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Report No.: SHEM111200167501
Page: 1 of 35

TEST REPORT

Application No. : SHEM111200167501
Applicant: ATMEL Semiconductor Technology (Shanghai), Ltd.
FCC ID: AIBA091563
Fundamental Frequency: 2405-2480 MHz
Type of Equipment: IEEE 802.15.4 and Zigbee, 2.4 GHz RF Module
Equipment Under Test (EUT):
Marking: NA
Name: AT86RF231 Radio Board
Model No.: A09-1563
Standards: FCC PART 15 SUBPART C, Section 15.247
Date of Receipt: February. 13, 2012
Date of Test: February. 13, 2012 to February. 15, 2012
Date of Issue: February. 21, 2012
Test Result : **PASS ***

* In the configuration tested, the EUT complied with the standards specified above.

Jim Xu
E&E Section Head
SGS-CSTC(Shanghai) Co., Ltd.

Neil Zhang
E&E Project Engineer
SGS-CSTC(Shanghai) Co., Ltd.

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2 Test Summary

TEST ITEM	FCC REFERANCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	Pass
Maximum peak output power	15.247(b)	Pass
Power spectrum density	15.247(e)	Pass
Radiated emission	15.205 & 15.209	Pass
Emission outside the Frequency band	15.247(d)	Pass
Power line conducted emission	15.207	Pass
Channel number of hopping system	15.247(a)(1)(iii)	NA
Average time of occupancy in any channel	15.247(a)(1)(iii)	NA
Antenna Requirement	15.203	Compliance

Noted: “-” means not require in the rules.



3 Contents

	Page
1 COVER PAGE	1
2 TEST SUMMARY	2
3 CONTENTS	3
4 GENERAL INFORMATION.....	4
4.1 CLIENT INFORMATION	4
4.2 DETAILS OF E.U.T.	4
4.3 DESCRIPTION OF SUPPORT UNITS	5
4.4 TEST LOCATION	5
4.5 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	5
4.6 TEST FACILITY	6
4.7 TEST INSTRUMENTS.....	7
4.8 E.U.T. OPERATION.....	8
4.9 TEST PROCEDURE & MEASUREMENT DATA	8
4.9.1 <i>Conducted Emission Test</i>	8
4.9.2 <i>Peak Output Power Measurement</i>	11
4.9.3 <i>6dB Bandwidth</i>	15
4.9.4 <i>Radiated Emission Band Edge</i>	22
4.9.5 <i>Conducted Spurious Emission Test</i>	27
4.9.6 <i>Spurious Radiated Emission Test</i>	30
4.9.7 <i>Peak Power Spectral Density</i>	34



4 General Information		
4.1 Client Information		
Applicant :	ATMEL Semiconductor Technology (Shanghai), Ltd.	
Applicant Address:	18F, Block B, Hi-tech building, No.900 Yishan Rd, Shanghai, China	
Manufacturer:	ATMEL Semiconductor Technology (Shanghai), Ltd.	
Manufacturer Address:	18F, Block B, Hi-tech building, No.900 Yishan Rd, Shanghai, China	
4.2 Details of E.U.T.		
Marking:	NA	
Name:	AT86RF231 Radio Board	
Model No.:	A09-1563	
Power Supply:	3V (from processor board)	
Hardware Version:	N/A	
Software Version:	N/A	
Frequency Band and Channels :	2405-2480 MHz	
	Channel Description:	
	Channel of Transmitter	Frequency(MHz)
	11	2405
	12	2410
	13	2415
	14	2420
	15	2425
	16	2430
	17	2435
	18	2440
	19	2445
	20	2450
	21	2455
22	2460	
23	2465	
24	2470	
25	2475	
26	2480	
Modulation Type:	DSSS [O-QPSK]	



4.3 Description of Support Units		
Name	Model No.	Remark
Laptop	ThinkPad X100e	N/A
AC Adapter	Lenovo 65W 20V	N/A
Mouse	Lenovo M-UAE119	N/A
SAM Reference Design(processor board)	SAM3S-WPIR-RD	5VDC (USB port supply)

4.4 Test Location

Tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.
Tel: +86 21 6191 5666 Fax: +86 21 6191 5655
No tests were sub-contracted.

4.5 Other Information Requested by the Customer

None.



4.6 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. To ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. Has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. Has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. Has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3172 and C-3514 respectively. Date of Registration: 2009-11-30. Date of Expiry: 2012-03-17.



Test Results

4.7 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2011-6-3	2012-6-1
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2011-6-3	2012-6-1
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2011-3-12	2012-3-10
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2011-6-3	2012-6-1
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2011-11-7	2012-11-5
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY—2009P	--	2011-10-13	2012-10-11
7	CLAMP METER	FLUKE	316	86080010	2011-04-22	2012-04-20
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2012-01-5	2013-01-3
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2011-6-17	2012-6-16
11	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT1800.0/ 2000.0-0.2/40- 5SSK	11	2012-1-23	2013-1-21
12	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT800.0/880 .0-0.2/40-5SSK	9	2011-1-23	2013-1-21
13	High pass Filter	FSCW	HP 12/2800- 5AA2	19A45-02	2011-4-8	2012-4-7
14	Low noise amplifier	TESEQ	LNA6900	70133	2011-7-5	2012-7-4
15	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2011-06-04	2012-06-03
16	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2011-05-07	2012-05-06



4.8 E.U.T. Operation

Input voltage: 3V (from processor board)
 Operating Environment:
 Temperature: 24.0 °C
 Humidity: 50 % RH
 Atmospheric Pressure: 1010 mbar
 EUT Operation: The EUT has been tested under operating condition.
 Test program was used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
 Channel low (2405MHz) mid(2440MHz) high(2480MHz)

4.9 Test Procedure & Measurement Data

4.9.1 Conducted Emission Test

Test Requirement: FCC Part15 15.207
Test date: February. 13, 2012
Standard Applicable According to section 15.207,frequency 150KHz to 30MHz shall not exceed the limit table as blew.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 [†]	56 to 46 [†]
0.5-5	56	46
5-30	60	50

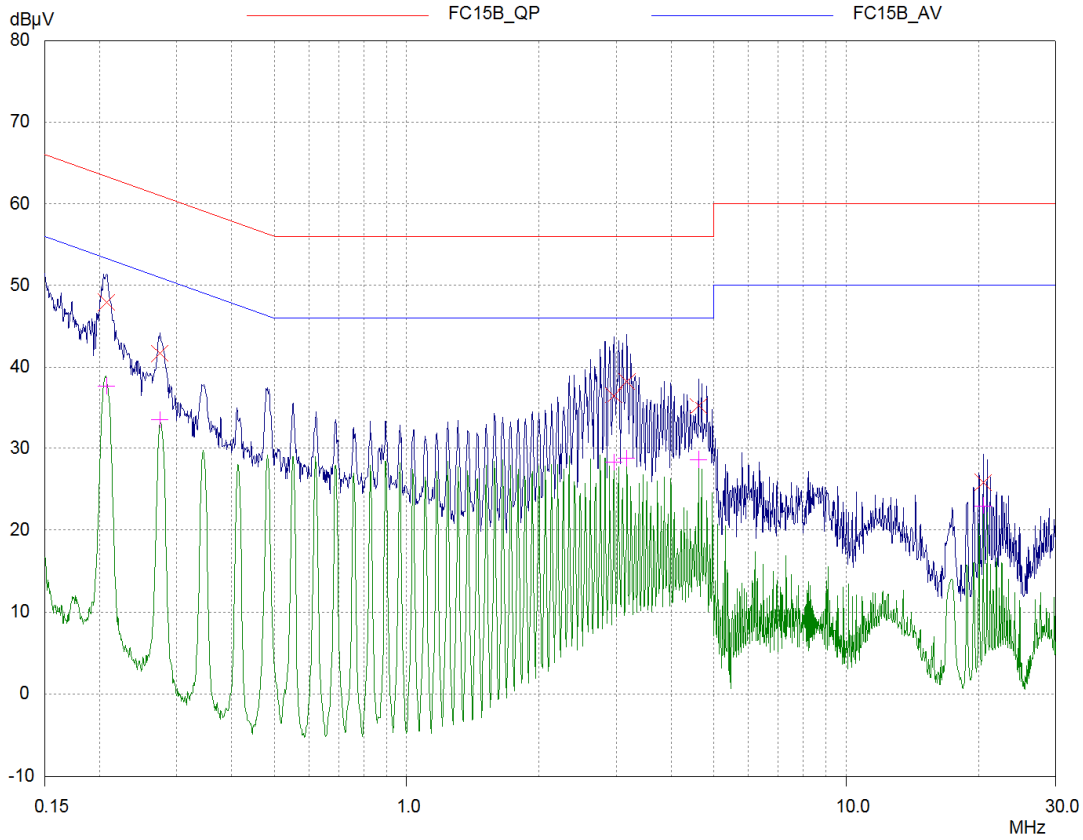
EUT Setup

- 1.The conducted emission tests were performed in the test site,using the setup in accordance with the ANSI C63.10-2009.
- 2.EUT is charged with PC.The AC Power adaptor of PC was plug-in LISN.The rear of the EUT and periphearals were placed flushed with the rear of the tabletop.
- 3.The LISN was connected with 120V AC/60Hz power source.

Measurement Result Operation mode:Normal Link Mode
 Note:All test modes have been tested.



L line:



Final Measurement Results

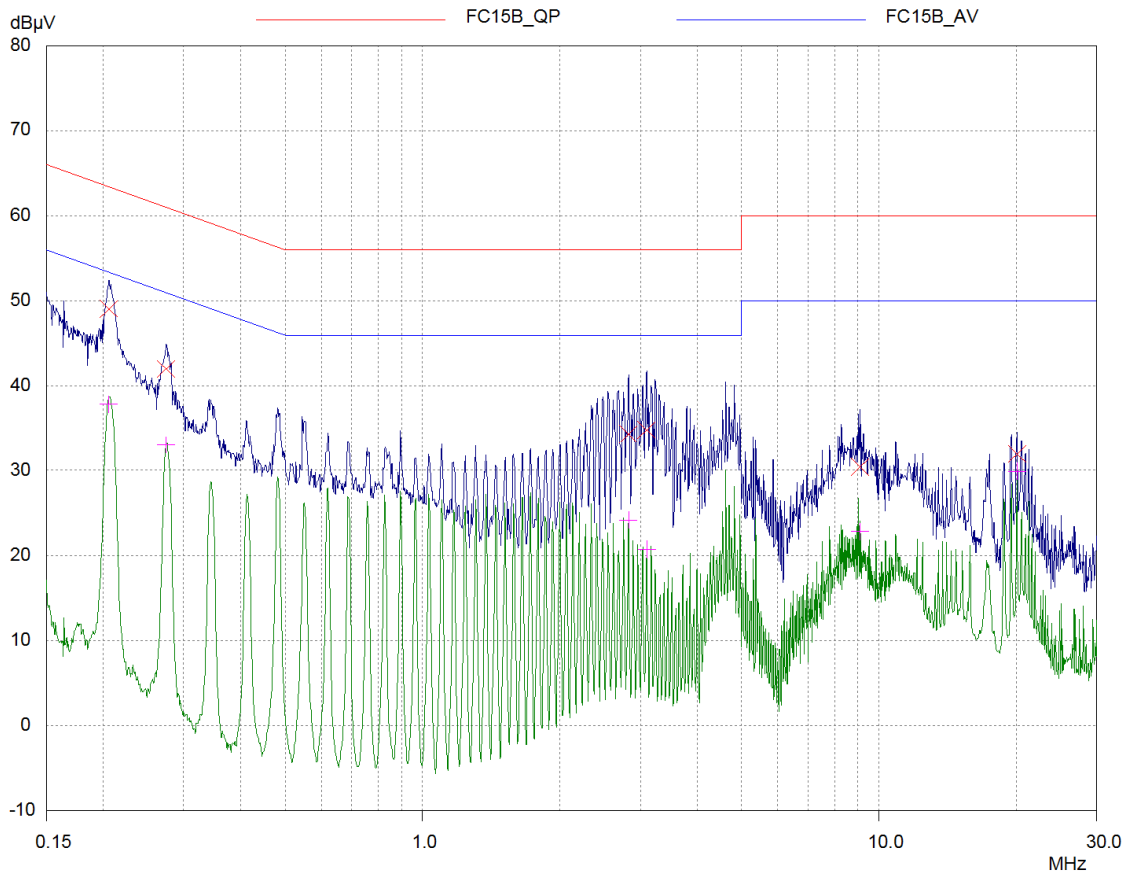
Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.20726	47.95	63.31	15.36
0.27408	41.71	60.99	19.28
2.9592	36.52	56.00	19.48
3.16699	38.22	56.00	17.78
4.6091	35.20	56.00	20.80
20.51282	25.81	60.00	34.19

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.20726	37.69	53.31	15.62
0.27408	33.48	50.99	17.51
2.9592	28.29	46.00	17.71
3.16699	28.75	46.00	17.25
4.6091	28.58	46.00	17.42
20.51282	22.96	50.00	27.04

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N Line:



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.20561	49.05	63.38	14.33
0.27408	42.03	60.99	18.96
2.82078	34.35	56.00	21.65
3.09204	34.85	56.00	21.15
9.08548	30.40	60.00	29.60
20.02733	31.91	60.00	28.09

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.20561	37.86	53.38	15.52
0.27408	32.99	50.99	18.00
2.82078	24.14	46.00	21.86
3.09204	20.69	46.00	25.31
9.08548	22.78	50.00	27.22
20.02733	29.88	50.00	20.12



4.9.2 Peak Output Power Measurement

Test Requirement: FCC Part 15 15.247(a)(2),(b)
Test date February 13, 2012
Standard Applicable: According to section 15.247(a)(2),(b)
 (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, 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.

Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.
3. Set the occur band to the entire emission bandwidth of the signal.
4. Record the max.channel power reading
5. Repeat above procedures until all the frequency measured were complete.

Measurement Result:

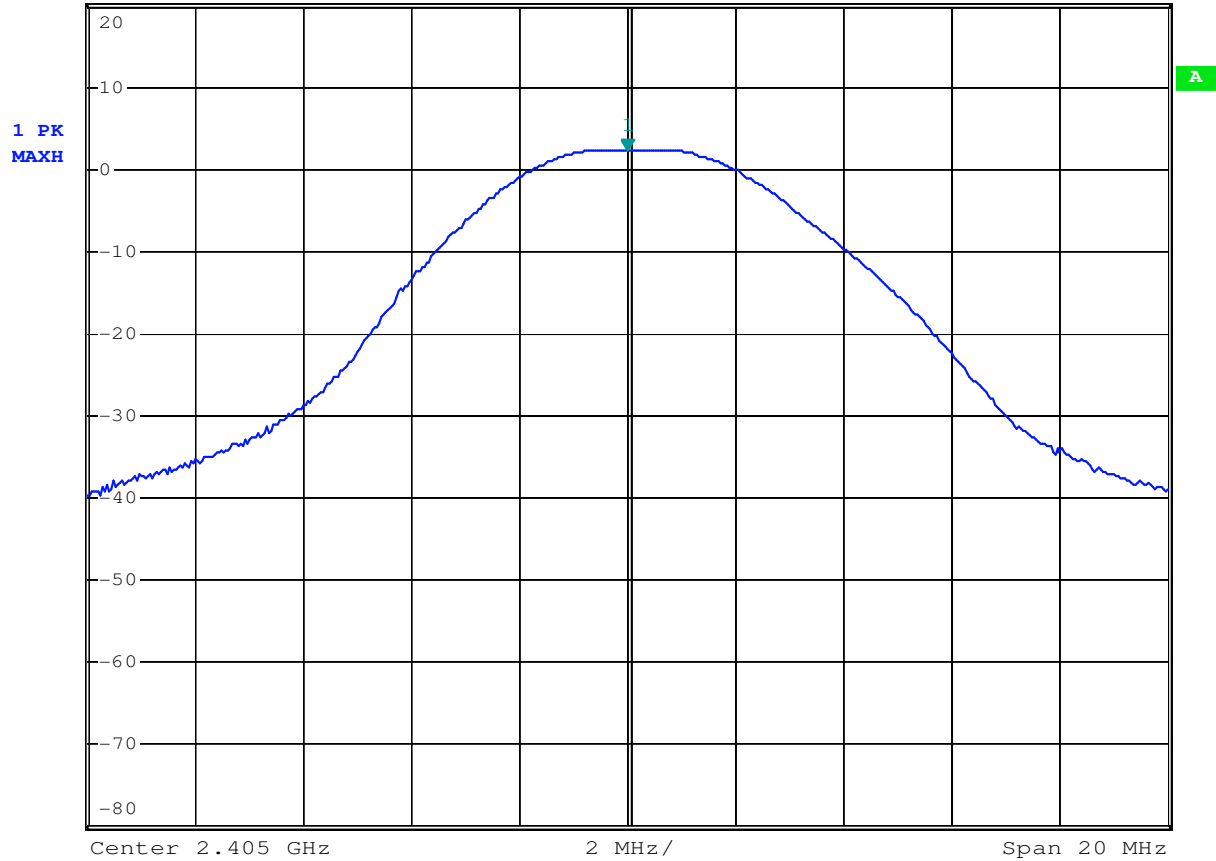
CH	Frequency (MHz)	Reading Power(dBm)	Cable Loss (dB)	Peak Output Power (dBm)	Limit (dBm)	Result
LOW	2405	2.33	0.5	2.83	30	PASS
MID	2440	2.13		2.63	30	PASS
HIGH	2480	1.48		1.98	30	PASS



Peak Power Output Data Plot(CH Low 2405MHz)



Ref 20 dBm *Att 30 dB *RBW 3 MHz Marker 1 [T1] 2.33 dBm
SWT 2.5 ms 2.405010000 GHz

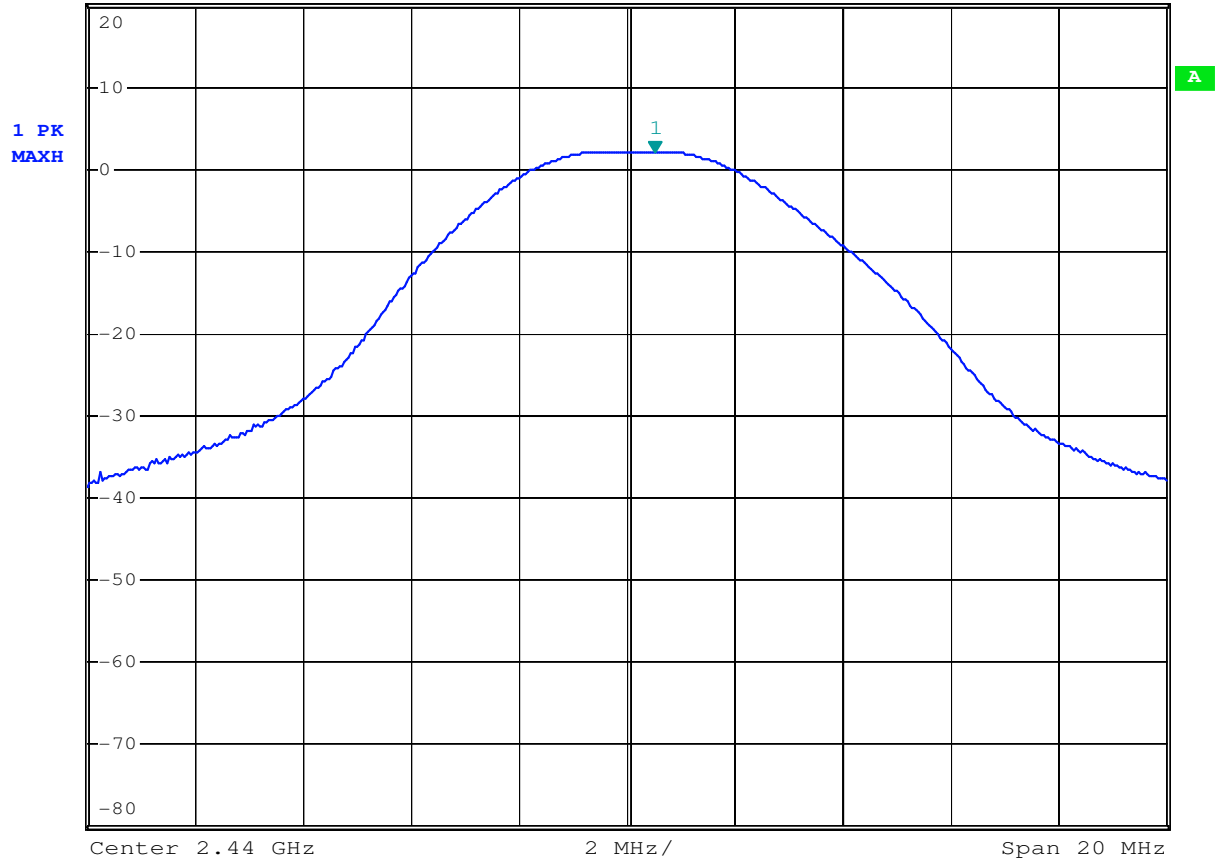




Peak Power Output Data Plot(CH Mid 2440MHz)



Ref 20 dBm *Att 30 dB *RBW 3 MHz Marker 1 [T1] 2.13 dBm
SWT 2.5 ms 2.440520000 GHz

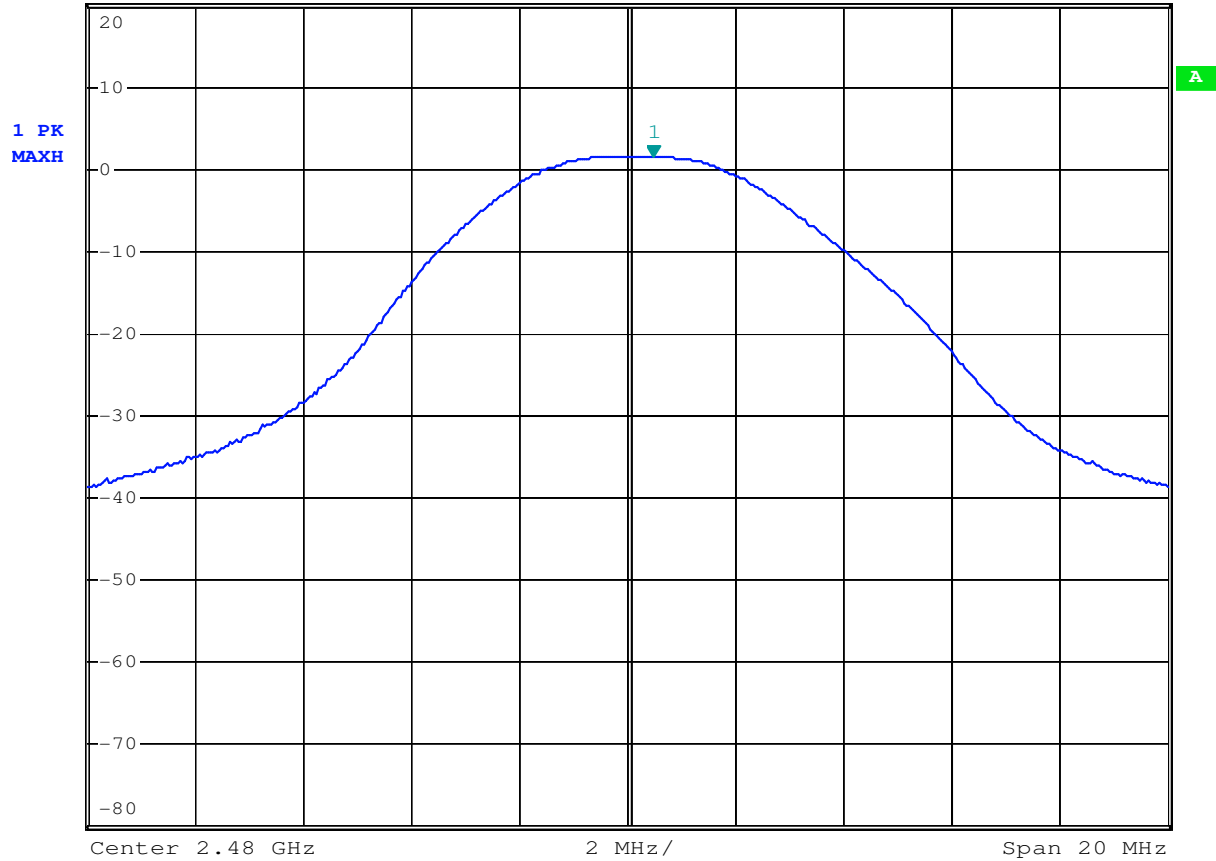




Peak Power Output Data Plot(CH High 2480MHz)



Ref 20 dBm *Att 30 dB *RBW 3 MHz Marker 1 [T1] *VBW 3 MHz 1.48 dBm
SWT 2.5 ms 2.480480000 GHz





4.9.3 6dB Bandwidth

Test Requirement: FCC Part15 247(a)(2)

Test date: February 13.2012

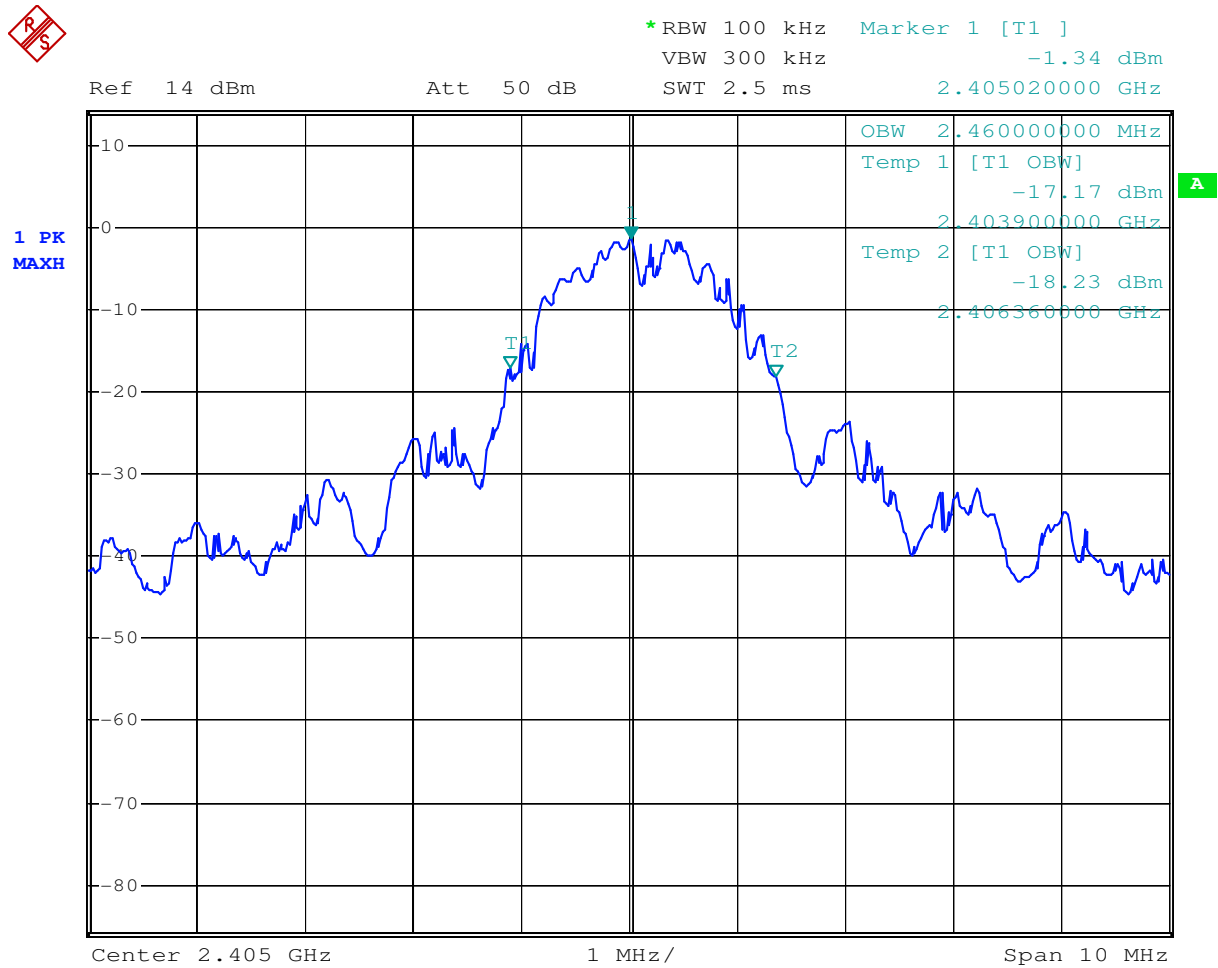
Standard Applicable: According to section 15.247(a)(2),Systems using digital modulationg techniques may operate in the 902-928MHz,2400-2483.5MHz,and 5725-5850MHz bands.The minimum 6dB bandwidth shall be at least 500KHz.

- Measurement Procedure:**
1. Place the EUT on the table and set it in transmitting mode.
 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
 3. Set the spectrum analyzer as RBW=100KHz, VBW =3* RBW, Span=30/ 50MHz, Sweep=auto
 4. Mark the peak frequency and -6dB (upper and lower) frequency.
 5. Repeat above procedures until all frequency measured were complete.

Measurement Result:

CH	Frequency (MHz)	6dB Bandwidth (MHz)	Limit Bandwidth (KHz)	Result	99% OBW (MHz)
LOW	2405	1.62	>500	PASS	2.46
MID	2440	1.62	>500	PASS	2.54
HIGH	2480	1.68	>500	PASS	2.54

99% Band Width Test Data CH-Low 2405MHz



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6dB Band Width Test Data CH-Mid 2440MHz

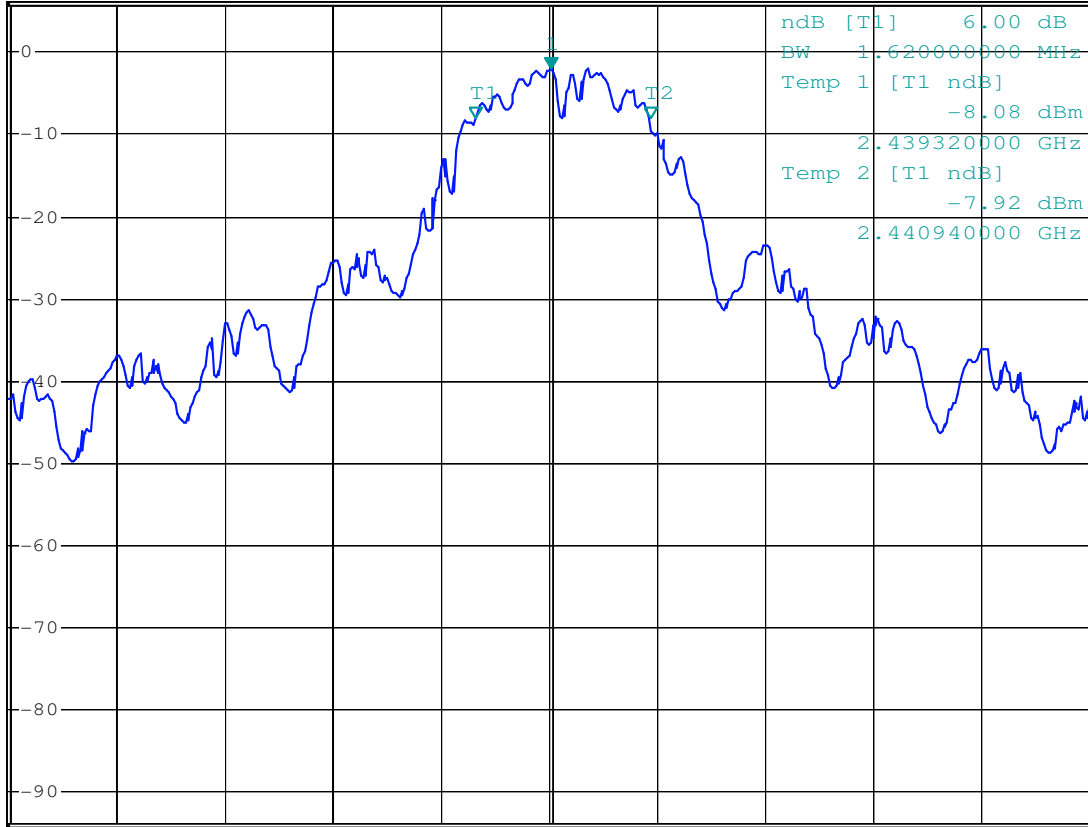


*RBW 100 kHz Marker 1 [T1] -2.04 dBm
 VBW 300 kHz
 SWT 2.5 ms 2.44020000 GHz

Ref 6 dBm

Att 40 dB

1 PK
MAXH

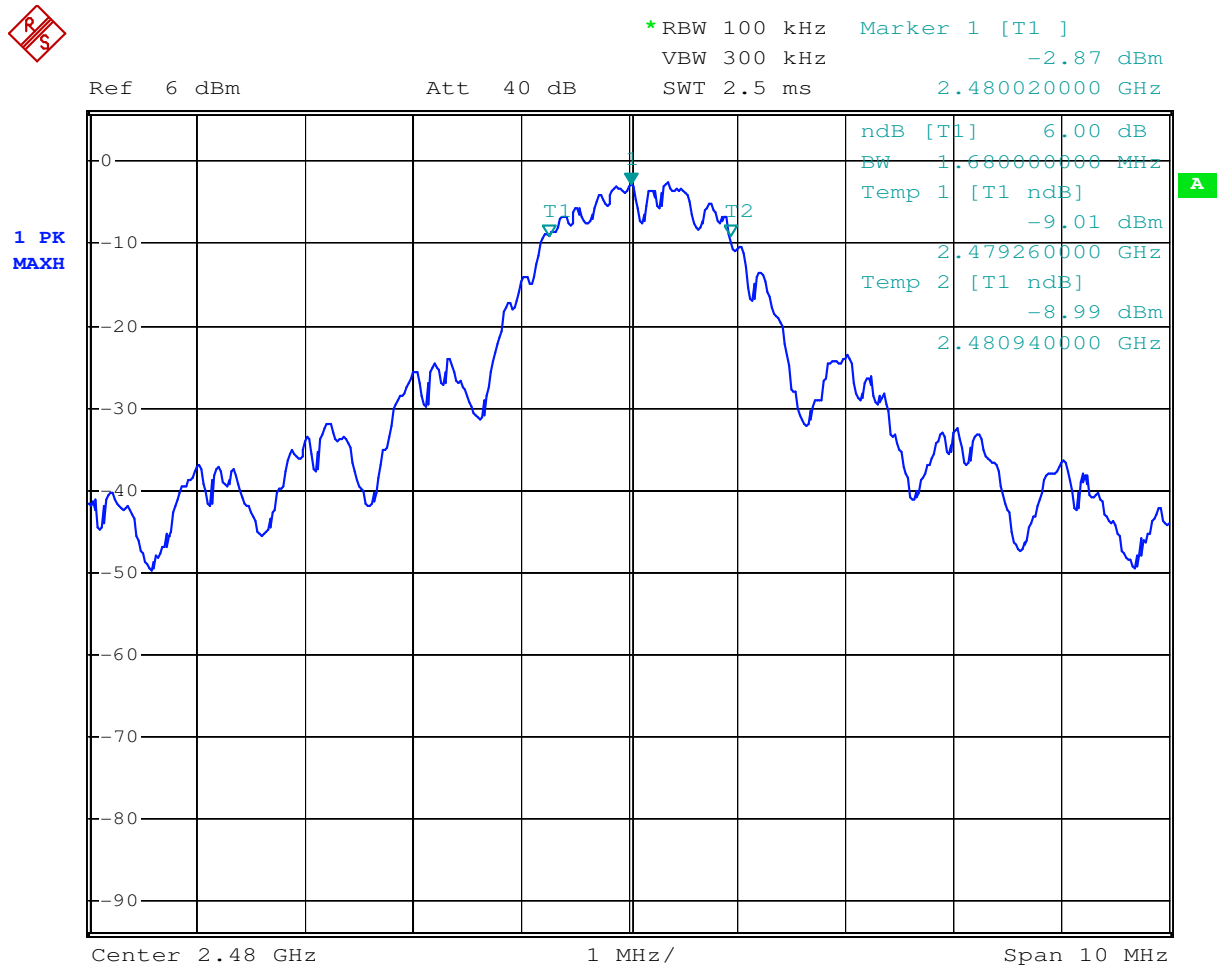


Center 2.44 GHz

1 MHz/

Span 10 MHz

6dB Band Width Test Data CH-High 2480MHz



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4.9.4 Radiated Emission Band Edge

Test Requirement: FCC Part15 247(c)

Test date: February 14.2012

Standard Applicable: According to section 15.247(c),in any 100KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating,the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power,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 15.209(a).

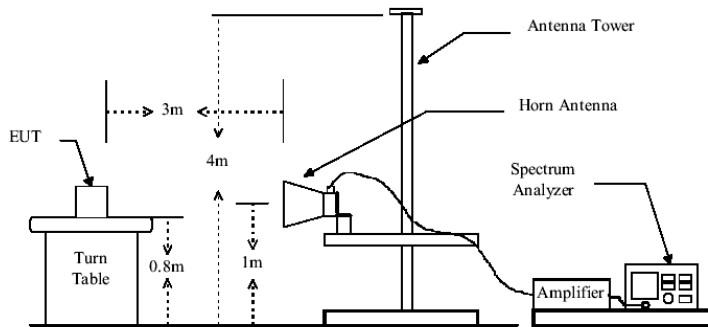
Measurement Procedure: The EUT was setup according to ANSI 63.10,2009 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47 CFR 15.247 requirements.The EUT is placed on a turn table which is 0.8 m above ground.The turn table is rotated 360 degrees to determine to the position of the maximum emission level.The EUT was positioned such that the distance from antenna to the EUT was 3 meters.The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level This is repeated for both horizontal and vertical polarization of the antenna.In order to find the maximum emission,all of the interface cables were manipulated according to ANSIC 63.10:2009 on radiated measurement.

Spectrum analyzer parameters setting as shown below:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

Radiated Emission Test Set-up Frequency Over 1GHz



Remark:

1.The field strength is calculated by adding the Antenna Factor,Preamplifier Factor&Cable Factor. The basic equation with a sample calculation is as follows:

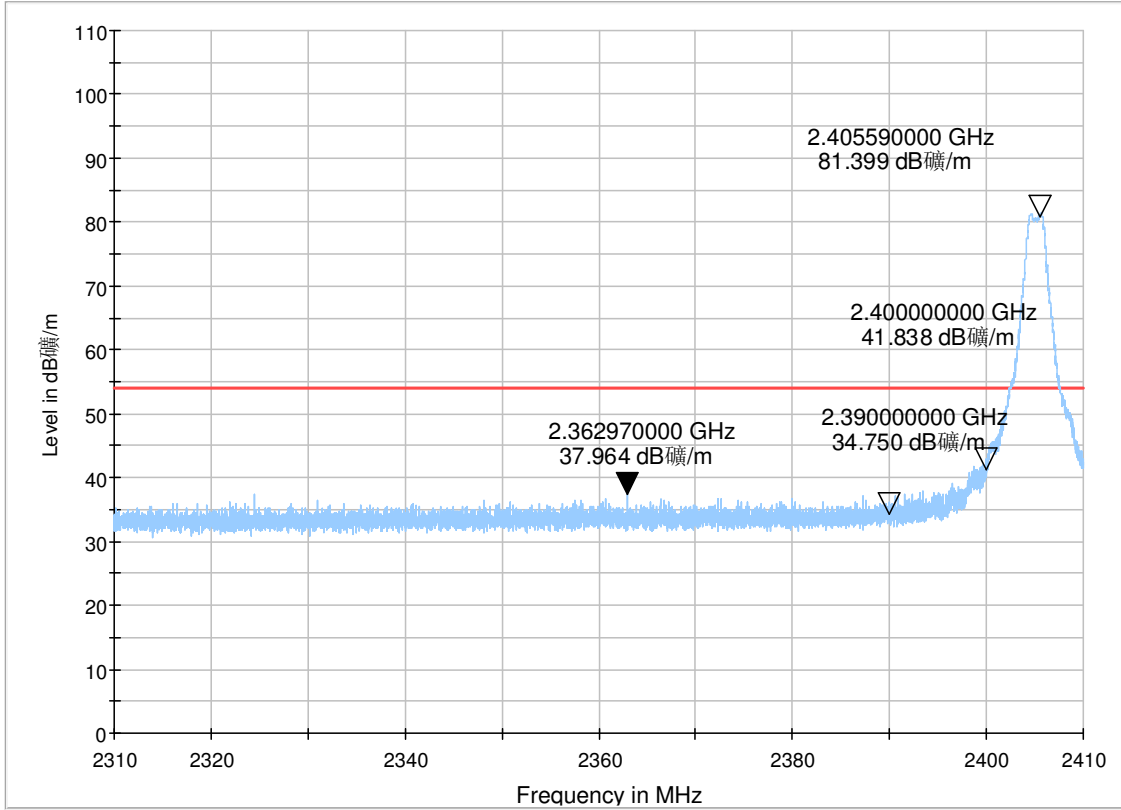
$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

2.Margin=limit-Final Test Level;

3.If the PK level is lower than AV limit, the AV test can be elided.



**Measurement Result:
CH Low 2405MHz Radiated Bandedge(Horizontal)**

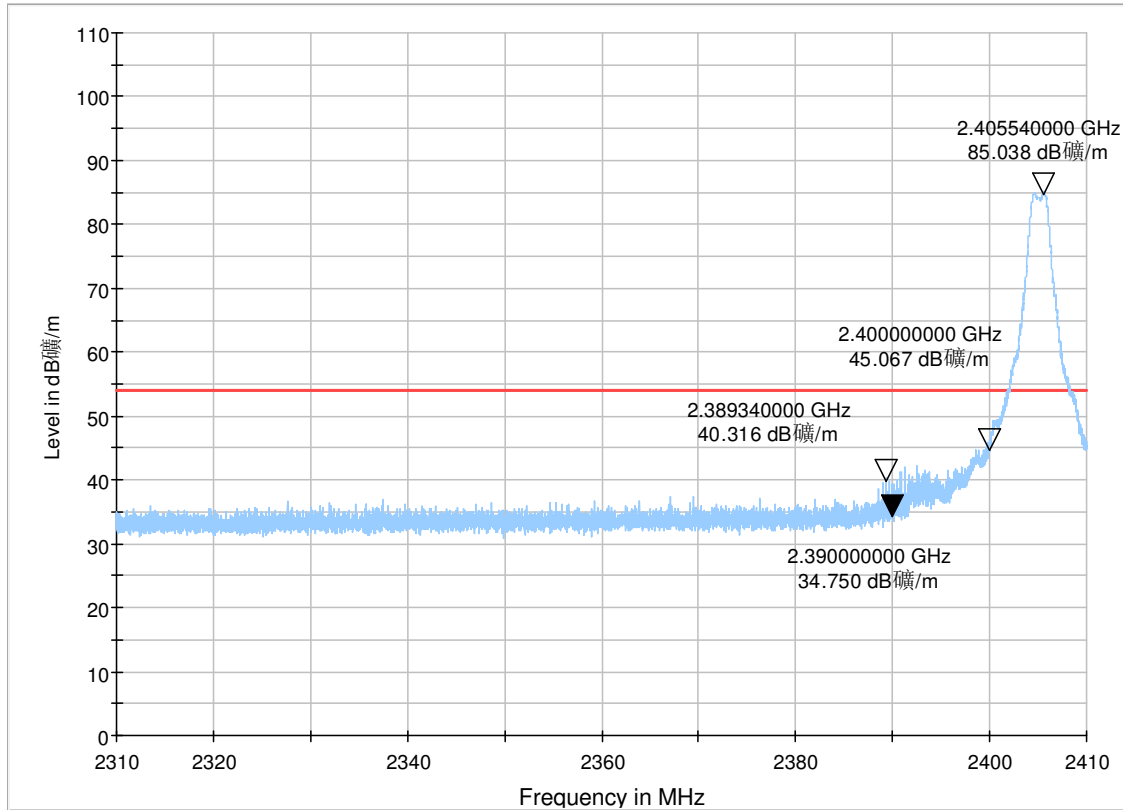


Horizontal, Peak Detector:

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	AVG Limit (dBuV/m)	Margin (dB)
2362.97	48.00	-10.04	37.96	54.00	16.04



CH Low 2405MHz Radiated Bandedge(Vertical)

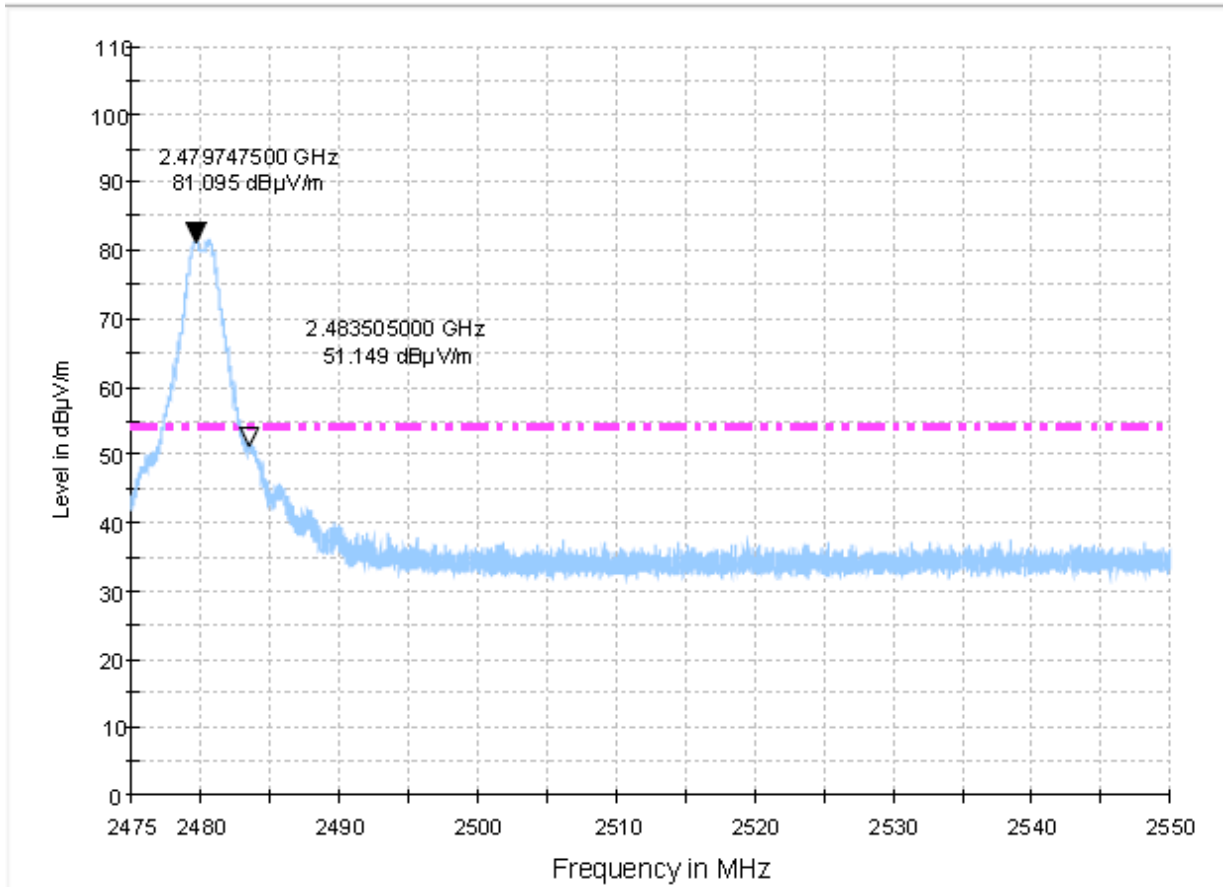


Vertical, Peak Detector:

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	AVG Limit (dBuV/m)	Margin (dB)
2389.34	55.11	-10.04	40.32	54.00	8.93



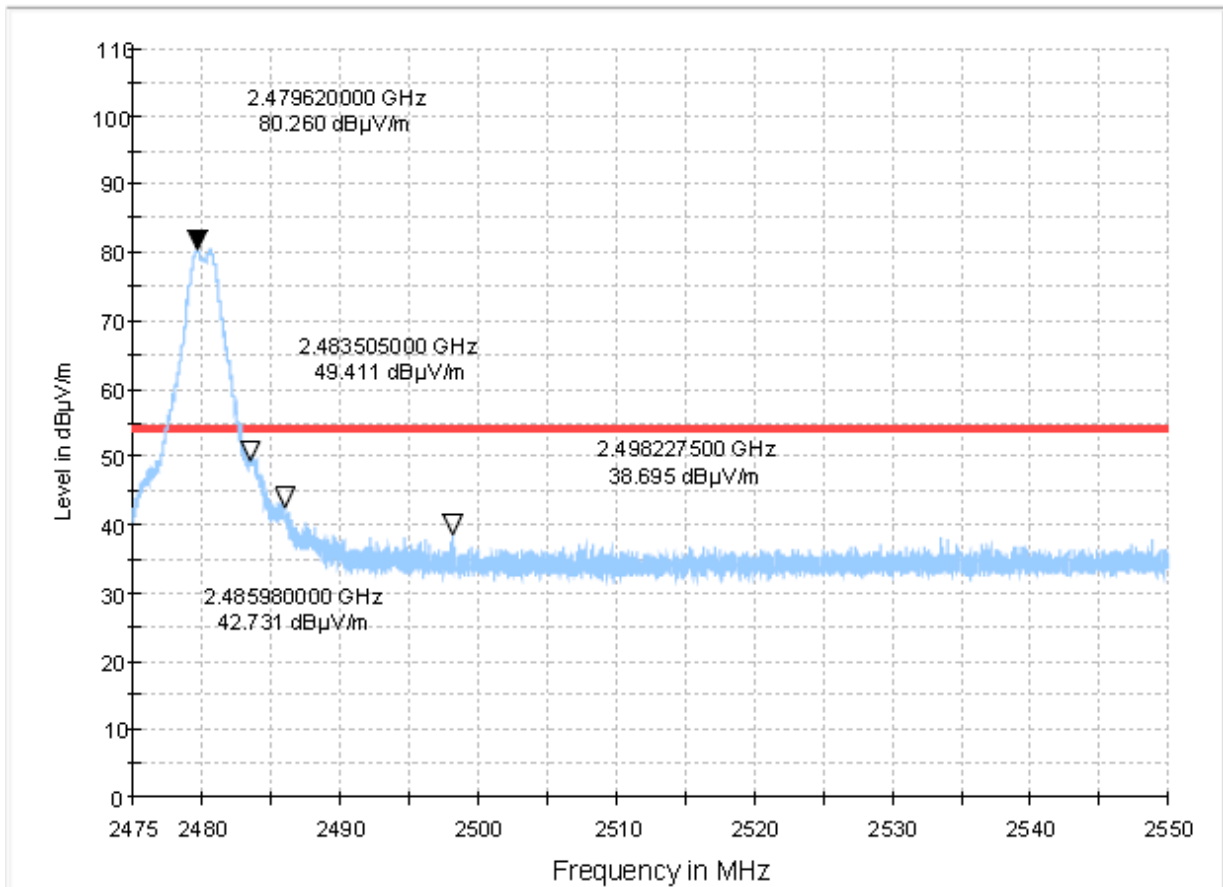
CH High 2480MHz Radiated Bandedge(Horizontal)



Horizontal, Peak Detector:

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	AVG Limit (dBuV/m)	Margin (dB)
2483.5	61.39	-10.24	51.15	54.00	2.85

CH High 2480MHz Radiated Bandedge(Vertical)



Vertical, Peak Detector:

Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	AVG Limit (dBuV/m)	Margin (dB)
2483.5	59.65	-10.24	49.41	54.00	4.59

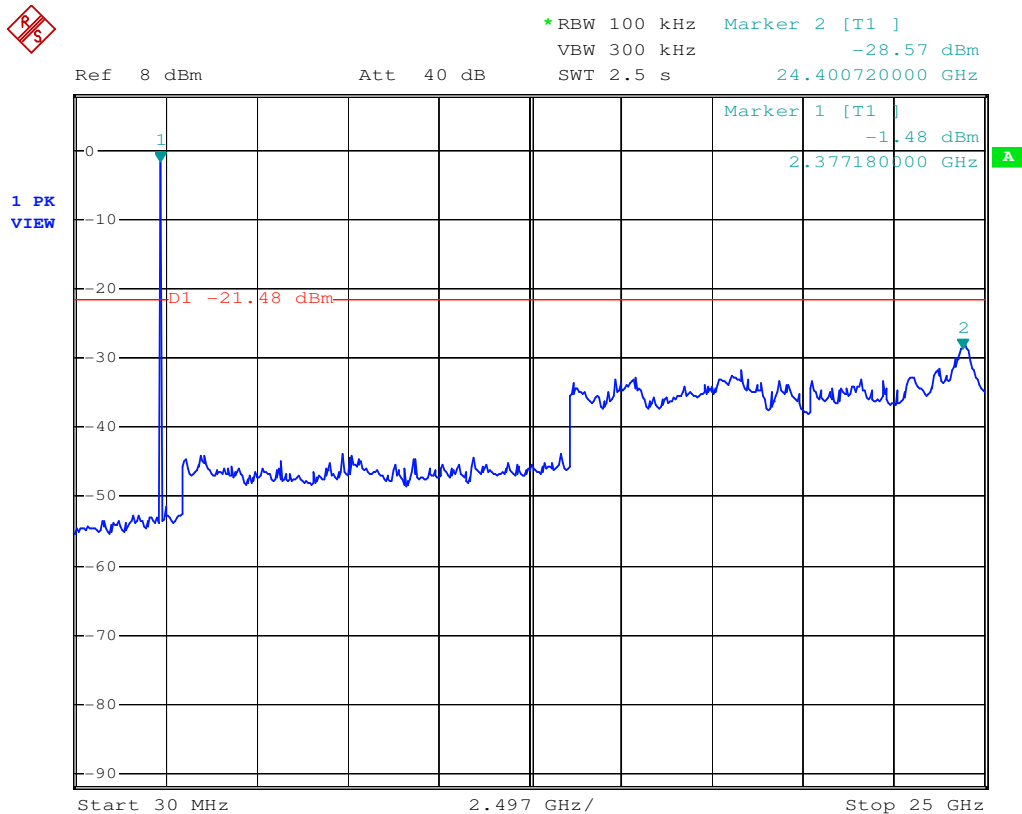


4.9.5 Conducted Spurious Emission Test

Test Requirement: FCC Part15 247(c)
Test date: Sep 15, 2011
Standard Applicable: According to section 15.247(c),in any 100KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating,the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power,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 15.209(a).

- Measurement Procedure:**
1. Place the EUT on the table and set it in transmitting mode.
 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
 3. Set center frequency of spectrum analyzer = operating frequency.
 4. Set the spectrum analyzer as RBW=100KHz VBW=300KHz, Sweep = auto
 6. Repeat above procedures until all frequency measured were complete.

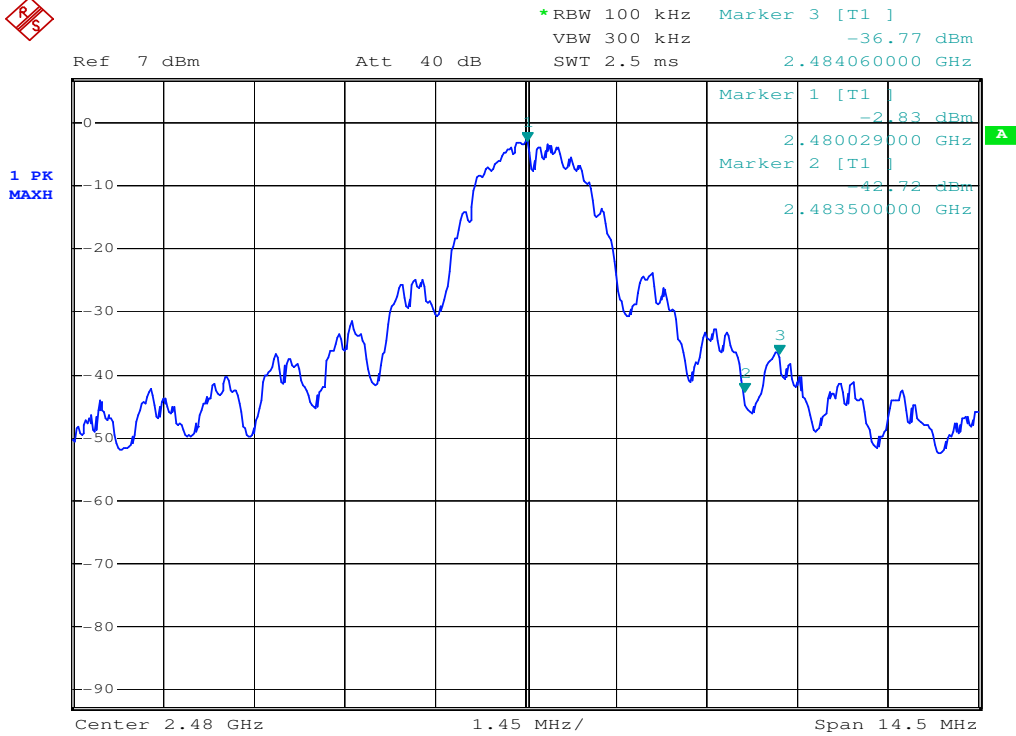
Measurement Result:
Conducted spurious Emission Measurement Result
 CH Low 2405MHz 30MHz-25GHz



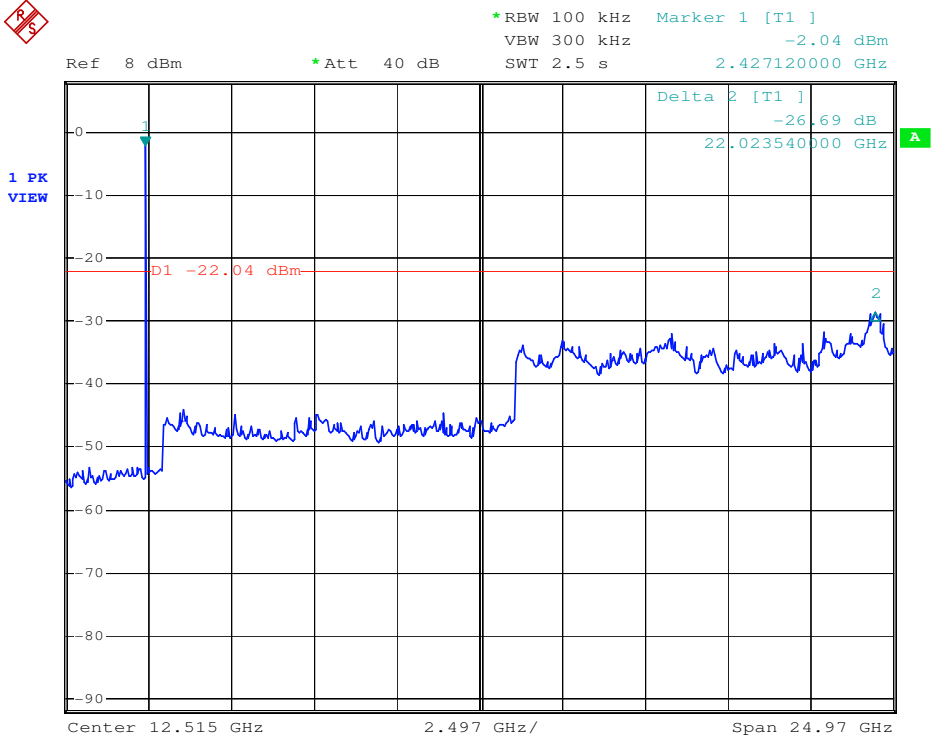
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Band Edge (Conducted Mode)

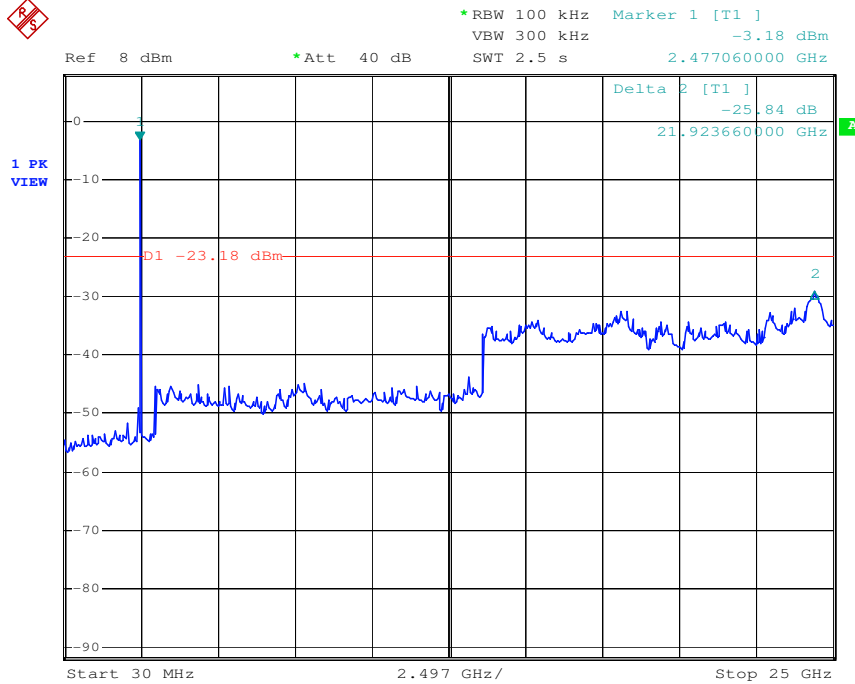


CH Middle 2440MHz 30M-25GHz

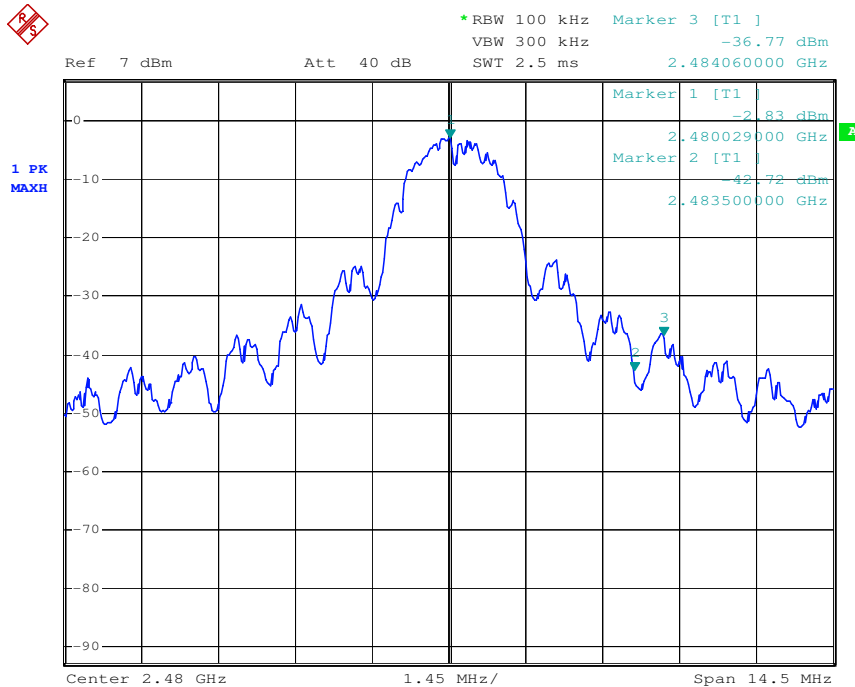




CH High 2480MHz 30M-25GHz



Band Edge



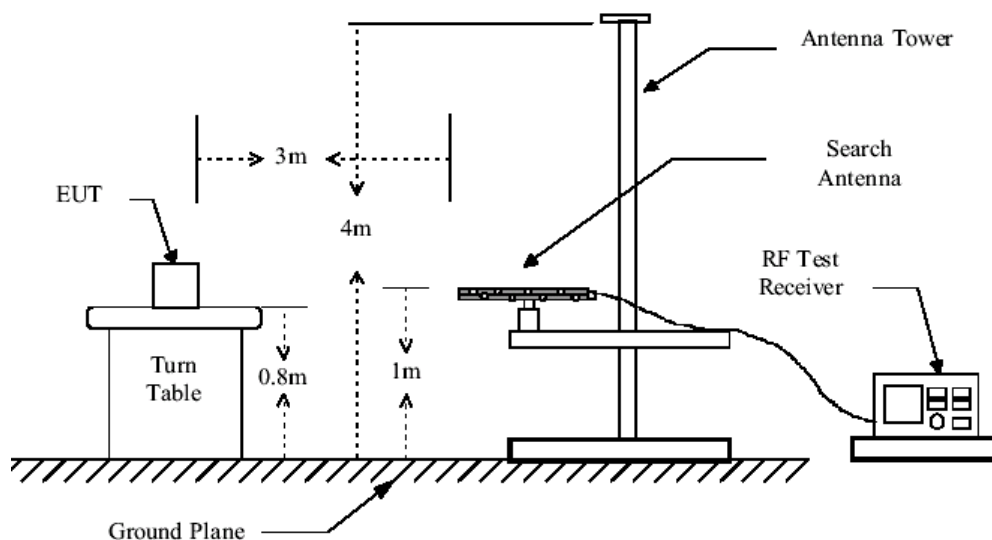
4.9.6 Spurious Radiated Emission Test

Test Requirement: FCC Part15 247(c)
Test date: Sep 13,2011 to Sep 15,2011
Standard Applicable: According to section 15.247(c),all other emissions outside these bands shall not exceed the general radiated emission limits specified in section15.209(a).And according to section 15.33(a)(1),for an intentional radiator operates below 10GHz,the frequency range of measurements:to the tenth harmonic of the highest fundamental frequency or to 40GHz,which is lower.

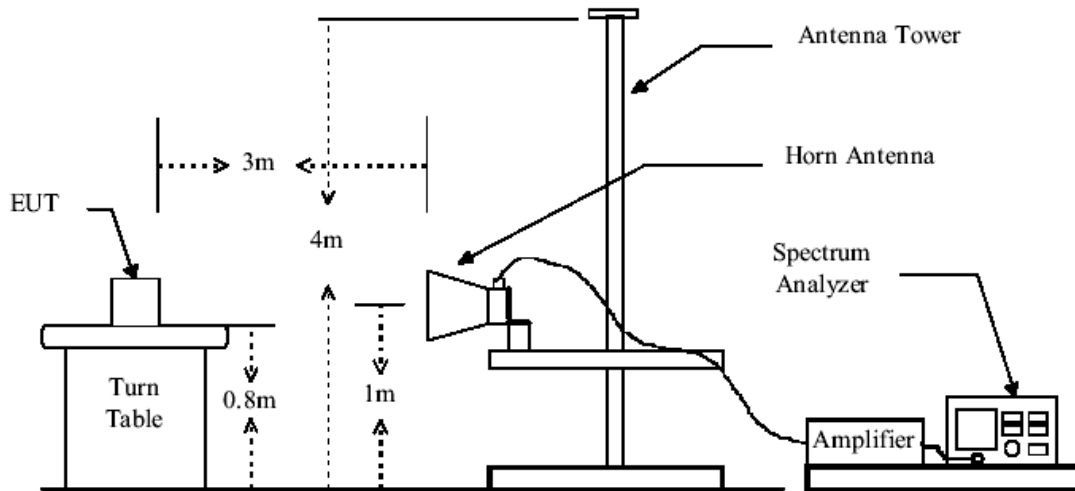
Measurement Procedure:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
 Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz). 1MHz resolution bandwidth and Peak detector apply (1000 MHz – 25GHz)
 Above 1GHz
 (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO.
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 all frequency measured were complete.
7. The field strength of spurious emission was measured in the following position:EUT satnd-up position (Z axis),lie-down position (X, Y axis) .The worst emission was found in lie-down postion(X axis) and the wrost case was recored.

**Radiated Test Set-up:
Radiated Emission Test Set-up,Frequency Below 1000MHz**



Radiated Emission Test Set-up Frequency Over 1GHz



Low noise amplifier was used below 1GHz, High pass Filter was used above 1GHz.

Remark:

1. The field strength is calculated by adding the Antenna Factor, Preamplifier Factor & Cable Factor. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

2. Margin = limit - Final Test Level;

3. If the PK level is lower than AV limit, the AV test can be elided.

Operation Mode: TX Low Mid CH 2405MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
32.48	14.4	0.7	24.6	48.00	38.50	40.00	Vertical
41.46	15.0	0.7	24.6	42.40	33.50	40.00	Vertical
43.87	14.6	0.7	24.6	40.00	30.70	40.00	Vertical
195.44	11.5	1.5	24.6	51.40	39.80	43.50	Vertical
144.07	15.1	1.4	24.6	40.03	31.93	43.50	Horizontal
196.45	11.5	1.5	24.6	46.80	35.20	43.50	Horizontal
346.22	14.9	2.2	24.4	41.43	34.13	46.00	Horizontal
799.79	21.9	3.5	24.3	33.05	34.15	46.00	Horizontal



1~25 GHz Harmonics & Spurious Emissions. Peak Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4809.5	30.6	6.4	0.5	-42.8	54.67	49.37	54	Vertical
4809.5	30.6	6.4	0.5	-42.8	53.99	48.69	54	Horizontal
5000~25000	-	-	-	-	-	None detected	-	-

The field strength is calculated by adding the Antenna Factor. Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} + \text{Filter} - \text{Pre-amplifier Factor}$$

Operation Mode: TX Mid CH 2440MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
32.48	14.4	0.7	24.6	48.00	38.50	40.00	Vertical
41.46	15.0	0.7	24.6	42.40	33.50	40.00	Vertical
43.87	14.6	0.7	24.6	40.00	30.70	40.00	Vertical
195.44	11.5	1.5	24.6	51.40	39.80	43.50	Vertical
144.07	15.1	1.4	24.6	40.03	31.93	43.50	Horizontal
196.45	11.5	1.5	24.6	46.80	35.20	43.50	Horizontal
346.22	14.9	2.2	24.4	41.43	34.13	46.00	Horizontal
799.79	21.9	3.5	24.3	33.05	34.15	46.00	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4879.5	30.6	6.4	0.5	-42.8	54.51	49.21	54	Vertical
4879.5	30.6	6.4	0.5	-42.8	56.15	51.85	54	Horizontal
5000~25000	-	-	-	-	-	None detected	-	-

The field strength is calculated by adding the Antenna Factor. Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} + \text{Filter} - \text{Pre-amplifier Factor}$$

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Operation Mode:TX High CH 2480MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
32.48	14.4	0.7	24.6	48.00	38.50	40.00	Vertical
41.46	15.0	0.7	24.6	42.40	33.50	40.00	Vertical
43.87	14.6	0.7	24.6	40.00	30.70	40.00	Vertical
195.44	11.5	1.5	24.6	51.40	39.80	43.50	Vertical
144.07	15.1	1.4	24.6	40.03	31.93	43.50	Horizontal
196.45	11.5	1.5	24.6	46.80	35.20	43.50	Horizontal
346.22	14.9	2.2	24.4	41.43	34.13	46.00	Horizontal
799.79	21.9	3.5	24.3	33.05	34.15	46.00	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AVG Limit (dBμV/m)	Antenna polarization
4958.9	31.6	6.9	0.5	-43.9	53.22	48.32	54	Vertical
4959.4	31.6	6.9	0.5	-43.9	53.07	48.17	54	Horizontal
5000~25000	-	-	-	-	-	None detected	-	-

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} + \text{Filter} - \text{Preamplifier Factor}$$



4.9.7 Peak Power Spectral Density

Test Requirement: FCC Part15 247(e)

Test date: Sep. 27, 2011

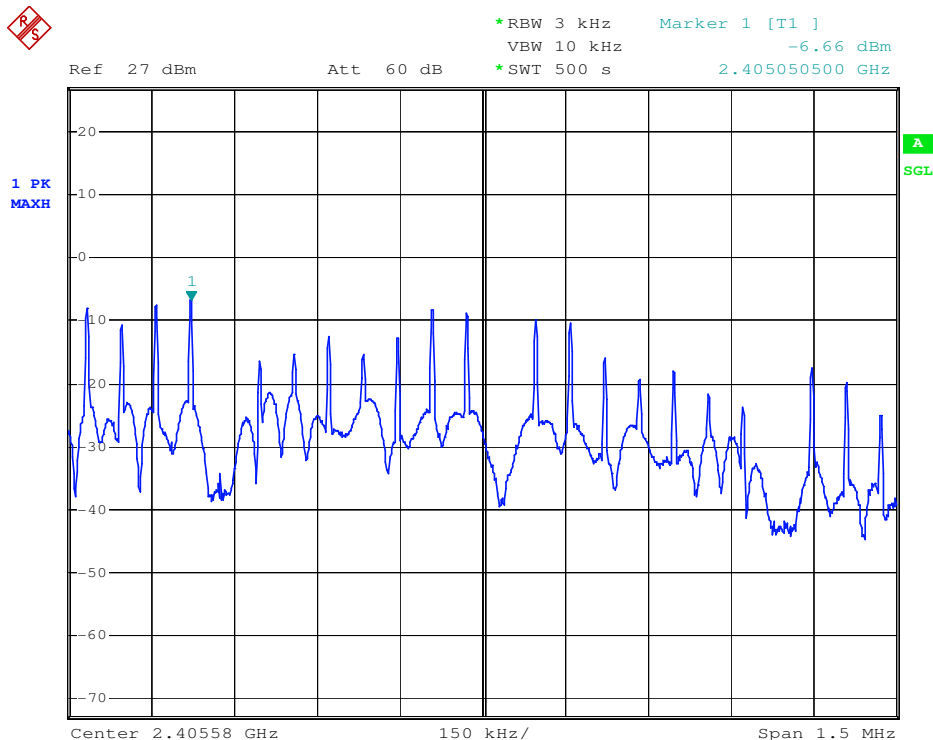
Standard Applicable: According to section 15.247(e),For digitally modulated systems,the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dB in any 3KHz band during any time in terval of continuous transmission.This power spectral density shall be 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 powr spectral density.

Measurement Procedure: The EUT was tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requiremnts. Set RBW=3KHz,Set VBW=10KHz,Span=100KHz,Sweep time=34s,Set detector=Peak detector.

Measurement Result:

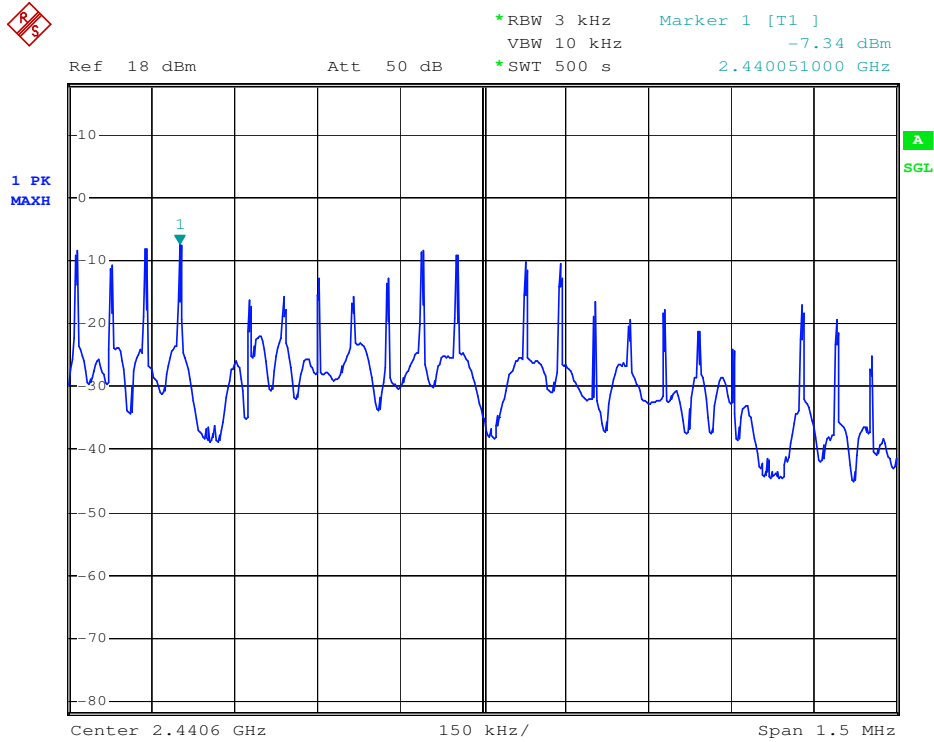
CH	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	2405	-6.66	0.5	-6.16	8	PASS
MID	2440	-7.34	0.5	-6.84	8	PASS
HIGH	2480	-8.14	0.5	-7.64	8	PASS

Power Spectral Density Test Plot(CH-Low)

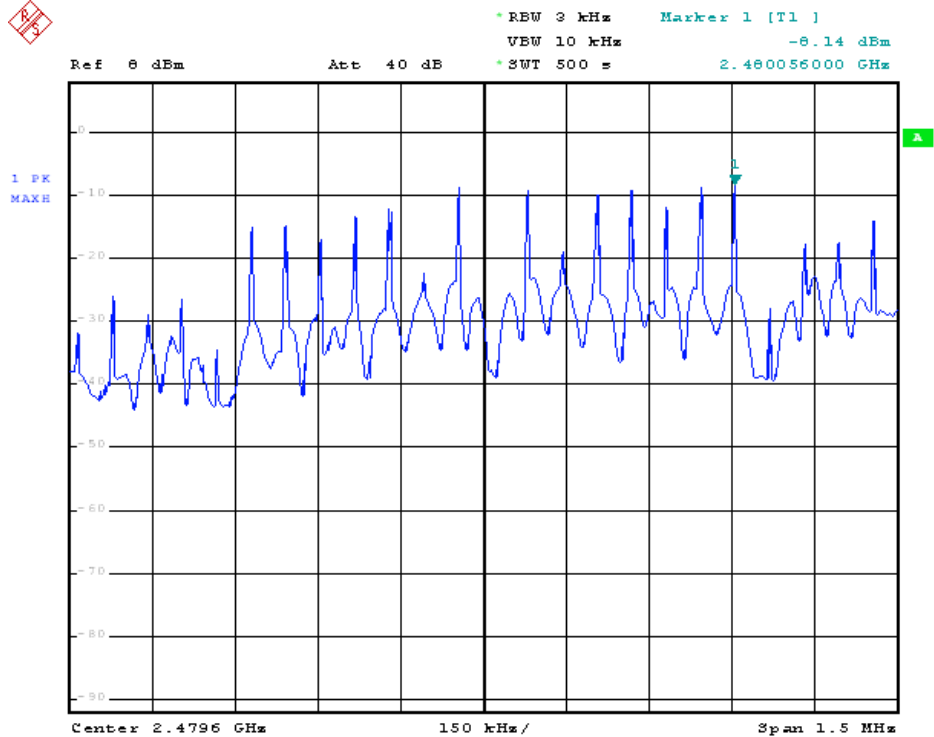




Power Spectral Density Test Plot(CH-Mid)



Power Spectral Density Test Plot(CH-High)



End of the Report

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