

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

OF

Applicant: Barco NV
Barco NV President Kennedypark35, 8500 Kortrijk, Belgium

Product Name: Clickshare CSE-200+

Brand Name: Barco

Model No.: CSE-200+

Model Difference: N/A

FCC ID: 2AAED-R9861521

Report Number: ER/2018/70112

FCC Rule Part: §15.407, Cat: NII

Issue Date: Sep. 03, 2018

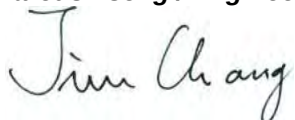
Date of Test: Jul. 12, 2018 ~ Aug. 22, 2018

Date of EUT Received: Jul. 12, 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 / Engineer****Approved By:****Jim Chang / Manager**

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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
ER/2018/70112	Rev.00	Initial creation of document	All	Sep. 03, 2018	Yuri Tsai

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1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Clickshare CSE-200+	
Brand Name:	Barco	
Model No.:	CSE-200+	
Model Difference:	N/A	
Product SW/HW version:	N/A / EVT2	
WLAN Module:	Model No.: WCBN811A	
Power Supply:	120Vac input / 12Vdc output from AC/DC adapter	
	Adapter:	Model No.: BA070-120417GXX Supplier: BILLION

WLAN 5GHz:

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm)	Modulation Technology
a	5150~5250	4	16.27	OFDM
	5725-5850	5	19.71	
n_HT ac_VHT 20M	5150~5250	4	HT: 16.33 (Worst Case)	OFDM
	5725-5850	5	HT: 19.90 (Worst Case)	
n_HT ac_VHT 40M	5150~5250	2	HT: 12.50 (Worst Case)	OFDM
	5725-5850	2	HT: 19.54 (Worst Case)	
ac_VHT 80M	5150~5250	1	13.24	OFDM
	5725-5850	1	16.35	
Modulation type:		64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only		
Antenna Type:		PCB Antenna, Peak Gain: 1.5dBi (5150~5250MHz) 3.01dBi (5725~5850MHz)		
Transition Rate:		802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps 802.11 n_40MHz: 13.5 - 150Mbps 802.11 ac_20MHz: 6.5 –86.7Mbps 802.11 ac_40MHz: 13.5 -200Mbps 802.11 ac_80MHz: 29.3 – 433.3Mbps		

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

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, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Number and Designation 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.

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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. Following shows an offset computation example.

SISO mode offset

= RF cable loss (dB)+ attenuation factor(dB)+ $10 \log(N_{ANT})$ dB =11.8(dB)

2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission & Conducted Emission (AC Power Line)

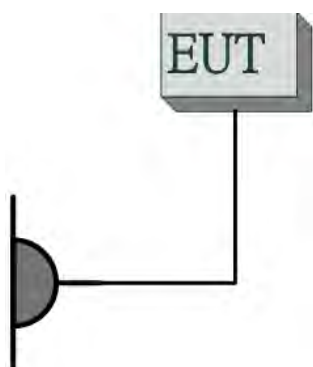


Fig. 2-2 Conducted (Antenna Port) Configuration Emission



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
2.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A

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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 & 6dB & 99% 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 5745 MHz ~5850 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode	
Channel	Frequency
149	5745
153	5765
157	5785
161	5805
165	5825

802.11 n HT40 Mode, 802.11ac VHT40 Mode	
channel	Frequency
151	5755
159	5795

802.11ac VHT80 Mode	
channel	Frequency
155	5775

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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 programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.

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	5220	44	44	OFDM	6	SISO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	SISO
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	SISO
802.11n_HT20				OFDM	MCS8	SISO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	SISO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	SISO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	SISO
802.11ac_VHT20				OFDM	MCS0	SISO
802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS0	SISO
802.11ac_VHT80	5775	155	155	OFDM	MCS0	SISO

Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/n/ac WLAN 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	SISO
802.11n_HT20 802.11ac_VHT20				OFDM	MCS8	SISO
802.11n_HT40 802.11ac_VHT40	5190~5230	38 to 46	38,46	OFDM	MCS8	SISO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	SISO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	SISO
802.11ac_HT20 802.11ac_VHT20				OFDM	MCS0	SISO
802.11ac_HT40 802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS0	SISO
802.11ac_VHT80	5775	155	155	OFDM	MCS0	SISO

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB & 6dB 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

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESC17	100335	2018/02/02	2019/02/01
LISN	SCHWARZ-BECK	NSLK 8127	8127-649	2018/05/18	2019/05/17

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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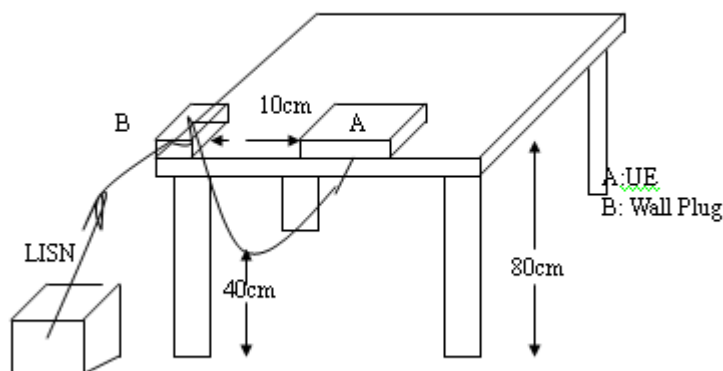
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6.4 Test SET-UP



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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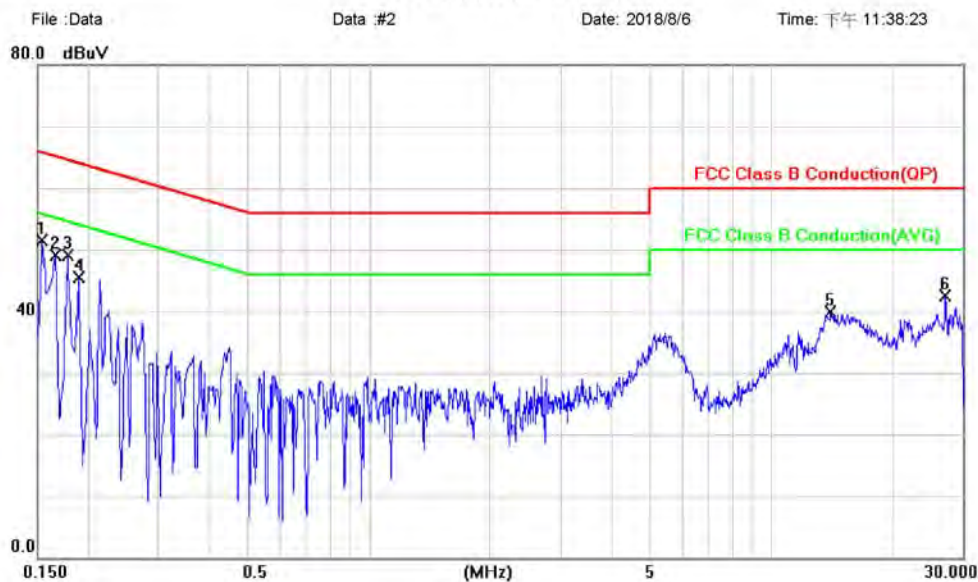
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Site: Conduction Room	Phase: L1	Temperature: 25 °C
Limit: FCC Class B Conduction(QP)	Power: AC 120V/60Hz	Humidity: 85 %
Mode: Operation		
Note: Adapter: BA070-120417GXX		

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1540	51.44	0.04	51.48	65.78	-14.30	peak	
2		0.1660	49.14	0.04	49.18	65.16	-15.98	peak	
3		0.1780	49.02	0.04	49.06	64.58	-15.52	peak	
4		0.1900	45.49	0.04	45.53	64.04	-18.51	peak	
5		14.0980	39.58	0.35	39.93	60.00	-20.07	peak	
6		27.1300	41.99	0.51	42.50	60.00	-17.50	peak	

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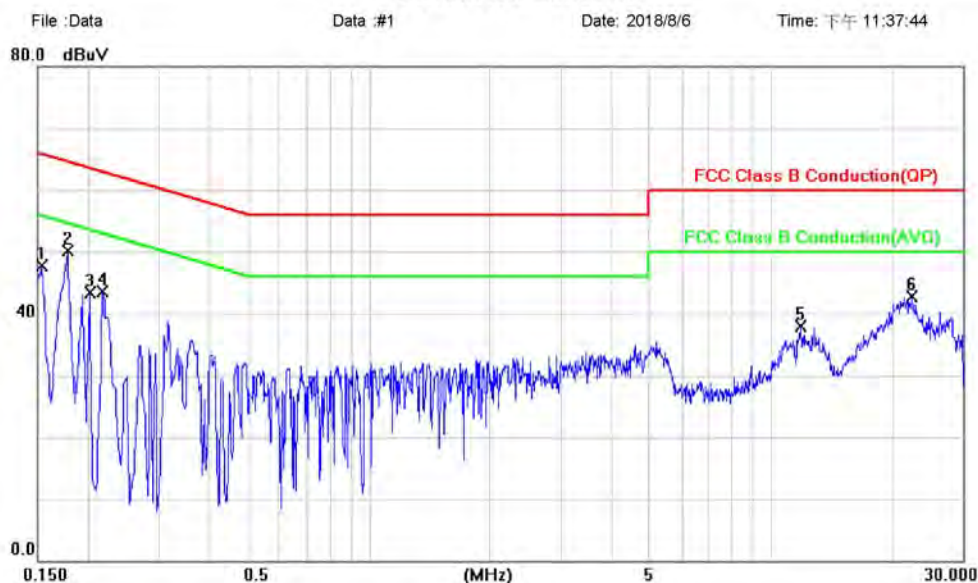
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Site: Conduction Room
Limit: FCC Class B Conduction(QP)
Mode: Operation
Note: Adapter: BA070-120417GXX

Phase: **N**
Power: AC 120V/60Hz

Temperature: 25 °C
Humidity: 85 %

Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1540	47.61	0.04	47.65	65.78	-18.13	peak	
2	*	0.1780	50.01	0.04	50.05	64.58	-14.53	peak	
3		0.2020	43.26	0.04	43.30	63.53	-20.23	peak	
4		0.2180	43.50	0.04	43.54	62.89	-19.35	peak	
5		11.8420	37.65	0.32	37.97	60.00	-22.03	peak	
6		22.5340	42.22	0.45	42.67	60.00	-17.33	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	95.74	0.19	0.48	1.00
802.11n_20	95.75	0.19	0.52	1.00
802.11n_40	91.51	0.39	1.05	2.00
802.11ac_80	84.05	0.75	2.15	3.00

$$\text{Duty Cycle Factor: } 10 * \log(1/0.9574) = 0.19$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.9575) = 0.19$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.9151) = 0.39$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.8405) = 0.75$$

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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 & 6DB 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. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
 - a. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto
 - b. Mark the peak frequency and -6dB (upper and lower) frequency.
6. For 99% Bandwidth:

Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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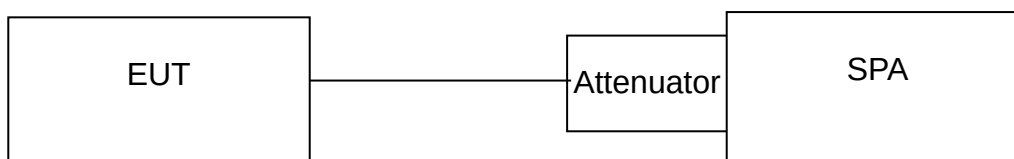
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8.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	2018/05/03	2019/05/02
DC Block	Mini-Circuits	BLK-18-S+	1	2018/01/02	2019/01/01
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01

8.4 Test Set-up



8.5 Measurement Result

26dB Bandwidth

802.11a_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.71	13.162
5220	20.77	13.175
5240	21.01	13.224

802.11n_HT20_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.26	13.276
5220	22.10	13.445
5240	24.87	13.956

802.11n_HT40_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.09	16.030
5230	39.85	16.004

802.11ac_VHT80_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	81.92	19.134

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6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC

802.11a_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.05	12.054
5785	15.25	11.832
5825	15.05	11.774

802.11n_HT20_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.90	12.013
5785	15.73	11.967
5825	14.98	11.756

802.11n_HT40_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	30.16	14.795
5795	32.65	15.139

802.11ac_VHT80_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	73.84	18.683

99% BW verification for DFS Function

802.11a_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.25	< 5250
5745	5731.86	> 5725

802.11n_HT20_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.85	< 5250
5745	5732.13	> 5725

802.11n_HT40_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5247.95	< 5250
5755	5734.70	> 5725

802.11ac_VHT80_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5247.40	< 5250
5775	5737.10	> 5725

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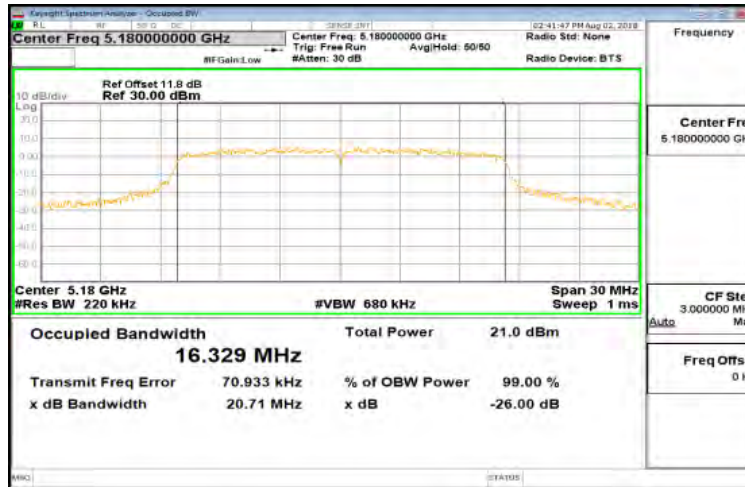
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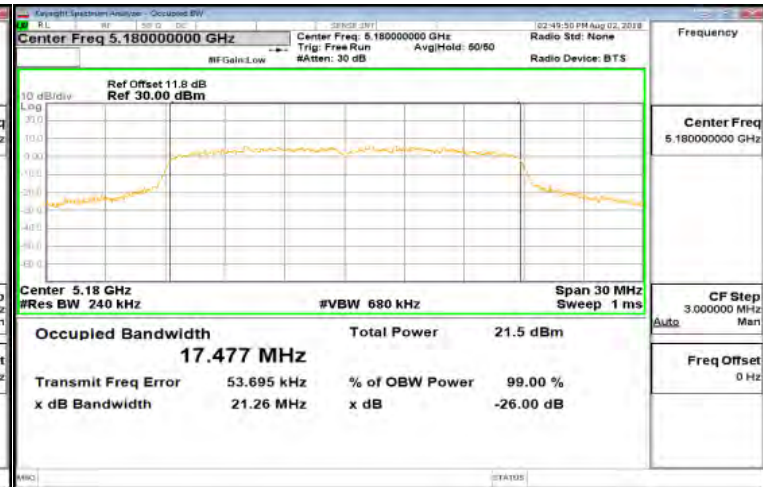
802.11a, 5150~5250 MHz

26dB Band Width Test Data CH-Low (5180MHz)

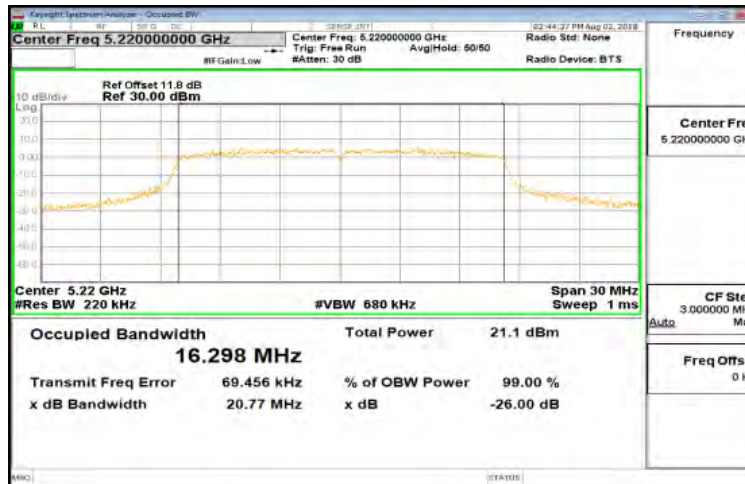


802.11n HT20, 5150~5250 MHz

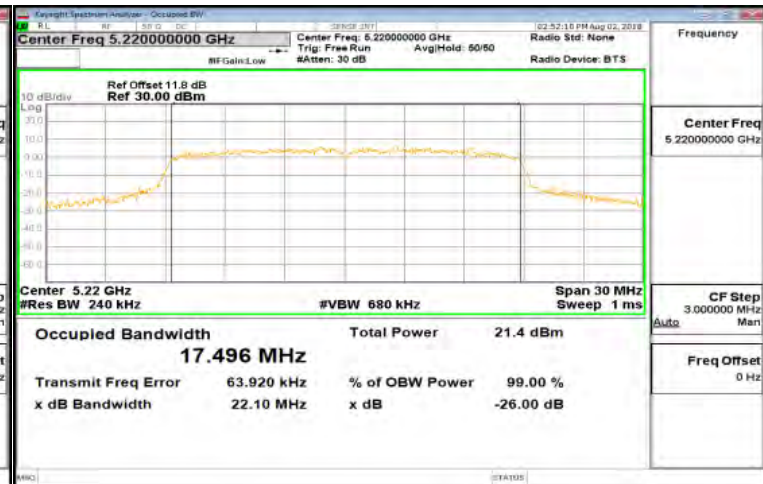
26dB Band Width Test Data CH-Low (5180 MHz)



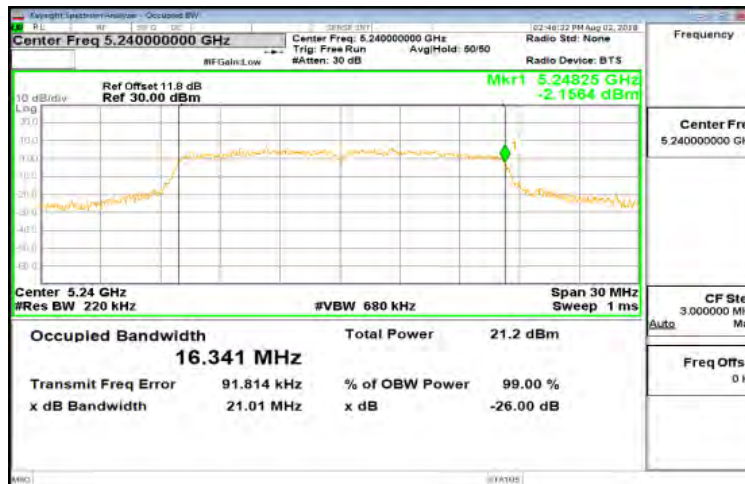
26dB Band Width Test Data CH-Mid (5220MHz)



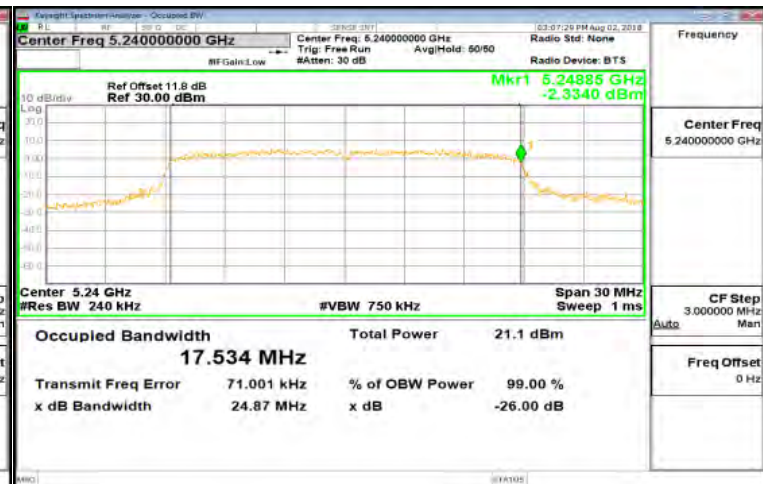
26dB Band Width Test Data CH-Mid (5220 MHz)



26dB Band Width Test Data CH-High (5240MHz)



26dB Band Width Test Data CH-High (5240 MHz)



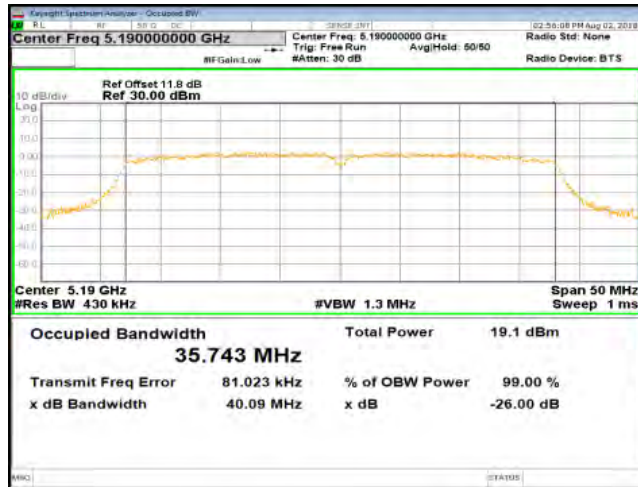
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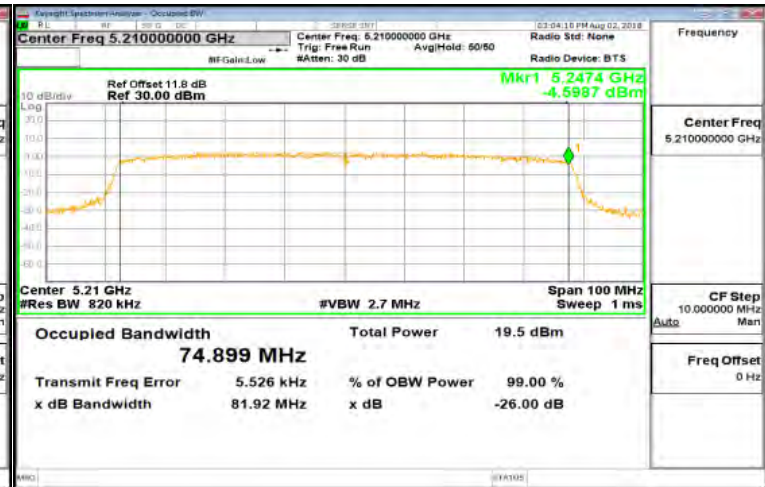
802.11n HT40, 5150~5250 MHz

26dB Band Width Test Data CH-Low (5190 MHz)

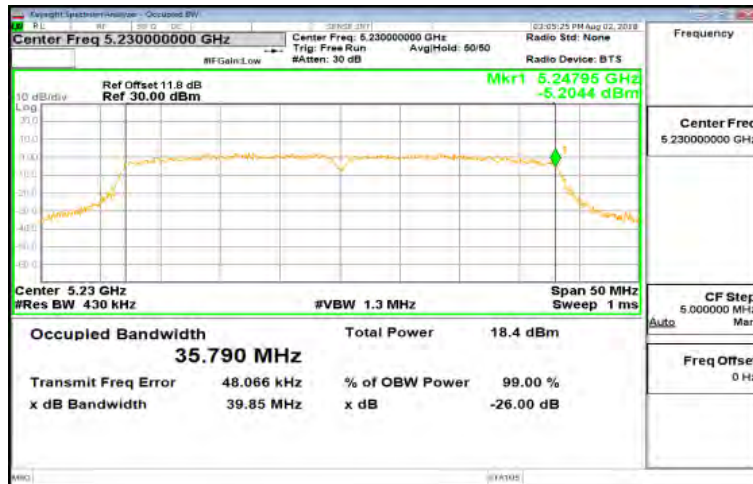


802.11ac VHT80, 5150~5250 MHz

26dB Band Width Test Data CH-Mid (5210 MHz)



26dB Band Width Test Data CH-High (5230 MHz)



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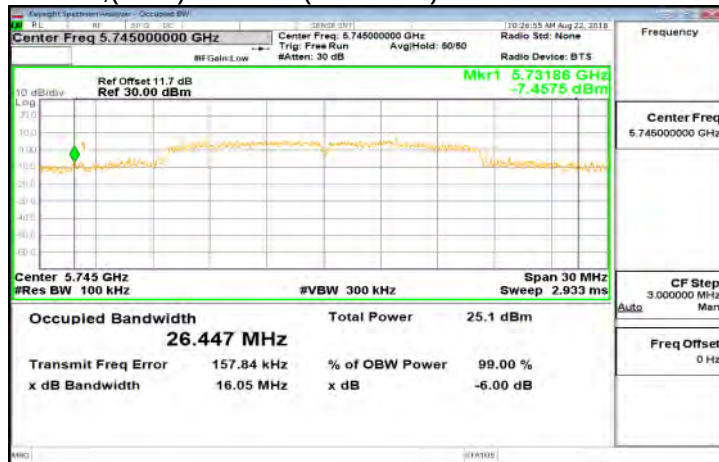
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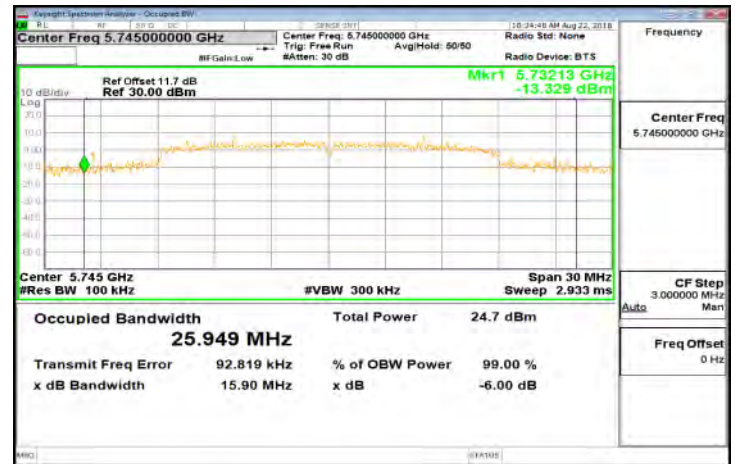
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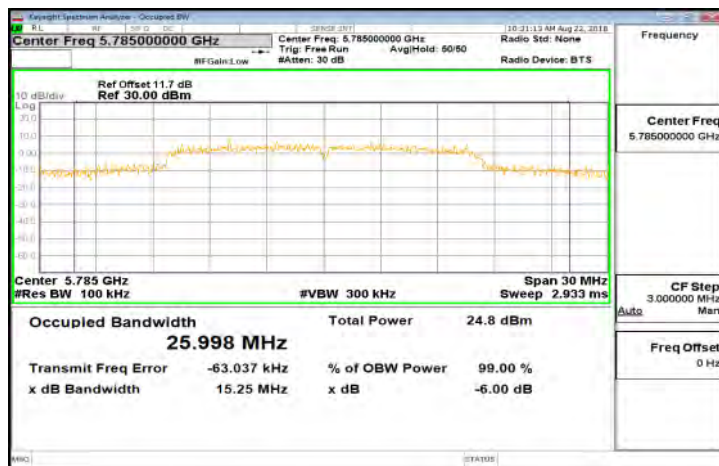
6dB Band Width measure with Peak detector for FCC 802.11a,(Main) 6dB BW (5745 MHz)



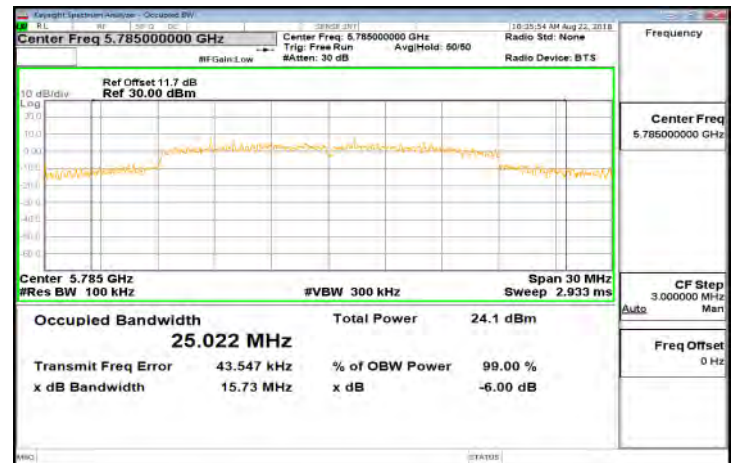
802.11n_HT20,(Main) 6dB BW (5745 MHz)



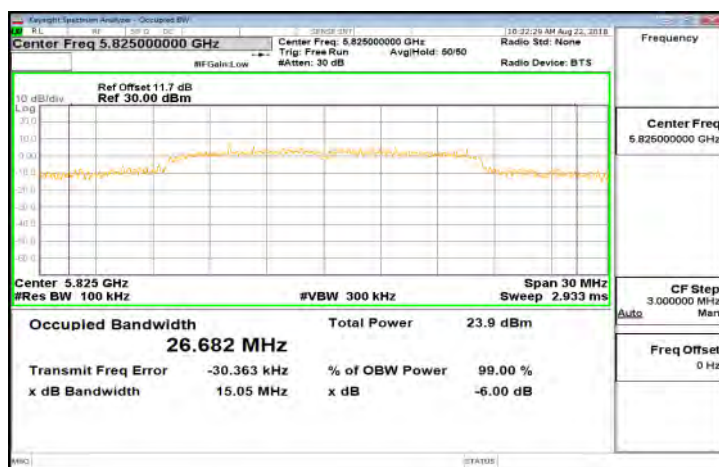
6dB BW (5785 MHz)



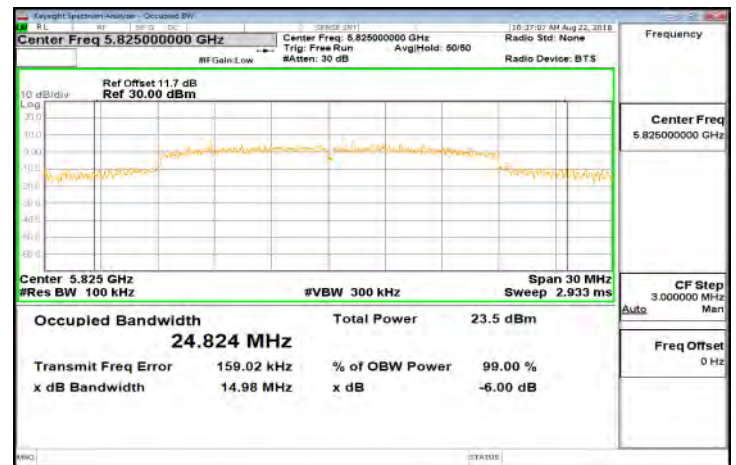
6dB BW (5785 MHz)



6dB BW (5825 MHz)



6dB BW (5825 MHz)



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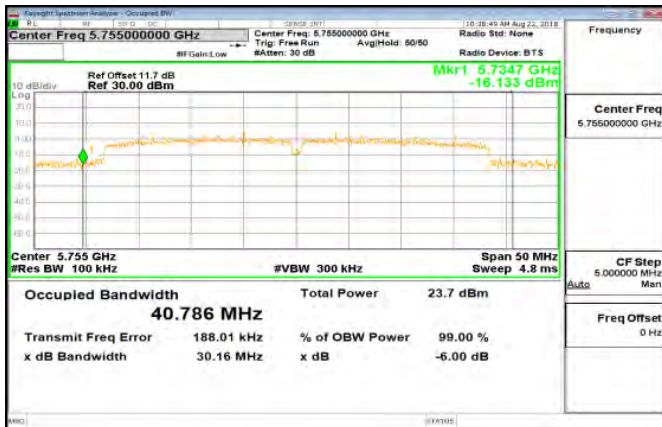
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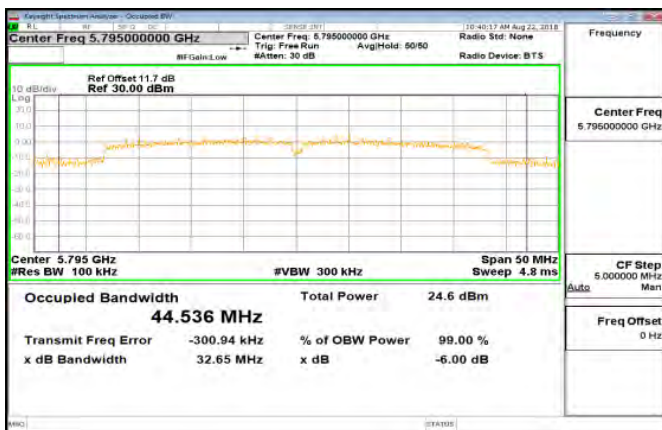
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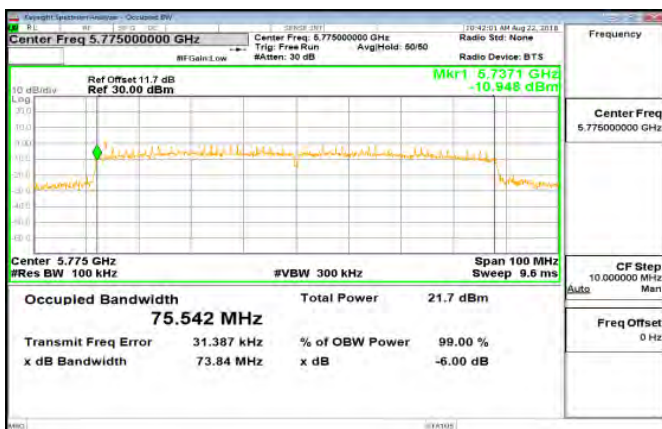
802.11n_HT40,(Main) 6dB BW (5755 MHz)



6dB BW (5795 MHz)



802.11ac VHT80,(Main) 6dB BW (5775 MHz)



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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 Acess Ponit	1 Watt(30dBm)
		Mobile and portable clinet 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)

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/duty cycle).
6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

9.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2496A	1804001	2018/02/01	2019/01/31
Power Sensor	Anritsu	MA2411B	1726104	2018/02/01	2019/01/31
Power Sensor	Anritsu	MA2411B	1726107	2018/02/01	2019/01/31
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01

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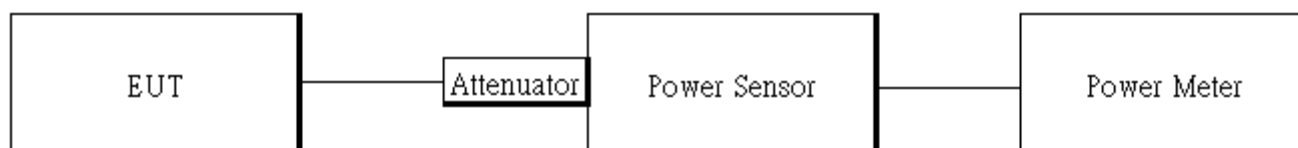
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9.4 Test Set-up



9.5 Measurement Result

Conducted output power (FCC)

802.11a_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	16.27	42.355	30	PASS
44	5220	6	16.23	41.967	30	PASS
48	5240	6	16.22	41.870	30	PASS
149	5745	6	19.71	93.520	30	PASS
157	5785	6	19.49	88.901	30	PASS
165	5825	6	19.03	79.966	30	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	MCS0	16.33	42.940	30	PASS
44	5220	MCS0	16.25	42.156	30	PASS
48	5240	MCS0	16.30	42.644	30	PASS
149	5745	MCS0	19.90	97.692	30	PASS
157	5785	MCS0	19.42	87.470	30	PASS
165	5825	MCS0	18.91	77.779	30	PASS

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802.11n_HT40_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
38	5190	MCS0	12.48	17.682	30	PASS
46	5230	MCS0	12.50	17.764	30	PASS
151	5755	MCS0	19.34	85.809	30	PASS
159	5795	MCS0	19.54	89.853	30	PASS

802.11ac_VHT80_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
42	5210	MCS0	13.24	21.109	30	PASS
155	5775	MCS0	16.53	45.026	30	PASS

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10 PEAK 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 Acess Ponit	
		Mobile and portable clinet device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

10.2 Measurement Procedure

- Place the EUT on the table and set it in transmitting mode.
- The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
- 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)
For U-NII-3 Band:
Set RBW=500 kHz, VBW≥ 3RBW, 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)
- User the cursor on spectrum to peak search the highest level of trace
- Record the max. reading and add 10 log(1/duty cycle).
- Repeat above procedures until all default test channel (low, middle, and high) was complete.

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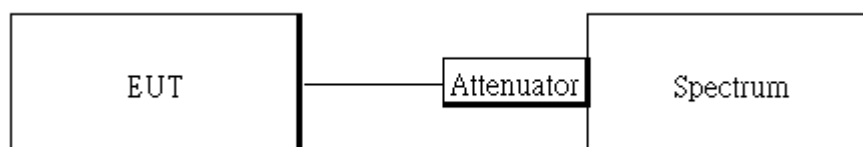
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10.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	2018/05/03	2019/05/02
DC Block	Mini-Circuits	BLK-18-S+	1	2018/01/02	2019/01/01
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01

10.4 Test Set-up



10.5 Measurement Result

POWER DENSITY 802.11a MODE						
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	4.43	11.80	0.19	4.62	17	-12.38
5220	2.52	11.80	0.19	2.71	17	-14.29
5240	3.80	11.80	0.19	3.99	17	-13.01
5745	12.73	11.70	-	12.73	30	-17.27
5785	12.18	11.70	-	12.18	30	-17.82
5825	11.82	11.70	-	11.82	30	-18.18

POWER DENSITY 802.11n HT20 MODE						
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	4.26	11.80	0.19	4.45	17	-12.55
5220	4.59	11.80	0.19	4.78	17	-12.22
5240	3.94	11.80	0.19	4.13	17	-12.87
5745	12.24	11.70	-	12.24	30	-17.76
5785	12.39	11.70	-	12.39	30	-17.61
5825	11.79	11.70	-	11.79	30	-18.21

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POWER DENSITY 802.11n HT40 MODE						
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5190	-4.72	11.80	0.39	-4.33	17	-21.33
5230	-3.57	11.80	0.39	-3.18	17	-20.18
5755	8.39	11.70	-	8.39	30	-21.61
5795	9.93	11.70	-	9.93	30	-20.07

POWER DENSITY 802.11ac VHT80 MODE						
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5210	-9.25	11.80	0.75	-8.50	17	-25.50
5775	3.11	11.70	-	3.11	30	-26.89

Note:

SISO offset=

11.8

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802.11a 5150~5250 MHz Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



Peak Power Spectral Density Data Plot (CH High 5240 MHz)



802.11a 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5785 MHz)



Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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802.11n HT20, 5150~5250 MHz
Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



Peak Power Spectral Density Data Plot (CH High 5240 MHz)



802.11n HT20, 5725~5850 MHz
Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5785 MHz)



Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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802.11n HT40, 5150~5250 MHz

Peak Power Spectral Density Data Plot (CH Low 5190 MHz)



Peak Power Spectral Density Data Plot (CH High 5795 MHz)



Peak Power Spectral Density Data Plot (CH High 5230 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5210 MHz)



802.11n HT40, 5725~5850 MHz

Peak Power Spectral Density Data Plot (CH Low 5755 MHz)



802.11ac VHT80, 5725~5850 MHz

Peak Power Spectral Density Data Plot (CH Mid 5775 MHz)



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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

SGS SAC-III					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bi-log Antenna	SCHWAZBECK	VULB9168	378	2017/12/29	2018/12/28
Horn Antenna	Schwarzbeck	BBHA9120D	1441	2017/08/04	2018/08/03
Horn Antenna	Schwarzbeck	BBHA9120D	1441	2018/08/04	2019/08/03
Horn Antenna	Schwarzbeck	BBHA9170	184	2017/12/12	2018/12/11
Loop Antenna	ETS.LINDGREN	6502	148045	2017/09/26	2018/09/25
3m Site NSA	SGS	966 chamber	N/A	2018/01/02	2019/01/01
Spectrum Analyzer	Agilent	E4446A	MY51100003	2018/05/15	2019/05/14
EMI Test Receiver	R&S	ESCI7	100335	2018/02/02	2019/02/01
Pre-Amplifier	HP	8449B	3008A00578	2018/01/02	2019/01/01
Pre-Amplifier	HP	8447D	2944A07676	2018/01/02	2019/01/01
Pre-Amplifier	EMC Instruments	EMC184045B	980135	2017/10/27	2018/10/26
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Filter 5150-5350 MHz	Micro-Tronics	BRM50703	1	2018/01/02	2019/01/01
Low Loss Cable	Huber Suhner	966_RX	9	2018/01/02	2019/01/01

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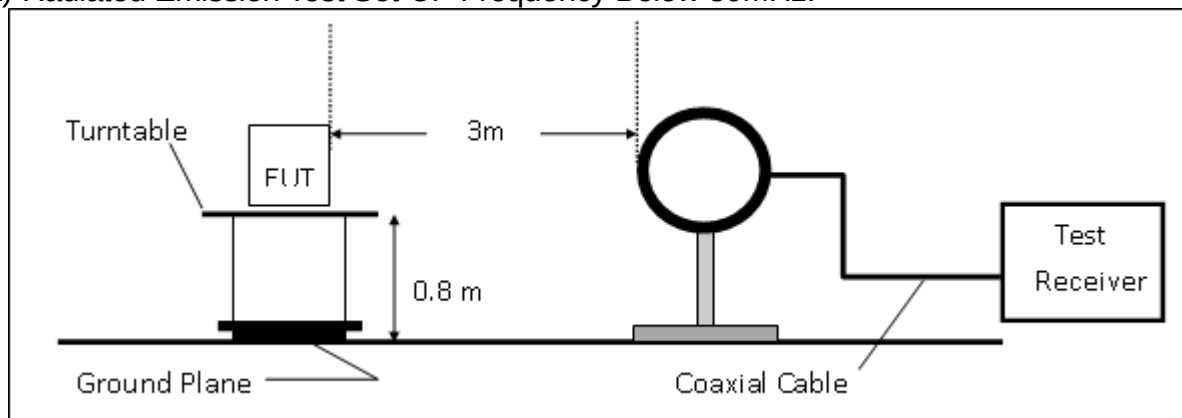
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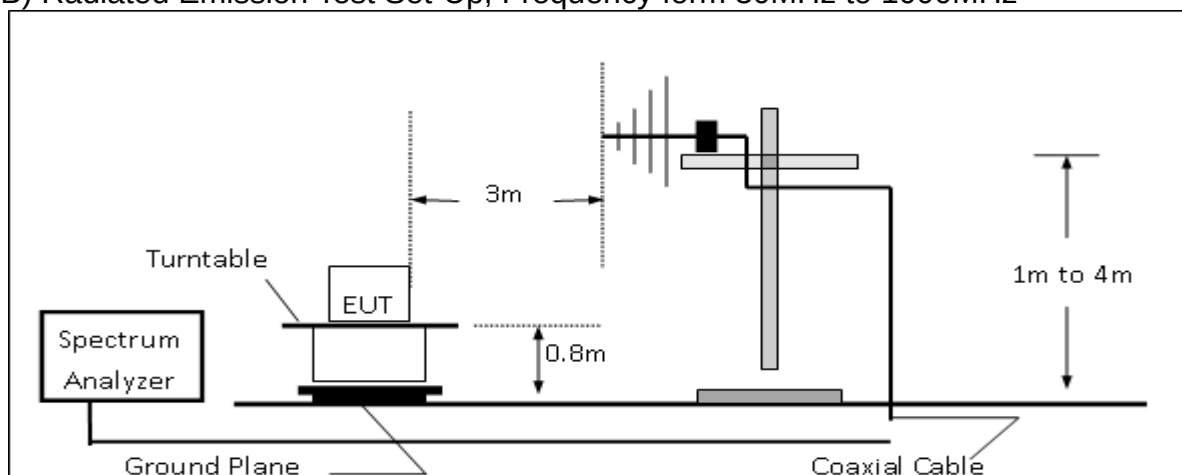
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11.3 Test SET-UP

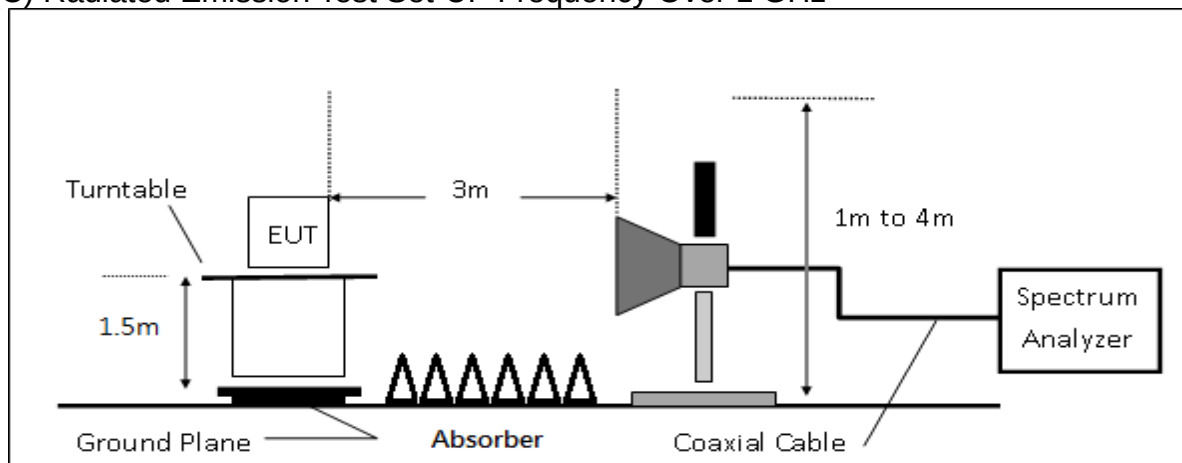
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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 .

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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 attach tabular data sheets.

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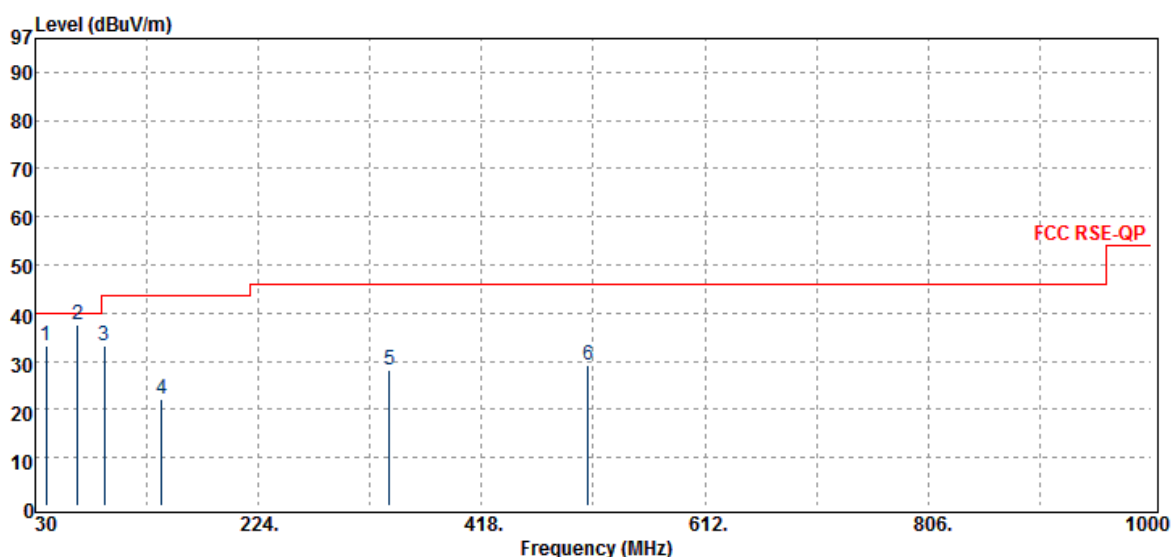
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Radiated Spurious Emission Measurement Result Below 1GHz Worst-Case Data: 802.11a 5150~5250 MHz

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

Test Date :2018-08-06
Temp./Humi. :23 deg_C / 62 RH
Engineer :Kane
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
39.70	Peak	41.43	-8.28	33.15	40.00	-6.85
66.86	Peak	46.86	-9.42	37.44	40.00	-2.56
90.14	Peak	46.97	-13.66	33.31	43.50	-10.19
139.61	Peak	30.17	-8.00	22.17	43.50	-21.33
337.49	Peak	33.03	-4.85	28.18	46.00	-17.82
510.15	Peak	31.31	-2.06	29.25	46.00	-16.75

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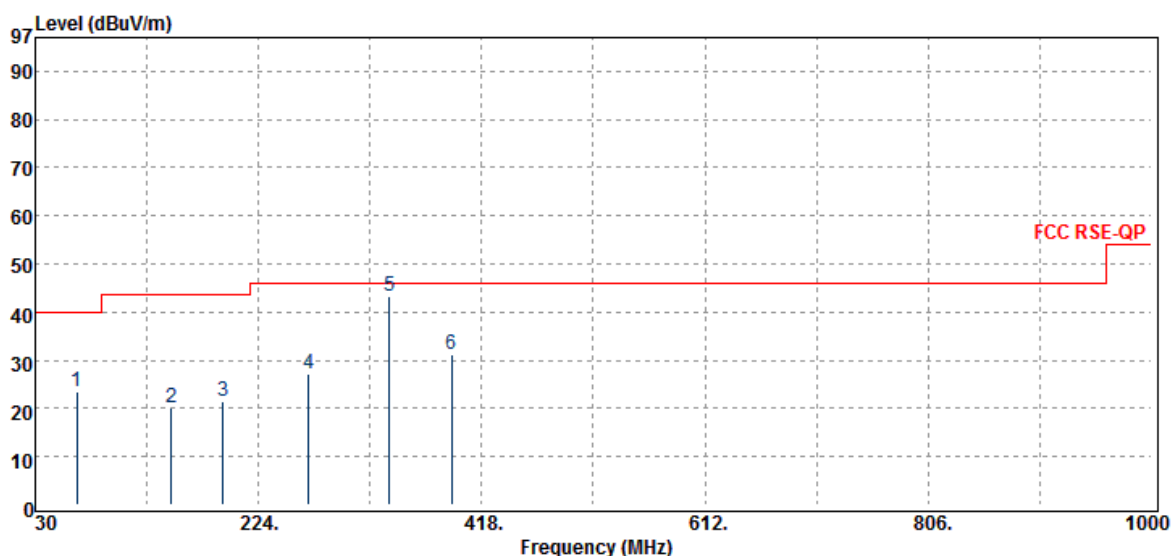
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Operation Band :802.11aB1
 Fundamental Frequency :5220 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-06
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
65.89	Peak	32.78	-9.20	23.58	40.00	-16.42
148.34	Peak	27.60	-7.47	20.13	43.50	-23.37
192.96	Peak	30.56	-9.06	21.50	43.50	-22.00
267.65	Peak	33.86	-6.74	27.12	46.00	-18.88
337.49	Peak	48.10	-4.85	43.25	46.00	-2.75
391.81	Peak	34.85	-3.55	31.30	46.00	-14.70

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802.11a, 5725~5850 MHz

Operation Band :802.11aB4

Fundamental Frequency :5785 MHz

Operation Mode :Tx CH MID

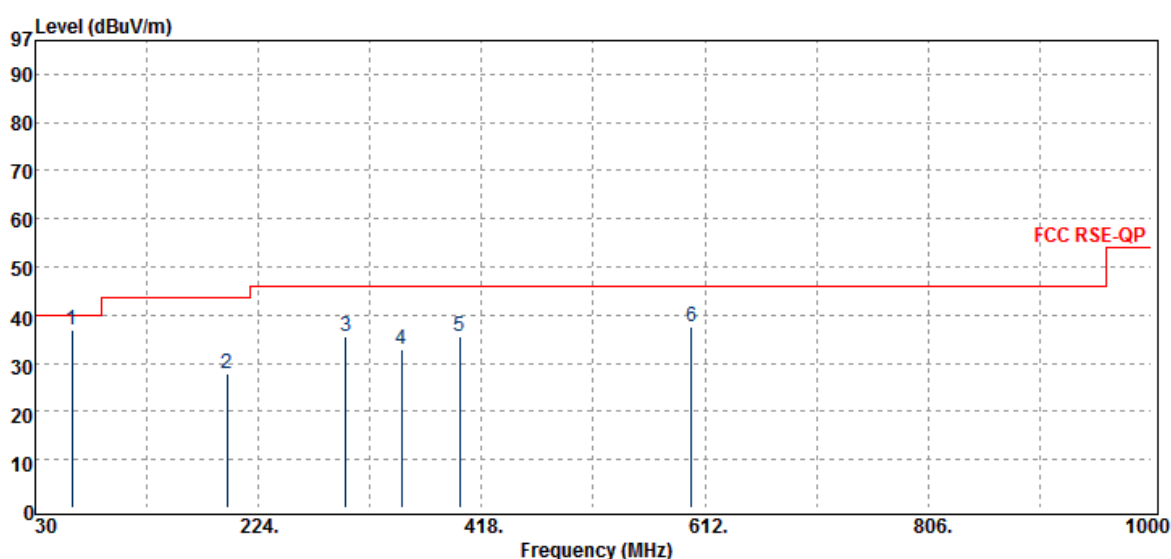
EUT Pol. :E2 Plane

Test Date :2018-08-21

Temp./Humi. :23 deg_C / 62 RH

Engineer :Kane

Measurement Pol. Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
62.01	Peak	45.34	-8.28	37.06	40.00	-2.94
196.84	Peak	36.93	-9.19	27.74	43.50	-15.76
299.66	Peak	40.97	-5.52	35.45	46.00	-10.55
348.16	Peak	37.61	-4.64	32.97	46.00	-13.03
398.60	Peak	38.83	-3.41	35.42	46.00	-10.58
600.36	Peak	37.48	0.12	37.60	46.00	-8.40

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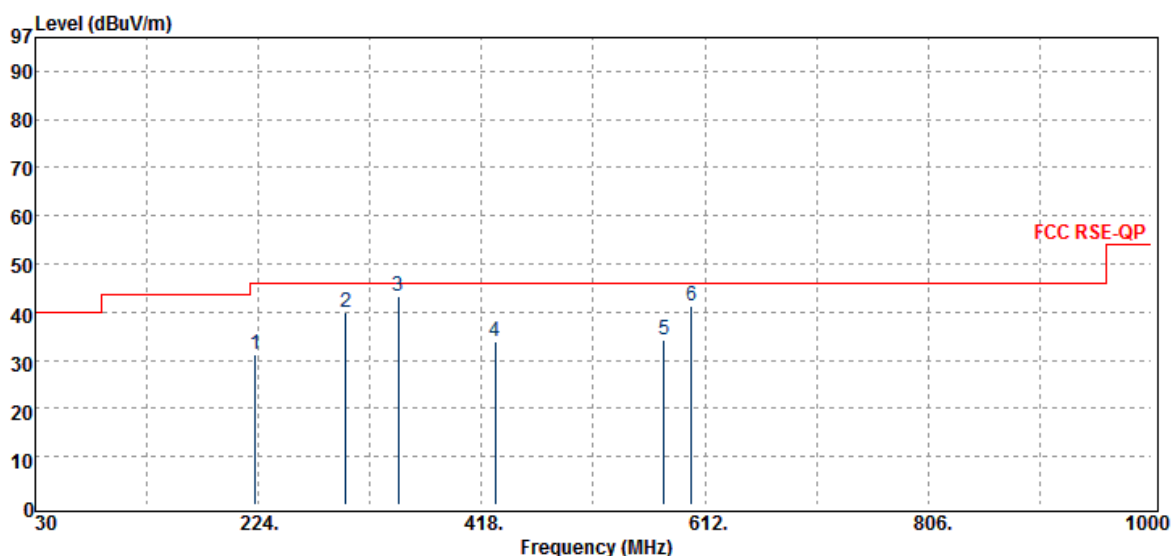
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Operation Band :802.11aB4
 Fundamental Frequency :5785 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
221.09	Peak	40.36	-9.01	31.35	46.00	-14.65
299.66	Peak	45.35	-5.52	39.83	46.00	-6.17
345.25	Peak	47.77	-4.57	43.20	46.00	-2.80
429.64	Peak	36.45	-2.70	33.75	46.00	-12.25
576.11	Peak	34.40	-0.11	34.29	46.00	-11.71
600.36	Peak	41.14	0.12	41.26	46.00	-4.74

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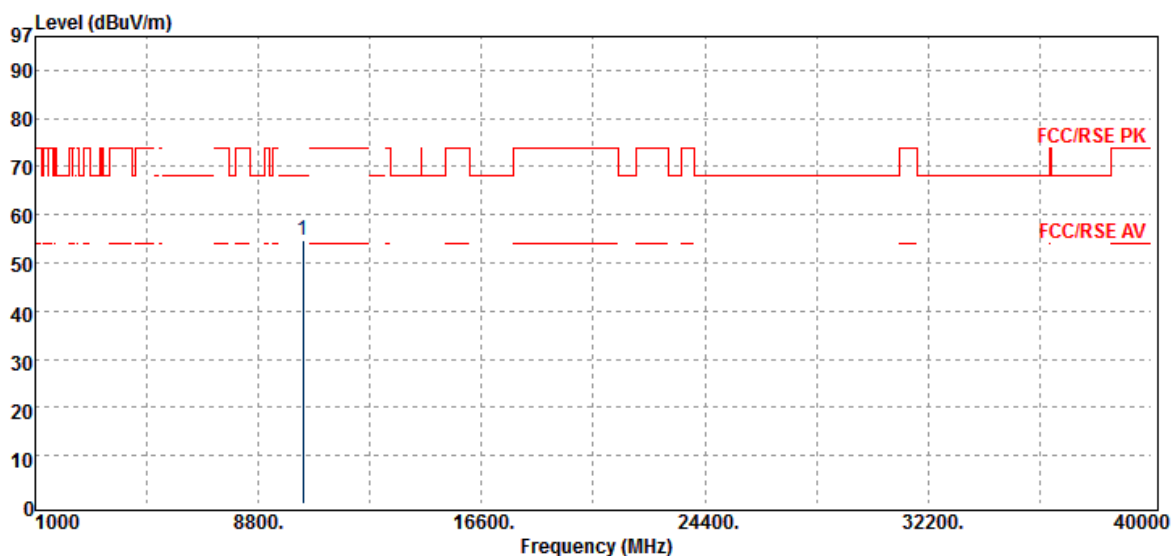
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Above 1GHz Worst-Case Data:

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

Operation Band	:802.11aB1	Test Date	:2018-08-02
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	Peak	34.90	19.71	54.61	68.20	-13.59

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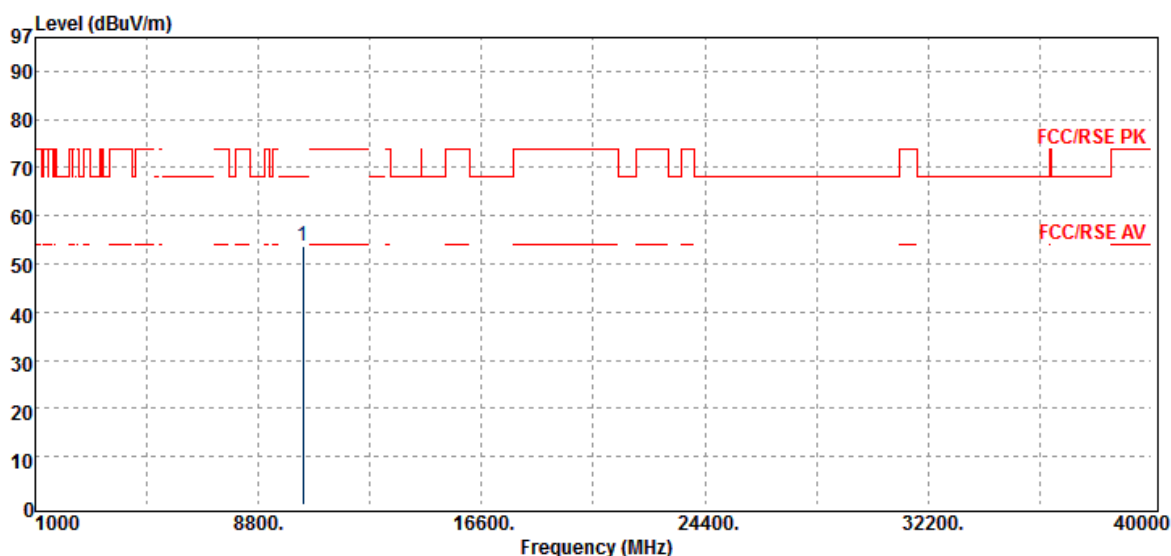
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Operation Band	:802.11aB1	Test Date	:2018-08-02
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	Peak	33.89	19.71	53.60	68.20	-14.60

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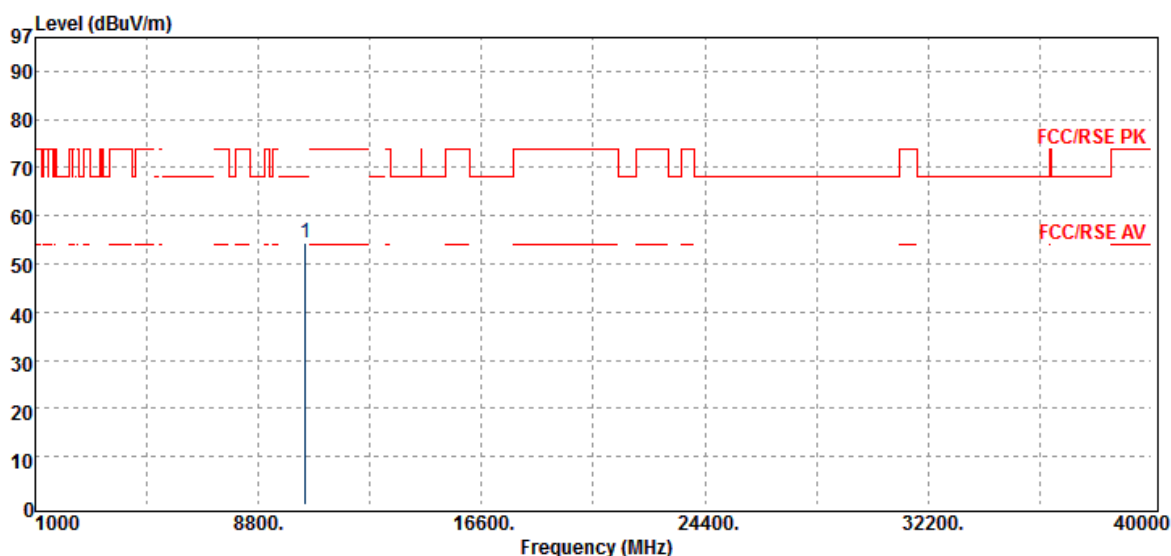
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Operation Band :802.11aB1
 Fundamental Frequency :5220 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
10440.00	Peak	34.17	20.05	54.22	68.20	-13.98

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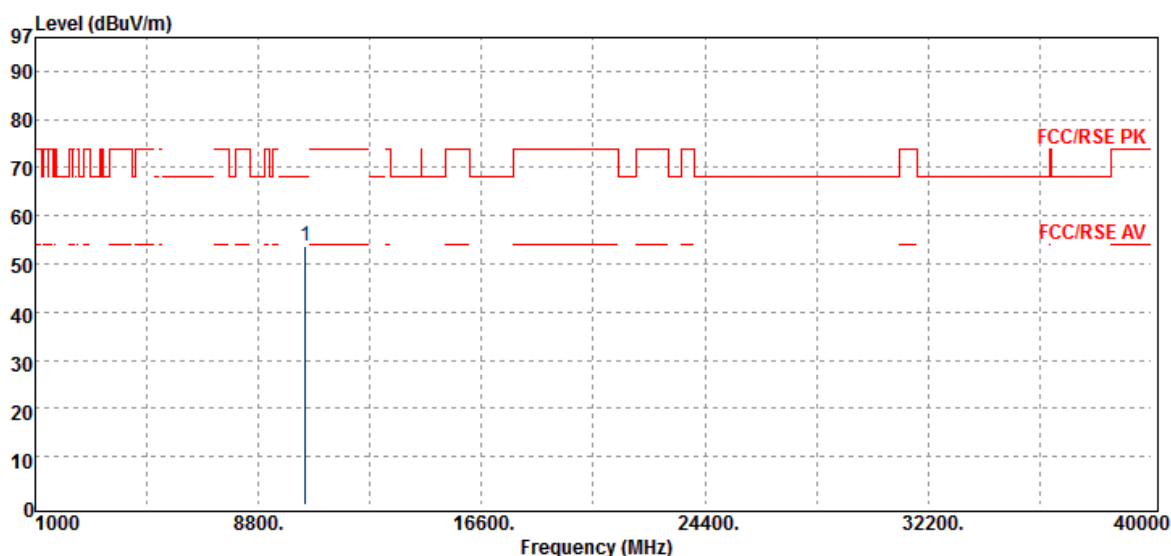
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Operation Band :802.11aB1
 Fundamental Frequency :5220 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10440.00	Peak	33.67	20.05	53.72	68.20	-14.48

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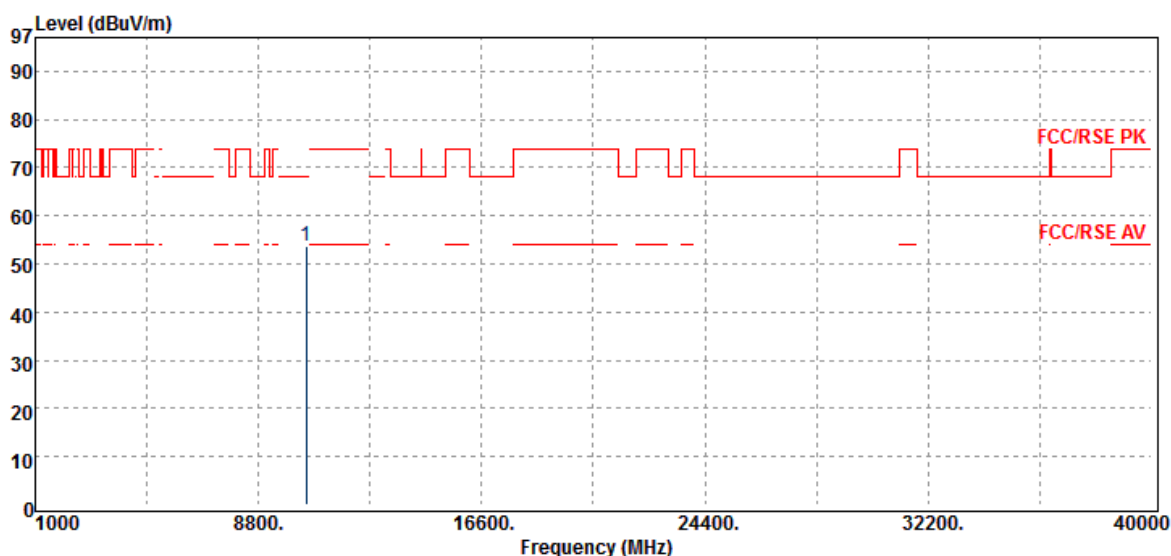
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Operation Band	:802.11aB1	Test Date	:2018-08-02
Fundamental Frequency	:5240 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10480.00	Peak	33.73	20.07	53.80	68.20	-14.40

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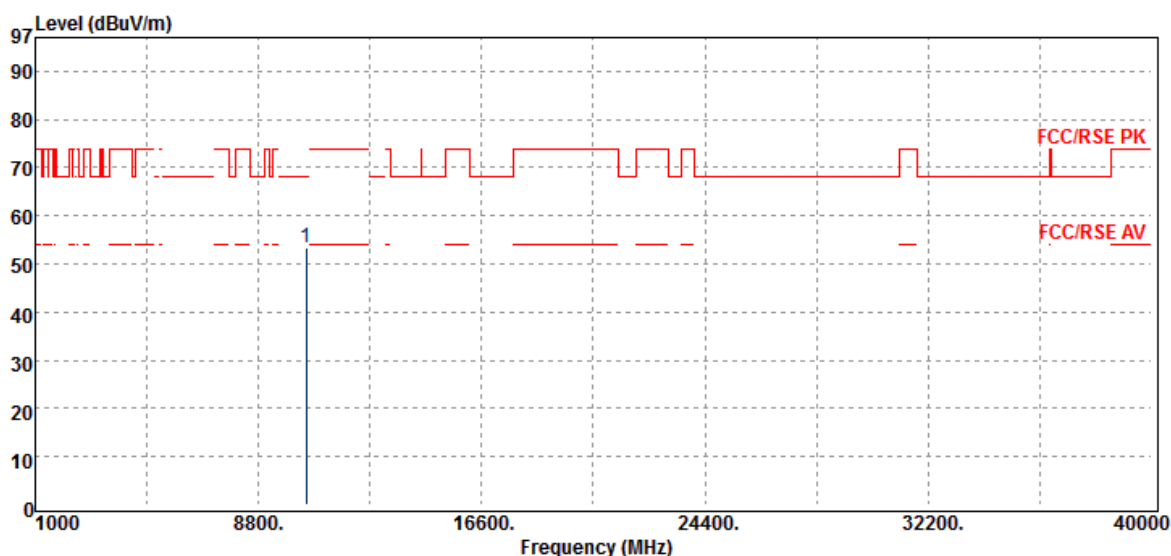
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Operation Band	:802.11aB1	Test Date	:2018-08-02
Fundamental Frequency	:5240 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10480.00	Peak	33.16	20.07	53.23	68.20	-14.97

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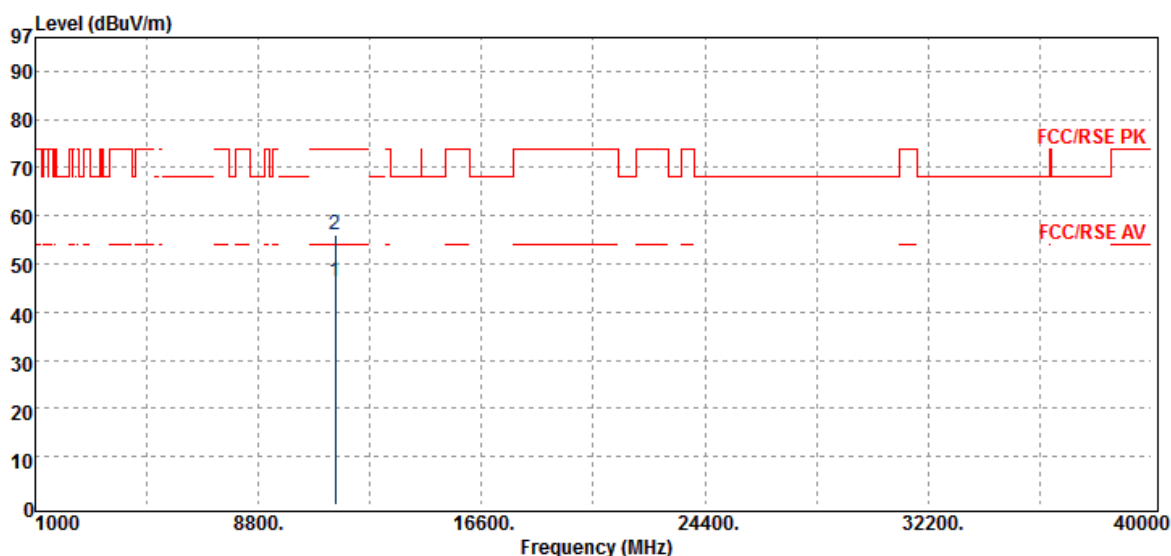
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Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz

Operation Band	:802.11aB4	Test Date	:2018-08-21
Fundamental Frequency	:5745 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	Average	24.82	21.61	46.43	54.00	-7.57
11490.00	Peak	34.52	21.61	56.13	74.00	-17.87

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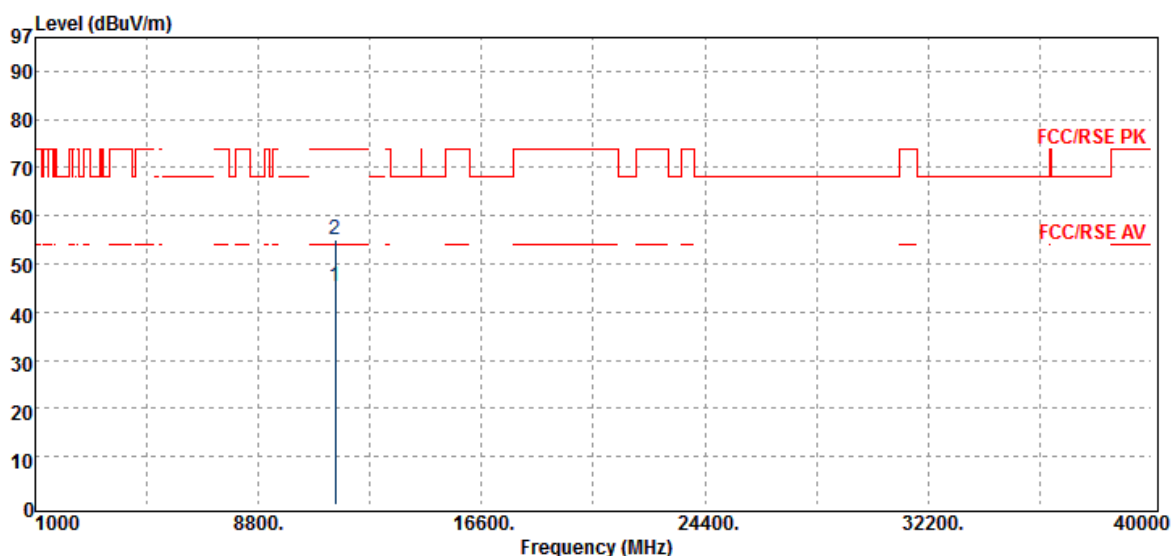
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Operation Band	:802.11aB4	Test Date	:2018-08-21
Fundamental Frequency	:5745 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	Average	23.78	21.61	45.39	54.00	-8.61
11490.00	Peak	33.58	21.61	55.19	74.00	-18.81

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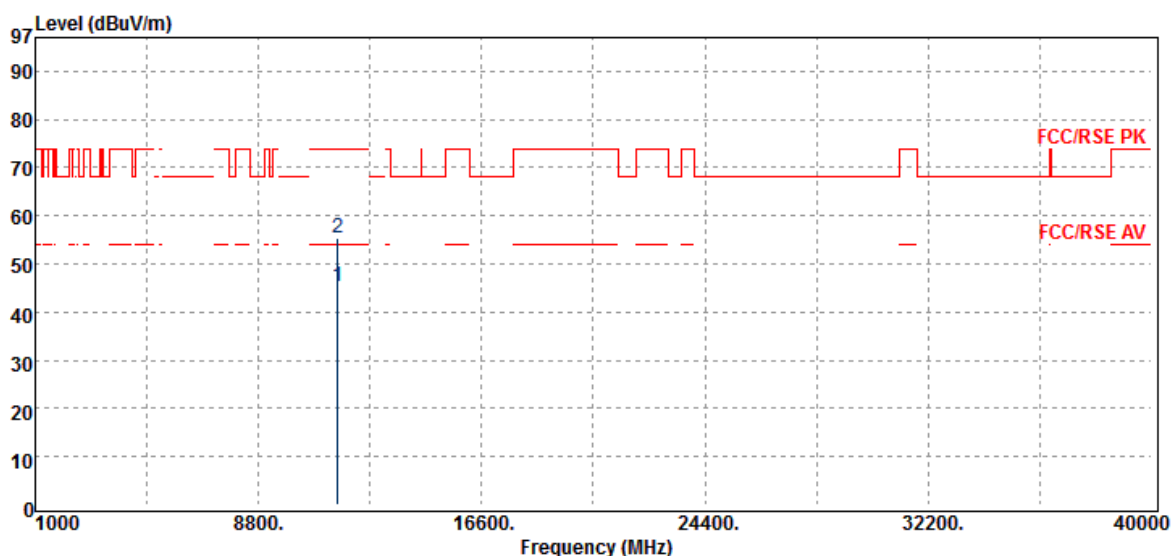
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Operation Band :802.11aB4
 Fundamental Frequency :5785 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
11570.00	Average	23.68	21.66	45.34	54.00	-8.66
11570.00	Peak	33.77	21.66	55.43	74.00	-18.57

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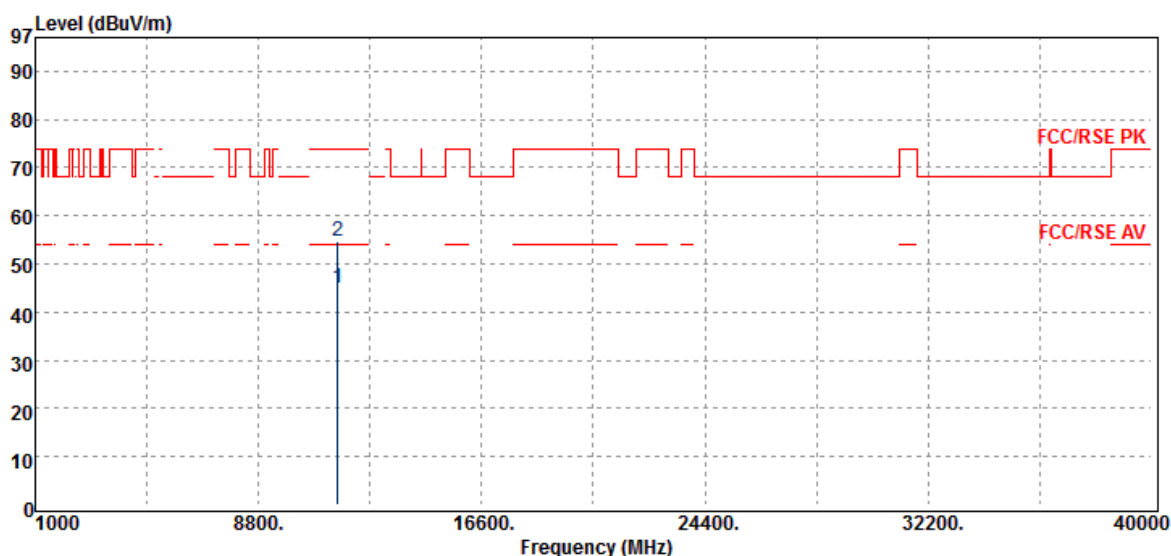
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Operation Band :802.11aB4
 Fundamental Frequency :5785 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11570.00	Average	23.28	21.66	44.94	54.00	-9.06
11570.00	Peak	33.13	21.66	54.79	74.00	-19.21

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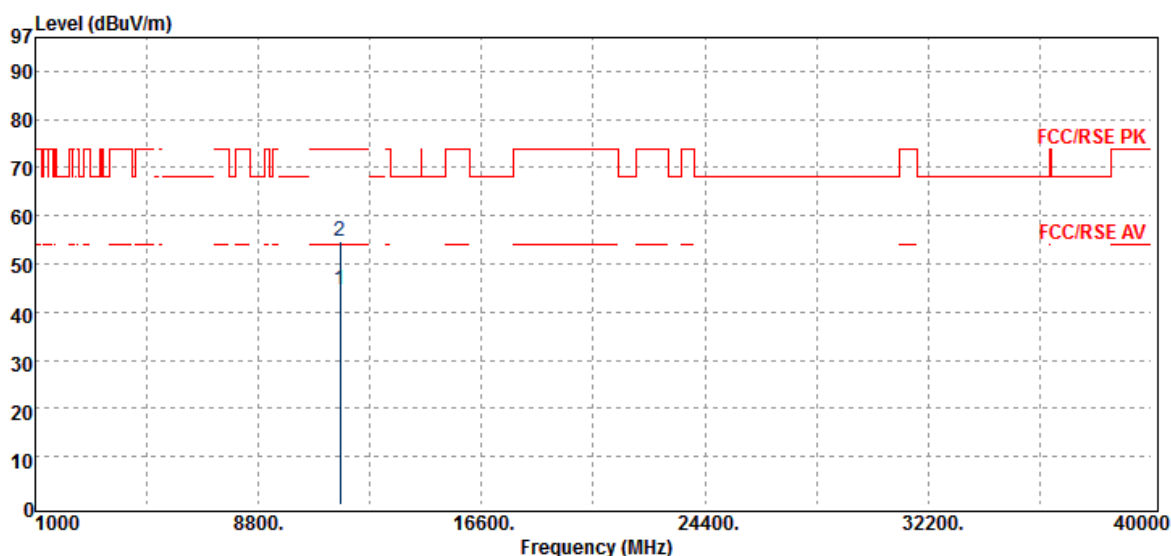
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Operation Band	:802.11aB4	Test Date	:2018-08-21
Fundamental Frequency	:5825 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11650.00	Average	23.13	21.60	44.73	54.00	-9.27
11650.00	Peak	33.17	21.60	54.77	74.00	-19.23

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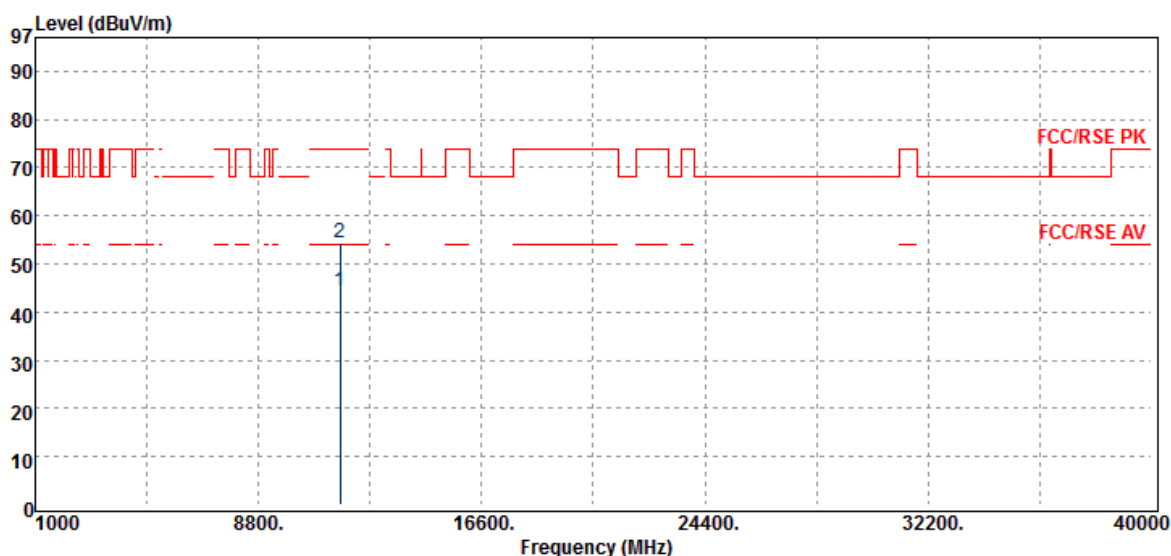
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Operation Band	:802.11aB4	Test Date	:2018-08-21
Fundamental Frequency	:5825 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11650.00	Average	22.69	21.60	44.29	54.00	-9.71
11650.00	Peak	32.75	21.60	54.35	74.00	-19.65

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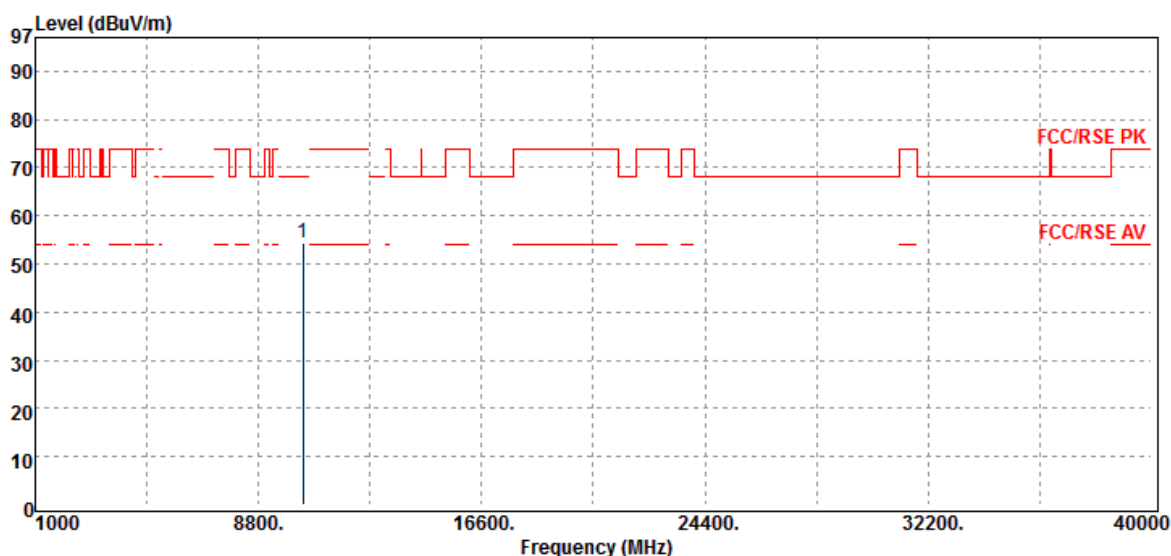
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Member of SGS Group

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

Operation Band	:802.11n20B1	Test Date	:2018-08-02
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	Peak	34.79	19.71	54.50	68.20	-13.70

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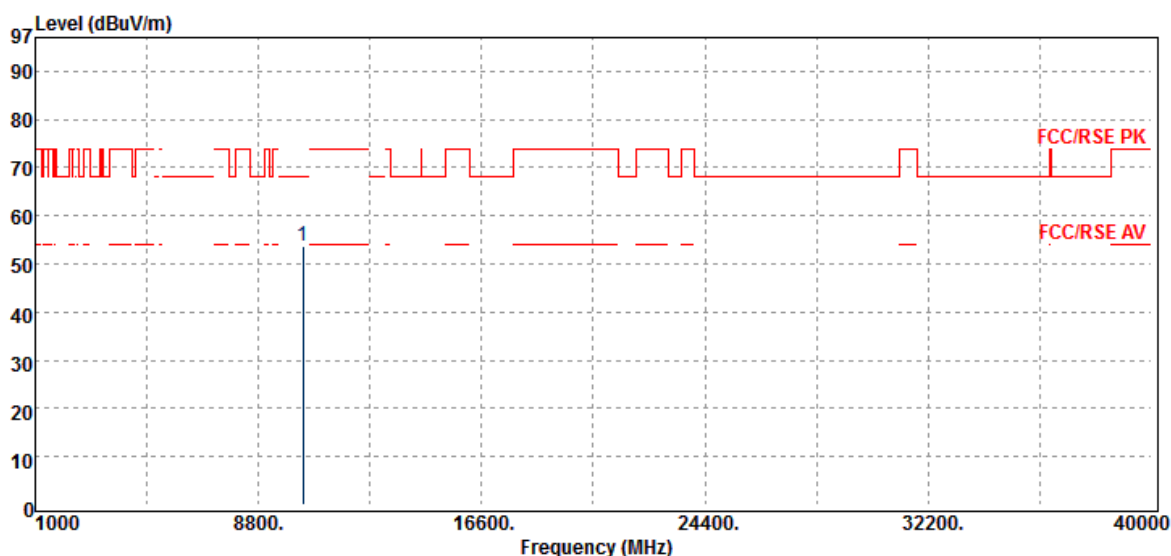
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Operation Band :802.11n20B1
 Fundamental Frequency :5180 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. Antenna :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	Peak	34.07	19.71	53.78	68.20	-14.42

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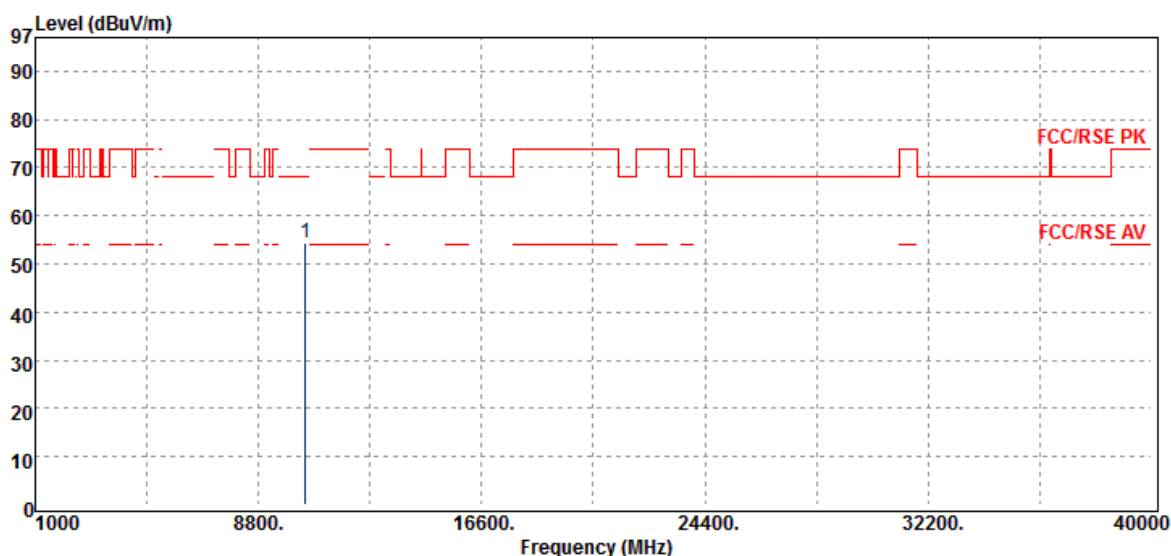
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Operation Band :802.11n20B1
 Fundamental Frequency :5220 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
10440.00	Peak	34.16	20.05	54.21	68.20	-13.99

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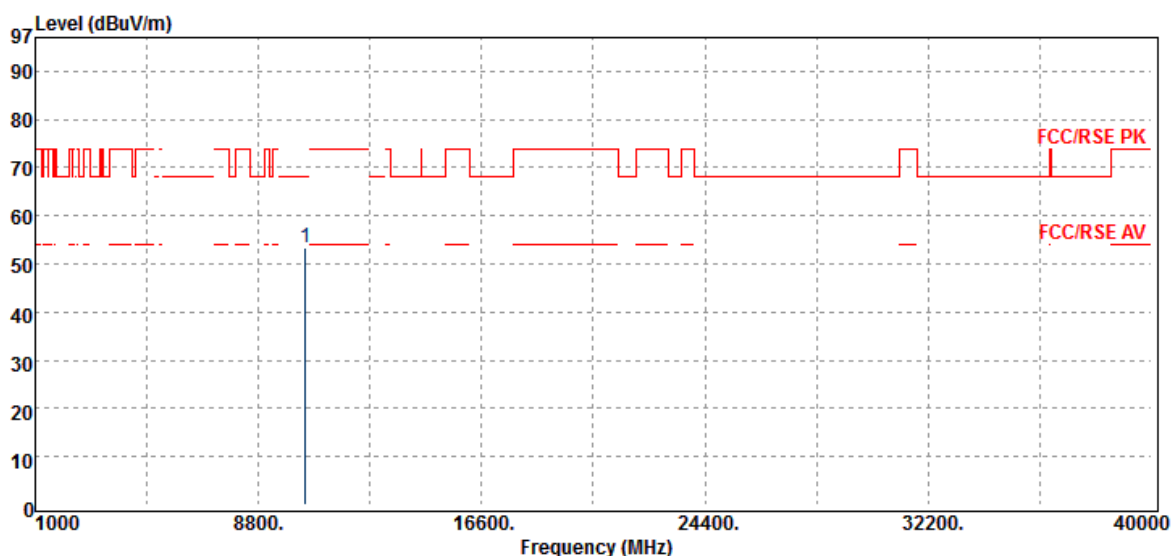
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Operation Band :802.11n20B1
 Fundamental Frequency :5220 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10440.00	Peak	33.46	20.05	53.51	68.20	-14.69

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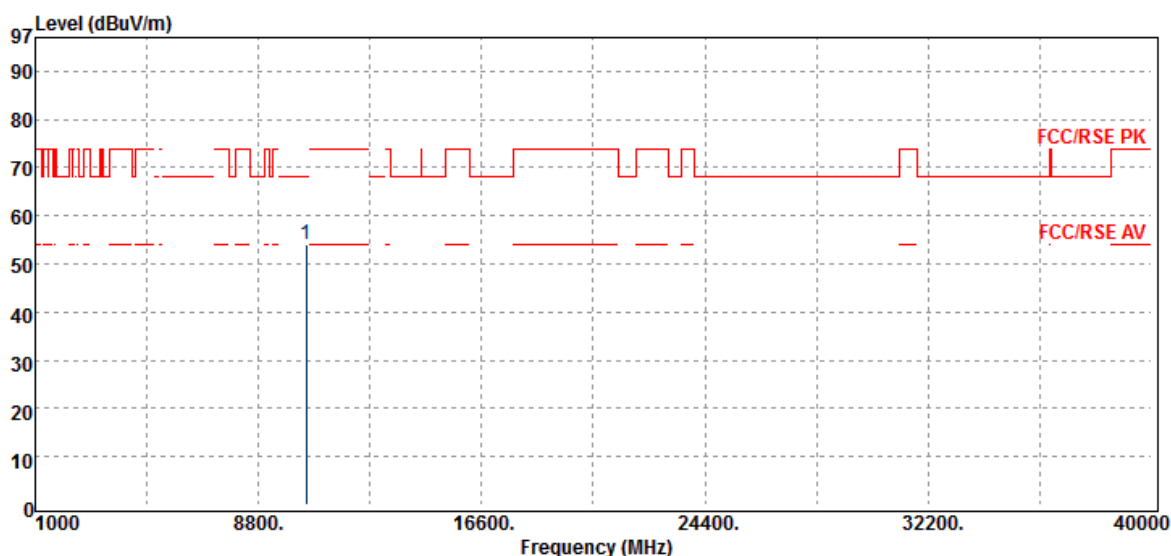
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Operation Band :802.11n20B1
 Fundamental Frequency :5240 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
10480.00	Peak	33.99	20.07	54.06	68.20	-14.14

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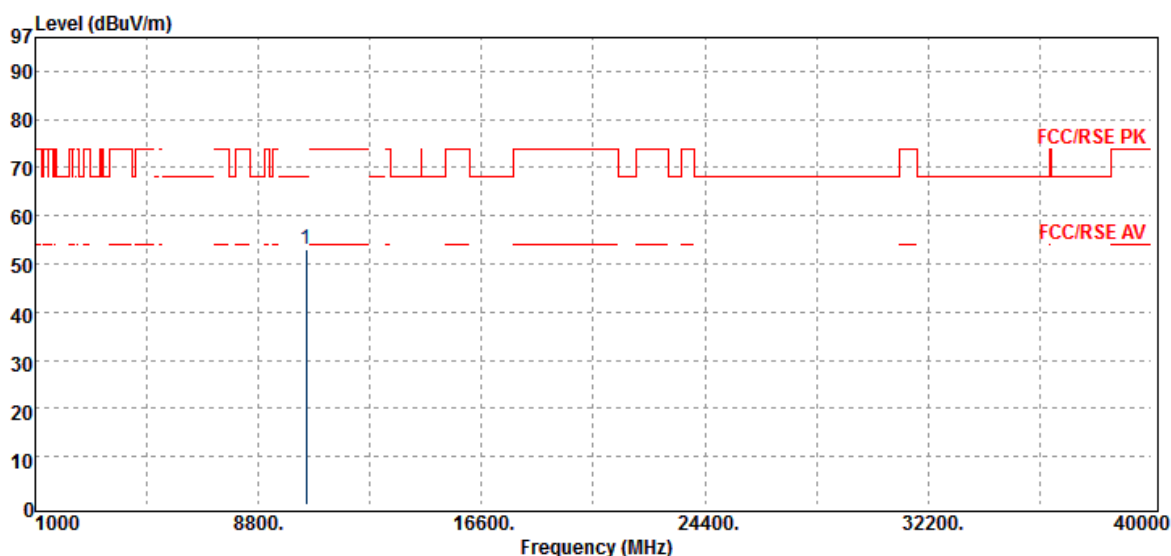
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Operation Band :802.11n20B1
 Fundamental Frequency :5240 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10480.00	Peak	32.94	20.07	53.01	68.20	-15.19

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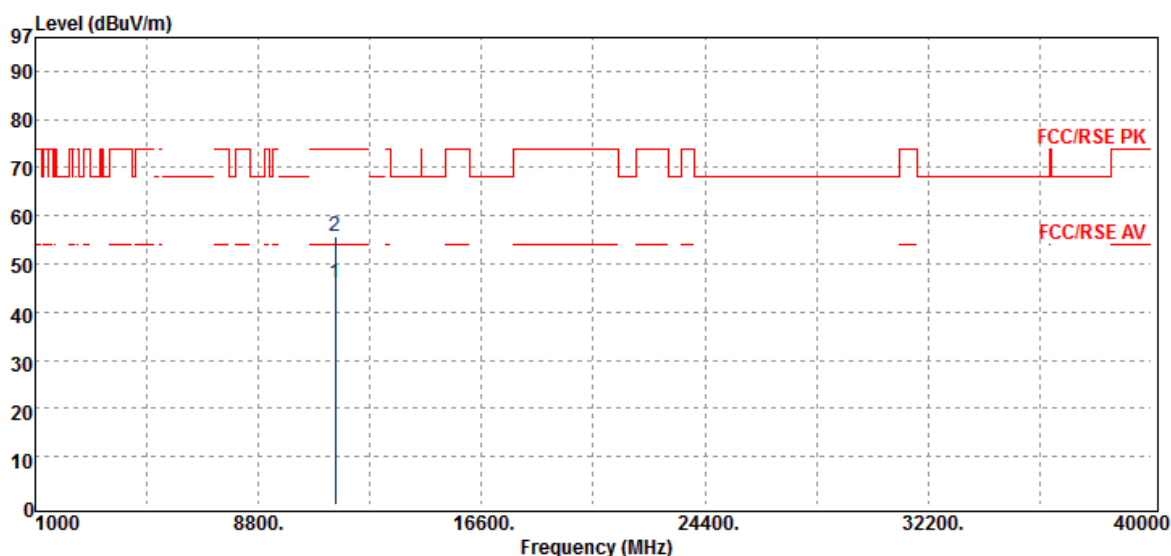
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Radiated Spurious Emission Measurement Result 802.11n HT20, 5725~5850 MHz

Operation Band	:802.11n20B4	Test Date	:2018-08-21
Fundamental Frequency	:5745 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	Average	24.36	21.61	45.97	54.00	-8.03
11490.00	Peak	34.13	21.61	55.74	74.00	-18.26

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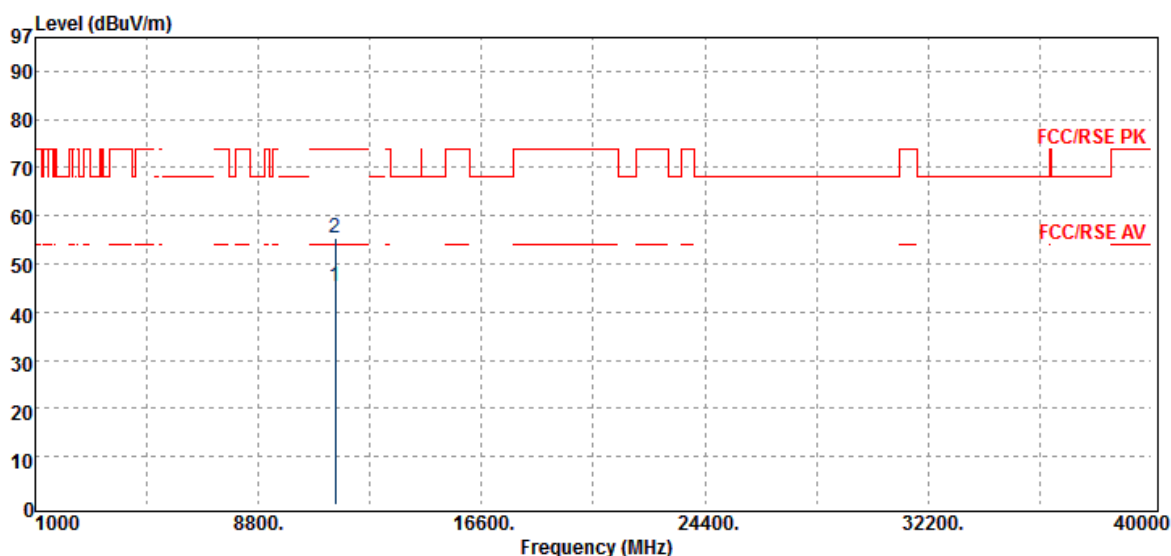
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Operation Band :802.11n20B4
 Fundamental Frequency :5745 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	Average	23.76	21.61	45.37	54.00	-8.63
11490.00	Peak	33.82	21.61	55.43	74.00	-18.57

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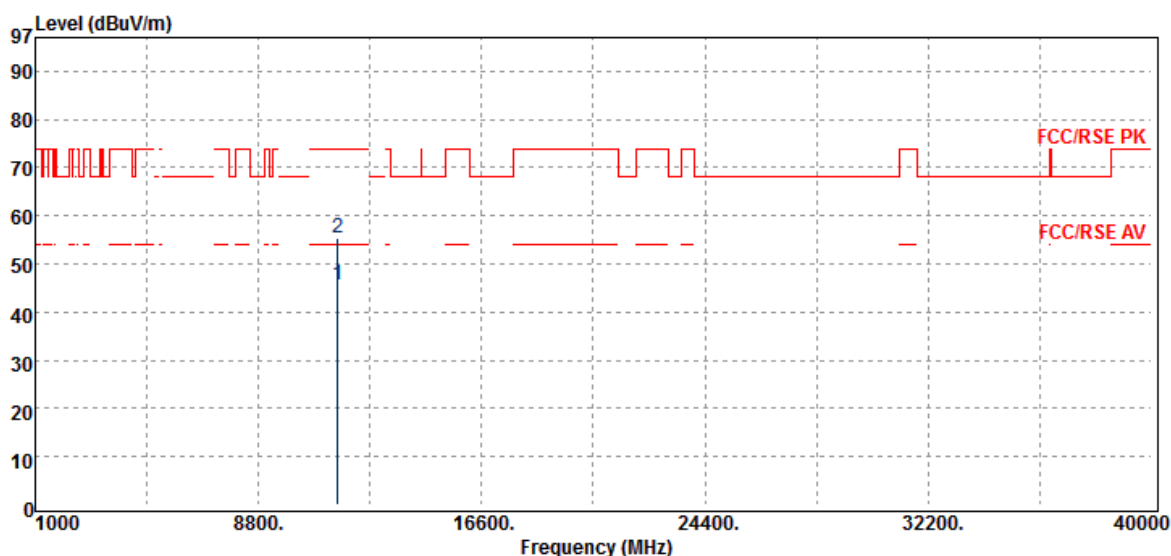
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Member of SGS Group

Operation Band :802.11n20B4
 Fundamental Frequency :5785 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11570.00	Average	23.90	21.66	45.56	54.00	-8.44
11570.00	Peak	33.72	21.66	55.38	74.00	-18.62

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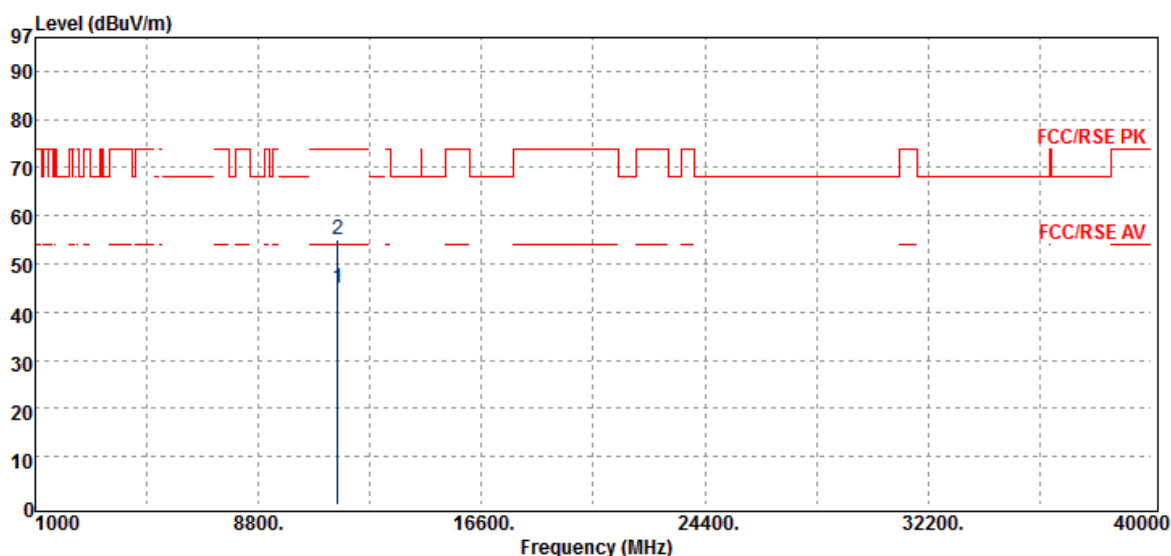
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www.tw.sgs.com

Member of SGS Group

Operation Band :802.11n20B4
 Fundamental Frequency :5785 MHz
 Operation Mode :Tx CH MID
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. Antenna :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11570.00	Average	23.48	21.66	45.14	54.00	-8.86
11570.00	Peak	33.24	21.66	54.90	74.00	-19.10

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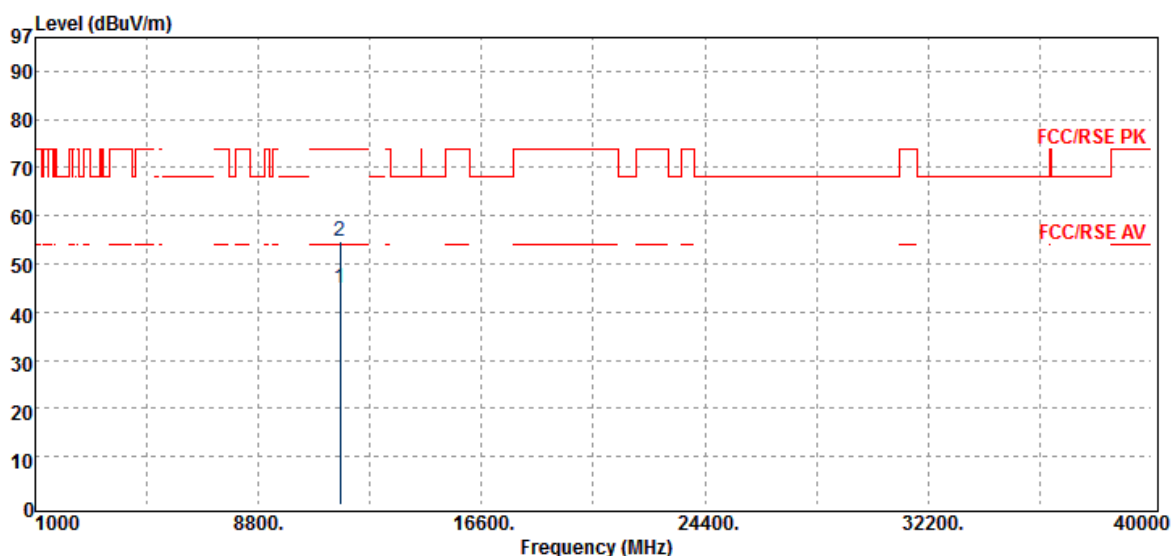
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Member of SGS Group

Operation Band :802.11n20B4
 Fundamental Frequency :5825 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
11650.00	Average	23.26	21.60	44.86	54.00	-9.14
11650.00	Peak	33.04	21.60	54.64	74.00	-19.36

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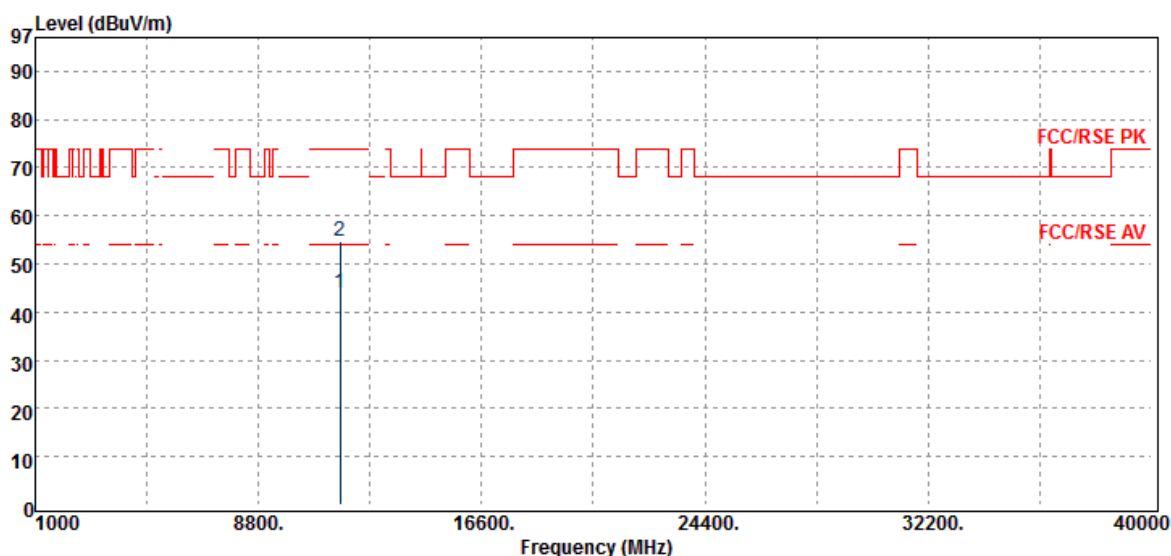
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Operation Band :802.11n20B4
 Fundamental Frequency :5825 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11650.00	Average	22.47	21.60	44.07	54.00	-9.93
11650.00	Peak	32.95	21.60	54.55	74.00	-19.45

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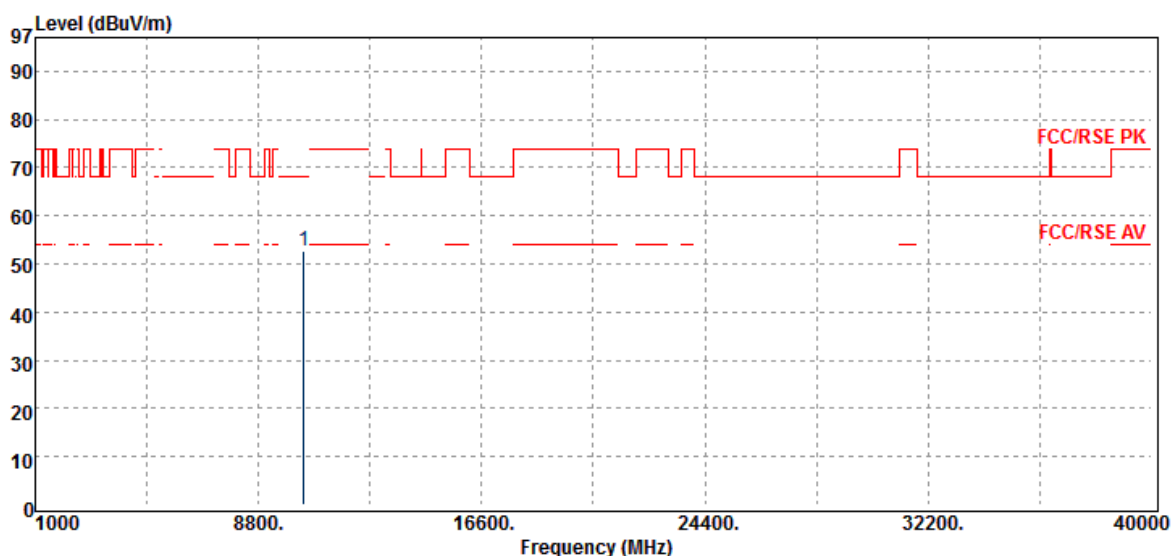
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Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

Operation Band	:802.11n40B1	Test Date	:2018-08-02
Fundamental Frequency	:5190 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10380.00	Peak	33.08	19.78	52.86	68.20	-15.34

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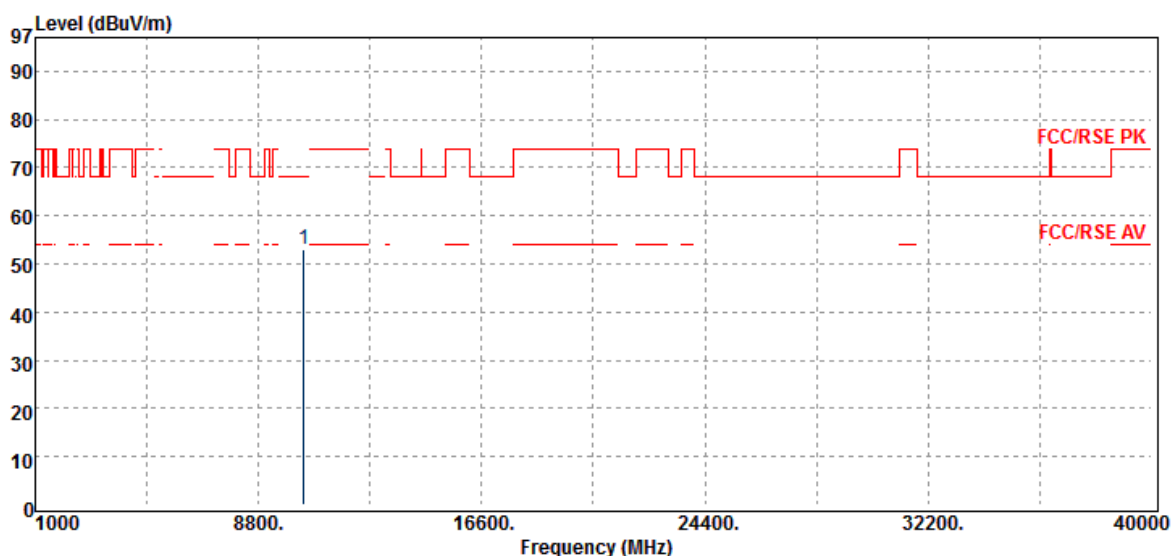
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www.tw.sgs.com

Member of SGS Group

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

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10380.00	Peak	33.24	19.78	53.02	68.20	-15.18

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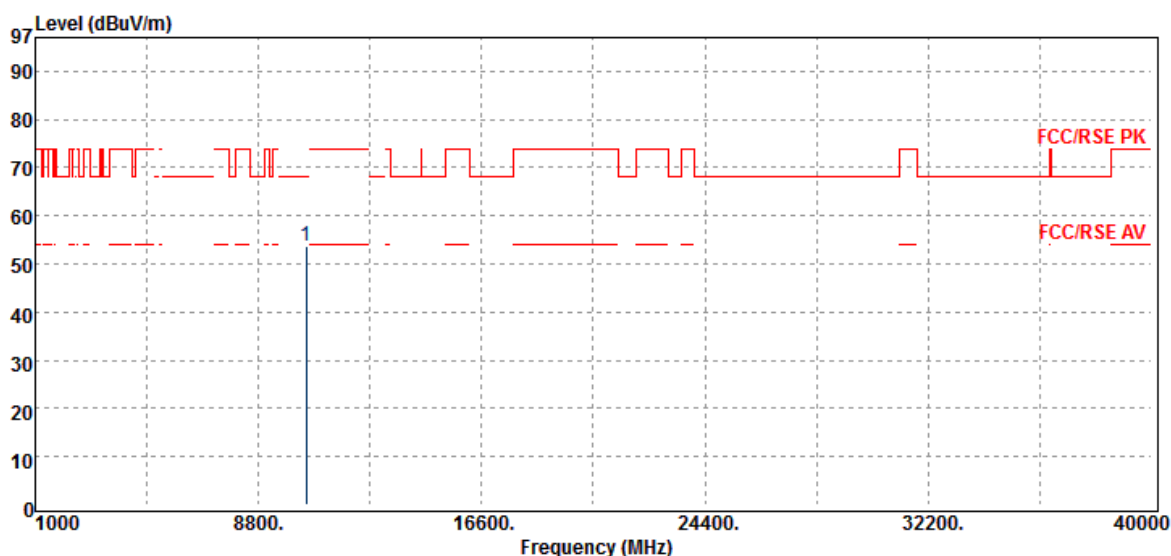
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Member of SGS Group

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

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
10460.00	Peak	33.64	20.07	53.71	68.20	-14.49

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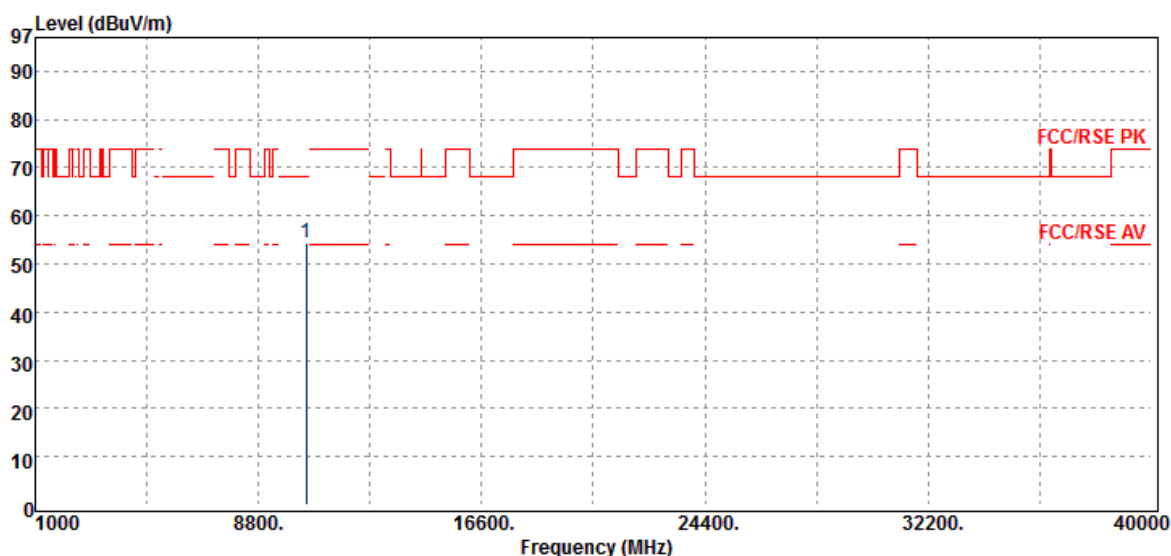
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www.tw.sgs.com

Member of SGS Group

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

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10460.00	Peak	34.22	20.07	54.29	68.20	-13.91

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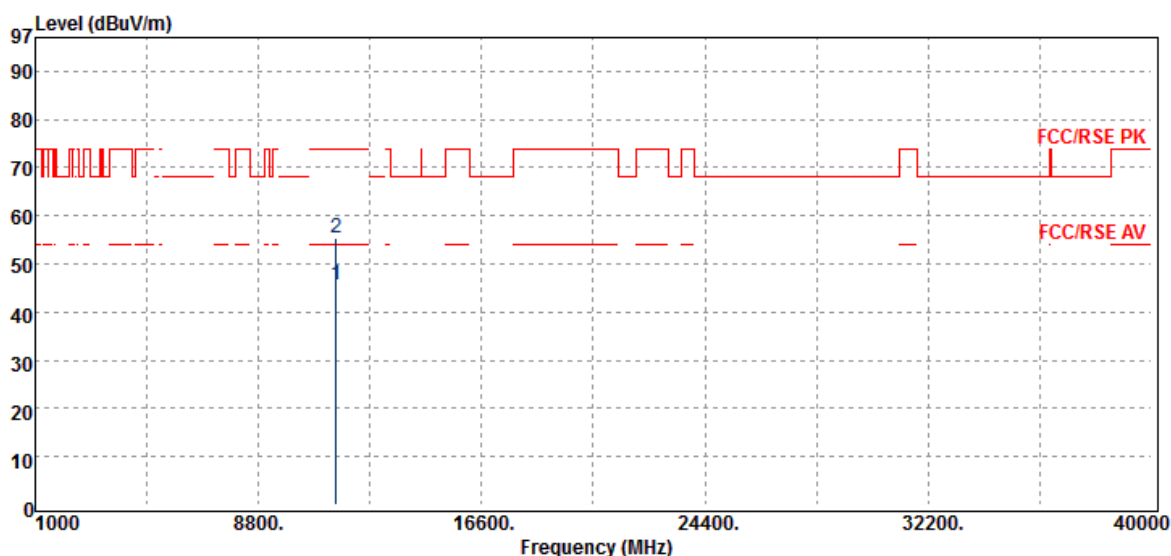
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Radiated Spurious Emission Measurement Result 802.11n HT40, 5725~5850 MHz

Operation Band	:802.11n40B4	Test Date	:2018-08-21
Fundamental Frequency	:5755 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	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
11510.00	Average	23.87	21.66	45.53	54.00	-8.47
11510.00	Peak	33.72	21.66	55.38	74.00	-18.62

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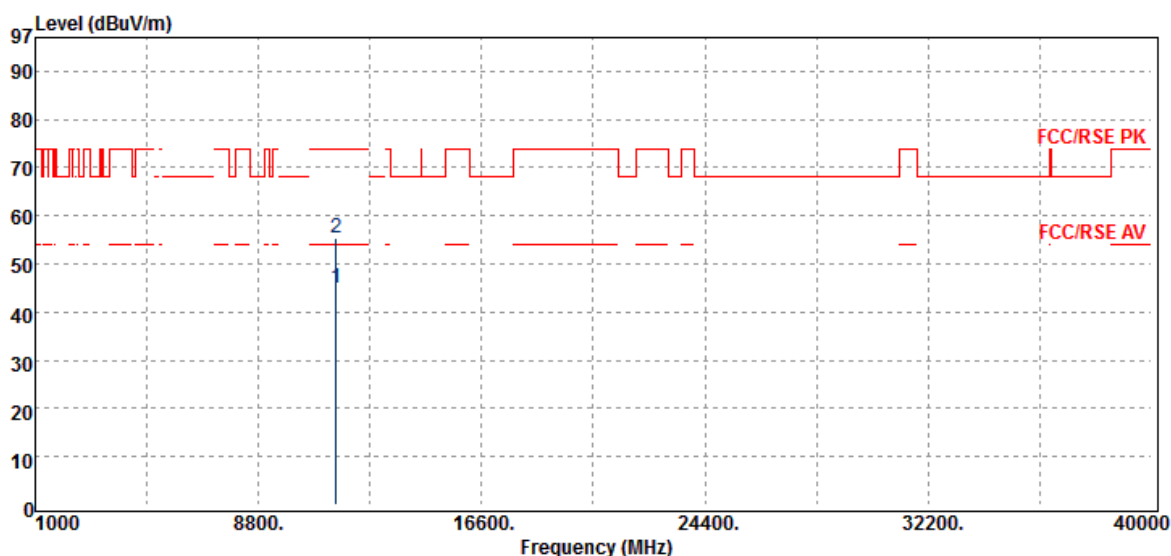
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Operation Band :802.11n40B4
 Fundamental Frequency :5755 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11510.00	Average	23.47	21.66	45.13	54.00	-8.87
11510.00	Peak	33.85	21.66	55.51	74.00	-18.49

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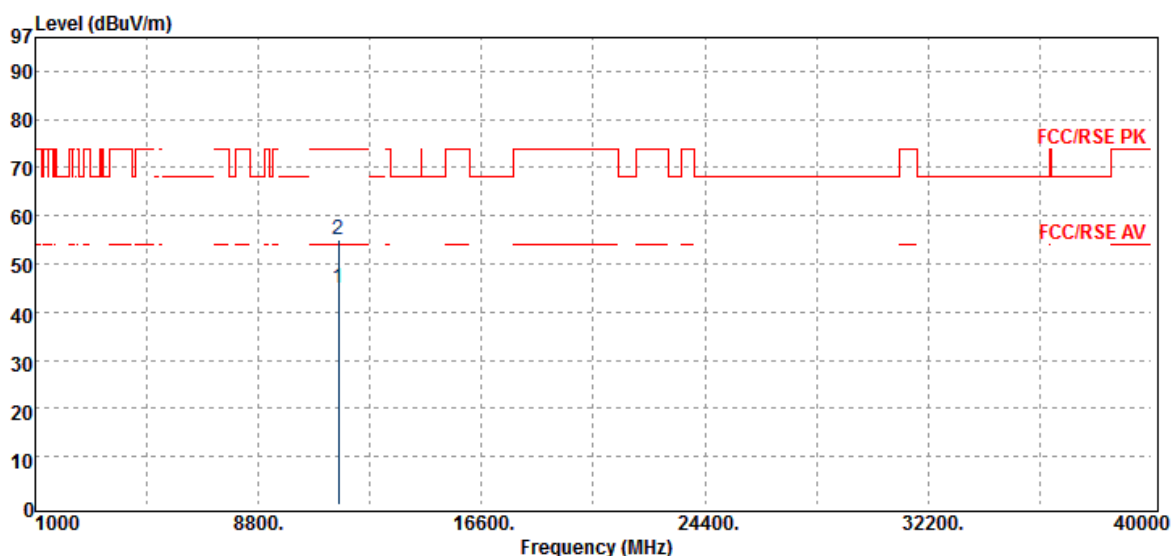
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Operation Band :802.11n40B4
 Fundamental Frequency :5795 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
11590.00	Average	23.27	21.66	44.93	54.00	-9.07
11590.00	Peak	33.45	21.66	55.11	74.00	-18.89

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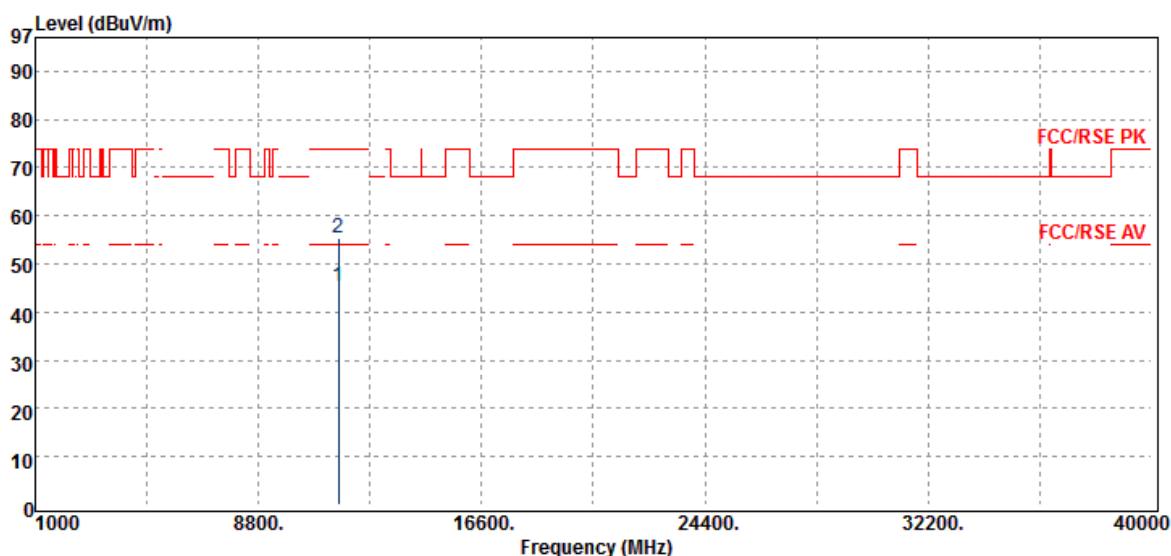
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Operation Band :802.11n40B4
 Fundamental Frequency :5795 MHz
 Operation Mode :Tx CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11590.00	Average	23.52	21.66	45.18	54.00	-8.82
11590.00	Peak	33.79	21.66	55.45	74.00	-18.55

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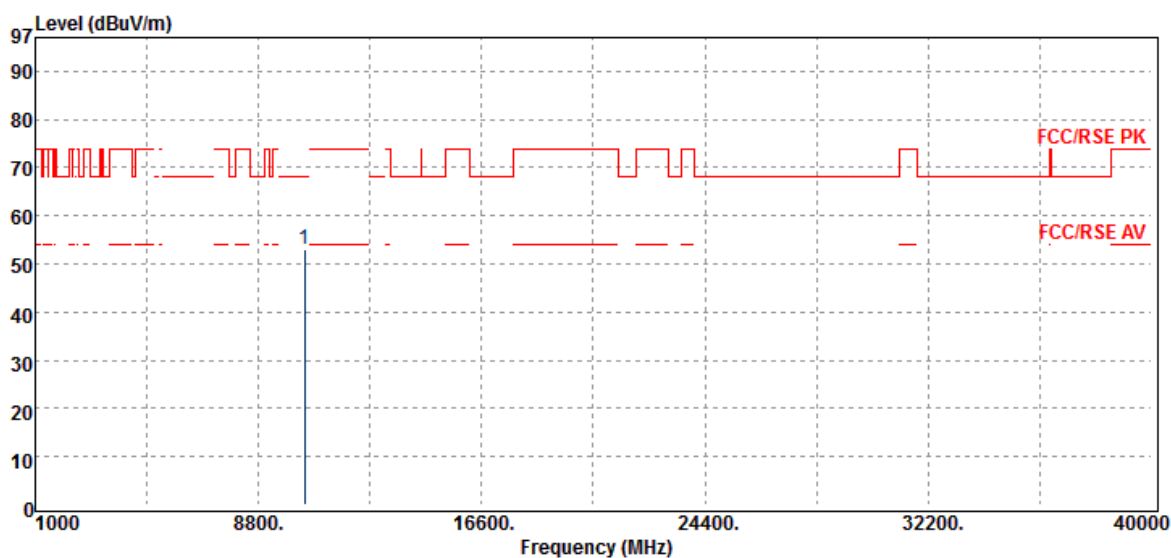
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Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5150~5250 MHz

Operation Band	:802.11ac80B1	Test Date	:2018-08-02
Fundamental Frequency	:5210 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	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
10420.00	Peak	33.14	19.99	53.13	68.20	-15.07

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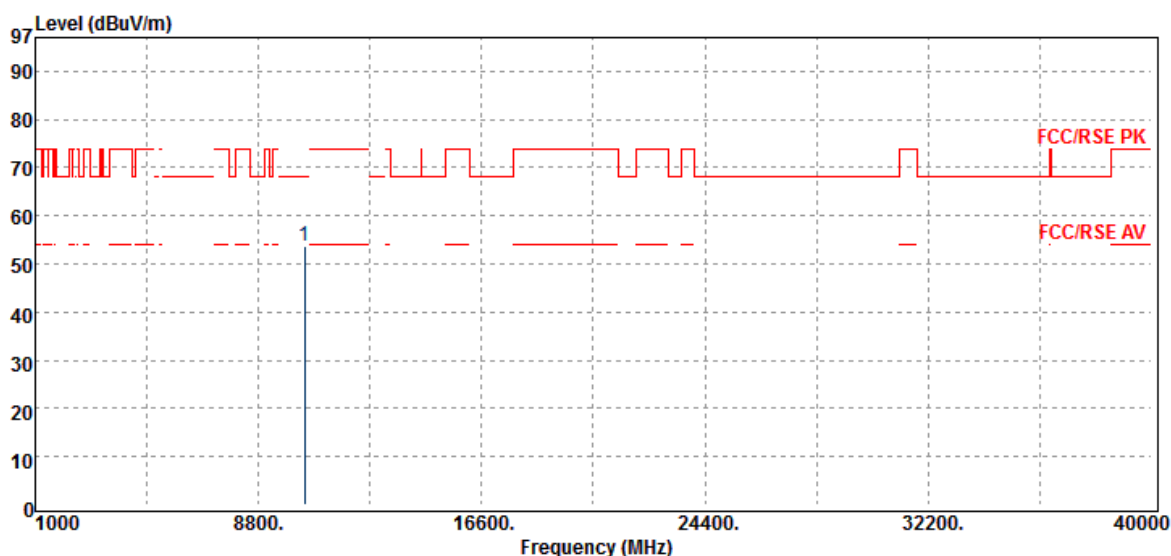
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Operation Band :802.11ac80B1
 Fundamental Frequency :5210 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-02
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10420.00	Peak	33.56	19.99	53.55	68.20	-14.65

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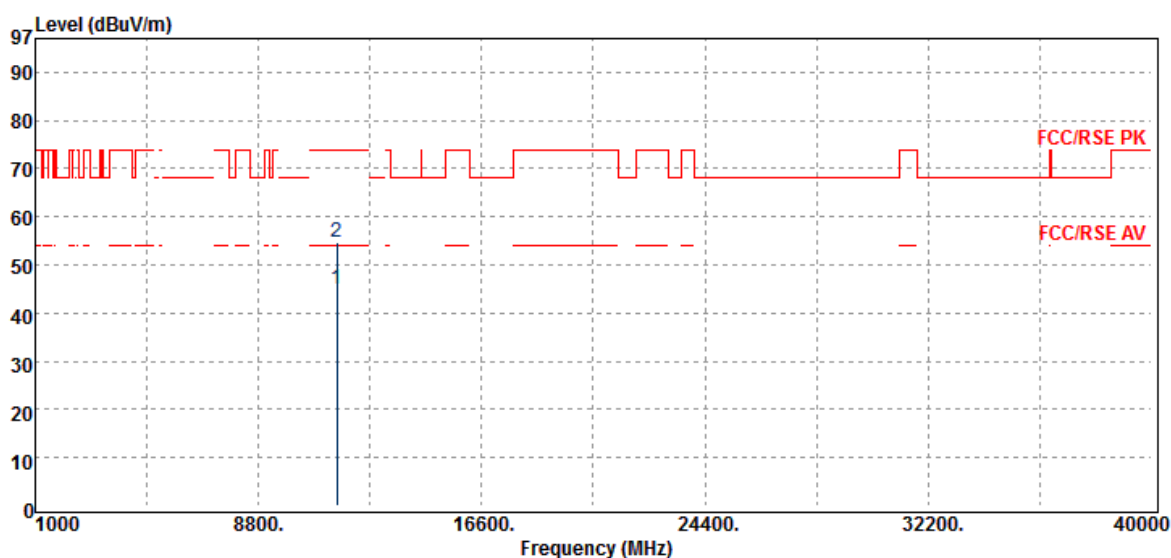
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Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5725~5850 MHz

Operation Band	:802.11ac80B4	Test Date	:2018-08-21
Fundamental Frequency	:5775 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	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
11550.00	Average	23.37	21.66	45.03	54.00	-8.97
11550.00	Peak	33.03	21.66	54.69	74.00	-19.31

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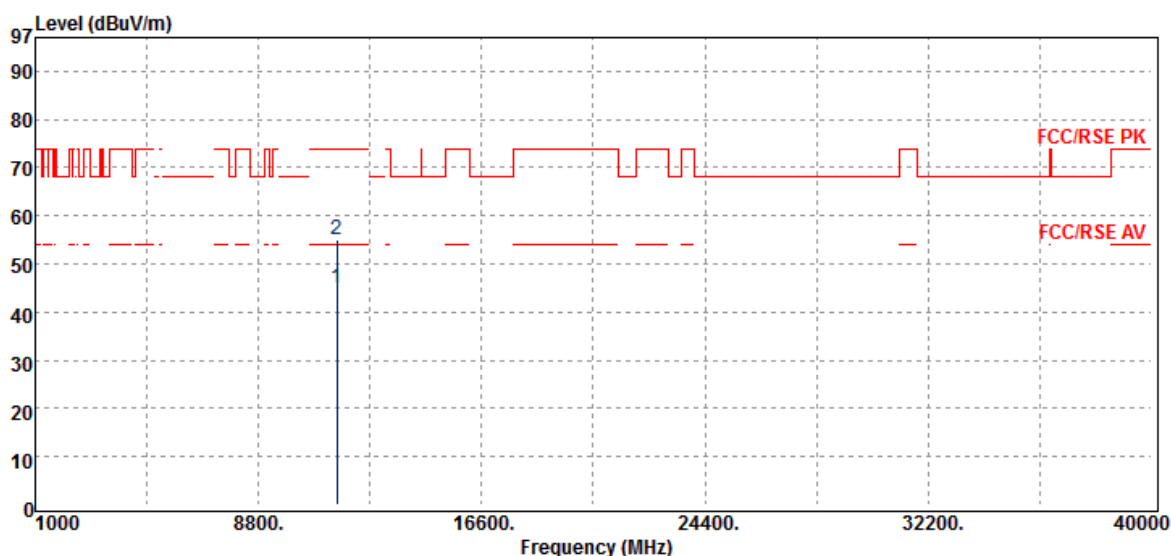
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Operation Band :802.11ac80B4
 Fundamental Frequency :5775 MHz
 Operation Mode :Tx CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11550.00	Average	23.27	21.66	44.93	54.00	-9.07
11550.00	Peak	33.38	21.66	55.04	74.00	-18.96

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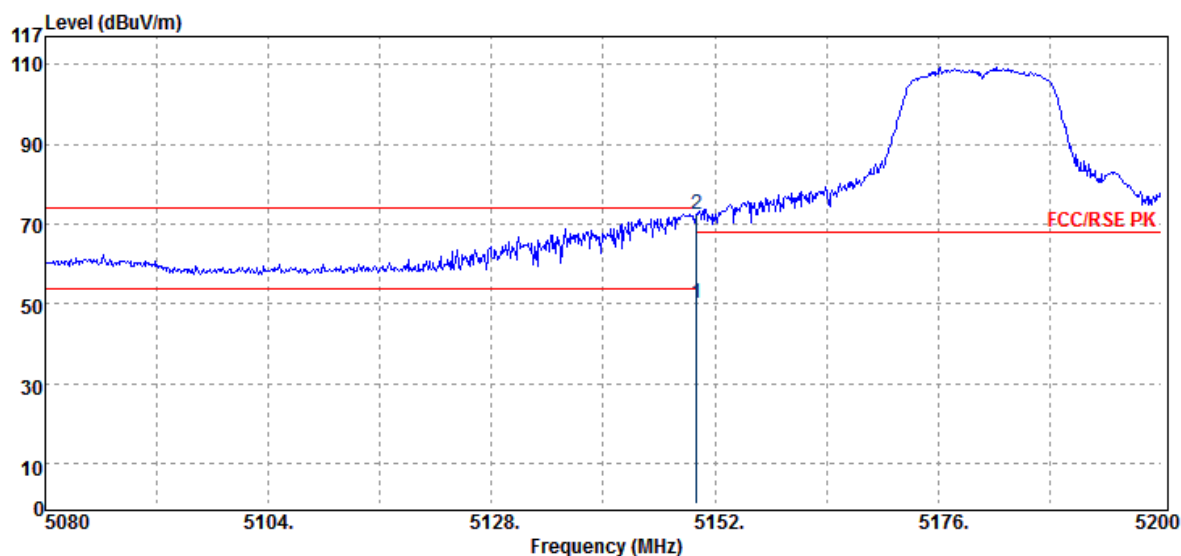
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Band edge falling to restricted band

802.11a mode

Operation Band	:802.11aB1	Test Date	:2018-07-31
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	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	41.79	8.32	50.11	54.00	-3.89
5150.00	Peak	64.03	8.32	72.35	74.00	-1.65

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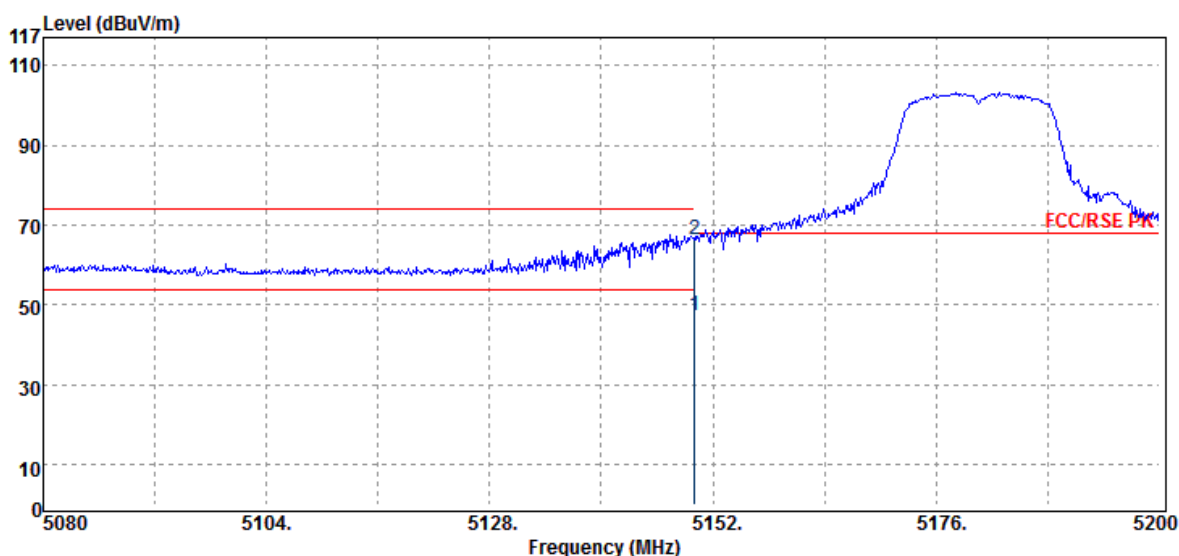
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Operation Band :802.11aB1
Fundamental Frequency :5180 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-07-31
Temp./Humi. :23 deg_C / 62 RH
Engineer :Kane
Measurement Antenna Pol. :HORIZONTAL



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	38.91	8.32	47.23	54.00	-6.77
5150.00	Peak	58.24	8.32	66.56	74.00	-7.44

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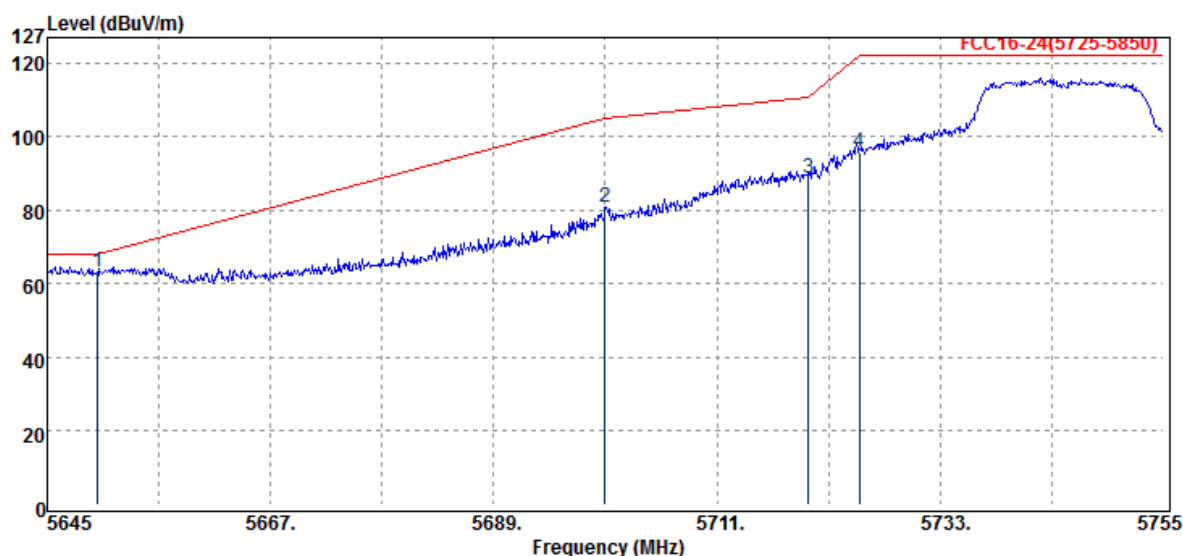
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Operation Band :802.11aB4
 Fundamental Frequency :5745 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
5650.00	Peak	54.02	9.20	63.22	68.23	-5.01
5700.00	Peak	71.61	9.35	80.96	105.23	-24.27
5720.00	Peak	79.27	9.43	88.70	110.83	-22.13
5725.00	Peak	86.20	9.44	95.64	122.23	-26.59

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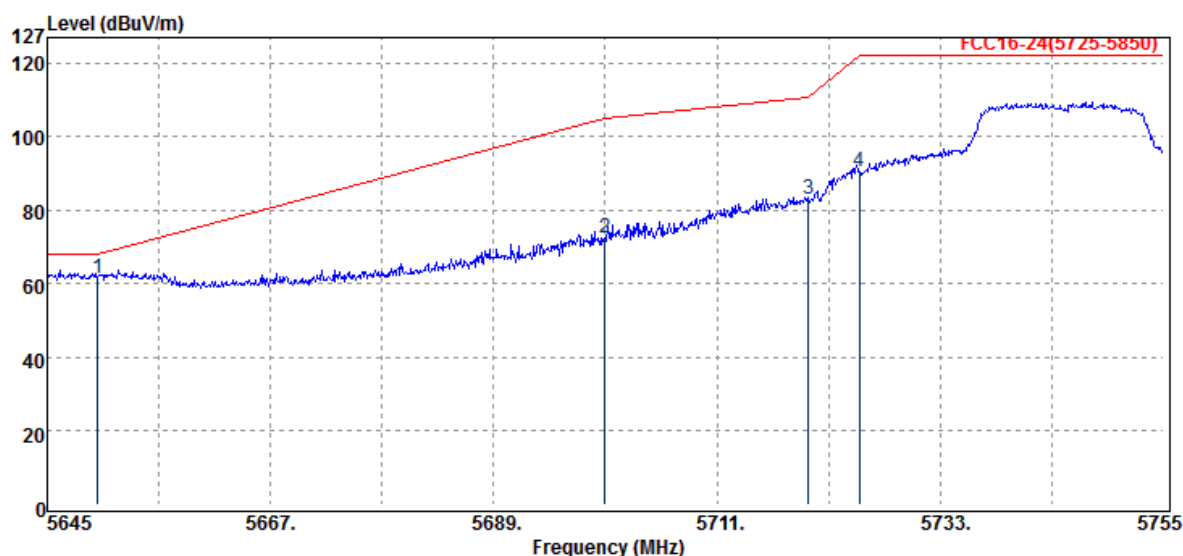
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Operation Band	:802.11aB4	Test Date	:2018-08-21
Fundamental Frequency	:5745 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5650.00	Peak	52.49	9.20	61.69	68.23	-6.54
5700.00	Peak	63.09	9.35	72.44	105.23	-32.79
5720.00	Peak	73.81	9.43	83.24	110.83	-27.59
5725.00	Peak	81.02	9.44	90.46	122.23	-31.77

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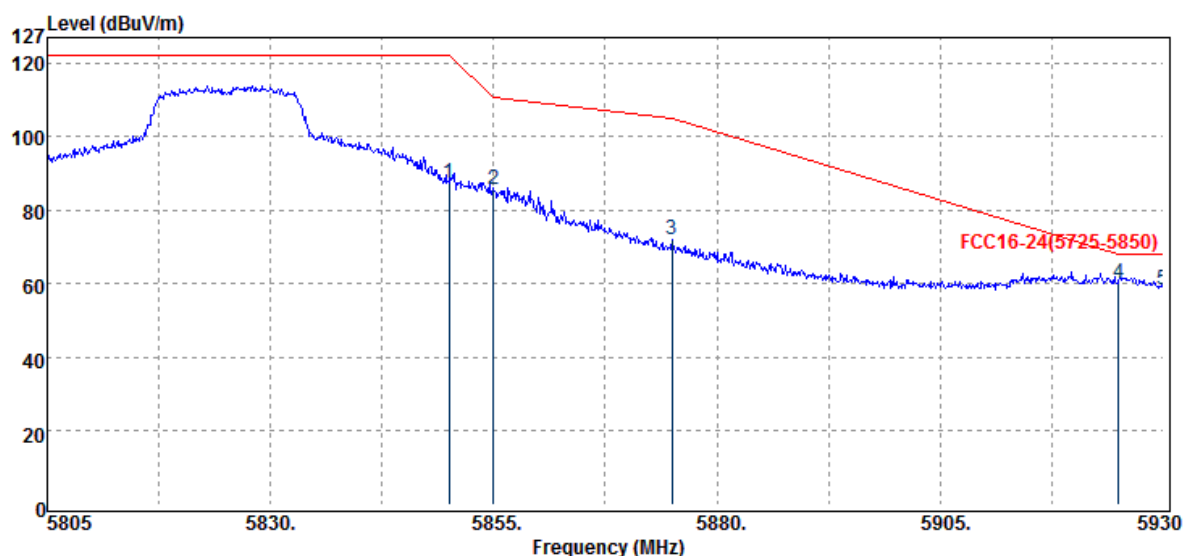
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Operation Band	:802.11aB4	Test Date	:2018-08-21
Fundamental Frequency	:5825 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5850.00	Peak	77.69	9.77	87.46	122.23	-34.77
5855.00	Peak	76.01	9.78	85.79	110.83	-25.04
5875.00	Peak	62.42	9.82	72.24	105.23	-32.99
5925.00	Peak	50.39	9.98	60.37	68.23	-7.86
5930.00	Peak	48.64	9.99	58.63	68.23	-9.60

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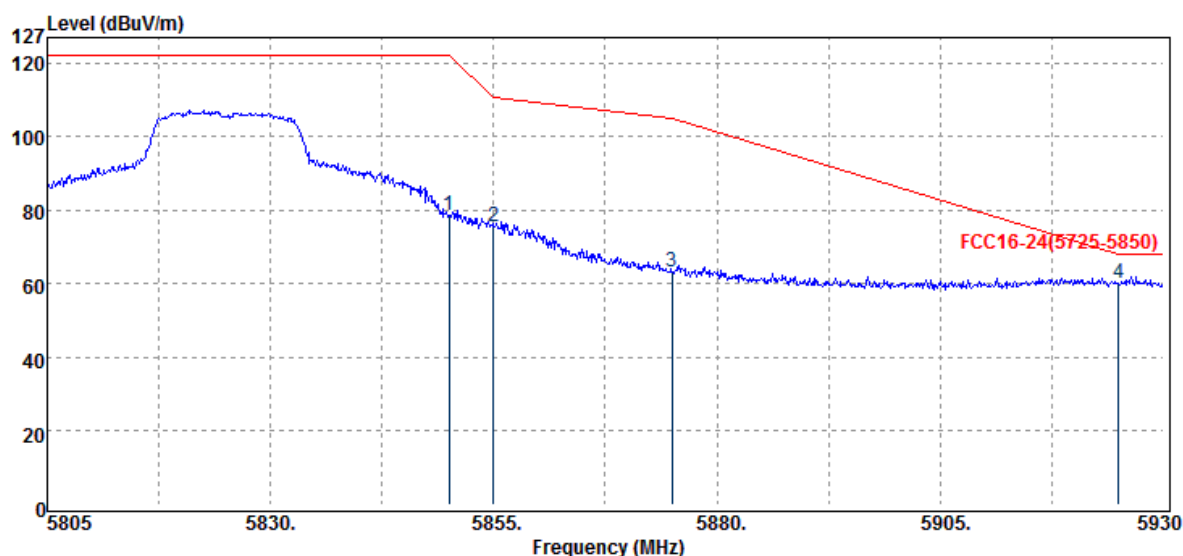
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Operation Band	:802.11aB4	Test Date	:2018-08-21
Fundamental Frequency	:5825 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5850.00	Peak	68.68	9.77	78.45	122.23	-43.78
5855.00	Peak	65.78	9.78	75.56	110.83	-35.27
5875.00	Peak	53.57	9.82	63.39	105.23	-41.84
5925.00	Peak	50.33	9.98	60.31	68.23	-7.92

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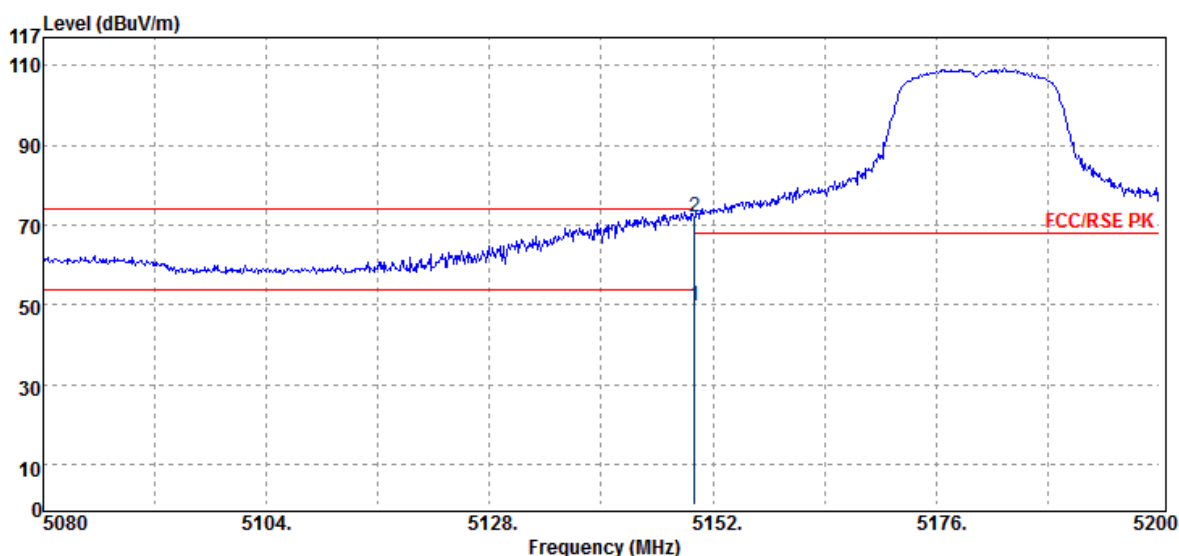
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802.11n20 HT mode

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

Test Date :2018-07-31
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5150.00	Average	41.54	8.32	49.86	54.00	-4.14
5150.00	Peak	63.73	8.32	72.05	74.00	-1.95

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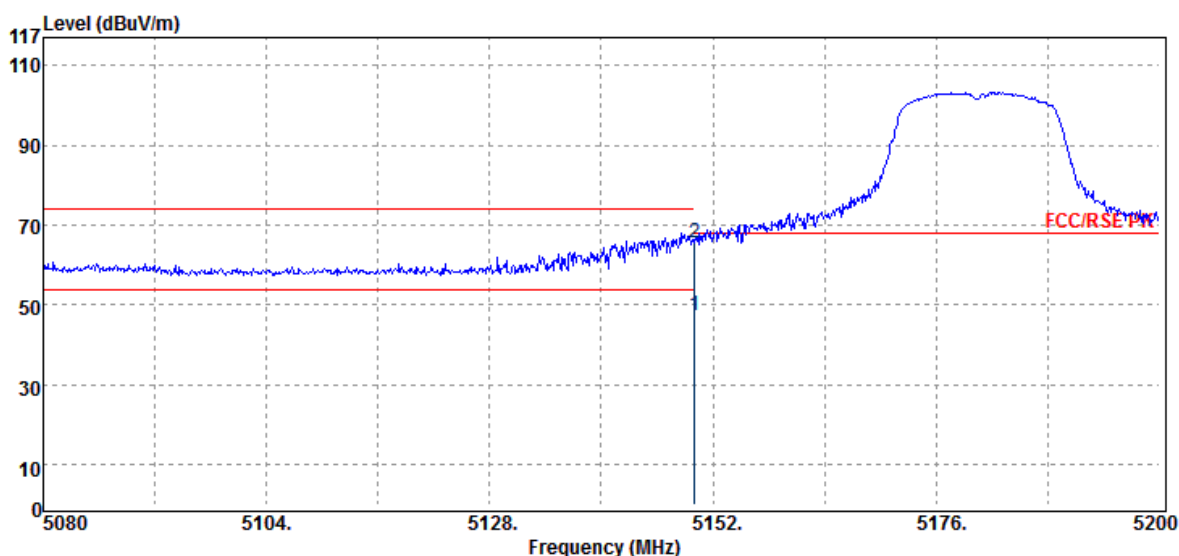
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Operation Band :802.11n20B1
 Fundamental Frequency :5180 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-07-31
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



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	38.95	8.32	47.27	54.00	-6.73
5150.00	Peak	57.40	8.32	65.72	74.00	-8.28

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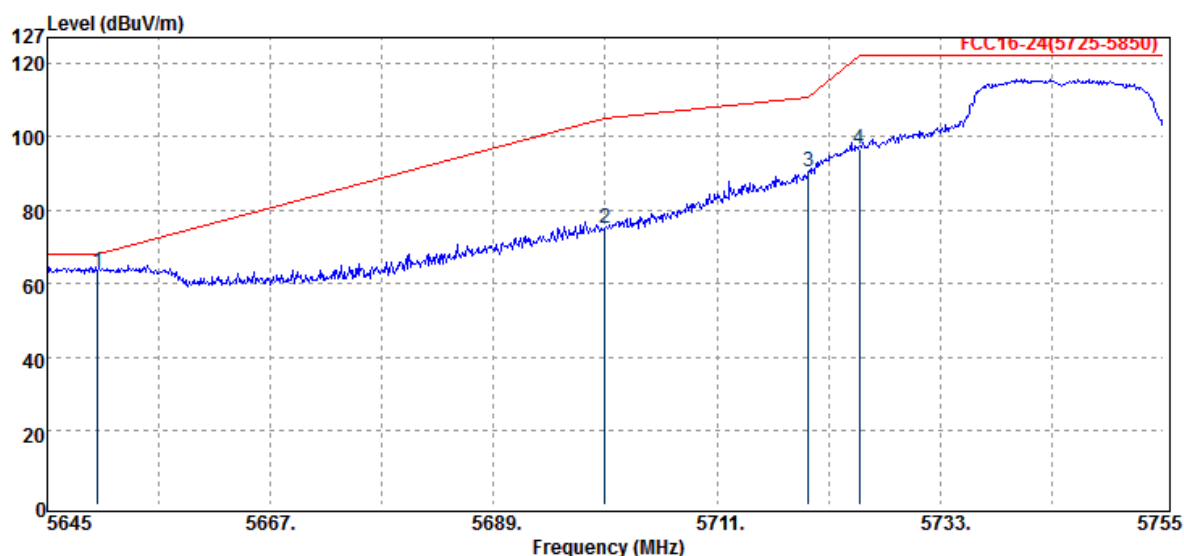
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Member of SGS Group

Operation Band :802.11n20B4
 Fundamental Frequency :5745 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
5650.00	Peak	54.22	9.20	63.42	68.23	-4.81
5700.00	Peak	65.73	9.35	75.08	105.23	-30.15
5720.00	Peak	81.08	9.43	90.51	110.83	-20.32
5725.00	Peak	87.15	9.44	96.59	122.23	-25.64

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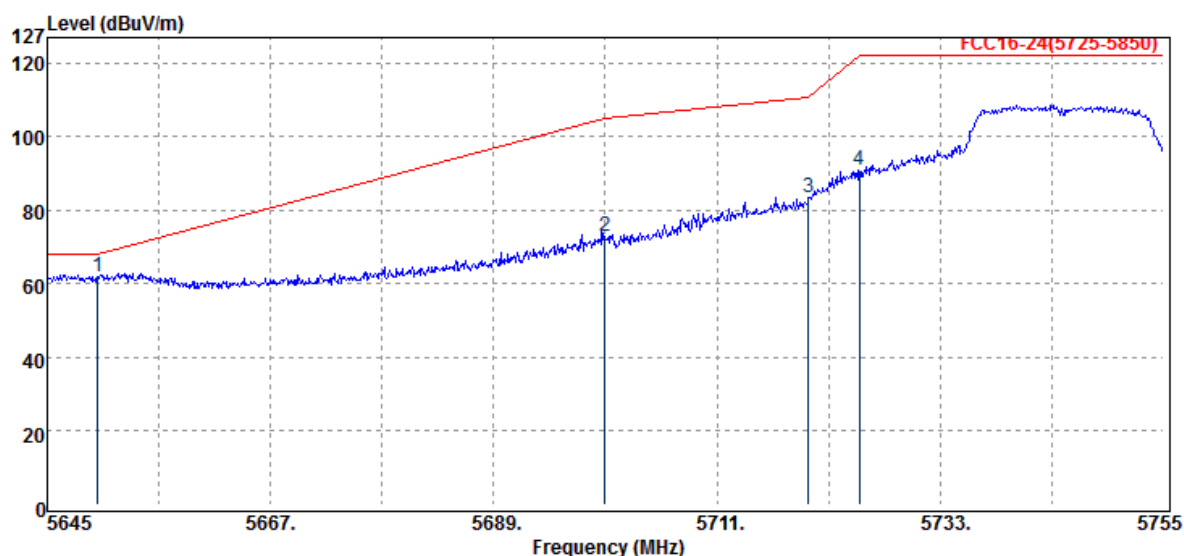
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Member of SGS Group

Operation Band :802.11n20B4
 Fundamental Frequency :5745 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5650.00	Peak	52.55	9.20	61.75	68.23	-6.48
5700.00	Peak	63.78	9.35	73.13	105.23	-32.10
5720.00	Peak	74.09	9.43	83.52	110.83	-27.31
5725.00	Peak	81.37	9.44	90.81	122.23	-31.42

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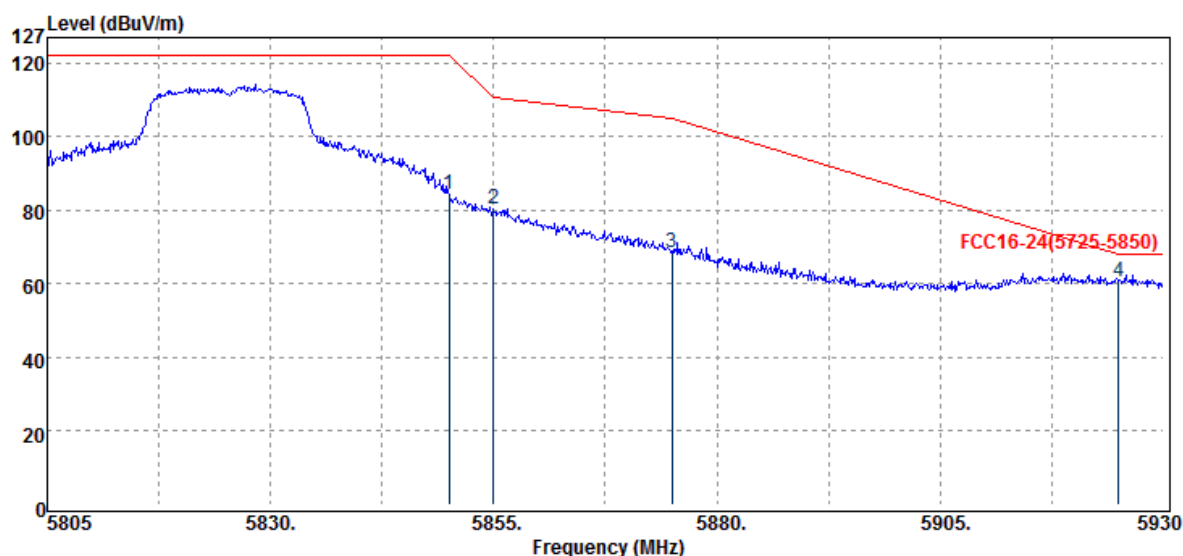
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Member of SGS Group

Operation Band :802.11n20B4
 Fundamental Frequency :5825 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
5850.00	Peak	74.77	9.77	84.54	122.23	-37.69
5855.00	Peak	70.45	9.78	80.23	110.83	-30.60
5875.00	Peak	58.56	9.82	68.38	105.23	-36.85
5925.00	Peak	50.73	9.98	60.71	68.23	-7.52

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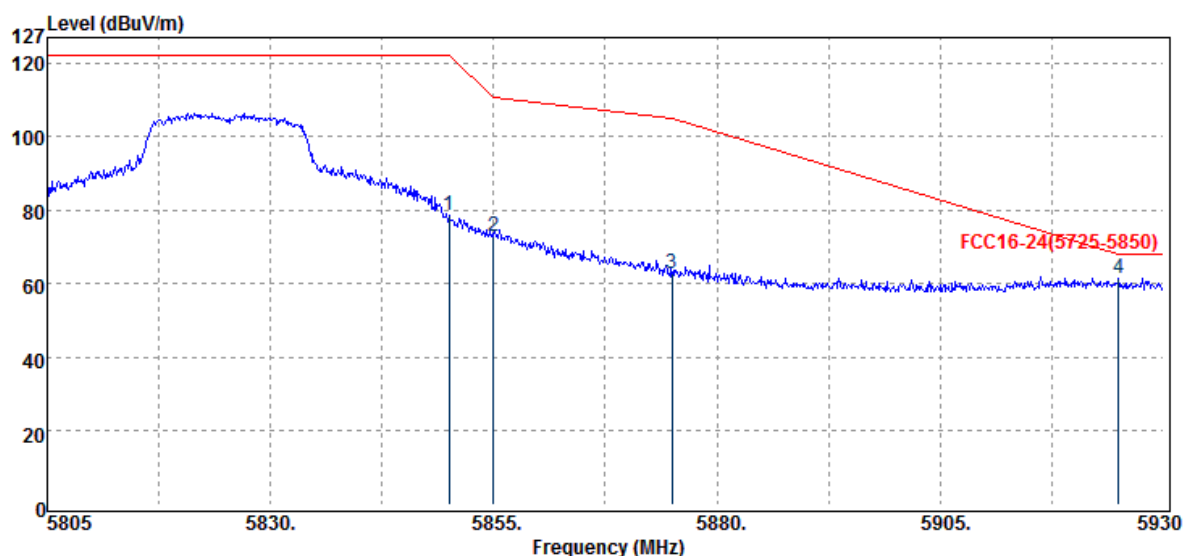
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Operation Band :802.11n20B4
 Fundamental Frequency :5825 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Pol. Antenna :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5850.00	Peak	68.70	9.77	78.47	122.23	-43.76
5855.00	Peak	62.97	9.78	72.75	110.83	-38.08
5875.00	Peak	52.99	9.82	62.81	105.23	-42.42
5925.00	Peak	51.68	9.98	61.66	68.23	-6.57

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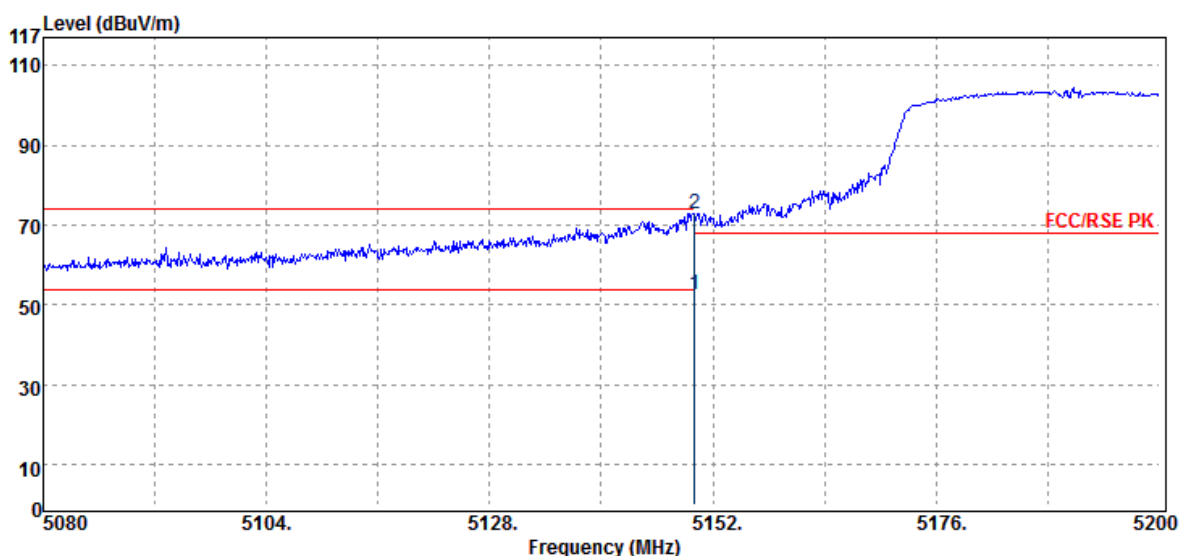
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802.11n40 HT mode

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

Test Date :2018-07-31
Temp./Humi. :23 deg_C / 62 RH
Engineer :Kane
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	44.41	8.32	52.73	54.00	-1.27
5150.00	Peak	64.36	8.32	72.68	74.00	-1.32

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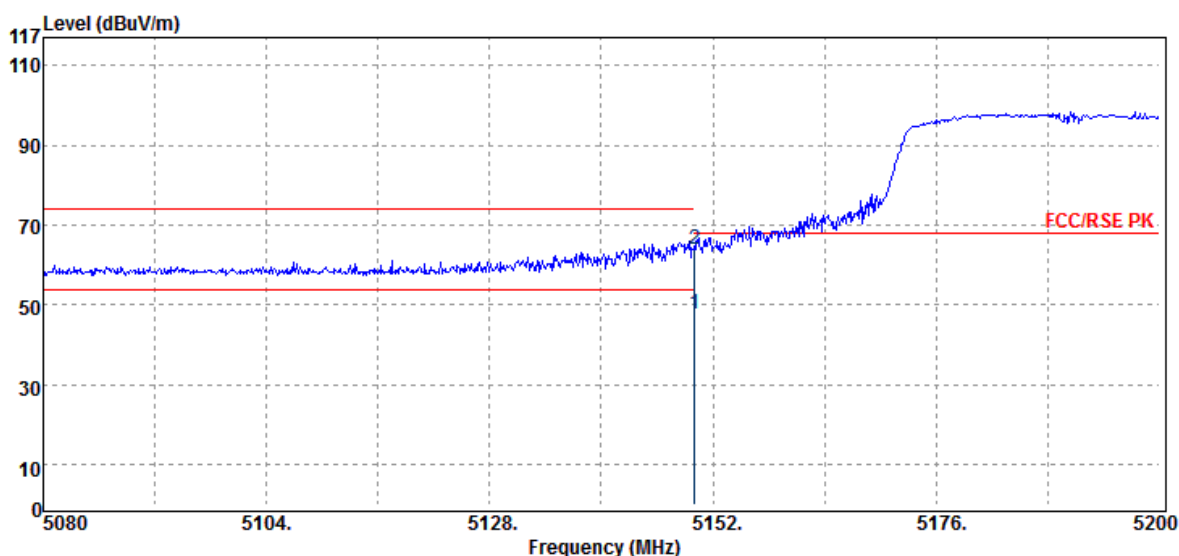
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Operation Band :802.11n40B1
 Fundamental Frequency :5190 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-07-31
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



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	39.42	8.32	47.74	54.00	-6.26
5150.00	Peak	55.71	8.32	64.03	74.00	-9.97

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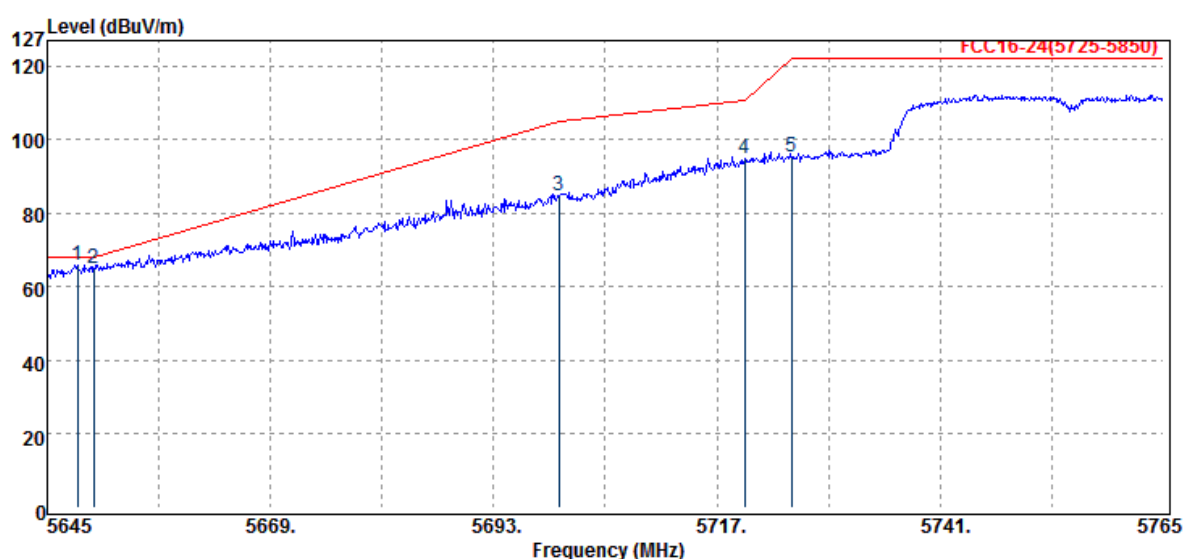
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Operation Band :802.11n40B4
 Fundamental Frequency :5755 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
5648.24	Peak	56.75	9.19	65.94	68.23	-2.29
5650.00	Peak	55.68	9.20	64.88	68.23	-3.35
5700.00	Peak	75.32	9.35	84.67	105.23	-20.56
5720.00	Peak	85.59	9.43	95.02	110.83	-15.81
5725.00	Peak	85.71	9.44	95.15	122.23	-27.08

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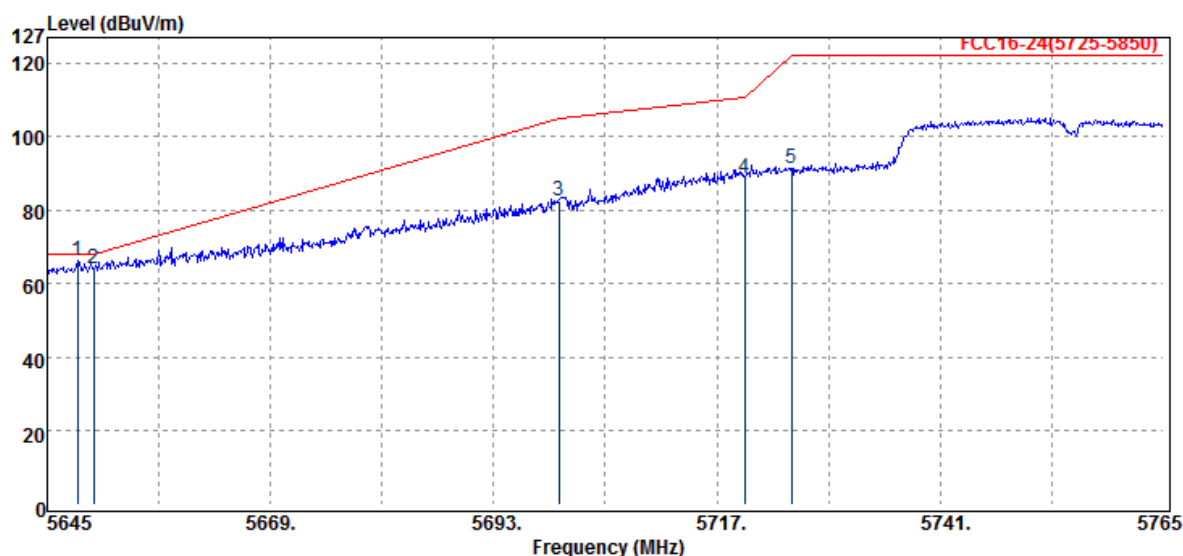
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Operation Band :802.11n40B4
 Fundamental Frequency :5755 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5648.24	Peak	57.12	9.19	66.31	68.23	-1.92
5650.00	Peak	54.96	9.20	64.16	68.23	-4.07
5700.00	Peak	73.42	9.35	82.77	105.23	-22.46
5720.00	Peak	79.15	9.43	88.58	110.83	-22.25
5725.00	Peak	81.98	9.44	91.42	122.23	-30.81

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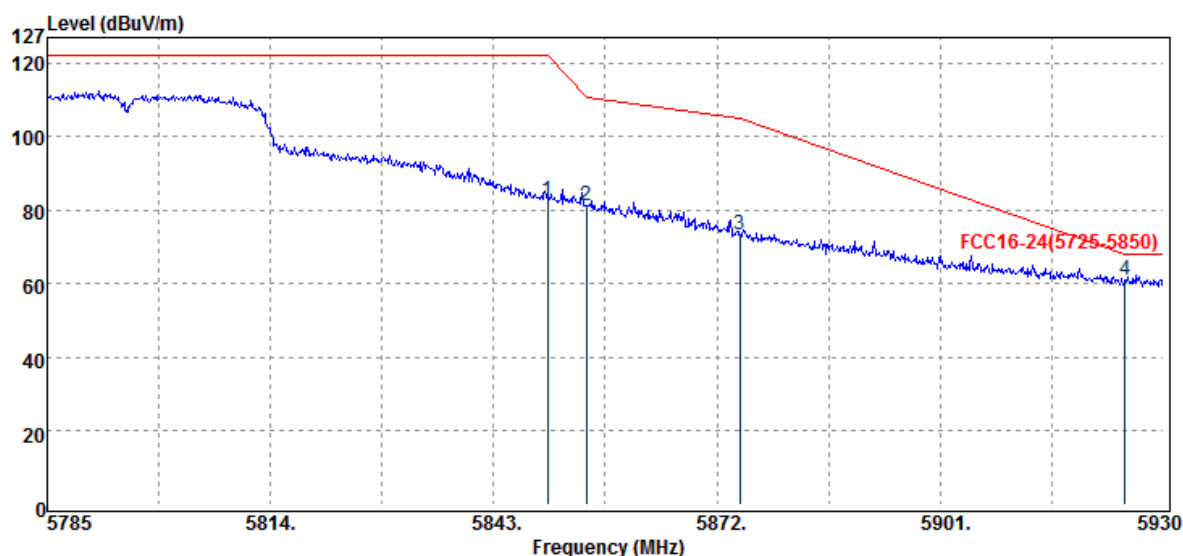
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Member of SGS Group

Operation Band :802.11n40B4
 Fundamental Frequency :5795 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
5850.00	Peak	72.97	9.77	82.74	122.23	-39.49
5855.00	Peak	71.69	9.78	81.47	110.83	-29.36
5875.00	Peak	63.78	9.82	73.60	105.23	-31.63
5925.00	Peak	51.03	9.98	61.01	68.23	-7.22

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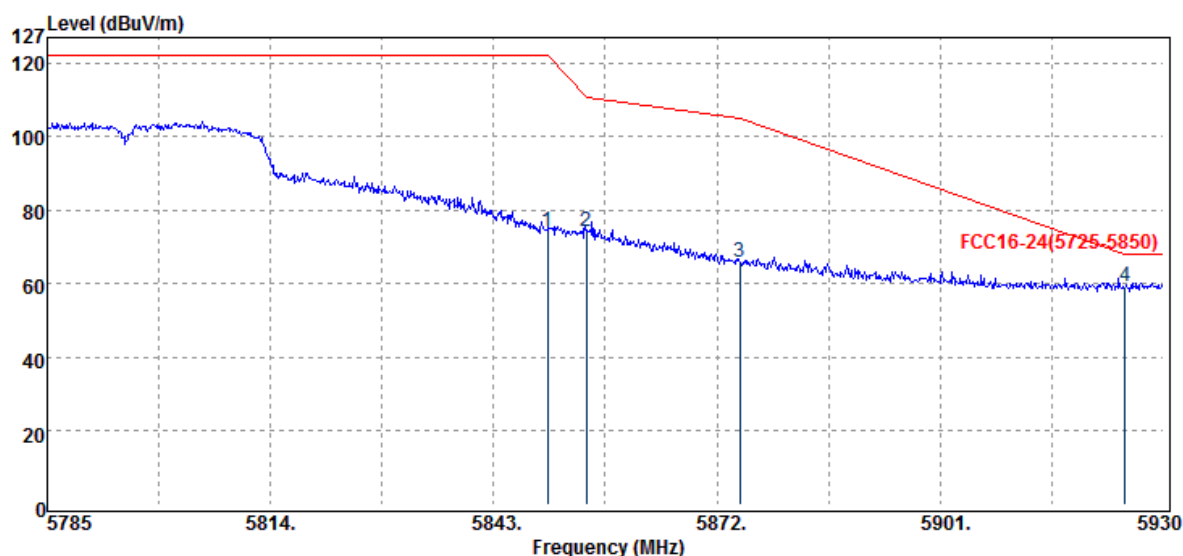
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Operation Band :802.11n40B4
 Fundamental Frequency :5795 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5850.00	Peak	64.39	9.77	74.16	122.23	-48.07
5855.00	Peak	64.35	9.78	74.13	110.83	-36.70
5875.00	Peak	55.98	9.82	65.80	105.23	-39.43
5925.00	Peak	49.21	9.98	59.19	68.23	-9.04

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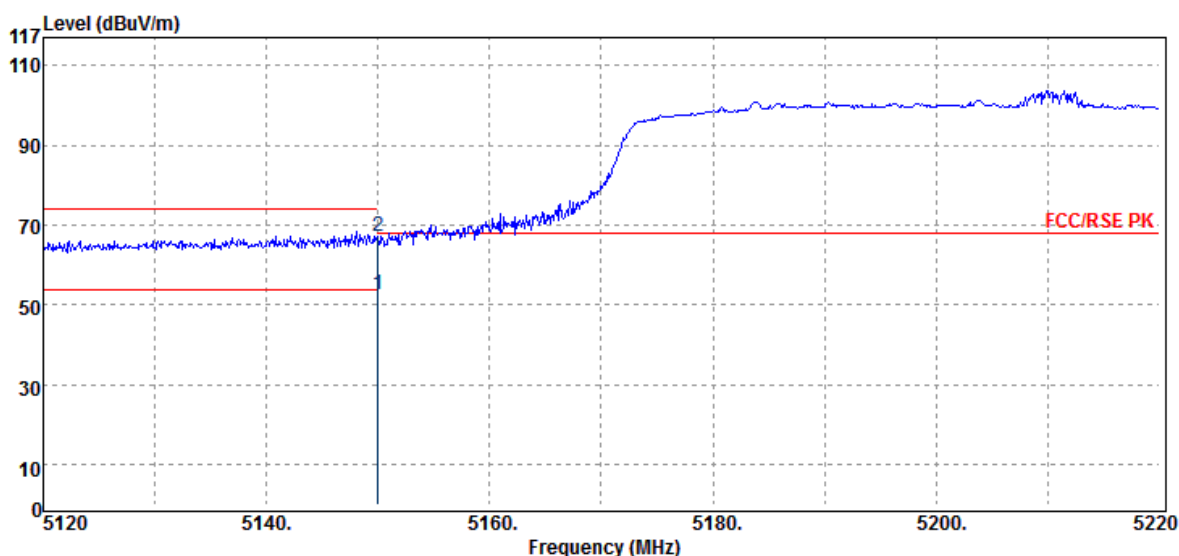
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Member of SGS Group

802.11ac80 VHT mode

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

Test Date :2018-07-31
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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	44.49	8.32	52.81	54.00	-1.19
5150.00	Peak	58.88	8.32	67.20	74.00	-6.80

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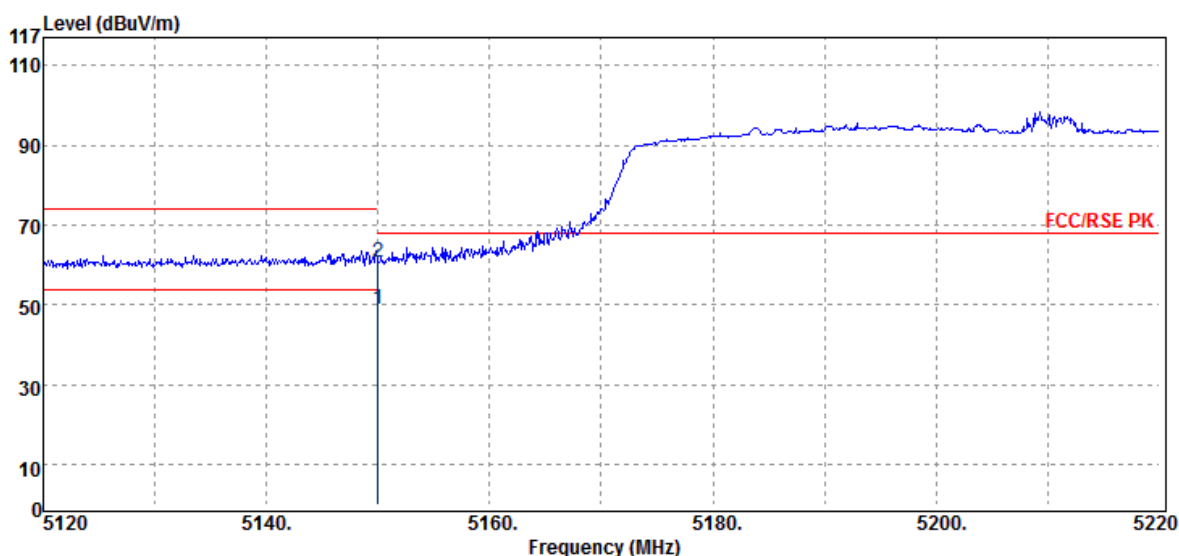
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www.tw.sgs.com

Member of SGS Group

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

Test Date :2018-07-31
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



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	40.49	8.32	48.81	54.00	-5.19
5150.00	Peak	52.34	8.32	60.66	74.00	-13.34

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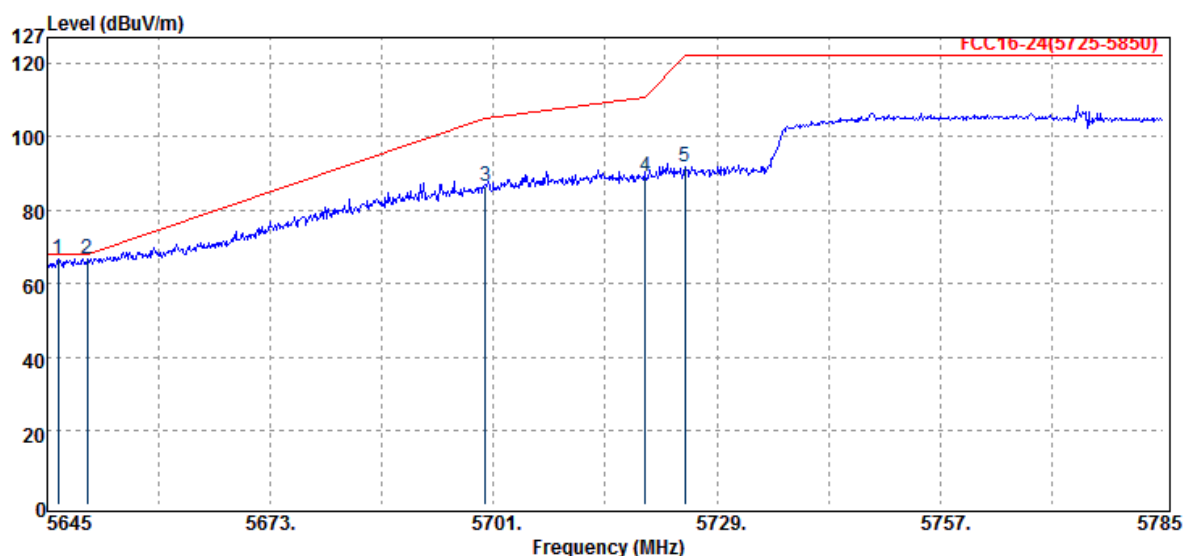
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Member of SGS Group

Operation Band :802.11ac80B4
Fundamental Frequency :5775 MHz
Operation Mode :Bandedge CH LOW
EUT Pol. :E2 Plane

Test Date :2018-08-21
Temp./Humi. :23 deg_C / 62 RH
Engineer :Kane
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
5646.40	Peak	57.74	9.19	66.93	68.23	-1.30
5650.00	Peak	57.60	9.20	66.80	68.23	-1.43
5700.00	Peak	77.24	9.35	86.59	105.23	-18.64
5720.00	Peak	79.92	9.43	89.35	110.83	-21.48
5725.00	Peak	82.60	9.44	92.04	122.23	-30.19

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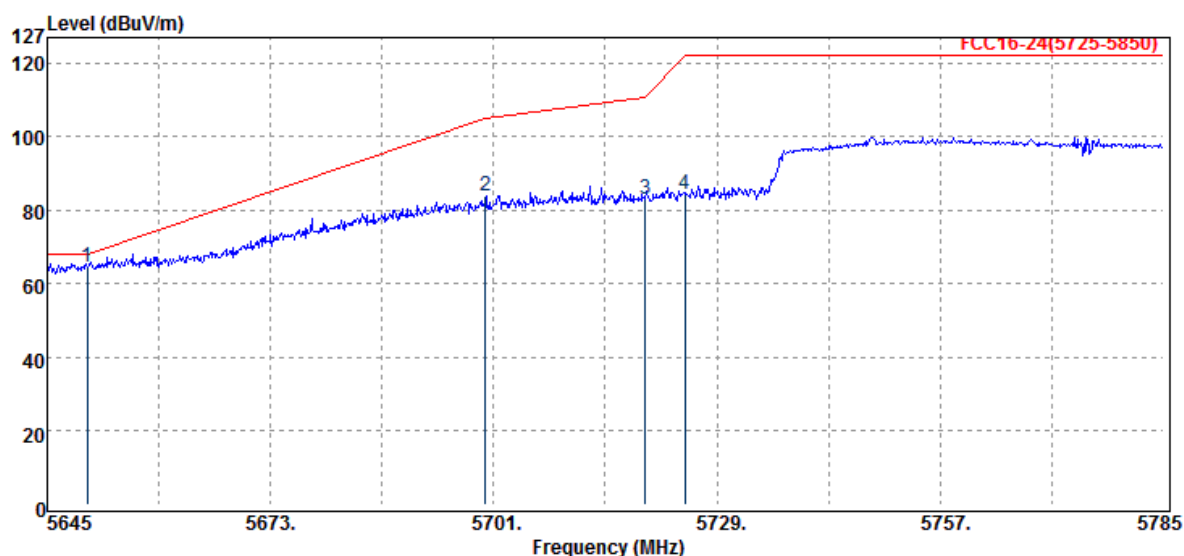
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Operation Band :802.11ac80B4
 Fundamental Frequency :5775 MHz
 Operation Mode :Bandedge CH LOW
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5650.00	Peak	55.53	9.20	64.73	68.23	-3.50
5700.00	Peak	74.77	9.35	84.12	105.23	-21.11
5720.00	Peak	73.75	9.43	83.18	110.83	-27.65
5725.00	Peak	75.06	9.44	84.50	122.23	-37.73

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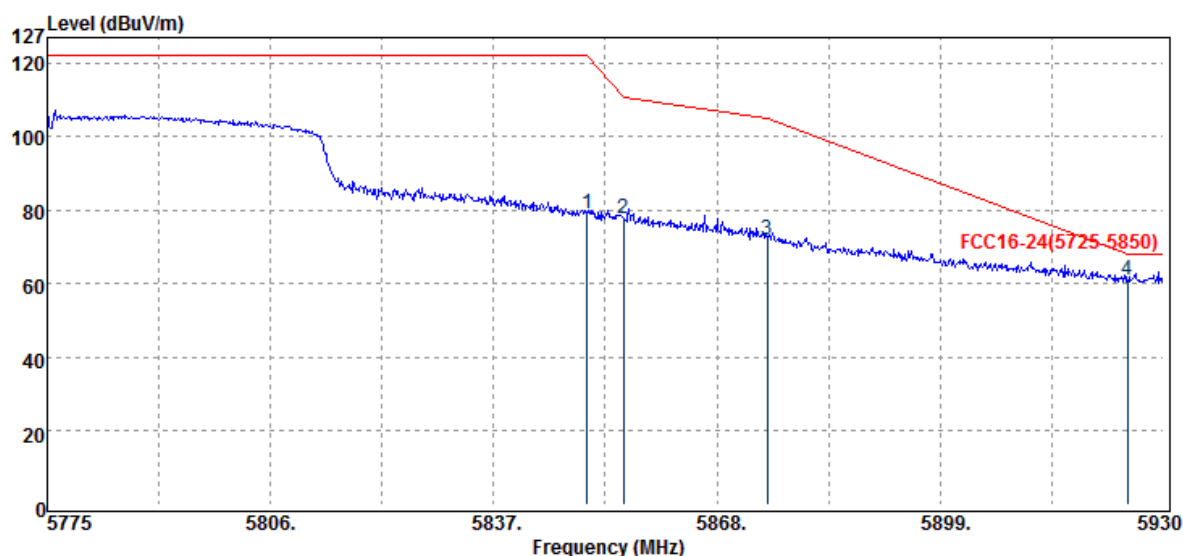
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 Fundamental Frequency :5775 MHz
 Operation Mode :Bandedge CH HIGH
 EUT Pol. :E2 Plane

Test Date :2018-08-21
 Temp./Humi. :23 deg_C / 62 RH
 Engineer :Kane
 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
5850.00	Peak	69.44	9.77	79.21	122.23	-43.02
5855.00	Peak	67.96	9.78	77.74	110.83	-33.09
5875.00	Peak	62.46	9.82	72.28	105.23	-32.95
5925.00	Peak	51.04	9.98	61.02	68.23	-7.21

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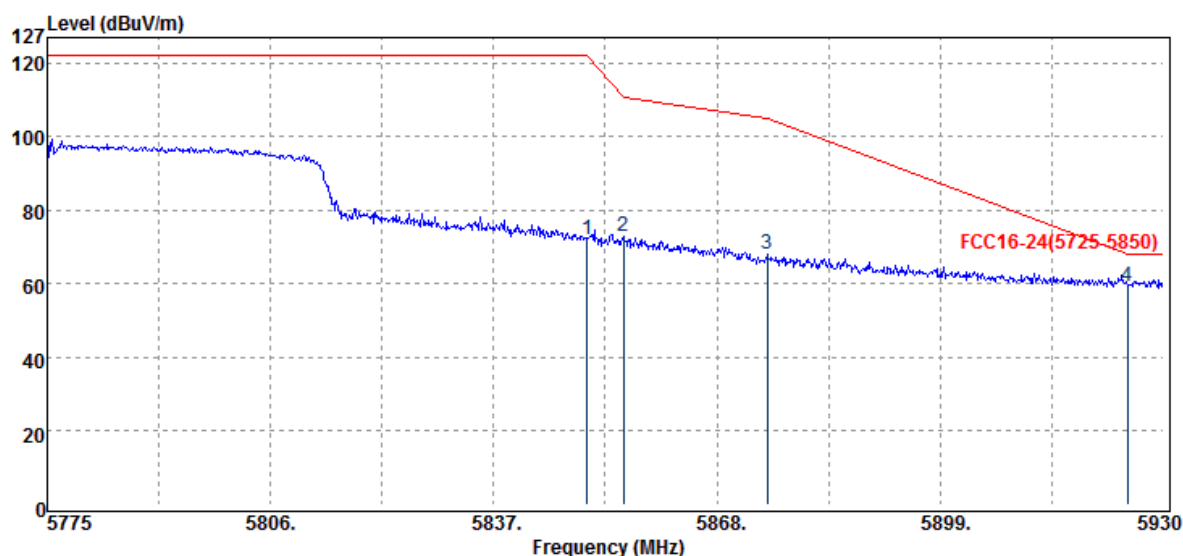
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Operation Band	:802.11ac80B4	Test Date	:2018-08-21
Fundamental Frequency	:5775 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Kane
EUT Pol.	:E2 Plane	Measurement Pol.	Antenna :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5850.00	Peak	62.49	9.77	72.26	122.23	-49.97
5855.00	Peak	63.28	9.78	73.06	110.83	-37.77
5875.00	Peak	58.13	9.82	67.95	105.23	-37.28
5925.00	Peak	49.43	9.98	59.41	68.23	-8.82

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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

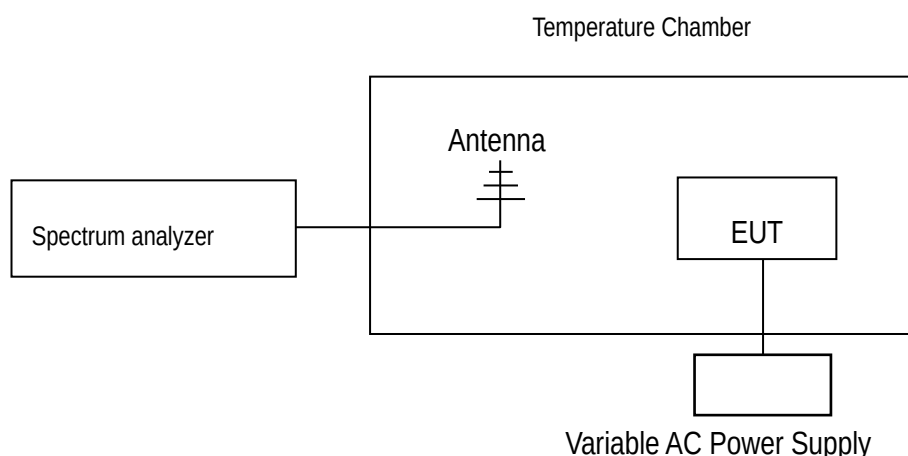
13.1 Standard Applicable

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:

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	2018/05/03	2019/05/02
DC Block	Mini-Circuits	BLK-18-S+	1	2018/01/02	2019/01/01
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01

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t (886-2) 2299-3279

f (886-2) 2298-0488

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13.5 Measurement Result

Startup

Operation Mode	802.11 a	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	36	5180	5,179.98990	0.00000195
		44	5220	5,219.98715	0.00000246
		48	5240	5,239.97301	0.00000515
		149	5745	5,744.99032	0.00000168
		157	5785	5,784.99183	0.00000141
		165	5825	5,824.98404	0.00000274
	120V	36	5180	5,179.98533	0.00000283
		44	5220	5,219.99241	0.00000145
		48	5240	5,239.97866	0.00000407
		149	5745	5,744.97841	0.00000376
		157	5785	5,784.97733	0.00000392
		165	5825	5,824.99660	0.00000058
25 °C	106.8V	36	5180	5,179.98827	0.00000226
		44	5220	5,220.00269	-0.00000052
		48	5240	5,239.97922	0.00000397
		149	5745	5,744.98082	0.00000334
		157	5785	5,784.97705	0.00000397
		165	5825	5,824.98255	0.00000300
55 °C	133.2V	36	5180	5,179.99729	0.00000052
		44	5220	5,219.99101	0.00000172
		48	5240	5,239.97152	0.00000543
		149	5745	5,744.99322	0.00000118
		157	5785	5,784.99433	0.00000098
		165	5825	5,824.99081	0.00000158
	120V	36	5180	5,179.99767	0.00000045
		44	5220	5,219.99503	0.00000095
		48	5240	5,239.97165	0.00000541
		149	5745	5,744.98352	0.00000287
		157	5785	5,784.99503	0.00000086
		165	5825	5,824.99736	0.00000045

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation Mode	802.11 n_HT40	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	38	5190	5,189.99145	0.00000165
		46	5230	5,230.00501	-0.00000096
		151	5755	5,754.97734	0.00000394
		159	5795	5,794.98266	0.00000299
	120V	38	5190	5,189.99569	0.00000083
		46	5230	5,229.99827	0.00000033
		151	5755	5,754.98977	0.00000178
		159	5795	5,794.97452	0.00000440
25 °C	106.8V	38	5190	5,189.98733	0.00000244
		46	5230	5,230.01098	-0.00000210
		151	5755	5,754.98633	0.00000237
		159	5795	5,794.97598	0.00000414
55 °C	133.2V	38	5190	5,190.00141	-0.00000027
		46	5230	5,229.99548	0.00000087
		151	5755	5,754.98843	0.00000201
		159	5795	5,794.99007	0.00000171
	120V	38	5190	5,190.00202	-0.00000039
		46	5230	5,230.00288	-0.00000055
		151	5755	5,754.97943	0.00000357
		159	5795	5,794.98096	0.00000329

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f (886-2) 2298-0488

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Operation Mode	802.11 ac_VHT80	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	42	5210	5,209.99485	0.00000099
		155	5775	5,775.00003	-0.00000001
	120V	42	5210	5,210.00585	-0.00000112
		155	5775	5,774.99744	0.00000044
25 °C	106.8V	42	5210	5,209.99803	0.00000038
		155	5775	5,774.99011	0.00000171
55 °C	133.2V	42	5210	5,209.99025	0.00000187
		155	5775	5,774.99970	0.00000005
	120V	42	5210	5,209.99434	0.00000109
		155	5775	5,775.00154	-0.00000027

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2 Minutes:

Operation Mode	802.11 a	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	36	5180	5,180.00037	-0.00000007
		44	5220	5,219.99246	0.00000144
		48	5240	5,239.98514	0.00000284
		149	5745	5,744.98545	0.00000253
		157	5785	5,784.99207	0.00000137
		165	5825	5,824.99112	0.00000152
	120V	36	5180	5,179.98884	0.00000215
		44	5220	5,220.00013	-0.00000002
		48	5240	5,239.97021	0.00000568
		149	5745	5,744.98295	0.00000297
		157	5785	5,784.97717	0.00000395
		165	5825	5,824.99521	0.00000082
25 °C	106.8V	36	5180	5,179.98556	0.00000279
		44	5220	5,219.98418	0.00000303
		48	5240	5,239.97264	0.00000522
		149	5745	5,744.97931	0.00000360
		157	5785	5,784.98971	0.00000178
		165	5825	5,824.99607	0.00000067
55 °C	133.2V	36	5180	5,179.98486	0.00000292
		44	5220	5,219.97794	0.00000423
		48	5240	5,239.97480	0.00000481
		149	5745	5,744.98850	0.00000200
		157	5785	5,784.97797	0.00000381
		165	5825	5,824.97794	0.00000379
	120V	36	5180	5,179.99165	0.00000161
		44	5220	5,219.97976	0.00000388
		48	5240	5,239.97520	0.00000473
		149	5745	5,744.97830	0.00000378
		157	5785	5,784.97826	0.00000376
		165	5825	5,824.99627	0.00000064

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台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation Mode	802.11 n_HT40	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	38	5190	5,190.00090	-0.00000017
		46	5230	5,230.01482	-0.00000283
		151	5755	5,754.97578	0.00000421
		159	5795	5,794.98059	0.00000335
	120V	38	5190	5,189.98642	0.00000262
		46	5230	5,230.00259	-0.00000050
		151	5755	5,754.98388	0.00000280
		159	5795	5,794.98053	0.00000336
25 °C	106.8V	38	5190	5,189.99155	0.00000163
		46	5230	5,230.01289	-0.00000246
		151	5755	5,754.98460	0.00000268
		159	5795	5,794.98506	0.00000258
55 °C	133.2V	38	5190	5,189.99715	0.00000055
		46	5230	5,229.99295	0.00000135
		151	5755	5,754.98768	0.00000214
		159	5795	5,794.97407	0.00000448
	120V	38	5190	5,189.99999	0.00000000
		46	5230	5,230.01128	-0.00000216
		151	5755	5,754.98845	0.00000201
		159	5795	5,794.98662	0.00000231

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f (886-2) 2298-0488

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Operation Mode	802.11 ac_VHT80	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	42	5210	5,210.00022	-0.00000004
		155	5775	5,774.99878	0.00000021
	120V	42	5210	5,210.00061	-0.00000012
		155	5775	5,775.00726	-0.00000126
25 °C	106.8V	42	5210	5,209.99960	0.00000008
		155	5775	5,774.99823	0.00000031
55 °C	133.2V	42	5210	5,209.99046	0.00000183
		155	5775	5,775.00213	-0.00000037
	120V	42	5210	5,209.99119	0.00000169
		155	5775	5,774.99655	0.00000060

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5 Minutes:

Operation Mode	802.11 a	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	36	5180	5,179.99784	0.00000042
		44	5220	5,219.98468	0.00000294
		48	5240	5,239.97773	0.00000425
		149	5745	5,744.99047	0.00000166
		157	5785	5,784.98807	0.00000206
		165	5825	5,824.98395	0.00000276
	120V	36	5180	5,179.97747	0.00000435
		44	5220	5,219.99971	0.00000006
		48	5240	5,239.97567	0.00000464
		149	5745	5,744.99167	0.00000145
		157	5785	5,784.99283	0.00000124
		165	5825	5,824.99621	0.00000065
25 °C	106.8V	36	5180	5,179.99111	0.00000172
		44	5220	5,219.99671	0.00000063
		48	5240	5,239.97684	0.00000442
		149	5745	5,744.98197	0.00000314
		157	5785	5,784.99088	0.00000158
		165	5825	5,824.99528	0.00000081
55 °C	133.2V	36	5180	5,179.99382	0.00000119
		44	5220	5,219.99492	0.00000097
		48	5240	5,239.96941	0.00000584
		149	5745	5,744.98917	0.00000188
		157	5785	5,784.99511	0.00000084
		165	5825	5,824.98488	0.00000260
	120V	36	5180	5,179.99416	0.00000113
		44	5220	5,219.99611	0.00000074
		48	5240	5,239.97140	0.00000546
		149	5745	5,744.98541	0.00000254
		157	5785	5,784.98750	0.00000216
		165	5825	5,824.99757	0.00000042

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Operation Mode	802.11 n_HT40	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	38	5190	5,189.98406	0.00000307
		46	5230	5,229.99531	0.00000090
		151	5755	5,754.97585	0.00000420
		159	5795	5,794.98534	0.00000253
	120V	38	5190	5,189.99893	0.00000021
		46	5230	5,230.00139	-0.00000027
		151	5755	5,754.98225	0.00000308
		159	5795	5,794.97526	0.00000427
25 °C	106.8V	38	5190	5,189.98312	0.00000325
		46	5230	5,230.01053	-0.00000201
		151	5755	5,754.97923	0.00000361
		159	5795	5,794.98689	0.00000226
55 °C	133.2V	38	5190	5,189.99655	0.00000066
		46	5230	5,229.99742	0.00000049
		151	5755	5,754.97523	0.00000430
		159	5795	5,794.97349	0.00000457
	120V	38	5190	5,190.01025	-0.00000197
		46	5230	5,230.00102	-0.00000020
		151	5755	5,754.98915	0.00000189
		159	5795	5,794.99215	0.00000135

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f (886-2) 2298-0488

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Operation Mode	802.11 ac_VHT80	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	42	5210	5,209.99907	0.00000018
		155	5775	5,774.99691	0.00000053
	120V	42	5210	5,210.00982	-0.00000188
		155	5775	5,774.99236	0.00000132
25 °C	106.8V	42	5210	5,210.00436	-0.00000084
		155	5775	5,774.99481	0.00000090
55 °C	133.2V	42	5210	5,209.99560	0.00000084
		155	5775	5,775.00144	-0.00000025
	120V	42	5210	5,209.99012	0.00000190
		155	5775	5,775.00974	-0.00000169

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No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

t (886-2) 2299-3279

f (886-2) 2298-0488

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10 Minutes:

Operation Mode	802.11 a	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	36	5180	5,179.99771	0.00000044
		44	5220	5,219.97987	0.00000386
		48	5240	5,239.97498	0.00000478
		149	5745	5,744.98500	0.00000261
		157	5785	5,784.98808	0.00000206
		165	5825	5,824.98109	0.00000325
	120V	36	5180	5,179.98673	0.00000256
		44	5220	5,220.00221	-0.00000042
		48	5240	5,239.97972	0.00000387
		149	5745	5,744.97916	0.00000363
		157	5785	5,784.98180	0.00000315
		165	5825	5,824.99547	0.00000078
25 °C	106.8V	36	5180	5,179.99053	0.00000183
		44	5220	5,220.00692	-0.00000133
		48	5240	5,239.97352	0.00000505
		149	5745	5,744.98290	0.00000298
		157	5785	5,784.99279	0.00000125
		165	5825	5,824.99246	0.00000130
55 °C	133.2V	36	5180	5,179.99613	0.00000075
		44	5220	5,219.99921	0.00000015
		48	5240	5,239.96201	0.00000725
		149	5745	5,744.99171	0.00000144
		157	5785	5,784.99200	0.00000138
		165	5825	5,824.99395	0.00000104
	120V	36	5180	5,180.00045	-0.00000009
		44	5220	5,219.99896	0.00000020
		48	5240	5,239.96241	0.00000717
		149	5745	5,744.98955	0.00000182
		157	5785	5,784.97940	0.00000356
		165	5825	5,824.98994	0.00000173

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f (886-2) 2298-0488

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Operation Mode	802.11 n_HT40	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	38	5190	5,189.99505	0.00000095
		46	5230	5,230.00354	-0.00000068
		151	5755	5,754.99057	0.00000164
		159	5795	5,794.98364	0.00000282
	120V	38	5190	5,189.99252	0.00000144
		46	5230	5,229.99450	0.00000105
		151	5755	5,754.99107	0.00000155
		159	5795	5,794.98420	0.00000273
25 °C	106.8V	38	5190	5,189.99149	0.00000164
		46	5230	5,230.00140	-0.00000027
		151	5755	5,754.98305	0.00000295
		159	5795	5,794.98223	0.00000307
55 °C	133.2V	38	5190	5,189.99268	0.00000141
		46	5230	5,229.99980	0.00000004
		151	5755	5,754.98632	0.00000238
		159	5795	5,794.97874	0.00000367
	120V	38	5190	5,189.99737	0.00000051
		46	5230	5,230.00300	-0.00000057
		151	5755	5,754.97478	0.00000438
		159	5795	5,794.97861	0.00000369

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台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation Mode	802.11 ac_VHT80	Test Date	2018.08.02
Temperature	:23 °C	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	133.2V	42	5210	5,209.99378	0.00000119
		155	5775	5,775.00813	-0.00000141
	120V	42	5210	5,209.99927	0.00000014
		155	5775	5,775.00701	-0.00000121
25 °C	106.8V	42	5210	5,210.00316	-0.00000061
		155	5775	5,774.99303	0.00000121
55 °C	133.2V	42	5210	5,210.00387	-0.00000074
		155	5775	5,775.00573	-0.00000099
	120V	42	5210	5,209.99605	0.00000076
		155	5775	5,774.99769	0.00000040

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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.

~ End of Report ~

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