

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

Last name, first name: LAST NAME, First name	Email address: Your email address.	Affiliation (if relevant): Your affiliation
If you are providing these comments officially on behalf of an organization/company, please name this here: EMF Research Committee of Korean Institute of Electromagnetic Engineering and Science (KIEES) of South Korea.		

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
1	Appendix A	Line number	General	This draft is an invaluable product of tremendous efforts of lots of scientists and researchers. However, there seems to be some problems in the rationale and the review results in the Appendix A: 1) It should be confirmed that the author's intentions of the published research results are reflected correctly, 2) It should be reconsidered that some results for the worst cases are ignored in consideration of cost-benefit effect, even though it is described that as a conservative step, reference levels have been derived such that under worst-case exposure conditions(which are highly unlikely to occur in practice).	Some texts in the Appendix need to be modified properly.	Explain the context of your comment.
2	Guidelines	697	Technical	In Table 5, the reference levels for local exposure are discontinuous at 400 MHz and 6 GHz.	Please check if this kind of tendency is what expected in the draft.	Explain the context of your comment.
3	Guidelines	711	Editorial	The description in Note 5 of Table 5 does not seem to be necessary.	Remove Note 5 in Table 5.	Explain the context of your comment.
4	Guidelines	718	Technical	In Table 6, the reference level is discontinuous at 400 MHz.	Please check if this kind of tendency is what expected in the draft.	Explain the context of your comment.

5	Guidelines	718	Technical	The reference levels for occupational and general public above 6 GHz given in Table 6, are inconsistent with the reference levels (S_{inc}) in Table 5 at $t=360$ (that is, the values are not the same at $t=360$).	Please check if this kind of tendency is what expected in the draft.	Explain the context of your comment.
6	Appendix A	632-634	General	<p>1) It is stated that Nagaoka et al., 2007 is the most recent study. However, since 2007, there have been many researches on children and WBA SAR. Therefore, it should be modified.</p> <p>2) Throughout the document the terms such as “significant”, “at most 15%”, and “at most 40%” are confusing and subjective.</p> <p>3) A study using child models which have used the standard dimensions specified by ICRP showed that the increases of the whole body average SARs are 15% (Nagaoka et al., 2007)</p> <p>Insert your proposed change.</p>	The conclusion drawn in this part of the draft, regarding the SAR issues for children compared to adults, needs to be carefully considered again and to be properly redescribed.	Explain the context of your comment.
Continue numbering	Document ?	Line number	Type of comment	Insert your comment.	Insert your proposed change.	Explain the context of your comment.

Add further rows if needed. For this copy the above row.

And paste it here.

7	Appendix A	627-632	Technical	The relevant reference should be specified correctly. Contextually, it is described as if it seems to be related to Lee and Choi, 2012. Even if it is so, there are some points to be made clear in this sentence. 1) In Lee and Choi, 2012, child models were not scaled down from an adult model. The 1-	The corresponding sentence is proposed to be revised as follows. Standing 1- and 5-year-old child models of the 50th percentile physique which were non-linearly deformed from a real 7-year-old model with the 50th percentile dimensions exceeded the basic	Explain the context of your comment.
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				and 5-year-old models were non-linearly deformed from a real 7-year-old model with the 50th percentile dimensions of 7-y-o Korean males (Lee et al., 2009). 2) In Lee and Choi, 2012, the average physique as well as the thin physique were considered. 3) The fundamental principle of ICNIRP is to adopt a conservative approach. However, the scope of the conservativeness is unclear. How many percentages of the public would be protected from exposures with this guidelines? Even standing 50th percentile 1- and 5-year-old child models exceeded the basic restrictions (WBA SAR) at frequencies of their whole body resonances and at above 1 GHz.	restrictions (WBA SAR) at frequencies of their whole body resonances and at above 1 GHz (up to 50% and 14% respectively when grounded at 2.45 GHz). It is noted that the increase of up to 10% (standing) and 20% (arms-up) in the whole body average SAR have been reported from calculations using thin models with the 10th percentile body mass index (BMI) (Lee et al., 2009, Lee and Choi, 2012). However, it may not be realistic that children or infants maintain their posture for a substantial time interval. [reference to be added] Lee A-K et al. 2009 Development of 7-year-old Korean child model for computational dosimetry ETRI J. 31 237-239.	
8	Appendix A	609,611, 618,619	Technical	E-polarization and H-polarization are not general expressions. They should be replaced with vertical polarization and horizontal polarization, respectively.	Replace 'E-polarization plane wave incidence' with 'vertically polarized plane wave incidence', and also replace 'H-polarized plane wave incidence' with 'horizontally polarized plane wave incidence'.	Explain the context of your comment.
9	Appendix A	623-625	Technical	After the publication of ICNIRP statement 2009, some relevant papers other than Bakker et al. (2010) also have been published. The sentence "After this ICNIRP statement, Bakker et al., (2010) reported similar (but slightly higher) enhancements (45%) of the child whole body average SAR." should be modified.	After this ICNIRP statement, Findlay et al. (2009), Bakker et al. (2010), and Lee et al. (2012) reported similar enhancements (40-50%) of the child whole body average SAR. [reference to be added as follows: Findlay R P, Lee A-K and Dimbylow P J, FDTD calculations of SAR for child voxel models in different postures between 10 MHz and 3 GHz Radiat. Prot. Dosim., 2009, 135: 226-231.]	Explain the context of your comment.

10	Appendix A	683-686	Technical	The document states that a smaller heating factor of children and the uncertainty of numerical analysis are the reasons not to revise the current reference levels. However, children under 2 years are vulnerable to thermoregulatory responses. Furthermore, numerical uncertainty should not be ignored and be added to the measured result for conservative estimation.	Need to be taken into account this point properly.	Explain the context of your comment.
11	Appendix A	771	Editorial	Typo in Reference level	100 mA and 20 mA --> 100 mA and 45 mA	Explain the context of your comment.
12	Guidelines	Line number	General	A lot of editorial errors in technical expressions/descriptions as well as in English.	Proof readings and proper corrections need to be necessary.	Explain the context of your comment.
13	Appendix B	9. CANCER	Technical	There are a few human studies investigating carcinogenic effects of RF energy. The rapid increase in mobile phone use during the last decade has raised some safety concerns. In particular, a risk for vestibular schwannoma is associated with mobile phone use because the acoustic nerve tissue is a sound perception organ and is located close to where people hold their mobile phones during use (Moon IS et al. 2014). Thus, it seems to be necessary to include the relevant research in Section 9. CANCER of the Appendix B.	Add the following sentences at the proper position in Section 9, and also add the relevant reference: "Although the odds ratio (OR) of tumor incidence according to mobile phone use was 0.956, vestibular schwannomas may coincide with the more frequently used ear of mobile phones and tumor volume that showed strong correlation with amount of mobile phone use. Thus, there is a possibility that mobile phone use may affect tumor growth (Moon et al., 2014)." [add the following literature in the reference] Moon IS et al., Association between vestibular schwannomas and mobile phone use. Tumor Biol. 2014, 35(1): 581–587.	Explain the context of your comment.

14	Appendix A	40-43 & 62-68	Technical	The expressions for the definitions of point-SAR and mass-averaged SAR, given in Eq.'s 2.2, 2.3, 2.7, and 2.8, are inconsistent.	Add some more descriptions regarding this issue, for more clarification.	Explain the context of your comment.
15	Appendix A	67	Technical	The volume of a certain averaging mass is defined as a shape of a cube. However, in the previous ICNIRP guidelines, it was a contiguous volume of the averaging mass. The rationale of the change in the shape needs to be described.	Add some expressions for the rationale for changing the shape of the volume of an averaging mass.	Explain the context of your comment.
16	Appendix A	37, 38	Technical	It would be more appropriate to replace dr with dv for volume integral.	$E_{\text{spatial average}} = \sqrt{\frac{1}{V} \int_V \mathbf{E}(r) ^2 dr}$ $\rightarrow E_{\text{spatial average}} = \sqrt{\frac{1}{V} \int_V \mathbf{E}(r) ^2 dv}$ $(V = \int_V dr) \rightarrow (V = \int_V dv)$	Explain the context of your comment.
17	Appendix A	40	Technical	Energy stored in electric or magnetic field can also be included in the incremental energy in this sentence. For more clarification, it would be better to change the expression of 'incremental energy' as proposed.	"SAR is defined as the time derivative of the incremental energy" --> "SAR is defined as the time derivative of the incremental energy consumption by heat"	Explain the context of your comment.
18	Appendix A	44,45,46	Technical	It would be better to explain more in detail related to the expression, 'SAR = $\frac{\sigma \mathbf{E} ^2}{\rho}$ '.	Insert the sentence, "In this case, Joule energy loss in a unit volume per a unit time is given by $\text{Re}[\mathbf{E} \cdot \mathbf{J}^*] = \sigma \mathbf{E} ^2 \left(\frac{\delta W}{\delta t} = \int \sigma \mathbf{E} ^2 dV \right)$.", in front of the sentence starting with 'Therefore, ...'.	Explain the context of your comment.
19	Appendix A	54	Editorial	Improper expression .	"where C is heat capacity (J kg ⁻¹ °C ⁻¹) of the tissue," --> "where C is specific heat capacity (J kg ⁻¹ °C ⁻¹) of the tissue,"	Explain the context of your comment.

20	Appendix A	55,56	Editorial	Improper expression	<p>"Eqn. 2.4 is not applied to actual cases because a large amount of heat energy rapidly diffuses during the exposure." --> "</p> <p>When a large amount of heat energy rapidly diffuses during the exposure Eqn. 2.4 is not applied to actual cases."</p>	Explain the context of your comment.
21	Appendix A	68	Editorial	Need to improve the expression for more clarification.	$SAR_{10g} = \frac{(Total\ power)_{V_{10g}}}{(Total\ weight)_{V_{10g}}} = \frac{\int_{V_{10g}} \sigma E ^2 dv}{\int_{V_{10g}} \rho dv}$ <p>--></p> $SAR_{10g} = \frac{(Total\ power)_{V_{10g}}}{(Total\ weight)_{V_{10g}}} = \frac{\int_{V_{10g}} \sigma E ^2 dv}{\int_{V_{10g}} \rho dv} = 100 \int_{V_{10g}} \sigma E ^2 dv$	Explain the context of your comment.
22	Appendix A	70	Editorial	Typo	1000 kg m-1--> 1000 kg m-3	Explain the context of your comment.
23	Appendix A	78,79	Technical	(Eqn.2.9) describes only power density, not energy density.	<p>"Therefore, the transmitted power and energy densities are defined at the body surface;"</p> <p>--> "Therefore, the transmitted power densities(W/m2) are defined at the body surface;"</p>	Explain the context of your comment.
24	Appendix A	87	Technical	Some more explanation would be necessary for (Eqn. 2.10).	"with the normal direction of the integral area A." --> "with the normal direction to the integral area A. E and H are rms phasors of electric or magnetic field strength vectors each including both incident and reflected wave."	Explain the context of your comment.

25	Appendix A	88	Editorial	It would be better to add a unit for the transmitted energy density.	"" the transmitted energy density' --> 'the transmitted energy density(J/m2)'	In electrical engineering H is so many and so exclusively used as magnetic field, another denoting letter is strongly suggested to express energy density .
26	Appendix A	90	Editorial	More detailed explanation for the integration variable 't' seems to be necessary for (Eqn. 2.11).	Add the following sentence below the (Eqn. 2.11): "Note that the parameter t in (Eqn. 2.11) is not for denoting highly changing rf variation but for usually slowly varying EMF strength."	Explain the context of your comment.
27	Appendix A	94	Editorial	Modification seems to be necessary for more clarification.	"The incident power density is defined as the absolute strength of the Poynting vector:" --> "The incident power density is defined as the absolute strength of the time average Poynting vector:"	Explain the context of your comment.