
Project #: 22455-15

Company: Hubblell Control Solutions

EUT: NXSMP2-SMI

RF Exposure Evaluation Report

Prepared for:

Hubblell Control Solutions
710 Hesters Crossing Rd., Suite 100
Round Rock, TX 78681

By

Nemko PTI, Inc.
1601 North A.W. Grimes Blvd., Suite B
Round Rock, Texas 78665

May 26, 2022

Written by



Shakil Murad
Wireless Engineer

Table of Contents

1.0	Maximum Permissible Exposure Evaluation (Supplements the test report.)	3
1.1	Applicable Documents	3
1.2	Criteria	3
1.3	Procedure	3
1.4	Duty Cycle Correction Factor Measurement	4
1.5	Power to Exposure Calculation, Conducted.....	5
1.6	RF MPE Evaluation – FCC.....	5
1.7	RF MPE Evaluation – ISED Canada.....	6
1.8	Conclusion	6

NOTICE:

- (1) This Report must not be used to claim product endorsement, by NVLAP, NIST, the FCC or any other Agency. This report also does not warrant certification by NVLAP or NIST.
- (2) This report shall not be reproduced except in full, without the written approval of Nemko PTI, Inc.
- (3) The significance of this report is dependent on the representative character of the test sample submitted for evaluation and the results apply only in reference to the sample tested. The manufacturer must continuously implement the changes shown herein to attain and maintain the required degree of compliance.

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

Table 1.1.1: 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.

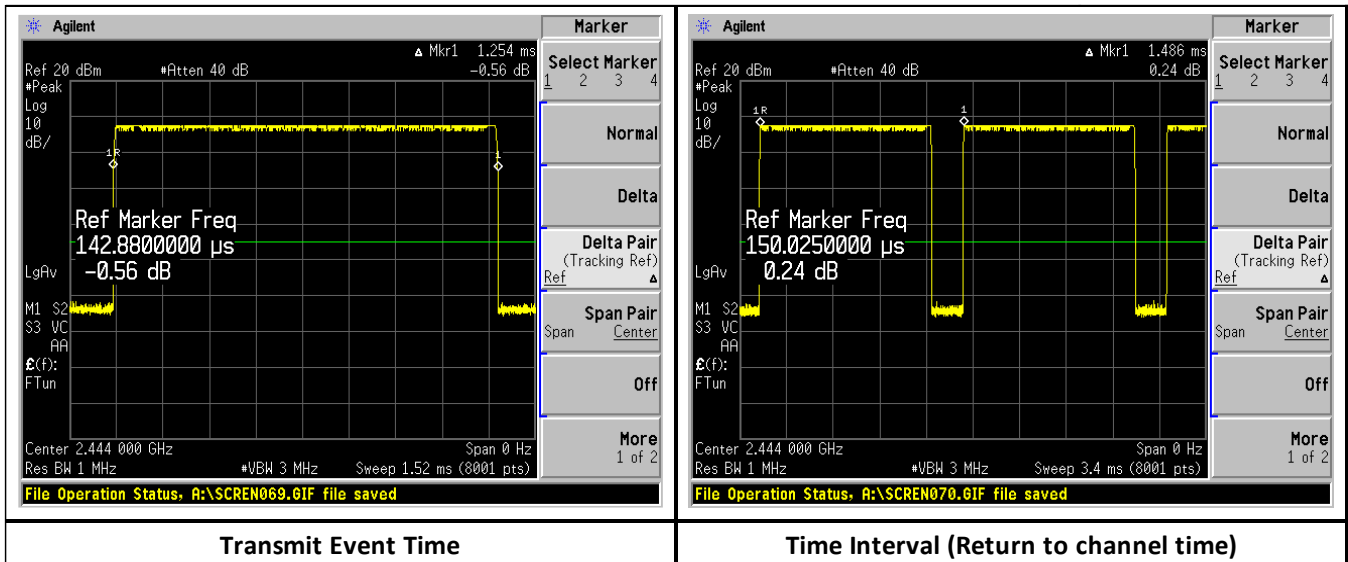
1.4 Duty Cycle Correction Factor Measurement

Measurement is based on intervals not to exceed 100 msec. Maximum transmitter on time is divided by the lesser of 100 msec or the actual measured minimum transmitter interval time. The result is converted to dB and applied as needed to peak measurements of transmitter artifacts to determine average power. This is not a pass/fail measurement.

Continuous packet transmission mode was used for the duty cycle measurement, which would represent a worst-case operating scenario.

On Time (msec)	Time Interval (msec)	Duty Cycle Factor (dB) (On Time/Interval)	Exposure Weighing Factor (dB) (10 * Log ₁₀ (Duty Cycle Factor))
1.254	1.486	= 0.844	= -0.74

Plotted measurements appear below:



1.5 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)
7.85	Not used to get worse case EIRP	3	10.85	12.16

1.6 RF MPE Evaluation – 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:

$$\text{EIRP} = 12.16 \text{ mW} = 0.01216 \text{ W}$$

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

$$\text{Power Density} = \text{EIRP}/4\pi d^2 = 0.01216/4*\pi*(0.2)^2 = 0.024 \text{ W/m}^2 = 0.0024 \text{ mW/cm}^2$$

$$\text{Power Density } 0.0024 \text{ mW/cm}^2 < 1 \text{ mW/cm}^2$$

1.7 RF MPE Evaluation – ISED Canada

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 from section 1.6 for frequency 2400 MHz:

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

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

$$\text{EIRP} = 0.01216 \text{ W} < 2.7 \text{ W}$$

1.8 Conclusion

Based on 20 cm separation distance between the user and the EUT, FCC and IC comply with MPE limits.

End of Report