TEST REPORT

of

FCC Part 15 Subpart C

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

Product :	**FortiWiFi 61F, FortiWiFi 60F**
Brand:	**FORTINET**
Model:	**FortiWiFi 60Fxxxxxx; FWF-60Fxxxxxx; FORTIWIFI-60Fxxxxxx; FortiWiFi 61Fxxxxxx; FWF-61Fxxxxxx; FORTIWIFI-61Fxxxxxx; (where "x" can be used "A-Z", or "0-9", or "-", or blank for software purposes or marketing purposes only)**
Model Difference:	**61 series had SSD**
FCC ID:	**TVE-121757A**
FCC Rule Part:	**§15.247, Cat: DTS**
Applicant:	**Fortinet Inc.**
Address:	**899 KIFER RD SUNNYVALE CA 94086-5301 UNITED STATES**

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
*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Testing laboratory
0997

Report No.: **ISL-19LR269FCDTS**
Issue Date : **2020/01/17**

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.
This report MUST not be used to claim product endorsement by TAF or any agency of the Government.

VERIFICATION OF COMPLIANCE

Applicant:	Fortinet Inc.
Product Description:	FortiWiFi 61F, FortiWiFi 60F
Brand Name:	FORTINET
Model No.:	FortiWiFi 60Fxxxxxx; FWF-60Fxxxxxx; FORTIWIFI-60Fxxxxxx; FortiWiFi 61Fxxxxxx; FWF-61Fxxxxxx; FORTIWIFI-61Fxxxxxx; (where "x" can be used "A-Z", or "0-9", or "-", or blank for software purposes or marketing purposes only)
Model Difference:	61 series had SSD
FCC ID:	TVE-121757A
Date of test:	2019/09/09 ~ 2020/01/16
Date of EUT Received:	2019/09/09

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:	Weitin Chen	***Date:***	2020/01/17
	Weitin Chen / Senior Engineer		
Prepared By:	Gigi yeh	***Date:***	2020/01/17
	Gigi Yeh / Senior Engineer		
Approved By:	Jerry Liu	***Date:***	2020/01/17
	Jerry Liu / Technical Manager		

Version

Version No.	Date	Description
00	2020/01/17	Initial creation of document

Uncertainty of Measurement

ISO/IEC 17025 requires that an estimate of measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

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%

Table of Contents

1 General Information

General:

Product Name	FortiWiFi 61F, FortiWiFi 60F	
Brand Name	FORTINET	
Model Name	FortiWiFi 60Fxxxxxx; FWF-60Fxxxxxx; FORTIWIFI-60Fxxxxxx; FortiWiFi 61Fxxxxxx; FWF-61Fxxxxxx; FORTIWIFI-61Fxxxxxx; (where "x" can be used "A-Z", or "0-9", or "-", or blank for software purposes or marketing purposes only)	
Model Difference	61 series had SSD	
USB Port	One provided for Data link	
Console port	One provided for Data link	
WAN port	TWO provided for Data link	
DMZ Port	One provided for Data link	
LAN Port	Seven provided for Data link	
Power Tolerance:	+/- 1 dB	
Power Supply	12Vdc from Adapter	
	Adapter: FSP	Model: FSP036-RHBN3

<table>
<tr><td>Test SoftWare Version</td><td>QSPR Ver5.0-00071</td></tr>
<tr><td>RF power setting in TEST SoftWare</td><td>
<table>
<tr><th rowspan="2">Mode</th><th rowspan="2">Freq (MHz)</th><th colspan="2">Power Setting</th></tr>
<tr><th>CDD</th><th>BF</th></tr>
<tr><td rowspan="3">11b</td><td>2412</td><td>21</td><td></td></tr>
<tr><td>2437</td><td>21</td><td></td></tr>
<tr><td>2462</td><td>20</td><td></td></tr>
<tr><td rowspan="3">11g</td><td>2412</td><td>17</td><td></td></tr>
<tr><td>2437</td><td>17</td><td></td></tr>
<tr><td>2462</td><td>17</td><td></td></tr>
<tr><td rowspan="3">802.11n HT20</td><td>2412</td><td>15</td><td>14</td></tr>
<tr><td>2437</td><td>18</td><td>14</td></tr>
<tr><td>2462</td><td>16</td><td>15</td></tr>
<tr><td rowspan="3">802.11n HT40</td><td>2422</td><td>15</td><td>14</td></tr>
<tr><td>2437</td><td>16</td><td>15</td></tr>
<tr><td>2452</td><td>15</td><td>14</td></tr>
</table>
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</table>

2.4GHz WLAN: 3TX/3RX

Wi-Fi	Frequency Range (MHz)	Channels	Peak / Average Power	Modulation Technology
802.11b	2412 – 2462(DTS)	11	28.48Bm (PK)	DSSS
802.11g	2412 – 2462(DTS)	11	28.63dBm (PK)	OFDM
802.11n	HT20 2412 – 2462(DTS)	11	29.24dBm (PK)	
802.11n	HT40 2422 – 2452(DTS)	7	27.24dBm (PK)	
Modulation type		CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM		
Antenna Designation		Dipole Antenna Mode name: W1800R WiFi 2.4G Antenna : 4.16 dBi		

Antenna Connected Construction:

The antenna type is Dipole antenna which is designed with detachable attachment and no consideration of replacement. Please see EUT photo for details.

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: TVE-121757A** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

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 v05r02

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 Amendment 1: 2019. 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 m/1.5m (frequency above 1GHz) above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 6 and 11 of ANSI C63.10: 2013.

2.4 Configuration of Tested System

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

RE

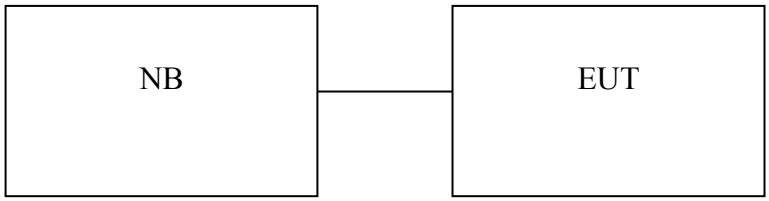


Table 2-1 Equipment Used in Tested System

Item	Equip-ment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	NB	ASUS	P2420L	NA	Non-Shielding	Non-Shielding

AC Conduction

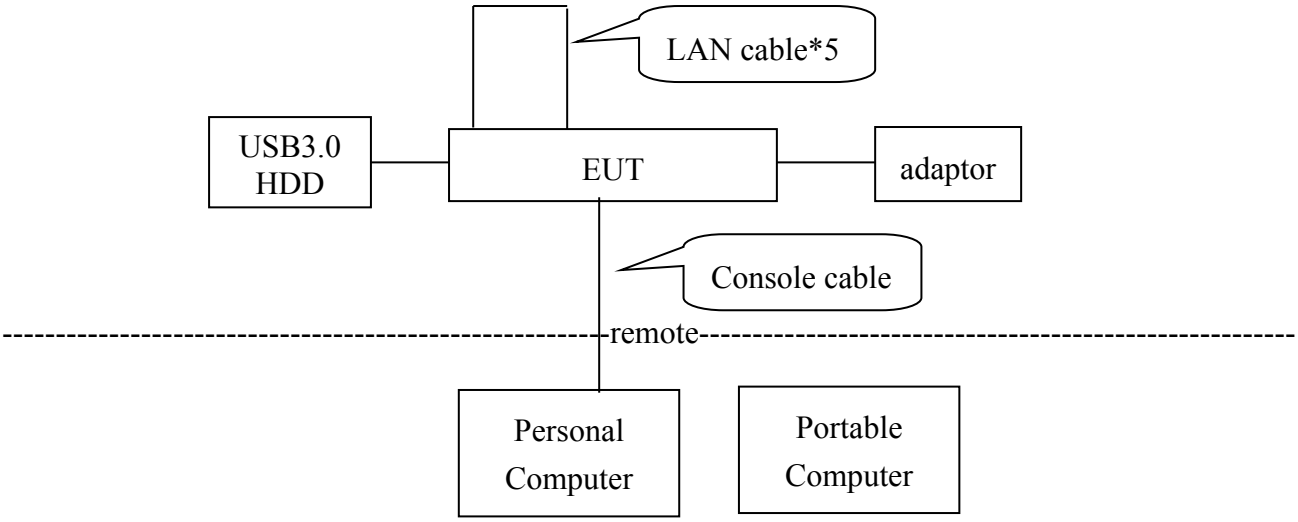


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	USB3.0 HDD	AKiTIO	SK2-U31AS-AKT	N/A	Shielded /1m	N/A
2	Portable Computer	DELL	P18S	6VWSKT1	N/A	Non-shielded /1.8m
3	Personal Computer	Lenovo	5PV	P834EW3	N/A	Non-shield / 1.8m
4	Traveling Disk (3.0)	Transcend	TS16GJF700	N/A	Shielded /1.27m	N/A

3 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4)	Peak Output Power/ EIRP	Compliant
§15.247(a)(2)	6dB & 99% Power Bandwidth	Compliant
§15.247(d)	100 kHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§15.203	Antenna Requirement	Compliant

4 Description of Test Modes

The EUT has been tested under engineering operating condition.

Test program used to control the EUT for staying in continuous transmitting mode is programmed.

For 802.11n, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channels were selected for the final test as listed below:

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

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

802.11n HT20: Channel low (2412MHz), mid (2437MHz), high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11n HT40: Channel low (2422MHz), mid (2437MHz), high (2452MHz) with 13.5Mbps lowest data rate are chosen for full testing.

Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi

5 Conduced Emission Test

5.1 Standard Applicable:

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

Frequency range (MHz)	Limits (dBuV)	
	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:

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction 02	LISN 26	R&S	ENV216	102378	11/21/2018	11/21/2019
Conduction 02	LISN 20	R&S	ENV216	101477	07/31/2019	07/31/2020
Conduction 02	Conduction 02-1 Cable	WOKEN	CFD 300-NL	Conduction 02 -1	09/11/2018	09/11/2019
Conduction 02	Conduction 02-1 Cable	WOKEN	CFD 300-NL	Conduction 02 -1	09/11/2019	09/11/2020
Conduction 02	EMI Receiver 14	ROHDE& SCHWARZ	ESCI	101034	05/31/2019	05/31/2020
Conduction 02	ISN T8 10	Teseq GmbH	ISN T800	42773	08/02/2019	08/02/2020
Conduction 02	Capacitive Voltage Probe	FCC	F-CVP-1	68	02/19/2019	02/19/2020
Conduction 02	Current Probe	SCHAFFNER	SMZ 11	18030	02/19/2019	02/19/2020

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.
4. Both 120V & 240V have been verified, and 120V/60Hz was defined as the worst-case and record in the report.

5.5 Measurement Result:

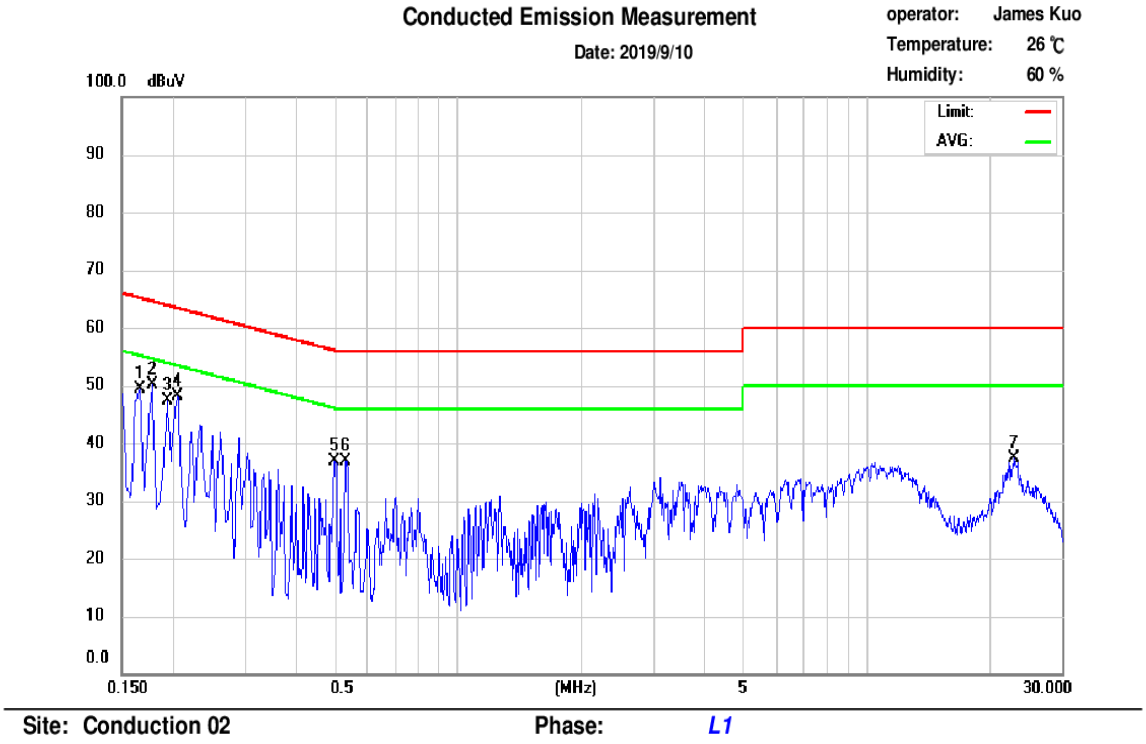
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

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

AC POWER LINE CONDUCTED EMISSION TEST DATA

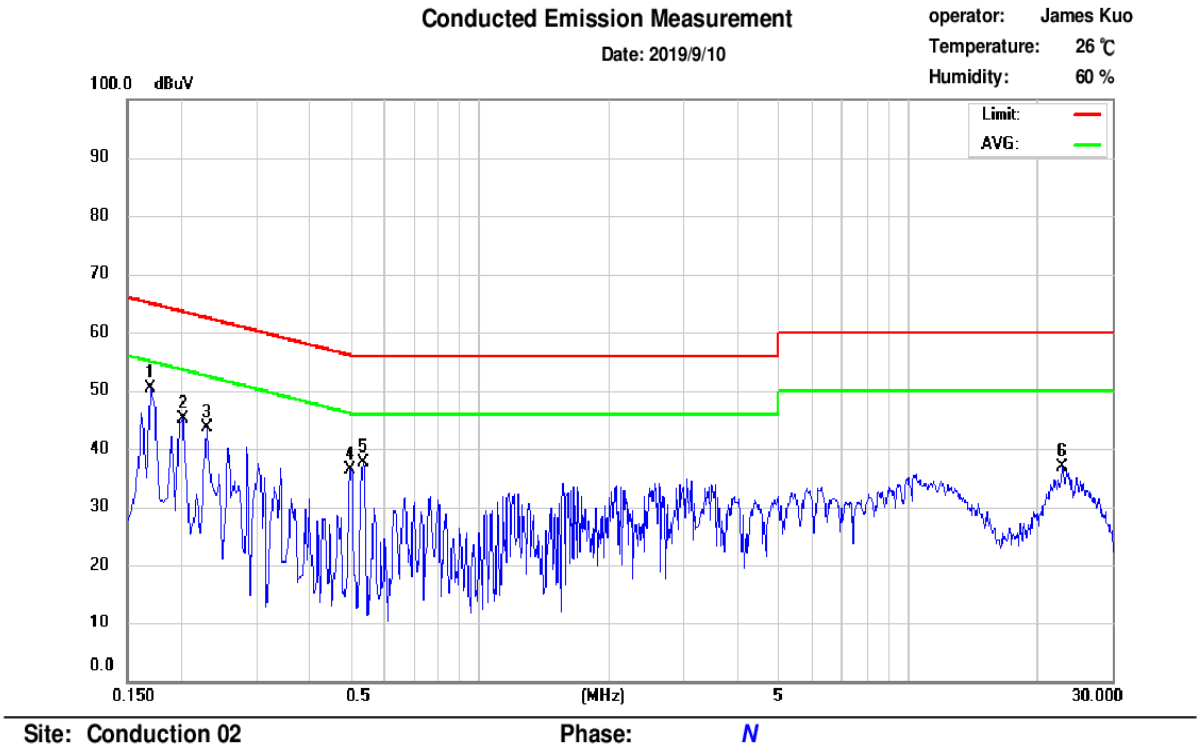
Operation Mode:	Full mode (Worst data)	Test Date:	2019/09/10

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	0.166	40.49	27.38	9.63	50.12	65.16	-15.04	37.01	55.16	-18.15
2	0.178	33.15	16.37	9.62	42.77	64.58	-21.81	25.99	54.58	-28.59
3	0.194	33.89	22.60	9.62	43.51	63.86	-20.35	32.22	53.86	-21.64
4	0.206	33.03	21.89	9.62	42.65	63.37	-20.72	31.51	53.37	-21.86
5	0.498	26.98	26.82	9.64	36.62	56.03	-19.41	36.46	46.03	-9.57
6	0.530	26.90	25.49	9.64	36.54	56.00	-19.46	35.13	46.00	-10.87
7	22.938	21.57	14.19	9.90	31.47	60.00	-28.53	24.09	50.00	-25.91

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



Site: Conduction 02 Phase: *N*

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	0.170	39.09	26.71	9.64	48.73	64.96	-16.23	36.35	54.96	-18.61
2	0.202	36.33	26.28	9.64	45.97	63.53	-17.56	35.92	53.53	-17.61
3	0.230	32.25	23.08	9.64	41.89	62.45	-20.56	32.72	52.45	-19.73
4	0.498	26.00	25.89	9.65	35.65	56.03	-20.38	35.54	46.03	-10.49
5	0.534	27.09	26.59	9.65	36.74	56.00	-19.26	36.24	46.00	-9.76
6	22.934	20.90	13.42	10.02	30.92	60.00	-29.08	23.44	50.00	-26.56

6 Peak Output Power Measurement

6.1 Standard Applicable:

According to §15.247(b)(3), (b)(4), (c)

(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:

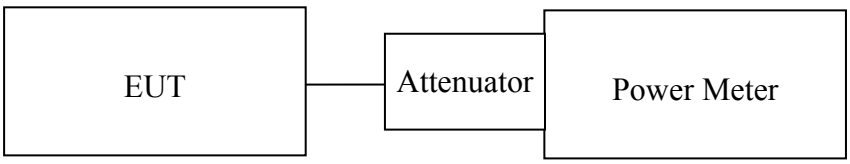
(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the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

6.2 Measurement Equipment Used:

Location Conducted	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conducted	Power Meter	Anritsu	ML2495A	1116010	10/04/2019	10/04/2020
Conducted	Power Sensor	Anritsu	MA2411B	34NKF50	10/04/2019	10/04/2020
Conducted	Power Sensor	DARE	RPR3006W	13I00030SNO33	01/11/2019	01/11/2020
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO35	06/27/2019	06/27/2020
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO36	06/27/2019	06/27/2020
Conducted	Temperature Chamber	KSON	THS-B4H100	2287	02/19/2019	02/19/2020
Conducted	DC Power supply	ABM	8185D	N/A	01/10/2019	01/10/2020
Conducted	AC Power supply	EXTECH	CFC105W	NA	N/A	N/A
Conducted	Spectrum analyzer	Keysight	N9010A	MY56070257	10/05/2019	10/05/2020
Conducted	Spectrum analyzer	R&S	FSP40	100116	01/10/2019	01/10/2020
Conducted	Test Software	DARE	Radiation Ver:2013.1.23	NA	NA	NA
Conducted	Test Software	R&S	CMUGO Ver:2.0.0	N/A	N/A	N/A
Conducted	Radio Communication Analyzer	R&S	CMU200	111968	10/29/2019	10/29/2020
Conducted	Radio Communication Analyzer	R&S	CMW500	1201.002K50108 793-JG	10/11/2019	10/11/2020
Conducted	BT Simulator	Agilent	N4010A	MY48100200	NA	NA
Conducted	GPS Simulator	Welnavigate	GS-50	701523	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:

CDD mode

Peak Output Power

Channel		Output Power (dBm)			Combined Output Power (dBm)	Limit (dBm)	Result
		Chain 0	chain 1	Chain 2			
802.11b	Low	22.86	23.51	23.96	28.24	30.00	Pass
	Mid	23.39	23.71	24.00	28.48	30.00	
	High	22.30	22.81	23.09	27.52	30.00	
802.11g	Low	23.69	24.21	23.57	28.60	30.00	
	Mid	23.38	23.95	24.21	28.63	30.00	
	High	23.36	23.94	23.89	28.51	30.00	
802.11n HT20	Low	21.46	22.83	22.96	27.24	30.00	
	Mid	23.68	25.07	24.54	29.24	30.00	
	High	21.39	22.48	22.70	27.00	30.00	
802.11n HT40	Low	21.66	22.69	22.71	27.15	30.00	
	Mid	21.86	22.73	22.76	27.24	30.00	
	High	21.40	22.75	22.72	27.11	30.00	

Average Output Power (MIMO 3TX)

Channel		Output Power (dBm)			Combined Output Power (dBm)	Limit (dBm)	Result
		Chain 0	chain 1	Chain 2			
802.11b	Low	21.12	21.66	21.98	26.37	30.00	Pass
	Mid	21.24	21.69	21.98	26.42	30.00	
	High	19.99	20.37	20.84	25.19	30.00	
802.11g	Low	17.03	17.76	18.11	22.43	30.00	
	Mid	17.38	17.95	18.12	22.60	30.00	
	High	16.97	17.55	17.67	22.18	30.00	
802.11n HT20	Low	14.61	15.31	15.77	20.03	30.00	
	Mid	17.38	18.96	18.65	23.15	30.00	
	High	14.95	15.23	15.79	20.11	30.00	
802.11n HT40	Low	14.15	15.57	15.62	19.94	30.00	
	Mid	14.91	15.69	15.37	20.11	30.00	
	High	14.17	15.73	15.22	19.86	30.00	

Beamforming mode

Peak Output Power

Channel		Output Power (dBm)			Combined Output Power (dBm)	Limit (dBm)	Result
		Chain 0	chain 1	Chain 2			
802.11n HT20	Low	19.87	20.13	20.40	24.91	27.07	Pass
	Mid	20.01	20.47	20.86	25.23	27.07	
	High	20.12	20.27	20.72	25.15	27.07	
802.11n HT40	Low	20.36	20.78	21.08	25.52	27.07	
	Mid	21.86	22.02	22.42	26.88	27.07	
	High	20.72	20.97	21.17	25.73	27.07	

Average Output Power

Channel		Output Power (dBm)			Combined Output Power (dBm)	Limit(dBm)	Result
		Chain 0	chain 1	Chain 2			
802.11n HT20	Low	12.98	13.21	13.61	18.05	27.07	Pass
	Mid	13.12	13.55	14.03	18.35	27.07	
	High	12.99	13.24	14.01	18.21	27.07	
802.11n HT40	Low	13.21	13.62	13.79	18.32	27.07	
	Mid	14.21	14.69	15.00	19.42	27.07	
	High	13.32	13.75	13.80	18.40	27.07	

7 6dB Bandwidth & 99% Bandwidth

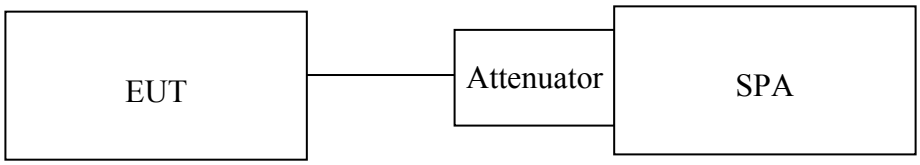
7.1 Standard Applicable:

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.

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	8.10	12.78	> 500	PASS
Mid	8.09	12.86	> 500	PASS
High	8.10	12.79	> 500	PASS

802.11g

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	16.35	16.37	> 500	PASS
Mid	16.34	16.38	> 500	PASS
High	16.36	16.38	> 500	PASS

802.11n HT20

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	17.54	17.55	> 500	PASS
Mid	17.29	17.56	> 500	PASS
High	17.53	17.56	> 500	PASS

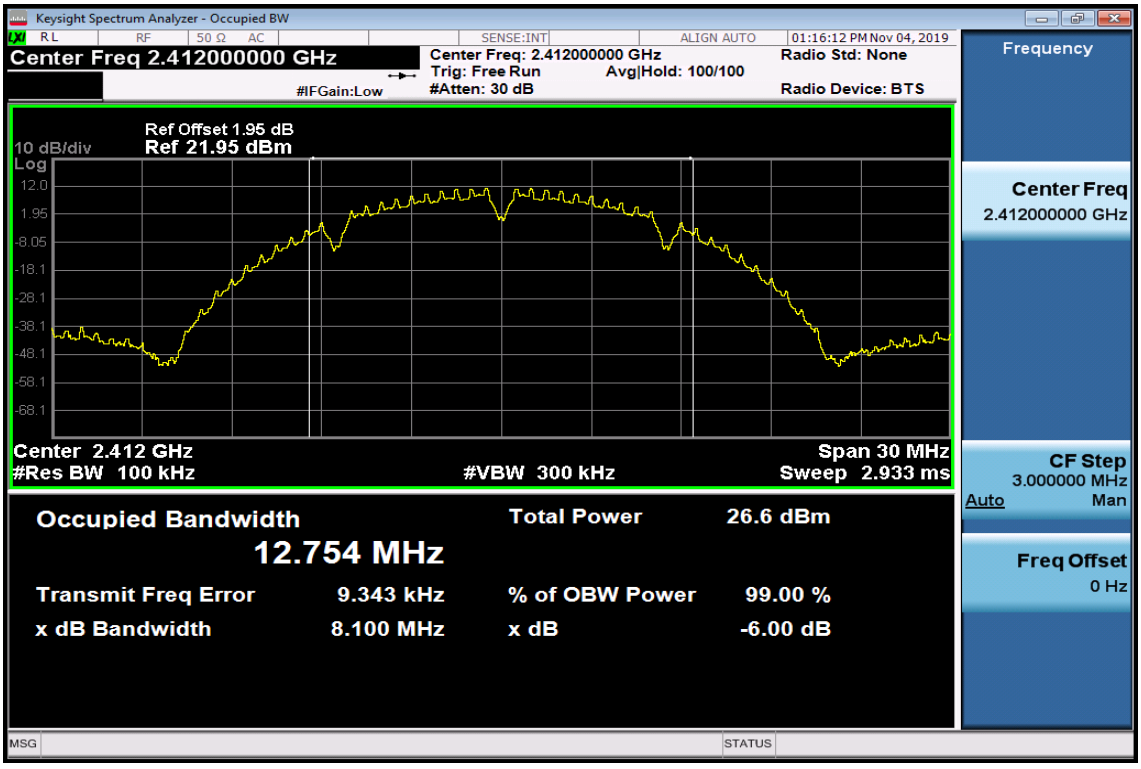
802.11n HT40

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
Low	36.12	36.35	> 500	PASS
Mid	35.10	35.83	> 500	PASS
High	35.15	35.83	> 500	PASS

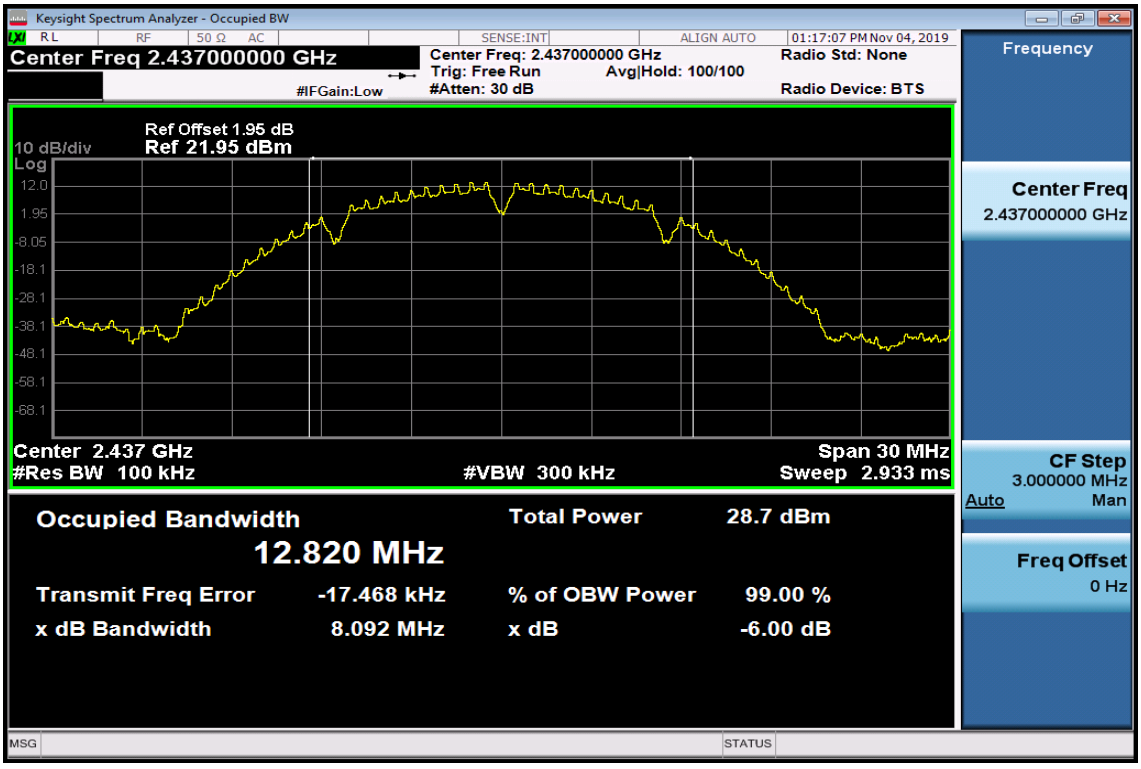
Note: Refer to next page for plots.

802.11b

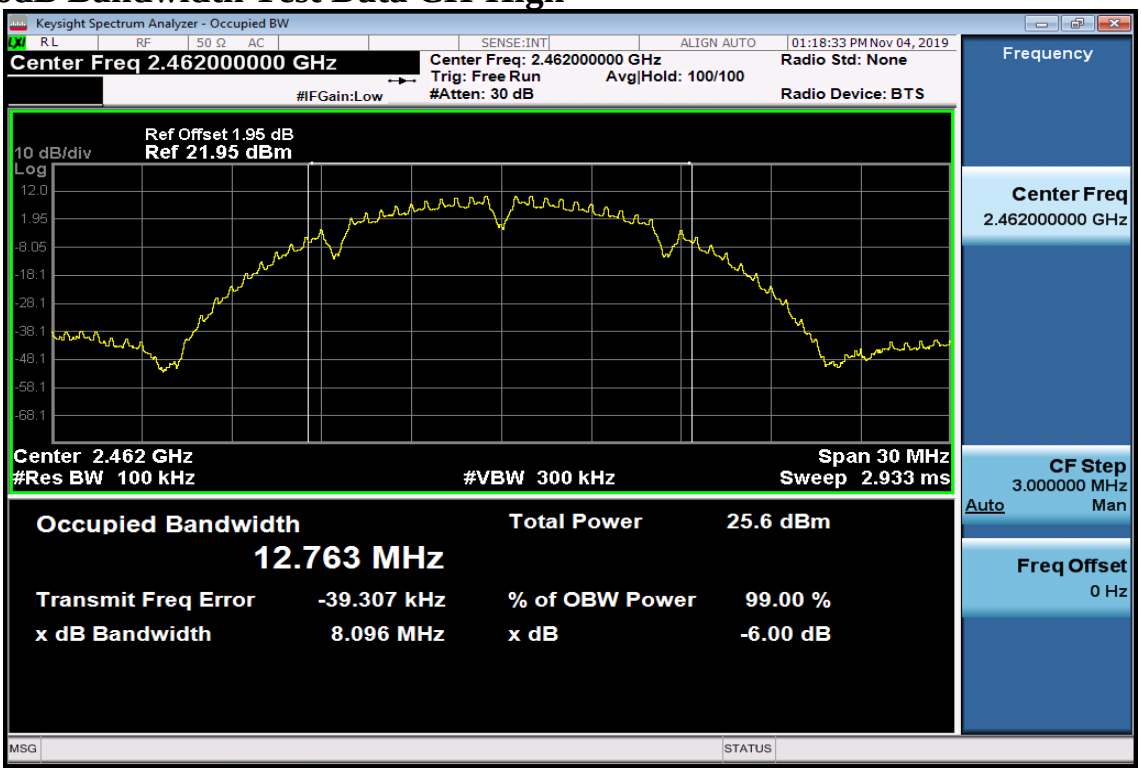
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

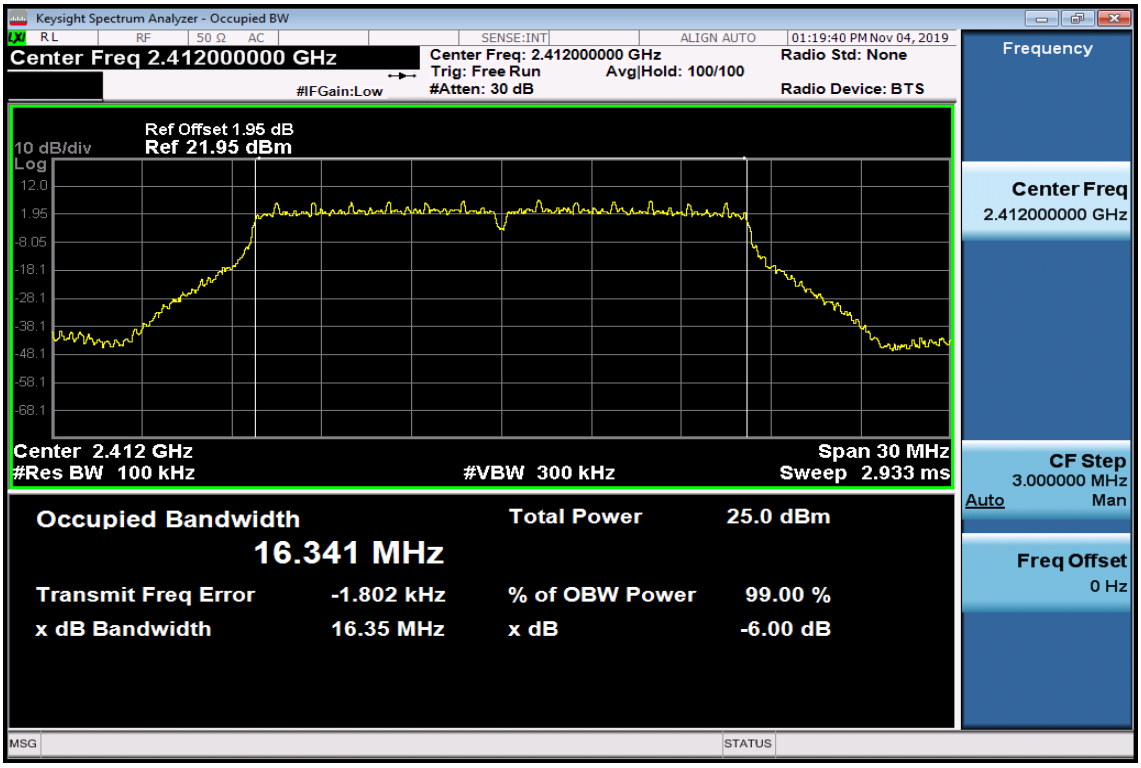


6dB Bandwidth Test Data CH-High

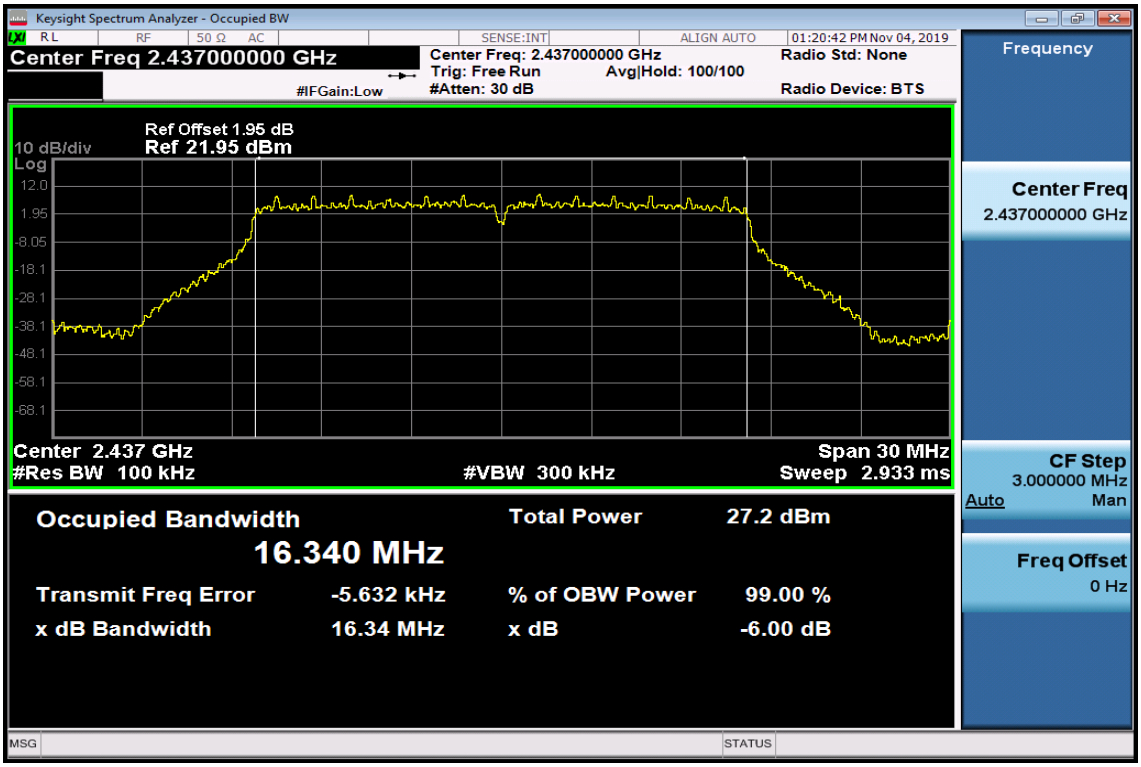


802.11g

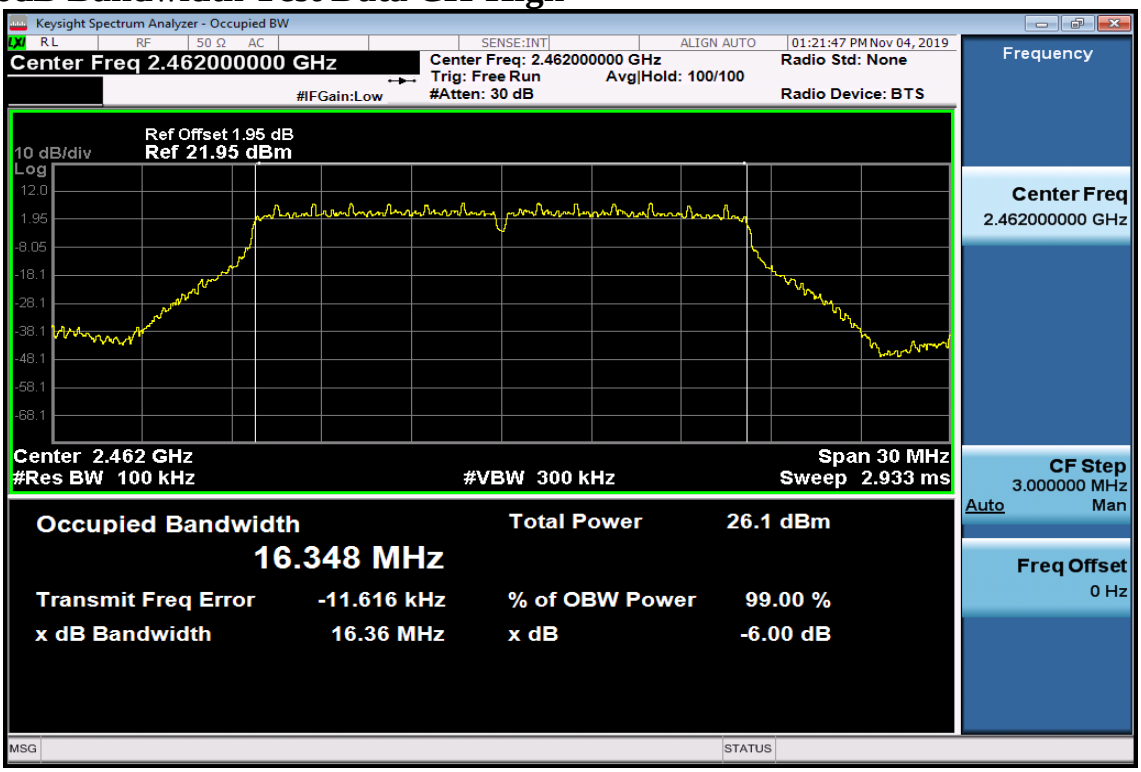
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

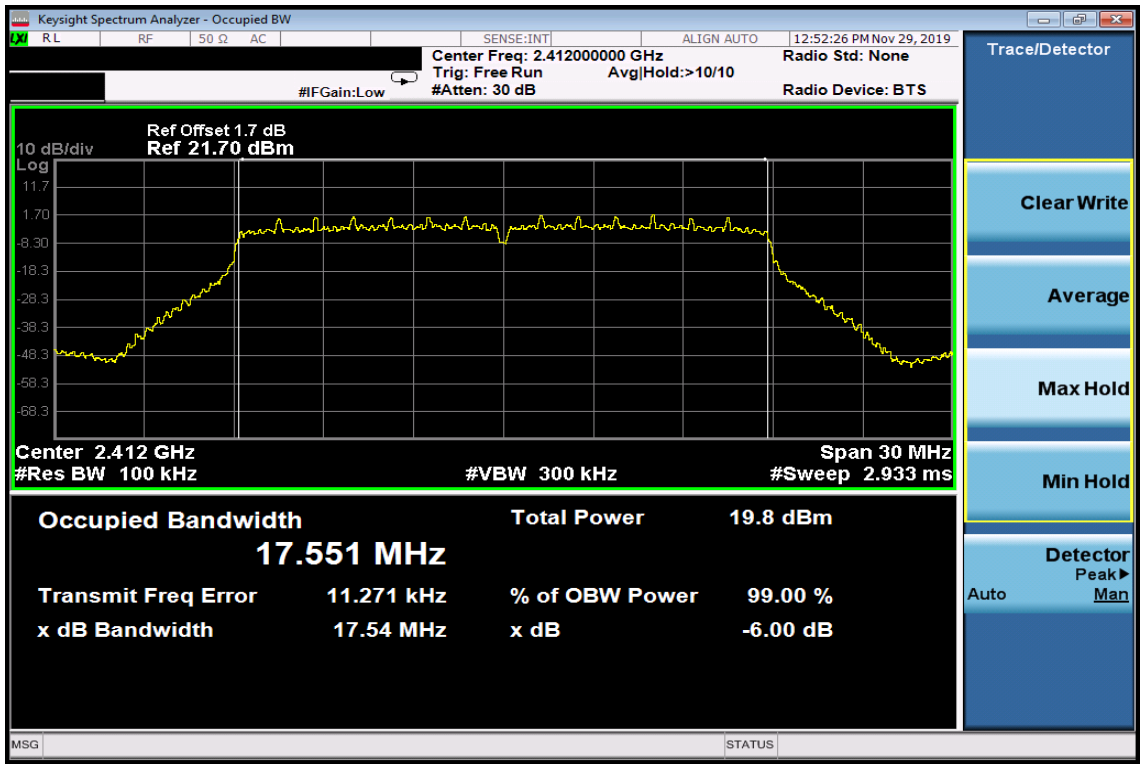


6dB Bandwidth Test Data CH-High

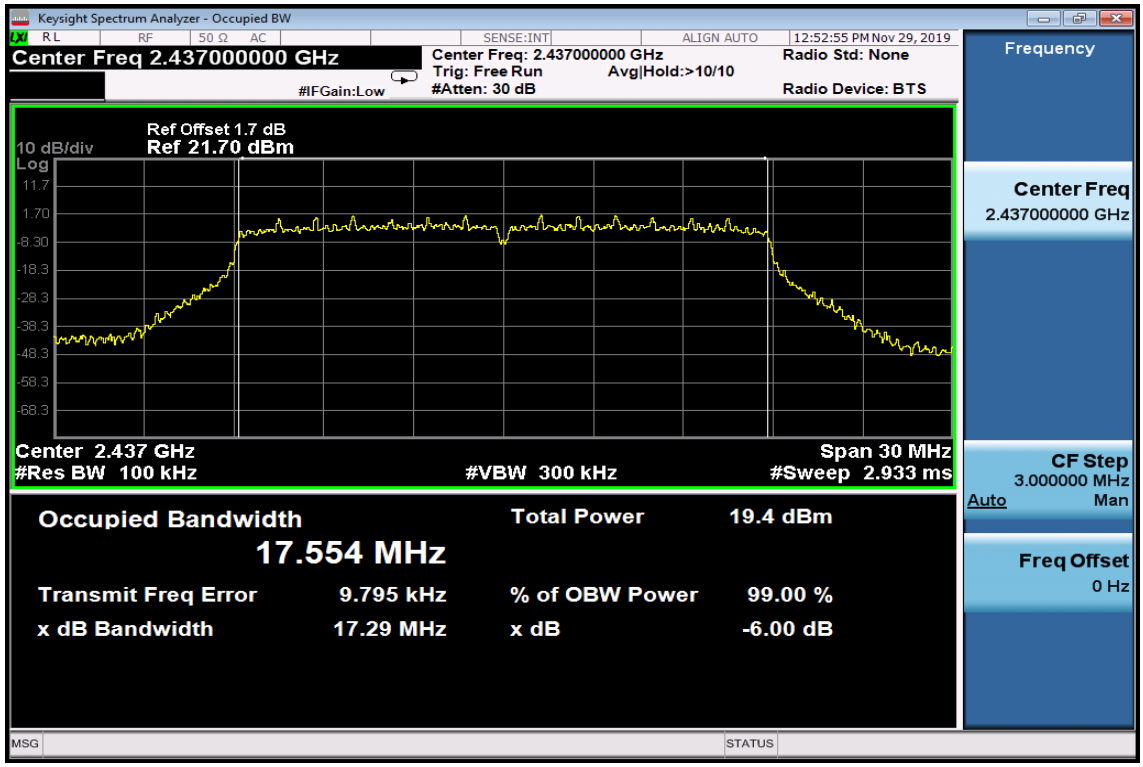


802.11n_HT20

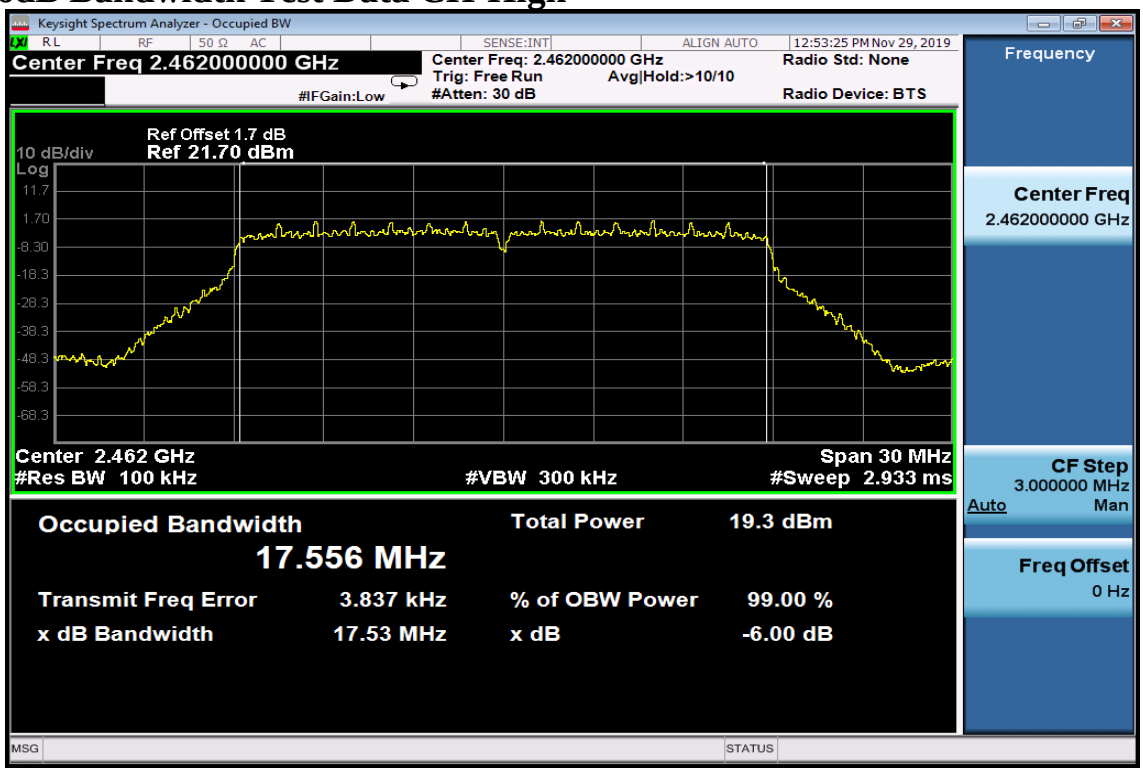
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

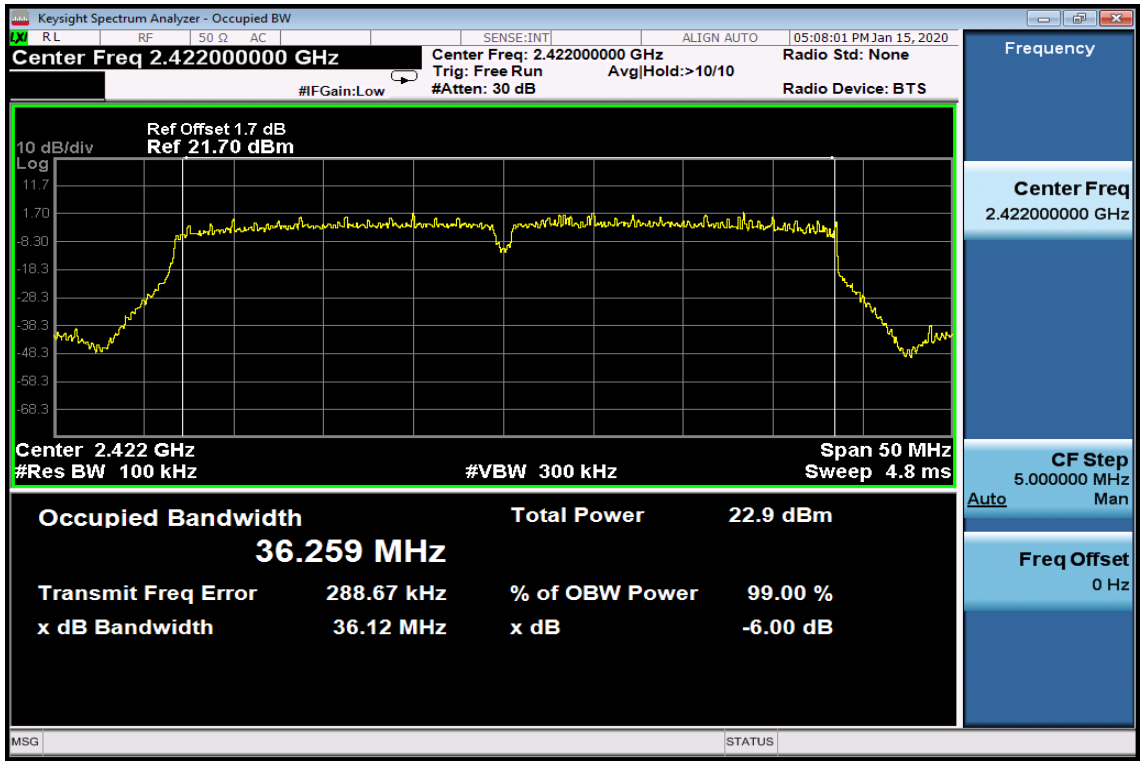


6dB Bandwidth Test Data CH-High

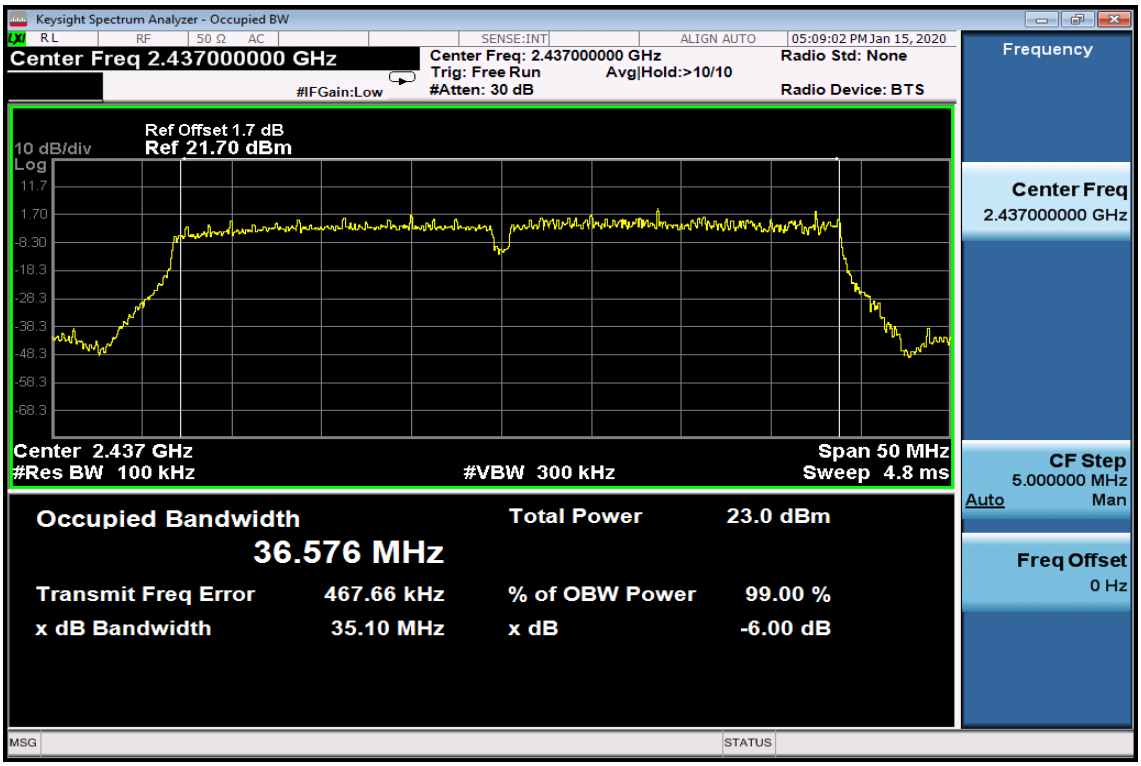


802.11n_HT40

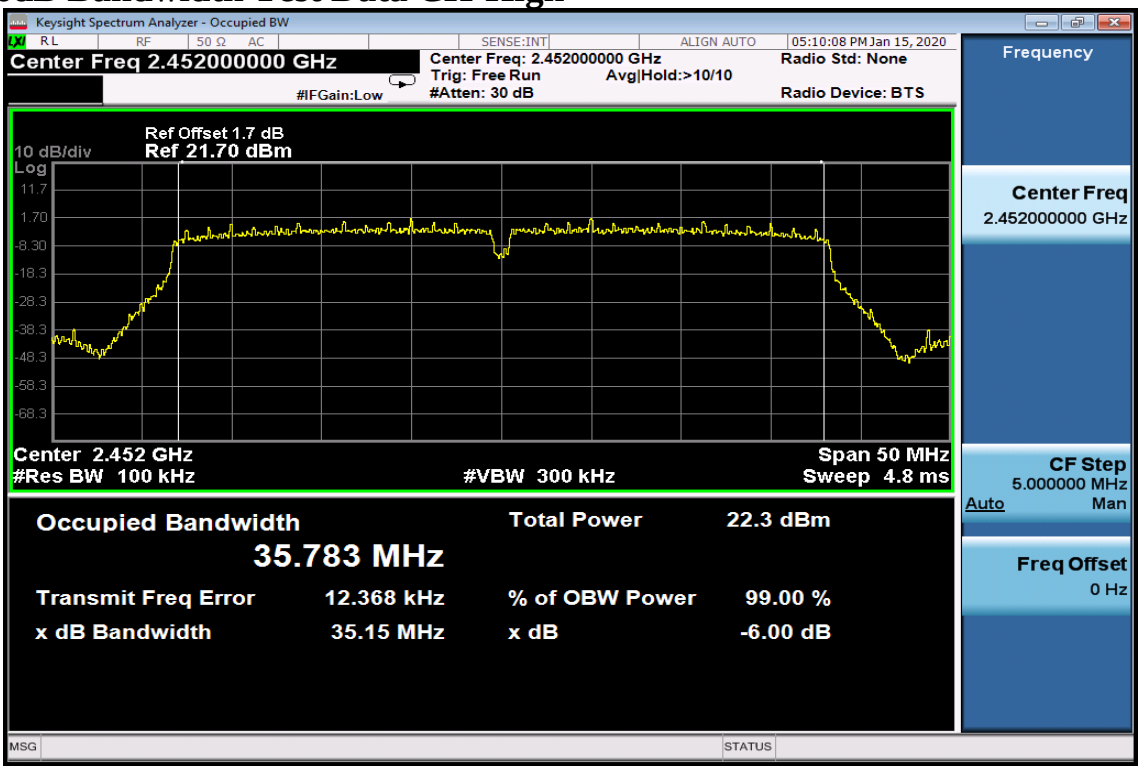
6dB Bandwidth Test Data CH-Low



6dB Bandwidth Test Data CH-Mid

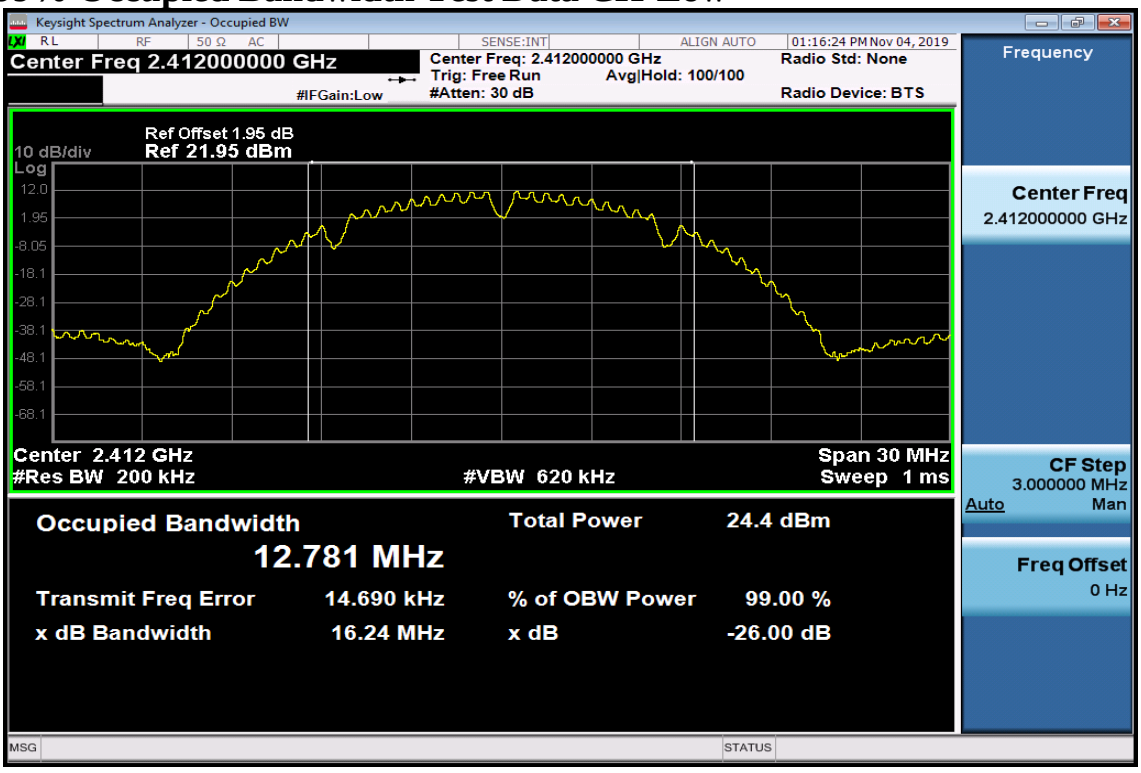


6dB Bandwidth Test Data CH-High

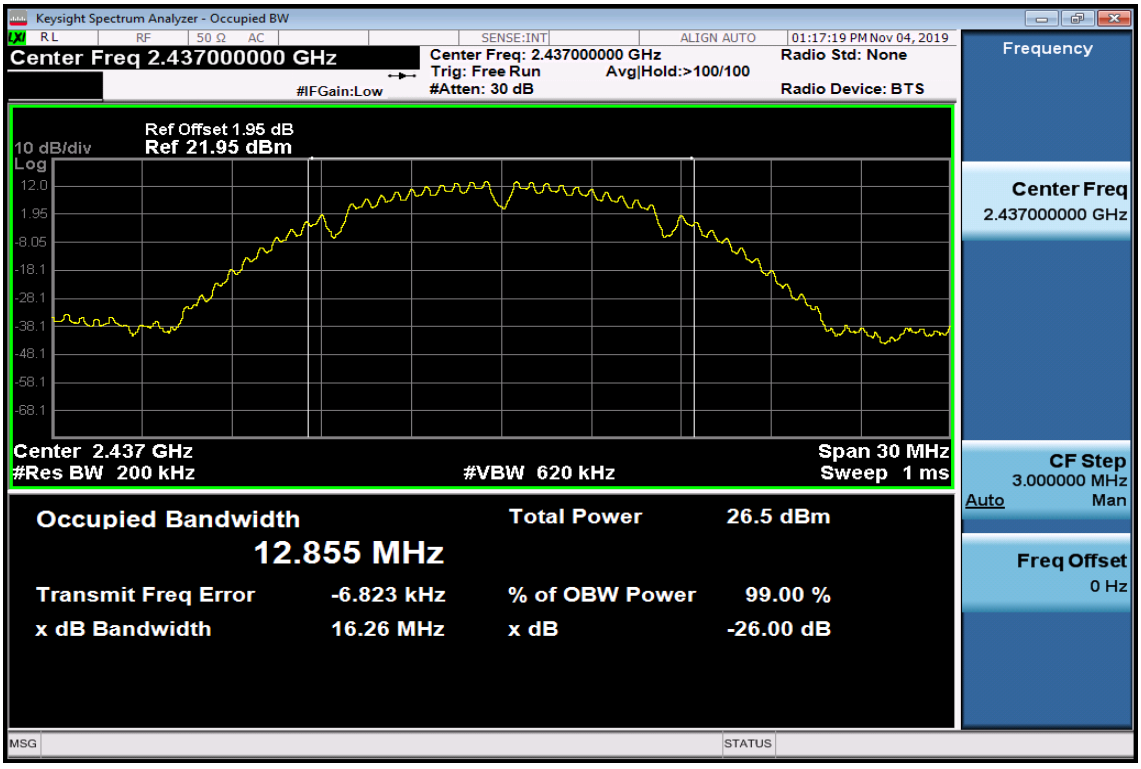


802.11b

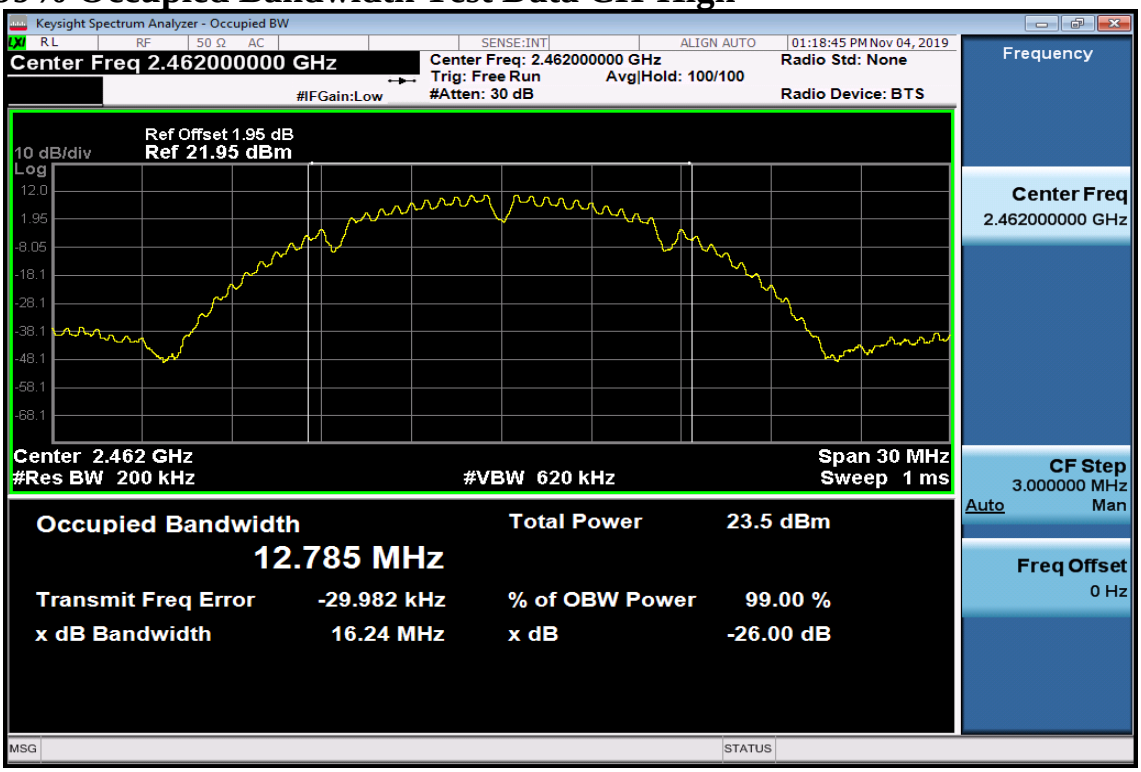
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid

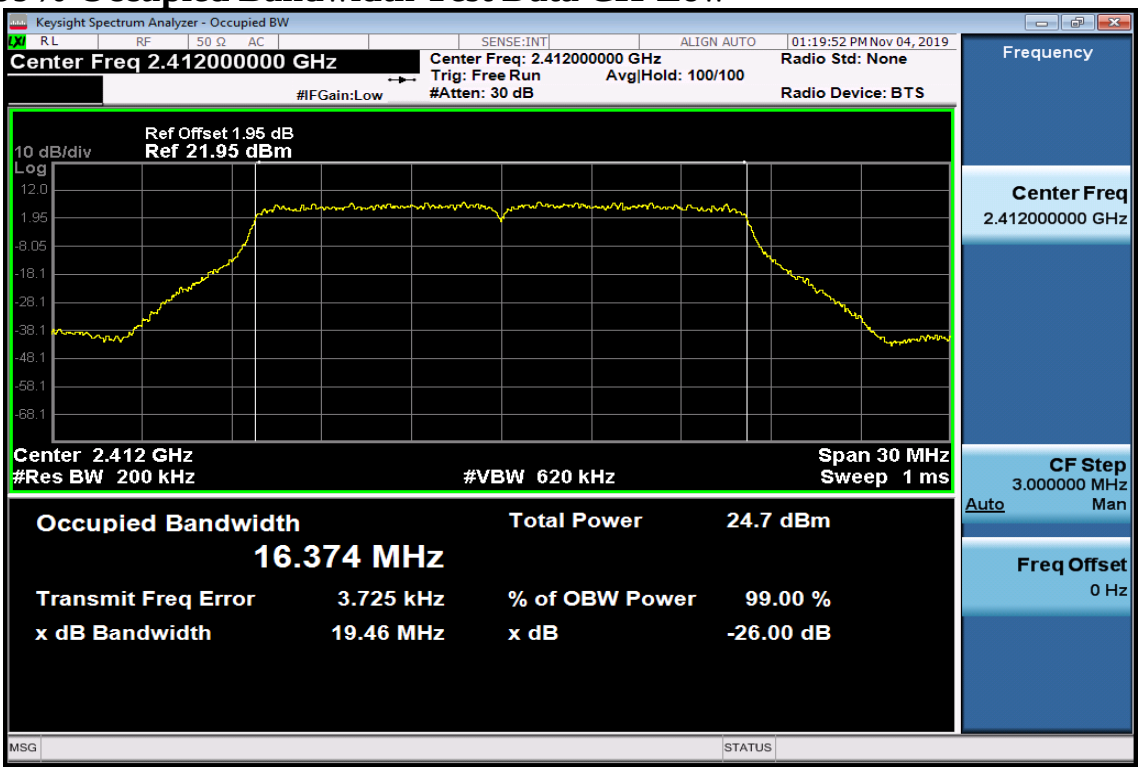


99% Occupied Bandwidth Test Data CH-High

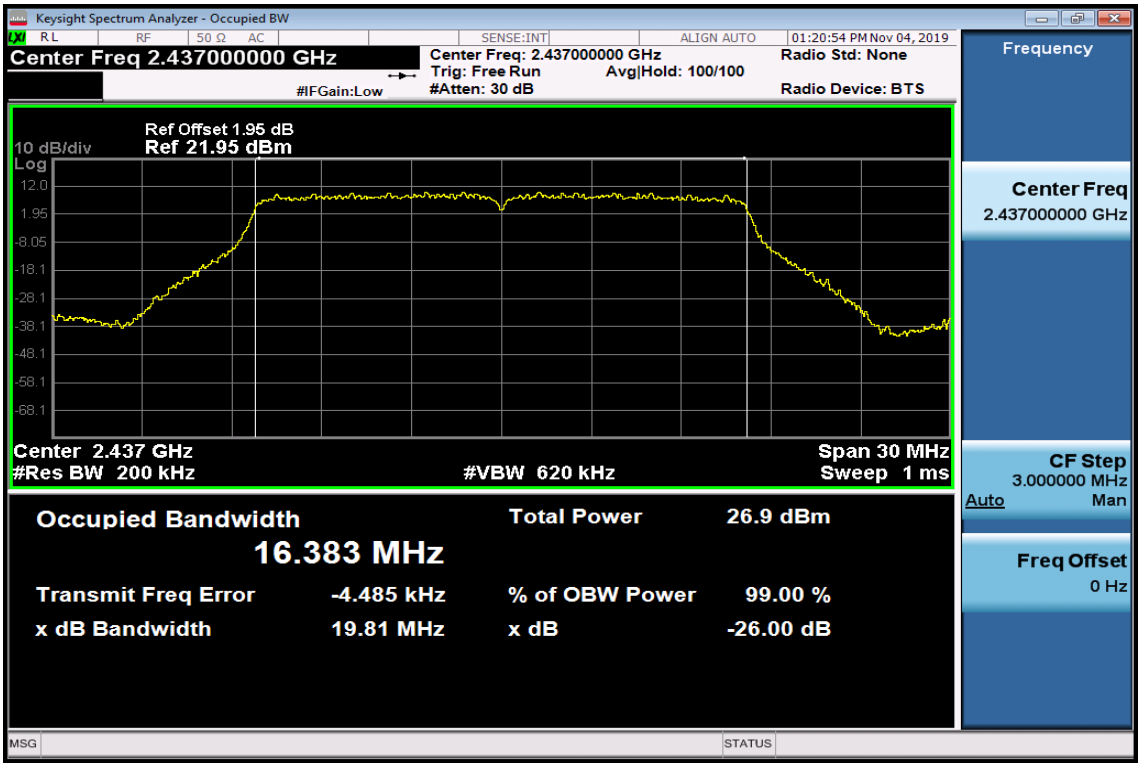


802.11g

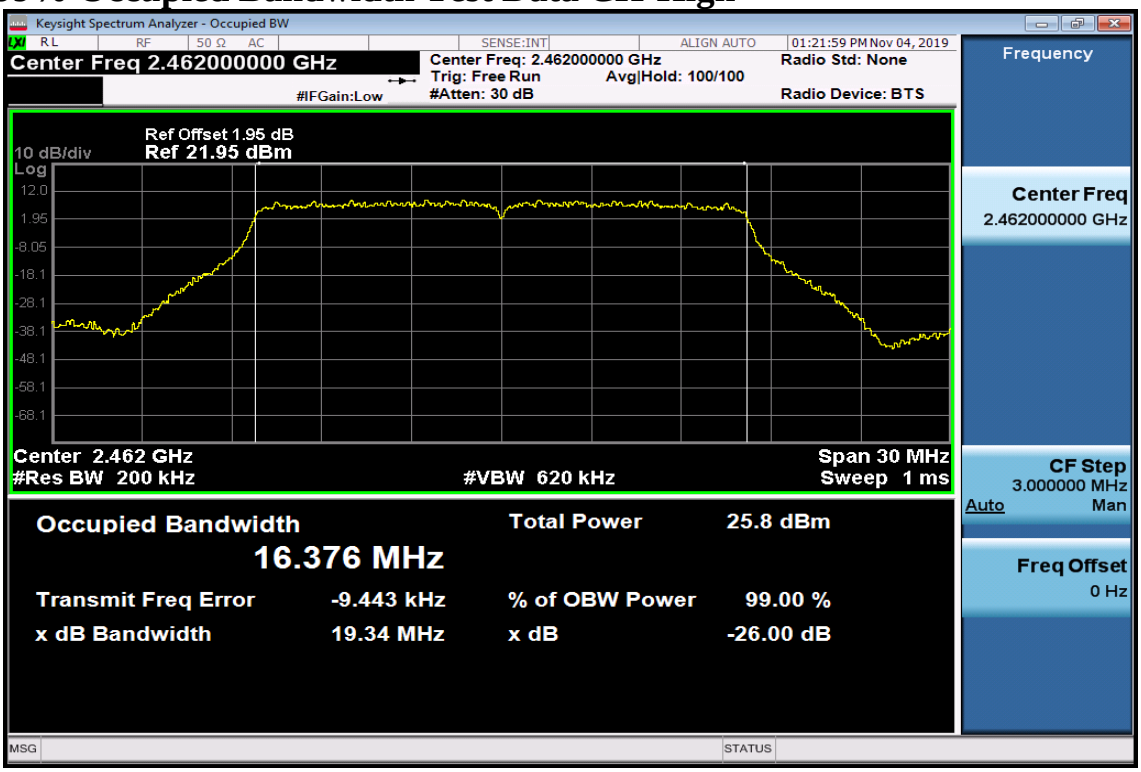
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid

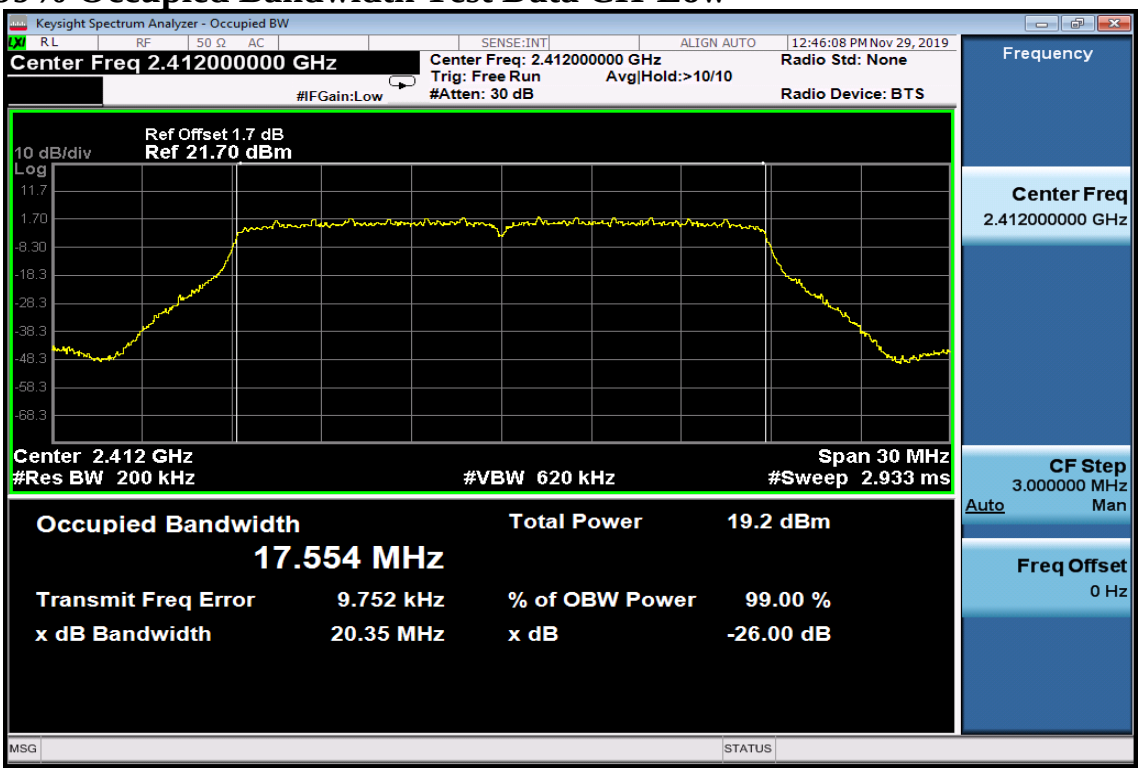


99% Occupied Bandwidth Test Data CH-High

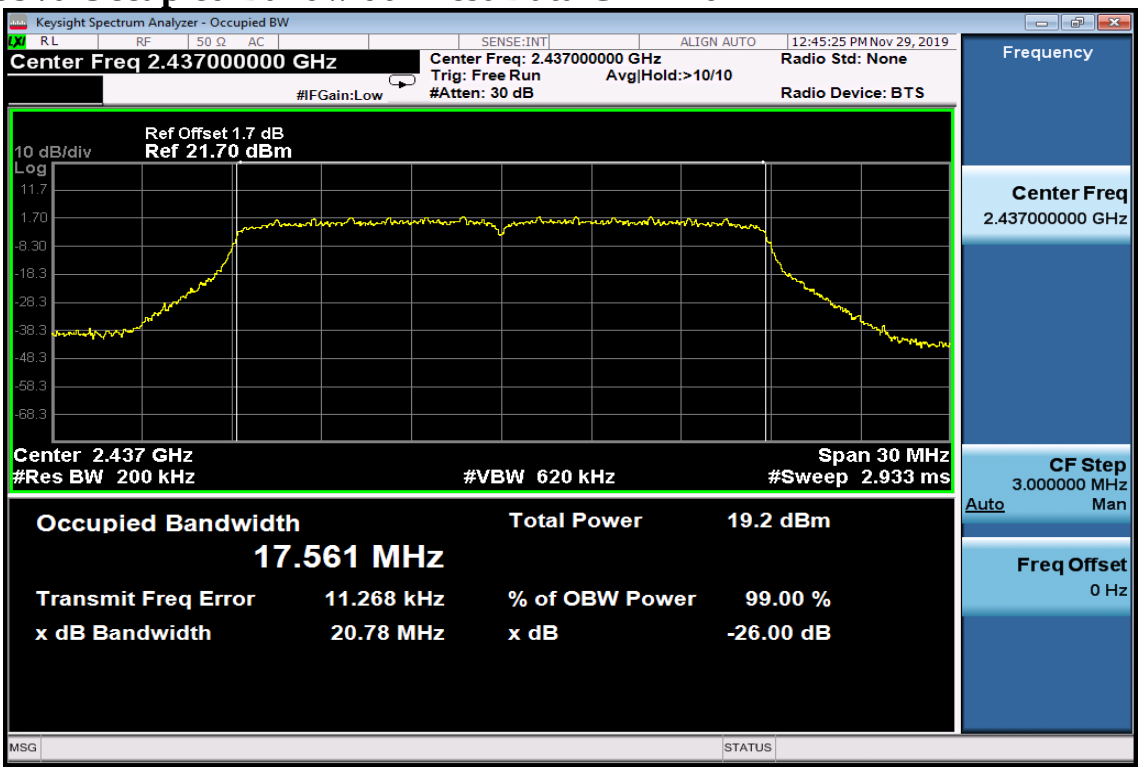


802.11n_HT20

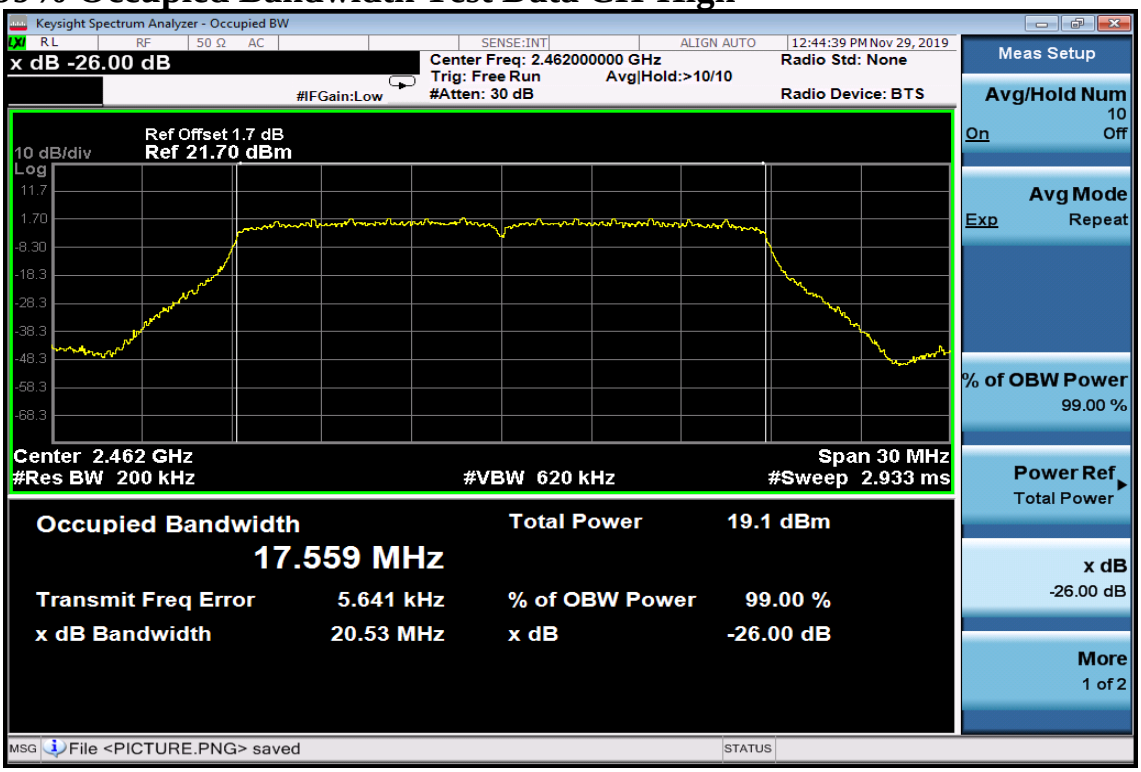
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid

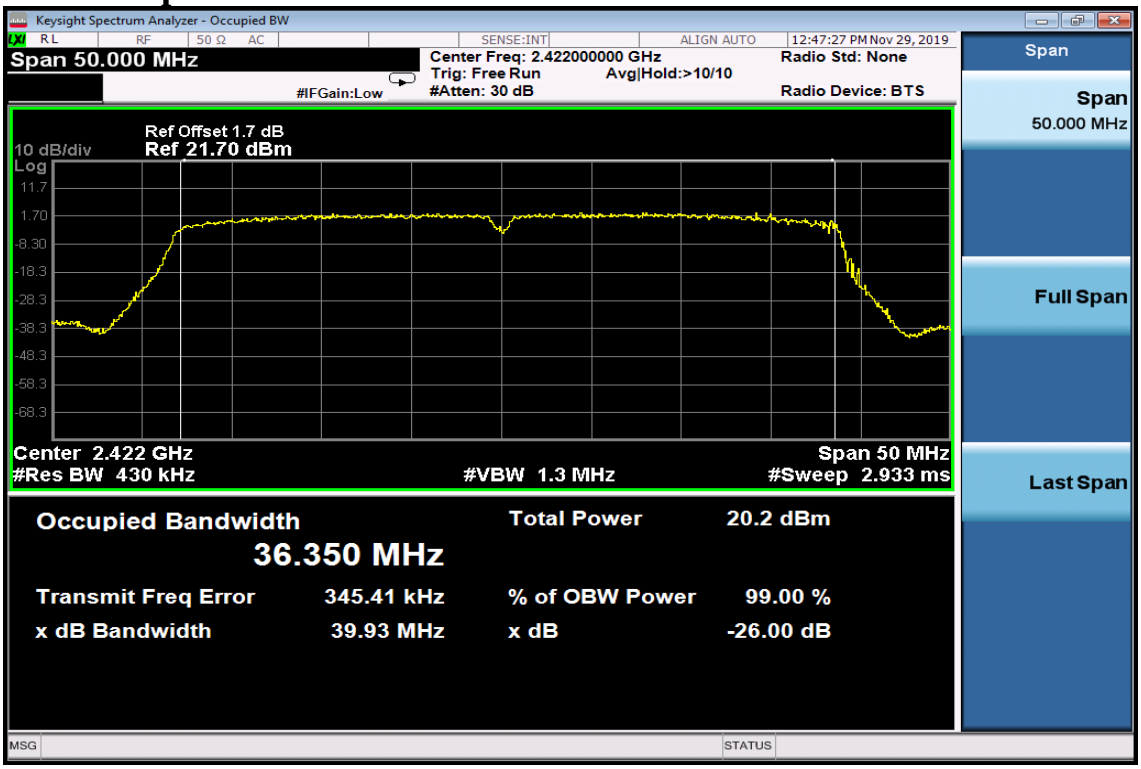


99% Occupied Bandwidth Test Data CH-High

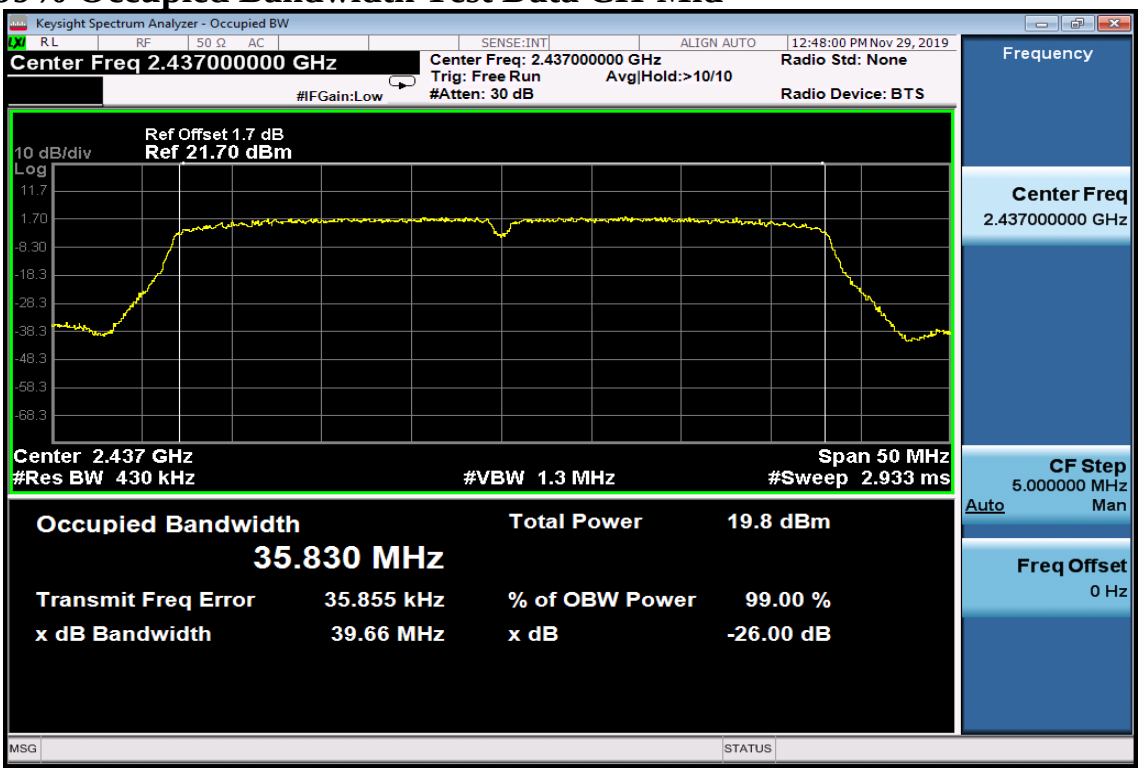


802.11n_HT40

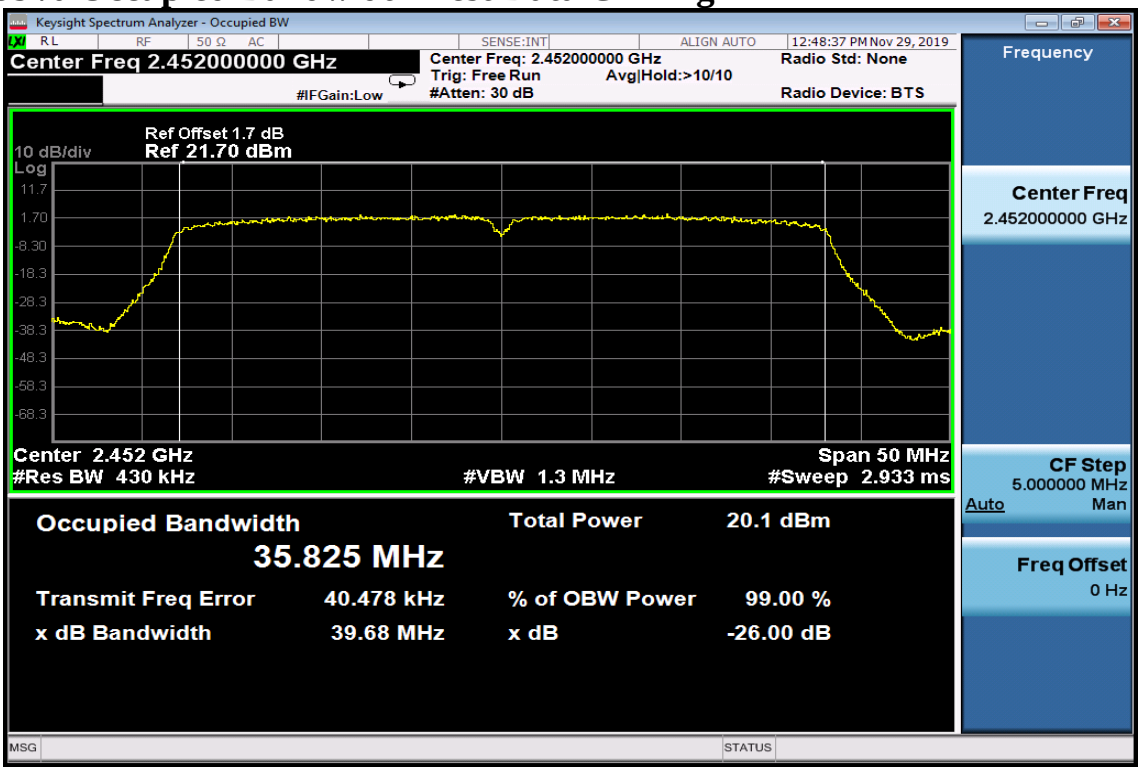
99% Occupied Bandwidth Test Data CH-Low



99% Occupied Bandwidth Test Data CH-Mid



99% Occupied Bandwidth Test Data CH-High



8 Spurious Radiated Emission Test

8.1 Standard Applicable

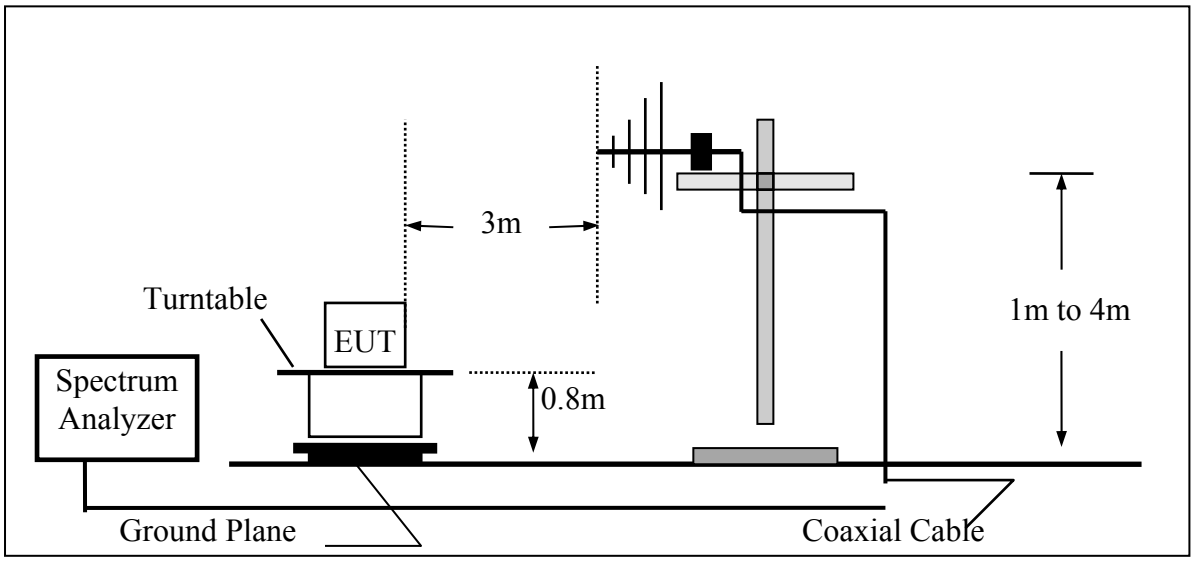
According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental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

8.2 Measurement Equipment Used:

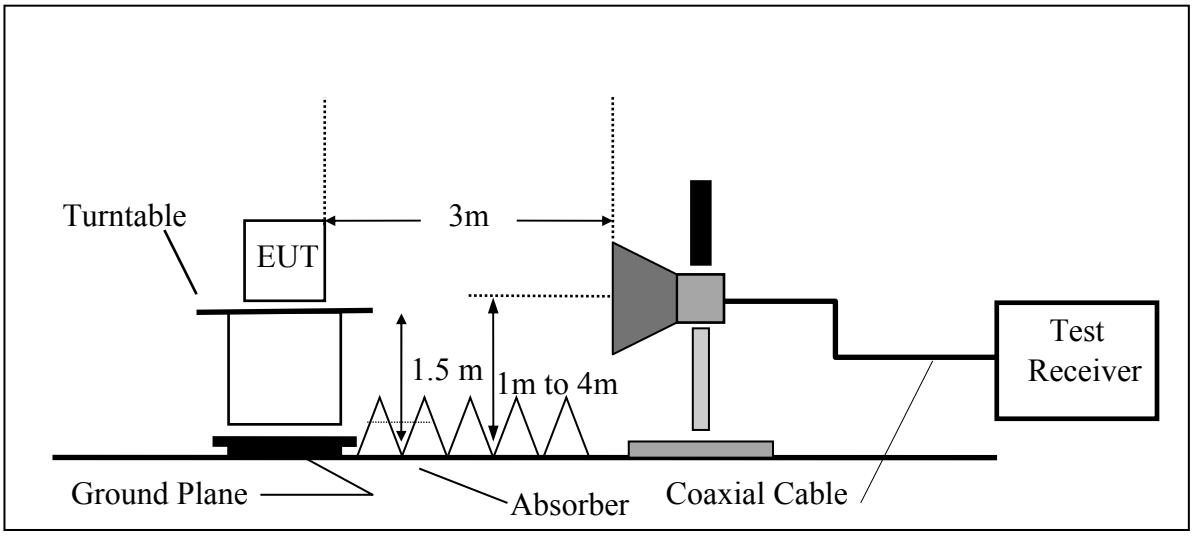
Chamber 19(966)					
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Last Cal.**	**Cal Due.**
Spectrum analyzer	R&S	FSP40	100116	01/10/2019	01/10/2020
EMI Receiver	R&S	ESR3	102461	08/08/2018	08/08/2020
Loop Antenna	EM	EM-6879	271	05/31/2019	05/31/2020
Bilog Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168 w 5dB Att.	736	01/29/2019	01/29/2020
Horn antenna (1GHz-18GHz)	Schwarzbeck	9120D	9120D-1627	06/17/2019	06/17/2020
Horn antenna (18GHz-26GHz)	Com-power	AH-826	081001	11/21/2019	11/21/2020
Horn antenna (26GHz-40GHz)	Com-power	AH-640	100A	03/29/2019	03/29/2021
Preamplifier (9kHz-1GHz)	HP	8447F	3113A06362	01/14/2019	01/14/2020
Preamplifier (1GHz-26GHz)	Agilent	8449B	3008A02471	10/05/2019	10/05/2020
Preamplifier (26GHz-40GHz)	MITEQ	JS4-26004000-27-5A	818471	05/06/2019	05/06/2020
RF Cable (9kHz-18GHz)	HUBER SUHNER	Sucoflex 104A	MY1397/4A	01/17/2019	01/17/2020
RF Cable (18GHz-40GHz)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/27/2017	11/27/2019
RF Cable (18GHz-40GHz)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/27/2019	11/27/2021
Signal Generator	Anritsu	MG3692A	20311	01/09/2019	01/09/2020
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A
Magnetic Field Meter	Combinova	MFM-10	645	10/16/2019	10/16/2020
Magnetic Field Meter	Combinova	MFM-1000	619	12/06/2019	12/06/2020
Electric Field Meter	Combinova	EFM-200	402	10/16/2019	10/16/2020
E-field probe	Narda / Wandel & Goltermann	EF-0691 + NBM-520	D-0135 + D-0526	03/02/2019	03/02/2020

8.3 Test SET-UP:

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



(B) Radiated Emission Test Setup Frequency above 1 GHz



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 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%)

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	2019/11/25
Channel number	CH Low	Test By	Weitin
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	62.98	35.82	-6.13	29.69	40.00	-10.31	Peak	VERTICAL
2	191.02	33.10	-7.08	26.02	43.50	-17.48	Peak	VERTICAL
3	250.19	33.91	-5.51	28.40	46.00	-17.60	Peak	VERTICAL
4	399.57	33.95	-2.02	31.93	46.00	-14.07	Peak	VERTICAL
5	496.57	33.07	-0.67	32.40	46.00	-13.60	Peak	VERTICAL
6	833.16	33.99	5.18	39.17	46.00	-6.83	Peak	VERTICAL
1	98.87	41.36	-10.39	30.97	43.50	-12.53	Peak	HORIZONTAL
2	250.19	40.52	-5.51	35.01	46.00	-10.99	Peak	HORIZONTAL
3	298.69	33.33	-3.85	29.48	46.00	-16.52	Peak	HORIZONTAL
4	497.54	31.71	-0.67	31.04	46.00	-14.96	Peak	HORIZONTAL
5	520.82	33.84	0.08	33.92	46.00	-12.08	Peak	HORIZONTAL
6	833.16	30.89	5.18	36.07	46.00	-9.93	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	2019/11/25
Channel number	CH Mid	Test By	Weitin
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	40.67	37.30	-5.65	31.65	40.00	-8.35	Peak	VERTICAL
2	125.06	32.37	-7.47	24.90	43.50	-18.60	Peak	VERTICAL
3	250.19	33.00	-5.51	27.49	46.00	-18.51	Peak	VERTICAL
4	298.69	31.48	-3.85	27.63	46.00	-18.37	Peak	VERTICAL
5	422.85	32.58	-1.60	30.98	46.00	-15.02	Peak	VERTICAL
6	833.16	32.78	5.18	37.96	46.00	-8.04	Peak	VERTICAL
1	94.99	41.62	-11.09	30.53	43.50	-12.97	Peak	HORIZONTAL
2	188.11	39.18	-6.87	32.31	43.50	-11.19	Peak	HORIZONTAL
3	250.19	41.56	-5.51	36.05	46.00	-9.95	Peak	HORIZONTAL
4	299.66	33.22	-3.82	29.40	46.00	-16.60	Peak	HORIZONTAL
5	518.88	28.54	0.02	28.56	46.00	-17.44	Peak	HORIZONTAL
6	833.16	30.29	5.18	35.47	46.00	-10.53	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 9MHz to 1000MHz were made with an instrument detector setting 9-90kHz/110-490kHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11b TX mode	Test Date	2019/11/25
Channel number	CH High	Test By	Weitin
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	94.99	41.62	-11.09	30.53	43.50	-12.97	Peak	VERTICAL
2	188.11	39.18	-6.87	32.31	43.50	-11.19	Peak	VERTICAL
3	250.19	41.56	-5.51	36.05	46.00	-9.95	Peak	VERTICAL
4	299.66	33.22	-3.82	29.40	46.00	-16.60	Peak	VERTICAL
5	518.88	28.54	0.02	28.56	46.00	-17.44	Peak	VERTICAL
6	833.16	30.29	5.18	35.47	46.00	-10.53	Peak	VERTICAL
1	98.87	41.09	-10.39	30.70	43.50	-12.80	Peak	HORIZONTAL
2	179.38	37.35	-6.05	31.30	43.50	-12.20	Peak	HORIZONTAL
3	250.19	41.41	-5.51	35.90	46.00	-10.10	Peak	HORIZONTAL
4	299.66	34.08	-3.82	30.26	46.00	-15.74	Peak	HORIZONTAL
5	498.51	35.64	-0.65	34.99	46.00	-11.01	Peak	HORIZONTAL
6	833.16	30.35	5.18	35.53	46.00	-10.47	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.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11g TX mode	Test Date	2019/11/25
Channel number	CH Low	Test By	Weitin
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	250.19	33.14	-5.51	27.63	46.00	-18.37	Peak	VERTICAL
2	302.57	31.44	-3.77	27.67	46.00	-18.33	Peak	VERTICAL
3	399.57	33.50	-2.02	31.48	46.00	-14.52	Peak	VERTICAL
4	521.79	34.63	0.11	34.74	46.00	-11.26	Peak	VERTICAL
5	598.42	29.92	1.49	31.41	46.00	-14.59	Peak	VERTICAL
6	833.16	34.71	5.18	39.89	46.00	-6.11	Peak	VERTICAL
1	100.81	41.33	-10.04	31.29	43.50	-12.21	Peak	HORIZONTAL
2	193.93	40.52	-7.18	33.34	43.50	-10.16	Peak	HORIZONTAL
3	250.19	40.56	-5.51	35.05	46.00	-10.95	Peak	HORIZONTAL
4	298.69	33.31	-3.85	29.46	46.00	-16.54	Peak	HORIZONTAL
5	385.99	29.11	-2.22	26.89	46.00	-19.11	Peak	HORIZONTAL
6	514.03	32.08	-0.18	31.90	46.00	-14.10	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.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11g TX mode	Test Date	2019/11/25
Channel number	CH Mid	Test By	Weitin
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	152.22	32.83	-5.19	27.64	43.50	-15.86	Peak	VERTICAL
2	250.19	33.50	-5.51	27.99	46.00	-18.01	Peak	VERTICAL
3	306.45	31.15	-3.72	27.43	46.00	-18.57	Peak	VERTICAL
4	399.57	34.39	-2.02	32.37	46.00	-13.63	Peak	VERTICAL
5	518.88	31.71	0.02	31.73	46.00	-14.27	Peak	VERTICAL
6	833.16	35.18	5.18	40.36	46.00	-5.64	Peak	VERTICAL
1	101.78	42.39	-9.91	32.48	43.50	-11.02	Peak	HORIZONTAL
2	191.02	39.64	-7.08	32.56	43.50	-10.94	Peak	HORIZONTAL
3	250.19	41.34	-5.51	35.83	46.00	-10.17	Peak	HORIZONTAL
4	299.66	33.12	-3.82	29.30	46.00	-16.70	Peak	HORIZONTAL
5	497.54	31.65	-0.67	30.98	46.00	-15.02	Peak	HORIZONTAL
6	833.16	30.97	5.18	36.15	46.00	-9.85	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.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11g TX mode	Test Date	2019/11/25
Channel number	CH High	Test By	Weitin
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	125.06	32.97	-7.47	25.50	43.50	-18.00	Peak	VERTICAL
2	250.19	33.48	-5.51	27.97	46.00	-18.03	Peak	VERTICAL
3	299.66	31.75	-3.82	27.93	46.00	-18.07	Peak	VERTICAL
4	422.85	32.90	-1.60	31.30	46.00	-14.70	Peak	VERTICAL
5	595.51	27.97	1.43	29.40	46.00	-16.60	Peak	VERTICAL
6	850.62	28.80	5.35	34.15	46.00	-11.85	Peak	VERTICAL
1	98.87	41.45	-10.39	31.06	43.50	-12.44	Peak	HORIZONTAL
2	191.02	38.84	-7.08	31.76	43.50	-11.74	Peak	HORIZONTAL
3	250.19	41.52	-5.51	36.01	46.00	-9.99	Peak	HORIZONTAL
4	299.66	33.69	-3.82	29.87	46.00	-16.13	Peak	HORIZONTAL
5	497.54	39.59	-0.67	38.92	46.00	-7.08	Peak	HORIZONTAL
6	841.89	28.30	5.29	33.59	46.00	-12.41	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.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/11/25
Channel number	CH Low	Test By	Weitin
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	125.06	33.50	-7.47	26.03	43.50	-17.47	Peak	VERTICAL
2	250.19	34.22	-5.51	28.71	46.00	-17.29	Peak	VERTICAL
3	353.98	30.47	-2.92	27.55	46.00	-18.45	Peak	VERTICAL
4	398.60	33.96	-2.03	31.93	46.00	-14.07	Peak	VERTICAL
5	520.82	32.51	0.08	32.59	46.00	-13.41	Peak	VERTICAL
6	833.16	35.28	5.18	40.46	46.00	-5.54	Peak	VERTICAL
1	98.87	41.15	-10.39	30.76	43.50	-12.74	Peak	HORIZONTAL
2	187.14	40.48	-6.78	33.70	43.50	-9.80	Peak	HORIZONTAL
3	250.19	41.67	-5.51	36.16	46.00	-9.84	Peak	HORIZONTAL
4	298.69	33.89	-3.85	30.04	46.00	-15.96	Peak	HORIZONTAL
5	520.82	31.62	0.08	31.70	46.00	-14.30	Peak	HORIZONTAL
6	833.16	30.53	5.18	35.71	46.00	-10.29	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.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/11/25
Channel number	CH Mid	Test By	Weitin
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	250.19	33.29	-5.51	27.78	46.00	-18.22	Peak	VERTICAL
2	407.33	33.36	-1.89	31.47	46.00	-14.53	Peak	VERTICAL
3	521.79	33.98	0.11	34.09	46.00	-11.91	Peak	VERTICAL
4	607.15	28.56	1.62	30.18	46.00	-15.82	Peak	VERTICAL
5	732.28	28.52	3.57	32.09	46.00	-13.91	Peak	VERTICAL
6	833.16	34.78	5.18	39.96	46.00	-6.04	Peak	VERTICAL
1	99.84	41.04	-10.19	30.85	43.50	-12.65	Peak	HORIZONTAL
2	186.17	39.34	-6.69	32.65	43.50	-10.85	Peak	HORIZONTAL
3	250.19	41.57	-5.51	36.06	46.00	-9.94	Peak	HORIZONTAL
4	298.69	32.78	-3.85	28.93	46.00	-17.07	Peak	HORIZONTAL
5	521.79	30.58	0.11	30.69	46.00	-15.31	Peak	HORIZONTAL
6	833.16	31.58	5.18	36.76	46.00	-9.24	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.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX mode	Test Date	2019/11/25
Channel number	CH High	Test By	Weitin
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	125.06	33.43	-7.47	25.96	43.50	-17.54	Peak	VERTICAL
2	250.19	33.44	-5.51	27.93	46.00	-18.07	Peak	VERTICAL
3	298.69	31.08	-3.85	27.23	46.00	-18.77	Peak	VERTICAL
4	391.81	33.61	-2.13	31.48	46.00	-14.52	Peak	VERTICAL
5	522.76	32.45	0.13	32.58	46.00	-13.42	Peak	VERTICAL
6	833.16	34.40	5.18	39.58	46.00	-6.42	Peak	VERTICAL
1	100.81	41.30	-10.04	31.26	43.50	-12.24	Peak	HORIZONTAL
2	165.80	36.96	-5.09	31.87	43.50	-11.63	Peak	HORIZONTAL
3	250.19	41.17	-5.51	35.66	46.00	-10.34	Peak	HORIZONTAL
4	298.69	34.40	-3.85	30.55	46.00	-15.45	Peak	HORIZONTAL
5	497.54	31.05	-0.67	30.38	46.00	-15.62	Peak	HORIZONTAL
6	833.16	31.02	5.18	36.20	46.00	-9.80	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.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100kHz, VBW=300kHz.