

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

OF

**Applicant:** Panasonic Mobile Communications Co., Ltd.  
600 Saedo-cho, Tsuzuki-ku, Yokohama-City, Kanagawa,  
224-8539, Japan

**Product Name:** Tablet Computer

**Brand Name:** Panasonic

**Model No.:** P-01K

**Model Difference:** N/A

**Report Number:** ER/2018/60051

**FCC ID:** UCE318001A

**FCC Rule Part:** §15.407, Cat: NII

**Issue Date:** Jun. 29, 2018

**Date of Test:** Jun. 11, 2018 ~ Jun. 22, 2018

**Date of EUT Received:** Jun. 11, 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.

*Louis Chen*  
**Tested By:** \_\_\_\_\_  
*Louis Chen / Engineer*

*Jim Chang*  
**Approved By:** \_\_\_\_\_  
*Jim Chang / Manager*



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## Revision History

Report Number	Revision	Description	Effectuated Page	Issue Date	Revised By
ER/2018/60051	Rev.00	Initial creation of document	All	Jun. 29, 2018	Tiffany Kao

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## 1. GENERAL INFORMATION

### 1.1 Product Description

General:

Product Name:	Tablet Computer	
Brand Name:	Panasonic	
Model No.:	P-01K	
Model Difference:	N/A	
Product SW/HW version:	15-03-021-006 / Rev.C	
Radio SW/HW version:	MSM8909.LA.3.0.1 / Rev.C	
Test SW Version:	N/A	
RF power setting in TEST SW:	N/A	
Power Supply:	3.8V from Rechargeable Li-ion Battery or 5V from AC/DC Adapter	
	Battery:	Model No.: P34, Supplier: Panasonic
	Adapter:	Model No.: 04, Supplier: MITSUMI

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## WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. Power (dBm)	Modulation Technology
11a_20	5180~5240	4	13.88	OFDM
	5260~5320	4	17.11	
	5500~5700	11	17.14	
11n_HT 20M	5180~5240	4	14.02	OFDM
	5260~5320	4	16.06	
	5500~5700	11	16.08	
11n_HT 40M	5190~5230	2	13.40	OFDM
	5270~5310	2	13.76	
	5510~5670	5	13.68	
Modulation Type		64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only		
Transition Rate:		802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps 802.11 n_40MHz: 13.5 - 150.0Mbps		
Antenna Designation:		PIFA Antenna, 5150~5725MHz Gain: 2.0dBi (Main)		

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## 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

KDB 789033 D02 v01r04 General UNII Test Procedures New Rules

KDB 644545 D03 v01 Guidance for IEEE 802.11ac

ANSI C63.10:2013

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

## 1.3 Test Facility

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

(TAF code 0513)

FCC Registration Numbers are: 509634 / TW0001

## 1.4 Special Accessories

There are no special accessories used while test was conducted.

## 1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

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

### 2.2 EUT Exercise

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

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on as 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 30MHz,. 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 as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

### 2.4 Measurement Results Explanation Example

#### For all conducted test items:

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

#### Note:

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

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## 2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission



Fig. 2-2 AC Power Line Conducted Emission

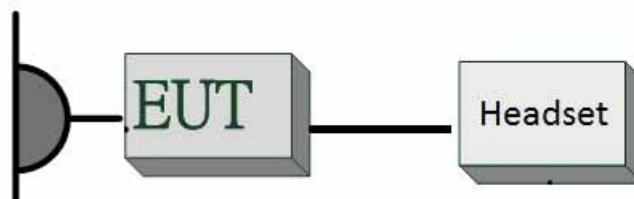


Fig. 2-2 Conducted (Antenna Port) Emission

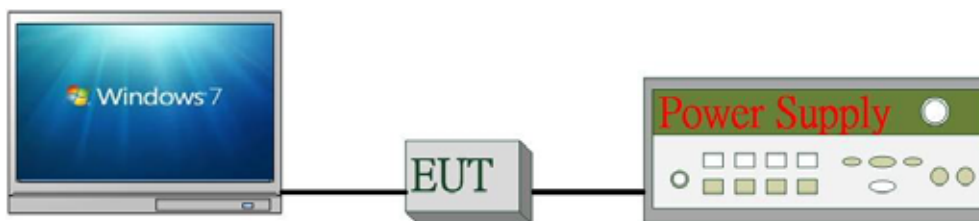


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	DC Power Supply	Anritsu	E3640A	MY52410006	N/A	Unshielded
3.	Notebook	Lenovo	T440	P0000564	Shielded	Unshielded

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### 3. SUMMARY OF TEST RESULT

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

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## 4. DESCRIPTION OF TEST MODES

### 4.1 Operated in U-NII Bands

#### Operated band in 5150 MHz ~5250 MHz:

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

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

#### Operated band in 5250 MHz ~5350 MHz:

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

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

#### Operated band in 5470 MHz ~5725 MHz:

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

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

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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	5180~5240	36 to 48	36,44,48	OFDM	6	MAIN
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	MAIN
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	MAIN
802.11n_HT20				OFDM	MCS0	MAIN
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	MAIN
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS0	MAIN
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS0	MAIN
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS0	MAIN
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS0	MAIN

#### 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 E1 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	MAIN
802.11n_HT20				OFDM	MCS0	MAIN
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	MAIN
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS0	MAIN
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS0	MAIN
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS0	MAIN
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS0	MAIN

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## 5. MEASUREMENT UNCERTAINTY

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

### Radiated Spurious Emission:

Measurement uncertainty (Polarization : <b>Vertical</b> )	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 : <b>Horizontal</b> )	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(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

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

### 6.2 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESC17	100760	2018/02/02	2019/02/01
LISN	SCHWARZBECK	NSLK 8127	8127-649	2018/05/18	2019/05/17
LISN	MESS TEC	FCC-LISN-50/250-25-2-01	4034	2018/03/19	2019/03/18
Coaxial Cables	N/A	WK CE Cable	N/A	2017/11/26	2018/11/25

### 6.3 EUT Setup

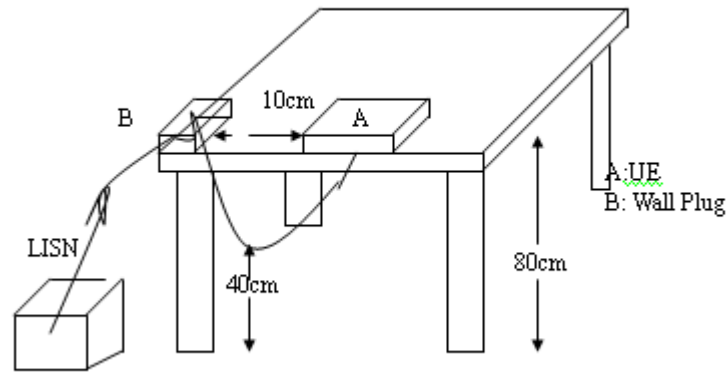
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz power source.

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## 6.4 Test SET-UP



## 6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed.

## 6.6 Measurement Result

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

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

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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Site : Conduction Room	Phase: <b>L1</b>	Temperature: 25 °C
Limit: FCC Class B Conduction(QP)	Power: AC 120V/60Hz	Humidity: 65 %
Mode: Config_1		
Note:		

### Conducted Emission



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		1.5580	19.80	20.24	40.04	56.00	-15.96	QP	
2		1.5580	7.30	20.24	27.54	46.00	-18.46	AVG	
3		1.9580	20.10	20.53	40.63	56.00	-15.37	QP	
4		1.9580	10.00	20.53	30.53	46.00	-15.47	AVG	
5 *		2.8700	22.90	20.31	43.21	56.00	-12.79	QP	
6		2.8700	10.20	20.31	30.51	46.00	-15.49	AVG	
7		4.1580	23.00	19.98	42.98	56.00	-13.02	QP	
8		4.1580	8.50	19.98	28.48	46.00	-17.52	AVG	
9		8.0380	19.06	19.96	39.02	60.00	-20.98	QP	
10		8.0380	12.90	19.96	32.86	50.00	-17.14	AVG	
11		10.3180	20.17	19.95	40.12	60.00	-19.88	QP	
12		10.3180	14.19	19.95	34.14	50.00	-15.86	AVG	

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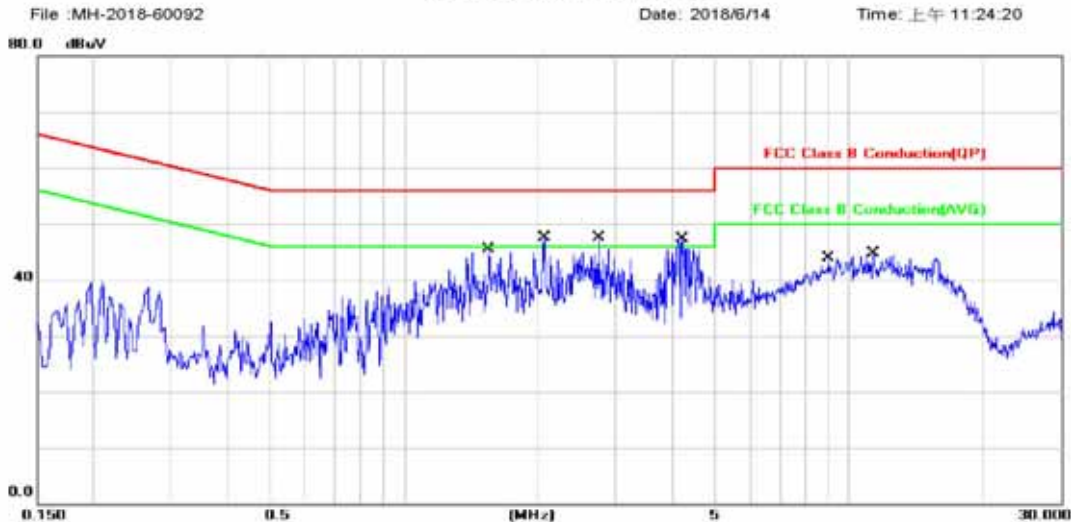
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Site : Conduction Room Phase: **N** Temperature: 25 °C  
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 65 %  
 Mode: Config\_1  
 Note:

### Conducted Emission



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		1.5540	17.20	20.23	37.43	56.00	-18.57	QP	
2		1.5540	8.00	20.23	28.23	46.00	-17.77	AVG	
3		2.0700	17.10	20.52	37.62	56.00	-18.38	QP	
4		2.0700	7.90	20.52	28.42	46.00	-17.58	AVG	
5		2.7500	20.70	20.32	41.02	56.00	-14.98	QP	
6 *		2.7500	11.10	20.32	31.42	46.00	-14.58	AVG	
7		4.2460	21.10	19.96	41.06	56.00	-14.94	QP	
8		4.2460	6.10	19.96	26.06	46.00	-19.94	AVG	
9		9.0220	17.73	19.95	37.68	60.00	-22.32	QP	
10		9.0220	11.63	19.95	31.58	50.00	-18.42	AVG	
11		11.3700	18.60	19.96	38.56	60.00	-21.44	QP	
12		11.3700	12.43	19.96	32.39	50.00	-17.61	AVG	

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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	87.41	0.58	0.73	1.00
802.11n_20	86.55	0.63	0.79	1.00
802.11n_40	76.12	1.19	1.57	2.00

$$\text{Duty Cycle Factor: } 10 * \log(1/0.8741) = 0.58$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.8655) = 0.63$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.7612) = 1.19$$

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## DUTY CYCLE TEST SIGNAL Measurement Result 802.11a



## 802.11n HT20



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## 802.11n HT 40



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## 8. 26DB EMISSION BANDWIDTH MEASUREMENT

### 8.1 Standard Applicable

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

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

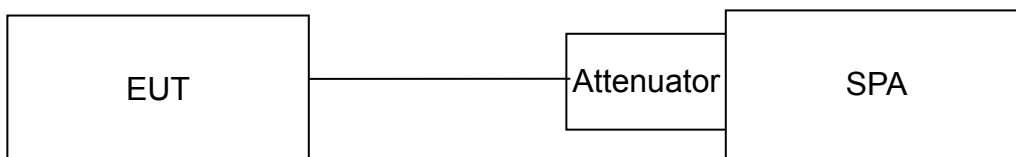
### 8.2 Measurement Procedure

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

### 8.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Temperature Chamber	TERCHY	MHG-120LF	911009	2018/05/18	2019/05/17
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01
Notebook	Lenovo	T440P	P0000564	N/A	N/A

### 8.4 Test Set-up



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## 8.5 Measurement Result

### 26dB Bandwidth

802.11a\_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.14	13.041
5220	22.11	13.445
5240	21.63	13.351
5260	21.85	13.394
5300	21.83	13.391
5320	20.38	13.092
5500	19.95	12.999
5580	21.29	13.281
5700	19.77	12.959

802.11n\_HT20\_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.31	13.076
5220	20.80	13.181
5240	22.70	13.559
5260	20.78	13.176
5300	20.72	13.164
5320	22.40	13.503
5500	22.38	13.498
5580	22.13	13.449
5700	20.57	13.132

802.11n\_HT40\_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	38.84	15.893
5230	42.48	16.282
5270	42.35	16.268
5310	42.71	16.305
5510	38.78	15.886
5550	<b>43.51</b>	16.386
5670	43.14	16.348

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## 99% BW Verification of DFS Function

### 802.11a

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5180	5171.77	< 5180
5240	5248.38	< 5250

### 802.11n\_HT20

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5180	5171.17	< 5180
5240	5248.13	< 5250

### 802.11n\_HT40

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5190	5172.01	< 5190
5230	5248.10	< 5250

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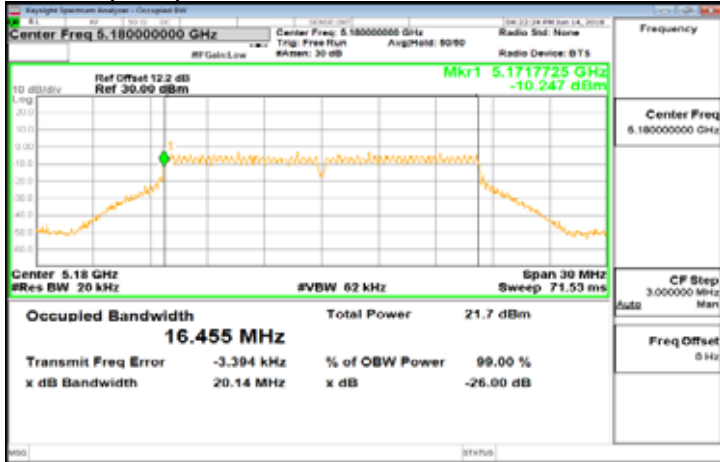
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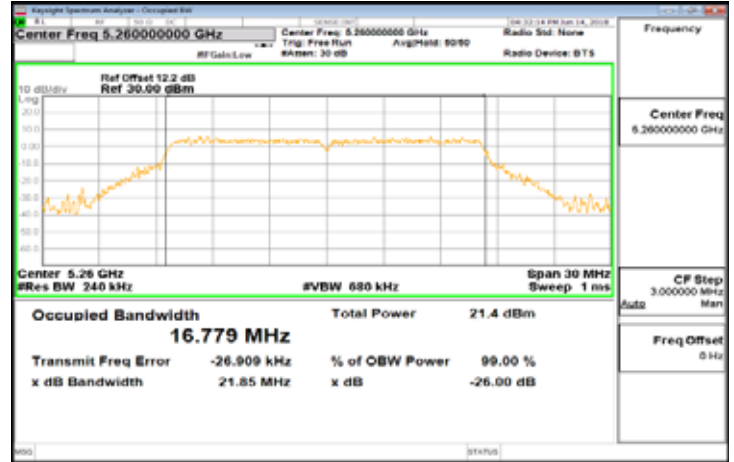
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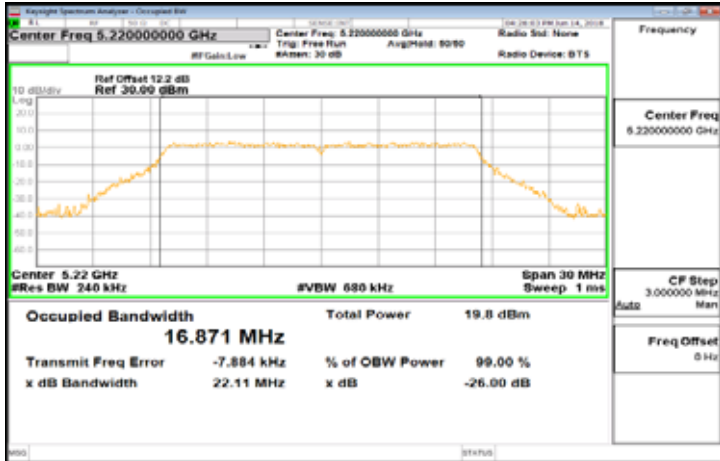
### 802.11a (Main) 5180MHz



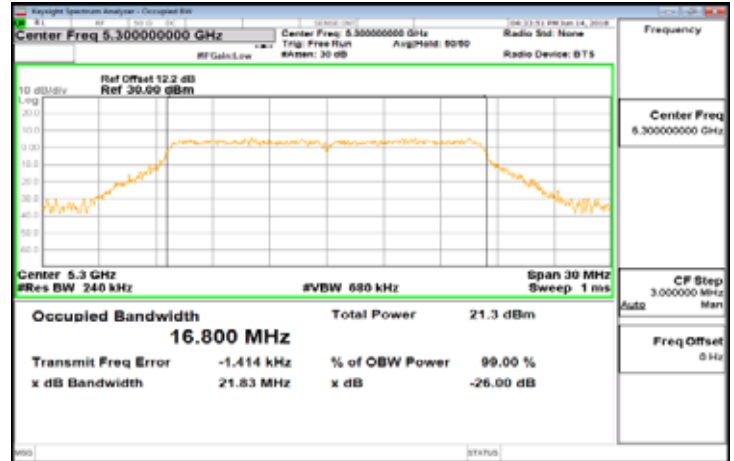
### 5260MHz



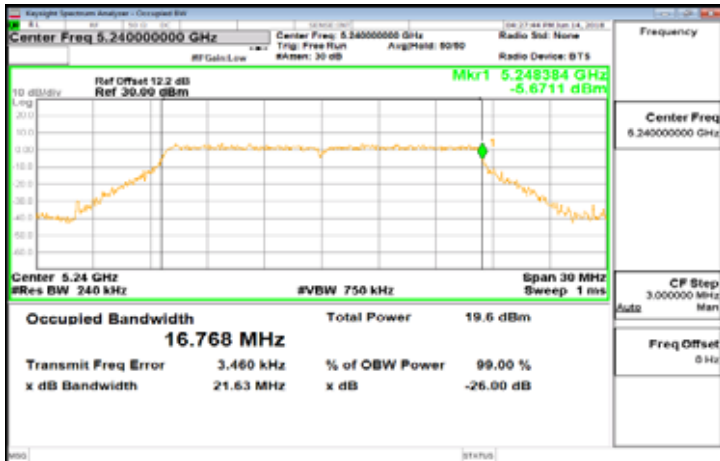
### 5220MHz



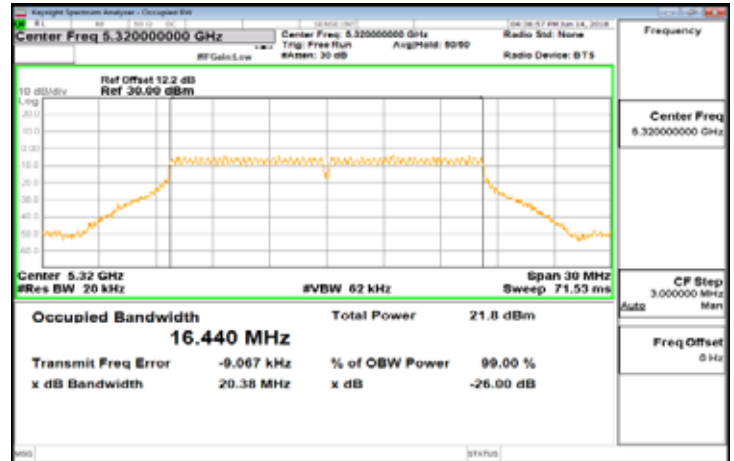
### 5300MHz



### 5240MHz



### 5320MHz



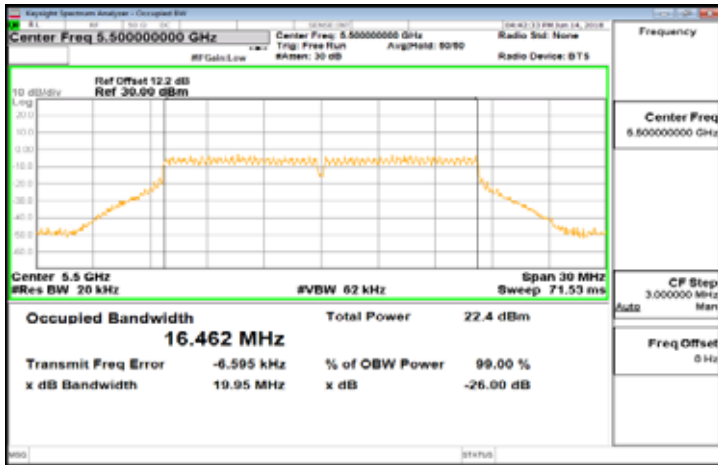
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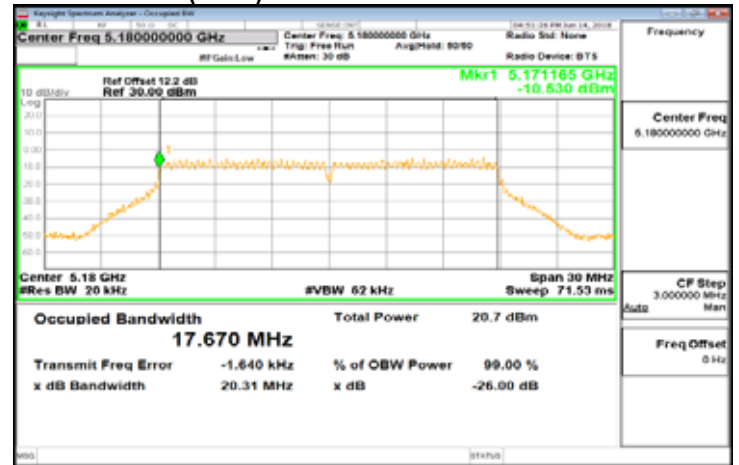
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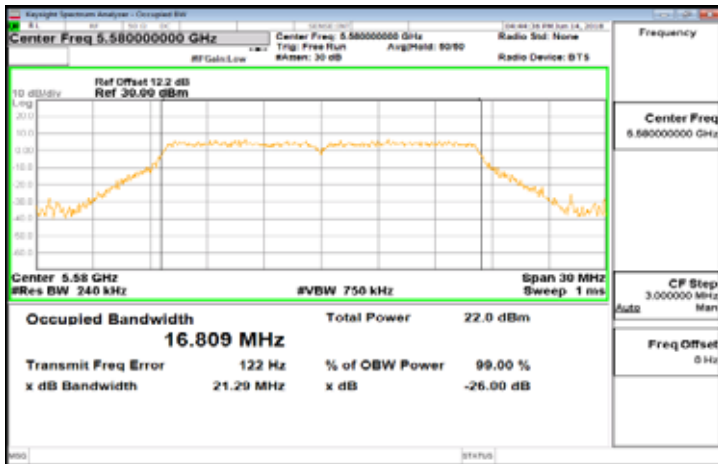
### 5500MHz



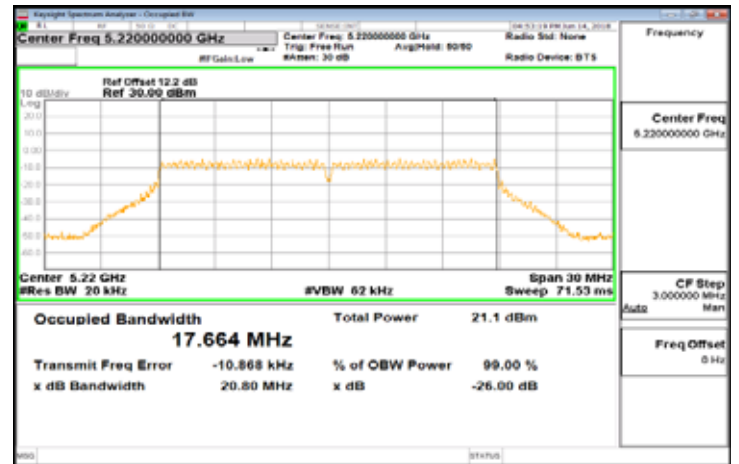
### 802.11n HT20 (Main) 5180 MHz



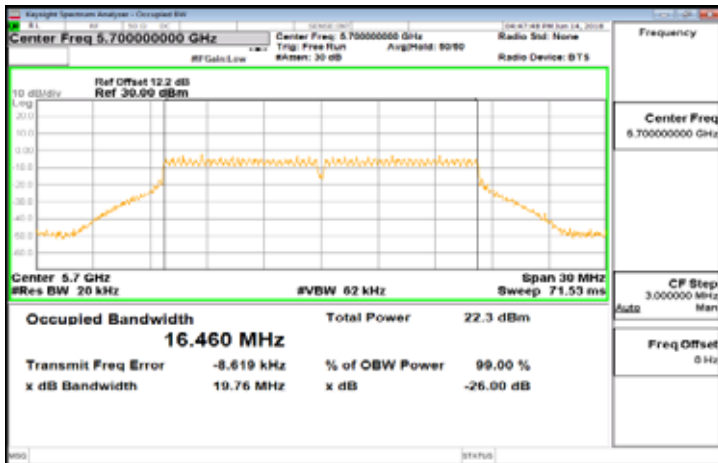
### 5580MHz



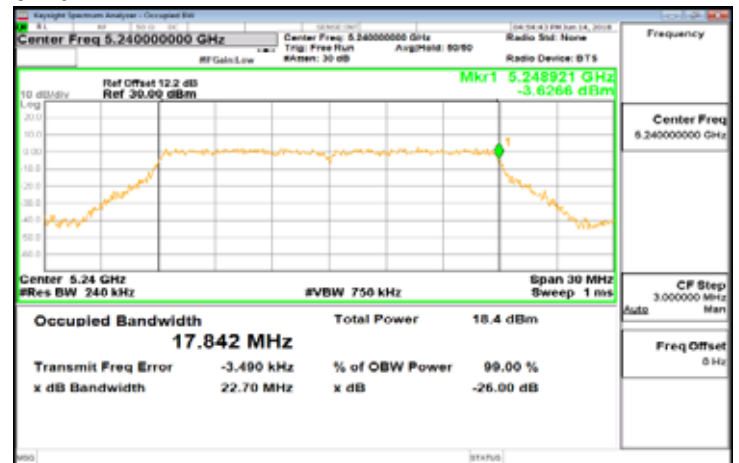
### 5220 MHz



### 5700MHz



### 5240 MHz

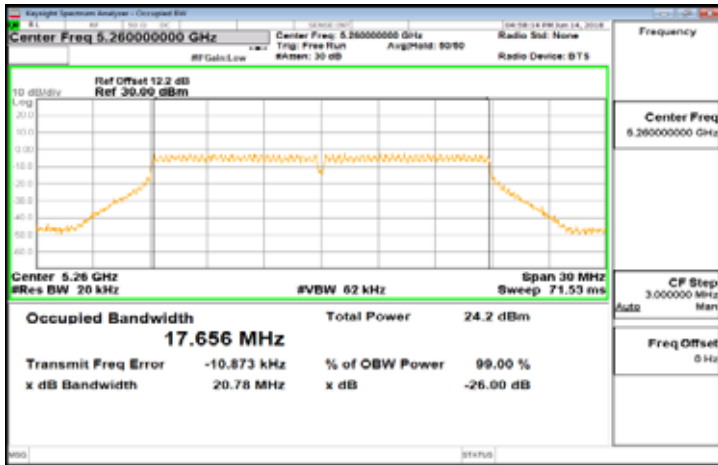


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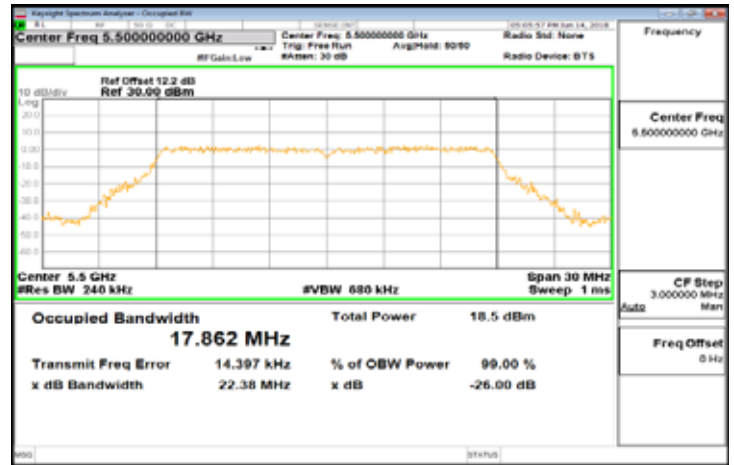
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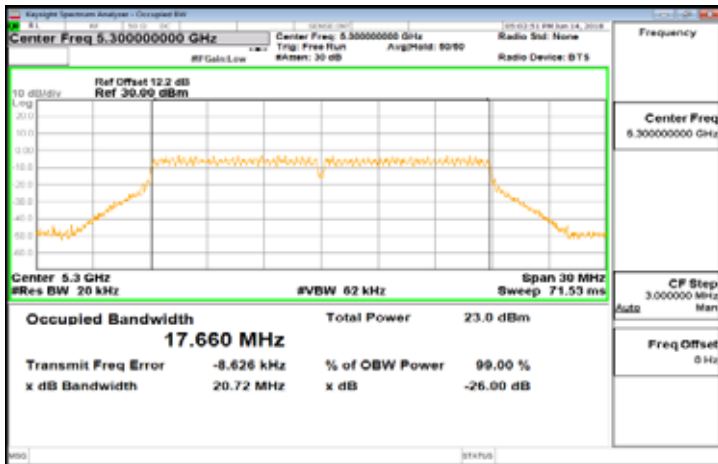
### 5260 MHz



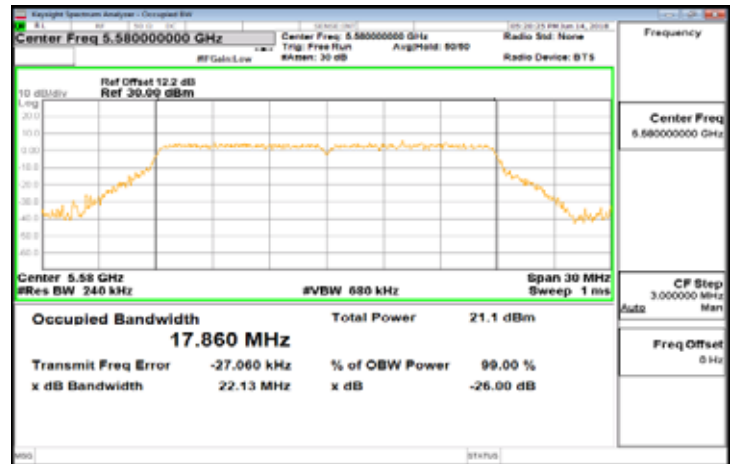
### 5500 MHz



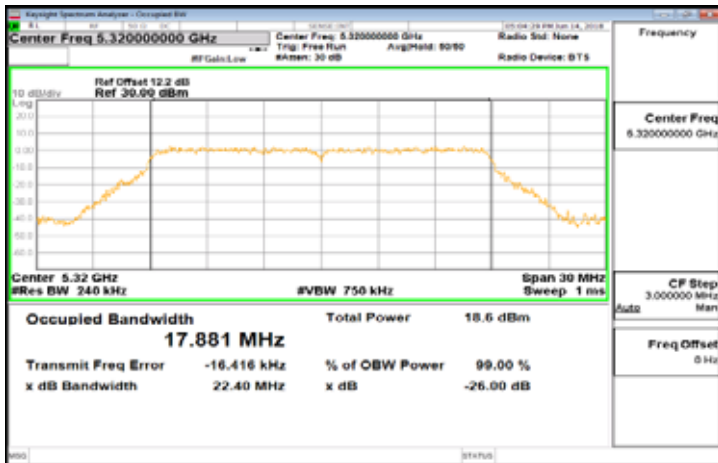
### 5300 MHz



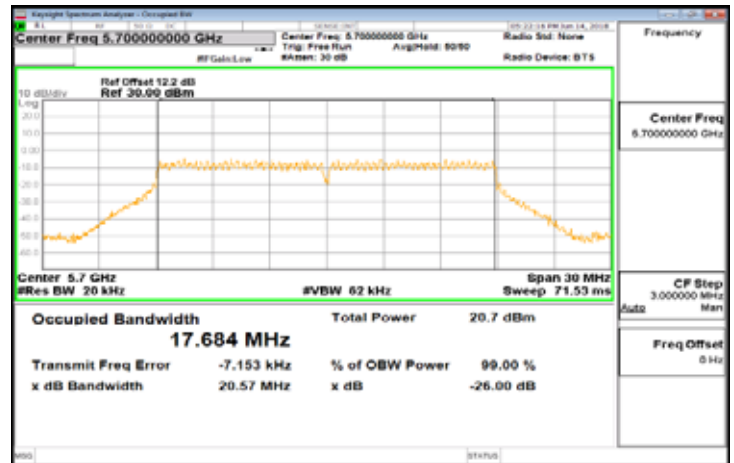
### 5580 MHz



### 5320 MHz



### 5700 MHz

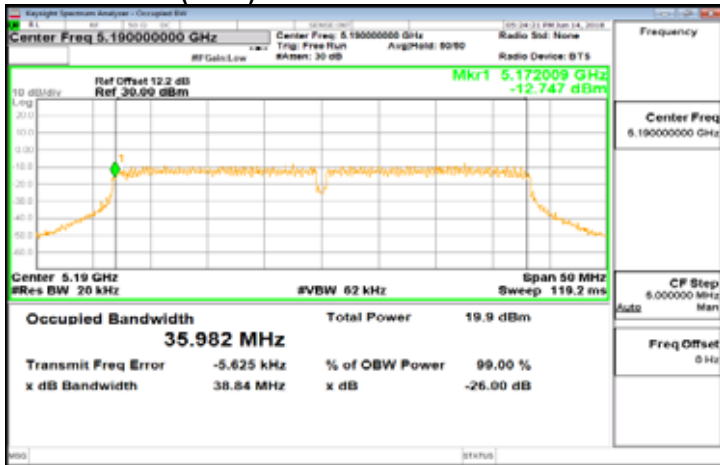


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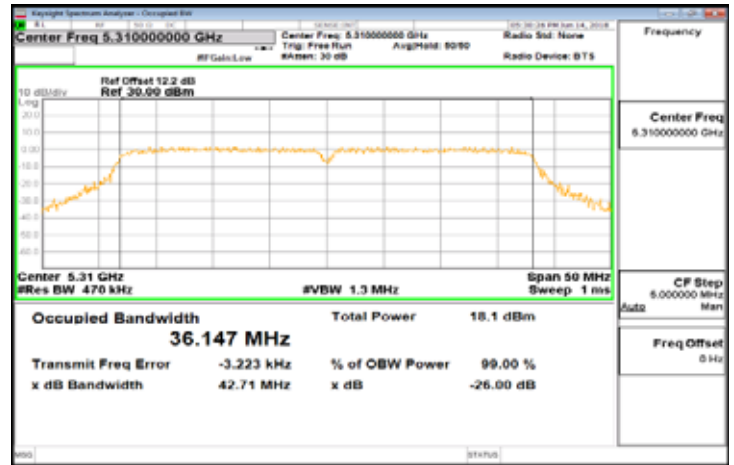
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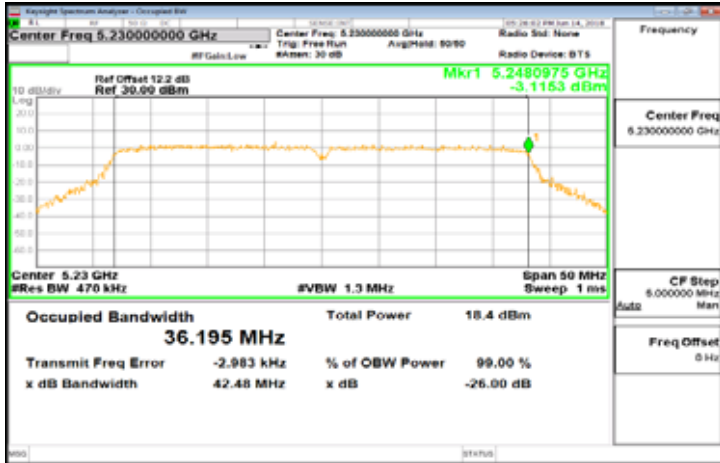
### 802.11n HT40 (Main) 5190 MHz



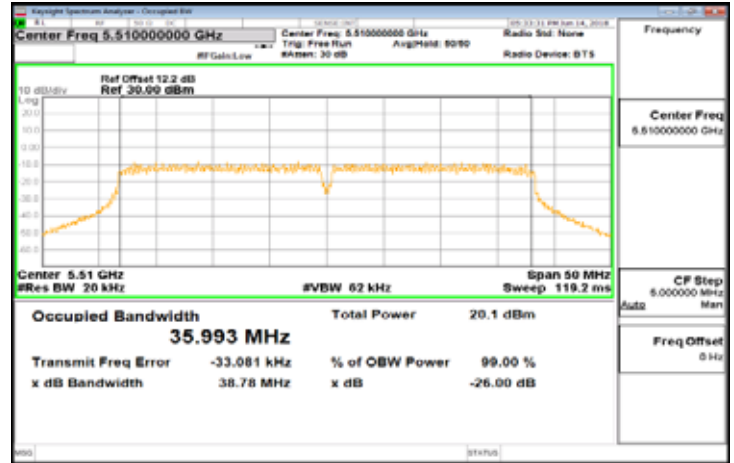
### 5310MHz



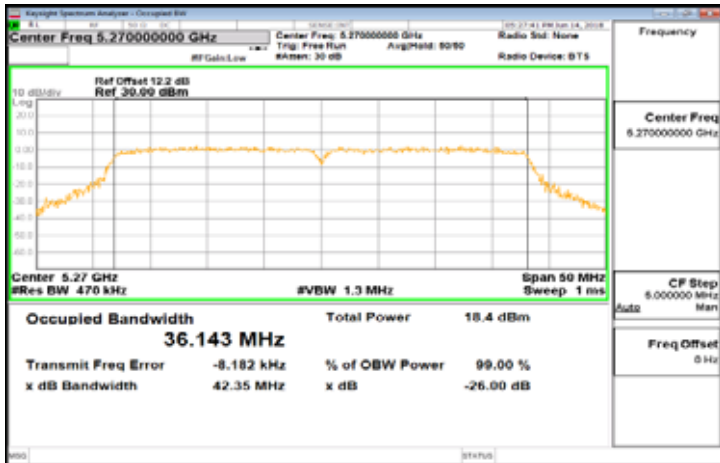
### 5230 MHz



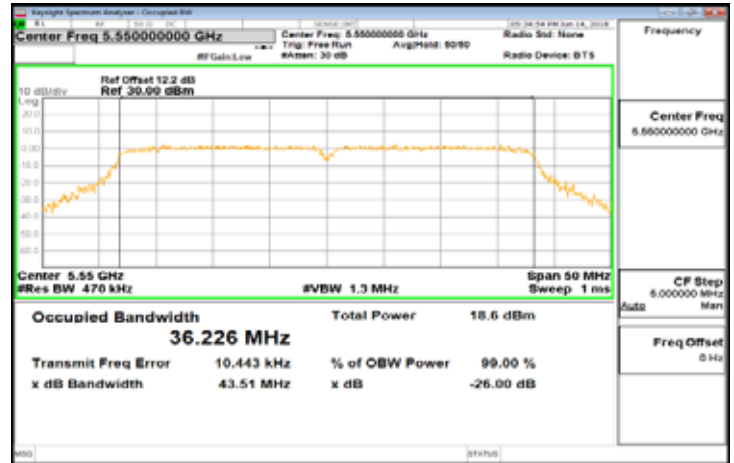
### 5510 MHz



### 5270 MHz



### 5550 MHz

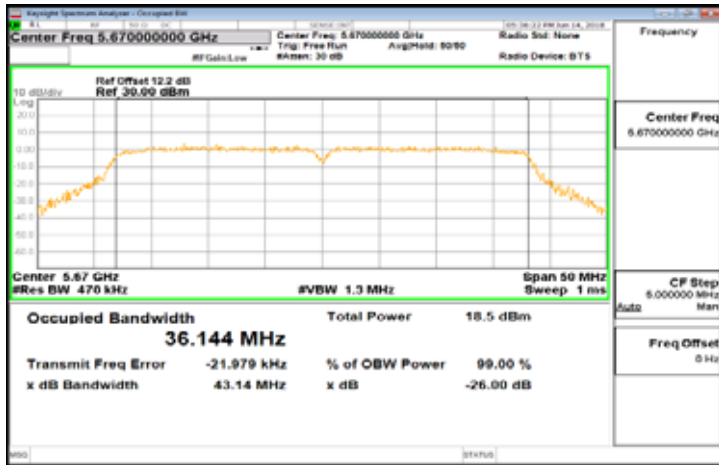


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5670 MHz



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## 9. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

### 9.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Mater device )	1 Watt(30dBm)
		Fixed point-to-point Aceso 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)

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

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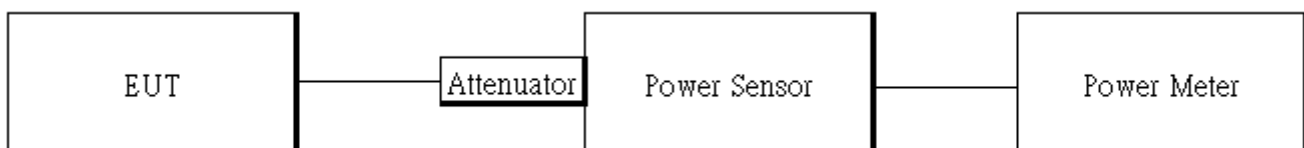
## 9.2 Measurement Procedure

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

## 9.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1804001	2018/02/01	2019/01/31
Power Sensor	Anritsu	MA2411B	1726104	2018/02/01	2019/01/31
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01
Notebook	Lenovo	T440P	P0000564	N/A	N/A

## 9.4 Test Set-up



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## 9.5 Measurement Result

### Conducted output power

#### 802.11a\_Main

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	13.81	24.068	23.98	PASS
44	5220	6	13.79	23.957	23.98	PASS
48	5240	6	13.88	24.459	23.98	PASS
52	5260	6	17.03	50.517	23.98 or $11+10\log(B) = 24.39$	PASS
60	5300	6	<b>17.11</b>	51.456	23.98 or $11+10\log(B) = 24.39$	PASS
64	5320	6	14.12	25.849	23.98 or $11+10\log(B) = 24.09$	PASS
100	5500	6	13.81	24.068	23.98 or $11+10\log(B) = 24.00$	PASS
116	5580	6	<b>17.14</b>	51.813	23.98 or $11+10\log(B) = 24.28$	PASS
140	5700	6	13.99	25.086	23.98 or $11+10\log(B) = 23.96$	PASS

#### 802.11n\_HT20\_Main

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	MCS0	13.71	23.474	23.98	PASS
44	5220	MCS0	13.86	24.299	23.98	PASS
48	5240	MCS0	14.02	25.211	23.98	PASS
52	5260	MCS0	16.02	39.956	23.98 or $11+10\log(B) = 24.18$	PASS
60	5300	MCS0	<b>16.06</b>	40.326	23.98 or $11+10\log(B) = 24.16$	PASS
64	5320	MCS0	14.06	25.444	23.98 or $11+10\log(B) = 24.50$	PASS
100	5500	MCS0	13.83	24.131	23.98 or $11+10\log(B) = 24.50$	PASS
116	5580	MCS0	<b>16.08</b>	40.512	23.98 or $11+10\log(B) = 24.45$	PASS
140	5700	MCS0	14.06	25.444	23.98 or $11+10\log(B) = 24.13$	PASS

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## 802.11n\_HT40\_Main

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
38	5190	MCS0	13.07	20.254	23.98	PASS
46	5230	MCS0	13.40	21.853	23.98	PASS
54	5270	MCS0	13.72	23.523	23.98 or $11+10\log(B) = 27.27$	PASS
62	5310	MCS0	<b>13.76</b>	23.741	23.98 or $11+10\log(B) = 27.31$	PASS
102	5510	MCS0	13.55	22.620	23.98 or $11+10\log(B) = 26.89$	PASS
110	5550	MCS0	<b>13.68</b>	23.308	23.98 or $11+10\log(B) = 27.39$	PASS
134	5670	MCS0	13.45	22.106	23.98 or $11+10\log(B) = 27.35$	PASS

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## 10. POWER SPECTRAL DENSITY

### 10.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Mater 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

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

### 10.2 Measurement Procedure

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

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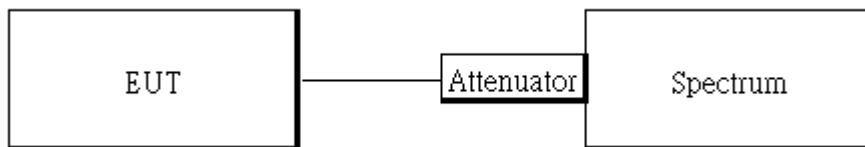
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### 10.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Temperature Chamber	TERCHY	MHG-120LF	911009	2018/05/18	2019/05/17
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01
Notebook	Lenovo	T440P	P0000564	N/A	N/A

### 10.4 Test Set-up



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## 10.5 Measurement Result

POWER DENSITY 802.11a MODE					
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	-2.61	0.58	-2.03	11	-13.03
5220	-2.32	0.58	-1.74	11	-12.74
5240	-2.07	0.58	-1.49	11	-12.49
5260	-0.46	0.58	0.12	11	-10.88
5300	4.14	0.58	4.72	11	-6.28
5320	-1.26	0.58	-0.68	11	-11.68
5500	-3.04	0.58	-2.46	11	-13.46
5580	-0.59	0.58	-0.01	11	-11.01
5700	-1.44	0.58	-0.86	11	-11.86
POWER DENSITY 802.11n HT20 MODE					
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	-2.72	0.63	-2.09	11	-13.09
5220	-2.73	0.63	-2.10	11	-13.10
5240	-4.19	0.63	-3.56	11	-14.56
5260	-1.40	0.63	-0.77	11	-11.77
5300	0.35	0.63	0.98	11	-10.02
5320	-2.72	0.63	-2.09	11	-13.09
5500	-1.96	0.63	-1.33	11	-12.33
5580	-0.75	0.63	-0.12	11	-11.12
5700	-2.84	0.63	-2.21	11	-13.21
POWER DENSITY 802.11n HT40 MODE					
Frequency (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5190	-10.02	1.19	-8.83	11	-19.83
5230	-9.84	1.19	-8.65	11	-19.65
5270	-10.69	1.19	-9.50	11	-20.50
5310	-8.71	1.19	-7.52	11	-18.52
5510	-10.89	1.19	-9.70	11	-20.70
5550	-9.3	1.19	-8.11	11	-19.11
5670	-8.51	1.19	-7.32	11	-18.32

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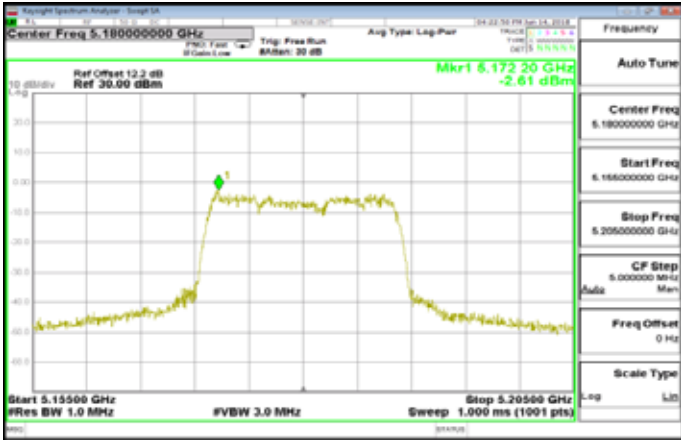
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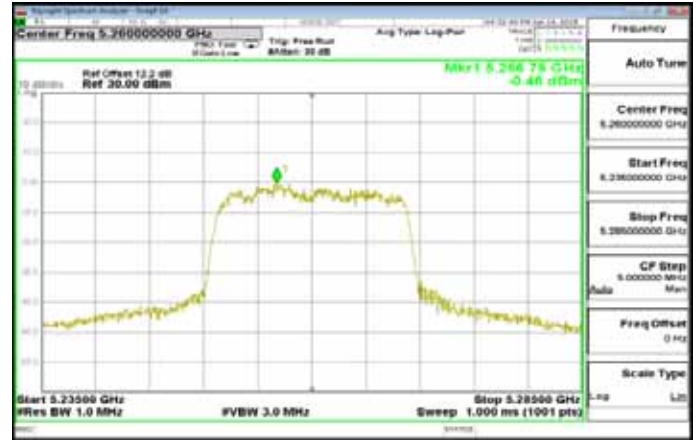
802.11a 5150~5250 MHz

Peak Power Spectral Density Data Plot (CH Low 5180 MHz)

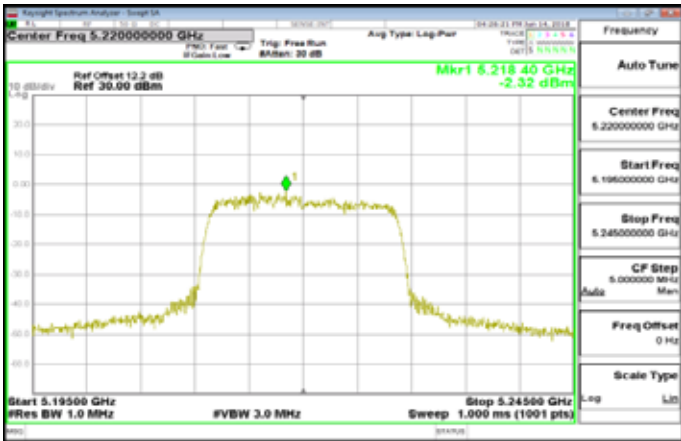


802.11a 5250~5350 MHz

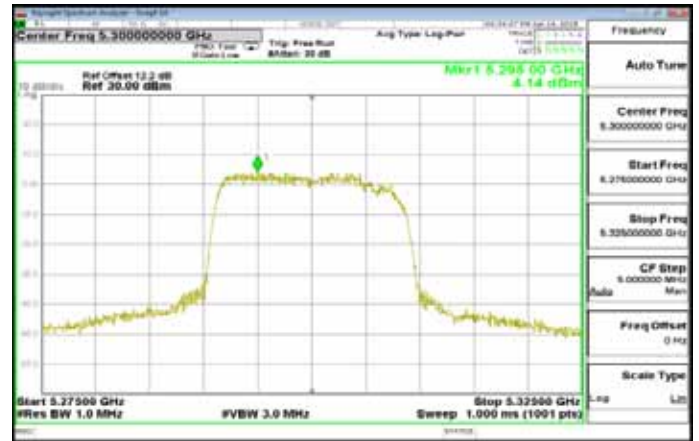
Peak Power Spectral Density Data Plot (CH Low 5260 MHz)



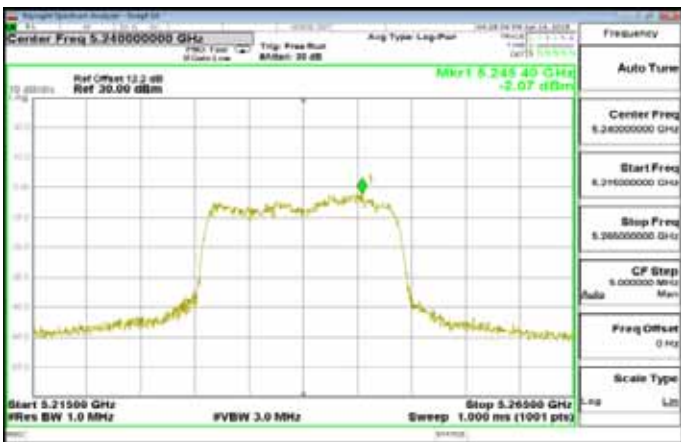
Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



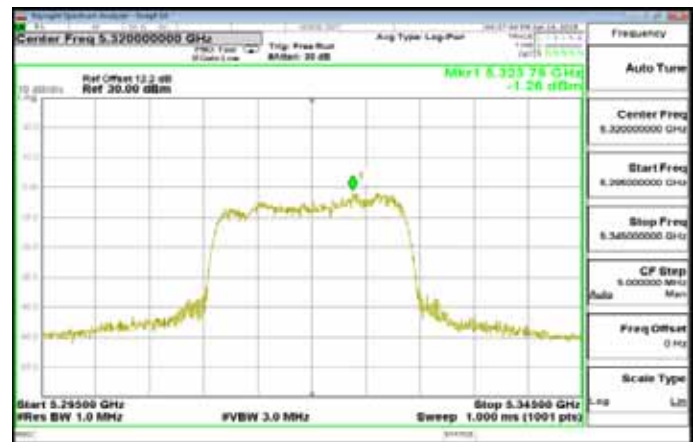
Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)



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



Peak Power Spectral Density Data Plot (CH High 5320 MHz)



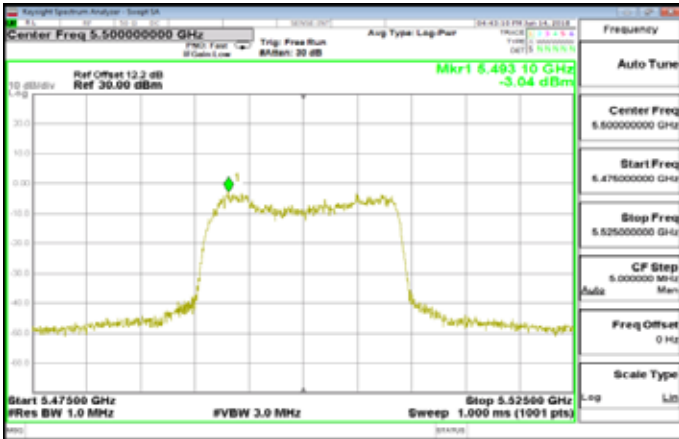
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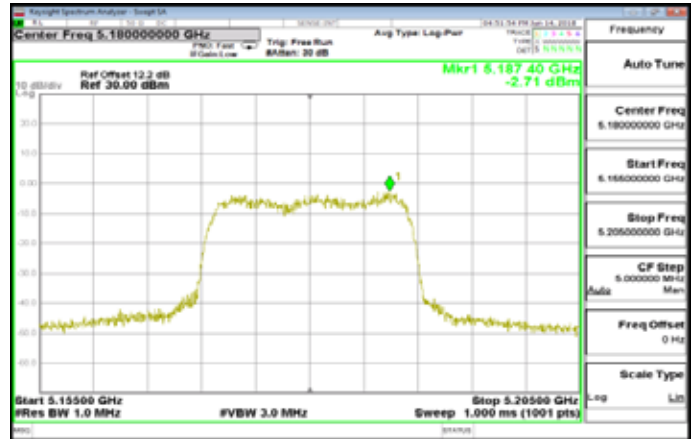
802.11a 5470~5725 MHz

Peak Power Spectral Density Data Plot (CH Low 5500 MHz)

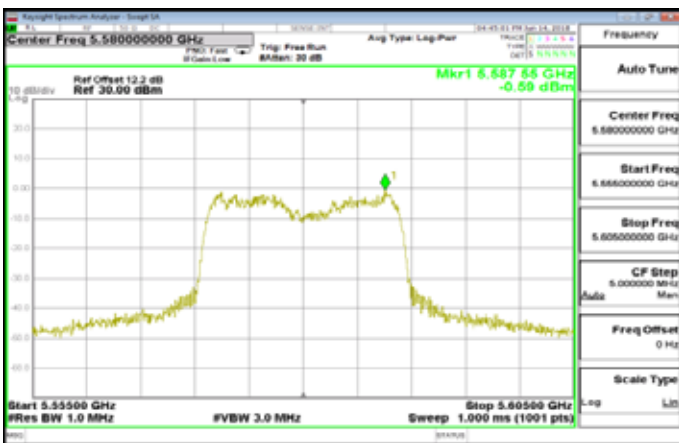


802.11n HT20, 5150~5250 MHz

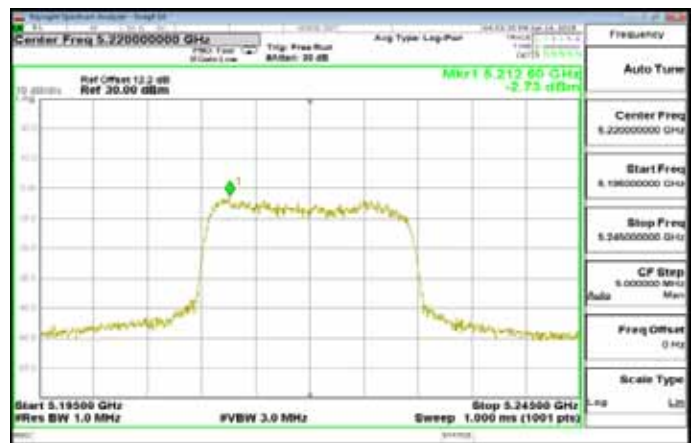
Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



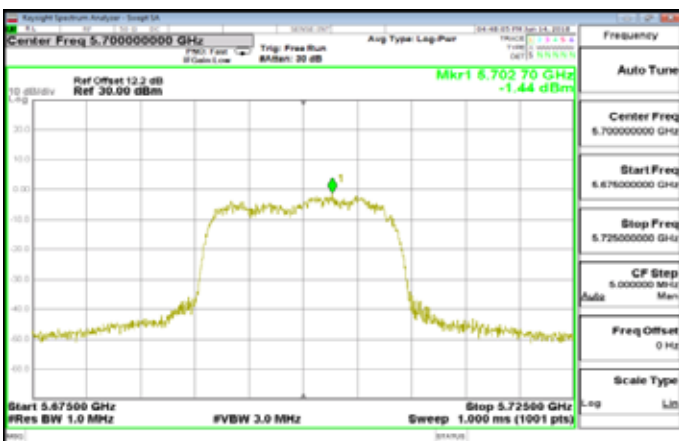
Peak Power Spectral Density Data Plot (CH Mid 5580 MHz)



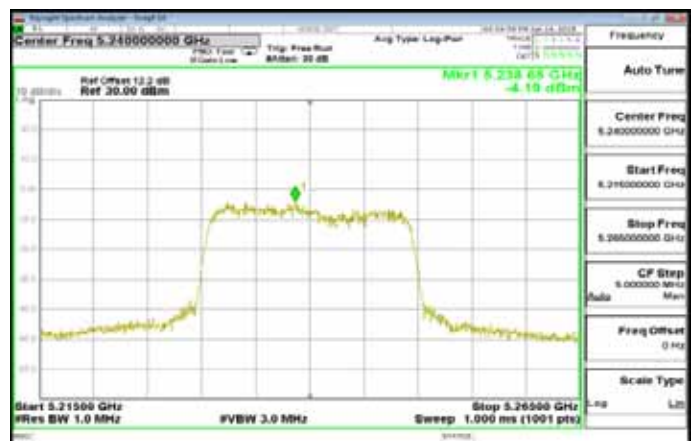
Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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



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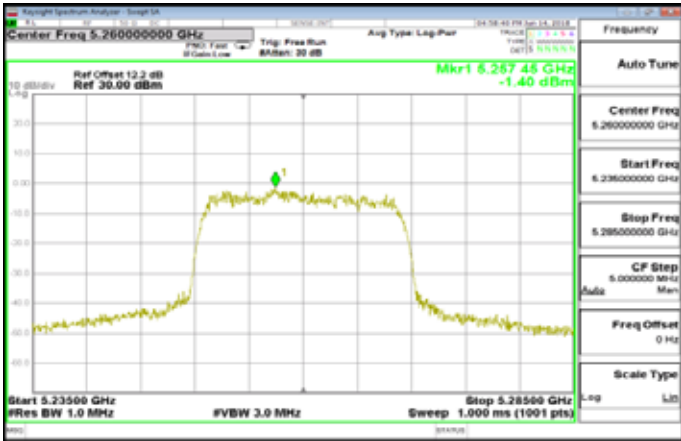
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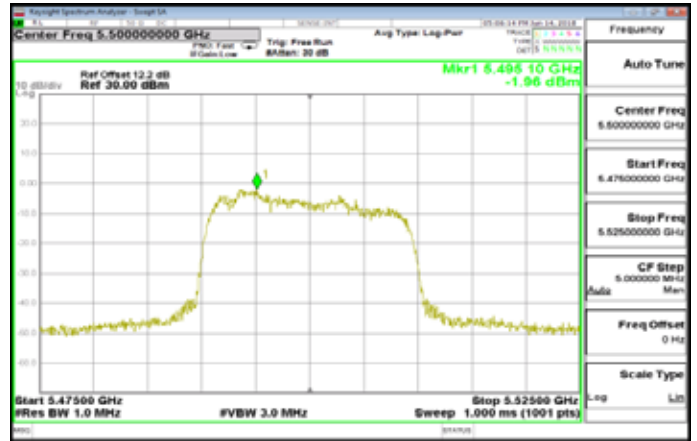
802.11n HT20, 5250~5350 MHz

Peak Power Spectral Density Data Plot (CH Low 5260MHz)

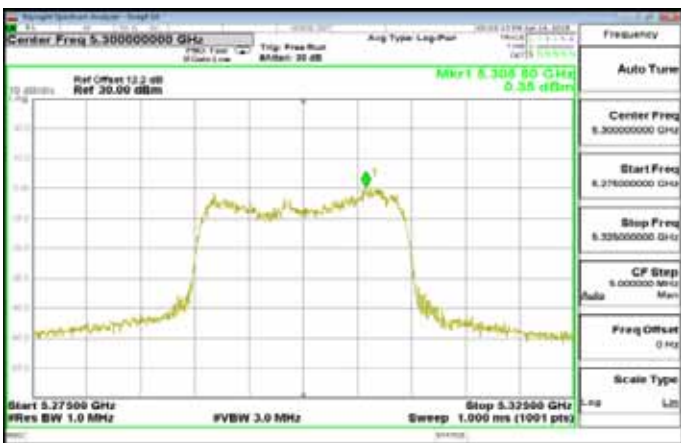


802.11n HT20, 5470~5725 MHz

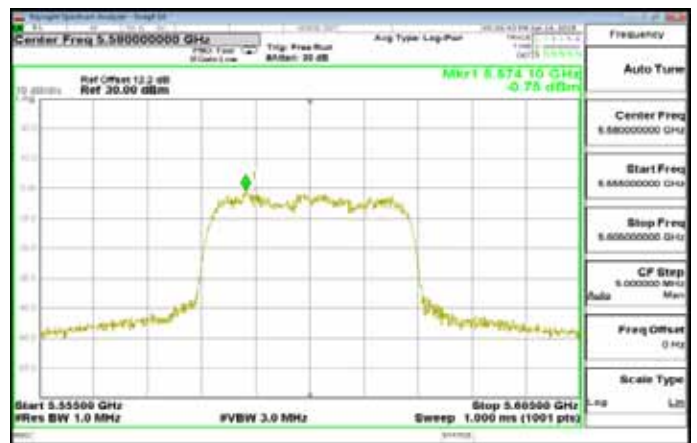
Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



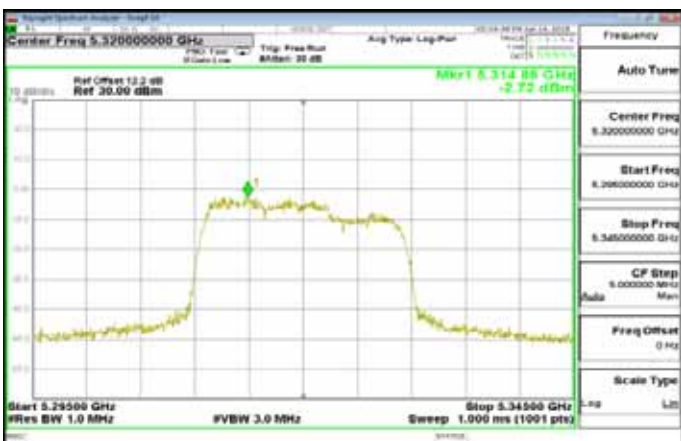
Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)



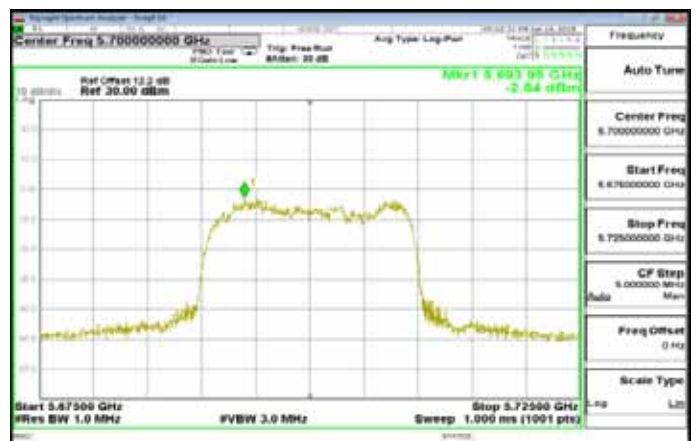
Peak Power Spectral Density Data Plot (CH Mid 5580MHz)



Peak Power Spectral Density Data Plot (CH High 5320 MHz)



Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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802.11n HT40, 5150~5250 MHz

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



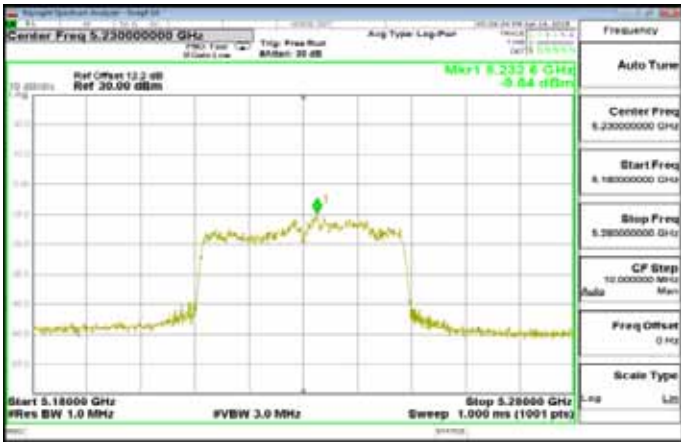
802.11n HT40, 5250~5350 MHz

Peak Power Spectral Density Data Plot (CH Low 5270 MHz)



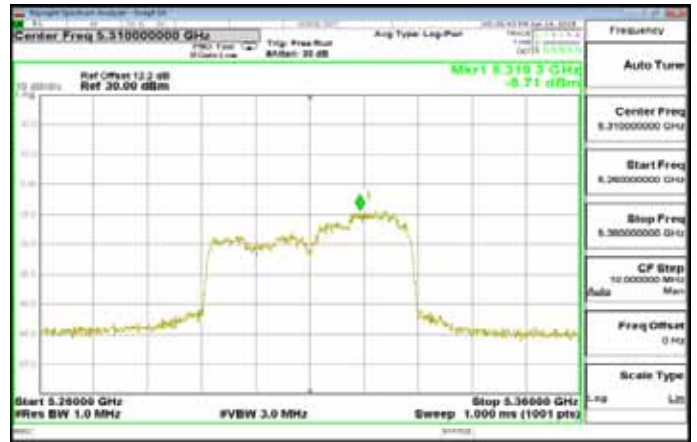
802.11n HT40, 5250~5350 MHz

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



802.11n HT40, 5250~5350 MHz

Peak Power Spectral Density Data Plot (CH High 5310 MHz)



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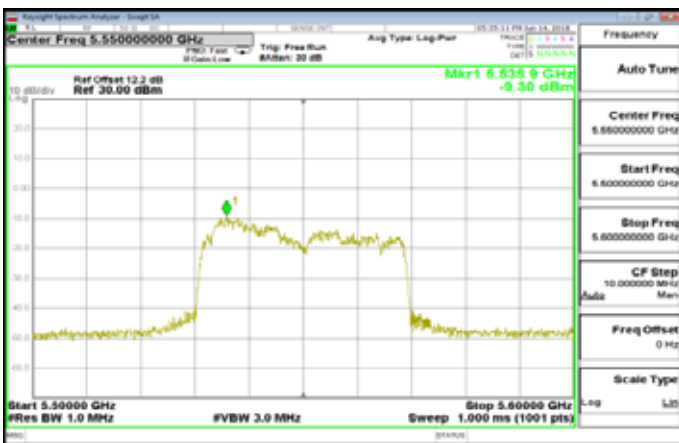
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802.11n HT40, 5470~5725 MHz

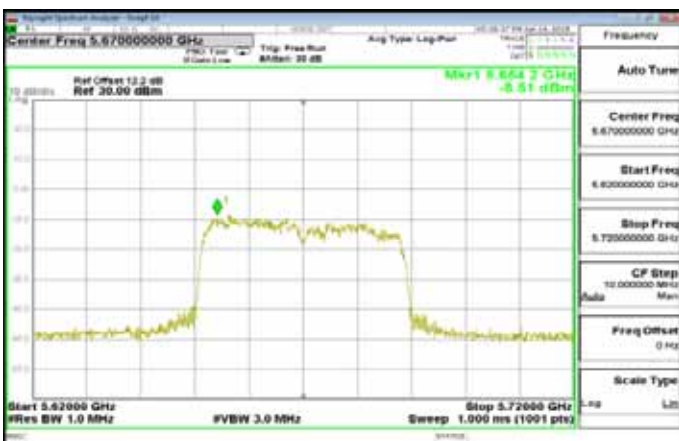
Peak Power Spectral Density Data Plot (CH Low 5510 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5550 MHz)



Peak Power Spectral Density Data Plot (CH High 5670 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
<p>*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.</p>		

EIRP = ( E\*d )<sup>2</sup> / 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)

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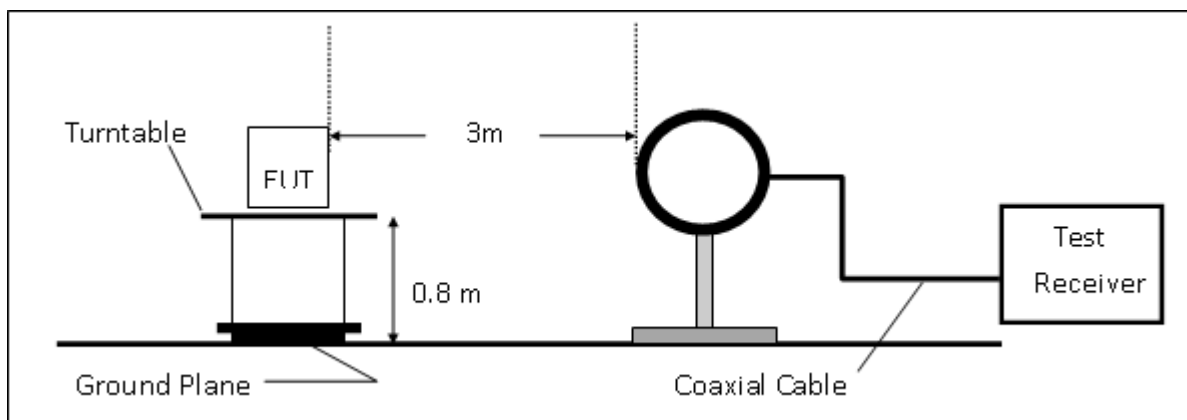
### 11.2 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL 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	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
Filter 5470-5725 MHz	Micro-Tronics	BRM50704	1	2018/01/02	2019/01/01
Low Loss Cable	Huber Suhner	966_RX	9	2018/01/02	2019/01/01
Notebook	Lenovo	T440P	P0000564	N/A	N/A

Note: N.C.R refers to Not Calibrated Required.

### 11.3 Test SET-UP

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

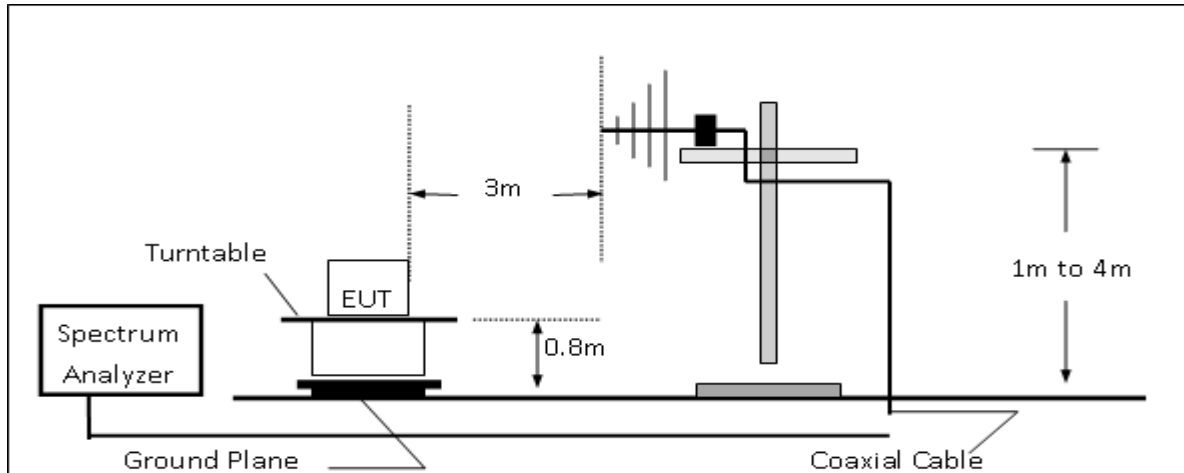


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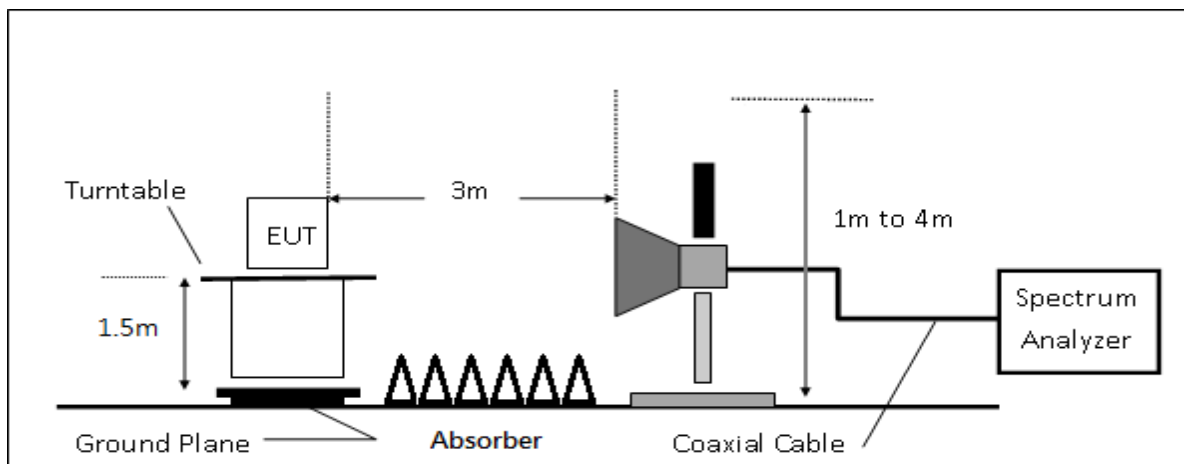
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## (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



## (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.
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  $\geq 1/T$  (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.

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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)

**Note :**

“F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

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

Radiated emission below 30MHz is measured in a 9m\*9m\*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site. And there is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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

### 11.7 Measurement Result

Refer to next page for tabular data sheets.

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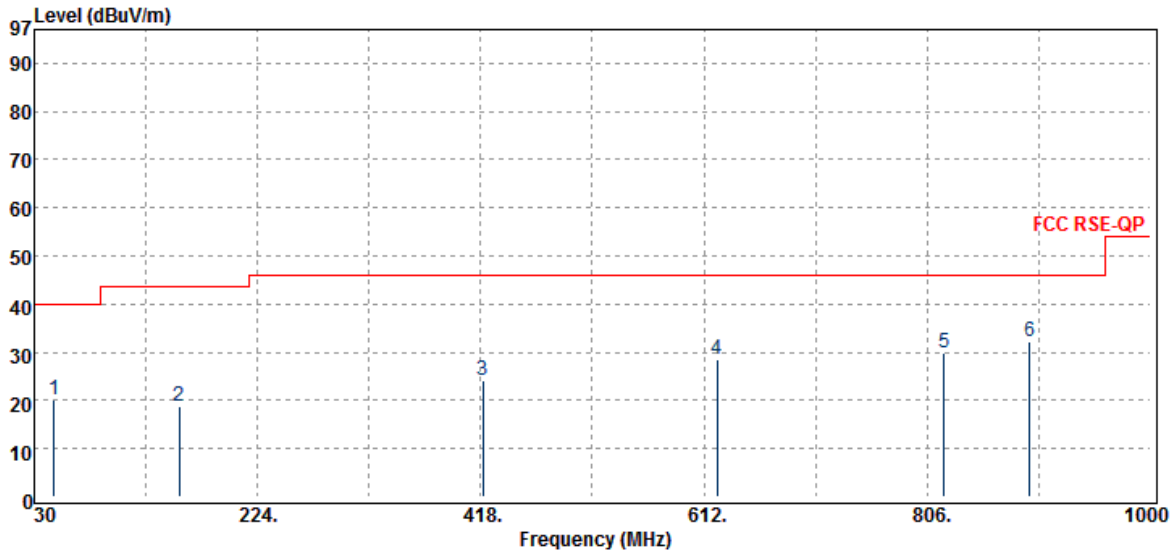
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### Radiated Spurious Emission Measurement Result

#### Below 1GHz Worst-Case Data:

Operation Band	:802.11aB1	Test Date	:2018-06-14
Fundamental Frequency	:5220 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Kane
EUT Pol.	:E1 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
47.46	Peak	27.84	-7.64	20.20	40.00	-19.80
156.10	Peak	26.14	-7.24	18.90	43.50	-24.60
419.94	Peak	26.81	-2.77	24.04	46.00	-21.96
623.64	Peak	27.75	0.64	28.39	46.00	-17.61
820.55	Peak	26.37	3.48	29.85	46.00	-16.15
895.24	Peak	26.24	6.02	32.26	46.00	-13.74

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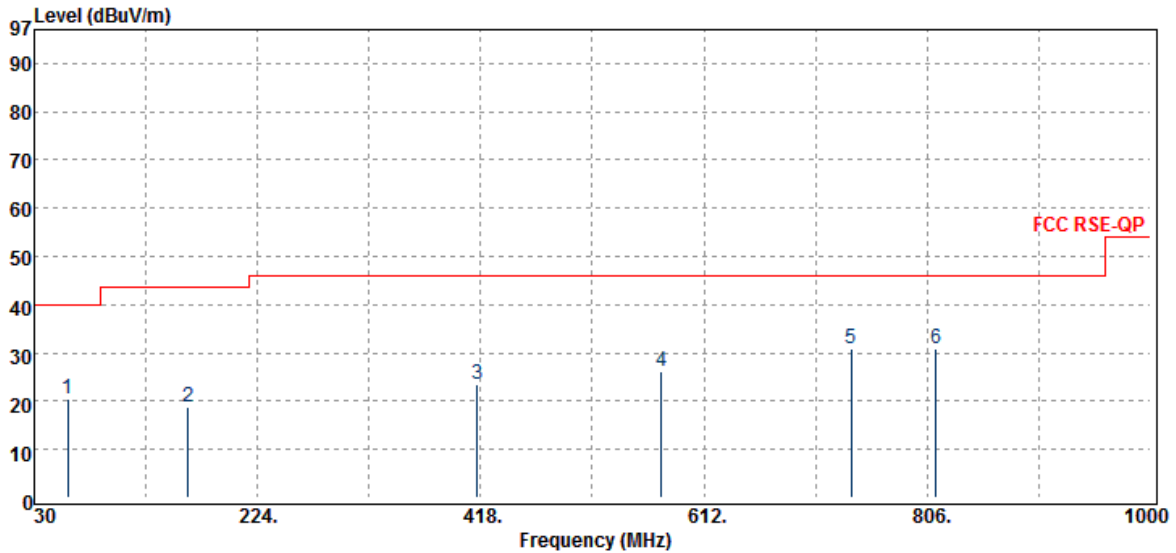
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Operation Band :802.11aB1  
 Fundamental Frequency :5220 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
59.10	Peak	28.08	-7.77	20.31	40.00	-19.69
163.86	Peak	26.19	-7.27	18.92	43.50	-24.58
415.09	Peak	26.53	-2.95	23.58	46.00	-22.42
575.14	Peak	26.26	-0.14	26.12	46.00	-19.88
740.04	Peak	27.20	3.56	30.76	46.00	-15.24
813.76	Peak	27.89	3.08	30.97	46.00	-15.03

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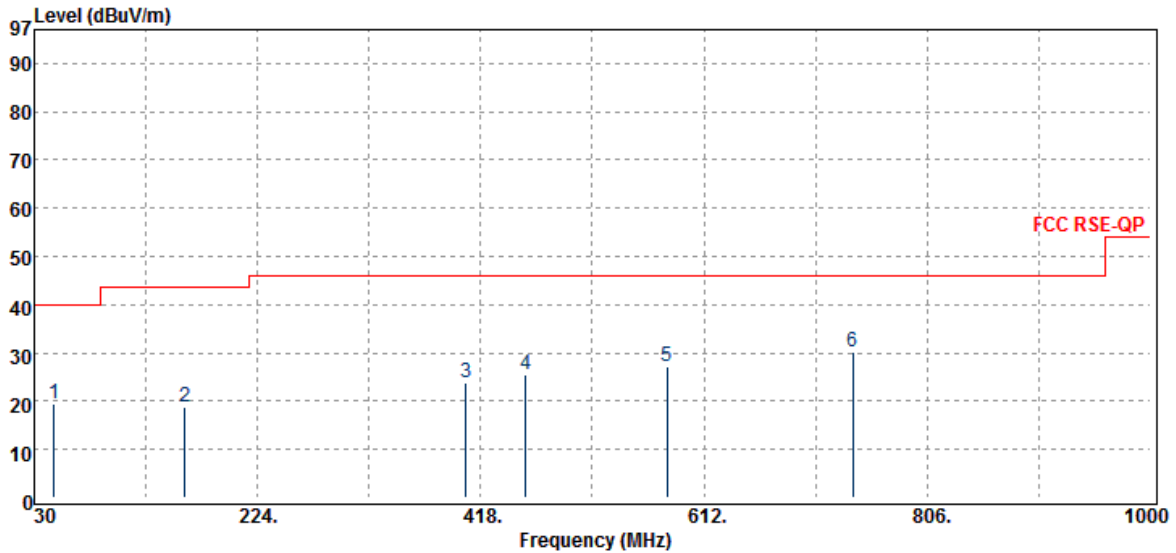
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**802.11a 5250~5350 MHz**

Operation Band :802.11aB2  
 Fundamental Frequency :5300 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
47.46	Peak	27.22	-7.64	19.58	40.00	-20.42
160.95	Peak	26.01	-7.14	18.87	43.50	-24.63
405.39	Peak	26.58	-2.91	23.67	46.00	-22.33
456.80	Peak	27.74	-2.37	25.37	46.00	-20.63
579.99	Peak	27.21	0.01	27.22	46.00	-18.78
741.01	Peak	26.80	3.35	30.15	46.00	-15.85

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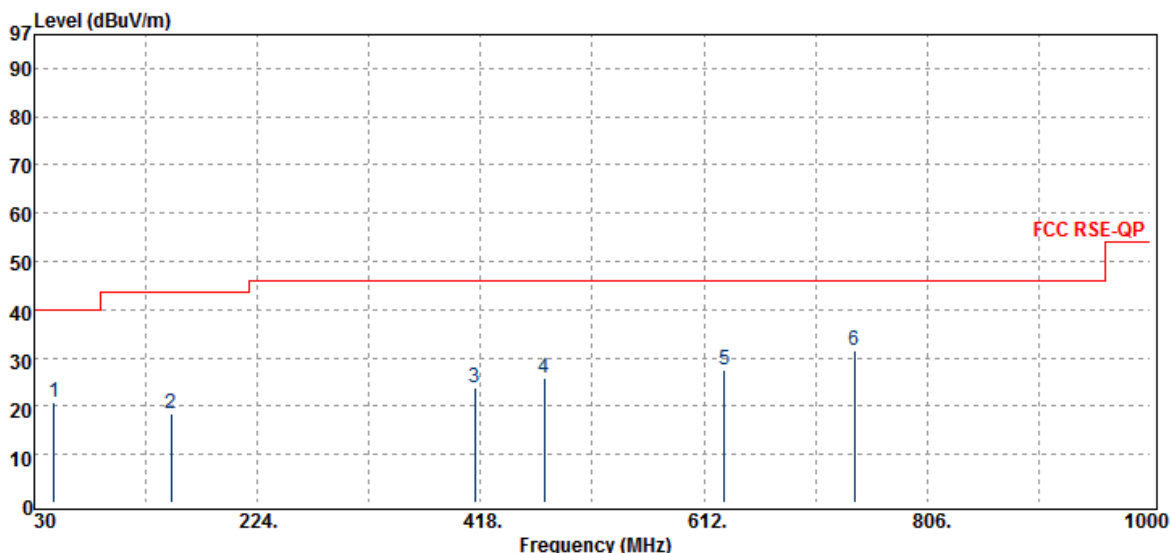
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Operation Band :802.11aB2  
 Fundamental Frequency :5300 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
47.46	Peak	28.41	-7.64	20.77	40.00	-19.23
149.31	Peak	26.03	-7.41	18.62	43.50	-24.88
413.15	Peak	26.68	-2.95	23.73	46.00	-22.27
473.29	Peak	27.99	-2.30	25.69	46.00	-20.31
629.46	Peak	26.81	0.85	27.66	46.00	-18.34
742.95	Peak	28.50	2.93	31.43	46.00	-14.57

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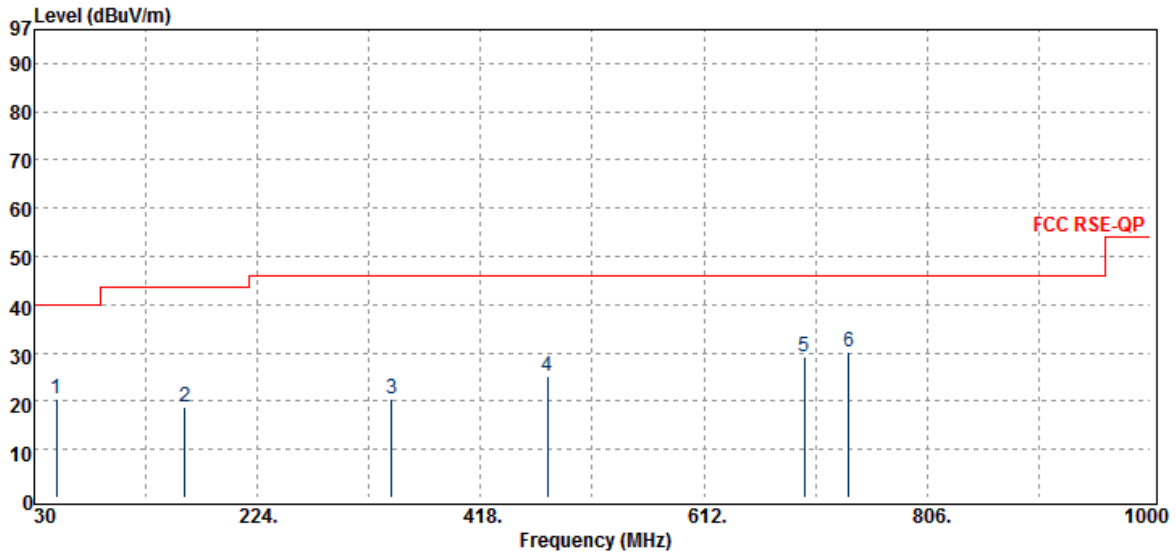
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**802.11a, 5470~5725 MHz**

Operation Band :802.11aB3  
 Fundamental Frequency :5580 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
49.40	Peak	27.97	-7.48	20.49	40.00	-19.51
160.95	Peak	25.97	-7.14	18.83	43.50	-24.67
340.40	Peak	25.27	-4.77	20.50	46.00	-25.50
476.20	Peak	27.57	-2.30	25.27	46.00	-20.73
699.30	Peak	27.45	1.74	29.19	46.00	-16.81
738.10	Peak	26.92	3.41	30.33	46.00	-15.67

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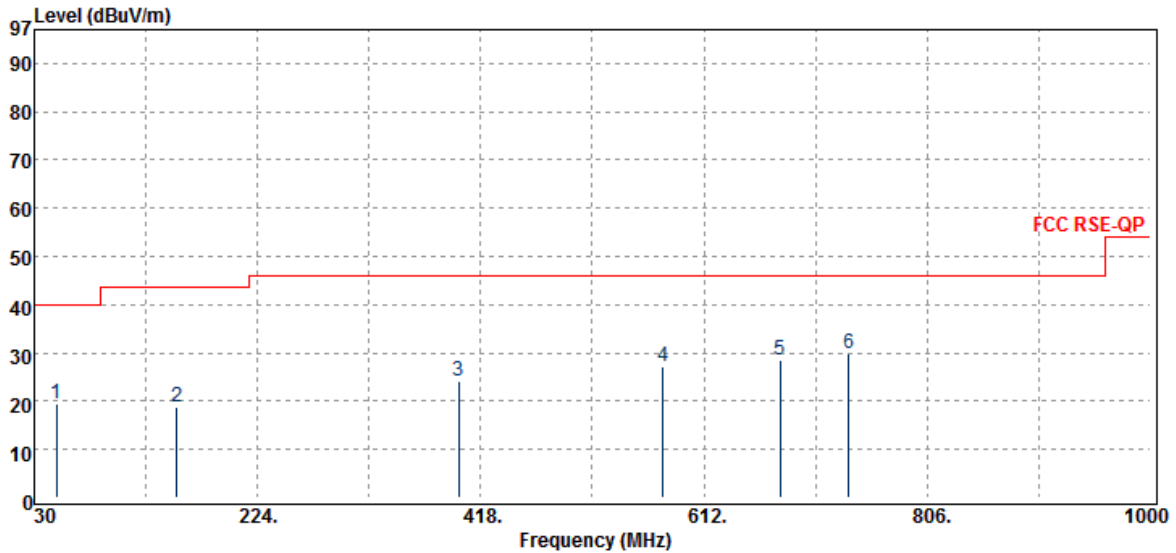
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Operation Band :802.11aB3  
Fundamental Frequency :5580 MHz  
Operation Mode :Tx CH MID  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
49.40	Peak	27.06	-7.48	19.58	40.00	-20.42
154.16	Peak	26.18	-7.30	18.88	43.50	-24.62
398.60	Peak	27.63	-3.41	24.22	46.00	-21.78
576.11	Peak	27.27	-0.11	27.16	46.00	-18.84
677.96	Peak	26.97	1.42	28.39	46.00	-17.61
738.10	Peak	26.57	3.41	29.98	46.00	-16.02

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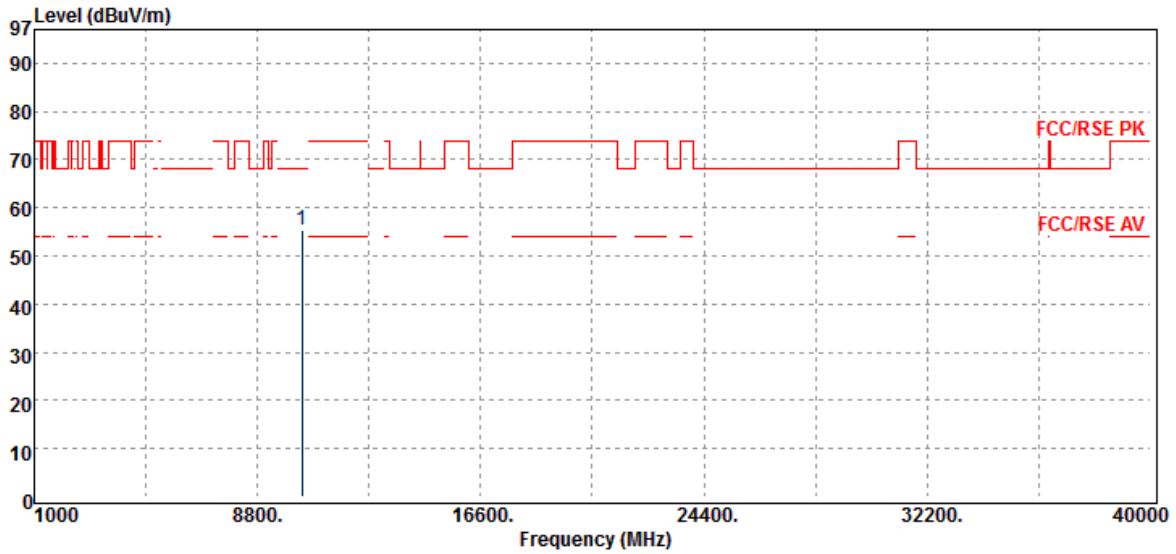
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**Above 1GHz Worst-Case Data:**

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

Operation Band	:802.11aB1	Test Date	:2018-06-14
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
10360.00	Peak	35.78	19.71	55.49	68.20	-12.71

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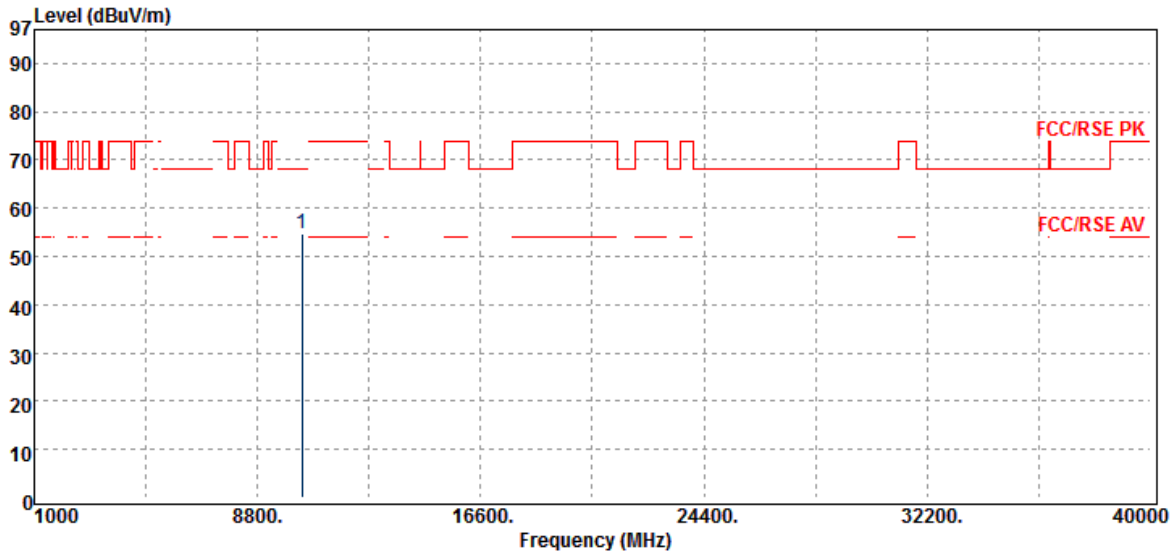
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Operation Band :802.11aB1  
Fundamental Frequency :5180 MHz  
Operation Mode :Tx CH LOW  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10360.00	Peak	34.99	19.71	54.70	68.20	-13.50

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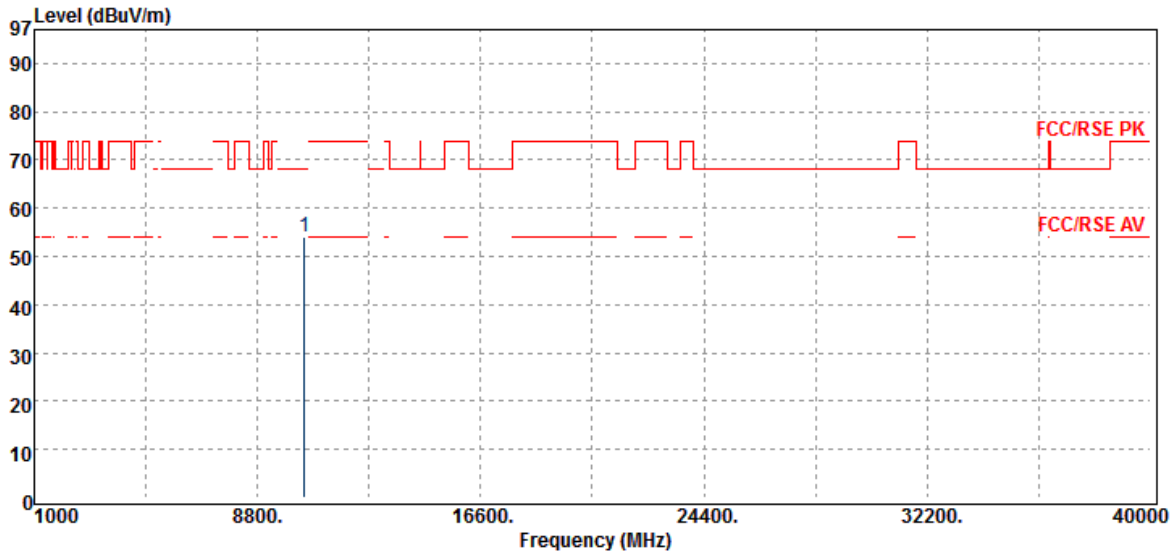
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Operation Band :802.11aB1  
 Fundamental Frequency :5220 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10440.00	Peak	33.85	20.05	53.90	68.20	-14.30

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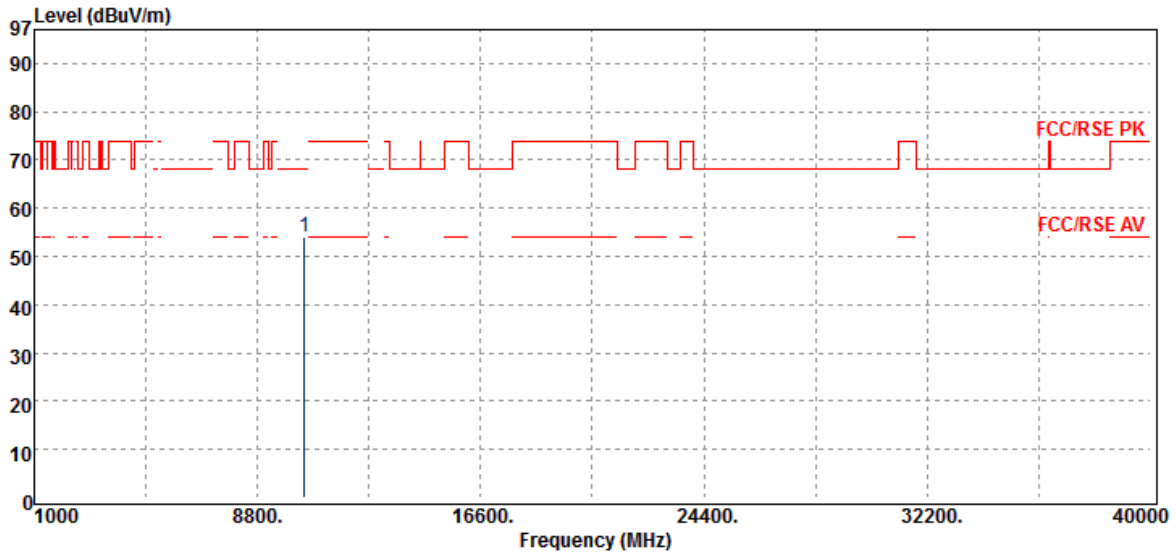
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Operation Band :802.11aB1  
Fundamental Frequency :5220 MHz  
Operation Mode :Tx CH MID  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10440.00	Peak	33.92	20.05	53.97	68.20	-14.23

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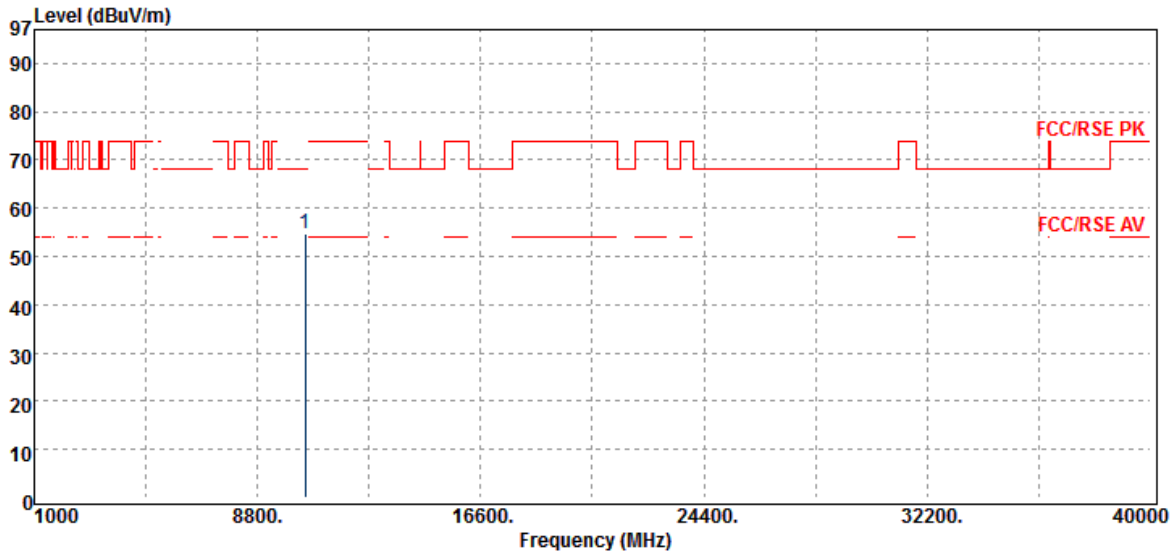
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Operation Band :802.11aB1  
Fundamental Frequency :5240 MHz  
Operation Mode :Tx CH HIGH  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10480.00	Peak	34.61	20.07	54.68	68.20	-13.52

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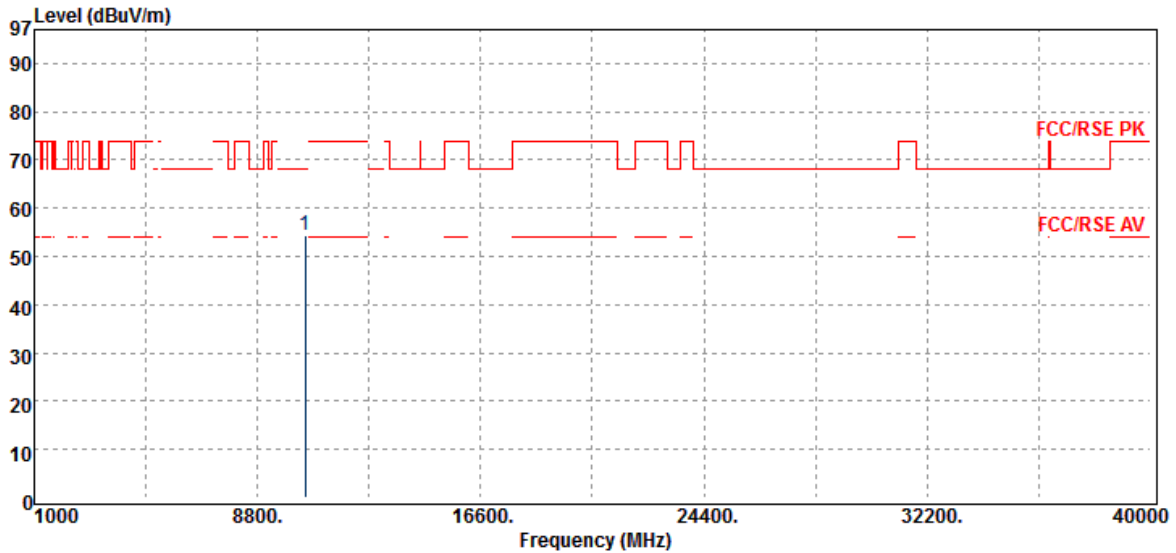
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Operation Band	:802.11aB1	Test Date	:2018-06-14
Fundamental Frequency	:5240 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10480.00	Peak	34.17	20.07	54.24	68.20	-13.96

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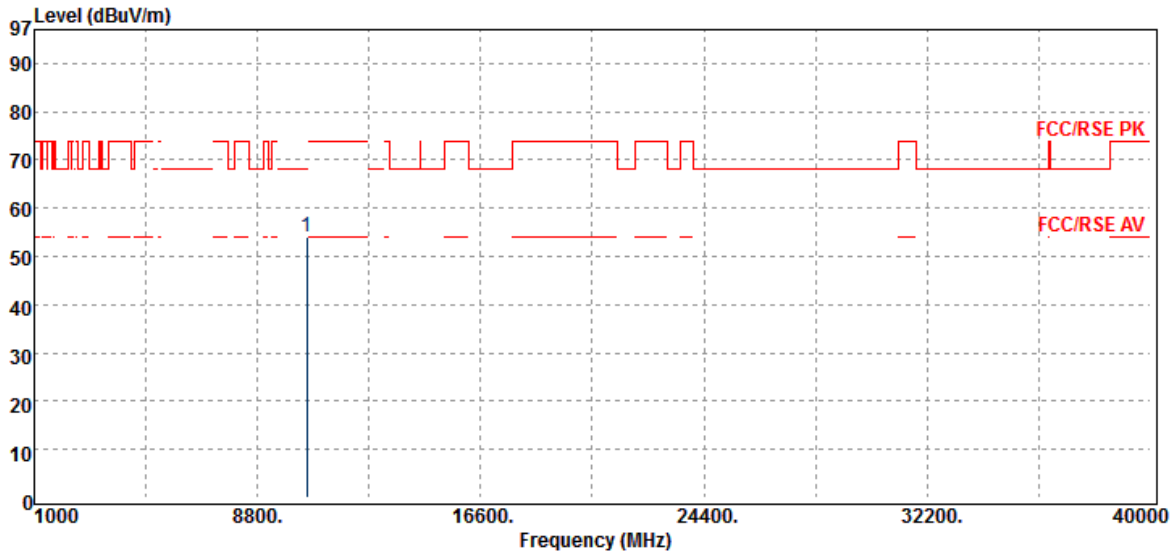
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### Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

Operation Band	:802.11aB2	Test Date	:2018-06-14
Fundamental Frequency	:5260 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10520.00	Peak	34.02	20.00	54.02	68.20	-14.18

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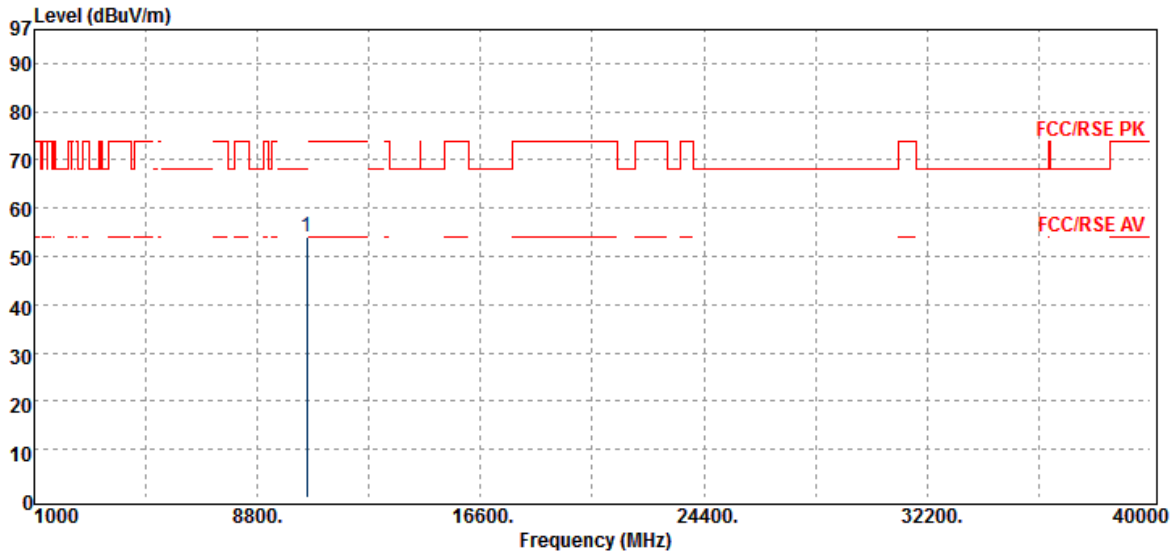
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Operation Band :802.11aB2  
Fundamental Frequency :5260 MHz  
Operation Mode :Tx CH LOW  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10520.00	Peak	33.88	20.00	53.88	68.20	-14.32

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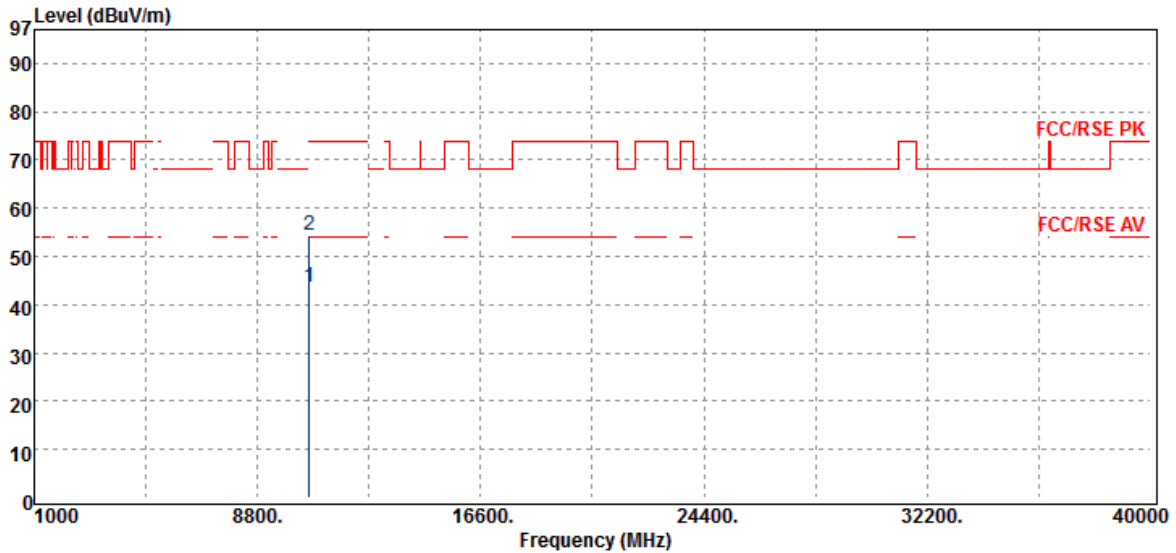
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Operation Band :802.11aB2  
 Fundamental Frequency :5300 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10600.00	Average	23.22	20.38	43.60	54.00	-10.40
10600.00	Peak	34.00	20.38	54.38	74.00	-19.62

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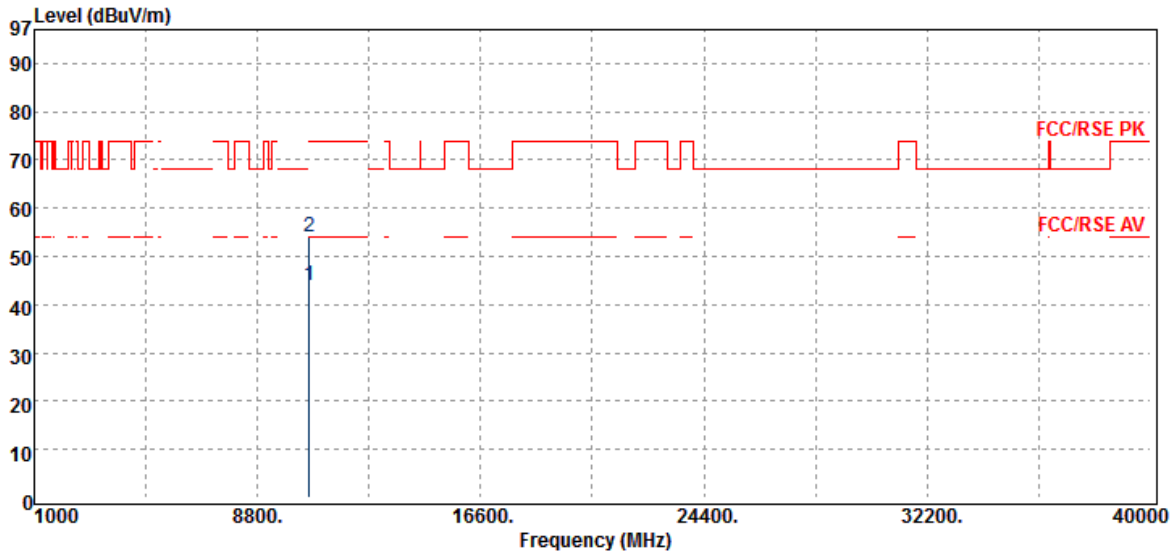
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Operation Band :802.11aB2  
Fundamental Frequency :5300 MHz  
Operation Mode :Tx CH MID  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10600.00	Average	23.45	20.38	43.83	54.00	-10.17
10600.00	Peak	33.63	20.38	54.01	74.00	-19.99

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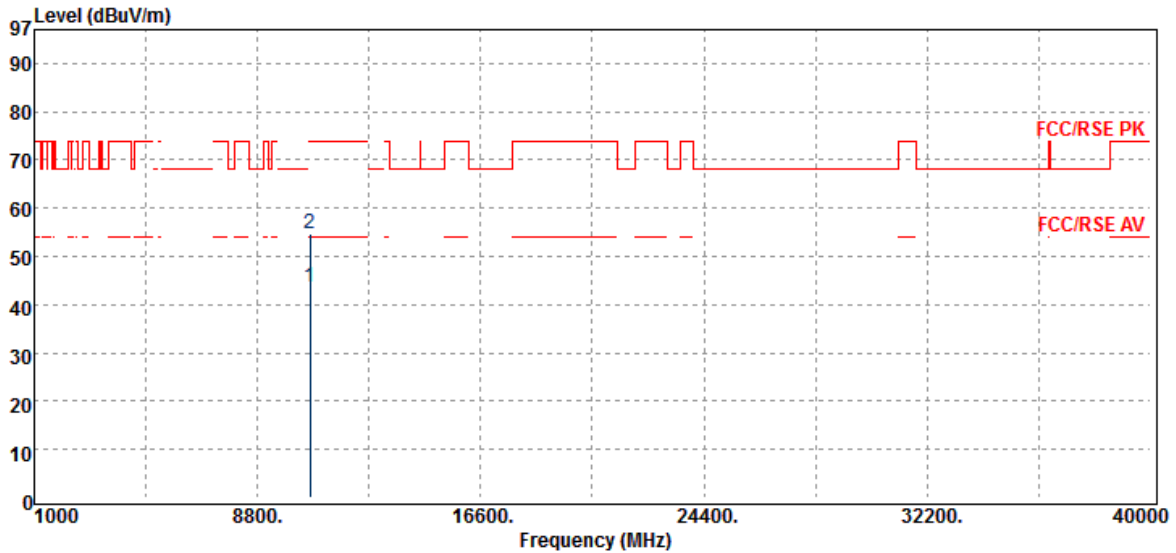
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Operation Band	:802.11aB2	Test Date	:2018-06-14
Fundamental Frequency	:5320 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10640.00	Average	23.32	20.44	43.76	54.00	-10.24
10640.00	Peak	34.39	20.44	54.83	74.00	-19.17

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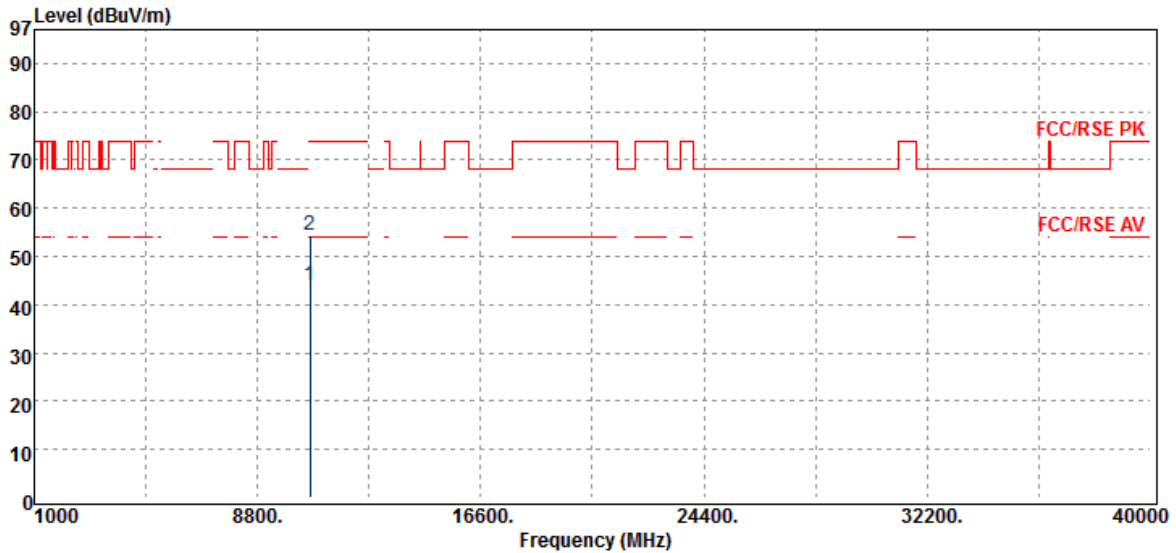
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Operation Band :802.11aB2  
 Fundamental Frequency :5320 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10640.00	Average	23.40	20.44	43.84	54.00	-10.16
10640.00	Peak	34.09	20.44	54.53	74.00	-19.47

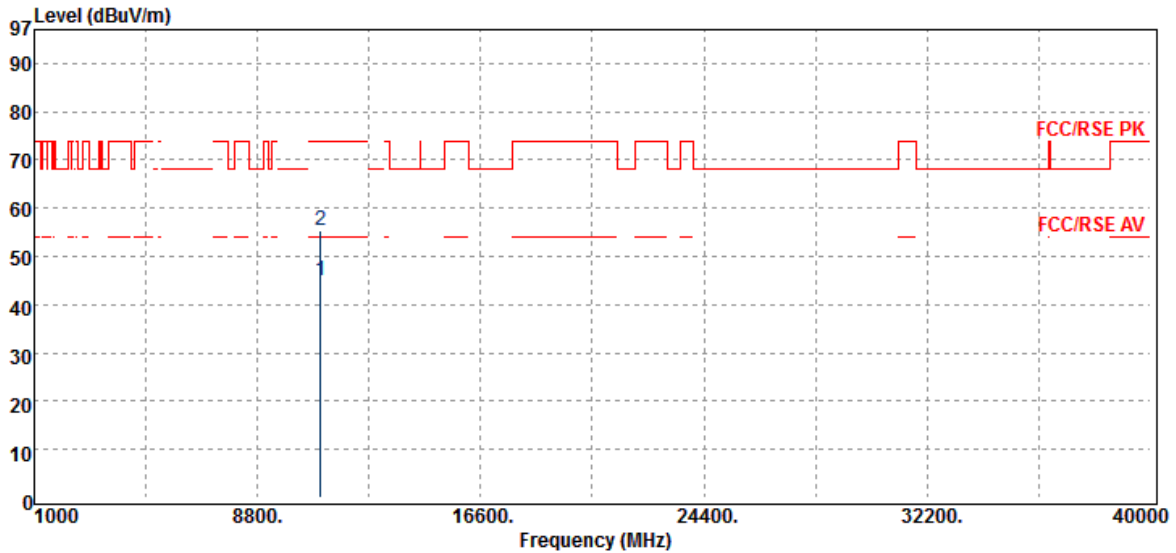
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### Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz

Operation Band	:802.11aB3	Test Date	:2018-06-14
Fundamental Frequency	:5500 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11000.00	Average	23.74	21.37	45.11	54.00	-8.89
11000.00	Peak	33.89	21.37	55.26	74.00	-18.74

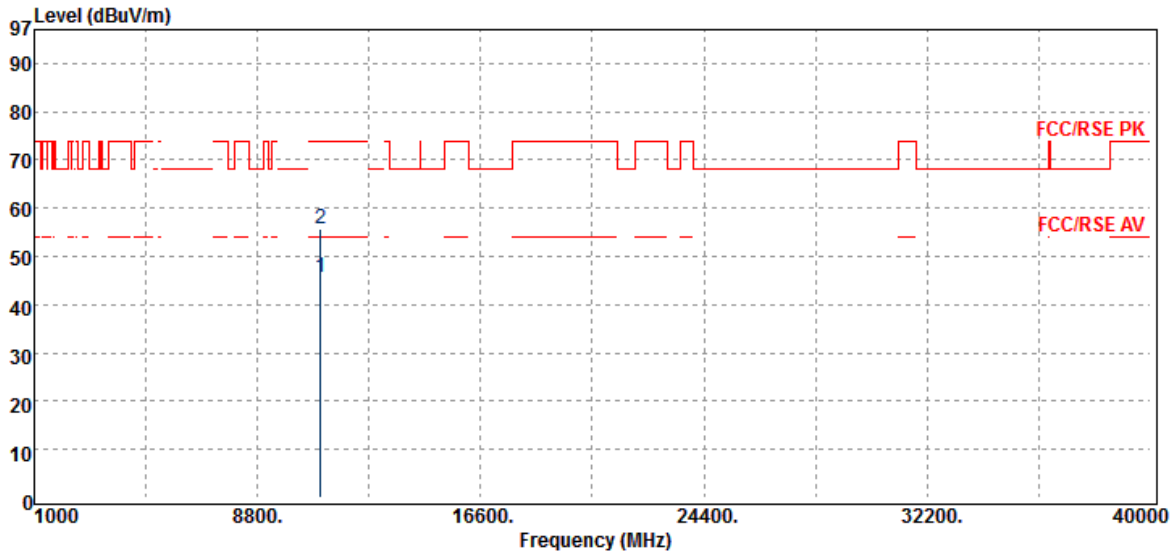
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Operation Band :802.11aB3  
Fundamental Frequency :5500 MHz  
Operation Mode :Tx CH LOW  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11000.00	Average	24.13	21.37	45.50	54.00	-8.50
11000.00	Peak	34.38	21.37	55.75	74.00	-18.25

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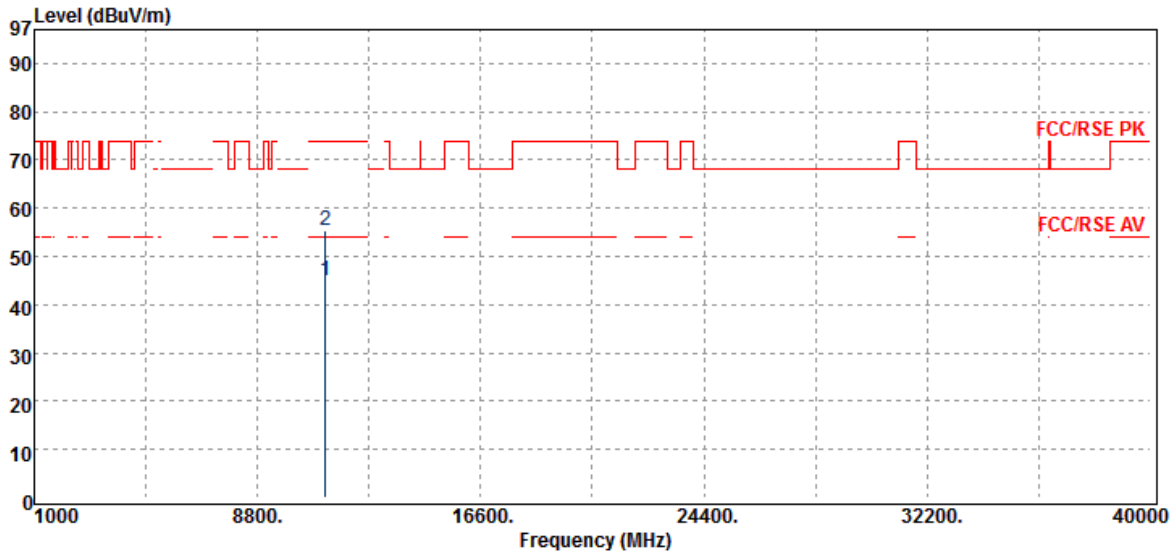
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Operation Band :802.11aB3  
 Fundamental Frequency :5580 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11160.00	Average	23.31	21.51	44.82	54.00	-9.18
11160.00	Peak	33.93	21.51	55.44	74.00	-18.56

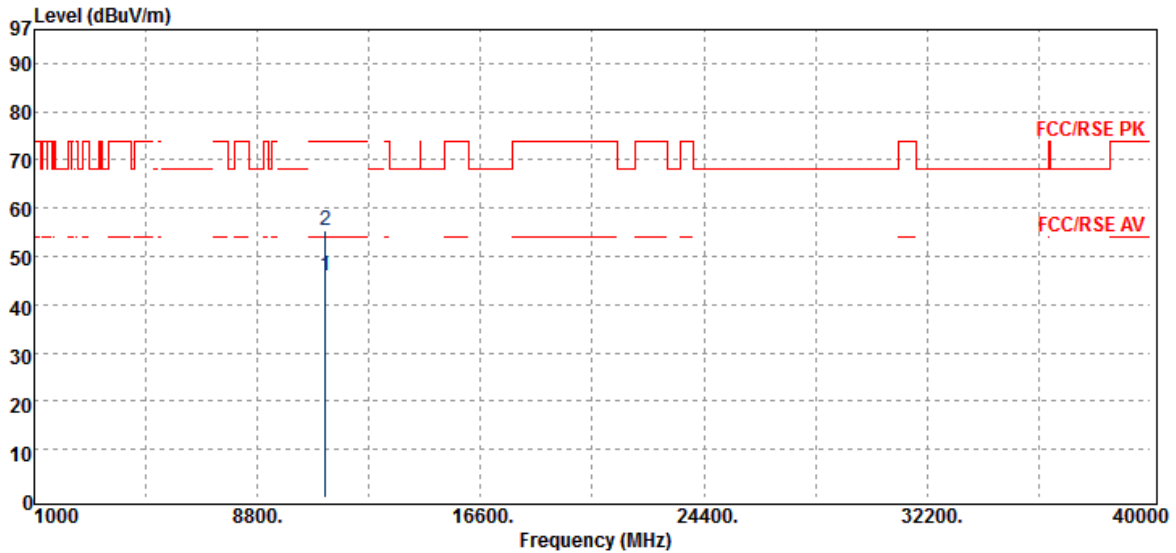
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Operation Band :802.11aB3  
Fundamental Frequency :5580 MHz  
Operation Mode :Tx CH MID  
EUT Pol. :E1 Plane

Test Date :2018-06-14  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11160.00	Average	24.42	21.51	45.93	54.00	-8.07
11160.00	Peak	33.97	21.51	55.48	74.00	-18.52

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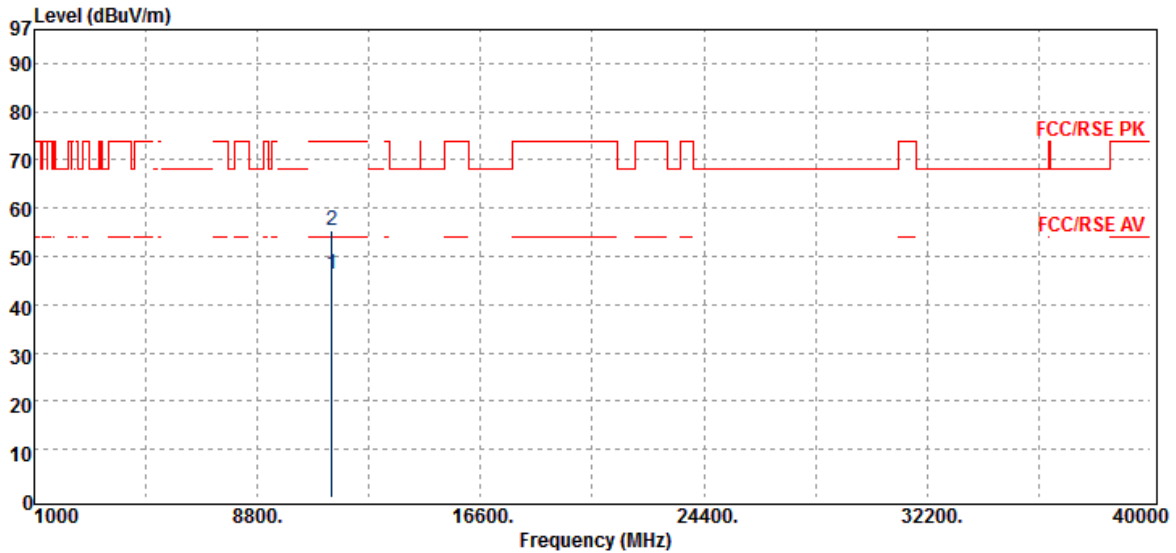
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Operation Band :802.11aB3  
 Fundamental Frequency :5700 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11400.00	Average	24.65	21.62	46.27	54.00	-7.73
11400.00	Peak	33.73	21.62	55.35	74.00	-18.65

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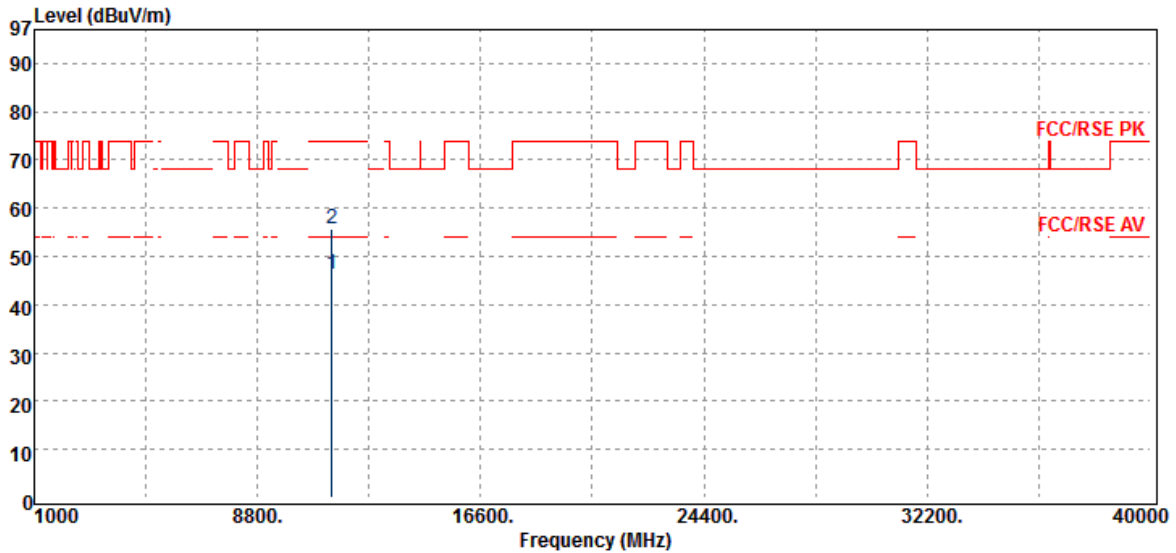
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Operation Band :802.11aB3  
 Fundamental Frequency :5700 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11400.00	Average	24.86	21.62	46.48	54.00	-7.52
11400.00	Peak	34.06	21.62	55.68	74.00	-18.32

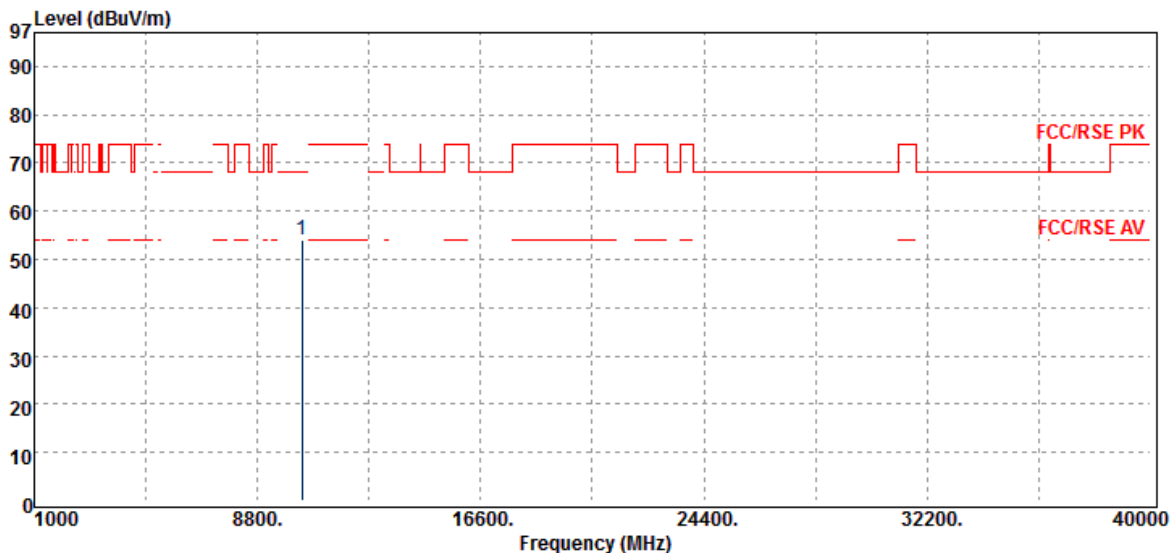
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**Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz**

Operation Band	:802.11n20B1	Test Date	:2018-06-14
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10360.00	Peak	34.31	19.71	54.02	68.20	-14.18

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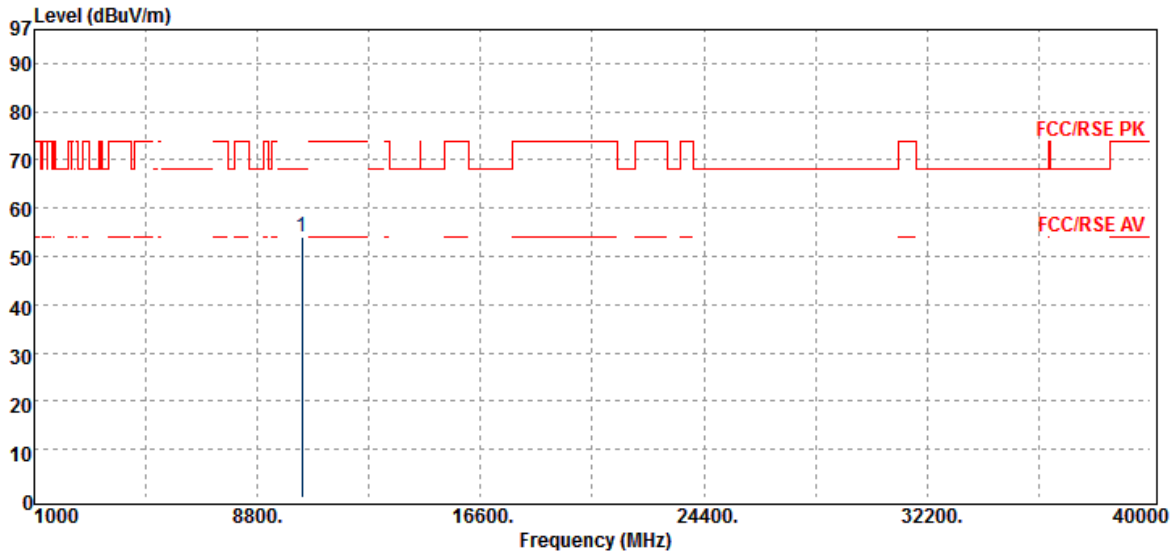
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Operation Band	:802.11n20B1	Test Date	:2018-06-14
Fundamental Frequency	:5180 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10360.00	Peak	34.41	19.71	54.12	68.20	-14.08

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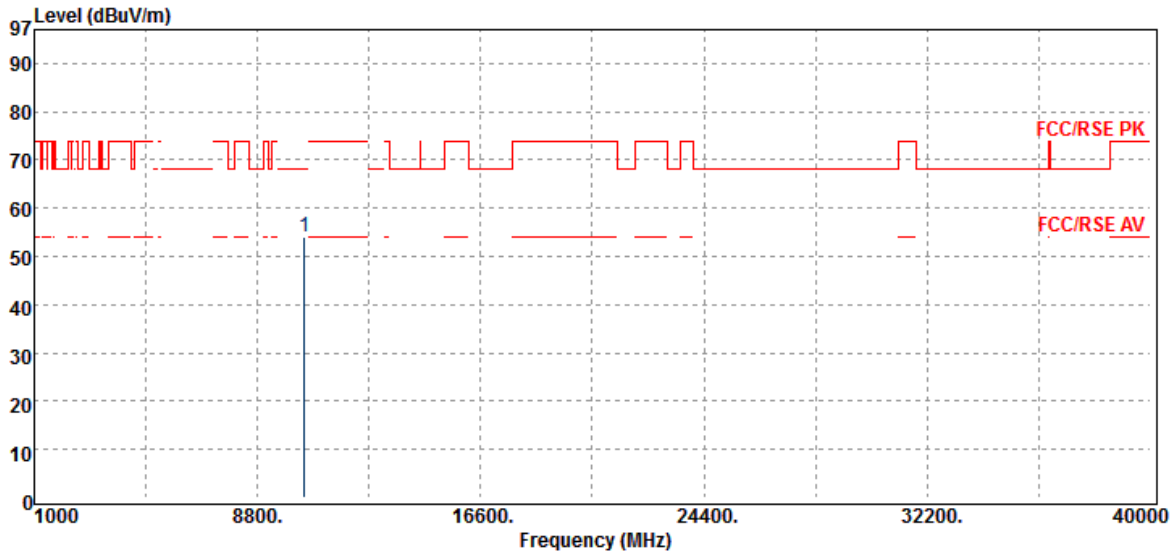
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Operation Band :802.11n20B1  
 Fundamental Frequency :5220 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10440.00	Peak	33.99	20.05	54.04	68.20	-14.16

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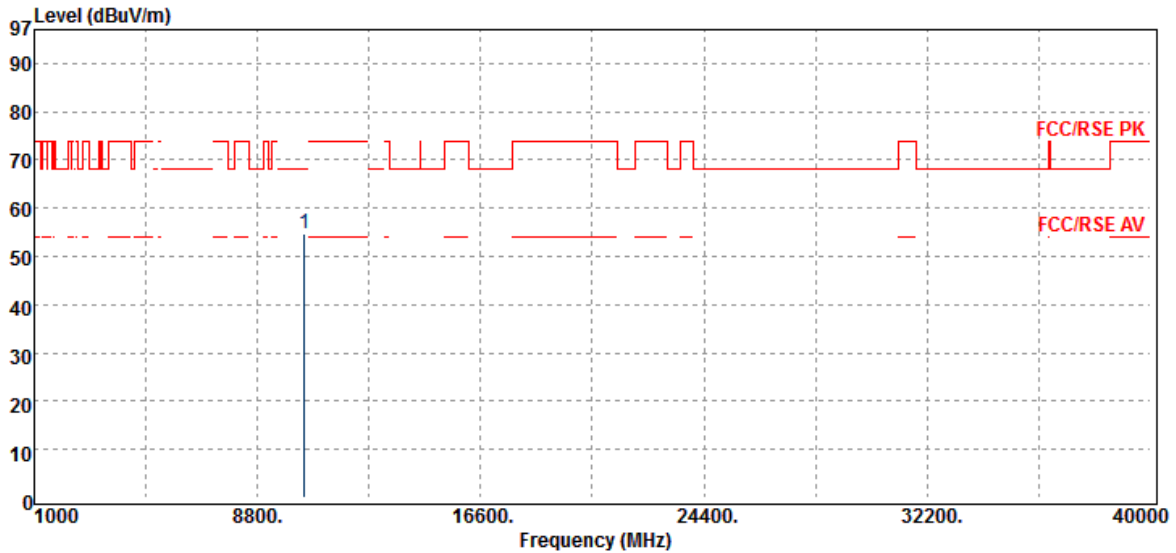
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Operation Band	:802.11n20B1	Test Date	:2018-06-14
Fundamental Frequency	:5220 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10440.00	Peak	34.76	20.05	54.81	68.20	-13.39

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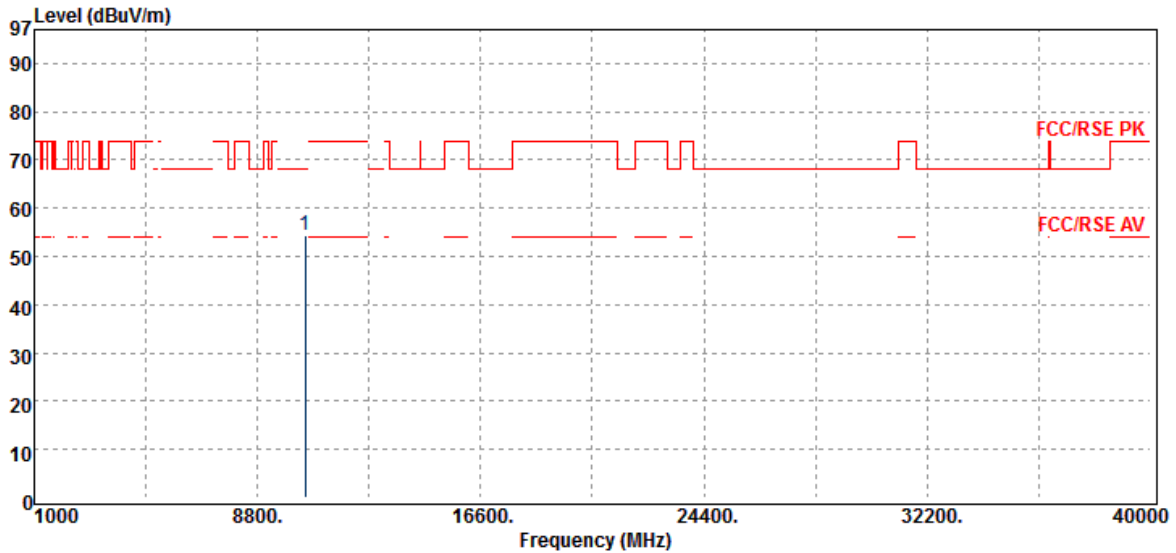
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Operation Band :802.11n20B1  
 Fundamental Frequency :5240 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10480.00	Peak	34.31	20.07	54.38	68.20	-13.82

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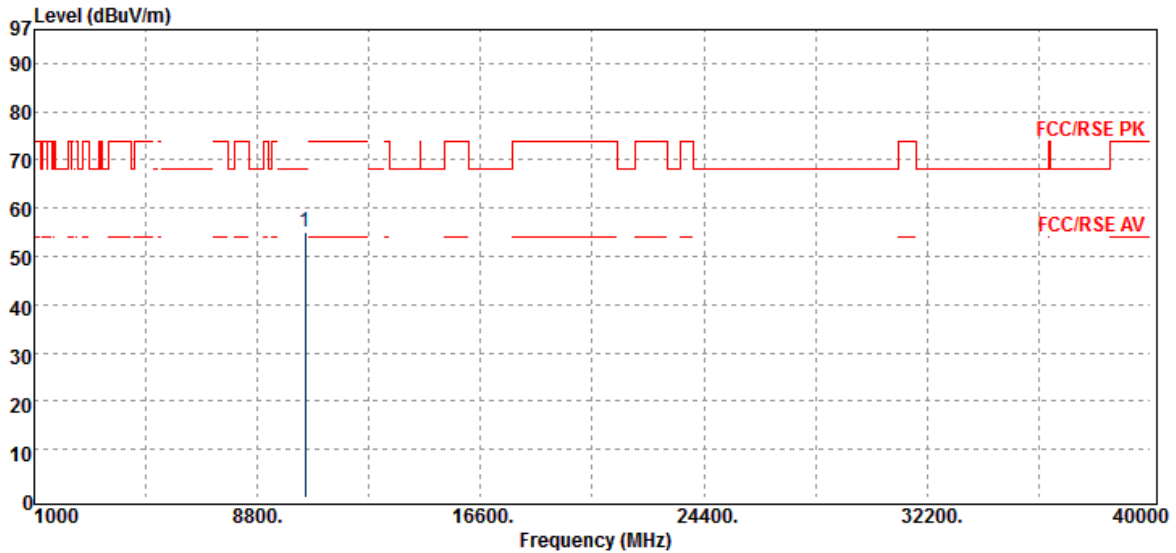
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Operation Band	:802.11n20B1	Test Date	:2018-06-14
Fundamental Frequency	:5240 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10480.00	Peak	35.01	20.07	55.08	68.20	-13.12

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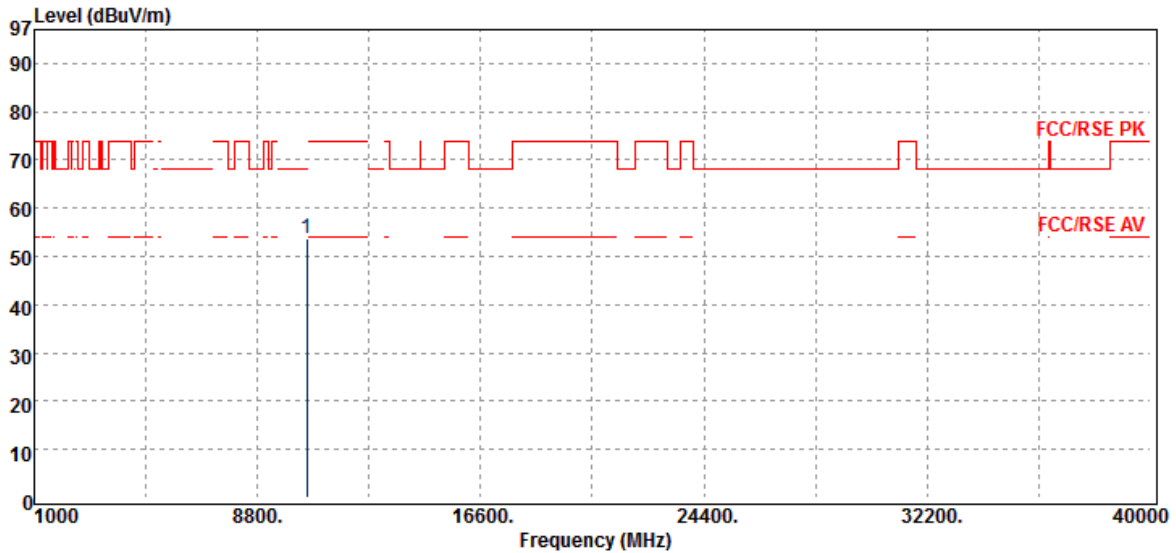
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### Radiated Spurious Emission Measurement Result 802.11n HT20, 5250~5350 MHz

Operation Band	:802.11n20B2	Test Date	:2018-06-14
Fundamental Frequency	:5260 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



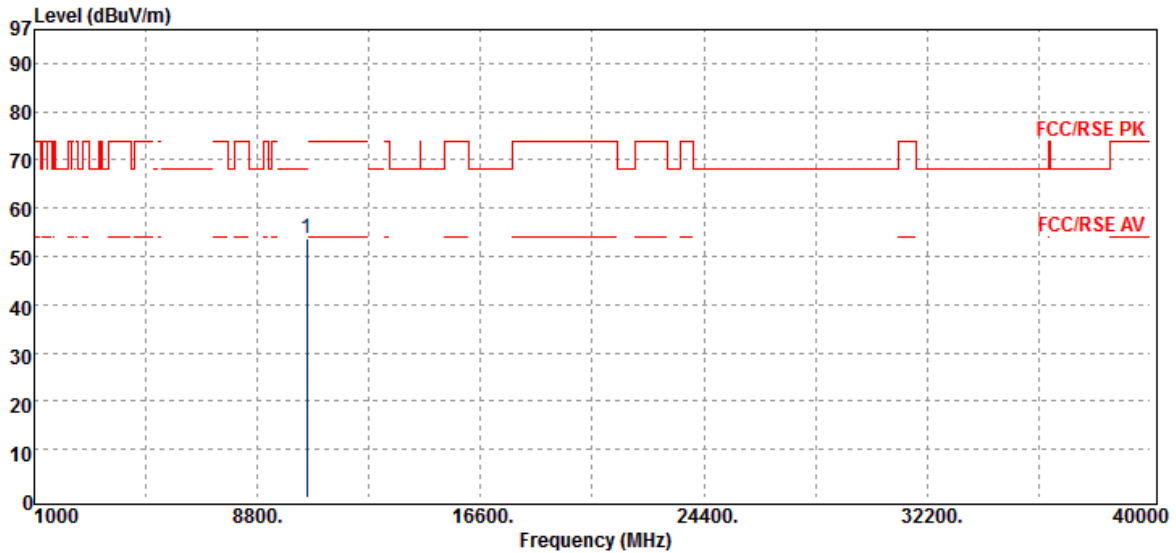
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
10520.00	Peak	33.76	20.00	53.76	68.20	-14.44

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Operation Band	:802.11n20B2	Test Date	:2018-06-14
Fundamental Frequency	:5260 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10520.00	Peak	33.61	20.00	53.61	68.20	-14.59

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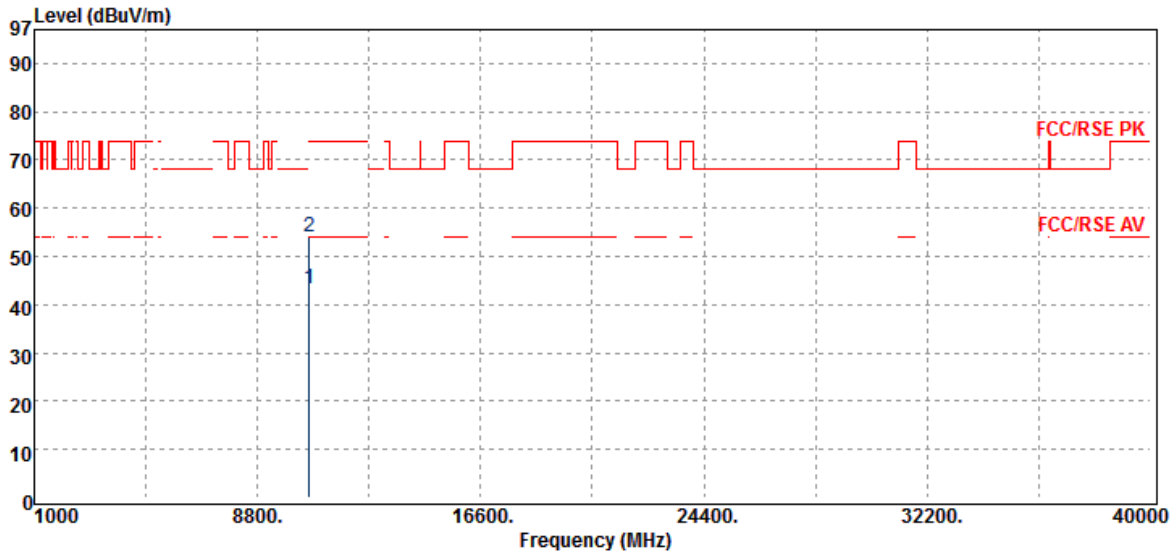
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Operation Band	:802.11n20B2	Test Date	:2018-06-14
Fundamental Frequency	:5300 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10600.00	Average	23.00	20.38	43.38	54.00	-10.62
10600.00	Peak	33.54	20.38	53.92	74.00	-20.08

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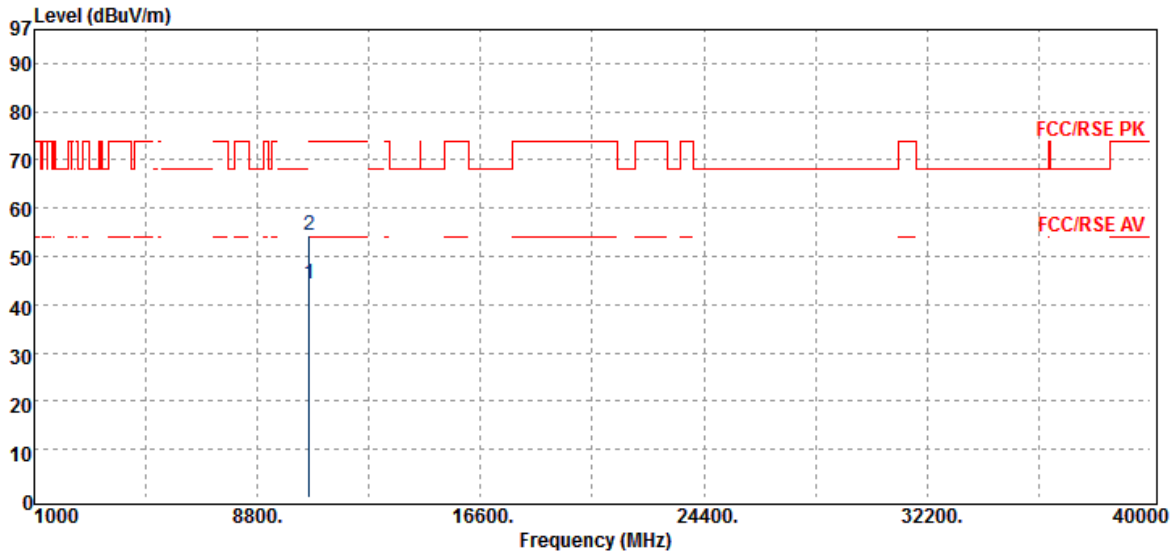
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Operation Band	:802.11n20B2	Test Date	:2018-06-14
Fundamental Frequency	:5300 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10600.00	Average	23.86	20.38	44.24	54.00	-9.76
10600.00	Peak	33.86	20.38	54.24	74.00	-19.76

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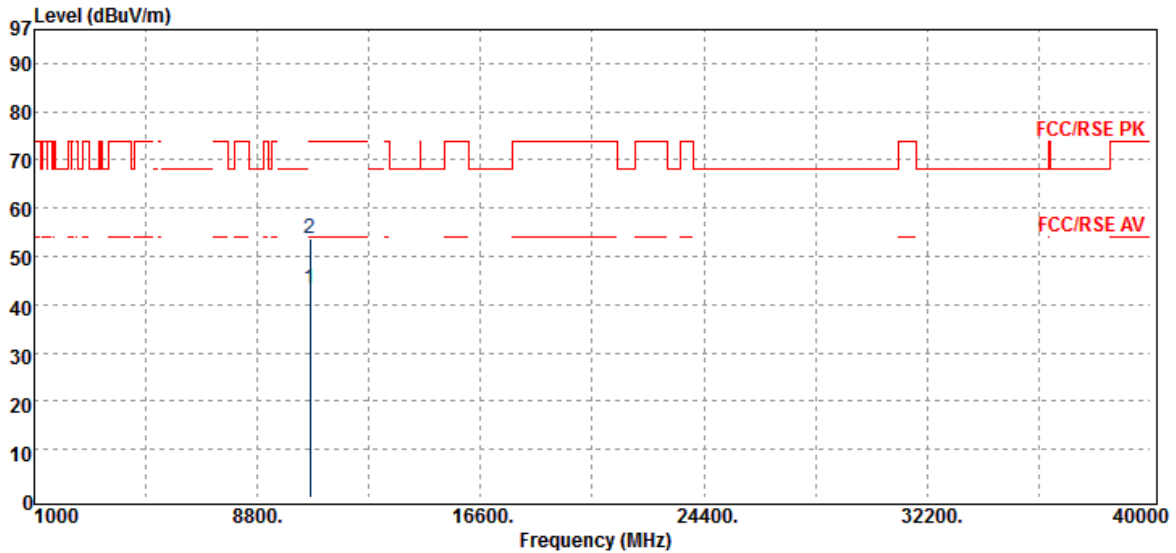
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Operation Band :802.11n20B2  
 Fundamental Frequency :5320 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10640.00	Average	22.91	20.44	43.35	54.00	-10.65
10640.00	Peak	33.41	20.44	53.85	74.00	-20.15

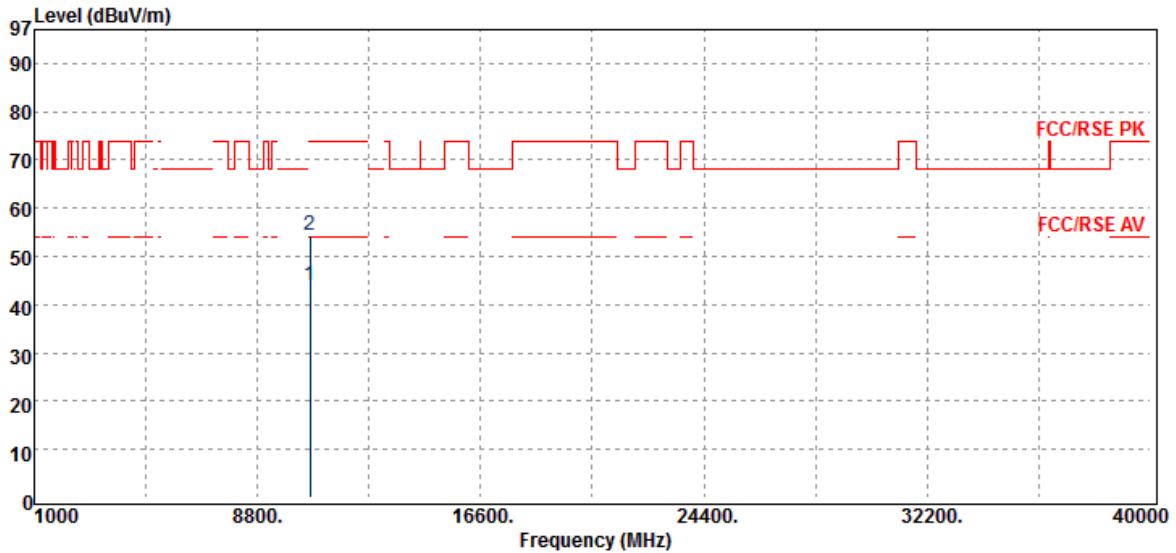
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Operation Band :802.11n20B2  
 Fundamental Frequency :5320 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10640.00	Average	23.42	20.44	43.86	54.00	-10.14
10640.00	Peak	33.96	20.44	54.40	74.00	-19.60

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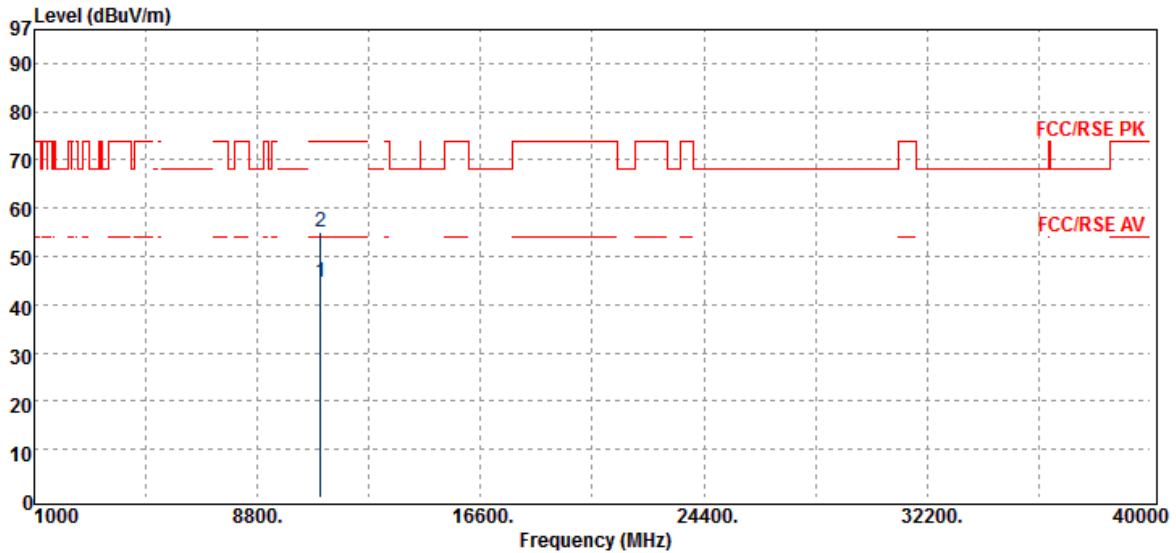
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### Radiated Spurious Emission Measurement Result 802.11n HT20, 5470~5725 MHz

Operation Band	:802.11n20B3	Test Date	:2018-06-14
Fundamental Frequency	:5500 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11000.00	Average	23.30	21.37	44.67	54.00	-9.33
11000.00	Peak	33.61	21.37	54.98	74.00	-19.02

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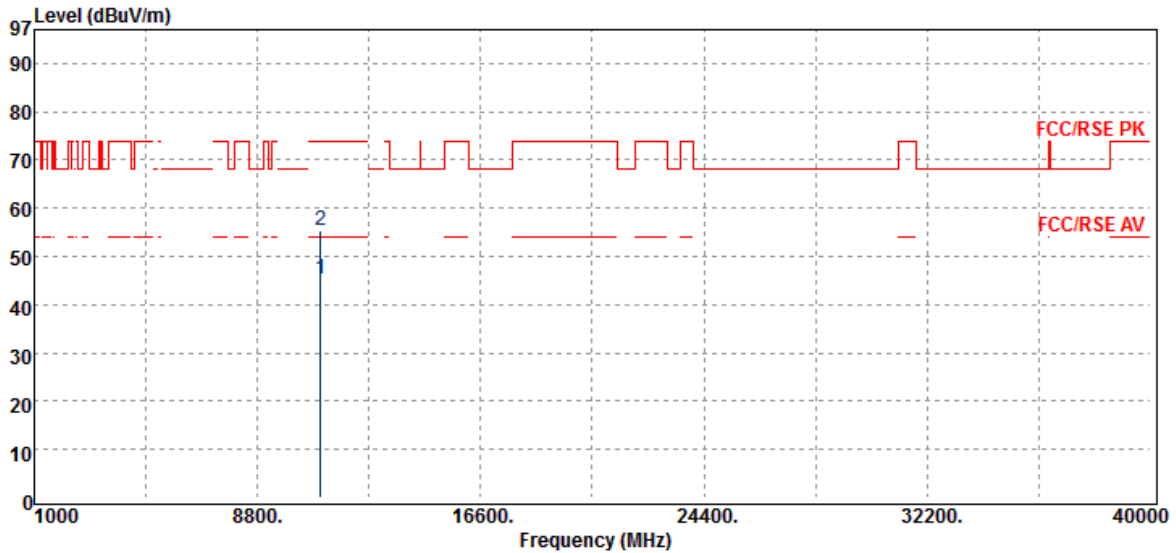
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Operation Band :802.11n20B3  
 Fundamental Frequency :5500 MHz  
 Operation Mode :Tx CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11000.00	Average	23.97	21.37	45.34	54.00	-8.66
11000.00	Peak	34.15	21.37	55.52	74.00	-18.48

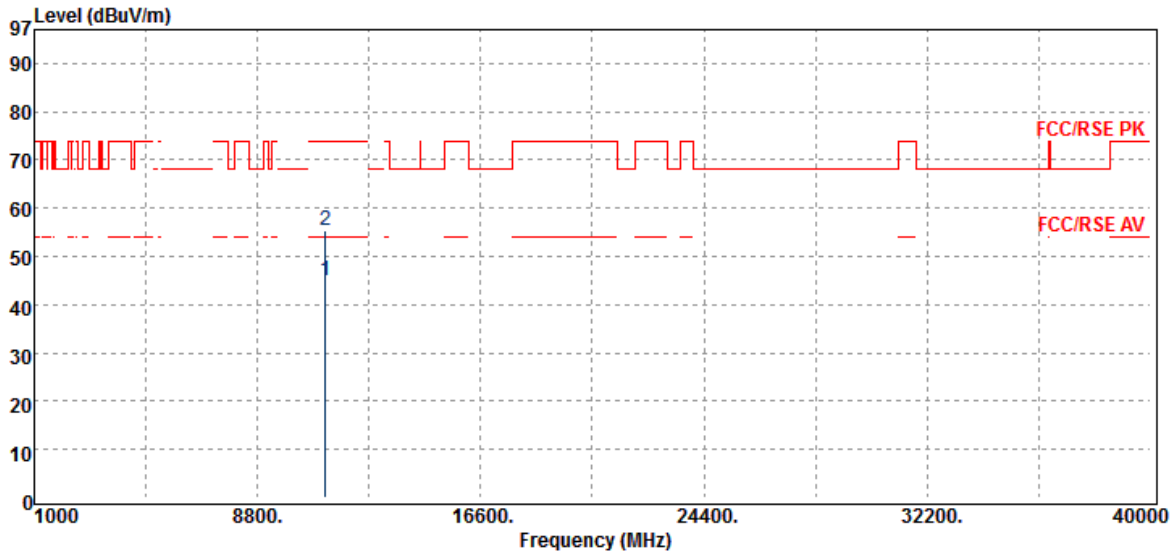
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Operation Band :802.11n20B3  
 Fundamental Frequency :5580 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



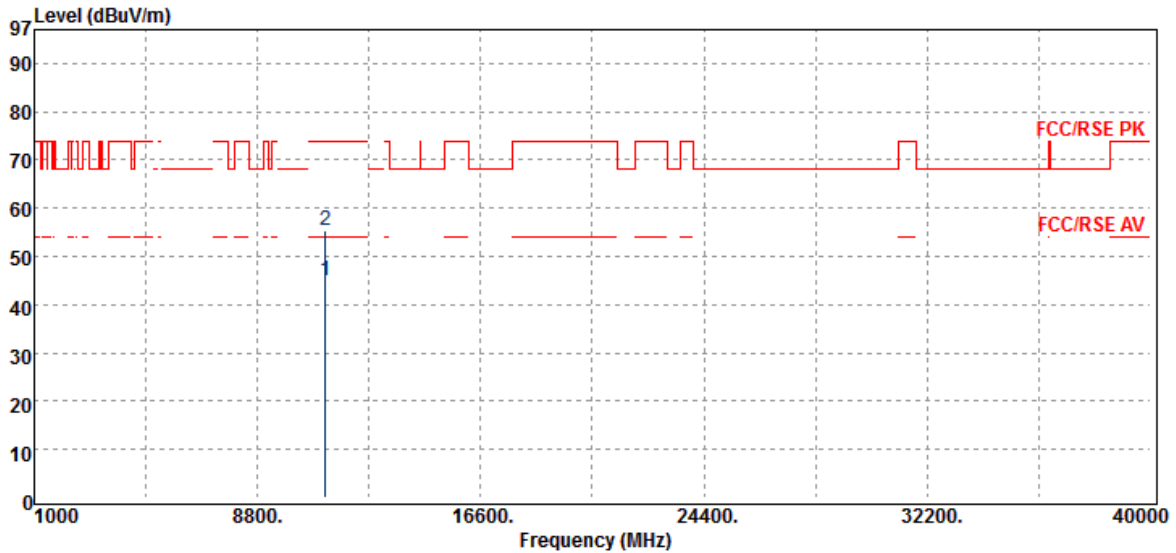
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11160.00	Average	23.33	21.51	44.84	54.00	-9.16
11160.00	Peak	33.86	21.51	55.37	74.00	-18.63

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Operation Band	:802.11n20B3	Test Date	:2018-06-14
Fundamental Frequency	:5580 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11160.00	Average	23.46	21.51	44.97	54.00	-9.03
11160.00	Peak	33.79	21.51	55.30	74.00	-18.70

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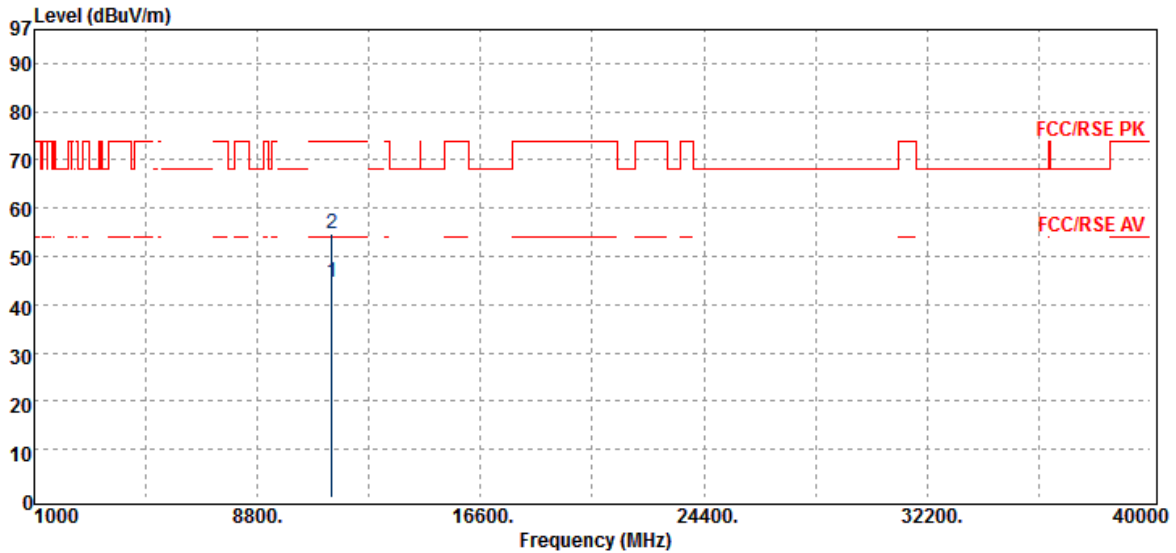
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Operation Band	:802.11n20B3	Test Date	:2018-06-14
Fundamental Frequency	:5700 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11400.00	Average	23.07	21.62	44.69	54.00	-9.31
11400.00	Peak	33.24	21.62	54.86	74.00	-19.14

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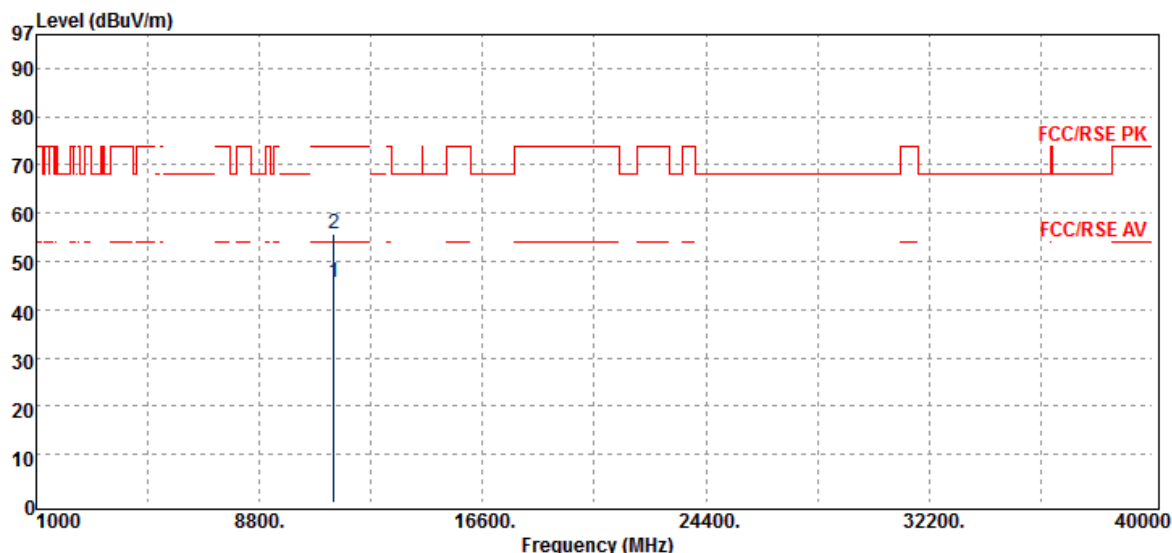
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Operation Band :802.11n20B3  
 Fundamental Frequency :5700 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11400.00	Average	23.97	21.62	45.59	54.00	-8.41
11400.00	Peak	34.14	21.62	55.76	74.00	-18.24

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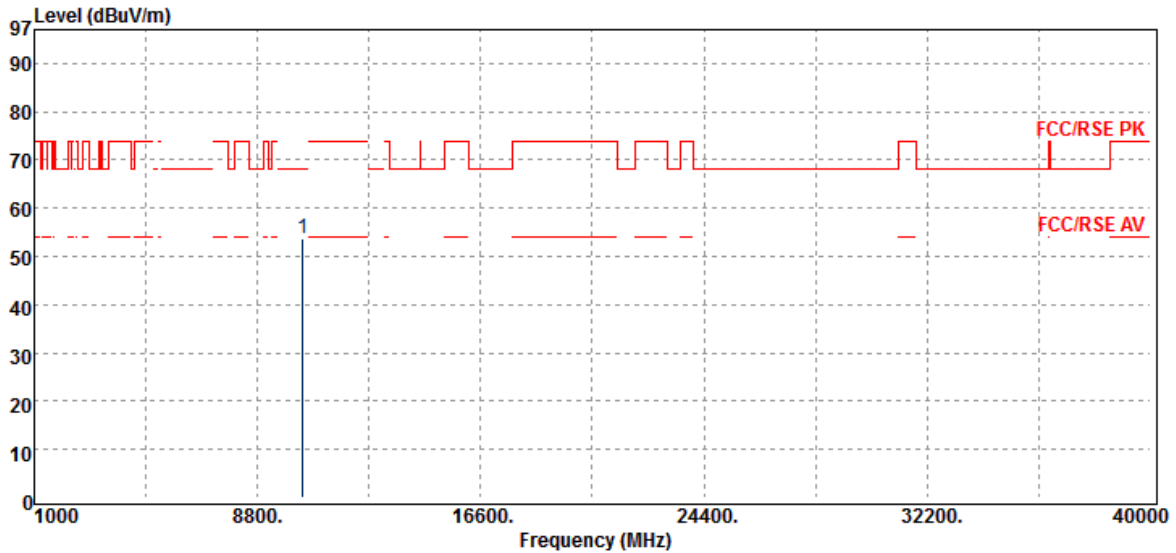
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### Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

Operation Band	:802.11n40B1	Test Date	:2018-06-14
Fundamental Frequency	:5190 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10380.00	Peak	34.00	19.78	53.78	68.20	-14.42

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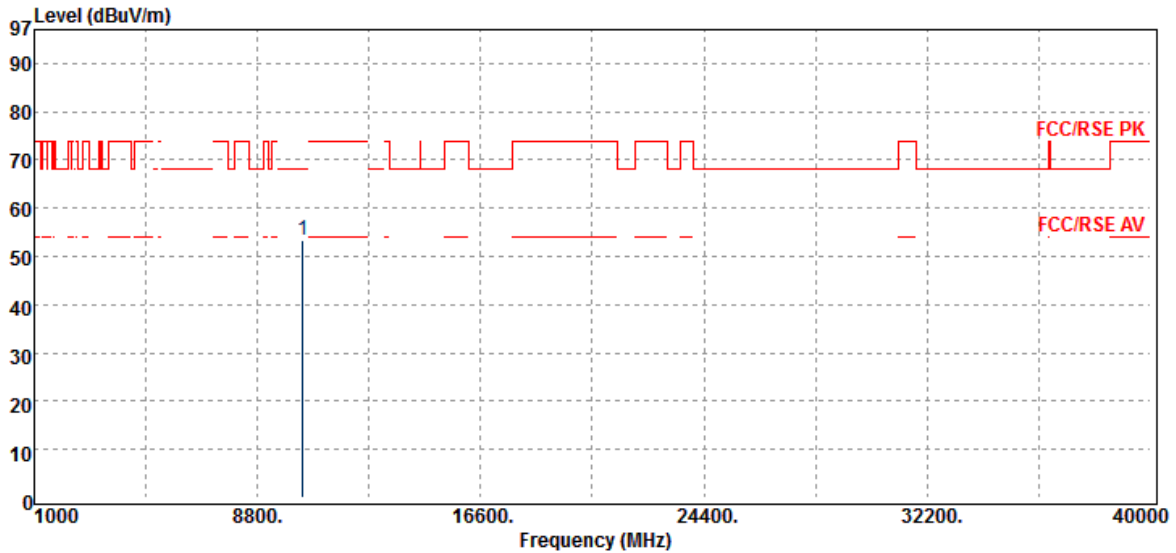
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Operation Band :802.11n40B1  
 Fundamental Frequency :5190 MHz  
 Operation Mode :Tx CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10380.00	Peak	33.64	19.78	53.42	68.20	-14.78

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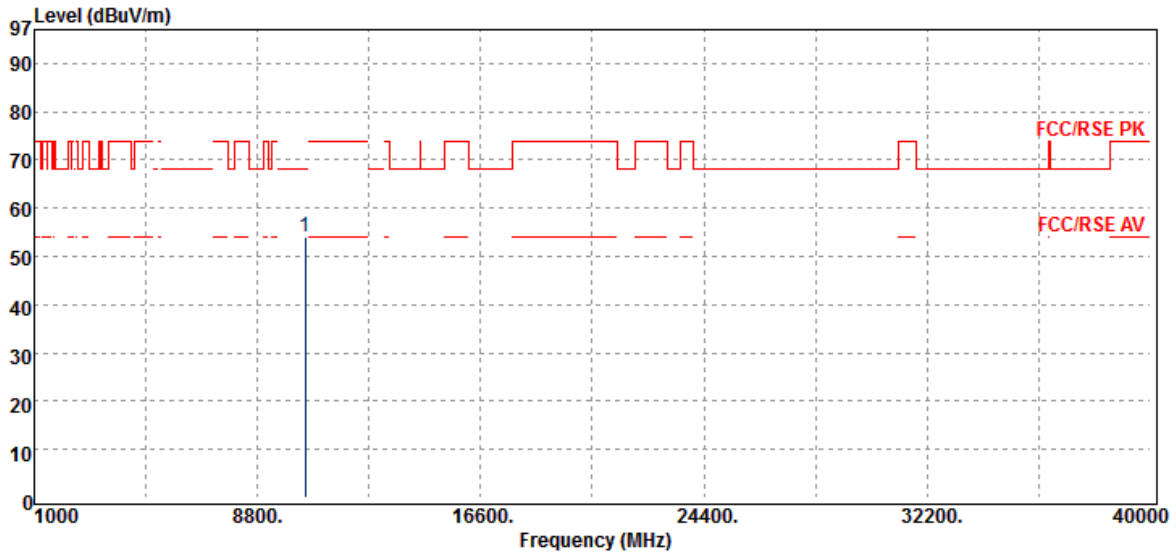
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Operation Band	:802.11n40B1	Test Date	:2018-06-14
Fundamental Frequency	:5230 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10460.00	Peak	34.04	20.07	54.11	68.20	-14.09

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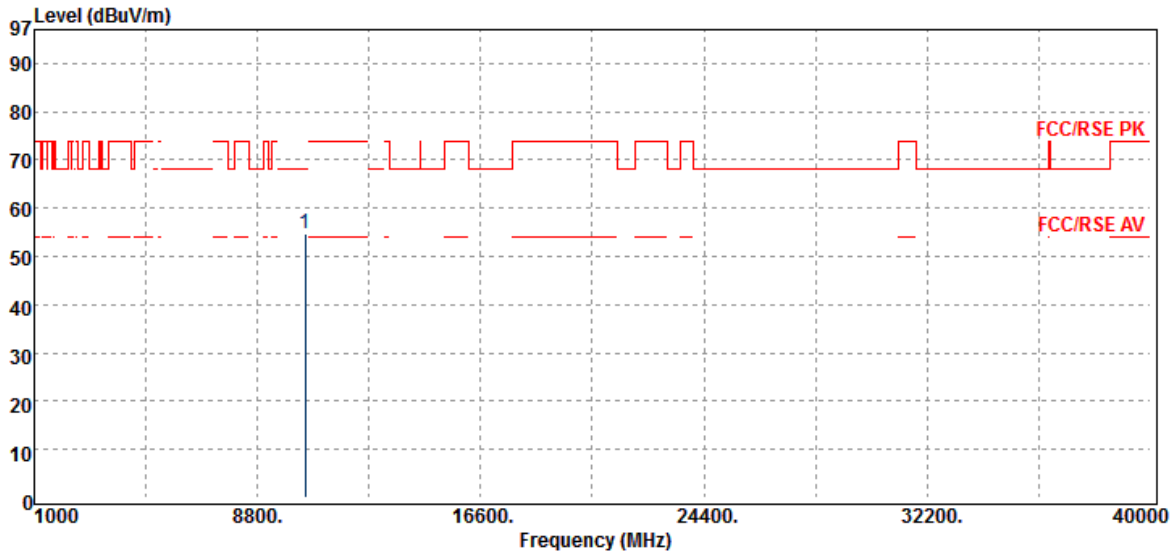
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Operation Band	:802.11n40B1	Test Date	:2018-06-14
Fundamental Frequency	:5230 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10460.00	Peak	34.62	20.07	54.69	68.20	-13.51

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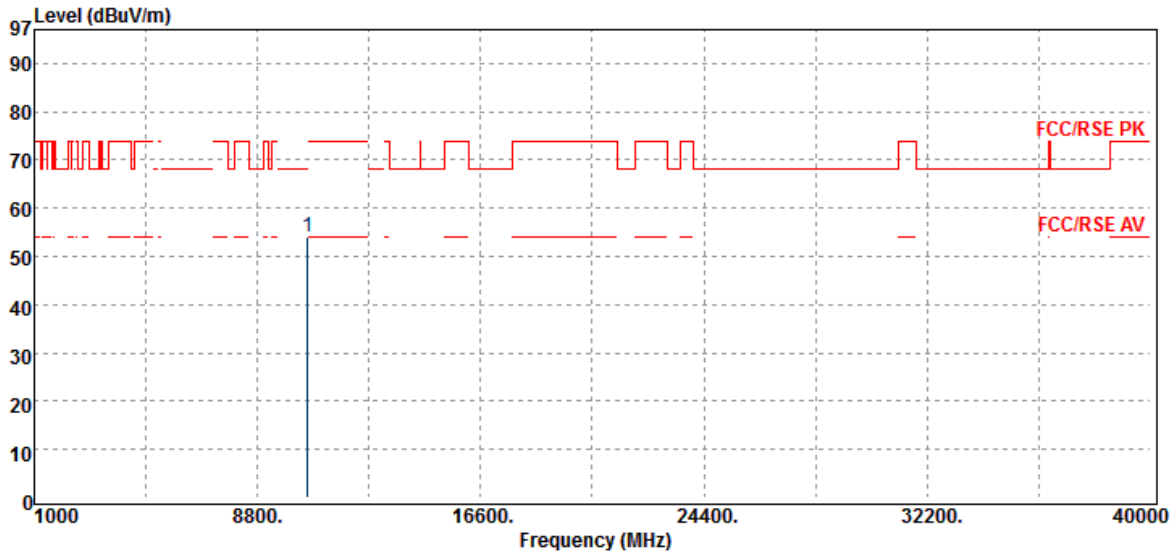
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### Radiated Spurious Emission Measurement Result 802.11n HT40, 5250~5350 MHz

Operation Band	:802.11n40B2	Test Date	:2018-06-14
Fundamental Frequency	:5270 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10540.00	Peak	33.94	20.02	53.96	68.20	-14.24

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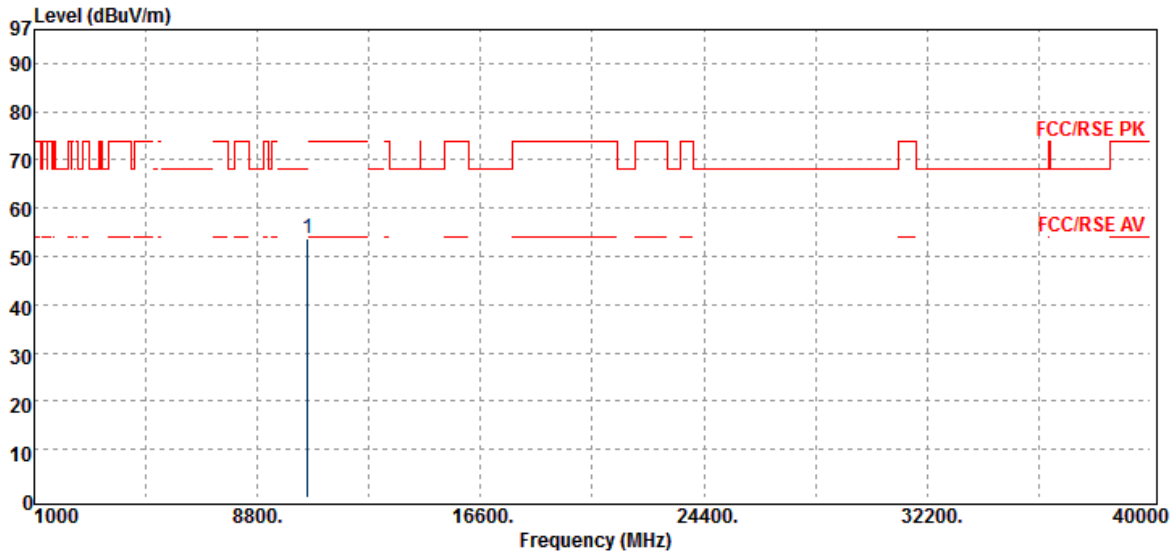
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Operation Band :802.11n40B2  
 Fundamental Frequency :5270 MHz  
 Operation Mode :Tx CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10540.00	Peak	33.70	20.02	53.72	68.20	-14.48

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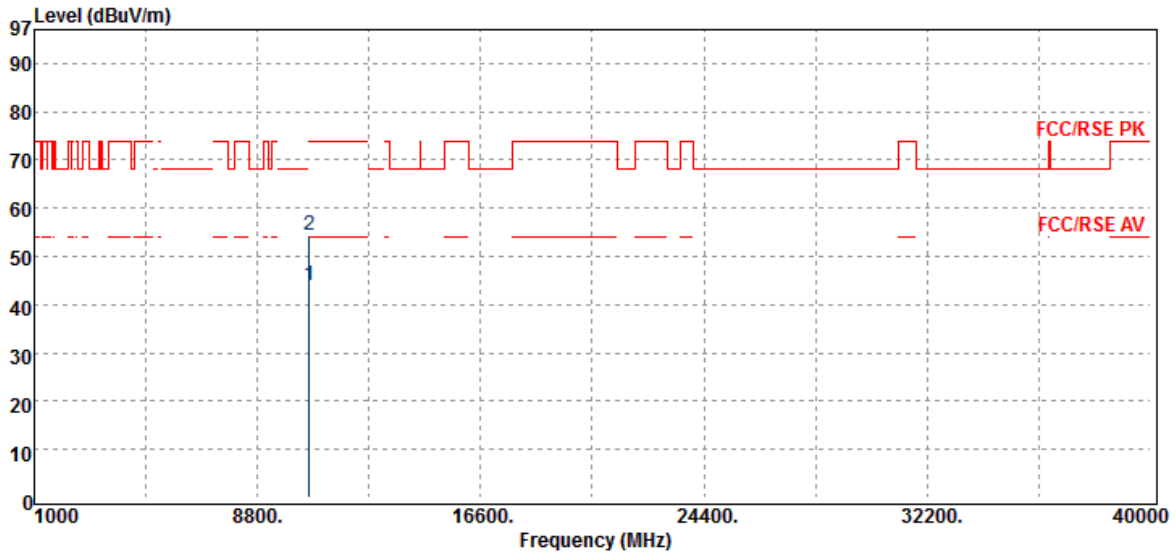
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Operation Band	:802.11n40B2	Test Date	:2018-06-14
Fundamental Frequency	:5310 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10620.00	Average	23.47	20.41	43.88	54.00	-10.12
10620.00	Peak	33.81	20.41	54.22	74.00	-19.78

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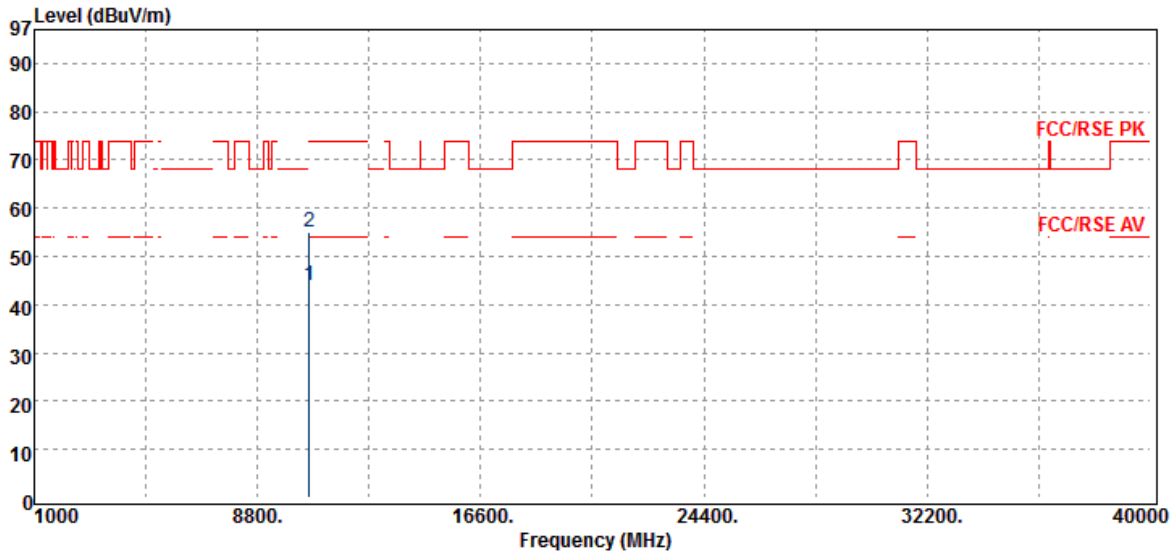
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Operation Band :802.11n40B2  
 Fundamental Frequency :5310 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
10620.00	Average	23.53	20.41	43.94	54.00	-10.06
10620.00	Peak	34.74	20.41	55.15	74.00	-18.85

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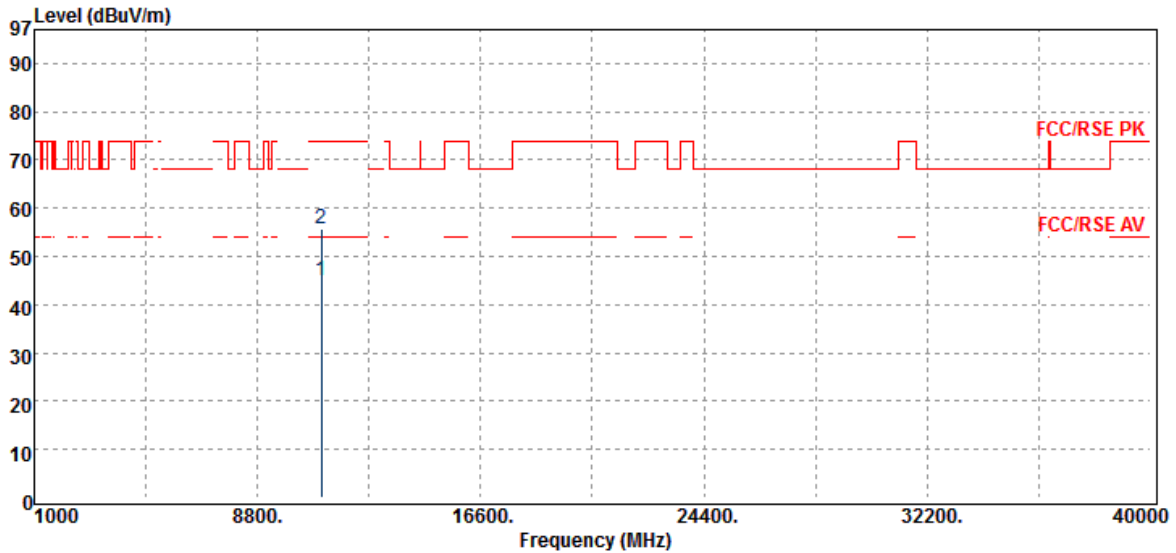
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### Radiated Spurious Emission Measurement Result 802.11n HT40, 5470~5725 MHz

Operation Band	:802.11n40B3	Test Date	:2018-06-14
Fundamental Frequency	:5510 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11020.00	Average	23.41	21.46	44.87	54.00	-9.13
11020.00	Peak	34.16	21.46	55.62	74.00	-18.38

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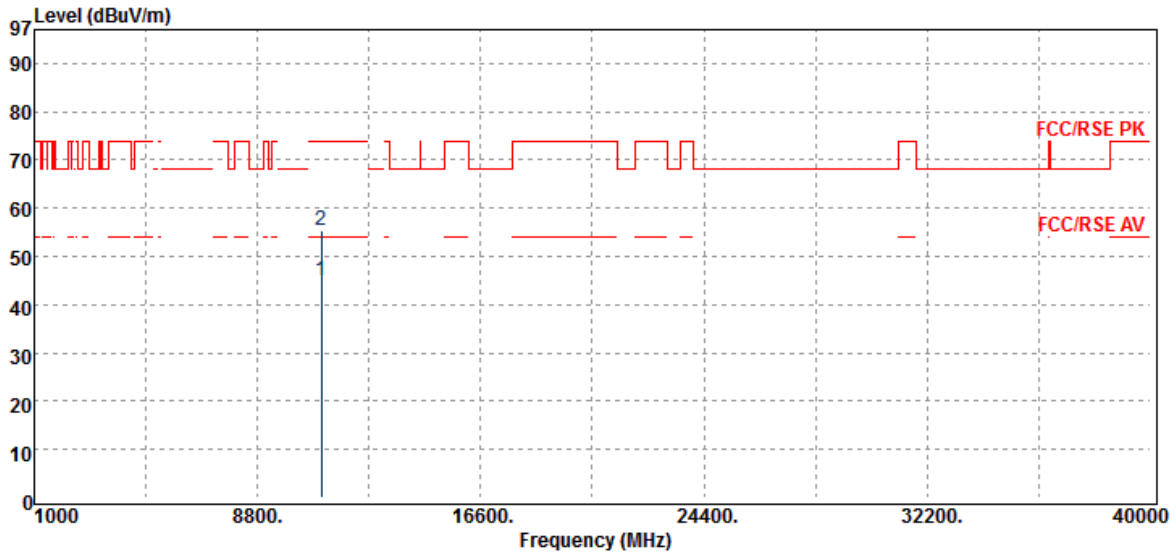
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Operation Band	:802.11n40B3	Test Date	:2018-06-14
Fundamental Frequency	:5510 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11020.00	Average	23.60	21.46	45.06	54.00	-8.94
11020.00	Peak	33.90	21.46	55.36	74.00	-18.64

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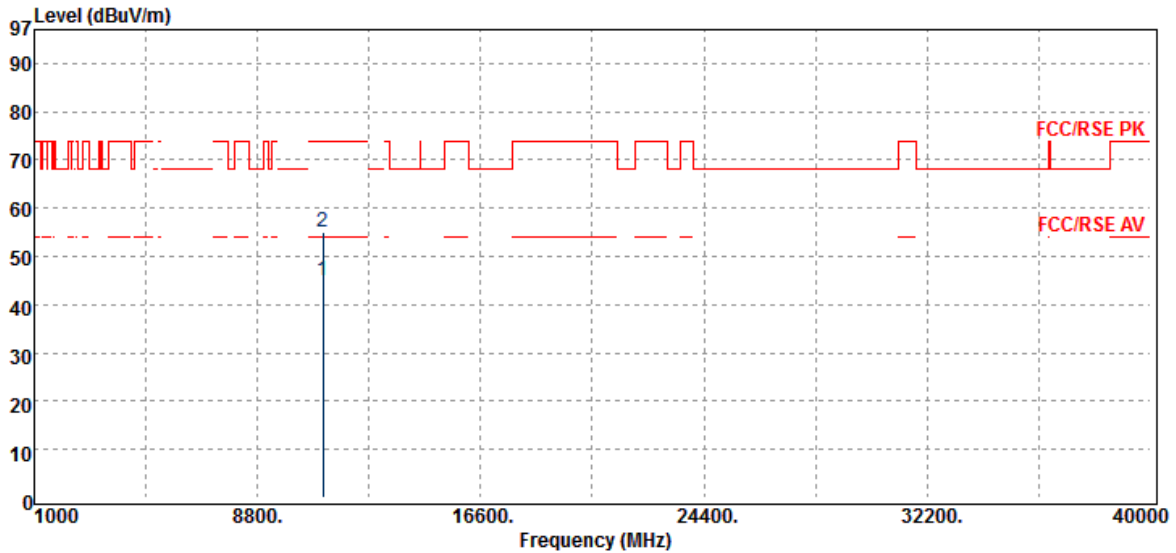
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Operation Band :802.11n40B3  
 Fundamental Frequency :5550 MHz  
 Operation Mode :Tx CH MID  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11100.00	Average	23.32	21.53	44.85	54.00	-9.15
11100.00	Peak	33.64	21.53	55.17	74.00	-18.83

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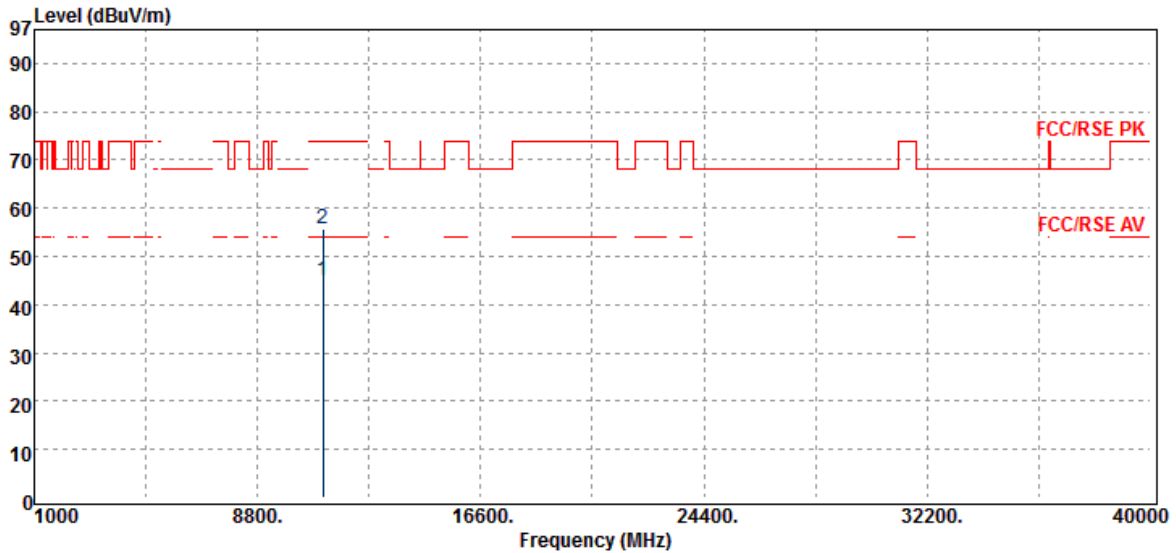
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Operation Band	:802.11n40B3	Test Date	:2018-06-14
Fundamental Frequency	:5550 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11100.00	Average	23.47	21.53	45.00	54.00	-9.00
11100.00	Peak	34.33	21.53	55.86	74.00	-18.14

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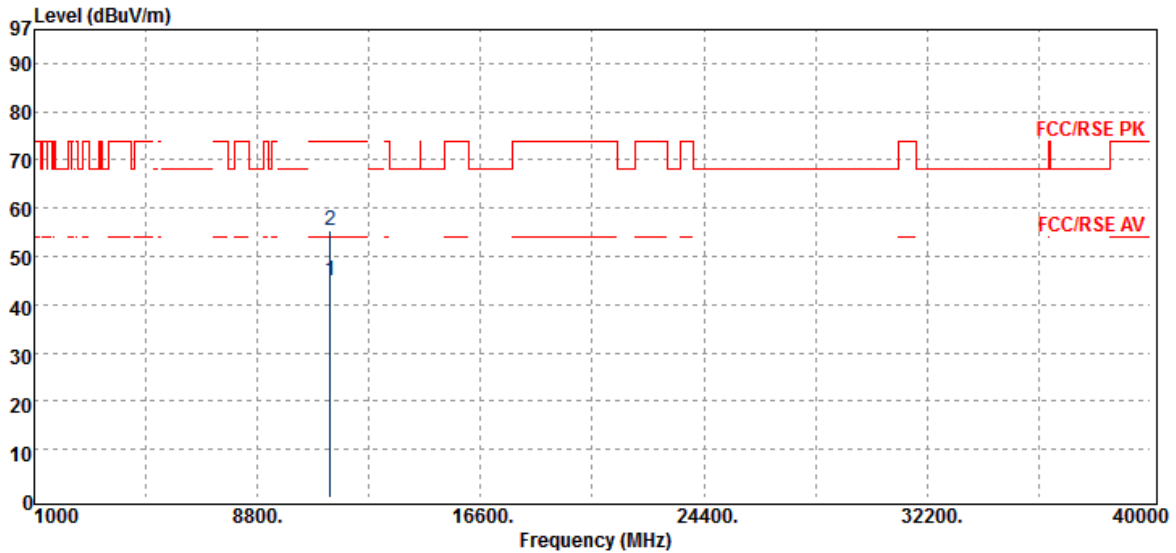
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Operation Band	:802.11n40B3	Test Date	:2018-06-14
Fundamental Frequency	:5670 MHz	Temp./Humi.	:23 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Kane
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11340.00	Average	23.28	21.54	44.82	54.00	-9.18
11340.00	Peak	33.73	21.54	55.27	74.00	-18.73

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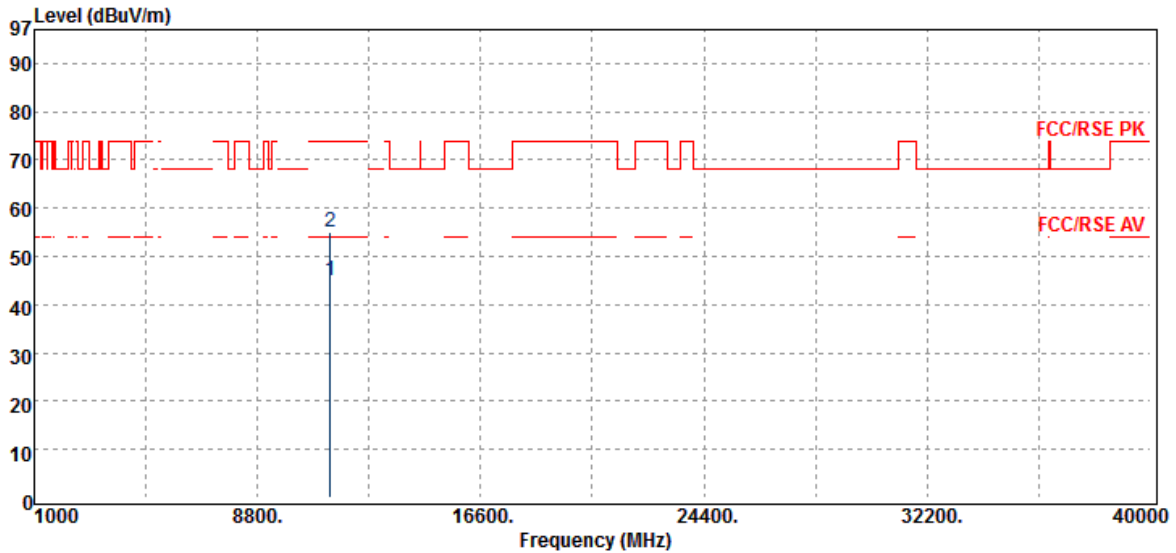
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Operation Band :802.11n40B3  
 Fundamental Frequency :5670 MHz  
 Operation Mode :Tx CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-14  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11340.00	Average	23.40	21.54	44.94	54.00	-9.06
11340.00	Peak	33.40	21.54	54.94	74.00	-19.06

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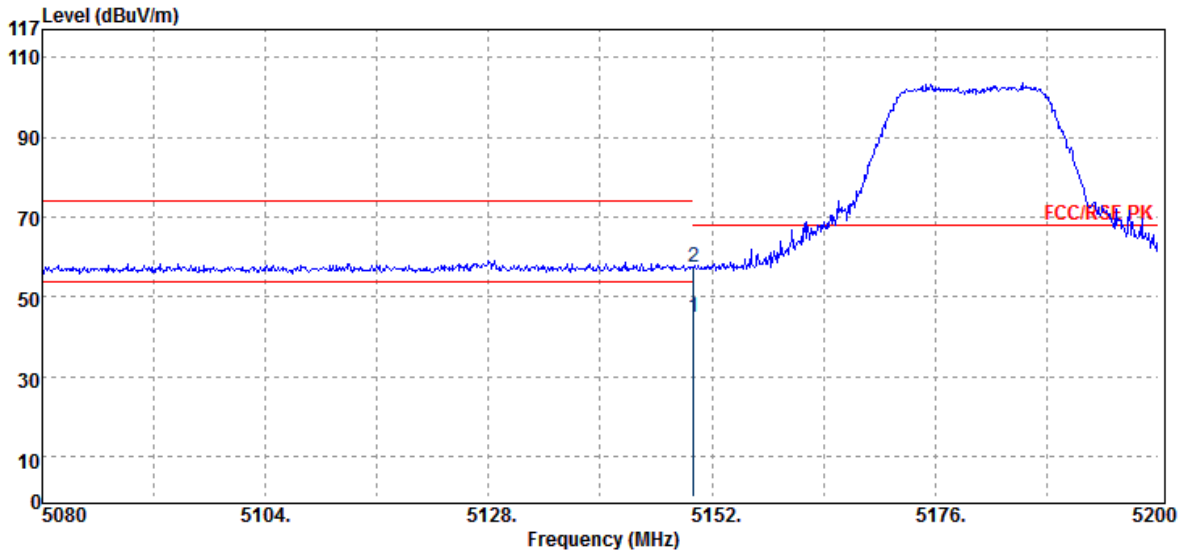
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### Band Edge falling to restricted band

#### 802.11a mode

Operation Band :802.11aB1  
 Fundamental Frequency :5180 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 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	36.77	8.32	45.09	54.00	-8.91
5150.00	Peak	49.08	8.32	57.40	74.00	-16.60

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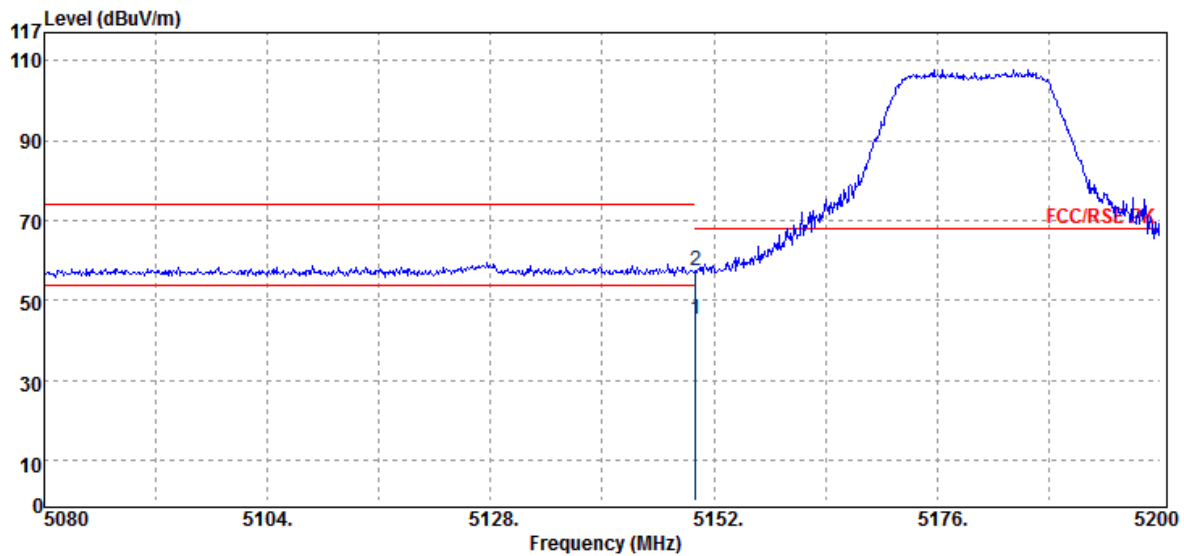
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Operation Band :802.11aB1  
Fundamental Frequency :5180 MHz  
Operation Mode :Bandedge CH LOW  
EUT Pol. :E1 Plane

Test Date :2018-06-13  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5150.00	Average	36.93	8.32	45.25	54.00	-8.75
5150.00	Peak	49.27	8.32	57.59	74.00	-16.41

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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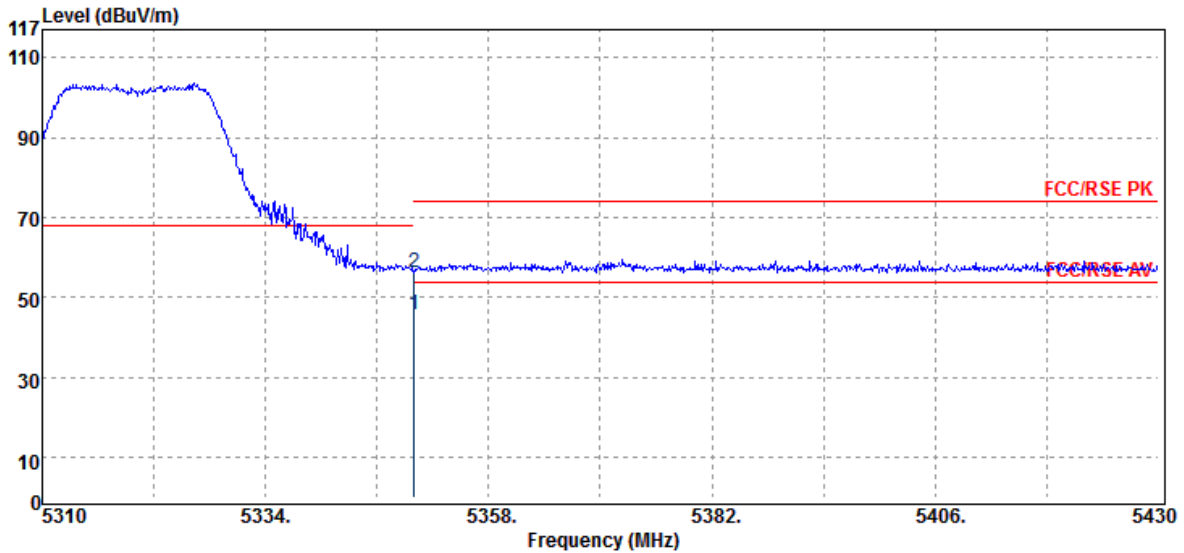
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Operation Band :802.11aB2  
 Fundamental Frequency :5320 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	36.98	8.63	45.61	54.00	-8.39
5350.00	Peak	47.71	8.63	56.34	74.00	-17.66

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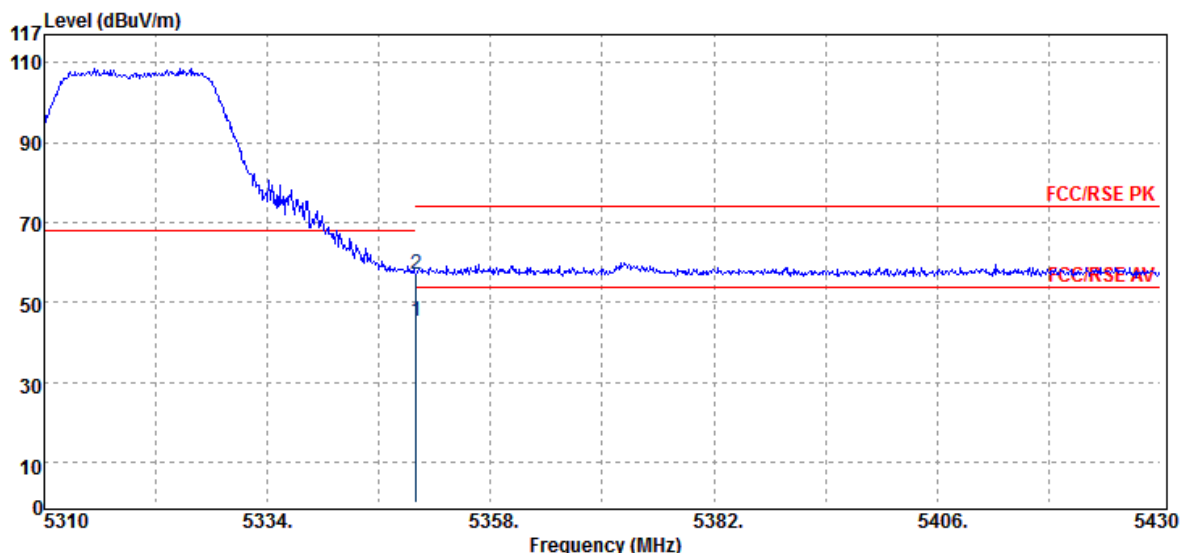
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Operation Band :802.11aB2  
 Fundamental Frequency :5320 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	36.91	8.63	45.54	54.00	-8.46
5350.00	Peak	48.64	8.63	57.27	74.00	-16.73

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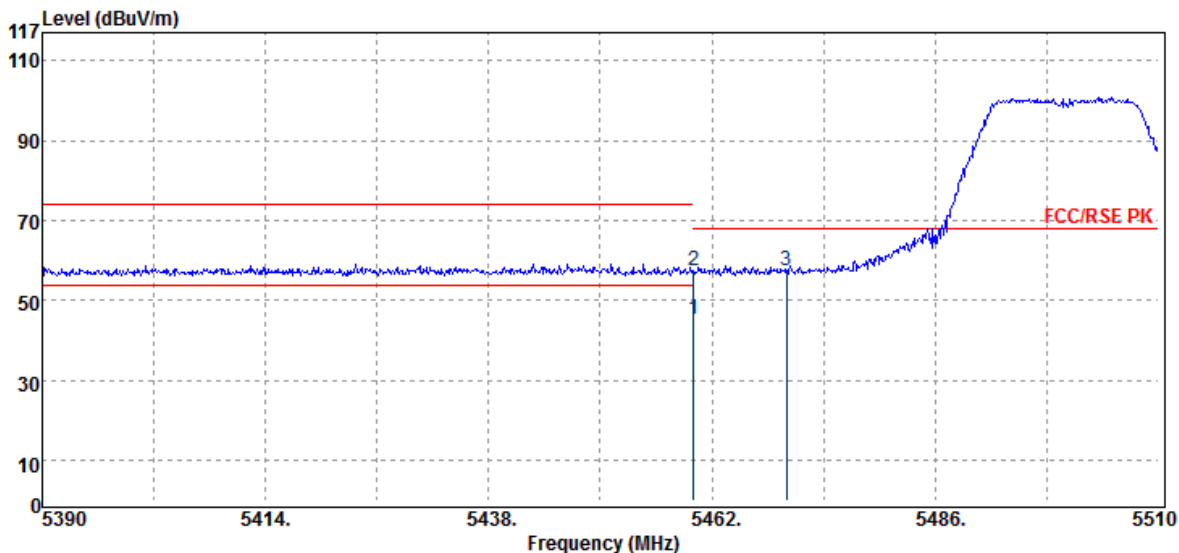
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Operation Band :802.11aB3  
 Fundamental Frequency :5500 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5460.00	Average	36.68	8.75	45.43	54.00	-8.57
5460.00	Peak	48.75	8.75	57.50	74.00	-16.50
5470.00	Peak	48.55	8.74	57.29	68.20	-10.91

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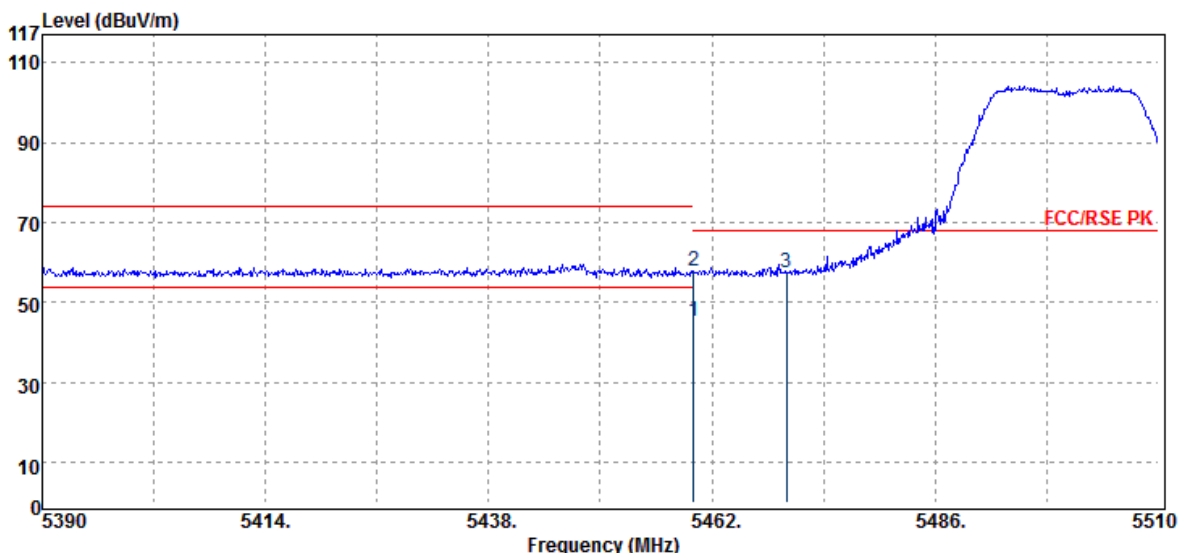
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Operation Band :802.11aB3  
 Fundamental Frequency :5500 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5460.00	Average	36.79	8.75	45.54	54.00	-8.46
5460.00	Peak	49.00	8.75	57.75	74.00	-16.25
5470.00	Peak	48.92	8.74	57.66	68.20	-10.54

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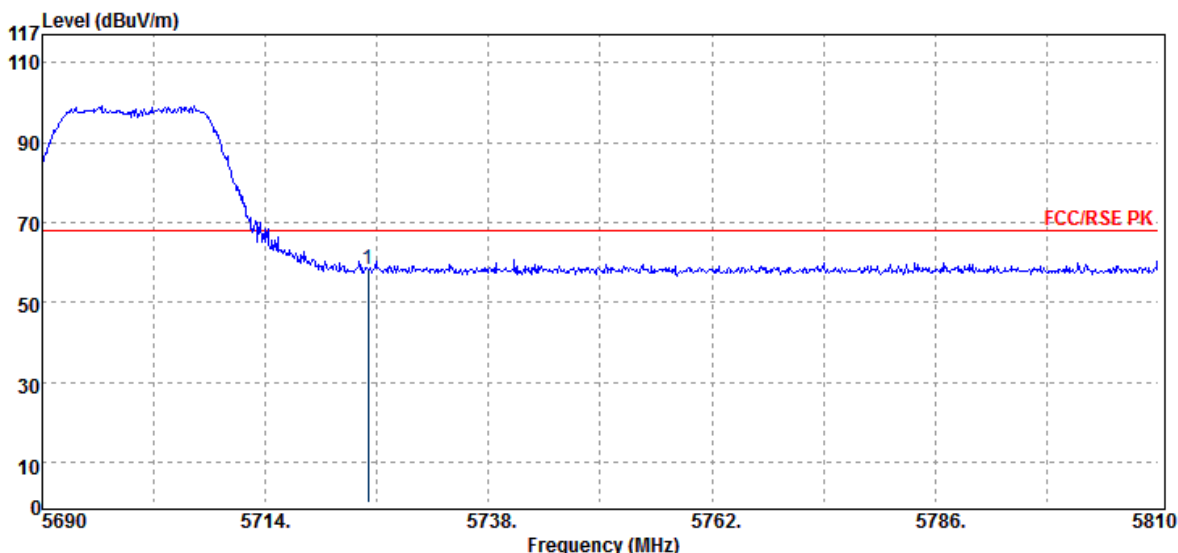
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Operation Band :802.11aB3  
 Fundamental Frequency :5700 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.98	9.44	58.42	68.20	-9.78

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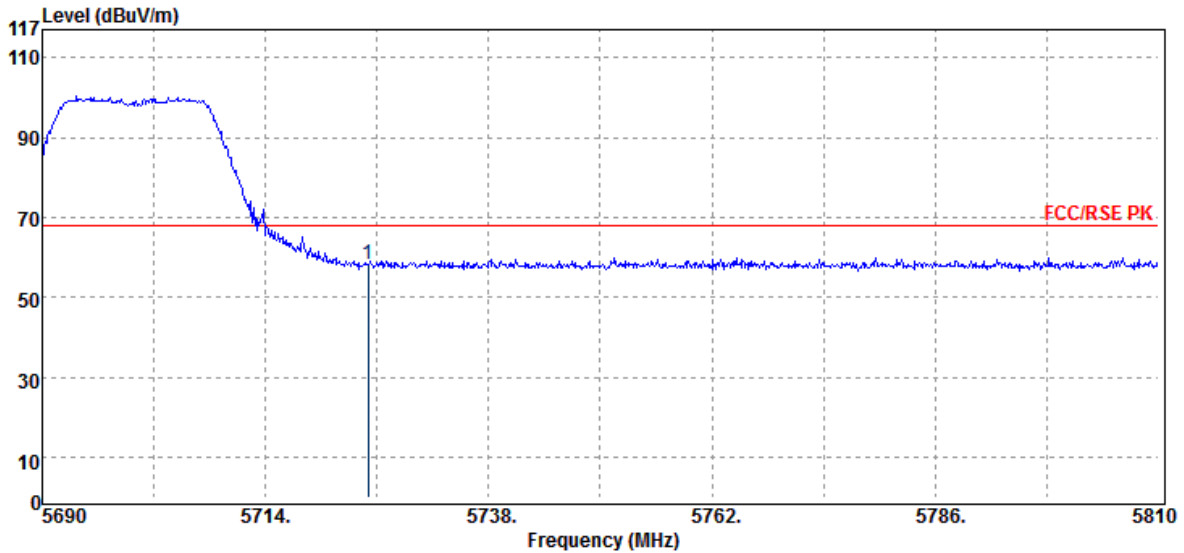
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Operation Band :802.11aB3  
 Fundamental Frequency :5700 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.96	9.44	58.40	68.20	-9.80

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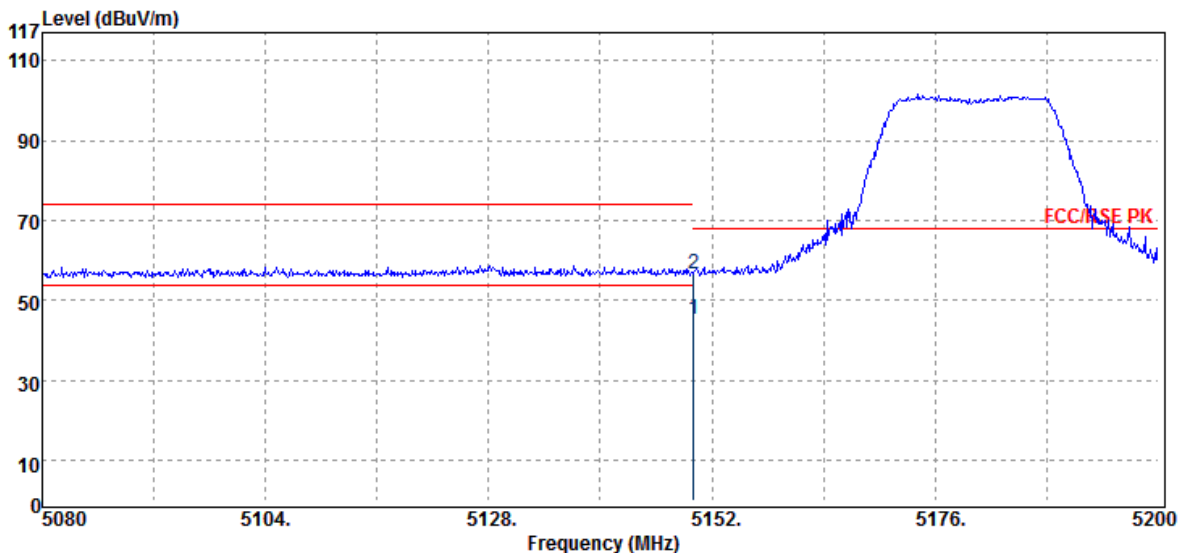
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**802.11n20 HT mode**

Operation Band :802.11n20B1  
 Fundamental Frequency :5180 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5150.00	Average	36.84	8.32	45.16	54.00	-8.84
5150.00	Peak	48.29	8.32	56.61	74.00	-17.39

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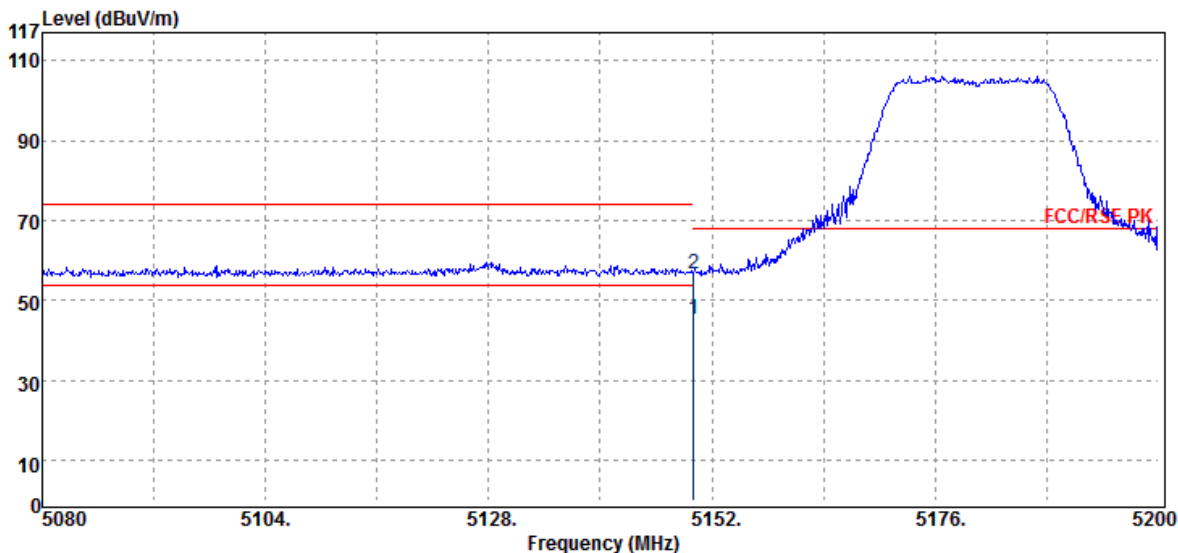
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Operation Band :802.11n20B1  
 Fundamental Frequency :5180 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5150.00	Average	36.93	8.32	45.25	54.00	-8.75
5150.00	Peak	48.55	8.32	56.87	74.00	-17.13

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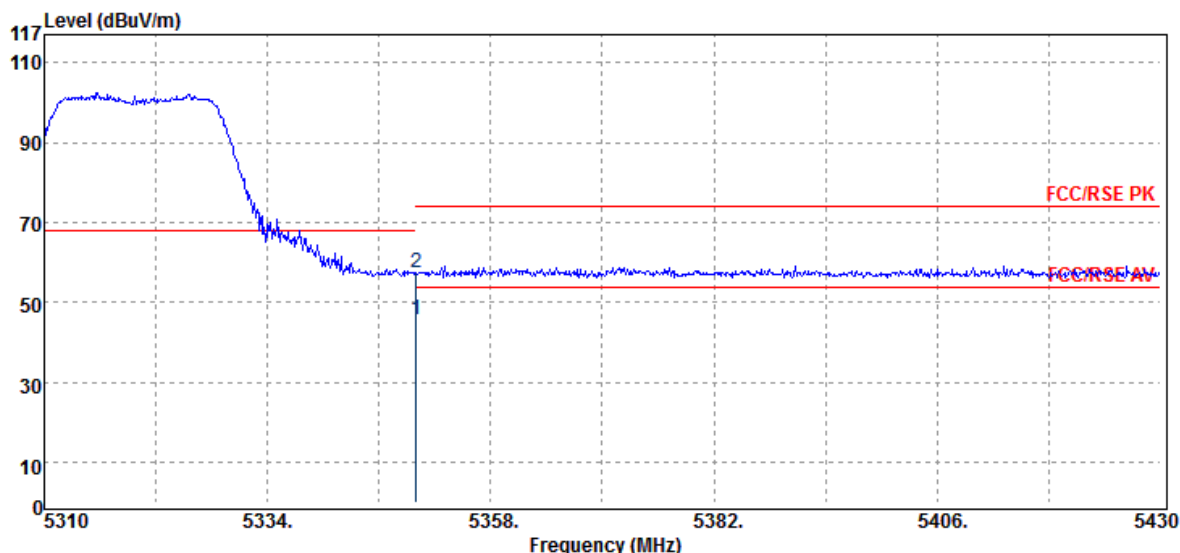
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Operation Band :802.11n20B2  
 Fundamental Frequency :5320 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	37.10	8.63	45.73	54.00	-8.27
5350.00	Peak	48.91	8.63	57.54	74.00	-16.46

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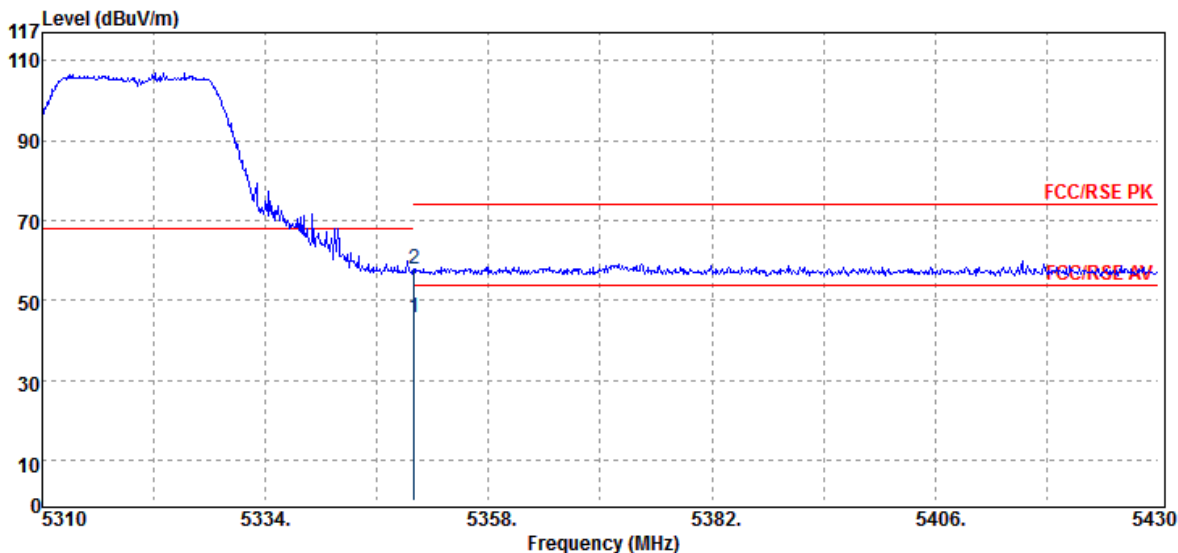
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Operation Band :802.11n20B2  
 Fundamental Frequency :5320 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	36.92	8.63	45.55	54.00	-8.45
5350.00	Peak	49.17	8.63	57.80	74.00	-16.20

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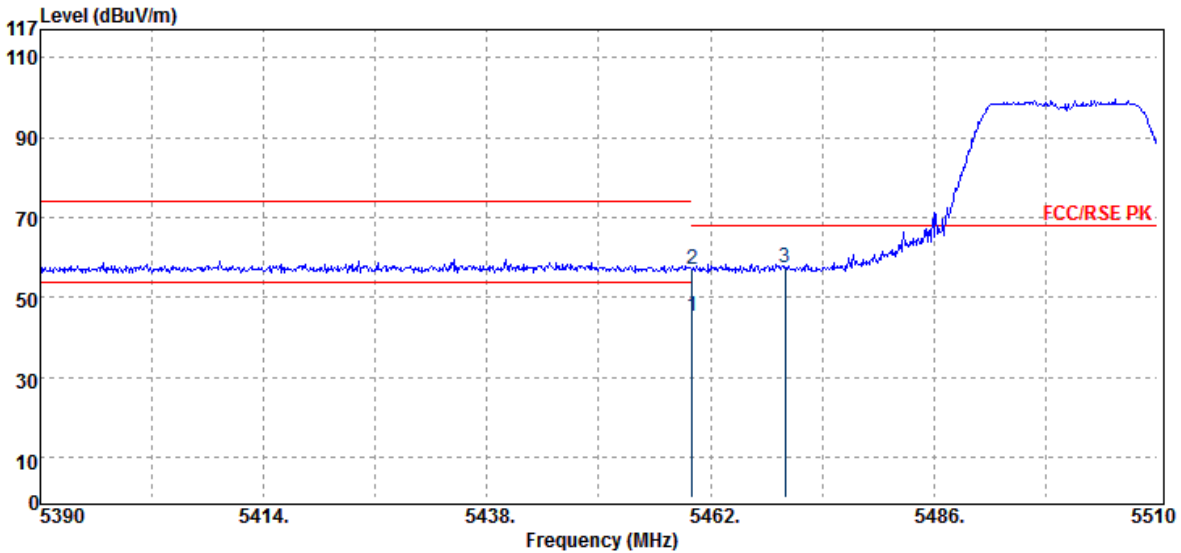
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Operation Band :802.11n20B3  
 Fundamental Frequency :5500 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5460.00	Average	36.77	8.75	45.52	54.00	-8.48
5460.00	Peak	48.51	8.75	57.26	74.00	-16.74
5470.00	Peak	48.63	8.74	57.37	68.20	-10.83

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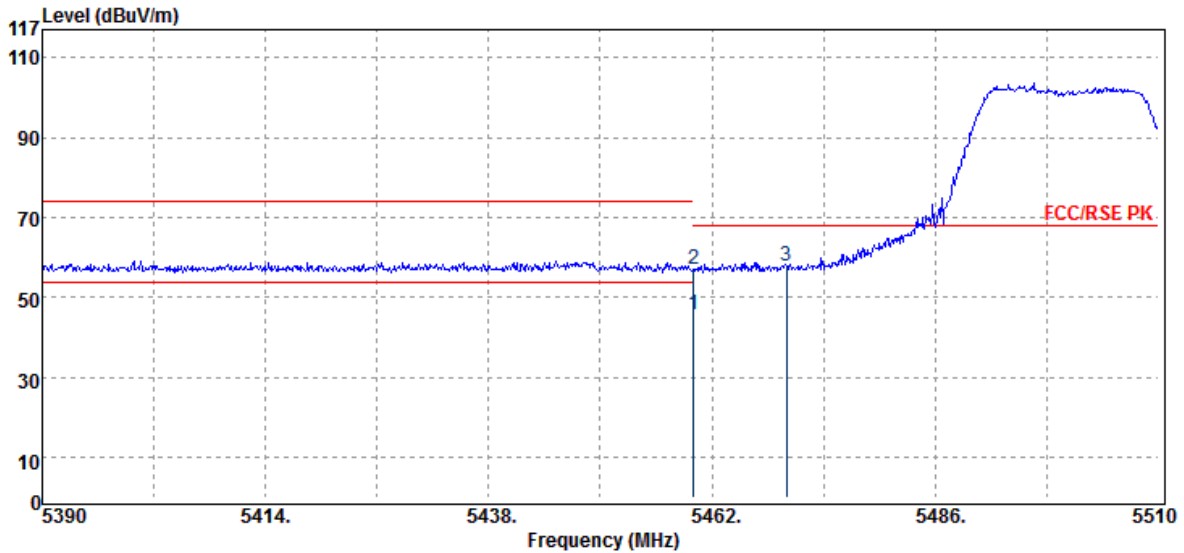
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Operation Band :802.11n20B3  
 Fundamental Frequency :5500 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5460.00	Average	36.85	8.75	45.60	54.00	-8.40
5460.00	Peak	48.47	8.75	57.22	74.00	-16.78
5470.00	Peak	49.34	8.74	58.08	68.20	-10.12

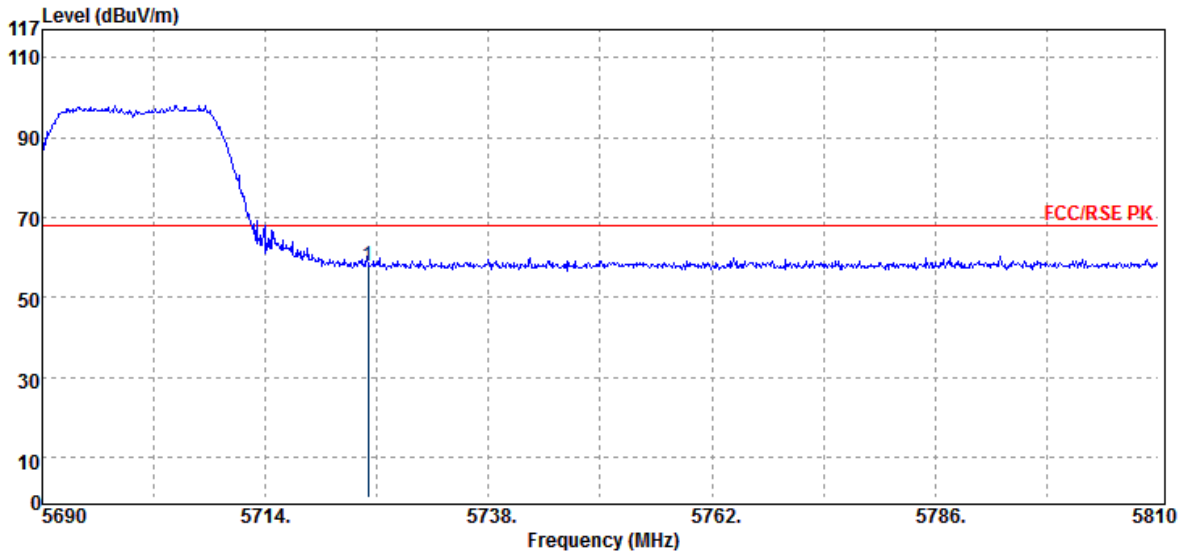
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Operation Band :802.11n20B3  
Fundamental Frequency :5700 MHz  
Operation Mode :Bandedge CH HIGH  
EUT Pol. :E1 Plane

Test Date :2018-06-13  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.40	9.44	57.84	68.20	-10.36

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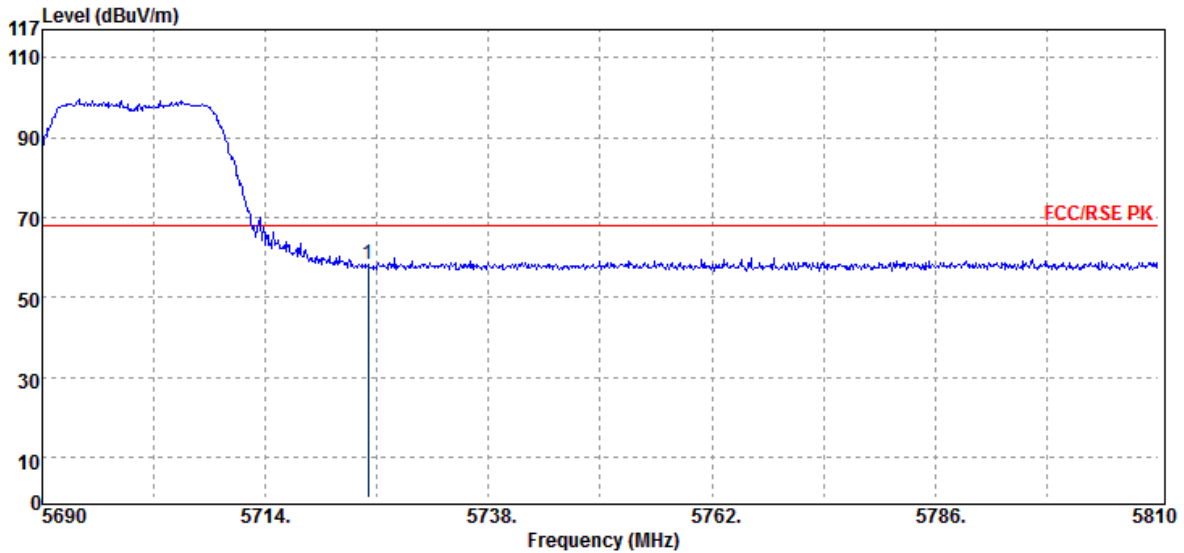
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Operation Band :802.11n20B3  
Fundamental Frequency :5700 MHz  
Operation Mode :Bandedge CH HIGH  
EUT Pol. :E1 Plane

Test Date :2018-06-13  
Temp./Humi. :23 deg\_C / 62 RH  
Engineer :Kane  
Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.91	9.44	58.35	68.20	-9.85

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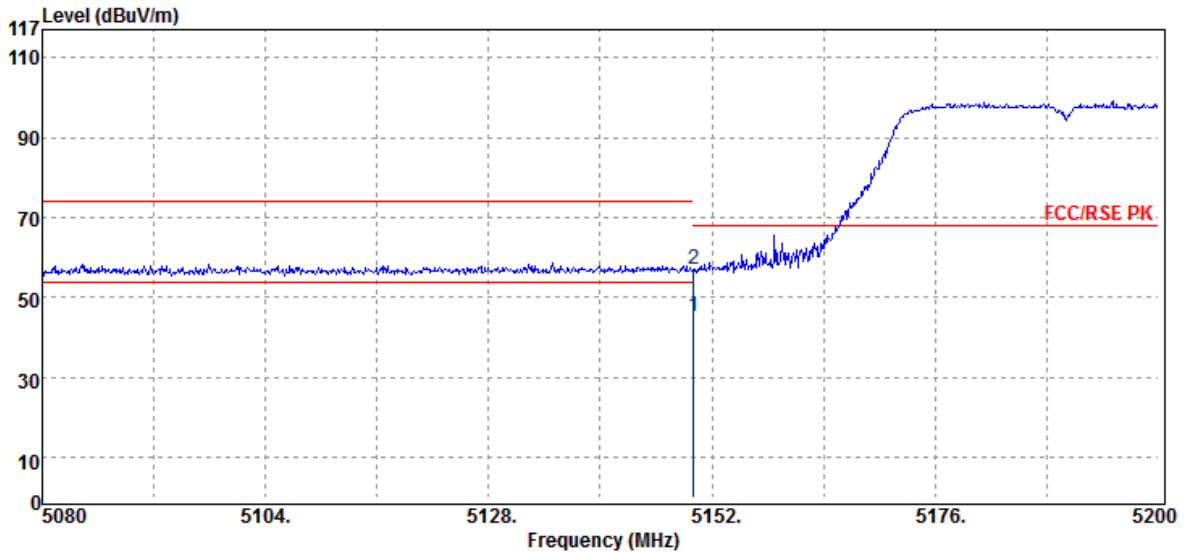
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**802.11n40 HT mode**

Operation Band :802.11n40B1  
 Fundamental Frequency :5190 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5150.00	Average	37.07	8.32	45.39	54.00	-8.61
5150.00	Peak	48.60	8.32	56.92	74.00	-17.08

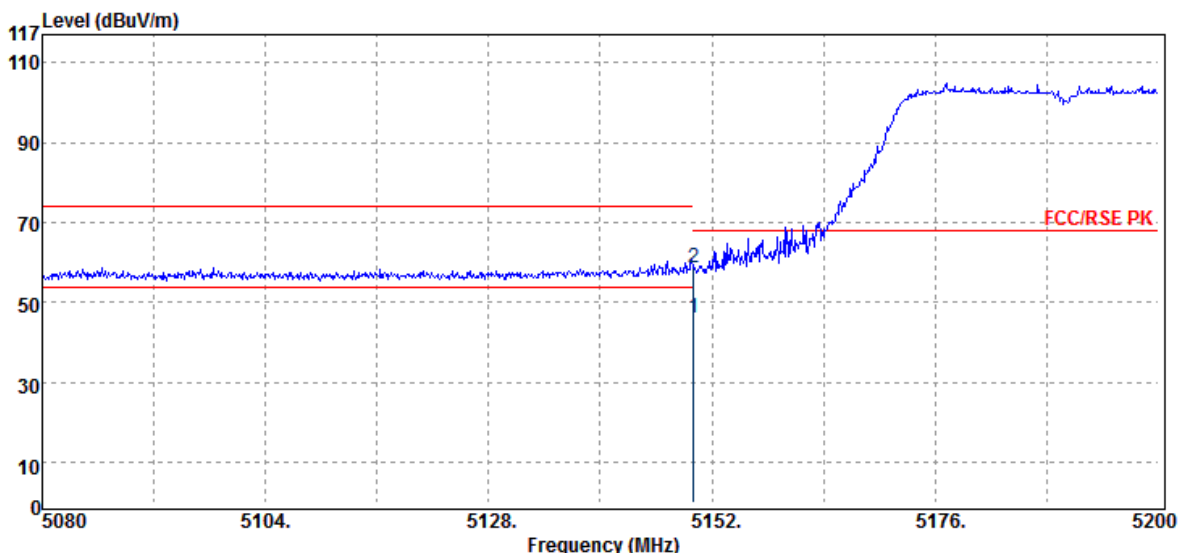
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Operation Band :802.11n40B1  
 Fundamental Frequency :5190 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5150.00	Average	37.76	8.32	46.08	54.00	-7.92
5150.00	Peak	50.24	8.32	58.56	74.00	-15.44

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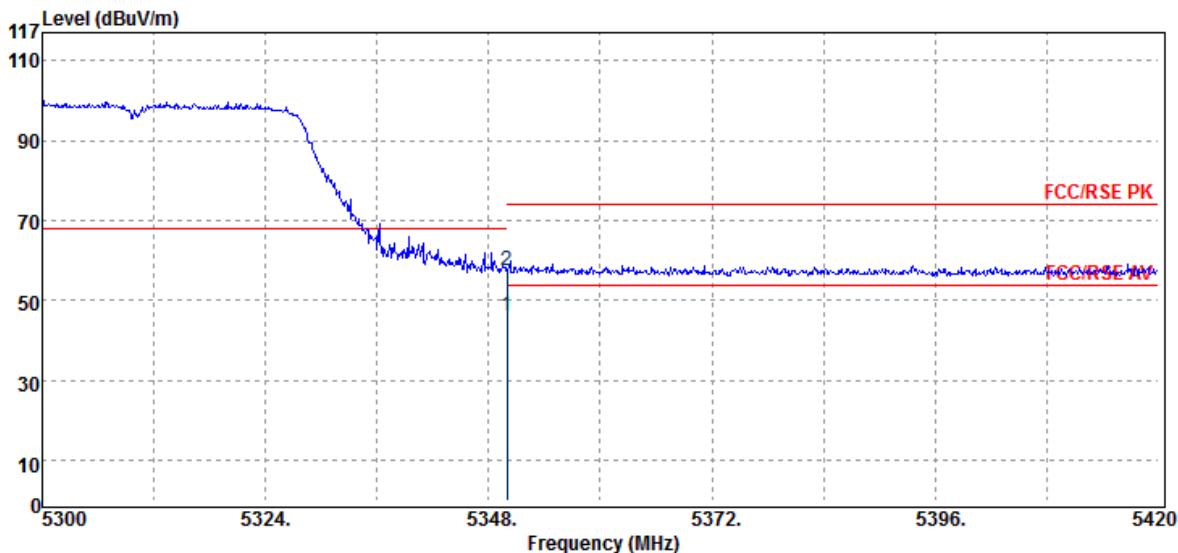
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Operation Band :802.11n40B2  
 Fundamental Frequency :5310 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	37.38	8.63	46.01	54.00	-7.99
5350.00	Peak	48.86	8.63	57.49	74.00	-16.51

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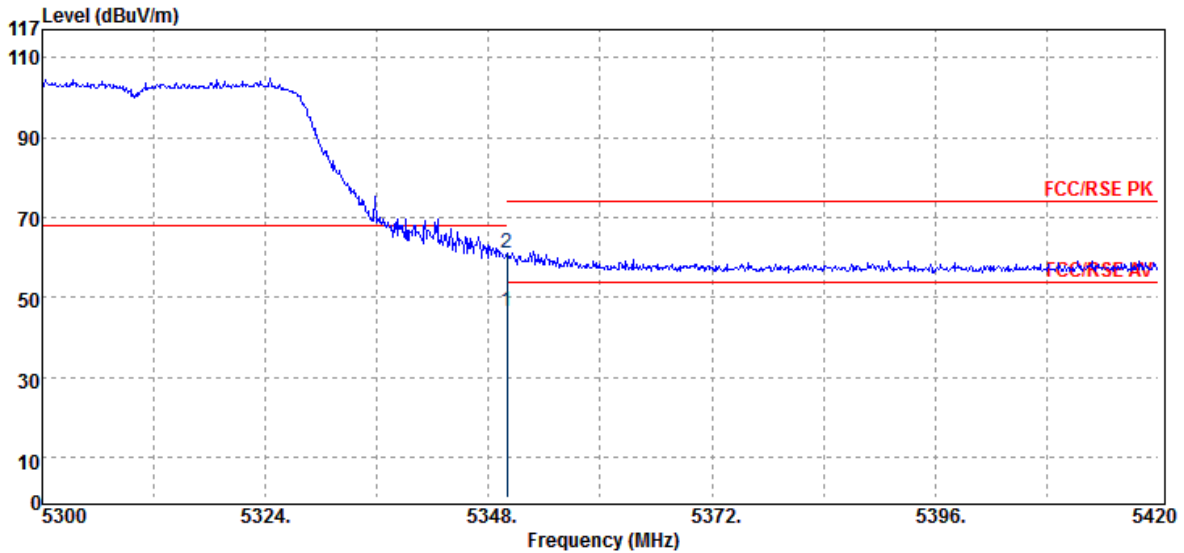
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Operation Band :802.11n40B2  
 Fundamental Frequency :5310 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5350.00	Average	38.05	8.63	46.68	54.00	-7.32
5350.00	Peak	52.70	8.63	61.33	74.00	-12.67

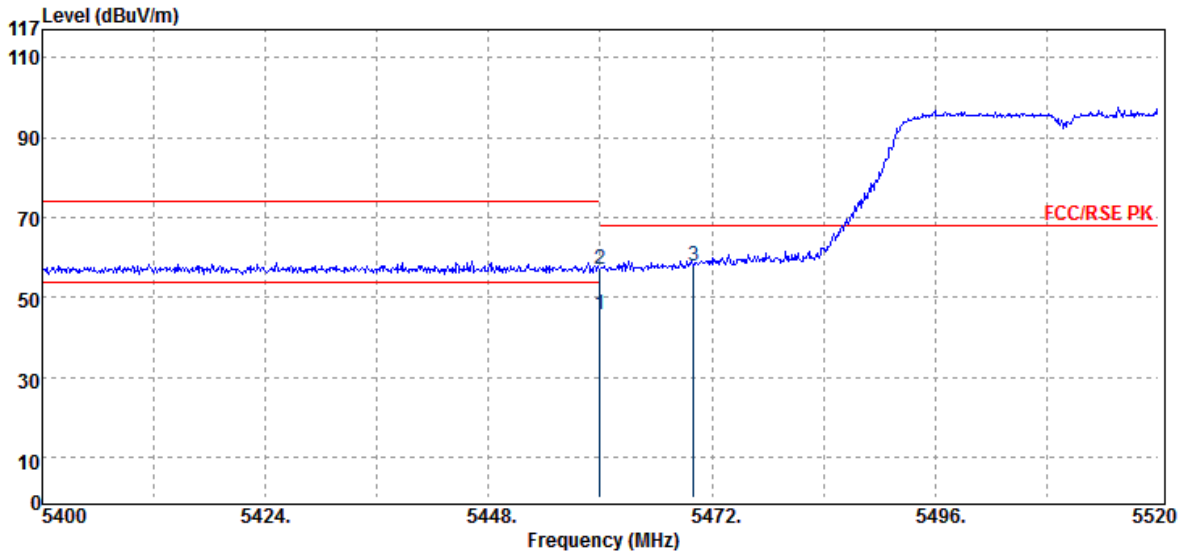
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Operation Band :802.11n40B3  
 Fundamental Frequency :5510 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5460.00	Average	37.17	8.75	45.92	54.00	-8.08
5460.00	Peak	48.38	8.75	57.13	74.00	-16.87
5470.00	Peak	49.30	8.74	58.04	68.20	-10.16

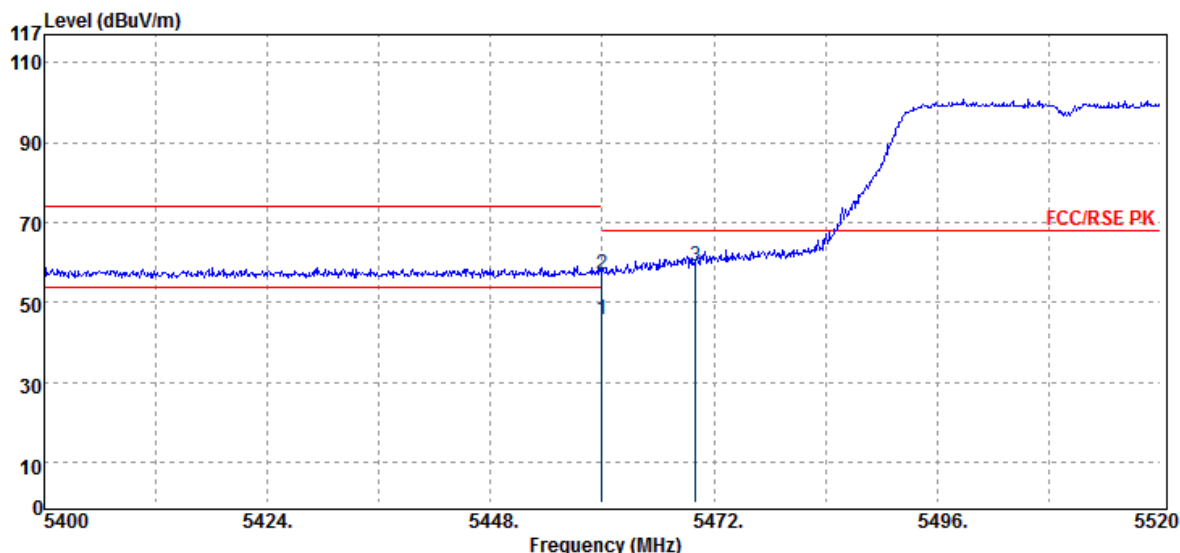
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Operation Band :802.11n40B3  
 Fundamental Frequency :5510 MHz  
 Operation Mode :Bandedge CH LOW  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5460.00	Average	37.20	8.75	45.95	54.00	-8.05
5460.00	Peak	48.32	8.75	57.07	74.00	-16.93
5470.00	Peak	50.53	8.74	59.27	68.20	-8.93

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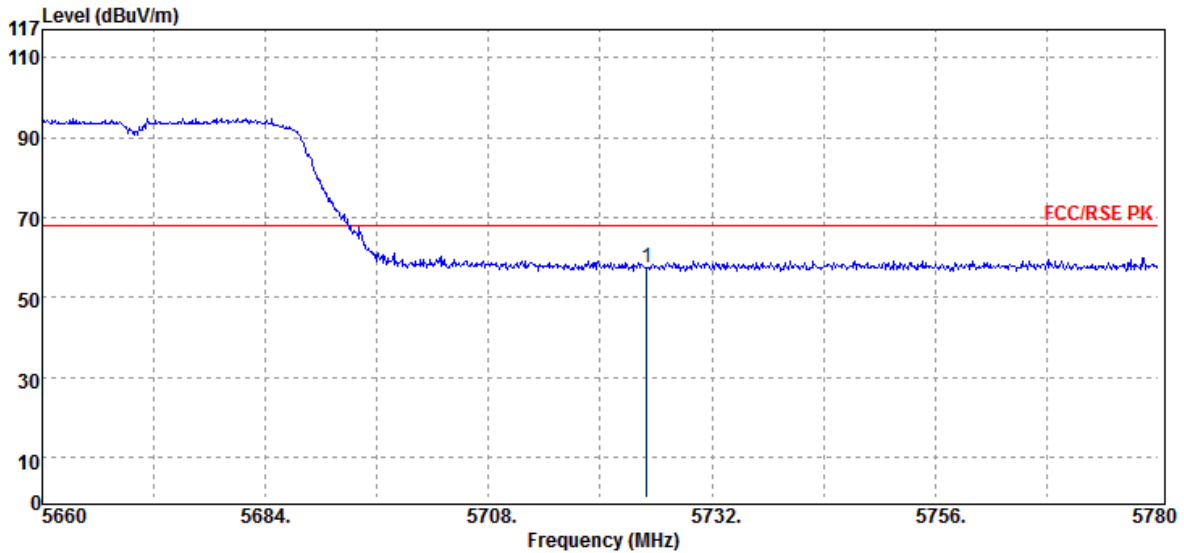
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Operation Band :802.11n40B3  
 Fundamental Frequency :5670 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.01	9.44	57.45	68.20	-10.75

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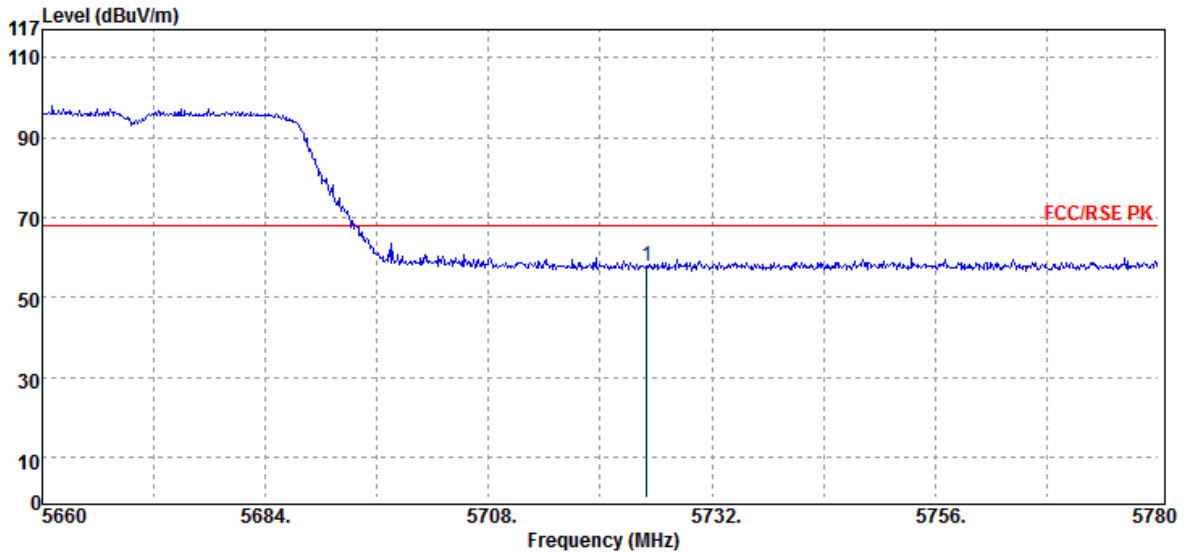
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Operation Band :802.11n40B3  
 Fundamental Frequency :5670 MHz  
 Operation Mode :Bandedge CH HIGH  
 EUT Pol. :E1 Plane

Test Date :2018-06-13  
 Temp./Humi. :23 deg\_C / 62 RH  
 Engineer :Kane  
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5725.00	Peak	48.63	9.44	58.07	68.20	-10.13

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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

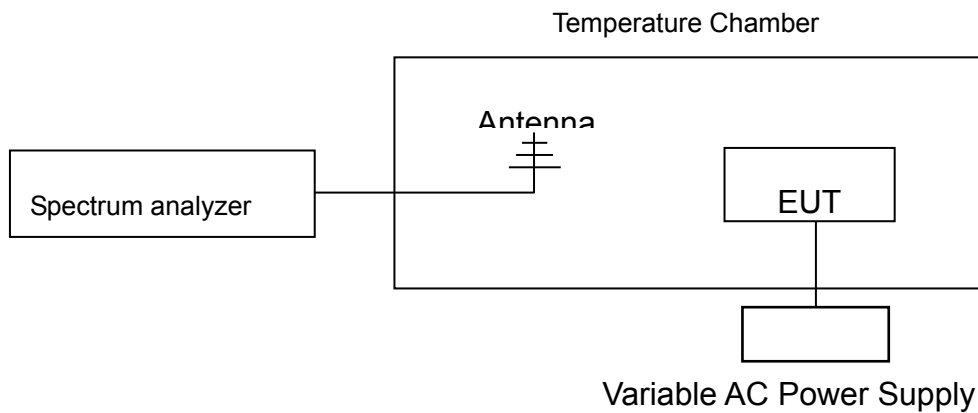
### 13.1 Standard Applicable

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



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### 13.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
Temperature Chamber	TERCHY	MHG-120LF	911009	2018/05/18	2019/05/17
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01
Notebook	Lenovo	T440P	P0000564	N/A	N/A

### 13.5 Measurement Result

#### Startup:

Operation Mode	802.11 a	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	36	5180	5,180.00053	-0.00000010
		44	5220	5,219.98985	0.00000194
		48	5240	5,239.97127	0.00000548
		52	5260	5,260.02947	-0.00000560
		60	5300	5,299.98029	0.00000372
		64	5320	5,320.00262	-0.00000049
	3.4V	100	5500	5,499.99498	0.00000091
		36	5180	5,179.97444	0.00000494
		44	5220	5,219.98349	0.00000316
		48	5240	5,239.96718	0.00000626
		52	5260	5,260.00287	-0.00000054
		100	5500	5,499.99169	0.00000151
		116	5580	5,579.99605	0.00000071
		140	5700	5,699.99673	0.00000057

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25	3.8V	36	5180	5,179.97513	0.00000480
		52	5260	5,260.00151	-0.00000029
		60	5300	5,299.99326	0.00000127
		64	5320	5,319.98244	0.00000330
		100	5500	5,499.97636	0.00000430
		116	5580	5,579.99790	0.00000038
		140	5700	5,700.00426	-0.00000075
50	4.2V	36	5180	5,180.01248	-0.00000241
		44	5220	5,219.99671	0.00000063
		48	5240	5,239.99310	0.00000132
		52	5260	5,260.00681	-0.00000129
		60	5300	5,299.99493	0.00000096
		64	5320	5,319.99293	0.00000133
		100	5500	5,499.98223	0.00000323
	3.4V	36	5180	5,179.99295	0.00000136
		44	5220	5,219.98282	0.00000329
		48	5240	5,240.01268	-0.00000242
		52	5260	5,259.99582	0.00000079
		60	5300	5,299.99851	0.00000028
		64	5320	5,319.99960	0.00000008
		100	5500	5,500.01218	-0.00000221
		116	5580	5,580.00078	-0.00000014
		140	5700	5,699.99470	0.00000093

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Operation Mode	802.11 n_HT40	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	38	5190	5,189.98619	0.00000266
		46	5230	5,230.00710	-0.00000136
		54	5270	5,269.99709	0.00000055
		62	5310	5,309.99293	0.00000133
		102	5510	5,510.00234	-0.00000043
	3.4V	110	5550	5,549.99861	0.00000025
		134	5670	5,670.00497	-0.00000088
		62	5310	5,309.99880	0.00000023
		102	5510	5,509.97799	0.00000399
		110	5550	5,549.99053	0.00000171
		134	5670	5,670.00912	-0.00000161

25	3.8V	38	5190	5,189.99749	0.00000048
		46	5230	5,229.98775	0.00000234
		54	5270	5,270.01373	-0.00000261
		134	5670	5,670.00303	-0.00000053
50	4.2V	38	5190	5,190.00035	-0.00000007
		46	5230	5,229.99079	0.00000176
		54	5270	5,270.00855	-0.00000162
		62	5310	5,309.98245	0.00000331
		102	5510	5,509.99913	0.00000016
		110	5550	5,549.98332	0.00000301
	3.4V	38	5190	5,189.99388	0.00000118
		46	5230	5,229.99922	0.00000015
		54	5270	5,270.00513	-0.00000097
		62	5310	5,310.00186	-0.00000035
		102	5510	5,509.99549	0.00000082
		110	5550	5,550.01073	-0.00000193
		134	5670	5,670.00751	-0.00000132

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**2 minutes:**

Operation Mode	802.11 a	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	36	5180	5,179.98868	0.00000219
		44	5220	5,219.99459	0.00000104
		48	5240	5,239.96878	0.00000596
		52	5260	5,260.02789	-0.00000530
		60	5300	5,299.98382	0.00000305
		64	5320	5,320.00329	-0.00000062
		100	5500	5,500.00160	-0.00000029
		116	5580	5,579.96924	0.00000551
	3.4V	140	5700	5,699.98096	0.00000334
		36	5180	5,179.97489	0.00000485
		44	5220	5,219.98213	0.00000342
		48	5240	5,239.97244	0.00000526
		52	5260	5,259.99701	0.00000057
		60	5300	5,299.97690	0.00000436
		64	5320	5,319.99201	0.00000150
		100	5500	5,499.99749	0.00000046
116	5580	5,580.00018	-0.00000003		
140	5700	5,700.00495	-0.00000087		

25	3.8V	36	5180	5,179.98018	0.00000383
		44	5220	5,220.00788	-0.00000151
		48	5240	5,239.97248	0.00000525
		52	5260	5,260.01574	-0.00000299
		60	5300	5,299.98060	0.00000366
		64	5320	5,319.97898	0.00000395
		100	5500	5,499.98078	0.00000349
		116	5580	5,579.99445	0.00000099
		140	5700	5,699.99991	0.00000002

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50	4.2V	36	5180	5,180.01307	-0.00000252
		44	5220	5,219.99042	0.00000184
		48	5240	5,239.97579	0.00000462
		52	5260	5,260.00902	-0.00000172
		60	5300	5,300.00869	-0.00000164
		64	5320	5,319.98383	0.00000304
		100	5500	5,499.97143	0.00000519
		116	5580	5,580.00294	-0.00000053
		140	5700	5,699.97461	0.00000445
	3.4V	36	5180	5,179.99276	0.00000140
		44	5220	5,219.97690	0.00000443
		48	5240	5,240.01440	-0.00000275
		52	5260	5,259.98346	0.00000314
		60	5300	5,300.00137	-0.00000026
		64	5320	5,320.00596	-0.00000112
		100	5500	5,500.00024	-0.00000004
		116	5580	5,579.98208	0.00000321
		140	5700	5,700.00862	-0.00000151

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Operation Mode	802.11 n_HT40	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	38	5190	5,189.99236	0.00000147
		46	5230	5,230.00381	-0.00000073
		54	5270	5,269.98606	0.00000265
		62	5310	5,310.00510	-0.00000096
		102	5510	5,509.99030	0.00000176
		110	5550	5,550.00856	-0.00000154
		134	5670	5,670.00477	-0.00000084
	3.4V	38	5190	5,190.00285	-0.00000055
		46	5230	5,229.99288	0.00000136
		54	5270	5,269.99920	0.00000015
		62	5310	5,309.99610	0.00000073
		102	5510	5,509.97348	0.00000481
		110	5550	5,549.99278	0.00000130
		134	5670	5,670.00638	-0.00000113

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25	3.8V	38	5190	5,190.00960	-0.00000185
		46	5230	5,229.99156	0.00000161
		54	5270	5,269.99940	0.00000011
		62	5310	5,310.00675	-0.00000127
		102	5510	5,509.99678	0.00000058
		110	5550	5,550.00445	-0.00000080
		134	5670	5,670.00820	-0.00000145
50	4.2V	38	5190	5,190.00344	-0.00000066
		46	5230	5,230.00150	-0.00000029
		54	5270	5,269.99931	0.00000013
		62	5310	5,309.99397	0.00000114
		102	5510	5,510.01284	-0.00000233
		110	5550	5,549.99049	0.00000171
		134	5670	5,670.00036	-0.00000006
	3.4V	38	5190	5,189.99505	0.00000095
		46	5230	5,230.01277	-0.00000244
		54	5270	5,270.00533	-0.00000101
		62	5310	5,309.99301	0.00000132
		102	5510	5,509.99050	0.00000172
		110	5550	5,550.00609	-0.00000110
		134	5670	5,670.01015	-0.00000179

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**5 minutes:**

Operation Mode	802.11 a	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	36	5180	5,179.99996	0.00000001
		44	5220	5,220.00515	-0.00000099
		48	5240	5,239.96861	0.00000599
		52	5260	5,260.01541	-0.00000293
		60	5300	5,299.97287	0.00000512
		64	5320	5,320.00618	-0.00000116
		100	5500	5,499.99118	0.00000160
		116	5580	5,579.97985	0.00000361
		140	5700	5,699.97784	0.00000389
	3.4V	36	5180	5,179.99241	0.00000147
		44	5220	5,219.98554	0.00000277
		48	5240	5,239.98536	0.00000279
		52	5260	5,259.99528	0.00000090
		60	5300	5,299.98041	0.00000370
		64	5320	5,319.99625	0.00000070
		100	5500	5,499.98833	0.00000212
		116	5580	5,580.01178	-0.00000211
		140	5700	5,700.00176	-0.00000031

25	3.8V	36	5180	5,179.98308	0.00000327
		44	5220	5,219.99404	0.00000114
		48	5240	5,239.97244	0.00000526
		52	5260	5,260.01868	-0.00000355
		60	5300	5,299.98923	0.00000203
		64	5320	5,319.98797	0.00000226
		100	5500	5,499.97853	0.00000390
		116	5580	5,579.98968	0.00000185
		140	5700	5,699.99942	0.00000010

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50	4.2V	36	5180	5,180.00801	-0.00000155
		44	5220	5,219.99552	0.00000086
		48	5240	5,239.99188	0.00000155
		52	5260	5,260.00596	-0.00000113
		60	5300	5,300.00342	-0.00000065
		64	5320	5,319.98272	0.00000325
		100	5500	5,499.97452	0.00000463
		116	5580	5,580.00340	-0.00000061
		140	5700	5,699.98706	0.00000227
	3.4V	36	5180	5,179.99362	0.00000123
		44	5220	5,219.98538	0.00000280
		48	5240	5,240.00402	-0.00000077
		52	5260	5,259.98195	0.00000343
		60	5300	5,299.99859	0.00000027
		64	5320	5,320.00156	-0.00000029
		100	5500	5,500.00427	-0.00000078
		116	5580	5,579.99476	0.00000094
		140	5700	5,699.99858	0.00000025

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Operation Mode	802.11 n_HT40	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	38	5190	5,189.99244	0.00000146
		46	5230	5,230.00822	-0.00000157
		54	5270	5,269.99372	0.00000119
		62	5310	5,309.99119	0.00000166
		102	5510	5,510.00593	-0.00000108
		110	5550	5,549.99382	0.00000111
		134	5670	5,670.00850	-0.00000150
	3.4V	38	5190	5,190.00051	-0.00000010
		46	5230	5,229.99541	0.00000088
		54	5270	5,270.00044	-0.00000008
		62	5310	5,310.00105	-0.00000020
		102	5510	5,509.97317	0.00000487
		110	5550	5,550.00278	-0.00000050
		134	5670	5,669.99638	0.00000064

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25	3.8V	38	5190	5,190.00034	-0.00000007
		46	5230	5,230.00212	-0.00000041
		54	5270	5,270.00565	-0.00000107
		62	5310	5,310.01017	-0.00000192
		102	5510	5,509.98713	0.00000234
		110	5550	5,549.99719	0.00000051
		134	5670	5,669.99212	0.00000139
50	4.2V	38	5190	5,190.00751	-0.00000145
		46	5230	5,229.98497	0.00000287
		54	5270	5,270.00043	-0.00000008
		62	5310	5,309.99277	0.00000136
		102	5510	5,510.01339	-0.00000243
		110	5550	5,549.98041	0.00000353
		134	5670	5,670.00610	-0.00000107
	3.4V	38	5190	5,190.01083	-0.00000209
		46	5230	5,230.01452	-0.00000278
		54	5270	5,269.99708	0.00000055
		62	5310	5,309.99825	0.00000033
		102	5510	5,509.99023	0.00000177
		110	5550	5,550.00132	-0.00000024
		134	5670	5,670.01014	-0.00000179

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**10 minutes:**

Operation Mode	802.11 a	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	36	5180	5,179.99475	0.00000101
		44	5220	5,219.98921	0.00000207
		48	5240	5,239.96644	0.00000640
		52	5260	5,260.02409	-0.00000458
		60	5300	5,299.97997	0.00000378
		64	5320	5,320.00814	-0.00000153
		100	5500	5,499.99804	0.00000036
		116	5580	5,579.98378	0.00000291
		140	5700	5,699.97733	0.00000398
	3.4V	36	5180	5,179.99013	0.00000191
		44	5220	5,219.98119	0.00000360
		48	5240	5,239.98090	0.00000365
		52	5260	5,259.99518	0.00000092
		60	5300	5,299.97444	0.00000482
		64	5320	5,319.99002	0.00000188
		100	5500	5,499.99620	0.00000069
		116	5580	5,580.01222	-0.00000219
		140	5700	5,700.01563	-0.00000274
25	3.8V	36	5180	5,179.98901	0.00000212
		44	5220	5,220.00749	-0.00000144
		48	5240	5,239.96989	0.00000575
		52	5260	5,260.01687	-0.00000321
		60	5300	5,299.97752	0.00000424
		64	5320	5,319.97287	0.00000510
		100	5500	5,499.97762	0.00000407
		116	5580	5,579.99244	0.00000136
		140	5700	5,699.99850	0.00000026

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50	4.2V	36	5180	5,180.00879	-0.00000170
		44	5220	5,219.99469	0.00000102
		48	5240	5,239.98746	0.00000239
		52	5260	5,260.00222	-0.00000042
		60	5300	5,300.00094	-0.00000018
		64	5320	5,319.99606	0.00000074
		100	5500	5,499.97479	0.00000458
		116	5580	5,579.98812	0.00000213
		140	5700	5,699.97330	0.00000468
	3.4V	36	5180	5,179.98714	0.00000248
		44	5220	5,219.98413	0.00000304
		48	5240	5,239.99906	0.00000018
		52	5260	5,259.98130	0.00000356
		60	5300	5,300.00330	-0.00000062
		64	5320	5,320.00717	-0.00000135
		100	5500	5,500.01203	-0.00000219
		116	5580	5,579.99095	0.00000162
		140	5700	5,699.99540	0.00000081

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Operation Mode	802.11 n_HT40	Test Date	2018.06.14
Temperature	:23	Test By	Gary
Humidity	:68 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	4.2V	38	5190	5,189.99852	0.00000029
		46	5230	5,230.01020	-0.00000195
		54	5270	5,269.99504	0.00000094
		62	5310	5,310.00603	-0.00000114
		102	5510	5,510.00706	-0.00000128
		110	5550	5,549.99961	0.00000007
		134	5670	5,670.00403	-0.00000071
	3.4V	38	5190	5,190.01575	-0.00000303
		46	5230	5,229.98608	0.00000266
		54	5270	5,269.99387	0.00000116
		62	5310	5,309.99406	0.00000112
		102	5510	5,509.96634	0.00000611
		110	5550	5,549.98785	0.00000219
		134	5670	5,670.00172	-0.00000030

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25	3.8V	38	5190	5,189.99755	0.00000047
		46	5230	5,230.00303	-0.00000058
		54	5270	5,270.01236	-0.00000235
		62	5310	5,309.99223	0.00000146
		102	5510	5,509.98807	0.00000216
		110	5550	5,550.00616	-0.00000111
		134	5670	5,669.99959	0.00000007
50	4.2V	38	5190	5,190.00215	-0.00000041
		46	5230	5,229.99902	0.00000019
		54	5270	5,270.00304	-0.00000058
		62	5310	5,309.99528	0.00000089
		102	5510	5,510.00174	-0.00000032
		110	5550	5,549.98377	0.00000292
		134	5670	5,670.01307	-0.00000230
	3.4V	38	5190	5,190.00037	-0.00000007
		46	5230	5,230.00435	-0.00000083
		54	5270	5,269.99741	0.00000049
		62	5310	5,309.99253	0.00000141
		102	5510	5,510.00354	-0.00000064
		110	5550	5,550.00687	-0.00000124
		134	5670	5,669.99898	0.00000018

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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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

An embedded-in antenna design is used.

The antenna is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

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