

US Tech Test Report:  
FCC ID:  
IC:  
Test Report Number:  
Issue date:  
Customer:  
Model:

FCC Part 15/IC RSS Certification  
USKEX-10004808  
11898A-10004808  
19-0109  
April 18, 2019  
Matrix Designs  
ExSENS

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## RF Exposure Report

**The EUT is considered to be portable device. Therefore it was evaluated to SAR exemption requirements.**

### **FCC SAR Exemption Part 2.1093**

#### **General SAR test exclusion per KDB 447498 D01 V06 section 4.3**

Test exclusion conditions are based on source-based time averaged maximum conducted output power of the RF channel, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

For 100 MHz to 6 GHz and test separation distances  $\leq 5$  mm, the SAR test exclusion thresholds are determined by the following:

$$[(\text{max. power of channel, mW})/(\text{min test separation distance, mm})] * [\sqrt{F_{(\text{GHz})}}] =$$

$$(0.00024/5) * (\sqrt{3995}) = 0.00303 \text{ W/kg}$$

$$\text{Limit} = \leq 3\text{W/kg}$$

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## **RSS-102, 2.5.2 Compliance:**

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

$$1.31 * 10^{-2} * 3995^{0.6834} = 3.7 \text{ W}$$

EUT max EIRP = -36.35 dBm + (4.16 dBi) = -32.19 dBm EIRP = 0.0006 Watts  
Which is << than 3.7 W

## **RSS-102 Exemption Limits for Routine Evaluation**

All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of section 2.5.1 or 2.5.2. If the equipment under test (EUT) meets the requirements of section 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance.

This EUT has been evaluated for compliance to section 2.5.1 of RSS-102 Issue 5 and has been shown to meet the requirements of Table 1. *SAR evaluation-Exemption limits for routine evaluation based on frequency and separation distance.* A footnote in RSS-102 Issue 5 also states that transmitters operating between 3 kHz – 10 MHz that meet the exemption requirements from routine SAR evaluation shall also demonstrate compliance to the instantaneous limits of Section 4, therefore a separate exhibit has been provided to show that the EUT meets the requirements of Section 4.

Conclusion:

EUT fulfills the requirements for exemption per Section 2.5 of RSS-102.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance<sup>4,5</sup>

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Output power level shall be the higher of the maximum conducted or equivalent isotropic radiated power (EIRP) source-based, time-averaged output power.

For separation distance less than 5mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

For this EUT the worst case output power level is the EIRP.  
 For this EUT the worst case separation distance is 5 mm.

**Evaluation Results:**

Note: The peak output power is used as the worst case.

Time-average Output Power (dBuV/m @ 3 m) = 58.90 dBuV/m (Table 4 of test report)

Power in EIRP = E(dbuV/m) + 20 log(d) – 104.8; where d= measurement distance in meters  
 = 58.90 + 20 log (3) -104.8 = -36.35 dBm (EIRP)

Power in mW = 10<sup>(-36.35/10)</sup>= 0.00025 mW << less than 1 mW