FCC TEST REPORT

FCC ID : SJ8-M900

Applicant : RDI Technology (Shenzhen) Co., Ltd
Address of Applicant : Building C1 Xingtang Industrial Park, East Baishixia, Fuyong, Baoan, Shenzhen, PRC.

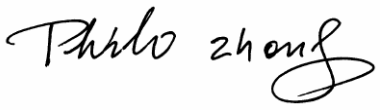
Equipment Under Test (EUT) :

Product description : Digital Wireless Monitor
Model No. : M900
Frequency Range : 2402MHz to 2478MHz

Standards : FCC 15 Paragraph 15.247

Date of Test : Aug.12,2010

Test Engineer : (Olic huang) 

Reviewed By :(Philo zhong) 

PERPARED 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

2 Contents

3 Test Summary

Test Items	Test Requirement	Test Method	Limit / Severity	Result
Maximum peak output power	FCC Part 15:2008	ANSI C63.4: 2003	20dBm	PASS
Restricted Band	FCC Part 15:2008	ANSI C63.4: 2003	Note	PASS
Dwell time	FCC Part 15:2008	ANSI C63.4: 2003	Maximum:0.4 s	PASS
Channel separation	FCC Part 15:2008	ANSI C63.4: 2003	Channel separation at least 1MHz	PASS
Hopping channel No.	FCC Part 15:2008	ANSI C63.4: 2003	As the test data	PASS
20-dB Bandwidth	FCC Part 15:2008	ANSI C63.4: 2003	Note	PASS
RF Exposure Test	FCC Part 15:2008	ANSI C63.4: 2003	Note	PASS
Mains Terminal Disturbance Voltage, 150kHz to 30MHz	FCC Part 15:2008	ANSI C63.4: 2003	N/A	PASS
Radiation Emission, 30MHz to 25GHz	FCC Part 15:2008	ANSI C63.4: 2003	N/A	PASS

Note : denote that for more details of the EUT , please refer to the relating test items as below .

Remark : the methods of measurement in all the test items were according to the FCC Public Notice DA 00-705 .

4 General Information

4.1Client Information

Applicant:	RDI Technology (Shenzhen) Co., Ltd
Address of Applicant:	Building C1 Xingtang Industrial Park,East Baishixia, Fuyong,Baoan, Shenzhen,PRC.
Manufacturer:	RDI Technology (Shenzhen) Co., Ltd
Address of Manufacturer:	Building C1 Xingtang Industrial Park,East Baishixia, Fuyong,Baoan, Shenzhen,PRC..

4.2General Description of E.U.T.

Product description:	Digital Wireless Monitor
Model No.:	M900

4.3Details of E.U.T.

Power Supply:	Adapter Input:AC 100-240V ~50/60Hz, 0.5A Output: DC 5.0V,2.0A

4.4Description of Support Units

The EUT has been tested as an independent unit.

4.5Standards Applicable for Testing

The customer requested FCC tests for a Digital Wireless Monitor. The standards used were FCC 15 Paragraph 15.247,Paragraph 15.205, Paragraph 15.207,Paragraph 15.209, Paragraph 15.31,Paragraph 15.33, Paragraph 15.35.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **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,June 24，2008.

- **IC – Registration No.:IC 7760A**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory 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 IC7760A,Aug.03，2008.

4.7 Test Location

All Emissions testswere performed at:-
1/F, Fukangtai Building,West Baima Rd.,Songgang Street, Baoan District, Shenzhen 518105, Guangdong,China.

Remark : All the test results of the peripherals were conformed to the Fcc Verification requirements.

4.8 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug-09	Aug-10	Wws20081596	±1dB
Trilog Broadband Antenne 30-3000 MHz	SCHWARZBECK MESS-ELEKTROM / VULB9163	336	W2008002	30-3000 MHz	Aug-09	Aug-10		±1dB
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM / VULB9163	667	W2008003	1-18GHz	Aug-09	Aug-10		f＜10 GHz：±1dB 10GHz＜f＜18 GHz：±1.5dB
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM / BBV 9718	9718-148	W2008004	0.5-18GHz	Aug-09	Aug-10		±1.2dB
10m Coaxial Cable with N-male Connectors usable up to 25GHz,	SCHWARZBECK MESS-ELEKTROM / AK 9515 H	-	-	-	Aug-09	Aug-10		-
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connector	SCHWARZBECK MESS-ELEKTROM / AK 9513				Aug-09	Aug-10		
Positioning Controller	C&C LAB/ CC-C-IF				N/A	N/A		
Color Monitor	SUNSPO/ SP-14C				N/A	N/A		
Test Receiver	ROHDE&SCHWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug-09	Aug-10	Wws20080942	±1dB
EMI Receiver	Beijingkehuan	KH3931		9k-1GHz	Aug-09	Aug-10		
Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug-09	Aug-10	Wws20080941	±10%

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
Absorbing Clamp	ROHDE&SCHWARZ/ MDS-21	100205	W2005003	impandance50 Ω loss ： 17 dB	Aug-09	Aug-10	Wws20080943	±1dB
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM / AK 9514				Aug-09	Aug-10		
Digital Power Analyzer	Em Test AG/Switzerland/ DPA 500	V0745103095	W2008012	Power：2000VA Vol-range：0-300V Freq_range：10-80Hz	Aug-09	Aug-10	Wwd20081185	Voltage distinguish:0.025% Power_freq distinguish:0.02Hz
Power Source	Em Test AG/Switzerland/ ACS 500	V0745103096	W2008013	Vol-range：0-300V Power_freq：10-80Hz				
Electrostatic Discharge Simulator	Em Test AG/Switzerland/DITO	V0745103094	W2008005	Contact discharge：500V-10KV Air diacharge：500V-16.5KV	Aug-09	Aug-10	Wwc20082400	7.5A current will be changed in V_m=1.5V
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range：9K-1GHz RF voltage：-60 dBm-+10dBm	Aug-09	Aug-10	Wws20081890	Power_freq distinguish0.1Hz RFeletricity distinguish 0.1 B
CDN M-Type	TESEQ GmbH/ CDN M016	25112	W2008009	Voltage correct factor 9.5 dB	Aug-09	Aug-10	Wwc20082396	150K-80MHz：±1dB 80-230MHz:-2-+3dB
EM-Clamp	TESEQ GmbH/ KEMZ 801	25453	W2008010	Freq_range：0.15-1000 MHz	Aug-09	Aug-10	Wwc20082397	0.3-400 MHz：±4dB Other freq：±5dB
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365			Aug-09	Aug-10	Wws20081597	

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
All Modules Generator	SCHAFFNER/6150	34579	W2008006	voltage:200V-4.4KV Pulse current：100A-2.2KA	Aug-09	Aug-10	Wwc20082401	voltage: ±10% Pulse current：±10%
Capacitive Coupling Clamp	SCHAFFNER/ CDN 8014	25311			Aug-09	Aug-10	Wwc20082398	-
Signal and Data Line Coupling Network	SCHAFFNER/ CDN 117	25627	W2008011	1.2/50μS	Aug-09	Aug-10	Wwc20082399	-
AC Power Supply	TONGYUN/ DTDGC-4				Aug-09	Aug-10	Wws20080944	-
Exposure Level Tester ELT-400	Narda Safety TEST Solutions/2304/03	M-0155	w2008022	Test freq range：1—400kHz	Aug-09	Aug-10	Wwd20081191	Test uncertainly：1—120kHz:±1.83%, 120 kHz-400 kHz: ±4.06%
Magnetic Field Probe 100cm^2	Narda Safety TEST Solutions/2300/90.10	M-1070	w2008021	Test freq range：1—400kHz				Test uncertainly：1Hz-10Hz: ±16.2%, 10Hz - 120kHz:±2.2%, 120 kHz-400 kHz: ±4.7%
Active Loop Antenna Charger 10kHz-30MHz	Beijing Dazhi / ZN30900A	-	-	10kHz-30MHz	Aug-09	Aug-10		±1dB

5 Conducted Emission Test

Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	Aug.12,2010
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

5.1Test Equipment

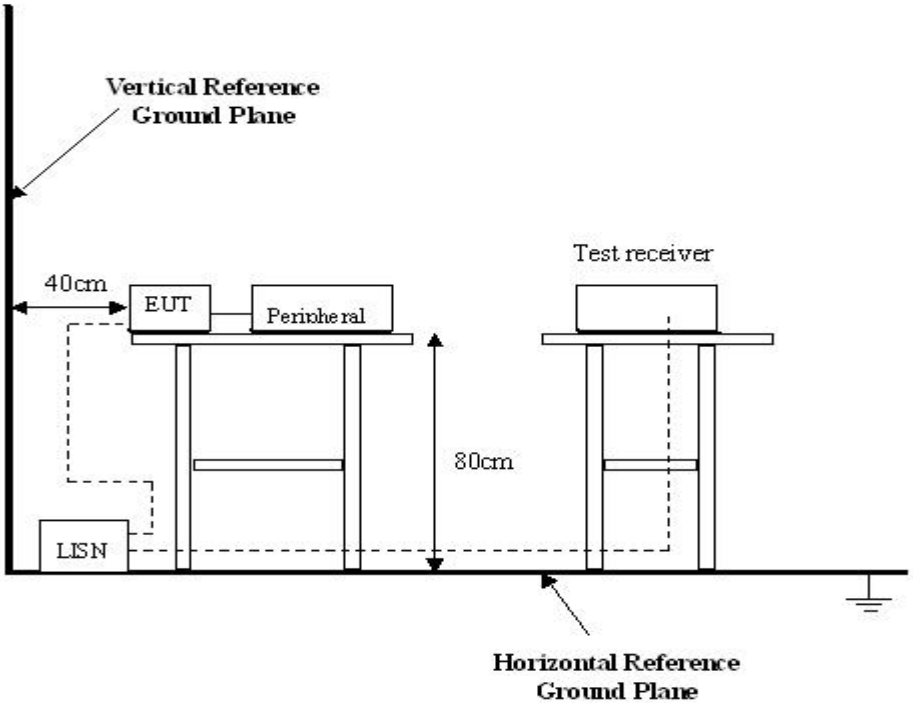
Please refer to Section 5 this report.

5.2Test Procedure

1. The EUT was connected to LISN and placed on a table.
2. The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.
3. 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.

5.3 Conducted Test Setup

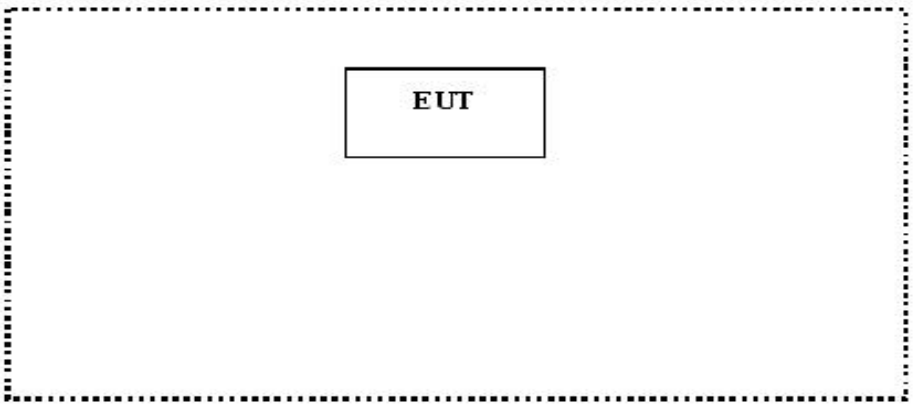
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



5.4EUT Operating Condition

Operating condition is according to ANSI C63.4:2003.

A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
C. Modulate output capacity of EUT up to specification.



5.5Conducted Emission Limits

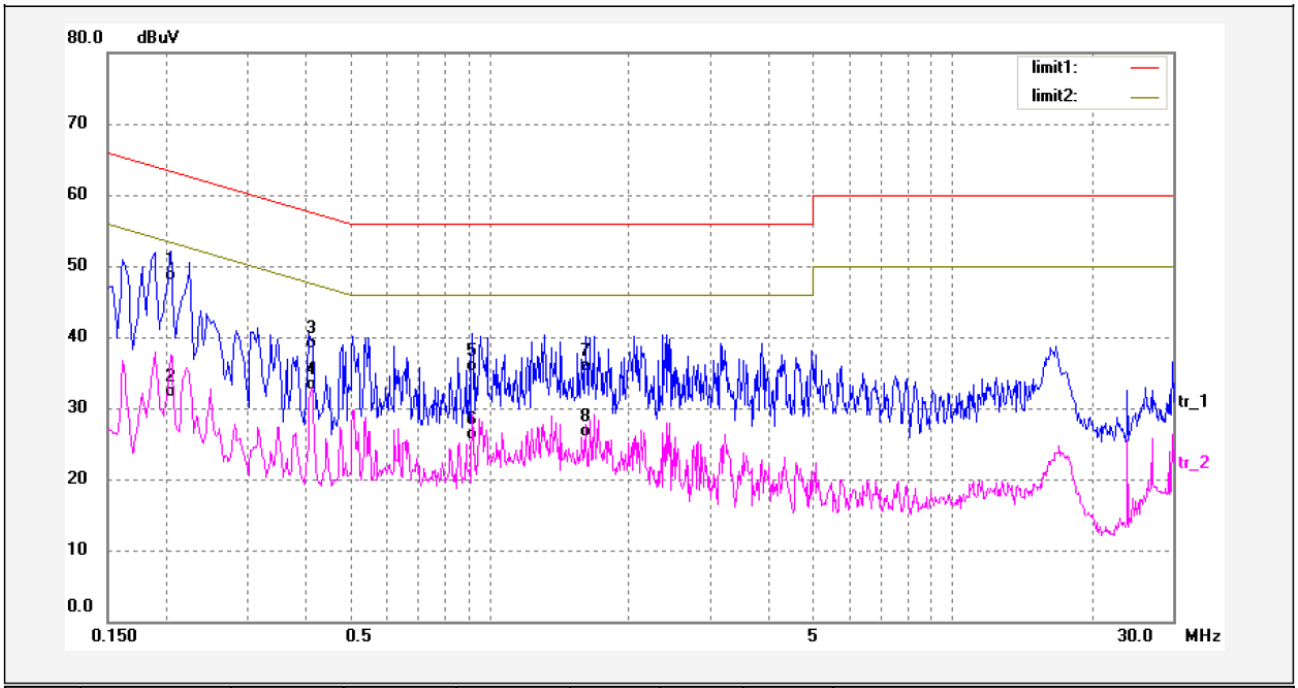
66-56 dBμV between 0.15MHz & 0.5MHz
56 dBμV between 0.5MHz & 5MHz
60 dBμV between 5MHz & 30MHz

Note: In the above limits, the tighter limit applies at the band edges.

5.6 Conducted Emission Test Data

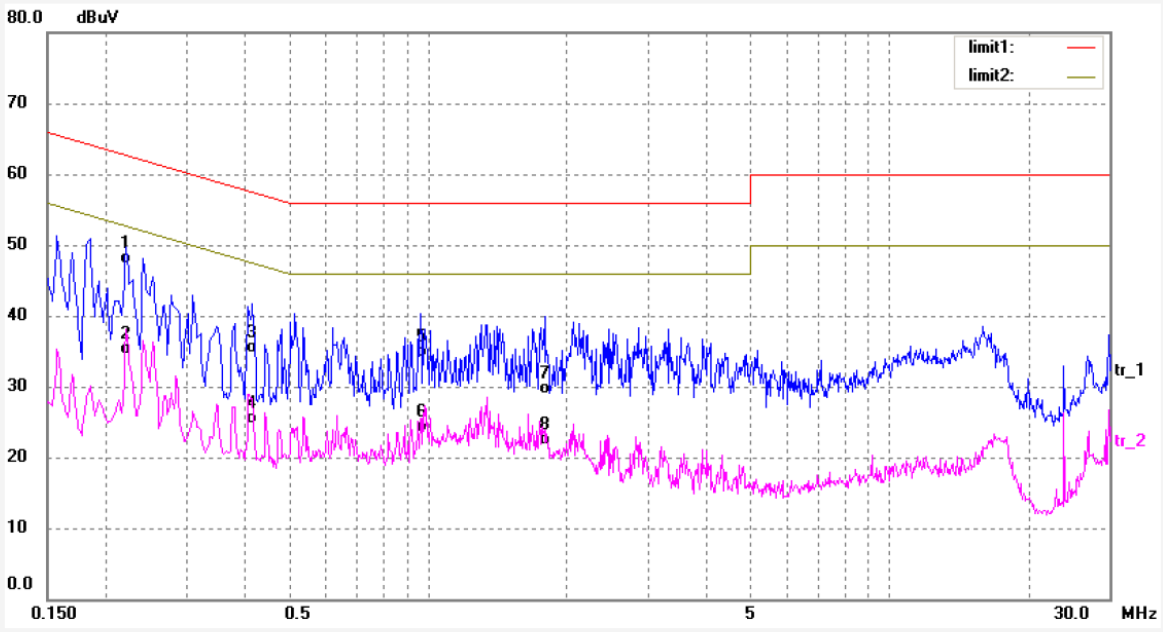
Remark: the EUT was tested in the modes:wireless normal link and AV/OUT mode,SD mode and the worse case was the wireless normal link.so the data show was the wireless normal link mode only.

Live Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2060	37.17	10.67	47.84	63.36	-15.52	QP	
2	0.2060	20.88	10.67	31.55	53.36	-21.81	AVG	
3	0.4100	27.55	10.70	38.25	57.65	-19.40	QP	
4	0.4100	21.90	10.70	32.60	47.65	-15.05	AVG	
5	0.9220	23.80	11.38	35.18	56.00	-20.82	QP	
6	0.9220	14.16	11.38	25.54	46.00	-20.46	AVG	
7	1.6180	22.99	12.20	35.19	56.00	-20.81	QP	
8	1.6180	13.70	12.20	25.90	46.00	-20.10	AVG	

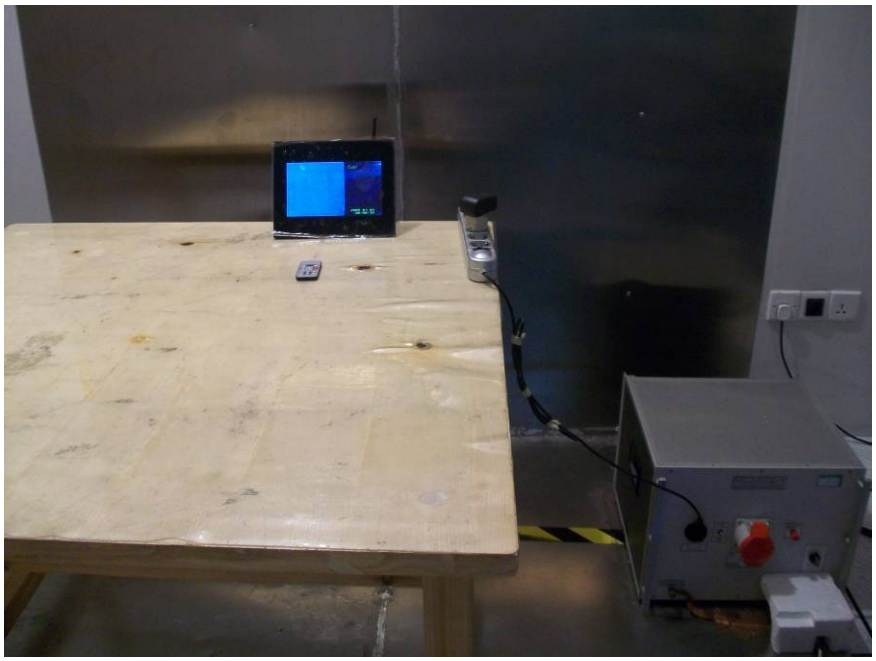
Neutral Line



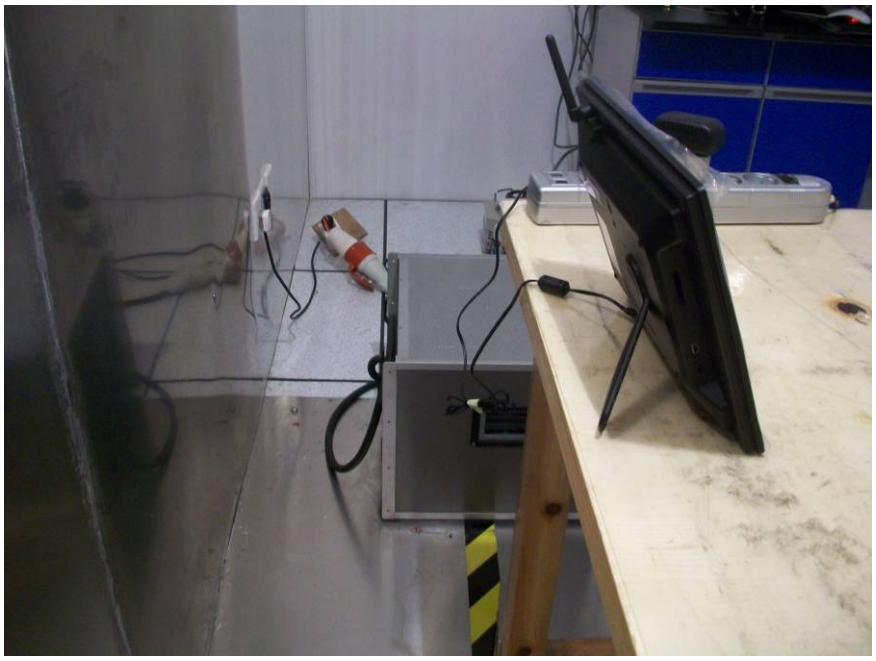
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2220	36.64	10.66	47.30	62.74	-15.44	QP	
2	0.2220	23.92	10.66	34.58	52.74	-18.16	AVG	
3	0.4180	24.06	10.71	34.77	57.49	-22.72	QP	
4	0.4180	13.93	10.71	24.64	47.49	-22.85	AVG	
5	0.9660	22.30	11.84	34.14	56.00	-21.86	QP	
6	0.9660	11.64	11.84	23.48	46.00	-22.52	AVG	
7	1.7980	16.67	12.23	28.90	56.00	-27.10	QP	
8	1.7980	9.49	12.23	21.72	46.00	-24.28	AVG	

5.7 Conducted Emission Test Setup View

Test Front View



Test Back View



6 Radiation Emission Test

Test Requirement:	FCC Part15 Paragraph 15.247
Test Method:	Based on ANSI 63.4:2003
Test Date:	Aug.12,2010
Frequency Range:	30MHz to 25GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth)
	Quasi-Peak if maximised peak within 6dB of limit

6.1Test Equipment

Please refer to Section 5 this report.

6.2Measurement 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.

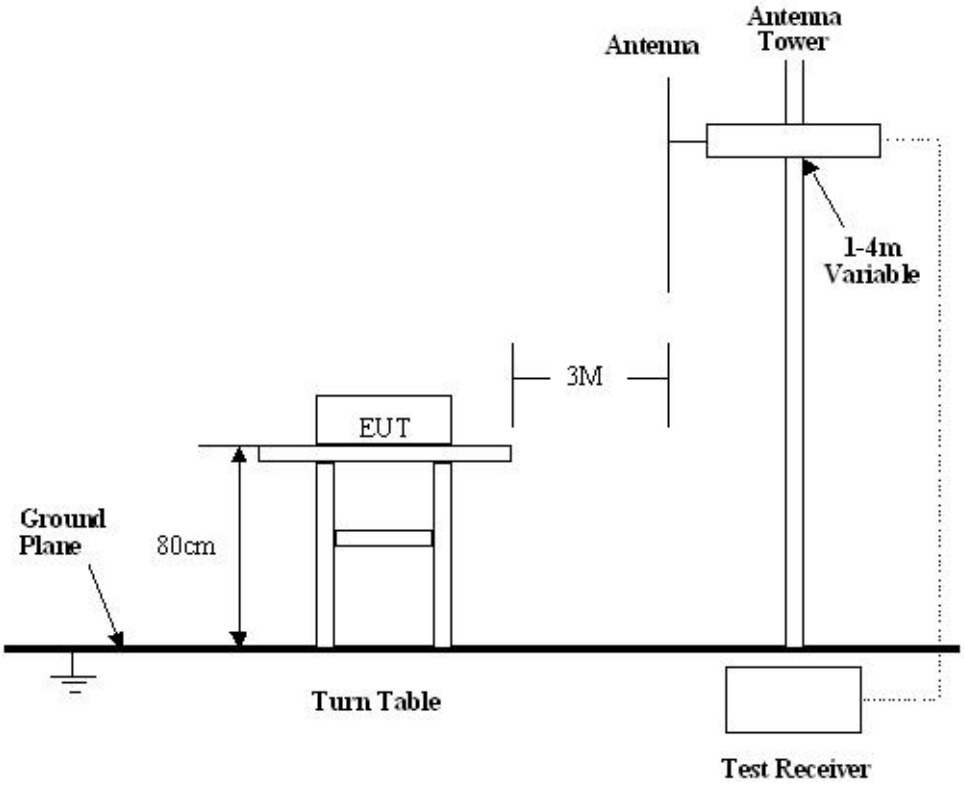
Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at WALTEK SERVICES EMC Lab is +/-5.03 dB.

6.3Test Procedure

1. The adapter was used in the equipment under test for radiated emissions test.
2. The radiation emission should be tested under the X position.So the data shown was the X position only.
3. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
4. All data was recorded in the peak and average detection mode.
5. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

6.4Radiated 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 specification used in this report was the FCC Part15 Paragraph 15.209 limits and Paragraph 15.247 limits.



6.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.247 Rules, the system was tested to 25000 MHz.
Below 1GHz

Start Frequency.....30 MHz
Stop Frequency .....1000 MHz
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.....1MHz
Quasi-Peak Adapter Bandwidth .....120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth 1MHz

6.6Corrected 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 -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Class B Limit

6.7 Summary of Test Results

According to the data in section 7.11, the EUT complied with the FCC Part15 Paragraph 15.247 standards.

6.8 EUT Operating Condition

The same as section 6.4 of this report.

Let the EUT work in test mode and test it.

6.9 Radiated Emissions Limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: (1) RF Voltage(dBuV)=20 log RF Voltage(uV)

(2) In the Above Table,the tighter limit applies at the band edges.

(3) Distance refers to the distance in meters between the measuring instrument antenna.

(4)The emission limit in this paragraph is based on measurement instrumentaion employing an average detector.Measurement using instrumentation with a peak detector function,corresponding to 20dB above the maximum permitted average limit.

(5)Above 1GHz, mark a Peak and average measurements for all emissions,Limit for peak is 74dBuV/m,According to Part15.35(b) and average is 54BuV/m.

6.10 Radiated Emissions Test Result

Formula of conversion factors:the field strength at 3m was egtablished by adding
The meter reading of the spectrum analyzer (which is set to read in units of dBuV/m)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stared in terms of dB.The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz)	Meter Reading +ACF=FS
33	20dBuV+10.36dB=30.36dBuV/m @3m

6.11 Radiated Emission Data

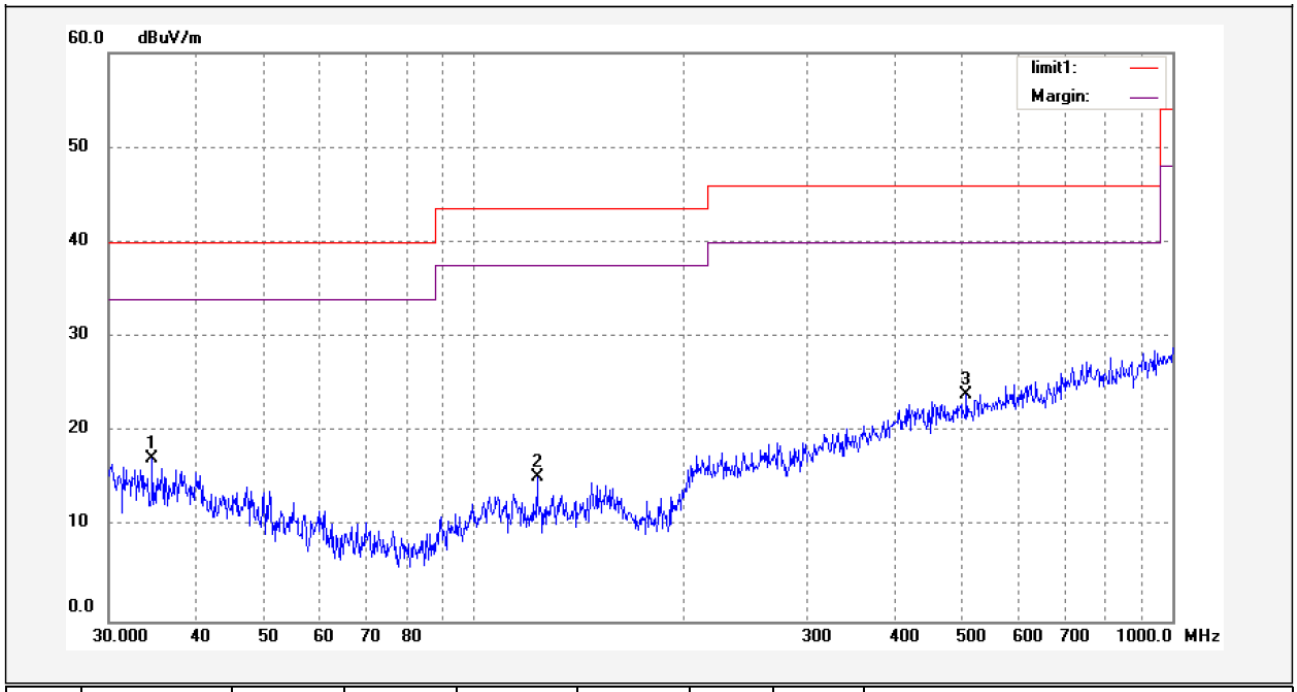
A. Test Item:	Radiated Emission Data
Test Voltage:	AC 120V
Test Mode:	CRX and CTX On
Temperature:	25.5 °C
Humidity:	51%RH
Test Result:	PASS

6.11.1 Test mode: continuously recevie mode.

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.

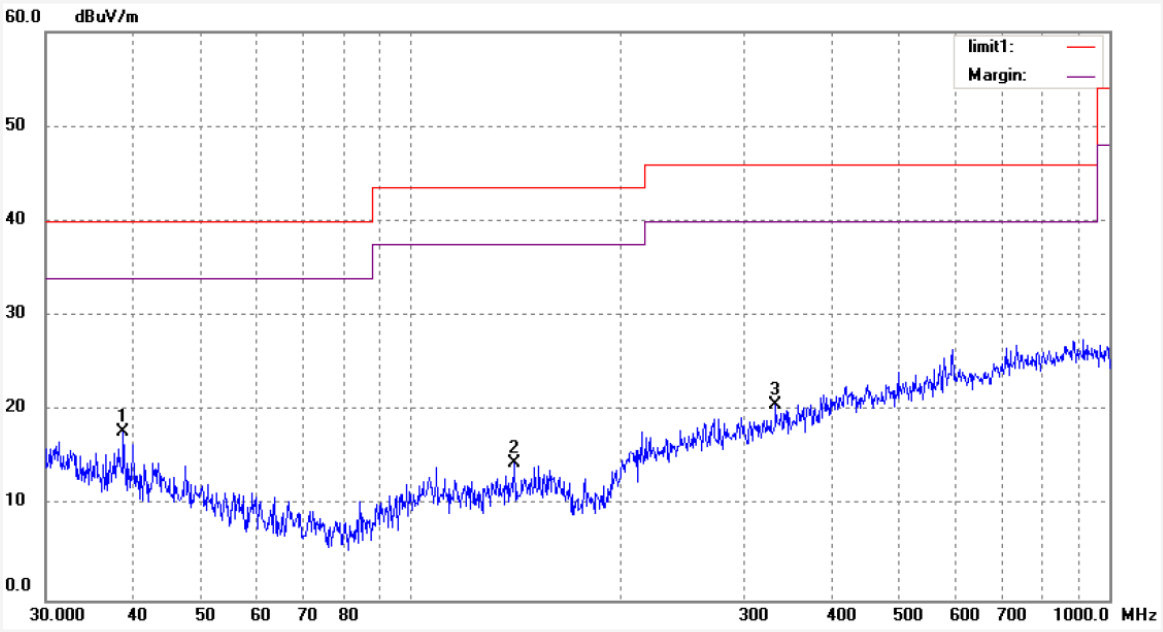
Test frequency : 30-1000MHz radiation test data:

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	

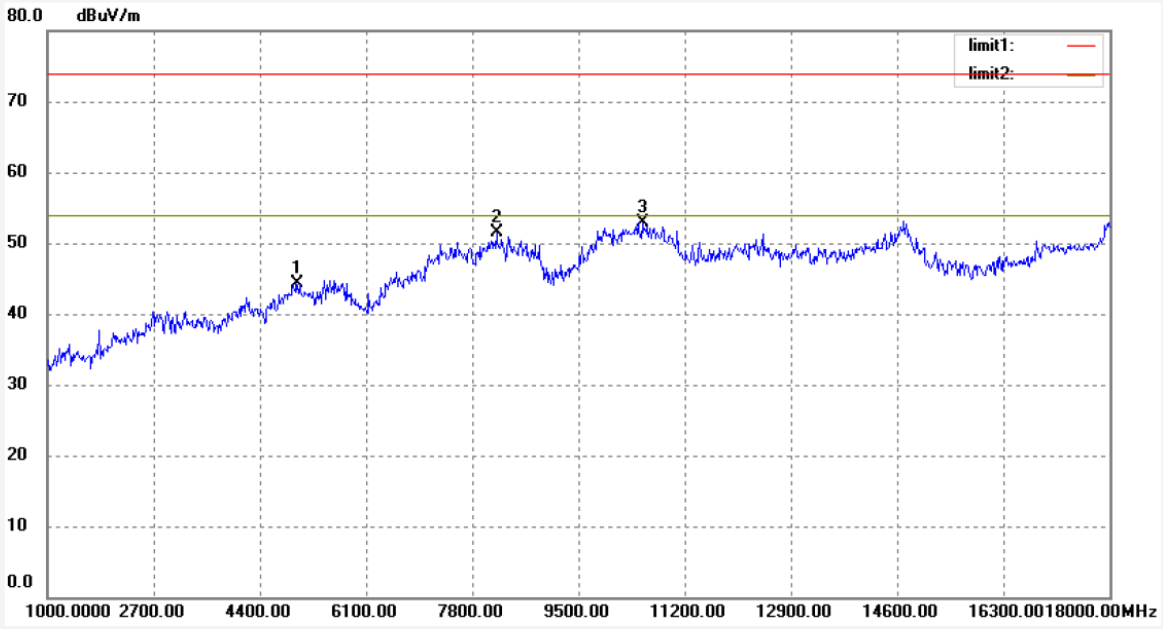
Horizontal



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	

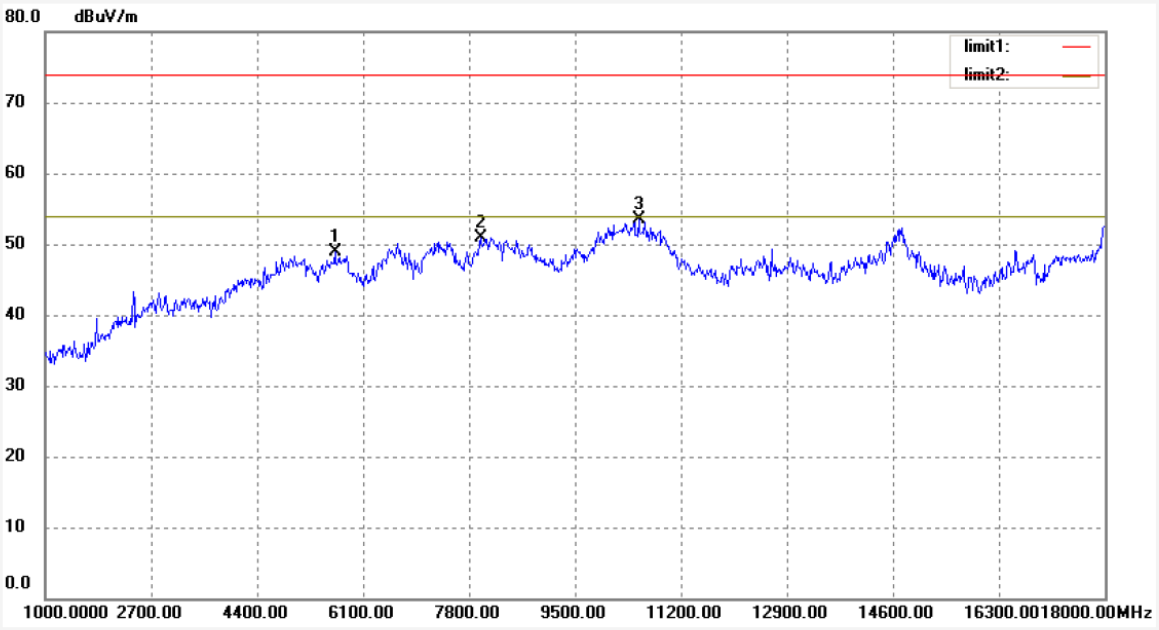
Test frequency: Above 1GHz radiation test data:

Vertical



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	

Horizontal



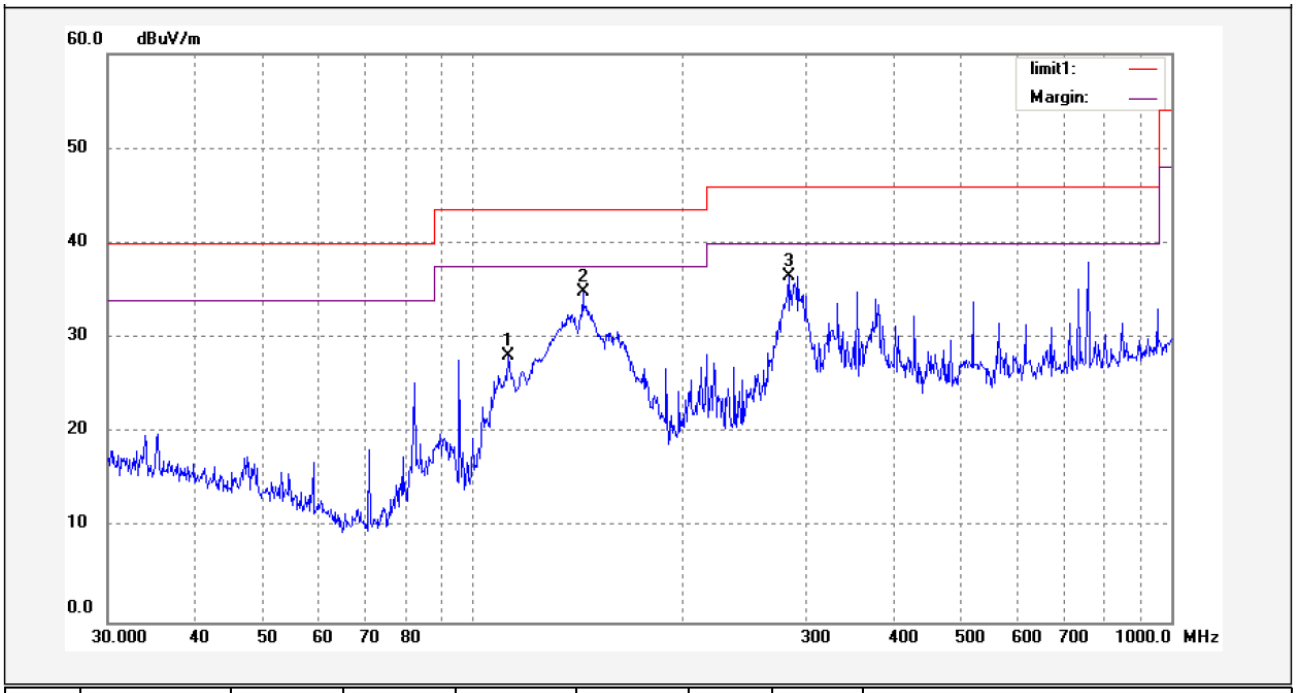
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5650.301	39.56	9.37	48.93	74.00	-25.07	peak	
2	7983.968	32.74	18.16	50.90	74.00	-23.10	peak	
3	10522.044	32.60	20.84	53.44	74.00	-20.56	peak	

6.11.2 Test mode: continuously transmit mode.

Remark: the EUT was tested in the modes:wireless normal link and AV/OUT mode,SD mode,and continuously transmit(CTX) mode,and the worse case was the CTX mode.so the data show was the CTX mode only. 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.

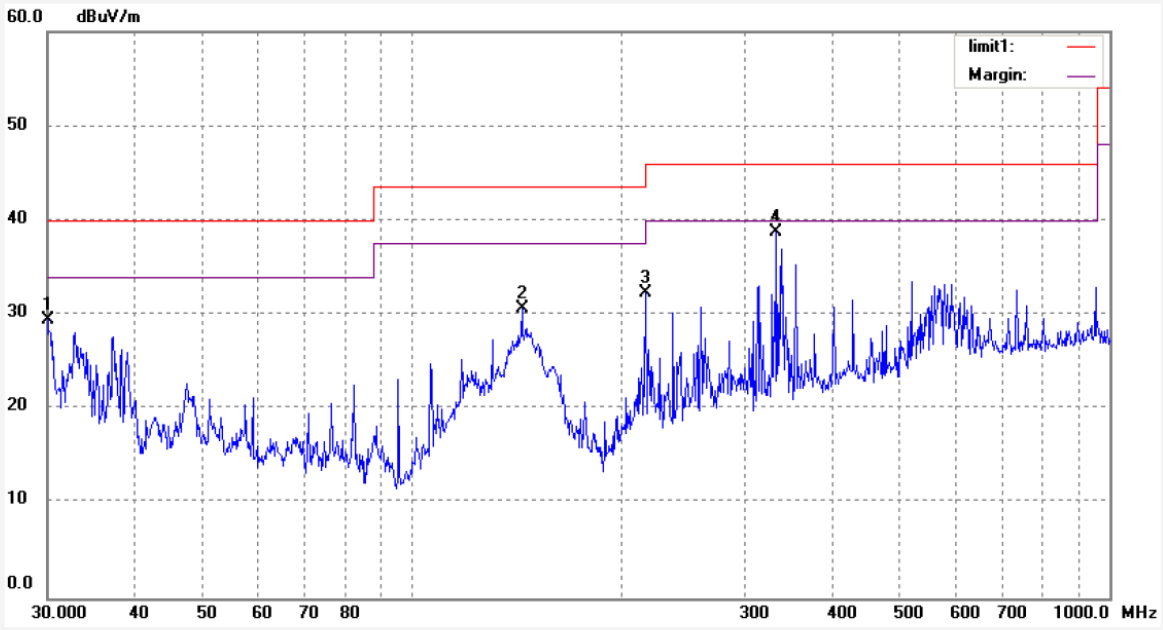
Test frequency : 30-1000MHz radiation test data:

Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	112.4271	14.85	13.25	28.10	43.50	-15.40	peak	
2	143.7760	21.43	13.44	34.87	43.50	-8.63	peak	
3	283.2637	19.03	17.52	36.55	46.00	-9.45	peak	

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	30.0000	12.02	17.40	29.42	40.00	-10.58	peak	
2	143.7760	17.24	13.44	30.68	43.50	-12.82	peak	
3	216.1197	15.57	16.80	32.37	46.00	-13.63	peak	
4	332.9536	19.30	19.44	38.74	46.00	-7.26	peak	

Test frequency : Above 1000MHz radiation Fundamental and Harmonic test data:

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC Part15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low frequency							
2402	AV	Vertical	96.56		(Fund.)	1.1	20
4804	AV	Vertical	51.23	54.00	2.77	1.1	40
7206	AV	Vertical	41.25	54.00	12.75	1.1	10
9608	AV	Vertical	41.43	54.00	12.57	1.1	60
12010	AV	Vertical	40.95	54.00	13.05	1.1	90
14412	AV	Vertical	40.69	54.00	13.31	1.0	120
16814	AV	Vertical	40.74	54.00	13.26	1.0	20
19216	AV	Vertical	39.45	54.00	14.55	1.1	150
21618	AV	Vertical	39.65	54.00	14.35	1.0	120
24020	AV	Vertical	38.77	54.00	15.23	1.0	105
2402	AV	Horizontal	91.01		(Fund.)	1.1	50
4804	AV	Horizontal	49.04	54.00	4.96	1.1	40
7206	AV	Horizontal	39.45	54.00	14.65	1.0	20
9608	AV	Horizontal	37.42	54.00	16.58	1.1	110
12010	AV	Horizontal	36.72	54.00	17.28	1.1	40
14412	AV	Horizonta	38.47	54.00	15.53	1.0	20
16814	AV	Horizontal	36.71	54.00	17.29	1.1	210
19216	AV	Horizontal	34.75	54.00	19.25	1.1	15
21618	AV	Horizontal	34.32	54.00	19.68	1.0	10
24020	AV	Horizontal	32.11	54.00	21.89	1.0	10
2402	PK	Vertical	115.23		(Fund.)	1.1	10
4804	PK	Vertical	67.65	74.00	6.35	1.0	230
7206	PK	Vertical	50.00	74.00	24.00	1.0	110
9608	PK	Vertical	49.18	74.00	24.82	1.1	100
12010	PK	Vertical	48.50	74.00	25.50	1.2	80
14412	PK	Vertical	47.45	74.00	26.55	1.2	60
16814	PK	Vertical	48.34	74.00	25.66	1.0	70
19216	PK	Vertical	46.38	74.00	27.62	1.2	170
21618	PK	Vertical	46.91	74.00	27.09	1.0	10

24020	PK	Vertical	47.14	74.00	26.86	1.1	45
2402	PK	Horizontal	106.35		(Fund.)	1.1	100
4804	PK	Horizontal	65.03	74.00	8.97	1.1	60
7206	PK	Horizontal	52.00	74.00	22.00	1.1	10
9608	PK	Horizontal	45.64	74.00	28.36	1.0	10
12010	PK	Horizontal	44.84	74.00	29.16	1.2	10
14412	PK	Horizontal	43.61	74.00	30.39	1.1	90
16814	PK	Horizontal	44.69	74.00	29.31	1.1	120
19216	PK	Horizontal	44.26	74.00	29.74	1.5	110
21618	PK	Horizontal	42.37	74.00	31.63	1.2	150
24020	PK	Horizontal	40.00	74.00	34.00	1.2	120
Middle frequency							
2440	AV	Vertical	96.14		(Fund.)	1.0	10
4880	AV	Vertical	50.32	54.00	3.68	1.1	10
7320	AV	Vertical	34.48	54.00	19.52	1.0	50
9760	AV	Vertical	36.56	54.00	17.44	1.2	20
12200	AV	Vertical	35.78	54.00	18.22	1.2	20
14640	AV	Vertical	36.66	54.00	17.34	1.1	110
17080	AV	Vertical	35.21	54.00	18.79	1.1	30
19520	AV	Vertical	35.32	54.00	18.68	1.1	10
21960	AV	Vertical	33.43	54.00	20.57	1.1	10
24400	AV	Vertical	30.47	54.00	23.53	1.2	90
2440	AV	Horizontal	90.12		(Fund.)	1.1	20
4880	AV	Horizontal	48.52	54.00	5.48	1.0	90
7320	AV	Horizontal	34.25	54.00	19.75	1.1	20
9760	AV	Horizontal	33.52	54.00	20.48	1.1	10
12200	AV	Horizontal	31.58	54.00	22.42	1.2	150
14640	AV	Horizontal	30.25	54.00	23.75	1.1	0
17080	AV	Horizontal	29.25	54.00	24.75	1.1	110
19520	AV	Horizontal	29.66	54.00	25.34	1.1	90
21960	AV	Horizontal	30.00	54.00	24.00	1.2	220
24400	AV	Horizontal	28.98	54.00	25.02	1.1	120
2440	PK	Vertical	114.26		(Fund.)	1.0	210
4880	PK	Vertical	67.65	74.00	6.35	1.1	90

7320	PK	Vertical	42.36	74.00	31.64	1.0	100
9760	PK	Vertical	40.35	74.00	33.65	1.1	120
12200	PK	Vertical	37.87	74.00	36.13	1.0	180
14640	PK	Vertical	36.10	74.00	38.90	1.0	10
17080	PK	Vertical	32.03	74.00	41.97	1.1	100
19520	PK	Vertical	30.21	74.00	43.79	1.0	120
21960	PK	Vertical	29.65	74.00	44.35	1.1	124
24400	PK	Vertical	28.30	74.00	45.70	1.0	120
2440	PK	Horizontal	107.21		(Fund.)	1.0	110
4880	PK	Horizontal	65.68	74.00	8.32	1.0	145
7320	PK	Horizontal	45.63	74.00	28.37	1.1	90
9760	PK	Horizontal	40.14	74.00	33.86	1.1	60
12200	PK	Horizontal	39.36	74.00	34.64	1.0	10
14640	PK	Horizontal	37.44	74.00	36.56	1.2	150
17080	PK	Horizontal	34.21	74.00	39.79	1.1	10
19520	PK	Horizontal	38.86	74.00	35.14	1.0	260
21960	PK	Horizontal	34.21	74.00	39.79	1.1	00
24400	PK	Horizontal	34.00	74.00	40.00	1.0	45
High frequency							
2478	AV	Vertical	95.98		(Fund.)	1.0	0
4956	AV	Vertical	51.02	54.00	2.99	1.1	40
7434	AV	Vertical	43.69	54.00	10.31	1.1	50
9912	AV	Vertical	36.00	54.00	18.00	1.0	45
12390	AV	Vertical	32.63	54.00	21.37	1.1	50
14868	AV	Vertical	30.34	54.00	23.66	1.1	60
17346	AV	Vertical	30.62	54.00	23.38	1.1	10
19824	AV	Vertical	30.13	54.00	23.87	1.1	50
22302	AV	Vertical	30.27	54.00	23.73	1.0	25
24780	AV	Vertical	29.00	54.00	24.00	1.0	20
2478	AV	Horizontal	91.36		(Fund.)	1.0	10
4956	AV	Horizontal	48.69	54.00	5.31	1.1	20
7434	AV	Horizontal	40.30	54.00	23.70	1.1	50
9912	AV	Horizontal	38.00	54.00	16.00	1.1	20
12390	AV	Horizontal	35.66	54.00	18.34	1.2	80

14868	AV	Horizontal	32.42	54.00	21.58	1.2	120
17346	AV	Horizontal	31.17	54.00	22.83	1.4	20
19824	AV	Horizontal	32.55	54.00	21.45	1.8	10
22302	AV	Horizontal	32.86	54.00	21.14	1.3	45
24780	AV	Horizontal	30.00	54.00	24.00	1.7	90
2478	PK	Vertical	114.36		(Fund.)	1.0	60
4956	PK	Vertical	66.69	74.00	7.31	1.1	10
7434	PK	Vertical	45.66	74.00	28.34	1.1	120
9912	PK	Vertical	42.00	74.00	32.00	1.1	10
12390	PK	Vertical	35.56	74.00	38.44	1.1	45
14868	PK	Vertical	38.65	74.00	35.35	1.1	90
17346	PK	Vertical	33.54	74.00	40.46	1.0	60
19824	PK	Vertical	36.26	74.00	37.74	1.1	120
22302	PK	Vertical	36.73	74.00	37.27	1.0	60
24780	PK	Vertical	30.21	74.00	43.99	1.1	90
2478	PK	Horizontal	107.15		(Fund.)	1.0	150
4956	PK	Horizontal	65.33	74.00	8.67	1.0	150
7434	PK	Horizontal	42.36	74.00	31.64	1.0	45
9912	PK	Horizontal	40.00	74.00	34.00	1.0	50
12390	PK	Horizontal	38.69	74.00	35.31	1.1	10
14868	PK	Horizontal	37.26	74.00	36.74	1.0	90
17346	PK	Horizontal	36.41	74.00	37.59	1.1	50
19824	PK	Horizontal	34.66	74.00	39.34	1.0	10
22302	PK	Horizontal	32.00	74.00	42.00	1.1	15
24780	PK	Horizontal	30.30	74.00	43.70	1.1	10

7 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 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.

8 Maximum Peak Output Power

Test Requirement: FCC Part15 Paragraph 15.247
Test Method: Based on ANSI 63.4:2003
Test Date: Aug.12,2010
Test mode: Compliance test in the worse case: Tx Lower/Tx Middle/Tx Upper
Requirements: Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 0.125W

Test procedure:

The following test procedure as below:

The transmitter output (antenna port) was connected to the spectrum analyzer.EUT and its simulators are placed on a table, let EUT working in test mode,then test it.

The bandwidth of the fundamental frequency was measured with the spectrum analyser using 100kHz RBW and 100kHz VBW.

Test Result: The unit does meet the FCC requirements.

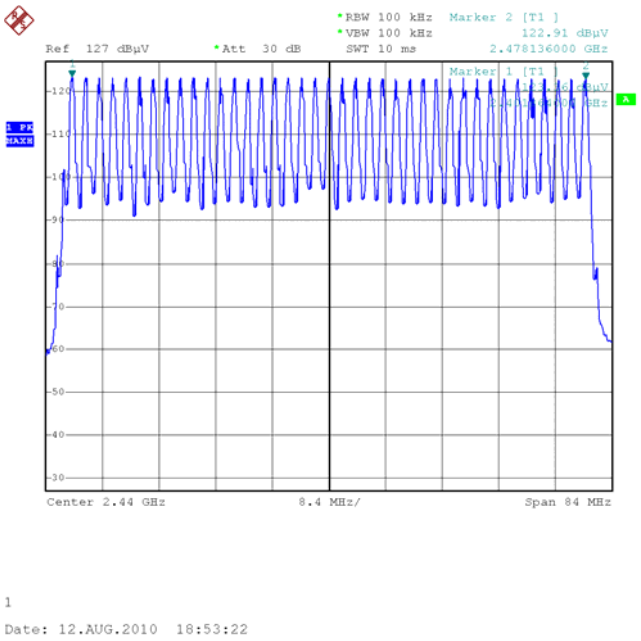
Test Channel	Fundamental Frequency(MHz)	Output Power (mW)	Limit (W)	Power output level
Lower	2402	36.95	0.125	conducted
Middle	2440	36.95	0.125	conducted
Upper	2478	30.25	0.125	conducted

Note: The EUT uses 39 channels ,and according to 47 CFR Part 15 Subpart C Section 15.247 (b),the the maximum allowable power for this device is 0.125W.

9 Hopping Channel Number

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.247
Test Date:	Aug.12,2010
Test mode:	The EUT work in test mode(Tx) and test it
Requirements:	Regulation 15.247(b) For frequency hopping systems operating In the 2400-2483.5MHz band employing at least 15 hopping channels.
Test result:	The total number of channels would be 39 channels. The unit does meet the FCC requirements.

Please refer the graph as below:



10 Frequency Separated

The requirements in this clause are only applicable to equipment using frequency hopping spread spectrum (FHSS) modulation.

Channel Separated

Definition: A hopping channel is any of the centre frequencies defined within the hopping sequence of a FHSS system.

Limit: Non-adaptive frequency hopping system shall make use of non-overlapping channels separated by the channel bandwidth as measured at 20dB below peak power.

The hopping channels defined within a hopping sequence shall be at least 1MHz apart(channel separation)

Operating Environment:

Temperature: 25.50 °C

Humidity: 51 % RH

Barometric Pressure: 1012 mbar

EUT Operation Condition:

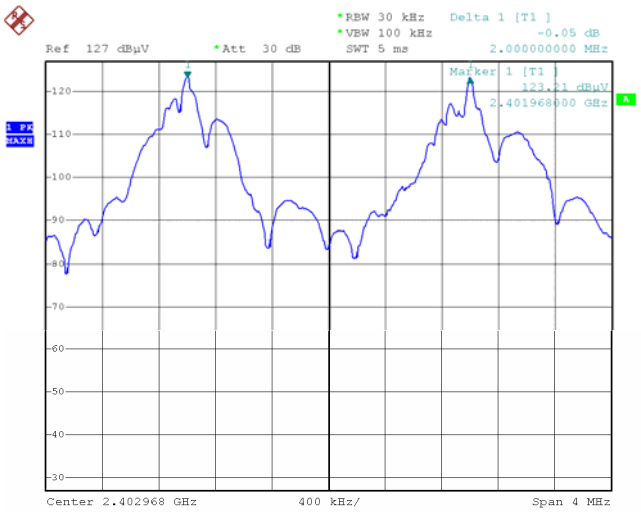
The EUT was programmed to be in continuously transmitting mode.

Test Result: PASS

Test Channel	Channel Separation	PASS/FAIL
Lower Channels	2MHz	Pass
Middle Channels	2MHz	Pass
Upper Channels	2MHz	Pass

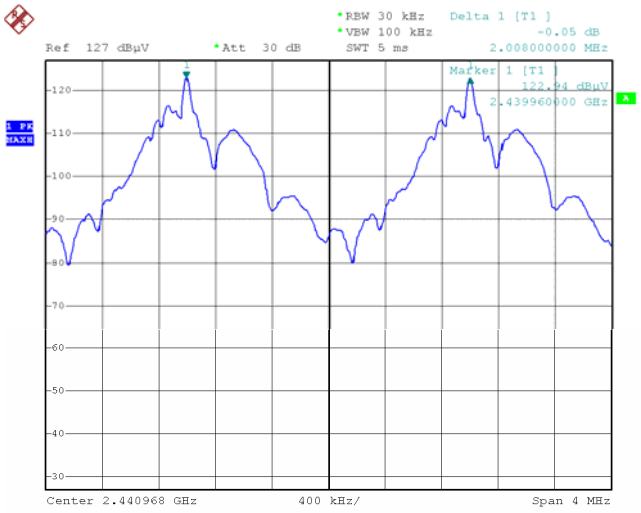
Please refer to the below photos for more details

Lower Channel



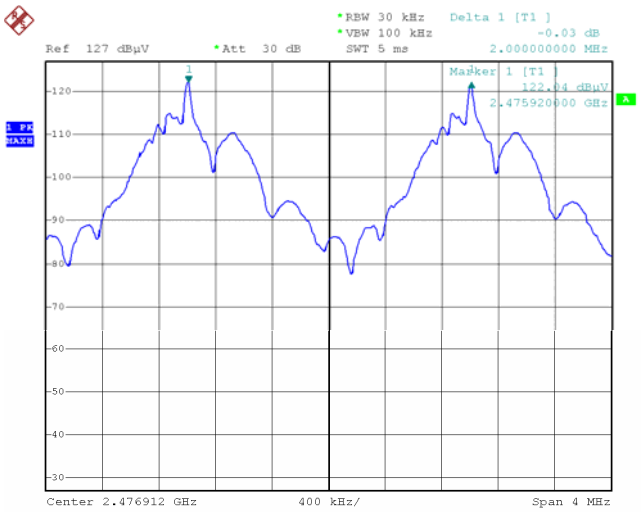
1
Date: 12.AUG.2010 18:46:28

Middle Channel



1
Date: 12.AUG.2010 18:47:56

Upper Channel



1

Date: 12.AUG.2010 19:04:28

11 Dwell time

The dwell time is the time spent at a particular frequency during any single hop.

Limit: the maximum dwell time shall be less than 0.4s.

Operating Environment:

Temperature: 25.5 °C

Humidity: 51 % RH

Barometric Pressure: 1012 mbar

EUT Operation Condition:

The EUT was programmed to be in continuously transmitting mode.

11.2 Test Procedure

The EUT output antenna port was connected to the spectrum analyzer. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz,and the frequency span to zero span,measure the maximum time duration of one single pulse. So,the Dwell Time can be calculated as follows:

T=Ton-time*Ntimes/1S*0.4*39≤0. 4S.

11.3 Test Result: PASS

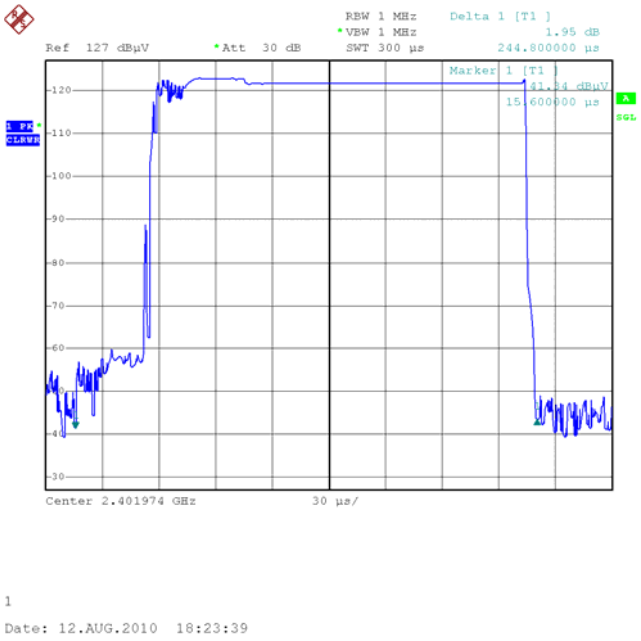
Please refer to the below photos for more details.

Channel 2402MHz

Dwell time of each occupation in this channel as follows:
0.0002448*600/1S*0.4*39=0.2291<0.4S

Test Result: PASS

The Results are not be greater than 0.4 seconds.

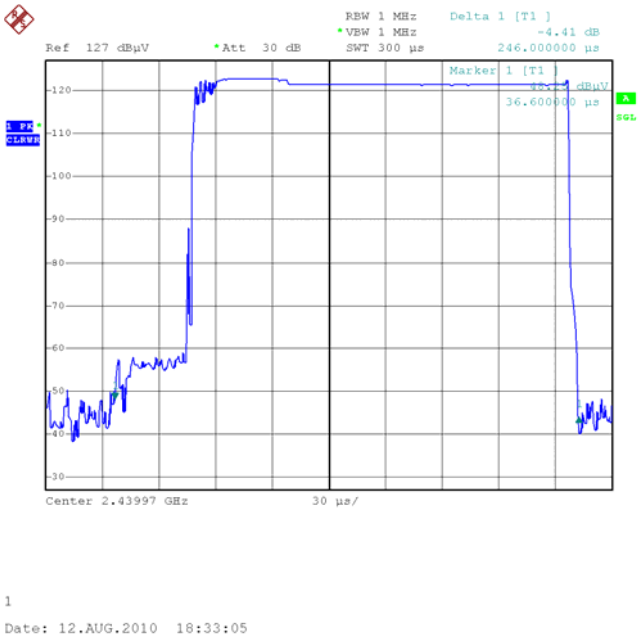


Channel 2440MHz

Dwell time of each occupation in this channel as follows:
0.000246*600/1S*0.4*39=0.2304<0.4S

Test Result: PASS

The Results are not be greater than 0.4 seconds.

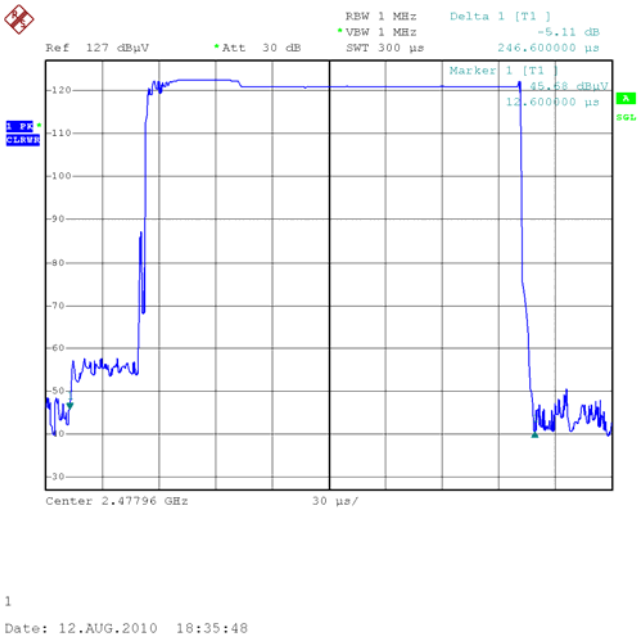


Channel 2478MHz

Dwell time of each occupation in this channel as follows:
0.0002466*600/1S*0.4*39=0.2309<0.4S

Test Result: PASS

The Results are not be greater than 0.4 seconds.



12 20-dB Bandwidth

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.247
Test Date:	Aug.12,2010
Test mode:	The EUT work in test mode(Tx) and test it

Test Procedure

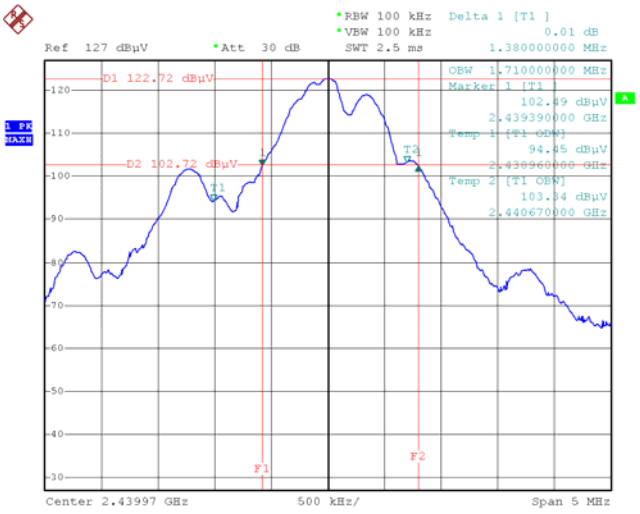
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100KHz RBW and 100KHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

Test Result

Please refer the graph as below:

Lower Channel 2402MHz

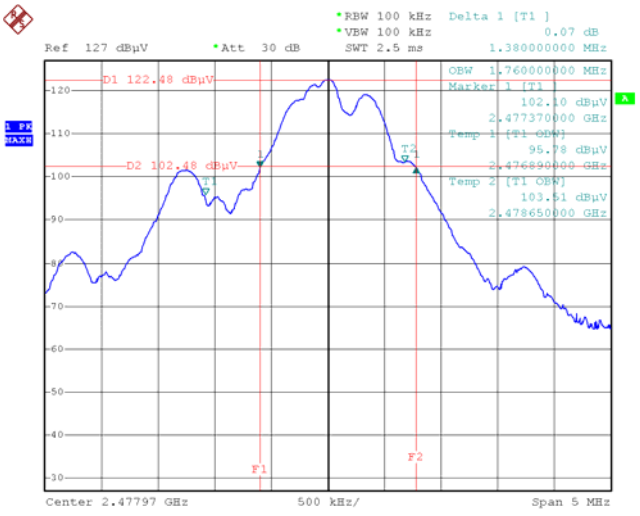
Middle Channel 2440MHz



1

Date: 12.AUG.2010 18:30:54

Upper Channel 2478MHz



1

Date: 12.AUG.2010 18:40:20

13 Radiated spurious emissions into adjacent restricted band

Test Requirement:	FCC Part15 Paragraph 15.205
Test Method:	Based on FCC Part 15 Paragraph 15.247
Test Date:	Aug.12,2010
Requirements:	The EUT work in test mode(Tx) and test it

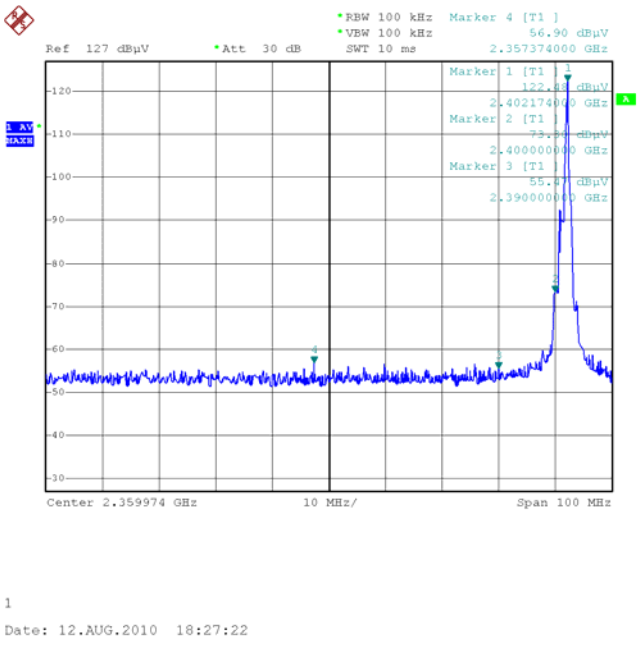
Requiments:

emissions that fall in the restricted bands(15.205).Above 1000MHz, compliance with the emissions limits in section 15.209 shall be demonstrated based on the average value of the measured emissions,The provisions in section 15.35 apply to these measurements.

Test procedure:

An in band field strength measurement of the fundamental emission using the RBW and detector function required by C63.4-2003 and FCC Rules.The procedure was repeated with an average detector and a plot made.The calculated field strength in the adjacent restricted band is presented below.

Lower bandedge/ restricted band (Average Value)



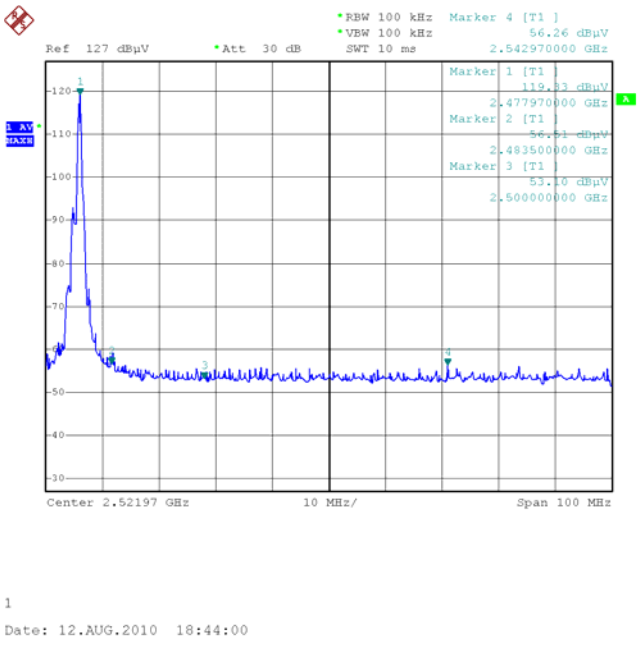
For 2400MHz bandedge checked with 2402MHz frequency operated,the delta shown at the plot is 122.48-73.30=49.18dB for peak detector mode.

The fundamental emission at the frequency of 2402MHz is 115.23dBuV/m for peak detector mode,so the bandedge emission is 115.23-49.18=66.05dBuV/m for peak detector mode.Here the limit for the emission is 74 dBuV/m for the peak detector,so the result passed.

And the same as the average detector. Here the limit for the emission is 54.00dBuV/m for the average detector.And the emission at the frequency of 2402MHz is 96.56dBuV/m, so the bandedge emission is 96.56-49.18=47.38dBuV/m for average detector mode ,is lower than the average limit, so the result passed.

Remark: the radation test data,please refer to the section 6.11 .

Upper Bandedge/ Restricted Band (Average Value)



For 2483.5MHz bandedge checked with 2478MHz frequency operated,the delta shown at the plot is 119.33-56.51=62.82dB for peak detector mode.

The fundamental emission at the frequency of 2478MHz is 114.36dBuV/m for peak detector mode,so the bandedge emission is 114.36-56.54=57.85dBuV/m for peak detector mode.Here the limit for the emission is 74 dBuV/m for the peak detector,so the result passed.

And the same as the average detector. Here the limit for the emission is 54.00dBuV/m for the average detector.And the emission at the frequency of 2478MHz is 95.98 dBuV/m, so the bandedge emission is 95.98-56.54=39.44dBuV/m for average detector mode ,is lower than the average limit, so the result passed.

Remark: the radation test data,please refer to the section 6.11

14 RF Exposure Test

Test Requirement:	FCC Part 2 Subpart J
Test Method:	Based on FCC Part 15 Paragraph 15.247
Test Date:	Aug.12,2010
Requirements:	The EUT work in test mode(Tx) and test it

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

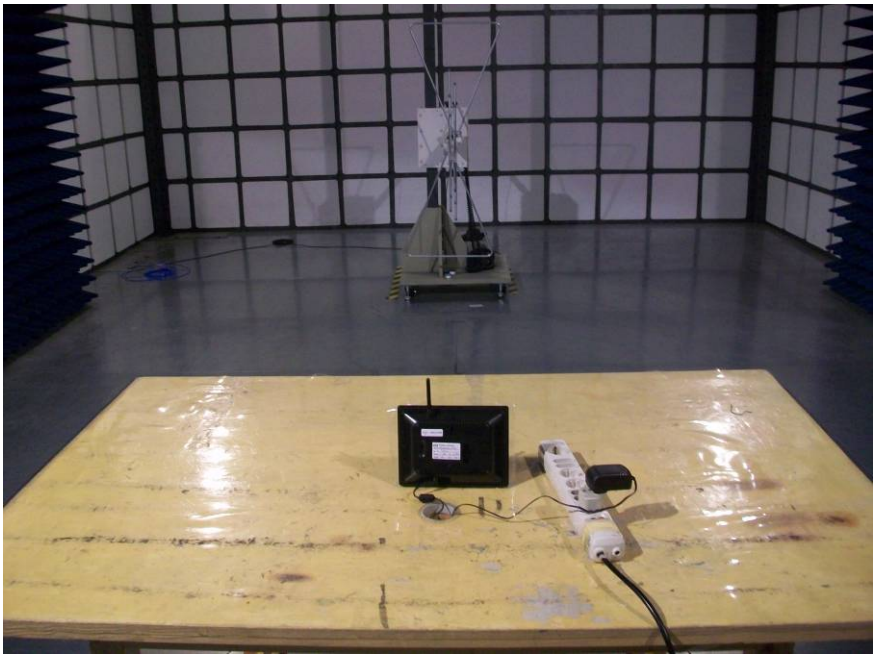
$$\boldsymbol{Pd} = \frac{30 \times P \times G}{377 \times d^2}$$

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

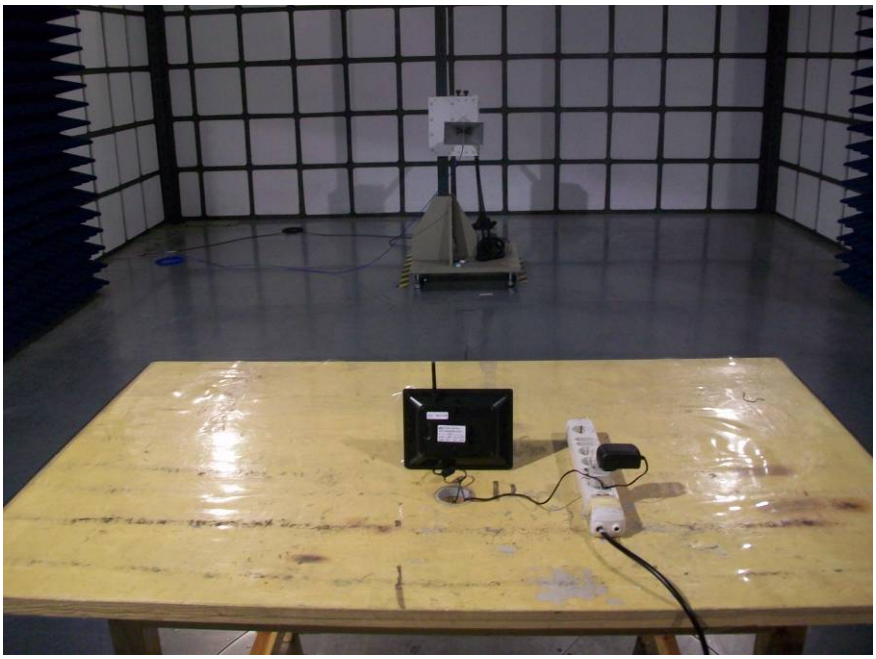
Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm2)	Limit of Power Density (S) (mW/cm2)	Test Result
-2.39	0.577	15.68	36.95	0.004241	1	Complies
-2.39	0.577	15.68	36.95	0.004241	1	Complies
-2.39	0.577	14.81	30.25	0.003472	1	Complies

15 Photographs of Test Setup for CRX and CTX

Radiation Emission Test View For 30MHz-1000MHz

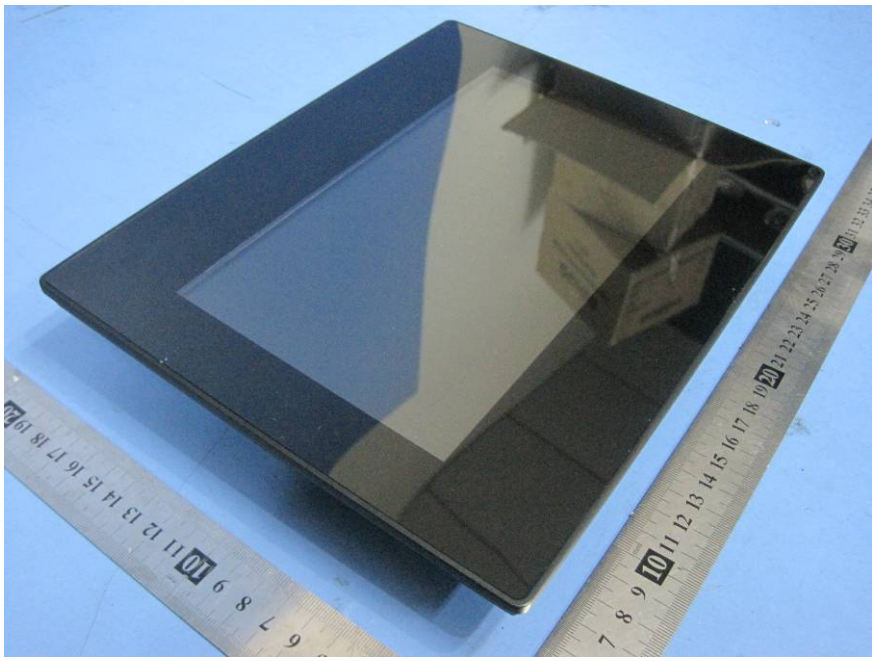


Radiation Emission Test View For 1GHz-25GHz

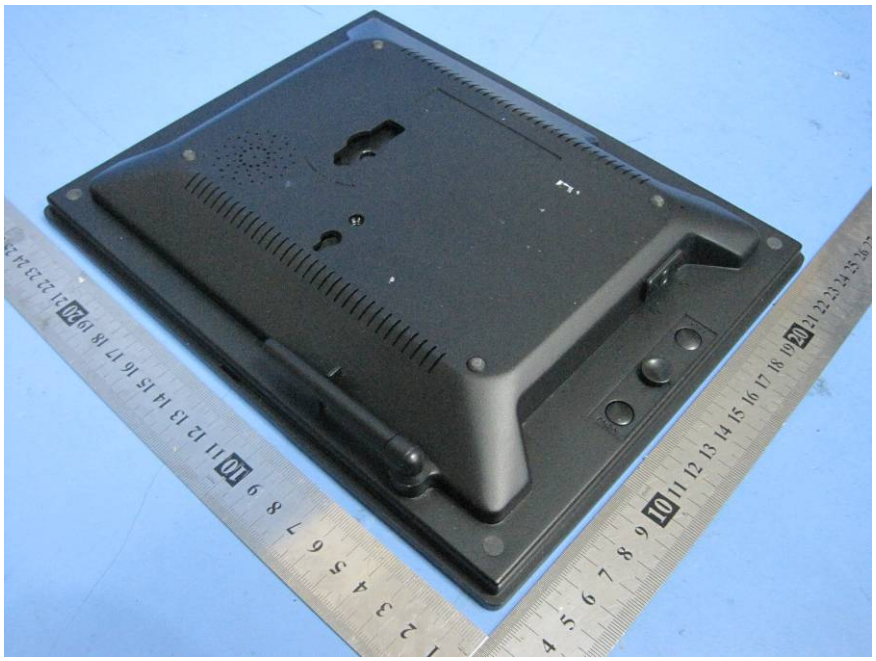


16 Photographs - Constructional Details

16.1 EUT - Front View

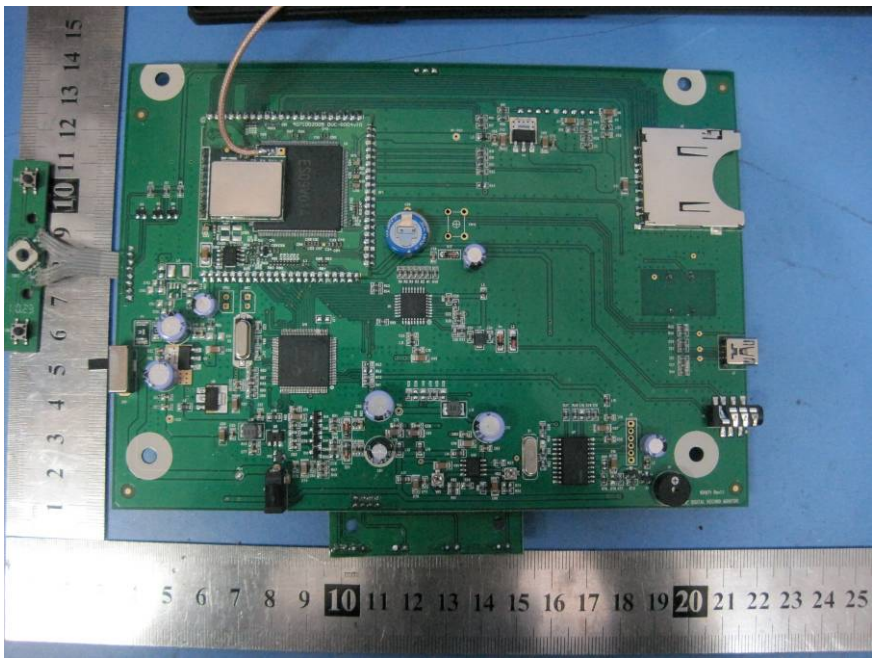


16.2 EUT - Back View

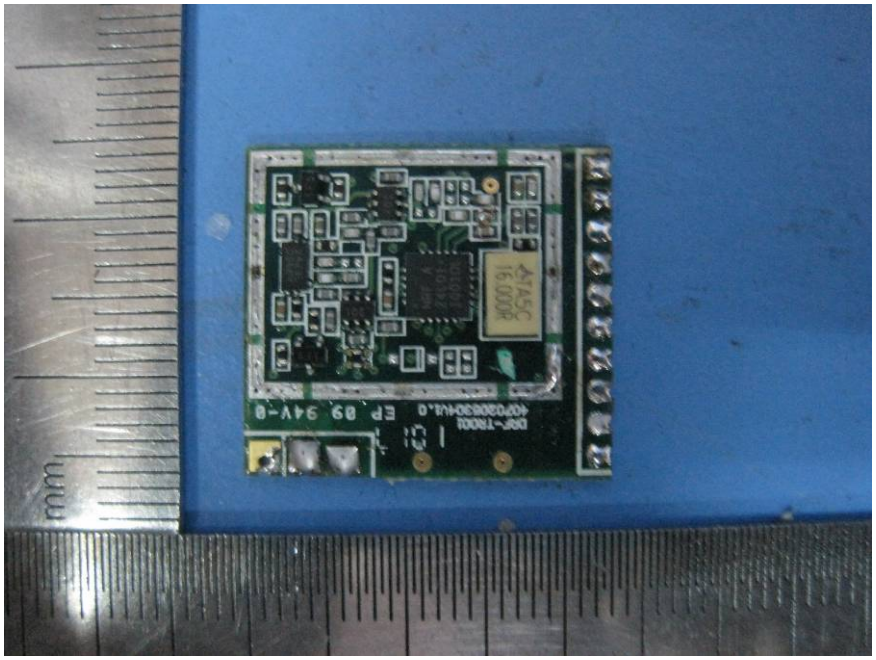


16.3 PCB 1 -Front View

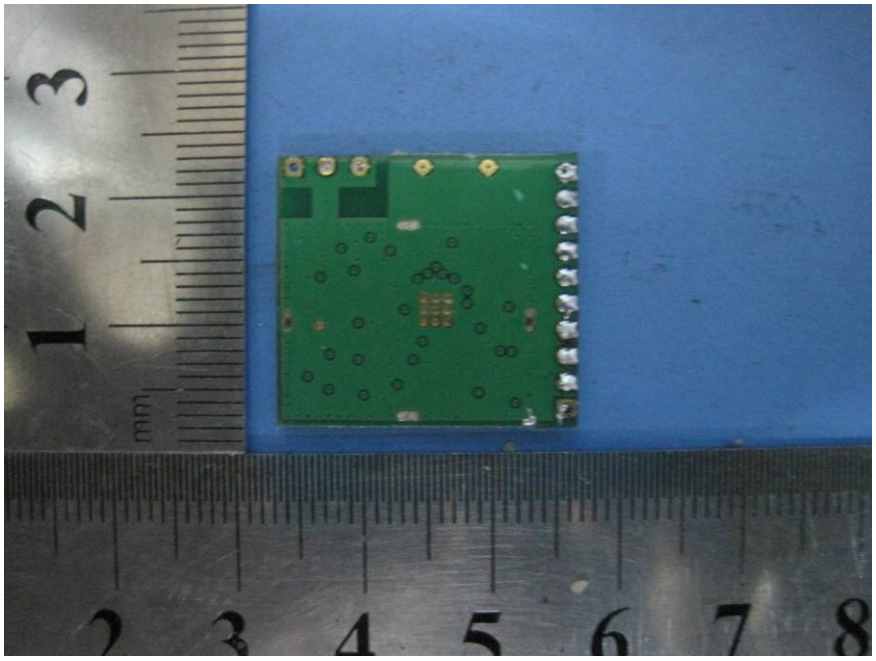
16.4 PCB 1 - Back View



16.5 PCB 2 -Front View



16.6 PCB 2-Back View



FCC ID 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 Top View/ proposed FCC Label Location