

TEST REPORT

FCC ID : WC2DS-987B
Applicant : Wonders Technology Co.,Ltd.
Address : DOSS Industrial Zone,Qiping Kengdu Industrial Area
Guihua Village, Guanlan Town Baoan District, ShenZhen,
China.
Manufacturer : Wonders Technology Co.,Ltd.
Address : DOSS Industrial Zone,Qiping Kengdu Industrial Area
Guihua Village, Guanlan Town Baoan District, ShenZhen,
China.

Equipment Under Test (EUT) :

Product Name : Wireless Speaker
Model No. : DS-987B,ISP883B
Brand : N/A,

Rules : FCC CFR47 Part15 Section 15.247:2010

Date of Test : July 17~25,2012

Date of Issue : July 25,2012

Test Result : **PASS***

Remark:

* The sample described above has been tested to be in compliance with the requirements of KDB Publication No. 558074. The test results have been reviewed and comply with the rules listed above and found to meet their essential requirements.

PERPARED BY:

Waltek Services (Shenzhen) Co., Ltd.

1/F, Fukangtai Building, West of Baima Road., Songgang Street, Bao'an District,
Shenzhen, China

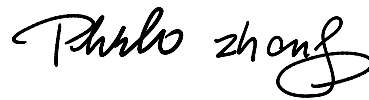
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Compiled by:



Zero Zhou / Project Engineer

Approved by:



Philo Zhong / Manager

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WALTEK SERVICES

Reference No.: WT12074508-D-S-F

2 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a)	PASS
Radiated Spurious Emissions	15.205(a) 15.209 15.247(d)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Band Edge	15.247(d) 15.205 15.209	PASS
Maximum Peak Output Power	15.247(b)(3)	PASS
Power Spectral Density	15.247(e)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

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4 General Information

4.1 General Description of E.U.T.

Product Name	: Wireless Speaker
Model No.	: DS-987B,ISP883B
Model Description	: The model difference are color and appearance.
Type of Modulation	: DSSS
Note	: N/A
Frequency Range	: 2403-2478MHz, 26 Channels in total
Oscillator	: 4 MHz
Antenna Gain	: 0 dBi
Antenna installation	: PCB Printed Antenna
Antenna Power	: 25.06 mW
PCB Type	: N/A
Software Version	: N/A

4.2 Details of E.U.T.

Technical Data	: DC 5.0V 2.0A powered by adapter (input:AC100-240V 50/60Hz 0.3A)
Adapter manufacturer	: DYS
M/N	: DYS122-050200W-1

4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2403	2	2406	3	2409	4	2412
5	2415	6	2418	7	2421	8	2424
9	2427	10	2430	11	2433	12	2436
13	2439	14	2442	15	2445	16	2448
17	2451	18	2454	19	2457	20	2460
21	2463	22	2466	23	2469	24	2472
25	2475	26	2478	27	-	28	-
29	-	30	-	31	-	32	-
33	-	34	-	35	-	36	-
37	-	38	-	39	-	40	-
41	-	42	-	43	-	44	-
45	-	46	-	47	-	48	-
49	-	50	-	51	-	52	-
53	-	54	-	55	-	56	-
57	-	58	-	59	-	60	-
61	-	62	-	63	-	64	-
65	-	66	-	67	-	68	-
69	-	70	-	71	-	72	-
73	-	74	-	75	-	76	-
77	-	78	-	79	-	-	-

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4.4 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, July 10, 2012.

- **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.

4.5 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

4.6 General condition

Ambient Condition: 25.5 °C 51 %RH

4.6.1 Environmental condition of test site

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

The follow condition is not applicable

Test Voltage	Input voltage
Rated voltage-15%	
normal	
Rated voltage+15%	

The follow condition is applicable.

Test voltage	Input Voltage
Rated voltage	DC 5V

4.6.2 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Lower channel	Middle channel	Upper channel
Transmitting	2403MHz	2439MHz	2478MHz
Receiving	2403MHz	2439MHz	2478MHz

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5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101178	August 13,2012
2.	LISN	R&S	ENV216	101215	August 13,2012
3.	Cable	HUBER+SUHNER	CBL2-NN-3M	2230300	August 14,2012
4.	Switch	---	RSU/M2	---	August 14,2012
3m Semi-anechoic Chamber for Radiation Emissions					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
1.	EMC Analyzer	Agilent	E7405A	MY45114943	August 13,2012
2.	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	August 13,2012
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	August 13,2012
4.	Broad-band Horn Antenna	SCHWARZBECK	VULB9163	667	August 13,2012
5.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	399	August 13,2012
6.	Broadband Preamplifier	SCHWARZBECK	BBV 9719	9719-254	August 13,2012
7.	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-148	August 13,2012
8.	10m Coaxial Cable with N- plug	SCHWARZBECK	AK 9515 H	-	August 14,2012
9.	10m 50 Ohm Coaxial Cable with N-plug	SCHWARZBECK	AK 9513	-	August 14,2012
10.	Positioning Controller	C&C LAB	CC-C-IF	-	August 14,2012
11.	Color Monitor	SUNSP0	SP-14C	-	August 14,2012

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 4.74 dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	± 2.46 dB (AC mains 150KHz~30MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

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6 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	KDB Publication No. 558074
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 E.U.T. Test Condition

Operating Environment:

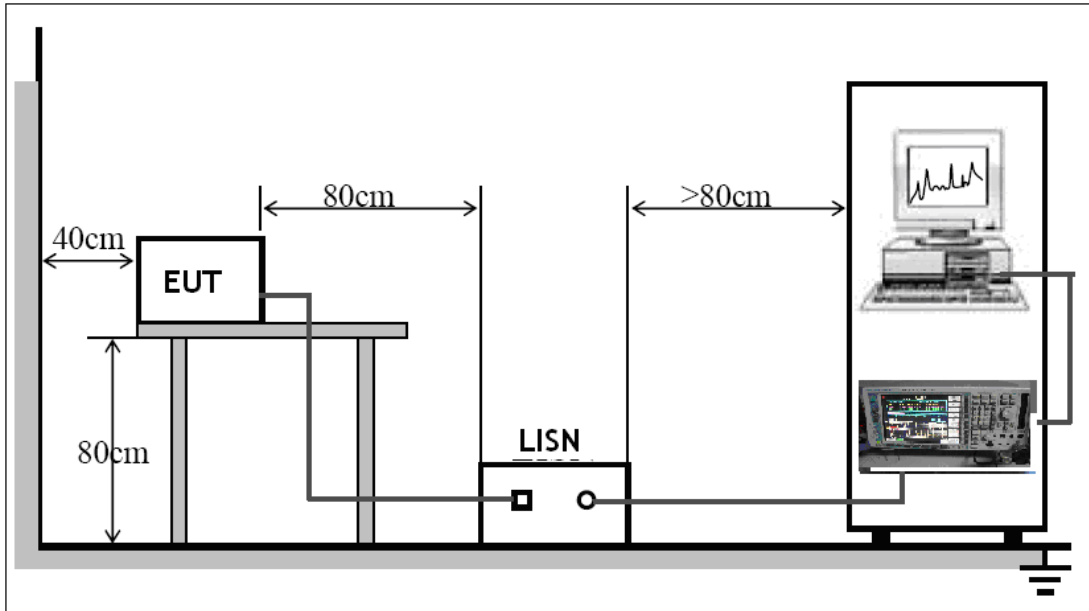
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	1012 mbar

Operation Mode and Spectrum Setup:

The EUT was tested in normal working mode. The worst data were shown as follow.

6.2 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 Part15.207 limits.



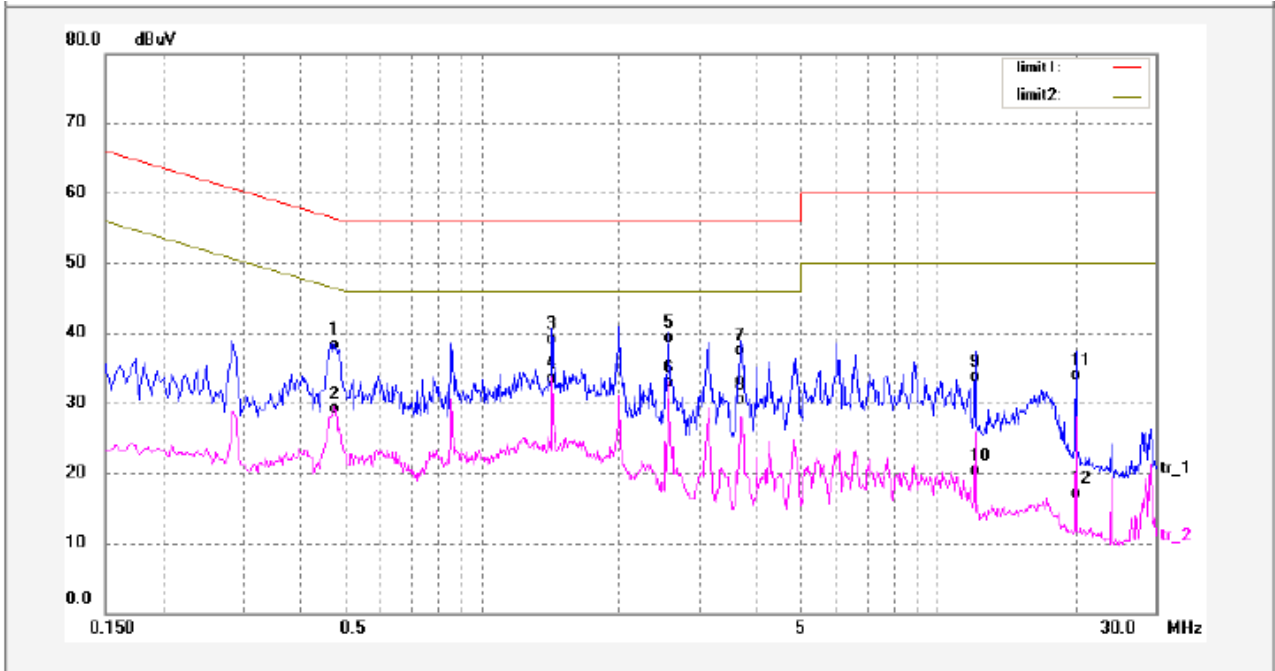
The EUT was placed on the test table in shielding room

6.3 Conducted Emission Test Result

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.

Test Mode: normal working

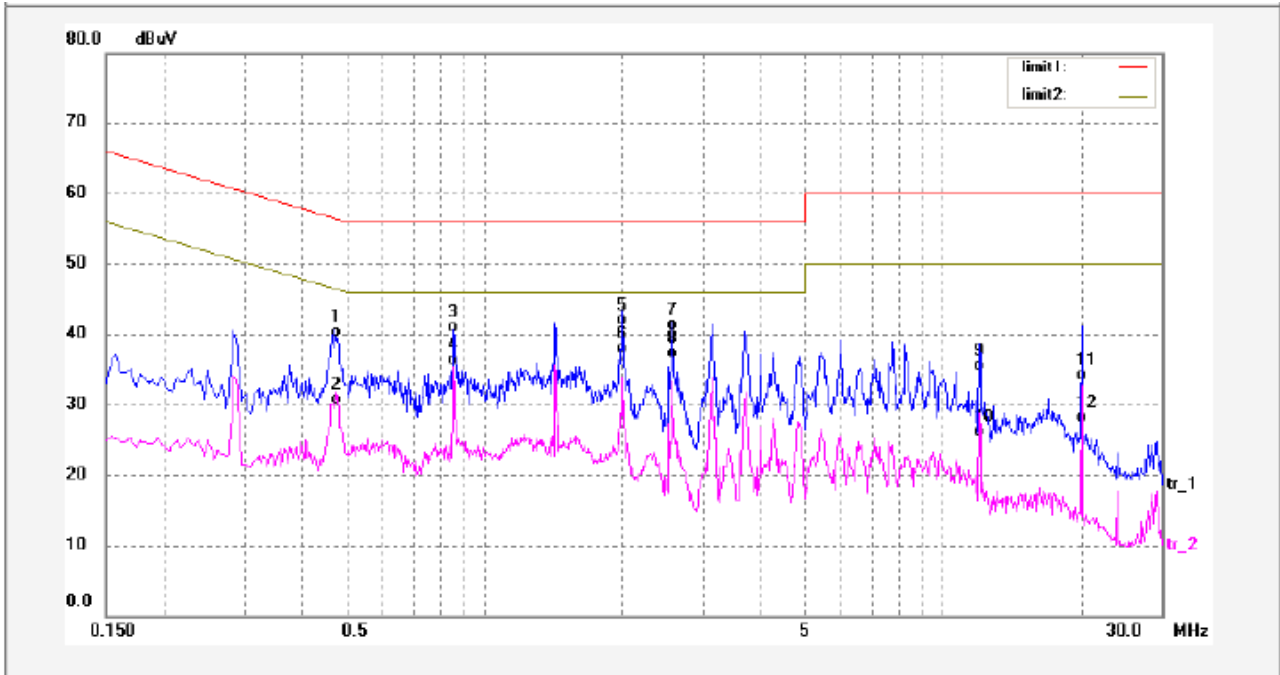
Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4700	27.07	10.39	37.46	56.51	-19.05	QP	
2	0.4700	17.86	10.39	28.25	46.51	-18.26	AVG	
3	1.4299	27.77	10.56	38.33	56.00	-17.67	QP	
4	1.4299	22.21	10.56	32.77	46.00	-13.23	AVG	
5	2.5740	27.70	10.73	38.43	56.00	-17.57	QP	
6	2.5740	21.46	10.73	32.19	46.00	-13.81	AVG	
7	3.7180	25.91	10.79	36.70	56.00	-19.30	QP	
8	3.7180	18.88	10.79	29.67	46.00	-16.33	AVG	
9	12.0700	21.87	10.99	32.86	60.00	-27.14	QP	
10	12.0700	8.58	10.99	19.57	50.00	-30.43	AVG	
11	20.1140	22.04	11.15	33.19	60.00	-26.81	QP	
12	20.1140	5.24	11.15	16.39	50.00	-33.61	AVG	

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Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4700	29.19	10.39	39.58	56.51	-16.93	QP	
2	0.4700	19.46	10.39	29.85	46.51	-16.66	AVG	
3	0.8580	29.59	10.45	40.04	56.00	-15.96	QP	
4	0.8580	25.06	10.45	35.51	46.00	-10.49	AVG	
5	2.0020	30.37	10.70	41.07	56.00	-14.93	QP	
6	2.0020	26.37	10.70	37.07	46.00	-8.93	AVG	
7	2.5740	29.85	10.73	40.58	56.00	-15.42	QP	
8	2.5740	25.76	10.73	36.49	46.00	-9.51	AVG	
9	12.0580	23.79	10.99	34.78	60.00	-25.22	QP	
10	12.0580	14.24	10.99	25.23	50.00	-24.77	AVG	
11	20.0940	22.13	11.15	33.28	60.00	-26.72	QP	
12	20.0940	16.07	11.15	27.22	50.00	-22.78	AVG	

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7 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247
 Test Method: KDB Publication No. 558074
 Test Result: PASS
 Frequency Range: 4 MHz to 25 GHz
 Measurement Distance: 3m
 15.209 Limit:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 -0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

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.

7.1 EUT Operation:

Operating Environment:

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

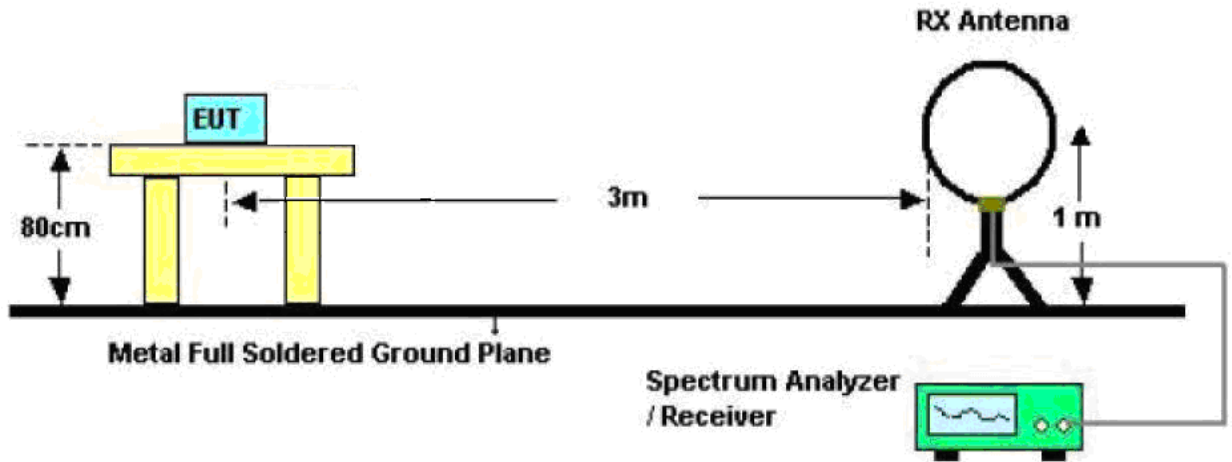
Operation Mode:

The EUT was tested in lower/middle/upper channel mode. The worst data were shown as follow.

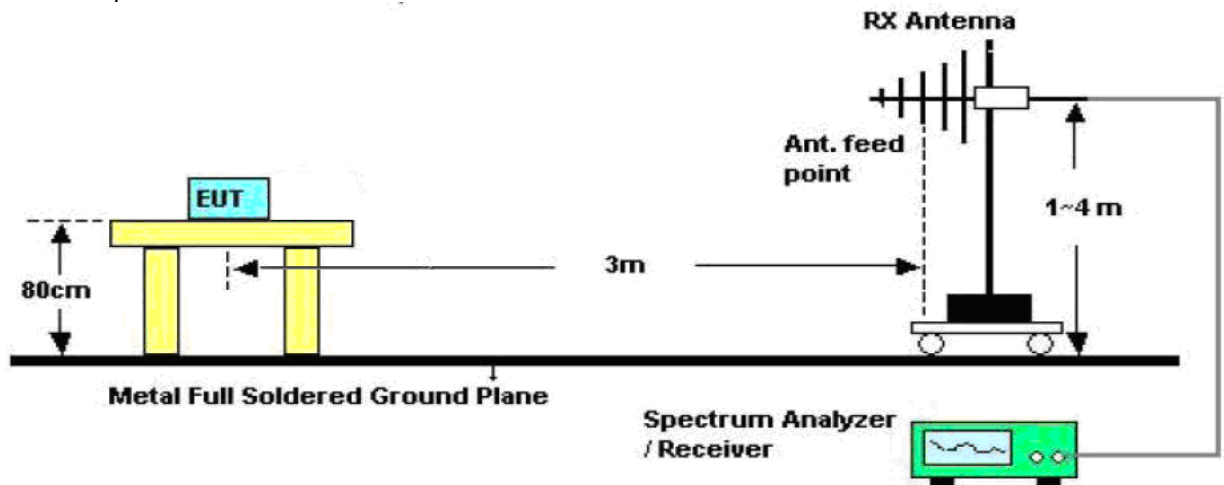
7.2 Test Setup

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

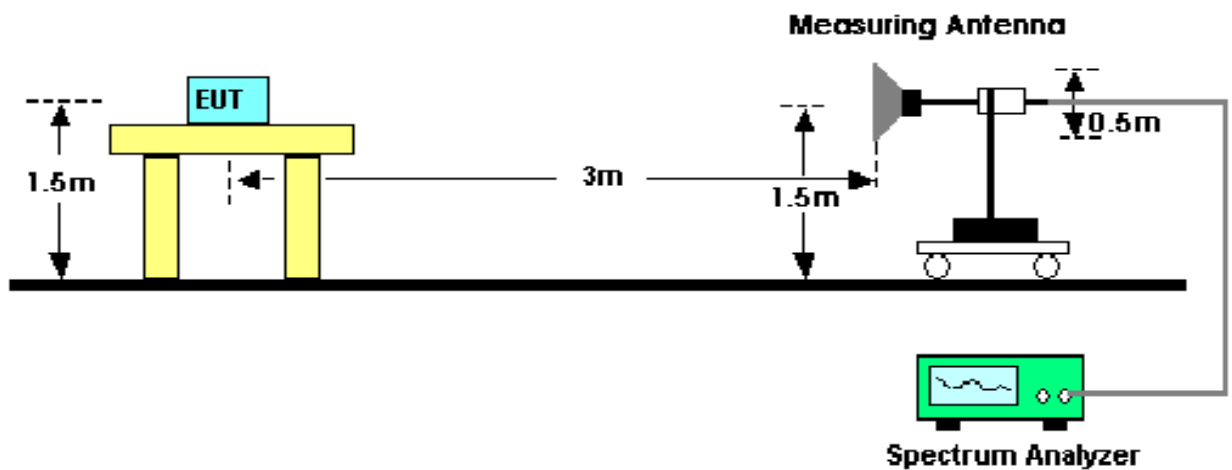
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



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7.3 Spectrum Analyzer Setup

According to FCC Part15 Rules, the system was tested from 4 MHz to 25GHz.

Below 30MHz

Sweep Speed Auto
IF Bandwidth..... 10KHz
Video Bandwidth..... 10KHz
Resolution Bandwidth..... 10KHz

30MHz ~ 1GHz

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

Sweep Speed Auto
IF Bandwidth..... 120 KHz
Video Bandwidth..... 3MHz
Quasi-Peak Adapter Bandwidth 120 KHz
Quasi-Peak Adapter Mode Normal
Resolution Bandwidth 1MHz

7.4 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 tested under 3-axes(X, Y, Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand). After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

7.5 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:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

7.6 Summary of Test Results

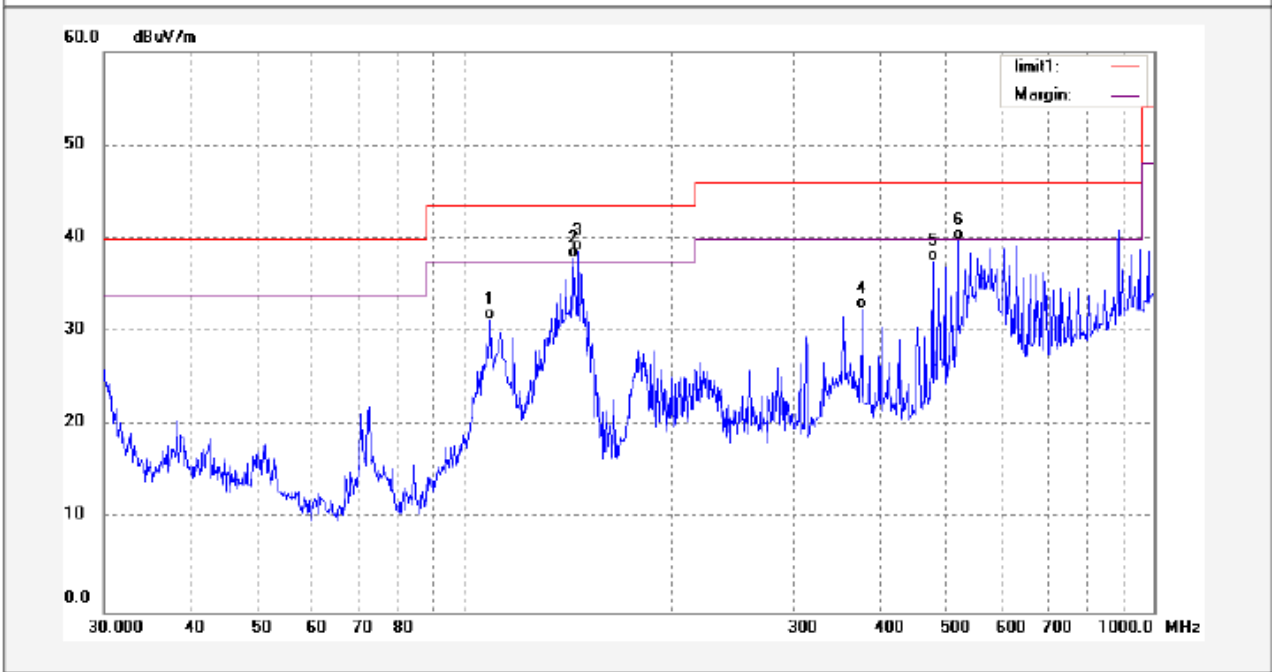
Test mode 1a: continuous receiving mode

Remark: the EUT were pretested at the upper, middle and lower channels, and the worst case was the middle Channel mode, so the data show was the middle channel mode 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

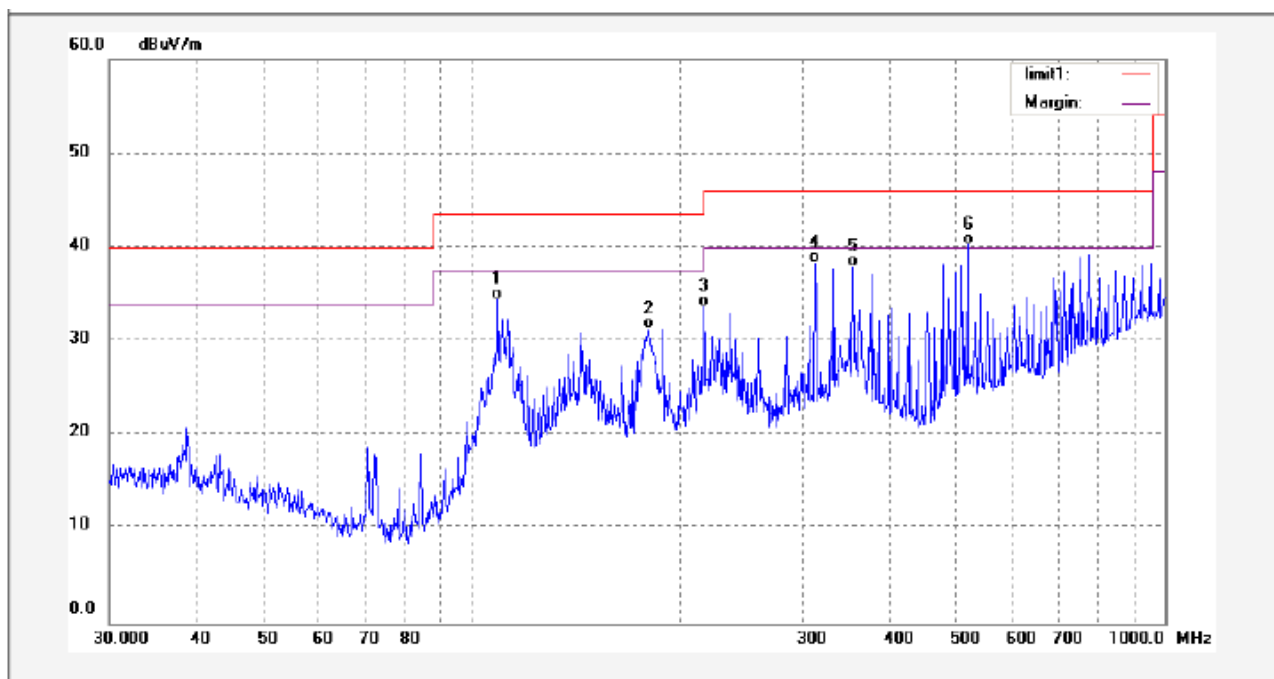
Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	108.9275	17.38	13.85	31.23	43.50	-12.27	QP	
2	143.7760	26.51	11.39	37.90	43.50	-5.60	QP	
3	146.3240	27.34	11.24	38.58	43.50	-4.92	QP	
4	377.8480	12.36	20.12	32.48	46.00	-13.52	QP	
5	478.1394	15.00	22.52	37.52	46.00	-8.48	QP	
6	520.2078	16.34	23.55	39.89	46.00	-6.11	QP	

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Antenna polarization: Horizontal



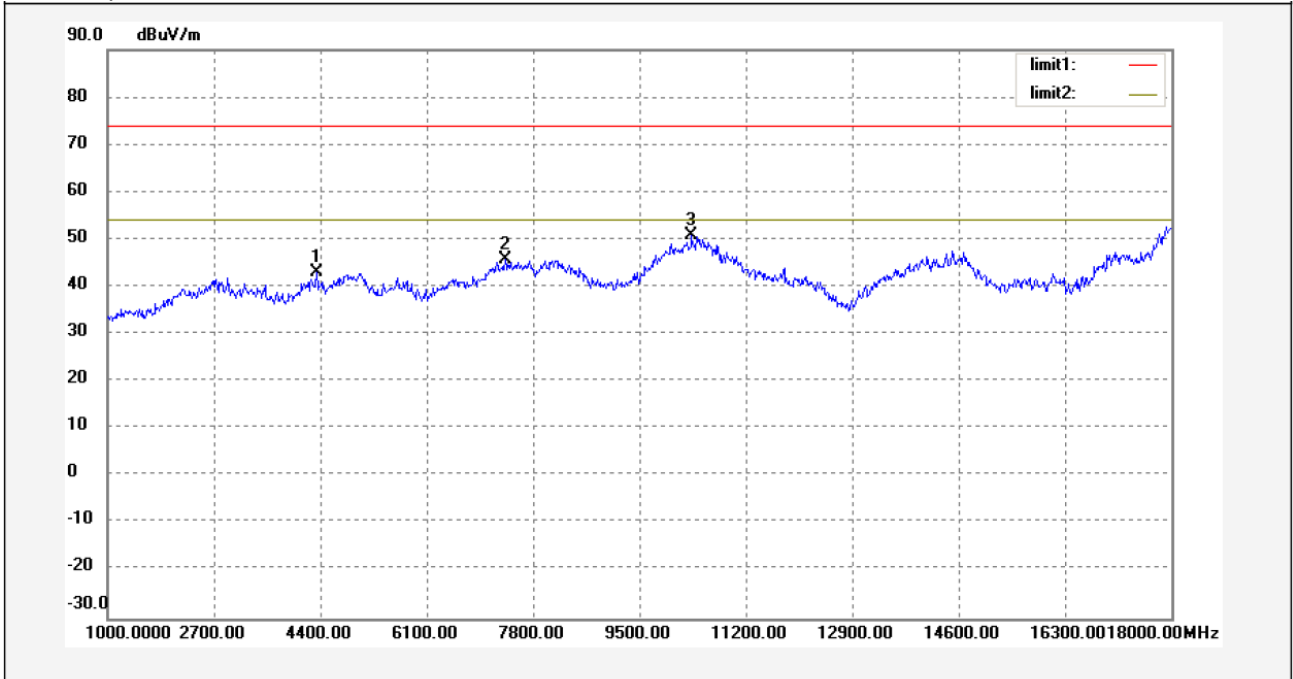
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	108.9276	20.61	13.85	34.46	43.50	-9.04	QP	
2	180.0304	18.21	13.06	31.27	43.50	-12.23	QP	
3	216.1197	18.30	15.33	33.63	46.00	-12.37	QP	
4	312.5482	20.08	18.29	38.37	46.00	-7.63	QP	
5	354.6912	17.41	20.43	37.84	46.00	-8.16	QP	
6	520.2078	16.78	23.55	40.33	46.00	-5.67	QP	

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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 did not record.

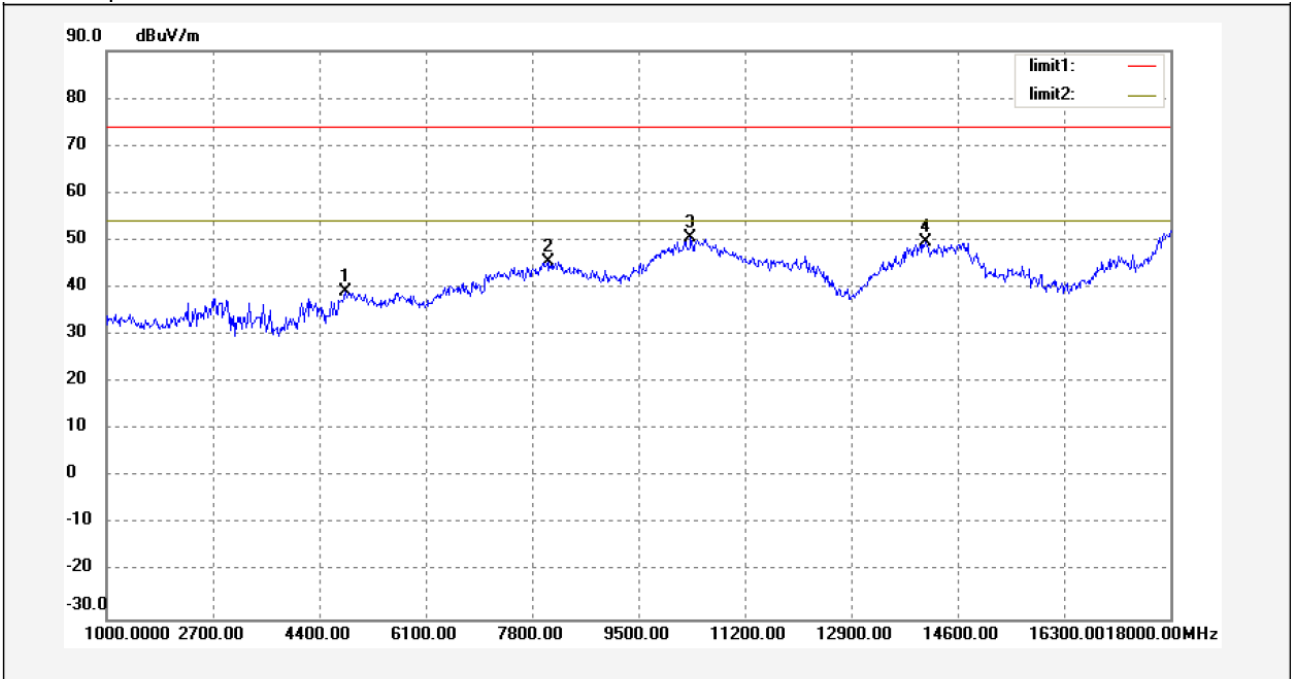
Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	4338.677	35.84	7.16	43.00	74.00	-31.00	peak	
2	7353.707	29.64	16.06	45.70	74.00	-28.30	peak	
3	10334.669	30.10	20.72	50.82	74.00	-23.18	peak	

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Antenna polarization: Horizontal



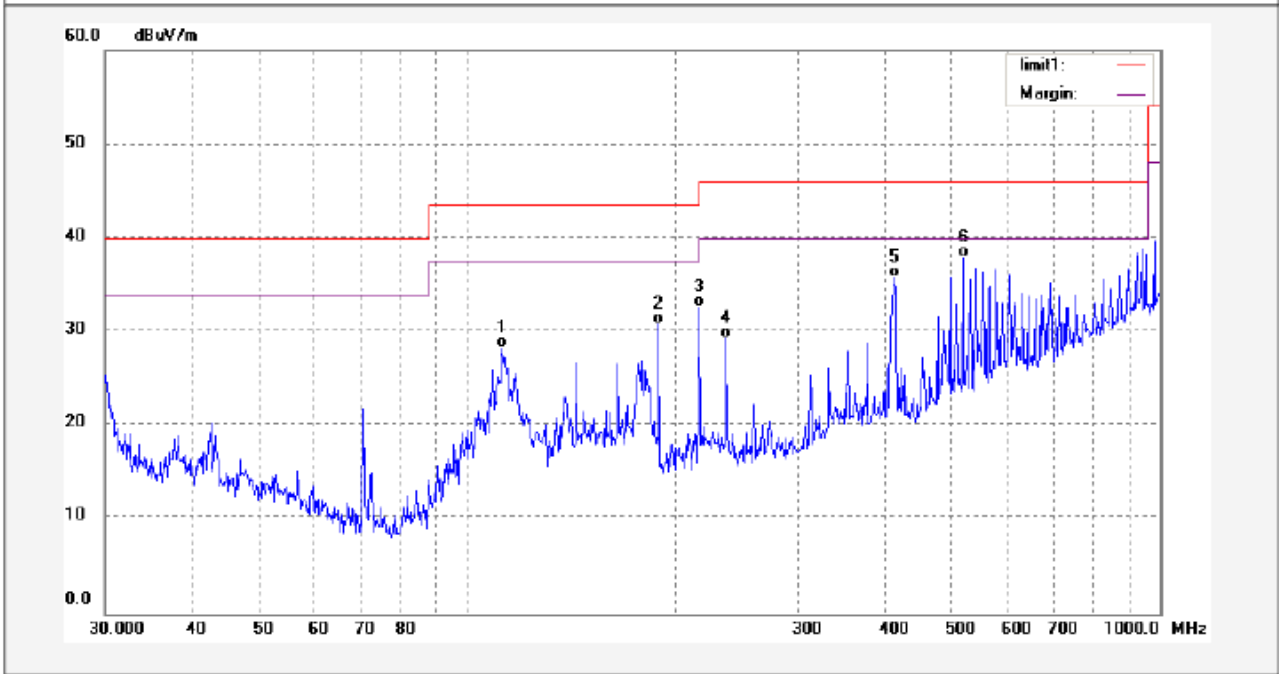
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	4815.631	34.38	4.77	39.15	74.00	-34.85	peak	
2	8052.104	30.68	14.91	45.59	74.00	-28.41	peak	
3	10334.669	32.56	18.05	50.61	74.00	-23.39	peak	
4	14082.164	26.66	23.01	49.67	74.00	-24.33	peak	

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Test mode 1b: continuous transmitting mode

Remark: The pre-test were performed at the upper, middle and lower channels. And the worst case was the middle Channel mode, so the data show was the middle channel mode only.
 Because the emissions below 30MHz are more than 20dB below the limit, the data is not shown in the report.
 Test Frequency: 30MHz ~ 1000MHz

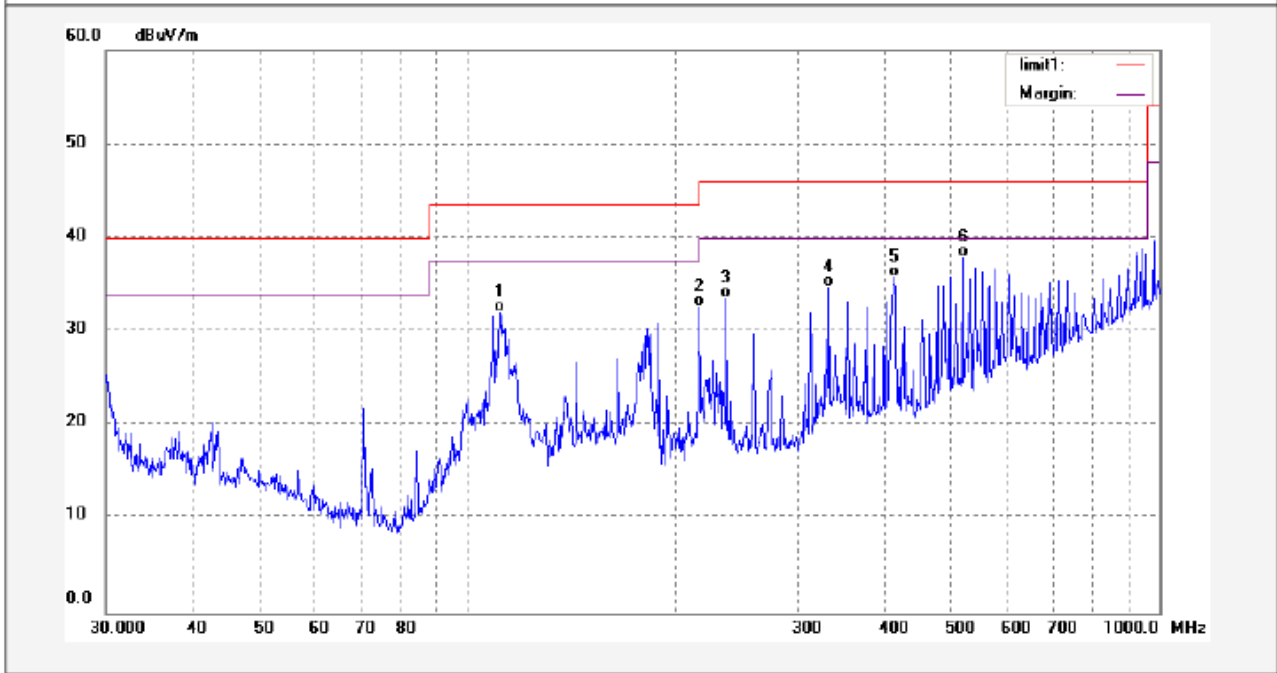
Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	112.4271	15.09	13.19	28.28	43.50	-15.22	QP	
2	189.1076	16.75	14.02	30.77	43.50	-12.73	QP	
3	216.1197	17.27	15.33	32.60	46.00	-13.40	QP	
4	236.7928	13.65	15.66	29.31	46.00	-16.69	QP	
5	413.9915	14.55	21.24	35.79	46.00	-10.21	QP	
6	520.2078	14.32	23.55	37.87	46.00	-8.13	QP	

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Antenna polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	111.2483	18.63	13.46	32.09	43.50	-11.41	QP	
2	216.1197	17.27	15.33	32.60	46.00	-13.40	QP	
3	236.7928	17.86	15.66	33.52	46.00	-12.48	QP	
4	332.9536	15.33	19.47	34.80	46.00	-11.20	QP	
5	413.9915	14.55	21.24	35.79	46.00	-10.21	QP	
6	520.2078	14.32	23.55	37.87	46.00	-8.13	QP	

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Test Frequency: 1GHz ~ 25GHz radiation test data
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	Horizontal	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

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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

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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

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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

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8 Band Edge Measurements

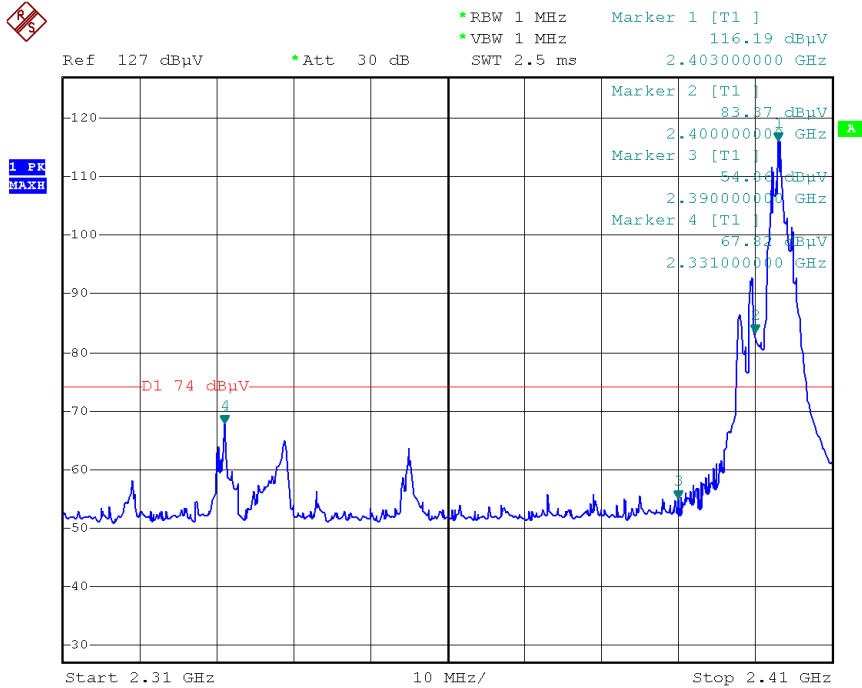
Test Requirement:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. As defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	KDB Publication No. 558074
Measurement Distance:	3m
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. 74.0 dBuV/m for peak above 1GHz 54.0 dBuV/m for AVG above 1GHz

8.1 Test Procedure:

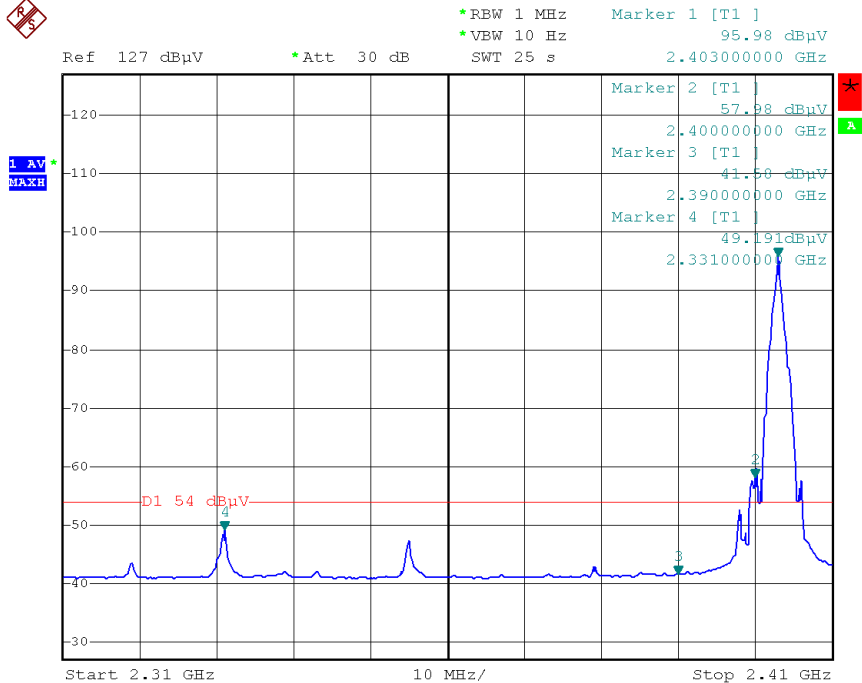
Detector:	For Peak value: RBW = 1 MHz for $f \geq 1$ GHz VBW \geq RBW; Sweep = auto Detector function = peak Trace = max hold For AVG value: RBW = 1 MHz for $f \geq 1$ GHz VBW = 10Hz; Sweep = auto Detector function = AVG Trace = max hold
Test mode:	Test in fixing operating frequency at lower, middle, upper channel.

8.2 Test Result:

Lower Channel – Peak

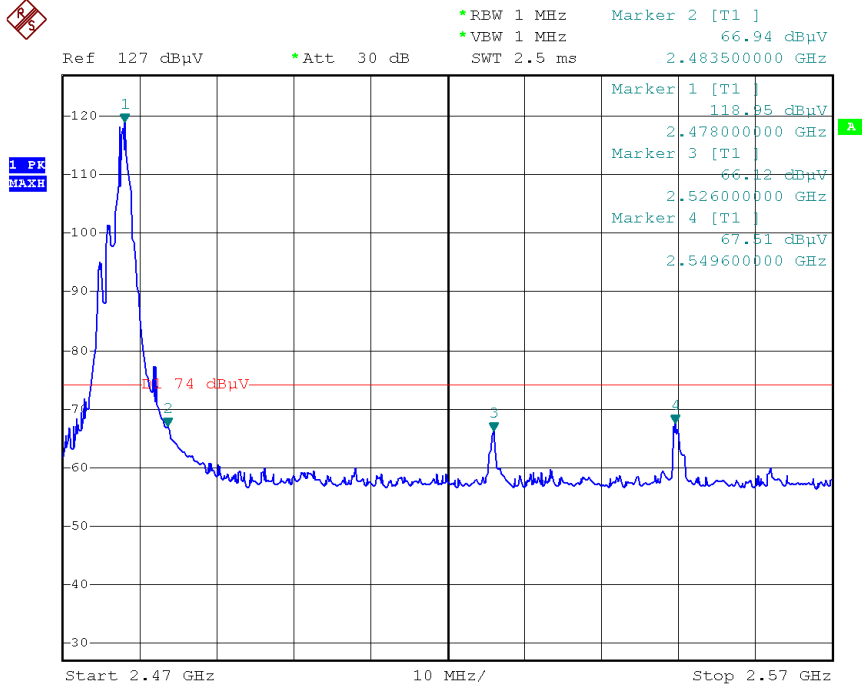


Lower Channel – AV

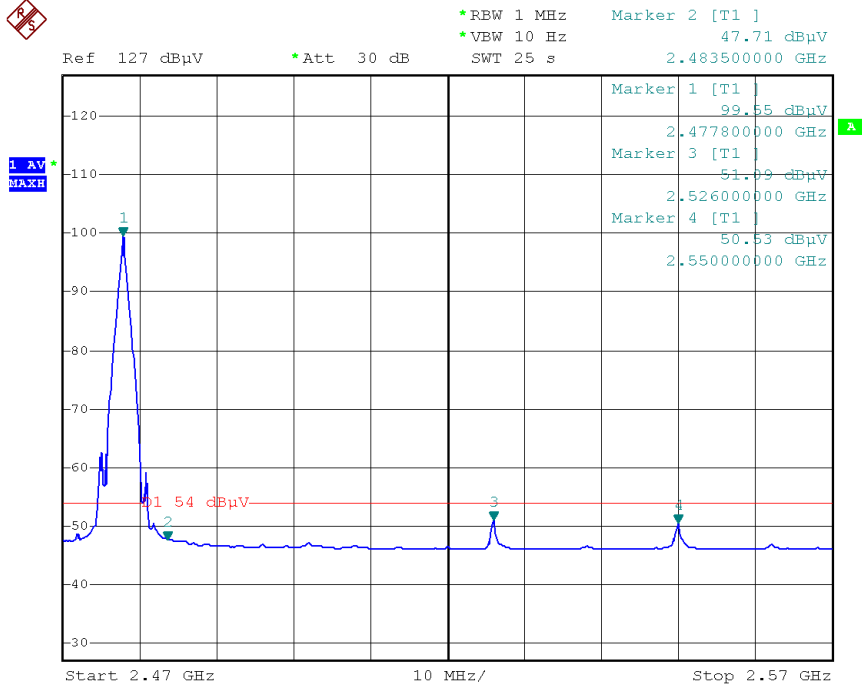


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Upper Channel – Peak



Upper Channel – AV



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9 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247
 Test Method: KDB Publication No. 558074
 Test Mode: Test in fixing operating frequency at lower, middle, upper channel.

9.1 Test Procedure:

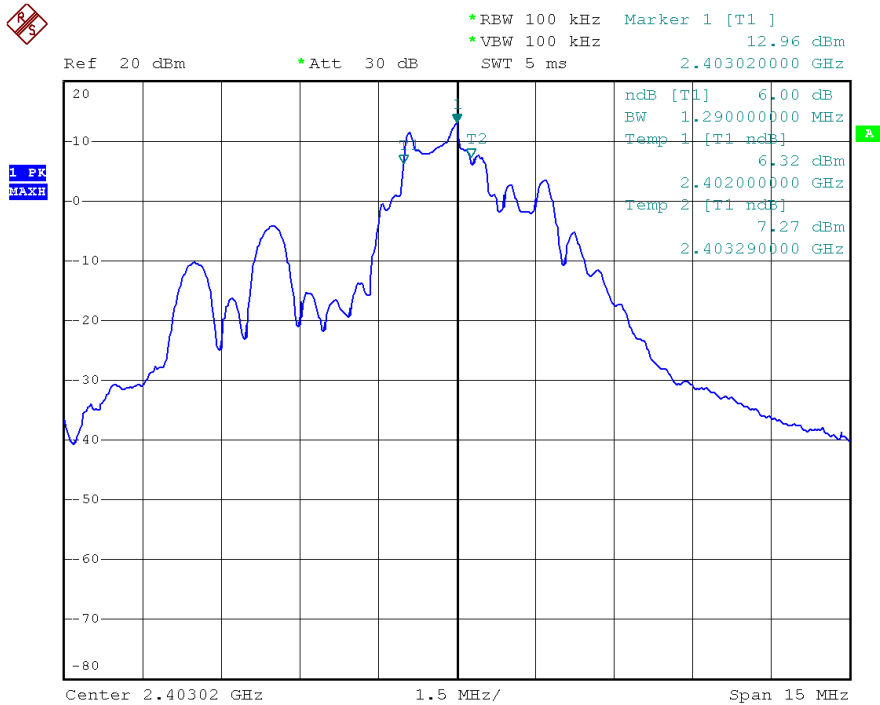
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 1MHz, VBW = 1MHz

9.2 Test Result:

Test Channel	Bandwidth
Lower	1.29MHz
Middle	1.44MHz
Upper	0.93MHz

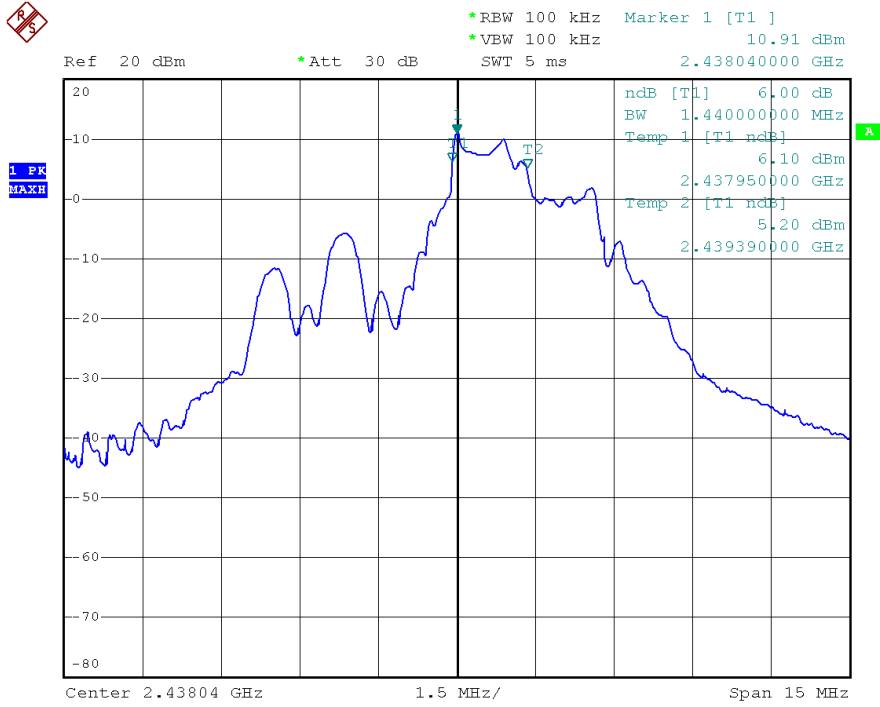
Test result plot as follows:

Lower Channel

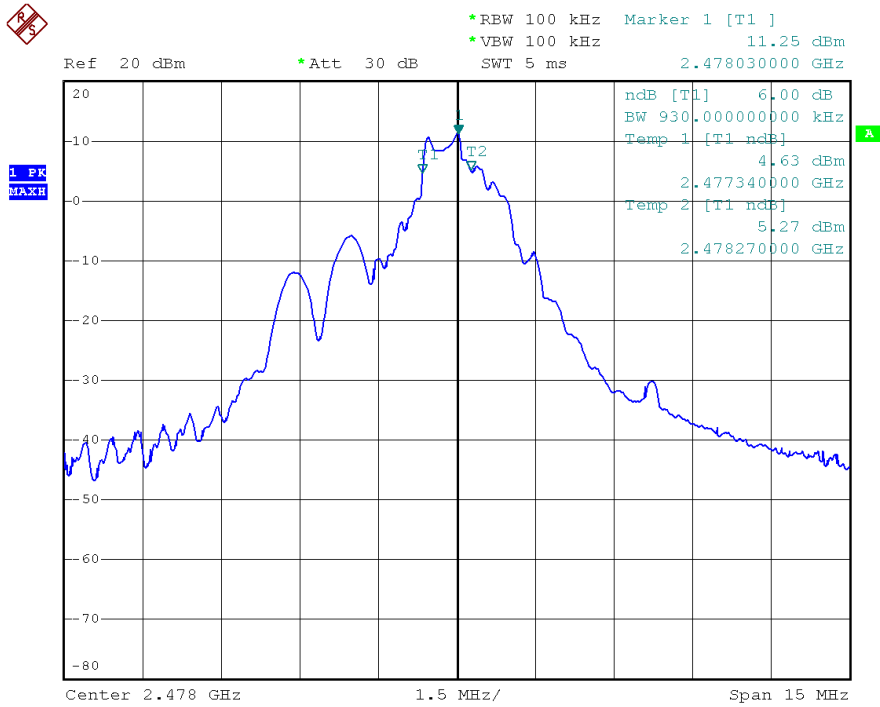


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Middle Channel



Upper Channel



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10 Maximum Peak Output Power

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB Publication No. 558074
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 lower, middle, upper channel.

10.1 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.

10.2 Test Result:

Test Channel	Output Power (dBm)	Limit (dBm)
Lower	13.99	30
Middle	12.46	30
upper	12.06	30

11 Power Spectral Density

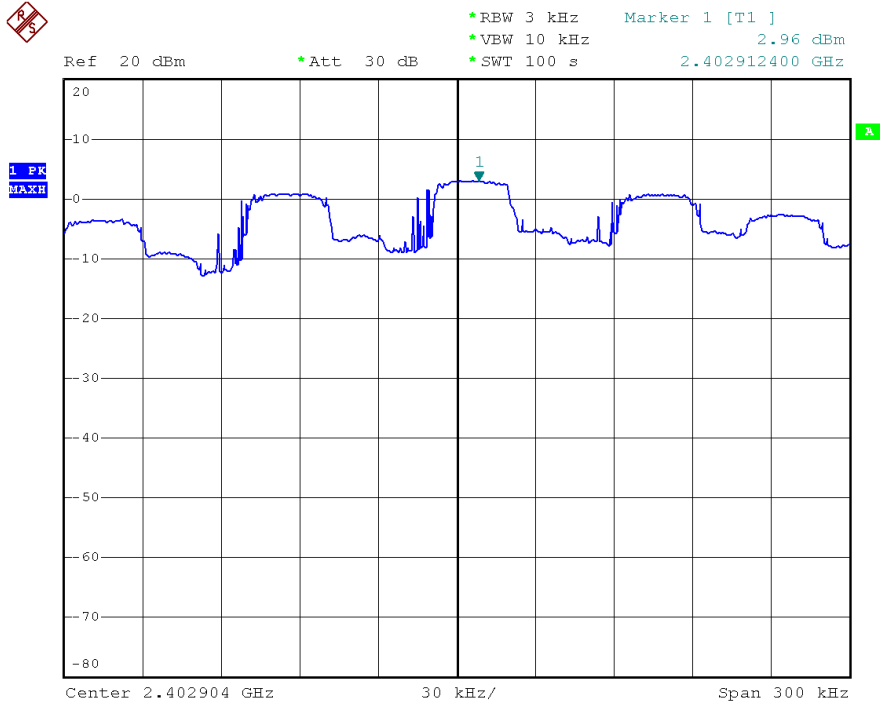
Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB Publication No. 558074
Test Limit:	Regulation 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time 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 lower, middle, upper channel.

11.1 Test Procedure:

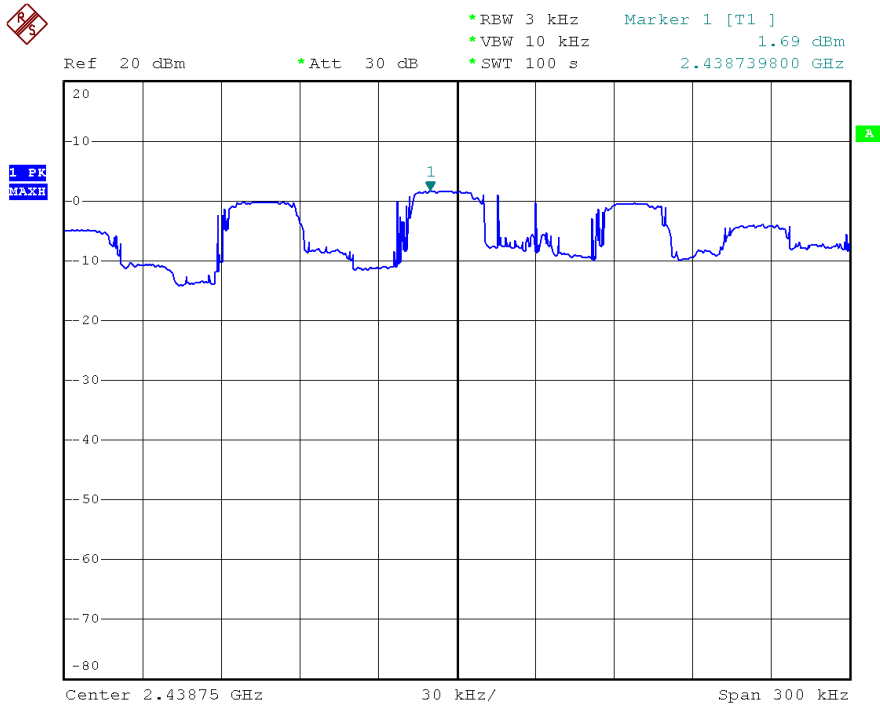
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 300kHz. Sweep = 100s; Detector Function = Peak. Trace = Max hold.

11.2 Test Result:

Test result plot as follows:
Lower Channel:

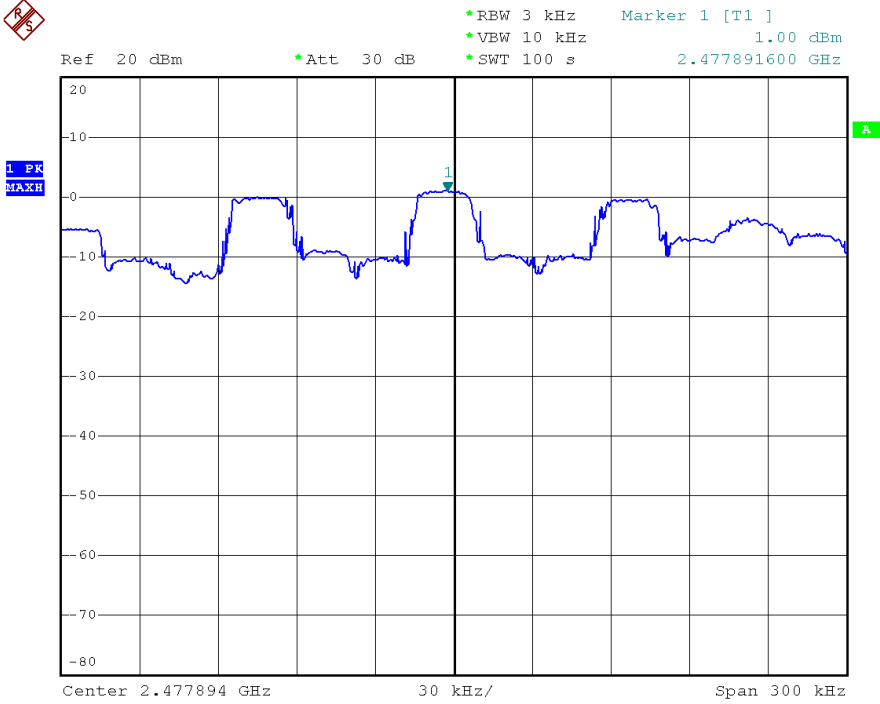


Middle Channel



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Upper Channel



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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 PCB printed antenna, fulfil the requirement of this section.

13 RF Exposure

13.1 Requirements:

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

13.2 Measurement Result:

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

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MPE Calculation Method

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

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

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

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/cm ²)	Limit of Power Density (S) (mW/cm ²)	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

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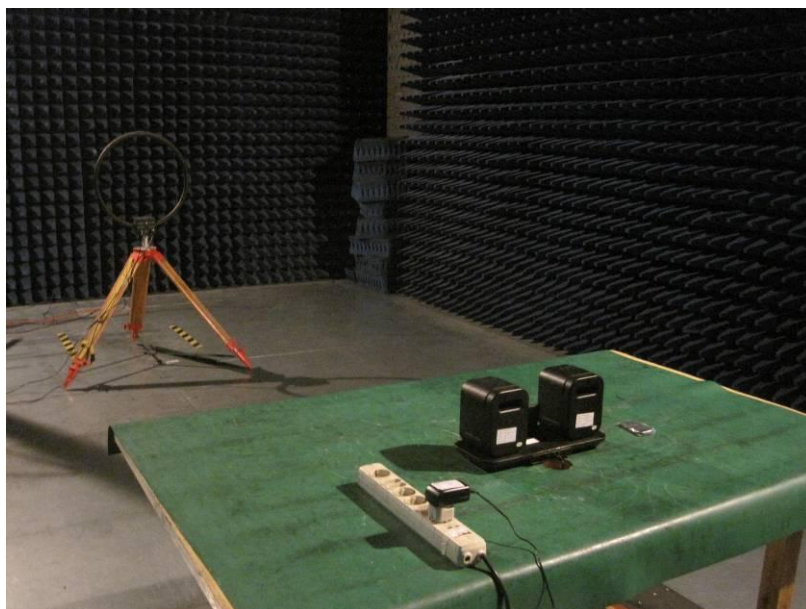
14 Photographs –Test Setup

14.1 Conduction Emission

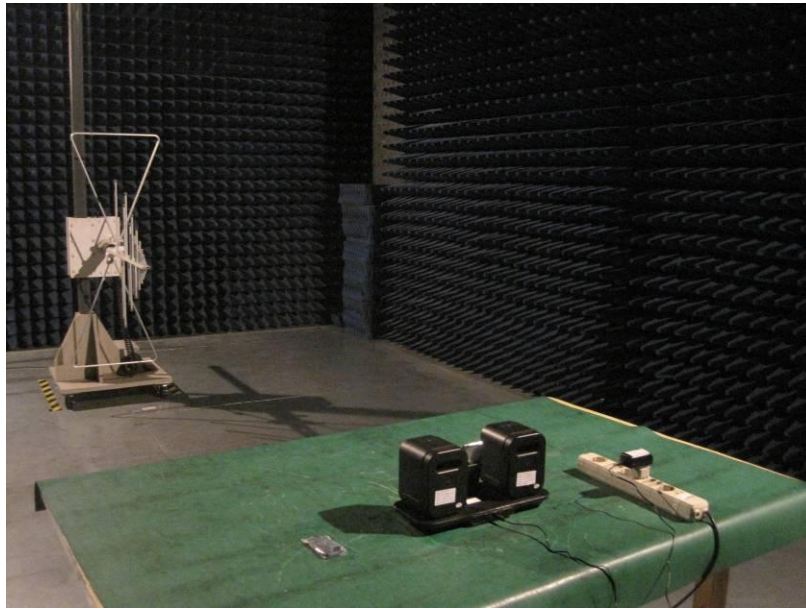


14.2 Radiation Spurious Emission

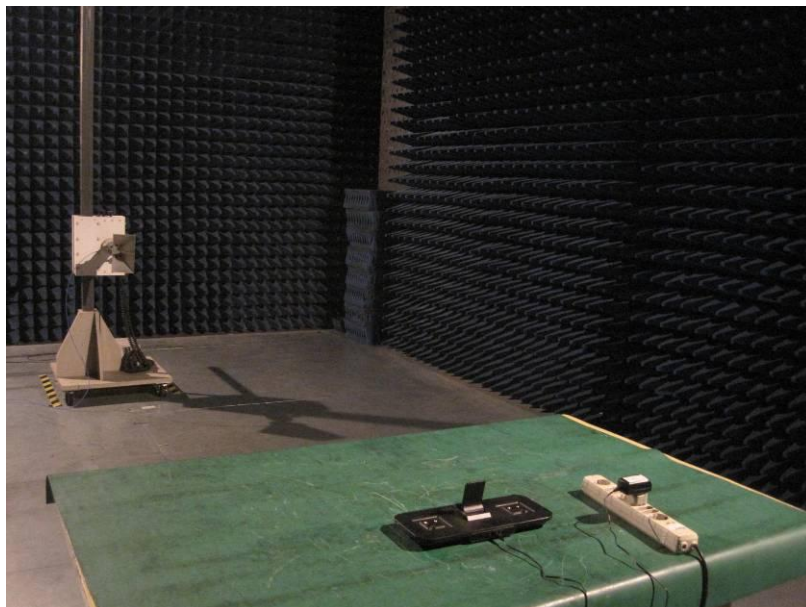
Below 30MHz



From 30-1000MHz



Above 1GHz



15 Photographs - Constructional Details

15.1 EUT – Appearance View



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Reference No.: WT12074508-D-S-F



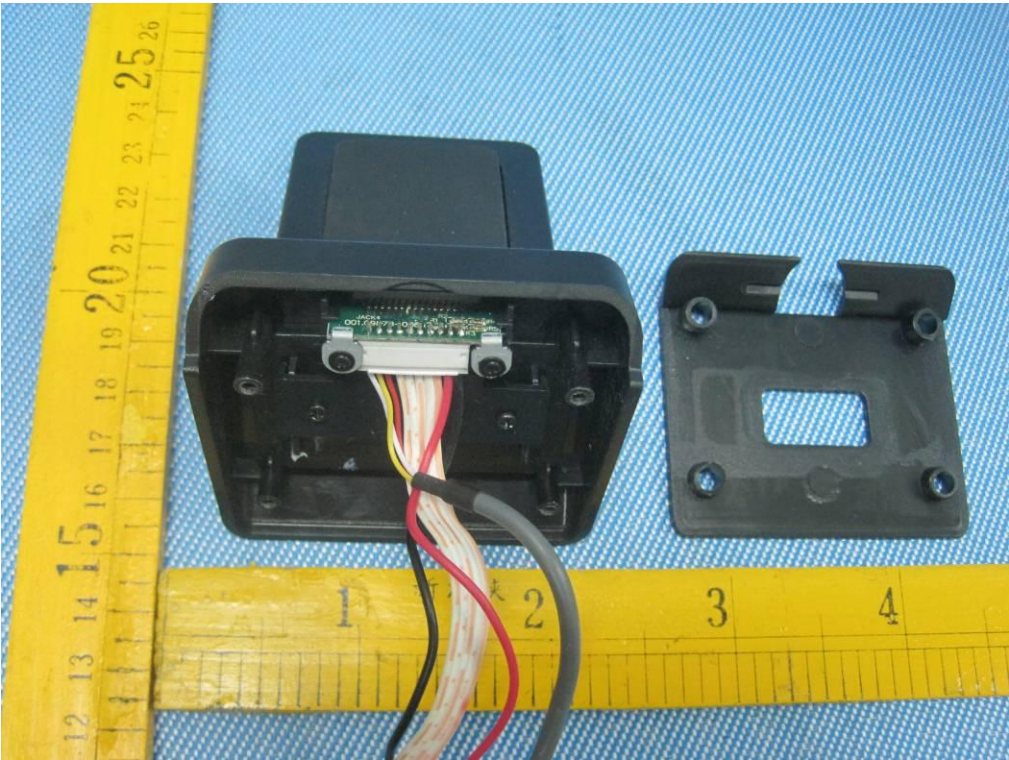
15.2 Adapter – Appearance View



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Reference No.: WT12074508-D-S-F

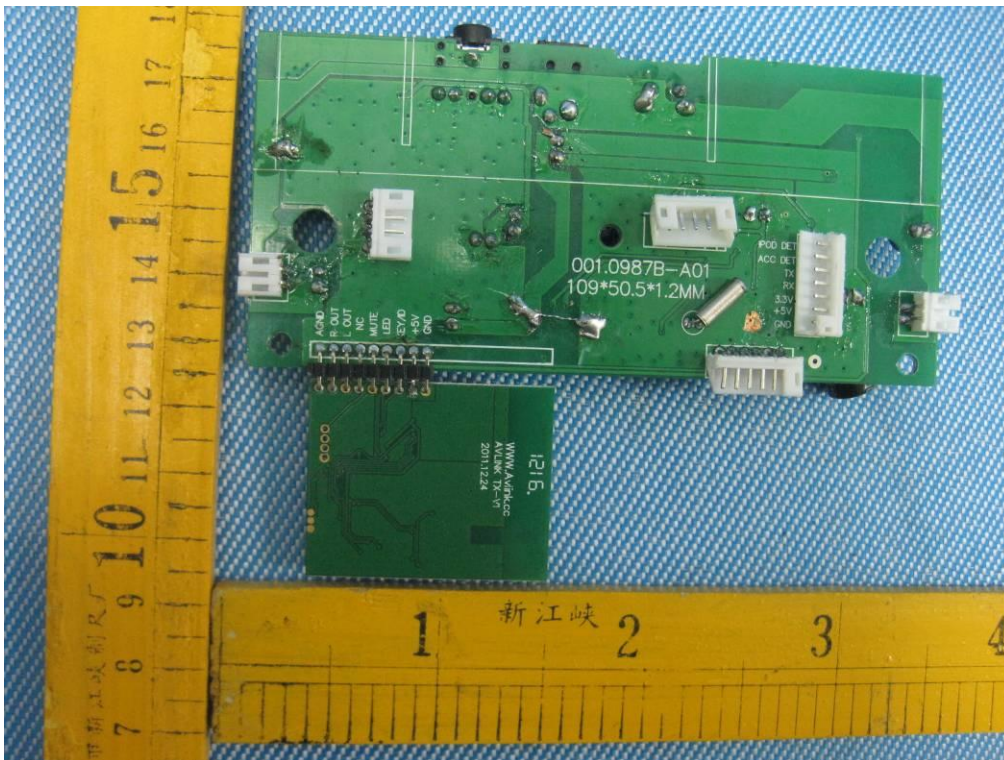
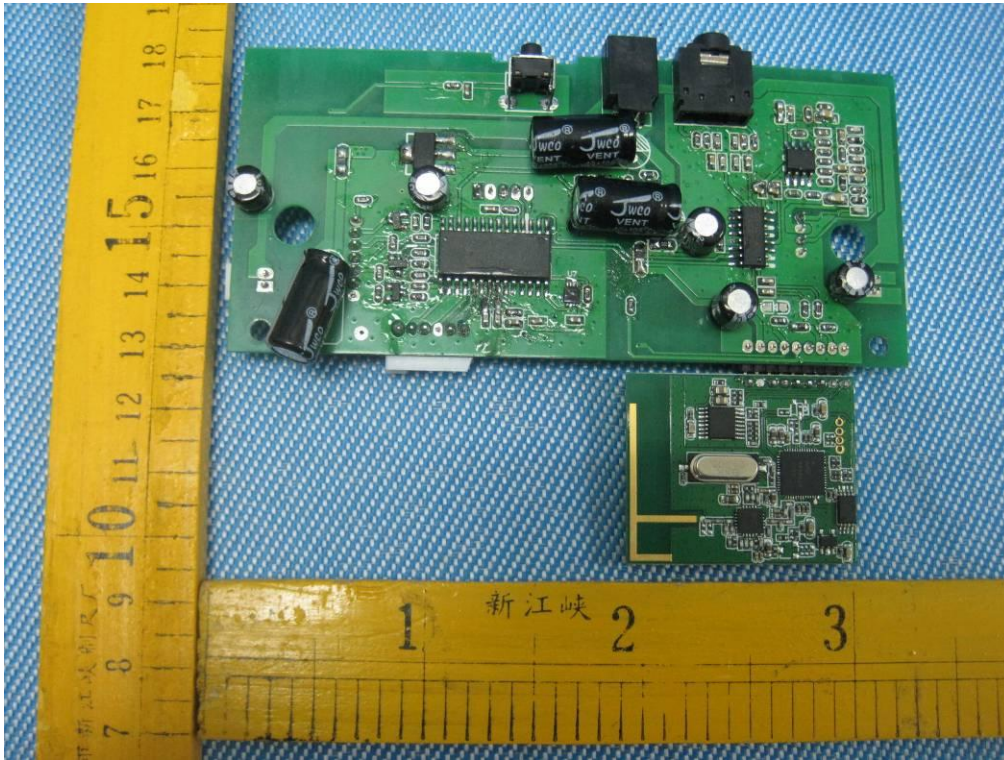
15.3 EUT- Open View



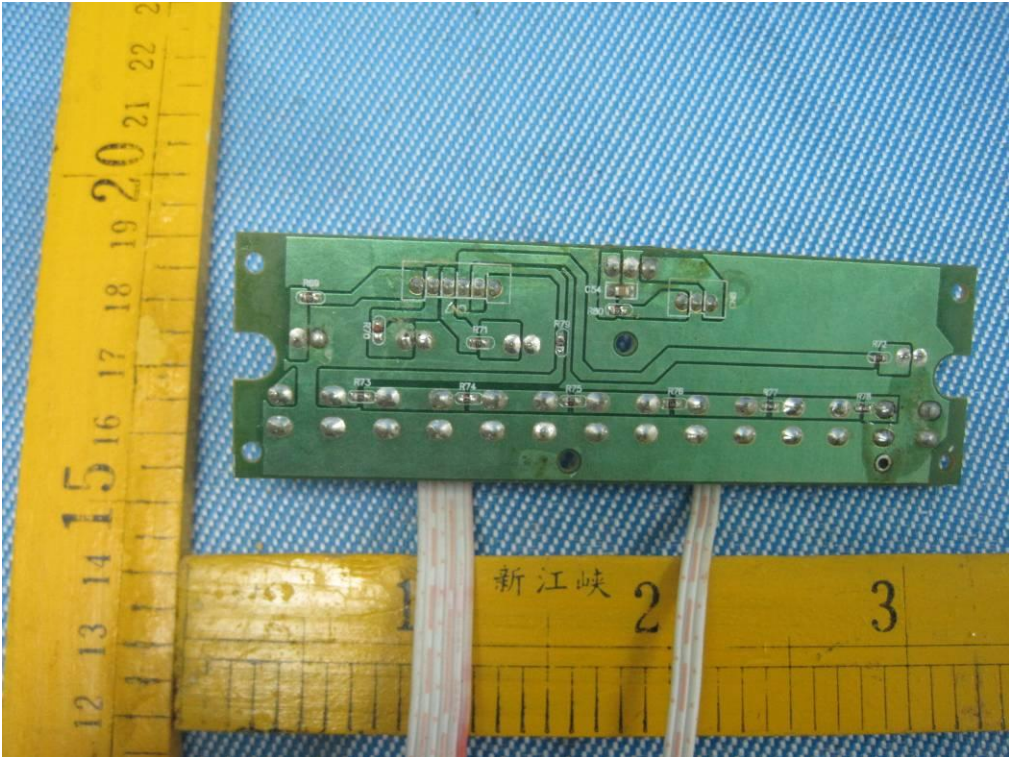
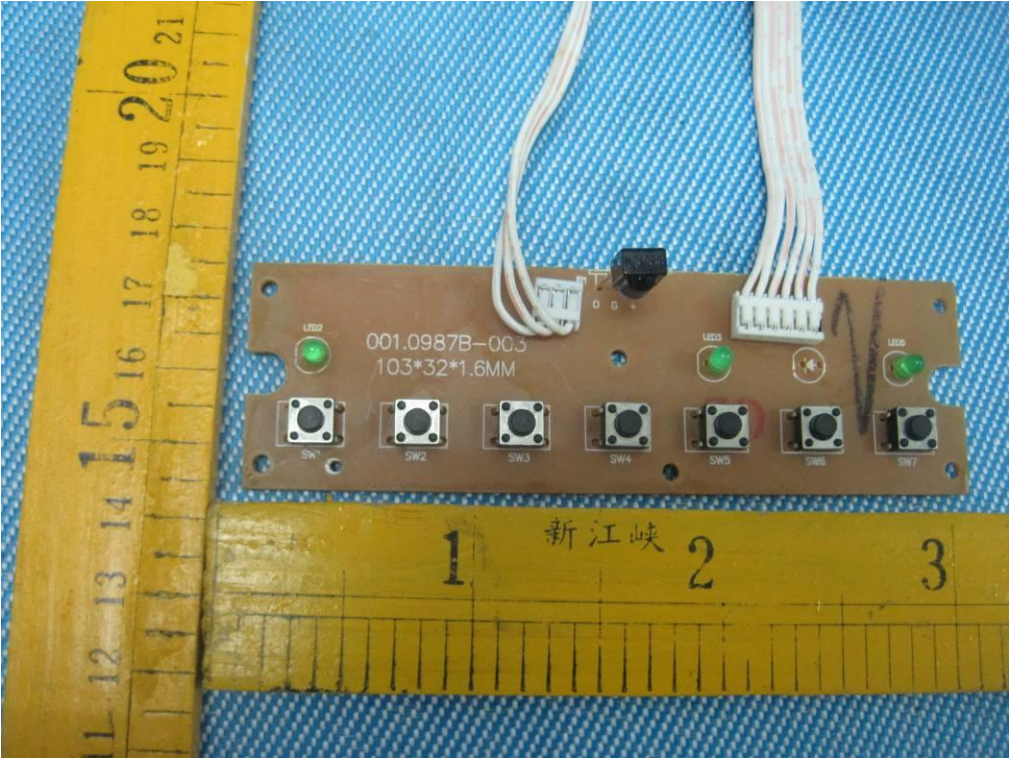
The results shown in this test report refer only to the sample(s) tested, This Test report cannot be reproduced, except in full, without prior written permission of the Company.
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15.4 EUT – PCB1 View



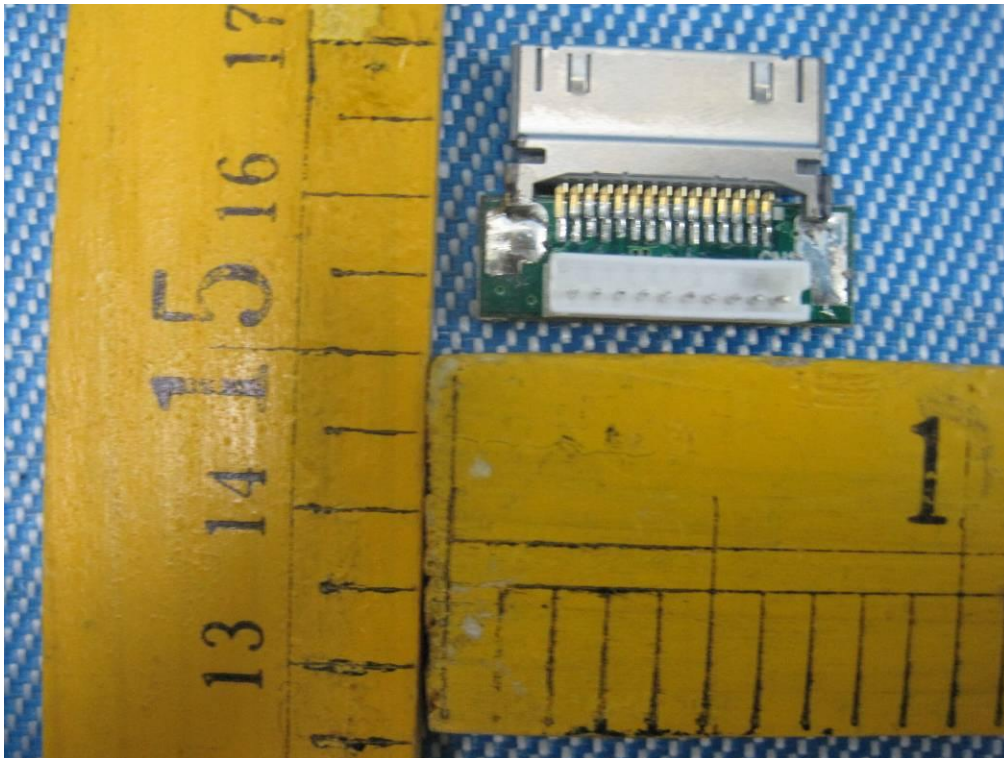
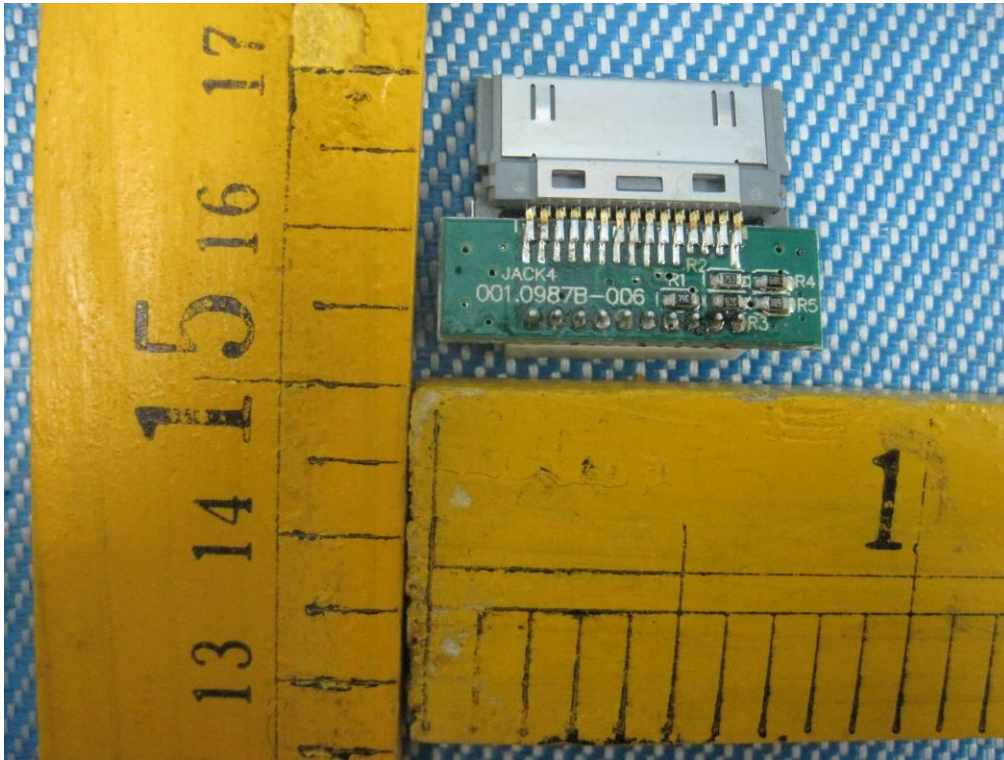
15.5 EUT – PCB2 View



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Reference No.: WT12074508-D-S-F

15.6 EUT – PCB3 View



16 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 Back View/ proposed FCC Label Location

