RADIO ADVISORY BOARD OF CANADA
CONSEIL CONSULTATIF CANADIEN DE LA RADIO

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235 Queen Street, 6th Floor
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(Submitted by email)

Subject: RSS-102.SAR.MEAS Draft Issue 2 and RSS-102.SAR.SIM Draft Issue 1

Dear Josette Gallant,

In January 2025, the Department requested that RABC review draft issue two of Radio Standards Specification (RSS) -102-SAR.MEAS – *Measurement Procedure for Assessing Specific Absorption Rate (SAR) Compliance in Accordance with RSS-102*; and the draft first issue of RSS-102.SAR.SIM, *Simulation Procedure for Assessing Specific Absorption Rate (SAR) Compliance in Accordance with RSS-102.* The Board assigned the review of the standard to the Electromagnetic Compatibility Committee. The Committee held one meeting to review the proposed changes to the standard, during which feedback was provided to the Department.

I have included as an attachment to this letter comments and recommendations for each of the standards.

In addition, at the request of the Department, RABC posted the draft standard on its website to facilitate comments from Canada's World Trade Organization (WTO) partners. A total of seventeen comments were received on our WTO portal and forwarded to the Department for consideration.

The Board has now completed its review. We appreciate having had the opportunity to review the standards.

Sincerely,

J. D. Farnes

J. David Farnes
General Manager

Attachments

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Comments and Recommendation Regarding RSS-102.SAR.MEAS

Line	Comment	Recommendation
248	"This is equivalent to 8 g tissue volume". It's unclear what "equivalent" means. If it is assumed that all the absorbed power density flowing through 4 cm3 is absorbed in the next 2 cm of depth, that is a plausible equivalency. But is that the case? RF power does not flow exactly perpendicular to a phantom surface, even if it's flat.	Perhaps mention that the IEC PAS allows deriving the APD from 8g SAR tests?
259	"259 matched load, e.g. 50 Ω". A "reference" load is general since the transmitter does not necessarily need to be impedance-matched to the load.	Use "reference load". Also specify whether it must be real or can be complex.
272	"It includes being strapped to the arm or leg of the user while transmitting." Wireless rings are popular. Add "finger" to the examples.	"...strapped to the finger, arm or leg of the user …"
Table 1	"Mass" The SI standard unit for mass is kg (https://en.wikipedia.org/wiki/International_System_of_Units)	change to "kg"
401	"The limits to prevent thermal effects are based on average exposure over any 6 minute period." The RF exposure time averaging is over continuous 6 minute intervals. Not sure "period" implies contiguity.	"...exposure over any contiguous 6 minute period."
472	"when the reference model is certified in Canada" Line 458 already states that the reference model must be certified in Canada, Is this sentence indicating something else?	Omit that sentence is not needed; clarify if it's needed.
520	"different firmware" There isn't a definition for "firmware". Somewhere else "software" is used. Sometimes, firmware is the SW on which some components run, which cannot be changed by the manufacturer but can possibly be configured by the manufacturer, for example loading XML profiles in the permanent memory.	It would be very helpful to define clearly what constitutes a change in "firmware". Maybe more than one term is needed, for example, "manufacturer-defined firmware settings".

533	**"provide enhanced/augmented capabilities "** **Not clear whether this refers to increased TX power or something else.**	**Clarify the specific enhancements that would trigger the requirement outlined in 7c.**
588	**"more than 20% from the previous measurement "** **This unnecessarily penalizes very well matched antennas; e.g. any value of the reflection coefficient is > 20% greater than zero. Also, not clear whether 20% is in terms of dB (it should not be, since it would effectively be using dBs of dBs).**	**Remove the 20% requirement.**
591	**"deviates by more than 5 Ω from the previous measurement."** **This unnecessarily penalizes well matched antennas; for example when the reactance goes from -2.5 Ω to +2.5 Ω the return loss does not change much at all if the resistance close to 50 Ω.** **When the resistance is equal to 50 Ω, the return loss is -32 dB < -20 dB in both cases.**	**Remove the bullet 2d.**

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Comments and Recommendation Regarding RSS-102.SAR.SIM

Line	Comment	Recommendation
149	"…alternative measurement method…" Was "simulation" intended?	Change to "…alternative simulation method…"
177	Consider adding the Transmission-Line Matrix (TLM) method in the future. This method allows representing miniature features in great detail without excessive memory and calculation time burden. This is accomplished using an "octree" meshing approach. Some commercial implementations (e.g. CST) enable conformal meshing and mesh convergence.	Consider mentioning TLM in a footnote at the end of line 186, as one of the suitable methods for 3D structures that might be favorably considered following an inquiry.
190	"The selected tool shall be demonstrated to meet the code verification requirements..." However, if a method different from FDTD/FIT or FEM is selected, none of the referenced numerical standards will allow successful verification because some requirements in those standards are very specific for numerical methods they were developed for.	Mention that some method-specific code-verification requirements in 62704-1 and -4 may not apply to other methods different from FDTD/FIT or FEM.
209	"Refer to 5.3.2 of RSS-102.NS.SIM as the requirements are identical." Many requirements of 5.3.2 in RSS-102.NS.SIM become impractical in the context of RSS-102.SAR.SIM. For example, requiring that "The excitation(s) applied to the EUT model must match the corresponding transmit waveforms as closely as possible" could readily discourage from using RSS-102.SAR.SIM at all. Looking at all the RB configurations available within each LTE band, replicating them (also considering their pseudo-random characteristics) "as close as possible" might quickly turn into a cumbersome endeavor, considering that an upper bound of the RF exposure levels	Provide the option to use conventional time-harmonic or impulsive excitations then scaling SAR to the nominal maximum transmit power levels at the applicable evaluation frequencies/channels/ranges.

	would be attainable using a conventional time-harmonic or impulsive (e.g. Gaussian derivative) excitation.	
224	"For assessments against the basic restrictions, it is necessary to model a tissue-equivalent phantom within which the induced SAR can be evaluated." Some application standards (IEC/IEEE 62704-2) specify non-homogeneous body phantoms that can indeed be successfully employed.	Add that in case the assessment is performed according to a specific application standard (e.g. IEC/IEEE 62704-2), then the phantoms defined in such a standard shall be used for assessment.
229-230	"...dimensions of the phantom may be reduced, provided that there is no measurable effect on the assessment results" This requirement is indefinite, unless a bounded tolerance is associated to "measurable effect".	Allow a 5% tolerance as typically done in other contexts. Also specify in which cases the tolerance would need to be documented (e.g. worst case per band?) Also consider adding a penalty on the applicable SAR threshold if the tolerance is larger than 5%, providing opportunities for meaningful tradeoffs when SAR is low.
229-235	Missing the editions of IEC/IEEE 62209-1528 / 62704-x.	Specify the editions or indicate "the latest available" (although that wouldn't work when referencing equations/tables/clauses).
243-245	When evaluating the EUT uncertainty, the provisions in sections 7.3.3 of the IEC/IEEE 62704-1 or IEC/IEEE 62704-4 are required. These are based on the comparison of experimental and numerical unaveraged SAR values. However, unaveraged SAR is not the intended metric to assess compliance with RSS-102. In addition, SAR, when experimentally measured, is always subject to averaging due to the finite dimension of the probe. For computations, the local SAR value will be dependent on the mesh size. The comparison of unaveraged values is therefore unattainable and can compromise the applicability of the document.	Clarify that section 7.3.3 of IEC/IEEE 62704-1 and IEC/IEEE 62704-4 is to be used to evaluate the uncertainty of the EUT model by comparison of experimentally and numerically determined 1-g or 10-g averaged SAR values.
268-9	"oriented to yield worst-case exposure" This requirement is indefinite and may lead to misinterpretation.	Clarify that the same conditions (distances, orientations) required in "SAR.MEAS" are to be employed.

275-6	**"Care should be taken to ensure that the edges and corners of the phantom are not placed in high-field regions, as the induced quantities may become artificially high in these areas. "** **It would be helpful to have some workarounds these issues through an inquiry.**	**Consider mentioning the possibility to submit an inquiry to use different phantoms, for example one of those mentioned in "SAR.MEAS" 5.6.2.**