
Project #: 22765-15

Company: American Innovations

EUT: RM5 I/O4

Maximum Permissible Exposure Evaluation Report

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1.0 Maximum Permissible Exposure Evaluation (Supplements the test report.)

The measured power is considered for the intended use of the device and resulting RF exposure to the user.

1.1 Applicable Documents

Document	Title
RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES
OET Bulletin 65 Edition 97-01	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

1.2 Criteria

Section Reference	Test Detail
FCC 47 CFR Part 1 I, 1.1310 // RSS-102, Issue 5	Radiofrequency radiation exposure limits

1.3 Procedure

Using measurement of peak power and considering the intended application, determine the permissible exposure level, applicability of exclusion, or whether additional exposure tests (SAR) are indicated. When applicable justify conclusion for selected exposure level and separation distance.

1.4 Power to Exposure Calculation, Conducted

The EUT transmitter power is determined by conducted measurement. Safe exposure distance was calculated for the allowed maximum uncontrolled public exposure limit.

Measured Conducted Peak Power (dBm)	Exposure Weighing Factor (dB)	Antenna Gain (dBi)	Corrected Peak Power EIRP (dBm)	EIRP In Linear Terms (mW)
15.47	(Ignored due to low power)	1.7	17.17	52.12

1.5 Antenna Separation Distance Analysis

As shown in figure below EUT will be installed inside a secondary enclosure and only be accessible by service personnel.



EUT Installation Inside a Secondary Enclosure

1.6 SAR Exemption Calculation – FCC

FCC 47 CFR Part 1 I, 1.1310, Radiofrequency radiation exposure limits.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(ii) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/ <u>f</u>	2.19/ <u>f</u>	*(180/ <u>f</u> ²)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			<u>f</u> /1500	<30
1,500-100,000			1.0	<30

According to table above, the MPE limit for 2400 MHz transmitter shall not exceed power density of 1 mW/cm² at a distance of 20 cm from the EUT.

Calculation:

$$\text{EIRP} = 52.12 \text{ mW} = 0.05212 \text{ W}$$

$$\text{Distance} = d = 20 \text{ cm} = 0.2 \text{ m}$$

$$\text{Power Density} = \text{EIRP} / 4\pi d^2 = 0.05212 / 4 * \pi * (0.2)^2 = 0.104 \text{ W/m}^2 = 0.0104 \text{ mW/cm}^2$$

$$\text{Power Density } 0.0104 \text{ mW/cm}^2 < 1 \text{ mW/cm}^2$$

1.7 SAR Exemption Calculation – IC

RSS-102, Section 2.5.2, Exemption Limits for Routine Evaluation – RF Exposure Evaluation

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:

- 1) below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance)
- 2) at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz
- 3) at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance)
- 4) 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
- 5) at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance)

Calculation:

Applying equation 4 in section 1.7 for frequency 2400 MHz:

$1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz.

$$\text{Limit} = 1.31 \times 10^{-2} \times 2400^{0.6834} = 2.7 \text{ W}$$

$$\text{EIRP} = 0.05212 \text{ W} < 2.7 \text{ W}$$

1.8 Conclusion

Based on 20 cm separation distance between the user and the EUT, FCC and IC exposure limits meet the applicable SAR exemption requirements.

End of Report