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TEST REPORT

FCC Part 15.247 & RSS-210

Report Reference No.: CTL1402240233-WF

Compiled by

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Date of issue: Mar. 20, 2014

Test Laboratory Name : Shenzhen CTL Testing Technology Co., Ltd.

Address : Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

Applicant's name: Global Marine Networks, LLC

Address : 2668 Jericho Rd, Maryville, TN, USA 37803

Test specification:

Standard : FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

RSS-210 Issue 8 (2010): Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF: Dated 2011-01

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Test item description : RedPort Satellite Optimizer

FCC ID: 2ABXOWXA-131

IC ID: 11867A-WXA131

Trade Mark : N/A

Model/Type reference : WXA-131, M4

Work frequency : 802.11b/g/n(20MHz): 2412~2462MHz

802.11n(40MHz): 2422~2452

Type of modulation : 802.11b DSSS, 802.11g/n: OFDM

Data Rate : 802.11b: 1/2/5.5/11 Mbps

802.11g: 6/9/12/18/24/36/48/54 Mbps

802.11n: up to 150 Mbps

Antenna Gain : -0.5dBi

Antenna type : Internal

Result : Positive

TEST REPORT

Test Report No. : CTL140240233-WF	Mar. 20, 2014 Date of issue
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Equipment under Test : RedPort Satellite Optimizer

Model /Type : M4

Listed Modes : WXA-131

Different Description : Only model's name and color are different based on the same PCB and electrical design.

Applicant : **Global Marine Networks, LLC**

Address : 2668 Jericho Rd, Maryville, TN, USA 37803

Manufacturer : **Shenzhen Poray Communication Co.,Ltd**

Address : 4F, Bldg D, FuSeng Industrial Park, HangCheng Ave, Bao'an District. Shenzhen City, China

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

[RSS-210 Issue 8 \(2010\)](#): Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

[ANSI C63.10-2009](#): American National Standard for Testing Unlicensed Wireless Devices.

[ANSI C63.4-2003](#)

[KDB Publication No. 558074 D01 v03r01 Guidance on Measurements for Digital Transmission Systems](#)



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Mar. 11, 2014
Testing commenced on	:	Mar. 11, 2014
Testing concluded on	:	Mar. 20, 2014

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC3.7V from battery, charged by DC 5V from USB

Description of the test mode

IEEE 802.11b/g/n: Thirteen channels are provided to the EUT, but only eleventh channels used for USA.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

2.3. Short description of the Equipment under Test (EUT)

A RedPort Satellite Optimizer support Wi-Fi 802.11b/g/n.

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

Test Mode:

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel low (2412MHz), mid (2442MHz) and high (2462MHz) with highest data rate are chosen for full testing.
3. Test Mode:

Test Mode(TM)	Description	Remark
1	Transmitting	802.11 b
2	Transmitting	802.11 g
3	Transmitting	802.11 n HT20
4	Transmitting	802.11 n HT40

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

○ - supplied by the manufacturer

● - supplied by the lab

● Notebook PC

Manufacturer : DELL

Model No. : PP18L

2.6. NOTE

1. The EUT is an 802.11b/g/n RedPort Satellite Optimizer, The functions of the EUT listed as below:

	Test Standards	Reference Report
WLAN 802.11b/g, 802.11n	FCC Part 15 Subpart C (Section 15.247)	CTL1402240233-WF

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	✓	—	—	—
802.11g	✓	—	—	—
802.11n(20MHz)	✓	—	—	—
802.11n(40MHz)	✓	—	—	—

3. The EUT incorporates a SISO function, Physically, the EUT provides two completed transmitter and two completed receivers.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ABXOWXA-131 and IC ID: 11867A-WXA131 filing to comply with of the FCC Part 15.247 and RSS-210 Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

The sites are constructed in conformance with the requirements of ANSI C6230, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

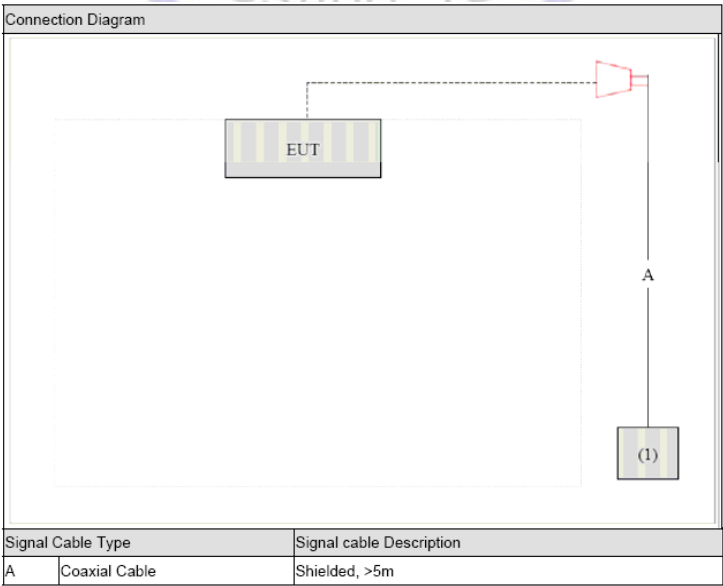
3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2013/07/12	2014/07/11
EMI Test Receiver	R&S	ESCI3	103710	2013/07/10	2014/07/09
EMI Test Receiver	R&S	ESPI	1164.6407.07	2013/07/10	2014/07/09
Spectrum Analyzer	Agilent	E4407B	MY45108355	2013/07/06	2014/07/05
Controller	EM Electronics	Controller EM 1000	N/A	2013/07/06	2014/07/05
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2013/07/12	2014/07/11
Horn Antenna	SCHWARZBECK	BBHA9170	1562	2013/07/12	2014/07/11
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2013/07/12	2014/07/11
LISN	R&S	ENV216	101316	2013/07/10	2014/07/09
LISN	R&S	ESH2-Z5	860014/010	2013/07/10	2014/07/09
LISN	SCHWARZBECK	NSLK8127	8127687	2013/07/10	2014/07/09
Microwave Preamplifier	HP	8349B	3155A00882	2013/07/10	2014/07/09
Amplifier	HP	8447D	3113A07663	2013/07/10	2014/07/09
Transient Limiter	Com-Power	LIT-153	532226	2013/07/10	2014/07/09
Wideband Peak Power Meter	Anritsu	ML2495A	6K00003382	2013/07/10	2014/07/09

3.7. Summary of Test Result

FCC PART 15/ RSS-210		
FCC Part 15.207 / RSS-Gen Section 7.7.2	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2) / RSS-210 Annex A8.2	6dB Bandwidth	PASS
RSS-Gen Section 4.6.1	99% Bandwidth	PASS
FCC Part 15.247(d) / RSS-210 Annex A8.5	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b) / RSS-210 Annex A8.4	Maximum Peak Output Power	PASS
FCC Part 15.247(e) / RSS-210 Annex A8.2	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209 / RSS-Gen Table 2&5&6	Radiated Emissions	PASS
FCC Part 15.247(d) / RSS-210 Annex A8.5	Band Edge Compliance of RF Emission	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

Remark: The measurement uncertainty is not included in the test result.

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

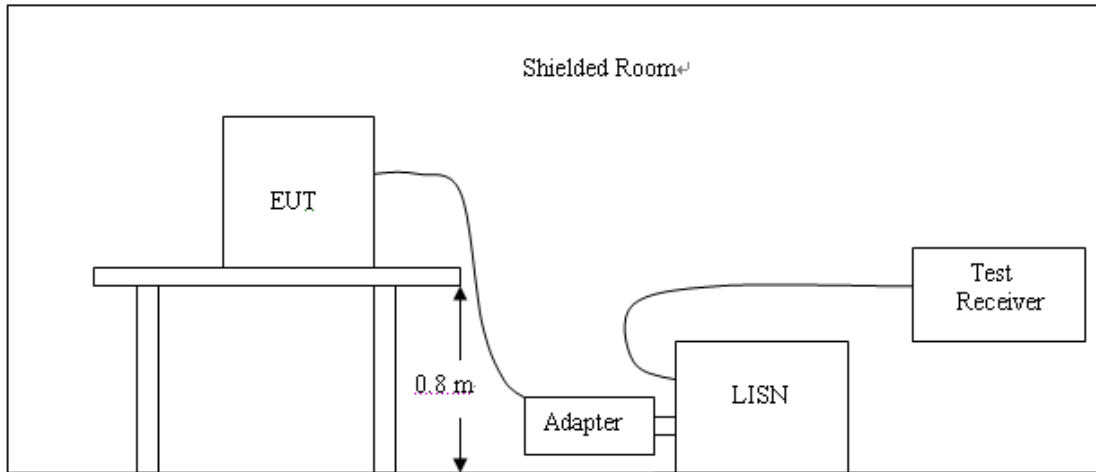
Test Items	Mode	Data Rate	Channel
AC Power Conducted Emission	Normal Link	11 Mbps	1
Maximum Peak Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	150Mbps	3/6/9
Radiated Emission 30MHz~1GHz	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	150Mbps	3/6/9
Radiated Emission 1GHz~10th Harmonic	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	150Mbps	3/6/9
Band Edge Compliance of RF Emission	11b/DSSS	11 Mbps	1/11
	11g/OFDM	54 Mbps	1/11
	11n(20MHz)/OFDM	65Mbps	1/11
	11n(40MHz)/OFDM	150Mbps	3/9

Note1: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

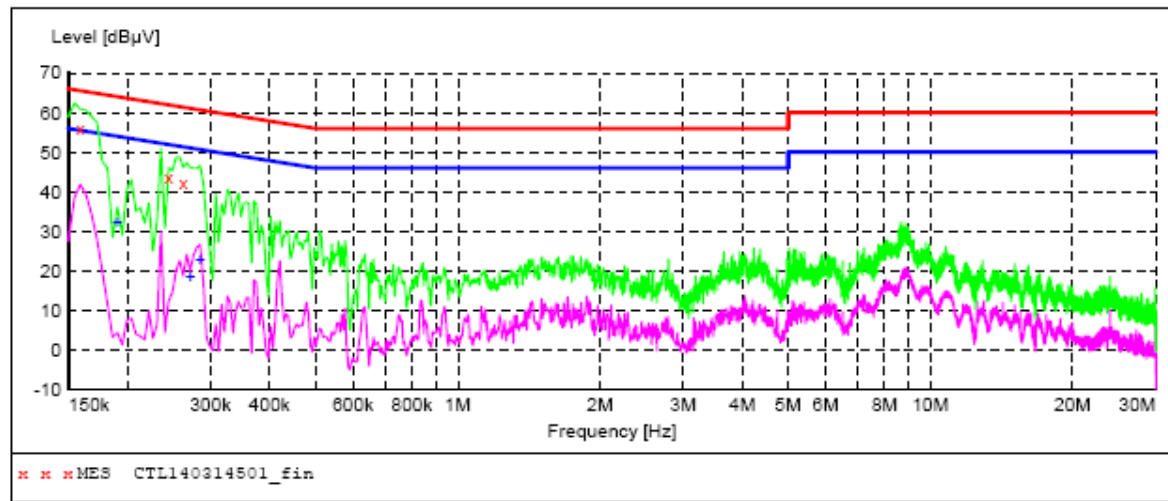
For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

The RBW/VBW for 150KHz to 30MHz: 9KHz

TEST RESULTS**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL140314501_fin"**

3/14/2014 8:50AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.159000	55.90	9.8	66	9.6	QP	L1	GND
0.244500	43.70	9.8	62	18.2	QP	L1	GND
0.262500	42.30	9.8	61	19.1	QP	L1	GND

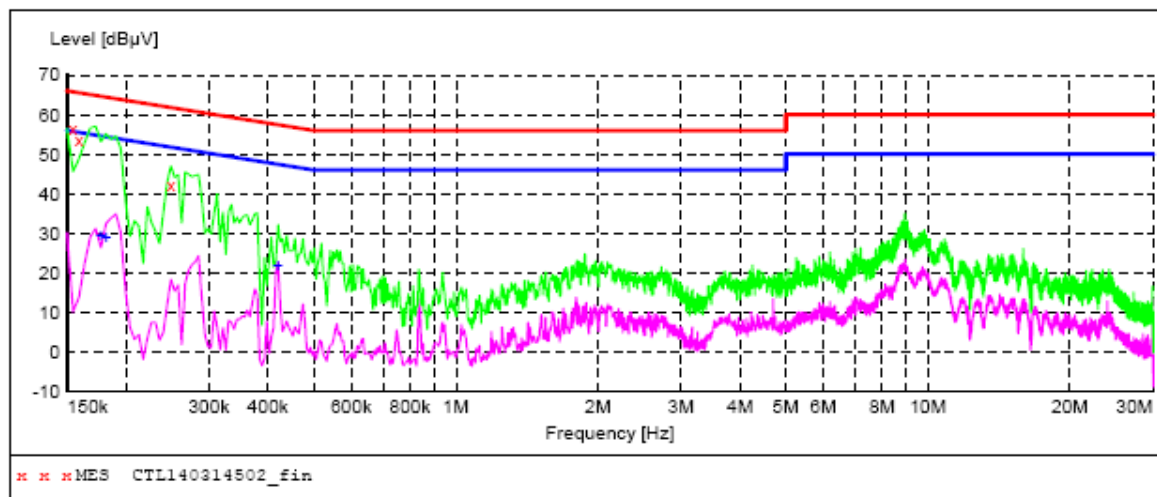
MEASUREMENT RESULT: "CTL140314501_fin2"

3/14/2014 8:50AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.190500	32.40	9.8	54	21.6	AV	L1	GND
0.271500	18.40	9.8	51	32.7	AV	L1	GND
0.285000	22.90	9.8	51	27.8	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL140314502_fin"**

3/14/2014 8:55AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154500	56.50	9.8	66	9.3	QP	N	GND
0.159000	53.50	9.8	66	12.0	QP	N	GND
0.249000	42.10	9.8	62	19.7	QP	N	GND

MEASUREMENT RESULT: "CTL140314502_fin2"

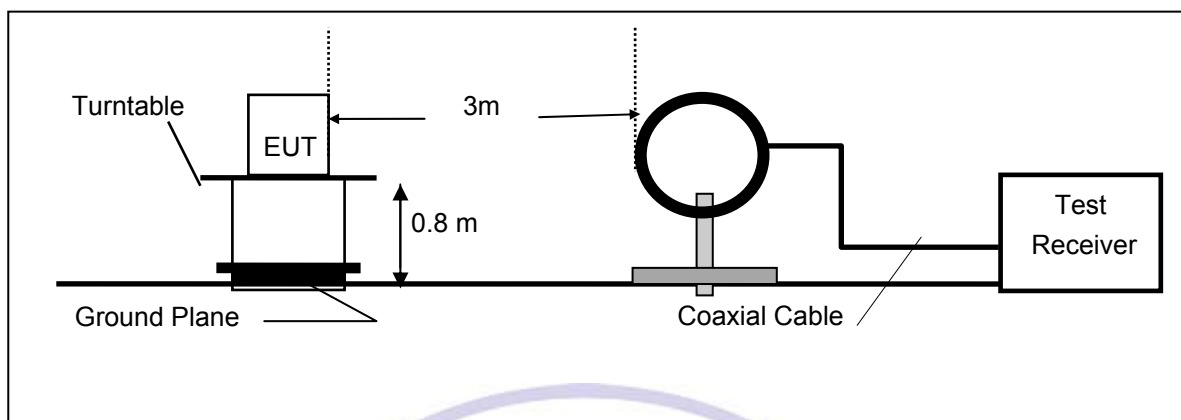
3/14/2014 8:55AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.177000	29.40	9.8	55	25.2	AV	N	GND
0.181500	29.00	9.8	54	25.4	AV	N	GND
0.420000	21.90	9.8	47	25.5	AV	N	GND

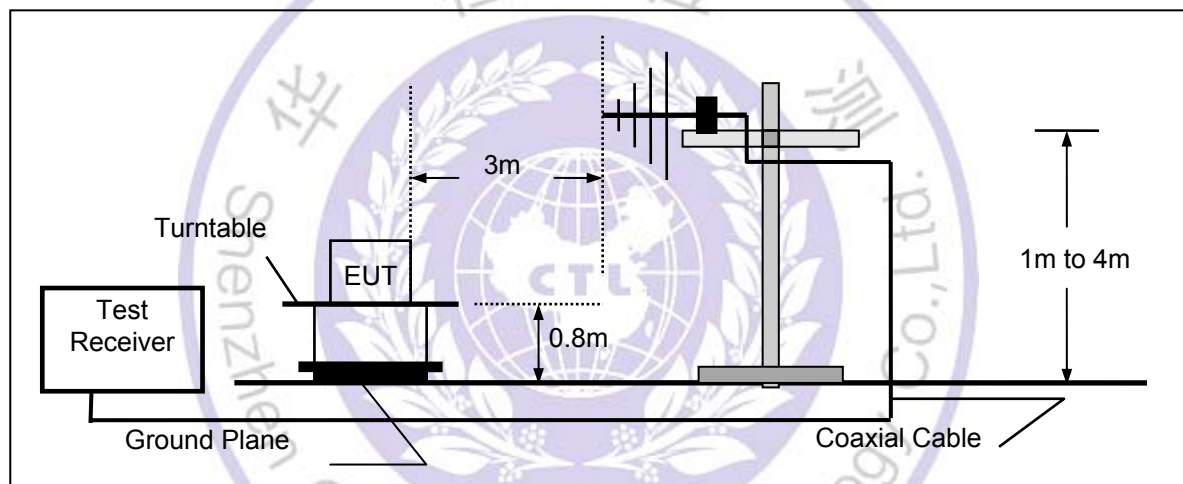
4.2. Radiated Emission Test

TEST CONFIGURATION

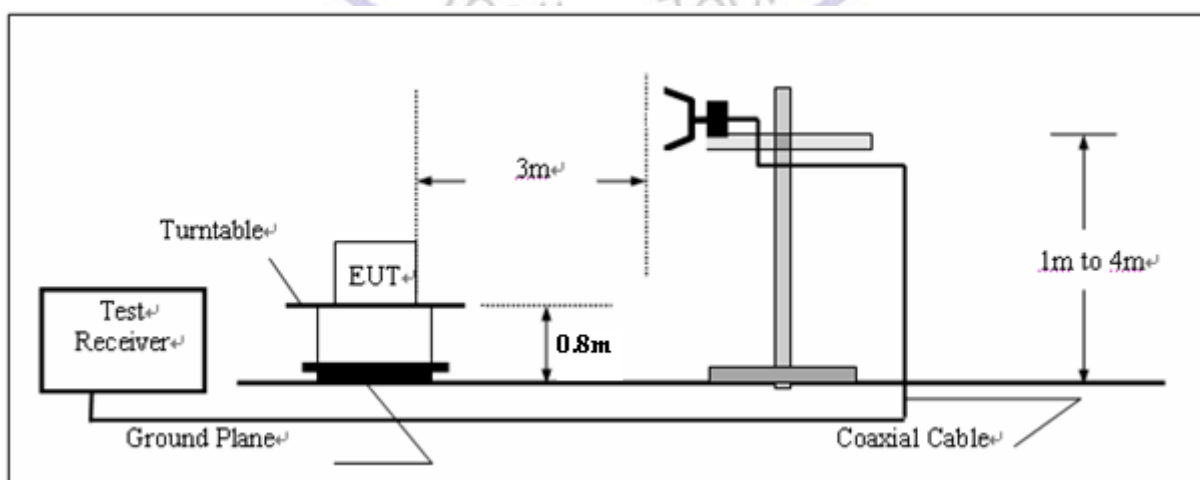
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



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



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



FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS), the EUT was setup according to ANSI C63.4: and tested according to ANSI C63.10 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f > 1$ GHz, 120 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Repeat above procedures until all frequency measurements have been completed.

Note:

When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60 degrees for H-plane and 90 degrees for E-plane.

LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT 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 desired power.

Note:

Three axes are chosen for pretest, the Y axis is the worst mode for final test.

TEST RESULTS

802.11b

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	2412.0	71.4	30.8	102.2	Fundamental	/	PK
	V	307.4	12.9	14.8	27.7	46	-18.3	QP
	V	500.0	15.6	19.7	35.3	46	-10.7	QP
	V	3200.0	42.8	-0.6	42.2	54(note3)	-11.8	PK
	V	4825.0	47.2	2.6	49.8	54(note3)	-4.2	PK
	V	7239.0	52.7	8.1	60.8	74	-13.2	PK
	V	7236.0	43.2	8.9	52.1	54	-1.9	AV
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
6	V	2437.0	71.9	31.2	103.1	Fundamental	/	PK
	V	317.1	13.0	15.2	28.2	46	-17.8	QP
	V	571.6	13.6	21.2	34.8	46	-11.2	QP
	V	3200.0	43.6	-0.6	43.0	54(note3)	-11.0	PK
	V	4876.0	49.2	2.8	52.0	54(note3)	-2.0	PK
	V	7315.5	53.2	8.8	62.0	74	-12.0	PK
	V	7311.0	43.9	8.8	52.7	54	-1.3	AV
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
11	V	2462.0	70.5	30.9	101.4	Fundamental	/	PK
	V	326.3	12.6	14.9	27.5	46	-18.5	QP
	H	582.0	12.9	21.2	34.1	46	-11.9	QP
	V	3200.0	44.1	-0.6	43.5	54(note3)	-10.5	PK
	V	4927.0	45.1	3.0	48.1	54(note3)	-5.9	PK
	V	7383.5	50.8	8.9	59.7	74	-14.3	PK
	V	7386.0	41.9	8.9	50.8	54	-3.2	AV
	H	24000.0	59.4	-8.9	50.5	54(note3)	-3.5	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

802.11g

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	2411.9	70.7	31.9	102.6	Fundamental	/	PK
	H	296.8	13.4	15.7	29.1	46	-17.9	QP
	H	567.4	13.9	21.3	35.2	46	-10.8	QP
	V	3200	50.0	-13.4	36.6	54(note3)	-17.4	PK
	V	4824.0	43.3	2.6	45.9	54(note3)	-8.1	PK
	V	7236.0	36.7	8.9	45.6	54	-8.4	AV
	V	7239.0	50.2	8.9	59.1	74	-14.9	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
6	V	2437.0	70.3	31.2	101.5	Fundamental	/	PK
	V	302.6	12.7	14.8	27.5	46	-18.5	QP
	V	599.9	13.8	21.2	35.0	46	-11.0	QP
	V	3200.0	42.5	-0.6	41.9	54(note3)	-12.1	PK
	V	4876.0	45.6	2.8	48.4	54(note3)	-5.6	PK
	V	7298.5	44.2	8.8	53.0	54(note3)	-1.0	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
11	V	2462.3	70.9	30.9	101.8	Fundamental	/	PK
	H	589.7	13.7	21.2	34.9	46	-11.1	QP
	V	286.6	12.5	14.7	27.2	46	-18.8	QP
	V	3200.0	42.7	-0.6	42.1	54(note3)	-11.9	PK
	V	4927.0	45.9	3.0	48.9	54(note3)	-5.1	PK
	V	7386.0	37.4	8.9	46.3	54	-7.7	AV
	V	7392.0	51.8	8.9	60.7	74	-13.3	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

802.11n(20MHz)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	V	2412.1	69.8	30.7	100.5	Fundamental	/	PK
	H	597.9	14.1	21.2	35.3	46	-10.7	QP
	H	311.8	12.5	15.1	27.6	46	-18.4	QP
	V	3200.0	42.4	-0.6	41.8	54(note3)	-12.2	PK
	V	4824.0	42.3	2.6	44.9	54(note3)	-9.1	PK
	V	7236.0	33.6	8.9	42.5	54	-11.5	AV
	V	7239.0	46.2	8.9	55.1	74	-18.9	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
6	V	2437.0	69.7	31.2	100.9	Fundamental	/	PK
	H	561.6	13.8	21.2	35.0	46	-11.0	QP
	H	343.3	13.2	16.0	29.2	46	-16.8	QP
	V	3200.0	42.5	-0.6	41.9	54(note3)	-12.1	PK
	V	4876.0	45.5	2.8	48.3	54(note3)	-5.7	PK
	V	7307.0	54.6	8.8	63.4	74	-10.6	PK
	V	7310.6	41.0	8.8	49.8	54	-4.2	AV
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
11	V	2462.0	71.6	30.9	102.5	Fundamental	/	PK
	H	300.1	13.7	14.7	28.4	46	-17.6	QP
	H	553.8	13.5	21.2	34.7	46	-11.3	QP
	V	3200.0	43.2	-0.6	42.6	54(note3)	-11.4	PK
	V	4924.0	42.7	3.0	45.7	54(note3)	-8.3	PK
	V	7375.0	50.1	9.0	59.0	74	-15.0	PK
	V	7378.3	34.6	9.0	43.6	54	-10.4	AV
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

802.11n(40MHz)

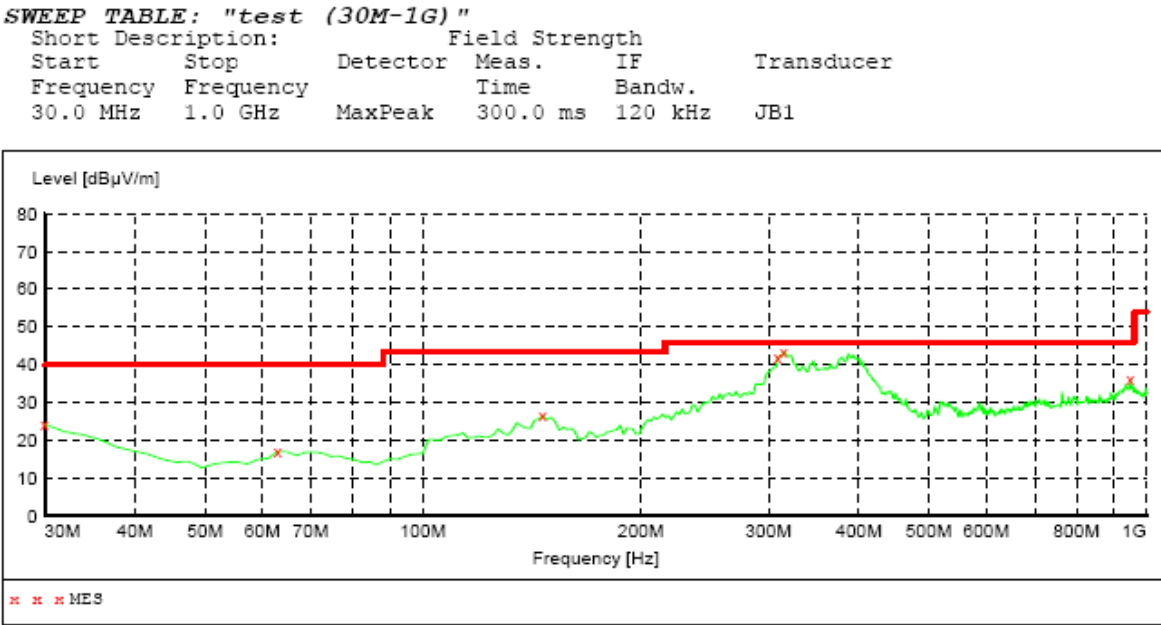
CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
3	V	2423.6	69.1	31.8	100.9	Fundamental	/	PK
	H	341.9	14.7	16.0	30.7	46	-15.3	QP
	H	564.0	14.5	21.2	35.7	46	-10.3	QP
	V	3200.0	42.5	-0.6	41.9	54(note3)	-12.1	PK
	V	4844.0	44.2	2.6	46.8	54(note3)	-7.2	PK
	V	7290.0	44.0	8.5	52.5	54(note3)	-1.5	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
6	V	2437.0	67.6	31.2	98.8	Fundamental	/	PK
	H	291.9	12.9	14.8	27.7	46	-18.3	QP
	H	553.3	13.6	21.2	34.8	46	-11.2	QP
	V	3200.0	42.1	-0.6	41.5	54(note3)	-12.5	PK
	V	4874.0	41.6	2.8	44.4	54(note3)	-9.6	PK
	V	7349.2	32.0	9.0	40.9	54	-13.1	AV
	V	7358.0	46.6	9.0	55.6	74	-18.4	PK
	H	24000.0	59.1	-8.9	50.2	54(note3)	-3.8	PK
9	V	2453.6	68.7	30.9	99.6	Fundamental	/	PK
	H	586.3	14.7	21.2	35.9	46	-10.1	QP
	H	294.3	13.4	14.8	28.2	46	-17.8	QP
	V	3200.0	42.6	-0.6	42.0	54(note3)	-12.0	PK
	V	4904.0	41.9	2.9	44.8	54(note3)	-9.2	PK
	V	7349.4	32.2	9.0	41.2	54	-12.8	AV
	V	7349.5	45.6	9.0	54.5	74	-19.5	PK
	H	24000.0	59.8	-8.9	50.9	54(note3)	-3.1	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test results which are attenuated more than 20 dB below the permissible value limit (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

The worst case of Receiver Radiated Emission below 1GHz:



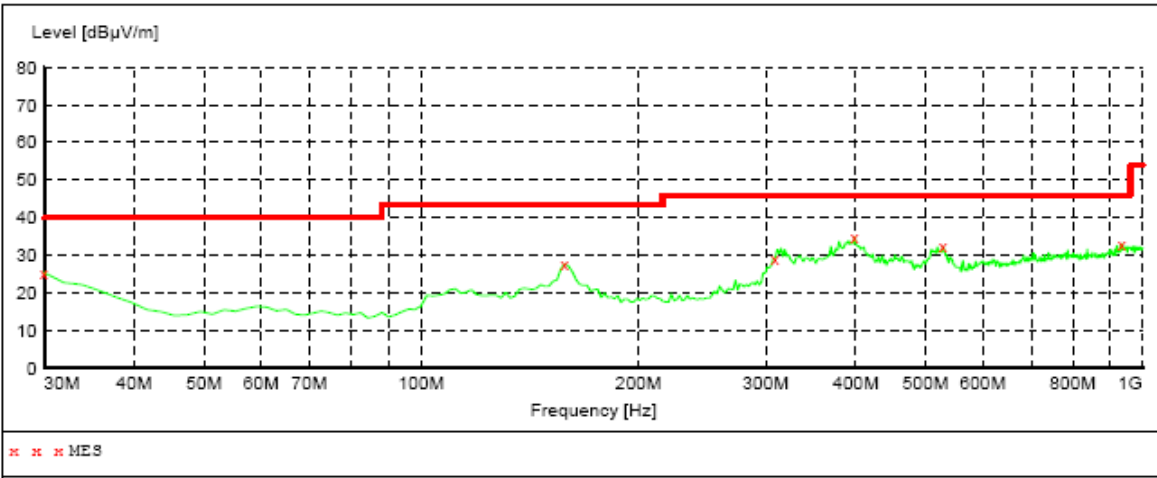
MEASUREMENT RESULT:

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.20	21.1	40.0	15.8	---	0.0	0.00	HORIZONTAL
62.980000	17.10	8.4	40.0	22.9	---	0.0	0.00	HORIZONTAL
146.400000	26.50	14.3	43.5	17.0	---	0.0	0.00	HORIZONTAL
309.360000	42.00	15.7	46.0	4.0	---	0.0	0.00	HORIZONTAL
315.180000	43.50	15.8	46.0	2.5	---	0.0	0.00	HORIZONTAL
949.560000	36.30	26.6	46.0	9.7	---	0.0	0.00	HORIZONTAL



SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



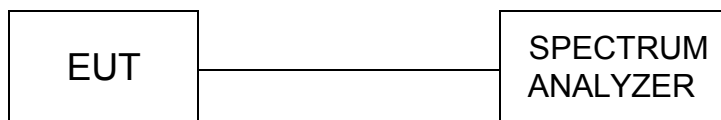
MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	25.40	21.1	40.0	14.6	---	0.0	0.00	VERTICAL
158.040000	27.70	14.0	43.5	15.8	---	0.0	0.00	VERTICAL
309.360000	29.30	15.7	46.0	16.7	---	0.0	0.00	VERTICAL
398.600000	34.80	18.0	46.0	11.2	---	0.0	0.00	VERTICAL
528.580000	32.30	20.5	46.0	13.7	---	0.0	0.00	VERTICAL
935.980000	33.10	26.5	46.0	12.9	---	0.0	0.00	VERTICAL



4.3. 6dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

LIMIT

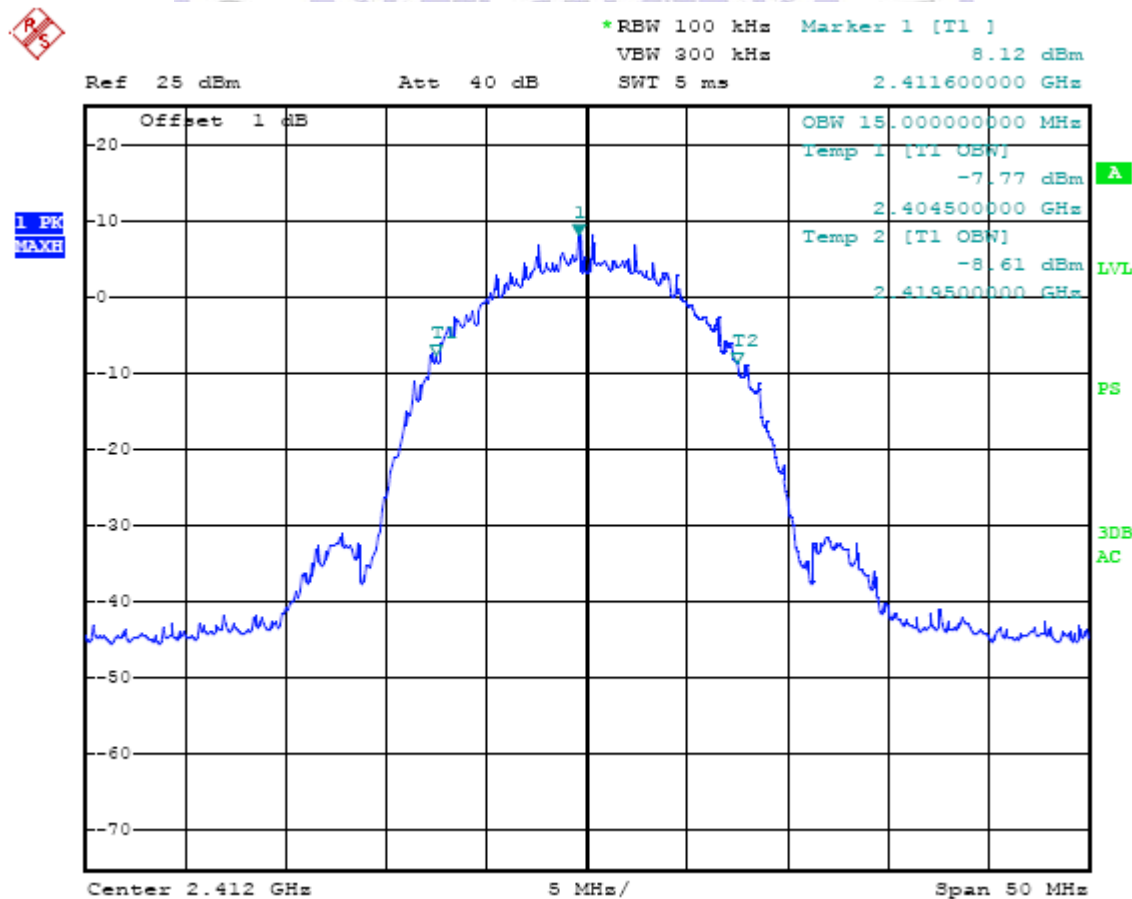
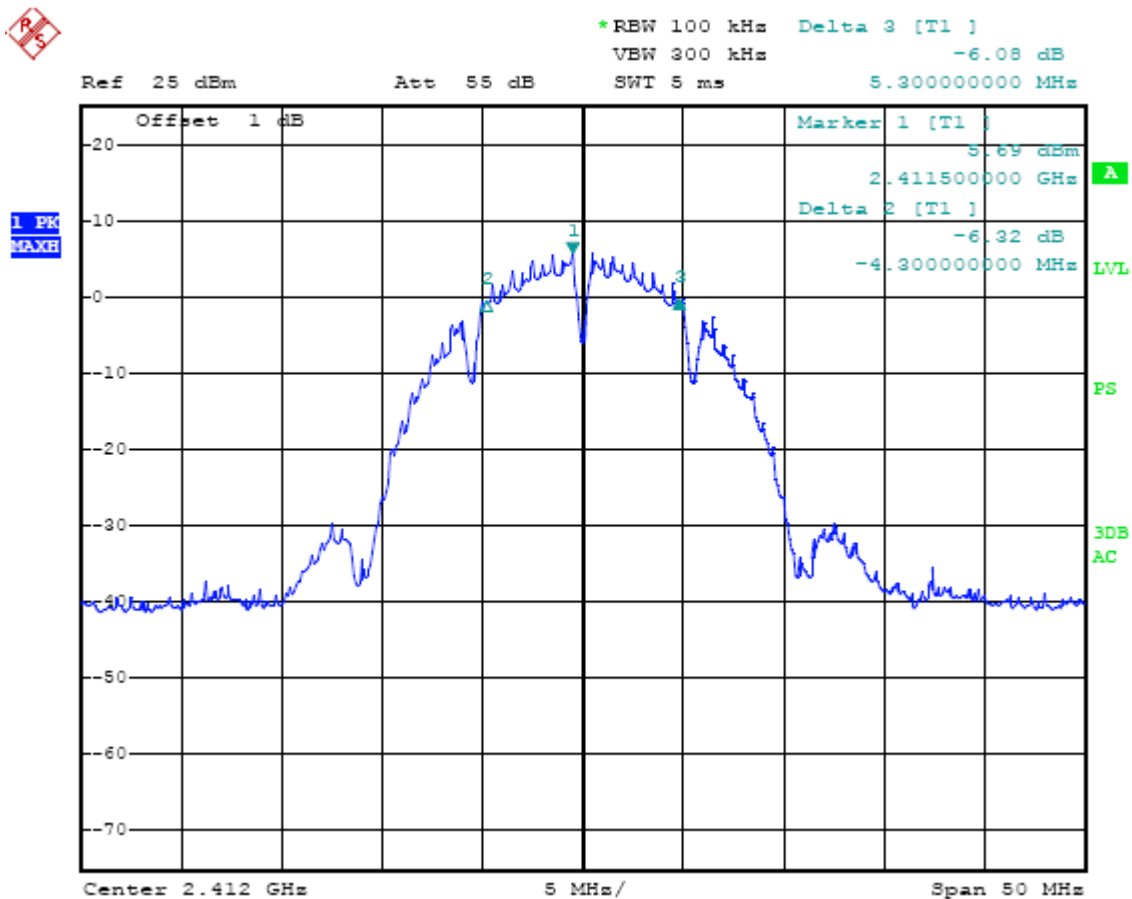
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

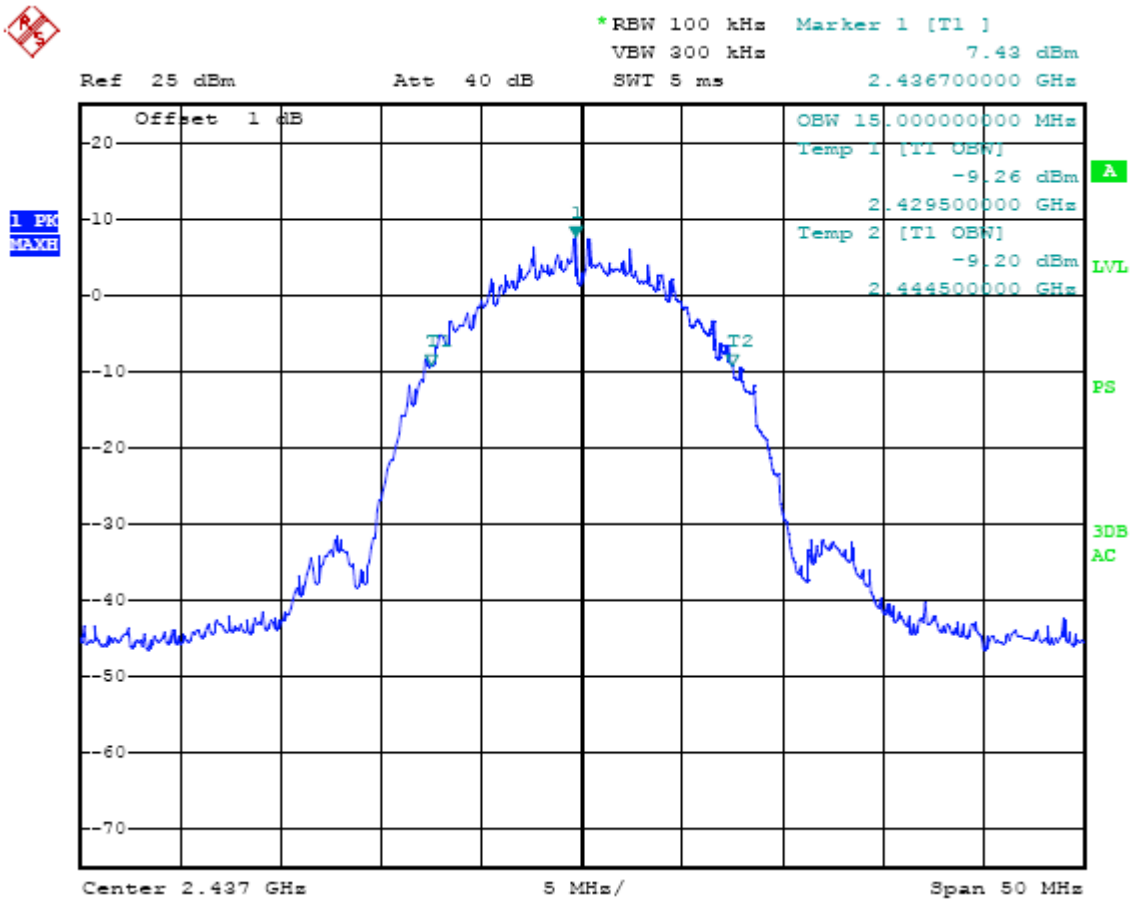
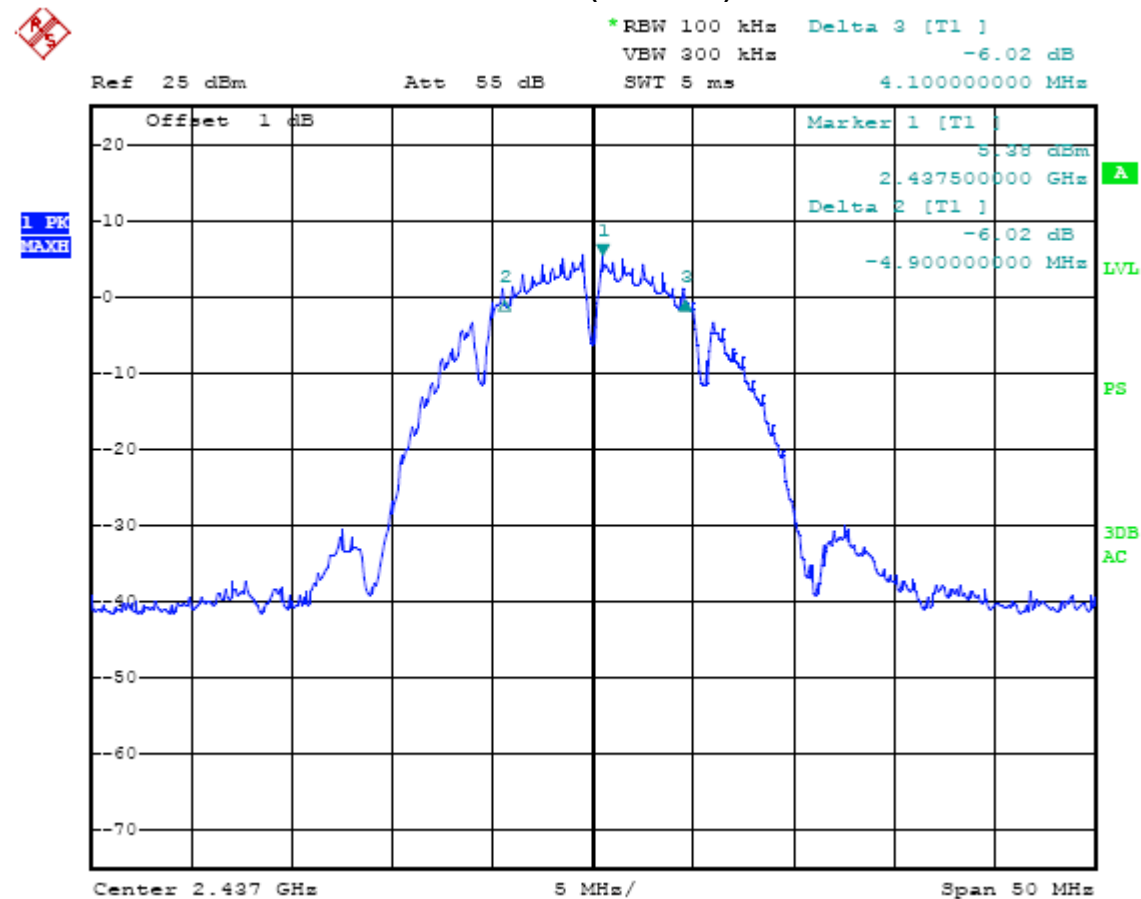
Product	:	RedPort Satellite Optimizer
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Occupied Bandwidth 6dB/99% (kHz)	Limit (kHz)	Result
01	2412	9600/15000	500	Pass
06	2437	9000/15000	500	Pass
11	2462	8800/15000	500	Pass

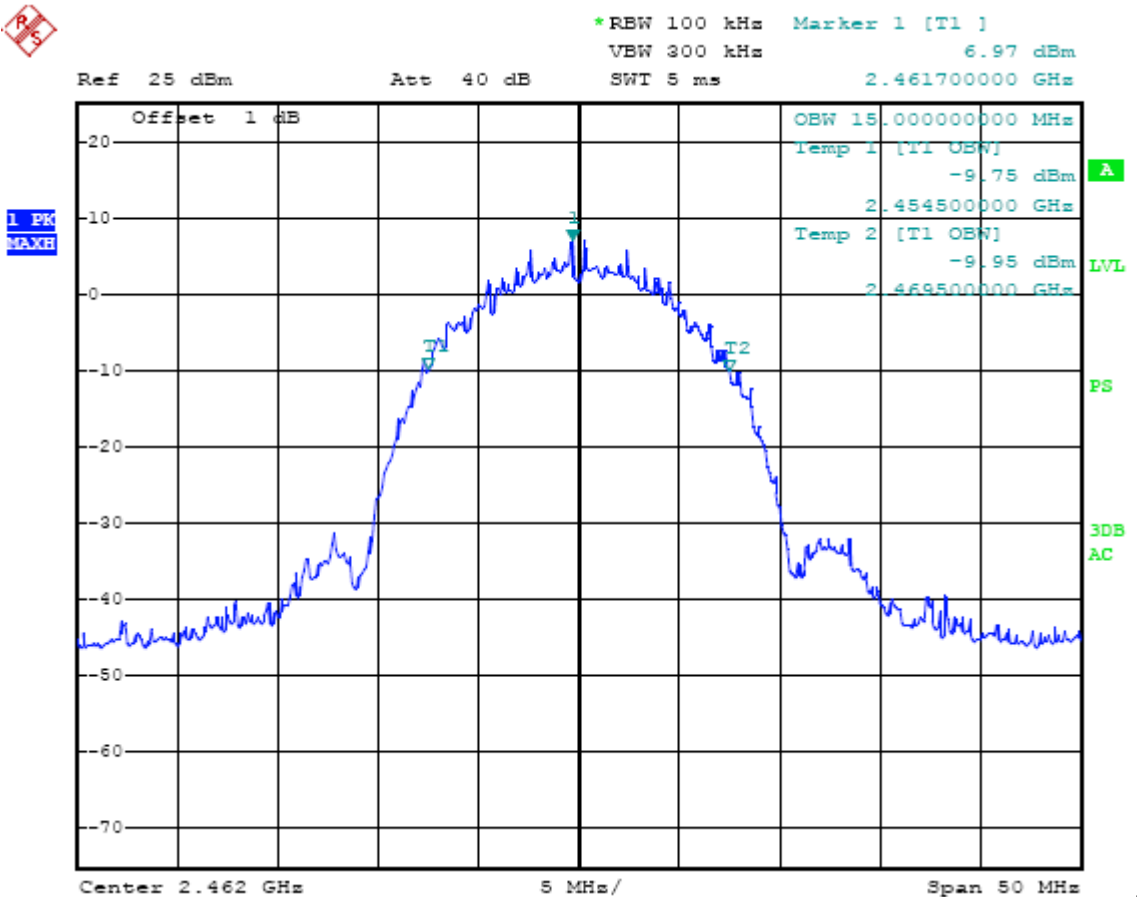
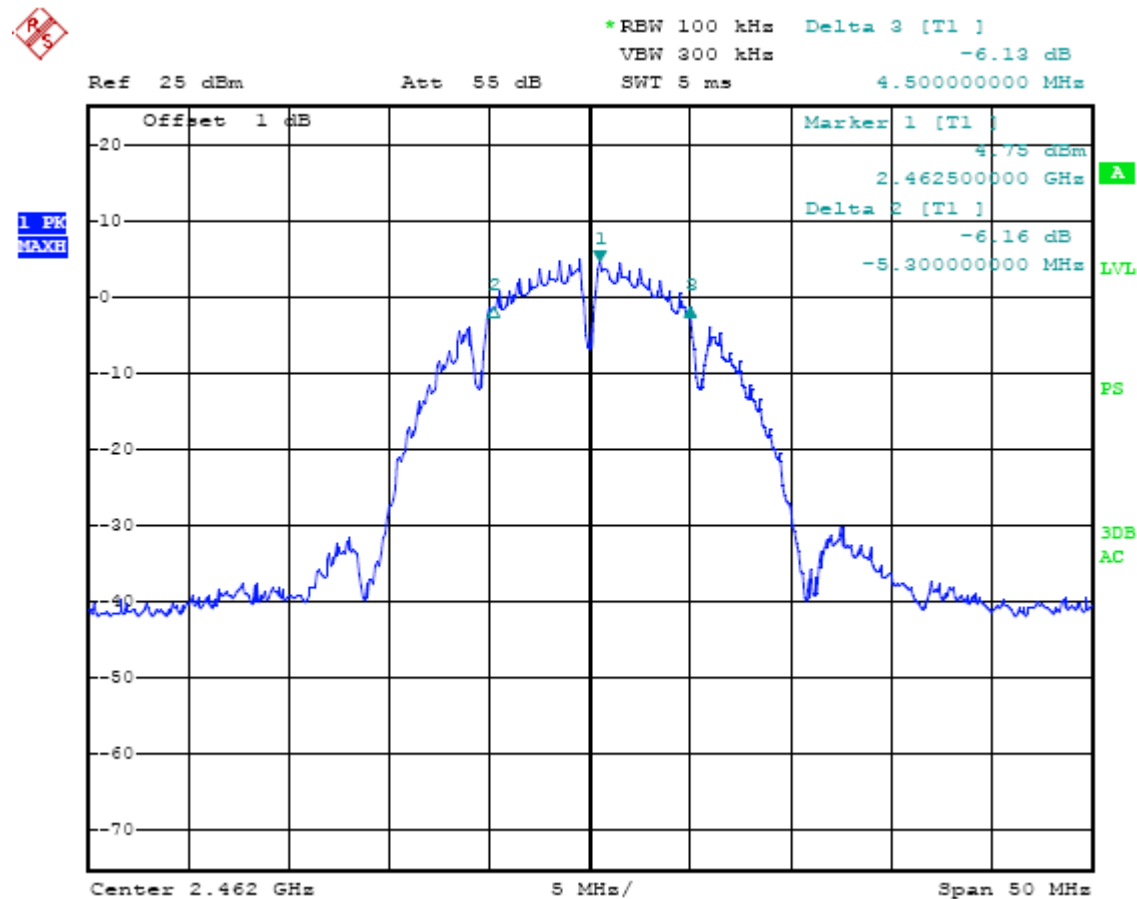
Channel 01 (2412MHz)



Channel 06 (2437MHz)



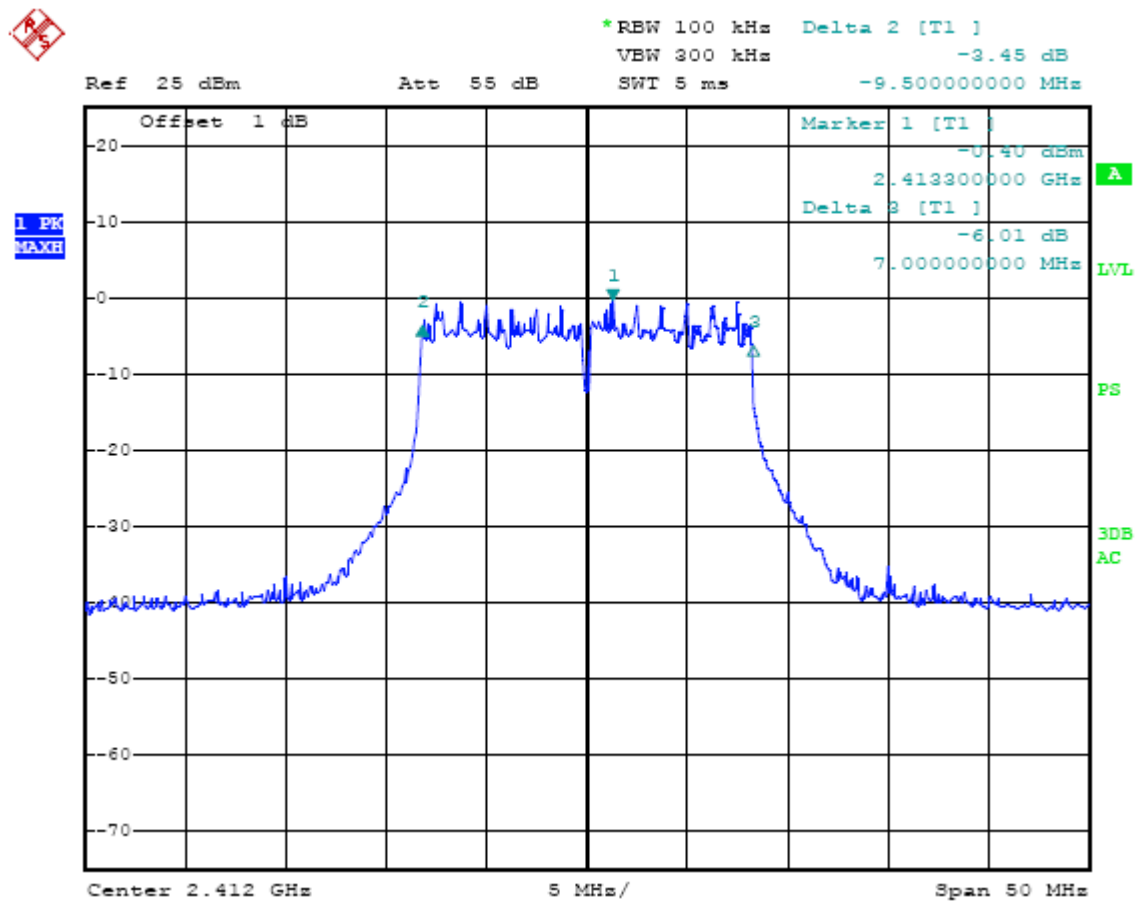
Channel 11 (2462MHz)

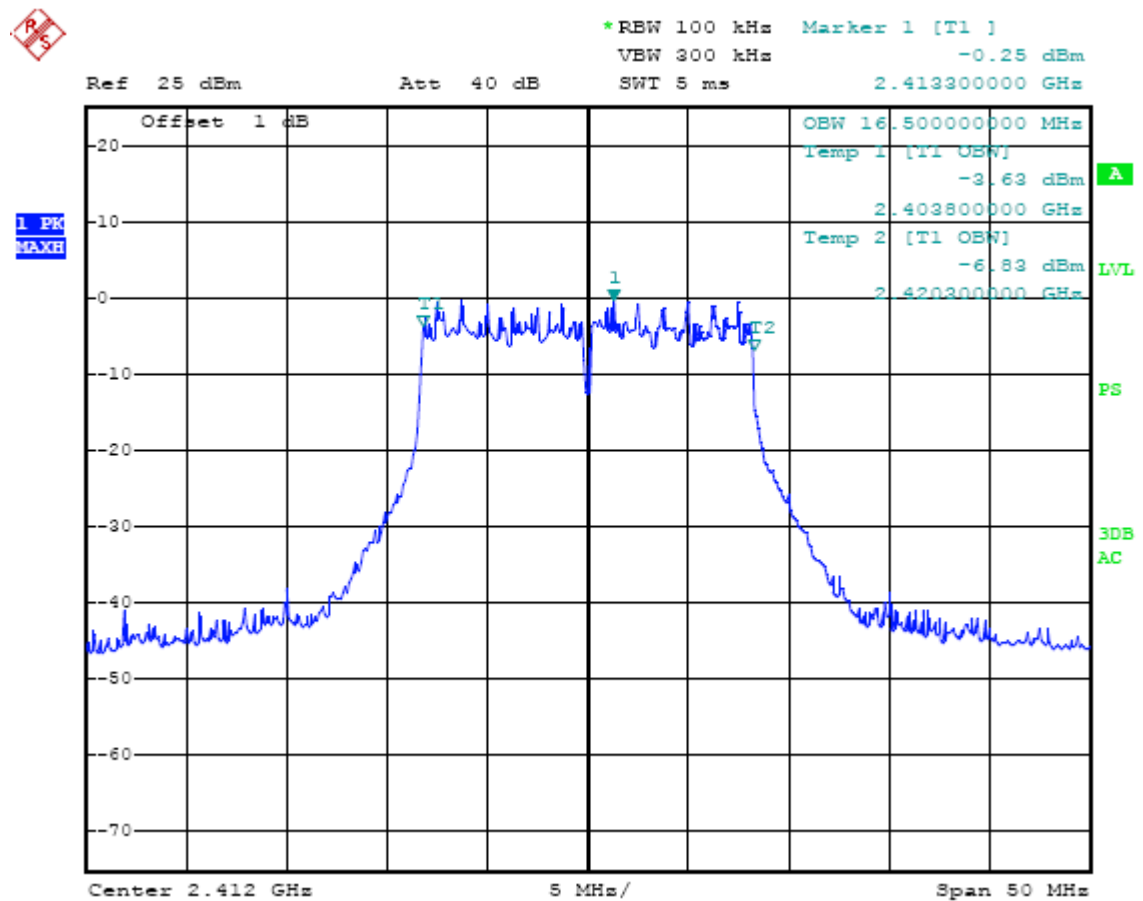


Product	:	RedPort Satellite Optimizer
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Occupied Bandwidth 6dB/99% (kHz)	Limit (kHz)	Result
01	2412	16500/16500	500	Pass
06	2437	16600/16500	500	Pass
11	2462	16600/16500	500	Pass

Channel 01 (2412MHz)





Channel 06 (2437MHz)



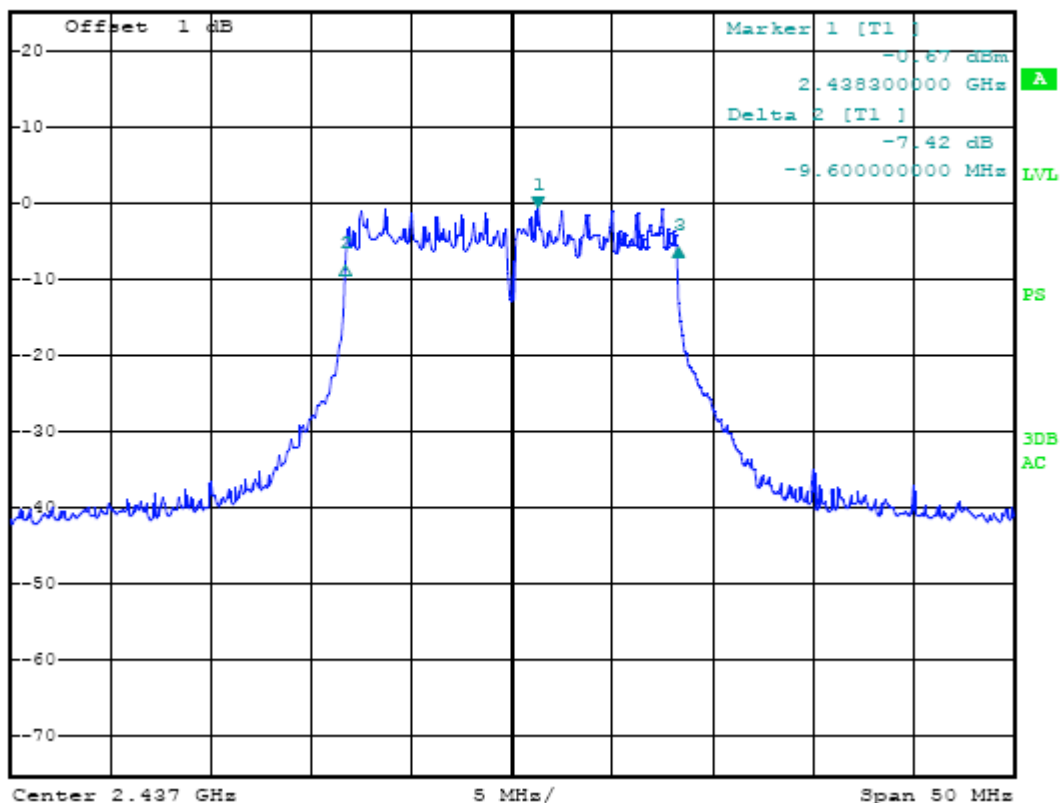
*RBW 100 kHz Delta 3 [T1]
VBW 300 kHz -5.19 dB
SWT 5 ms 7.000000000 MHz

Ref 25 dBm

Att 55 dB

SWT 5 ms

7.000000000 MHz

1 PK
MAXH

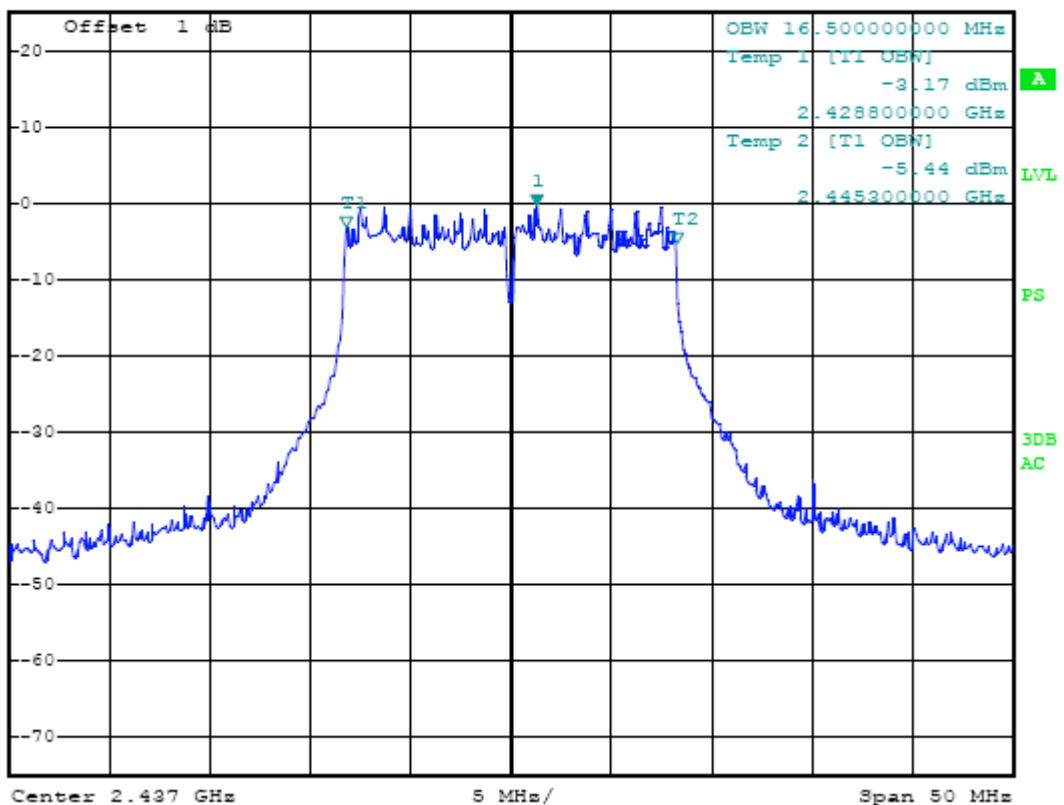
*RBW 100 kHz Marker 1 [T1]
VBW 300 kHz -0.36 dBm
SWT 5 ms 2.438300000 GHz

Ref 25 dBm

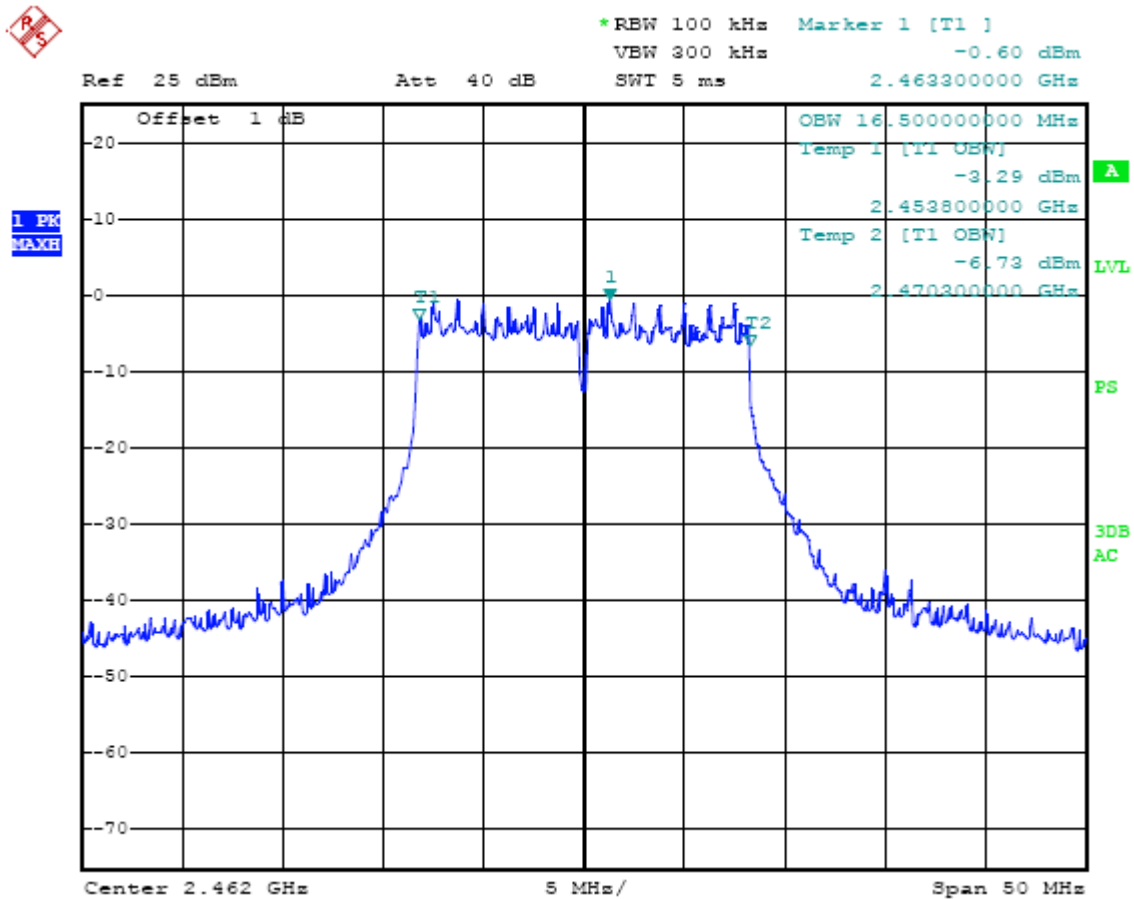
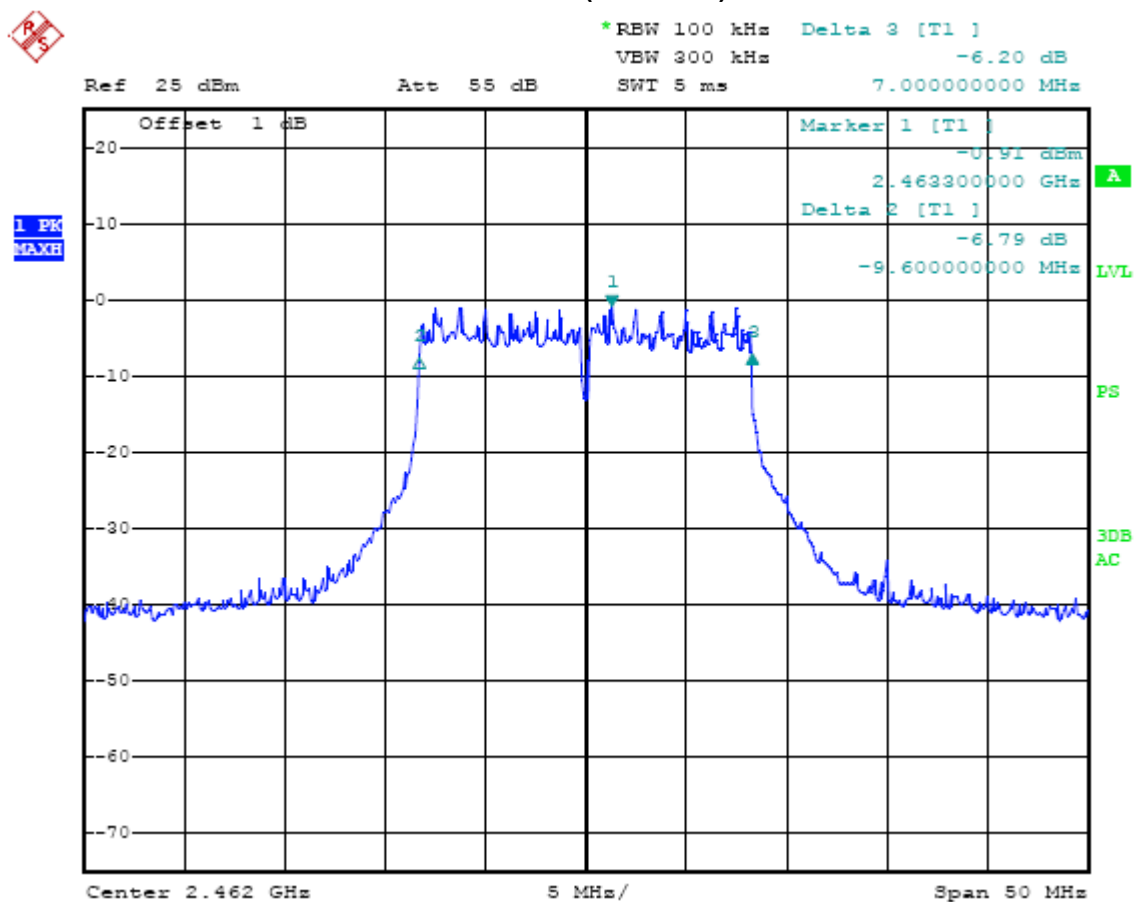
Att 40 dB

SWT 5 ms

2.438300000 GHz

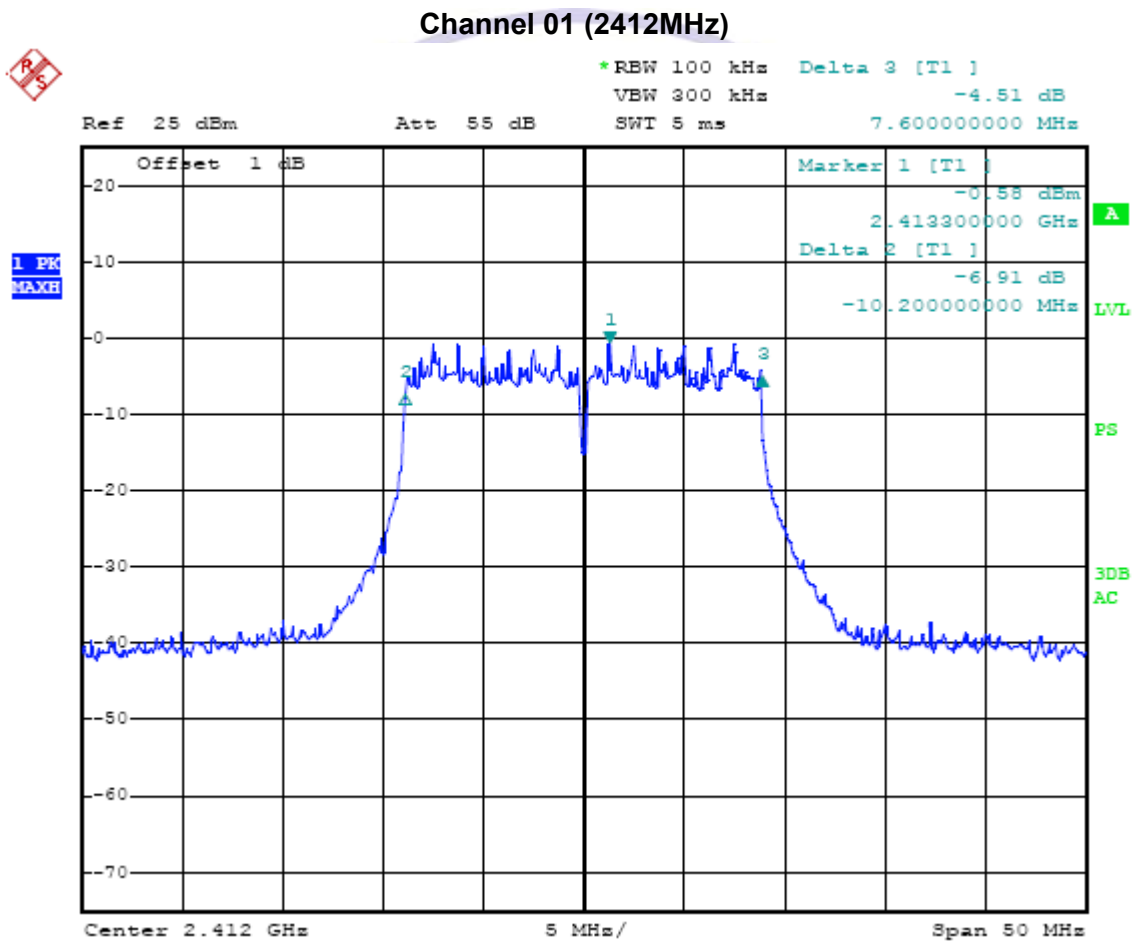
1 PK
MAXH

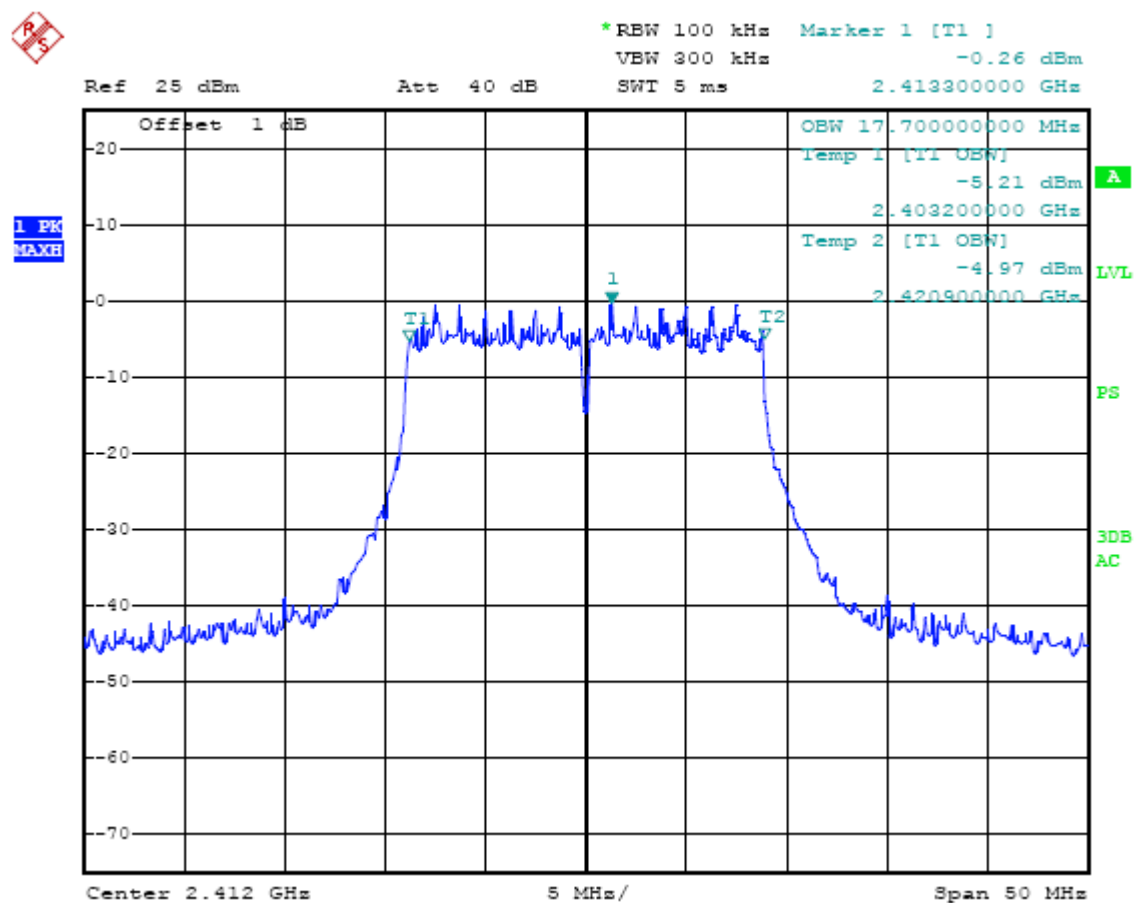
Channel 11 (2462MHz)



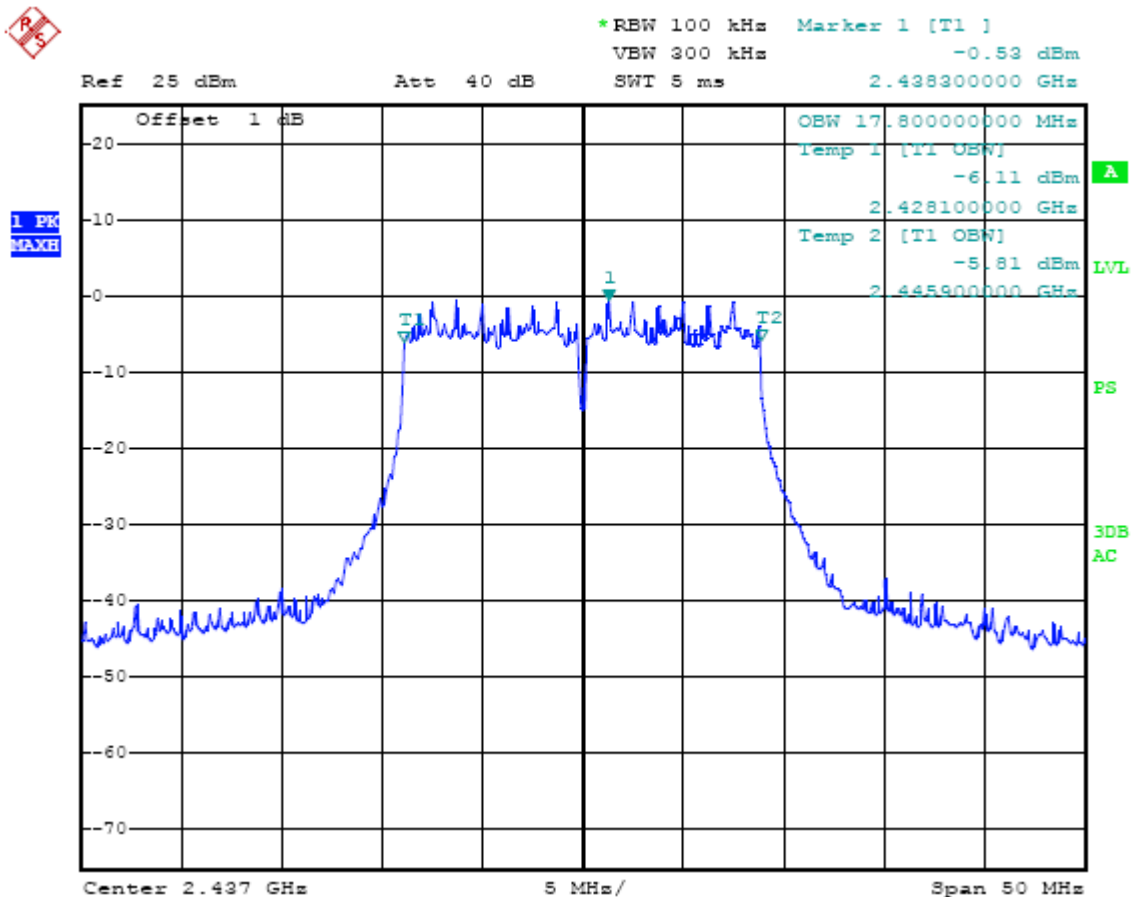
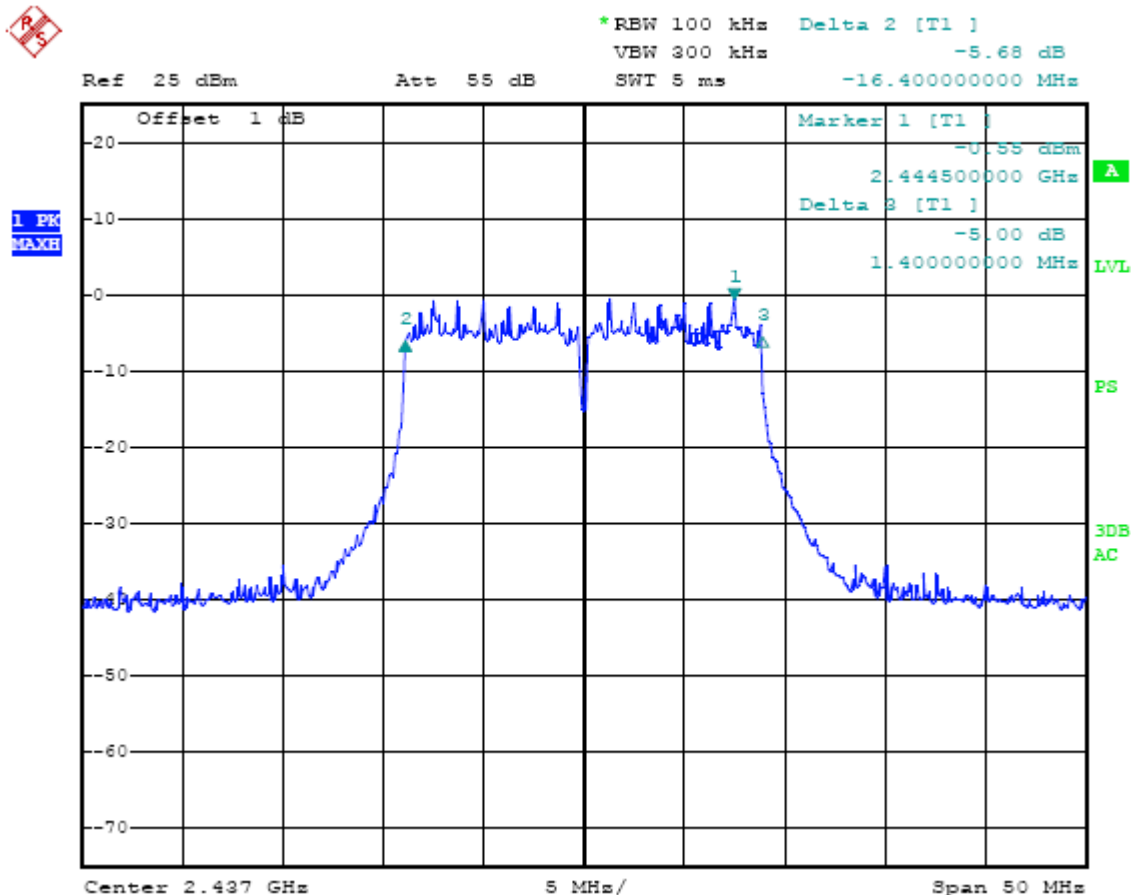
Product	:	RedPort Satellite Optimizer
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth 6dB/99% (kHz)	Limit (kHz)	Result
01	2412	17800/17700	500	Pass
06	2437	17800/17800	500	Pass
11	2462	17800/17800	500	Pass

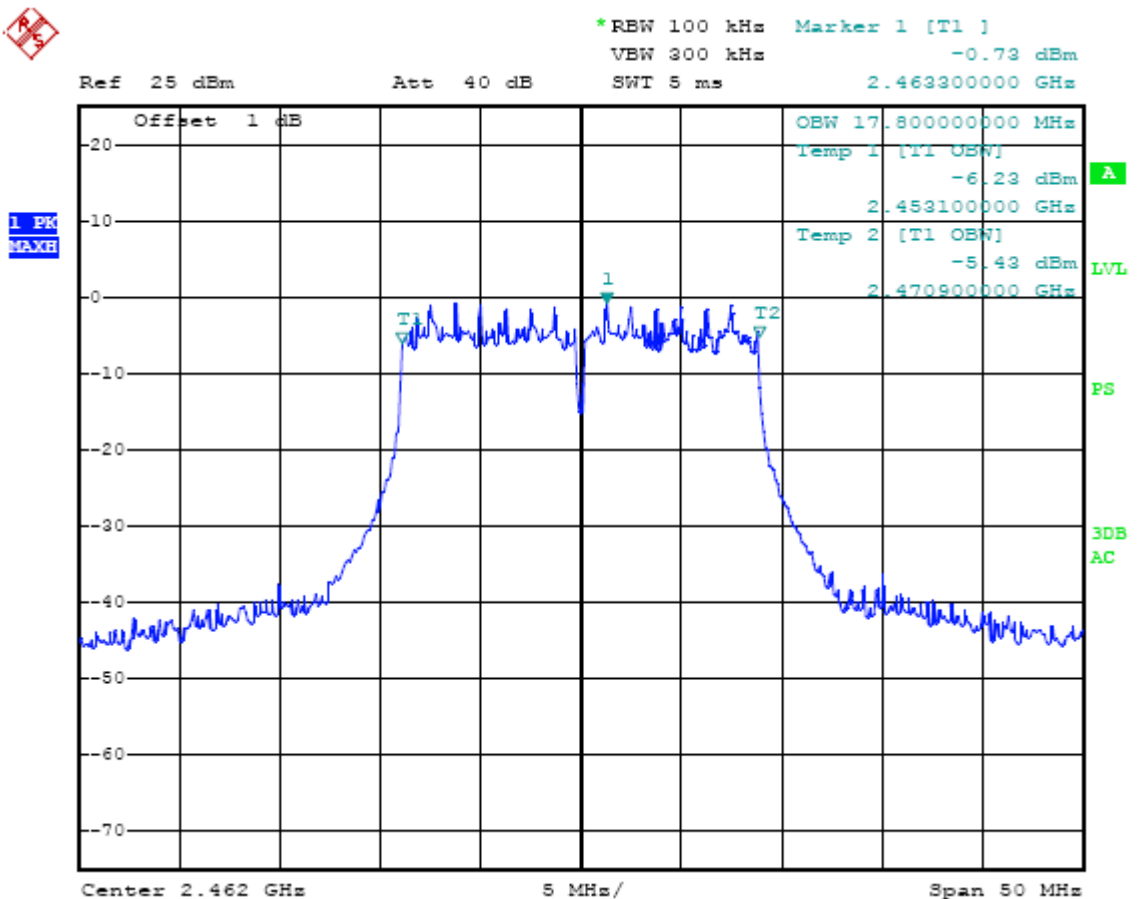
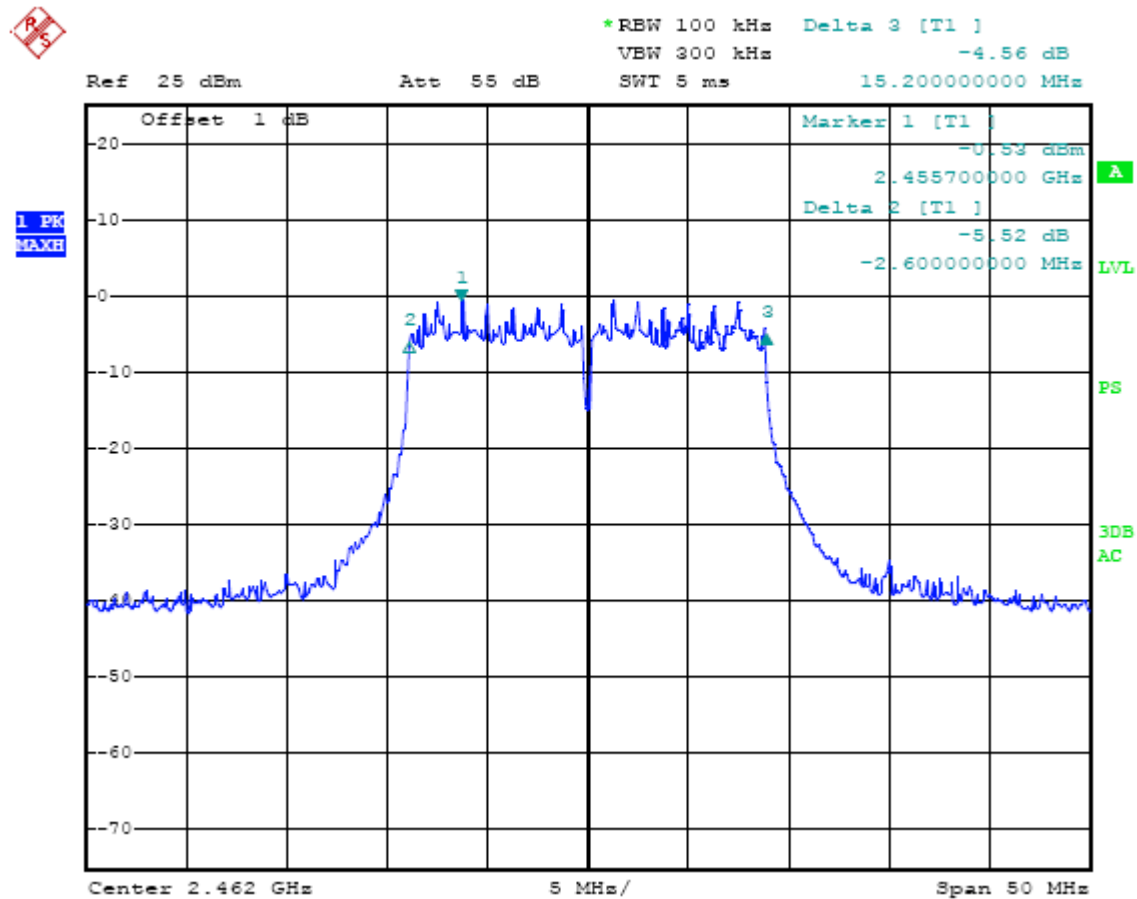




Channel 06 (2437MHz)



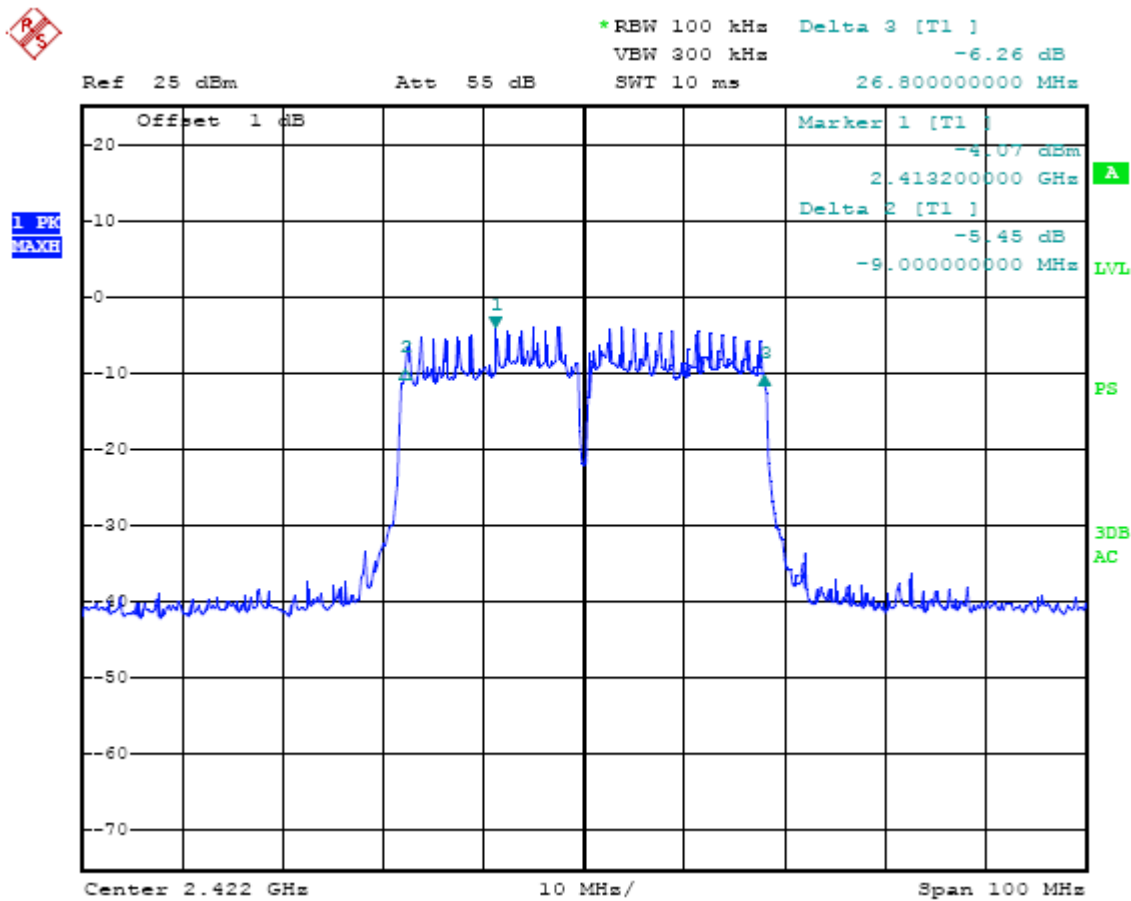
Channel 11 (2462MHz)

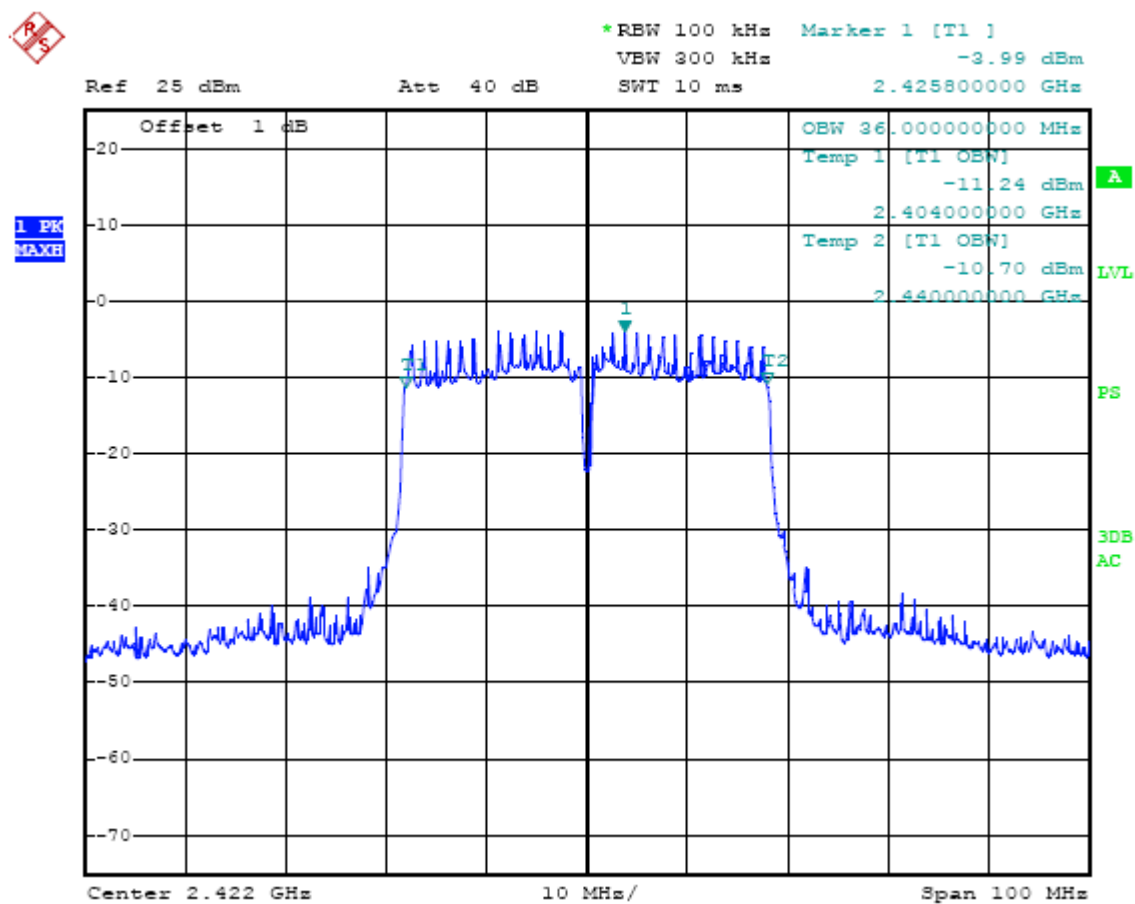


Product	:	RedPort Satellite Optimizer
Test Item	:	6dB Occupied Bandwidth
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth 6dB/99% (kHz)	Limit (kHz)	Result
03	2422	35800/36000	500	Pass
06	2437	36000/36000	500	Pass
09	2452	35800/36000	500	Pass

Channel 03 (2422MHz)





Channel 06 (2437MHz)



*RBW 100 kHz Delta 3 [T1]
VBW 300 kHz -7.43 dB
SWT 10 ms 14.400000000 MHz

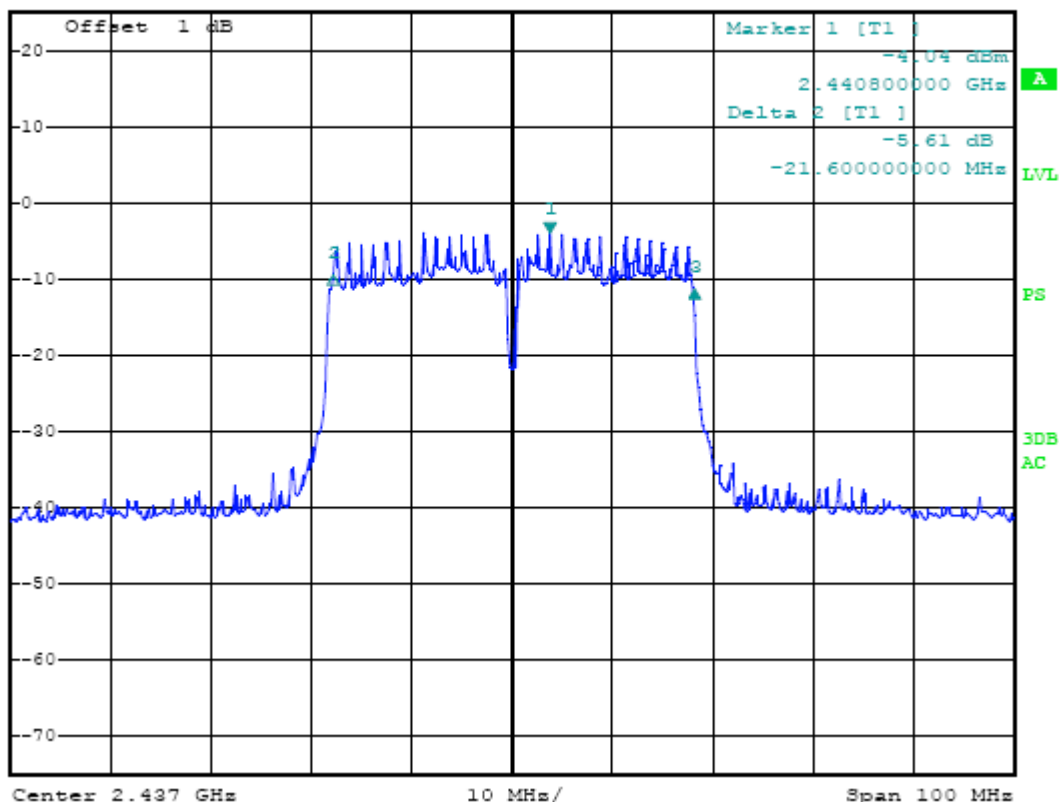
Ref 25 dBm

Att 55 dB

SWT 10 ms

14.400000000 MHz

1 PK
MAXH



*RBW 100 kHz Marker 1 [T1]
VBW 300 kHz -3.94 dBm
SWT 10 ms 2.428200000 GHz

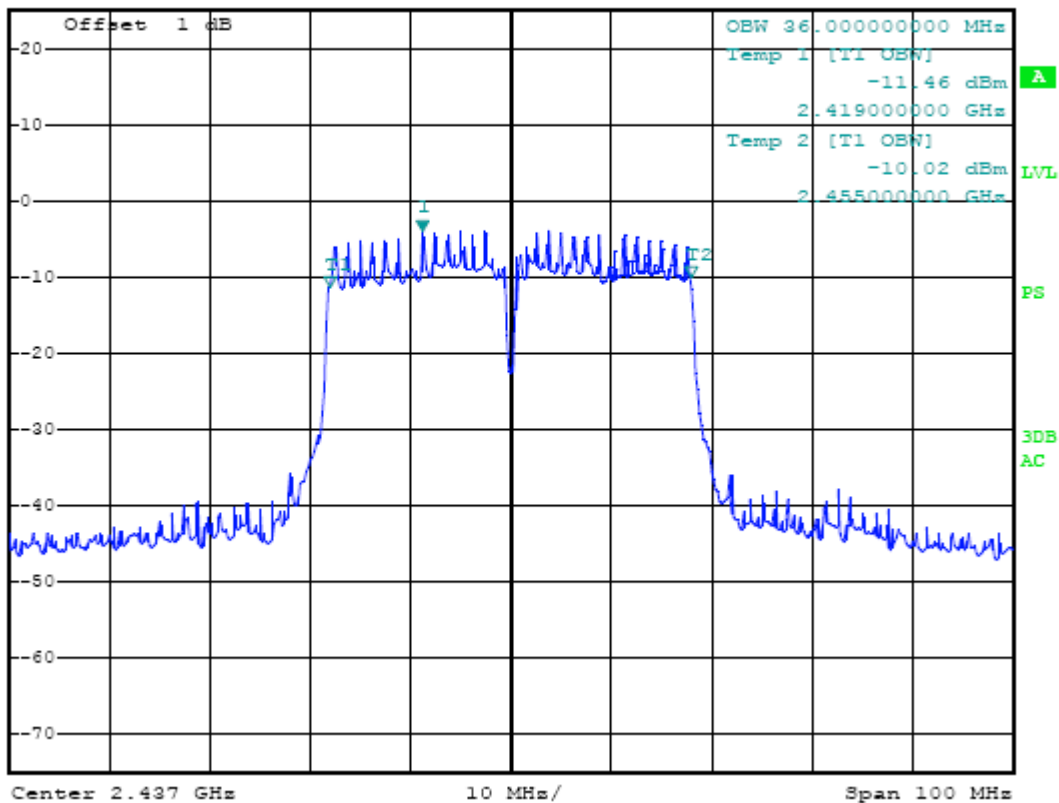
Ref 25 dBm

Att 40 dB

SWT 10 ms

2.428200000 GHz

1 PK
MAXH



Channel 09 (2452MHz)



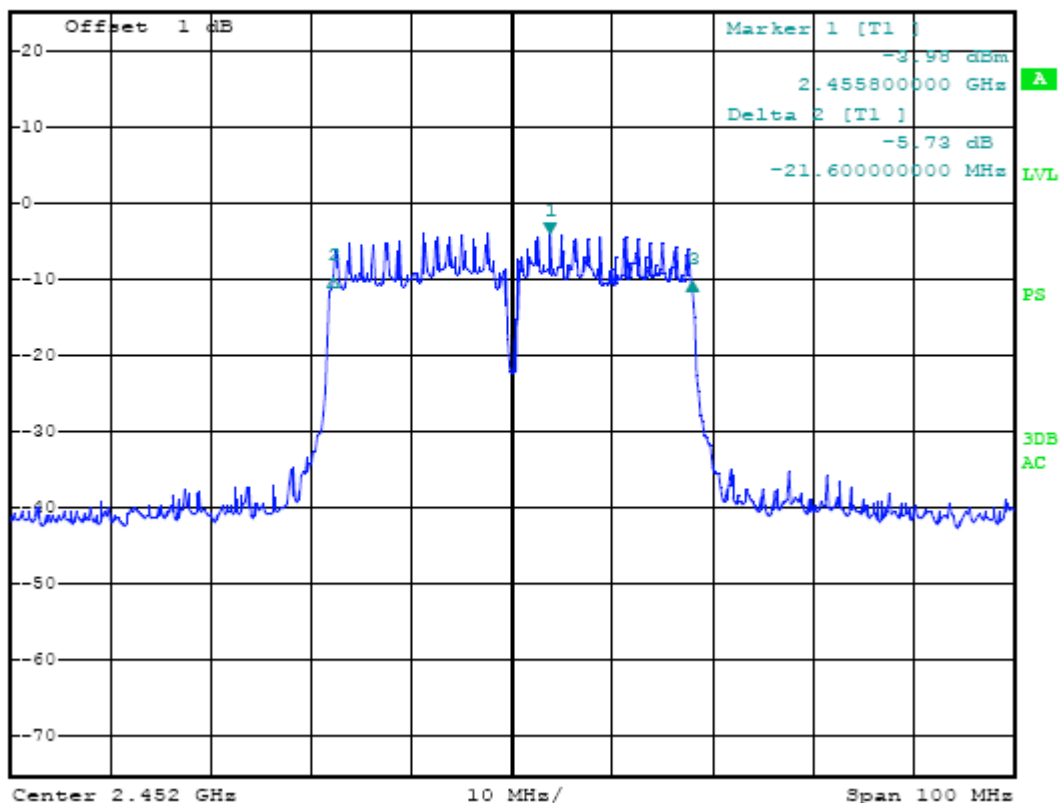
*RBW 100 kHz Delta 3 [T1]
VBW 300 kHz -6.32 dB
SWT 10 ms 14.200000000 MHz

Ref 25 dBm

Att 55 dB

SWT 10 ms

14.200000000 MHz

1 PK
MAXH

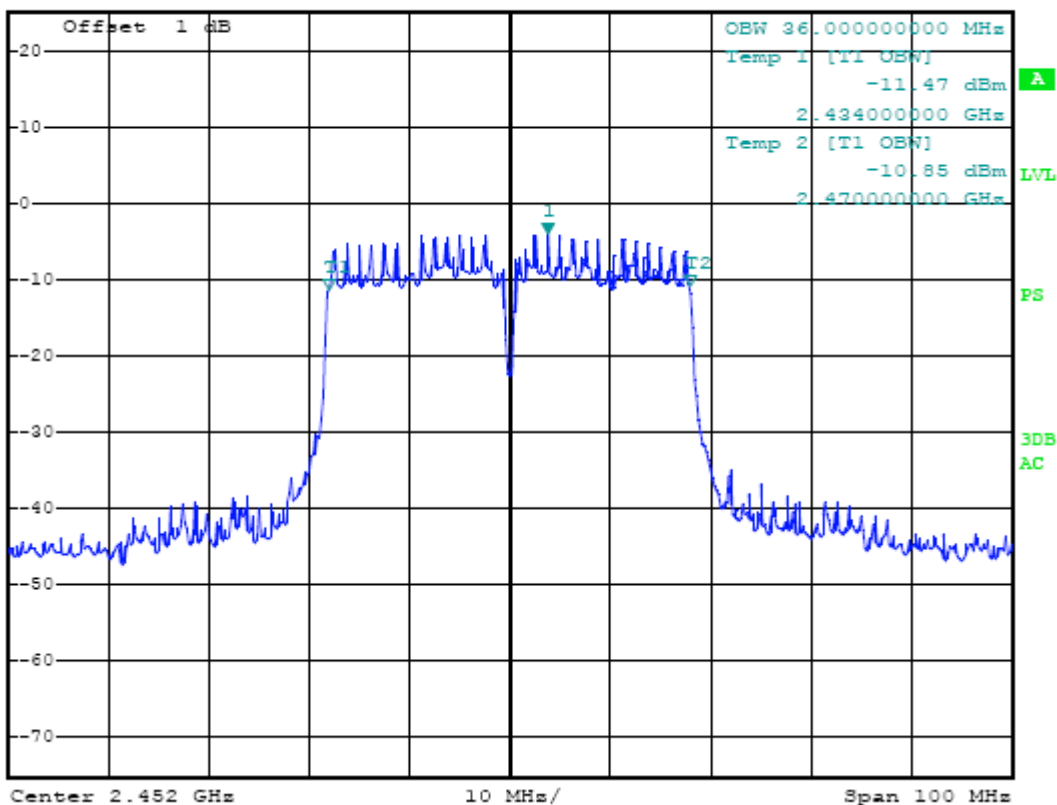
*RBW 100 kHz Marker 1 [T1]
VBW 300 kHz -4.08 dBm
SWT 10 ms 2.455800000 GHz

Ref 25 dBm

Att 40 dB

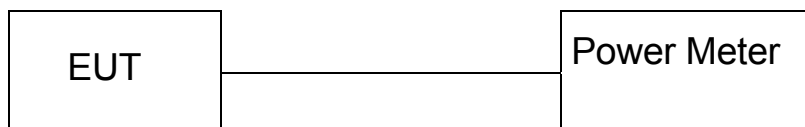
SWT 10 ms

2.455800000 GHz

1 PK
MAXH

4.4. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to C63.10 -2009 and KDB558074, The EUT was directly connected to the power meter / spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Use the wideband power meter to test peak power and record the result.

LIMIT

The Peak Output Power Measurement limits are 30dBm.

TEST RESULTS

Product	:	RedPort Satellite Optimizer
Test Item	:	Power Output
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	9.91	30.00	Pass
6	2437	9.87	30.00	Pass
11	2462	9.89	30.00	Pass

Product	:	RedPort Satellite Optimizer
Test Item	:	Power Output
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	9.75	30.00	Pass
6	2437	9.79	30.00	Pass
11	2462	9.80	30.00	Pass

Product	:	RedPort Satellite Optimizer
Test Item	:	Power Output
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

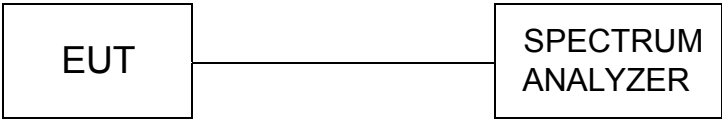
Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
1	2412	9.77	30.00	Pass
6	2437	9.73	30.00	Pass
11	2462	9.69	30.00	Pass

Product	:	RedPort Satellite Optimizer
Test Item	:	Power Output
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
3	2422	9.56	30.00	Pass
6	2437	9.59	30.00	Pass
9	2452	9.64	30.00	Pass

4.5. Band Edge Measurement

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS) with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100 kHz, to measure the conducted peak band edge.

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

- Span: Set Span for minimum 50 MHz - Reference Level: 110 dB μ V (corrected for gains and losses of test antenna factor, preamp gain and cable loss) - Attenuation: 10 dB
- Sweep Time: Coupled - Resolution Bandwidth: Up to and including 1 GHz = \geq 100 kHz
- Resolution Bandwidth: Above 1 GHz = 1 MHz - Video Bandwidth: Below 1 GHz = 300 kHz
- Video Bandwidth: Up to and including 1 GHz = \geq 3 MHz for peak and 10 Hz for average
- Detector: Peak

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

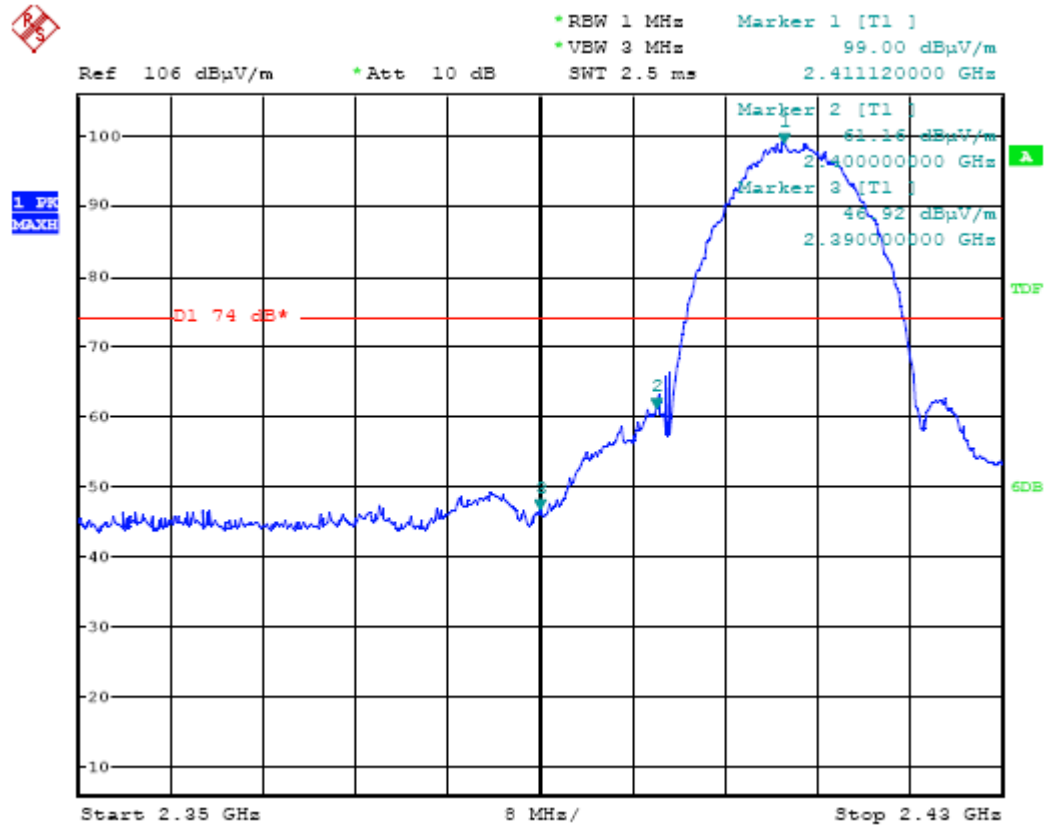
LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209(see Section 15.205(c)).

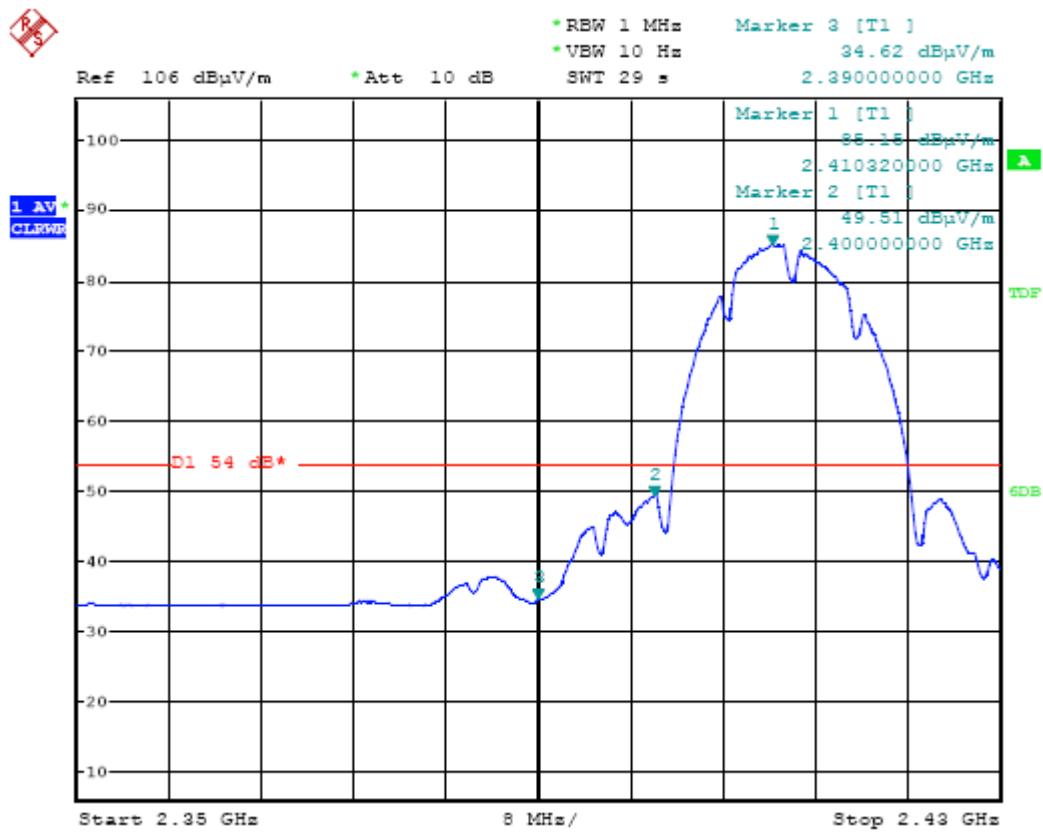
Frequency (MHz)	Limit Average (dBuv/m)	Limit Peak (dBuv/m)
Below 2390 or Above 2483.5	54	74

TEST RESULTS

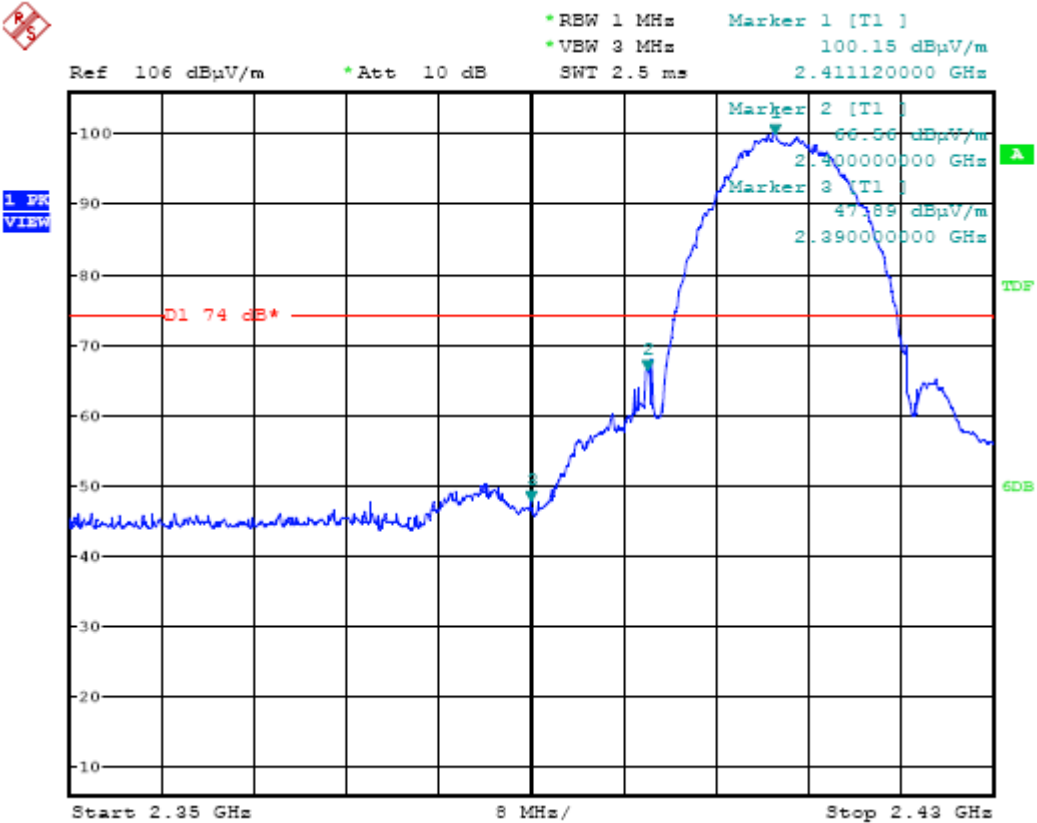
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC Part15.209 RE(3m)	Margin: 0
Probe: BBHA 9120D 499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2412MHz by 802.11b	



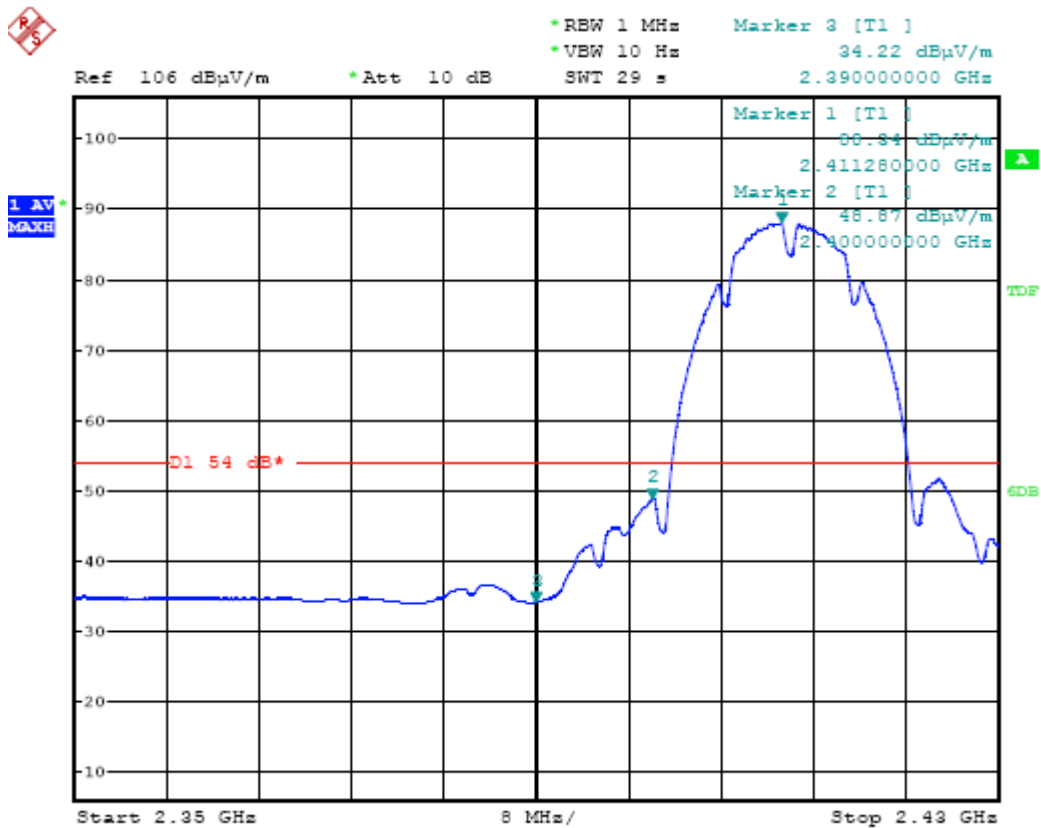
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2412MHz by 802.11b	



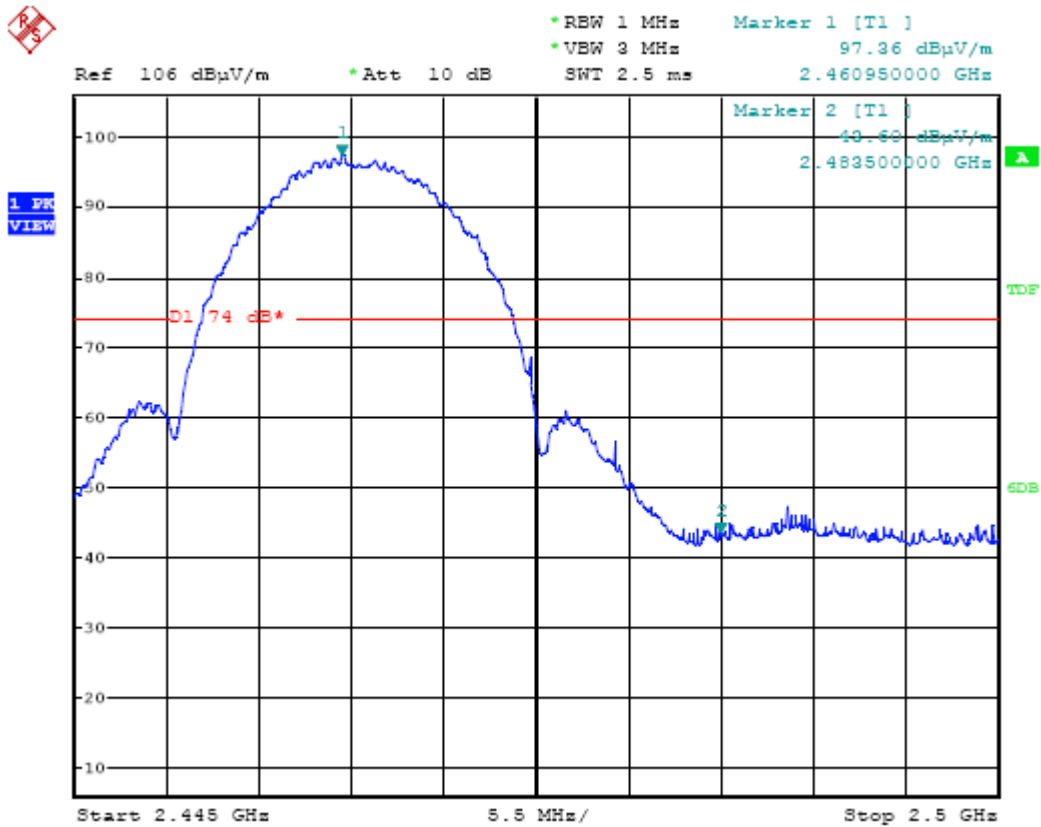
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2412MHz by 802.11b	



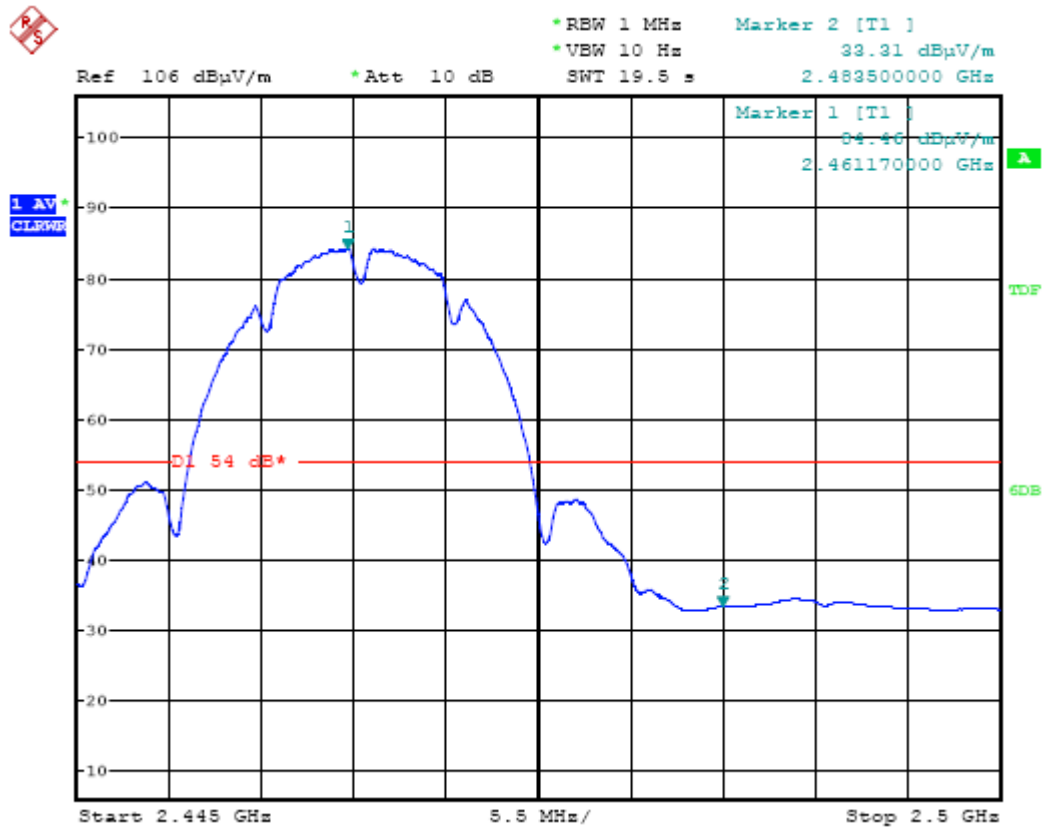
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2412MHz by 802.11b	



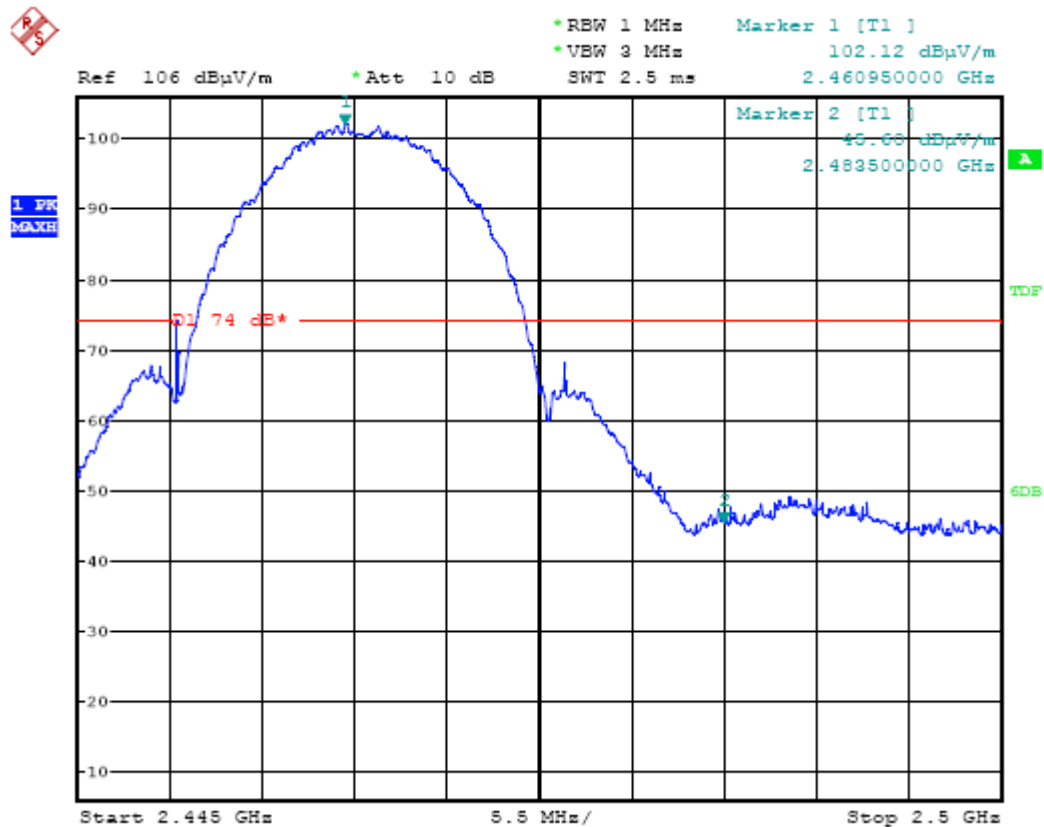
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2462MHz by 802.11b	



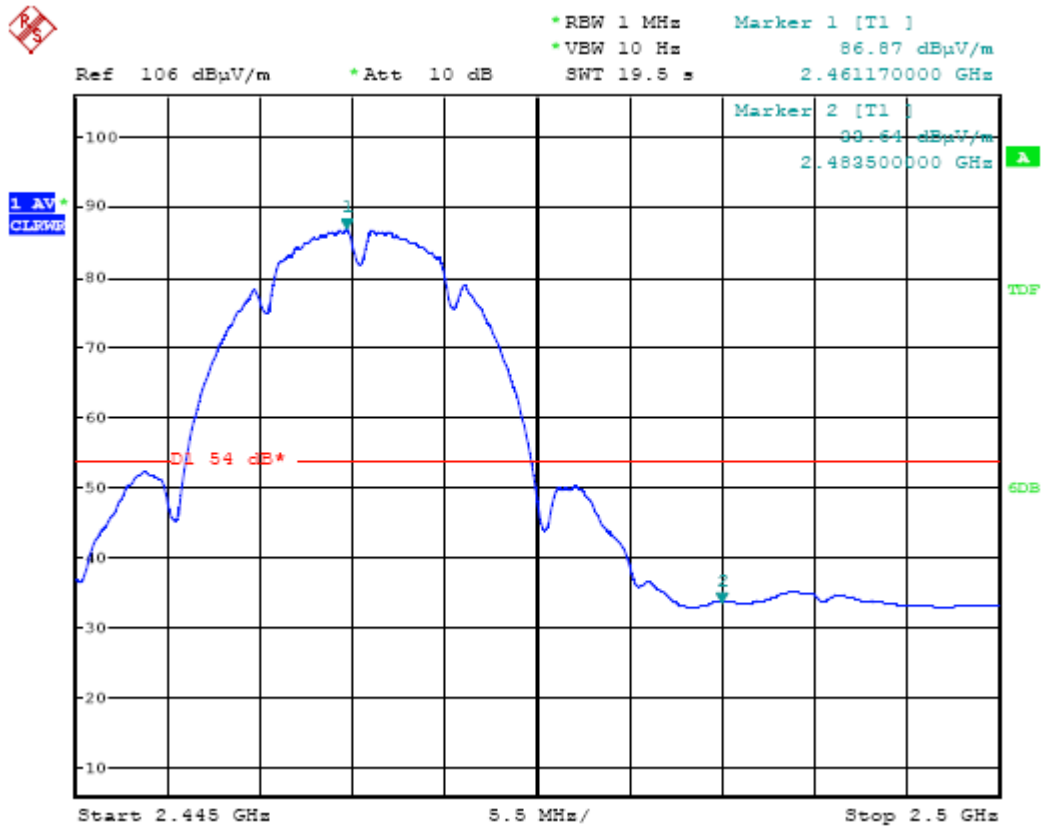
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2462MHz by 802.11b	



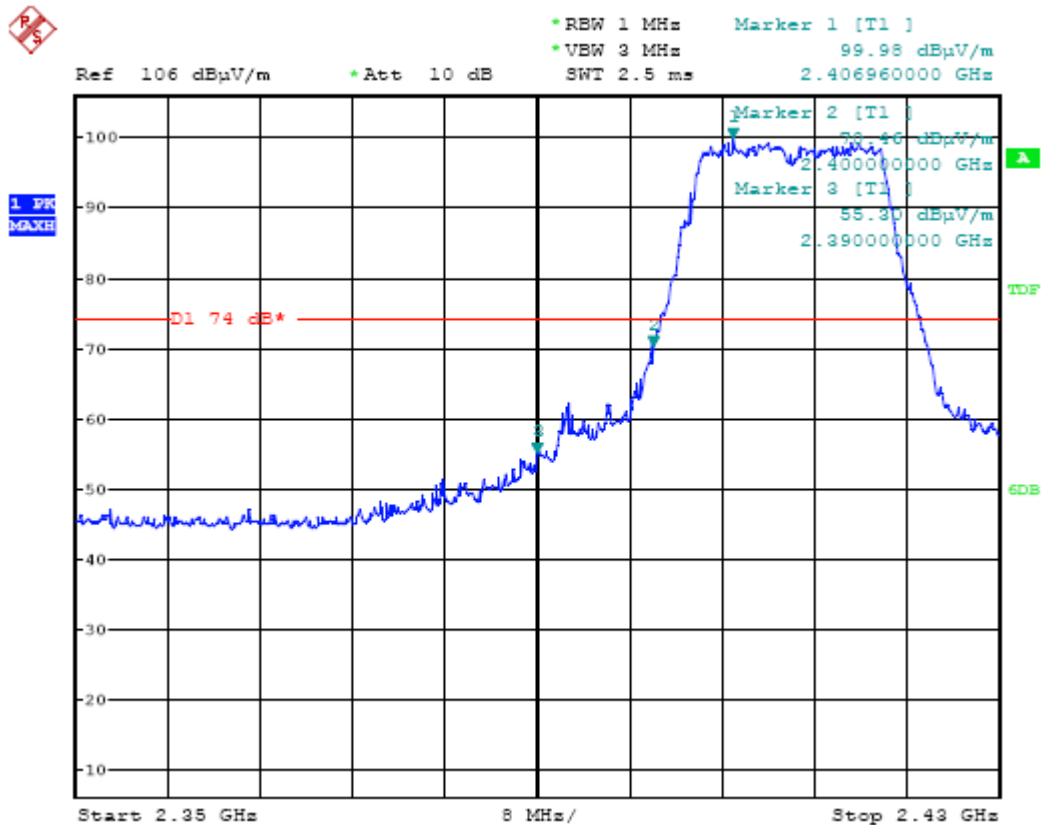
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2462MHz by 802.11b	



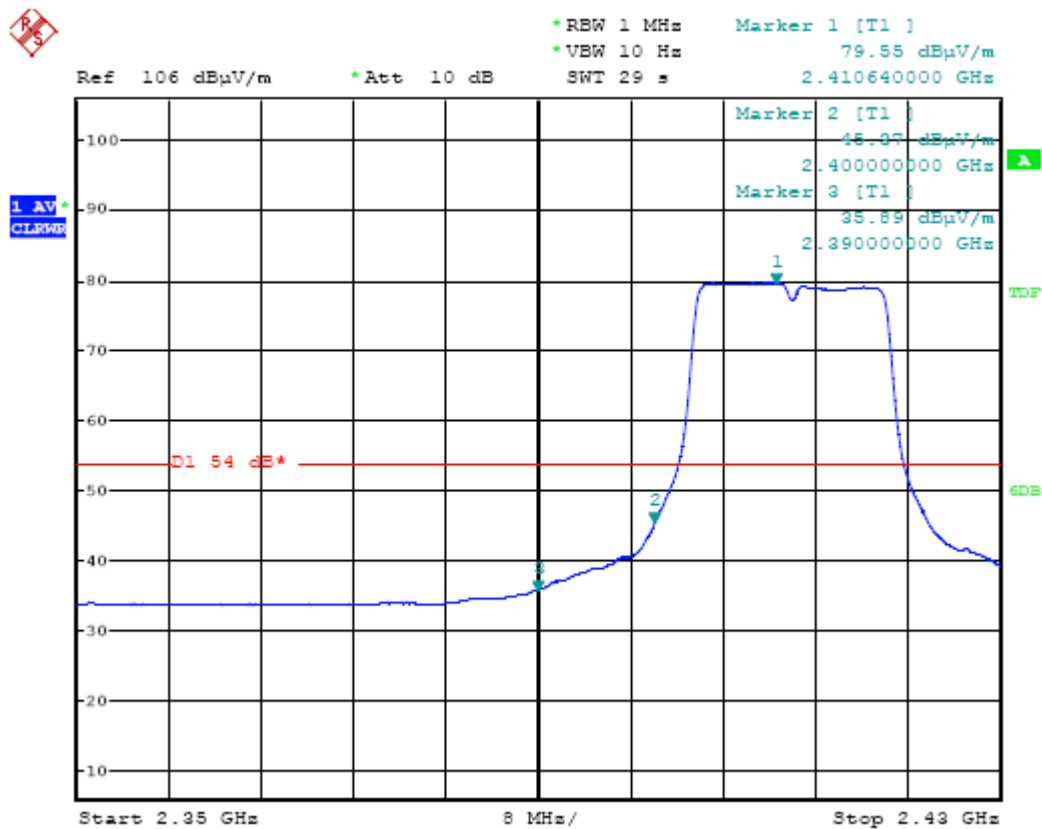
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode1:Transmit at channel 2462MHz by 802.11b	



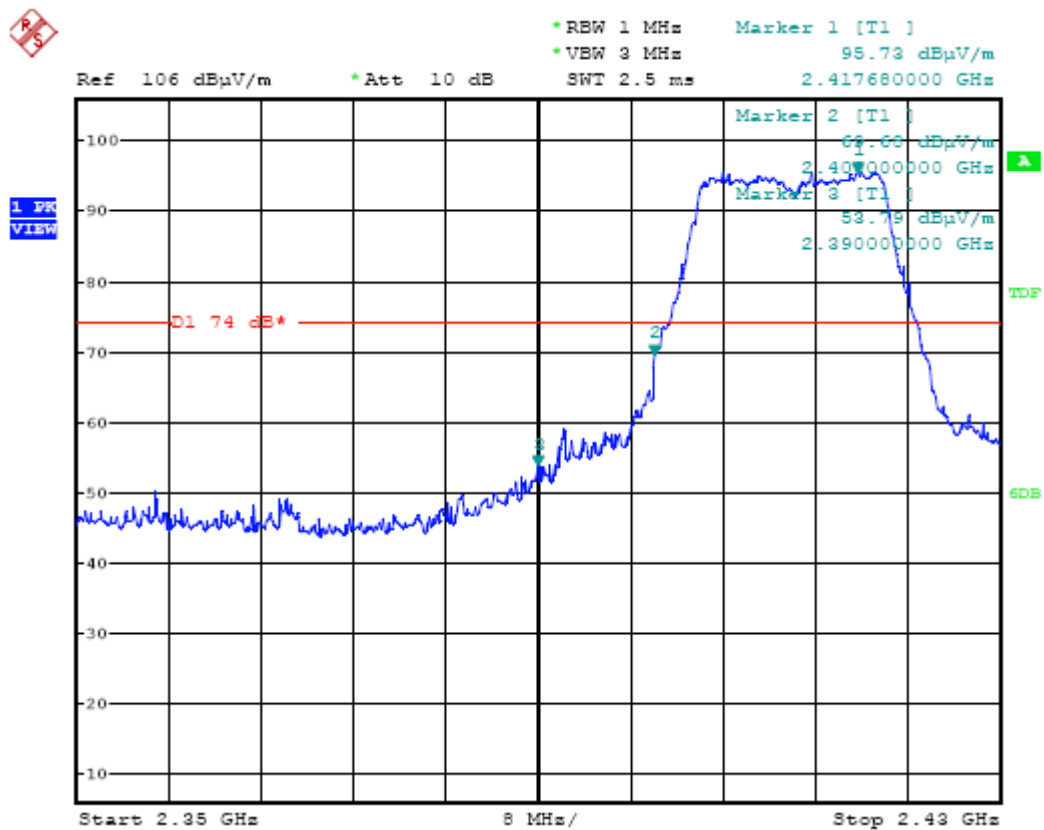
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2412MHz by 802.11g	



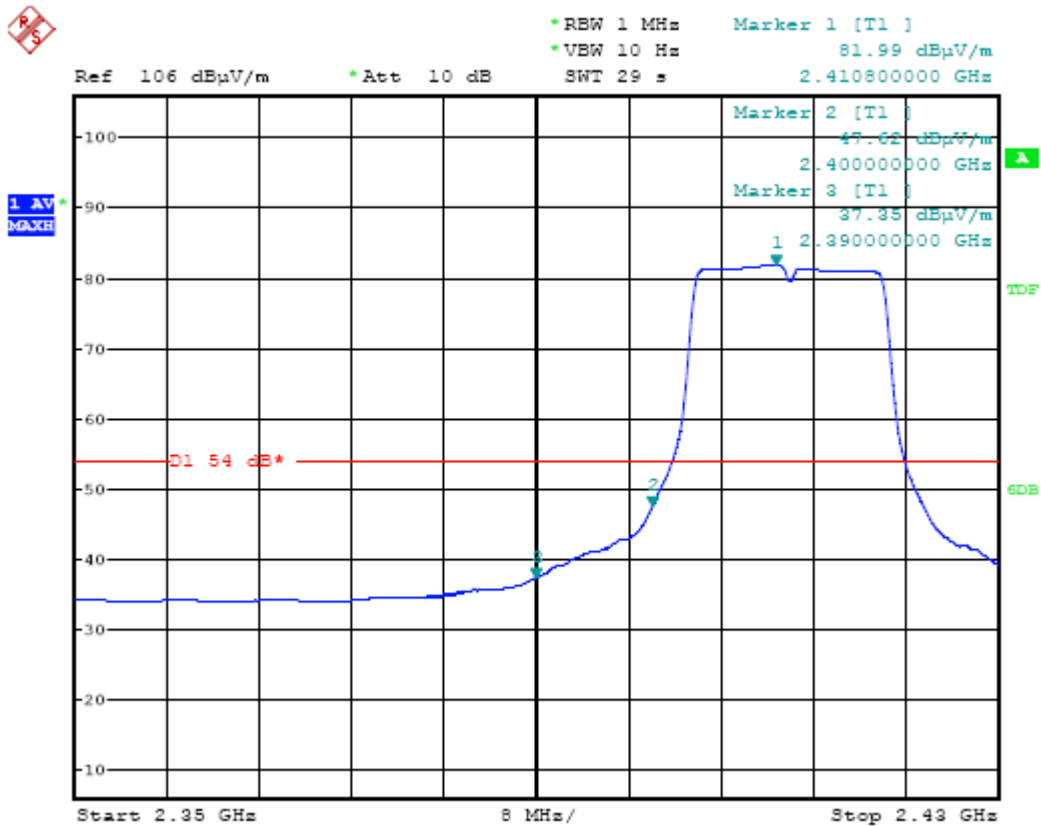
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2412MHz by 802.11g	



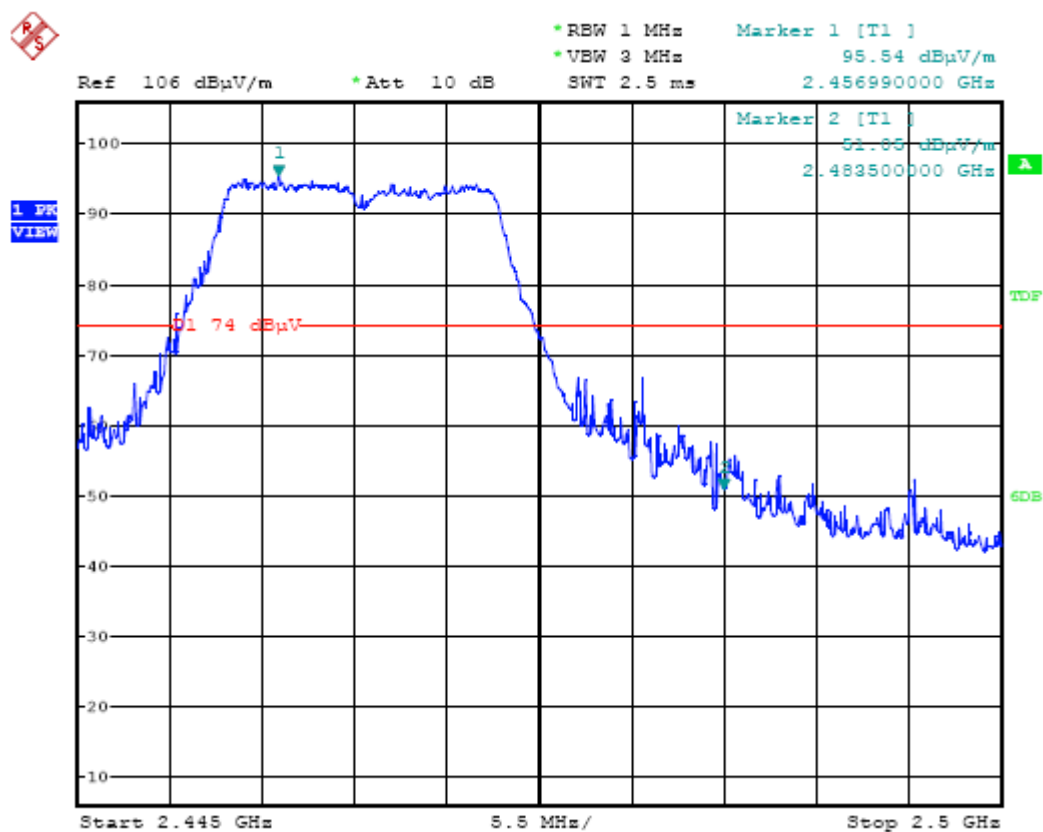
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2412MHz by 802.11g	



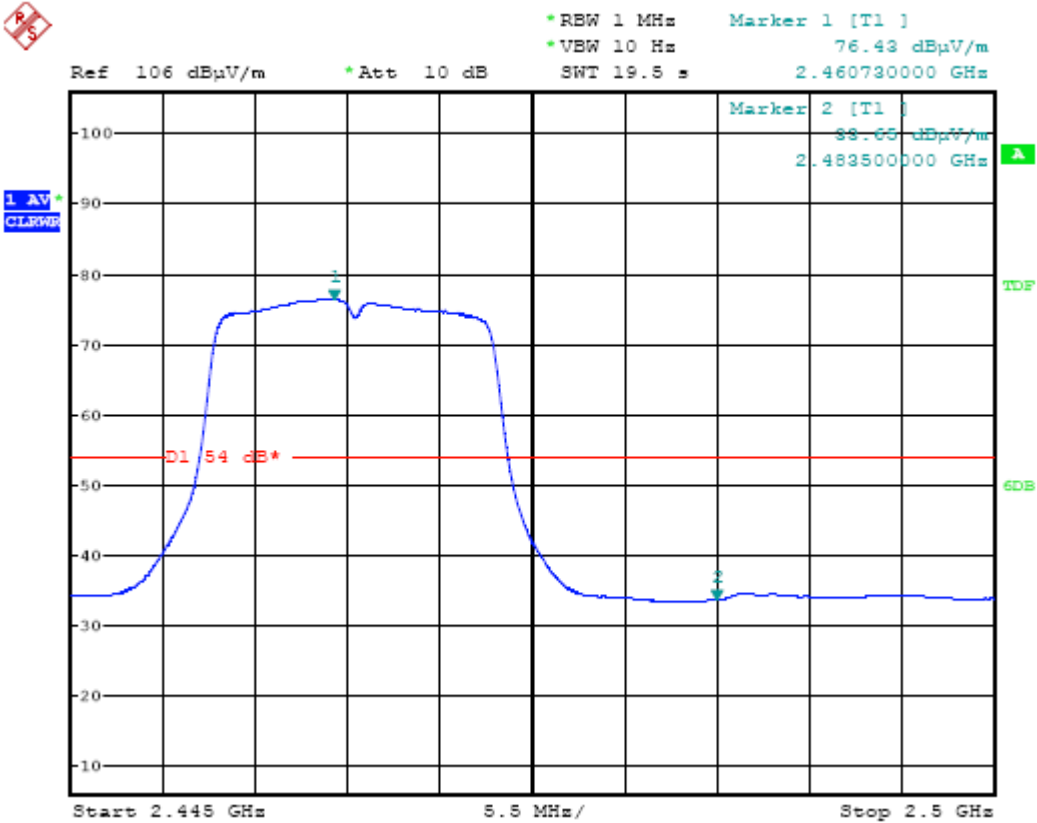
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2412MHz by 802.11g	



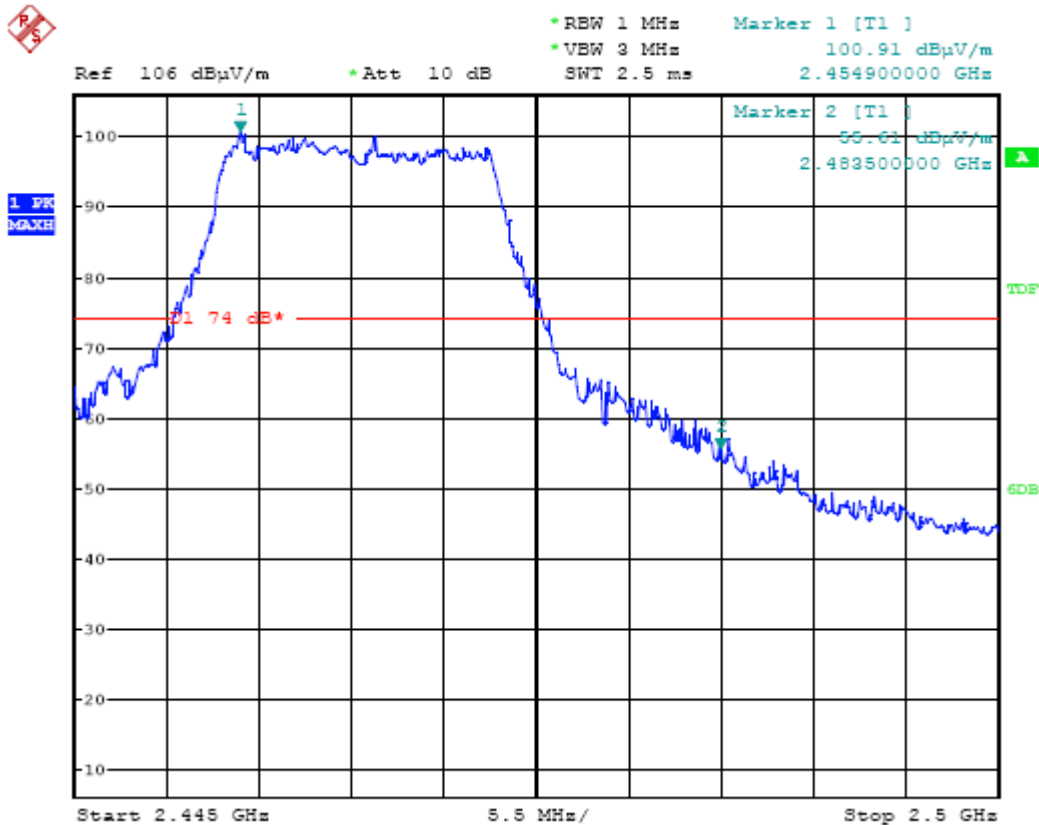
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2462MHz by 802.11g	



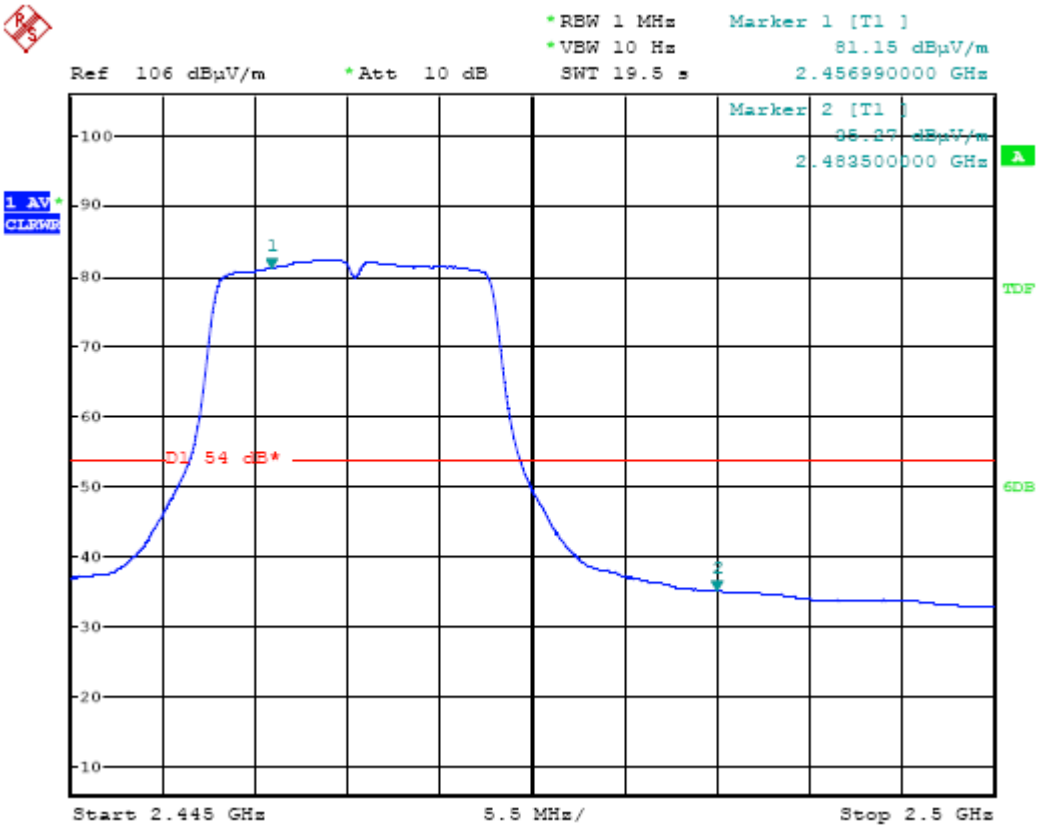
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2462MHz by 802.11g	



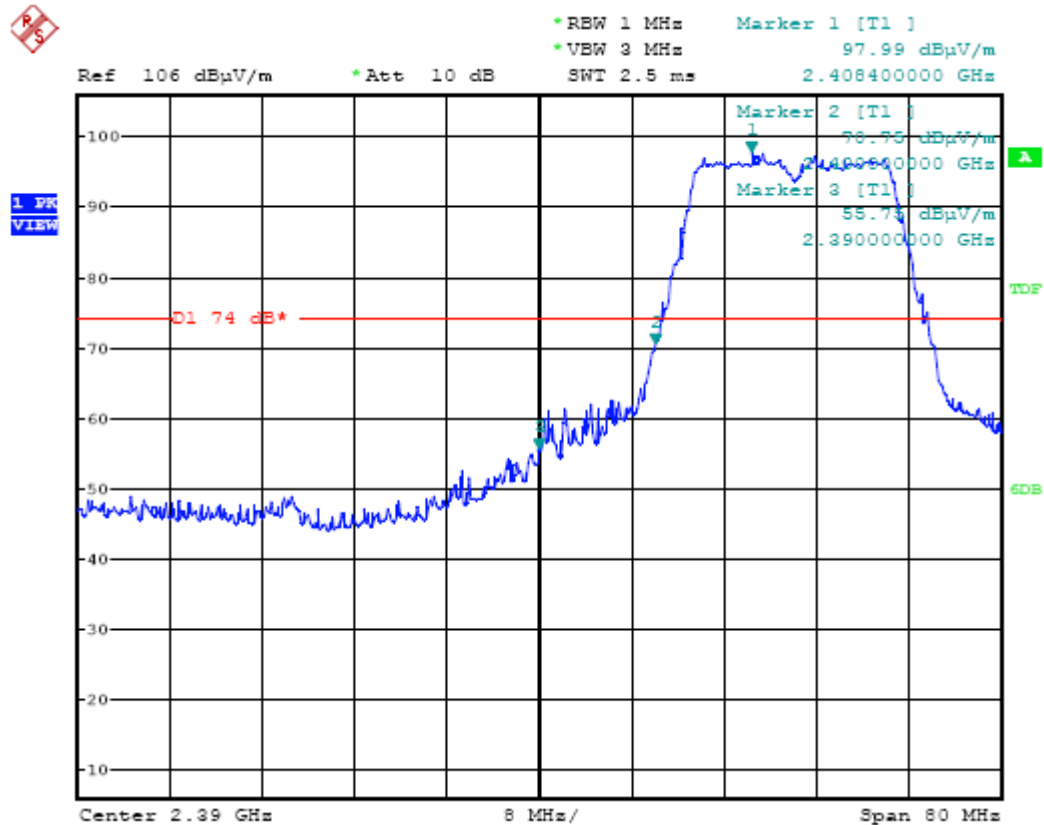
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2462MHz by 802.11g	



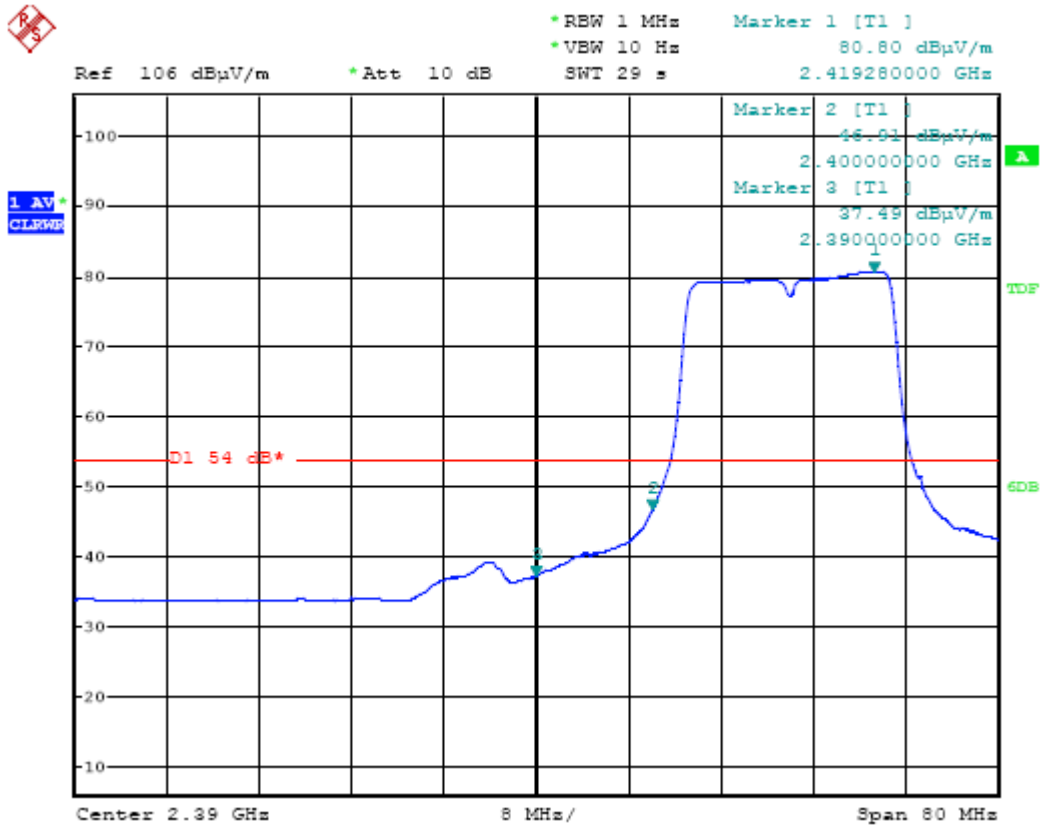
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode2:Transmit at channel 2462MHz by 802.11g	



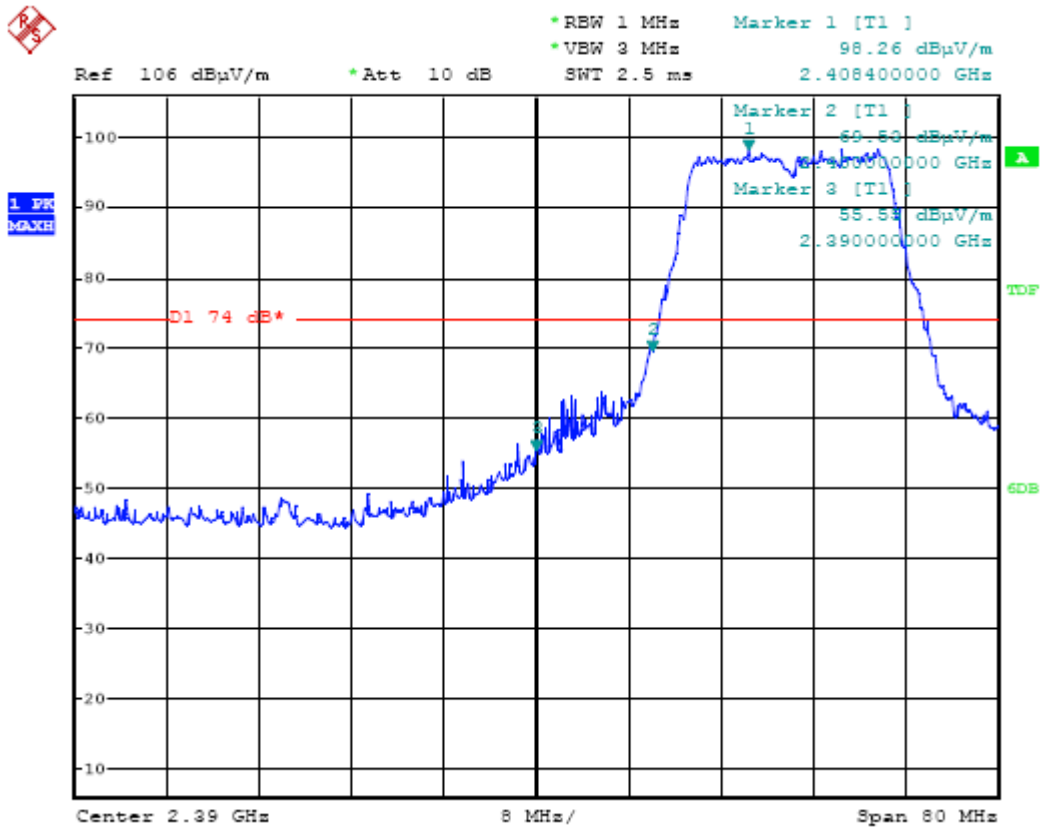
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2412MHz by 802.11n20MHz	



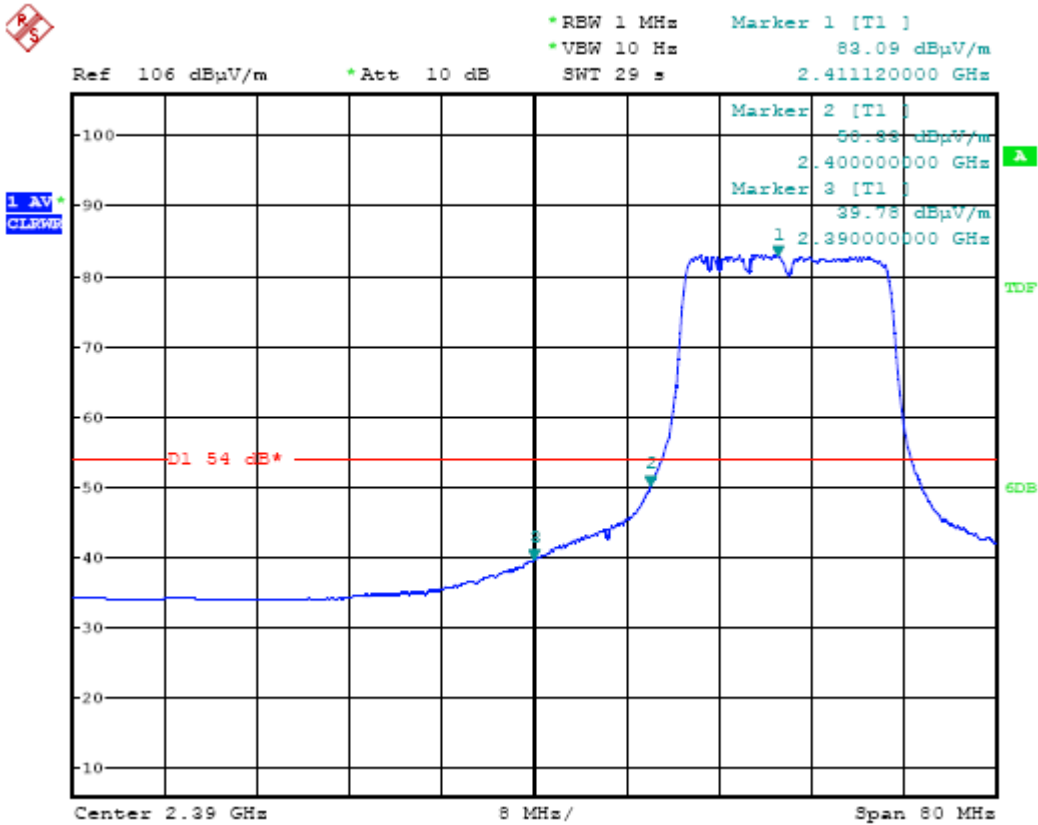
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2412MHz by 802.11n20MHz	



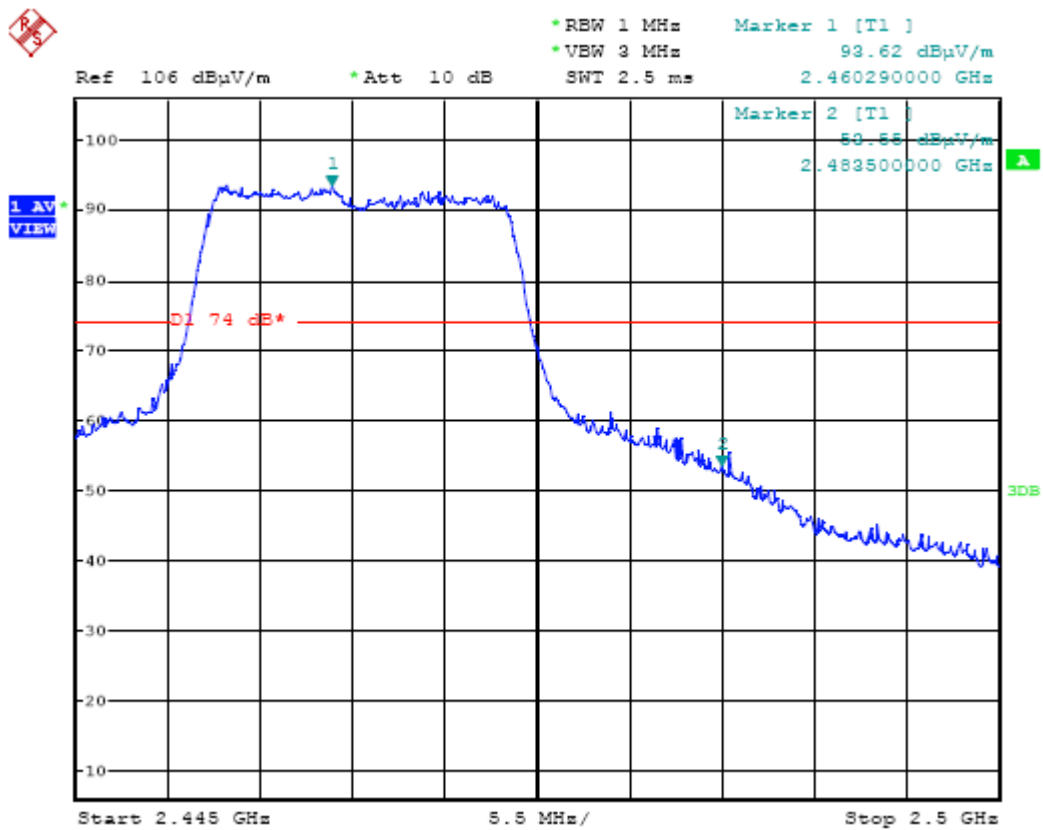
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2412MHz by 802.11n20MHz	



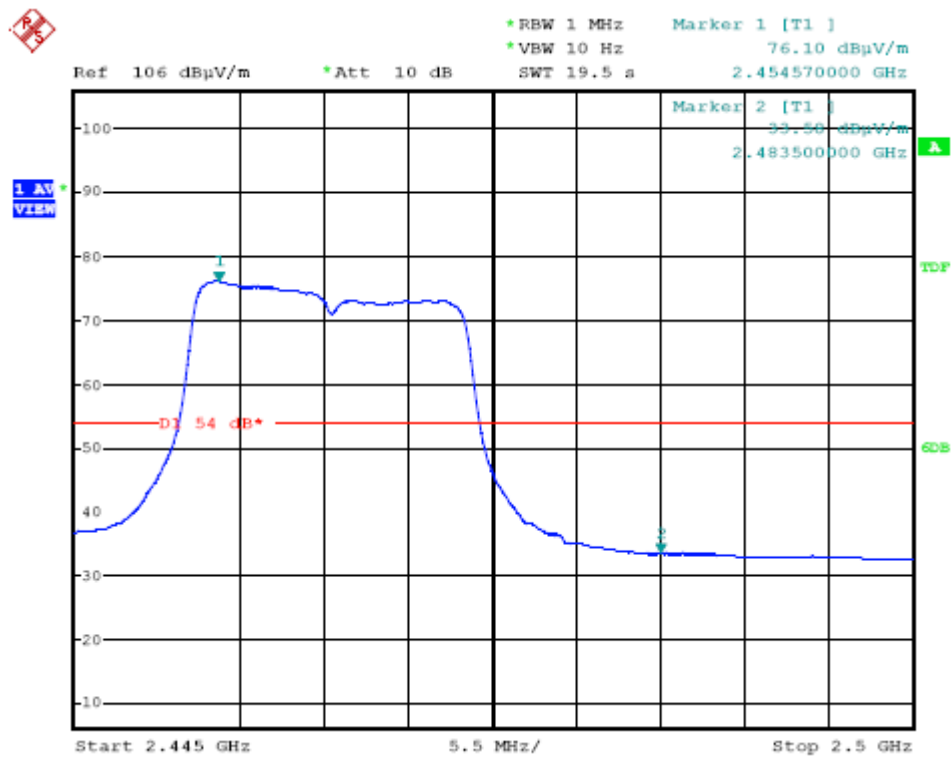
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2412MHz by 802.11n20MHz	



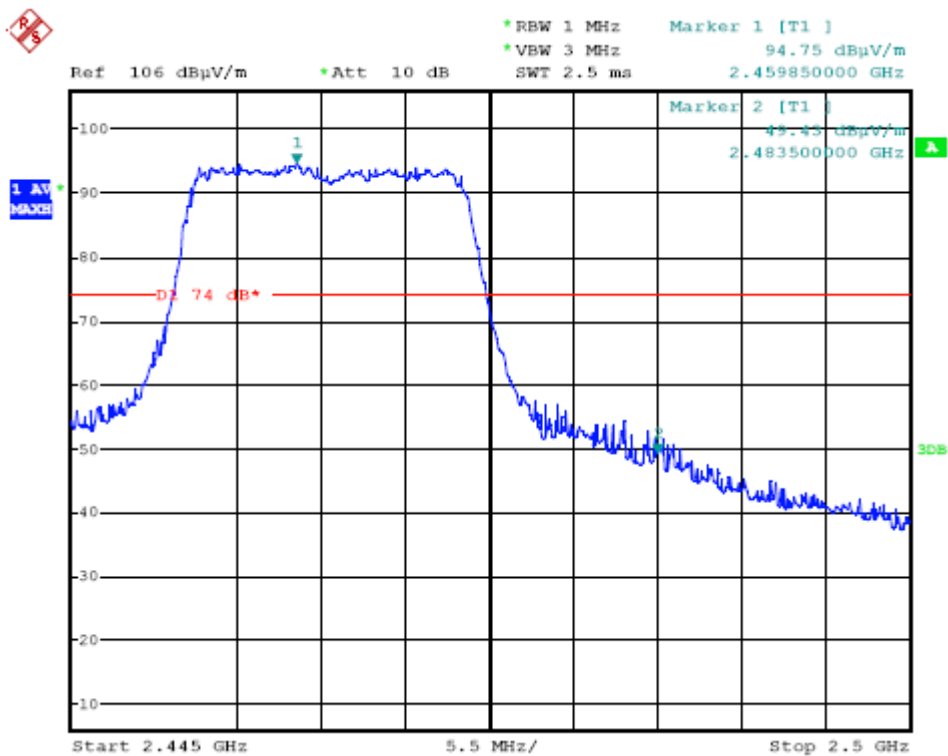
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2462MHz by 802.11n20MHz	



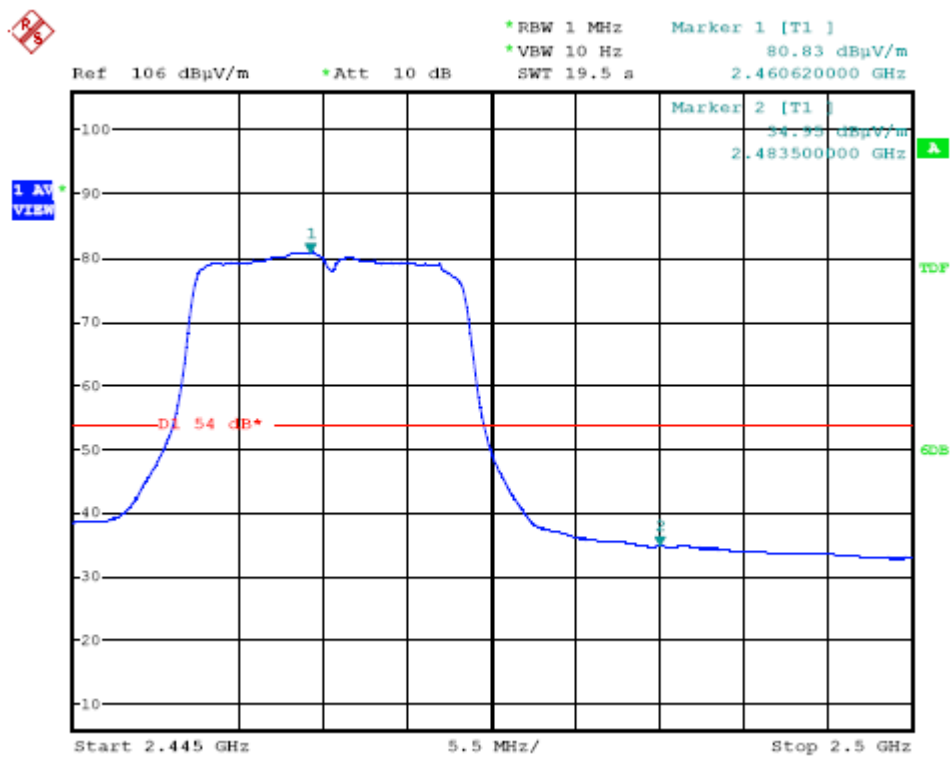
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2462MHz by 802.11n20MHz	



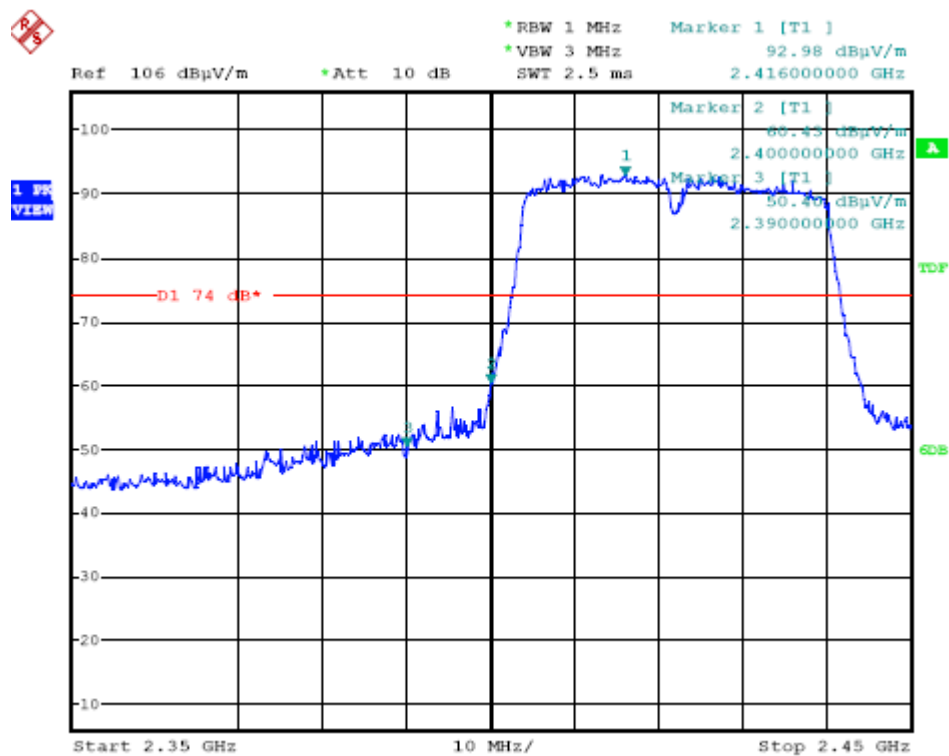
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2462MHz by 802.11n20MHz	



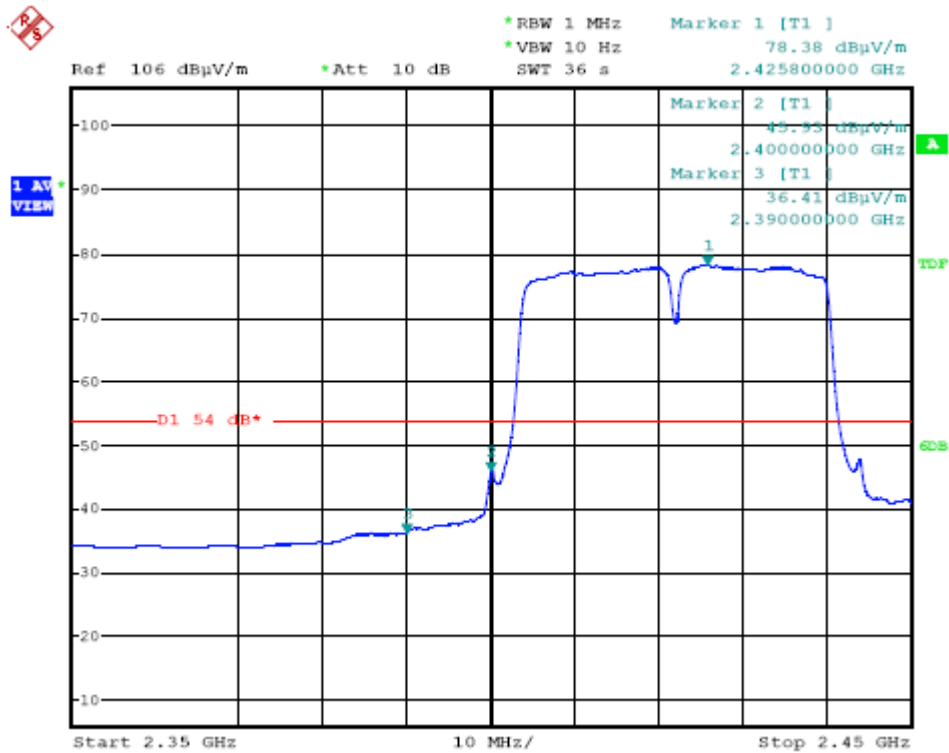
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode3:Transmit at channel 2462MHz by 802.11n20MHz	



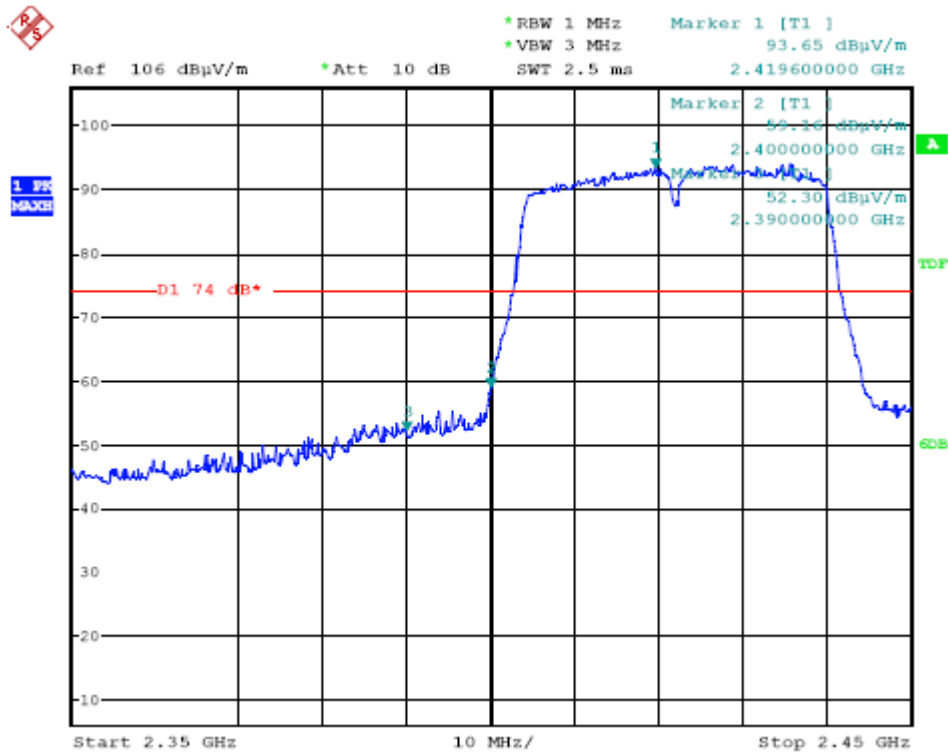
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2422MHz by 802.11n40MHz	



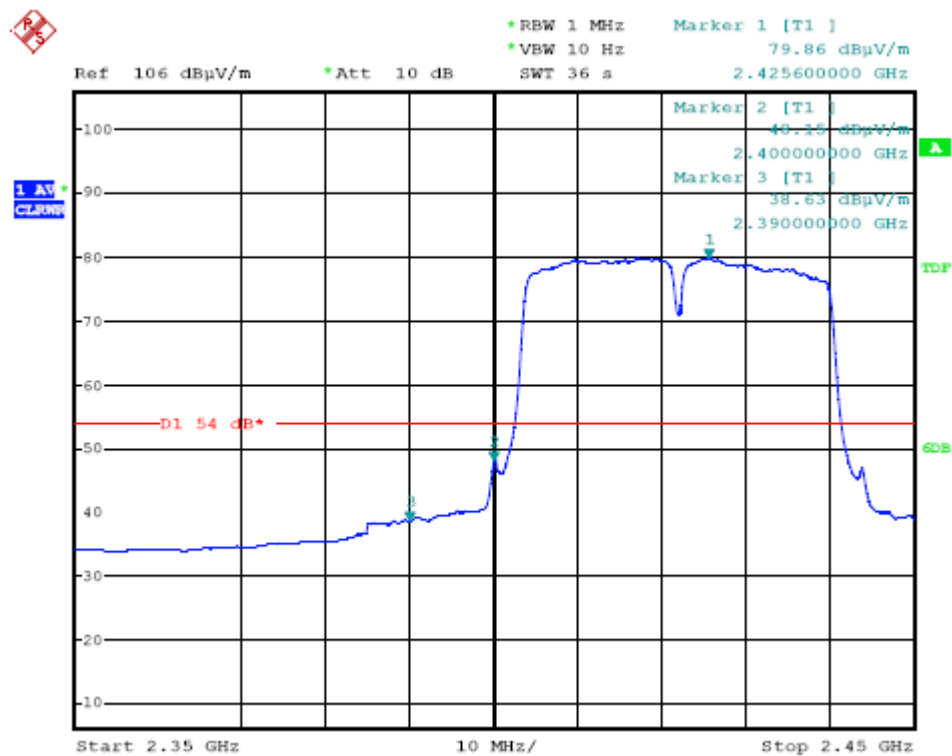
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2422MHz by 802.11n40MHz	



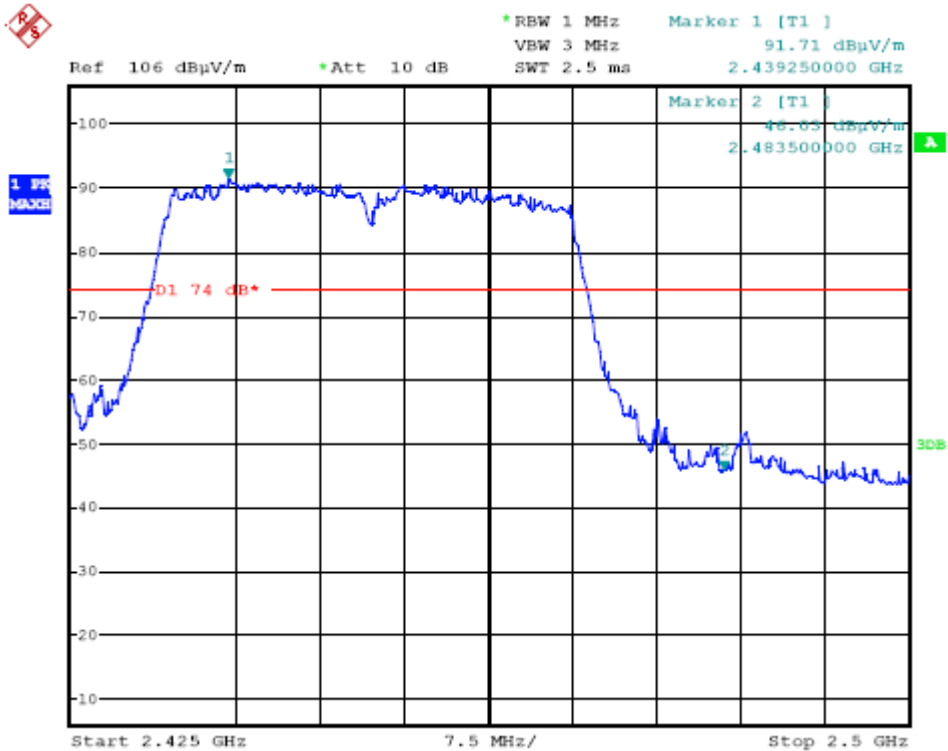
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2422MHz by 802.11n40MHz	



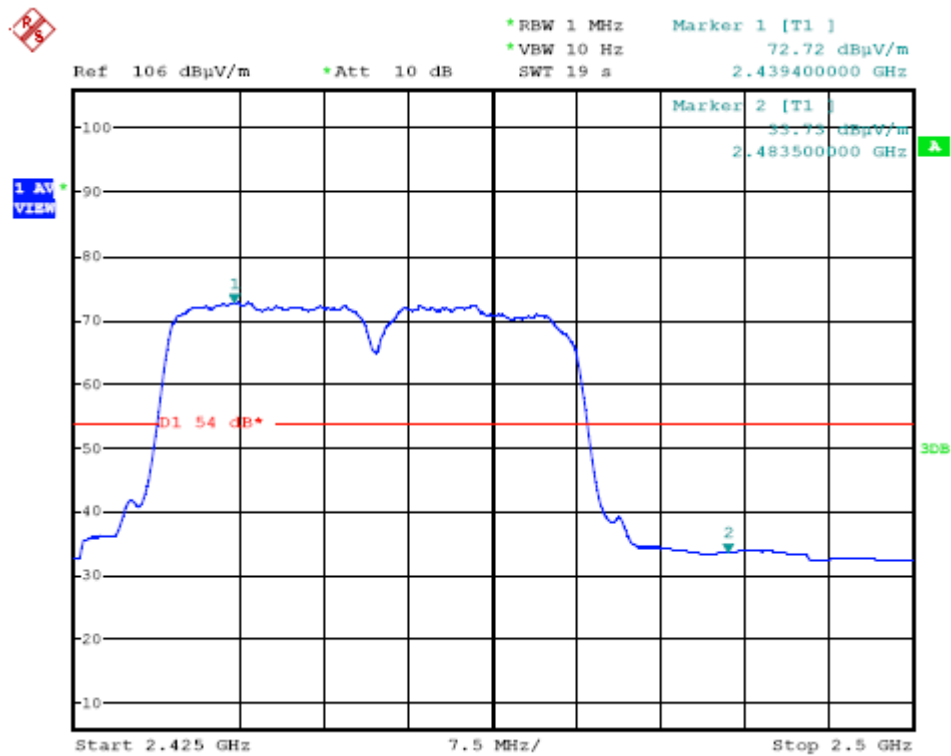
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2422MHz by 802.11n40MHz	



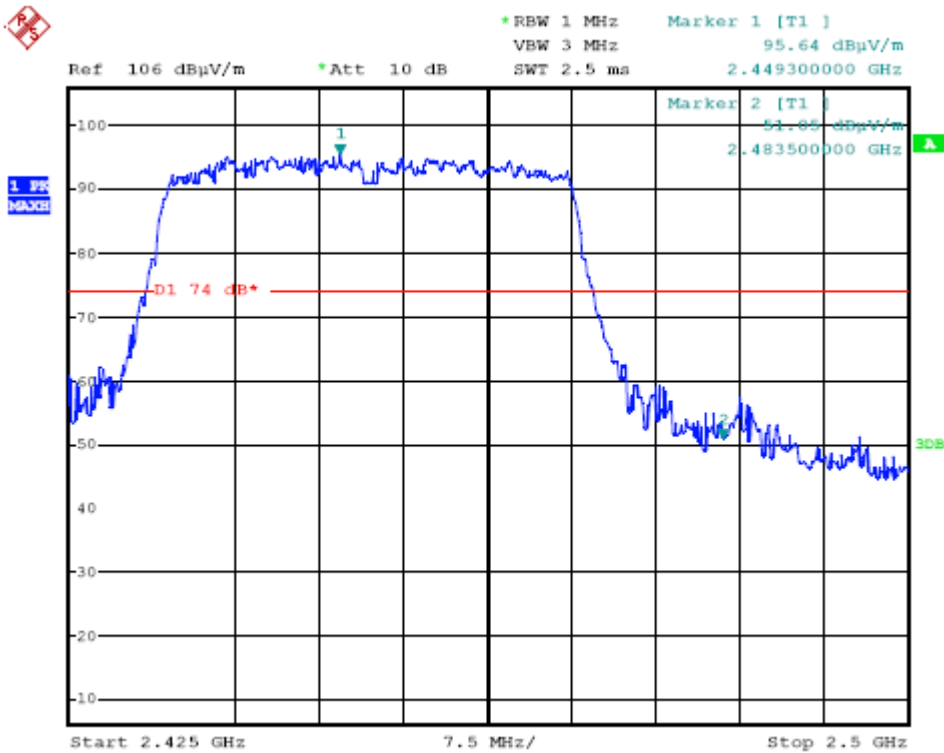
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2452MHz by 802.11n40MHz	



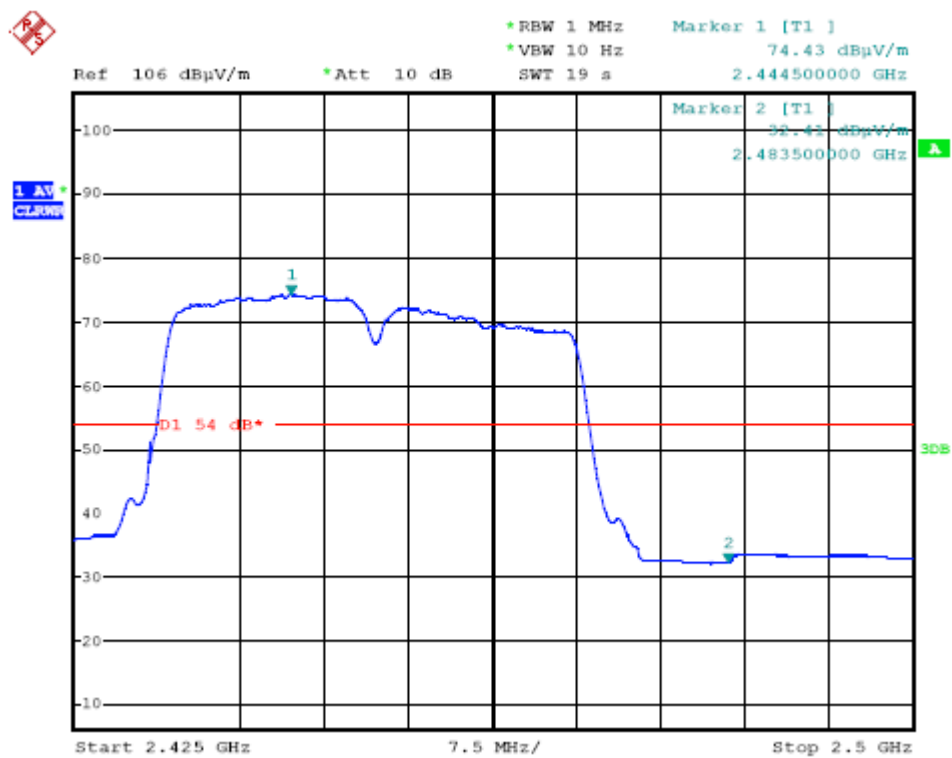
Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2452MHz by 802.11n40MHz	



Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2452MHz by 802.11n40MHz	

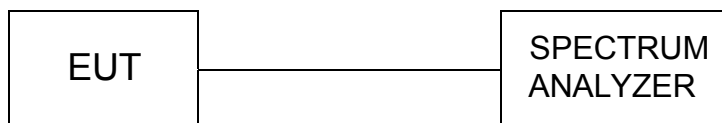


Engineer: Happy	
Site: AC5	Time: 2014/03/19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: RedPort Satellite Optimizer	Power: AC 120V/60Hz
Note: Mode4:Transmit at channel 2452MHz by 802.11n40MHz	



4.6. Power Spectral Density Measurement

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB558074 D01 v03r01 for compliance to FCC 47CFR 15.247 requirements.

Set RBW= 3 kHz, VBW \geq 10KHz, SPAN to 1.5 times greater than the EBW,.

LIMIT

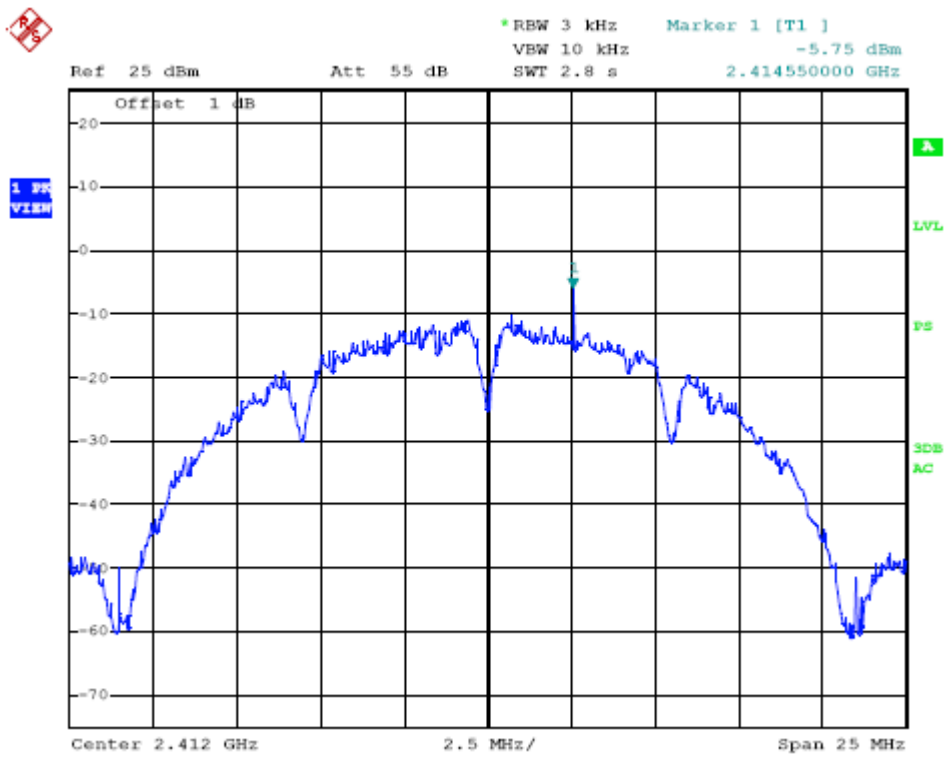
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

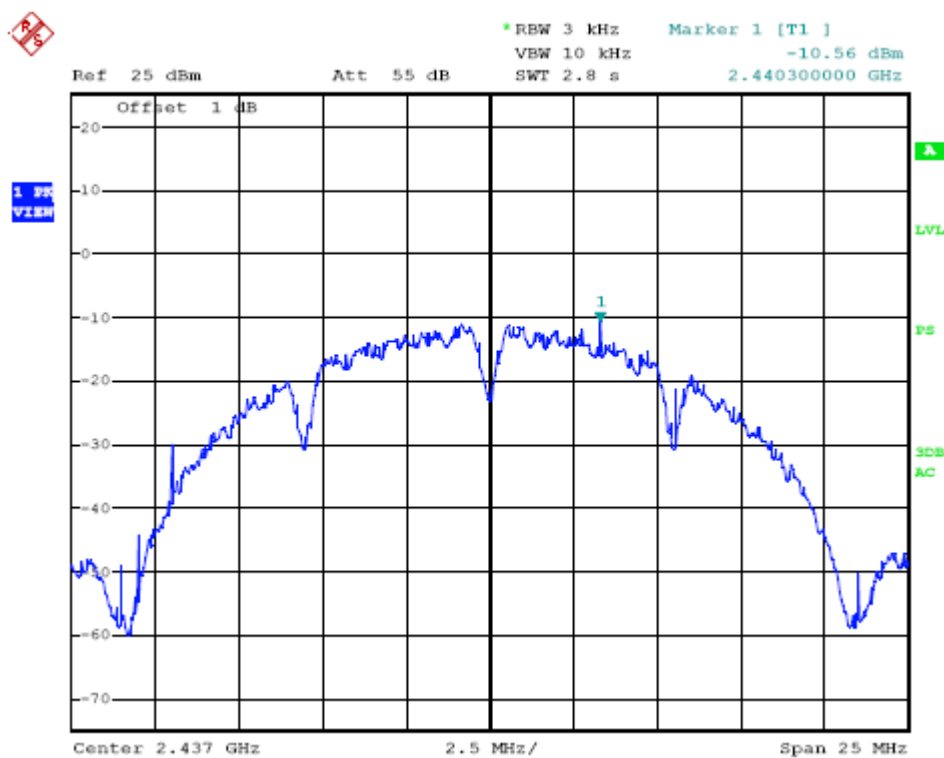
Product	:	RedPort Satellite Optimizer
Test Item	:	Power Spectral Density
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
01	2412	-5.75	8	Pass
06	2437	-10.56	8	Pass
11	2462	-5.30	8	Pass

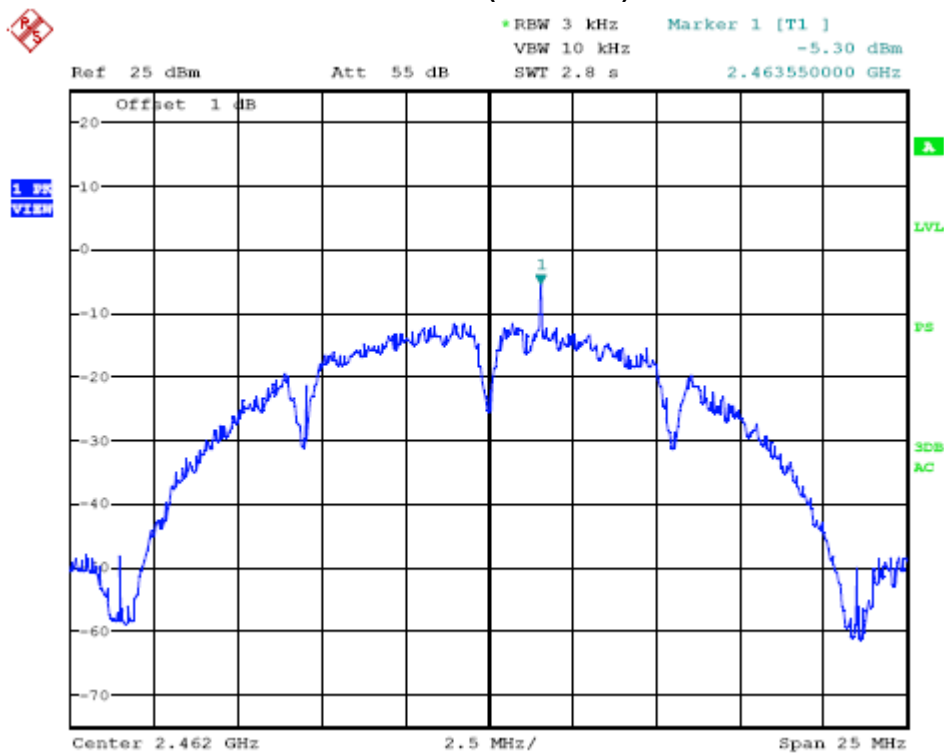
Channel 01 (2412MHz)



Channel 06 (2437MHz)



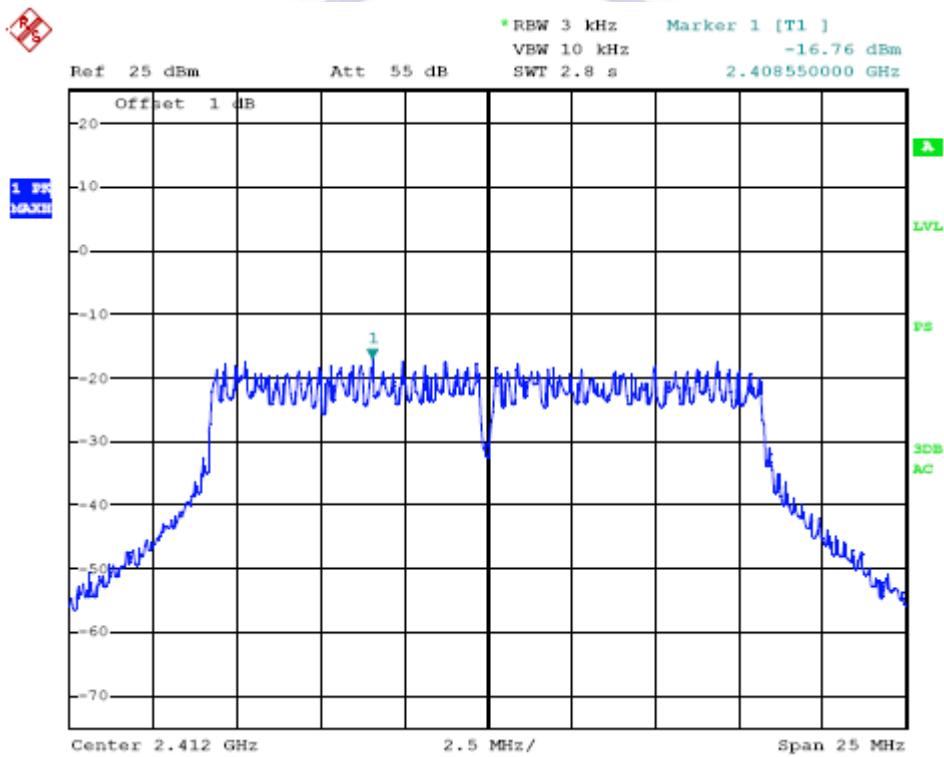
Channel 11 (2462MHz)



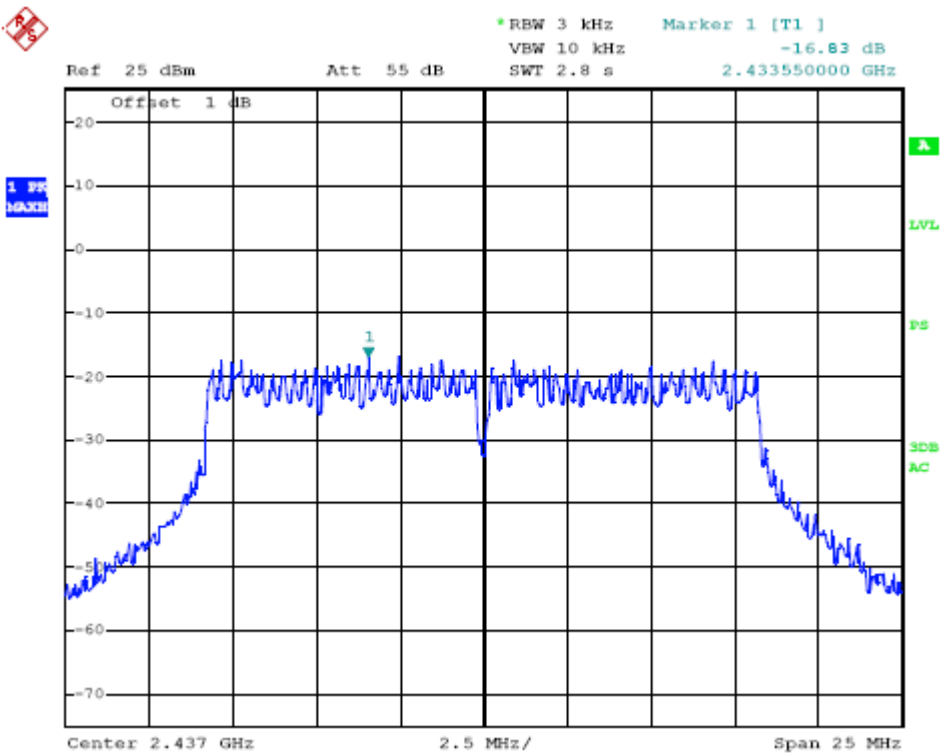
Product	:	RedPort Satellite Optimizer
Test Item	:	Power Spectral Density
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
01	2412	-16.76	8	Pass
06	2437	-16.83	8	Pass
11	2462	-16.94	8	Pass

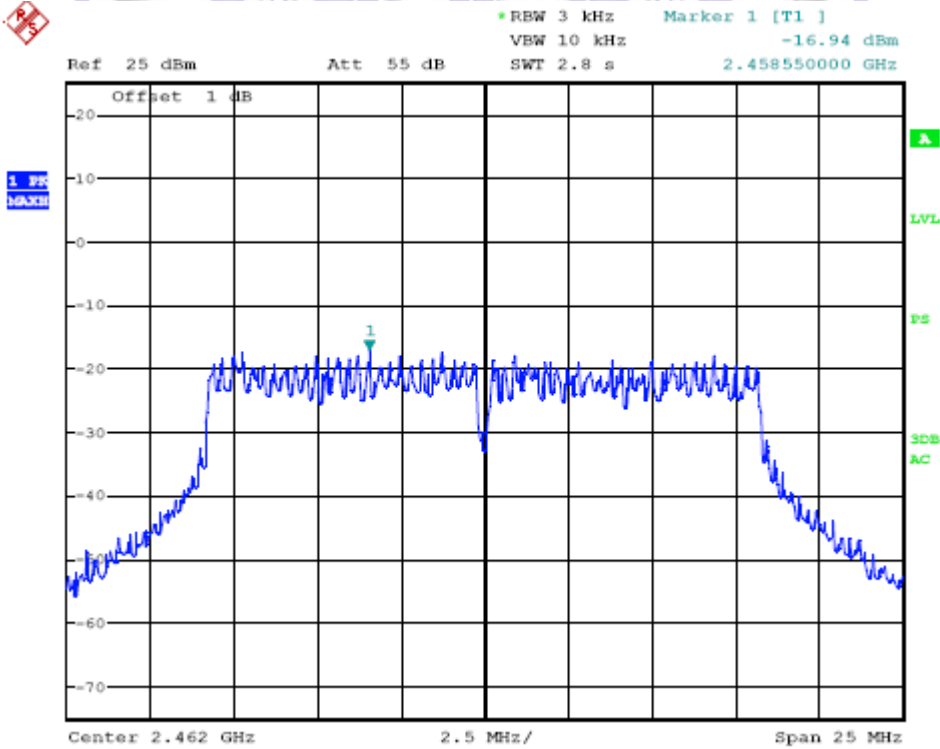
Channel 01 (2412MHz)



Channel 06 (2437MHz)



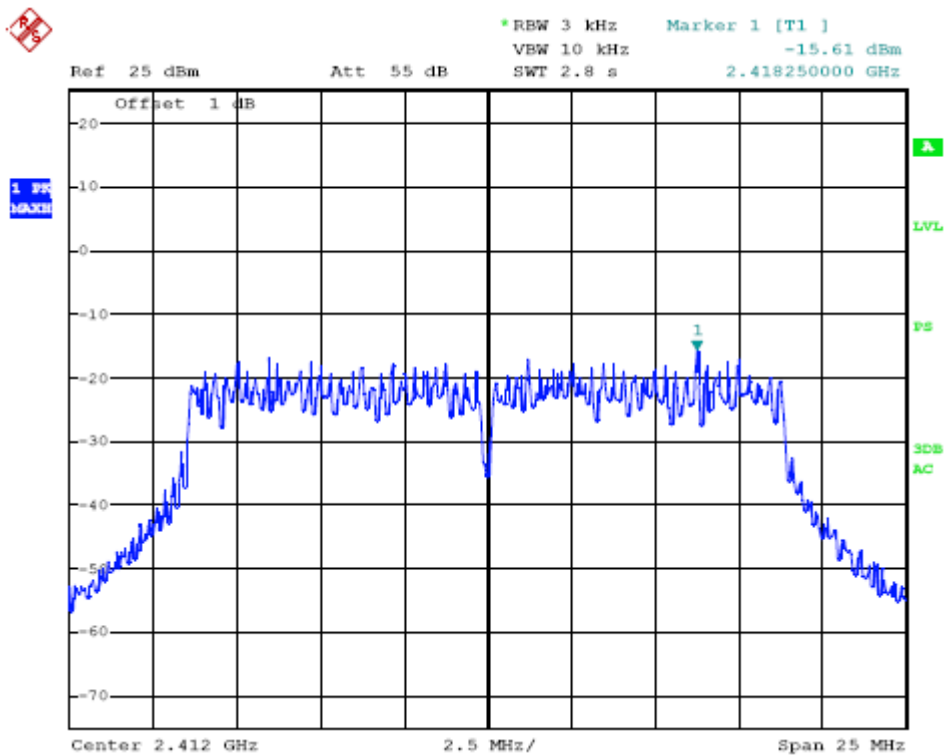
Channel 11 (2462MHz)



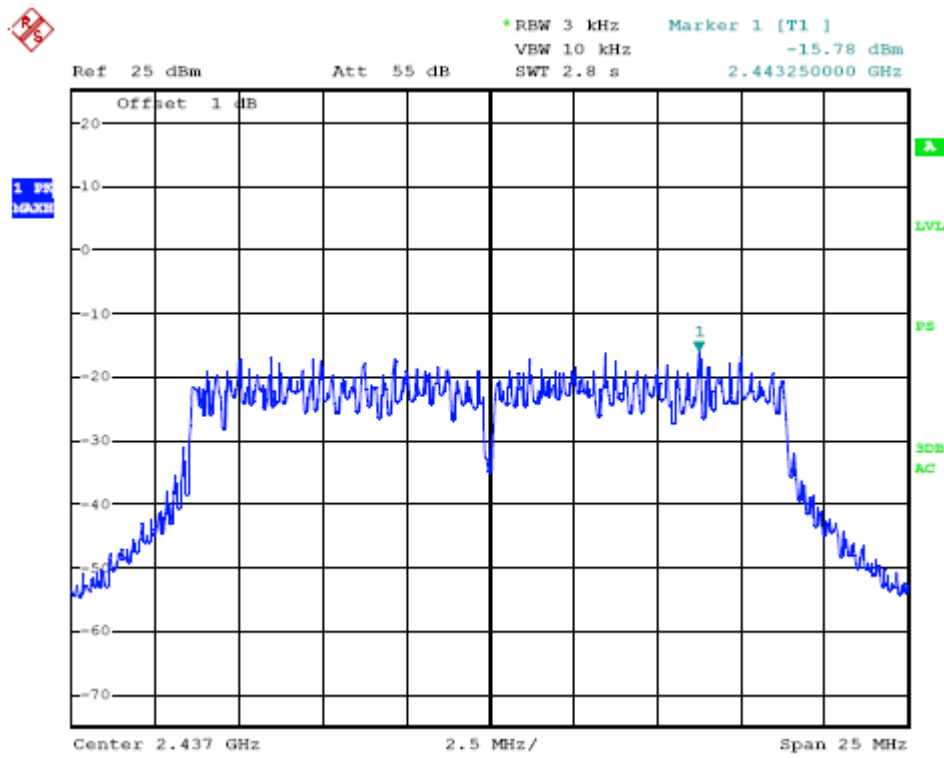
Product	:	RedPort Satellite Optimizer
Test Item	:	Power Spectral Density
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
01	2412	-15.61	8	Pass
06	2437	-15.78	8	Pass
11	2462	-15.96	8	Pass

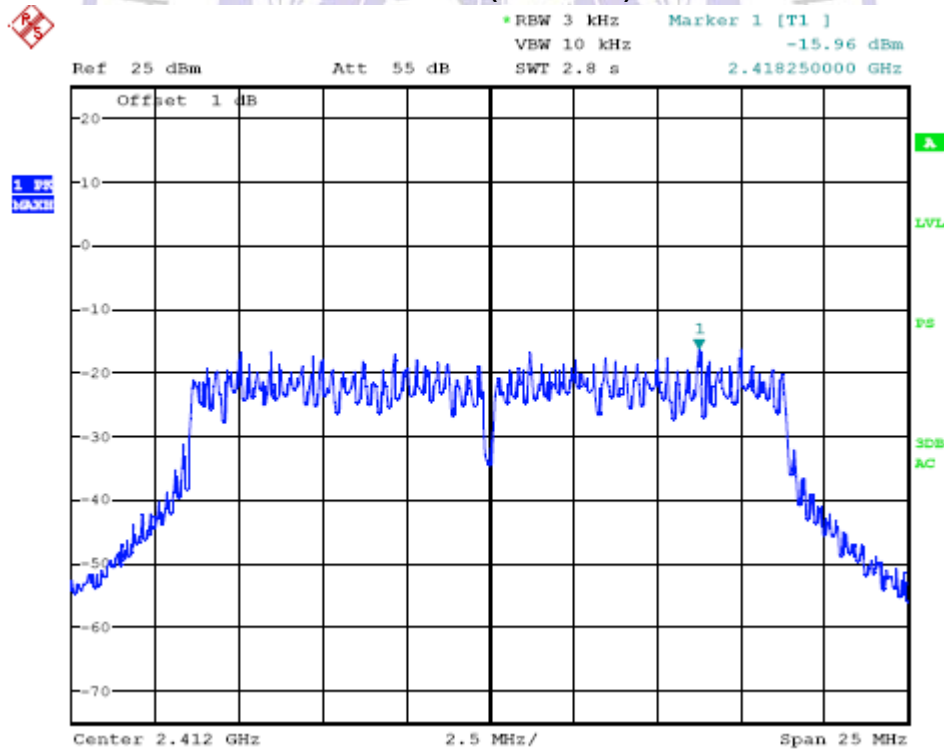
Channel 01 (2412MHz)



Channel 06 (2437MHz)



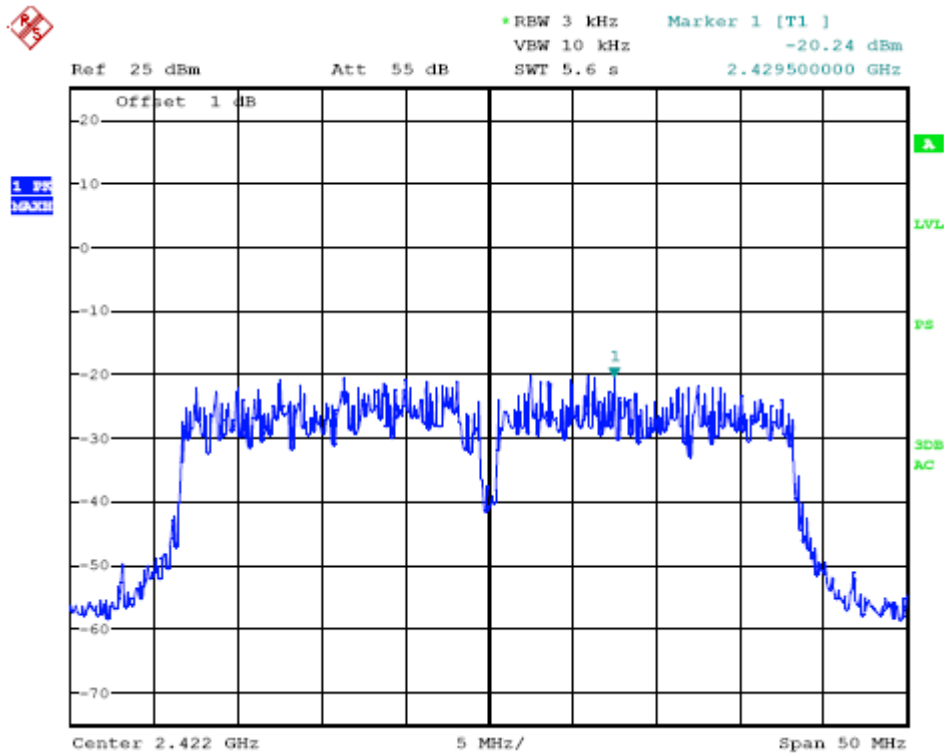
Channel 11 (2462MHz)



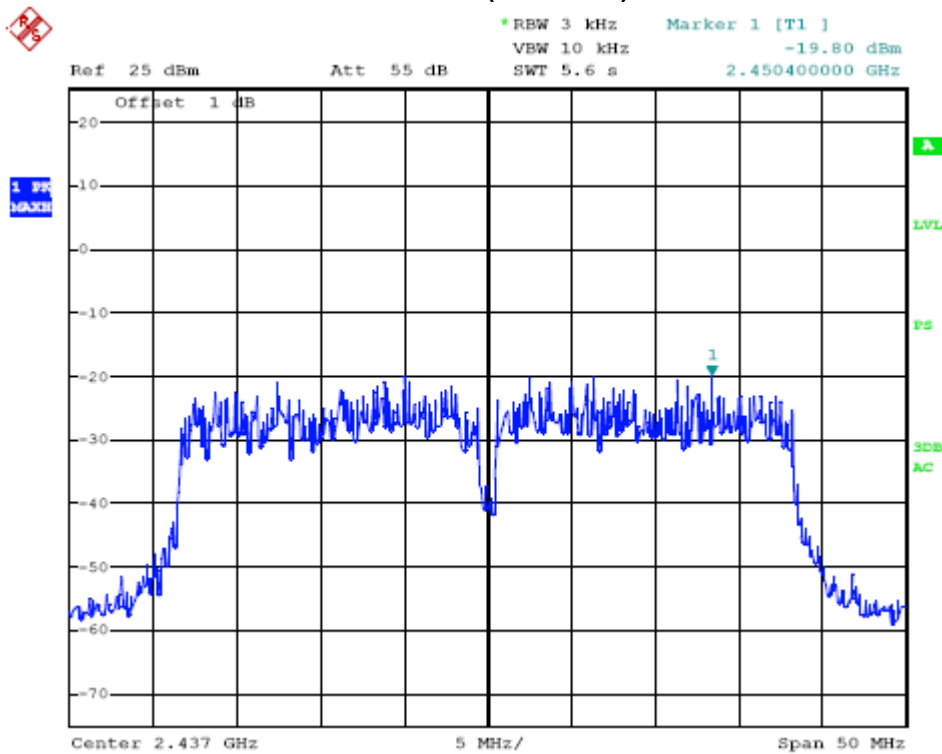
Product	:	RedPort Satellite Optimizer
Test Item	:	Power Spectral Density
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz)

Channel No.	Frequency (MHz)	Measurement PPSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
03	2422	-20.24	8	Pass
06	2437	-19.80	8	Pass
09	2452	-19.42	8	Pass

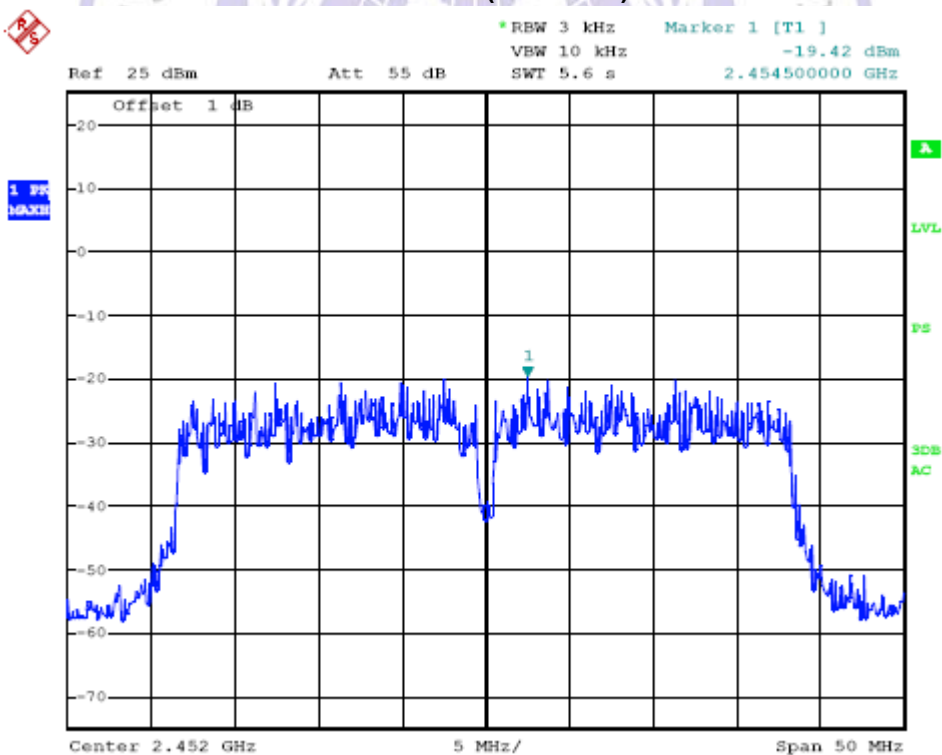
Channel 03 (2422MHz)



Channel 06 (2437MHz)

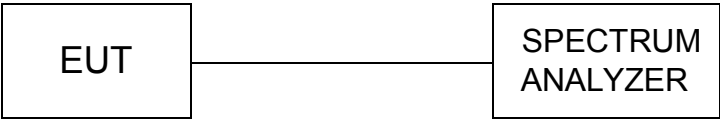


Channel 09 (2452MHz)



4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB558074 D01 v03r01 for compliance to FCC 47CFR 15.247 requirements.

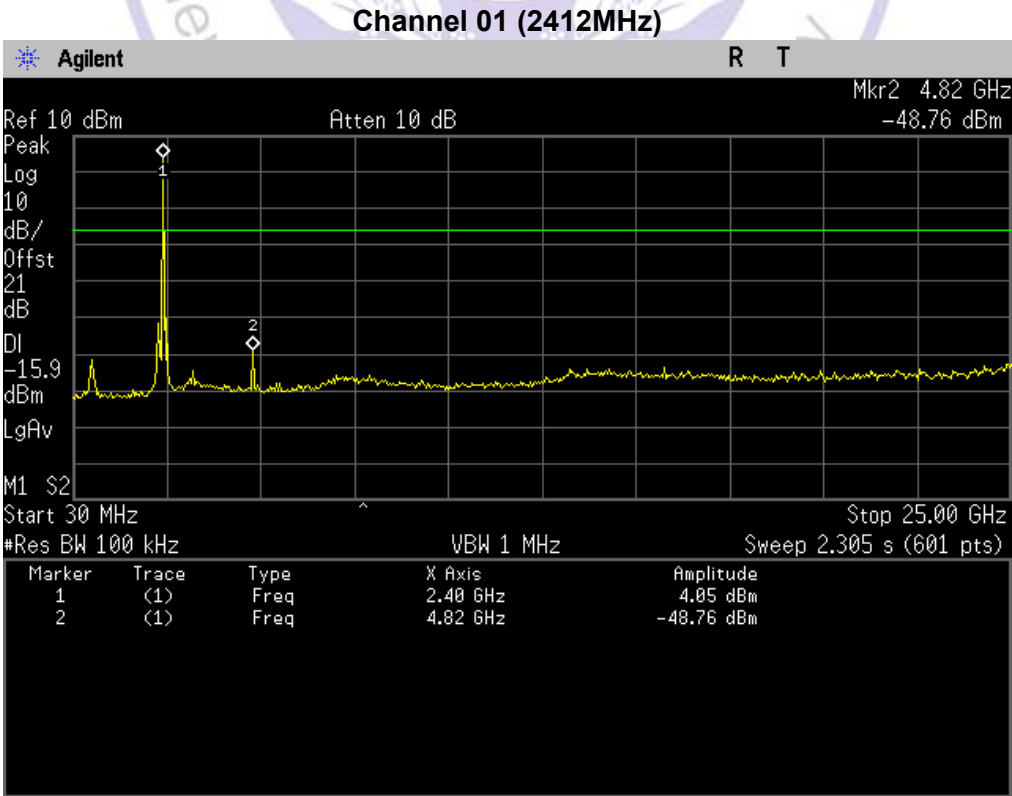
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and measure frequency range from 30MHz to 26.5GHz.

LIMIT

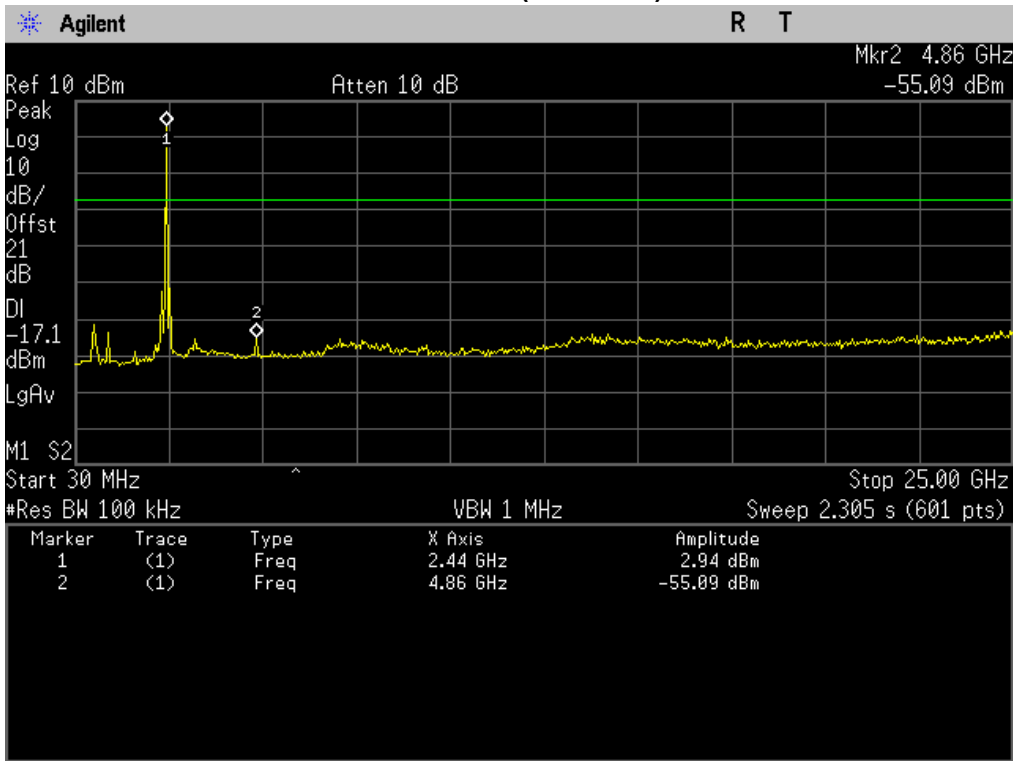
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

TEST RESULTS

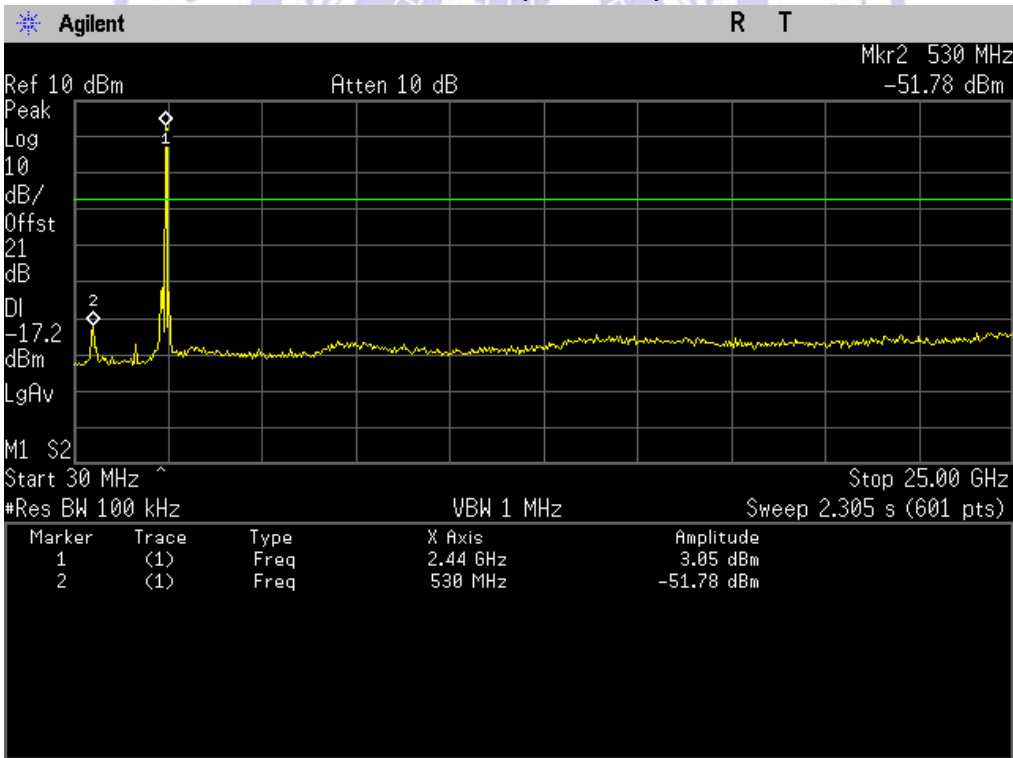
Product	:	RedPort Satellite Optimizer
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 1: Transmit by 802.11b



Channel 06 (2437MHz)

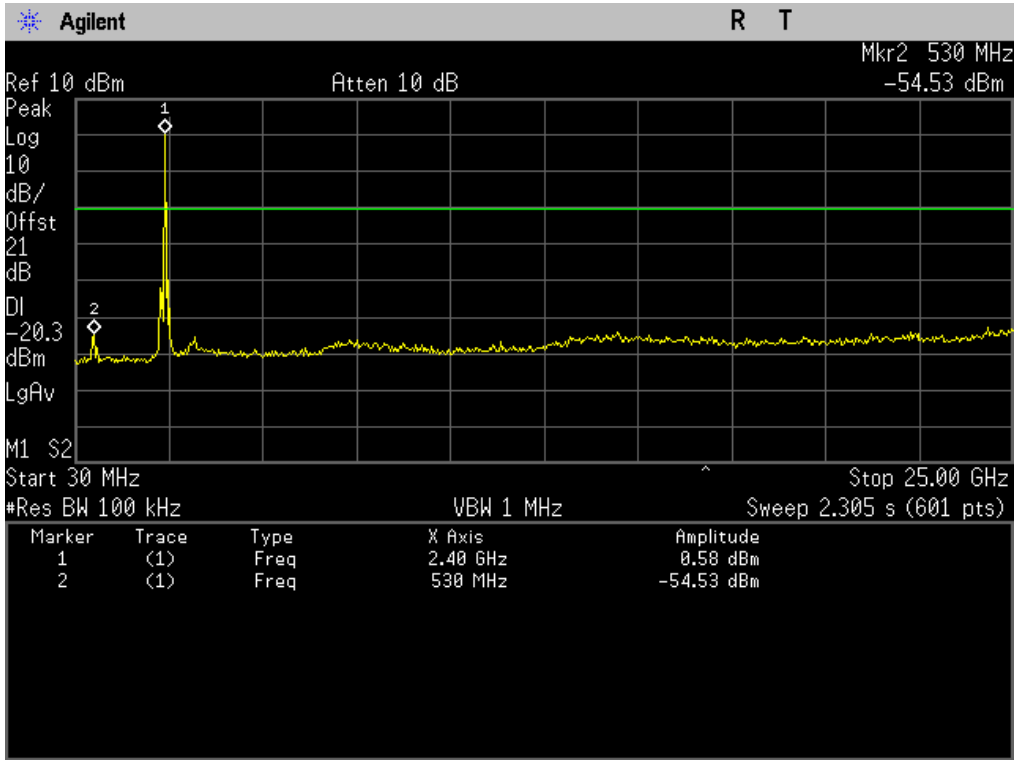


Channel 11 (2462MHz)

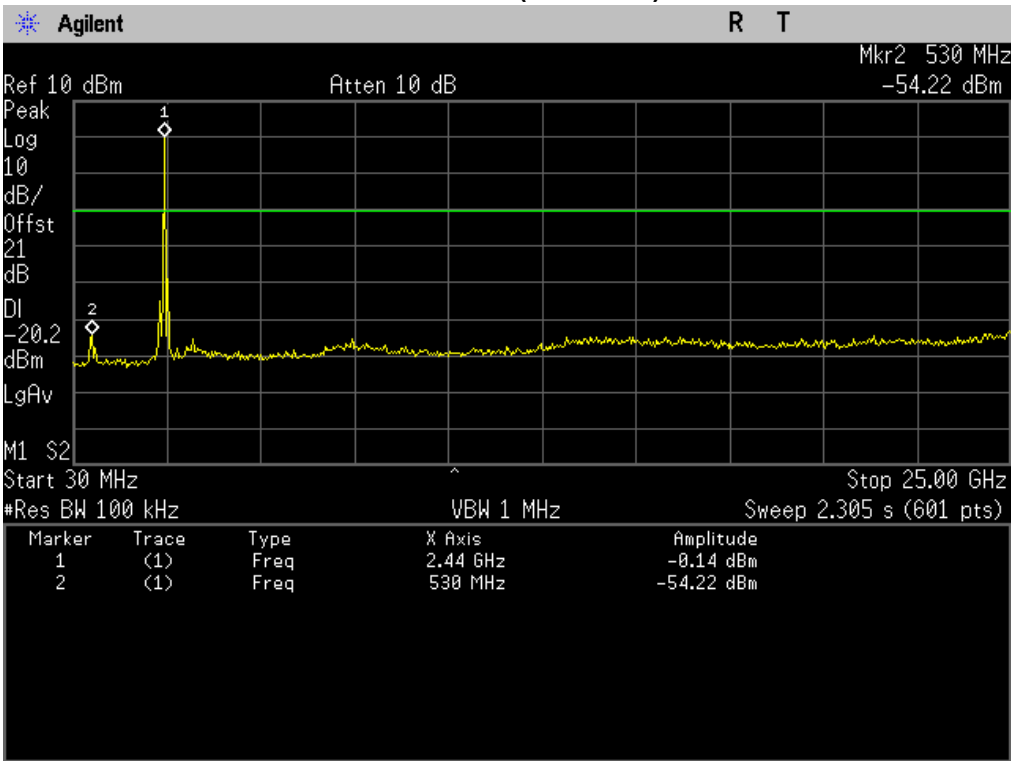


Product	:	RedPort Satellite Optimizer
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 2: Transmit by 802.11g

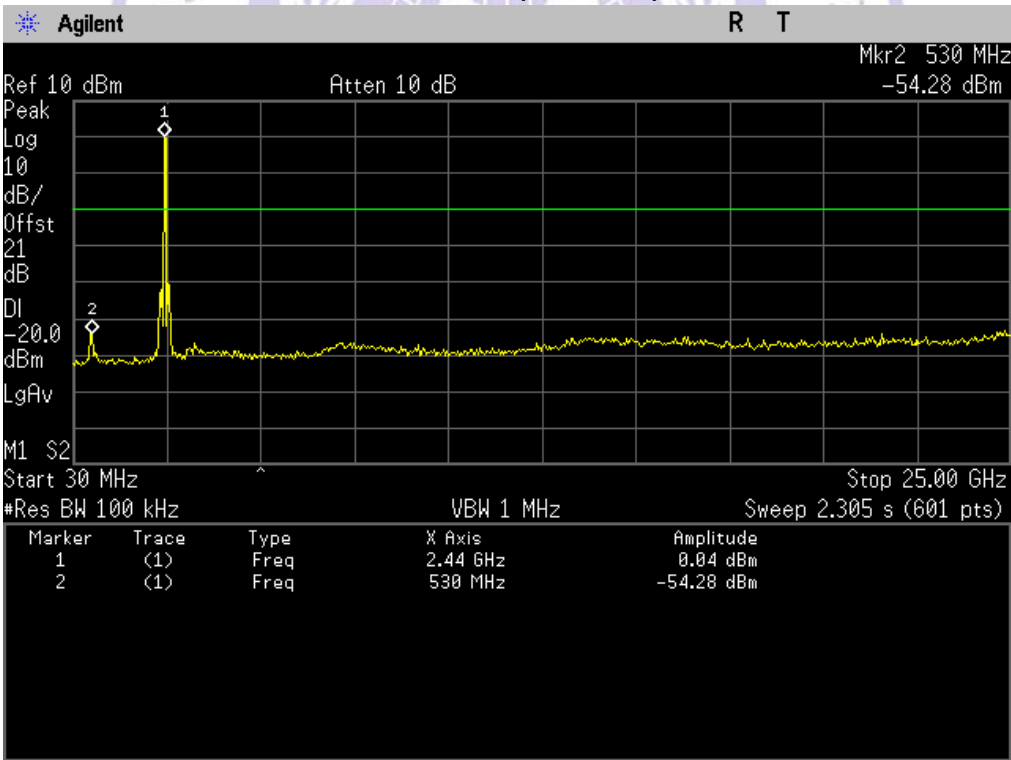
Channel 01 (2412MHz)



Channel 06 (2437MHz)

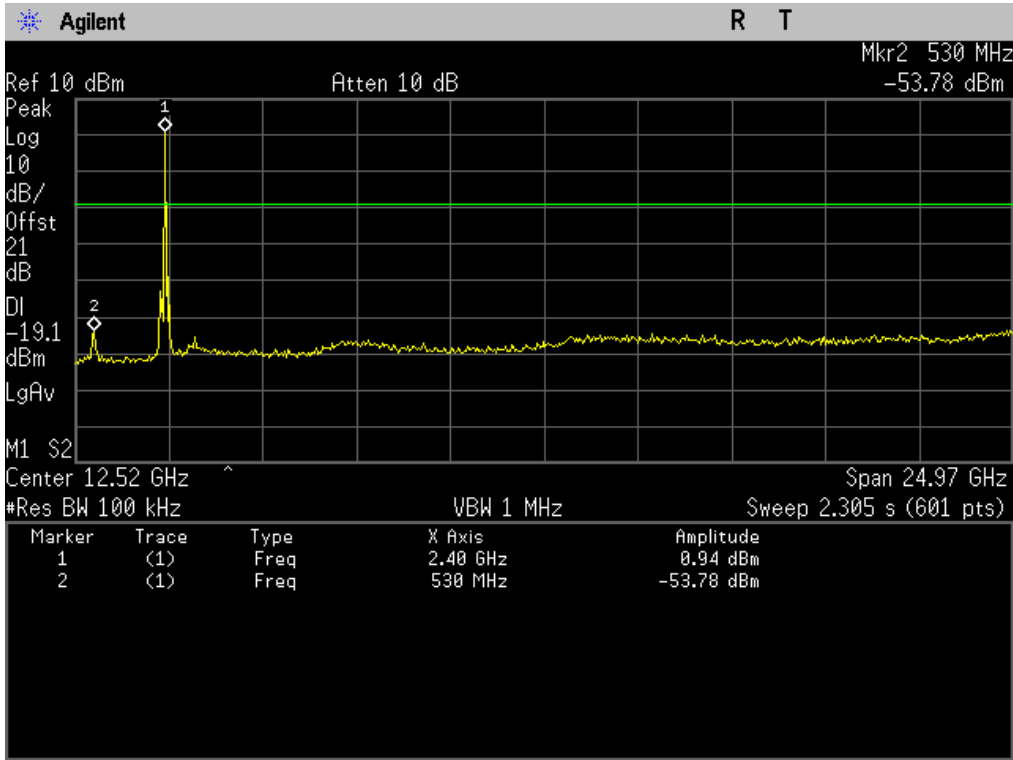


Channel 11 (2462MHz)

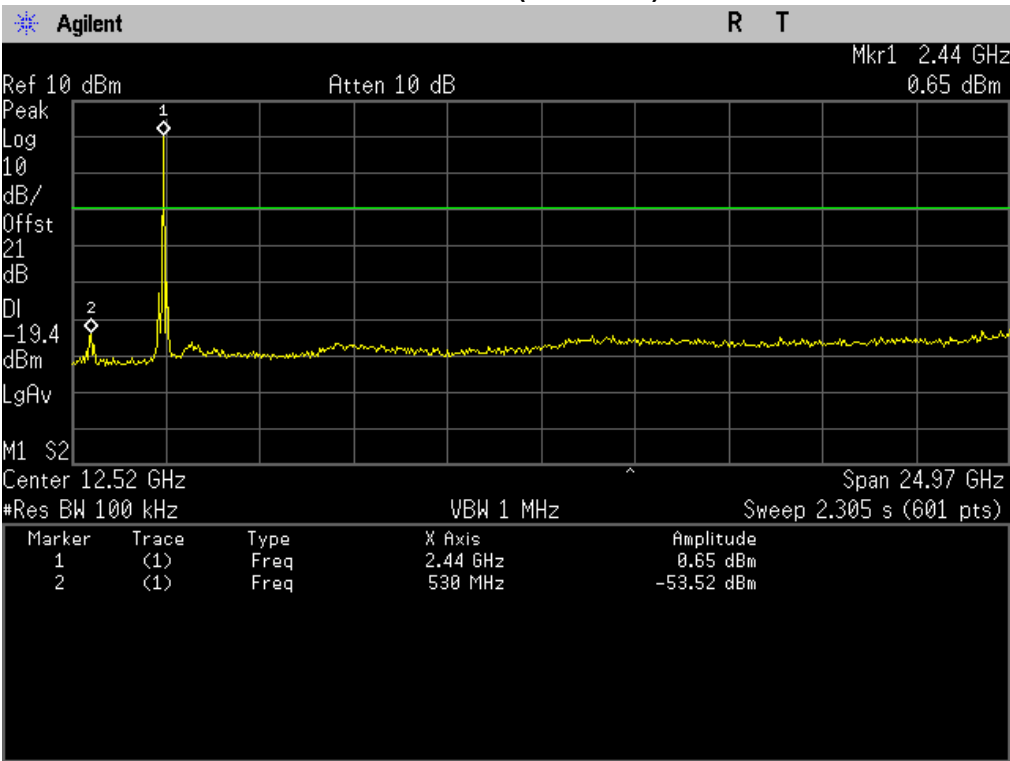


Product	:	RedPort Satellite Optimizer
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz)

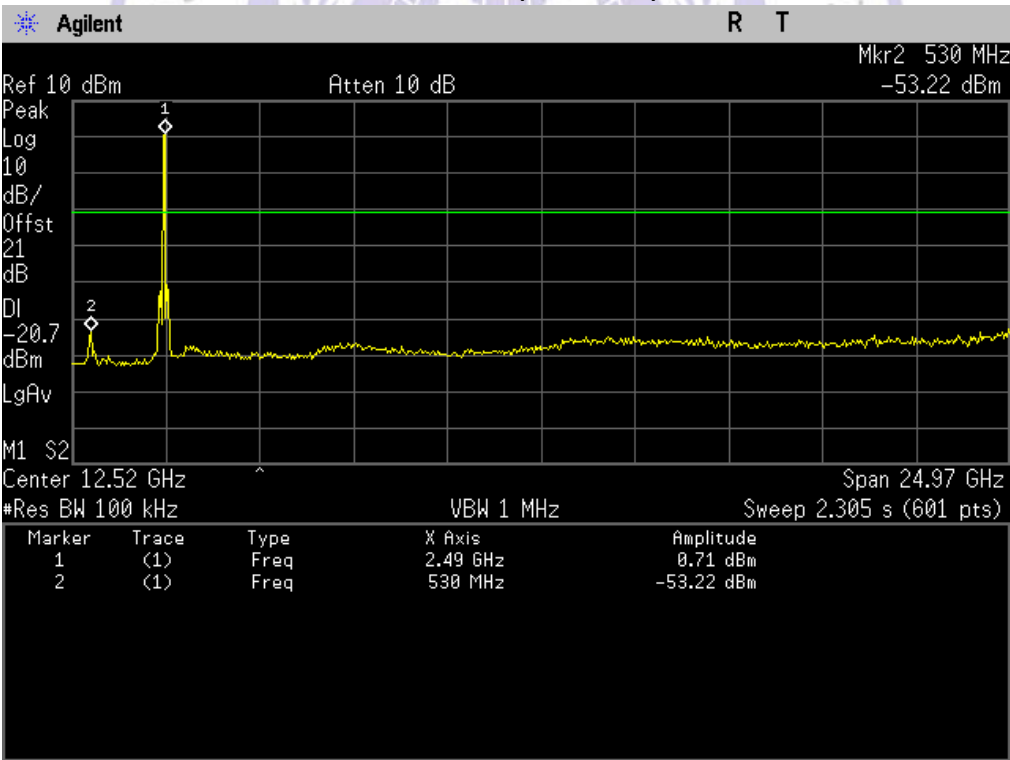
Channel 01 (2412MHz)



Channel 06 (2437MHz)

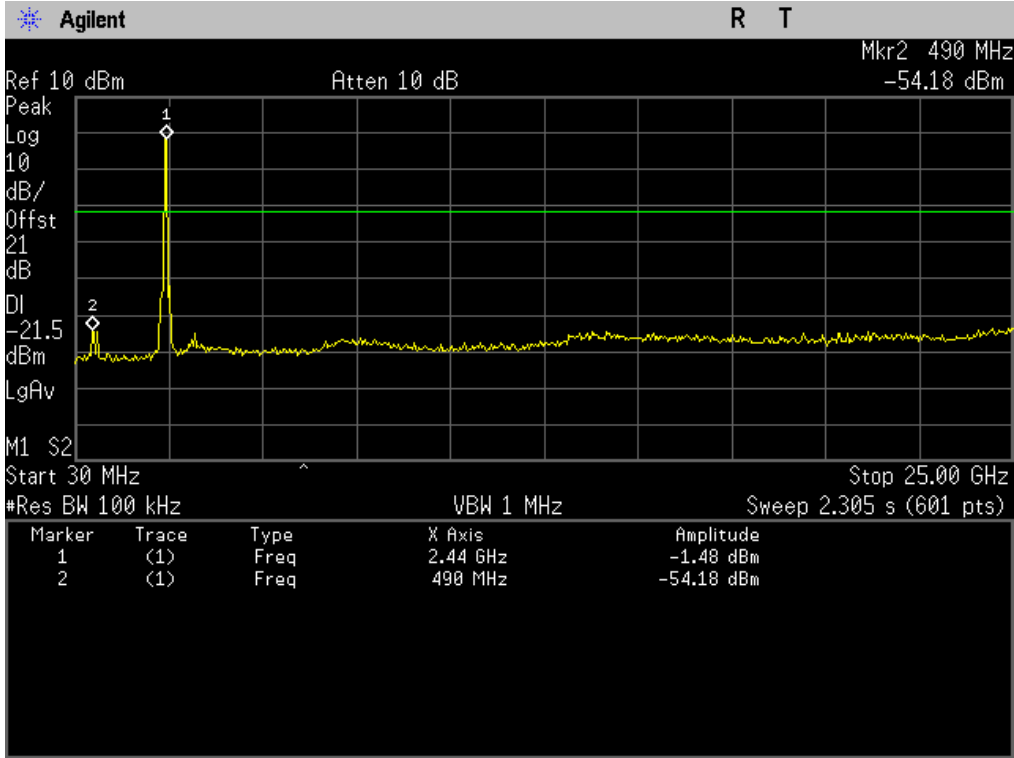


Channel 11 (2462MHz)

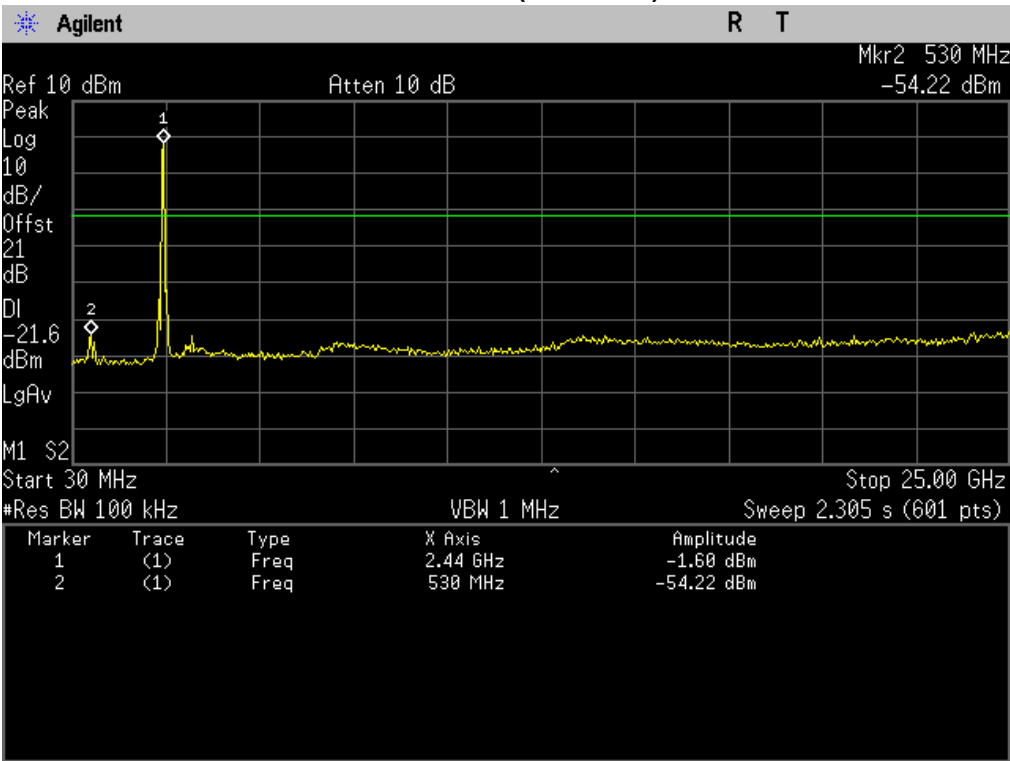


Product	:	RedPort Satellite Optimizer
Test Item	:	RF Antenna Conducted Spurious
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz)

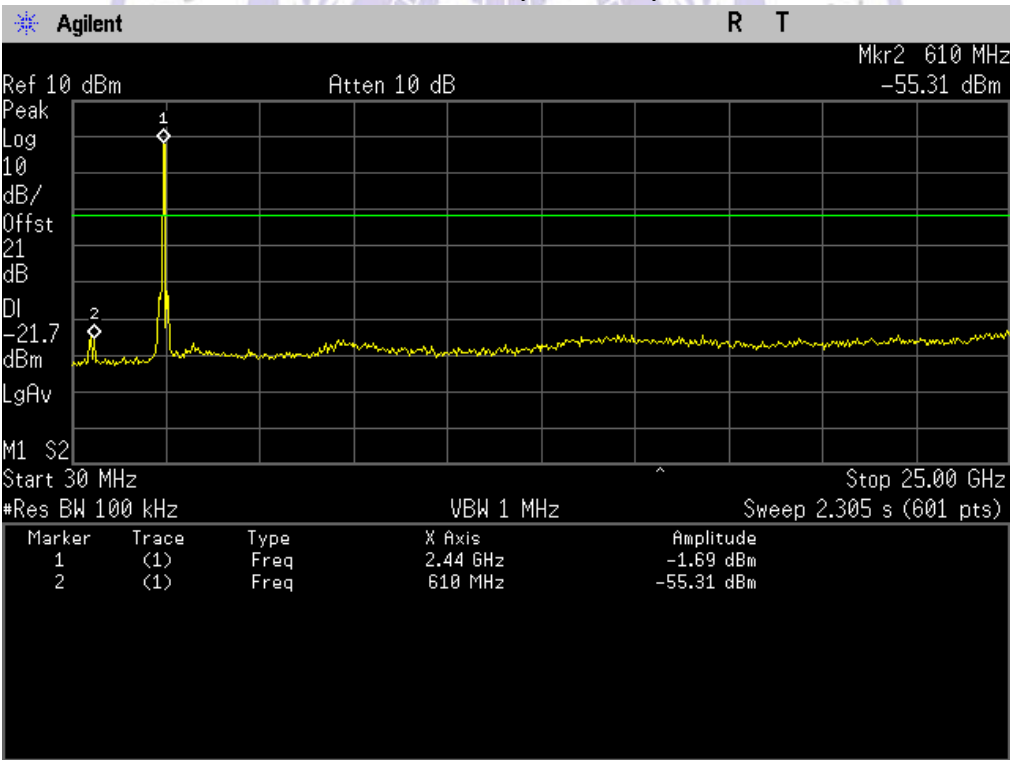
Channel 03 (2422MHz)



Channel 06 (2437MHz)

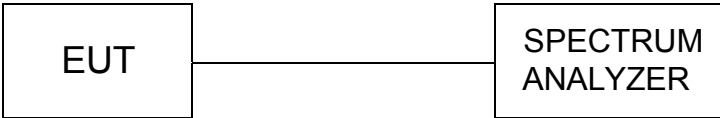


Channel 09 (2452MHz)



4.8. Operation Frequency Range of 20dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

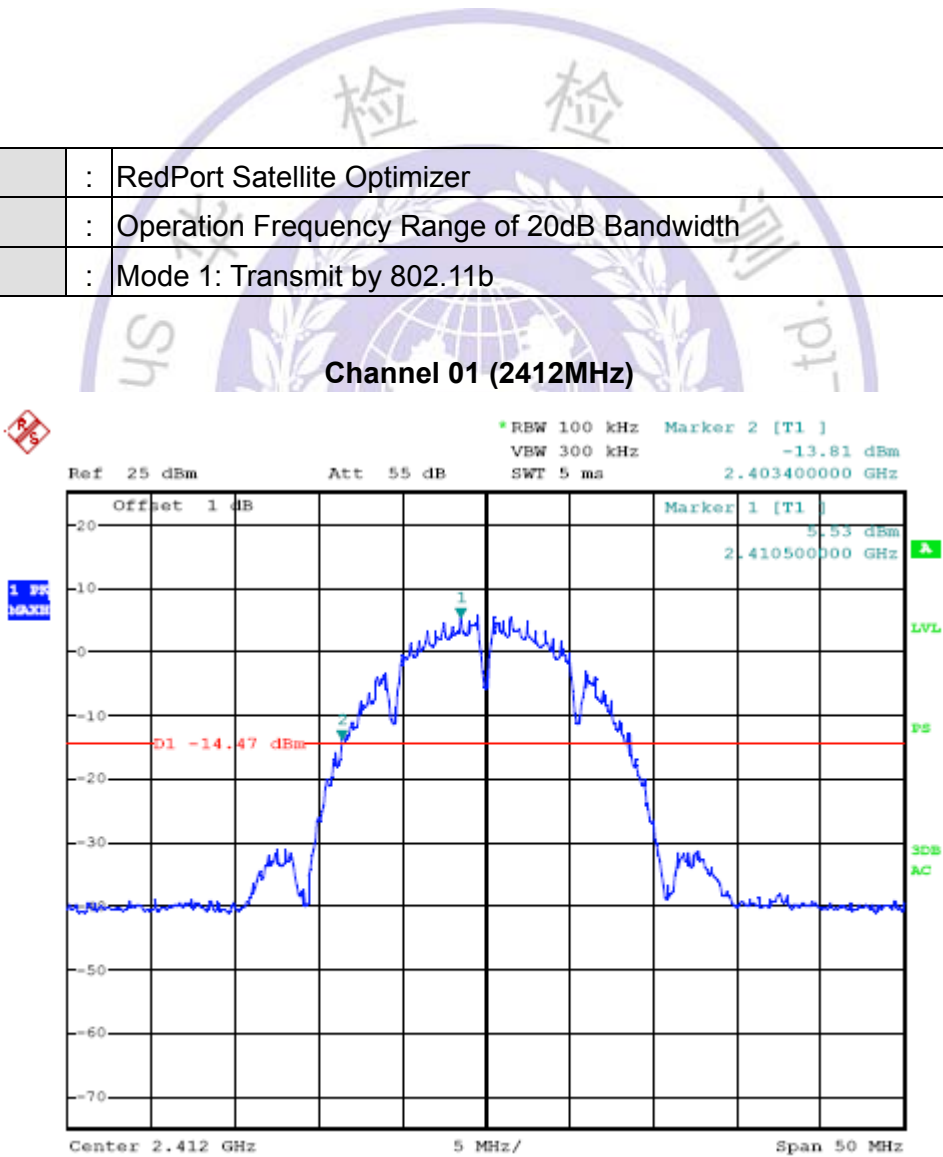
The EUT was tested according to KDB558074 D01 v03r01 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Span greater than RBW.

LIMIT

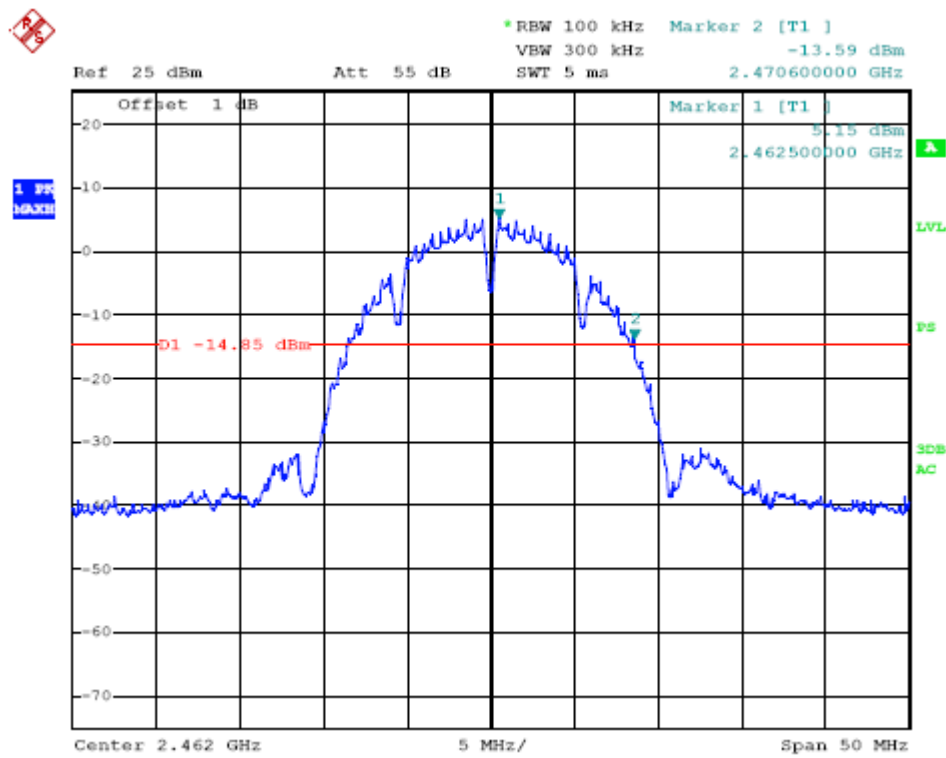
20 dB bandwidth of the emission is contained within the operation frequency band.

TEST RESULT

Product	:	RedPort Satellite Optimizer
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Mode	:	Mode 1: Transmit by 802.11b

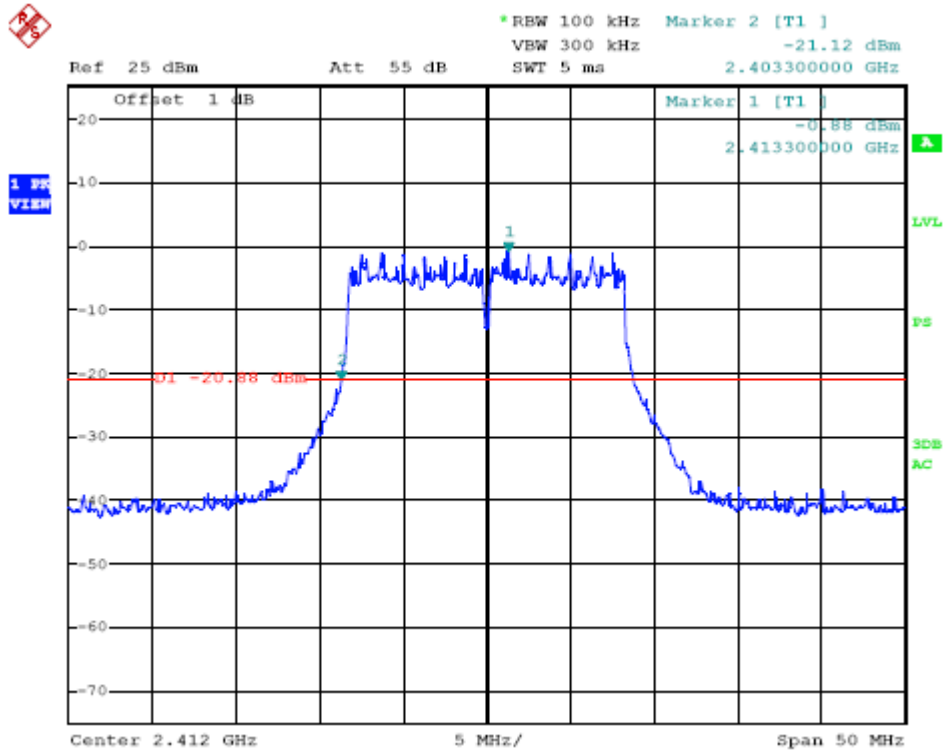


Channel 11 (2462MHz)

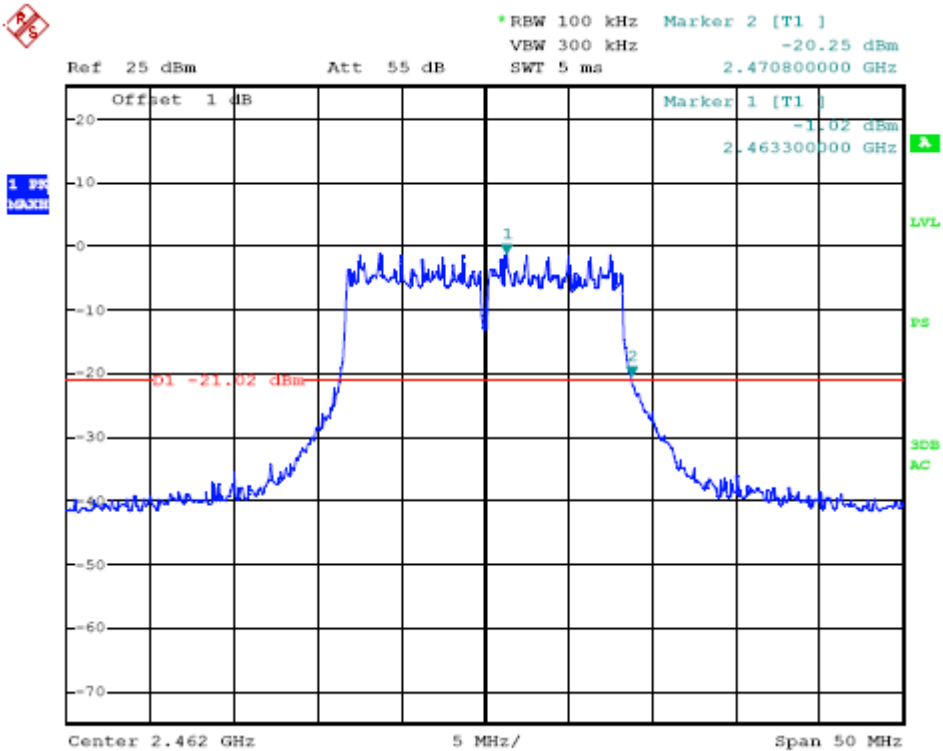


Product	:	RedPort Satellite Optimizer
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Mode	:	Mode 2: Transmit by 802.11g

Channel 01 (2412MHz)

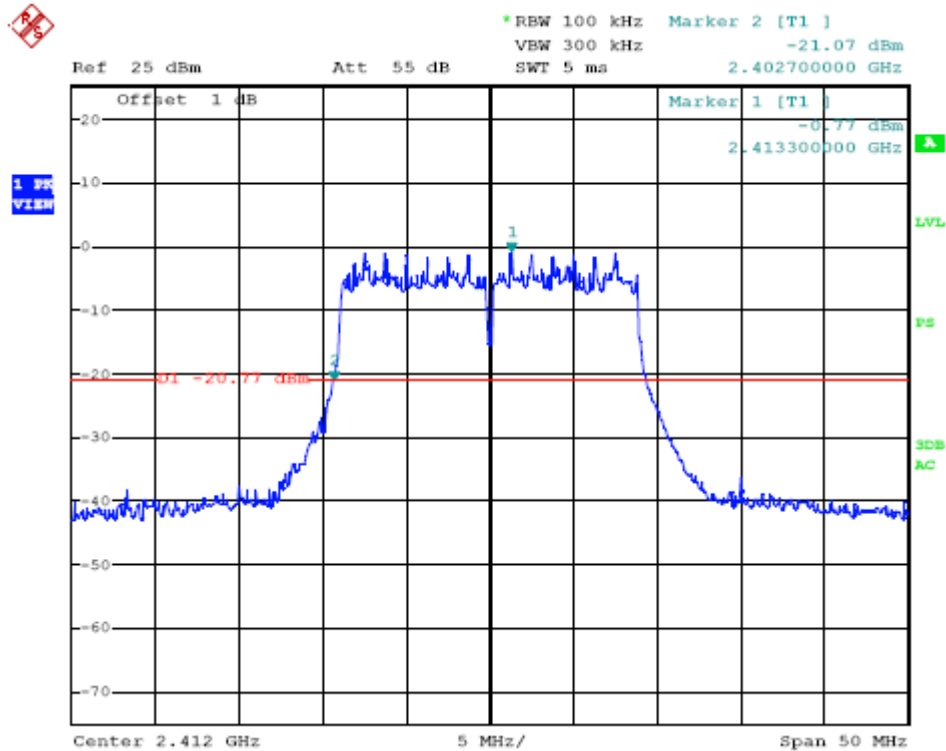


Channel 11 (2462MHz)

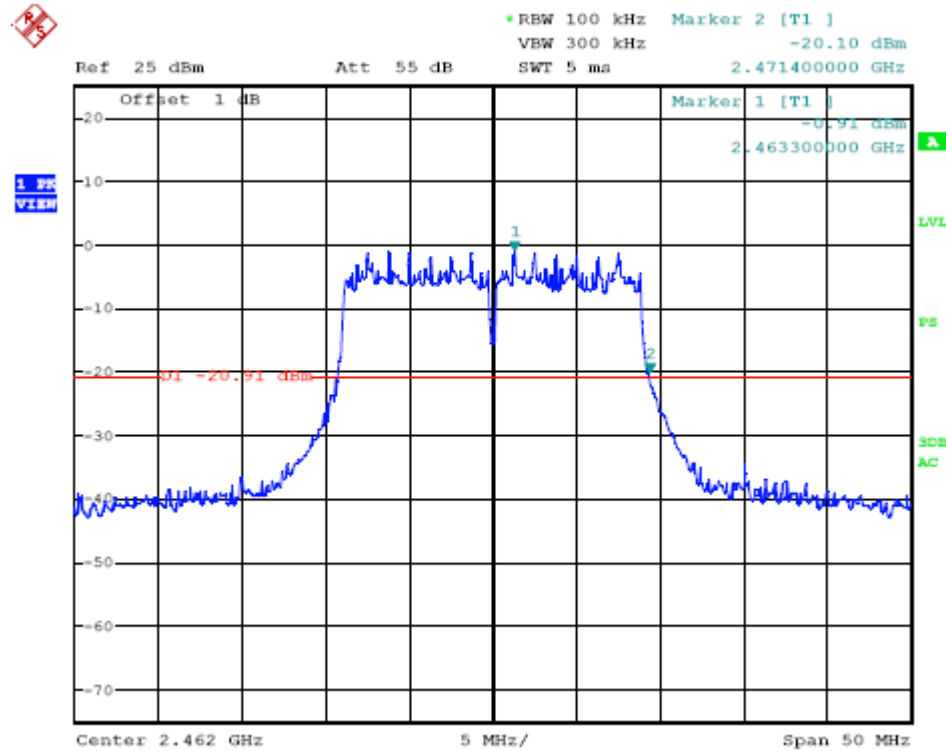


Product	:	RedPort Satellite Optimizer
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Mode	:	Mode 3: Transmit by 802.11n (20MHz)

Channel 01 (2412MHz)

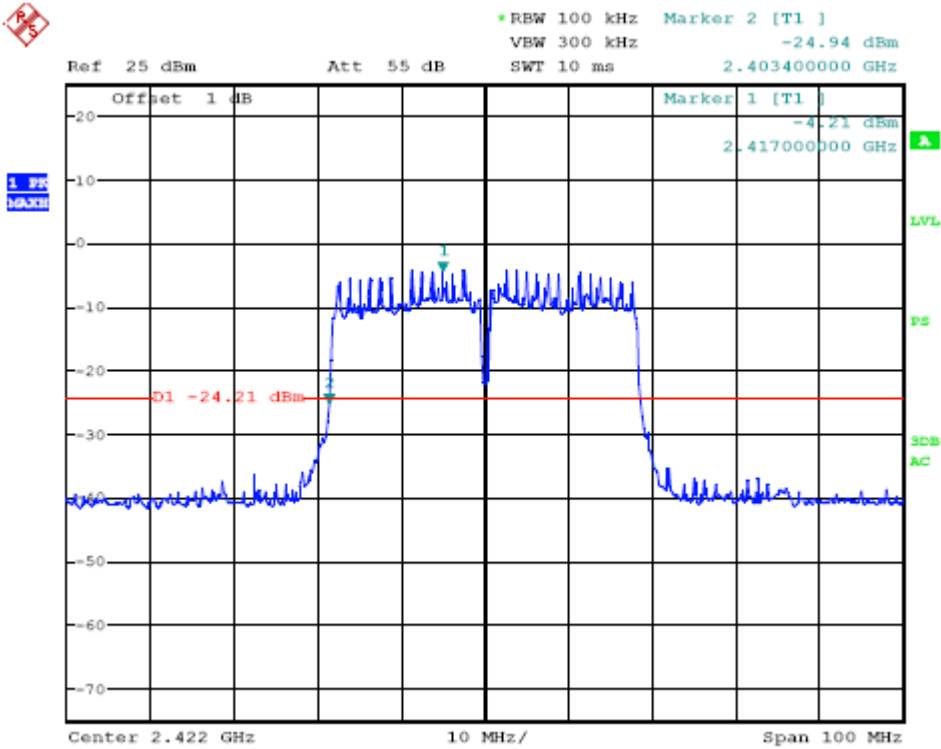


Channel 11 (2462MHz)

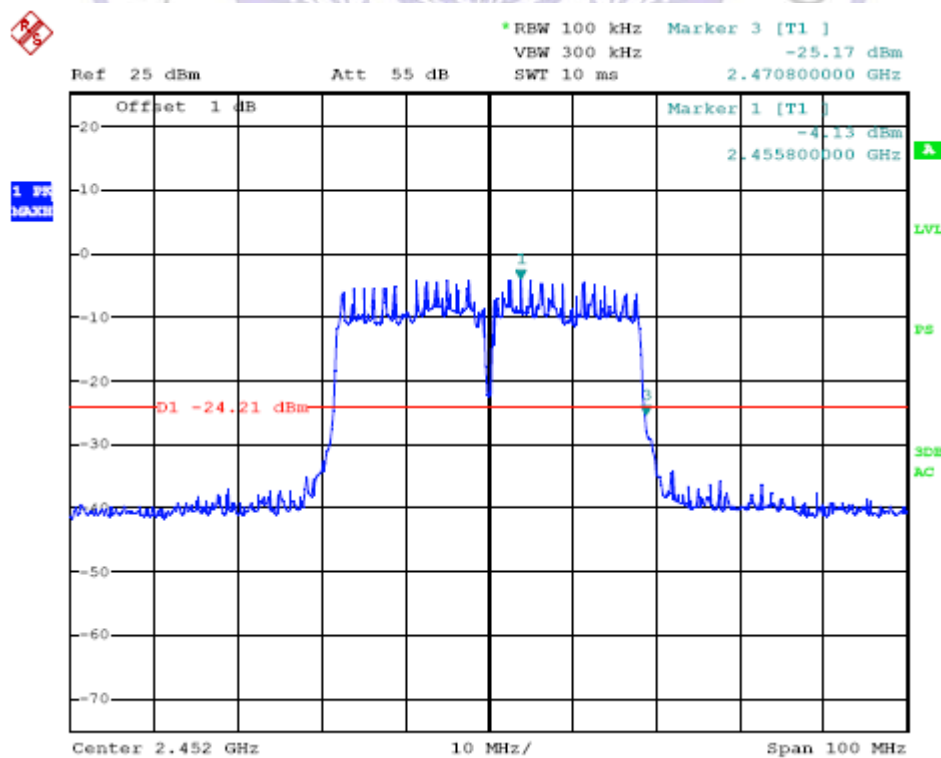


Product	:	RedPort Satellite Optimizer
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Mode	:	Mode 4: Transmit by 802.11n (40MHz)

Channel 03 (2422MHz)



Channel 09 (2452MHz)



4.9. Antenna Requirement

STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

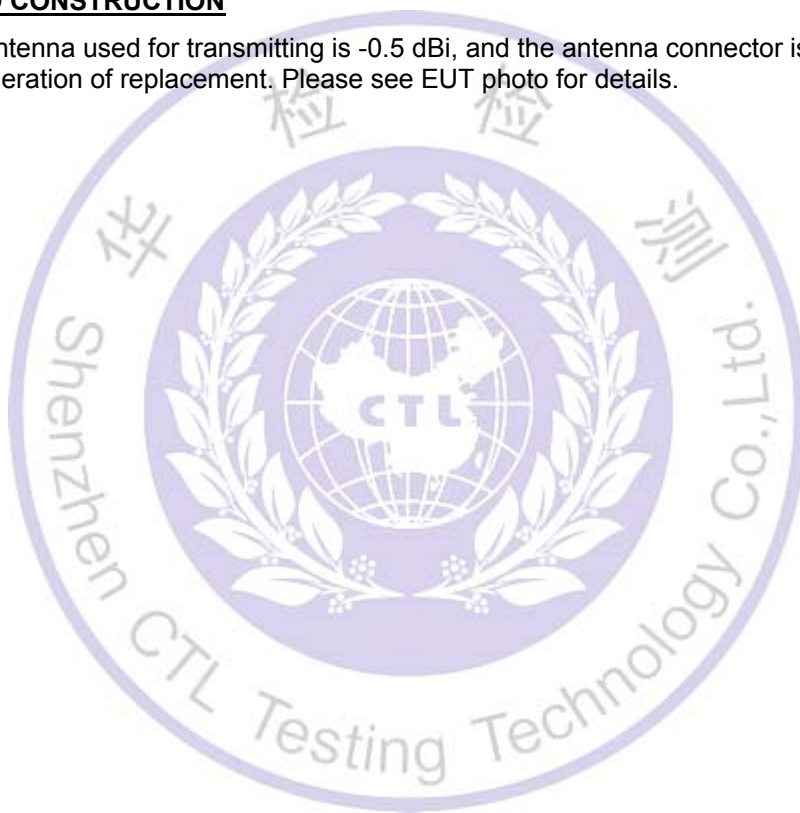
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

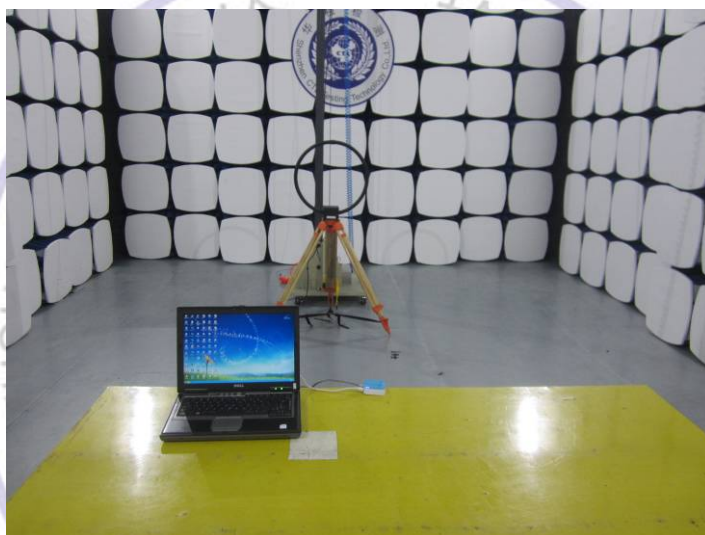
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

ANTENNA CONNECTED CONSTRUCTION

The directional gains of antenna used for transmitting is -0.5 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.



5. Test Setup Photos of the EUT

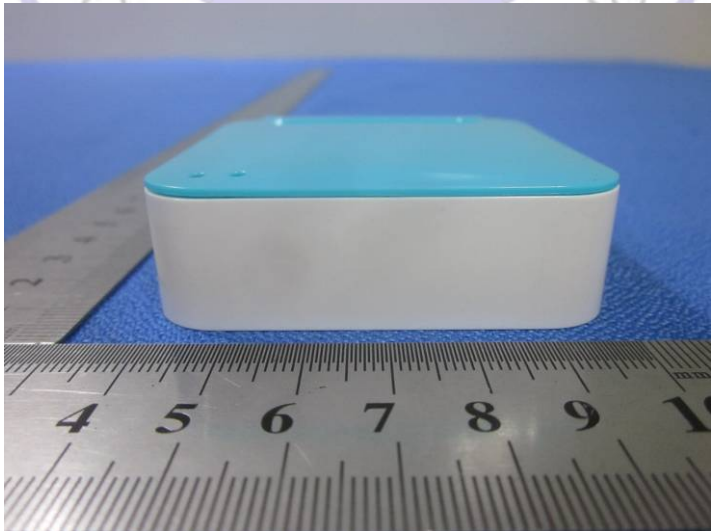
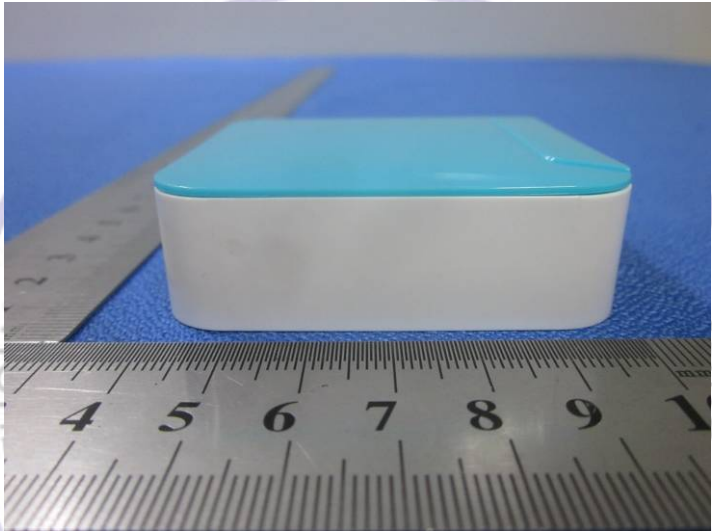




6. External and Internal Photos of the EUT

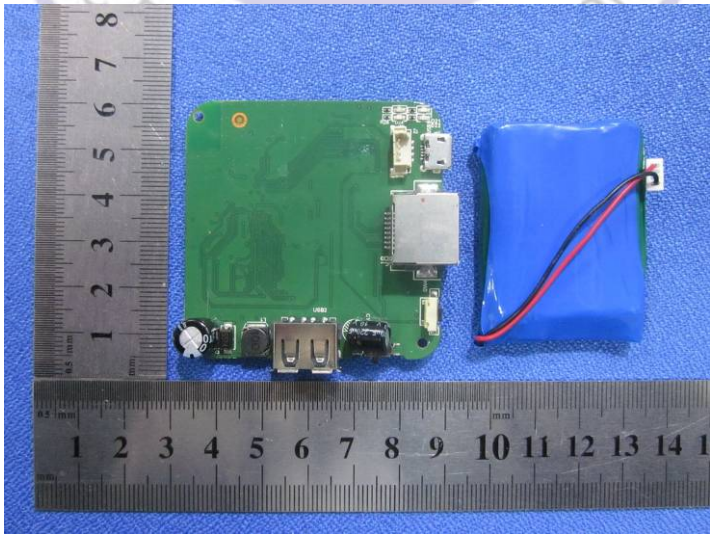
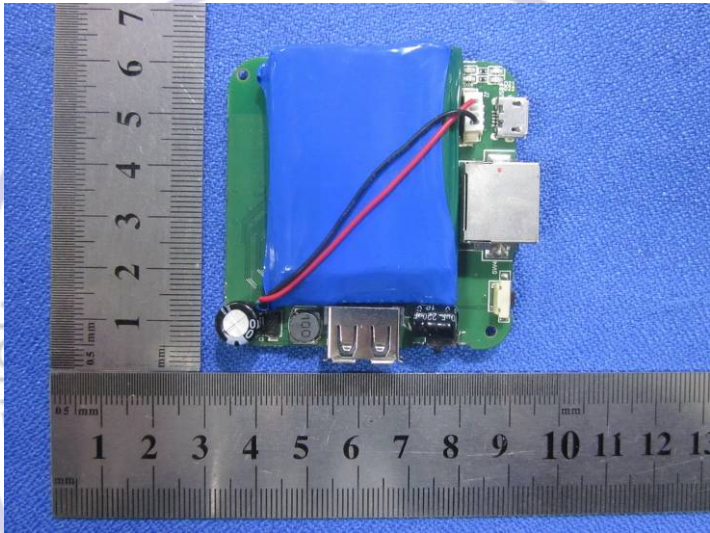
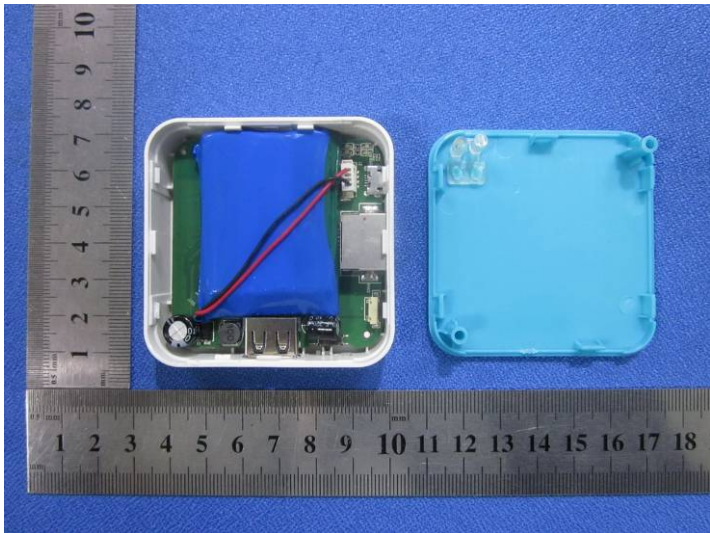
External Photos of EUT

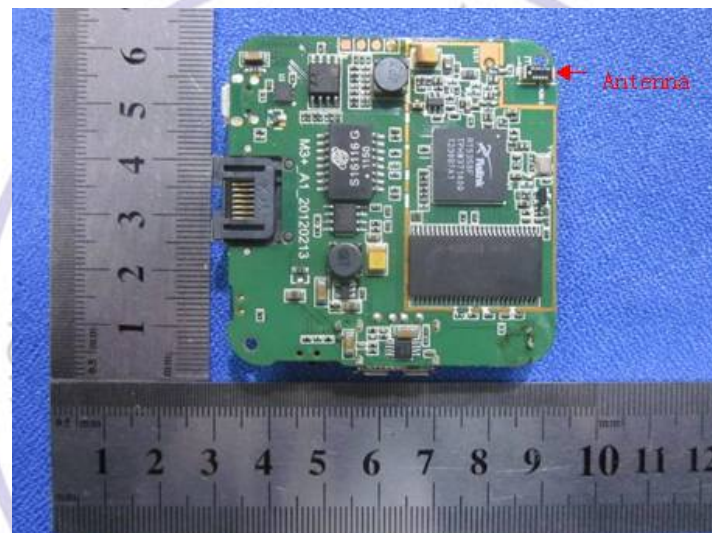
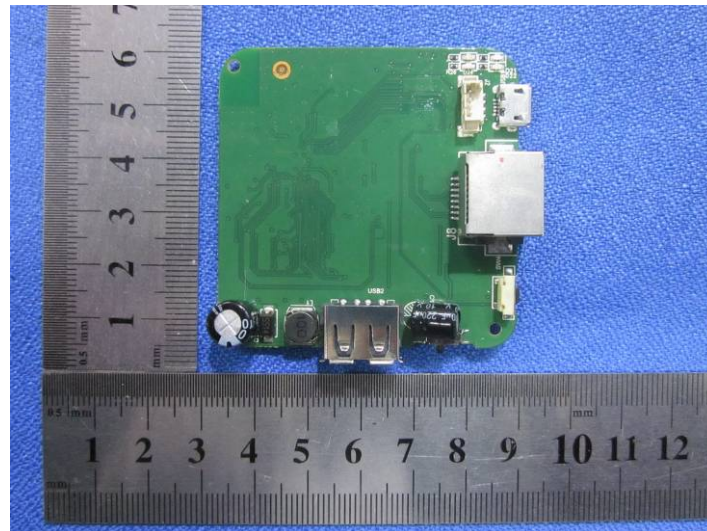






Internal Photos of EUT





.....End of Report.....