

Australian Government Australian Radiation Protection and Nuclear Safety Agency



#### **Resolution of comments**

# Public consultation on the draft Standard for Limiting Exposure to Radiofrequency Fields – 100 KHz to 300 GHz (RPS S-1)

ARPANSA engaged in public consultation on the draft *Standard for Limiting Exposure to Radiofrequency Fields – 100 KHz to 300 GHz* (RPS S-1). The consultation period was originally from 31 August till 30 September 2020 but was extended till 21 October 2020. Submissions could be made securely online via a dedicated website hosted by the Australian Government Department of Health Citizen Space. Details on the consultation are available on <u>https://www.arpansa.gov.au/standard-limiting-exposure-radiofrequency-fields-100-khz-300-ghz-rps-s-1</u>.

The public consultation received 61 submissions of which 36 were from the public, 11 from industry and 14 from other organisations (academic and research/government/non-government). From the 61 submissions received there was a total of 451 individual comments. Seven submissions selected not to have their comments published and 18 submissions selected to have their comments published anonymously.

The tables below list the individual comments received for specific sections of the draft RPS S-1 as well as general comments. The tables also include ARPANSA's response to the comments and any changes to the draft RPS S-1. Line numbers refer to those specified in the consultation draft RPS S-1. Note that comments made by submitters on specific sections that were of a general nature are included in the General Comments table.

Below are hyperlinks to the different tables for quicker access:

Section 1. Introduction

Section 2. Basic restrictions and reference levels for exposure to RF fields between 100 kHz and 300 GHz

Section 3. Simultaneous exposure to multiple frequency fields

Section 4. Verification of compliance with the basic restrictions and reference levels

Section 5. Protection—occupational and general public exposure

**Schedules** 

**Appendices** 

<u>Glossary</u>

General comments

#### **Section 1. Introduction**

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
2	Anonymous	It would appear that "Standard" is missing from " publishes Fundamentals, Codes and Guides" given RPS S-1 is a Standard and Standards are listed below at 22. Therfore it is suggested that this should read: " publishes Fundamentals, Codes, Standards and Guides"		Changed "publishes Fundamentals, Codes and Guides in the Radiation Protection Series (RPS)" to "publishes Fundamentals, Codes, Standards and Guides in the Radiation Protection Series (RPS)"
43	Stop Smart Meters Australia Inc	t alia Stop Smart Meters Australia (SSMA) assumes that line 43, which is prior to this Section, will be amended such that the 'k' in kHz in the title of the Standard is in lowercase. This issue should also be corrected in the Standard's footer.		KHz' has been changed to 'kHz' throughout the document
78	Kordia New Zealand	ia New aland 78 – the word "indicative" does not seem appropriate. The Reference Levels were developed by ICNIRP and provide assurance that the Basic Restrictions will be met. "Indicative" suggests imprecision or vagueness to readers.		Changed "indicative" to "corresponding"
83	South Australia EPA	South Australia EPA Change "The Standard is based on" to "This Standard is based on"		Changed "The Standard is based on" to "This Standard is based on"
85	South Australia EPA	South Australia EPA Change this "frequency fields." to "frequency electromagnetic fields"		Changed "high frequency fields." to "RF electromagnetic fields"
90	South Australia EPA	th Australia EPA Would this be a repeat of the previous sentences?		No change
96	South Australia EPA	South Australia EPA Change "health, safety, and environment laws provide obligation" to "health, safety, and environmental laws provide obligation"		Changed "health, safety, and environment laws provide obligation" to "health, safety, and environmental laws provide obligation"
176	Steven Weller	Section: 1.1 Citation lines 176-177 Issue: 3kHz – 100kHz range has been dropped without suitable explanation. They are radiofrequencies used by marine radio. What standards apply for this frequency range if RPS S-1 is formally accepted? Previously the RF standard included this range and now it doesn't. Even if ICNIRP has guidelines for the lower frequencies, Australia has not formally adopted them. ARPANSA needs to take ownership.	Frequencies between 100 kHz to 300 GHz is a better representation of the radiofrequency range. Frequencies below 100 kHz are covered in the ICNIRP (2010) Low Frequency Guidelines	No change

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
191	South Australia EPA	Change "published the Report by the ARPANSA" to "published a Report by the ARPANSA"	Agreed	Changed "published the Report by the ARPANSA" to "published a report by the ARPANSA"
194	Line 194 requires additional explanatory information after the following sentence: "The report concluded that the science behind the ARPANSA RF Standard remains sound and that the exposure limits in the Standard continue to provide a high degree of protection against the known health effects of exposure to RF". In order to more accurately reflect current expert opinion, SSMA recommends that this sentence is added: "However, subsequent independent review of the scientific evidence that was available to ARPANSA and its expert panel for this report has demonstrated that it provided a poor representation of the state of the science within the specified time frame of 2000–2014" (Leach & Weller 2017, p. 12).		The sentence accurately reflects the conclusions of the ARPANSA (2014) review	No change
195	South Australia EPA Change "where the ARPANSA Standard could" to "where the ARPANSA 2002 Standard could"		Agreed	Changed "where the ARPANSA Standard could" to "where the ARPANSA 2002 Standard could"
197	Simon Cooke- Willis	<ul> <li>Frequency Range- Although the changes to RPS3 S-1 frequency range is noted [page 1 line 197-200] there is no further guidance to the reader what Australian Standard if any applies.</li> <li>Suggest:</li> <li>[a] Lines 197-200 could be deleted as it can be assumed the reader is clearly aware of frequency range covered by the document as it is clearly stated in the title of RPS3 S-1 and no reference to other frequencies is needed or</li> <li>[b] line 200 continues with "2010, respectively [ICNIRP,2009;2010) and these limits apply [or refer to another appropriate AS]</li> </ul>	The paragraph mentions the revision of the ICNIRP RF Guidelines but also refers to ICNIRP Guidelines for frequencies below 100 kHz. There is no Australian Standard for fields below 100 kHz	No change
197	South Australia EPA	South Australia Change "Given the progress in the science of the effects of RF fields ICNIRP" to "Given the scientific advances surrounding EPA the effects of RF fields since 1998, ICNIRP"		Changed "Given the progress in the science of the effects of RF fields ICNIRP" to "Given the scientific advances surrounding the effects of RF fields since 1998, ICNIRP"
201	South Australia EPA	Change "adopt international standards where they exist and can be applied to" to "adopt existing international standards that can be applied to"	The existing text describes the context better	No change
203	Janobai Smith	Line 203 concludes, following the claim that it is Australian government policy to implement international best practice and to adopt international standards where they exist and can be applied to the Australian regulatory environment, that the standard is based on the ICNIRP (2020) recommendations for RF fields. As ICNIRP's guidelines patently do not represent world best practice, SSMA recommends that the draft standard does not reference this document. SSMA considers it critical that Australia's Standard for RF provides a high degree of protection for all Australians against adverse health effects of RF exposure; this is currently not the case. A good starting point for informing such a standard would be the IGNIR International Guidelines on Non-Ionising Radiation (IGNIR 2018, p. 3–6), the Standard for Building Biology Testing Methods SBM-2015 (Institut für Baubiologie + Nachhaltigkeit, p. 1–2), the Austrian Medical Association guidelines (Austrian Medical	ARPANSA considers the ICNIRP (2020) RF guidelines to be international best practice	No change

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		Association 2012, p. 9) and the BioInitiative 2012 report recommendations for radiofrequency radiation exposure (BioInitiative Working Group 2012, pp. 1517–1526).		
205	South Australia EPA	Change "human exposure RF fields" to "human exposure to RF fields"	Agreed	Changed "human exposure RF fields" to "human exposure to RF fields"
206	South Australia EPA	Change "prevent adverse health effects" to "prevent adverse human health effects"	The preceeding text assumes adverse health effects to human health	No change
209	South Australia EPA	could this be interpreted to mean that RPS S-1 is also inclusive of the RF field source (i.e., equipment/device performance) as a means of controlling human exposure? Or would this likely tie into the additional technical standards incorporated within RPS S-1 (such as those of IEEE etc.)?	The parameters of RF sources in relation to power output which may in turn be related to exposure levels are covered by technical standards produced by organisations such as IEC and IEEE	No change
211	ORSAA	Lines 211-212: RPS S-1 has not made it clear up front that the intention is to increase exposure limits in certain frequency ranges. This information is buried and opaque.	The exposure limits set in the new RPS S-1 are similar to those in RPS3 with some refinements. The limits in the new RPS S-1 have been refined to account for increased knowledge on how temperature rises within the human body when exposed to high RF EME levels.	No change
216	South Australia EPA	Could you also include "Gender and racial background?"	Gender and racial background are not relevant parameters in relation to this Standard	No change
220	South Australia EPA	Would 'radiated' not be the same as 'produced' in this instance? Suggest removing.	Agreed	Removed "radiated"
224	Janobai Smith	Text in lines 224–226 stipulates that the Standard does not apply to patients exposed to RF fields during medical exposure, but does apply to persons operating the radiating equipment and others who are in the vicinity during the procedure. This information in relation to the other people who are in the vicinity during the procedure appears to be at odds with the	The Standard does not apply to Medical exposure, which includes	No change

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		explanation in the Glossary, which stipulates that medical exposure also applies to carers and comforters of patients (lines 1062–1063).	patients, carers and comforters of patients. It is widely accepted that medical exposure can exceed exposure limits because the benefit of treatment outweighs any possible harm The Standard does apply to people operating the radiating equipment and others in the vicinity (other than carers and comforters)	
224	South Australia EPA	For clarity, would RPS S-1 also be exclusive of non-medical/cosmetic procedures? may need to be clearly expressed if inapplicable.	Agreed	Added the following at the end of the paragraph in lines 224-226 "The Standard also applies to people exposed to RF fields during cosmetic treatments without control by a qualified medical practitioner."
232	South Australia EPA	According to the ICNIRP 2020 publication: "There is no evidence that additional precautionary measures will result in a benefit to the health of the population". If the latter wording is to be included in RPS S-1, perhaps further guidance on such 'specific additional precautions' may be ideal if they are a requirement, noting that RPS S-1 does not provide 'restrictions' for contact currents (as stated on pg. 11).	Guidance on contact currents is provided in Section 2.5	No change
259	Kordia New Zealand	Terms in the Foreword section are not highlighted as the first use of a term (e.g. reference level). It is also suggested that the terms are formatted appropriately throughout the document, rather than only on first use.	The Foreword is not considered as as the start of the Standard in terms of "Each of the terms in bold type on first use has the meaning given in the Glossary"	No change
259	Kordia New Zealand	There are several additional terms that have a specific technical meaning (e.g. Occupational, General Public) that should be added to the glossary.	Terms that are defined within the Standard (such as Occupational and General public which are defined on page 22) are not included in the Glossary	No change

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	Anonymous	3) In contrast to RPS 3, there is is no practical guidance as to how spatial averaging of incident field measurements should be performed when assessing compliance with the reference levels to determine whole body exposure. This contrasts with section 2.7 of RPS 3. It could be argued that spatial averaging is a measurement issue, but it is not addressed in AS2772.2:2016.	The Standard refers to the ICNIRP (2020) guidelines for further information on spatial averaging (available in Appendix A)	No change
	Simon Cooke- Willis	2: Averaging period Throughout the document reference is made to limits based on measurement averaging over a time period of 6 minute and 30 minute . While It is the intention that measurements and subsequent averaging occur during an unbroken 6 or 30 minute period it is not stated and could deliberately or otherwise be misunderstood for example as the aggregate of several shorter measurement periods added to make the 6 or 30 minute time. The dimension of 6 or 30 minute is a critical aspect to determine compliance; it should be more clearly stated and /or defined in Glossary. Suggest : The averaging period is defined as the average of [highest number practicable] sample measurements over an unbroken 6 or 30 minute period of time.	Clarification has been made in the text regarding averaging times	In Section 2.4 changed "is compliant with the guidelines. These averaging times are not necessarily" to "is compliant with the Standard. These averaging and integrating times are continuous periods. They are not necessarily"
283	Kordia New Zealand	283 – the terms occupational and general public are in single quotes and this formatting is inconsistent with other use.	Agreed	Quotation marks made consistent throughout the document
283	Kordia New Zealand	283 to 291 - this introductory section should highlight that the Occupational category requires screening for health issues, adult age, pregnancy, and the presence of implanted passive metallic objects or medical electronic devices. The General Public category should highlight that they can be of any age or health status. These points should be briefly introduced here where the terms Occupational and General Public are first mentioned, ahead of their use in the following sections, rather than only being explained afterwards in section 5.	Section 2.1 provides a brief description on the definition and requirements for General Public and Occupational Exposure and points to Section 5 for a detailed description	No change
289	South Australia EPA	Add comma "continually exposed and" to "continually exposed, and"	Agreed	Changed "continually exposed and" to "continually exposed, and"
304	GSMA	In section 2.2 it is stated that: 'Provided that all basic restrictions are met and adverse effects can be excluded,	Agreed	Replaced "Provided that all basic restrictions are met and adverse effects

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		the reference levels may be exceeded.' This appears to be based on the approach in the ICNIRP (1998) guidelines, however, in ICNIRP (2020) it is stated in the section 'Guidelines for limiting radiofrequency EMF exposure' that: 'To be compliant with the present guidelines, for each exposure quantity (e.g., E- field, H-field, SAR), and temporal and spatial averaging condition, either the basic restriction or corresponding reference level must be adhered to; compliance with both is not required.' Therefore, we propose to amend the sentence to say: 'To be compliant with the present standard, for each exposure quantity (e.g., E- field, H-field, SAR), and temporal and spatial averaging condition, either the basic restriction or corresponding reference level must be adhered to; compliance with both is not required.'		can be excluded, the reference levels may be exceeded. The reference levels have been conservatively formulated such that compliance with the reference levels given in this Standard will in most circumstances ensure compliance with the basic restrictions." with "'To be compliant with the present standard, for each exposure quantity (e.g., E-field, H- field, SAR), and temporal and spatial averaging condition, either the basic restriction or corresponding reference level must be adhered to; compliance with both is not required.'"
304	BAI Communications (Formerly Broadcast Australia)	Lines 304 to 305 "Provided that all basic restrictions are met and adverse effects can be excluded, the reference levels may be exceeded." Clarification on what is meant by "adverse effects can be excluded, reference levels may be exceeded". How are adverse health effects excluded.? Reference levels can be exceeded by how much.?	The sentence has been reworded	The sentence has been reworded to "To be compliant with the present standard, for each exposure quantity (e.g., E-field, H-field, SAR), and temporal and spatial averaging condition, either the basic restriction or corresponding reference level must be adhered to; compliance with both is not required."
305	South Australia EPA	No proposed change, however, does this mean an 'either or situation'? i.e., compliance can be achieved if either the relevant reference levels or basic restrictions are met in special circumstances? Or would additional calculations be needed to assess compliance if one is adapted with consideration of the other?	The sentence has been reworded	The sentence has been reworded to "To be compliant with the present standard, for each exposure quantity (e.g., E-field, H-field, SAR), and temporal and spatial averaging condition, either the basic restriction or corresponding reference level must be adhered to; compliance with both is not required."
305	BAI Communications (Formerly	Lines 305 to 307 "The reference levels have been conservatively formulated such that compliance with the reference levels given in this Standard will in most circumstances ensure compliance with the basic restrictions."	The sentence has been reworded	The sentence has been reworded to "To be compliant with the present standard, for each exposure quantity (e.g., E-field, H-field, SAR), and temporal and spatial

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	Broadcast Australia)	Clarification on what is meant by "most circumstances". What circumstances do not ensure compliance.?		averaging condition, either the basic restriction or corresponding reference level must be adhered to; compliance with both is not required."
307	Department of Defence	8. It is unclear where the line would be drawn between whole body and local exposure but would assume the Local Exposure Limit would apply for people partially exposed to incident RF field levels from transmitters (head and shoulders outside a hatch on a vehicle, for example).	Text has been added to clarify 'whole body' and 'local' exposure	Added a new paragraph at the end of Section 2.2 after line 307 "The basic restrictions and reference levels are specified for average exposure over the whole body (whole body average exposure), and also for exposure over localised areas of the body (local exposure). Tables 1 to 7 specify whether the basic restrictions and reference levels applying to local exposure incorporate any spatial averaging and, if so, the volume or area over which the exposure is averaged, or whether they apply to the spatial peak (maximum) exposure."
308	Department of Defence	Section 2.3 Basic Restrictions – some confusion over the use of 6 min and 30 min time windows. A short explanation would help.	RPS S-1 refers to the ICNIRP guidelines for the derivation of the limits including the rationale for time averaging. The notes of Table 1 mention that 30 min is used for whole body exposure limits whereas 6 min is used for local exposure limits	No change
309	ORSAA	<ul> <li>When ICNIRP guidelines are referred to, the text needs to indicate which sections are relevant. If tables or figures from the ICNIRP guidelines have been adapted, RPS S-1 needs to give a clear explanation for the adjustments. A few words in a footnote is not adequate</li> <li>e.g. lines 308-409 The basic restrictions are specified in Tables 1-2. A description of their derivation is provided in the ICNIRP guidelines (2020).</li> </ul>	The standard is designed to provide guidance in the simplest form possible to avoid confusion. Referencing supporting documentation is appropriate for the purposes of brevity. ARPANSA has published a supporting document titled "Changes in the new ARPANSA Radiofrequency Standard" which also	No change

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			outlines the differences between RPS S-1 and the ICNIRP (2020) guidelines	
314	BAI Communications (Formerly Broadcast Australia)	Lines 314 to 315 "between 100 kHz and 300 GHz, basic restrictions on whole body average SAR are provided to prevent whole-body heat stress (see Table 1)" This statement contradicts bullet point "(a)" at line numbers 312 to 313. The basic restrictions for frequencies between 100kHz and 10MHz are based solely on electrostimulation and not whole body heating.	For frequencies between 100 kHz and 10 MHz there are limits to prevent both electrostimulation and whole-body heat stress thus the overlap	No change
316	BAI Communications (Formerly Broadcast Australia)	Lines 316 to 317 "between 100 kHz and 6 GHz, basic restrictions on local SAR (head/torso and limbs) are provided to prevent excessive localised temperature rise in tissue (see Table 1)" This statement contradicts bullet point "(a)" at line numbers 312 to 313. The basic restrictions for frequencies between 100kHz and 10MHz are based solely on electrostimulation and not localised temperature rise in tissue.	For frequencies between 100 kHz and 10 MHz there are limits to prevent both electrostimulation and excessive local heating thus the overlap	No change
318	South Australia EPA	Was this a mistake? "restrictions on local SA are" change to "restrictions on local SAR are"	Between 400 MHz and 6 GHz, basic restrictions are on local Specific Energy Absorption (SA) not Specific Energy Absorption Rate (SAR	No change
320	Department of Defence	The use of "excessive heating of the tissue" versus "rapid temperature elevation". Are these terms used interchangeably regarding the same response in the body?	No. "Excessive heating of tissue" refers to heating that can cause pain or tissue damage. "Rapid temperature elevation" refers to very quick temperature rise (less than 6 min) that can create hot- spots. RPS S-1 refers to the rationale of the ICNIRP (2020) guidelines which explain these concepts in detail.	No change
324	BAI Communications (Formerly Broadcast Australia)	Table 1 Frequency Range Table 1 frequencies should be amended to cater for the frequencies for electrostimulation. i.e. references to 100kHz in the table should be amended to 10MHz.	The basic restrictions to prevent electrostimulation between 100 kHz and 10 MHz are provided in Table 3	No change

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325	South Australia EPA	"intervals ≥6 minutes" add a space " "intervals ≥ 6 minutes"	Agreed	Changed "intervals ≥6 minutes" to " "intervals ≥ 6 minutes"
335	BAI Communications (Formerly Broadcast Australia)	Table 2 Frequency Range Table 2 frequencies should be amended to cater for the frequencies for electrostimulation. i.e. references to 100kHz in the table should be amended to 10MHz.	Table 2 provides basic restrictions for rapid temperature elevation and not electrostimulation. Basic restrictions for electrostimulation are provided in Table 3	No change
340	Kordia New Zealand	340 to 341 - refer to comments about line 457 to 459 with regard to further explanation of the parameter "t" and provision of a worked example.	Note 2 has been revised	Note 2 has been revised to "t is the exposure time in seconds,"
363	Kordia Solutions	Section 2.4 Local Exposures Reference Levels. What defines a "local exposure"? I could not find a definition within the standard. Is "local exposure" just to limbs? Does it include local exposure to the torso? What percentage of exposure to the torso would be classed as Local? A clearer definition of local exposure would be required especially for frequency ranges 10MHz-2GHz. Specifically what differentiates whole body exposure to local exposure.	Agreed that definitions are required for 'local' and 'whole-body' exposure	Added a new paragraph at the end of Section 2.2 "The basic restrictions and reference levels are specified for average exposure over the whole body (whole body average exposure), and also for exposure over localised areas of the body (local exposure). Tables 1 to 7 specify whether the basic restrictions and reference levels applying to local exposure incorporate any spatial averaging and, if so, the volume or area over which the exposure is averaged, or whether they apply to the spatial peak (maximum) exposure."
364	South Australia EPA	Did you mean computational modelling and experimental measurements?	Yes	Changed "computation and measurement studies" to "computational modelling and experimental measurement"
378	Department of Defence	7. Limb current – the standard says these measurements are "only relevant in exposure scenarios where a person is not electrically isolated". Some clarification on this definition would be useful.	Agreed	Sentence amended to "Limb current reference levels are only relevant in exposure scenarios where a person is not electrically isolated from a ground plane"

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392	Telstra Corporation	Section 2.4 Reference levels - Table 4 alignment with International Best Practice. Telstra recommends to align the definition of near reactive near field/radiating near field boundary in Table 4 with the definition in the ICNIRP 2020 Guidelines of $\lambda/(2\pi)$ . Our view is that this is critical to maintain international best practice and harmonization.	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. The Standard points to guidance from appropriate exposure assessment standards	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
392	Andrew Wood	Reactive Near-field distance As has been pointed out by others, there is a difference between this distance, which is specified in Table 4 as I/4, but the more usual expression (and the one given on p 511 of ICNIRP) is I/2p. Actually, elsewhere it is given as 0.62v(D3/I), which for a half-wave dipole is 0.22 I (which is closer to I/4 than I/2p). I suspect the I/4 comes from AS/NZS 2772.2:2016 and IEC 62232:2018, which I don't have access to, but it is important to resolve which is the most reliable, since there appear to be unintended consequences for stakeholders.	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. The Standard points to guidance from appropriate exposure assessment standards	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
392	Dr Kenneth Joyner	In Table 4 of Section 2.4, ARPANSA suggests an approximate value for the defined distance to the near reactive boundary of an antenna. We note that the value of $\lambda/4$ provided is not consistent with that suggested by ICNIRP in Appendix A of their most recent guidelines. The ICNIRP Guidelines state: Taking into account such sources of uncertainty, the guidelines have more conservative rules for exposure in the reactive and radiative near-field than far-field zone. This makes it difficult to specify whether, for the purpose of compliance, an exposure should be considered reactive near-field, radiative near-field or far-field without consideration of a range of factors that cannot be easily specified in advance. As a rough guide, distances >2D2/ $\lambda$ (m), between $\lambda/(2\pi)$ and 2D2/ $\lambda$ (m), and $< \lambda/(2\pi)$ (m) from an antenna correspond approximately to the far-field, radiative near-field and reactive near-field, respectively, where D and $\lambda$ refer to the longest dimension of the antenna and wavelength, respectively, in meters. However, it is anticipated that input from technical standards bodies should be utilized to better determine which of the far-field/near-field zone reference level rules should be applied so as to provide appropriate concordance between reference levels and basic restrictions (emphasis added). A note to the ARPANSA Table 4 also states:	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. The Standard points to guidance from appropriate exposure assessment standards	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."

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		Users should consult appropriate exposure assessment standards, such as AS/NZS 2772.2:2016 and IEC 62232:2018 for further details and definition of the boundaries for specific circumstances.		
		However, while neither the ARPANSA nor the ICNIRP values for this distance are prescriptive, industry is concerned that regulators may nonetheless be inclined to adopt the ARPANSA $\lambda/4$ value explicitly for ease of reference.		
		Industry has significant concerns with the proposed use of $\lambda/4$ in the ARPANSA draft and its potential adoption by the ACMA and other regulators for the following reasons:		
		i. This would potentially negate the input from technical standards bodies which are better suited to determine which of the far-field/near-field zone reference level rules should be applied so as to provide appropriate concordance between reference levels and basic restrictions, as per the ICNIRP Guidelines.		
		ii. This will trigger the measurement of basic restrictions at greater separation distances from devices than ICNIRP Guidelines upon which the draft is based. The ARPANSA draft acknowledges that 'mandatory basic restrictions are specified as quantities that are often impractical to measure'. To retain the $\lambda/4$ restriction will present an onerous impracticable situation for industry as the IEC is yet to start work on an international standard for transmitted power density.		
		iii. ARPANSA on several occasions has stated that ICNIRP Guidelines represent best practice and there was no justification for extra levels of conservatism that the $\lambda/4$ distance imposes. Indeed, the ARPANSA draft states: The Standard is based on the 2020 guidelines of the International Commission for		
		Non-Ionizing Radiation Protection (ICNIRP) for high frequency fields. ICNIRP is the peak international body developing and disseminating science-based advice on health protection in relation to exposure to non-ionising radiation and is recognised by the World Health Organization for its independence and expertise in this area.		
		level of protection for all people against substantiated adverse health effects from exposures to both short- and long-term, continuous and discontinuous RF fields iv. ARPANSA has not offered any scientific justification for the use of $\lambda/4$ whereas ICNIRP has spent the better part of a decade reviewing the scientific literature and		
		agreed that $\lambda/2\pi$ is the appropriate, but not binding, metric.		

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		Consequently, industry recommends to ARPANSA that the more widely accepted value of $\lambda/(2\pi)$ as suggested by ICNIRP should be adopted in Table 4, both for consistency with ICNIRP and to avoid any potential confusion for regulators and other users of the ARPANSA standard.		
392	GSMA	We note the guidance on the reactive near field/radiating near field distance as λ/4 from the antenna in Section 2.4. As there is no technical rationale provided to diverge from the guidance in ICNIRP (2020) we recommend that ARPANSA adopt the guidance on definitions provided in ICNIRP (2020).	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. The Standard points to guidance from appropriate exposure assessment standards	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
392	BAI Communications (Formerly Broadcast Australia)	Table 4 "Table 4 "Table 4 "Table 4 "Table 4 "Table 4 reactive near field/radiating near field Distance from antenna formula " $\lambda/4$ "." This is incorrect, formula should be: $\lambda/2\pi$ .	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. The Standard points to guidance from appropriate exposure assessment standards	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
392	Kordia New Zealand	392 – The heading in Table 4 is missing the distance unit (metres)	Table 4 has been removed	Removed Table 4
392	Kordia New Zealand	392 - whilst the boundary of the reactive field is cannot be precisely defined, and there are various rules of thumb, $\lambda/4$ (table 4) is not a commonly used formula. The more commonly used formula is $\lambda/2\pi$ and since that is what the ICNIRP 2020 Guidelines use (see p.31), it is suggested that this is used here.	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. The Standard points to guidance from appropriate exposure assessment standards	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
392	Australian Mobile Telecommunicati ons Association	Section 2.4 - Reference Levels: Line 392, Table 4: The value provided for distance to the near reactive field boundary is not consistent with ICNIRP and widely accepted practice in other standards. For the purposes of	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. The Standard points to	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further

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		harmonisation and international best practice, suggest align with ICNIRP(2020) and change reactive near field/radiating near field distance to lambda/2.	guidance from appropriate exposure assessment standards	details and definition of the boundaries for specific circumstances."
392	Department of Defence	10. Why does Table 4 only include partial information regarding field regions (specifically single/multi element arrays) but nothing on aperture antennas? Except for a follow-up line of "Users should consult appropriate exposure assessment standards, such as AS/NZS 2772.2:2016 and IEC 62232:2018 for further details and definition of the boundaries for specific circumstances." Why not include all the relevant information so as to reduce mistakes?	The guide on distances of the far field, radiating near field and reactive near field from the antenna has been removed. Guidance on these is the premise of appropriate exposure assessment standards	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
396	Kordia Solutions	lines 396, 397 and throughout RPS-S1 Standard. When referencing other standards, should not specify the dated version as these will become dated quickly.		Dated versions of some of the referenced standards have been removed
396	Australian Mobile Telecommunicati ons Association	Lines 396-397 To reduce the potential for document references to become outdated, remove the year of the referenced standard and simply refer to the current edition. Change text to read: "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."	Agreed	Lines 396-397 have been revised to "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
401	BAI Communications (Formerly Broadcast Australia)	Table 5 Frequency Range Clarification on why the frequency break points for reference levels are different for Occupational exposure to General Public exposure at frequencies <30MHz. i.e. Occupational – 0.1-6.943MHz & 6.943-30MHz General Public – 0.1-6.27MHz & 6.27-30MHz	Below these frequency break points the Reference Levels for Incident E-field Strength would be greater than the peak instantaneous field strengths (which are different for occupational and general public exposure) based on electrostimulation effects shown in (now) Table 7. This is mentioned in Note 2.	No change
401	Department of Defence	5. Table 5. – Why are the frequency ranges different for occupational (0.1-6.943 MHz) compared to general public (0.1-6.27 MHz)?	Below these frequency break points (6.943 MHz for occupational and 6.27 MHz for the general public) the Reference Levels for Incident E-field Strength would be greater than the peak instantaneous field strengths (which are	No change

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			different for occupational and general public exposure) based on electrostimulation effects shown in (now) Table 7. This is mentioned in Note 2.	
410	Kordia New Zealand	410 and 437 – these notes refer the reader to ICNIRP 2020a. However, the relevant information should be included in this Standard so that it is self-contained document, rather than referring another document. It is recommended that the following text from Appendix A of ICNIRP 2020 is integrated into the Standard: Figure 1 (S:\Rad_Health\NIR\EMR\RF Standard\Consultation\Figures from Adam Tommy.docx)	The Standard appropriately references other documents for further information, including the ICNIRP 2020 guidelines in this instance	No change
428	BAI Communications (Formerly Broadcast Australia)	Table 6 Frequency Range Clarification on why the frequency break points for reference levels are different for Occupational exposure to General Public exposure for frequencies <10MHz. i.e. Occupational – 0.1-0.135MHz & 0.135-10MHz General Public – 0.1233MHz & 0.233-10MHz	Below these frequency break points the Reference Levels for Incident E-field Strength would be greater than the peak instantaneous field strengths (which are different for occupational and general public exposure) based on electrostimulation effects shown in (now) Table 7. This is mentioned in Note 2.	No change
428	Andrew Wood	Table 6 E-fields Specifies Occupational maximum local E-field of 300 V/m at 10 MHz (1504/f0.7), but this is not represented in Fig 2 (which appears to cut out abruptly at around 13 MHz and at around 170 V/m). Schedule 2 gives minimum frequency as 20 MHz, with E-field value of 184.73 V/m. For General Public there is a similar disparity, with 133 V/m at 10 MHz, but Fig 3 cuts out at 83 V/m, at 20 MHz and Schedule 3 has 20 MHz also (82.41 V/m).	Figures 2 and 3 have been revised. The Look-up tables in Schedules 2 and 3 are only a guide and provide values for certain rounded frequencies	Figures 2 and 3 have been revised. No change to Schedules 2 and 3
428	Andrew Wood	Table 6 H-fields Specifies Occupational maximum local H-field of 80 A/m at 0.135 MHz, but Schedule 2 suggests that there are no reference levels below 0.2 MHz, with Fig 2 likewise. For General Public there is a similar disparity, with Table 6 specifying down to 0.233	Figures 2 and 3 have been revised. The Look-up tables in Schedules 2 and 3 are only a guide and provide values for certain rounded frequencies	Figures 2 and 3 have been revised. No change to Schedules 2 and 3

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		MHz, with H-field of 21 A/m but Schedule 3 cuts out at 0.3 MHz and Fig 3 likewise (with a field of 16.33 A/m)		
428	Andrew Wood	Maybe a solution to the inconsistent ranges mentioned above is to introduce extra lines into Tables 5 & 6 to extend the 'ES' values into the parts of the sloping portions where the values are above the figures in red (once the RMS/peak issue has been resolved).	The reference levels for spatial peak and temporal peak field strength, to RF electromagnetic fields from 100 kHz to 10 MHz are provided in (now) Table 7	No change
428	Department of Defence	6. Table 6. – Why are the frequency ranges different for occupational (0.1-0.135 MHz) compared to general public (0.1-0.233 MHz)?	Below these frequency break points (0.135 MHz for occupational and 0.233 MHz for the general public) the Reference Levels for Incident E-field Strength would be greater than the peak instantaneous field strengths (which are different for occupational and general public exposure) based on electrostimulation effects shown in (now) Table 7. This is mentioned in Note 2.	No change
452	Anonymous	<ul> <li>2) A category of time integrated, i.e. energy density, has also been introduced for local exposure (Table 7). It is not clear why this should only apply to local exposure, as it is easy to think of scenarios such as exposure to a radar beam, where the whole body is exposed.</li> <li>The limits for time dependent exposure are going to be very difficult apply in practice, since they are based on an exposure time, which in most situations could only be determined after an exposure event. For example, if a person is exposed to a scanning radar beam, there will be a specific time in any given scan that they are exposed, but the number of scans to which they are exposed is indeterminate.</li> <li>Perhaps in an occupational case the exposure time could be defined for a particular task, but in general, it is difficult to see how these limits could be applied to set up controls to prevent overexposure. This is particularly true of the general public case, where a person is, by definition, unaware of the RF field.</li> </ul>	Limits on whole body exposure are applied to prevent a core-body temperature rise above 1°C and averaged over to take into account the time it takes to reach a steady-state temperature. Limits on rapid temperature rise (now Table 6) are applied for local exposure only to prevent 'hot-spots' Hot spots can occur for short duration exposures because there is not sufficient time for heat to dissipate (or average out) over tissue. This is further explained in the rationale provided by the ICNIRP (2020) guidelines. The application of time- dependent limits comes down to planning the job beforehand, based on knowledge of what the scan	No change

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			characteristics are. This should determine the exposure time per scan, the interval between exposures and the expected exposure, from which the time spent in the beam can be calculated. (the exposure can be measured without someone having to be in the beam: the other parameters should be available from the radar operator)	
457	Kordia New Zealand	<ul> <li>457 to 459 – ICNIRPs description of the parameter "t" is not clear in this Note 2, and in the accompanying text. We suggest that this note is either rewritten or clarified, suggested as follows:</li> <li>"t" is the evaluation window (or integration period) over which the Reference Level (or Basic</li> <li>Restriction) value and the corresponding exposure level are calculated. "t" is not the length of a pulse</li> <li>or train of pulses. All windows from 1 to 360 seconds must be evaluated because, whilst the level in</li> <li>many windows may be compliant, in some specific windows it may not. The full range of windows</li> <li>may not need to be evaluated if a clear trend in the exposure assessment becomes apparent.</li> <li>Some worked examples would do much to clarify how to apply this Reference Level from Table 7 (or Basic Restriction from Table 2), perhaps in a new "Informative" section.</li> </ul>	Note 2 has been revised to "t is the exposure time interval in seconds,". Worked examples can be informative and will be considered as part of information material that is supplementary but is published seperately to the Standard	Note 2 has been revised to "t is the exposure time in seconds,"
457	Kordia New Zealand	457 – is time t limited to a minimum of one second or can it be less than one second? A value of t less than one second will allow very high bursts of short duration energy – is this the intention?	The time t is not limited to 1 second, t is for any time up to 360 seconds i.e. the Standard protects against shorter bursts (e.g. 100 microseconds)	No change
466	Australian Mobile Telecommunicati ons Association	Footnote 6 to Table 7 Missing "b)": Change:" substituted for Uinc; within the reactive near-field zone," to: " substituted for Uinc; b) within the reactive near-field zone,"	Agreed	In Note 6 " substituted for Uinc; within the reactive near-field zone," has been changed to " substituted for Uinc; b) within the reactive near-field zone,"

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466	Department of Defence	3. Table 7, note 6: missing "b)"	Agreed	In Note 6 " substituted for Uinc; within the reactive near-field zone," has been changed to " substituted for Uinc; b) within the reactive near-field zone,"
473	BAI Communications (Formerly Broadcast Australia)	Table 8 Lines 473 to 474 "Table 8. Reference levels for local exposure, peak instantaneous field strength, to RF electromagnetic fields from 100 kHz to 10 MHz, (unperturbed rms values)" Clarification for "Reference levels for local exposure" at line number 473. Note 1. for Table 8 indicates whole body exposure, whereas the Table refers to local exposure.	The title of (now) Table 7 has been revised. Note 1 has been revised	Changed title of (now) Table 7 to "Table 7. Reference levels for spatial peak and temporal peak field strength, to RF electromagnetic fields from 100 kHz to 10 MHz (unperturbed RMS values)." Changed Note 1 to "Note 1: Regardless of the far-field/near-field zone distinction, compliance is demonstrated if neither the temporal and spatial peak Einc or Hinc, over the space occupied by the body, exceeds the above reference level values."
473	BAI Communications (Formerly Broadcast Australia)	Table 8 Incident Field Strengths Clarification for inclusion of "Table 8". The inclusion of Table 8 seems to be superfluous, Tables 5, 6 and Schedules 2, 3 Look Up tables would suffice if fully populated. Table 8 adds a layer of complication and questions regarding the frequency discrepancies when compared against the listed reference limits and is not adding value to this Standard.	Tables 5 and 6 (now Tables 4 and 5) are for time averaged exposures relevant to thermal effects, while Table 8 (now Table 7) is for temporal peak values relevant for electrostimulation.	No change
473	Andrew Wood	Table 8 The values in red are also the limits for the range 0.1 – 10 MHz given in Table 8, and this appears to be consistent with the present ICNIRP 2010 standard, which has same values over a slightly larger frequency range (down to 3 kHz) and is based on 'unperturbed rms values'. However, the heading of Table 8 refers to 'peak instantaneous' Since 'peak instantaneous' values can be v2 higher than RMS values, a 30 min sinewave at 80 A/m has a (temporal) peak instantaneous values of 113 A/m, which would mean that it would comply with Table 6, but not Table 8. The heading to Table 8 is somewhat misleading in that it refers to 'peak instantaneous' but then 'unperturbed RMS values' in the same sentence, implying that temporal	The title of (now) Table 7 has been revised.	Changed title of (now) Table 7 to "Table 7. Reference levels for spatial peak and temporal peak field strength, to RF electromagnetic fields from 100 kHz to 10 MHz (unperturbed RMS values)."

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		values are to be considered. In Table 8 in ICNIRP 2020 'peak values' clearly refers to spatial rather than temporal (see note below table in ICNIRP 2020). If peak spatial values are meant, then this should be stated and reference to 'instantaneous' removed.		
476	Kordia New Zealand	476 – it may be worth clarifying in the notes that neither temporal nor spatial averaging is applicable in Table 8.	The title of (now) Table 7 has been revised which makes it clear that the values are related to spatial and temporal peak so averaging is not applicable	<ul> <li>Changed title of (now) Table 7 to "Table</li> <li>7. Reference levels for spatial peak and temporal peak field strength, to RF electromagnetic fields from 100 kHz to 10 MHz (unperturbed RMS values)."</li> </ul>
485	Kordia New Zealand	485 – as per 410	The Standard appropriately references other documents for further information, including the ICNIRP 2020 guidelines in this instance	No change
492	Simon Cooke- Willis	3] Section 2.5 line 493 Exposure to contact currents is indirect However exposure to contact currents may be direct or indirect Suggest; Exposure due to contact currents may be indirect ,	Exposure to contact currents is indirect because it requires an intermediate conducting object to transduce the field	No change
500	South Australia EPA	Change "nature of hazard due" to "nature of the hazard due"	Agreed	Changed "nature of hazard due" to "nature of the hazard due"
502	South Australia EPA	Would the probability of risk associated with contact currents above 110 MHz be reduced at higher frequencies at all? If not, would there be an upper frequency beyond which contact currents would not need to be set?	Contact currents occur approximately within the 100 kHz to 110 MHz range	No change
502	South Australia EPA	"This may also be useful for assisting the responsible person (see section 5.1.3) in conducting a risk-benefit analysis associated with allowing a person into a RF environment that may result in contact currents. "Suggest moving this sentence after the introduction of points (a) – (c) for better flow/readability.	Agreed	The sentence "This may also be useful for assisting the responsible person (see section 5.1.3) in conducting a risk- benefit analysis associated with allowing a person into a RF environment that may result in contact currents." has been moved after points (a) - (c)
505	South Australia EPA	"(a) Available data suggest that" Would these be for contact currents up to 110 MHz? Are there any references to be added here?	Added ICNIRP (2020) Guidelines as a reference	Added "(see ICNIRP, 2020)

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507	Australian Mobile Telecommunicati ons Association	Section 2.5 - Contact Currents: Line 507, (b) Recommend adding "such as the proximity to the original source and the angular alignment to the original source"	Agreed	Changed "and is affected by conducting-object configuration" to "and is affected by conducting-object configuration such as the proximity to the original source and the angular alignment to the original source"
511	Australian Mobile Telecommunicati ons Association	Line 511-515, (i)-(iii) Recommend adding a further consideration (between ii and iii): "Reducing or removing the RF power at the original source can eliminate the risk" Recommend changing "metallic" to "conductive" Recommend adding "or PPE" after "insulating materials"	Agreed	Lines 509 - 515 have been changed to (i) large conducting objects should be connected to ground (grounding) (ii) workers should make contact via insulating materials or PPE (e.g. RF protective gloves) (iii) Reducing or removing the RF power at the original source can eliminate the risk (iv) workers should be made aware of the risks, including the possibility of 'surprise', which may impact on safety in ways other than the direct impact of the current on tissue (for example, by causing accidents when working at heights).
511	South Australia EPA	<ul> <li>(i) large metallic objects should be connected to ground (grounding) Remove a space after ground "(i) large metallic objects should be connected to ground (grounding)"</li> </ul>	Agreed	Changed "connected to ground (grounding)" to "connected to ground (grounding)"

Section 3	<mark>. Sim</mark> u	Itaneous	exposure	to m	ultiple	frequency	fields
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539	Stop Smart Meters Australia Inc	Word Version Draft Lines 539 to 662 "Simultaneous exposure to multiple frequency fields." Clarification on "Simultaneous exposure to multiple frequency fields". Is the intent to isolate each frequency for assessment and add them.? i.e. If a site transmits 4 services at FM frequencies, is the intent of this standard to isolate and assess each one individually and then add the components together for final assessment against the reference limits.? Similar for multiple services at MF or VHF or UHF frequencies. This will create adverse and onerous service disruptions if services have to be switched off to assess by measurement each and every frequency emission in isolation.	There has not been any real change from RPS3 in the requirements for simultaneous exposure to multiple frequency fields and RPS-S1 is consistent with the ICNIRP (2020) guidelines on this issue. The intent is for each service (frequency) to be measured separately and the total found by summing the ratios against the limits. There is no need to switch off services to do this if using a spectrum analyser.	No change
548	Kordia New Zealand	548 to 550 – this is not correct for the radiating (near and far) fields since it is only necessary to evaluate one quantity, rather than evaluating all quantities to determine the largest. While it is appropriate for reactive fields, this sentence should be removed regardless, since the notes in the reference level tables accurately describe what evaluation is required for each of the field zones.	It is agreed that in the radiating field (where S = E × H) it is only necessary to measure one quantity in order to know all three. However, the reference levels below 30 MHz do not conform with this relationship, so the largest ratio is used and hence the need for Note 5 to Tables 5 and 6 and Note 1 to Table 8. Text has been added to clarify this.	Changed "should be evaluated to demonstrate compliance. Reference levels are" to "should be evaluated for each source and used to demonstrate compliance. In the radiating far-field at frequencies above 30 MHz, the E <sup>2</sup> , H <sup>2</sup> and S exposure ratios are essentially identical and only one ratio need be determined. Reference levels are"
583	Kordia New Zealand	583 – this term should be changed from MAX to OR, since radiating (near and far) fields only require that one of these three parameters is evaluated. A note can be added to the paragraph, similar to that in line 591, e.g. "Note that in the reactive field zone the second	It is better to leave the equations with MAX and add a note that since the three	Changed "respectively. Note that the third term is not appropriate for the reactive near-field zone, and so cannot

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		term must be evaluated as MAX, not OR." An alternative option – to leave the formula as MAX but add a note allowing the use of "OR" for radiating fields – is not recommended, since the predominant use of this Standard is for radiating fields rather than reactive fields.	exposure ratios will be identical in the far-field, for frequencies above 30 MHz (where the reference levels also follow the S = E × H relationship), the second term only requires one of the ratios to be evaluated.	be used in Eqn. 3. The equivalent terms for basic restrictions must be used instead." to "respectively. Note that in the radiating far-field the three exposure ratios in the second term of Eqn. 3 are essentially identical and therefore only one ratio need be determined at each frequency. Note that the third term of Eqn. 3 is not appropriate and cannot be used for the reactive near-field zone. In this circumstance, the equivalent terms from Eqn. 1 for basic restrictions must be used instead."
598	Kordia New Zealand	598 – as per 583. This should be OR, not MAX, with an accompanying note.	It is better to leave the equations with MAX and add a note that since the three exposure ratios will be identical in the far-field, for frequencies above 30 MHz (where the reference levels also follow the S = E × H relationship), the second term only requires one of the ratios to be evaluated.	Added the following to the end of the sentence in line 607 "Note that in the radiating far-field the three exposure ratios in the second term of Eqn. 4 are essentially identical and therefore only one ratio need be determined at each frequency. Note that the third term of Eqn. 4 is not appropriate and cannot be used for the reactive near-field zone. In this circumstance, the equivalent terms from Eqn. 1 for basic restrictions must be used instead."
599	Kordia New Zealand	599 to 601 – these terms are not appropriate for the reactive field zone, so a note at line 607 should be added as per the note at 591 to 592, but referring to terms 3, 4, and 5.	Agreed	Changed "every position in the human body." to "every position in the human body. Note that within the reactive near-field zone for frequencies above 2 GHz, reference levels cannot be used to determine compliance, and so basic restrictions must be assessed (refer to Eqn 2)."
618	Kordia New Zealand	618 to 620 – see our comments for lines 639 to 640 regarding the evaluation window t.	Note 2 on Table 2 states: " restrictions must be satisfied	No change

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			for all values of t between >0 and <360 seconds, regardless of the temporal characteristics of the exposure itself.". This does not mean that the exposure ratio terms in Eqn. 6 need to be reformulated. Eqn. 6 tells you how to evaluate the exposure for a particular time, t. Table 2 sets out the basic restriction requirement to be observed for any time 0 < t < 360 seconds.	
622	Andrew Wood	Typographical error on p 15 Replace 'power' with 'energy' in the following lines: 622 restriction given in Table 2, over time t, respectively; Uab,4cm,i(t) and Uab,4cm,BR(t) are the 4-cm2 absorbed *energy* 623 density level at frequency i and the 4-cm2 absorbed *energy* density basic restriction given in Table 2, over 624 time t, respectively; Uab,1cm,i(t) and Uab,1cm,BR(t) are the 1-cm2 absorbed *energy* density level at frequency i and 625 the 1-cm2 absorbed *energy* density basic restriction given in Table 2, over time t, respectively; inside the body	Agreed	Replaced "power" with "energy" in the referred lines
638	Kordia New Zealand	638 – as per 583. This should be OR, not MAX, with an accompanying note. 639 to 640 – these terms are not appropriate for the reactive field zone, so a note at line 650 should be added as per the note at 591 to 592, but referring to terms 3, 4, and 5.	It is better to leave the equations with MAX and add a note that since the three exposure ratios will be identical in the far-field, for frequencies above 30 MHz (where the reference levels also follow the S = E × H relationship), the second term only requires one of the ratios to be evaluated.	Added the following at the end of line 650 "Note that in the radiating far-field the three exposure ratios in the second term of Eqn. 7 are essentially identical and therefore only one ratio need be determined at each frequency. Note that within the reactive near-field zone for frequencies above 400 MHz, reference levels cannot be used to determine compliance. In this circumstance, the

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				equivalent terms from Eqn. 6 for basic restrictions must be used instead."
639	Kordia New Zealand	<ul> <li>639 to 640 – the energy density terms of this formula (terms 3, 4, and 5 shown below) doesn't align</li> <li>with our understanding of how Table 7 is applied. Figure 2 (S:\Rad_Health\NIR\EMR\RF Standard\Consultation\Figures from Adam Tommy.docx)Table 7 must be evaluated for all values of t (the evaluation window) from 0 to 360 seconds. If the exposure level in any one of these evaluation windows is non-compliant, then the entire assessment is</li> <li>non-compliant. That is, the greatest value of U/URL for all evaluation windows must be identified.</li> <li>Furthermore, all frequencies and energy density terms must be evaluated and the levels aggregated in each evaluation window before moving on to the next window.</li> <li>To effect this change we propose that the energy density terms of equation 7 are reformatted as</li> <li>follows: Figure 3 (S:\Rad_Health\NIR\EMR\RF Standard\Consultation\Figures from Adam Tommy.docx)</li> </ul>	Eqn. 7 tells you how to calculate the exposure at the particular time t and Note 2 of Table 7 (now Table 6) has been revised to set the reference level requirement to be observed for any time 0 < t < 360 seconds.	Changed the end of Note 2 in (now) Table 6 to "delivered in t seconds, must not exceed these reference level values for any time 0 < t < 360 s."
657	Kordia Solutions	Section 3.7 Reference levels Electrostimulation. Is there an explanation/definition that defines multi-frequency fields? IE, for when two or more services are operating from the same antenna. This has become more critical to clarify as the electrostimulation reference level at 1MHz has reduced from 3,452V/m in existing RPS3 down to 170V/m in proposed RPS-S1. Would an AM Radio site with two services operating from the same antenna (676kHz and 765kHz) be classed as a multi frequency site and need to be assessed at individual frequencies? Summing individual voltages of individual services as per RPS-S1 Equation 9, actually creates a larger Occupational Exclusion Zone compared to the simpler Broadband measurement of both services operating at the same time.	Yes the intent is for each service (frequency) to be measured separately and the total found by summing the ratios against the limits. The requirements for simultaneous exposure to multiple frequency fields in the Standard are consistent with the ICNIRP (2020) guidelines	No change

### Section 4. Verification of compliance with the basic restrictions and reference levels

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	Muhammad Furqan	Verification shouldn't be left only on a single tool and must be verified by different available tools like Altair FEKO, IXUS Software, ITU EMF Estimator etc.	Section 4 does not describe the tools that can be used for compliance but rather the requirements including providing references to relevant standards on how compliance should be verified	No change
685	Australian Mobile Telecommunications Association	Section 4 - Preamble: Insert new paragraph before Section 4.1 to provide greater clarity that this section provides general guidance and advice only: "This section provides general guidance on assessing compliance with the basic restrictions and reference levels. It sets out basic principles and minimum requirements and is not intended to be exhaustive. Overriding the general guidance is the requirement that an EME compliance assessment must be performed in accordance with the requirements of relevant regulatory authorities, including commonwealth or state-based health and safety authorities and agencies."	It is appropriate for this Standard to state and provide references to other standards on how compliance should be verified	No change
687	Kordia Solutions	Section 4.1 General. When referencing other measurement standards, ARPANSA should specify a hierarchy of which Standards gets precedence(IE, RPS-S1, then AS2772.2, then others)	The Standard provides references to other relevant standards on how compliance should be verified and different ones will be appropriate for different circumstances	No change
687	South Australia EPA	Would guidance on the methodology and/or types of RF instrumentation (if measurements are taken practically in the field to verify compliance) be out of scope for this Standard?	It is appropriate for this Standard to state and provide references to other standards on how compliance should be verified	No change
700	Australian Mobile Telecommunications Association	Section 4.1 - General: Lines 700-701 Delete the last sentence in paragraph 2, "An exception is where compliance can be determined from a consideration of equipment parameters and conditions of use (See Section 4.4)." Consequential to deleting Section 4.4, see later comment.	The last sentence of paragraph 2 has been changed and Section 4.4 has been deleted	Changed "An exception is where compliance can be determined from a consideration of equipment parameters and conditions of use (See Section 4.4)." to "The only exception is for

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				devices that are not capable of exceeding the exposure limits under any conditions of use; supplementary guidance on how this is determined is provided in the <i>RPS S-1</i> Advisory Note: Compliance of mobile or portable transmitting equipment (100 kHz to 6 GHz)."
702	Anonymous	What is the definition of an appropriately qualified and experienced person or organisation (testing authority)?	Text has been added to qualify this sentence	Changed "appropriately qualified and experienced person or organisation (testing authority)" to "appropriately qualified and experienced person or organisation (testing authority) in accordance with relevant AS/NZS, IEC or IEEE standards"
703	South Australia EPA	(testing authority ). What are the requirements (or what constitutes) a person or organisation as being a 'testing authority'?	Text has been added to qualify this sentence	Changed "appropriately qualified and experienced person or organisation (testing authority)" to "appropriately qualified and experienced person or organisation (testing authority) in accordance with relevant AS/NZS, IEC or IEEE standards"
707	GSMA	This condition may conflict with the actual maximum approach to compliance of base stations outlined in IEC TR 62669 and we propose the following amended wording: 'Verification of compliance must be based on conditions leading to the highest expected RF field levels transmitted under normal operating conditions.'	Agreed	Changed "Verification of compliance must be based on conditions leading to the highest RF field levels emitted under normal operating conditions and maximum expected duty factor" to "Verification of compliance must be based on conditions

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				leading to the highest RF field exposure emitted under normal operating conditions."
707	Australian Mobile Telecommunications Association	Lines 707-709 The words at Lines 707-709 could have very specific interpretation under the current ACMA LCD for mobile Carriers: "Verification of compliance must be based on conditions leading to the highest *RF field levels* emitted under normal operating conditions and maximum expected duty factor. Further assessment must be made after any modification that may increase the level of human exposure" (emphasis added) - 'RF field levels' could be interpreted as E-field peak V/m, for comparison against the reference levels. To avoid this potential interpretation by regulators, suggest a more generic term such as 'highest RF exposure' be substituted for 'highest RF field levels'. This would allow 'exposure' to be based on what the assessor considers to be representative. This is also consistent with the term used in the next para (713)	Agreed	Changed "leading to the highest RF field levels emitted" to "leading to the highest RF field exposure emitted"
720	South Australia EPA	Change this "within 3 dB of incident power density." to "3 decibels (dB) of the incident power density"	Standard units are not spelt out in the Standard as prior knowledge is assumed	No change
720	South Australia EPA	"3 dB of incident power density." May be showing my naiveite here, but would dB be in reference to the ratio or differential in power (as power density is usually expressed as W/cm2 or power per unit area/surface)?	dB is standard unit used in the context of RF testing	No change
721	ORSAA	Section 2 Type Testing/RF Site Evaluation (lines 721-726) 'Type testing or RF site evaluation must not be used where the RF levels are unpredictable (b) antenna structures where the RF field pattern is likely to be significantly influenced by the local ground plane conditions or "environmental clutter". Environmental clutter refers to buildings, vehicles, trees/vegetation or other structures that have an influence on the measured levels of RF by introducing reflections, scattering or absorption that is difficult to predict. ' This principle is the opposite of what it needs to be. The problem created by 'environmental clutter' is the random factors that make the computational predictions unreliable. Reflections and scatter may cause the exposures to be much less or much greater than those predicted by the computational models. It	Type testing means not actually doing the measurements because you've already measured or have results from very similar types of devices and installations. Rather than measuring every one, you assume that if you've already measured at least two and found similar results that the next one will also be similar. This is why you can't apply it to unpredictable situations, or when your previous measurements show great variation (more than 3 dB). Calculations may also apply. If you have confirmed calculations with measurements for at least	No change

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		is precisely in these circumstances that site testing must be done, in order to establish the real exposures.	two instances, then using "type testing" you could just do calculations for subsequent cases as long as the environmental clutter (real world variation) was similar in the new cases.	
728	Kordia Solutions	Section 4.3 Records. Why are Site EME records only to be made available to site employees? These site EME records should be made available to anyone authorised to access the site or accessing areas where general public levels are exceeded (ie, contractors, volunteers, visitors etc).	Agreed	Changed "for inspection by relevant radiation protection authorities (see Appendix 2) or employees (including employee representatives)." to "for inspection by relevant radiation protection authorities (see Appendix 2) and/or persons authorised to access the site or their representatives."
729	ORSAA	Section 4.3 Records (lines 729-730) 'An up-to-date log of measurements or computations for the site configuration must be kept by the site owner and be available for inspection by relevant radiation protection authorities (see Appendix 2) or employees (including employee representatives). ' Historical records need to be available to ANY member of the public who requests them. Given that the exposures are being made on the public, it is their right to know what they are being exposed to. Moreover, such records will allow ARPANSA and other agencies to carry out epidemiological studies with hard data. These studies are needed to ascertain the effects of long-term exposures, which are not addressed in the ICNIRP guidelines.	This section deals with proof of compliance with the reference levels as required by the standard and regulatory bodies.	No change
732	Australian Mobile Telecommunications Association	Section 4.4 – Mobile or Portable Transmitting Equipment: RPS-S1 has made a specific reference to Mobile and Portable Transmitting Equipment without an apparent rationale for attention to this class of equipment as compared to any other equipment. It also relates to demonstration of compliance for a particular case which AMTA submits is the purview of the appropriate regulator. AMTA therefore recommends this sub-section be deleted as it is comprehensively dealt with in ACMA regulations and is therefore not required in this standard.	Agreed	Section 4.4 has been deleted

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732	Department of Defence	12. References to ICNIRP guidelines, IEC and IEEE standards are given without specific reference to the guidelines or standards (para 4.1 and 4.4).	There are various IEC and IEEE standards that are relevant and further new standards by these organisations are continually introduced so a general mention is more appropriate	No change
735	Anonymous	In the new standard there is no definite guidance for mobile and portable equipment, as per schedule 5 of RPS 3. The document on the ARPANSA web site explaining changes to RPS-3 states that: "Specific rules on the compliance of mobile or portable transmitting equipment are no longer within the scope of RPS S-1." This exclusion is quite difficult to understand since the devices which most likely are the greatest source of general public RF exposure are mobile phones, and surely there should be in included in the scope of any RF exposure standard. Specifically in section 4.4 of RPS S-1, line 735 it states: "Detailed compliance provisions are provided in various IEC and IEEE standards." If the standards applying to RF exposure from mobile devices are to be specified in an external standards it is important that a specific standard is selected. Further, it is not reasonable to state "Under some specified circumstances, these standards may also provide exemptions from testing for low powered equipment", if the circumstances are not specified.	Section 4.4 has been deleted	Section 4.4 has been deleted
735	ORSAA	Section 4.4 Compliance of Mobile or Portable Transmitting Equipment (line 735) 'Detailed compliance provisions are provided in various IEC and IEEE standards The standard needs to be clearer about what these provisions are and where to find them if it is to be of use to organisations and government authorities. '	Section 4.4 has been deleted	Section 4.4 has been deleted
735	South Australia EPA	"Detailed compliance provisions are provided in various IEC and IEEE standards." Will guidance, suggestions, or similar RPS3 supporting documentation, be provided for evaluating compliance? This statement seems a little broad.	There are various IEC and IEEE standards that are relevant and further new standards by these organisations are continually introduced so a general mention is more appropriate	No change

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	lan R Gardner	I am strongly supportive of the proposed updated ARPANSA RF Standard. I note that there are still a few 'Australia only' sections in the proposed RPS S-1, 2020, but that it is overwhelmingly in line with the ICNIRP 2020 revisions. Whilst understanding the assumptions, logic and the rationale for continuing to have a higher Occupational Exposure Standard I remain concerned that the messaging and communications about this possibly perceived 'less safe' exposure for these occupationally exposed workers will be deliberately misrepresented and/or misunderstood. Ideally, I'd like to see ONE exposure standard that is 'safe' for all workers and the public. Perhaps there needs to be some economic analysis to underpin exactly why there still needs to be a different occupational exposure standard for RF workers. In line with the Commonwealth and State WHS laws and the associated Duty of Care Requirements, there would have to be a massive and unavoidable cost impact to truly justify having a different standard. I believe that the evidence still shows that even the higher Occupationally Exposed RF levels are still safe but would welcome formal consideration by ARPANSA of the continuing necessity for the two-level exposure standard.	Many exposure standards incorporate both a public and occupational exposure limit to the agent being considered. As mentioned in the Standard occupational exposure is only permitted under controlled conditions. In particular, a thorough risk analysis must be performed, and an appropriate risk management regimen implemented, prior to the exposure occurring. More stringent conditions are applied to the exposure of members of the general public because individual members of the public may be continually exposed and cannot reasonably be expected to take precautions to minimise or avoid exposure. Indeed in most circumstances members of the public may not be aware that the exposure is occurring.	No change
746	BAI Communication s (Formerly Broadcast Australia)	Lines 746 to 747 "Occupational exposure is only permitted under controlled conditions. In particular, a thorough risk analysis must be performed, and an appropriate risk management regimen implemented, prior to the exposure occurring." Clarification on risk assessments for "Occupational exposure". The industry is well versed on the requirements for training, PPE and pre-placement medical assessments when working as an RF Worker. What particular risk analysis assessment is being referred to in this context.? Is the intention to risk assess every instance of access to Occupational areas.?	Yes, a risk assessment is required in every instance of access to occupational areas. Examples on the application of the Standard can be included in supplementary material to the Standard	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard

## Section 5. Protection—occupational and general public exposure

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
746	South Australia EPA	What is associated with 'controlled conditions' – would this be criteria enveloped within a 'controlled area'?	"controlled conditions" is used as a general term whereas "controlled area" is a defined term.	Defined terms in Section 5 are now capitalised e.g. 'Controlled Area'
753	Australian Mobile Telecommunica tions Association	Section 5.1 - Definitions : We welcome the introduction of the new category of "Controlled Area Worker". However, we would like to better understand "Controlled Areas " and "Responsible Person" and what the implications of these are on our day to day operations. The other term that has been used without definition is "Direct Supervision". We also suggest the development of a guidance document to assist in the implementation of the proposed safe work management framework in real life scenarios including some worked examples.	Direct supervision' is used as a general term in this context. Examples on the application of the Standard can be included in supplementary material to the Standard	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard
754	Stop Smart Meters Australia Inc	Provisions in Section 5.5.1, Occupational Exposure, rest on the assumption that the designated 'responsible' person is able to ascertain areas that are above occupational exposure limits and thereby take appropriate measures (signage, education, etc.). However, due to the complexity of the Standard, this may be an unwarranted assumption. Similarly, expertise in ascertaining the general public exposure limits is required in instances where an occupationally exposed person has a medical device susceptible to RF interference, a metallic implant, or is pregnant. It is likely that a simplified Standard would result in better outcomes, given the increased likelihood that the responsible person would understand their obligations.	The standard has the necessary content for the protection of the public and workers. The responsible person requires access to expertise to determine compliance with the standard but does not require that expertise themselves. Techniques and methods for compliance with this standard are the subject of other technical standards. Examples on the application of the Standard can be included in supplementary material to the Standard	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard
754	Department of Defence	13. The standard introduces "controlled area worker" at 5.1.1. This term is not used elsewhere nor are specific requirements provided for this group. What is the benefit from including this category of worker?	A "controlled area worker" is a person who's exposed up to occupational exposure limits, however, their exposure is not intrinsic to the nature of their work. For example, a window cleaner working in close proximity to a mobile phone base station. Examples on the application of the Standard can be included in supplementary material to the Standard	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
760	Australian Mobile Telecommunica tions Association	Line 760 Current: (a) RF worker: A person who may be exposed to RF fields in the course of and intrinsic to the nature of their work. This does not define the level that an RF worker may be exposed to. AMTA suggests a more explicit definition: Suggest: (a) RF worker: A person who may be "occupationally" exposed to RF fields in the course of and intrinsic to the nature of their work. Noting the term 'occupationally exposed' is implicitly defined at line 741 as "[not] exposed to RF fields that exceed the occupational exposure limits;"	Agreed	Changed "(a) RF worker: A person who may be exposed to RF fields" to "(a) RF worker: A person who may be occupationally exposed to RF fields"
762	Anonymous	762 RPS S-1 introduces "controlled area worker" as a new class of worker and references 5.1.2, however 5.1.2 is silent on the distinction between an RF worker and a controlled area worker. Unless the requirements for both are addressed and presumably together with their allowable scope of work or responsibility, the addition of a controlled area worker appears to be unwarranted complication. A concern here would be that some may accept a lower standard of training by claiming they are a controlled area worker and not an RF worker, but in this case the controlled area worker should probably be supervised by an RF worker. With the introduction of "visitor" it appears that there is no reason for inclusion of a controlled area worker given that someone other than an RF worker required to perform work on an RF site could be just considered a visitor and thus be required to be under the supervision of an RF worker for whatever activities they may undertake.	A "controlled area worker" is a person who's exposed up to occupational exposure limits, however, their exposure is not intrinsic to the nature of their work. For example, a window cleaner working in close proximity to a mobile phone base station. The Standard makes no assumption regarding the training level of each category. Examples on the application of the Standard can be included in supplementary material to the Standard	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard
762	South Australia EPA	Change "A person other than an RF worker and who may be" to "A person, other than an RF worker, who may be"	Agreed	Changed "A person other than an RF worker and who may be" to "A person, other than an RF worker, who may be"
767	South Australia EPA	Would this also include ancillary personnel?	The list provided is not exhaustive	No change

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
774	Australian Mobile Telecommunica tions Association	Line 774 Current: (d) visitor: Visitors to RF sites who are under direct supervision and may be exposed above general public limits but below occupational limits while transiting controlled areas. This statement does not describe what direct supervision means nor does it describe who a suitable supervisor would be. Suggest: (d) visitor: Visitors to RF sites who are under the direct supervision of a "Responsible Person" or an "RF Worker", may be exposed above general public limits but below occupational limits while transiting controlled areas.	Agreed but have also added "contolled area worker".	Changed "who are under direct supervision and may be exposed" to "who are under the direct supervision of a Responsible Person/RF Worker/Controlled Area Worker and may be exposed"
792	South Australia EPA	There is an extra space after the (C)	Agreed	Removed extra space after the (c)
793	South Australia EPA	Incidentally we suggest the structure of "the person conducting a business or undertaking, owner or operator of the RF sources" at 793 be reviewed as it does not appear to read correctly. Perhaps based on words at 770 it could read "the person conducting a business or undertaking, manager or owner of the facility containing the relevant RF sources and the owner or operator of the RF sources"	This terminology is consistent with WHS legislation as advised by Safe Work Australia.	No change
795	Australian Mobile Telecommunica tions Association	Line 795 We believe there is a need to distinguish between the Responsible Person who manages RF safety in the Controlled Area at the time of access and the "Person With Management Control" of the workplace (PWMC) who has operational control over the area on behalf of the person conducting a business or undertaking, manager or owner of the facility containing the relevant RF sources– this becomes important when there are multiple businesses or undertakings carrying out activities at the site who may separately engage multiple contractors who require access to the Controlled area at various times. On each occasion, there may be a different Responsible Person while the PWMC for the overall facility would remain the same. This then aligns with construction codes of practice and regulations and places the same single point of hazard control for a workplace onto a single person or role. To put this additional hierarchy into effect requires changes to the definition of Controlled Area and additions to the description of the Responsible Person. We have also made some minor additions (underlined) to the relevant responsibilities.	This level of operational detail is not the subject of this Standard. Examples on the application of the Standard can be included in supplementary material to the Standard	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard
795	Australian Mobile Telecommunica	We suggest at line 795 replace responsible person with: (iii) the "Person With Management Control (PWMC)" and contact details	This level of operational detail is not the subject of this Standard. Examples on the application of the Standard can be included in	No change to the Standard. ARPANSA will work with other relevant authorities on

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	tions Association		supplementary material to the Standard	developing supplementary material to the Standard
797	Australian Mobile Telecommunica tions Association	Lines 797-818 Suggest: "5.1.3 Person With Management Control (PWMC) and Responsible Person The person with overall management of a Controlled Area with respect to persons who need to work in or transit the area is the Person With Management Control (PWMC) for the Controlled Area. This would typically be the building owner or facility manager. A responsible person is to be appointed by the person conducting a business or undertaking, manager or PWMC for the Controlled Area containing the relevant RF sources. The name and contact details of the PWMC are to be readily available to persons seeking access to the controlled area. The responsible person is responsible for the following: a) ensure up to date documentation regarding exposures associated with all RF sources affecting the work area is available; b) ensure signage and markings delineate areas exceeding public and occupational exposure limits c) ensure persons are familiarized with any RF sources and the associated public and occupational access areas, relevant to their activity d) ensure persons are aware of appropriate safe working practices e) ensure security of access to the controlled area To enable the PWMC to meet their obligations the following parties are required to consult, cooperate and co-ordinate with the PWMC: a) the responsible person or persons conducting a business or undertaking, owner or operator of the RF sources, and b) visitors, contractors or other workers who need to access the area. The appointment of a PWMC does not replace or lessen the duty of care required of a person conducting a business or undertaking, facility manager or facility owner under the relevant work health and safety (WHS) or occupational health and safety (OHS) laws."	In terms of including "Person With Management Control (PWMC)", this level of operational detail is not the subject of this Standard. Examples on the application of the Standard can be included in supplementary material to the Standard. Agreed on the amendments to the responsibilities and the parties required to consult	Changed "a) ensure documentation regarding exposures associated with RF sources is available" to "a) ensure up to date documentation regarding exposures associated with all RF sources affecting the work area is available". Changed "b) contractors or other workers who need to access the area" to "b) visitors, contractors or other workers who need to access the area"
797	Anonymous	Addition of the requirement for a "responsible person" to be appointed for the overall management of a controlled area by the person conducting a business or undertaking,	Examples on the application of the Standard can be included in	No change to the Standard. ARPANSA will work with

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		<ul> <li>manager or owner of the facility containing the relevant RF sources is a great concept,</li> <li>however we envisage implementation difficulties given the many stakeholders acknowledged</li> <li>at 812 - 815. From a compliance assessment perspective, we anticipate many sites being</li> <li>unable to be certified as compliant to RPS S-1 due to the absence of an appointed responsible</li> <li>person, in part because stakeholders can't agree on who's responsibility it is to appoint the</li> <li>responsible person.</li> <li>Incidentally we suggest the structure of "the person conducting a business or undertaking, owner or operator of the RF sources" at 793 be reviewed as it does not appear to read</li> <li>correctly. Perhaps based on words at 770 it could read "the person conducting a business or undertaking, manager or owner of the facility containing the relevant RF sources and the owner or operator of the RF sources"</li> </ul>	supplementary material to the Standard	other relevant authorities on developing supplementary material to the Standard
797	Department of Defence	14. At paragraph 5.1.3 it states that a "responsible person" can be appointed whereas in RPS C1, the responsible person is defined to have the same meaning as the person conducting a business or undertaking. The use of defined terms must be standardised across ARPANSA publications.	The final paragraph points out that "The appointment of a responsible person does not replace or lessen the duty of care required of a person conducting a business or undertaking, facility manager or facility owner under the relevant work health and safety (WHS) or occupational health and safety (OHS) laws"	No change
797	ORSAA	Section 5.1.3 Responsible Person inconsistent with Section 5.22 Risk Management Process The description of 'responsible person' (lines 798-810) is not adequate given the requirement for risk management (lines 844-846) assessment of the risk. This step includes assessment of exposure levels, and comparison to the relevant exposure limits. Advice on measurement or calculation of exposures relevant to the limits is given in AS/NZS 2772.2 (2016) or relevant IEC and IEEE standards It is unlikely that any normal worker assigned to the role of 'responsible person' would be able to interpret AS/NZS 2772.2 (2016) or be aware of the relevant IEC and IEEE standards	The responsible person requires access to expertise to determine compliance with the standard but does not require that expertise themelves.	No change
806	Anonymous	It is suggested that barriers be included such that it reads "b) ensure barriers, signage and markings as appropriate delineate areas exceeding public and occupational exposure limits", because barriers are an important means available to the responsible person to protect against occupational or general public over exposure, particularly being that barriers being an	Changed to "ensure signage, markings or other measures deliniate"	Changed "ensure barriers, signage and markings as appropriate delineate" to "ensure signage, markings or other measures deliniate"

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		engineering control are inherently more effective than the administrative controls of signage and markings.		
808	BAI Communication s (Formerly Broadcast Australia)	Line 808 "ensure signage and markings delineate areas exceeding public and occupational exposure limits" Clarification on dot point "(b)". Is signage or markings relevant if documentation indicates specific areas with appropriate scaling and identification are produced.? Transmission sites are dynamic, the requirement to place signage or markings and or adjust positioning for Occupational and General Public exclusion limit zones that may constantly shift is inefficient and not a practical solution.	Changed to "ensure signage, markings or other measures deliniate"	Changed "ensure barriers, signage and markings as appropriate delineate" to "ensure signage, markings or other measures deliniate"
822	Stop Smart Meters Australia Inc	Line 822 has a superfluous space before the full-stop.	Agreed	Deleted the extra space before the full stop
824	Kordia New Zealand	824 – whilst this section is a good description of the actions required, we suggest that it would be enhanced by promoting a collaborative approach to RF field safety between occupational workers and duty holders. Workers and duty holders are equally responsible for health and safety outcomes.	This is covered in all WHS legislations in all jurisdictions	No change
824	Department of Defence	15. In paragraph 5.2 the term "duty holder" is introduced. This role doesn't appear to differ from the role of the "responsible person". The inconsistency in the use of defined terms must be standardised across ARPANSA publications.	The duty holder has a defined meaning within WHS legislation and it includes extra people to a responsible person.	No change
839	Kordia Solutions	Section 5.2.2.C Risk Management and control. The statement "The control/s chosen must not cause other hazards" would be incredibly difficult to comply with. For example using an EWP may reduce risk of exposure compared to climbing a tower, however, other hazards are inevitably created by using an EWP. Recommend revising this statement.	Agreed	Changed "The control/s chosen must not cause other hazards" to "The control/s chosen must consider any hazards they may introduce".
855	Steven Weller	Section: 5.2.3 Hierarchy of control measures Lines 856-877 Feedback: On a positive note it is good to see the adoption of measures used in ionising radiation protection philosophy included for RF radiation protection. Although it remains to be	Optimisation does not apply in the case where limits offer protection against all known health effects. The	No change
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		<ul> <li>seen how it will be implemented, particularly in the public space where typical exposures are non-consensual, and a sensitive population does exist and is not protected by the current or proposed RF Standard. ARPANSA may argue that sensitive people do not exist but I would like to remind ARPANSA that this was discussed specifically at an EMERG meeting that I attended in which an occupational health specialist suggested sensitivity is plausible and may not be adequately protected against. He then gave an example of how some people are sensitive to sound and that they could still experience discomfort to sounds that fall beneath audiological safety limits (DB levels).</li> <li>Recommendation: I would like to see some specific text around optimization in this section as it is a complementary component to the hierarchy of controls.</li> </ul>	principles for protection in RPS S-1 are based on the newly published ICNIRP Principles For Non-ionising Radiation Protection. The exposure limits in the ARPANSA Standard are set well below the threshold for adverse health effects. Further reduction in exposure does not result in additional health benefits	
860	Anonymous	The Hierarchy of Controls: Elimination, Substitution, Engineering, Administrative and PPE are well known and applied widely in managing occupational risk. The associated section in RPS3 dealt with each at 5.1.3 (a) - (e). RPS S-1 has departed from this by inserting "(c) isolation of the risk or work process" without comment as to which category (and thus effectiveness) of control it is and splitting PPE across (f) and (g) without indicating that personal RF alarms are categorised as PPE. Based on our training experience, it is believed that best understanding will be gained and application of the principles made, by maintaining a direct relationship of each paragraph with the well known hierarchy of controls. It is suggested that "(c) isolation of the risk or work process" should be removed as a standalone item and included in the administrative control paragraph since in a contemporary RF site context, it isolation usually achieved by way of an outage put into effect by administrative means. Again the important (and very common) control means of barriers is omitted. Therefore the following is suggested: (a) elimination of the hazard. If this is not reasonably practicable, exposure to the risk, where appropriate, must be minimised by one or a combination of the following control measures (b) substitution with a less hazardous process or less hazardous plant (c) engineering controls including redesign of equipment or work processes. Examples include: barriers to access, building in shielding, fail-safe interlocks, earthing of large metallic objects, built-in leakage detectors and alarms or utilising waveguide below cut-off shielding techniques (e) personal issue RF alarms are a form of personal protective equipment (PPE) which are designed to alert the worker to the presence of RF fields above the exposure limits. Training is essential for proper use and safety benefits. Other forms of PPE may used, however all users of PPE must be provided with the appropriate PPE and trained and supervised in its use to ensure	Agreed on deleting point (c ) on isolation. The RF alarm is a uniquely important device for RF workers and the proper training in use and maintenance should be emphasised separately.	Part (c ) on isolation has been deleted. Part (d) has changed from "Examples include: building in shielding" to "Examples include: barriers to access, building in shielding". Part (g) has changed from "(For more information on PPE see IEEE C95.7-2014)." to "(For more information on PPE see IEEE C95.7)."

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		use it accordingly. In addition, the PPE must be maintained and replaced as specified by the manufacturer to ensure it is kept in good condition so that its effectiveness as a control is not compromised (For more information on PPE see IEEE C95.7-2014).		
863	Anonymous	<ul> <li>In the hierarchy of controls, point c (line 863) is "isolation of the risk or work process". This is an addition to the control hierarchy from that in RPS-3. It is not clear what is meant by "isolation", and it would be useful to include an example how this would be implemented or how it is applicable to an RF situation.</li> <li>In RPS-3 leather work gloves were included as an example of practical PPE and it would be useful to include them as an example of PPE in RPS S-1.</li> </ul>	Agreed on deleting point (c ) on isolation. There are numerous examples of PPE and the Standard refers to IEEE C95.7 for more information	Part (c ) on isolation has been deleted.
878	Kordia New Zealand	878 – it is suggested that this section also includes a comment requiring workers to exercise care in terms of contract currents, referring to section 2.5.	Section 5.2.4 has been removed. Guidance on contact currents is presented in Section 2.5	Section 5.2.4 has been removed.
878	Steven Weller	Section: 5.2.4 Risk mitigation consideration for occupational workers Issue: What about risk mitigation consideration for the general public? Where are they detailed? There is also fixation on thermal effects only. Non-thermal effects are not considered – yet they are real and constitute a real risk to health. Why is ARPANSA ignoring them? Does ARPANSA lack sufficient expertise in biomedical sciences to make a proper determination?	Section 5.2.4 has been removed.	Section 5.2.4 has been removed.
891	Kordia Solutions	Section 5.2.6 Provision of information. Sect 5.2.6.a: The statement "preferably with a written explanation see (d) below" is redundant and creates circular referencing. The first line already says occupational workers need to be informed about this. Sect 5.2.6.b: Incorrect cross reference of 5.1.3. It is also unknown what "safe work practices" are been referred to here. Sect 5.2.6.c: Incorrect cross reference of 5.4. It should be 5.5. Sect 5.2.6.d: Incorrect cross reference of 5.2.6. It should be 5.2.7.	a. Agreed; b. Reference to 5.1.3 refers to the Responsible Person ensuring persons are aware of appropriate safe working practices which are described in all of Section 5.2; c. Agreed d. Agreed however due to having now deleted Section, 5.2.4, reference to medical assessment becomes 5.2.6.	5.2.6(a) Removed "preferably with a written explanation see (d) below"; 5.2.6(b) No change; 5.2.6(c) Changed "See 5.4" to "See 5.5"; 5.2.6(d) changed to (d) "the precautions and procedures to be followed if they are or become pregnant (see 5.3) during the time they are engaged in RF work" and have added a part (e) "the precautions and procedures to be followed if they

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				have/receive metallic implants or medical devices (see 5.2.6) during the time they are engaged in RF work"
891	Department of Defence	16. Para 5.2.6 (c), 5.5 (b) and 5.6 (d)ii use the term "over exposure". What does this term mean, exceed reference levels (occupational or non-occupational), basic restrictions or observable health effects? Did the authors mean "acute exposure"?	Over-exposure is now defined in the Glossary	Over-exposure is now defined in the Glossary
891	Department of Defence	17. Para 5.2.6 (c) references para 5.4 this should be para 5.5.	Agreed	Changed "See 5.4" to "See 5.5"
897	BAI Communication s (Formerly Broadcast Australia)	Line 897 "safe working practices, (see 5.1.3)" Clarification on "safe work practices" dot point "(b)". Cross refencing to section 5.1.3 does not seem applicable, suggested more appropriate cross reference would be section 5.2.1.	Reference to 5.1.3 refers to the Responsible Person ensuring persons are aware of appropriate safe working practices which are described in all of Section 5.2	No change
898	BAI Communication s (Formerly Broadcast Australia)	Line 898 "the procedures to be followed in the event of any over-exposure (see 5.4)" Clarification on "the procedures to be followed in the event of any over-exposure (see 5.4)" dot point "(c)". Cross refencing to section 5.4 does not seem applicable, suggested more appropriate cross reference would be section 5.5.	Agreed	Changed "See 5.4" to "See 5.5"
899	BAI Communication s (Formerly Broadcast Australia)	Lines 899 to 901 "the precautions and procedures to be followed if they are or become pregnant (see 5.3), or have/receive metallic implants or medical devices (see 5.2.6) during the time they are engaged in RF work" Clarification on "the precautions and procedures to be followed if they are or become pregnant (see 5.3), or have/receive metallic implants or medical devices (see 5.2.6) during the time they are engaged in RF work" dot point "(d)". Cross refencing to section 5.2.6 does not seem applicable, suggested more appropriate cross reference would be section 5.2.7.	Agreed however due to having now deleted Section, 5.2.4, reference to medical assessment becomes 5.2.6.	5.2.6(d) changed to (d) "the precautions and procedures to be followed if they are or become pregnant (see 5.3) during the time they are engaged in RF work" and have added a part (e) "the precautions and procedures to be followed if they have/receive metallic implants or medical devices (see 5.2.6) during the time

Line No.	Name of submitter		ARPANSA response	Changes to the draft RPS S-1
				they are engaged in RF work"
900	Australian Mobile Telecommunica tions Association	Line 900: 5.2.6 should read 5.2.7	Agreed however due to having now deleted Section, 5.2.4, reference to medical assessment becomes 5.2.6.	5.2.6(d) changed to (d) "the precautions and procedures to be followed if they are or become pregnant (see 5.3) during the time they are engaged in RF work" and have added a part (e) "the precautions and procedures to be followed if they have/receive metallic implants or medical devices (see 5.2.6) during the time they are engaged in RF work"
902	BAI Communication s (Formerly Broadcast Australia)	Lines 902 to 904 "that if they become unwell without obvious cause they should attend their own General Practitioner (as for any illness or medical condition) and inform their doctor that they work with RF fields and give the doctor the information about RF fields referred to above in (a)." Clarification on "that if they become unwell without obvious cause they should attend their own General Practitioner (as for any illness or medical condition) and inform their doctor that they work with RF fields and give the doctor the information about RF fields referred to above in (a)." dot point "(e)". Cross refencing to section 5.2.6 (a) should also include referencing to section 5.5 dot point (b), paper by Hocking and Gobbo (2011).	Section 5.2.6 (e) has been deleted	Section 5.2.6 (e) has been deleted
903	Anonymous	5.2.7 Medical Assessment (lines 903 -907) There must be procedures in place to ensure that persons who are occupationally exposed above basic restrictions for the public and who have medical devices susceptible to RF interference or metallic implants are not put at risk by their exposure. It is advisable that persons who may be occupationally exposed to RF fields are subject to a placement assessment (Hocking and Mild, 2008).	Routine preplacement medical examinations of the eyes as per previous standards have been deleted because they are of little proven value; moreover after an overexposure there is a delay before the possible onset of cataract weeks to months later which enables a prompt examination to determine a	No change

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
			"baseline" of the status of the lens with follow-up examination later.	
903	Telstra Corporation	Section 5.2.7 - Regarding worker safety and medical / metallic implants, we suggest that section 5.2.7 should also refer to the IEEE 2019 RF Safety Standard C95.1, sections B.7.8 and B.2.2.4 as this provides practical guidance for the assessment of implants in RF fields, which is based on extensive modelling and research We suggest this section be modified to the following: 5.2.7 Medical Assessment 'There must be procedures in place to ensure that persons who are occupationally exposed above basic restrictions for the public and who have medical devices susceptible to RF interference or metallic implants are not put at risk by their exposure. It is advisable that persons who may be occupationally exposed to RF fields are subject to a placement assessment (Hocking and Mild, 2008). The IEEE 2019 RF Safety Standard C95.1, sections B.7.8 and B.2.2.4. provides practical advice for the assessment of medical devices and makes comment on metallic implants. This advice should be sufficient for most cases and no further steps would be required such as performing computational analysis, which is unlikely to be an option for many persons.'	Agreed	The following has been added at the end of Section 5.2.7 (now Section 5.2.6) "The IEEE Standard C95.1 (Sections B.2.2.4 and B.7.8) provides practical advice for the assessment of medical devices and makes comment on metallic implants. This advice should be sufficient for most cases and no further steps would be required such as performing computational analysis, which is unlikely to be an option for many persons."
903	Australian Centre for Electromagnetic Bioeffects Research	4. Medical assessment (RPS S-1; s5.2.7) RPS S-1 s5.2.7 states that "It is advisable that persons who may be occupationally exposed to RF fields are subject to a placement assessment (Hocking and Mild, 2008)". This is important, particularly in terms of identifying those with metallic implants or other situations/conditions that may enhance the potential for RF-EMFs to adversely affect the body. However, it would be useful to specify the situations/conditions that are relevant here, rather than relying on access to an external document.	The Standard appropriately refers to external documents for supplementary information. A further reference to IEEE Standard C95.1 has been added which provides practical advice for the assessment of medical devices and makes comment on metallic implants.	The following has been added at the end of Section 5.2.7 (now Section 5.2.6) "The IEEE Standard C95.1 (Sections B.2.2.4 and B.7.8) provides practical advice for the assessment of medical devices and makes comment on metallic implants. This advice should be sufficient for most cases and no further steps would be required such as performing computational analysis, which is unlikely to be an option for many persons."

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
915	Department of Defence	<ul> <li>18. Paragraph 5.4 states that "The personnel files of workers who are occupationally exposed to RF fields should be identified and maintained. Such files should be retained for the full duration of, and after termination of employment as required by law."</li> <li>a. Is this intended to mean that the personnel files of workers who are occupational exposed should identify that they are occupationally exposed? This isn't clear from the wording?</li> <li>b. Specifically, what law requires the retainment of occupationally exposed RF workers personnel files?</li> </ul>	The wording has been revised to clarify that the personnel files of workers who are occupational exposed should identify that they are occupationally exposed. The retention of files refers to personnel files in general.	Changed "exposed to RF fields should be identified and maintained." to "exposed to RF fields should be maintained and identify that the worker is occupationally exposed to RF fields."
920	Kordia Solutions	Sect 5.5 Post Incident Exposure management. It would be helpful to provide Weblink or further information on how to register NON IONISING RADIATION incidents to the Australian Radiation Incident Register to make this section clearer. Currently, the websites for each of the States only mentions ionising incidents, with NO information for non-ionising incidents. It would be important that ARPANSA, and each state update their respective webpages to ensure there is a suitable landing webpage that allows reporting and information on RF Overexposure reporting. I could not find where to report any radiation accidents on most of the states webpages.	Information on the Australian Radiation Incident Register has been added to Appendix 2	Information on the Australian Radiation Incident Register has been added to Appendix 2
920	Australian Centre for Electromagnetic Bioeffects Research	5. Post incident exposure assessment (RPS S-1; s5.5) RPS S-1 s5.2.7 states that "A plan for management of any incident of proven or suspected over-exposure should be developed in advance". Further, it suggests the following first aid plan in cases where exposure is suspected to have exceeded the draft RPS S-1 limits: "(a) first Aid treatment should be obtained from the nearest first aider, doctor or hospital as required for burns or other injuries; (b) employers should arrange for employees suspected or confirmed as over-exposed to RF fields to be medically assessed as soon as practical after the over-exposure. The employer/site operator should provide information regarding the characteristics of the RF fields. The paper by Hocking and Gobbo (2011) provides information for doctors on the medical management of acute overexposure; and (c) the incident must be investigated and corrective actions taken. The incident must be reported and managed as per relevant Commonwealth or State/Territory Work Health and Safety legislation (see Appendix 2). The incident must be reported to the Australian Radiation Incident Register". It terms of "a", this is reasonable in that 'if' an injury is suspected, then the worker should be assessed medically, but it should be noted that merely being exposed above the limits does not, in and of itself provide a reason for suspecting that an injury has occurred. This is because the limits are set at levels that are well-below what science has shown is necessary to cause harm, and so moderate overexposures would not be expected to cause harm. For example, if a worker was exposed at twice the occupational limit, in terms of 'whole body exposure' limits this would merely result in a body core temperature rise far less than normal circadian variation	A medical examination is required in the case of over exposure regardless of symptoms. The potential for delayed symptoms due to high RF exposure cannot be eliminated. However Section 5.5 has been revised to mention that an overexposure will not necessarily lead to harm because of the significant safety factors within the limits	Changed "A plan for management of any incident of proven or suspected over- exposure should be developed in advance. The following plan of action is suggested:" to "A plan for management of any incident of confirmed or suspected over-exposure should be developed in advance. An over-exposure will not necessarily lead to harm because the exposure limits of the Standard are set well below where harm has been shown to occur. The following plan of action is suggested:"

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		over the course of the day, and in terms of localised exposure limits this would merely result in a localised tissue temperature rise of 5 degrees. Accordingly, it is not clear why it would be necessary to require a medical examination when an overexposure that is too small to cause harm was encountered (suggestion "b"), nor why it would be important to be reported as an incident to organisations such as COMCARE (suggestion "c"), as in both cases these would appear to be more relevant actions in situations where some form of harm had occurred. ARPANSA may wish to consider whether this section could be rewritten with the focus on situations where harm had occurred (e.g. if someone felt that they had received a burn then it would appear sensible to follow this up medically and to report the incident), rather than relying on exposure level (which, at the draft RPS S-1 limits, does not correspond to harm). It may also be useful to provide specification of the sorts of injuries that could be expected to occur following sufficiently high RF-EMF exposures (e.g. hyperthermia, local burns), so that workers could be aware of such possibilities and thusincrease the chance of them detecting harm associated with RF-EMF over-exposure.		
923	South Australia EPA	"first Aid" to "first aid"	Agreed	Change "first Aid" to "first aid"
929	Anonymous	Paragraph (c) reads as if "incident" means a "proven over-exposure incident" since it implies reporting to the Australian Radiation Incident Register and in accordance with Commonwealth or State/Territory legislation is mandatory, however we assume that such reporting is only required in the case of a proven over-exposure incident. Also, it may be that on investigation an unproven over-exposure incident does not require any corrective action. Note that no details are provided, even in Appendix 2, of how to contact the Australian Radiation Incident Register in order to report an over-exposure incident and so it is suggested that such contact details be included in that appendix. If our understanding is correct, it is suggested (c) could read: (c) the incident must be investigated and appropriate corrective actions taken. The incident must be managed and where proven to be an over-exposure incident reported, as per relevant Commonwealth or State/Territory Work Health and Safety legislation. A proven over- exposure incident must be reported to the Australian Radiation Incident Register. (see Appendix 2)	Section 5.5 c has been revised	Section 5.5 c has been revised to "the incident must be investigated and appropriate corrective actions taken. Where confirmed to be an over- exposure incident, it must be reported and managed as per relevant Commonwealth or State/Territory Work Health and Safety legislation. A confirmed incident must be reported by the relevant radiation protection authority to the Australian Radiation Incident Register (see Appendix 2)."
931	South Australia EPA	Add a full stop at the end of point ( C )	Agreed	Added a full stop at the end of point ( C )

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
932	Andrew Wood	None, but I would support the re-introduction of a 'precautionary clause'. Shifting the burden of overseeing operation of RF systems in a prudent fashion to Communications Alliance Ltd only covers telecommunications. It doesn't for example encourage operators of RF welding equipment to minimize exposure of workers.	The principles for protection in RPS S- 1 are based on the newly published ICNIRP Principles For Non-ionising Radiation Protection. The exposure limits in the ARPANSA Standard are set well below the threshold for adverse health effects. Further reduction in exposure does not result in additional health benefits, and therefore minimisation is not necessary. Further the minimisation clause in RPS3 applied to General Public exposure only	No change
932	Anonymous	Comment 4: In Section 5.6 Protection of the General Public (lines 932 onward) you write "Measures for the protection of members of the general public who may be exposed to RF fields due to their proximity to antennas or other RF sources must include the following:" . You have removed the clause that limits unnecessary exposure (Clause 5.7e in RPS3). You cannot remove this clause without categorically saying that the levels you permit in the Standard are perfectly safe for everyone. You cannot say this because: Firstly, 253 scientists have called for increased protection from EMF exposure. i.e. Levels of EMF exposure permitted in Standards such as this one. These scientists have "published peer-reviewed papers on the biological or health effects of non-ionizing electromagnetic fields, part of the electromagnetic field (EMF) spectrum that includes extremely low frequency fields (ELF) emitted by electrical devices; and, radiofrequency radiation (RFR), used for wireless communications". (https://www.emfscientist.org/) Secondly, you say that research is not conclusive yourself (lines 92-94) "Research is continuing in many countries into possible effects on health arising from RF exposure. In recognition of this, the Radiation Health Committee will continue to monitor the results of this research and, where necessary, issue amendments to this document. " Suggestion 5: Provide a clause that limits unnecessary exposure, as was included in RPS3.	The principles for protection in RPS S- 1 are based on the newly published ICNIRP Principles For Non-ionising Radiation Protection. The exposure limits in the ARPANSA Standard are set well below the threshold for adverse health effects. Further reduction in exposure does not result in additional health benefits, and therefore minimisation is not necessary	No change

Line No.	Name of submitter	Comment ARPANSA response		Changes to the draft RPS S-1
932	Department of Defence	19. Para 5.6 (d)ii implies that members of the public who are over exposed should be treated as if the exposure was an acute overexposure. This needs better explanation as to why the extreme measure (eg in case they have implants).	A medical examination is required in the case of over exposure regardless of symptoms.	No change
932	Department of Defence	20. Para 5.6 (d)iii the use of "must" is inconsistent with this being a "suggested" plan of action. We recommend replacing "must" with "should".	The plan of action is suggested however if the plan is followed the actions in part (iii) are a 'must'	No change
933	BAI Communication s (Formerly Broadcast Australia)	Line 933 "The incident must be reported to the Australian Radiation Incident Register." Clarification for the "Australian Radiation Incident Register". Please identify what Register this is. The suggested application of contact lists in this standard are insufficient.	The Australian Radiation Incident Register (ARIR) is managed by ARPANSA and is Australia's national database of incidents and events, where radiation or radioactivity was implicated. Reports in ARIR are provided by Commonwealth, state and territory radiation protection authorities. Section 5.5 d(iii) also mentions an incident must be reported to the relevant radiation protection authority.	Section 5.5 d (iii) has been revised to "(iii) the incident must be investigated and appropriate corrective actions taken. Where confirmed to be an over- exposure incident, it must be reported to the relevant radiation protection authority (see Appendix 2). A confirmed incident must be reported by the relevant radiation protection authority to the Australian Radiation Incident Register referred to in 5.5(c)."
948	Anonymous	The above comments also apply to general public exposure in that (iii) reads as if "incident" means a "proven over-exposure incident" and therefore similarly it is suggested (iii) should read: (iii) the incident must be investigated and appropriate corrective actions taken. Where proven to be an over-exposure incident, it must be reported to the relevant radiation protection authority. A proven over-exposure incident must be reported to the Australian Radiation Incident Register. (see Appendix 2) It is noted that "proven" and "confirmed" appear to be used interchangeably in this section and so it is suggested that one or the other is chosen and then used consistently for clarity.	Agreed	Section 5.5 d (iii) has been revised to "(iii) the incident must be investigated and appropriate corrective actions taken. Where confirmed to be an over- exposure incident, it must be reported to the relevant radiation protection authority (see Appendix 2). A confirmed incident must be reported by the relevant radiation protection

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
				authority to the Australian Radiation Incident Register referred to in 5.5(c)."
948	Anonymous	It is noted that "proven" and "confirmed" appear to be used interchangeably in this section and so it is suggested that one or the other is chosen and then used consistently for clarity.	Agreed	Changed "proven" to "confirmed"
951	BAI Communication s (Formerly Broadcast Australia)	Lines 951 to 953 "The incident must be reported to the Australian Radiation Incident Register." Clarification for the "Australian Radiation Incident Register". Please identify what Register this is. The suggested application of contact lists in this standard are insufficient.	The Australian Radiation Incident Register (ARIR) is managed by ARPANSA and is Australia's national database of incidents and events, where radiation or radioactivity was implicated. Reports in ARIR are provided by Commonwealth, state and territory radiation protection authorities. Section 5.5 d(iii) also mentions an incident must be reported to the relevant radiation protection authority.	Section 5.5 d (iii) has been revised to "(iii) the incident must be investigated and appropriate corrective actions taken. Where confirmed to be an over- exposure incident, it must be reported to the relevant radiation protection authority (see Appendix 2). A confirmed incident must be reported by the relevant radiation protection authority to the Australian Radiation Incident Register referred to in 5.5(c)."

## Schedule 1, 2 and 3

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
952	BAI Communications (Formerly Broadcast Australia)	Schedule 1 Figure 1 Power Density Graph Line The Power density graphic line is incorrect, this limit should be extended to 30MHz.	Agreed	Figure 2 has been revised
957	BAI Communications (Formerly Broadcast Australia)	Schedule 1 Figure 2 Power Density Graph Line The Power density graphic line is incorrect, this limit should be extended to 30MHz.	Agreed	Figure 3 has been revised
964	Stop Smart Meters Australia Inc	SSMA recommends that the Look-up Tables set out kHz with a lowercase k.	Agreed	Changed "KHz" to "kHz" in the Look- up tables
964	Kordia New Zealand	964 to 973 – these tables only consider whole body and local exposure reference levels which are straightforward to determine from Tables 5 and 6. Readers of this Standard would benefit more by including guidance on how to interpret and apply Tables 2 and 7, along with worked examples.	Examples on the application of the Standard can be included in supplementary material to the Standard	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard
965	BAI Communications (Formerly Broadcast Australia)	Schedule 2 Look Up Table "Incident E field Strength Einc (V/m-1)" Look Up Table should be further populated with reference limits where applicable for both Whole Body and Local Exposure. i.e. for 100kHz to 6MHz.	There are no reference levels for Einc below 6.943 for occupational whole body exposure and below 10 MHz for occupational local exposure	No change
969	BAI Communications (Formerly Broadcast Australia)	Schedule 3 Look Up Table "Incident E field Strength Einc (V/m-1)" Look Up Table should be further populated with reference limits where applicable for both Whole Body and Local Exposure. i.e. for 100kHz to 6MHz.	There are no reference levels for Einc below 6.27 MHz for general public whole body exposure and below 10 MHz for general public local exposure	No change

## Appendix 1 and 2

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	Anonymous	As per comments in 11. above, it is suggested that contact details of the Australian Radiation Incident Register be included in Appendix 2 in order to facilitate reporting of a proven over-exposure incident.	Agreed	Information on the Australian Radiation Incident Register has been added to Appendix 2

## Glossary

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	Australian Mobile Telecommunications Association	Add new definition: Over exposure The terms "over-exposure" or "overexposure" are used in the draft standard without definition. A definition should be added e.g. "Exposure exceeding the relevant local or whole-body basic restrictions taking into account the appropriate averaging time (e.g. 6 minutes or 30 minutes). A short-term exposure to a level exceeding the basic restriction typically does not lead to an over- exposure unless the time-averaged level is above the limit relevant limit."	Agreed	Added the following definition for "over- exposure" in the Glossary "Exposure exceeding the relevant local or whole- body basic restrictions taking into account the appropriate averaging time (e.g. 6 minutes or 30 minutes). A short- term exposure to a level exceeding the basic restriction typically does not lead to an over-exposure unless the time- averaged level is above the relevant limit."
	lan R Gardner	Helpful !	Noted	No change
1014	Anonymous	Comment 3: In Section 2.2 Basic Restrictions and Reference Levels (lines 292-296) you write: "Mandatory limits on exposure to RF fields are based on established health effects and are termed 'basic restrictions'. Protection against established adverse health effects requires that these basic restrictions are not exceeded." What does established mean? Suggestion 4: You should define what you mean by the word established in the glossary, or rephrase the sentence, as you are using the word 'established' in an unconventional way.	"Established" has been replaced with "substantiated"	in lines 293-294 changed "are based on established health effects and are termed 'basic restrictions'. Protection against established adverse health effects" to "are based on substantiated health effects and are termed 'basic restrictions'. Protection against substantiated adverse health effects"
1014	Anonymous	Define the word 'established' as you are using it in the document (I refer to this at point 8).	The word "established" has been replaced with "substantiated" so there is no need for a definition	No change
1014	Anonymous	1) In the draft standard the limits on exposure of a limited portion of the body that were implied in the spatial averaging section of RPS-3 have been formalised in section 2.4, lines 373 and 374,	A definition for local exposure is	Added a new paragraph at the end of Section 2.2 after line 307 "The basic

Line No.	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		and Tables 6 and 7. However, "local exposure" is not formally defined. It should be included in the glossary.	now provided in Section 2.2	restrictions and reference levels are specified for average exposure over the whole body (whole body average exposure), and also for exposure over localised areas of the body (local exposure). Tables 1 to 7 specify whether the basic restrictions and reference levels applying to local exposure incorporate any spatial averaging and, if so, the volume or area over which the exposure is averaged, or whether they apply to the spatial peak exposure."
1015	Andrew Wood	Absorbed Power Density (N.B. this 'Citizen Space' doesn't allow symbols, so the next comment will be difficult to interpret. However, I'm happy to provide further feedback via another route. The definition of this quantity leaves much to be desired. It is more a deficiency with ICNIRP, but ARPANSA could attempt to reduce uncertainty on how to interpret this quantity, since it is a basic restriction. The definition given on p 35 does little to satisfy those who want to fully understand this quantity, which, as I understand it, is the power density on the tissue side of the air/skin boundary. To illustrate, the usual formula for non-ionising radiation falling normally on a surface between air and another medium is as follows: S(z) = SORtexp(-az) Where S0 is the incident power density, Rt is the transmission coefficient, a is the power absorption coefficient in m-1 or alternatively cm-1 and z is the distance into the medium. I am assuming Sab is SORt, but this needs to be confirmed. Using the Gabriel database, the values for skin at 6 and 300 GHz are as follows (for S0 = 1.00 W/m2): Tissue Frequency (GHz) Z2 (W) Rt a m-1 S(z = 1mm) Dry skin 6 63 0.49 122 0.43 Dry skin 300 177 0.87 3664 0.022 Wet skin 300 163 0.84 4565 0.009 ICNIRP Appendix A gives a rationale (see pp 504, 508 of ICNIRP 2020), but in my opinion there needs to be further explanation to give clarity.	The Standard refers to the ICNIRP (2020) guidelines for a rationale and detailed information on the Basic Restrictions and Reference Levels	In line 1015 have added "Further information on many of the quantities defined in the Glossary is provided in the ICNIRP (2020) guidelines"

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1081	Kordia New Zealand	1081 to 1086 – we suggest that clearer definitions for Seq and Sinc are provided to clarify the distinction between them (and similarly for Ueq and Uinc). ICNIRP 2020 (p.13) states that the distinction relates to far field and near field considerations, suggesting plane or spherical wave fronts respectively.	The definitions given are sufficient to convey the difference between Sinc and Seq (and similarly for Ueq and Uinc). Further information on these quantities is provided in the ICNIRP (2020) guidelines	No change
1087	Australian Mobile Telecommunications Association	Lines 1087-1089 RMS Delete "the function" and replace with "a set of numbers" The root mean square which is derived by first squaring "a set of numbers " and then determining the mean value of the squares obtained, and taking the square root of that mean value	Agreed	Changed "by first squaring the function and then" to "by first squaring a set of numbers and then"
1090	Anonymous	1090 Specific absorption (SA) should be Specific energy absorption (SA) as stated at 296/297	Agreed	Changed "Specific absorption (SA)" to "Specific energy absorption"
1092	Anonymous	Specific absorption rate (SAR) should be Specific energy absorption rate (SAR) as stated at 296	Agreed	Changed "Specific absorption rate (SAR)" to "Specific energy absorption rate (SAR)"
1092	South Australia EPA	Change "Specific absorption rate (SAR)" to "Specific energy absorption rate (SAR)" 'Energy' included here to coincide with the SAR description in the body text.	Agreed	Changed "Specific absorption rate (SAR)" to "Specific energy absorption rate (SAR)"
1104	South Australia EPA	Australian Standard 1319 1994. Safety signs for the occupational environment. Standards Australia. [http://www.approvedfirstaid.com.au/wp-content/uploads/2016/06/AS-1319%E2%80%941994- Safety-signs-for-the-occupational-environment.pdf] Link doesn't work unfortunately, though believe this Standard had a revision in 2018? https://www.standards.org.au/standards- catalogue/sa-snz/publicsafety/sf-005/as1319-1994	Agreed	Changed link to https://www.standards.org.au/standards- catalogue/sa-snz/publicsafety/sf-005/as 1319-1994

## **General comments**

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Andrew Wood	Continuity with other standards at 300 GHz. This is really a problem ICNIRP needs to address (and probably is addressing), but some acknowledgement needs to be included that this is an area where further adjustment may occur in the future. To illustrate, the ICNIRP Laser standard has limits which go down to f = 300 GHz (wavelength 1 mm). See Fig 10 in Health Physics 105(3):271-295; 2013 where (>2600 nm corresponds to < 115 THz) for 100 s exposures of the skin, the equivalent of Uinc is 10^5 J/m2, as opposed to 4.2 J/m2 in Table 7 (General Public). Clearly, there are issues when comparing coherent with incoherent radiation, but more work in harmonization needs to be done. N.B. diode lasers are now operating as MMW sources, so issue of coherent radiation may need to be considered	This is valid point but not one to be addressed by RPS S-1 at this point. The issue will be mentioned to ICNIRP for further discussion.	No change
Andrew Wood	Very happy that ARPANSA is harmonizing with ICNIRP (rather than IEEE or having a purely local set of limits). Application of this standard in real world situations is likely to be difficult to implement (except by a small and select group of experts). ARPANSA should consider a back-up document to explain to the uninitiated what steps they should take in order to demonstrate compliance.	Examples on the application of the Standard can be included in supplementary material to the Standard.	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard
Andrea Weber	The Draft Standard specifies limits of human exposure to RF fields to prevent adverse health effects (1.3 Purpose, line 206) and is "designed to protect all people of all ages and health status" when exposed to RF EME (ARPANSA Q&A). As there is continuing uncertainty and conflict within the science as to what the established adverse health effects actually are, the Standard should reflect a precautionary approach to protect the health of the Australian public. The Draft Standard is based on the assessment that heating is the only cause of health effects in the body and does not take into account non-thermal biological effects of low- level RF EME exposure shown to impact health. Health effects at levels of exposure too low to cause heating need to be adequately considered in the Standard. The Scope of the Draft Standard (1.4 Scope, lines 216 & 217) states that the Standard is applicable wherever the general public (including persons of any age or health status) may be exposed to RF fields " Many scientists and doctors consider this everyday exposure	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) that there is unsubstantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty. The management of the consultation process through the Department of	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	to be potentially detrimental to the health and wellbeing of children, those with compromised and chronic health conditions and people with electromagnetic sensitivity (EHS). The Draft Standard covers reference levels (2.4) over short timeframes (6/30 minutes) considering heating effects only. It does not appear to account for longer timeframes of exposure or long-term low-level exposure. As our children are exposed since birth, this needs to be taken into account when drafting protective exposure limits. In the ARPANSA Q&A, it is stated that "The intensity of RF EME diminishes rapidly with distance away from the source." As the Draft Standard we are now reviewing will have particular significance for 5G and future technologies using these higher frequencies, is this statement still accurate? Will the intensity of RF EME actually diminish with distance considering the frequency and technology used to run 5G? ARPANSA opened this review of the Draft Standard, welcoming everyone to share their views so I don't understand why a postal address was denied for those with EHS unable to use the online format? This doesn't seem reasonable when I'm sure it could have been accommodated with very little effort. Due to the growing scientific evidence, advocacy from highly qualified experts and unfortunately the growing number of people adversely affected by RF EME exposure, we are approaching a point where these factors can no longer be written off as "unsubstantiated". When this happens, where will this leave the health and wellbeing of the Australian public? There is the opportunity right now in the review of this Draft Standard to start making necessary changes and provide the Australian public with adequate and appropriate protection.	Health website is in compliance with Australian government policies and guidelines. ARPANSA acknowledges that while symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	
Angela Foulds	' Overall harmonisation with ICNIRP was considered important and the exposure limits in the ARPANSA 2002 Standard differed only in small detail from those in the ICNIRP 1998 guidelines." Arpansa is required to state why they wished to harmonise the Australian Standard with the Germany based club ICNIRP. Previous to ICNIRP, Dr P Czerski, from Poland was head of the INIRC.	ICNIRP is recognised as the peak body in non- ionizing radiation protection. The ICNIRP guidelines are considered as international best practice in non-ionising radiation protection, and are used by most countries world- wide.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	Upon Dr Czerski passing away prematurely in 1990, Mike Repacholi set up ICNIRP based upon short term exposure to non-ionising radiation.	ICNIRP also provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry	
	Repacholi, a physicist, had little to no educational background or expertise in the field of microwave biological effects, chronic and delayed effects and disease or illness manifestation path ways.	The ARPANSA Standard considers all health effects associated with RF EME exposure. The only substantiated health effects of exposure to RF EME are heating of biological tissue, electroporation and electrostimulation at very high exposure levels. There is no substantiated scientific evidence for other adverse health effects from exposure to RF EME below the limits set within the Standard. The limits set to prevent these effects are very	
	Repacholi did not acutually devise the limits for the ICNIRP, nor did members of his club. They simply adopted the microwave oven emission standard from the FDA to protect against burns, heat shock and so on.		
	On the other hand, Dr P Czerski, with extensive educational background in medicine, in both chronic and delayed effects from exposure to microwave radiation, produced both short term and long term or 24 hr health limits for Poland.		
	Today short term and 24 hour limits in line with Dr Czerski and the world experts, protect up to 40% of the world's population.	conservative incorporating significant safety factors for additional protection against uncertainties.	
	Australia is crippled with limits 100 x worse than what the world experts recommend for 24 hour exposure to microwave radiation.		
	ARPANSA''s non ionising division does not have expertise in the area of chronic and delayed effects of Microwave radiation, the illness and disease manifestation pathways. It is therefore acknowledged that ARAPNSA sought to adopt a Standard from elsewhere.		
	The ICNIRP club produced a standard in line with their area of expertise, being physics, in order to protect against short term health effects such as burns and shock. This is clear in the following statement:		
	"the only adverse health effects on humans that were fully verified by a stringent evaluation [by ICNIRP] were short term immediate health consequences such as stimulation of peripheral nerves and muscles, functional changes in the nervous system and		
	other tissues, shocks and burnsThere are also data for chronic low level exposure that indicated that there may be other health effects'' ICNIRP 1998		
	There is no immediate problem noted with ARPANSA adopting the ICNIRP standard to protect against short term effects such as burns and heat shock. This is indeed a physics		

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	calculation and representative of the expertise of Repacholi. These short term limits are indeed used around the world as short term limits. However, grave errors occur when non experts seek to extrapolate or interpret data beyond their own chartered level of expertise. Neither ICNIRP nor ARPANSA possess the medical knowledge, educational background nor level of expertise to formulate medically based limits protective against chronic or delayed health effects.		
	Chronic and delayed health effects from low level exposure to Microwave Radiation have clearly been acknowledged in the past by ICNIRP but more specifically have long been acknowledged by the current and past worldwide experts in this field.		
	Neither ICNIRP nor ARPANSA can become experts capable of formulating medically based guidelines simply through reading and discussing studies conducted by actual experts. This is akin to a hospital orderly reviewing and discussing the medication of a patient as portending to be an expert having read many medication outlines.		
	Quite simply, Arpansa should stick to what they are good at and clearly define their level of expertise in a written form, by each team member, to be critiqued and verified by the experts in this field. This is part of being chartered and is an absent and fatal flaw within the Arpansa Non-ionising Division.		
	The recent updated ICNIRP standard is clear evidence of errors occurring due to the absence of expertise in microwave radiation medically based biological effects.		
	The recent review and update of the ICNIRP standard was led by Rodney Croft who has a background in psychology from the Telstra partnered ACEBR. The updated standard purports to be not only protective against short term effects but also against long term and chronic health effects with no reduction in the limits for 24 hr exposure.		
	Clearly this is an error, due to the absence of the critical factor of length of exposure, i.e. time. and this aspect is addressed further below.		
	ARPANSA seek to follow the ICNIRP standard for no clear reason however their lack of expertise has resulted in ARPANSA being unable to realise the errors within and hence seeks to perpetuate them and endanger the Australian Public.		
	"It is Australian Government Policy to implement international best practice"		

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	The ICNIRP standard is widely understood to provide world worst practice limits for 24 hr exposure to microwave radiation.		
	Australians deserve far better from the bureaucrats at ARPANSA.		
	It is true that many countries have limits similar to ICNIRP, however this is for the short term limits. Further to this, the short term limits were devised long before ICNIRP arose and are in line with the FDA microwave oven emission standard.		
	Best Practice 24 hr limits are 100 to 1000 x lower than the limits presented in the ICNIRP standard.		
	Best Practice limits are used in countries such as Russia, China, Poland, Switzerland, Belgium and Italy. It is to be noted that both United Nations bases, Geneva and Brussels ensure limits 100 x safer than in the ICNIRP standard. In fact the chronic 24 hr limits were determined decades ago and remain unchanged today as current best practice. Microwave radiation has not changed and the limits are based upon extensive studies both at the bench and in the field.		
	Clearly ARPANSA is failing to protect Australians adequately from the known harmful effects of chronic exposure to wireless radiation. The safe limits protecting up to 40% of the world's population are based upon extensive experimental studies and studies of people occupationally exposed to wireless radiation. ARPANSA is ignoring expert advice, both current and past, regarding the safe limits for wireless radiation. ARPANSA has a duty to provide world best practice for Australians and instead is providing world worst practice.		
	ICNIRP is an obscure club based in Germany. Whilst it is stated that the WHO back ICNiRP, this is clearly an industry biased organisation. Up to 80% of WHO funding is from industry. Further to this the biggest donors to WHO are arguably the largest investors in 5G radiation. To further the industry influence, the UN ITU formulated 5G with Huawei and Microsoft, the official name is ITU IMT-2020.		
	The WHO is in no way considered to be free from industry bias and in fact the EMF project was crippled from credibility due to payments from industry to Repacholi via the Adelaide Hospital. This was acknowledged widely circa 2006. It is a false statement that the WHO represents the public interest when industry bias is so extreme.		
	Since at least circa 1999, the world experts in the field of biological health effects have		

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	raised the alarm that the limits in the ICNIRP standard are wrong. Many countries have now implemented safe 24 hr limits, still ARPANSA has failed to realise the grave errors of using a short term protective limit for a 24 hr limit and has not.		
	This error has been shown to Arpansa repeatedly, yet ARPANSA fail to act to protect Australians with world best practice limits formulated by the world experts.		
	This is inexcusable and is no longer acceptable. World best practice must be provided within Safety Standards for Australians.		
Angela Foulds	<ul> <li>2.2 "Mandatory limits on exposure to RF fields are based on established health effects"</li> <li>It is to be noted that "established" refers to what ICNIRP or ARPANSA consider to be established.</li> <li>The world experts in the field of biological effects have long understood that microwave radiation causes symptoms such as : headaches, dizziness, insomnia, depression, tachycardia, from low dose long term exposure. These effects are known effects.</li> <li>It is noted that often ICNIRP and ARPANSA have statements such as,</li> <li>"the causal mechanism is unclear; the dose relationship varies; the results differ when the experiment is repeated, therefore the study cannot be relied upon for setting limits.</li> <li>Neither ICNIRP nor ARPANSA possess expertise in biological health effects on a cellular or sub-cellular level, nor in the disease or illness manifestation pathways. This places both organisations in a poor position to determine the long term implications of biological</li> </ul>	The ICNIRP guidelines are considered as international best practice in non-ionising radiation protection, and are used by most countries world- wide. The limits set within the standard are based on substantiated science and international best practice. They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The Standard covers the frequencies proposed for use in the 5G network.	No change
	ICNIRP and ARPANSA have sought to frame the above known health effects as a "psychological phenomenon". The heavy inclusion in ICNIRP of individuals specialising in "communication" and "psychology" seeks to strengthen the approach of dismissing known health effects that are poorly understood. Hence this leads to a critical error of failing to protect against known health effects. ICNIRP is closed off to the world leaders in this field of chronic and delayed health effects caused by exposure to microwave radiation and ARPANSA is devoid of experts in this field.		

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	For ARPANSA to continue to adopt ICNIRP standard is to deliberately ignore the world experts and to fail the Australian Public in providing by far, by a factor of over 100, world worst practice for 24 hr exposure to Microwave radiation.		
	Solution:		
	Immediately, ARPANSA is to adopt world best practice. The limits in Switzerland could be considered or China. This should again be taken to public consultation, as opposed to public comment. ARPANSA is to involve to a high level the PUBLIC as the public is by far the largest stakeholder.		
	The limits provided in Table 1 are incorrect. The ICNIRP limits are based upon a "slab model". The model fails to incorporate the varying electromagnetic properties of the human body.		
	Particularly this is dangerous with mmWave microwave radiation which is absorbed in the top mm of the skin. Within the top mm of the skin are numerous blood vessels and sensitive nerve endings.		
	Blood, containing iron, has electromagnetic properties. Blood has been shown to have a SAR that is up to 30 x higher than surrounding tissue.		
	The limits therefore represent a GRAVE ERROR. The limits do not take into account the electromagnetic properties of iron in the blood.		
	Further to this, long term stimulation of nerve endings from mmWave results in long term electromagnetic pulses travelling throughout the body.		
	mmWave microwave radiation is known to be highly biologically active and have a wide range of adverse health effects on humans even at low levels of exposure.		
	Where has ARPANSA reflected this knowledge within the standard?		
	It is not acceptable for ARPANSA to ignore this known evidence. Particularly as very few countries seek to deploy mmWave microwave radiation on their citizens.		
	M Swicord, circa 1980 conducted mmWav studies and it was revealed that RNA and DNA absorbs the mmWave microwave radiation and heats to 60 degrees celsius with no		

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	discernible change in overall body temperature.		
	These are known studies. ARPANSA may not know of these studies, but that again reveals the lack of expertise in this area.		
	This year in Australia mmWave experimental emitters were turned on as follows:		
	Optus- from Feb 2020: 3 emitters in Melbourne, 4 emitters in Sydney, 3 emitters at the Gold Coast,		
	Telstra - from June 2020: 18 emitters in Melbourne only.		
	mmWave microwave radiation has been used extensively this year in America and across the globe in microwave experiments conducted by Klaus Schwab's WEF and Public Private Partnerships. The so called "living laboratories" are in public spaces however the "living" are not aware of these experiments taking place. These experiments ran throughout 2020, termed 5G EVE by Klaus Schwab and have been concurrent with illness across the globe. What studies has ARPANSA undertaken to satisfy themselves that the microwave radiation used in these experiments was not making people sick or contributing to the advancement		
	of the virus? A study of the following illness outcome could be conducted:		
	Europe's first wave of PPP experiments in public spaces began in Feb 2020 and people started falling ill not long after. For an example, here is a link to the WEF ''living laboratory'' experiment portal showing Turin, Italy in Feb 2020 being subject to the launch of experiments.		
	https://www.5g-eve.eu/public-premiere-of-5g-eve-portal-at-live-online-demo/		
	Indeed Europe's second wave of microwave experiments began September 2020 and again people are falling ill.		
	It is important to note that in the "experiments" this year beginning in Wuhan, FULL 5G is used including mmWave and beam forming.		

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	In Australia we are yet to receive the FULL 5G, as this is 5G EVE for Klaus Schwab.		
	5G GENESIS is the next step.		
	For this, the ACMA will be auctioning next March, mmWave microwave radiation to enable the carriers to deploy this across Australia.		
	Both Optus and Telstra have statements regarding working towards the Germany born 4th Revolution.		
	However, the public may not understand what the 4th Revolution entails as desired by Klaus Schwab. It is outlined in the following, however ARPANSA need to be transparent with the public as to whether this level of wireless radiation they are enabling is consistent with life on earth:		
	https://www.skynews.com.au/details/_6199544116001		
	Whilst some of the above words belong to the journalist, Klaus own words regarding his transhuman future that 5G is to enable can be sought easily.		
	ARPANSA may be aligned with the "ushering in" Klaus 4th revolution, however this is more akin to covert deployment that is unacceptable in normal society.		
	The limits set out by ARPANSA to accommodate 5G are too high when compared to the known adverse effects from Microwave radiation.		
	It is critical that ARPANSA understands that the mmWave microwave radiation will be beam formed both from cell towers and 5G satellites.		
	The studies that reveal that this will be highly damaging to humans and nature are extensive. However ARPANSA "is unaware of evidence", deems there to be "no substantiated evidence" for adverse health effects below the APRANSA health limits.		
	The current and past world experts have already determined that adverse health effects occur at levels of exposure many times lower than the ARPANSA limits.		
	ARPANSA's lack of expertise in this field is leading to critical errors that could be avoided		

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	through adopting world best practice instead of world worst practice. Ignorance is not a valid excuse. "not knowing" "not being aware of" is addressed further regarding the people involved in producing this standard. The severe lack of expertise and chartered representation has resulted in a standard that is not aligned with or reflective of the studies and recommendations provided by the world experts in this field of microwave radiation health effects.		
Angela Foulds	<ul> <li>'It is important to determine whether, in situations of simultaneous exposure to fields of different</li> <li>542 frequencies, these exposures are additive in their effects. Additivity should be examined separately for the</li> <li>543 effects of thermal and electrical stimulation, and restrictions met after accounting for such additivity.''</li> <li>The above statements by ARPANSA do not take into consideration that the carriers using the limits are not required by the ACMA to take into account emissions from other sites when applying for a license.</li> <li>It should be clearly directed that all sources are to be taken into account, this is common sense.</li> <li>If ARPANSA is to protect the public from the known harmful effects of wireless radiation, surrounding sites must be accounted for.</li> </ul>	The Standard is applicable for exposure from all RF sources in the environment i.e. simultaneous exposure from multiple frequency fields (as is mentioned in Section 3 of the Standard).	No change
Angela Foulds	Throughout this section, the term exposure is used incorrectly. The ARPANSA standard is barely different to the microwave oven emission standard. "While emission and exposure standards are stated in the same terms of measurement, mW/m2 - radiation emissions are measured at a specific distance from a radiation source with NO consideration to the LENGTH of TIME a person may be exposed. Radiation exposure, however, is measured in terms of the length of time a person is subject to given levels of radiation with no consideration to the distance from the source of sources." (Ref: Comptroller General of the United States, "More protection from Microwave	The exposure limits in the Standard apply for any exposure duration (short term or long term). The averaging times in the Standard refer to the time it takes for whole body (30 min) and localised (6 min) temperature rise. The only substantiated health effects of exposure to RF EME are heating of biological tissue, electroporation and electrostimulation at very high exposure levels.	No change

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	Radiation Hazards Needed.''		
	In virtually all studies regarding the chronic and delayed effects from exposure to microwave radiation, TIME is a factor. This does not refer to the averaging over 6 mins calculation. TIME or "length of exposure" refers to how long a person is exposed to the microwave radiation for.		
	Length of exposure greatly changes the biological effects. The adverse biological effects from an acute high dose of microwave radiation are also known to be similarly matched by the same dose being broken down into smaller increments and delivered over time:		
	<ul> <li>'the same biological effects produced by a single microwave exposure at a given level have been reported from multiple microwave exposures at lower exposure levels."</li> <li>"Exposure of the population should be kept as low as possible"</li> <li>"The likelihood of biological effects occurring has also been shown to increase as the length of each exposure increases."</li> <li>"Consequently the effects of single and repeated exposures should be considered SEPERATELY, even when exposure takes place under identical conditions" (Environmental Health Criteria 16, World Health Organisation).</li> </ul>		
	"It should be stressed that long term low dose exposure may induce peripheral lymphocytosis, stimulation of lymphopoiesis and anomalies of nuclear structure and mitotic abnormalities in lymphocytes and erythroblasts." (The Effects of Microwaves on Human Lymphocyte Cultures, W. Stodolnik Baranska.)		
	ARPANSA has provided an emission standard protective of immediate health effects ONLY.		
	For ARPANSA and ICNIRP to purport that this standard protects against known long term chronic and delayed health effects is wrong and a false statement.		
	The 14 year long NTP again proved the cumulative effects of long term low level exposure to microwave radiation. In fact the NTP proved that wireless radiation causes cancer.		
	In many countries bureaucrat departments are grasping this knowledge and insisting on wired connections in pre-schools and schools. ARPANSA is yet to act to inform the public of the known cumulative adverse effects from wireless radiation even though this landmark		
	the implications of the NTP study which were stated in plain English and to inform the		

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	public. ARPANSA fails the Public of Australia in not acting to promote wired connections. Further to this wired connections have 1/10 the carbon footprint of wireless. The failings are compounded.		
	Industry has stated that the testing of a phased array beam formed microwave radiation has thus far been problematic due to equipment limitations.		
	Further to this, only this year will 5G enable equipment by "rolled out" on the public.		
	ARPANSA would be aware that 5G also involves a web of up to 45000 5g satellites beam forming microwave radiation directly at or to a person's device.		
	Therefore:	The Standard applies to all sources emitting RF EME.	
	Where has APPANSA tested a hand held device receiving a phased array beam formed radar mmWave from a satellite directly to the device?	The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public	
	What is the resultant power of this at the antennae within a person's hand?	and occupational exposure limits up to 300 GHz.	
Angela Foulds	Is the power level received to the device from a satellite dangerous to a small child? Given mmWave radiation is absorbed within the top mm of the skin, how has ARPANSA	At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur.	No change
	unrelated to "the virus", unrelated to Kawasaki disease, are not the result of the mmWave deployment in 5G testbeds?	It is the assessment of ARPANSA that there is no substantiated scientific evidence to support any	
	What studies has ARPANSA conducted in the area of the 5G testbeds to determine if the people within those areas are affected or unaffected by being within a 5G "living laboratory"?	RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network.	
	The world experts in the field of biological effects, medical based chronic and delayed effects have already determined the ICNIRP limits to not be protective of the health of people and nature. The world experts have numerous studies attesting this.		
	ARPANSA and ICNIRP, non expert bodies, have adapted the original FDA microwave oven emission standard to provide a set of "safe limits" in their own standard and now seek to present as an authority regarding protective health limits both long term and short term.		

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	It is at this stage, it is to be re-iterated that as far as being protective of acute effects, this is		
	indeed a readily acceptable basis for a physics consideration up to 3GHz .		
	Beyond acute effects and beyond this frequency, far more complex considerations come		
	into play that are beyond the knowledge of simply physics and certainly psychology has		
	nought to offer in this field of radiation safety.		
	ARPANSA and ICNIRP in operating outside of their ill defined expertise are making grave		
	errors in the provision of safe limits suitable for the Australian Public.		
	It does not appear appropriate for ARPANSA to be trusted with this critical area of health		
	concern. Simply pointing out the errors is scarcely enough to ensure safety.		
	Indeed the backstop here is to consult with current and past world expert advice and at a		
	minimum provide Australians with current best practice limits that are protecting up to		
	40% of the world's population.		
	This indeed is what is required for APDANISA to most the surrent legislative requirement		
	regarding "Best Practice Standards"		
	Ideally the RF Standard is returned to the Australian Standards Process in order to form		
	part of the robust Australian Standards library.		
	It was only due to pressure from politicians and industry that the standard was changed to		
	transhuman revolution. Very few if any Australians would find this an acceptable nath to		
	walk down. It only through covert operations, that this path is being walked.		
	As Australians become aware of the lack of protection from the rapidly increasing		
	microwave radiation emitted from satellites, small cells, hand sets, modems and more,		
	ARPANSA's failings will become blatantly obvious.		
	Klaus Schwab states that this is 5G EVE. So much more radiation is coming with 5G GENESIS		
	for his transhuman revolution so sought by him but unknown to the public.		
	(Refer: The Great Reset, SKY NEWS 11/10/20.		
	https://www.skynews.com.au/details/_6199544116001)		
	Now is the time to provide the same best practice limits as enjoyed in sourchise where PE		
	cancer rates are up to 1/3 of those in Australia.		

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	Now is the time to adopt a limit for 24 hr exposure that DOES NOT exceed 10 uW/cm2. This is regardless of any measurements of current exposure. This is to protect the public long term with the RIGHT LIMITS.		
	It is time.		
	Below is the list of people involved in the Production of the ARPANSA STANDARD FOR LIMITING EXPOSURE to RF FIELDS		
	Dr Kerapidis : Physics		
	Dr Rick Tinker - ? Applied Science		
	Dr Bruce Hocking - Former Telstra/Telecom Doctor represents bias and contractual considerations are expected.	The Standard is based on the ICNIRP guidelines, which are considered as international best practice in non-ionising radiation protection, and are used by most world-wide. The ARPANSA standard was further developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders. For transparency, ARPANSA also put the Standard open for consultation to the public from 31 August	
	Dr Martin Gledhill - An industry technician?		
	Mr Rohan Mate - ? Science degree		
Angela Foulds	Mr David Urban - ? Science Degree		No change
	Dr Stuart Henderson - Physics		
	Mr Don Wijayasinghe - General Practitioner		
	Mr Ray Mc Kenzie - Bachelor of Applied Science Physics honours.		
	There is a complete absence of expertise within the group of people involved in producing such an important safety standard.		
	If the standard is to protect simply from burns, shocks, etc, the above list would potentially be suitable.		
	However the above list would still require chartered representation from the community and more representation from the public.		

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	In order to provide protective limits with regards to 24 hr exposure to wireless radiation, a far greater level of expertise is of necessity and must be represented. This is not to give "lip service" and tick a box, this is to ensure that the limits are right. At present they are far from right by a factor of at least 100.		
	ARPANSA have revealed their inability to recognise their own limitations, this is inherent when not defining individual areas of expertise. It is not suitable to continue to advise a government bureaucratic department of their failings when they simply lack the fundamental ability to acknowledge their errors.		
	The above list reveals numerous "Doctors". However they are not experts in the correct field of cellular and sub-cellular effects of wireless radiation and disease and illness manifestation pathways.		
	Physics as a basis for short term effects is reasonably straight forward and many people would arrive at similar limits for short term effects, as evidenced world wide with the continued use of the FDA microwave emission standard as the basis of this and other standards for short term effects.		
	To state that short term limits and long term or 24 hours limits are the same, is a grave error.		
	With FULL 5G coming shortly, with triple the carbon footprint of 4G and scaffolded on 4G as well as the deployment widely of mmWave next year, we are on the cusp of far higher levels of microwave radiation.		
	ARPANSA is providing the wrong limits for a 24 hour setting by at least a factor of 100.		
	The errors are clearly caused by the lack of expertise within the ARPANSA group above and it is arrogance and negligence to continue to ignore the obvious. ARPANSA should not be intrusted with the formulation of safe limits for wireless radiation.		
	Expert advice regarding safe limits is lacking. In this case as a sheer minimum, ARPANSA must adopt world best practice immediately in order to be in accord with legislative requirements and to protect against liability.		
Angela Foulds	ARPANSA's standard is ONLY suitable for short term exposure limits based upon physics.	The exposure limits in the Standard apply for any exposure duration (short term or long term). The	No change

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	Chronic and Delayed effects require extensive medical knowledge a that is not represented adequately by Arpansa. Icnirp is an obscure club based in Germany not presently open to the experts.	averaging times in the Standard refer to the time it takes for whole body (30 min) and localised (6 min) temperature rise.	
	<ul> <li>Klaus Schwab from Germany has called 5G his catalyst to RESET the GLOBE.</li> <li>The WHO is funded predominantly by industry with arguably the greatest investment in 5G in the world. The WHO represents obvious bias, particularly as the UN was involved in inventing 5G.</li> <li>In the current standard ARPANSA is ignoring the experts and the clear evidence regarding the cumulative effects of exposure to wireless radiation.</li> <li>In Geneva and Brussels, the two bases for the UN, the allowed level of wireless radiation is 100 x safer than in Australia.</li> <li>Further to this, neither Geneva or Brussels will be subject to mmWave radiation nor beam forming due to the lack of safety studies and the presence of studies revealing severe adverse effects.</li> <li>mmWave radiation in particular is KNOWN to have severe adverse effects on mankind.</li> <li>Beam Forming is KNOWN to cause the microwave radiation to penetrate far more deeply, yet this is not addressed or "not known" by ARPANSA.</li> <li>Australia has both mmWave and beam forming coming due to Arpansa's lack of safety knowledge.</li> <li>China is not having mmWave nor Beam Forming outside of the initial experiments in Wuhan long since completed.</li> <li>China also has wireless radiation limits that are 100 x lower than in Australia. In fact predominantly in China, 3G is used. The propaganda is not true.</li> <li>Australians should not be reliant on non-experts in this field adopting world worst practice. This is entirely unacceptable and a moratorium on 5G, particularly beam forming and mmWave, must be called whilst safe limits are devised for wireless technology.</li> </ul>	<ul> <li>The only substantiated health effects of exposure to RF EME are heating of biological tissue, electroporation and electrostimulation at very high exposure levels.</li> <li>The Standard also applies to all frequencies in the RF range including millimetre waves.</li> <li>ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence.</li> <li>ARPANSA and the World Health Organization (WHO) do not support the adoption of arbitrary exposure limits.</li> <li>The exposure limits in the ARPANSA Standard are based on current scientific knowledge and are aligned with international guidelines prepared by the International Commission for Non-Ionising Radiation Protection (ICNIRP) and endorsed by the WHO.</li> <li>The ICNIRP guidelines form the basis for regulations within most countries world-wide</li> </ul>	

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	It is simply not good enough for non-experts to reply with "Arpansa does not agree" or "Icnirp has reviewed all relevant studies".		
	Non experts reviewing experts studies is fraught with danger. That is where we are right now, in a very dangerous situation because of the fundamental lack of chartered and public representation within the standard setting body. On top of a lack of written definition of individual areas of expertise within the standards group.		
	It is difficult to see that Arpansa could ever be entrusted with publishing correct limits, therefore the default position for ARPANSA should be to publish world best practice similar to Switzerland.		
	This is a matter of urgency.		
	Regards,		
	Angela Foulds		
Anonymous	I recommend ARPANSA set the RF exposure limit at least 100 times lower than the current level. Australia would then have a similar level to Switzerland at 95,000 microwatts/sq metre rather than the current level of 10,000,000 microwatts/sq metre. The reasoning for this recommendation is as follows. Thermal effects: The current safety standards test relies heavily on a specific temperature limit not being exceeded while exposing a piece of plastic to 6 minutes of RF radiation. Reliance on this test ignores the findings of the majority of independent studies that cite biological effects occur at very low levels of power density transmission and that effects are accumulative over time. The relevance of a single 6 minute thermal test is therefore questionable.	The limits set within the standard are based on substantiated science and international best practice. They are underpinned by ARPANSA's assessment of the scientific evidence and consistent with several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects	No change
	We are being exposed to NIR from mobile phone towers 24/7 365 days, at power levels much higher than what the human body evolved in co-ordination with nature over millions of years, and inundated by frequencies that do not occur in nature at all eg. pulsed waves. Power density and Frequency:	Research – Scientific Literature 2000-2012. The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.	

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	I believe the main consideration in reviewing the Standards relates to high NIR power density and its effect on the intricate neural network of the human body. The field of biological study that most fits with inquiry into bio-effects of RF is Magneto- biology, a field of study still in its infancy. A more precautionary approach to the setting of limits should be applied by ARPANSA until at least the technology is proven safe by this field of science. A comparison of Power Densities by country shows that what is deemed safe in one country can be 100 times higher than that in another country: https://www.powerwatch.org.uk/science/intguidance.asp	ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence. ARPANSA and the World Health Organization do not support the adoption of arbitrary exposure limits.	
Anonymous	ARPANSA acts to set Australia's RF exposure limit to be 100 times lower than the current level at say 95,000 microwatts/sq metre. This level would be the same as used by Switzerland and is intuitively safer. I believe the vast majority of Australians expect the safest level possible from their regulatory authority. Thank you for considering this submission.	The limits set within the standard are based on substantiated science and international best practice. While ARPANSA is aware of more conservative limits set in some countries, these limits are not supported by scientific evidence. ARPANSA and the WHO do not support the adoption of arbitrary exposure limits.	No change
Anonymous	Australia's RF exposure limit be set 100 times lower than the current level at say 95,000 microwatts/sq metre. I believe the vast majority of Australians expect the safest level possible from their regulatory authority. I will leave ARPANSA reviewer(s) with some additional questions: 1. Has ARPANSA reviewed the 106 page 1971 US Naval Medical Research Institute Bio- effects of Electromagnetic Fields study? The study of some 138 health effects is here: https://ecfsapi.fcc.gov/file/7022311479.pdf 2. Has ARPANSA reviewed the well-researched Oceania Radiofrequency Scientific Advisory Association power-point presentation of RF related Bio-effects: https://www.orsaa.org/uploads/6/7/7/9/67791943/bio-effect_findings_full_version.pdf 3. Is ARPANSA aware of the Public Safety Recommendations made by its equivalent scientific advice group in Russia, the Russian National Committee on Non-Ionizing Radiation Protection? https://www.radiationresearch.org/articles/new-russian-list-of-emf-hazard- and-prohibition-signs-for-wireless-users-and-general-public/ At stake is the future health of all Australians, most especially children who are going to be exposed to a lifetime of toxic radiation.	The limits set within the standard are based on substantiated science and international best practice. They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012.	No change

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	In reviewing the NMRI and ORSAA material, I notice many of the bio-effect symptoms of over-exposure to NIR present as flu-like in nature. In the absence of a fundamental medical knowledge in the field of magneto-biology, it is possible that practicing medical doctors, specialists, nurses, etc could misinterpret symptoms caused by NIR with similar symptoms associated with influenza, COVID-19 or other viruses. This leads to a final question: Has ARPANSA informed the Australian Government and State Chief Medical Advisors that RF radiation sickness resulting from over-exposure to NIR can present symptoms that mimic the symptoms of influenza, COVID-19 or other similar virus?	The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.	
	Thank you	The ICNIRP guidelines are considered as	
Anonymous	I believe that our planet is in dire peril if it follows the standards of ICNIRP for radiation exposure. In following it's patent bias to industry, ARPANSA's new draft standard is so compromised by ICNIRP's industry links that it's lack of credibility is obvious.	<ul> <li>international best practice in non-ionising radiation protection, and are used by most countries worldwide.</li> <li>ICNIRP is recognised as the peak body in non-ionizing radiation protection by the mainstream scientific community.</li> <li>ICNIRP provides declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry.</li> <li>ARPANSA is an independent Australian Government Agency that is responsible for assessing scientific evidence and protecting people and the environment from the harmful effects of radiation by applying international best practice and advice to government and stakeholders.</li> </ul>	No change
Anonymous	Condoning toxic RF effects from the magnetosphere above the Earth, to insects, bacteria, plants, birds, bats and humans - ARPANSA's sanctioned proliferation of current levels of radiation in the environment is a planetary sin. Dismissing the potential effects of 5G is likewise.	The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public and occupational exposure limits up to 300 GHz.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur.	
		It is the assessment of ARPANSA that there is no substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network.	
		Impacts of RF EME from artificial sources on plant and animal life have not been established. Existing studies on the effects of low-level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment.	
Anonymous	These 'standards' dismally fail to protect us from RF exposure as previous EMF standards already fail to prevent adverse health effects. Electro-sensitives such as myself are happy to explain the miseries we suffer from current radiation levels that have not respect for our boundaries. ES is classified as a disability in the UK. We, the 'canaries in the coal mine', must not be ignored!	ARPANSA acknowledges that while the symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change
Anonymous	ARPANSA should be shamed into oblivion for this outrageous denial of our rights to enjoy a safe environment. RF is officially a Class 2B carcinogen (along with lead), according to the WHO. It was, apparently, the use of lead eating utensils by the Roman emperors that brought them down. Will there be a parallel with RF proliferation? Will all nature have to become disordered and people starve, sicken and society fail, due to RF and EMFs, and just to fuel industry profits?	There is currently no substantiated scientific evidence that exposure to RF EME below the exposure limits set in the Standard causes cancer or any adverse health effect. Some studies have shown an association between heavy mobile and cordless phone use and brain cancer. These studies suffer from methodological shortcomings including biased information on mobile phone use. Other studies have not substantiated these results. Based largely on this	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		limited evidence, the International Agency for Research on Cancer has classified RF fields as possibly carcinogenic to humans.	
		However, a study led by ARPANSA in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in any brain tumour types since then.	
		More rigorous long-term studies are being coordinated by the World Health Organization and Australia is taking part in this research program.	
Anonymous	When ARPANSA is rid of all industry links and influences, then one might begin to trust its standards. Meanwhile, they are in cahoots with an industry that is playing a very dangerous game and the consequences are too awful to contemplate.	ARPANSA is an independent Australian Government Agency that is responsible for assessing scientific evidence and protecting people and the environment from the harmful effects of radiation by applying international best practice and advice to government and stakeholders.	No change
Anonymous	<ul> <li>Thank you for the opportunity to make comment on the draft ARPANSA 'Standard for Limiting Exposure to Radiofrequency Fields – 100 KHz to 300 GHz'. This document is inadequate to protect health for the following reasons.</li> <li>It protects only against the heating effects of radiation, not the athermal biological effects that place a significant burden on the body and are linked to health problems. These athermal exposures are linked with damage to cells, DNA, hormones and oxidative stress in many scientific studies.</li> <li>Increased rates of brain tumours have been found at levels of exposure that comply with the Australian and international standards. As a result, the International Agency for Research on Cancer classified radiofrequency radiation as a Class 2B carcinogen. Lack of scientific research on real-world exposures makes it impossible to stipulate appropriate limits for 5G frequencies.</li> <li>Many people experience painful symptoms when exposed to radiation from wireless</li> </ul>	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- lonizing Radiation Protection (ICNIRP) that there is no substantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to	No change
Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
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	The draft standard does not protect against harmful effects from peaks of exposure, as it averages these peaks over time. The draft standard protects against short-term, acute effects and not long-term effects that people experience living and working in an exposed environment, as most people are. It is incumbent on ARPANSA to amend the draft to address these issues and ensure an appropriate level of protection for Australians.	provide additional protection and account for uncertainty.	
Anonymous	The WHO, ICNIRP and ARPANSA have strong industry ties that demonstrate powerful influence on RF EMR safety research outcomes. According to Prof. Klaus Buchner, 'The mobile communications industry sets its own limit values.'	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry. ARPANSA is an independent Australian Government Agency that is responsible for assessing scientific evidence and protecting people and the environment from the harmful effects of radiation by applying international best practice and advice to government and stakeholders. The limits set in RPS S-1 are based on substantiated health effects from exposure to RF EME.	No change
Anonymous	Reference levels in the draft assume that averaging exposure for 6 minutes - 30 minutes is safe. The draft further assumes, incorrectly, that sudden bursts of radiation have the same effect on the body as exposure to a steady and continuous signal. The draft does NOT protect against long-term exposure.	<ul> <li>The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure.</li> <li>The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur.</li> <li>At levels below the limits in the Standard, the temperature rises are within normal body temperature variations.</li> <li>The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure.</li> </ul>	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		Exposure to RF EME below the limits in the Standard do not have a cumulative effect.	
		The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard. The ARPANSA RF Standard accounts for all modes of RFEME transmission including continuous and pulsed.	
Anonymous	<ol> <li>Understanding Risks</li> <li>ARPANSA admits to risks and the need to understand those risks from RF EMR exposure. At odds with ICNIRP and ARPANSA, it is the assessment of Australian and international health authorities, expert scientists and doctors that there is ' established scientific evidence of adverse health effects below current exposure limits.'</li> <li>Leading global RF EMR experts, scientists, biophysicists, epidemiologists and doctors warn of detrimental effects from RF EMR exposure well below limits set by ICNIRP. Repeatedly ignored, these standards endorsed by WHO, advised by ICNIRP and ARPANSA continue to deny effects other than heating of exposed tissue.</li> <li>The draft fails to protect against all harmful effects on the body that are known to occur at levels too low to cause heating, such as DNA and cell damage, increased levels of free radicals, changes in levels of hormones and neurotransmitters, and brain tumours. The draft ignores proposed mechanisms that account for adverse effects on the body at nonheating levels of exposure, such as oxidative stress, derangement of heavy metals, impacts on amalgams resulting in antenna effects, inter-cranial oscillations, hearing loss, neurological disorders, activation of calcium ion channels and mast cells, and cancer.</li> <li>According to signatories of the EMF Scientist Appeal: 'It is our opinion that, because the ICNIRP guidelines do not cover long-term exposure and low intensity effects, they are insufficient to protect public health.'</li> <li>The International Agency for Research on Cancer has classified levels that comply with existing standards as a Class 2B carcinogen, in the same category as lead. Many await a reclassification of RF EMR to a Class 1 Carcinogen.</li> </ol>	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. The ICNIRP RF guidelines are underpinned by the body of available scientific and health evidence and set limits based on established health effects of exposure to RF EME. ARPANSA contributed to ICNIRP's revision of the revised RF guidelines and recognise them as being in line with international best practice. While there are some scientists and organisations that have the opinion that there are negative health implications of low-level RF EME exposure it is important to note that their opinion is not supported by health authorities, mainstream science and the body of available scientific and health research. ARPANSA has assessed the body of available evidence (including the same evidence those scientists provide to support their position) and does not agree with their conclusions. This is due to, amongst other things, the available studies demonstrating mixed or lack of consistent results, methodological shortcomings and no	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		proposed plausible biological mechanisms for how harm may occur at low level exposure.	
		ARPANSA's assessment is in line with that of the World health Organization (WHO) and ICNIRP. There is currently no substantiated scientific evidence that exposure to RF EME below the exposure limits set in the Standard causes cancer or any adverse health effect.	
		Some studies have shown an association between heavy mobile and cordless phone use and brain cancer. These studies suffer from methodological shortcomings including biased information on mobile phone use. Other studies have not substantiated these results. Based largely on this limited evidence the International Agency for Research on Cancer has classified RF fields as possibly carcinogenic to humans.	
		A study led by ARPANSA in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in any brain tumour types since then.	
		coordinated by WHO and Australia is taking part in this research program.	
Anonymous	For frequencies from 100 kHz to 300 GHz, tissue heating can occur and must be avoided. Members of the public are chronically over exposed to complex and variable mixtures of low and Ultra High Radio Frequency electromagnetic fields. Critical exposure depends on the distance from the source, together with the emitted power and duty factor. Specific frequencies and modulations are more likely to produce biological effects than continuous wave. Therefore, further experimentation on humanity & wildlife in investigating the carcinogenic potential of exposure to multiple RF frequencies should cease immediately. All	The ARPANSA RF Standard accounts for exposure from all sources, any time duration and all modes of RF EME transmission including continuous and pulsed. There are no substantiated health effects at levels below the limits of the Standard.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	well known. Both brief and continual exposure to multiple frequency fields pose an increased carcinogenic hazard.		
Anonymous	ARPANSA has been keeping Data collection records of Australians' complaints of biological harm from RF EMR. What has been done with this data? Where is the official response to	Members of the public who believe they have suffered ill-effects as a result of exposure to EMR can lodge a written complaint to the ARPANSA Electromagnetic Radiation Health Complaints Register. Relevant data gathered is used to produce statistical summaries for the public and the Commonwealth Government on the nature and level of complaints	No change
		received. Information could be used by ARPANSA to help identify future areas of research into the effects of electromagnetic fields on people and the environment.	
Anonymous	1. Humanity and Environment Beyond Saturation Under the Act 1998, ARPANSA is bound to protect all Australians and the environment from the harmful effects of RF EMR, including current Australians suffering from, and medically diagnosed with Electro Magnetic Harm Syndrome (EHS), Radiation Poisoning or Microwave Syndrome. Outrageously, ICNIRP admits ' the science pertaining to direct radiofrequency EMF effects on nerve stimulation and associated restrictions within the ICNIRP (2010) guidelines has not been reconsidered here.'	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change
	2. Research ARPANSA has a reputation for highly selective cherry-picking of research that fits Industry affiliations. Notably, ARPANSA fails to acknowledge very thorough Military research.	The limits set within the standard are based on substantiated science and international best practice.	
Anonymous	Concerning the effects of 5G, other than documented Military research, no epidemiological testing has been conducted on exposed populations, therefore, it is premature to establish safety limits already released 5G frequencies.	They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific	No change
	ARPANSA states: ' The main changes in the limits of the new Standard relate to additional restrictions for RF EME exposure at higher frequencies, above 6 GHz, which is of importance to 5G and other future technologies using these higher frequencies.'	Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising	

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	Hardell and Carlberg: '[Comment] Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest'	Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard covers the frequencies proposed for use in the 5G network.	
Anonymous	<ul> <li>2. Best Practice Regulation</li> <li>ARPANSA claims: 'It is Australian Government Policy to implement international best practice and to adopt international standards where they exist and can be applied to the Australian regulatory environment.' Yet according to a 2018 Comparison of International Policies on Electro Magentic Fields, Russia, Switzerland, Austria and Italy have lower levels of exposure than ARPANSA standards. Some areas practice the Precautionary Principle with lower exposure limits than ARPANSA RF Standard. Yet ARPANSA states: ' However, these limits are not based on substantiated scientific evidence' For the health and safety of every Australian, it is imperative that the Precautionary Principle and LARA (As Low as Reasonably Achievable) principles apply in Australia. We are not SAM.</li> <li>With ever increasing numbers of EHS Australians, ARPANSA confirms: 'The exposure limits set in the updated guidelines are considered by ARPANSA and the broader scientific community to be international best practice.' It appears that the 'broader scientific community' does not include well informed, expert colleagues with non vested interests, who disagree with ICNIRP/ARPANSA.</li> <li>ARPANSA claims it engages in best practice regulation whilst its current Australian standard exposes all Australians from cradle to grave in standards which are 100 times higher than International Best Practice (IBP). In terms of population, 40% of the rest of the globe have safer standards.</li> <li>Why have warnings from highly qualified Public Representatives not been heede? Conclusion: VOTE of No Confidence in ARPANSA and ICNIRP's Draft: Standard for Limiting Exposure to Radiofrequency Fields – 100 KHz to 300 GHz (RPS S-1)</li> </ul>	It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- lonizing Radiation Protection (ICNIRP) that there is no substantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty. While there are some scientists and organisations that have the opinion that there are negative health implications of low-level RF EME exposure it is important to note that their opinion is not supported by health authorities, mainstream science and the body of available scientific and health research. ARPANSA has assessed the body of available evidence (including the same evidence those scientists provide to support their position) and does not agree with their conclusions. This is due to, amongst other things, the available studies demonstrating mixed or lack of consistent results, methodological shortcomings and no proposed plausible biological mechanisms for how harm may occur at low level exposure. ARPANSA's assessment is in line with that of the World Health Organization.	No change
Anonymous	3. Policy If ever increasing 24/7 involuntary exposure to RF EME, particularly minimum exposure to	ICNIRP's RF guidelines are considered to be international best practice.	No change

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	100 KHz to 300 GHz is deemed at 'safe' levels in Australia, why the need for ARPANSA to yet again adopt ICNIRP's '… revision of its guidelines for radiofrequency radiation protection'?	Further, ARPANSA contributed to the review of ICNIRP's guidelines and provided comment to the ICNIRP consultatation process.	
		Australian Government policy is to adopt existing international guidelines if they are appropriate for use in Australia. In this case, the ICNIRP RF guidelines fulfil this criteria.	
Anonymous	Comment 1: In Section 1.2 Background (lines 190-194) you write: "In March 2014 ARPANSA published the Report by the ARPANSA Radiofrequency Expert Panel on Review of Radiofrequency Health Effects Research – Scientific Literature 2000 – 2012 (ARPANSA, 2014). The report concluded that the science behind the ARPANSA RF Standard remains sound and that the exposure limits in the Standard continue to provide a high degree of protection against the known health effects of exposure to RF." As you would be aware from EMERG meetings, I criticised this report as being erroneous, not independent and a simplistic paper count. Suggestion 1: I suggest that you conduct an independent review of the scientific literature from that period, but also include scientific literature from prior to that period and, very importantly, the *missing eight years after that period i.e. 2013-2020* before producing a new Standard.	ICNIRP provide an assessment of the scientific and health evidence in Appendix B of the ICNIRP RF exposure guidelines. The review of the evidence is consistent with other major reviews including: : ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard covers the frequencies proposed for use in	No change
Anonymous	Comment 2: In Section 1.4 Scope: Your Standard does not apply to members of the animal kingdom other than humans, members of the plant kingdom and members of other kingdoms of living things. You do however write: "The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) publishes Fundamentals, Codes 3 and Guides in the Radiation Protection Series (RPS), which promote national policies and practices that 4 protect human health and the environment from harmful effects of radiation." (lines2-4) Suggestion 2: I suggest you include all the other living things in the world in consideration	Impacts of RF EME from artificial sources on plant and animal life have not been established. However, existing studies on the effects of low-level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment.	No change

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	of your Standard by reviewing all relevant scientific literature, for example studies on the effects of EMR on honey bees and plants. Suggestion 3: You need to update the Scope to specifically list what living things the Standard applies to and what it does not.		
Anonymous	As you are aware, I was a member of the Electomagnetic Energy Reference Group (EMERG) from 2014-2019. During this time I attended your meetings with representatives of the government, telecommunications industry and members of ICNIRP. I attended these meetings with an open mind. Comment 5: Scientific Evidence has not been addressed During my time on EMERG I presented many pieces of scientific evidence suggesting that the limits you have used in this Standard are too high. I have not received any good justification from anyone on EMERG as to how the scientific evidence I presented can be ignored. For example, the National Toxicology Program (NTP) long term Study into Cell Phone Radio Frequency Radiation found: • Clear evidence of an association with tumors in the hearts of male rats. The tumors were malignant schwannomas. • Some evidence of an association with tumors in the brains of male rats. The tumors were malignant gliomas. • Some evidence of an association with tumors in the adrenal glands of male rats. The tumors were benign, malignant, or complex combined pheochromocytoma. (https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones/index.html) The NTP study results were supported by the study from the Ramazzini Institute titled "Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission" (https://pubmed.ncbi.nlm.nih.gov/29530389/) These studies match human data. E.g. The cancers in Attorney Jimmy Gonzalez (https://www.youtube.com/watch?v=Ka5v_HLMhxs)	ARPANSA reviewed the NTP study. This review is available on the ARPANSA website: <u>https://www</u> .arpansa.gov.au/news/arpansa- reviews-animal-study-radiofrequency-exposure- and-health.	No change
Anonymous	Suggestion 6: You should not be producing Standards when there is sufficient scientific evidence to suggest that they are wrong. Unlike the earlier Standard, commonly known as RPS3, you have removed a discussion of all scientific studies in the document, that form the basis for your Standard.	RPS S-1 refers to the ICNIRP (2020) guidelines on the rationale of the exposure limits and health evidence.	No change

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Anonymous	Suggestion 7: I suggest you reference long-term scientific studies, such as those just mentioned for transparency.	An assessment of the body of scientific evidence for RF EME exposure and health is provided in Annex B of the ICNIRP (2020) Guidelines.	No change
Anonymous	Comment 6: Lack of Scientific Rigour The group EMERG was disbanded a year prior to the release of this draft. This is objectionable. Surely vigorous scientific debate is what is required to produce a Standard, particularly one that is so far-reaching.	<ul> <li>The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.</li> <li>The Standard was also open for consultation to the public from 31 August to 21 October 2020.</li> </ul>	No change
Anonymous	Suggestion 8: I suggest a thorough review of this document is carried out by people with suitable medical qualifications.	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change
Anonymous	Comment 7: Reliance upon ICNIRP In the Forward you write "ICNIRP is the peak international body developing and disseminating science-based advice on health protection in relation to exposure to non- ionising radiation (lines 85-86)". ICNIRP has been largely criticised for its ties to industry and as such this statement should be reworded.	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provides declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry.	No change
Anonymous	Suggestion 9: If you are to describe it as a "peak" international body you need to justify this.	ICNIRP includes experts from different countries and disciplines, such as biology, epidemiology, medicine, physics, and chemistry, that work together with and within ICNIRP to assess the risk of NIR exposure and provide exposure guidance.	No change
Anonymous	Final Comments I would like to emphasize that: - I find it disturbing that you remove the clause that limits unnecessary exposure to the general population when there is uncertainty over your limits. - I find it very concerning that so many scientists researching in this field and so many long-	Noted. Specific comments addressed individually previously	No change

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	term studies disagree with the standards you are setting (refer to the links earlier in this submission)		
	<ul> <li>I find it alarming that your Standard is inapplicable to every other species of living thing on this planet apart from humans, when your remit is to protect everything from harm.</li> </ul>		
	Thank you for the opportunity to comment on this draft.		
	The Draft standards do not take into account the fact that the pulsing non-ionizing EMR emitted from devices such as smart meters, mobile phone towers, mobile phones and related equipment such as 4G Wifi routers and 5G devices, negatively effects the health and wellbeing of people with an ElectroHypersensitivity (EHS) disability.		
	As a person with medically diagnosed EHS, I suffer ill health when exposed to levels of pulsing EMR at levels which are well below ARPANSA's current and proposed Draft standards; My ill-health symptoms include Tinnitus, sleeplessness, inflammation, skin irritation, heart palpations, and other adverse ill health effects.		
	I believe the Draft standard is neither adequate nor sufficiently comprehensive as it fails to incorporate findings from extensive, independent, established scientific research. ARPANSA and ICNIRP are not medical experts.	The ARPANSA RF Standard accounts for all modes of RF EME transmission including continuous and pulsed and protects against all substantiated health effects.	
Anonymous	In setting the Draft standard, ARPANSA must ensure it avoids turning a Blind Eye to the vast body of evidence that contradicts ARPANSA's findings that pulsing non-ionizing EMR is safe and only causes heating effects.	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science	No change
	To ensure its Standards are adequate and are based on a comprehensive scientific process, examples of Evidence to which ARPANSA should not turn a blind eye when setting its Draft standards include the following :	so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	
	1, Pulsing non-ionizing radiation at a frequency similar to that emitted by the smart-meter		
	communications devices in the State of Victoria has been experimentally confirmed by the		
	USA Government (U.S. Air Force) and The University of Rome, to cause negative health effects, including Tinnitus (my condition, high nitched ringing in the ears which leads to		
	sleeplessness.) The relevant Declassified document is titled: Radiofrequency/microwave		
	radiation biological effects and safety standards: A Review Doc AD A 282 886 Rome		
	laboratory Air Force materiel Command Griffiss Air Force Base, New York. US Airforce in		
	house report L TR94 53 declassified study into RF Microwave radiation biological effects		
	and safety Standards Rome Laboratory, refer extract page 13.		

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	<ol> <li>A PubMed-listed, peer-reviewed study, entitled Self-reporting of Symptom Development from Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series, offers the hypothesis that "some people can develop symptoms from exposure to the radiofrequency fields of wireless smart meters". The study's conclusions pointed to the "possibility that smart meters may have unique characteristics that lower people's threshold for symptom development". The most common symptoms in the study were insomnia, headaches, tinnitus, fatigue, and cognitive disturbances. The American Academy of Environmental Medicine (AAEM) has endorsed this study, stating, "It is a well documented 92 case series that is scientifically valid. It clearly demonstrates adverse health effects in the human population from smart meter emissions" The Victorian study, in addition to a US-based survey, is discussed by Dr. Ronald M. Powell. Dr. Powell is a retired career U.S. Government scientist. He holds a Ph.D. in Applied Physics from Harvard University. During his Government career, he worked for the Executive Office of the President, the National Science Foundation, and the National Institute of Standards and Technology. In his US survey, 49% of people reported sleep disorders from exposure to pulsed EMR from smart meters. More information on how EMR affects sleep can be found here: <u>http://www</u>.emraustralia.com.au/knowledgebase/emr-and-sleep http://www feb se/emfguru/Research/emf-emr/EMR-Reduces-Melatonin htm</li> </ol>		
	<ol> <li>The World Health Organization agency classifies RF EMR as possibly carcinogenic to humans, group 2B (May 31<sup>st</sup>, 2011).</li> <li>A report on the Swedish Governments position on the treatment of ElectroHypersensitivity as a disability by Associate Professor O. Johansson, Department of Neuroscience at the Karolinska Institute Stockholm Sweden</li> <li>A Report from the Austrian Medical Association on EMRF related problems ElectroHypersensitivity.</li> <li>Dr. Gerd Oberfeld Dept of Public health Salzburg report, regarding EMF and disease and a letter to the editor about the creation of the EHS condition by radiation.</li> <li>The Schwazenburg Transmitter study; The Swiss shortwave transmitter study and its relevance to smart meter exposures. Radiofrequency health standards and the smart meter controversy: Council of Europe report May 2011: The precautionary principle, various studies.</li> <li>Summary HESE UK: International regulations and biological effects ref p5 and p11 with scientific study references on radiation limits.</li> <li>The Freiburger Appeal 2002, signed by 1,000 physicians.</li> <li>Other governments, including those of Switzerland and Russia, as well as at least nine</li> </ol>		

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	<ul> <li>EU Member States, (e.g. Austria) have set their own "preventative" exposure limits which are significantly lower than those outlined in ICNIRP.</li> <li>11. The Austrian Medical Association has a set of guidelines for the treatment of EMR related health problems. Sweden recognizes EHS as a functional impairment.</li> <li>12. More about the Precautionary Principle, EMR standards and people like me who have "Photosensitivity" or ElectroHypersensitivity.</li> <li>13. ARPANSA's own Fact sheet 14, that said "wireless technology (i.e. 5G) is so new we can't be sure there isn't some risk."</li> <li>14. Refer phone tower health effects. <u>https://mdsafetech.org/cell-tower-health-effects/</u></li> </ul>		
	Some Proposed considerations which I request ARPANSA to undertake when formulating its new Standard are as follows :		
	<ol> <li>EMR Standards should be set at much lower levels such as those that exist in China, Russia, and some European country levels. ARPANSA should adopt the Precautionary principle as a basic tenet of standard-setting.</li> </ol>		
	2.) Standards should incorporate the same instructions that are issued by mobile phone manufacturers who publicly advise phone users to hold the phone handset well away from their head and have it on speaker mode when in use so that they can thereby avoid serious health effects.		
	3.) Standards should require that The State of Victoria's DEWLP should conform with the AEMC national guidelines on smart meters.		
	4) Standards should require that a Telecom company must relocate a 5G mini-base station technology so that is well away from the residences of persons who are Electrohypersensitive. For example, since the time that new 5G equipment was fitted, without my consent or consultation, outside my premises, I am unable to use the two rooms which face in the line of sight to the new 5G telecom equipment. 5G technology is causing me health problems ( Body cramping, Atrial fibrillation, Tinnitus).		
	5) Arpansa could advise all telecoms that all cell towers need to be placed a minimum of 300 meters from any residential premises and removed from hospitals. Ref <u>https://mdsafetech</u> .org/cell-tower-health-effects/		
	6) Standards should be device-specific and recognize User-health feedback and long-term		

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	exposures, particularly where exposure is 24 hours/7 days a week.		
	In undertaking the task of Draft standard-setting, ARPANSA should be mindful to avoid any potential for perceptions of conflict of interest which may arise.		
	ARPANSA is a Government controlled entity and the Government, via ACMA, has generated and continues to generate considerable revenue and taxes from the sale and issuance of 4 and 5 G licenses. ARPANSA needs to be mindful to avoid any potential perception of conflict of interest when formulating standards.		
	For example, ARPANSA is now setting a new standard AFTER the rollout of untested 5G technologies, and therefore the potential for perception by some of a conflict of interest might be considered. Specifically, given ARPANSA's ownership and control by the Government, it may not be apparent to some as to how ARPANSA could now draw up a Draft Standard that does not align with the pre-existing, commercial interests of the Government.		
	I believe that, when setting standards, ARPANSA must give consideration to avoiding any potential perception of conflict of interest.		
	One proposed solution to address this potential conflict of interest is for ARPANSA to ensure that standards align with recommendations not from ICNIRP, but from a truly independent, highly qualified, research organization that is known and respected by the community and ARPANSA. One such organization that could 84Iaus84 this role is the Oceania Radiofrequency Scientific Advisory Association Inc (ORSSA) which could review the research impartially and assist ARPANSA to determine standards for pulsing non-ionizing EMR at levels which do not inflict negative health outcomes on people such as myself with EHS.		
Anonymous	My comments pertain to two of my Naturopath clients A 67yo mother and 39yo Daughter. Both presenting with epilepsy style symptoms about 5 months ago during 1 <sup>st</sup> Covid Victoria Lock down The mother was more heavily symptomatic with nightime 'jerking' constantly waking her thru the night. Doctors placed her on neural sensors thru the night. NothING was confirmed Hence her visit to me for another opinion.	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change

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Name of submitter	She had been an occasional customer previously         Having seen her in the past we became aware she was an electromagnetic sensitive person having determine this as a genetic trait amongst females her daughter became symptomatic too.         We can only estimate that whilst all humans are Electromagnetic being's some 3-4% of females are extremely sensitive.         Our initial discussion's with the mother centered around her symptoms becoming evident around the 1 <sup>st</sup> Covid shutdown where all her neighbours were working from home AND children home schooled.         Knowing that all radiations issues are cumulative, her symptoms got worse & worse the longer 85laus lock downs continued         Needless to say during the following 3 months she and her daughter improved markedly esp after ceasing all home wifi, blue tooth etc. She then had all her home hardwired to the Web as well as replacing her LED lighting with thermal lighting such as Quartz down lights. This was addressed beca use the mother also had a history of progressive visual blindness called retinal detachment         After doing these measures the mother also had a history of progressive of medical sciences Dr Martin Pall of Washington University         Since 2013 he has aciduously broken the issues of Non ionizing Radiation illeffects on human cells.         He has determined the damage is done to human cells via VGCCs or Voltage Gated Calcium Channels.         His research was published in 2018 in a 90+ page PDF here         https://einarflydal.files.wordpress.com/2018/04/pall-to-eu-on-5g-harm-march-2018.pdf         In short he declare's that our EMF standards worldwide are up to 100x set TOO high May I respectfully ask APRANSA to heav	ARPANSA response	Changes to the draft RPS S-1
	from section 3 Dr Pall declare's that the real danger of Non ionizing radiaton is that of its pulsing which exponentially increases it's damage . Further he says it is as yet unknown how multiple EMFS interact with human cells General comment from section 4 <u>https://einarflydal</u> .files.wordpress.com/2018/04/pall-to-eu-on-5g- harm-march-2018.pdf General comment from section 5 Like all radiation the real danger comes from repeated exposure 0ver the years Whether at home, at work etc etc		
Anonymous	Like all radiation the real danger comes from repeated exposure 0ver the years Whether at home, at work etc etc	Exposure to RF EME below the limits does not have a cumulative effect.	No change

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	I beseech the authorities approach the levels in a new light A new light to reset all the safe Radiation levels at least 190x lower the the current levels. Further Dr Pall ''s FAR from alone in his research There are many many other science based papers and websites having exposed these principles relating to Non ionizing radiation in the new 5G radiations Warmly Glen Rees	The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels many times above the limits set in the Standard.	
	Thank you for the opportunity to comment on the ARPANSA standard, as a member of the public and to provide some supporting links, including relevant testimony from scientists. In regard to the issue of exposure levels to protect the general public,	The limits set within the standard are based on substantiated science and international best practice.	
Anonymous	I particularly wish to draw attention to comments by Australian scientist Professor Trevor Marshall, ex Curtin University and current head of The Californian Auto Immune Disease Research Foundation, in two international conference talks, the first in which he refers to important overlooked published research relevant to increasing background radiation levels in communities and Type II Diabetes (an issue also raised in official US testimony by medical scientist Dr Sharon Goldberg, amidst other diverse overlooked concerns, these conference links being referenced first place in the list at the end. In the second conference talk (excerpt), as an engineer and ex IEEE member also himself, Marshall identifies a background exposure level which he proposed as both technically feasible and compatible with human biology including optimal immune function; stating that we just need to be smarter about the way we apply technology. This surely becomes	They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty. The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public and occupational exposure limits up to 300 GHz.	No change
	all the easier if we make super fast fibre the backbone of our home internet, as recently proposed as the intention by Government. The background exposure level proposed by Professor Marshall aligns well with relevant levels mentioned in a 2015 paper by Panagopolous et al below, on the topic of why man made fields are so biologically active in contrast to natural radiation sources and simulated exposures and also an early research paper from 1978 by William Bise which discussed EEG effects in human experiments). If we worked around Marshal''s proposed exposure level for a background exposure standard, all the health issues referenced below would seemingly be addressed.		
	While this is the main comment of my submission, I feel it is also essential to provide supporting evidence to justify such standard changes proposed by Professor Marshall, because so many of us have now come to believe that it will simply not be possible to have	At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur. It is the assessment of ARPANSA	

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	a healthy population while so many both diverse and fundamental effects remain unaddressed by standards, due to the standards basis itself being flawed according to many scientists with long term expertise in this field, so I hope you will have the patience to bear with me in providing support for my comment. In this regard it is worth noting that this year two reports from Europe also referenced below, ' 5G Rollout, State of Play' and a Swiss Sonar Reinsure Report both raised concerns about potential public health effects of increasing radio frequency exposures relevant to 5G . Despite comparatively less research specific to the higher 5G frequencies, a 2007 publication"Birds, Bees, Mankin" by biologist Ulrich Warnke had already highlighted a research paper by Belyeav et al finding effects on DNA at extremely low exposure levels in the millimetre range. Another concern is it has been acknowledged that 5G will heat the skin slightly and in early papers noted that radiation exposures had greater effects where ambient temperatures were above 28 degrees87laus8787s— Australia is a HOT country? A letter from Australian advisory agency ORSAA below also notes the immune system is	that there is no substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network.	
	situate in the skin. In 1973, long before cell phones and other wireless tech came to market, a Canadian Engineering Report addressed the complex hazard if microwave radio frequency radiation exposure to the public were ever to become widespread noting in its concluding pages that there were both thermal and non thermal effects, with the SAR being inadequate to address these. much of that research having originated in Eastern Europe and Russia, where safety standards for workers had already been set at substantially lower than the western world, though still not accounting for long term exposure.		
	One of the most obvious crucial factors overlooked by the current safety standards is the fact that the standard is said to protect for 6 minute localised exposure and 30 minute full body exposure against tissue heating. The world of 30 minute exposures is recently gone for the majority now, for whereas the phones that were around in the 1990s had one antenna that was seemingly dormant when not in active use, phones these days have five or so antennas in a wrap around case configuration which emit constant standby radiation when simply powered on, with an increasing number of app updates constantly creating even more traffic. DECT phones and wifi modem bases and wireless printers also emit constant "standb' radiation as do smart appliances when simply powered on at the power point, constituting greatly overlooked sources of 24/7 chronic radiation. Consider, until recently many households still had a basic copper corded landline phone for long conversations; the loss of this energy efficient reliable service having been cause for lament by so many Australians with the NBN rollout (Engineer Timothy Shcoele's addressed		

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	this issue in his 2017 comprehensive report 'Reinventing Landlines.)'.		
	In 2001 Dr Ted Litovitz PhD gave a US Congressional Briefing where he opened by noting that many scientists honestly defend the thermal standard. He then spoke about 'replication' issues and went on to table biological research effects published at levels thousands of times beneath the thermal tissue heating standard for non-ionising radiation and picked one replicated effect out of the table; the cellular stress response. He said this was a direct effect of the cells in response to something that caused damage, where the cells would create special proteins to go in and repair damage, but that this response was designed for short term stressors only and broke down over time, making the short duration thermal safety standard such a problem, as we all rely on that repair capacity to counter disease and remain healthy.		
	In a 2010 conference excerpt below, nine years after Litovitz' briefing, Dr Martin Blank, head of the 2015 UN Scientists Appeal repeated Litovitz' warning about the cellular stress response, noted in his own research with his colleague Reba Goodman, stating this in itself as clear proof by the cells in their own language, of the inadequacy of the current safety standards basis. In regard to such adaptive responses designed to protect from short term exposures, a paper by Hao et al detailing oxidative pathway activation as one of the mechanisms of radio frequency damage, also referred to noting an initial adaptive phase that broke down after long term exposure,		
	In terms of the oxidative damage noted in that paper, a later review paper by other authors documented oxidative effects in 93 out of 100 studies reviews, commenting on one of the studies having noted this effect even at very low 'standby' cell phone level exposures. A review paper on impacts on Brain Energy Metabolism also made note of the fact that the same effects observed as high level exposures of short duration were observed at very low levels over longer duration, further supporting the crucial shortcomings of a short term safety standards and Professor Marshall's concerns about increasing electrosmog.		
	One of the other well established, or replicated, effects in the table displayed by Litovitz is the blood brain barrier effects, as since confirmed in a series of experiments by Swedish scientist Leif Salford and his team; Salford noting in a 2010 conference talk referenced below the potential crucial overlooked relevance of this research to the public, having authored a paper in 2003 based on that research which warned of a potential epidemic of early Alzheimer's Disease. (Note Salfor''s talk is listed below and the relevant exposure level is mentioned also in Hardel''s 2017 Stockholm Railway Station public health exposure review).		

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	A 2018 published paper co-authored by Australian scientists including Dr Rodney Croft, acknowledged that recent advances in research had provided new insights confirming unexpected effects of non- ionising radiation and discussed the promise of using very brief radio frequency radiation exposure at non thermal exposure levels for around 1 and a half minutes to allow passage of chemotherapy drugs past the blood brain barrier. Unfortunately the other side of this coin, is that our safety standards currently allow constant exposure at such levels and levels below that were noted as a source of such concern for long term exposure by Salford in his conference talk; effect starting after 2 minutes, with a continuing cascade of effects for 52 days leaving dark neurons after a single 2 hour exposure. Early scientist Alan Frey had already noted similar effects in his own research before the advent of cell phones, including research in humans where he noted headaches in volunteers and himself and commented on cell phone passive exposure relevance in a 1998 paper.		
	Scientist Andrew Marino with 40 plus years of published research in this field explained in an interview entitled 'Going Somewhere' that one of the key reasons Western standards remain based on the thermal standard can be attributed to a science disciplines divide between physics and biology having historically occupied separate streams, noting from his qualification in both spheres, that physicists tend to deal in linear systems, whilst human biology is non-linear with physics and engineering having long partnered in the manufacturing of technology.6 Professor Martin Pall, who has spoken at many conferences on this issue in recent years, says the biology and physics actually point in the same direction, in drawing attention to numerous reviews and overlooked relevance to several current public health trends, including depression and neuropsychiatric effects. It is worth noting here that a 2014 Department of the Interior letter to the US FCC safety agency; the Dept of Interior having oversight of that agency and the EPA, made brief official comment in an 'Enclosure', that the safety standards were now 30 years obsolete in continuing to be based on thermal standard.		
	<ul> <li>Marino believes the key is to make exposure about personal choice, rather than blanketing all of society in such fields. It is worth noting that as mentioned by physicist and occupational epidemiologist Dr Paul Herous in official US testimony, these scientists are keen to work with industry in getting things right and that even Frank Clegg, ex Head of Microsoft Canada has commented on coming from a clever industry that can rise to fixing things, given the directive.</li> <li>If background levels were kept low at the sort of level recommended by Professor Marshall</li> </ul>		

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	and we adopted Marin''s suggestion of personal choice regarding exposure, there could for instance quite easily also be an inititaitve to provide specific wifi access areas in shopping centres and public places, rather than exposing everyone, including young children and pregnant mothers involuntarily. This would also be in line with a 2011 European Parliament Resolution 1815 later which called for need to heed their previous warnings to reduce public exposures, particularly passive exposures. It seems it would be quite feasible to introduce such measures satisfactorily.		
	In official email testimony Canadian cardiologist Dr Hugh Scully stated concern that 20% of people had inherent sensitivity to radio frequency radiation and both the US government National Toxicology Program and the Ramazzini Institute studies testing the hypothesis of the thermal near field and far field standards made findings of cardiomyopathy, Fiorella Belpoggi of the Ramazzini Institute commenting on the relevance of this to heart disease, a conference talk displaying by Dr Martin Pall in which he gave account of several reviews and mentioned potential relevance of overlooked cardiac effects to increases in sudden cardiac arrest in young people without known risk factors.		
	Effects in early reviews were as diverse as those tabled by Litovitz in his 2001 talk, as noted by medical scientist Dr Goldberg in her testimony and included effects on heart function, EEG, immune system, memory, endocrine and nervous systems, even carbohydrate metabolism. It was also acknowledged in early reviews that biological understanding of many systems was also not nearly as complete as it has since become.		
	Imagine the energy saving alone, if households could retain the old reliable standard copper landline corded phone and power off mobile phone and devices when not in use, forwarding calls to land lines. If necessary, cost for upkeep of the copper landline to continue alongside NBN could be covered with a minimal increase in rates, allowing this Universal Service Obligation so essential in power outages as it should. Perhaps there could even be potential for Telecommunications companies to profit from offering home phone bundles with ability to supplying additional lines to kid's bedrooms, and NBN connections to bedrooms for phone USB connection at home, as obviously the smart phones themselves having become an integral part of modern life are''t going away.		
	Professor Olle Johansson in an interview and 2015 letter has stated that while epidemiology always carries some inherent problems, cellular and other research effects have been published that are relevant in themselves to all sorts of epidemic conditions increasing in the general population, including his work on mast cells having strong potential relevance to increasing allergies and asthma. In his letter he noted below how		

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	tired the global populations has become of slow action on exposures that are later confirmed after decades of inaction.		
	In 2012 an International Doctor's Appeal originating from Germany had over a thousand signatories drawing attention to an earlier appeal from 2000, calling attention to health observations in their patients under chronic radio frequency exposure. One of those doctors, Dr Selsam-Waldmann documented these health effects in a letter to the German Prime Minister with a report based on clinical records of her long term patients showing health effects down as low as 0.06 V/M in patients under long term exposure to pulsed digital radiofrequency radiation in their homes.		
	Dr Mallery Blythe of the UK speaking at a 2018 International Childhood Cancer Conference in London referred to this as the 'Elephant in The Room' of public health, with time for precaution already well overdue, particularly when it comes to protecting children, echoing statements made by numerous expert scientists over the last two decades including Ernesto Burgio PhD of Italy who spoke in a 2015 conference of the urgent need to protect the fetus, based on research by Dr Hugh Taylor and research review in her chapter of the 2012 Biolnitiative Report by Harvard neurologist Dr Martha Herbert of the Transcend Autism Project, Burgio's talk also displaying the significance of Dr Martin Blank's research, as head of the 260 plus 2015 Scientists Appeal to UN and WHO.		
	Dr Marino stated in written 2016 US official smart meter testimony that as a scientist it was hard for him to imagine more cellular, animal and epidemiology studies could be required to indicate biological effects relevant to all kinds of human diseases. He also mentioned his own research having clinically established the existence of the "electrosensitivit" phenomenon in a physician volunteer, a condition said to be increasing in the general public as exposure increases. However like Dr Blank, Litovitz and others who have published research on the cellular stress response, he also stated in that document that the cellular stress response and other noted biological effects occur regardless, beneath the level of conscious awareness of humans.		
	A German Telekom wifi Speedport also recently warned in its instruction pages to place the device away from the vicinity of living and sleeping areas due to the radiofrequency radiation it emits, so there has even been some acknowledgement of health concerns from the industry sector in Europe, a Swisscom patent from 2003 having also acknowledged research showing non thermal level chromosome damage while seeking to address standby radiation permanently emitted by such devices while not in active use . So awareness is obviously growing even amongst industries, but too slowly for benefit of public health,		

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	which of course includes industry people themselves.		
	In 2017, Hardell et al published a review paper documenting some of the peak pulsed radiofrequency exposure levels relevant to published research and public health, including findings of a real life human cell tower study from Germany in 2011 that showed changes in clinically relevant neurotransmitters over time associated with disease. Note other chronic exposure concerns relevant to cell towers and human disease and documented health effects in patients, subject of several international doctors' appeals from Europe listed below including the 1000 strong 2012 International Doctors' Appeal.		
	As Frank Clegg, ex Microsoft Canada head has stated, the industry is clever and so It seems to him quite a lot could probably be done that could also be profitable to industry. (Note scientists like Dr Paul Heroux from McGill Unviersity in his 5G testimony, with his history working with utilities, say they are keen to work with industry in cooperative effort, not against industry).		
	In a 2011 German real life cell tower study involving human volunteers, changes in clinically relevant neurotransmitters were noted at levels as low as 30 microwatts per metre, lending further support to concerns for long term chronic exposure from cell towers and other permanent sources of exposure, further supporting the clinical observations of documented effects in long term patients noted in a 2007 report by German physician Dr Selsam-Waldmann where patients had been chronically exposed to levels as low as 0.06 V/M on a continual basis in their homes.		
	(How can annual 'Are You Ok?' days and Lifeline and Beyond Blue help lines cope in a situation where overlooked increasing chronic radiation exposure is causing fundamental changes to hormones and neurotransmitters directly related to mood and wellbeing, anxiety, depression and stress/coping syndromes, making it hard to''tal'' them away?, particularly when yo''re talking on a source of that radiation.		
	Dr Ron Melnick, head of the US Govt National Toxicology Program cell phone study when the study began, since retired, made official written comment this year to the US FDA agency about the National Toxicology Program study findings having met the FDA's own recommended requirement of the NTP ten years earlier and in meeting accepted criteria had proven the thermal standard hypothesis false.9 Ex ICNIRP member James Lin also wrote in an IEEE journal article of the significance of the 2011 2B IARC classification of Radiofrequency and later 2015 UN Scientists Appeal and NTP study. 9a, 9b, 9c 9D.		

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	Of note, a 1997 WHO paper on 'Radiofrequency Radiation and Public Health' had already stated that an earlier lymphoma study should not be ignored if similar follow up findings were ever made. 10 In an official presentation to the National Toxicology Program, Theodora Scorato of Environmental Health Trust noted that in 2015 a team of German scientists Lerchl et al had published replicated effects of an earlier 2011 German study with findings for lymphoma and other cancers, at levels lower than the National Toxicology and Ramazzini study findings; the authors concluding the finding to be important and with no clear dose response.		
	Regarding Scorato's comment re. DNA damage, five years earlier in 2010, Franz Adlkofer, head of the European Union funded Reflex Research project also gave testimony in an official Maine hearing regarding his team's unexpected findings of DNA damage 10c, as per Dr Henry Lai and Jerry Philips earlier findings in the 1990s.10d In 2012 Igor Belyaev published a paper on stem cell DNA damage which noted relevance to severe cellular stress response and implications for cancer. In a later relevant conference talk, Belyaev also spoke of effects at vanishingly low levels over greater duration of exposure. A 2000 review by the Ecolog Institute expressed surprise at several laboratories having confirmed DNA damage at unexpectedly low levels and spoke of documented research evidence for cancer.		
	With 5G comes the concern also of heating of the skin, scientists cautioning re. overlooked interplay with interaction with sweat ducts along with the fact that the immune system is situated in the skin Also concerns in early papers which noted greater effects at ambient temperatures above 28 degrees Celsius, so anything that heats the skin surely cannot be good Australia's temperatures can rise way above this in our long hot summers. Australia's Oceanic Radiofrequency Safety Advisory Agency addressed such concerns in a letter.		
	In the previously mentioned early review papers, some of the observations regarding complexities of 'non thermal' effects noted in various early research reports spanning 1960s to 1990s were:		
	Pulsed fields (as used by modern tech today) were in general noted to be much more biologically active.		
	Duration of exposure was an important factor; as recently commented on as a crucial factor by modern scientists such as Igor Belyaev from Stockholm University who referred to effects on stem cell DNA at 'vanishingly' low levels at extended durations of exposure. An early report also noted above 300 MHz duration, as frequency rose, exposure duration		

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	must be reduced. Most of toda''s frequencies are well above that frequency range and constantly climbing.		
	Interaction with ambient temperature was said to play a role, with temperatures above 28 degrees94laus9494s showing greater effects. It was also noted that blowing cool air over the skin could cause enhanced effects (air conditioning???) Oxygen levels also played a role in effects.		
	These were repeatable, rather than one off observations and while much of the research was conducted at levels relevant to workers using quite specialised and potentially more localised equipment in their occupations, levels were noted to be below tissue heating levels and showing findings relevant to brain, heart function, EEG, nervous, immune and endocrine systems and even carbohydrate metabolism. Amongst the higher non thermal levels, was also sometimes mention of levels very much relevant to passive exposures today from standby radiation and passive exposure from towers, wifi routers, cell phones and the like.		
	Another somewhat frequent observation was the phenomenon of delayed effects; not observable until a week or a month after a single exposure ended, often taking up to a month to return to normal state. It is noteworthy perhaps that certain delayed effects were observed to continue for 52 days after 2 hour exposure in rat studies by Professor Leif Salford and his team at Lund University in their decade long series of blood brain barrier studies using real cell phones, a 2010 conference talk by Salford noting passive exposure concerns relevant to both mobile phones and tower exposures.		
	I thank you again for your time and the opportunity to share such concerns and the evidence for their basis. Please see list of links below.		
	2019 European Parliament Report, '5G, STATE OF PLAY IN EUROPE, USA and ASIA' Health risks p11, 6-7		
	https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/631060/IPOL_IDA(2019)631 060_EN.pdf		
	2019 Swiss-SONAR Insurance Report notes 5G risks including potential public health hazard (p29): <u>https://ehtrus</u> t.org/wp-content/uploads/Swiss-Re-SONAR-Publication-2019-excerpt- 1.pdf		
	Cardiologist submission to Royal Society of Canada:		
	<u>http://ww</u> w.c4st.org/images/documents/rsc/Submissions/DrHugh-Scully-MD-Submission- to-RSC-Panel.pdf Scientist letter re students: https://manhattanneighbors.org/wp-		

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	content/uploads/Johansson.pdf		
	2018 Professor Belpoggi, Italian Ramazzini Institute Far Field Study notes similar findings		
	NTP study and relevance of schwann cell findings to heart and numerous organs		
	throughout body, comments at end on 5G, environment)		
	https://www.youtube.com/watch?v=9vjZdRSu4u0&pbjreload=10		
	1. 2016 Conference, Australian Professor Marshall, Head Auto Immune Disease Research		
	Foundation California discusses 2011 NIDA human research relevant Diabetes, need to		
	incorporate science. (@ 12 – 16 min): <u>https://ww</u> w.youtube.com/watch?v=7eDqKv8nz4A		
	1a. Professor Marshall conference excerpt displays 'technically achievable' human		
	compatible level to aim for with existing infrastructure: <u>https://yout</u> u.be/sN7f1jKX7ak		
	Co-signed IARC Scientists' letter appeals protection residents from 5G towers.		
	<u>https://ehtrus</u> t.org/wp-content/uploads/Lennart-Hardell-BROWN-HONORABLE-EDMUND- G.pdf		
	OFFICIAL 5G TESTIMONY Dr Heroux PhD (Director Occupational Health, Epidemiology &		
	Biostatistics, McGill University): https://www.youtube.com/watch?v=2JI7-9 FRYc		
	2017 conference physicist Paul Ben Ahai re. 5G frequency experiments sweat ducts:		
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	10.1038/srep14914:		
	https://www.researchgate.net/publication/281622609_Real_versus_Simulated_Mobile_Ph		
	one_Exposures_in_Experimental_Studies		
	1c. 1978 paper Bise discusses early human EEG research effects at exposure levels relevant		
	to those calculated in the above paper. <u>http://emfsafetynetwor</u> k.org/wp-		
	content/uploads/2011/08/Bise1978.pdf		
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	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5406447/pdf/12026_2016_Article_8825.p		
	df		
	2. US Medical scientist Dr Goldberg Official 5G Testimony addresses diverse relevance		
	overlooked published research: <u>https://ww</u> w.youtube.com/watch?v=gdbM7OpJQ0k		
	3. 1973 Engineering Report describes SAR inadequacies and complex exposure hazard		
	should public microwave exposure ever become widespread: p26		
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	3a. 2002 EPA letter clarifies unaddressed limitations of the current 'thermal' 6 min. safety		

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	FCC-2003pdf		
	4. 2001 Scientist's Congressional Briefing alert re inadequate basis of standards in light of		
	effects far below thermal threshold): <u>http://ww</u> w.youtube.com/watch?v=6lAFbQqyVio		
	4a. 2010 lecture, Professor Leif Salford, Lund University Sweden, CRUCIAL Research Cell		
	Phones and Towers Blood Brain Barrier (Key 10–- 18 min)		
	https://www.youtube.com/watch?v=oXcLmh5ZGBg		
	4b. 2018 Australian research paper blood brain barrier notes in conclusion that recent		
	advances in science have confirmed existence non-ionising effects:		
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	Salford's research raising passive exposure concerns and the issue of reflection in the built		
	and natural environment. <u>http://arxi</u> v.org/ftp/physics/papers/0703/0703124.pdf		
	5. 2010, Dr Blank PhD addresses science misperceptions and implications of cellular stress		
	response noted as replicated in Litovitz' 2001 Congressional Briefing. (4 min conference		
	excerpt): <u>https://ww</u> w.youtube.com/watch?v=qj_QgFIqAdE		
	6. 2009 Interview Dr Andrew Marino PhD 40 years research insights field of		
	electromagnetics— early physics, engineering, biology discipline divide:		
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	7. 2018, Dr. Martin Pall PhD Forum talk explains one of the key mechanisms behind very		
	low level EMF effects and why 5G rollout should be avoided:		
	https://www.youtube.com/watch?v=i9kHM-swYis		
	7a. Pall's reviw paper, 'Neuropsychiatric effects including Depression.'		
	https://www.ncbi.nlm.nih.gov/pubmed/26300312		
	7b. 2014 US Dept. Interior (with oversight FCC) comments in Enclosure addendum re.		
	obsolete safety standards basis: <u>https://ww</u> w.ntia.doc.gov/files/ntia/us_doi_comments.pdf		
	7c. 2009 Fisheries & Wildlife Report notes obsolete standards, tower radiation impacts		
	Humans. <u>http://electromagnetichealt</u> h.org/pdf/CommTowerResearchNeedsPublicBriefing- 2-409.pdf		
	8. DR. ERICA MALLERY-BLYTHE, CHILDHOOD CANCER CONFERENCE LONDON 2018		
	'ELEPHANT IN THE ROOM of PUBLIC HEALTH'		
	https://www.youtube.com/watch?v=7HJcH_ZP-y0		
	8a. Interview Professor Johansson interview: DNA damage, immune system, blood brain		
	barrier, allergies, sperm quality, far below safety standards:		
	https://www.youtube.com/watch?v=bSsMeiJ60uc		
	8b. Professor Johansson's 2015 letter addresses diverse overlooked published research and		
	urges to avoid past failures to heed risk.		
	https://drive.google.com/file/d/0B8Oub2Nx5eSLcy0zWFJjdk01VXM/view		

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	8c. (REVIEW) 'Radiofrequency Radiation Exposure at Stockholm Central Railway Station in		
	Sweden' biological effects research relevant to public exposure. ' Hardell. (Details public		
	health relevant exposure levels, page 7):		
	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5021254/pdf/ijo-49-04-1315.pdf		
	8d. 2014 OFFICIAL EPIDEMIOLOGY TESTIMONY, Dr Paul Dart (Note Graphs 12 – 15 min):		
	https://www.youtube.com/watch?v=dpQegD1D34k		
	8e. 2012 International Doctors' Appeal: <u>http://freiburge</u> r-appell-		
	2012.info/media/International_Doctors_Appeal_2012_Nov.pdf		
	8f. German Doctor's Report cites chronic exposure levels relevant to documented clinical		
	health effects in long term patients:		
	http://proximajmone.altervista.org/adhd/it/elettricita/Corneila_W_Selsami_2005.pdf		
	8g. 2010 talk, Eileen O' Connor, UK Radiation Research Trust, Cell Tower Cancer Clusters:		
	https://www.youtube.com/watch?v=XfP6MmkLP9s		
	8h. 2009 Pubmed Review, 'ELF and RF Alzheimer's Disease and Breast Cancer.'		
	http://www.ncbi.nlm.nih.gov/pubmed/1927883		
	8i. 2011 Cell tower study, 'Changes of Clinically Important Neurotransmitters under the		
	Influence of Modulated RF Fields—A Long term Study under Real life Conditions,' notes		
	exposure levels relevant to effects known to lead to health damage over time.		
	https://www.avaate.org/IMG/pdf/Rimbach-Study-20112.pdf		
	8J. How does long term exposure to base stations and mobile phones affect human		
	hormone profiles? 2011: <u>http://avaat</u> e.org/IMG/pdf/Eskander_et_al_2011.pdf		
	9. Ron Melnick PhD, Retired National Toxicology Program Study Head 2020 comments to		
	https://ectsapi.tcc.gov/file/1051420599254/Meinick%20comments%20FCC%20proposed%		
	20rule%2019-226.pdf		
	9a. EX ICNIRP James Lin 2020 letter 5G acknowledges significance of 2015 ON Scientists		
	Appeal: <u>https://ww</u> w.emi-poilai.org/en/article/4189/		
	bttps://www.orsaa.org/uploads/6/7/7/0/67701042/orsaa.submission_to_acma_2017_fina		
	<u>Inteps.//ww</u> w.orsaa.org/upioads/0////9/0/79191943/orsaa_submission_to_acma_2017_ma l.pdf		
	9d. 2011 Official IARC Announcement (4 min):		
	https://www.youtube.com/watch?v=s4E2i5XFX9M		
	10. 1997, WHO defines wellbeing as an important component of health and refers to likely		
	causes of health effects deserving of more investigation and mentions early lymphoma		
	findings: pp 4, 5&6: <u>http://whqlibdo</u> c.who.int/hq/1998/WHO_EHG_98.13.pdf		
	10a. 2018 Official Comments to National Toxicology Panel, Theordora Scorato, Enviro		
	Health Trust (3 min): <u>https://ww</u> w.youtube.com/watch?v=cUj89OiLEmM		
	10b. Relevant Scorato's comment and WHO 1997 paper, see 2015 German replication		

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	<ul> <li>study: <u>http://ww</u>w.sciencedirect.com/science/article/pii/S0006291X15003988</li> <li>10c. 2010 OFFICIAL HEARING Head of European Union Reflex Research Project testifies re. DNA Damage findings. <u>https://ww</u>w.youtube.com/watch?v=8ofuCNhRleg</li> <li>10d. Scientist's letter addresses crucial overlooked concerns rollout 5G in light of</li> <li>established science<u>https://ehtrust.org/wp-content/uploads/Jerry-L-Phillips-PhD.pdf</u></li> <li>10e. Markovà E, Malmgren LO, Belyaev IY. Microwaves from Mobile Phones Inhibit 53BP1</li> <li>Focus Formation in Human Stem Cells More Strongly Than in Differentiated Cells: Possible</li> <li>Mechanistic Link to Cancer Risk. Environ Health Perspect. 2010 Mar;118(3):394-9. doi:</li> <li>10.1289/ehp.0900781. Epub 2009 Oct 23. PMID: 20064781; PMCID: PMC2854769. 2010</li> <li><u>https://ww</u>w.ncbi.nlm.nih.gov/pmc/articles/PMC2854769/pdf/ehp-118-394.pdf</li> <li>10f. 2000 Industry commissioned Research Review (p 11 pulsed radiation microthermal effects, p 12 DNA, p 34 Cancer): <u>http://electromagnetichealt</u>h.org/wp-content/</li> </ul>		
Anonymous	<ul> <li>The draft standard developed by ARPANSA will not protect Australians from the harmful effects of radiofrequency radiation.</li> <li>ARPANSA has based the draft on a flawed standard developed by ICNIRP, that has been criticised by many scientists.</li> <li>A fundamental problem with the draft is that it only protects against the heating effects of exposure, whereas research shows that harmful effects on the body occur at levels too low to cause heating. It is clear that standards protecting only against thermal effects of radiation are inadequate. This is shown by the large number of studies showing increased rates of brain tumors in users of mobile phones that comply with existing standards and these studies have been taken seriously enough for the International Agency for Research on Cancer to classify radiofrequency radiation as a Class 2B carcinogen.</li> <li>It is critical that the draft standard be amended to take into account the nonthermal effects of radiation, such as harmful effects on cells, hormones and genes, including effects that are consistent with the development of cancer, such as cell proliferation.</li> <li>Another serious flaw of the standard is the way it averages the impacts of radiation over a period of time, thus 'diluting' the impact of the signal on the body. This does not take into account what is happening in real-world exposures where people are impacted by brief, intense peaks of radiation. The standard needs to be changed to address these peak exposures.</li> </ul>	<ul> <li>ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community.</li> <li>The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and ICNIRP that there is unsubstantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard.</li> <li>The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty. Some epidemiological studies have reported a possible association between heavy mobile and cordless phone use and brain cancer. However, weaknesses in the methods of these studies and conflicting evidence from other well- conducted studies means that this association remains unsubstantiated.</li> </ul>	No change

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	<ul> <li>levels of radiofrequency radiation that comply with the ARPANSA standard. One has only to talk to colleagues, read articles or look at scientific research from various countries to see that people develop headaches, skin problems, memory and concentration problems, sleep problems, fatigue and many other symptoms that impact their wellbeing.</li> <li>According to the WHO, 'Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'. In its current form, the draft standard will not protect either the health or wellbeing of Australians.</li> <li>If it is to99laus99l this function, then it needs to be greatly amended and the assumptions underlying its development reconsidered as a matter of urgency.</li> </ul>	A study led by ARPANSA in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in any brain tumour types since then. While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause. There is currently no substantiated scientific evidence that exposure to RF EME below the exposure limits set in the Standard causes cancer or any adverse health effect.	
Anonymous	RPS-3 is a comprehensive document, containing both the exposure standard and measures to protect both occupational workers and the general public and a detailed rationale for the standard, as well as a comprehensive survey of the literature relevant to the exposure standard. While it is important that ARPANSA update RPS 3 to reflect the latest ICNIRP exposure standard, the draft RPS S-1 is a less comprehensive document and omits much of the background information that made RPS 3 such a useful reference.	It is appropriate for this Standard to state and provide references to other standards and documents for further information.	No change
Anonymous	An editorial point, at least two of the links I tested in the references were broken. All need to be checked updated before publication.	Agreed	Links have been updated
Anonymous	Where are the scientific studies showing that your limits are safe?	The safety of RF EME exposure is a highly active area of science and thousands of studies have been published worldwide. The research into the safety of RF EME has been reviewed by ARPANSA and other international health authorities. Health risk assessments take into account the body of available evidence and summarise the scientific and health implications of	No change

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		these. This is very important as no single study can provide conclusive evidence of safety or harm. Some major reviews on RF EME and health conducted by health authorities include: the ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',	
		Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and	
		Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012.	
Anonymous	Why has there not been thorough consultation with members of the public?	The draft RF exposure standard (RPS S-1) was open for consultation to everyone, including members of the public, from 31 August to 21 October 2020.	No change
Anonymous	With twenty years of extra research and 5 G being stopped world wide, do you take full liability if members of the public fall ill due to radiation?	ARPANS''s role is to maintain the appropriate RF exposure standard and the revised standard is based on substantiated science and international best practice. The frequencies currently being used and proposed for the 5G network are covered within the ARPANSA RF exposure standard. At levels of exposure below the public exposure limits set within the standard, there is no substantiated scientific evidence for adverse health effects.	No change
Anonymous	I100lause Ann barrett. Am a concerned mother and grandmother who wishes to have it proven to me that exposure to 5G radiation from the multiple 5G towers and smaller 5G cells that have been installed in locations all around where I and my family reside are safe	ARPANS''s role is to maintain the appropriate RF exposure standard and the revised standard is	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	and not harmful to Humans, animals or insects. And should me or my family become ill due to the exposure to 5G radiation coming from these towers, do you take full liability? As I nor any one I know has been properly and clearly notified of the upgrade to 5G of existing towers or the installation of New 5G towers.	based on substantiated science and international best practice. The frequencies currently being used and proposed for the 5G network are covered within the ARPANSA RF exposure standard. At levels of exposure below the public exposure limits set within the standard, there is no substantiated scientific evidence for adverse health effects.	
Anonymous	1. The draft standard was developed primarily by government employees as well as a representative of the Mobile Carriers' Forum and a specialist in occupational health. Even though the exposure limits are intended to be applied to the general public and workers, no members of the general public or worker organisations were included. (A former Standards Australia standard-setting committee included community and union representatives.)	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change
Anonymous	<ul> <li>2. 'The standard is based on the 2020 guidelines of the International Commission for Non- Ionizing Radiation Protection (ICNIRP) for high frequency fields' (line 83).</li> <li>ICNIRP has been criticised for its links to industry (for example, <u>https://klau</u>s- buchner.eu/bestimmt-diemobilfunk-industrie-ihre-eigenen-grenzwerte/ and <u>https://ww</u>w.spandidos-publications.com/10.3892/ ol.2020.11876)</li> <li>The INCIRP Guidelines have been criticised by hundreds of scientists throughout the world. 'It is our opinion that, because the ICNIRP guidelines do not cover long-term exposure and low intensity effects, they are insufficient to protect public health,' say signatories to the EMF Scientist Appeal: https:// <u>www.emfscientist</u>.org/index.php/emfscientist-appeal</li> </ul>	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry. The ICNIRP guidelines are considered as international best practice in non-ionising radiation protection.	No change
Anonymous	<ul> <li>3. The draft states that its purpose is to 'prevent adverse health effects' (line 206) and its limits are 'based on established health effects' (line 293).</li> <li>However, the draft does''t protect against all health effects. It only protects against those that it considers relevant, which are (section 2.4): <ul> <li>electrostimulation of excitable tissue</li> <li>whole-body heat stress</li> </ul> </li> <li>excessive localised temperature rise in tissue/heating ie heating above 1 degree C</li> <li>4. The draft fails to protect against harmful effects on the body that are known to occur at levels too low to cause heating—in other words, at levels that comply with it. These harmful effects include: <ul> <li>cell damage</li> </ul> </li> </ul>	The only established health effects of exposure to RF EME are heating of biological tissue, electroporation and electrostimulation at very high exposure levels. There is no substantiated scientific evidence for other adverse health effects from exposure to RF EME below the limits set within the Standard.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	<ul> <li>changes in levels of hormones and neurotransmitters         <ul> <li>DNA damage</li> <li>increased levels of free radicals</li> <li>brain tumours.</li> <li>Examples:</li> </ul> </li> <li>Premature aging of pine needles = .0000027 microwatts</li> <li>Children: Behavioural changes, headaches, irritability, concentration difficulties = .5 microwatts</li> <li>Laptop Wi-fi: sperm DNA fragmentation and decrease in sperm viability = 1.0</li> <li>Headache, dizziness, irritability, fatigue, insomnia, weakness, chest pain, difficulty breathing, indigestion = 1.0 microwatts</li> <li>Changes in the Hippocampus affecting memory and learning = 4.0 microwatts</li> <li>DNA damage in cells = 6.0 microwatts</li> </ul>	The limits set to prevent these effects are very conservative incorporating significant safety factors for additional protection against uncertainties.	
Anonymous	<ul> <li>5. The draft's assumption that health problems are caused primarily by heating is inconsistent with mechanisms that have been proposed to account for adverse effects on the body at non-heating levels of exposure, such as: <ul> <li>oxidative stress, implicated in many health problems, including cancer</li> <li>activation of calcium ion channels</li> <li>activation of mast cells.</li> <li>Example:</li> </ul> </li> <li>Altered calcium metabolism in heart muscles = 2.5 microwatts</li> </ul>	The mechanisms proposed for non-thermal effects (apart from electroporation and electrostimulation) have not been demonstrated.	No change
Anonymous	6. The draft's claim to protect health is at odds with the fact that the International Agency for Research on Cancer has classified levels that comply with existing standards as a Class 2B carcinogen, in the same category as lead.	There is currently no substantiated scientific evidence that exposure to RF EME below the exposure limits set in the Standard causes cancer or any adverse health effect. Some studies have shown an association between heavy mobile and cordless phone use and brain cancer. These studies suffer from methodological shortcomings including biased information on mobile phone use. Other studies have not substantiated these results. Based largely on this limited evidence the International Agency for Research on Cancer has classified RF fields as possibly carcinogenic to humans.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		A study led by ARPANSA in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in any brain tumour types since then. More rigorous long-term studies are being coordinated by WHO and Australia is taking part in this research program.	
Anonymous	7. The draft's claim to protect health is at odds with the experiences of many people in the community who report unpleasant symptoms, often referred to as Electromagnetic Hypersensitivity (EHS), when exposed to radiofrequency radiation from mobile phones, WiFi routers, mobile phone towers, smart meters and other wireless devices. Scientists in many countries have documented such reports and EHS is considered by some doctors in Australia to be a diagnosable condition.	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change
Anonymous	<ul> <li>8. The reference levels in the draft are designed to protect (section 2.2) against: <ul> <li>whole body exposure averaged over 30 mins</li> <li>local exposure, averaged over 6 mins</li> <li>brief local exposure, up to 6 mins</li> <li>instantaneous local exposure.</li> </ul> </li> <li>However, these levels are based on assumptions that averaging exposure for various periods of time (6 minutes / 30 minutes) is safe. It assumes that continuous exposure to a "smoother" signal has the same effect on the body as random signals with sharp bursts of radiation. This may not, in fact, be the case as It's just as likely that a brief strong peak of exposure will damage the body.</li> </ul>	The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure. The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur. At levels below the limits in the Standard, the temperature rises are within normal body temperature variations. The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure. Exposure to RF EME below the limits in the Standard do not have a cumulative effect. The substantiated harmful effects of exposure to RF	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		levels, many times above the limits set in the Standard. The ARPANSA	
		RF Standard accounts for all modes of RFEME transmission including continuous and pulsed.	
		The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure.	
	9. The draft protects against exposures for short periods of time (6 minutes / 30 minutes). It does NOT protect against long-term exposure such as people receive when using wireless equipment for hours each day every day for years on end , or vicariously exposed to wireless signal at their workplaces, schools (preschools through to higher education), in public spaces or exposed to neighbourhood wireless signals, whether or not they use wireless equipment themselves. Examples Smart Meter = 7.93 microwatts Changes in Behaviour 30minute exposure (avoidance) = 10 microwatts	The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur.	
		At levels below the limits in the Standard, the temperature rises are within normal body temperature variations.	
		The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure.	
Anonymous		Exposure to RF EME below the limits in the Standard do not have a cumulative effect.	No change
		The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard. The ARPANSA	
		RF Standard accounts for all modes of RFEME transmission including continuous and pulsed. The intensity of RF EME diminishes rapidly with distance away from the source. A person's exposure will always be dominated by the device closest to them.	
		The use of multiple devices in a confined space combined with exposures from infrastructure does not lead to cumulative exposures above the public exposure limits.	

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Name of submitter	<ul> <li>10. The draft protects against exposures for short periods of time (6 minutes / 30 minutes). However, it doesn't take into consideration the effect of exposure in conjunction with electromagnetic fields already present in infrastructure.</li> <li>In a study published in the journal Measurement Dr Malka Halgamuge and Lyn McLean, report on electromagnetic fields present in a hundred Australian homes.</li> <li>'Our results show that high magnetic fields are even present in typical homes,' said Dr Halgamuge, a lecturer in electrical engineering at the University of Melbourne. 'They can be present from microwave ovens, conducive water pipes, meter boxes, and wiring, as well as external sources such as power lines, transformers and substations.' The study analysed 3163 measurements of magnetic fields from 100 houses in different parts of Australia and provides data for appliances, different locations, conducive plumbing and other sources. It found that fields of above 4 milliGauss – a level classed as a possible carcinogen by the IARC – were present in many situations, with the potential of exposing residents in high-use locations such as beds. The results also showed that some brands of appliances generated much higher magnetic fields than others, suggesting that appliances can be designed in ways that reduce exposure to users. 'Our results highlight the importance of measuring fields in every home,' said Lyn McLean, Director of EMR Australia PL. 'That way people can identify the magnetic fields that are present and take steps to reduce their exposure.'</li> <li>Halgamuge, MN and McLean, L, 'Measurement and analysis of power-frequency magnetic fields in residences: Results from a nilot study' Measurement 125:415-24, 2018</li> </ul>	<ul> <li>ARPANSA response</li> <li>The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure.</li> <li>The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur.</li> <li>At levels below the limits in the Standard, the temperature rises are within normal body temperature variations.</li> <li>The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure.</li> <li>Exposure to RF EME below the limits in the Standard do not have a cumulative effect.</li> <li>The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard. The ARPANSA</li> <li>RF Standard accounts for all modes of RF EME transmission including continuous and pulsed. The intensity of RF EME diminishes rapidly with distance away from the source.</li> <li>A person's exposure will always be dominated by the device closest to them.</li> <li>The use of multiple devices in a confined space combined with exposures from infrastructure does</li> </ul>	Changes to the draft RPS S-1
	<ul> <li>much higher magnetic fields than others, suggesting that appliances can be designed in ways that reduce exposure to users. 'Our results highlight the importance of measuring fields in every home,' said Lyn McLean, Director of EMR Australia PL. 'That way people can identify the magnetic fields that are present and take steps to reduce their exposure.'</li> <li>Halgamuge, MN and McLean, L, 'Measurement and analysis of power-frequency magnetic fields in residences: Results from a pilot study', Measurement 125:415-24, 2018.</li> </ul>	The use of multiple devices in a confined space combined with exposures from infrastructure does not lead to cumulative exposures above the public exposure limits.	
		away from the source. A person's exposure will always be dominated by the device closest to them. The use of multiple devices in a confined space combined with exposures from infrastructure does	
		Extremely low frequency magnetic fields from power supply infrastructure and appliances in the home in the referenced study are not the subject of RPS S-1, rather they are covered by the ICNIRPS (2010) low frequency guidelines.	

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Anonymous	11. The draft allows higher levels of exposure than those permitted by standards in countries such as Russia, Switzerland, Austria and Italy, which draw on the same scientific evidence. Note: Salzburg have an inside and outside exposure level.	ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence. ARPANSA and other health authorities such as the World Health Organization do not support the adoption of arbitrary exposure limits.	No change
Anonymous	12. It is premature to establish safety limits for 5G frequencies as no epidemiological testing has been conducted on exposed populations. Humans are electromagnetic beings. The human heart, brain and nervous system works by using electrical signals and this can be monitored using EEG and ECG. Therapeutic applications of non-ionising radiation are widely used, and the fact that doctors use electro therapy for healing purposes proves that frequencies do interact and have an effect on the body. Although some non-ionising electromagnetic frequencies are beneficial for healing, other frequencies have potentially harmful biological effects. With the new frontier in medicine, the human micro-biome, discovering the interaction between micro-organisms and the beneficial impact on human health, it is imperative that testing be thorough and determine the effects on ALL currently known components of human health.	The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard, which sets both public and occupational exposure limits up to 300 GHz. At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur. It is the assessment of ARPANSA that there is substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network. The safety of RF EME exposure is a highly active area of science and thousands of studies have been published worldwide. The research into the safety of RF EME has been reviewed by ARPANSA and other international health authorities. Health risk assessments take into account the body of available evidence and summarise the scientific and health implications of these. This is very important as no single study can provide conclusive evidence of safety or harm.	No change
Anonymous	13. While the draft standards cater to the telecommunications industry, it leaves the government and businesses open to future class actions. Wireless technologies are being	ARPANSA's role is to maintain the appropriate RF exposure standard and the revised standard is	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	rolled out faster than science can evaluate the risks and the insurance industry is reluctant to insure against exposure to EMR due to the lack of safety testing. The financial burden of compensation, the burden on the health system and the cost of the burden of the care of individuals will negatively impact the economy. Increased need for doctors, specialists(including mental health and diagnostic specialists), equipment, downtime from illness or care responsibilities; mis-diagnosis, wrongly prescribed medications/interventions for EMR caused hyperactivity, depression, anxiety, health complaints, infertility and birth defects in the future which have arisen from EMR exposure in utero, the list goes on. It is imperative that the standards demonstrate to the insurance industry that EMR technology and implementation into the environment at large, is insurable. SONAR 2019: New emerging risk insights https://www.swissre.com/institute/research/sonar/sonar2019.html By Martin Weymann, Head Sustainability, Emerging & PRM, & Rainer Egloff, Senior Risk Manager, Group Risk Management Published on:22 May 2019	based on substantiated science and international best practice.	
Anonymous	14. In light of the uncertainty about safe levels of exposure in the scientific literature where large areas of uncertainties remain about the long-term impact of EMR on human health and the environment, and without the inclusion of the precautionary principle to help protect children (including risk to sperm, ova, and unborn) the document must recommend a precautionary approach to exposure and include suggestions for achieving this. It could well be argued that, in its present form, the draft standard caters more for the profitability of the telecommunications industry than the health of the Australian public and workers. If Australians are to have confidence in the ARPANSA RF standard, then the issues raised above need to be addressed before a new standard is released.	The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.	No change
Anonymous	The draft standard was developed primarily by government employees as well as a representative of the Mobile Carriers' Forum and a specialist in occupational health. Even though the exposure limits are intended to be applied to the general public and workers, no members of the general public or worker organisations were included. (A former Standards Australia standard-setting committee included community and union representatives.)	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change
Anonymous	The reference levels in the draft are designed to protect (section 2.2) against: • whole body exposure averaged over 30 mins • local exposure, averaged over 6 mins • brief local exposure, up to 6 mins • instantaneous local exposure.	The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure. The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur.	No change

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	However, these levels are based on assumptions that averaging exposure for various periods of time (6 minutes / 30 minutes) is safe. It assumes that continuous exposure to a "smoother" signal has the same effect on the body as random signals with sharp bursts of radiation. This may not, in fact, be the case as It's just as likely that a brief strong peak ofexposure will damage the body.	At levels below the limits in the Standard, the temperature rises are within normal body temperature variations. The exposure averaging times are designed for the purpose of assessing exposure levels, not setting	
	<ul> <li>The draft protects against exposures for short periods of time (6 minutes / 30 minutes). It does NOT protect against long-term exposure such as people receive when using wireless equipment for hours each day every day for years on end.</li> <li>The draft allows higher levels of exposure than those permitted by standards in countries such as Russia, Switzerland, Austria and Italy, which draw on the same scientific evidence.</li> <li>It is premature to establish safety limits for 5G frequencies as no epidemiological testing has been conducted on exposed populations.</li> </ul>	time limits for exposure. Exposure to RF EME below the limits in the Standard do not have a cumulative effect. The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard. The ARPANSA	
	In light of the uncertainty about safe levels of exposure in the scientific literature, the document must recommend a precautionary approach to exposure and include suggestions for achieving this.	RF Standard accounts for all modes of RFEME transmission including continuous and pulsed. The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public and occupational exposure limits up to 300 GHz. At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur.	
		It is the assessment of ARPANSA that there is no substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network. ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence. The standard incorporates significant safety factors to set limits many times below exposures where	
Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
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		substantiated health effects occur in order to provide strong protection and account for uncertainty.	
Anonymous	The draft's claim to protect health is at odds with the experiences of many people in the community who report unpleasant symptoms, often referred to as Electromagnetic Hypersensitivity (EHS), when exposed to radio frequency radiation from mobile phones, WiFi routers, mobile phone towers, smart meters and other wireless devices. Scientists in many countries have documented such reports and EHS is considered by some doctors in Australia to be a diagnosable condition.	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change
Anonymous	The draft's claim to protect health is at odds with the fact that the International Agency for Research on Cancer has classified levels that comply with existing standards as a Class 2B carcinogen, in the same category as lead.	There is currently no substantiated scientific evidence that exposure to RF EME below the exposure limits set in the Standard causes cancer or any adverse health effect. Some studies have shown an association between heavy mobile and cordless phone use and brain cancer. These studies suffer from methodological shortcomings including biased information on mobile phone use. Other studies have not substantiated these results. Based largely on this limited evidence the International Agency for Research on Cancer has classified RF fields as possibly carcinogenic to humans. A study led by ARPANSA in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in any brain tumour types since then. More rigorous long-term studies are being coordinated by the World Health Organization and Australia is taking part in this research program.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Anonymous	It could well be argued that, in its present form, the draft standard caters more for the profitability of the telecommunications industry than the health of the Australian public and workers. If Australians are to have confidence in the ARPANSA RF standard, then the issues raised above need to be addressed before a new standard is released.	<ul> <li>The limits set within the standard are based on good science and international best practice.</li> <li>They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health Effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012.</li> <li>The standard covers the frequencies proposed for use in the 5G network.</li> </ul>	No change
Anonymous	<ul> <li>'The standard is based on the 2020 guidelines of the International Commission for Non- Ionizing Radiation Protection (ICNIRP) for high frequency fields' (line 83).</li> <li>ICNIRP has been criticised for its links to industry (for example, https://klaus- buchner.eu/bestimmt-diemobilfunk-industrie-ihre-eigenen-grenzwerte/ and https://www.spandidos-publications.com/10.3892/ ol.2020.11876 )</li> <li>The INCIRP Guidelines have been criticised by hundreds of scientists throughout the world. 'It is our opinion that, because the ICNIRP guidelines do not cover long-term exposure and low intensity effects, they are insufficient to protect public health,' say signatories to the EMF Scientist Appeal: https:// www.emfscientist.org/index.php/emfscientist-appeal</li> <li>The draft states that its purpose is to 'prevent adverse health effects' (line 206) and its limits are 'based on established health effects' (line 293).</li> </ul>	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry. There is no substantiated scientific evidence of adverse health effects from continuous exposure to RF EME below the exposure limits set in the standard.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	However, the draft doesn't protect against all health effects. It only protects against those that it considers relevant, which are (section 2.4): • electro stimulation of excitable tissue • whole-body heat stress • excessive localised temperature rise in		
Anonymous	The draft allows higher levels of exposure than those permitted by standards in countries such as Russia, Switzerland, Austria and Italy, which draw on the same scientific evidence. It is premature to establish safety limits for 5G frequencies as no epidemiological testing has been conducted on exposed populations. In light of the uncertainty about safe levels of exposure in the scientific literature, the document must recommend a precautionary approach to exposure and include suggestions for achieving this.	ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence. ARPANSA and other health authorities such as the World Health Organization do not support the adoption of arbitrary exposure limits. The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public and occupational exposure limits up to 300 GHz. At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur. It is the assessment of ARPANSA that there is substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network. The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Anonymous	Numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of thereproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans. Damage goes well beyond the human race, as there is growing evidence of harmful effects to both plant and animal life. These findings justify our appeal to the United Nations (UN) and, all member States in the world, to encourage the World Health Organisation (WHO) to exert strong leadership in fostering the development of more protective EMF guidelines, encouraging precautionary measures, and educating the public about health risks, particularly risk to children and fetal development.	<ul> <li>The limits set within the standard are based on good science and international best practice. They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk</li> <li>Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.</li> <li>It is established that animals and plants have natural responses to electromagnetic fields including migratory patterns and pollination. The biomechanisms of these responses have not been firmly established and there are competing theories that continue to be investigated. Impacts of RF EME from artificial sources on plant and animal life have not been established.</li> <li>Existing studies on the effects of low-level RF EME exposure limits set within the Standard are adequate in providing protection to the environment.</li> </ul>	No change
Anonymous	While the draft standard claims to protect against 'adverse health effects', it allows exposure to levels of radiation that have been shown to damage the body.	There is no substantiated scientific evidence for adverse health effects below the limits set in the standard.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	The exposure levels it allows are also above those allowed in some other countries that have used the same body of international research in their standards-setting process. Additionally, it is based on assumptions that may well be flawed.	The limits set within the standard are based on substantiated science and international best practice. They are underpinned by several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty. ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence. ARPANSA and other health authorities such as the World Health Organization do not support the adoption of	
		arbitrary exposure limits.	
Anonymous	Thank you for the opportunity to comment on the draft of the Standard RPS 1. I note in line 73 that the title of the Standard has been changed, adding the word "Limiting" exposure to Radiofrequency Fields. I find this ironic when the word "limiting" means restricting or restraining, yet if we look at the RFNSA site that shows proposed upgrades to mobile phone towers, there is an overall increase in exposure levels. For example Site no 3226007 has an increase of 8.2%.	ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence. ICNIRP is	No change

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	Couple this with multiple tower upgrades, which now include another layer of technology, 5G. This added to by the increase in public exposure from a growing number of wireless devices that people have in their homes and from environmental exposures from mobile phone towers, smart meters, WIFI, etc I am unsure how this Standard can live up to its name.	recognised as the peak body in non-ionizing radiation protection. The ICNIRP RF guidelines are underpinned by the body of available scientific evidence and set limits based on substantiated health effects of exposure to RF EME.	
	<ul> <li>Line 88 "The ICNIRP guidelines reflect international best practice on what constitutes a high level of protection for all people against substantiated adverse health effects"</li> <li>Several points need to be raised here: Why has ARPANSA chosen the ICNIRP guidelines to base it's Standard on when there are many other Standards around the world that have far stricter and more protective levels? " Over 40% of the World have exposure guidelines at least 10-fold more rigorous than ICNIRP Guidelines" Jamieson I. 2014 Even the State Contact listed in Appendix 2 for obtaining advice or assistance advised me to ask the question to the ACMA as to why ARPANSA has chosen the ICNIRP guidelines as its Standard when there are other more protective standards around the world.</li> <li>Secondly I would dispute the claim that it offers a high level of protection for all people. As a person who is highly sensitive to EMR emitted from mobile phone towers, smart meters, smart phones and Wi-Fi, I am suffering a myriad of unwanted health effects from these emissions, which are at levels that ARPANSA deem "protective".</li> <li>These symptoms which include severe head pressure, blurred vision, high pitch ringing, insomnia, skin rashes, a burning sensation on my skin, chronic muscle aches and pains and cognitive disturbances are well documented by many experts who recognise EHS (electrohypersensitivity) as an increasing and debilitating problem associated directly with exposure to man made artificial EMR. "It is officially recognised as a functional impairment in Sweden. The Canadian Human Rights Commission also acknowledges environmental sensitivity attributed to EMF's." (Johansson 2010 Wilkie &amp; Baker 2007) I certainly do NOT feel protected by these Standards.</li> <li>Further more, neurological effects and neurodegenerative diseases have been attributed to EMF exposure as sited in the Europaem EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.</li></ul>	ARPANSA contributed to ICNIRP's revision of the revised RF guidelines and recognise them as being in line with international best practice. While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	
Anonymous	Line 92-94 says, "Research is continuing in many countries into possible affects on health Radiation Health Committee will continue to monitor the results of this research and where necessary issue amendments to this document".	RPS S-1 is based on substantiated science and international best practice. It is underpinned by several reviews of the body of scientific literature	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	Appeal EMF scientist.org and many others experts in their field who have listed numerous proven scientific publications that show that EMF's affect living organisms at levels well below what the ICNIRP guidelines recommend and proclaims these guidelines to be inadequate, it begs the question as to why these guidelines are being followed in the first place. Line 201 -203 " It is the Australian Government policy to adopt international best practice This Standard is based on the ICNIRP guidelines (2020) " As previously stated the ICNIRP guidelines do not represent world's best practice.	'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard covers the frequencies proposed for use in the 5G network.	
Anonymous	Line 293 " Mandatory limits on exposure to RF fields are based on established health effects" This draft does not protect against all health effects. It only recognises electrostimulation of excitable tissue, whole body heat stress excessive localised temperature rise in tissue and rapid temperature elevation (lines 312-318) Some call this the " cooking Standard". This draft blatantly ignores any other evidenced and established adverse and damaging health effects. Symptoms observed in those who are EHS include: Headaches; visual disturbance; hearing disturbance; sleep problems; dizziness; poor blood circulation; capillary fragility; cold hands & feet; fatigue; heart problems; irritability; dermatological symptoms; disorientation, reduced libido; altered liver enzymes; recurring infections; memory deficits; general malaise; muscle pain; nausea; nasal congestion; night sweats; increased need to urinate; restless legs; tinnitus; depression; anxiety. (Jamieson. I 2014) ORSAA has a huge database of studies, which show effects to RF EMR at levels well below what ARPANSA are recommending as being safe. https://www.orsaa.org/orsaa- database.html As previously mentioned my health has been severely impacted by RF EMR. This was triggered by the installation of a smart meter on my house. Although I have reported this countless times to Government no action has ever been taken to investigate. I am aware of hundreds of people who are also suffering extreme health problems from their smart meters, yet when we report this to officials we get directed to ARPANSA and are told that everything complies as it falls within " the Standard". We are then directed by ARPANSA to seek medical advice. It is incongruent that ARPANSA is charged with protecting our health, yet it is not a health body and therefore cannot do so. ARPANSA recognises this	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	by directing me to seek medical advice, which I have done. I have a medical certificate but Government authorities ignore this because ARPANSA says that everything is safe.		
		ICNIRP is recognised as the peak body in non- ionizing radiation protection.	
Anonymous	<ul> <li>Appendix 2 Line 992 Where advice or assistance is required the draft directs us to our State body for Radiation health, in my case Team Leader Radiation Safety Victorian Branch Department of Health.</li> <li>When I contacted this department I was advised to ask the question to the ACMA as to why ARPANSA has chosen the ICNIRP guidelines as its Standard when there are other more protective standards around the world.</li> </ul>	The ICNIRP RF guidelines are underpinned by the body of available scientific evidence and set limits based on established health effects of exposure to RF EME.	No change
		ARPANSA contributed to ICNIRP's revision of the revised RF guidelines and recognise them as being international best practice.	
Anonymous	When ARPANSA emailed me regarding this submission opportunity they identified me as "an important stakeholder with an interest in the area of RF EME." If I am so important to ARPANSA why do they continue to turn a blind eye to my reporting of EMR related illness, with a medical certificate and also for those others in the community who have similarly reported to them? My plea to ARPANSA is that they recognise that as it stands the draft of the Standard RPS 1 fails to protect all its citizens, and significantly fails to accommodate vulnerable people like me who are highly sensitive to RF EMR. A Precautionary Approach should be adopted and EHS should be recognized as is in other countries.	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause. The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.	No change
Anonymous	I'm currently living in 280m away from huge cell tower located at M2. I strongly disagree to	The exposure limits for RF EME have not been significantly altered in the draft revised standard RPS S-1 compared to the previous RPS 3. In regard to specific infrastructure, the base station facility emissions must comply with the public	No change
Anonymous	raise the exposure limit of RF radiation. The proposed one is nearly a double of existing configuration which will have great impact on my daughter's health.	exposure limits within the standard regardless of the number of antennas on site. At exposure levels below this limit, there is no substantiated scientific evidence for adverse health effects.	NO CHANGE

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Anonymous	As noted earlier, the comments provided are largely from a perspective of desiring the Standard to provide good guidance for the various RF site stakeholders on the management of the risk posed by RF exposure and be a sound reference for training RF workers as well as those verifying compliance.	Noted	No change
Anonymous	<ul> <li>These comments are provided from the viewpoint of being a current user of RPS3 as a reference when performing measurements and modelling of RF exposure levels in order to determine compliance on behalf of clients.</li> <li>We note that while in the "Changes in the new ARPANSA Radiofrequency Standard" document it states "The exposure limits set in the updated ARPANSA Standard (RPS S-1, 2020) are similar to those in the 2002 standard (RPS3, 2002) with some refinements.", the presentation/specification of Reference Levels appears far more "complicated" than those in RPS3.</li> <li>It is acknowledged that such complication is necessary due to the adoption of ICNIRP 2020 which has addressed the matter in a more granular manner in order for the respective limits to relate more specifically to the established health effects across the whole body and specific parts thereof with respect to frequency.</li> <li>As such we hope/request on finalisation of RPS S-1 that ARPANSA conducts industry workshops for those having to practically apply the new standard in real world situations as the transition from RPS3 to RPS S-1 occurs.</li> </ul>	ARPANSA plans to liaise with different stakeholders on the application of RPS S-1.	No change
Anonymous	As noted earlier, the comments provided are largely from a perspective of desiring the Standard to provide good guidance for the various RF site stakeholders on the management of the risk posed by RF exposure and be a sound reference for training RF workers as well as those verifying compliance.	Addressed in other comments from submitter.	No change
Anonymous	There was no member of the public or worker organisation included in the development of this draft.	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change
Anonymous	The standard is based on 2020 guidelines of the ICNRP which has links to INDUSTRY. They don't cover long term exposure and low intensity effects and are insufficient to protect public health.	ICNIRP is recognised as the peak body in non- ionizing radiation protection.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		ICNIRP provides declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry. There are no substantiated health effects of continuous low-level exposure to RF EME below the limits set within the standard.	
Anonymous	Draft fails to protect against harmful effects on the body that are known to occur at levels too low to cause heating (cell damage, hormone & neurotransmitter changes, DNA damage, brain tumours). It caters more for the profitability of telecommunications industry than the health of People! No epidemiological testing of 5g safety limits has been conducted. This draft allows higher levels of exposure than what other countries standards permit.	There is no substantiated scientific evidence for other adverse health effects other than heating of biological tissue, electroporation and electrostimulation. The limits set to prevent these effects are very conservative incorporating significant safety factors for additional protection against uncertainties. The standard is based on exposure limitation and is thus neutral regarding applications that result in RF exposure. ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence. ARPANSA and other health authorities such as the World Health Organization do not support the adoption of arbitrary exposure limits.	No change
Anonymous	Is there anyone involved in the creation of this draft, prepared to do the right thing for humanity? This is the great Awakening!	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change
Antje Struthmann	<ol> <li>The draft standard was developed primarily by government employees as well as a representative of the Mobile Carriers' Forum and a specialist in occupational health. Even though the exposure limits are intended to be applied to the general public and workers, no members of the general public or worker organizations were included. (A former Standards Australia standard-setting committee included community and union representatives.)</li> </ol>	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Antje Struthmann	2. 'The standard is based on the 2020 guidelines of the International Commission for Non- Ionizing Radiation Protection (ICNIRP) for high frequency fields' (line 83).•ICNIRP has been criticised for its links to industry (for example, https://klaus-buchner.eu/bestimmt-die- mobilfunk-industrie-ihre-eigenen-grenzwerte/and https://www.spandidos- publications.com/10.3892/ol.2020.11876)•The INCIRP Guidelines have been criticised by hundreds of scientists throughout the world. 'It is our opinion that, because the ICNIRP guidelines do not cover long-term exposure and low-intensity effects, they are insufficient to protect public health,' say signatories to the EMF Scientist Appeal: https://www.emfscientist.org/index.php/emf-scientist-appeal	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provides declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry. ARPANSA considers guidance provided by ICNIRP as international best practice in non-ionising radiation protection.	No change
Antje Struthmann	3. The draft states that its purpose is to 'prevent adverse health effects' (line 206) and its limits are 'based on established health effects' (line 293). However, the draft doesn't protect against all health effects. It only protects against those that it considers relevant, which are (section 2.4):•electrostimuilation of excitable tissue•whole-body heat stress•excessive localised temperature rise in (Continued from page 1)(Continued on page 3)	The only established health effects of exposure to RF EME are heating of biological tissue, electroporation and electrostimulation at very high exposure levels.	No change
Antje Struthmann	4. The draft fails to protect against harmful effects on the body that are known to occur at levels too low to cause heating—in other words, at levels that comply with it. These harmful effects include:•cell damage•changes in levels of hormones and neurotransmitters•DNA damage•increased levels of free radicals•brain tumours.	There is no substantiated scientific evidence for other adverse health effects from exposure to RF EME below the limits set within the Standard. The limits set to prevent these effects are very conservative incorporating significant safety factors for additional protection against uncertainties.	No change
Antje Struthmann	5. The draft's assumption that health problems are caused primarily by heating is inconsistent with mechanisms that have been proposed to account for adverse effects on the body at nonheating levels of exposure, such as:•oxidative stress, implicated in many health problems, including cancer•activation of calcium ion channels•activation of mast cells.	The mechanisms proposed for non-thermal effects (other than electroporation and electrostimulation) have not been demonstrated.	No change
Antje Struthmann	6. The draft's claim to protect health is at odds with the fact that the International Agency for Research on Cancer has classified levels that comply with existing standards as a Class 2B carcinogen, in the same category as lead.	There is currently no substantiated scientific evidence that exposure to RF EME below the exposure limits set in the Standard causes cancer or any adverse health effect. Some studies have shown an association between heavy mobile and cordless phone use and brain cancer. These studies suffer from methodological	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		shortcomings including biased information on mobile phone use. Other studies have not substantiated these results. Based largely on this limited evidence the International Agency for Research on Cancer has classified RF fields as possibly carcinogenic to humans.	
		A study led by ARPANSA in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in any brain tumour types since then.	
		More rigorous long-term studies are being coordinated by the World Health Organization and Australia is taking part in this research program	
Antje Struthmann	7. The draft's claim to protect health is at odds with the experiences of many people in the community who report unpleasant symptoms, often referred to as Electromagnetic Hypersensitivity (EHS), when exposed to radiofrequency radiation from mobile phones, WiFi routers, mobile phone towers, smart meters and other wireless devices. Scientists in many countries have documented such reports and EHS is considered by some doctors in Australia to be a diagnosable condition.	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change
Antje Struthmann	8. The reference levels in the draft are designed to protect (section 2.2) against:•whole body exposure averaged over 30 mins•local exposure, averaged over 6 mins•brief local exposure, up to 6 mins•instantaneous local exposure available free online at www.emraustralia.com.au   © EMR Australia PLPage 4 However, these levels are based on assumptions that averaging exposure for various periods of time (6 minutes / 30 minutes) is safe. It assumes that continuous exposure to a "smoother" signal has the same effect on the body as random signals with sharp bursts of radiation. This may not, in fact, be the case as It's just as likely that a brief strong peak of exposure will damage the body	The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure. The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur. At levels below the limits in the Standard, the temperature rises are within normal body temperature variations. The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		Exposure to RF EME below the limits in the Standard do not have a cumulative effect.	
		The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard.The ARPANSA	
		RF Standard accounts for all modes of RFEME transmission including continuous and pulsed.	
		The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure.	
Antje Struthmann	9. The draft protects against exposures for short periods of time (6 minutes / 30 minutes). It does NOT protect against long-term exposure such as people receive when using wireless equipment for hours each day every day for years on end.	The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur.	
		At levels below the limits in the Standard, the temperature rises are within normal body temperature variations.	
		The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure.	No change
		Exposure to RF EME below the limits in the Standard do not have a cumulative effect.	
		The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard. The ARPANSA	
		RF Standard accounts for all modes of RF EME transmission including continuous and pulsed.	
Antje Struthmann	10. The draft allows higher levels of exposure than those permitted by standards in countries such as Russia, Switzerland, Austria and Italy, which draw on the same scientific evidence.	ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		ARPANSA and the WHO do not support the adoption of arbitrary exposure limits.	
Antje Struthmann	11. It is premature to establish safety limits for 5G frequencies as no epidemiological testing has been conducted on exposed populations.	The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public and occupational exposure limits up to 300 GHz.	
		At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur.	
		It is the assessment of ARPANSA that there is no substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network.	No change
		The safety of RF EME exposure is a highly active area of science and thousands of studies have been published worldwide. The research into the safety of RF EME has been reviewed by ARPANSA and other international health authorities. Health risk assessments take into account the body of available evidence and summarise the scientific and health implications of these. This is very important as no single study can provide conclusive evidence of safety or harm.	
Antje Struthmann	12. In light of the uncertainty about safe levels of exposure in the scientific literature, the document must recommend a precautionary approach to exposure and include suggestions for achieving this. It could well be argued that, in its present form, the draft standard caters more for the profitability of the telecommunications industry than the health of the Australian public and workers. If Australians are to have confidence in the ARPANSA RF standard, then the issues raised above need to be addressed before a new standard is released.	The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Anton S Vanderbyl	This is just another exercise to protect industry profit , you know it and so does everyone else.	The standard is not technology or application specific. It sets limits for exposure to RF EME based on substantiated science and to protect people against established health effects.	No change
Anton S Vanderbyl	Where is the provision for children who are more at risk ? Where is the provision for long term exposure and effects that are biologically not immediately apparent from that long term exposure.	The ARPANSA RF Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME. The Standard is applicable to any time duration and protects against all substantiated health effects.	No change
Anton S Vanderbyl	Where is the independent evidence that saturating the bio sphere with EMR on a continuing basis with increasing level and multiple frequencies is not going to have negative effects on the biology of living organisms, data can be delivered by other means , Are you aiming to deliver convenience to a dead planet?	Impacts of RF EME from artificial sources on plant and animal life have not been established. However, existing studies on the effects of low level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment.	No change
Anton S Vanderbyl	How are people to know how much they are being harmed and by how much???	RPS S-1 provides protection against all known health effects of exposure to RF EME. ARPANSA also provides information for the public on EME and health on its website.	No change
Anton S Vanderbyl	You guys know that each and every one of you can be held personally liable for the harm you cause .	ARPANSA's role is to maintain the appropriate RF exposure standard and the revised standard is based on substantiated science and international best practice.	No change
Anton S Vanderbyl	You won't be able to hide behind your so called standard for much longer.	<ul> <li>ARAPANSA is transparent about the its role and the development of RPS S-1.</li> <li>The draft RF exposure standard (RPS S-1) was open for consultation to everyone, including members of the public, from 31 August to 21 October 2020.</li> </ul>	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Australian Centre for Electromagnetic Bioeffects Research	<ol> <li>Competence to comment on the relation between 5G exposure and health The Australian Centre for Electromagnetic Bioeffects Research (ACEBR) is a Centre of Excellence funded by the National Health and Medical Research Council of Australia since 2005. ACEBR's remit is, among other things, to conduct cutting-edge research into potential health effects associated with exposure to the radiofrequency (RF) electromagnetic fields (EMFs) emitted by telecommunications devices, such as 5G. The ACEBR board is comprised of senior Australian academics with expertise ranging from mechanisms (e.g. how does RF- EMF affect the body), to experimental animal research (e.g. does RF-EMF cause pathology in mice) and experimental human research (e.g. does RF-EMF cause symptoms in those who report being 'electro-hypersensitive'). Importantly, the ACEBR board has substantial experience addressing this issue in terms of both national and international science evaluation, including roles within the International Commission on Non-Ionising Radiation Protection (ICNIRP) and the World Health Organisation (WHO). For example, the lead ACEBR researcher (Croft) chaired the latest ICNIRP RF-EMF Guidelines (2020), which forms the basis of the science underlying the draft RPS S-1.</li> </ol>	Noted	No change
Australian Centre for Electromagnetic Bioeffects Research	2. Overall safety of ICNIRP (2020) and the draft ARPANSA RPS S-1 The draft ARPANSA RPS S-1 is based on the ICNIRP (2020) RF-EMF guidelines. The ICNIRP (2020) guidelines are based on the latest science available on RF-EMF bioeffects and safety, a scientific literature which is extensive and sufficient to provide strong confidence that the resultant restrictions, if adhered to, will ensure safety for those exposed to RF-EMF. Indeed, there is no indication from science or elsewhere that anyone who receives RF-EMF exposure within the ICNIRP (2020) guidelines will be harmed. As the draft ARPANSA RPS S-1 limits do not exceed those of ICNIRP (2020), they will similarly provide protection from harm associated with RF-EMF exposure.	Noted	No change
Australian Centre for Electromagnetic Bioeffects Research	3. Differences between the draft ARPANSA RPS S-1 and ICNIRP (2020) There is one difference between the draft ARPANSA RPS S-1 and ICNIRP (2020) standards that should be noted. In the ICNIRP (2020) guidelines, two separate sets of limits are specified within the 100 kHz – 10 MHz frequency range, one relating to nerve stimulation and the other relating to heating effects. This method was employed to help separate the two types of bioeffects that RF-EMF can have on the body. The draft RPS S-1 does not make this distinction, and has merely provided one set of limits (the lowest of the nerve stimulation and heating limits specified by ICNIRP [2020]). This is entirely appropriate, as the distinction between the two mechanisms of interaction with the body is not relevant to health and safety, only the limits themselves are, and the draft RPS S-1 has taken the most stringent/conservative of the ICNIRP (2020) limits.	Noted	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Australian Centre for Electromagnetic Bioeffects Research	<ul> <li>6. Conclusions</li> <li>The ARPANSA draft RPS S-1 will provide a very high degree of safety for both the general public and RF-EMF workers. The structure, logic, and interfacing with international best-practice are exemplary. Slight deviations from that international best practice will not affect health and safety, but will simplify the document and make it easier for people to understand it and adhere to its requirements. Although minor suggestions have been given above, they will not appreciably affect health and safety.</li> <li>ARPANSA are to be commended on providing such a thorough and useful document that will undoubtedly improve RF-EMF exposure health and safety in Australia.</li> </ul>	Noted	No change
Australian Mobile Telecommunicat ions Association	<ul> <li>AMTA welcomes the opportunity to respond to ARPANSA's consultation on the updated Radiation Protection Series, RPS S-1 standard. The update has been eagerly awaited following the update to the international guidelines earlier this year and will be an important factor in maintaining the Australian public's confidence in the safety of the mobile communications technology deployed by AMTA's members.</li> <li>Fundamentally, AMTA is supportive of the new standard and in particular its adoption of the International Commission on Non-Ionizing Radiation (ICNIRP) guidelines without significant amendment. The ICNIRP guidelines published in March 2020 are supported by an additional two decades of research into the health effects of exposure to radiofrequency (RF) fields and so bring the latest science and knowledge to the adoption of worlds best practice in RF non-ionising radiation protection.</li> </ul>	Noted	No change
Australian Mobile Telecommunicat ions Association	Editorial : Foreword "International Commission for Non-Ionizing Radiation Protection" should be "International Commission on Non-Ionizing Radiation Protection" Multiple instances Should use "kHz" instead of "KHz" Multiple instances SI units should be written in singular form, i.e. "volt", "ampere", "watt", "joule" etc. (and not "volts", "amperes", "watts", "joules") Multiple instances SI units should be written with a lower-case letter, i.e. "joule", "watt", "second" (and not "Joule", "Watt", "Second") ARPANSA supporting document: Changes in the new ARPANSA Radiofrequency Standard: Table 1 - Technical Changes, Basic Restrictions	Agreed	The suggested changes have been incorporated in the Standard

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	Current: - Averaging volume for local SAR Current: SAR averaged over a single tissue provides somewhat worse correlation with local temperature than that for multiple tissues Suggest: - SAR averaged over a cube (with no air pockets) provides a better correlation with temperature than 10 g of contiguous tissue in the shape of a cube.		
BAI Communications (Formerly Broadcast Australia)	Clarification is required on the expected timing of Final version release and expectations for the industry on when these new limits will be enforced. Due to the wide ranging ramifications for the AM Radio Broadcast industry, it is suggested that a 5 year grandfather clause be added from release date to ensure the industry has enough time to readjust to the proposed reference limits change in the 100kHz to 30MHz frequency range in this proposed draft.	Application or enforcement of RPS S-1 as a regulatory instrument is a matter for the relevant statutory body.	No change
Department of Defence	<ol> <li>Why is this being released as a standard rather than a code? Typically codes define regulatory limits and requirements while standards set the way in which the limits are measured and applied. This naming convention is also inconsistent with the RPS hierarchy &lt; https://www.arpansa.gov.au/regulation-and-licensing/regulatory-publications/publication- program &gt;</li> </ol>	The RPS series of documents has been revised with new definitions on what constitutes a code and a standard. ARPANSA's Radiation Health Committee has decided that RPS S-1 should be a standard which may be referenced by regulators, authorities, industry and other stakeholders in State, Territory or Commonwealth jurisdictions.	No change
Department of Defence	2. This document would benefit from being published after the "Fundamentals for Protection Against Non-Ionising Radiation" are published.	It is not known when the "Fundamentals for Protection Against Non-Ionising Radiation" will be published and it is important to publish an update to RPS3. The Standard mentions that it's principles for protection against adverse health effects of exposure to RF fields are based on the ICNIRP principles for non-ionising radiation protection (ICNIRP, 2020b).	No change
Department of Defence	9. A more informed reasoning for the change of standard would be helpful; other than the newer standard relies on more recent science, which infers that we aren't as harmed by large instantaneous exposure as previously believed.	The changes in the new Standard are explained in the rationale provided in the revised ICNIRP Guidelines. This is mentioned in Section 2.3 of RPS S-1.	No change
Department of Defence	11. Guidance at the start of the document on other relevant/necessary documents to be used in conjunction with RPS S-1 would be useful (eg AS/NZS, IEC, ICNIRP, IEEE).	The Standard provides references to other documents at the relevant sections.	No change
Dimi	I am submitting my concerns with the above public consultation. Over time I have noticed the increase of RF (falsely called that in order to mislead the	RPS S-1 is based on substantiated science and international best practice. It is underpinned by	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	<ul> <li>public) when in reality we are talking about MR (Microwave Radiation/frequencies) and EMF signals from various sources eg telco phone towers, wifi, etc. More recently, during 'covid lockdown', upgrades have been made to all platforms of technology making me (an EMF/MR sensitive person) more unwell and others around me reporting unwellness also eg headaches, ringing in their ears, tiredness/lethargy, difficulty concentrating, dizziness, nausea, tremors, etc. There are too many effects on people's health and on the environment eg bees, birds, etc to be ignored by industry and its regulators - yet 'ignore' is what they are doing, proclaiming that all these MR and EMF signals are safe. How absurd (or hocus pocus) the science around this seems to be! How was this determined in the first place? Was it set by industry and 'conflict of interest' regulators?</li> <li>I consider all MR and EMF technology levels to be set too high already and to be harmful as a result of this - a bombardment on the planet and it's inhabitants in the name of capitalism and so called progress. There are no safe standards set nor disclosed accurately. No one is reporting on the accumulative effects on people and the environment.</li> <li>It is an assault on the living creatures of this planet to keep going with this type of technology, unless there is a deliberate and willful intent, on the planet.</li> <li>Asking for public input after the fact, is a bit like trying to demonstrate that regulators are trying to do the right thing, but after the horse has bolted How pretentious!</li> <li>It would be honourable to see industry and its regulators actually stake stock of what they are doing and how they are 'enabling' the capitalist model to destroy our humanity and our planet.</li> </ul>	several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard covers the frequencies proposed for use in the 5G network. Exposure to RF EME below the limits does not have a cumulative effect. The established harmful effects of exposure to RF EME are acute in nature and occur at very high levels many times above the limits set in the Standard. While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause. Impacts of RF EME from artificial sources on plant and animal life have not been established. However, existing studies on the effects of low level RF EME exposure limits set within the Standard are adequate in providing protection to the environment.	

To Whom It May Concern,Re: ARPANSA is engaging in public consultation on the draft Standard for Limiting Exposure to Radiofrequency Fields – 100 KHz to 300 GHzRPS S-1 is based on substantiated science and international best practice. It is underpinned by several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to	Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Interster, winnee uot, Hair Loss - increases on, Headaches - which are constant and daily, 	Don	Comment         To Whom It May Concern,         Re: ARPANSA is engaging in public consultation on the draft Standard for Limiting Exposure to Radiofrequency Fields – 100 KHz to 300 GHz         I wanted to express my concerns with the above public consultation.         Over time I have been noticing the increase of telco phone towers, both newly erected and beefed up ones that not only look unsightly, but are making the public sick and unwell. The reason I know of this firsthand is because I know of someone who has been diagnosed by a medical doctor as having EMF sensitivity. This person continually complains of many side effects, which are (but not limited to): <ul> <li>Hair Loss - increasing as time goes on,</li> <li>Headaches - which are constant and daily,</li> <li>Difficulty Concentrating,</li> <li>Dizziness - has had falls,</li> <li>Nausea,</li> <li>Brain Fog,</li> <li>Chronic Fatigue, constantly exhausted</li> <li>Memory Loss,</li> <li>Tinnitus,</li> <li>Tremors,</li> <li>Digestive Issues,</li> </ul> <li>Electromagnetic Sensitivity - being around wireless devices in shops, and a number of others</li> <li>It is timely that you have sought public feedback on the safety standards of 'microwave' radiation (not 'radio waves' as it is being incorrectly claimed from my research). This is a health issue and concern for everyone as we are now all surrounded by these 'invisible' emissions 24/7, and they have been shown to cause harm to DNA and to other biological functions such as sleep and fertility, thus affecting everyone's health and wellbeing.</li> <li>ARPANSA has only focused on heating effects on the body in the past, this is not realistic, we n</li>	RPS S-1 is based on substantiated science and international best practice. It is underpinned by several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard covers the frequencies proposed for use in the SG network.	S-1 No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	are real and do affect the health of children as well as adults. When it comes to hospitals,		
	patients are already unwell and need to recover from sickness/illness without being		
	bombarded with increasing levels of radiation. eg such as microwave signals beaming		
	through their bodies, which are trying to recover.		
	It is deemed urgent that ARPANSA investigates the high microwave radiation levels that are		
	emitted at the actual scene of the telco towers, not behind the screen of a computer with		
	out-of-touch computer modelling and by using scientific experiments which fail to consider		
	the health impact on real people.		
	ARPANSA is meant to be a governing body ensuring the safety and protection of people		
	from harmful radiation levels emitted from telco towers. It is also meant to determine		
	safety levels (if there is such a thing) and enforce those safety levels across all telco towers,		
	everywhere.		
	It is requested that ARPANSA studies a specific telco tower, such as any local one adjacent		
	to a State School in a high density zone, and take some real-time 'actual' readings of this		
	tower. By doing this ARPANSA would quickly realise that these towers are emitting signals		
	that can, and will, cause serious biological effects with long term exposures continuously		
	(24/7), which will have detrimental and harmful effects on human health - this is classed as		
	assault on the people residing in the local area and on the children who attend the school		
	and play on the school grounds.		
	Learning that 5G is coming quick and fast, and how the microwave signals (not radiowaves		
	as wrongly being termed) are accumulating, it will be near impossible for ARPANSA to		
	prove that any telco tower is safe for humans and the environment. Each tower seems to		
	have a minimum of 3G, 4G and now 5G transmitters, for the 3 big players, which are		
	Telstra, Optus and Vodafone. All this translates to at least 9 transmitters (but the average		
	maybe many more transmitters) to be present on each telco tower. This equates to an		
	increase in microwave radiation emissions once upgrades are completed on a tower, thus		
	making it impossible for ARPANSA to ensure that the TOTAL emitting radiation readings are		
	in fact safe [please reply to this statement and prove me wrong].		
	Question - Why are we seeing more sickness with the increase of the microwave radiation		
	being emitted from these telco towers? Are the levels already too high?		
	ARPANSA is looking into the 'Standard for Limiting Exposure to Radiofrequency Fields – 100		
	KHz to 300 GHz' but what in fact are you looking for? Is it realistic to go above 20GHz as this		
	even seems to be too much for human health? It has been proven that approx. 90GHz is		
	enough microwave radiation to heat up the skin on the human body.		
	Another point I wish clarified is this - in your EME Reports, how do you take into account		
	the radiation levels of telco towers which are within a 2km radius of each other? Research		
	has shown that telco towers within a close proximity 'interfere' with each other and		
	therefore increase their radiation signals/levels as a result. eg. if a mobile phone has to		

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	work harder the further away it is from a mobile tower, thus emitting stronger radiation levels in order to be efficient, surely, telco towers would do the same in order to counteract each other's signaling/cancelling? This of course can't be good for human health and to the environment (birds, bees, wildlife, etc). WiFi can have similar health effects at telco tower radiation. Please view this experiment to see the outcome of such harmful signals: Watercress and Wifi - The Controlled Experiment 2019 https://youtu.be/Fnt32wocPCA In closing, I trust that ARPANSA will take on board the above points, conduct a close-up investigation into a telco tower adjacent to a state school (as a reference point/standard), so that safer microwave radiation levels (if such a thing is possible) from telco towers can be enforced for the benefit of all humans and the environment. I expect a reply to the above issues and questions raised so I know you have taken these into consideration. Regards Don S		
EMR Australia pL	<ol> <li>The draft standard was developed primarily by government employees as well as a representative of the Mobile Carriers' Forum and a specialist in occupational health. Even though the exposure limits are intended to be applied to the general public and workers, no members of the general public or worker organisations were included. (A former Standards Australia standard-setting committee included community and union representatives.)</li> </ol>	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change
EMR Australia pL	<ul> <li>2. 'The standard is based on the 2020 guidelines of the International Commission for Non- Ionizing Radiation Protection (ICNIRP) for high frequency fields' (line 83).</li> <li>ICNIRP has been criticised for its links to industry (for example, https://klaus- buchner.eu/bestimmt-die-mobilfunk-industrie-ihre-eigenen-grenzwerte/ and https://www.spandidos-publications.com/10.3892/ol.2020.11876 )</li> <li>The INCIRP Guidelines have been criticised by hundreds of scientists throughout the world. 'It is our opinion that, because the ICNIRP guidelines do not cover long-term exposure and low-intensity effects, they are insufficient to protect public health,' say signatories to the EMF Scientist Appeal: https://www.emfscientist.org/index.php/emf- scientist-appeal</li> </ul>	ICNIRP is recognised as the peak body in non- ionizing radiation protection. The Standard is based on the ICNIRP guidelines, which are considered as international best practice in non-ionising radiation protection, and are used by most countries world-wide ICNIRP provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry.	No change
EMR Australia pL	<ol> <li>The draft states that its purpose is to 'prevent adverse health effects' (line 206) and its limits are 'based on established health effects' (line 293).</li> </ol>	The Standard considers all health effects associated with RF EME exposure. The only substantiated	No change

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	<ul> <li>However, the draft doesn't protect against all health effects. It only protects against those that it considers relevant, which are (section 2.4): <ul> <li>electrostimuilation of excitable tissue</li> <li>whole-body heat stress</li> </ul> </li> <li>excessive localised temperature rise in tissue/heating ie heating above 1 degree C.</li> </ul>	health effects of exposure to RF EME are heating of biological tissue and electrostimulation at very high exposure levels.	
EMR Australia pL	<ul> <li>4. The draft fails to protect against harmful effects on the body that are known to occur at levels too low to cause heating—in other words, at levels that comply with it. These harmful effects include: <ul> <li>cell damage</li> <li>changes in levels of hormones and neurotransmitters</li> </ul> </li> </ul>	The Standard considers all health effects associated with RF EME exposure. The only substantiated health effects of exposure to RF EME are heating of biological tissue and electrostimulation at very high exposure levels. There is no substantiated scientific evidence for other adverse health effects from exposure to RF	No change
	<ul> <li>DNA damage</li> <li>increased levels of free radicals</li> <li>brain tumours.</li> </ul>	EME below the limits set within the Standard. The limits set to prevent these effects are very conservative incorporating significant safety factors for additional protection against uncertainties.	
EMR Australia pL	<ul> <li>5. The draft's assumption that health problems are caused primarily by heating is inconsistent with mechanisms that have been proposed to account for adverse effects on the body at nonheating levels of exposure, such as:</li> <li>oxidative stress, implicated in many health problems, including cancer <ul> <li>activation of calcium ion channels</li> <li>activation of mast cells.</li> </ul> </li> </ul>	The Standard considers all health effects associated with RF EME exposure. The only substantiated health effects of exposure to RF EME are heating of biological tissue and electrostimulation at very high exposure levels. The mechanisms proposed for non-thermal effects (apart from electrostimulation and electroporation) have not been demonstrated.	No change
EMR Australia pL	6. The draft's claim to protect health is at odds with the fact that the International Agency for Research on Cancer has classified levels that comply with existing standards as a Class 2B carcinogen, in the same category as lead.	There is currently no substantiated scientific evidence that exposure to RF EME below the exposure limits set in the Standard causes cancer or any adverse health effect. Some studies have shown an association between heavy mobile and cordless phone use and brain cancer. These studies suffer from methodological shortcomings including biased information on mobile phone use. Other studies have not substantiated these results. Based largely on this	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		limited evidence the International Agency for Research on Cancer has classified RF fields as possibly carcinogenic to humans.	
		A study led by ARPANSA in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in any brain tumour types since then.	
		More rigorous long-term studies are being coordinated by WHO and Australia is taking part in this research program.	
EMR Australia pL	7. The draft's claim to protect health is at odds with the experiences of many people in the community who report unpleasant symptoms, often referred to as Electromagnetic Hypersensitivity (EHS), when exposed to radiofrequency radiation from mobile phones, WiFi routers, mobile phone towers, smart meters and other wireless devices. Scientists in many countries have documented such reports and EHS is considered by some doctors in Australia to be a diagnosable condition.	While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	No change
	<ul> <li>8. The reference levels in the draft are designed to protect (section 2.2) against:</li> <li>whole body exposure averaged over 30 mins</li> <li>local exposure, averaged over 6 mins</li> </ul>	The ARPANSA RF Standard accounts for all modes of RF EME transmission including continuous and pulsed.	
EMR Australia pL	<ul> <li>brief local exposure, up to 6 mins         <ul> <li>instantaneous local exposure.</li> </ul> </li> <li>However, these levels are based on assumptions that averaging exposure for various periods of time (6 minutes / 30 minutes) is safe. It assumes that continuous exposure to a "smoother" signal has the same effect on the body as random signals with sharp bursts of radiation. This may not, in fact, be the case as It's just as likely that a brief strong peak of exposure will damage the body.</li> </ul>	The time averaging used is based on biological tissue absorption and dissipation of the deposited energy. The exposure averaging times are designed for the purpose of assessing exposure, not setting time limits for exposure.	No change
EMR Australia pL	9. The draft protects against exposures for short periods of time (6 minutes / 30 minutes). It does NOT protect against long-term exposure such as people receive when using wireless equipment for hours each day every day for years on end.	The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur.	
		At levels below the limits in the Standard, the temperature rises are within normal body temperature variations.	
		The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure.	
		Exposure to RF EME below the limits in the Standard do not have a cumulative effect.	
		The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard. The ARPANSA	
		RF Standard accounts for all modes of RF EME transmission including continuous and pulsed.	
		ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence.	
EMR Australia pL	10. The draft allows higher levels of exposure than those permitted by standards in countries such as Russia, Switzerland, Austria and Italy, which draw on the same scientific evidence.	The exposure limits in the ARPANSA Standard are based on current scientific knowledge and are aligned with international guidelines prepared by the International Commission for Non-Ionising Radiation Protection (ICNIRP) and endorsed by the World Health Organization (WHO).	No change
		The ICNIRP guidelines form the basis for regulations within most countries in the world, including Australia and most of the European Union. ARPANSA and the WHO do not support the adoption of arbitrary exposure limits.	

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard, which sets both public and occupational exposure limits up to 300 GHz. At these higher 5G frequencies, the limits in the	
EMR Australia pL	11. It is premature to establish safety limits for 5G frequencies as no epidemiological testing has been conducted on exposed populations.	ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur. It is the assessment of ARPANSA that there is substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network.	No change
EMR Australia pL	12. In light of the uncertainty about safe levels of exposure in the scientific literature, the document must recommend a precautionary approach to exposure and include suggestions for achieving this.	The standard incorporates significant safety factors to set limits many times below exposures where established health effects occur in order to provide strong protection and account for uncertainty.	No change
EMR Surveys Pty Ltd	I write as a member of the Standards Australia TE7 committee and ARPANSA RPS3 standard-setting working group, who was, for many years, involved in the process of establishing an Australian radiofrequency standard and who is familiar with the relevant research, standards-setting process and the assumptions that underlie it. I also have some 30 years of experience in measuring ELF and RF electromagnetic fields. It is my firm opinion that the draft radiofrequency standard proposed by ARPANSA is inadequate to meet ARPANSA's obligation of protecting public health. It is based on the ICNIRP Guidelines for protection against predominantly heating effects. One of the key flaws of the standard is that it does not protect people from long-term, low level or athermal exposures to radiation. It cannot be assumed that the standard will protect the current generation of children born to an environment in which higher levels of man-made radiation are present than has ever before been the case. It cannot be assumed that the standard will protect the children born to them. There is a large body of research, of which ARPANSA is aware, showing that athermal exposures damage the body. In	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- lonizing Radiation Protection (ICNIRP) that there is no substantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	radiation that the draft has ignored.		
	Like former standards, this document allows exposures to signals that have been averaged over time. There is no evidence that exposures averaged in this way are safe – only that they prevent heating effects that are not the sole cause of damage. A short, high-level spike, averaged over six, or even thirty minutes, will be appear to be a negligible signal. However, it may have a significant effect on the body.		
	Given the lack of research on the effects of exposure to real-world 5G radiation, we simply do not know what levels of exposure are or will be safe in the long term. It is premature for this standard to set a level of 'safe' exposure. Clearly much more research needs to be done before such claims can be made in a standard.		
	In light of the serious shortcomings of the Standard, it is essential that the document include a section on 'Precautionary Recommendations'. This section should include recommendations for minimising exposure wherever possible and alerting the public to the important sources of radiation in their environment. For example, they should be informed that they will receive much more exposure from a hand-held mobile phone, than from a distant phone tower and advise against unnecessary exposures such as sleeping with their mobile telephone under their pillow. I would be happy to contribute further recommendations to this section if and when it is drafted.		
	The new standard must not continue to give the impression that exposure to man-made radiation, at levels above which harmful effects have been found, is 'safe'. Nothing could be more nonsensical.		
	John Lincoln B.E. Elect. Eng		
Environment and Community Safe From Radiation Inc.	There has been no proper public debate on this issue. This draft has all been constructed behind closed doors without including the people who are going to be affected by the future increases in exposure into the discussion.	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety	No shanga
	There have been no medical, health, or science experts independent of industry interests involved. This is not democracy. It advances a perception of control of the state by industry interests.	management stakeholders. The draft was also released for public consultation from 31 August till 21 October and ARPANSA is addressing all the comments received. ICNIRP is recognised as the	NO Change
	I he draft is almost the same as the ICNIRP RF Guidelines. ICNIRP is an industry serving	peak body in non-ionizing radiation protection and	

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	organisation, set up to create guidelines to protect its own interests rather than to protect the public. With the latest pandemic we have seen how ignorance on health concerns can have a detrimental effect on economics. The evidence suggests that ARPANSA has not done its due diligence to act independently of industry and to consider health as a priority.	guidance provided by ICNIRP is considered international best practice. ICNIRP provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry.	
Environment and Community Safe From Radiation Inc.	We note that S2.1 of the Draft acknowledges a violation of the basic human rights to health and safety and of consent: "The general public are often unaware of exposure, may be continually exposed and cannot reasonably be expected to take precautions to minimise or avoid exposure." For people who suffer from exposure to RF and do not consent, this statement can be taken as an admission of ARPANSA knowingly being a party to harming those people. Barrister Broomhall has presented legal arguments that this constitutes an assault. Not just on one person, but an entire population.	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- lonizing Radiation Protection (ICNIRP) that there is no substantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty.	No change
Environment and Community Safe From Radiation Inc.	The draft does not appear to make provision for: a. Acceptable dosage, based on age, gender (c.f. alcohol) or medical condition. b. The greater environment. This is an object of the ARPANS Act and has been entirely overlooked. Only humans are considered for the purposes of the RF standard, not plants, insects, birds and other animals (including pets). There are plenty of animal studies showing definite carcinogenic effect from RF on animals (e.g. lab rats). c. The real world is one where people place the phone hard up against their ear or against their body (bra, or pants pocket). The notion of an air-gap in lab testing on a model that simulates approximately 2% of the population (e.g. S.A.M.) is fanciful. d. Non-thermal effects, such as the many biological effects documented in the ORSAA database www.orsaa.org e. Effects of continuous long-term exposures (longer than 30 minutes) on human health	The Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME. The Standard is based on scientific research that shows the levels at which harmful effects occur and it sets the exposure limits, based on international best practice, well below these harmful levels. The Standard considers all health effects associated with RF EME exposure. The only substantiated health effects of exposure to RF EME are heating of	No change

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	<ul> <li>f. Children as being more vulnerable – with thinner skulls and growing brains.</li> <li>g. Young people as they are now in the category of high-end users (like those in the Interphone study who showed significant higher risk of glioma with 30 minute usage per day for longer than 10 years)</li> <li>h. Signals that are being sent at 100kHz or less - which includes the signals carrying the information we are sending from our phones and tablets. <ul> <li>i. People who are affected by electromagnetic fields.</li> <li>The draft does make provision for:</li> </ul> </li> <li>a. Industry to inflict greater levels of exposure to RF-EMR to the entire population, by adding more towers, more 5G masts, more Wi-Fi in schools and in the workplace, more devices incorporating wireless, driverless cars and buses, and the Internet of Things.</li> <li>b. Industry to take less responsibility to Australians for the health effects of their infrastructure and signals.</li> <li>c. The energy, waste, and environmental burden that the increased rollout will create</li> </ul>	biological tissue, electroporation and electrostimulation at very high exposure levels. The Standard is aligned with international guidelines prepared by the International Commission on Non- Ionizing Radiation Protection (ICNIRP) and endorsed by the World Health Organization (WHO). Exposure below 100 kHz is outside the scope of RPS S-1 and is addressed by the ICNIRP (2010) guidelines.	
Environment and Community Safe From Radiation Inc.	<ul> <li>The industry is conveniently fixated on power densities and that there is no harm if tissue is not heated.</li> <li>However, it is a known fact that (particularly with mm waves), the central nervous system (initially via skin receptors) can act as a conduit to the brain, stimulating the release of endogenous chemicals such as carbon monoxide or opioids.</li> <li>Moreover, for decades weaponised frequencies have been researched (again well documented) that cause resonance or molecular disruption.</li> <li>One must consider frequency (carrier waves and data transitions), perhaps phase and not only power density.</li> <li>If the only tool one has is a hammer, then one treats every problem as if it were a nail. ARPANSA would be well aware how incredibly complex and electrosensitive biological systems are. I do not envy ARPANSA the difficult task it has before it, but the longest journey starts with one step, and that step must be to engage in the internationally recognised Standards setting process, involving all stakeholders.</li> </ul>	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. The ARPANSA RF Standard accounts for all frequencies within RF range including millimetre waves. The Standard also accounts for all modes of RF EME transmission	No change
Environment and Community Safe From Radiation Inc.	Who audits the computer simulations and determines them to be accurate in terms of real- world readings? Base stations are constantly adapting their output levels depending on the number of calls	Computer simulations and modelling methods are documented and have been published in peer- reviewed publications. They are based on worst case conditions to provide conservative estimates.	No change

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	they are handling and how far away the handsets are from them. How can the computer simulations be remotely close to real-world conditions, when a real person living in a real street is exposed to different frequencies, time-varying power levels, and overlaps from different radiation sources (hot spots)?	There have also been numerous measurement studies worldwide showing that exposure from telecommunications is much lower than the allowable limits.	
	ARPANSA do no real long-term background monitoring. Is is all based on calculations. We are not living in a computer simulation. The real complex world needs real measurements. Industry (as a condition of emitting a polutant) should be required to have an EME monitor within real-world distances from every cell tower and small cell which records the actual level of emissions and reports it in real-time and then time-averages the level of exposure people near those monitoring stations are receiving. The information should be available to the general public. Carriers could use this data to adjust the power outputs of their radiation emissions sources in real time.	<ul> <li>ARPANSA conducted a measurement survey on mobile phone base stations from 2007 to 2013 and found the RF EME emissions from these structures to be well below the public exposure limits set in the ARPANSA RF standard.</li> <li>ARPANSA also conducted a study of Wi-Fi in schools which also included measurements of RF EME from other telecommunications sources including radio, TV and mobile phone base stations. The study showed the RF EME from each source was well below the public exposure limits set in the ARPANSA RF standard.</li> <li>In early 2020, the Australian Communications and Media Authority (ACMA) measured RF EME exposures at 59 small cell sites across Australia.</li> </ul>	
		small cell sites were below 1 per cent of the limits in the ARPANSA RF Standard. ARPANSA is planning further measurement studies of RF EME in the community under the new EME program.	
Environment and Community Safe From Radiation Inc.	The public need to be able to access the information for their local towers: a. what frequency of signals are being sent and my whom b. the power levels of each effects from exposure to RF EME. The Standard is based c. records of what has changed, d. how the signals from all surrounding towers add together for each household	Information about the RF EME exposure levels from any mobile phone base station or small cell can be found on the <u>Radiofrequency National Site Archive</u> <u>website</u> . This publicly accessible database allows anyone to search for a particular base station or small cell at a site of interest. Users can download the Environmental Electromagnetic Energy (EME) Report for a specific base station.	No change

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		The EME report contains details about the radio systems, telecommunications carriers and RF EME exposure levels at the chosen site.	
	Between wi-fi and cordless and cell phones, and small cells and base stations on or near workplaces, every worker in the country would be exposed to varying degrees in the workplace.	The Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME.	
Environment and Community Safe From Radiation Inc.	a. This has been known about by ARPANSA since at least 2002. b. Why has there been no risk communications and how is this to be addressed? How is it that ACEBR tell the Nation that harm from non-thermal levels or radiation is all in	The Standard is based on scientific research that shows the levels at which harmful effects occur and it sets the exposure limits, based on international best practice, well below these harmful levels.	No change
	your head (nocebo), yet they have a WHS Policy warning of the hazards to health and safety from mobile phones. ARPANSA should quantify the issue of workplace risk, clarify 'nocebo' and advise that harm did not need to proven in the McDonald vs Comcare workers compensation case, so as not to obfuscate the risk.	The Standard protects against simultaneous exposure from all sources (simultaneous exposure to multiple frequency fields - Section 3)	
Environment and Community Safe From Radiation Inc.	<ul> <li>There is little point in ARPANSA having advice, and keeping it a secret.</li> <li>a. For example, we have asked ARPANSA previously (no direct response as is typical of ARPANSA) who in Government elected not to advise parents and schools of ARPANSA's recommendation that exposure for children be minised? <ul> <li>b. Who is responsible for risk communications?</li> </ul> </li> <li>c. Who is responsible for ensuring there will be OH&amp;S guidelines in the workplace or the school?</li> <li>d. Who is responsible for making the public/workers aware of a register of adverse health effects, making that register accessible (e.g. people who suffer greatly from radiation sickness are not going to log on with their i-phone to fill in a form)?</li> <li>e. Who is responsible for notifying and training doctors on radiation sickness and the billable code IDC-10?</li> <li>f. Who will inform workplaces that Lloyds excludes injuries from EMR exposure from its insurance products because of the impact it might have on the insurance industry. It is self-evident the impact would not be favourable. That is, the risk is foreseeable and likely inevitable because if realised it will impact the insurance industry unfavourably. If one is not able to obtain insurance for a 'thing', then the Cambridge Dictionary defines that as 'uninsurable'.</li> <li>g. Who is responsible for notifying wireless industry shareholders that the consequence of the risk of harm to environment, health and safety is so high, that it is a material risk to the</li> </ul>	ARPANSA's role is to maintain the appropriate RF exposure standard and the revised standard is based on substantiated science and international best practice. Application or enforcement of RPS S-1 as a regulatory instrument is a matter for the relevant statutory body.	No change

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	viability of the industry? ARPANSA has failed to create a standard that provides precaution for Australians against the known harm and the future risk.		
Environment and Community Safe From Radiation Inc.	There is no box for the process or validity of the Standard, nor the relevance of risk or how this Standard operates as a regulatory instrument. On this basis, ECSFR, will be issuing an open letter to ARPANSA (which will be posted on our web site: www.ECSFR.com.au) to address these issues.	Noted. Standards become regulatory instruments if they are incorporated into Acts or regulations as a specific requirement in governing regulatory frameworks.	No change
Fiona Harper Harwood	The 1st problem problem with all the 'Safety Standards' is that global protection agencies and the FCC have chosen, by law, to allow the roll out of technology, the SAR Thermal Test or heat science to show that the technology is safe. Thus only referring to temperature rise and ignoring all other science, importantly Biological Science to set safety levels. Also, technology has advanced incredibly since 1998, and to still be in line with this is outdated. ref: line 187 "Overall harmonisation with ICNIRP was considered important and the exposure limits in the 188 ARPANSA 2002 Standard differed only in small detail from those in the ICNIRP 1998 guidelines." Re naming EMR with EME is false and misleading as wireless frequencies are radiation. The wireless industry has not even tested 5G to show that it is safe. the ARPANSA act Section 3 in the original reads "The object of this Act is to protect the health and safety of people and to protect the environment, from the harmful effects of radiation" The mission statement in the new Act: "The mission on ARPANSA is to protect people and the environment from the harmful effects of radiation" "health and safety" has been removed. Why is that?	The only established health effect of exposure to RF EME is heating of biological tissue, electroporation and electrostimulation. The assessment of SAR is necessary to quantify the RF energy being deposited into tissue to avoid the heating effect. This also protects against electroporation and electrostimulation which occur at much higher exposure levels. The limits set within the standard are based on good science and international best practice. They are underpinned by several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The standard covers the frequencies proposed for use in the 5G network. The mission of ARPANSA to protect human health	No change

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		and the environment from harmful effects of radiation is included in RPS S-1.	
		The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels.	
Fiona Harper Harwood	Again the SAR test is used, thermal effects only. Biological science is ignored. To allow these high levels is of major concern, but also allows the safety agencies to give a % of the radiation readings recorded in reports to appear very low, thus fooling the public into believing they are safe. In the notes of the table in section 2.3 line 328 the SAR exposure is averaged over 30 minutes & line 329 6 minutes. The reality is that people are exposed 24/7 from accumulative radiation from multiple devices.	It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- Ionizing Radiation Protection (ICNIRP) that there is unsubstantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The Standard applies to any time duration from instantaneous to long- term.	No change
		The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty.	
		The only established health effect of exposure to RF EME is heating of biological tissue (as well as electroporation and electrostimulation).	
Fiona Harper Harwood	Again the problem is the use of the SAR test to determine safety throughout the total report. The SAR test is only thermal and does not take into account any biological & cellular effects on humans and all living things. The SAR test is completely inadequate and way out of date.	The assessment of SAR is necessary to quantify the RF energy being deposited into tissue to avoid the heating effect.	No change
		This also protects against electroporation and electrostimulation which occur at much higher exposure levels. The limits set within the standard are based on substantiated science and international best practice.	
Fiona Harper Harwood	line 1074: Radiofrequency. (RF) the word radiation is not used. Radiofrequency is radiation, including microwaves.	All energy transfer including visible light and sound can be defined broadly as radiation. "Radiofrequency" is the correct scientific term used	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		to describe the part of the electromagnetic spectrum that RPS S-1 addresses.	
Fiona Harper Harwood	The SAR test must be abolished. Health and safety is not protected with this test. Biological science must be acknowledged and used a guide to create actual safe levels to offer protection to workers and the public.	The only established health effect of exposure to RF EME is heating of biological tissue (as well as electroporation and electrostimulation). The assessment of SAR is necessary to quantify the RF energy being deposited into tissue to avoid the heating effect. The limits set within the standard are based on substantiated science and international best practice.	No change
Gary Richardson	There have been studies showing harm from short term exposure to radio frequency radiation for 3G/4G but hardly any for 5G which is quite different than the previous generations of the technology. There has been hardly any mention by ARPANSA or the media on the health effects of this technology on humans or wildlife Where are the peer reviewed scientific papers showing that your limits are safe? - Why have we, the public, not been thoroughly consulted about the roll out of 5G? - With many years of extra research and 5G being stopped by many countries worldwide, do you take full liability if members of the public fall ill due to radiation?	The only established health effects of exposure to RF EME are heating of biological tissue, electroporation and electrostimulation at very high exposure levels. There is no substantiated scientific evidence for other adverse health effects from exposure to RF EME below the limits set within the Standard. The limits set to prevent these effects are very conservative incorporating significant safety factors for additional protection against uncertainties. It is established that animals and plants have natural responses to electromagnetic fields including migratory patterns and pollination. The biomechanisms of these responses have not been firmly established and there are competing theories that continue to be investigated. Impacts of RF EME from artificial sources on plant and animal life have not been established. However, existing studies on the effects of low-level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment. ARPANSA's role is to maintain the appropriate RF exposure standard and	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		the revised standard is based on good science and international best practice.	
Gary Richardson	<ul> <li>Where are the peer reviewed scientific papers showing that your limits of the above frequency range, are safe?</li> <li>Why have we, the public, not been thoroughly consulted about the roll out of 5G?</li> <li>With many years of extra research and 5G being stopped by many countries worldwide, do you take full liability if members of the public fall ill due to radiation?</li> </ul>	<ul> <li>ARPANSA's role is to maintain the appropriate RF exposure standard and the revised standard is based on substantiated science and international best practice.</li> <li>The limits set within the standard are based on good science and international best practice. They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk</li> <li>Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent</li> <li>Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and</li> <li>Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The Standard covers the frequencies proposed for use in the 5G network.</li> </ul>	No change
Gary Richardson	There has been no mention of any extra health effects caused by multiple frequency fields that are increasing as time goes on.	Exposure to RF EME below the limits does not have a cumulative effect.The Standard protects against simultaneous exposure to multiple frequency fields (Section 3). The established harmful effects of exposure to RF EME are acute in nature and occur at very high levels many times above the limits set in the Standard.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		Mitigation methods for the general public are not considered necessary.	
	There has been little mention of any mitigating methods that the general public may use to	Protection is provided by compliance with the exposure limits set for the public.	
Gary Richardson	protect themselves against this radiation.extra health effects caused by multiple frequency fields	The limits are set very conservatively, incorporating significant safety factors for additional protection against uncertainties.	No change
		The Standard protects against simultaneous exposure to multiple frequency fields (Section 3).	
Gary Richardson	extra health effects caused by multiple frequency fields	The Standard protects against simultaneous exposure to multiple frequency fields (Section 3).	No change
		The limits set within the standard are based on substantiated science and international best practice.	
Gary Richardson	We feel we are flying blind and that the industry is not listening to the concerns of the public and that of academics in the telecommunications fields. We feel that we are confused regarding the vast difference between the safety limits of ARPANSA and that of the Bioinitiative organization.	They are underpinned by several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012.	No change
		while there are some scientists that have the opinion that there are negative health implications of low-level RF EME exposure it is important to note that their opinion is not supported by health authorities, mainstream science and the body of available scientific and health research.	
Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
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		ARPANSA has assessed the body of available evidence (including the same evidence those scientists provide to support their position) and does not agree with their conclusions. This is due to, amongst other things, the available studies demonstrating mixed or lack of consistent results, methodological shortcomings and no proposed plausible biological mechanisms for how harm may occur at low level exposure. ARPANSA's assessment is in line with that of the World health Organization (WHO) and the International Commission on Non-ionizing Radiation Protection (ICNIRP).	
GSMA	<ul> <li>GSMA welcomes the decision of ARPANSA to continue to follow the guidance on RF-EMF limits produced by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). These guidelines from the basis of RF-EMF protection policy in most countries for exposure from mobile network equipment and mobile devices.</li> <li>The ICNIRP (1998) limits form the basis of the European Council recommendation 1999/519/EC [1] for public EMF exposure limits. This recommendation is adopted by the majority of countries in Europe [2] for mobile networks and used by all countries in Europe for mobile devices. The reason for the difference is that mobile networks are regulated at the national level whereas as mobile phones are considered products and regulated at the European Union level. Some former Soviet countries have retained restrictive limits, while others (for example, Czech Republic in 2000, Estonia 2002, Hungary in 2003, Slovakia 2004 and Romania 2006) have moved to adopt international (ICNIRP) based limits. The reasons for adopting restrictive limits in other countries are diverse and not justified by the international scientific consensus.</li> <li>The GSMA website [3] contains maps showing the adoption of public exposure limits for</li> </ul>	Noted	No change
	mobile networks and mobile devices. The maps are based on data compiled from scientific papers, expert reports, regulatory authority websites and personal communications with national industry or government stakeholders. The networks limits map was updated 27 April 2020 and shows that globally, 132 countries apply the international limits, 11 follow the US Federal Communications Commission (FCC) 1996 limits, and 36 have other limits. There are many differences between those countries		

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	adopting 'other' limit values and their application. Such arbitrary limits may impact mobile network deployment Operators typically apply the ICNIRP limit where no country regulations exist.		
	<ul> <li>The device limits map was updated 1 August 2019 and shows that globally, 152 countries apply the international limits and 19 use the FCC 1996 limits. Two countries appear to retain the power density limits of the former Soviet Union but it is unclear whether these are applied in practice. Manufacturers typically apply the international limit where no country regulations exist.</li> <li>[1] https://op.europa.eu/en/publication-detail/-/publication/9509b04f-1df0-4221-bfa2-c7af77975556/language-en.</li> <li>[2] Comparison of international policies on electromagnetic fields. National Institute for Public Health and the Environment (RIVM). 18 February 2018.</li> <li>[3] https://www.gsma.com/publicpolicy/consumer-affairs/emf-and-health/emf-policy</li> </ul>		
GSMA	<ul> <li>GSMA welcomes the identification of additional groups of persons who may be subject to occupational exposure limits. We note that a similar philosophy though less developed approach is also described in ITU-T K.145 [1].</li> <li>[1] ITU-T K.145 (11/2019) - Assessment and management of compliance with radio frequency electromagnetic field exposure limits for workers at radiocommunication sites and facilities available at http://handle.itu.int/11.1002/1000/14076</li> </ul>	Noted	No change
GSMA	<ul> <li>The GSMA welcomes the ARPANSA decision to remove the 'precautionary approach' language from RPS S-1. This is consistent with the statement in ICNIRP (2020) that:</li> <li>'There is no evidence that additional precautionary measures will result in a benefit to the health of the population.'</li> <li>For consistency we suggest that ARPANSA review the answer to the FAQ question 'Is it safe for my kids to use mobile phones?' [https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/reducing-exposure-to-mobile-phones/radio-waves-frequently-asked-questions] so that it is also consistent with the</li> </ul>	Noted	No change
	ARPANSA advice given in the ARPANSA fact sheet Mobile phones and health [https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation- sources/mobile-phones] which states: 'Although it is not considered necessary, parents may decide that they wish to lower their children's RF EME exposure when using mobile phones. In this case, parents can encourage		

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	their children to reduce call time, only make calls where reception is good, use hands-free devices or speaker options, or send text messages instead of making calls.'		
Ian R Gardner	Supportive	Noted	No change
Kenneth Joyner	Industry is supportive of the adoption of the 2020 ICNIRP Guidelines but industry recommends that ARPANSA adopt the more widely accepted value of $\lambda/(2\pi)$ for the boundary of the reactive near-field in Table 4 as suggested by ICNIRP, both for consistency with ICNIRP and to avoid any potential confusion for regulators and other users of the ARPANSA standard.	Agreed	Removed Table 4 and replaced with the following text "Users should consult appropriate exposure assessment standards, such as current editions of AS/NZS 2772.2 and IEC 62232 for further details and definition of the boundaries for specific circumstances."
Kordia Solutions	This comment refers to "References/ Bibliography". Consider giving each of the 19 referenced document an individual number, ie, [1] to [19], to make references throughout the RPS-S1 standard easier and more concise.	Referencing follows the style of ARPANSA's Radiation Protection Series of documents.	No change
Kordia Solutions	The new proposed Electrostimulation Reference levels for workers at AM Radio sites (around 1MHz) will be significantly stricter than existing RPS3 levels. For Industry, this will create Larger Occupational exclusion zones onsite. Will ARPANSA be discussing with state WHS regulators the impact of this, and be recommending a suitable changeover period to comply with the new standard? Ie, 12, 24, 36 months?	ARPANSA will liaise with different authorities on the application of the new Standard.	No change
Lucian Anastasiu	There has been no proper public debate on this issue. This draft has all been constructed behind closed doors without including the people who are going to be affected by the future increases in exposure into the discussion. There have been no medical, health, or science experts independent of industry interests involved. This is not democracy. It is control of the state by industry interests. The draft is almost the same as the ICNIRP RF Guidelines. ICNIRP is an industry serving organisation, set up to create guidelines to protect its own interests rather than to protect the public. This guideline is good for the economy but bad for people's health. With the latest pandemic we have seen how ignorance on health concerns can have a detrimental	The standard was developed by a committee whose members have relevant expertise in RF EME exposureand health and underwent drafting consultation with work health and safety management stakeholders. The draft was also released for public consultation from 31 August till 21 October and ARPANSA is addressing all the comments received.	No change

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	effect on economics. ARPANSA has not done its due diligence to act independently of industry and to consider health as a priority.	The ICNIRP guidelines are considered as international best practice in non-ionising radiation protection, and are used by most countries world- wide.	
Lucian Anastasiu	The draft does not make provision for: • Non-thermal effects, such as the many biological effects documented in the ORSAA database www.orsaa.org • Effects of continuous long-term exposures (longer than 30 minutes) on human health • Children as being more vulnerable – with thinner skulls and growing brains • Young people as they are now in the category of high-end users (like those in the Interphone study who showed significant higher risk of glioma with 30 minute usage per day for longer than 10 years) • Signals that are being sent at 100kHz or less - which includes the signals carrying the information we are sending from our phones and tablets. • People who are affected by electromagnetic fields • The greater environment. Only humans are considered for the purposes of the RF standard, not plants, insects, birds and other animals (including pets). The draft does make provision for • Industry to inflict greater levels of exposure to RF-EMR to the entire population, by adding more towers, more 5G masts, more Wi-Fi in schools and in the workplace, more devices incorporating wireless, driverless cars and buses, and the Internet of Things. • Industry to take less responsibility to Australians o for the health effects of their infrastructure and signals o for the energy burden that the increased rollout will create	The Standard is based on scientific research that shows the levels at which harmful effects occur and it sets the exposure limits, based on international best practice, well below these harmful levels. The Standard considers all health effects associated with RF EME exposure. The only substantiated health effects of exposure to RF EME are heating of biological tissue, electroporation and electrostimulation at very high exposure levels. The Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME. The Standard is aligned with international guidelines prepared by the International Commission on Non- Ionizing Radiation Protection (ICNIRP) and endorsed by the World Health Organization (WHO). Exposure below 100 kHz is outside the scope of RPS S-1 and is addressed by the ICNIRP (2010) guidelines.	No change
Lucian Anastasiu	There is a grown concern amongst people that the layers of EMF that are added often by the industry affect our health and the health of the planet. I do not feel protected in this country and I suffer because I cannot protect my family as a father. Everywhere my chidren go they are exposed without their will to WiFi, 3G, 4G and now 5G. Not to mention satellites, NBN towers and emergency services, plus military, radars, police. This is an invasion on our bodies and an atttack against humanity. These waves affect my ability to focus, stay healthy, sleep, stay positive, be a normal human being. And I am not the only one, I have many people in my circle that have the same problems. We all know it is because of EMF.	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders. The ICNIRP guidelines are considered as international best practice in non-ionising radiation	No change

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		protection, and are used by most countries world- wide	
		The Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME.	
		While symptoms of people who identify as electromagnetic hypersensitive (EHS) are real and can have disabling effect for the affected individual, EHS has no clear diagnostic criteria and the science so far has not provided evidence that exposure to RF EME below the limits set in the ARPANSA RF Standard is the cause.	
Lucian Anastasiu	I appeal to your humanity, to the human being behind your eyes to take action and transform ARPANSA into a reliable organisation that works for the betterment of health.	ARPANSA's role is to maintain the appropriate RF exposure standard. The revised standard is based on substantiated science and international best practice. The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting	No change
		consultation with work health and safety management stakeholders.	
	<ul> <li>The public need to be able to access the information for their local towers o what frequency of signals are being sent and by whom</li> </ul>	Information about the RF EME exposure levels from any mobile phone base station or small cell can be found on the <u>Radiofrequency National Site Archive</u> website.	
Lucian Anastasiu	o the power levels of each o records of what has changed, o how the signals from all surrounding towers add together for each household • Real world measurements of exposures need to be available on request rather than relying on estimates from computer programs • ARPANSA do no real long-term background monitoring. Is is all based on calculations. We are not living in a computer simulation. The real complex world needs real measurements.	This publicly accessible database allows anyone to search for a particular base station or small cell at a site of interest.	No change
		Users can download the Environmental Electromagnetic Energy (EME) Report for a specific base station. The EME report contains details about the radio systems, telecommunications carriers and RF EME exposure levels at the chosen site.	

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	If it turns out that myself or my children are harmed by this technology, ARPANSA will be deemed to be responsible. ARPANSA has failed to create a standard that provides precaution for Australians against the known harm and the future risk.	The ARPANSA RF Standard (RPS S-1) is designed to protect the public and workers from exposure to RF EME by setting exposure limits.	
		The Standard is based on scientific research that shows the levels at which harmful effects occur and it sets the exposure limits, based on international best practice, well below these harmful levels.	
Lucian Anastasiu		The Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME.	No change
		The Standard is aligned with international guidelines prepared by the International Commission on Non- Ionizing Radiation Protection (ICNIRP) and endorsed by the World Health Organization (WHO).	
Lucian Anastasiu	I appeal to ARPANSA to install EMF meters on all schools around Australia with the visibility on the schools electronic boards. WiFi in the classrooms should be banned, as it is in some developed countries that are working for the health of their future generations. Telco towers close to schools, child care centres, sport grounds should be banned. ARPANSA should encourage wired equipment and educate the public on wiring. The measurements that you have on your website are not taken constantly and the cumulative exposure is not accounted. You do not educate the parents and society about the dangers of EMF, you just protect the industry to sell more modems, radios and RF equipment, and keep on saying "no conclusive evidence" by dismissing independent research and the voice of those harmed.	The Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME. All telecommunications and wireless devices emitting RF EME are required to comply with the public exposure limits set within the standard. There is no substantiated evidence of adverse health effects at RF EME levels below the public exposure limits.	No change
Martin Luther	I am responding to the ARPANSA call for comment on the new guidelines relating to Electro-Magnetic Radiation(EMR). I note changes made for frequencies below 100MHz. This seems to be based on theoretical studies. Involving laboratory measurements and computer modelling. Has ARPANSA or ICNIRP conducted any epidemiological surveys to see if there are, in fact, "real world" medical effects? There are a number of cohorts available who are regularly exposed to significant levels of EMR in the 1MHz to 100MHz segment of the spectrum. Many of them over many years.	A rationale for the change in the limits is provided in the ICNIRP (2020) guidelines. It is noted that the limits are set at levels much lower than where health effects are known to occur as a precautionary measure and to account for uncertainty in the science.	No change

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	The most obvious group is radio amateurs of which there are tens of thousands around the world. 10,000 in Australia, 70,000 in Germany, 75,000 in UK, 760,000 in USA, 435,000 in Japan and 150,000 in China. I have not seen any evidence of adverse effects on other radio amateurs or myself. In fact, from observation of my friends, the opposite may be true. Do radio amateurs live longer? I have spent over 50 years in close proximity to RF. As a teenager I could not afford expensive things like meters so "tuned" my home-built transmitter to get maximum output by observing the blue glow on the anodes of the final tubes. 100watts at 3.5MHz within 250cm of my teenage head! Most radio amateurs have transmitters sitting on desks just in front of the operator. When earth connections are poor, such as when operated from the second floor, it is not unusual to get an RF burn to the lip from a metal cased microphone. Other cohorts include military radio operators and technicians, older radio officers on Ocean going ships and broadcast technicians. My point is not whether the standards as set are correct but whether in fact there is any real world measurable adverse medical effect from the long-term exposure to electromagnetic fields at these frequencies. We all accept that there are clear and measurable effects from heating at high power microwave frequencies. However, the level of excitation from those frequencies is very different to that created at lower frequencies. Making it not useful to just assert it is "all" the same radiation. I am concerned that these "standards" which may have little effect in the real world are being used to frighten people. With all sorts of unintended consequences including, at the very silly end, that Covid 19 is spread by 5G wireless radiation! Martin Luther BSc (Electronics), MBA, VK7GN.		
Mike Repacholi	I've reviewed this draft and it is in excellent shape. It follows ICNIRP well and refers to ICNIRP docs appropriately. The only thing missing is any reference to possible cosmetic use of RF. Are they considered to be "medical". Might be worth a mention.	Agreed	Added the following at the end of the paragraph in lines 224-226 "The Standard also applies to people exposed to RF fields during cosmetic treatments without control by a qualified medical practitioner."

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Mike Wood	The safety of our workers and contractors, as well as the safety of other occupational workers and the general public is an important and ongoing consideration for Telstra. We consult widely for the introduction of new mobile base station equipment, and we deploy all new sites and upgrades in accordance with relevant standards including RPS-3 to ensure the safety of all occupational workers (including other incidental workers at a site) and the safety of the general public. For this reason, we specifically support the updates to Part 5 of the standard, particularly in relation to changes to include a broader range of occupational workers (for example, window cleaners) working within the vicinity of radiocommunications equipment such as mobile base stations. In this context, we propose further work is undertaken once the standard is formally made to develop implementation guidelines to assist the broad range of occupational workers, employers and facility owners and managers understand their obligations under the updated standard. The need for implementation guidelines is evidenced by the large number of questions at ARPANSA's workshop on implementation issues and concerns. Our proposal is also driven by the fact that we are the owner and operator of over 30,000 radiocommunications facilities in Australia, some of which are on Telstra property such as shopping centres, street light poles, water tanks and other facilities. It is important that the owners and facility managers of any property where radiocommunications equipment is located have clear, practical guidance so that staff, works and contractors, as well as visitors and the general public are protected in accordance with the standard. We propose that ARPANSA work with Safe Work Australia to develop a set of practical implementation guidelines that cover a good sample set of scenarios. We observe that Safe Work Australia could also make an excellent partner for the development of practical implementation guidelines or with Safe Work Australia to unders s	Examples on the application of the Standard can be included in supplementary material to the Standard.	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard

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	<ul> <li>Action Levels (ALs) and Exposure Limit Values (ELVs)</li> <li>deciding what, if anything, you may need to do to protect your employees from the risk arising from exposure to EMFs;</li> <li>assessing and controlling any risks from EMFs in the workplace;</li> <li>protecting employees at particular risk;</li> <li>exemption from certain aspects of the CEMFAW Regulations; and</li> <li>references and further reading. https://www.hse.gov.uk/radiation/nonionising/emf.htm</li> <li>We consider that this material would also be useful for informing the development of an Australian implementation guide</li> </ul>		
Muhammad Furqan	Instead of general exposure limits mentioned from 100 KHz to 300 GHz , BR, SA, SAR, PSD etc. should be mentioned against specific frequencies being used by different technologies like FR1 and FR2 for 5G SA and %G NSA, WiFi, 4G LTE etc.	The Standard is not technology specific but applies to all RF sources between 100 kHz and 300 GHz.	No change
Muhammad Furqan	Simultaneous exposure to multiple frequencies is additive and it should not be enough mentioning it. As we know 5G will use mMIMO through array antennas using beamforming, this should be categorically mentioned with exposure of all the frequencies used for different array sizes and be added up with exposure of already existing frequencies	The Standard covers simultaneous exposure to multiple frequency fields (Section 3).	No change
Muhammad Furqan	Verification shouldn't be left only on a single tool and must be verified by different available tools like Altair FEKO, IXUS Software, ITU EMF Estimator etc. Why not introduce a mobile app to display actual radiation levels. 5G enabled mobile phones will have larger value of Rx frequencies and they can display the actual amount of radiations for given frequencies as well as simultaneous exposure to multiple frequencies.	This not within the scope of the Standard.	No change
Muhammad Furqan	We are moving into the era of RF congestion, and soon it will be difficult to find any RF band available, thanks to 5G and LEO HTS mega constellations. We must revise the research as we have been updating the research carried out in previous century. We have lots of simulation tools at our disposal to predict the exposure levels for any given frequency with all the transmission parameters considered. Moreover, we must take into account the effects of these transmissions/emissions on the environment as well as wild life.	All infrastructure and devices emitting RF EME with a resultant exposure to the public must comply with the exposure limits set in the ARPANSA RF standard. The limits set within the standard are based on substantiated science and international best practice. They are underpinned by several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health	No change

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		effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012.	
		The standard covers the frequencies proposed for use in the 5G network.	
		Existing studies on the effects of low-level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment.	
		The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public and occupational exposure limits up to 300 GHz.	
natalie faulkner	i endorse the entire "white paper on 5G" by EMP Australia PL 2020" see link https://cdn.shopify.com/s/files/1/0266/5411/3837/files/5G_White_Paper _EMR_Australia.v1.1.pdf?v=1588816562	At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur.	No change
		It is the assessment of ARPANSA that there is substantiated scientific evidence to support any adverse health effects from low-level exposure to RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network.	
natalie faulkner	<ul> <li>2.4 GHz = 4G (wifi)</li> <li>2.45 GHz = your Microwave</li> <li>96 GHz = US Military crowd control weapons</li> <li>30 - 300 GHz = 5G</li> </ul>	All of the frequencies listed are covered in the Standard and appropriate limits are set to provide protection.	No change

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natalie faulkner	EMF Radiation Safety Standards: • Luxembourg: 20 μW/m <sup>2</sup> • Switzerland: 40 μW/m <sup>2</sup> • China: 60 μW/m <sup>2</sup> Italy/France/Russia: 100 μW/m <sup>2</sup> • Australia: 10,000 μW/m <sup>2</sup>	The limits from other countries quoted are not all correct. ARPANSA is aware that some regions around the world have set exposure limits lower than the limits of the ARPANSA RF Standard. However, these limits are not based on substantiated scientific evidence.	No change
natalie faulkner	I endorse these references below in their entirety https://principia-scientific.org/lloyds-insurers-refuse-to-cover-5g-wifi- illnesses/ https://childrenshealthdefense.org/news/the-dangers-of-5g-tochildrens- health/	The references provided are news articles and opinion pieces. Although they may cite scientific literature, ARPANSA's assessment of the body of scientific and health research is that there is no substantiated evidence for adverse health effects from exposure to RF EME below the limits set in the standard, including from 5G infrastructure.	No change
ORSAA	This introductory section does not give the full account, which needs to be made transparent for the public to understand the positions being taken the current draft. The existing ARPANSA Standard is not a true accredited standard Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz is a set of guidelines Known non-thermal biological effects left out from the start: The initial working group was the Australian TE/7 under the auspices of Standards Australia (not ARPANSA Radiation Health Committee (RHC) as is stated in line 183). The independent academics included on that committee were concerned about early scientific findings found by the industry's own scientists; i.e. that mobile phone exposures inhibited repair to DNA damage, with consequences for developing babies, children and young adults (Carlo, 2000). These committee members therefore wanted the safety limits in the standard to cater for any such biological effects. However, the committee was unable to come to an agreement because some members with ties to industry insisted the standards should only cover effects due to heating of tissue (which are not relevant to everyday exposures of normal users). Due to this impasse, the committee was disbanded. This was the only committee in the entire history of Standards Australia that had been unable to approve a new standard.	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provides declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry. ARPANSA is an independent Australian Government Agency that is responsible for assessing scientific evidence and protecting people and the environment from the harmful effects of radiation by applying international best practice and advice to government and stakeholders. The limits set in RPS S-1 are based on substantiated health effects from exposure to RF EME.	No change

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	Compromised by industry priorities from the start: The federal government then gave the task of accepting (or rubber stamping) the International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998 exposure guidelines to a newly created organisation, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).		
	ICNIRP is an industry-connected self-appointed body based in Germany, whose members are also members of the WHO EMF project and who have question marks hanging over their reputations due to conflicts of interest (Maisch, 2006). The reason for the ARPANSA decision for' harmonisation' with ICNIRP (line 187) may be to align with the International Business Plan disguised as International Best Practice rather than to prioritize Health. The original ARPANSA guidelines set an extremely high reference level of 1000 $\mu$ W / cm2, which is 60 times stronger than normal phone		
	emissions and 150 times stronger than exposures from background towers. This irrelevant limit subsequently paved the way for wireless to be rolled out nationally, unhampered by government constraints. If the potential harm associated with Electromagnetic Radiation (EMR) exposures is realized, it will be found that it affects many people, including children and youth. To be responsible to the trusting public, ARPANSA would therefore need to adopt the highest principles available for setting RF exposure guidelines. Standards Australia provides the gold standard for the process and delivery of standards. According to Standards Australia, 'Standards' have particular characteristics defined by the ISO/IEC Guide 2 as well as recommended processes for their formulation . ORSAA finds that the creation of the RPS S- 1 draft has not adhered to these principles in terms of both content and process, for the reasons given below		
ORSAA	Content requirements for a standard have not been satisfied The full knowledge base of science has not been utilized Standards should be based on the consolidated results of science, technology and experience	The Standard is aligned with the ICNIRP (2020) guidelines which is considered international best practice.	No change

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		All available and relevant scientific evidence was assessed in the development of the ICNIRP guidelines.	
ORSAA	Basic restrictions are meant to provide protection against established adverse health effects (line 294). However, the 'basic restrictions' as defined by ARPANSA in section 2.3 and the subsequent reference levels in section 2.4 of the RPS S-1 draft only consider the science regarding: • electrostimulation of excitable tissue • whole-body heat stress • excessive localised temperature rise and rapid temperature elevation • tissue/heating i.e. heating above 1 degree C. • absorbed power density measured over short-term exposures (6 minutes) • frequencies above 100kHz These areas of focus are mostly not applicable to everyday use. This is because their rationale is derived from the ICNIRP interpretation of the science, with only focuses on thermal effects. This is not the required consolidated collection of papers revealing a far more extensive picture regarding established adverse health effects. The figure below shows the top 7 categories of biological and health effects in terms of the number of peer-reviewed published papers in the ORSAA database. Enzyme changes / protein damage 387 papers Biochemical changes 281 papers Oxidative stress 269 papers DNA damage / Mutation / Genotoxic Effects 171 papers Altered gene expression 159 papers Programmed cell death 109 papers Overall, the majority of the recent studies (67%) in the ORSAA database show effects to biological systems and potentially to human health. As well as those shown above, other important categories include impacts on the immune and reproductive systems, changes to neurotransmitters, memory effects, damage to mitochondria, and fertility effects. A striking observation is the large number of studies showing an increase in oxidative stress, which underlies conditions such cardiovascular disease, caceer, Alzheimer's disease, diabetes and aging. The numbers of papers in each category make it clear that evidence for adverse health effects are indeed 'established'.	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- lonizing Radiation Protection (ICNIRP) that there is unsubstantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty.	No change

The notion that Non-ionising radiation is safe compared to lonising radiation is a false premise. Biological interaction does not discern this division in the EMR spectrum and the bio-effects of RF radiation are more complex. The modulations make this agent much more bio-active at much lower power densities and as such, long-term health effects cannot be	
ruled out. Unlike ionising radiation at low exposure this man-made agent is not found in nature, so that animal biology has not had the time to adapt.	
As it stands, the ARPANSA standard is just a carbon copy of the ICNIRP standard which attracted significant public feedback that was not adequately addressed (e.g. the criticism that the ICNIRP standard failed to conduct a quality systematic review on which to base its position (Canadians for Safe Technology, 2018). ARPANSA has relied on their own TRS164 literature review. Published reports from the ORSAA database contain clear evidence of blind spots and errors contained within the ARPANSA review (Bandara & Weller, 2017; Leach & Weller, 2017). For example, the review omitted many papers revealing that RF- EMR exposures cause oxidative stress and inflammation. These are important factors that modern medicine has recognized as playing an important underlying role in many common and chronic health conditions such as heart disease, type 2 diabetes, depression and cancer. These are major conditions placing huge burdens on the current health system, on student well-being and on human productivity. Unfortunately, the issues highlighted by the ORSAA researchers have been ignored by ARPANSA (Bandara, Leach, & Weller, 2018). Instead they have been rolled forward into TRS-S-1.	
There has been no regular review with updates to the ARPANSA knowledge base Standards are regularly reviewed to ensure that they keep pace with advances in technology.	
While much relevant science has advanced over the recent years, ARPANSA has kept in place regulatory standards devised in the 1990s that are now based on antiquated and questionable science. The RPS S-1 draft makes only minor adjustments to the original standard, in spite of the huge increases within the built environment of exposures levels and exposure times. Moreover, advances in science have revealed the manipulative effects of electrical and magnetic fields on the brain and the body, e.g., transcranial magnetic stimulation is now being used to treat depression. Even though the mechanisms are not fully understood, such treatments provide proof of non-thermal effects of weak EMF/EMR on health. Furthermore, they reveal the complexity of the interactions between EMF/EMR signals and biology, potentially producing both healing and harmful effects. The effects are dependent on the characteristics of the waveforms (Panagopoulos, Johansson, & Carlo,	

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	the carrier signal (Kostoff, Heroux, Aschner, & Tsatsakis, 2020). This complexity is not grasped or respected by industry, ICNIRP, the WHO EMF project or ARPANSA. The member reviewers within these organisations do not have the requisite expertise to keep abreast of this science. Neither do they seem to understand the implications for human well-being and the environment.		
ORSAA	As a result of this apparent lack of understanding by ARPANSA, the following oversights have occurred in the draft standard: The draft does not address non-thermal or chronic exposures. RPS S-1 is a thermal-effects only standard. It cannot guarantee protection for users being subject to everyday exposure levels, occurring 24/7 at home, work and school. The risk to the general public is not from acute 6-minute or even 30-minute exposures that causes heating; rather it is from the cumulative effects of long-term exposures that damages cells, DNA and interferes with brainwaves, as described above. The extrapolation from these known thermal exposures to non-thermal exposures means that a precautionary factor based on known bio-effects must be adopted in much the same manner as we have adopted a precautionary approach for low exposures to ionising radiation. Scientists, including those at the FDA, recognize that the distinctions among thermal and nonthermal effects, and acute and chronic effects, must be addressed in subsequent research (Carlo, 2000 p. 62) Unfortunately, most laboratory studies conducted by industry have not been set up to test real world conditions (Kostoff et al., 2020). The draft does not address the lifetime exposures of this generation of children and adolescents. The lack of consideration in RPS S-1 for effects of long-term exposure is particularly concerning for the current generation of children and adolescents. It has already been shown that long-term use of more than half an hour a day for 10 years or more puts users into the high risk category for brain tumours (INTERPHONE Study Group, 2010). This has nothing to do with heating, but is due to the body experiencing more DNA damage than it is able to repair. Furthermore, pulsed signals with frame repetition rates between 2 and 20 Hz being due to power saving can interfere with delta, alpha and beta brain-wave activity respectively (Hyland & Chambers, 2001; Regel et al., 2007). EEG changes have been observed in 78 out 85 provocation studies	<ul> <li>There has been considerable research on possible long-term health effects of exposure to RF EME below the limits set in international guidelines and the ARPANSA RF Standard.</li> <li>There is currently no substantiated evidence that indicates long-term health effects from exposure to RF EME below the limits of the Standard.</li> <li>The ARPANSA RF Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME. The principles for protection in RPS S-1 are based on the newly published ICNIRP Principles For Non-ionising Radiation Protection.</li> <li>The exposure limits in the ARPANSA Standard are set well below the threshold for adverse health effects. Further reduction in exposure does not result in additional health benefits.</li> </ul>	No change

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	phones. Collectively, these studies have investigated over 100,000 children and adolescents		
	from over 10 countries. Over half of the papers show clear effects, including effects on		
	attention, cognitive processing, memory behavior and emotions, sleep, headaches and		
	muscle fatigue.		
	These effects need to be protected against by basic restrictions and reference levels.		
	Children and adolescents comprise a special group that need to be catered for in the		
	Australian standards. This has already been recognized by several countries (e.g., France,		
	Russia and Cyprus). Moreover, the Russian Federal Service for Surveillance on Consumer		
	Rights Protection and Human Wellbeing has issued guidelines on the use of mobile		
	communication devices in education settings. They have also published recommendations		
	to parents on safe use of mobile phones, limiting the time of use and increasing the		
	distance between the phone and the child's ear (Grigoriev, 2020). This recognition at state		
	level of the vulnerability to children from chronic exposures needs to also be made in		
	Australia by ARPANSA		
	The draft does not include a precautionary section		
	A precautionary section was included in the RPS-3 guidelines but this has been removed		
	with no reasons given. If precaution is not the main business of ARPANSA, then what is its		
	main business?		
	Other content specific concerns		
	• There is a risk that the thermal effects limit will be violated with 5G exposures.		
	Neuteid and Kuster (2018) warn against 5G beam pulses creating intense not spots more		
	damaging than plane waves. How this has been addressed in RPS 5-1 is not clear.		
	Indusands of people world-wide have been reporting narmful effects that have been     shown to be logitized from quicting our courses (Dioudenné, 2016, Hecking, 2014, Hereach		
	shown to be legitimate, from existing exposures (Dieudonne, 2016; Hocking, 2014; Lamech, 2014). Bether then beering these values as the need for future presention, these early		
	2014). Rather than hearing these voices as the need for future precaution, these early		
	The range from 2KHz to 100 kHz that was severed by the provinus guidelines PDS 2 has		
	• The range from SKH2 to 100 KH2 that was covered by the previous guidelines KP3-5 has		
	at frequencies lower than 100 KHz (International Commission on Non Ionizing Padiation		
	Protection 2020 b n 5) The lower frequency range is the most bioactive range and where		
	brainwayes operate. Any RE pulsed signal will thus bring with it effects on the brain in this		
	frequency range. The ICNIRP 2010 review of the 3KHz to 100 kHz frequency range admitted		
	that there are gans in the existing knowledge with regards to nulsed signals (International		
	Commission on Non-Ionizing Radiation Protection 2020a)		
	Problematically, 3KHz to 100 kHz is also the range in which many of the RF modulations sit		
	These modulations carry the texts, tweets and video downloads that are being sent on the		
	carrier waves. Therefore, we argue that this range cannot be separated from an RF		
	standard. On the contrary, in RPS S-1 the range 3 kHz to 100 kHz needs to be a major focus		

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	of the standard. • Risk management not addressed in following ICNIRP's lead, ARPANSA is not using best practice in risk managing. Risk management does not feature in ICNIRP guidelines. Risk management is not about establishing "substantiated" adverse health effects but about identifying potential hazards which are numerous and remain unaddressed. Medical science does not require substantiated evidence including mechanisms to make a medical diagnosis. There are many health syndrome's that are not fully understood. • Human rights not protected Line 230 The exposure limits represent acceptable levels of RF exposure to the body. Who or what medically-based organisation has defined what is acceptable? How have the public been involved in this decision making which effects their very being? RPS S-1 includes no allocations for prevention or protection for those people who do not agree to be exposed		
ORSAA	<ul> <li>While extending the measurement time for whole body exposure measures to 30 minutes is an improvement over 6 minutes, it has not been made clear why 30 minutes is an adequate time. Given that many Australians will be exposed to these frequencies 24/7, the science, testing and standard setting needs to be based on long-term exposures.</li> </ul>	The ARPANSA RF Standard applies to all types of exposure, including short and long-term exposure. The averaging times mentioned in the Standard refer to the time it takes for a whole body (30 min) and localised (6 min) temperature rise to occur. At levels below the limits in the Standard, the temperature rises are within normal body temperature variations. The exposure averaging times are designed for the purpose of assessing exposure levels, not setting time limits for exposure. Exposure to RF EME below the limits in the Standard do not have a cumulative effect. The substantiated harmful effects of exposure to RF EME are acute in nature and occur at very high levels, many times above the limits set in the Standard. The ARPANSA RF Standard accounts for all modes of RF EME transmission including continuous and pulsed.	No change
ORSAA	<ul> <li>It is not clear why the occupationally exposed population is safe at double the exposures allowed for the general population, or why 83 V/m is the appropriate value for peak</li> </ul>	Occupational exposure limits are in fact 5 times the level of the general public limits.	No change

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	instantaneous electric field spikes. It needs to be clarified that 83V/m corresponds to 18.27 W/m2 which is nearly double the current 10 W/m2. The rationale for now allowing spikes at double the current reference level has not been given. There are no references given to experimental work showing that these levels provide safety while higher levels cause harm. Similar to the ICNIRP guidelines, these numbers have been the result of estimates from computer modelling rather than being based on biological experimental work. Bio- compatibility of devices is not even considered. When the health of humanity is at stake, guesstimates are not good enough. The same engineering modeling and testing that goes into infrastructure needs to be applied to all lifeforms before the go-ahead can be given to commence operations.	Occupationally exposed workers are subject to work health and safety arrangements, training and are aware of the exposure. There is no substantiated evidence of adverse health effects at below occupational exposure limits, however, public exposure limits incorporate a greater degree of conservatism to offer additional precaution. E-field and H-field reference levels in RPS3 were overly conservative based on limited research. RPS S-1 has updated these reference levels to incorporate improved knowledge on the levels required to reach the basic restrictions.	
ORSAA	<ul> <li>Bandara, P., Leach, V., &amp; Weller, S. (2018). Health Risks of Wireless Technologies. Radiation Protection in Australasia, 35(2), 22-26.</li> <li>Bandara, P., &amp; Weller, S. (2017). Biological effects of low-intensity radiofrequency electromagnetic radiation—time for a paradigm shift in regulation of public exposure. Radiat Protect Australas, 34, 2-6.</li> <li>Belyaev, I., Dean, A., Eger, H., Hubmann, G., Jandrisovits, R., Kern, M., Müller, K. (2016). EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. Reviews on environmental health, 31(3), 363-397. Canadians for Safe Technology. (2018). Canadians for Safe Technology (C4ST) input re public consultation for ICNIRP Draft Guidelines Report. Retrieved from http://c4st.org/wp-content/uploads/2020/01/Canadians-for-Safe-Technology-C4ST-input-re-public-consultation-for-ICNIRP-Draft-Guidelines-Report.pdf</li> <li>Carlo, G. L. (2000). Radio waves, wireless signals, and public health: Is this the next silent spring? Environmental Claims Journal, 12, 55 - 77.</li> <li>Dieudonné, M. (2016). Does electromagnetic hypersensitivity originate from nocebo responses? Indications from a qualitative study. Bioelectromagnetics, 37(1), 14-24.</li> <li>Efoui-Hess, M., &amp; The Shift Project. (2019). Climate Crisis: The Unsustainable sue of online video: A practical case study for digital sobriety. Retrieved from France: https://theshiftproject.org/en/article/unsustainable-use-online-video/</li> <li>Grigoriev, Y. (2020). The importance of adequate information on assessing the danger of EMR of cellular communications for public health. Radiation biology. Radioecology, 60(5), 533-541.</li> <li>Hocking, B. (2014). Electrical hypersensitivity (EHS). Journal of Health, Safety and</li> </ul>	<ul> <li>While there is some research that reports biological and health effects of RF EME, this is not what an overall assessment of the evidence indicates.</li> <li>It is also important to note that reported biological effects do not necessarily indicate harm to human health.</li> <li>There are also variations in the quality of studies and their applicability to human health. When all the research on RF EME and health is assessed in its totality, there is no substantiated evidence of adverse health effects from exposure to RF EME at levels below the limits set within the ARPANSA RF Standard.</li> </ul>	No change

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	Environment, 30, 349-356. Hyland, G., & Chambers, G. (2001). The physiological and environmental effects on non- ionising electromagnetic radiation: European Parliament, Directorate General for Research. International Commission on Non-lonizing Radiation Protection. (2020a). Gaps in Knowledge Relevant to the "Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz–100 kHz)". Health physics, 118(5), 533-542. International Commission on Non-lonizing Radiation Protection. (2020b). Guidelines for Limiting Exposure to Electromagnetic Fields (100 kHz to 300 GHz). Health physics. INTERPHONE Study Group. (2010). Brain tumour risk in relation to mobile telephone use: results of the INTERPHONE international case–control study. International journal of epidemiology, 39(3), 675-694. Kostoff, R. N., Heroux, P., Aschner, M., & Tsatsakis, A. (2020). Adverse health effects of 5G mobile networking technology under real-life conditions. Toxicology Letters, 323, 35-40. Lamech, F. (2014). Self-reporting of symptom development from exposure to radiofrequency fields of wireless smart meters in victoria, australia: a case series. Alternative Therapies in Health and Medicine, 20(6), 28. Leach, V., & Weller, S. (2017). Radio frequency exposure risk assessment and communication: Critique of ARPANSA TR-164 report. Do we have a problem. Radiation Protection in Australasia, 34(2), 9-18. Maisch, D. (2006). Conflict of interest and bias in health advisory committees: a case study of the WHO's Electromagnetic Frequency (EMF) Task Group. Journal of the Australasian College of Nutritional and Environmental Medicine, 25(1), 15. Neufeld, E., & Kuster, N. (2018). Systematic derivation of safety limits for time-varying 5G radiofrequency exposure based on analytical models and thermal dose. Health physics, 115(6), 705-711. Panagopoulos, D. J., Johansson, O., & Carlo, G. L. (2015). Real versus simulated mobile phone exposures in experimental studies. BioMed research international, 2015. Professio		
ORSAA	Process requirements for a standard have not been satisfied 'Developing national consensus Standards is a structured and formal process. The committee members and their Nominating Organisations are intimately involved with the	The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting	No change

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	Standard under development and its contents Committee members explore the potential consequences of those contents for themselves	consultation with work health and safety management stakeholders.	
	needs and expectations. As well, there is often considerable negotiation between the stakeholders, including consideration of any Public Comments received, when striking a balance between competing factors in order to establish the requirements that go into an	The standard is in line with the new ICNIRP (2020) RF Guidelines which are considered international best practice.	
	Australian Standard' (Standards Australia)	The draft RF exposure standard (RPS S-1) was open for consultation to everyone from 31 August to 21 October 2020.	
	In contrast, the ARPANSA process for formulating the draft standard has been minimal: These four categories of publications [Fundamentals, Codes, Standards and Guides] are informed by public comment during drafting and are subject to a process of assessment of regulatory impact. (lines 30-31) The required 'structured and formal process' for developing this new standard has not been made transparent or available to the public. There has been no chance for discussions or negotiations. Only industry and those with high occupationally exposed have had their needs and expectations heard. The appropriate array of stakeholders that would be warranted for formulating this very important standard have not been included, such as independent scientists, medical researchers and doctors, members of ORSAA, community representatives and local government. 'if the trade-off between factors such as cost and safety is biased one way or the other, the community will be placing its faith in something that either offers inadequate safety or	The Office of Best Practice Regulation advised ARPANSA that no consultation Regulatory Impact Statement was necessary for the new RPS S-1 because the proposed amendments to RPS3 reflect international best practice on limiting exposure to RF EME.	
	with national standardization helps avoid such problems. These problems have not been avoided due to the lack of consultation and the industry bias in the current standards setting process.' (Standards Australia)		
	Alternative solutions have not been considered 'if there are several acceptable technical solutions and one of those solutions is not catered for in the Standard, it could have significant legal and financial implications for those using that solution ' (Standards Australia)		
	There are alternative technical solutions to setting standards as well as to the telecommunication and information systems to which these standards are giving right of passage, as follows:		

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	Other possible standards are: • The EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF- related health problems and illnesses (Belyaev et al., 2016). This Guideline reviews the evidence for health effects and gives detailed recommendations for precautionary EMF / EMR exposures (See Table 3). • The building biologist standard (Professional Association of German Building Biologists (VBD), 2020) These both have lower refence levels than those that TRS-S-1 is proposing. Other possible telecommunication solutions are: • For connecting the internet: wired connections are more secure, consume much less		
	<ul> <li>power, and do not cause the biological harm that wireless solutions can cause. Moreover, wired solutions provide reliable connections during fire and other disasters. (Schoechle, 2018).</li> <li>For dealing with load demand: Instead of allowing unlimited consumption, more mature approaches could facilitate and legislate processes to ensure sustainability. This is similar to accepting that unlimited industrial growth is accelerating the energy crisis and responding accordingly. This system of prioritizing users and content has been already used in remote NT for many years. The related social and political issues are further discussed in Efoui-Hess and The Shift Project (2019).</li> </ul>		
	A net benefit case must be made 'Where a party is proposing a project to develop, amend or revise an Australian Standard, that party is responsible for developing a Net Benefit case and submitting it as part of the project proposal. Standards Australia's policy is that a Standard must provide a value or benefit to the Australian community that exceeds the costs likely to be imposed on suppliers, users and other parties in the community as a result of its development and implementation. Each Australian Standard must demonstrate positive Net Benefit to the community as a whole. This requirement reflects the Memorandum of Understanding (MoU) between Standards Australia and the Commonwealth Government. The Net Benefit Case must be made prior to the development of an Australian Standard.		
	A net benefit proposal is required to show how and why the standard will benefit: • PUBLIC HEALTH AND SAFETY including the most appropriate method to improve health or safety; • SOCIAL AND COMMUNITY IMPACT including 'intangible' costs and benefits borne by		

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	<ul> <li>different sectors of the community, including the most vulnerable consumers or end users;</li> <li>ENVIRONMENTAL IMPACT including 'intangible' costs and benefits (e.g. noise; pollution; amenity);</li> <li>COMPETITION including international alignment in global markets and impacts upon innovation;</li> <li>ECONOMIC IMPACT including increased/decreased costs; increased/reduced utility; redistribution of wealth; inequitable impacts on the most vulnerable consumers or end users; employment; economic growth or contraction, productivity outcomes; ' (Standards Australia)</li> </ul>		
	RPS S-1 does not present a case for net benefit. Instead, the current changes are merely listed as Improved accuracy; New or updated method; Improved prediction; Obsolete; Align with International Best Practice; and Australian specific change. These headings all cover technical benefits, but do not address any of the above factors. They are not explained, and the reasons given are minimal, such as 'To align with the ICNIRP (2010) Guidelines. These explanations fall way short of what is required for an effective Standard.		
	For breaches of the above protocols, ORSAA maintains that the RPS S-1 has not been formulated in an appropriate manner.		
	Conclusions		
	For over two decades, the telecommunications industry in Australia has been operating without an industry-independent regulatory body with the expertise required to provide an effective assessment on health effects or risk management. However, through the review process, Australia has an incredible opportunity to lead the world in creating public health-based standards to replace the existing good-for-business guidelines.		
	For ARPANSA to carry out its duty to make public health a priority requires ARPANSA to learn more about biological effects and public health risks from world leading microwave radiation biophysicists, doctors and public health experts, rather than relying on ICNIRP guidelines and advisors. ARPANSA needs to work to create solutions for testing and monitoring and thereby create a true 'Standard' so as to protect Australians rather than putting families further at risk.		
	The recommendations listed throughout this document, if followed, would help to make both of these possible.		

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ORSAA	Lack of completeness The draft requires more detail and clarity in many sections. It is not written at the professional level required of a Standard. An executive summary is required to clarify what is being changed and why. Specific issues around lack of clarity are as follows:	The Standard follows the format of other ARPANSA documents in the Radiation Protection Series	No change
ORSAA	• The compliance and risk management sections need less vagueness to make them effective and usable. These principles would need to be followed up with actions by ARPANSA.	Examples on the application of the Standard can be included in supplementary material to the Standard.	No change to the Standard. ARPANSA will work with other relevant authorities on developing supplementary material to the Standard
ORSAA	Inadequate specification of compliance procedures Section 4: Verification of compliance (lines 702-704) 'Measurements or computations to prove compliance with this Standard must be made by an appropriately qualified and experienced person or organisation (testing authority). It is at the discretion of the testing authority whether direct measurement or computation is the appropriate methodology to be used.' It is of concern for ORSAA that currently, neither APRANSA nor industry possess the measuring equipment or the personnel needed to test computational estimates against the real-world exposures. It has not yet been established that the current reports adequately and reliably address the simultaneous exposure to multiple frequency fields referred to in Section 3. This is going to get worse as the number of frequencies increase and the number of masts and towers increase in public places, suburban streets, and within residences.	ARPANSA has equipment and expertise to perform appropriate RF measurements	No change
Pamela Baxter	I am concerned that no one in my area has been given any information regarding the health effects of 5G. To be honest I cannot find any recent studies done. Can you provide recent studies proving 5G is safe for me and my children. Can you consult with the community before putting up more towers or upgrading the ones that already exist. Why are they mostly next to schools (My daughter's included) The kids in her school have suffered nose bleeds fainting nausea and dizziness since 5G uprade next to her school. Is this a coincidence? Will you accept liability if the students and or teachers start to have a higher rate of heart conditions or cancers or Autoimune disorders over the next 6 months. Hope to hear from you	The current and proposed higher operating frequencies for the 5G network are covered within the ARPANSA RF Standard which sets both public and occupational exposure limits up to 300 GHz. At these higher 5G frequencies, the limits in the ARPANSA RF Standard are set to well below where any measurable heating at the surface of the skin and the eye occur. It is the assessment of ARPANSA that there is no substantiated scientific evidence to support any adverse health effects from low-level exposure to	No change

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		RF EME associated with telecommunications and wireless technology below the limits set within the ARPANSA RF Standard, including the 5G network.	
		The safety of RF EME exposure is a highly active area of science and thousands of studies have been published worldwide.	
		The research into the safety of RF EME has been reviewed by ARPANSA and other international health authorities. Health risk assessments take into account the body of available evidence and summarise the scientific and health implications of these. This is very important as no single study can provide conclusive evidence of safety or harm.	
		ARPANSA conducted a measurement survey on mobile phone base stations from 2007 to 2013 and found the RF EME emissions from these structures to be well below the public exposure limits set in the ARPANSA RF standard.	
	I suggest regularly doing a reading of the RF fields to confirm they are at a safe level. Show some up to date research to prove and educate the public as to what a safe level would be for children and adults Invite the community to moniter the levels themselves with an EMF reader.	ARPANSA also conducted a study of Wi-Fi in schools which also included measurements of RF EME from other telecommunications sources including radio, TV and mobile phone base stations.	
Pamela Baxter		The study showed the RF EME from each source was well below the public exposure limits set in the ARPANSA RF Standard. In early 2020, the Australian Communications and Media Authority (ACMA) measured RF EME exposures at 59 small cell sites across Australia.	No change
		They reported that the RF EME exposure at all the small cell sites were below 1 per cent of the limits in the ARPANSA RF Standard. ARPANSA is planning further measurement studies of RF EME in the community under the new EME program.	

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		The limits set within the standard are based on good science and international best practice. They are underpinned by several reviews of the body of scientific literature including: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The Standard covers the frequencies proposed for use in the 5G network.	
Pamela Baxter	Section 3. Not sure what this is but sounds like what is happening to our children sitting in classrooms with wi fi.	Section 3 deals with simultaneous exposure to multiple frequency fields e.g. exposure from different sources of RF fields.	No change
Pamela Baxter	Some recent research into what the basic levels should be so as not to cause harm to the health of humans, animals and insects. Proof this is being shared to.	Existing studies on the effects of low level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment.	No change
Pamela Baxter	Towers should not be placed next to schools, playing fields or on top of buildings. Will you accept liability when the public become sick from exposure due to 5G	<ul> <li>The RF EME emissions from both mobile phone base stations and small cells are required by the Australian Communications and Media Authority to comply with the exposure limits set within the ARPANSA RF Standard.</li> <li>All publicly accessible areas around mobile phone base stations and other communications infrastructure are therefore considered safe regardless of distance away from the antennas.</li> </ul>	No change

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Pamela Baxter	The government has just announced millions in funding to go towards NBN. The reason is to provide faster internet. Isn't the purpose of 5G supposed to be for faster internet. Is 5G being rolled out for any other purpose other than faster internet	<ul> <li>ARPANSA's role is to maintain the appropriate RF exposure standard and the revised standard is based on substantiated science and international best practice.</li> <li>The ARPANSA RF exposure standard is neutral in regard to policy and specific technology.</li> </ul>	No change
Pamela Baxter	What is the purpose of 5G in Australia. If for faster internet then why is the government spending millions on NBN. My main concern is the damage to the health of all living things done by 5G More consultation with the public and proof of safety would be appreciated	<ul> <li>ARPANSA's role is to maintain the appropriate RF exposure standard and the revised standard is based on substantiated science and international best practice.</li> <li>The ARPANSA RF exposure standard is neutral in regard to policy and specific technology.</li> <li>The frequencies proposed for the 5G network are covered with the ARPANSA RF standard. At exposure levels below the the public exposure limits set with the standard, there is no substantiated evidence of adverse health effects.</li> </ul>	No change
Simon Cooke- Willis	ARPANSA is to be congratulated on being one of the first Governmental organisations to implement adoption of ICNIRP 2020 recommendation providing a high level of protection based on the most recent RF research outcomes.	Noted	No change
Steven Weller	Section: Forward lines 85- 87 Issue: The significance of ICNIRP is overstated. Rationale: ICNIRP is a self-appointed international non-government organisation that lacks appropriate oversight. The World Health Organization's (WHO) recognition of ICNIRP being an International body originally came from the WHO EMF project, which was set up by the same founder of both groups, Dr Michael Repacholi. What we effectively have is Dr Repacholi endorsing Dr Repacholi.1 The original intention of Dr Repacholi to establish formal safety guidelines for	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry.	No change

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	radiofrequency exposures was a noble idea, but along the way it appears to have been corrupted. This is evident in the membership selection process and the connections many of the members have with military and industry through their research1, 2, as evidenced by publication funding declarations (in the specific instances where they have decided to make such declarations public)3. Of course, both the military and industry are beneficiaries of ICNIRP's generous safety limit recommendations.		
	The ICNIRP membership selection process is shrouded in secrecy and is not an open process, lacking transparency, unlike equivalent organisations such as the International Commission on Radiological Protection (ICRP), an international body that is not formally associated with ICNIRP. Nor does ICNIRP membership include any of the following traits expected of an all-inclusive, independent and open international non-government organisation:		
	<ol> <li>Representatives from countries that have stricter RF protection policies;</li> <li>Representatives from radiation protection authorities who promote safer RF standards than ICNIRP and are also advisors to the WHO;</li> <li>Scientists with different viewpoints on the science, particularly on non-thermal biological effects.</li> </ol>		
	The current membership selection process can at best be described as cronyism. This creates a fundamental trust issue. As ARPANSA is closely associating itself with ICNIRP membership (Dr Karipidis), the selection of the ICNIRP guidelines as the basis for an RF Standard means public trust in ARPANSA also becomes seriously challenged.		
	Section: Forward lines 85- 87 Issue: False and misleading claim in regards to international best practices on risk management	Exposure to RE EME has been the subject of many studies and a number of reviews. Reviews take into account the body of available evidence and summarise the scientific and health implications. This is very important as no single study can provide	
Steven Weller	Rationale: ICNIRP is not following international best practices (IBP) for risk management. In fact, risk management does not appear to feature in ICNIRP guidelines. International best practices for evaluating evidence of harm appears to have become twisted by ICNIRP and western RF regulatory bodies as discussed by the late Dr Neil Cherry in his paper "CRITICISM OF THE HEALTH ASSESSMENT IN THE ICNIRP GUIDELINES FOR RADIOFREQUENCY AND MICROWAVE RADIATION (100 kHz - 300 GHz)".4 Dr Cherry indicated in 2000 that ICNIRP "was highly selective, biased and very dismissive of the genotoxic evidence and the epidemiological evidence of cancer effects and reproductive	conclusive evidence of safety or harm. There are various types of studies that contribute to the pool of scientific evidence for RF EME exposure and health including epidemiological studies that investigate disease in human populations and experimental studies on human volunteers, animals, tissues and cells. The principles for protection in RPS	No change

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	effects." Roll forward 20 years and nothing much has changed. ICNIRP still continues to be	S-1 are based on the newly published ICNIRP	
	particularly dismissive of epidemiological evidence because all existing studies involve non-	Principles For Non-ionising Radiation Protection.	
	thermal exposures.	The exposure limits in the ARPANSA Standard are	
		set well below the threshold for adverse health	
	Risk management is not about establishing "substantiated" adverse health effects.5 Risk	effects. Further reduction in exposure does not	
	management is about identifying potential hazards, evaluating them and developing	result in additional health benefits	
	sensible mitigation strategies. All of these steps have been sidelined or ignored. This is		
	evident in the absence of a publicly accessible risk register that discloses all the potential	Scientific evidence is deemed to be established	
	risks, and steps taken in the RF standard to mitigate them.o	broader scientific community. This usually follows	
	Today, people are being harmed by the currently permitted RE exposure levels as	an evaluation of the available data by expert	
	evidenced by the number of informed people who have made a registration on ARPANSA's	scientific hodies using a health risk assessment	
	health complaints register7 or have presented ARPANSA with medical certificates. All are	annroach. In a health risk assessment all the	
	currently being ignored, with a suggestion that some are likely to be suffering a	available studies, with either positive or negative	
	psychosomatic disorder without any proper formal investigation by ARPANSA or the	effects, need to be evaluated and judged on their	
	Department of Health or medically gualified researchers in Australia.	own merit, and then all together in a weight of	
		evidence approach.	
	The requirement by ICNIRP and ARPANSA for substantiated evidence is an artificial		
	construct that is not grounded in real science but appears to be a politically motivated	ARPANSA and other health authorities such as the	
	decision.	World health Organization (WHO) and the	
		International Commission on Non-ionizing Radiation	
	The accumulated research that is available to ICNIRP and ARPANSA demonstrates the	Protection (ICNIRP) assess all of the available	
	potential risks to health associated with chronic RF exposure is numerous. Yet they remain	evidence using the health risk assessment approach	
	unaddressed and unacknowledged by either party. Risks include cancer, infertility,	when reviewing the merit of research within the	
	neurodegeneration, cardiovascular disease, immune dysfunction, mental illnesses to name	body of evidence.	
	but a few.5, 8		
	Risk management best practices incorporate a precautionary approach or a precautionary		
	principle particularly when there is a level of uncertainty presented in the science. 5 With		
	the RPS S-1 draft, precautionary aspects that appeared in the original RF standard (RPS 3)		
	annexure have been removed without any suitable justification. The "RP" in the title of		
	both organisations is supposed to represent "Radiation Protection", but instead, what we		
	are seeing today is "radiation promotion" into the environment. There is a complete		
	absence of precaution despite there being significant scientific evidence of potential harm.		
	No plausible justifications have been provided by either ICNIRP or ARPANSA as to why		
	scientific evidence that suggests harm at levels well below public limits can be ignored.3, 9		
	This might be a foreign concept to ARPANSA but not all devices need Wi-Fi. There needs to		

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	be a cost-benefit analysis or a process of optimisation applied so that irradiation needs to be justified. Examples are WIFI in baby nappies and electric tooth brushes.		
Steven Weller	<ul> <li>Section: 1.2 Background lines 190 – 196</li> <li>Issue: Misrepresentation of scientific evidence and invalid claims of safety</li> <li>Rationale: ORSAA scientists reviewed TRS-16410 using data provided by ARPANSA from its own database of international research and found the report to have misrepresented the balance of evidence and what real science is suggesting.11 TRS-164 identified a number of biological effects without attempting to address the potential to cause harm. Biological endpoints were also excluded from tables (e.g. oxidative stress) and then brushed aside with a flippant remark on how evidence remains tenuous, which ORSAA has demonstrated to be grossly inaccurate. Oxidative stress is a prominent outcome identified by more than 240 papers12 that have tested for it. Oxidative stress is known by scientists and medical practitioners to be associated with many human diseases and so therefore constitutes a real health risk.</li> <li>TR-164 was a failure in good science and demonstrated a lack of competence by those who performed the review. True science would look at the evidence holistically to see if there was converging evidence across all experimental types (in vivo, in vitro ex vivo, ecological, human provocation and epidemiological), not compartmentalized as ARPANSA researchers did. Nor was there any investigation as to why there were differences in outcomes reported in the literature. There was no consideration for confirmation biases, funding biases in publication outcomes, research quality or signal generation source. Such an investigation would have helped identify potential sources of uncertainty and whether some of this uncertainty being presented is in fact real or manufactured.</li> </ul>	Other reviews conducted independently from that contained in TR 164 have come to similar conclusions based on the body of evidence. Examples include: ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)', and Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields'.	No change
Steven Weller	Section: 1.2 Scope line 215 - 240 Issue: No consideration for the greater environment and its inhabitants. The space in front of a transmitter is not a vacuum. Other life forms inhabit this environment. ICNIRP guidelines are for protecting humans from acute exposures and thermal effects only.13 What about plants, insects, birds and other animals that are being exposed chronically? Bacteria are also not considered. This oversight is important as there are experimental studies14 showing developing resistance to antibiotics under RF exposure conditions in order to protect themselves. Bacteria are found in large numbers on, and in, humans.	RPS S-1 is a human exposure protection standard. Existing studies on the effects of low level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	Section: 1.2 Scope line 230 Issue: Contestable statement on acceptable levels	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels.	
Steven Weller	Rationale: Acceptable to whom? Physical scientists and engineers who have no biomedical expertise? Members of the public have no choice in the matter because much of their RF exposure is without formal consent. People who do not agree to be exposed have no recourse to prevent such ensuant exposures. As mentioned previously, there are people who are being injured by current permitted RF exposure levels. ARPANSA has made no attempt to formally investigate any of the people who have declared they have been injured on ARPANSA's health complaint register. There also has been no health surveillance studies conducted by ARPANSA or the Department of Health investigating the wellbeing of the general public living near cell phone towers to validate the RF Standard's validity.	It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- Ionizing Radiation Protection (ICNIRP) that there is unsubstantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty.	No change
Steven Weller	Section: 1.5 Principles for Protection lines 235-239 Issue: The principles are missing critical radiation protection philosophies Rationale: Radiation protection philosophies such as "as low as reasonably achievable" (ALARA) and the precautionary principle are missing. Also, where is optimization discussed? Children are being ignored. ARPANSA has previously claimed that there is very little research on children15 and it is unclear if they are at greater risk because they are smaller, absorb more radiation and their bodies are developing. Other countries are now treating children as a special exposure group and limiting their exposure by issuing parental advice. Does ARPANSA have more recent information that demonstrates they are no longer at risk? If yes, where is this information?	<ul> <li>Optimisation does not apply in the case where limits offer protection against all known health effects. ALARA is applied to ionising radiation where a threshold for health effects has not been established.</li> <li>The principles for protection in RPS S-1 are based on the newly published ICNIRP Principles For Nonionising Radiation Protection. The exposure limits in the ARPANSA Standard are set well below the threshold for adverse health effects. Further reduction in exposure does not result in additional health benefits.</li> <li>The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) that there is unsubstantiated scientific evidence to support any adverse health effects at the functional organisation is the scientific evidence to support any adverse health effects at the functional of the functional functio</li></ul>	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		levels below the limits set in the ARPANSA RF Standard.	
		The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty.	
		The ARPANSA RF Standard is designed to protect people of all ages and health status against the known adverse health effects from exposure to RF EME.	
Steven Weller	Section: 2.3 Basic Restrictions/2.4 Reference Levels lines 309 - 491 Issue: Heavy on theoretical formulas and calculations, but missing biological and medical facts. Rationale: The proposed RF Standard appears to be designed to allow current technologies to function unimpeded with no scientific basis for affording biological protection, particularly in regards to non-thermal biological effects. The fact that there are RF Standards more protective in the world prompts one to ask why ARPANSA considers they are so confident that ICNIRP has got it right. Other RF Standards are 100 times more protective and are also being claimed by their respective governments to be scientifically based. The only protection on offer by the RPS S-1 RF Standard appears to be one of legal protection to government and industry RF polluters. It is also noted that permitted levels are designed for humans only and the caveat for human protection is only relevant for providing protection against acute exposures and thermal effects. There is a lack of consideration for non-thermal effects, which are numerous, and chronic long-term exposures or effects on other species in the environment, which include insects, plants, birds and other animals. Absorption characteristics are different between species and as previously stated, the space in front of a transmitting panel is not a vacuum. Insects and birds inhabit these zones and so are not protected. The ARPANS act16 requires ARPANSA to consider the environment. However, there is no direct evidence in the draft RPS S-1 document that environmental impacts have been considered.	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) that there is unsubstantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty. The standard is for the purposes of limiting exposure and is not designed to enable any particular application or technology. It is established that animals and plants have natural responses to electromagnetic fields including migratory patterns and pollination. The biomechanisms of these responses have not been firmly established and there are competing theories that continue to be investigated. Impacts of RF EME from artificial sources on plant and animal life have not been established. However, existing studies on the effects of low level RF EME exposure on plants and animals	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		Standard are adequate in providing protection to the environment.	
	Section: 3.1 General principles Lines 541-559	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels.	
Steven Weller	<ul> <li>Issue: No consideration for non-thermal effects or synergistic effects/combinative effects with other environmental toxins. No discussion of accumulative effects associated with chronic exposures from multiple RF sources and different frequencies.</li> <li>Rationale: Experimental evidence17 suggests that synergistic effects can occur when an organism is exposed to a chemical genotoxic agent and RF simultaneously or concurrently. The RF Standard does not consider such scenarios. Chronic exposures can lead to accumulative damage, particularly DNA damage as evidenced by experimental studies investigating lifetime exposures18. DNA damage is a precursor for cancer development.19</li> </ul>	It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non- lonizing Radiation Protection (ICNIRP) that there is no substantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty.	No change
Steven Weller	Section: 5.2.2 Risk Management lines 841 – 843 Question: Where is ARPANSA's risk management process documented, what hazards have been identified, and how does RPS S-1 mitigate against them?	ARAPNSA's assessment of the risks is in-line with that of the ICNIRP (2020) guidelines. ICNIRP provides a rationale for setting exposure limits based on assessment of the scientific and health evidence in Appendix B of the ICNIRP RF Guidelines. Mitigation is facilitated by compliance with the exposure limits.	No change
Steven Weller	Section: 5.2.2 Risk Management lines 844 – 846 Question: Where is ARPANSA's assessment of the risks? TRS-164 does not fulfil this requirement because it has misrepresented the science, the balance of evidence and also ignored important evidence. It does not identify the potential risks and how they can be mitigated. It does not consider non-thermal effects for their potential to cause harm.	ARAPNSA's assessment of the risks is in-line with that of the ICNIRP (2020) guidelines. ICNIRP provides a rationale for setting exposure limits based on assessment of the scientific and health evidence in Appendix B of the ICNIRP RF Guidelines. Mitigation is facilitated by compliance with the exposure limits.	No change
Steven Weller	Section Regulatory authorities Lines 995 – 1013	ARPANSA's role is to maintain the appropriate RF exposure standard and the revised standard is	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
	<ul> <li>Issue: The ACMA is not an expert body on the possible health effects of human exposure to RF and is not responsible for investigating possible health effects.</li> <li>Questions: So, who has the health regulatory responsibility? The Radiocommunications Act20 puts the health protection responsibility clearly on ACMA. If there is a memorandum of understanding between ARPANSA and ACMA on health responsibilities then mention it.</li> <li>Where do the individual state health departments fit in all of this? Clarity on jurisdiction is required.</li> <li>For years concerned members of the public have been given the run around as federal and state government departments "buck pass" the issue to other departments in an endless loop. State health department officials say talk to ACMA. ACMA says talk to ARPANSA. ARPANSA either hides behind its RF Standard or suggests the concerned person should raise their objections with the party that is responsible for rolling out the RF infrastructure.</li> <li>ARPANSA lacks credible experts in radiation health particularly as it employs no medical experts. I am aware that there is at least one medical expert who is adequately qualified and is involved in the consultation process but he appears to be potentially compromised based on a number of published papers that see him flip flop on the issue of EMR sensitivity. A case perhaps of knowing which side his bread is buttered on?</li> <li>ARPANSA has failed to date in the task of acting responsibly on public health complaints, as it avoids its duty of care to investigate individual cases or even groups of cases that are documented on the health complaint register ARPANSA is maintaining. Holding up the RF Standard as a defensive wall against inquiry and to avoid a proper investigation is not acceptable. The RF Standard needs to clearly identify who the public should be raising RF associated health issues with, and who is obligated to investigate. It is not good enough to send people to their personal doctors for advice because th</li></ul>	based on substantiated science and international best practice. ARPANSA is also considered Australia's peak scientific body on radiation protection and has the relevant expertise in RF EME exposure and health. ARPANSA works closely with the state and territory radiation and health departments to promote radiation protection and health. ARPANSA regulates the use of specific RF emitting equipment within the Commonwealth. While there are no specific occupational exposure regulations for RF EME in most states or territories, protection for workers is provided by relevant work health and safety or occupational health and safety regulations. ACMA are the regulatory body responsible for licensing and compliance of communications infrastructure. ACMA's regulatory arrangements require these sources of RF EME to comply with the public exposure limits in the ARPANSA RF Standard.	
Steven Weller	Question: Has ARPANSA at any stage sent any details of its health complaint register (not just numbers in a report) to the health department for a formal investigation?	Investigation is not one of the purposes of the register which ARPANSA makes clear on its website. <u>https://www.arpansa.gov.au/research/surveys/elec</u> <u>tromagnetic-radiation-health-complaints-register</u> . Further, ARPANSA protects the privacy of complainants.	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
Steven Weller	Conclusion: The offer to involve the public in a consultation process is a welcome step if it leads to a proper discussion and handling of different viewpoints in a responsible manner that includes ALL stakeholders (this includes the largest stakeholder, the general public). If ARPANSA chooses to follow the same approach ICNIRP took with its public consultation then it will be a failure as ICNIRP did not address or discuss any of the myriad of concerns raised by informed and eminent international scientists. As such, I am hoping this is not going to end up as a simple flag waving exercise and a political stunt by ARPANSA to say the public was consulted, because by definition a consultation is a "meeting to discuss something". There are a number of important concerns raised in this response document that need addressing because as it stands today, the draft RF Standard is not fit for purpose. There are too many issues relating to a lack of precaution, the failure to identify and treat potential risks, the failure to consider sensitive populations, and the failure to consider non thermal biological effects. Evidence needs to be treated as evidence, especially when there is a significant evidence base that suggests chronic exposures are harmful. The current requirement to "establish evidence" first before acting is not recognised as a risk management best practice and is both unjustified and reckless. Many experts in RF Health do not consider ICNIRP's RF Guidelines to be protective. Some of these experts come from countries that have adopted RF Standards that are 100 times more restrictive and therefore more protective than what ICNIRP has on offer. Being both a scientific researcher and a member of the public I do have to question ARPANSA's motive for closely aligning with an organisation that is secretive, not inclusive and downplays or ignores the plethora of peer reviewed scientific evidence suggesting harm. ARPANSA has an opportunity to create an RF Standard that is world class and pro	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ICNIRP provide declarations of Conflict of Interest on their website and a requirement of commission participation is that members are not affiliated with industry. The ICNIRP guidelines are considered as international best practice in non-ionising radiation protection.	No change

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Stop Smart Meters Australia Inc	Line 236 states that "The principles for protection against adverse health effects of exposure to RF fields in this Standard are based on the ICNIRP principles for non-ionising radiation protection". As previously flagged, a large cohort of experts consider that the ICNIRP principles are flawed and do not provide protection against long-term exposure and low-intensity effects of exposure to RF fields (EMF Scientific Appeal 2000). In consequence, the Standard should not be based on ICNIRP guidelines as these are viewed as being insufficient to protect public health. REFERENCES Austrian Medical Association 2012, Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF-related health problems and illnesses (EMF syndrome), Consensus paper of the EMF Working Group (AG-EMF), Available: https://www.magdahavas.com/wp-content/uploads/2012/06/Austrian-EMF-Guidelines- 2012.pdf Biolnitiative Working Group 2012, Key Scientific Evidence and Public Health Policy Recommendations, Section 17, C. Sage and D. O. Carpenter, Biolnitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Radiation, Available: www.bioinitiative.org EMF Scientist Appeal 2020, International Appeal: Scientists call for Protection from Non- ionizing Electromagnetic Field Exposure, Available: https://gnir.org/ Institut für Baubiologie + Nachhaltigkeit 2015, Building Biology Evaluation Guidelines for Sleeping Areas, Supplement to the Standard of Building Biology Testing Methods SBM- 2015, Available: https://buildingbiology.com/site/downloads/richtwerte-2015-englisch.pdf Leach & Weller 2017, Conference Paper, Radio Frequency Exposure Risk Assessment and Communication: Critique of ARPANSA TR-164 Report. Do we have a problem?, Available: https://www.researchgate.net/publication/325169912_Radio_Frequency_Exposure_Risk_A sessment_and_Communication_Critique_of_ARPANSA_TR- 164_Report_Do_we_have_a_problem/link/5f5ab2d392851c07895d3609/download	ICNIRP is recognised as the peak body in non- ionizing radiation protection by the mainstream scientific community. ARPANSA contributed to the revision of the ICNIRP guidelines and the public consultation process for draft revisions. While there are some scientists and organisations that have the opinion that there are negative health implications of low level RF EME exposure it is important to note that their opinion is not supported by health authorities, mainstream science and the body of available scientific and health research. ARPANSA has assessed the body of available evidence (including the same evidence those scientists provide to support their position) and does not agree with their conclusions. This is due to, amongst other things, the available studies demonstrating mixed or lack of consistent results, methodological shortcomings and no proposed plausible biological mechanisms for how harm may occur at low level exposure. ARPANSA's assessment is in line with that of the World health Organization (WHO), ICNIRP and other health authorities.	No change
Stop Smart Meters Australia Inc	Protection of the general public should require facility and equipment owners to take effective measures to reduce public exposure on the basis of the precautionary principle. Other countries and jurisdictions have seen fit to introduce a variety of measures to achieve this aim. For instance, comparing ARPANSA's limits to figures reported on in 2018: the limit in Flanders was 7% of what is allowed in Australia for electrical field strength per antenna for telecommunication in places such as homes, schools, rest homes and nurseries; in the Brussels Region total exposure for power density was limited to 2% in residences; in Wallonia electrical field strength per antenna in residences was set at 7% for 900 MHz; in	Protection of the public is provided by compliance with the public exposure limits set in RPS S-1. Facility owners are obliged to ensure that any public expose resulting from the operation of their facilities comply with these limits. The limits are set conservatively to provide a high level of protection and account for any uncertainties.	No change

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	Bulgaria fixed limits for power density were 2% at 900 MHz and less than 2% for higher frequencies; in Croatia 'sensitive areas' (homes, offices, schools, kindergartens, maternity wards, hospitals, facilities for the elderly and disabled and tourist accommodation) the limit was 16% for power density; in Greece the limit was 60% for power density when antenna stations are located closer than 300 metres from the property boundaries of schools, kindergartens, hospitals or facilities for the elderly (and mobile phone antenna stations are not allowed within these facilities), the limit in Italy was 2% for the power density at 900 MHz in homes, schools, playgrounds and places where people might stay for more than four hours; in Lithuania power density was set at 10% for 900 MHz; in Luxemburg a 7% limit at 900 MHz was set for the electrical field strength per radiating element for antennas with a power of 100 W or higher; in Poland publicly-accessible places were limited to a 2% power density at 900 MHz; in China at 900 MHz the power density was set at 9%; in India the limit for EMF from telecommunication base stations was 10% for power density; in Russia the power density limit was 2% in and around residential buildings and inside public and industrial premises; and in Switzerland a limit of 10% for electric field strength applied to 'sensitive-use' locations, such as apartments, schools and children's playgrounds, near mobile phone antennae, broadcasting and radar installations (Stam 2018, pp. 9–11). REFERENCE Stam, R. 2018, Comparison of international policies on electromagnetic fields (power frequency and radiofrequency fields), National Institute for Public Health and the Environment, RIVM (The Netherlands), Available: https://www.rivm.nl/sites/default/files/2018- 11/Comparison%20of%20international%20policies%20on%20electromagnetic%20fields%2 02018.pdf		
Stop Smart Meters Australia Inc	Line 203 concludes, following the claim that it is Australian government policy to implement international best practice and to adopt international standards where they exist and can be applied to the Australian regulatory environment, that the standard is based on the ICNIRP (2020) recommendations for RF fields. As ICNIRP's guidelines patently do not represent world best practice, SSMA recommends that the draft standard does not reference this document. SSMA considers it critical that Australia's Standard for RF provides a high degree of protection for all Australians against adverse health effects of RF exposure; this is currently not the case. A good starting point for informing such a standard would be the IGNIR International Guidelines on Non-Ionising Radiation (IGNIR 2018, p. 3– 6), the Standard for Building Biology Testing Methods SBM-2015 (Institut für Baubiologie + Nachhaltigkeit, p. 1–2), the Austrian Medical Association guidelines (Austrian Medical Association 2012, p. 9) and the Biolnitiative Working Group 2012, pp. 1517–1526).	ICNIRP is recognised as the peak international body in non-ionizing radiation protection. While there are some scientists that have the opinion that there are negative health implications of low level RF EME exposure it is important to note that their opinion is not supported by health authorities, mainstream science and the body of available scientific and health research. ARPANSA has assessed the body of available evidence (including the same evidence those scientists provide to support their position) and does not agree with their conclusions. This is due to, amongst other things, the available studies demonstrating mixed or lack of consistent results,	No change
Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
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		methodological shortcomings and no proposed plausible biological mechanisms for how harm may occur at low level exposure. ARPANSA's assessment is in line with that of the World health Organization (WHO) and the International Commission on Non- ionizing Radiation Protection (ICNIRP).	
Stop Smart Meters Australia Inc	<ul> <li>SSMA recommends that ARPANSA returns to the drawing board in respect of the new RPS S-1.</li> <li>The ICNIRP (2020) principles for non-ionising radiation are considered by many scientists to be flawed and not a suitable basis for a RF standard. The majority of scientific papers examining outcomes in the 300 MHz–3 GHz range report biological effects (Leach, Weller &amp; Redmayne 2018, p. 1). An increasing number of Australians are suffering the consequences of a standard that is focused on preventing thermal effects to tissue and which ignores biological effects. A number of our 600+ members and 6000+ website followers have reported distressing symptoms following exposure to artificial electromagnetic radiation (EMR). SSMA is in receipt of in excess of 400 (unsolicited) reports alleging a variety of adverse symptoms, some of which have been life-threatening, as a result of exposure to electricity smart meter emissions. Smart meters, although a particularly problematic source of EMF (Lamech 2014, p. 28), are one of only many modern sources of pulsed EMF; the individuals who have made these reports therefore represent the tip of the iceberg in relation to how many Australians may have been adversely affected by electro-pollution.</li> <li>SSMA notes that even where countries and jurisdictions have seen fit to adopt ICNIRP's guidelines, in many instances they have only done so following the adoption of significant reductions in ICNIRP's limits. This has resulted in guidelines or standards which are ten or even hundreds of times more protective than Australia's RF Standard (Jamieson 2014, p. 4).</li> <li>It should also be recognised that ARPANSA's association with ICNIRP, and its reliance on ICNIRP for providing it with the basis of a RF standard, immediately flags concern in regard to the acumen and competence of ARPANSA. Endorsement of 'science-based' advice from ICNIRP papears to be analogous to giving credence to a quack's directives to guilible followers. ICNIRP is a small, insular private</li></ul>	The new Standard takes into account all of the research on RF EME exposure and health effects, including studies reporting effects at non-thermal exposure levels. It is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) that there is unsubstantiated scientific evidence to support any adverse health effects at levels below the limits set in the ARPANSA RF Standard. The limits are set conservatively and well below the levels at which established health effects occur to provide additional protection and account for uncertainty. ICNIRP is recognised as the peak international body in non-ionizing radiation protection. The standard was developed by a committee whose members have relevant expertise in RF EME exposure and health and underwent drafting consultation with work health and safety management stakeholders.	No change

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	opinions on health risks from EMF (Hardell 2017, pp. 407–408). A recent investigative report concluded that ICNIRP could not be relied on for providing independent scientific advice on non-ionising radiation (van Scharen 2020, p. 49).		
	It is also unacceptable that the working group for the draft standard did not include community and union representatives (lines 1171–1173). SSMA views the inclusion of a representative from the Mobile Carriers Forum on the working group (line 1173) as a breach of ethics; this is akin to giving a tobacco company the opportunity to influence tobacco control legislation and suggests that ARPANSA is focused on facilitating industry interests, rather than on safeguarding public health, similarly to what has occurred within the FCC (Alster 2015, Cha. 1, p. 2).		
	In view of the rapidly expanding body of evidence demonstrating harm as a result of exposure to non-ionising electromagnetic radiation below the threshold for causing heating effects, SSMA considers that ARPANSA has a duty of care to formulate a standard for RF that is demonstrably precautionary. The draft Standard for Limiting Exposure to Radiofrequency Fields – 100 kHz to 300 GHz does not fulfil this criterion.		
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	<ul> <li>Leach, V., Weller, S. &amp; Redmayne, M. 2018, A novel database of bio-effects from non- ionizing radiation, Reviews on environmental health, 33. 10.1515/reveh-2018-0017, Available:</li> <li>https://www.researchgate.net/publication/325627752_A_novel_database_of_bio- effects_from_non-ionizing_radiation</li> <li>Stam, R. 2018, Comparison of international policies on electromagnetic fields (power frequency and radiofrequency fields), National Institute for Public Health and the Environment, RIVM (The Netherlands), Available:</li> </ul>		
	11/Comparison%20of%20international%20policies%20on%20electromagnetic%20fields%2 02018.pdf		
	van Scharen, H. 2020, The International Commission on Non-Ionizing Radiation Protection: Conflicts of interest, corporate interests and the push for 5G, report commissioned, coordinated and published by M. Rivasi MEP and Dr K. Buchner MEP, Available: https://klaus-buchner.eu/wp-content/uploads/2020/06/ICNIRP-report-FINAL-19-JUNE- 2020.pdf		
Telstra Corporation	Telstra welcomes the opportunity to provide comment on the draft RPS S-1. The RPS S-1 standard will play a critical role in defining safe operating radio frequency exposure limits for radio communications equipment and devices, and we commend ARPANSA for this timely update consistent with international best practice that in turn will ensure public and occupational safety for all Australians	Noted	No change
Terry Redfern	What studies have shown that the technology is safe to animals, insects and humans. Can you guarantee that this technology will do no harm. Ifno then you must not approve it's use.	The limits set within the standard are based on good science and international best practice. They are underpinned by several reviews of the body of scientific literature including: the ICNIRP review of RF EME and health 'Appendix B: Health Risk Assessment Literature', The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)'s opinion 'Potential health effects of exposure to electromagnetic fields (EMF)',Public Health England's review by the Independent Advisory Group on Non-ionising Radiation titled 'Health effects from radiofrequency electromagnetic fields', and Review of	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		Radiofrequency Health Effects Research – Scientific Literature 2000-2012. The Standard covers the frequencies proposed for use in the 5G network. It is established that animals and plants have natural responses to electromagnetic fields including migratory patterns and pollination. The biomechanisms of these responses have not been firmly established and there are competing theories that continue to be investigated. Impacts of RF EME from artificial sources on plant and animal life have not been established. Existing studies on the effects of low level RF EME exposure on plants and animals indicate that the exposure limits set within the Standard are adequate in providing protection to the environment.	
Terry Redfern	No proof exists that exposure to multiple frequency fields is safe to humans.	Exposure to RE EME has been the subject of many studies and a number of reviews. Reviews take into account the body of available evidence and summarise the scientific and health implications. This is very important as no single study can provide conclusive evidence of safety or harm. There are various types of studies that contribute to the pool of scientific evidence for RF EME exposure and health including epidemiological studies that investigate disease in human populations and experimental studies on human volunteers, animals, tissues and cells. Based on reviews conducted of the body of scientific evidence, it is the assessment of ARPANSA that there is no substantiated evidence of adverse health effects from exposure to RF EME below the limits set within the ARPANSA RF exposure standard, including exposure to multiple frequency fields.	No change
Terry Redfern	Worldwide studies have shown that there is a danger to All life.	Exposure to RE EME has been the subject of many studies and a number of reviews. Reviews take into account the body of available evidence and	No change

Name of submitter	Comment	ARPANSA response	Changes to the draft RPS S-1
		This is very important as no single study can provide conclusive evidence of safety or harm. There are various types of studies that contribute to the pool of scientific evidence for RF EME exposure and	
		health including epidemiological studies that investigate disease in human populations and experimental studies on human volunteers, animals, tissues and cells. Based on reviews conducted of the body of scientific evidence, it is the assessment of ARPANSA that there is no substantiated evidence of	
		adverse health effects from exposure to RF EME below the limits set within the ARPANSA RF exposure standard.	