

Table of Contents

Report Cover Page	1
Table of Contents	2
Figures	3
1. GENERAL INFORMATION	4
1.1 Verification of Compliance	4
1.2 Equipment Modifications.....	5
1.3 Product Information	6
1.4 Test Methodology	6
1.5 Test Facility	6
1.6 Test Equipment	7
1.7 Statement for the Document Use.....	7
2. PRODUCT LABELING.....	8
3. SYSTEM TEST CONFIGURATION.....	9
3.1 Justification	9
3.2 Special Accessories	9
3.3 Configuration of Tested System.....	9
4. SYSTEM SCHEMATICS	14
5. RADIATED EMISSION DATA	15
5.1 Field Strength Calculation	15
5.2 Test Methods and Conditions	15
5.3 Test Data	15
6. EUT RECEIVING MODE VERIFICATION	24
7. PHOTOS OF TESTED EUT	25

Figures

Figure 2.1 FCC ID Label.....	8
Figure 2.2 Location of Label on Back of the EUT.....	8
Figure 3.1 Radiated Test Setup, Position 1	10
Figure 3.2 Radiated Test Setup, Position 2	11
Figure 3.3 Radiated Test Setup, Position 3	12
Figure 3.4 Radiated Test Setup.....	13
Figure 4.1 EUT Schematics.....	14
Figure 7.1 Front View	26
Figure 7.2 Back View	27
Figure 7.3 Rear Cover Removed _ Inside View.....	28
Figure 7.4 Battery Removed _ Inside View	29
Figure 7.5 900MHz PCB & 2.4GHz PCB Connection	30
Figure 7.6 PCB 2.4GHz Component Side View	31
Figure 7.7 PCB 2.4GHz Foil Side View	32
Figure 7.8 PCB 900MHz Component Side View.....	33
Figure 7.9 PCB_900MHz Rear Side View	34

1. GENERAL INFORMATION

1.1 Verification of Compliance

EUT: MULTI-MODE PATIENT TAG

Model: ITD-762

Applicant: CENTRAK, INC.

Test Type: FCC Part 15C Sec. 15.249 CERTIFICATION

Result: PASS

Tested by: ADVANCED COMPLIANCE LABORATORY

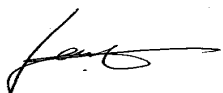
Test Date: September 17, 2012

Report Number: 0048-120904-01

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC rules and regulations Part 15 subpart C. This said equipment in the configuration described in the report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)	Uncertainty(dB)
		30-1000MHz	1-6.5GHz	Conducted
Combined Std. Uncertainty u_c	norm.	± 2.36	± 2.99	± 1.83



Wei Li
 Lab Manager
 Advanced Compliance Lab

Date September 17, 2012

1.2 Equipment Modifications

N/A

1.3 Product Information

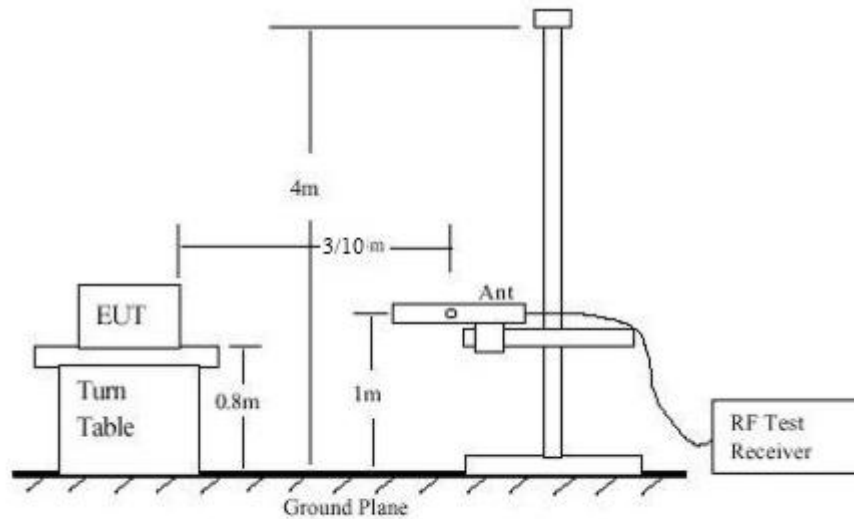
System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	MULTI-MODE PATIENT TAG (1)	ST2-DM762	
Housing	PLASTICS		
Power Supply	3V DC Battery		
Operation Freq.	904MHz ~ 926MHz , 2412MHz ~ 2462MHz		
Receiver	2X762(RX)	Verification	

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2003 at an antenna to EUT distance of 3 /10 meters.



Radiated Emission Measurement

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated and conducted data are located at Hillsborough, New Jersey. This site has been accepted by FCC to perform measurements under Part 15 or 18 in a letter dated May 19, 1997 (Refer to: 31040/PRV 1300F2). The NVLAP Lab code for accreditation of FCC EMC Test Method is: 200101-0.

1.6 Test Equipment

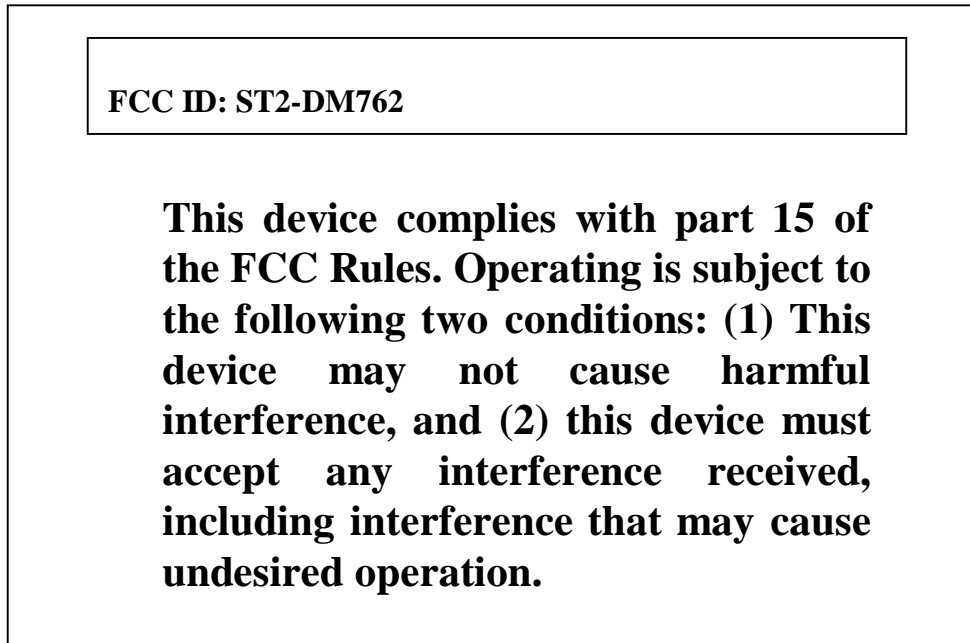
Manufacture	Model	Serial No.	Description	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	15/10/12
Agilent	E4440A	US40420700	3Hz-26.5GHz Spectrum Analyzer	25/8/13
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/13
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/13
ARA	MWH-1826/B	1013	18-26GHZ Horn Antena	10/2/2013
EMCO	3115	4945	Double Ridge Guide Horn Antenna	22/01/13
Electro-Meterics	ALR-25M/30	289	10KHz-30MHz Active Loop Antenna	28/05/13
Fischer Custom	LISN-1	900-4-0008	Line Impedance Stabilization Networks	18/03/13
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	24/03/13

All Test Equipment Used are Calibrated Traceable to NIST Standards.

1.7 Statement for the Document Use

This report shall not be reproduced except in full, without the written approval of the laboratory. And this report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

2. PRODUCT LABELING



**Figure 2.1 FCC ID Label
(Only FCC ID shown on EUT)**

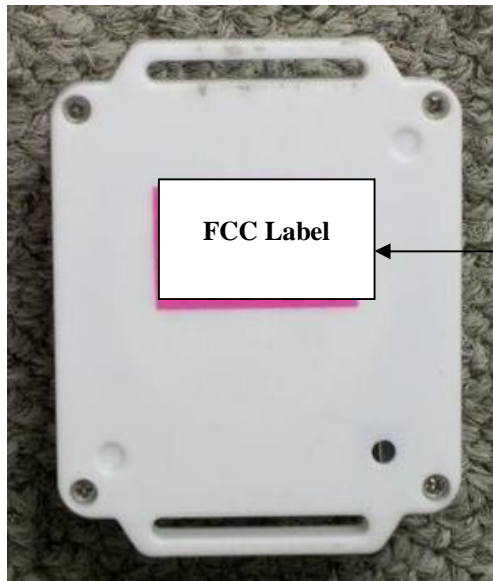


Figure 2.2 FCC Label Location

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). And its antenna was permanently attached to the EUT: wire type (max length 3”) for 900MHz band & stripe line antenna for 2.4GHz Band.

Testing was performed as EUT was continuously operated at the following frequency channels:

Low=904MHz, Middle= 915MHz, High=926MHz and
Low=2412MHz, Middle= 2437MHz, High=2462MHz

Fresh external battery was used for extended operating time.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

Figure 3.1 to Figure 3.4 illustrate this system, which is tested standing along.



Figure 3.1 Radiated Test Setup, position 1



Figure 3.2 Radiated Test Setup, position 2



Figure 3.3 Radiated Test Setup, position 3





Figure 3.4 Radiated Test Setup

4. SYSTEM SCHEMATICS

See Attachment.

Figure 4.1 System Schematics

5. RADIATED EMISSION DATA

5.1 Field Strength Calculation

The corrected field strength is automatically calculated by EMI Receiver using following:

$$FS = RA + AF + CF + AG$$

where FS: Corrected Field Strength in dB μ V/m

RA: Amplitude of EMI Receiver before correction in dB μ V

AF: Antenna Factor in dB/m

CF: Cable Attenuation Factor in dB

AG: Built-in Preamplifier Gain in dB (Stored in receiver as part of the calibration data)

THE "DUTY CYCLE CORRECTION FACTOR" FOR SPURIOUS RADIATED EMISSIONS IS;
 $20 \log * (4 \text{ ms} / 100 \text{ ms}) = -28 \text{ dB}$, WHICH WAS USED TO CORRECT THE AVERAGE RADIATED EMISSION READINGS.

5.2 Test Methods and Conditions

The initial step in collecting radiated data is a EMI Receiver scan of the measurement range below 30MHz using peak detector and 9KHz IF bandwidth / 30KHz video bandwidth. For the range 30MHz - 1GHz, 100KHz IF bandwidth / 100KHz video bandwidth are used. Both bandwidths are 1MHz for above 1GHz measurement. The radio spectrum was investigated from the lowest frequency generated within the device (without going below 9 kHz) up to the 10th harmonic of the rated transmitted emission.

5.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 5.1.

Test Personnel:



Typed/Printed Name: Edward Lee

Date: September 17, 2012

Radiated Test Data (CH-904MHz/915MHz/926MHz & Harmonics)

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
904	V/X	1.2	315	82.14	54.14	94	-39.86
1808	V/X	1.1	270	46.54	18.54	54	-35.46
2712	V/X	1.1	045	57.74	29.74	54	-24.26
904	H/X	1.2	045	89.34	61.34	94	-32.66
1808	H/X	1.1	180	47.24	19.24	54	-34.76
2712	H/X	1.1	180	59.64	31.64	54	-22.36
915	V/X	1.2	330	81.95	53.95	94	-40.05
1830	V/X	1.1	270	47.85	19.85	54	-34.15
2745	V/X	1.1	045	60.25	32.25	54	-21.75
915	H/X	1.2	045	85.85	57.85	94	-36.15
1830	H/X	1.1	180	48.35	20.35	54	-33.65
2745	H/X	1.1	180	60.15	32.15	54	-21.85
926	V/X	1.2	000	84.31	56.31	94	-37.69
1852	V/X	1.1	090	59.81	31.81	54	-22.19
2778	V/X	1.1	135	50.41	22.41	54	-31.59
926	H/X	1.2	135	86.71	58.71	94	-35.29
1852	H/X	1.0	135	48.61	20.61	54	-33.39
2778	H/X	1.1	330	60.91	32.91	54	-21.09
904	V/Y	1.2	235	85.94	57.94	94	-36.06
1808	V/Y	1.1	265	46.34	18.34	54	-35.66
2712	V/Y	1.1	180	61.54	33.54	54	-20.46
904	H/Y	1.2	235	87.24	59.24	94	-34.76
1808	H/Y	1.1	330	46.84	18.84	54	-35.16
2712	H/Y	1.1	330	57.24	29.24	54	-24.76
915	V/Y	1.2	235	85.55	57.55	94	-36.45
1830	V/Y	1.1	270	48.65	20.65	54	-33.35
2745	V/Y	1.1	180	63.45	35.45	54	-18.55
915	H/Y	1.2	180	86.65	58.65	94	-35.35
1830	H/Y	1.1	180	48.15	20.15	54	-33.85
2745	H/Y	1.1	300	58.75	30.75	54	-23.25

926	V/Y	1.2	235	87.51	59.51	94	-34.49
1852	V/Y	1.1	270	51.11	23.11	54	-30.89
2778	V/Y	1.1	235	63.61	35.61	54	-18.39
926	H/Y	1.2	330	89.91	61.91	94	-32.09
1852	H/Y	1.1	225	48.01	20.01	54	-33.99
2778	H/Y	1.1	330	60.31	32.31	54	-21.69
904	V/Z	1.2	000	85.34	57.34	94	-36.66
1808	V/Z	1.1	090	46.54	18.54	54	-35.46
2712	V/Z	1.1	045	57.74	29.74	54	-24.26
904	H/Z	1.2	045	86.24	58.24	94	-35.76
1808	H/Z	1.1	180	46.74	18.74	54	-35.26
2712	H/Z	1.1	180	58.54	30.54	54	-23.46
915	V/Z	1.2	045	85.35	57.35	94	-36.65
1830	V/Z	1.1	045	48.25	20.25	54	-33.75
2745	V/Z	1.1	045	64.55	36.55	54	-17.45
915	H/Z	1.2	045	87.75	59.75	94	-34.25
1830	H/Z	1.1	225	46.65	18.65	54	-35.35
2745	H/Z	1.1	215	58.35	30.35	54	-23.65
926	V/Z	1.2	045	84.31	56.31	94	-37.69
1852	V/Z	1.1	270	50.61	22.61	54	-31.39
2778	V/Z	1.1	045	65.21	37.21	54	-16.79
926	H/Z	1.2	045	86.31	58.31	94	-35.69
1852	H/Z	1.1	135	48.91	20.91	54	-33.09
2778	H/Z	1.1	330	58.01	30.01	54	-23.99

(1) The limit for emissions within the 902-928MHz band is 50mV(94dB) per Sec. 15.249. The limit for its harmonics is 500uV (54dB). Other spurious emissions shall be lower than either its fundamental by 50dB or the limit defined in Sec. 15.209, whichever is higher.

(2) If each peak reading is less than the FCC average limit, it'll be not necessary to show the measured/ calculated average reading.

Radiated Test Data (CH-2412MHz/2437MHz/2462MHz & Harmonics)

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
2412	V/X	1.1	000	90.5	62.5	94	-31.5
4824	V/X	1.1	045	68.5	40.5	54	-13.5
2412	H/X	1.0	000	89.9	61.9	94	-32.1
4824	H/X	1.1	000	65.5	37.5	54	-16.5
2437	V/X	1.1	135	90.3	62.3	94	-31.7
4874	V/X	1.0	180	69.5	41.5	54	-12.5
2437	H/X	1.0	090	91.5	63.5	94	-30.5
4874	H/X	1.0	135	68.4	40.4	54	-13.6
2462	V/X	1.1	000	90.0	62	94	-32
4924	V/X	1.0	000	67.8	39.8	54	-14.2
2462	H/X	1.1	180	89.6	61.6	94	-32.4
4924	H/X	1.0	225	68.1	40.1	54	-13.9
2412	V/Y	1.1	090	89.4	61.4	94	-32.6
4824	V/Y	1.1	000	68.2	40.2	54	-13.8
2412	H/Y	1.1	000	93.5	65.5	94	-28.5
4824	H/Y	1.1	045	69.1	41.1	54	-12.9
2437	V/Y	1.1	090	90.3	62.3	94	-31.7
4874	V/Y	1.1	045	68.9	40.9	54	-13.1
2437	H/Y	1.0	000	93.7	65.7	94	-28.3
4874	H/Y	1.0	000	69.1	41.1	54	-12.9
2462	V/Y	1.1	045	90.8	62.8	94	-31.2
4924	V/Y	1.0	090	68.5	40.5	54	-13.5
2462	H/Y	1.1	000	88.5	60.5	94	-33.5
4924	H/Y	1.0	000	68.0	40.0	54	-14
2412	V/Z	1.1	000	95.0	67.0	94	-27
4824	V/Z	1.1	180	69.4	41.4	54	-12.6
2412	H/Z	1.1	000	89.2	61.2	94	-32.8
4824	H/Z	1.0	180	68.2	40.2	54	-13.8

2437	V/Z	1.1	135	90.7	62.7	94	-31.3
4874	V/Z	1.1	045	68.4	40.4	54	-13.6
2437	H/Z	1.1	000	93.1	65.1	94	-28.9
4874	H/Z	1.1	090	69.0	41.0	54	-13
2462	V/Z	1.1	000	93.6	65.6	94	-28.4
4924	V/Z	1.0	000	68.8	40.8	54	-13.2
2462	H/Z	1.1	180	89.0	61.0	94	-33
4924	H/Z	1.0	135	68.1	40.1	54	-13.9

The limit for emissions within the 2400-2483.5MHz band is 50mV(94dB) per Sec. 15.249. The limit for its harmonics is 500uV (54dB). Other spurious emissions shall be lower than either its fundamental by 50dB or the limit defined in Sec. 15.209, whichever is higher.

(2) If each peak reading is less than the FCC average limit, it'll be not necessary to show the measured/ calculated average reading.

Other Spurious outside of the band 902-928MHz

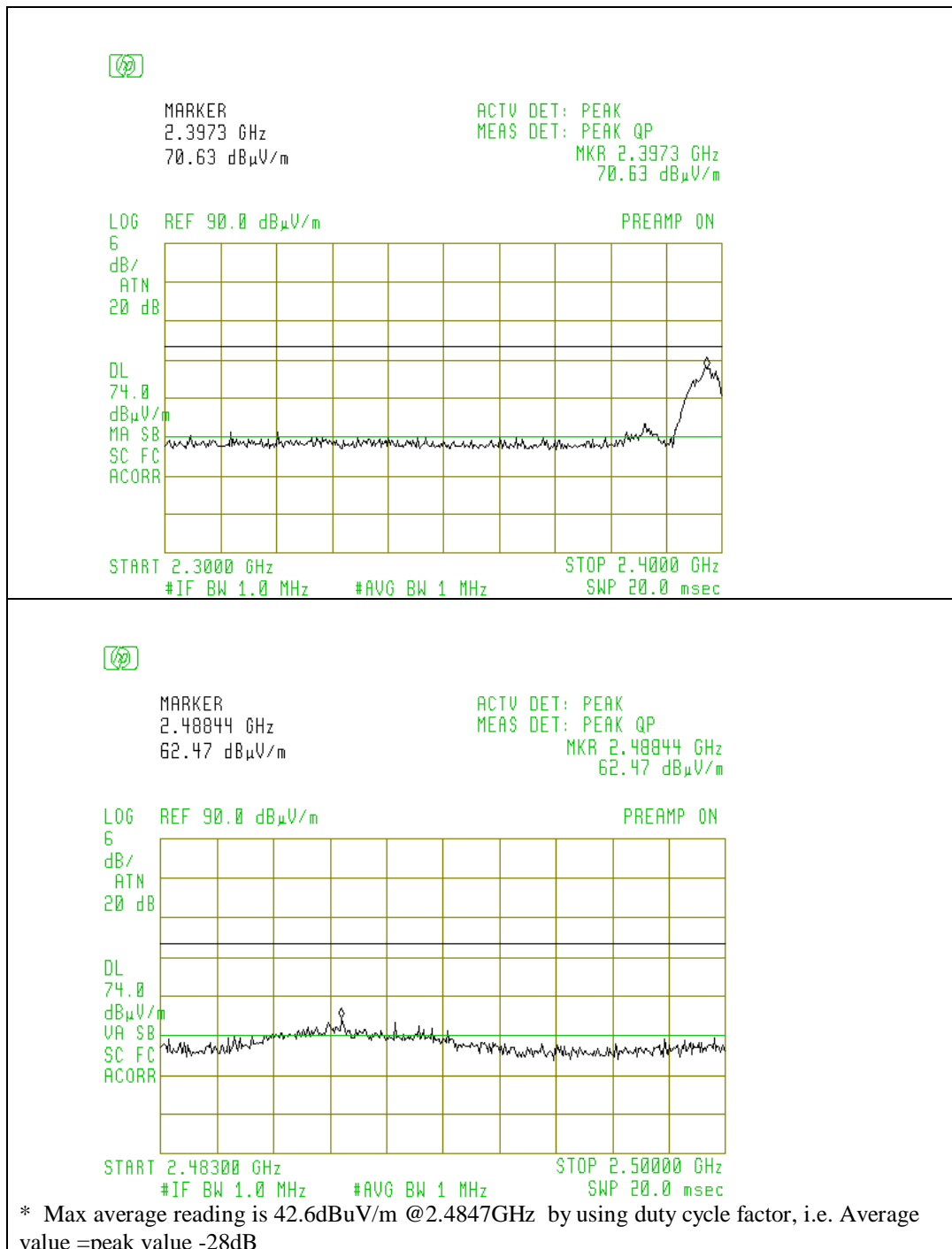
Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
574.5	V	1.1	250	36.7	46.5	-9.8
890.2	V	1.1	200	37.0	46.5	-9.5
928.5	V	1.0	180	36.6	46.5	-9.9
368.1	H	1.0	090	36.5	46.5	-10.0
328.5	H	1.0	100	35.8	46.5	-10.7

Other Spurious outside of the band 2400-2483.5MHz

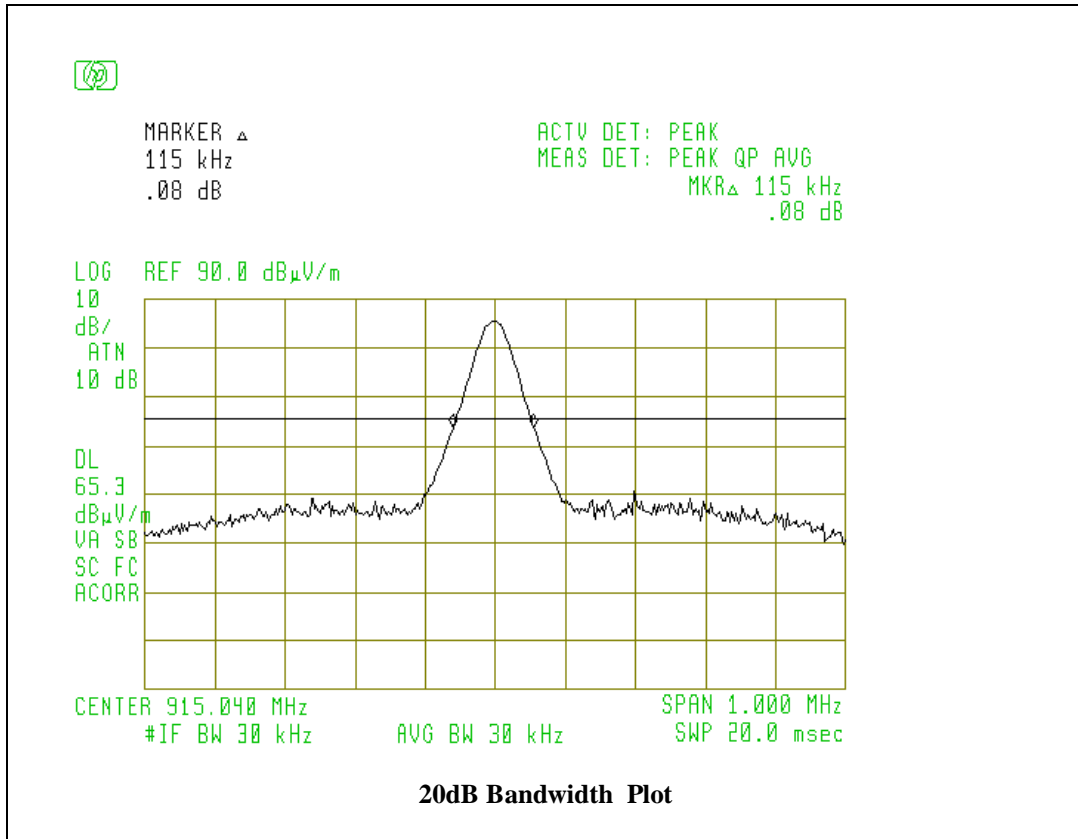
Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
1460.0	V	1.1	100	45.3	54.0	-8.7
1583.8	V	1.1	050	42.6	54.0	-11.4
1913.0	V	1.1	090	44.7	54.0	-9.3
1448.0	H	1.0	030	43.9	54.0	-10.1
1913.0	H	1.0	190	44.0	54.0	-10

Comparing to the limit defined in Sec. 15.209, emissions below the limit by 20dB were not recorded.

Band-edge spurious (Also meet peaking Limit)



20 dB Bandwidth : 900MHz Band



20 dB Bandwidth : 2400MHz Band

