

FCC TEST REPORT
for
BearExtender

BearExtender PC
Model No.: BE300

Prepared for : BearExtender
Address : 1406 Henry Street, Berkeley, California, 94709, USA

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited
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Report Number : R011504778I
Date of Test : Apr. 27~ May 29, 2015
Date of Report : Jun. 02, 2015

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TEST REPORT

Applicant : BearExtender
Manufacturer : Hk Suncon Ltd.
EUT : BearExtender PC
Model No. : BE300
Serial No. : N.A.
Trade Mark : BearExtender
Rating : DC 5V, 200mA

Measurement Procedure Used:
FCC Part15 Subpart C, Paragraph 15.247

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Apr. 27~ May 29, 2015

Prepared by :

Kebo Zhang

(Tested Engineer / Kebo Zhang)

Reviewer :

Amy Ding

(Project Manager / Amy Ding)

Approved & Authorized Signer :

Tom Chen

(Manager / Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : BearExtender PC

Model Number : BE300

Test Power Supply : DC 5V via USB Port

RF Transmission : 2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20))
Frequency : 2422MHz~2452MHz (802.11n(HT40))

Channels : 11 For (802.11b/802.11g/802.11n(HT20))
7 For (802.11n(HT40))

Modulation : 802.11b CCK
802.11g OFDM
802.11n MCS

Antenna Gain: : 4dBi

Applicant : BearExtender
Address : 1406 Henry Street, Berkeley, California, 94709, USA

Manufacturer : Hk Suncon Ltd.
Address : Room1103A, Jinhua building, Gaofeng road in Dalang, longhua new district, Baoan, Shenzhen ,China.

Factory : BearExtender
Address : 1406 Henry Street, Berkeley, California, 94709, USA

Date of receipt : Apr. 27, 2015

Date of Test : Apr. 27~ May 29, 2015

1.2. Auxiliary Equipment Used during Test

PC	: Manufacturer: DELL M/N: Optiplex 3020 MT S/N: CN-079V51-70163-4AD-089K-A00 Input Rating: AC 100-240V, 50-60Hz 5.4A CE , FCC DOC, CCC
MONITOR	: Manufacturer: DELL M/N: UZ2215Hf S/N: CN-035VN6-72872-45A-A3AB Input Rating: AC 100-240V, 50-60Hz, 1.5A Output Rating: DC 19.5V, 4.62A TUV-GS FCC CE KCC VCCI
KEYBOARD	: Manufacturer: DELL M/N: SK-8120 S/N: CN-0DJ365-71616-49J-0MVR-A00 Input Rating: DC 5V,0.05A CE FCC VCCI KCC TUV-GS Cable: 1.8m, unshielded
MOUSE	: Manufacturer: DELL M/N: MS111-T S/N: CN-0KW2YH-71616-488-1CBJ Input Rating: DC 5V,0.1A Cable: 1.8m, unshielded CE FCC VCCI KCC TUV-GS
Printer	: Manufacturer:Brother M/N: MFC-3360C S/N: N/A CE, FCC:DOC
Power Line	: Non-Shielded, 1.5m
VGA Cable	: Non-Shielded, 1.5m

1.3. Description of Test Facility

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

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, 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 752021, July 10, 2013.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, February 22, 2013.

Test Location

All Emissions tests were performed at Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.4. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.1 dB (Horizontal)
Ur = 4.3 dB (Vertical)

Conduction Uncertainty : Uc = 3.4dB

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC Part 15, Paragraph 15.247.

2.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107, 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15, Paragraph 15.247(b)(1)	Maximum Output Power	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS	Complies
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-	N/A
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS	Complies

2.2. Description of Test Modes

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps lowest data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps lowest data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20): Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with MCS 0 Mbps lowest data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT40): Channel 3(2422MHz), Channel 6(2437MHz) and Channel 9(2452MHz) with MCS 0 Mbps lowest data rate (the worst case) are chosen for the final testing.

2.3. List of channels:

√ - available

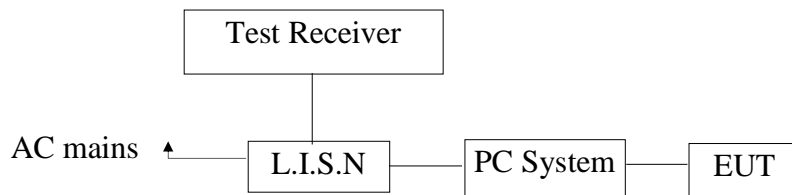
X - tested

Number	Frequency(MHz)		802.11 b/g/n (HT20)	802.11 b/g/n (HT40)
1	2412	√	X	
2	2417	√		
3	2422	√		X
4	2427	√		
5	2432	√		
6	2437	√	X	X
7	2442	√		
8	2447	√		
9	2452	√		X
10	2457	√		
11	2462	√	X	

3. Conducted Emission Test

3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



3.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

- Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT and simulator as shown as Section 3.1.
- 3.4.2. Turn on the power of all equipment.
- 3.4.3. Let the EUT work in test mode (On) and measure it.

3.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 3.6.

3.6. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 17, 2015	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 17, 2015	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 17, 2015	1 Year

3.7. Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150KHz to 30 MHz is investigated.

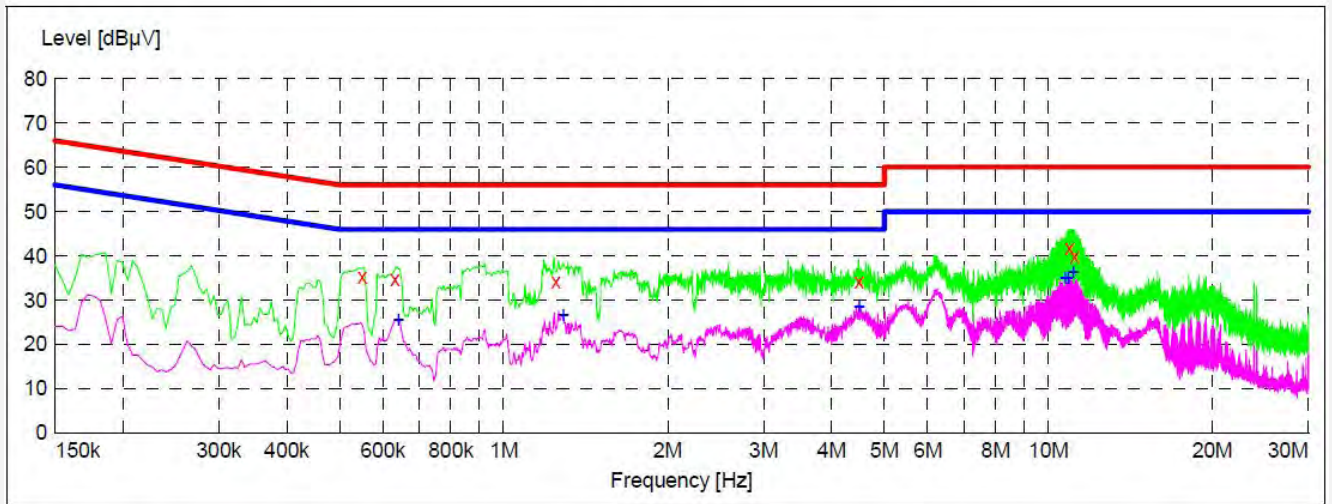
Please refer the following pages.

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
 Operating Condition: On
 Test Specification: DC 5V via USB Port
 Comment: Live Line
 Tem.:25°C Hum.:50%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.550500	35.30	20.1	56	20.7	QP	L1	GND
0.631500	34.70	20.1	56	21.3	QP	L1	GND
1.247500	34.10	20.2	56	21.9	QP	L1	GND
4.483000	34.30	20.5	56	21.7	QP	L1	GND
10.918000	41.70	20.6	60	18.3	QP	L1	GND
11.170000	39.90	20.6	60	20.1	QP	L1	GND

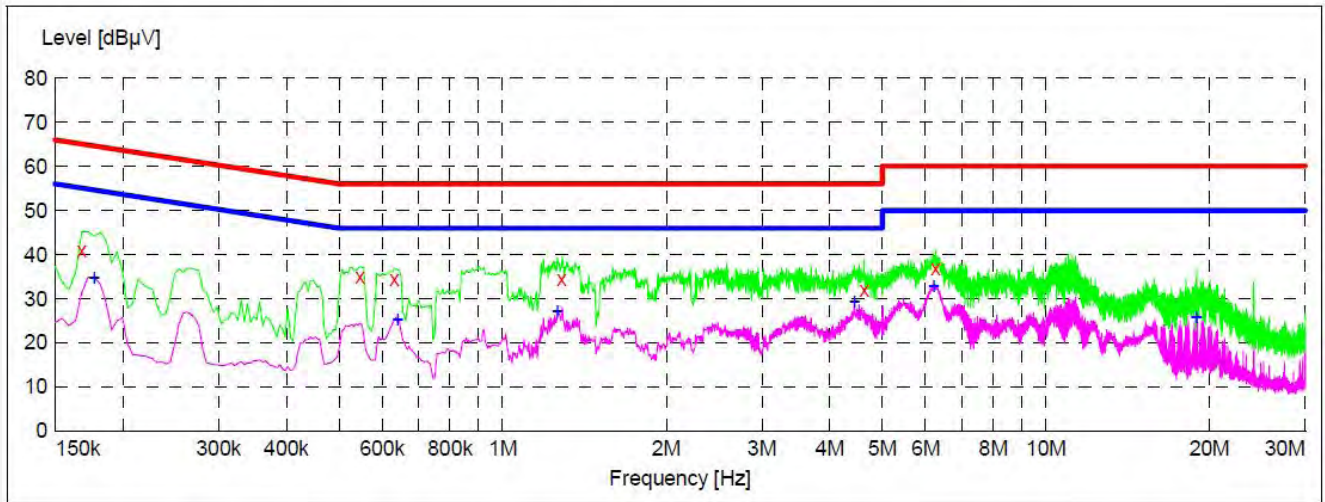
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.640500	25.40	20.1	46	20.6	AV	L1	GND
1.288000	26.80	20.2	46	19.2	AV	L1	GND
4.487500	28.60	20.5	46	17.4	AV	L1	GND
10.724500	35.00	20.6	50	15.0	AV	L1	GND
10.859500	35.00	20.6	50	15.0	AV	L1	GND
11.120500	36.30	20.6	50	13.7	AV	L1	GND

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
 Operating Condition: On
 Test Specification: DC 5V via USB Port
 Comment: Neutral Line
 Tem.:25°C Hum.:50%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages

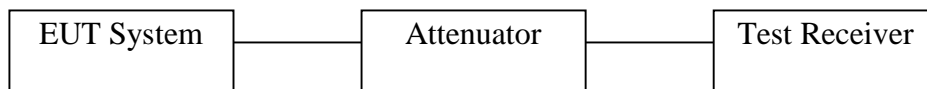


Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	41.00	20.1	65	24.1	QP	N	GND
0.546000	35.00	20.1	56	21.0	QP	N	GND
0.631500	34.50	20.1	56	21.5	QP	N	GND
1.283500	34.60	20.2	56	21.4	QP	N	GND
4.622500	32.20	20.5	56	23.8	QP	N	GND
6.251500	37.10	20.5	60	22.9	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	34.90	20.1	55	19.7	AV	N	GND
0.640500	25.20	20.1	46	20.8	AV	N	GND
1.261000	27.30	20.2	46	18.7	AV	N	GND
4.438000	29.50	20.5	46	16.5	AV	N	GND
6.206500	32.90	20.5	50	17.1	AV	N	GND
18.941500	25.90	20.8	50	24.1	AV	N	GND

4. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

4.1 Test Setup



4.2 6dB Bandwidth

a. Limit

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

b. Test Procedure

1. Place the EUT on the table and set it in the 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 $\geq 3 \times$ RBW = 300kHz,
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

20dB Bandwidth:

C63.10

Occupied Bandwidth (OBW=20dB Bandwidth)

1. Set RBW=1%~5% OBW
2. Set the VBW $\geq 3 \times$ RBW
3. Set the span range between 2 times and 5 times of the OBW
4. Sweep Time= Auto
Detector= Peak
Trace= Max hold
5. Once the reference level is established, the equipment is conditioned with typical modulating signals to produce the worst case (i.e. the widest) bandwidth. Unless otherwise specified for an unlicensed wireless device, measure the bandwidth at the -20dB levels with respect to the reference level.

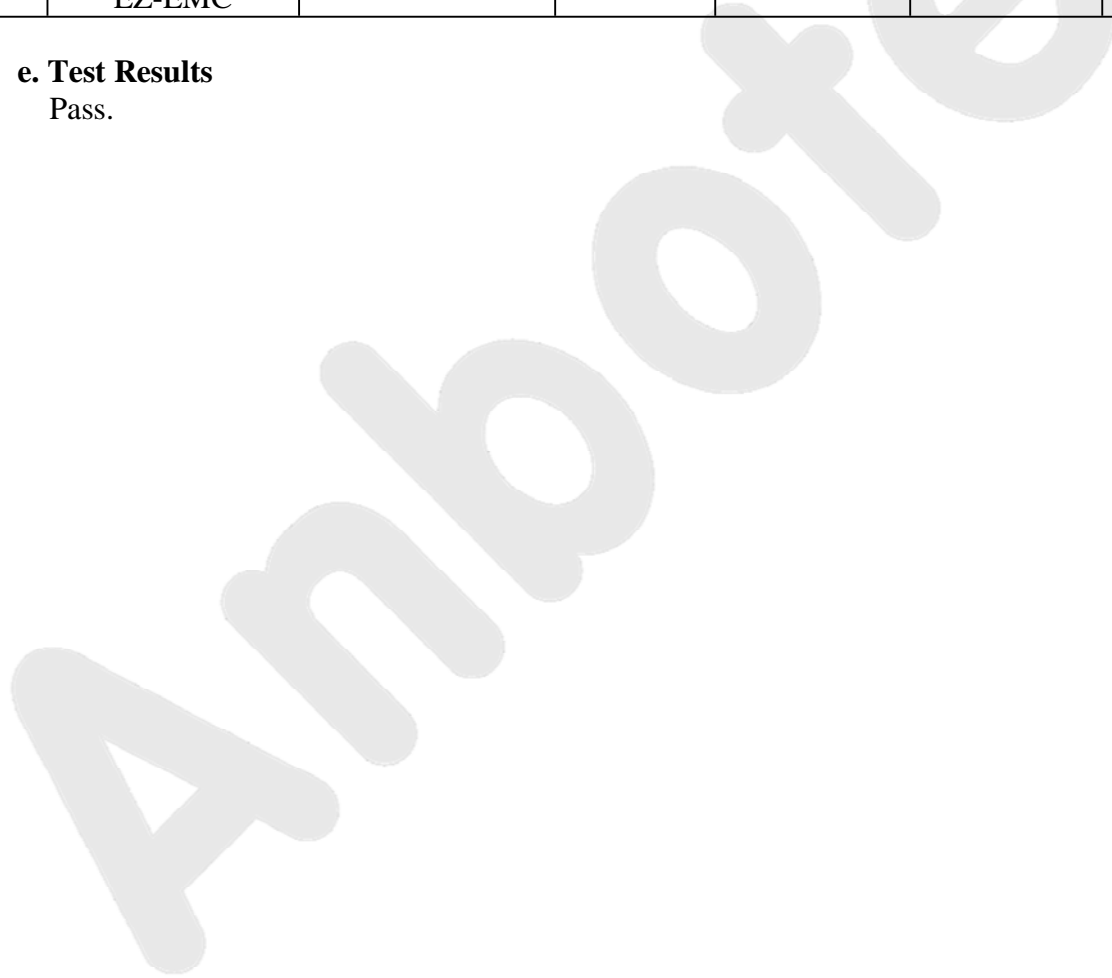
c. Test Setup See 4.1

d. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Apr. 17, 2015	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Apr. 17, 2015	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 17, 2015	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 20, 2015	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 20, 2015	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 17, 2015	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

e. Test Results

Pass.



f. Test Data

6dB Bandwidth

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	12.84		Pass
Mid	2437	12.76	>500	Pass
High	2462	12.76		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.48		Pass
Mid	2437	16.48	>500	Pass
High	2462	16.48		Pass

Test mode: IEEE 802.11n (HT20)

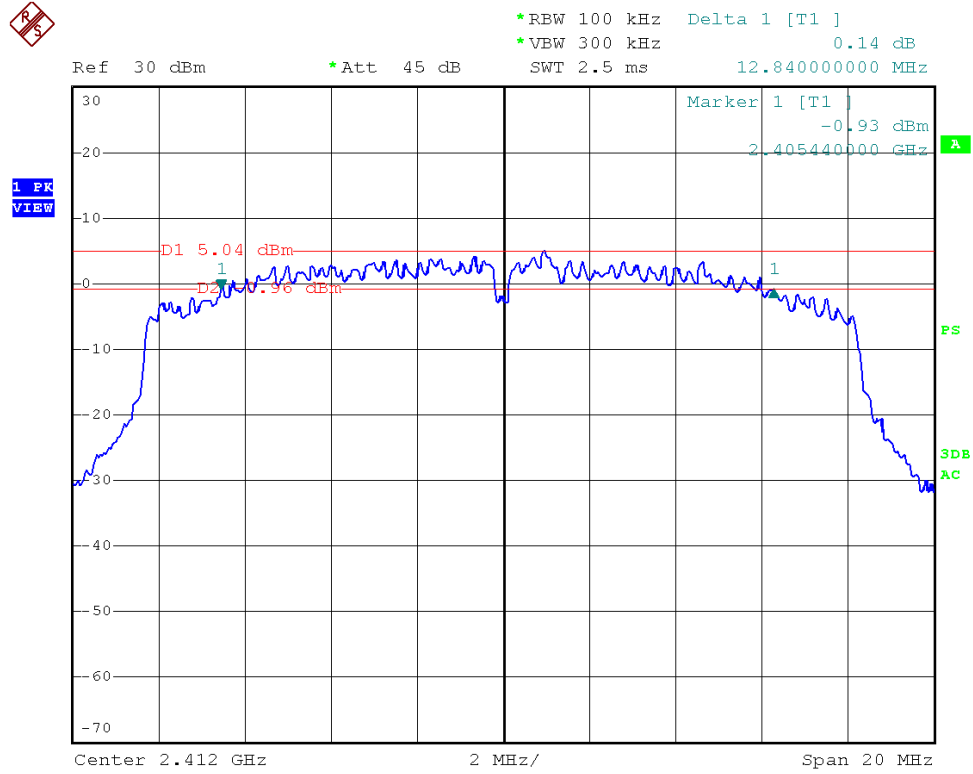
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.48		Pass
Mid	2437	16.48	>500	Pass
High	2462	16.48		Pass

Test mode: IEEE 802.11n (HT40)

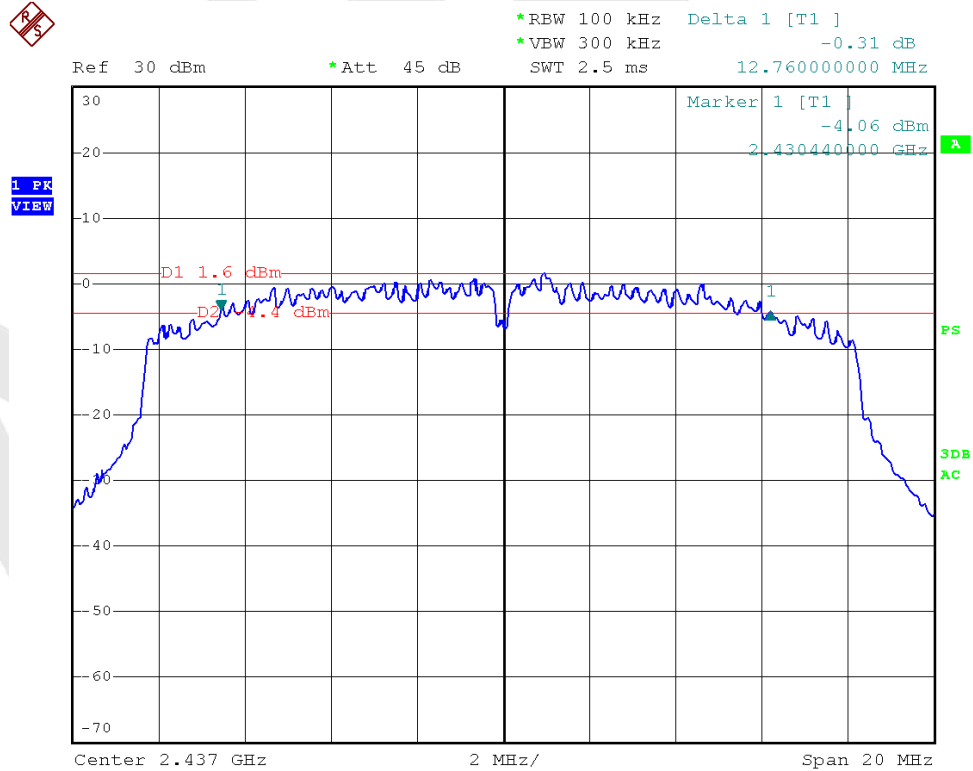
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2422	36.40		Pass
Mid	2437	35.44	>500	Pass
High	2452	35.52		Pass

Test Plots See the following page.

Test Mode: 802.11b---Low



Test Mode: 802.11b---Mid

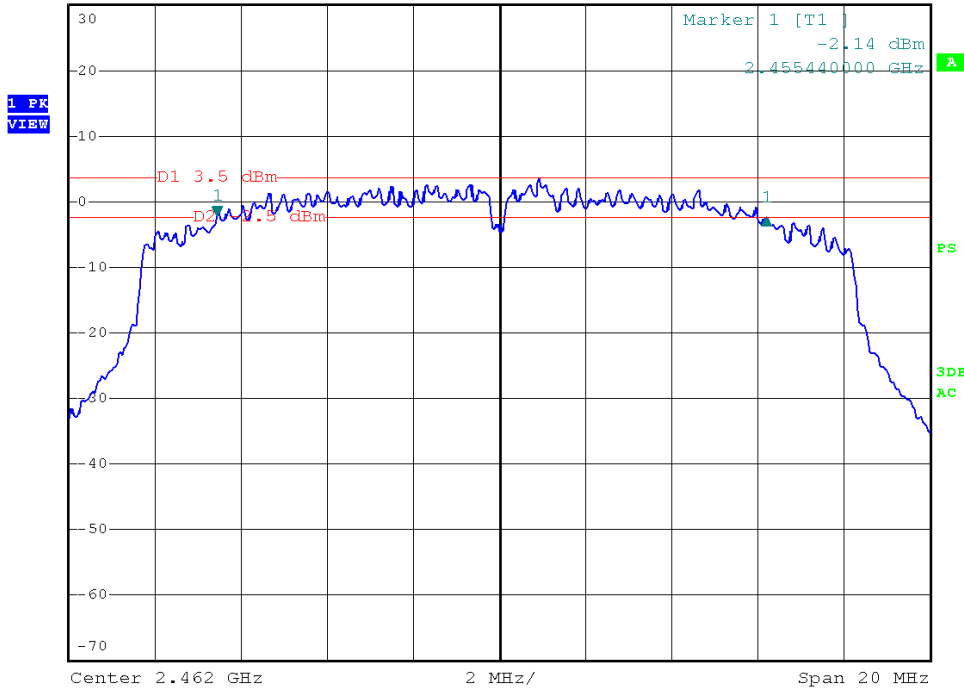


Test Mode: 802.11b---High



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.40 dB
SWT 2.5 ms 12.760000000 MHz

Ref 30 dBm *Att 45 dB

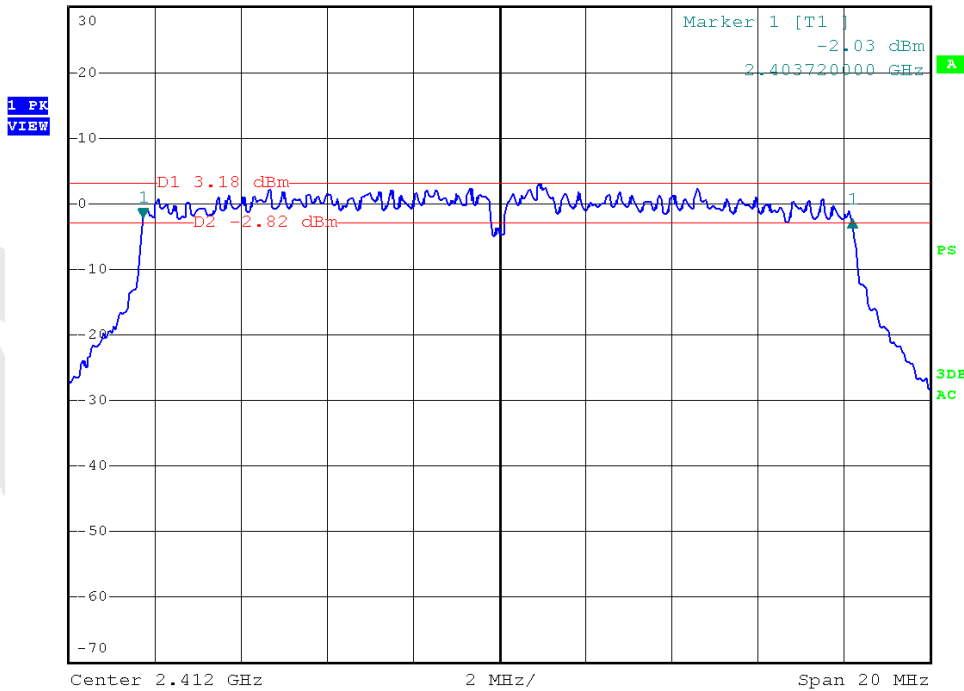


Test Mode: 802.11g---Low



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.42 dB
SWT 2.5 ms 16.480000000 MHz

Ref 30 dBm *Att 45 dB

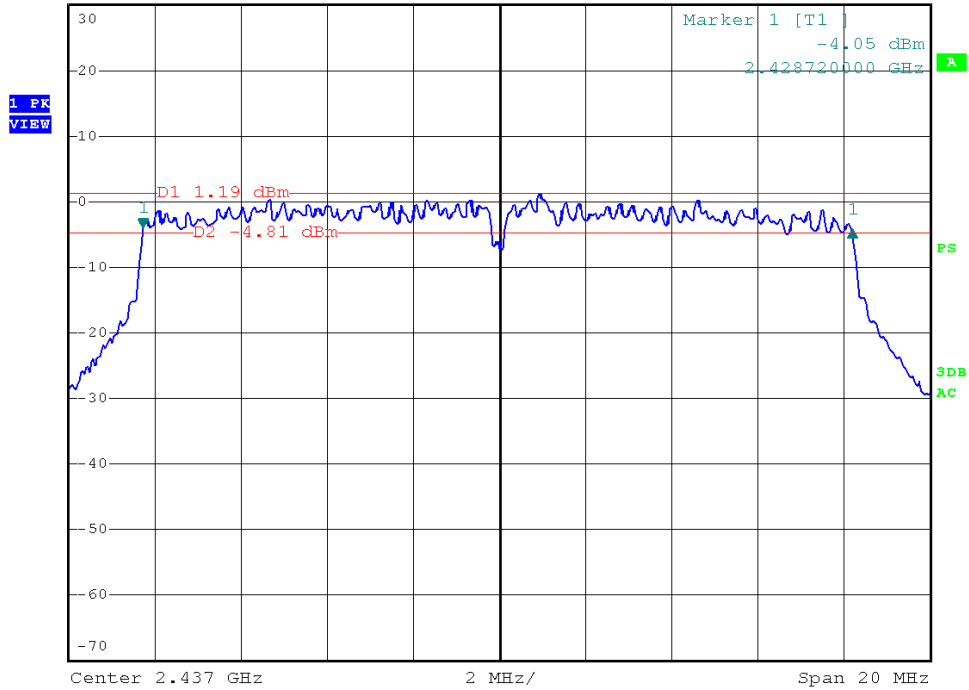


Test Mode: 802.11g---Mid



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.32 dB
SWT 2.5 ms 16.480000000 MHz

Ref 30 dBm *Att 45 dB

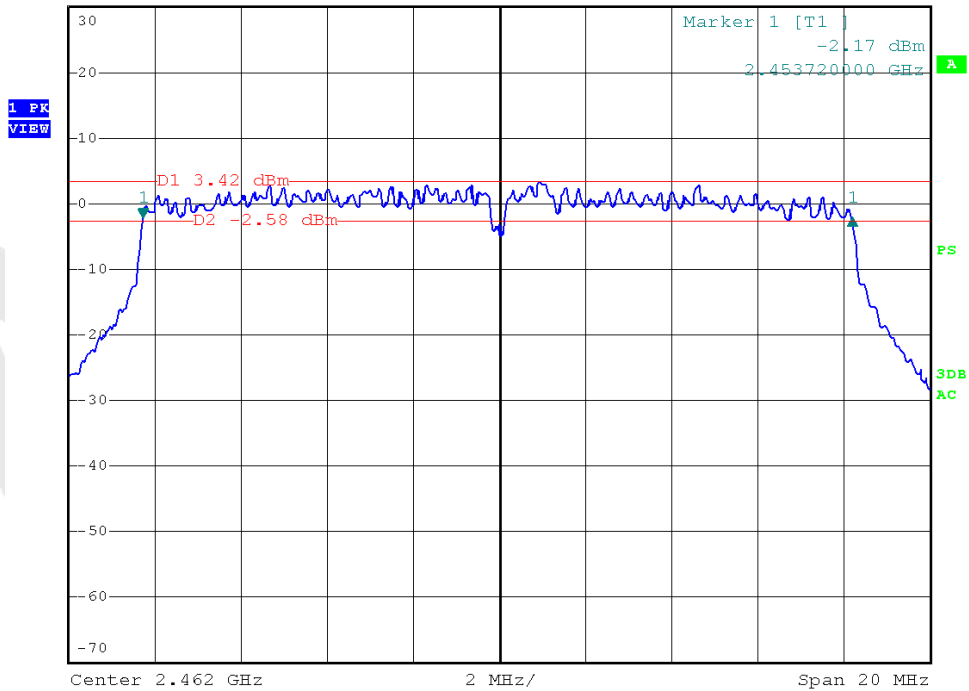


Test Mode: 802.11g---High



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz 0.15 dB
SWT 2.5 ms 16.480000000 MHz

Ref 30 dBm *Att 45 dB

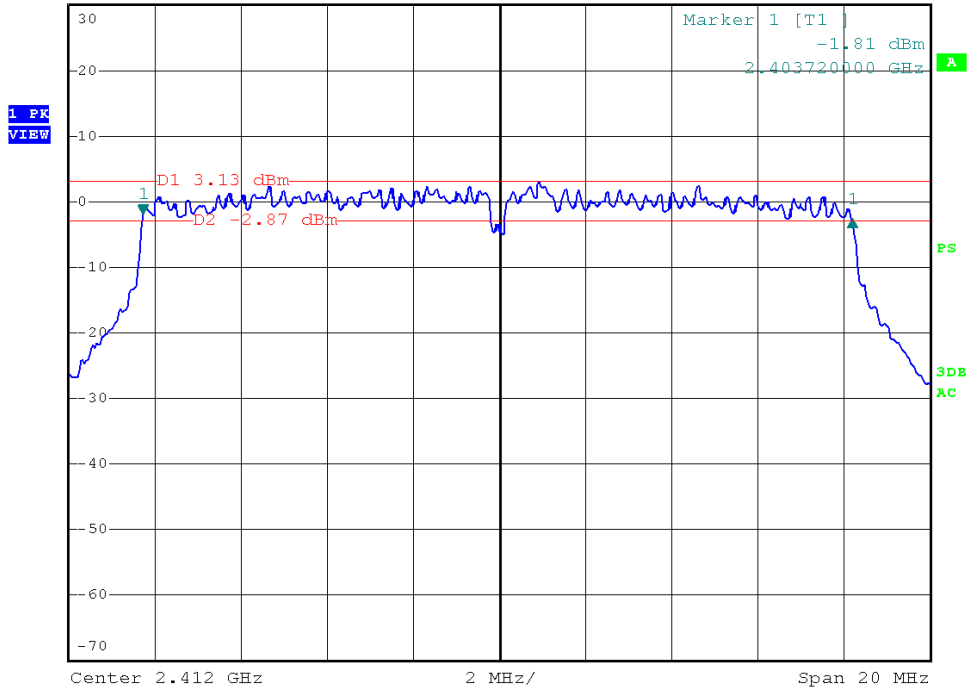


Test Mode: 802.11n (HT20)---Low



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.95 dB
SWT 2.5 ms 16.480000000 MHz

Ref 30 dBm *Att 45 dB

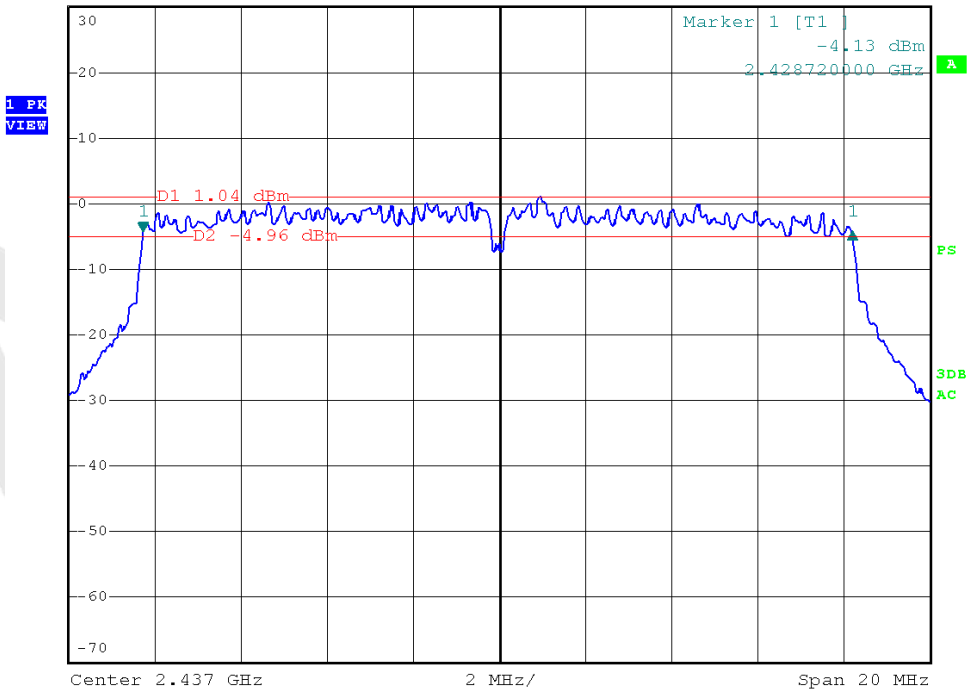


Test Mode: 802.11n (HT20)---Mid



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.25 dB
SWT 2.5 ms 16.480000000 MHz

Ref 30 dBm *Att 45 dB

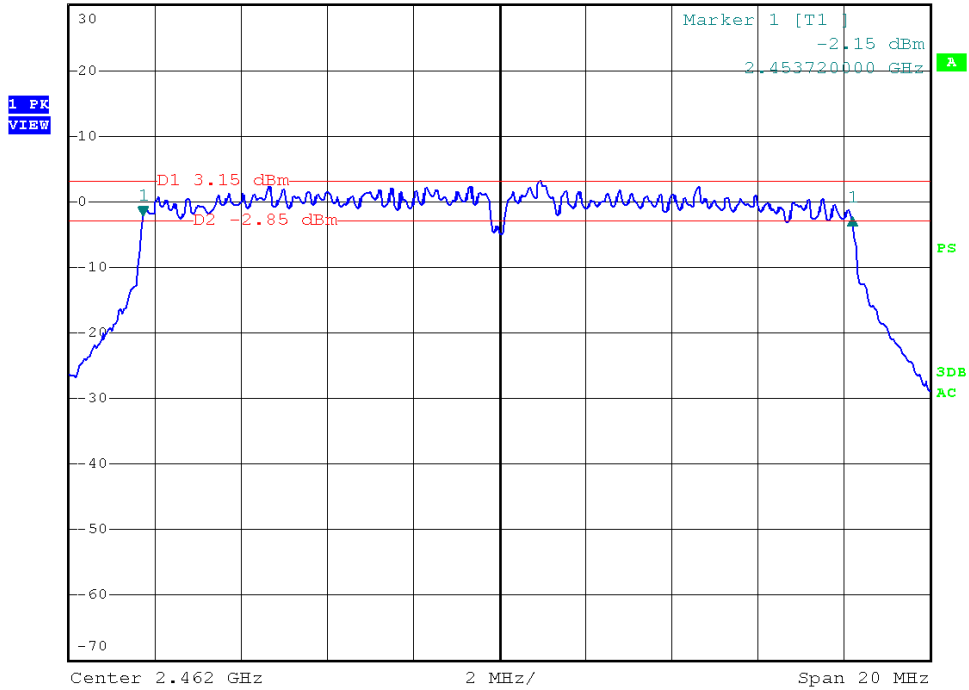


Test Mode: 802.11n (HT20)---High



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.18 dB
SWT 2.5 ms 16.480000000 MHz

Ref 30 dBm *Att 45 dB

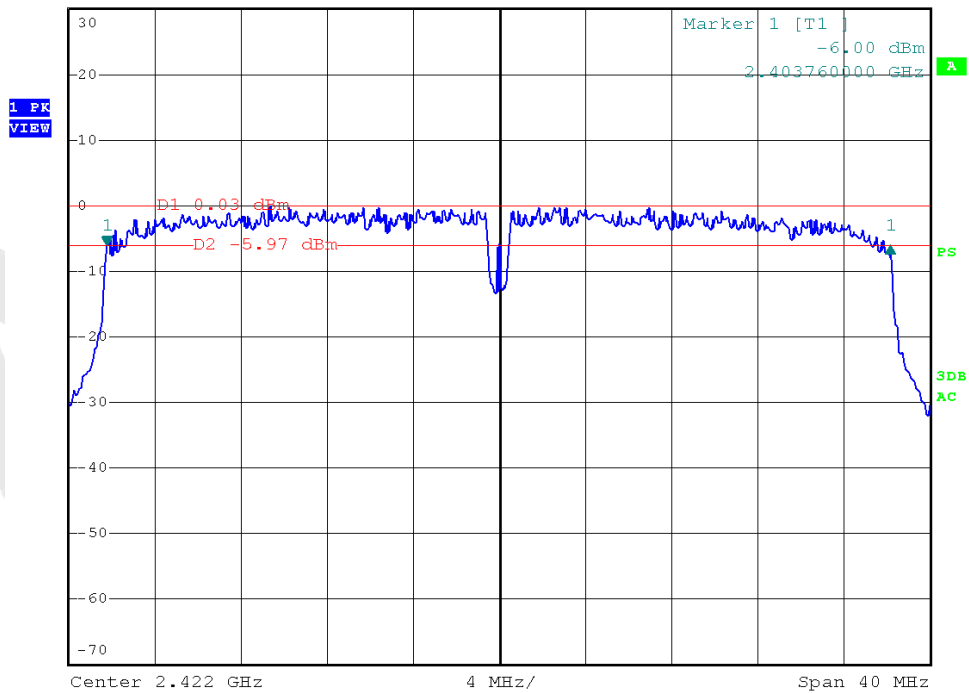


Test Mode: 802.11n (HT40)---Low



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.14 dB
SWT 5 ms 36.400000000 MHz

Ref 30 dBm *Att 45 dB

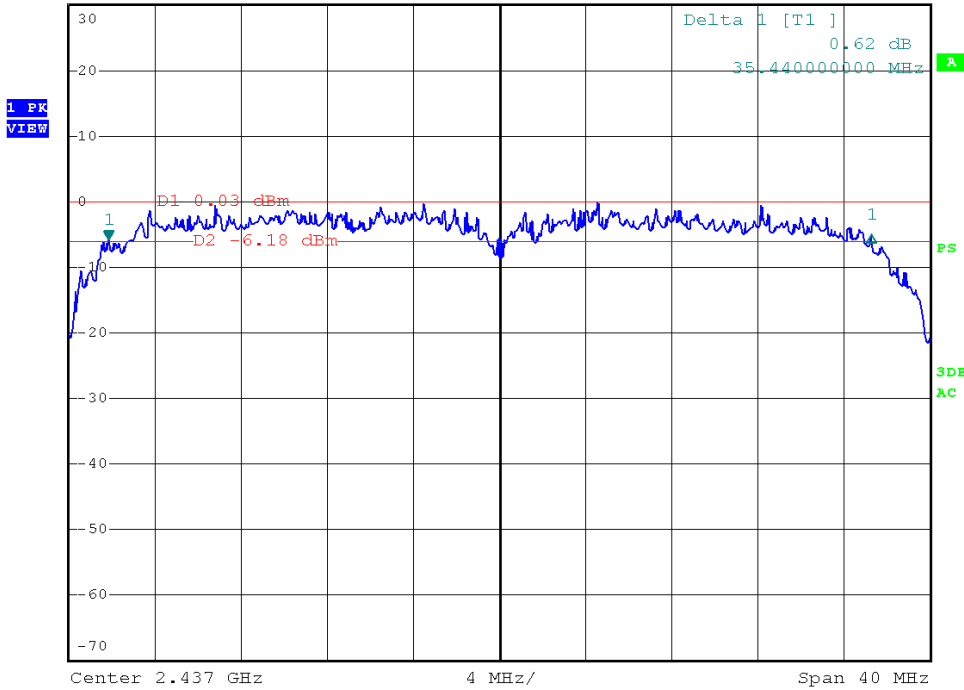


Test Mode: 802.11n (HT40)---Mid



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -5.70 dBm
SWT 5 ms 2.418840000 GHz

Ref 30 dBm *Att 45 dB

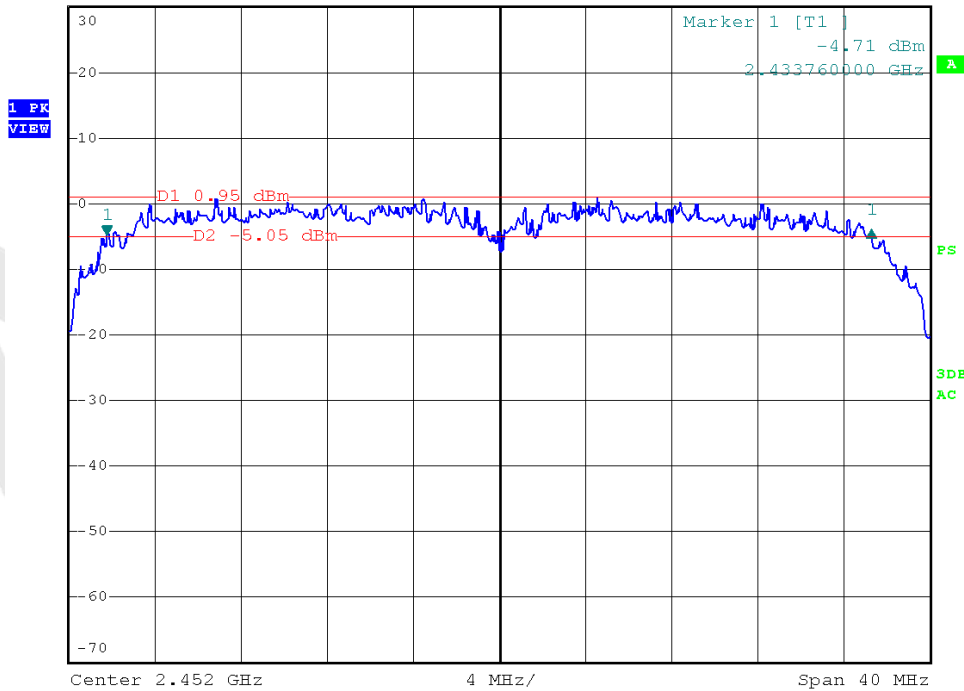


Test Mode: 802.11n (HT40)---High



*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz 0.67 dB
SWT 5 ms 35.520000000 MHz

Ref 30 dBm *Att 45 dB



20dB Bandwidth

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	21.52	Pass
Mid	2437	21.60	Pass
High	2462	21.44	Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	23.84	Pass
Mid	2437	23.92	Pass
High	2462	24.08	Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	23.84	Pass
Mid	2437	23.68	Pass
High	2462	24.00	Pass

Test mode: IEEE 802.11n (HT40)

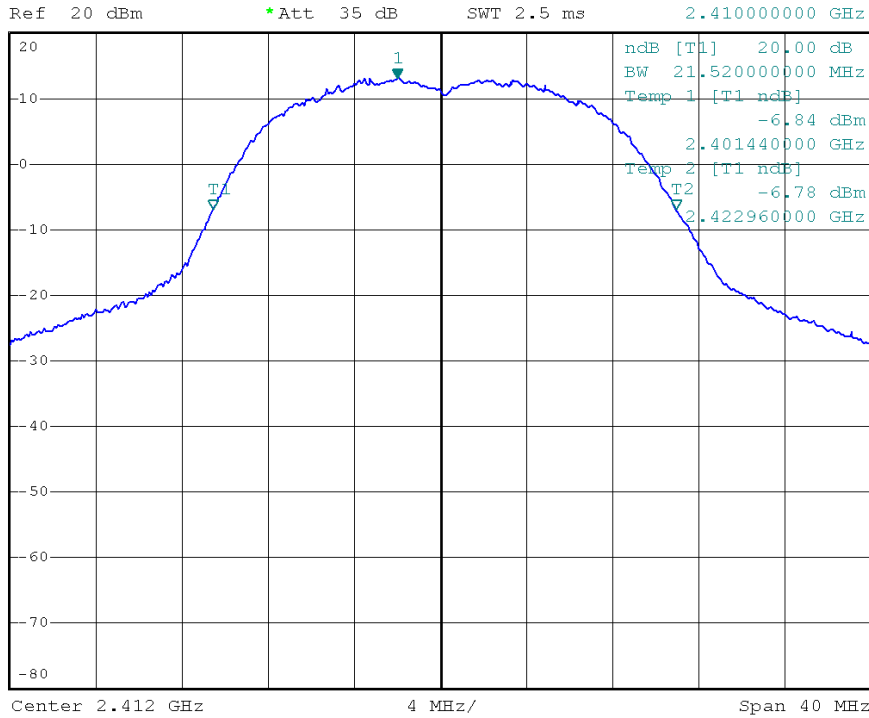
Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2422	42.72	Pass
Mid	2437	42.72	Pass
High	2452	42.72	Pass

Test Plots See the following page.

Test Mode: 802.11b---Low



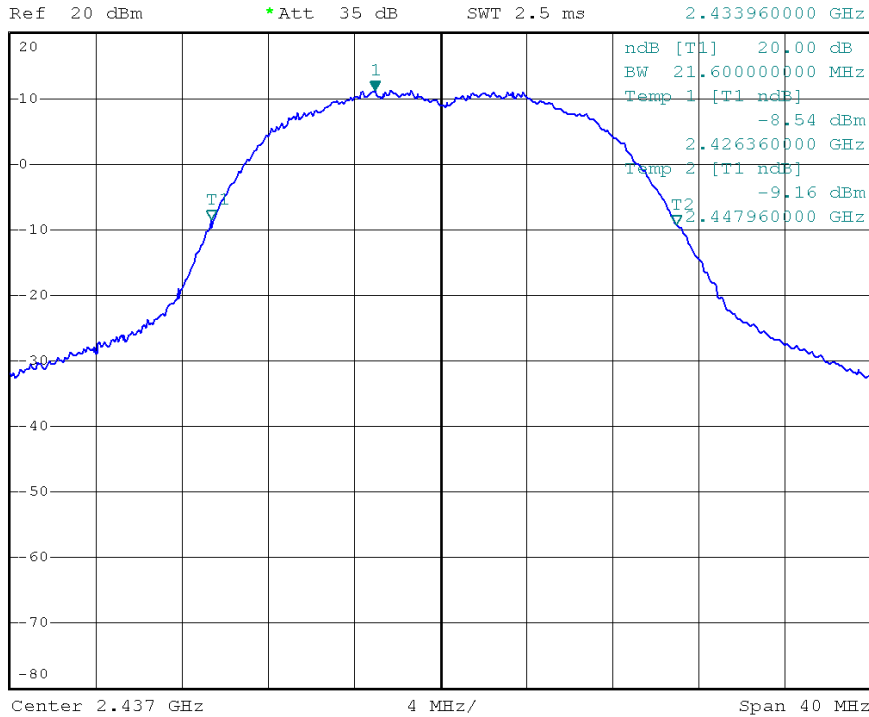
*RBW 300 kHz Marker 1 [T1]
*VBW 1 MHz 13.00 dBm
SWT 2.5 ms 2.410000000 GHz



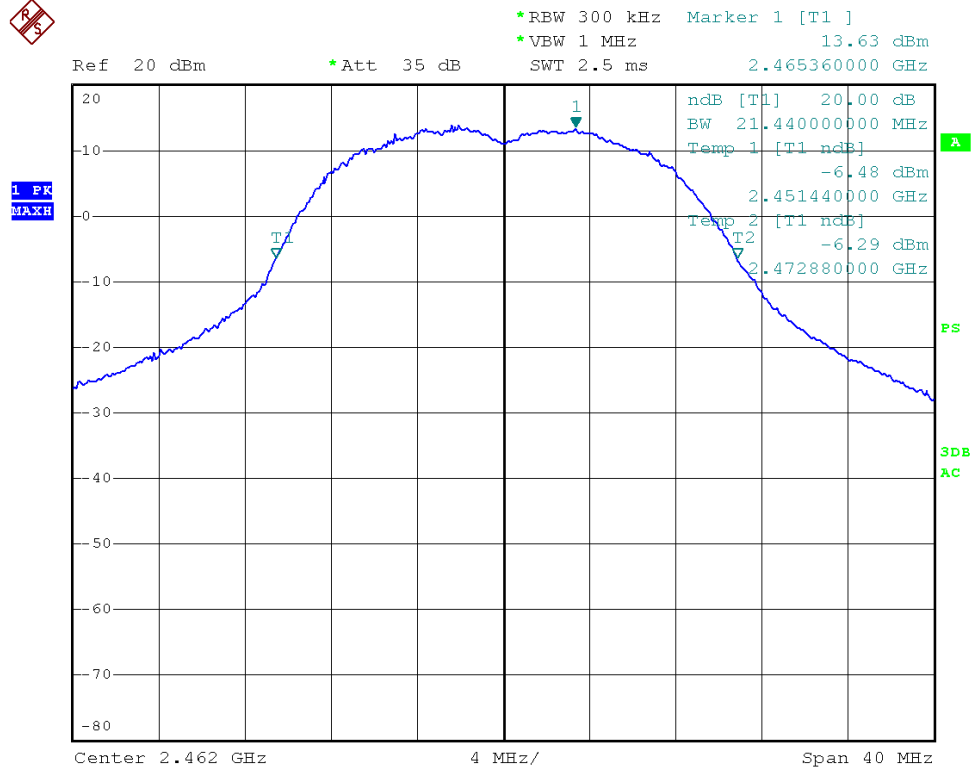
Test Mode: 802.11b---Mid



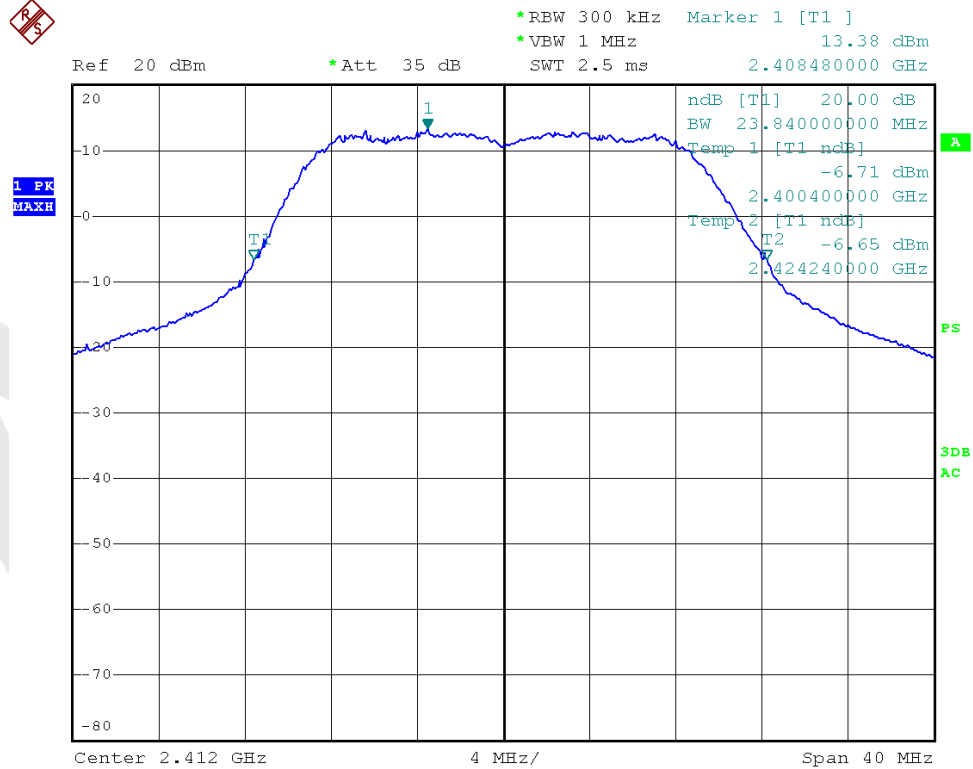
*RBW 300 kHz Marker 1 [T1]
*VBW 1 MHz 11.12 dBm
SWT 2.5 ms 2.433960000 GHz



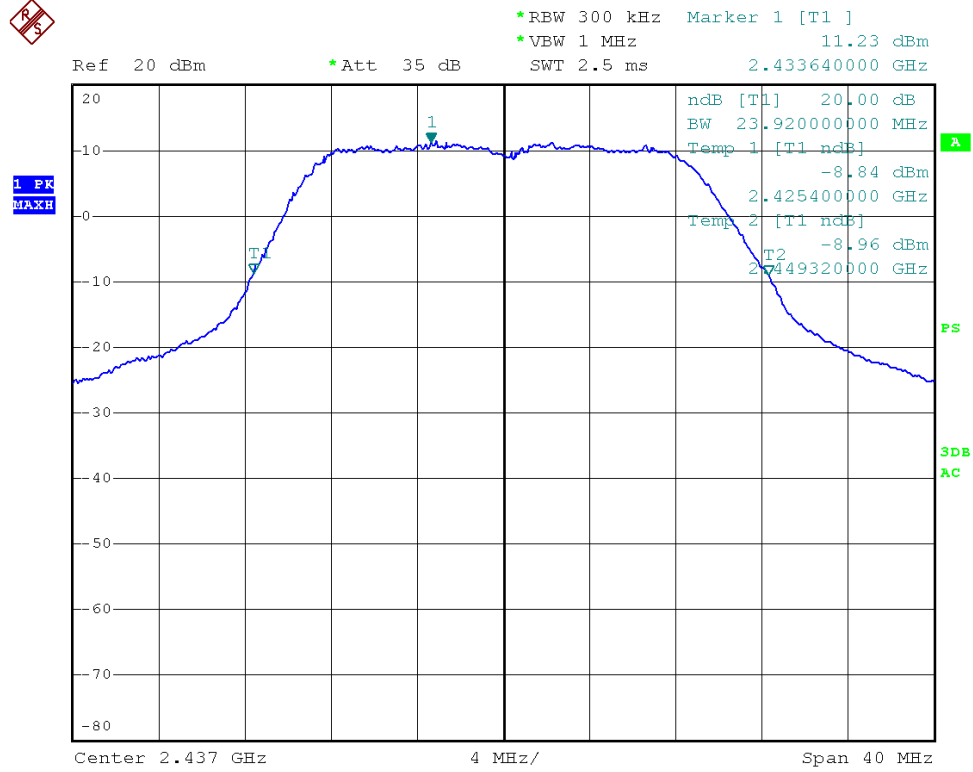
Test Mode: 802.11b---High



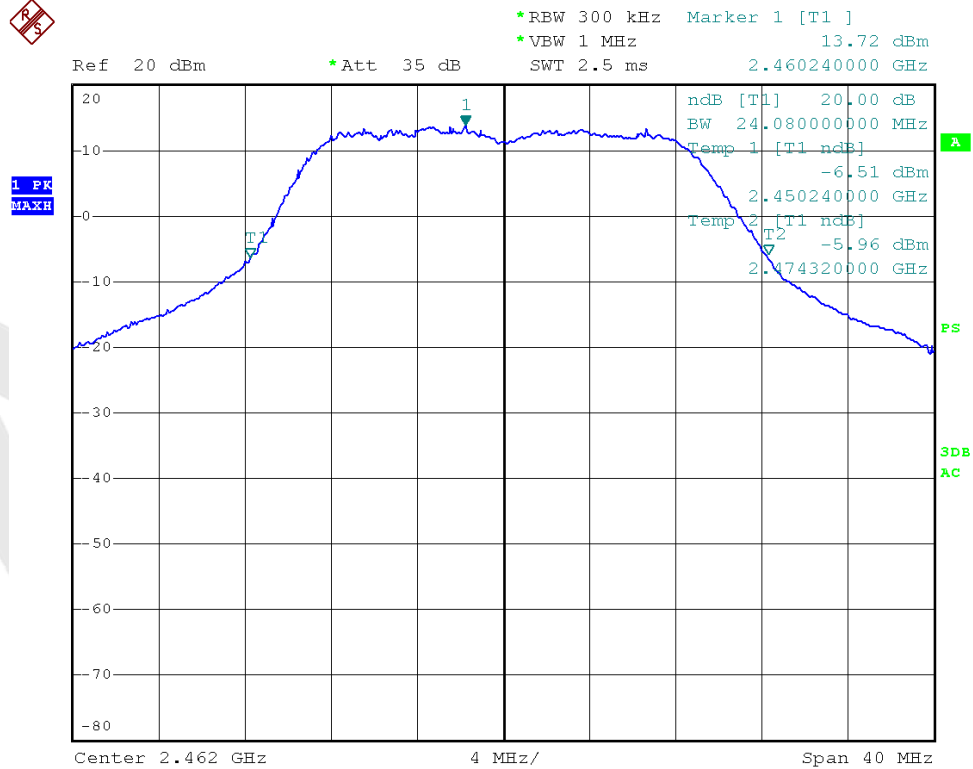
Test Mode: 802.11g---Low



Test Mode: 802.11g---Mid



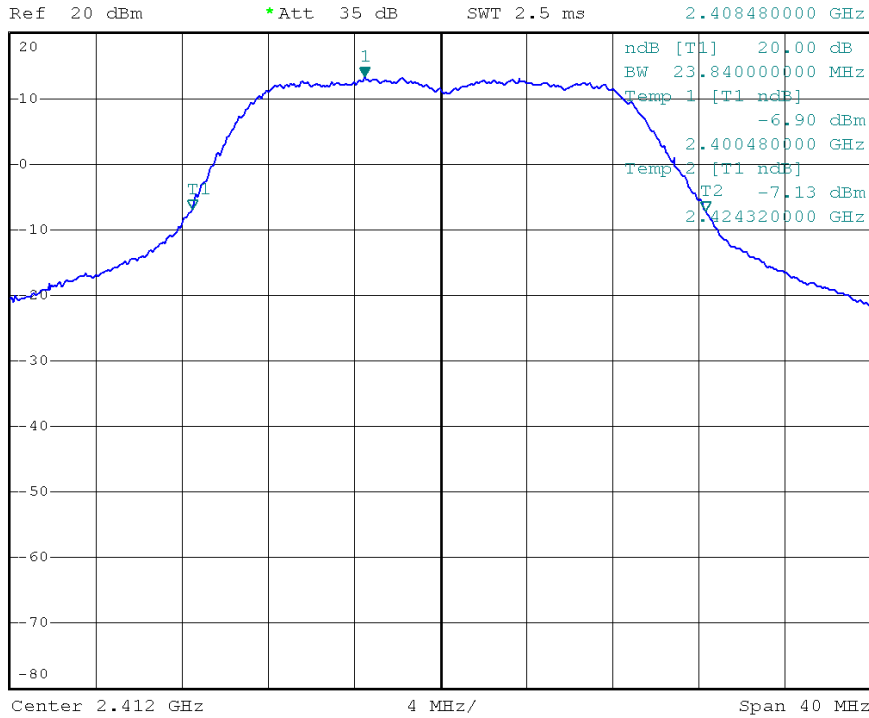
Test Mode: 802.11g---High



Test Mode: 802.11n (HT20)---Low



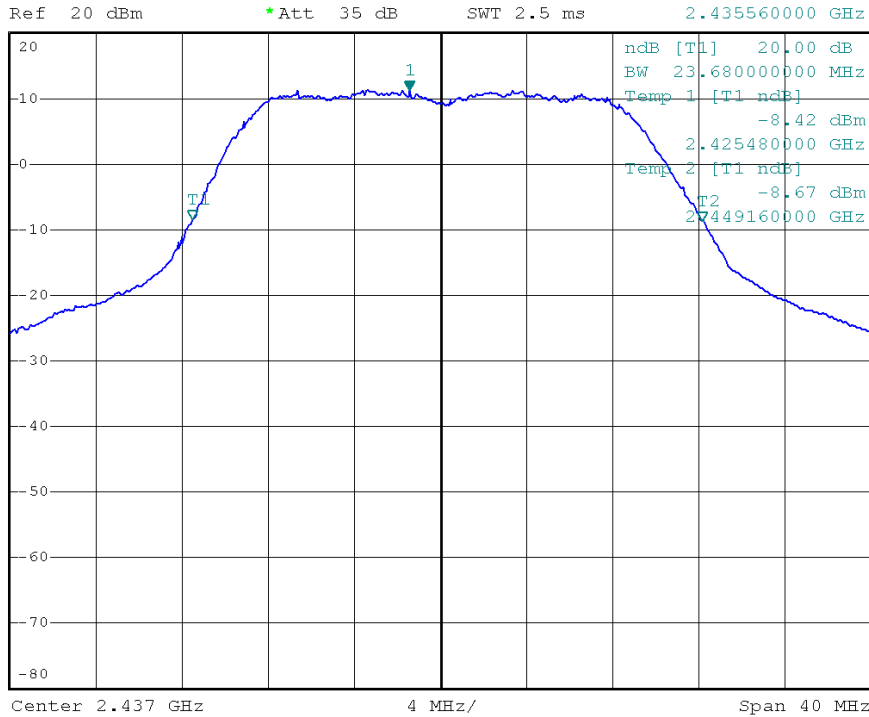
*RBW 300 kHz Marker 1 [T1]
*VBW 1 MHz 13.22 dBm
SWT 2.5 ms 2.408480000 GHz



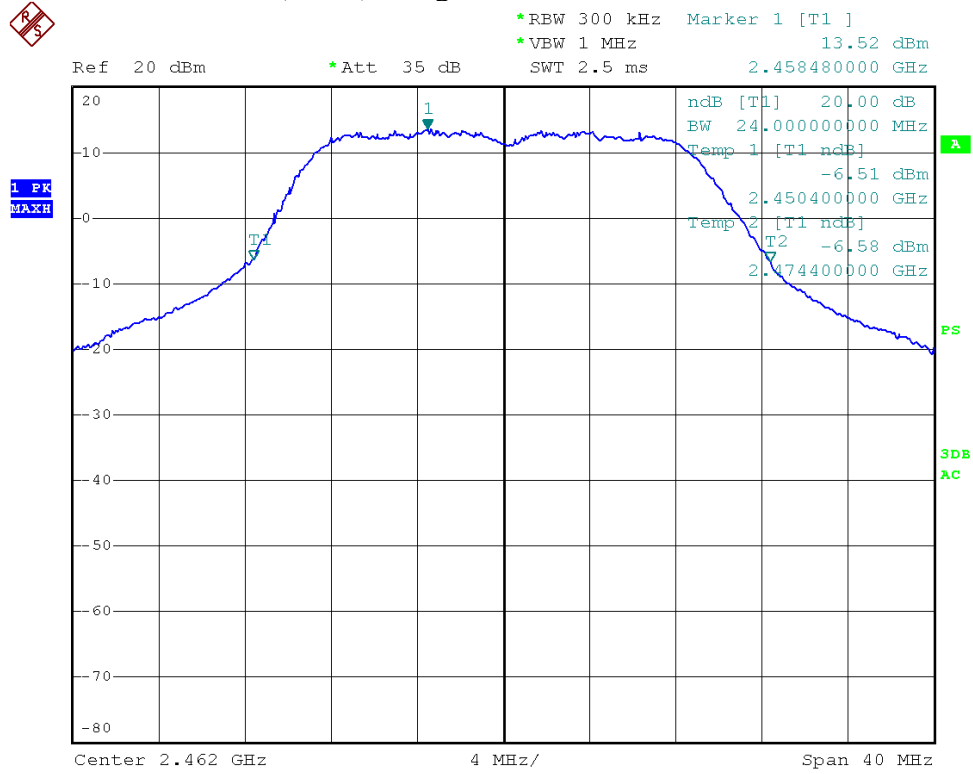
Test Mode: 802.11n (HT20)---Mid



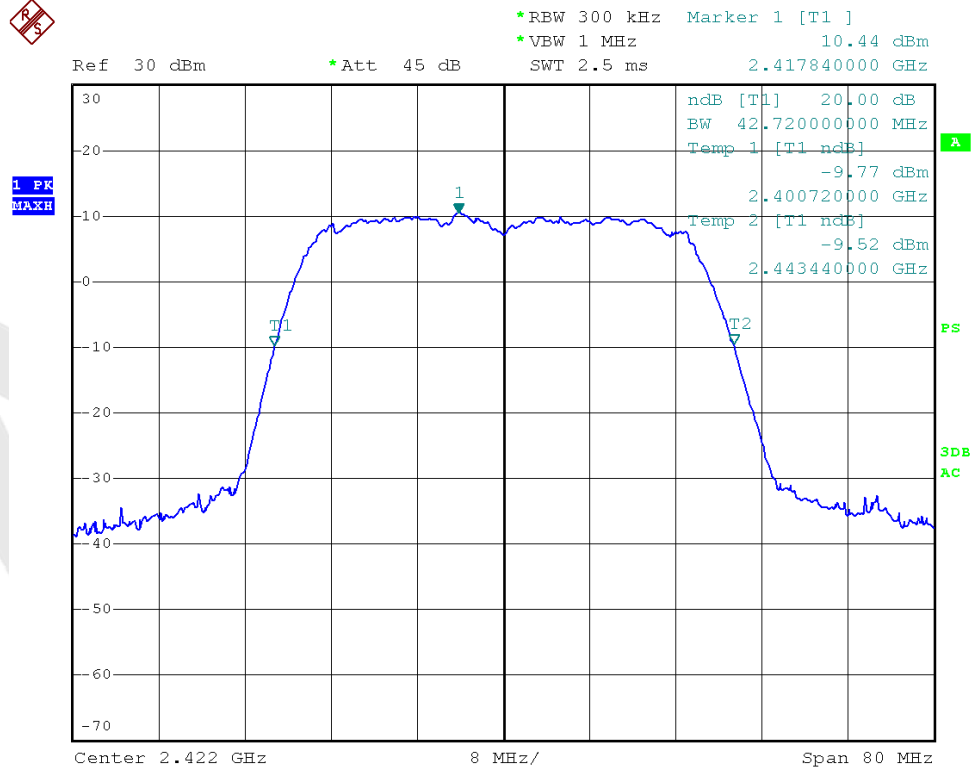
*RBW 300 kHz Marker 1 [T1]
*VBW 1 MHz 11.28 dBm
SWT 2.5 ms 2.435560000 GHz



Test Mode: 802.11n (HT20)---High



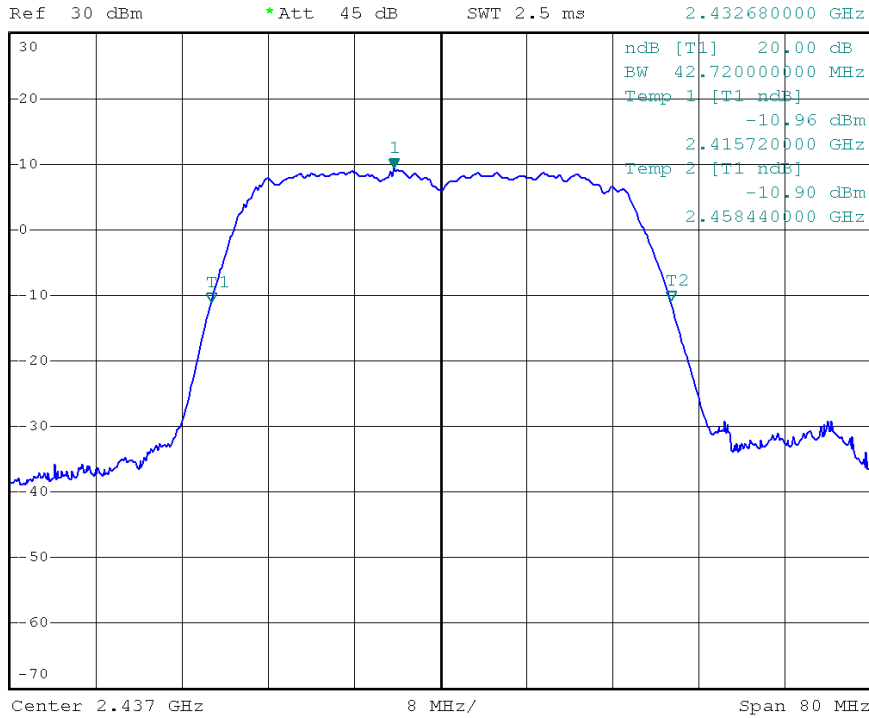
Test Mode: 802.11n (HT40)---Low



Test Mode: 802.11n (HT40)---Mid



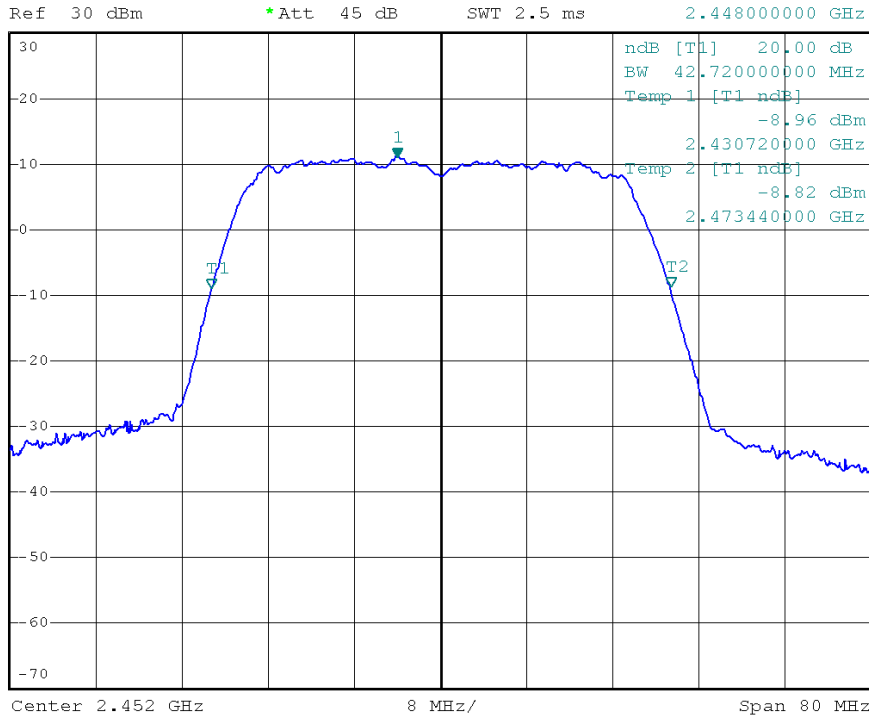
*RBW 300 kHz Marker 1 [T1]
*VBW 1 MHz 9.29 dBm
SWT 2.5 ms 2.432680000 GHz



Test Mode: 802.11n (HT40)---High



*RBW 300 kHz Marker 1 [T1]
*VBW 1 MHz 11.09 dBm
SWT 2.5 ms 2.448000000 GHz



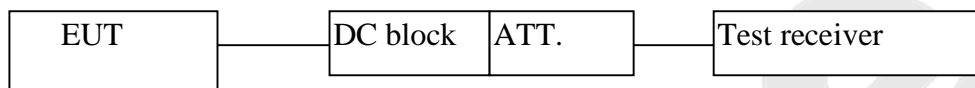
4.3. Maximum Output Power Test

a. Limit

The maximum output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt (30dBm).
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. Configuration of Measurement



c. Data Rates

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1 Mbps data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6 Mbps data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT20: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6.5Mbps data rate (the worst case) are chosen for the final testing.

IEEE802.11n (HT40: Channel 3(2422MHz), Channel 6(2437MHz) and Channel 9(2452MHz) with 13.5Mbps data rate (the worst case) are chosen for the final testing.

d. Test Procedure

This test was according the kDB 558074 9.2.2:

1. Set span to at least 1.5 times the OBW.
2. Set the RBW =1~5% of the OBW, not to exceed 1MHz.
3. Set VBW $\geq 3 \times$ RBW.
4. Detector = Average.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

e. Test Equipment

Same as the equipment listed in 4.2.

f. Test Results

Pass.

g. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit		Result
			(dBm)	(watts)	
Low	2412	15.35	30	1	Pass
Mid	2437	15.59			Pass
High	2462	15.92			Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit		Result
			(dBm)	(watts)	
Low	2412	13.66	30	1	Pass
Mid	2437	13.77			Pass
High	2462	13.91			Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit		Result
			(dBm)	(watts)	
Low	2412	13.80	30	1	Pass
Mid	2437	13.78			Pass
High	2462	13.88			Pass

Test mode: IEEE 802.11n (HT40)

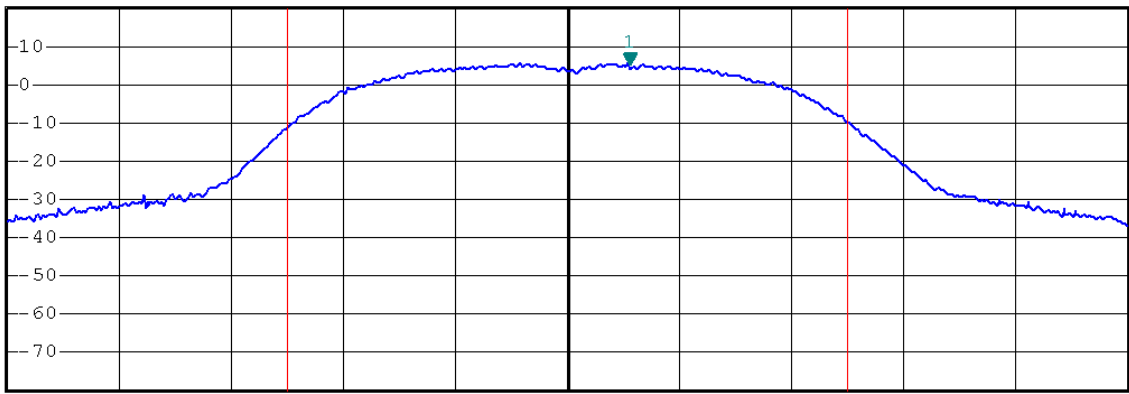
Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit		Result
			(dBm)	(watts)	
Low	2422	13.00	30	1	Pass
Mid	2437	13.08			Pass
High	2452	13.53			Pass

Test Mode: 802.11b---Low



Ref 20 dBm *Att 35 dB *RBW 300 kHz *VBW 3 MHz SWT 2.5 ms Marker 1 [T1]
5.85 dBm
2.414160000 GHz

1 RM *
MAXH



Center 2.412 GHz 4 MHz/ Span 40 MHz

Tx Channel

Bandwidth

20 MHz

Power

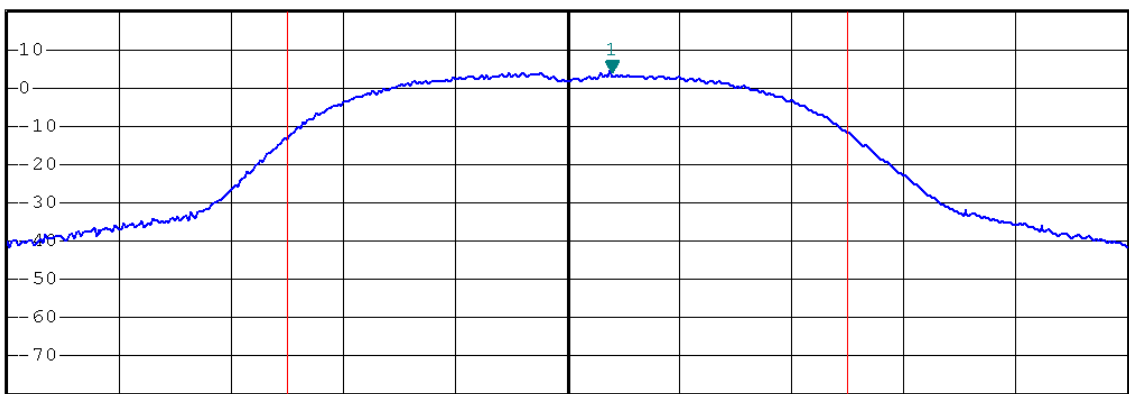
15.35 dBm

Test Mode: 802.11b---Mid



Ref 20 dBm *Att 35 dB *RBW 300 kHz *VBW 3 MHz SWT 2.5 ms Marker 1 [T1]
4.33 dBm
2.438520000 GHz

1 RM *
MAXH



Center 2.437 GHz 4 MHz/ Span 40 MHz

Tx Channel

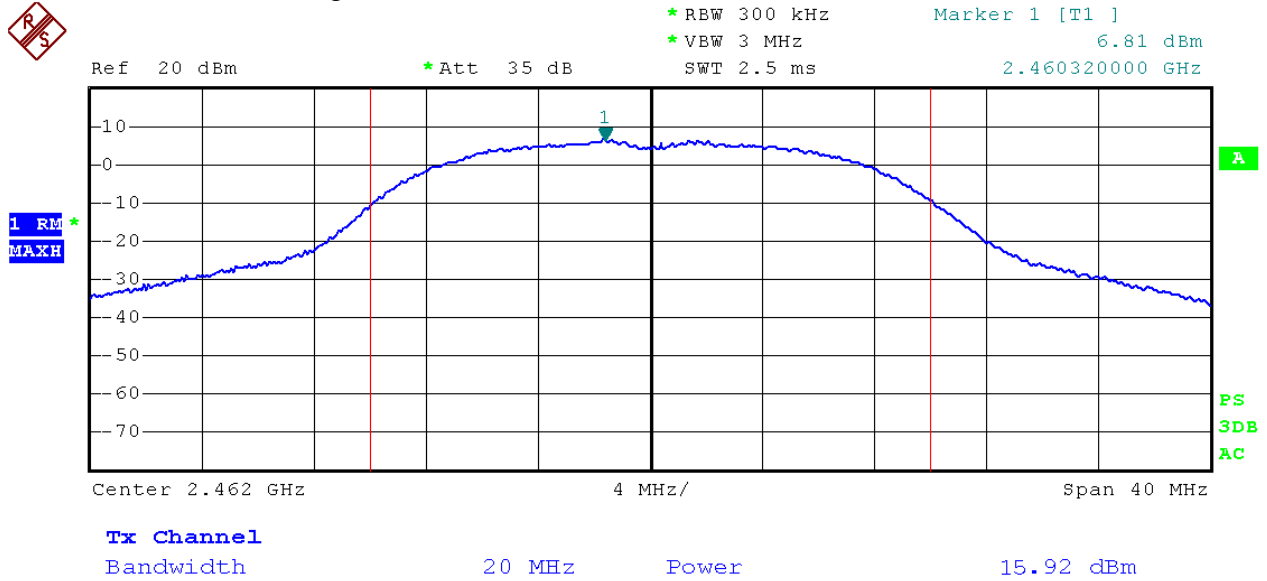
Bandwidth

20 MHz

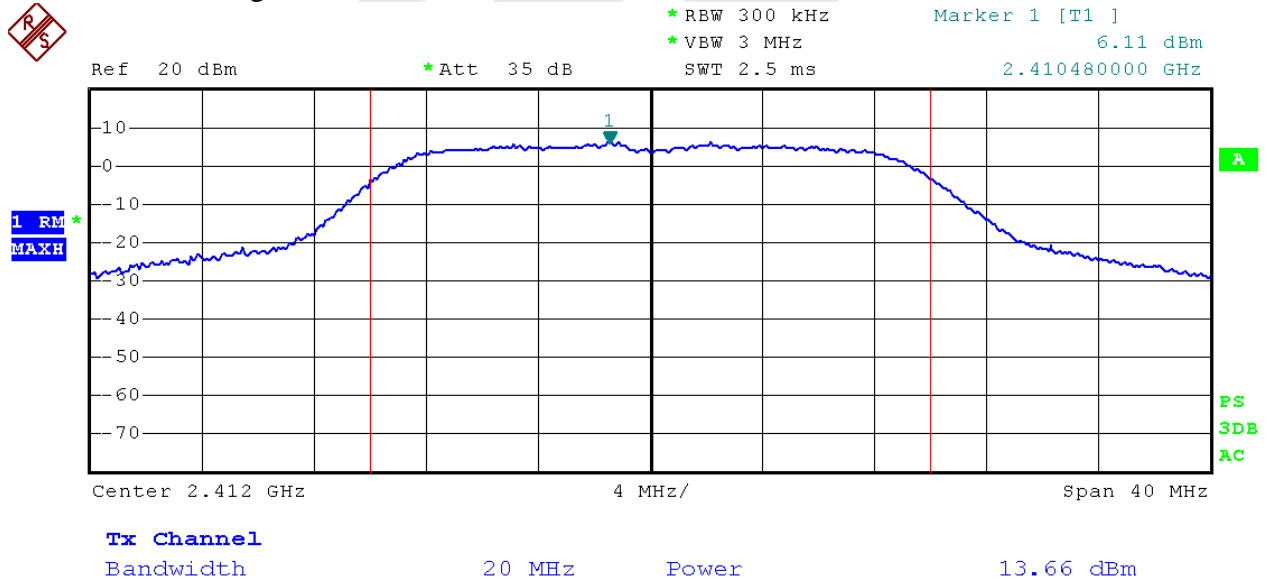
Power

15.59 dBm

Test Mode: 802.11b---High



Test Mode: 802.11g---Low

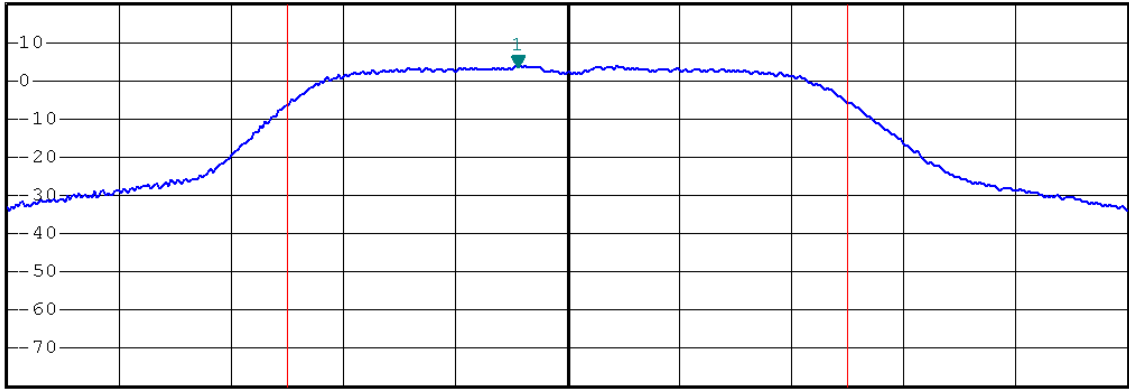


Test Mode: 802.11g---Mid



Ref 20 dBm *Att 35 dB *RBW 300 kHz Marker 1 [T1]
 *VBW 3 MHz 4.16 dBm
 SWT 2.5 ms 2.435160000 GHz

1 RM *
MAXH



Center 2.437 GHz 4 MHz/ Span 40 MHz

Tx Channel

Bandwidth

20 MHz

Power

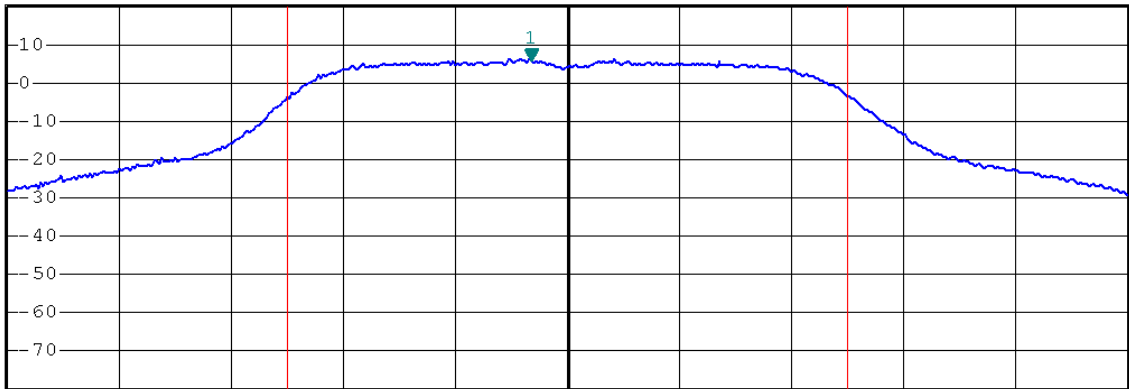
13.77 dBm

Test Mode: 802.11g---High



Ref 20 dBm *Att 35 dB *RBW 300 kHz Marker 1 [T1]
 *VBW 3 MHz 6.39 dBm
 SWT 2.5 ms 2.460640000 GHz

1 RM *
MAXH



Center 2.462 GHz 4 MHz/ Span 40 MHz

Tx Channel

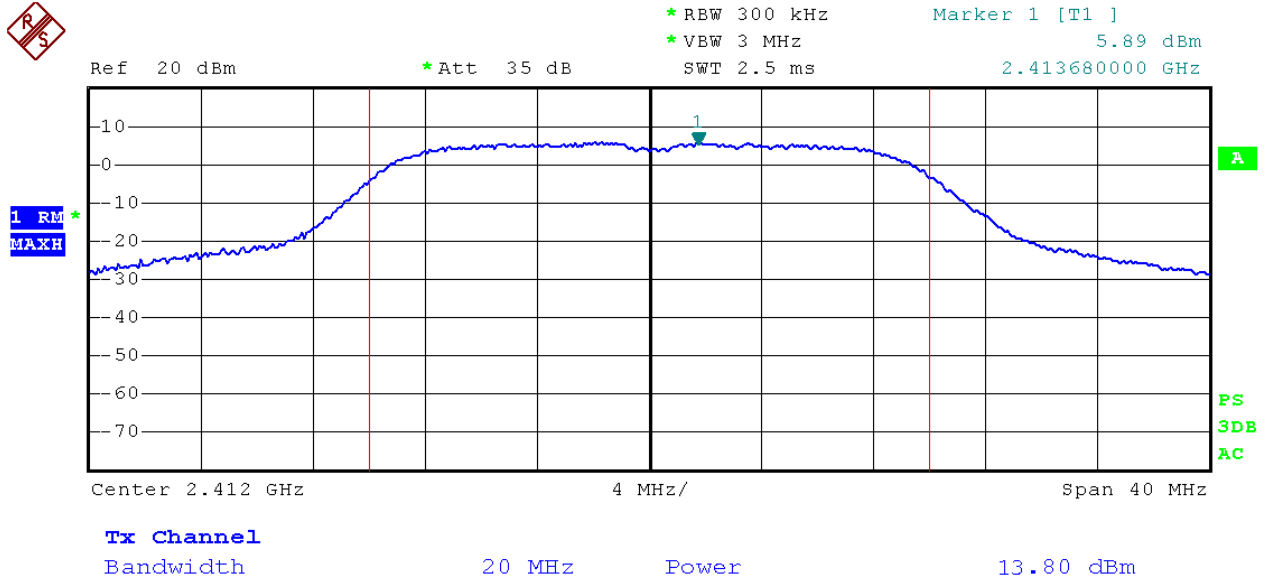
Bandwidth

20 MHz

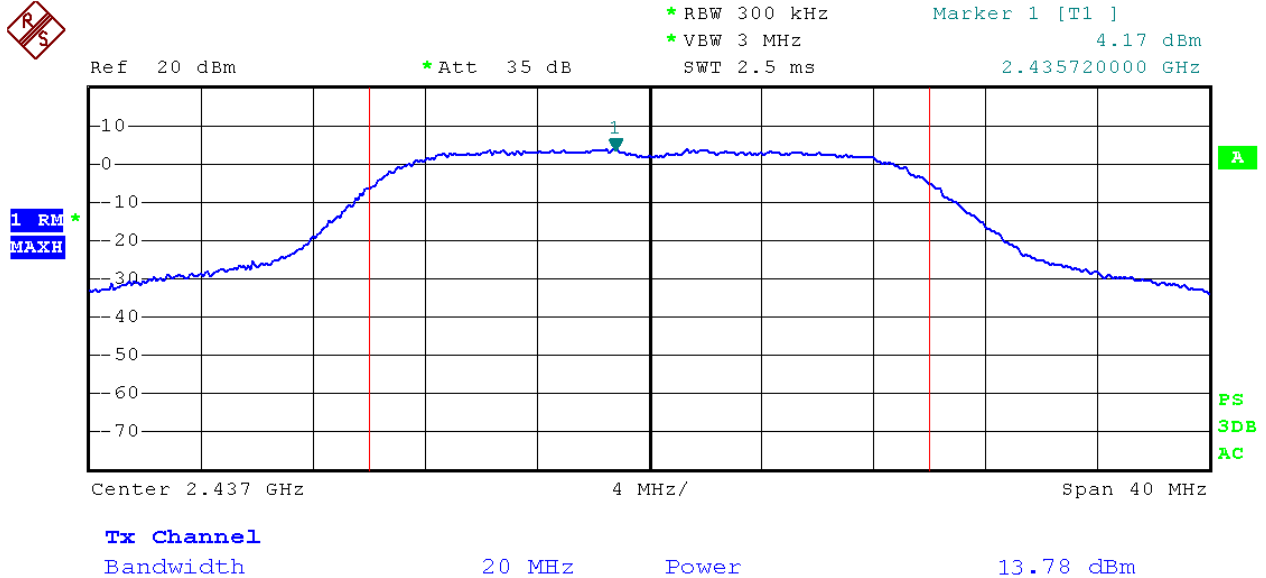
Power

13.91 dBm

Test Mode: 802.11n(HT20)---Low



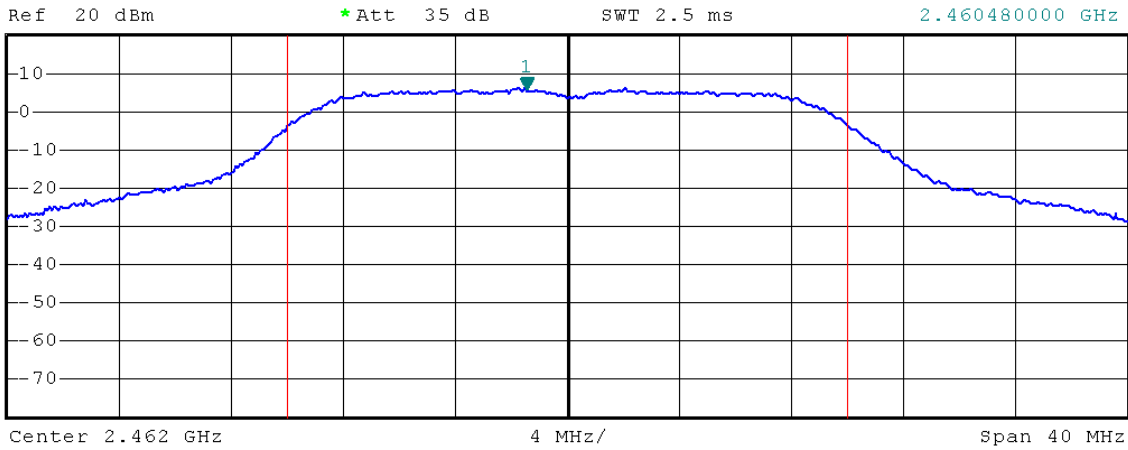
Test Mode: 802.11n(HT20)---Mid



Test Mode: 802.11n(HT20)---High



*RBW 300 kHz
*VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
6.49 dBm
2.460480000 GHz

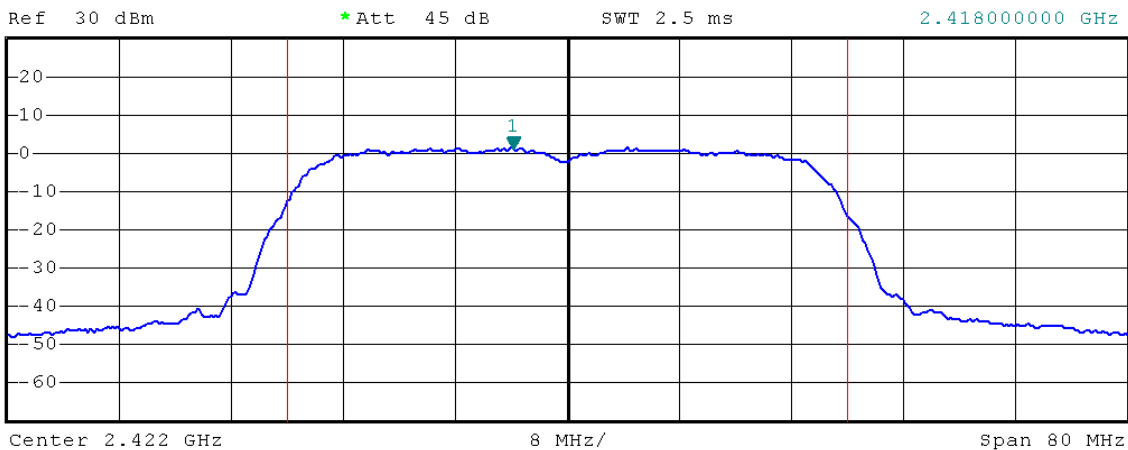


Tx Channel
Bandwidth 20 MHz Power 13.88 dBm

Test Mode: 802.11n(HT40)---Low



*RBW 1 MHz
*VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
1.43 dBm
2.418000000 GHz



Tx Channel
Bandwidth 40 MHz Power 13.00 dBm

4.4. Band Edges Measurement

a. Limit

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

b. Test Procedure

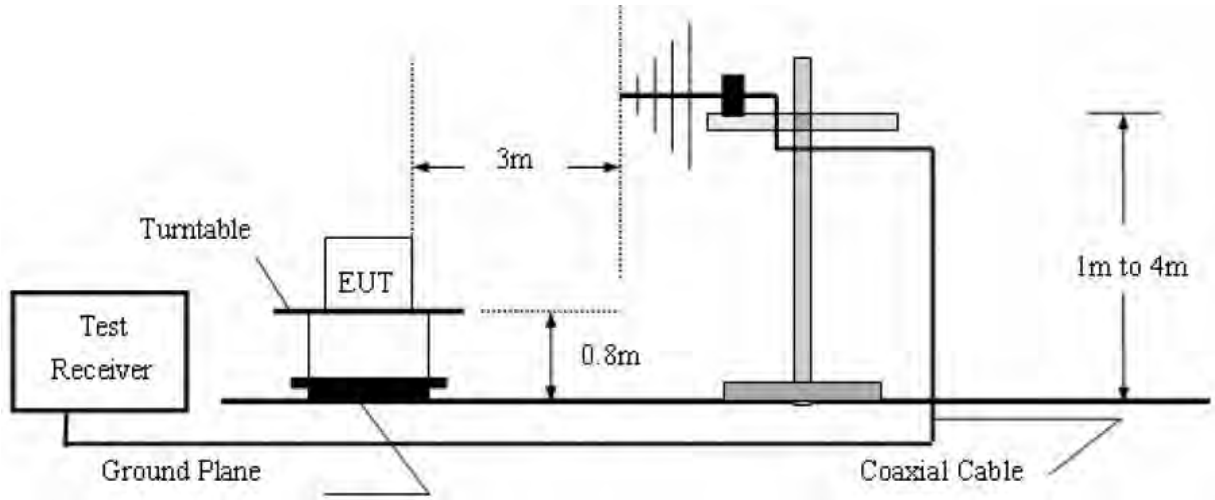
1. Conducted Method:

- 1) Set RBW=100KHz, VBW=300KHz
- 2) Detector=peak
- 3) Sweep time= auto
- 4) Trace mode=max hold.

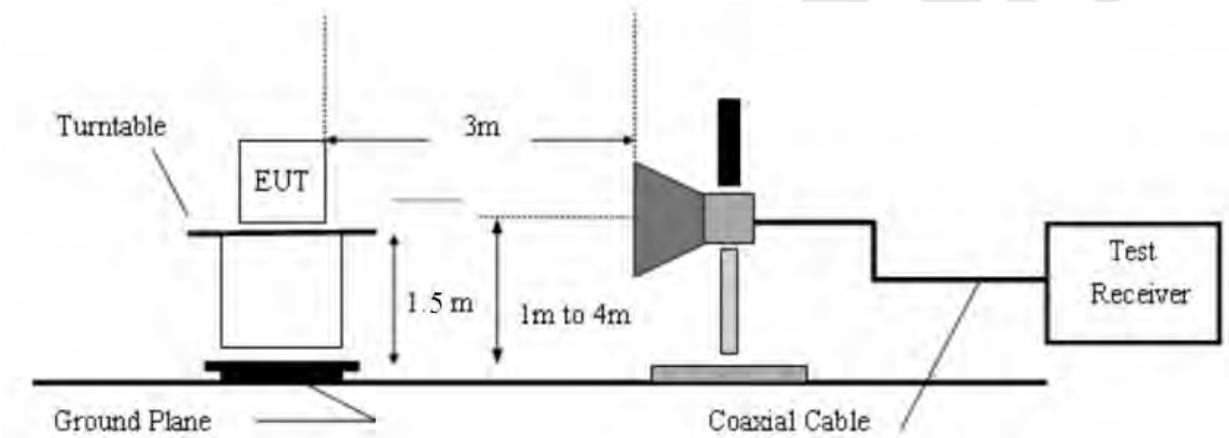
2. Radiated Method:

- 1) For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane. The EUT is tested in 9*6*6 Chamber.
For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane. The EUT is tested in 9*6*6 Chamber.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4) Peak detector: RBW=1MHz, VBW=3MHz, SWT=AUTO
Average detector: RBW=1MHz, VBW=10Hz, SWT=AUTO
The EUT is tested in 9*6*6 Chamber.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

30M to 1G emissions:



1G to 40G emissions:



c. Test Equipment

Same as the equipment listed in 4.2.

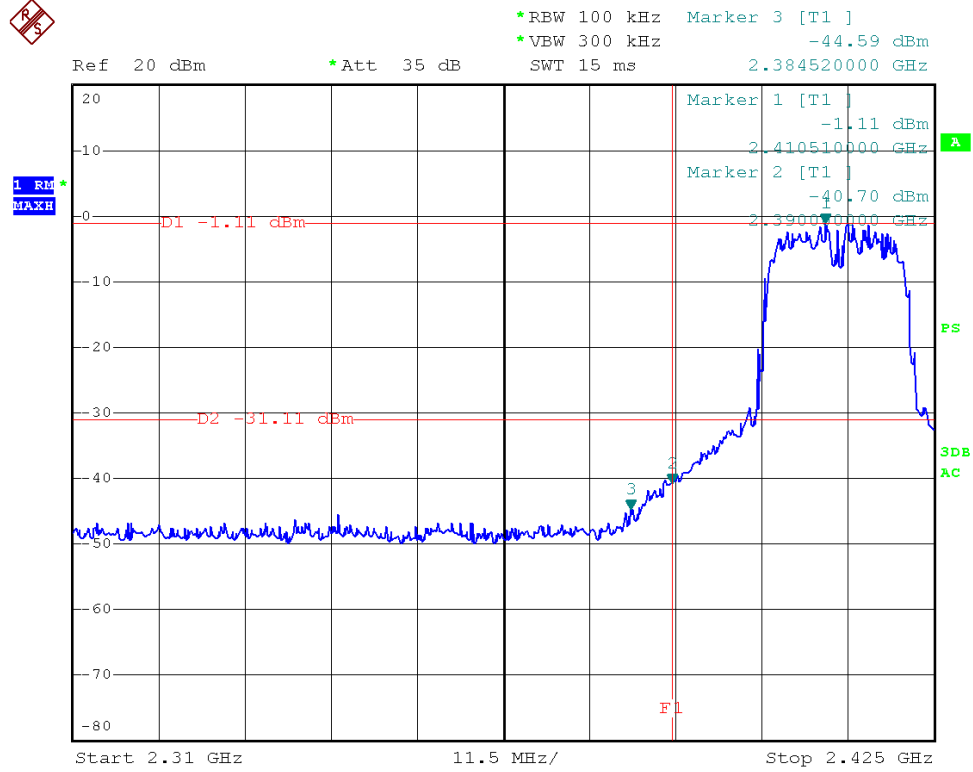
d. Test Results

Pass.

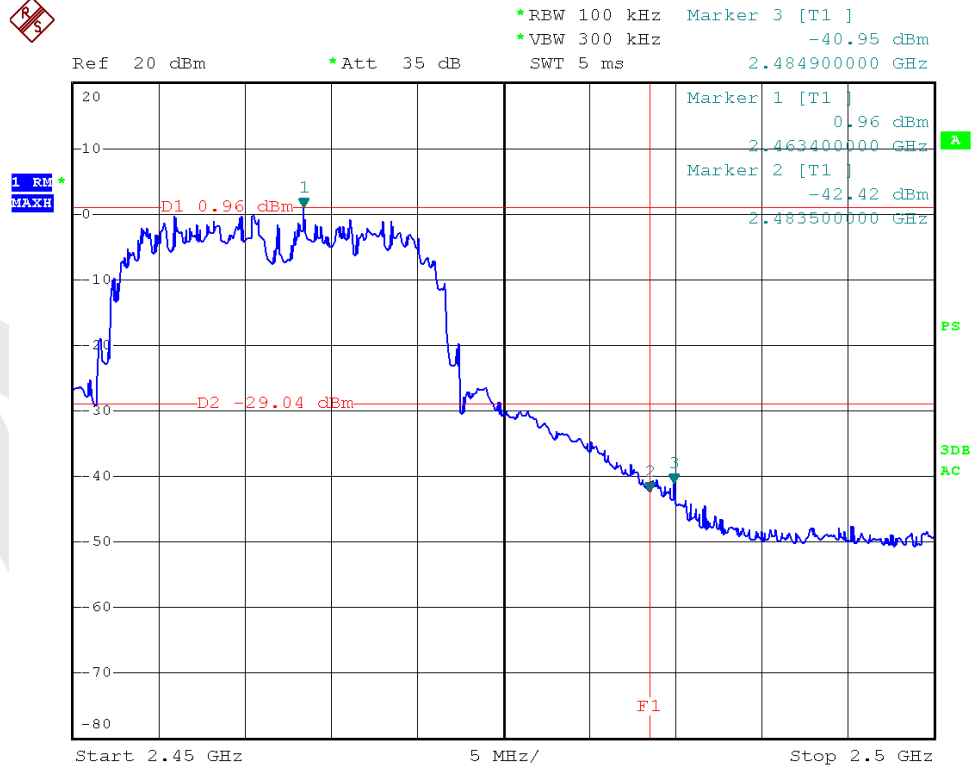
e. Test Plots

See the following page.

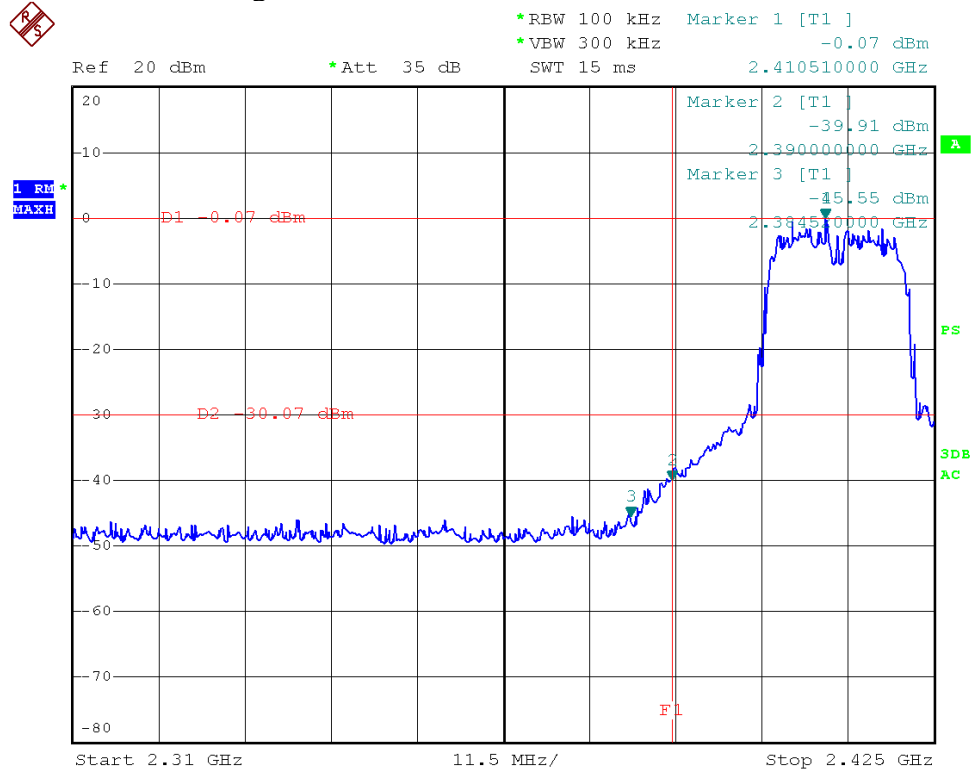
Test Mode: 802.11b ---Low



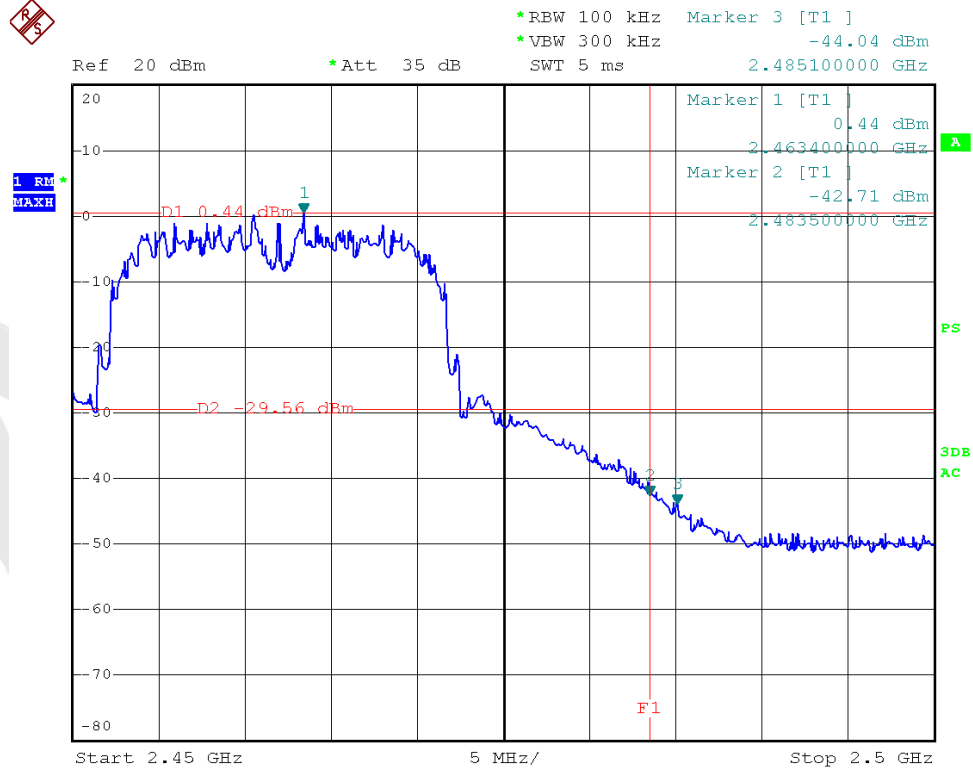
Test Mode: 802.11b ---High



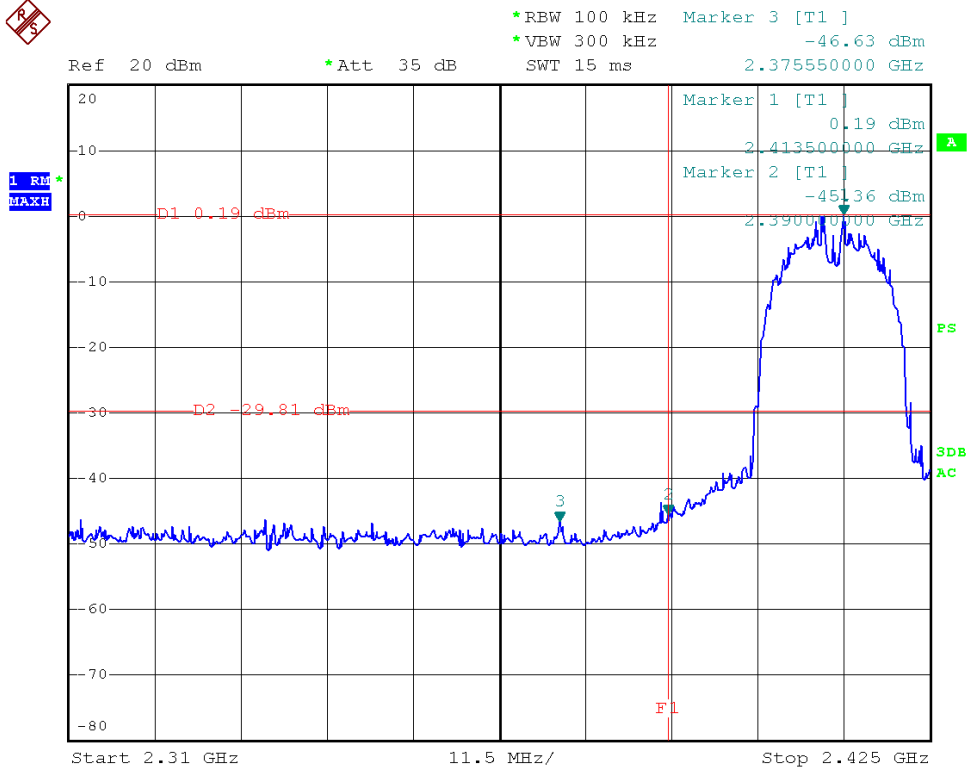
Test Mode: 802.11g ---Low



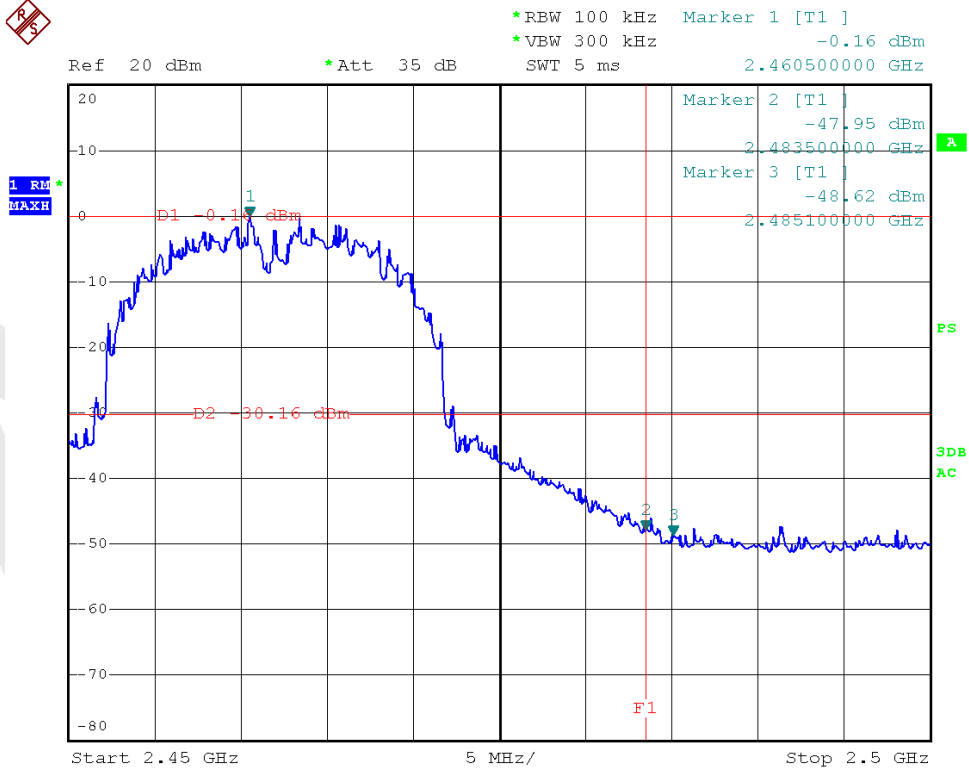
Test Mode: 802.11g ---High



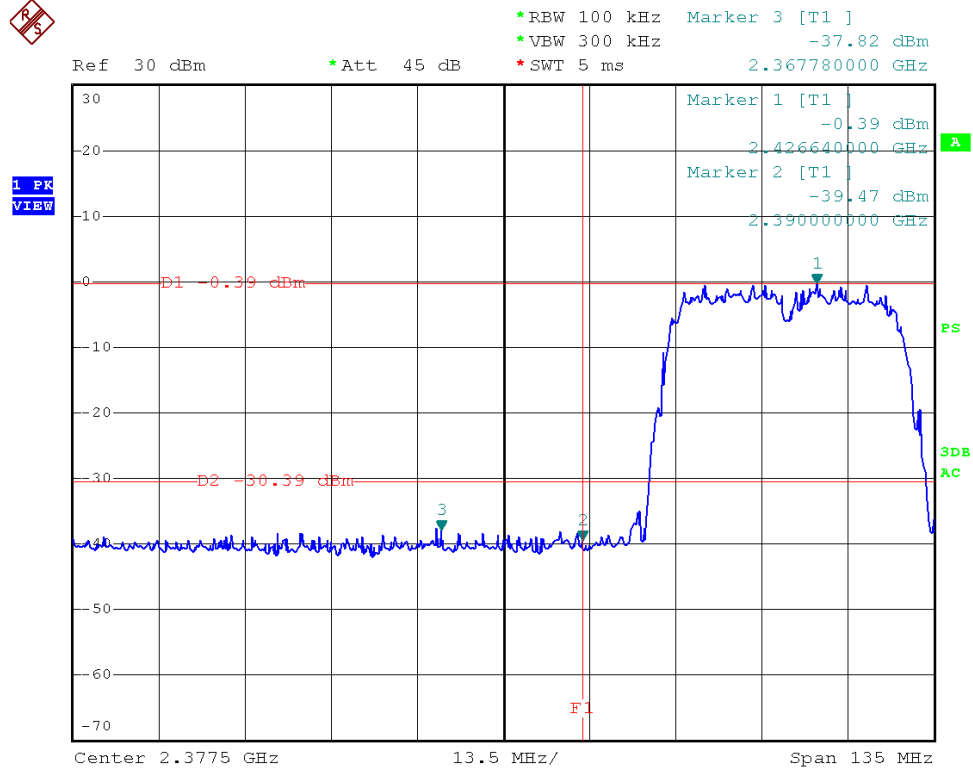
Test Mode: 802.11n (HT20) ---Low



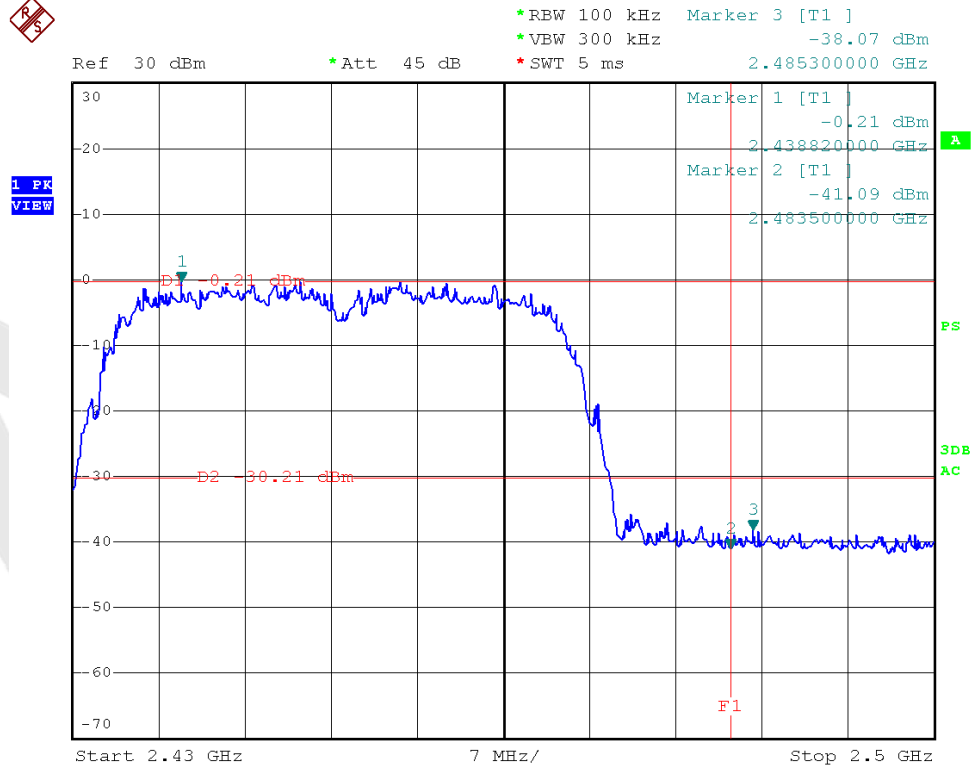
Test Mode: 802.11n (HT20)---High



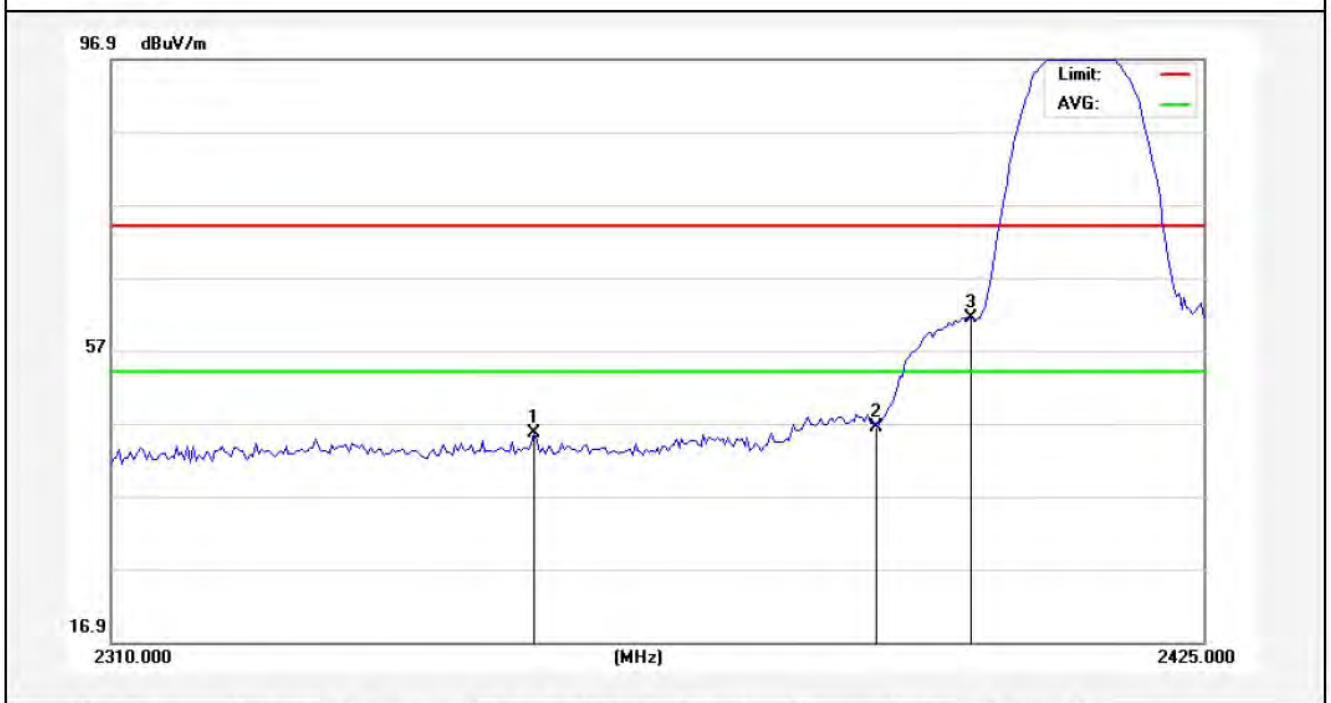
Test Mode: 802.11n (HT40) ---Low



Test Mode: 802.11n (HT40) ---High



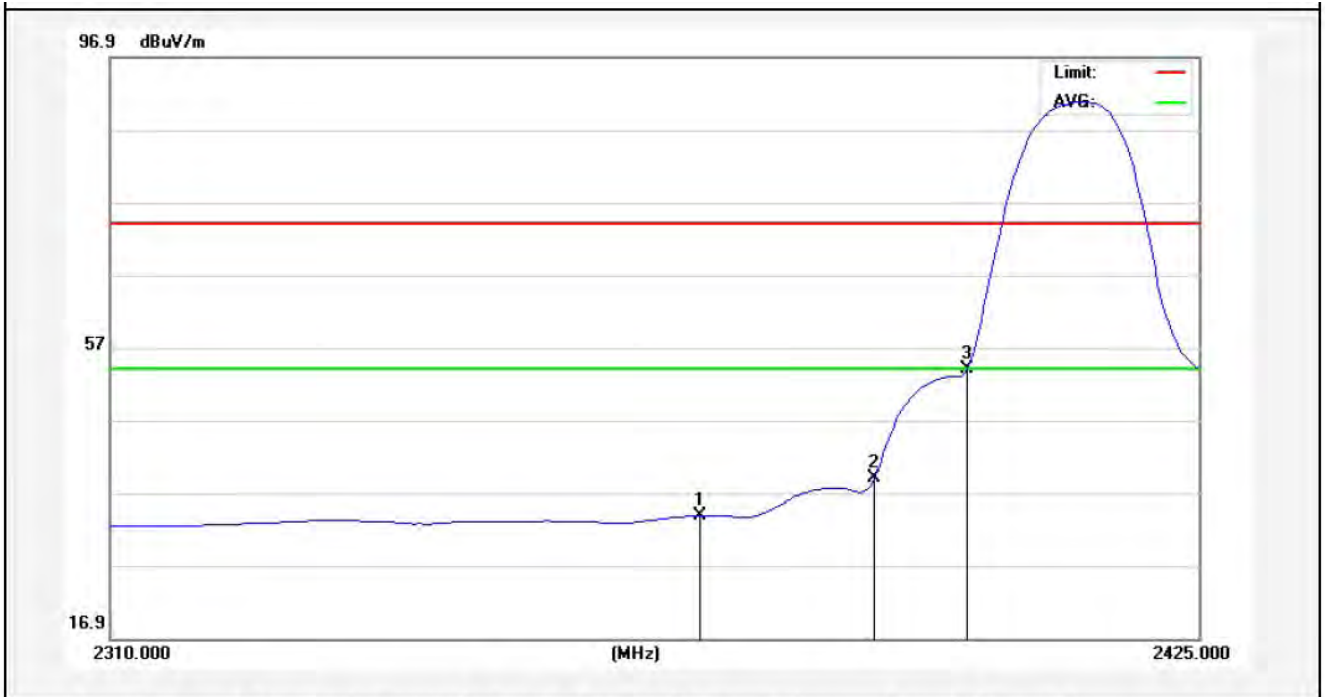
Test Mode: 802.11b
2412MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2353.988	48.23	-2.59	45.64	74.00	-28.36	peak			
2	2390.000	48.88	-2.51	46.37	74.00	-27.63	peak			
3	2400.000	63.82	-2.49	61.33	74.00	-12.67	peak			

AMB

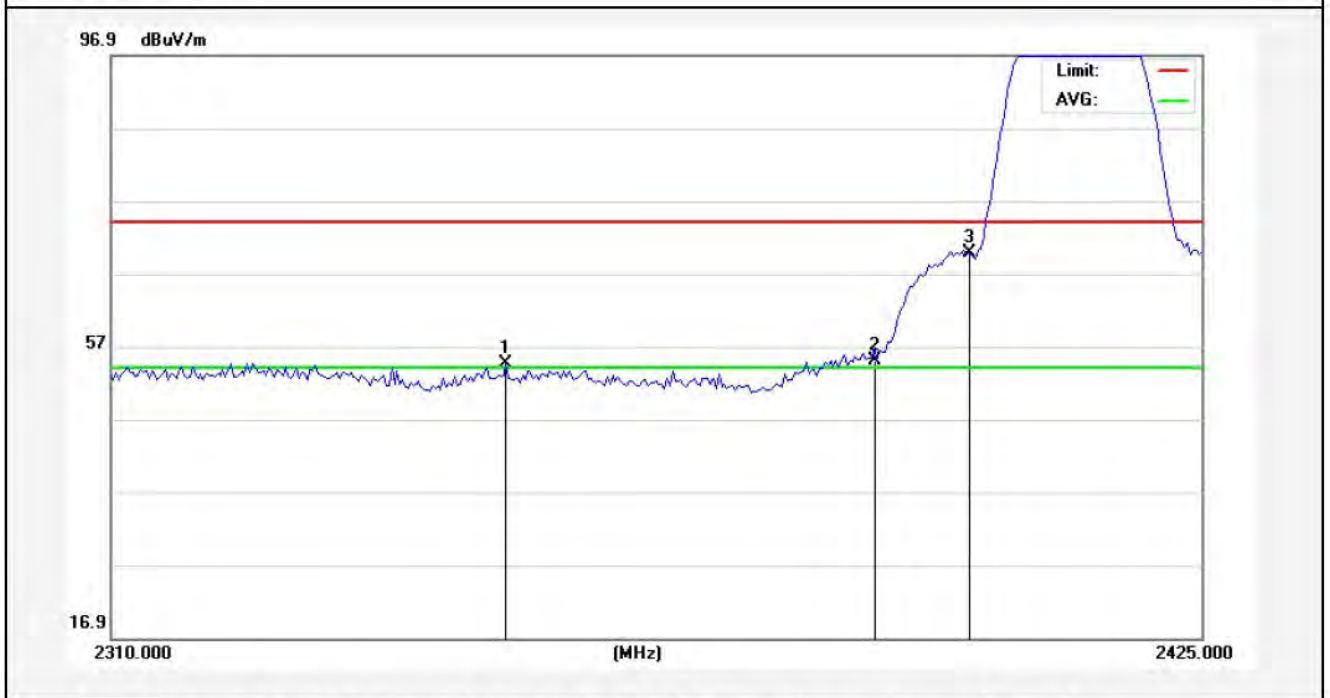
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2371.813	36.37	-2.55	33.82	54.00	-20.18	AVG			
2	2390.000	41.45	-2.51	38.94	54.00	-15.06	AVG			
3	2400.000	56.43	-2.49	53.94	54.00	-0.06	AVG			

AMB-BE300

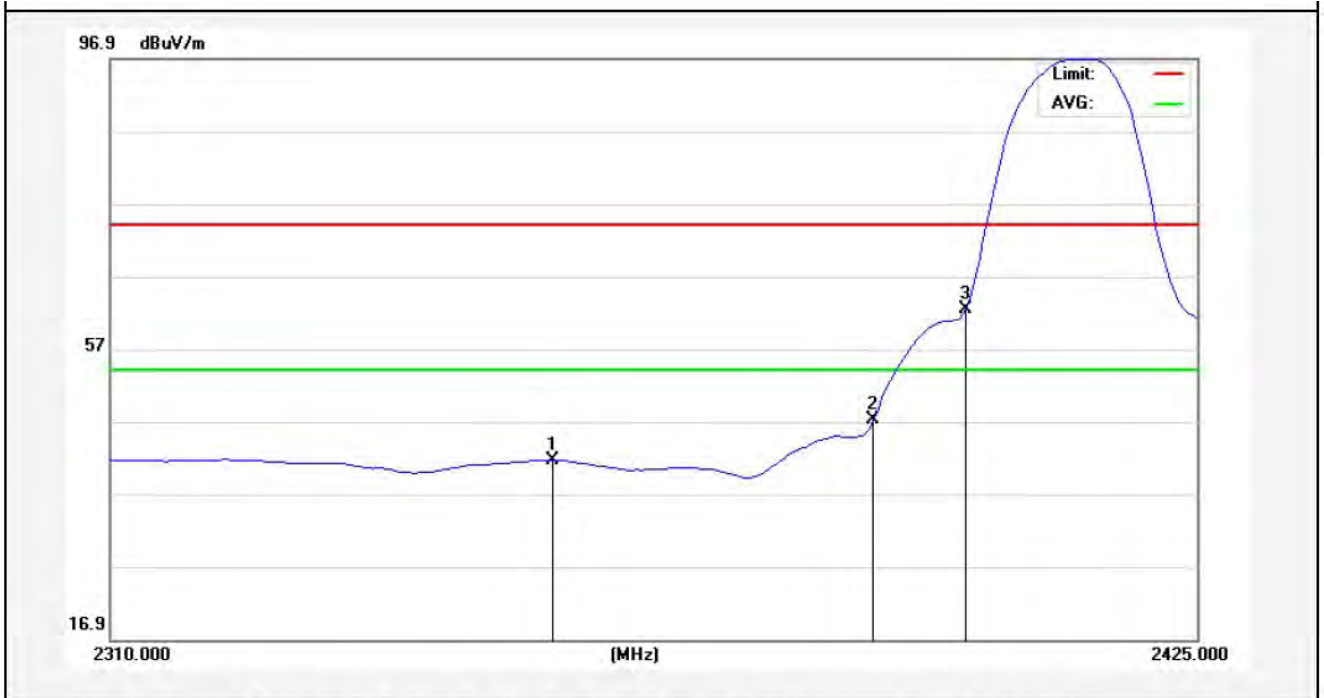
Test Mode: 802.11b
2412MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2351.113	57.25	-2.60	54.65	74.00	-19.35	peak			
2	2390.000	57.61	-2.51	55.10	74.00	-18.90	peak			
3	2400.000	72.31	-2.49	69.82	74.00	-4.18	peak			

AMB

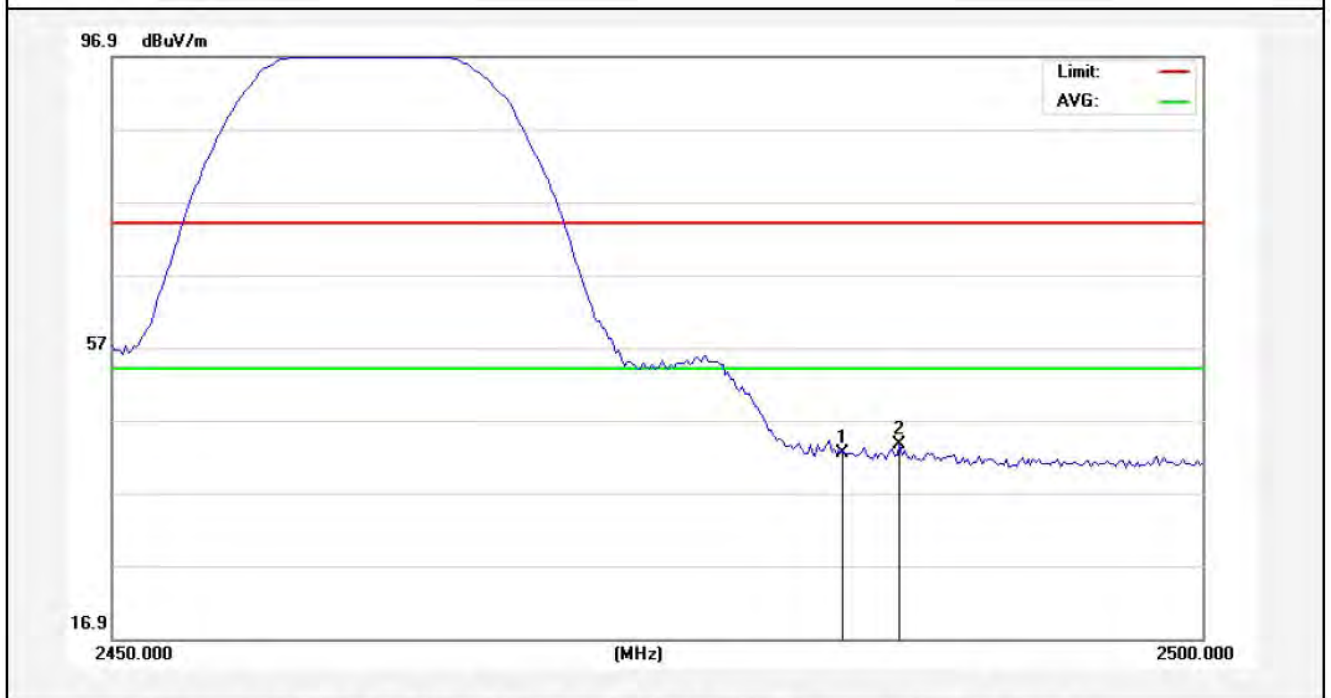
Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2356.287	44.27	-2.59	41.68	54.00	-12.32	AVG			
2	2390.000	49.64	-2.51	47.13	54.00	-6.87	AVG			
3	2400.000	64.96	-2.49	62.47	54.00	8.47	AVG			

AMB

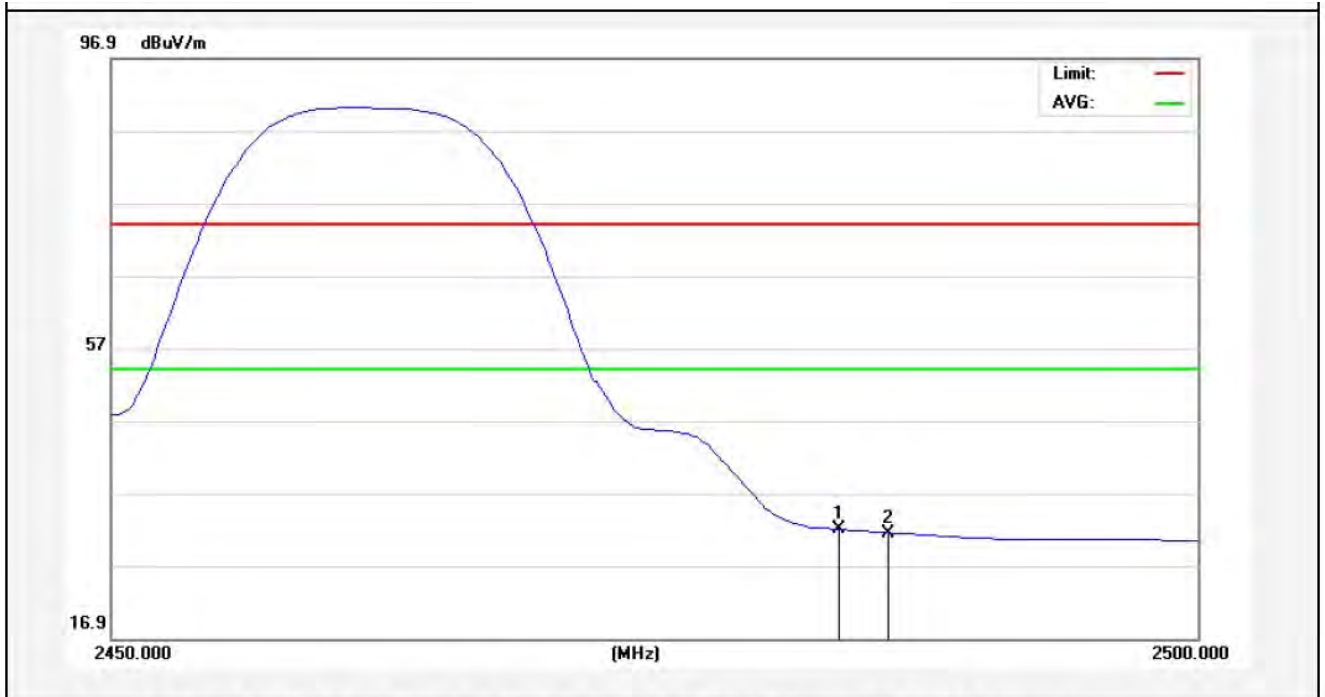
Test Mode: 802.11b
2462MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	44.80	-2.31	42.49	74.00	-31.51	peak			
2	2486.125	45.84	-2.30	43.54	74.00	-30.46	peak			

AMB

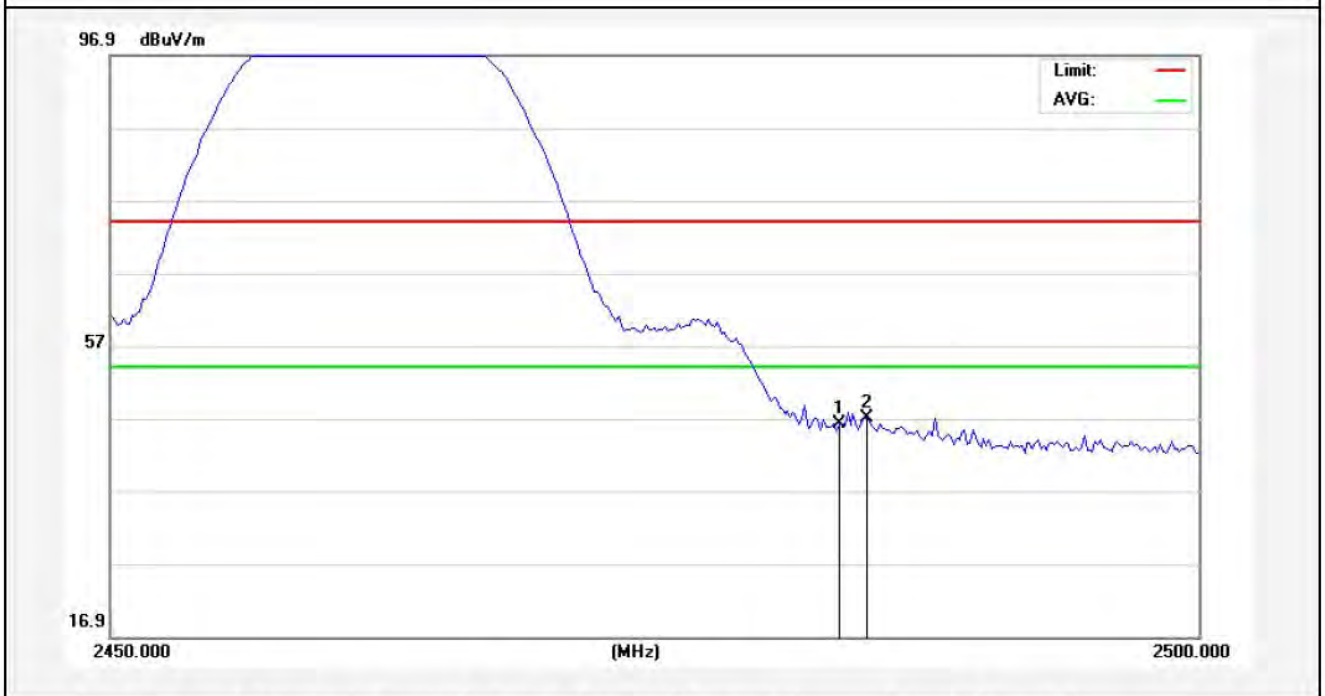
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	34.26	-2.31	31.95	54.00	-22.05	AVG			
2	2485.750	33.78	-2.30	31.48	54.00	-22.52	AVG			

Anbotek

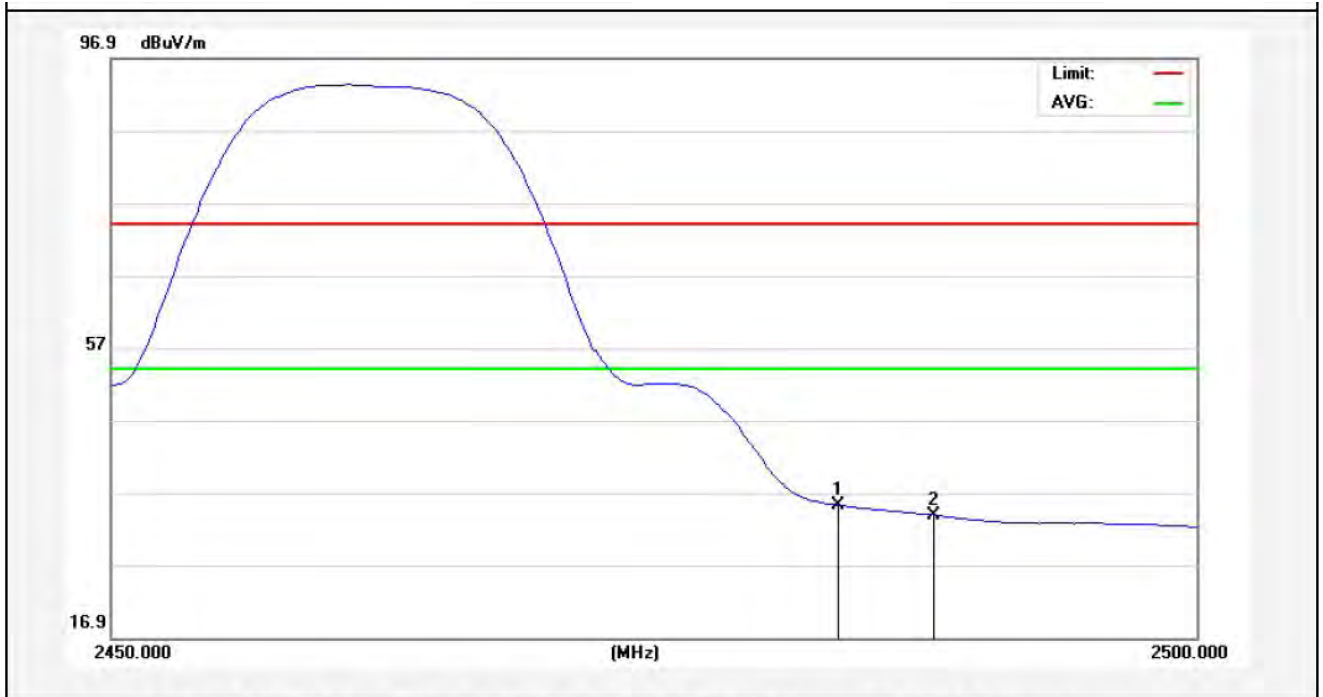
Test Mode: 802.11b
2462MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	48.53	-2.31	46.22	74.00	-27.78	peak			
2	2484.750	49.38	-2.30	47.08	74.00	-26.92	peak			

AMB

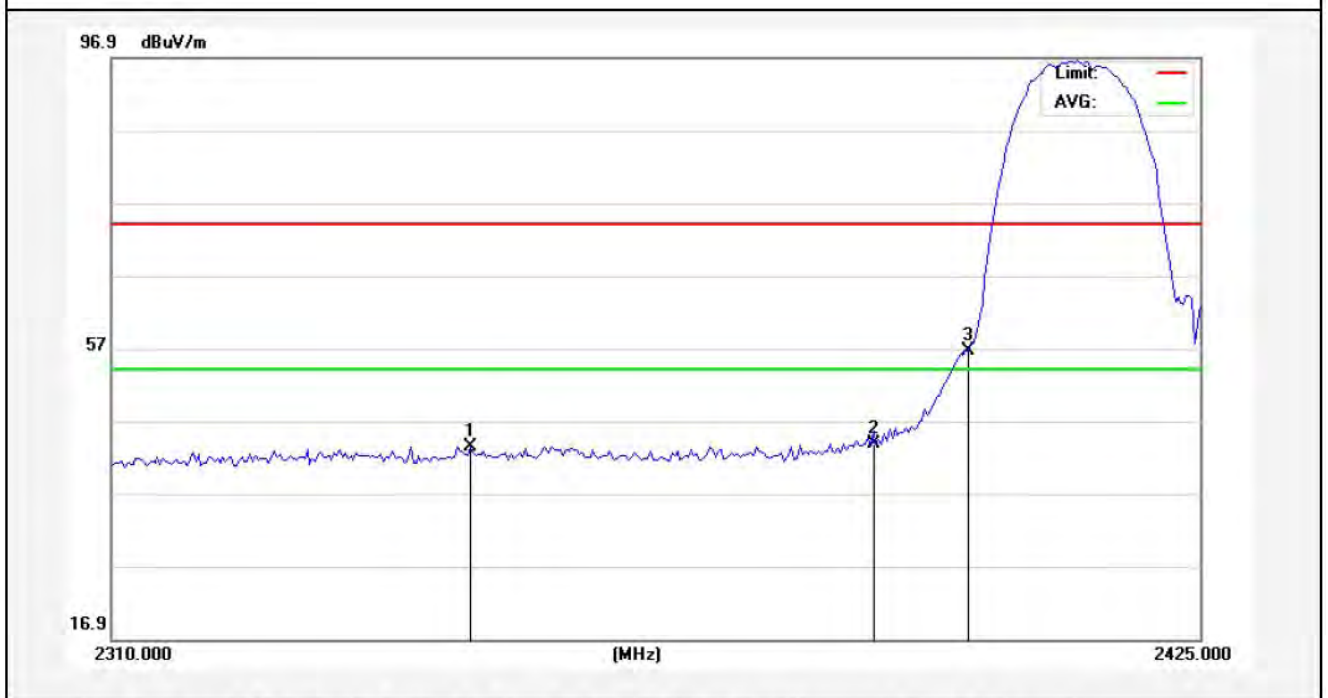
Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	37.58	-2.31	35.27	54.00	-18.73	AVG			
2	2487.875	36.17	-2.30	33.87	54.00	-20.13	AVG			

Anbotek

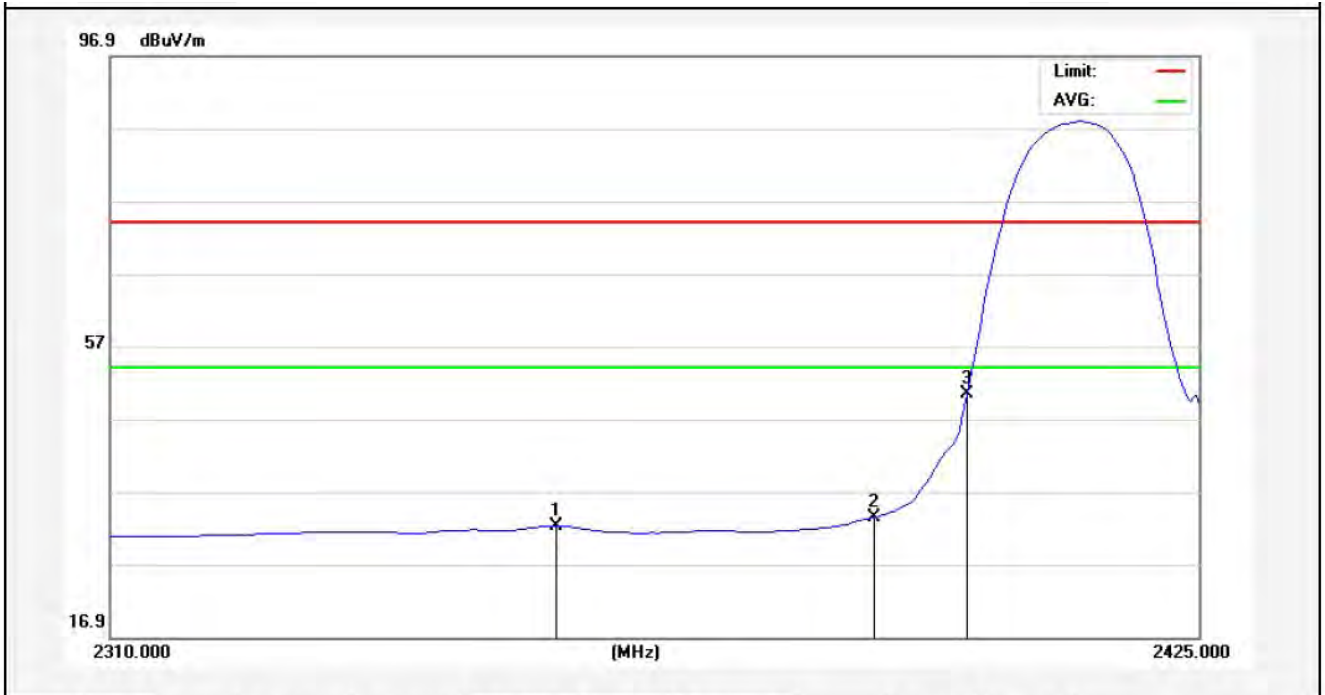
Test Mode: 802.11g
2412MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2347.375	46.02	-2.61	43.41	74.00	-30.59	peak			
2	2390.000	46.36	-2.51	43.85	74.00	-30.15	peak			
3	2400.000	59.16	-2.49	56.67	74.00	-17.33	peak			

AMB

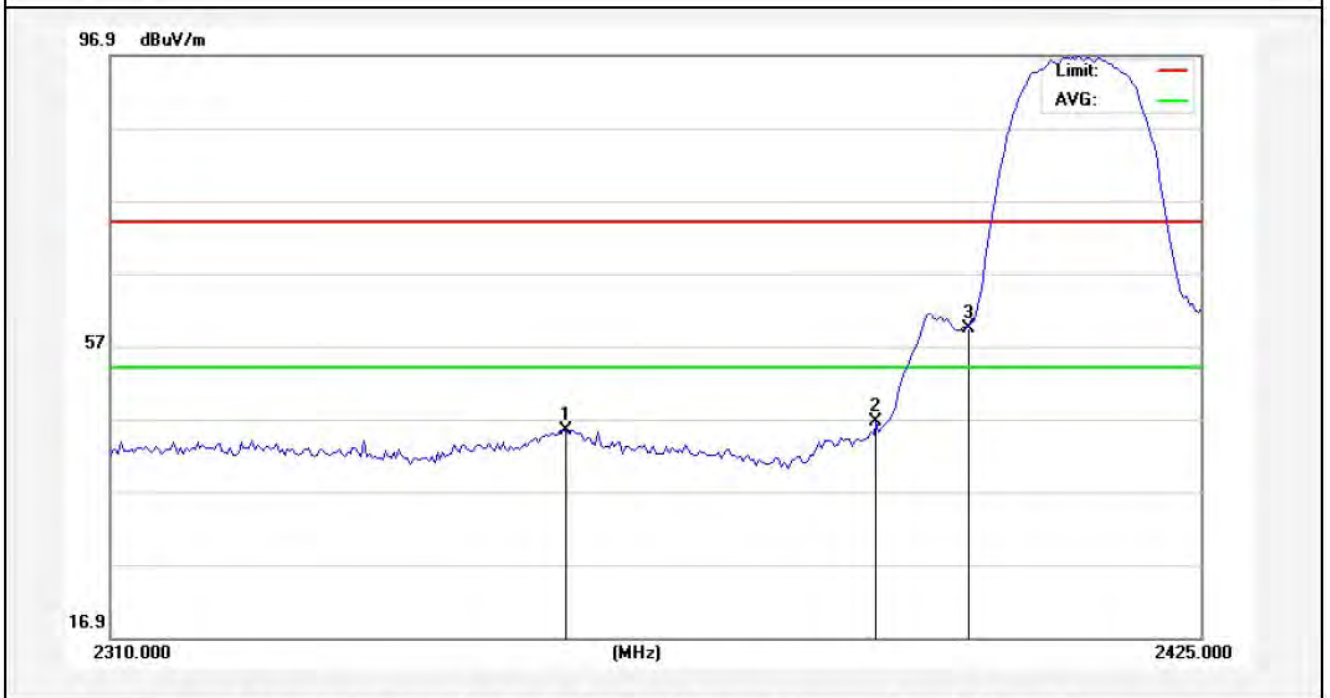
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2356.575	34.89	-2.59	32.30	54.00	-21.70	AVG			
2	2390.000	35.93	-2.51	33.42	54.00	-20.58	AVG			
3	2400.000	52.91	-2.49	50.42	54.00	-3.58	AVG			

AMB-BE300

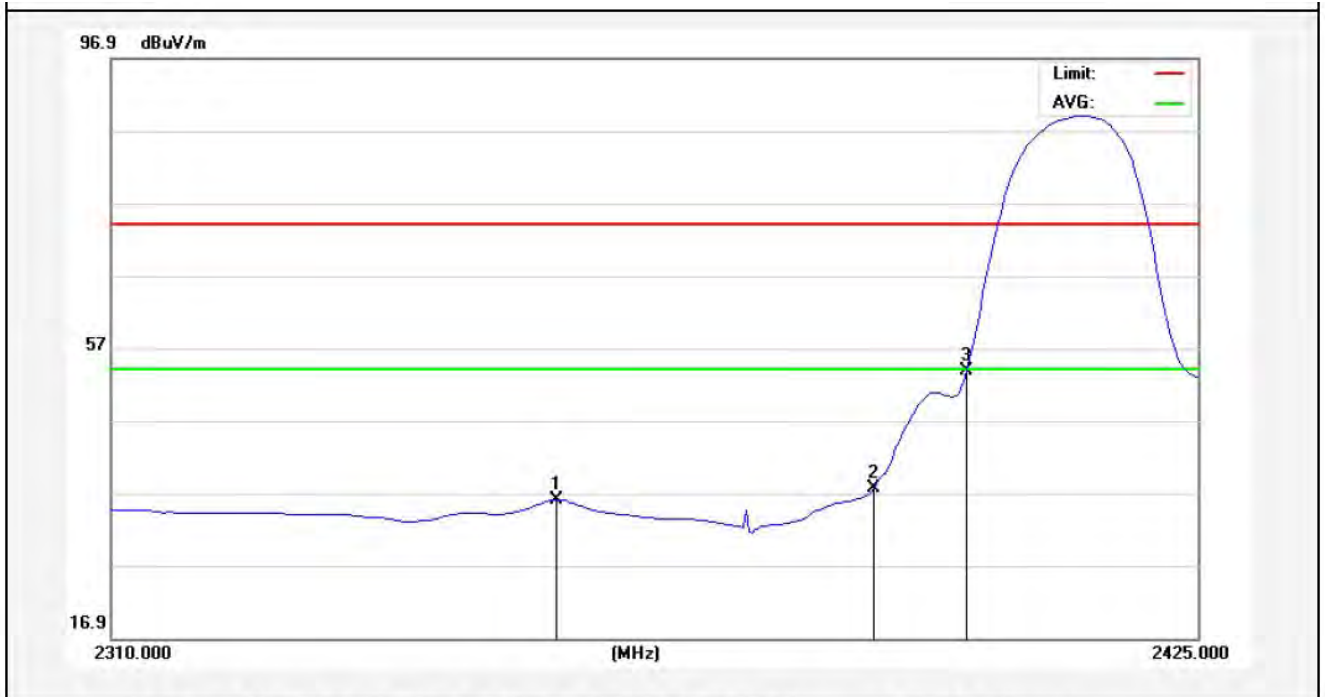
Test Mode: 802.11g
2412MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2357.438	48.04	-2.59	45.45	74.00	-28.55	peak			
2	2390.000	49.05	-2.51	46.54	74.00	-27.46	peak			
3	2400.000	61.99	-2.49	59.50	74.00	-14.50	peak			

AMB

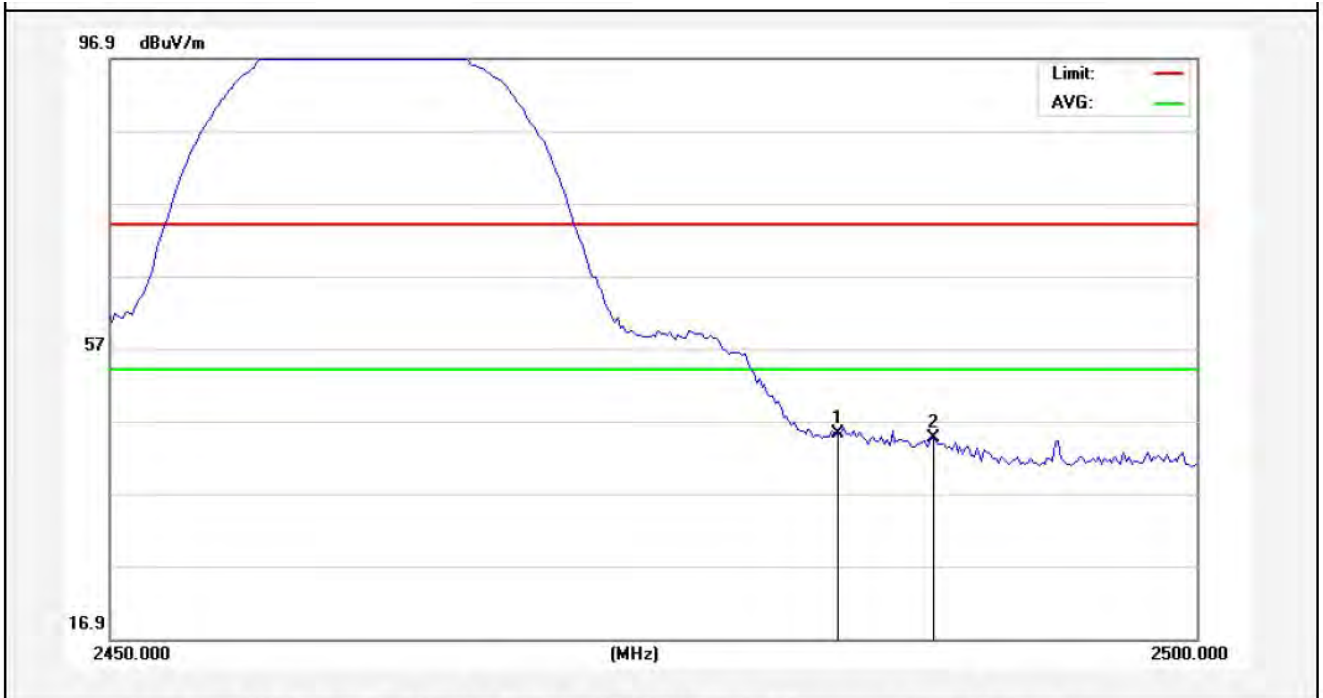
Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2356.575	38.63	-2.59	36.04	54.00	-17.96	AVG			
2	2390.000	40.18	-2.51	37.67	54.00	-16.33	AVG			
3	2400.000	56.29	-2.49	53.80	54.00	-0.20	AVG			

Anbotek

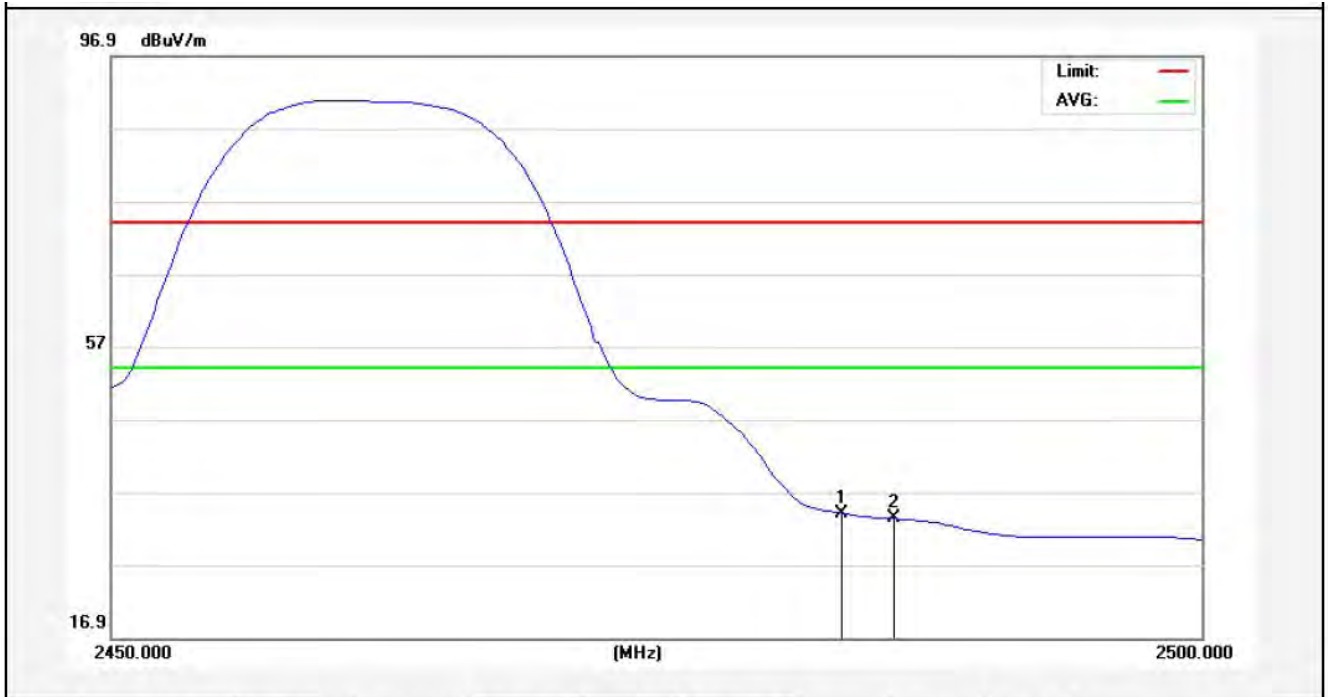
Test Mode: 802.11g
2462MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	47.44	-2.31	45.13	74.00	-28.87	peak			
2	2487.875	47.00	-2.30	44.70	74.00	-29.30	peak			

AMB

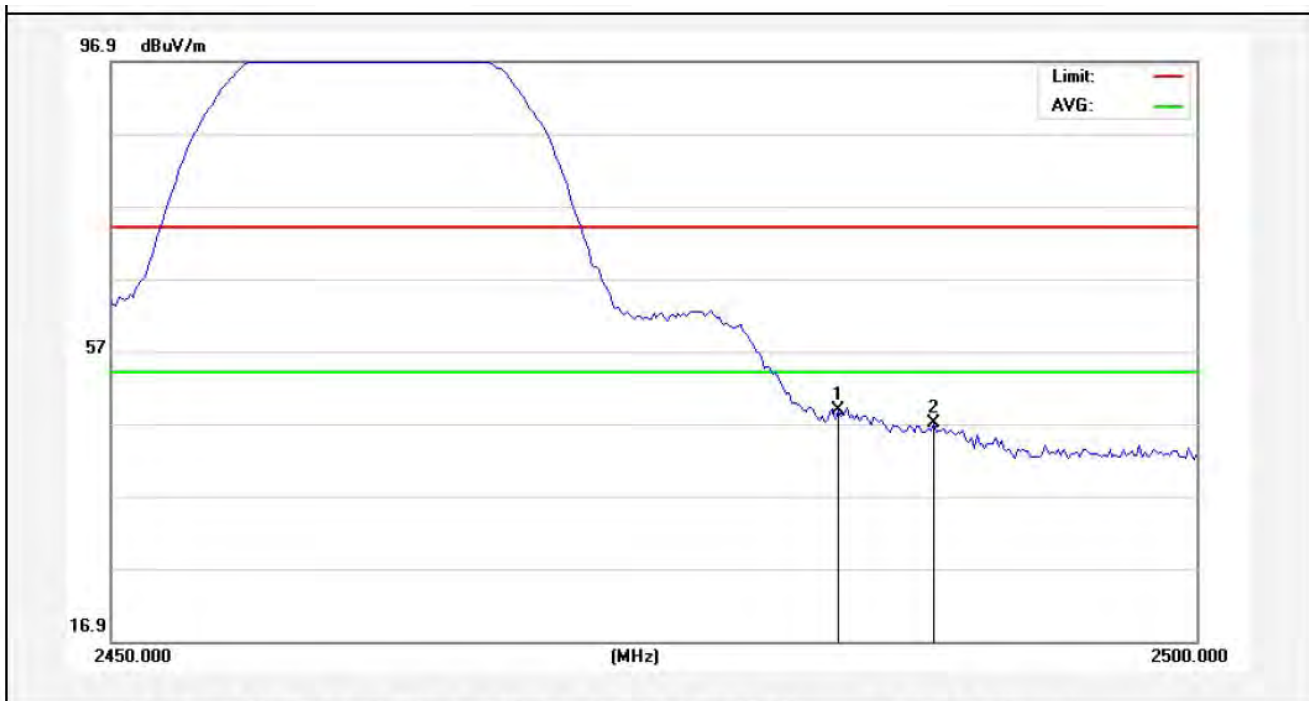
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	36.38	-2.31	34.07	54.00	-19.93	AVG			
2	2485.875	35.66	-2.30	33.36	54.00	-20.64	AVG			

Anbotek

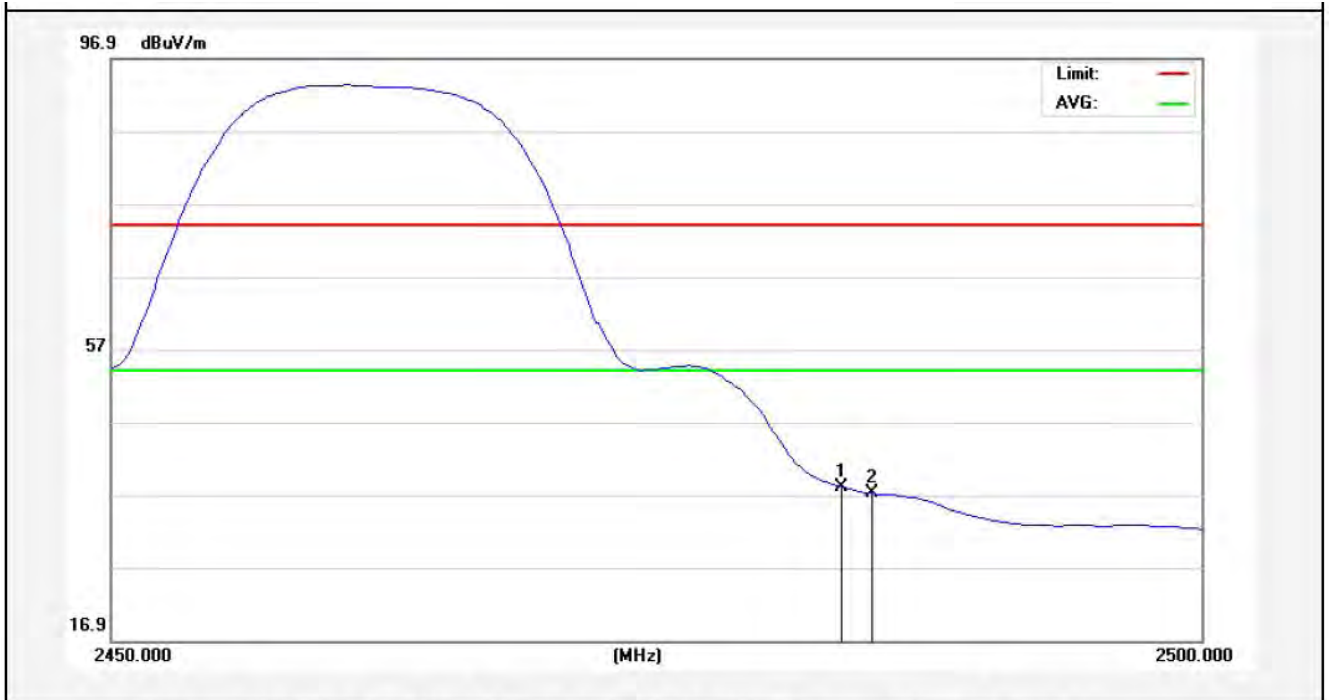
Test Mode: 802.11g
2462MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	51.07	-2.31	48.76	74.00	-25.24	peak			
2	2487.875	49.38	-2.30	47.08	74.00	-26.92	peak			

AMB

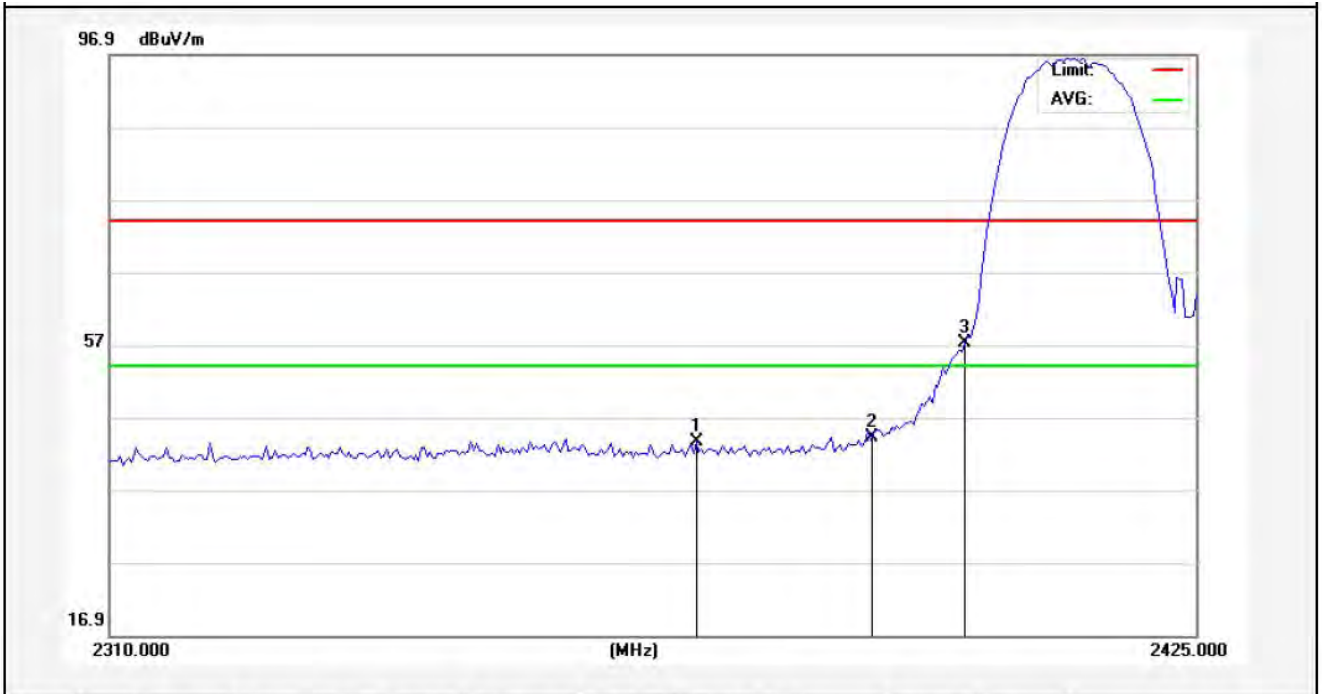
Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	40.38	-2.31	38.07	54.00	-15.93	AVG			
2	2484.875	39.43	-2.30	37.13	54.00	-16.87	AVG			

AMB-BE300

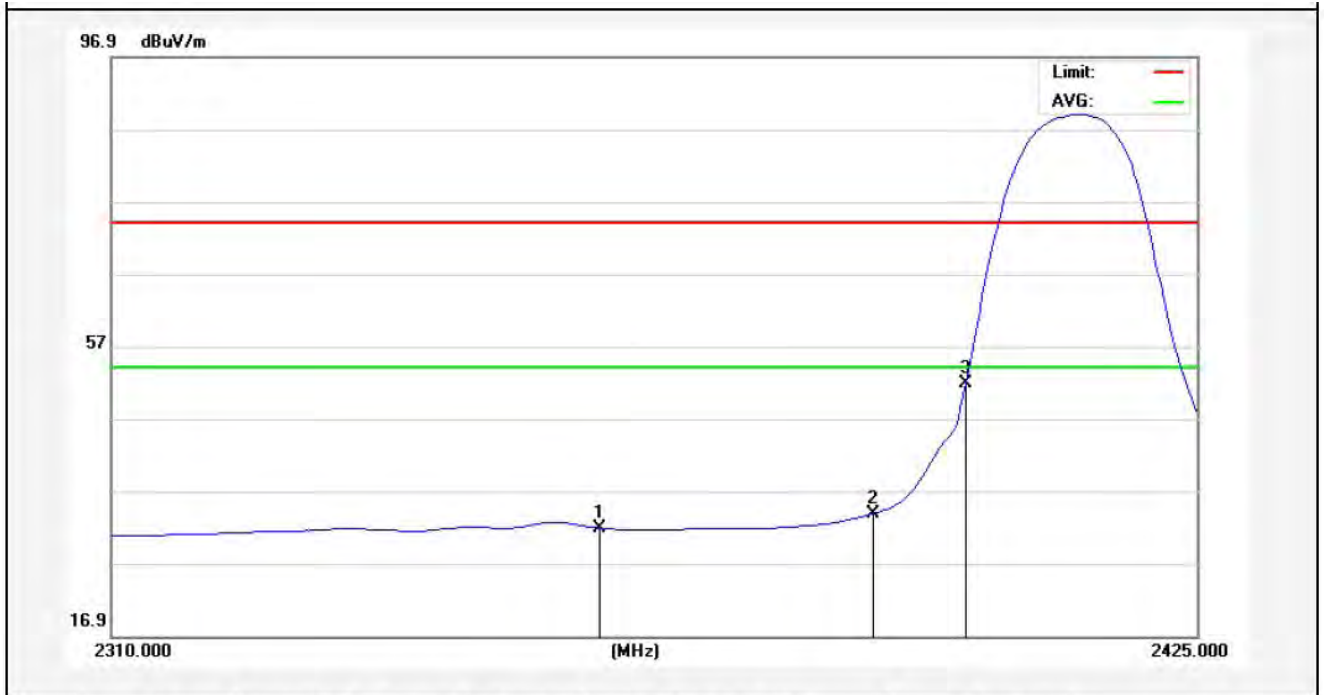
Test Mode: 802.11n (HT20)
2412MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2371.525	46.22	-2.56	43.66	74.00	-30.34	peak			
2	2390.000	46.63	-2.51	44.12	74.00	-29.88	peak			
3	2400.000	59.75	-2.49	57.26	74.00	-16.74	peak			

AMB

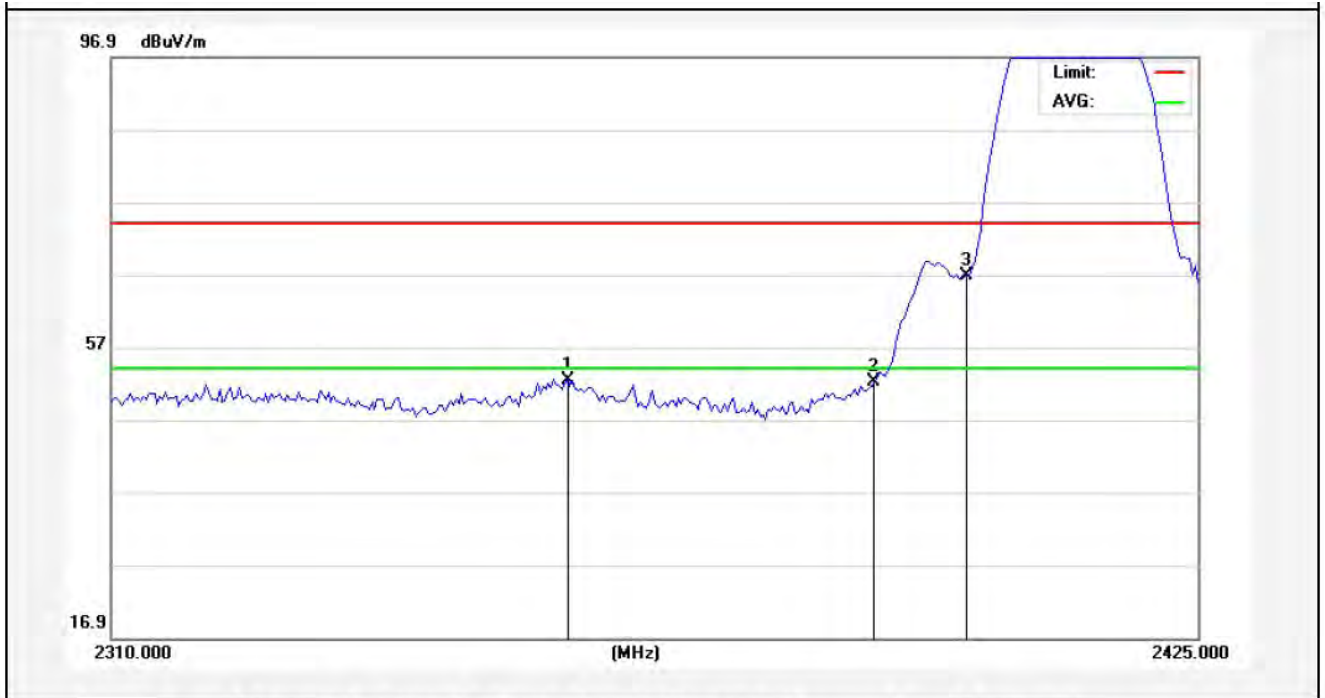
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2361.175	34.40	-2.58	31.82	54.00	-22.18	AVG			
2	2390.000	36.33	-2.51	33.82	54.00	-20.18	AVG			
3	2400.000	54.39	-2.49	51.90	54.00	-2.10	AVG			

AMB-BE300

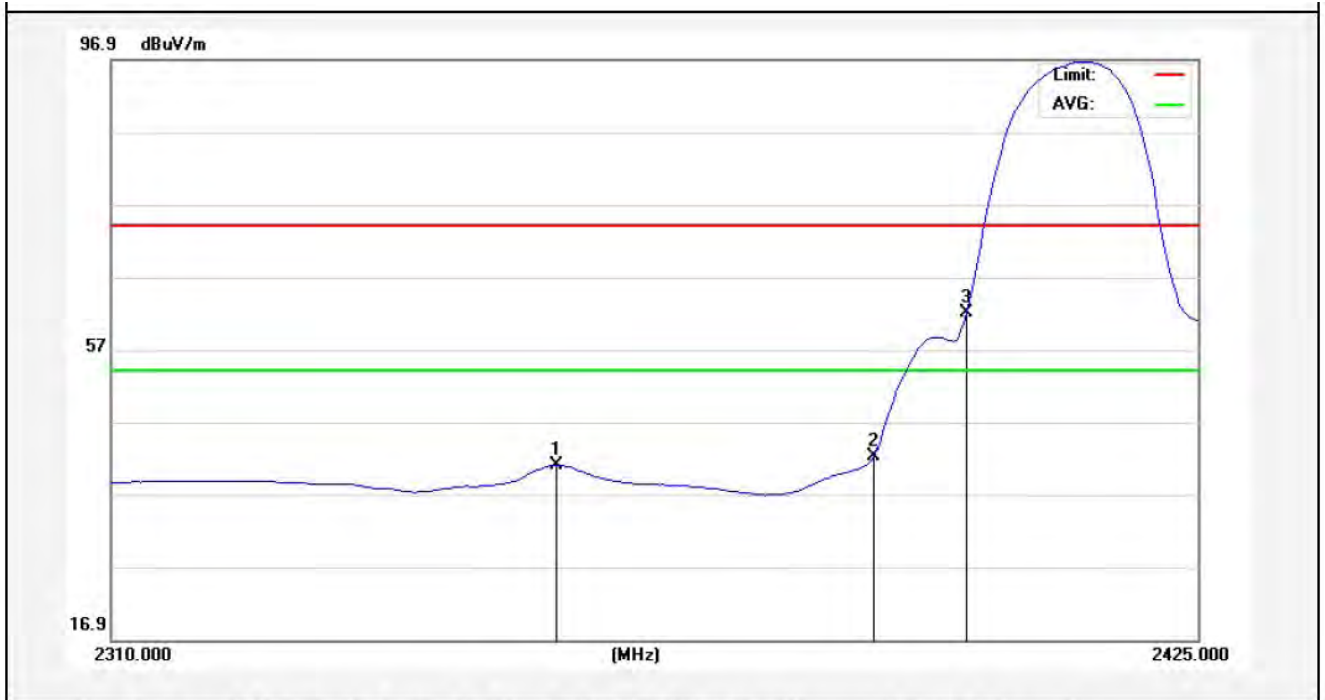
Test Mode: 802.11n (HT20)
2412MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2357.725	55.09	-2.59	52.50	74.00	-21.50	peak			
2	2390.000	54.63	-2.51	52.12	74.00	-21.88	peak			
3	2400.000	69.24	-2.49	66.75	74.00	-7.25	peak			

AMB

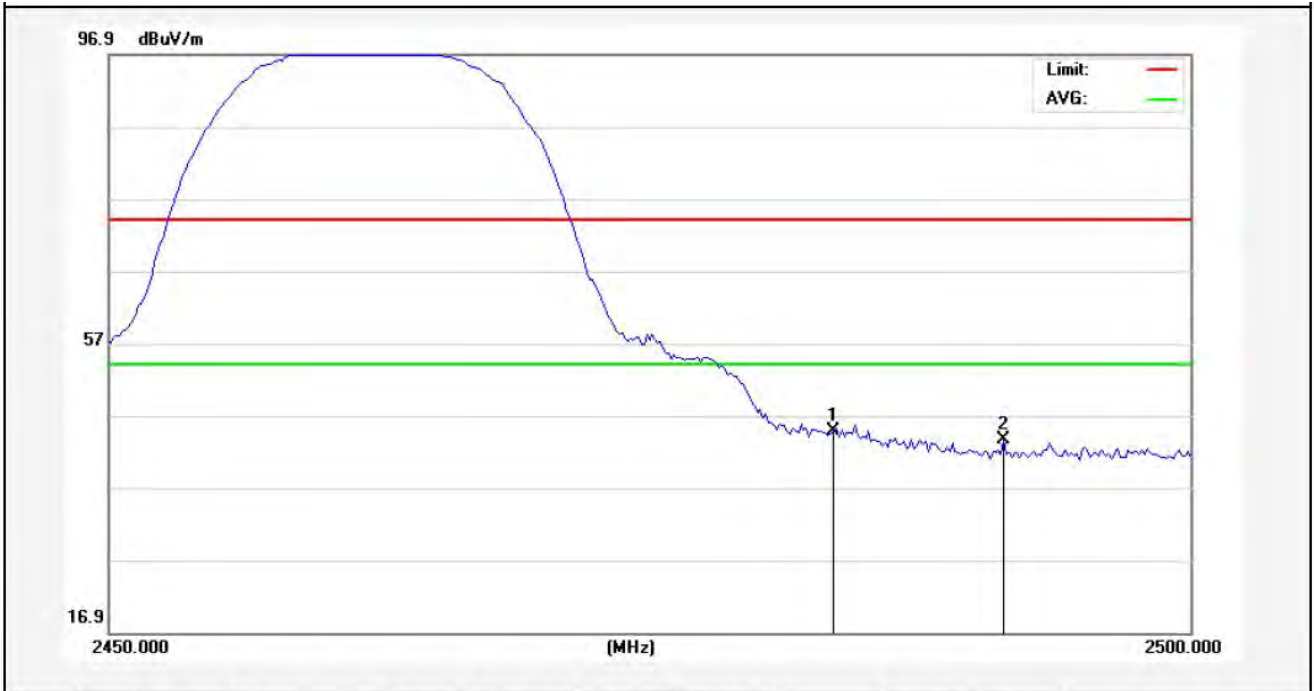
Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2356.575	43.56	-2.59	40.97	54.00	-13.03	AVG			
2	2390.000	44.80	-2.51	42.29	54.00	-11.71	AVG			
3	2400.000	64.50	-2.49	62.01	54.00	8.01	AVG			

AMB-BE300

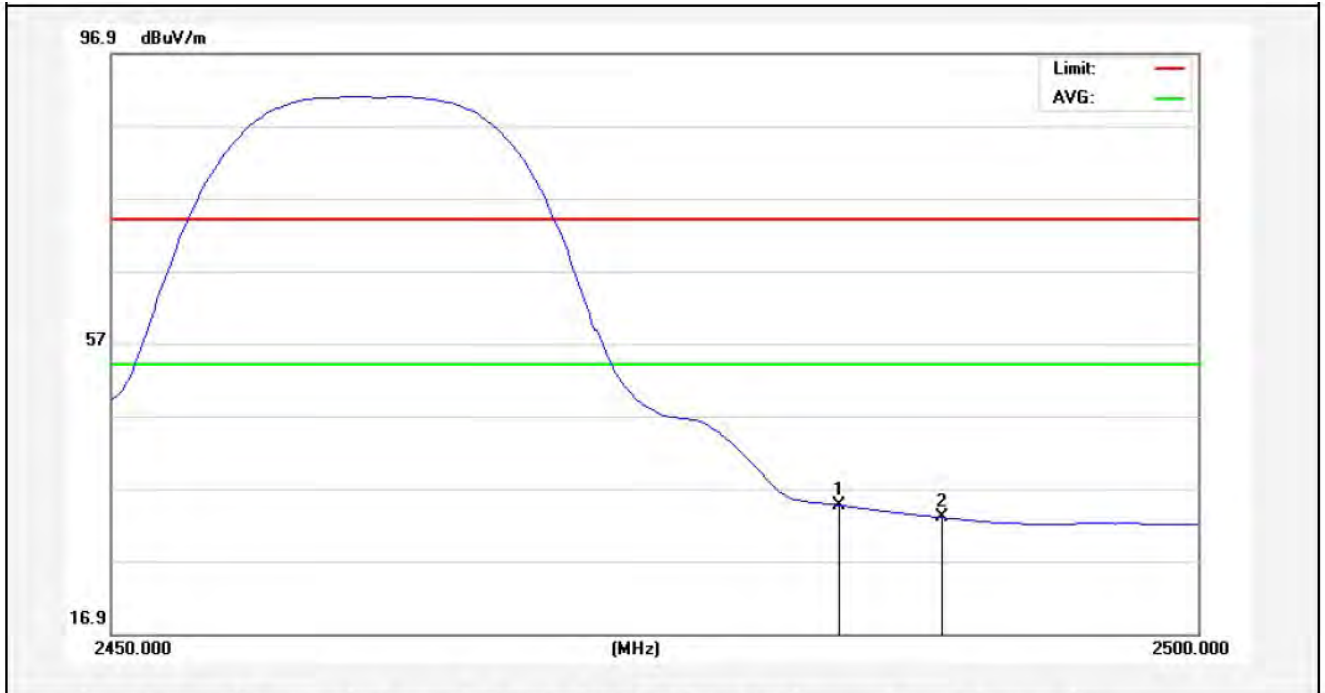
Test Mode: 802.11n (HT20)
2462MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	47.09	-2.31	44.78	74.00	-29.22	peak			
2	2491.375	45.91	-2.29	43.62	74.00	-30.38	peak			

AMB

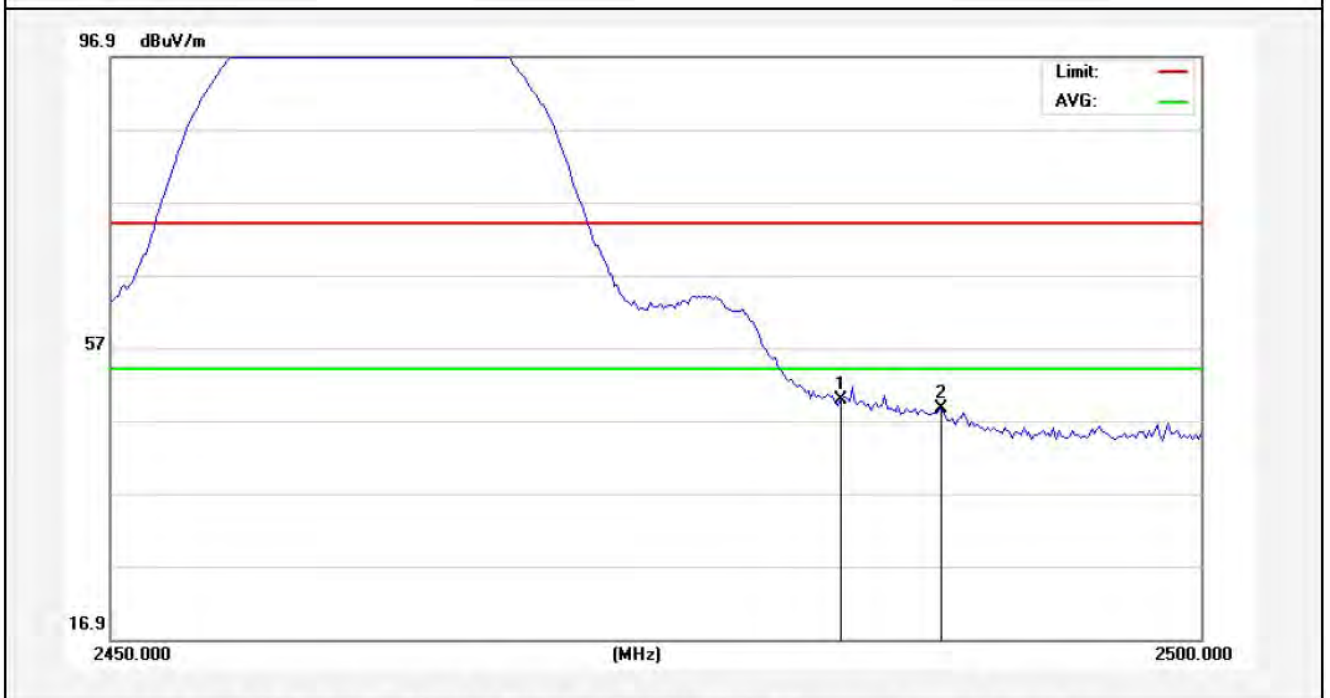
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	36.97	-2.31	34.66	54.00	-19.34	AVG			
2	2488.250	35.22	-2.30	32.92	54.00	-21.08	AVG			

AMB

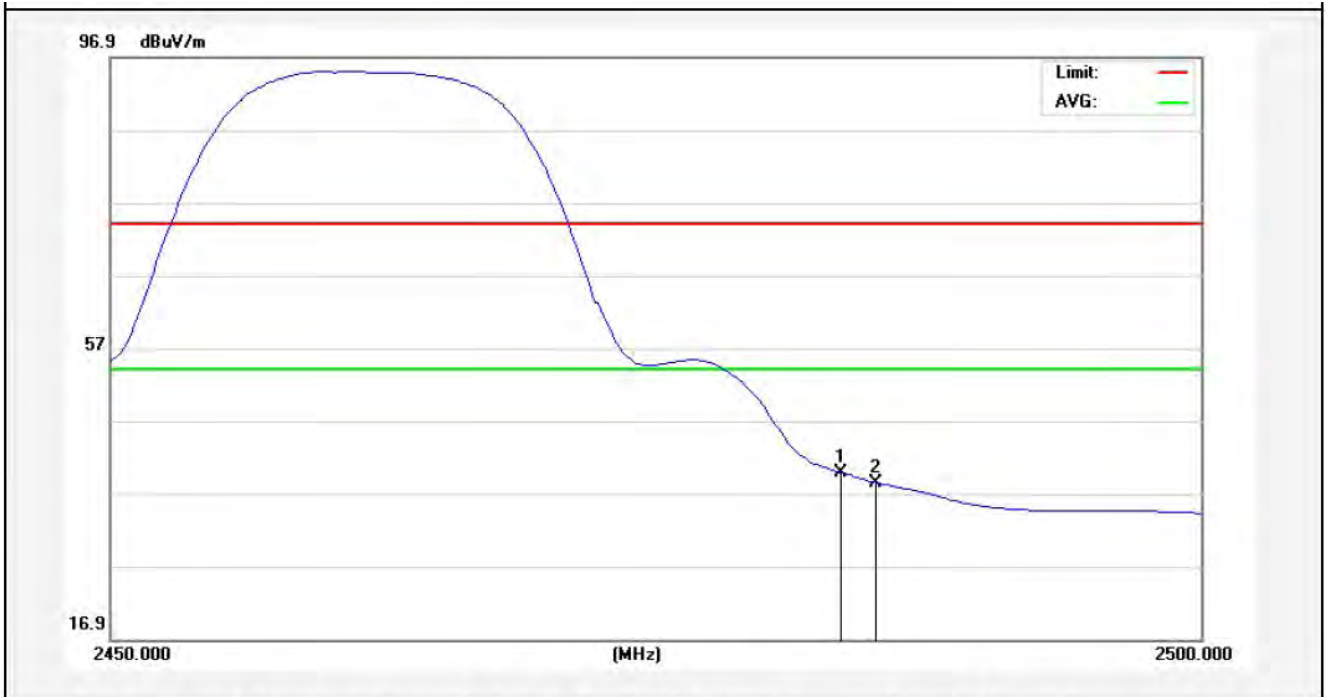
Test Mode: 802.11n (HT20)
2462MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	52.12	-2.31	49.81	74.00	-24.19	peak			
2	2488.125	50.96	-2.30	48.66	74.00	-25.34	peak			

AMB

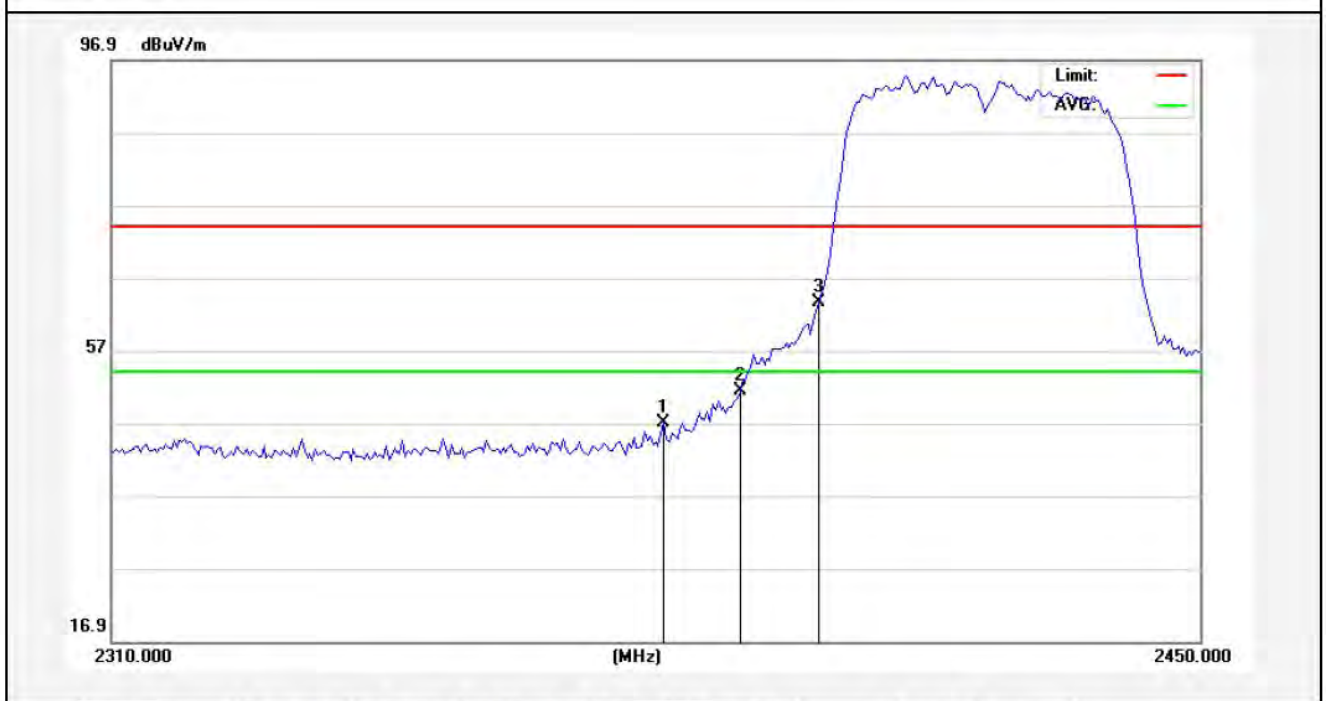
Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	42.11	-2.31	39.80	54.00	-14.20	AVG			
2	2485.125	40.73	-2.30	38.43	54.00	-15.57	AVG			

AMB-BE300

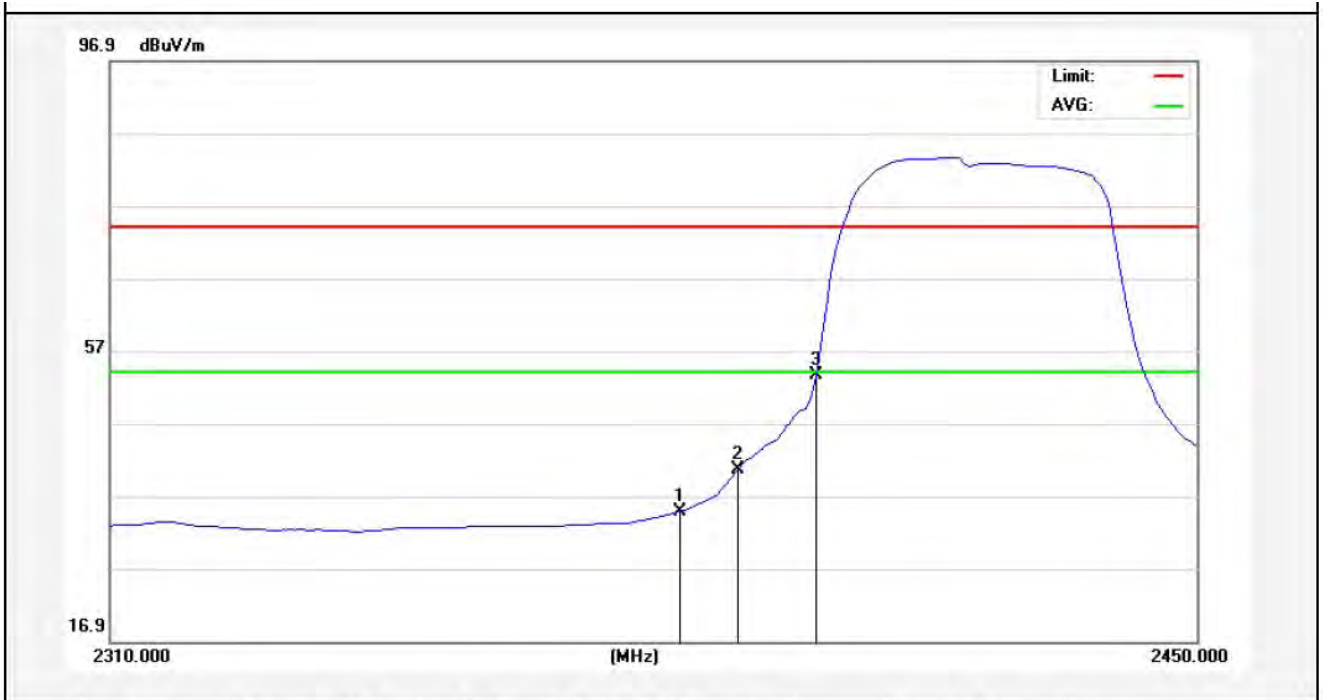
Test Mode: 802.11n (HT40)
2422MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2380.350	49.45	-2.54	46.91	74.00	-27.09	peak			
2	2390.000	54.01	-2.51	51.50	74.00	-22.50	peak			
3	2400.000	66.01	-2.49	63.52	74.00	-10.48	peak			

AMB

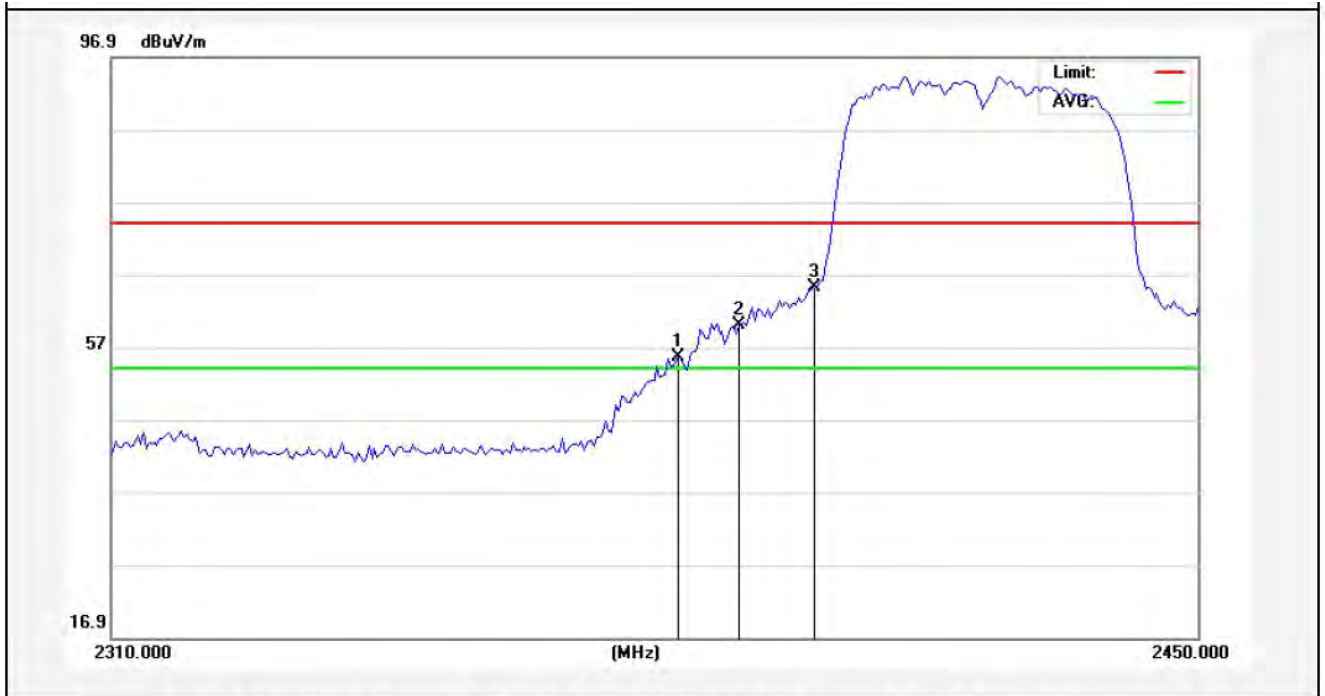
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2382.800	37.36	-2.53	34.83	54.00	-19.17	AVG			
2	2390.000	43.15	-2.51	40.64	54.00	-13.36	AVG			
3	2400.000	56.14	-2.49	53.65	54.00	-0.35	AVG			

AMB-BE300

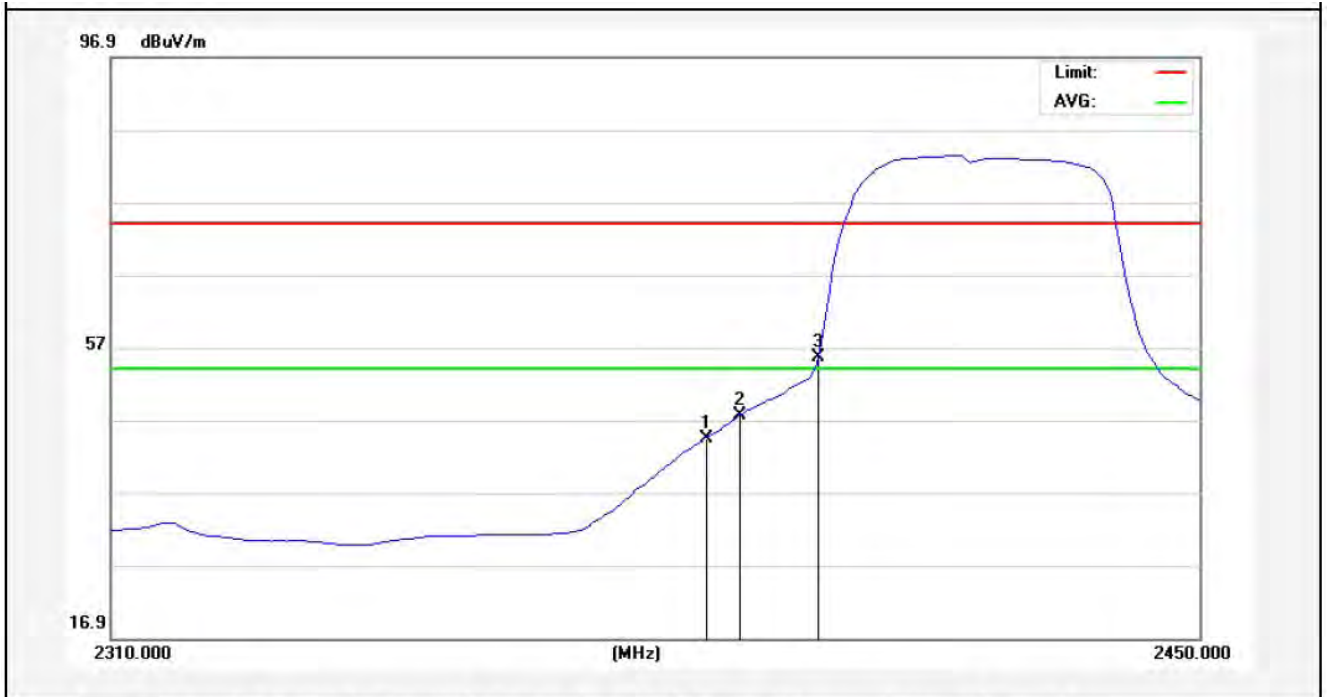
Test Mode: 802.11n (HT40)
2422MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2382.450	58.08	-2.53	55.55	74.00	-18.45	peak			
2	2390.000	62.46	-2.51	59.95	74.00	-14.05	peak			
3	2400.000	67.72	-2.49	65.23	74.00	-8.77	peak			

AMB

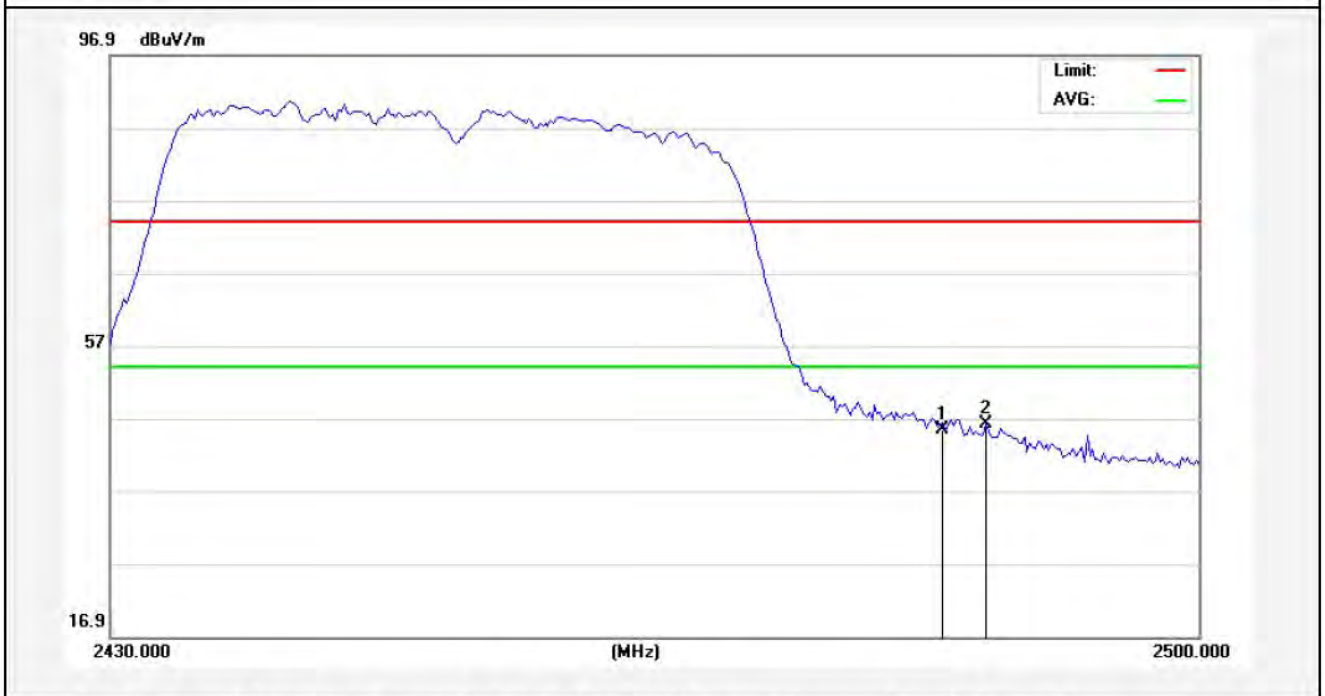
Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2385.600	46.85	-2.52	44.33	54.00	-9.67	AVG			
2	2390.000	50.14	-2.51	47.63	54.00	-6.37	AVG			
3	2400.000	58.16	-2.49	55.67	54.00	1.67	AVG			

AMB-BE300

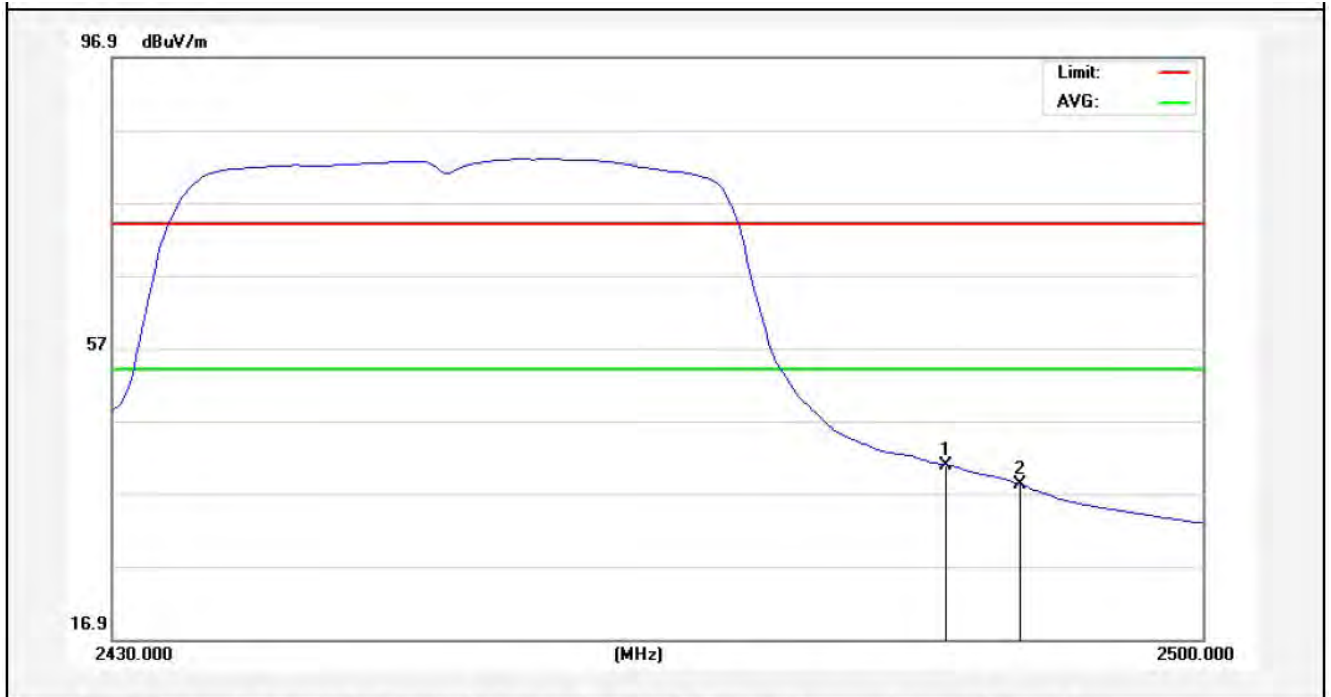
Test Mode: 802.11n (HT40)
2452MHz
Horizontal-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	47.73	-2.31	45.42	74.00	-28.58	peak			
2	2486.350	48.50	-2.30	46.20	74.00	-27.80	peak			

AMB

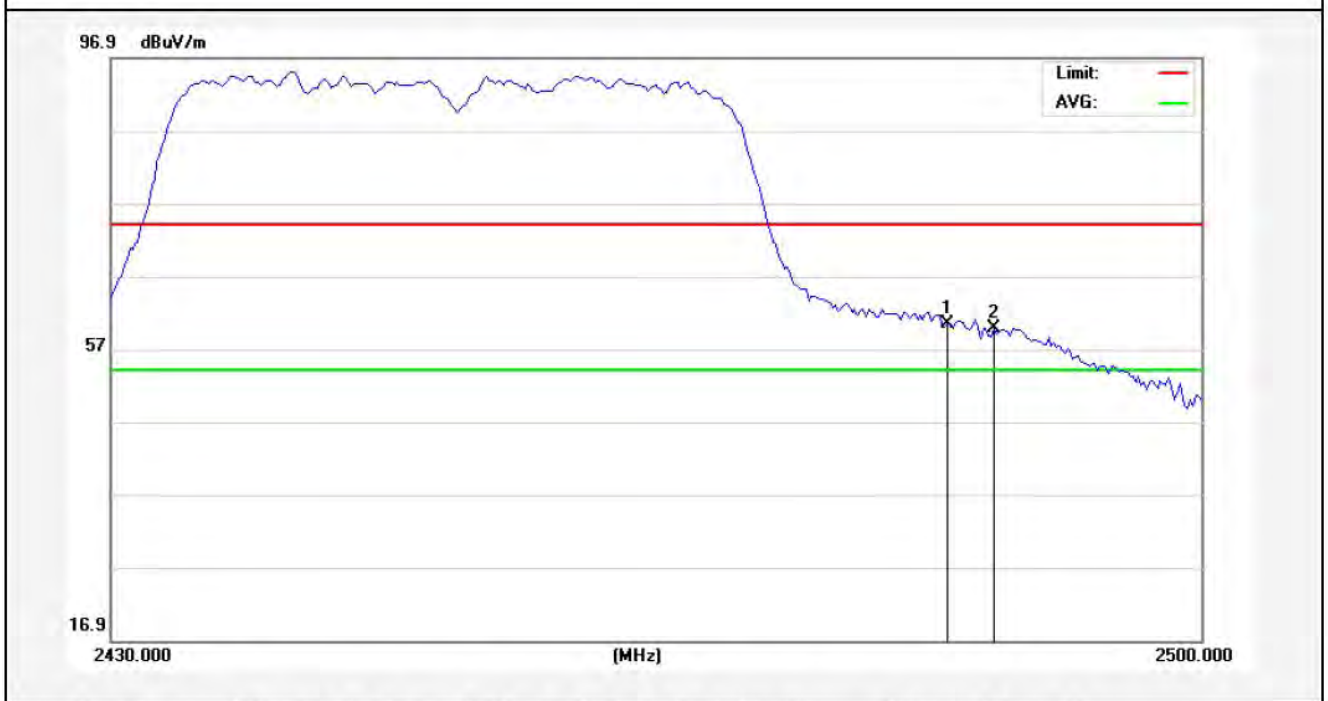
Horizontal-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	43.20	-2.31	40.89	54.00	-13.11	AVG			
2	2488.275	40.50	-2.30	38.20	54.00	-15.80	AVG			

AMB

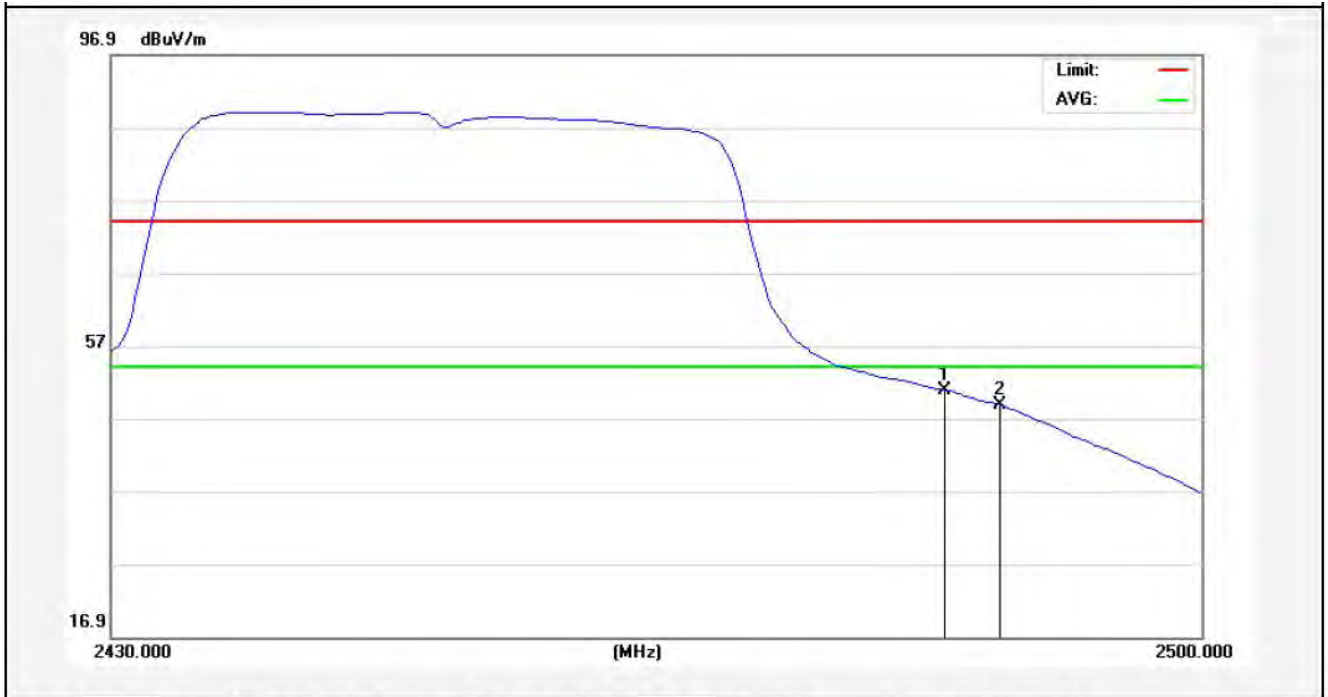
Test Mode: 802.11n (HT40)
2452MHz
Vertical-PEAK:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	62.81	-2.31	60.50	74.00	-13.50	peak			
2	2486.700	62.07	-2.30	59.77	74.00	-14.23	peak			

AMB

Vertical-AV:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	53.10	-2.31	50.79	54.00	-3.21	AVG			
2	2487.050	51.09	-2.30	48.79	54.00	-5.21	AVG			

AMB-BE300

4.5. Peak Power Spectral Density

a. Limit

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

b. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5 times DTS BW, Sweep=500s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

c. Test Equipment

Same as the equipment listed in 4.2.

d. Test Setup

See 4.1

e. Test Results

Pass

f. Test Data

Please refer to the following data.

g. Test Plot See the following pages

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-10.70	-	8.00	Pass
Mid	2437	-13.65	-		Pass
High	2462	-9.52	-		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Σ PPSD (dBm)	Limit (dBm)	Result
Low	2412	-8.39	-	8.00	Pass
Mid	2437	-12.44	-		Pass
High	2462	-9.23	-		Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-8.68	-	8.00	Pass
Mid	2437	-11.14	-		Pass
High	2462	-8.54	-		Pass

Test mode: IEEE 802.11n (HT40)

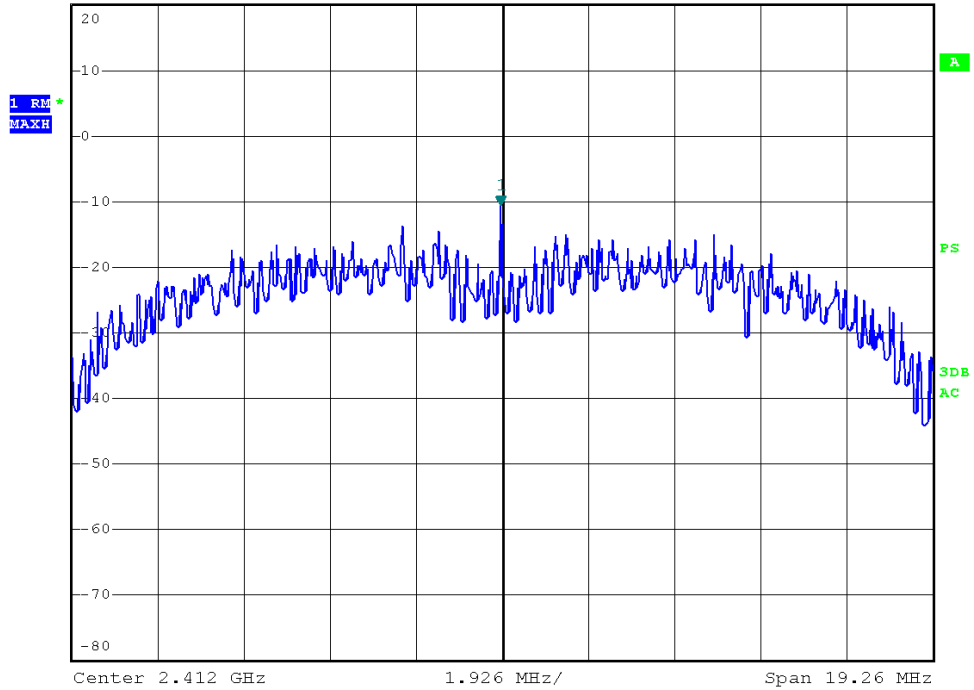
Channel	Frequency (MHz)	PPSD (dBm/3KHz)	Σ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2422	-11.58	-	8.00	Pass
Mid	2437	-12.13	-		Pass
High	2452	-10.66	-		Pass

802.11 b CH--Low



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -10.70 dBm
SWT 2.15 s 2.411961480 GHz

Ref 20 dBm *Att 35 dB

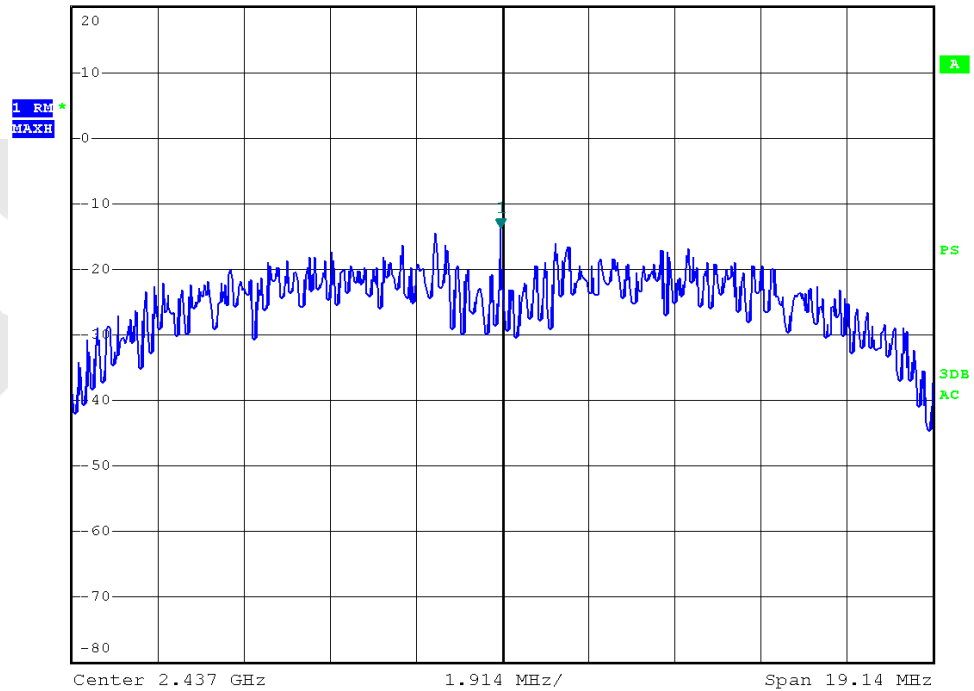


802.11 b CH--Mid

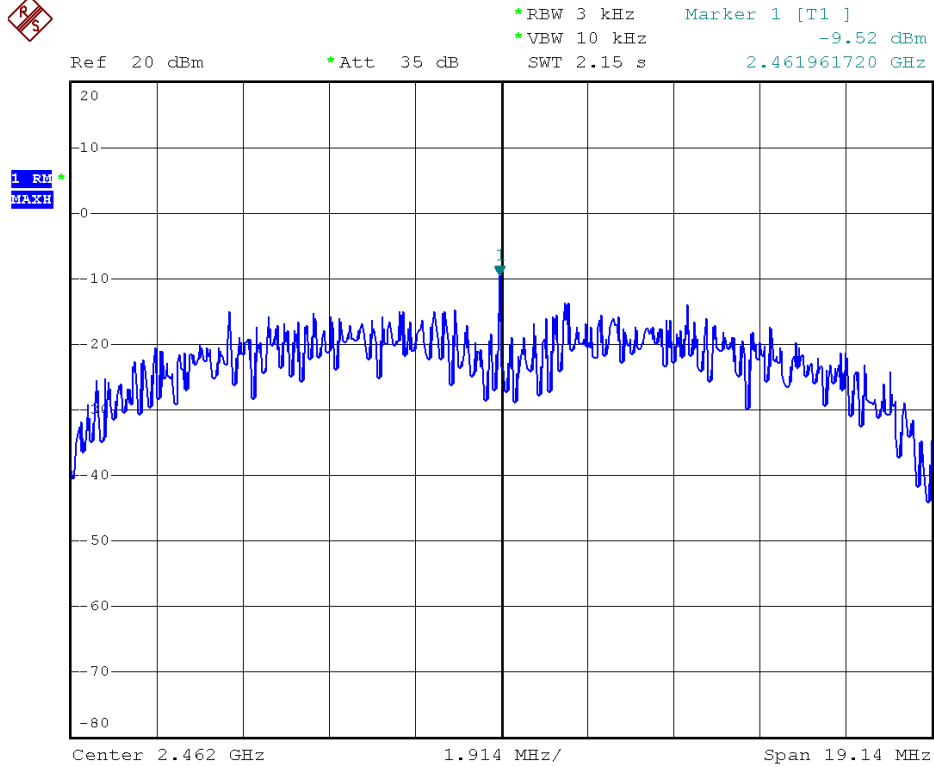


*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -13.65 dBm
SWT 2.15 s 2.436961720 GHz

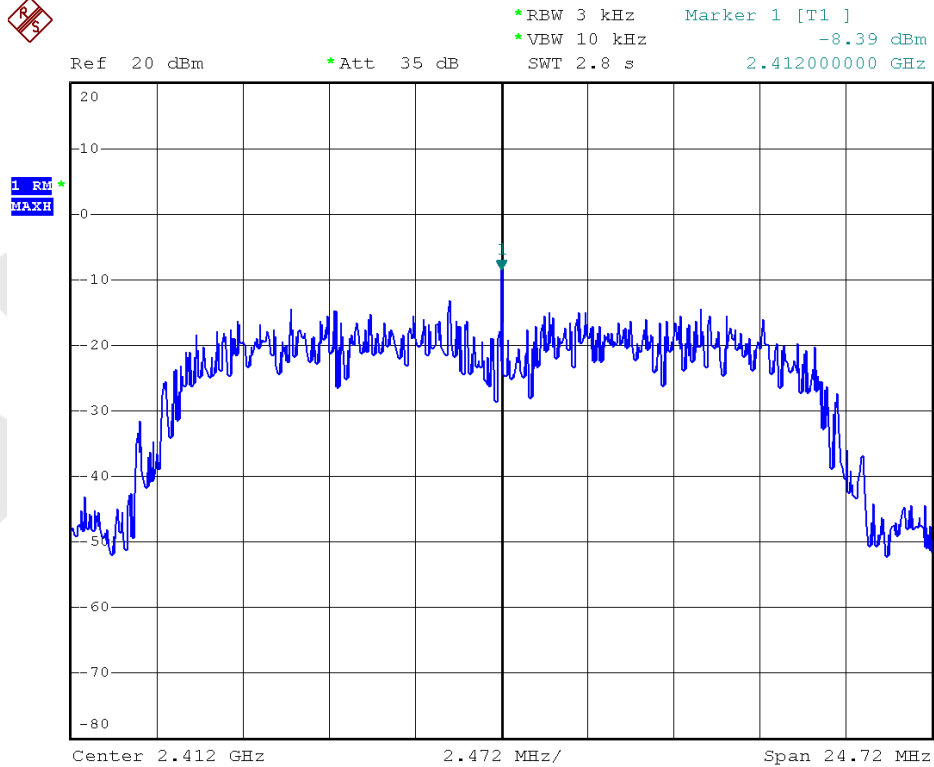
Ref 20 dBm *Att 35 dB



802.11 b CH--High



802.11g CH--Low

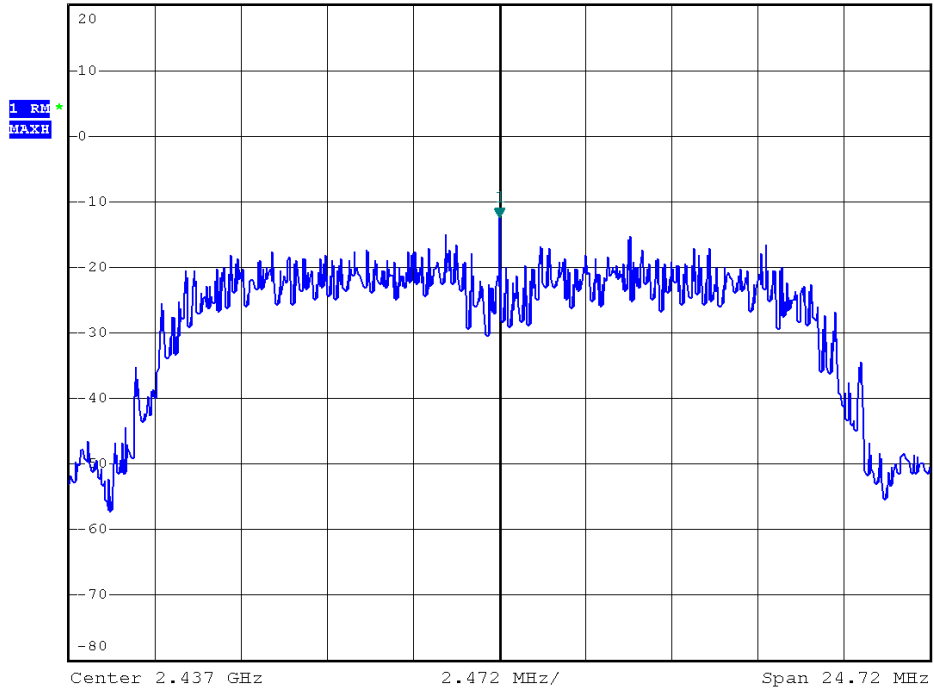


802.11g CH--Mid



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -12.44 dBm
SWT 2.8 s 2.437000000 GHz

Ref 20 dBm *Att 35 dB

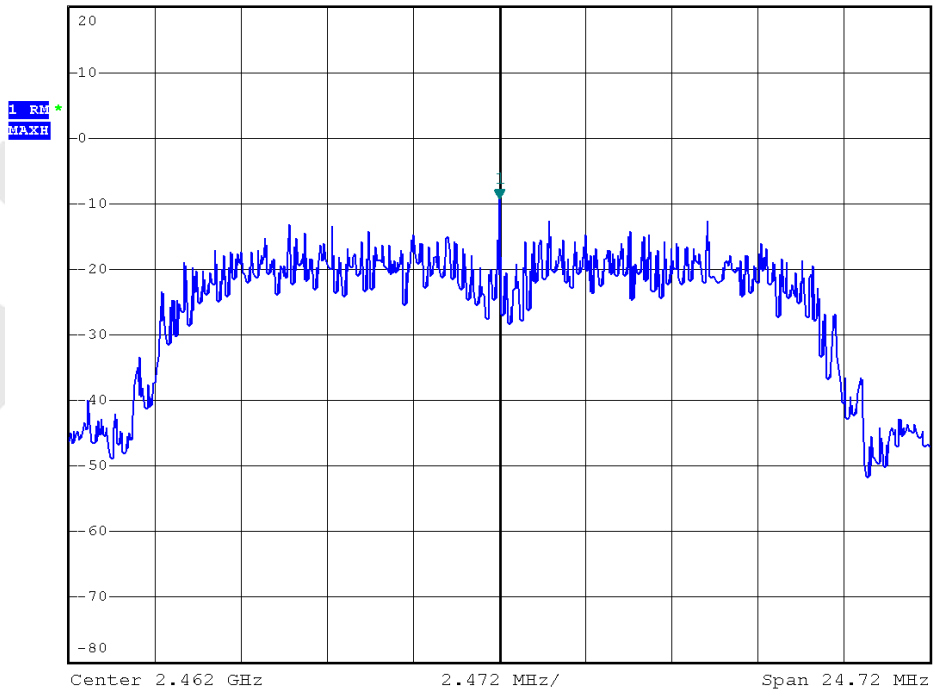


802.11g CH--High

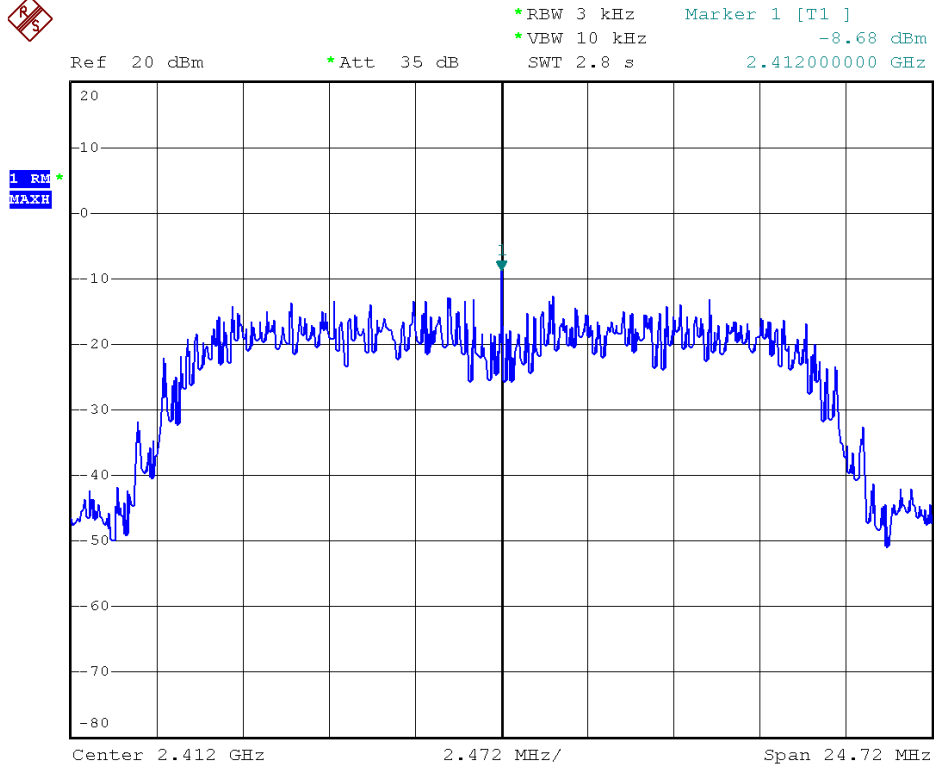


*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -9.23 dBm
SWT 2.8 s 2.462000000 GHz

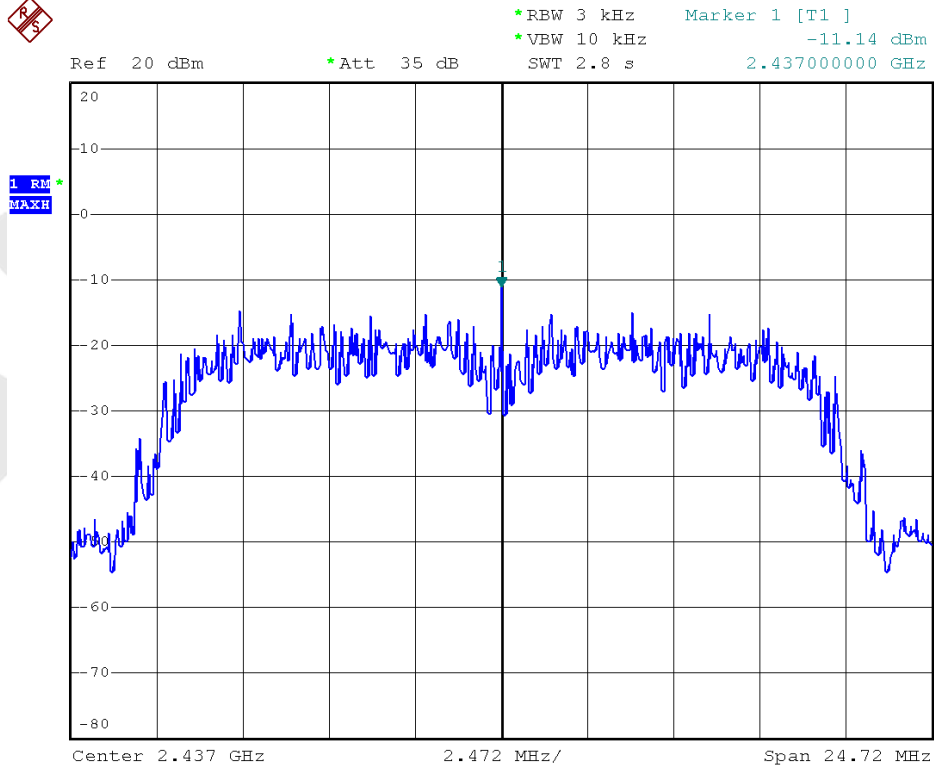
Ref 20 dBm *Att 35 dB



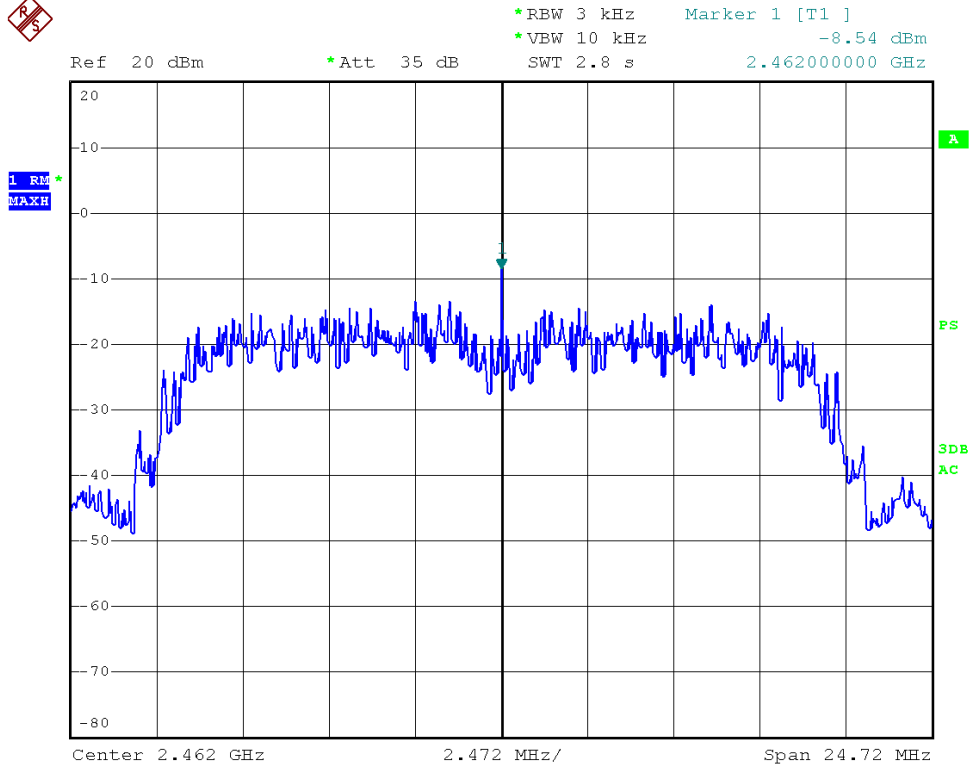
802.11n (HT20) CH—Low



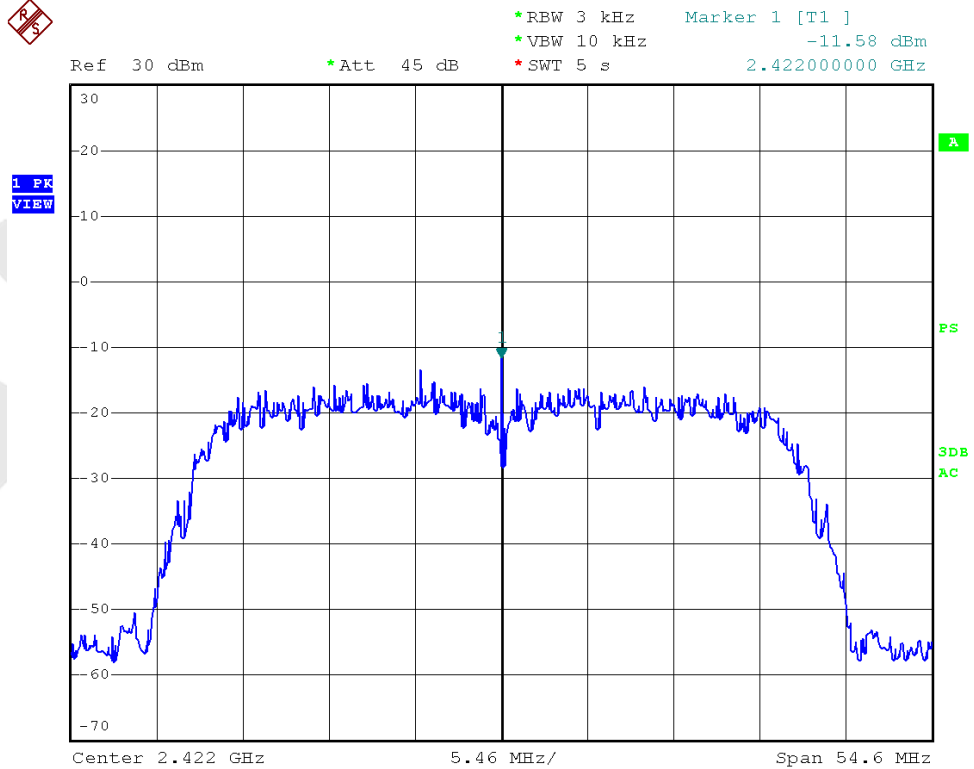
802.11n (HT20) CH—Mid



802.11n (HT20) CH—High



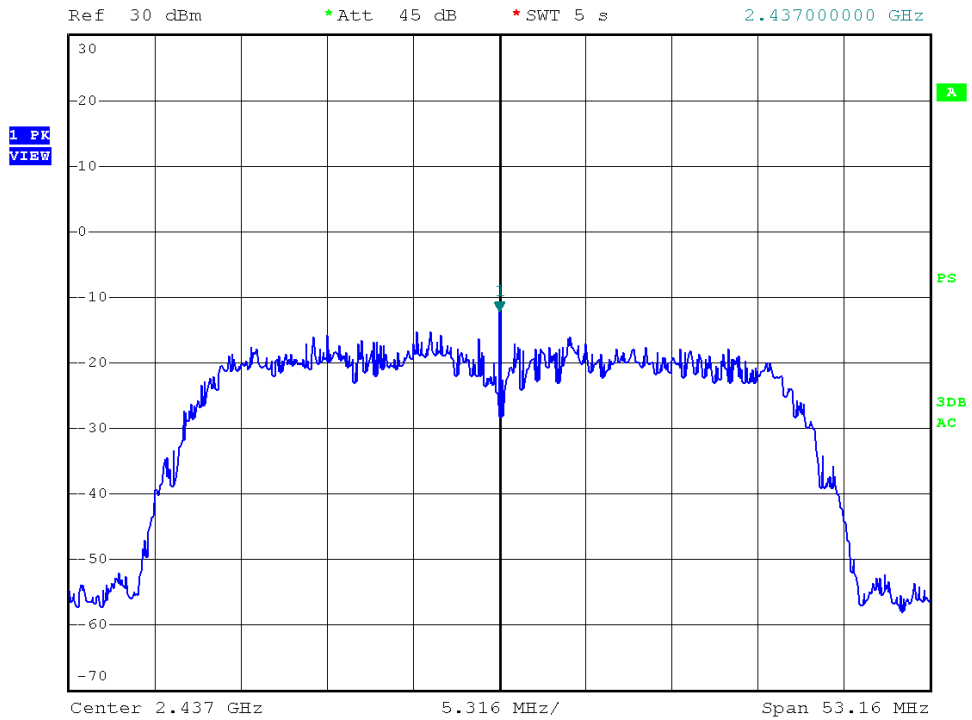
802.11n (HT40) CH—Low



802.11n (HT40) CH—Mid



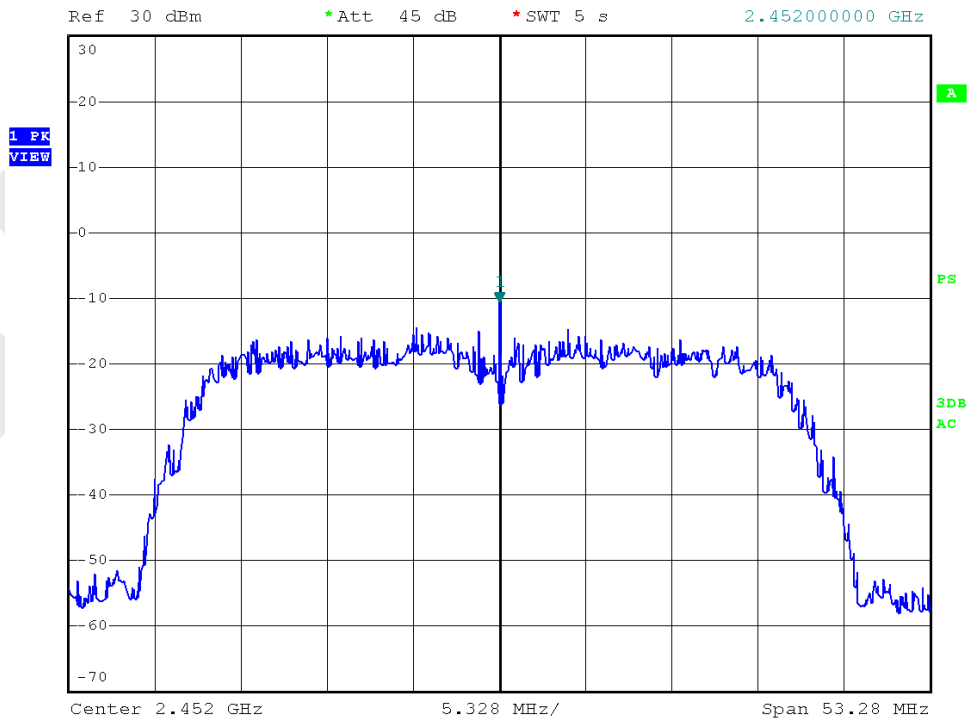
*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -12.13 dBm
*SWT 5 s 2.437000000 GHz



802.11n (HT40) CH—High



*RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -10.66 dBm
*SWT 5 s 2.452000000 GHz



4.6. Radiated Emissions

4.6.1.1. Test Limits (< 30 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

4.6.1.2. Test Limits (\geq 30 MHz)

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	S15.209	
902-928 MHz		30 - 88 MHz	40 dBuV/m
2.4-2.4835 GHz		88 - 216 MHz	43.5
94 dB μ V/m @3m	54 dB μ V/m @3m	216 - 960 MHz	46
		ABOVE 960 MHz	54dBuV/m

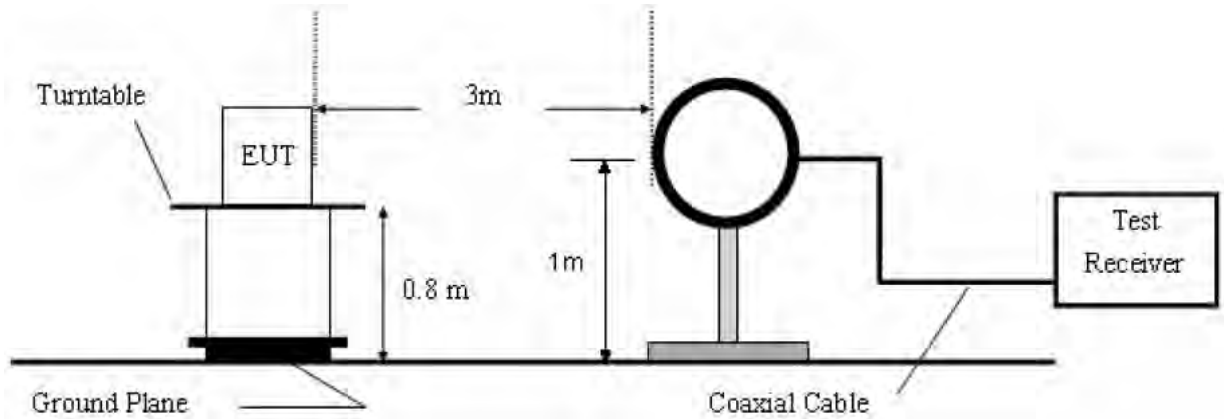
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Equipment

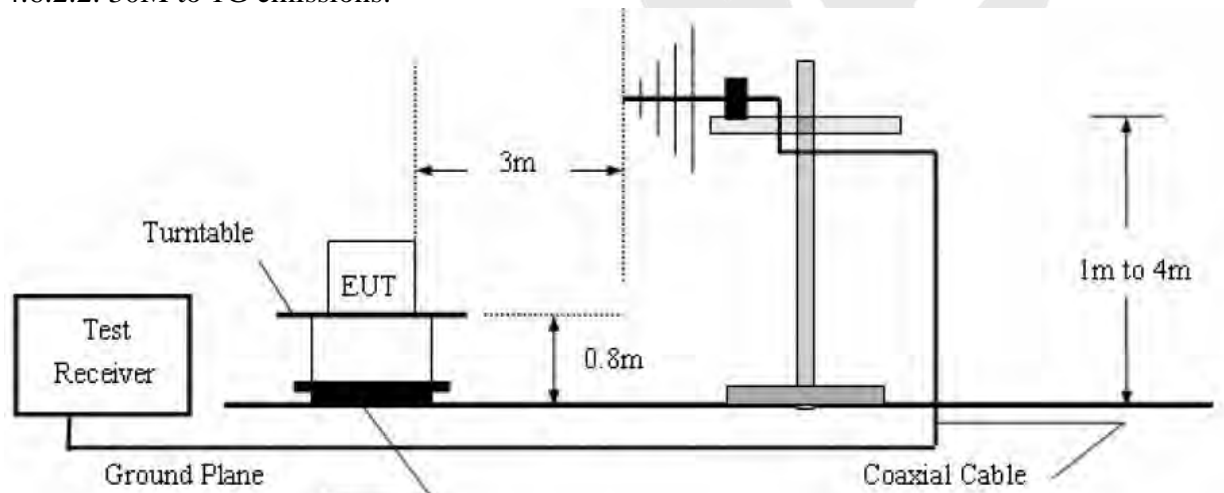
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Apr. 17, 2015	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Apr. 17, 2015	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 17, 2015	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 20, 2015	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 20, 2015	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Apr. 17, 2015	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

4.6.2. Test Configuration:

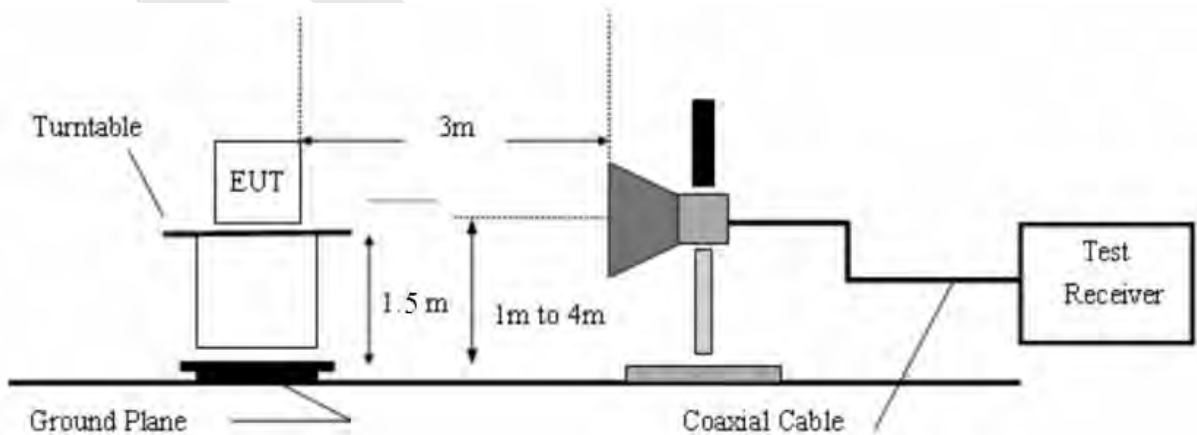
4.6.2.1. 9k to 30MHz emissions:



4.6.2.2. 30M to 1G emissions:



4.6.2.3. 1G to 40G emissions:



4.6.3. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz.

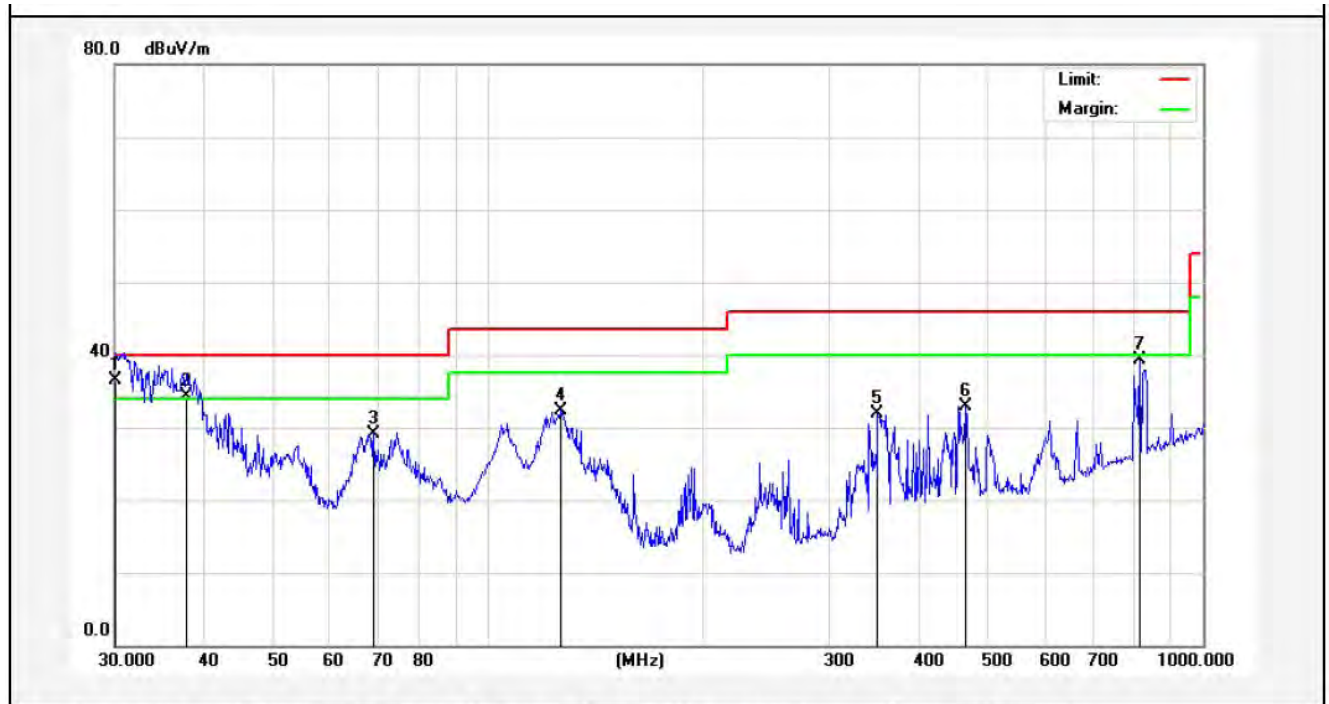
The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 4.6.4.

4.6.4. Test Results

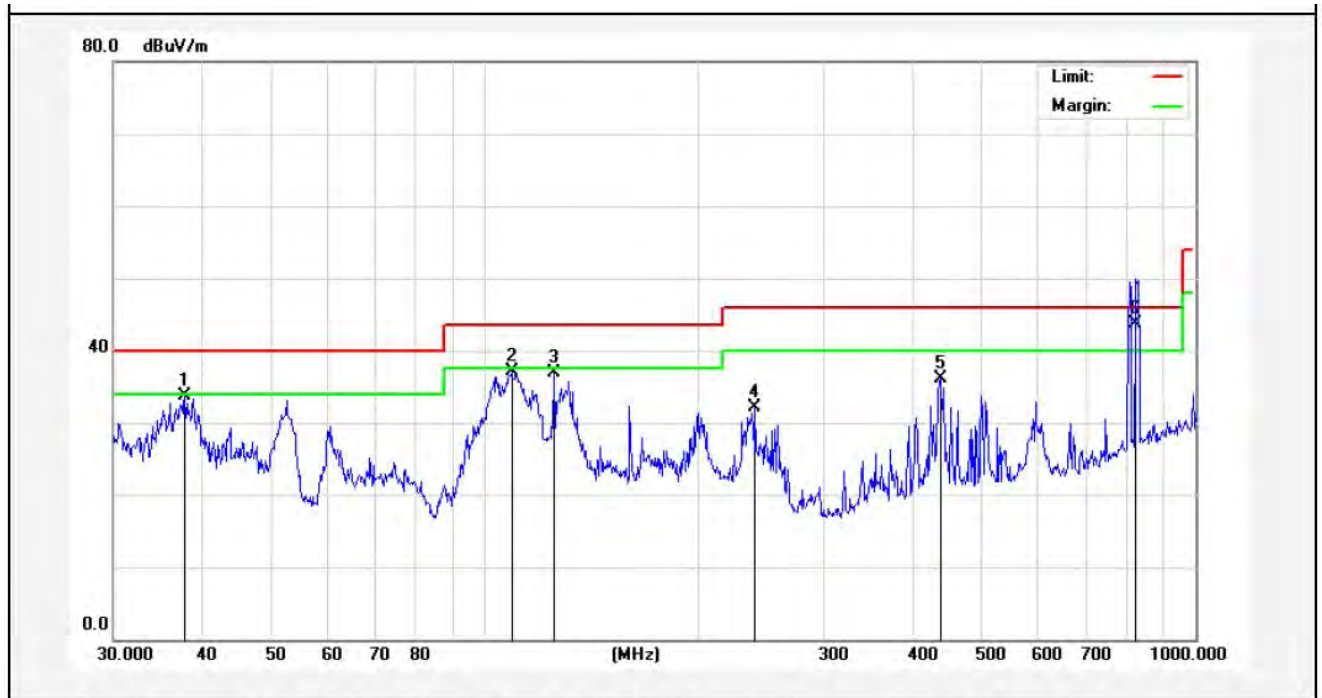
Please refer to the following pages.

Job No.:	011504778I	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	On	Distance:	3m



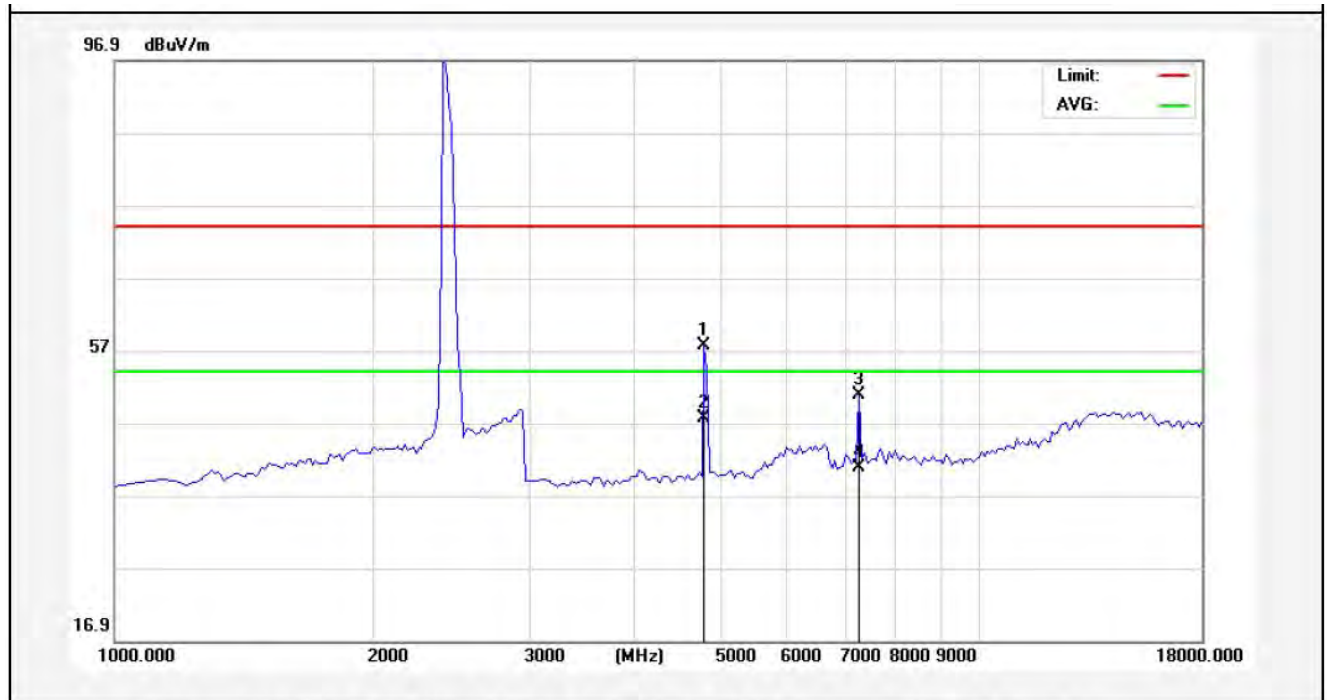
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.0000	53.42	-16.95	36.47	40.00	-3.53	QP	300	360	
2	37.8121	46.33	-12.09	34.24	40.00	-5.76	QP	300	0	
3	69.1141	48.33	-19.24	29.09	40.00	-10.91	peak			
4	126.3286	54.59	-22.27	32.32	43.50	-11.18	peak			
5	350.4768	45.93	-13.97	31.96	46.00	-14.04	peak			
6	465.5994	44.78	-11.94	32.84	46.00	-13.16	peak			
7	815.9678	45.57	-6.28	39.29	46.00	-6.71	peak			

Job No.:	011504778I	Polarization:	Vertical
Standard:	(RE)FCC PART15 C_3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	On	Distance:	3m



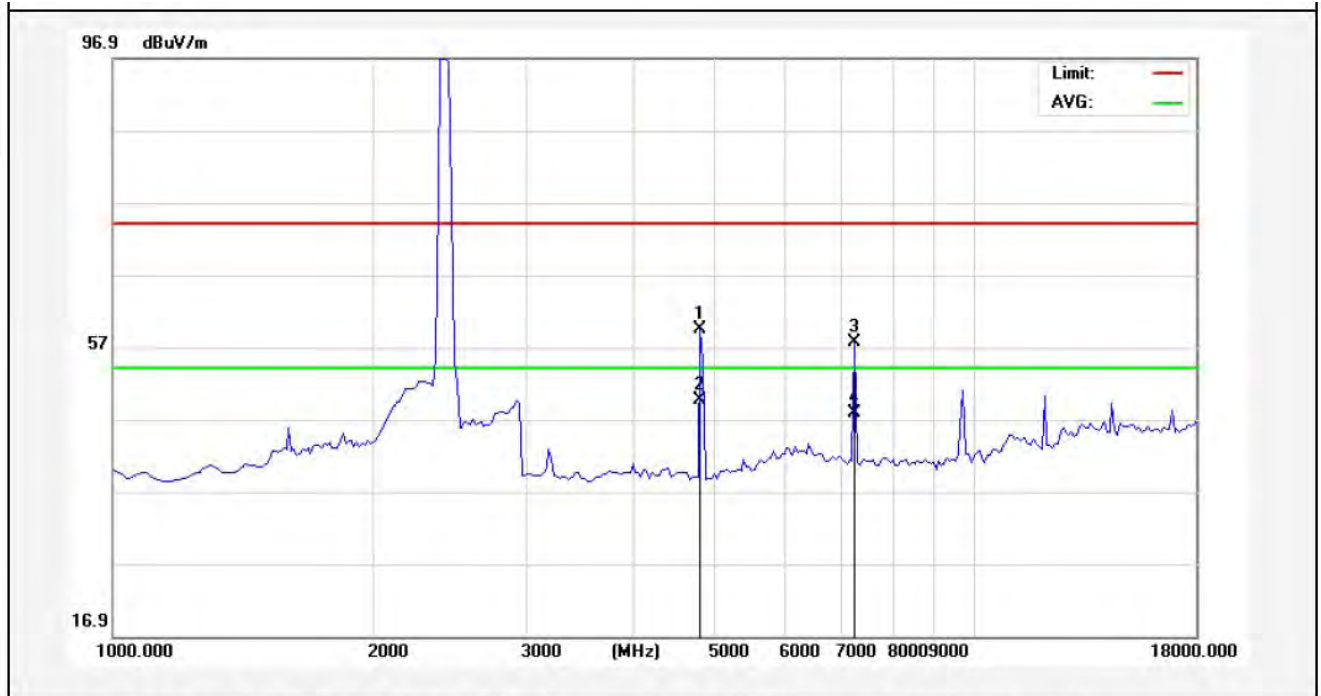
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	37.8121	45.73	-12.09	33.64	40.00	-6.36	peak			
2	109.0286	57.74	-20.63	37.11	43.50	-6.39	peak			
3	125.0066	59.00	-22.08	36.92	43.50	-6.58	peak			
4	239.9874	50.12	-18.09	32.03	46.00	-13.97	peak			
5	437.1198	48.24	-12.23	36.01	46.00	-9.99	peak			
6	824.8867	49.72	-6.10	43.62	46.00	-2.38	QP	100	0	

Job No.:	011504778I	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C_3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Note:	802.11b(2412MHz)	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4825.000	54.29	3.34	57.63	74.00	-16.37	peak			
2	4825.000	44.24	3.34	47.58	54.00	-6.42	AVG			
3	7247.500	42.32	8.48	50.80	74.00	-23.20	peak			
4	7247.500	32.37	8.48	40.85	54.00	-13.15	AVG			

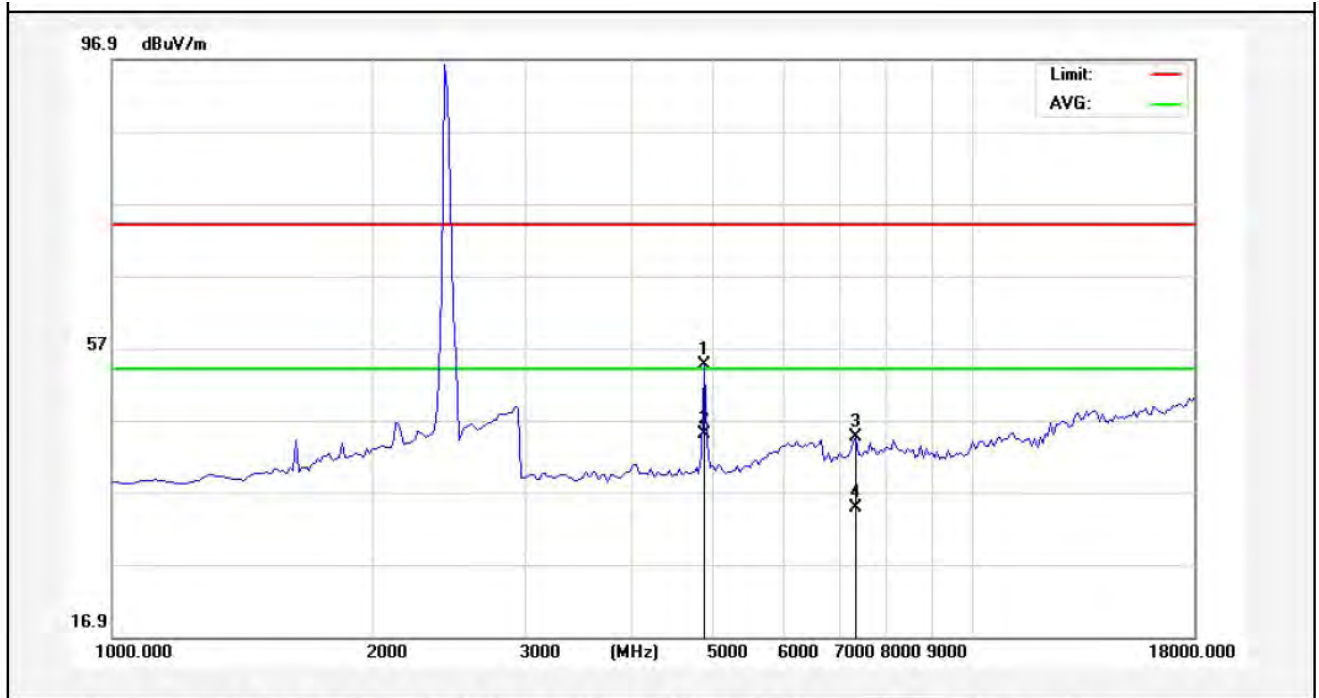
Job No.:	011504778I	Polarization:	Vertical
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Note:	802.11b(2412MHz)	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4825.000	56.04	3.34	59.38	74.00	-14.62	peak			
2	4825.000	46.31	3.34	49.65	54.00	-4.35	AVG			
3	7247.500	49.13	8.48	57.61	74.00	-16.39	peak			
4	7247.500	39.37	8.48	47.85	54.00	-6.15	AVG			



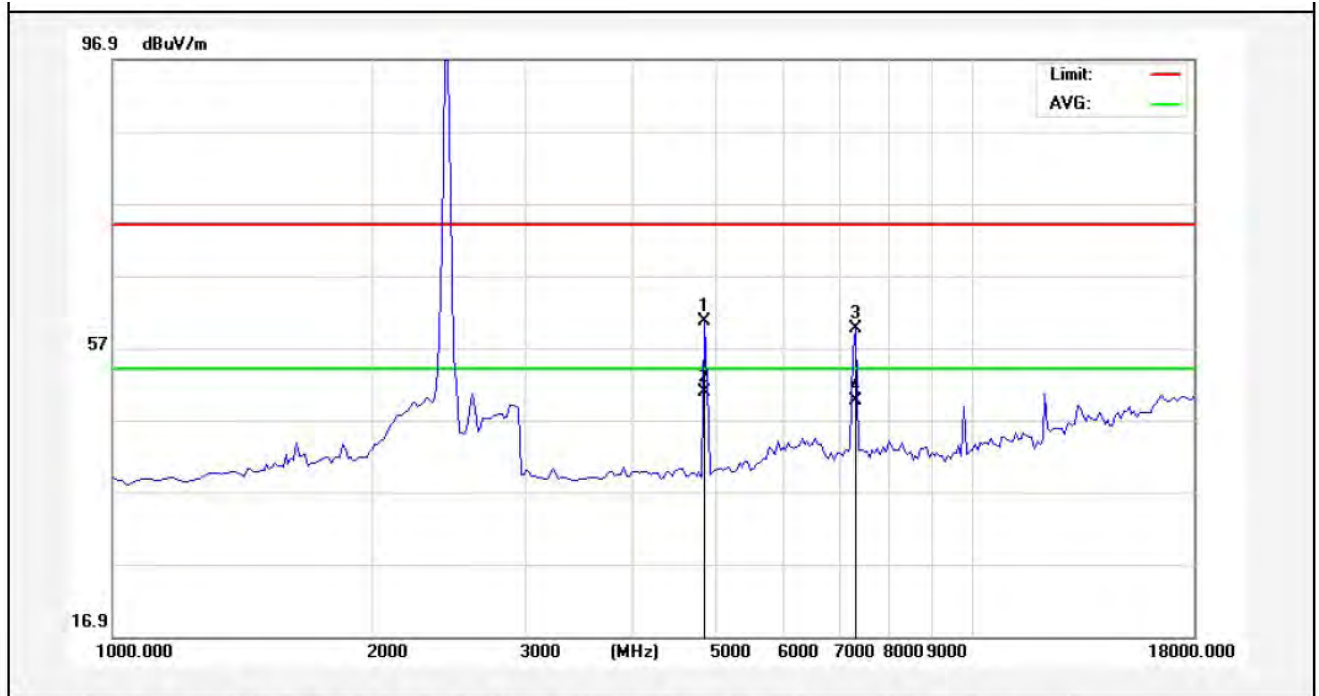
Job No.:	011504778I	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C_3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Note:	802.11b(2437MHz)	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4867.500	51.20	3.41	54.61	74.00	-19.39	peak			
2	4867.500	41.54	3.41	44.95	54.00	-9.05	AVG			
3	7332.500	36.01	8.58	44.59	74.00	-29.41	peak			
4	7332.500	26.29	8.58	34.87	54.00	-19.13	AVG			



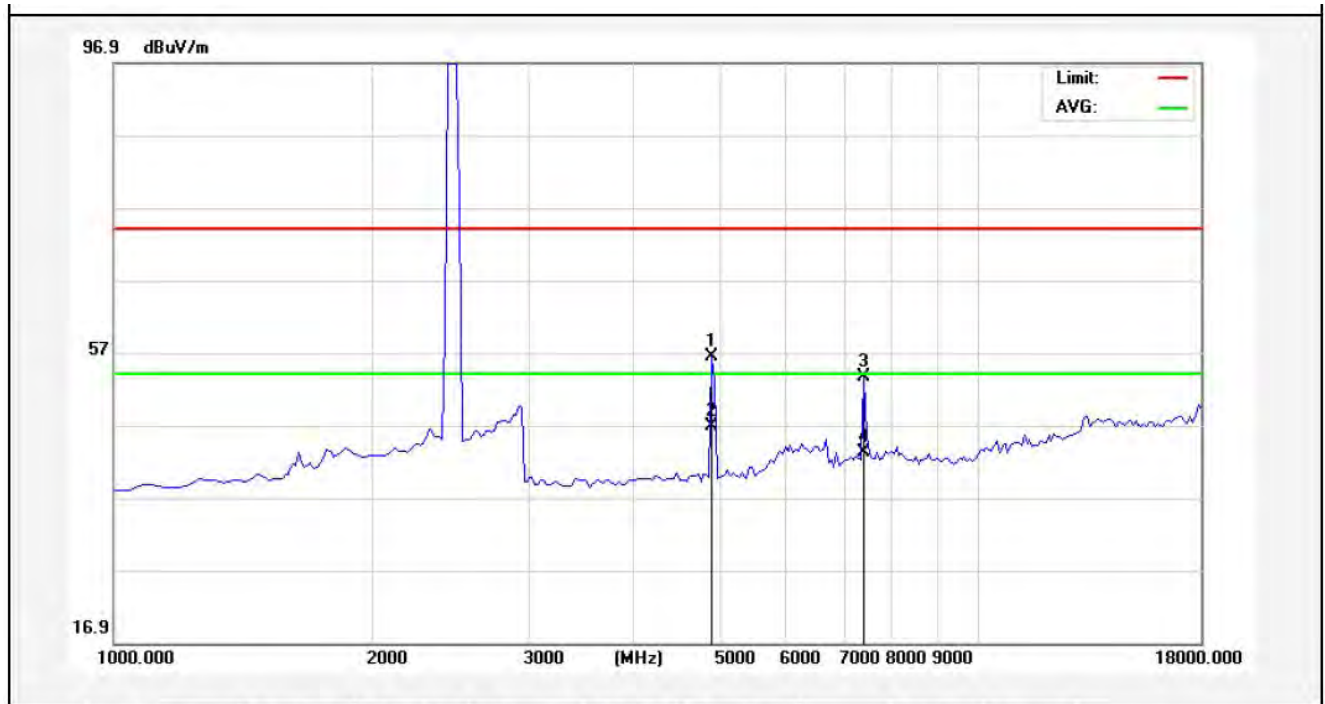
Job No.:	011504778I	Polarization:	Vertical
Standard:	(RE)FCC PART15 C_3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Note:	802.11b(2437MHz)	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4867.500	57.13	3.41	60.54	74.00	-13.46	peak			
2	4867.500	47.33	3.41	50.74	54.00	-3.26	AVG			
3	7332.500	51.03	8.58	59.61	74.00	-14.39	peak			
4	7332.500	41.00	8.58	49.58	54.00	-4.42	AVG			



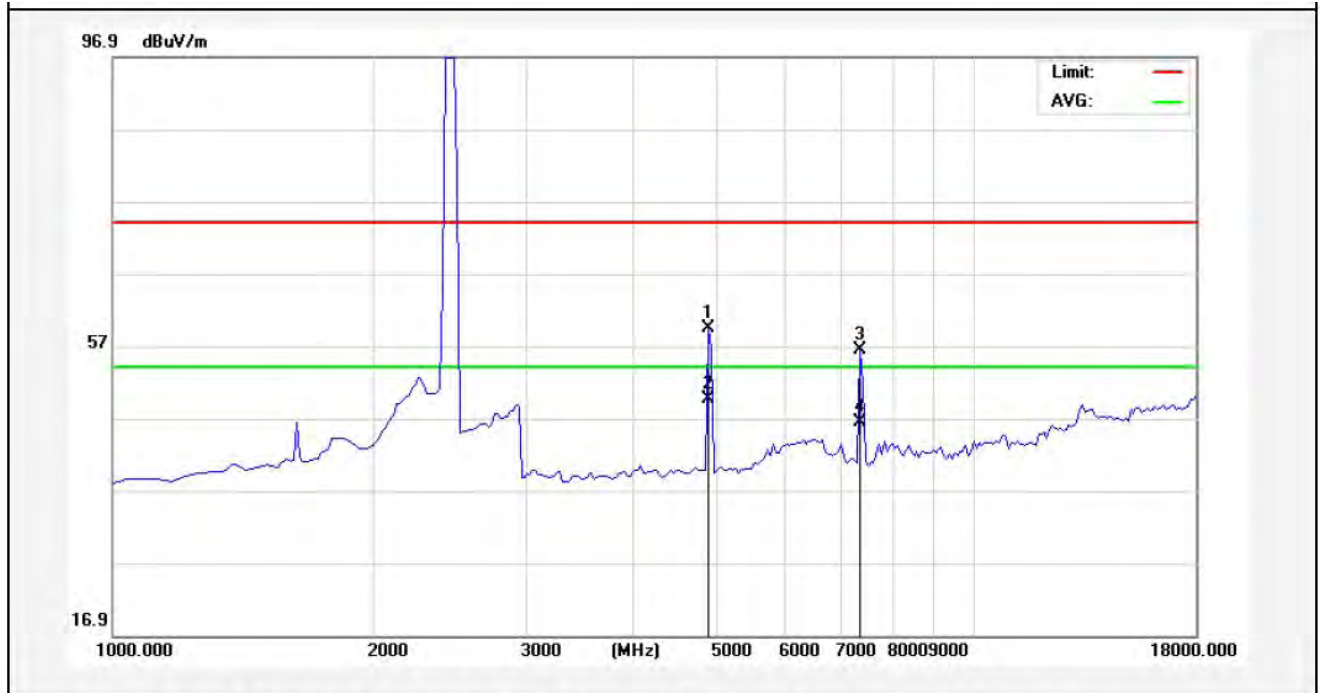
Job No.:	011504778I	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C_3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Note:	802.11b(2462MHz)	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4910.000	53.00	3.49	56.49	74.00	-17.51	peak			
2	4910.000	43.36	3.49	46.85	54.00	-7.15	AVG			
3	7375.000	45.03	8.63	53.66	74.00	-20.34	peak			
4	7375.000	34.65	8.63	43.28	54.00	-10.72	AVG			



Job No.:	011504778I	Polarization:	Vertical
Standard:	(RE)FCC PART15 C_3m	Power Source:	DC 5V via USB Port
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Note:	802.11b(2462MHz)	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4910.000	55.83	3.49	59.32	74.00	-14.68	peak			
2	4910.000	46.09	3.49	49.58	54.00	-4.42	AVG			
3	7375.000	47.74	8.63	56.37	74.00	-17.63	peak			
4	7375.000	37.68	8.63	46.31	54.00	-7.69	AVG			



5. ANTENNA APPLICATION

5.1. Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

5.2. Result

The EUT's antenna used a external antenna which is permanently attached, The antenna's gain is 4dBi and meets the requirement.

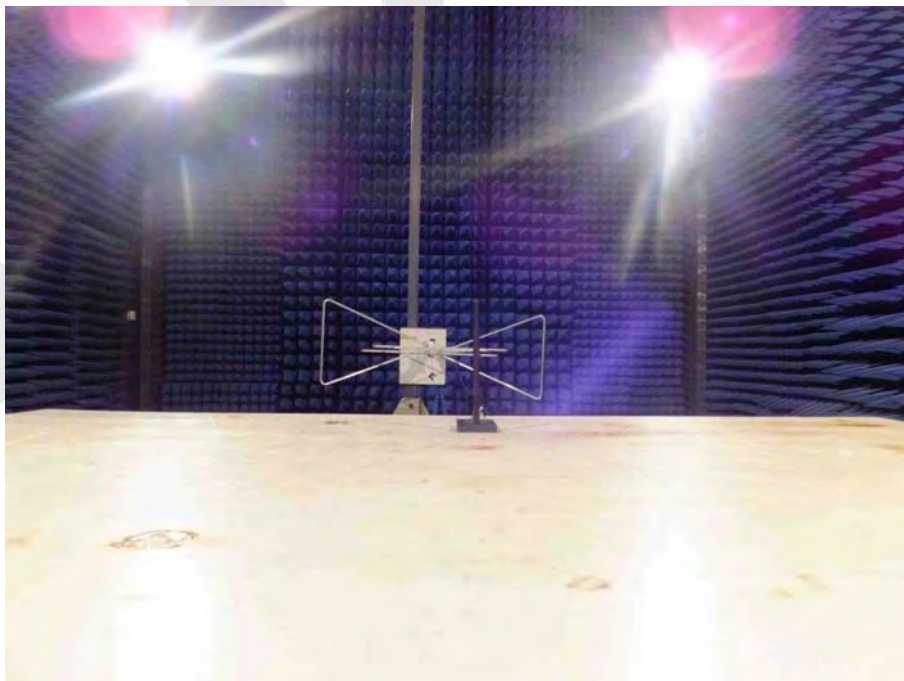


6. PHOTOGRAPH

6.1. Photo of Conducted Emission Measurement



6.2. Photo of Radiation Emission Test





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APPENDIX I (EXTERNAL PHOTOS)

Figure 1
The EUT-Overall View



Figure 2
The EUT-Top View



Figure 3
The EUT-Bottom View



Figure 4
The EUT-Front View



Figure 5
The EUT-Back View



Figure 6
The EUT-Right View

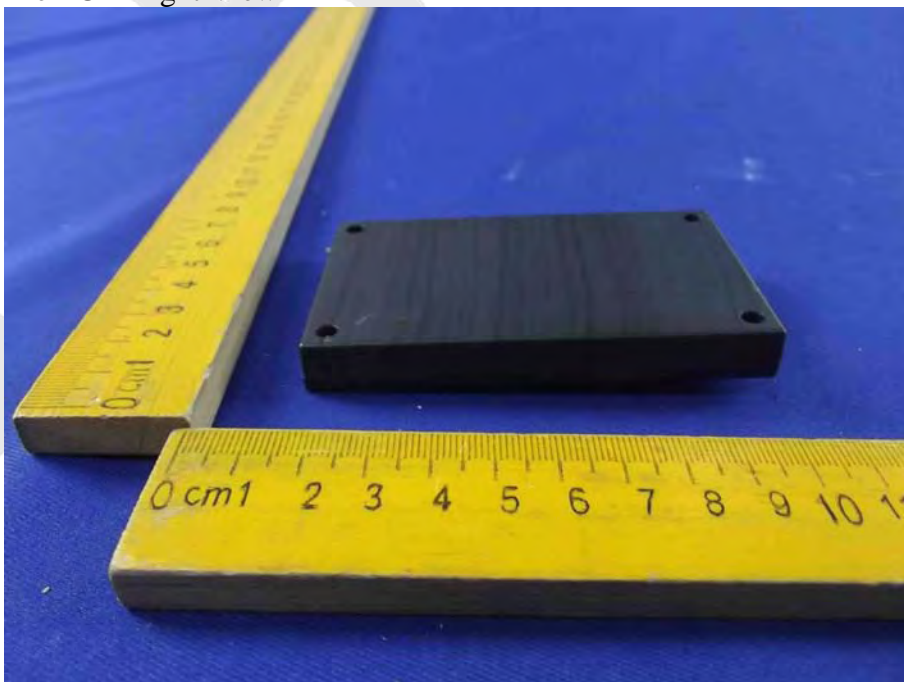


Figure 7
The EUT-Left View



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APPENDIX II (INTERNAL PHOTOS)

Figure 8
The EUT-Inside View

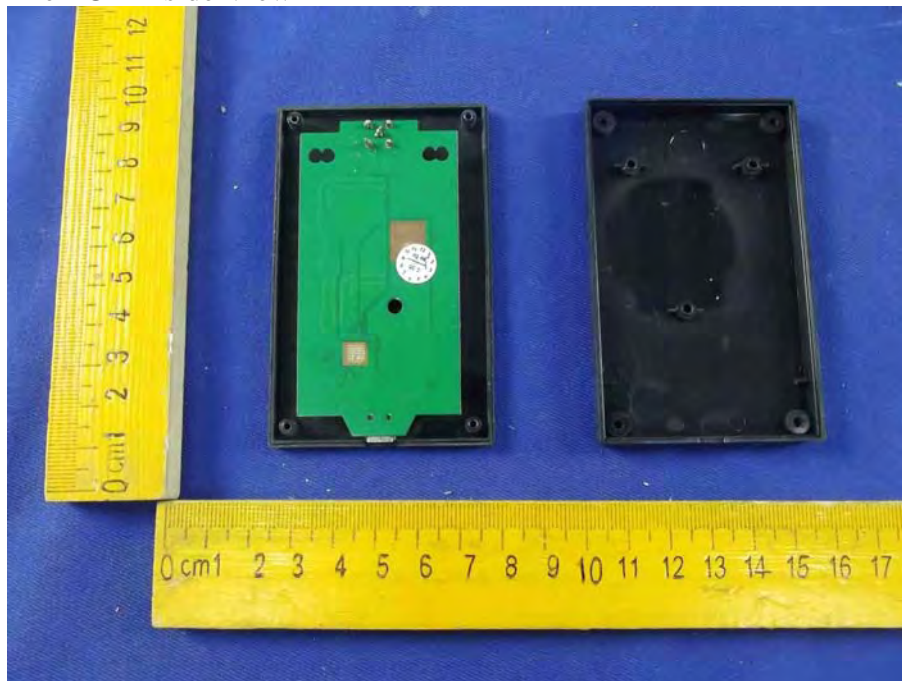


Figure 9
PCB of the EUT-Front View

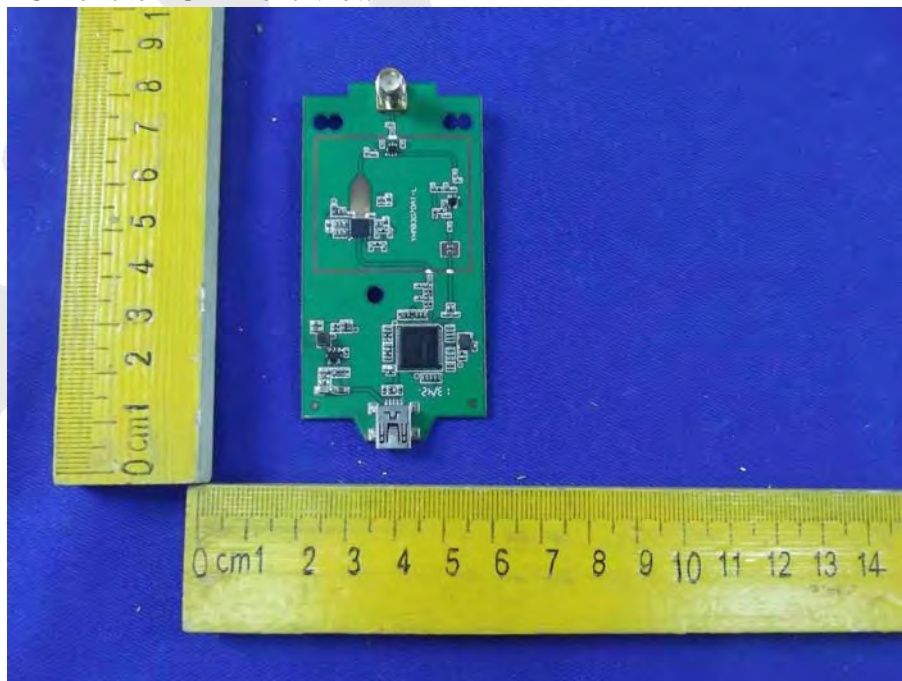


Figure 10
PCB of the EUT-Back View

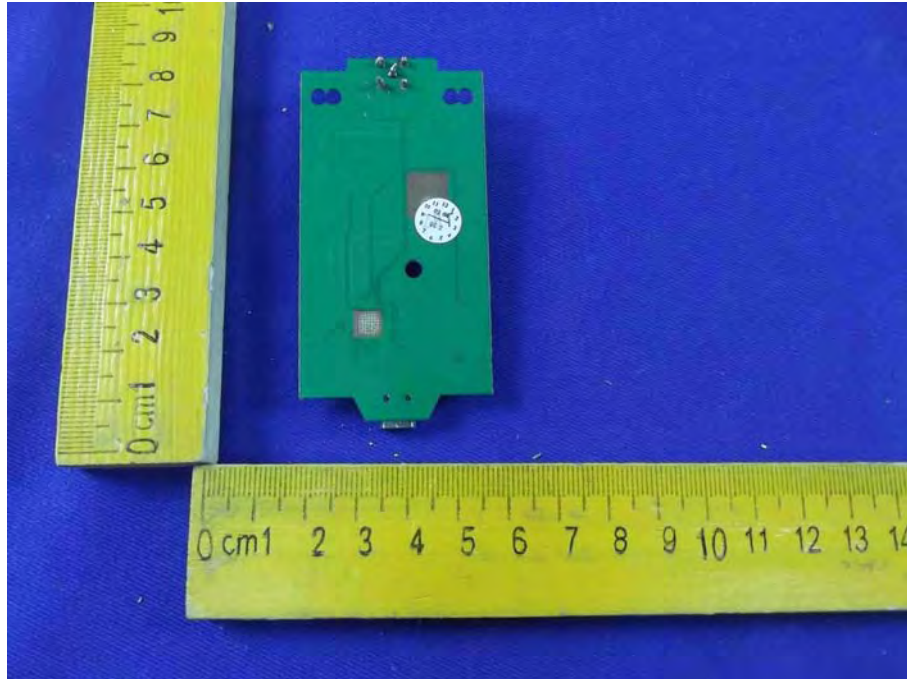


Figure 11
PCB of the EUT-Module View

