TEST REPORT

of

FCC Part 15 Subpart C AND CANADA RSS-247

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**UC Phone**
Brand:	**Cisco**
Model:	**CP-6861**
Model Difference:	**N/A**
FCC ID:	**LDK68612057**
IC:	**2461N-68612057**
FCC Rule Part:	**§15.247, Cat: DTS**
IC Rule Part:	**RSS-247 issue 2: 2017**
	RSS-Gen issue 5: 2018
Applicant:	**Cisco Systems, Inc.**
Address:	**FCC: 170 West Tasman Dr. San Jose, CA 95134, USA**
	ISED: 125 West Tasman Dr. Bldg. P San Jose CA 95134 United States Of America

Test Performed by:
International Standards Laboratory Corp.
<LT Lab.>
*Site Registration No.
BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-4;

*Address:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
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Report No.: **ISL-19LR087FCDTS**
Issue Date : **2019/05/21**

VERIFICATION OF COMPLIANCE

Applicant:	Cisco Systems, Inc.
Product Description:	UC Phone
Brand Name:	Cisco
Model No.:	CP-6861
Model Difference:	N/A
FCC ID:	LDK68612057
IC:	2461N-68612057
Date of test:	2019/03/18 ~ 2019/05/17
Date of EUT Received:	2019/03/18

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory Corp.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:		***Date:***	2019/05/21
	Barry Lee / Senior Engineer		
Prepared By:		***Date:***	2019/05/21
	Gigi Yeh / Senior Engineer		
Approved By:		***Date:***	2019/05/21
	Jerry Liu / Technical Manager		

Version

Version No.	Date	Description
00	2019/05/21	Initial creation of document

Uncertainty of Measurement

Description Of Test	Uncertainty
Conducted Emission (AC power line)	2.586 dB
Field Strength of Spurious Radiation	≤30MHz: 2.96dB 30-1GHz: 4.22 dB 1-40 GHz: 4.08 dB
Conducted Power	2.412 GHz: 1.30 dB 5.805 GHz: 1.55 dB
Power Density	2.412 GHz:1.30 dB 5.805 GHz: 1.67 dB
Frequency	0.0032%
Time	0.01%
DC Voltage	1%

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1 General Information

General:

Product Name	UC Phone	
Brand Name	Cisco	
Model Name	CP-6861	
Model Difference	N/A	
RJ9 Port	Two provided for Data link	
RJ45 Port	One provided for Data link	
AUX port	One provided for Data link	
DC jack	One provided	
Power Tolerance:	+/- 1 dB	
Power Supply	5Vdc from Adapter	
	Adapter: Asian Power	Model: WB-10E05R

IC RSS-Gen:

PMN (Product Marketing Name)	CP-6861
HVIN (Hardware Version Identification Number)	CP-6861
Product SW version	Cmterm-6861.11-2-4MPP-92_DEV
Product HW version	18051-1A
Radio SW version	N/A
Radio HW version	N/A
Test SoftWare Version	Tera Term File Version : 4.101.0.0
RF power setting in TEST SoftWare	802.11b #16 802.11g #14 802.11n20 #13 802.11n40 #14 802.11a #15 802.11HT20 #15 802.11HT40 #14

2.4GHz WLAN: 1TX/1RX

Wi-Fi	Frequency Range (MHz)	Channels	Peak / Average Power	Modulation Technology
802.11b	2412 – 2462(DTS)	11	18.21Bm (PK)	DSSS
802.11g	2412 – 2462(DTS)	11	22.51dBm (PK)	OFDM
802.11n	HT20 2412 – 2462(DTS)	11	23.57dBm (PK)	
802.11n	HT40 2422 – 2452(DTS)	7	23.61dBm (PK)	
Modulation type		CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM		
Antenna Designation		Type: PIFA Antennas, 2.44dBi		

Bluetooth:

Frequency Range:	2402 – 2480MHz	
Bluetooth Version:	V2.1 + EDR	V4.2
Channel number:	79 channels	40 channels, 2MHz step
Modulation type	GFSK +π / 4DQPSK + 8DPSK	Wide band Modulation (GFSK)
Transmit Power:	8.57 dBm Peak	6.26 dBm Peak
Dwell Time:	≤ 0.4s	N/A
Antenna Designation:	Type: PIFA Antennas, 2.44dBi	

This report applies for 2.4GHz Wifi + BT LE.

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: LDK68612057** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and **IC: 2461N-68612057** filing to comply with Industry Canada RSS-247 issue 2.

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

KDB Document: 558074 D01 15.247 Meas Guidance v0.5

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory Corp.**<LT Lab.> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013. FCC Registration Number is: 487532; Designation Number is: TW0997, Canada Registration Number: 4067B-4.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

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 6 of ANSI C63.10: 2013 and RSS-Gen issue 5. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8/1.5 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 and 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. According to the requirements in Section 8 and 13 and Sub-clause 8.3.1.2 of ANSI C63.10: 2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed channel)

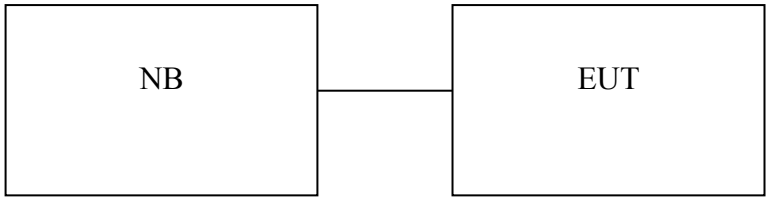


Table 2-1 Equipment Used in Tested System

Item	Equip-ment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	NB	Lenovo	X220i	NA	Non-Shielding	Non-Shielding

3 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207(a) RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4) RSS-247 issue 2,§5.4(4)	Peak Output Power/ EIRP	Compliant
§15.247(a)(2) RSS-247 issue 2, §5.2(1) RSS-Gen §6.6	6dB & 99% Power Bandwidth	Compliant
§15.247(d) RSS-247 issue 2, §5.5	100 kHz Bandwidth of Frequency Band Edges	Compliant
§15.247(d) RSS-247 issue 2, §5.5	Spurious Emission	Compliant
§15.247(e) RSS-247 issue 2, §5.2	Peak Power Density	Compliant
§15.203 RSS-GEN 8.3	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 programmed.

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

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

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

802.11 n _40MHz: Channel low (2422MHz)、mid (2437MHz)、high (2452MHz) with 13.5Mbps lowest data rate are chosen for full testing.

BT BLE

Channel low (2402MHz)、mid (2442MHz) and high (2480MHz) with each modulation were chosen for full testing.

5 Conduced Emission Test

5.1 Standard Applicable:

According to §15.207 and RSS-Gen §7.2.4, frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
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 0.15 MHz to 0.50 MHz.		

5.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Conduction 04-3 Cable	WOKEN	CFD 300-NL	Conduction 04 -3	08/30/2018	08/29/2019
EMI Receiver 18	Rohde & Schwarz	ESCI	101392	05/16/2019	05/15/2020
LISN 18	ROHDE & SCHWARZ	ENV216	101424	05/31/2019	05/30/2020
LISN 03	ROHDE & SCHWARZ	ESH3-Z5	828874/010	07/22/2018	07/21/2019
Test Software	Farad	EZEMC Ver:ISL-03A2	N/A	N/A	N/A

5.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10-2013.
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:

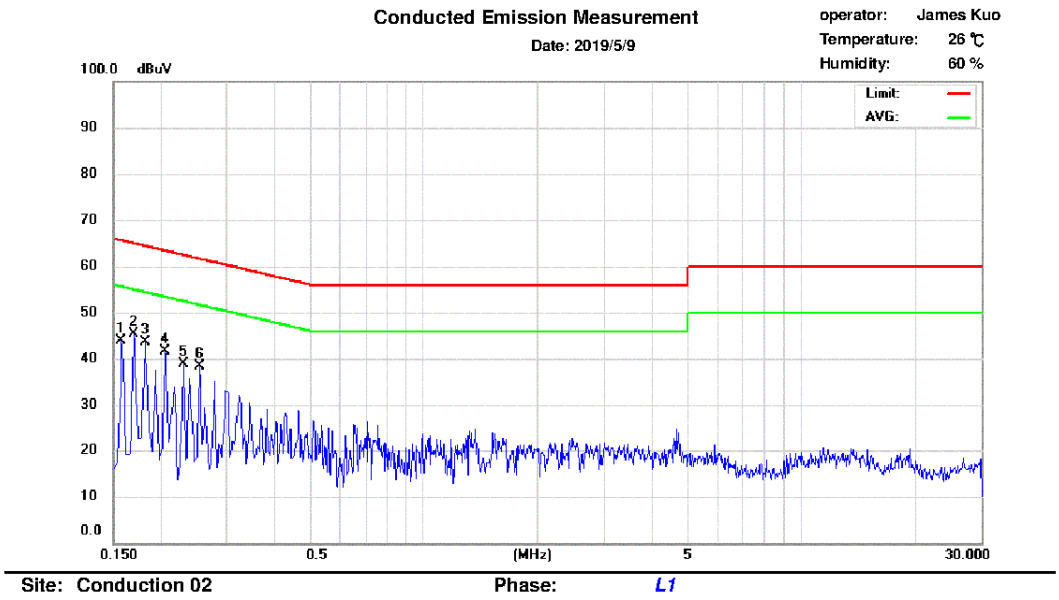
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

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

AC POWER LINE CONDUCTED EMISSION TEST DATA

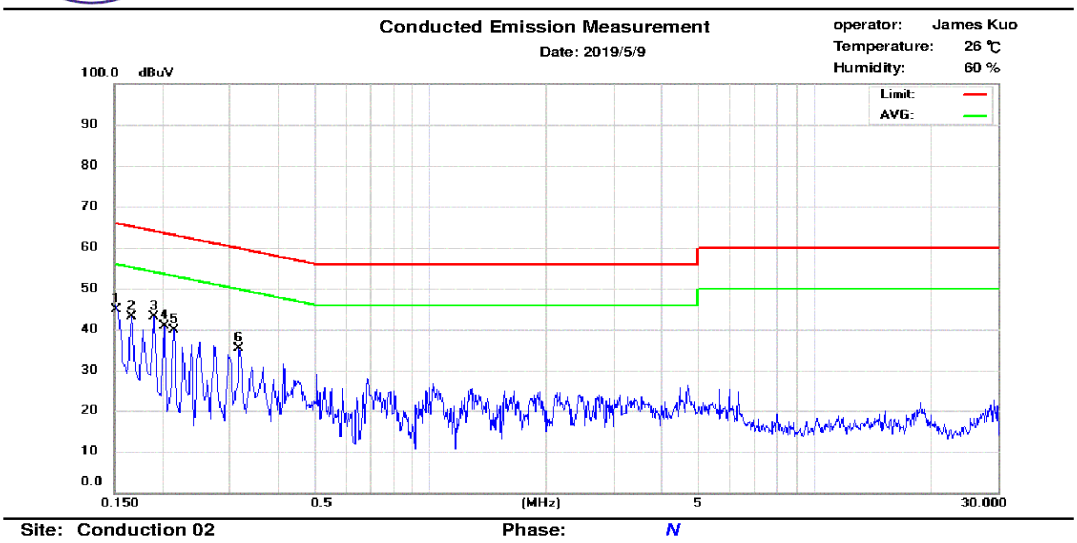
Operation Mode:	Full mode	Test Date:	2019/05/09
Test By:	Barry		

Address:No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.158	32.95	13.13	9.63	42.58	65.57	-22.99	22.76	55.57	-32.81
2	0.170	32.41	12.91	9.63	42.04	64.96	-22.92	22.54	54.96	-32.42
3	0.182	30.90	12.46	9.62	40.52	64.39	-23.87	22.08	54.39	-32.31
4	0.206	29.33	11.43	9.62	38.95	63.37	-24.42	21.05	53.37	-32.32
5	0.230	28.51	12.18	9.62	38.13	62.45	-24.32	21.80	52.45	-30.65
6	0.254	27.40	13.19	9.62	37.02	61.63	-24.61	22.81	51.63	-28.82

Address:No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel:03-4071718



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.154	32.00	17.49	9.64	41.64	65.78	-24.14	27.13	55.78	-28.65
2	0.166	31.80	19.02	9.64	41.44	65.16	-23.72	28.66	55.16	-26.50
3	0.190	30.20	15.71	9.64	39.84	64.04	-24.20	25.35	54.04	-28.69
4	0.202	25.76	10.10	9.64	35.40	63.53	-28.13	19.74	53.53	-33.79
5	0.214	27.08	10.89	9.64	36.72	63.05	-26.33	20.53	53.05	-32.52
6	0.318	23.37	17.30	9.64	33.01	59.76	-26.75	26.94	49.76	-22.82

6 Peak 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 Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(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.

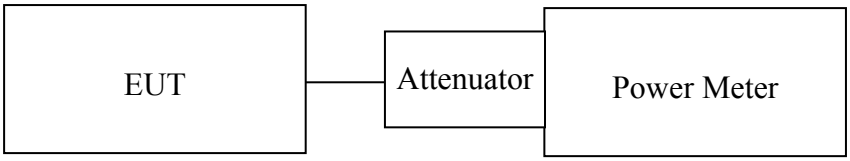
According to RSS-247 issue 2, §5.4
(D)For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e)

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling 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 transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Last Cal.**	**Cal Due.**
Power Meter 05	Anritsu	ML2495A	1116010	10/28/2018	10/27/2019
Power Sensor 05	Anritsu	MA2411B	34NKF50	10/28/2018	10/27/2019
Power Sensor 06	DARE	RPR3006W	13I00030SNO33	01/11/2019	01/10/2020
Power Sensor 07	DARE	RPR3006W	13I00030SNO34	01/11/2019	01/10/2020
Temperature Chamber	KSON	THS-B4H100	2287	02/19/2019	02/18/2020
DC Power supply	ABM	8185D	N/A	01/10/2019	01/09/2020
AC Power supply	EXTECH	CFC105W	NA	N/A	N/A
Attenuator	Woken	Watt-65m3502	11051601	NA	NA
Splitter	MCLI	PS4-199	12465	12/26/2017	12/25/2019
Spectrum analyzer	keysight	N9010A	MY56070257	10/15/2018	10/14/2019
Spectrum analyzer	R&S	FSP40	100116	01/10/2019	01/09/2020
Test Software	DARE	Radiation Ver:2013.1.23	NA	NA	NA

6.3 Test Set-up:



6.4 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 power meter
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

6.5 Measurement Result:

802.11b

Cable loss = 0	Output Power		Limit (dBm)
CH	Detector		
	PK (dBm)	AV (dBm)	
Low	18.21	15.12	30.00
Mid	17.72	15.38	
High	17.96	14.41	

802.11g

Cable loss = 0	Output Power		Limit (dBm)
CH	Detector		
	PK (dBm)	AV (dBm)	
Low	22.17	14.42	30.00
Mid	22.51	14.15	
High	22.23	14.39	

802.11n_HT20

Cable loss = 0	Output Power		Limit (dBm)
CH	Detector		
	PK (dBm)	AV (dBm)	
Low	23.43	13.35	30.00
Mid	23.57	14.06	
High	23.46	13.39	

802.11n_HT40

Cable loss = 0	Output Power		Limit (dBm)
CH	Detector		
	PK (dBm)	AV (dBm)	
Low	23.61	12.94	30.00
Mid	23.42	12.65	
High	23.17	12.46	

LE Mode 4.0

Frequency (MHz)	Peak Reading Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
Low	5.52	5.52	0.00356	1
Mid	5.95	5.95	0.00394	1
High	5.31	5.31	0.00340	1

LE Mode 4.2

Frequency (MHz)	Peak Reading Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
Low	6.26	6.26	0.00423	1
Mid	6.09	6.09	0.00407	1
High	5.96	5.96	0.00394	1

Offset: 1.95dB

7 6dB Bandwidth & 99% Bandwidth

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.

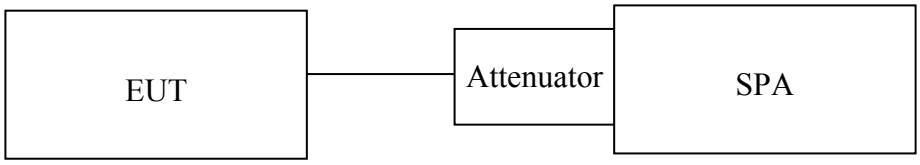
According to RSS-247 issue 2, §5.2

(a)The minimum 6 dB bandwidth shall be 500 kHz.

7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

7.3 Test Set-up:



7.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100kHz, VBW = 3*RBW, Span= cover the complete power envelope of the signal of the UUT Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result:

802.11b

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	8.58	11.72	> 500	PASS
Mid	8.58	12.81	> 500	PASS
High	8.12	12.21	> 500	PASS

802.11g

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	15.72	16.53	> 500	PASS
Mid	16.13	16.80	> 500	PASS
High	15.16	16.35	> 500	PASS

802.11n HT20

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	16.35	17.63	> 500	PASS
Mid	17.18	17.94	> 500	PASS
High	15.16	17.50	> 500	PASS

802.11n HT40

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	35.14	35.76	> 500	PASS
Mid	35.80	36.62	> 500	PASS
High	35.22	36.13	> 500	PASS

BT LE 4.0

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	0.72	1.06	> 500	PASS
Mid	0.72	1.06	> 500	PASS
High	0.72	1.06	> 500	PASS

BT LE 4.2

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	0.72	1.06	> 500	PASS
Mid	0.72	1.06	> 500	PASS
High	0.72	1.06	> 500	PASS

Note: Refer to next page for plots.

802.11b

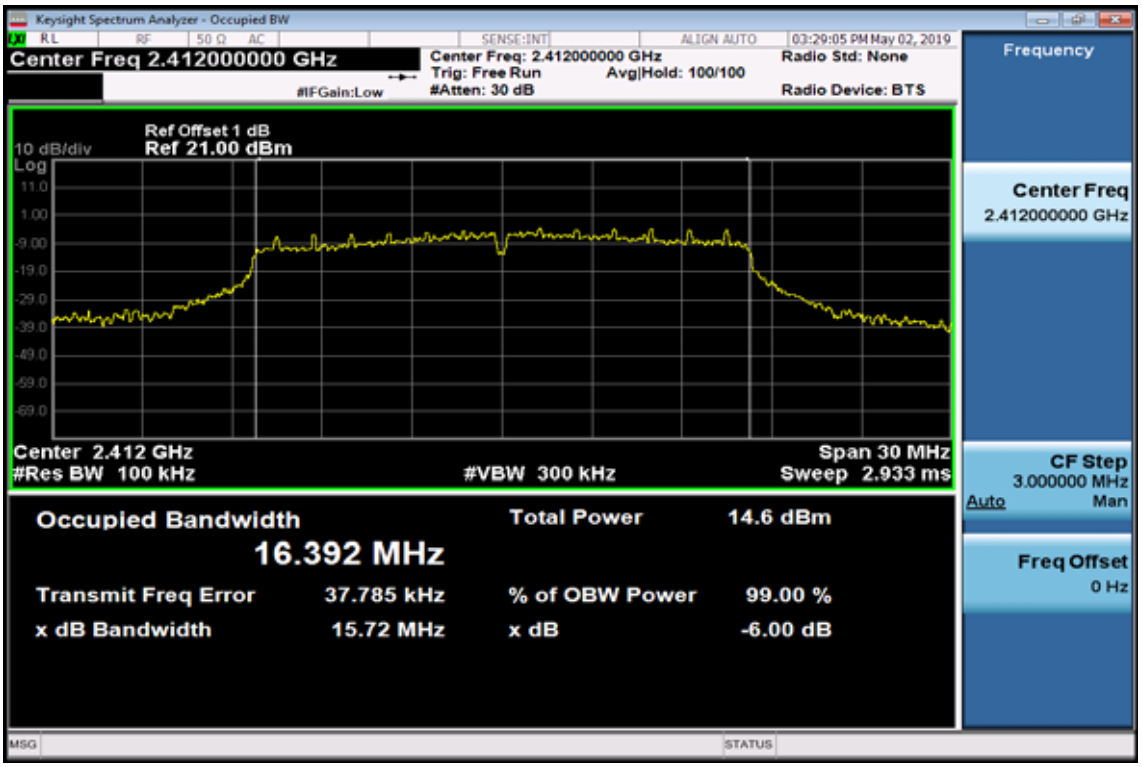
6dB Bandwidth Test Data CH-Low

6dB Bandwidth Test Data CH-Mid

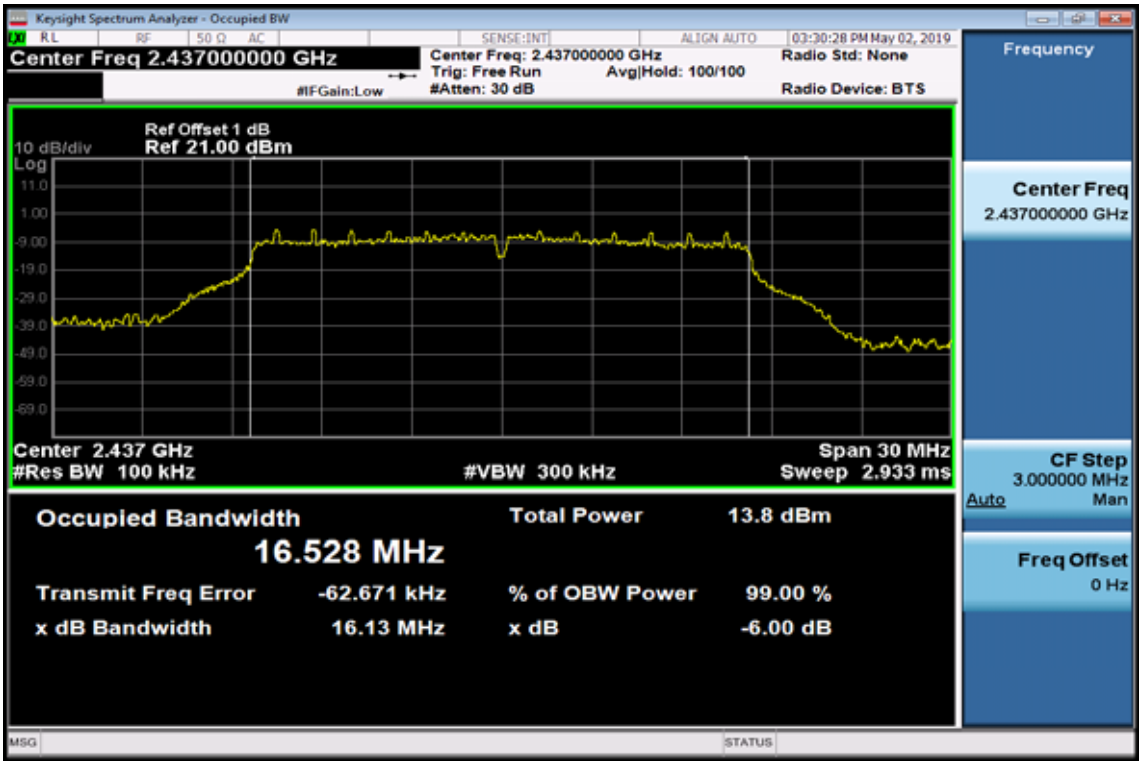
6dB Bandwidth Test Data CH-High

802.11g

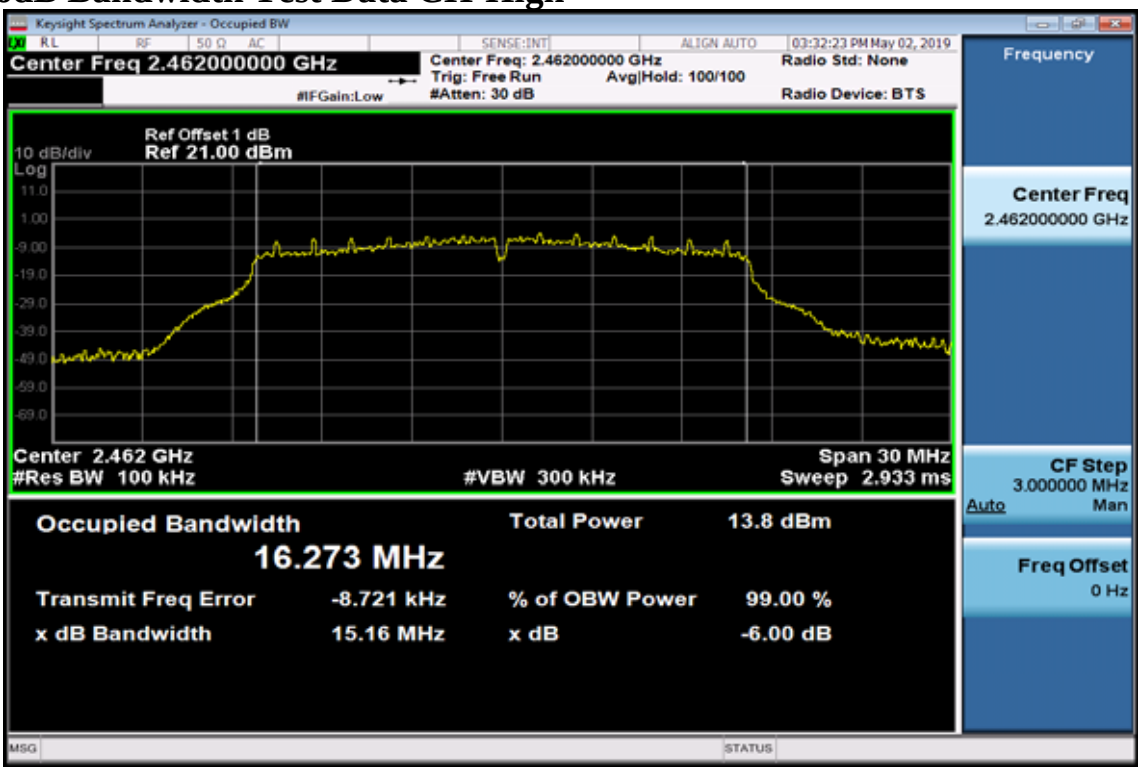
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

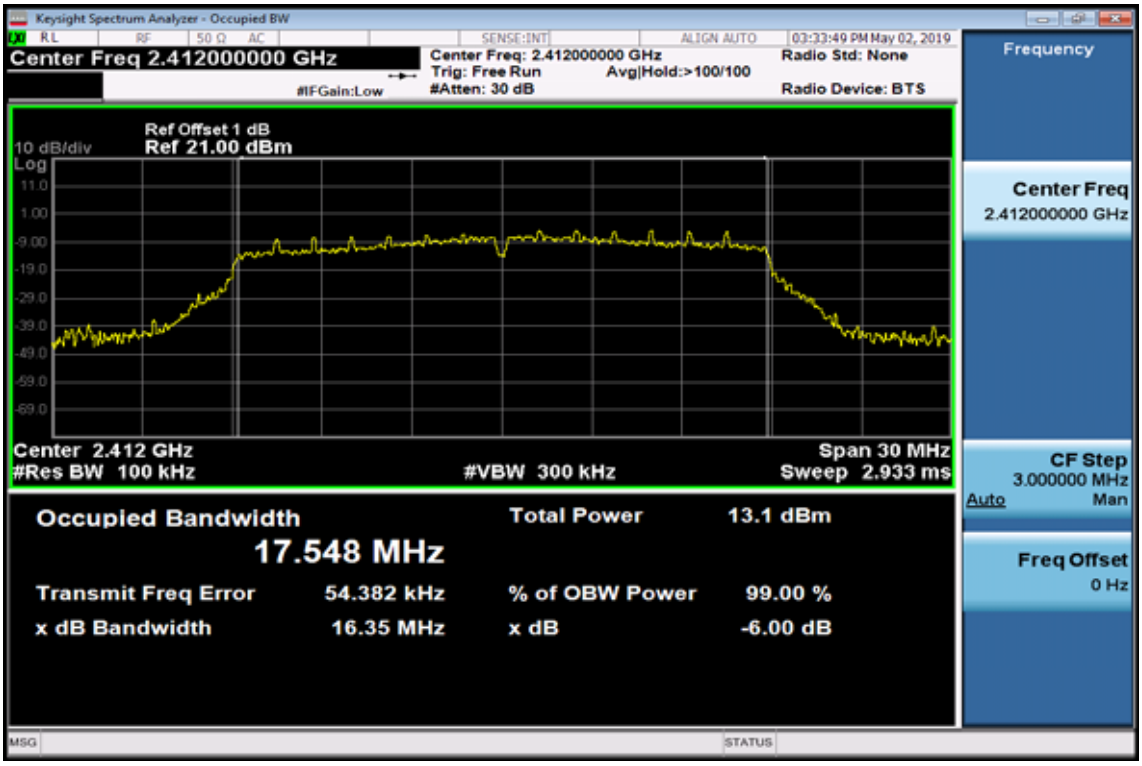


6dB Bandwidth Test Data CH-High

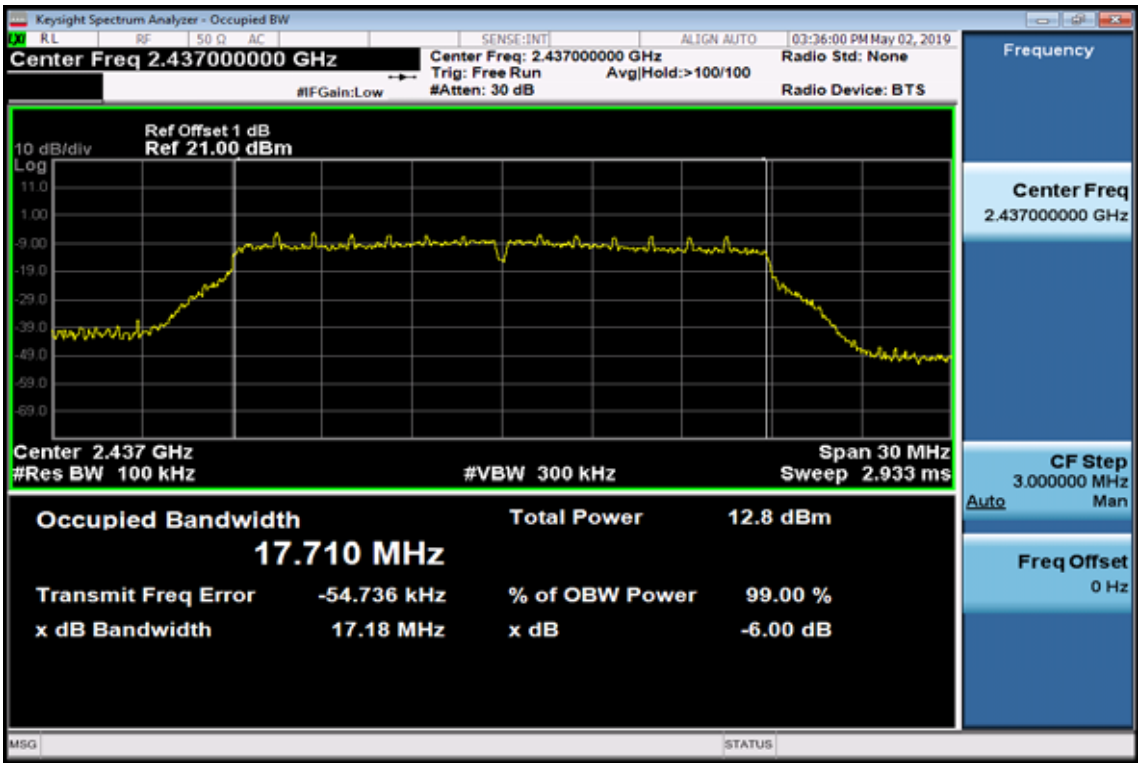


802.11n_HT20

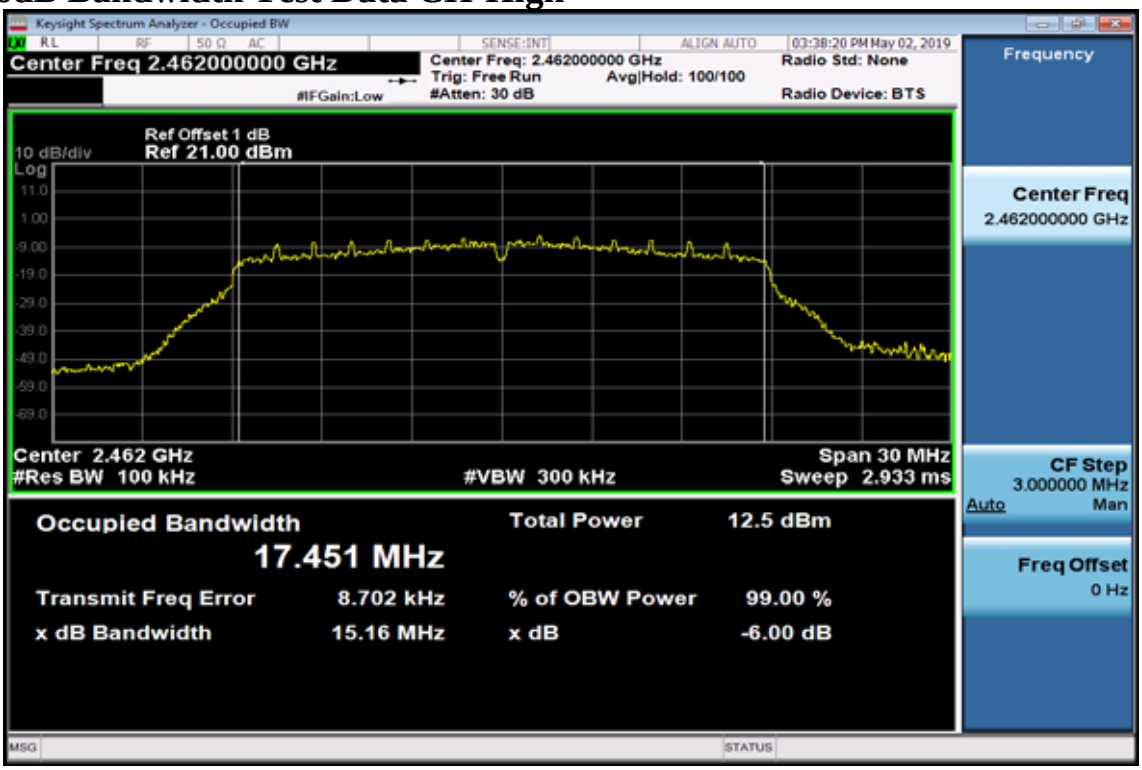
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

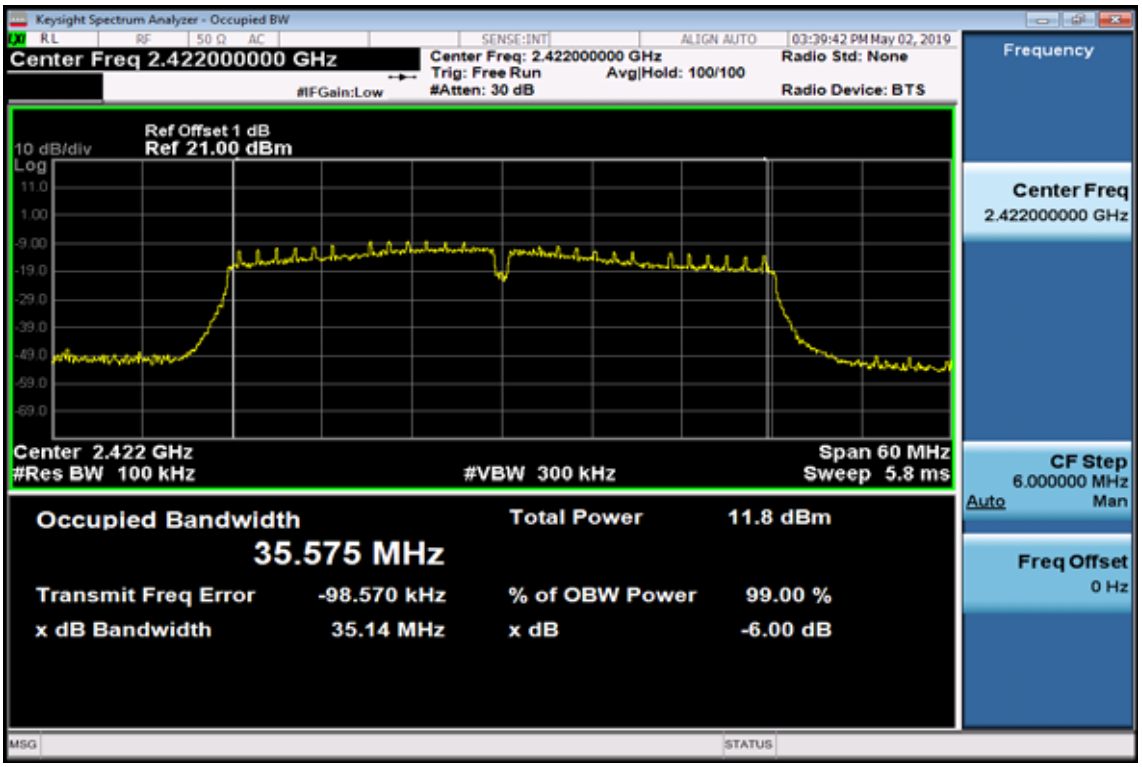


6dB Bandwidth Test Data CH-High

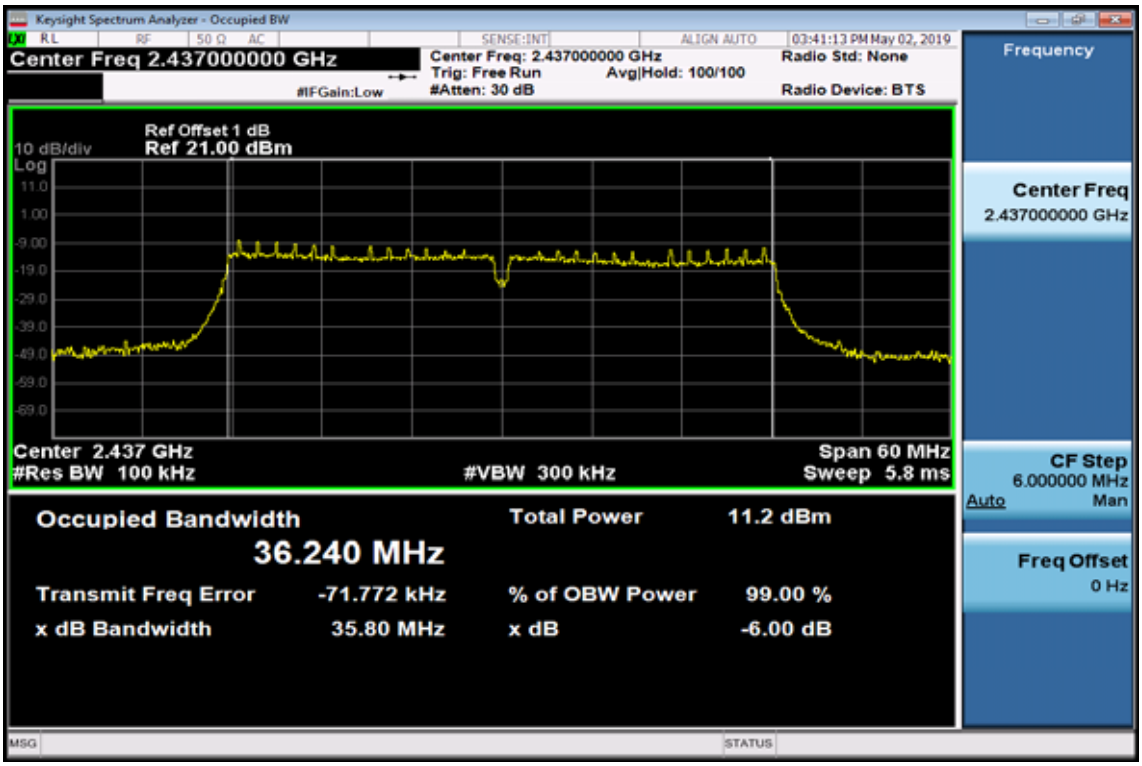


802.11n_HT40

6dB Bandwidth Test Data CH-Low



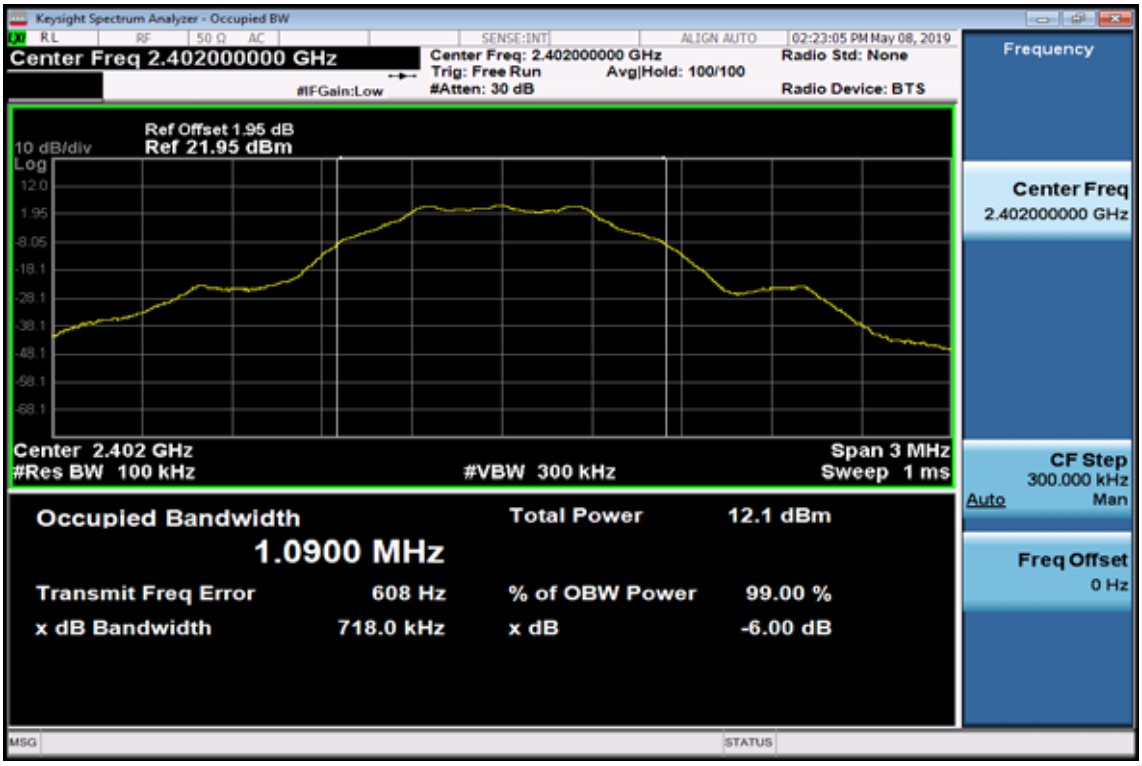
6dB Bandwidth Test Data CH-Mid



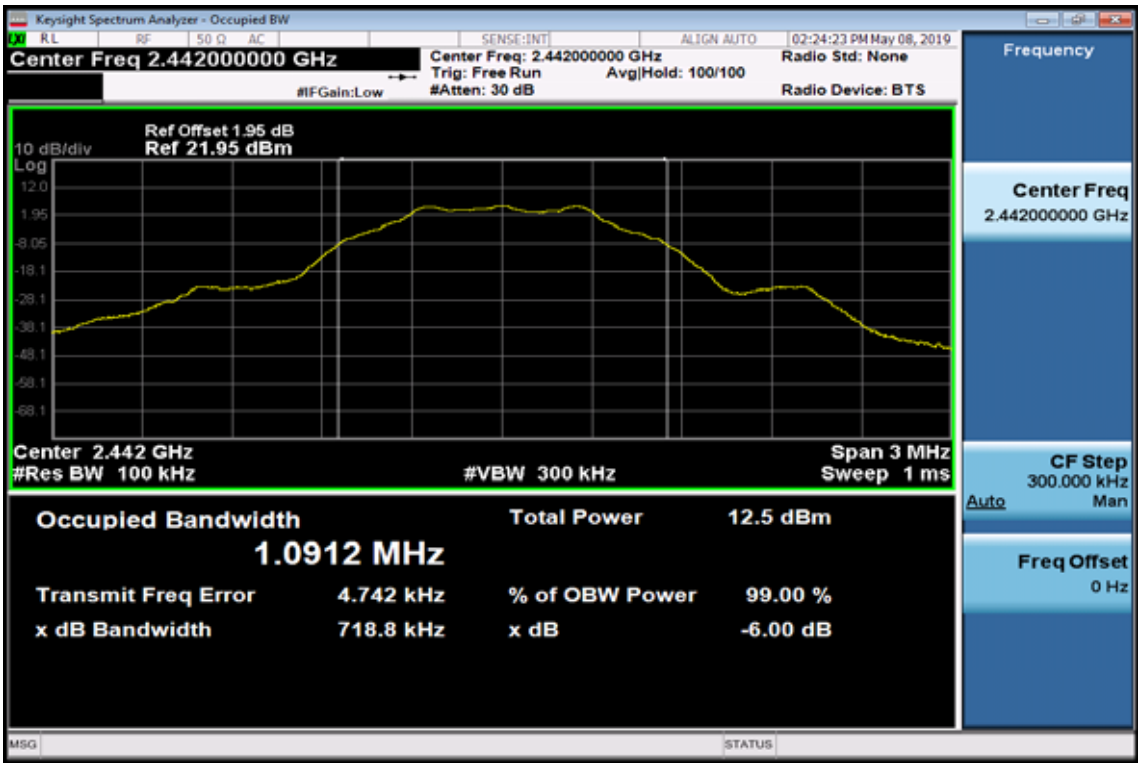
6dB Bandwidth Test Data CH-High

BT LE 4.0

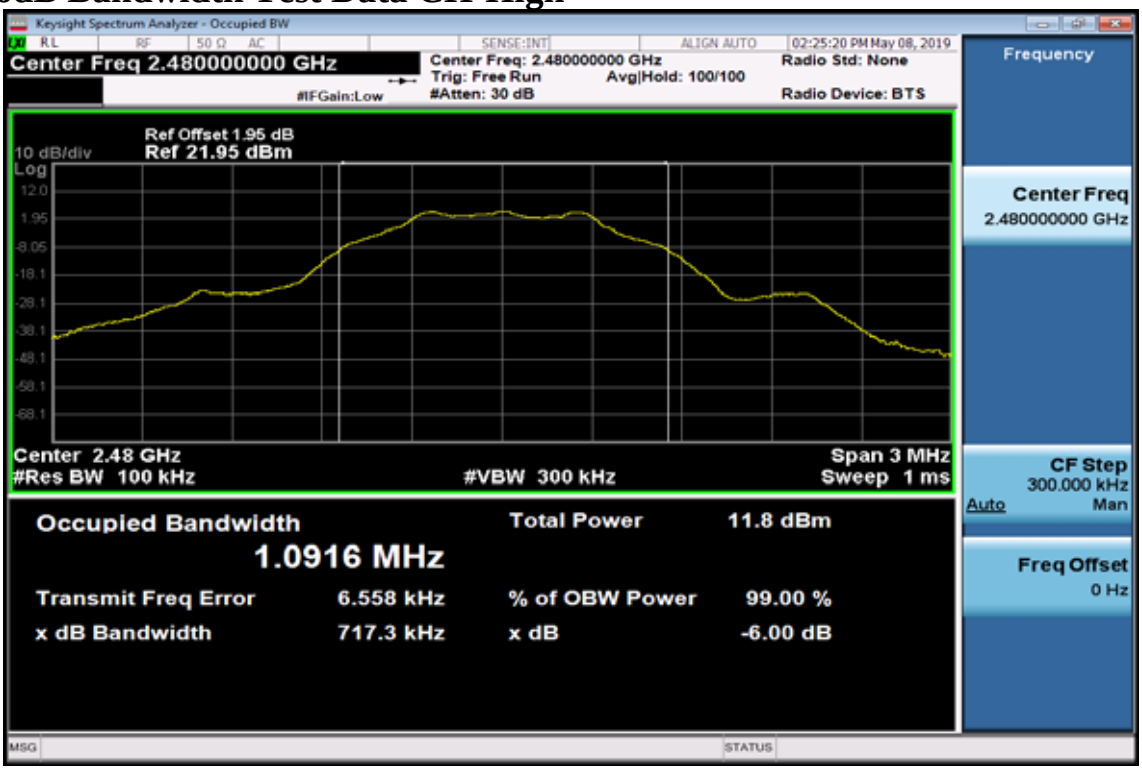
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

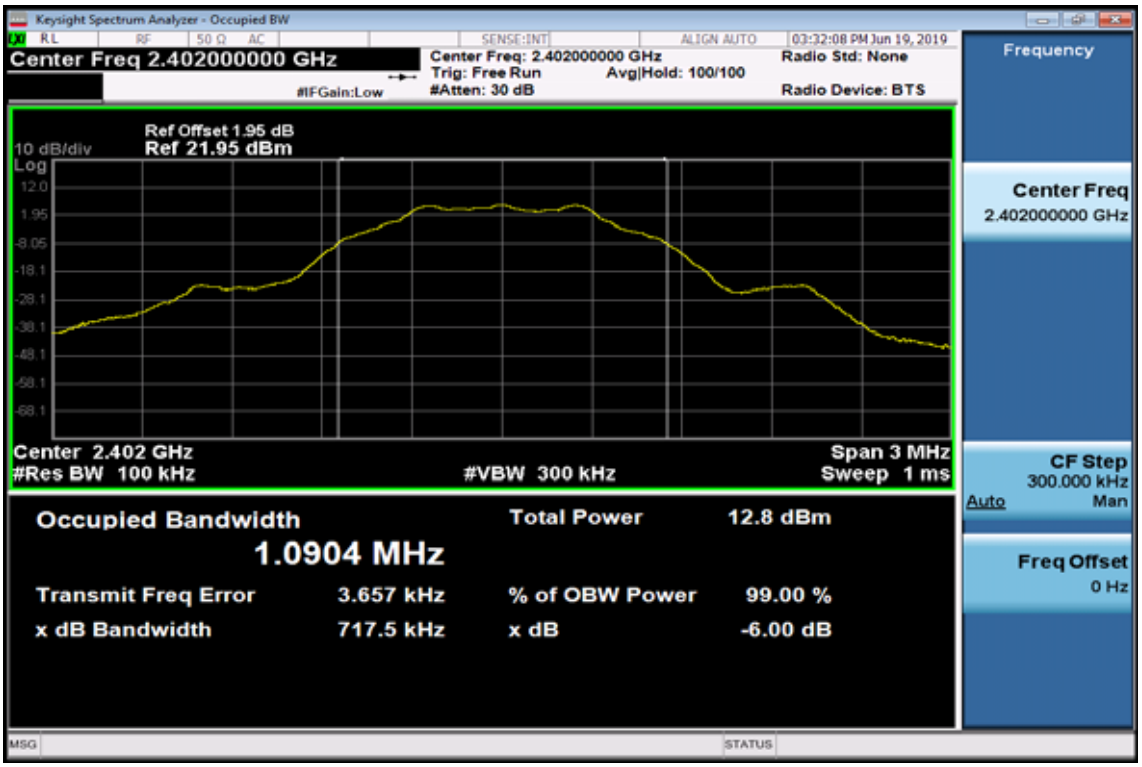


6dB Bandwidth Test Data CH-High

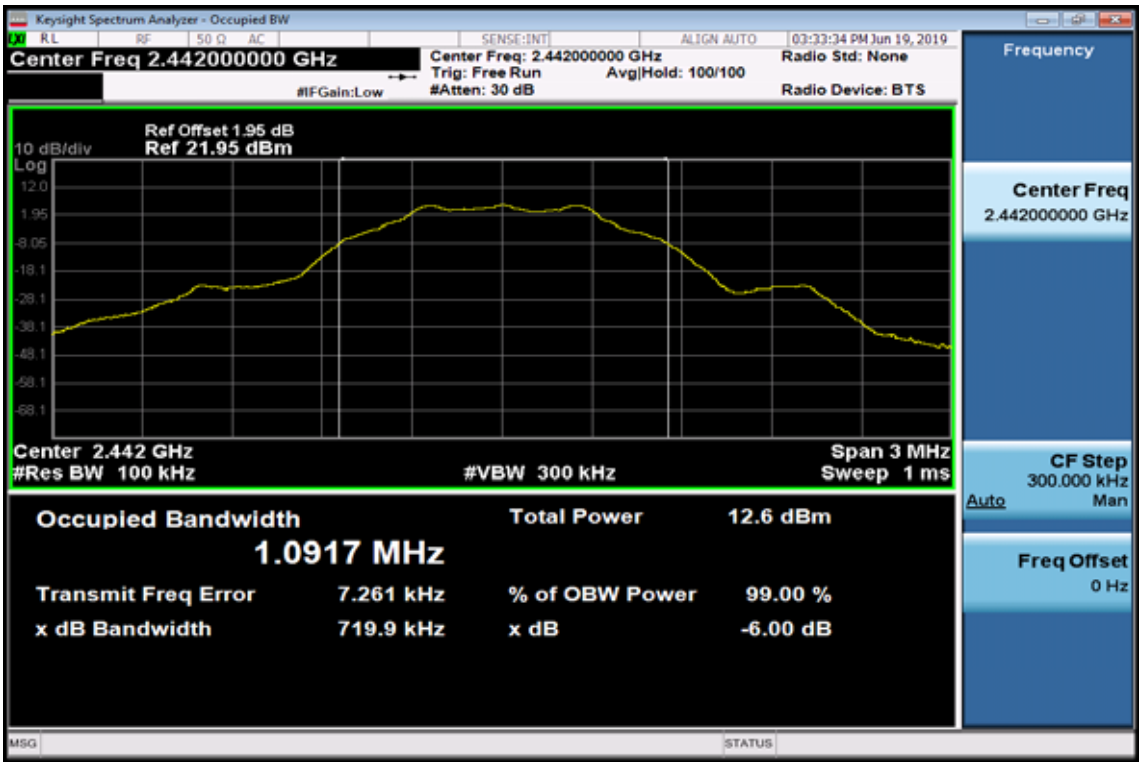


BT LE 4.2

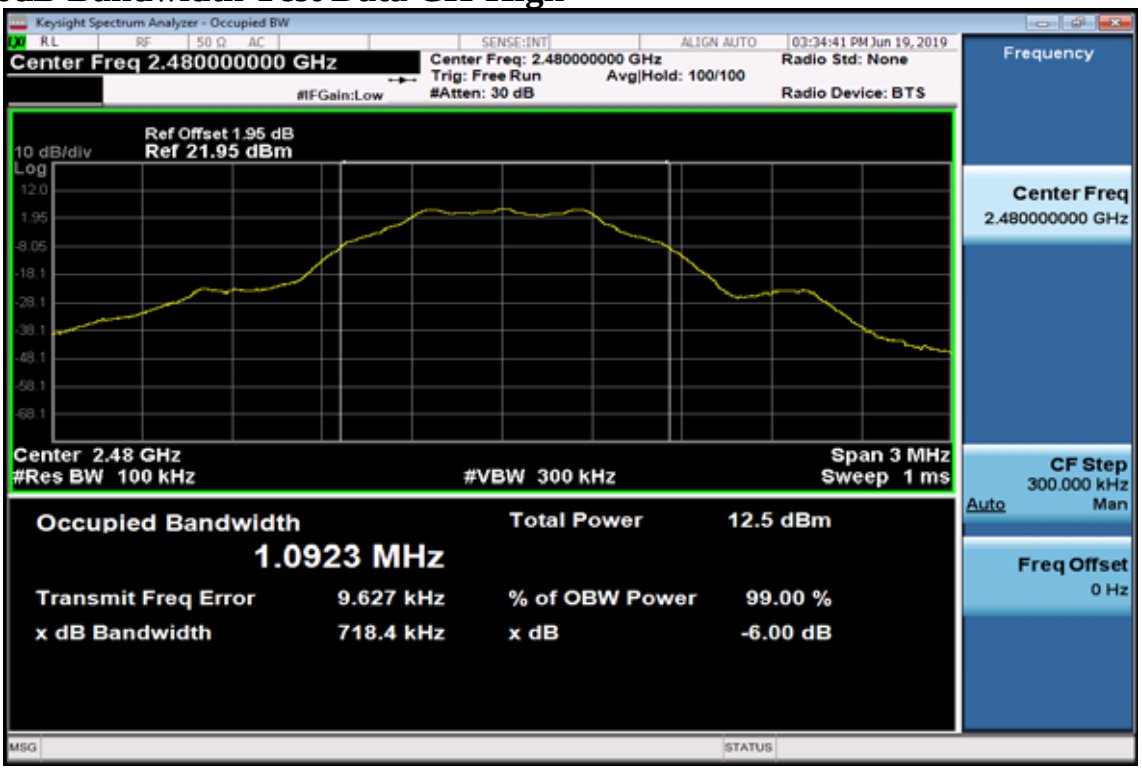
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

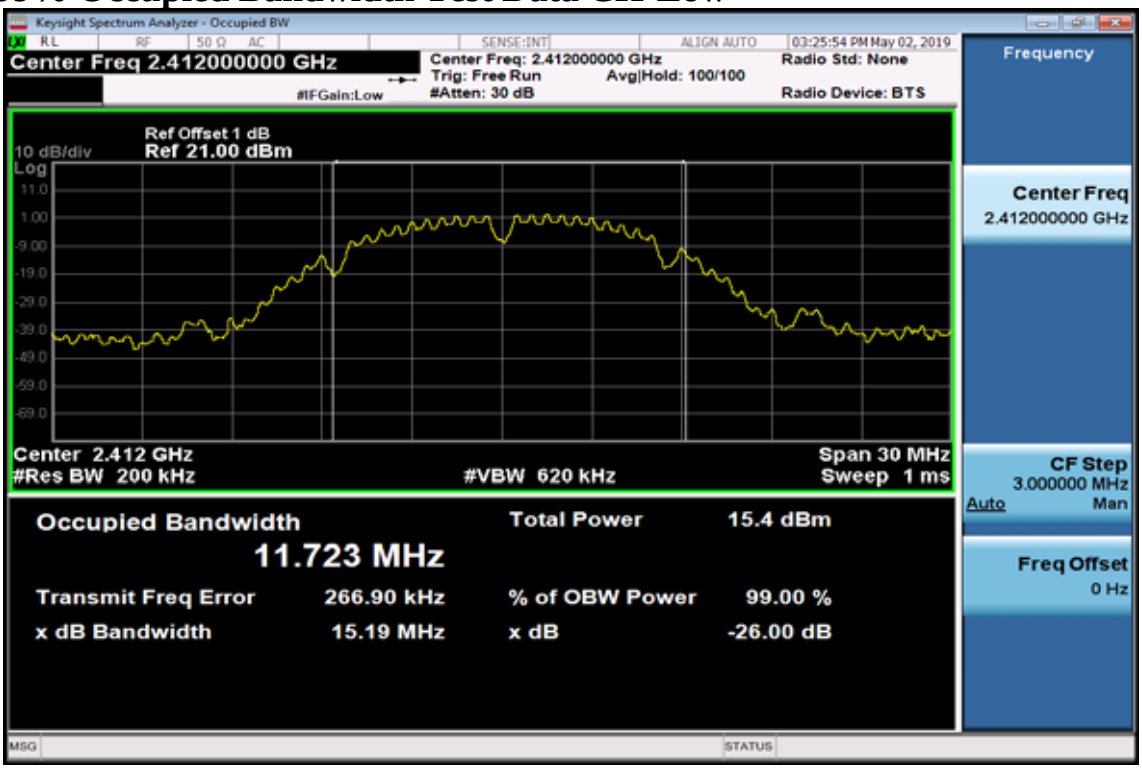


6dB Bandwidth Test Data CH-High

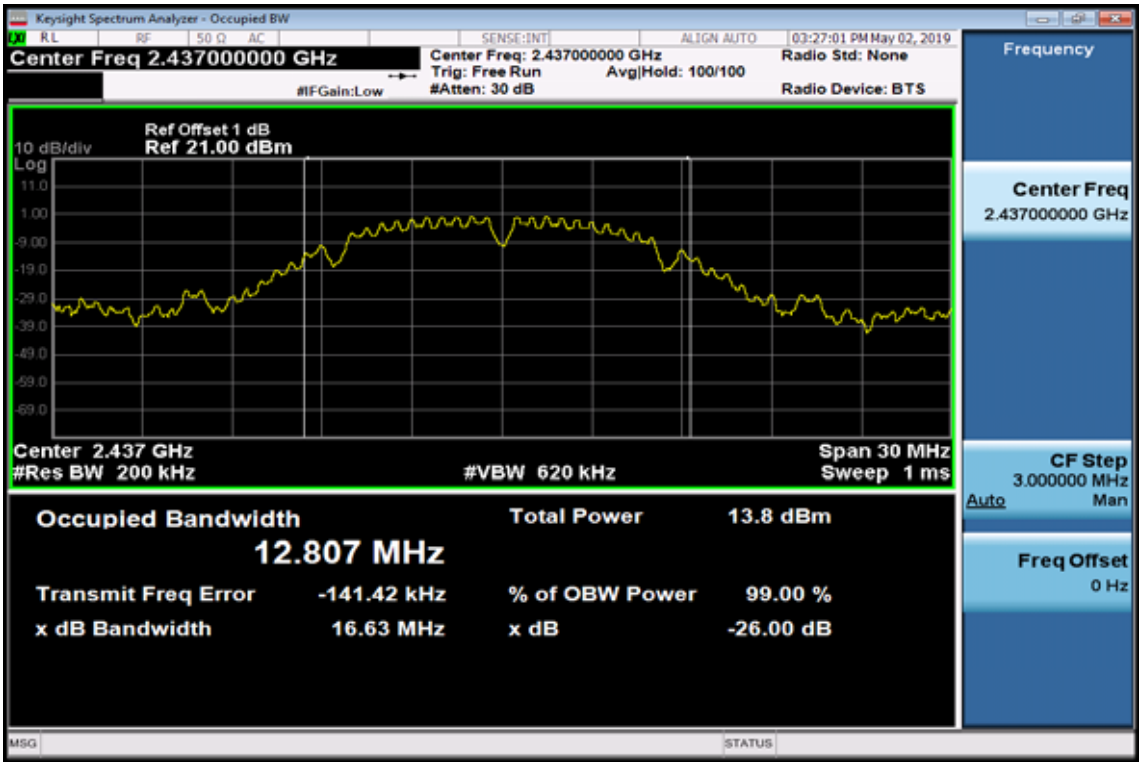


802.11b

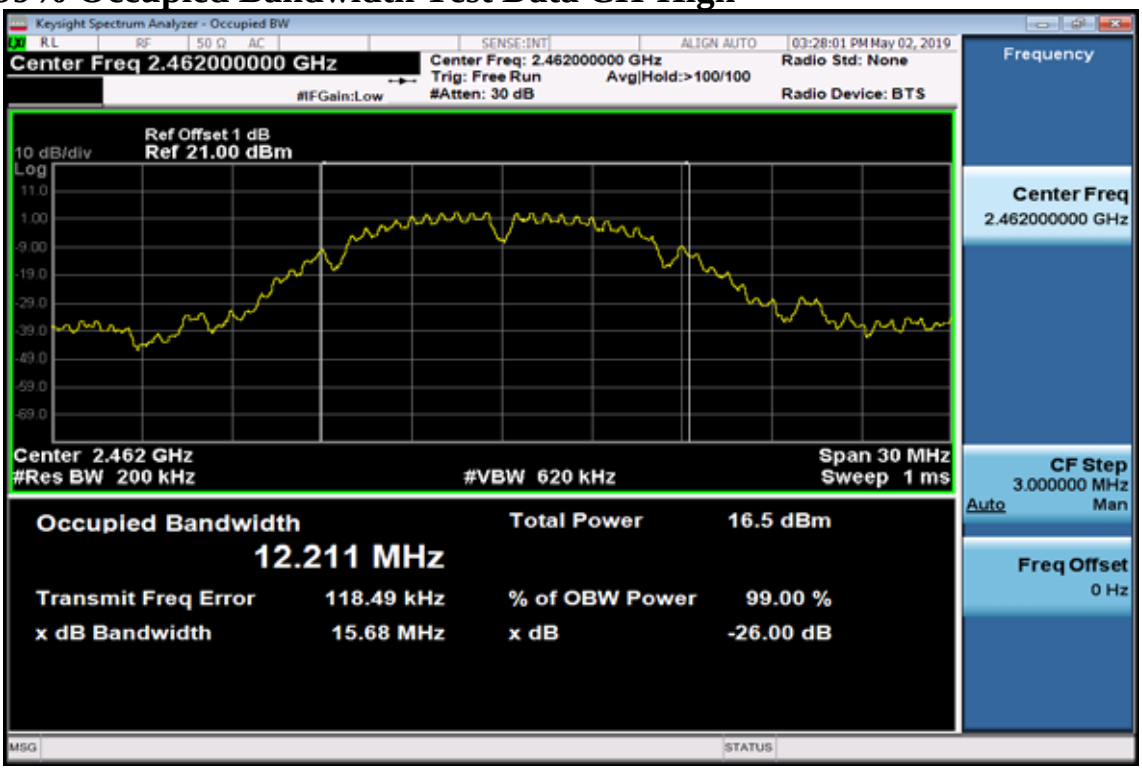
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid

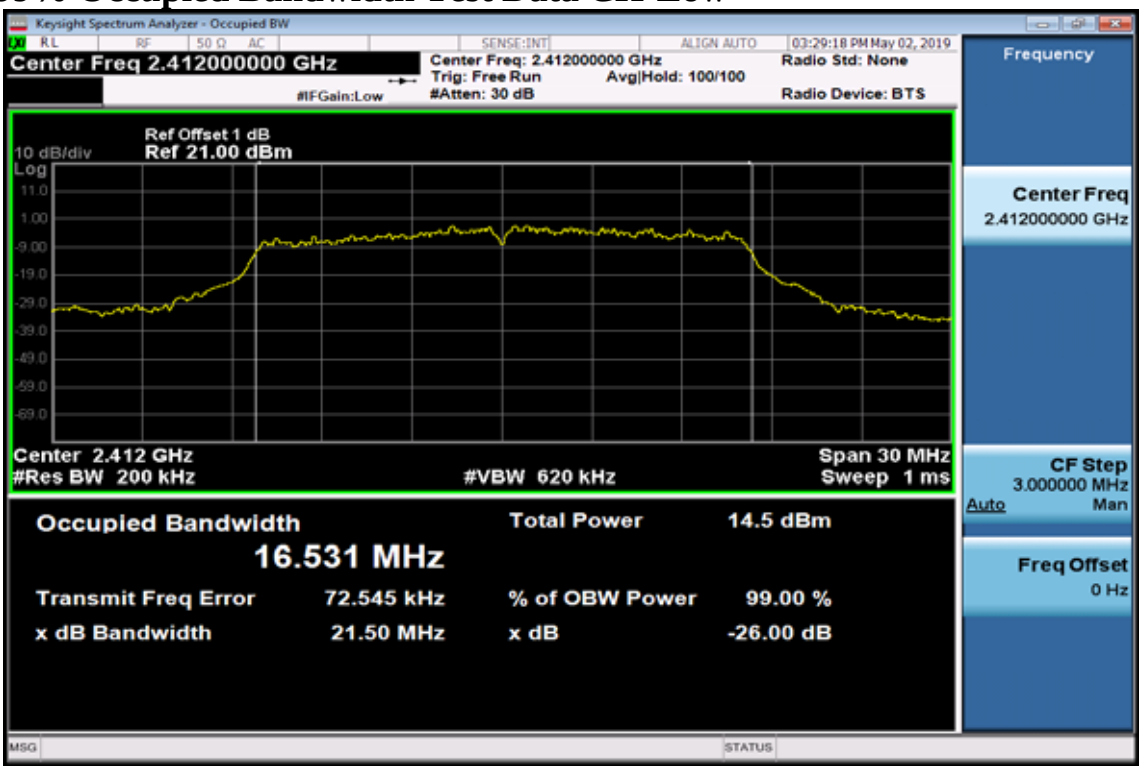


99% Occupied Bandwidth Test Data CH-High

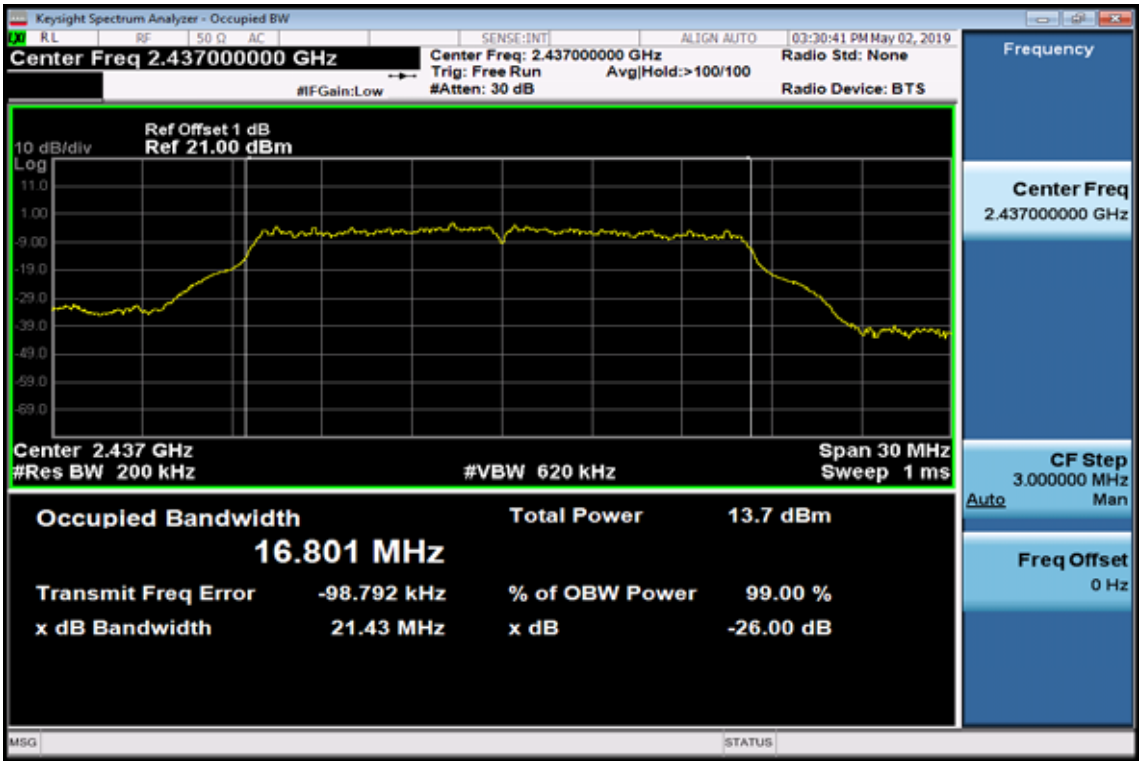


802.11g

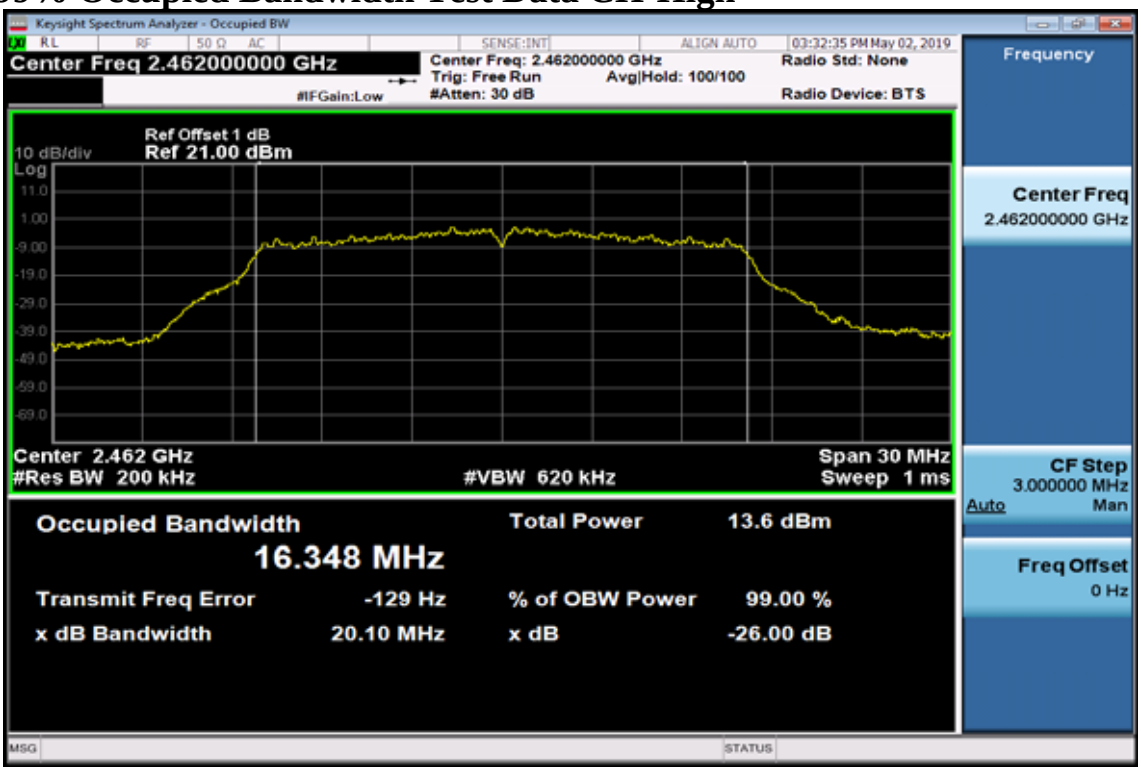
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid

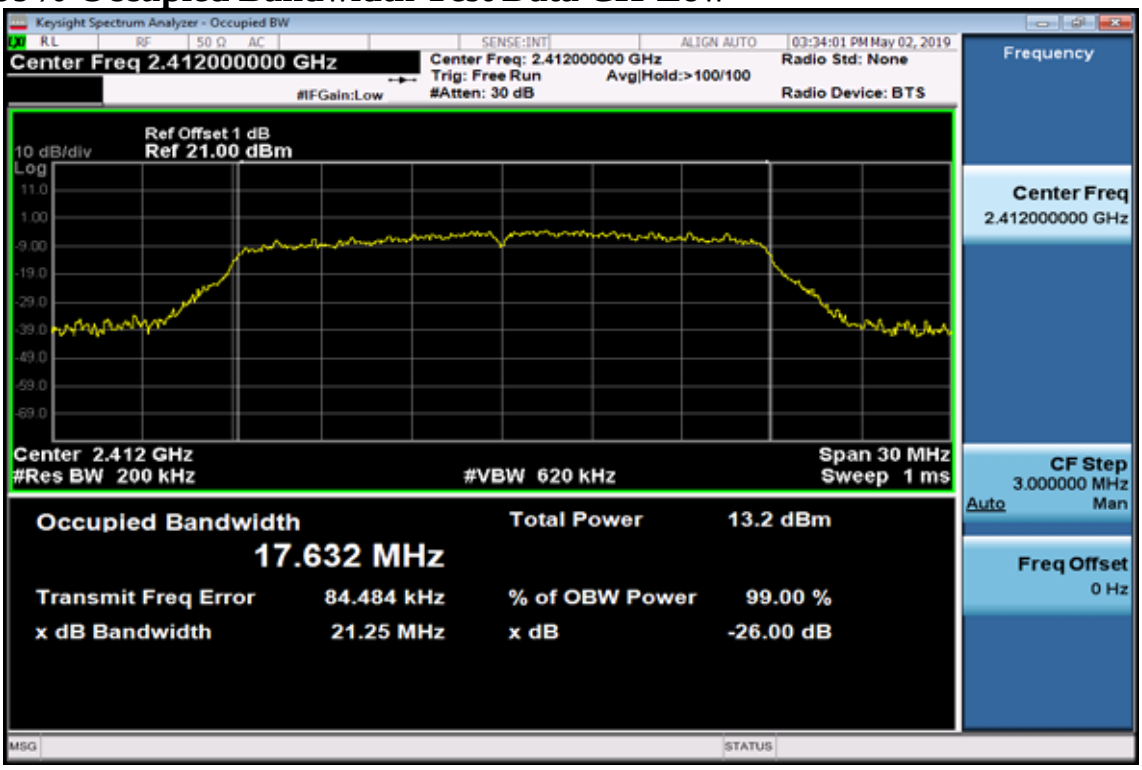


99% Occupied Bandwidth Test Data CH-High

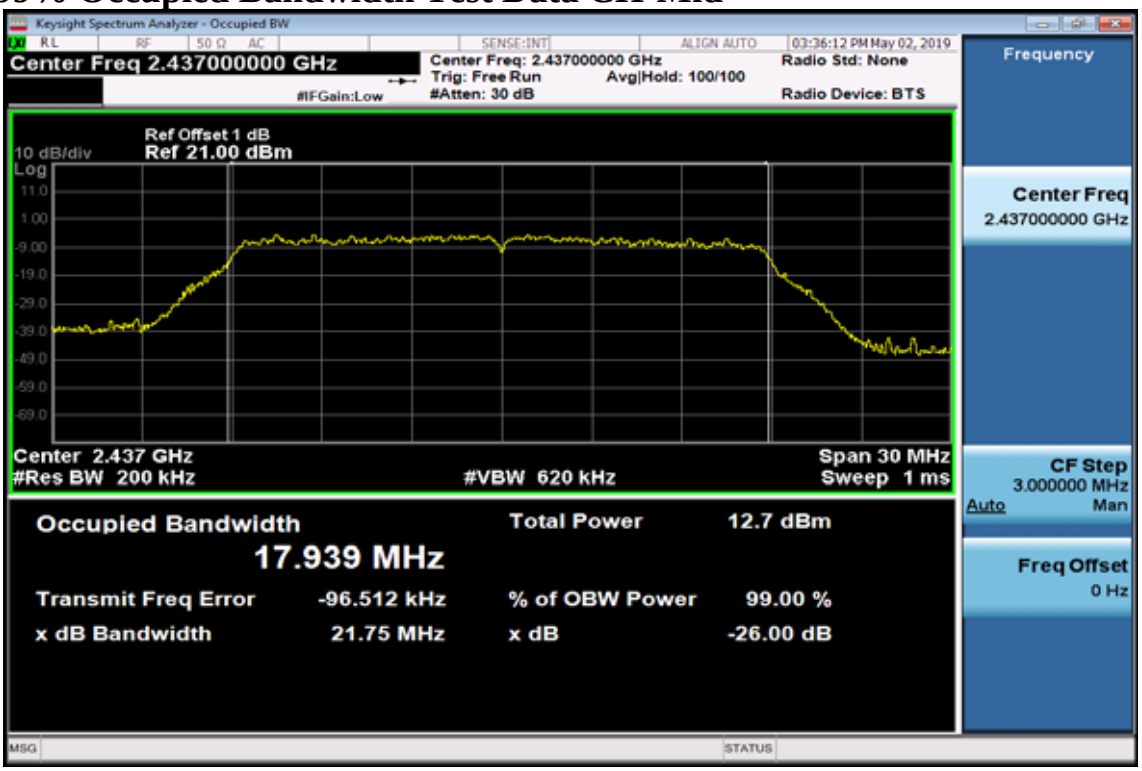


802.11n_HT20

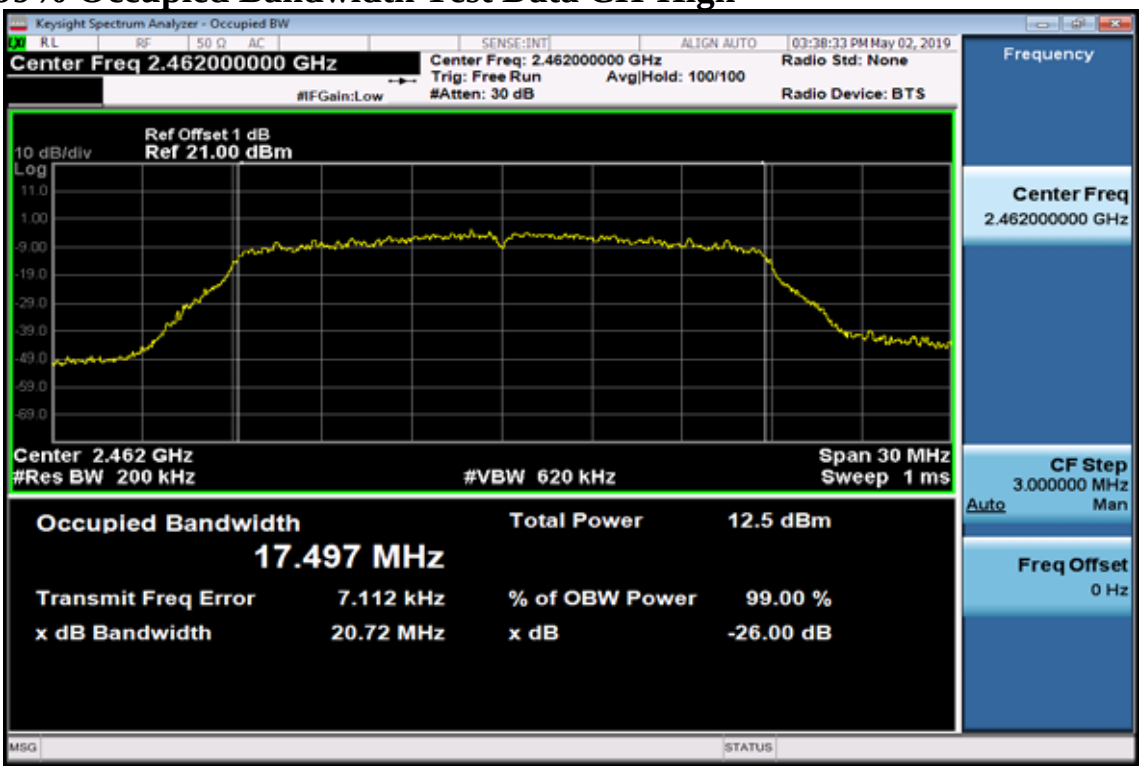
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid

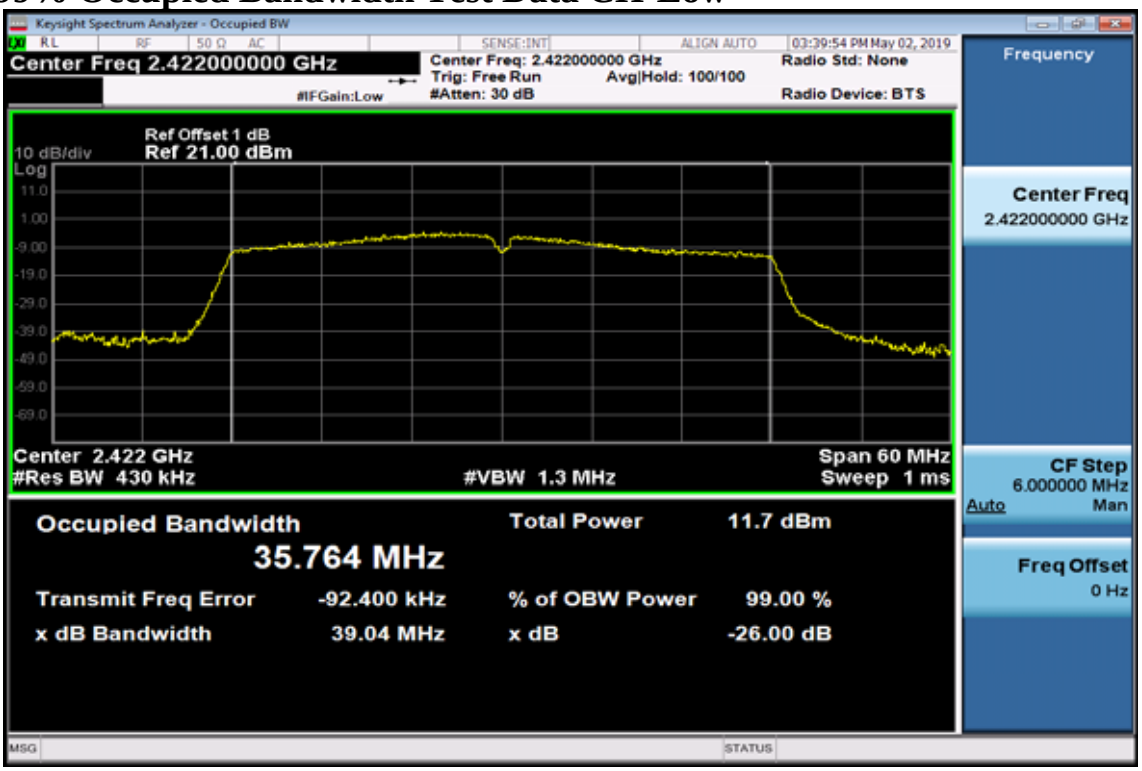


99% Occupied Bandwidth Test Data CH-High

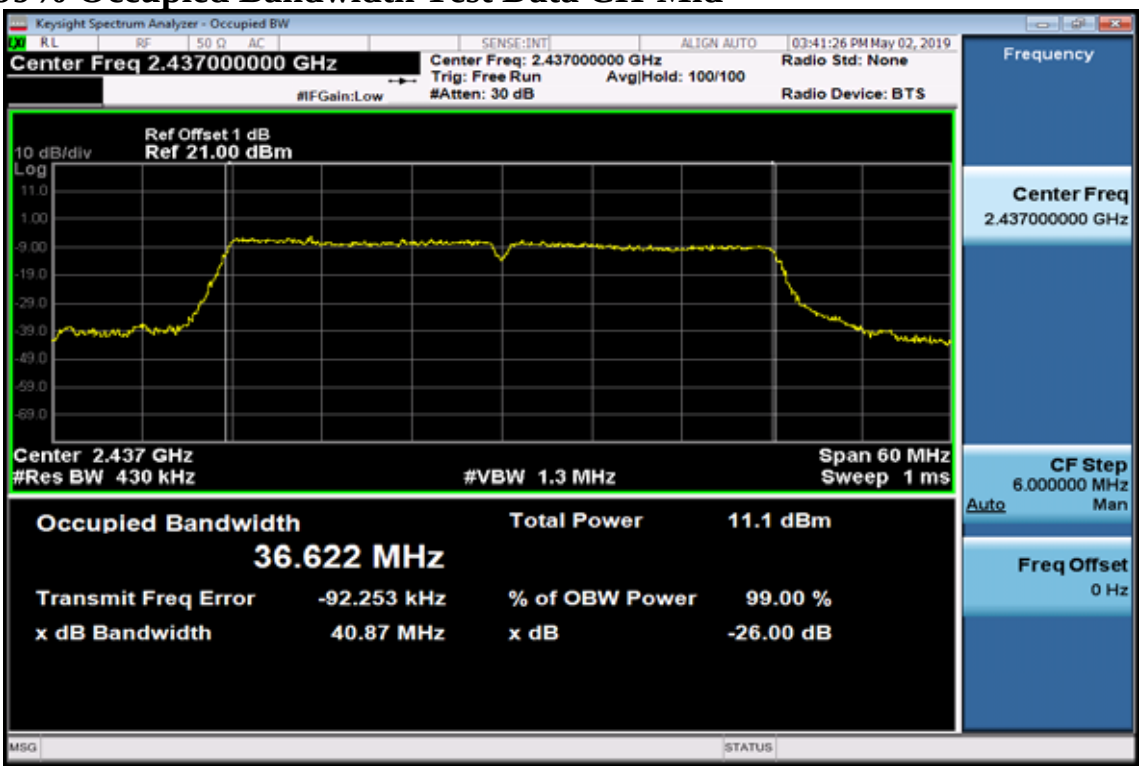


802.11n_HT40

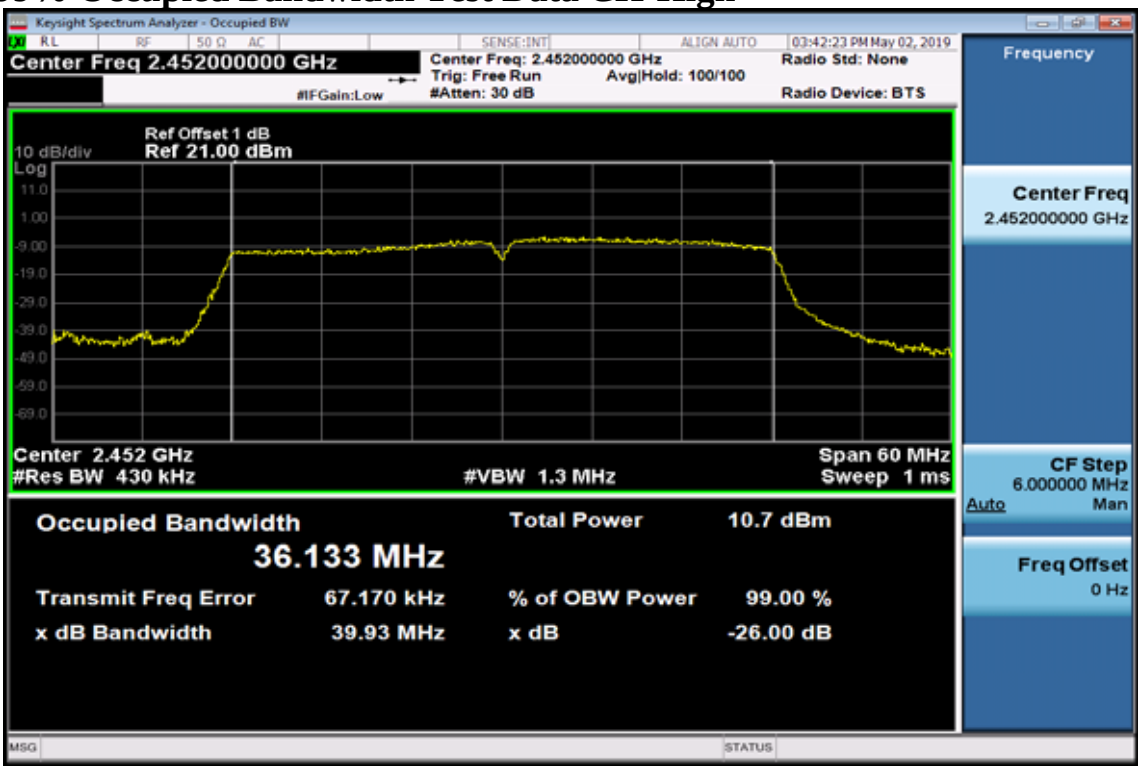
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid



99% Occupied Bandwidth Test Data CH-High



BT LE 4.0

99% Occupied Bandwidth Test Data CH-Low

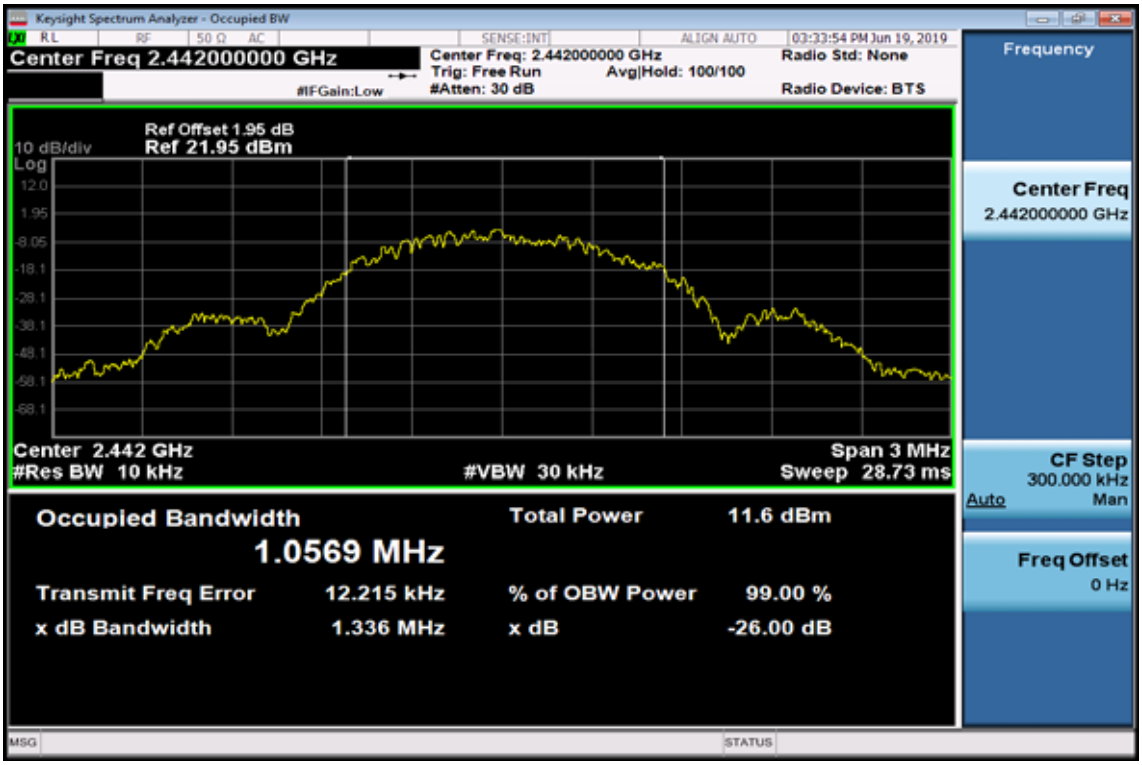
99% Occupied Bandwidth Test Data CH-Mid

99% Occupied Bandwidth Test Data CH-High

BT LE 4.2

99% Occupied Bandwidth Test Data CH-Low

99% Occupied Bandwidth Test Data CH-Mid



99% Occupied Bandwidth Test Data CH-High

8 Spurious Radiated Emission Test

8.1 Standard Applicable

According to §15.247(d), 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.

According to RSS-247 issue 2, §5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digi-tally modulated device is operating, the RF power that is produced shall be at least 20 dB be-low that in the 100 kHz bandwidth within the band that contains the highest level of the de-sired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

8.2 Measurement Equipment Used:

8.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

8.2.2 Radiated emission:

Refer to section 8.2 for details.

8.3 Test SET-UP:

The test item only performed radiated mode

Refer to section 8.3 for details.

8.4 Measurement Procedure:

1 According 414788 section 2, Either OATS or chamber for radiated emission below 30MHz, the test was done at 966 chamber, the test site was evaluated with OATS and the Chamber has test signals level greater than OATS's.

2 The EUT was placed on a turn table which is 0.8m/1.5m above ground plane in 966 chamber.

3 The turn table shall rotate 360 degrees to determine the position of maximum emission level.

4 EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.

5 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.

6 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

7 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

8 Repeat above procedures until all frequency measured were complete.

Test receiver setting	:	Blew 1GHz
Detector	:	Average(9kHz – 90kHz, 110kHz – 90kHz), Quasi-Peak
Bandwidth	:	200Hz, 120kHz
Test spectrum setting	:	Above 1GHz
Peak	:	RBW=1MHz, VBW=3MHz,Sweep=auto
Average (for Wi-Fi)	:	RBW=1MHz, VBW=10Hz, Sweep=auto
Average (for BLE)	:	RBW=1MHz, VBW=3kHz, Sweep=auto

Average Measurement Setting (VBW)

Mode	Duty Cycle (%)	T_{on} (us)	T_{off} (us)	$1/T_{on}$ (kHz)	Determined VBW Setting
802.11b	100	-	-	-	10Hz (Duty cycle ≥ 98%)
802.11g	100	-	-	-	10Hz (Duty cycle ≥ 98%)
802.11n (HT20)	100	-	-	-	10Hz (Duty cycle ≥ 98%)
802.11n (HT40)	100	-	-	-	10Hz (Duty cycle ≥ 98%)
Bluetooth LE	63.2	395	230	2.53	3kHz

8.5 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	

8.6 Measurement Result:

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

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11b TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	76.56	34.62	-10.40	24.22	40.00	-15.78	Peak	VERTICAL
2	154.16	28.88	-5.93	22.95	43.50	-20.55	Peak	VERTICAL
3	250.19	32.99	-6.67	26.32	46.00	-19.68	Peak	VERTICAL
4	375.32	34.84	-3.49	31.35	46.00	-14.65	Peak	VERTICAL
5	515.97	34.21	-1.37	32.84	46.00	-13.16	Peak	VERTICAL
6	749.74	33.12	3.08	36.20	46.00	-9.80	Peak	VERTICAL
1	111.48	32.47	-9.33	23.14	43.50	-20.36	Peak	HORIZONTAL
2	171.62	35.16	-6.43	28.73	43.50	-14.77	Peak	HORIZONTAL
3	285.11	31.87	-5.24	26.63	46.00	-19.37	Peak	HORIZONTAL
4	375.32	34.33	-3.49	30.84	46.00	-15.16	Peak	HORIZONTAL
5	399.57	34.87	-2.98	31.89	46.00	-14.11	Peak	HORIZONTAL
6	500.45	31.87	-1.64	30.23	46.00	-15.77	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11b TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	76.56	34.81	-10.40	24.41	40.00	-15.59	Peak	VERTICAL
2	145.43	30.90	-6.19	24.71	43.50	-18.79	Peak	VERTICAL
3	193.93	32.15	-8.41	23.74	43.50	-19.76	Peak	VERTICAL
4	285.11	33.77	-5.24	28.53	46.00	-17.47	Peak	VERTICAL
5	375.32	35.04	-3.49	31.55	46.00	-14.45	Peak	VERTICAL
6	498.51	31.57	-1.66	29.91	46.00	-16.09	Peak	VERTICAL
1	111.48	32.65	-9.33	23.32	43.50	-20.18	Peak	HORIZONTAL
2	170.65	34.74	-6.30	28.44	43.50	-15.06	Peak	HORIZONTAL
3	285.11	31.96	-5.24	26.72	46.00	-19.28	Peak	HORIZONTAL
4	375.32	34.00	-3.49	30.51	46.00	-15.49	Peak	HORIZONTAL
5	500.45	32.06	-1.64	30.42	46.00	-15.58	Peak	HORIZONTAL
6	749.74	31.94	3.08	35.02	46.00	-10.98	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11b TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	75.59	35.13	-10.14	24.99	40.00	-15.01	Peak	VERTICAL
2	156.10	30.05	-5.92	24.13	43.50	-19.37	Peak	VERTICAL
3	250.19	33.05	-6.67	26.38	46.00	-19.62	Peak	VERTICAL
4	304.51	32.11	-4.75	27.36	46.00	-18.64	Peak	VERTICAL
5	386.96	33.23	-3.25	29.98	46.00	-16.02	Peak	VERTICAL
6	749.74	33.64	3.08	36.72	46.00	-9.28	Peak	VERTICAL
1	111.48	33.03	-9.33	23.70	43.50	-19.80	Peak	HORIZONTAL
2	171.62	34.79	-6.43	28.36	43.50	-15.14	Peak	HORIZONTAL
3	285.11	32.01	-5.24	26.77	46.00	-19.23	Peak	HORIZONTAL
4	375.32	34.17	-3.49	30.68	46.00	-15.32	Peak	HORIZONTAL
5	399.57	34.50	-2.98	31.52	46.00	-14.48	Peak	HORIZONTAL
6	515.00	33.21	-1.40	31.81	46.00	-14.19	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11g TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	75.59	35.23	-10.14	25.09	40.00	-14.91	Peak	VERTICAL
2	156.10	26.79	-5.92	20.87	43.50	-22.63	Peak	VERTICAL
3	250.19	32.64	-6.67	25.97	46.00	-20.03	Peak	VERTICAL
4	285.11	32.70	-5.24	27.46	46.00	-18.54	Peak	VERTICAL
5	514.03	32.99	-1.42	31.57	46.00	-14.43	Peak	VERTICAL
6	749.74	33.27	3.08	36.35	46.00	-9.65	Peak	VERTICAL
1	158.04	27.27	-5.91	21.36	43.50	-22.14	Peak	HORIZONTAL
2	192.96	31.11	-8.37	22.74	43.50	-20.76	Peak	HORIZONTAL
3	399.57	31.04	-2.98	28.06	46.00	-17.94	Peak	HORIZONTAL
4	497.54	29.57	-1.68	27.89	46.00	-18.11	Peak	HORIZONTAL
5	600.36	28.18	0.42	28.60	46.00	-17.40	Peak	HORIZONTAL
6	780.78	26.85	3.40	30.25	46.00	-15.75	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11g TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	75.59	34.46	-10.14	24.32	40.00	-15.68	Peak	VERTICAL
2	156.10	29.98	-5.92	24.06	43.50	-19.44	Peak	VERTICAL
3	285.11	32.00	-5.24	26.76	46.00	-19.24	Peak	VERTICAL
4	375.32	35.88	-3.49	32.39	46.00	-13.61	Peak	VERTICAL
5	500.45	32.29	-1.64	30.65	46.00	-15.35	Peak	VERTICAL
6	749.74	33.37	3.08	36.45	46.00	-9.55	Peak	VERTICAL
1	112.45	33.47	-9.23	24.24	43.50	-19.26	Peak	HORIZONTAL
2	171.62	33.98	-6.43	27.55	43.50	-15.95	Peak	HORIZONTAL
3	285.11	31.14	-5.24	25.90	46.00	-20.10	Peak	HORIZONTAL
4	375.32	35.60	-3.49	32.11	46.00	-13.89	Peak	HORIZONTAL
5	500.45	32.37	-1.64	30.73	46.00	-15.27	Peak	HORIZONTAL
6	749.74	32.79	3.08	35.87	46.00	-10.13	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11g TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	32.91	36.01	-7.11	28.90	40.00	-11.10	Peak	VERTICAL
2	75.59	34.26	-10.14	24.12	40.00	-15.88	Peak	VERTICAL
3	250.19	32.32	-6.67	25.65	46.00	-20.35	Peak	VERTICAL
4	375.32	34.10	-3.49	30.61	46.00	-15.39	Peak	VERTICAL
5	500.45	31.35	-1.64	29.71	46.00	-16.29	Peak	VERTICAL
6	749.74	33.05	3.08	36.13	46.00	-9.87	Peak	VERTICAL
1	112.45	32.79	-9.23	23.56	43.50	-19.94	Peak	HORIZONTAL
2	171.62	34.58	-6.43	28.15	43.50	-15.35	Peak	HORIZONTAL
3	285.11	32.14	-5.24	26.90	46.00	-19.10	Peak	HORIZONTAL
4	399.57	34.43	-2.98	31.45	46.00	-14.55	Peak	HORIZONTAL
5	513.06	32.75	-1.43	31.32	46.00	-14.68	Peak	HORIZONTAL
6	749.74	33.18	3.08	36.26	46.00	-9.74	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	76.56	34.98	-10.40	24.58	40.00	-15.42	Peak	VERTICAL
2	153.19	29.31	-5.95	23.36	43.50	-20.14	Peak	VERTICAL
3	285.11	32.68	-5.24	27.44	46.00	-18.56	Peak	VERTICAL
4	375.32	35.01	-3.49	31.52	46.00	-14.48	Peak	VERTICAL
5	500.45	32.65	-1.64	31.01	46.00	-14.99	Peak	VERTICAL
6	749.74	33.71	3.08	36.79	46.00	-9.21	Peak	VERTICAL
1	112.45	32.32	-9.23	23.09	43.50	-20.41	Peak	HORIZONTAL
2	171.62	34.72	-6.43	28.29	43.50	-15.21	Peak	HORIZONTAL
3	375.32	35.37	-3.49	31.88	46.00	-14.12	Peak	HORIZONTAL
4	399.57	34.60	-2.98	31.62	46.00	-14.38	Peak	HORIZONTAL
5	500.45	31.41	-1.64	29.77	46.00	-16.23	Peak	HORIZONTAL
6	749.74	32.97	3.08	36.05	46.00	-9.95	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	75.59	34.54	-10.14	24.40	40.00	-15.60	Peak	VERTICAL
2	153.19	29.35	-5.95	23.40	43.50	-20.10	Peak	VERTICAL
3	285.11	32.14	-5.24	26.90	46.00	-19.10	Peak	VERTICAL
4	375.32	37.27	-3.49	33.78	46.00	-12.22	Peak	VERTICAL
5	515.00	31.71	-1.40	30.31	46.00	-15.69	Peak	VERTICAL
6	749.74	34.85	3.08	37.93	46.00	-8.07	Peak	VERTICAL
1	110.51	33.55	-9.41	24.14	43.50	-19.36	Peak	HORIZONTAL
2	164.83	34.50	-6.04	28.46	43.50	-15.04	Peak	HORIZONTAL
3	375.32	34.96	-3.49	31.47	46.00	-14.53	Peak	HORIZONTAL
4	399.57	34.78	-2.98	31.80	46.00	-14.20	Peak	HORIZONTAL
5	500.45	32.61	-1.64	30.97	46.00	-15.03	Peak	HORIZONTAL
6	749.74	33.00	3.08	36.08	46.00	-9.92	Peak	HORIZONTAL

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 9kHz 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.

1.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	76.56	34.22	-10.40	23.82	40.00	-16.18	Peak	VERTICAL
2	155.13	30.01	-5.93	24.08	43.50	-19.42	Peak	VERTICAL
3	199.75	31.77	-8.60	23.17	43.50	-20.33	Peak	VERTICAL
4	285.11	32.17	-5.24	26.93	46.00	-19.07	Peak	VERTICAL
5	375.32	37.82	-3.49	34.33	46.00	-11.67	Peak	VERTICAL
6	500.45	32.13	-1.64	30.49	46.00	-15.51	Peak	VERTICAL
1	111.48	33.16	-9.33	23.83	43.50	-19.67	Peak	HORIZONTAL
2	171.62	35.96	-6.43	29.53	43.50	-13.97	Peak	HORIZONTAL
3	375.32	34.83	-3.49	31.34	46.00	-14.66	Peak	HORIZONTAL
4	399.57	34.40	-2.98	31.42	46.00	-14.58	Peak	HORIZONTAL
5	500.45	31.84	-1.64	30.20	46.00	-15.80	Peak	HORIZONTAL
6	749.74	33.63	3.08	36.71	46.00	-9.29	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT40 TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	76.56	35.13	-10.40	24.73	40.00	-15.27	Peak	VERTICAL
2	153.19	29.84	-5.95	23.89	43.50	-19.61	Peak	VERTICAL
3	304.51	32.09	-4.75	27.34	46.00	-18.66	Peak	VERTICAL
4	375.32	34.30	-3.49	30.81	46.00	-15.19	Peak	VERTICAL
5	500.45	30.93	-1.64	29.29	46.00	-16.71	Peak	VERTICAL
6	749.74	34.12	3.08	37.20	46.00	-8.80	Peak	VERTICAL
1	171.62	35.22	-6.43	28.79	43.50	-14.71	Peak	HORIZONTAL
2	342.34	32.00	-4.15	27.85	46.00	-18.15	Peak	HORIZONTAL
3	375.32	35.53	-3.49	32.04	46.00	-13.96	Peak	HORIZONTAL
4	399.57	35.63	-2.98	32.65	46.00	-13.35	Peak	HORIZONTAL
5	513.06	32.89	-1.43	31.46	46.00	-14.54	Peak	HORIZONTAL
6	749.74	33.02	3.08	36.10	46.00	-9.90	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT40 TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	32.91	36.67	-7.11	29.56	40.00	-10.44	Peak	VERTICAL
2	150.28	29.56	-5.97	23.59	43.50	-19.91	Peak	VERTICAL
3	285.11	32.25	-5.24	27.01	46.00	-18.99	Peak	VERTICAL
4	375.32	34.48	-3.49	30.99	46.00	-15.01	Peak	VERTICAL
5	500.45	32.12	-1.64	30.48	46.00	-15.52	Peak	VERTICAL
6	749.74	33.35	3.08	36.43	46.00	-9.57	Peak	VERTICAL
1	172.59	35.00	-6.56	28.44	43.50	-15.06	Peak	HORIZONTAL
2	285.11	32.38	-5.24	27.14	46.00	-18.86	Peak	HORIZONTAL
3	375.32	34.08	-3.49	30.59	46.00	-15.41	Peak	HORIZONTAL
4	399.57	33.79	-2.98	30.81	46.00	-15.19	Peak	HORIZONTAL
5	500.45	31.91	-1.64	30.27	46.00	-15.73	Peak	HORIZONTAL
6	749.74	34.29	3.08	37.37	46.00	-8.63	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT40 TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	75.59	33.39	-10.14	23.25	40.00	-16.75	Peak	VERTICAL
2	155.13	31.01	-5.93	25.08	43.50	-18.42	Peak	VERTICAL
3	285.11	32.29	-5.24	27.05	46.00	-18.95	Peak	VERTICAL
4	375.32	35.66	-3.49	32.17	46.00	-13.83	Peak	VERTICAL
5	500.45	31.01	-1.64	29.37	46.00	-16.63	Peak	VERTICAL
6	749.74	33.46	3.08	36.54	46.00	-9.46	Peak	VERTICAL
1	172.59	35.62	-6.56	29.06	43.50	-14.44	Peak	HORIZONTAL
2	285.11	31.72	-5.24	26.48	46.00	-19.52	Peak	HORIZONTAL
3	331.67	31.39	-4.32	27.07	46.00	-18.93	Peak	HORIZONTAL
4	375.32	35.02	-3.49	31.53	46.00	-14.47	Peak	HORIZONTAL
5	500.45	32.07	-1.64	30.43	46.00	-15.57	Peak	HORIZONTAL
6	749.74	32.98	3.08	36.06	46.00	-9.94	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	801.11b TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	57.07	-19.05	38.02	74.00	-35.98	Peak	VERTICAL
2	4824.00	46.84	-9.22	37.62	74.00	-36.38	Peak	VERTICAL
1	1497.00	53.65	-19.05	34.60	74.00	-39.40	Peak	HORIZONTAL
2	4824.00	46.45	-9.22	37.23	74.00	-36.77	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11b TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	57.54	-19.05	38.49	74.00	-35.51	Peak	VERTICAL
2	4874.00	46.66	-9.09	37.57	74.00	-36.43	Peak	VERTICAL
1	1497.00	55.60	-19.05	36.55	74.00	-37.45	Peak	HORIZONTAL
2	4924.00	47.52	-8.96	38.56	74.00	-35.44	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11b TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	51.46	-19.05	32.41	74.00	-41.59	Peak	VERTICAL
2	4924.00	47.49	-8.96	38.53	74.00	-35.47	Peak	VERTICAL
1	1497.00	51.46	-19.05	32.41	74.00	-41.59	Peak	HORIZONTAL
2	4924.00	47.49	-8.96	38.53	74.00	-35.47	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	801.11g TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	55.51	-19.05	36.46	74.00	-37.54	Peak	VERTICAL
2	4824.00	45.30	-9.22	36.08	74.00	-37.92	Peak	VERTICAL
1	2029.00	50.27	-17.36	32.91	74.00	-41.09	Peak	HORIZONTAL
2	4824.00	44.85	-9.22	35.63	74.00	-38.37	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.1g TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	55.75	-19.05	36.70	74.00	-37.30	Peak	VERTICAL
2	4874.00	46.21	-9.09	37.12	74.00	-36.88	Peak	VERTICAL
1	1497.00	52.20	-19.05	33.15	74.00	-40.85	Peak	HORIZONTAL
2	4874.00	46.86	-9.09	37.77	74.00	-36.23	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11g TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	55.61	-19.05	36.56	74.00	-37.44	Peak	VERTICAL
2	4924.00	45.99	-8.96	37.03	74.00	-36.97	Peak	VERTICAL
1	4924.00	47.03	-8.96	38.07	74.00	-35.93	Peak	HORIZONTAL
2	7386.00	46.25	-1.60	44.65	74.00	-29.35	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1987.00	55.57	-17.82	37.75	74.00	-36.25	Peak	VERTICAL
2	4824.00	45.64	-9.22	36.42	74.00	-37.58	Peak	VERTICAL
1	1497.00	51.82	-19.05	32.77	74.00	-41.23	Peak	HORIZONTAL
2	4824.00	45.96	-9.22	36.74	74.00	-37.26	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	56.22	-19.05	37.17	74.00	-36.83	Peak	VERTICAL
2	4874.00	45.32	-9.09	36.23	74.00	-37.77	Peak	VERTICAL
1	1721.00	57.51	-19.05	38.46	74.00	-35.54	Peak	HORIZONTAL
2	4874.00	45.27	-9.09	36.18	74.00	-37.82	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	57.02	-19.05	37.97	74.00	-36.03	Peak	VERTICAL
2	4924.00	46.22	-8.96	37.26	74.00	-36.74	Peak	VERTICAL
1	1497.00	53.05	-19.05	34.00	74.00	-40.00	Peak	HORIZONTAL
2	4924.00	45.72	-8.96	36.76	74.00	-37.24	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11n HT40 TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	42.45	-7.18	35.27	74.00	-38.73	Peak	VERTICAL
2	4844.00	32.20	3.51	35.71	74.00	-38.29	Peak	VERTICAL
1	1497.00	42.00	-7.18	34.82	74.00	-39.18	Peak	HORIZONTAL
2	4844.00	32.33	3.51	35.84	74.00	-38.16	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11n HT40 TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	43.10	-7.18	35.92	74.00	-38.08	Peak	VERTICAL
2	4874.00	32.16	3.57	35.73	74.00	-38.27	Peak	VERTICAL
1	1497.00	42.61	-7.18	35.43	74.00	-38.57	Peak	HORIZONTAL
2	4874.00	32.25	3.57	35.82	74.00	-38.18	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	802.11n HT40 TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	42.75	-7.18	35.57	74.00	-38.43	Peak	VERTICAL
2	4904.00	32.76	3.66	36.42	74.00	-37.58	Peak	VERTICAL
1	1721.00	41.38	-6.87	34.51	74.00	-39.49	Peak	HORIZONTAL
2	4904.00	32.72	3.66	36.38	74.00	-37.62	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (below 1GHz) BLE Mode

Operation Mode	TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	32.91	35.77	-7.11	28.66	40.00	-11.34	Peak	VERTICAL
2	76.56	34.56	-10.40	24.16	40.00	-15.84	Peak	VERTICAL
3	250.19	32.09	-6.67	25.42	46.00	-20.58	Peak	VERTICAL
4	285.11	31.33	-5.24	26.09	46.00	-19.91	Peak	VERTICAL
5	500.45	30.73	-1.64	29.09	46.00	-16.91	Peak	VERTICAL
6	749.74	33.32	3.08	36.40	46.00	-9.60	Peak	VERTICAL
1	118.27	28.49	-8.71	19.78	43.50	-23.72	Peak	HORIZONTAL
2	170.65	28.50	-6.30	22.20	43.50	-21.30	Peak	HORIZONTAL
3	342.34	28.89	-4.15	24.74	46.00	-21.26	Peak	HORIZONTAL
4	399.57	30.34	-2.98	27.36	46.00	-18.64	Peak	HORIZONTAL
5	497.54	29.73	-1.68	28.05	46.00	-17.95	Peak	HORIZONTAL
6	822.49	28.41	3.93	32.34	46.00	-13.66	Peak	HORIZONTAL

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 9kHz 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.

Radiated Spurious Emission Measurement Result (below 1GHz) BLE Mode

Operation Mode	TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	75.59	35.50	-10.14	25.36	40.00	-14.64	Peak	VERTICAL
2	250.19	33.58	-6.67	26.91	46.00	-19.09	Peak	VERTICAL
3	285.11	31.55	-5.24	26.31	46.00	-19.69	Peak	VERTICAL
4	399.57	28.11	-2.98	25.13	46.00	-20.87	Peak	VERTICAL
5	500.45	29.19	-1.64	27.55	46.00	-18.45	Peak	VERTICAL
6	749.74	33.47	3.08	36.55	46.00	-9.45	Peak	VERTICAL
1	199.75	31.24	-8.60	22.64	43.50	-20.86	Peak	HORIZONTAL
2	331.67	29.78	-4.32	25.46	46.00	-20.54	Peak	HORIZONTAL
3	399.57	32.02	-2.98	29.04	46.00	-16.96	Peak	HORIZONTAL
4	500.45	30.63	-1.64	28.99	46.00	-17.01	Peak	HORIZONTAL
5	610.06	28.58	0.54	29.12	46.00	-16.88	Peak	HORIZONTAL
6	785.63	28.04	3.45	31.49	46.00	-14.51	Peak	HORIZONTAL

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 9kHz 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.

2.

Radiated Spurious Emission Measurement Result (below 1GHz) BLE Mode

Operation Mode	TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	75.59	33.76	-10.14	23.62	40.00	-16.38	Peak	VERTICAL
2	250.19	33.11	-6.67	26.44	46.00	-19.56	Peak	VERTICAL
3	285.11	32.15	-5.24	26.91	46.00	-19.09	Peak	VERTICAL
4	470.38	30.84	-1.91	28.93	46.00	-17.07	Peak	VERTICAL
5	500.45	31.07	-1.64	29.43	46.00	-16.57	Peak	VERTICAL
6	749.74	33.06	3.08	36.14	46.00	-9.86	Peak	VERTICAL
1	169.68	28.84	-6.21	22.63	43.50	-20.87	Peak	HORIZONTAL
2	285.11	28.63	-5.24	23.39	46.00	-22.61	Peak	HORIZONTAL
3	399.57	30.94	-2.98	27.96	46.00	-18.04	Peak	HORIZONTAL
4	500.45	29.26	-1.64	27.62	46.00	-18.38	Peak	HORIZONTAL
5	646.92	28.78	0.98	29.76	46.00	-16.24	Peak	HORIZONTAL
6	752.65	27.41	3.12	30.53	46.00	-15.47	Peak	HORIZONTAL

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 9kHz 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.

3.

Radiated Spurious Emission Measurement Result (above 1GHz) BLE Mode

Operation Mode	TX mode	Test Date	2019/05/17
Channel number	CH Low	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	41.54	-7.18	34.36	74.00	-39.64	Peak	VERTICAL
2	4804.00	32.22	3.41	35.63	74.00	-38.37	Peak	VERTICAL
1	1497.00	41.09	-7.18	33.91	74.00	-40.09	Peak	HORIZONTAL
2	4804.00	32.01	3.41	35.42	74.00	-38.58	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz) BLE Mode

Operation Mode	TX mode	Test Date	2019/05/17
Channel number	CH Mid	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	44.46	-7.18	37.28	74.00	-36.72	Peak	VERTICAL
2	4884.00	33.39	3.60	36.99	74.00	-37.01	Peak	VERTICAL
1	1497.00	42.52	-7.18	35.34	74.00	-38.66	Peak	HORIZONTAL
2	4884.00	33.96	3.60	37.56	74.00	-36.44	Peak	HORIZONTAL

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.

Radiated Spurious Emission Measurement Result (above 1GHz) BLE Mode

Operation Mode	TX mode	Test Date	2019/05/17
Channel number	CH High	Test By	Barry
Temperature	25 ℃	Pol	Ver./Hor
Humidity	60 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	1497.00	42.74	-7.18	35.56	74.00	-38.44	Peak	VERTICAL
2	4960.00	33.33	3.78	37.11	74.00	-36.89	Peak	VERTICAL
1	1497.00	40.01	-7.18	32.83	74.00	-41.17	Peak	HORIZONTAL
2	4960.00	32.57	3.78	36.35	74.00	-37.65	Peak	HORIZONTAL

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.

9 100kHz Bandwidth of Band Edges Measurement

9.1 Standard Applicable:

According to §15.247(d), 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).

According to RSS-247 issue 2, §5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digi-tally modulated device is operating, the RF power that is produced shall be at least 20 dB be-low that in the 100 kHz bandwidth within the band that contains the highest level of the de-sired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

9.2 Measurement Equipment Used:

8.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

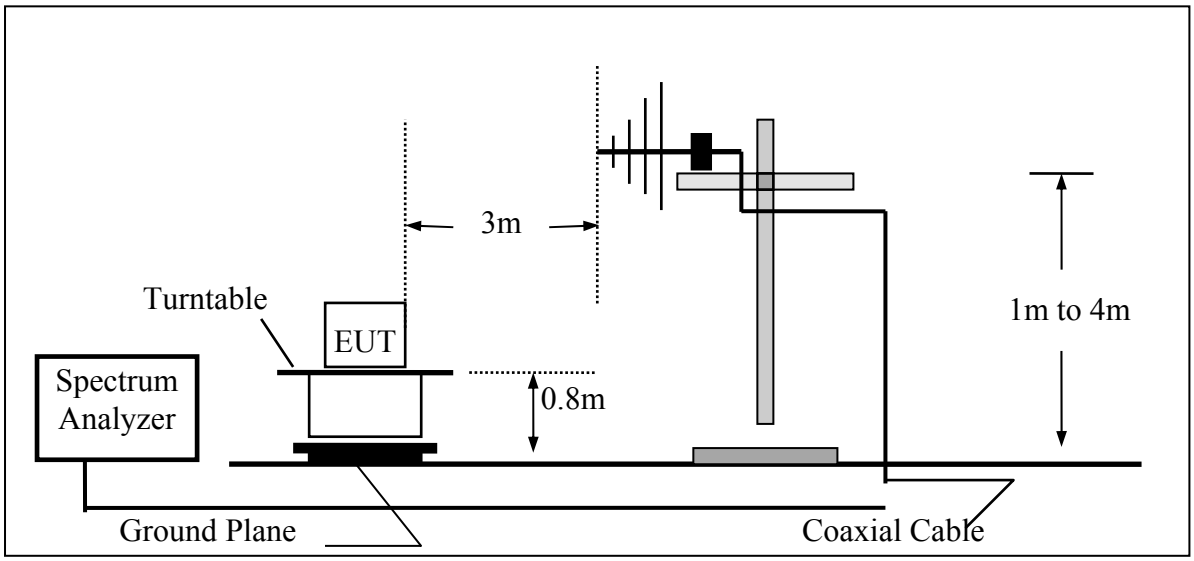
8.2.2. Radiated emission:

Chamber 19(966)					
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Last Cal.**	**Cal Due.**
Spectrum analyzer	R&S	FSP40	100116	01/10/2019	01/09/2020
EMI Receiver	R&S	ESR3	102461	08/08/2018	08/07/2019
Loop Antenna(9K-30M)	EM	EM-6879	271	06/06/2018	06/05/2020
Bilog Antenna (30M-1G)	SCHWARZ-BECK	VULB9168 w 5dB Att	736	01/29/2019	01/28/2020
Horn antenna (1G-18G)	SCHWARZBECK	9120D	9120D-1627	11/27/2017	11/26/2019
Horn antenna (18G-26G)	Com-power	AH-826	081001	11/21/2017	11/20/2019
Horn antenna (26G-40G)	Com-power	AH-640	100A	03/29/2019	03/28/2021
Preamplifier (9k-1000M)	HP	8447F	3113A06362	01/14/2019	01/13/2020
Preamplifier(1G-26G)	Agilent	8449B	3008A02471	10/29/2018	10/28/2019
Preamplifier (26G-40G)	MITEQ	JS4-26004000-27-5A	818471	05/06/2019	05/05/2020
RF Cable (9k-18G)	HUBER SU-HNER	SUCOFLEX 104A	MY1397/4A	01/17/2019	01/16/2020
RF cable (18G~40G)	HUBER SU-HNER	Sucoflex 102	27963/2&37421/2	11/12/2018	11/11/2019
Turn Table	MF	Turn Table-19	Turn Table-19	N/A	N/A
Mast Tower	MF	JSDES-15A	1308283	N/A	N/A
Controller	MF	MF-7802BS	MF780208460	N/A	N/A
AC power source	T-Power	TFC-1005	40006471	N/A	N/A
Signal Generator	Anritsu	MG3692A	20311	01/09/2019	01/08/2020
2.4G Filter	Micro-Tronics	Brm50702	76	12/25/2018	12/24/2019
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A

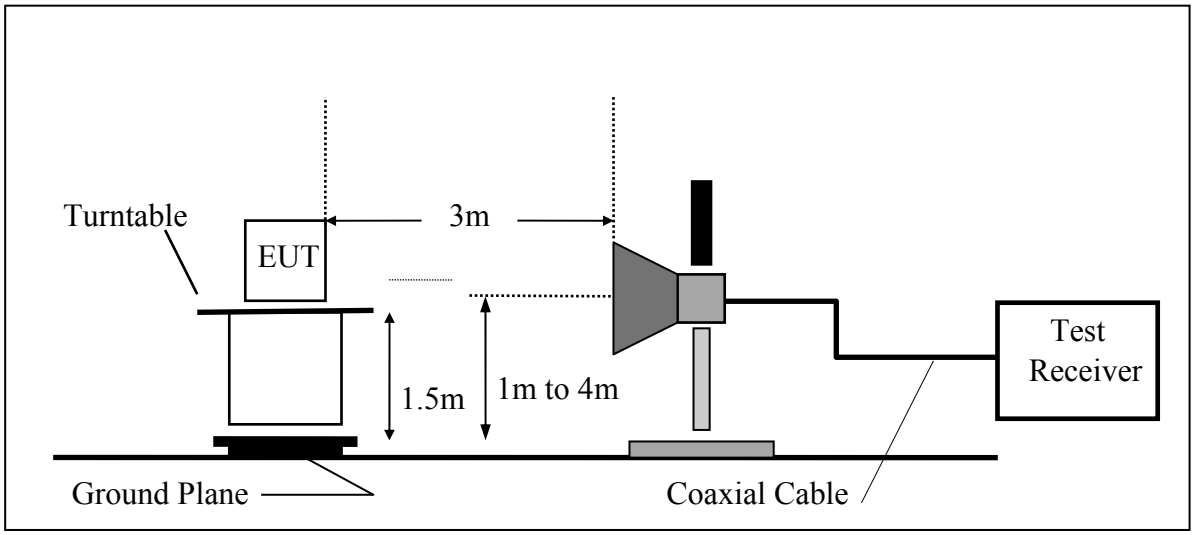
9.3 Test Setup

The test item only performed radiated mode

(A) Radiated Emission Test Setup for frequency below 1000MHz



(B) Radiated Emission Test Setup for frequency above 1 GHz



9.4 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.

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

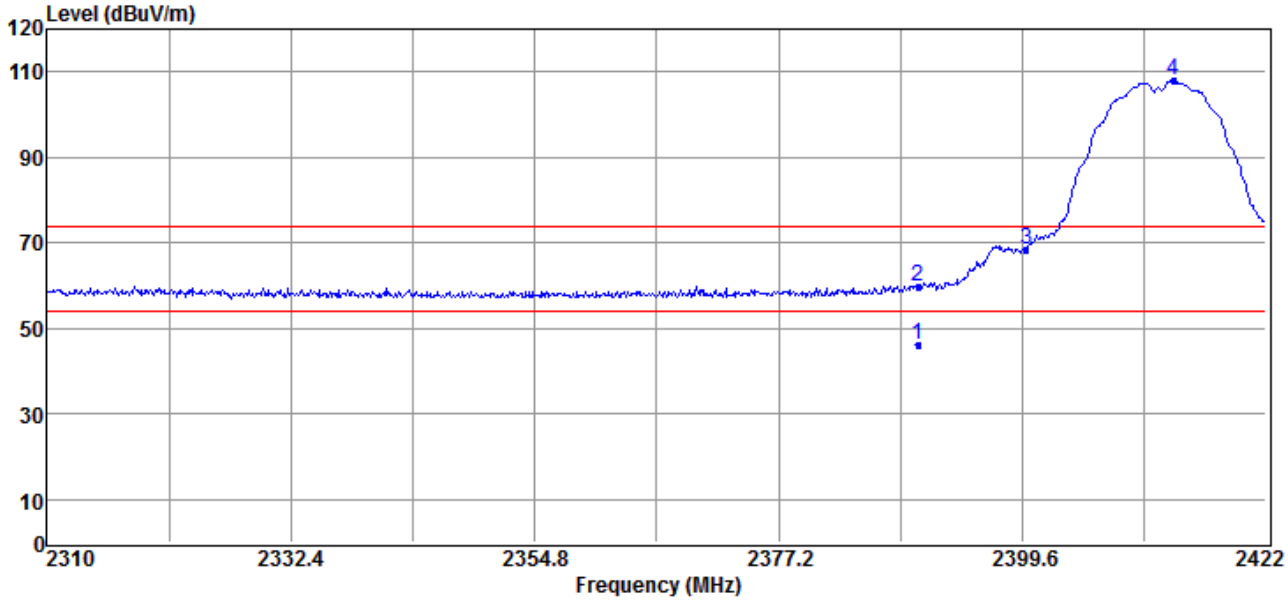
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6 Measurement Result:

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

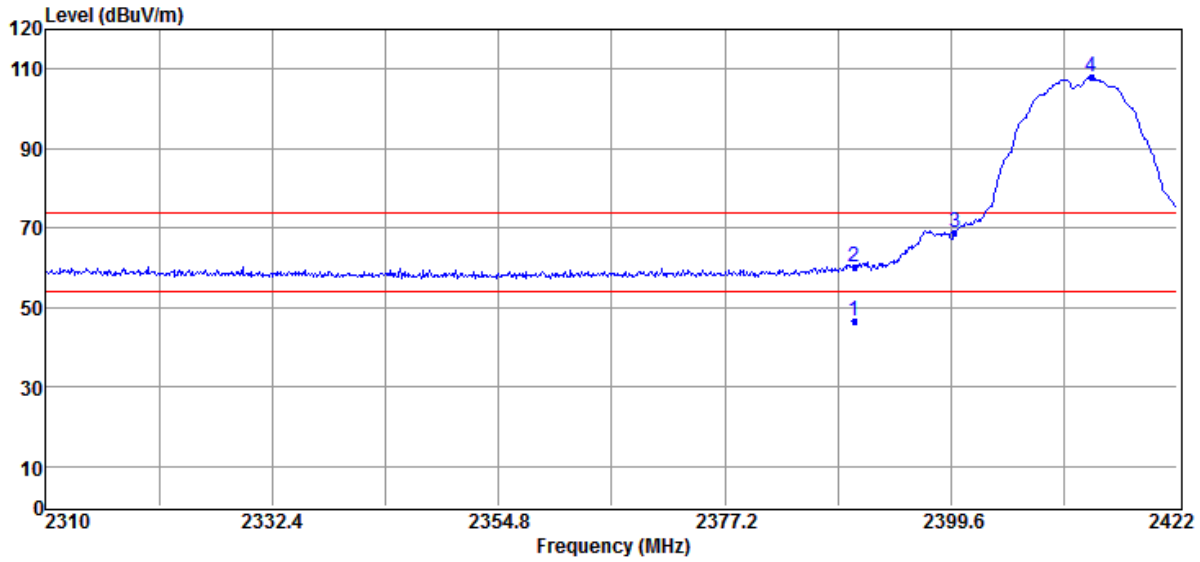
Radiated Emission: 802.11 b mode

Operation Mode	TX CH Low	Test Date	2019/05/17
Fundamental Frequency	2412 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	13.27	32.72	45.99	54.00	-8.01	Average	VERTICAL
2	2390.00	26.98	32.72	59.70	74.00	-14.30	Peak	VERTICAL
3	2400.00	35.54	32.71	68.25	87.99	-19.74	Peak	VERTICAL
4	2413.49	75.28	32.71	107.99	F	--	Peak	VERTICAL

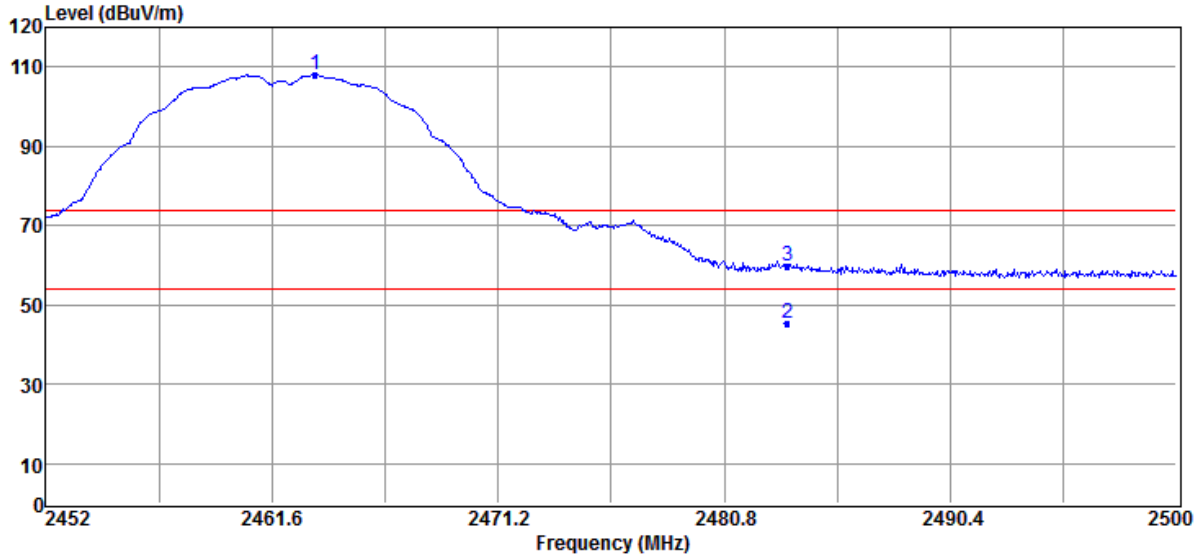
Remark: F" denotes fundamental frequency



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	14.07	32.72	46.79	54.00	-7.21	Average	HORIZONTAL
2	2390.00	27.47	32.72	60.19	74.00	-13.81	Peak	HORIZONTAL
3	2400.00	36.00	32.71	68.71	87.87	-19.16	Peak	HORIZONTAL
4	2413.49	75.16	32.71	107.87	F	--	Peak	HORIZONTAL

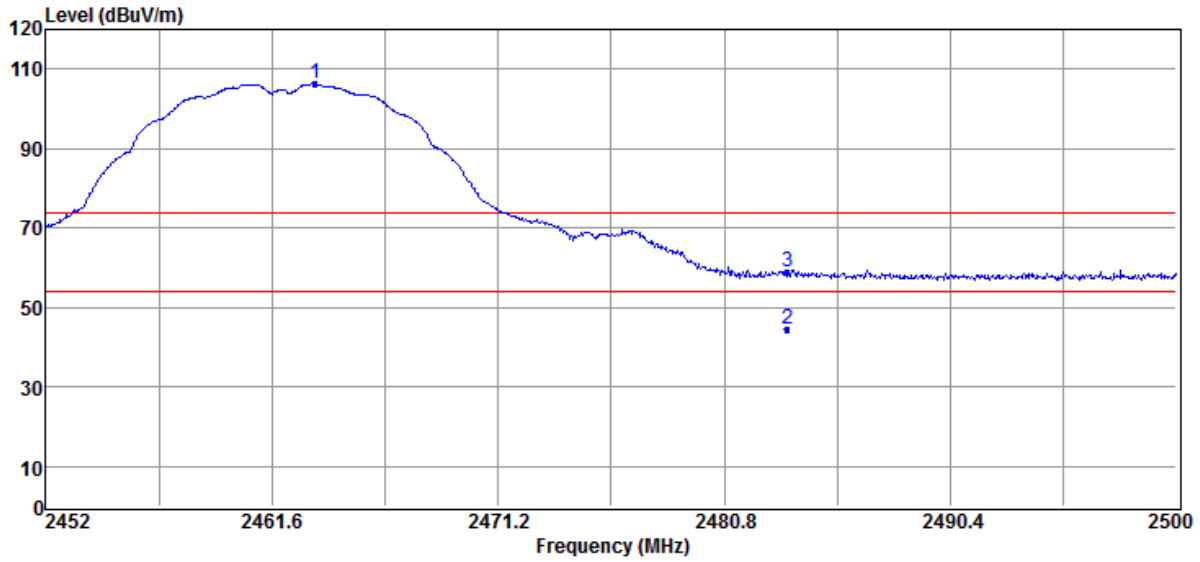
Remark: F" denotes fundamental frequency

Operation Mode	TX CH High	Test Date	2019/05/17
Fundamental Frequency	2462 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2463.42	75.36	32.61	107.97	F	---	Peak	VERTICAL
2	2483.50	12.45	32.76	45.21	54.00	-8.79	Average	VERTICAL
3	2483.50	26.97	32.76	59.73	74.00	-14.27	Peak	VERTICAL

Remark: “F” denotes fundamental frequency

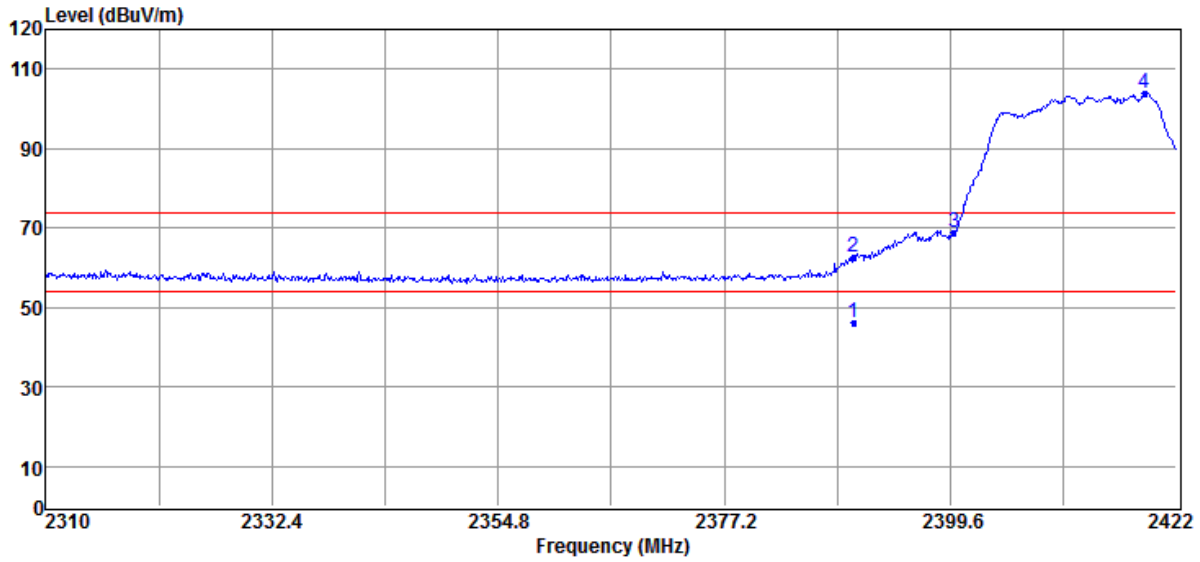


No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2463.42	73.68	32.61	106.29	F	---	Peak	HORIZONTAL
2	2483.50	11.94	32.76	44.70	54.00	-9.30	Average	HORIZONTAL
3	2483.50	26.01	32.76	58.77	74.00	-15.23	Peak	HORIZONTAL

Remark: “F” denotes fundamental frequency

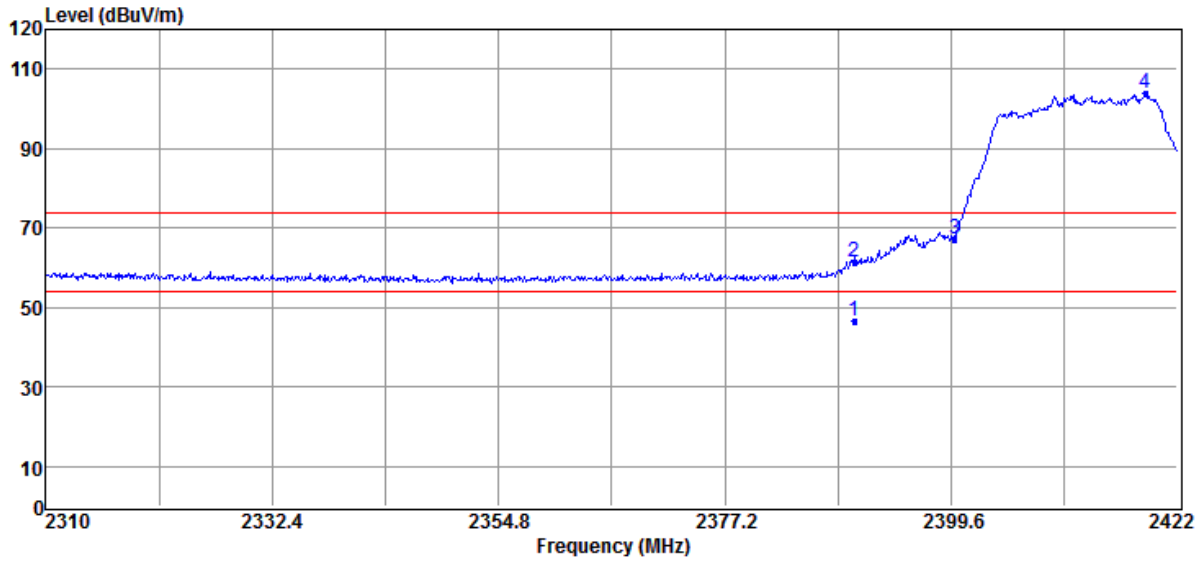
Radiated Emission: 802.11 g mode

Operation Mode	TX CH Low	Test Date	2019/05/17
Fundamental Frequency	2412 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	13.50	32.72	46.22	54.00	-7.78	Average	VERTICAL
2	2390.00	29.81	32.72	62.53	74.00	-11.47	Peak	VERTICAL
3	2400.00	36.04	32.71	68.75	84.06	-15.31	Peak	VERTICAL
4	2418.86	71.34	32.72	104.06	F	---	Peak	VERTICAL

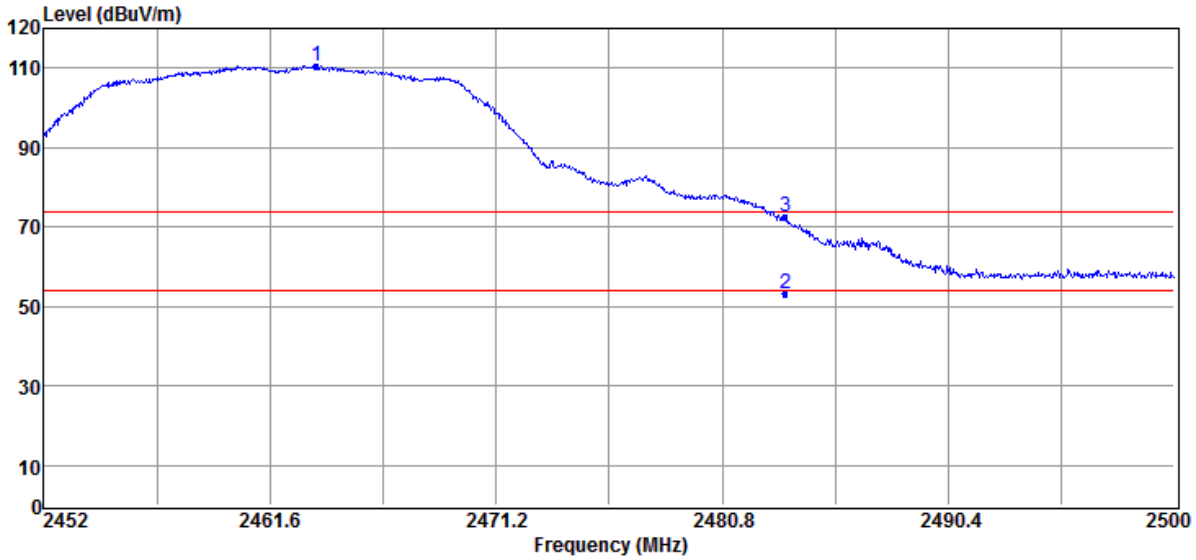
Remark: “ F” denotes fundamental frequency



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	13.83	32.72	46.55	54.00	-7.45	Average	HORIZONTAL
2	2390.00	28.85	32.72	61.57	74.00	-12.43	Peak	HORIZONTAL
3	2400.00	34.54	32.71	67.25	83.93	-16.68	Peak	HORIZONTAL
4	2418.86	71.21	32.72	103.93	F	---	Peak	HORIZONTAL

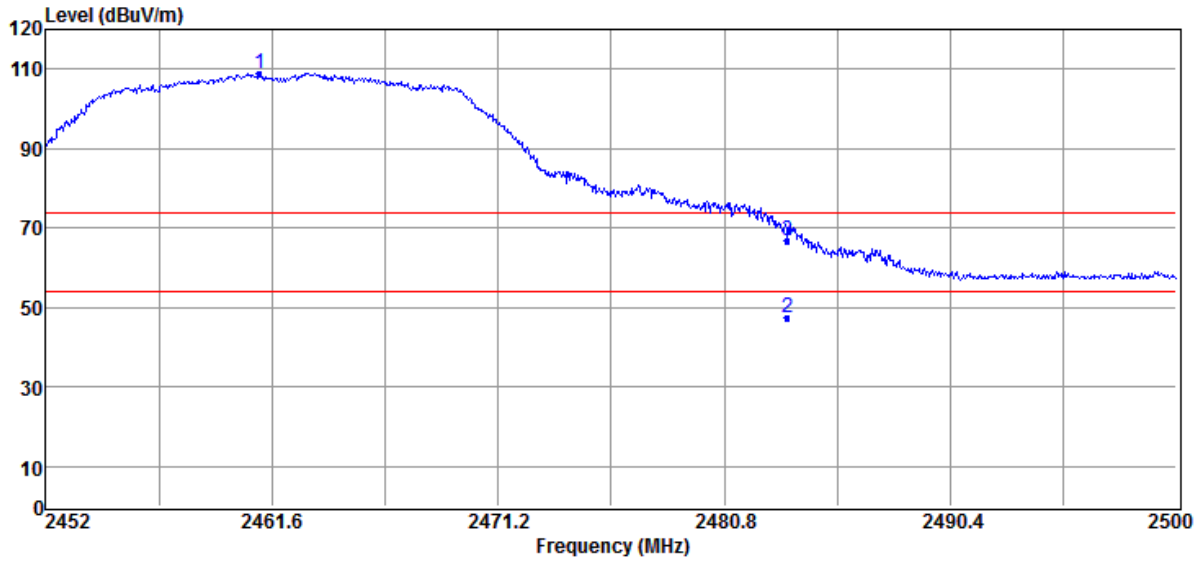
Remark: “F” denotes fundamental frequency

Operation Mode	TX CH High	Test Date	2019/05/17
Fundamental Frequency	2462 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2463.57	77.77	32.61	110.38	F	---	Peak	VERTICAL
2	2483.50	20.31	32.76	53.07	54.00	-0.93	Average	VERTICAL
3	2483.50	39.76	32.76	72.52	74.00	-1.48	Peak	VERTICAL

Remark: “ F” denotes fundamental frequency

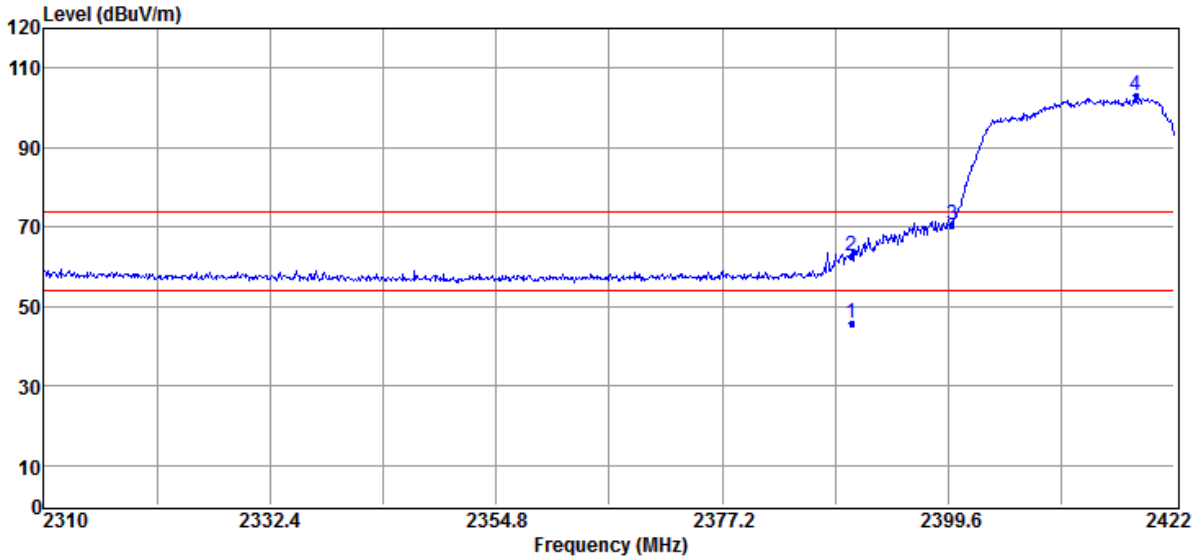


No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2461.07	76.12	32.62	108.74	F	---	Peak	HORIZONTAL
2	2483.50	14.53	32.76	47.29	54.00	-6.71	Average	HORIZONTAL
3	2483.50	34.17	32.76	66.93	74.00	-7.07	Peak	HORIZONTAL

Remark: “F” denotes fundamental frequency

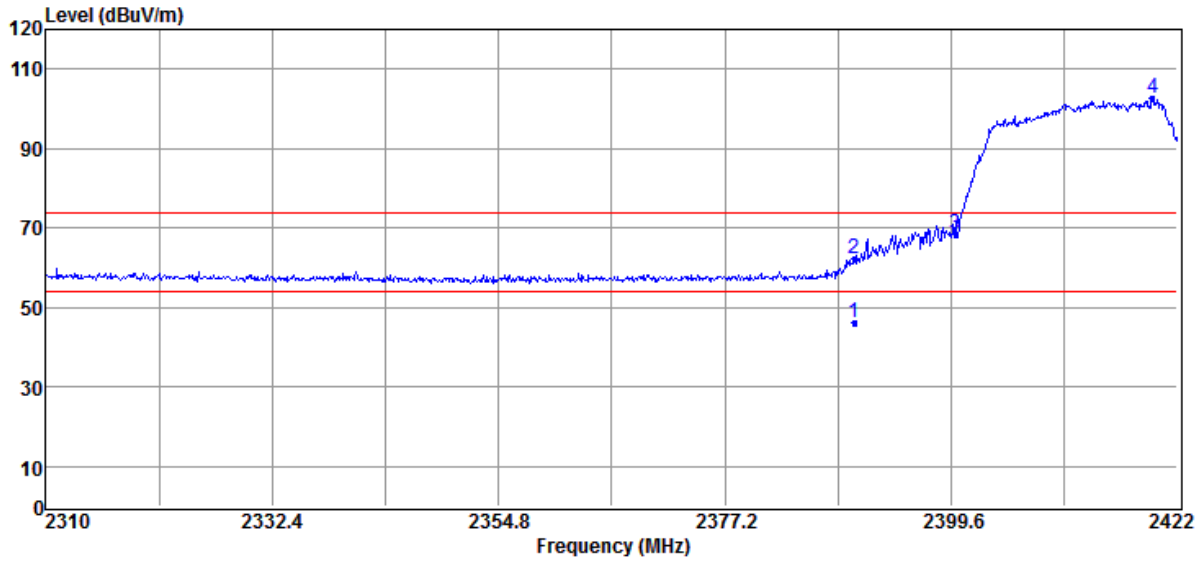
Radiated Emission: 802.11 n_HT20 mode

Operation Mode	TX CH Low	Test Date	2019/05/17
Fundamental Frequency	2412 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	13.21	32.72	45.93	54.00	-8.07	Average	VERTICAL
2	2390.00	29.92	32.72	62.64	74.00	-11.36	Peak	VERTICAL
3	2400.00	37.64	32.71	70.35	83.07	-12.72	Peak	VERTICAL
4	2418.19	70.35	32.72	103.07	F	--	Peak	VERTICAL

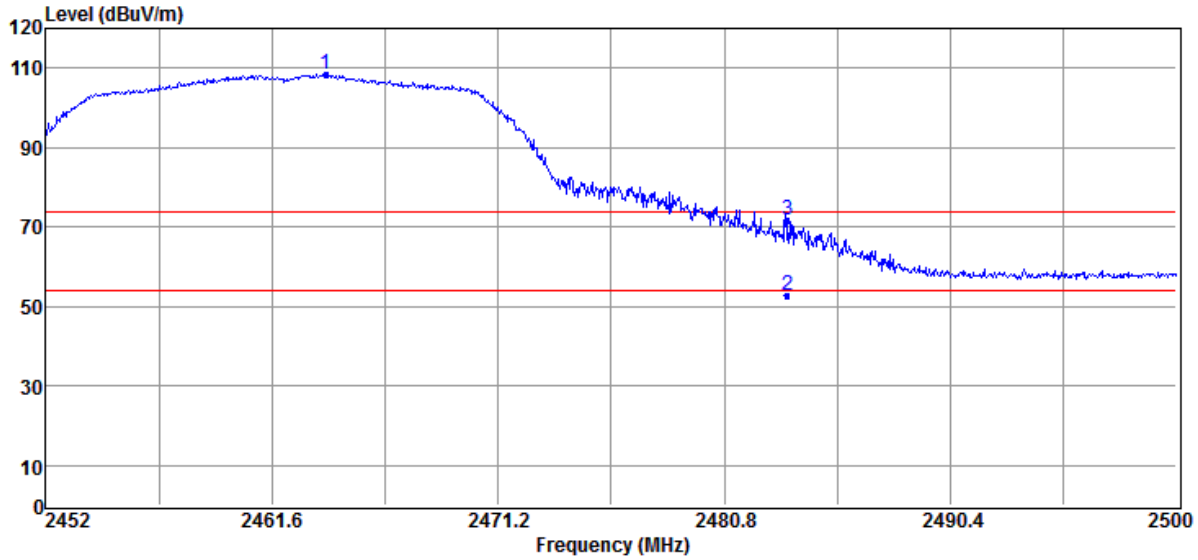
Remark: “ F” denotes fundamental frequency



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	13.66	32.72	46.38	54.00	-7.62	Average	HORIZONTAL
2	2390.00	29.38	32.72	62.10	74.00	-11.90	Peak	HORIZONTAL
3	2400.05	35.77	32.71	68.48	82.63	-14.15	Peak	HORIZONTAL
4	2419.54	69.91	32.72	102.63	F	--	Peak	HORIZONTAL

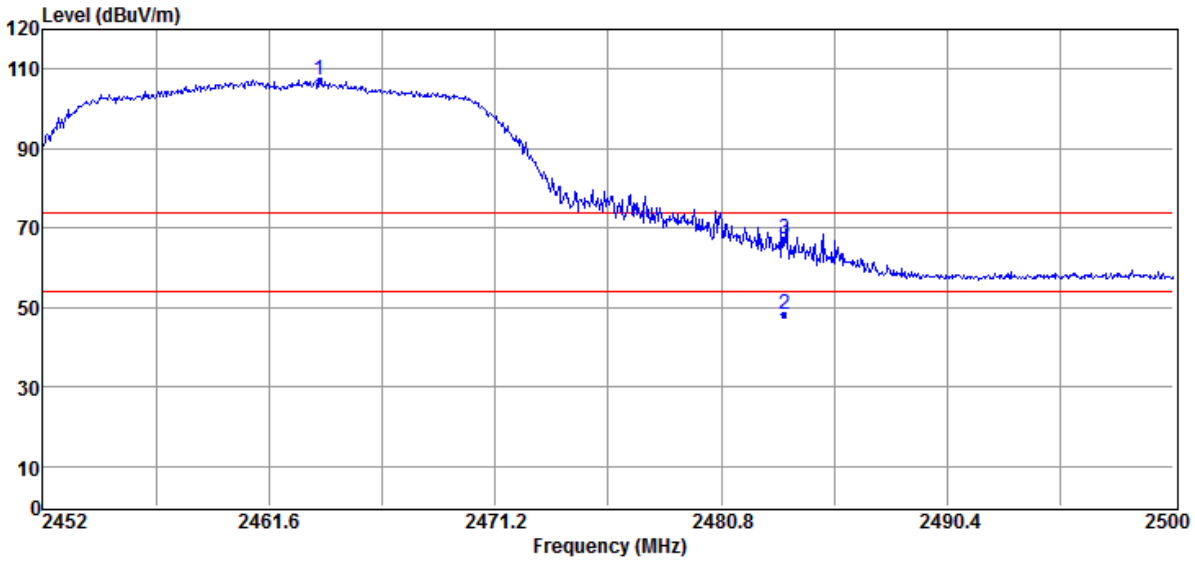
Remark: “ F” denotes fundamental frequency

Operation Mode	TX CH High	Test Date	2019/05/17
Fundamental Frequency	2462 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2463.90	75.69	32.61	108.30	74.00	34.30	Peak	VERTICAL
2	2483.50	20.11	32.76	52.87	54.00	-1.13	Average	VERTICAL
3	2483.50	39.06	32.76	71.82	74.00	-2.18	Peak	VERTICAL

Remark: “ F” denotes fundamental frequency

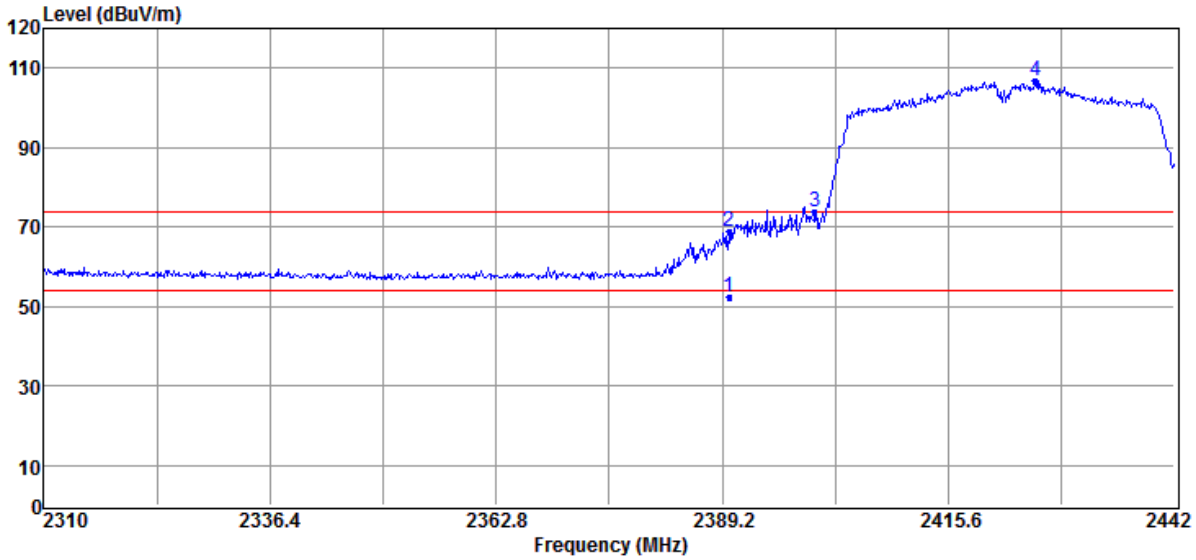


No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2463.76	74.54	32.61	107.15	74.00	33.15	Peak	HORIZONTAL
2	2483.50	15.43	32.76	48.19	54.00	-5.81	Average	HORIZONTAL
3	2483.50	34.40	32.76	67.16	74.00	-6.84	Peak	HORIZONTAL

Remark: “ F” denotes fundamental frequency

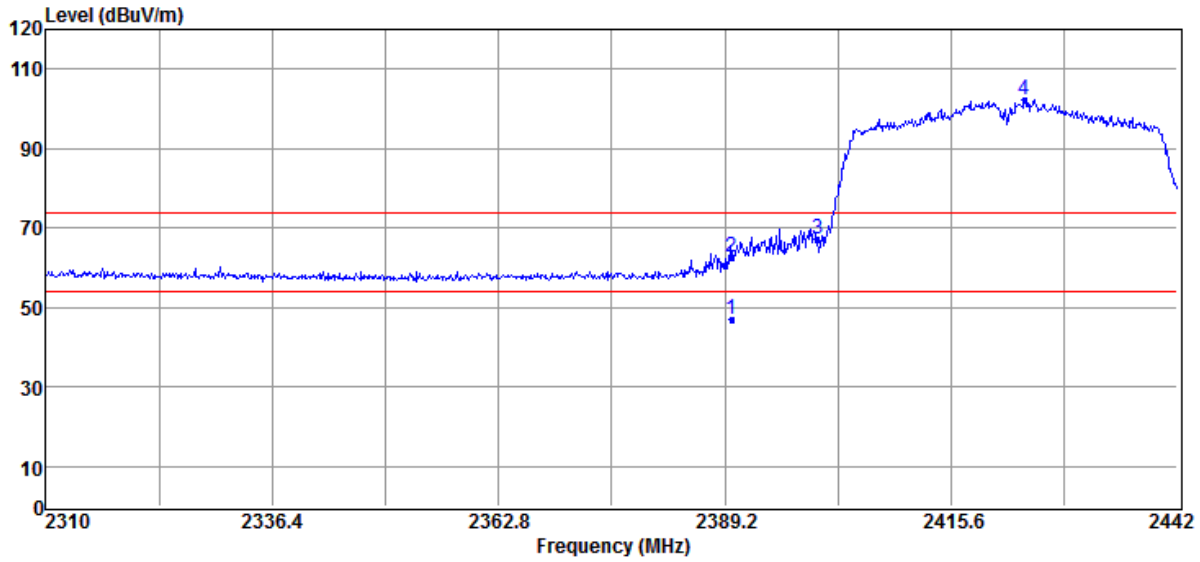
Radiated Emission: 802.11 n_HT40 mode

Operation Mode	TX CH Low	Test Date	2019/05/17
Fundamental Frequency	2412 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	19.47	32.72	52.19	54.00	-1.81	Average	VERTICAL
2	2390.00	36.19	32.72	68.91	74.00	-5.09	Peak	VERTICAL
3	2400.00	41.31	32.71	74.02	86.71	-12.69	Peak	VERTICAL
4	2425.76	73.99	32.72	106.71	F	--	Peak	VERTICAL

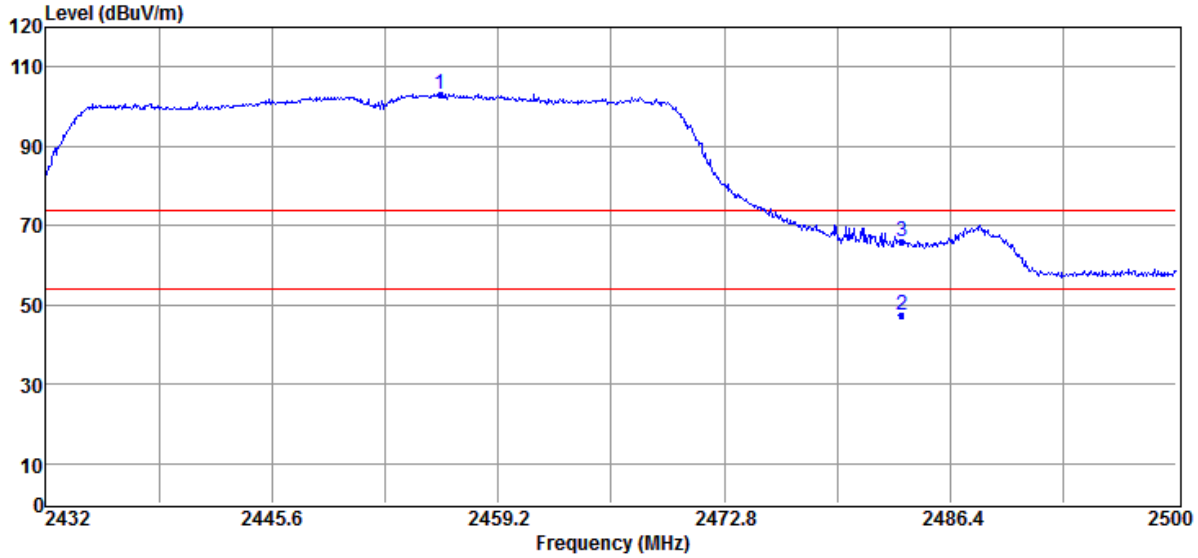
Remark: “ F” denotes fundamental frequency



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	14.31	32.72	47.03	54.00	-6.97	Average	HORIZONTAL
2	2390.00	30.09	32.72	62.81	74.00	-11.19	Peak	HORIZONTAL
3	2400.00	34.39	32.71	67.10	82.20	-15.1	Peak	HORIZONTAL
4	2424.18	69.48	32.72	102.20	F	--	Peak	HORIZONTAL

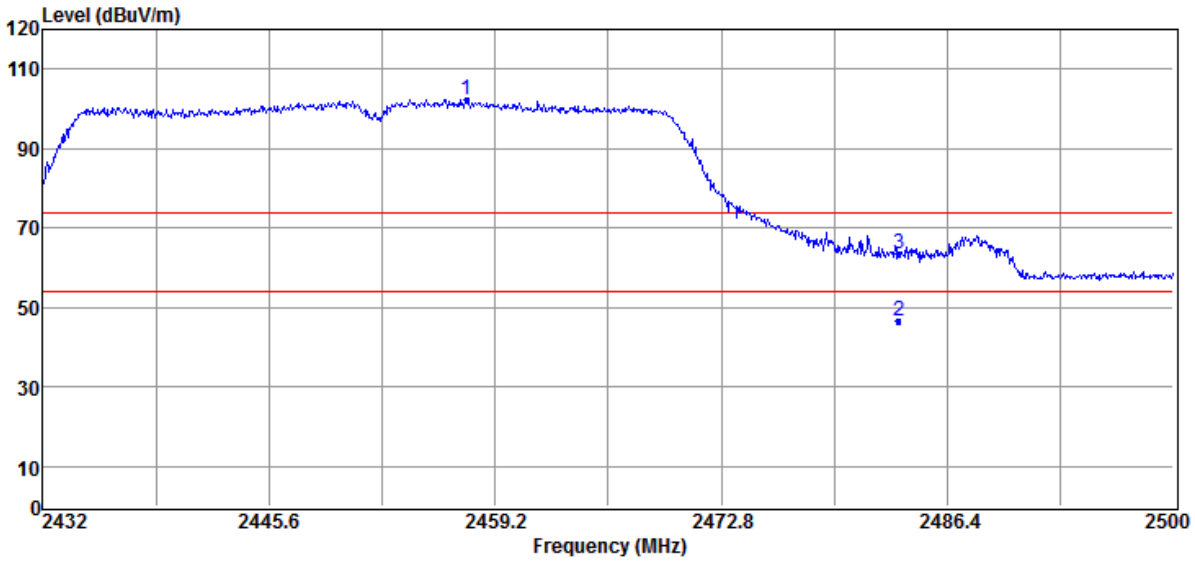
Remark: “ F” denotes fundamental frequency

Operation Mode	TX CH High	Test Date	2019/05/17
Fundamental Frequency	2462 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2455.73	70.66	32.62	103.28	F	---	Peak	VERTICAL
2	2483.50	14.73	32.76	47.49	54.00	-6.51	Average	VERTICAL
3	2483.50	33.15	32.76	65.91	74.00	-8.09	Peak	VERTICAL

Remark: “ F” denotes fundamental frequency

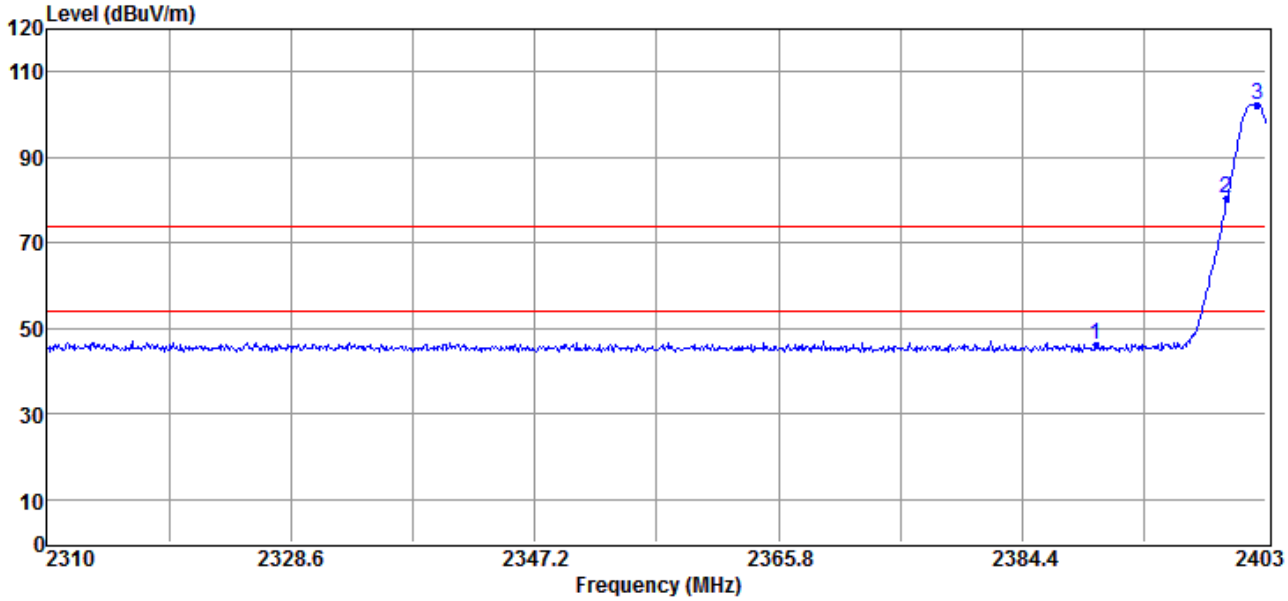


No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2457.50	69.72	32.62	102.34	F	---	Peak	HORIZONTAL
2	2483.50	13.82	32.76	46.58	54.00	-7.42	Average	HORIZONTAL
3	2483.50	30.73	32.76	63.49	74.00	-10.51	Peak	HORIZONTAL

Remark: “ F” denotes fundamental frequency

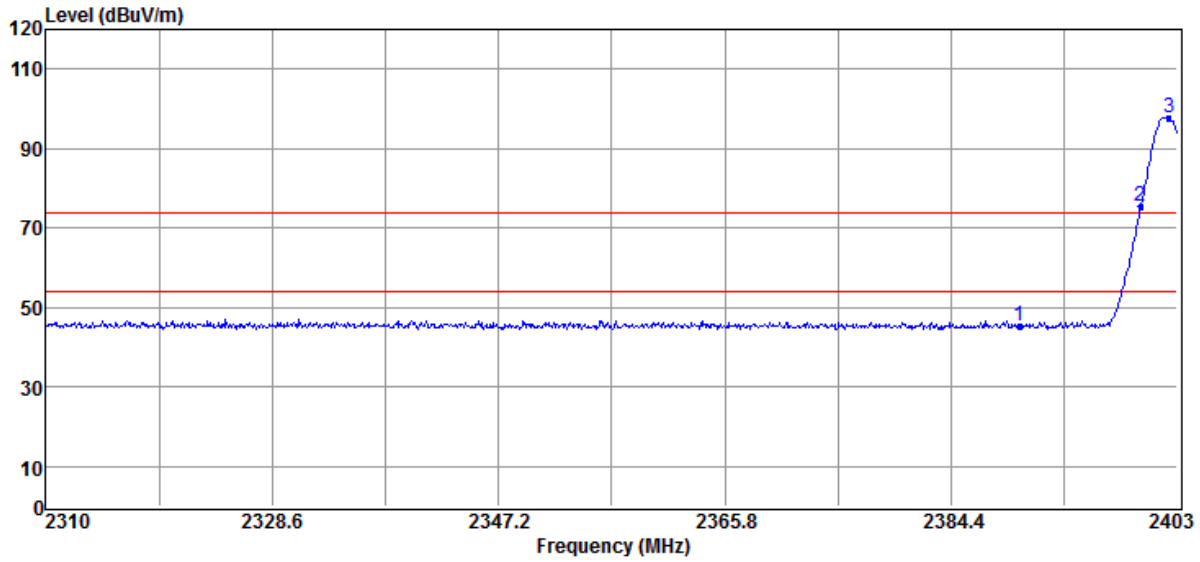
Radiated Emission: BLE mode

Operation Mode	TX CH Low	Test Date	2019/05/17
Fundamental Frequency	2402 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	49.08	-2.98	46.10	74.00	-27.90	Peak	VERTICAL
2	2400.00	83.27	-2.99	80.28	82.47	-2.19	Peak	VERTICAL
3	2402.35	105.46	-2.99	102.47	F	--	Peak	VERTICAL

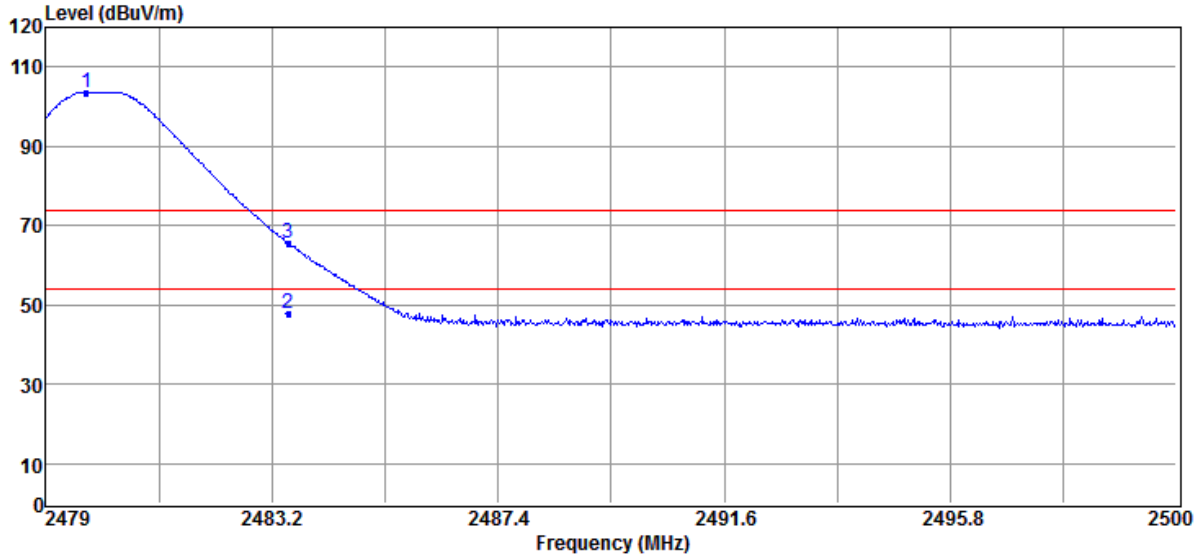
Remark: “ F” denotes fundamental frequency



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2390.00	48.27	-2.98	45.29	74.00	-28.71	Peak	HORIZONTAL
2	2400.00	78.57	-2.99	75.58	77.82	-2.24	Peak	HORIZONTAL
3	2402.35	100.81	-2.99	97.82	F	--	Peak	HORIZONTAL

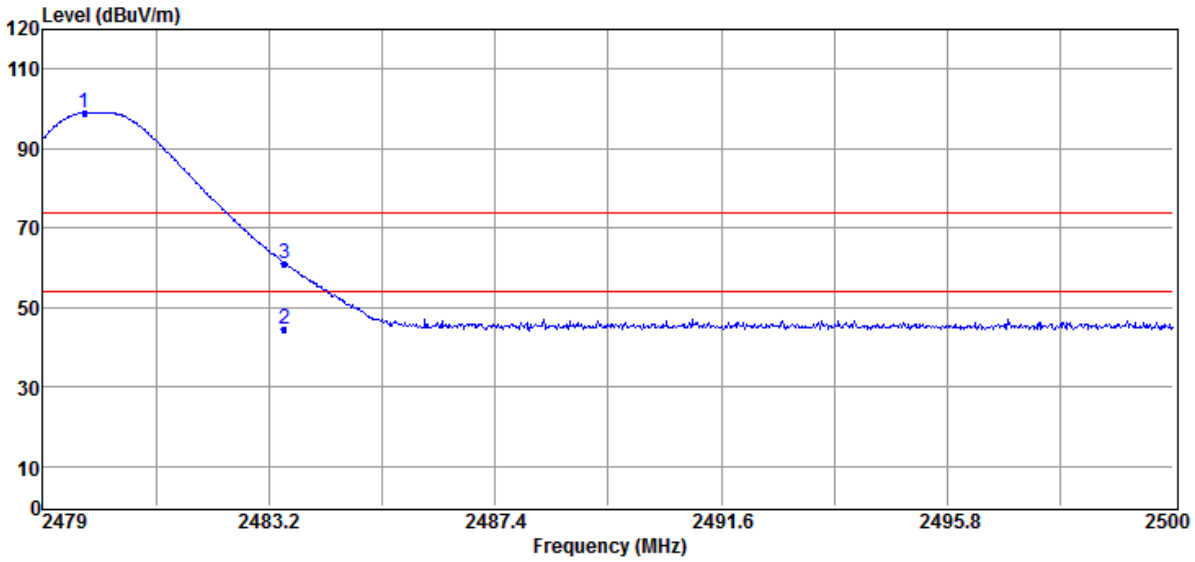
Remark: “ F” denotes fundamental frequency

Operation Mode	TX CH High	Test Date	2019/05/17
Fundamental Frequency	2480 MHz	Test By	Barry
Temperature	25 ℃	Humidity	60 %



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2479.76	106.78	-3.07	103.71	F	--	Peak	VERTICAL
2	2483.50	50.67	-2.94	47.73	54.00	-6.27	Average	VERTICAL
3	2483.50	68.51	-2.94	65.57	74.00	-8.43	Peak	VERTICAL

Remark: “ F” denotes fundamental frequency



No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2479.78	102.01	-3.07	98.94	F	--	Peak	HORIZONTAL
2	2483.49	47.61	-2.94	44.67	54.00	-9.33	Average	HORIZONTAL
3	2483.49	64.08	-2.94	61.14	74.00	-12.86	Peak	HORIZONTAL

Remark: “ F” denotes fundamental frequency

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.

According to RSS-247 issue 2, §5.2
(2)The transmitter power spectral density conducted from the transmitter 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 Section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

10.2 Measurement Equipment Used:

Refer to section 6.2 for details.

10.3 Test Set-up:

Refer to section 7.3 for details.

10.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW =3kHz, VBW = 10kHz, Set the span to 1.5 DTS bandwidth., Sweep=Auto
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

10.5 Measurement Result:

802.11b Mode

CH	Power Density Level dBm/3kHz	Maximum Limit (dBm)
Low	-12.69	8
Mid	-13.60	8
High	-13.25	8

802.11g Mode

CH	Power Density Level dBm/3kHz	Maximum Limit (dBm)
Low	-16.56	8
Mid	-17.75	8
High	-16.32	8

802.11n HT20

CH	Power Density Level dBm/3kHz	Maximum Limit (dBm)
Low	-18.08	8
Mid	-19.75	8
High	-17.86	8

802.11n HT40

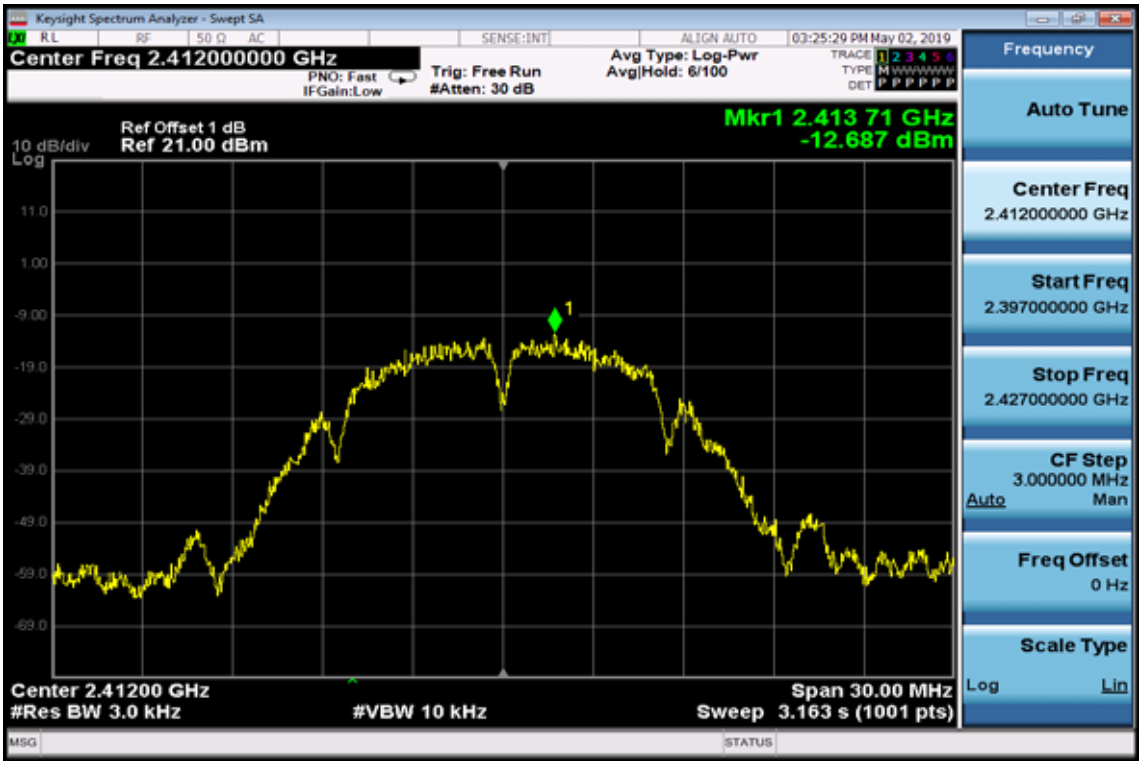
CH	Power Density Level dBm/3kHz	Maximum Limit (dBm)
Low	-22.66	8
Mid	-24.03	8
High	-22.19	8

BT LE mode

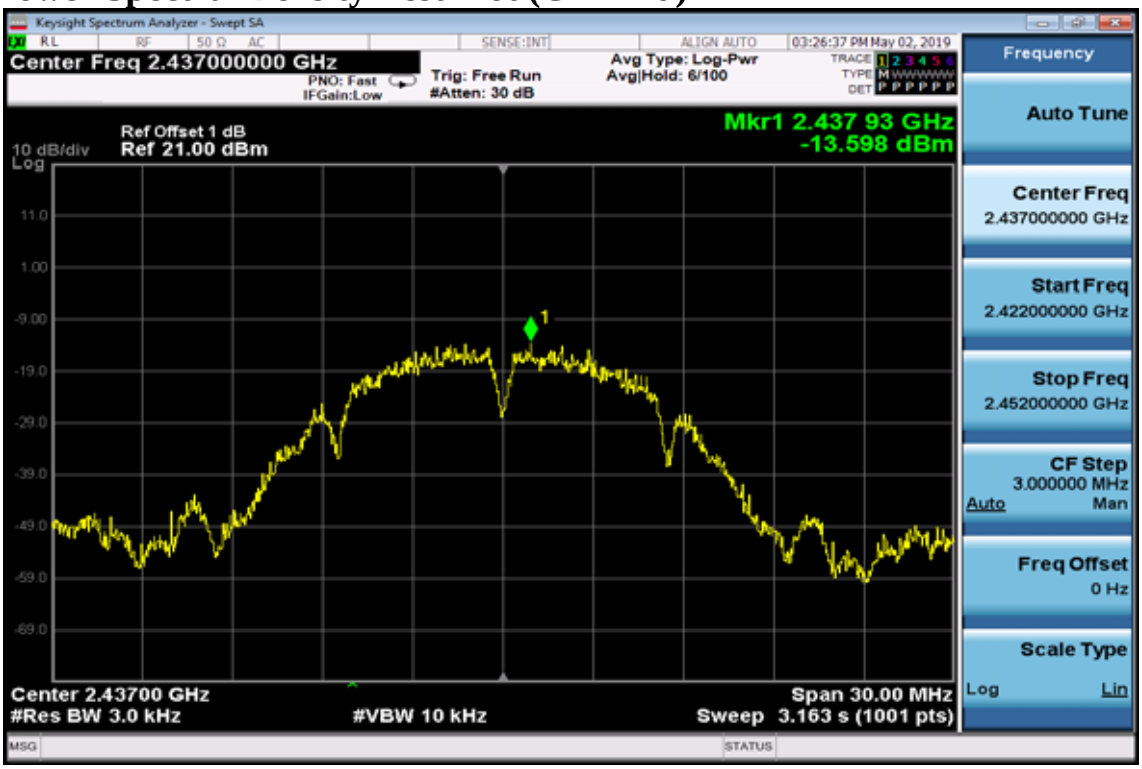
CH	Power Density Level dBm/3kHz	Maximum Limit (dBm)
Low	-8.75	8
Mid	-8.28	8
High	-8.92	8

802.11b

Power Spectral Density Test Plot (CH-Low)



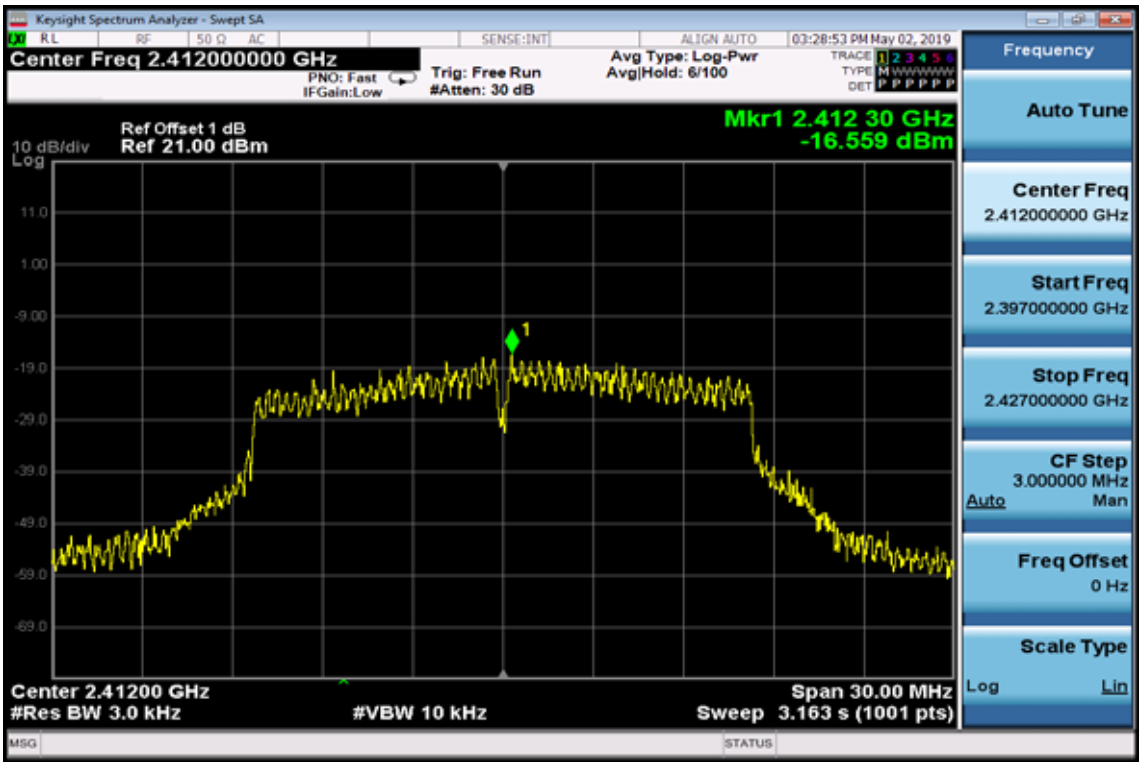
Power Spectral Density Test Plot (CH-Mid)



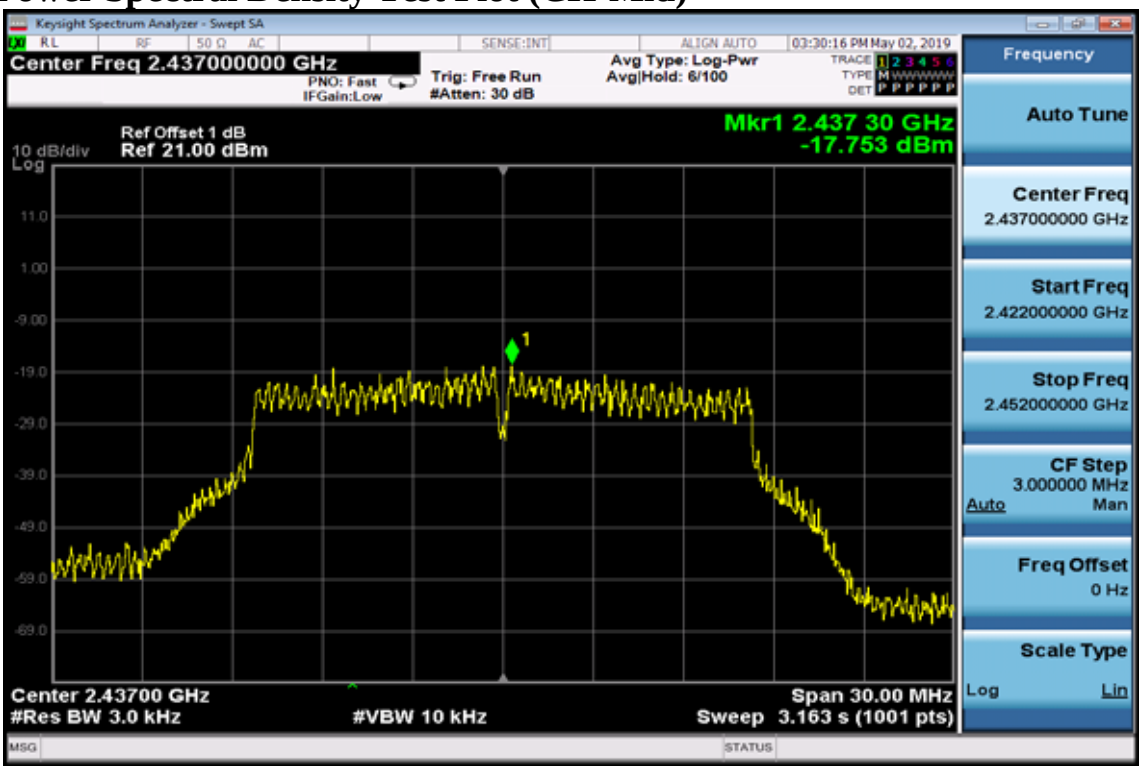
Power Spectral Density Test Plot (CH-High)

802.11g

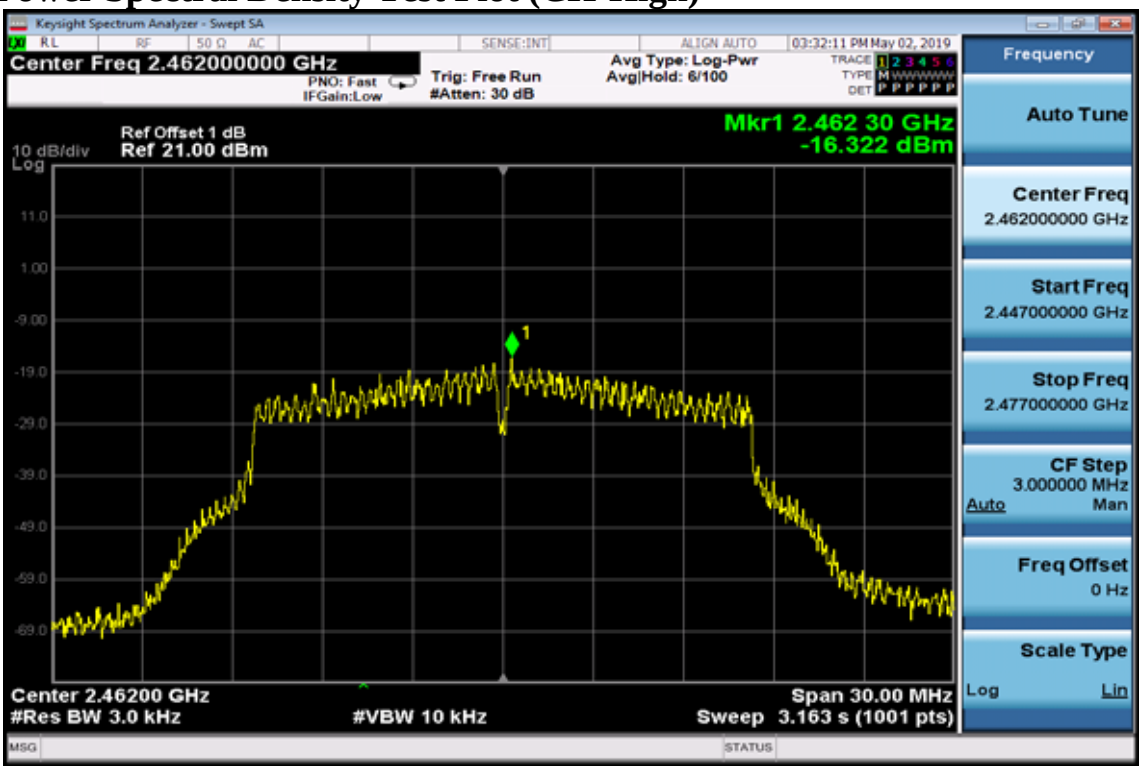
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

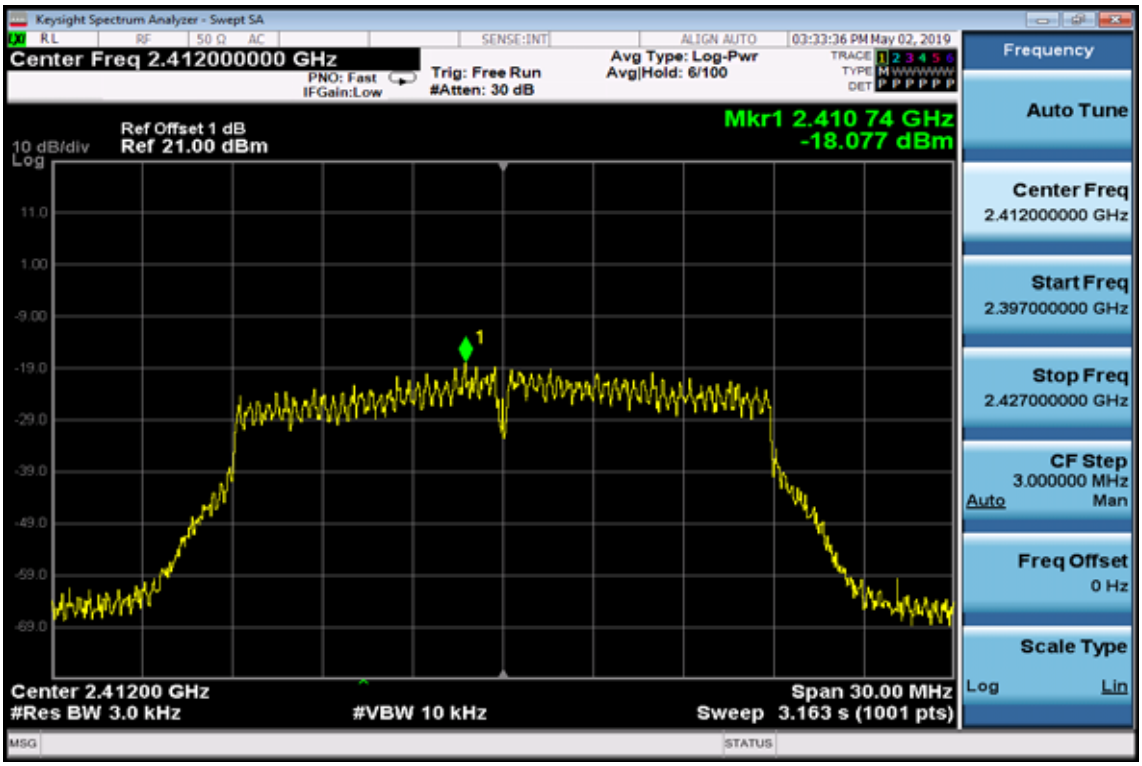


Power Spectral Density Test Plot (CH-High)

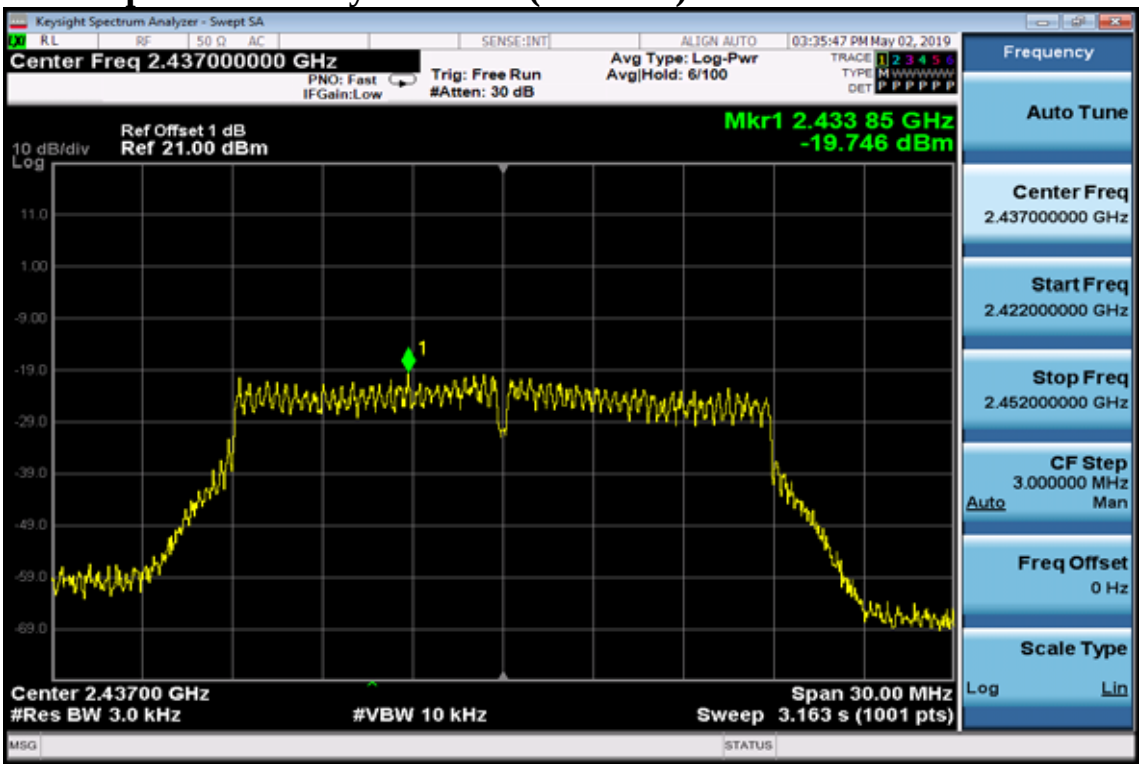


802.11n_HT20

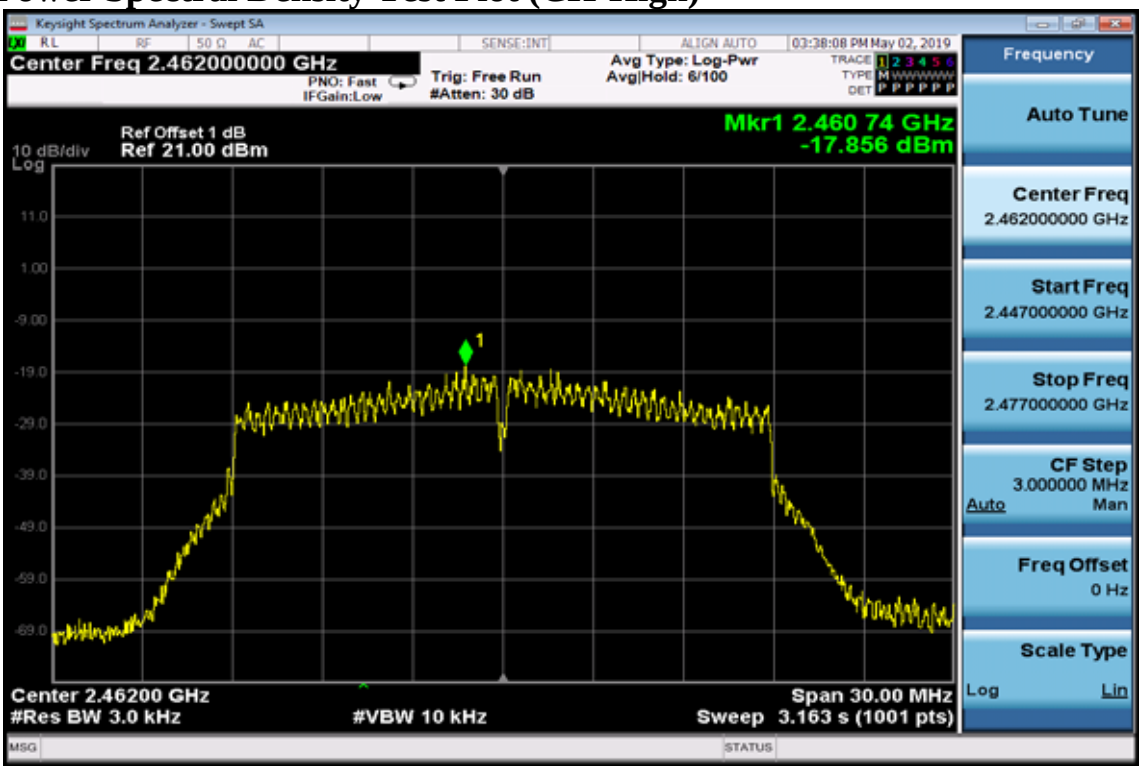
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

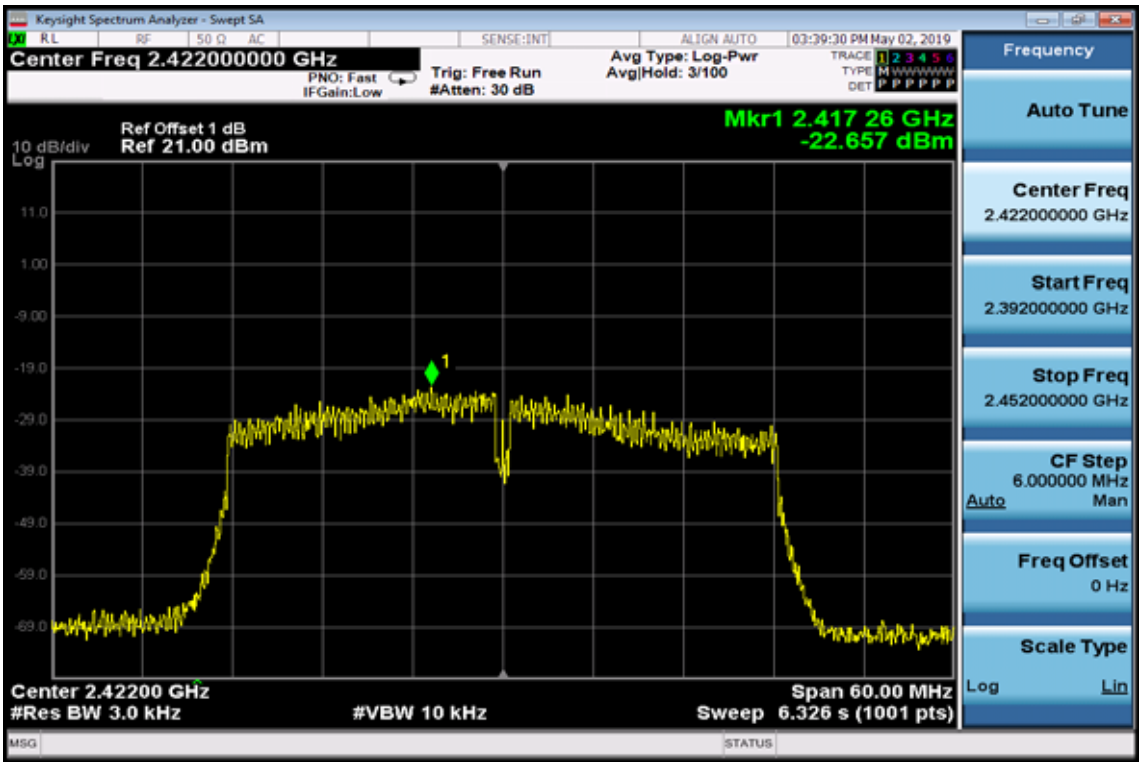


Power Spectral Density Test Plot (CH-High)

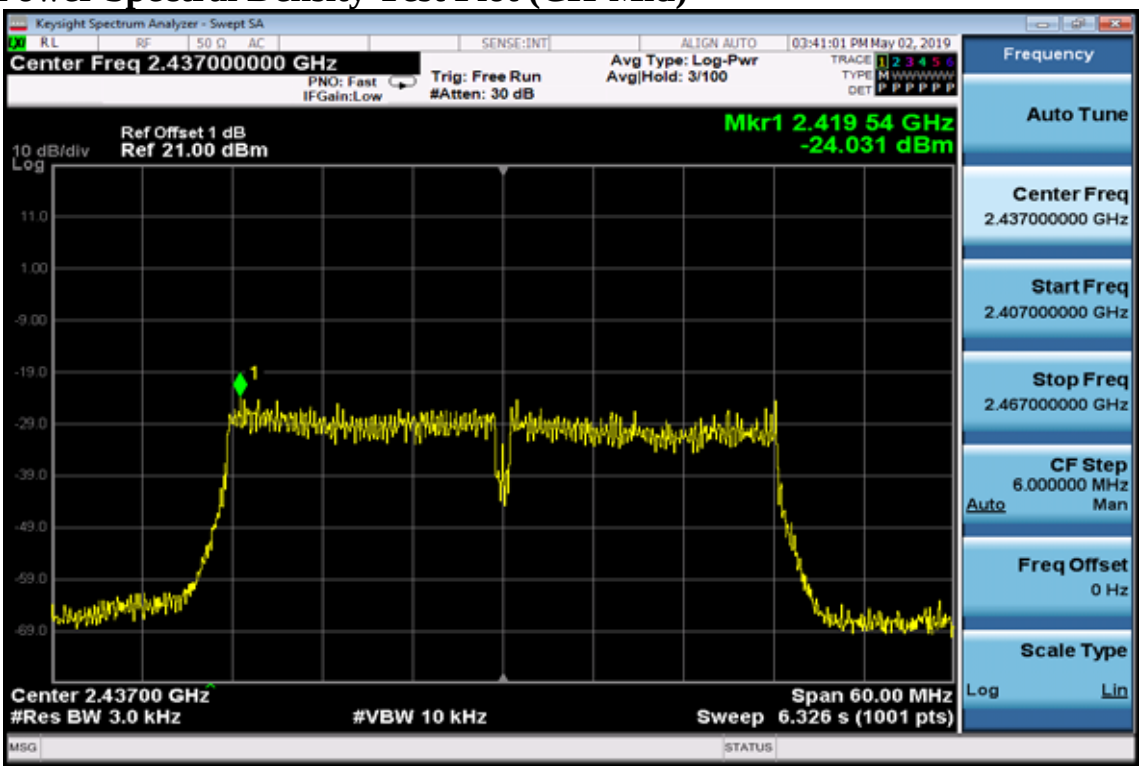


802.11n_HT40

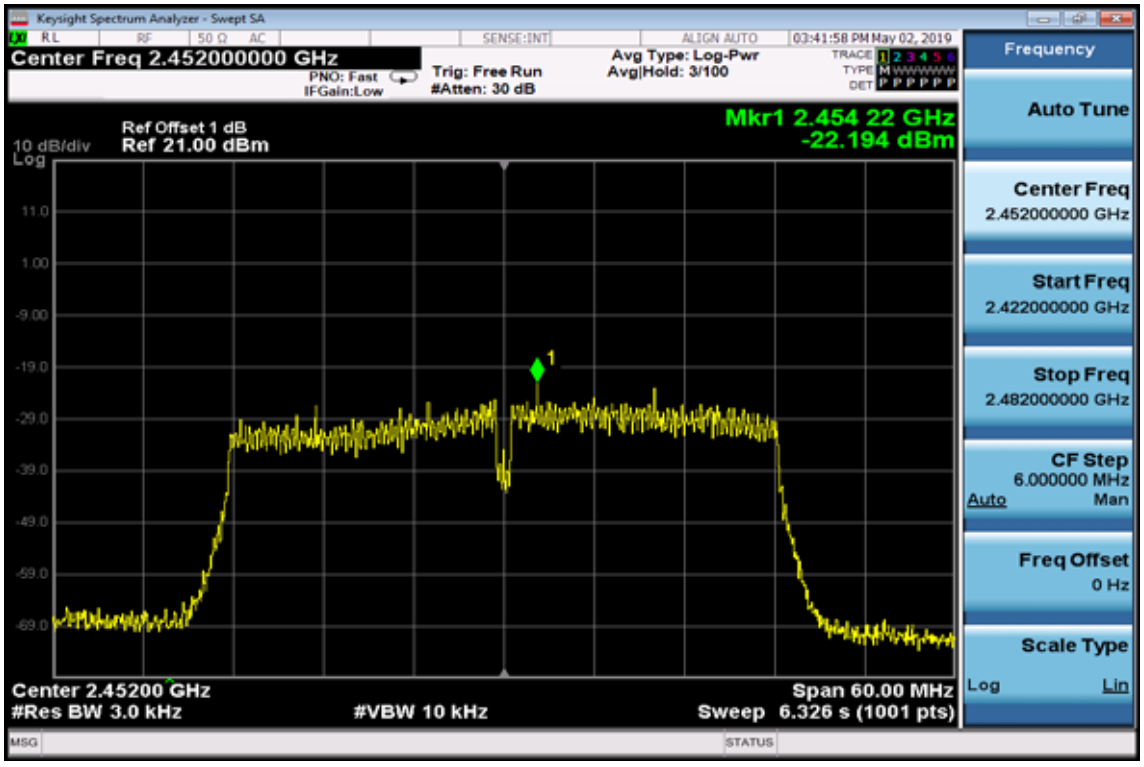
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

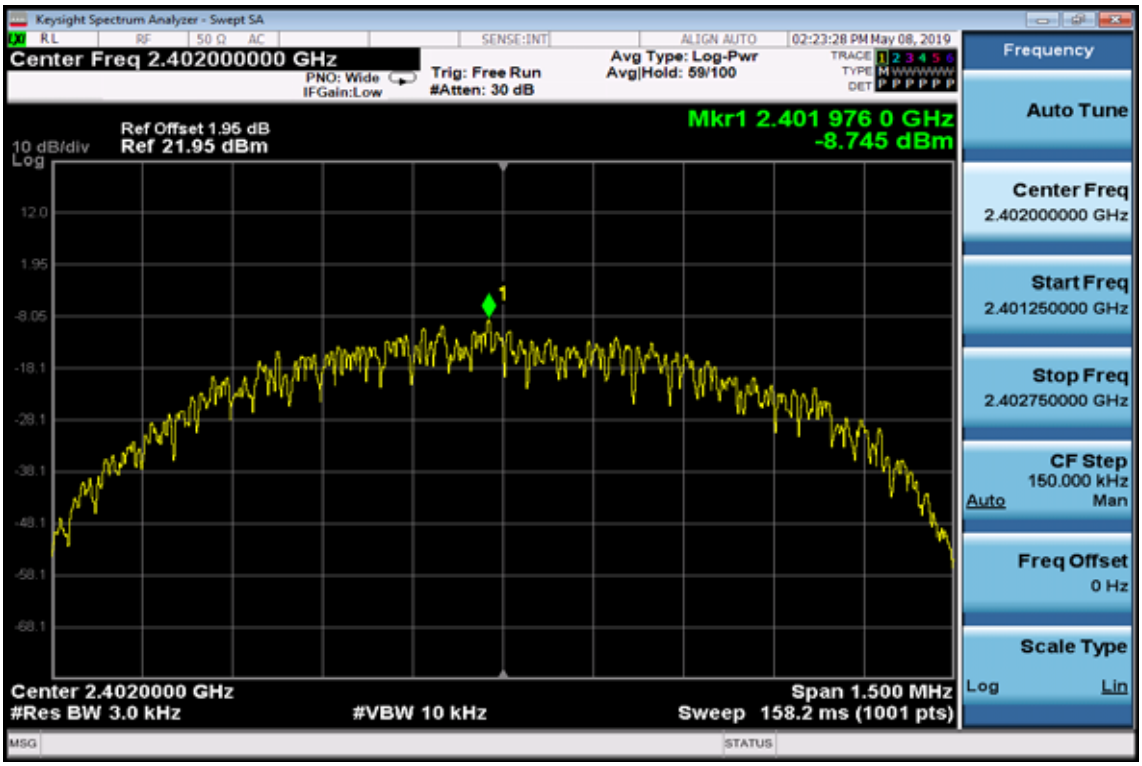


Power Spectral Density Test Plot (CH-High)

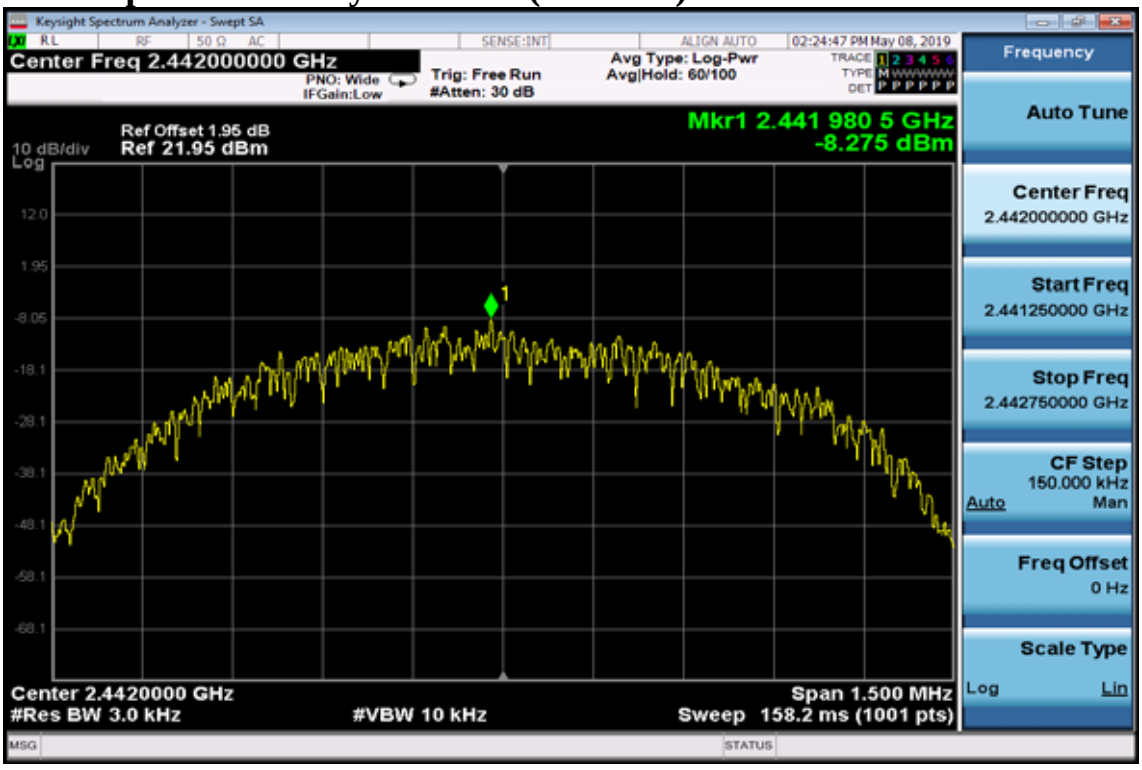


BT LE

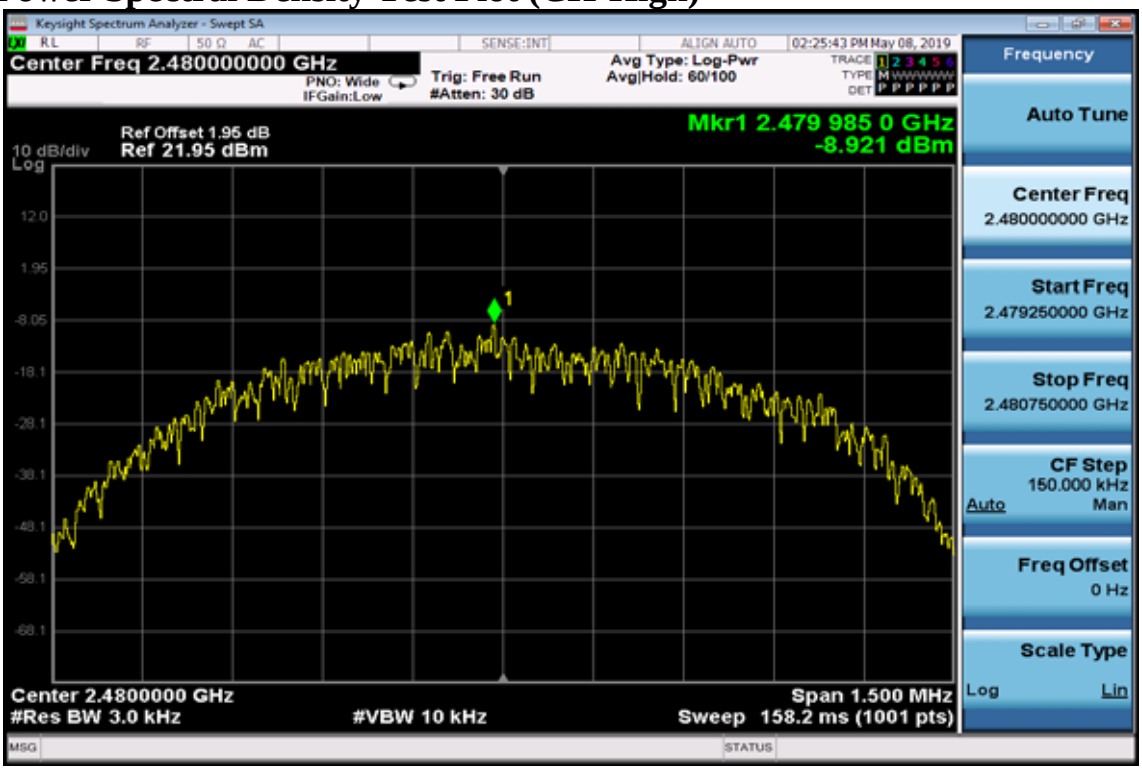
Power Spectral Density Test Plot (CH-Low)



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.

According to RSS-GEN 6.8 antenna requirement:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below). When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

> This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

11.2 Antenna Connected Construction:

The directional gins of antenna used for transmitting is 2.44dBi , and the antenna is PIFA type and no consideration of replacement. Please see EUT photo and antenna spec. for details.