FCC TEST REPORT
for
Shenzhen KeZhongLong Optoelectronic Technology Co., Ltd.

WIFI Module
Model No.: WM415

Prepared for	:	Shenzhen KeZhongLong Optoelectronic Technology Co., Ltd.
Address	:	3/F, B5 Bldg., XinFu Industrial Zone, ChongQing Road, FuYong Street, BaoAn District, Shenzhen, Guangdong, 518000, China

Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number	:	R011509457I
Date of Test	:	Sept. 17~ Oct. 12, 2015
Date of Report	:	Oct. 13, 2015

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TEST REPORT

Applicant	:	Shenzhen KeZhongLong Optoelectronic Technology Co., Ltd.
Manufacturer	:	Shenzhen KeZhongLong Optoelectronic Technology Co., Ltd.
EUT	:	WIFI Module
Model No.	:	WM415
Serial No.	:	N.A.
Trade Mark	:	N.A.
Rating	:	DC 5V, 200mA

Measurement Procedure Used:
FCC Part15 Subpart C 2015, 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 : Sept. 17~ Oct. 12, 2015

Prepared by : (Tested Engineer / Kebo Zhang)

Reviewer : (Project Manager / Amy Ding)

Approved & Authorized Signer : (Manager / Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	WIFI Module
Model Number	:	WM415
Test Power Supply	:	DC 5V
RF Transmission Frequency	:	2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20)) 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:	:	-1.78 dBi
Applicant	:	Shenzhen KeZhongLong Optoelectronic Technology Co., Ltd.
Address	:	3/F, B5 Bldg., XinFu Industrial Zone, ChongQing Road, FuYong Street, BaoAn District, Shenzhen, Guangdong, 518000, China
Manufacturer	:	Shenzhen KeZhongLong Optoelectronic Technology Co., Ltd.
Address	:	3/F, B5 Bldg., XinFu Industrial Zone, ChongQing Road, FuYong Street, BaoAn District, Shenzhen, Guangdong, 518000, China
Factory	:	Shenzhen KeZhongLong Optoelectronic Technology Co., Ltd.
Address	:	3/F, B5 Bldg., XinFu Industrial Zone, ChongQing Road, FuYong Street, BaoAn District, Shenzhen, Guangdong, 518000, China
Date of receipt	:	Sept. 17, 2015
Date of Test	:	Sept. 17~ Oct. 12, 2015

1.2. Auxiliary Equipment Used during Test

N/A

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 registed 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	-	N/A
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 isprogrammed.
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:

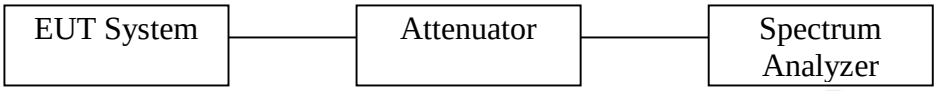
√ - available

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. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

3.1 Test Setup



3.2 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≥3*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≥3*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 3.1

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
8	Power Sensor	DAER	RPR3006W	15I00041SN046	Jun 30, 2015	1 Year
9	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Jun 30, 2015	1 Year
10	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Jun 30, 2015	1 Year
11	Signal Generator	Agilent	E4421B	MY41000743	Jun 30, 2015	1 Year
12	DC Power supply	IV	IV-8080	YQSB0096	Jun 30, 2015	1 Year
13	TEMP&HUMI PROGRAMMABLE CHAMBER	Bell Group	BE-THK-150M8	SE-0137	Mar 16, 2015	1 Year

e. Test Results

Pass.

f. Test Data
6dB Bandwidth

ANT A
Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	10.07		Pass
Mid	2437	10.07	>500	Pass
High	2462	10.07		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.57		Pass
Mid	2437	16.57	>500	Pass
High	2462	16.57		Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	17.80		Pass
Mid	2437	17.80	>500	Pass
High	2462	17.81		Pass

Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2422	36.43		Pass
Mid	2437	36.41	>500	Pass
High	2452	36.45		Pass

Test Plots See the following page.

ANT B

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	10.07		Pass
Mid	2437	10.07	>500	Pass
High	2462	10.06		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.57		Pass
Mid	2437	16.57	>500	Pass
High	2462	16.57		Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	17.80		Pass
Mid	2437	17.80	>500	Pass
High	2462	17.80		Pass

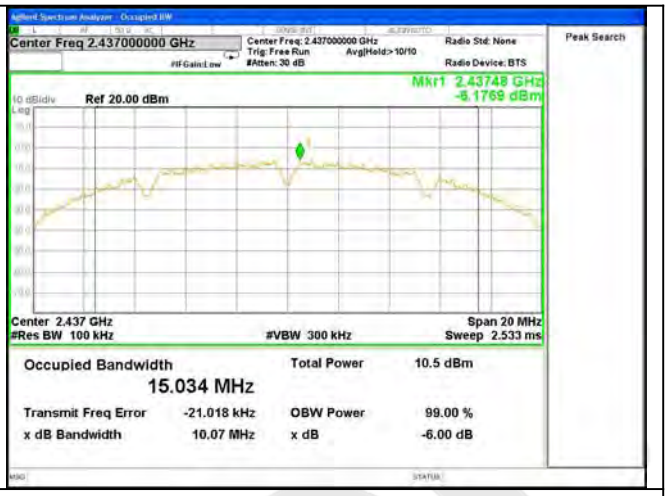
Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2422	36.41		Pass
Mid	2437	36.42	>500	Pass
High	2452	36.42		Pass

Test Plots See the following page.

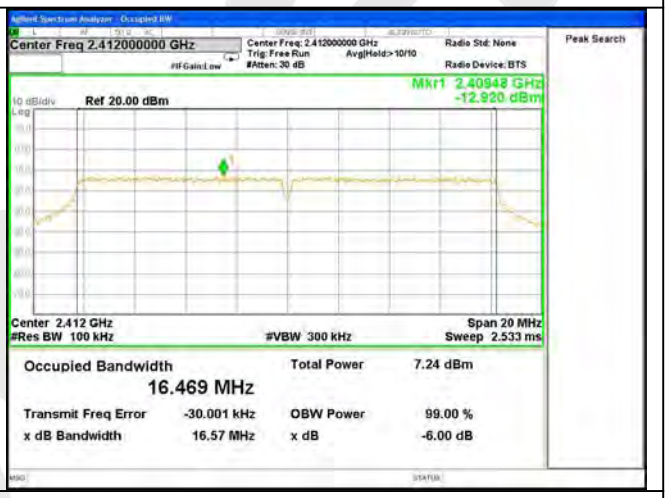
ANT A

Test Mode: 802.11b---Low

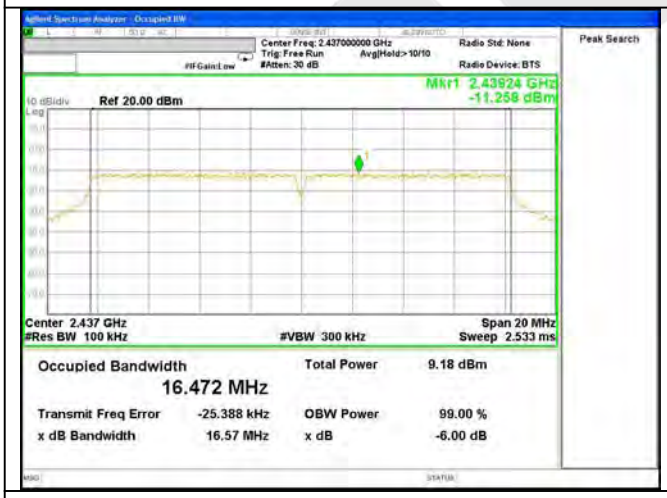


Test Mode: 802.11b---Mid

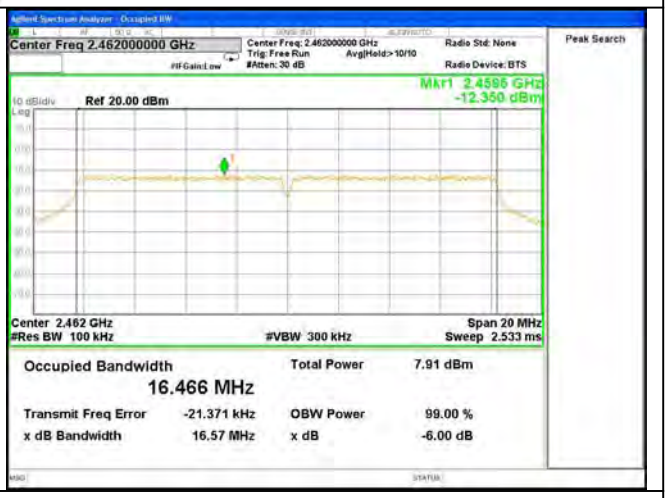
Test Mode: 802.11b---High



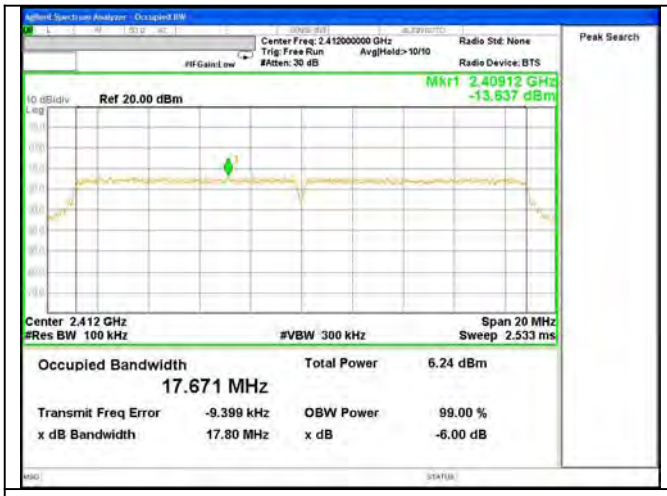
Test Mode: 802.11g---Low



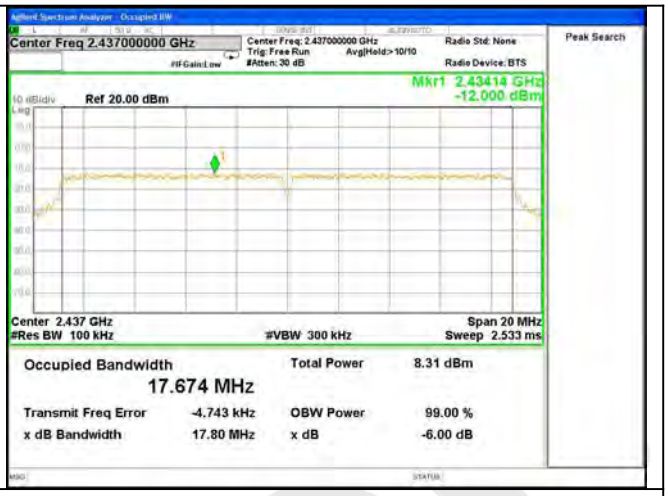
Test Mode: 802.11g---Mid



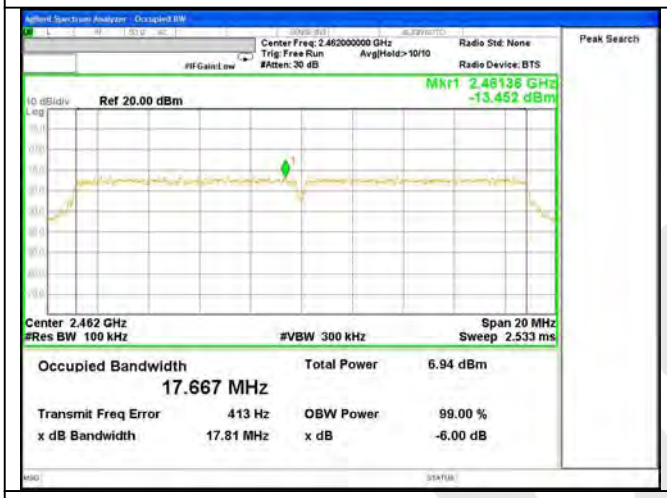
Test Mode: 802.11g---High



Test Mode: 802.11n20---Low

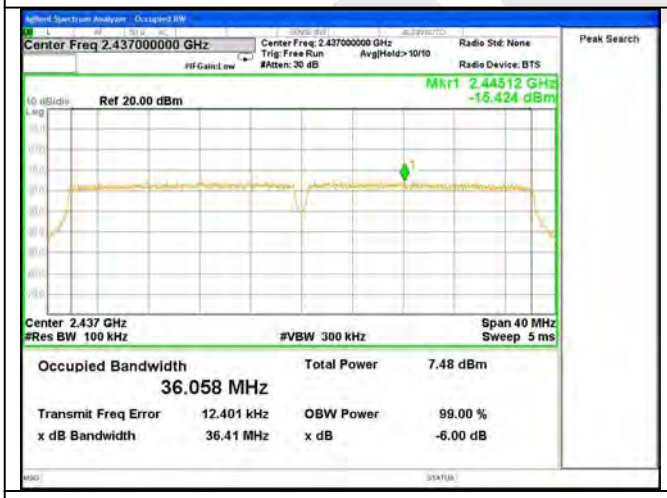


Test Mode: 802.11n20---Mid



Test Mode: 802.11n20---High

Test Mode: 802.11n40---Low



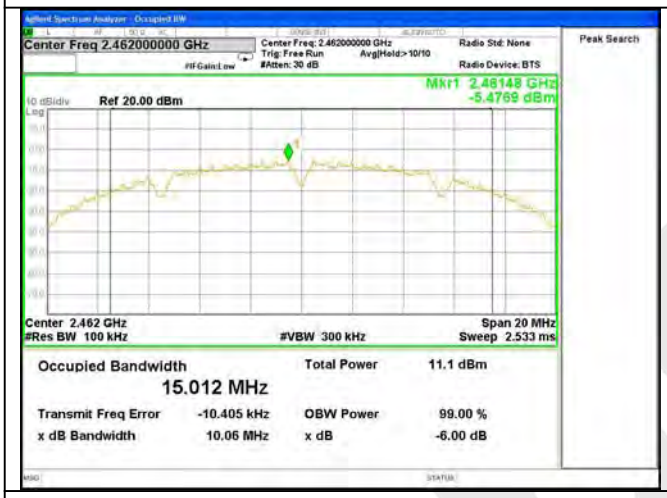
Test Mode: 802.11n40---Mid

Test Mode: 802.11n40---High

ANT B

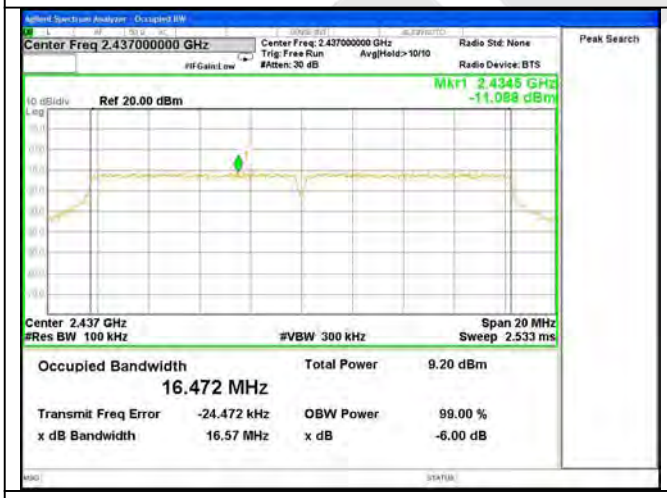
Test Mode: 802.11b---Low

Test Mode: 802.11b---Mid



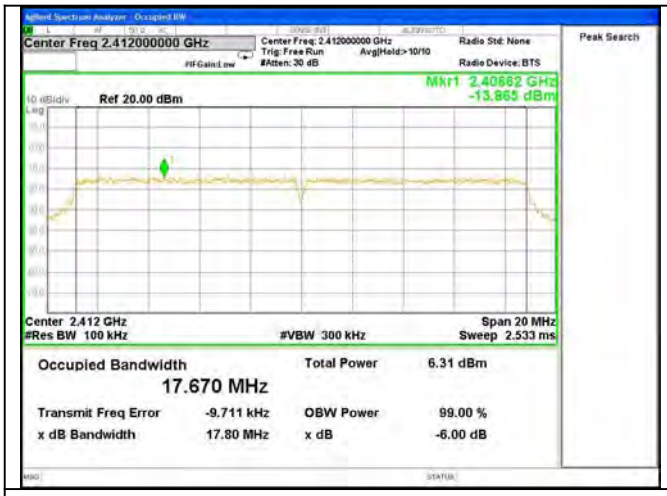
Test Mode: 802.11b---High

Test Mode: 802.11g---Low

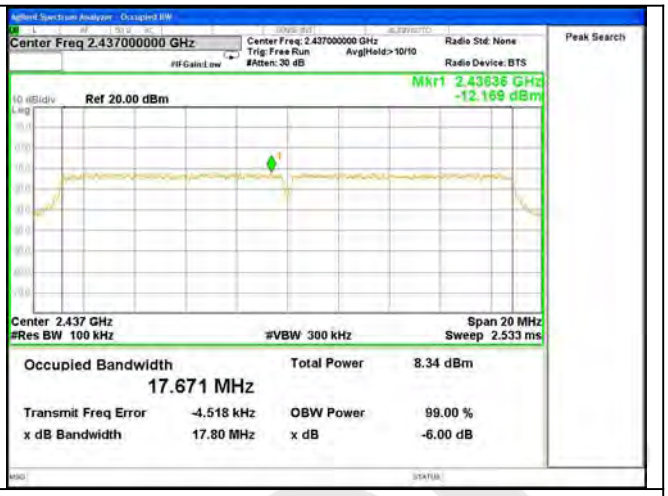


Test Mode: 802.11g---Mid

Test Mode: 802.11g---High



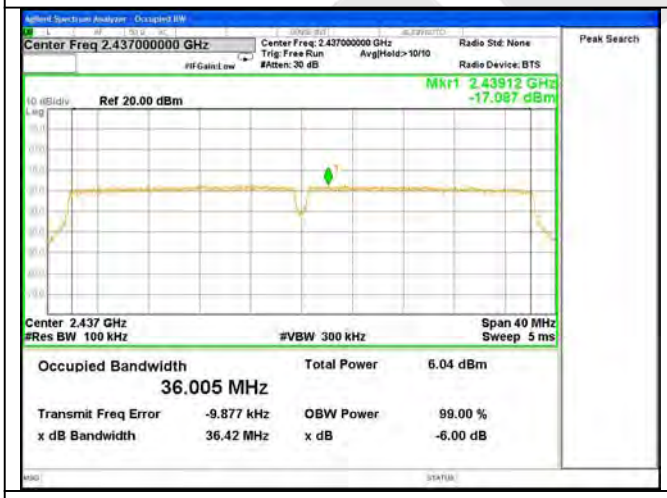
Test Mode: 802.11n20---Low



Test Mode: 802.11n20---Mid

Test Mode: 802.11n20---High

Test Mode: 802.11n40---Low



Test Mode: 802.11n40---Mid

Test Mode: 802.11n40---High

20dB Bandwidth

ANT A
Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	17.26	Pass
Mid	2437	17.25	Pass
High	2462	17.25	Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	19.53	Pass
Mid	2437	19.59	Pass
High	2462	19.63	Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	20.39	Pass
Mid	2437	20.41	Pass
High	2462	20.41	Pass

Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2422	38.67	Pass
Mid	2437	38.65	Pass
High	2452	38.49	Pass

Test Plots See the following page.

ANT B

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	17.25	Pass
Mid	2437	17.25	Pass
High	2462	17.24	Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	19.52	Pass
Mid	2437	19.59	Pass
High	2462	19.53	Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2412	20.38	Pass
Mid	2437	20.55	Pass
High	2462	20.45	Pass

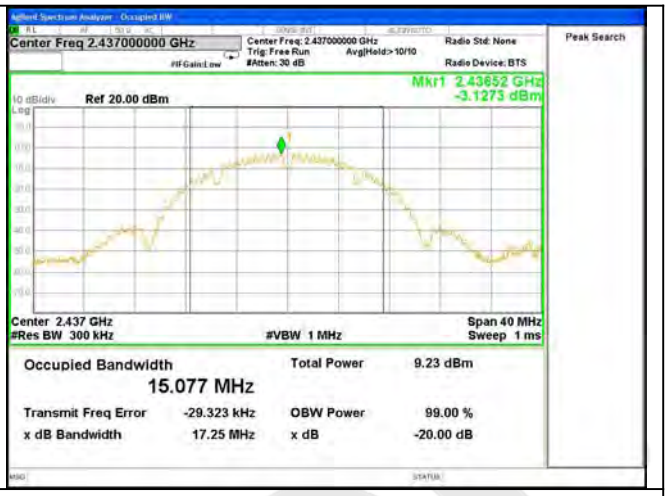
Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Bandwidth (MHz)	Results
Low	2422	38.55	Pass
Mid	2437	38.48	Pass
High	2452	38.69	Pass

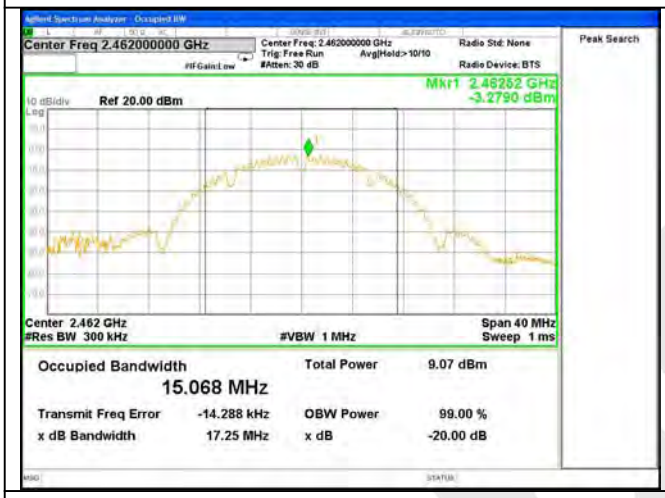
Test Plots See the following page.

ANT A

Test Mode: 802.11b---Low

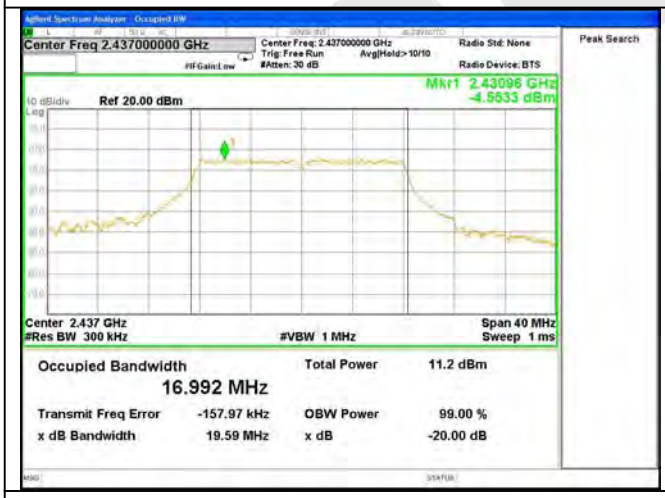


Test Mode: 802.11b---Mid



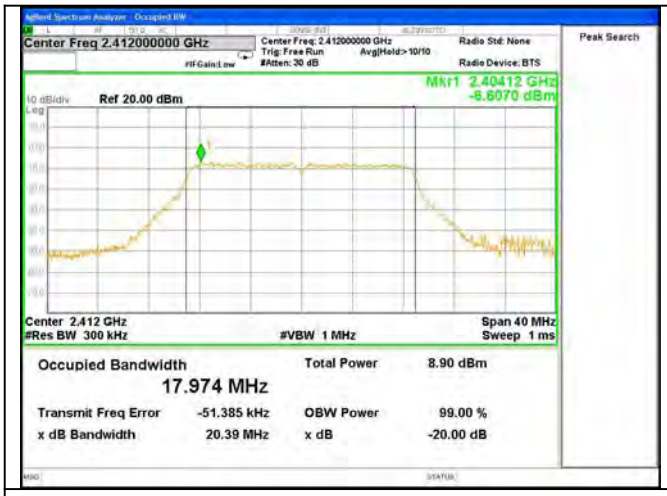
Test Mode: 802.11b---High

Test Mode: 802.11g---Low

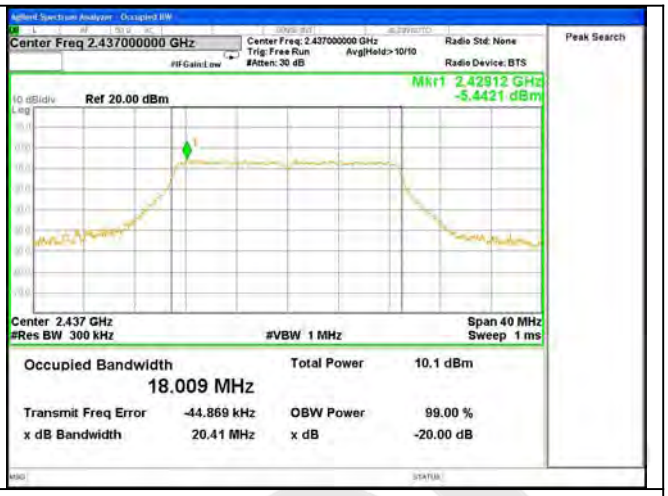


Test Mode: 802.11g---Mid

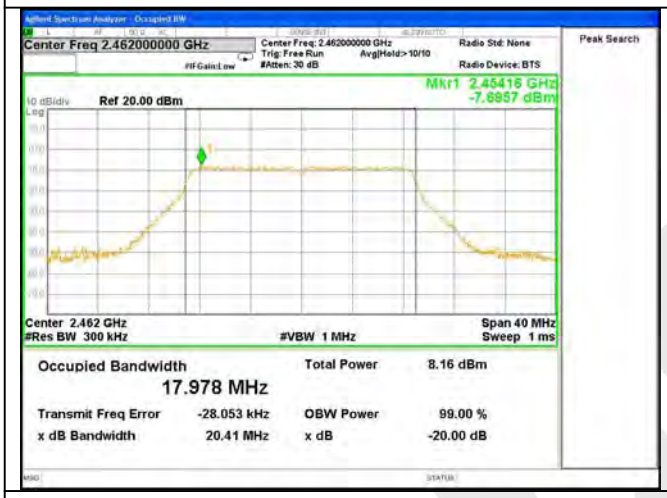
Test Mode: 802.11g---High



Test Mode: 802.11n20---Low



Test Mode: 802.11n20---Mid



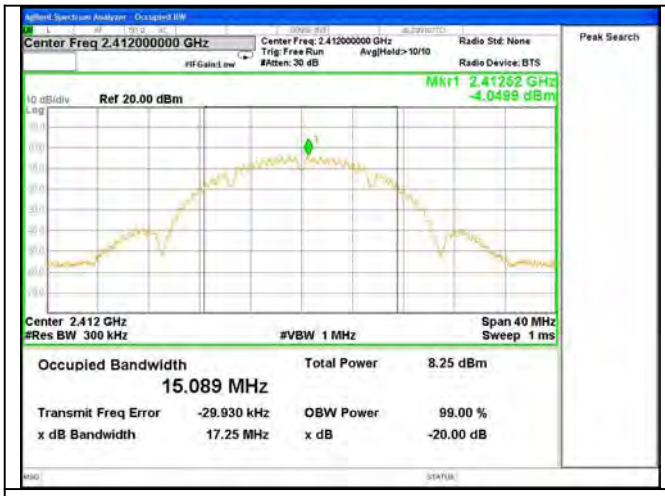
Test Mode: 802.11n20---High

Test Mode: 802.11n40---Low

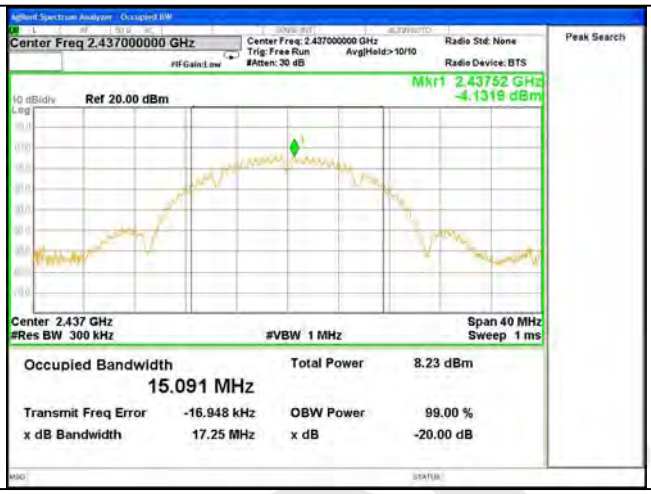
Test Mode: 802.11n40---Mid

Test Mode: 802.11n40---High

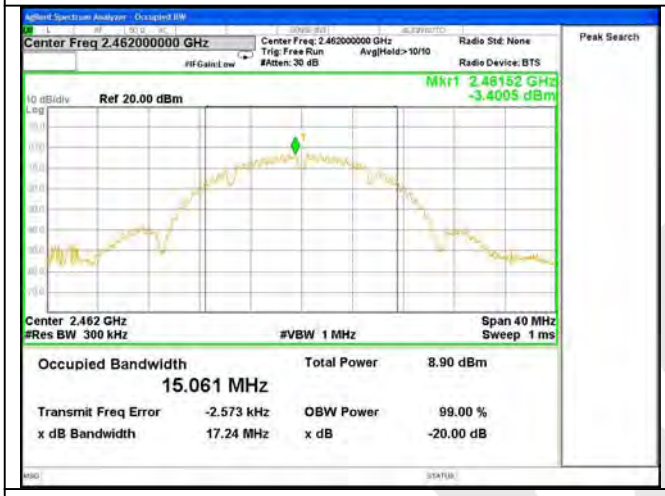
ANT B



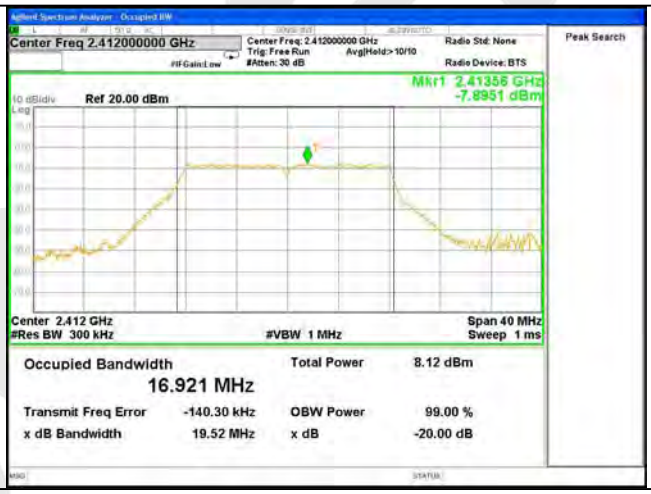
Test Mode: 802.11b---Low



Test Mode: 802.11b---Mid

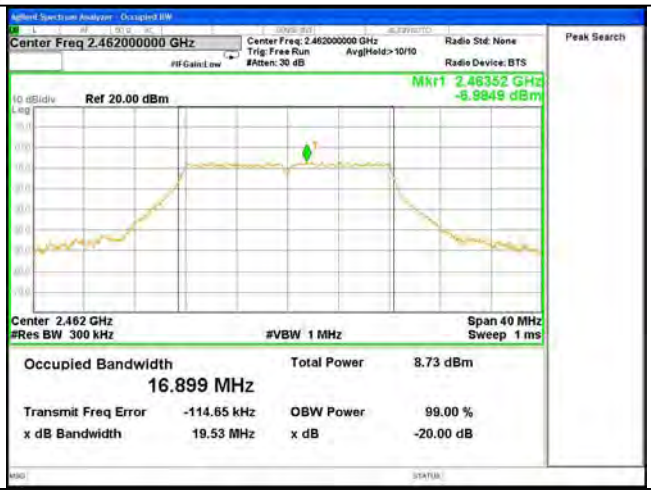


Test Mode: 802.11b---High

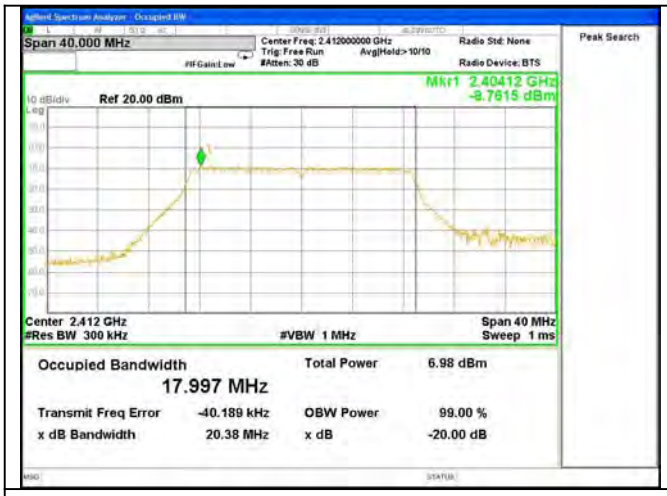


Test Mode: 802.11g---Low

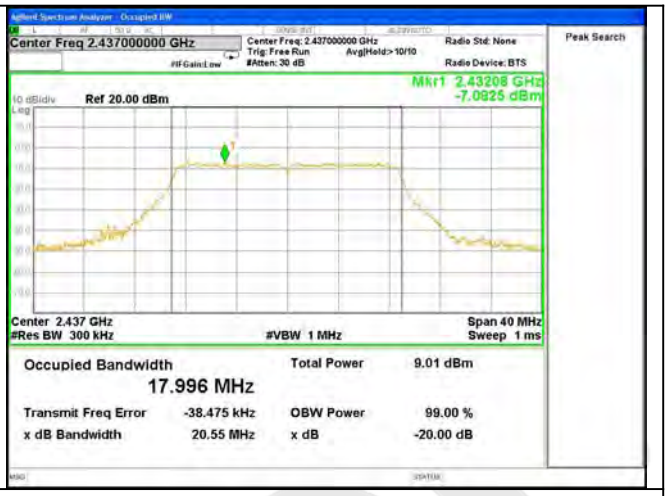
Test Mode: 802.11g---Mid



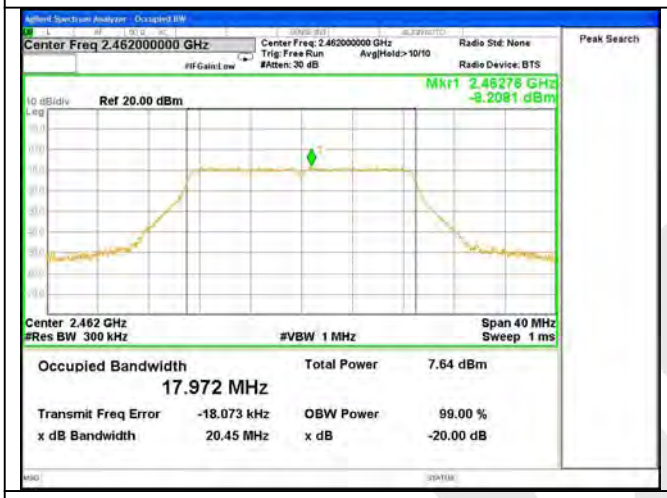
Test Mode: 802.11g---High



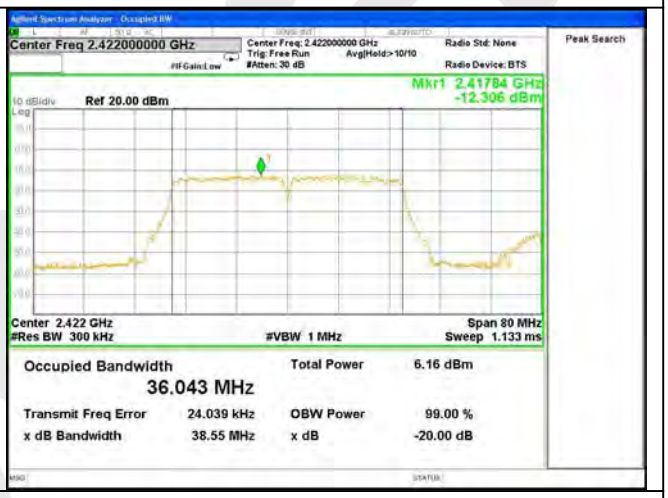
Test Mode: 802.11n20---Low



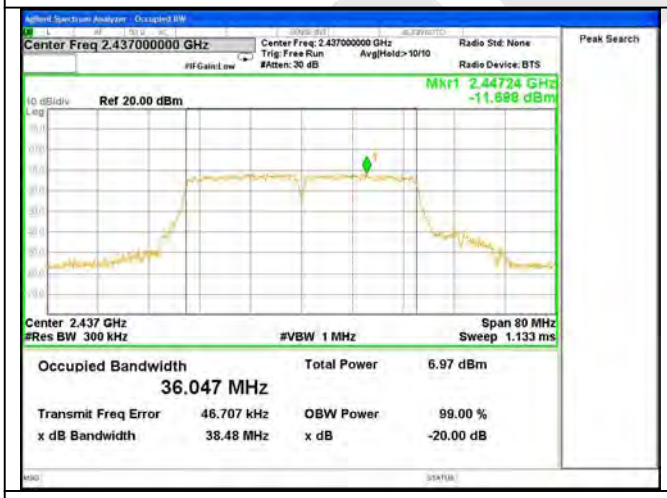
Test Mode: 802.11n20---Mid



Test Mode: 802.11n20---High



Test Mode: 802.11n40---Low



Test Mode: 802.11n40---Mid

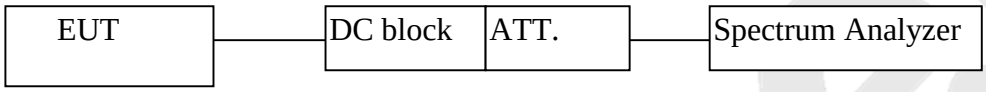
Test Mode: 802.11n40---High

3.3. 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≥3*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 3.2.

f. Test Results

Pass.

g. Test Data

Antenna A Gain= -1.78 dBi
Antenna B Gain= -1.78 dBi
Array Gain= 1.23 dBi= G_{ANT}+10*log(N_{ANT})dBi

ANT A
Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	11.45	30	1	Pass
Mid	2437	11.36			Pass
High	2462	11.37			Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	10.02	30	1	Pass
Mid	2437	11.23			Pass
High	2462	9.26			Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	9.65	30	1	Pass
Mid	2437	10.08			Pass
High	2462	8.66			Pass

Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2422	7.65	30	1	Pass
Mid	2437	7.28			Pass
High	2452	6.50			Pass

ANT B

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	8.62	30	1	Pass
Mid	2437	8.43			Pass
High	2462	9.06			Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	8.22	30	1	Pass
Mid	2437	10.23			Pass
High	2462	8.86			Pass

Test mode: IEEE 802.11n (HT20)

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2412	6.96	30	1	Pass
Mid	2437	9.09			Pass
High	2462	7.81			Pass

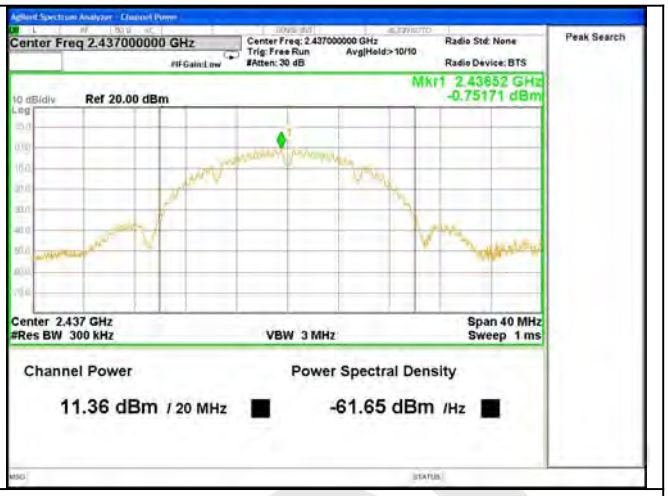
Test mode: IEEE 802.11n (HT40)

Channel	Frequency (MHz)	Maximum transmit power	Limit		Result
		(dBm)	(dBm)	(watts)	
Low	2422	5.74	30	1	Pass
Mid	2437	6.30			Pass
High	2452	5.86			Pass

Channel	Channel Frequency (MHz)	ANT A Output Power (dBm)	ANT B Output Power (dBm)	Data Rate (Mbps)	MIMO Output Power (dBm)	Limit (dBm)
802.11n (20M MIMO) mode						
Low	2412	9.65	6.96	MCS0	11.52	30
Middle	2437	10.08	9.09	MCS0	12.62	30
High	2462	8.66	7.81	MCS0	11.27	30
802.11n (40M MIMO) mode						
Low	2422	7.65	5.74	MCS0	9.81	30
Middle	2437	7.28	6.30	MCS0	9.83	30
High	2452	6.50	5.86	MCS0	9.20	30

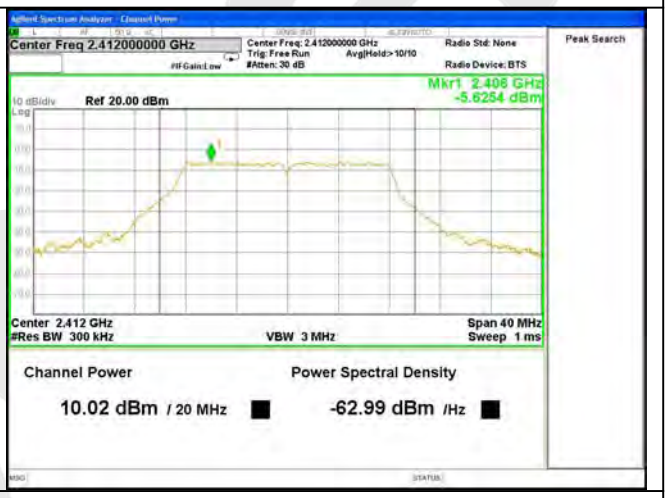
ANT A

Test Mode: 802.11b---Low



Test Mode: 802.11b---Mid

Test Mode: 802.11b---High

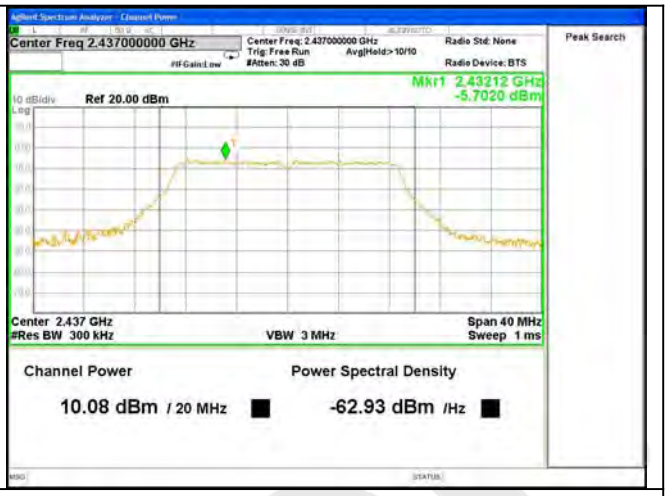


Test Mode: 802.11g---Low

Test Mode: 802.11g---Mid

Test Mode: 802.11g---High

Test Mode: 802.11n20---Low



Test Mode: 802.11n20---Mid

Test Mode: 802.11n20---High

Test Mode: 802.11n40---Low

Test Mode: 802.11n40---Mid

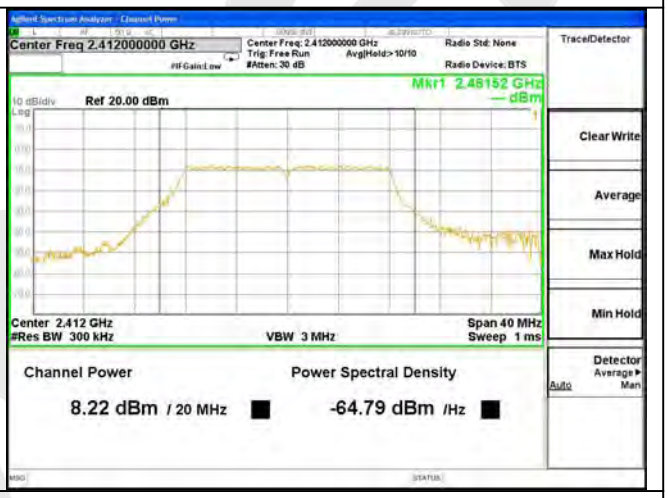
Test Mode: 802.11n40---High

ANT B

Test Mode: 802.11b---Low

Test Mode: 802.11b---Mid

Test Mode: 802.11b---High

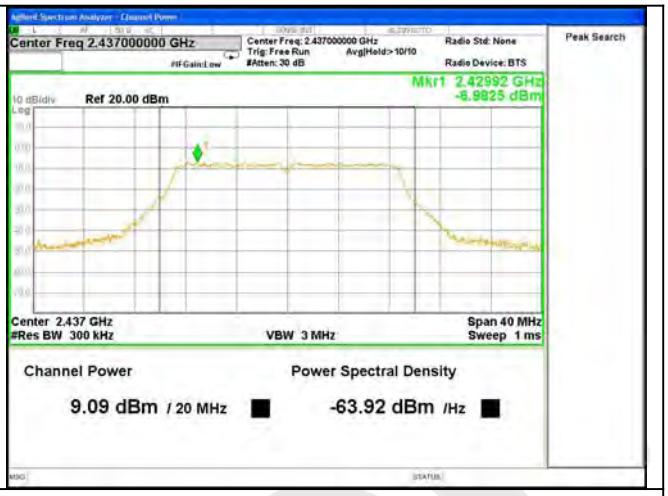


Test Mode: 802.11g---Low

Test Mode: 802.11g---Mid

Test Mode: 802.11g---High

Test Mode: 802.11n20---Low



Test Mode: 802.11n20---Mid

Test Mode: 802.11n20---High

Test Mode: 802.11n40---Low

Test Mode: 802.11n40---Mid

Test Mode: 802.11n40---High

3.4. 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 in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

b. Test Procedure

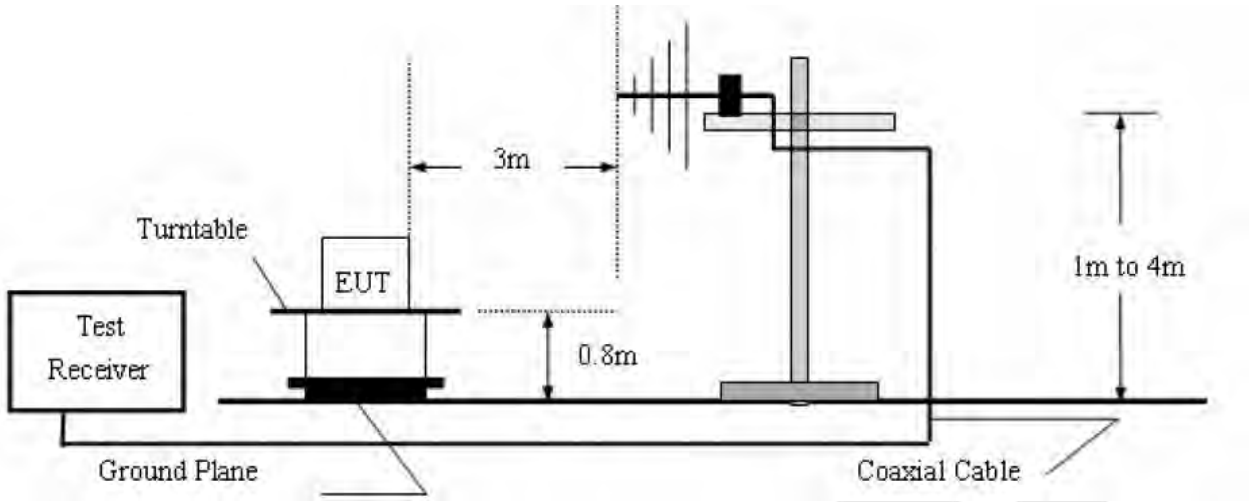
1. Conducted Method:

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

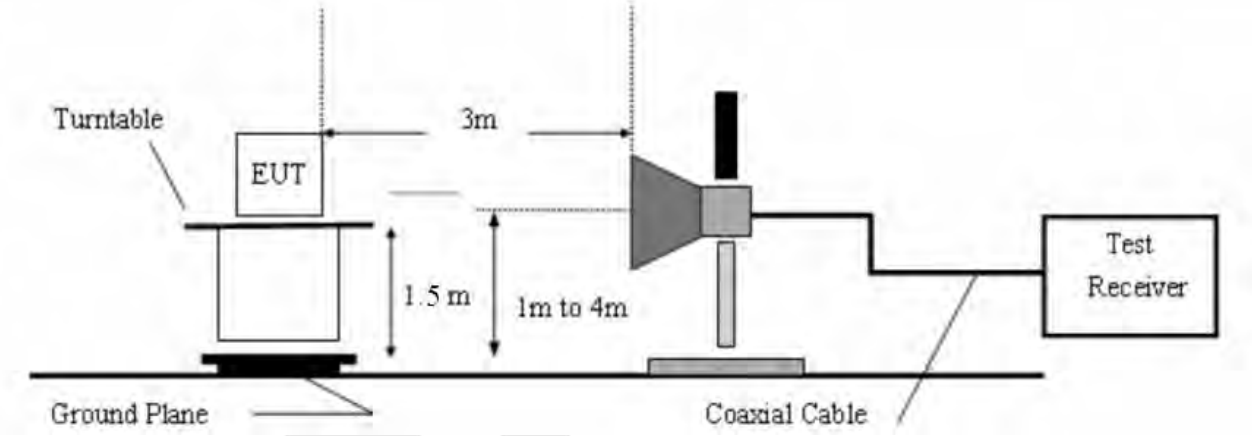
2. Radiated Method:

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 3.2.

d. Test Results

Pass.

e. Test Plots

See the following page.

ANT A

Test Mode: 802.11b---Low

Test Mode: 802.11b---High

Test Mode: 802.11g---Low

Test Mode: 802.11g---High

Test Mode: 802.11n20---Low

Test Mode: 802.11n20---High

	
Test Mode: 802.11n40---Low	Test Mode: 802.11n40---High

ANT B

Test Mode: 802.11b---Low

Test Mode: 802.11b---High

Test Mode: 802.11g---Low

Test Mode: 802.11g---High

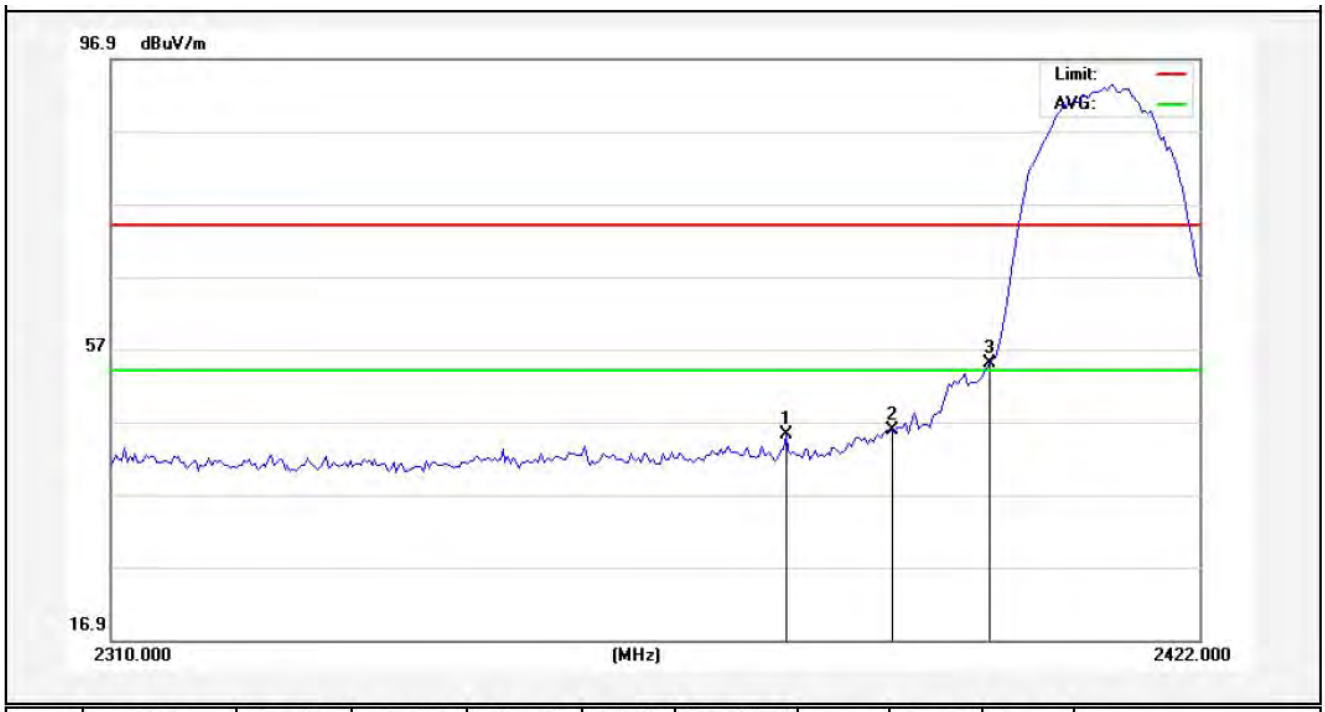
Test Mode: 802.11n20---Low

Test Mode: 802.11n20---High

	
Test Mode: 802.11n40---Low	Test Mode: 802.11n40---High

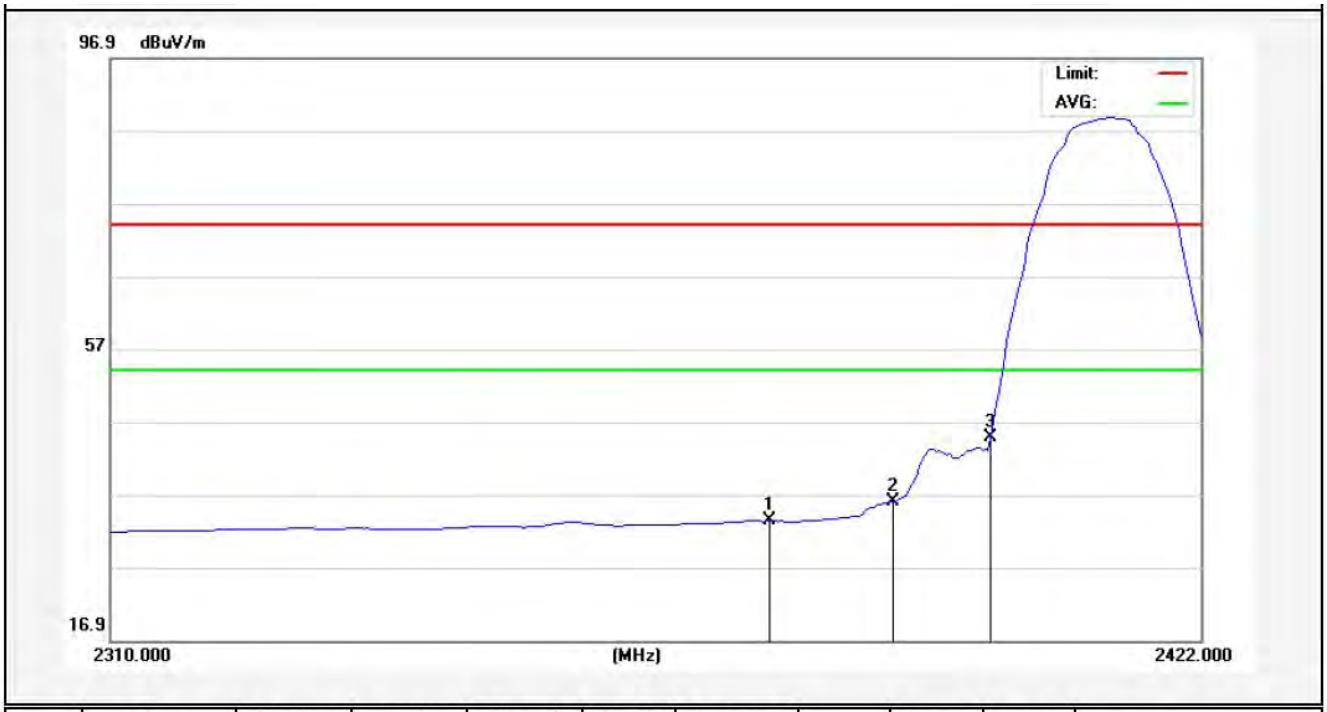
ANT A

Test Mode: 802.11b
2412MHz
Horizontal-PEAK:



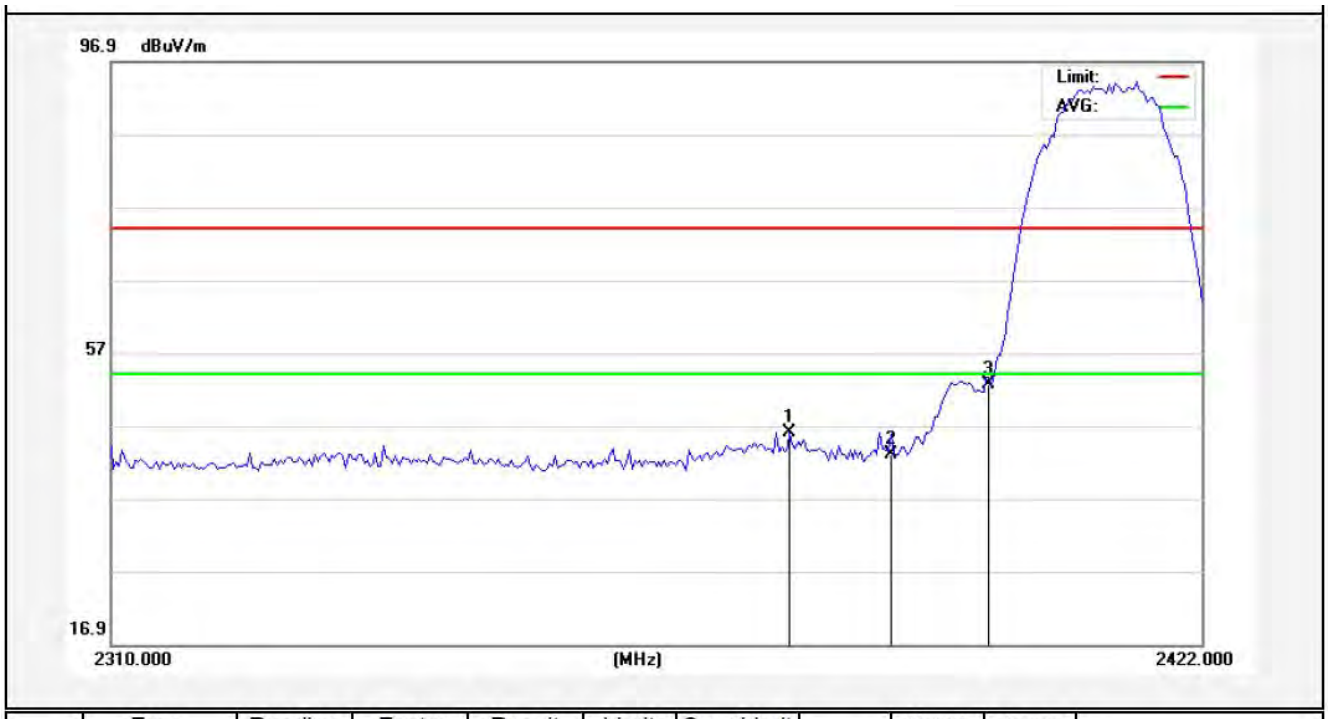
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2378.880	47.78	-2.54	45.24	74.00	-28.76	peak			
2	2390.000	48.32	-2.51	45.81	74.00	-28.19	peak			
3	2400.000	57.49	-2.49	55.00	74.00	-19.00	peak			

Horizontal-AV:



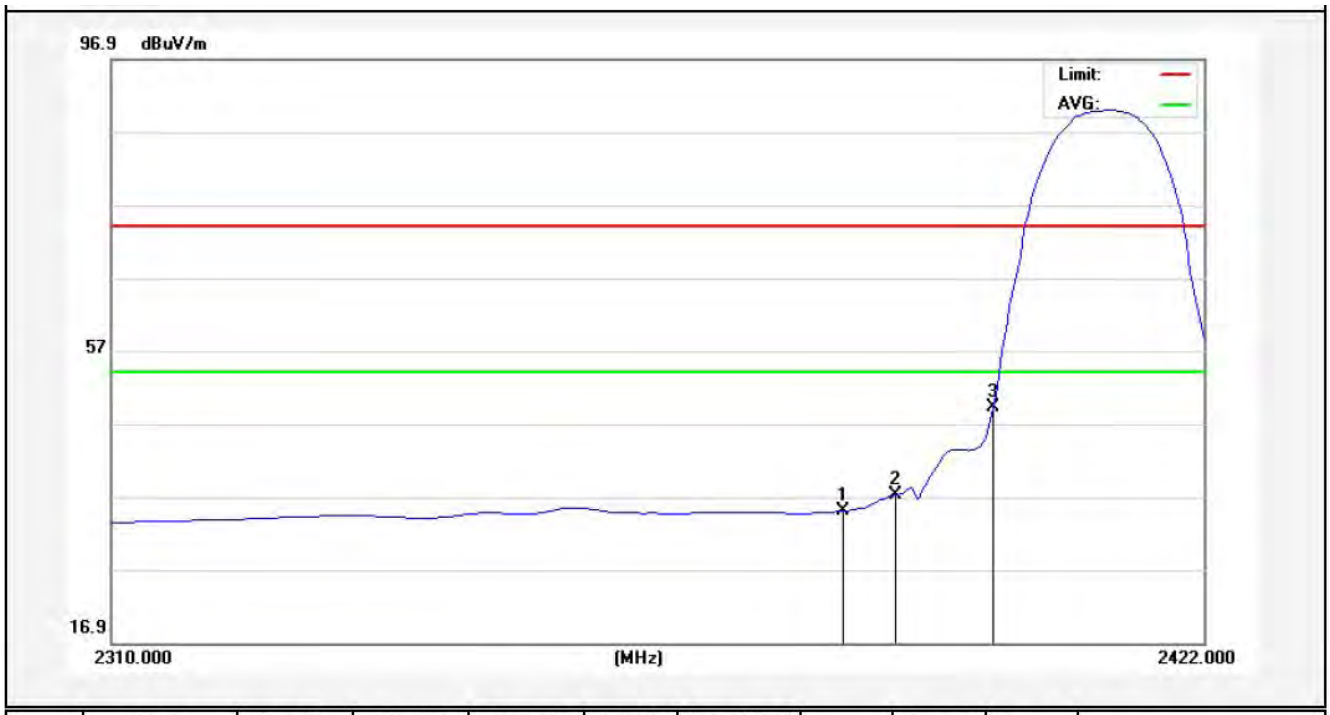
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2377.200	35.88	-2.54	33.34	54.00	-20.66	AVG			
2	2390.000	38.52	-2.51	36.01	54.00	-17.99	AVG			
3	2400.000	47.27	-2.49	44.78	54.00	-9.22	AVG			

Test Mode: 802.11b
2412MHz
Vertical-PEAK:



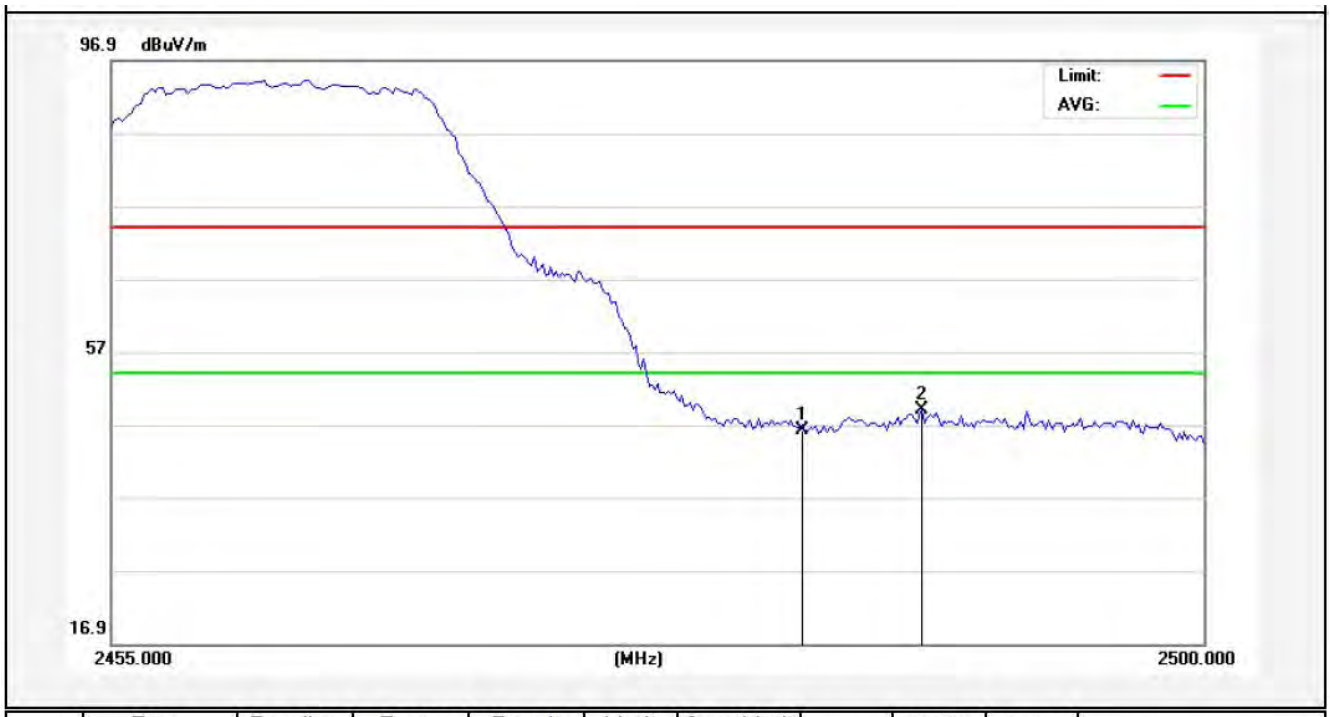
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2379.160	48.48	-2.54	45.94	74.00	-28.06	peak			
2	2390.000	45.58	-2.51	43.07	74.00	-30.93	peak			
3	2400.000	55.14	-2.49	52.65	74.00	-21.35	peak			

Vertical-AV:



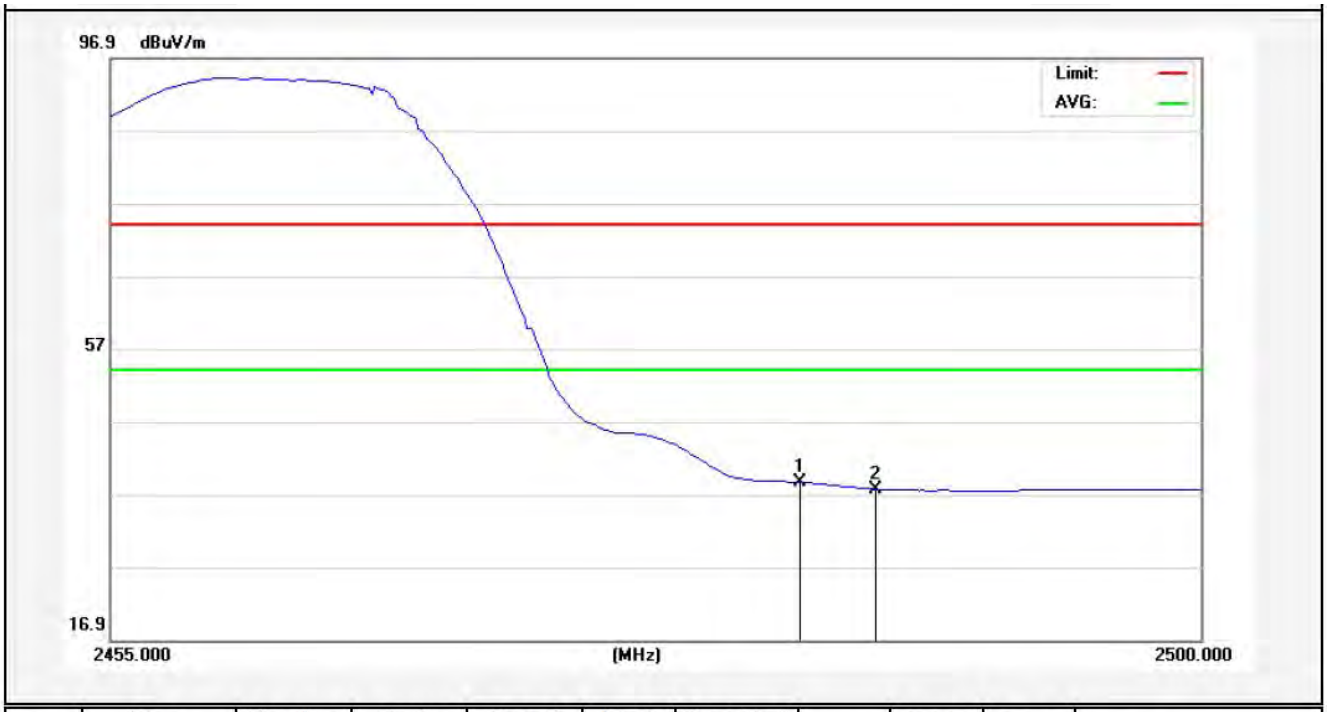
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2384.200	37.51	-2.53	34.98	54.00	-19.02	AVG			
2	2390.000	39.67	-2.51	37.16	54.00	-16.84	AVG			
3	2400.000	51.61	-2.49	49.12	54.00	-4.88	AVG			

Test Mode: 802.11b
2462MHz
Horizontal-PEAK:



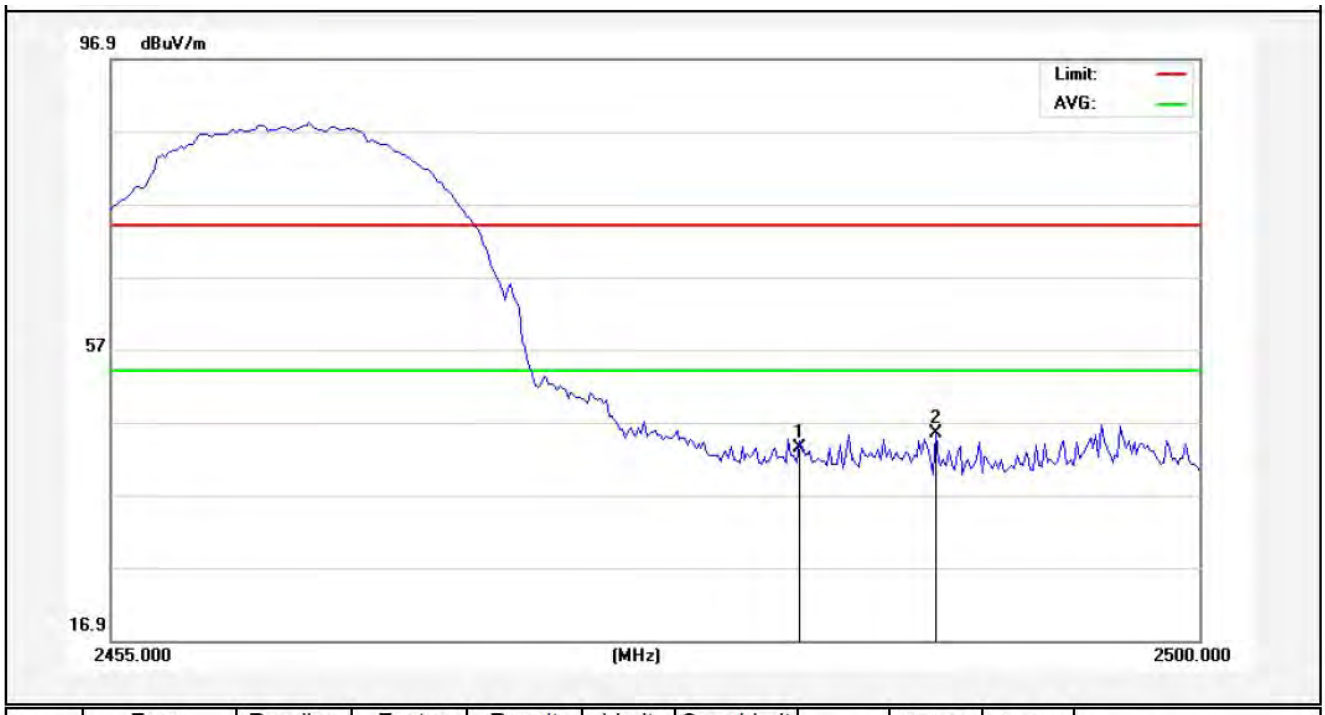
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	48.60	-2.31	46.29	74.00	-27.71	peak			
2	2488.412	51.24	-2.30	48.94	74.00	-25.06	peak			

Horizontal-AV:



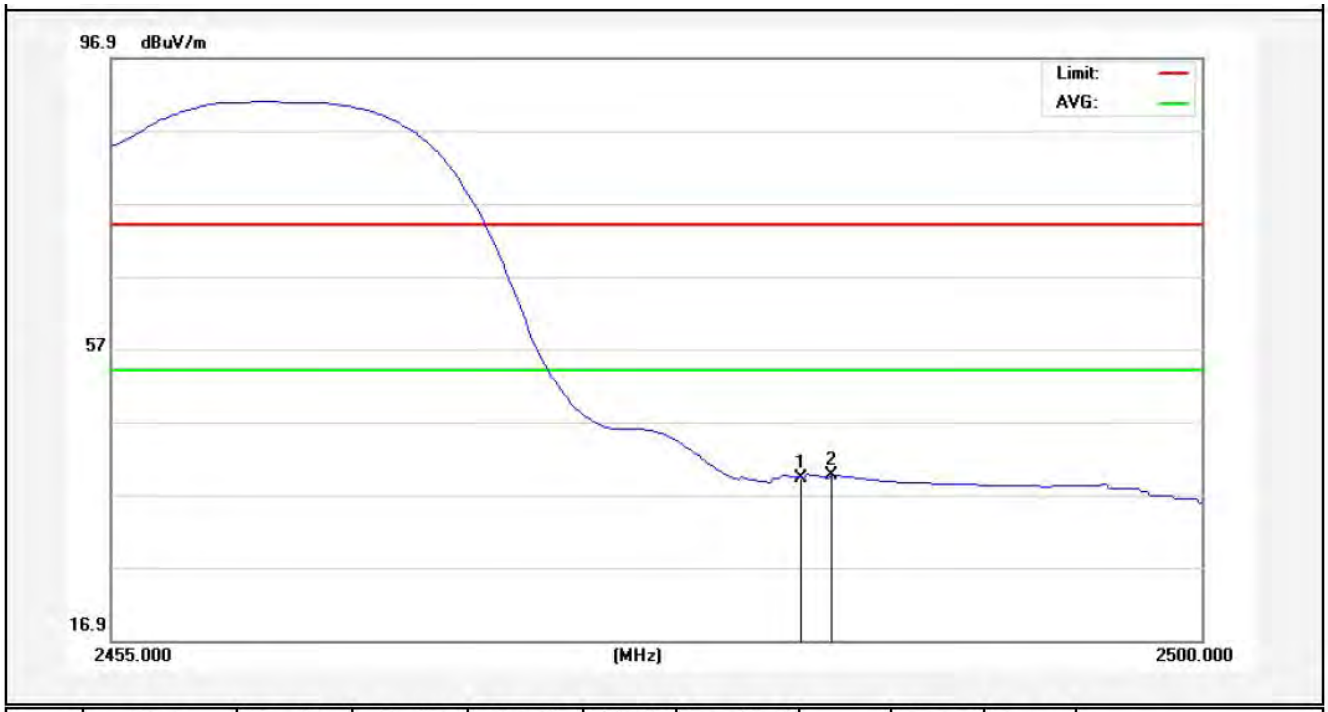
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	40.89	-2.31	38.58	54.00	-15.42	AVG			
2	2486.613	39.97	-2.30	37.67	54.00	-16.33	AVG			

Test Mode: 802.11b
2462MHz
Vertical-PEAK:



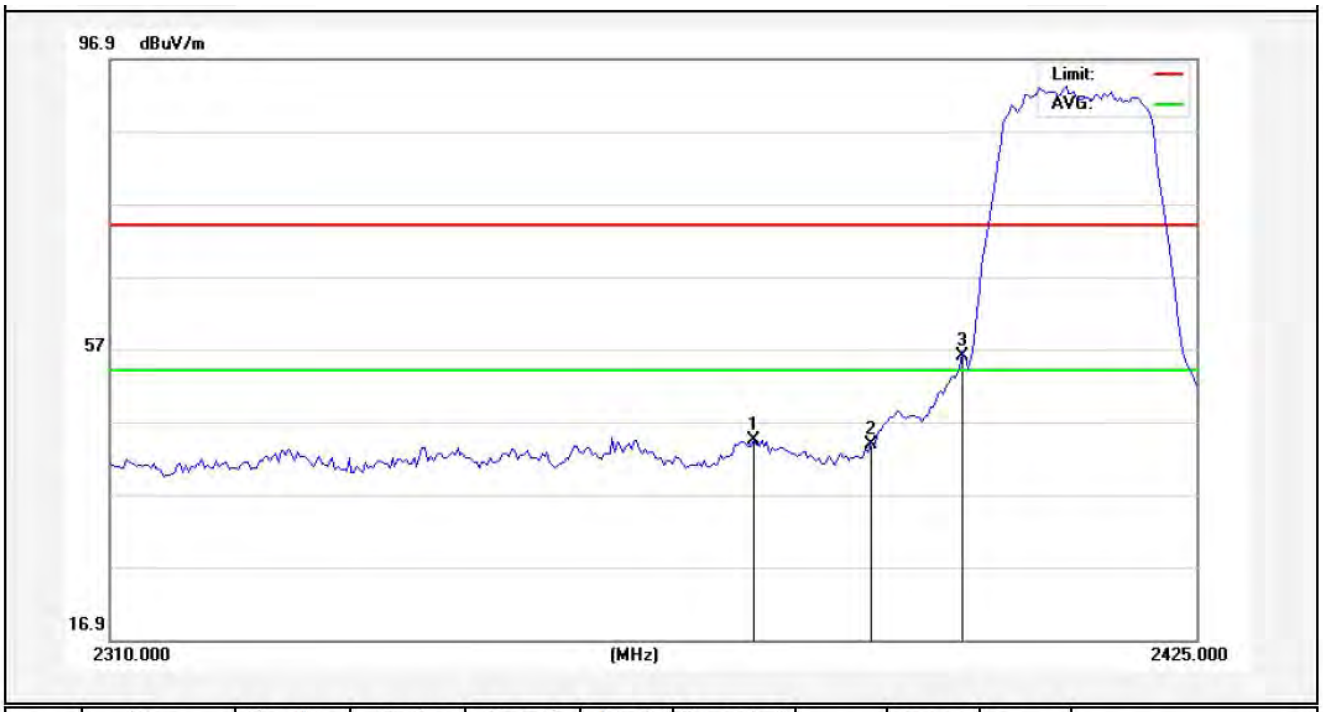
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	45.75	-2.31	43.44	74.00	-30.56	peak			
2	2489.088	47.62	-2.29	45.33	74.00	-28.67	peak			

Vertical-AV:



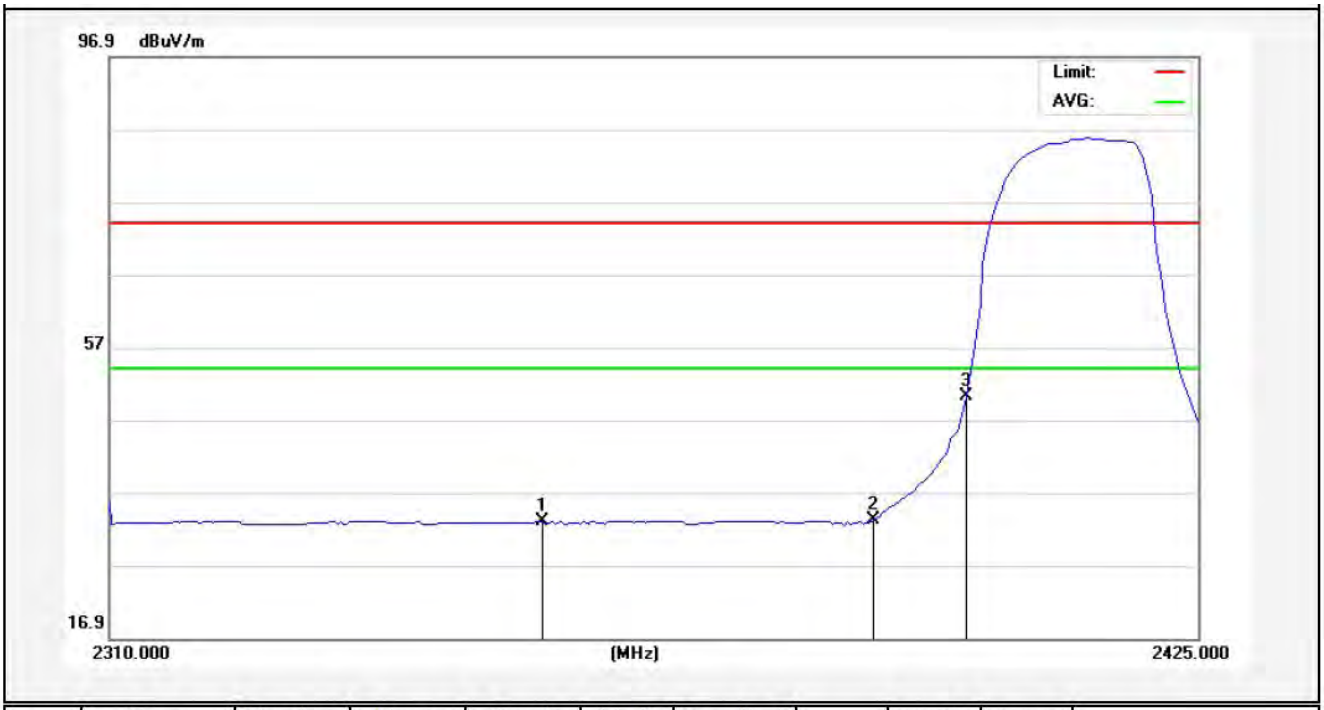
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	41.59	-2.31	39.28	54.00	-14.72	AVG			
2	2484.700	42.00	-2.30	39.70	54.00	-14.30	AVG			

Test Mode: 802.11g
2412MHz
Horizontal-PEAK:



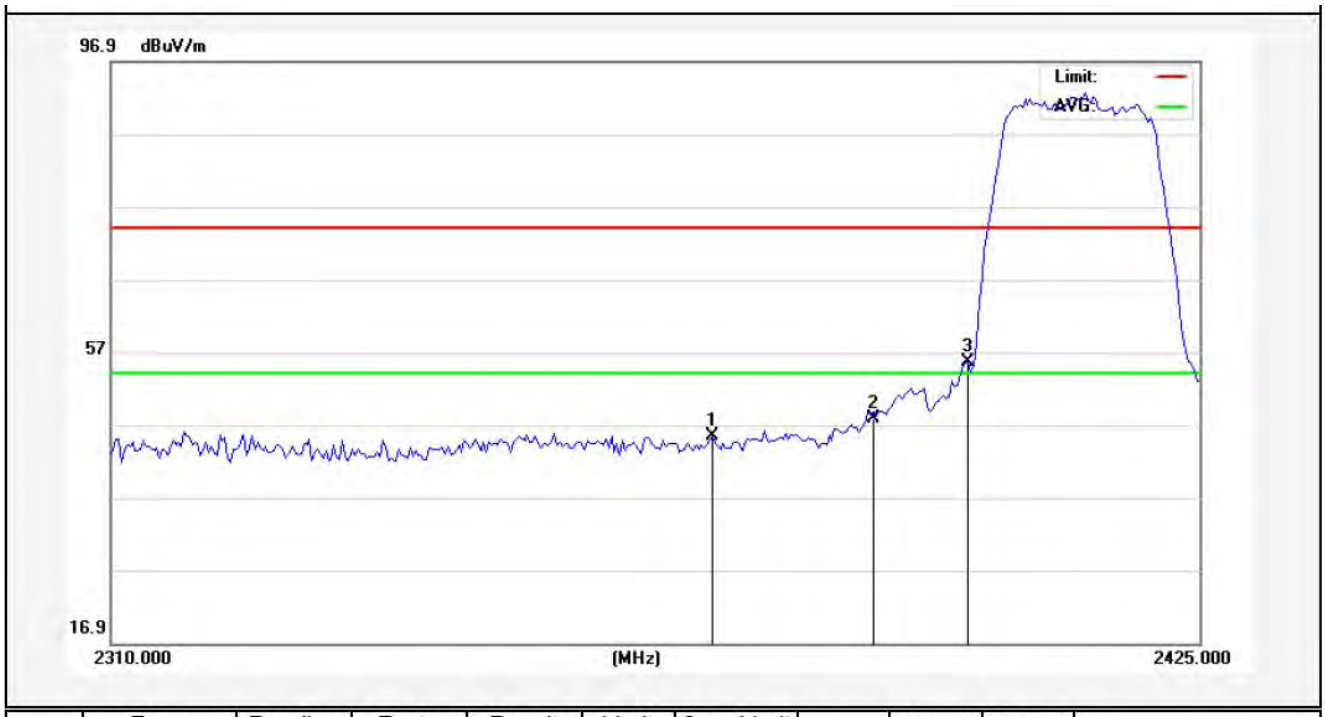
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2377.563	46.92	-2.54	44.38	74.00	-29.62	peak			
2	2390.000	46.25	-2.51	43.74	74.00	-30.26	peak			
3	2400.000	58.43	-2.49	55.94	74.00	-18.06	peak			

Horizontal-AV:



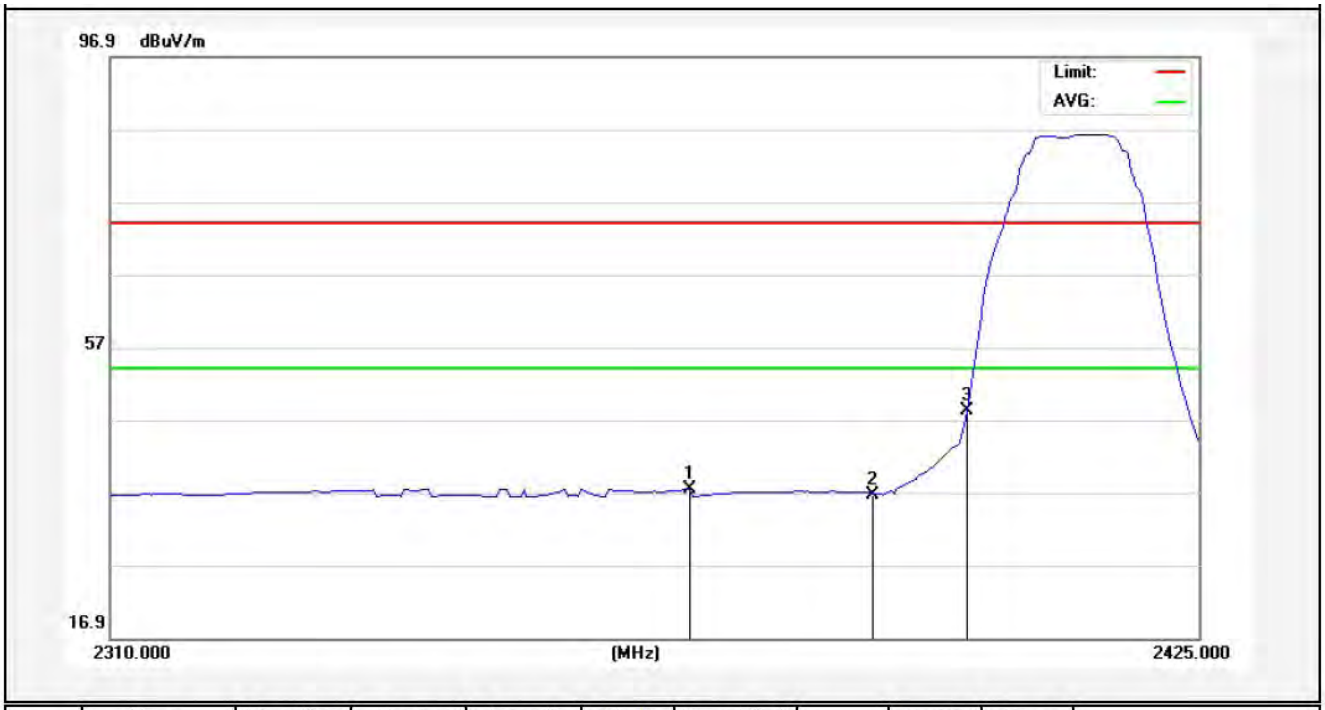
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2355.137	35.69	-2.59	33.10	54.00	-20.90	AVG			
2	2390.000	35.77	-2.51	33.26	54.00	-20.74	AVG			
3	2400.000	52.79	-2.49	50.30	54.00	-3.70	AVG			

Test Mode: 802.11g
2412MHz
Vertical-PEAK:



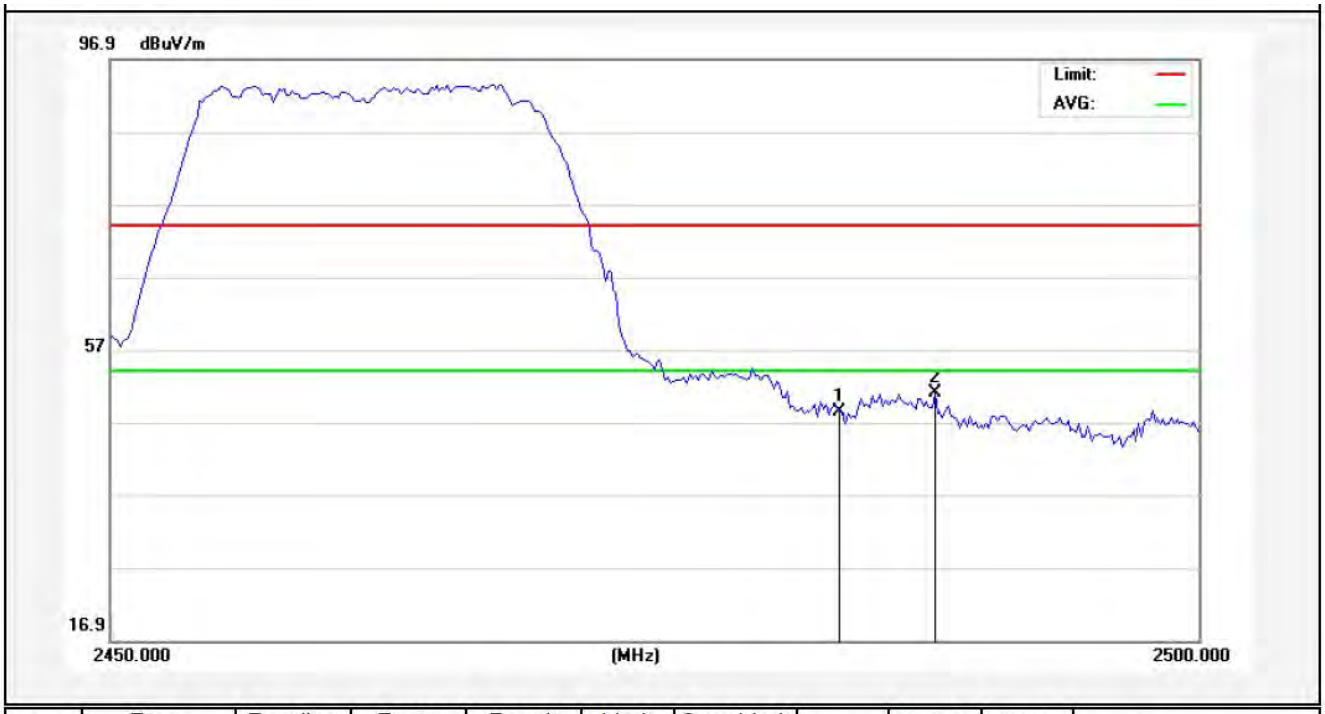
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2372.963	47.96	-2.55	45.41	74.00	-28.59	peak			
2	2390.000	50.33	-2.51	47.82	74.00	-26.18	peak			
3	2400.000	58.15	-2.49	55.66	74.00	-18.34	peak			

Vertical-AV:



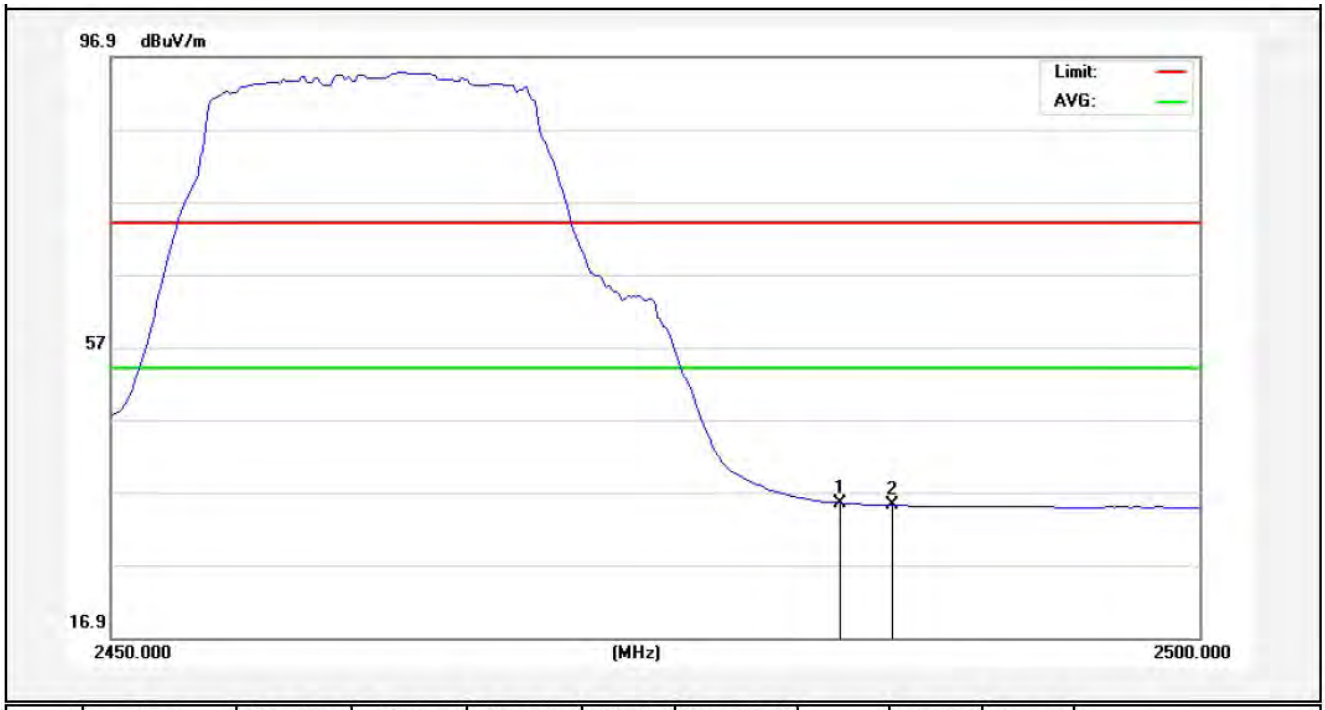
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2370.662	39.93	-2.56	37.37	54.00	-16.63	AVG			
2	2390.000	39.10	-2.51	36.59	54.00	-17.41	AVG			
3	2400.000	50.64	-2.49	48.15	54.00	-5.85	AVG			

Test Mode: 802.11g
2462MHz
Horizontal-PEAK:



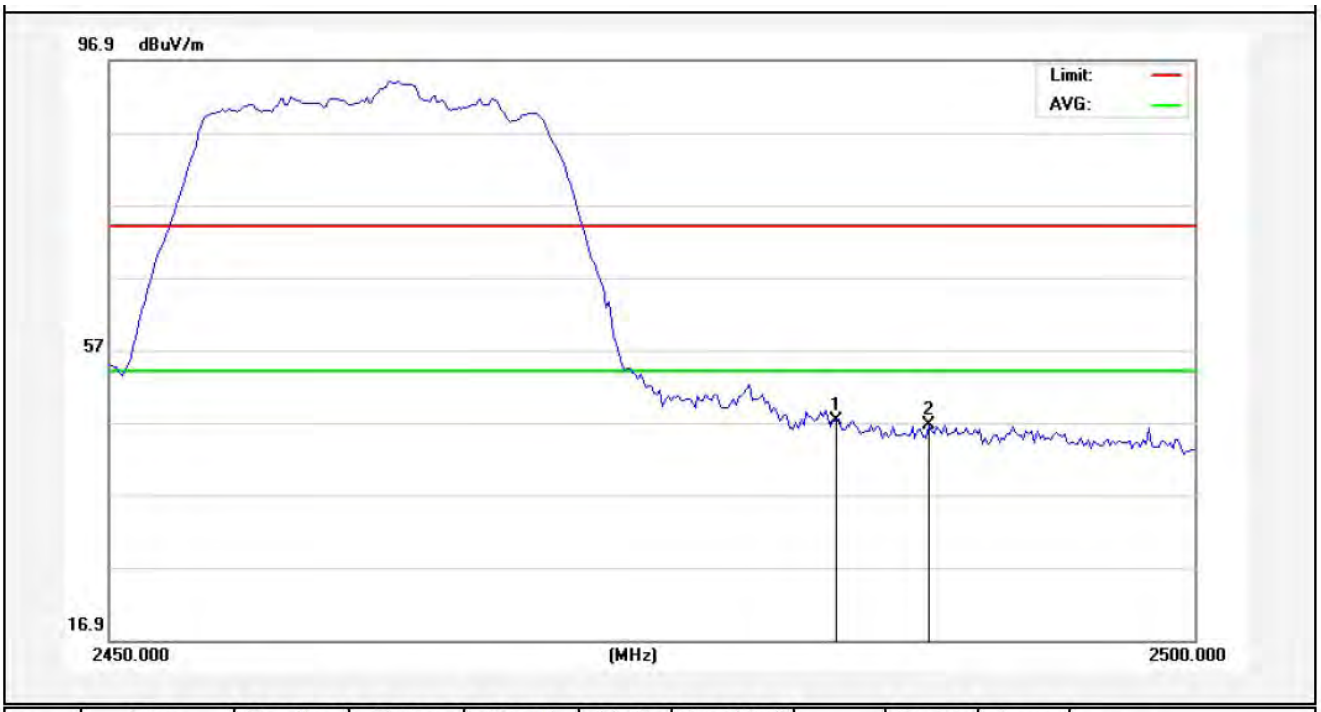
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	50.64	-2.31	48.33	74.00	-25.67	peak			
2	2487.875	53.27	-2.30	50.97	74.00	-23.03	peak			

Horizontal-AV:



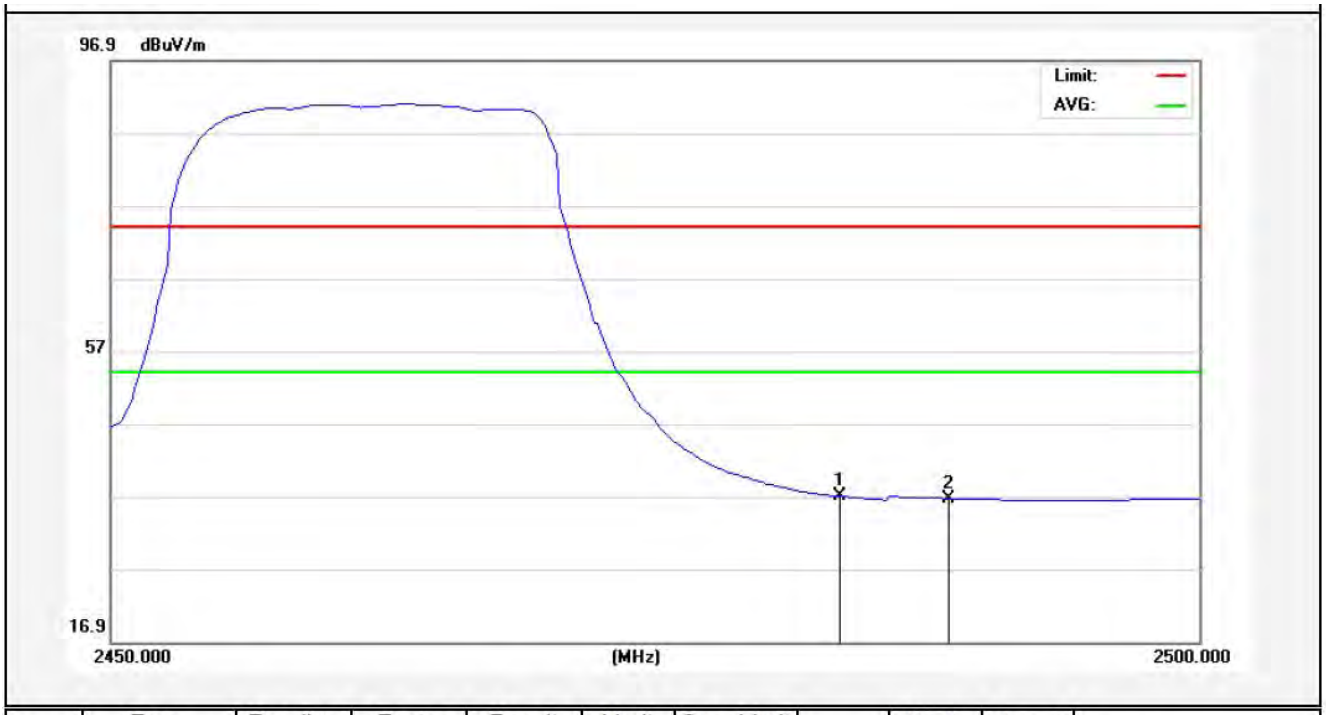
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	37.79	-2.31	35.48	54.00	-18.52	AVG			
2	2485.875	37.45	-2.30	35.15	54.00	-18.85	AVG			

Test Mode: 802.11g
2462MHz
Vertical-PEAK:



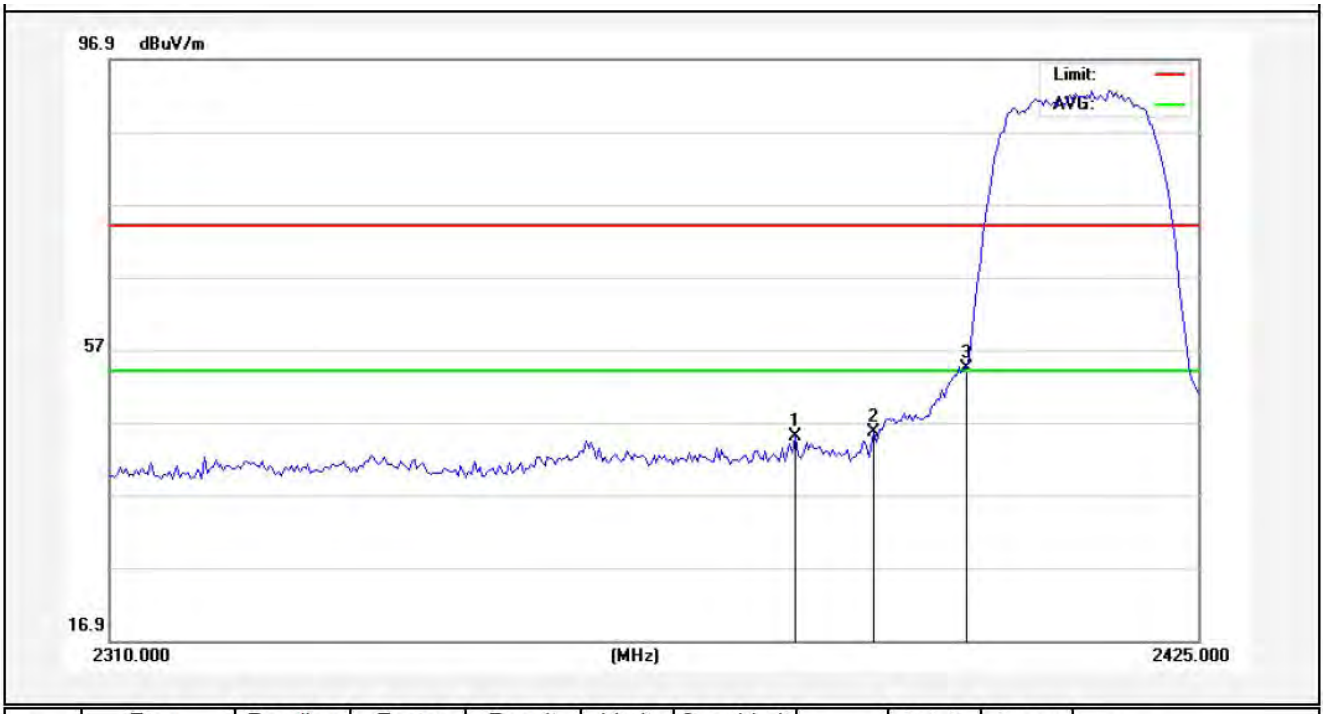
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	49.53	-2.31	47.22	74.00	-26.78	peak			
2	2487.750	48.99	-2.30	46.69	74.00	-27.31	peak			

Vertical-AV:



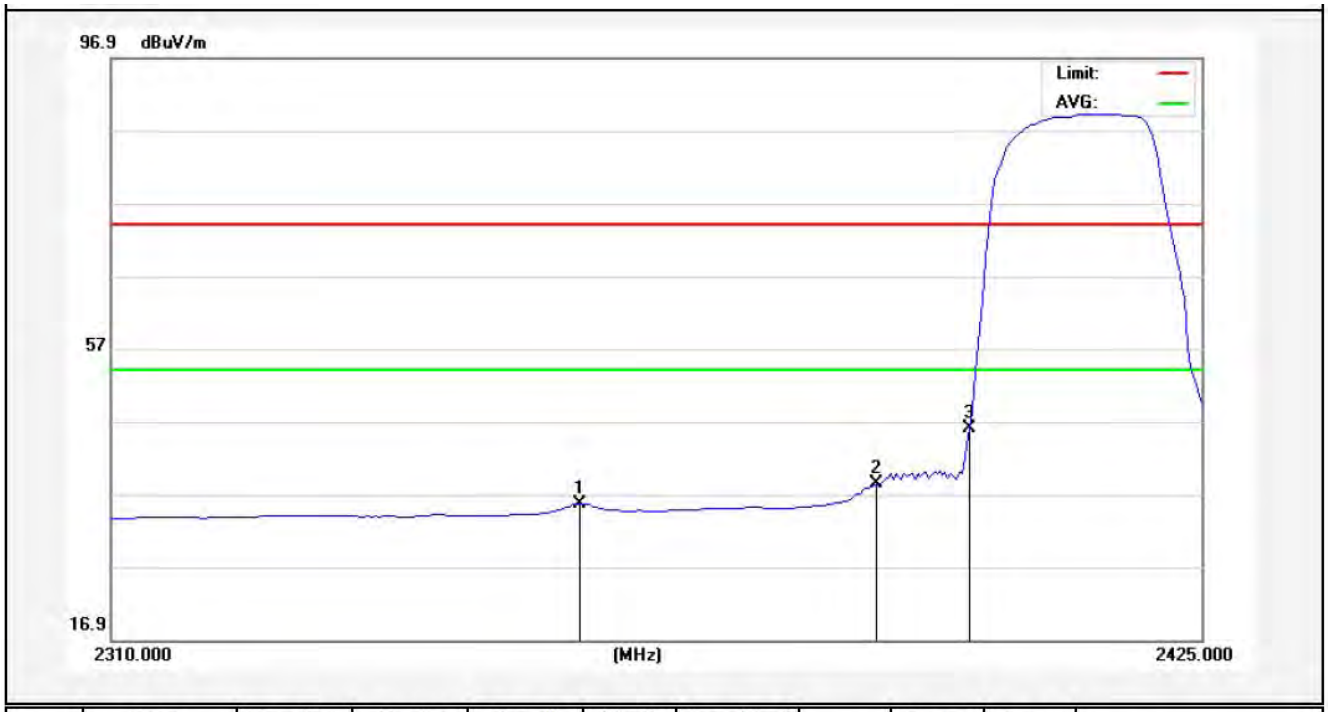
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	39.29	-2.31	36.98	54.00	-17.02	AVG			
2	2488.500	38.98	-2.30	36.68	54.00	-17.32	AVG			

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



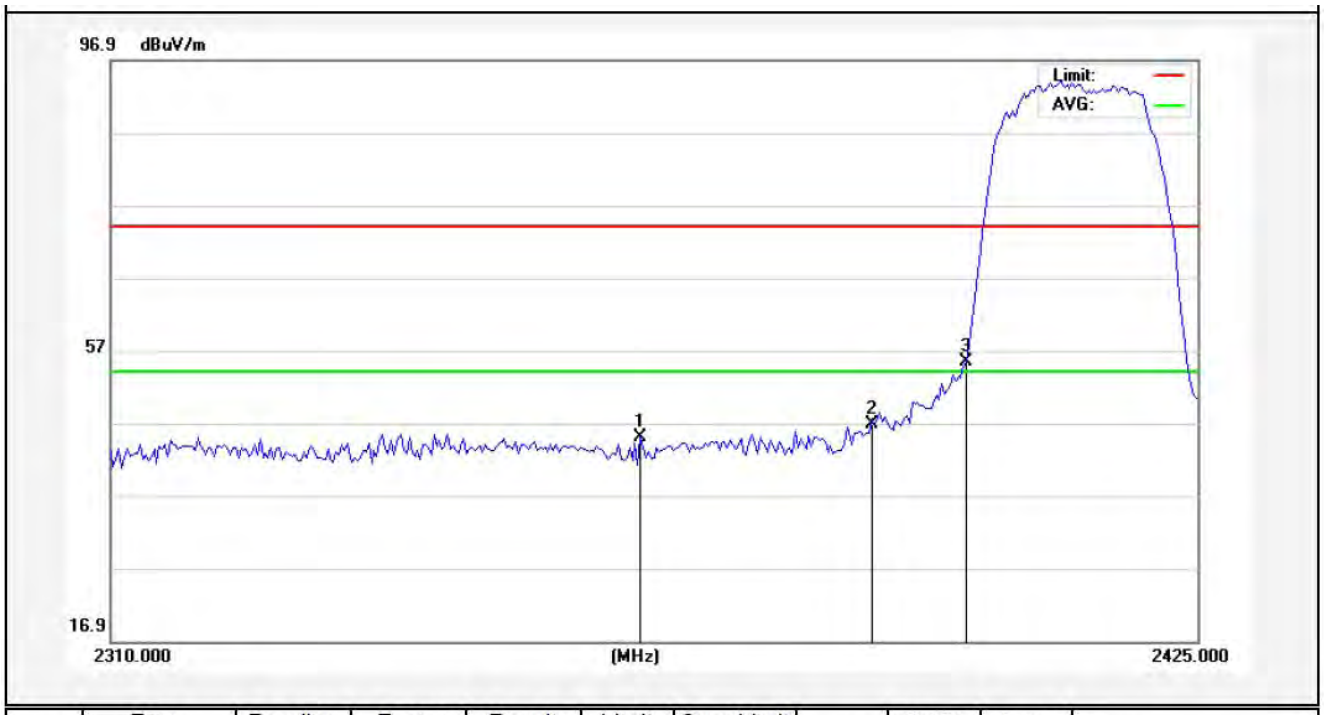
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2381.875	47.54	-2.53	45.01	74.00	-28.99	peak			
2	2390.000	48.20	-2.51	45.69	74.00	-28.31	peak			
3	2400.000	56.81	-2.49	54.32	74.00	-19.68	peak			

Horizontal-AV:



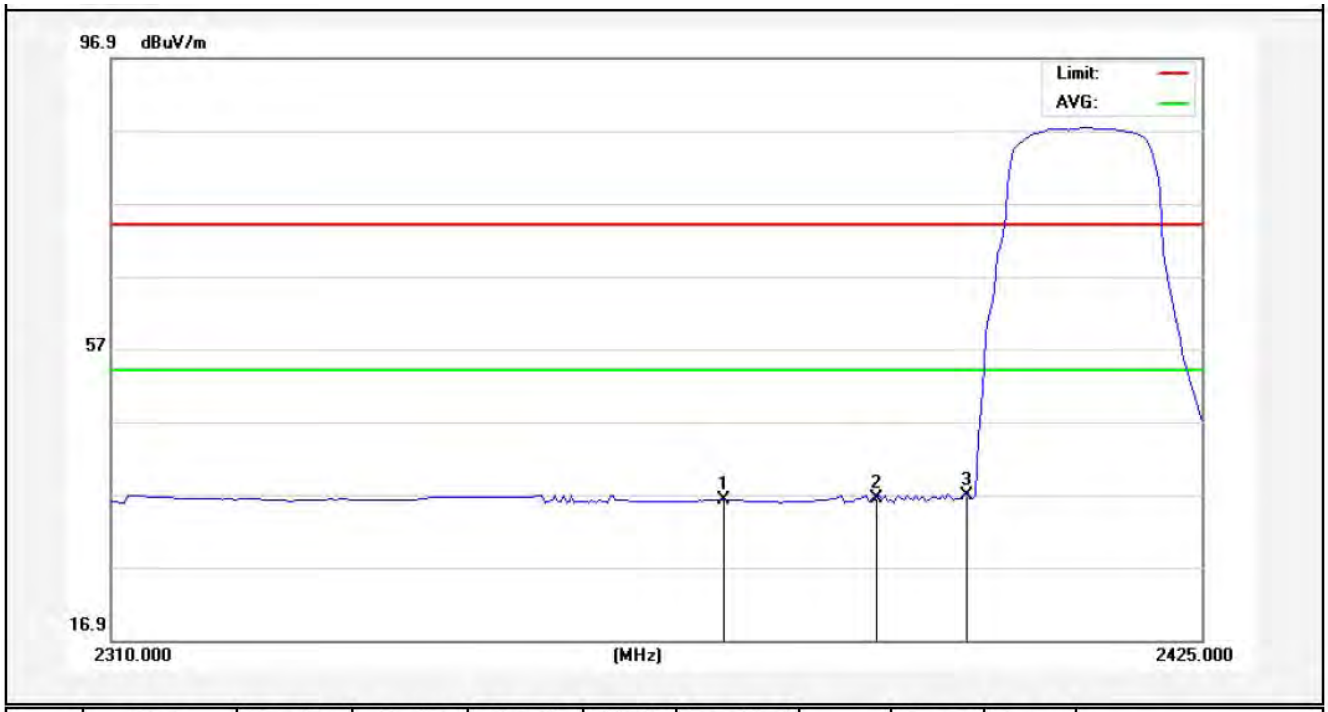
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2358.875	38.26	-2.58	35.68	54.00	-18.32	AVG			
2	2390.000	40.82	-2.51	38.31	54.00	-15.69	AVG			
3	2400.000	48.48	-2.49	45.99	54.00	-8.01	AVG			

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



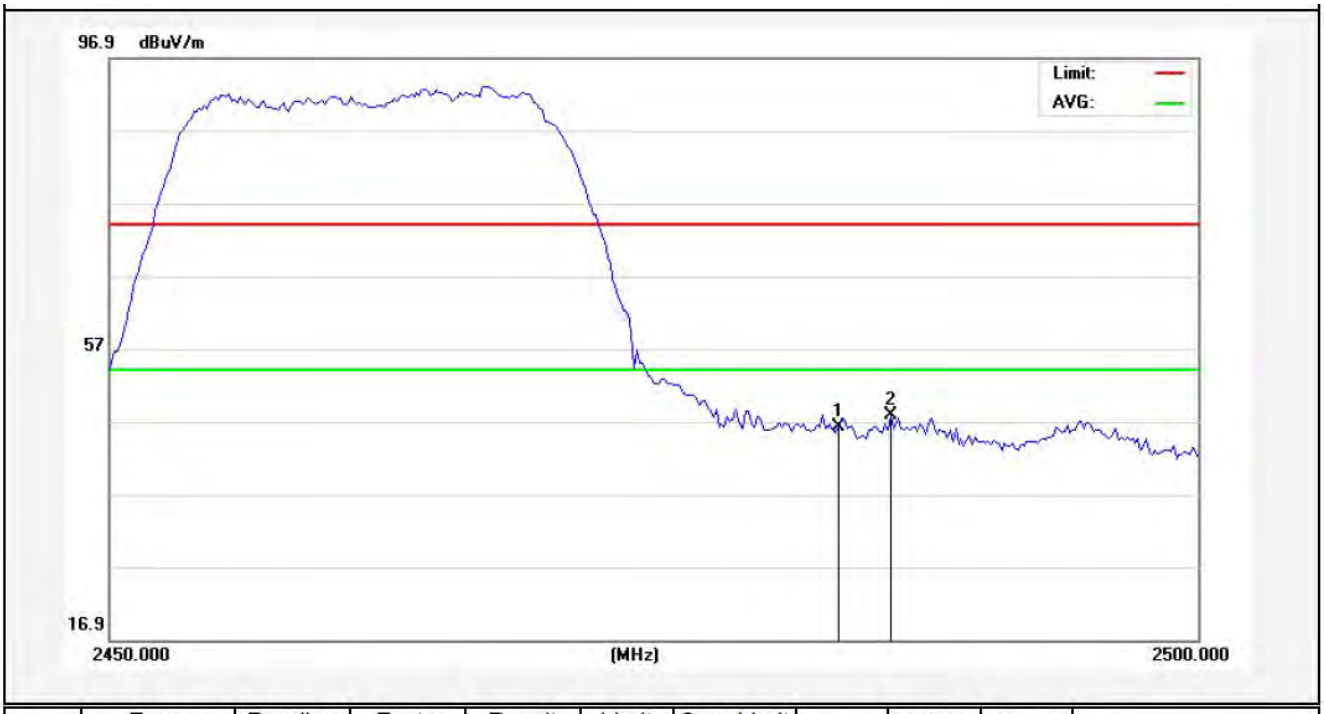
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2365.488	47.53	-2.57	44.96	74.00	-29.04	peak			
2	2390.000	49.25	-2.51	46.74	74.00	-27.26	peak			
3	2400.000	57.86	-2.49	55.37	74.00	-18.63	peak			

Vertical-AV:



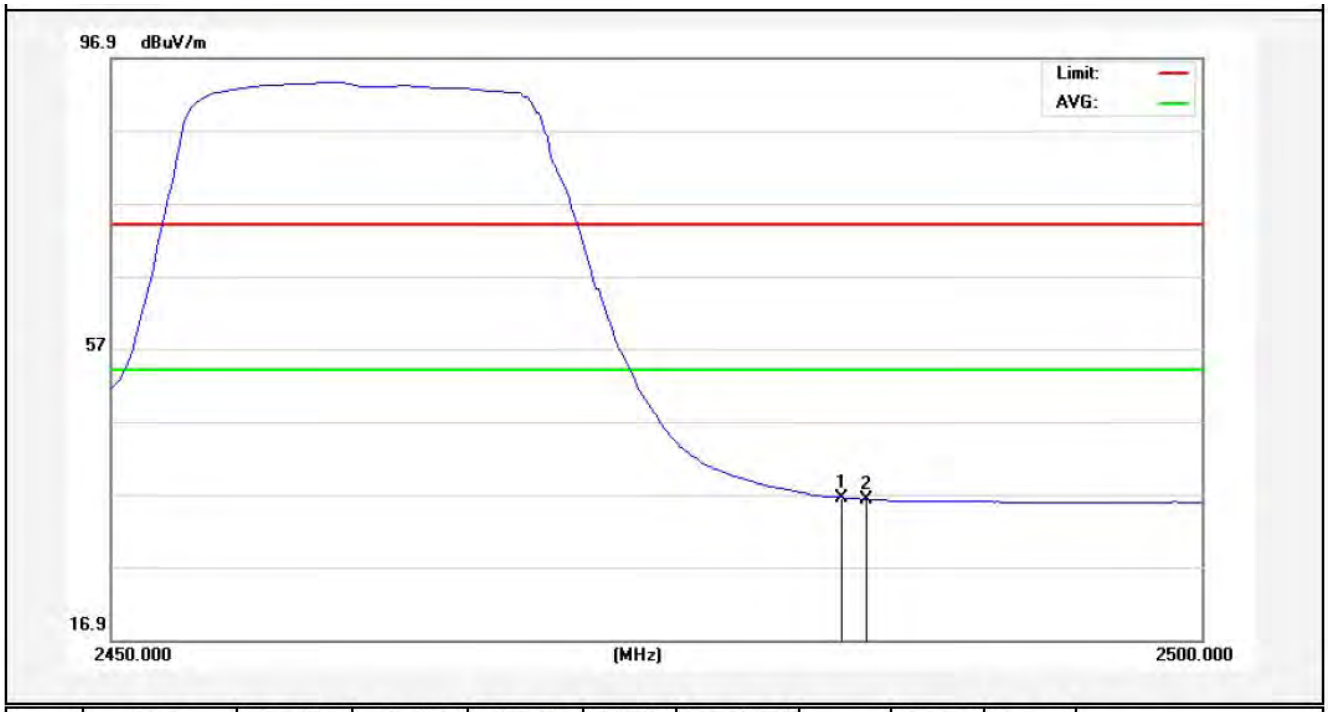
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2374.113	38.70	-2.55	36.15	54.00	-17.85	AVG			
2	2390.000	39.01	-2.51	36.50	54.00	-17.50	AVG			
3	2400.000	39.25	-2.49	36.76	54.00	-17.24	AVG			

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



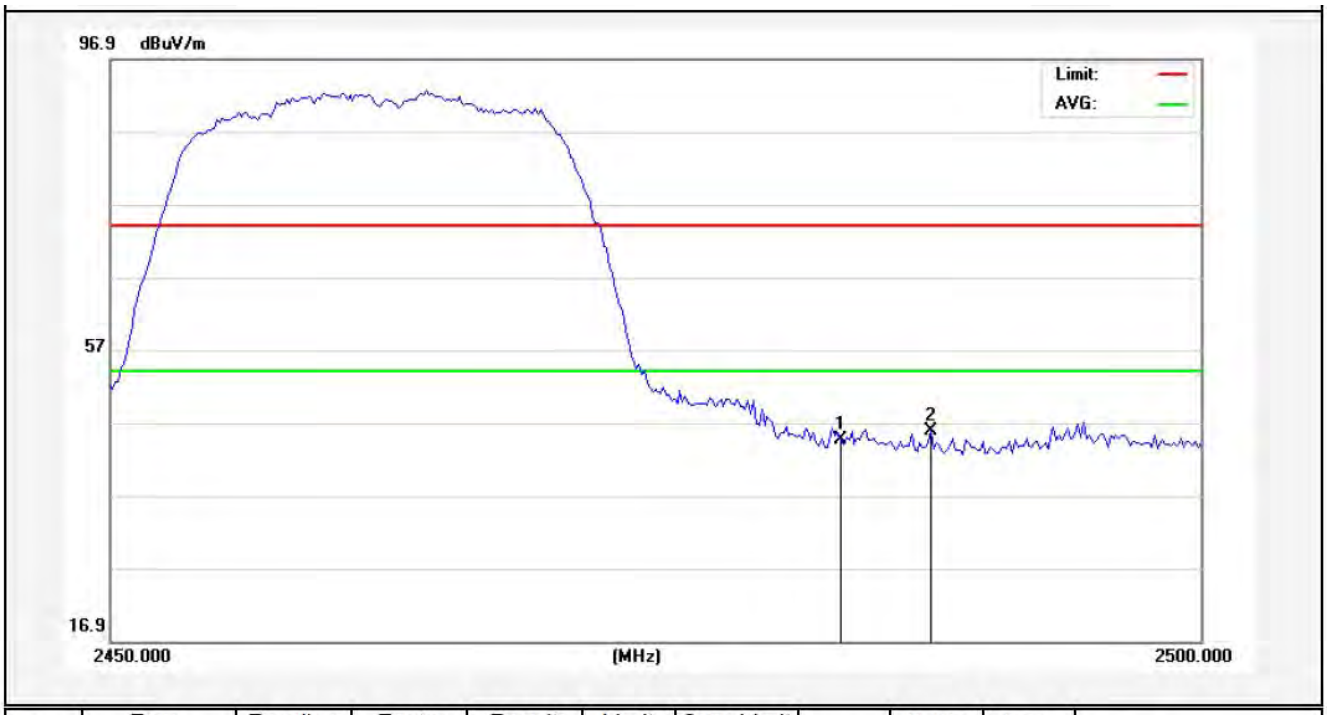
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	48.60	-2.31	46.29	74.00	-27.71	peak			
2	2485.875	50.01	-2.30	47.71	74.00	-26.29	peak			

Horizontal-AV:



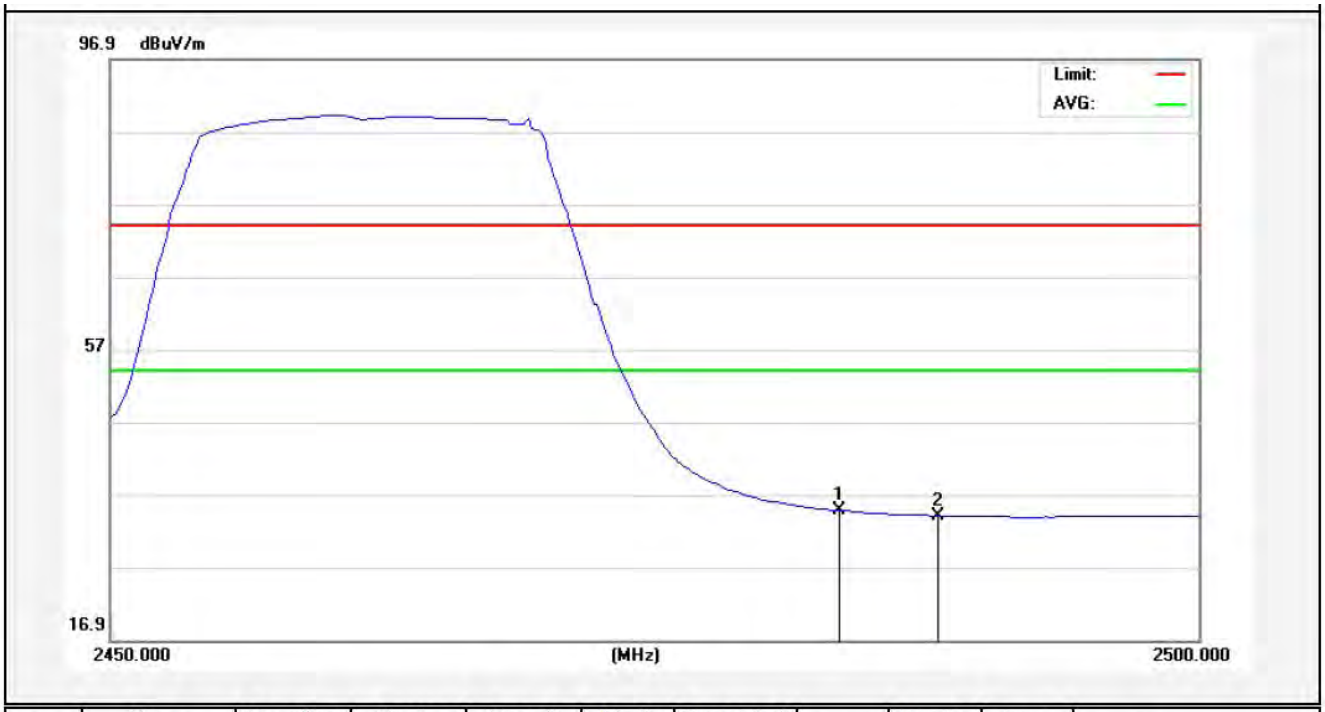
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	38.81	-2.31	36.50	54.00	-17.50	AVG			
2	2484.625	38.55	-2.30	36.25	54.00	-17.75	AVG			

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



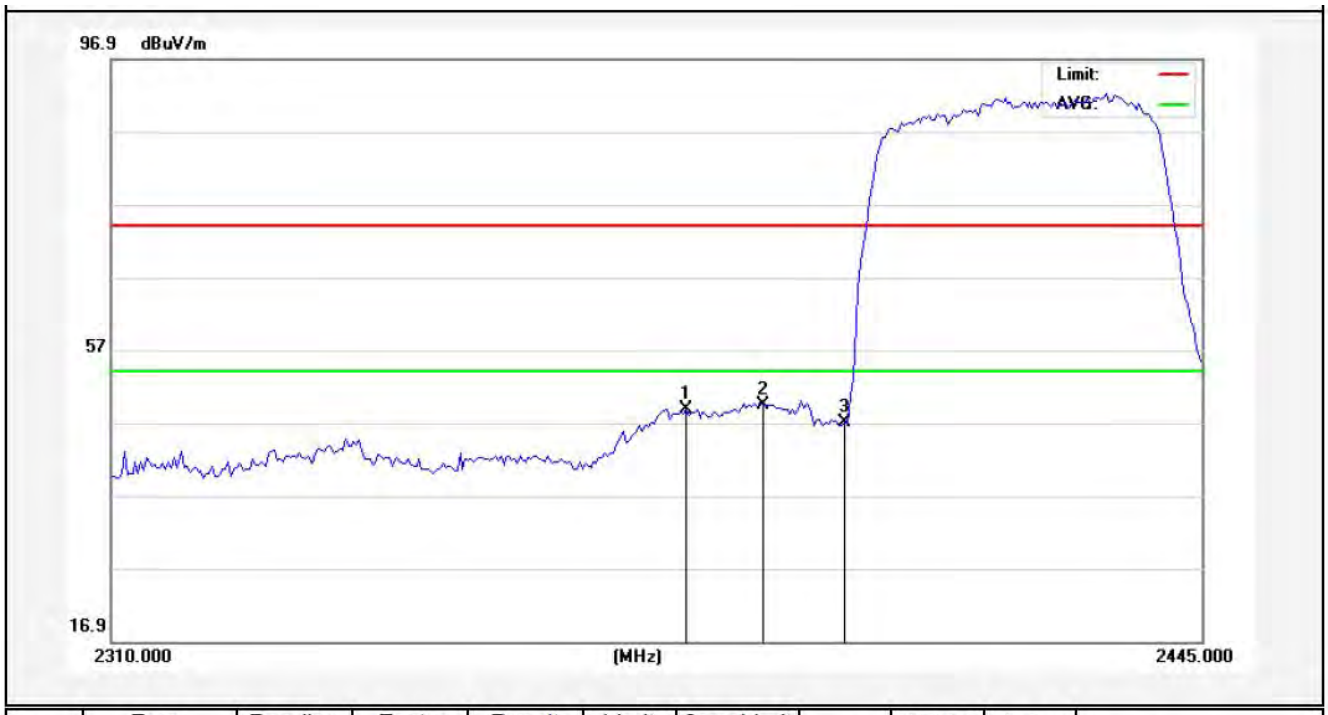
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	46.84	-2.31	44.53	74.00	-29.47	peak			
2	2487.625	48.13	-2.30	45.83	74.00	-28.17	peak			

Vertical-AV:



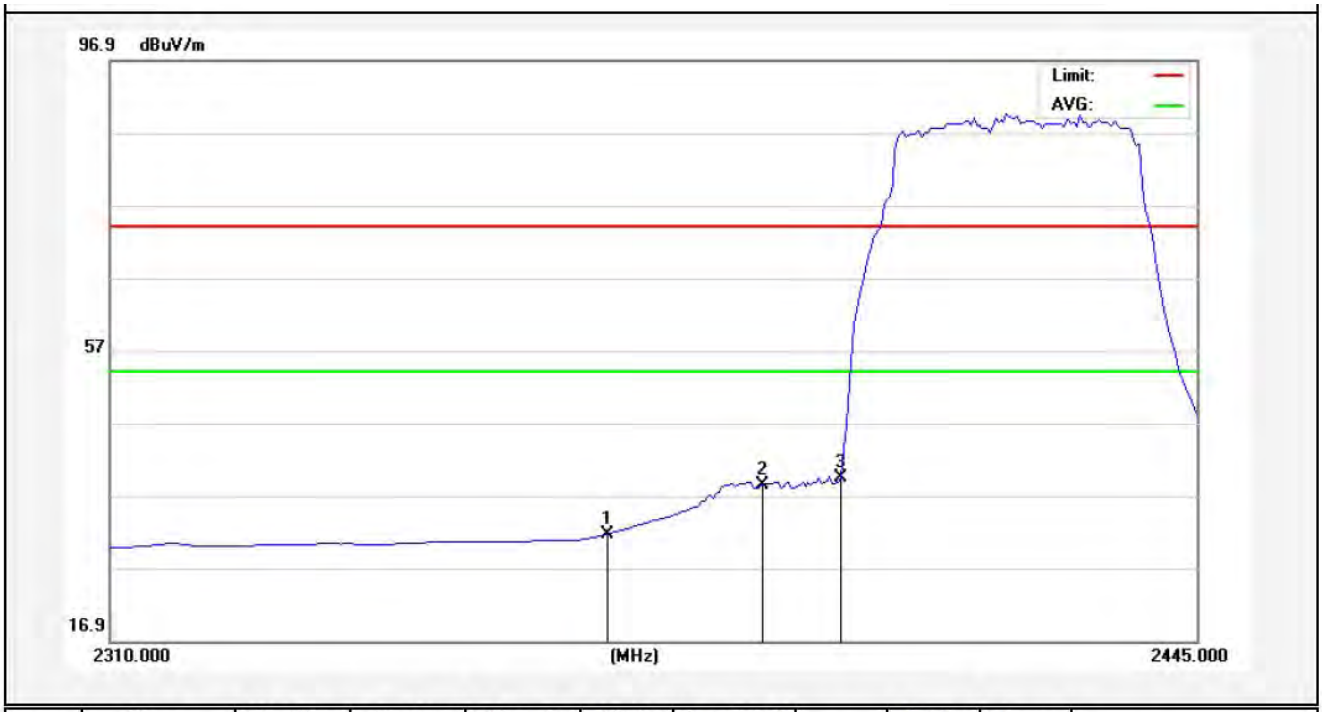
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	37.09	-2.31	34.78	54.00	-19.22	AVG			
2	2488.000	36.36	-2.30	34.06	54.00	-19.94	AVG			

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



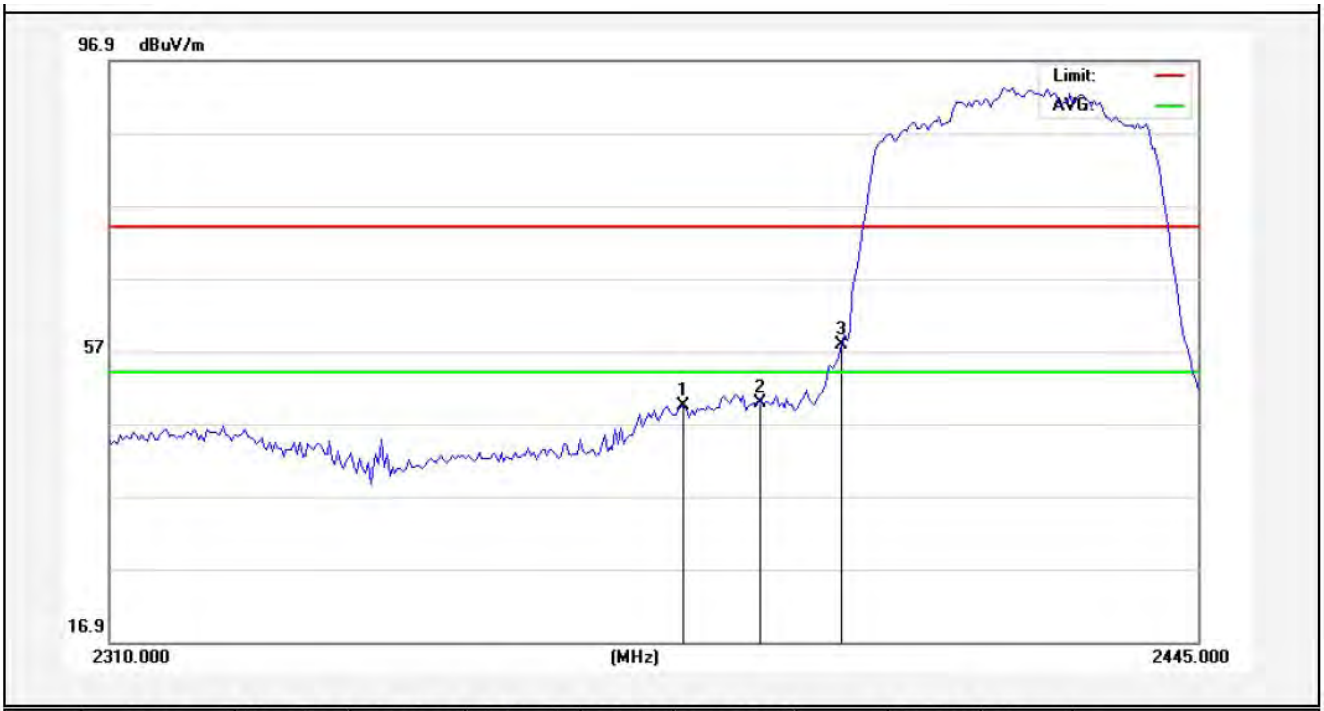
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2380.537	51.40	-2.54	48.86	74.00	-25.14	peak			
2	2390.000	51.82	-2.51	49.31	74.00	-24.69	peak			
3	2400.000	49.55	-2.49	47.06	74.00	-26.94	peak			

Horizontal-AV:



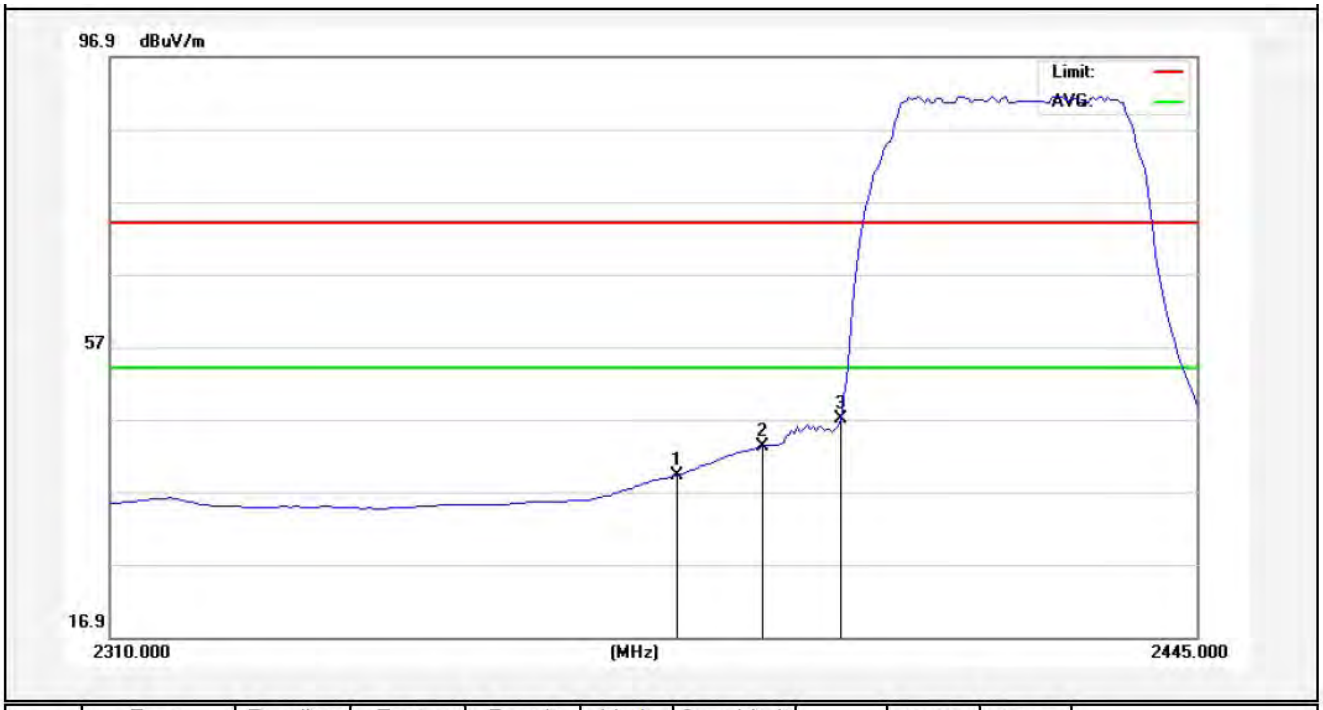
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2371.088	34.19	-2.56	31.63	54.00	-22.37	AVG			
2	2390.000	40.92	-2.51	38.41	54.00	-15.59	AVG			
3	2400.000	41.86	-2.49	39.37	54.00	-14.63	AVG			

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



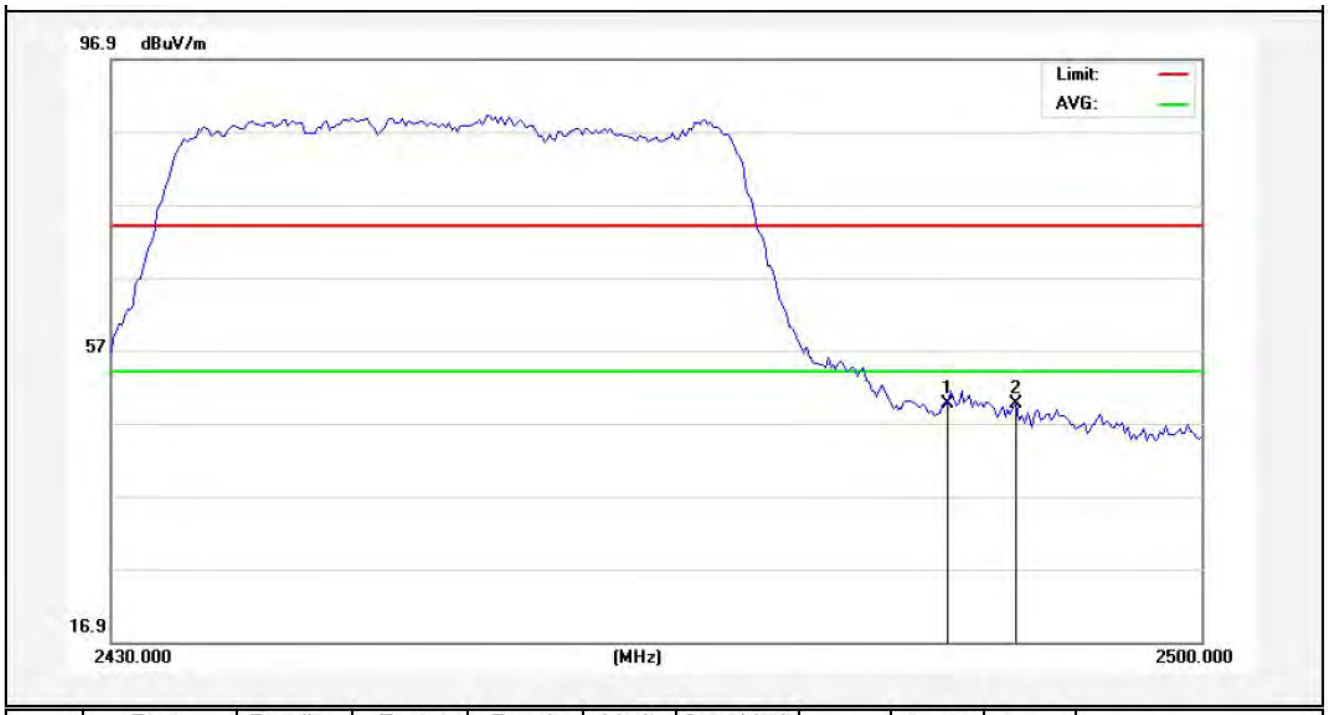
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2380.537	52.00	-2.54	49.46	74.00	-24.54	peak			
2	2390.000	52.39	-2.51	49.88	74.00	-24.12	peak			
3	2400.000	60.35	-2.49	57.86	74.00	-16.14	peak			

Vertical-AV:



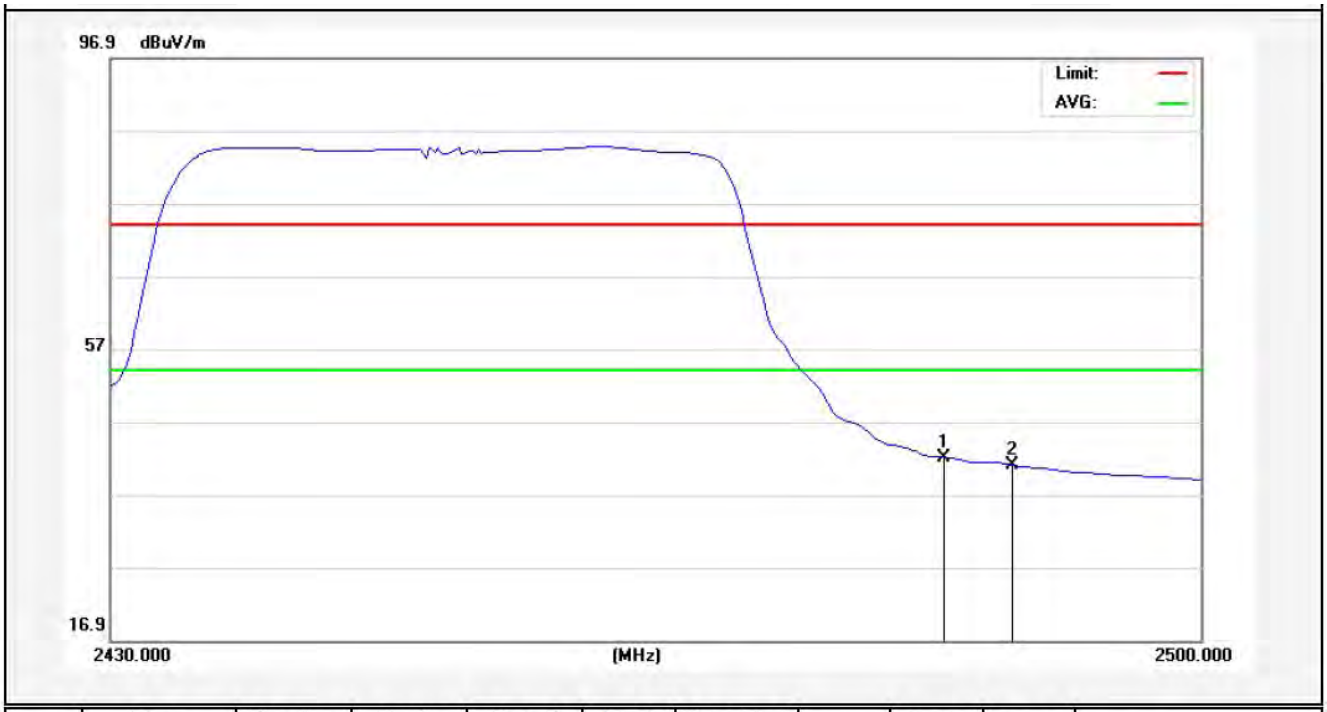
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2379.863	41.83	-2.54	39.29	54.00	-14.71	AVG			
2	2390.000	45.72	-2.51	43.21	54.00	-10.79	AVG			
3	2400.000	49.43	-2.49	46.94	54.00	-7.06	AVG			

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



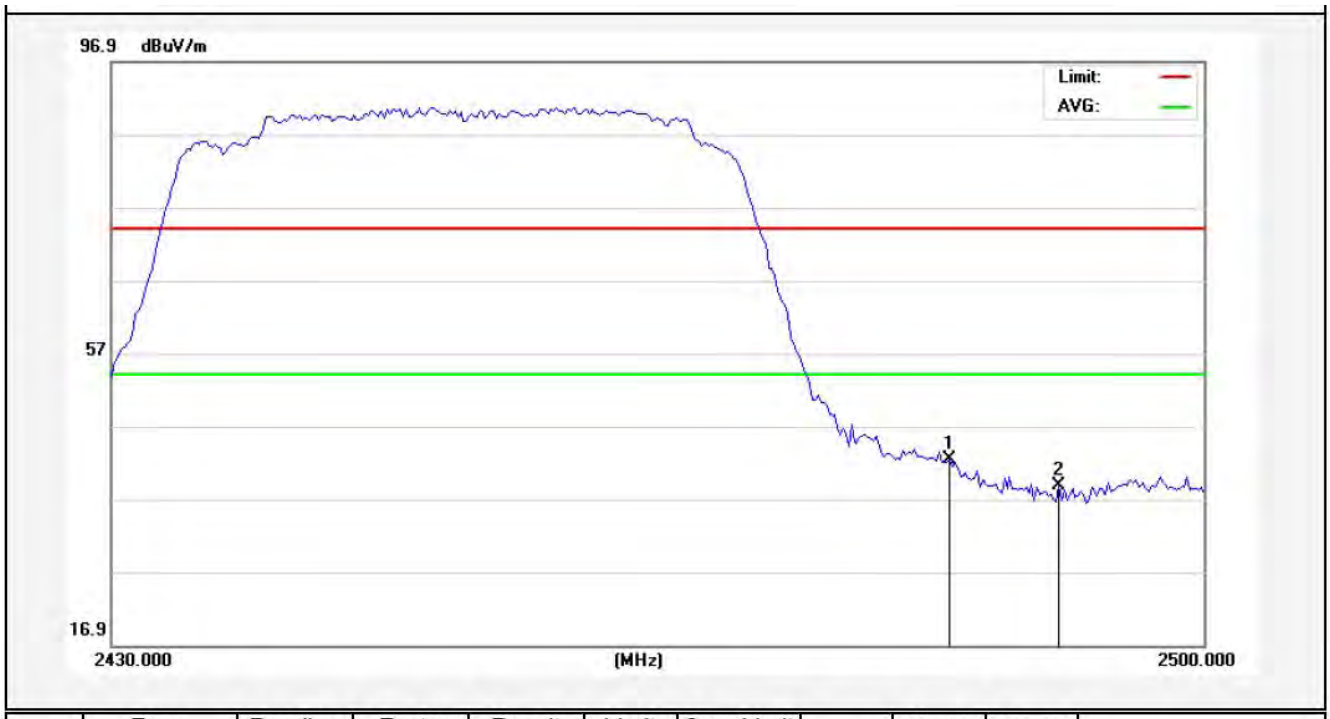
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	51.98	-2.31	49.67	74.00	-24.33	peak			
2	2488.100	51.81	-2.30	49.51	74.00	-24.49	peak			

Horizontal-AV:



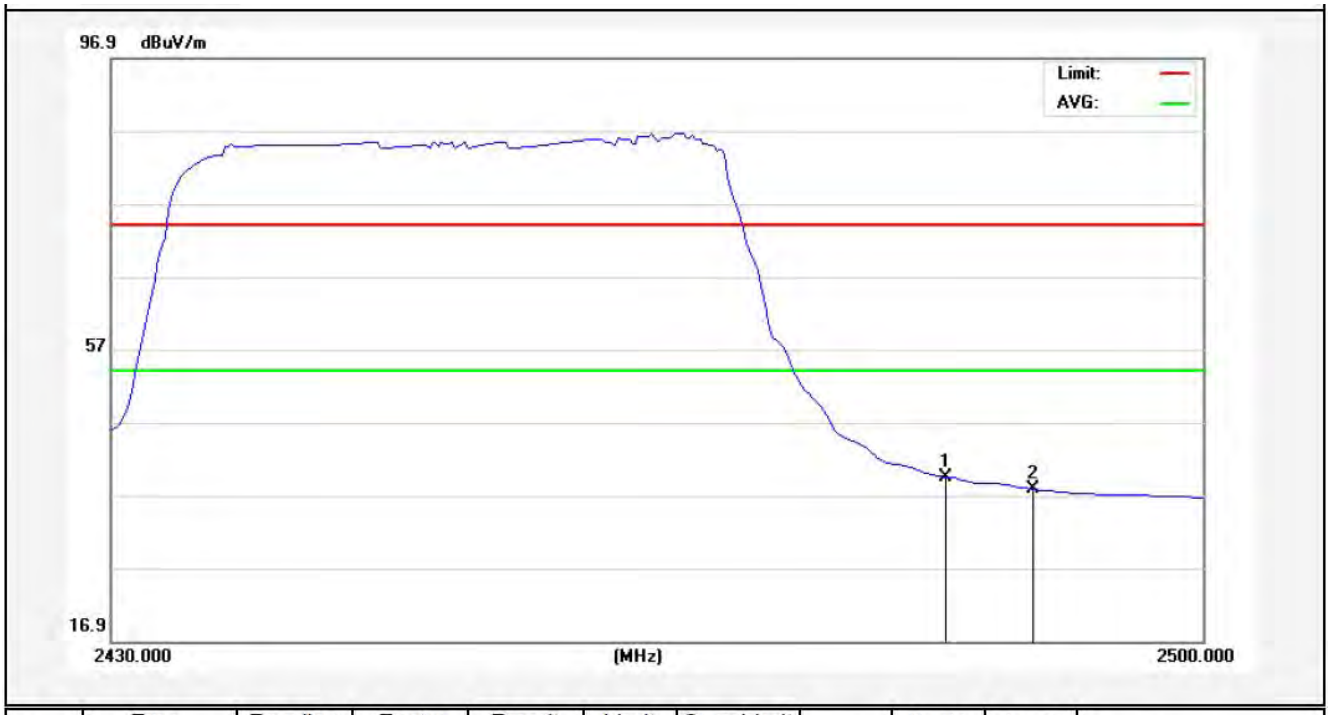
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	2483.500	44.40	-2.31	42.09	54.00	-11.91	AVG			
2	2487.925	43.32	-2.30	41.02	54.00	-12.98	AVG			

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	44.77	-2.31	42.46	74.00	-31.54	peak			
2	2490.725	41.12	-2.29	38.83	74.00	-35.17	peak			

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	41.74	-2.31	39.43	54.00	-14.57	AVG			
2	2489.150	40.08	-2.29	37.79	54.00	-16.21	AVG			