



FCC PART 15 SUBPART C

TEST REPORT

FOR

BlacX Urban Wi-Fi Edition HDD Docking Station

Model : ST-001-D31COE-A1, ST-001-***-**(* present A-Z, 0-9
or Space)**

Trade Name: Thermaltake

Issued to

Thermaltake Technology Co., Ltd.

5F., No. 185, Sec. 2, Tiding Blvd., Neihu Dist., Taipei City, Taiwan

Issued by

PEP Certification Corp.

EMC Test Site	Xizhi Office and Lab	12F.-3, No.27-1, Ln. 169, Kangning St., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)
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PHOTOS OF EUT



1. GENERAL INFORMATION

Applicant : Thermaltake Technology Co., Ltd.

Address : 5F., No. 185, Sec. 2, Tiding Blvd., Neihu Dist., Taipei City, Taiwan

Manufacturer : H & Y Technology Co., Ltd.

Address : 4th Industrial Area, Xia-Gang, Chang-An Town, Dong Guan City, Guangdong, China

EUT : BlacX Urban Wi-Fi Edition HDD Docking Station

Model Name : ST-001-D31COE-A1, ST-001-*****-**(* present A-Z, 0-9 or Space)

Model Differences : N/A

FCC part 15 subpart C

Receipt Date : 12/12/2013

Final Test Date : 01/23/2014

Tested By:

Reviewed by:

Jan. 23, 2014
Date

S.K. Chang

S.K. Chang / Engineer

Jan. 23, 2014
Date

Alex Chou

Alex Chou / Manager
Designation Number: TW1075



1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT

EUT Type : Engineer Type

Condition when received : Good Damage :

EUT Name : BlacX Urban Wi-Fi Edition HDD Docking Station

Model Number : ST-001-D31COE-A1

FCC ID : 2AAUCST001D31COUA1

Receipt Date : 12/12/2013

EUT Power Rating : AC Power
 DC Power
 DCV from PC
 DCV from Adaptor

Input : AC 100-240V, 50/60Hz, 1.5A
Output : DC 12V, 2A

IO Port : DC in Port x 1
USB 3.0 Port x 1



WLAN: 1TX, 1RX

Frequency Band 2400~2483.5MHz ISM band

Data Transfer Rates 11N:150/135/121.5/108.81.54/40.5/27/13.5Mbps

130/117/104/78/52/39/26/Mbps

65/58.5/52./39/26/19.5/13/6.5Mbps

11g: 54/48/36/24/18/12/9/6 Mbps (Dynamic)

11b: 11/5.5/3/2/1 Mbps (Dynamic)

Channel: 11 Channels for United State(FCC)

13 Channels for Europe (ETSI)

13 Channels for Japan (TELEC)

Extend Frequency: DSSS

Modulation Type: OFDM



1.2 TEST METHODOLOGY

Both conducted and radiated testing were performed according to procedures in ANSI C63.4. Radiated testing was performed at an antenna to EUT distance 3 meters.



1.3 DESCRIPTION OF THE SUPPORT EQUIPMENTS

Setup Diagram

See test photographs attached in appendix I for the actual connections between EUT and support equipment.

Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
1.	PC	CU5	L3ADA3F	R33B65	leveno	N/A	Unshielded 1.8m
2.	MONITOR	2212Ph	E9777JA0 0166	R33037	AOC	Shielded 1.8m	Unshielded 1.8m
3.	PRINTER	STYLUS PHOTO75 0	BDEK0176 29	3872P011	EPSON	Shielded 1.8m	Unshielded 1.8m
4.	KEYBOARD	Y-UR83	N/A	T51160	Logitech	Shielded 1.8m / USB	N/A
5.	USB storage	TS2GJFV30	156511-640 0	DOC/ D33193	TRANSCEND	Shielded 1m	N/A
6.	Mouse	N889	N/A	R41101	DELL	Shielded 1.8m / USB	N/A
EUT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
2.	PCB1	HY-EB-1089-WIFI	N/A	N/A	N/A	N/A	N/A
3.	PCB2	EB-1089-U3_B	N/A	N/A	N/A	N/A	N/A

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer’s requirement and conditions for the intended use.

1.4 FEATURES OF EUT: PLEASE REFER TO USER MANUAL OR PRODUCT SPECIFICATION.



2 SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 TEST PROCEDURE

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4.



1.4 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

TABLELIST OF TEST AND MEASUREMENT EQUIPMENT

Test Site	Instrument	Manufacturer	Model No.	S/N	Next Cal. Date
Conduction	Receiver	R&S	ESHS10	830223/008	Nov. 23, 2014
	Spectrum Analyzer	ADVANTEST	R3261C	87120343	Mar. 18, 2014
	RF Cable	MIYAZAKI & Anritsu	RG58A0 & MP59B	M79094	Apr. 08, 2014
	L.I.S.N	Rolf Heine Hochfrequenztechnik	NNB-2/16z	98062	Jan. 16, 2015
	EMI Test Receiver	R&S	EAHS-10	1093.4495.03	Mar. 21, 2014
	Click Analyzer	Schaffner	DIA1512C	5218	June 15, 2014
Radiation	Spectrum Analyzer	Nex1	NS-265	NO5044006	Aug. 04, 2014
	Antenna	Schwarzbeck	VULB 9161	4077	Feb. 02, 2014
	RF Cable	N/A	N/A	N/A	Jan. 18, 2015
	Pre-Amp	Schaffner	CPA-9232	1012	Jan. 20, 2015
EMS	Harmonic/ Flicker	EMC-PARTNER	HAR-1000	066	Sep. 27, 2014
	ESD Simulator	NOISEKEN	ESS-2002	ESS0767151	Mar. 18. 2014
	EFT Noise Generator	EMC-PARTNER	TRANSIENT -2000	N/A	Sep. 03, 2014
	Surge Tester	EMC-PARTNET	TRANSIENT -2000	N/A	Mar. 17, 2014



	CDN	FRANKONIA	CDN M2+M3	A3011021	Nov. 23, 2014
	T4 CDN	FRANKONIA	CDN-RJ45	A3023011	Nov. 17, 2014
	Conducted Immunity Test System	FRANKONIA	CIT-10175	102C3117	Nov. 23, 2014

#: CALIBRATION INTERVAL OF INSTRUMENTS LISTED ABOVE IS ONE YEAR



3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
15.207(a)	AC Power Line Conducted Emission	Compliant
15.247(b) (3), (4)	Peak Output Power	Compliant
15.247(a)(2)	6dB Bandwidth	Compliant
15.247(d)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
15.247(d)	Spurious Emission	Compliant
15.247(e)	Peak Power Density	Compliant
15.203	Antenna Requirement	Compliant



4 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering operating condition.
Test program used to control the EUT for staying in continuous transmitting mode is pro-programmed.

802.11 b mode: Channel low (2412MHz) 、 mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz) 、 mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n _20MHz: Channel low (2412MHz) 、 mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11 n_40MHz: Lowest (2422MHz), Mid (2437MHz) and Highest (2452MHz) with 13.5Mbps lowest data rate are chosen for full testing.

Radiated emissions were tested with two type of antenna, the worst case of chip antenna 3dBi data was reported.



5 CONDUCTED EMISSION TEST

5.1 STANDARD APPLICABLE:

According to §15.207, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limit dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	40
5 to 30	60	50

Note

1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

5.2 EUT SETUP:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.



5.4 MEASUREMENT PROCEDURE:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

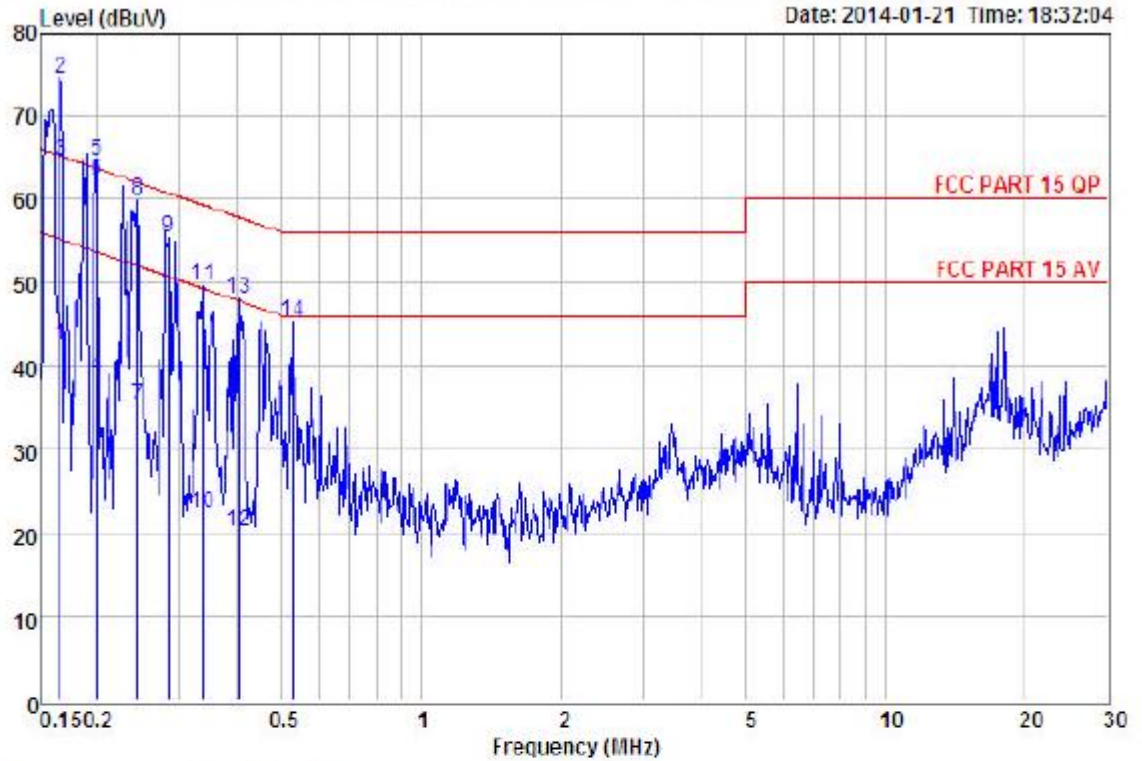
5.5 MEASUREMENT RESULT:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.



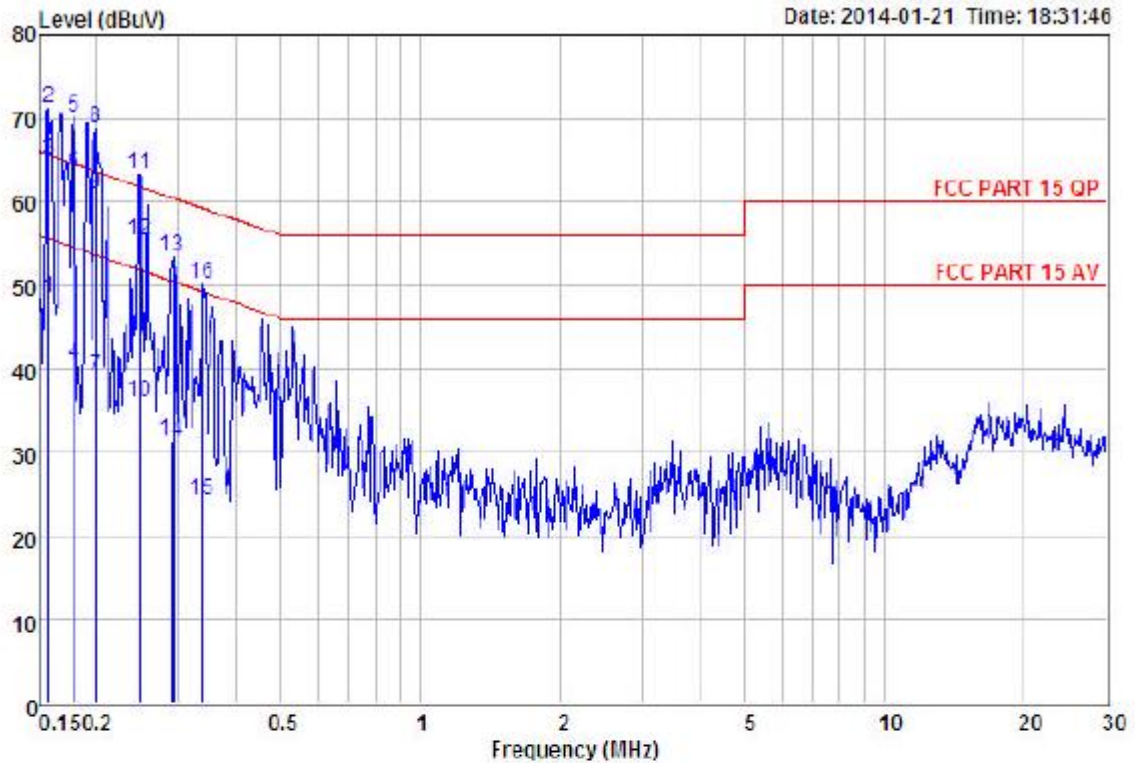
5.6 TEST DATA:



Site : Conduction
 Condition : FCC PART 15 QP CON-LISN(103) LINE
 EUT : Please refer to page 1 of report
 MODEL : Please refer to page 1 of report
 MEMO : USB 3.0 R/W

Remarks: : Factor=Insertion loss+Cable loss

	Read	Over	Limit			
Freq	Level	Level	Factor	Limit	Line	Remark
MHz	dBuV	dBuV	dB	dB	dBuV	
1	0.17	42.38	42.50	0.12	-12.66	55.16 Average
2 *	0.17	74.28	74.40	0.12	9.24	65.16 Peak
3	0.17	64.38	64.50	0.12	-0.66	65.16 QP
4	0.20	38.38	38.50	0.12	-15.17	53.67 Average
5 *	0.20	64.40	64.52	0.12	0.85	63.67 Peak
6	0.20	62.18	62.30	0.12	-1.37	63.67 QP
7	0.24	35.08	35.20	0.12	-16.80	52.00 Average
8	0.24	59.65	59.77	0.12	-2.23	62.00 Peak
9	0.28	55.11	55.24	0.13	-5.48	60.72 Peak
10	0.34	22.26	22.40	0.14	-26.91	49.31 Average
11	0.34	49.30	49.44	0.14	-9.87	59.31 Peak
12	0.40	20.06	20.20	0.14	-27.57	47.77 Average
13	0.40	47.96	48.10	0.14	-9.67	57.77 Peak
14	0.52	45.10	45.25	0.15	-10.75	56.00 Peak



Site : Conduction
 Condition : FCC PART 15 QP CON-LISN(103) NEUTRAL
 EUT : Please refer to page 1 of report
 MODEL : Please refer to page 1 of report
 MEMO : USB 3.0 R/W

Remarks: : Factor=Insertion loss+Cable loss

	Freq	Read Level	Level	Factor	Over Limit	Limit Line	Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	
1	0.16	48.38	48.50	0.12	-7.10	55.60	Average
2 *	0.16	71.12	71.24	0.12	5.64	65.60	Peak
3	0.16	64.88	65.00	0.12	-0.60	65.60	QP
4	0.18	40.49	40.60	0.11	-13.99	54.59	Average
5 *	0.18	69.95	70.06	0.11	5.47	64.59	Peak
6	0.18	63.39	63.50	0.11	-1.09	64.59	QP
7	0.20	38.89	39.00	0.11	-14.67	53.67	Average
8 *	0.20	68.72	68.83	0.11	5.16	63.67	Peak
9	0.20	60.89	61.00	0.11	-2.67	63.67	QP
10	0.25	35.89	36.00	0.11	-15.86	51.86	Average
11 *	0.25	63.20	63.31	0.11	1.45	61.86	Peak
12	0.25	55.19	55.30	0.11	-6.56	61.86	QP
13	0.29	53.30	53.41	0.11	-7.09	60.50	Peak
14	0.29	31.29	31.40	0.11	-29.10	60.50	QP
15	0.34	24.08	24.20	0.12	-25.07	49.27	Average
16	0.34	50.17	50.29	0.12	-8.98	59.27	Peak



6 PEAK /AVERAGE OUTPUT POWER MEASUREMENT

6.1 STANDARD APPLICABLE:

According to §15.247(b)(3),(4)

(b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Con-ducted Output Power is defined as the total transmit power delivered to all antennas and antenna ele-ments averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements.

The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1),(b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c) Operation with directional antenna gains greater than 6 dBi.

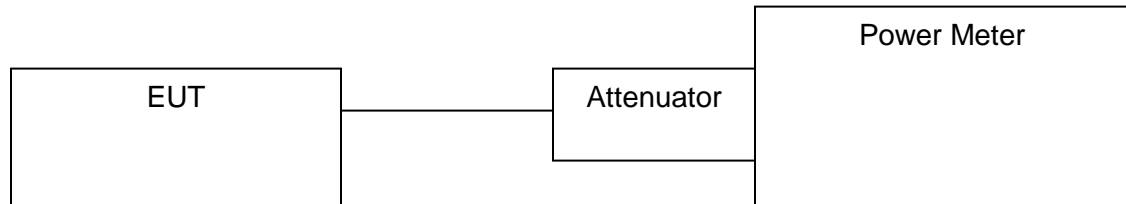
(1) Fixed point-to-point operation:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.



6.2 TEST SET-UP:



6.3 MEASUREMENT PROCEDURE:

Refer to Measurement Procedure KDB Document: 558074 D01 DTS Meas Guidance v01

1. Connect EUT to Power meter.
2. Read Peak and Average from power meter.



6.4 MEASUREMENT RESULT:

802.11b

Cable loss = 0		Output Power		Limit(dBm)
CH	Frequency(MHz)	Detector		
		PK(dBm)	AV(dBm)	
1	2412	19.22	16.84	30
6	2437	19.14	16.78	
11	2462	19.21	16.81	

802.11g

Cable loss = 0		Output Power		Limit(dBm)
CH	Frequency(MHz)	Detector		
		PK(dBm)	AV(dBm)	
1	2412	22.88	13.58	30
6	2437	22.54	13.12	
11	2462	23.05	13.84	

802.11N 20MHz

Cable loss = 0		Output Power		Limit(dBm)
CH	Frequency(MHz)	Detector		
		PK(dBm)	AV(dBm)	
1	2412	23.14	14.11	30
6	2437	23.07	14.02	
11	2462	23.24	14.17	

802.11N 40MHz

Cable loss = 0		Output Power		Limit(dBm)
CH	Frequency(MHz)	Detector		
		PK(dBm)	AV(dBm)	
1	2422	23.22	14.21	30
6	2437	23.14	14.15	
11	2452	23.08	14.10	



7 6DB BANDWIDTH(EBW)

7.1 STANDARD APPLICABLE:

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

7.2 MEASUREMENT EQUIPMENT USED:

Refer to section 6.2 for details.

7.3 TEST SET-UP:

Refer to section 6.3 for details.

7.4 MEASUREMENT PROCEDURE:

Refer to section 5.1.1 EBW Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v01

1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
(802.11bgnHT20MHz =200KHz),(802.11Nht40=400KHz)
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.



7.5 MEASUREMENT RESULT:

802.11b

Frequency(MHz)	6dB Bandwidth(MHz)	6dB Bandwidth(KHz)	Result
2412	12.11	>500	PASS
2437	12.11	>500	PASS
2462	12.11	>500	PASS

802.11g

Frequency(MHz)	6dB Bandwidth(MHz)	6dB Bandwidth(KHz)	Result
2412	16.54	>500	PASS
2437	16.54	>500	PASS
2462	16.53	>500	PASS

802.11n HT20

Frequency(MHz)	6dB Bandwidth(MHz)	6dB Bandwidth(KHz)	Result
2412	16.90	>500	PASS
2437	17.66	>500	PASS
2462	17.64	>500	PASS

802.11n HT40

Frequency(MHz)	6dB Bandwidth(MHz)	6dB Bandwidth(KHz)	Result
2422	36.39	>500	PASS
2437	36.38	>500	PASS
2452	36.38	>500	PASS

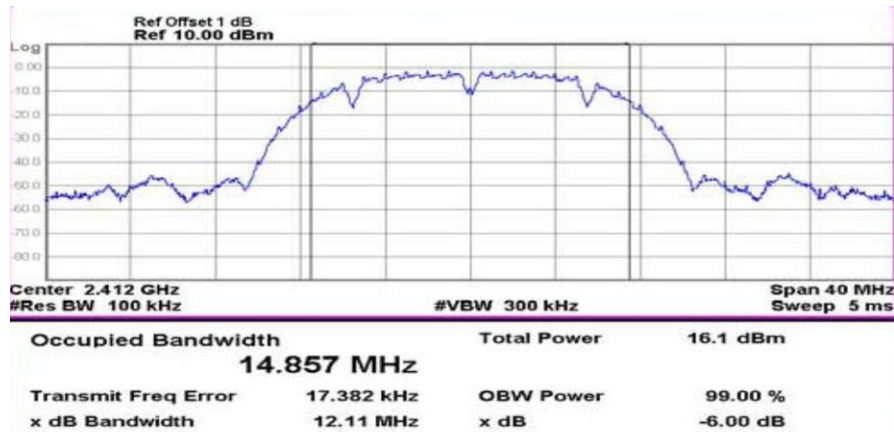
Note: Refer to next page for plots



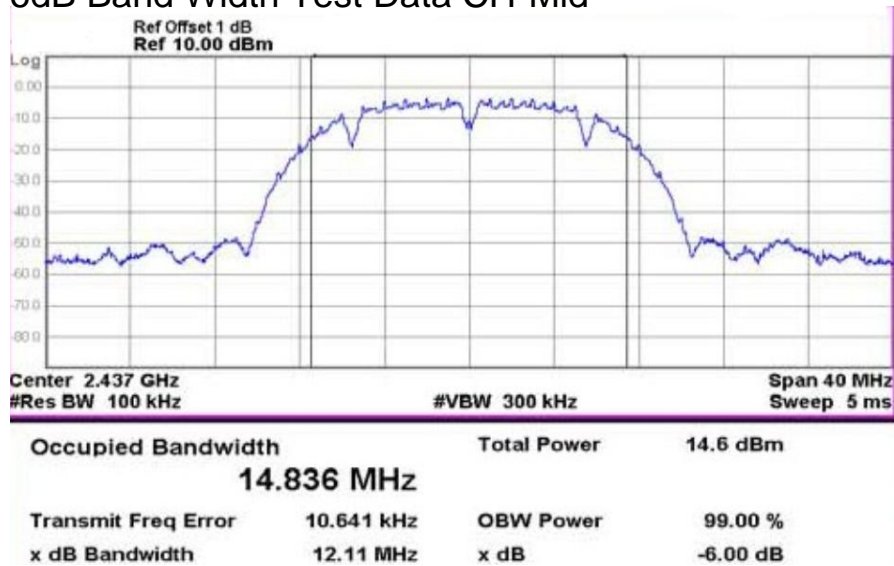
7.6 TEST DATA:

802.11b

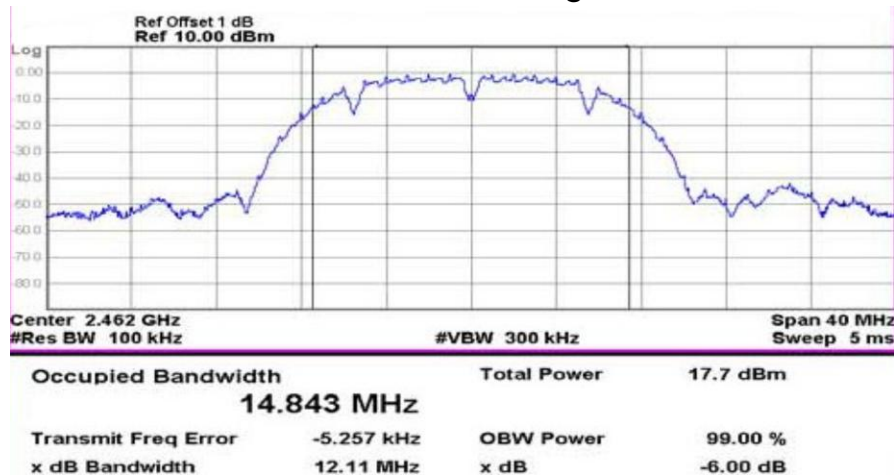
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



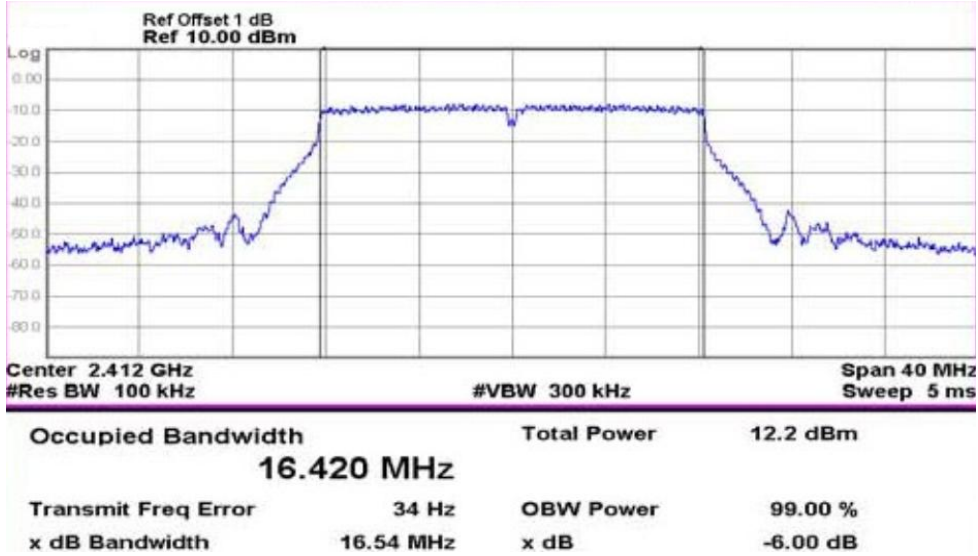
6dB Band Width Test Data CH-High



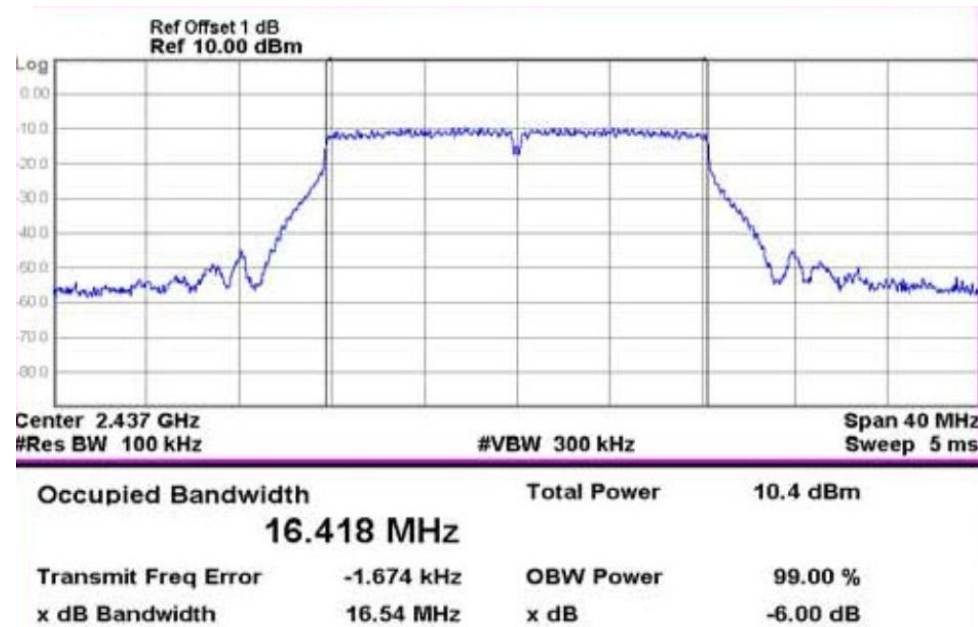


802.11g

6dB Band Width Test Data CH-Low

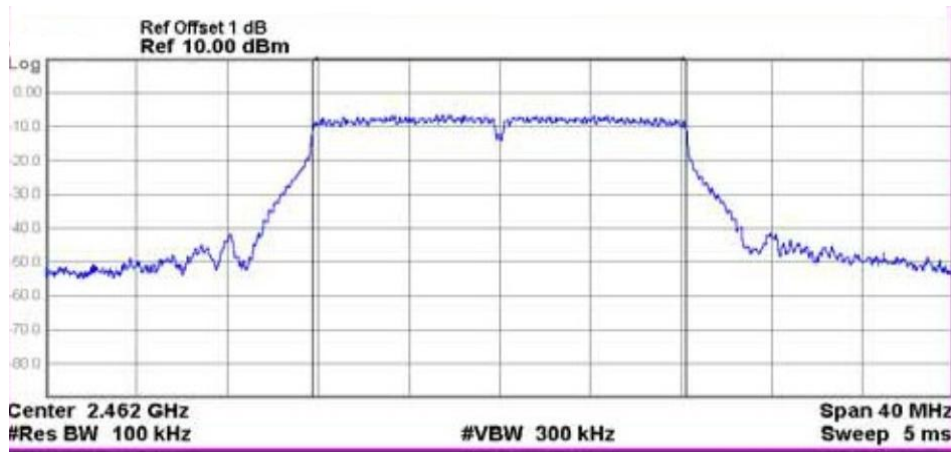


6dB Band Width Test Data CH-Mid





6dB Band Width Test Data CH-High

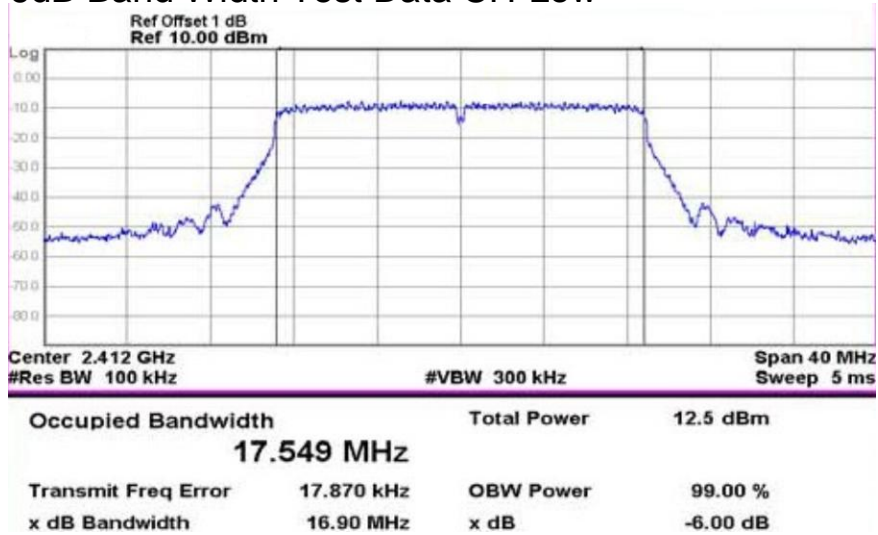


Occupied Bandwidth		Total Power	13.6 dBm
	16.422 MHz		
Transmit Freq Error	-6.798 kHz	OBW Power	99.00 %
x dB Bandwidth	16.53 MHz	x dB	-6.00 dB

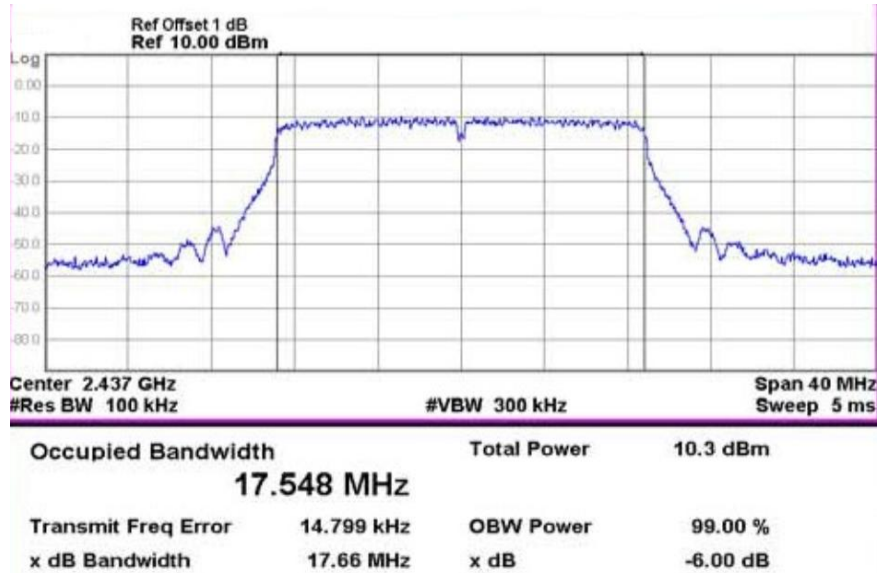


802.11n_20M

6dB Band Width Test Data CH-Low

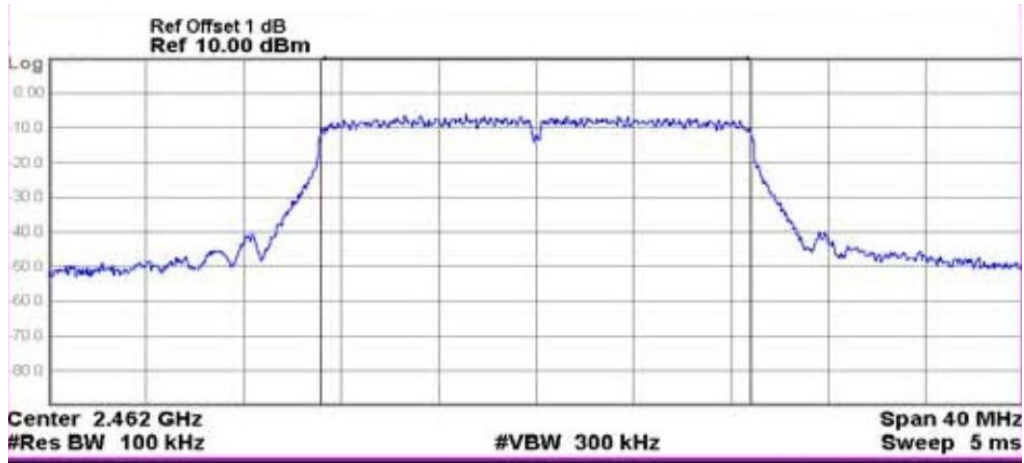


6dB Band Width Test Data CH-Mid





6dB Band Width Test Data CH-High

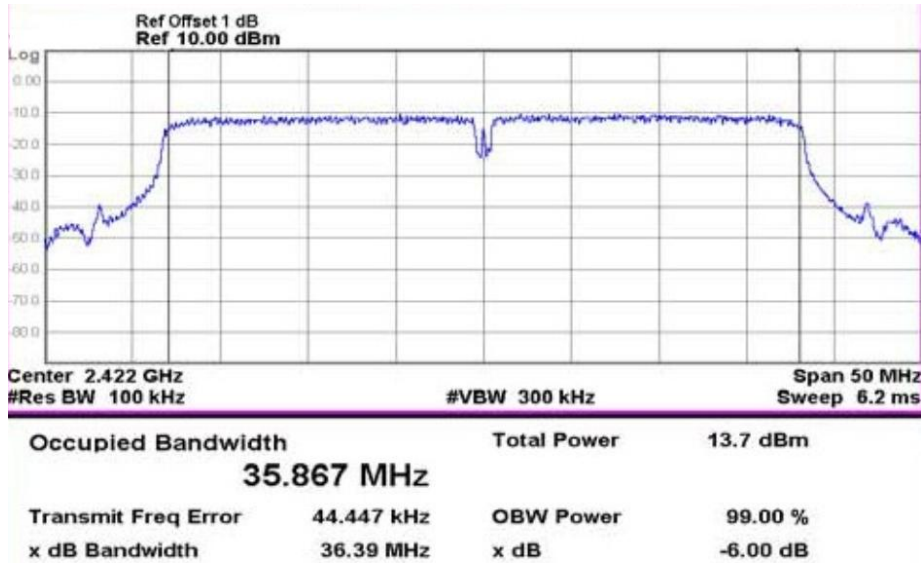


Occupied Bandwidth		Total Power	13.1 dBm
	17.554 MHz		
Transmit Freq Error	11.061 kHz	OBW Power	99.00 %
x dB Bandwidth	17.64 MHz	x dB	-6.00 dB

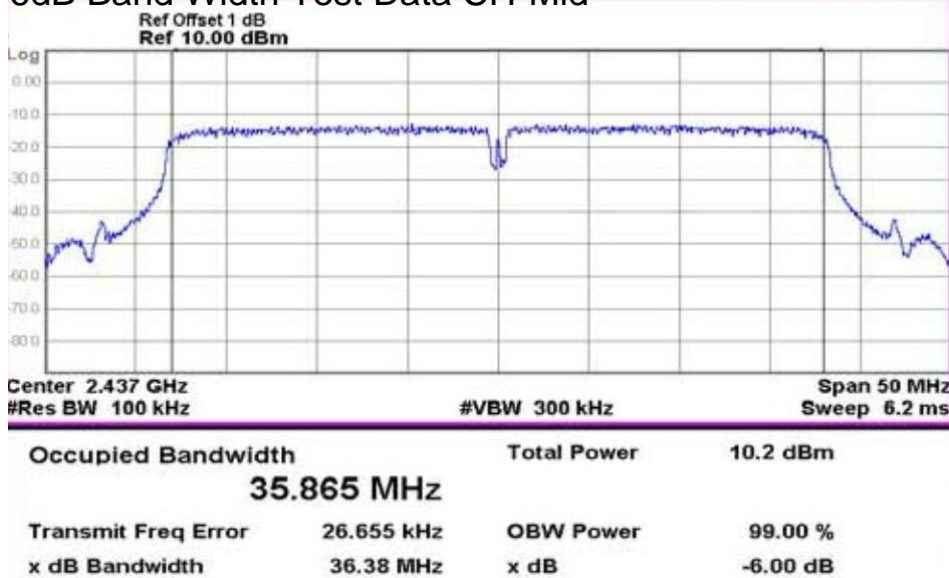


802.11n_40M

6dB Band Width Test Data CH-Low

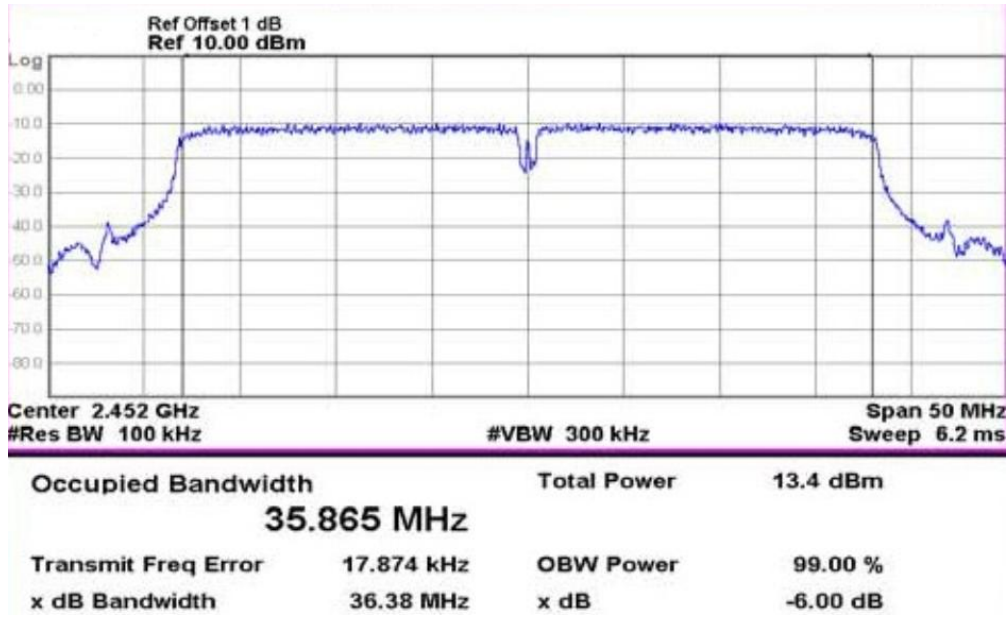


6dB Band Width Test Data CH-Mid





6dB Band Width Test Data CH-High





8 100KHZ BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 STANDARD APPLICABLE:

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 re-stricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

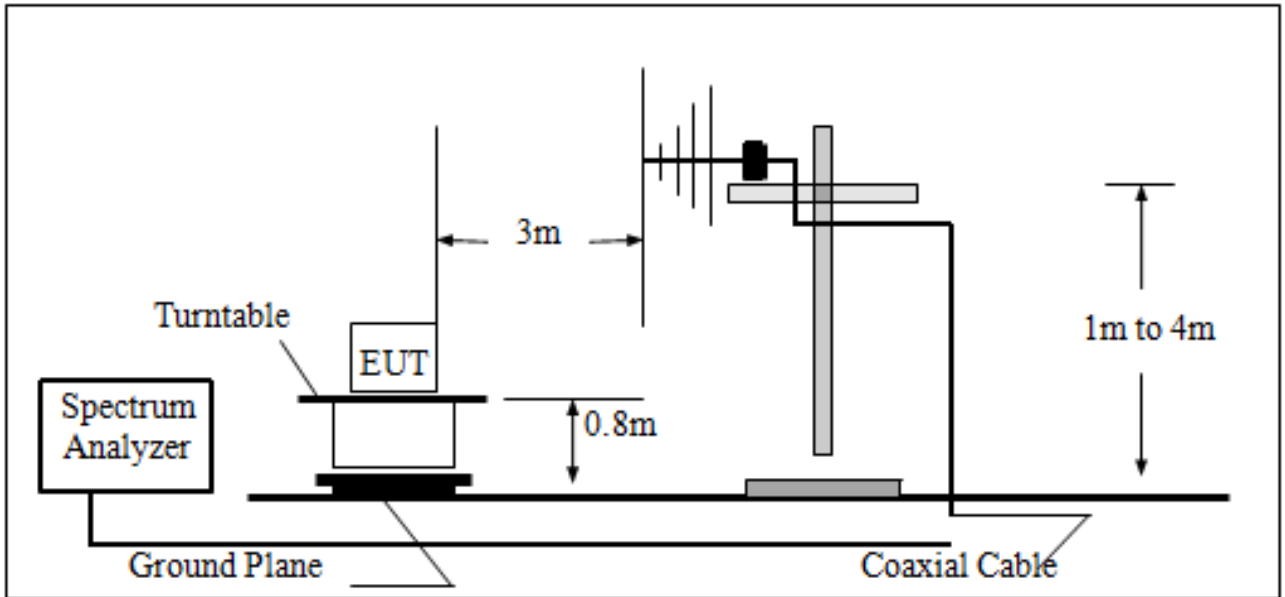
8.2 TEST SET-UP:

8.2.1 Conducted Emission at antenna port:

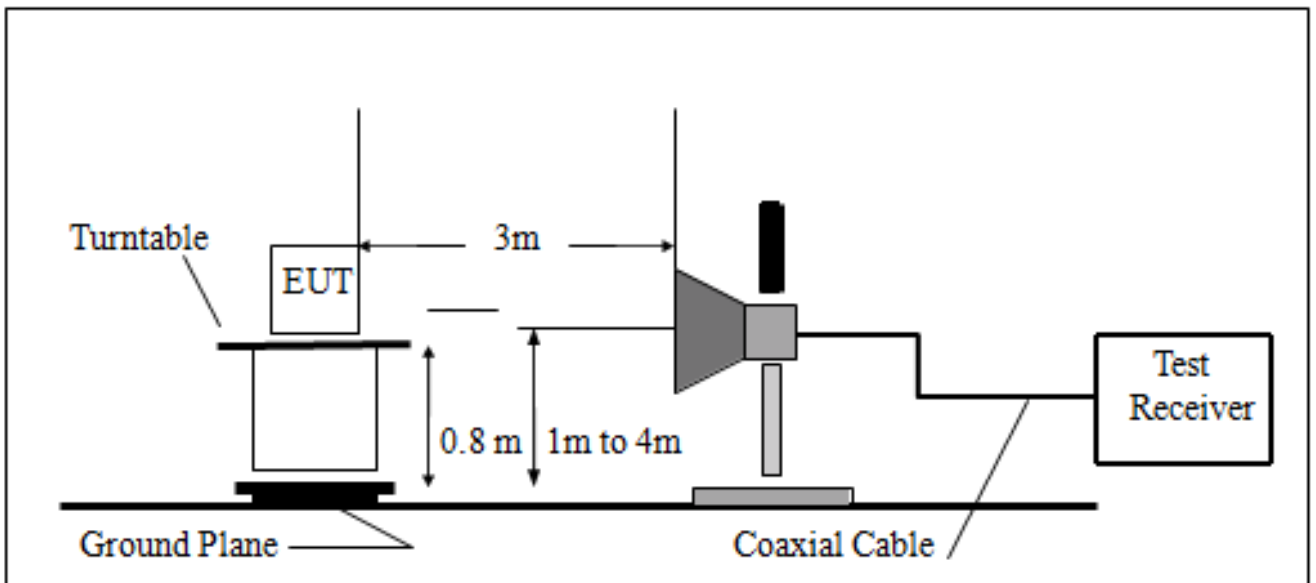
Refer to section 6.3 for details.

8.2.2 Radiated emission:

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



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz





8.3 MEASUREMENT PROCEDURE:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

Refer to section 5.4.2 and 5.4.2.2.4 Band-Edge Measurements of KDB Document:
558074 D01 DTS Meas Guidance v01

The measurement of unwanted emissions at the edge of the authorized frequency bands can be complicated by the leakage of RF energy from the fundamental emission into the RBW passband. Thus, for measurements at the band edges, a narrower resolution bandwidth (no less than 10 kHz) can be used within the first 1 MHz beyond the fundamental emission, provided that that measured energy is subsequently integrated over the appropriate reference bandwidth (i.e., 100 kHz or 1 MHz). This integration can be performed using the band power function of the spectrum analyzer or by summing the spectral levels (in linear power units) over the appropriate reference bandwidth.

8.4 FIELD STRENGTH CALCULATION:

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

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

8.5 MEASUREMENT RESULT:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.



8.6 TEST DATA:

802.11b

Band Edges Test Data CH-Low

Band Edges Test Data CH-High



Radiated Emission: 802.11 b mode (worst case)

Operation Mode: TX CH Low
Fundamental Frequency: 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2386.64	17.06	31.21	48.27	54.00	-5.73	Average	VERTICAL
2	2386.64	30.04	31.21	61.25	74.00	-12.75	Peak	VERTICAL
3	2390.00	17.85	31.21	49.06	54.00	-4.94	Average	VERTICAL
4	2390.00	28.62	31.21	59.83	74.00	-14.17	Peak	VERTICAL
1	2350.72	15.07	31.14	46.21	54.00	-7.79	Average	HONRIONAL
2	2350.72	28.74	31.14	59.88	74.00	-14.12	Peak	HONRIONAL
3	2390.00	15.57	31.21	46.78	54.00	-7.22	Average	HONRIONAL
4	2390.00	28.12	31.21	59.33	74.00	-14.67	Peak	HONRIONAL

Operation Mode: TX CH High
Fundamental Frequency: 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	16.86	31.38	48.24	54.00	-5.76	Average	VERTICAL
2	2483.50	27.89	31.38	59.27	74.00	-14.73	Peak	VERTICAL
3	2485.37	16.99	31.39	48.38	54.00	-5.62	Average	VERTICAL
4	2485.37	29.82	31.39	61.21	74.00	-12.79	Peak	VERTICAL
1	2483.50	15.15	31.38	46.53	54.00	-7.47	Average	HONRIONAL
2	2483.50	27.07	31.38	58.45	74.00	-15.55	Peak	HONRIONAL
3	2489.14	15.08	31.39	46.47	54.00	-7.53	Average	HONRIONAL
4	2489.14	28.56	31.39	59.95	74.00	-14.05	Peak	HONRIONAL

Remark:

1. Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
5. Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



802.11g

Band Edges Test Data CH-Low

Band Edges Test Data CH-High



Radiated Emission: 802.11 g mode (worst case)

Operation Mode: TX CH Low
Fundamental Frequency: 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2390.00	18.13	31.21	49.34	54.00	-4.66	Average	VERTICAL
2	2390.00	32.48	31.21	63.69	74.00	-10.31	Peak	VERTICAL
1	2330.94	15.13	31.11	46.24	54.00	-7.76	Average	HONRIONAL
2	2330.94	28.73	31.11	59.84	74.00	-14.16	Peak	HONRIONAL
3	2390.00	16.07	31.21	47.28	54.00	-6.72	Average	HONRIONAL
4	2390.00	26.97	31.21	58.18	74.00	-15.82	Peak	HONRIONAL

Operation Mode: TX CH High
Fundamental Frequency: 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	20.11	31.38	51.49	54.00	-2.51	Average	VERTICAL
2	2483.50	30.59	31.38	61.97	74.00	-12.03	Peak	VERTICAL
3	2485.37	19.78	31.38	51.16	54.00	-2.84	Average	VERTICAL
4	2485.37	33.42	31.38	64.80	74.00	-9.20	Peak	VERTICAL
1	2483.50	17.33	31.38	48.71	54.00	-5.29	Average	HONRIONAL
2	2483.50	28.11	31.38	59.49	74.00	-14.51	Peak	HONRIONAL

Remark:

1. Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3. Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
5. Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



802.11n_20M

Band Edges Test Data CH-Low

Band Edges Test Data CH-High



Radiated Emission: 802.11 n_20M mode (worst case)

Operation Mode: TX CH Low
Fundamental Frequency: 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2390.00	20.02	31.21	51.23	54.00	-2.77	Average	VERTICAL
2	2390.00	36.65	31.21	67.86	74.00	-6.14	Peak	VERTICAL
1	2330.94	17.43	31.21	48.64	54.00	-5.36	Average	HONRIONAL
2	2330.94	30.30	31.21	61.51	74.00	-12.49	Peak	HONRIONAL

Operation Mode: TX CH High
Fundamental Frequency: 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	17.61	31.38	48.99	54.00	-5.01	Average	VERTICAL
2	2483.50	32.88	31.38	64.26	74.00	-9.74	Peak	VERTICAL
1	2483.50	16.57	31.38	47.95	54.00	-6.05	Average	HONRIONAL
2	2483.50	26.84	31.38	58.22	74.00	-15.78	Peak	HONRIONAL
3	2484.05	18.36	31.38	49.74	54.00	-4.26	Average	HONRIONAL
4	2484.05	28.49	31.38	59.87	74.00	-14.13	Peak	HONRIONAL

Remark:

1. Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3. Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
5. Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



802.11n_40M

Band Edges Test Data CH-Low

Band Edges Test Data CH-High



Radiated Emission: 802.11 n_40M mode (worst case)

Operation Mode: TX CH Low
Fundamental Frequency: 2422MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2388.98	21.39	31.21	52.60	54.00	-1.40	Average	VERTICAL
2	2388.98	38.30	31.21	69.51	74.00	-4.49	Peak	VERTICAL
3	2390.00	21.79	31.21	53.00	54.00	-1.00	Average	VERTICAL
4	2390.00	37.01	31.21	68.22	74.00	-5.78	Peak	VERTICAL
1	2386.14	16.76	31.21	47.97	54.00	-6.03	Average	HONRIONAL
2	2386.14	30.47	31.21	61.68	74.00	-12.32	Peak	HONRIONAL
3	2390.00	17.27	31.21	48.48	54.00	-5.52	Average	HONRIONAL
4	2390.00	28.89	31.21	60.10	74.00	-13.90	Peak	HONRIONAL

Operation Mode: TX CH High
Fundamental Frequency: 2452MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2483.50	21.36	31.38	52.74	54.00	-1.26	Average	VERTICAL
2	2483.50	35.86	31.38	67.24	74.00	-6.76	Peak	VERTICAL
3	2487.88	21.14	31.39	52.53	54.00	-1.47	Average	VERTICAL
4	2487.88	38.42	31.39	69.81	74.00	-4.19	Peak	VERTICAL
1	2483.50	18.03	31.38	49.41	54.00	-4.59	Average	HONRIONAL
2	2483.50	29.15	31.38	60.53	74.00	-13.47	Peak	HONRIONAL
3	2487.96	20.27	31.39	51.66	54.00	-2.34	Average	HONRIONAL
4	2487.96	31.27	31.39	62.66	74.00	-11.34	Peak	HONRIONAL

Remark:

1. Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3. Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



9 SPURIOUS RADIATED EMISSION TEST

9.1 STANDARD APPLICABLE

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

9.2 MEASUREMENT EQUIPMENT USED:

9.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

9.2.2 Radiated emission:

Refer to section 7.2 for details.

9.3 TEST SET-UP:

9.3.1 Conducted Emission at antenna port:

Refer to section 6.3 for details.

9.3.2 Radiated emission:

Refer to section 7.3 for details.

9.4 MEASUREMENT PROCEDURE:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.



**Refer to section 5.4.2 Unwanted Emissions into Restricted Frequency Bands of KDB
Document: 558074 D01 DTS Meas Guidance v01**



9.5 FIELD STRENGTH CALCULATION

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

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

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

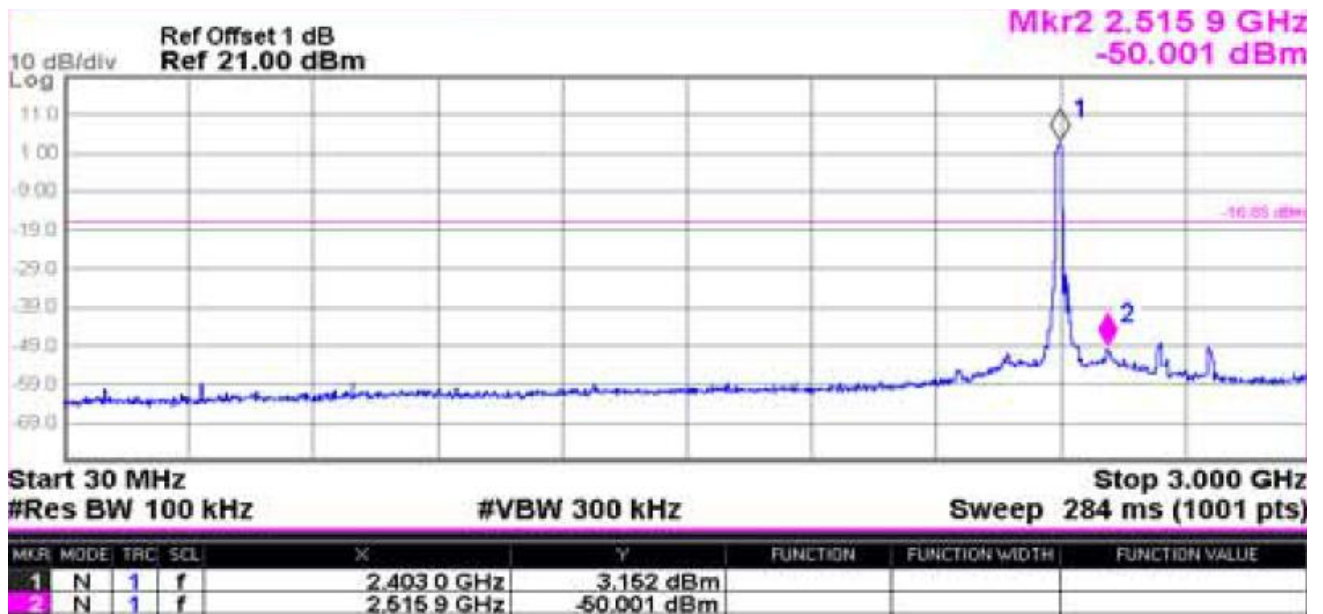
9.6 MEASUREMENT RESULT:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

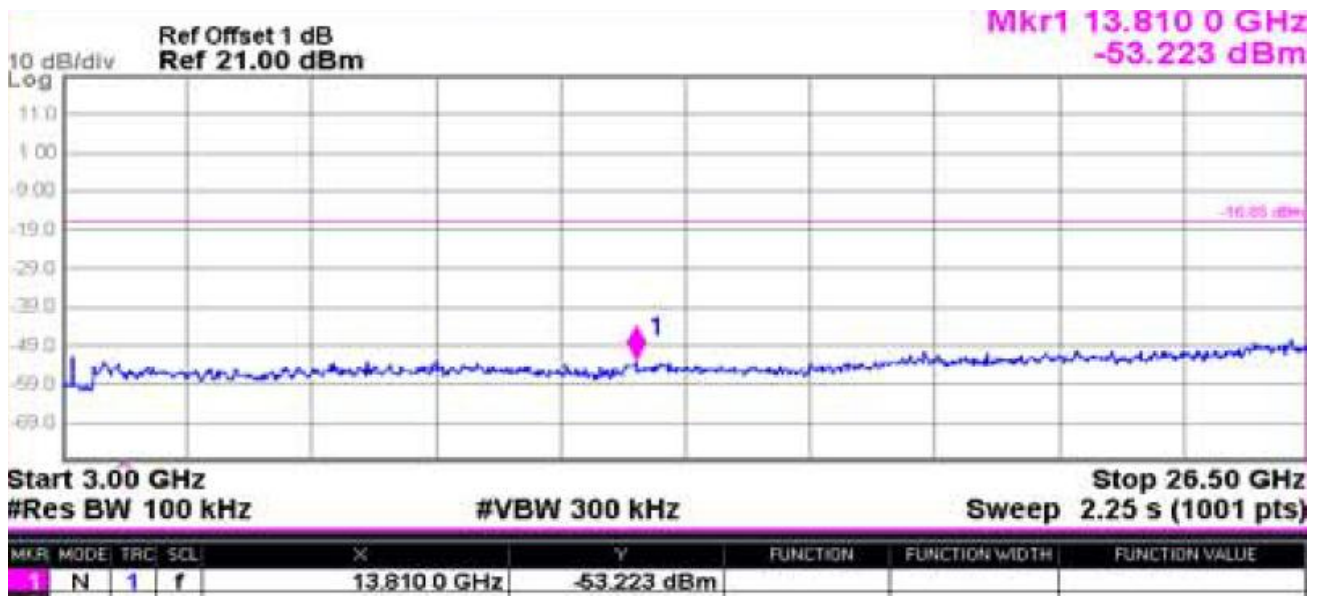


Conducted Spurious Emission Measurement Result (802.11b)

Ch Low 30MHz – 3GHz

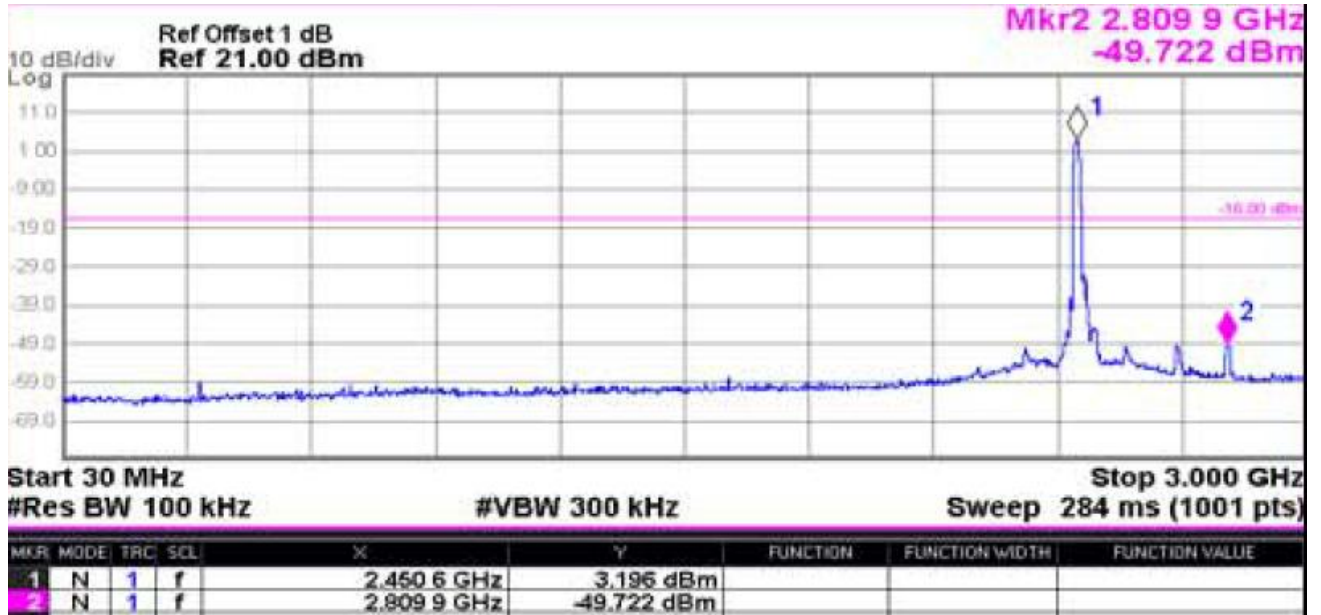


Ch Low 3GHz – 26.5GHz

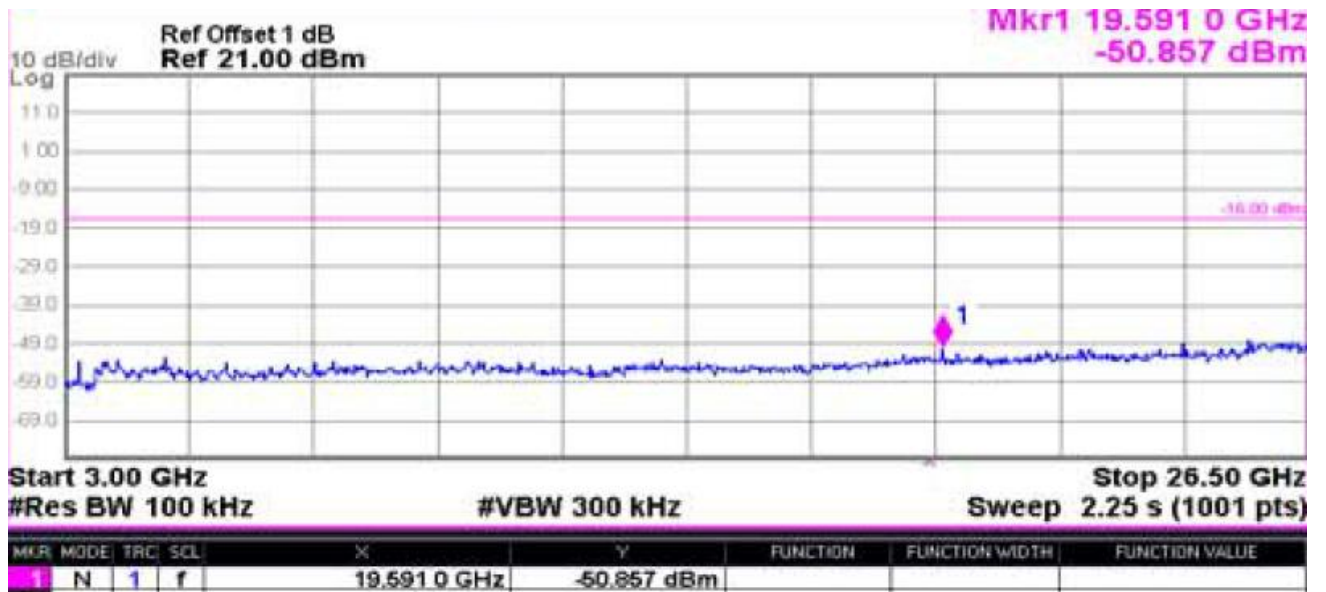




Ch Mid 30MHz – 3GHz

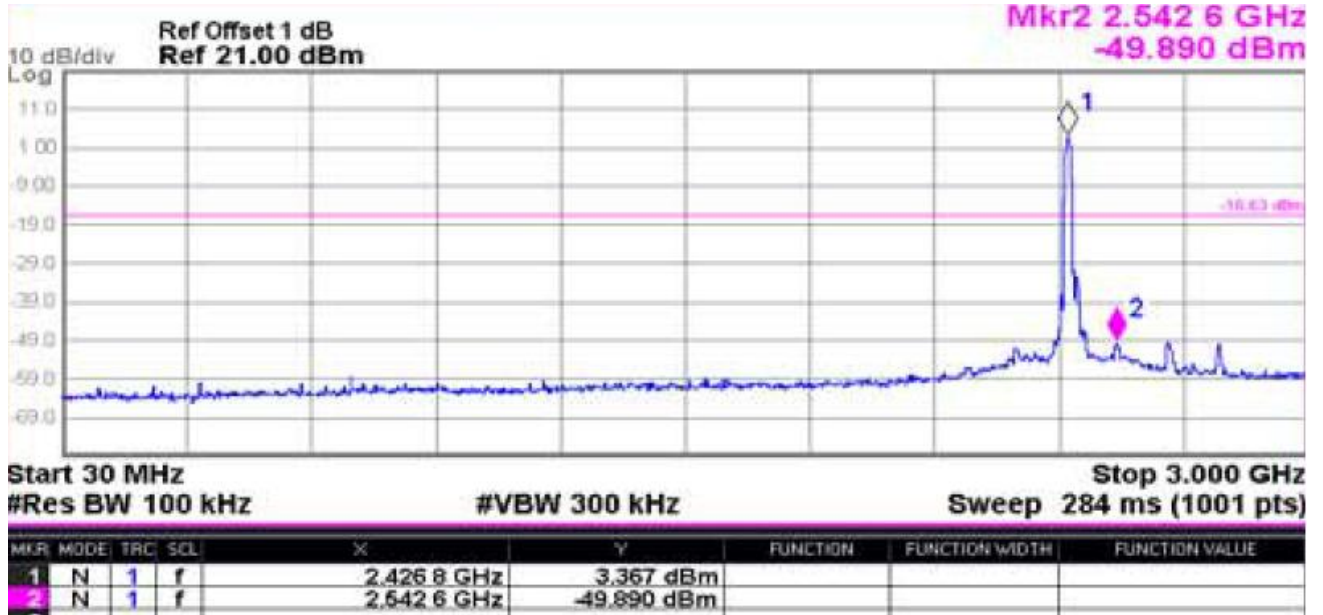


Ch Mid 3GHz – 26.5GHz

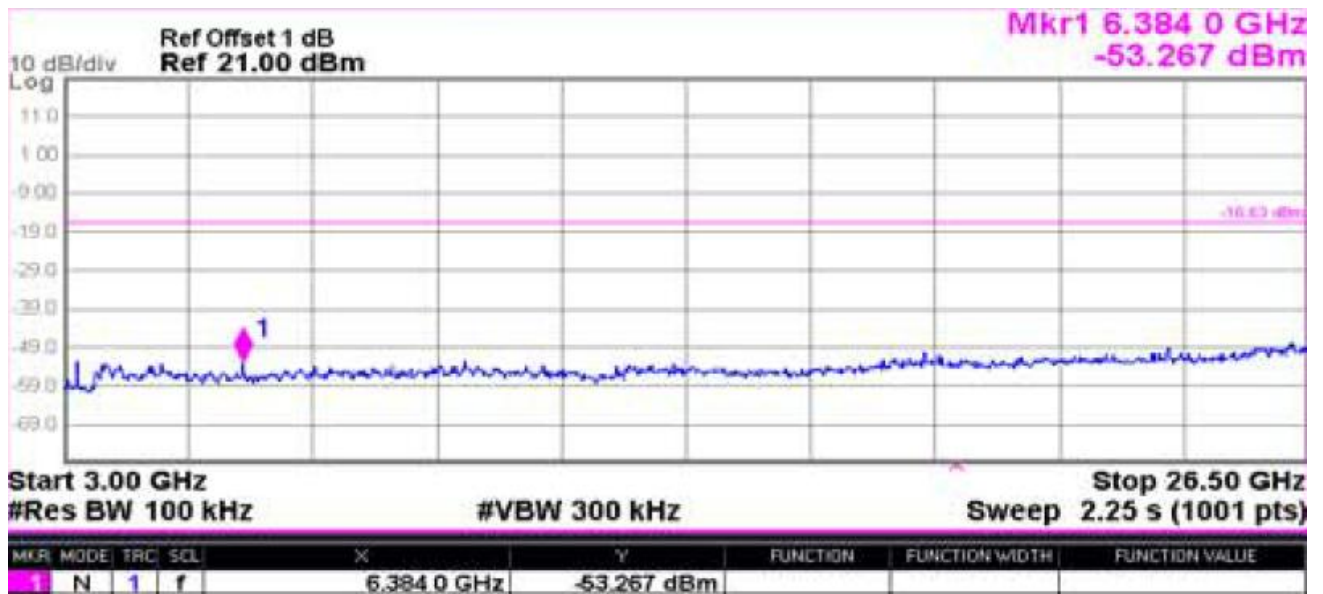




Ch High 30MHz – 3GHz



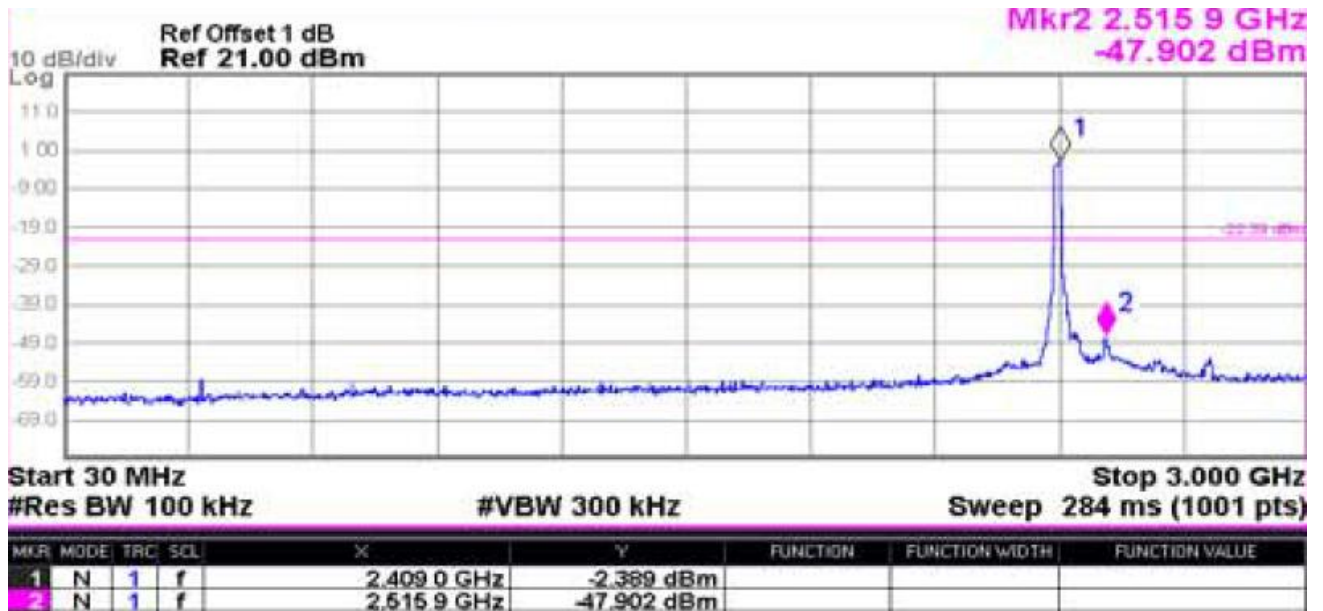
Ch High 3GHz – 26.5GHz



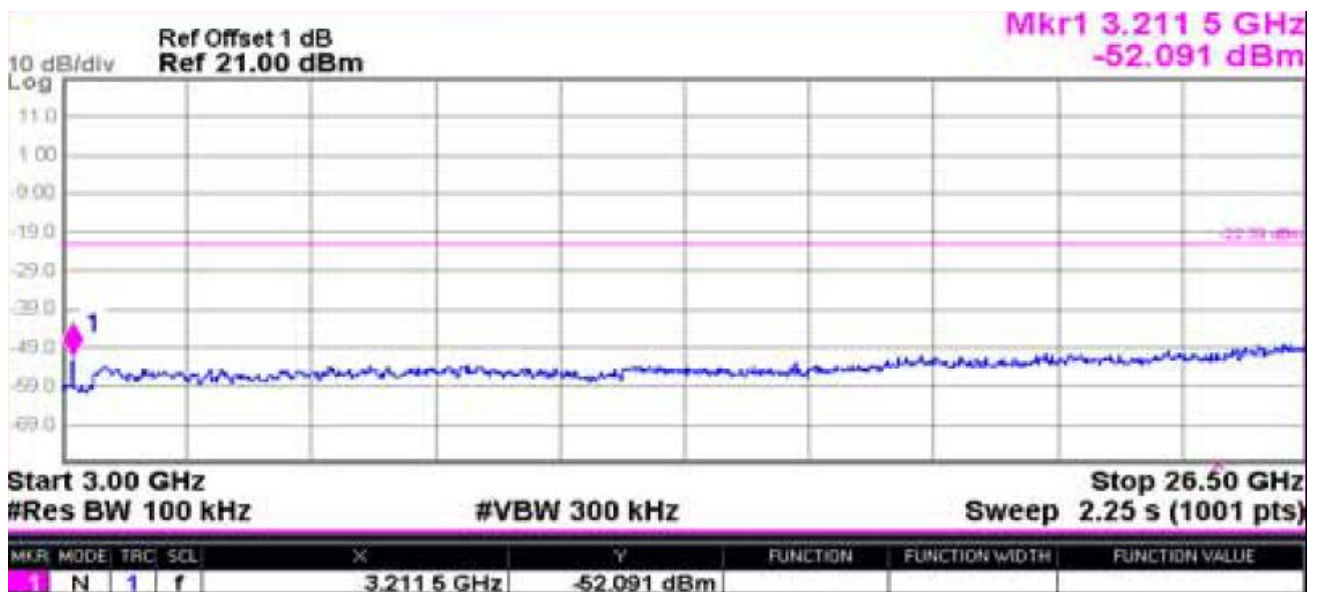


Conducted Spurious Emission Measurement Result (802.11g)

Ch Low 30MHz – 3GHz

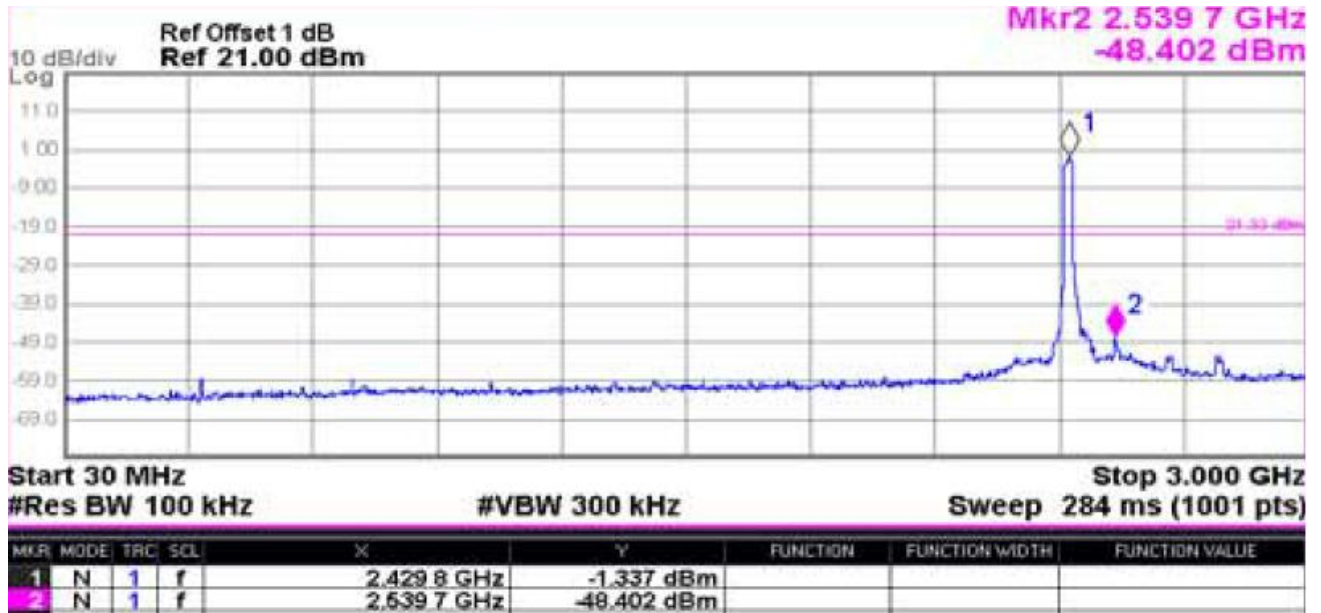


Ch Low 3GHz – 26.5GHz

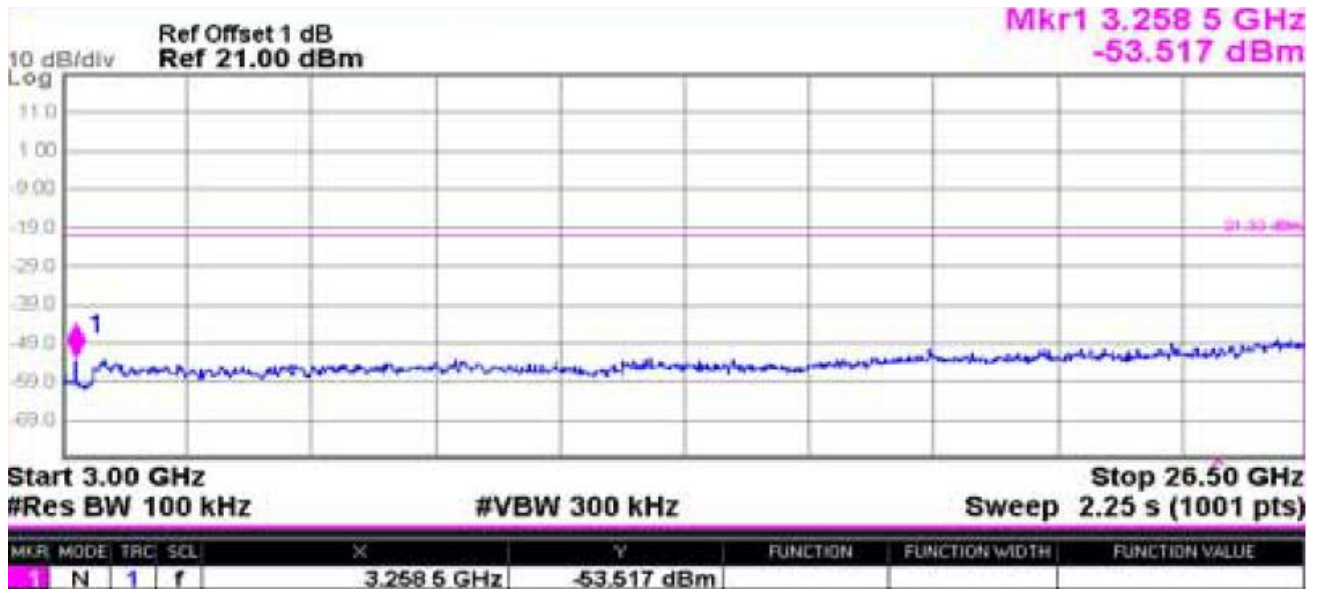




Ch Mid 30MHz – 3GHz

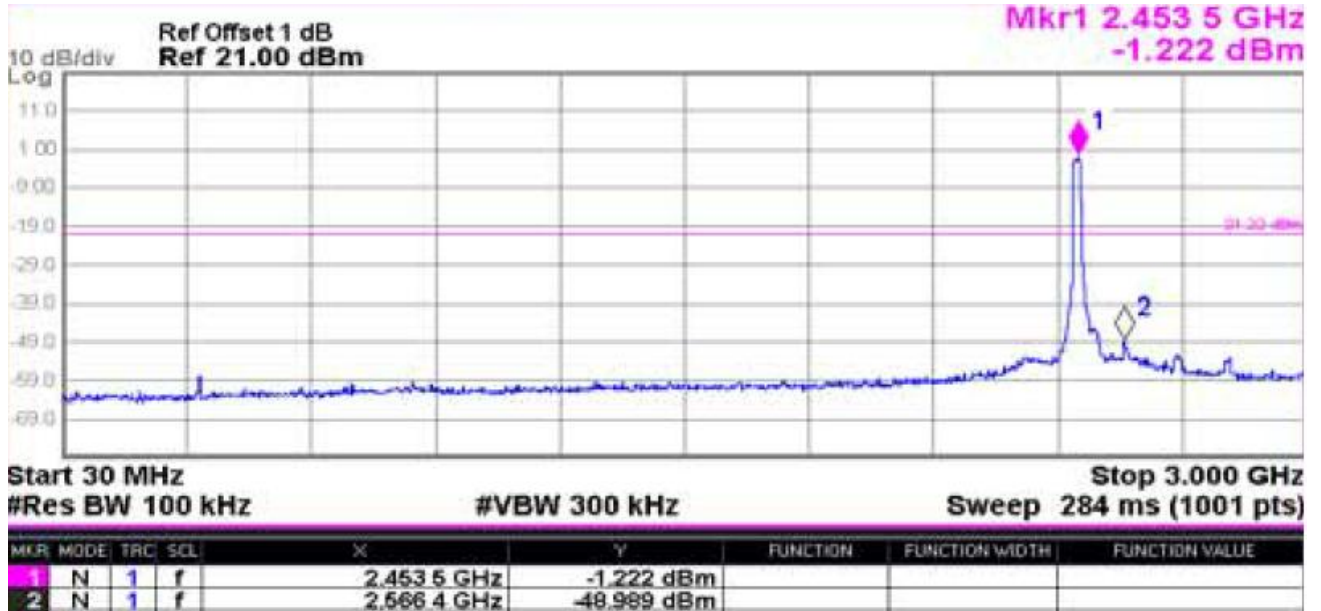


Ch Mid 3GHz – 26.5GHz

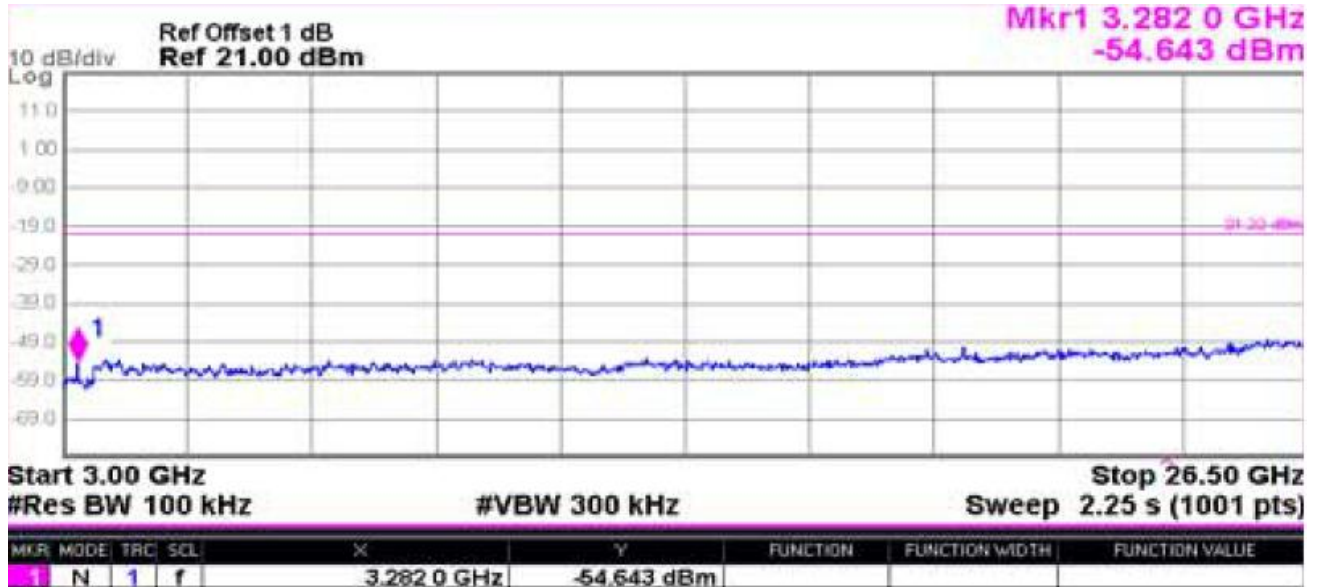




Ch High 30MHz – 3GHz



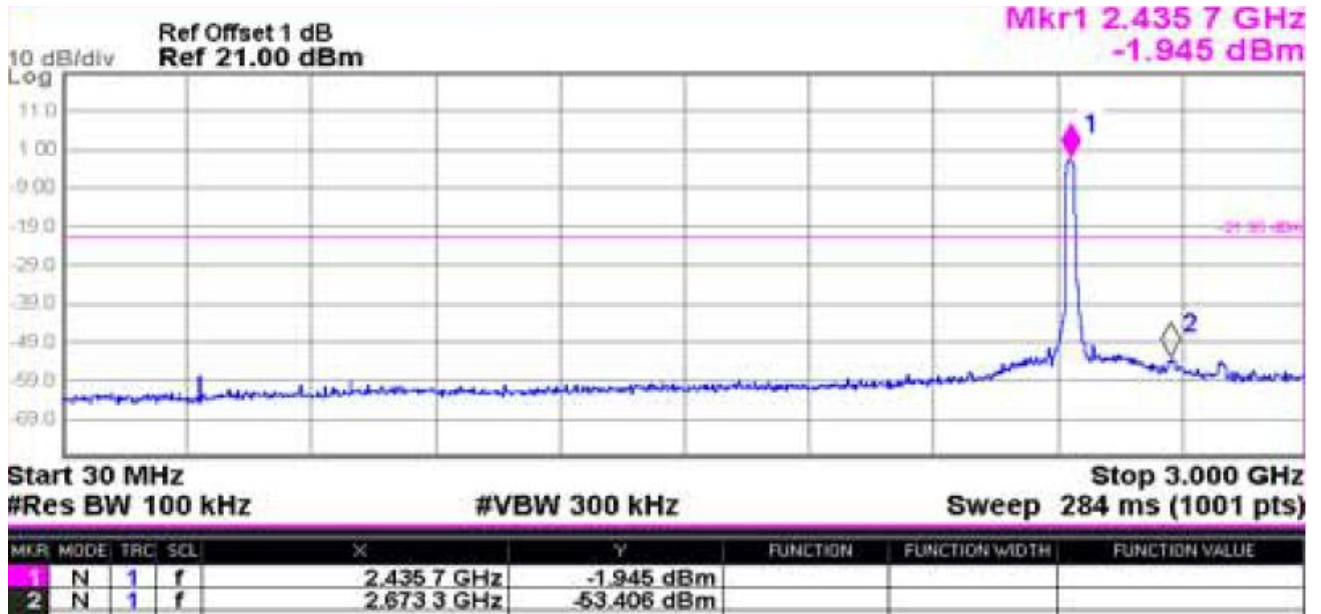
Ch High 3GHz – 26.5GHz



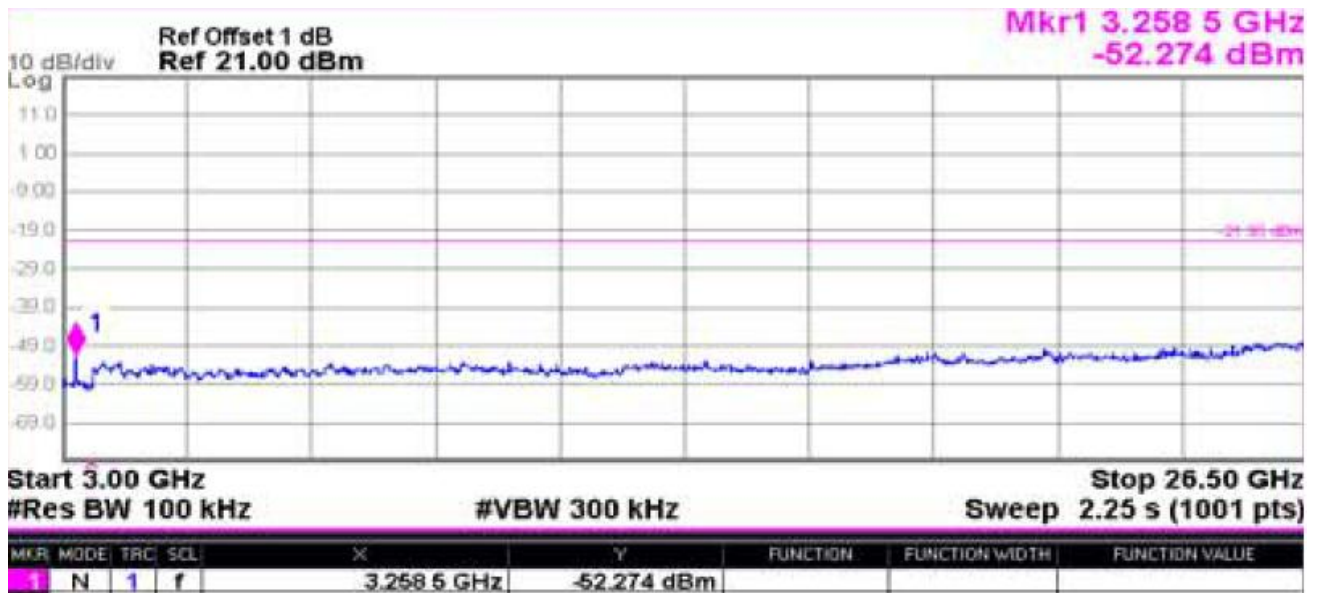


Conducted Spurious Emission Measurement Result (802.11n_20M)

Ch Low 30MHz – 3GHz

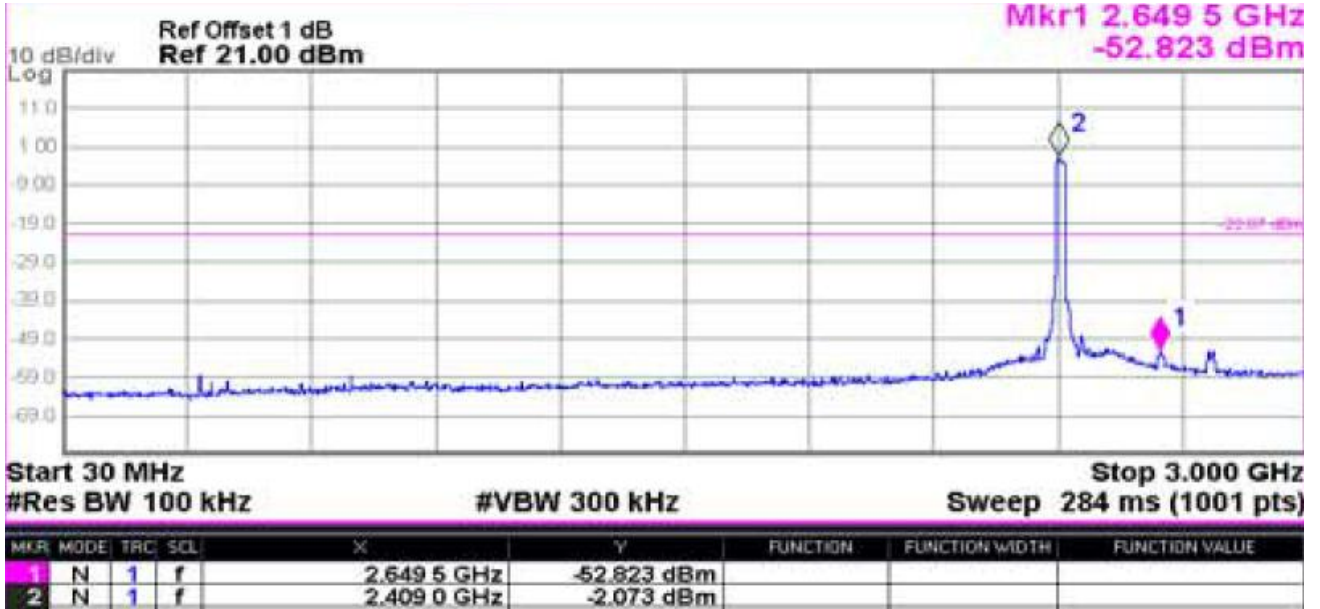


Ch Low 3GHz – 26.5GHz

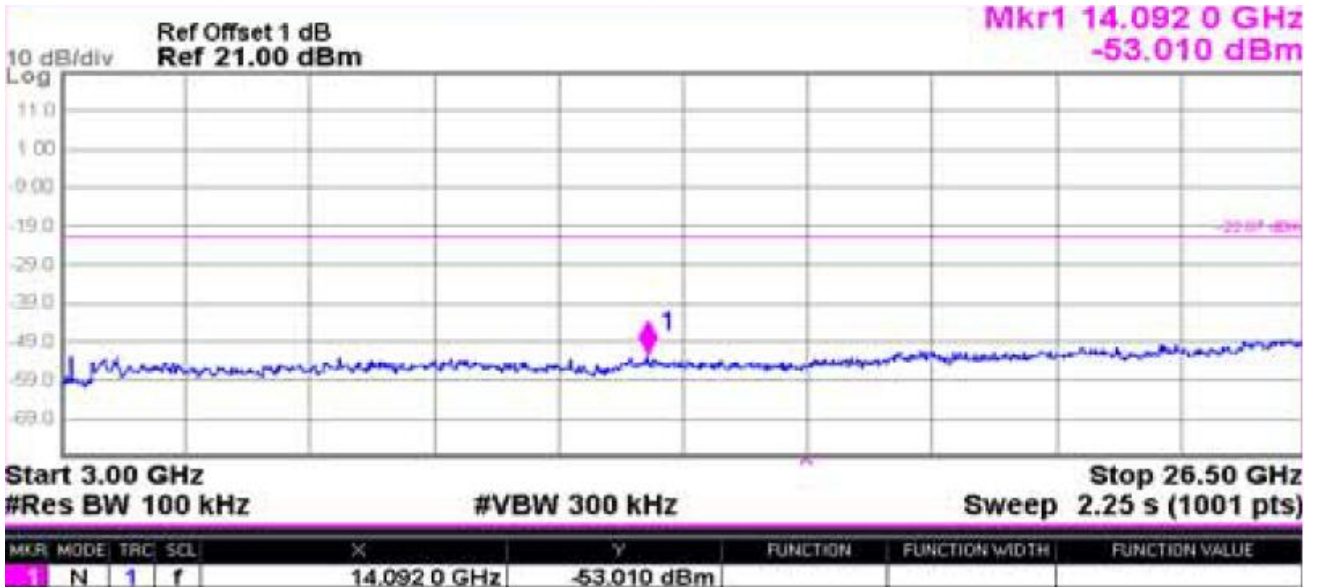




Ch Mid 30MHz – 3GHz

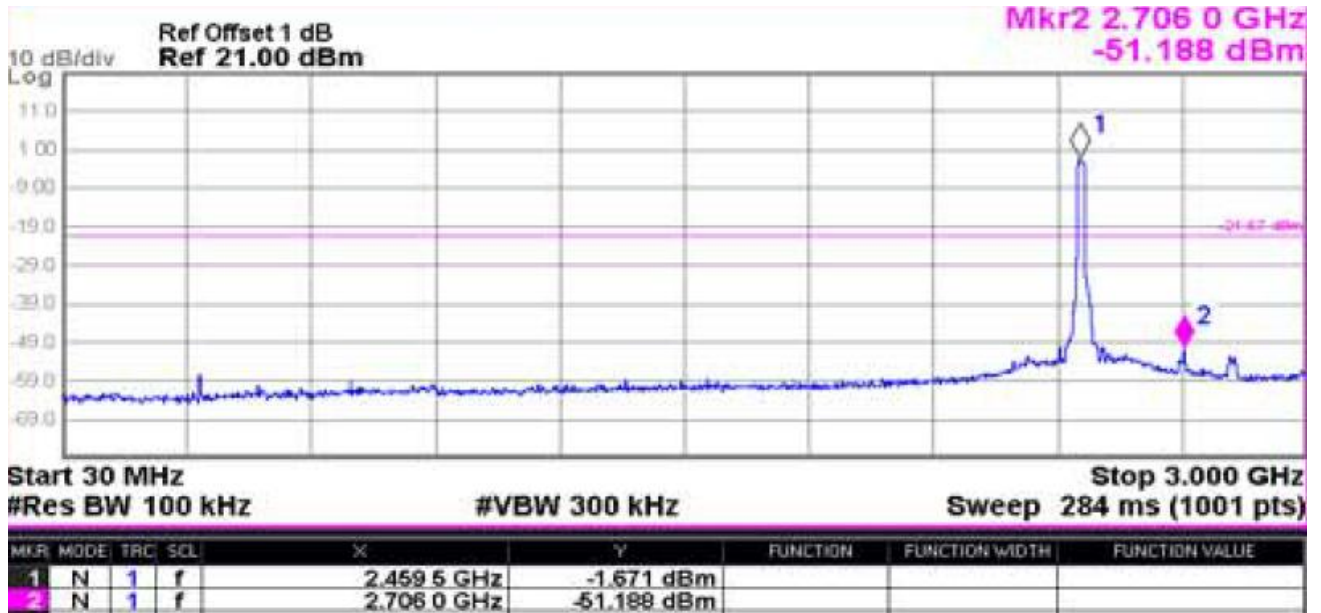


Ch Mid 3GHz – 26.5GHz

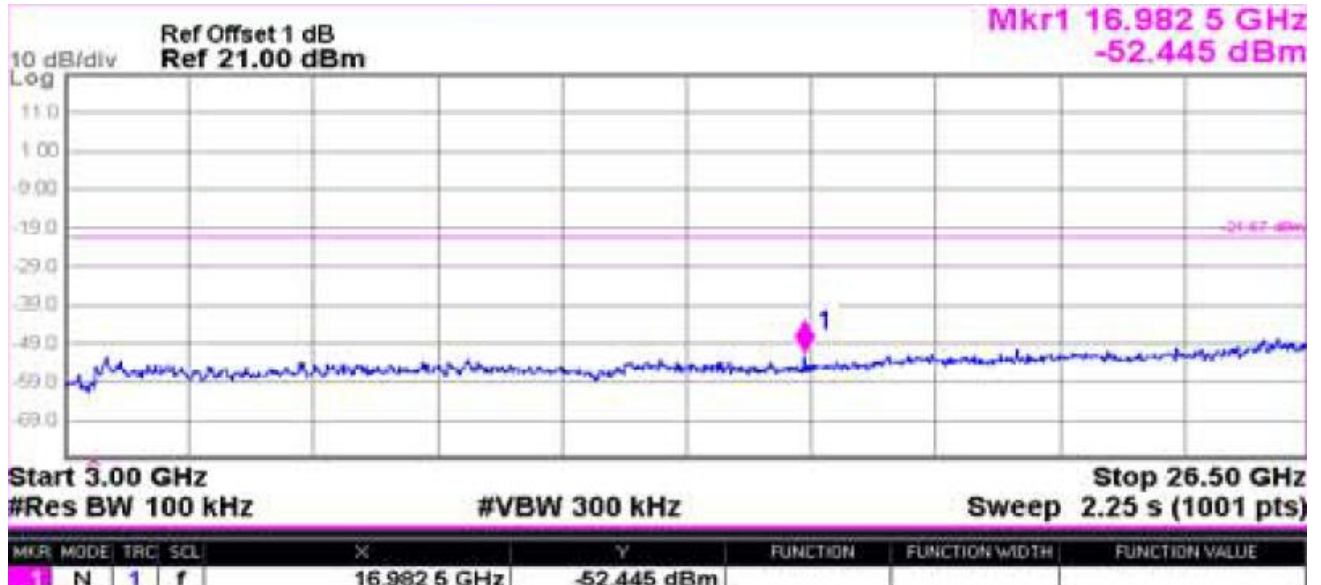




Ch High 30MHz – 3GHz



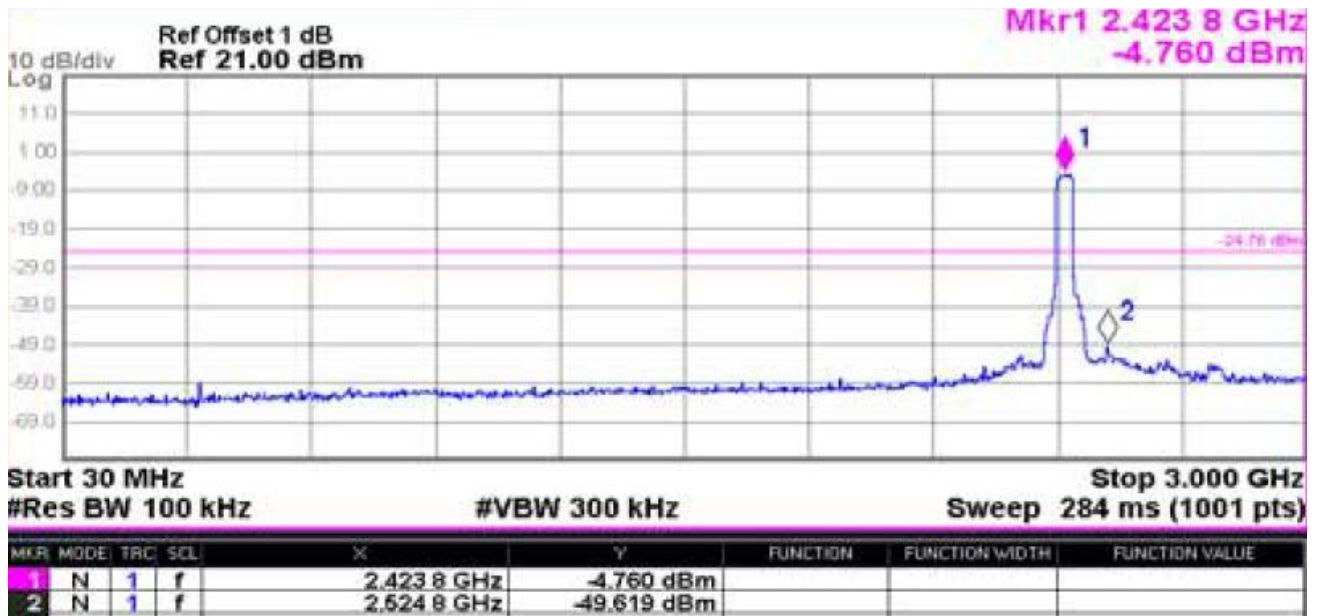
Ch High 3GHz – 26.5GHz



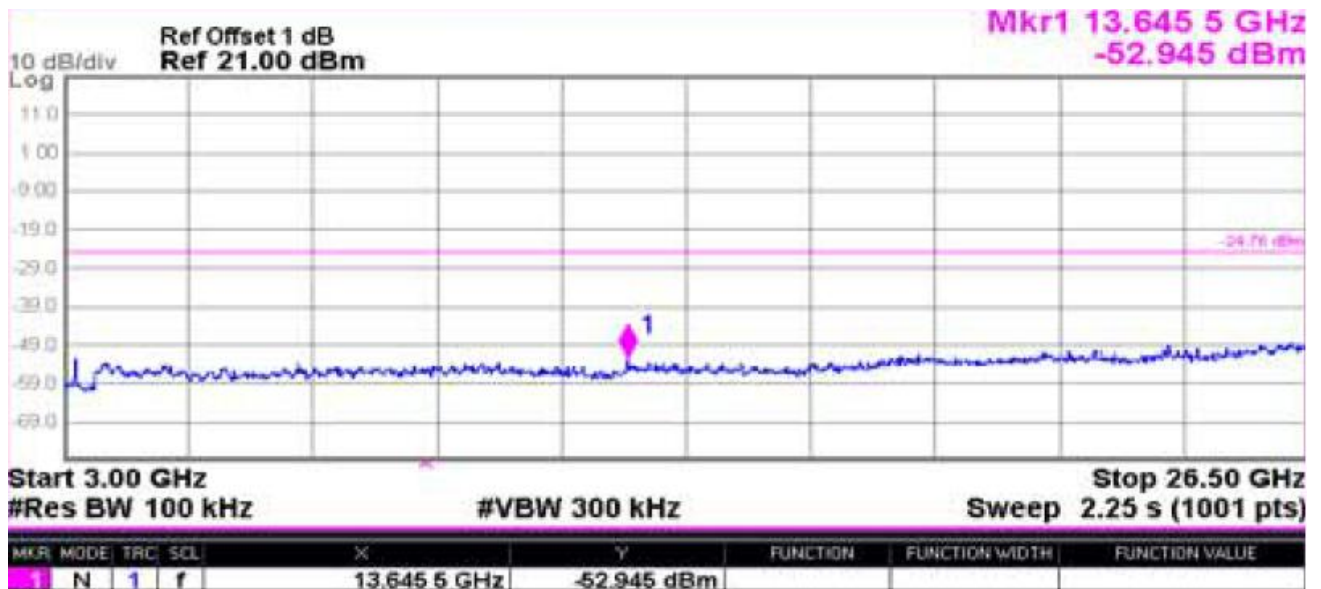


Conducted Spurious Emission Measurement Result (802.11n_40M)

Ch Low 30MHz – 3GHz

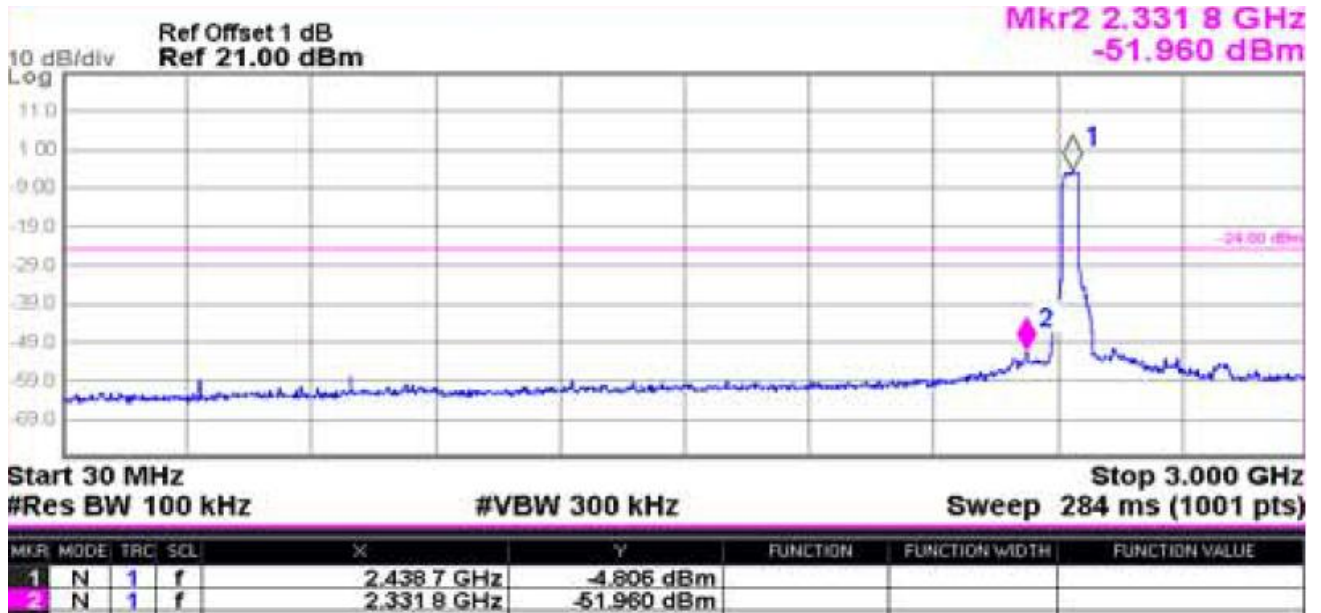


Ch Low 3GHz – 26.5GHz

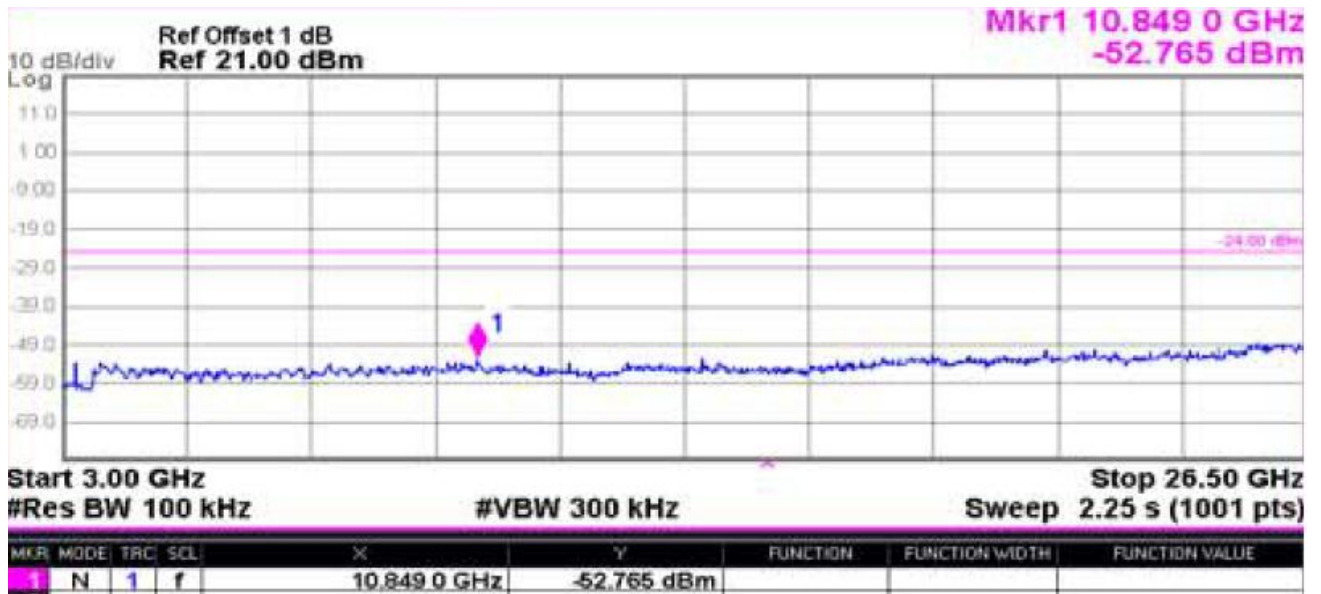




Ch Mid 30MHz – 3GHz

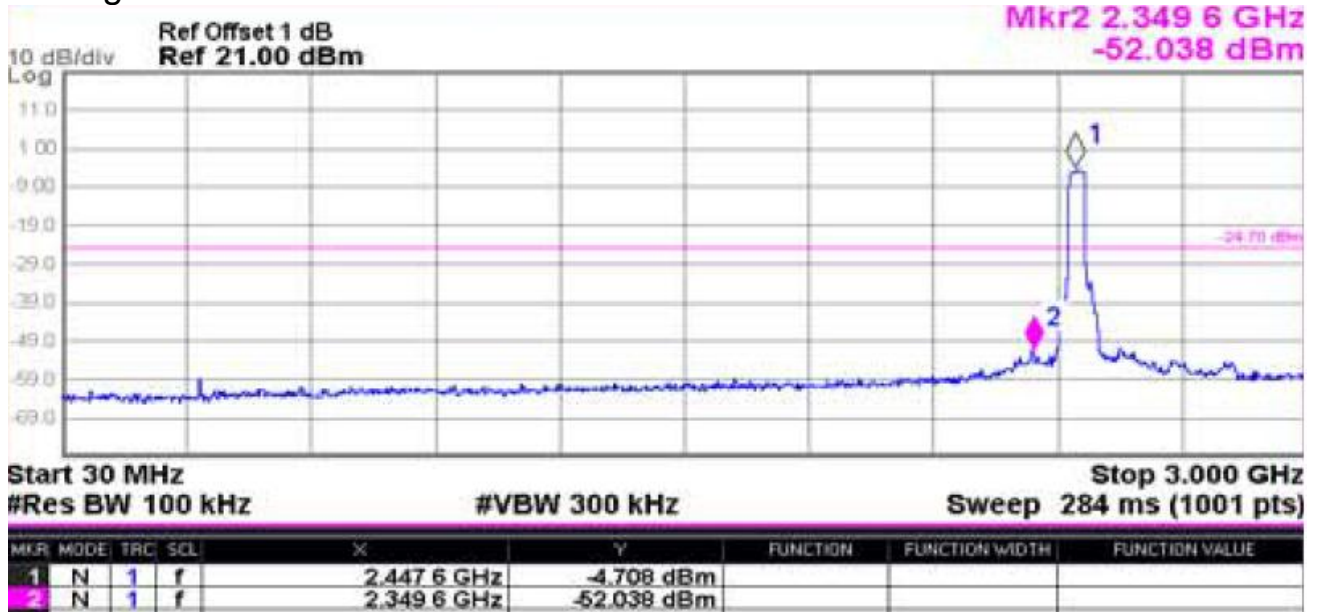


Ch Mid 3GHz – 26.5GHz





Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz





Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11b TX CH Low
Fundamental Frequency 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	63.95	-42.17	-15.26	26.91	40.00	-13.09	Peak	VERTICAL
2	120.21	-15.34	-15.34	26.12	43.50	-17.38	Peak	VERTICAL
3	188.11	-15.74	-15.74	26.25	43.50	-17.25	Peak	VERTICAL
4	250.19	-14.13	-14.13	30.10	46.00	-15.90	Peak	VERTICAL
5	359.80	-11.28	-11.28	33.13	46.00	-12.87	Peak	VERTICAL
6	839.95	-3.06	-3.06	30.36	46.00	-15.64	Peak	VERTICAL
1	186.17	41.14	-15.54	25.60	43.50	-17.90	Peak	HONRIONAL
2	250.19	56.74	-14.13	42.61	46.00	-3.39	Peak	HONRIONAL
3	359.80	48.24	-11.28	36.96	46.00	-9.04	Peak	HONRIONAL
4	500.45	42.77	-9.04	33.73	46.00	-12.27	Peak	HONRIONAL
5	742.95	31.94	-4.04	27.90	46.00	-18.10	Peak	HONRIONAL
6	960.23	40.70	-1.19	39.51	54.00	-14.49	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11b TX CH Mid

Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	120.21	43.61	-15.34	28.27	43.50	-15.23	Peak	VERTICAL
2	188.11	42.76	-15.74	27.02	43.50	-16.48	Peak	VERTICAL
3	359.80	44.94	-11.28	33.66	46.00	-12.34	Peak	VERTICAL
4	500.45	45.89	-9.04	36.85	46.00	-9.15	Peak	VERTICAL
5	839.95	34.42	-3.06	31.36	46.00	-14.64	Peak	VERTICAL
6	874.87	32.31	-2.44	29.87	46.00	-16.13	Peak	VERTICAL
1	184.23	41.38	-15.33	26.05	43.50	-17.45	Peak	HONRIONAL
2	250.19	47.18	-14.13	33.05	46.00	-12.95	Peak	HONRIONAL
3	359.80	51.24	-11.28	39.96	46.00	-6.04	Peak	HONRIONAL
4	500.45	39.26	-9.04	30.22	46.00	-15.78	Peak	HONRIONAL
5	600.36	34.13	-6.74	27.39	46.00	-18.61	Peak	HONRIONAL
6	960.23	37.66	-1.19	36.47	54.00	-17.53	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11b TX CH High

Fundamental Frequency 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	120.21	41.76	-15.34	26.42	43.50	-17.08	Peak	VERTICAL
2	187.14	42.65	-15.64	27.01	43.50	-16.49	Peak	VERTICAL
3	250.19	47.73	-14.13	33.60	46.00	-12.40	Peak	VERTICAL
4	359.80	45.49	-11.28	34.21	46.00	-11.79	Peak	VERTICAL
5	500.45	39.54	-9.04	30.50	46.00	-15.50	Peak	VERTICAL
6	839.95	33.90	-3.06	30.84	46.00	-15.16	Peak	VERTICAL
1	118.27	39.57	-15.54	24.03	43.50	-19.47	Peak	HONRIONAL
2	250.19	45.08	-14.13	30.95	46.00	-15.05	Peak	HONRIONAL
3	359.80	47.95	-11.28	36.67	46.00	-9.33	Peak	HONRIONAL
4	500.45	42.90	-9.04	33.86	46.00	-12.14	Peak	HONRIONAL
5	600.36	35.18	-6.74	28.44	46.00	-17.56	Peak	HONRIONAL
6	960.23	37.05	-1.19	35.86	54.00	-18.14	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11g TX CH Low
Fundamental Frequency 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	120.21	41.86	-15.34	26.52	43.50	-16.98	Peak	VERTICAL
2	188.11	42.43	-15.74	26.69	43.50	-16.81	Peak	VERTICAL
3	250.19	46.43	-14.13	32.30	46.00	-13.70	Peak	VERTICAL
4	359.80	43.17	-11.28	31.89	46.00	-14.11	Peak	VERTICAL
5	500.45	40.29	-9.04	31.25	46.00	-14.75	Peak	VERTICAL
6	839.95	33.46	-3.06	30.40	46.00	-15.60	Peak	VERTICAL
1	118.27	40.42	-15.54	24.88	43.50	-18.62	Peak	HONRIONAL
2	250.19	56.08	-14.13	41.95	46.00	-4.05	Peak	HONRIONAL
3	359.80	49.96	-11.28	38.68	46.00	-7.32	Peak	HONRIONAL
4	500.45	44.31	-9.04	35.27	46.00	-10.73	Peak	HONRIONAL
5	600.36	35.47	-6.74	28.73	46.00	-17.27	Peak	HONRIONAL
6	960.23	36.50	-1.19	35.31	54.00	-18.69	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11g TX CH Mid

Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	62.98	39.27	-15.16	24.11	40.00	-15.89	Peak	VERTICAL
2	120.21	42.54	-15.34	27.20	43.50	-16.30	Peak	VERTICAL
3	188.11	43.60	-15.74	27.86	46.00	-15.64	Peak	VERTICAL
4	359.80	48.14	-11.28	36.86	46.00	-9.14	Peak	VERTICAL
5	500.45	45.11	-9.04	36.07	46.00	-9.93	Peak	VERTICAL
6	839.95	33.96	-3.06	30.90	46.00	-15.10	Peak	VERTICAL
1	186.17	41.14	-15.54	25.60	43.50	-17.90	Peak	HONRIONAL
2	250.19	48.11	-14.13	33.98	46.00	-12.02	Peak	HONRIONAL
3	359.80	49.83	-11.28	38.55	46.00	-7.45	Peak	HONRIONAL
4	500.45	43.69	-9.04	34.65	46.00	-11.35	Peak	HONRIONAL
5	600.36	33.64	-6.74	26.90	46.00	-19.10	Peak	HONRIONAL
6	960.23	38.37	-1.19	37.18	54.00	-16.82	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11g TX CH High

Fundamental Frequency 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	118.27	42.23	-15.54	26.69	43.50	-16.81	Peak	VERTICAL
2	188.11	43.28	-15.74	27.54	43.50	-15.96	Peak	VERTICAL
3	250.19	44.67	-14.13	30.54	46.00	-15.46	Peak	VERTICAL
4	359.80	44.88	-11.28	33.60	46.00	-12.40	Peak	VERTICAL
5	500.45	40.12	-9.04	31.08	46.00	-14.92	Peak	VERTICAL
6	839.95	33.71	-3.06	30.65	46.00	-15.35	Peak	VERTICAL
1	120.21	42.57	-15.34	27.23	43.50	-16.27	Peak	HONRIONAL
2	250.19	56.31	-14.13	42.18	46.00	-3.38	Peak	HONRIONAL
3	359.80	47.89	-11.28	36.61	46.00	-9.39	Peak	HONRIONAL
4	500.45	42.20	-9.04	33.16	46.00	-12.84	Peak	HONRIONAL
5	600.36	35.05	-6.74	28.31	46.00	-17.69	Peak	HONRIONAL
6	960.23	37.38	-1.19	36.19	54.00	-17.81	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11n_20M TX CH Low
Fundamental Frequency 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	118.27	41.50	-15.54	25.96	43.50	-17.54	Peak	VERTICAL
2	187.14	41.51	-15.64	25.87	43.50	-17.63	Peak	VERTICAL
3	359.80	47.23	-11.28	35.95	46.00	-10.05	Peak	VERTICAL
4	500.45	41.34	-9.04	32.30	46.00	-13.70	Peak	VERTICAL
5	600.36	36.56	-6.74	29.82	46.00	-16.18	Peak	VERTICAL
6	960.23	38.27	-1.19	37.08	54.00	-16.92	Peak	VERTICAL
1	250.19	55.99	-14.13	41.86	46.00	-4.14	Peak	HONRIONAL
2	359.80	52.60	-11.28	41.32	46.00	-4.68	Peak	HONRIONAL
3	500.45	49.40	-9.04	40.36	46.00	-5.64	Peak	HONRIONAL
4	600.36	40.16	-6.74	33.42	46.00	-12.58	Peak	HONRIONAL
5	874.87	41.45	-2.44	39.01	46.00	-6.99	Peak	HONRIONAL
6	960.23	40.87	-1.19	39.68	54.00	-14.32	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11n_20M TX CH Mid

Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	250.19	51.34	-14.13	37.21	46.00	-8.79	Peak	VERTICAL
2	359.80	53.43	-11.28	42.15	46.00	-3.85	Peak	VERTICAL
3	514.03	47.09	-8.76	38.33	46.00	-7.67	Peak	VERTICAL
4	668.26	40.52	-5.70	34.82	46.00	-11.18	Peak	VERTICAL
5	740.04	38.14	-4.12	34.02	46.00	-11.98	Peak	VERTICAL
6	960.23	36.58	-1.19	35.39	54.00	-18.61	Peak	VERTICAL
1	250.19	55.65	-14.13	41.52	46.00	-4.48	Peak	HONRIONAL
2	359.80	54.06	-11.28	42.78	46.00	-3.22	Peak	HONRIONAL
3	500.45	51.14	-9.04	42.10	46.00	-3.90	Peak	HONRIONAL
4	600.36	40.77	-6.74	34.03	46.00	-11.97	Peak	HONRIONAL
5	874.87	42.11	-2.44	39.67	46.00	-6.33	Peak	HONRIONAL
6	960.23	41.74	-1.19	40.55	54.00	-13.45	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11n_20M TX CH High

Fundamental Frequency 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	120.21	42.52	-15.34	27.18	43.50	-16.32	Peak	VERTICAL
2	188.11	43.99	-15.74	28.25	43.50	-15.25	Peak	VERTICAL
3	359.80	44.99	-11.28	33.71	46.00	-12.29	Peak	VERTICAL
4	500.45	39.88	-9.04	30.84	46.00	-15.16	Peak	VERTICAL
5	839.95	33.50	-3.06	30.44	46.00	-15.56	Peak	VERTICAL
6	944.71	30.63	-1.33	29.30	46.00	-16.70	Peak	VERTICAL
1	186.17	41.73	-15.54	26.19	43.50	-17.31	Peak	HONRIONAL
2	250.19	56.31	-14.13	42.18	46.00	-3.82	Peak	HONRIONAL
3	359.80	48.93	-11.28	37.65	46.00	-8.35	Peak	HONRIONAL
4	500.45	43.05	-9.04	34.01	46.00	-11.99	Peak	HONRIONAL
5	600.36	33.29	-6.74	26.55	46.00	-19.45	Peak	HONRIONAL
6	960.23	40.83	-1.19	39.64	54.00	-14.36	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11n_40M TX CH Low
Fundamental Frequency 2422MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	187.14	43.60	-15.64	27.96	43.50	-15.54	Peak	VERTICAL
2	250.19	45.28	-14.13	31.15	46.00	-14.85	Peak	VERTICAL
3	359.80	45.59	-11.28	34.31	46.00	-11.69	Peak	VERTICAL
4	445.16	39.52	-9.60	29.92	46.00	-16.08	Peak	VERTICAL
5	500.45	40.23	-9.04	31.19	46.00	-14.81	Peak	VERTICAL
6	839.95	34.00	-3.06	30.94	46.00	-15.06	Peak	VERTICAL
1	186.17	42.05	-15.54	26.51	43.50	-16.99	Peak	HONRIONAL
2	250.19	43.23	-14.13	29.10	46.00	-16.90	Peak	HONRIONAL
3	359.80	48.52	-11.28	37.24	46.00	-8.76	Peak	HONRIONAL
4	500.45	42.12	-9.04	33.08	46.00	-12.92	Peak	HONRIONAL
5	816.67	31.86	-3.29	28.57	46.00	-17.43	Peak	HONRIONAL
6	960.23	39.09	-1.19	37.90	54.00	-16.10	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11n_40M TX CH Mid
Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	118.27	41.33	-15.54	25.79	43.50	-17.71	Peak	VERTICAL
2	185.20	41.65	-15.44	26.21	43.50	-17.29	Peak	VERTICAL
3	359.80	43.93	-11.28	32.65	46.00	-13.35	Peak	VERTICAL
4	445.16	37.28	-9.60	27.68	46.00	-18.32	Peak	VERTICAL
5	500.45	42.94	-9.04	33.90	46.00	-12.10	Peak	VERTICAL
6	839.95	33.84	-3.06	30.78	46.00	-15.22	Peak	VERTICAL
1	185.20	41.24	-15.44	25.80	43.50	-17.70	Peak	HONRIONAL
2	250.19	56.14	-14.13	42.01	46.00	-3.99	Peak	HONRIONAL
3	359.80	50.77	-11.28	39.49	46.00	-6.51	Peak	HONRIONAL
4	500.45	42.95	-9.04	33.91	46.00	-12.09	Peak	HONRIONAL
5	742.95	32.85	-4.04	28.81	46.00	-17.19	Peak	HONRIONAL
6	960.23	38.16	-1.19	36.97	54.00	-17.03	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: 802.11n_40M TX CH High

Fundamental Frequency 2452MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	118.27	41.74	-15.54	26.20	43.50	-17.30	Peak	VERTICAL
2	185.20	43.21	-15.44	27.77	43.50	-15.73	Peak	VERTICAL
3	250.19	41.54	-14.13	27.41	46.00	-18.59	Peak	VERTICAL
4	359.80	44.82	-11.28	33.54	46.00	-12.46	Peak	VERTICAL
5	500.45	41.16	-9.04	32.12	46.00	-13.88	Peak	VERTICAL
6	839.95	33.79	-3.06	30.73	46.00	-15.27	Peak	VERTICAL
1	185.20	41.24	-15.44	25.80	43.50	-17.70	Peak	HONRIONAL
2	250.19	55.32	-14.13	41.19	46.00	-4.81	Peak	HONRIONAL
3	359.80	49.89	-11.28	38.61	46.00	-7.39	Peak	HONRIONAL
4	500.45	46.48	-9.04	37.44	46.00	-8.56	Peak	HONRIONAL
5	813.76	32.80	-3.33	29.47	46.00	-16.53	Peak	HONRIONAL
6	960.23	37.79	-1.19	36.60	54.00	-17.40	Peak	HONRIONAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11b TX CH Low
Fundamental Frequency 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1966.00	58.99	-12.49	46.50	74.00	-27.50	Peak	VERTICAL
2	4824.00	49.10	-2.26	46.84	74.00	-27.16	Peak	VERTICAL
1	1504.00	56.52	-15.48	41.04	74.00	-32.96	Peak	HONRIONAL
2	4824.00	48.77	-2.26	46.51	74.00	-27.49	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11b TX CH Mid

Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1770.00	55.07	-13.74	41.33	74.00	-32.67	Peak	VERTICAL
2	4874.00	48.39	-2.09	46.30	74.00	-27.70	Peak	VERTICAL
1	1112.00	57.24	-16.85	40.66	74.00	-33.34	Peak	HONRIONAL
2	4874.00	47.25	-2.09	45.16	74.00	-28.84	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11b TX CH High
Fundamental Frequency 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1560.00	56.50	-15.10	41.40	74.00	-32.60	Peak	VERTICAL
2	4924.00	47.65	-1.92	45.73	74.00	-28.27	Peak	VERTICAL
1	1994.00	56.07	-12.32	43.75	74.00	-30.25	Peak	HONRIONAL
2	4924.00	48.83	-1.92	46.91	74.00	-27.09	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11g TX CH Low

Fundamental Frequency 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1944.00	56.34	-12.32	44.02	74.00	-29.98	Peak	VERTICAL
2	4824.00	47.34	-2.26	45.08	74.00	-28.92	Peak	VERTICAL
1	1441.00	54.73	-15.66	39.07	74.00	-34.93	Peak	HONRIONAL
2	4824.00	47.06	-2.26	44.80	74.00	-29.20	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11g TX CH Mid
Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1203.00	52.95	-16.31	36.64	74.00	-37.36	Peak	VERTICAL
2	4847.00	46.38	-2.09	44.29	74.00	-29.71	Peak	VERTICAL
1	1112.00	55.12	-16.58	38.54	74.00	-35.46	Peak	HONRIONAL
2	4874.00	44.82	-2.09	42.73	74.00	-31.27	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11g TX CH High

Fundamental Frequency 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1798.00	51.55	-13.56	37.99	74.00	-36.01	Peak	VERTICAL
2	4924.00	46.15	-1.92	44.23	74.00	-29.77	Peak	VERTICAL
1	1112.00	55.96	-16.58	39.38	74.00	-34.62	Peak	HONRIONAL
2	4924.00	44.81	-1.92	42.89	74.00	-31.11	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11n_20M TX CH Low
Fundamental Frequency 2412MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1994.00	58.77	-12.32	46.45	74.00	-27.55	Peak	VERTICAL
2	4824.00	48.28	-2.26	46.02	74.00	-27.98	Peak	VERTICAL
1	1322.00	55.10	-15.97	39.13	74.00	-34.87	Peak	HONRIONAL
2	4824.00	46.59	-2.26	44.33	74.00	-29.67	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11n_20M TX CH Mid
Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1742.00	57.91	-13.93	43.98	74.00	-30.02	Peak	VERTICAL
2	4874.00	44.67	-2.09	42.58	74.00	-31.42	Peak	VERTICAL
1	1112.00	55.88	-16.58	39.30	74.00	-34.70	Peak	HONRIONAL
2	4874.00	45.56	-2.09	43.47	74.00	-30.53	Peak	HONRIONAL

Remark:



- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11n_20M TX CH High
Fundamental Frequency 2462MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2050.00	51.85	-12.14	39.71	74.00	-34.29	Peak	VERTICAL
2	4924.00	46.24	-1.92	44.32	74.00	-29.68	Peak	VERTICAL
1	1644.00	53.13	-14.55	38.58	74.00	-35.42	Peak	HONRIONAL
2	4924.00	46.00	-1.92	44.08	74.00	-29.92	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11n_40M TX CH Low
Fundamental Frequency 2422MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1994.00	54.49	-12.32	42.17	74.00	-31.83	Peak	VERTICAL
2	4844.00	47.06	-2.19	44.87	74.00	-29.13	Peak	VERTICAL
1	1994.00	55.74	-12.32	43.42	74.00	-30.58	Peak	HONRIONAL
2	4844.00	47.77	-2.19	45.58	74.00	-28.42	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11n_40M TX CH Mid
Fundamental Frequency 2437MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1994.00	60.87	-12.32	48.55	74.00	-25.45	Peak	VERTICAL
2	4874.00	46.02	-2.09	43.93	74.00	-30.07	Peak	VERTICAL
1	1497.00	53.30	-15.50	37.80	74.00	-36.20	Peak	HONRIONAL
2	4874.00	47.28	-2.09	45.19	74.00	-28.81	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: 802.11n_40M TX CH High
Fundamental Frequency 2452MHz

No	Freq. MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	2120.00	51.72	-11.96	39.76	74.00	-34.24	Peak	VERTICAL
2	4904.00	45.39	-1.99	43.40	74.00	-30.60	Peak	VERTICAL
1	1994.00	53.54	-12.32	41.22	74.00	-32.78	Peak	HONRIONAL
2	4904.00	46.95	-1.99	44.96	74.00	-29.04	Peak	HONRIONAL

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 4 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 5 Sweep time= 200 ms.



10 PEAK POWER SPECTRAL DENSITY

10.1 STANDARD APPLICABLE:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

10.2 MEASUREMENT EQUIPMENT USED:

Refer to section 6.2 for details.

10.3 TEST SET-UP:

Refer to section 6.3 for details.

10.4 MEASUREMENT PROCEDURE:

Refer to section 5.3.1 Measurement Procedure PKPSD:of KDB Document: 558074 D01
DTS Meas Guidance v01

- 1 Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
- 2 Set the RBW = 100 kHz.
- 3 Set the VBW \geq 300 kHz.
- 4 Set the span to 5-30 % greater than the EBW.
- 5 Detector = peak.
- 6 Sweep time = auto couple.
- 7 Trace mode = max hold.
- 8 Allow trace to fully stabilize.
- 9 Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 10 Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3 \text{ kHz}/100 \text{ kHz} = -15.2 \text{ dB})$.
- 11 The resulting peak PSD level must be $\leq 8 \text{ dBm}$.



10.5 MEASUREMENT RESULT:

802.11b Mode

Frequency MHz	Power Density Reading (dBm)/100KHz	BWCF (dB)	Power Density Level(dBm)/3KHz	Maximum Limit (dBm)
2412	3.39	-15.2	-11.81	8
2437	3.46	-15.2	-11.74	8
2462	3.29	-15.2	-11.91	8

BWCF(bandwidth correction factor)=10log (3 kHz/100KHz) kHz = -15.2 dB)

802.11g Mode

Frequency MHz	Power Density Reading (dBm)/100KHz	BWCF (dB)	Power Density Level(dBm)/3KHz	Maximum Limit (dBm)
2412	-1.2	-15.2	-16.4	8
2437	-1.13	-15.2	-16.33	8
2462	-1.33	-15.2	-16.53	8

BWCF(bandwidth correction factor)=10log (3 kHz/100KHz) kHz = -15.2 dB)

802.11n HT20 Mode

Frequency MHz	Power Density Reading (dBm)/100KHz	BWCF (dB)	Power Density Level(dBm)/3KHz	Maximum Limit (dBm)
2412	-1.6	-15.2	-16.8	8
2437	-1.2	-15.2	-16.4	8
2462	-1.36	-15.2	-16.56	8

BWCF(bandwidth correction factor)=10log (3 kHz/100KHz) kHz = -15.2 dB)

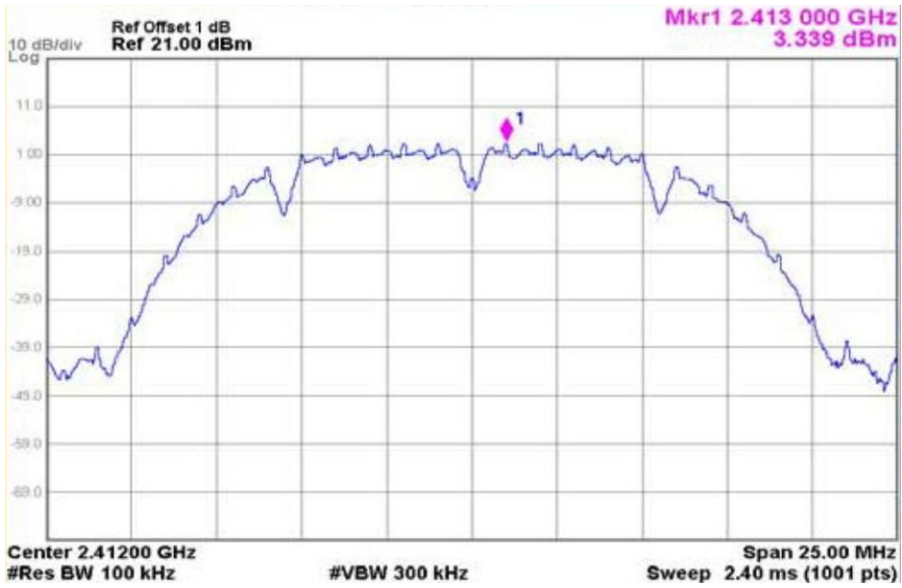
802.11n HT40 Mode

Frequency MHz	Power Density Reading (dBm)/100KHz	BWCF (dB)	Power Density Level(dBm)/3KHz	Maximum Limit (dBm)
2422	-4.32	-15.2	-19.52	8
2437	-4.16	-15.2	-19.36	8
2452	-4.64	-15.2	-19.84	8

BWCF(bandwidth correction factor)=10log (3 kHz/100KHz) kHz = -15.2 dB)



802.11b Power Spectral Density Test Plot (CH-Low)

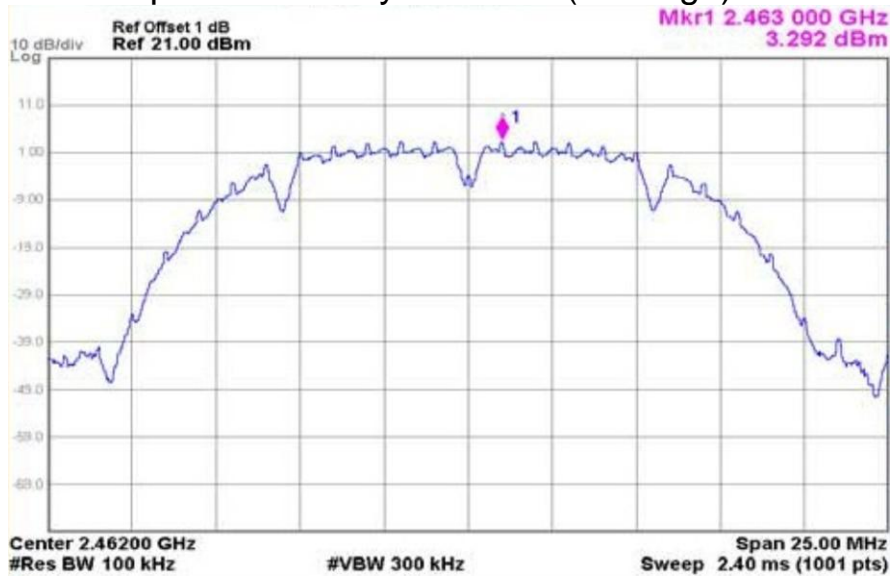


Power Spectral Density Test Plot (CH-Mid)

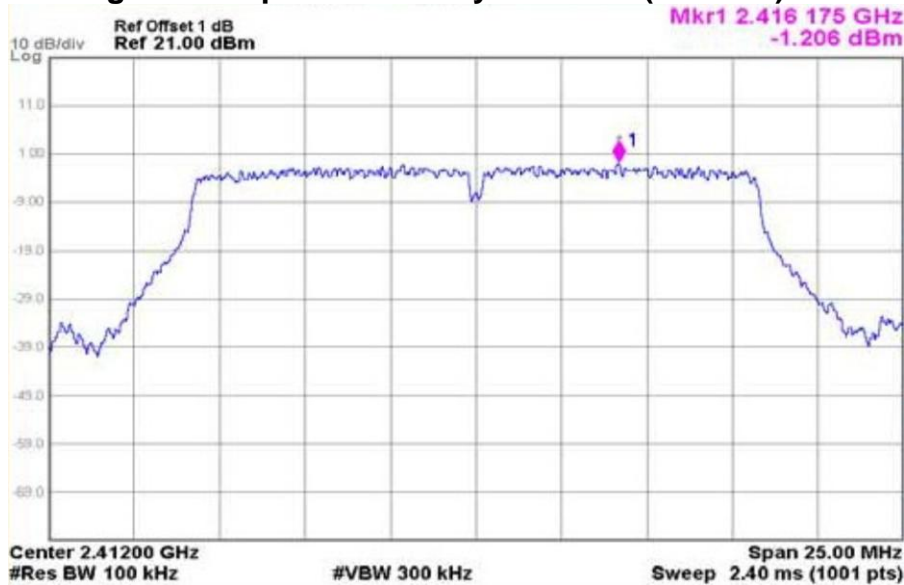




Power Spectral Density Test Plot (CH-High)

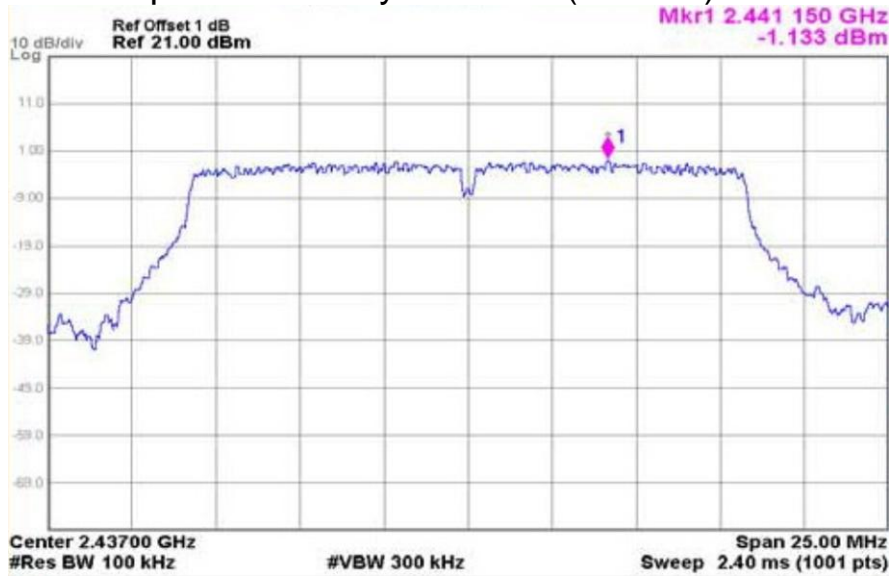


802.11g Power Spectral Density Test Plot (CH-Low)

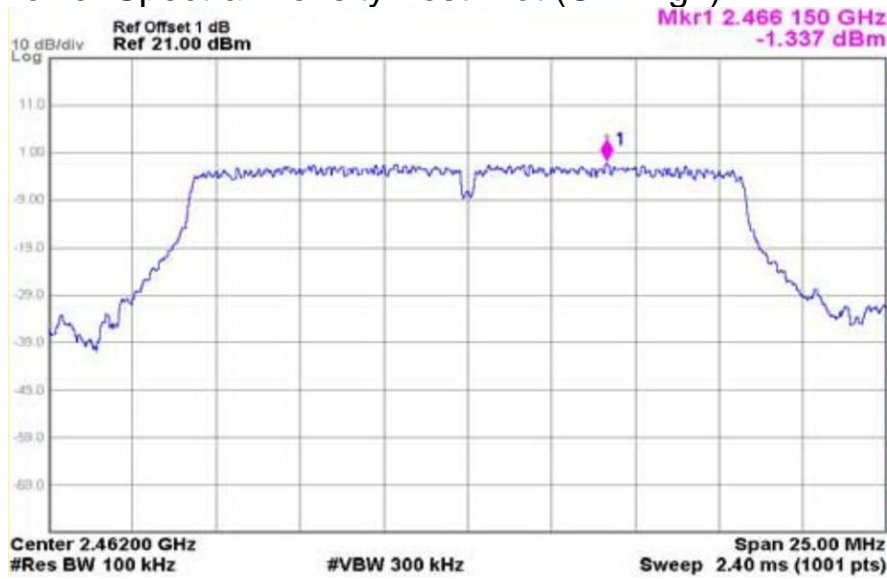




Power Spectral Density Test Plot (CH-Mid)

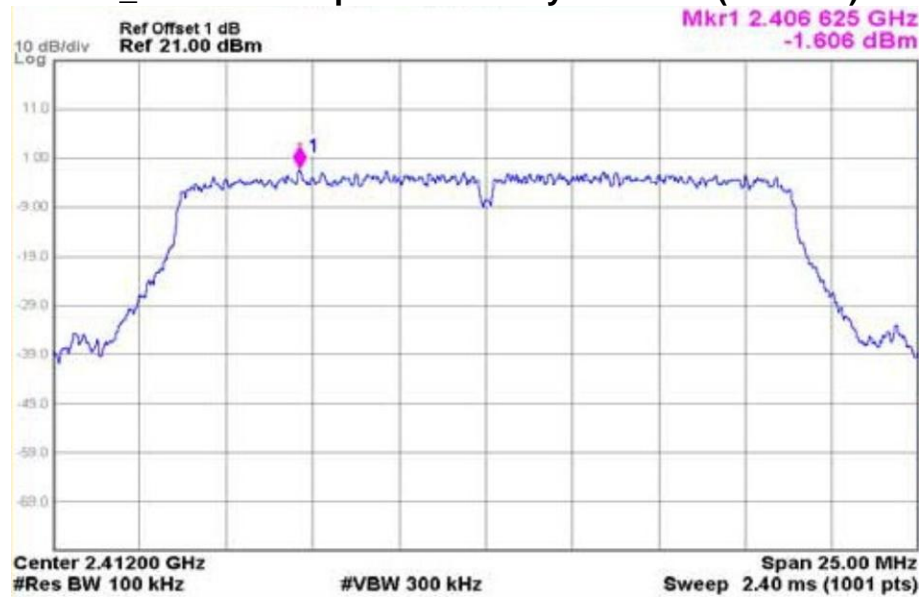


Power Spectral Density Test Plot (CH-High)

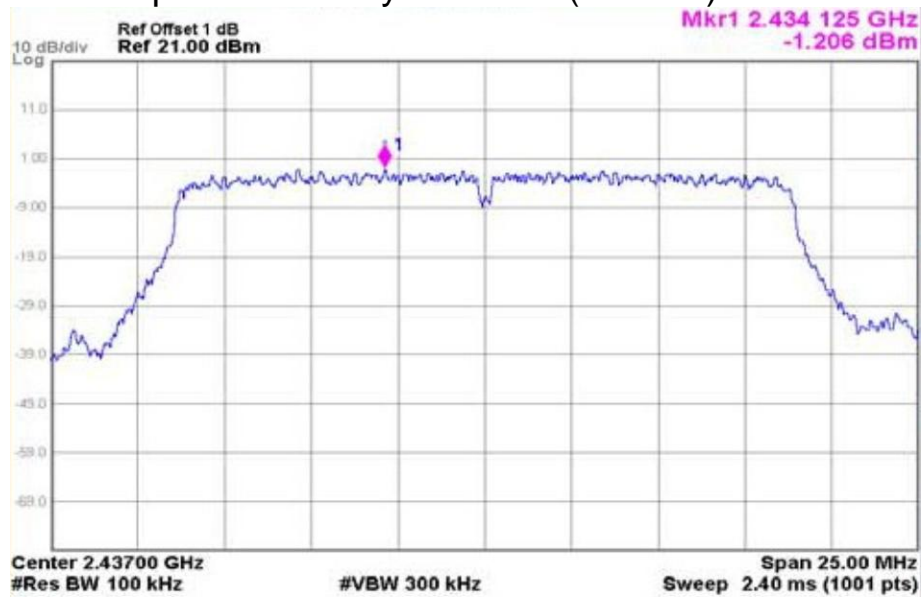




802.11n_20M Power Spectral Density Test Plot (CH-Low)

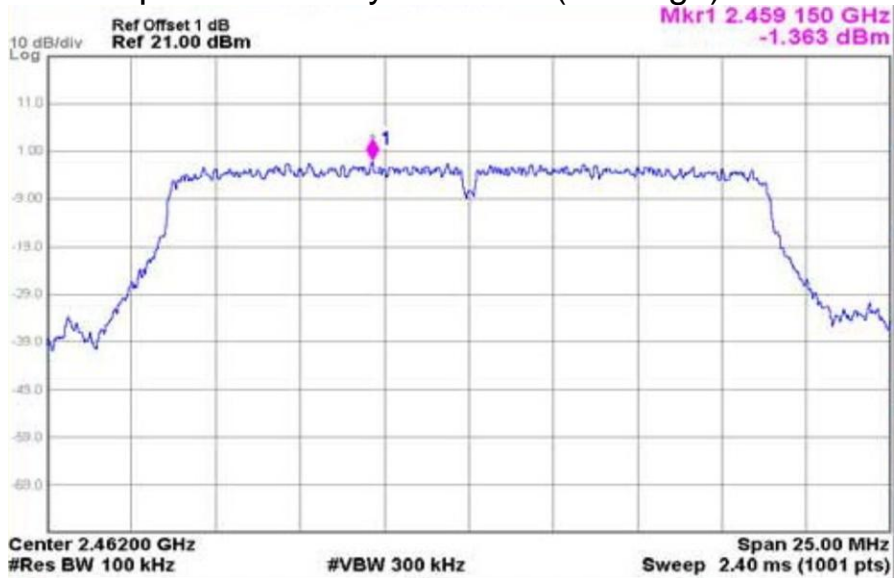


Power Spectral Density Test Plot (CH-Mid)

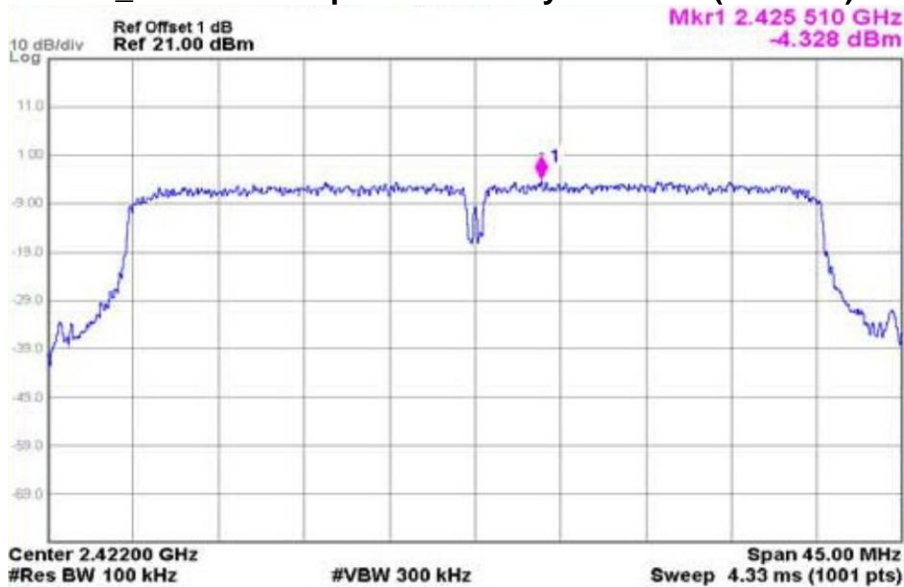




Power Spectral Density Test Plot (CH-High)

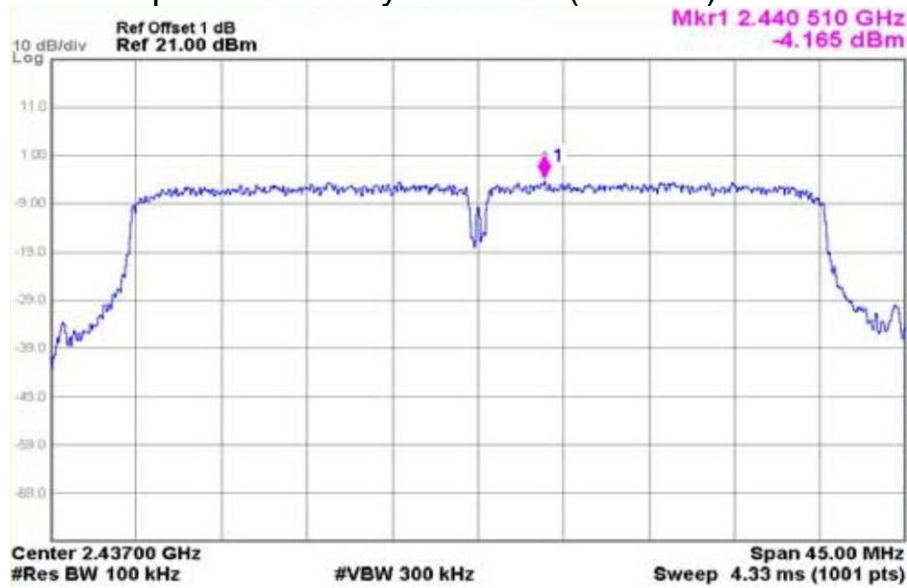


802.11n_40M Power Spectral Density Test Plot (CH-Low)

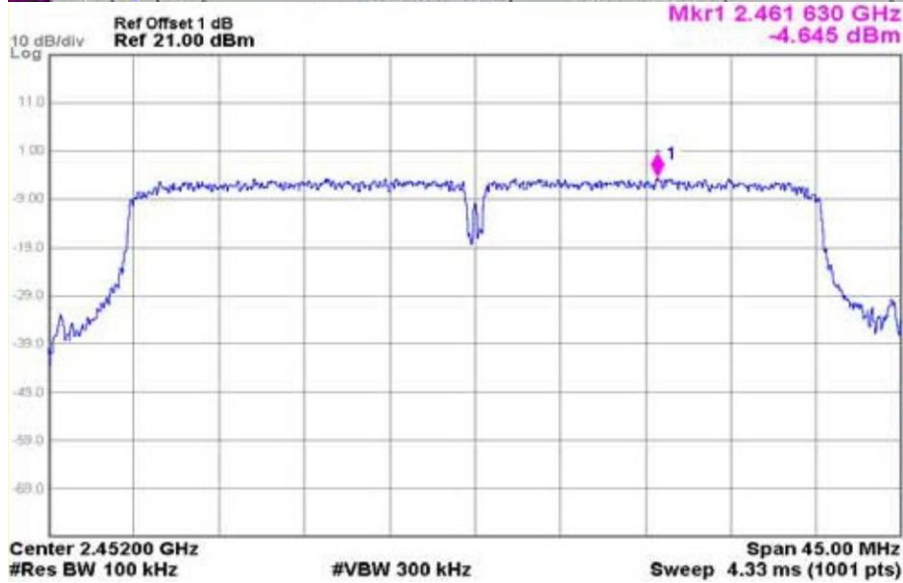
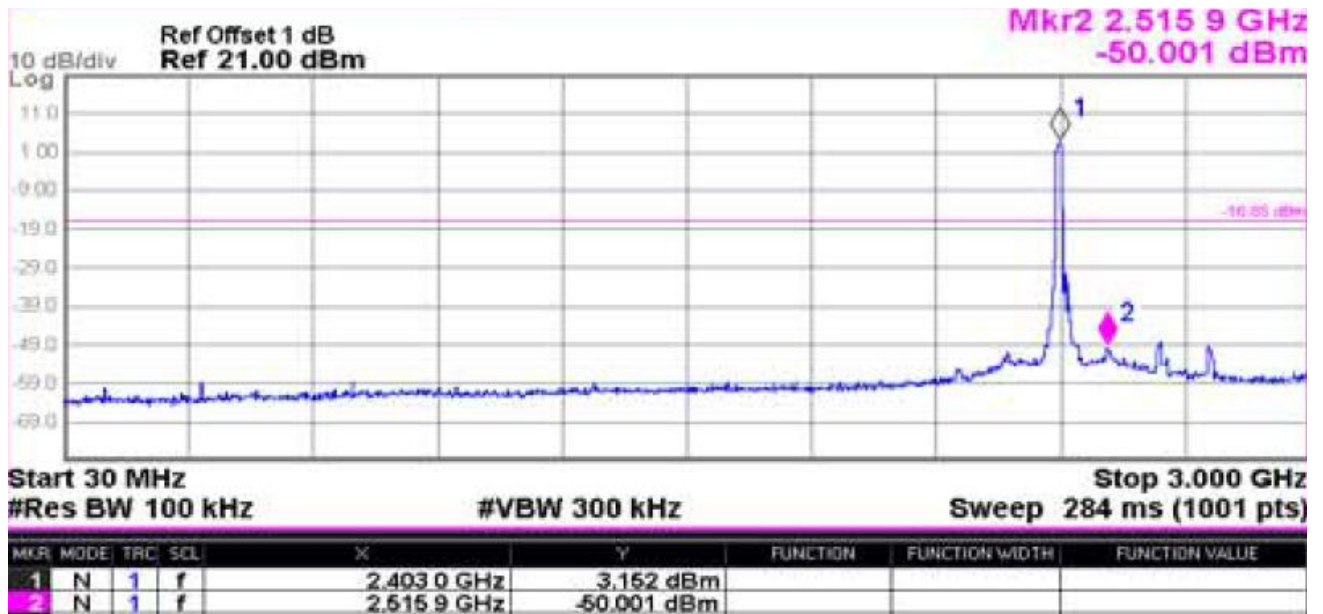




Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)





11 ANTENNA REQUIREMENT

11.1 STANDARD APPLICABLE:

According to &15.203, Antenna requirement. 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 Sections 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 Section 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.

11.2 ANTENNA CONNECTED CONSTRUCTION:

The directional gains of antenna used for transmitting is Chip antenna / 3.0dBi or PCB Antenna / 2.9dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

Appendix 1

PHOTOS OF TEST CONFIGURATION

