SGS-CSTC Standards Technical Services（Shanghai） Co., Ltd.

588 West Jindu Road,Songjiang District,Shanghai,China

Telephone: +86 (0) 21 6191 5666
Fax: +86 (0) 21 6191 5655
ee.shanghai@sgs.com

TEST REPORT

Application No.:	SHEM120200011201
Applicant:	Monster, LLC
Equipment Under Test (EUT):	
NOTE: The following sample(s) submitted was/were identified on behalf of the client as	
EUT Name:	StreamCast HD Transmitter
Brand Name:	Monster Products
Model No:	MSP STRC USB XMT WW
Fundamental Frequency :	2412-2464 MHz, 5736-5814MHz and 5180-5240MHz*
Test Frequency:	2412-2464 MHz, 5736-5814MHz
FCC ID:	RJE-178461
IC:	5153A-178461
Standards:	FCC PART 15 SUBPART C, Section 15.247 RSS-210 Issue 8 (December 2010) RSS-Gen Issue 3 (December 2010)
Date of Receipt:	Feb. 13, 2012
Date of Test:	Feb. 15, 2012 to Apr. 28, 2012
Date of Issue:	Apr.28, 2012
Test Result :	**PASS ***

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

For 5180-5240MHz band please reference report SHEM120200011202.

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

E&E EMC Engineer
SGS-CSTC(Shanghai) Co., Ltd.

2 Test Summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	Test Procedure	RESULT
Power line conducted emission	15.207	RSS-Gen Issue 8 Clause 7.2.4	ANSI C63.10,2009 Clause 6.2	Pass
Radiated emission	15.205 & 15.209	RSS-Gen Issue 8 Clause 7.2.5	ANSI C63.10,2009 Clause 6.4	Pass
Channel number of hopping system	15.247(a)(1)(iii)	RSS-210 Issue 8 Annex 8	N/A	NA
Average time of occupancy in any channel	15.247(a)(1)(iii)	RSS-210 Issue 8 Annex 8	NA	NA
Minimum 6dB Bandwidth	15.247(a)(2)	RSS-210 Issue 8 Annex 8	ANSI C63.10,2009 Clause 6.9	Pass
Maximum peak output power	15.247(b)	RSS-210 Issue 8 Annex 8	ANSI C63.10,2009 Clause 6.10.2	Pass
RF exposure	15.247(I) 2.1091	RSS-102 Issue 4	---	Pass
Radiated Emission BandEdge	15.247(d)	---	ANSI C63.10,2009 Clause 6.9	Pass
Emission outside the Frequency band	15.247(d)	RSS-210 Issue 8 Annex 8	ANSI C63.4,2003 Clause 6.12	Pass
Power spectrum density	15.247(e)	RSS-210 Issue 8 Annex 8	ANSI C63.10,2009 Clause 6.11	Pass
Occupied bandwidth	---	RSS-Gen Issue 3 Clause 4.6.1	RSS-Gen Issue 3 Clause 4.6.1	Tested

3 Contents

4 General Information

4.1 Client Information

Applicant :	Monster, LLC
Applicant Address:	7251 West Lake Mead Blvd Suite 342 Las Vegas, NV 89128
Manufacturer:	Hansong(Nanjing) Technology Ltd.
Manufacturer Address:	8th Kangping Road, Jiangning Economy and Technology Development Zone,Nanjing,201106,China

4.2 Details of E.U.T.

EUT Name:	StreamCast HD Transmitter	
Brand Name:	Monster Products	
Model No:	MSP STRC USB XMT WW	
Power Supply:	Monster usb: 5V, 100mA(Power supply by PC)	
Frequency Band Channels :	2412-2464 MHz Channel Description:	
	Channel of Tranmitter	Frequency(MHz)
	Low	2412
	Mid	2438
	High	2464
	5736-5814 MHz Channel Description:	
	Channel of Tranmitter	Frequency(MHz)
	Low	5736
	Mid	5762
	High	5814
Modulation Type:	QPSK	
Antenna Type:	Integral antenna(Antenna Gain 2.0dB)	

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

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

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.

5 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2011-06-03	2012-06-01
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2011-06-03	2012-06-01
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2012-03-10	2013-03-09
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2011-06-03	2012-06-01
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2011-10-09	2012-10-08
4	Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 373	2012-03-15	2013-03-14
7	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY－2009P	--	2011-10-15	2012-10-14
8	CLAMP METER	FLUKE	316	86080010	2012-04-20	2013-04-19
9	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2011-10-14	2012-10-13
11	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2011-06-17	2012-06-16
12	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT1800.0/2000.0-0.2/40-5SSK	11	2011-06-26	2012-06-25
13	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT800.0/880.0-0.2/40-5SSK	9	2011-06-26	2012-06-25
14	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2012-04-07	2013-04-06
15	Low nosie amplifier	TESEQ	LNA6900	70133	2011-07-05	2012-07-04

16	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2011-06-04	2012-06-03
17	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2011-05-07	2012-05-06

6 Test Procedure & Measurement Data

6.1 E.U.T. Operation

Input voltage: 5.0V (by PC output)

Operating Environment:

Temperature: 25.0 °C

Humidity: 45 % RH

Atmospheric Pressure: 1013 mbar

EUT Operation: The EUT has been tested under operating condition.

Test program was used to control the EUT for staying in continuous transmitting mode is programmed.

For 2412-2464MHz Band Channel low (2412MHz) mid(2438MHz) high(2464MHz)

For 5736-5814MHz Band Channel low (5736MHz) mid(5762MHz) high(5814MHz)

6.2 Conducted Emission Test

Test Requirement: FCC Part15 15.207

Test date: Feb. 21, 2012

Standard Applicable According to section 15.207,frequency 150KHz to 30MHz shall not 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.

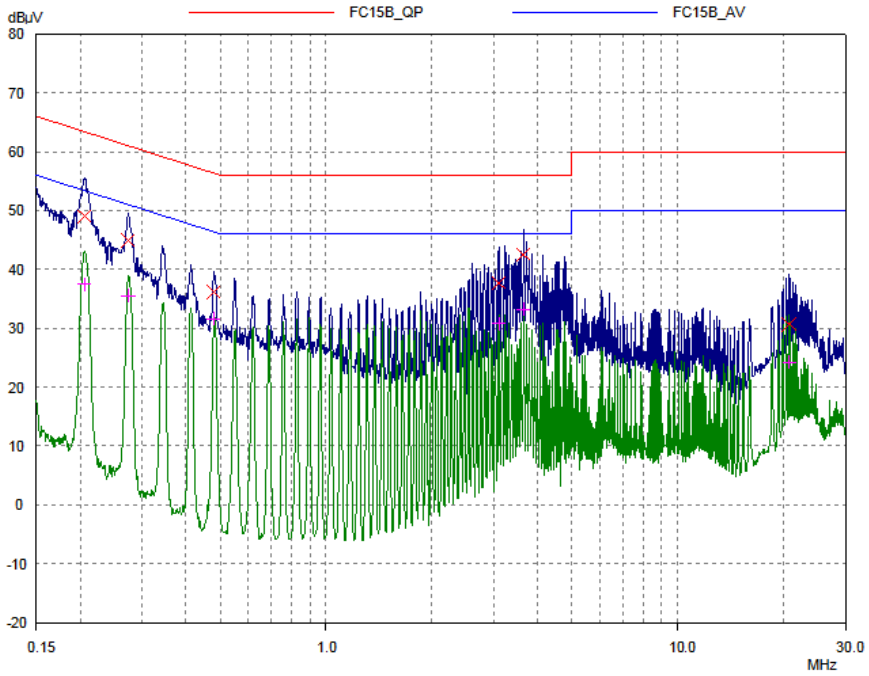
2.EUT is charged with PC.The AC Power adaptor of PC was plug-in LISN.The rear of the EUT and periphearals were placed flushed with the rear of the tabletop.

3.The LISN was connected with 120V AC/60Hz power source.

Measurement Result Operation mode: Transimitter conducted to Receiver by wireless.

Note:All test modes have been tested, below show the worst plots.

L line:

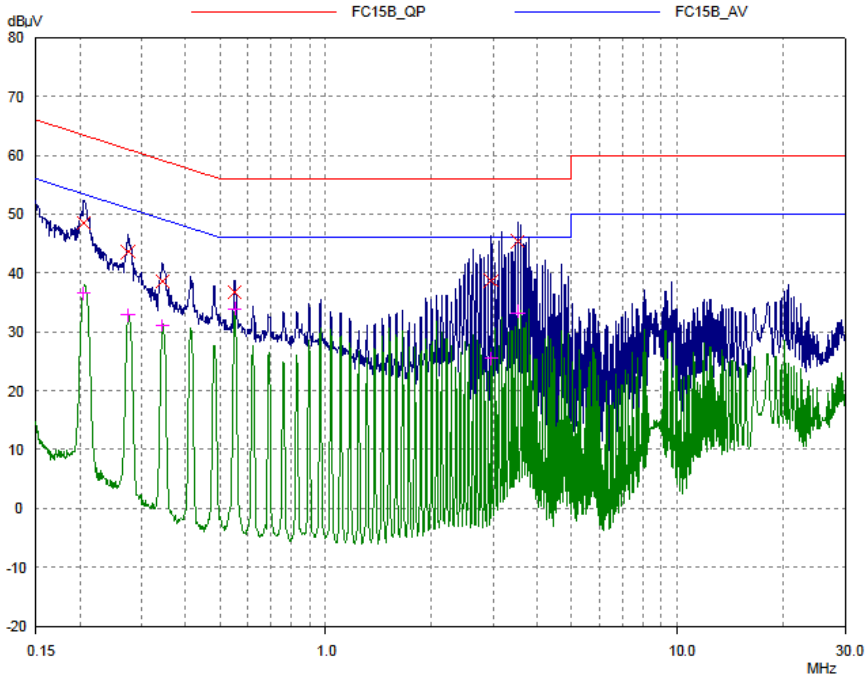


Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.20561	49.03	63.38	14.35
0.27408	44.93	60.99	16.06
0.47929	36.10	56.35	20.25
3.09204	37.73	56.00	18.27
3.64189	42.51	56.00	13.49
20.75996	30.63	60.00	29.37

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.20561	37.46	53.38	15.92
0.27408	35.58	50.99	15.41
0.47929	31.58	46.35	14.77
3.09204	30.80	46.00	15.20
3.64189	33.22	46.00	12.78
20.75996	24.26	50.00	25.74

N Line:



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.20479	48.51	63.41	14.90
0.27408	43.63	60.99	17.36
0.34274	38.59	59.14	20.55
0.55116	36.65	56.00	19.35
2.9592	38.68	56.00	17.32
3.51337	45.32	56.00	10.68

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.20479	36.50	53.41	16.91
0.27408	32.79	50.99	18.20
0.34274	31.07	49.14	18.07
0.55116	33.92	46.00	12.08
2.9592	25.49	46.00	20.51
3.51337	33.29	46.00	12.71

6.3 Radiated Spurious Emission Test

Test Requirement: FCC Part15 247(d) and FCC Part 15.209

Test date: Mar. 15, 2012 to Mar. 19, 2012

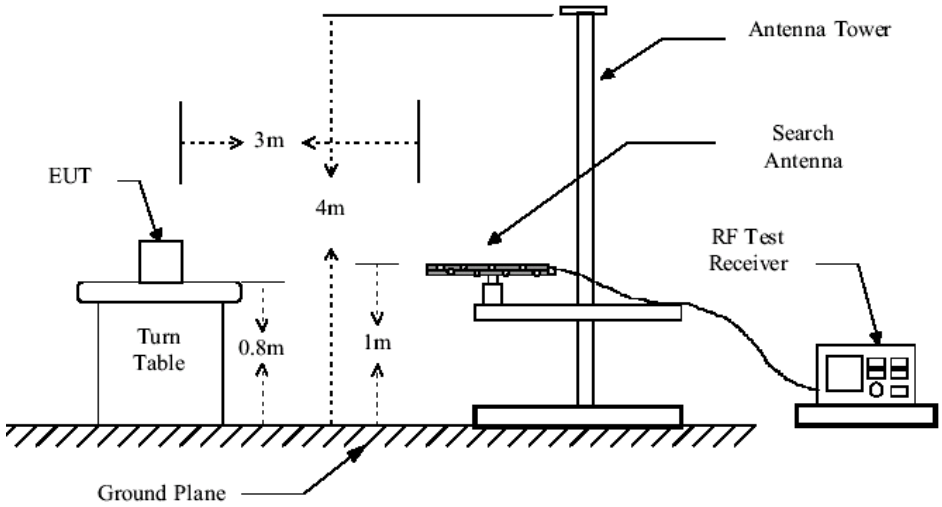
Standard Applicable: According to section 15.247(c),all other emissions outside these bands shall not exceed the general radiated emission limits specified in section15.209(a).And according to section 15.33(a)(1),for an intentional radiator operates below 10GHz,the frequency range of measurements:to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

Measurement Procedure:

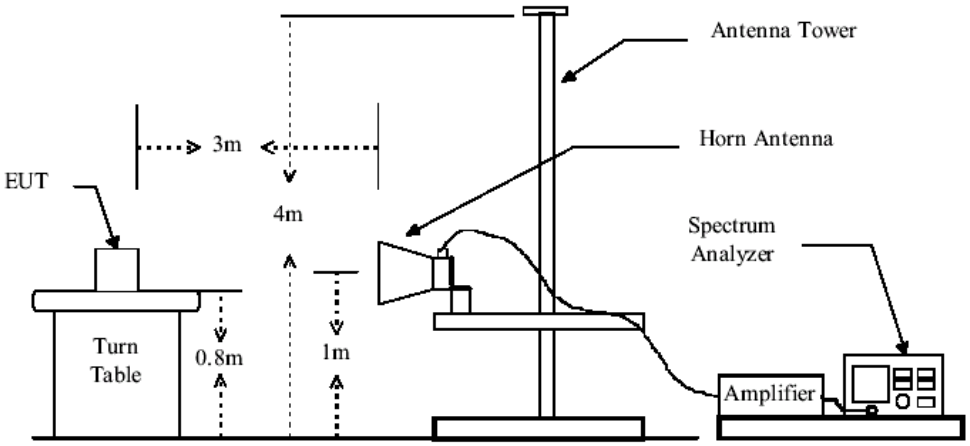
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Pre-test with the Horizontal, Vertical and other status towards to the test antenna. To find the worst status.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away 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.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

Radiated Test Set-up:

Radiated Emission Test Set-up,Frequency Below 1000MHz



Radiated Emission Test Set-up Frequency Over 1GHz



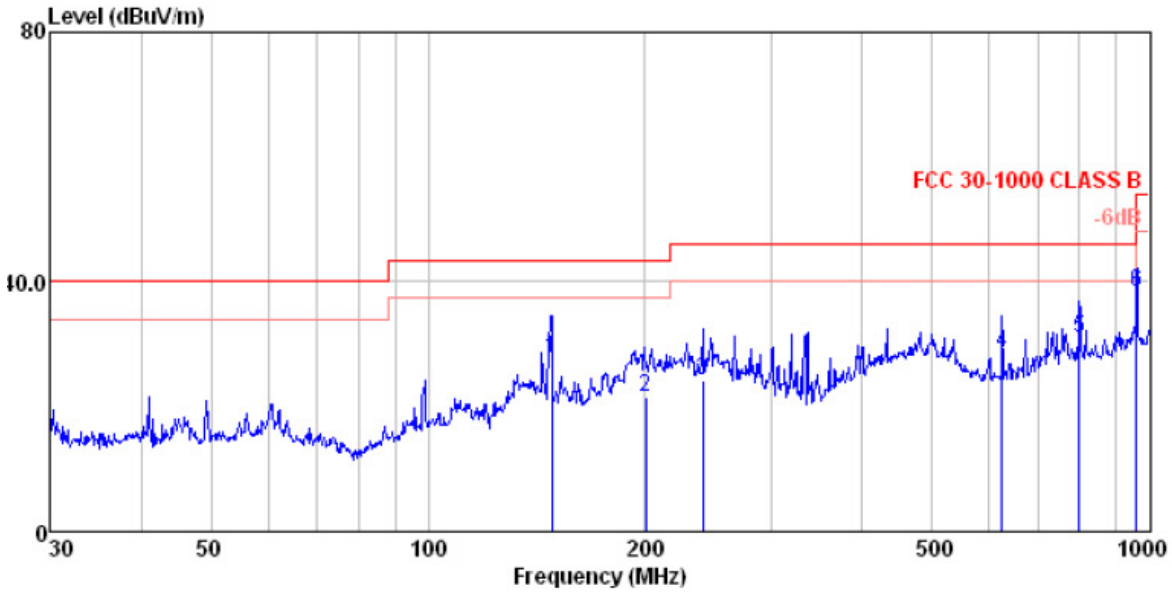
Low nosie amplifier was used below 1GHz,High pass Filter was used above 1GHz.

Tests results:

From the pre-test the worst status is the EUT Horizontal towards to the antenna. Below is the worst test results.

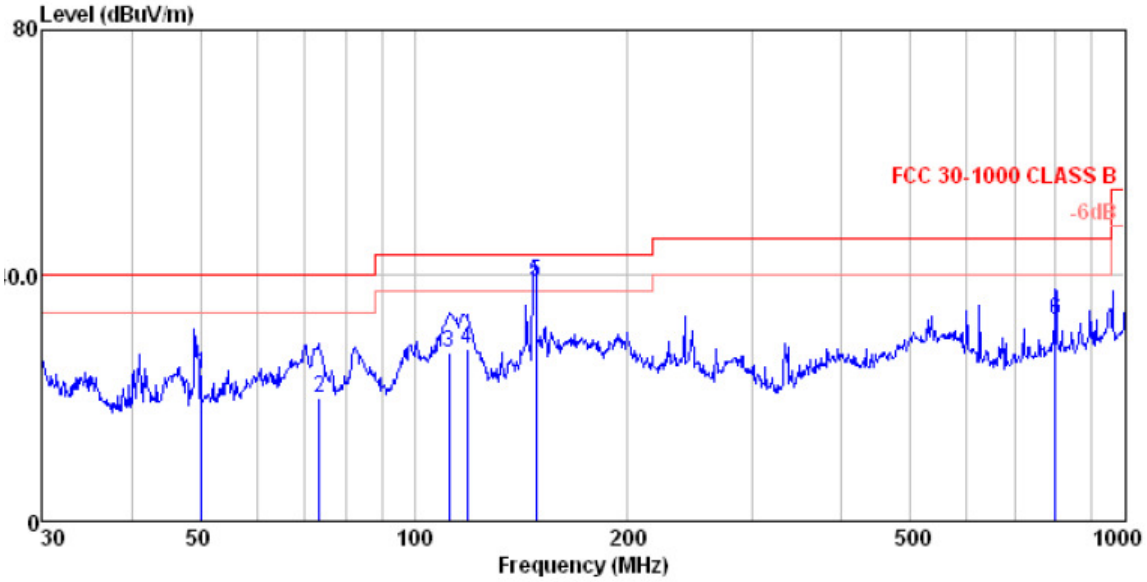
Operation Mode:2.4GHz Band

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



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	148.37	38.70	12.60	1.26	24.70	27.86	43.50	-15.64	QP
2	200.31	35.28	9.30	1.51	24.60	21.49	43.50	-22.01	QP
3	240.33	36.67	10.40	1.69	24.50	24.26	46.00	-21.74	QP
4	625.08	30.28	19.70	2.98	24.20	28.76	46.00	-17.24	QP
5	799.16	29.31	22.19	3.45	24.00	30.95	46.00	-15.05	QP
6	958.85	34.27	23.97	3.82	23.76	38.30	46.00	-7.70	QP

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



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	50.20	35.21	12.79	0.65	24.70	23.95	40.00	-16.05	QP
2	73.65	33.99	10.07	0.83	24.70	20.19	40.00	-19.81	QP
3	112.13	40.85	10.12	1.10	24.70	27.37	43.50	-16.13	QP
4	118.60	41.31	10.19	1.13	24.70	27.93	43.50	-15.57	QP
5	148.28	49.90	12.60	1.26	24.70	39.06	43.50	-4.44	QP
6	799.25	30.68	22.49	3.45	24.00	32.62	46.00	-13.38	QP

Operation Mode: TX Low Mid CH 2412MHz

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
4823.3	30.6	6.4	0.5	42.8	46.91	41.61	54	Vertical
7233.4	35.5	8.1	0.6	43.8	47.26	47.66	54	Vertical
9644.2	37.7	9.3	0.9	42.7	43.23	48.43	54	Vertical
12055.3	38.6	10.9	1.1	44.0	42.99	49.59	54	Vertical
4824.1	30.6	6.4	0.5	42.8	48.17	42.87	54	Horizontal
7236.6	35.5	8.1	0.6	43.8	48.28	48.68	54	Horizontal
9648.4	37.7	9.3	0.9	42.7	44.27	49.47	54	Horizontal
12060.3	38.6	10.9	1.1	44.0	44.02	50.62	54	Horizontal

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode: TX Mid CH 2438MHz

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
4873.0	30.6	6.4	0.5	42.8	45.37	40.07	54	Vertical
7309.5	35.5	8.1	0.6	43.1	44.61	45.71	54	Vertical
9746.0	38.1	9.8	0.9	42.3	39.88	46.38	54	Vertical
12182.5	38.6	10.9	1.1	44.0	41.93	48.53	54	Vertical
4873.0	30.6	6.4	0.5	42.8	46.42	41.12	54	Horizontal
7309.5	35.5	8.1	0.6	43.1	45.21	46.31	54	Horizontal
9746.0	38.1	9.8	0.9	42.3	42.39	48.89	54	Horizontal
12182.5	38.6	10.9	1.1	44.0	42.61	49.21	54	Horizontal

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode:TX High CH 2464MHz

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

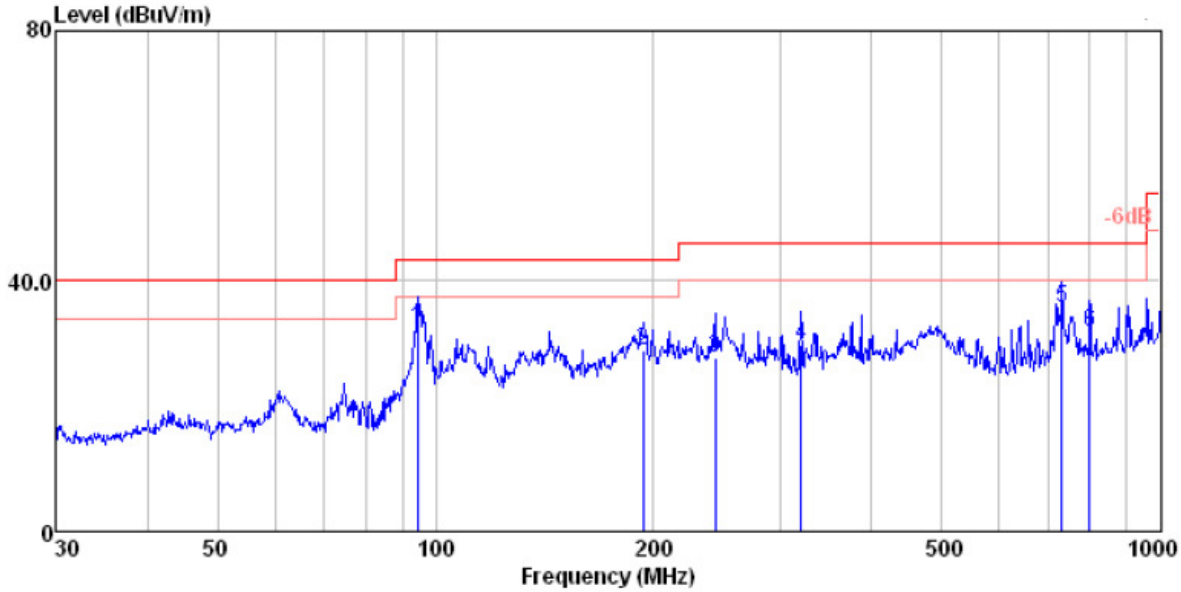
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
4927.4	31.6	6.9	0.5	43.9	45.27	40.37	54	Vertical
7391.1	35.8	8.1	0.6	43.8	44.61	45.31	54	Vertical
9854.8	38.1	9.8	0.9	42.3	41.01	47.51	54	Vertical
12318.5	38.6	10.9	1.1	44.4	42.28	48.48	54	Vertical
4927.4	31.6	6.9	0.5	43.9	45.24	40.34	54	Horizontal
7391.1	35.8	8.1	0.6	43.8	43.97	44.67	54	Horizontal
9854.8	38.1	9.8	0.9	42.3	40.45	46.95	54	Horizontal
12318.5	38.6	10.9	1.1	44.4	42.00	48.20	54	Horizontal

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

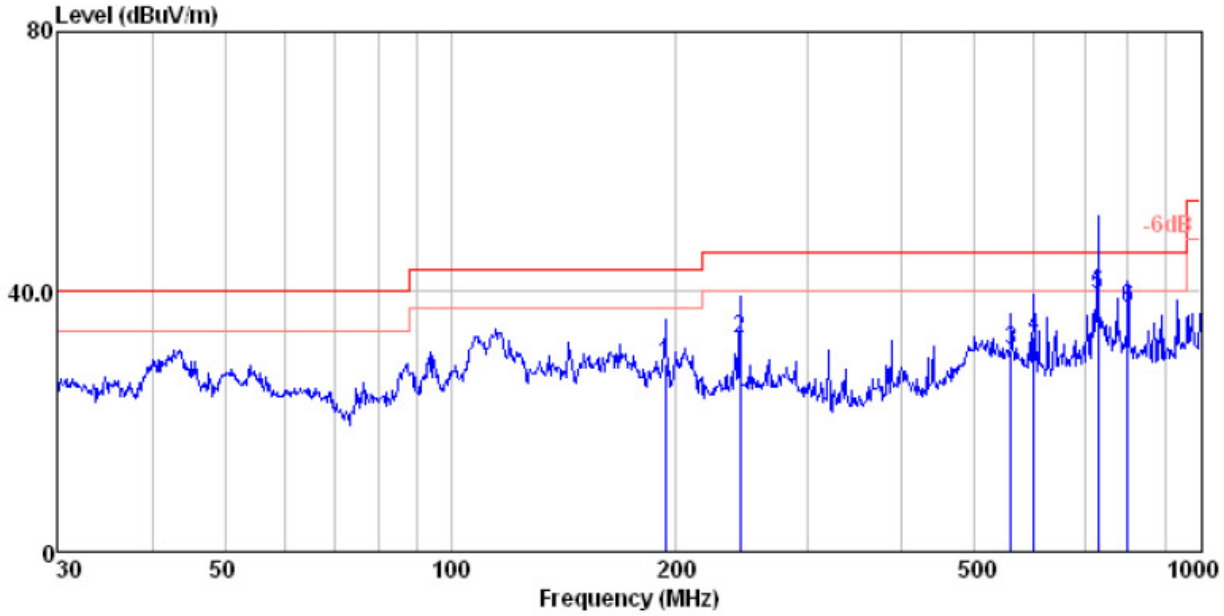
Operation Mode:5.8GHz Band

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



	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	94.43	47.50	8.81	0.99	24.70	32.60	43.50	-10.90	QP
2	193.09	42.55	9.58	1.48	24.60	29.01	43.50	-14.49	QP
3	243.38	40.26	10.43	1.70	24.50	27.89	46.00	-18.11	QP
4	319.94	39.25	12.96	2.02	24.50	29.73	46.00	-16.27	QP
5 q	731.92	35.28	21.21	3.26	24.07	35.68	46.00	-10.32	QP
6	798.98	30.28	22.19	3.45	24.00	31.92	46.00	-14.08	QP

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



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	193.09	42.57	9.58	1.48	24.60	29.03	43.50	-14.47	QP
2	243.38	45.26	10.43	1.70	24.50	32.89	46.00	-13.11	QP
3	558.73	34.26	18.14	2.78	24.27	30.91	46.00	-15.09	QP
4	599.32	35.25	19.18	2.91	24.20	33.14	46.00	-12.86	QP
5 q	729.36	39.24	21.17	3.26	24.08	39.59	46.00	-6.41	QP
6	798.98	35.58	22.48	3.45	24.00	37.51	46.00	-8.49	QP

Operation Mode: TX Low CH 5736MHz

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
11472.4	39.5	10.4	0.9	43.2	38.93	46.53	54	Vertical
17208.6	39.8	13.2	1.3	41.8	34.78	47.28	54	Vertical
22944.8	41.5	11.7	1.5	44.8	39.57	49.47	54	Vertical
11472.4	39.5	10.4	0.9	43.2	38.53	46.13	54	Horizontal
17208.6	39.8	13.2	1.3	41.8	34.52	47.02	54	Horizontal
22944.8	41.5	11.7	1.5	44.8	39.07	48.97	54	Horizontal

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode: TX Mid CH 5762MHz

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
11523.4	39.5	10.4	0.9	43.2	38.18	45.78	54	Vertical
17285.1	39.8	13.2	1.3	41.8	34.07	46.57	54	Vertical
23046.8	41.5	11.7	1.5	44.8	38.21	48.11	54	Vertical
11523.4	39.5	10.4	0.9	43.2	37.61	45.21	54	Horizontal
17285.1	39.8	13.2	1.3	41.8	33.52	46.02	54	Horizontal
23046.8	41.5	11.7	1.5	44.8	38.04	47.94	54	Horizontal

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode:TX High CH 5814MHz

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
11628.8	39.5	10.4	0.9	43.2	39.25	46.85	54	Vertical
17443.2	39.8	13.2	1.3	41.8	35.01	47.51	54	Vertical
23257.6	41.5	11.7	1.5	44.8	38.35	48.25	54	Vertical
11628.8	39.5	10.4	0.9	43.2	37.72	45.32	54	Horizontal
17443.2	39.8	13.2	1.3	41.8	33.67	46.17	54	Horizontal
23257.6	41.5	11.7	1.5	44.8	37.58	47.48	54	Horizontal

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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

6.4 6dB Bandwidth

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

Test date: Mar. 26.2012

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:

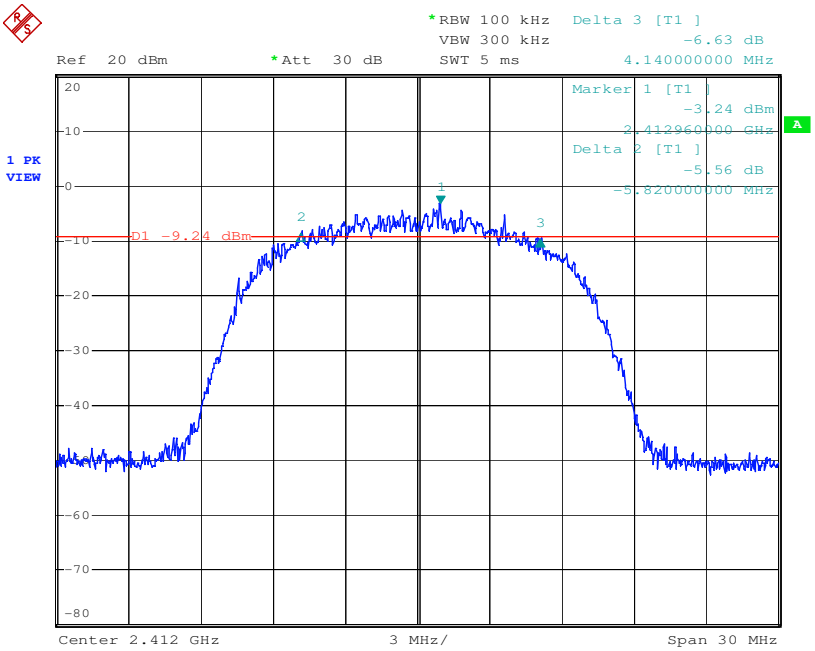
For 2412-2464MHz Band:

CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
LOW	2412	9.96	500	PASS
MID	2438	11.04	500	PASS
HIGH	2464	10.02	500	PASS

For 5736-5814MHz Band:

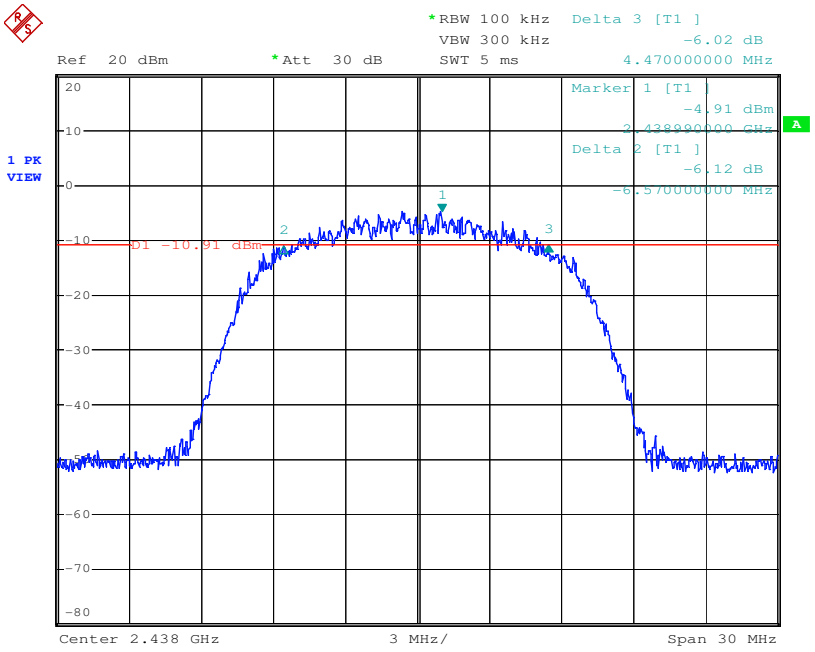
CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
LOW	5736	10.32	500	PASS
MID	5762	10.26	500	PASS
HIGH	5814	11.04	500	PASS

6dB Band Width Test Data CH 2412MHz:



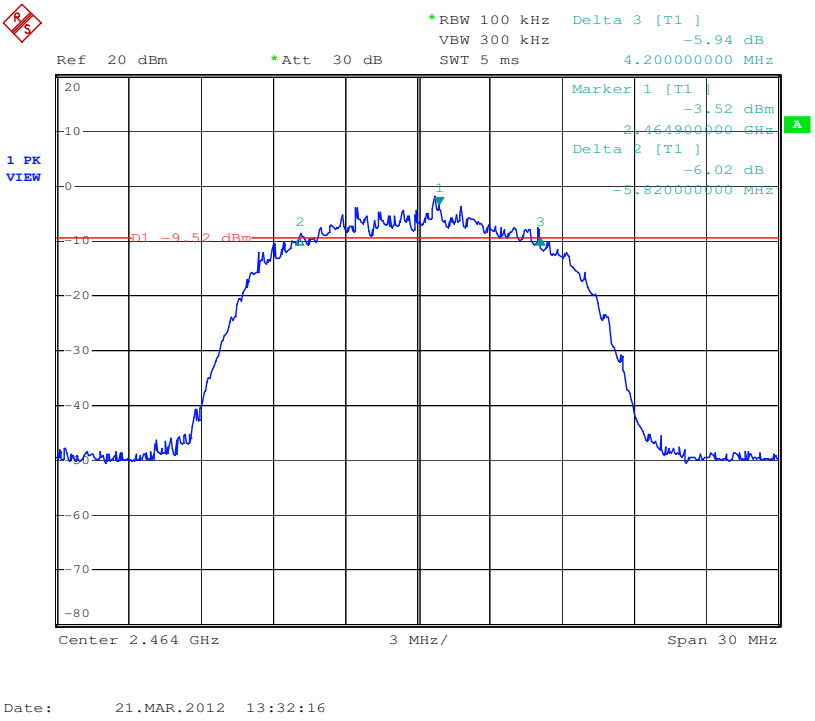
Date: 21.MAR.2012 11:08:00

6dB Band Width Test Data CH 2438MHz:

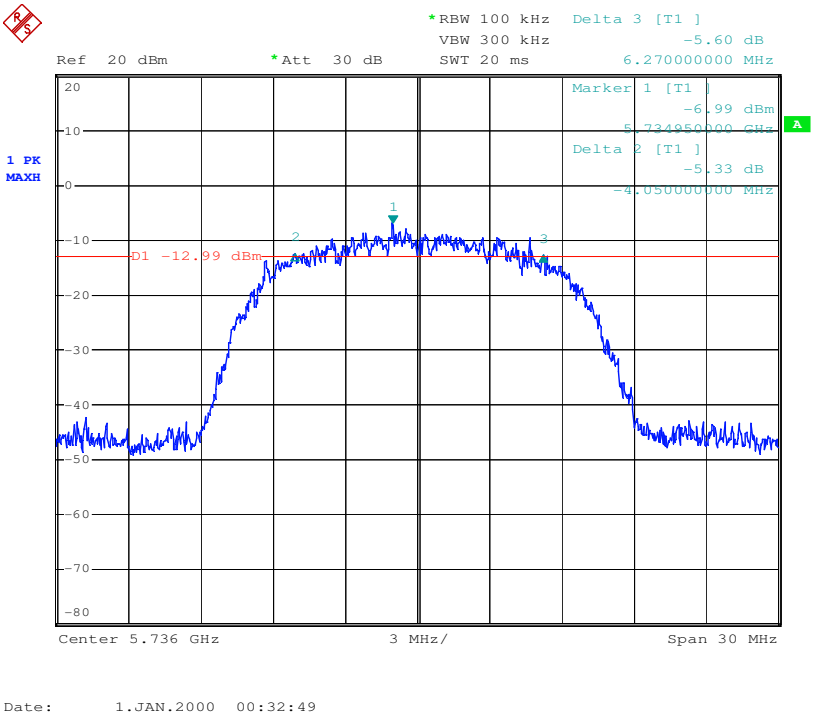


Date: 21.MAR.2012 11:09:22

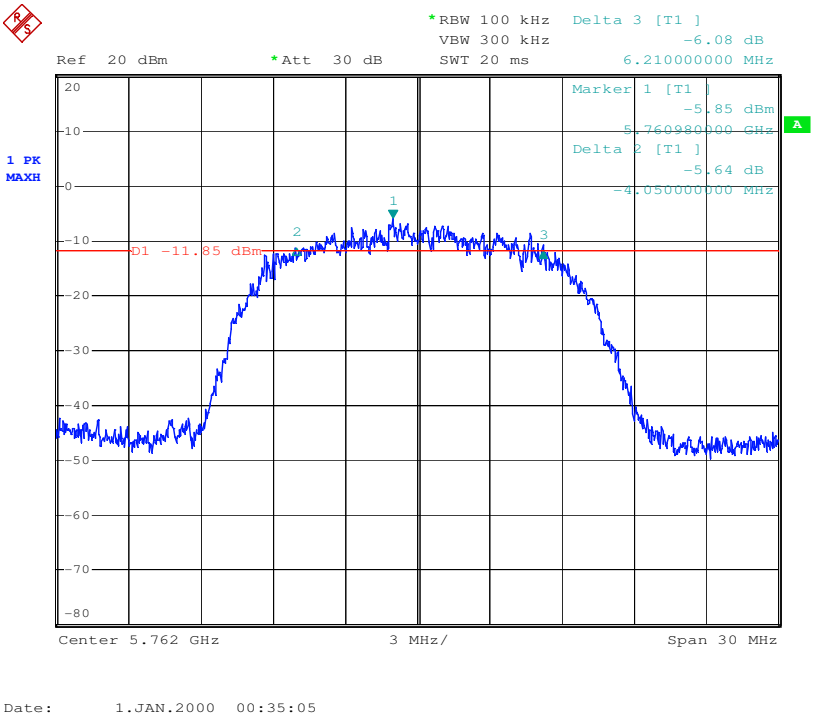
6dB Band Width Test Data CH 2464MHz:



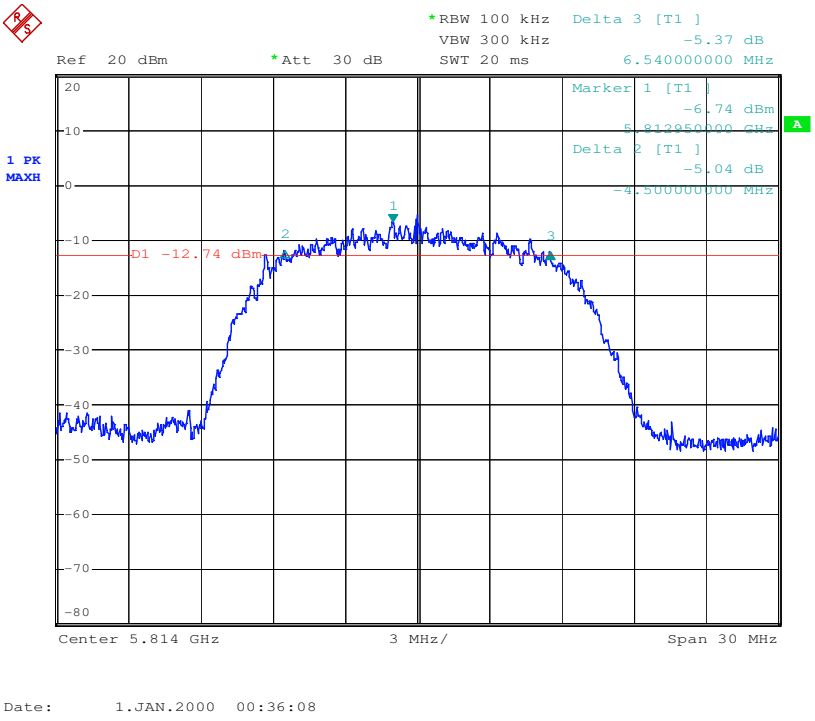
6dB Band Width Test Data CH 5736MHz:



6dB Band Width Test Data CH 5762MHz:



6dB Band Width Test Data CH 5814MHz:



6.5 Peak Output Power Measurement

Test Requirement: FCC Part 15 15.247(a)(2),(b)

Test date Mar. 26, 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.

Measuremet Produre

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 calbe from the antenna port to the spectrum.
3. Set the occur band to the entire emission bandwitdth of the signal.
4. Record the max.channel power reading

   Repeat above procedures until all the frequency measured were complete.

Measurement Result:

For 2412-2464MHz Band:

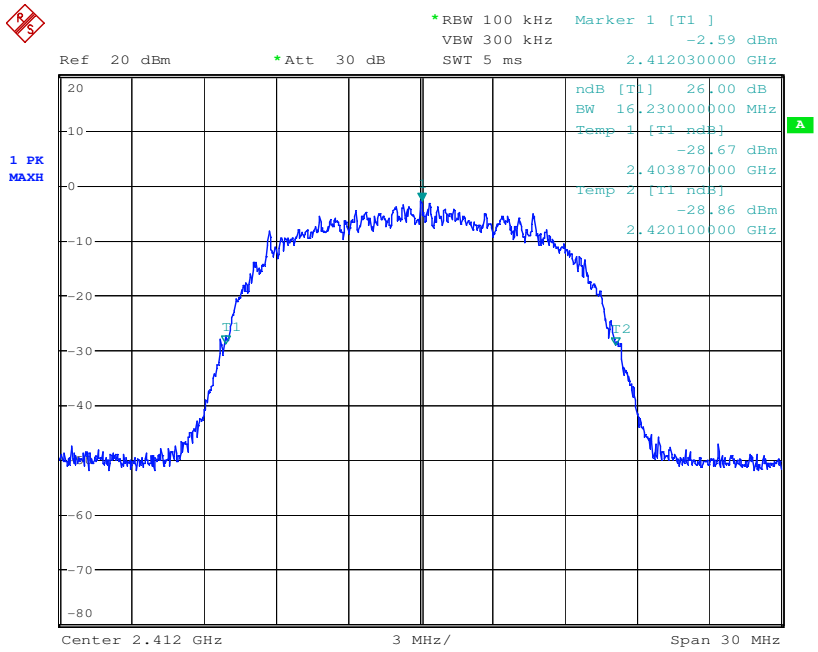
CH	Frequency (MHz)	Reading Peak Power (dBm)	Reading RMS Power (dBm)	Cable Loss (dB)	Output RMS Power (dBm)	Output Peak Power (dBm)	Peak Power Limit (dBm)	Result
LOW	2412	14.73	9.88	0.5	10.38	15.23	30	PASS
MID	2437	14.50	9.47	0.5	9.97	15.00	30	PASS
HIGH	2462	14.49	9.20	0.5	9.70	14.99	30	PASS

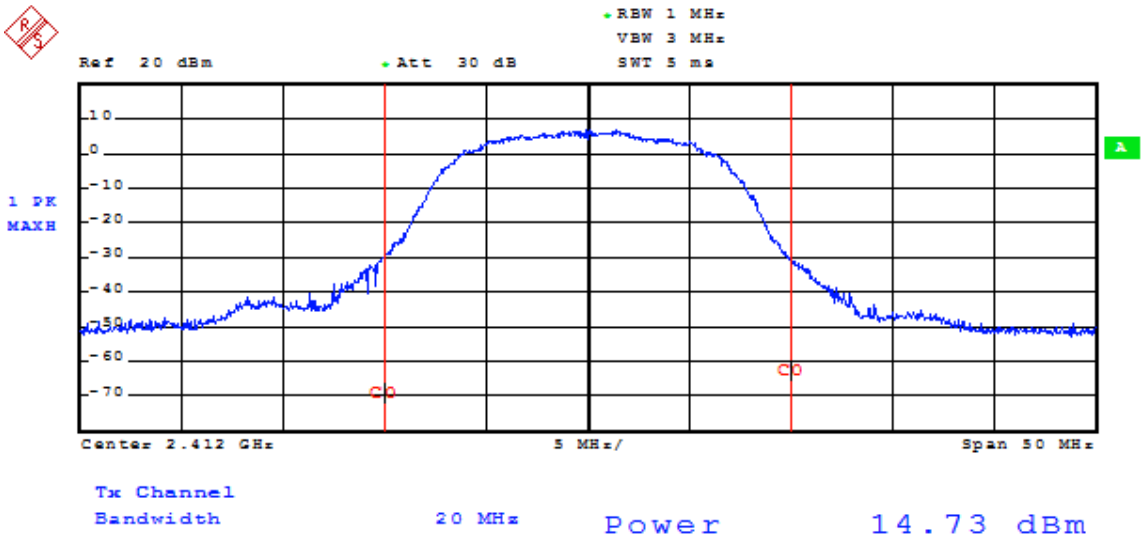
For 5736-5814MHz Band:

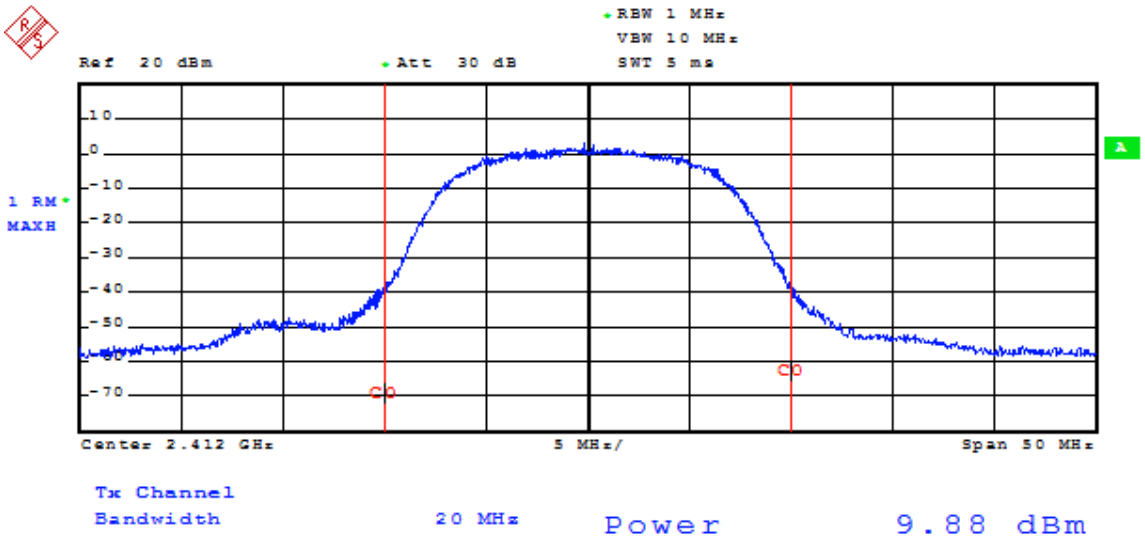
CH	Frequency (MHz)	Reading Peak Power (dBm)	Reading RMS Power (dBm)	Cable Loss (dB)	Output RMS Power (dBm)	Output Peak Power (dBm)	Peak Power Limit (dBm)	Result
LOW	5736	11.34	4.57	0.5	5.07	11.84	30	PASS
MID	5762	11.91	5.23	0.5	5.73	12.41	30	PASS
HIGH	5814	10.96	4.28	0.5	4.78	11.46	30	PASS

For 2412-2464MHz Band:

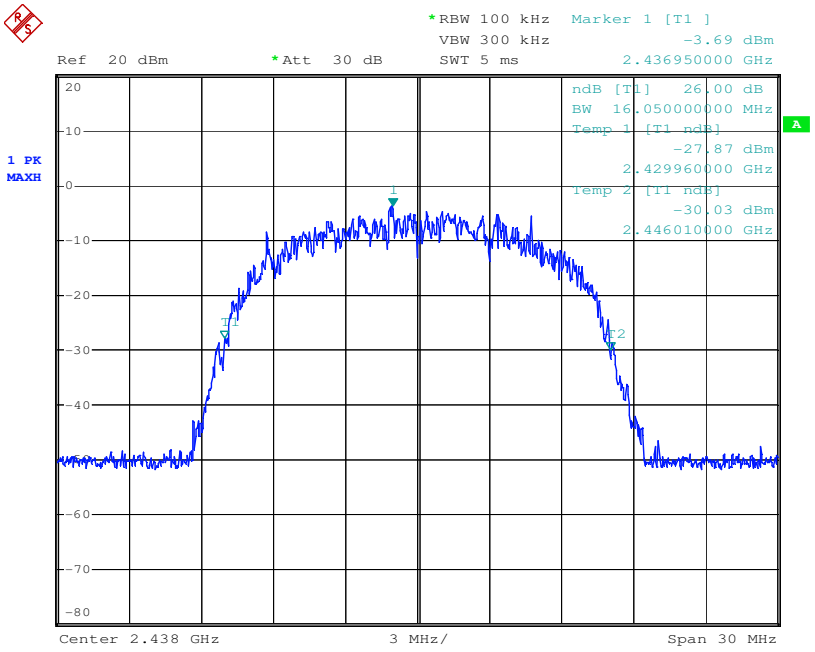
CH Low 2412MHz

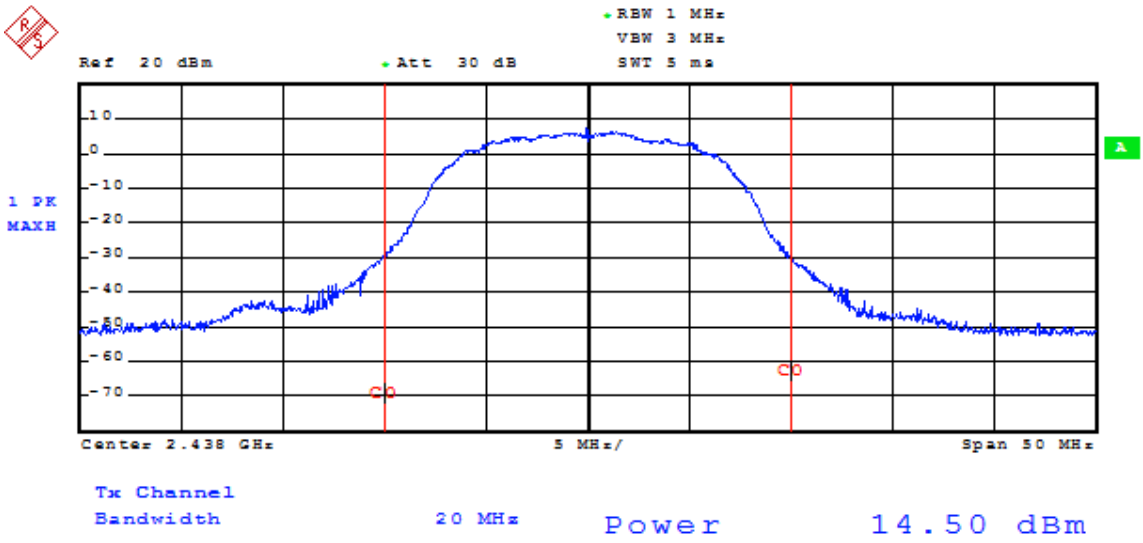


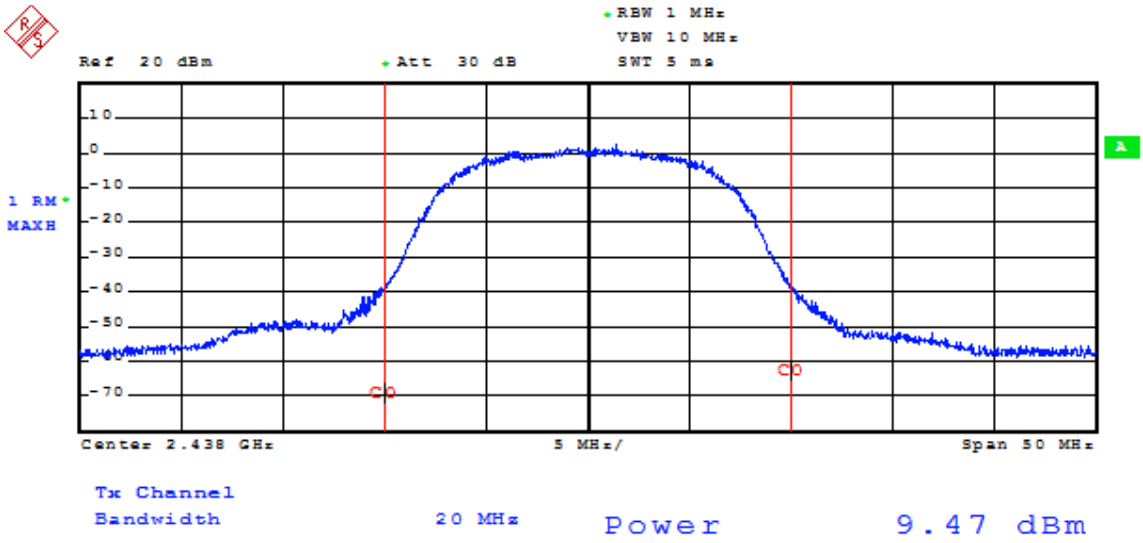




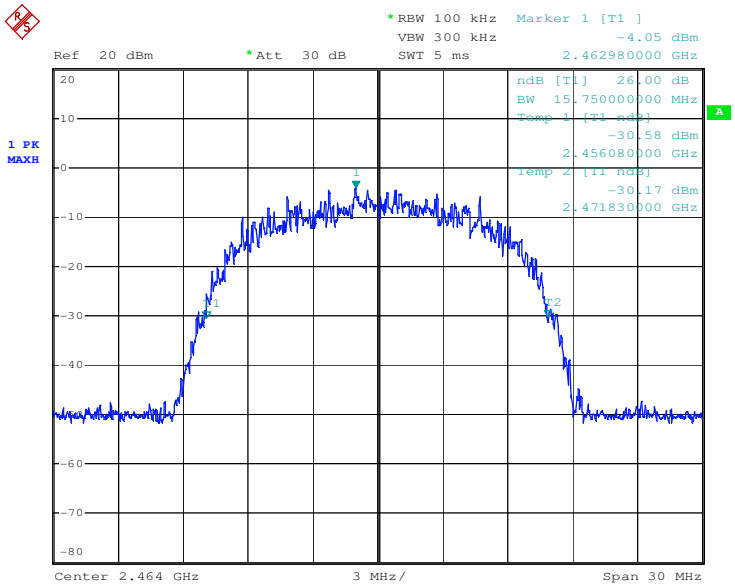
CH Mid 2438MHz

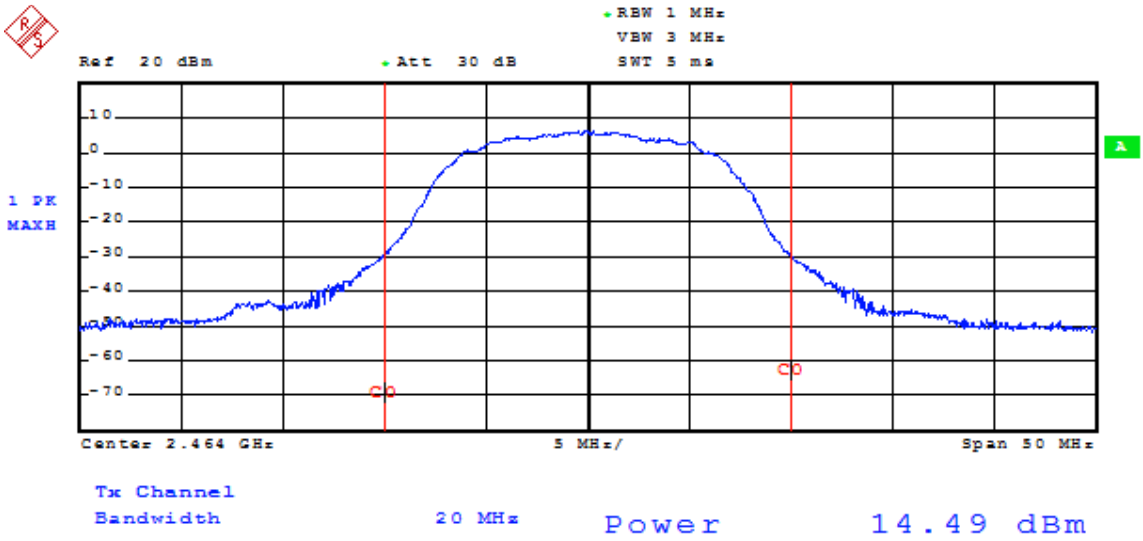


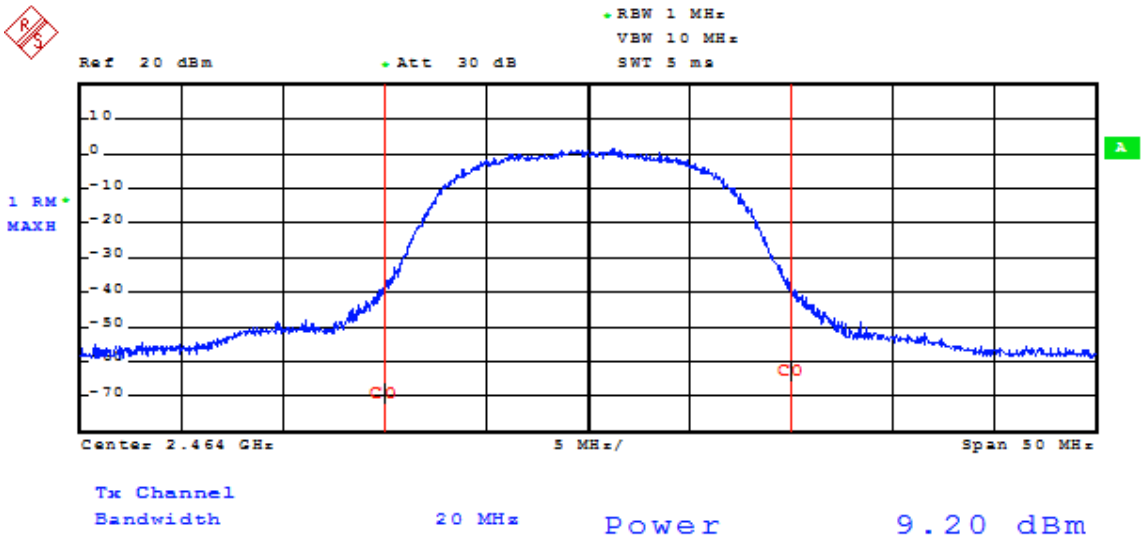




CH High 2464MHz

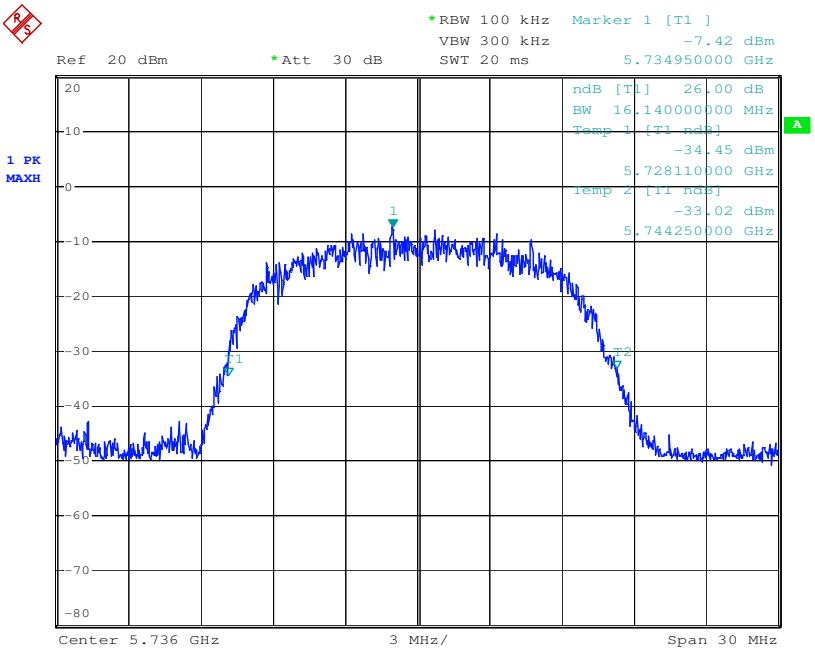


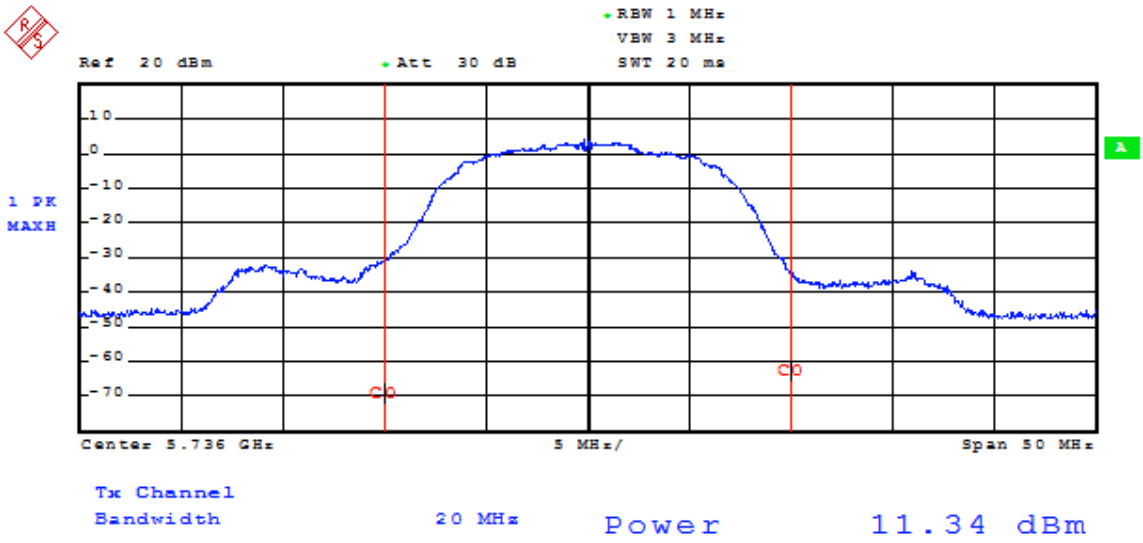


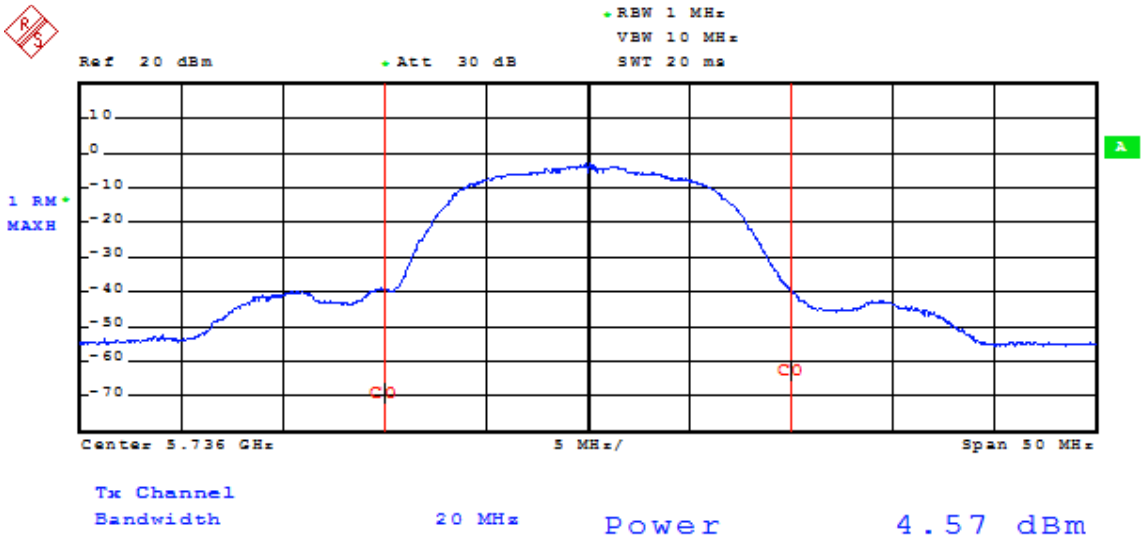


For 5736-5814MHz Band:

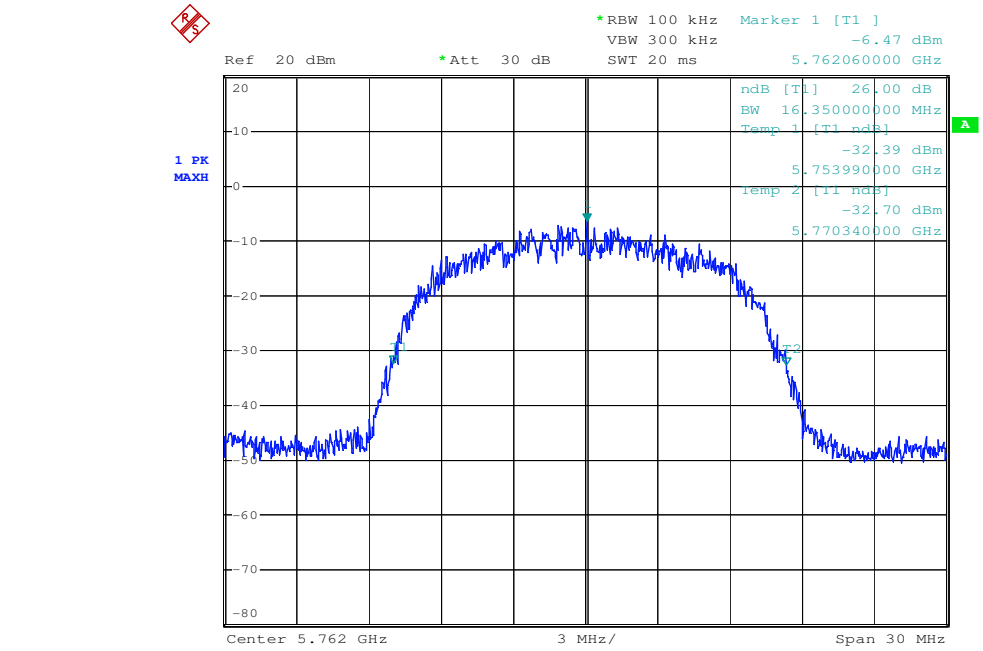
CH Low 5736MHz

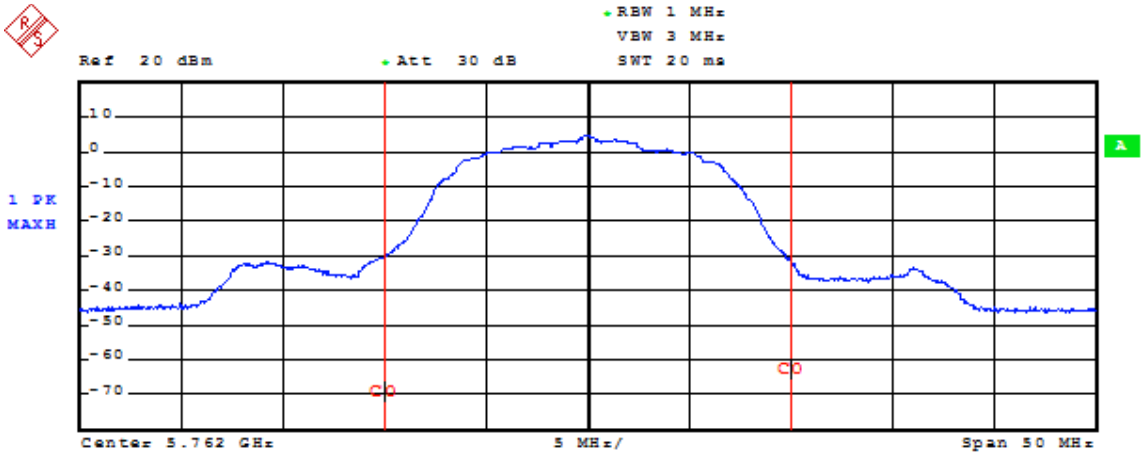


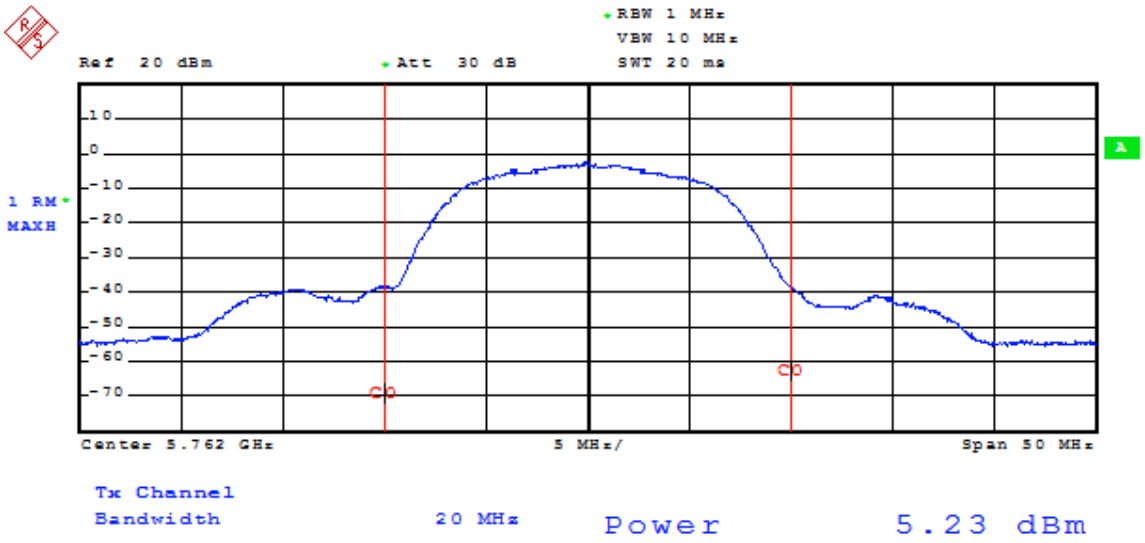




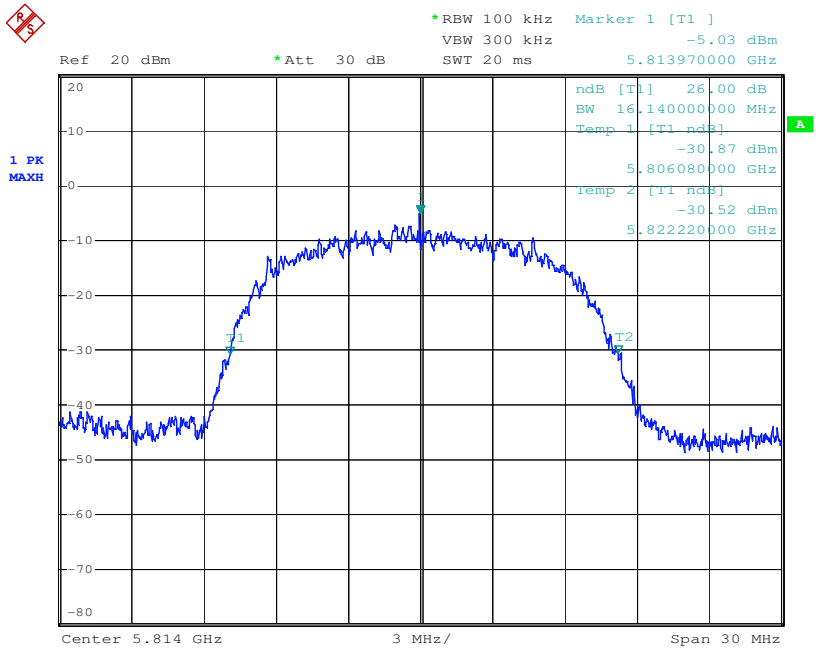
CH Mid 5762MHz

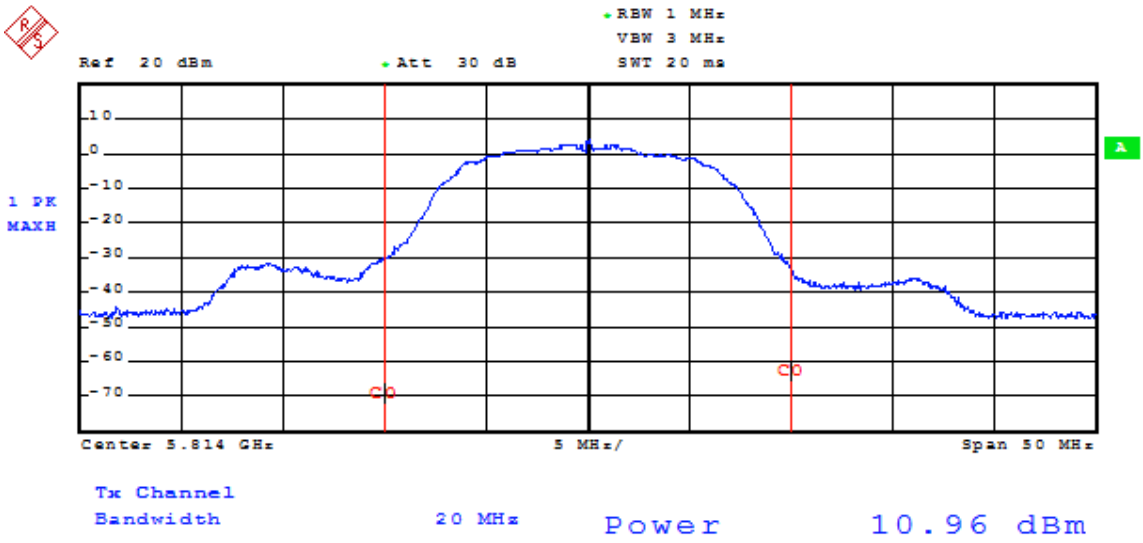


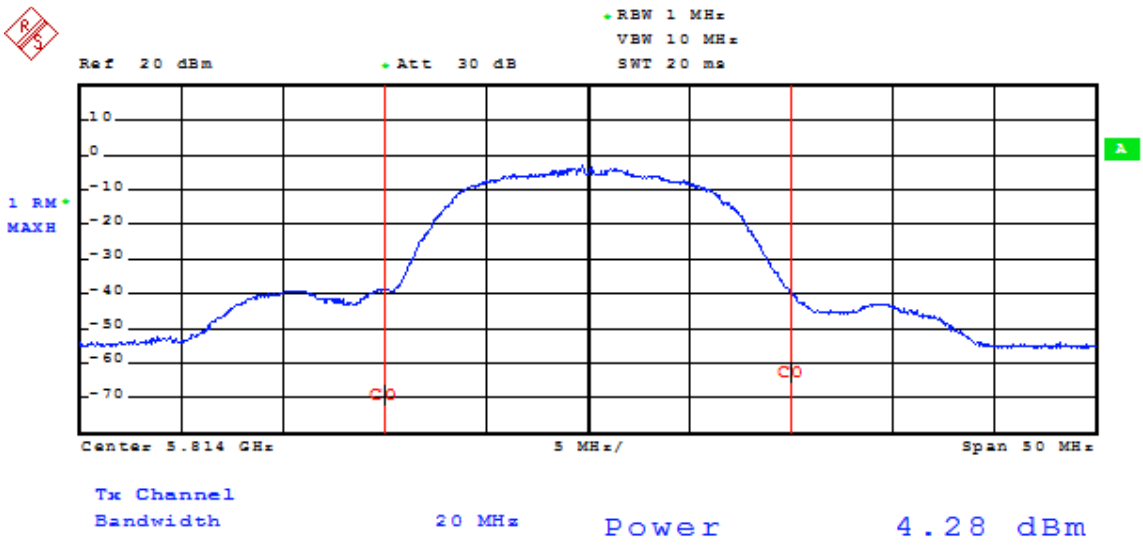




CH High 5814MHz







6.6 RF Exposure Compliance Requirement

15.247(i) requirement:
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 of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

TCB Exclusion List (7 July 2002)

Exposure category	low threshold	high threshold
General population	(60/*f*GHz) mW. $d < 2.5$ cm (120/*f*GHz) mW. $d \geq 2.5$ cm	(900/*f*GHz) mW. $d < 20$ cm
Occupational	(375/*f*GHz) mW. $d < 2.5$ cm (900/*f*GHz) mW. $d \geq 2.5$ cm	(2250/*f*GHz) mW. $d < 20$ cm

6.6.1 Output power Results:

For 2412-2464MHz Band:

CH	Frequency (MHz)	Reading Peak Power (dBm)	Reading RMS Power (dBm)	Cable Loss (dB)	Output RMS Power (dBm)	Output Peak Power (dBm)
LOW	2412	14.73	9.88	0.5	10.38	15.23
MID	2437	14.50	9.47	0.5	9.97	15.00
HIGH	2462	14.49	9.20	0.5	9.70	14.99

For 5736-5814MHz Band:

CH	Frequency (MHz)	Reading Peak Power (dBm)	Reading RMS Power (dBm)	Cable Loss (dB)	Output RMS Power (dBm)	Output Peak Power (dBm)
LOW	5736	11.34	4.57	0.5	5.07	11.84
MID	5762	11.91	5.23	0.5	5.73	12.41
HIGH	5814	10.96	4.28	0.5	4.78	11.46

6.6.2 EUT RF Exposure

The Max Conducted RMS Output Power is 5.73dBm(3.74mW) at 5736-5814MHz band.
And the antenna gain is 2dB PCB integrated in the actual use logarithmic terms convert to numeric result is nearly 1.58

According to the formula. calculate the EIRP test result:

EIRP= P x G = 10.92 mW x 1.58 = 17.25 mW ①

SAR requirement:

S= 60 / f(GHz) = 60/2.464 = 24.351 mW ② ;

① < ②.

The Max Conducted RMS Output Power is 10.38dBm(10.92mW) at 2412-2464MHz band.
And the antenna gain is 2dB PCB integrated in the actual use logarithmic terms convert to numeric result is nearly 1.58

According to the formula. calculate the EIRP test result:

EIRP= P x G = 3.74 mW x 1.58 = 5.909 mW ③

SAR requirement:

S= 60 / f(GHz) = 60/5.814 = 10.320 mW ④ ;

③ < ④ .

So the SAR test for Bluetooth is not required.

6.7 Radiated Emission Band Edge

Test Requirement: FCC Part15 247(c)

Test date: May. 04.2012

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 Distance: 3m (Semi-Anechoic Chamber)

Limit: 40.0 dBμV/m between 30MHz & 88MHz;

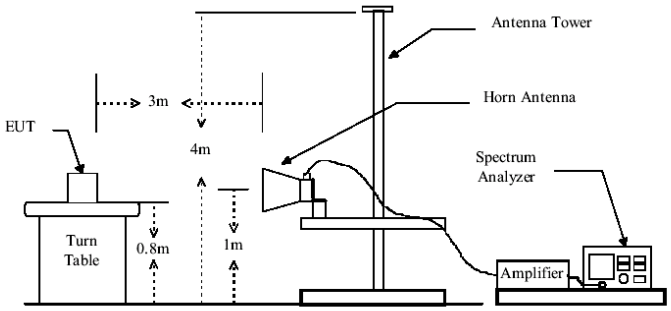
43.5 dBμV/m between 88MHz & 216MHz;

46.0 dBμV/m between 216MHz & 960MHz;

AV 54.0 dBμV/m PK 74.0dBμV/m above 960MHz.

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 menters.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



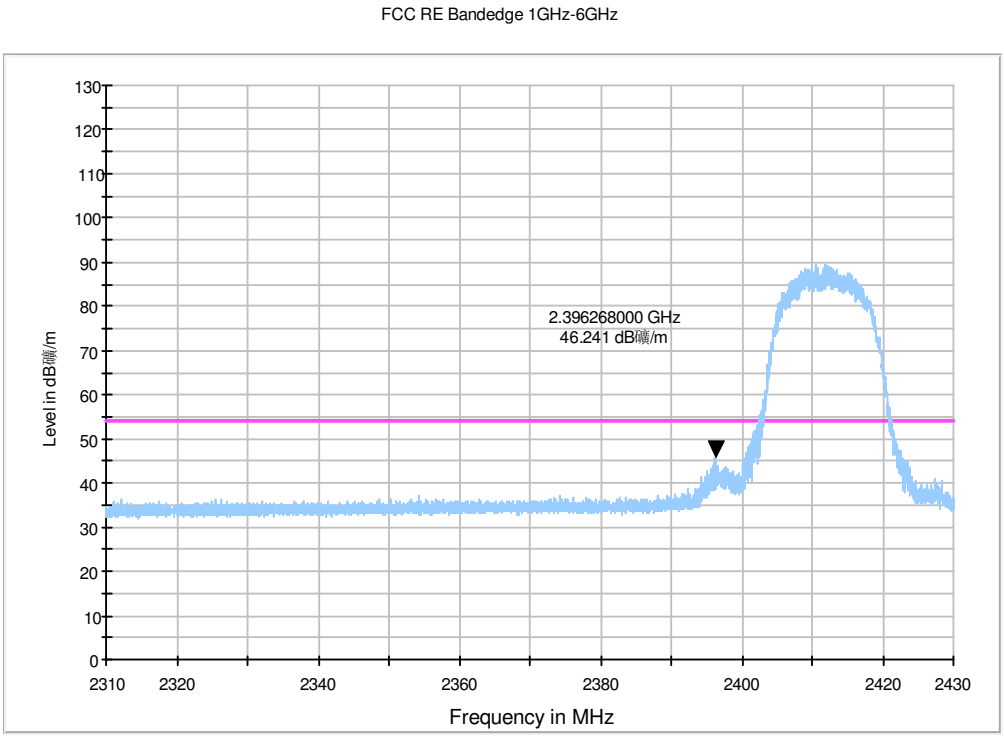
The field strength is calculated by adding the Antenna Factor,Preamplifier Factor&Cable Factor. The

basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

Radiated Bandedge Measurement Result:

CH Low 2412MHz Radiated Bandedge(Horizontal)

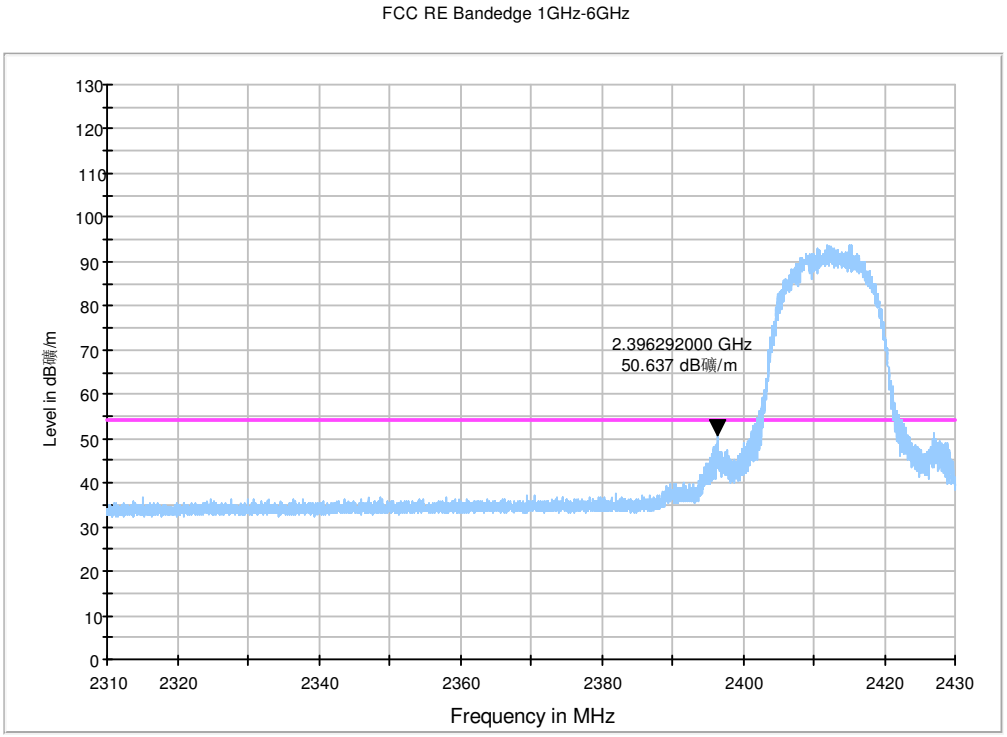
Horizontal, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2396.27	56.34	27.60	42.50	4.80	46.24	54.00	7.76

CH Low 2412MHz Radiated Bandedge(Vertical)

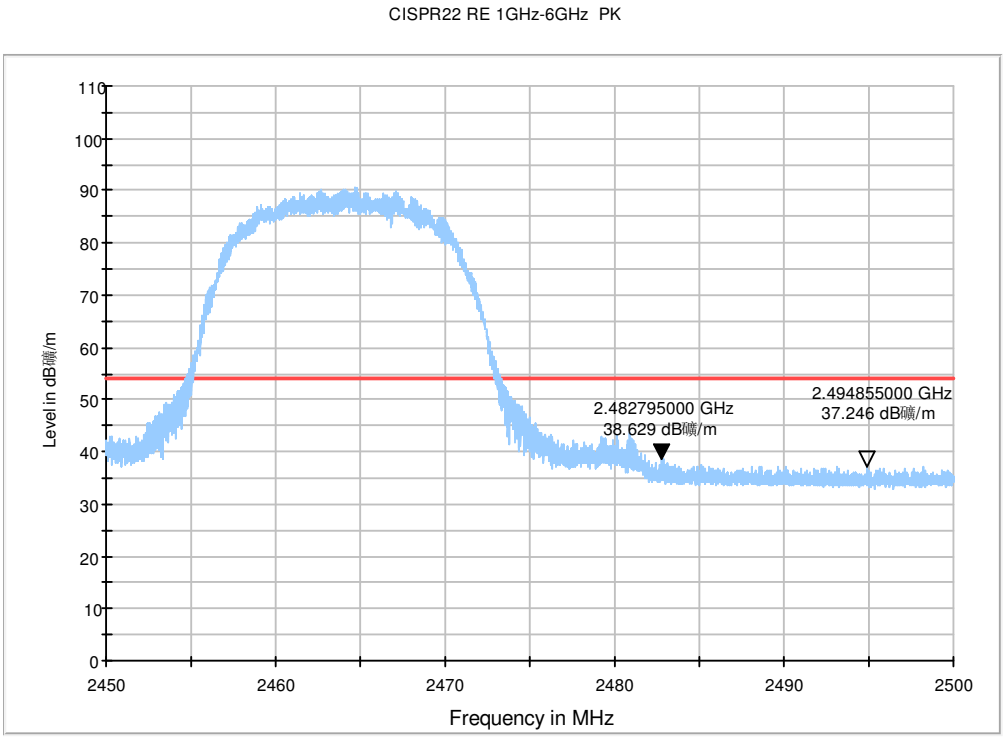
Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2396.29	60.74	27.60	42.50	4.80	50.64	54.00	3.36

CH High 2464MHz Radiated Bandedge(Horizontal)

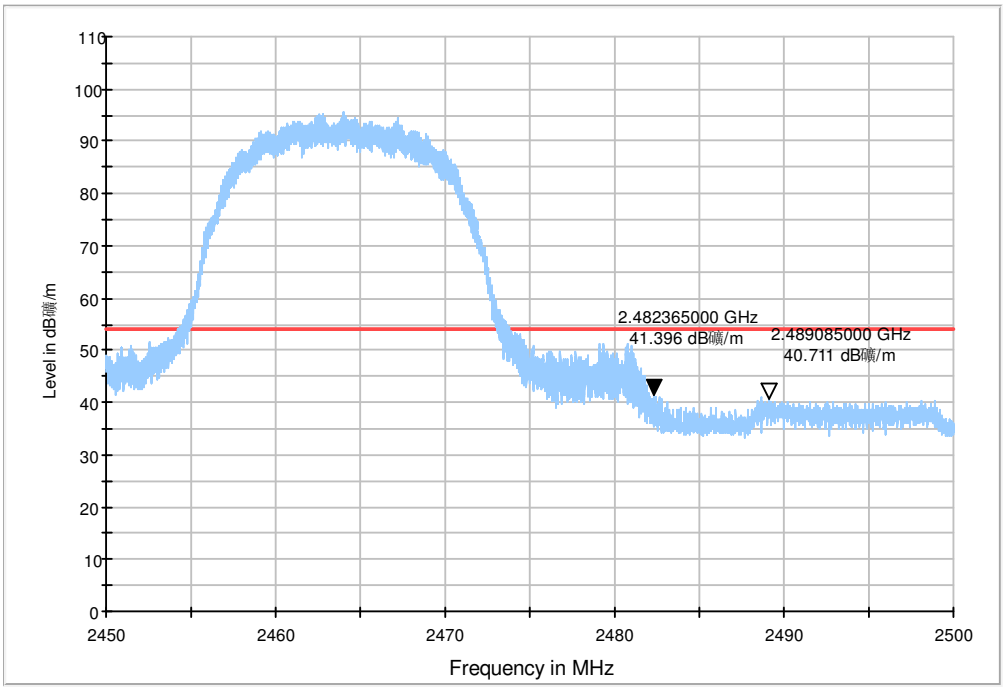
Horizontal, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2482.80	48.73	27.60	42.50	4.80	38.63	54.00	15.37

CH High 2464MHz Radiated Bandedge(Vertical)

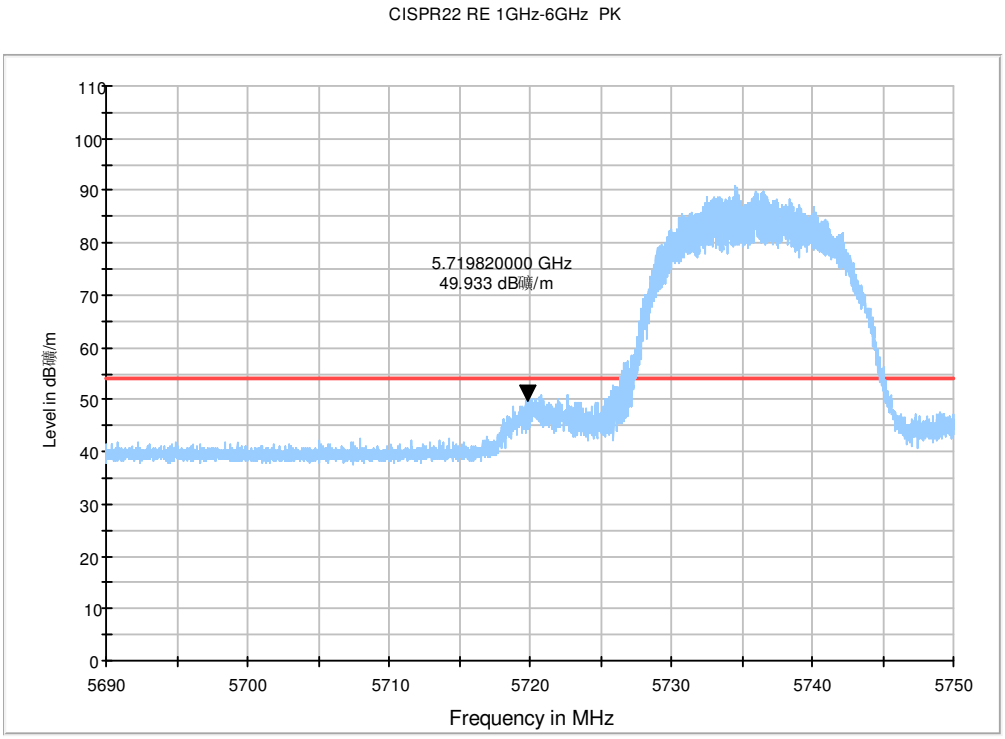
Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2482.37	51.50	27.60	42.50	4.80	41.40	54.00	12.6

CH Low 5736MHz Radiated Bandedge(Horizontal)

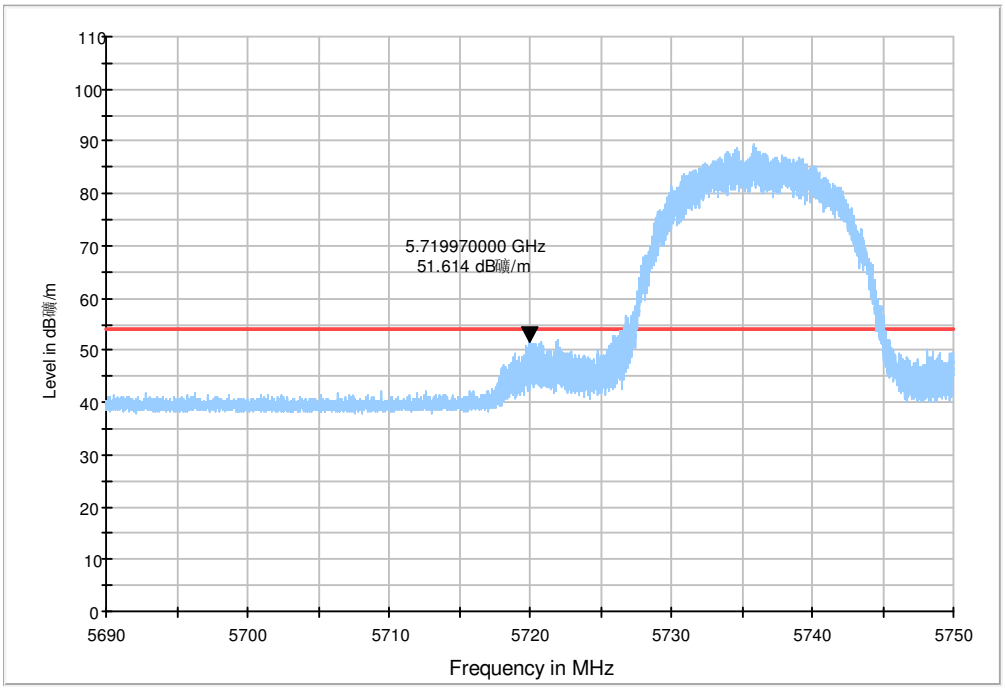
Horizontal, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
5719.82	53.53	32.80	44.0	7.60	49.93	54.00	4.07

CH Low 5736MHz Radiated Bandedge(Vertical)

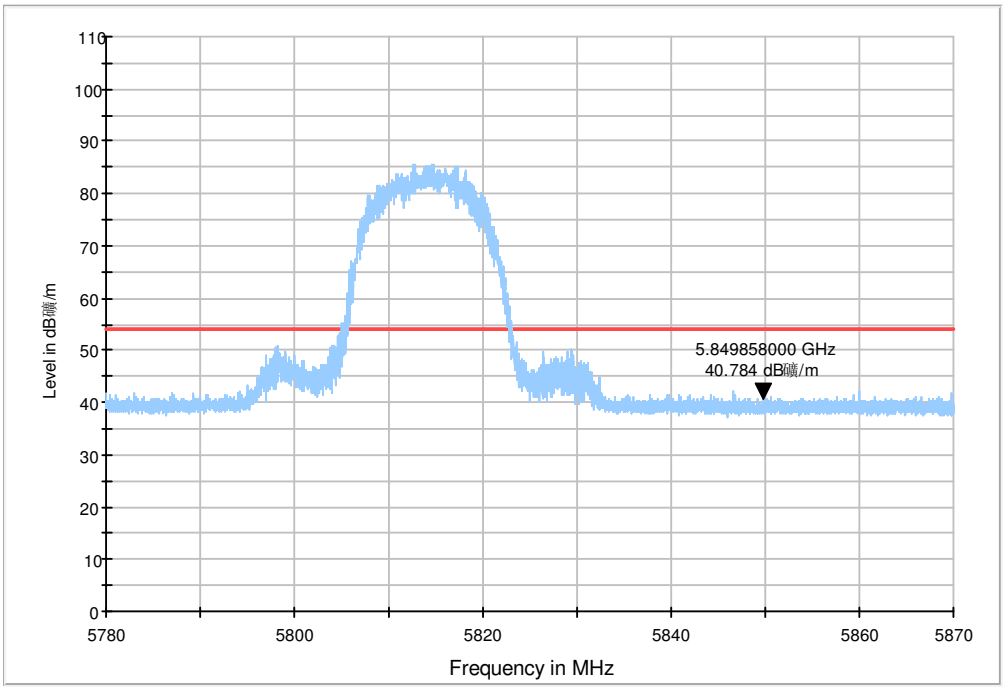
Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
5719.97	55.24	32.80	44.0	7.60	51.64	54.00	2.36

CH High 5814MHz Radiated Bandedge(Horizontal)

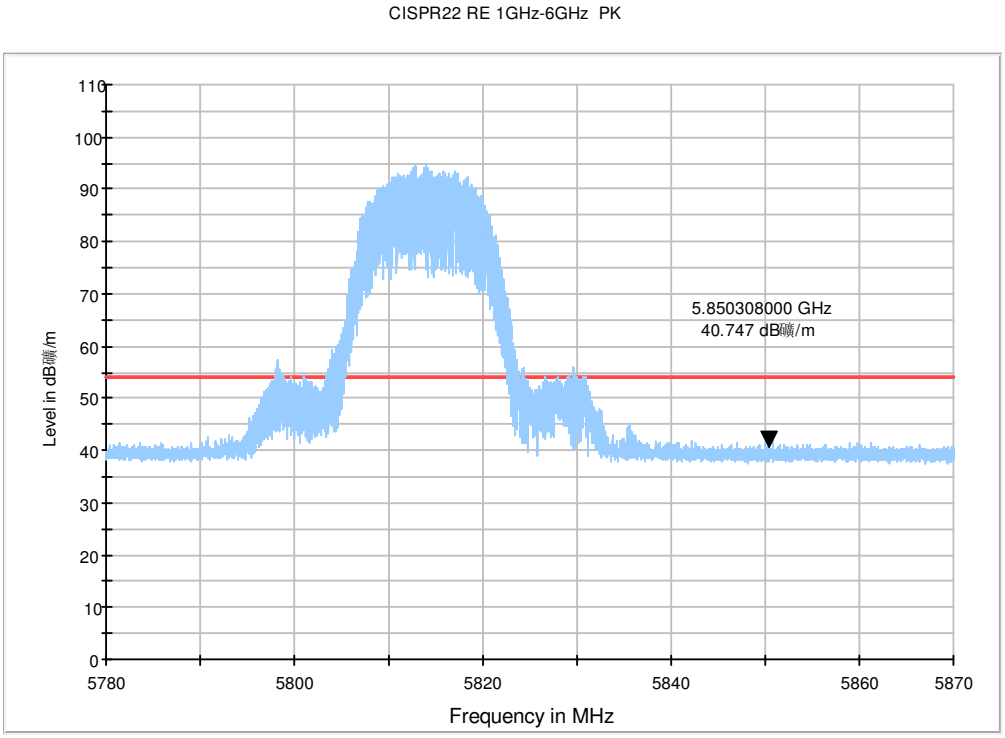
Horizontal, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
5849.86	44.38	32.80	44.0	7.60	40.78	54.00	13.22

CH High 5814MHz Radiated Bandedge(Vertical)

Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
5850.31	44.35	32.80	44.0	7.60	40.75	54.00	13.25

Remark: 1. The Peak Level less than the AV limit, so the AV level is no greater than the AV limit.

2. No any other emission which fall in restricted bands can be detected and be reported.

All frequencies within the “Restricted bands” have been evaluated to compliance. Section 15.205 Restricted bands of operation.

6.8 Conducted Spurious Emission Test

Test Requirement: FCC Part15 247(c)

Test date: Mar. 26, 2012

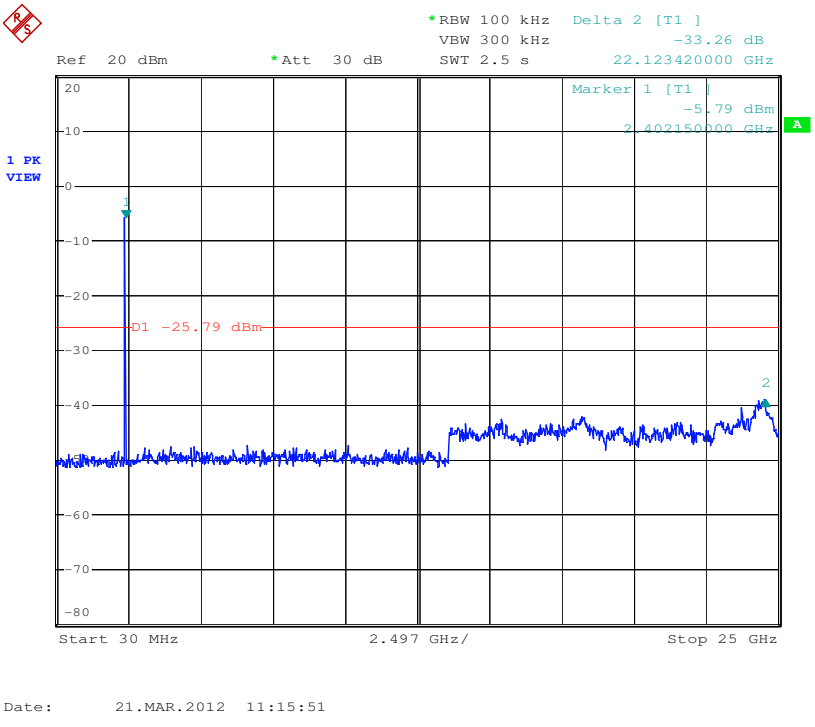
Standard Applicable: According to section 15.247(c),in any 100KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating,the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within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

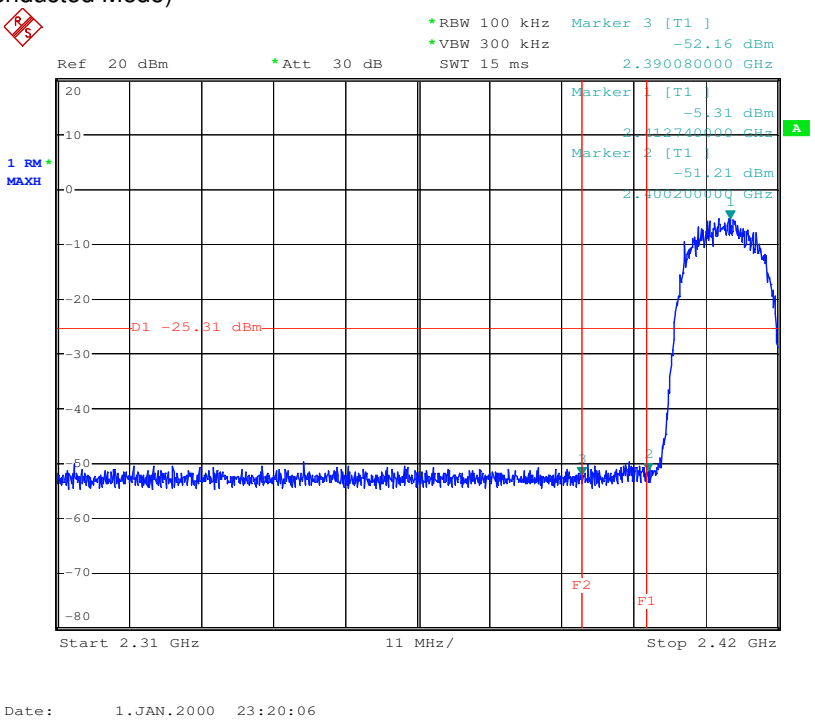
Measurement Result:

Conducted spurious Emission Measurement Result For 2412-2464MHz Band

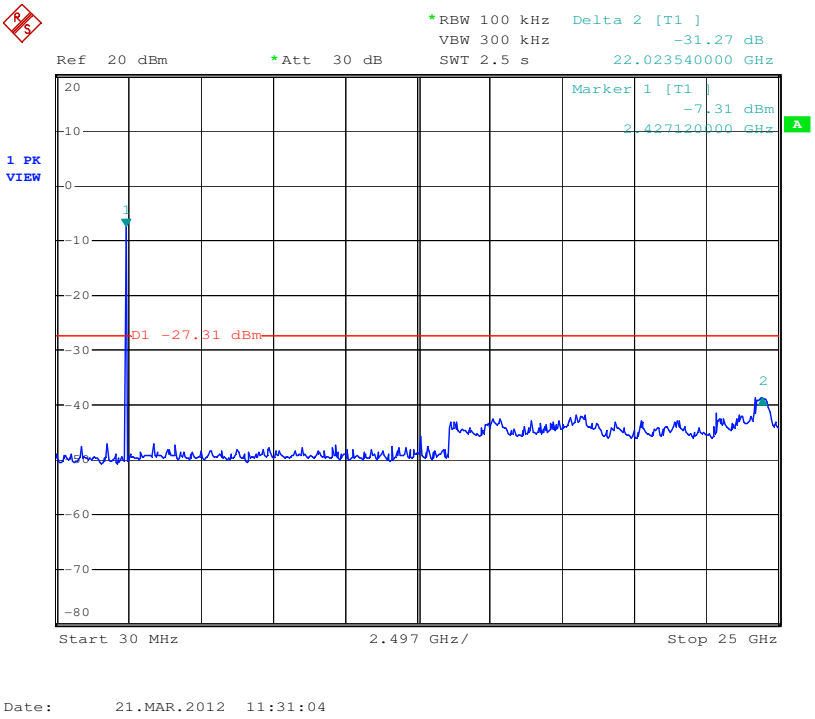
CH Low 30MHz-25GHz



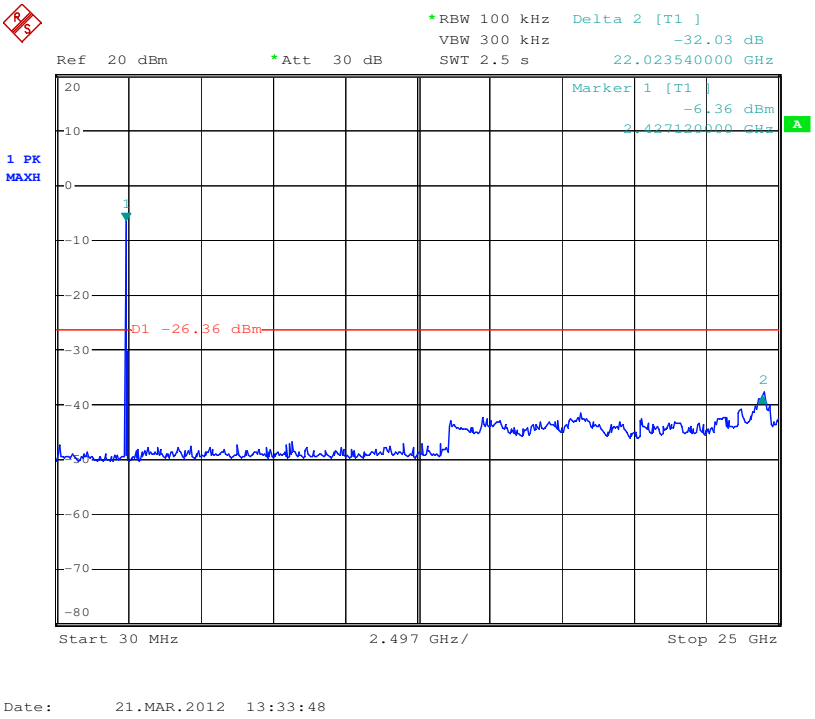
Band Edge (Conducted Mode)



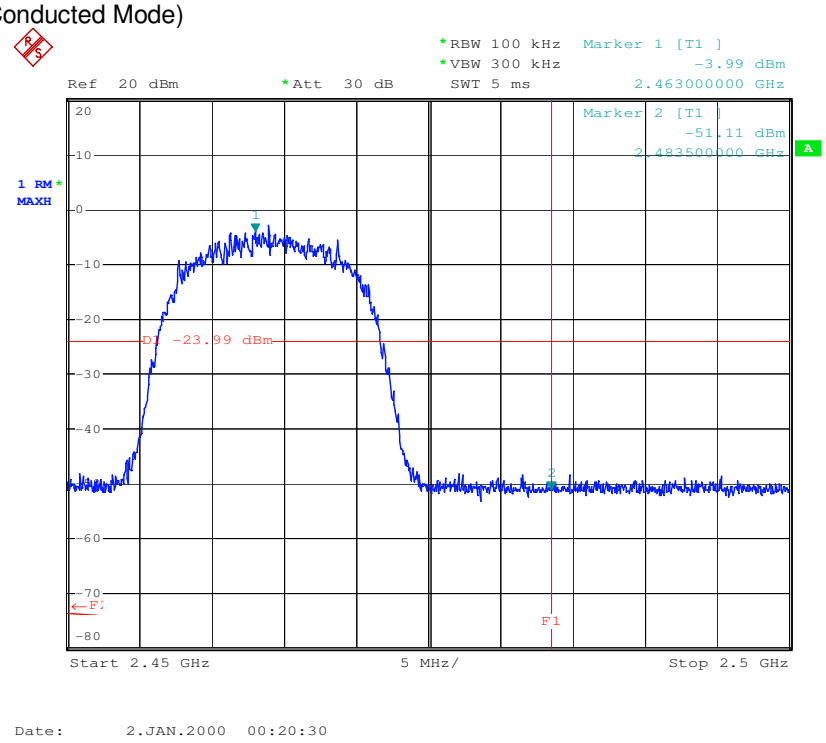
Ch Mid 30MHz-25GHz



Ch High 30MHz-25GHz

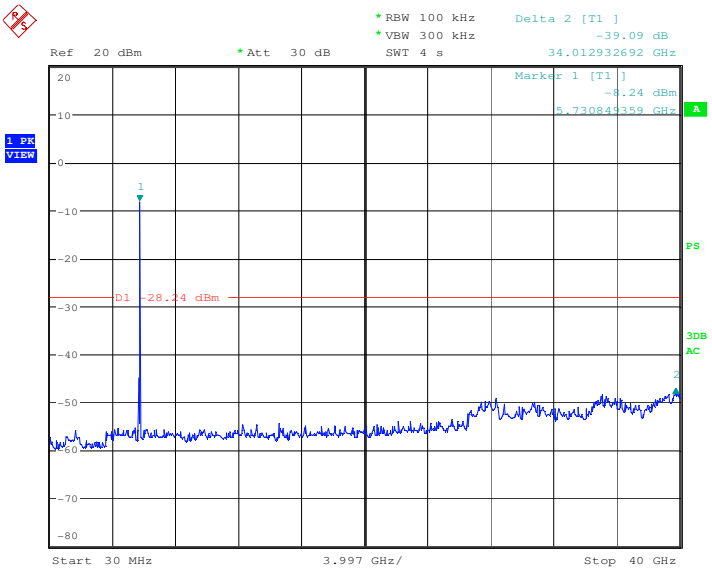


Band Edge (Conducted Mode)



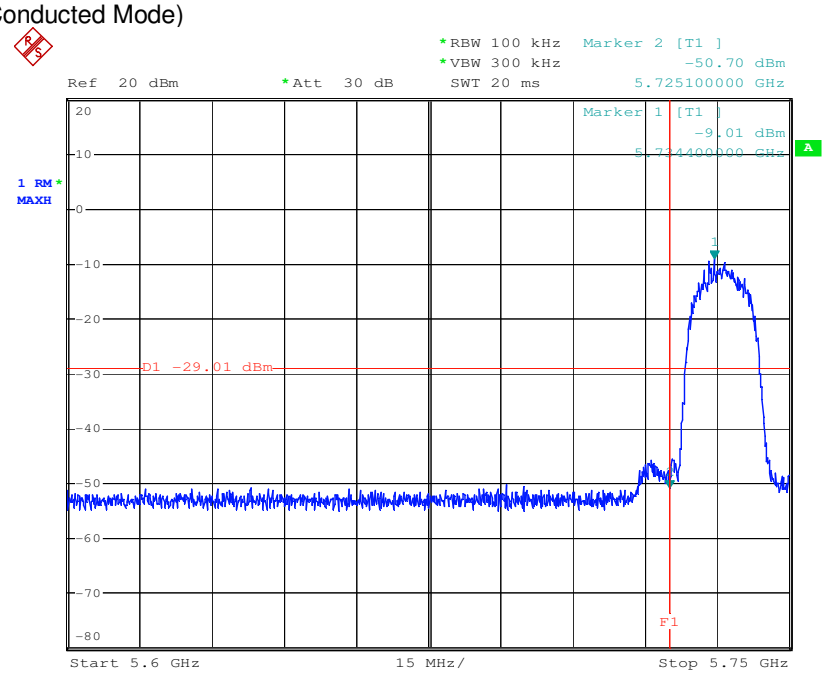
Conducted spurious Emission Measurement Result For 5736-5814MHz Band

CH Low 30MHz-40GHz



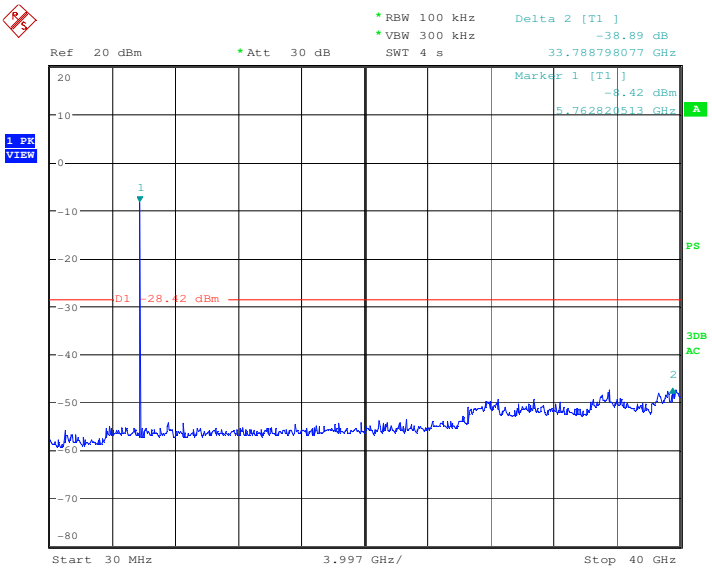
Date: 3.MAY.2012 15:21:08

Band Edge (Conducted Mode)



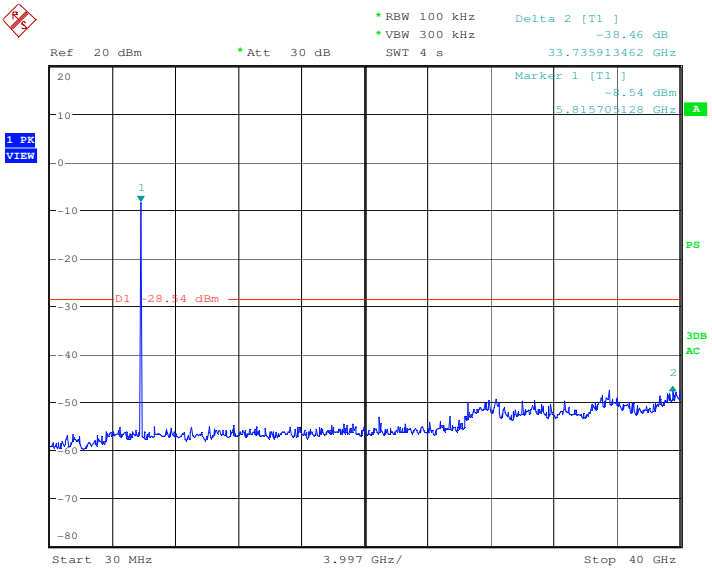
Date: 2.JAN.2000 00:25:20

Ch Mid 3GHz-40GHz



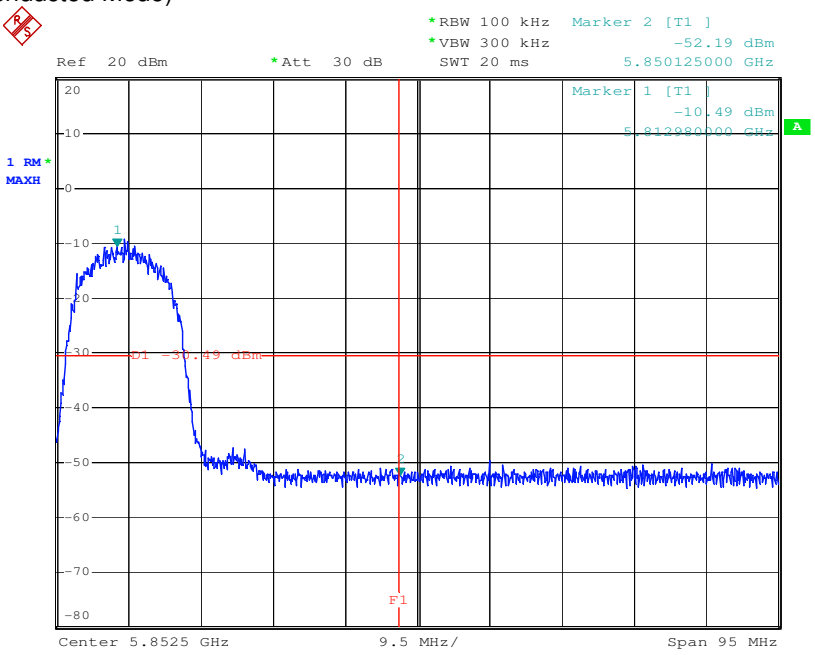
Date: 3.MAY.2012 15:24:35

Ch High 3GHz-40GHz



Date: 3.MAY.2012 15:27:24

Band Edge (Conducted Mode)



6.9 Peak Power Spectral Density

Test Requirement: FCC Part15 247(e)

Test date: Mar. 28, 2012

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 ofANSI C63.10 for compliance to FCC 47CFR 15.247 requiremnts. Set RBW=3KHz,Set VBW=10KHz,Span=3MHz,Sweep time=100s,Set detector=Peak detector.

Measurement Result:

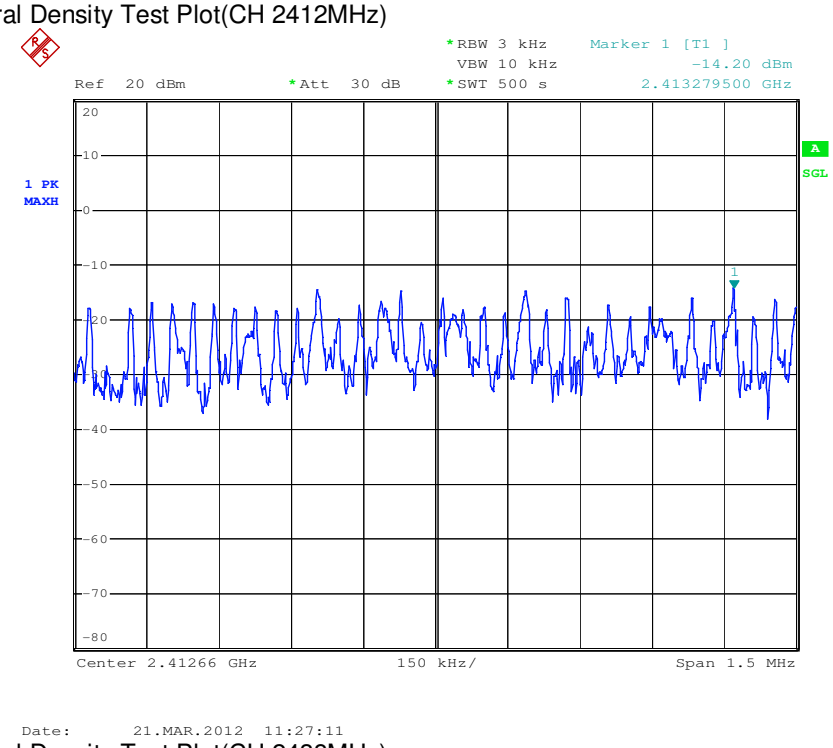
For 2412-2464MHz Band

CH	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	2412	-14.20	0.5	-13.70	8	PASS
MID	2438	-14.72	0.5	-14.22	8	PASS
HIGH	2462	-14.47	0.5	-13.97	8	PASS

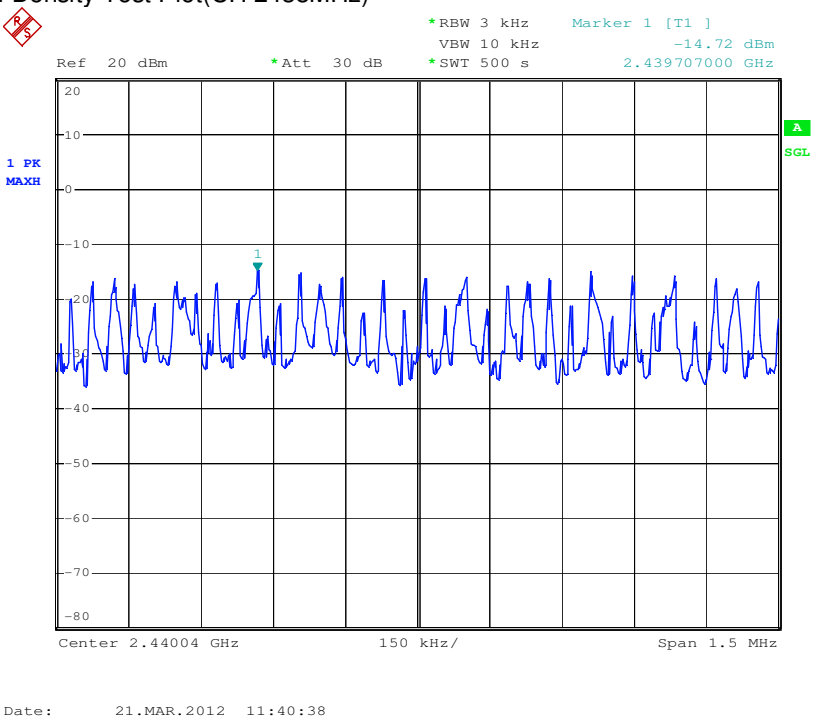
For 5736-5814MHz Band

CH	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	5736	-16.26	0.5	-15.76	8	PASS
MID	5762	-16.47	0.5	-15.97	8	PASS
HIGH	5814	-14.73	0.5	-14.23	8	PASS

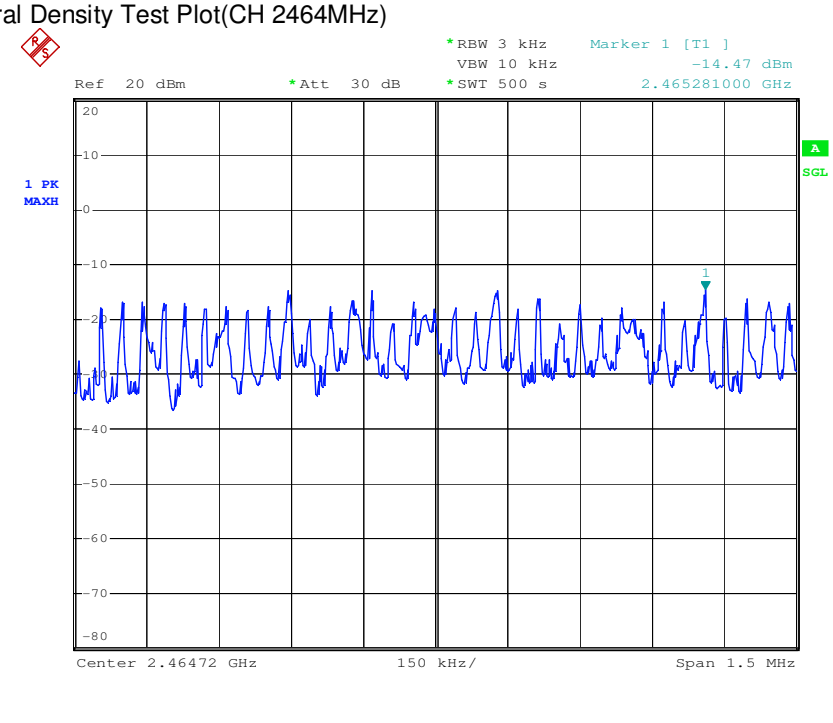
Power Spectral Density Test Plot(CH 2412MHz)



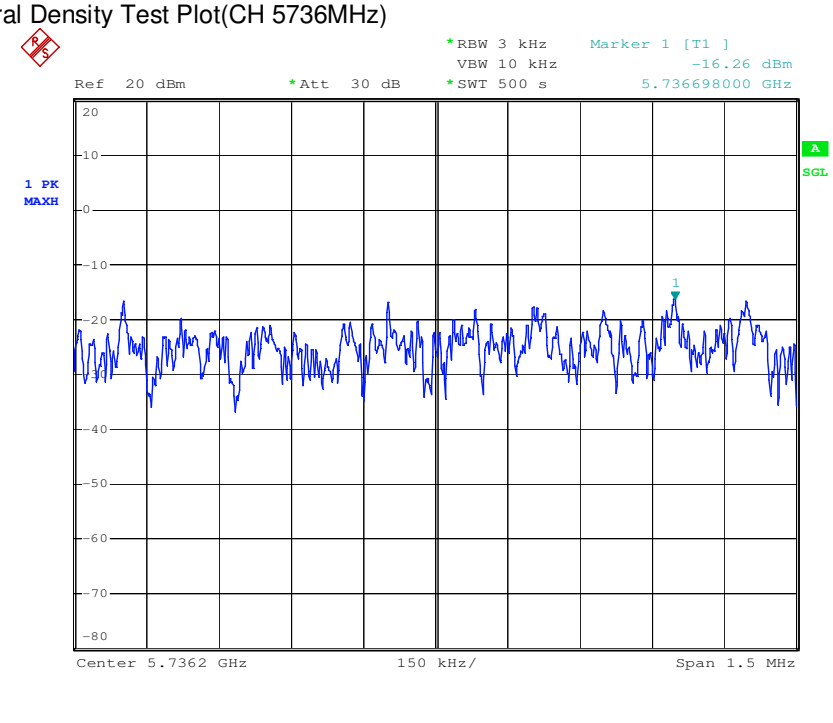
Power Spectral Density Test Plot(CH 2438MHz)



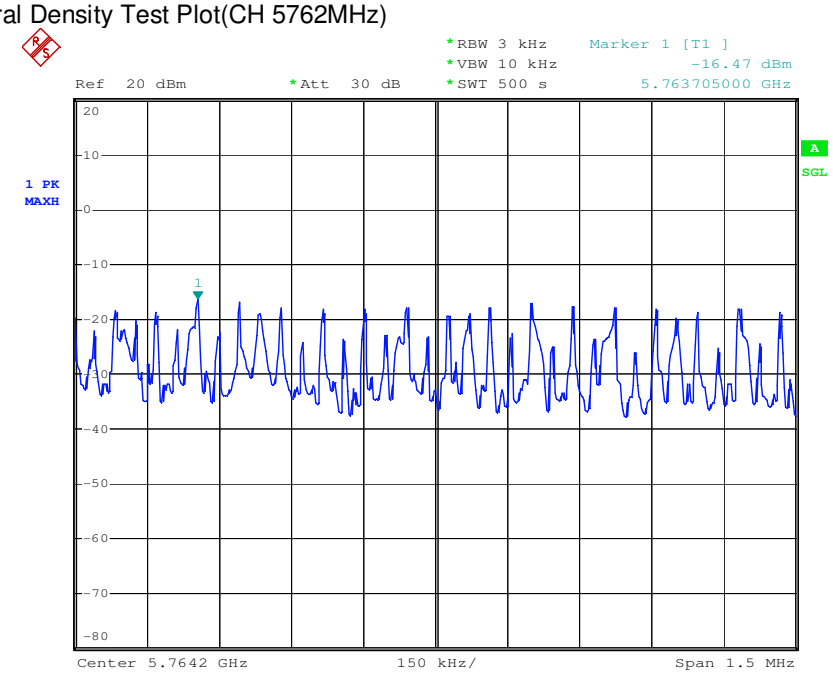
Power Spectral Density Test Plot(CH 2464MHz)



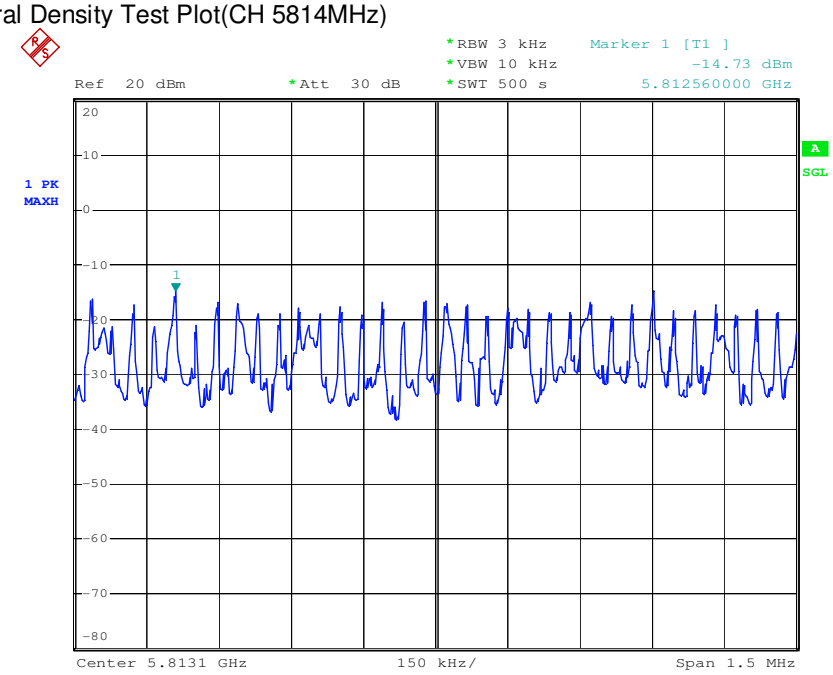
Power Spectral Density Test Plot(CH 5736MHz)



Power Spectral Density Test Plot(CH 5762MHz)



Power Spectral Density Test Plot(CH 5814MHz)



6.10 Occupied Bandwidth Test

Test Requirement: RSS-Gen Issue 3 Clause 4.6.1

Test date: Jun. 13, 2012

Standard Applicable According to the section RSS-Gen Issue 3 Clause 4.6.1

EUT Setup The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer with the resolutions set at 100kHz,the video bandwidth set at 300kHz.

Measurement Result:

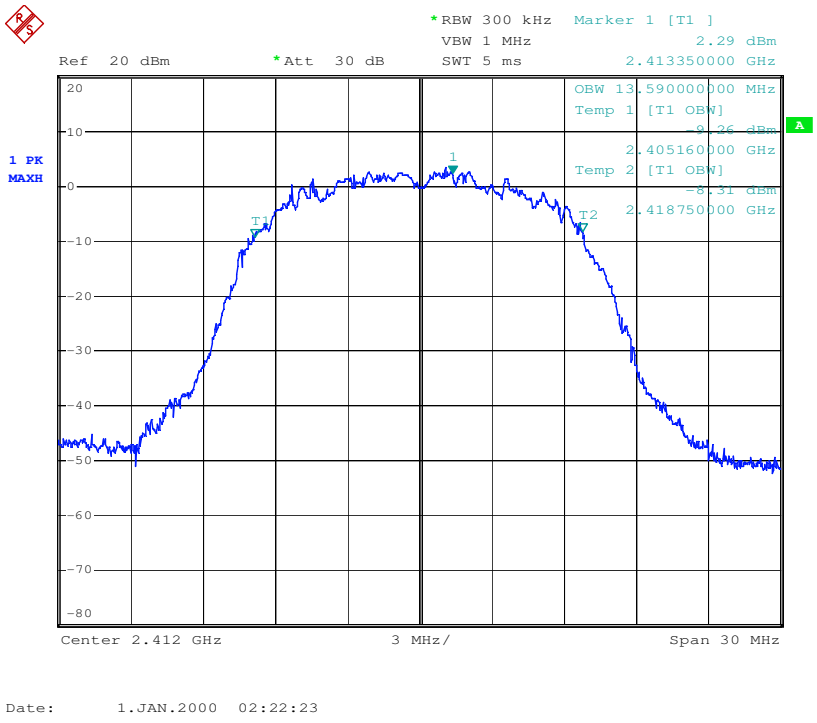
For 2412-2464MHz Band

Channel	Frequency (MHz)	Bandwidth (MHz)
LOW	2412	13.59
MID	2438	13.59
HIGH	2464	13.62

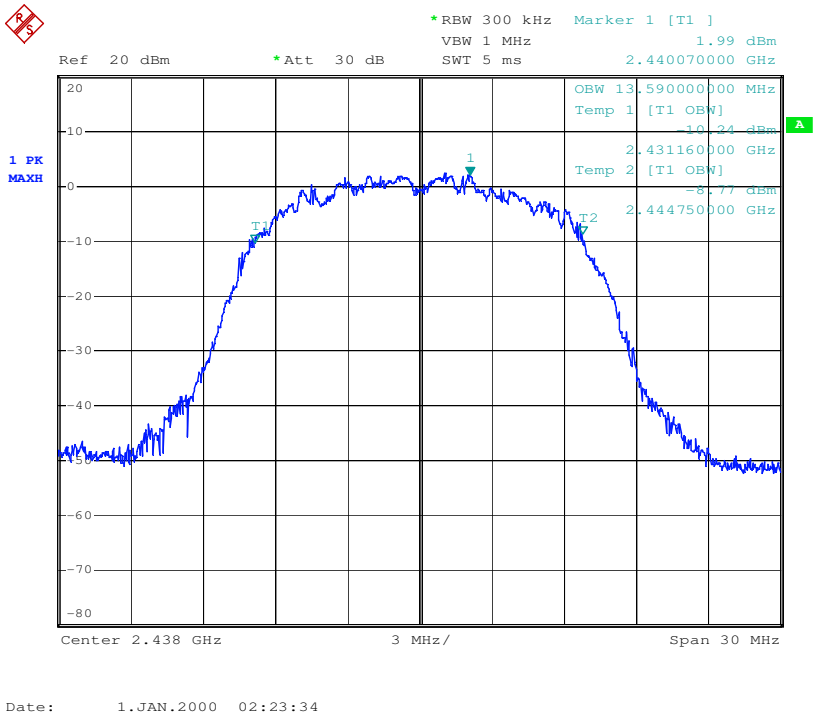
For 5736-5814MHz Band

Channel	Frequency (MHz)	Bandwidth (MHz)
LOW	5736	13.62
MID	5762	13.68
HIGH	5814	13.74

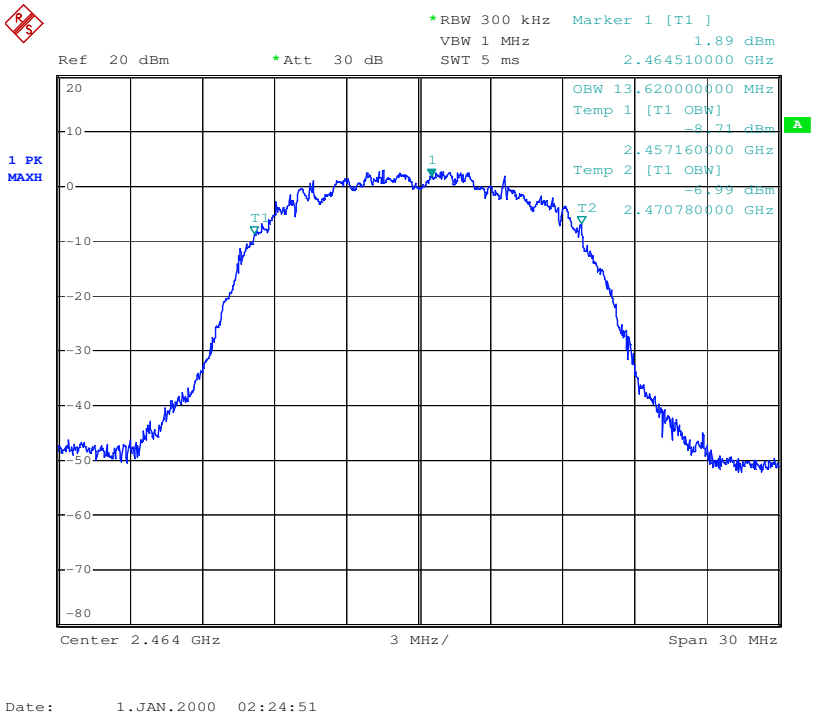
Channel 2412MHz



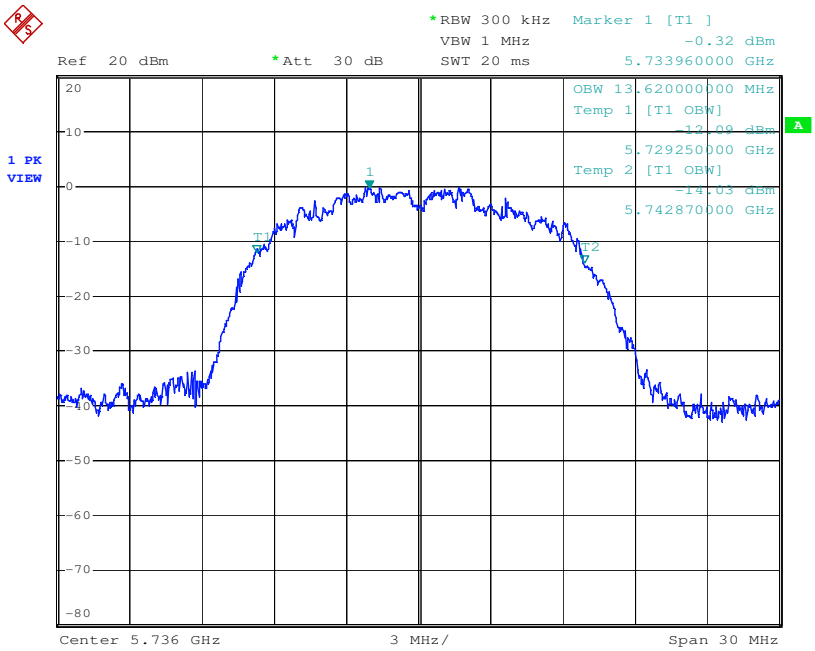
Channel 2438MHz



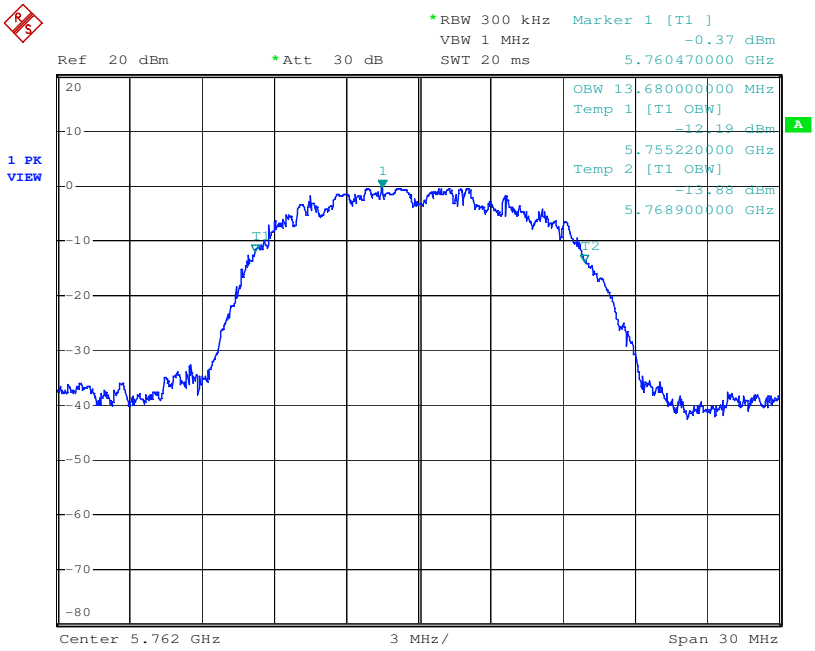
Channel 2464MHz



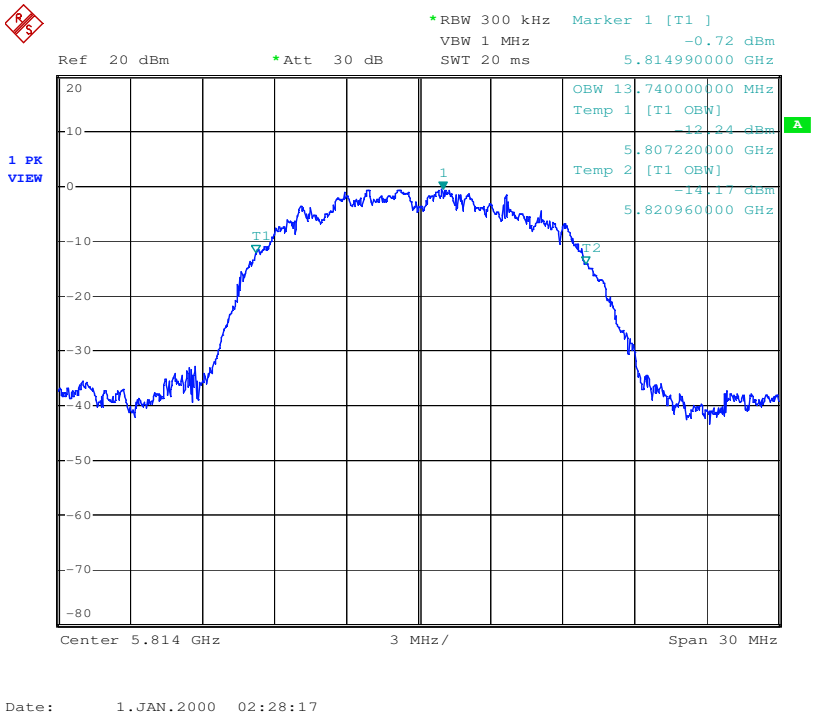
Channel 5736MHz



Channel 5762MHz



Channel 5814MHz



End of Report