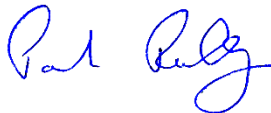


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ISED CAB identifier:	IE0001
Date	19 th Oct 2022
EUT Description	Nordic ID 13.56MHz transmitter
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RF Exposure Exhibit– Technical Report

1.0 SAR Evaluation

SAR Exclusion Limits

Excerpt from 447498 KDB (47498 D01 General RF Exposure Guidance v06)

Section 4.3.1 Standalone SAR Test exclusion considerations

4.3.1. Standalone SAR test exclusion considerations

- 1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$$\left[\frac{\text{max. power of channel, including tune-up tolerance, mW}}{(\text{min. test separation distance, mm})} \cdot \sqrt{f_{\text{(GHz)}}} \right] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR,}^{25} \text{ where}$$

- $f_{\text{(GHz)}}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation²⁶
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

- 2) At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:²⁷
 - a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm) · ($f_{\text{(MHz)}/150}$)] mW, at 100 MHz to 1500 MHz
 - b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz
- 3) At frequencies below 100 MHz, the following may be considered for SAR test exclusion, and as illustrated in Appendix C:²⁸
 - a) The power threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by $[1 + \log(100/f_{\text{(MHz)}})]$ for *test separation distances* > 50 mm and < 200 mm
 - b) The power threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$ for *test separation distances* ≤ 50 mm
 - c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

2. SAR Evaluation FCC

Note the Radiated field strength was measured at 3 metres and the conversion formula below was used to determine the EIRP in dBm

$$EIRP (dBm) = E_{3m} (dBuV/m) - 95.2$$

Calculation = $[P/D] * [\sqrt{f_{(GHz)}}]$

where:

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- P = max power of channel including tuneup tolerance mW
- D = min separation distance mm
- Power and distance are rounded to the nearest mW and mm before calculation²⁵
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

Note Maximum field strength =54.18dBuV/m at 3m

Prediction frequency:	f	13.56	MHz
Maximum power of channel :	P	0.000	mW
Minimum separation distance:	D	5	mm
Calculation		0.01	
Numeric Threshold for 1g SAR		3	
SAR Test not required		0.01 < 3	

The table above shows that for general population head and body SAR, the transmitter meets the required limits and SAR test is not required.

Note It also meets the general population extremity SAR numeric threshold limit of 7.5

Test result Pass

3. SAR Evaluation ISED

RSS 102 Issue 5 (Mar 2019) Section 2.5.1 Exemption limits for Routine Evaluation SAR Evaluation

Note the Radiated field strength was measured at 3 metres and the conversion formula below was used to determine the EIRP in dBm

$$EIRP (dBm) = E_{3m} (dBuV/m) - 95.2$$

Calculation = $[P/D] * [f_{(GHz)}]$

where:

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- P = max power of channel including tuneup tolerance mW
- D = min separation distance mm
- Power and distance are rounded to the nearest mW and mm before calculation²⁵
- The result is rounded to one decimal place for comparison

Note Maximum field strength =54.18dBuV/m at 3m

Prediction frequency: f	13.56	MHz
EIRP Peak	-41	dBm
Time Averaging Factor	0.00	dB
Tune up factor	0	dB
Minimum separation distance: D	5	mm
EIRP Peak P	0.00	mW
Exemption limit for Routine Evaluation SAR :	71	mW
Head and Body SAR; General pop/Uncontrolled		
Test Result : Exempt from SAR Evaluation		

Results show that the 13.56MHz transmitter meets the SAR exclusion limits as per RSS 102 Section 2.5.1 for general population head/body SAR.

It also meets the exemption limit (178mW) for routine SAR evaluation in the case of extremity /limb worn for general population.

End of Report