
**COMPLIANCE WORLDWIDE INC.
TEST REPORT 269-10R1**

**In Accordance with the Requirements of
Federal Communications Commission CFR Title 47 Part 15.249, Subpart C
Industry Canada RSS 210, Issue 7**

**Low Power License-Exempt Radio Communication Devices
Intentional Radiators**

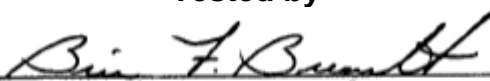
**Issued to
Sensitech
800 Cummings Center, Suite 258X
Beverly, MA 01915-6197**

**for the
TempTale RF Monitor**

**FCC ID: SRMT11012177
IC: 6654A-11012177**

Report Issued on July 23, 2010

Tested by



Brian F. Breault

Reviewed by



Larry K. Stillings

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Table of Contents

1. Scope	3
2. Product Details	3
2.1. Manufacturer	3
2.2. Model Number	3
2.3. Serial Number	3
2.4. Description	3
2.5. Power Source	3
2.6. EMC Modifications	3
3. Product Configuration	4
3.1. Support Equipment	4
3.2. Cables	4
3.3. Operational Characteristics & Software	4
3.4. Block Diagram	4
4. Measurements Parameters	4
4.1. Measurement Equipment Used to Perform Test	4
4.2. Measurement & Equipment Setup	4
4.3. Measurement Procedure	5
4.4. Choice of Operating Frequencies	5
5. Measurement Summary	6
6. Measurement Data	6
6.1. Antenna Requirement	7
6.2. Radiated Field Strength of Fundamental	7
6.3. Radiated Field Strength of Harmonics	9
6.4. Band Edge Measurements	10
6.5. Spurious Radiated Emissions	12
6.6. Occupied Bandwidth (-26 dB)	13
6.7. 99% Bandwidth	13
6.8. Occupied (-26 dB) Bandwidth / 99% Bandwidth Plots	13
6.9. Public Exposure to Radio Frequency Energy Levels	15
7. Test Site Description	17

1. Scope

This test report certifies that the Sensitech TempTale RF Monitor, as tested, meets the FCC Part 15, Subpart C and Industry Canada RSS 210, Issue 7 requirements. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

2. Product Details

- 2.1. Manufacturer:** Sensitech
- 2.2. Model Number:** TempTale RF Monitor
- 2.3. Serial Number:** 1475000005
- 2.4. Description:** The TempTale RF monitor stores temperature values, identifies locations traveled through and stores shipment information. All of this information can be transmitted wirelessly to a local computer. Time and temperature information displayed on the PC also includes the location information during the trip.
- 2.5. Power Source:** 3 Volts DC (1 CR123ASL Lithium Battery)
- 2.6. Hardware Revs.:** Rev. A
- 2.7. Software Rev.:** Rev. A, Version 1025
- 2.8. EMC Modifications:** None

3. Product Configuration

3.1. Support Equipment

Device	Manufacturer	Model	Serial No.	Comment
No Support Equipment				

3.2. Cables

Cable Type	Length	Shield	From	To
No external cables				

3.3. Operational Characteristics & Software

1. Press the red Stop button to stop/reset the unit.
2. Press the green Start switch in the following manner:
 - One Time – Channel 0 (920.650 MHz)
 - Two Times – Channel 1 (914.900 MHz)
 - Three Times – Channel 2 (922.270 MHz)

3.4. Block Diagram



4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
Spectrum Analyzer	Agilent	E4407B	MY4510449	7/09/2011
EMI Receiver	Hewlett Packard	8546A	3330A00115	10/28/2010
Microwave Preamp	Hewlett Packard	8449B	3008A01323	9/22/2010
Bilog Antenna	Com-Power	AC-220	25509	8/6/2010
Horn Antenna	Electro-Metrics	EM-6961	6337	7/22/2010

4.2. Measurement & Equipment Setup

Test Dates:	7/19/2010 - 7/23/2010
Test Engineers:	Brian Breault
Normal Site Temperature (15 - 35°C):	21.6
Relative Humidity (20 -75%RH):	35
Frequency Range:	30 MHz to 9.6 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	100 kHz - 30 MHz to 1 GHz
	1 MHz - Above 1 GHz
EMI Receiver Average Bandwidth:	300 kHz - 30 MHz to 1 GHz
	3 MHz - Above 1 GHz
Detector Function:	Peak, Quasi-Peak & Average

4. Measurements Parameters (continued)

4.3. Measurement Procedure

Test measurements were made in accordance FCC Part 15.249, IC RSS-210 Annex II: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

The test methods used to generate the data in this test report is in accordance with ANSI C63.4: 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

In accordance with ANSI C63.4-2003, section 13.1.4.1, c), the device under test was rotated through three orthogonal axes to determine which attitude produced the highest emission relative to the limit. The positions tested were the following:

- Position 1 - DUT on left side (X axis)
- Position 2 - DUT facing forward (Y axis)
- Position 3 - DUT facing up, bottom toward 0° (Z axis)

All measurements detailed in this test report represent the attitude that produced the highest emission relative to a given limit.

4.4. Choice of Operating Frequencies

The Sensitech TempTale RF Monitor employs 3 channels in the 903 MHz to 928 MHz frequency range. In accordance with ANSI C63.4, Section 13.1.1, all three channels are detailed in this test report:

- Low Channel – 914.900 MHz
- Middle Channel – 920.650 MHz
- High Channel – 922.270 MHz

5. Measurement Summary

Test Requirement	FCC Requirement	Test Section	Result	Comment
Antenna Requirement	15.203	6.1	Compliant	Unit has an internal PCB antenna.
Radiated Field Strength of Fundamental	15.249 (a),(c)	6.2	Compliant	
Radiated Field Strength of Harmonics	15.249 (a),(c)	6.3	Compliant	
Fixed, Point-to-Point Operation	15.249 (b)	---	Not Required	
Band Edge Measurements	15.249 (d) 15.209	6.4	Compliant	
Spurious Radiated Emissions	15.249 (d), 15.209	6.5	Compliant	
Occupied Bandwidth	ANSI C63.4 § 13.1.7	6.6	Compliant	
99% Bandwidth	IC RSS-GEN	6.7	Compliant	
Conducted Emissions	15.207	N/A	Not Required	DUT uses batteries only.
Public Exposure to Radio Frequency Energy Levels	1.1307 (b) (1)	6.9	Compliant	

6. Measurement Data

6.1. Antenna Requirement (Section 15.203)

Requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

Status: The unit under test employs a permanent, non-user accessible PCB antenna.

6.2. Radiated Field Strength of Fundamental (15.249, Section (a), (c)), IC RSS-210 A2.9

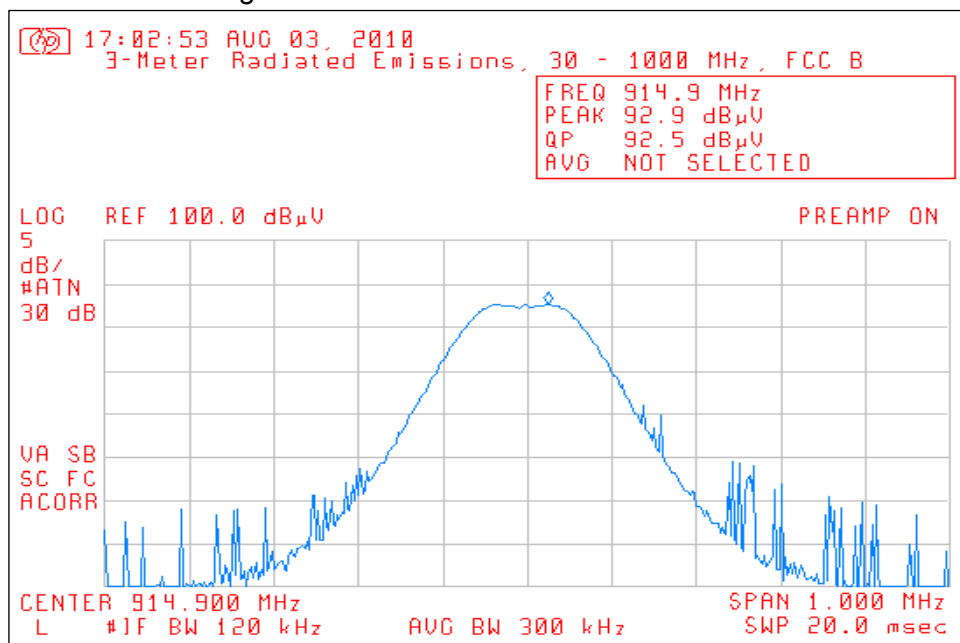
Requirement: The 3 meter field strength of the fundamental emissions from intentional radiators operated within the 902-928 MHz frequency bands shall comply with the following requirement: 50 millivolts/meter (94 dB μ V/m), quasi-peak mode measurement.

Site Temperature: 22.4°C Site Humidity: 31% RH

Chan.	Freq.	Amplitude ¹ (dB μ V/m)		Limit (dB μ V/m)		Quasi-Peak Margin	Ant Polarity	Ant Height	Turntable Azimuth
		Peak	Quasi-Peak	Peak	Quasi-Peak				
Low	914.900	92.90	92.50	114	94	-1.50	H	100	180
Mid	920.650	93.20	92.90	114	94	-1.10	H	100	180
High	922.270	93.10	92.80	114	94	-1.20	H	100	194

¹ All correction factors are included in the measurement values

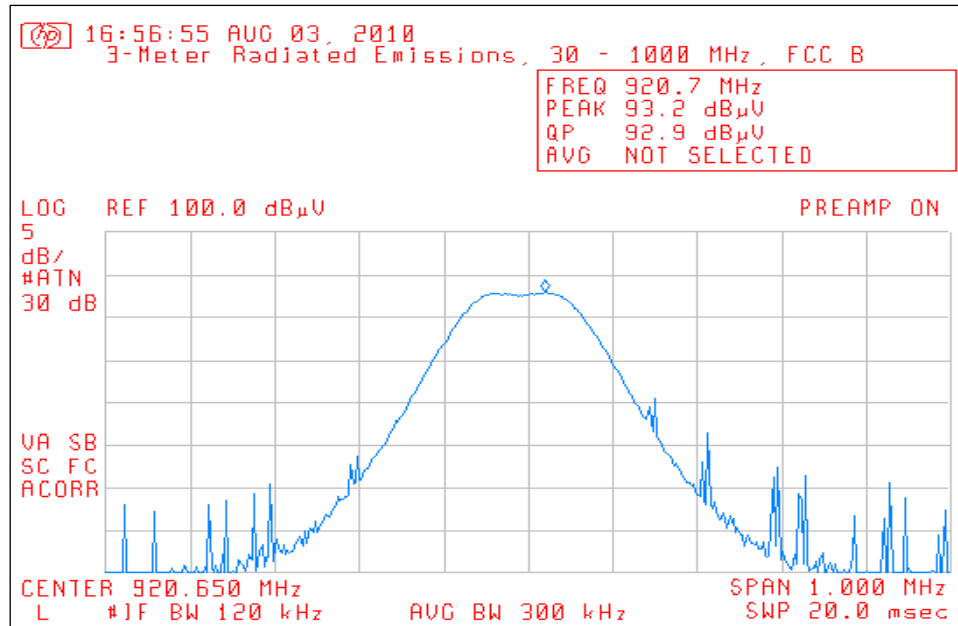
6.2.1. Radiated Field Strength of Fundamental – Low Channel



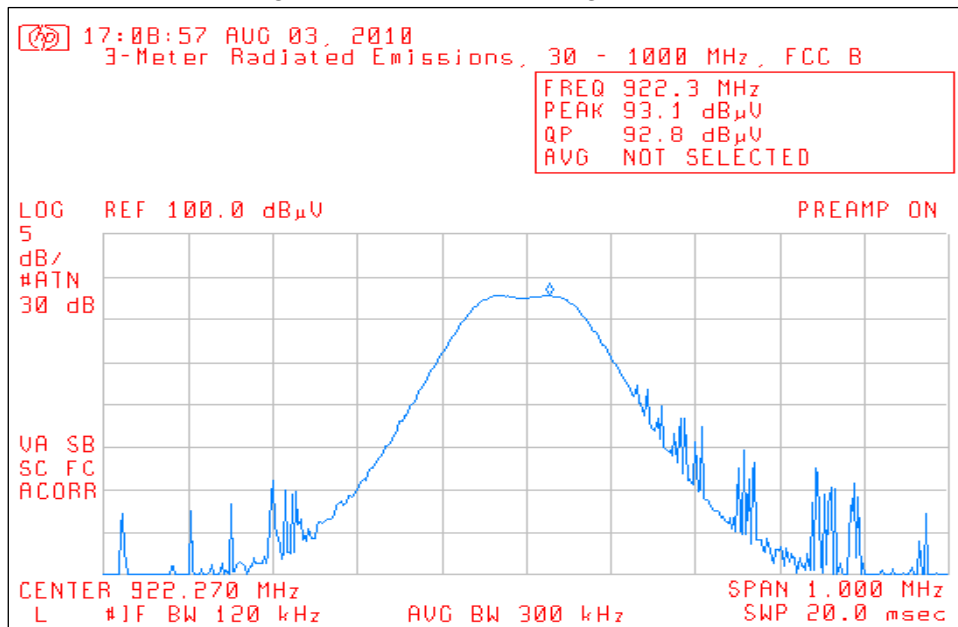
6. Measurement Data (continued)

6.2. Radiated Field Strength of Fundamental (15.249, Section (a)), IC RSS-210 A2.9

6.2.2. Radiated Field Strength of Fundamental – Middle Channel



6.2.3. Radiated Field Strength of Fundamental – High Channel



6. Measurement Data (continued)

6.3. Radiated Field Strength of Harmonics (15.249, Section (a)), IC RSS-210 A2.9

Requirement: The 3 meter field strength of the harmonic emissions from intentional radiators operated within the 902-928 MHz frequency bands shall comply with the following: 500 microvolts/meter (54 dB μ V/m), average mode measurement. Peak field strength may not be greater than 20 dB above the average limit (74 dB μ V/m).

Test Note: The harmonic emissions tabled in this section represent the absolute worst case emissions from the three orthogonal axes tested. Refer to section 4.3 for additional information.

6.3.1. Low Frequency

Fundamental Frequency (MHz)	Harmonic	Field Strength (dB μ V/m)		Limit (dB μ V/m)		Margin (dB μ V/m)		Ant Pol (H/V)	Antenna Height (cm)	Turntable Position (deg)
		Peak	Average	Peak	Average	Peak	Average			
914.900	1829.800	51.84	48.99	74.00	54.00	-22.16	-5.01	V	100	268
	2744.700	42.95	30.50	74.00	54.00	-31.05	-23.50	H	100	0
	3659.600	43.68	33.80	74.00	54.00	-30.32	-20.20	V	125	355
	4574.500	47.78	33.53	74.00	54.00	-26.22	-20.47	H	100	0
	5489.400	53.85	49.49	74.00	54.00	-20.15	-4.51	V	136	355
	6404.300	48.64	36.22	74.00	54.00	-25.36	-17.78	V	100	0
	7319.200	50.59	38.97	74.00	54.00	-23.41	-15.03	V	100	0
	8234.100	51.68	39.46	74.00	54.00	-22.32	-14.54	H	100	0
9149.000	48.57	39.84	74.00	54.00	-25.43	-14.16	H	100	0	

6.3.2. Middle Frequency

Fundamental Frequency (MHz)	Harmonic	Field Strength (dB μ V/m)		Limit (dB μ V/m)		Margin (dB μ V/m)		Ant Pol (H/V)	Antenna Height (cm)	Turntable Position (deg)
		Peak	Average	Peak	Average	Peak	Average			
920.650	1841.300	51.04	48.56	74.00	54.00	-22.96	-5.44	V	100	268
	2761.950	43.87	31.55	74.00	54.00	-30.13	-22.45	H	100	0
	3682.600	44.42	31.83	74.00	54.00	-29.58	-22.17	H	100	0
	4603.250	46.96	34.48	74.00	54.00	-27.04	-19.52	H	100	0
	5523.900	54.75	50.24	74.00	54.00	-19.25	-3.76	H	129	0
	6444.550	48.97	36.45	74.00	54.00	-25.03	-17.55	H	100	0
	7365.200	51.56	38.92	74.00	54.00	-22.44	-15.08	H	100	0
	8285.850	52.28	40.12	74.00	54.00	-21.72	-13.88	H	100	0
	9206.500	52.97	39.84	74.00	54.00	-21.03	-14.16	H	100	180

6. Measurement Data (continued)

6.3. Radiated Field Strength of Harmonics (15.249, Section (a)), IC RSS-210 A2.9

6.3.3. High Frequency

Fundamental Frequency (MHz)	Harmonic	Field Strength (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Ant Pol (H/V)	Antenna Height (cm)	Turntable Position (deg)
		Peak	Average	Peak	Average	Peak	Average			
922.270	1844.540	51.32	48.84	74.00	54.00	-22.68	-5.16	V	100	254
	2766.810	42.70	30.55	74.00	54.00	-31.30	-23.45	H	100	0
	3689.080	45.36	33.69	74.00	54.00	-28.64	-20.31	V	135	0
	4611.350	45.10	34.09	74.00	54.00	-28.90	-19.91	V	120	270
	5533.620	55.45	51.52	74.00	54.00	-18.55	-2.48	V	123	355
	6455.890	49.19	36.12	74.00	54.00	-24.81	-17.88	H	107	0
	7378.160	50.24	41.20	74.00	54.00	-23.76	-12.80	V	109	10
	8300.430	51.86	39.50	74.00	54.00	-22.14	-14.50	H	100	0
	9222.700	50.85	39.98	74.00	54.00	-23.15	-14.02	H	125	0

6.4. Band Edge Measurements

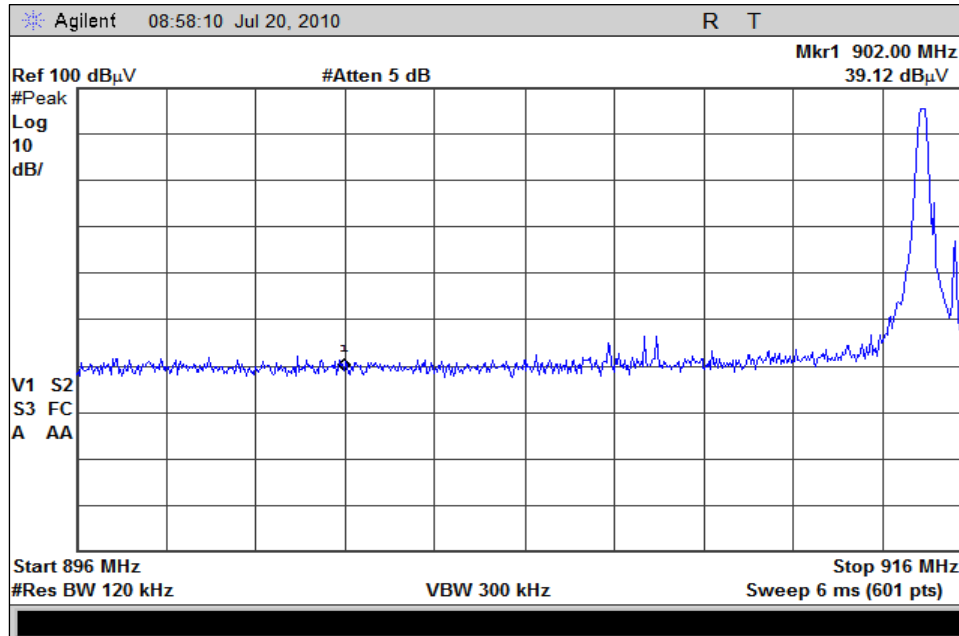
Requirement: Emissions radiated outside of the specified frequency band of 902 MHz to 928 MHz, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Frequency	Band Edge (dBµV/m)			Limit (dBµV/m)	Margin (dB)	Result
	Freq MHz	Peak	Q-Peak	Q-Peak		
914.900	902	39.12	37.73	46.0	-8.3	Compliant
922.270	928	40.83	37.85	46.0	-8.2	Compliant

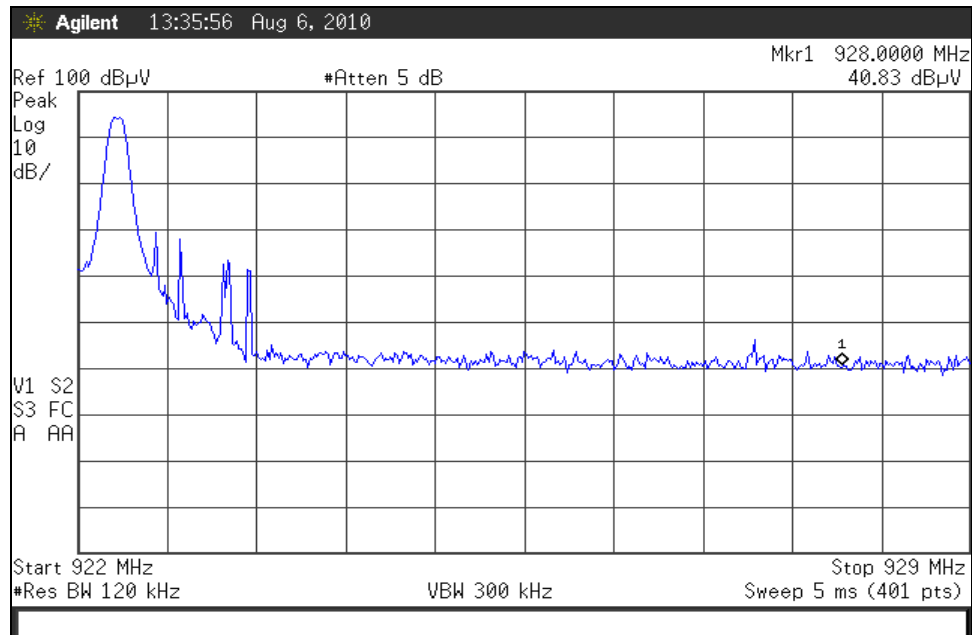
6. Measurement Data (continued)

6.4. Band Edge Measurements

6.4.1. Band Edge Measurements - Lower Band Edge



6.4.2. Band Edge Measurements - Upper Band Edge



6. Measurement Data (continued)

6.5. Spurious Radiated Emissions, 30 MHz to EUT 10th Harmonic (15.249, Section (d)), IC RSS-GEN

Requirement: Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test Note: The spurious emissions detailed in this section represent the combined worst case emissions of the low, middle and high operating frequencies.

6.5.1. Regulatory Limit: FCC Part 209, Quasi-Peak

Frequency Range (MHz)	Distance (Meters)	Limit (dB μ V/m)
30 to 88	3	40.0
88 to 216	3	43.5
216 to 960	3	46.0
Above 960	3	54.0

6.5.2. Test Results, 30 MHz to 1 GHz

Freq. (MHz)	Pk Amp ¹ (dB μ V/m)	QP Amp ¹ (dB μ V/m)	QP Limit (dB μ V/m)	Margin (dB)	Ant Pol (H/V)	Ant Ht (cm)	Table (Deg)	Comments ²
745.9	33.20	31.00	46.0	-15.00	V	155	138	LF/Pos 2
758.9	34.20	31.60	46.0	-14.40	V	159	204	LF/Pos 2
810.9	40.70	39.80	46.0	-6.20	V	136	124	LF/Pos 2
862.9	44.00	42.50	46.0	-3.50	V	100	0	LF/Pos 2
764.6	34.40	31.70	46.0	-14.30	V	150	138	MF/Pos 2
790.6	41.80	28.80	46.0	-17.20	V	135	204	MF/Pos 2
816.6	41.70	39.70	46.0	-6.30	V	130	178	MF/Pos 2
868.6	38.30	35.70	46.0	-10.30	V	127	310	MF/Pos 2
714.3	30.10	27.60	46.0	-18.40	V	101	134	HF/Pos 2
766.3	32.60	30.90	46.0	-15.10	V	157	154	HF/Pos 2
792.2	31.00	27.40	46.0	-18.60	V	147	330	HF/Pos 2
818.3	41.30	39.70	46.0	-6.30	V	135	164	HF/Pos 2
870.8	40.20	38.80	46.0	-7.20	V	119	138	HF/Pos 2

¹ Value includes all correction factors.

² LF, MF and HF refer to the transmit frequency. Pos X refers to the position of the DUT. For further information, see section 4.3.

6.5.3. Test Results, > 1 GHz

There were no measurable emissions above 1 GHz except the harmonic emissions detailed in section 6.3 of this test report.

6. Measurement Data (continued)

6.6 Occupied Bandwidth (ANSI C63.4, Section 13.1.7)

Requirement: The occupied bandwidth measurements on an intentional radiator shall be made in accordance with the requirements outlined in ANSI C63.4-2003, Section 13.1.7. If no bandwidth requirement is specified by the procuring or regulatory agency, measure the bandwidth at -26 dB with respect to the reference level.

Channel	Frequency (MHz)	-26 dB Bandwidth (MHz)	Result
Low	914.900	0.537	Compliant
Middle	920.650	0.528	Compliant
High	922.270	0.508	Compliant

6.7. 99% Bandwidth (RSS 210)

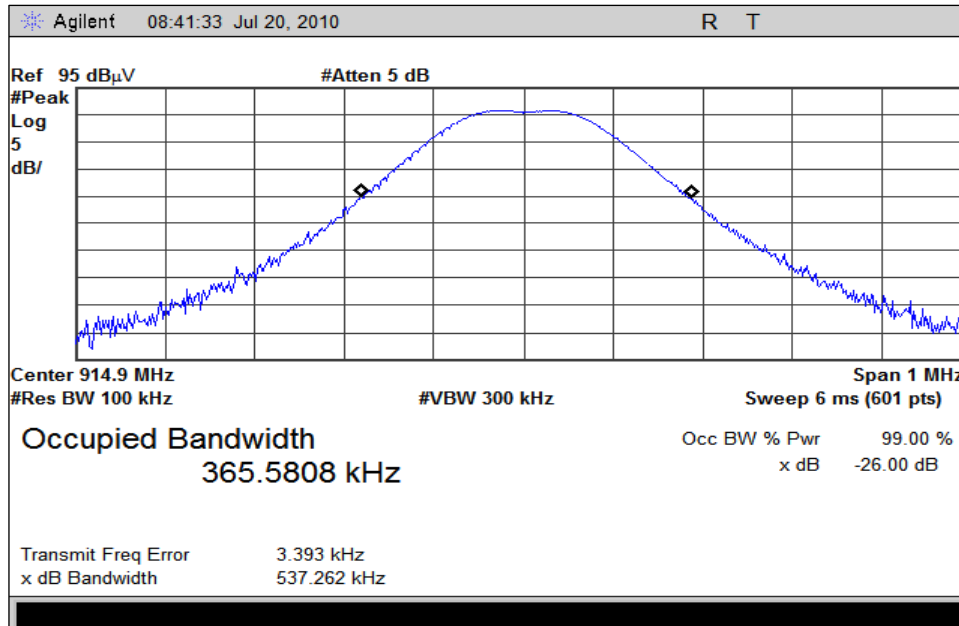
Requirement: The 99% bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

Channel	Channel Frequency	99% Power Bandwidth	Allowable Power Bandwidth	Result
	MHz	MHz	MHz	
Low	914.900	0.366	4.574	Compliant
Middle	920.650	0.357	4.603	Compliant
High	922.270	0.345	4.611	Compliant

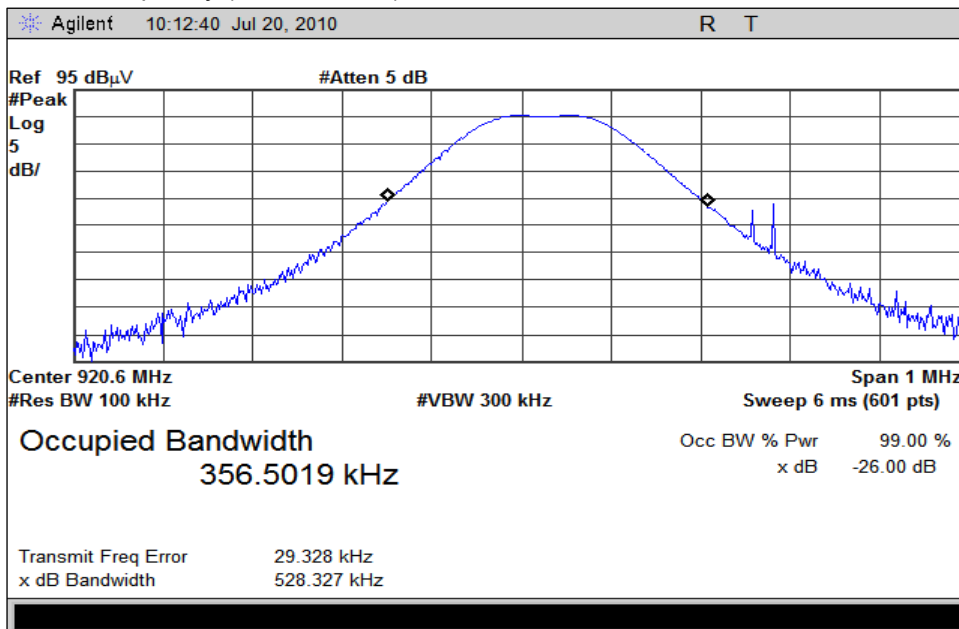
6. Measurement Data (continued)

6.8. Occupied (-26 dB) Bandwidth / 99% Bandwidth Plots

Low Frequency (914.880MHz)



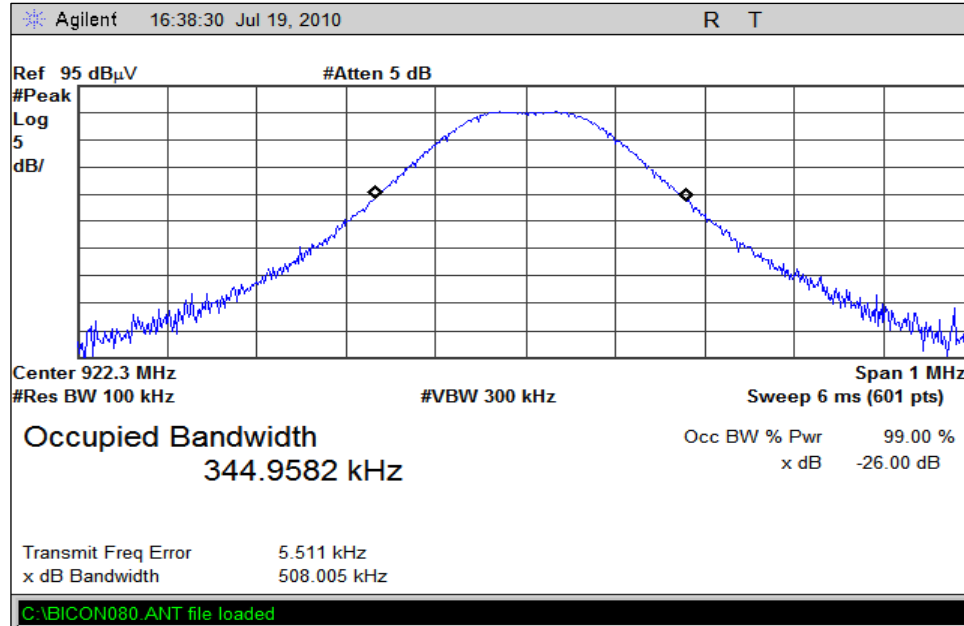
Middle Frequency (920.625 MHz)



6. Measurement Data (continued)

6.8. Occupied (-26 dB) Bandwidth / 99% Bandwidth Plots

High Frequency (922.270MHz)



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

6.9.1. Note: The following equation is used to determine the output power from the measured field strength:

$$P = \frac{(E \times d)^2}{(30 \times G)}$$

P = the power in Watts.

E = the measured maximum field in V/m

G = the numeric gain of the transmitting antenna over an isotropic radiator.

d = the distance in meters of the field strength measurement.

Channel	Frequency	Peak Field Strength	Distance	Antenna Gain ¹	Measured Output Power
	(MHz)	(dBμV/m)	(m)	(dBi)	(mW)
Low	914.900	92.90	3.0	-3.20	1.2221408
Mid	920.650	93.20	3.0	-3.20	1.3095475
High	922.270	93.10	3.0	-3.20	1.2797386

6. Measurement Data (continued)

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

6.9.2. Radio Frequency Energy Levels

Channel	Freq.	MPE Distance (cm)	DUT Output Power (dBm)	DUT Antenna Gain (dBi)	Power Density		Limit (mW/cm2)	Result
					(mW/cm2)	(W/m2)		
					(4)			
1	914.900	20	0.87	-3.20	0.0001164	0.0011637	1	Compliant
0	920.650	20	1.17	-3.20	0.0001247	0.0012470	1	Compliant
2	922.270	20	1.07	-3.20	0.0001219	0.0012186	1	Compliant

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

PD = Power Density (mW/cm2)

OP = DUT Output Power (dBm)

AG = DUT Antenna Gain (dBi)

d = MPE Distance (cm)

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 20 centimeters of the body of the user.
2. Sections 6.4 of this test report.
3. Data provided by the product manufacturer.
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.

7. Test Site Description

Compliance Worldwide is located at 357 Main Street in Sandown, New Hampshire. The test sites at Compliance Worldwide are used for conducted and radiated emissions testing in accordance with Federal Communications Commission (FCC) and Industry Canada standards. A description of the test sites is on file with the FCC (registration number **96392**) and Industry Canada (file number **IC 3023A-1**).

The radiated emissions test site is a 3 and 10 meter enclosed open area test site (OATS). Personnel, support equipment and test equipment are located in the basement beneath the OATS ground plane.

The conducted emissions site is part of a 16' x 20' x 12' ferrite tile chamber and uses one of the walls for the vertical ground plane required by EN 55022.

Both sites are designed to test products or systems 1.5 meter W x 1.5 meter L x 2.0 meter H, floor standing or table top.