

**Test Number: 288-12R3**
**Issue Date: 06/29/2012**

## 7. Measurement Data (continued)

### 7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1))

#### RSS-GEN 5.5, RSS 102

Requirement: (15.247(i))

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. Devices are subject to the radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), FCC 47 CFR 2.1091 and 47 CFR 2.1093, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment.

Procedure: The power density is calculated from the peak field strength and device antenna gain:

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

PD Power Density	mW/cm <sup>2</sup>
OP DUT Output Power	dBm
AG DUT Antenna Gain	dBi
d MPE Distance	cm

Conclusion: The device under test is meets radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), § 2.1091 and § 2.1093.

#### Power Calculated from Peak Field Strength

802.11b Mode Channel	Frequency	Peak Field Strength	Distance	Antenna Gain <sup>1</sup>	Measured Output Power
	(MHz)	(dB $\mu$ V/m)	(m)	(dBi)	(mW)
Low	2412	126.46	3.0	12.5	74.67
Mid	2437	131.94	3.0	12.5	263.71
High	2462	128.80	3.0	12.5	127.97

802.11g Mode Channel	Frequency	Peak Field Strength	Distance	Antenna Gain <sup>1</sup>	Measured Output Power
	(MHz)	(dB $\mu$ V/m)	(m)	(dBi)	(mW)
Low	2412	131.16	3.0	12.5	220.35
Mid	2437	134.81	3.0	12.5	510.65
High	2462	130.93	3.0	12.5	208.99

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## 7. Measurement Data (continued)

### 7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102 (continued)

HT20 Mode Channel	Frequency	Peak Field Strength	Distance	Antenna Gain <sup>1</sup>	Measured Output Power
	(MHz)	(dB $\mu$ V/m)	(m)	(dBi)	(mW)
Low	2412	129.00	3.0	12.5	134.01
Mid	2437	131.75	3.0	12.5	252.42
High	2462	128.26	3.0	12.5	113.01

HT40 Mode Channel	Frequency	Peak Field Strength	Distance	Antenna Gain <sup>1</sup>	Measured Output Power
	(MHz)	(dB $\mu$ V/m)	(m)	(dBi)	(mW)
Low	2422	126.10	3.0	12.5	68.73
Mid	2437	128.93	3.0	12.5	131.86
High	2452	126.63	3.0	12.5	77.65

<sup>1</sup> Antenna gain value provided by the manufacturer.

<sup>2</sup> Reference Section 7.4 of this test report for the formula used to convert field strength to power.

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## 7. Measurement Data (continued)

### 7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102 (continued)

802.11b Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
2412	20.0	18.73	12.5	0.2641505	2.6415048	1	Compliant
2437	20.0	24.21	12.5	0.9329350	9.3293503	1	Compliant
2462	20.0	21.07	12.5	0.4527426	4.5274264	1	Compliant

802.11g Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
2412	20.0	23.43	12.5	0.7795633	7.7956333	1	Compliant
2437	27.0	27.08	12.5	0.9912515	9.9125151	1	Compliant
2462	20.0	23.20	12.5	0.7393523	7.3935225	1	Compliant

HT20 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
2412	20.0	21.27	12.5	0.4740797	4.7407974	1	Compliant
2437	20.0	24.02	12.5	0.8929999	8.9299988	1	Compliant
2462	20.0	20.53	12.5	0.3998079	3.9980793	1	Compliant

HT40 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
2422	20.0	18.37	12.5	0.2431372	2.4313719	1	Compliant
2437	20.0	21.20	12.5	0.4664997	4.6649973	1	Compliant
2452	20.0	18.90	12.5	0.2746954	2.7469541	1	Compliant

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 20 centimeters of the body of the user.

- Section 7.4 of this test report.
- Data supplied by the client. Antenna specification data of worst case antenna used by the DUT.
- Power density is calculated from field strength measurement and antenna gain.
- Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

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## 7. Measurement Data (continued)

### 7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1))

#### RSS-GEN 5.5, RSS 102

Requirement: (15.247(i))

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. Devices are subject to the radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), FCC 47 CFR 2.1091 and 47 CFR 2.1093, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment.

Procedure: The power density is calculated from the peak field strength and device antenna gain:

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

PD Power Density	mW/cm <sup>2</sup>
OP DUT Output Power	dBm
AG DUT Antenna Gain	dBi
d MPE Distance	cm

Conclusion: The device under test is meets radio frequency radiation exposure requirements specified in 47CFR 1.1307(b), § 2.1091 and § 2.1093.

#### Power Calculated from Peak Field Strength

802.11a Mode Channel	Frequency	Peak Field Strength	Distance	Antenna Gain <sup>1</sup>	Measured Output Power
	(MHz)	(dB $\mu$ V/m)	(m)	(dBi)	(mW)
Low	5745	132.51	3.0	11.5	378.55
Mid	5785	132.50	3.0	11.5	377.68
High	5825	132.13	3.0	11.5	346.83

HT20 Mode Channel	Frequency	Peak Field Strength	Distance	Antenna Gain <sup>1</sup>	Measured Output Power
	(MHz)	(dB $\mu$ V/m)	(m)	(dBi)	(mW)
Low	5745	131.12	3.0	11.5	274.87
Mid	5785	130.13	3.0	11.5	218.84
High	5825	129.58	3.0	11.5	192.81

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**7. Measurement Data (continued)****7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1))  
RSS-GEN 5.5, RSS 102 (continued)**

HT40 Mode Channel	Frequency	Peak Field Strength	Distance	Antenna Gain <sup>1</sup>	Measured Output Power
	(MHz)	(dB $\mu$ V/m)	(m)	(dBi)	(mW)
Low	5755	129.78	3.0	11.5	201.89
High	5795	129.51	3.0	11.5	189.72

<sup>1</sup> Antenna gain value provided by the manufacturer.<sup>2</sup> Reference Section 7.4 of this test report for the formula used to convert field strength to power.

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## 7. Measurement Data (continued)

### 7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1)) RSS-GEN 5.5, RSS 102 (continued)

802.11a Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
5745	21.0	25.78	11.5	0.9648789	9.6487888	1	Compliant
5785	21.0	25.77	11.5	0.9626597	9.6265972	1	Compliant
5825	20.0	25.40	11.5	0.9746561	9.7465609	1	Compliant

HT20 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
5745	20.0	24.39	11.5	0.7724162	7.7241625	1	Compliant
5785	20.0	23.40	11.5	0.6149664	6.1496642	1	Compliant
5825	20.0	22.85	11.5	0.5418155	5.4181547	1	Compliant

HT40 Mode Channel Frequency	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
				(mW/cm2)	(W/m2)		
				(1)	(2)	(3)	(4)
5745	20.0	23.05	11.5	0.5673504	5.6735044	1	Compliant
5795	20.0	22.78	11.5	0.5331524	5.3315244	1	Compliant

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 20 centimeters of the body of the installer. All other mobile and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter.

- Section 7.4 of this test report.
- Data supplied by the client. Antenna specification data of worst case antenna used by the DUT.
- Power density is calculated from field strength measurement and antenna gain.
- Reference CFR 1.1310, Table 1: Limits for Maximum Permissible Exposure (MPE), Section (B): Limits for General Population/Uncontrolled Exposure.

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**7. Measurement Data (continued)****7.10. Public Exposure to Radio Frequency Energy Levels (15.247(i) (1.1307 (b)(1))  
RSS-GEN 5.5, RSS 102 (continued)**

**Co-location of Radio Operation. Worse case from 2.4 GHz and 5.8 GHz Modes of operation.**

Radio	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density (mW/cm <sup>2</sup> )	Power Density (W/m <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
	(1)	(2)	(3)	(4)	(4)	(5)	
802.11g	38.0	27.08	12.5	0.5002913	5.0029129	1.00	Compliant
802.11a	30.0	25.78	11.5	0.4726587	4.7265867	1.00	Compliant
<b>SUM</b>	<b>38.0</b>	<b>N/A</b>	<b>N/A</b>	<b>0.9729500</b>	<b>9.7294996</b>	<b>1.00</b>	<b>Compliant</b>

**Note:** For outdoor installations, installers must be instructed to be at least 38 cm away from the high gain antenna when the device is in operation.

**A minimum separation of 38 cm from the antenna is required when both radios are in operation in the 2.4 and 5.8 GHz bands.**