Dear Contributor,

Thank you for participating in the public consultation of the ICNIRP draft guidelines.

Please note that it is important that ICNIRP understands exactly the points that you are making. To facilitate our task and avoid misunderstandings, please:

* be concise
* be precise
* provide supporting evidence (reference to publication, etc.) if available and helpful.

**Please provide your details below as per the online form and the provision of the privacy policy**

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| Last name, first name: Moule, Brett | Email address: brett.moule@kordia.com.au | Affiliation (if relevant): Your affiliation |
| If you are providing these comments officially **on behalf** of an organization/company, please name this here: Kordia (Australia & New Zealand) | | |
| I hereby agree that, for the purpose of the public consultation, **my comments along with my identity (last and first names, affiliation and organization where relevant) will be published** on the ICNIRP website after the consultation phase. | | |

**Please complete the comments table:** Please use 1 row per comment. If required, please add extra rows to the table.

|  | **Document**  **(Guidelines, App A,**  **App B)** | **Line Number**  **#** | **Type of comment (General/ Technical/ Editorial)** | **Comment. Proposed change. Context.** |
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| **1** | Guidelines | Line number | Editorial | Kordia wishes to thank ICNIRP for the opportunity to comment on the Draft Guidelines issued for public consultation.  Our comments largely address how the Guidelines might be used to formulate national protection standards, and the practicalities of applying them to real exposure situations. We do not address the discussion on biological aspects or the formulation of the Basic Restrictions, nor how these in turn are used to determine the Reference Levels.  Our main concerns are:   * the ICNIRP 2010 limits above 100kHz are not integrated into the 2018 Guidelines; * issues with the proposed Reference Levels (mainly below 1GHz);   We have also suggested areas that might be clarified, and note some editorial points.  We look forward to the formal issue of the new RF Guidelines. |
| **2** | Guidelines | 157 | Editorial | The numbering to indicate section “4.2“ is missing.  Insert numbering “4.2“ prior to “RADIOFREQUENCY EMF HEALTH RESEARCH“ |
| **3** | Guidelines | 192-200 | Technical | Further clarification should be written into this section as to whether ICNIRP classifies Nerve Stimulation as an “adverse health effect“ or only as a “biological effect“. It is assumed that ICNIRP classifies Nerve Stimulation as an adverse health effect because of statements written in lines 207-210 and 429-431 (stating that all limits from the 2010 LF guidelines must be followed).  We recommend that section 4.3.1 explicitly states that nerve stimulation is an adverse health effect and that protection according to the exposure limits in ICNIRP 2010 is required |
| **4** | Guidelines | 199-200 | General | Having two current ICNIRP Guidelines covering the same frequency range of 100kHz – 10MHz (ICNIRP 2010 LF and ICNIRP 2018 RF) may lead to ambiguities and misinterpretations, particularly in multi-frequency assessments involving both sets of Basic Restrictions and/or Reference Levels. A single self-contained document providing comprehensive and consistent guidance is preferred.  ICNIRP should at least include the Basic Restrictions, Reference Levels (tables 3 and 4), and multi-frequency formulas required to protect against Nerve Stimulation (in the frequency range 100kHz to 10MHz) directly into these proposed RF 2018 Guidelines.  Not including these tables in ICNIRP 2018 increases the risk that these limits will be forgotten, or applied incorrectly. We would prefer one document covering all health effects in the frequency range 100 kHz – 300 GHz with comprehensive and consistent guidance. |
| **5** | Guidelines | 681 | Technical | Tables 4 and 5 – up to 400 MHz – are linked. Table 4 is for whole body exposure, but if the whole body is exposed, then all “localised” parts of the body are exposed as well, and hence Table 5 also applies. However, whilst Table 4 allows 30 minute averaging and spatial averaging, Table 5 has the same PFD limits but only allows 6 minute averaging and no spatial averaging. Therefore, Table 5 is always more stringent up to 400 MHz. Is this what ICNIRP intended? If so, a not relevant indication “-----“ should be put in the relevant cells in table 4, making it clear in Tables 4, 5 and 6 that up to 400 MHz only Table 5 applies. |
| **6** | Guidelines | 687, 690, 693 | Technical | Note 3 and # are not individually correct and it would be simpler if notes 3, # and \* are merged into one consistent note about whether E and/or H fields need to be measured.  Note “#” states that reactive and radiative near field conditions are compliant if both E and H fields are assessed. However, we expect that it is not necessary to measure both fields in the radiative near field, and that it will be compliant if either E or H fields are measured. The note should be amended to specify that Both E field and H field assessment is only required within the “reactive” Near field only.  Refer to AS/NZS 2772.2:2016, Appendix B for an example of this measurement explanation. |
| 7 | Guidelines | 697 | Technical | The Table 5 description includes the wording “for time intervals ≥ 6 minutes”. This is not clear and we have two interpretations:   * Is this table for continuous (albeit perhaps varying in level) RF exposures of at least 6 minutes? * Or is this table for 6 minute time intervals with exposures of shorter duration? (e.g. a one minute exposure with no exposure in the following 5 minutes).   If it is the first interpretation, we recommend the table heading be reworded “for exposures ≥ 6 minutes (averaging time interval is 6 minutes)”.  If it is the second interpretation, we recommend the table heading relating to time is changed to “… for exposures < 6 minutes (averaging time interval is 6 minutes)”. |

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| 8 | Guidelines | 700 | Technical | The localised exposure reference levels above and below 400MHz don’t align. There is a step mismatch at the 400MHz frequency. (e.g., Occupational RL at 399 MHz=10 W/m2, whilst at 401 MHz=50 W/m2). Similar disparity for General Public RL’s. Is this what ICNIRP intended? If this is as intended, this discontinuity should be acknowledged and explained in the body text.  It is noted that the proposed IEEE C95.1 standard in this part of the spectrum 10 MHz to 400 MHz is GP=10 W/m2, occupational= 50 W/m2. |
| 9 | Guidelines | 703-706 | Technical | Note 2 states that at frequencies below 400 MHz, the Spatial Peak value must be used. This statement is sensible IF the localised exposure reference levels are higher than the whole body reference levels, (i.e.- as per previous comment). If the local exposure reference levels are identical to whole body exposure levels, Note 2 basically prohibits spatial averaging over the body height below 400 MHz. Was this the intent of ICNIRP?  It is noted that the proposed IEEE C95.1 standard in this part of the spectrum 10 MHz to 400 MHz is GP=10 W/m2, occupational= 50 W/m2. |
| 10 | Guidelines | 709 | Editorial | There is a typographic error. “66GHz” is written instead of “6 GHz”  New text to state “6 GHz”. |
| 11 | Guidelines | 711 | Editorial | Note 5 is not required.  Remove note 5 from this table. |
| 12 | Guidelines | 712-716 | Editorial | Include guidance in notes “#” and “\*” on whether E and/or H fields need to be assessed, as per Kordia comment 6 above. |
| 13 | Guidelines | 718 | Technical | The units in Table 6 are energy density (kJ/m²). It is understood that Table 6 is included to limit energy bursts, energy density is not a practical unit for measurement, whereas the intent of reference levels is to have more easily assessed quantities (lines 612-613). We recommend that this table is recast as “averaged rms power flux density” by dividing the formulae by “t”. Users of ICNIRP 1998 with 6 minute time averaging are already used to averaging power flux densities.  However, it is very difficult to measure and integrate rapidly varying or transient exposures that Table 6 applies to, especially for environmental RF field measurements using a radiation meter. Is Table 6 more intended for calculated assessments? If so, then energy density can be retained, but a note should be included to state that in practice this is for calculated assessments only. The symbol, Hinc, for energy density is unfortunate since it is very similar to the symbol for magnetic field H. We recommend this is given a unique symbol. |
| 14 | Guidelines | 719 | Editorial | We recommend that the wording in the table heading relating to time is changed to “… for exposures < 6 minutes (averaging time interval is between 1 and 360 seconds)”. |
| 15 | Guidelines | 720 | Editorial | The 100 kHz to 400 MHz sections of the table, instead of referring to note 2, should be simplified to a “not relevant” indication “-----“, making it clear in Tables 4, 5 and 6 that up to 400 MHz only Table 5 applies. |
| 16 | Guidelines | 720 | Editorial | In the table, the Occupational formula for >6 GHz has a missing open square bracket “[“ |
| 17 | Guidelines | 722 | Editorial | Clarification required defining the minimum value of “t” is one second. Text similar to line 606 should be inserted into the line.  Add text “for t<1, t=1 must be used“. |
| 18 | Guidelines | 722 | Technical | The note in lines 607 and 608 referring to evaluation for all values of t < 360 seconds should also be included in Table 6. We interpret this as requiring 360 individual assessments presuming integer values of t. If this is the case, it is not immediately obvious and needs to be explained thoroughly in the main text.  It is also difficult to evaluate, requiring detailed knowledge of the waveform together with either a brute force calculation or a degree of judgement to shortcut the otherwise lengthy analysis. |
| 19 | Guidelines | 731 | Technical | Note 4 uses the phrase “should not exceed“. Whilst it is understood that Reference Levels are optional and Basic Restrictions are mandatory, this wording could be confusing.  We recommend that the text is changed to “The limits in this table apply to the exposure from any group of pulses, or subgroup of pulses in a train, delivered in t seconds.“ |
| 20 | Guidelines | 746-812 | Technical | There is a contradiction for the requirements of Contact Currents between ICNIRP 2010 LF and these Proposed ICNIRP 2018 RF Guidelines. The ICNIRP LF 2010 guidelines specifies that Contact Current reference levels are required between 100kHz -10MHz; however these proposed 2018 RF Guidelines states that there is no requirement for Contact Current assessments. This contradicts lines 429-431 of these 2018 guidelines that states that all reference levels of the 2010 LF need to be complied with.  Recomend that ICNIRP clarifies the requirement for Contact Current measurements and any contradictions with 2010 LF guidelines. |
| 21 | Guidelines | Line number | General | We also recommend that ICNIRP provides a spreadsheet calculator for all tables to ensure the exposure limits are correctly interpreted and enumerated. All of these issues with Tables 4, 5 and 6 highlight a need to provide worked examples in an informative appendix. |