

**6. Measurement Data (continued)**

**6.12. Public Exposure to Radio Frequency Energy Levels (1.1307 (b)(1))**

**6.12.1. SAR Test Exclusion Calculation**

Requirement: Portable devices as defined in § 2.1093 of this chapter operating under Part 15 are subject to radio frequency radiation exposure requirements as specified in §§ 1.1307(b) and 2.1093 of this chapter. For a 1-g SAR, the test exclusion result must be ≤ 3.0.

Test Notes: 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 the following formula:

$$\text{SAR Test Exclusion} = \frac{P_{\text{MAX}}}{d_{\text{MIN}}} \times \sqrt{f_{\text{(GHz)}}} \quad (1)$$

- $P_{\text{MAX}}$  mW Maximum power of channel, including tune-up tolerance
- $d_{\text{MIN}}$  mm Minimum test separation distance, mm (≤ 50 mm)
- $f_{\text{(GHz)}}$  GHz  $f_{\text{(GHz)}}$  is the RF channel transmit frequency in GHz (>100 MHz and <6 GHz)

(1) FCC OET 447498 - Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

Result: The device under test meets the exclusion requirement detailed in FCC OET 447498.

Channel:		4, 16M	4, 64M	
Input:	$P_{\text{MAX}}$	0.991	0.394	mW
	$d_{\text{MIN}}$	5.000	5.000	mm
	$f_{\text{(GHz)}}$	4.097	4.243	GHz
<b>Test Exclusion:</b>		<b>0.401</b>	<b>0.162</b>	
<b>Limit Exemption:</b>		<b>3.000</b>	<b>3.000</b>	

<sup>1</sup> Taken from the peak data in Section 6.5 of this test report (converted to mW).

Notes:

The device does not exceed the test limit exemption and therefore a routine SAR Evaluation is not required.

**6. Measurement Data (continued)**

**6.12.1 RF Exposure for devices that operate above 6 GHz**

Requirements: 2.1093(b): A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

2.1093 (d): Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified 47 CFR 1.1310. Measurements and calculations to demonstrate compliance with MPE Field strength or power density limits for device operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure for devices that operate between 1500 to 100,000 MHz is 1.0 mW/cm<sup>2</sup> using a 30 minute averaging time.

Center Frequency (GHz)	MPE Distance (cm)	DUT Peak Output Power (dBm)	DUT Antenna Gain (dBi)	DUT Peak Power (mW)	Power Density		FCC Limit (mW/cm <sup>2</sup> )
					(mW/cm <sup>2</sup> )	(W/m <sup>2</sup> )	
	(1)	(2)	(3)		(4)		(5)
6.491	5	-1.23	0.0	0.753	0.0023980	0.0239801	1
6.488	5	-5.43	0.0	0.286	0.0009117	0.0091170	1

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

1. Reference CFR 2.1093(b): For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 5 centimeters of the body of the user.
2. Section 6.7 of this test report. Measured Peak Power at 3 Meters.
3. Antenna Gain included in the measured values of Section 6.7
4. Power density is calculated from field strength measurement and antenna gain.
5. Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

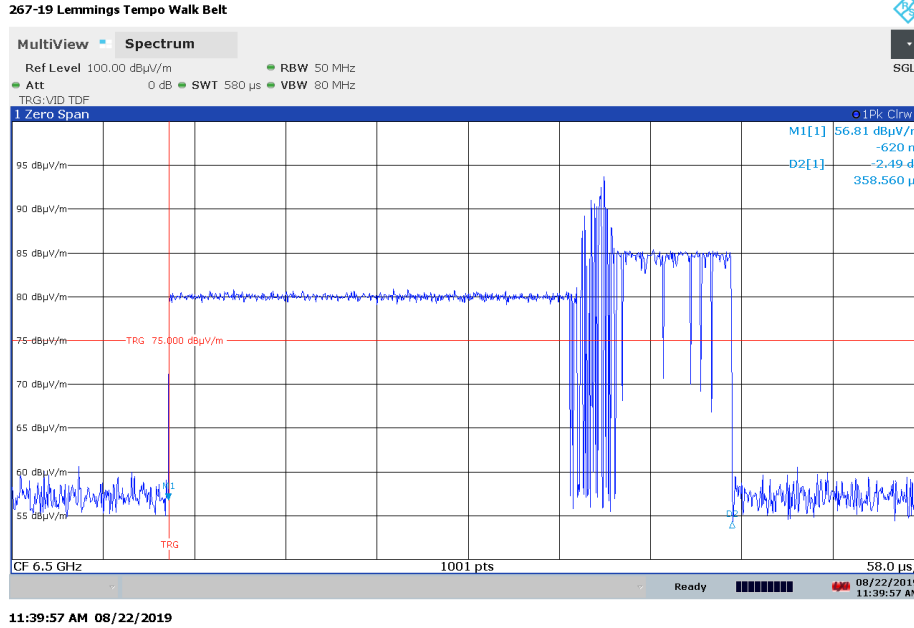
**Note:** This is the peak power of the device in a 50 MHz bandwidth, the time averaged power is significantly lower. **20 \* LOG (0.0358 mS / 22.02 mS) = -35.76 dB**

6. Measurement Data (continued)

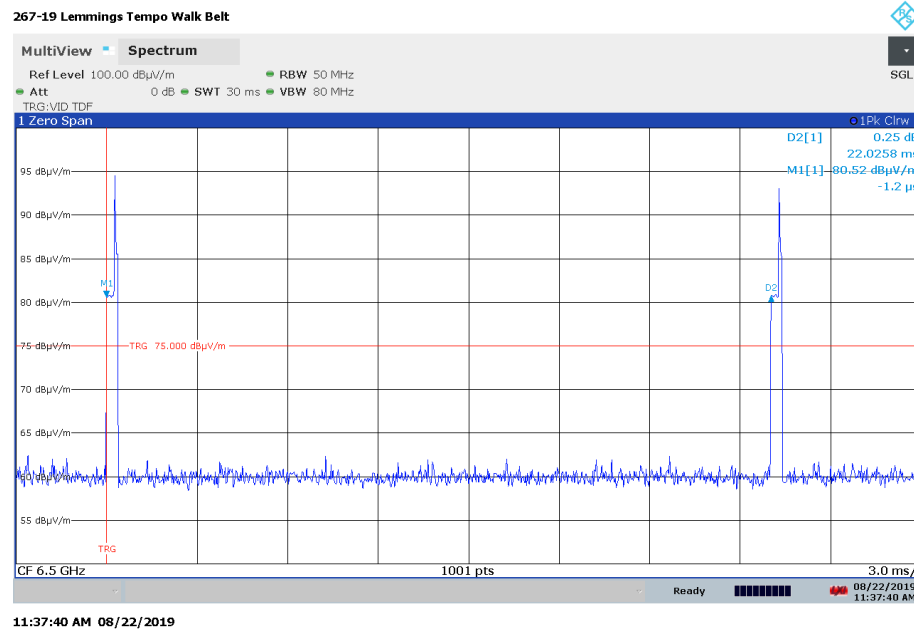
6.12. Public Exposure to Radio Frequency Energy Levels (1.1307 (b)(1))

6.12.1 RF Exposure for devices that operate above 6 GHz (continued)

Worst Case Duty Cycle of the device Burst Length = 0.35856 mS



Repetition Time = 22.02 mS



**6. Measurement Data (continued)**

**6.12. Public Exposure to Radio Frequency Energy Levels (1.1307 (b)(1))**

**6.12.1 RF Exposure for devices that operate above 6 GHz (continued)**

Time averaged power when using the worst case peak power at close distances

A conservative measured distance of the actual end usage of the product results in a distance of at least 1 mm from the body when using the clip shown in the manual maintaining the antenna is on the side away from the body. That results in an exposure level below the 1 mW/cm<sup>2</sup> limit.

Frequency (GHz)	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	DUT Output Power milliWatts	Power Density		FCC Limit (mW/cm <sup>2</sup> )
					(mW/cm <sup>2</sup> )	(W/m <sup>2</sup> )	
	(1)	(2)	(3)		(4)		(5)
6.497	1	-1.23	0.0	0.753	0.0599501	0.5995013	1

Further reduction is achieved using the time averaged power of the device that is 35.76 dB lower than the peak power. The time averaged power of -37.00 dBm or 0.0002 mW results in a significantly lower RF exposure when 1 cm from the body.

Frequency (GHz)	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	DUT Output Power milliWatts	Power Density		FCC Limit (mW/cm <sup>2</sup> )
					(mW/cm <sup>2</sup> )	(W/m <sup>2</sup> )	
	(1)	(2)	(3)		(4)		(5)
6.497	1	-37.00	0.0	0.000200	0.0000159	0.0001589	1

**6. Measurement Data (continued)**

**6.12. Public Exposure to Radio Frequency Energy Levels (RSS-102)**

**6.12.1 RF Exposure for devices that operate above 6 GHz (continued)**

Requirements: All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.1 or 2.5.2.

Section 2.5.1: SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1. The limit at 5800 MHz is 1 mW at a distance of ≤ 5mm.

Section 2.5.2: 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 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).

Center Frequency (GHz)	DUT Peak Output Power (dBm)	DUT Peak Output Power	ISED 2.5.1 Limit	DUT Peak Output Power	ISED 2.5.2 Limit
		(milliWatts EIRP)	(milliWatts)	(Watts EIRP)	(Watts)
	(1)	(2)	(3)	(4)	(5)
6.496	-1.23	0.753	1	0.000753	5
6.501	-5.43	0.286	1	0.000286	5

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

1. Section 6.8 of this test report. Measured Peak Power at 3 Meters
2. Converted dBm (E.I.R.P) measured in Section 6.8 to milliwatts
3. Reference ISED RSS-102 Section 2.5.1 Limit at 5800 MHz
4. Converted dBm (E.I.R.P) measured in Section 6.8 to Watts
5. Reference ISED RSS-102 Section 2.5.2 Limit above 6 GHz

**Note:** This is the peak power of the device in a 50 MHz bandwidth the time averaged power of the device is significantly lower. **20 \* LOG (0.0358 mS / 22.02 mS) = -35.76 dB**

**6. Measurement Data (continued)**

**6.12. Public Exposure to Radio Frequency Energy Levels (RSS-102)**

**6.12.1 RF Exposure for devices that operate above 6 GHz (continued)**

Time Averaged Power

Center Frequency (GHz)	DUT Peak Output Power (dBm)	DUT Peak Output Power	ISED 2.5.1 Limit	DUT Peak Output Power	ISED 2.5.2 Limit
		(milliWatts EIRP)	(milliWatts)	(Watts EIRP)	(Watts)
	(1)	(2)	(3)	(4)	(5)
6.496	-37.00	0.0000002	1	0.000200	5
6.501	-41.77	0.0000001	1	0.000067	5