

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART E REQUIREMENT**

OF

Applicant: Sharp Corporation, Mobile Communication B.U.
2-13-1, Hachihonmatsu-lida, Higashi-hiroshima-shi,
Hiroshima, 739-0192, Japan

Manufacturer: Sharp Corporation
1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan

Product Name: Smart Phone

Report Number: ER/2018/A0088

FCC ID: APYHRO00264

FCC Rule Part: §15.407, Cat: NII

Issue Date: Nov. 08, 2018

Date of Test: Oct. 03, 2018 ~ Oct. 29, 2018

Date of EUT Received: Oct. 03, 2018

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Tested By:

Marcus Tseng

Marcus Tseng / Sr. Engineer**Approved By:**

Jay Lin

Jay Lin / Asst. Supervisor

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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
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1. GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Smart Phone
Hardware Version:	DVT
Software Version:	N/A
Power Supply:	3.85V from Rechargeable Li-ion Battery

WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. Power (dBm)	Modulation Technology
11a_20	5180~5240	4	14.93	OFDM
	5260~5320	4	14.93	
	5500~5700	11	14.85	
11n_HT / ac_VHT 20M	5180~5240	4	HT: 14.90 (Worst Case)	OFDM
	5260~5320	4	HT: 14.87 (Worst Case)	
	5500~5700	11	HT: 14.82 (Worst Case)	
11n_HT / ac_VHT 40M	5190~5230	2	HT: 14.94 (Worst Case)	OFDM
	5270~5310	2	HT: 14.89 (Worst Case)	
	5510~5670	5	HT: 14.97 (Worst Case)	
11ac VHT80M	5210	1	14.43	OFDM
	5290	1	14.31	
	5530~5610	2	14.80	
Modulation Type		64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only		
Transition Rate:		802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps 802.11 ac_20MHz: 6.5 – 173.3Mbps 802.11 ac_40MHz: 13.5 – 400.0Mbps 802.11 ac_80MHz: 29.3 – 866.7Mbps		
Antenna Designation:		Inverted-F Antenna, 5150~5250MHz Gain: -3.3dBi (Main) / -1.1dBi (Aux) 5250~5350MHz Gain: -3.3dBi (Main) / -1.1dBi (Aux) 5470~5725MHz Gain: -2.5dBi (Main) / -1.3dBi (Aux)		

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

KDB 789033 D02 v02r01 General UNII Test Procedures New Rules

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

(TAF code 0513)

FCC Registration Numbers are: 509634 / TW0001

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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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

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. 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 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.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission

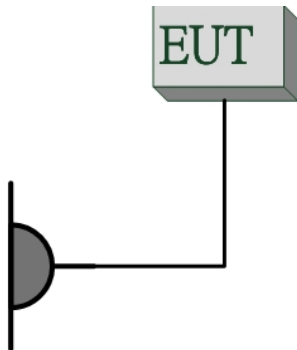


Fig. 2-2 Conducted (Antenna Port) Emission

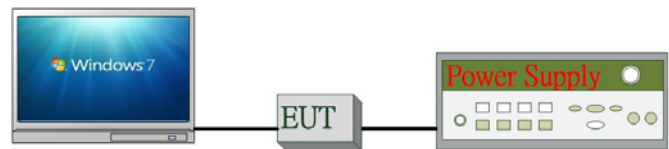


Fig. 2-2 AC Power Line Conducted Emission



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	DC Power Supply	Anritsu	E3640A	MY52410006	N/A	Unshielded
3.	Notebook	Lenovo	T440P	P0000564	Shielded	Unshielded

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3. SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	26 dB Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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4. DESCRIPTION OF TEST MODES

4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode	
Channel	Frequency
36	5180
40	5200
44	5220
48	5240

802.11 n HT40 Mode, 802.11ac VHT40 Mode	
channel	Frequency
38	5190
46	5230

802.11ac VHT80 Mode	
channel	Frequency
42	5210

Operated band in 5250 MHz ~5350 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode	
channel	Frequency
52	5260
56	5280
60	5300
64	5320

802.11 n HT40 Mode, 802.11ac VHT40 Mode	
channel	Frequency
54	5270
62	5310

802.11ac VHT80 Mode	
Channel	Frequency
58	5290

Operated band in 5470 MHz ~5725 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode	
Channel	Frequency
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700

802.11 n HT40 Mode, 802.11ac VHT40 Mode	
channel	Frequency
102	5510
110	5550
118	5590
126	5630
134	5670

802.11ac VHT80 Mode	
channel	Frequency
106	5530
122	5610

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4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting mode is prorammed.
3. Investigation has been done on all the possible configurations for searching the worst case.
4. The given UE is pre-scanned among 802.11n and ac modes, and 802.11n yields the highest reading that generates the highest emission.

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	44	OFDM	6	2TX
802.11a	5260~5320	52 to 64	60	OFDM	6	2TX
802.11a	5500~5700	100 to 140	116	OFDM	6	2TX
RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS8	MIMO

Note: The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for WLAN 5GHz Transmitter for channel Low, Mid and High, the worst case E2 position was reported.

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ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	2TX
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS8	MIMO

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Measurement	+/- 0.96 dB
Peak Power Spectral Density Measurement	+/- 1.67 dB
Frequency Stability	+/- 123.36 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6. CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(μV)	
	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.

6.2 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100335	02/02/2018	02/01/2019
LISN	SCHWARZBECK	NSLK 8127	8127-649	05/18/2018	05/17/2019

6.3 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 rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz power source.

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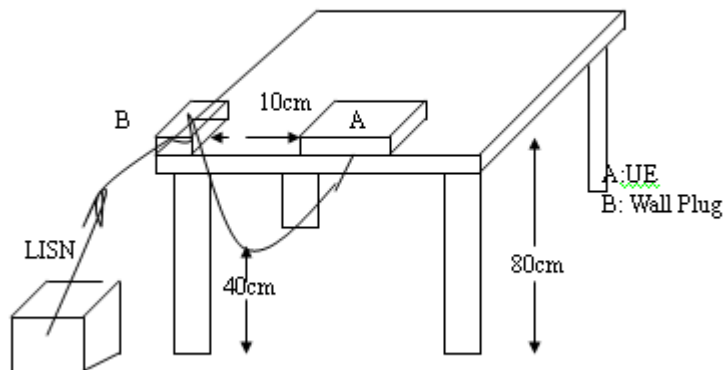
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6.4 Test SET-UP



6.5 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 phases of power being supplied by given UE are completed.

6.6 Measurement Result

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

Note2: The * reveals the worst-case results that closet to the limit.

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Site Conduction Room

Phase: **L1**

Temperature: 25 °C

Limit: FCC Class B Conduction(QP)

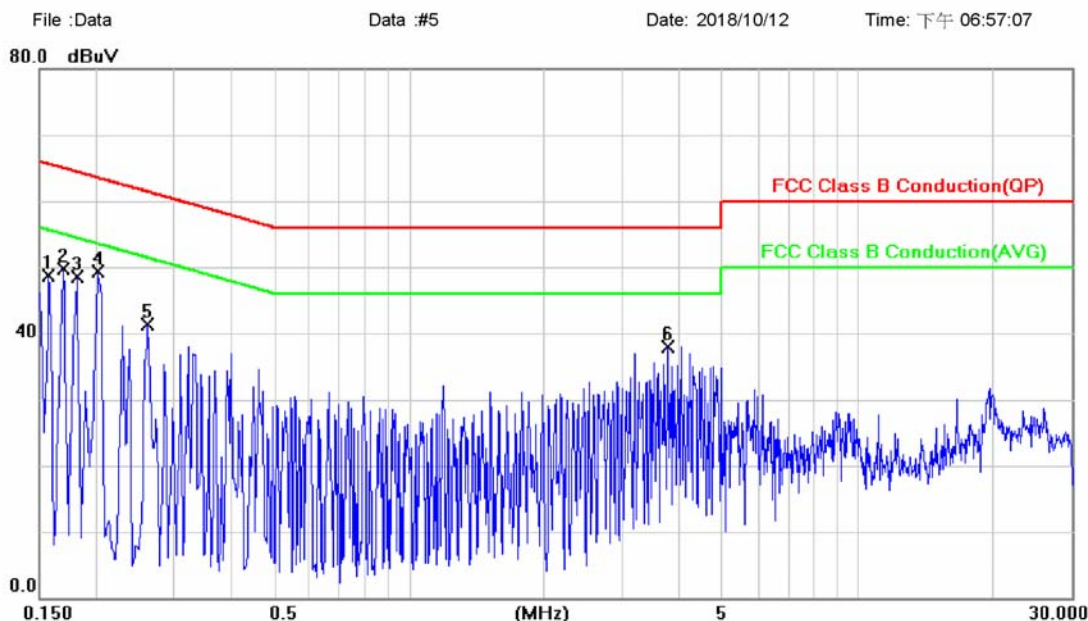
Power: AC 120V/60Hz

Humidity: 85 %

Mode: Operation

Note:

Conducted Emission



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1580	48.63	0.04	48.67	65.57	-16.90	peak	
2		0.1700	49.76	0.04	49.80	64.96	-15.16	peak	
3		0.1820	48.55	0.04	48.59	64.39	-15.80	peak	
4 *		0.2020	49.29	0.04	49.33	63.53	-14.20	peak	
5		0.2620	41.18	0.04	41.22	61.37	-20.15	peak	
6		3.7820	37.83	0.15	37.98	56.00	-18.02	peak	

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Site Conduction Room

Limit: FCC Class B Conduction(QP)

Mode: Operation

Note:

Phase: **N**

Power: AC 120V/60Hz

Temperature: 25 °C

Humidity: 85 %

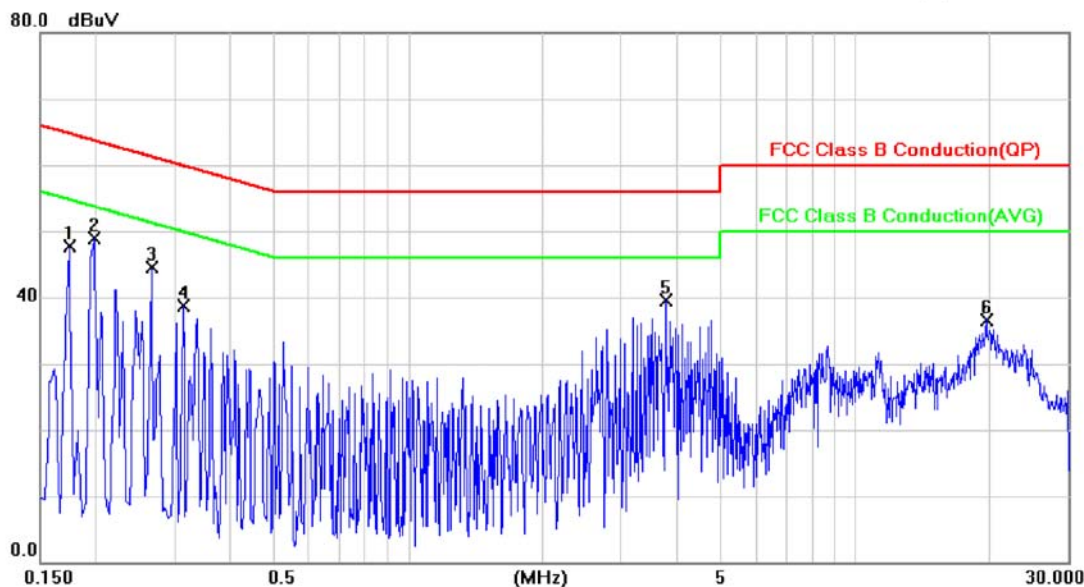
Conducted Emission

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Date: 2018/10/12

Time: 下午 06:52:58



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1740	47.72	0.04	47.76	64.77	-17.01	peak	
2	*	0.1980	48.80	0.04	48.84	63.69	-14.85	peak	
3		0.2660	44.40	0.04	44.44	61.24	-16.80	peak	
4		0.3140	38.67	0.04	38.71	59.86	-21.15	peak	
5		3.7780	39.30	0.15	39.45	56.00	-16.55	peak	
6		19.6940	36.18	0.42	36.60	60.00	-23.40	peak	

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7. DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$$

Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

Mode	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	98.37	0.07	0.49	0.01
802.11n_20	97.98	0.09	0.53	1.00
802.11n_40	96.19	0.17	1.08	2.00
802.11ac_80	92.84	0.32	2.19	3.00

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DUTY CYCLE TEST SIGNAL Measurement Result

802.11a



802.11n HT20



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802.11n HT 40



802.11 ac VHT 80



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8. 26DB EMISSION BANDWIDTH MEASUREMENT

8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

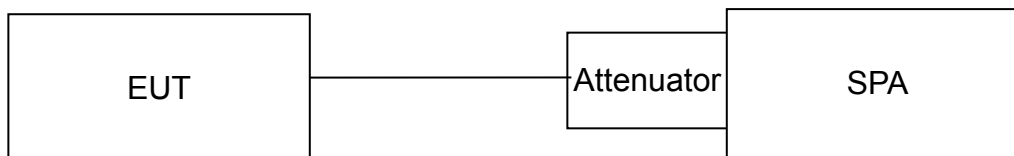
8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
 - a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
 - b. Mark the peak frequency and -26dB (upper and lower) frequency.
4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
5. Repeat above procedures until all test default channel measured were complete.

8.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	02/14/2018	02/13/2019
DC Power Supply	Anritsu	E3640A	MY52410006	11/28/2017	11/27/2018
Temperature Chamber	TERCHY	MHG-120LF	911009	05/18/2018	05/17/2019
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2018	01/01/2019
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2018	01/01/2019
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2018	01/01/2019
Notebook	Lenovo	T440P	P0000564	N/A	N/A

8.4 Test Set-up



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8.5 Measurement Result

26dB Bandwidth

802.11a_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.98	13.421
5220	21.67	13.359
5240	21.67	13.358
5260	21.53	13.331
5300	21.48	13.321
5320	21.93	13.411
5500	21.77	13.379
5580	21.44	13.312
5700	21.55	13.334

802.11a_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.82	13.389
5220	21.66	13.356
5240	21.50	13.324
5260	21.98	13.420
5300	22.10	13.443
5320	21.68	13.361
5500	21.86	13.397
5580	21.52	13.327
5700	21.65	13.354

802.11n_HT20_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.51	13.523
5220	22.65	13.551
5240	22.54	13.529
5260	22.52	13.525
5300	22.58	13.538
5320	22.77	13.574
5500	23.23	13.661
5580	22.92	13.603
5700	22.56	13.534

802.11n_HT20_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.97	13.612
5220	22.63	13.547
5240	22.90	13.597
5260	22.57	13.535
5300	22.76	13.572
5320	22.60	13.540
5500	22.53	13.528
5580	22.46	13.514
5700	22.86	13.591

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802.11n_HT40_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	41.85	16.217
5230	42.07	16.240
5270	41.94	16.226
5310	42.09	16.242
5510	41.92	16.224
5550	42.11	16.244
5670	42.09	16.241

802.11n_HT40_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.22	16.255
5230	42.22	16.255
5270	42.39	16.273
5310	42.05	16.238
5510	41.98	16.230
5550	42.34	16.268
5670	42.39	16.273

802.11ac_VHT80_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	84.84	19.286
5290	84.85	19.287
5530	84.93	19.291
5610	85.05	19.297

802.11ac_VHT80_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	84.82	19.285
5290	84.62	19.275
5530	85.63	19.326
5610	84.61	19.274

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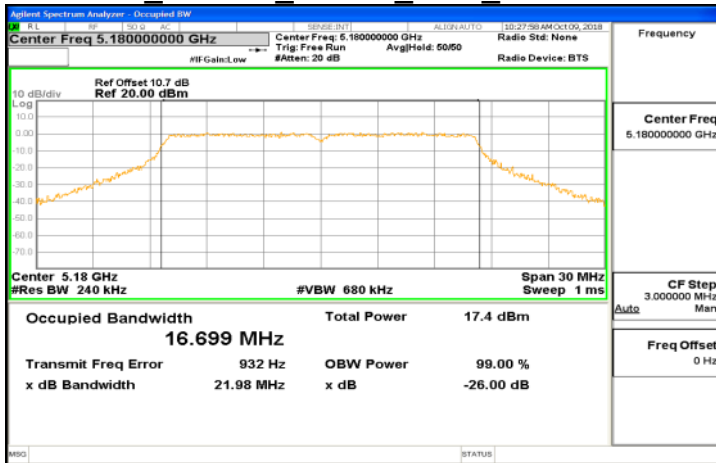
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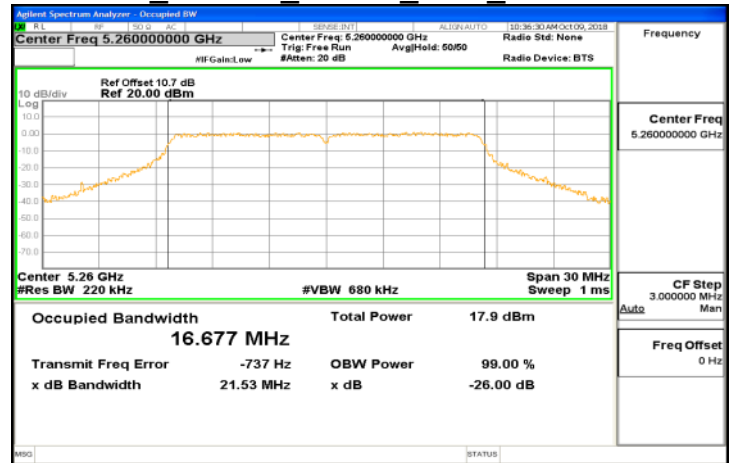
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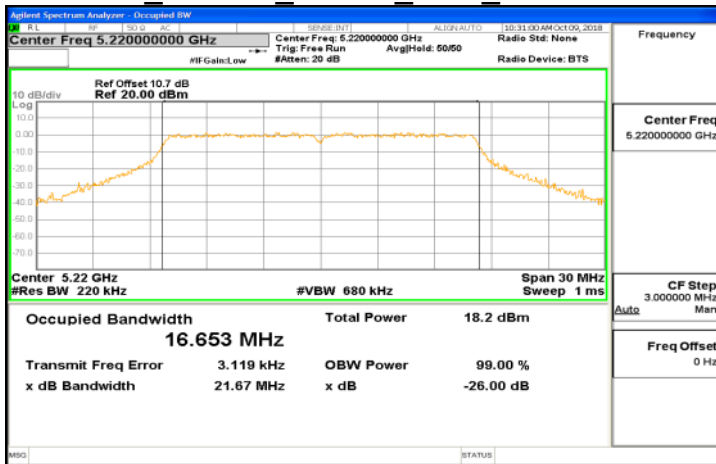
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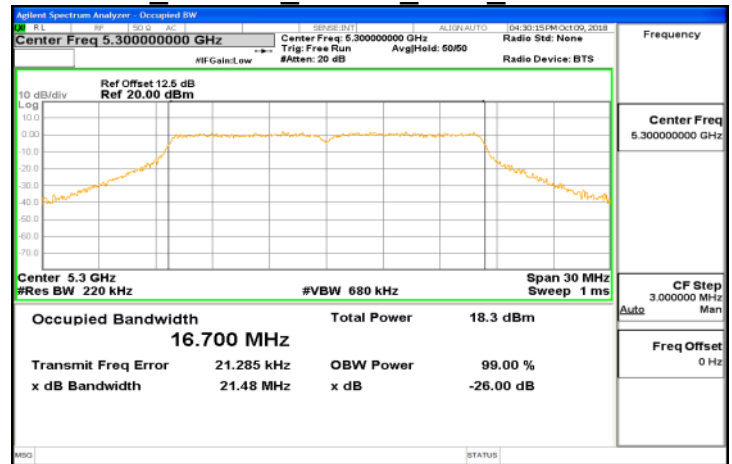
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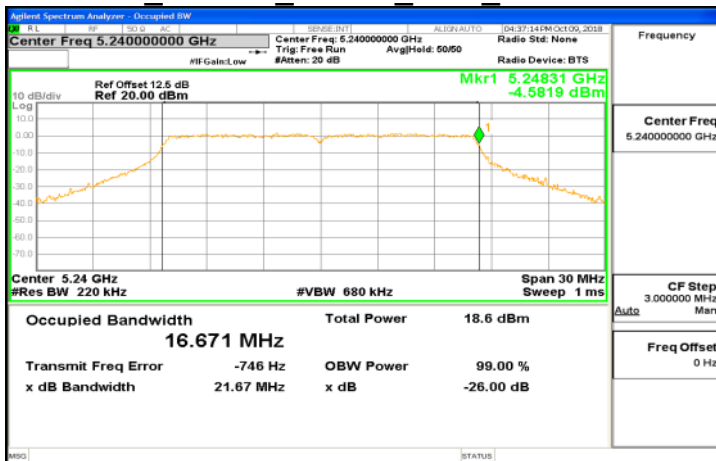
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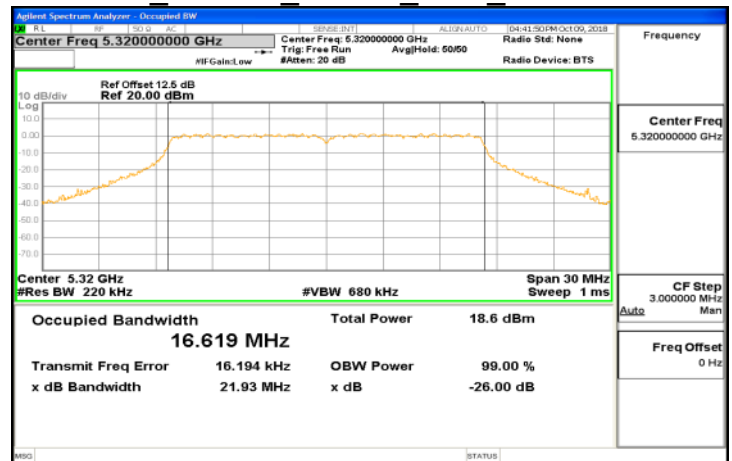
FCC 802.11a 20MHz Main 5300MHz



FCC 802.11a 20MHz Main 5240MHz



FCC 802.11a 20MHz Main 5320MHz



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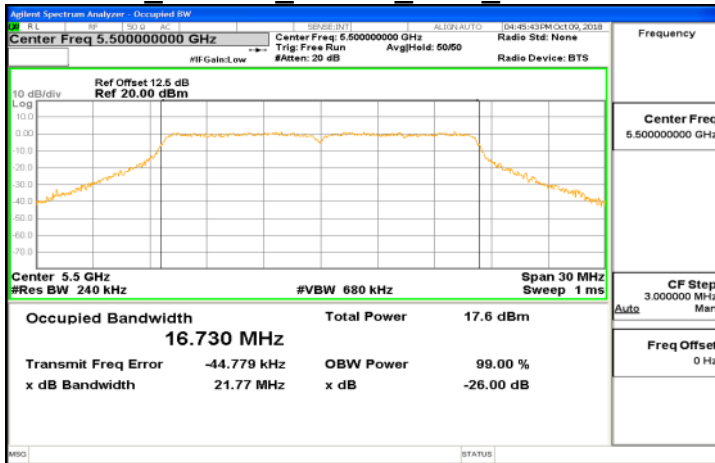
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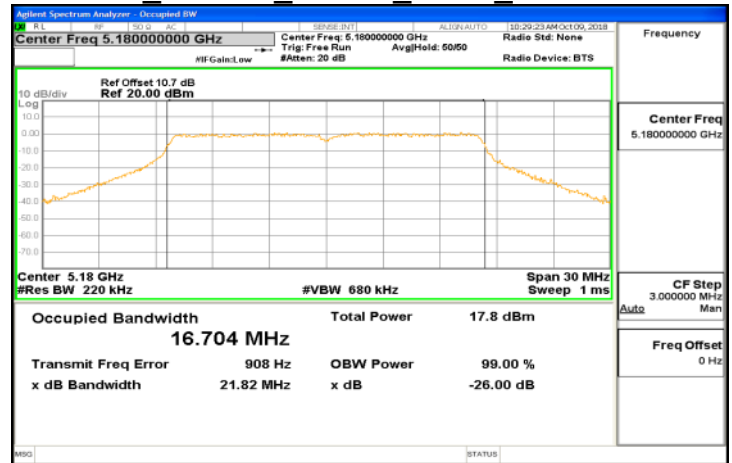
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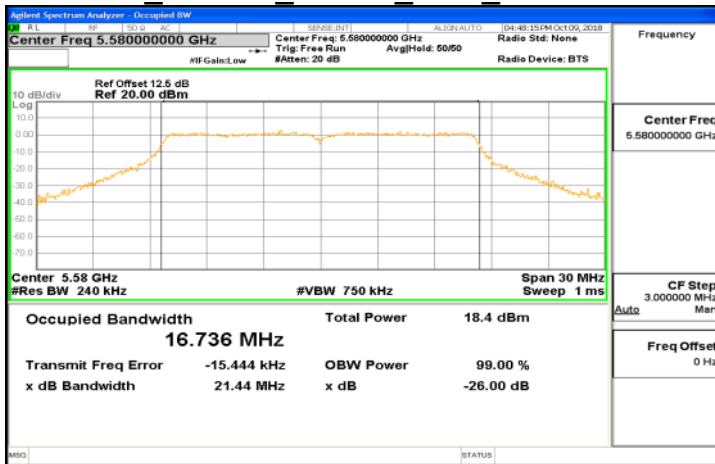
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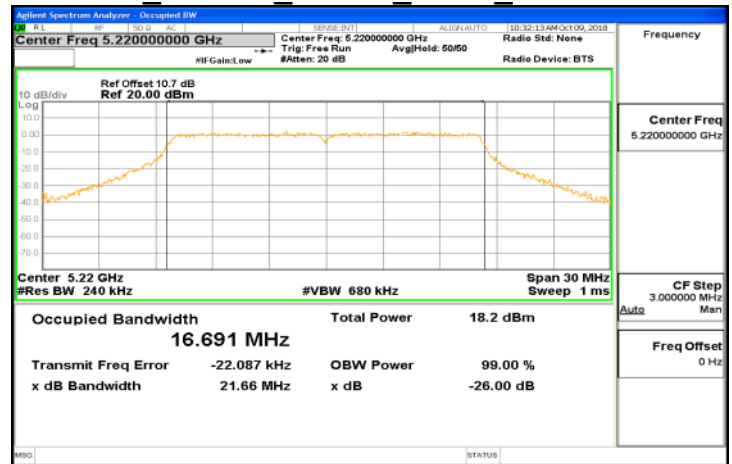
FCC 802.11a 20MHz AUX1 5180MHz



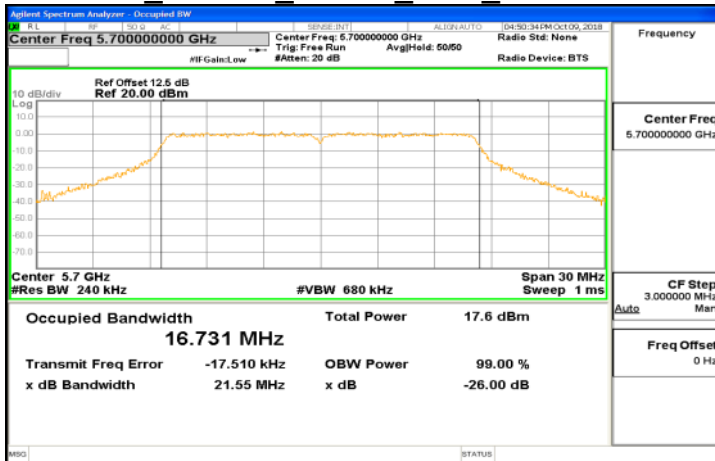
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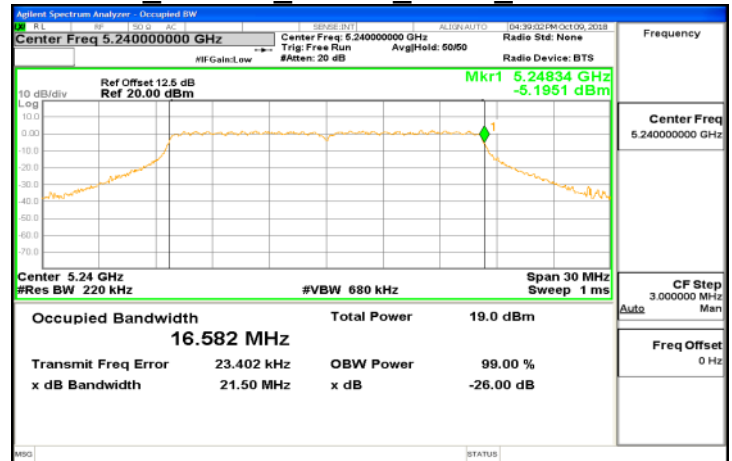
FCC 802.11a 20MHz AUX1 5220MHz



FCC 802.11a 20MHz Main 5700MHz



FCC 802.11a 20MHz AUX1 5240MHz



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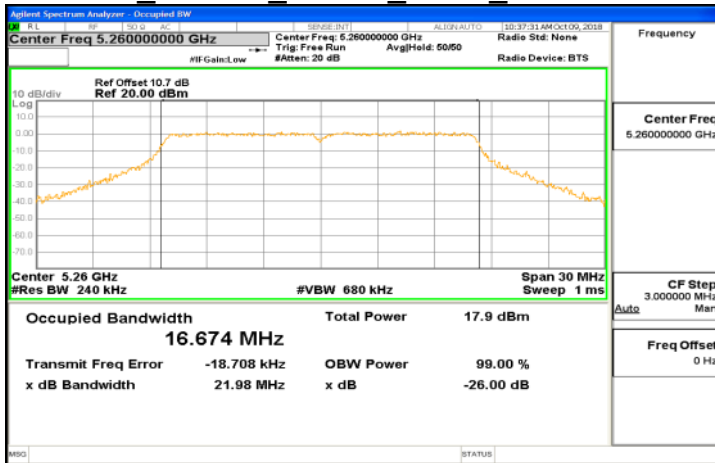
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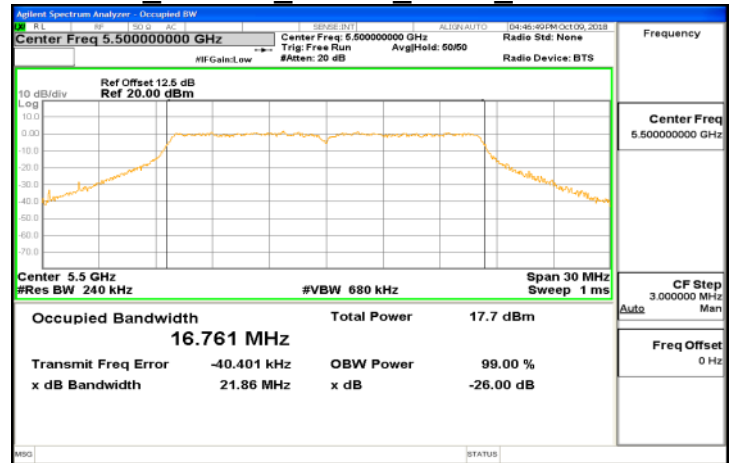
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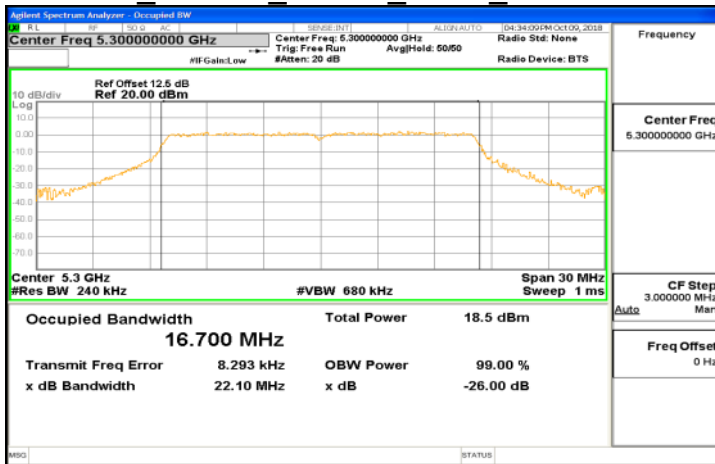
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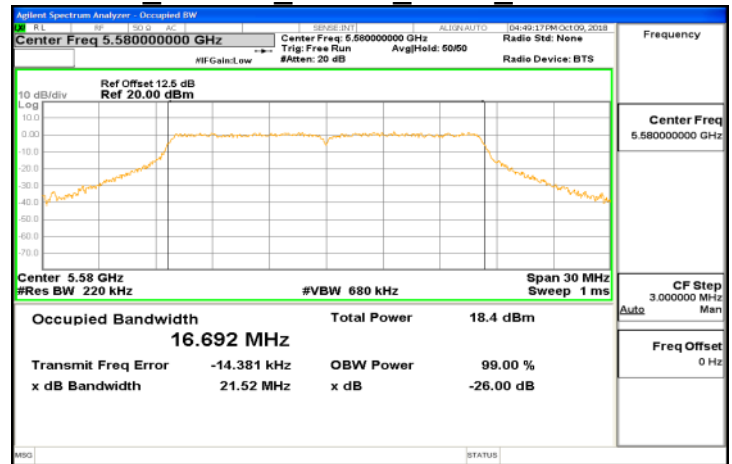
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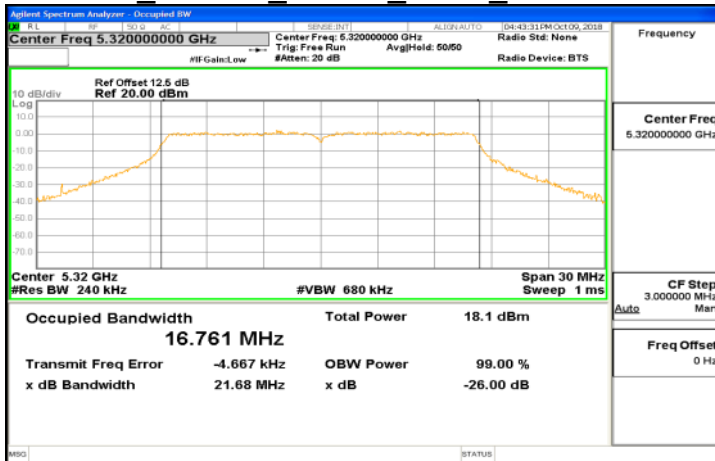
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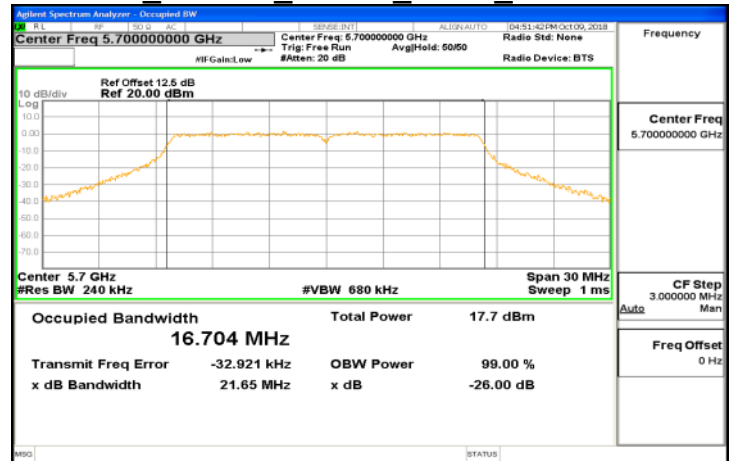
FCC 802.11a 20MHz AUX1 5580MHz



FCC 802.11a 20MHz AUX1 5320MHz



FCC 802.11a 20MHz AUX1 5700MHz



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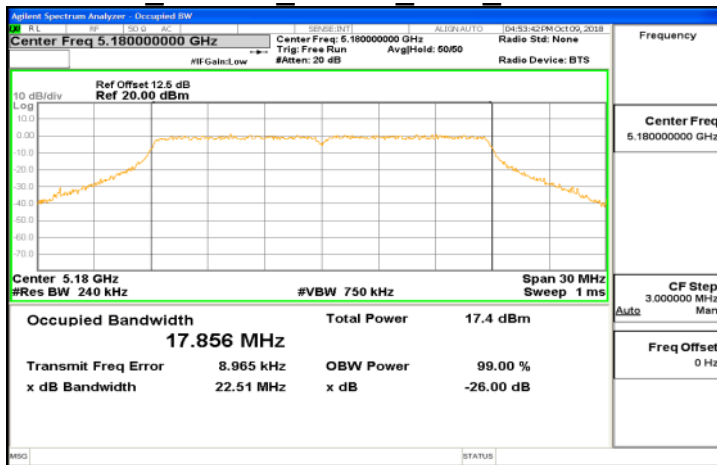
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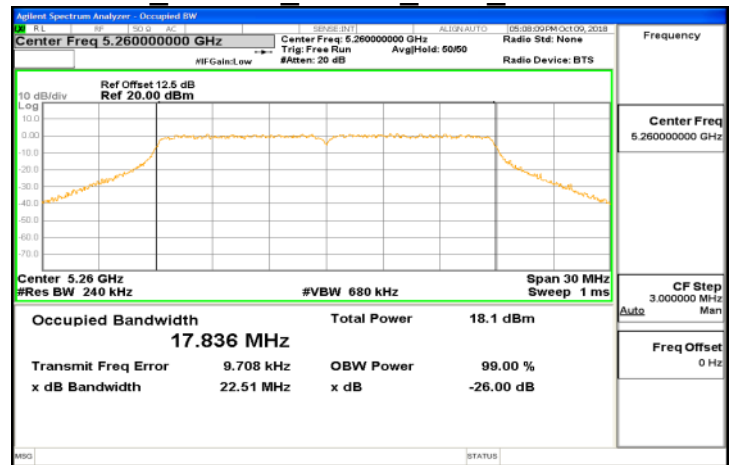
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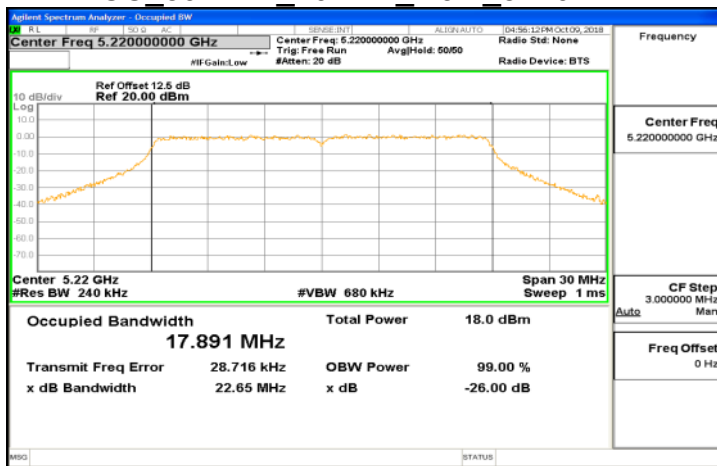
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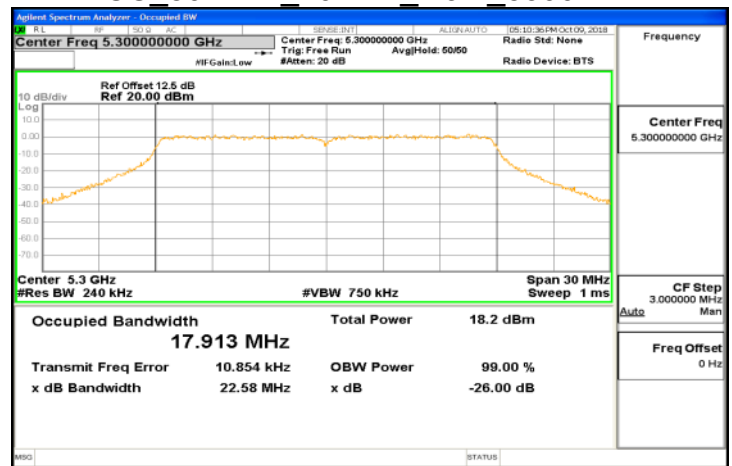
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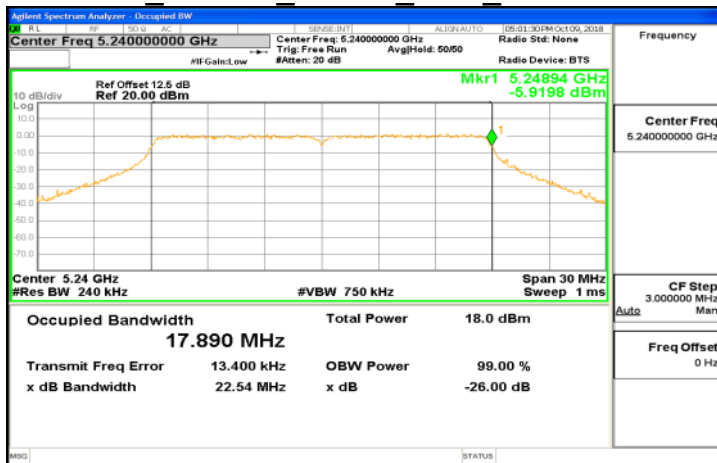
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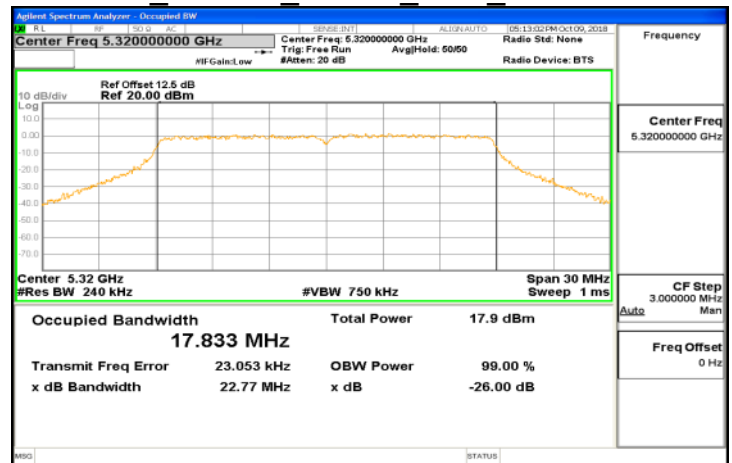
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FCC 802.11n 20MHz Main 5240MHz



FCC 802.11n 20MHz Main 5320MHz



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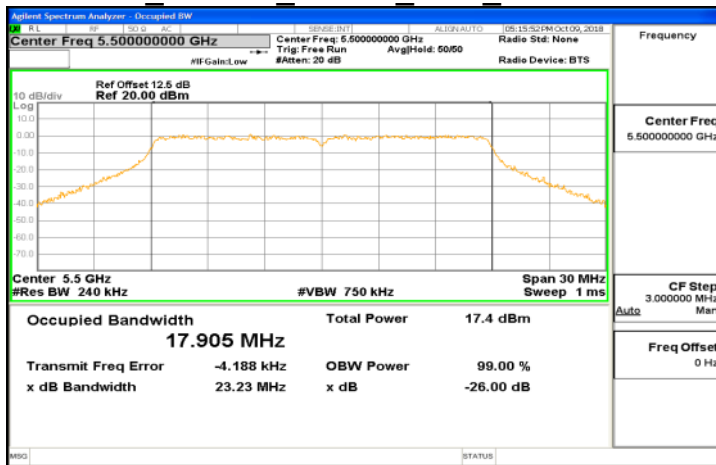
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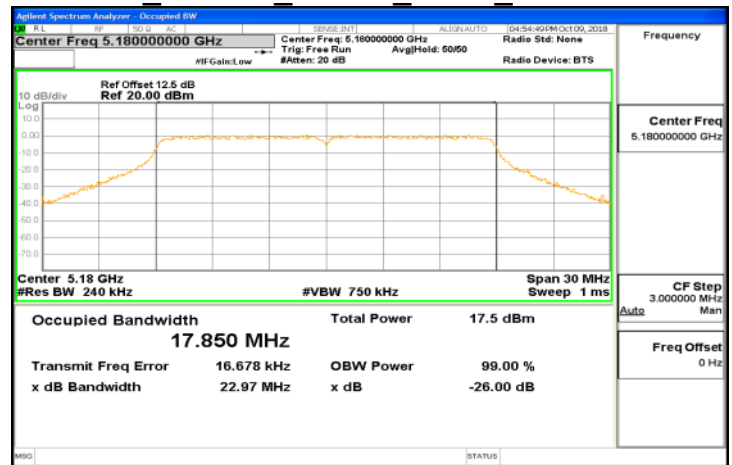
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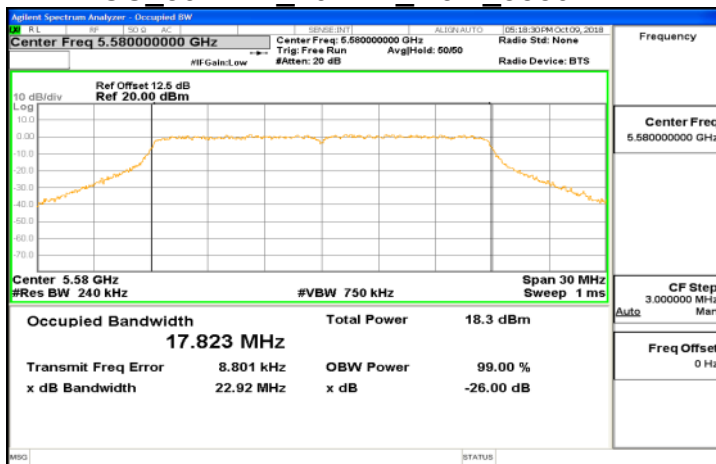
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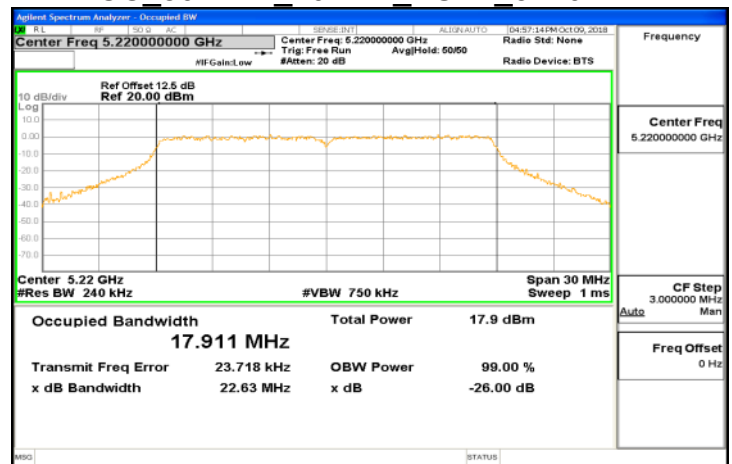
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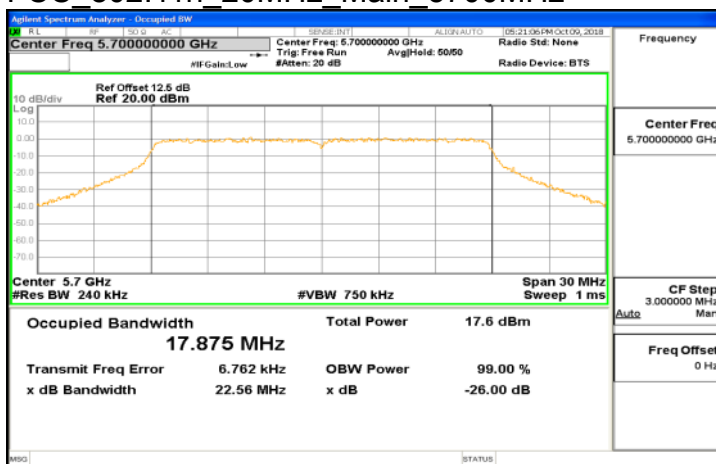
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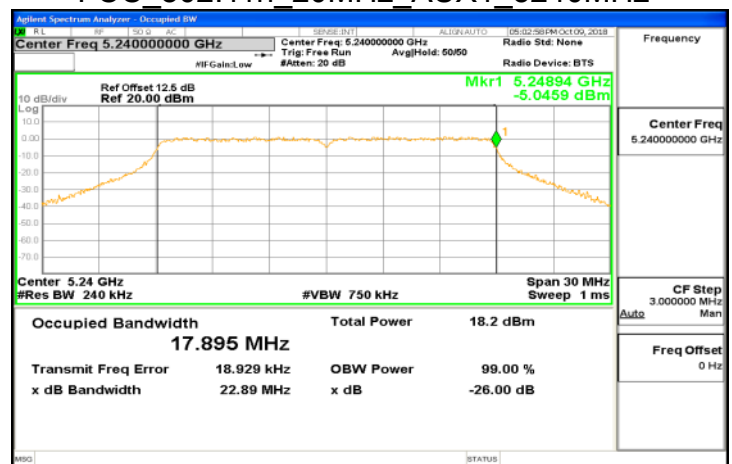
FCC 802.11n 20MHz AUX1 5220MHz



FCC 802.11n 20MHz Main 5700MHz



FCC 802.11n 20MHz AUX1 5240MHz



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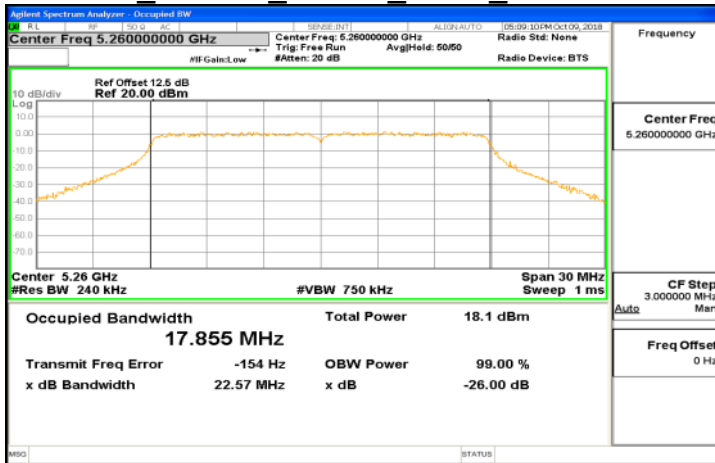
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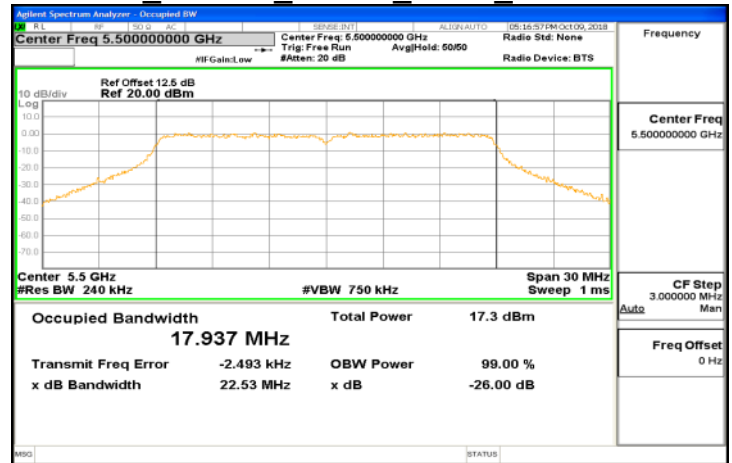
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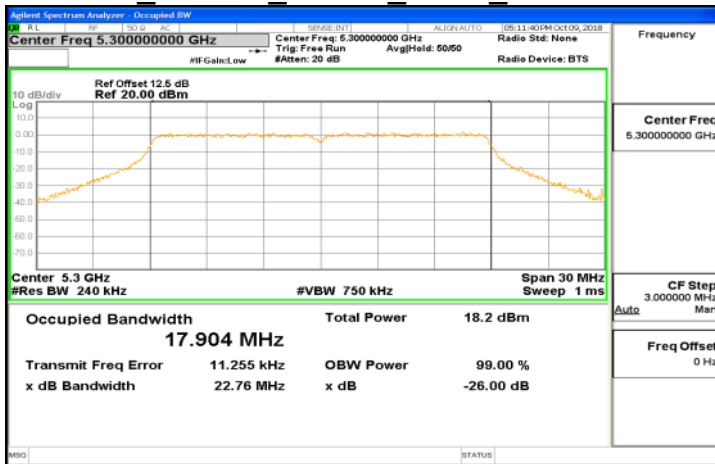
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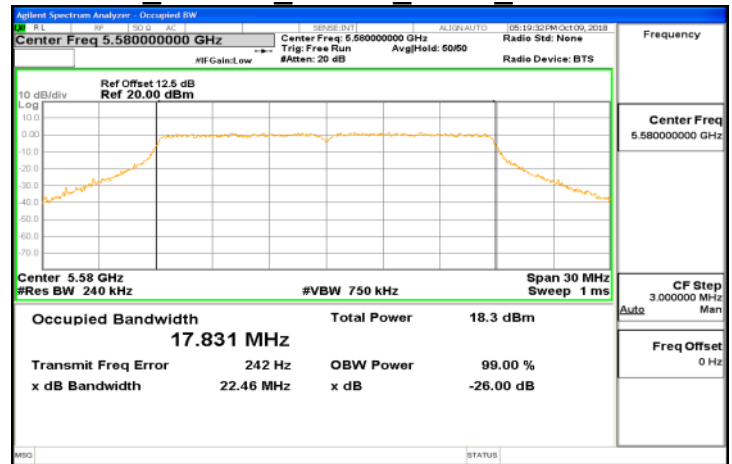
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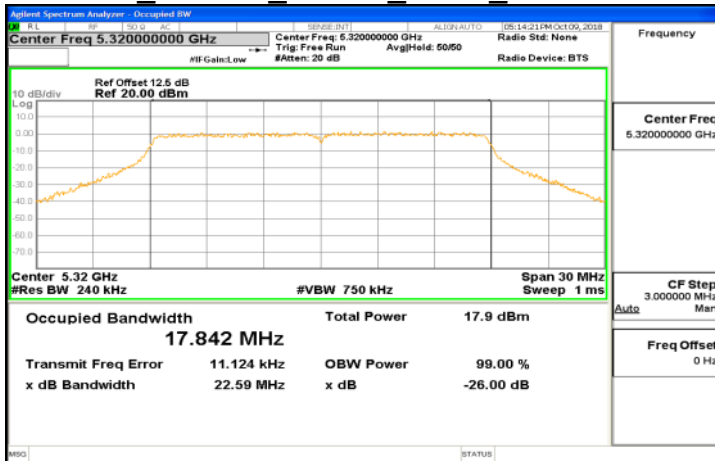
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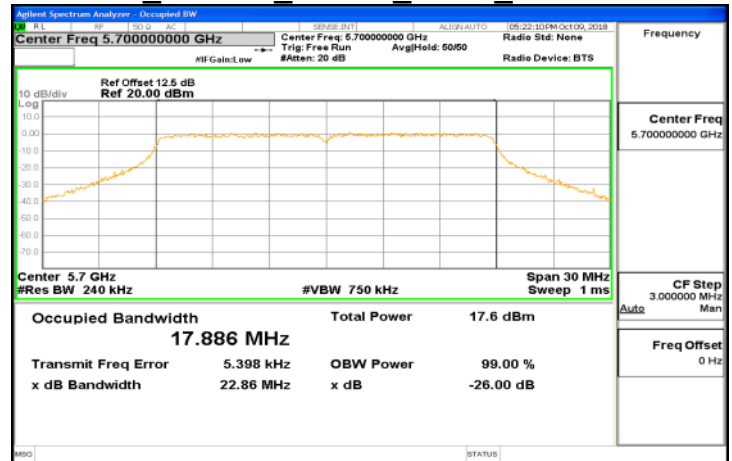
FCC 802.11n 20MHz AUX1 5580MHz



FCC 802.11n 20MHz AUX1 5320MHz



FCC 802.11n 20MHz AUX1 5700MHz

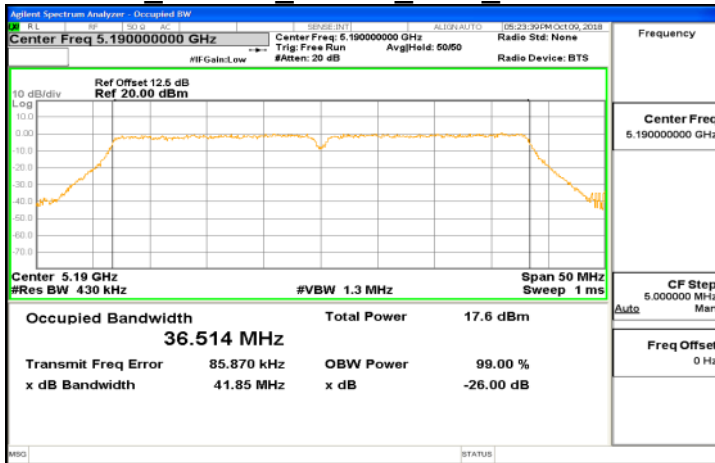


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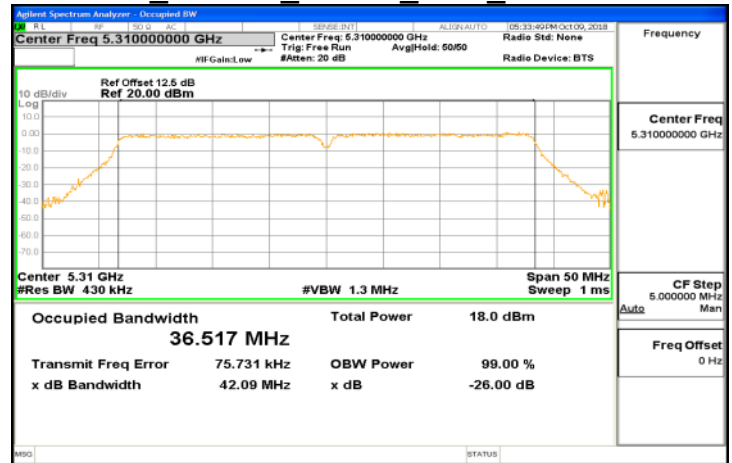
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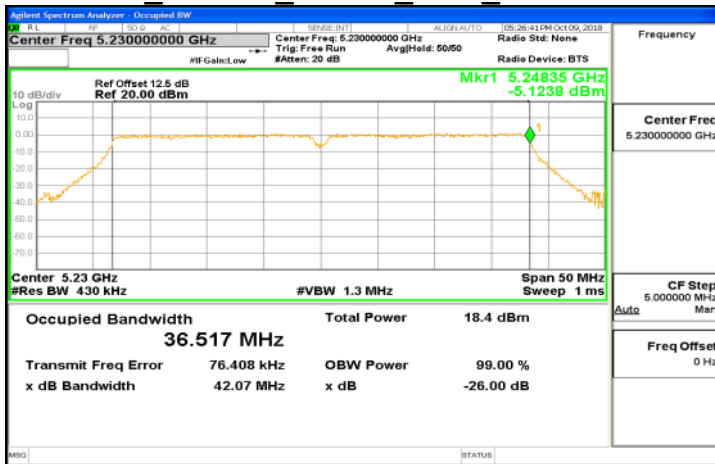
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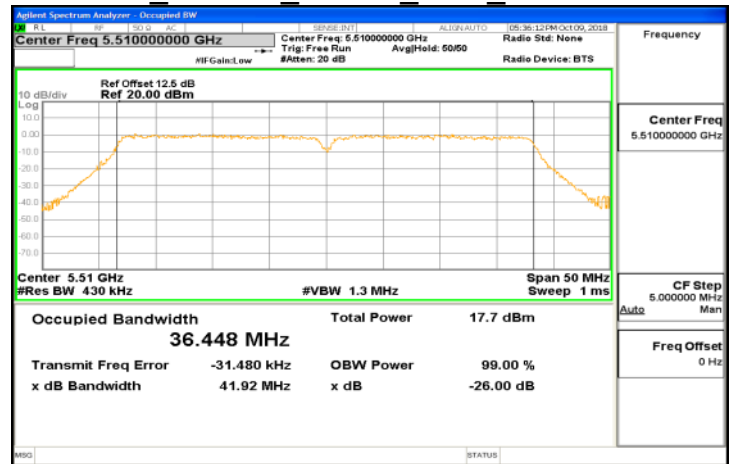
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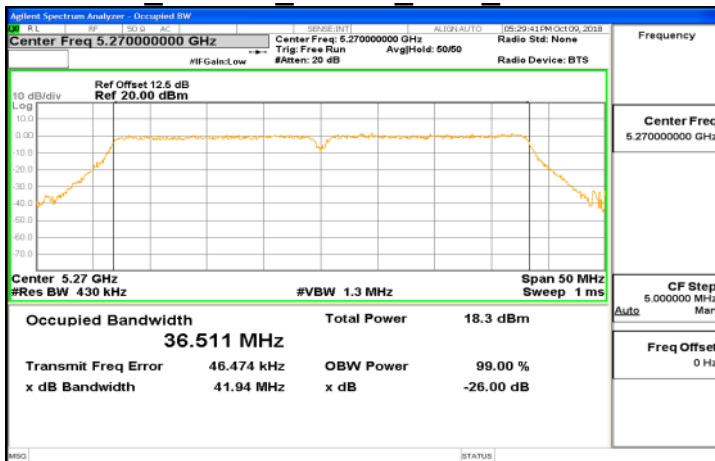
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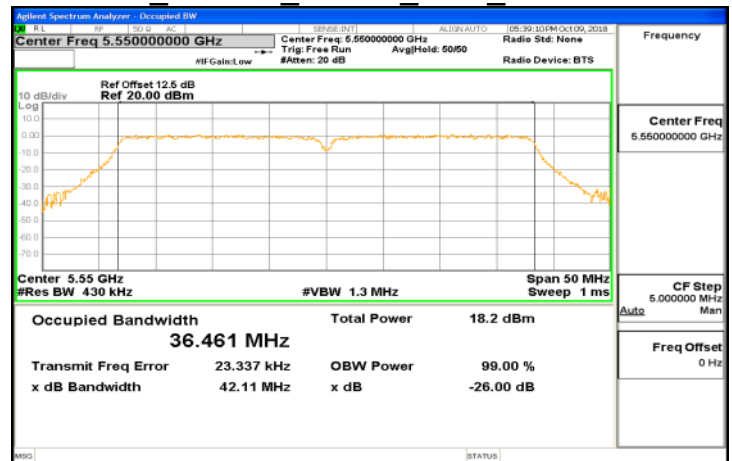
FCC 802.11n 40MHz Main 5510MHz



FCC 802.11n 40MHz Main 5270MHz



FCC 802.11n 40MHz Main 5550MHz



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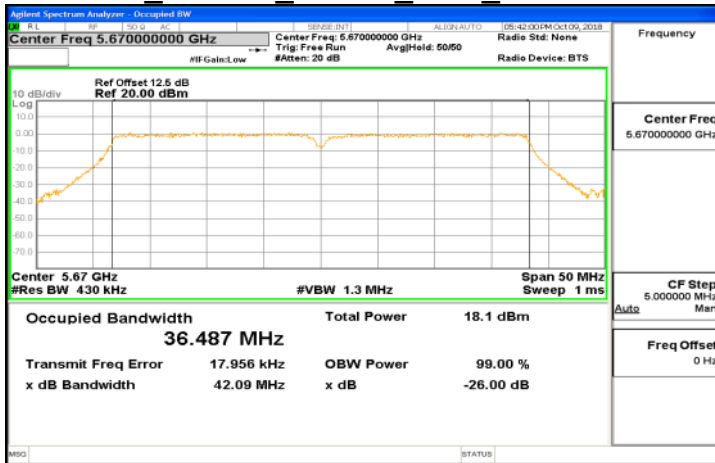
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f (886-2) 2298-0488

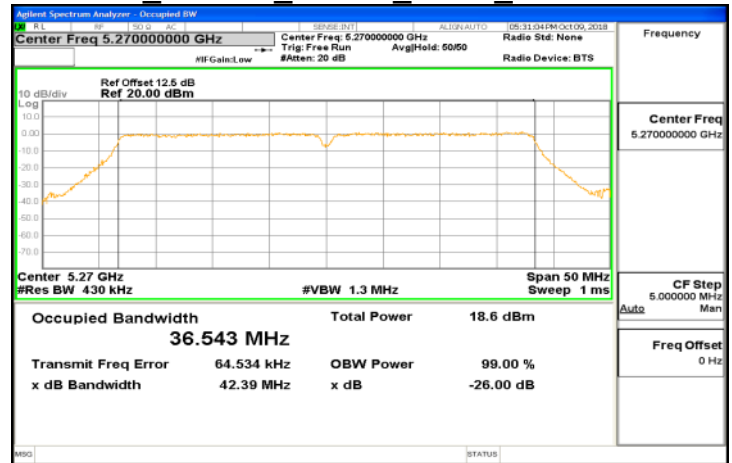
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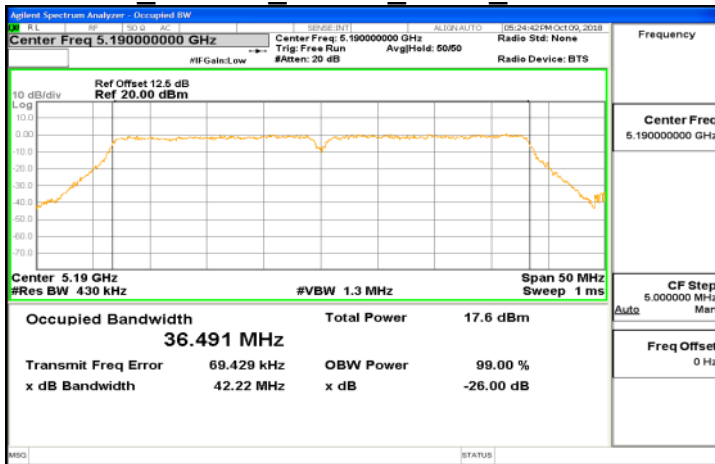
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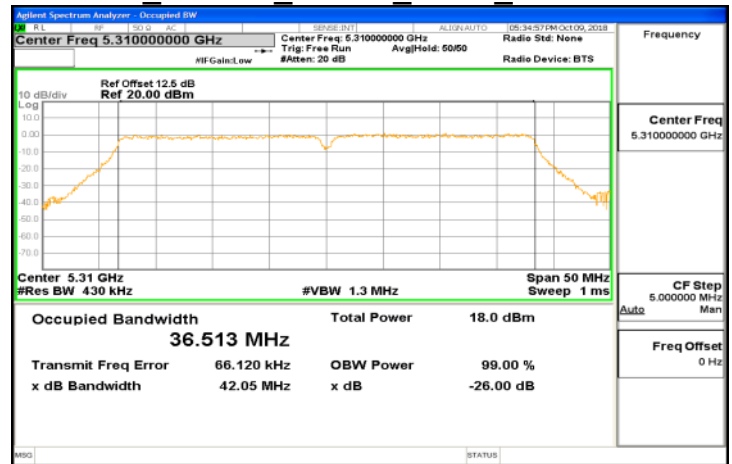
FCC 802.11n 40MHz AUX1 5270MHz



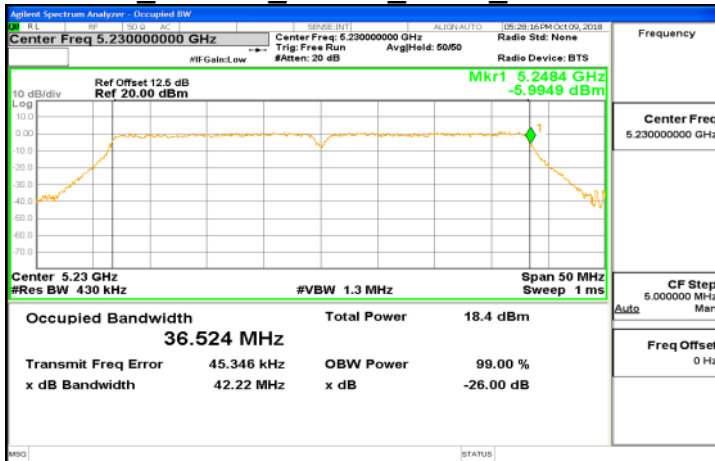
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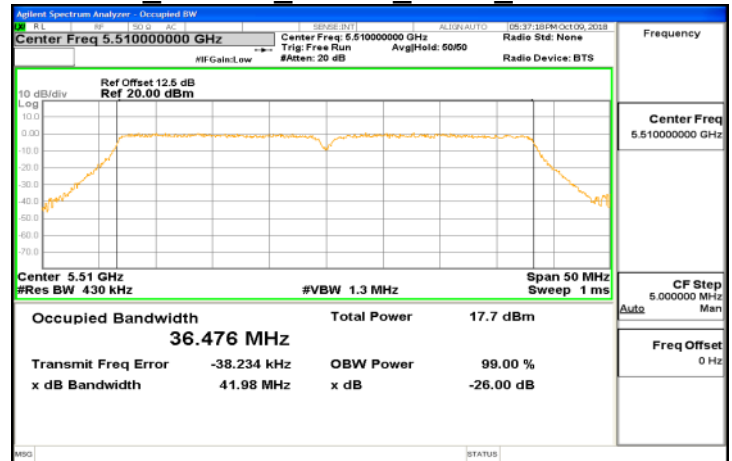
FCC 802.11n 40MHz AUX1 5310MHz



FCC 802.11n 40MHz AUX1 5230MHz



FCC 802.11n 40MHz AUX1 5510MHz



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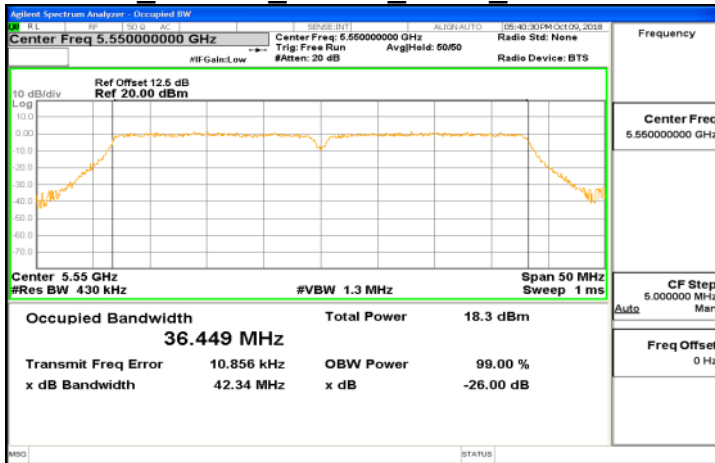
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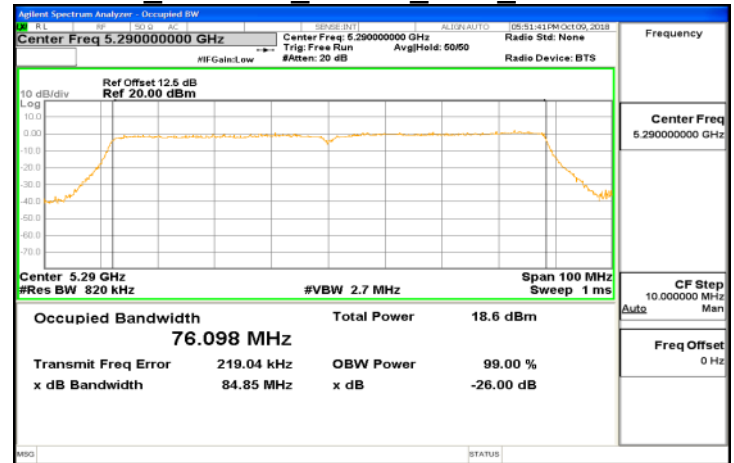
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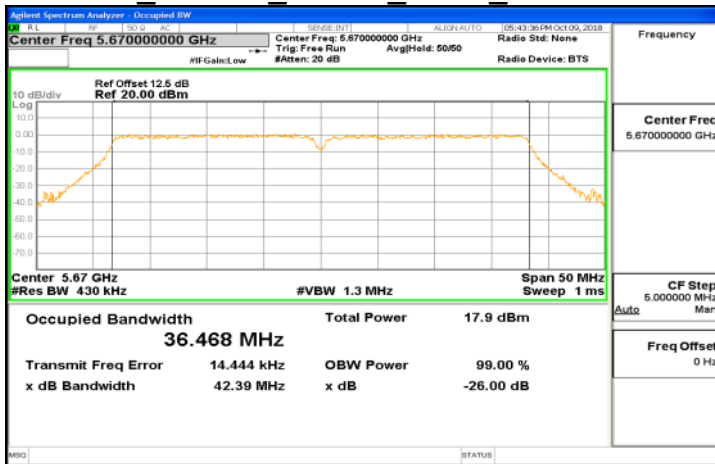
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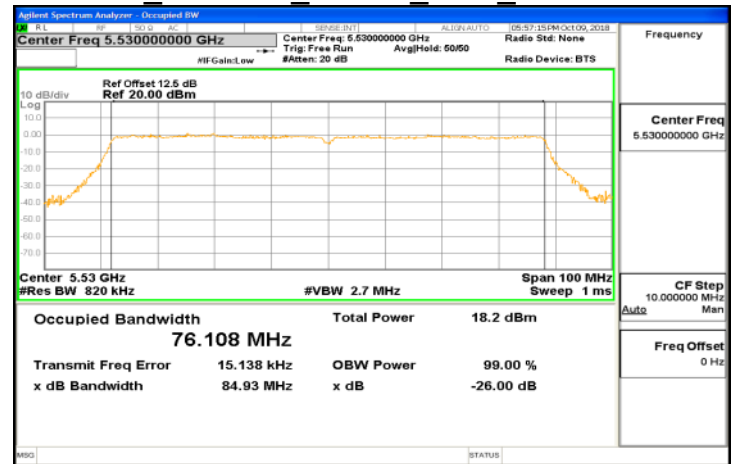
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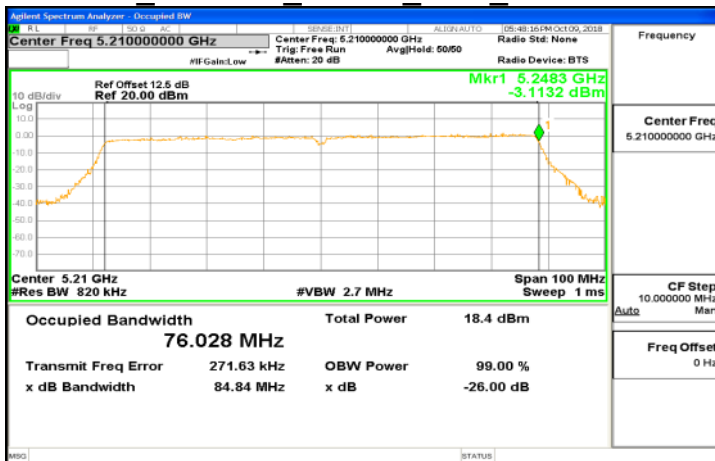
FCC 802.11n 40MHz AUX1 5670MHz



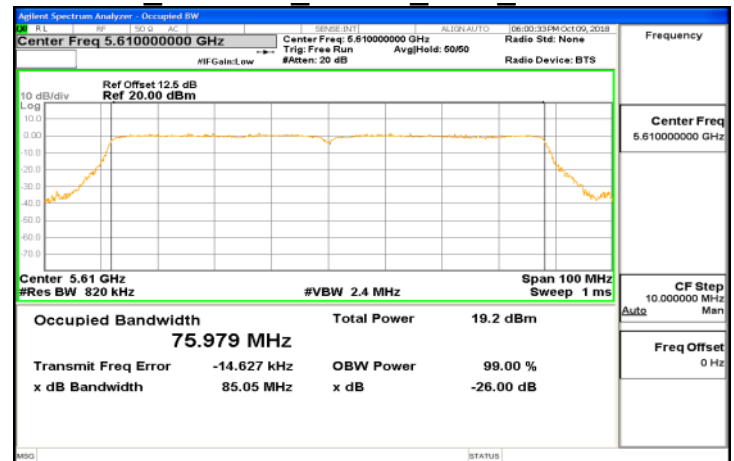
FCC 802.11ac 80MHz Main 5530MHz



FCC 802.11ac 80MHz Main 5210MHz



FCC 802.11ac 80MHz Main 5610MHz



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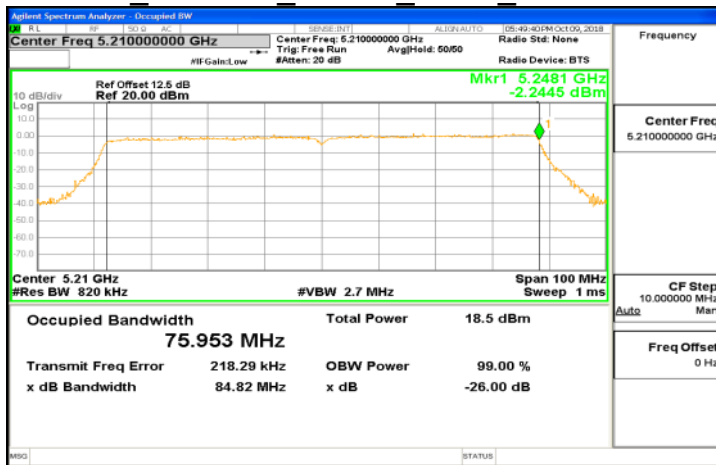
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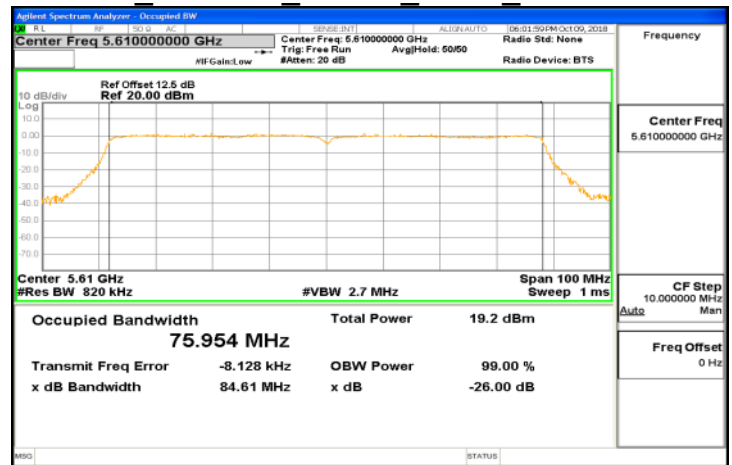
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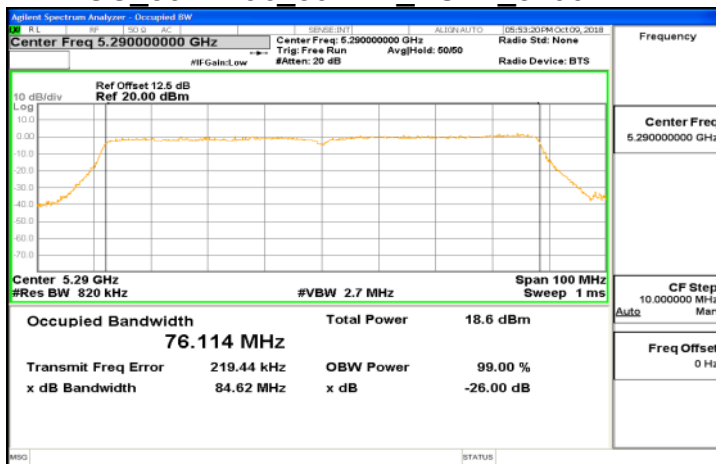
FCC 802.11ac 80MHz AUX1 5210MHz



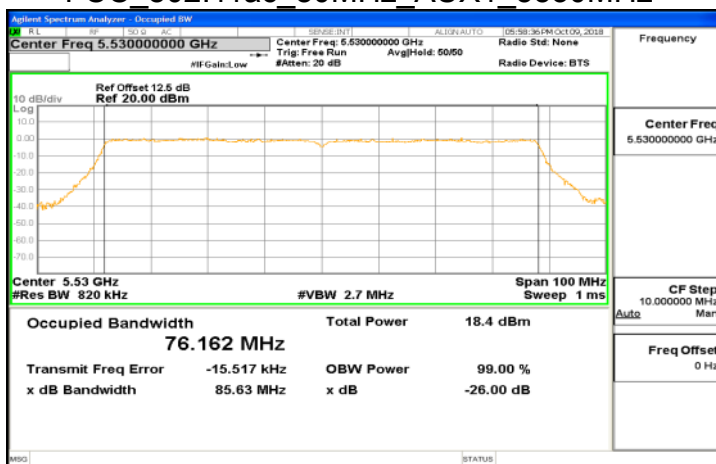
FCC 802.11ac 80MHz AUX1 5610MHz



FCC 802.11ac 80MHz AUX1 5290MHz



FCC 802.11ac 80MHz AUX1 5530MHz



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9. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Master device)	1 Watt(30dBm)
		Fixed point-to-point Access Ponit	1 Watt(30dBm)
	√	Mobile and portable client device	250mW(23.98dBm)
U-NII-2A	√		250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C	√		250mW(23.98dBm) or 11dBm+10 log B
U-NII-3			1 Watt(30dBm)

If transmitting antennas of directional gain greater than 6 dBi are used, both the transmit power and the power spectral density shall be reduced by the amount in dB that the direction-al gain of the antenna exceeds 6 dBi.

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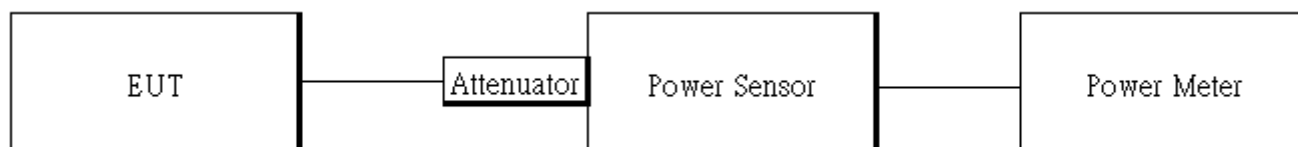
9.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
4. Power Meter is used as the auxiliary test equipment to conduct the output power measurement.
5. Record the max. reading and add $10 \log(1/\text{duty cycle})$.
6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

9.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1804001	02/01/2018	01/31/2019
Power Sensor	Anritsu	MA2411B	1726104	02/01/2018	01/31/2019
Power Sensor	Anritsu	MA2411B	1726107	02/01/2018	01/31/2019
DC Power Supply	Anritsu	E3640A	MY52410006	11/28/2017	11/27/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2018	01/01/2019
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2018	01/01/2019
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2018	01/01/2019
Notebook	Lenovo	T440P	P0000564	N/A	N/A

9.4 Test Set-up



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9.5 Measurement Result

802.11a_2Tx

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
36	5180	6	11.37	11.41	14.47	28.001	23.98	PASS
44	5220	6	11.89	11.75	14.90	30.919	23.98	PASS
48	5240	6	11.87	11.83	14.93	31.129	23.98	PASS
52	5260	6	11.74	11.96	14.93	31.139	23.98 or $11+10\log(B) = 24.33$	PASS
60	5300	6	11.84	11.79	14.90	30.880	23.98 or $11+10\log(B) = 24.32$	PASS
64	5320	6	11.33	11.28	14.39	27.458	23.98 or $11+10\log(B) = 24.36$	PASS
100	5500	6	11.23	11.46	14.43	27.722	23.98 or $11+10\log(B) = 24.38$	PASS
116	5580	6	11.75	11.79	14.85	30.561	23.98 or $11+10\log(B) = 24.31$	PASS
140	5700	6	11.29	11.42	14.44	27.779	23.98 or $11+10\log(B) = 24.33$	PASS

802.11n_HT20_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
36	5180	MCS8	11.22	11.45	14.44	27.768	23.98	PASS
44	5220	MCS8	11.84	11.73	14.88	30.791	23.98	PASS
48	5240	MCS8	11.9	11.71	14.90	30.938	23.98	PASS
52	5260	MCS8	11.64	11.89	14.87	30.660	23.98 or $11+10\log(B) = 24.52$	PASS
60	5300	MCS8	11.67	11.82	14.84	30.511	23.98 or $11+10\log(B) = 24.54$	PASS
64	5320	MCS8	11.21	11.28	14.34	27.190	23.98 or $11+10\log(B) = 24.54$	PASS
100	5500	MCS8	11.24	11.39	14.41	27.635	23.98 or $11+10\log(B) = 24.53$	PASS
116	5580	MCS8	11.62	11.82	14.82	30.339	23.98 or $11+10\log(B) = 24.51$	PASS
140	5700	MCS8	11.26	11.4	14.43	27.730	23.98 or $11+10\log(B) = 24.53$	PASS

802.11n_HT40_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
38	5190	MCS8	11.26	11.28	14.45	27.855	23.98	PASS
46	5230	MCS8	11.79	11.73	14.94	31.182	23.98	PASS
54	5270	MCS8	11.67	11.75	14.89	30.826	23.98 or $11+10\log(B) = 27.23$	PASS
62	5310	MCS8	11.27	11.18	14.40	27.569	23.98 or $11+10\log(B) = 27.24$	PASS
102	5510	MCS8	11.24	11.32	14.46	27.920	23.98 or $11+10\log(B) = 27.22$	PASS
110	5550	MCS8	11.66	11.91	14.97	31.375	23.98 or $11+10\log(B) = 27.24$	PASS
134	5670	MCS8	11.15	11.42	14.47	27.965	23.98 or $11+10\log(B) = 27.24$	PASS

802.11ac_VHT80_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
42	5210	MCS0	11.06	11.14	14.43	27.753	23.98	PASS
58	5290	MCS0	10.88	11.08	14.31	27.003	23.98 or $11+10\log(B) = 30.27$	PASS
106	5530	MCS0	10.83	11.15	14.33	27.076	23.98 or $11+10\log(B) = 30.29$	PASS
122	5610	MCS0	11.19	11.73	14.80	30.209	23.98 or $11+10\log(B) = 30.27$	PASS

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10. POWER SPECTRAL DENSITY

10.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Master device)	17dBm/ MHz
		Fixed point-to-point Access Ponit	
	√	Mobile and portable client device	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C	√		11dBm/ MHz
U-NII-3			30dBm/ 500kHz

If transmitting antennas of directional gain greater than 6 dBi are used, both the transmit power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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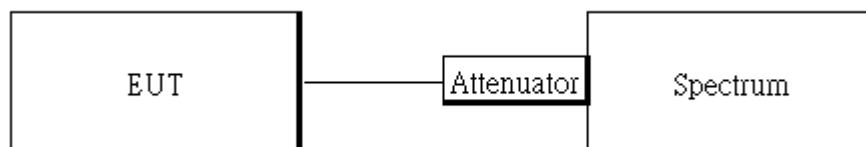
10.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. **For U-NII1, U-NII-2A, U-NII-2C Band:**
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

10.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	02/14/2018	02/13/2019
DC Power Supply	Anritsu	E3640A	MY52410006	11/28/2017	11/27/2018
Temperature Chamber	TERCHY	MHG-120LF	911009	05/18/2018	05/17/2019
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2018	01/01/2019
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2018	01/01/2019
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2018	01/01/2019
Notebook	Lenovo	T440P	P0000564	N/A	N/A

10.4 Test Set-up



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10.5 Measurement Result

POWER DENSITY 802.11a MODE						
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	0.20	10.68	0.07	0.27	11	-10.73
5220	1.06	10.68	0.07	1.13	11	-9.87
5240	0.74	10.68	0.07	0.81	11	-10.19
5260	0.14	10.68	0.07	0.21	11	-10.79
5300	0.90	12.49	0.07	0.97	11	-10.03
5320	0.96	12.49	0.07	1.03	11	-9.97
5500	0.51	12.49	0.07	0.58	11	-10.42
5580	1.11	12.49	0.07	1.18	11	-9.82
5700	0.41	12.49	0.07	0.48	11	-10.52

POWER DENSITY 802.11n HT20 MODE						
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	-0.37	12.49	0.09	-0.28	11	-11.28
5220	0.39	12.49	0.09	0.48	11	-10.52
5240	0.35	12.49	0.09	0.44	11	-10.56
5260	0.54	12.49	0.09	0.63	11	-10.37
5300	0.45	12.49	0.09	0.54	11	-10.46
5320	0.32	12.49	0.09	0.41	11	-10.59
5500	0.05	12.49	0.09	0.14	11	-10.86
5580	0.61	12.49	0.09	0.70	11	-10.30
5700	0.24	12.49	0.09	0.33	11	-10.67

POWER DENSITY 802.11n HT40 MODE						
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5190	-3.7	12.49	0.17	-3.53	11	-14.53
5230	-2.78	12.49	0.17	-2.61	11	-13.61
5270	-2.89	12.49	0.17	-2.72	11	-13.72
5310	-3.32	12.49	0.17	-3.15	11	-14.15
5510	-2.95	12.49	0.17	-2.78	11	-13.78
5550	-2.93	12.49	0.17	-2.76	11	-13.76
5670	-3.00	12.49	0.17	-2.83	11	-13.83

POWER DENSITY 802.11ac VHT80 MODE						
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5210	-6.42	12.49	0.32	-6.10	11	-17.10
5290	-7.50	12.49	0.32	-7.18	11	-18.18
5530	-7.13	12.49	0.32	-6.81	11	-17.81
5610	-6.73	12.49	0.32	-6.41	11	-17.41

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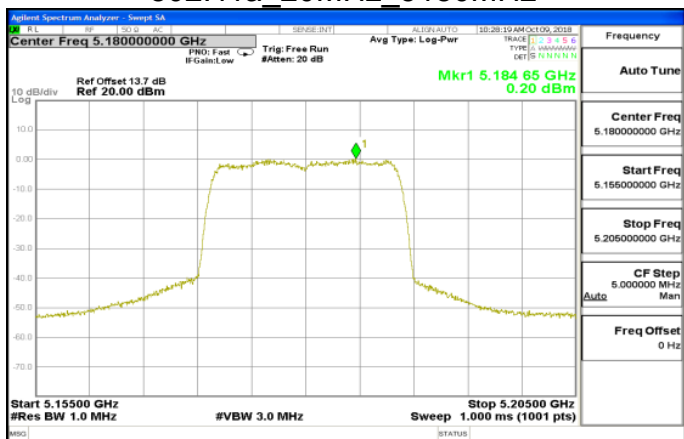
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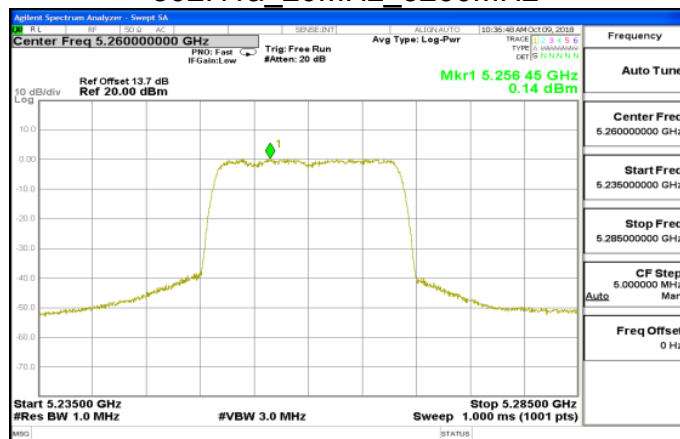
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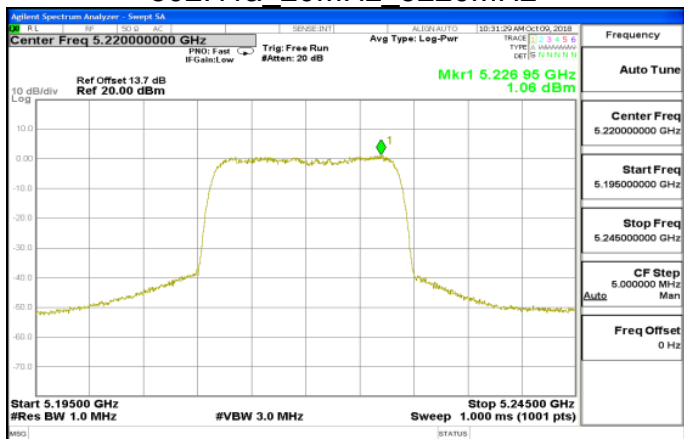
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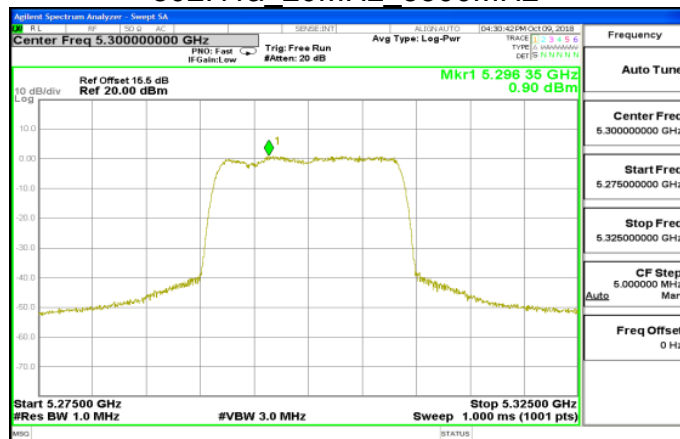
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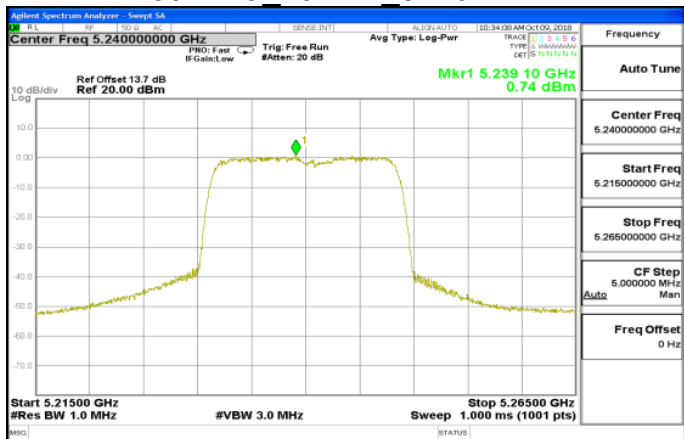
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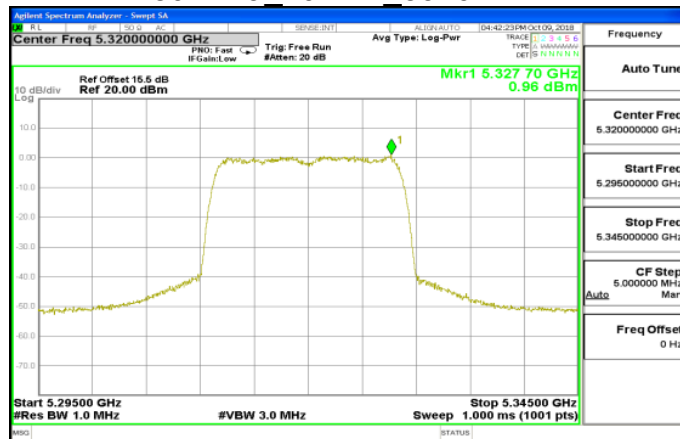
802.11a 20MHz 5300MHz



802.11a 20MHz 5240MHz



802.11a 20MHz 5320MHz



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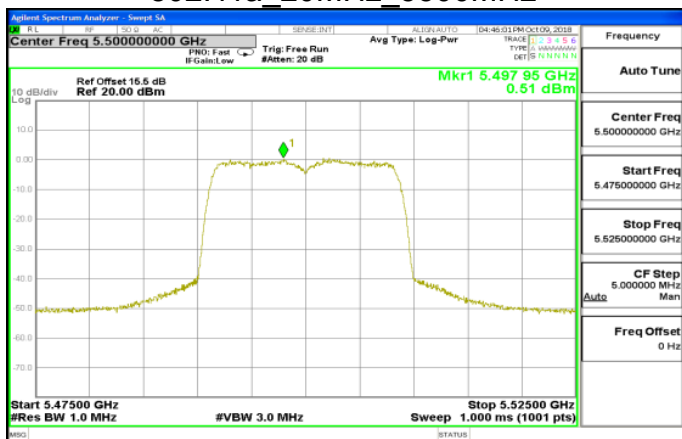
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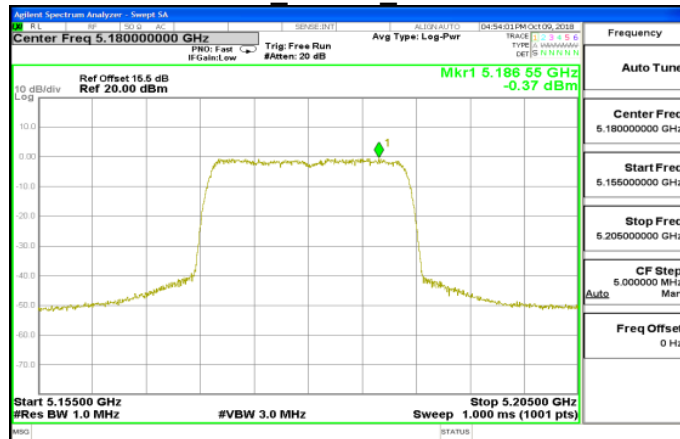
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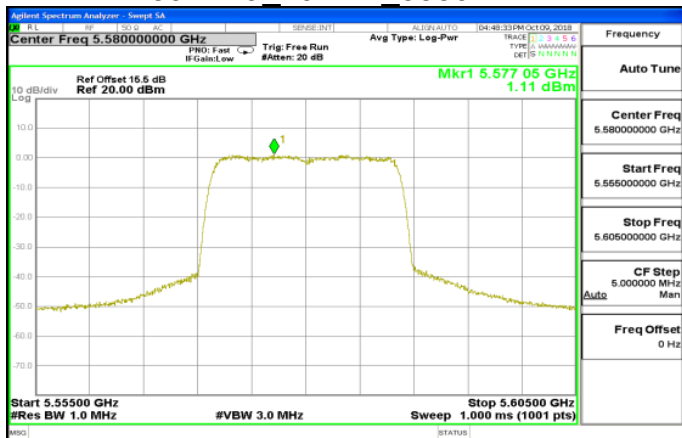
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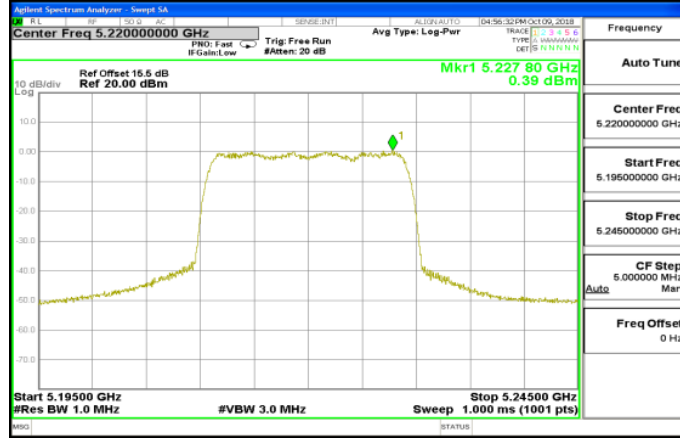
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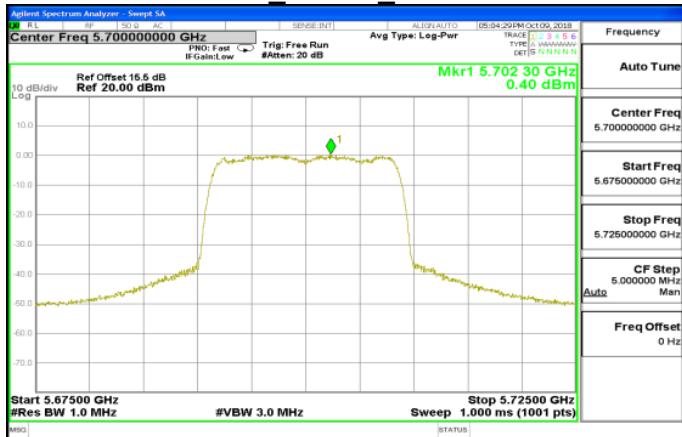
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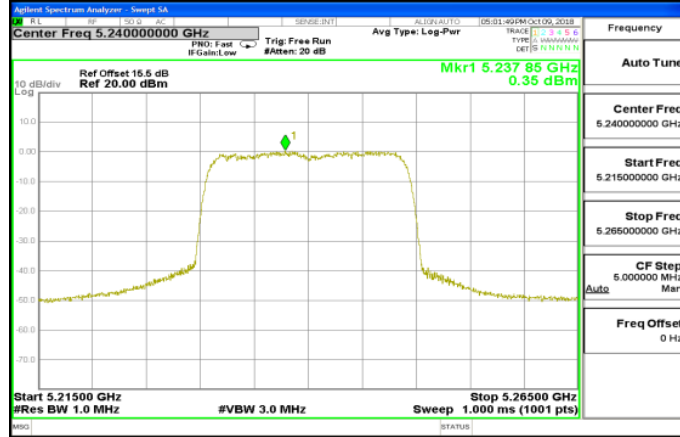
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802.11a 20MHz 5700MHz



802.11n 20MHz 5240MHz



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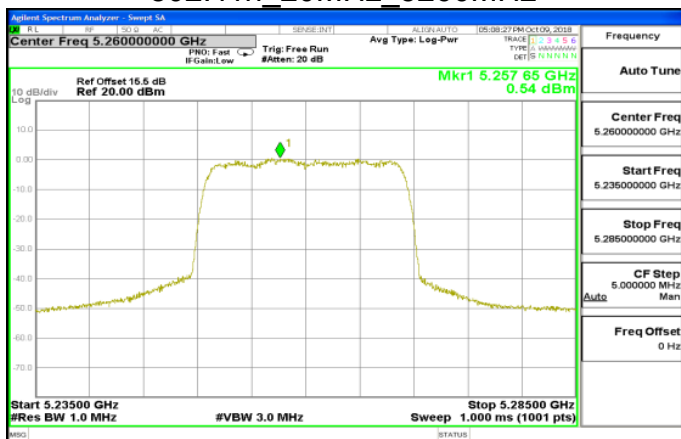
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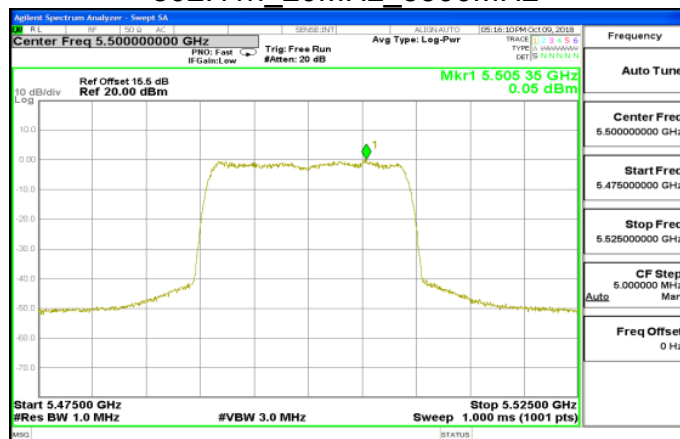
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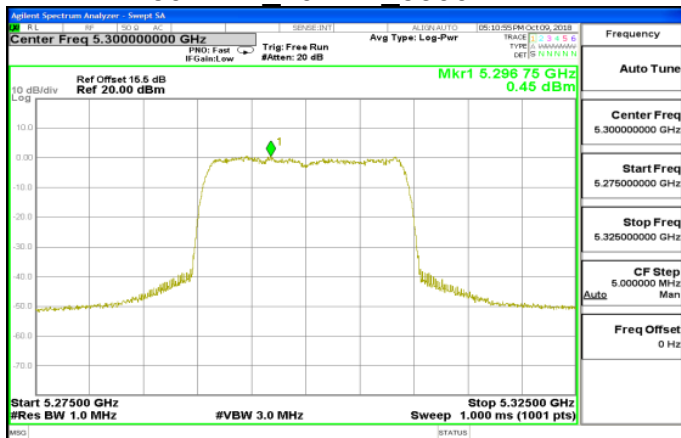
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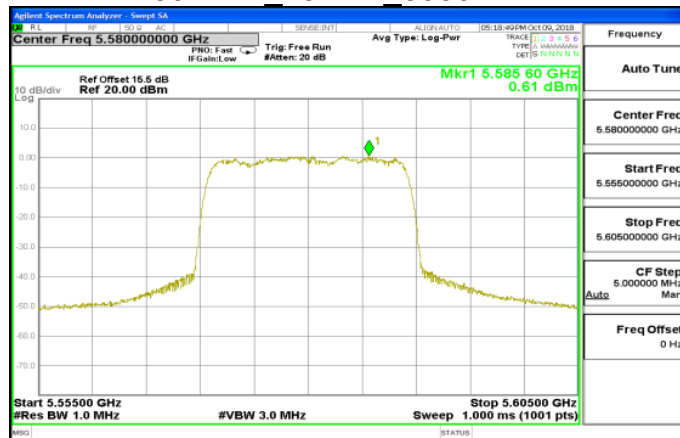
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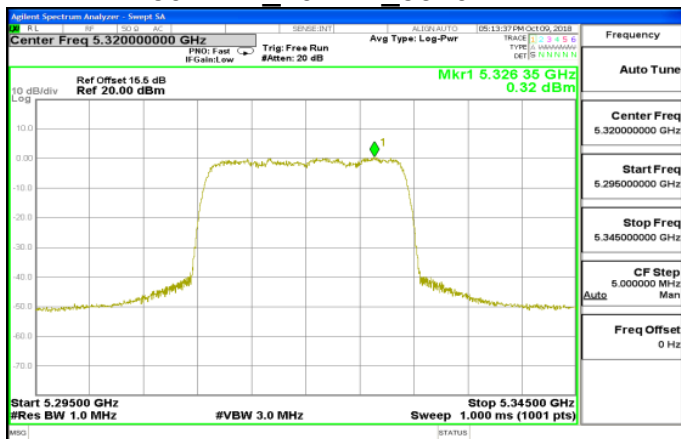
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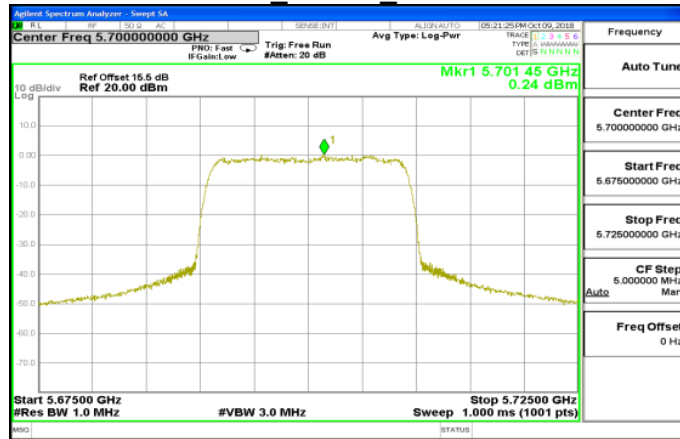
802.11n 20MHz 5580MHz



802.11n 20MHz 5320MHz



802.11n 20MHz 5700MHz



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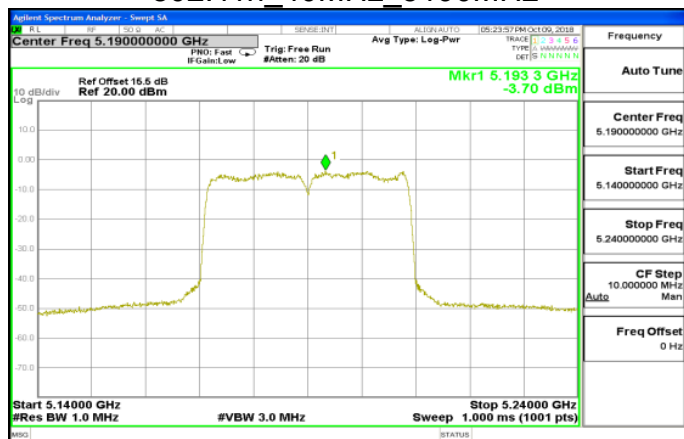
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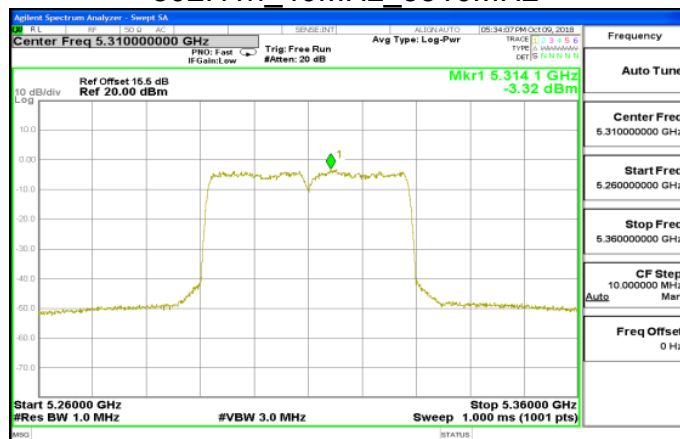
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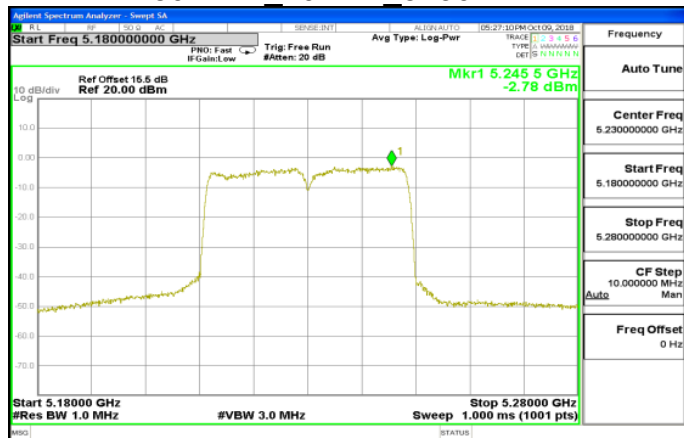
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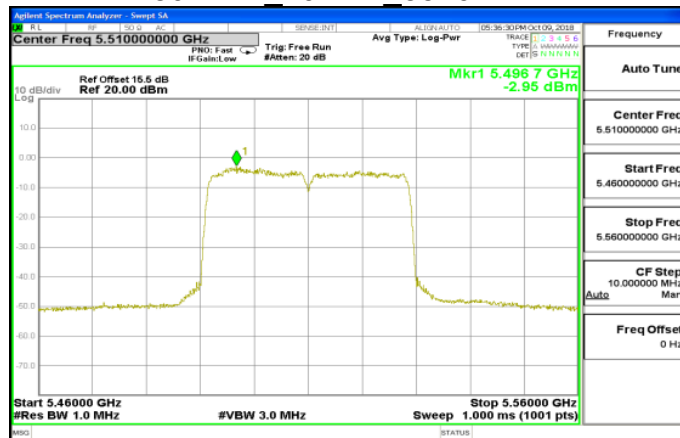
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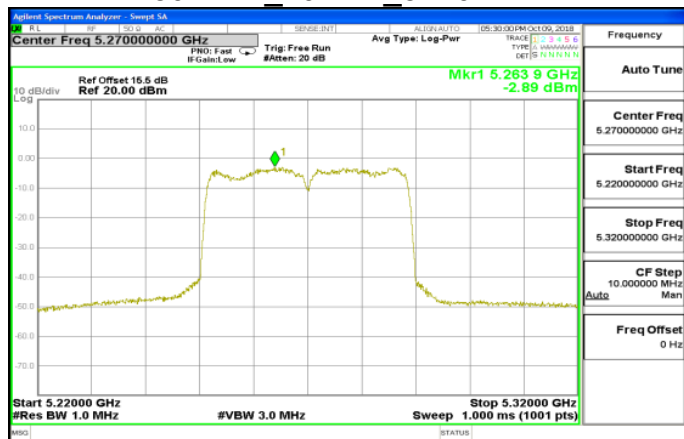
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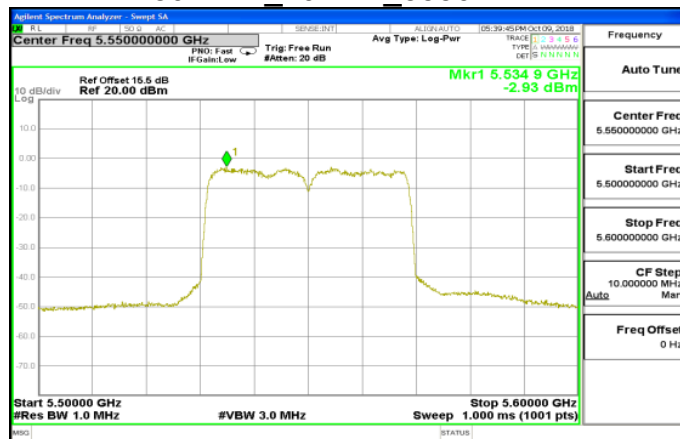
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802.11n 40MHz 5270MHz



802.11n 40MHz 5550MHz



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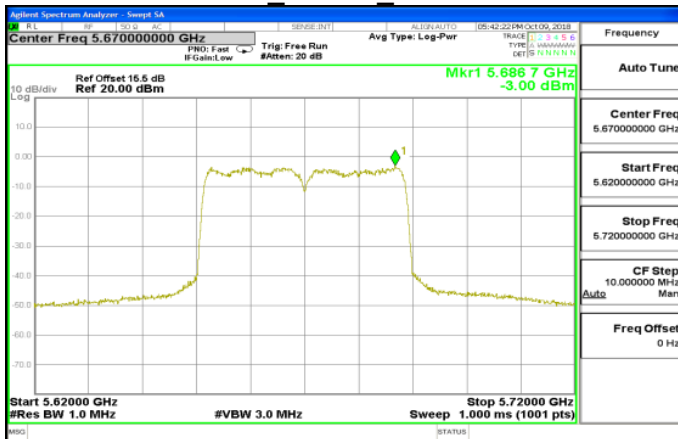
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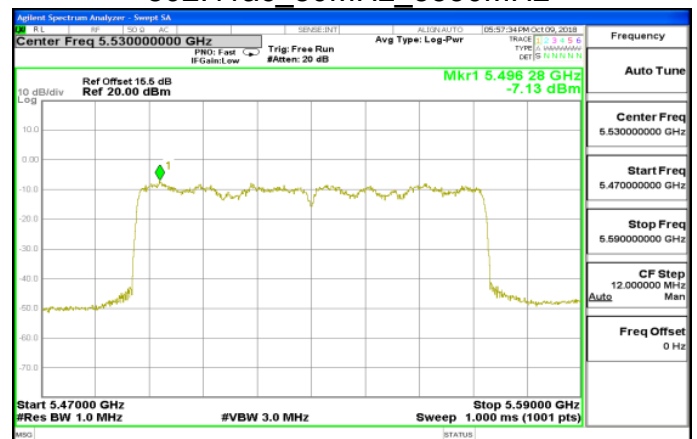
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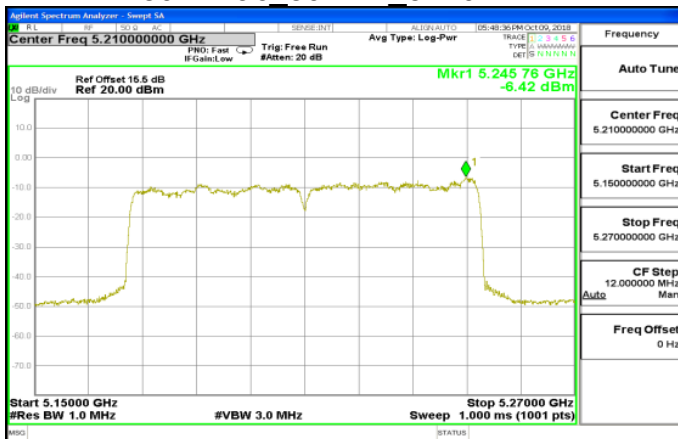
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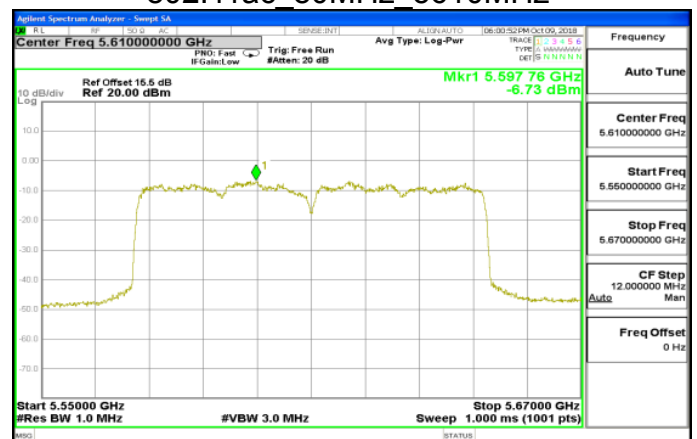
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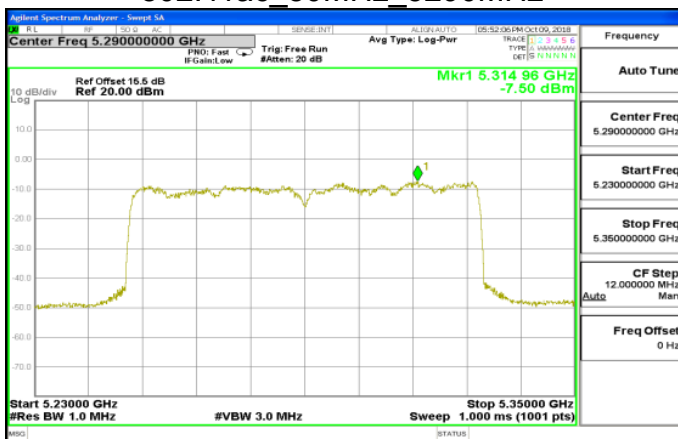
802.11ac 80MHz 5210MHz



802.11ac 80MHz 5610MHz



802.11ac 80MHz 5290MHz



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11. UNDESIRABLE RADIATED EMISSION MEASUREMENT

11.1 Standard Applicable

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

1. For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
2. For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

APPLICABLE TO	LIMIT	
FCC KDB 789033 D02 General UNII Test Procedures New Rules	FIELD STRENGTH AT 3m	
	PK: 74 (dBμV/m)	AV 54 (dBμV/m)
APPLICABLE TO	EIRP LIMIT	FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.3 (dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8(dBμV/m) *3 PK:122.2 (dBμV/m) *4
*1 beyond 75 MHz or more above of the bandedge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

EIRP = $(E \cdot d)^2 / 30$, where E is the field in V/m, d is the measurement distance (3m),
EIRP is the equivalent isotropically radiated power in Watts.

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Unwanted spurious emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

11.2 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Bi-log Antenna	SCHWAZBECK	VULB9168	378	12/29/2017	12/28/2018
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/16/2018	08/15/2019
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2017	12/11/2018
Loop Antenna	ETS.LINDGREN	6502	148045	10/03/2018	10/02/2019
3m Site NSA	SGS	966 chamber	N/A	01/02/2018	01/01/2019
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/15/2018	05/14/2019
EMI Test Receiver	R&S	ESCI7	100335	02/02/2018	02/01/2019
Pre-Amplifier	HP	8449B	3008A00578	01/02/2018	01/01/2019
Pre-Amplifier	HP	8447D	2944A07676	01/02/2018	01/01/2019
Pre-Amplifier	EMC Instruments	EMC184045B	980135	10/02/2018	10/01/2019
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2018	01/01/2019
Filter 5150-5350 MHz	Micro-Tronics	BRM50703	1	01/02/2018	01/01/2019
Filter 5470-5725 MHz	Micro-Tronics	BRM50704	1	01/02/2018	01/01/2019
Low Loss Cable	Huber Suhner	966_RX	9	01/02/2018	01/01/2019
Notebook	Lenovo	L420	LR-7HXZA	N/A	N/A

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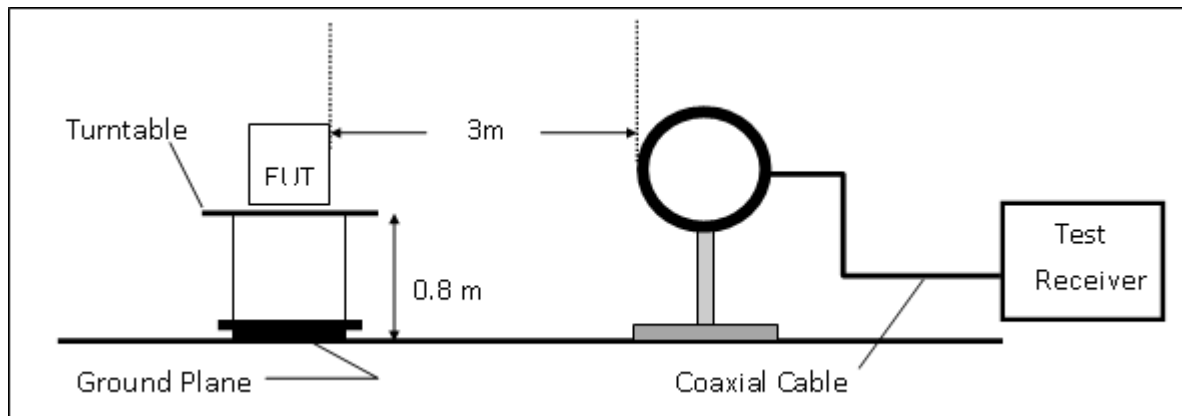
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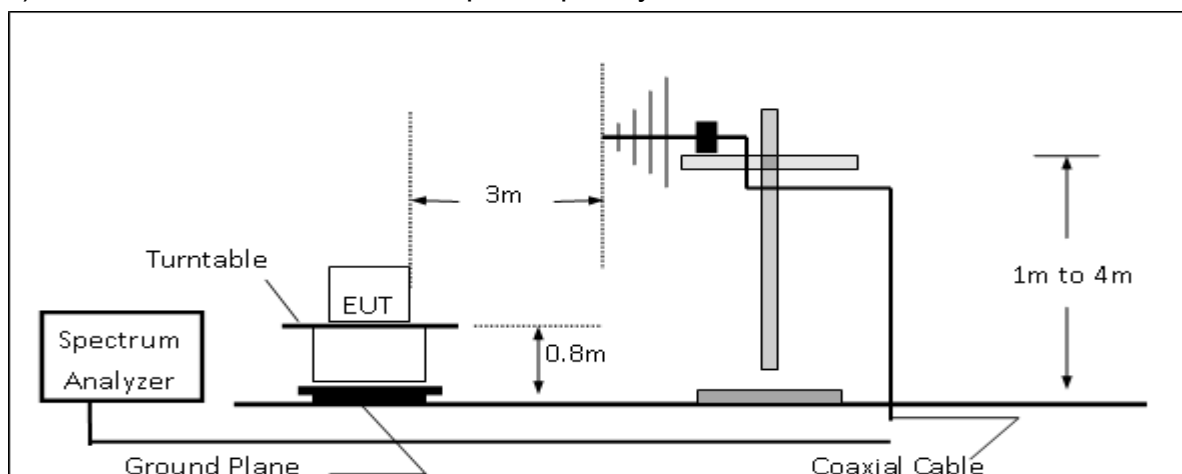
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11.3 Test SET-UP

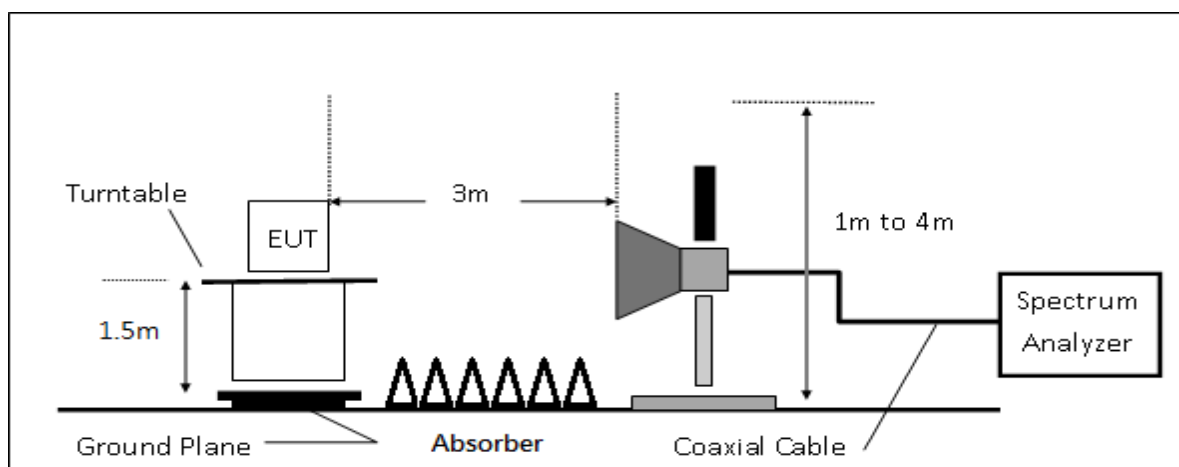
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-UP, Frequency form 30MHz to 1000MHz



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



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11.4 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
3. The EUT was placed on a turn table with 0.8m for frequency < 1GHz and 1.5m for frequency > 1GHz above ground plane.
4. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
11. Repeat above procedures until all frequency measured were complete.

11.5 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	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

11.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

11.7 Measurement Result

Refer to next page for tabular data sheets.

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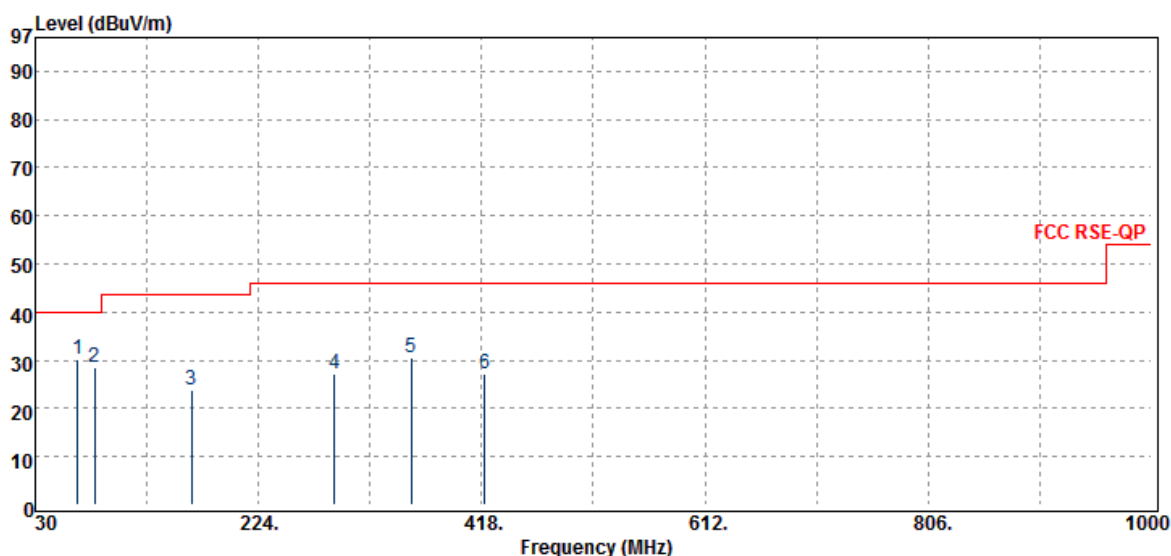
Radiated Spurious Emission Measurement Result

Below 1GHz Worst-Case Data:

802.11a 5150~5250 MHz

Operation Band :802.11aB1
Fundamental Frequency :5220 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
66.86	Peak	39.75	-9.42	30.33	40.00	-9.67
81.41	Peak	40.79	-12.22	28.57	40.00	-11.43
165.80	Peak	31.01	-7.32	23.69	43.50	-19.81
289.96	Peak	33.04	-5.82	27.22	46.00	-18.78
356.89	Peak	34.89	-4.21	30.68	46.00	-15.32
420.91	Peak	30.17	-2.84	27.33	46.00	-18.67

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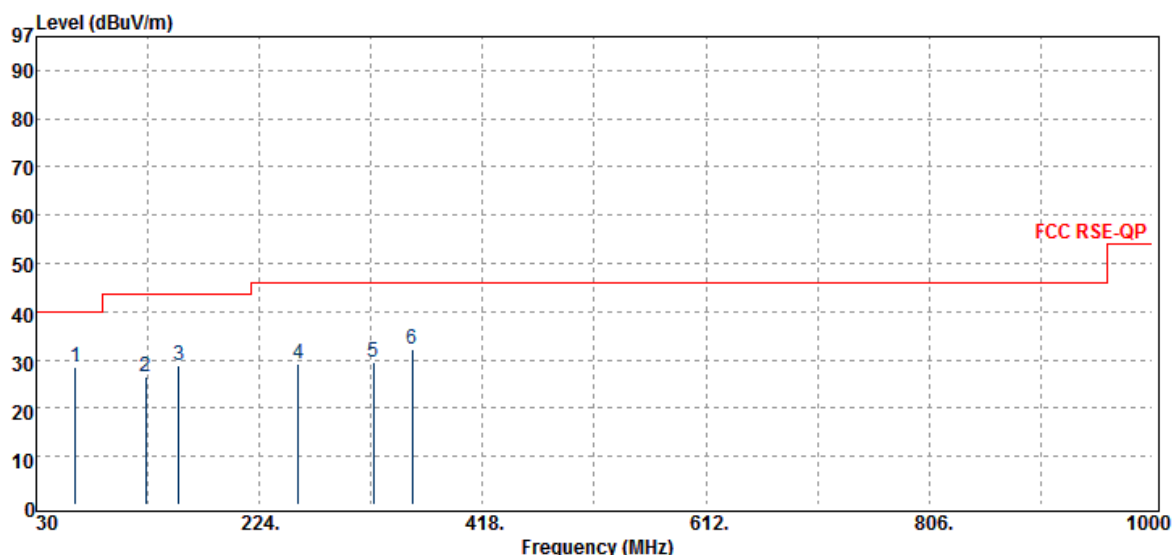
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Operation Band :802.11aB1
Fundamental Frequency :5220 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
63.95	Peak	37.32	-8.75	28.57	40.00	-11.43
125.06	Peak	36.17	-9.62	26.55	43.50	-16.95
154.16	Peak	36.24	-7.30	28.94	43.50	-14.56
257.95	Peak	36.32	-7.08	29.24	46.00	-16.76
322.94	Peak	34.44	-5.07	29.37	46.00	-16.63
356.89	Peak	36.43	-4.21	32.22	46.00	-13.78

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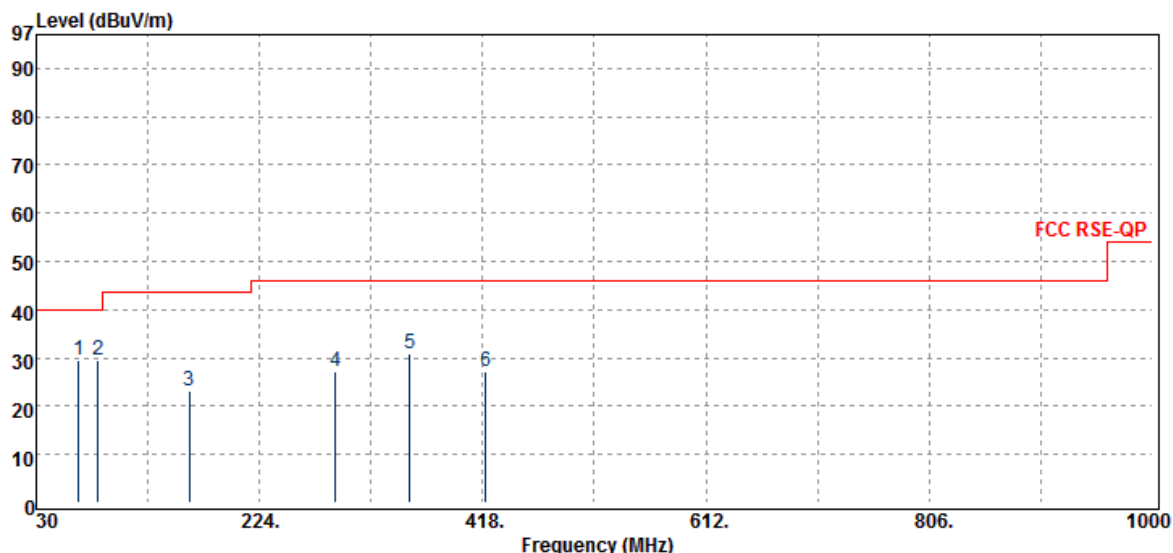
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802.11a 5250~5350 MHz

Operation Band :802.11aB2
Fundamental Frequency :5300 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
66.86	Peak	38.91	-9.42	29.49	40.00	-10.51
83.35	Peak	41.96	-12.58	29.38	40.00	-10.62
162.89	Peak	30.49	-7.23	23.26	43.50	-20.24
289.96	Peak	33.09	-5.82	27.27	46.00	-18.73
354.95	Peak	35.07	-4.18	30.89	46.00	-15.11
420.91	Peak	30.17	-2.84	27.33	46.00	-18.67

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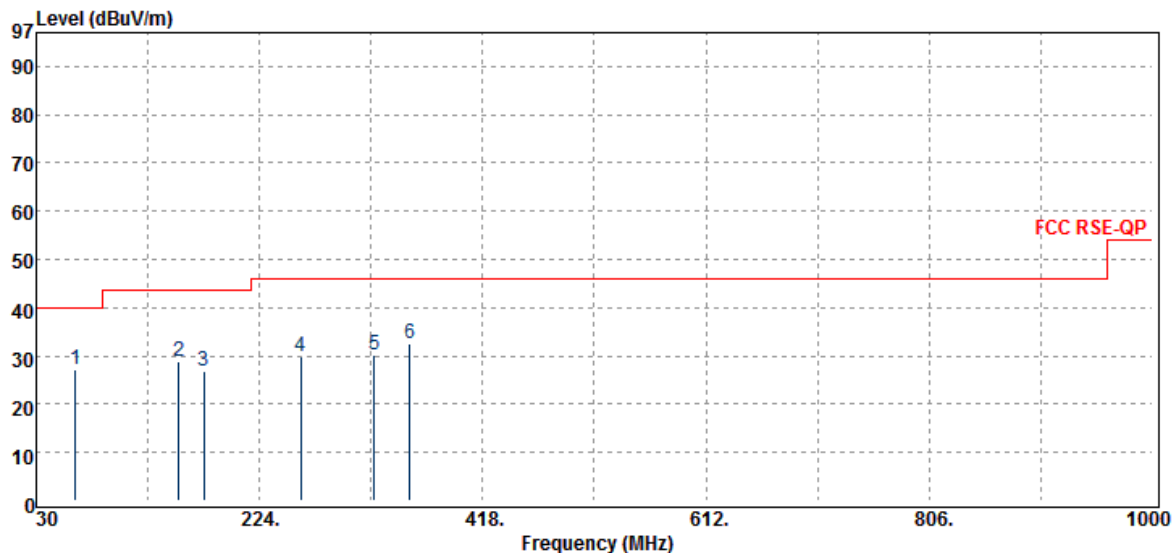
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Operation Band :802.11aB2
Fundamental Frequency :5300 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
63.95	Peak	36.05	-8.75	27.30	40.00	-12.70
154.16	Peak	36.02	-7.30	28.72	43.50	-14.78
175.50	Peak	34.70	-7.89	26.81	43.50	-16.69
259.89	Peak	36.94	-7.03	29.91	46.00	-16.09
323.91	Peak	35.14	-5.08	30.06	46.00	-15.94
354.95	Peak	36.82	-4.18	32.64	46.00	-13.36

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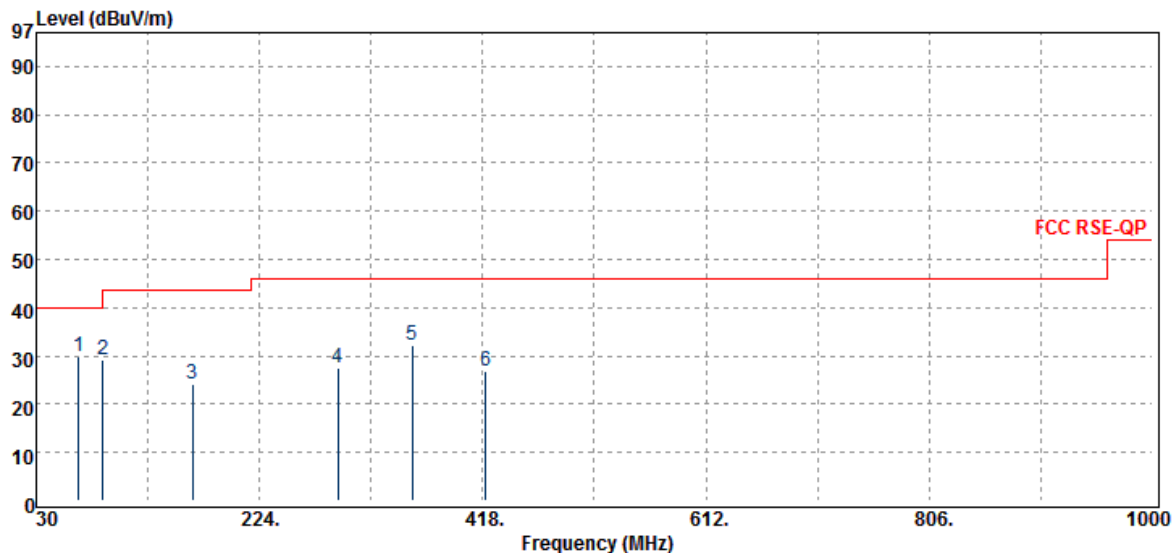
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802.11a, 5470~5725 MHz

Operation Band :802.11aB3
Fundamental Frequency :5580 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
66.86	Peak	39.29	-9.42	29.87	40.00	-10.13
88.20	Peak	42.49	-13.39	29.10	43.50	-14.40
165.80	Peak	31.60	-7.32	24.28	43.50	-19.22
291.90	Peak	33.26	-5.76	27.50	46.00	-18.50
356.89	Peak	36.34	-4.21	32.13	46.00	-13.87
420.91	Peak	29.74	-2.84	26.90	46.00	-19.10

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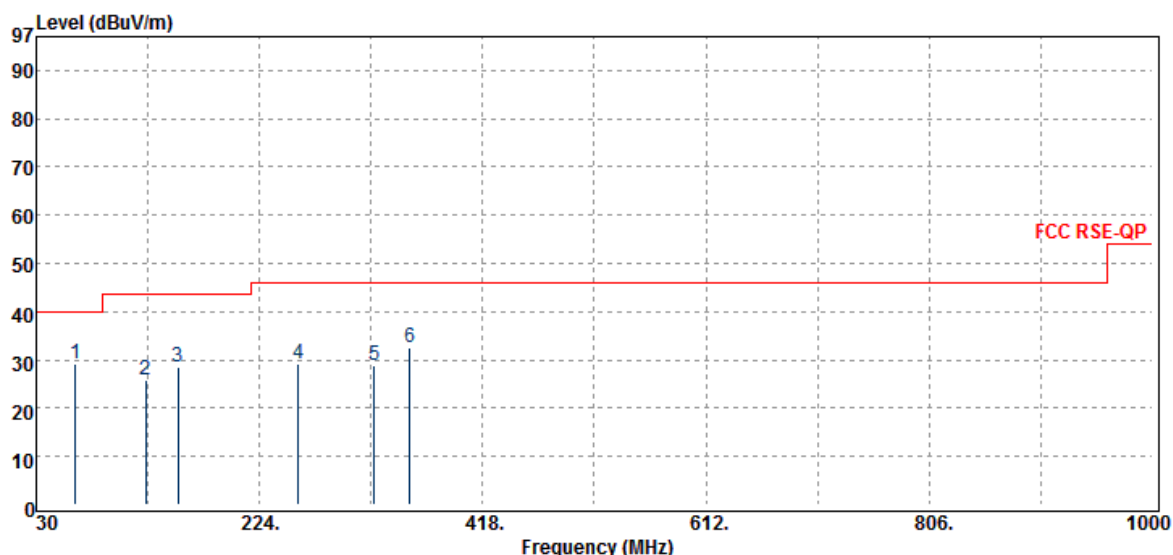
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Operation Band :802.11aB3
Fundamental Frequency :5580 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
63.95	Peak	37.81	-8.75	29.06	40.00	-10.94
125.06	Peak	35.48	-9.62	25.86	43.50	-17.64
153.19	Peak	35.68	-7.31	28.37	43.50	-15.13
257.95	Peak	36.34	-7.08	29.26	46.00	-16.74
323.91	Peak	34.01	-5.08	28.93	46.00	-17.07
354.95	Peak	36.58	-4.18	32.40	46.00	-13.60

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Above 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result 802.11a, 5150~5250 MHz

Operation Band	:802.11aB1	Test Date	:2018-10-29
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10360.00	Peak	34.57	19.71	54.28	68.20	-13.92

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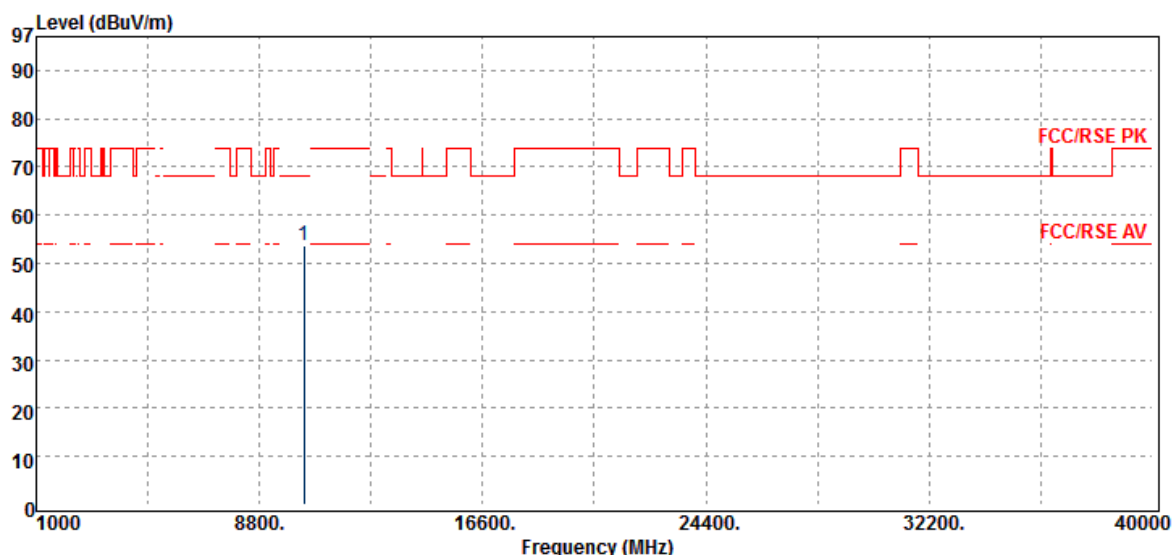
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Operation Band :802.11aB1
Fundamental Frequency :5180 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10360.00	Peak	34.12	19.71	53.83	68.20	-14.37

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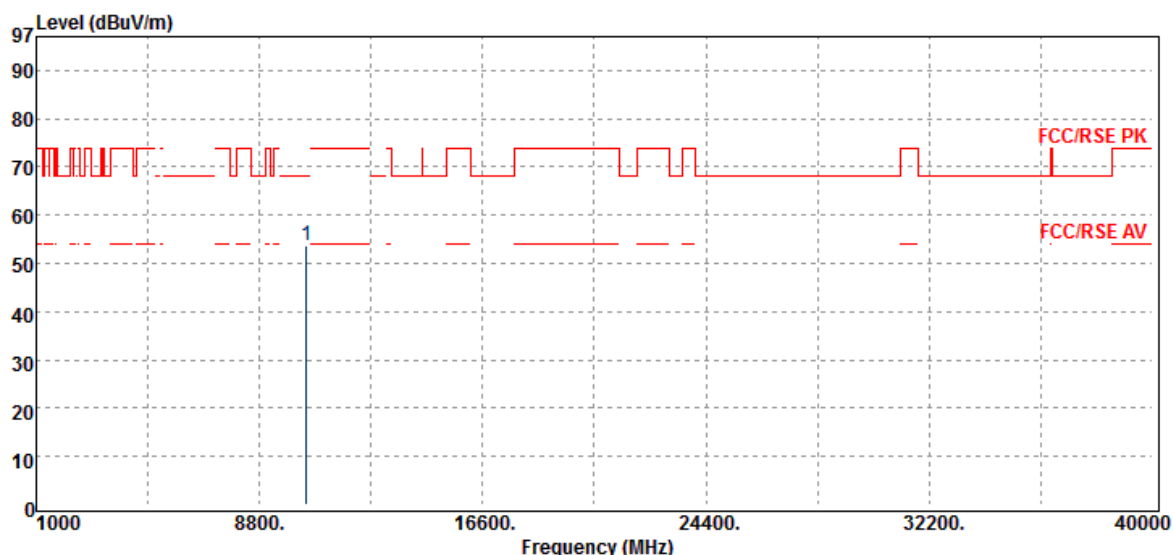
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Operation Band :802.11aB1
Fundamental Frequency :5220 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10440.00	Peak	33.58	20.05	53.63	68.20	-14.57

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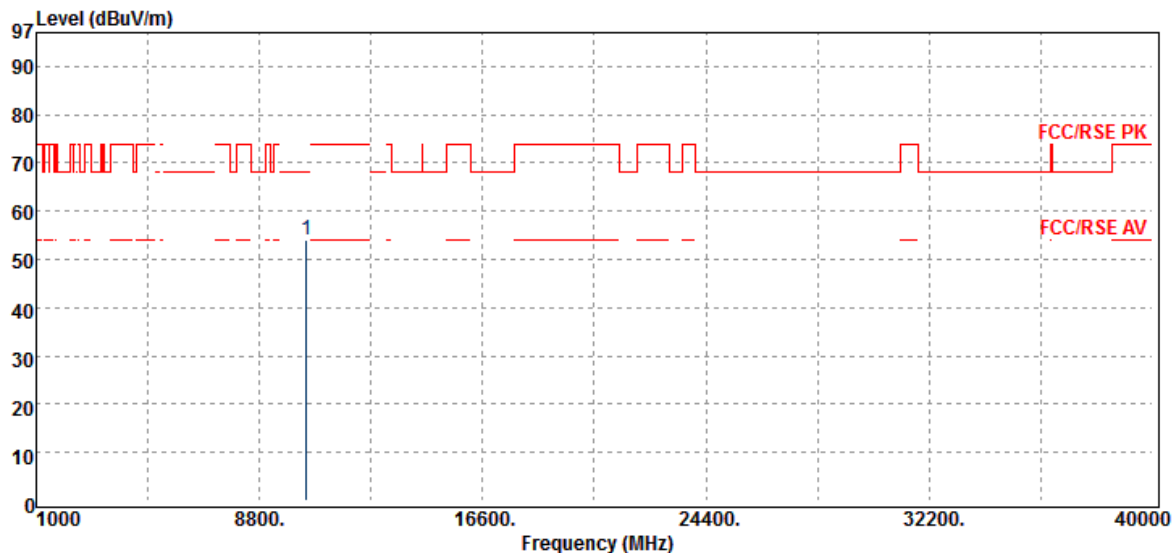
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Operation Band :802.11aB1
Fundamental Frequency :5220 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10440.00	Peak	34.04	20.05	54.09	68.20	-14.11

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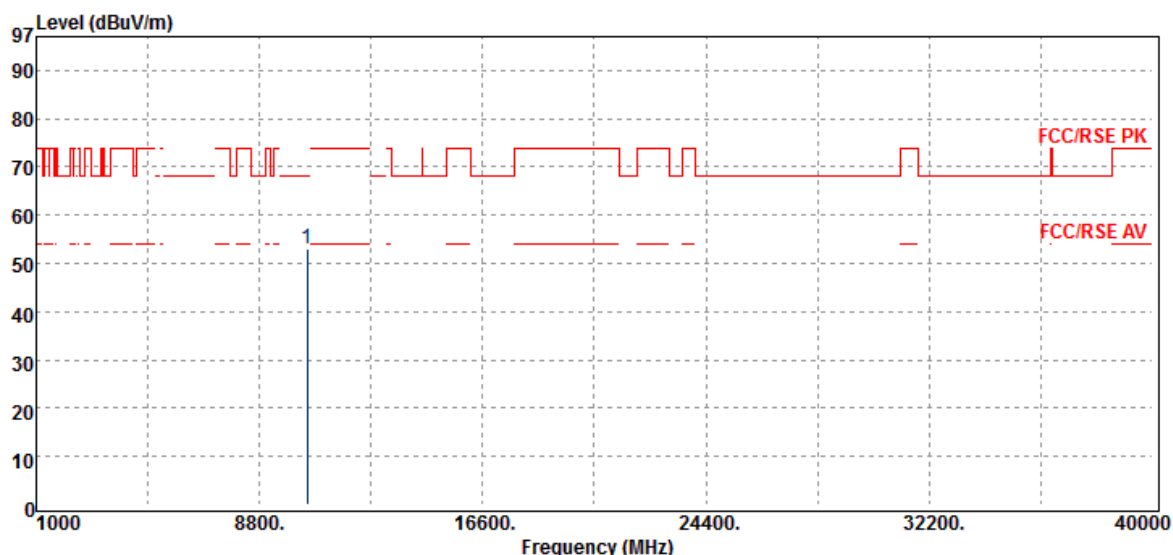
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Operation Band :802.11aB1
Fundamental Frequency :5240 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10480.00	Peak	32.84	20.07	52.91	68.20	-15.29

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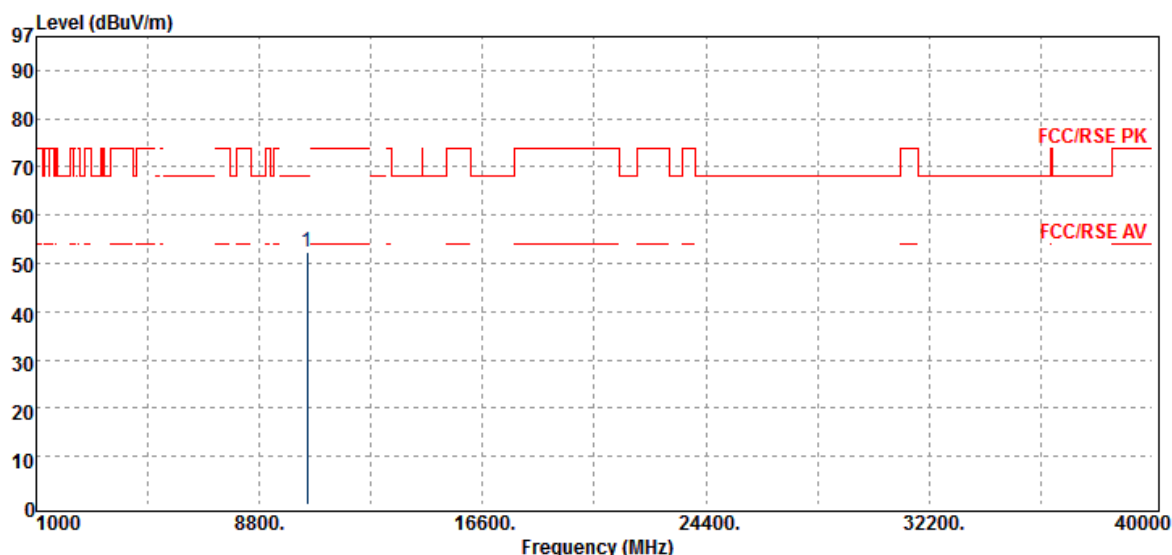
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Operation Band :802.11aB1
Fundamental Frequency :5240 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10480.00	Peak	32.34	20.07	52.41	68.20	-15.79

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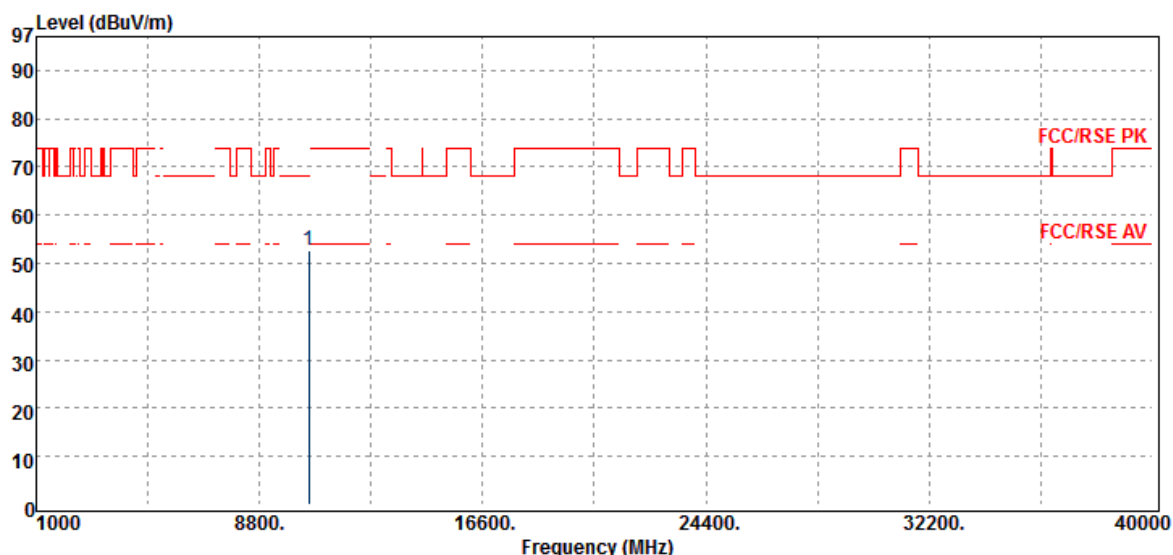
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Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

Operation Band	:802.11aB2	Test Date	:2018-10-29
Fundamental Frequency	:5260 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10520.00	Peak	32.67	20.00	52.67	68.20	-15.53

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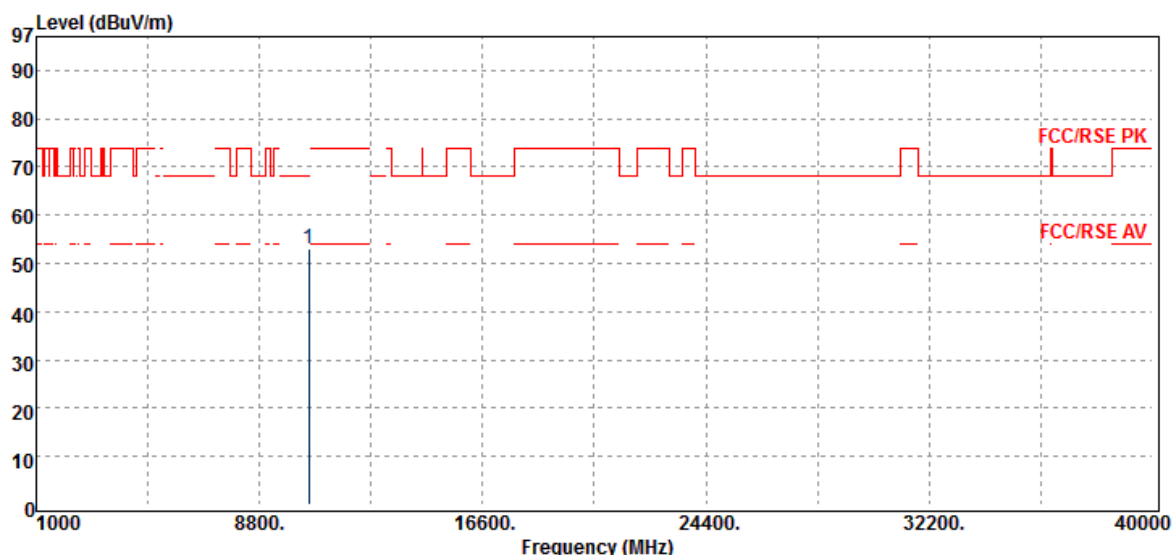
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Operation Band :802.11aB2
Fundamental Frequency :5260 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10520.00	Peak	33.06	20.00	53.06	68.20	-15.14

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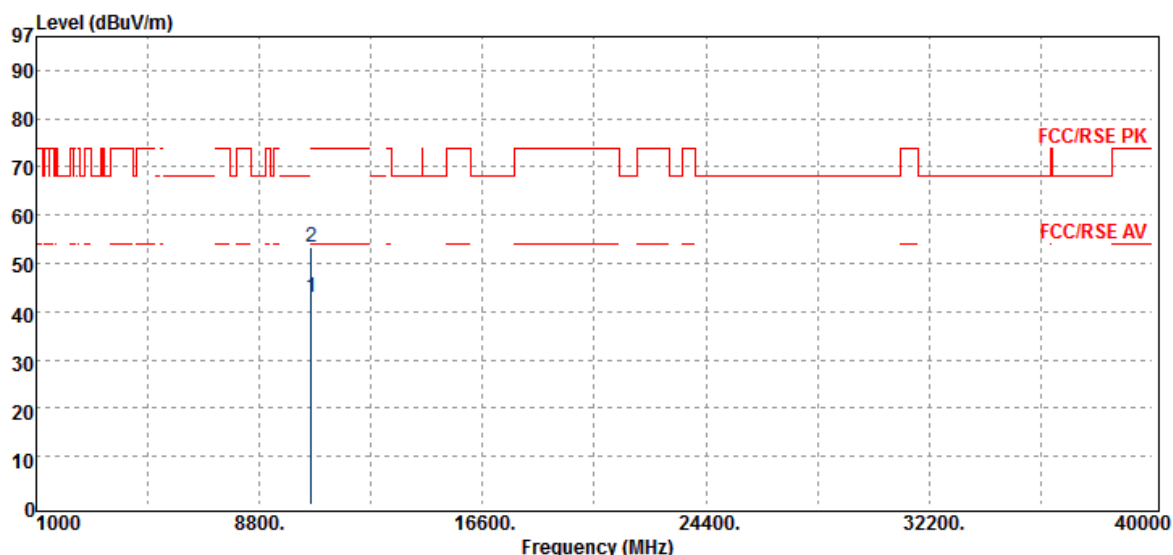
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Operation Band :802.11aB2
Fundamental Frequency :5300 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10600.00	Average	22.57	20.38	42.95	54.00	-11.05
10600.00	Peak	33.14	20.38	53.52	74.00	-20.48

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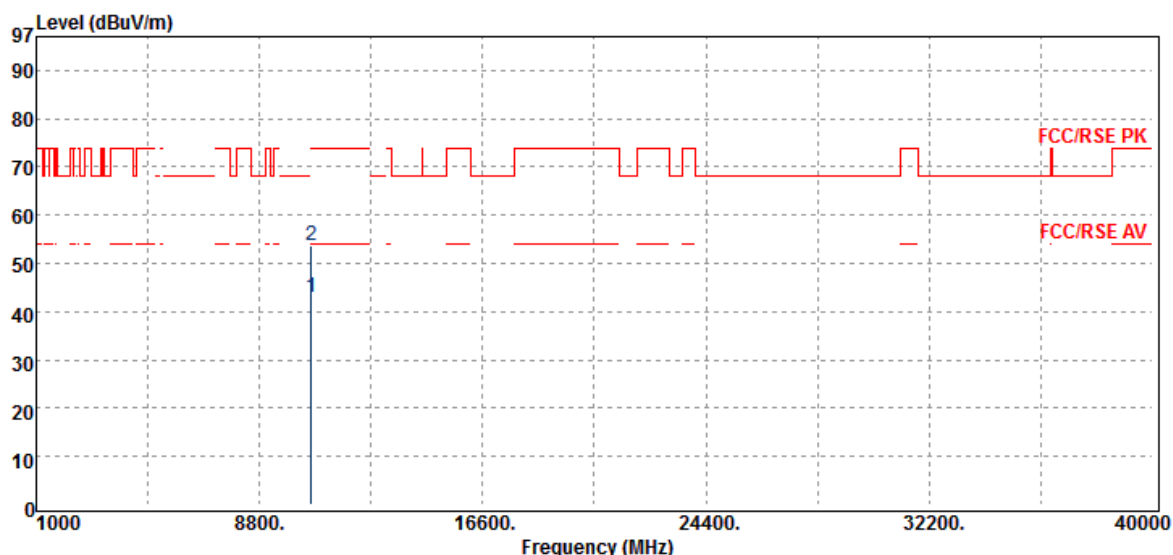
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Operation Band :802.11aB2
Fundamental Frequency :5300 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10600.00	Average	22.62	20.38	43.00	54.00	-11.00
10600.00	Peak	33.48	20.38	53.86	74.00	-20.14

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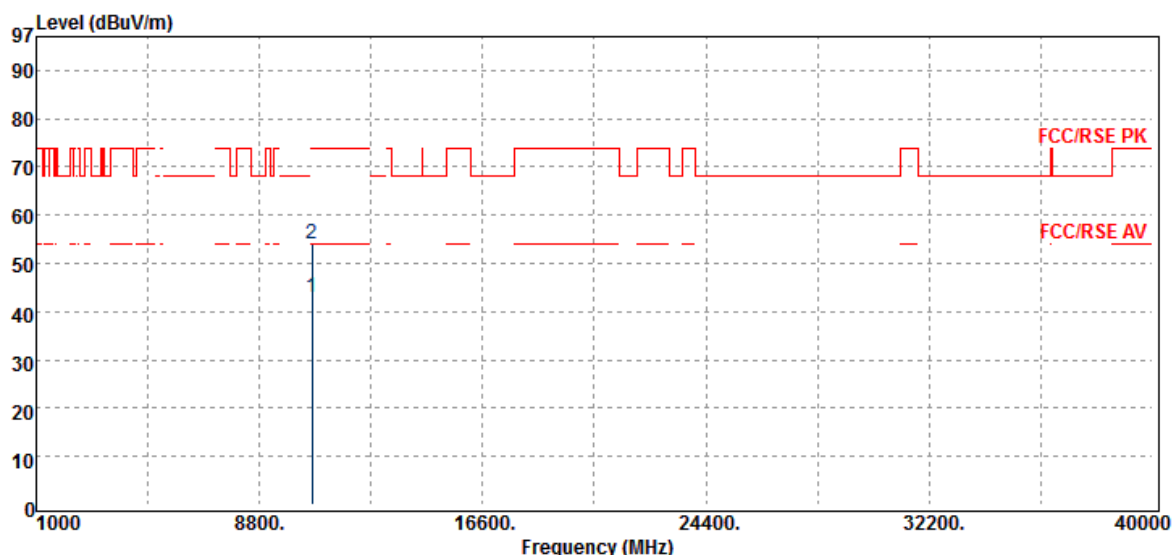
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Operation Band :802.11aB2
Fundamental Frequency :5320 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10640.00	Average	22.45	20.44	42.89	54.00	-11.11
10640.00	Peak	33.75	20.44	54.19	74.00	-19.81

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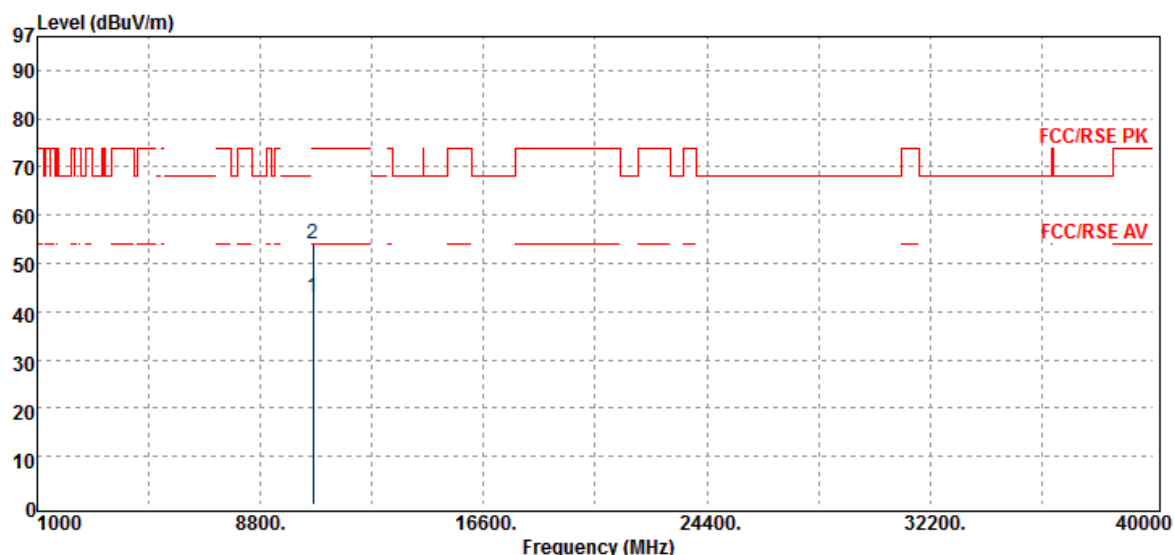
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Operation Band :802.11aB2
Fundamental Frequency :5320 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10640.00	Average	22.57	20.44	43.01	54.00	-10.99
10640.00	Peak	33.76	20.44	54.20	74.00	-19.80

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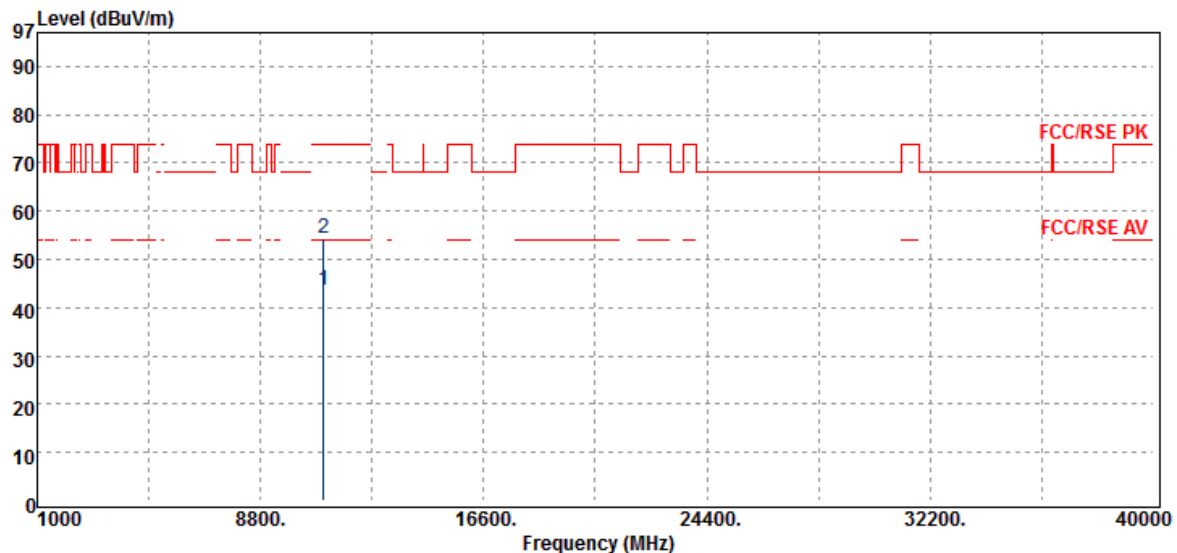
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Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz

Operation Band	:802.11aB3	Test Date	:2018-10-29
Fundamental Frequency	:5500 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11000.00	Average	22.27	21.37	43.64	54.00	-10.36
11000.00	Peak	33.13	21.37	54.50	74.00	-19.50

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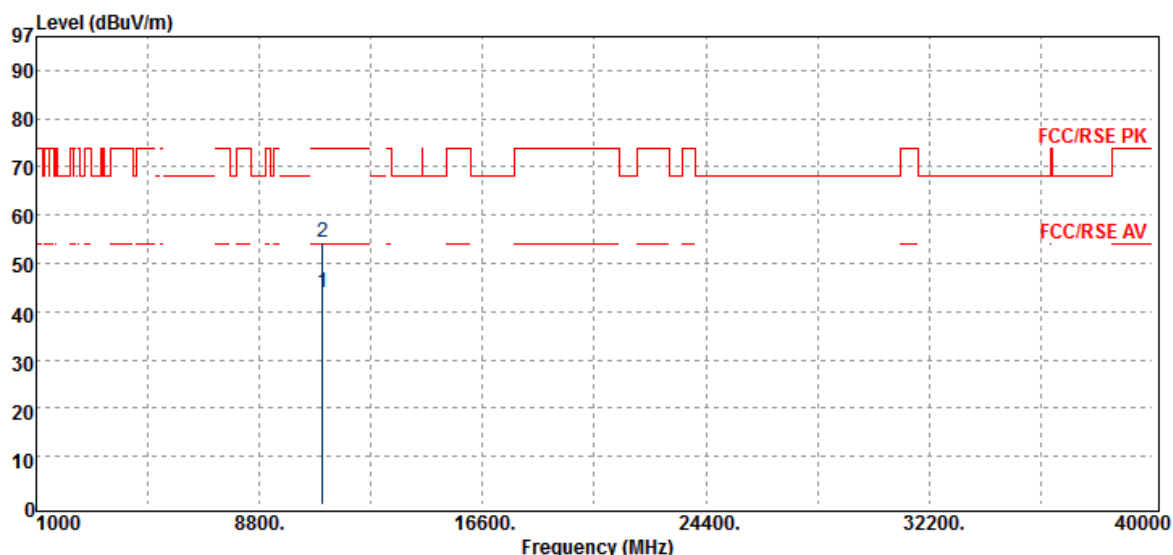
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Operation Band :802.11aB3
Fundamental Frequency :5500 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11000.00	Average	22.53	21.37	43.90	54.00	-10.10
11000.00	Peak	33.06	21.37	54.43	74.00	-19.57

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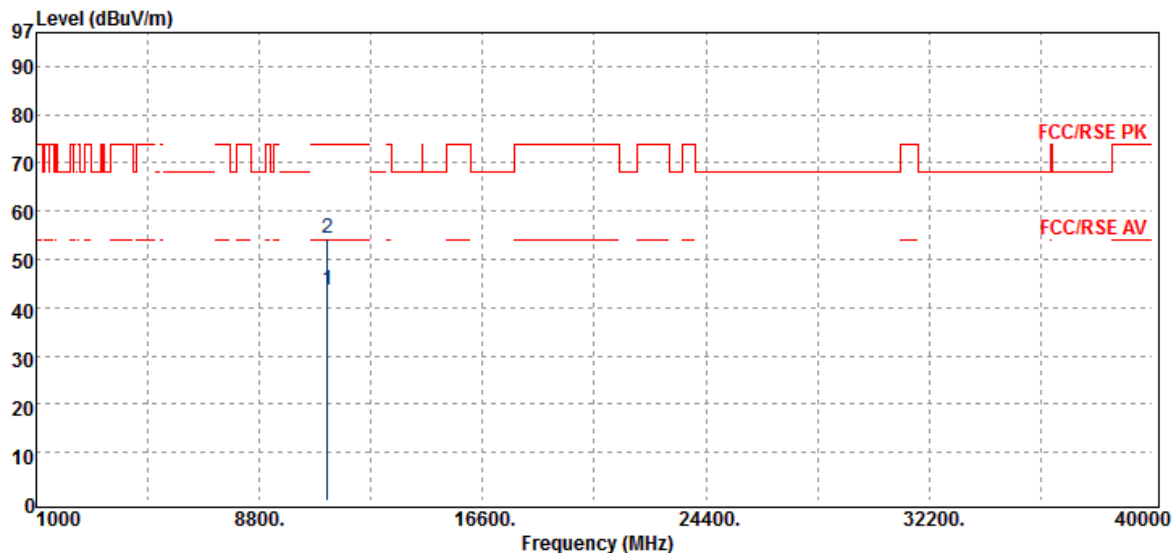
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Operation Band :802.11aB3
Fundamental Frequency :5580 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11160.00	Average	22.06	21.51	43.57	54.00	-10.43
11160.00	Peak	32.94	21.51	54.45	74.00	-19.55

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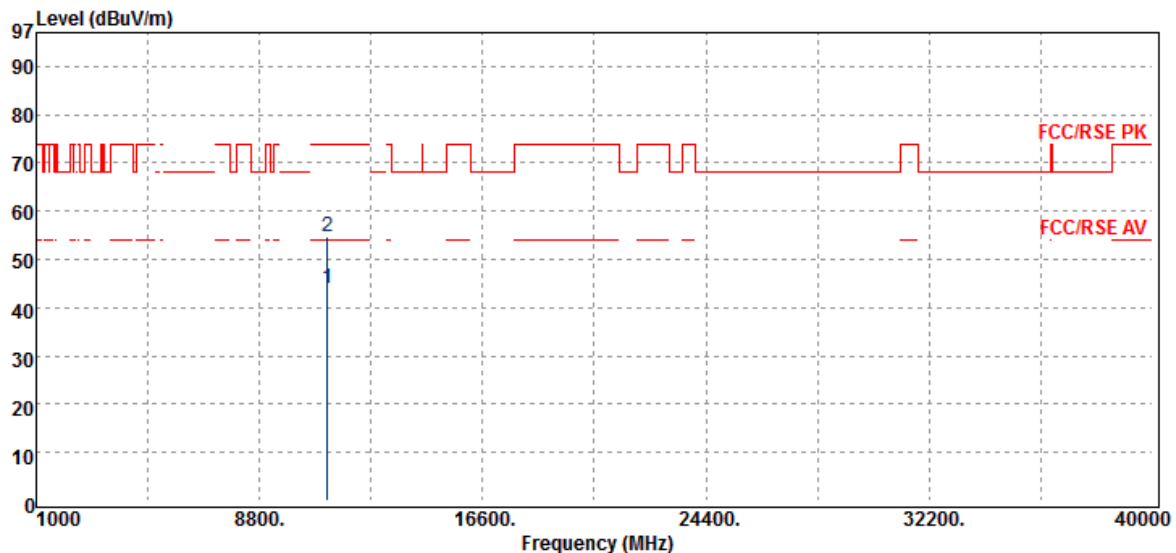
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Operation Band :802.11aB3
Fundamental Frequency :5580 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11160.00	Average	22.35	21.51	43.86	54.00	-10.14
11160.00	Peak	33.11	21.51	54.62	74.00	-19.38

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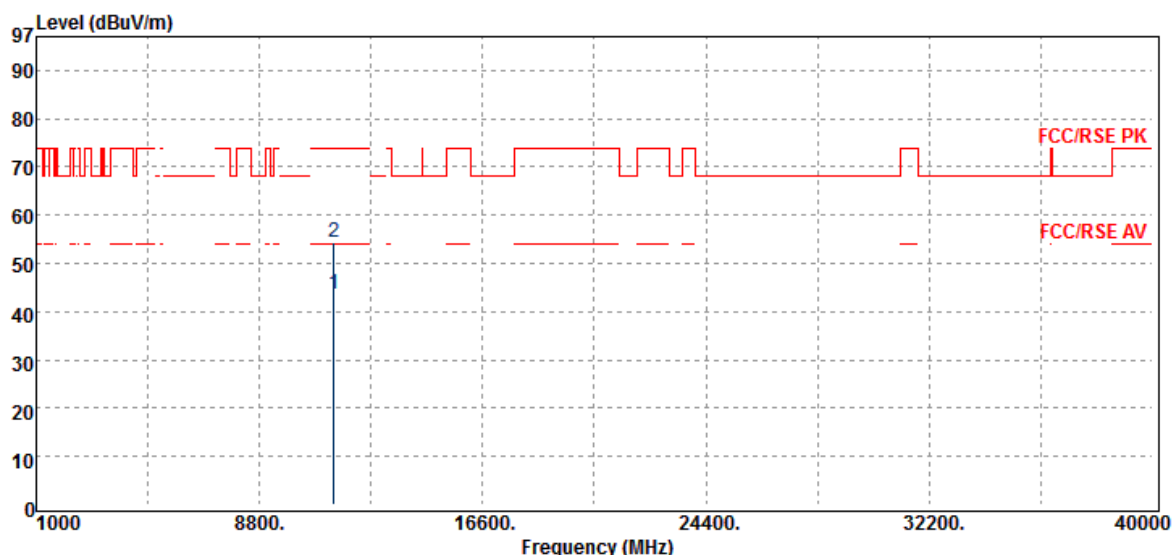
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Operation Band :802.11aB3
Fundamental Frequency :5700 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11400.00	Average	22.18	21.62	43.80	54.00	-10.20
11400.00	Peak	32.90	21.62	54.52	74.00	-19.48

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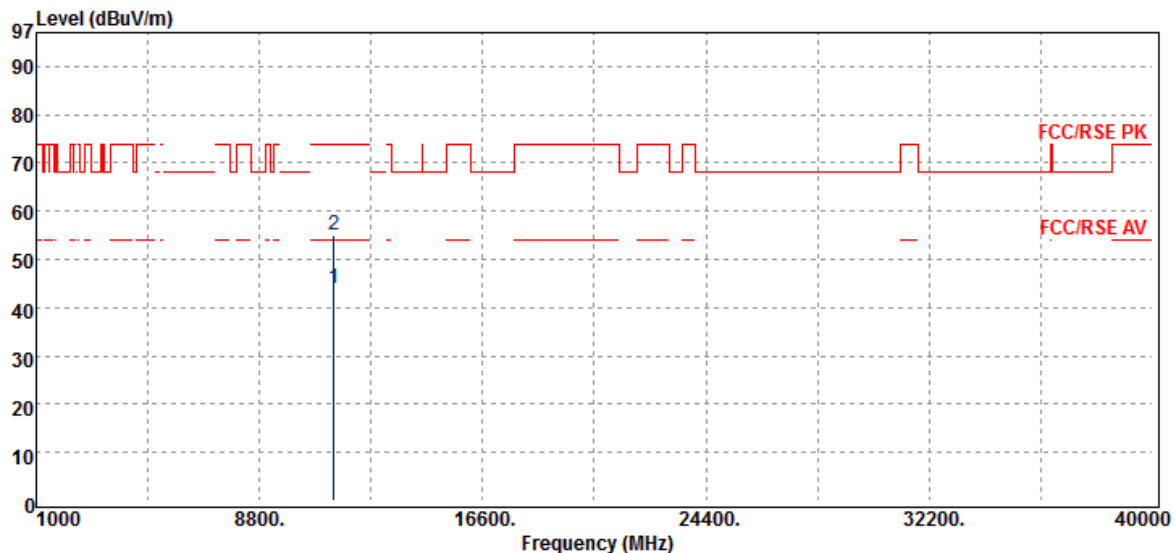
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Operation Band :802.11aB3
Fundamental Frequency :5700 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11400.00	Average	22.51	21.62	44.13	54.00	-9.87
11400.00	Peak	33.33	21.62	54.95	74.00	-19.05

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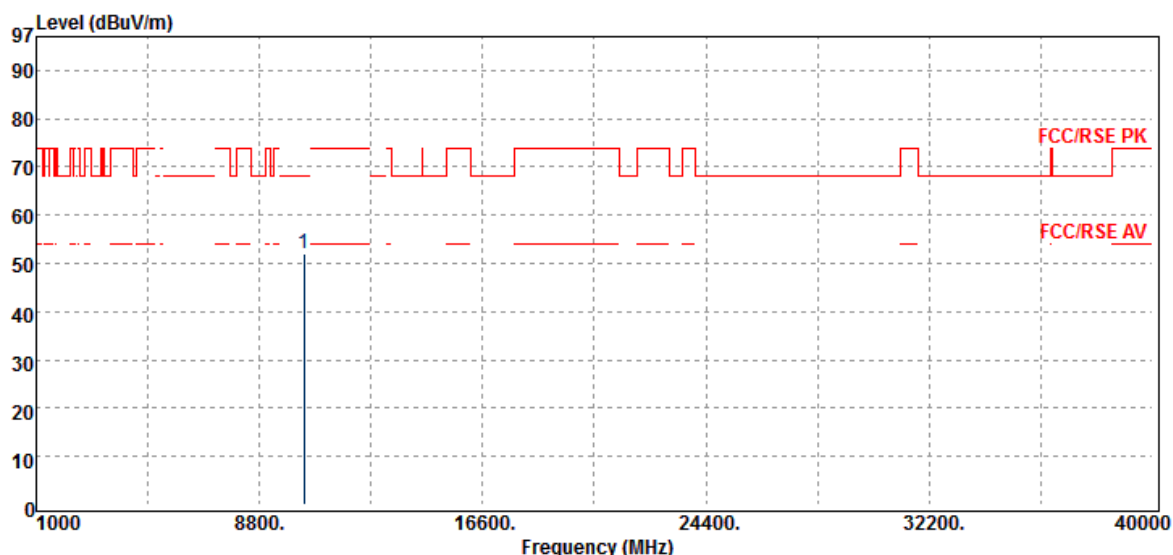
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Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz

Operation Band	:802.11n20B1	Test Date	:2018-10-29
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10360.00	Peak	32.36	19.71	52.07	68.20	-16.13

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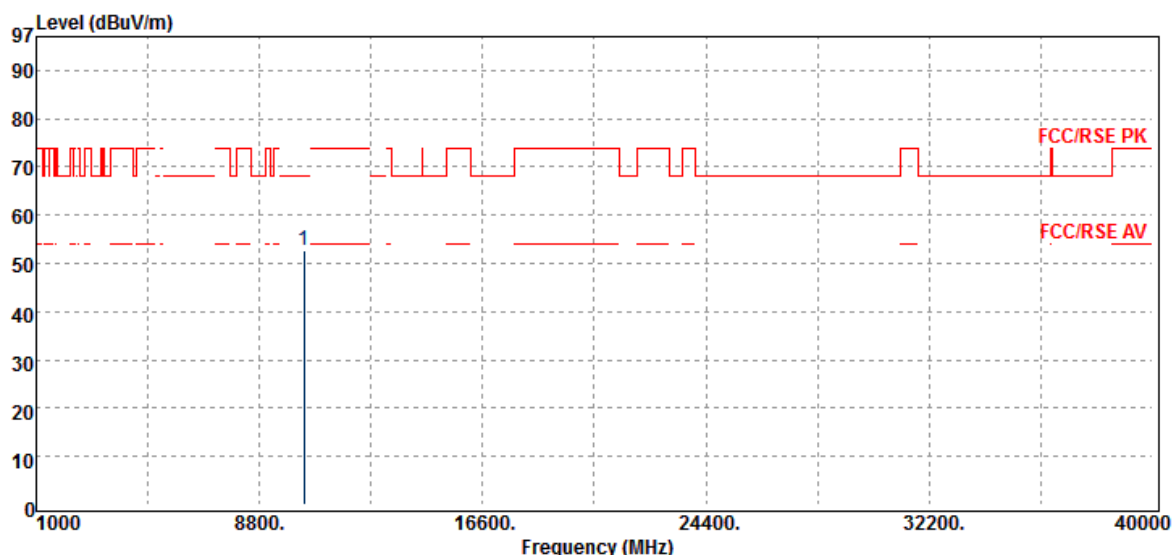
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Operation Band :802.11n20B1
Fundamental Frequency :5180 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10360.00	Peak	32.91	19.71	52.62	68.20	-15.58

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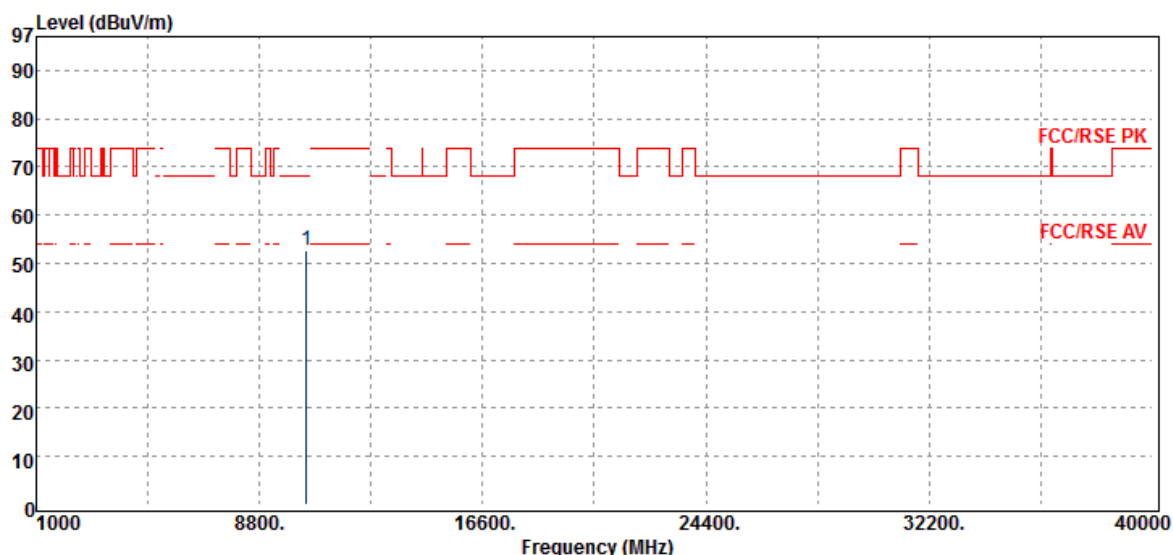
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Operation Band :802.11n20B1
Fundamental Frequency :5220 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10440.00	Peak	32.71	20.05	52.76	68.20	-15.44

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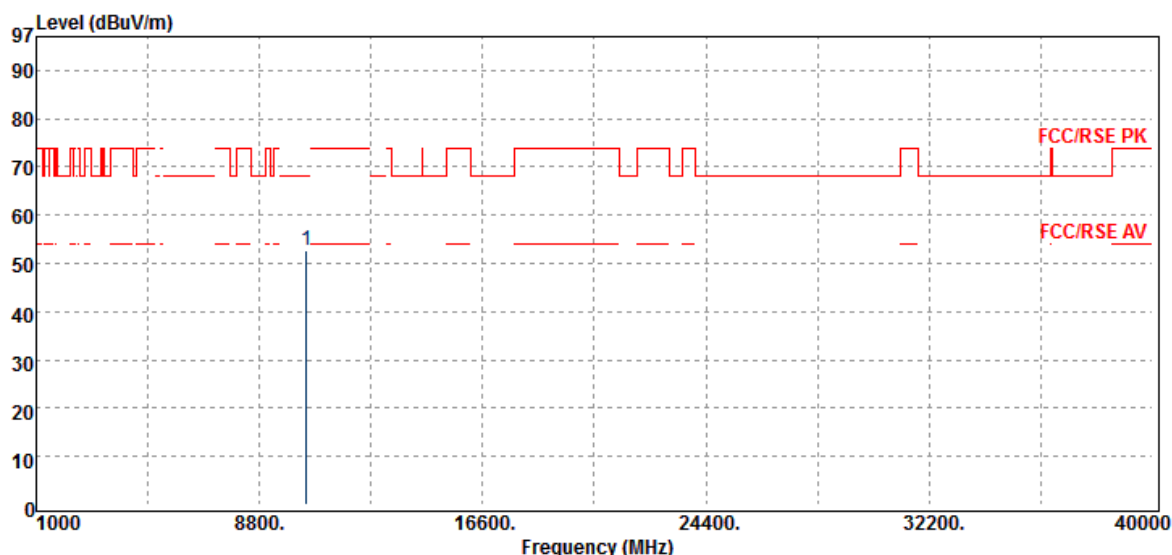
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Operation Band :802.11n20B1
Fundamental Frequency :5220 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10440.00	Peak	32.53	20.05	52.58	68.20	-15.62

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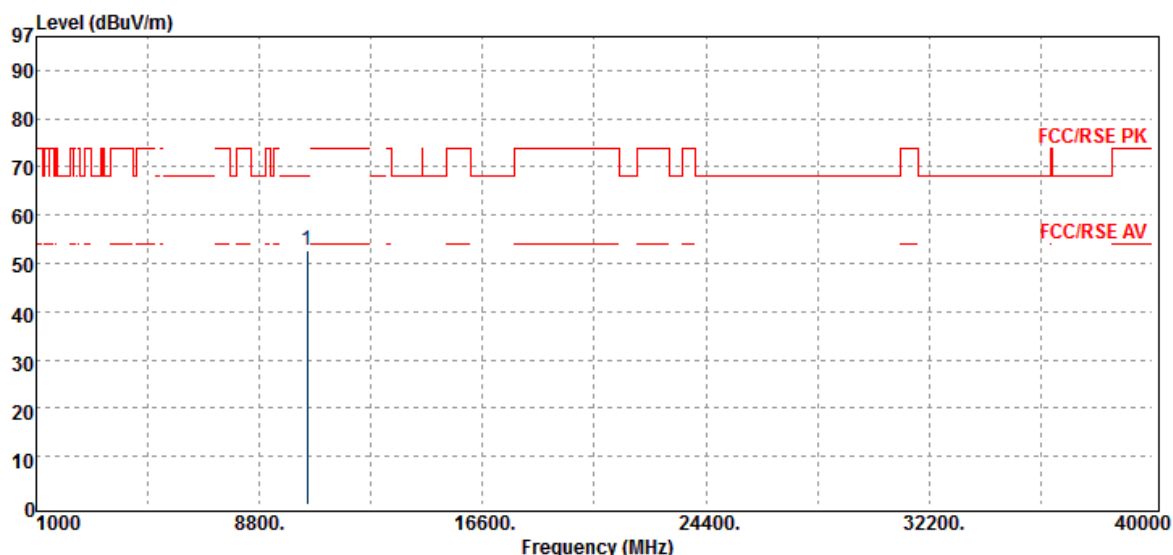
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www.tw.sgs.com

Member of SGS Group

Operation Band :802.11n20B1
Fundamental Frequency :5240 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10480.00	Peak	32.70	20.07	52.77	68.20	-15.43

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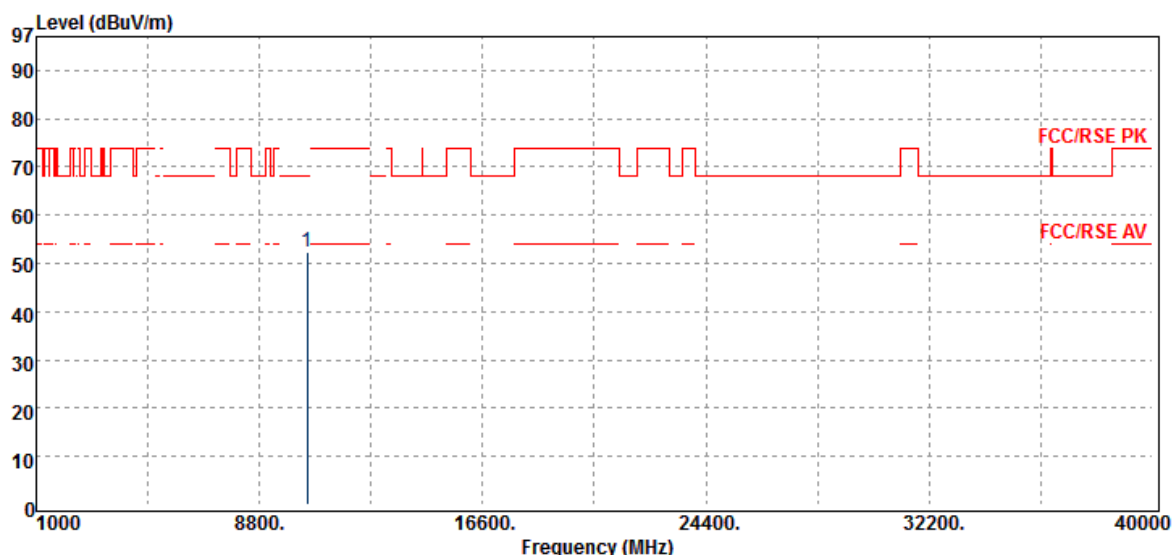
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Operation Band :802.11n20B1
Fundamental Frequency :5240 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10480.00	Peak	32.23	20.07	52.30	68.20	-15.90

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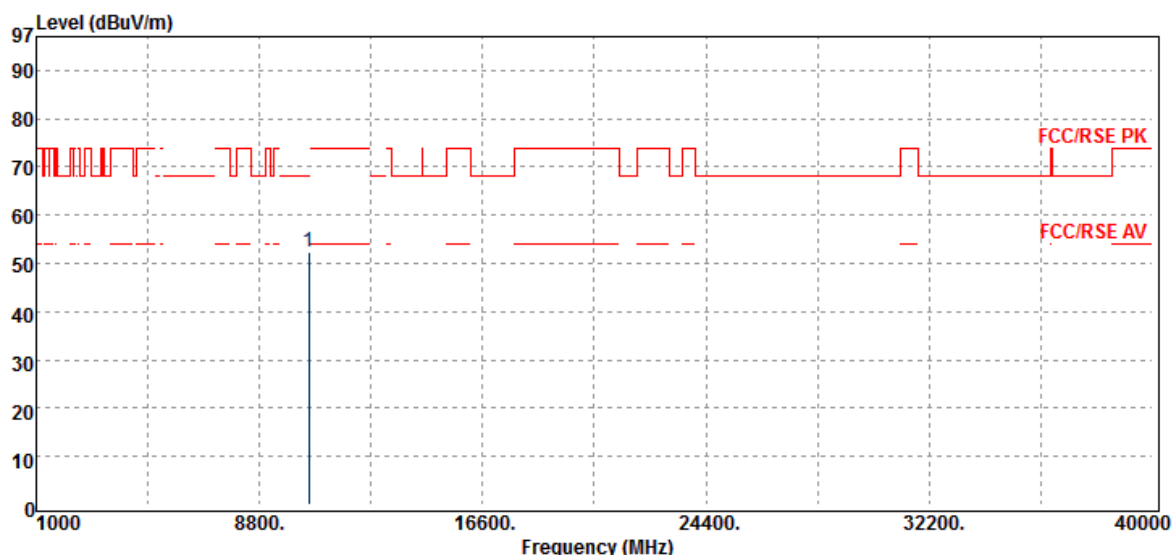
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www.tw.sgs.com

Member of SGS Group

Radiated Spurious Emission Measurement Result 802.11n HT20, 5250~5350 MHz

Operation Band	:802.11n20B2	Test Date	:2018-10-29
Fundamental Frequency	:5260 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10520.00	Peak	32.41	20.00	52.41	68.20	-15.79

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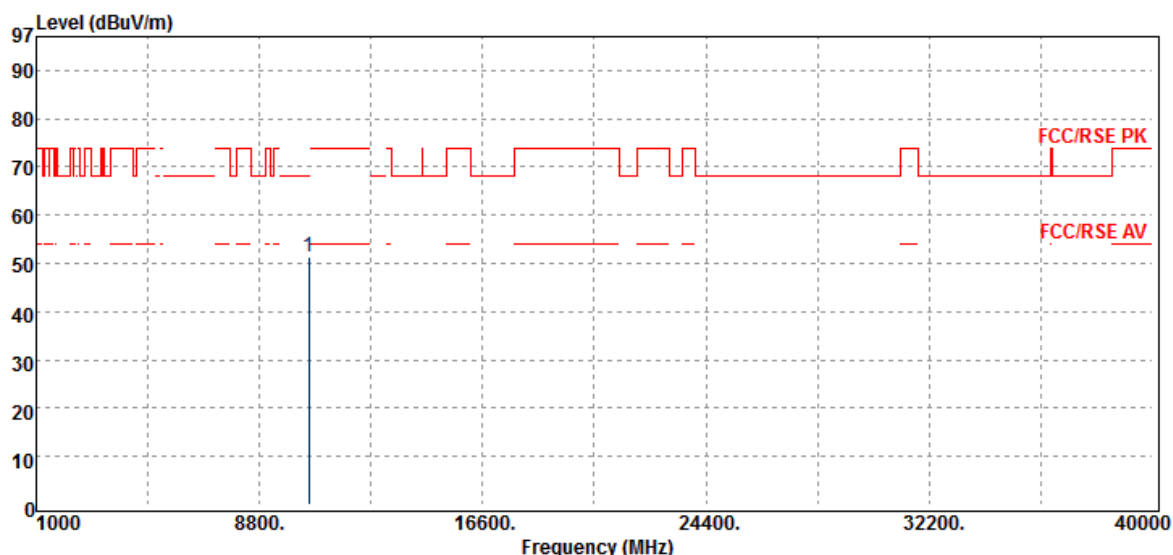
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Member of SGS Group

Operation Band :802.11n20B2
Fundamental Frequency :5260 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10520.00	Peak	31.47	20.00	51.47	68.20	-16.73

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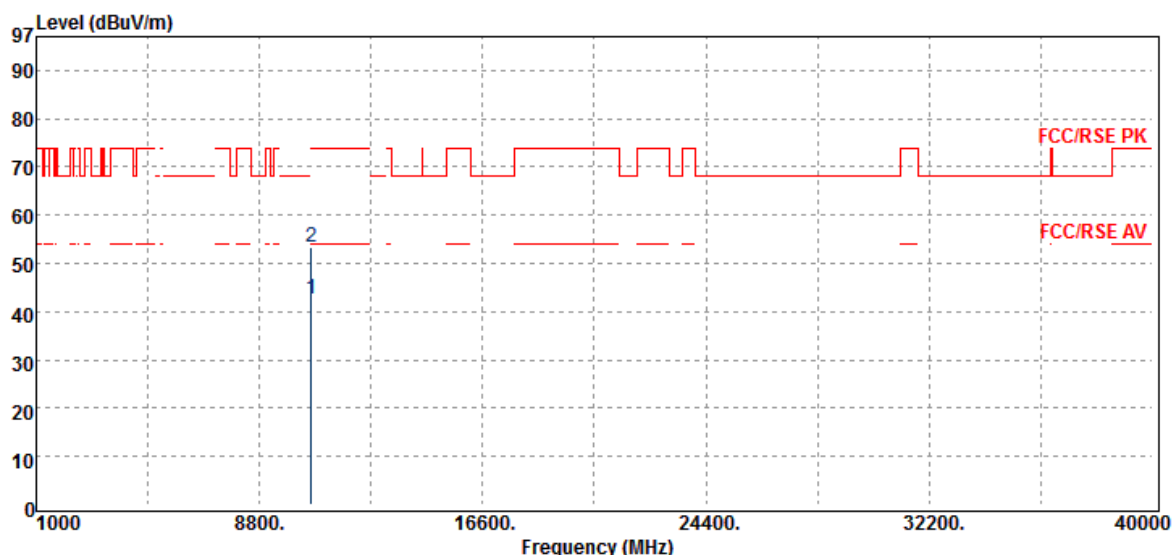
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Operation Band :802.11n20B2
Fundamental Frequency :5300 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10600.00	Average	22.23	20.38	42.61	54.00	-11.39
10600.00	Peak	33.09	20.38	53.47	74.00	-20.53

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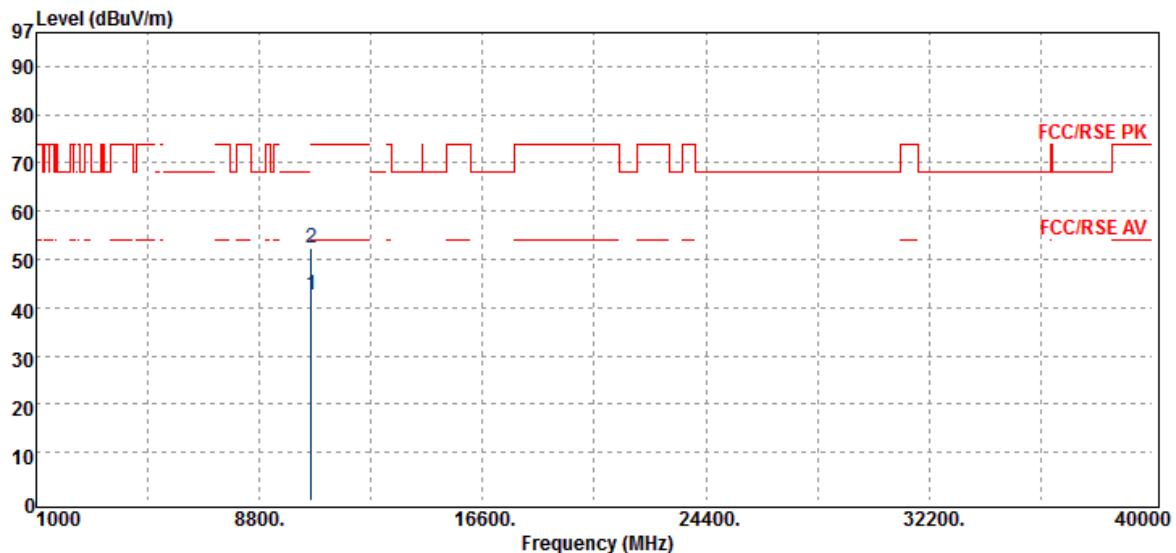
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Operation Band	:802.11n20B2	Test Date	:2018-10-29
Fundamental Frequency	:5300 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10600.00	Average	22.31	20.38	42.69	54.00	-11.31
10600.00	Peak	31.93	20.38	52.31	74.00	-21.69

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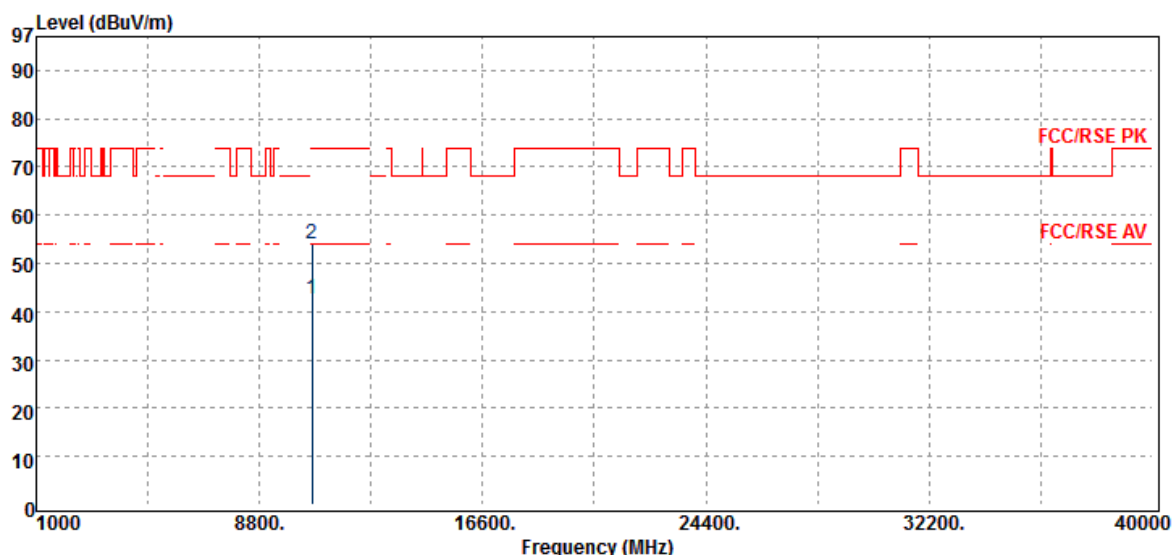
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Operation Band :802.11n20B2
Fundamental Frequency :5320 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10640.00	Average	22.27	20.44	42.71	54.00	-11.29
10640.00	Peak	33.67	20.44	54.11	74.00	-19.89

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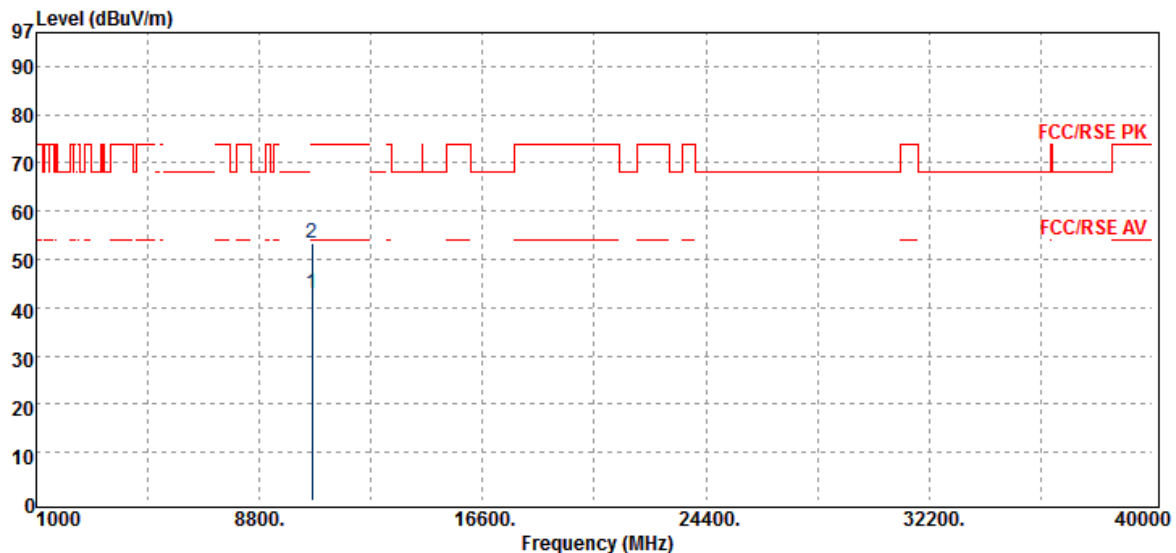
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Operation Band :802.11n20B2
Fundamental Frequency :5320 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10640.00	Average	22.59	20.44	43.03	54.00	-10.97
10640.00	Peak	32.91	20.44	53.35	74.00	-20.65

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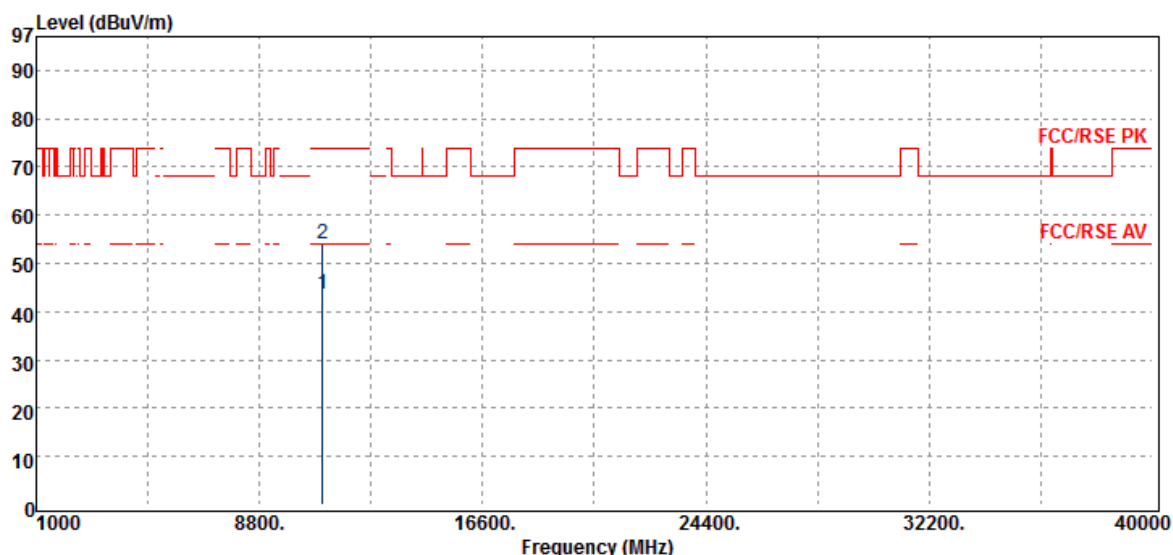
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Radiated Spurious Emission Measurement Result 802.11n HT20, 5470~5725 MHz

Operation Band	:802.11n20B3	Test Date	:2018-10-29
Fundamental Frequency	:5500 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11000.00	Average	22.17	21.37	43.54	54.00	-10.46
11000.00	Peak	32.62	21.37	53.99	74.00	-20.01

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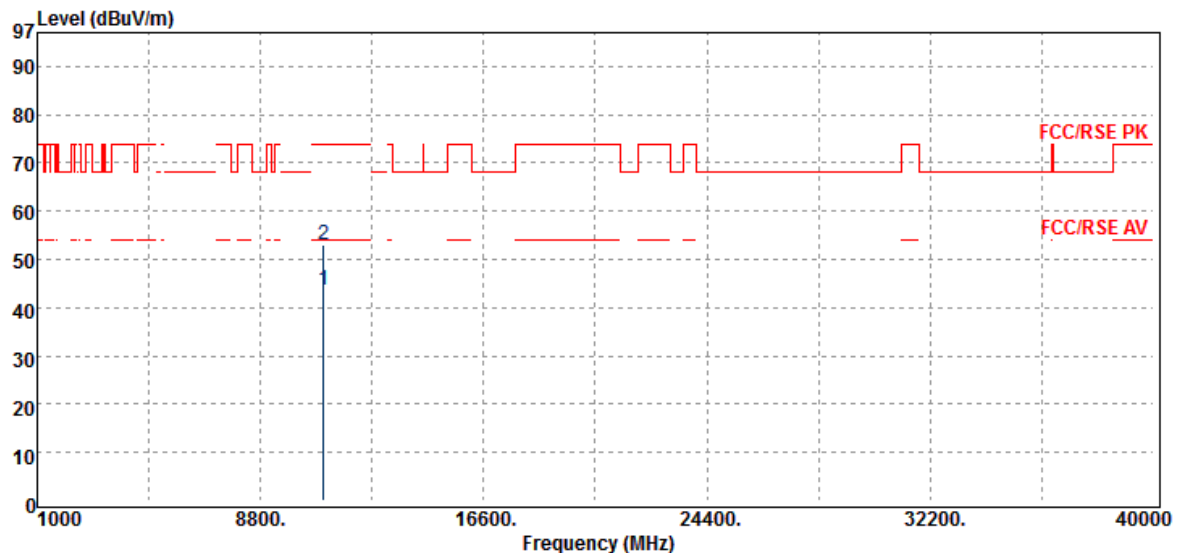
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Operation Band :802.11n20B3
Fundamental Frequency :5500 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11000.00	Average	22.39	21.37	43.76	54.00	-10.24
11000.00	Peak	31.64	21.37	53.01	74.00	-20.99

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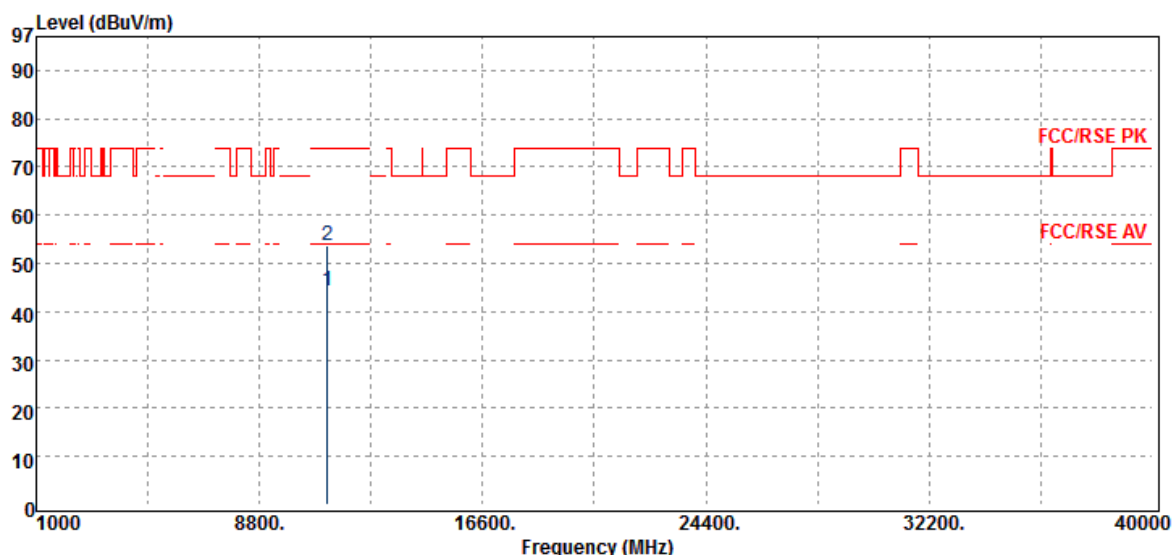
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Operation Band :802.11n20B3
Fundamental Frequency :5580 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11160.00	Average	22.86	21.51	44.37	54.00	-9.63
11160.00	Peak	32.09	21.51	53.60	74.00	-20.40

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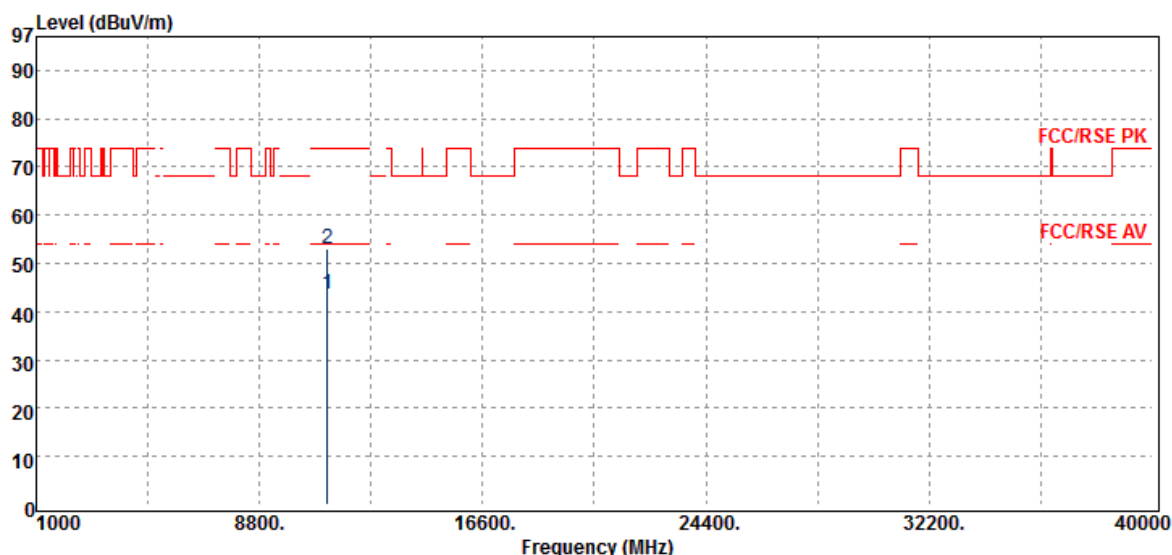
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Member of SGS Group

Operation Band :802.11n20B3
Fundamental Frequency :5580 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11160.00	Average	21.96	21.51	43.47	54.00	-10.53
11160.00	Peak	31.60	21.51	53.11	74.00	-20.89

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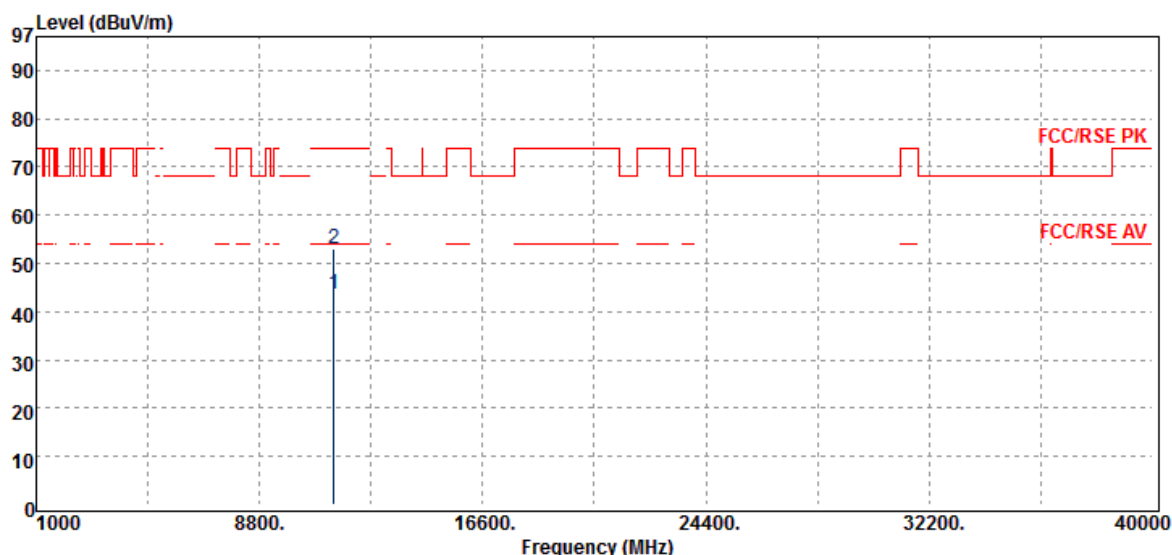
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Member of SGS Group

Operation Band :802.11n20B3
Fundamental Frequency :5700 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11400.00	Average	21.87	21.62	43.49	54.00	-10.51
11400.00	Peak	31.29	21.62	52.91	74.00	-21.09

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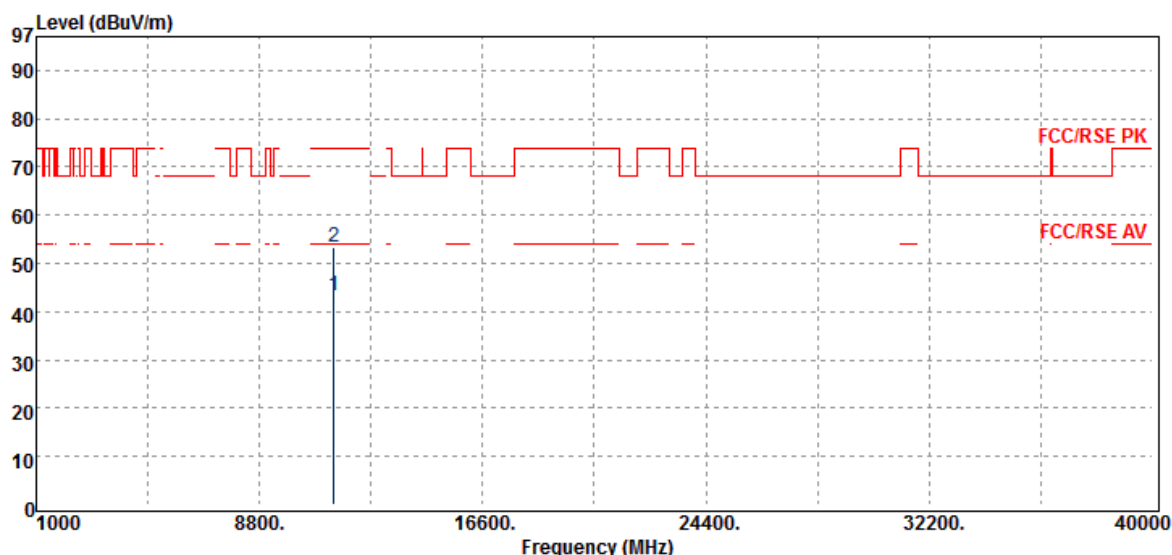
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Operation Band :802.11n20B3
Fundamental Frequency :5700 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11400.00	Average	21.75	21.62	43.37	54.00	-10.63
11400.00	Peak	31.84	21.62	53.46	74.00	-20.54

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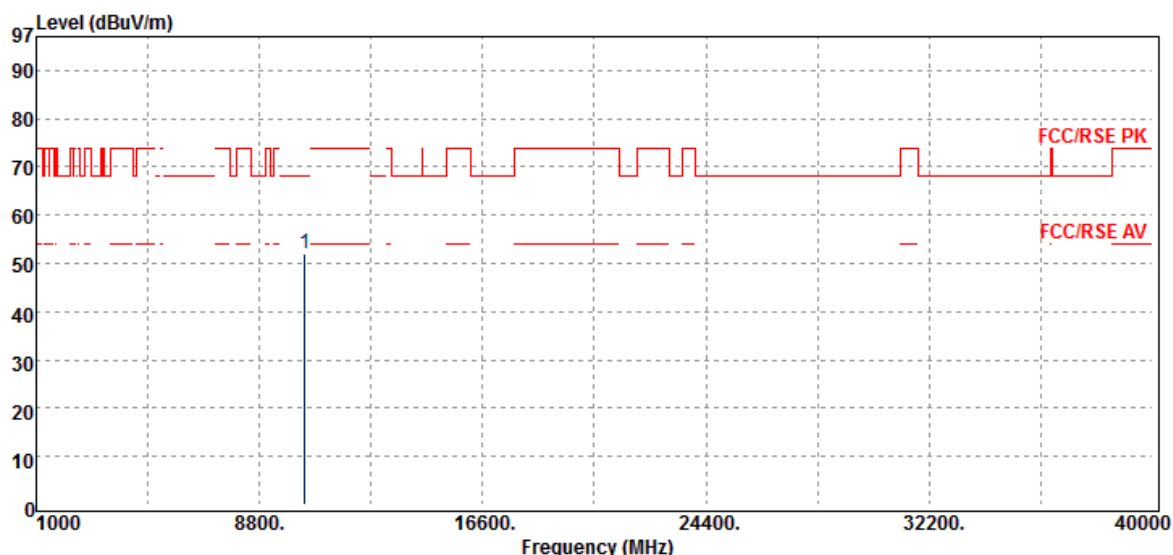
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Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

Operation Band	:802.11n40B1	Test Date	:2018-10-29
Fundamental Frequency	:5190 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10380.00	Peak	32.24	19.78	52.02	68.20	-16.18

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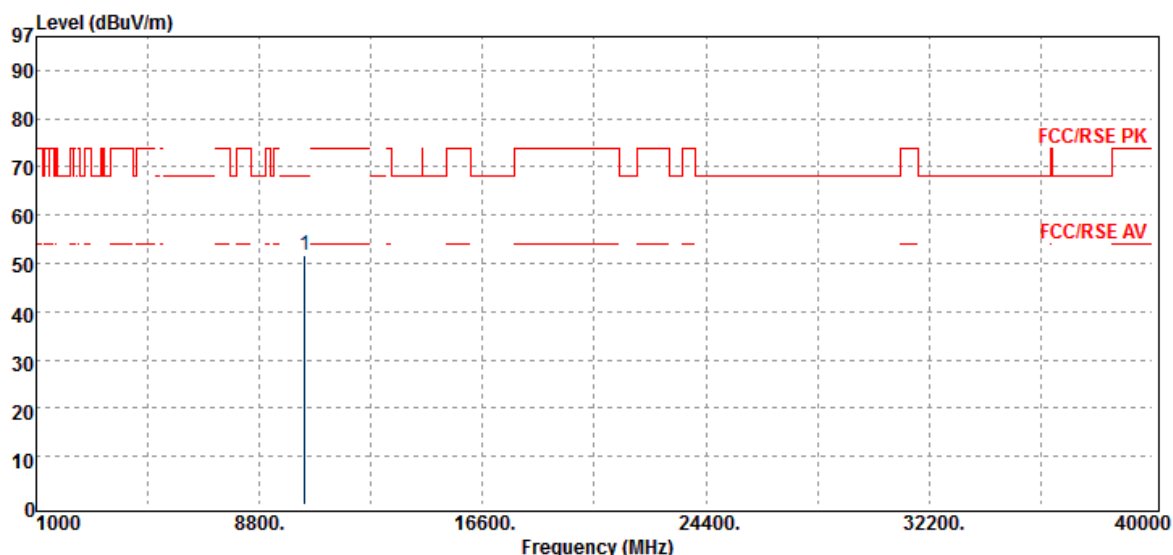
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Operation Band :802.11n40B1
Fundamental Frequency :5190 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10380.00	Peak	32.01	19.78	51.79	68.20	-16.41

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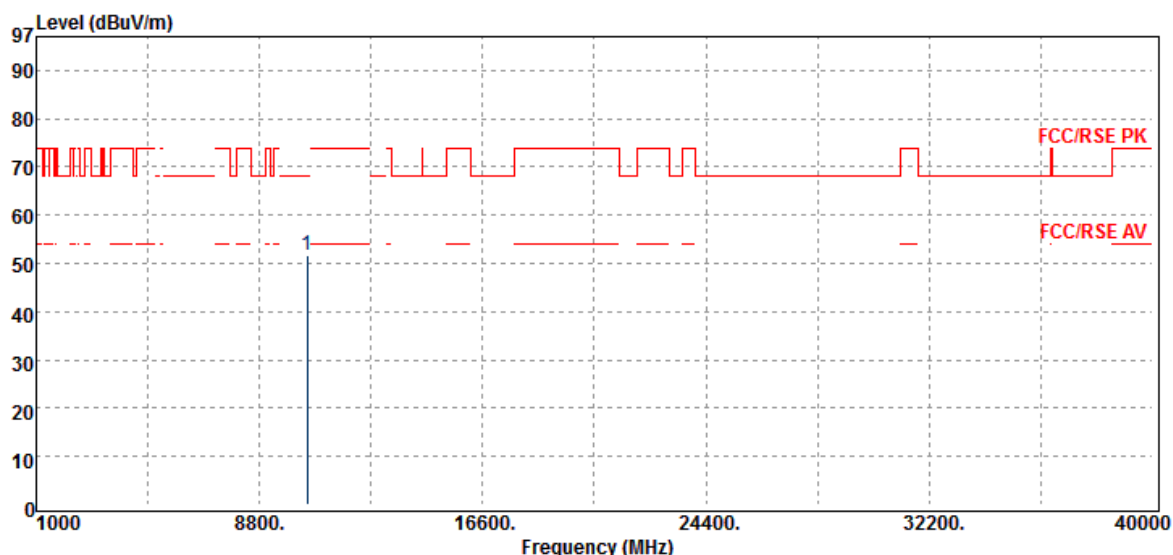
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Operation Band :802.11n40B1
Fundamental Frequency :5230 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10460.00	Peak	31.68	20.07	51.75	68.20	-16.45

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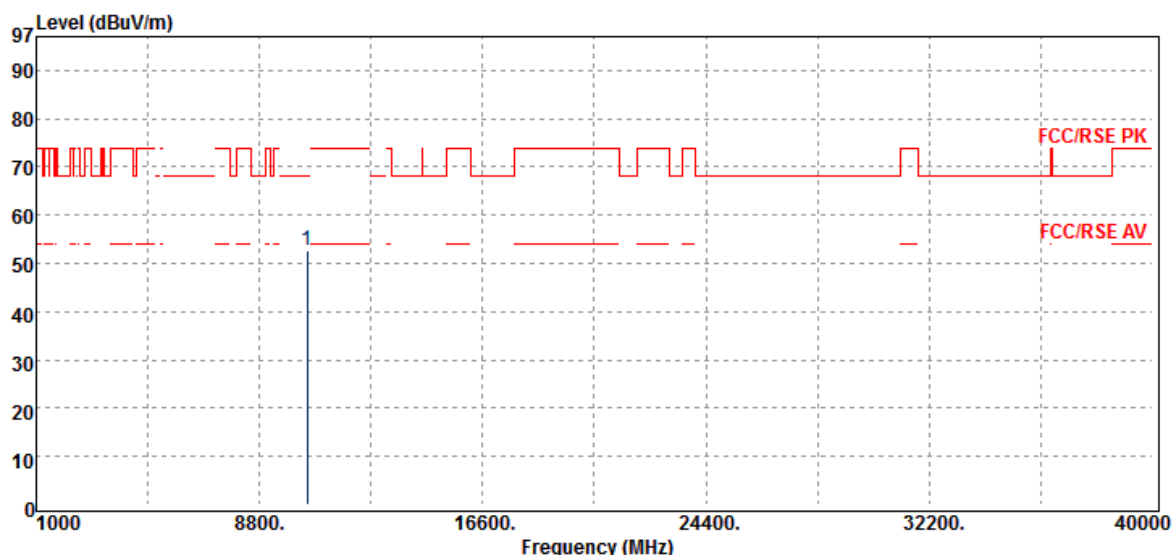
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Operation Band :802.11n40B1
Fundamental Frequency :5230 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10460.00	Peak	32.70	20.07	52.77	68.20	-15.43

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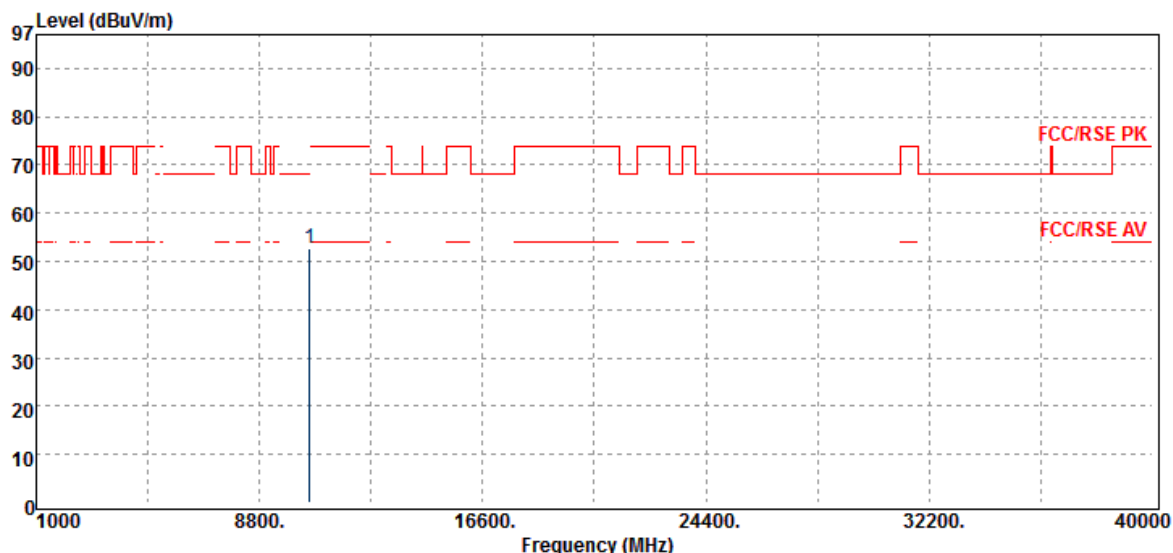
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Radiated Spurious Emission Measurement Result 802.11n HT40, 5250~5350 MHz

Operation Band	:802.11n40B2	Test Date	:2018-10-29
Fundamental Frequency	:5270 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10540.00	Peak	32.56	20.02	52.58	68.20	-15.62

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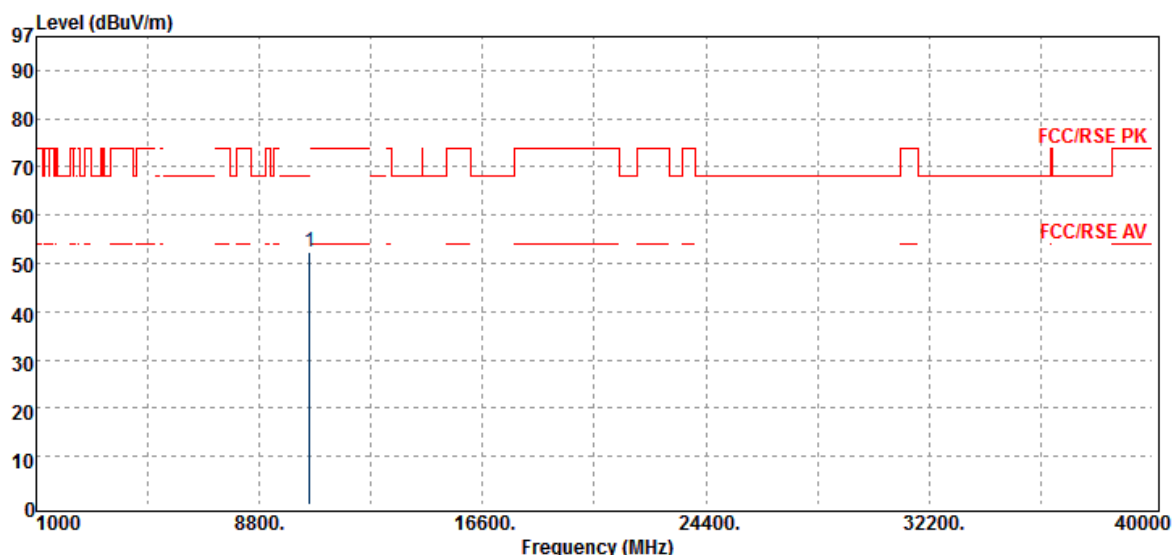
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Operation Band :802.11n40B2
Fundamental Frequency :5270 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10540.00	Peak	32.17	20.02	52.19	68.20	-16.01

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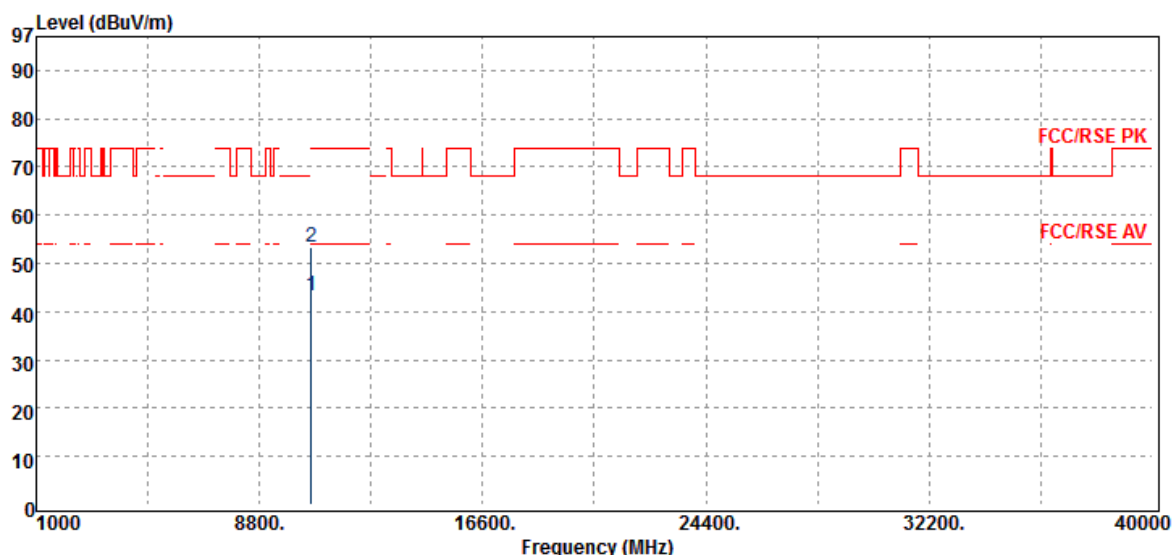
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Operation Band :802.11n40B2
Fundamental Frequency :5310 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10620.00	Average	22.87	20.41	43.28	54.00	-10.72
10620.00	Peak	32.82	20.41	53.23	74.00	-20.77

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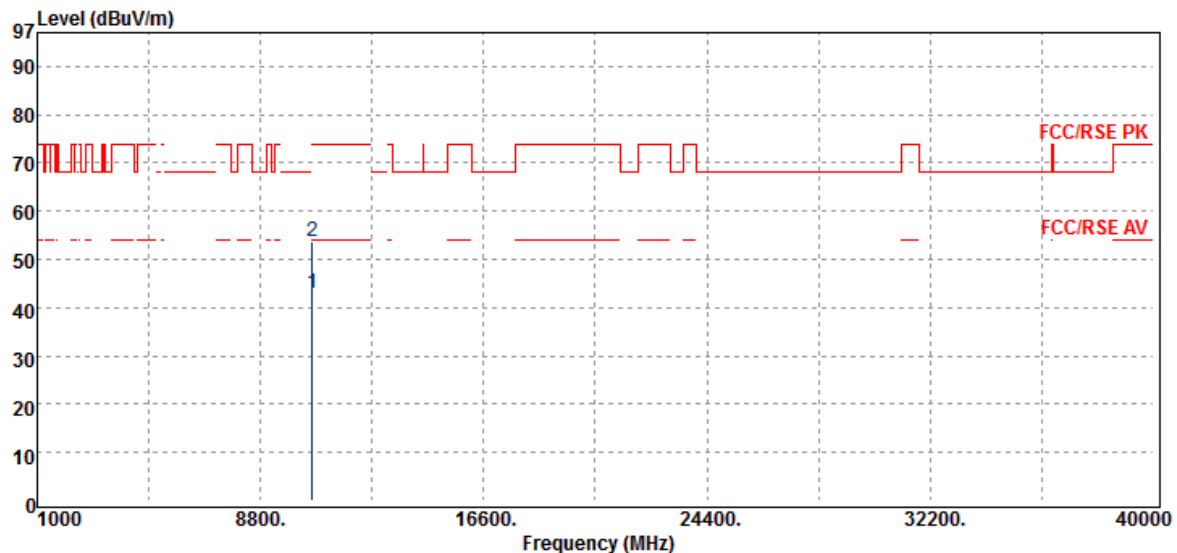
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Operation Band	:802.11n40B2	Test Date	:2018-10-29
Fundamental Frequency	:5310 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10620.00	Average	22.57	20.41	42.98	54.00	-11.02
10620.00	Peak	33.16	20.41	53.57	74.00	-20.43

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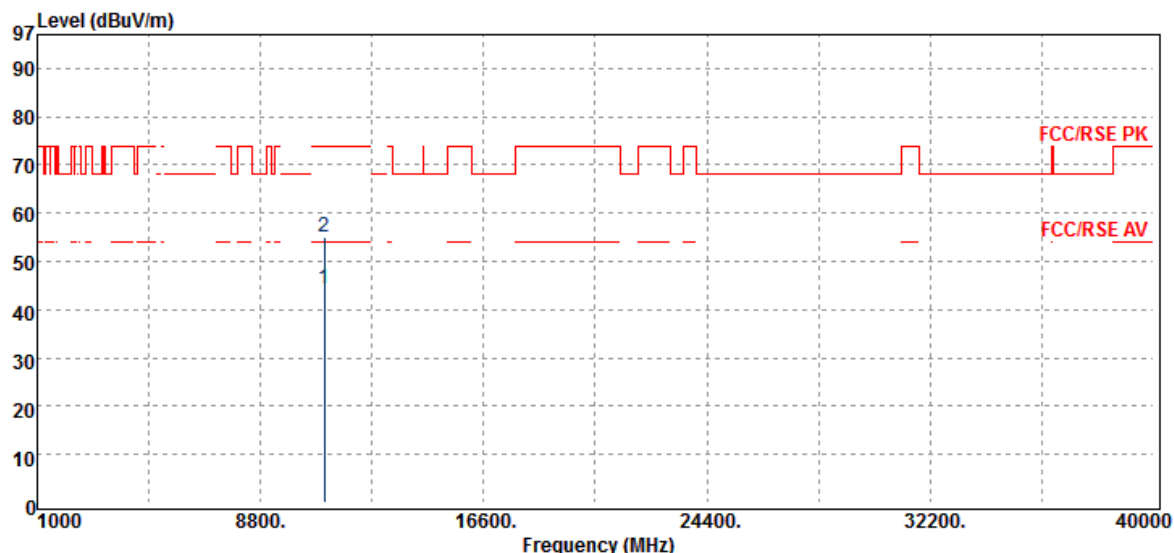
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Radiated Spurious Emission Measurement Result 802.11n HT40, 5470~5725 MHz

Operation Band	:802.11n40B3	Test Date	:2018-10-29
Fundamental Frequency	:5510 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11020.00	Average	22.71	21.46	44.17	54.00	-9.83
11020.00	Peak	33.60	21.46	55.06	74.00	-18.94

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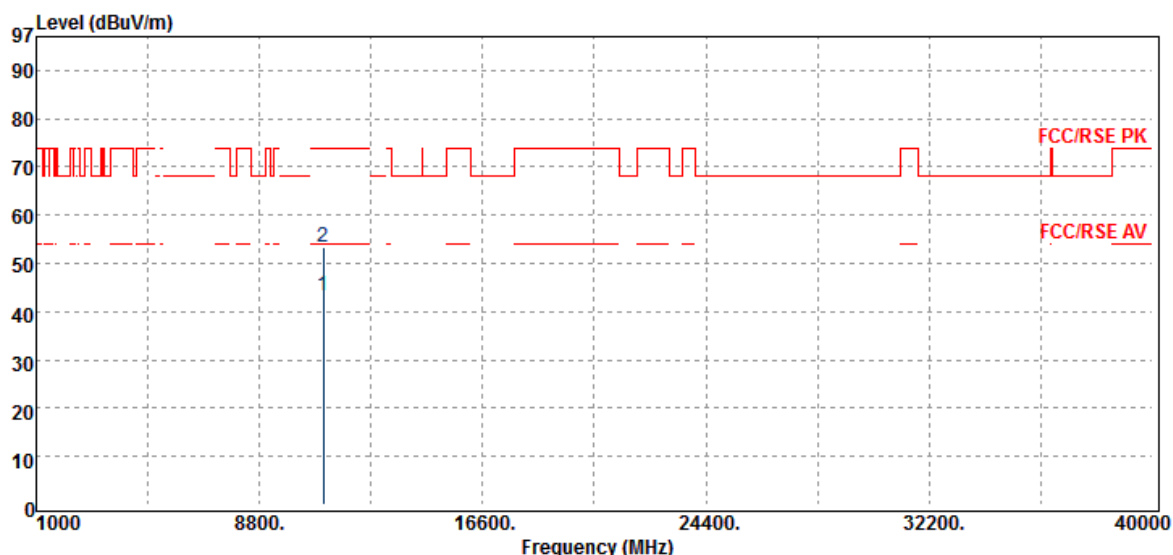
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Operation Band :802.11n40B3
Fundamental Frequency :5510 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11020.00	Average	21.92	21.46	43.38	54.00	-10.62
11020.00	Peak	31.87	21.46	53.33	74.00	-20.67

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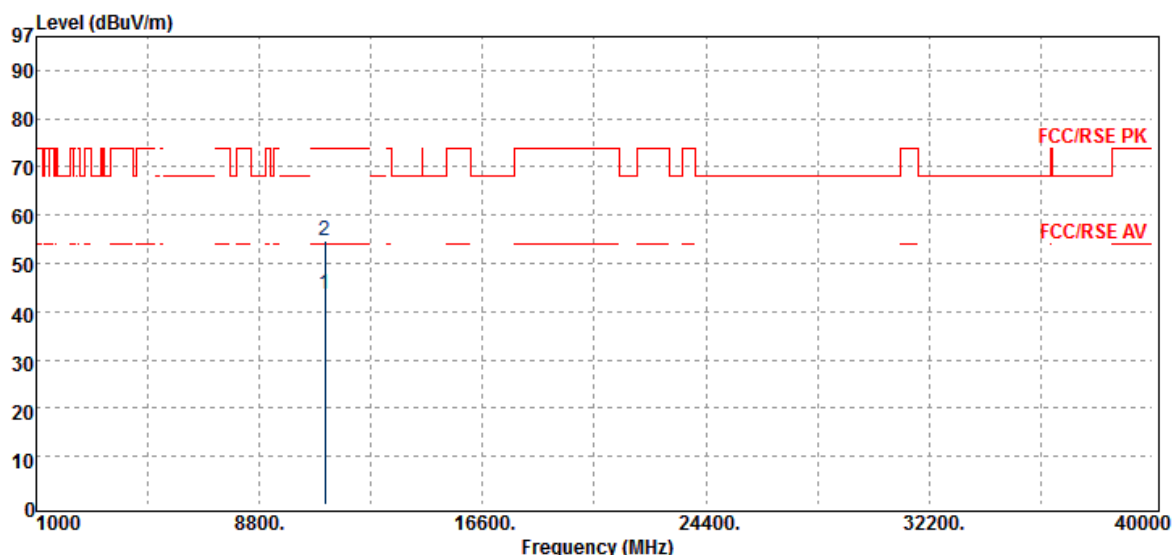
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Operation Band :802.11n40B3
Fundamental Frequency :5550 MHz
Operation Mode :Tx CH MID
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11100.00	Average	22.13	21.53	43.66	54.00	-10.34
11100.00	Peak	33.04	21.53	54.57	74.00	-19.43

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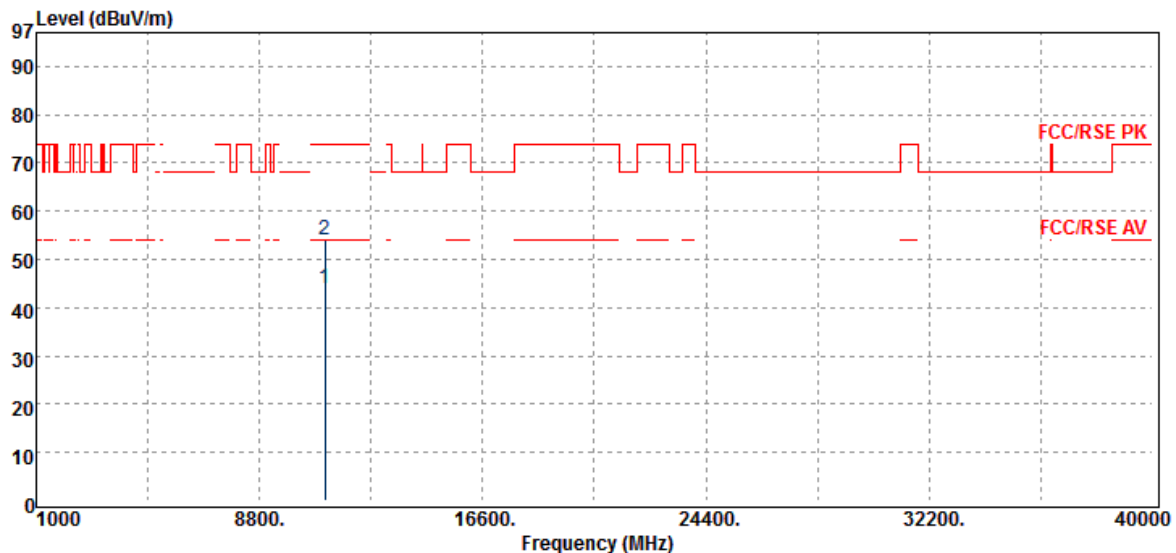
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Operation Band	:802.11n40B3	Test Date	:2018-10-29
Fundamental Frequency	:5550 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11100.00	Average	22.41	21.53	43.94	54.00	-10.06
11100.00	Peak	32.62	21.53	54.15	74.00	-19.85

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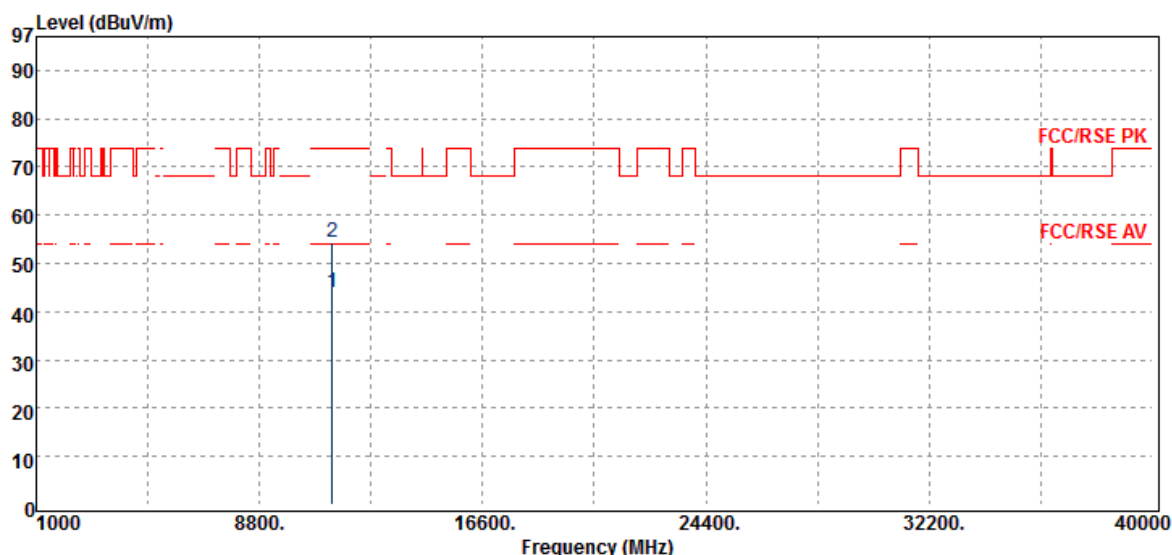
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Operation Band :802.11n40B3
Fundamental Frequency :5670 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11340.00	Average	22.28	21.54	43.82	54.00	-10.18
11340.00	Peak	32.73	21.54	54.27	74.00	-19.73

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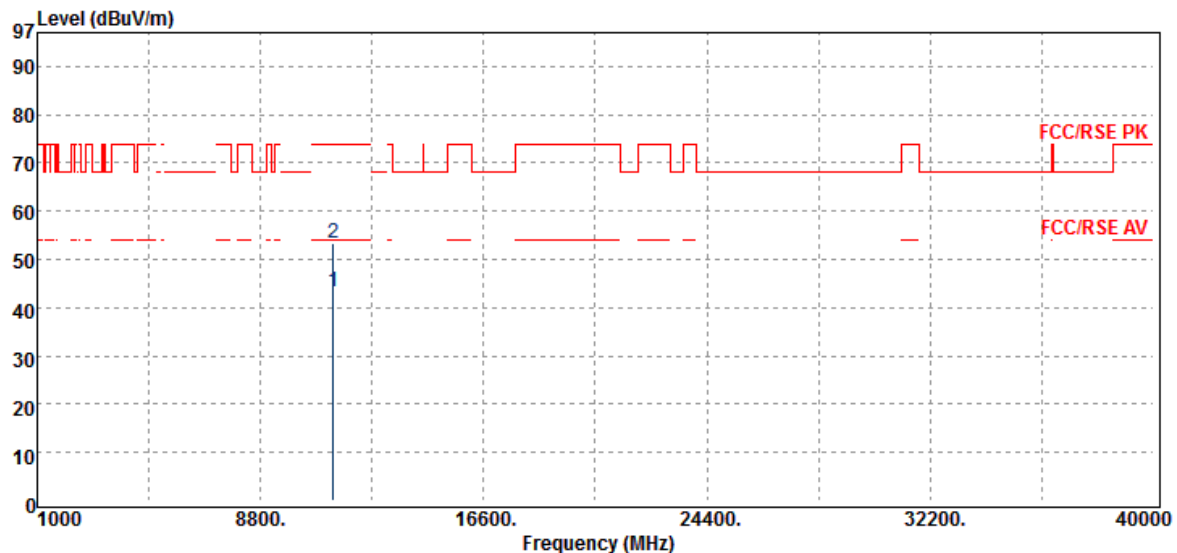
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Operation Band :802.11n40B3
Fundamental Frequency :5670 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11340.00	Average	21.80	21.54	43.34	54.00	-10.66
11340.00	Peak	31.85	21.54	53.39	74.00	-20.61

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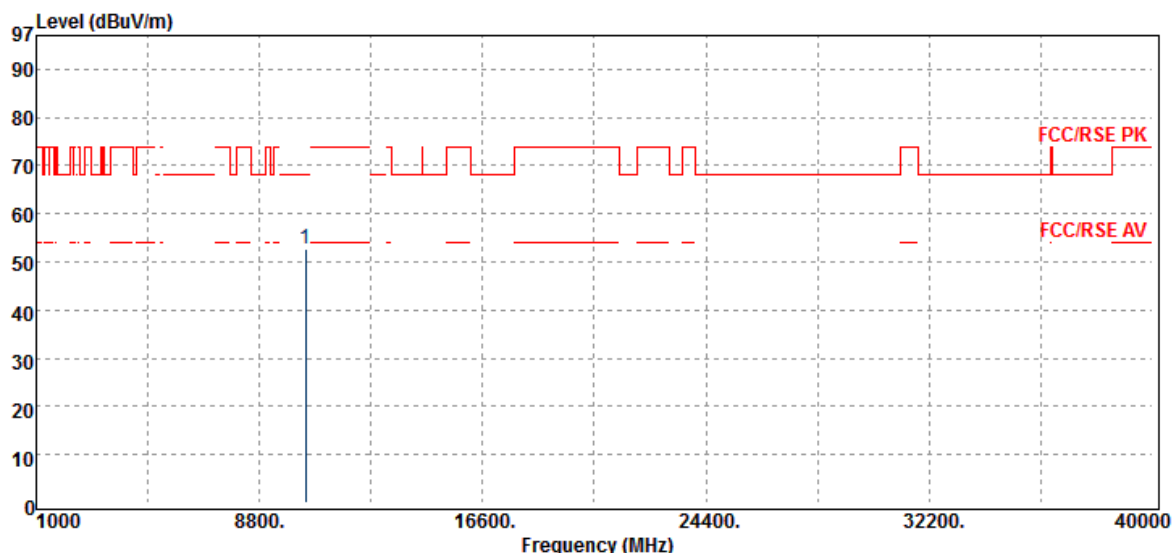
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Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5150~5250 MHz

Operation Band	:802.11ac80B1	Test Date	:2018-10-29
Fundamental Frequency	:5210 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10420.00	Peak	32.54	19.99	52.53	68.20	-15.67

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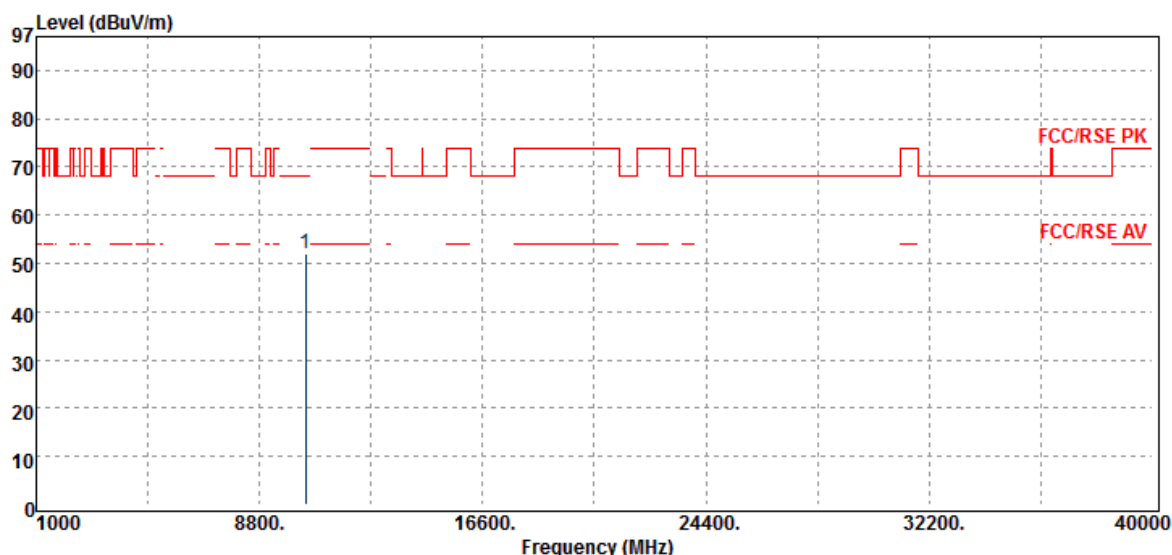
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Operation Band :802.11ac80B1
 Fundamental Frequency :5210 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10420.00	Peak	32.08	19.99	52.07	68.20	-16.13

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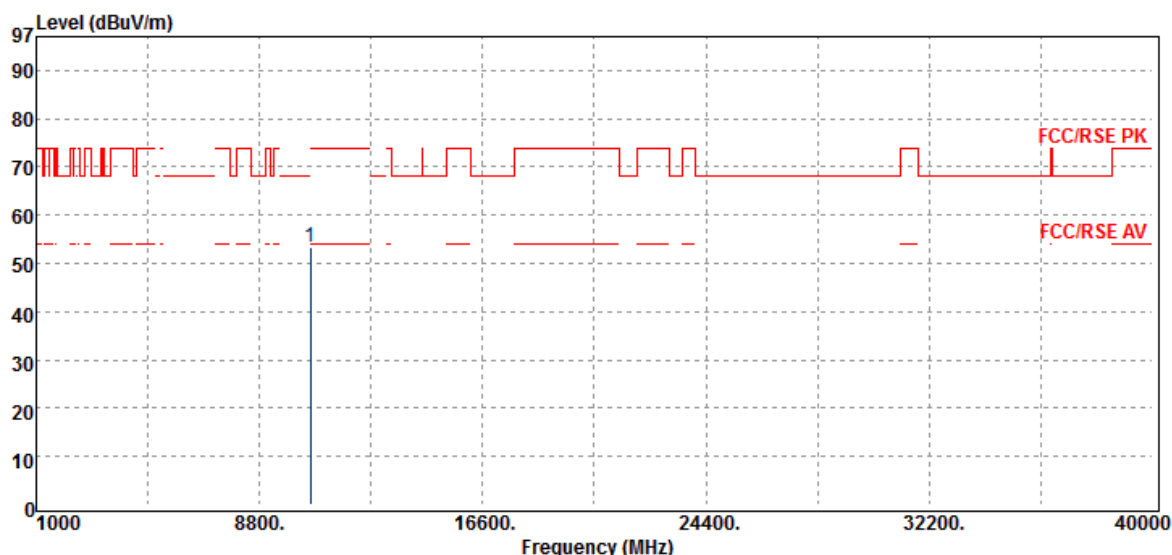
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Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5250~5350 MHz

Operation Band	:802.11ac80B2	Test Date	:2018-10-29
Fundamental Frequency	:5290 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Wei
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10580.00	Peak	32.98	20.23	53.21	68.20	-14.99

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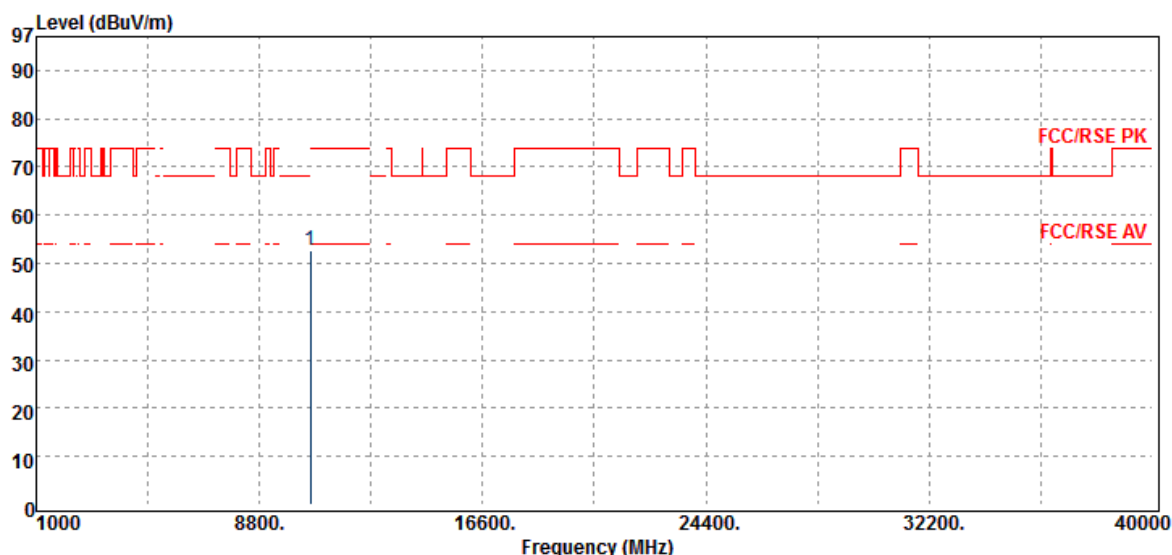
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Operation Band :802.11ac80B2
Fundamental Frequency :5290 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10580.00	Peak	32.39	20.23	52.62	68.20	-15.58

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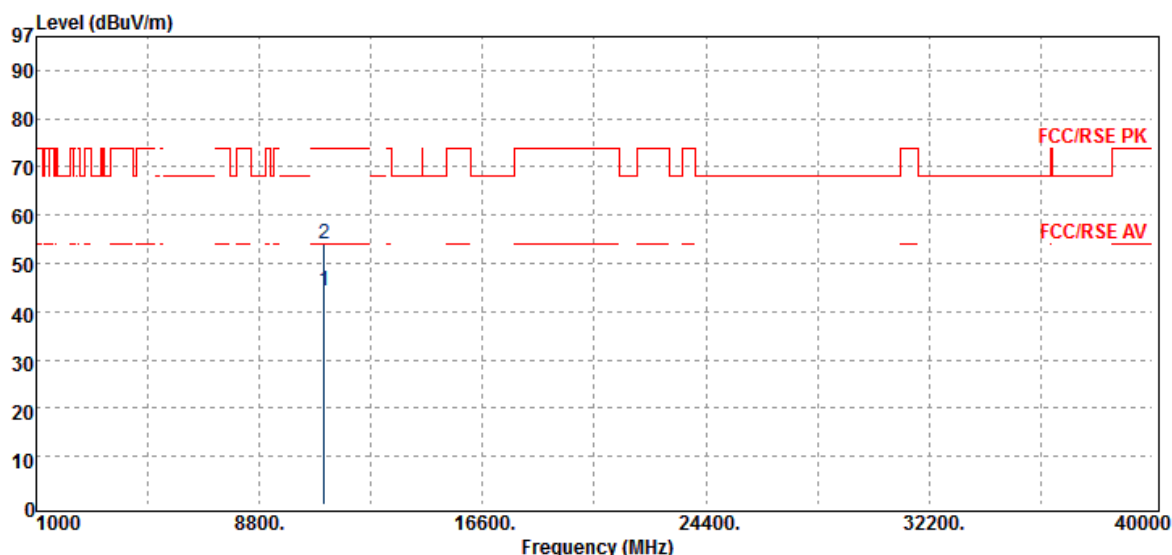
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Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5470~5725 MHz

Operation Band :802.11ac80B3
Fundamental Frequency :5530 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11060.00	Average	22.74	21.53	44.27	54.00	-9.73
11060.00	Peak	32.34	21.53	53.87	74.00	-20.13

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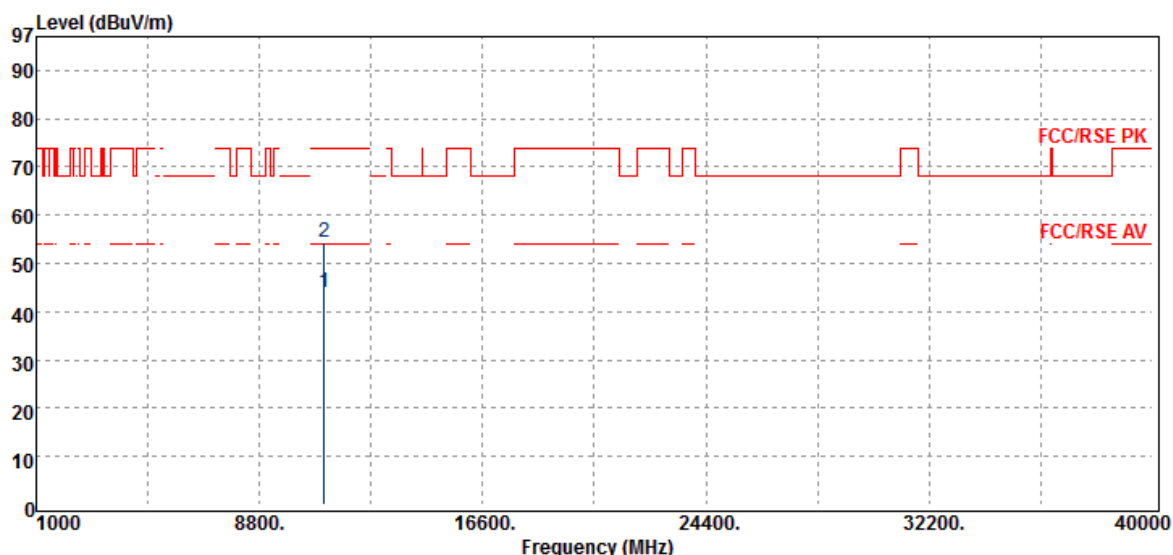
f (886-2) 2298-0488

www.tw.sgs.com

Member of SGS Group

Operation Band :802.11ac80B3
Fundamental Frequency :5530 MHz
Operation Mode :Tx CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11060.00	Average	22.61	21.53	44.14	54.00	-9.86
11060.00	Peak	32.99	21.53	54.52	74.00	-19.48

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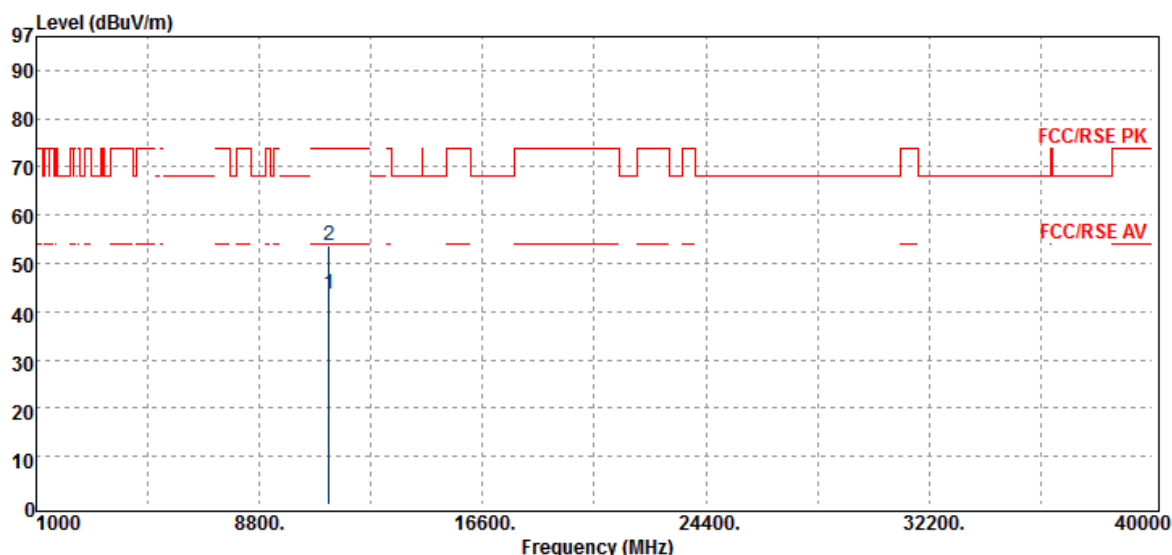
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www.tw.sgs.com

Member of SGS Group

Operation Band :802.11ac80B3
 Fundamental Frequency :5610 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11220.00	Average	22.18	21.56	43.74	54.00	-10.26
11220.00	Peak	32.03	21.56	53.59	74.00	-20.41

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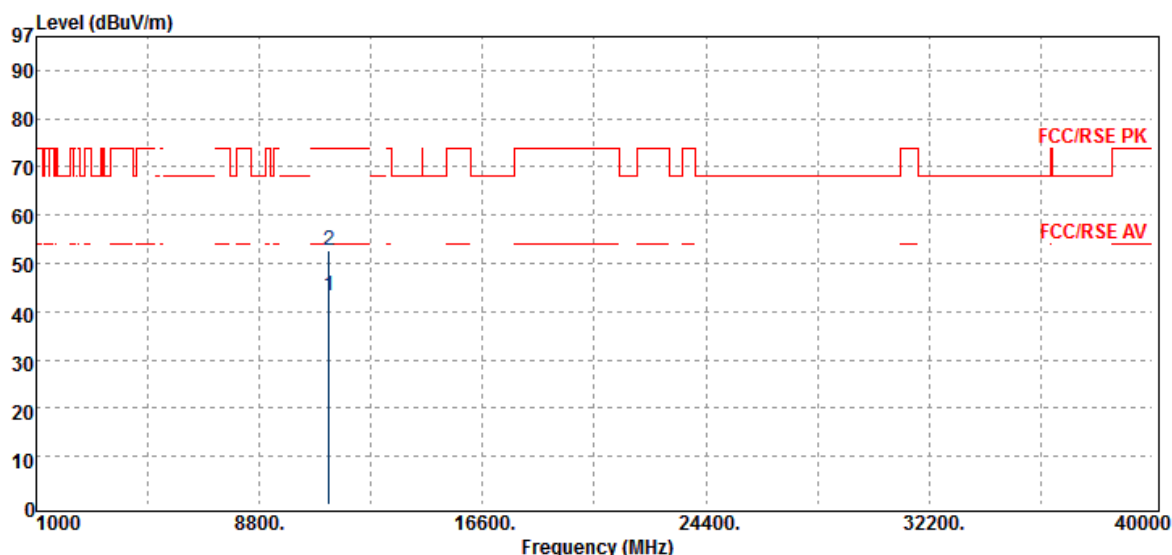
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Operation Band :802.11ac80B3
Fundamental Frequency :5610 MHz
Operation Mode :Tx CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11220.00	Average	21.86	21.56	43.42	54.00	-10.58
11220.00	Peak	31.23	21.56	52.79	74.00	-21.21

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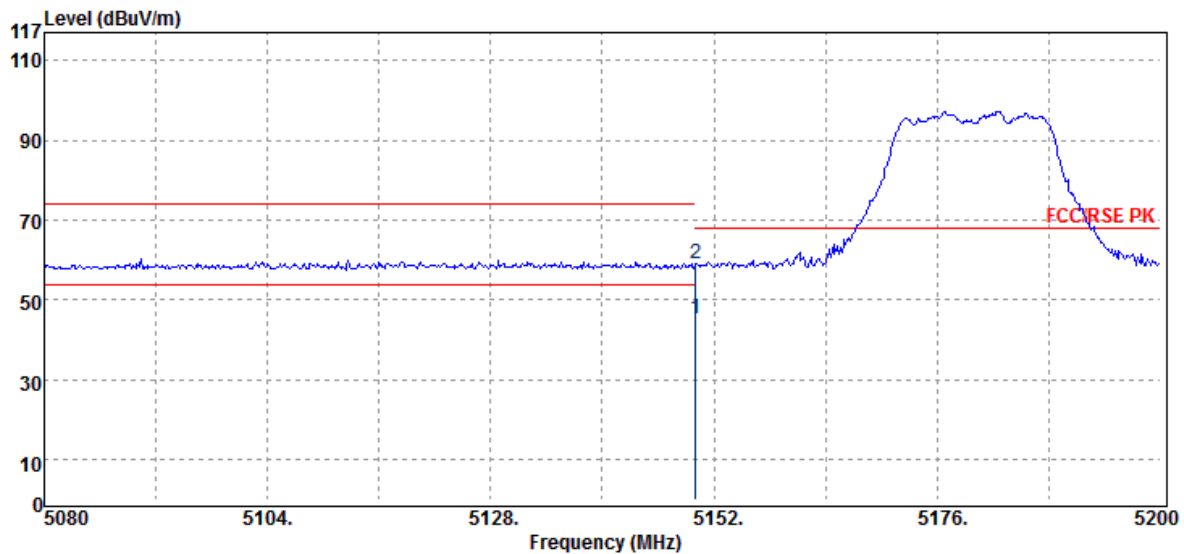
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Band Edge falling to restricted band

802.11a mode

Operation Band :802.11aB1
Fundamental Frequency :5180 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5150.00	Average	37.10	8.32	45.42	54.00	-8.58
5150.00	Peak	50.78	8.32	59.10	74.00	-14.90

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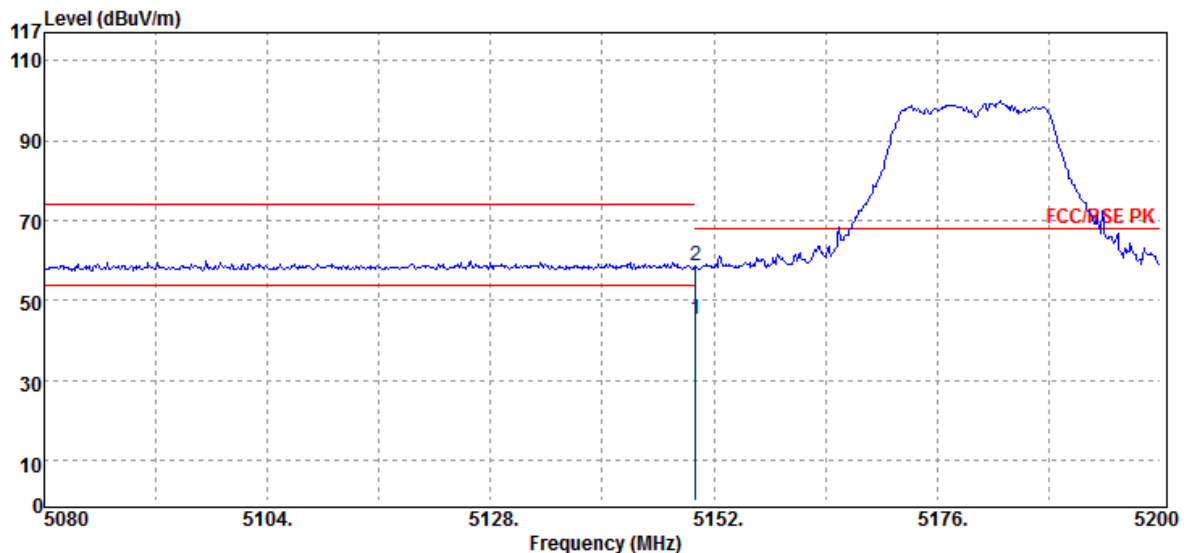
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Operation Band :802.11aB1
Fundamental Frequency :5180 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5150.00	Average	37.15	8.32	45.47	54.00	-8.53
5150.00	Peak	50.21	8.32	58.53	74.00	-15.47

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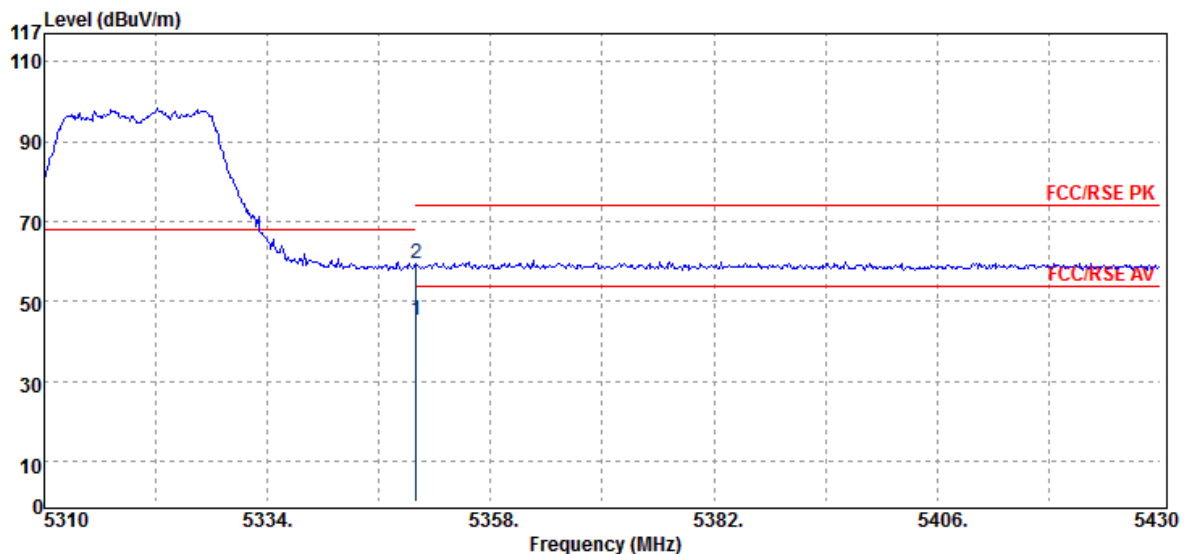
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Member of SGS Group

Operation Band :802.11aB2
 Fundamental Frequency :5320 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5350.00	Average	36.82	8.63	45.45	54.00	-8.55
5350.00	Peak	50.72	8.63	59.35	74.00	-14.65

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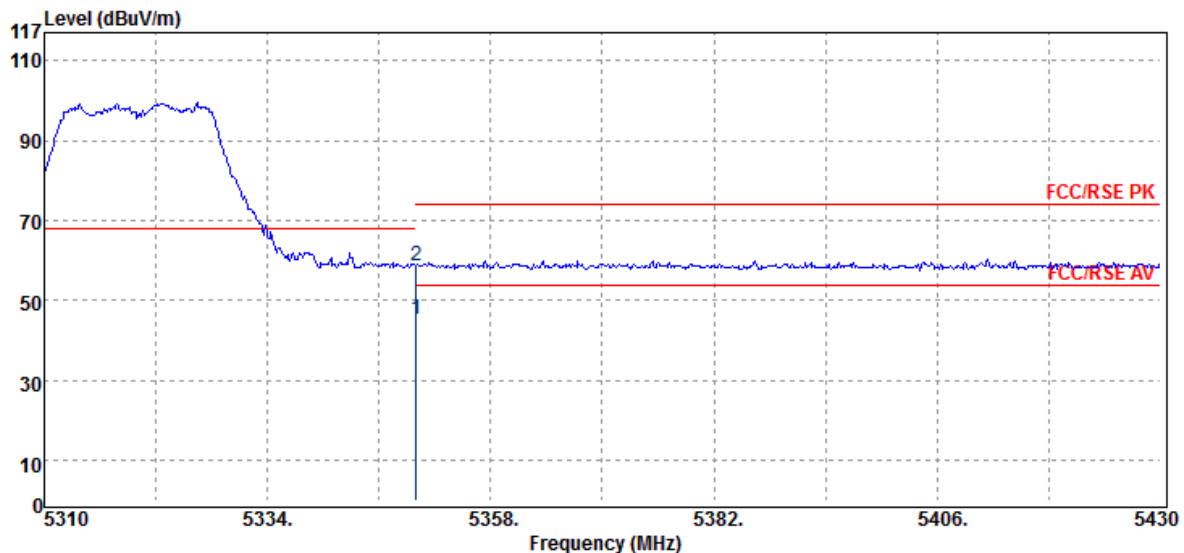
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Operation Band :802.11aB2
 Fundamental Frequency :5320 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5350.00	Average	36.90	8.63	45.53	54.00	-8.47
5350.00	Peak	50.24	8.63	58.87	74.00	-15.13

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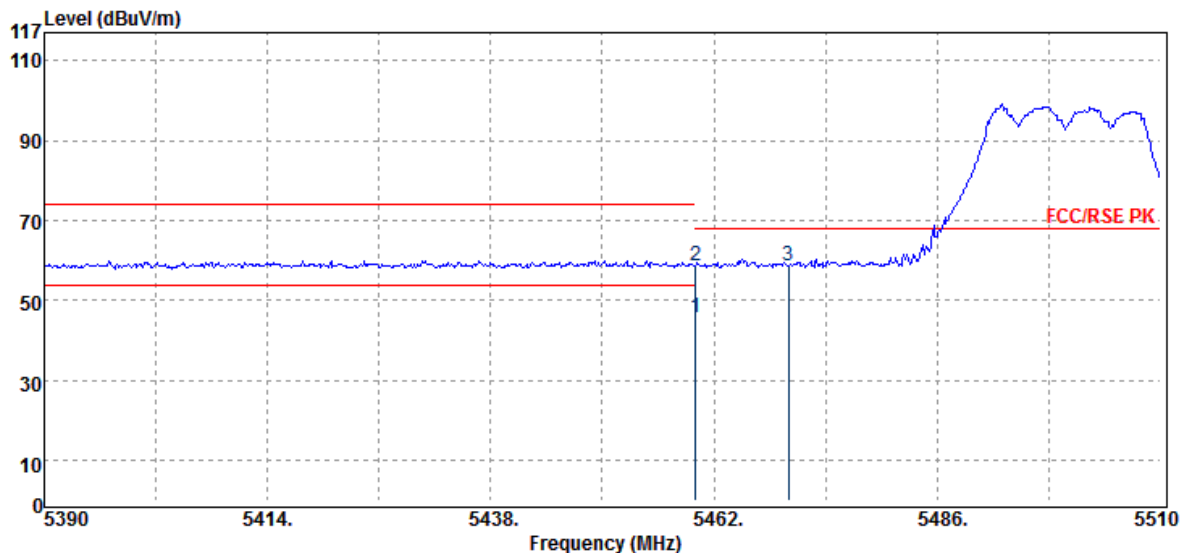
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Member of SGS Group

Operation Band :802.11aB3
Fundamental Frequency :5500 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	36.91	8.75	45.66	54.00	-8.34
5460.00	Peak	49.98	8.75	58.73	74.00	-15.27
5470.00	Peak	50.07	8.74	58.81	68.20	-9.39

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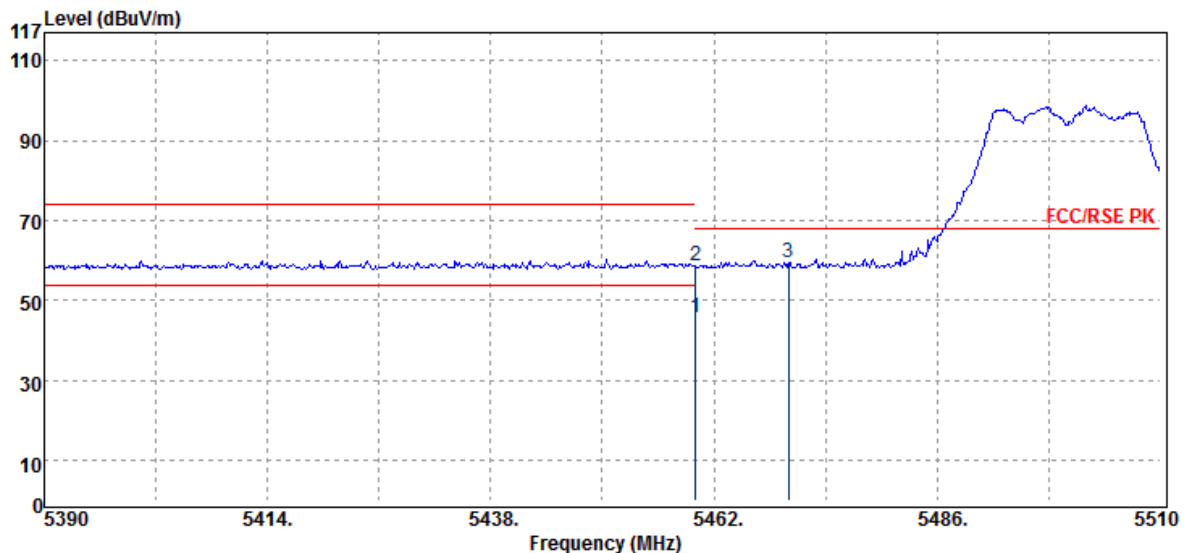
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Operation Band :802.11aB3
 Fundamental Frequency :5500 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	36.84	8.75	45.59	54.00	-8.41
5460.00	Peak	49.98	8.75	58.73	74.00	-15.27
5470.00	Peak	50.80	8.74	59.54	68.20	-8.66

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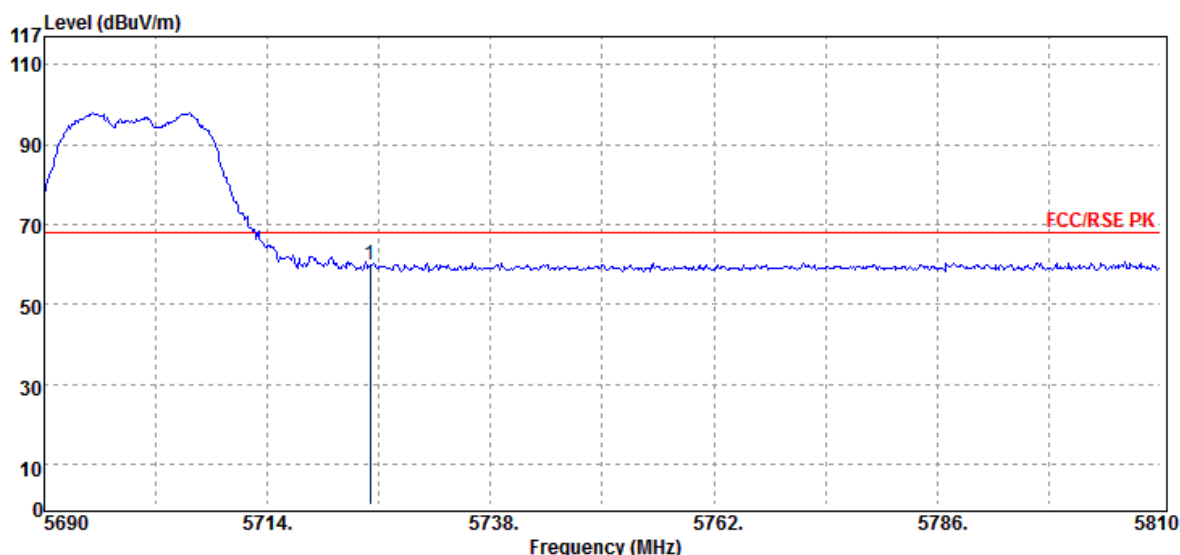
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Member of SGS Group

Operation Band :802.11aB3
 Fundamental Frequency :5700 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5725.00	Peak	50.58	9.44	60.02	68.20	-8.18

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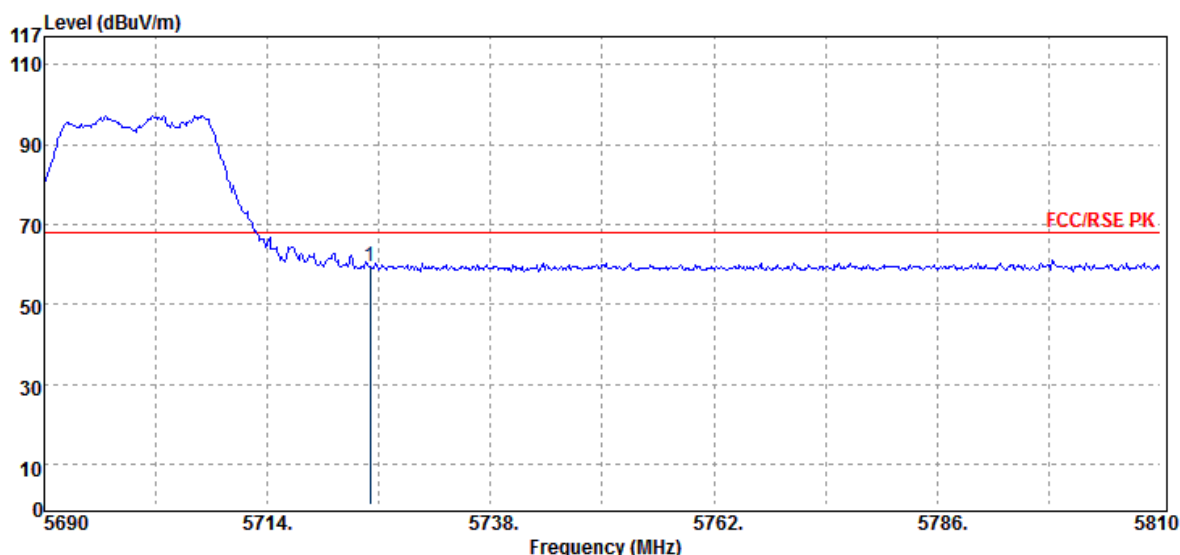
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Member of SGS Group

Operation Band :802.11aB3
 Fundamental Frequency :5700 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5725.00	Peak	50.02	9.44	59.46	68.20	-8.74

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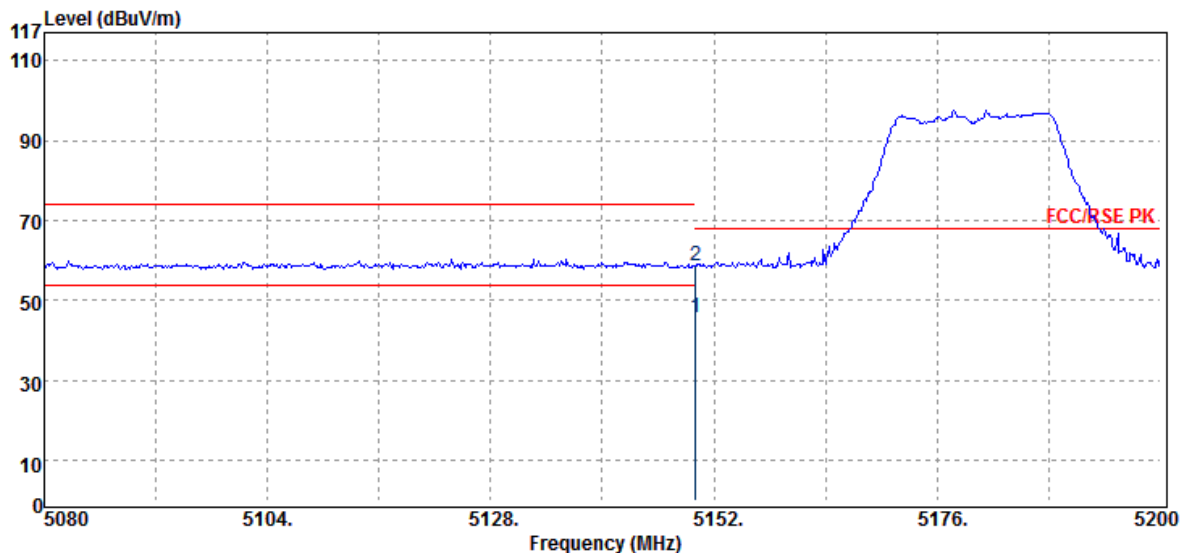
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802.11n20 HT mode

Operation Band :802.11n20B1
Fundamental Frequency :5180 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5150.00	Average	37.38	8.32	45.70	54.00	-8.30
5150.00	Peak	50.46	8.32	58.78	74.00	-15.22

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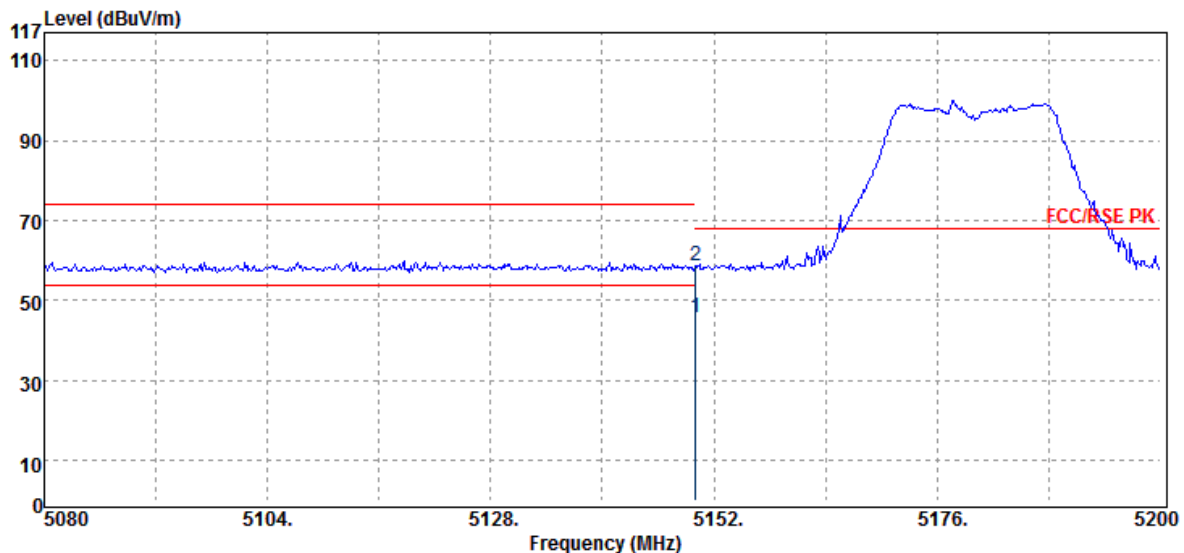
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Operation Band :802.11n20B1
 Fundamental Frequency :5180 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5150.00	Average	37.57	8.32	45.89	54.00	-8.11
5150.00	Peak	50.47	8.32	58.79	74.00	-15.21

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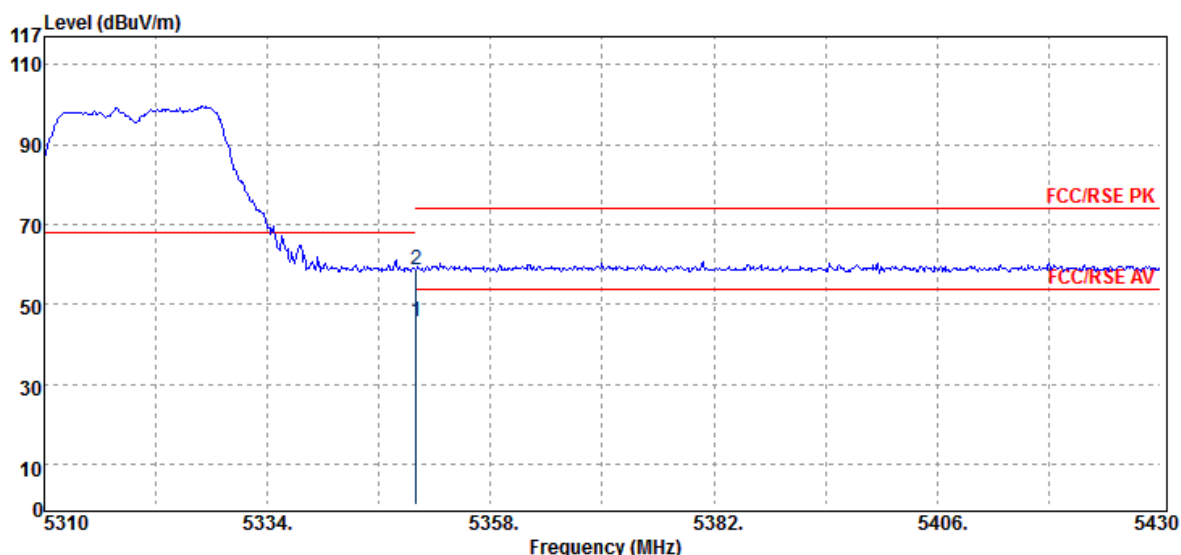
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Operation Band :802.11n20B1
 Fundamental Frequency :5320 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5350.00	Average	37.26	8.63	45.89	54.00	-8.11
5350.00	Peak	49.90	8.63	58.53	74.00	-15.47

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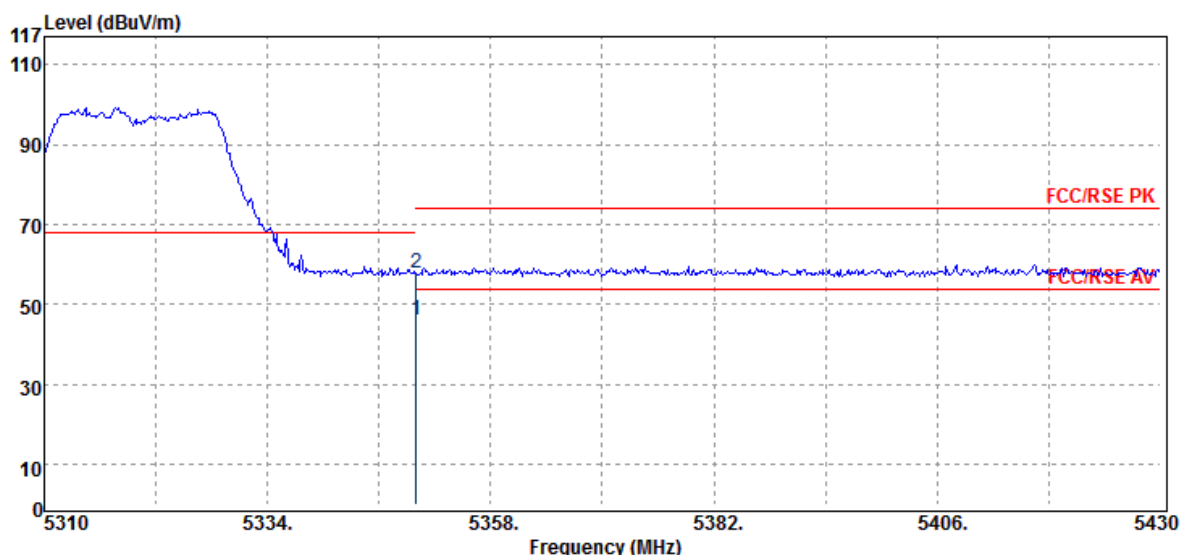
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Operation Band :802.11n20B1
Fundamental Frequency :5320 MHz
Operation Mode :Bandedge CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5350.00	Average	37.33	8.63	45.96	54.00	-8.04
5350.00	Peak	49.22	8.63	57.85	74.00	-16.15

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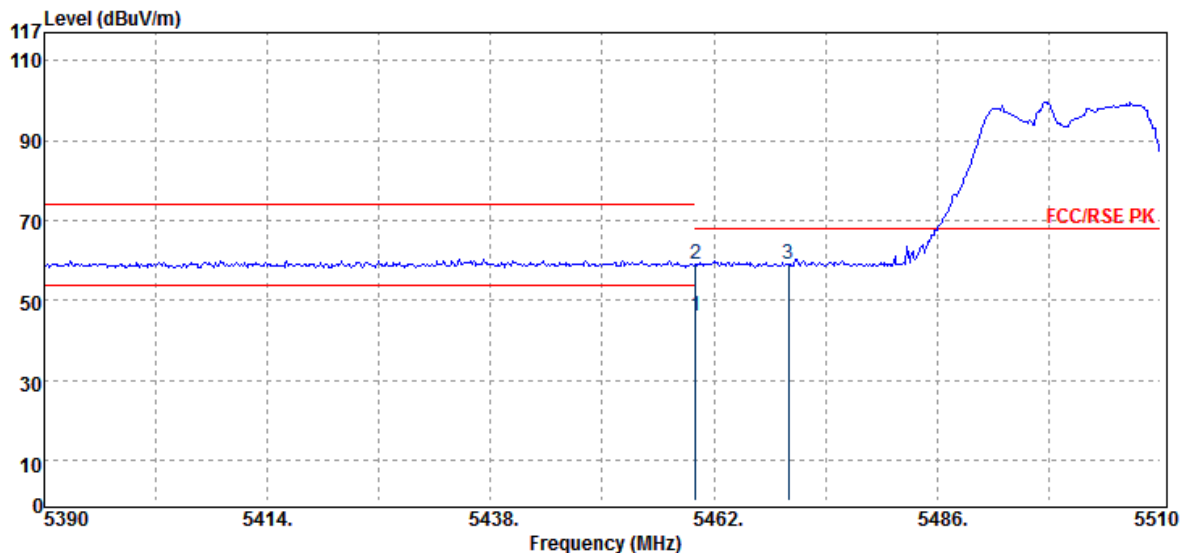
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Operation Band :802.11n20B3
Fundamental Frequency :5500 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-29
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	37.55	8.75	46.30	54.00	-7.70
5460.00	Peak	50.48	8.75	59.23	74.00	-14.77
5470.00	Peak	50.39	8.74	59.13	68.20	-9.07

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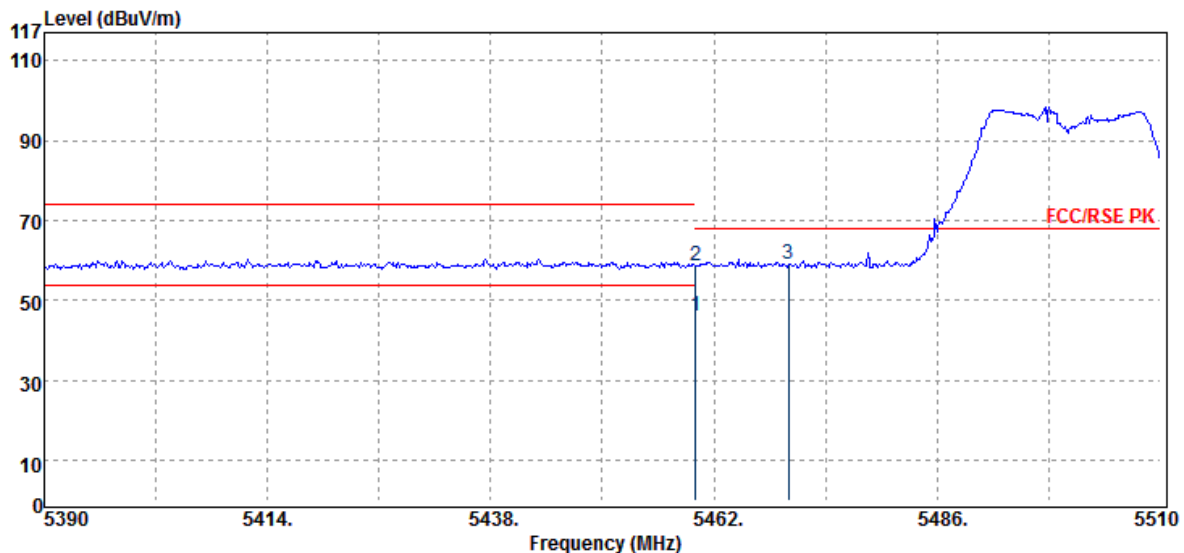
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Operation Band :802.11n20B3
 Fundamental Frequency :5500 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	37.31	8.75	46.06	54.00	-7.94
5460.00	Peak	50.06	8.75	58.81	74.00	-15.19
5470.00	Peak	50.24	8.74	58.98	68.20	-9.22

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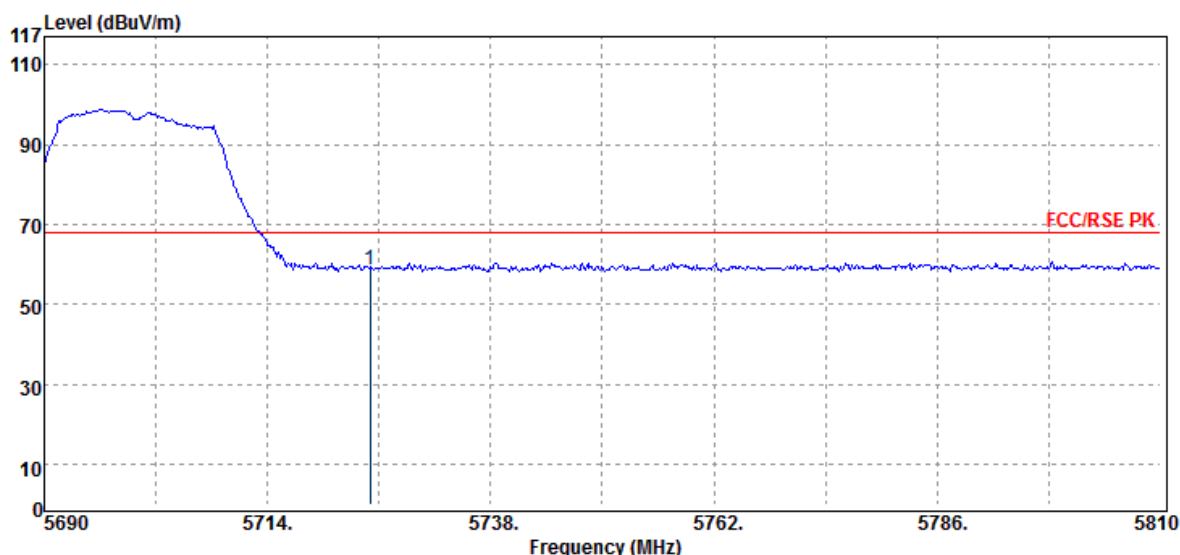
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Operation Band :802.11n20B3
 Fundamental Frequency :5700 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5725.00	Peak	49.25	9.44	58.69	68.20	-9.51

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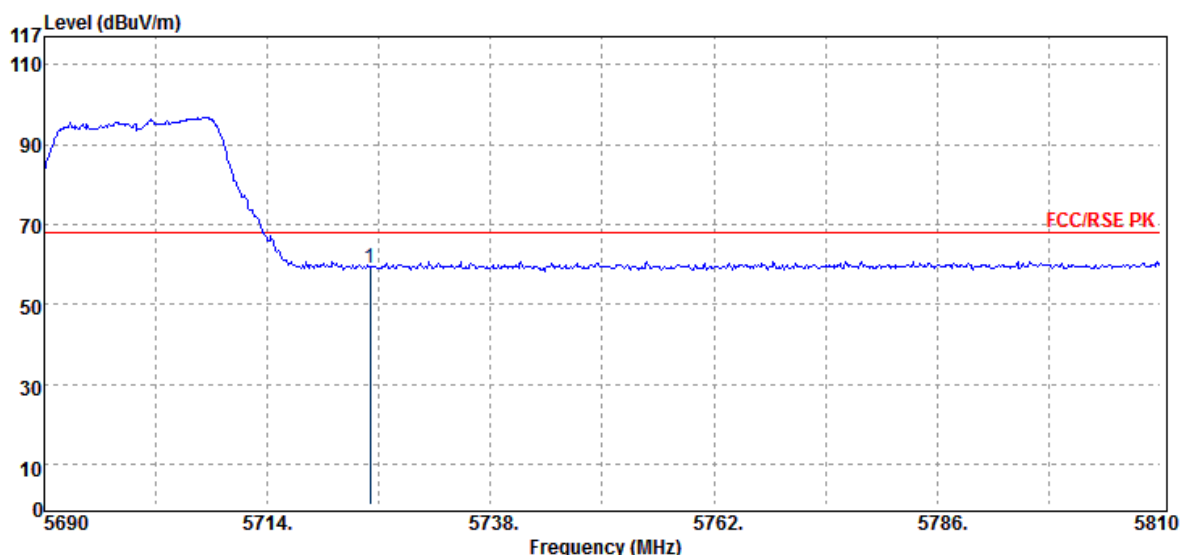
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Operation Band :802.11n20B3
 Fundamental Frequency :5700 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-29
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5725.00	Peak	49.63	9.44	59.07	68.20	-9.13

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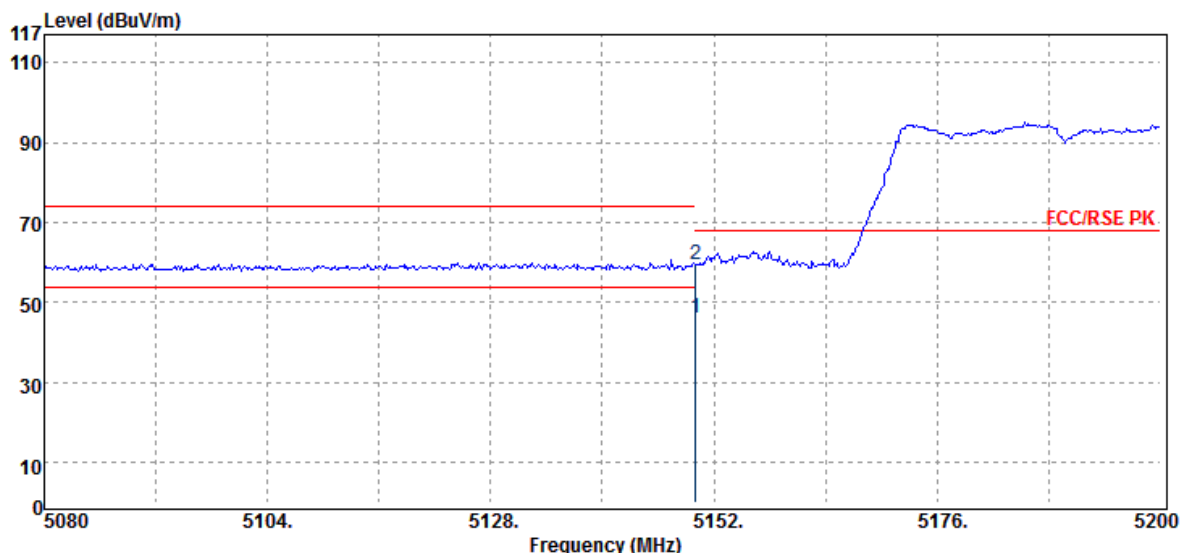
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802.11n40 HT mode

Operation Band :802.11n40B1
Fundamental Frequency :5190 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-19
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5150.00	Average	37.68	8.32	46.00	54.00	-8.00
5150.00	Peak	51.16	8.32	59.48	74.00	-14.52

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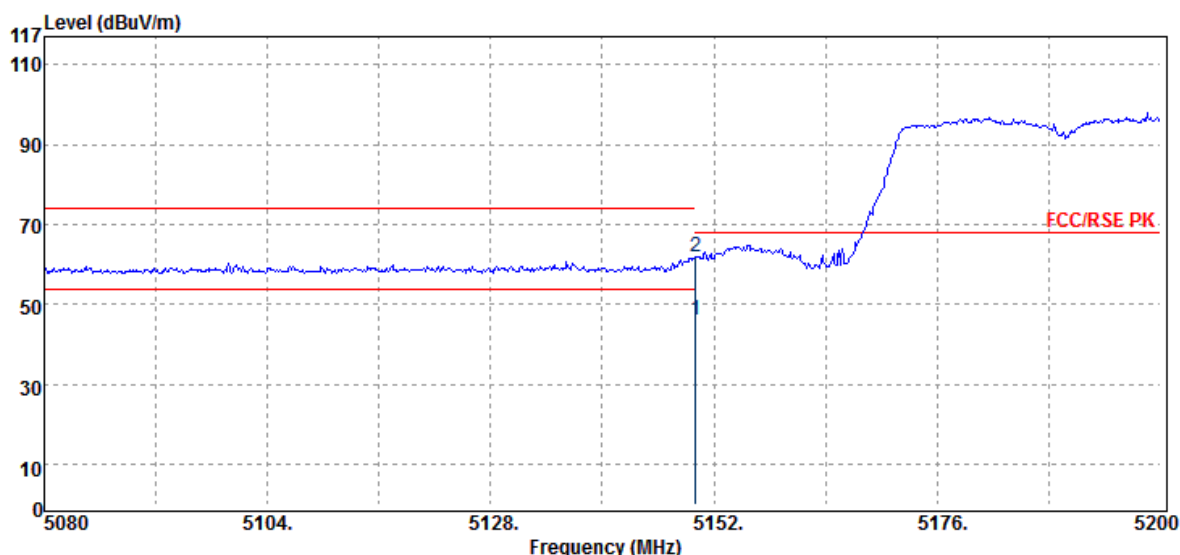
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Operation Band :802.11n40B1
Fundamental Frequency :5190 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-10-19
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5150.00	Average	37.96	8.32	46.28	54.00	-7.72
5150.00	Peak	53.54	8.32	61.86	74.00	-12.14

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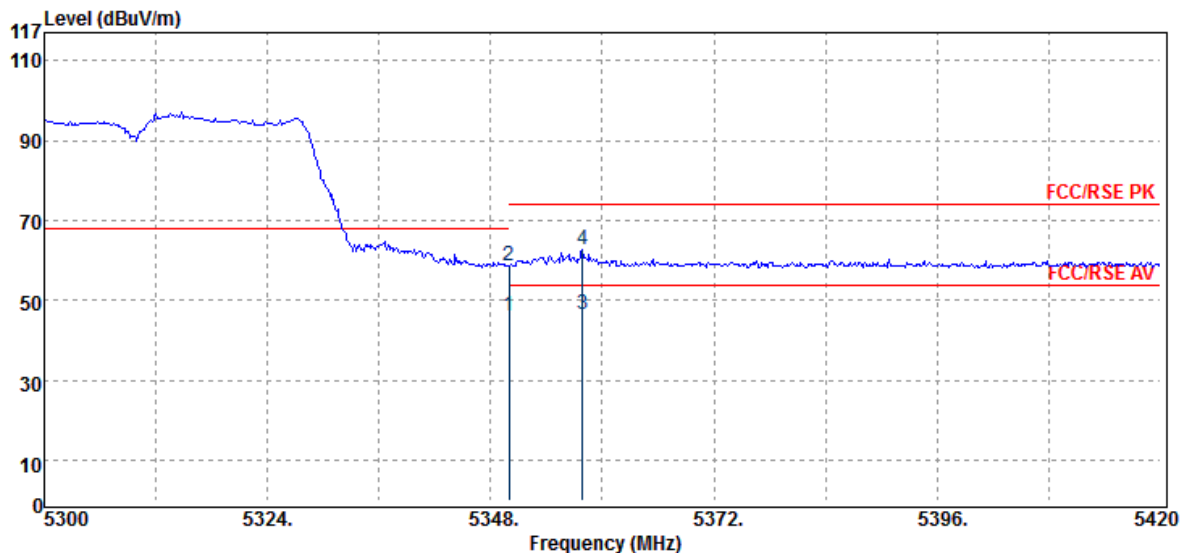
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Operation Band :802.11n40B2
Fundamental Frequency :5310 MHz
Operation Mode :Bandedge CH HIGH
EUT Pol. :E2 Plane

Test Date :2018-10-19
Temp./Humi. :23 deg_C / 62 RH
Engineer :Wei
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5350.00	Average	37.72	8.63	46.35	54.00	-7.65
5350.00	Peak	50.21	8.63	58.84	74.00	-15.16
5357.84	Average	37.84	8.65	46.49	54.00	-7.51
5357.84	Peak	54.19	8.65	62.84	74.00	-11.16

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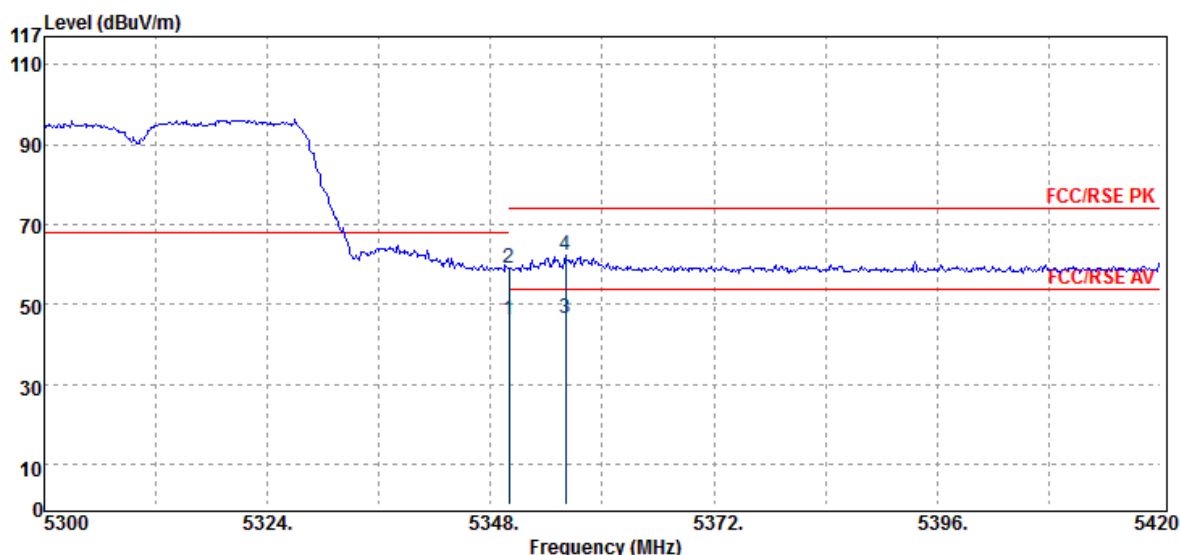
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www.tw.sgs.com

Member of SGS Group

Operation Band :802.11n40B2
 Fundamental Frequency :5310 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5350.00	Average	37.58	8.63	46.21	54.00	-7.79
5350.00	Peak	50.37	8.63	59.00	74.00	-15.00
5356.04	Average	37.81	8.64	46.45	54.00	-7.55
5356.04	Peak	53.80	8.64	62.44	74.00	-11.56

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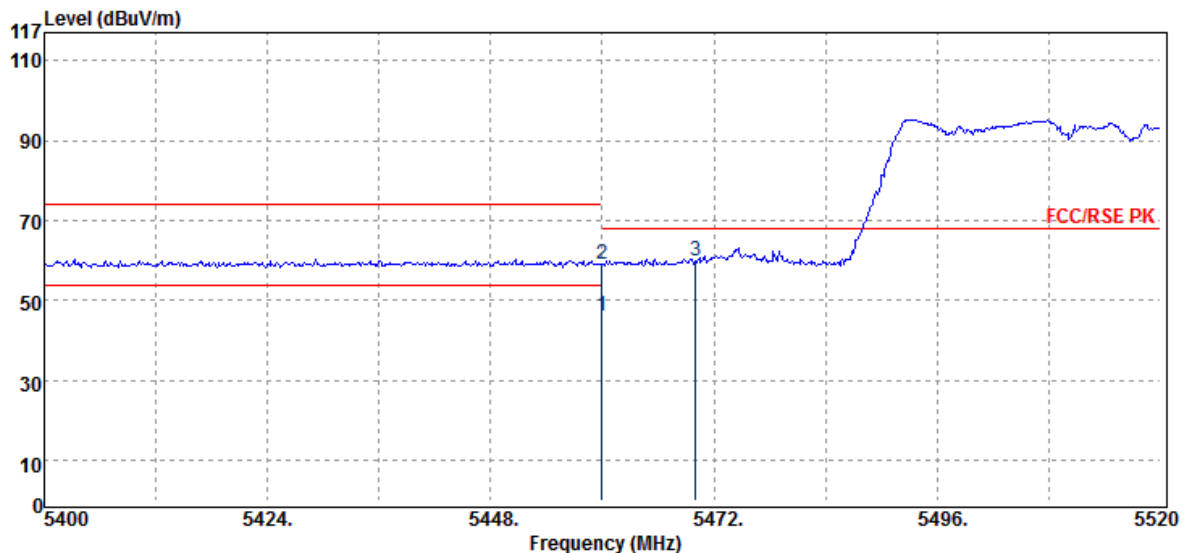
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Member of SGS Group

Operation Band :802.11n40B3
 Fundamental Frequency :5510 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	37.39	8.75	46.14	54.00	-7.86
5460.00	Peak	50.40	8.75	59.15	74.00	-14.85
5470.00	Peak	51.17	8.74	59.91	68.20	-8.29

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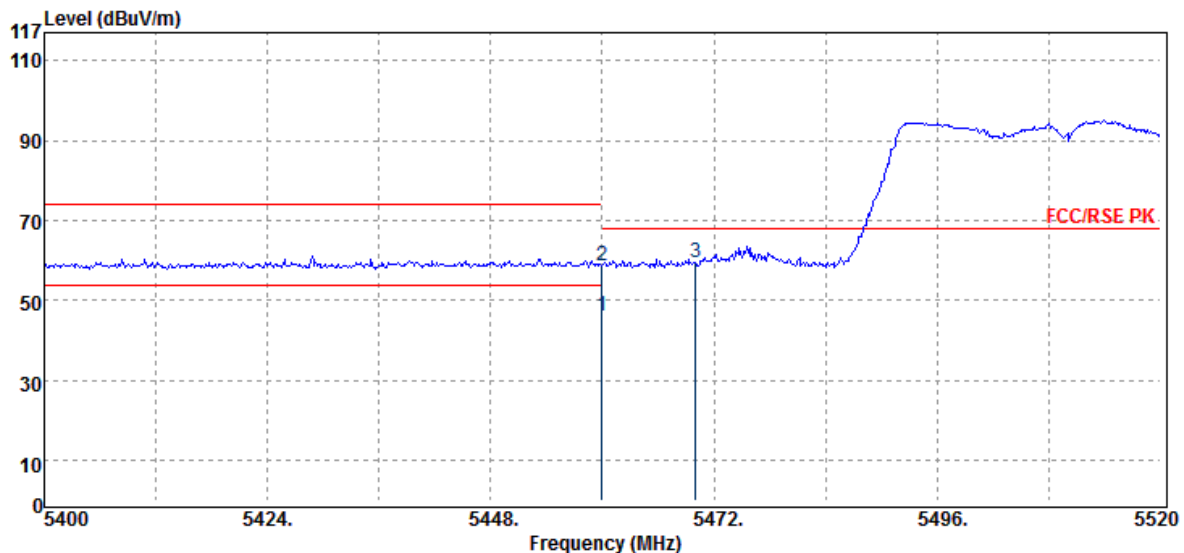
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Operation Band :802.11n40B3
 Fundamental Frequency :5510 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	37.41	8.75	46.16	54.00	-7.84
5460.00	Peak	49.99	8.75	58.74	74.00	-15.26
5470.00	Peak	50.75	8.74	59.49	68.20	-8.71

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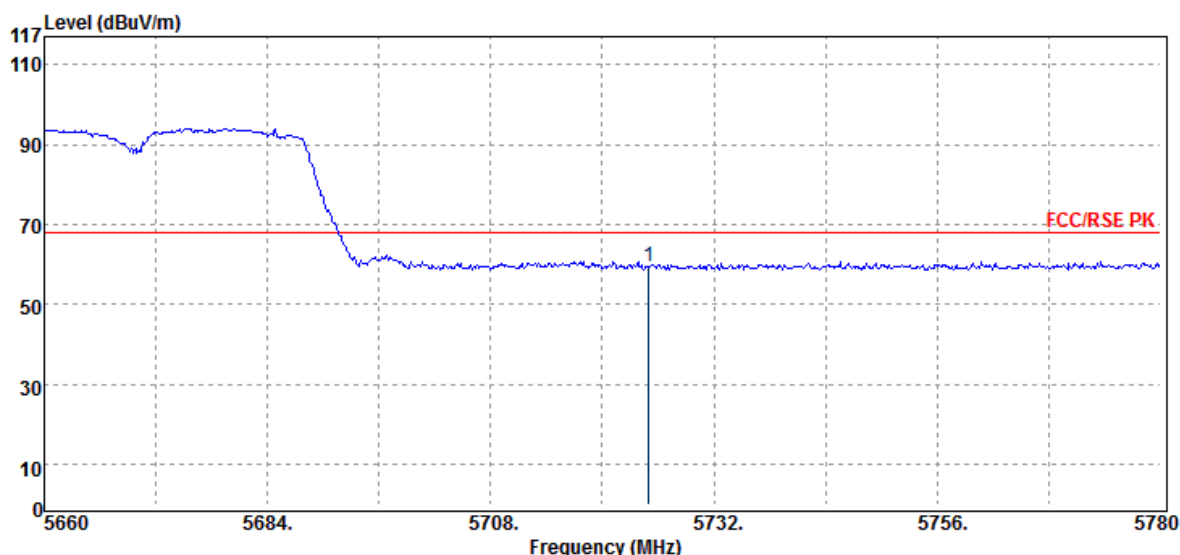
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Member of SGS Group

Operation Band :802.11n40B3
 Fundamental Frequency :5670 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5725.00	Peak	50.25	9.44	59.69	68.20	-8.51

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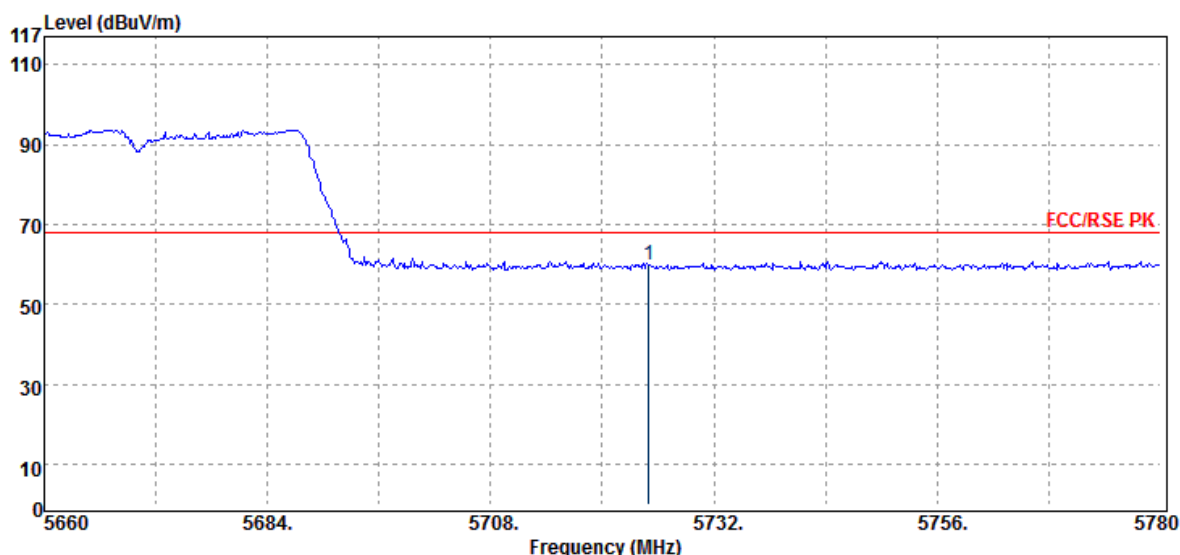
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Operation Band :802.11n40B3
 Fundamental Frequency :5670 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5725.00	Peak	50.35	9.44	59.79	68.20	-8.41

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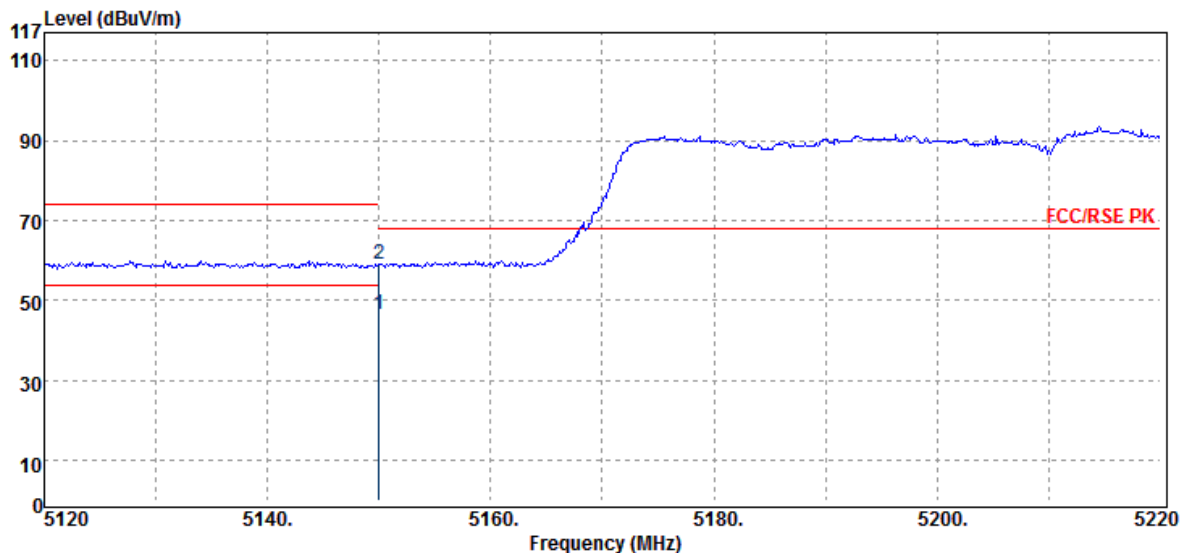
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802.11ac VHT80 mode

Operation Band :802.11ac80B1
 Fundamental Frequency :5210 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5150.00	Average	38.29	8.32	46.61	54.00	-7.39
5150.00	Peak	50.62	8.32	58.94	74.00	-15.06

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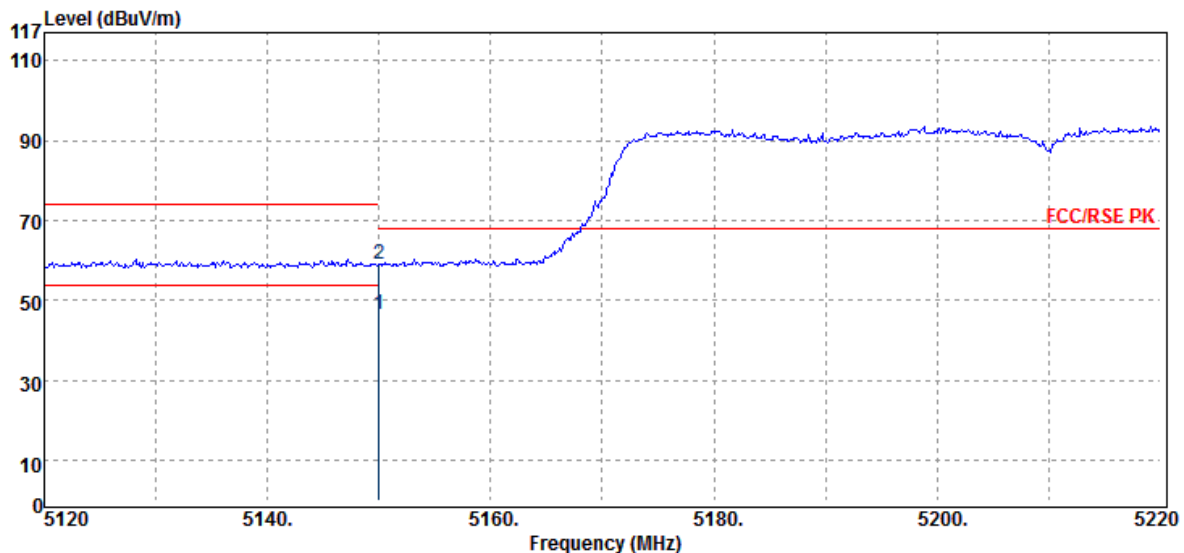
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Operation Band :802.11ac80B1
 Fundamental Frequency :5210 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5150.00	Average	38.20	8.32	46.52	54.00	-7.48
5150.00	Peak	50.93	8.32	59.25	74.00	-14.75

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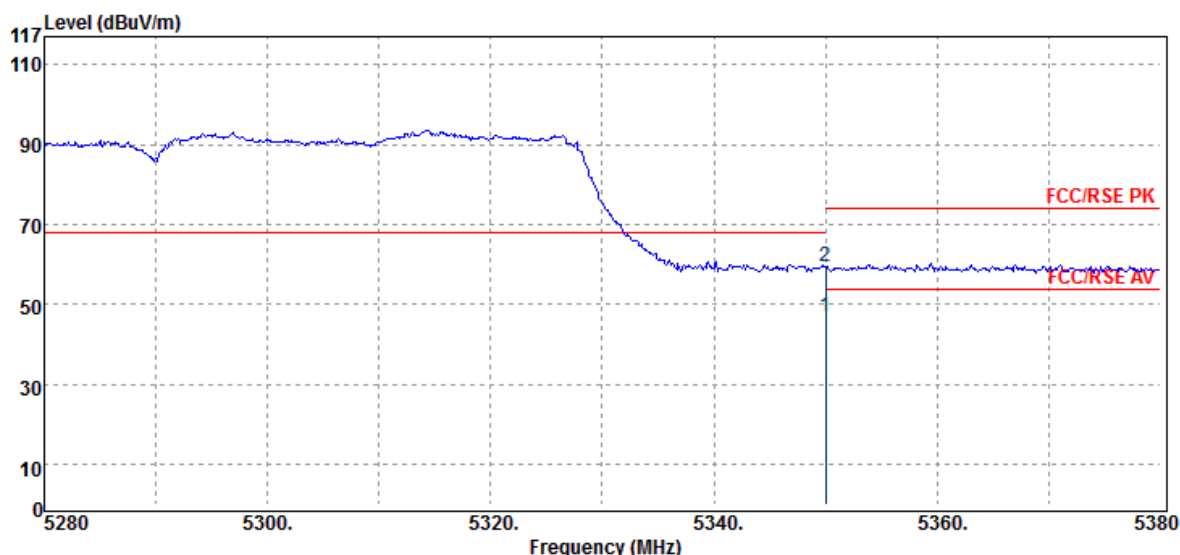
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Operation Band :802.11ac80B2
 Fundamental Frequency :5290 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5350.00	Average	38.18	8.63	46.81	54.00	-7.19
5350.00	Peak	51.07	8.63	59.70	74.00	-14.30

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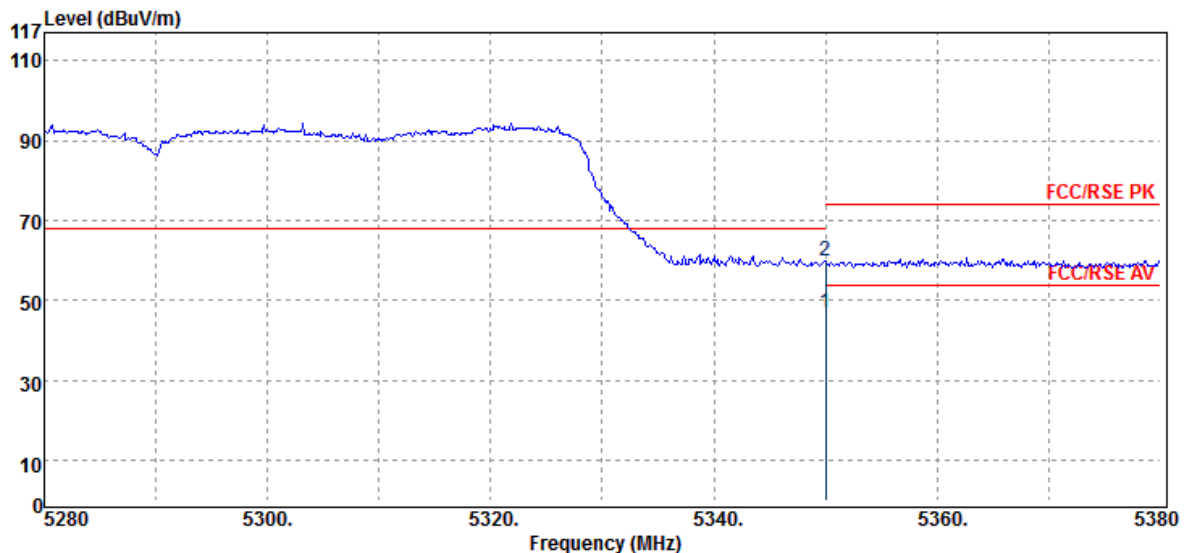
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Operation Band :802.11ac80B2
 Fundamental Frequency :5290 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5350.00	Average	38.21	8.63	46.84	54.00	-7.16
5350.00	Peak	51.14	8.63	59.77	74.00	-14.23

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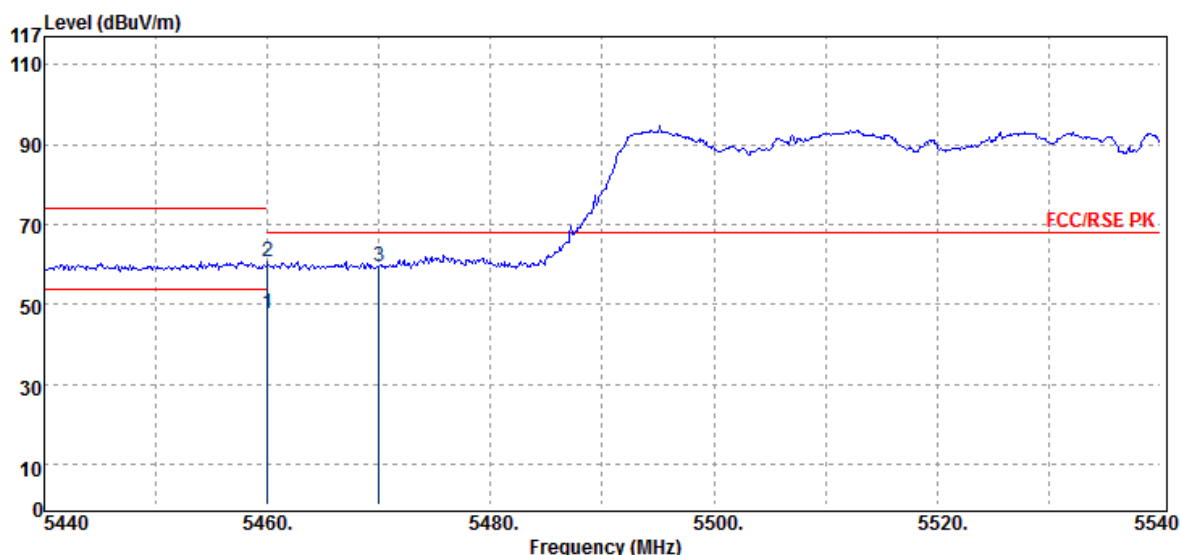
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Member of SGS Group

Operation Band :802.11ac80B3
 Fundamental Frequency :5530 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	39.19	8.75	47.94	54.00	-6.06
5460.00	Peak	51.82	8.75	60.57	74.00	-13.43
5470.00	Peak	50.71	8.74	59.45	68.20	-8.75

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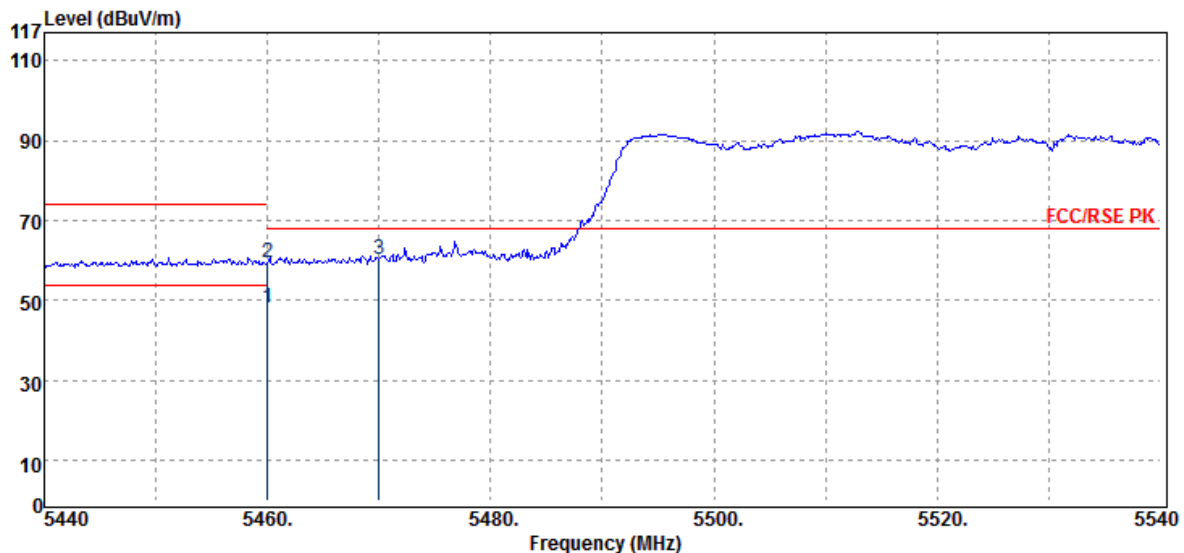
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Operation Band :802.11ac80B3
 Fundamental Frequency :5530 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-10-19
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Wei
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5460.00	Average	39.23	8.75	47.98	54.00	-6.02
5460.00	Peak	50.67	8.75	59.42	74.00	-14.58
5470.00	Peak	51.43	8.74	60.17	68.20	-8.03

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12. TRANSMISSION IN THE ABSENCE OF DATA

12.1 Standard Applicable

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

12.2 Result

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

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13. FREQUENCY STABILITY

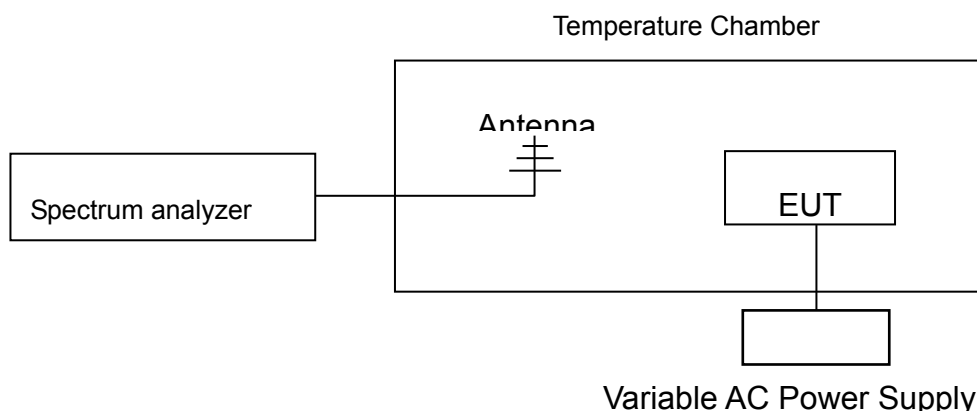
13.1 Standard Applicable

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

13.2 Measurement Procedure

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
6. Repeat step with the temperature chamber set to the lowest temperature.

13.3 Test SET-UP



13.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	02/14/2018	02/13/2019
DC Power Supply	Anritsu	E3640A	MY52410006	11/28/2017	11/27/2018
Temperature Chamber	TERCHY	MHG-120LF	911009	05/18/2018	05/17/2019
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2018	01/01/2019
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2018	01/01/2019
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2018	01/01/2019
Notebook	Lenovo	T440P	P0000564	N/A	N/A

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13.5 Measurement Result

Startup:

Operation Mode	802.11 a	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	36	5180	5,180.00132	-0.00000025
		44	5220	5,219.99492	0.00000097
		48	5240	5,239.97911	0.00000399
		52	5260	5,260.01565	-0.00000298
		60	5300	5,299.97813	0.00000413
		64	5320	5,319.99590	0.00000077
		100	5500	5,499.99636	0.00000066
		116	5580	5,579.97307	0.00000483
		140	5700	5,699.97524	0.00000434
	3.27V	36	5180	5,179.97310	0.00000519
		44	5220	5,219.98560	0.00000276
		48	5240	5,239.96990	0.00000574
		52	5260	5,259.99617	0.00000073
		60	5300	5,299.98453	0.00000292
		64	5320	5,320.00293	-0.00000055
		100	5500	5,500.00184	-0.00000033
		116	5580	5,580.00646	-0.00000116
		140	5700	5,700.00588	-0.00000103

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25 °C	3.85V	36	5180	5,179.97933	0.00000399
		44	5220	5,219.99941	0.00000011
		48	5240	5,239.98324	0.00000320
		52	5260	5,260.01932	-0.00000367
		60	5300	5,299.98320	0.00000317
		64	5320	5,319.98566	0.00000270
		100	5500	5,499.98961	0.00000189
		116	5580	5,579.98059	0.00000348
		140	5700	5,700.00191	-0.00000033

55 °C	4.43V	36	5180	5,179.99959	0.00000008
		44	5220	5,220.00391	-0.00000075
		48	5240	5,239.98909	0.00000208
		52	5260	5,259.99608	0.00000075
		60	5300	5,299.99937	0.00000012
		64	5320	5,319.98804	0.00000225
		100	5500	5,499.97920	0.00000378
		116	5580	5,580.00159	-0.00000029
		140	5700	5,699.97714	0.00000401
	3.27V	36	5180	5,180.00058	-0.00000011
		44	5220	5,219.98257	0.00000334
		48	5240	5,240.00163	-0.00000031
		52	5260	5,259.98504	0.00000284
		60	5300	5,300.00775	-0.00000146
		64	5320	5,320.01268	-0.00000238
		100	5500	5,500.00049	-0.00000009
		116	5580	5,579.98970	0.00000185
		140	5700	5,699.99738	0.00000046

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Operation Mode	802.11 n_HT40	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	38	5190	5,189.99895	0.00000020
		46	5230	5,229.99749	0.00000048
		54	5270	5,269.98457	0.00000293
		62	5310	5,309.99622	0.00000071
		102	5510	5,509.99309	0.00000125
		110	5550	5,550.00529	-0.00000095
		134	5670	5,669.99020	0.00000173
	3.27V	38	5190	5,189.99832	0.00000032
		46	5230	5,229.99703	0.00000057
		54	5270	5,269.99089	0.00000173
		62	5310	5,309.99983	0.00000003
		102	5510	5,509.98946	0.00000191
		110	5550	5,549.99087	0.00000165
		134	5670	5,669.98967	0.00000182

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25 °C	3.85V	38	5190	5,189.98313	0.00000325
		46	5230	5,230.00407	-0.00000078
		54	5270	5,269.99473	0.00000100
		62	5310	5,309.99912	0.00000017
		102	5510	5,510.00174	-0.00000032
		110	5550	5,549.99363	0.00000115
		134	5670	5,669.99096	0.00000159
55 °C	4.43V	38	5190	5,189.99289	0.00000137
		46	5230	5,230.01298	-0.00000248
		54	5270	5,269.98531	0.00000279
		62	5310	5,309.99315	0.00000129
		102	5510	5,509.99411	0.00000107
		110	5550	5,550.00459	-0.00000083
		134	5670	5,670.00231	-0.00000041
	3.27V	38	5190	5,189.99724	0.00000053
		46	5230	5,230.00958	-0.00000183
		54	5270	5,269.98195	0.00000342
		62	5310	5,310.00663	-0.00000125
		102	5510	5,509.99288	0.00000129
		110	5550	5,549.99062	0.00000169
		134	5670	5,669.99896	0.00000018

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Operation Mode	802.11 ac_VHT80	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	42	5210	5,209.99553	0.00000086
		58	5290	5,290.00238	-0.00000045
		106	5530	5,530.00832	-0.00000150
		122	5610	5,609.99448	0.00000098
	3.27V	42	5210	5,209.99602	0.00000076
		58	5290	5,290.00580	-0.00000110
		106	5530	5,530.00635	-0.00000115
		122	5610	5,610.00574	-0.00000102
25 °C	3.85V	42	5210	5,210.00493	-0.00000095
		58	5290	5,290.00700	-0.00000132
		106	5530	5,530.00408	-0.00000074
		122	5610	5,610.00716	-0.00000128
55 °C	4.43V	42	5210	5,209.99531	0.00000090
		58	5290	5,289.99158	0.00000159
		106	5530	5,529.99207	0.00000143
		122	5610	5,610.00611	-0.00000109
	3.27V	42	5210	5,209.99757	0.00000047
		58	5290	5,289.99487	0.00000097
		106	5530	5,529.99035	0.00000175
		122	5610	5,610.00515	-0.00000092

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2 Minutes:

Operation Mode	802.11 a	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	36	5180	5,179.99712	0.00000056
		44	5220	5,219.99729	0.00000052
		48	5240	5,239.97472	0.00000482
		52	5260	5,260.01737	-0.00000330
		60	5300	5,299.98002	0.00000377
		64	5320	5,319.99519	0.00000090
		100	5500	5,499.99485	0.00000094
		116	5580	5,579.97301	0.00000484
		140	5700	5,699.98552	0.00000254
	3.27V	36	5180	5,179.98154	0.00000356
		44	5220	5,219.98188	0.00000347
		48	5240	5,239.97074	0.00000558
		52	5260	5,260.00547	-0.00000104
		60	5300	5,299.98031	0.00000371
		64	5320	5,319.99439	0.00000105
		100	5500	5,499.98944	0.00000192
		116	5580	5,580.01244	-0.00000223
		140	5700	5,700.01433	-0.00000251

25 °C	3.85V	36	5180	5,179.99104	0.00000173
		44	5220	5,220.01024	-0.00000196
		48	5240	5,239.96988	0.00000575
		52	5260	5,260.01506	-0.00000286
		60	5300	5,299.99078	0.00000174
		64	5320	5,319.96926	0.00000578
		100	5500	5,499.97518	0.00000451
		116	5580	5,579.99239	0.00000136
		140	5700	5,699.98704	0.00000227

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55 °C	4.43V	36	5180	5,179.99771	0.00000044
		44	5220	5,220.00278	-0.00000053
		48	5240	5,239.98550	0.00000277
		52	5260	5,260.00976	-0.00000186
		60	5300	5,300.00684	-0.00000129
		64	5320	5,319.99791	0.00000039
		100	5500	5,499.97909	0.00000380
		116	5580	5,579.98826	0.00000210
		140	5700	5,699.98357	0.00000288
	3.27V	36	5180	5,179.99534	0.00000090
		44	5220	5,219.97273	0.00000522
		48	5240	5,240.00955	-0.00000182
		52	5260	5,259.99908	0.00000018
		60	5300	5,300.00224	-0.00000042
		64	5320	5,320.01458	-0.00000274
		100	5500	5,500.01529	-0.00000278
		116	5580	5,579.98721	0.00000229
		140	5700	5,700.00030	-0.00000005

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Operation Mode	802.11 n_HT40	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	38	5190	5,189.98618	0.00000266
		46	5230	5,230.01146	-0.00000219
		54	5270	5,269.99299	0.00000133
		62	5310	5,309.99498	0.00000095
		102	5510	5,510.00369	-0.00000067
		110	5550	5,549.99595	0.00000073
		134	5670	5,670.00627	-0.00000111
	3.27V	38	5190	5,190.00126	-0.00000024
		46	5230	5,229.99324	0.00000129
		54	5270	5,270.00554	-0.00000105
		62	5310	5,309.99673	0.00000062
		102	5510	5,509.97415	0.00000469
		110	5550	5,550.00373	-0.00000067
		134	5670	5,670.01061	-0.00000187

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25 °C	3.85V	38	5190	5,189.99883	0.00000023
		46	5230	5,230.00080	-0.00000015
		54	5270	5,270.01394	-0.00000264
		62	5310	5,309.99531	0.00000088
		102	5510	5,509.99468	0.00000097
		110	5550	5,550.01271	-0.00000229
		134	5670	5,669.99465	0.00000094
55 °C	4.43V	38	5190	5,190.01688	-0.00000325
		46	5230	5,229.99314	0.00000131
		54	5270	5,270.00054	-0.00000010
		62	5310	5,309.98763	0.00000233
		102	5510	5,510.01896	-0.00000344
		110	5550	5,549.98994	0.00000181
		134	5670	5,670.00280	-0.00000049
	3.27V	38	5190	5,189.99276	0.00000140
		46	5230	5,230.01295	-0.00000248
		54	5270	5,269.99815	0.00000035
		62	5310	5,309.99302	0.00000132
		102	5510	5,510.00240	-0.00000044
		110	5550	5,550.00337	-0.00000061
		134	5670	5,670.01528	-0.00000269

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Operation Mode	802.11 ac_VHT80	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	42	5210	5,210.00590	-0.00000113
		58	5290	5,289.99835	0.00000031
		106	5530	5,530.00116	-0.00000021
		122	5610	5,609.99061	0.00000167
	3.27V	42	5210	5,210.00174	-0.00000033
		58	5290	5,289.99977	0.00000004
		106	5530	5,530.00842	-0.00000152
		122	5610	5,610.00994	-0.00000177
25 °C	3.85V	42	5210	5,209.99053	0.00000182
		58	5290	5,290.00418	-0.00000079
		106	5530	5,530.00508	-0.00000092
		122	5610	5,609.99155	0.00000151
55 °C	4.43V	42	5210	5,210.00063	-0.00000012
		58	5290	5,290.00226	-0.00000043
		106	5530	5,530.00082	-0.00000015
		122	5610	5,609.99575	0.00000076
	3.27V	42	5210	5,210.00215	-0.00000041
		58	5290	5,290.00196	-0.00000037
		106	5530	5,530.00056	-0.00000010
		122	5610	5,610.00513	-0.00000091

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5 Minutes:

Operation Mode	802.11 a	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	36	5180	5,179.98352	0.00000318
		44	5220	5,219.99922	0.00000015
		48	5240	5,239.98025	0.00000377
		52	5260	5,260.02763	-0.00000525
		60	5300	5,299.97279	0.00000513
		64	5320	5,320.00803	-0.00000151
		100	5500	5,499.98998	0.00000182
		116	5580	5,579.98048	0.00000350
		140	5700	5,699.96594	0.00000598
	3.27V	36	5180	5,179.97741	0.00000436
		44	5220	5,219.97114	0.00000553
		48	5240	5,239.97733	0.00000433
		52	5260	5,259.99707	0.00000056
		60	5300	5,299.97892	0.00000398
		64	5320	5,319.98677	0.00000249
		100	5500	5,499.99430	0.00000104
		116	5580	5,580.00624	-0.00000112
		140	5700	5,700.01111	-0.00000195

25 °C	3.85V	36	5180	5,179.98804	0.00000231
		44	5220	5,219.99356	0.00000123
		48	5240	5,239.98461	0.00000294
		52	5260	5,260.01103	-0.00000210
		60	5300	5,299.99540	0.00000087
		64	5320	5,319.97730	0.00000427
		100	5500	5,499.99290	0.00000129
		116	5580	5,579.98841	0.00000208
		140	5700	5,700.00373	-0.00000065

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55 °C	4.43V	36	5180	5,180.01148	-0.00000222
		44	5220	5,219.99237	0.00000146
		48	5240	5,239.98184	0.00000347
		52	5260	5,259.99671	0.00000062
		60	5300	5,299.99930	0.00000013
		64	5320	5,319.98133	0.00000351
		100	5500	5,499.97620	0.00000433
		116	5580	5,579.99504	0.00000089
		140	5700	5,699.98031	0.00000345
	3.27V	36	5180	5,179.99870	0.00000025
		44	5220	5,219.98719	0.00000245
		48	5240	5,240.01189	-0.00000227
		52	5260	5,259.98830	0.00000222
		60	5300	5,300.00541	-0.00000102
		64	5320	5,320.00338	-0.00000063
		100	5500	5,499.99931	0.00000012
		116	5580	5,579.98764	0.00000222
		140	5700	5,700.00787	-0.00000138

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Operation Mode	802.11 n_HT40	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	38	5190	5,189.99870	0.00000025
		46	5230	5,229.99594	0.00000078
		54	5270	5,269.99187	0.00000154
		62	5310	5,309.99183	0.00000154
		102	5510	5,510.00479	-0.00000087
		110	5550	5,550.00474	-0.00000085
		134	5670	5,670.00216	-0.00000038
	3.27V	38	5190	5,190.01061	-0.00000204
		46	5230	5,230.00212	-0.00000041
		54	5270	5,269.99670	0.00000063
		62	5310	5,309.99323	0.00000127
		102	5510	5,509.96059	0.00000715
		110	5550	5,550.00428	-0.00000077
		134	5670	5,670.00730	-0.00000129

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25 °C	3.85V	38	5190	5,190.01007	-0.00000194
		46	5230	5,229.98553	0.00000277
		54	5270	5,270.01366	-0.00000259
		62	5310	5,310.00228	-0.00000043
		102	5510	5,509.99269	0.00000133
		110	5550	5,550.01352	-0.00000244
		134	5670	5,670.00328	-0.00000058
55 °C	4.43V	38	5190	5,190.01877	-0.00000362
		46	5230	5,229.99420	0.00000111
		54	5270	5,270.01456	-0.00000276
		62	5310	5,309.98605	0.00000263
		102	5510	5,510.00763	-0.00000138
		110	5550	5,549.98218	0.00000321
		134	5670	5,670.01113	-0.00000196
	3.27V	38	5190	5,190.00714	-0.00000138
		46	5230	5,230.01105	-0.00000211
		54	5270	5,269.99655	0.00000066
		62	5310	5,310.00020	-0.00000004
		102	5510	5,509.99383	0.00000112
		110	5550	5,549.99384	0.00000111
		134	5670	5,670.01156	-0.00000204

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Operation Mode	802.11 ac_VHT80	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	42	5210	5,210.00783	-0.00000150
		58	5290	5,289.99052	0.00000179
		106	5530	5,529.99754	0.00000045
		122	5610	5,609.99664	0.00000060
	3.27V	42	5210	5,210.00537	-0.00000103
		58	5290	5,290.00832	-0.00000157
		106	5530	5,529.99228	0.00000140
		122	5610	5,610.00995	-0.00000177
25 °C	3.85V	42	5210	5,209.99582	0.00000080
		58	5290	5,290.00912	-0.00000172
		106	5530	5,529.99789	0.00000038
		122	5610	5,609.99169	0.00000148
55 °C	4.43V	42	5210	5,210.00333	-0.00000064
		58	5290	5,289.99282	0.00000136
		106	5530	5,529.99336	0.00000120
		122	5610	5,610.00750	-0.00000134
	3.27V	42	5210	5,210.00660	-0.00000127
		58	5290	5,290.00994	-0.00000188
		106	5530	5,529.99661	0.00000061
		122	5610	5,609.99480	0.00000093

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Operation Mode	802.11 a	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	36	5180	5,179.98614	0.00000268
		44	5220	5,219.99304	0.00000133
		48	5240	5,239.97831	0.00000414
		52	5260	5,260.01974	-0.00000375
		60	5300	5,299.98304	0.00000320
		64	5320	5,320.00011	-0.00000002
		100	5500	5,499.99395	0.00000110
		116	5580	5,579.97649	0.00000421
		140	5700	5,699.96898	0.00000544
	3.27V	36	5180	5,179.97526	0.00000478
		44	5220	5,219.97143	0.00000547
		48	5240	5,239.97631	0.00000452
		52	5260	5,259.99699	0.00000057
		60	5300	5,299.97633	0.00000447
		64	5320	5,319.99575	0.00000080
		100	5500	5,499.99960	0.00000007
		116	5580	5,580.01158	-0.00000207
		140	5700	5,700.00567	-0.00000099

25 °C	3.85V	36	5180	5,179.97672	0.00000449
		44	5220	5,219.99300	0.00000134
		48	5240	5,239.97693	0.00000440
		52	5260	5,260.01190	-0.00000226
		60	5300	5,299.99460	0.00000102
		64	5320	5,319.98578	0.00000267
		100	5500	5,499.98596	0.00000255
		116	5580	5,579.99060	0.00000168
		140	5700	5,700.00161	-0.00000028

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55 °C	4.43V	36	5180	5,180.01684	-0.00000325
		44	5220	5,220.00498	-0.00000095
		48	5240	5,239.98850	0.00000220
		52	5260	5,260.00847	-0.00000161
		60	5300	5,300.00971	-0.00000183
		64	5320	5,319.98831	0.00000220
		100	5500	5,499.97310	0.00000489
		116	5580	5,580.00265	-0.00000047
		140	5700	5,699.97890	0.00000370
	3.27V	36	5180	5,179.98288	0.00000331
		44	5220	5,219.98671	0.00000255
		48	5240	5,240.01663	-0.00000317
		52	5260	5,259.99128	0.00000166
		60	5300	5,299.99756	0.00000046
		64	5320	5,320.00103	-0.00000019
		100	5500	5,500.01509	-0.00000274
		116	5580	5,579.98355	0.00000295
		140	5700	5,699.99667	0.00000058

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Operation Mode	802.11 n_HT40	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	38	5190	5,189.98491	0.00000291
		46	5230	5,230.01139	-0.00000218
		54	5270	5,269.99668	0.00000063
		62	5310	5,310.00997	-0.00000188
		102	5510	5,510.00623	-0.00000113
		110	5550	5,550.00052	-0.00000009
		134	5670	5,670.00516	-0.00000091
	3.27V	38	5190	5,190.01415	-0.00000273
		46	5230	5,229.99594	0.00000078
		54	5270	5,269.99868	0.00000025
		62	5310	5,310.00768	-0.00000145
		102	5510	5,509.97586	0.00000438
		110	5550	5,549.99600	0.00000072
		134	5670	5,670.01048	-0.00000185

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25 °C	3.85V	38	5190	5,189.99274	0.00000140
		46	5230	5,229.99845	0.00000030
		54	5270	5,270.00617	-0.00000117
		62	5310	5,309.99733	0.00000050
		102	5510	5,509.99361	0.00000116
		110	5550	5,549.99529	0.00000085
		134	5670	5,670.00283	-0.00000050
55 °C	4.43V	38	5190	5,190.01623	-0.00000313
		46	5230	5,229.99831	0.00000032
		54	5270	5,270.00383	-0.00000073
		62	5310	5,309.98898	0.00000207
		102	5510	5,510.00010	-0.00000002
		110	5550	5,549.97403	0.00000468
		134	5670	5,670.00314	-0.00000055
	3.27V	38	5190	5,190.01226	-0.00000236
		46	5230	5,230.00008	-0.00000001
		54	5270	5,270.00145	-0.00000027
		62	5310	5,310.00803	-0.00000151
		102	5510	5,509.98799	0.00000218
		110	5550	5,549.99240	0.00000137
		134	5670	5,670.00529	-0.00000093

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Operation Mode	802.11 ac_VHT80	Test Date	2018.10.09
Temperature	:23 °C	Test By	Tom
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.43V	42	5210	5,210.00799	-0.00000153
		58	5290	5,290.00775	-0.00000146
		106	5530	5,530.00775	-0.00000140
		122	5610	5,610.00454	-0.00000081
	3.27V	42	5210	5,210.00299	-0.00000057
		58	5290	5,290.00458	-0.00000087
		106	5530	5,530.00937	-0.00000169
		122	5610	5,610.00304	-0.00000054
25 °C	3.85V	42	5210	5,209.99962	0.00000007
		58	5290	5,290.00404	-0.00000076
		106	5530	5,530.00363	-0.00000066
		122	5610	5,610.00759	-0.00000135
55 °C	4.43V	42	5210	5,209.99907	0.00000018
		58	5290	5,289.99709	0.00000055
		106	5530	5,529.99343	0.00000119
		122	5610	5,610.00739	-0.00000132
	3.27V	42	5210	5,209.99128	0.00000167
		58	5290	5,290.00730	-0.00000138
		106	5530	5,529.99748	0.00000045
		122	5610	5,609.99065	0.00000167

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14. ANTENNA REQUIREMENT

14.1 Standard Applicable

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

According to §15.407, If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

14.2 Antenna Connected Construction

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo for details.

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