FCC TEST REPORT

FCC ID	: WC2DS-955BT
Applicant	: Wonders Technology Co., Ltd.
Address	: Doss Industrial Zone, Qiping Kengdu Industrial ARE Guihua Village, Guanlan Town, Baoan District, Shenzhen, China.

Equipment Under Test (EUT) :

Product Name	: Wireless Speaker
Model No.	: DS-955B, ISP822B

Standards	: FCC CFR47 Part 15 Section 15.247:2009
Date of Test	: December 29, 2011 ~ January 17, 2012
Date of Issue	: January 31, 2012
Test Engineer	: Hunk yan / Engineer
Reviewed By	: Philo zhong / Manager

Test Result	**: PASS**

Prepared By:
Waltek Services (Shenzhen) Co., Ltd.
1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District,
Shenzhen 518105, China

Tel :+86-755-27553488
Fax:+86-755-27553868

✧ The sample detailed above has been tested to the requirements of Council Directives ANSI C63.4:2003. The test results have been reviewed against the Directives above and found to meet their essential requirements.

2 Test Summary

Test Items	Test Requirement	Result
Mains Terminal Disturbance Voltage, 150kHz to 30MHz	15.207(a)	PASS
Radiated Spurious Emissions (9kHz to 25GHz)	15.205(a) 15.209 15.247(d)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3)	PASS
Power Spectral Density	15.247(e)	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

3 Contents

4 General Information

4.1 Client Information

Applicant	: Wonders Technology Co., Ltd.
Address of Applicant	: Doss Industrial Zone, Qiping Kengdu Industrial ARE Guihua Village, Guanlan Town, Baoan District, Shenzhen, China.
Manufacturer	: Wonders Technology Co., Ltd.
Address of Manufacturer	: Doss Industrial Zone, Qiping Kengdu Industrial ARE Guihua Village, Guanlan Town, Baoan District, Shenzhen, China.

4.2 General Description of E.U.T.

Product Name	: Wireless Speaker
Model No.	: DS-955B, ISP822B
Difference Description	: Both models are exactly same, except for model number.

4.3 Details of E.U.T.

Technical Data	: Adapter Input: 100- 240VAC, 50/60Hz, 350mA Adapter Output: 5.0VDC, 2000mA
Operation Frequency	: 2403MHz ~ 2478MHz
Modulation Technique	: DSSS
Channel Number	: 26 Channels
Antenna Gain	: 0 dBi

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Wireless Speaker. The standards used were FCC CFR47 Part 15 Section 15.247, Section 15.209, Section 15.207 and Section 15.203.

4.6 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: IC7760A**
  Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A, August 3, 2010.

- **FCC – Registration No.: 880581**
  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, May 26, 2011.

4.7 Test Location

All the tests were performed at:
Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building, West Baima Rd.,Songgang Street, Baoan District, Shenzhen, China

5 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug. 2, 2011	Aug. 1, 2012	±1dB
Trilog Broadband Antenne	SCHWARZBECK MESS-ELEKTROM / VULB9163	336	W2008002	30-3000 MHz	Aug. 2, 2011	Aug. 1, 2012	±1dB
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM / BBHA 9120D(1201)	667	W2008003	1-18GHz	Aug. 2, 2011	Aug. 1, 2012	f < 10 GHz : ±1dB 10GHz < f < 18 GHz : ±1.5dB
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM / BBV 9718	9718-148	W2008004	0.5-18GHz	Aug. 2, 2011	Aug. 1, 2012	±1.2dB
10m Coaxial Cable with N-male Connectors	SCHWARZBECK MESS-ELEKTROM / AK 9515 H	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-
10m 50 Ohm Coaxial Cable	SCHWARZBECK MESS-ELEKTROM / AK 9513	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-
Positioning Controller	C&C LAB/ CC-C-IF	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-
Color Monitor	SUNSPO/ SP-14C	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-
Test Receiver	ROHDE&SCHWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug. 2, 2011	Aug. 1, 2012	±1dB
Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug. 2, 2011	Aug. 1, 2012	±10%
Active Loop Antenna	Beijing Dazhi / ZN30900A	-	-	-	Aug. 2, 2011	Aug. 1, 2012	±1dB
MP3 Player	Ipod Player/A1285	5K85004U3R0	-	-	Aug. 2, 2011	Aug. 1, 2012	±0.5dB

6 Conducted Emission

Test Requirement:	FCC CFR47 Part 15 Section 15.207
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz 56 dBμV between 0.5MHz & 5MHz 60 dBμV between 5MHz & 30MHz The tighter limit applies at the band edges.
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

EUT Operation :

Operating Environment:

Temperature: 25.5 °C
Humidity: 51 % RH
Atmospheric Pressure: 1012 mbar

EUT Operation:

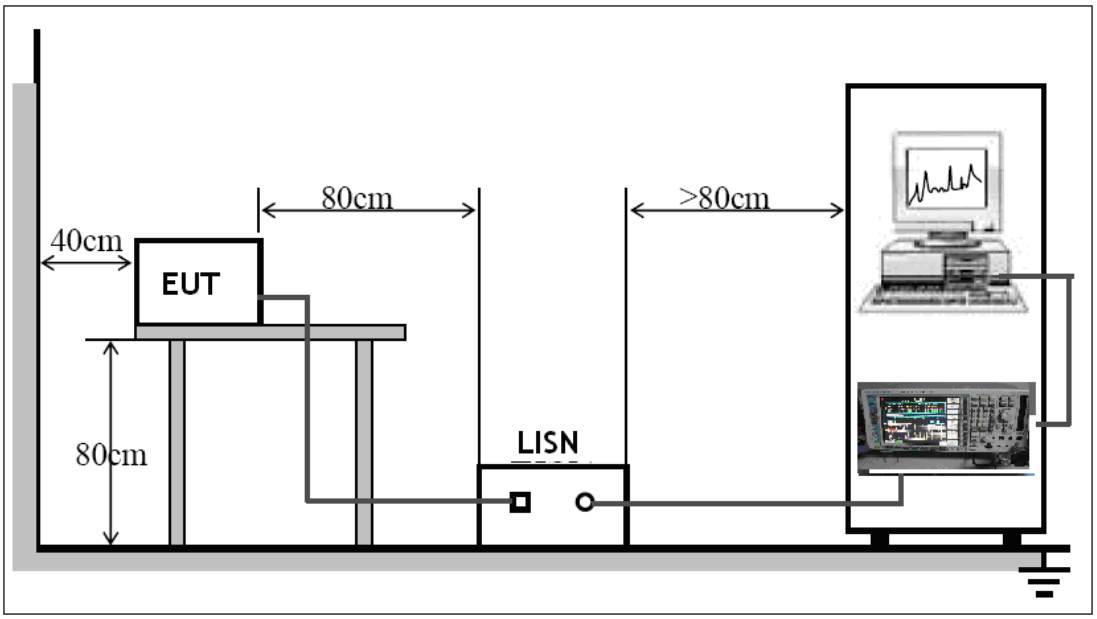
The EUT was tested in continuously transmit mode and normal linking mode. The worse mode is normal linking mode, thus the data show in the report is that mode's only.

The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC CFR47 Part 15 Section 15.207 limits.

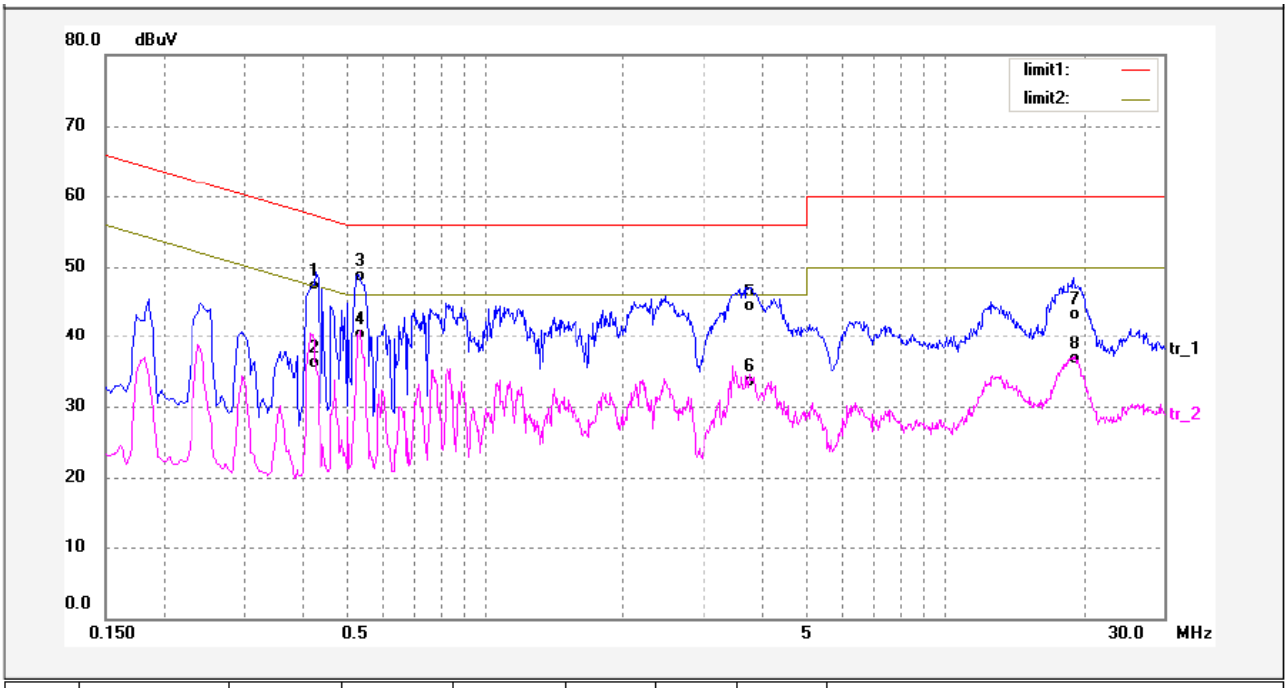


The EUT was placed on the test table in shielding room

Conducted Emission Test Result

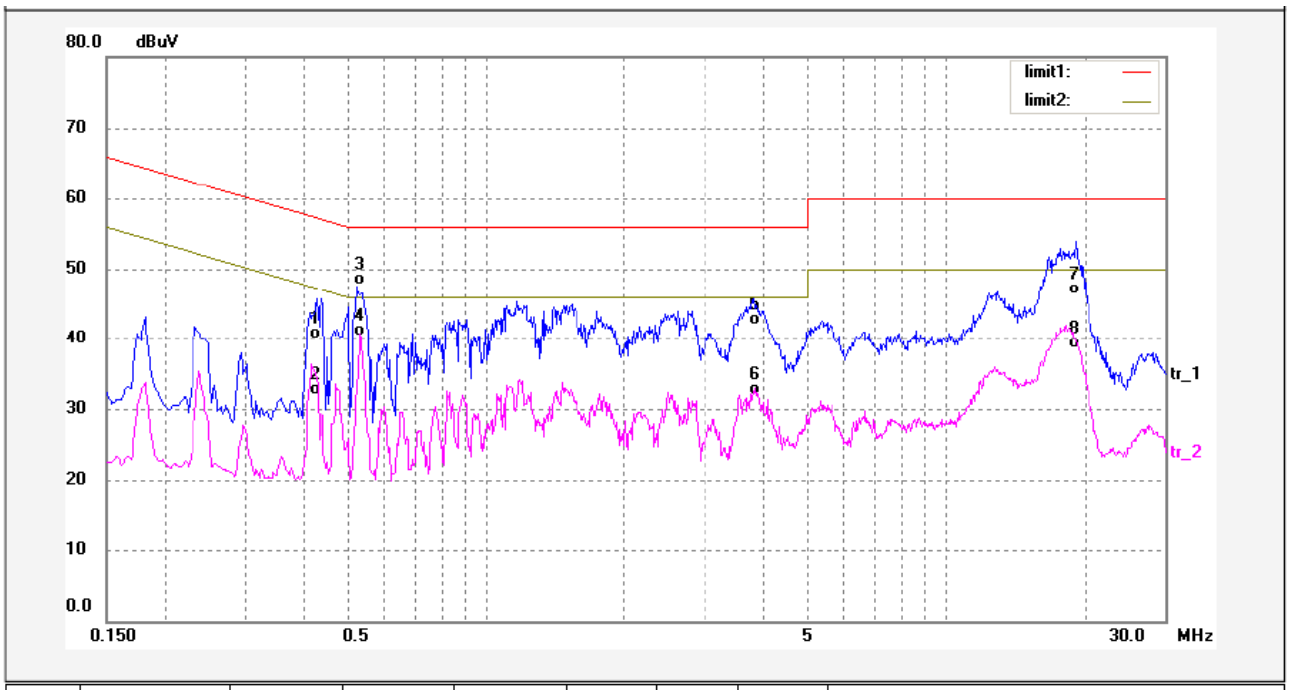
An initial pre-scan was performed on the live and neutral lines.

Live line:



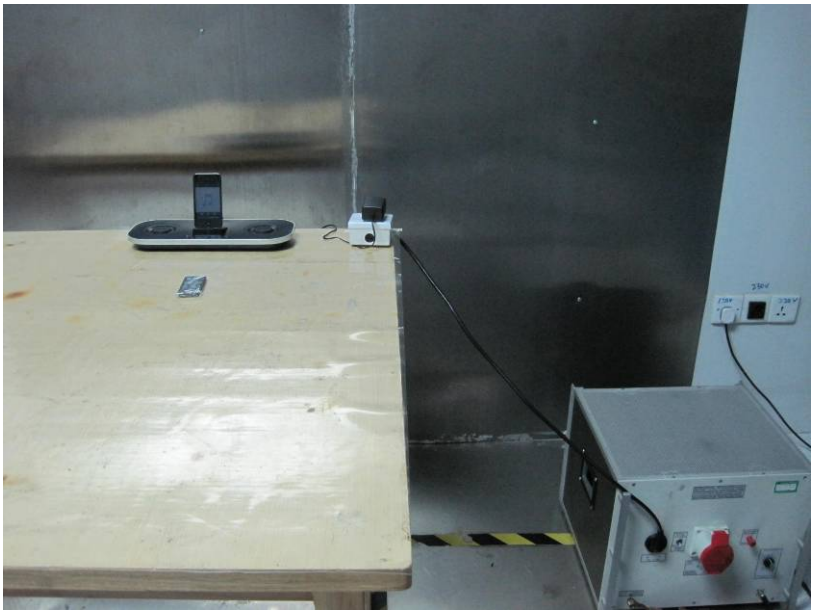
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4300	35.79	10.73	46.52	57.25	-10.73	QP	
2	0.4300	24.50	10.73	35.23	47.25	-12.02	AVG	
3	0.5299	36.22	11.63	47.85	56.00	-8.15	QP	
4	0.5299	27.92	11.63	39.55	46.00	-6.45	AVG	
5	3.7300	30.99	12.53	43.52	56.00	-12.48	QP	
6	3.7300	20.27	12.53	32.80	46.00	-13.20	AVG	
7	19.0700	30.13	12.27	42.40	60.00	-17.60	QP	
8	19.0700	23.63	12.27	35.90	50.00	-14.10	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4300	29.09	10.73	39.82	57.25	-17.43	QP	
2	0.4300	21.11	10.73	31.84	47.25	-15.41	AVG	
3	0.5260	36.03	11.66	47.69	56.00	-8.31	QP	
4	0.5260	28.69	11.66	40.35	46.00	-5.65	AVG	
5	3.8380	29.40	12.52	41.92	56.00	-14.08	QP	
6	3.8380	19.40	12.52	31.92	46.00	-14.08	AVG	
7	19.1660	34.13	12.27	46.40	60.00	-13.60	QP	
8	19.1660	26.23	12.27	38.50	50.00	-11.50	AVG	

Photograph – Conducted Emission Test Setup



7 Radiated Spurious Emissions

Test Requirement:	FCC CFR47 Part 15 Section 15.209 & 15.247
Test Method:	Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005
Test Result:	PASS
Frequency Range:	9kHz to 25GHz
Measurement Distance:	3m
15.209 Limit:	40.0 dBuV/m between 30MHz & 88MHz 43.5 dBuV/m between 88MHz & 216MHz 46.0 dBuV/m between 216MHz & 960MHz 54.0 dBuV/m above 960MHz
15.247 (d) Limit:	(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that Contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.
Test mode:	The EUT was tested in continuously Transmit mode.

EUT Operation :

Operating Environment:

Temperature: 25.5 °C
Humidity: 51 % RH
Atmospheric Pressure: 1012 mbar

Measurement Uncertainty

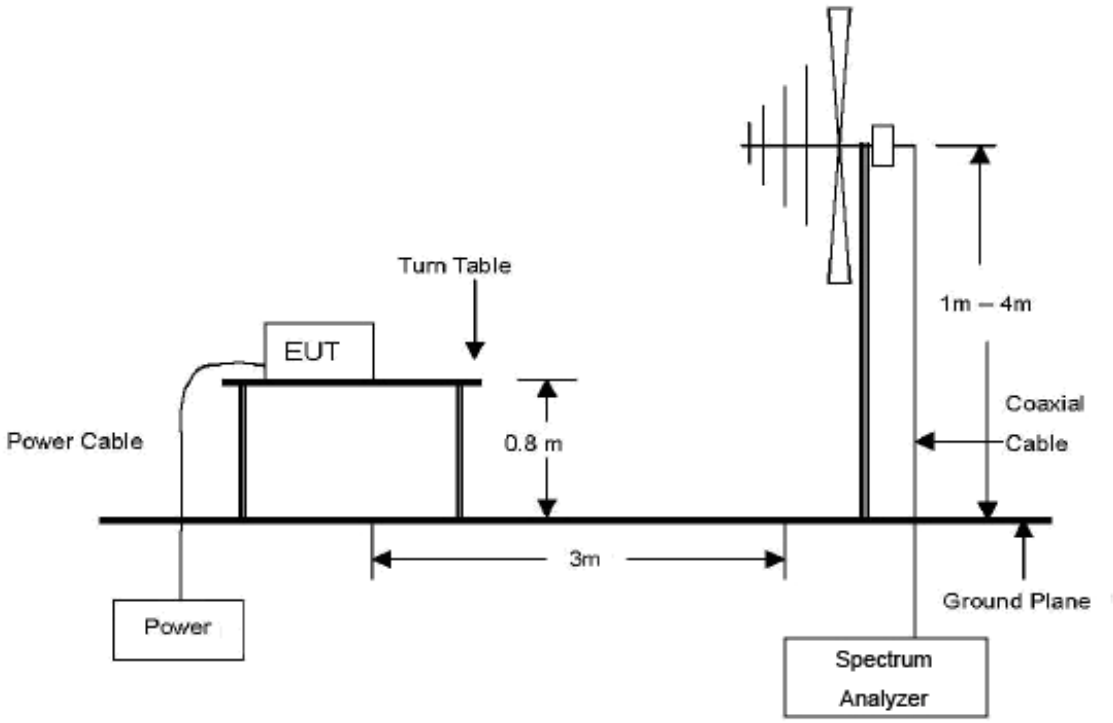
All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is $\pm$5.03dB.

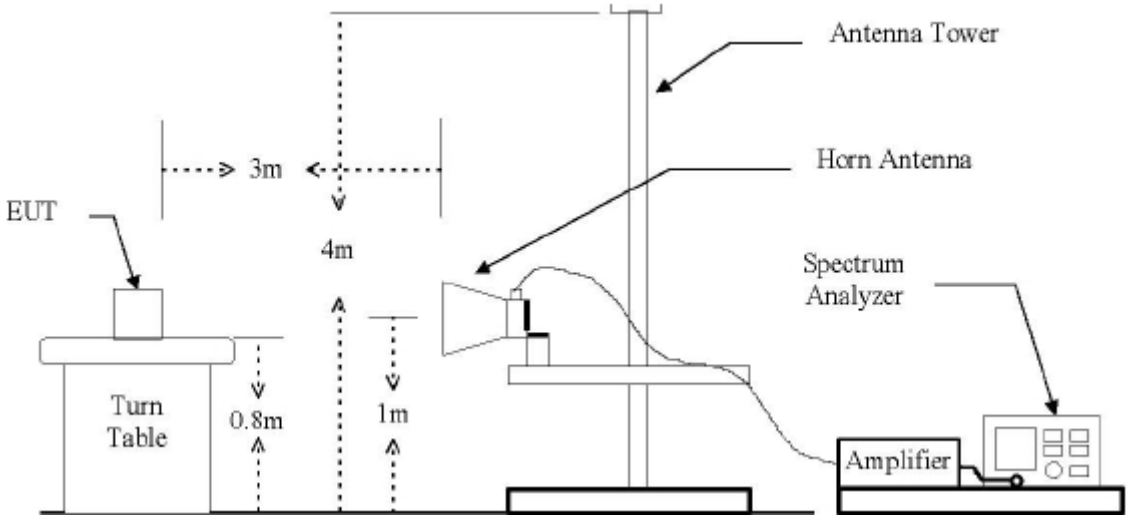
Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003.

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 25 GHz Emissions.



Spectrum Analyzer Setup

According to FCC Part15 Rules, the system was tested 9kHz to 25000MHz.

9kHz ~ 30MHz

Start Frequency	9kHz
Stop Frequency	30MHz
Sweep Speed	Auto
IF Bandwidth	10kHz
Video Bandwidth	10kHz
Resolution Bandwidth	10kHz

30MHz ~ 1GHz

Start Frequency	30 MHz
Stop Frequency	1000MHz
Sweep Speed	Auto
IF Bandwidth	120 KHz
Video Bandwidth	100KHz
Quasi-Peak Adapter Bandwidth	120 KHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	100KHz

Above 1GHz

Start Frequency	1000 MHz
Stop Frequency	25000MHz
Sweep Speed	Auto
IF Bandwidth	120 KHz
Video Bandwidth	3MHz
Quasi-Peak Adapter Bandwidth	120 KHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X(normal uses) axis positioning. And all the modes was tested in the report.Only the worst case is shown in the report.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

Summary of Test Results

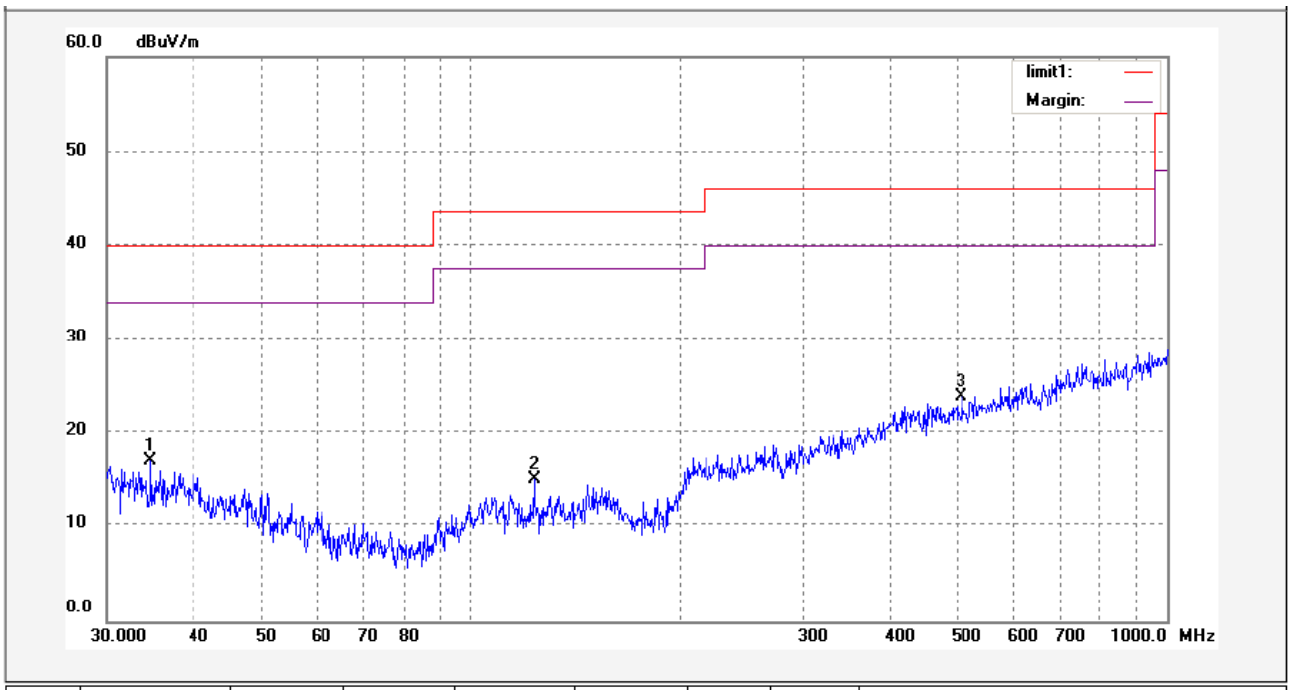
According to the data in this section, the EUT complied with the FCC CFR47 Part 15 Section 15.209 & 15.247 standards.

Test mode: continuously recevie mode

Remark: the EUT was pre-tested at the high, middle and low channel, and the worse case was the low Channel, so the data show was the low channel's only. Because the emissions below 30MHz are more than 20dB below the limit, the data is not show in the report.

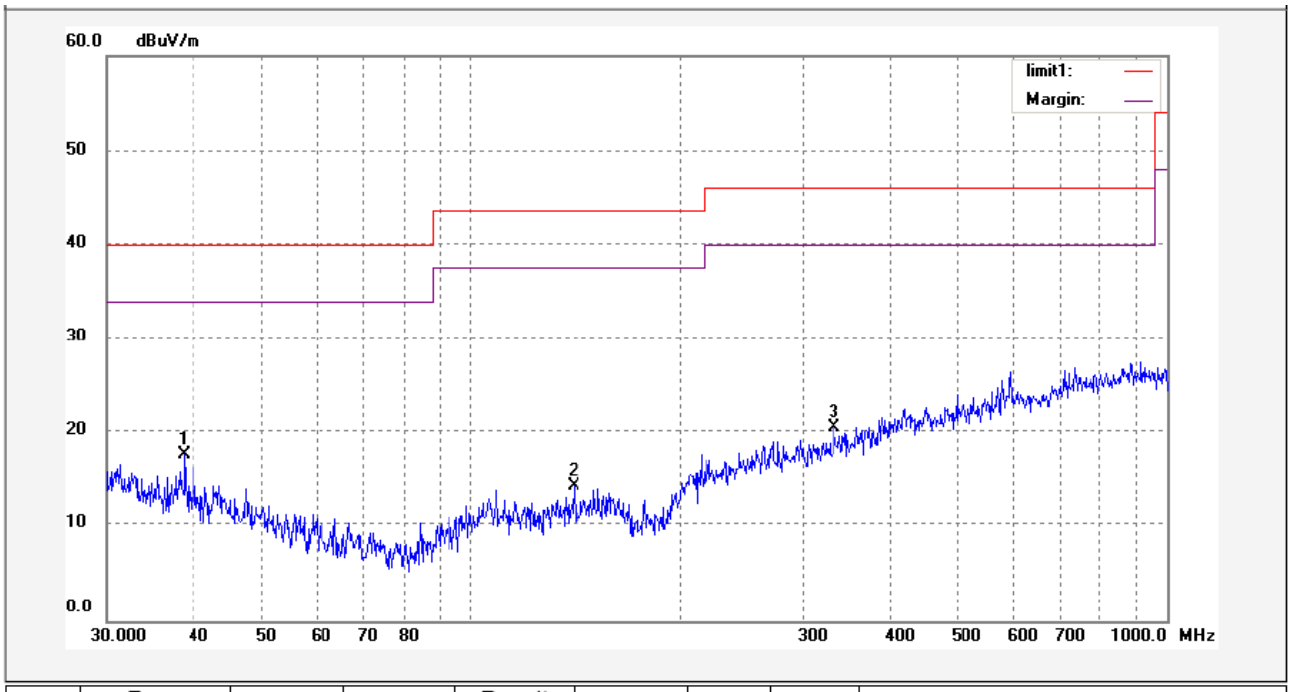
Test Frequency : 30MHz ~ 1000MHz

Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	34.6485	0.59	16.56	17.15	40.00	-22.85	peak	
2	123.1815	2.38	12.78	15.16	43.50	-28.34	peak	
3	507.5694	1.12	22.74	23.86	46.00	-22.14	peak	

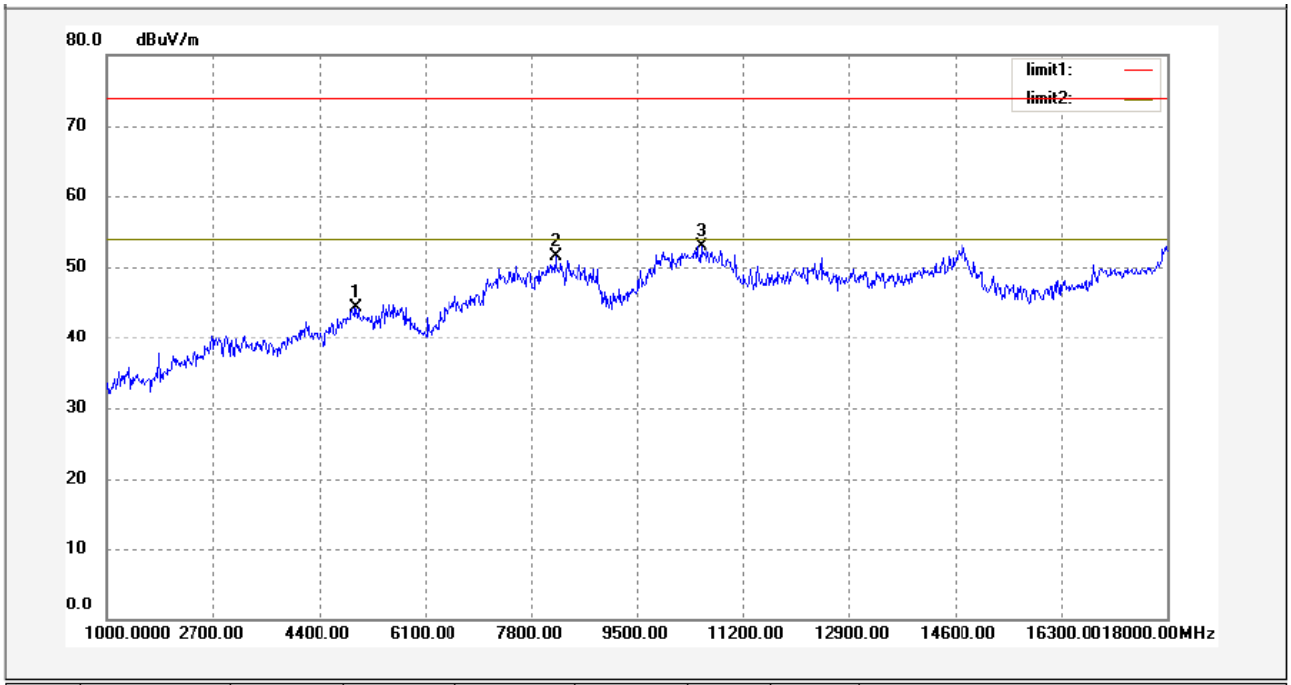
Antenna polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	38.7716	1.54	16.20	17.74	40.00	-22.26	peak	
2	140.7767	1.38	13.12	14.50	43.50	-29.00	peak	
3	332.9536	1.17	19.44	20.61	46.00	-25.39	peak	

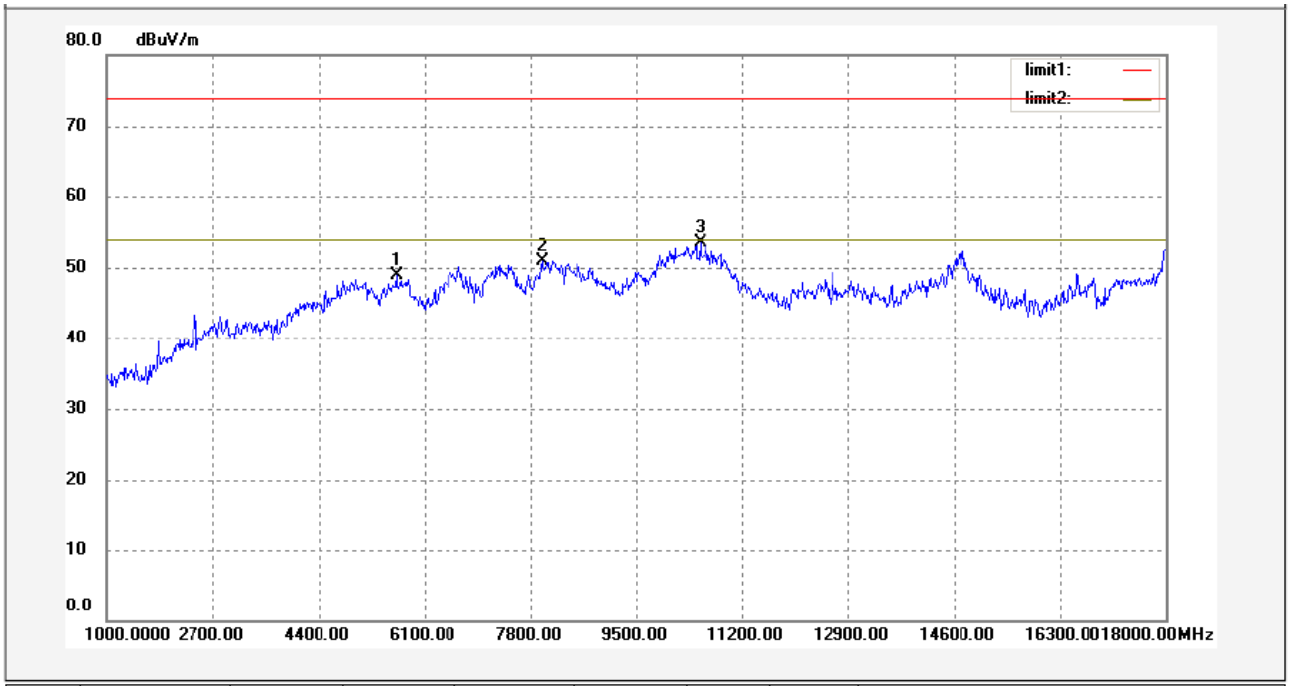
Test Frequency: Above 1GHz radiation test data:

Remark: No any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	4985.972	39.15	5.12	44.27	74.00	-29.73	peak	
2	8188.377	36.98	14.58	51.56	74.00	-22.44	peak	
3	10522.044	34.45	18.52	52.97	74.00	-21.03	peak	

Antenna polarization: Horizontal



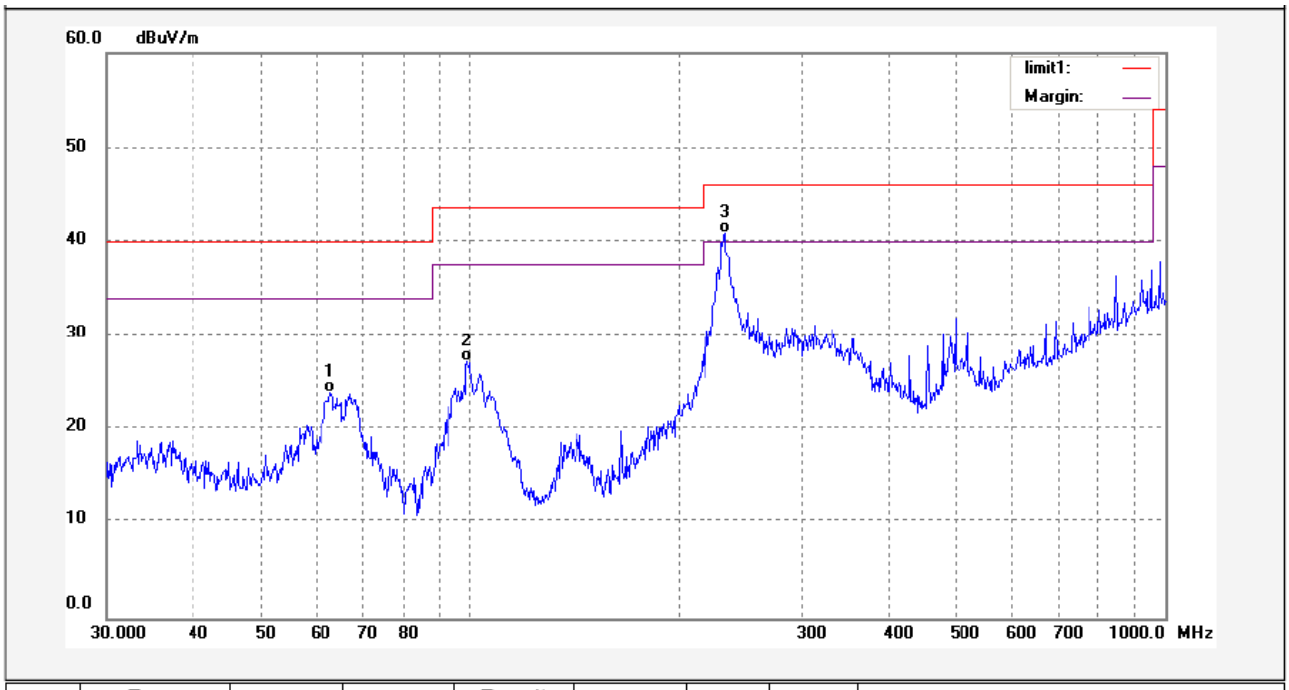
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5650.301	39.56	9.37	48.93	74.00	-25.07	peak	
2	7983.968	32.74	18.16	50.90	74.00	-23.10	peak	
3	10522.044	32.60	20.84	53.44	74.00	-20.56	peak	

Test mode: continuously transmit mode

Test Frequency : 30MHz ~ 1000MHz

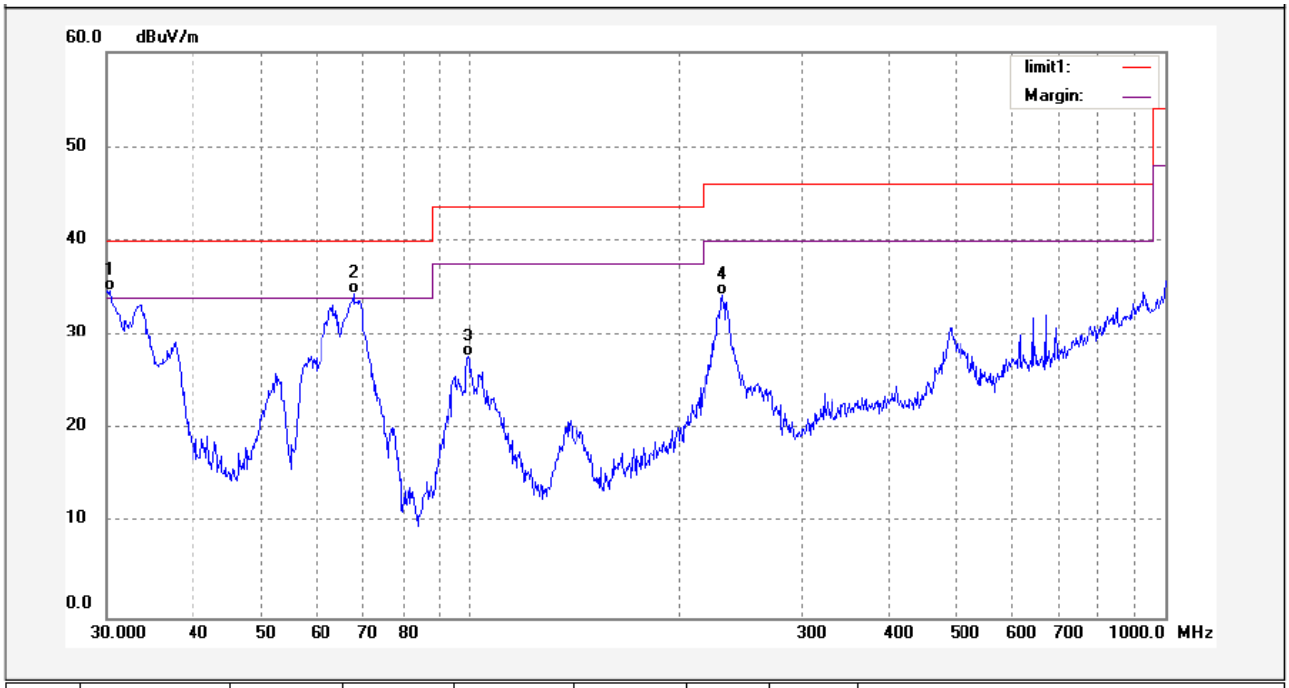
Remark: the EUT was pretested at the high, middle and low channel, and the worse case was the low Channel, so the data show was the low channel only. Because the emissions below 30MHz are more than 20dB below the limit, the data is not show in the report.

Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	62.9640	12.26	11.64	23.90	40.00	-16.10	QP	
2	99.0690	13.47	13.83	27.30	43.50	-16.20	QP	
3	232.6691	24.88	15.96	40.84	46.00	-5.16	QP	

Antenna polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	30.3179	18.50	16.22	34.72	40.00	-5.28	QP	
2	68.0241	24.09	10.35	34.44	40.00	-5.56	QP	
3	99.4177	13.76	13.89	27.65	43.50	-15.85	QP	
4	231.0399	18.14	16.12	34.26	46.00	-11.74	QP	

Test Frequency: 1GHz ~ 25GHz

And the below is the Fundamental and Harmonic

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low frequency							
2403	AV	Vertical	89.16		(Fund.)	1.0	210
4806	AV	Vertical	35.78	54.00	-18.22	1.1	50
7209	AV	Vertical	30.32	54.00	-23.68	1.5	130
9612	AV	Vertical	33.29	54.00	-20.71	1.2	70
12015	AV	Vertical	34.95	54.00	-19.05	1.3	260
14418	AV	Vertical	29.08	54.00	-24.92	1.1	140
16821	AV	Vertical	37.72	54.00	-16.28	1.5	200
19224	AV	Vertical	26.09	54.00	-27.91	1.3	280
21627	AV	Vertical	32.77	54.00	-21.23	1.2	180
24030	AV	Vertical	29.66	54.00	-24.34	1.1	150
2403	AV	Horizontal	95.07		(Fund.)	2.1	110
4806	AV	Horizontal	42.28	54.00	-11.72	1.8	60
7209	AV	Horizontal	38.60	54.00	-15.40	1.9	190
9612	AV	Horizontal	34.69	54.00	-19.31	2.3	310
12015	AV	Horizontal	31.05	54.00	-22.95	2.0	200
14418	AV	Horizonta	37.98	54.00	-16.02	1.7	70
16821	AV	Horizontal	40.87	54.00	-13.13	1.8	40
19224	AV	Horizontal	33.75	54.00	-20.25	1.9	100
21627	AV	Horizontal	32.17	54.00	-21.83	1.5	160
24030	AV	Horizontal	34.78	54.00	-19.22	1.2	140
2403	PK	Vertical	109.16		(Fund.)	1.5	180
4806	PK	Vertical	56.68	74.00	-17.32	1.5	200
7209	PK	Vertical	53.87	74.00	-20.13	1.3	280
9612	PK	Vertical	55.75	74.00	-18.25	1.2	180
12015	PK	Vertical	52.06	74.00	-21.94	1.2	90
14418	PK	Vertical	47.81	74.00	-26.19	1.8	60
16821	PK	Vertical	54.66	74.00	-19.34	1.9	190
19224	PK	Vertical	56.88	74.00	-17.12	2.3	310
21627	PK	Vertical	47.87	74.00	-26.13	1.3	260
24030	PK	Vertical	43.60	74.00	-30.40	1.1	140

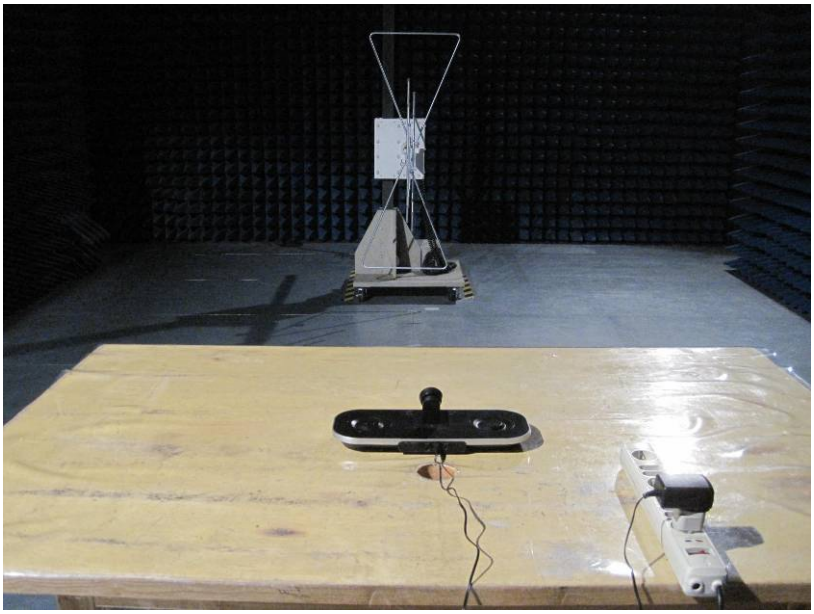
2403	PK	Horizontal	116.68		(Fund.)	2.3	310
4806	PK	Horizontal	63.78	74.00	-10.22	2.0	200
7209	PK	Horizontal	55.97	74.00	-18.03	1.7	70
9612	PK	Horizontal	58.69	74.00	-15.31	1.8	60
12015	PK	Horizontal	60.78	74.00	-13.22	2.1	110
14418	PK	Horizontal	55.95	74.00	-18.05	1.8	60
16821	PK	Horizontal	50.90	74.00	-23.10	1.9	190
19224	PK	Horizontal	52.61	74.00	-21.39	1.9	100
21627	PK	Horizontal	54.84	74.00	-19.16	1.5	160
24030	PK	Horizontal	48.80	74.00	-25.20	1.7	140
Middle frequency							
2439	AV	Vertical	86.80		(Fund.)	1.3	280
4878	AV	Vertical	33.82	54.00	-20.18	1.2	180
7317	AV	Vertical	30.89	54.00	-23.11	1.1	150
9756	AV	Vertical	34.92	54.00	-19.08	1.1	140
12195	AV	Vertical	29.30	54.00	-24.70	1.5	200
14634	AV	Vertical	32.81	54.00	-21.19	1.3	280
17073	AV	Vertical	27.20	54.00	-26.80	1.1	50
19512	AV	Vertical	28.21	54.00	-25.79	1.5	130
21951	AV	Vertical	28.09	54.00	-25.91	1.2	70
24390	AV	Vertical	27.04	54.00	-26.96	1.1	140
2439	AV	Horizontal	95.04		(Fund.)	2.0	200
4878	AV	Horizontal	38.88	54.00	-15.12	1.7	70
7317	AV	Horizontal	40.80	54.00	-13.20	1.8	40
9756	AV	Horizontal	34.92	54.00	-19.08	1.8	60
12195	AV	Horizontal	36.10	54.00	-17.90	1.9	190
14634	AV	Horizontal	38.83	54.00	-15.17	2.3	310
17073	AV	Horizontal	33.91	54.00	-20.09	1.9	100
19512	AV	Horizontal	35.82	54.00	-18.18	1.5	160
21951	AV	Horizontal	32.26	54.00	-21.74	1.7	140
24390	AV	Horizontal	34.82	54.00	-19.18	1.7	120
2439	PK	Vertical	106.82		(Fund.)	1.0	0
4878	PK	Vertical	58.55	74.00	-15.45	1.1	90
7317	PK	Vertical	60.04	74.00	-13.96	1.4	100
9756	PK	Vertical	59.12	74.00	-14.88	1.3	120

12195	PK	Vertical	54.09	74.00	-19.91	1.7	180
14634	PK	Vertical	55.94	74.00	-18.06	1.2	0
17073	PK	Vertical	50.82	74.00	-23.18	1.4	40
19512	PK	Vertical	48.99	74.00	-25.01	1.5	120
21951	PK	Vertical	48.22	74.00	-25.78	1.5	135
24390	PK	Vertical	51.81	74.00	-22.19	1.2	120
2439	PK	Horizontal	115.94		(Fund.)	1.0	60
4878	PK	Horizontal	59.29	74.00	-14.71	1.7	45
7317	PK	Horizontal	62.78	74.00	-11.22	1.6	90
9756	PK	Horizontal	56.33	74.00	-17.67	1.5	60
12195	PK	Horizontal	57.99	74.00	-16.01	1.4	150
14634	PK	Horizontal	61.41	74.00	-12.59	1.2	150
17073	PK	Horizontal	51.30	74.00	-22.70	1.1	120
19512	PK	Horizontal	52.73	74.00	-21.27	1.5	150
21951	PK	Horizontal	48.99	74.00	-25.01	1.1	0
24390	PK	Horizontal	50.90	74.00	-23.10	1.6	135
High frequency							
2478	AV	Vertical	85.87		(Fund.)	1.0	0
4956	AV	Vertical	37.09	54.00	-16.91	1.2	45
7434	AV	Vertical	40.02	54.00	-13.98	1.2	120
9912	AV	Vertical	39.13	54.00	-14.87	1.4	60
12390	AV	Vertical	36.51	54.00	-17.49	1.5	135
14868	AV	Vertical	34.98	54.00	-19.02	1.8	120
17346	AV	Vertical	33.00	54.00	-21.00	1.1	100
19824	AV	Vertical	34.89	54.00	-19.11	1.1	60
22302	AV	Vertical	28.83	54.00	-25.17	1.4	80
24780	AV	Vertical	30.18	54.00	-23.82	1.5	60
2478	AV	Horizontal	94.83		(Fund.)	1.0	0
4956	AV	Horizontal	36.21	54.00	-17.79	1.8	120
7434	AV	Horizontal	42.01	54.00	-11.99	1.2	60
9912	AV	Horizontal	39.27	54.00	-14.73	1.5	100
12390	AV	Horizontal	38.48	54.00	-15.52	1.2	60
14868	AV	Horizontal	36.29	54.00	-17.71	1.2	120
17346	AV	Horizontal	35.43	54.00	-18.57	1.4	100
19824	AV	Horizontal	36.78	54.00	-17.22	1.8	100

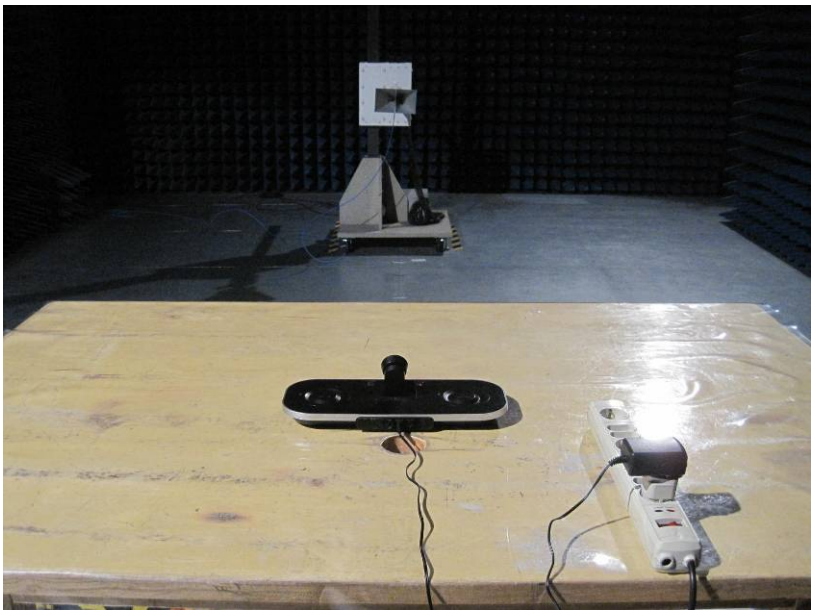
22302	AV	Horizontal	28.93	54.00	-25.07	1.3	100
24780	AV	Horizontal	29.15	54.00	-24.85	1.6	10
2478	PK	Vertical	105.97		(Fund.)	1.0	0
4956	PK	Vertical	56.01	74.00	-17.99	1.2	60
7434	PK	Vertical	57.78	74.00	-16.22	1.8	90
9912	PK	Vertical	53.90	74.00	-20.10	1.5	180
12390	PK	Vertical	50.82	74.00	-23.18	1.4	60
14868	PK	Vertical	53.13	74.00	-20.87	1.2	60
17346	PK	Vertical	49.24	74.00	-24.76	1.2	135
19824	PK	Vertical	47.09	74.00	-26.91	1.2	120
22302	PK	Vertical	43.94	74.00	-30.06	1.6	60
24780	PK	Vertical	45.40	74.00	-28.60	1.4	90
2478	PK	Horizontal	115.82		(Fund.)	1.1	60
4956	PK	Horizontal	60.97	74.00	-13.03	1.4	90
7434	PK	Horizontal	61.91	74.00	-12.09	1.5	60
9912	PK	Horizontal	58.71	74.00	-15.29	1.3	100
12390	PK	Horizontal	56.09	74.00	-17.91	1.2	135
14868	PK	Horizontal	54.39	74.00	-19.61	1.7	0
17346	PK	Horizontal	57.00	74.00	-17.00	1.8	180
19824	PK	Horizontal	55.14	74.00	-18.86	1.5	60
22302	PK	Horizontal	49.90	74.00	-24.10	1.8	120
24780	PK	Horizontal	51.18	74.00	-22.82	1.0	60

Photograph – Radiation Spurious Emission Test Setup

Below 1GHz



Above 1GHz

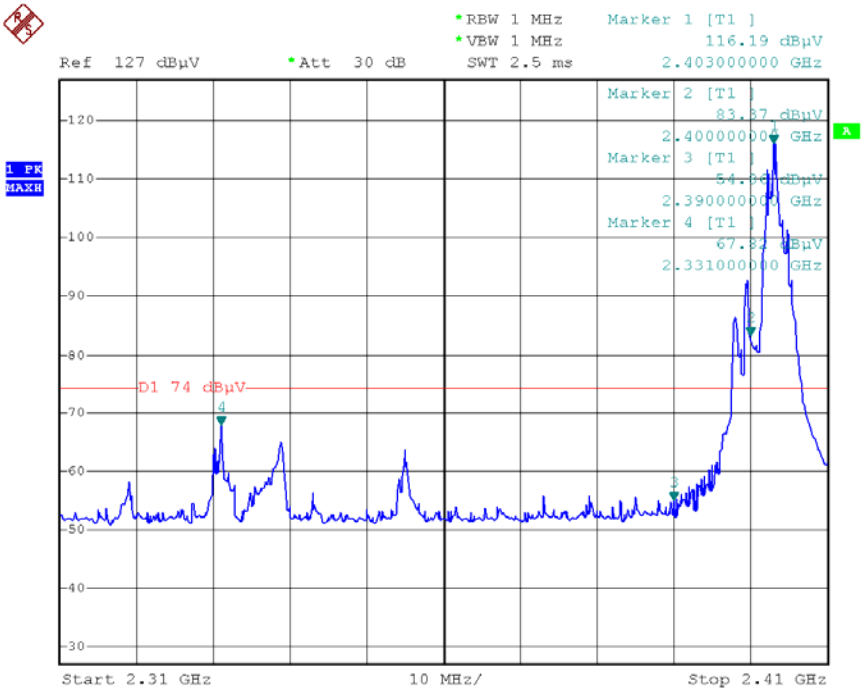


8 Band Edge Measurement

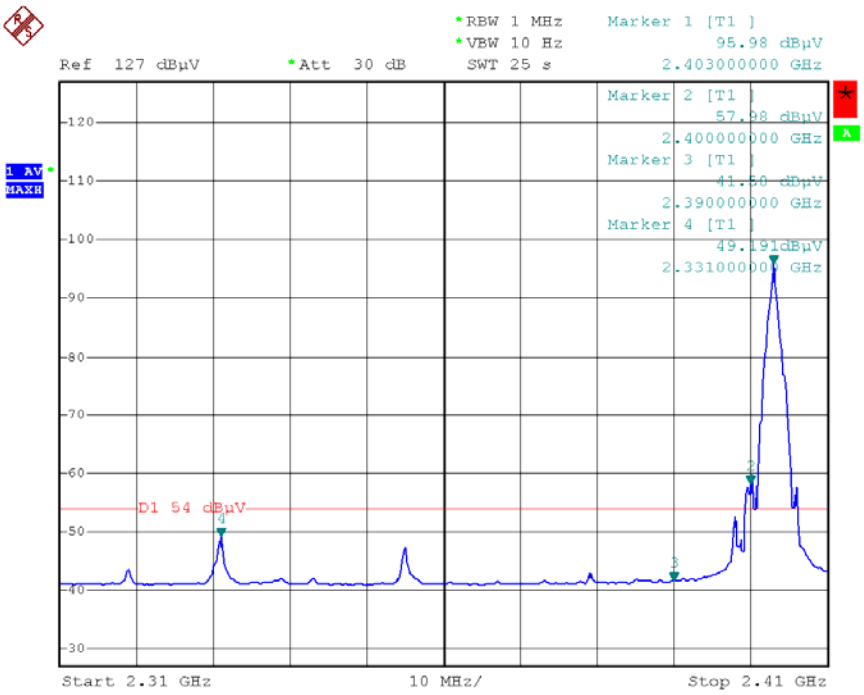
Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005
Measurement Distance:	3m
Limit:	According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see §15.205(c)).
Detector:	For Peak value: RBW = 1 MHz for f ≥ 1 GHz VBW ≥ RBW; Sweep = auto Detector function = peak Trace = max hold For AVG value: RBW = 1 MHz for f ≥ 1 GHz VBW = 10Hz; Sweep = auto Detector function = AVG Trace = max hold

Test Result:

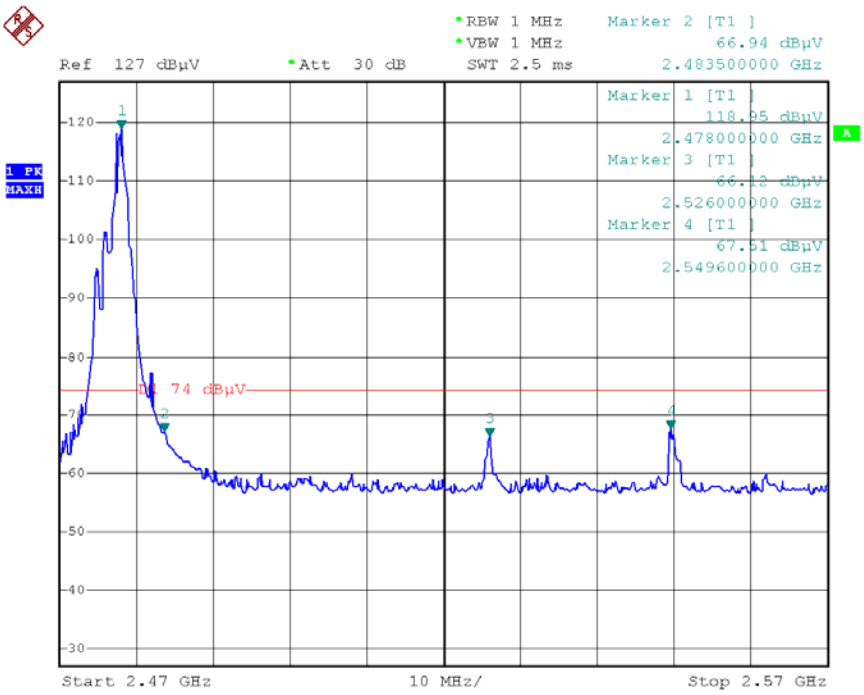
Low Channel – Peak



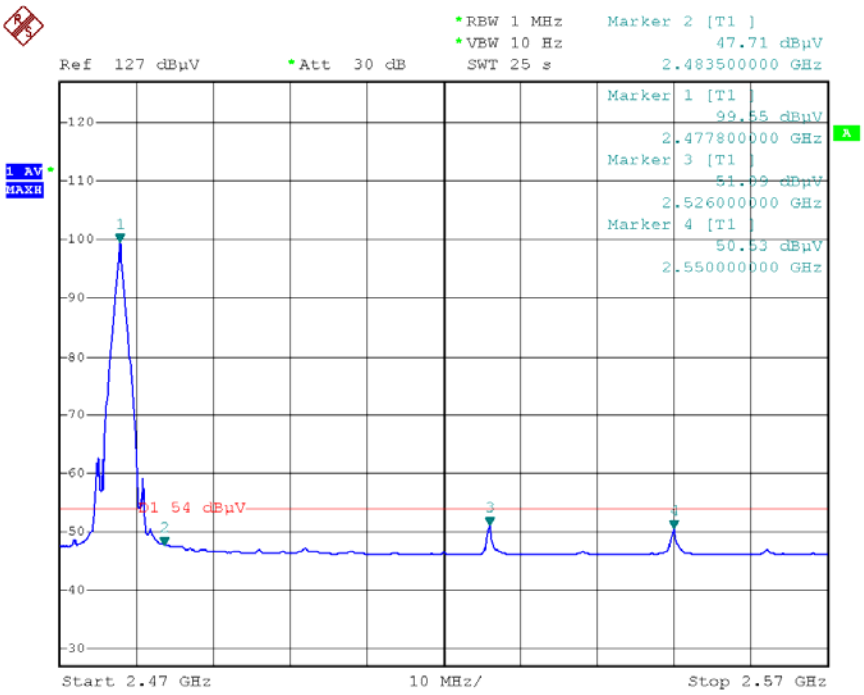
Low Channel – AV



High Channel – Peak



High Channel – AV



9 6 dB Bandwidth Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005
Limit:	Regulation 15.247 (a)(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Mode:	Test in fixing operating frequency at low, Middle, high channel.

Test Procedure:

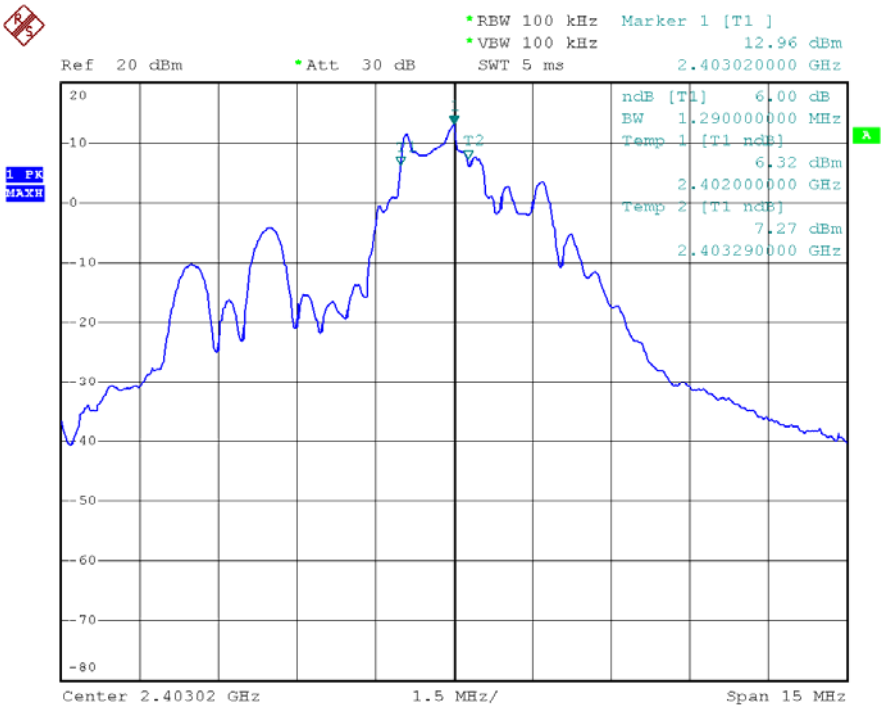
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: Span = 15MHz, RBW = 100kHz, VBW = 100kHz

Test Result:

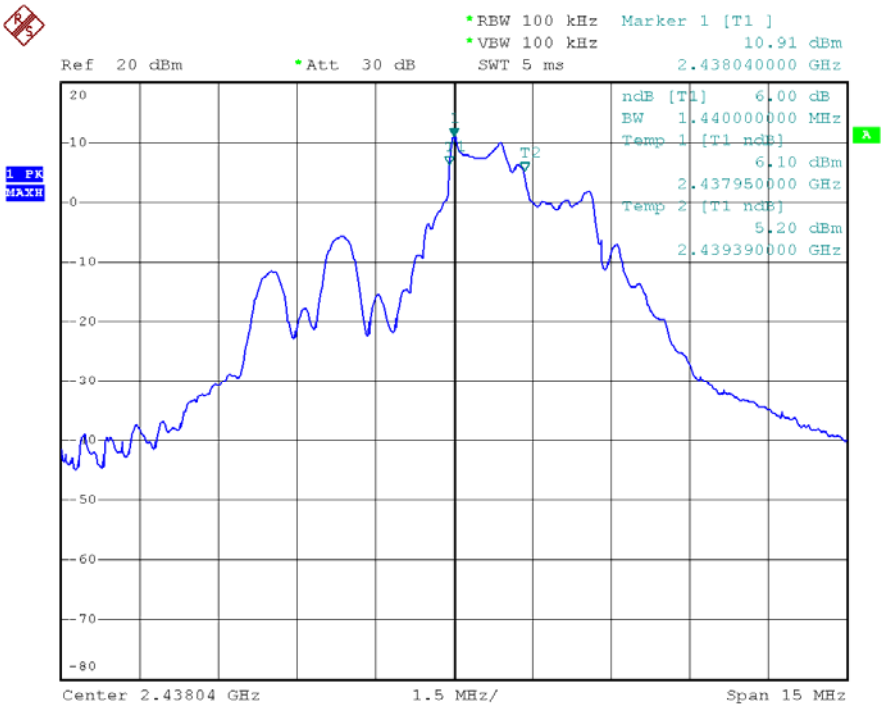
Test Channel	Bandwidth	Result
Low	1.29MHz	PASS
Middle	1.44MHz	PASS
High	0.93MHz	PASS

Test result plot as follows:

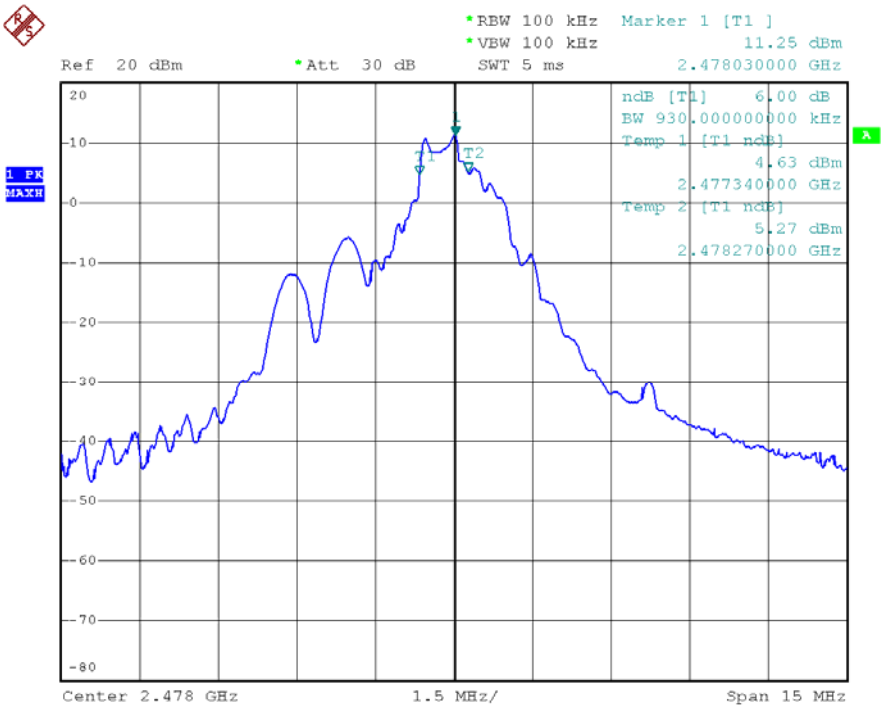
Low Channel



Middle Channel



High Channel



10 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005

Test Limit: Regulation 15.247 (b)(3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test mode: Test in fixing operating frequency at low, Middle, high channel.

Test Procedure:

1． Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2． Set the spectrum analyzer: RBW = 3 MHz, VBW = 10 MHz, Sweep = auto; Detector Function = Peak.

3． Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

Test Result:

Test Channel	Output Power (dBm)	Limit (dBm)
Low	13.99	30
Middle	12.46	30
High	12.06	30

11 Power Spectral Density

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005
Test Limit:	Regulation 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Mode:	Test in fixing operating frequency at low, Middle, high channel.

Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

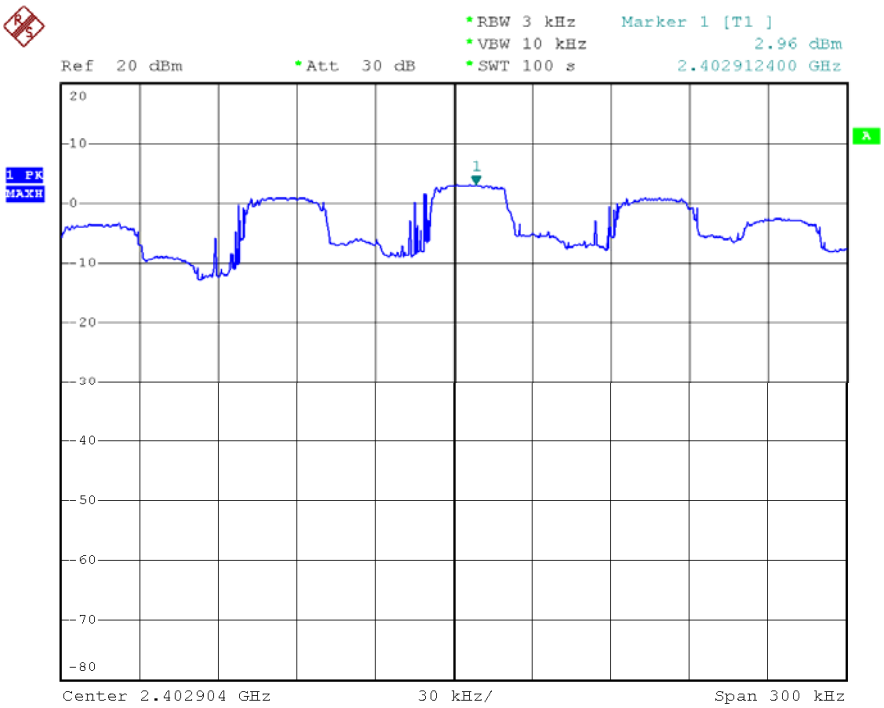
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 300kHz. Sweep = 100s; Detector Function = Peak. Trace = Max hold.

Test Result:

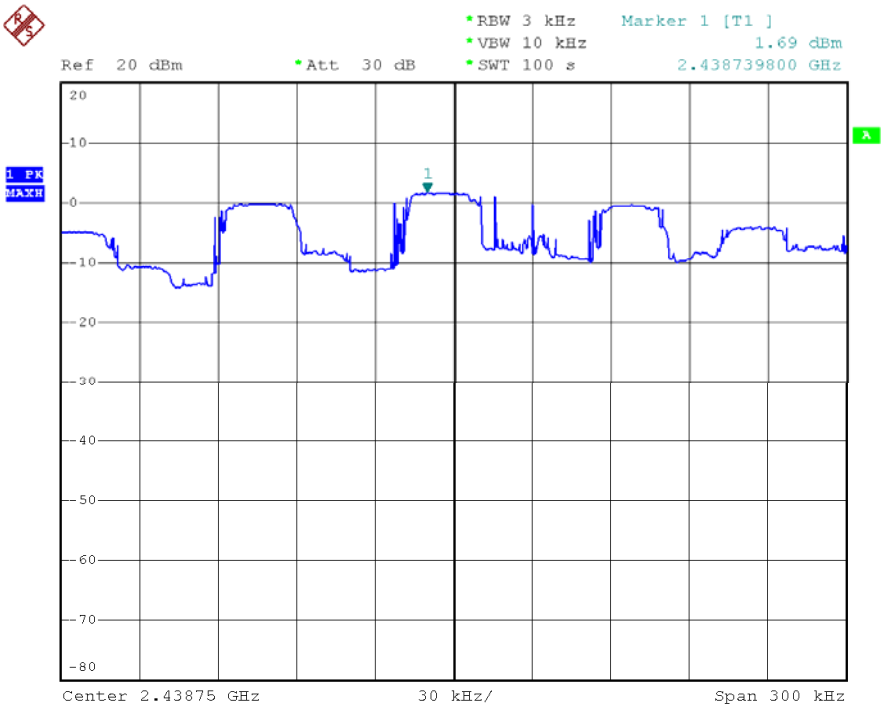
Test result: PASS

Test result plot as follows:

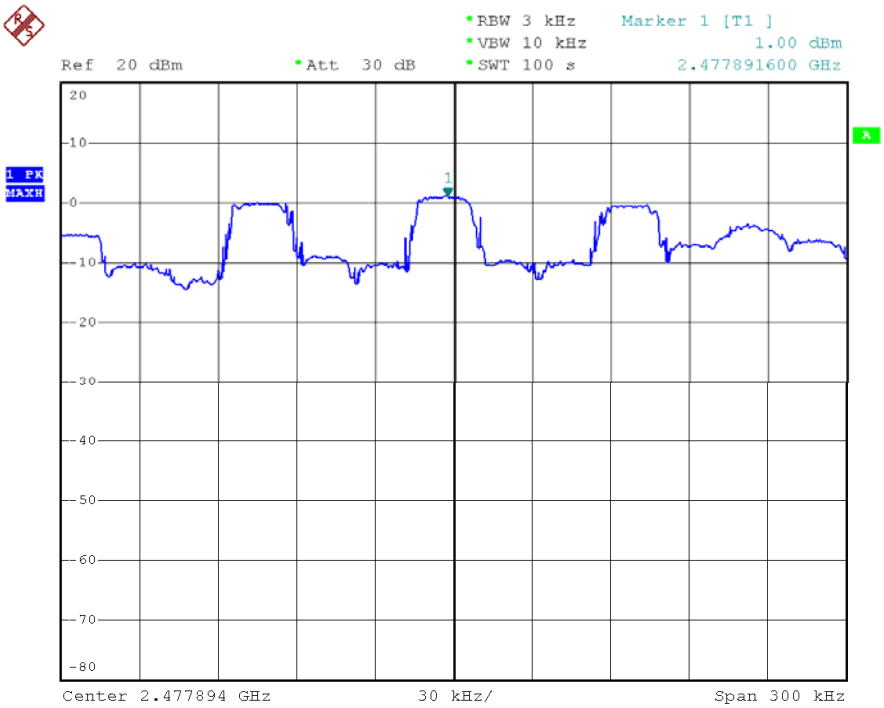
Low Channel



Middle Channel



High Channel



12 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, 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. This product has a permanent antenna, fulfill the requirement of this section.

13 RF Exposure

Test Requirement: FCC CFR47 Part 1 Section 1.1307

Test Method: Based on FCC Part 15.247

Test Mode: The EUT work in test mode(Tx).

Requiments:

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 limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

MPE Calculation Method

$$E\ (V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd\ (W/m^2) = \frac{E^2}{377}$$

E = Electric field (V/m)
P = Peak RF output power (W)
G = EUT Antenna numeric gain (numeric)
d = Separation distance between radiator and human body (m)
The formula can be changed to

$$\boldsymbol{Pd} = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

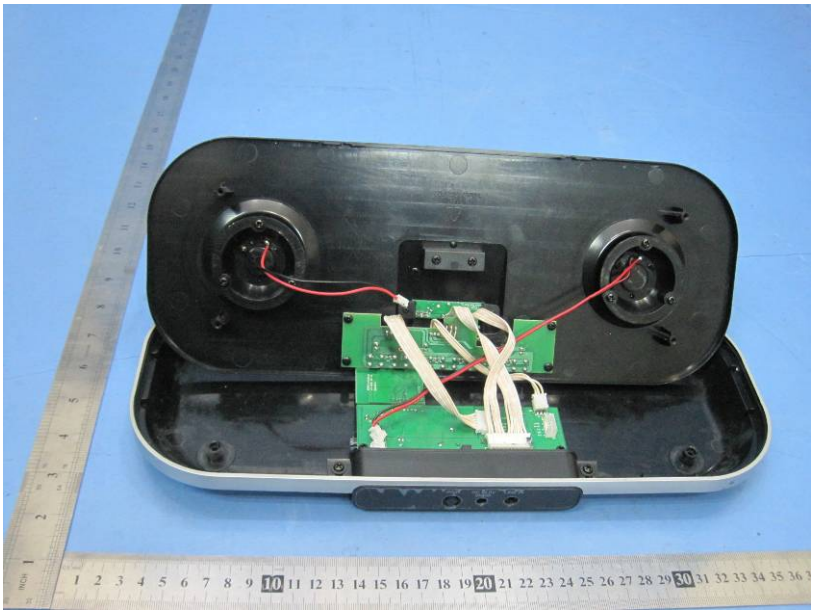
Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm2)	Limit of Power Density (S) (mW/cm2)	Test Result
0	1	13.99	25.06	0.0050	1	Complies
0	1	12.46	17.62	0.0035	1	Complies
0	1	12.06	16.07	0.0031	1	Complies

14 Photographs - Constructional Details

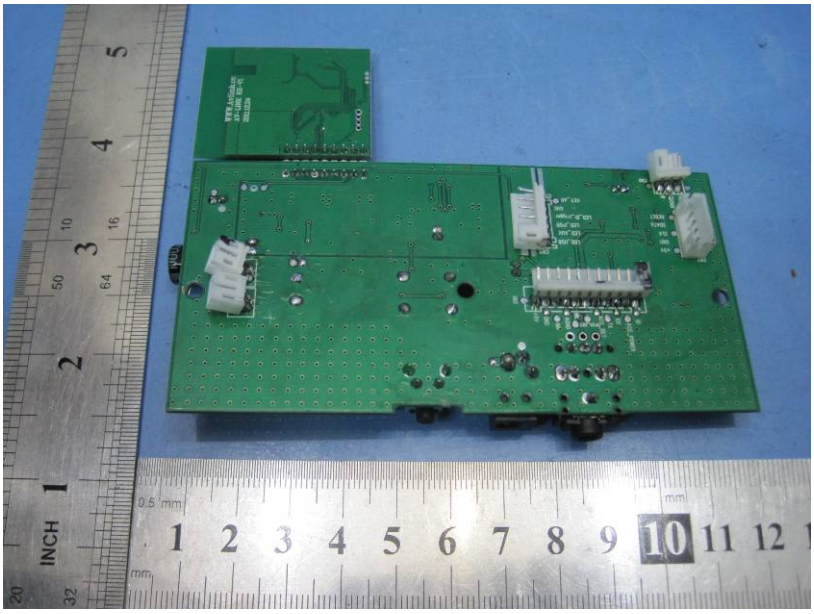
14.1 Product View

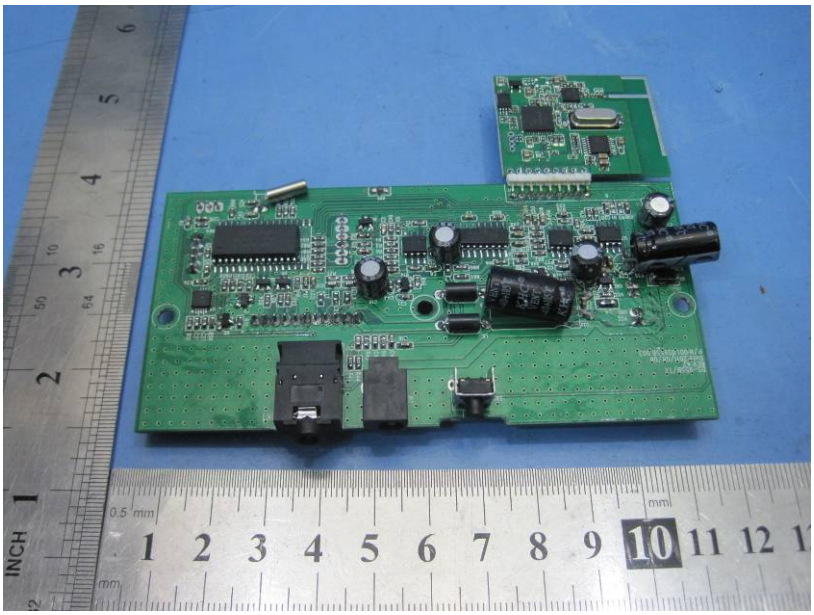
14.2 EUT – Appearance View

14.3 EUT-Open View

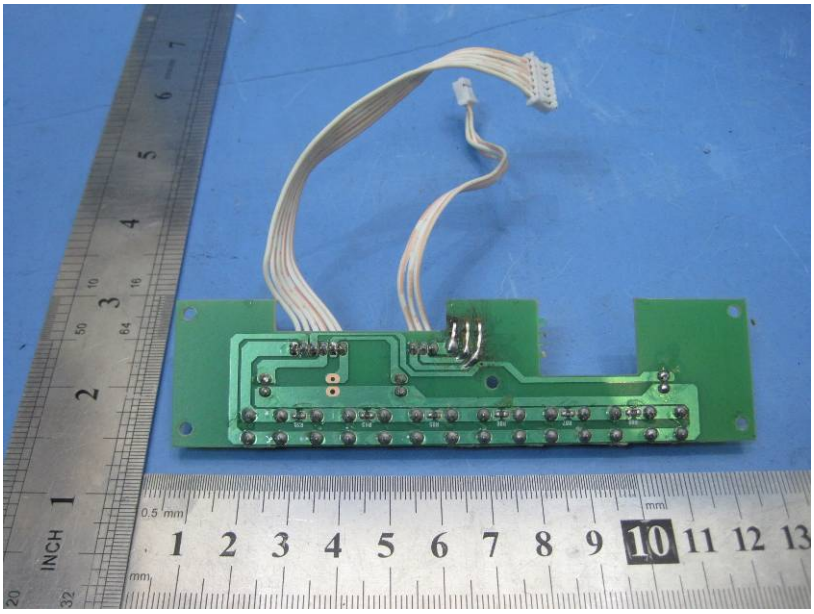


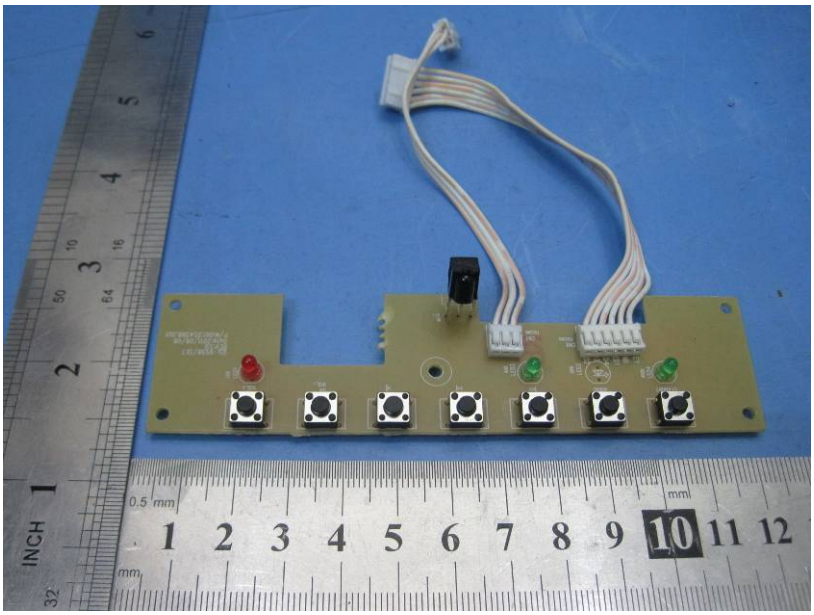
14.4 PCB1 - View



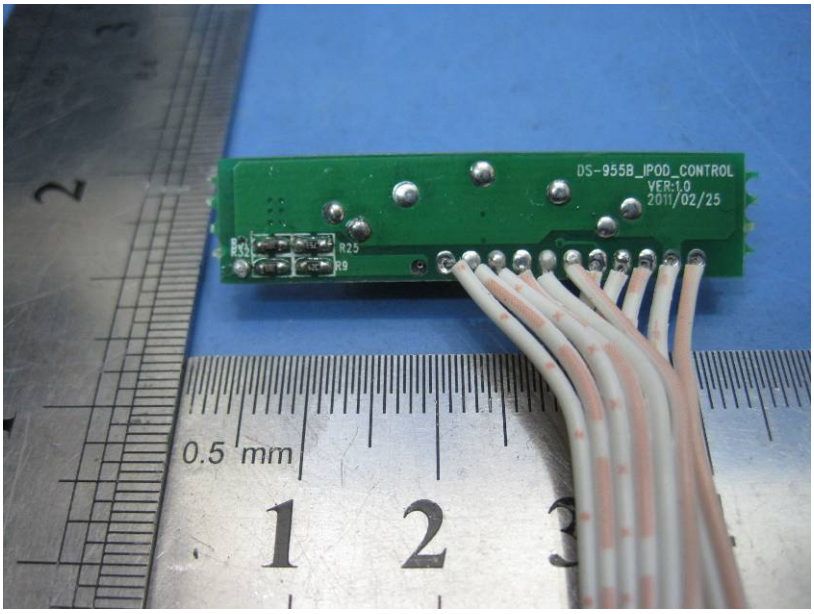


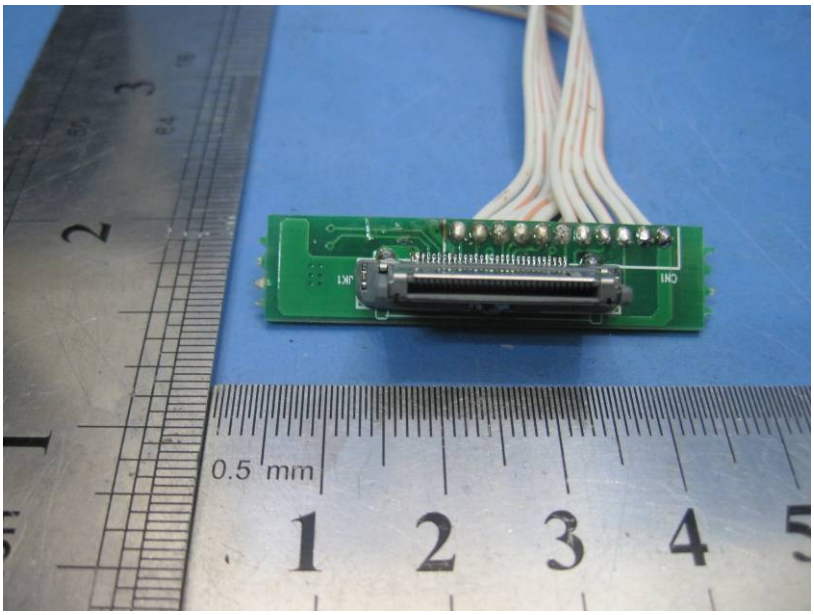
14.5 PCB2 - View



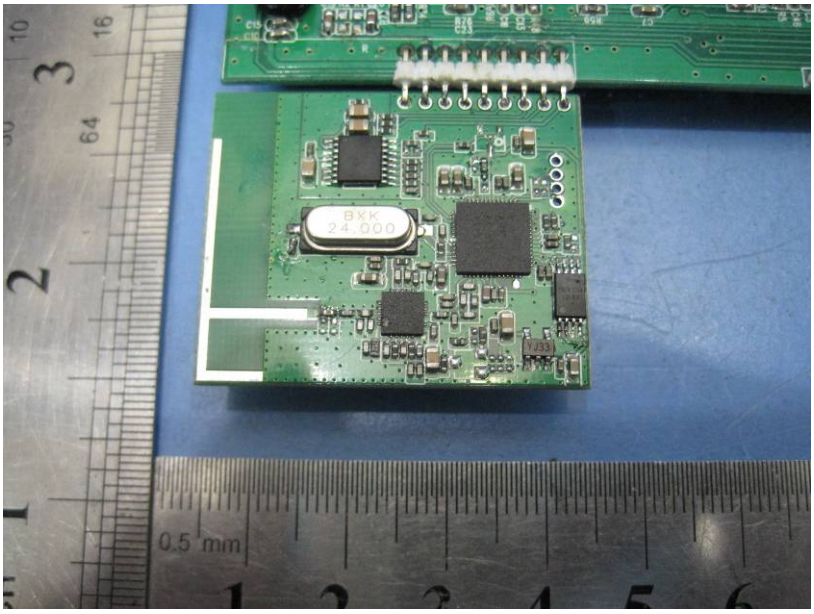


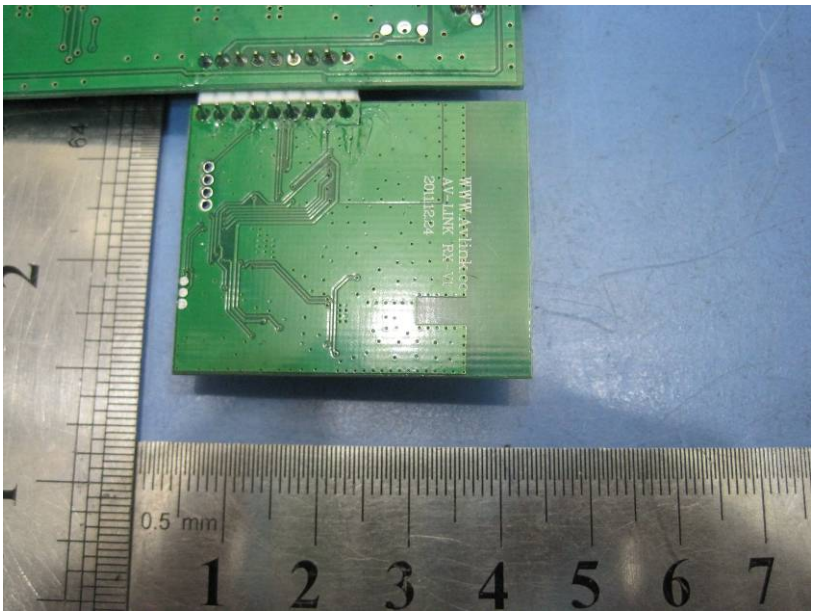
14.6 PCB3 - View





14.7 RF Module - View





15 FCC Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/proposed FCC Mark Location