ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPARTC AND CANADIAN RSS 210 ISSUE 7 REQUIREMENT

OF

Celio REDFLY Mobile Dock

MODEL No.: CRF-DS1, CRF-DS2

BRAND NAME: N/A

FCC ID: VVU75010

REPORT NO: ES100806028F

ISSUE DATE: August 30, 2010

Prepared for
Celio Technology Corp
12159 South Business Park Drive Suite 240, Draper Utah, 84020, USA

Prepared by
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VERIFICATION OF COMPLIANCE

Applicant:	Celio Technology Corp 12159 South Business Park Drive Suite 240, Draper Utah, 84020, USA
Product Description:	Celio REDFLY Mobile Dock
Brand Name:	N/A
Model Number:	CRF-DS1, CRF-DS2 (Note: Both modes are the same except model numbers are different. We prepare CRF-DS1 for test.)
Serial Number:	N/A
File Number:	ES100806028F
Date of Test:	July 29, 2010 to August 24, 2010

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003), RSS GEN and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247 and RSS 210 Issue 7.

The test results of this report relate only to the tested sample identified in this report.

Approved By

David Lee / Q.A. Manager
SHENZHEN EMTEK CO., LTD.

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1. GENERAL INFORMATION

1.1 Product Description

The Celio Technology Corp Model: CRF-DS1(referred to as the EUT in this report) The EUT is an short range, lower power, Celio REDFLY Mobile Dock designed as an " Input Device. It is designed by way of utilizing the GFSK, DQPSK and 8DPSK modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

A). Operation Frequency: 2402-2480MHz
B). Modulation: GFSK, DQPSK, 8DPSK
C). Number of Channel: 79
D). Channel space: 1MHz
E). Rated RF Output Power: 0dBm
F). BIT Rate of Transmission: 2Mbps, 3Mbps
G). Antenna Type: PCB antenna
H). Antenna GAIN: 0dBi
I). Power Supply: DC8.5V with AC Adapter or with battery
J). Adapter:
Model: HK-R110-A05
PRI: 100-240V~ 50/60Hz 0.5A
SEC.: DC 5V, 0-2A

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: VVU75010, filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and Canadian RSS 210 Issue 7. The composite system (receiver) is compliance with Subpart B is authorized under a DoC procedure.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2009) and in RSS GEN. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2005.11.02
The certificate is valid until 2010.11
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01:2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2008.3
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, March 18, 2008
The Certificate Registration Number is 709623.

Accredited by Industry Canada, March 5, 2010
The Certificate Registration Number is 46405-4480.

Name of Firm : SHENZHEN EMTEK CO., LTD

Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2009. and RSS GEN Conducted emissions from the EUT measured in the **frequency range between 0.15 MHz and 30MHz** using **CISPR Quasi-Peak and average detector mode**.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009 and RSS GEN.

2.4 Limitation

(1) Channel Separation test

FCC Part 15, Subpart C Section 12.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 Bandwidth of the hopping channel, whichever is greater.

Frequency Range (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

(2) 20dB Bandwidth

Frequency Range(MHz)	Quantity of Hopping Channel	Limit(kHz) 50	25	15	75
902-928		<250	>250	NA	NA
2400-2483.5		NA	NA	>1000	<1000

(3) Quantity of Hopping Channel

FCC Part 15, Subpart C Section 12.247

Frequency Range (MHz)	Limit(Quantity of Hopping Channel) 20dB bandwidth <250kHz	20dB bandwidth >250kHz	20dB bandwidth <1MHz	20dB bandwidth >1MHz
902-928	50	25	NA	NA
2400-2483.5	NA	NA	75	15
5725-5850	NA	NA	75	NA

(4) Time of Occupancy(Dwell Time)

FCC Part 15, Subpart C Section 12.247

Frequency Range (MHz)	LIMIT(rms) 20dB bandwidth <250kHz(50Channel)	20dB bandwidth >250kHz(25Channel)	20dB bandwidth <1MHz(75Channel)
902-928	400(20S)	400(10S)	NA
2400-2483.5	NA	NA	400(30S)
5725-5850	NA	NA	400(30S)

Note: The "()"is all channel's average time of occupancy.

(5) Maximum Peak Output Power

FCC Part 15, Subpart C Section 12.247

Frequency Range (MHz)	Quantity of Hopping Channel	LIMIT(W) 50	25	15	75
902-928		1(30dBm)	0.125(21dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30dBm)
5725-5850		NA	NA	NA	1(30dBm)

(6) Band edge

FCC Part15, Subpart C Section 15.247, In any 100kHz bandwidth outside the frequency band in with the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, attenuation below the general limits specified in section 15.209(a) is not required. 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).

Operating Frequency Range(MHz)	Spurious emission frequency	Limit	
		Peak power ration to emission(dBc)	Emission level(dBuV/m)
902-928	<902	>20	NA
	>928	>20	NA
	960-1240	NA	54
2400-2483.5	<2400	>20	NA
	>2483.5-2500	NA	54
5725-5850	<5350-5460	NA	54
	<5725	>20	NA
	>5850	>20	NA

(7) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

(8) Radiated Emission

FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

Frequency (MHz)	Field strength μV/m	Distance(m)	Field strength at 3m dBμV/m
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

FCC Part 15, Section 15.35(b) limit of radiated emission for frequency above 1000MHz

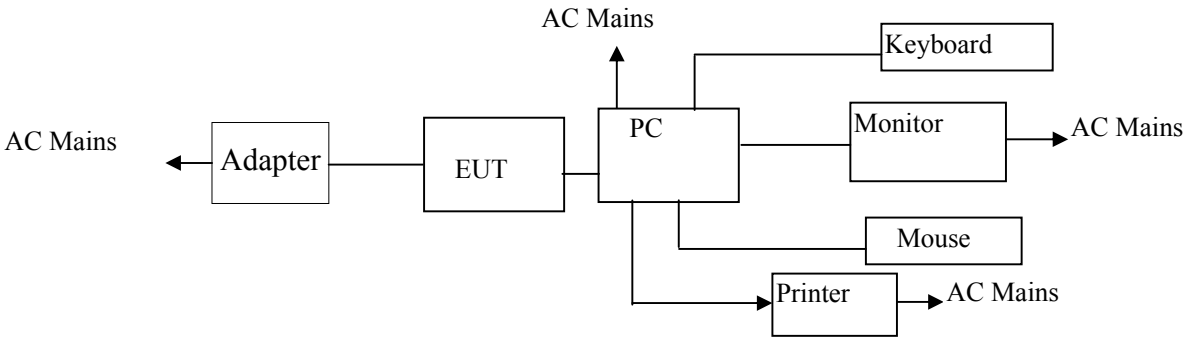
Frequency(MHz)	Class A(dBμV/m)(at 3m)		Class B(dBμV/m)(at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

FCC Part 15, Subpart C Section 15.249 The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency(MHz)	Filed Strength of Fundamental(at 3m)		Filed Strength of Harmonics(at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
902-928	114	94	74.0	54.0
2400-2483.5	114	94	74.0	54.0
5725-5875	114	94	74.0	54.0
24000-24250	128	108	88.0	68.0

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System



2.6 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	Celio REDFLY Mobile Dock	N/A	N/A	VVU75010	N/A	***EUT***
2	External adaptor	CGS	CGSW-0851500	N/A	N/A	

Note:

(1) Unless otherwise denoted as EUT in『Remark』column , device(s) used in tested system is a support equipment.

2.7 Description of test modes

The EUT (Celio REDFLY Mobile Dock) has been tested under normal operating condition.
This EUT is a FHSS system, we use blue test to control the EUT with parallel port, Let EUT hopping on and transmit at every channel with highest power, Only output power use conducted method, others are using radiated method. After sirfdemo330R1 send the command to EUT, it can be removed, and the EUT keep hopping. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for best.

Channel	Frequency(MHz)
1	2402
40	2441
79	2480

3. Summary of Test Results

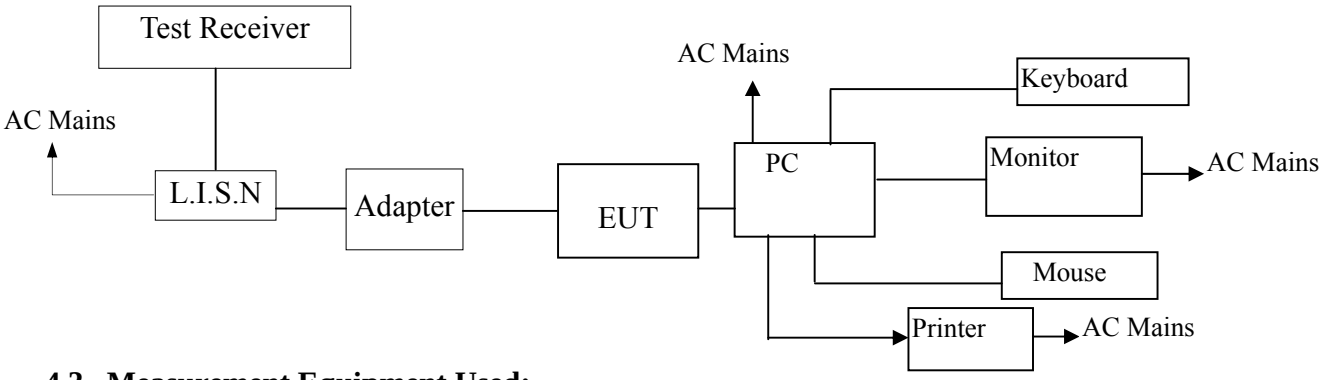
FCC Rules	IC Rules	Description Of Test	Result
§15.247(a)(1)	RSS 210 A8.1(2)	Channel Separation test	Compliant
§15.247(a)(1)	--	20dB Bandwidth	Compliant
--	RSS 210 A8.1(1)	99%dB Bandwidth	Compliant
§15.247(a)(1)(iii)	RSS 210 A8.1(4)	Quantity of Hopping Channel	Compliant
§15.247(a)(1)(iii)	RSS 210 A8.1(4)	Time of Occupancy (Dwell Time)	Compliant
§15.247(b)	RSS 210 A8.4	Max Peak output Power test	Compliant
§15.247(d)	RSS 210 A8.5	Band edge test	Compliant
§15.207	RSS GEN Table 2	AC Power Conducted Emission	Compliant
§15.247(d),§15.209	RSS 210 A8.5	Radiated Emission	Compliant
§15.203	--	Antenna Requirement	Compliant
§15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	Compliant

4. Conducted Emissions Test

4.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used:

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2010	05/29/2011
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2010	05/29/2011
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2010	05/29/2011
50ΩCoaxial Switch	Anritsu	MP59B	M20531	05/29/2010	05/29/2011

4.4 Conducted Emission Limit

(7) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.5 Measurement Result:

Date of Test:	August 07, 2010	Temperature:	22℃
Frequency Detector:	0.15~30MHz	Humidity:	50%
Test Result:	PASS	Test Mode:	Bluetooth Mode

Test Line	Frequency MHz	Emission Level QP dB(μV)	Emission Level AV dB(μV)	Limits QP dB(μV)	Limits AV dB(μV)	Margin QP dB(μV)	Margin AV dB(μV)
Neutral	0.17	46.5	35.66	64.96	54.96	-18.46	-19.3
	0.23	45.49	35.44	62.45	52.45	-16.96	-17.01
	0.345	46.79	34.87	59.08	49.08	-12.29	-14.21
	0.43	48.2	34.02	57.25	47.25	-9.05	-13.23
	0.8	47.52	30.62	56	46	-8.48	-15.38
	2.1	48.34	32.77	56	46	-7.66	-13.23
Line	0.17	47.61	33.29	64.96	54.96	-17.35	-21.67
	0.235	43.44	32.03	62.27	52.27	-18.83	-20.24
	0.295	45.65	30.55	60.38	50.38	-14.73	-19.83
	0.325	43.88	30.03	59.58	49.58	-15.7	-19.55
	0.43	44.44	28.87	57.25	47.25	-12.81	-18.38
	2.05	45.31	28.87	56	46	-10.69	-17.13

4.6 Conducted Measurement Photos:

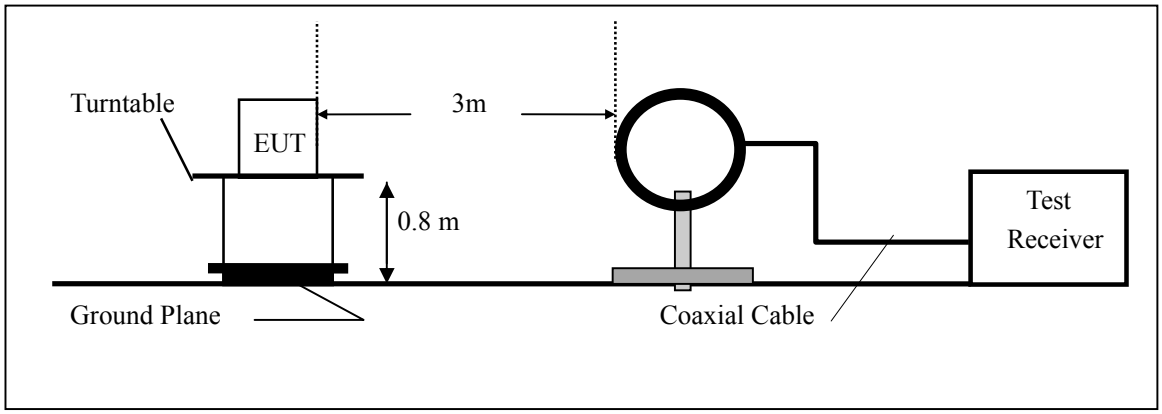
5. Radiated Emission Test

5.1 Measurement Procedure

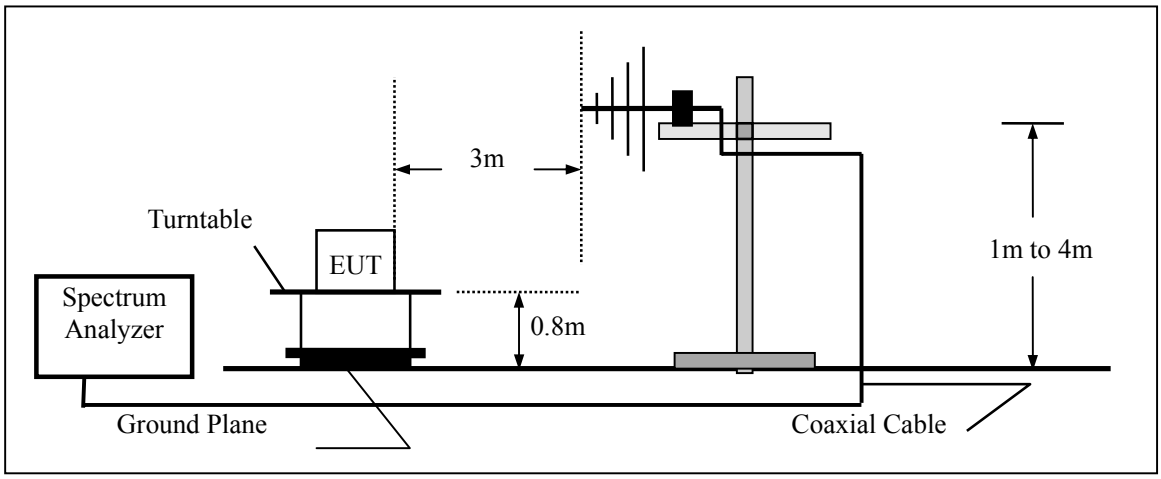
1 The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

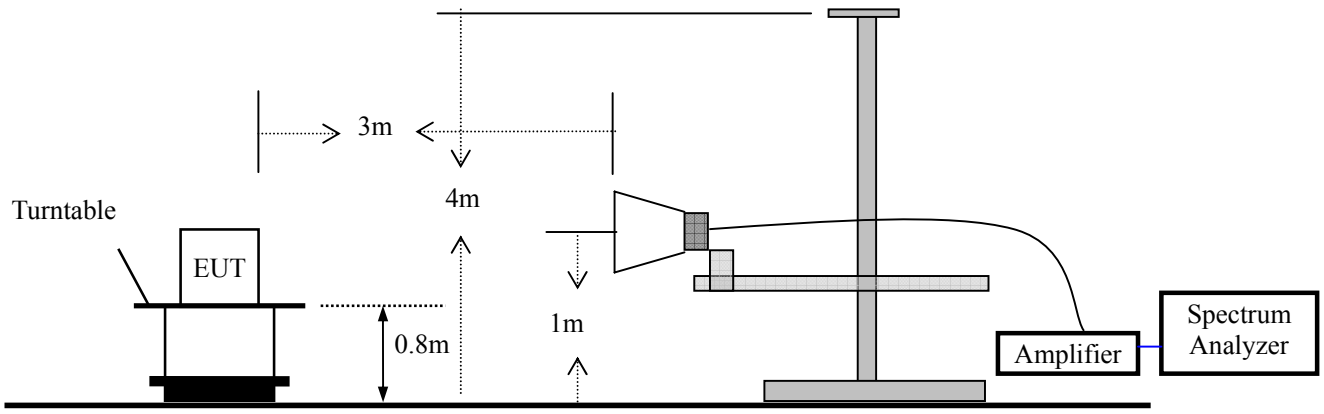
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



5.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSP7	839511/010	05/29/2010	05/29/2011
Spectrum Analyzer	HP	E4407B	839840481	05/29/2010	05/29/2011
EMI Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2010	05/29/2011
Pre-Amplifier	HP	8447D	2944A07999	05/29/2010	05/29/2011
Bilog Antenna	Schwarzbeck	VULB9163	142	05/29/2010	05/29/2011
Loop Antenna	ARA	PLA-1030/B	1029	05/29/2010	05/29/2011
Horn Antenna	Electro-Metrics	EM-6961	103314	05/29/2010	05/29/2011
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/29/2010	05/29/2011

5.4 Measurement Result

TX mode:

Operation Mode:	2402MHz	Test Date :	08/14/2010
Frequency Range:	30~1000MHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KL

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
33.109	V	34.93	40	-5.07	PK
37.7724	V	34.53	40	-5.47	PK
73.5256	V	34.8	40	-5.2	PK
129.4871	V	37.93	43.5	-5.57	PK
244.5192	V	38.92	46	-7.08	PK
399.968	V	40.66	46	-5.34	PK
75.0801	H	33.06	40	-6.94	PK
244.5192	H	33.85	46	-12.15	PK
260.0641	H	33.79	46	-12.21	PK
354.8878	H	35.4	46	-10.6	PK
399.968	H	40.61	46	-5.39	PK
441.9391	H	39.15	46	-6.85	PK

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

TX mode:

Operation Mode:	2441MHz	Test Date :	08/14/2010
Frequency Range:	30~1000MHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KL

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
33.11	V	34.65	40	-5.35	PK
38.27	V	34.12	40	-5.88	PK
74.73	V	34.14	40	-5.86	PK
132.09	V	36.93	43.5	-6.57	PK
244.62	V	37.8	46	-8.2	PK
402.27	V	40.6	46	-5.4	PK
75.58	H	32.06	40	-7.94	PK
244.62	H	34.05	46	-11.95	PK
260.76	H	34.8	46	-11.2	PK
355.89	H	35.51	46	-10.49	PK
400.27	H	40.05	46	-5.95	PK
443.94	H	38.08	46	-7.92	PK

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

TX mode:

Operation Mode:	2480MHz	Test Date :	08/14/2010
Frequency Range:	30~1000MHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	KL

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
33.11	V	33.6	40	-6.4	PK
38.02	V	35.1	40	-4.9	PK
74.53	V	34.28	40	-5.72	PK
132.99	V	36.73	43.5	-6.77	PK
244.72	V	35.8	46	-10.2	PK
401.47	V	39.8	46	-6.2	PK
75.22	H	38.22	40	-1.78	PK
245.52	H	39.43	46	-6.57	PK
260.06	H	35.74	46	-10.26	PK
359.89	H	35.41	46	-10.59	PK
402.07	H	40.23	46	-5.77	PK
442.94	H	37.08	46	-8.92	PK

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

TX mode:

Operation Mode:	CH1: 2402MHz	Test Date :	08/14/2010
Frequency Range:	1-25GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV) PK	Emission Level(dBuV) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
10889.42	V	57.91	45.04	74	54	-16.09	-8.96
14676.28	V	60.27	48.18	74	54	-13.73	-5.82
18000	V	65.03	52.08	74	54	-8.97	-1.92
--	V	--	--	--	--	--	--
--	V	--	--	--	--	--	--
10181.09	H	56.61	44.74	74	54	-17.39	-9.26
14621.79	H	60.67	48.92	74	54	-13.33	-5.08
18000	H	64.98	52.5	74	54	-9.02	-1.5
--	H	--	--	--	--	--	--
--	H	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level + Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

TX mode:

Operation Mode:	CH40: 2441MHz	Test Date :	08/14/2010
Frequency Range:	1-25GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4868.59	V	51.03	35.16	74	54	-22.97	-18.84
14540.06	V	61.01	49.27	74	54	-12.99	-4.73
18000	V	64.71	51.89	74	54	-9.29	-2.11
--	V	--	--	--	--	--	--
--	V	--	--	--	--	--	--
4868.59	H	50.76	32.83	74	54	-23.24	-21.17
14403.84	H	60.96	48.93	74	54	-13.04	-5.07
18000	H	64.73	51.08	74	54	-9.27	-2.92
--	H	--	--	--	--	--	--
--	H	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

TX mode:

Operation Mode:	CH79: 2480MHz	Test Date :	08/14/2010
Frequency Range:	1-25GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV) PK	Emission Level(dBuV) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
4950.32	V	53.16	35.73	74	54	-20.84	-18.27
10344.55	V	56.65	44.69	74	54	-17.35	-9.31
14512.82	V	60.83	49.47	74	54	-13.17	-4.53
--	V	--	--	--	--	--	--
--	V	--	--	--	--	--	--
4950.32	H	47.62	34.09	74	54	-26.38	-19.91
10344.55	H	57.41	44.9	74	54	-16.59	-9.1
14458.33	H	61.32	49.49	74	54	-12.68	-4.51
--	H	--	--	--	--	--	--
--	H	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

RX mode:

Operation Mode:	RX	Test Date :	08/14/2010
Frequency Range:	30-1GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
33.109	V	34.53	40	-5.47	PK
37.7724	V	34.47	40	-5.53	PK
62.6442	V	33.19	40	-6.81	PK
93.734	V	32.54	43.5	-10.96	PK
129.4871	V	40.45	43.5	-3.05	PK
406.186	V	42.46	46	-3.54	PK
73.5256	H	32.17	40	-7.83	PK
194.7756	H	27.1	43.5	-16.4	PK
232.0833	H	29.02	46	-16.98	PK
260.0641	H	35.38	46	-10.62	PK
404.6314	H	40.82	46	-5.18	PK
446.6026	H	36.45	46	-9.55	PK

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

RX mode:

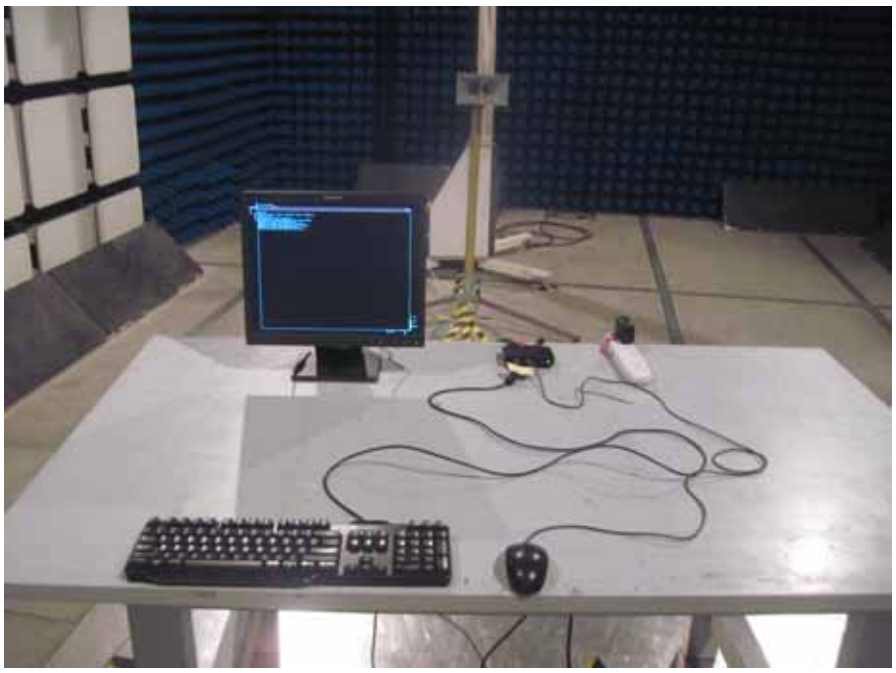
Operation Mode:	RX	Test Date :	04/02/2010
Frequency Range:	1-25GHz	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

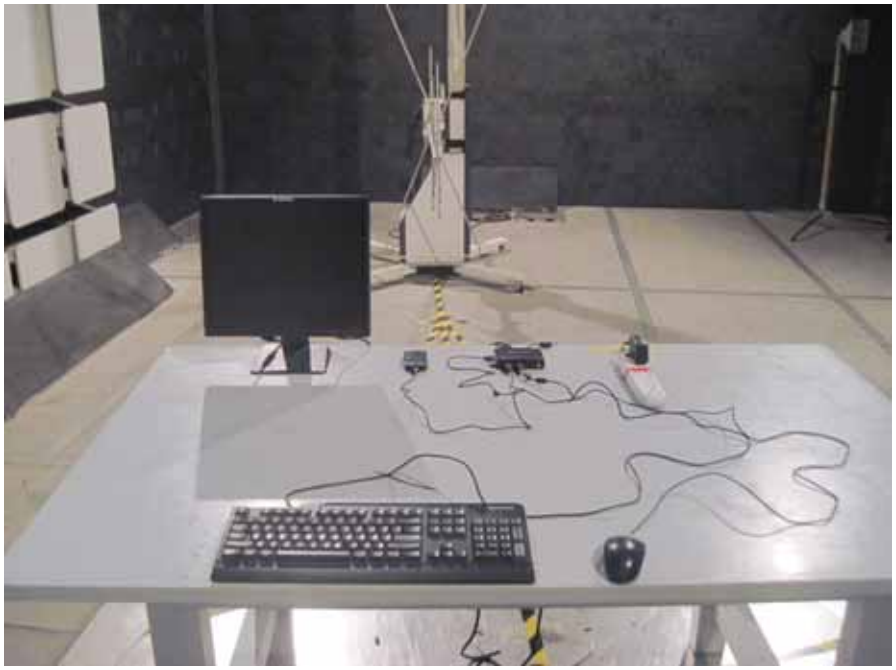
Freq.	Ant.Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
11052.88	V	56.75	44.18	74	54	-17.25	-9.82
14512.82	V	61.21	48.97	74	54	-12.79	-5.03
180000	V	64.78	53.4	74	54	-9.22	-0.6
--	V	--	--	--	--	--	--
--	V	--	--	--	--	--	--
10371.79	H	56.96	44.57	74	54	-17.04	-9.43
14594.55	H	60.87	48.96	74	54	-13.13	-5.04
18000	H	65.2	51.26	74	54	-8.8	-2.74
--	H	--	--	--	--	--	--
--	H	--	--	--	--	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5.5 Radiated Measurement Photos:



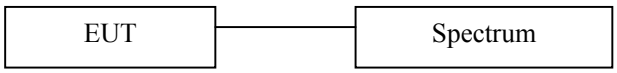


6. Channel Separation test

6.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used:

Same as 4.3 Radiated Emission Measurement.

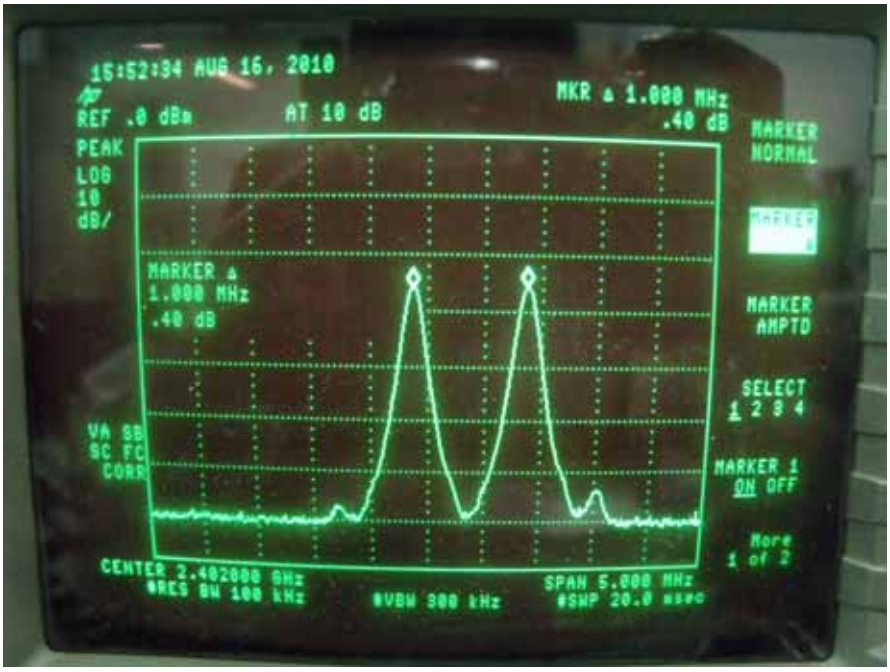
6.4 Measurement Results:

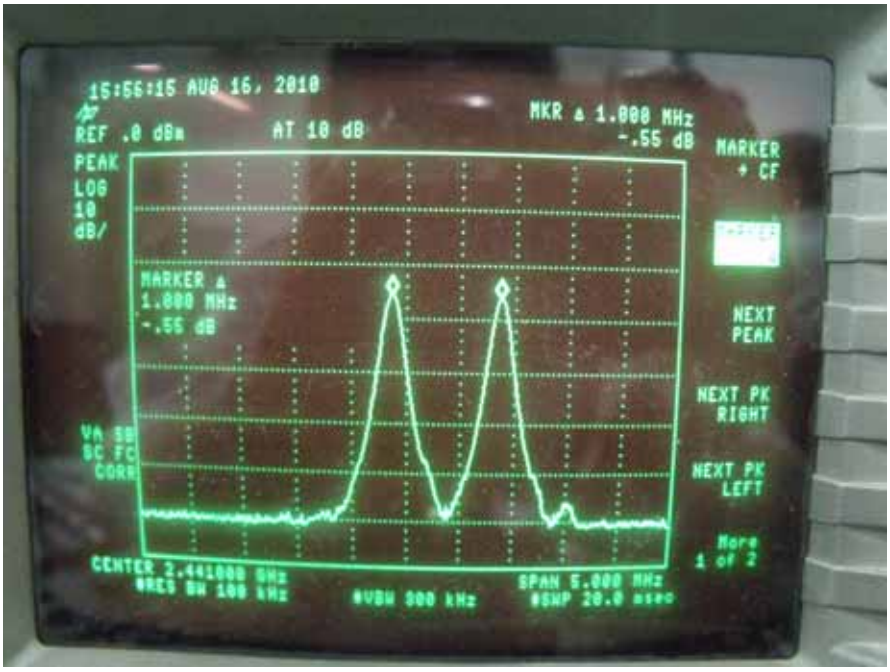
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	08/14/2010
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
1	2402	1000.00	>775 kHz
40	2441	1000.00	>775 kHz
79	2480	1000.00	>758 kHz

NOTE: For two-third of the 20db bandwith (page34) is greater than 25kHz. So the limit of Separation Limit are just as the above table.


16:52:34 AUG 16, 2010
REF .0 dBm
AT 10 dB
MKR Δ 1.000 MHz
.40 dB
PEAK
LOG
10
dB/
MARKER Δ
1.000 MHz
.40 dB
MARKER
NORMAL
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.402000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
#SWP 20.0 msec


16:56:15 AUG 16, 2010
REF .0 dBm
AT 10 dB
MKR Δ 1.000 MHz
-.55 dB
PEAK
LOG
10
dB/
MARKER Δ
1.000 MHz
-.55 dB
MARKER
+ CF
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
CENTER 2.441000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
#SWP 20.0 msec

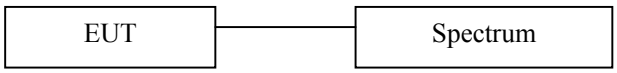

15:59:14 AUG 16, 2010
REF .0 dBm
AT 10 dB
MKR Δ 1.000 MHz
-1.35 dB
PEAK
LOG
10
dB/
MARKER Δ
1.000 MHz
-1.35 dB
MARKER
NORMAL
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.400000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
#SWP 20.0 msec

7. Bandwidth test

7.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used:

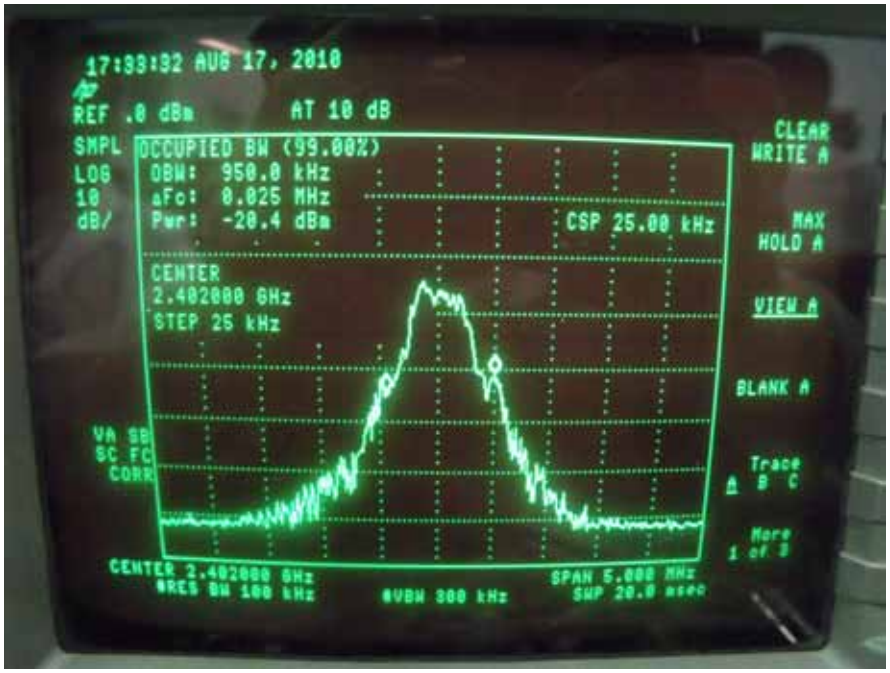
Same as 4.3 Radiated Emission Measurement.

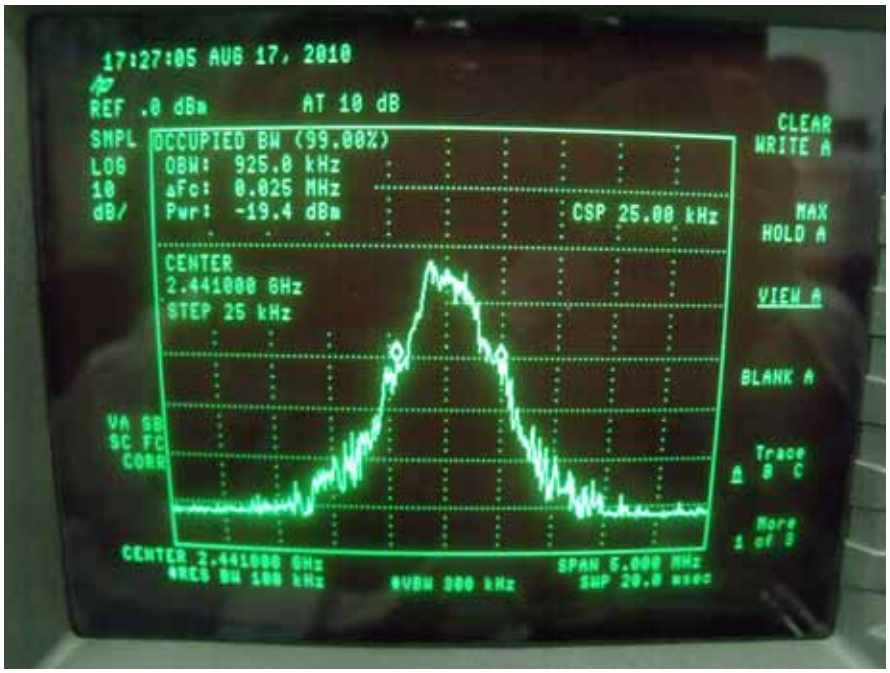
7.4 Measurement Results:

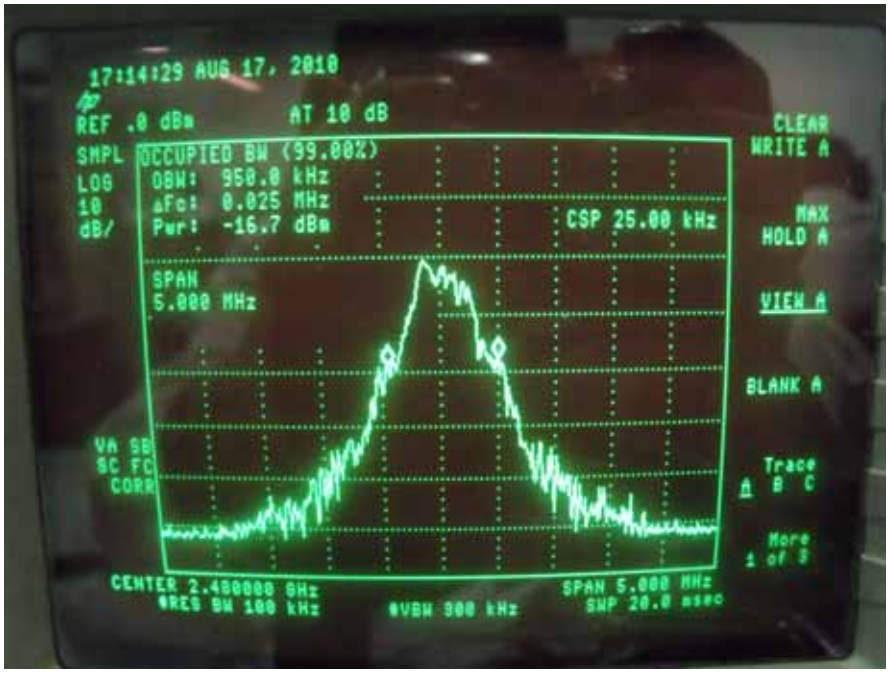
7.4.1 99% Bandwidth test data Chart:

Spectrum Detector:	PK	Test Date:	08/14/2010
Test By:	Andy	Temperature:	28 ℃
Test Result:	PASS	Humidity:	65 %

Channel number	Channel frequency (MHz)	99% Down BW(kHz)
1	2402	950
40	2441	925
79	2480	950


17:33:32 AUG 17, 2010
REF .0 dBm
AT 10 dB
SMPL
LOG
10
dB/
OCCUPIED BW (99.00%)
OBW: 950.0 kHz
ΔFc: 0.025 MHz
Pwr: -20.4 dBm
CSP 25.00 kHz
CENTER
2.402000 GHz
STEP 25 kHz
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
CENTER 2.402000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
SWP 20.0 msec

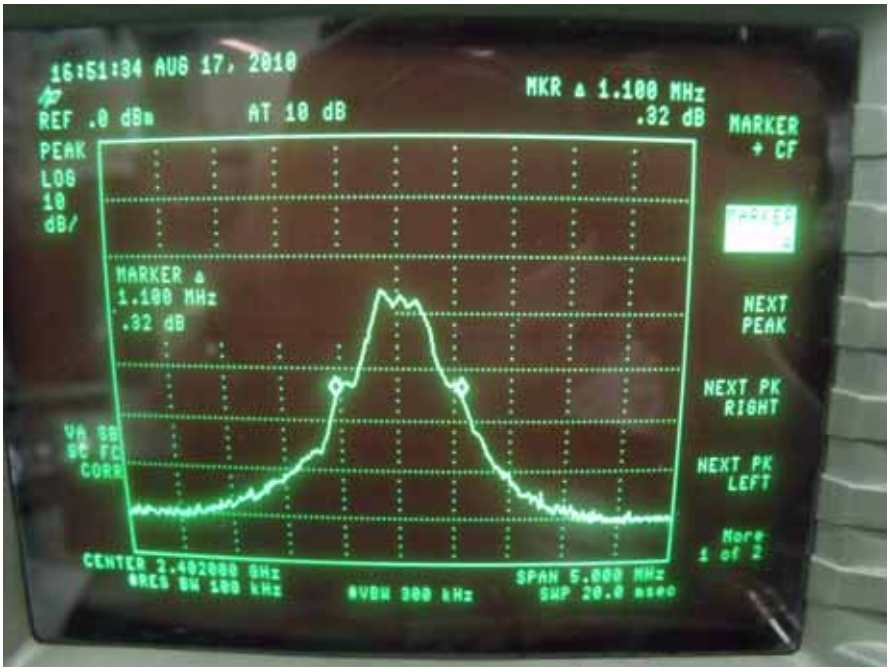

17:27:05 AUG 17, 2010
REF .0 dBm
AT 10 dB
SMPL
LOG
10
dB/
OCCUPIED BW (99.00%)
OBW: 925.0 kHz
ΔFc: 0.025 MHz
Pwr: -19.4 dBm
CSP 25.00 kHz
CENTER
2.441000 GHz
STEP 25 kHz
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
CENTER 2.441000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
SWP 20.0 msec

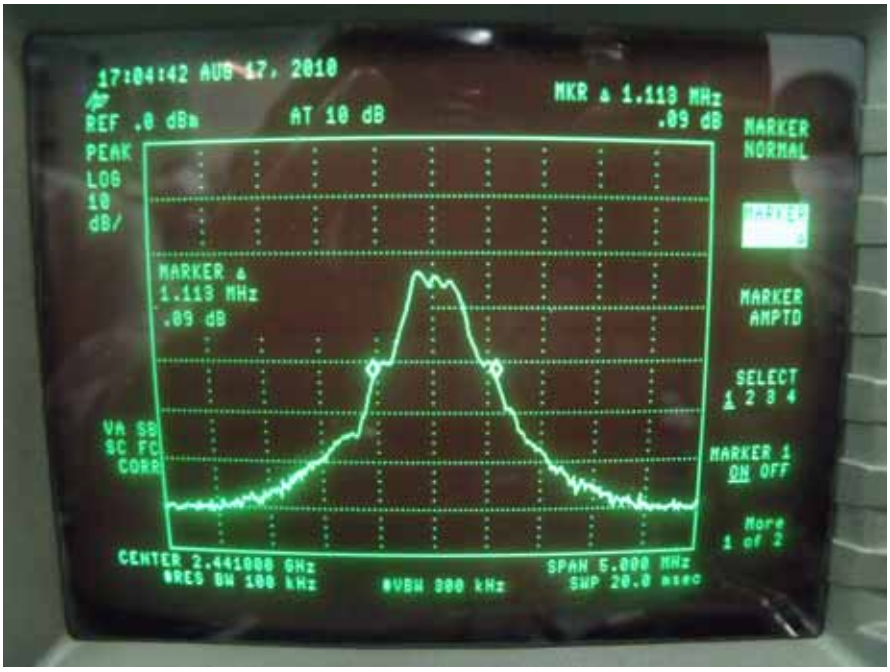


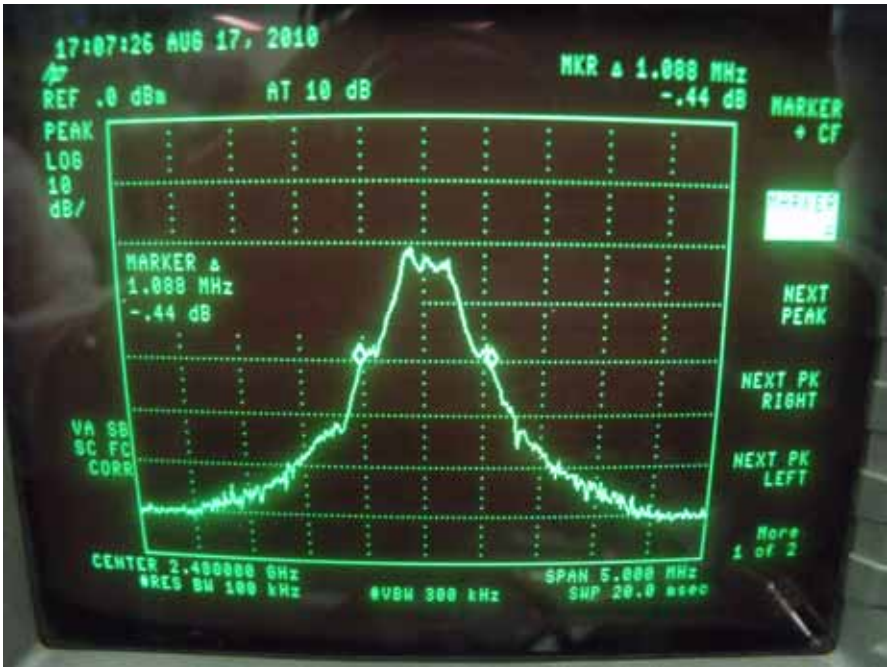
7.4.2 20dB Bandwidth test data Chart:
Refer to attached data chart.

Spectrum Detector:	PK	Test Date:	08/17/2010
Test By:	Andy	Temperature:	28 ℃
Test Result:	PASS	Humidity:	65 %

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1100
40	2441	1113
79	2480	1088


16:51:34 AUG 17, 2010
MKR Δ 1.100 MHz
.32 dB
REF .0 dBm
AT 10 dB
PEAK
LOG
10
dB/
MARKER Δ
1.100 MHz
.32 dB
MARKER
→ CF
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.402000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
SWP 20.0 msec


17:04:42 AUG 17, 2010
MKR Δ 1.113 MHz
.09 dB
REF .0 dBm
AT 10 dB
PEAK
LOG
10
dB/
MARKER Δ
1.113 MHz
.09 dB
MARKER
NORMAL
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.441000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
SWP 20.0 msec

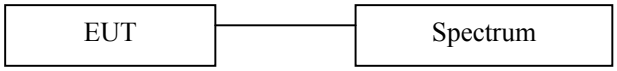

17:07:26 AUG 17, 2010
REF .0 dBm
AT 10 dB
MKR Δ 1.088 MHz
-.44 dB
PEAK
LOG
10
dB/
MARKER Δ
1.088 MHz
-.44 dB
MARKER
→ CF
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.400000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SPAN 5.000 MHz
SWP 20.0 msec

8. Quantity of Hopping Channel Test

8.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used:

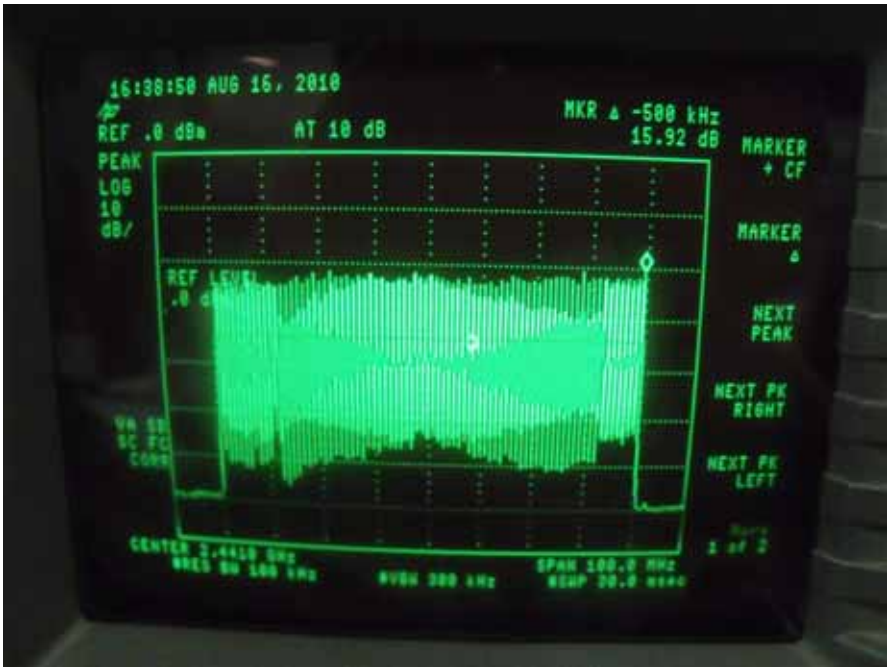
Same as 4.3 Radiated Emission Measurement.

8.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	08/14/2010
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %

Hopping Channel Frequency Range	Quantity of Hopping Channel	Quantity of Hopping Channel
2402-2480	79	79

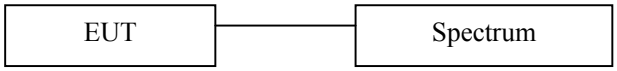

16:38:50 AUG 16, 2010
REF .0 dBm
AT 10 dB
MKR Δ -500 kHz
15.92 dB
PEAK
LOG
10
dB/
MARKER
+ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT

9. Time of Occupancy (Dwell Time) test

9.1 Measurement Procedure

a. Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

9.2 Test SET-UP (Block Diagram of Configuration)



9.3 Measurement Equipment Used:

Same as 4.3 Radiated Emission Measurement.

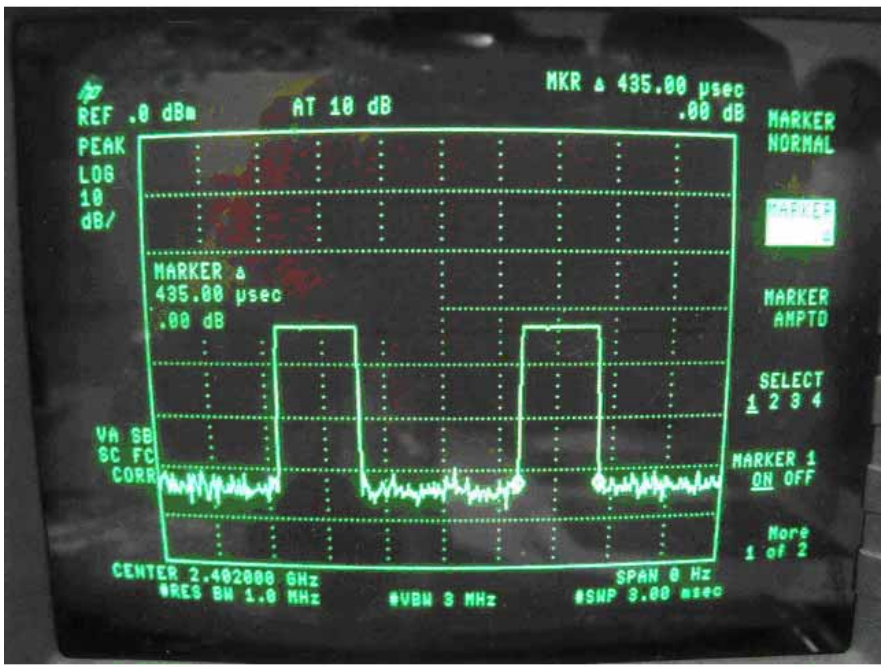
9.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	08/20/2010
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %

Mode	Number of transmission in a 31.6(79 Hopping*0.4)	Length of transmissions time(msec)	Result (msec)	Limit (msec)
DH1	51(times/5 sec)*6.32=322.32 times	0.435	140.2092	400
DH3	26(times/5 sec)*6.32=164.32 times	1.616	265.5411	400
DH5	15(times/5 sec)*6.32=94.80 times	2.717	257.5716	400

DH1


REF .0 dBm
AT 10 dB
MKR Δ 435.00 µsec
.00 dB
PEAK
LOG
10
dB/
MARKER Δ
435.00 µsec
.00 dB
MARKER
NORMAL
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.402000 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 0 Hz
#SWP 3.00 msec

DH3


REF .0 dBm
AT 10 dB
MKR Δ 1.6116 msec
.00 dB
PEAK
LOG
10
dB/
MARKER Δ
1.6116 msec
.00 dB
MARKER
NORMAL
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.441000 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 0 Hz
#SWP 6.32 msec

DH5

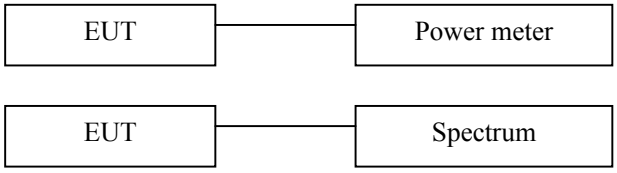

REF .0 dBm
AT 10 dB
MKR Δ 2.7176 msec
-1.59 dB
PEAK
LOG
10
dB/
MARKER Δ
2.7176 msec
-1.59 dB
MARKER
NORMAL
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
VA SB
SC FC
CORR
CENTER 2.480000 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 0 Hz
#SWP 6.82 msec

10. MAX IMUM PEAK OUTPUT POWER TEST

10.1 Measurement Procedure

a. Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.
d. Measure the captured power within the band and recording the plot.
e. Repeat above procedures until all frequencies required were complete.

10.2 Test SET-UP (Block Diagram of Configuration)



10.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSP7	839511/010	05/29/2010	05/29/2011
Power meter	Boonton	4232A	29001	05/29/2010	05/29/2011
Power sensor	Boonton	51011-EMC	31184	05/29/2010	05/29/2011

10.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	08/20/2010
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %

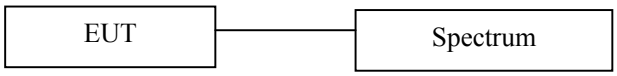
Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
1	2402.00	-2.98	0.5	125	PASS
40	2441.00	-3.34	0.46	125	PASS
79	2480.00	-3.15	0.48	125	PASS

11. Band EDGE test

11.1 Measurement Procedure

1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.

11.2 Test SET-UP (Block Diagram of Configuration)



11.3 Measurement Equipment Used:

Same as 4.3 Radiated Emission Measurement.

11.4 Measurement Results:

Refer to attached data chart.

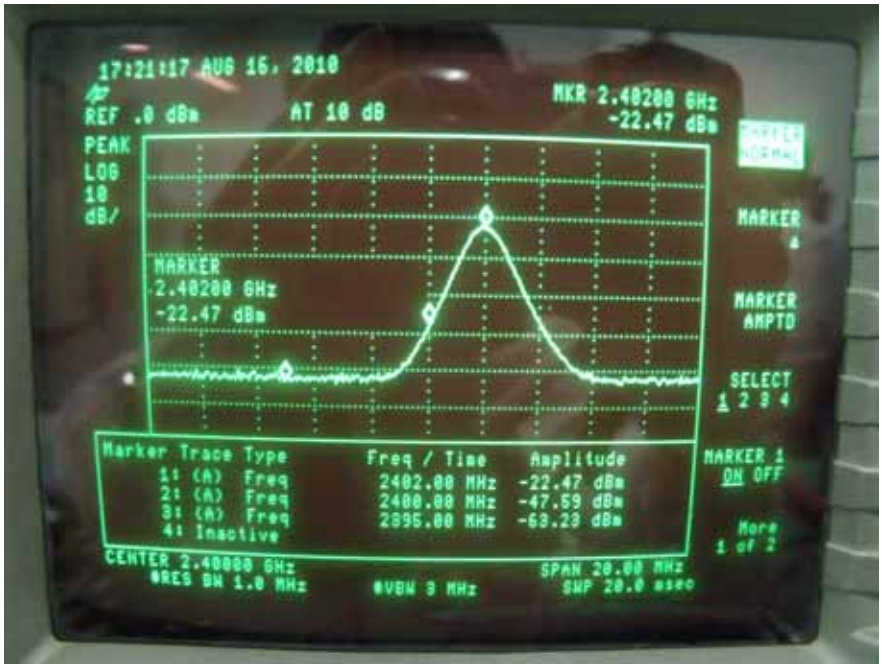
Spectrum Detector:	PK	Test Date :	08/14/2010
Test By:	Andy	Temperature :	28 ℃
Test Result:	PASS	Humidity :	65 %

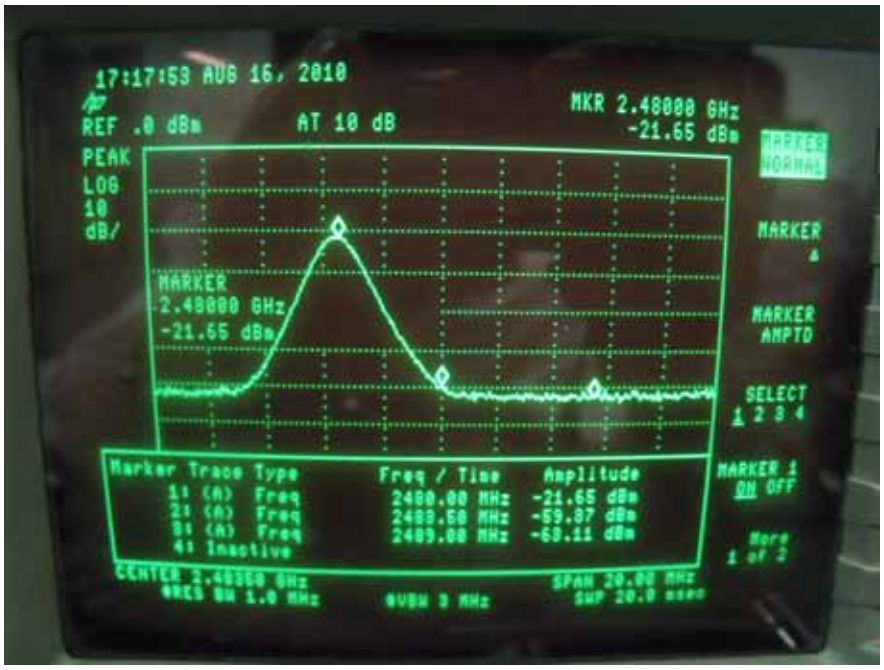
1.Conducted Test

Frequency (MHz)	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
<2400	-22.47	-63.23	-40.76	>20dBc
>2483.5	-21.65	-63.11	-41.46	>20dBc

2.Radiated emission test

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		QP	AV	QP	AV
<2400	V	53.69	35.78	74.00	54.00
>2483.5	V	55.21	36.17	74.00	54.00


17:21:17 AUG 16, 2010
REF .0 dBm
AT 10 dB
MKR 2.40200 GHz
-22.47 dBm
PEAK
LOG
10
dB/
MARKER
2.40200 GHz
-22.47 dBm
MARKER
MARKER AMPTD
SELECT
1 2 3 4
Marker Trace Type
1: (A) Freq
2: (A) Freq
3: (A) Freq
4: Inactive
Freq / Time
2402.00 MHz
2400.00 MHz
2895.00 MHz
Amplitude
-22.47 dBm
-47.59 dBm
-63.23 dBm
MARKER 1 ON OFF
More 1 of 2
CENTER 2.40000 GHz
#RES BW 1.0 MHz
#VBW 3 MHz
SPAN 20.00 MHz
SWP 20.0 msec


17:17:53 AUG 16, 2010
REF .0 dBm
AT 10 dB
MKR 2.48000 GHz
-21.65 dBm
PEAK
LOG
10
dB/
MARKER
2.48000 GHz
-21.65 dBm
MARKER
MARKER AMPTD
SELECT
1 2 3 4
Marker Trace Type
1: (A) Freq
2: (A) Freq
3: (A) Freq
4: Inactive
Freq / Time
2480.00 MHz
2483.50 MHz
2489.00 MHz
Amplitude
-21.65 dBm
-59.87 dBm
-63.11 dBm
MARKER 1 ON OFF
More 1 of 2
#RES BW 1.0 MHz
#VBW 3 MHz
SWP 20.0 msec

12. Antenna Port Emission

12.1 Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/29/2010	05/29/2011

12.2 Measuring Instruments and setting

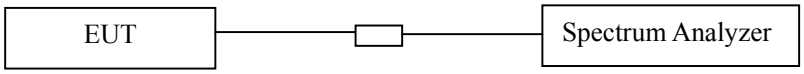
The following table is the setting of spectrum analyzer.

Spectrum analyzer	Setting
Attenuation	Auto
RB	100kHz
VB	300kHz
Detector	Peak
Trace	Max hold

12.3 Test Procedures

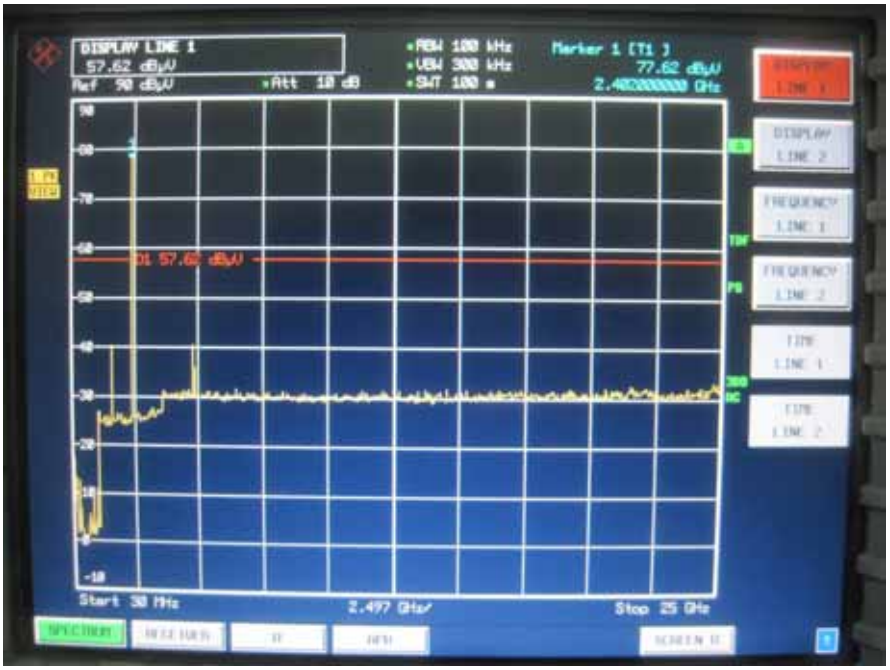
The conducted spurious emissions were measured conducted using a spectrum analyzer at low, mid, and hi channels, The limit was determined by attenuation 20dB of the RF peak power output.

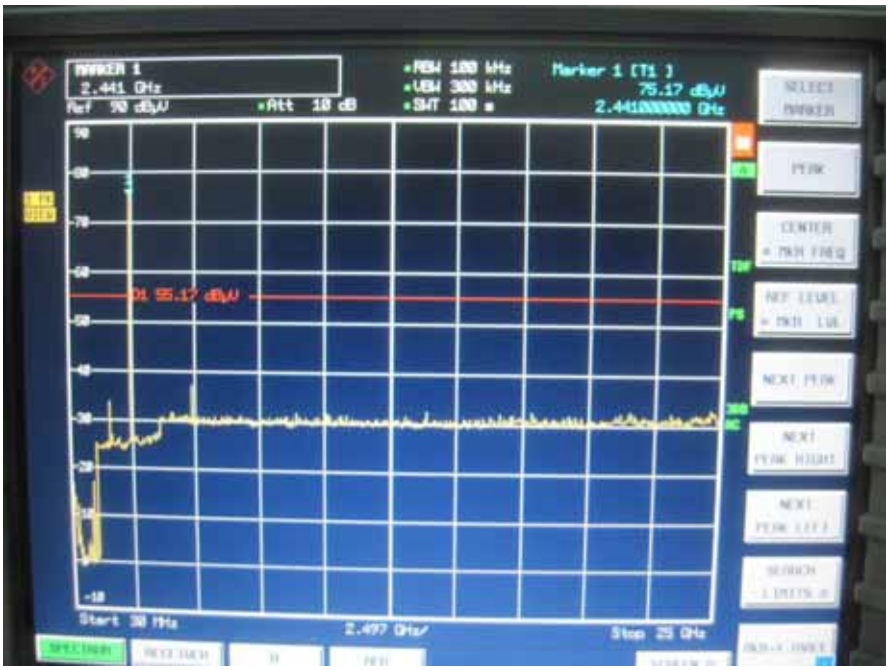
12.4 Block Diagram of Test setup

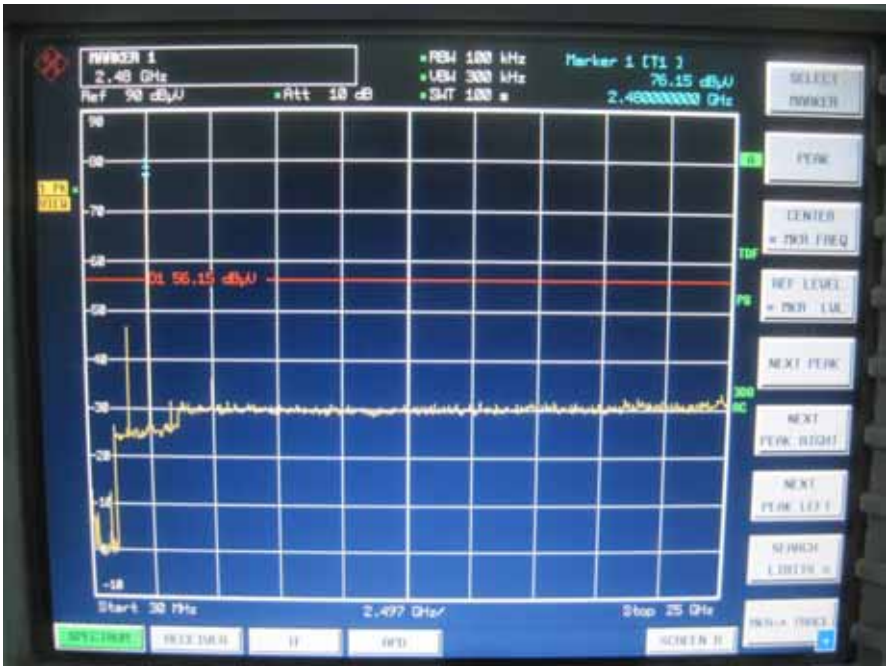


12.5. Test Result

PASS.


DISPLAY LINE 1
57.62 dBµV
Ref 90 dBµV
Att 10 dB
RBW 100 kHz
VBW 300 kHz
SWT 100 s
Marker 1 [T1]
77.62 dBµV
D1 57.62 dBµV
Start 30 MHz
2.497 GHz/
Stop 25 GHz


MARKER 1
2.441 GHz
Ref 90 dBµV
Att 10 dB
RBW 100 kHz
VBW 300 kHz
SWT 100 s
Marker 1 [T1]
75.17 dBµV
D1 55.17 dBµV
Start 30 MHz
2.497 GHz/
Stop 25 GHz



13. Antenna Application

13.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.240, RSS 210 Issue 7.

FCC part 15C section 15.247 and RSS 210 Issue 7 requirements:
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

13.2. Result

The EUT's antenna used a chip antenna and integrated on PCB, The antenna's gain is 0dBi and meets the requirement.