

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

**Applicant:** HP Inc.  
3390 East Harmony Road Fort Collins, Colorado 80528 United States

**Product Name:** Notebook PC

**Brand Name:** HP

**Model No.:** TPN-Q198

**Model Difference:** N/A

**FCC ID:** B94TPQ198WCWT

**Report Number:** E2/2017/80076

**FCC Rule Part:** §15.407, Cat: NII

**Issue Date:** Sep. 20, 2017

**Date of Test:** Aug. 30, 2017

**Date of EUT Received:** Jul. 11, 2017

**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.

**Prepared By:**

Allen Tsai

Allen Tsai / Engineer

**Approved By:**

Jim Chang

Jim Chang / Asst. Manager



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## Revision History

Report Number	Revision	Description	Issue Date
E2/2017/80076	Rev.00	Initial creation of document	Sep. 20, 2017

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## Contents

<b>1</b>	<b>GENERAL INFORMATION</b> .....	<b>4</b>
<b>2</b>	<b>SYSTEM TEST CONFIGURATION</b> .....	<b>7</b>
<b>3</b>	<b>SUMMARY OF TEST RESULT</b> .....	<b>9</b>
<b>4</b>	<b>DESCRIPTION OF TEST MODES</b> .....	<b>10</b>
<b>5</b>	<b>MEASUREMENT UNCERTAINTY</b> .....	<b>14</b>
<b>6</b>	<b>CONDUCTED EMISSION TEST</b> .....	<b>15</b>
<b>7</b>	<b>DUTY CYCLE TEST SIGNAL</b> .....	<b>19</b>
<b>8</b>	<b>26dB &amp; 6dB EMISSION BANDWIDTH MEASUREMENT</b> .....	<b>22</b>
<b>9</b>	<b>MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT</b> .....	<b>44</b>
<b>10</b>	<b>PEAK POWER SPECTRAL DENSITY</b> .....	<b>49</b>
<b>11</b>	<b>UNDESIRABLE RADIATED EMISSION MEASUREMENT</b> .....	<b>60</b>
<b>12</b>	<b>TRANSMISSION IN THE ABSENCE OF DATA</b> .....	<b>211</b>
<b>13</b>	<b>FREQUENCY STABILITY</b> .....	<b>212</b>
<b>14</b>	<b>ANTENNA REQUIREMENT</b> .....	<b>230</b>

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# 1 GENERAL INFORMATION

## 1.1 Product Description

### General:

Product Name:	Notebook PC	
Brand Name:	HP	
Model No.:	TPN-Q198	
Model Difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
WLAN & BT Module:	Brand: Qualcomm, Model No: WCN3990	
LTE & GPS Module:	Brand: Qualcomm, Model No: WTR5975	
Power Supply:	11.55Vdc from Rechargeable Li-polymer Battery or 5 / 9 / 10 / 12 / 15 / 20Vdc from AC/DC Adapter	
	Battery:	Model No.: HSTNN-LB8D, Supplier: Chongqing C-Tech Technology Co., Ltd.
	Adapter:	1. Model No.: TPN-DA07, Supplier: DELTA ELECTRONICS (JIANGSU) LTD. 2. Model No.: TPN-LA06, Supplier: LITE-ON TECHNOLOGY (CHANG-ZHOU)CO., LTD.

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**WLAN 5GHz:**

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm)	Modulation Technology
a	5180~5240	4	13.73	OFDM
	5260~5320	4	13.84	
	5500~5700	12	14.00	
	5745~5825	5	14.07	
n_HT ac_VHT 20M	5180~5240	4	HT: 17.07 (Worst case)	OFDM
	5260~5320	4	HT: 17.12 (Worst case)	
	5500~5700	11	HT: 16.84 (Worst case)	
	5745~5825	5	HT: 16.98 (Worst case)	
n_HT ac_VHT 40M	5190~5230	2	HT: 16.78 (Worst case)	OFDM
	5270~5310	2	HT: 16.95 (Worst case)	
	5510~5670	5	HT: 17.08 (Worst case)	
	5755~5795	2	HT: 17.08 (Worst case)	
ac_VHT 80M	5210	1	13.17	OFDM
	5290	1	12.07	
	5530~5610	2	16.85	
	5775	1	17.19	
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only			
Transition Rate:s	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps 802.11 ac_20MHz: 6.5 –173.3Mbps 802.11 ac_40MHz: 13.5 –400.0Mbps 802.11 ac_80MHz: 29.3 – 866.7Mbps			

Vendor	Ant. Type	Main / Aux	Part No.	Freq.(MHz)	Peak Gain (dBi)
INPAQ Corporation	Coupling	Main	DQ6LB020013/ DQ6LB020014 (WA-F-LTE8LBG1LB-02-003 /WA-F-LTE8LBG1LB-02-004)	5150~5250	1.48
				5250~5350	0.90
				5470~5725	-1.29
				5725~5850	-1.45
	Coupling	Aux	DQ6LB020013/ DQ6LB020014 (WA-F-LTE8LBG1LB-02-003 /WA-F-LTE8LBG1LB-02-004)	5150~5250	-2.15
				5250~5350	-1.60
				5470~5725	-0.74
				5725~5850	-0.74

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## 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules

FCC KDB 662911 D01 Multiple Transmitter Output

FCC KDB 644545 D03 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.2, Keji 1st Rd.,  
Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Numbers are: 735305

## 1.4 Special Accessories

There are no special accessories used while test was conducted.

## 1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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## 2 SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

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

### 2.2 EUT Exercise

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

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 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 a 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 Configuration

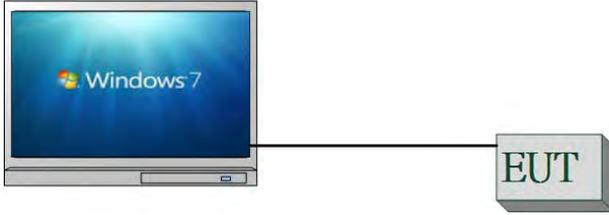


Fig. 2-2 Conducted (Antenna Port) Emission Configuration

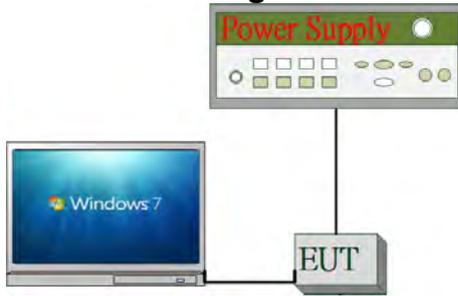


Fig. 2-3 Conducted (AC powerline) Emission Configuration

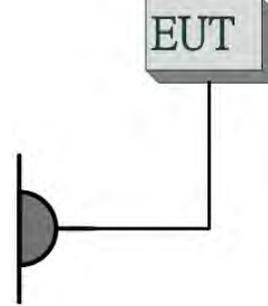


Table 2-1 Equipment Used in Tested System

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.	Notebook	Lenovo	L430	R9-WR6X4	Shielded	Unshielded
3.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	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 & 6dB & 99% Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

### 4.1 Operated in U-NII Bands

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

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

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

802.11ac VHT80 Mode	
channel	Frequency
42	5210

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

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

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

802.11ac VHT80 Mode	
Channel	Frequency
58	5290

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**Operated band in 5500 MHz ~5700 MHz:**

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

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

<b>802.11ac VHT80 Mode</b>	
channel	Frequency
106	5530
122	5610

**Operated band in 5745 MHz ~5850 MHz:**

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

<b>802.11 n HT40 Mode, 802.11ac VHT40 Mode</b>	
channel	Frequency
151	5755
159	5795

<b>802.11ac VHT80 Mode</b>	
channel	Frequency
155	5775

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#### 4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.

#### RADIATED EMISSION TEST:

MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
<b>RADIATED EMISSION TEST (BELOW 1 GHz)</b>						
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Aux
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	Aux
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO
802.11a	5500~5720	100 to 140	100,116,140	OFDM	6	Aux
802.11ac_VHT80	5530~5690	106 to 138	106,122,138	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Aux
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO
<b>RADIATED EMISSION TEST (ABOVE 1 GHz)</b>						
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Aux
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	Aux
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO
802.11a	5500~5720	100 to 144	100,116,140	OFDM	6	Aux
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5510~5710	102 to 142	102,110,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Aux
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO

**Note:** The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/n/ac WLAN Transmitter for channel Low, Mid and High, the worst case E2 position was reported

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**ANTENNA PORT CONDUCTED MEASUREMENT:**

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Aux
802.11n_HT20 802.11ac_VHT20				OFDM	MCS8	MIMO
802.11n_HT40 802.11ac_VHT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	Aux
802.11n_HT20 802.11ac_VHT20				OFDM	MCS8	MIMO
802.11n_HT40 802.11ac_VHT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	Aux
802.11n_HT20 802.11ac_VHT20				OFDM	MCS8	MIMO
802.11n_HT40 802.11ac_VHT40	5510~5670	102 to 134	102,110,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Aux
802.11n_HT20 802.11ac_VHT20				OFDM	MCS8	MIMO
802.11n_HT40 802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO

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## 5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB & 6dB Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Measurement	+/- 0.96 dB
Peak Power Spectral Density Measurement	+/- 1.67 dB
Frequency Stability	+/- 123.36 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

### Radiated Spurious Emission:

Measurement uncertainty (Polarization : <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

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI 7	100950	12/12/2016	12/11/2017
Coaxial Cables	N/A	N30N30-1042-1 50cm	N/A	08/30/2017	08/29/2018
LISN	Schwarzbeck	NSLK 8127	8127-648	06/18/2017	06/17/2018
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

### 6.3. EUT Setup

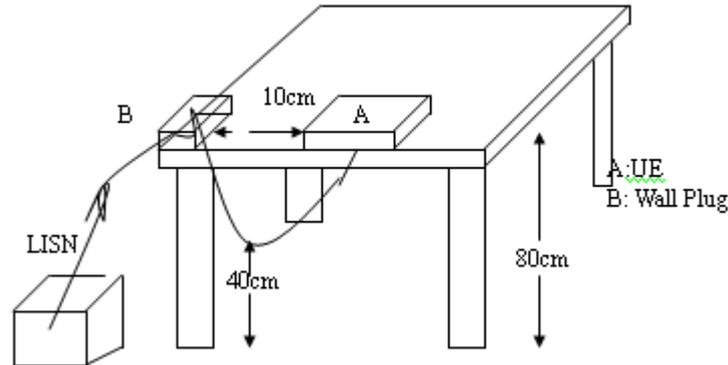
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the table top.
3. The LISN was connected with 120Vac/60Hz 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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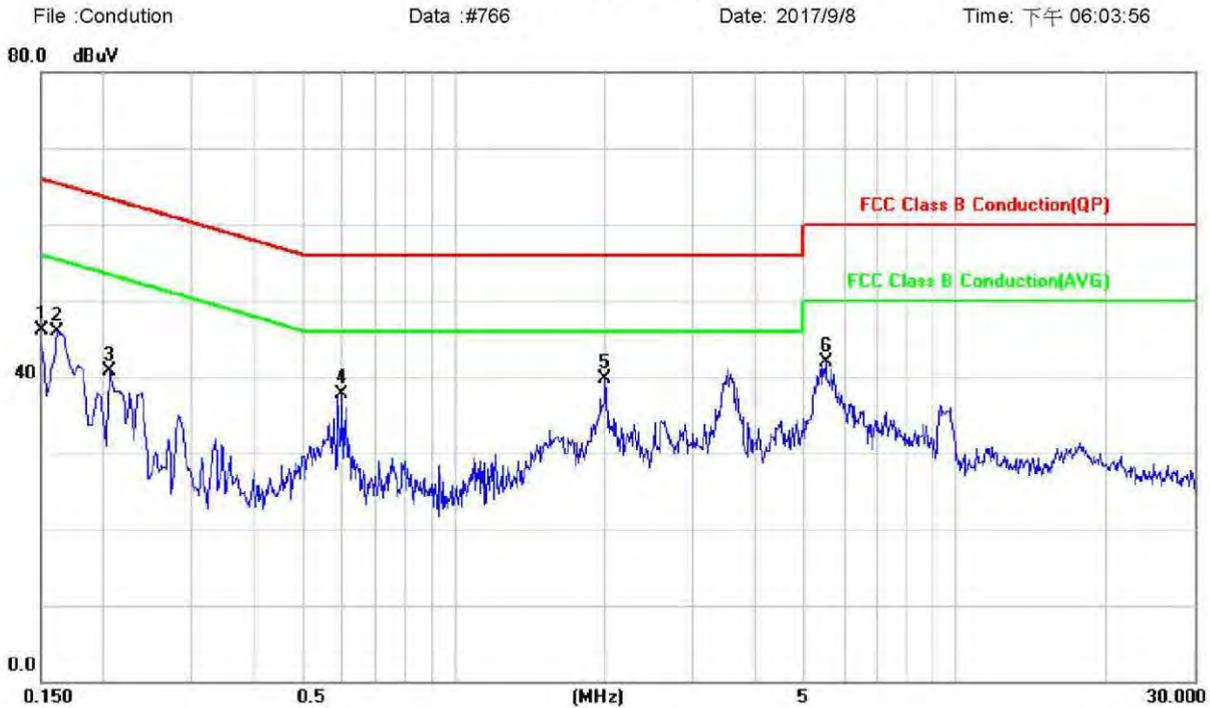
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Site : Conduction Room  
Limit: FCC Class B Conduction(QP)  
Mode:  
Note:

Phase: L1  
Power: AC 120V/60Hz

Temperature: 24 °C  
Humidity: 65 %

### Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1500	26.39	19.65	46.04	66.00	-19.96	peak	
2		0.1620	26.34	19.65	45.99	65.36	-19.37	peak	
3		0.2060	20.98	19.65	40.63	63.37	-22.74	peak	
4		0.5980	17.59	20.08	37.67	56.00	-18.33	peak	
5	*	2.0060	19.19	20.56	39.75	56.00	-16.25	peak	
6		5.5260	21.83	20.09	41.92	60.00	-18.08	peak	

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Site : Conduction Room  
Limit: FCC Class B Conduction(QP)  
Mode:  
Note:

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

Temperature: 24 °C  
Humidity: 65 %

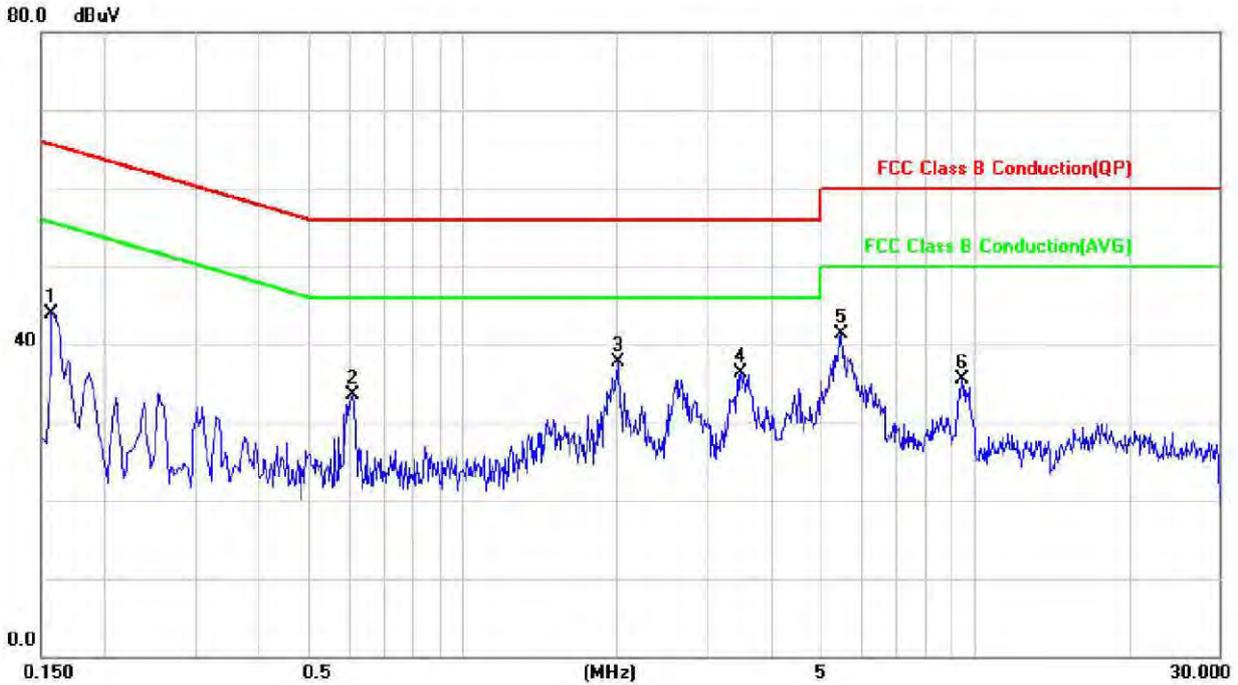
### Conducted Emission

File :Conduction

Data :#767

Date: 2017/9/8

Time: 下午 06:04:43



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1580	24.49	19.50	43.99	65.57	-21.58	peak	
2		0.6100	13.59	19.93	33.52	56.00	-22.48	peak	
3	*	2.0180	17.20	20.42	37.62	56.00	-18.38	peak	
4		3.4980	16.11	20.18	36.29	56.00	-19.71	peak	
5		5.4900	21.37	19.95	41.32	60.00	-18.68	peak	
6		9.4540	15.60	19.94	35.54	60.00	-24.46	peak	

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## 7 DUTY CYCLE TEST SIGNAL

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

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

### Formula:

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

### Measurement Procedure:

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

Duty Cycle:

Mode	Duty Cycle (%)	Duty Factor (dB) =10*log ( 1/Duty Cycle )
802.11a	98.25	0.08
802.11n_20	96.43	0.16
802.11ac_20	96.41	0.16
802.11n_40	96.40	0.16
802.11ac_40	96.23	0.17
802.11ac_80	92.89	0.32

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## DUTY CYCLE TEST SIGNAL Measurement Result 802.11a



## 802.11n HT20



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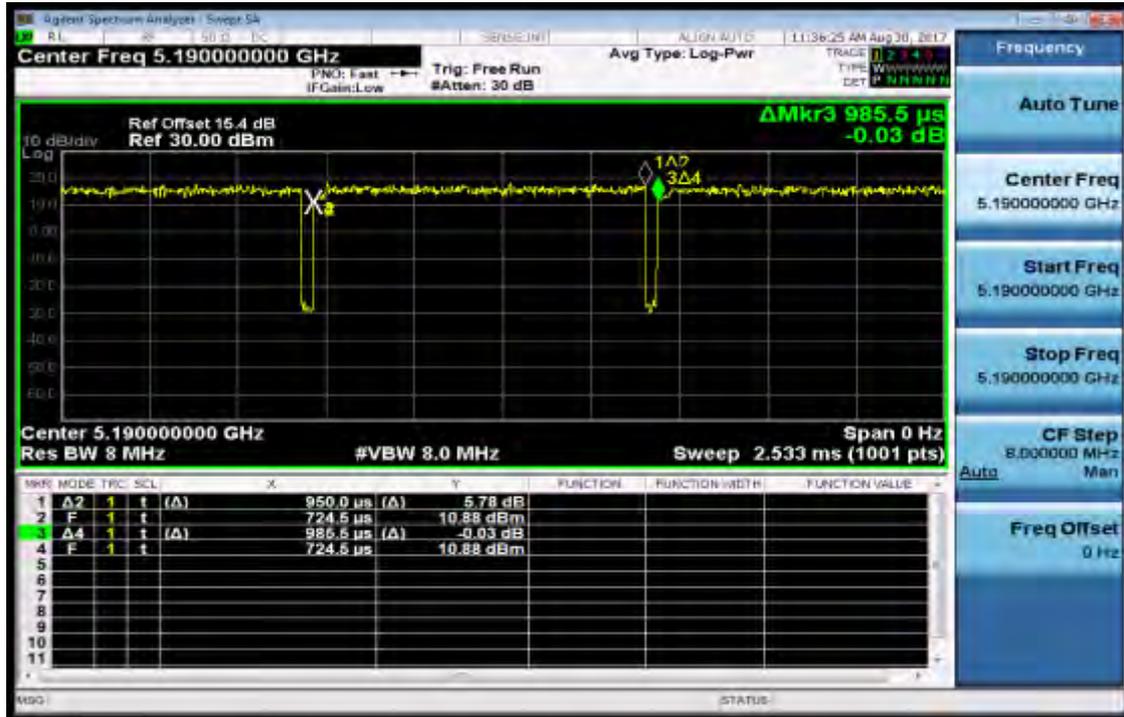
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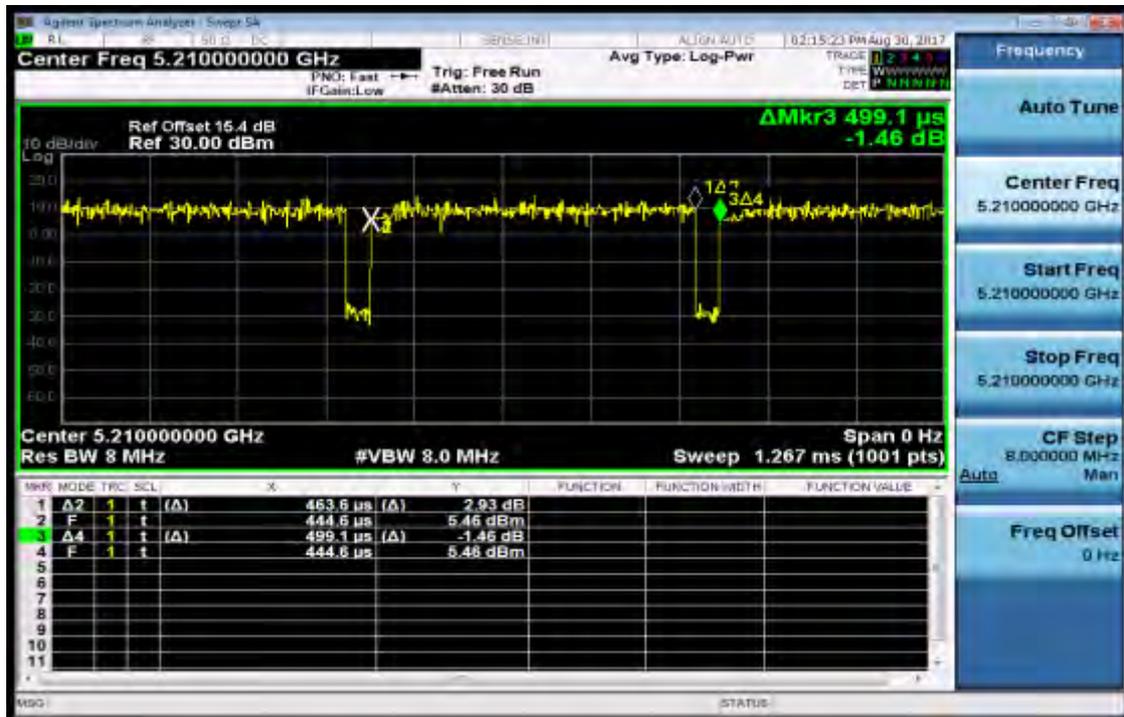
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### 802.11n HT 40



### 802.11 ac VHT 80



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## 8 26DB & 6DB EMISSION BANDWIDTH MEASUREMENT

### 8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.  
The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

### 8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
  - a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
  - b. Mark the peak frequency and -26dB (upper and lower) frequency.
4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
5. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
  - a. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto
  - b. Mark the peak frequency and -6dB (upper and lower) frequency.
6. Repeat above procedures until all test default channel measured were complete.

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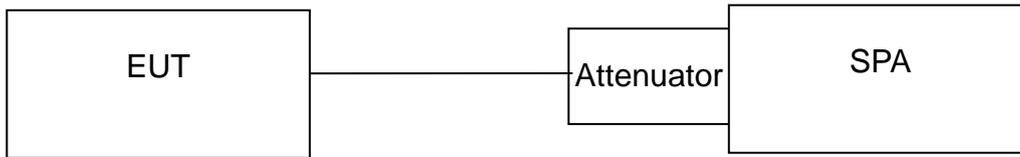
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### 8.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2016	12/11/2017
DC Block	PASTERNAK	PE8210	RF29	12/12/2016	12/11/2017
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018

### 8.4 Test Set-up



### 8.5 Measurement Result

#### 26dB Bandwidth

802.11a\_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.99	13.421
5220	21.31	13.286
5240	21.96	13.416
5260	21.30	13.283
5300	21.29	13.282
5320	21.30	13.284
5500	21.02	13.226
5580	21.08	13.239
5700	21.34	13.292

802.11a\_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.30	13.284
5220	21.30	13.284
5240	21.58	13.341
5260	21.34	13.292
5300	22.23	13.469
5320	21.31	13.286
5500	21.98	13.421
5580	21.97	13.419
5700	21.32	13.288

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802.11n\_HT20\_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.99	13.221
5220	22.39	13.501
5240	23.02	13.620
5260	23.44	13.700
5300	21.91	13.407
5320	21.68	13.361
5500	21.82	13.389
5580	22.90	13.598
5700	21.90	13.403

802.11n\_HT20\_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.77	13.573
5220	22.17	13.458
5240	22.57	13.536
5260	23.51	13.713
5300	22.36	13.494
5320	22.87	13.592
5500	21.26	13.275
5580	22.85	13.589
5700	22.16	13.456

802.11n\_HT40\_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.85	16.111
5230	40.47	16.071
5270	41.11	16.140
5310	41.03	16.131
5510	40.84	16.111
5550	<b>41.01</b>	16.129
5670	41.01	16.129

802.11n\_HT40\_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	41.42	16.172
5230	40.02	16.023
5270	40.35	16.058
5310	40.59	16.084
5510	40.06	16.027
5550	40.92	16.120
5670	40.43	16.067

802.11ac\_VHT80\_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	82.84	19.182
5290	83.94	19.240
5530	83.03	19.192
5610	82.75	19.178

802.11ac\_VHT80\_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	82.10	19.144
5290	82.53	19.166
5530	82.34	19.156
5610	82.43	19.161

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**6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC**
**802.11a\_Main**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.83	11.993
5785	16.34	12.133
5825	14.92	11.738

**802.11a\_Aux1**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.41	11.877
5785	14.49	11.611
5825	16.31	12.123

**802.11n\_HT20\_Main**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.62	11.936
5785	15.10	11.789
5825	16.29	12.119

**802.11n\_HT20\_Aux1**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.22	12.361
5785	16.28	12.116
5825	15.07	11.781

**802.11n\_HT40\_Main**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	35.11	15.454
5795	35.75	15.533

**802.11n\_HT40\_Aux1**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	33.82	15.292
5795	35.13	15.456

**802.11ac\_VHT80\_Main**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	75.30	18.768

**802.11ac\_VHT80\_Aux1**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	72.72	18.617

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## 99% BW to prove that all signals in band I is no over band I

## 802.11a\_Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.31	< 5250

## 802.11a\_Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.22	< 5250

## 802.11n\_HT20\_Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.88	< 5250

## 802.11n\_HT20\_Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.88	< 5250

## 802.11n\_HT40\_Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.15	< 5250

## 802.11n\_HT40\_Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.15	< 5250

## 802.11ac\_VHT80\_Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5248.00	< 5250

## 802.11n\_HT80\_Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5248.00	< 5250

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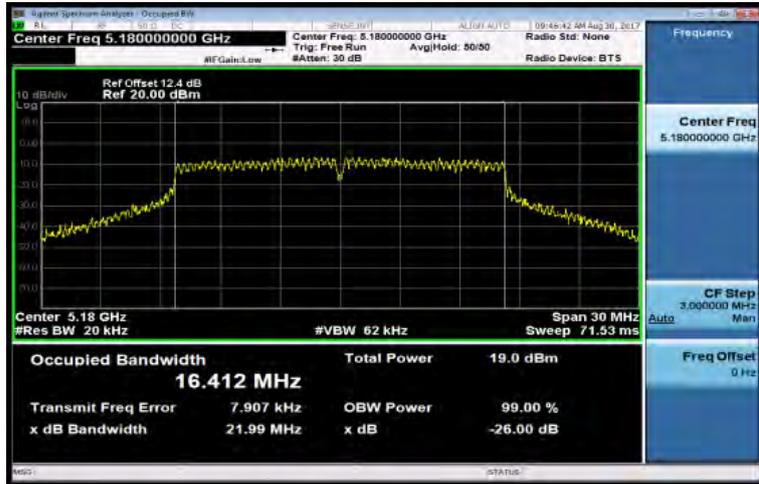
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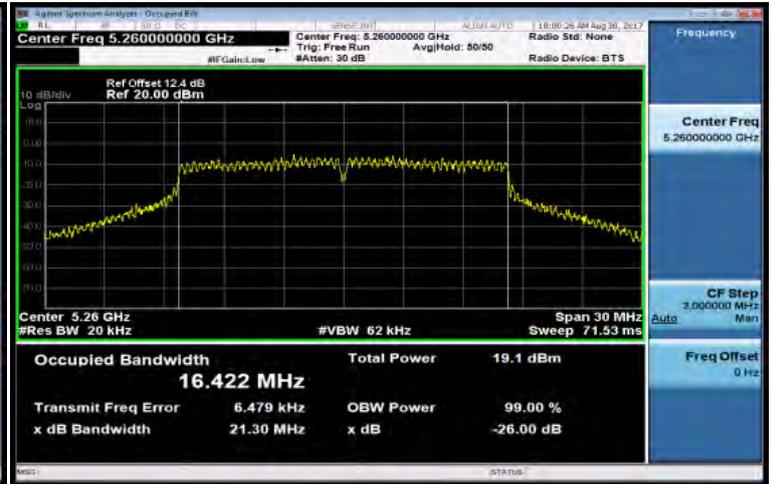
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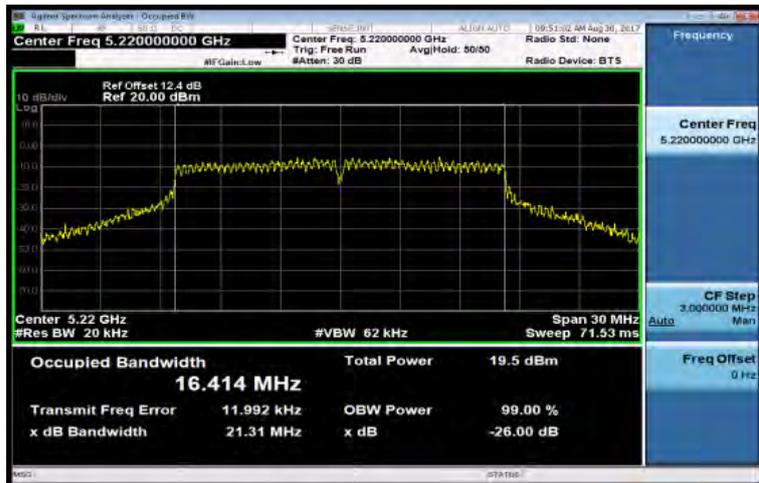
802.11a (Main) 5180MHz



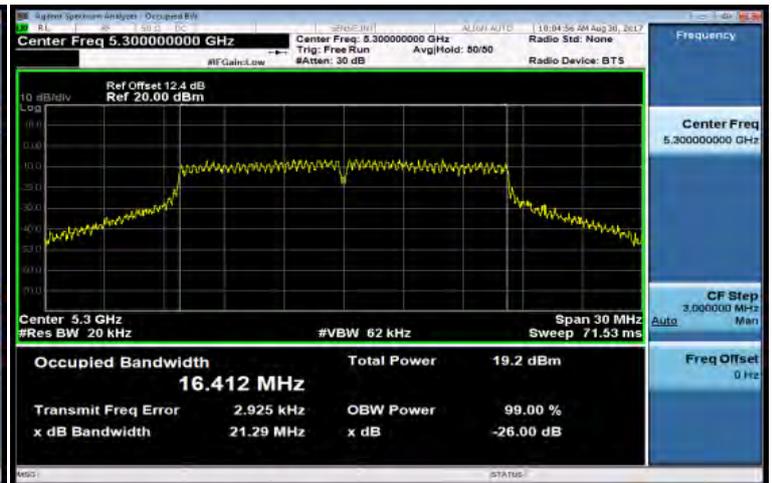
5260MHz



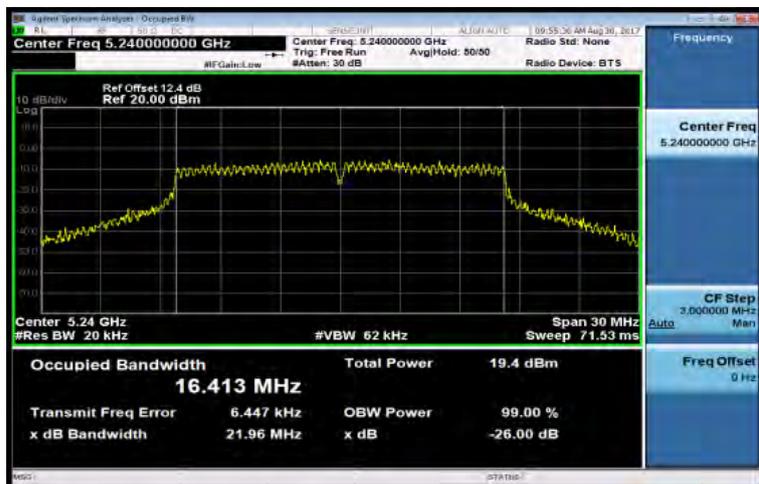
5220MHz



5300MHz



5240MHz



5320MHz

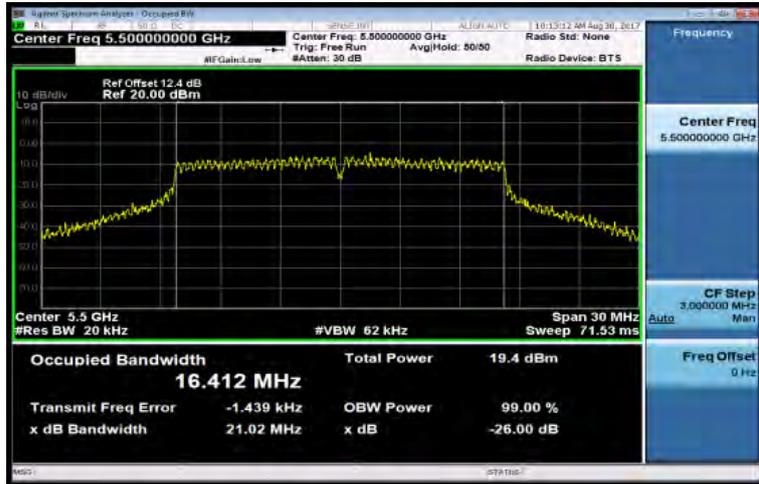


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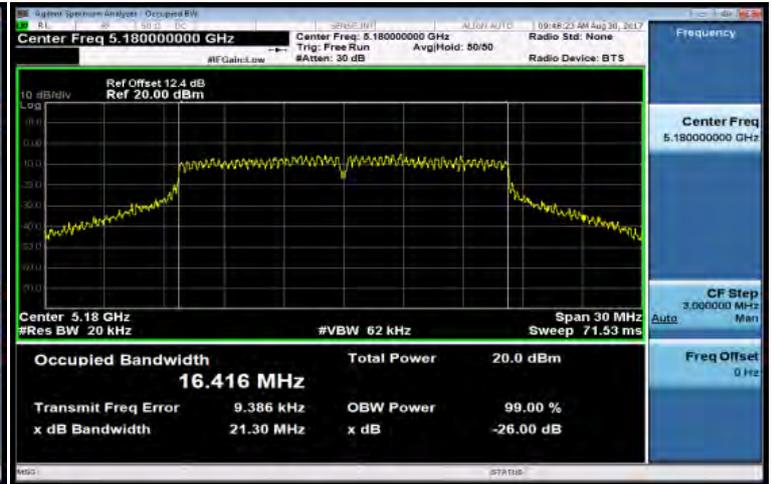
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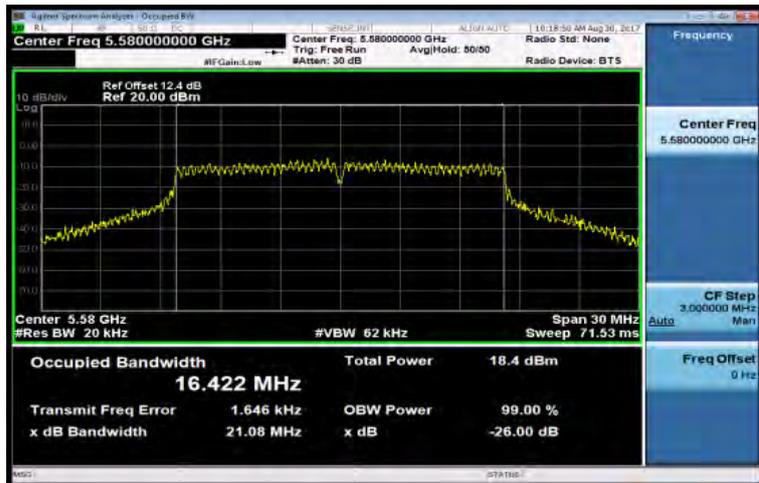
5500MHz



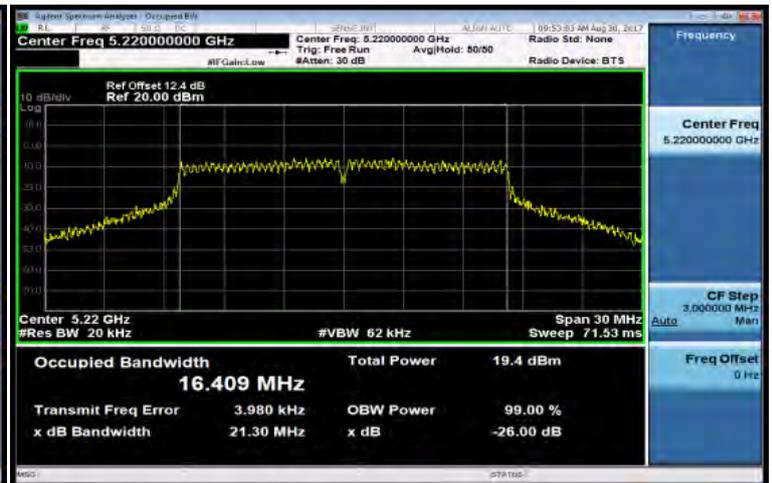
802.11a (Aux1) 5180MHz



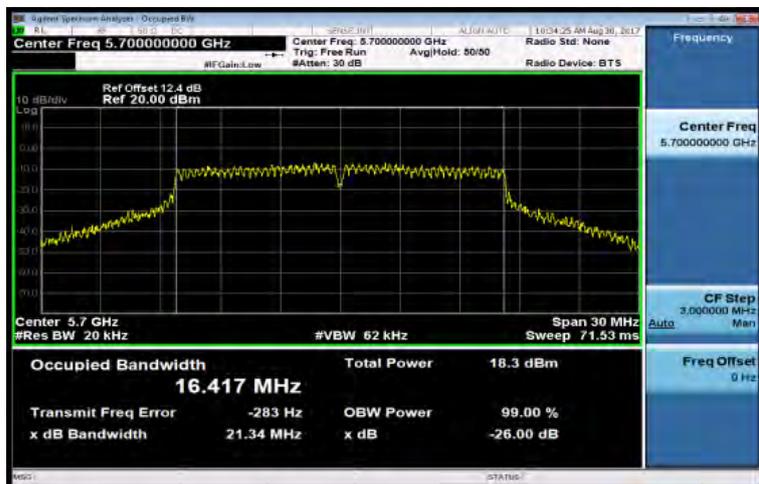
5580MHz



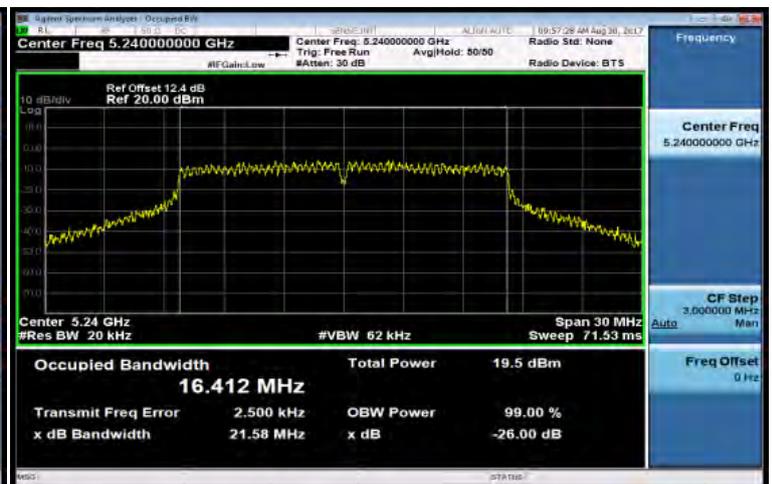
5220MHz



5700MHz



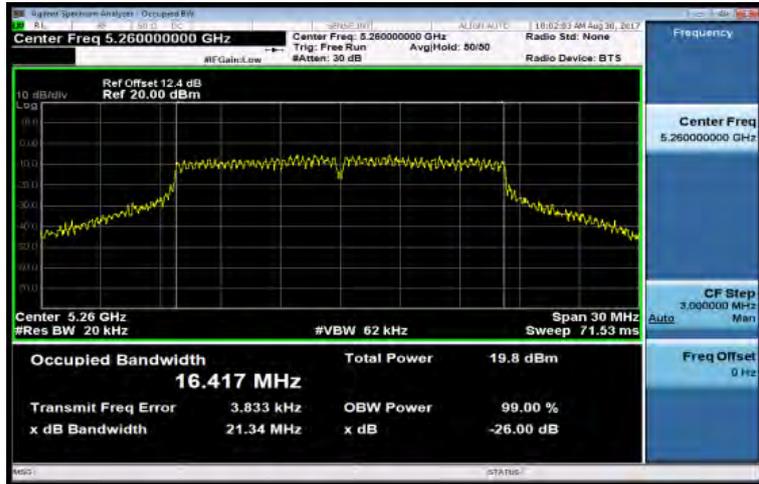
5240MHz



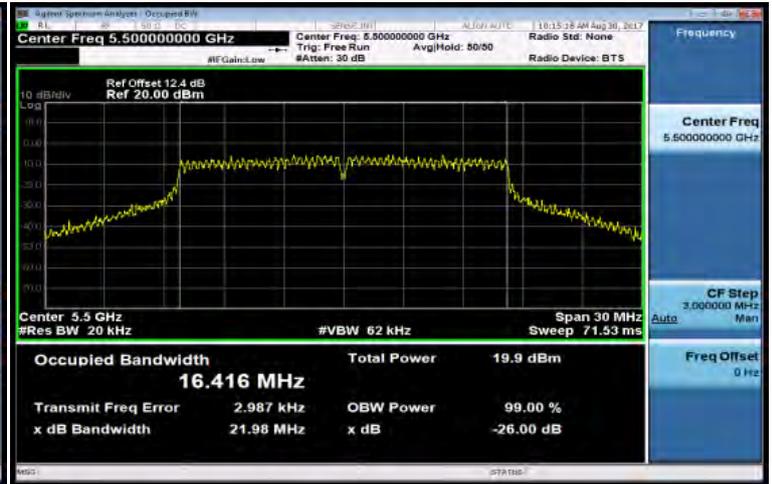
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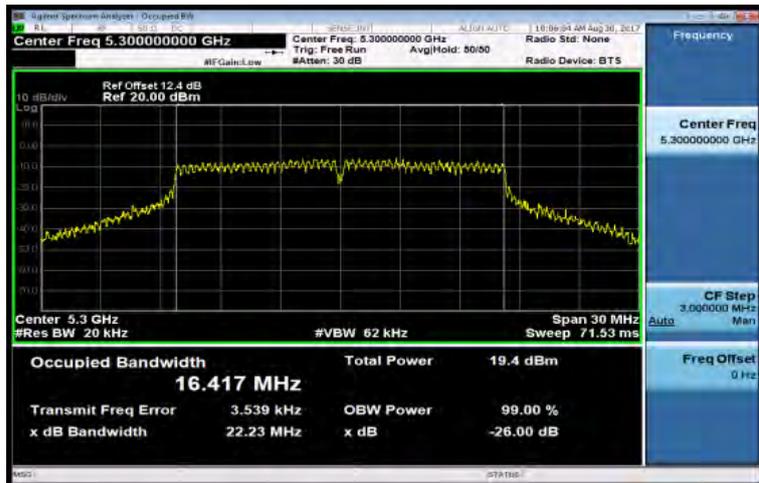
5260MHz



5500MHz



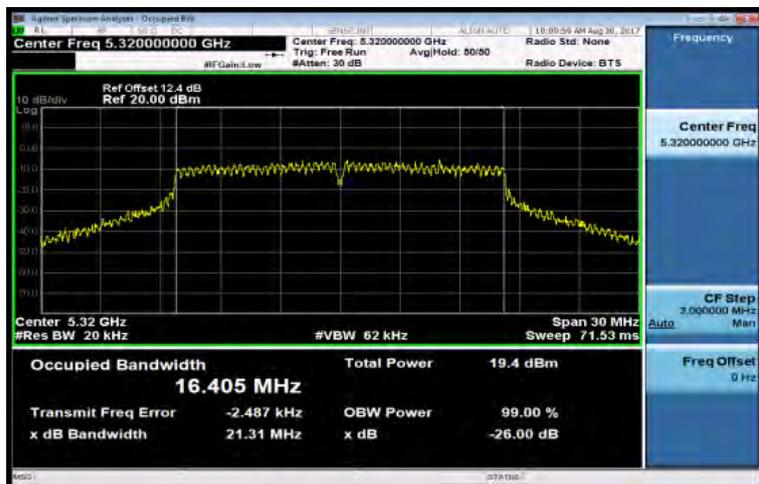
5300MHz



5580MHz



5320MHz



5700MHz

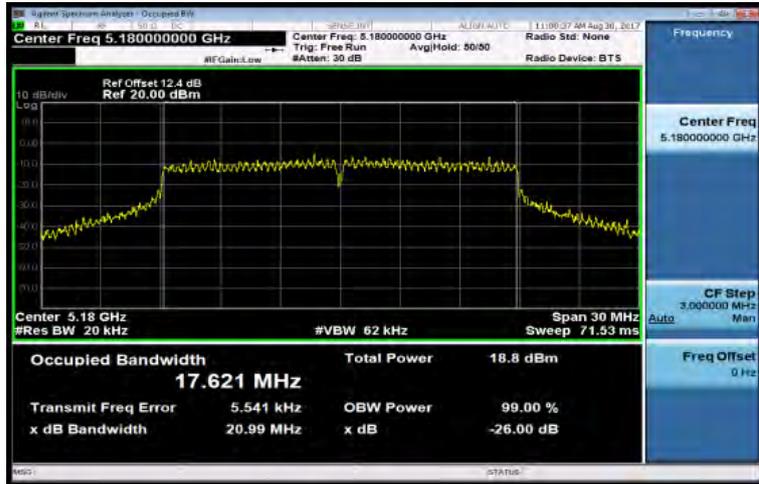


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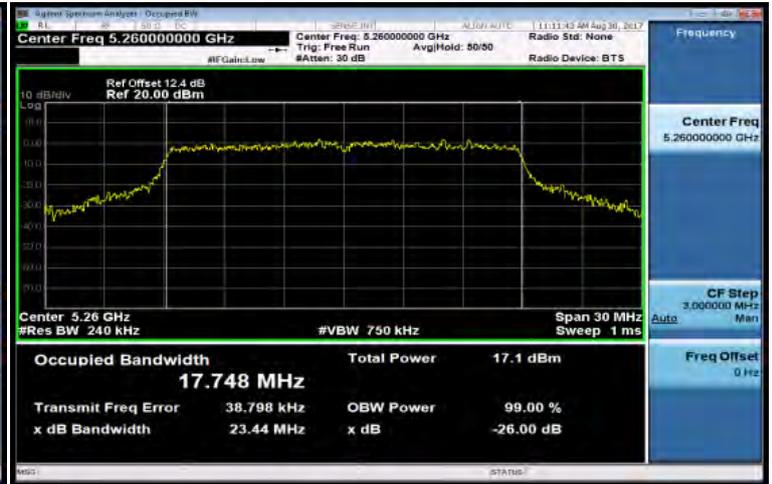
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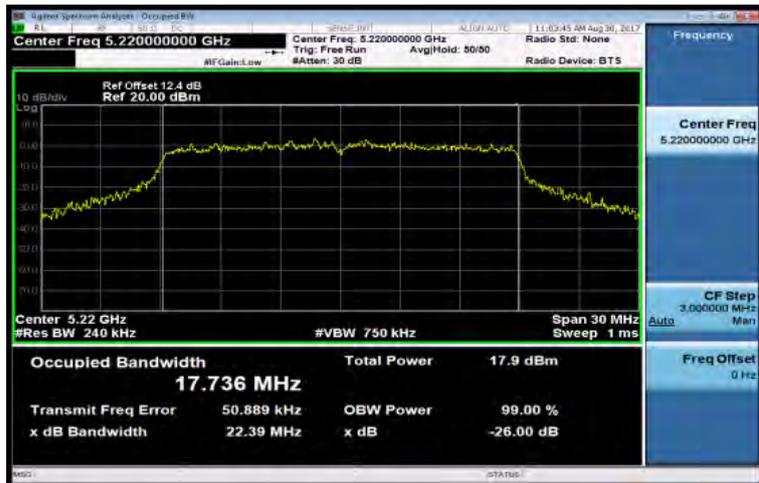
802.11n HT20 (Main) 5180 MHz



5260 MHz



5220 MHz



5300 MHz



5240 MHz



5320 MHz

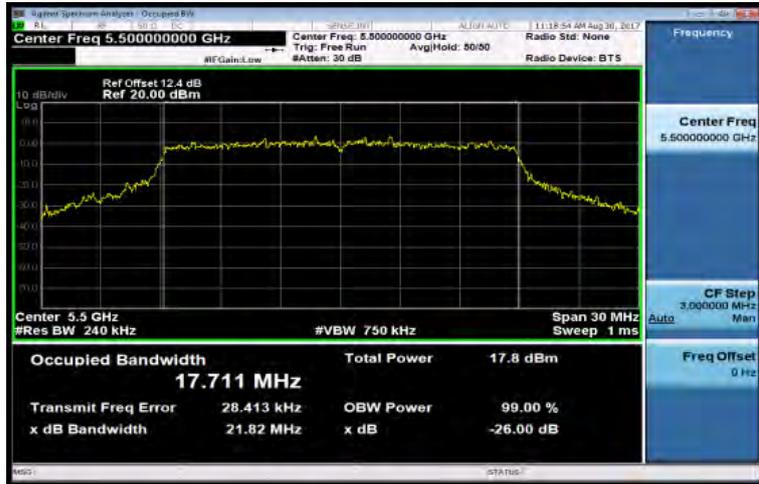


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5500 MHz



802.11n HT20 (Aux1) 5180 MHz



5580 MHz



5220 MHz



5700 MHz



5240 MHz



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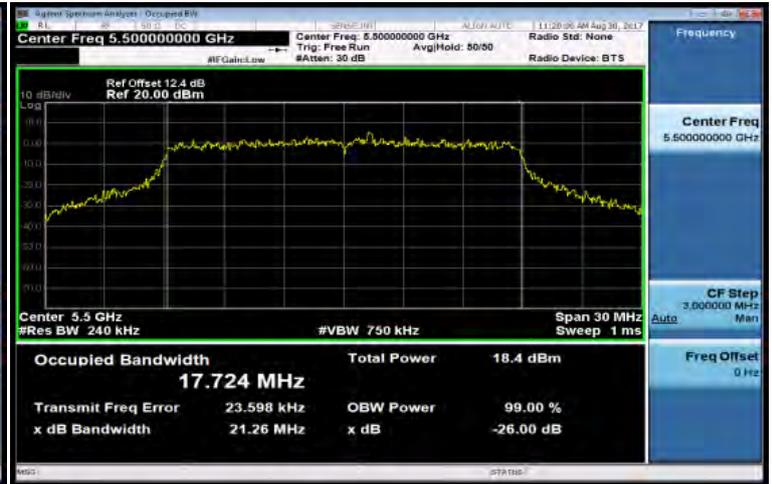
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5260 MHz



5500 MHz



5300 MHz



5580 MHz



5320 MHz



5700 MHz

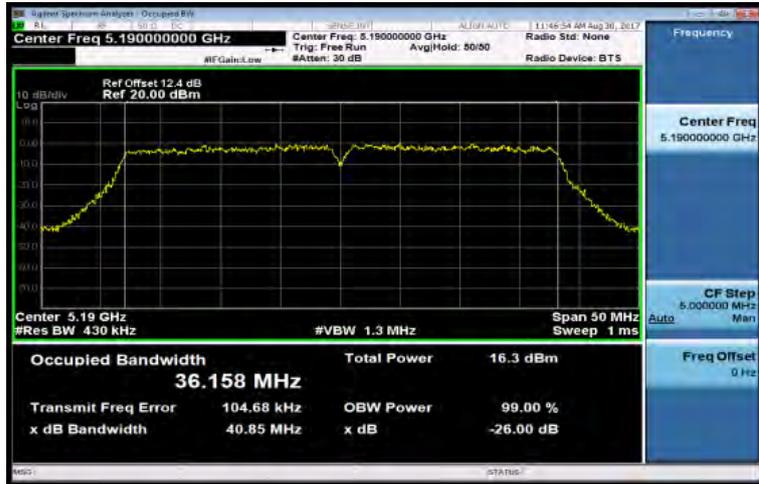


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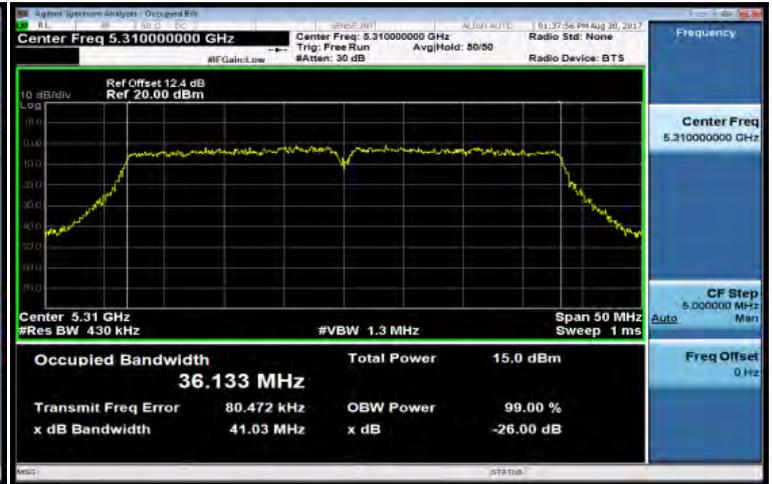
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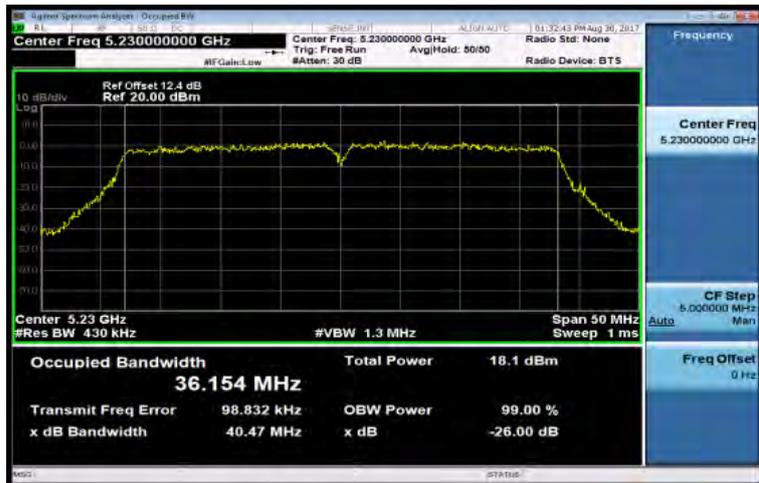
802.11n HT40 (Main) 5190 MHz



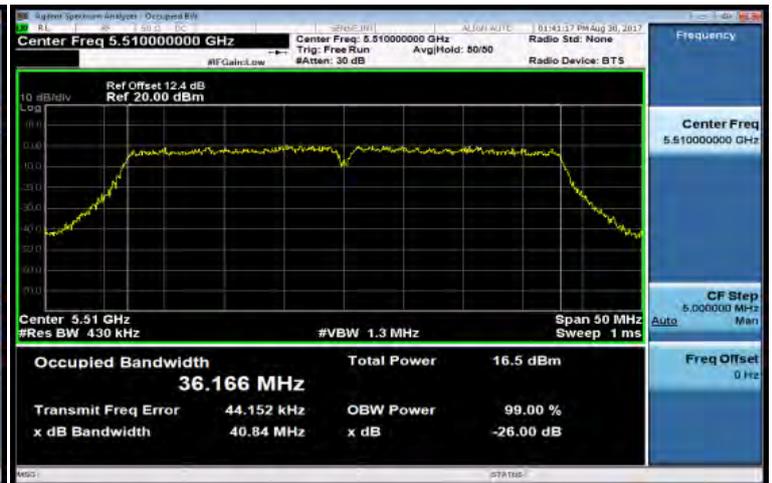
5310MHz



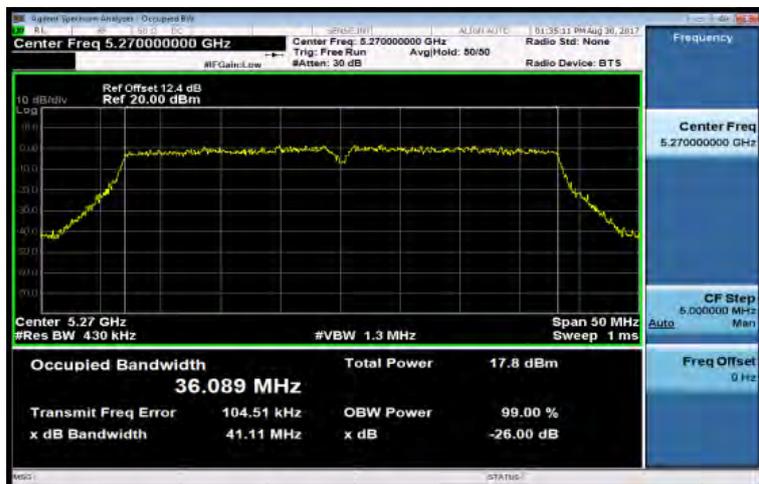
5230 MHz



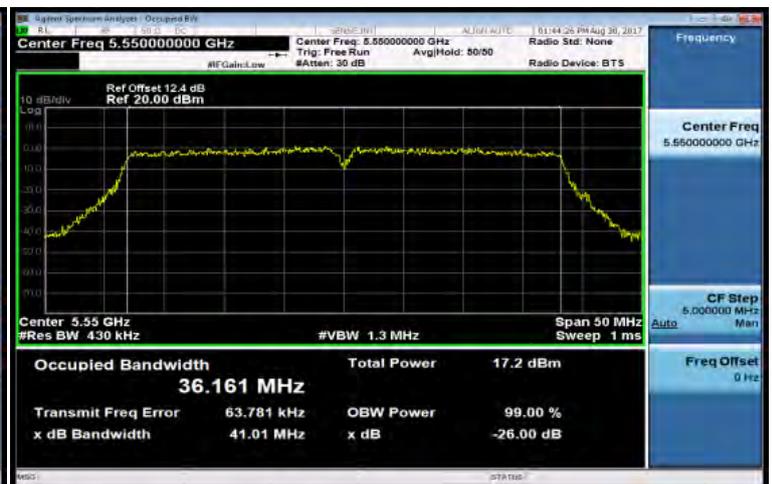
5510 MHz



5270 MHz



5550 MHz

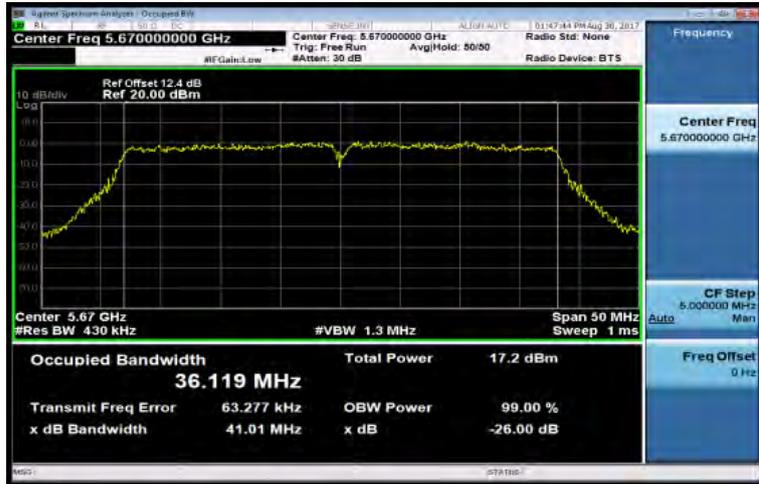


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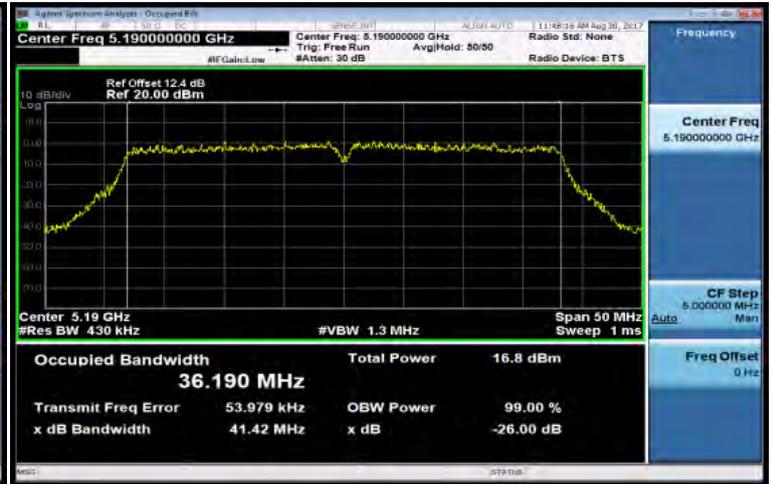
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5670 MHz



802.11n HT40 (Aux1) 5190 MHz



5230 MHz



5270 MHz

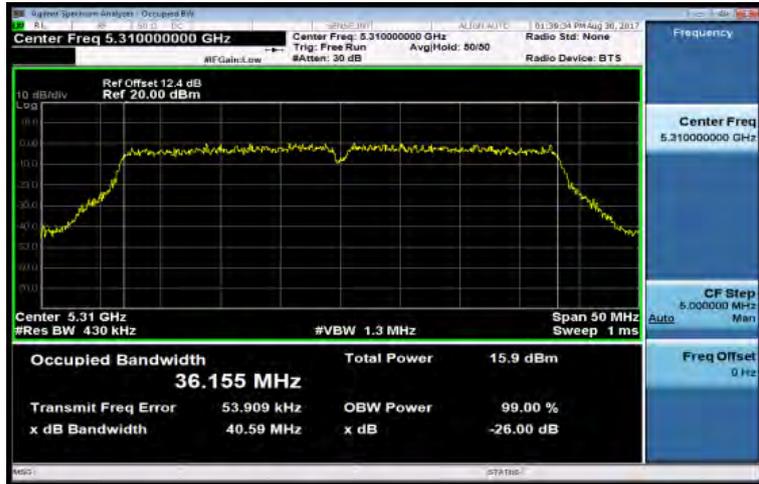


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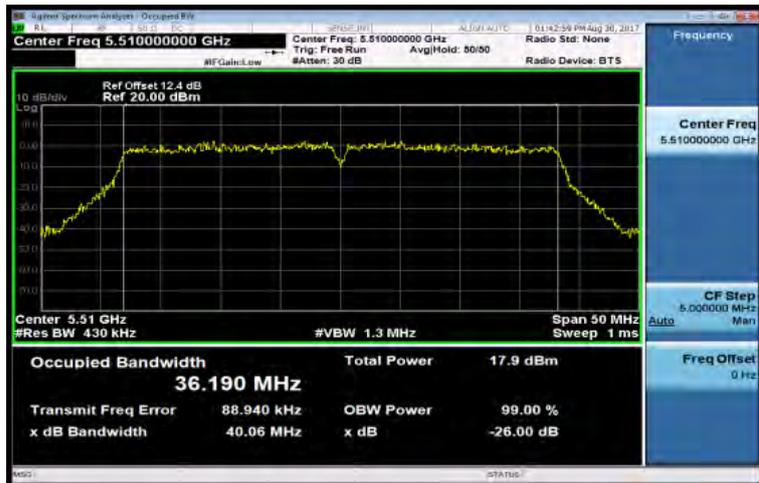
5310MHz



5670 MHz



5510 MHz



5550 MHz



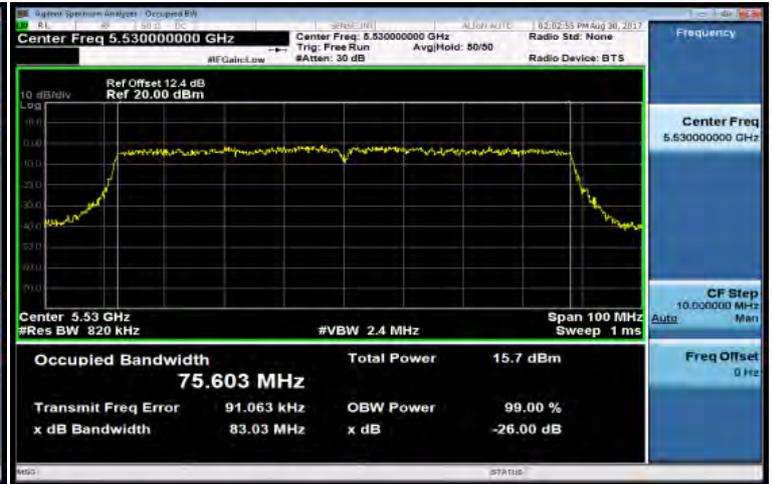
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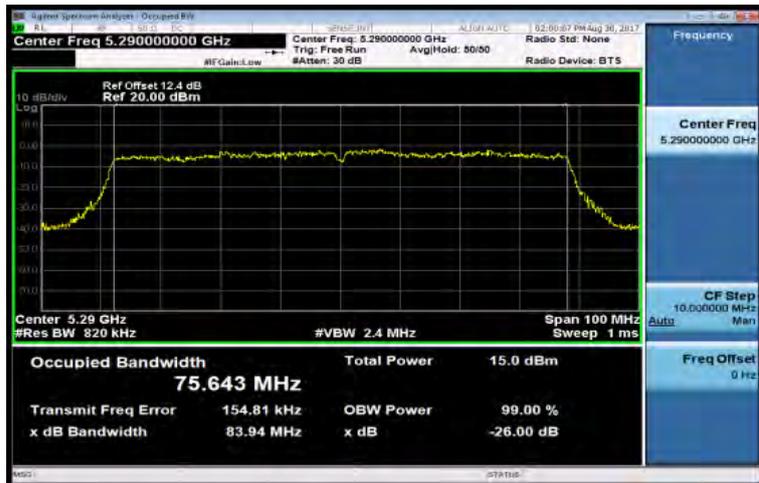
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802.11ac VHT80 (Main) 5210 MHz

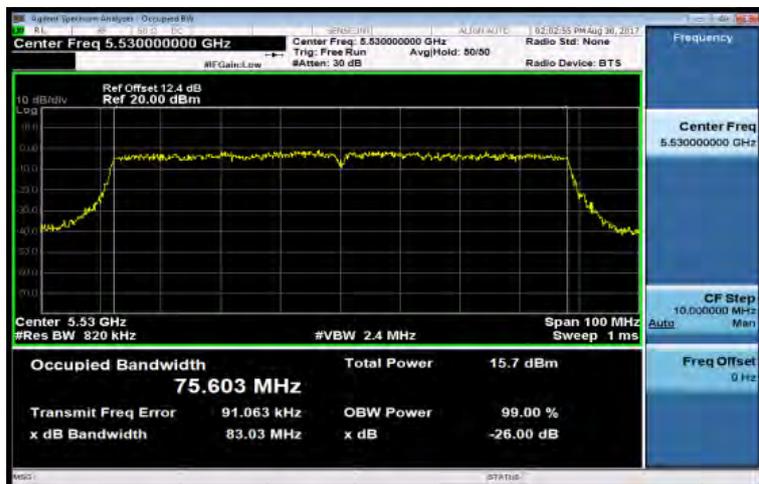
5610 MHz



5290 MHz



5530 MHz



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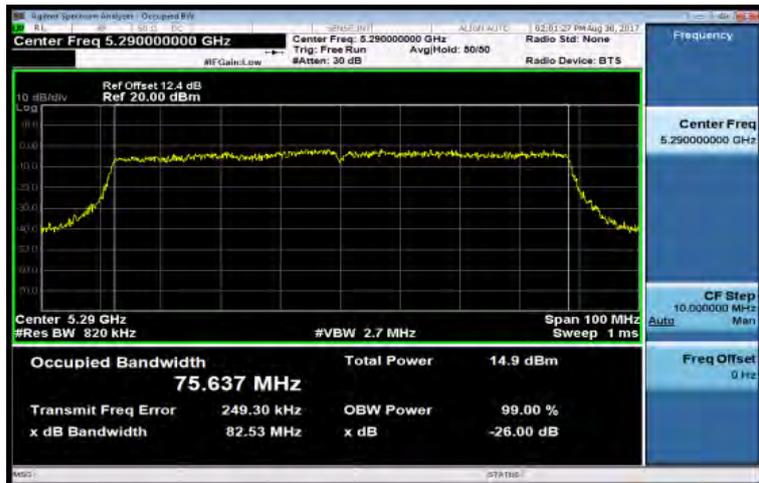
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802.11ac VHT80 (Aux1) 5210 MHz

5610 MHz



5290 MHz



5530 MHz

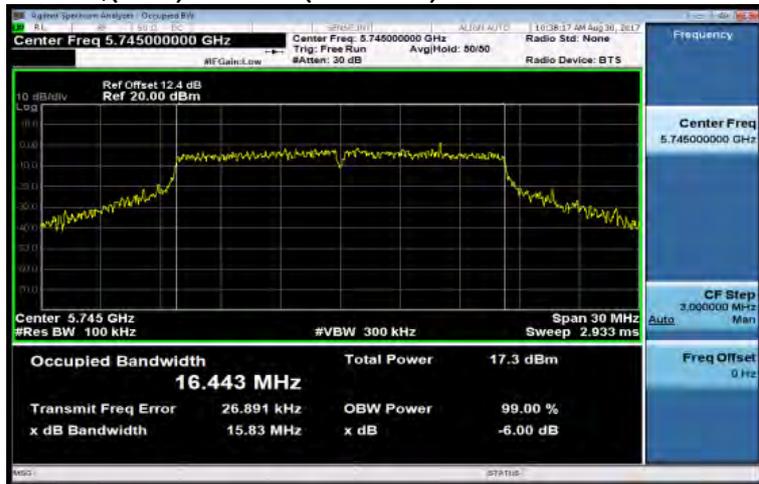


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6dB Band Width measure with Peak detector for FCC  
802.11a,(Main) 6dB BW (5745 MHz)



6dB BW (5785 MHz)



6dB BW (5825 MHz)



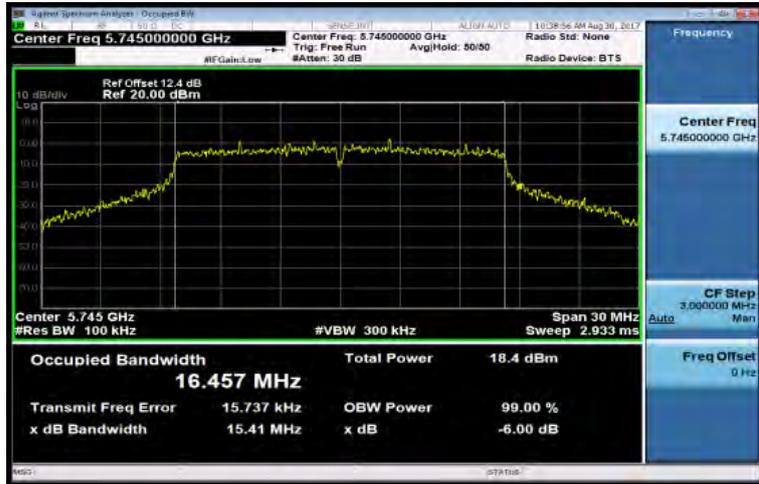
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802.11a,(Aux1) 6dB BW (5745 MHz)

802.11n\_HT20,(Main) 6dB BW (5745 MHz)



6dB BW (5785 MHz)

6dB BW (5785 MHz)



6dB BW (5825 MHz)

6dB BW (5825 MHz)



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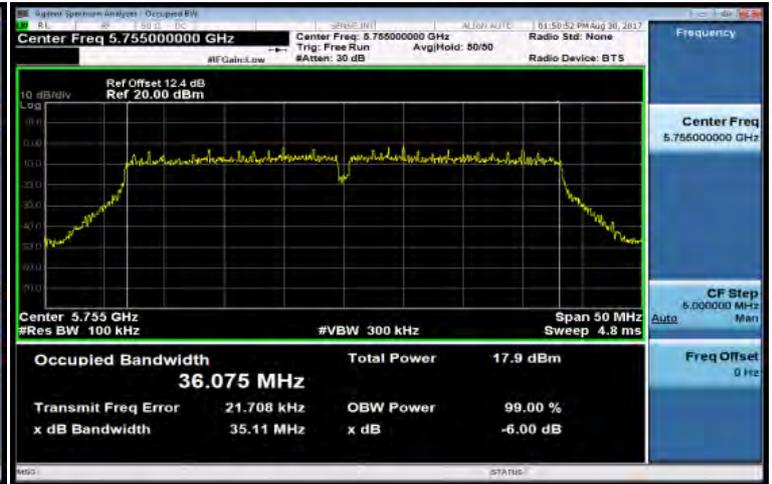
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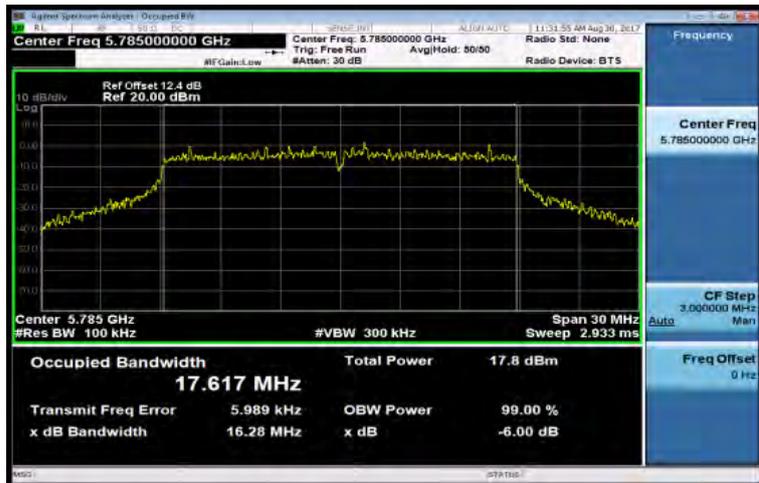
802.11n\_HT20,(Aux1) 6dB BW (5745 MHz)



802.11n\_HT40,(Main) 6dB BW (5755 MHz)



6dB BW (5785 MHz)



6dB BW (5795 MHz)



6dB BW (5825 MHz)

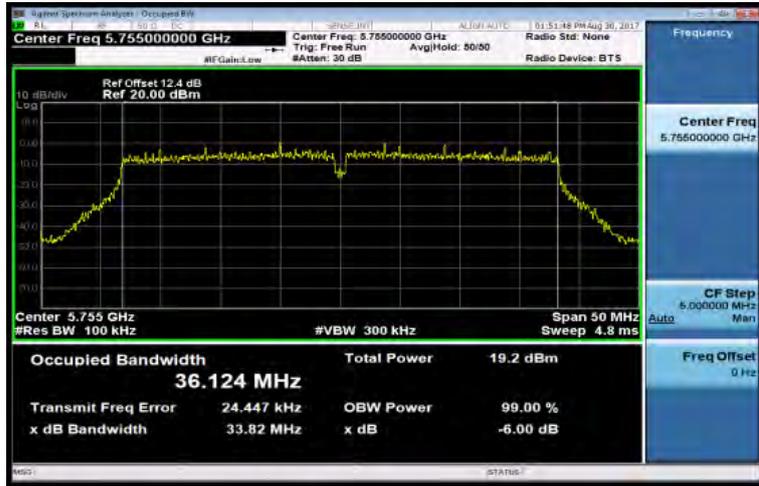


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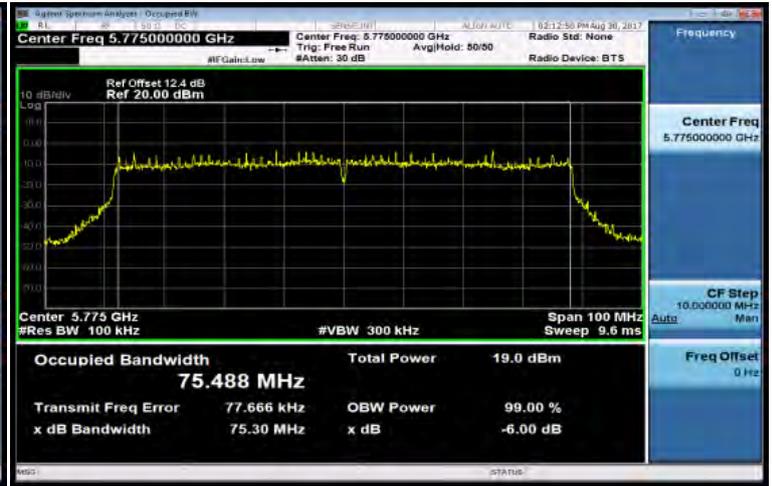
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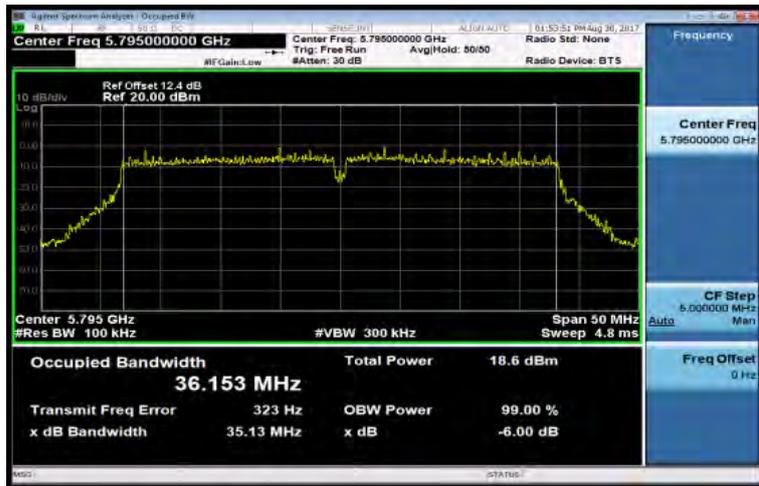
802.11n\_HT40,(Aux1) 6dB BW (5755 MHz)



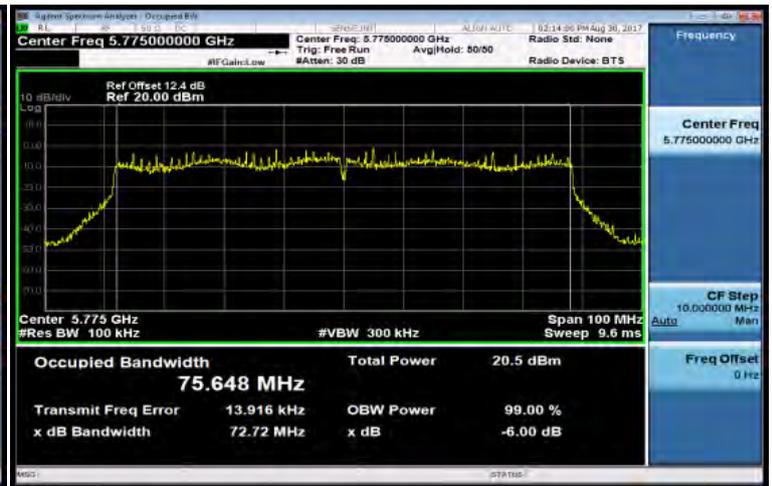
802.11ac VHT80,(Main) 6dB BW (5775 MHz)



6dB BW (5795 MHz)



802.11ac VHT80,(Aux1) 6dB BW (5775 MHz)

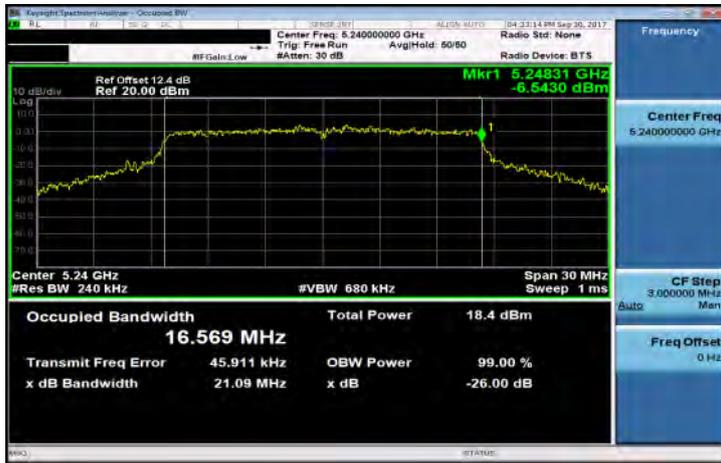


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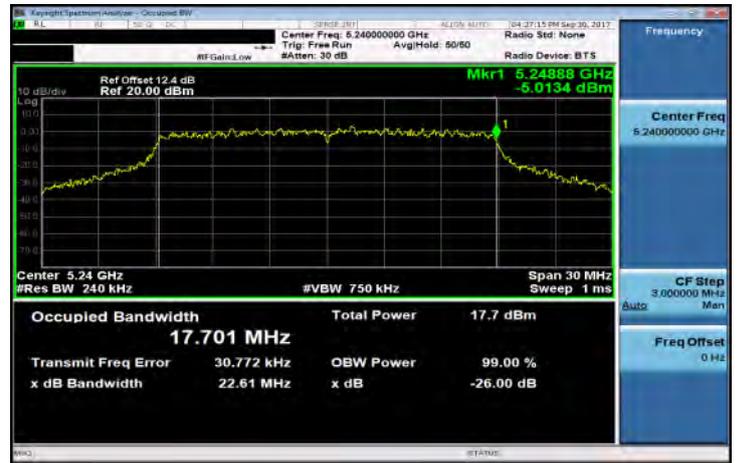
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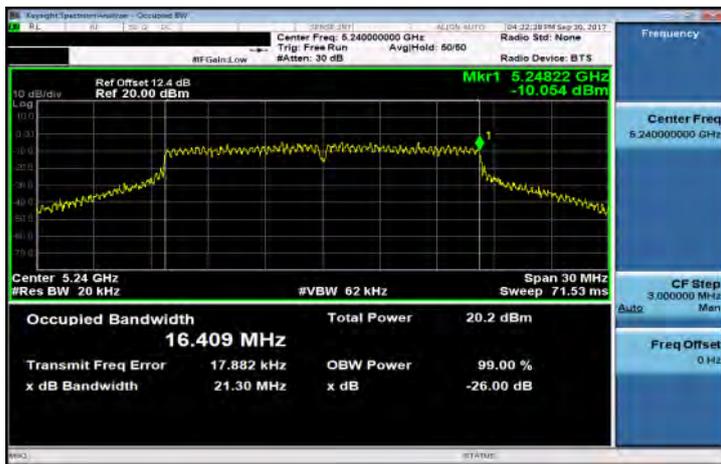
99% BW to prove that all signals in band I is no over band I  
802.11a\_5240MHz (Main)



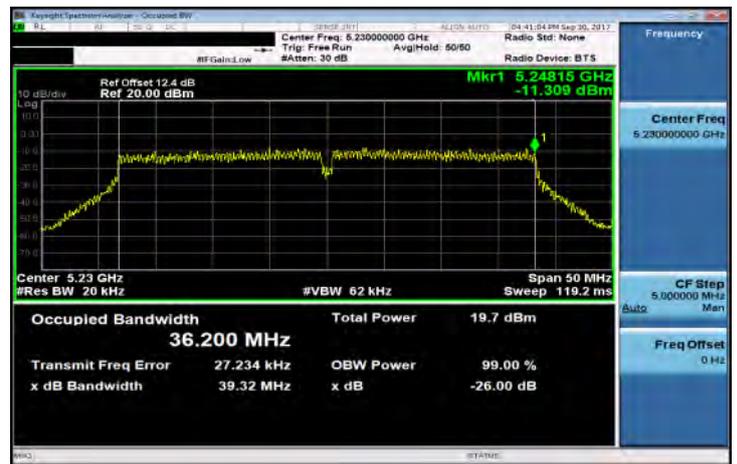
802.11n\_20MHz\_5240MHz (Aux)



802.11a\_5240MHz (Aux)



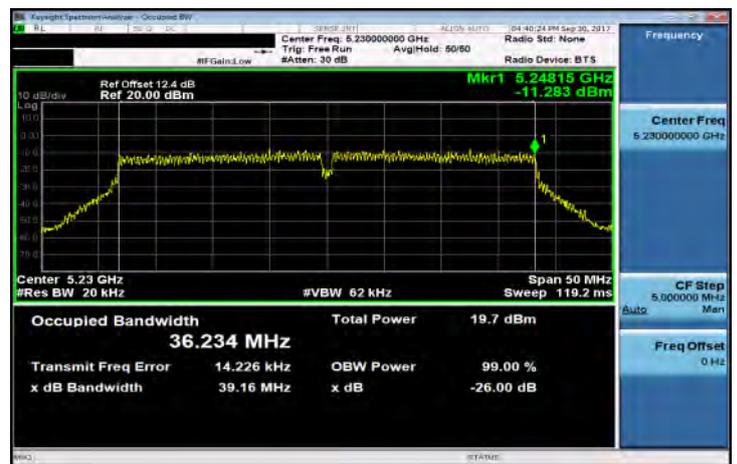
802.11n\_40MHz\_5230MHz (Main)



802.11n\_20MHz\_5240MHz (Main)



802.11n\_40MHz\_5230MHz (Aux)



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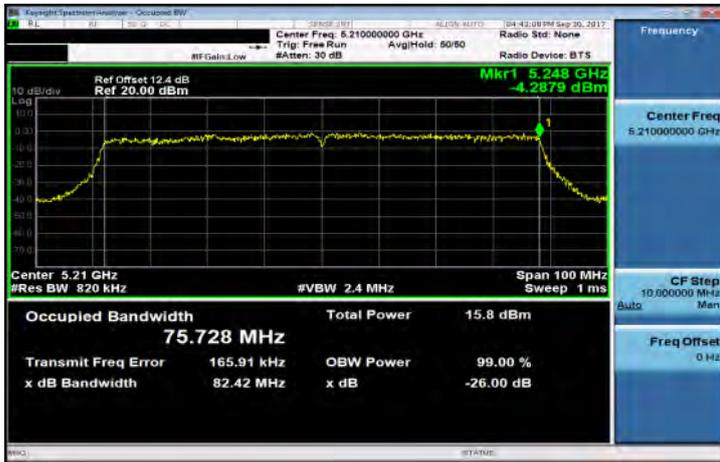
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802.11n\_80MHz\_5210MHz (Main)



802.11n\_80MHz\_5210MHz (Aux)



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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 Access 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 peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the direction-al gain of the antenna exceeds 6 dBi.

**Note:**

The antenna gain is granter than 6 dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

	Effective Legacy Gain (dBi)	Limit
UNII-1	1.48+3.01=4.49dBi	23.98dBm
UNII-2A	0.90+3.01=3.91dBi	23.98dBm
U-NII-2C	-0.74+3.01=2.27dBi	23.98dBm
U-NII-3	-0.74+3.01=2.27dBi	30 dBm

Therefore the limit no needs to reduce for the UNII-1, U-NII-2A, U-NII-2C and U-NII-3 band.

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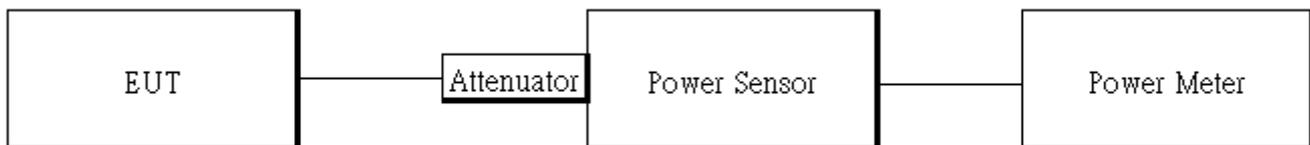
## 9.2 Measurement Procedure

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

SGS Conducted Room					
Name of Equip-ment	Manufacturer	Model	Serial Num-ber	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2496A	1326001	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315048	06/23/2017	06/22/2018
Power Sensor	Anritsu	MA2411B	1315049	06/23/2017	06/22/2018
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2016	12/11/2017
DC Block	PASTERNAK	PE8210	RF29	12/12/2016	12/11/2017
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017
DC Power Sup-ply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018

## 9.4 Test Set-up



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## 9.5 Measurement Result

## Conducted output power (FCC)

## 802.11a\_Main

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	13.40	21.861	23.98	PASS
44	5220	6	13.39	21.811	23.98	PASS
48	5240	6	13.27	21.216	23.98	PASS
52	5260	6	13.62	22.997	23.98 or $11+10\log(B) = 24.28$	PASS
60	5300	6	13.41	21.911	23.98 or $11+10\log(B) = 24.28$	PASS
64	5320	6	13.33	21.511	23.98 or $11+10\log(B) = 24.28$	PASS
100	5500	6	13.50	22.370	23.98 or $11+10\log(B) = 24.23$	PASS
116	5580	6	13.41	21.911	23.98 or $11+10\log(B) = 24.24$	PASS
140	5700	6	13.68	23.317	23.98 or $11+10\log(B) = 24.29$	PASS
149	5745	6	13.80	23.970	30	PASS
157	5785	6	13.29	21.314	30	PASS
165	5825	6	13.80	23.970	30	PASS

## 802.11a\_Aux1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	13.73	23.587	23.98	PASS
44	5220	6	13.67	23.263	23.98	PASS
48	5240	6	13.65	23.156	23.98	PASS
52	5260	6	13.84	24.192	23.98 or $11+10\log(B) = 24.29$	PASS
60	5300	6	13.69	23.370	23.98 or $11+10\log(B) = 24.47$	PASS
64	5320	6	13.61	22.944	23.98 or $11+10\log(B) = 24.29$	PASS
100	5500	6	13.85	24.248	23.98 or $11+10\log(B) = 24.42$	PASS
116	5580	6	13.64	23.103	23.98 or $11+10\log(B) = 24.42$	PASS
140	5700	6	14.00	25.100	23.98 or $11+10\log(B) = 24.29$	PASS
149	5745	6	14.07	25.507	30	PASS
157	5785	6	13.59	22.838	30	PASS
165	5825	6	13.96	24.870	30	PASS

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## 802.11n\_HT20\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)		RESULT
			CH 0	CH 1					
36	5180	MCS8	13.46	13.64	16.72	45.303		23.98	PASS
44	5220	MCS8	14.13	13.66	<b>17.07</b>	49.109		23.98	PASS
48	5240	MCS8	14.04	13.71	17.05	48.848		23.98	PASS
52	5260	MCS8	14.11	13.78	<b>17.12</b>	49.641	23.98	or $11+10\log(B) = 24.70$	PASS
60	5300	MCS8	13.79	13.29	16.72	45.264	23.98	or $11+10\log(B) = 24.41$	PASS
64	5320	MCS8	13.86	13.46	16.83	46.504	23.98	or $11+10\log(B) = 24.36$	PASS
100	5500	MCS8	13.79	13.5	16.82	46.320	23.98	or $11+10\log(B) = 24.27$	PASS
116	5580	MCS8	13.65	13.69	<b>16.84</b>	46.562	23.98	or $11+10\log(B) = 24.59$	PASS
140	5700	MCS8	13.51	13.58	16.71	45.242	23.98	or $11+10\log(B) = 24.40$	PASS
149	5745	MCS8	14.17	13.43	<b>16.98</b>	48.151		30	PASS
157	5785	MCS8	13.87	13.47	16.84	46.611		30	PASS
165	5825	MCS8	13.84	13.56	16.87	46.909		30	PASS

## 802.11n\_HT40\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)		RESULT
			CH 0	CH 1					
38	5190	MCS8	11.77	11.55	14.83	29.320		23.98	PASS
46	5230	MCS8	13.87	13.34	<b>16.78</b>	45.956		23.98	PASS
54	5270	MCS8	13.84	13.73	<b>16.95</b>	47.815	23.98	or $11+10\log(B) = 27.06$	PASS
62	5310	MCS8	11.13	10.75	14.11	24.857	23.98	or $11+10\log(B) = 27.08$	PASS
102	5510	MCS8	13.06	12.77	16.09	39.154	23.98	or $11+10\log(B) = 27.03$	PASS
110	5550	MCS8	14.07	13.75	<b>17.08</b>	49.241	23.98	or $11+10\log(B) = 27.12$	PASS
134	5670	MCS8	13.26	13.82	16.72	45.283	23.98	or $11+10\log(B) = 27.07$	PASS
151	5755	MCS8	14.02	13.8	<b>17.08</b>	49.223		30	PASS
159	5795	MCS8	13.78	13.72	16.92	47.429		30	PASS

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## 802.11ac\_VHT20\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)		RESULT
			CH 0	CH 1					
36	5180	MCS8	13.11	13.26	16.35	41.648		23.98	PASS
44	5220	MCS8	13.76	13.35	16.73	45.396		23.98	PASS
48	5240	MCS8	13.66	13.49	<b>16.74</b>	45.563		23.98	PASS
52	5260	MCS8	13.77	13.5	<b>16.81</b>	46.210	23.98	or $11+10\log(B) = 24.70$	PASS
60	5300	MCS8	13.56	12.95	16.43	42.423	23.98	or $11+10\log(B) = 24.41$	PASS
64	5320	MCS8	13.66	13.2	16.61	44.120	23.98	or $11+10\log(B) = 24.36$	PASS
100	5500	MCS8	13.42	13.18	16.47	42.776	23.98	or $11+10\log(B) = 24.27$	PASS
116	5580	MCS8	13.45	13.43	<b>16.61</b>	44.160	23.98	or $11+10\log(B) = 24.59$	PASS
140	5700	MCS8	13.22	13.2	16.38	41.882	23.98	or $11+10\log(B) = 24.40$	PASS
149	5745	MCS8	13.84	13.19	16.70	45.055		30	PASS
157	5785	MCS8	13.56	13.24	16.57	43.785		30	PASS
165	5825	MCS8	13.64	13.44	<b>16.71</b>	45.201		30	PASS

## 802.11ac\_VHT40\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)		RESULT
			CH 0	CH 1					
38	5190	MCS8	11.77	11.55	14.84	29.320		23.98	PASS
46	5230	MCS8	13.87	13.34	<b>16.79</b>	45.956		23.98	PASS
54	5270	MCS8	13.84	13.73	<b>16.96</b>	47.815	23.98	or $11+10\log(B) = 27.06$	PASS
62	5310	MCS8	11.13	10.75	14.12	24.857	23.98	or $11+10\log(B) = 27.08$	PASS
102	5510	MCS8	13.06	12.77	16.09	39.154	23.98	or $11+10\log(B) = 27.03$	PASS
110	5550	MCS8	14.07	13.75	<b>17.09</b>	49.241	23.98	or $11+10\log(B) = 27.12$	PASS
134	5670	MCS8	13.26	13.82	16.73	45.283	23.98	or $11+10\log(B) = 27.07$	PASS
151	5755	MCS8	14.02	13.8	<b>17.09</b>	49.223		30	PASS
159	5795	MCS8	13.78	13.72	16.93	47.429		30	PASS

## 802.11ac\_VHT80\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)		RESULT
			CH 0	CH 1					
42	5210	MCS8	10.11	9.56	<b>13.17</b>	19.293		23.98	PASS
58	5290	MCS8	8.91	8.56	<b>12.07</b>	14.958	23.98	or $11+10\log(B) = 30.17$	PASS
106	5530	MCS8	10.73	10.61	14.00	23.338	23.98	or $11+10\log(B) = 30.16$	PASS
122	5610	MCS8	13.41	13.62	<b>16.85</b>	44.942	23.98	or $11+10\log(B) = 30.16$	PASS
155	5775	MCS8	13.99	13.73	<b>17.19</b>	48.666		30	PASS

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## 10 PEAK POWER SPECTRAL DENSITY

### 10.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Mater device )	17dBm/ MHz
		Fixed point-to-point Access 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 peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Note:**

The antenna gain is granter than 6 dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

	Effective Legacy Gain (dBi)	Limit
UNII-1	1.48+3.01=4.49dBi	17dBm
UNII-2A	0.90+3.01=3.91dBi	11dBm
U-NII-2C	-0.74+3.01=2.27dBi	11dBm
U-NII-3	-0.74+3.01=2.27dBi	30dBm

Therefore the limit needs to reduce for the UNII-1, U-NII-2A, U-NII-2C and U-NII-3 band.

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### 10.2 Measurement Procedure

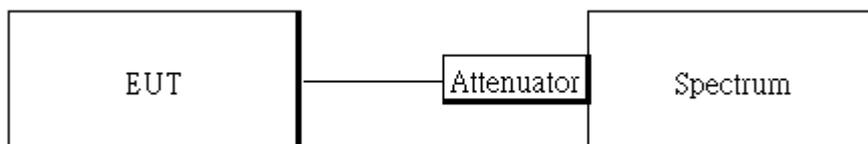
1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. **For U-NII1, U-NII-2A, U-NII-2C Band:**  
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)  
**For U-NII-3 Band:**  
Set RBW=500 kHz,  $VBW \geq 3RBW$ , where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add  $10 \log(1/\text{duty cycle})$ .
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Note: For the test of PSD at MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome

### 10.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2016	12/11/2017
DC Block	PASTERNAK	PE8210	RF29	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF23	12/12/2016	12/11/2017
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018

### 10.4 Test Set-up



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## 10.5 Measurement Result

POWER DENSITY 802.11a MODE			
Frequency (MHz)	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	1.84	11	-9.16
5220	0.28	11	-10.72
5240	0.40	11	-10.60
5260	1.55	11	-9.45
5300	0.03	11	-10.97
5320	0.34	11	-10.66
5500	1.36	11	-9.64
5580	0.08	11	-10.92
5700	1.52	11	-9.48
5745	7.65	30	-22.35
5785	6.77	30	-23.23
5825	6.95	30	-23.05

POWER DENSITY 802.11n HT40 MODE			
Frequency (MHz)	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5190	-3.24	11	-14.24
5230	-1.33	11	-12.33
5270	-1.46	11	-12.46
5310	-2.30	11	-13.30
5510	-3.27	11	-14.27
5550	-1.12	11	-12.12
5670	-0.94	11	-11.94
5755	5.16	30	-24.84
5795	5.11	30	-24.89

POWER DENSITY 802.11n HT20 MODE			
Frequency (MHz)	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	3.12	11	-7.88
5220	3.12	11	-7.88
5240	2.02	11	-8.98
5260	2.10	11	-8.90
5300	1.93	11	-9.07
5320	1.45	11	-9.55
5500	2.98	11	-8.02
5580	1.62	11	-9.38
5700	2.42	11	-8.58
5745	8.60	30	-21.40
5785	7.56	30	-22.44
5825	7.77	30	-22.23

POWER DENSITY 802.11ac VHT80 MODE			
Frequency (MHz)	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5210	-6.62	11	-17.62
5290	-8.91	11	-19.91
5530	-6.72	11	-17.72
5610	-4.62	11	-15.62
5775	3.38	30	-26.62

**Note:**

SISO offset= 12.4 dB  
 MIMO offset= 15.4 dB

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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)



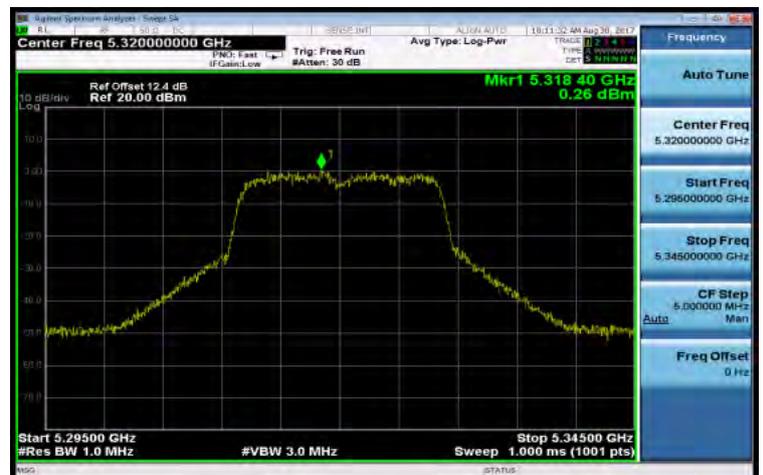
Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)



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)



802.11a 5725~5850 MHz

Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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



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



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



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

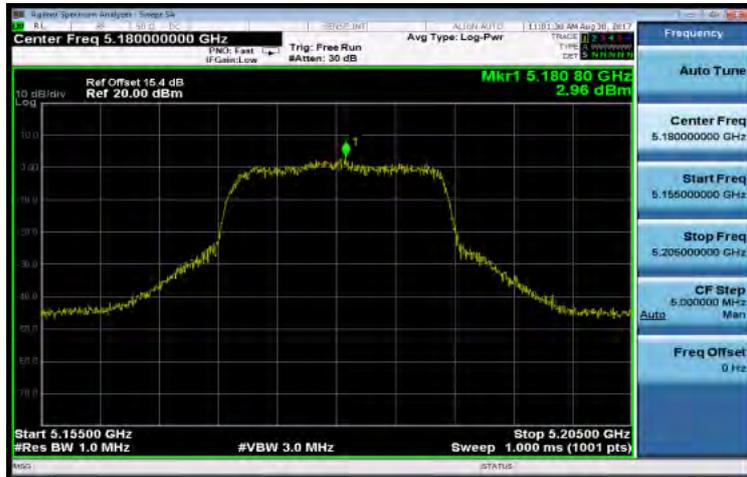


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802.11n HT20, 5150~5250 MHz

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



802.11n HT20, 5250~5350 MHz

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



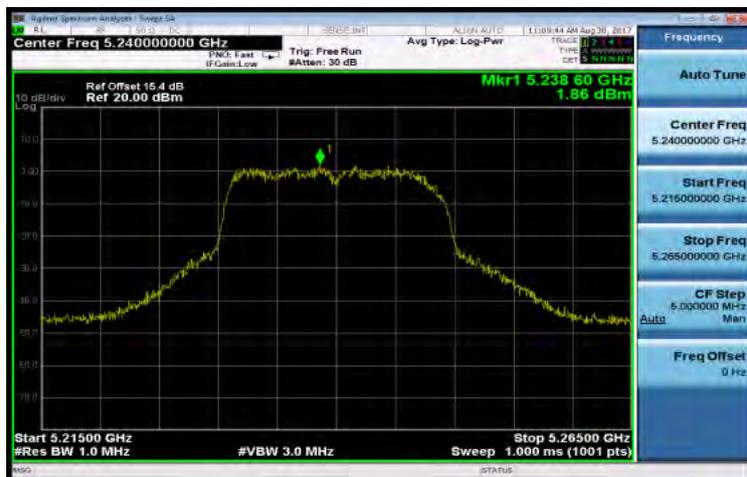
Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



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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802.11n HT20, 5470~5725 MHz

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



802.11n HT20, 5725~5850 MHz

Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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



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



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



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



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802.11n HT40, 5150~5250 MHz

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



802.11n HT40, 5250~5350 MHz

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



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



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

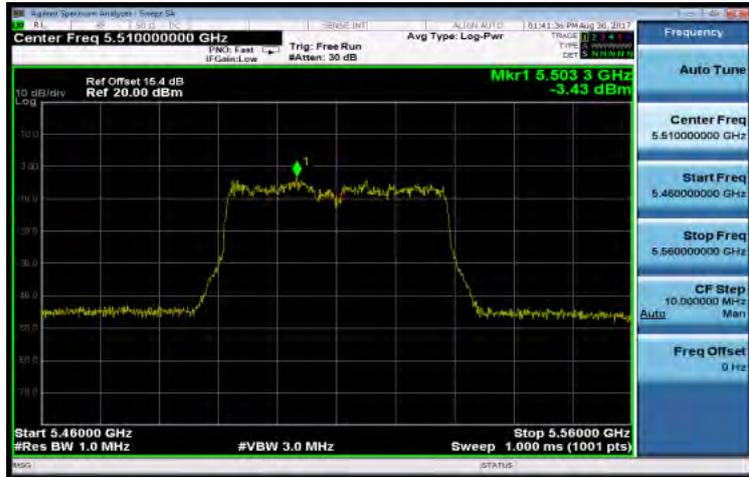


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802.11n HT40, 5470~5725 MHz  
Peak Power Spectral Density Data Plot (CH Low 5510 MHz)



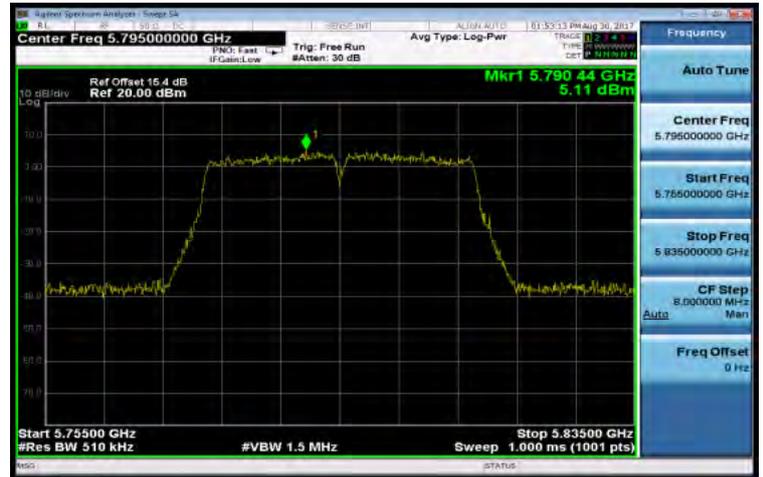
802.11n HT40, 5725~5850 MHz  
Peak Power Spectral Density Data Plot (CH Low 5755 MHz)



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



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



Peak Power Spectral Density Data Plot (CH High 5670 MHz)



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802.11ac VHT80, 5150~5250 MHz  
Peak Power Spectral Density Data Plot (CH Mid 5210 MHz)



802.11ac VHT80, 5470~5725 MHz  
Peak Power Spectral Density Data Plot (CH Low 5530 MHz)



802.11ac VHT80, 5250~5350 MHz  
Peak Power Spectral Density Data Plot (CH Mid 5290 MHz)



802.11ac VHT80, 5470~5725 MHz  
Peak Power Spectral Density Data Plot (CH High 5610 MHz)



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802.11ac VHT80, 5725~5850 MHz

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



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## 11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

### 11.1 Standard Applicable

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

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

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

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

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

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

**Note:**

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

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## 11.2 Measurement Equipment Used

SGS SAC-III					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESU 40	100363	04/18/2017	04/17/2018
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2016	12/22/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2016	11/02/2017
Horn Antenna	ETS-Lindgren	3117	00143272	12/15/2016	12/16/2017
Horn Antenna	Schwarzbeck	BBHA9170	185	08/01/2017	07/31/2018
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-18	10204	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF27	12/12/2016	12/11/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
Site VSWR	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2017	05/03/2018
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

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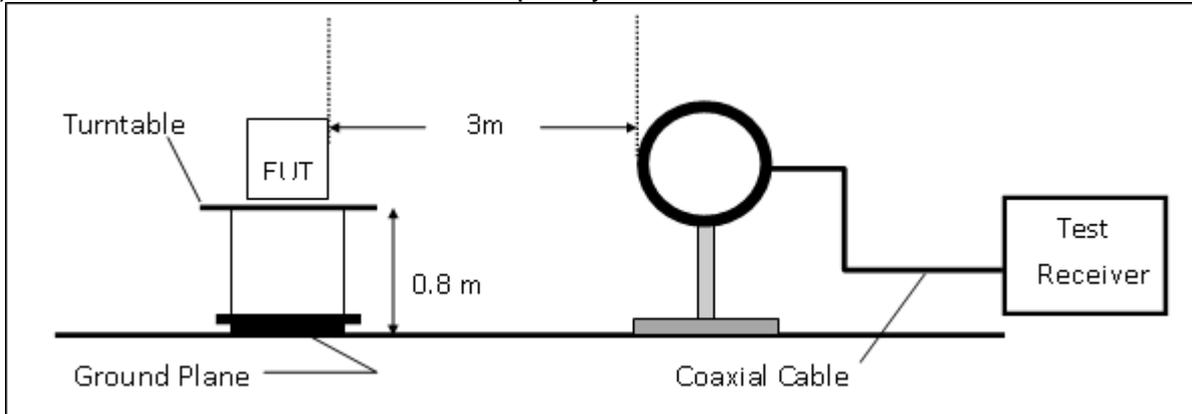
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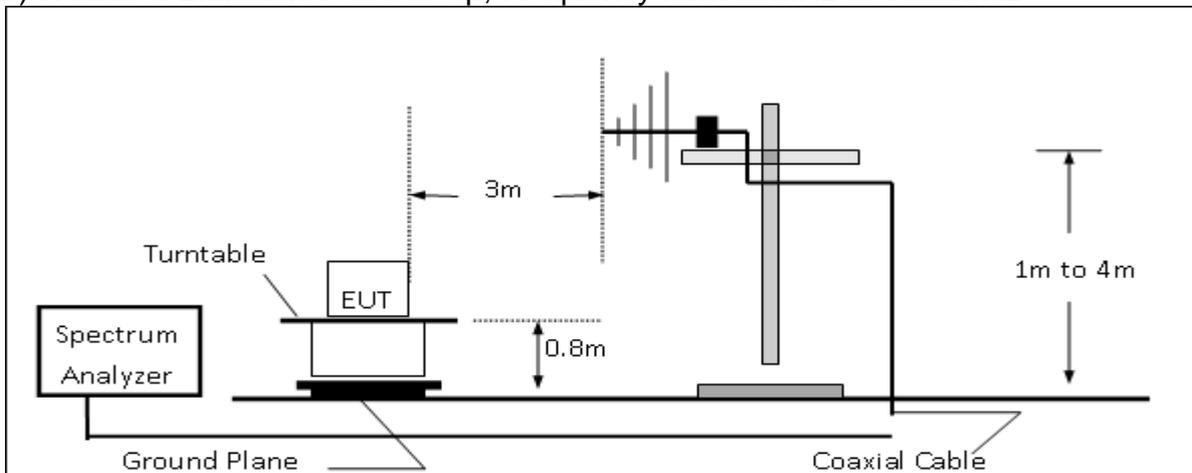
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### 11.3 Test SET-UP

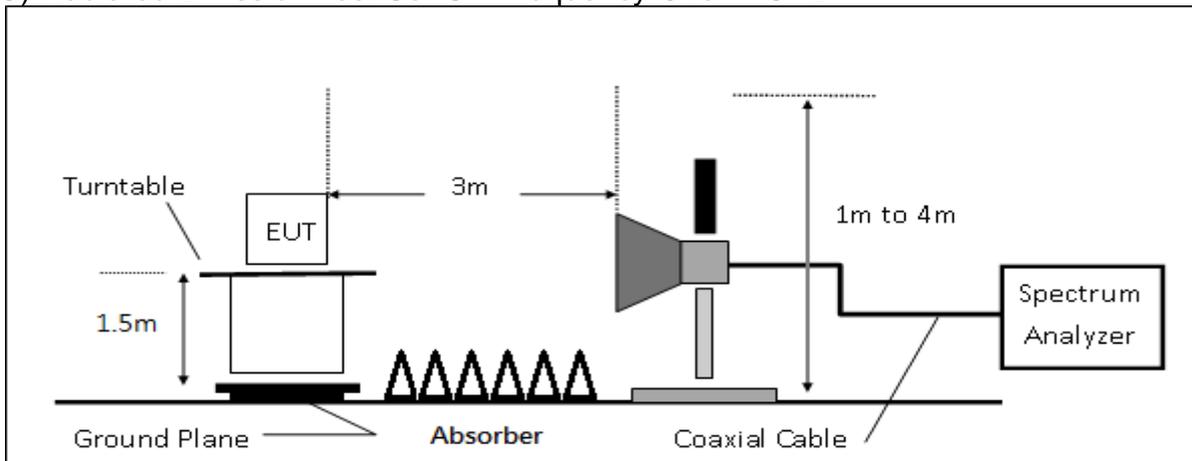
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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### 11.4 Measurement Procedure

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

### 11.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

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

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

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

**Note :**

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

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

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

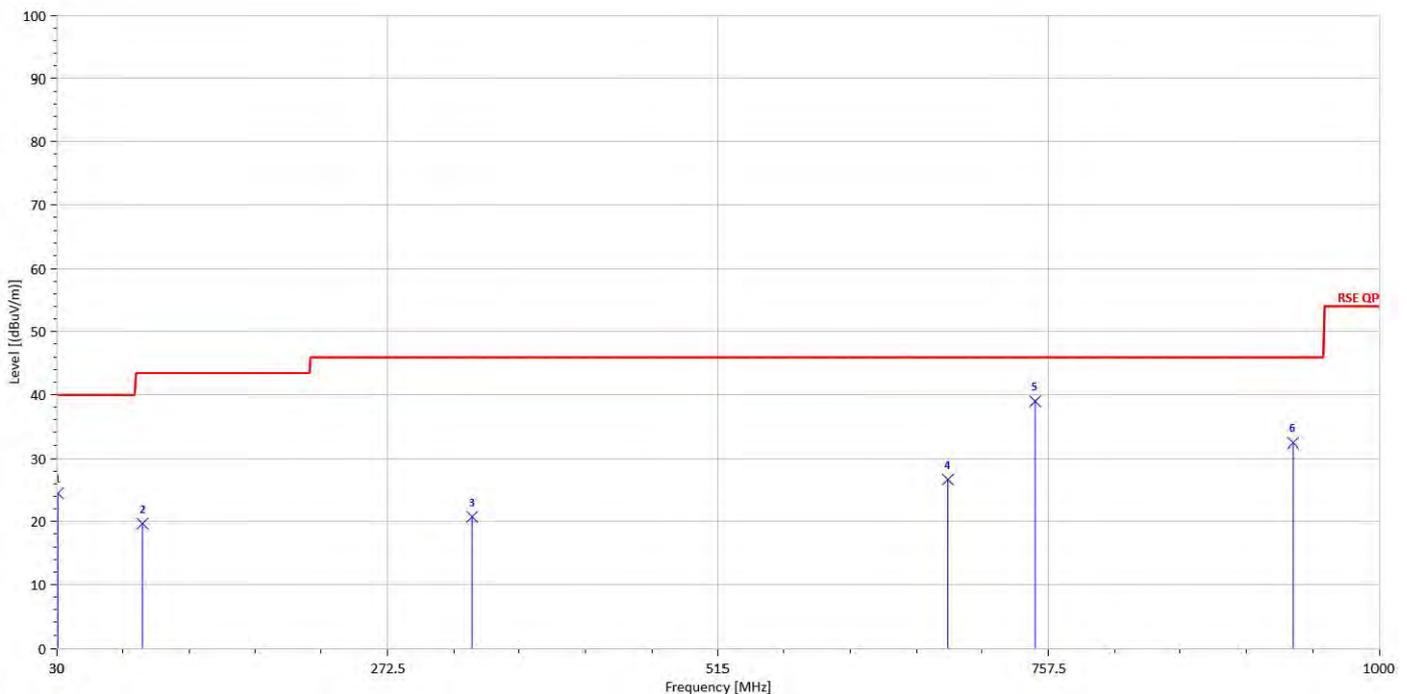
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

### 11.7 Measurement Result

#### Radiated Spurious Emission Measurement Result

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

Operation Mode :	802.11aB1	Test Date :	2017/8/30
Fundamental Frequency :	5220 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Enzo
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.97	S	Peak	32.16	-7.70	24.46	40	-15.54
93.05	S	Peak	38.57	-18.95	19.62	43.5	-23.88
334.58	S	Peak	32.55	-11.85	20.71	46	-25.29
683.78	S	Peak	32.21	-5.55	26.66	46	-19.34
747.80	S	Peak	43.15	-4.16	38.99	46	-7.01
936.95	S	Peak	34.09	-1.70	32.39	46	-13.61

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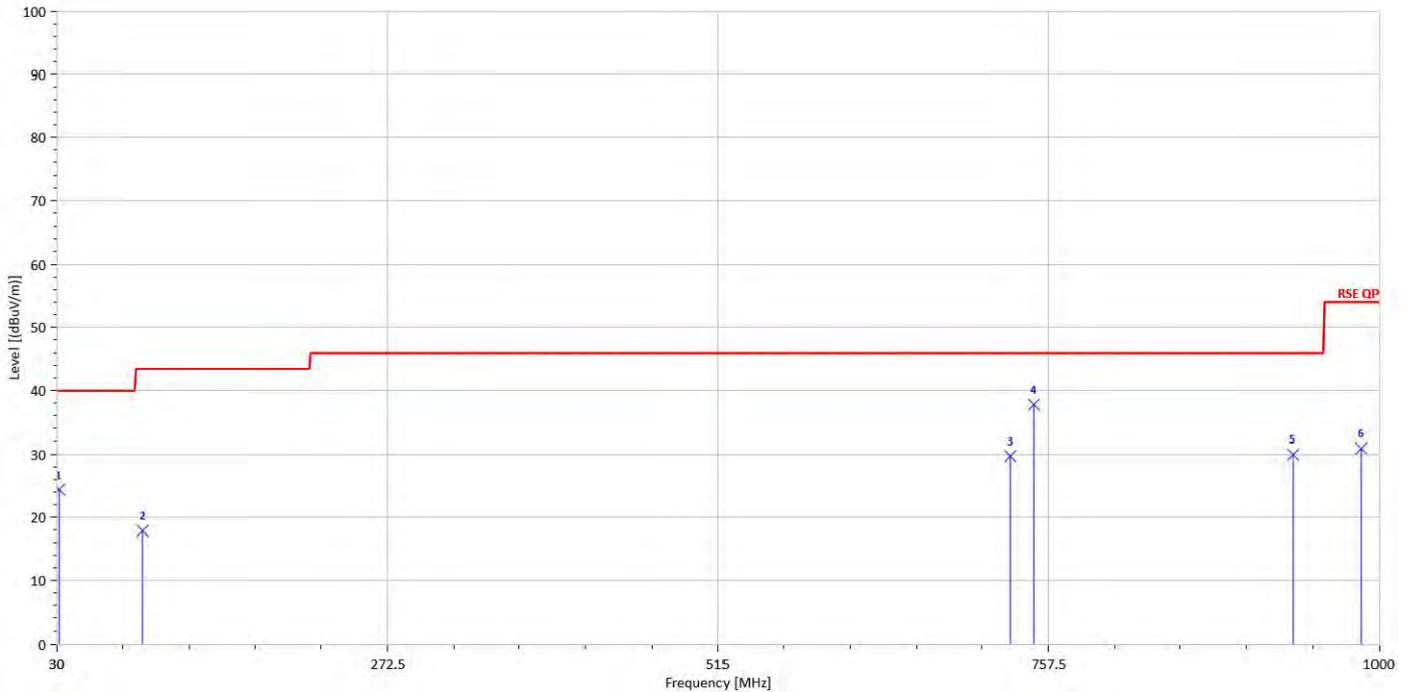
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Operation Mode : 802.11aB1 Test Date : 2017/8/30  
 Fundamental Frequency : 5220 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
31.94	S	Peak	32.62	-8.22	24.40	40	-15.60
93.05	S	Peak	36.81	-18.95	17.85	43.5	-25.65
729.37	S	Peak	34.34	-4.64	29.70	46	-16.30
746.83	S	Peak	42.03	-4.23	37.80	46	-8.20
936.95	S	Peak	31.65	-1.70	29.95	46	-16.05
987.39	S	Peak	31.48	-0.57	30.92	54	-23.08

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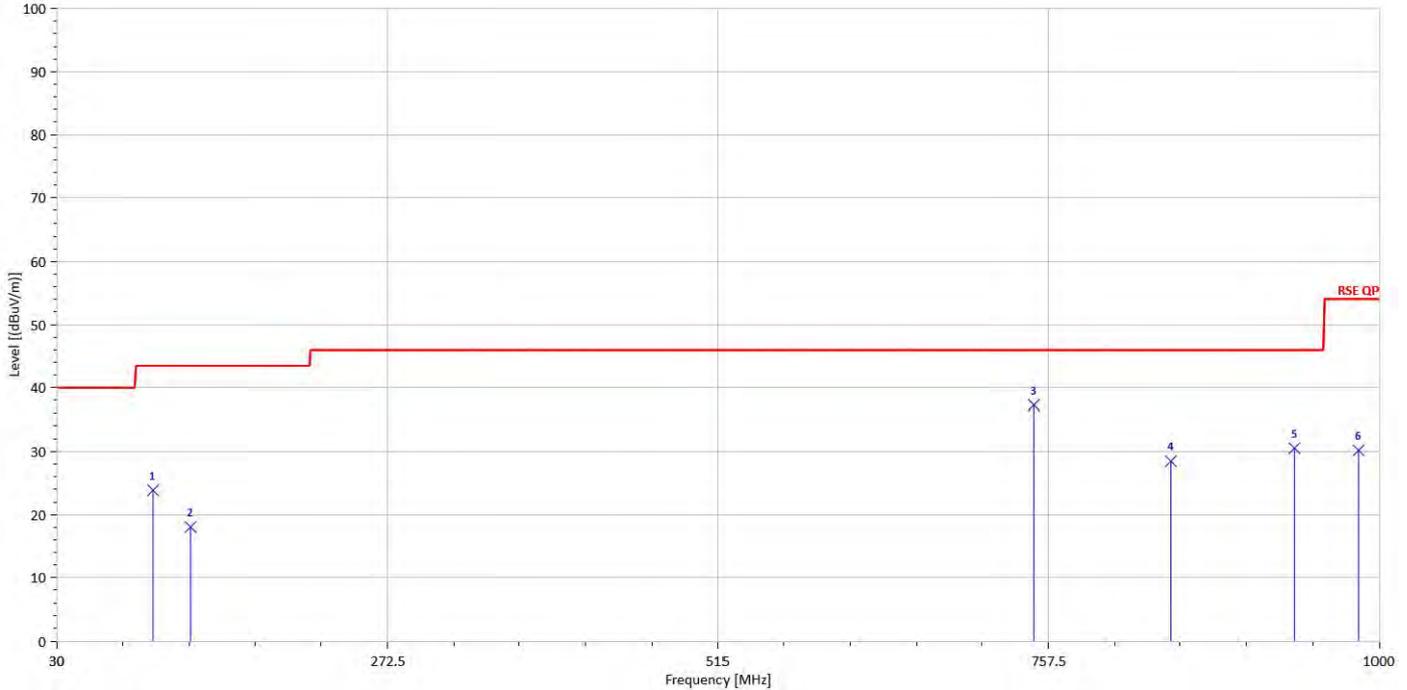
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Operation Mode :	802.11aB2	Test Date :	2017/8/30
Fundamental Frequency :	5300 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Enzo
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
100.81	S	Peak	41.43	-17.64	23.79	43.5	-19.71
127.97	S	Peak	33.69	-15.62	18.07	43.5	-25.43
746.83	S	Peak	41.50	-4.23	37.27	46	-8.73
847.71	S	Peak	31.48	-3.06	28.42	46	-17.58
937.92	S	Peak	32.21	-1.71	30.50	46	-15.50
985.45	S	Peak	30.88	-0.72	30.16	54	-23.84

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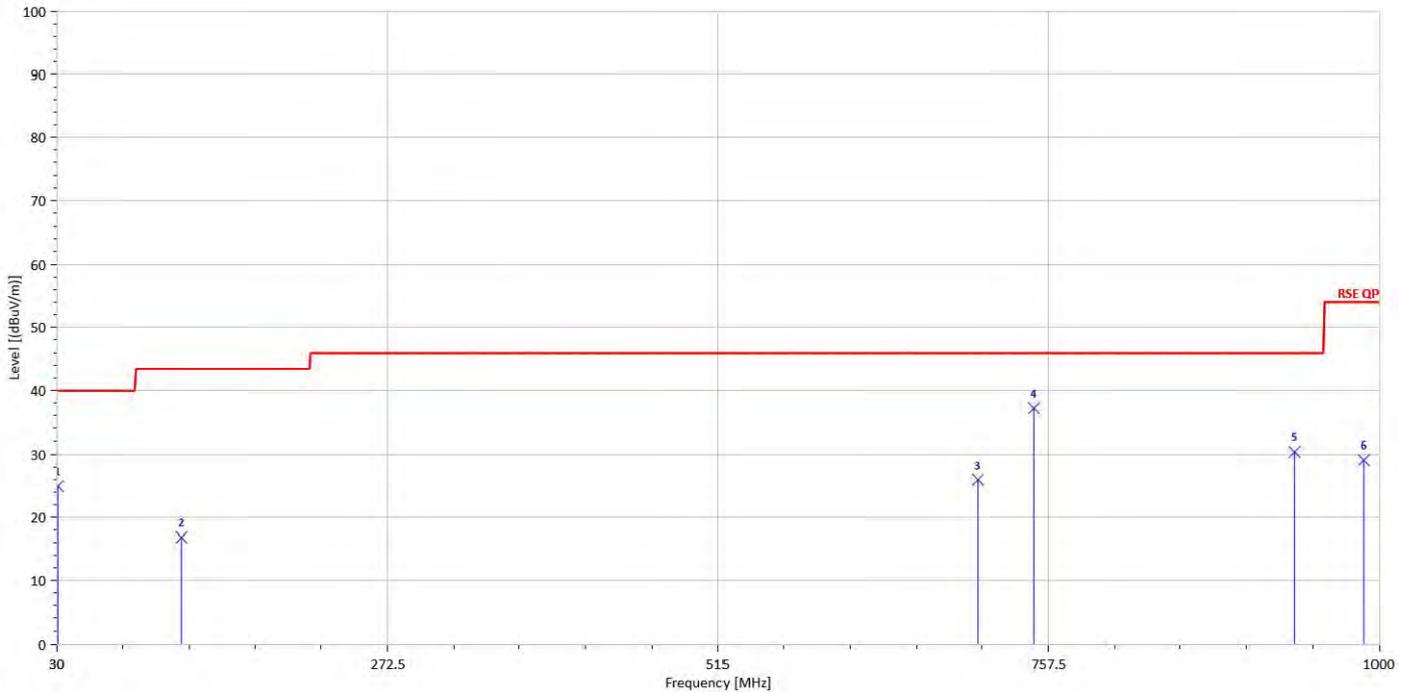
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Operation Mode : 802.11aB2      Test Date : 2017/8/30  
 Fundamental Frequency : 5300 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Enzo  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.97	S	Peak	32.64	-7.70	24.93	40	-15.07
121.18	S	Peak	32.63	-15.80	16.82	43.5	-26.68
706.09	S	Peak	31.02	-5.08	25.94	46	-20.06
746.83	S	Peak	41.44	-4.23	37.21	46	-8.79
937.92	S	Peak	32.08	-1.71	30.37	46	-15.63
989.33	S	Peak	29.73	-0.66	29.07	54	-24.93

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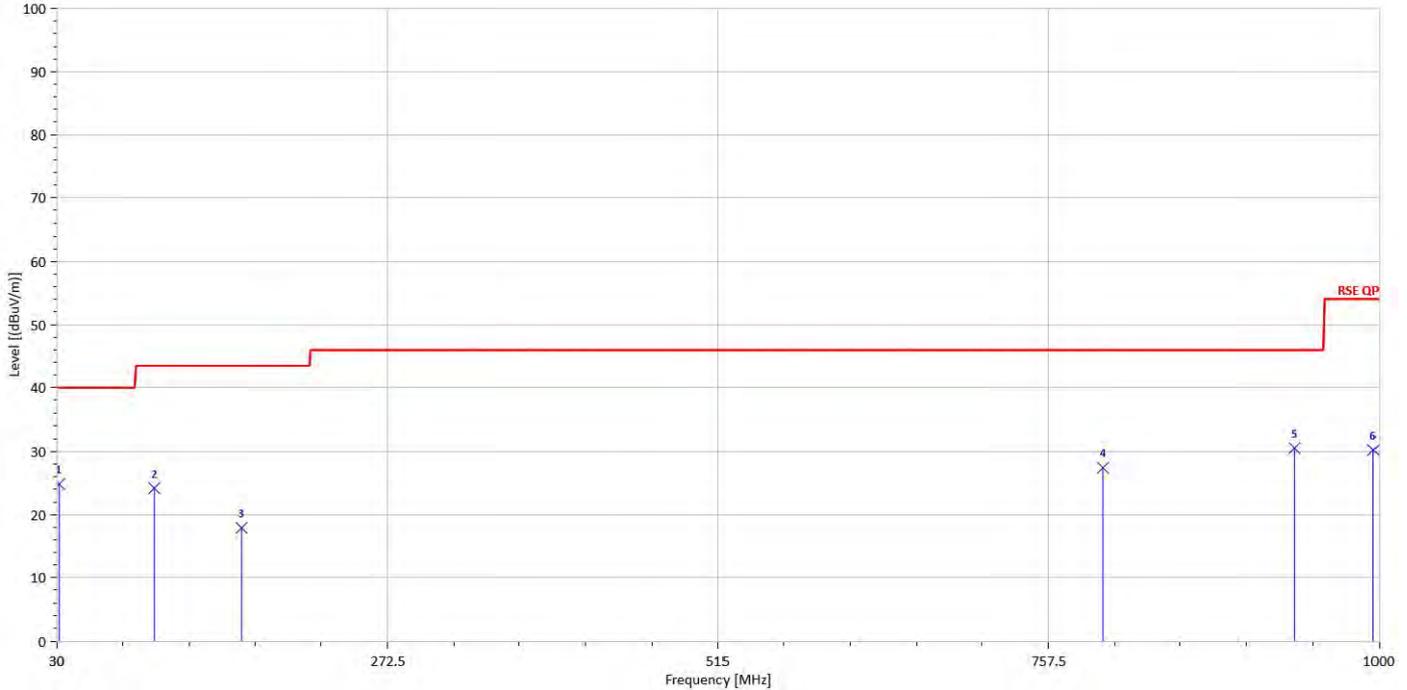
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Operation Mode : 802.11aB3 Test Date : 2017/8/30  
 Fundamental Frequency : 5580 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
31.94	S	Peak	33.01	-8.22	24.79	40	-15.21
101.78	S	Peak	41.64	-17.52	24.11	43.5	-19.39
165.80	S	Peak	35.85	-17.92	17.93	43.5	-25.57
797.27	S	Peak	31.38	-4.01	27.38	46	-18.62
937.92	S	Peak	32.23	-1.71	30.52	46	-15.48
996.12	S	Peak	30.82	-0.61	30.21	54	-23.79

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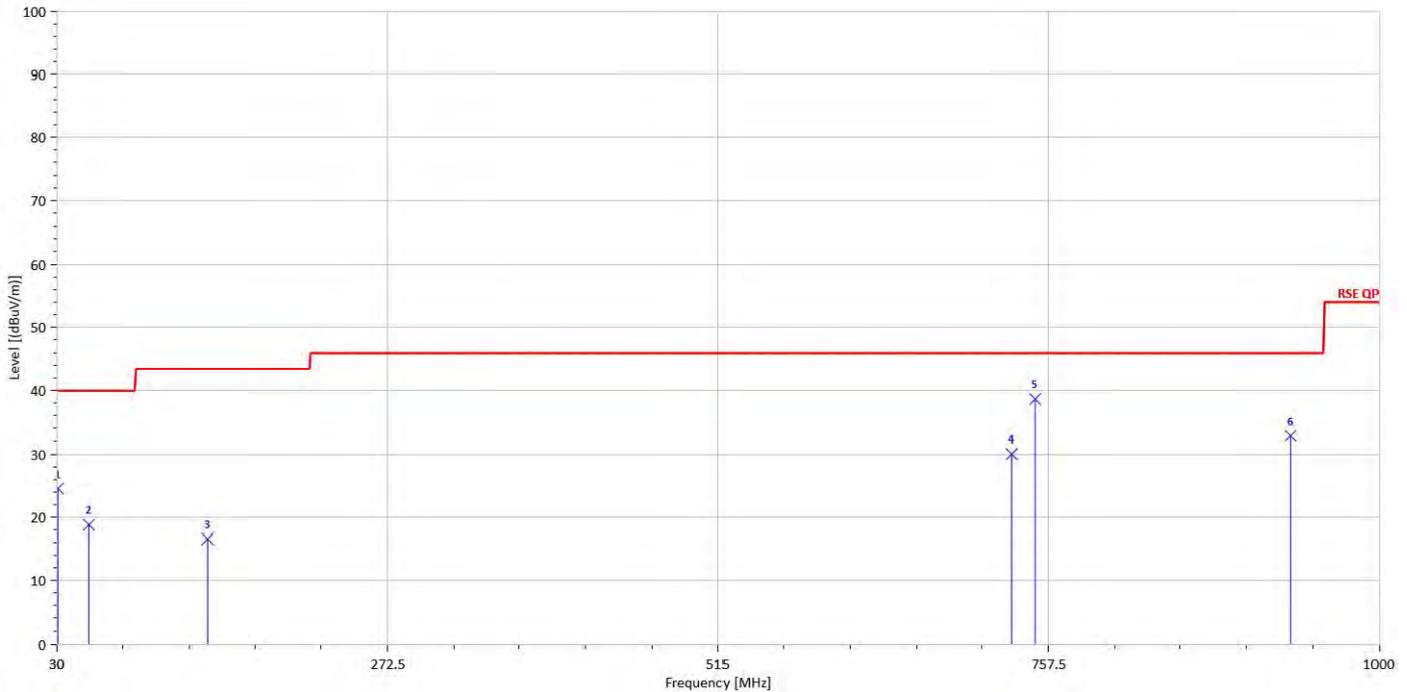
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Operation Mode : 802.11aB3 Test Date : 2017/8/30  
 Fundamental Frequency : 5580 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.97	S	Peak	32.25	-7.70	24.55	40	-15.45
53.28	S	Peak	39.32	-20.53	18.79	40	-21.21
140.58	S	Peak	32.75	-16.17	16.58	43.5	-26.92
730.34	S	Peak	34.70	-4.67	30.03	46	-15.97
747.80	S	Peak	42.84	-4.16	38.68	46	-7.32
935.01	S	Peak	34.42	-1.59	32.83	46	-13.17

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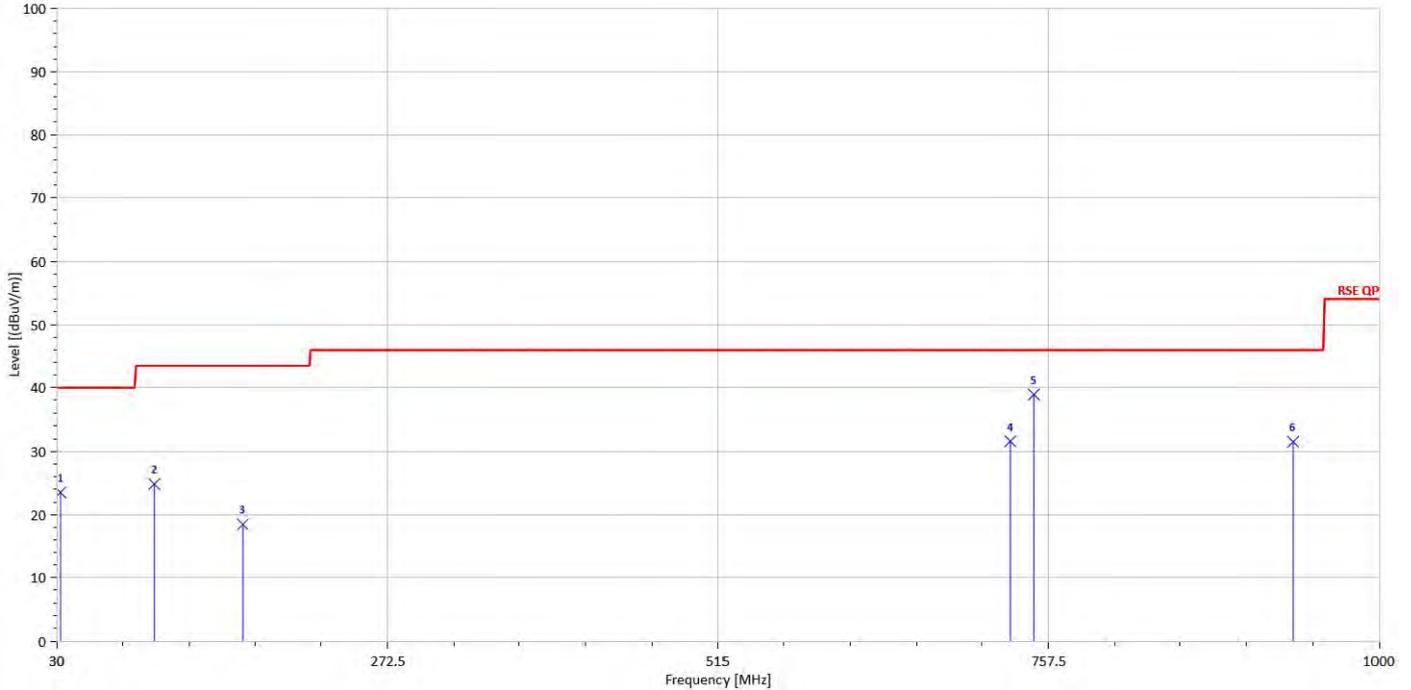
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Operation Mode : 802.11aB4 Test Date : 2017/8/30  
 Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
32.91	S	Peak	32.18	-8.75	23.43	40	-16.57
101.78	S	Peak	42.29	-17.52	24.77	43.5	-18.73
166.77	S	Peak	36.44	-17.95	18.49	43.5	-25.01
729.37	S	Peak	36.25	-4.64	31.60	46	-14.40
746.83	S	Peak	43.15	-4.23	38.92	46	-7.08
936.95	S	Peak	33.21	-1.70	31.51	46	-14.49

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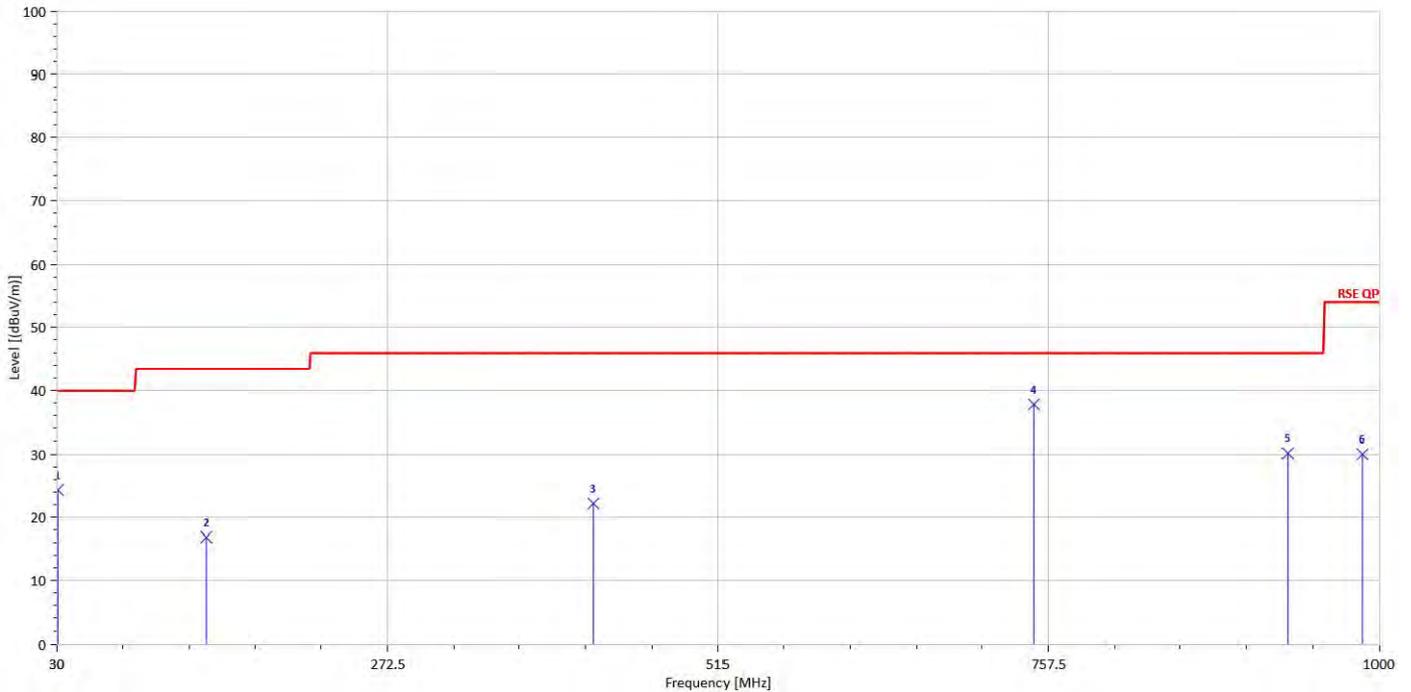
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Operation Mode : 802.11aB4 Test Date : 2017/8/30  
 Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.97	S	Peak	32.03	-7.70	24.32	40	-15.68
139.61	S	Peak	32.88	-16.02	16.86	43.5	-26.64
423.82	S	Peak	31.46	-9.30	22.16	46	-23.84
746.83	S	Peak	42.07	-4.23	37.84	46	-8.16
933.07	S	Peak	31.83	-1.66	30.17	46	-15.83
988.36	S	Peak	30.58	-0.57	30.01	54	-23.99

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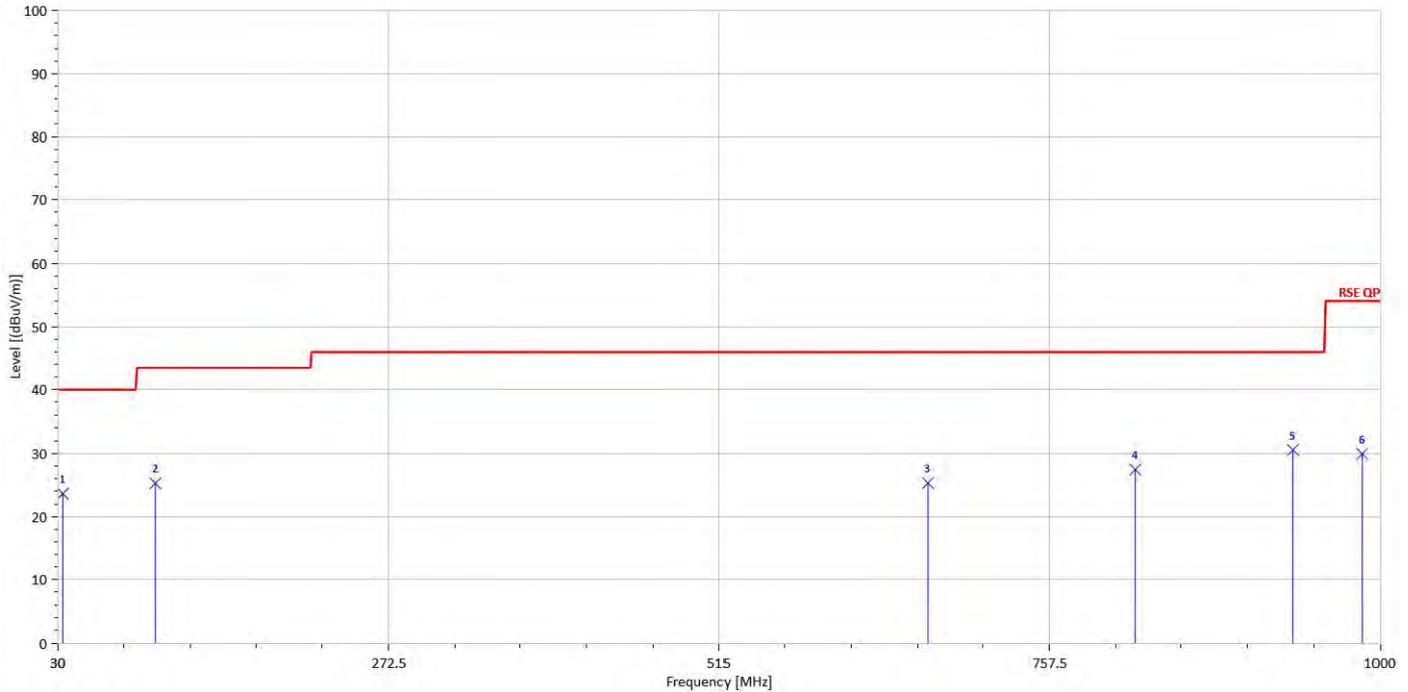
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Operation Mode : 802.11ac80B1 Test Date : 2017/8/30  
 Fundamental Frequency : 5210 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
33.88	S	Peak	32.83	-9.27	23.56	40	-16.44
101.78	S	Peak	42.73	-17.52	25.21	43.5	-18.29
668.26	S	Peak	30.70	-5.46	25.24	46	-20.76
820.55	S	Peak	30.28	-2.87	27.41	46	-18.59
935.98	S	Peak	32.21	-1.66	30.55	46	-15.45
987.39	S	Peak	30.49	-0.57	29.93	54	-24.07

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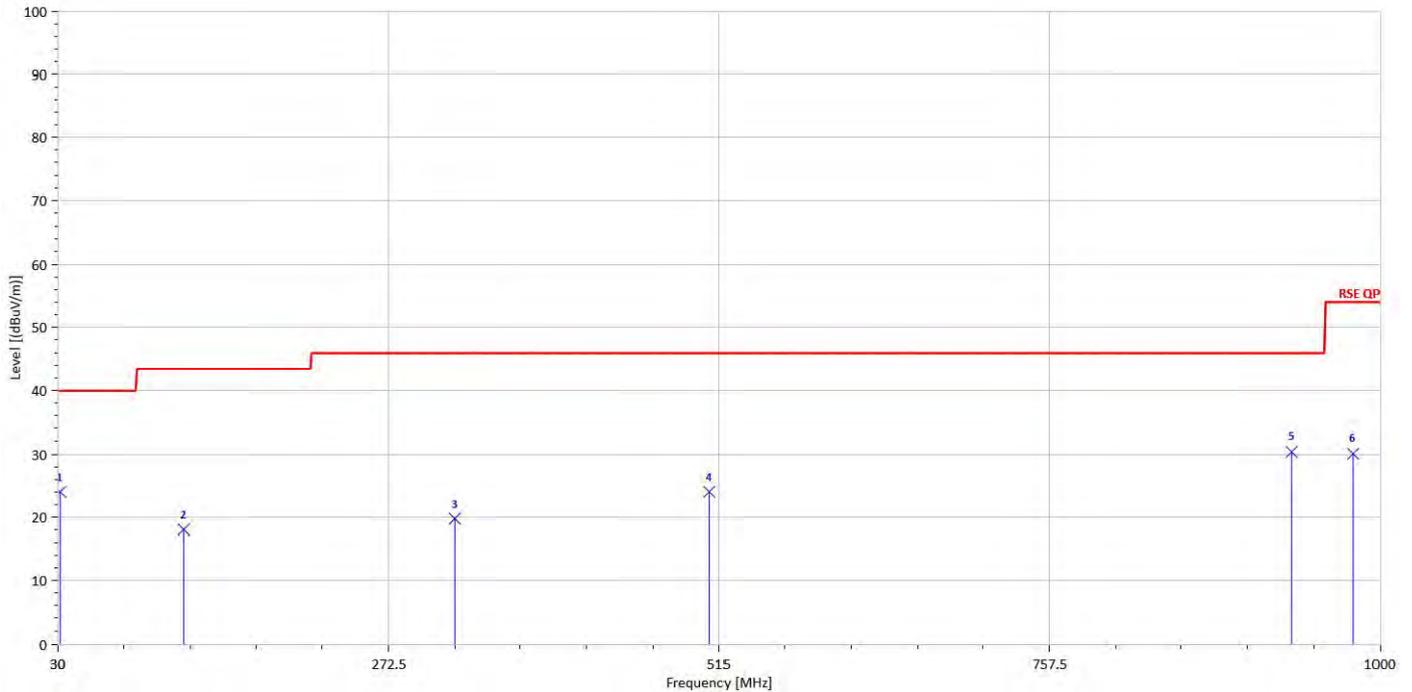
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Operation Mode : 802.11ac80B1 Test Date : 2017/8/30  
 Fundamental Frequency : 5210 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
31.94	S	Peak	32.23	-8.22	24.01	40	-15.99
122.15	S	Peak	33.82	-15.77	18.04	43.5	-25.46
321.00	S	Peak	32.03	-12.27	19.75	46	-26.25
508.21	S	Peak	31.81	-7.79	24.02	46	-21.98
935.01	S	Peak	31.99	-1.59	30.40	46	-15.60
980.60	S	Peak	30.94	-0.84	30.10	54	-23.90

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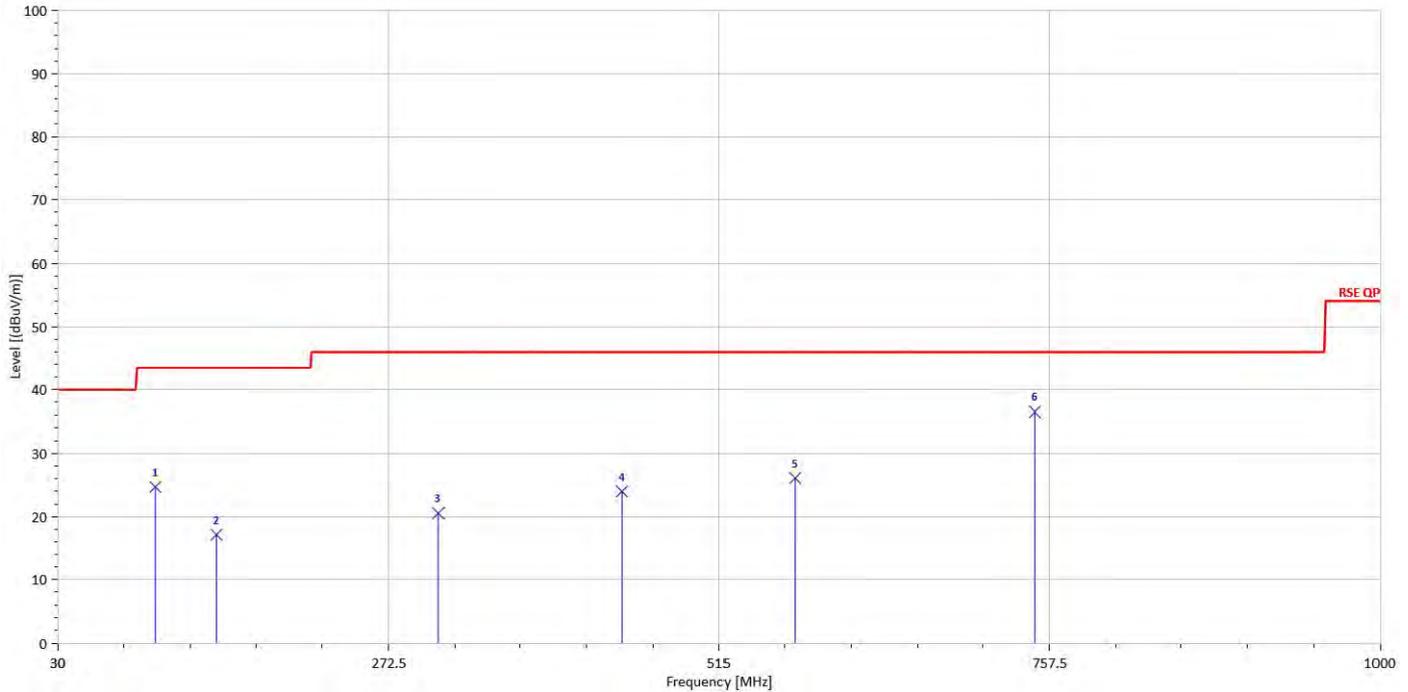
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Operation Mode : 802.11ac80B2 Test Date : 2017/8/30  
 Fundamental Frequency : 5290 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	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
101.78	S	Peak	42.15	-17.52	24.62	43.5	-18.88
146.40	S	Peak	33.61	-16.45	17.16	43.5	-26.34
309.36	S	Peak	33.21	-12.62	20.59	46	-25.41
444.19	S	Peak	33.25	-9.33	23.92	46	-22.08
571.26	S	Peak	32.42	-6.37	26.05	46	-19.95
746.83	S	Peak	40.77	-4.23	36.54	46	-9.46

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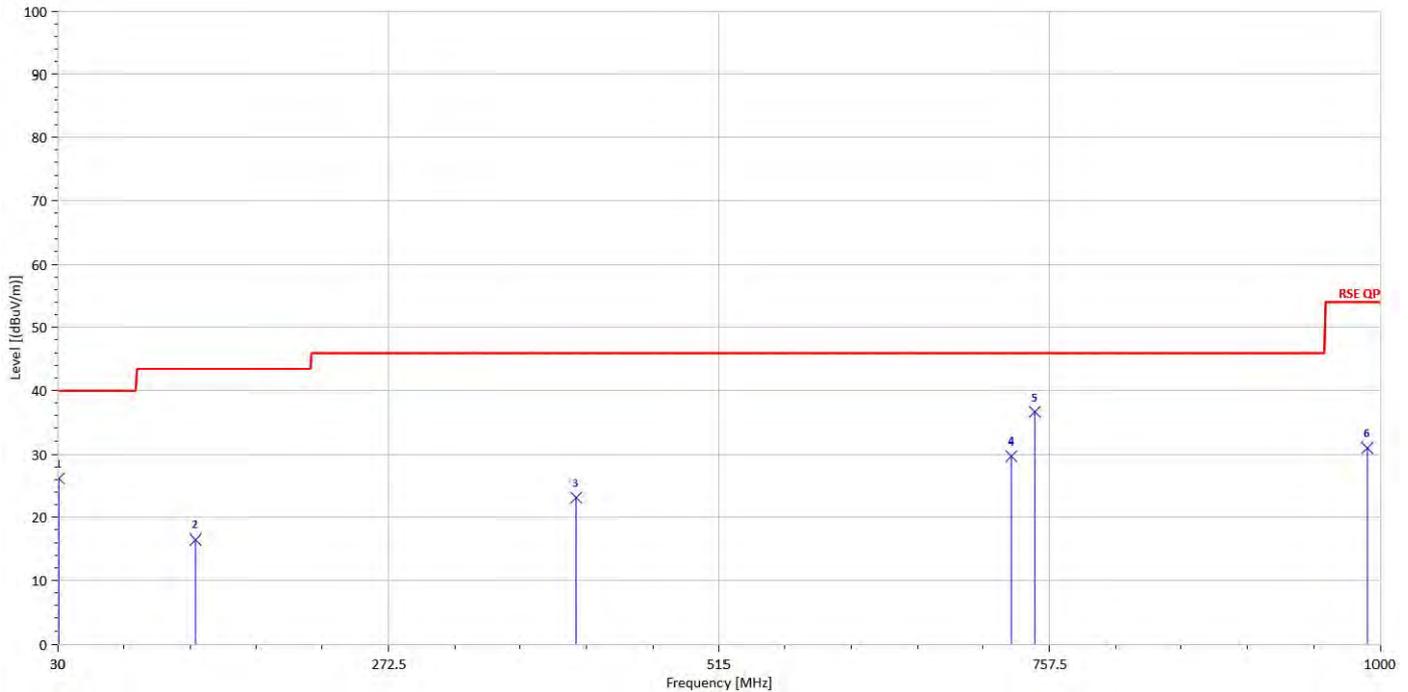
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Operation Mode : 802.11ac80B2 Test Date : 2017/8/30  
 Fundamental Frequency : 5290 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.97	S	Peak	33.87	-7.70	26.16	40	-13.84
130.88	S	Peak	32.21	-15.71	16.50	43.5	-27.00
410.24	S	Peak	32.25	-9.16	23.09	46	-22.91
729.37	S	Peak	34.34	-4.64	29.70	46	-16.30
746.83	S	Peak	40.87	-4.23	36.64	46	-9.36
991.27	S	Peak	31.67	-0.67	31.00	54	-23.00

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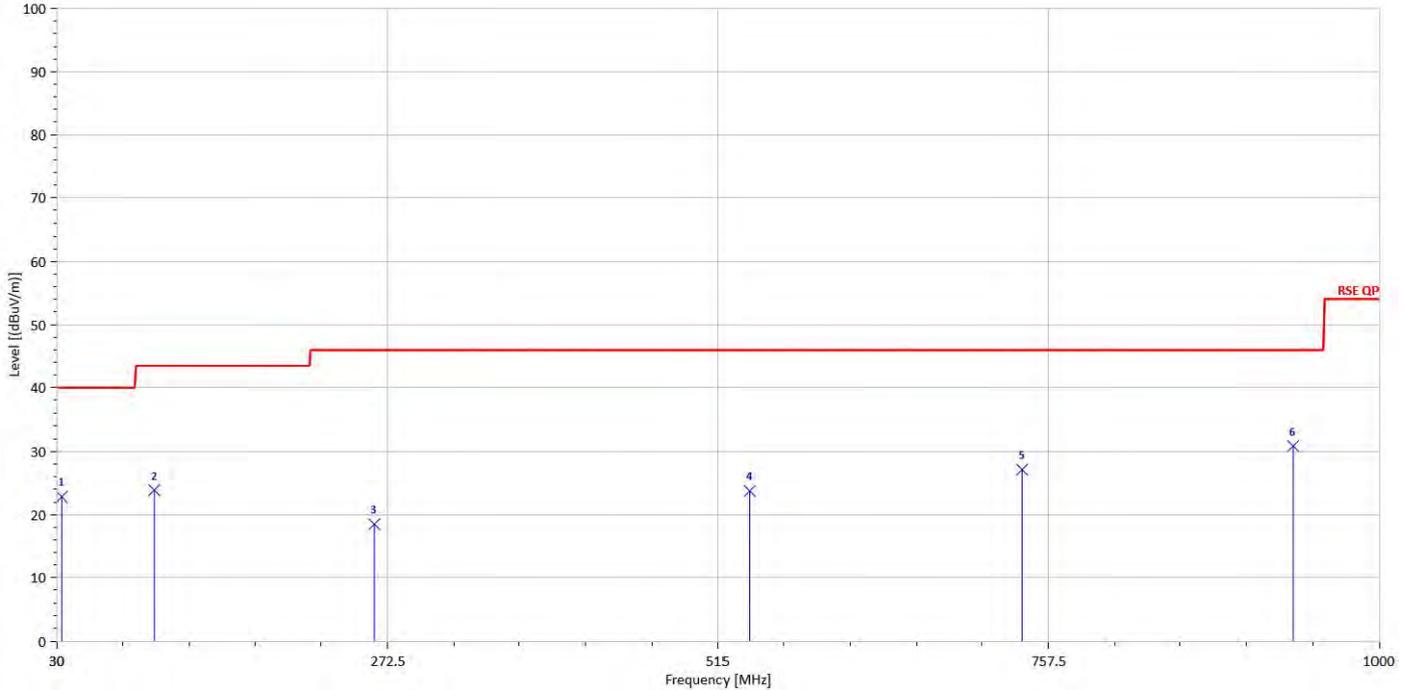
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### 802.11ac VHT80, 5470~5725 MHz

Operation Mode :	802.11ac80B3	Test Date :	2017/8/30
Fundamental Frequency :	5610 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Enzo
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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
33.88	S	Peak	32.03	-9.27	22.76	40	-17.24
101.78	S	Peak	41.33	-17.52	23.80	43.5	-19.70
262.80	S	Peak	32.33	-13.81	18.53	46	-27.47
538.28	S	Peak	31.04	-7.37	23.67	46	-22.33
738.10	S	Peak	31.33	-4.25	27.08	46	-18.92
936.95	S	Peak	32.55	-1.70	30.85	46	-15.15

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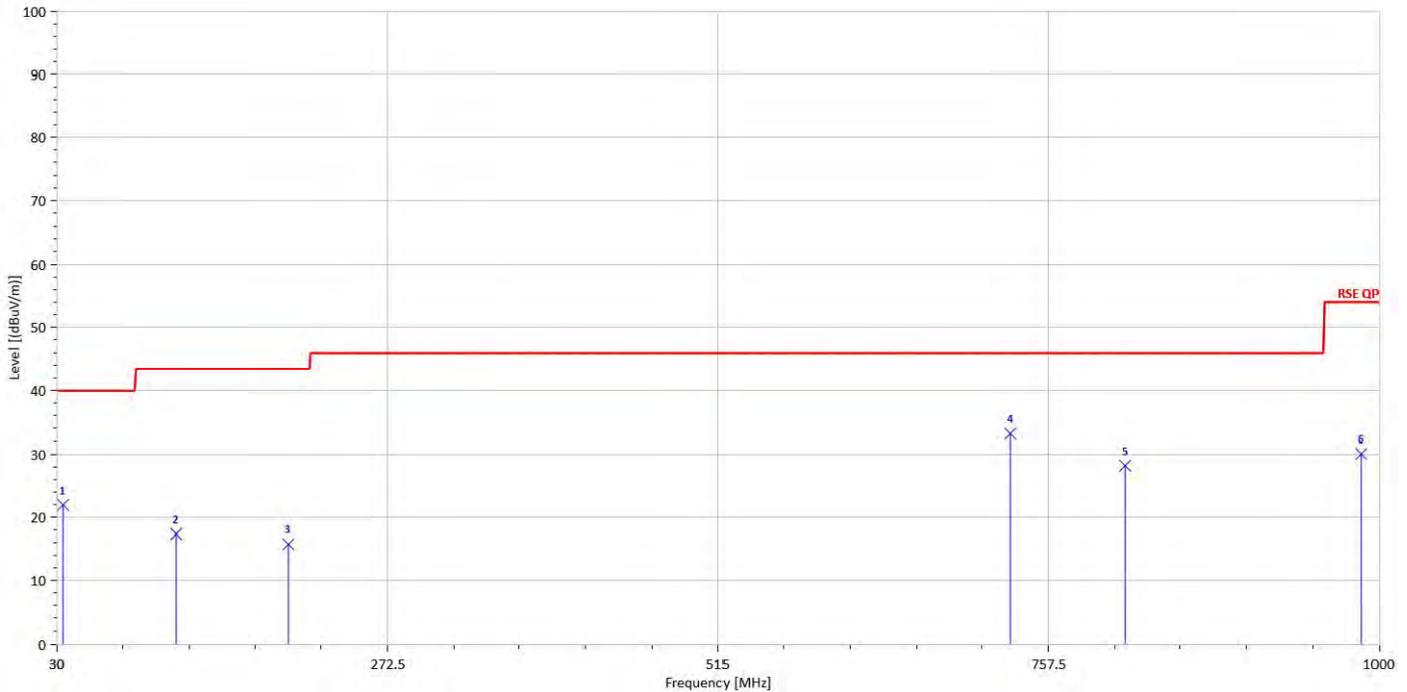
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Operation Mode : 802.11ac80B3 Test Date : 2017/8/30  
 Fundamental Frequency : 5610 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
34.85	S	Peak	31.72	-9.78	21.94	40	-18.06
117.30	S	Peak	33.36	-16.00	17.36	43.5	-26.14
199.75	S	Peak	33.30	-17.51	15.78	43.5	-27.72
729.37	S	Peak	37.83	-4.64	33.19	46	-12.81
813.76	S	Peak	31.27	-3.07	28.20	46	-17.80
987.39	S	Peak	30.62	-0.57	30.05	54	-23.95

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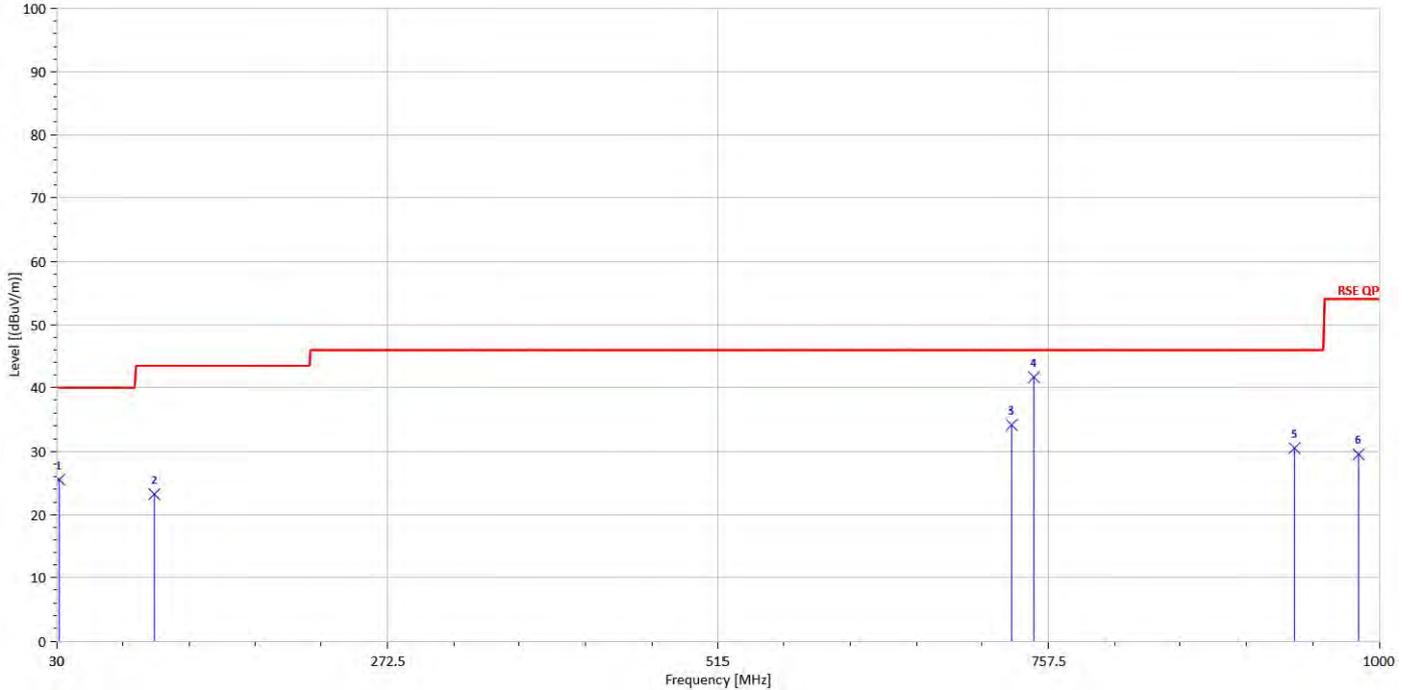
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**802.11ac VHT80,**

Operation Mode :	802.11ac80B4	Test Date :	2017/8/30
Fundamental Frequency :	5775 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Enzo
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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
31.94	S	Peak	33.70	-8.22	25.48	40	-14.52
101.78	S	Peak	40.69	-17.52	23.16	43.5	-20.34
730.34	S	Peak	38.89	-4.67	34.22	46	-11.78
746.83	S	Peak	45.91	-4.23	41.68	46	-4.32
937.92	S	Peak	32.23	-1.71	30.52	46	-15.48
985.45	S	Peak	30.24	-0.72	29.53	54	-24.47

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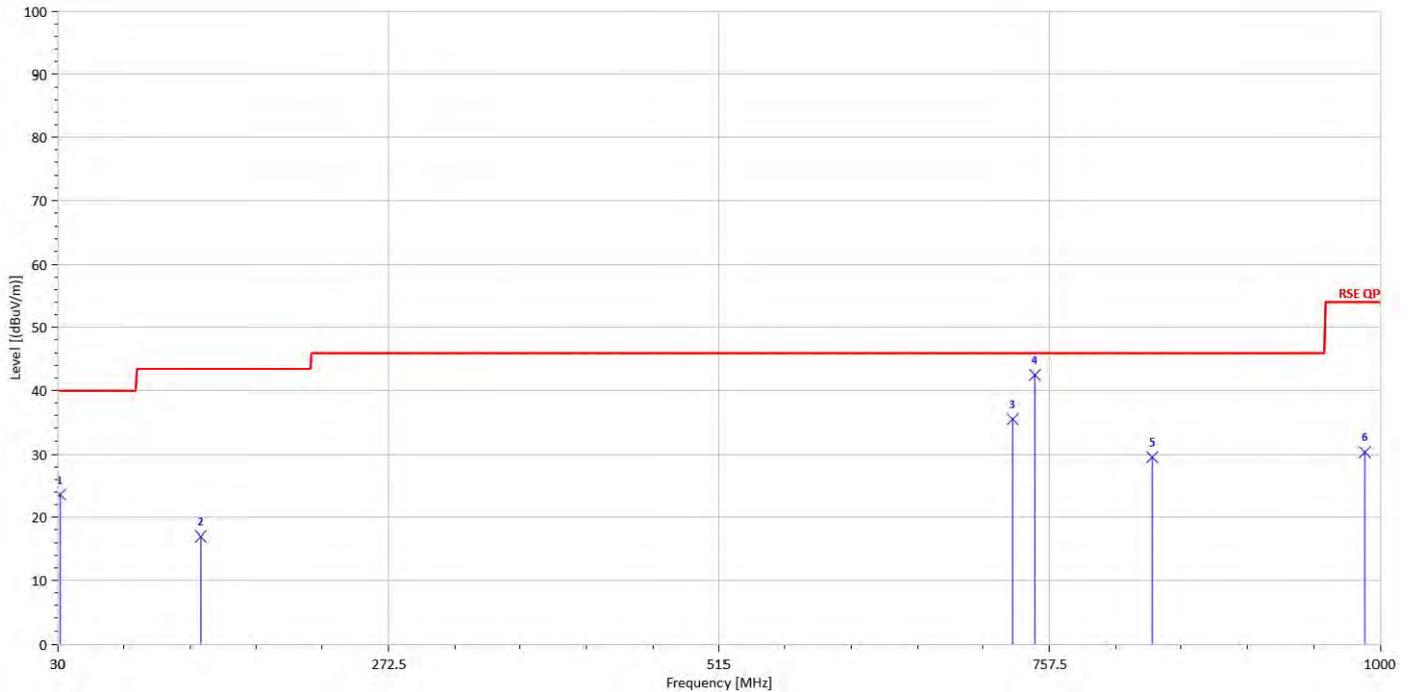
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Operation Mode : 802.11ac80B4 Test Date : 2017/8/30  
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Enzo  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
31.94	S	Peak	31.81	-8.22	23.59	40	-16.41
134.76	S	Peak	32.75	-15.77	16.98	43.5	-26.52
730.34	S	Peak	40.13	-4.67	35.46	46	-10.54
746.83	S	Peak	46.77	-4.23	42.54	46	-3.46
833.16	S	Peak	32.35	-2.81	29.54	46	-16.46
989.33	S	Peak	31.02	-0.66	30.36	54	-23.64

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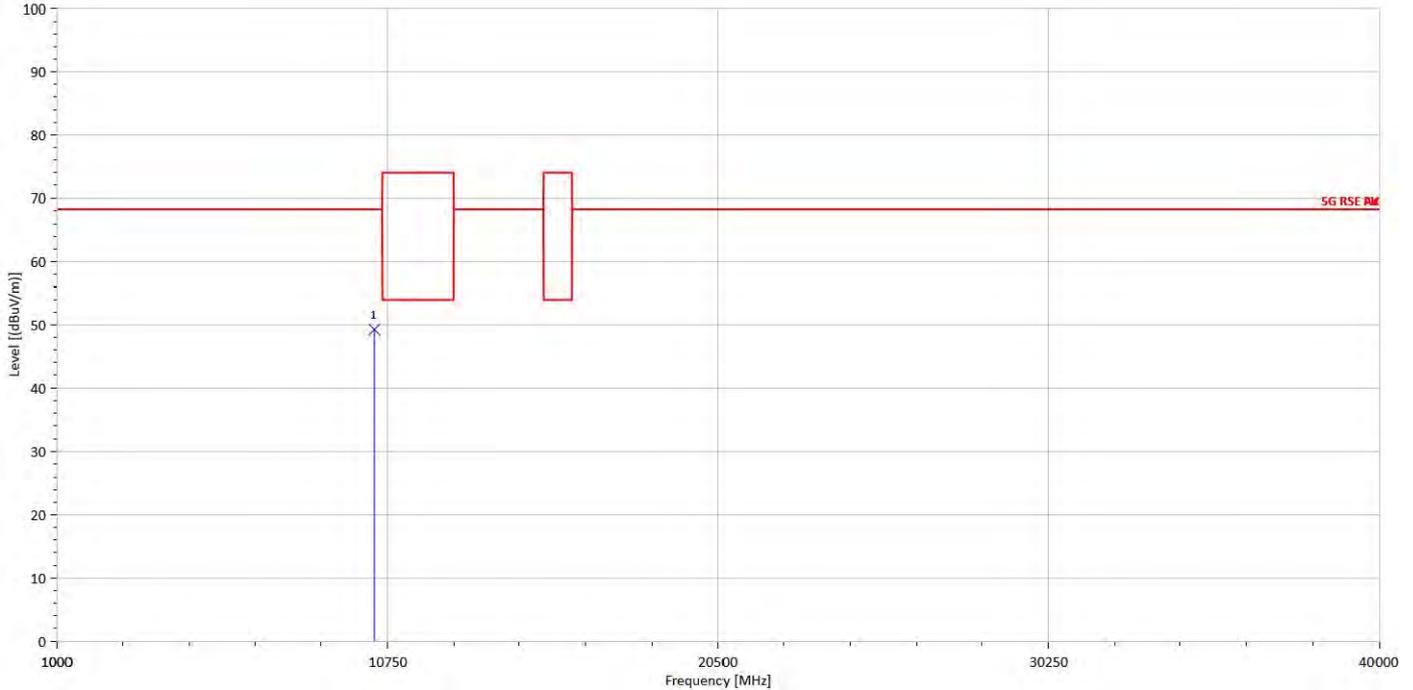
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**Above 1GHz Worst-Case Data:**

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

Operation Mode :	802.11aB1	Test Date :	2017/8/30
Fundamental Frequency :	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	H	Peak	29.08	20.18	49.26	68.3	-19.04

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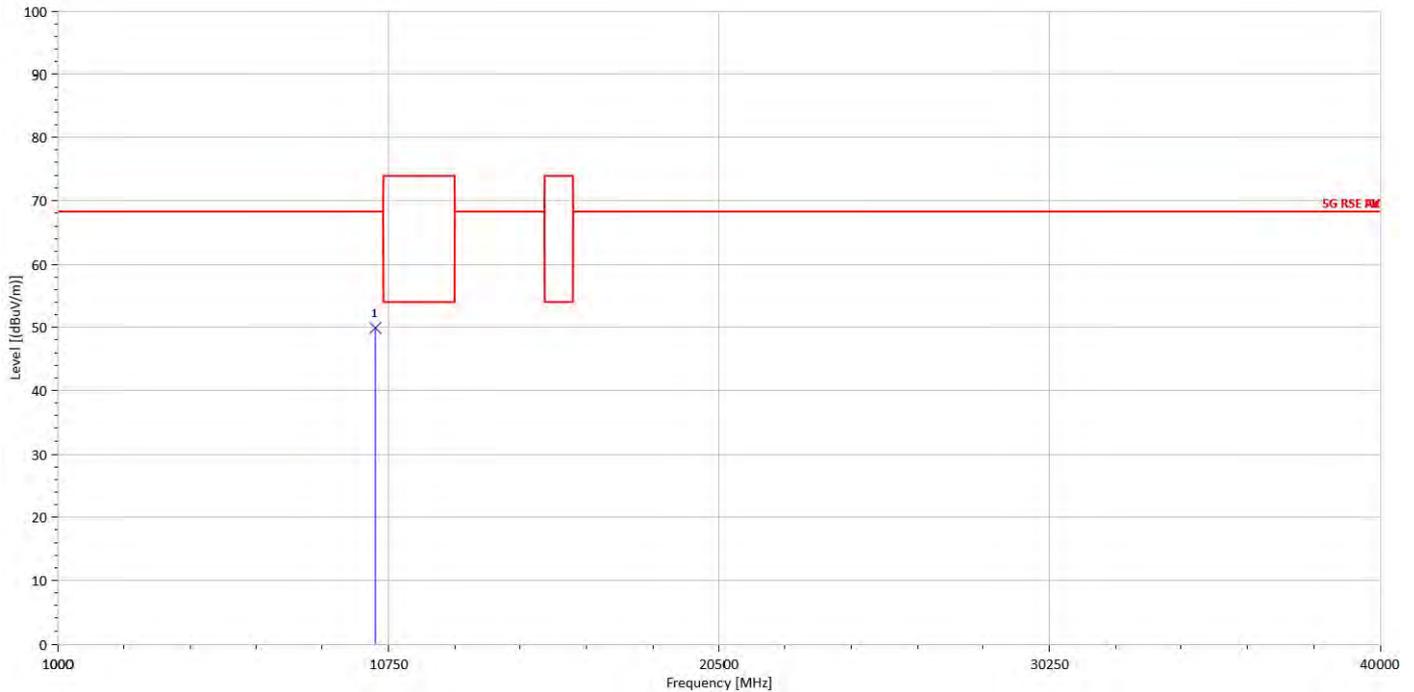
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Operation Mode :	802.11aB1	Test Date :	2017/8/30
Fundamental Frequency :	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10360.00	H	Peak	29.70	20.18	49.88	68.3	-18.42

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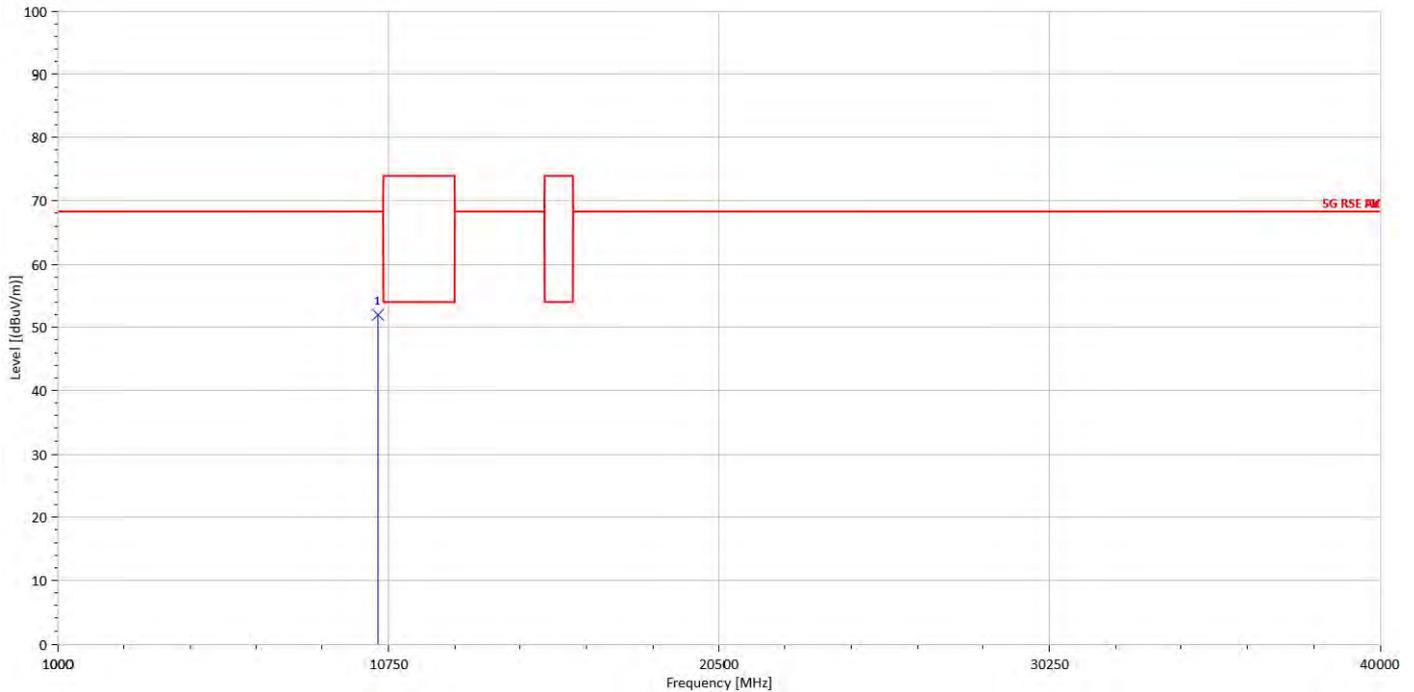
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Operation Mode :	802.11aB1	Test Date :	2017/8/30
Fundamental Frequency :	5220 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10440.00	H	Peak	31.68	20.29	51.97	68.3	-16.33

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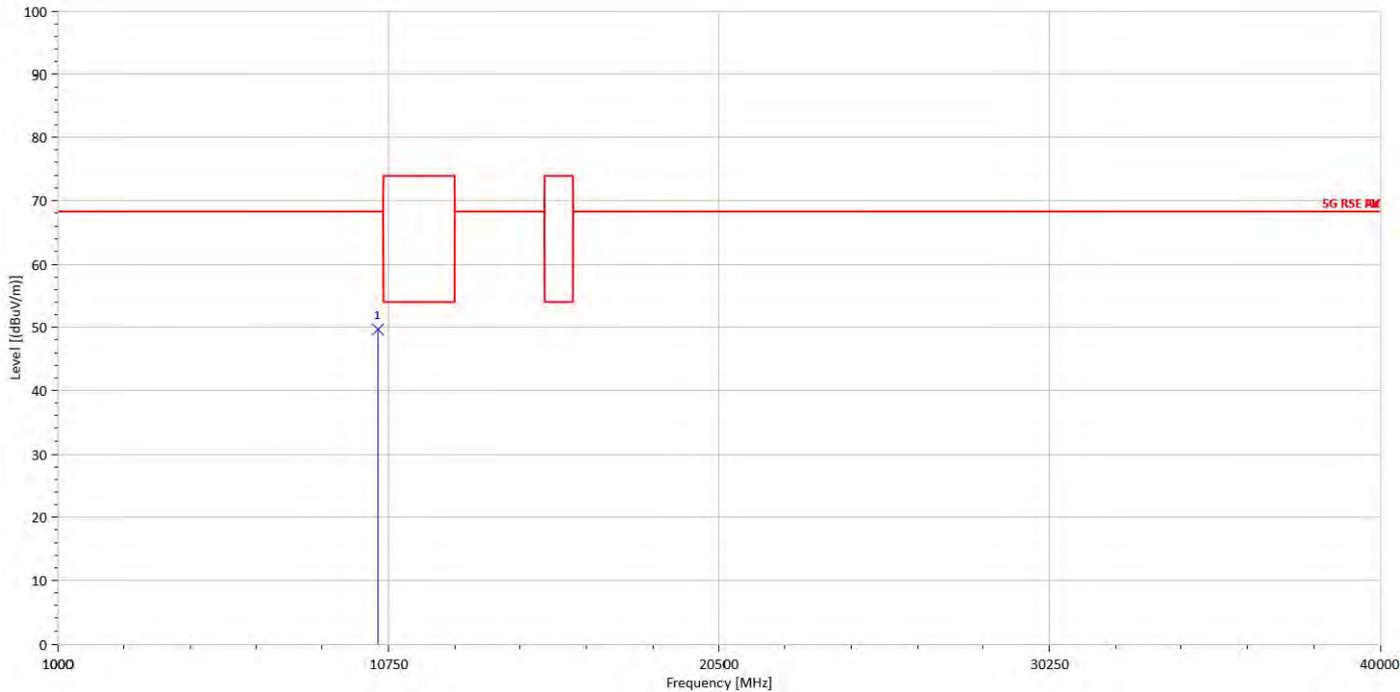
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Operation Mode :	802.11aB1	Test Date :	2017/8/30
Fundamental Frequency :	5220 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10440.00	H	Peak	29.34	20.29	49.64	68.3	-18.66

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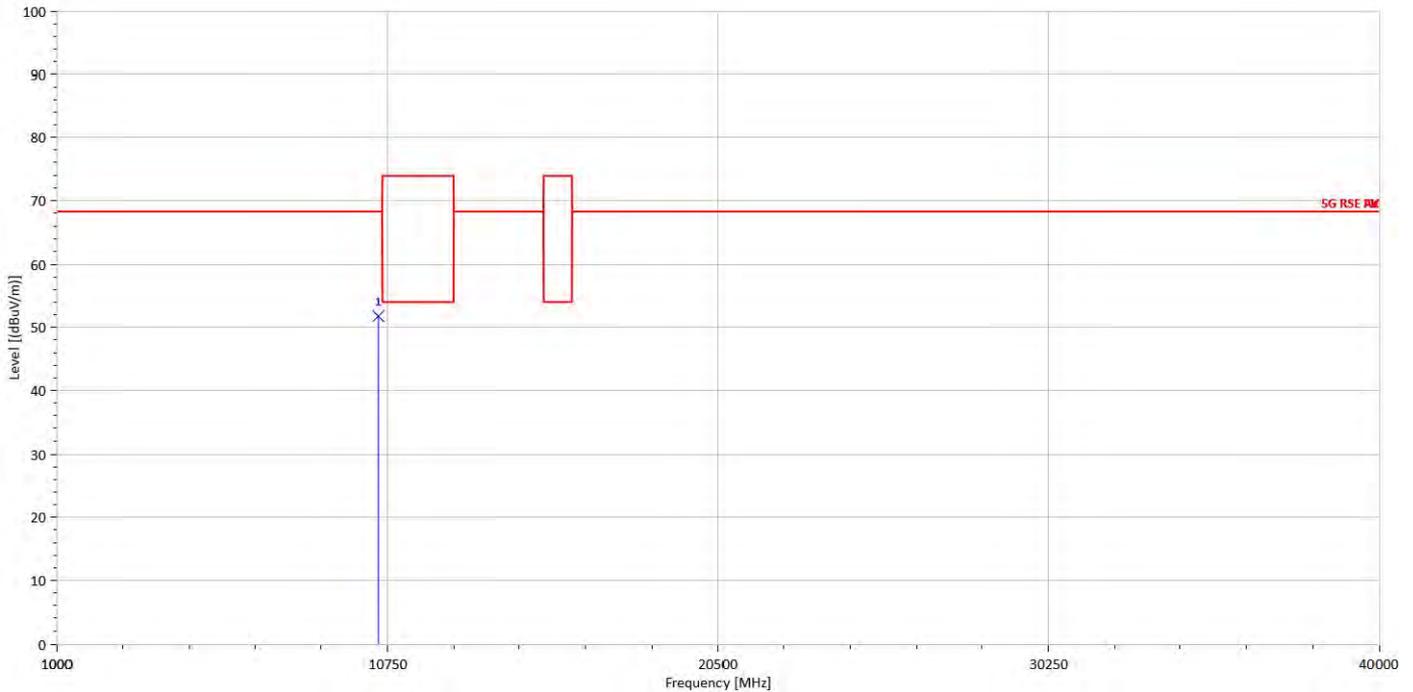
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Operation Mode :	802.11aB1	Test Date :	2017/8/30
Fundamental Frequency :	5240 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10480.00	H	Peak	31.08	20.68	51.76	68.3	-16.54

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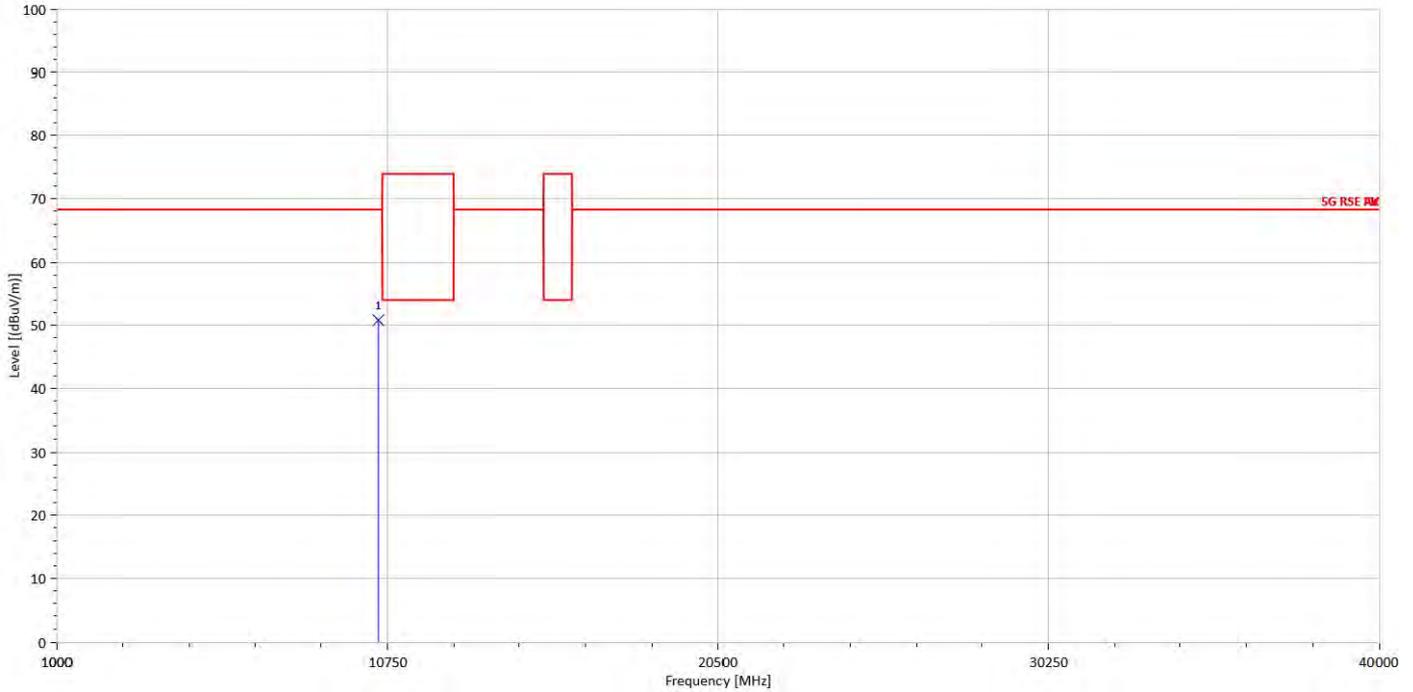
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Operation Mode : 802.11aB1      Test Date : 2017/8/30  
 Fundamental Frequency : 5240 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10480.00	H	Peak	30.12	20.68	50.80	68.3	-17.50

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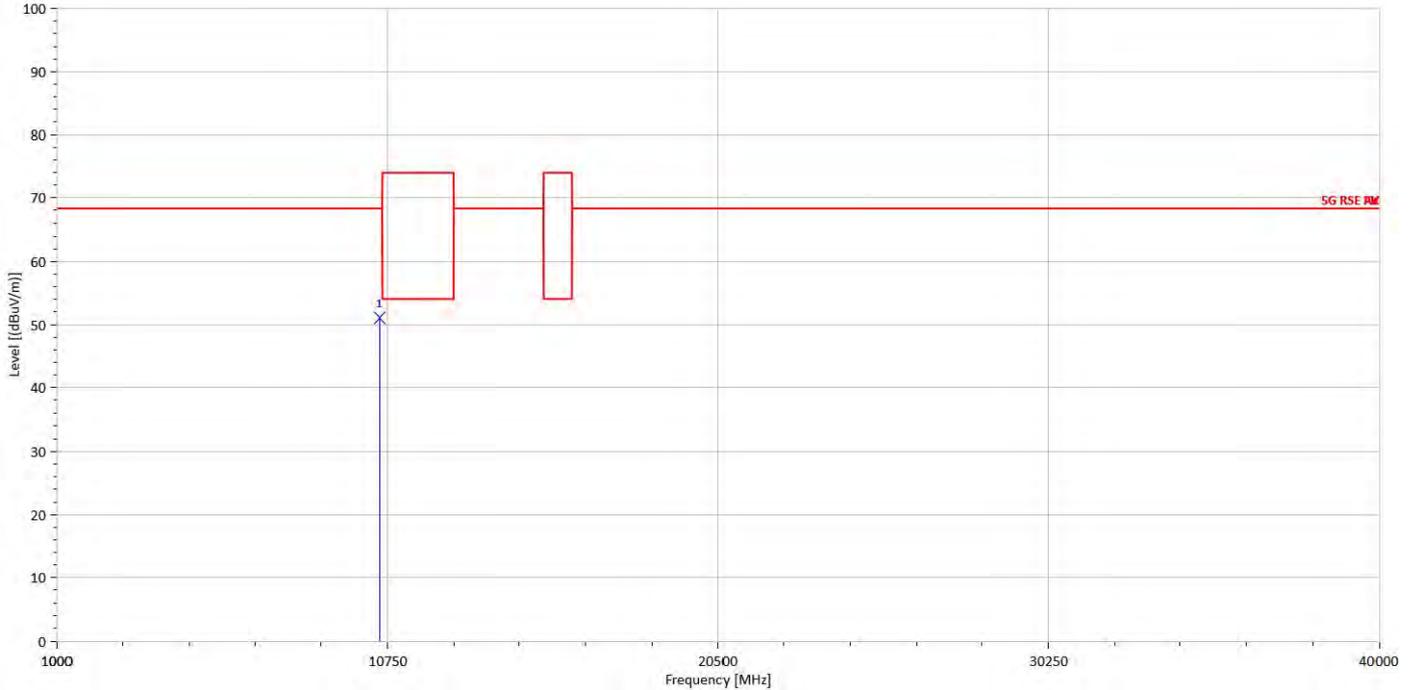
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### Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

Operation Mode :	802.11aB2	Test Date :	2017/8/30
Fundamental Frequency :	5260 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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	H	Peak	30.96	20.10	51.06	68.3	-17.24

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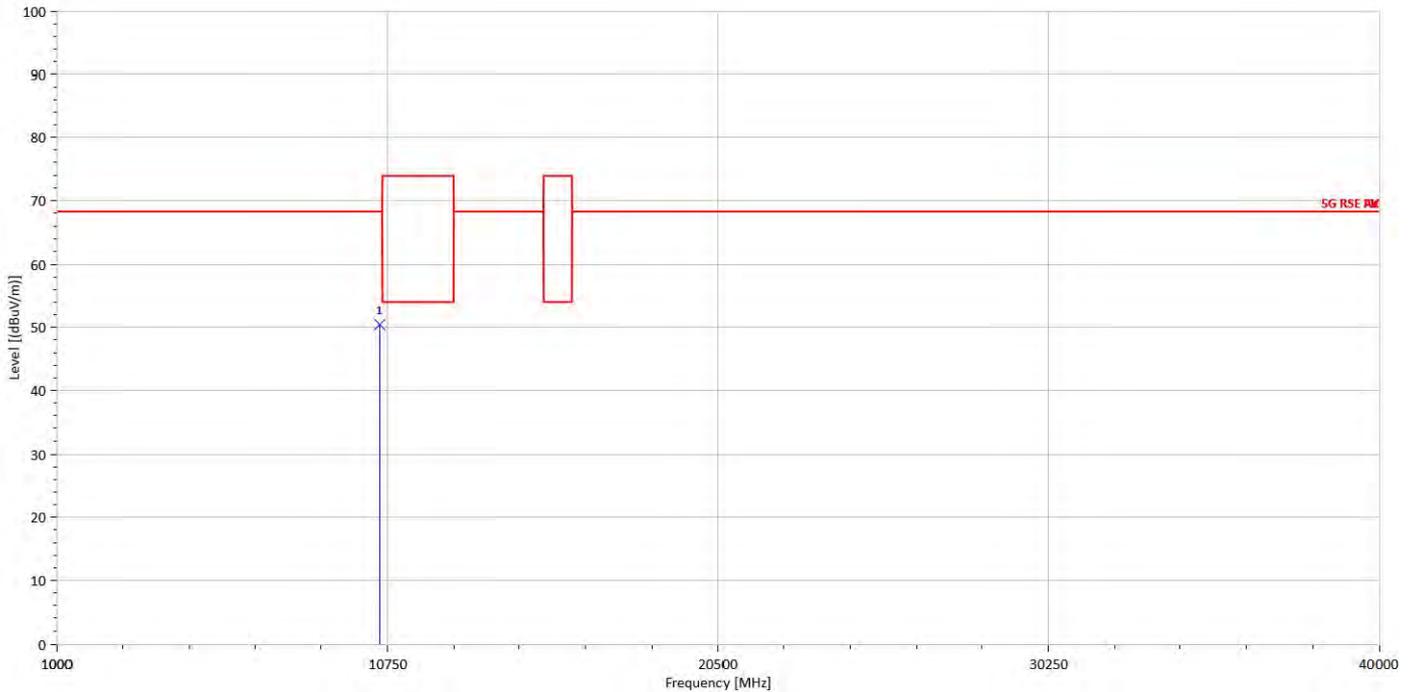
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Operation Mode :	802.11aB2	Test Date :	2017/8/30
Fundamental Frequency :	5260 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10520.00	H	Peak	30.32	20.10	50.42	68.3	-17.88

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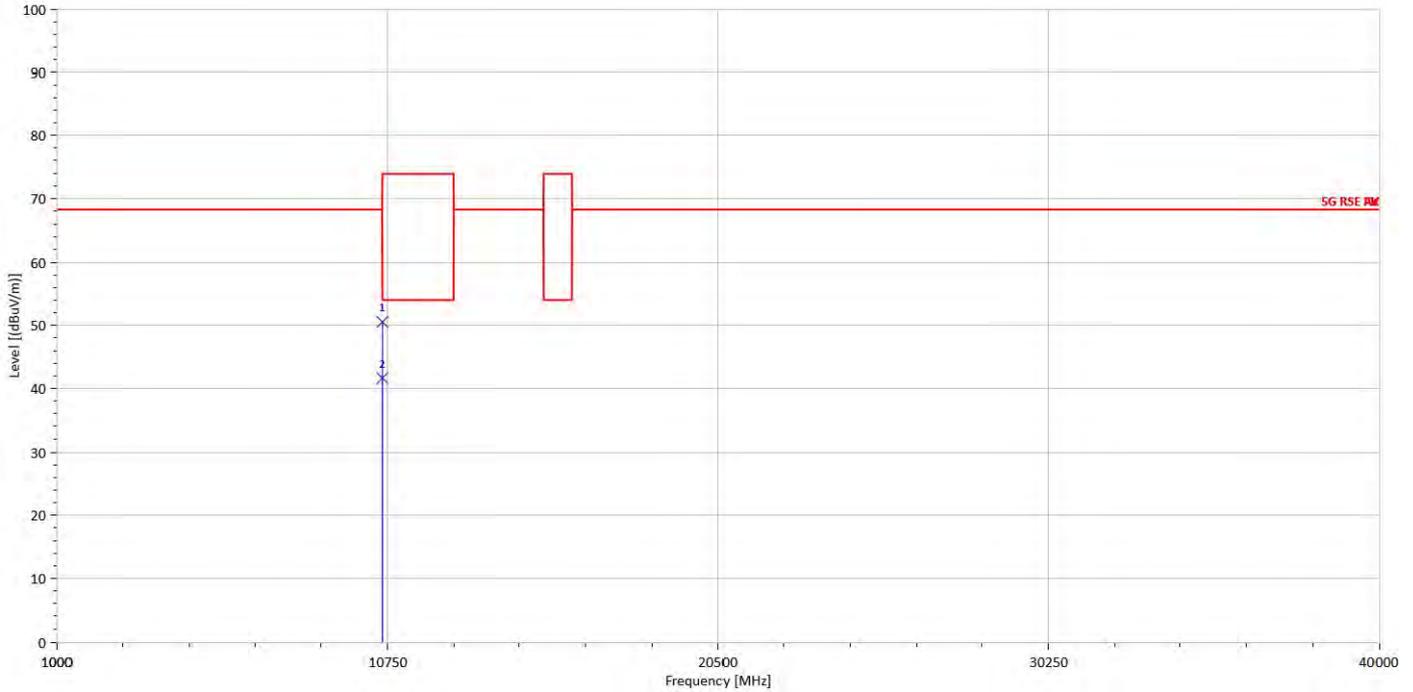
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Operation Mode : 802.11aB2      Test Date : 2017/8/30  
 Fundamental Frequency : 5300 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10600.00	H	Peak	30.36	20.17	50.52	74	-23.48
10600.00	H	Average	21.55	20.17	41.72	54	-12.28

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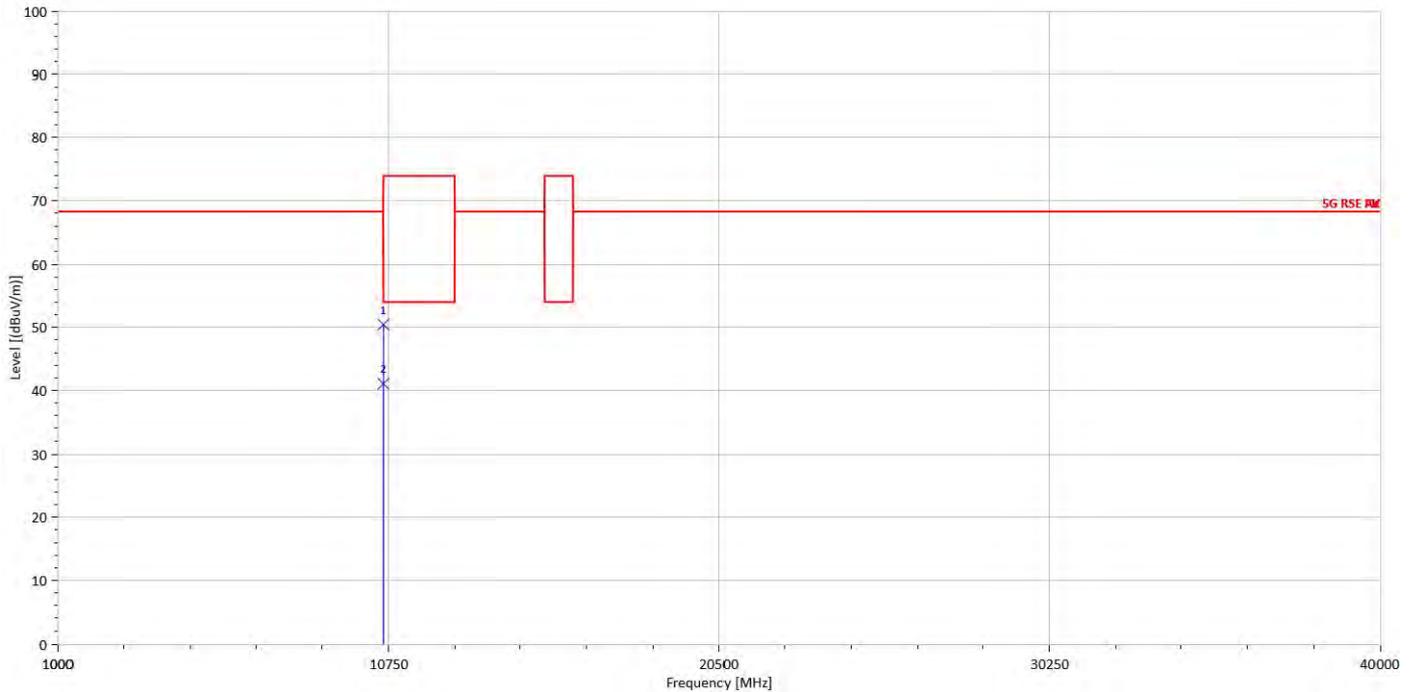
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Operation Mode : 802.11aB2 Test Date : 2017/8/30  
 Fundamental Frequency : 5300 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10600.00	H	Peak	30.27	20.17	50.43	74	-23.57
10600.00	H	Average	20.96	20.17	41.13	54	-12.87

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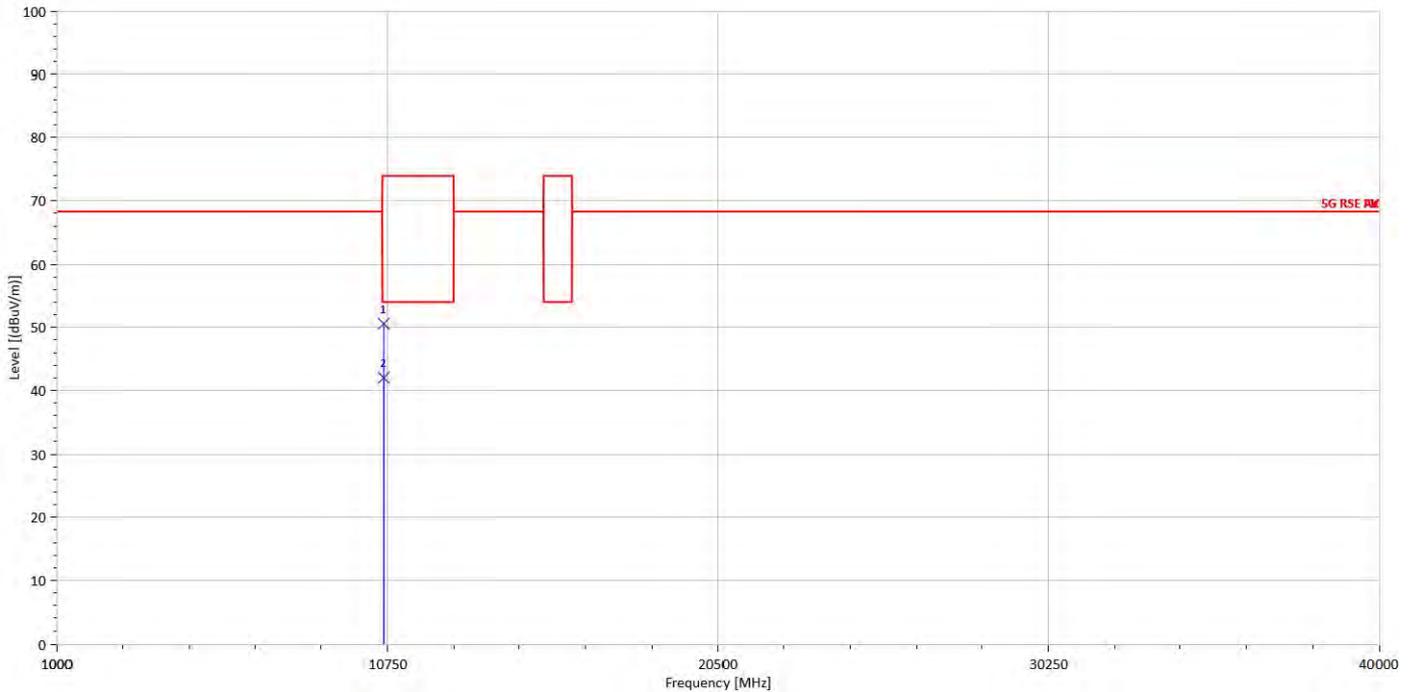
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Operation Mode : 802.11aB2 Test Date : 2017/8/30  
 Fundamental Frequency : 5320 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10640.00	H	Peak	30.21	20.34	50.56	74	-23.44
10640.00	H	Average	21.74	20.34	42.08	54	-11.92

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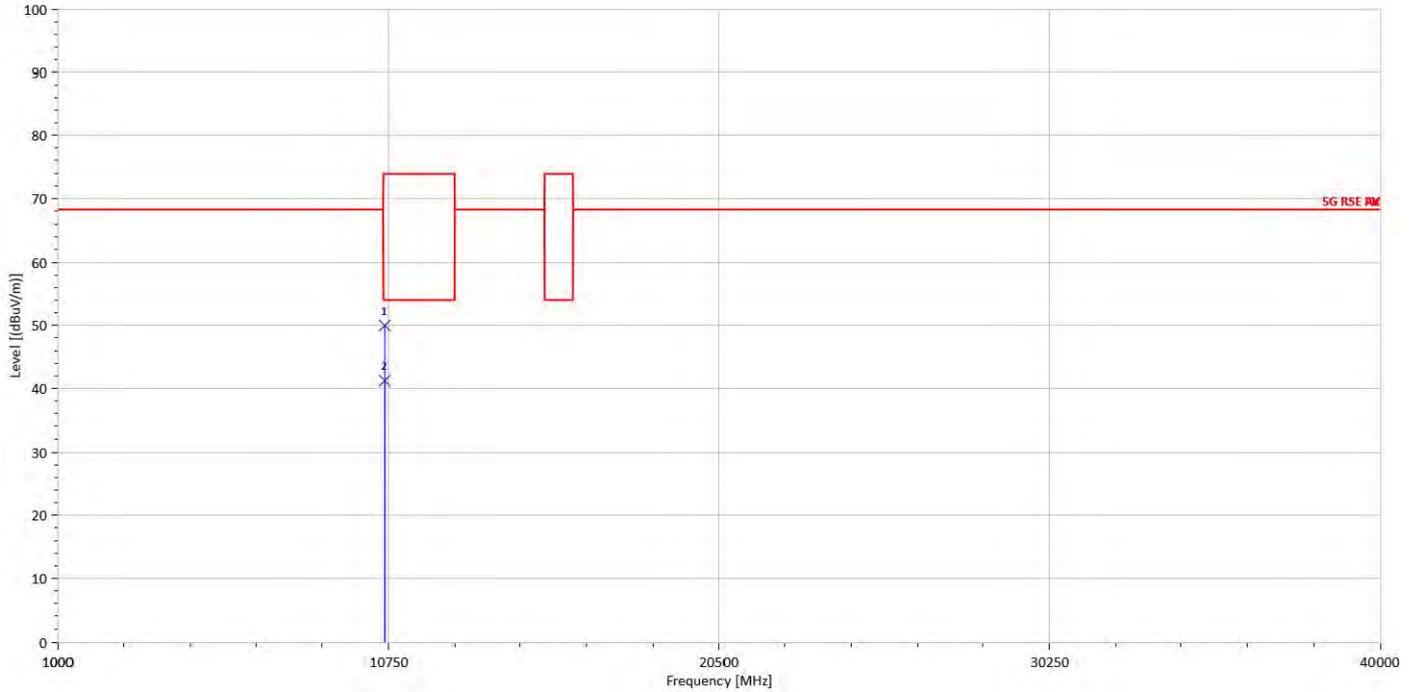
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Operation Mode : 802.11aB2 Test Date : 2017/8/30  
 Fundamental Frequency : 5320 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10640.00	H	Peak	29.61	20.34	49.95	74	-24.05
10640.00	H	Average	20.96	20.34	41.30	54	-12.70

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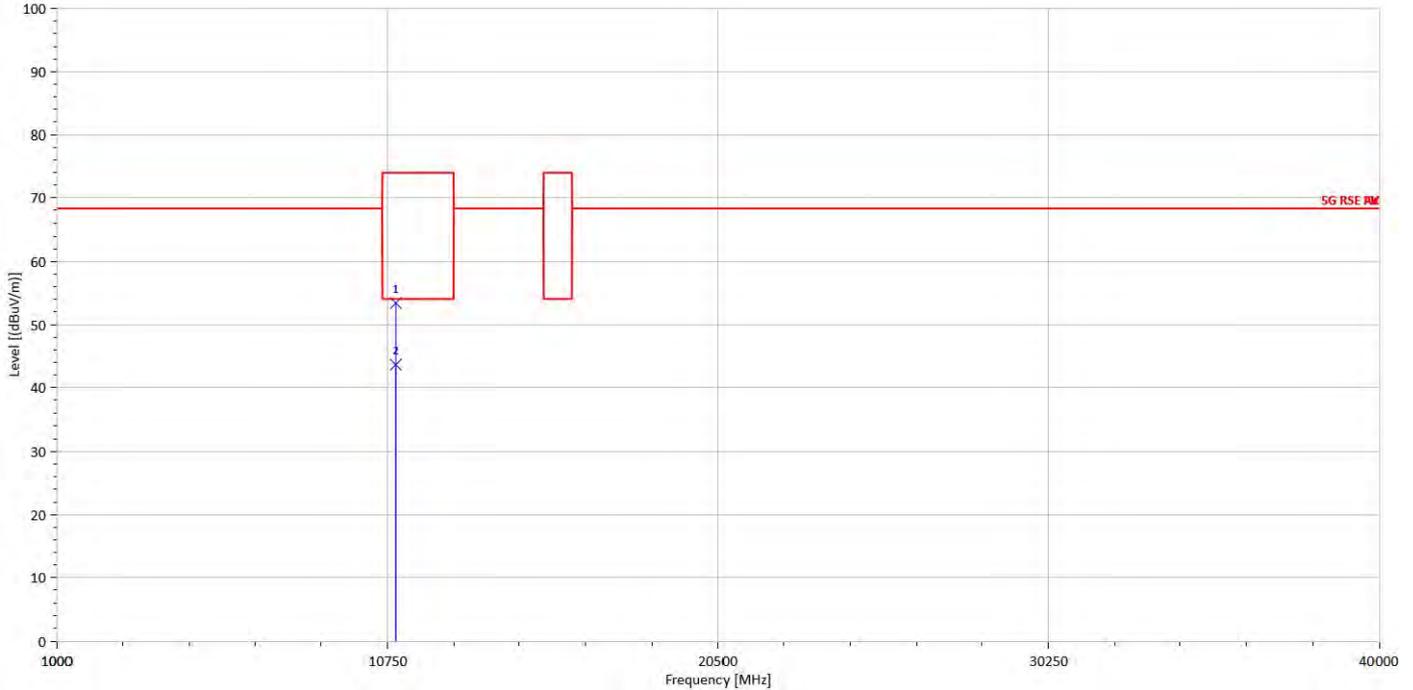
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### Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz

Operation Mode : 802.11aB3      Test Date : 2017/8/30  
 Fundamental Frequency : 5500 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



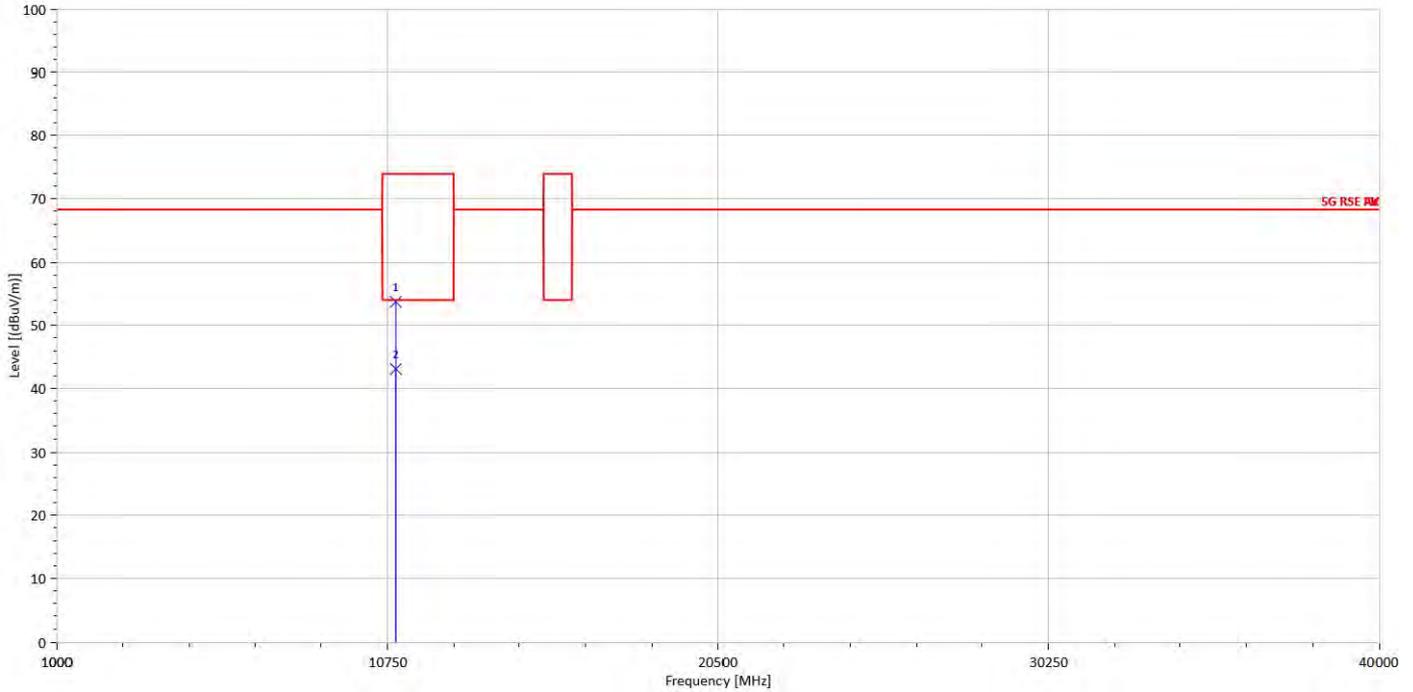
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11000.00	H	Peak	31.26	22.11	53.37	74	-20.63
11000.00	H	Average	21.57	22.11	43.68	54	-10.32

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Operation Mode : 802.11aB3 Test Date : 2017/8/30  
 Fundamental Frequency : 5500 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11000.00	H	Peak	31.62	22.11	53.73	74	-20.27
11000.00	H	Average	21.06	22.11	43.17	54	-10.83

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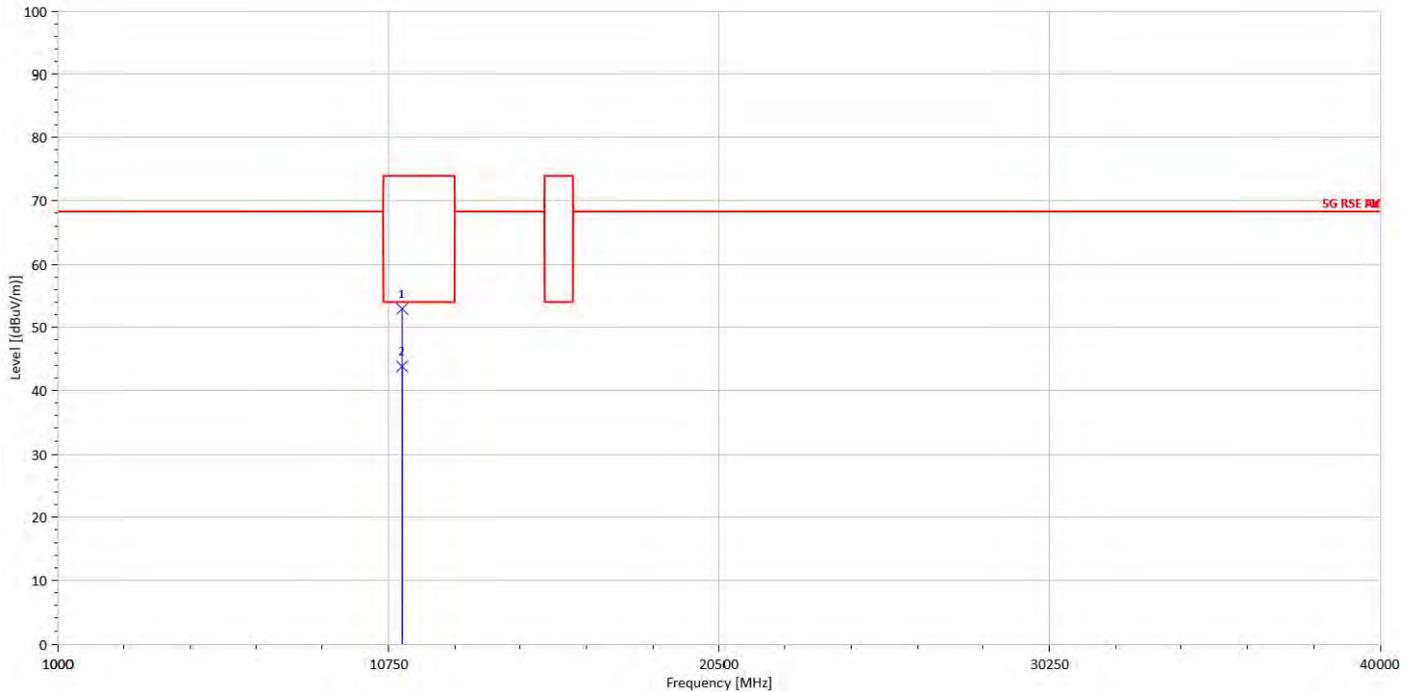
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Operation Mode :	802.11aB3	Test Date :	2017/8/30
Fundamental Frequency :	5580 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11160.00	H	Peak	30.90	22.04	52.94	74	-21.06
11160.00	H	Average	21.85	22.04	43.89	54	-10.11

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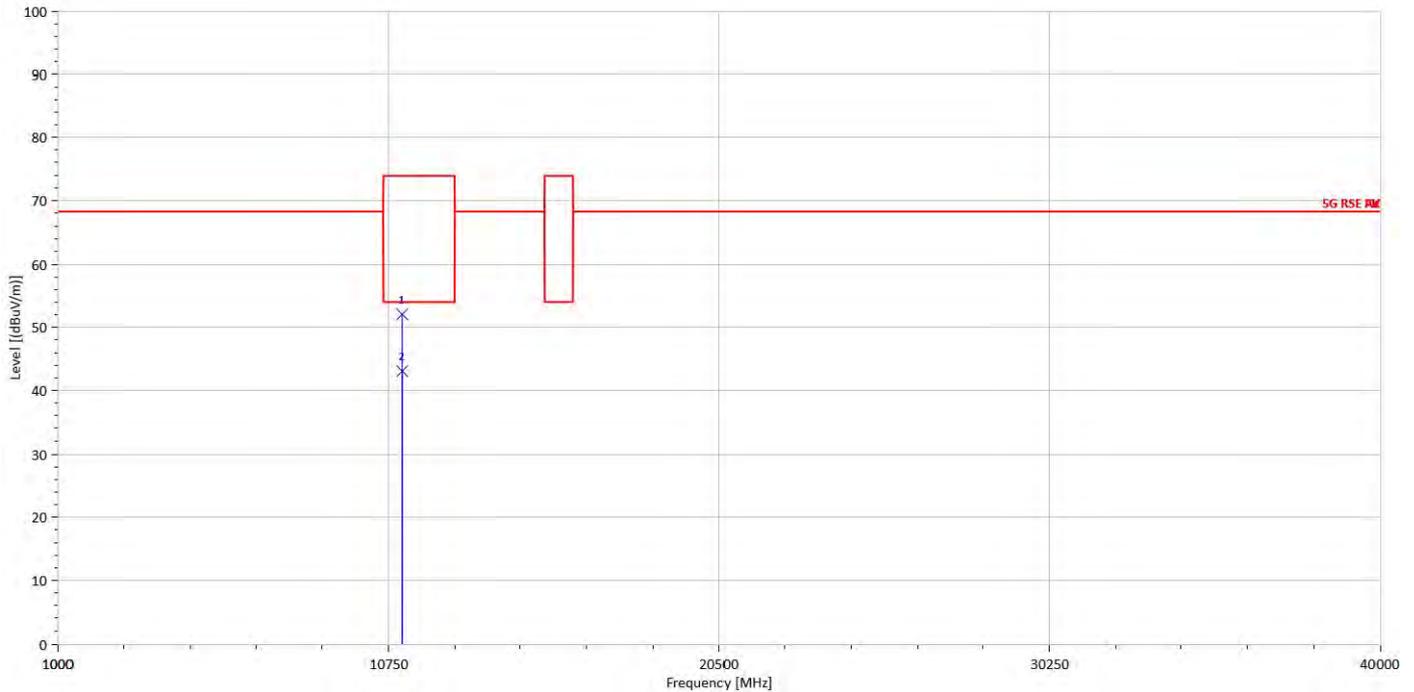
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Operation Mode :	802.11aB3	Test Date :	2017/8/30
Fundamental Frequency :	5580 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11160.00	H	Peak	30.02	22.04	52.05	74	-21.95
11160.00	H	Average	21.10	22.04	43.14	54	-10.86

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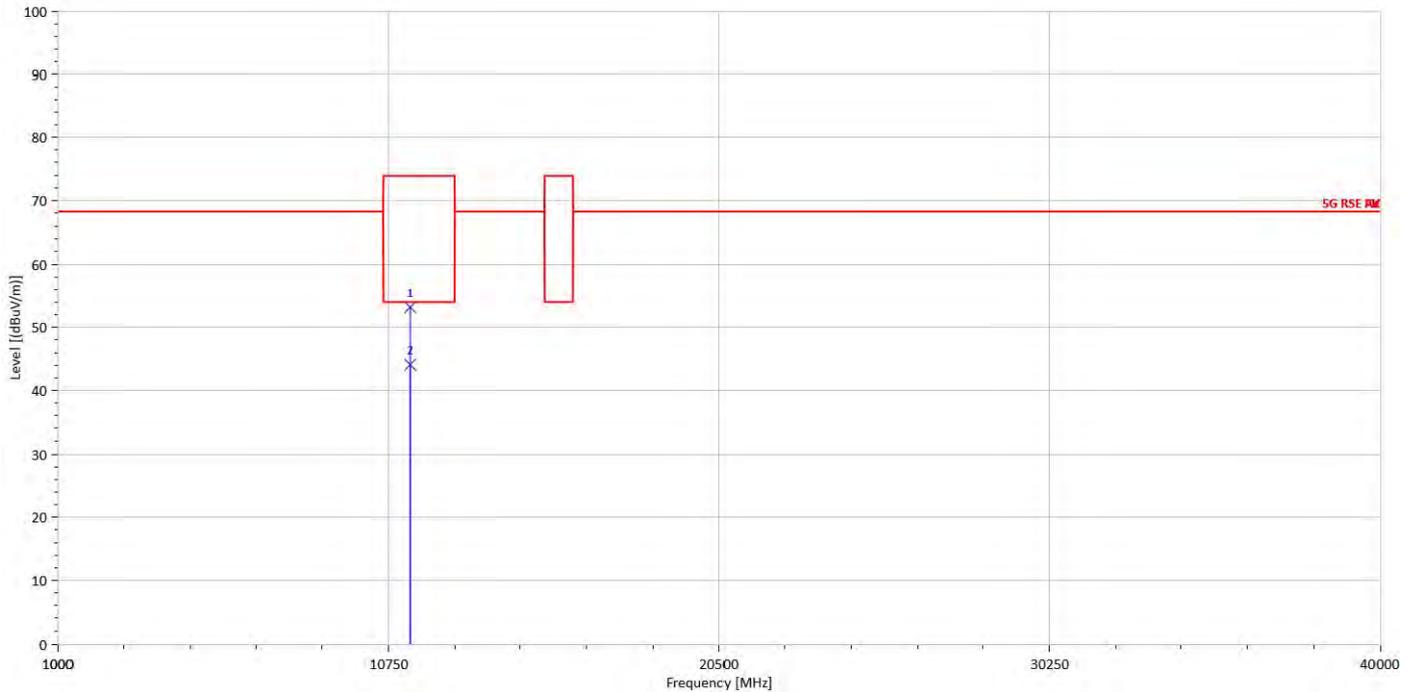
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Operation Mode : 802.11aB3 Test Date : 2017/8/30  
 Fundamental Frequency : 5700 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11400.00	H	Peak	31.98	21.22	53.19	74	-20.81
11400.00	H	Average	22.95	21.22	44.17	54	-9.83

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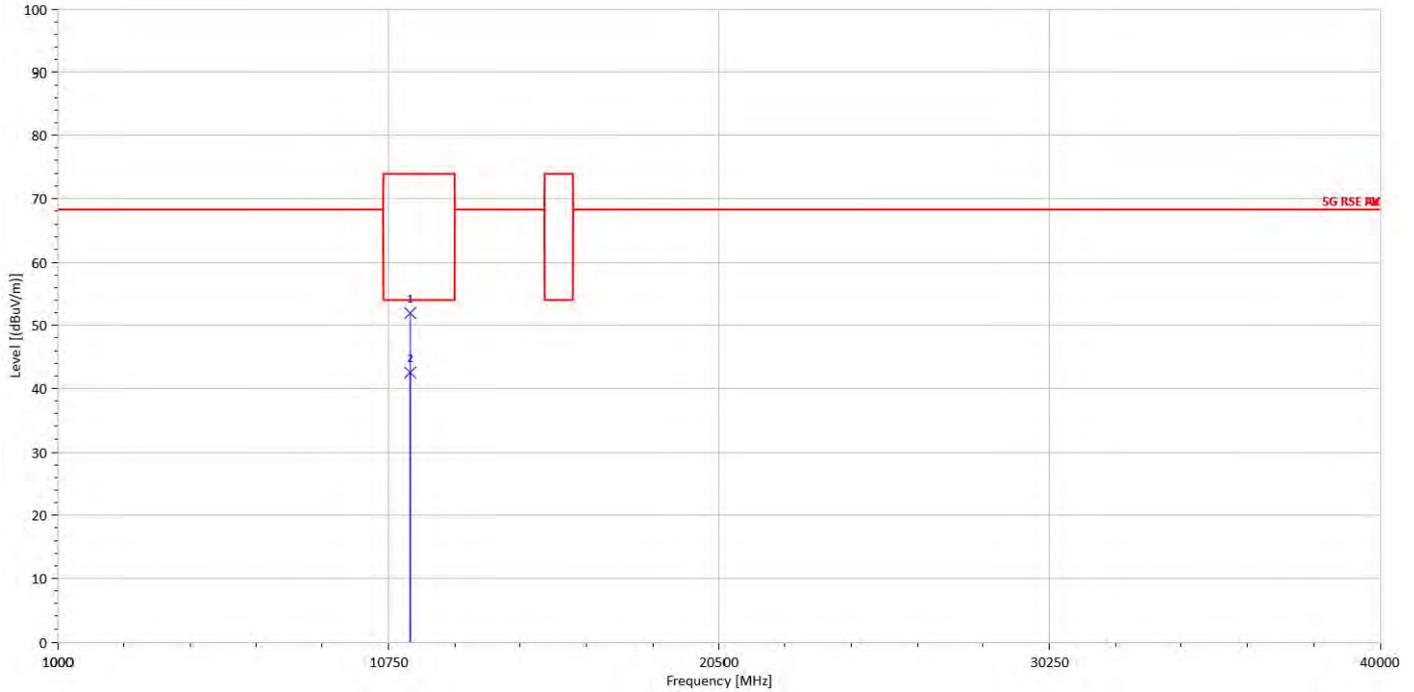
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Operation Mode : 802.11aB3 Test Date : 2017/8/30  
 Fundamental Frequency : 5700 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11400.00	H	Peak	30.73	21.22	51.94	74	-22.06
11400.00	H	Average	21.39	21.22	42.61	54	-11.39

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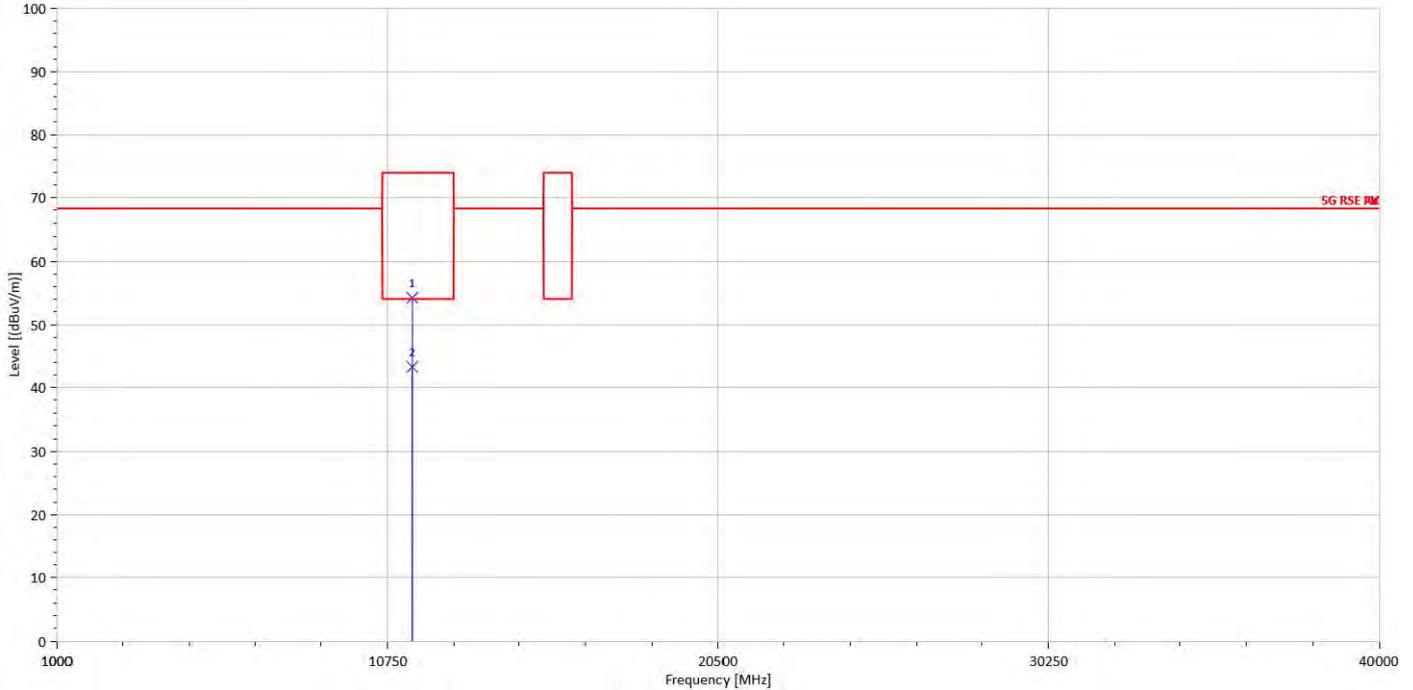
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### Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz

Operation Mode : 802.11aB4      Test Date : 2017/8/30  
 Fundamental Frequency : 5745 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	H	Peak	33.49	20.70	54.19	74	-19.81
11490.00	H	Average	22.61	20.70	43.31	54	-10.69

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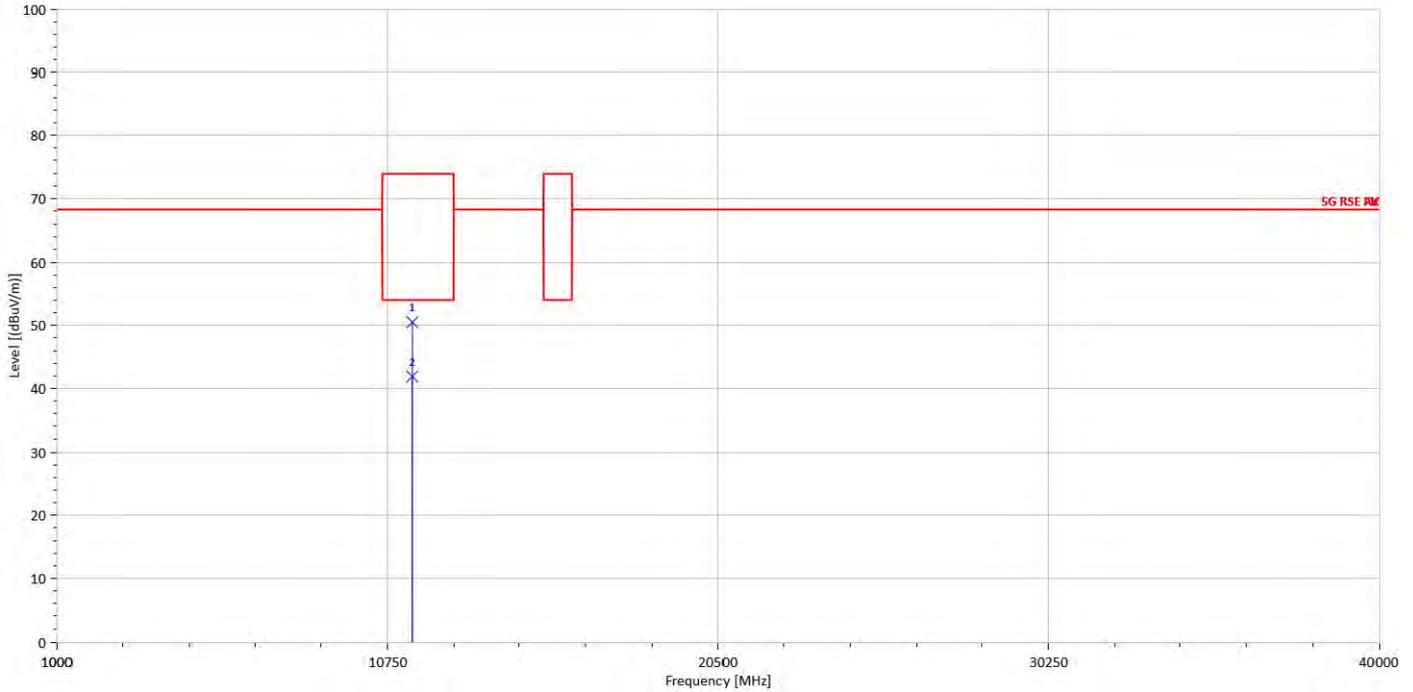
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Operation Mode : 802.11aB4      Test Date : 2017/8/30  
 Fundamental Frequency : 5745 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11490.00	H	Peak	29.78	20.70	50.48	74	-23.52
11490.00	H	Average	21.26	20.70	41.96	54	-12.04

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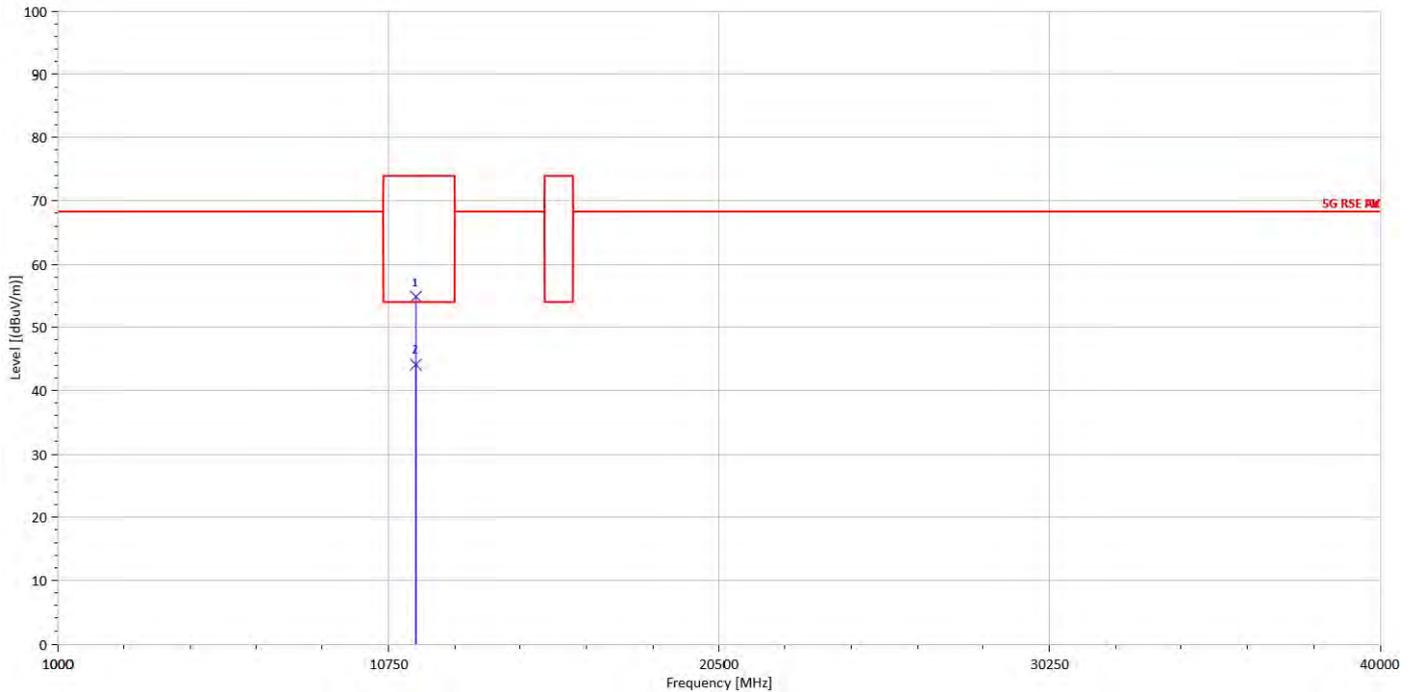
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Operation Mode :	802.11aB4	Test Date :	2017/8/30
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11570.00	H	Peak	33.43	21.44	54.87	74	-19.13
11570.00	H	Average	22.74	21.44	44.18	54	-9.82

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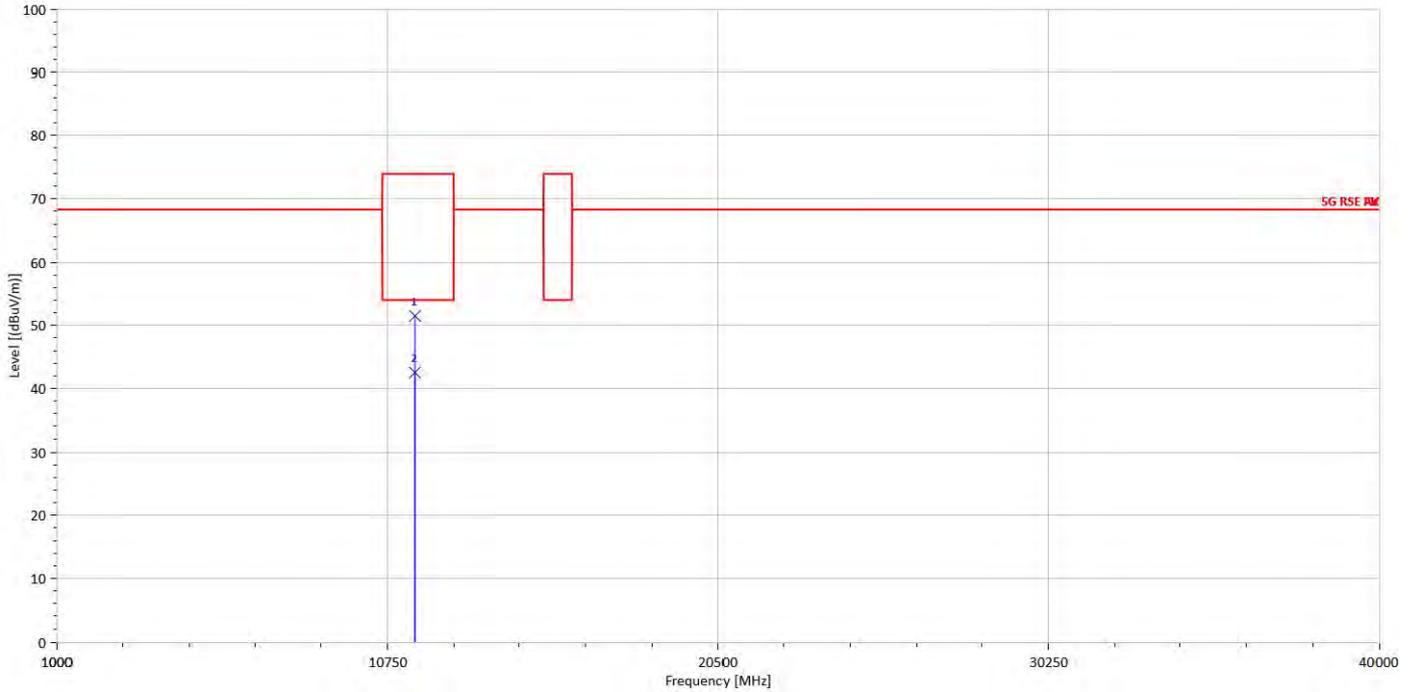
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Operation Mode : 802.11aB4      Test Date : 2017/8/30  
 Fundamental Frequency : 5785 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11570.00	H	Peak	30.03	21.44	51.48	74	-22.52
11570.00	H	Average	21.15	21.44	42.59	54	-11.41

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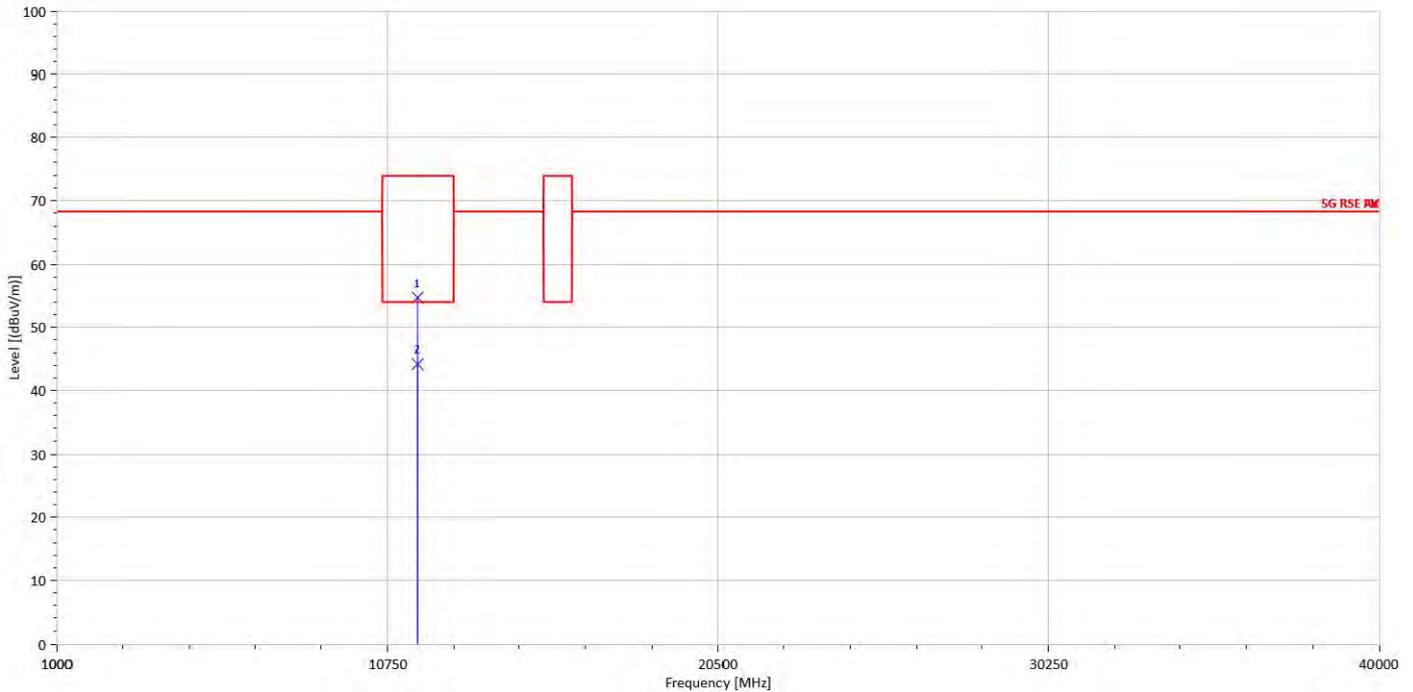
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Operation Mode : 802.11aB4 Test Date : 2017/8/30  
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11650.00	H	Peak	32.71	22.02	54.73	74	-19.27
11650.00	H	Average	22.22	22.02	44.24	54	-9.76

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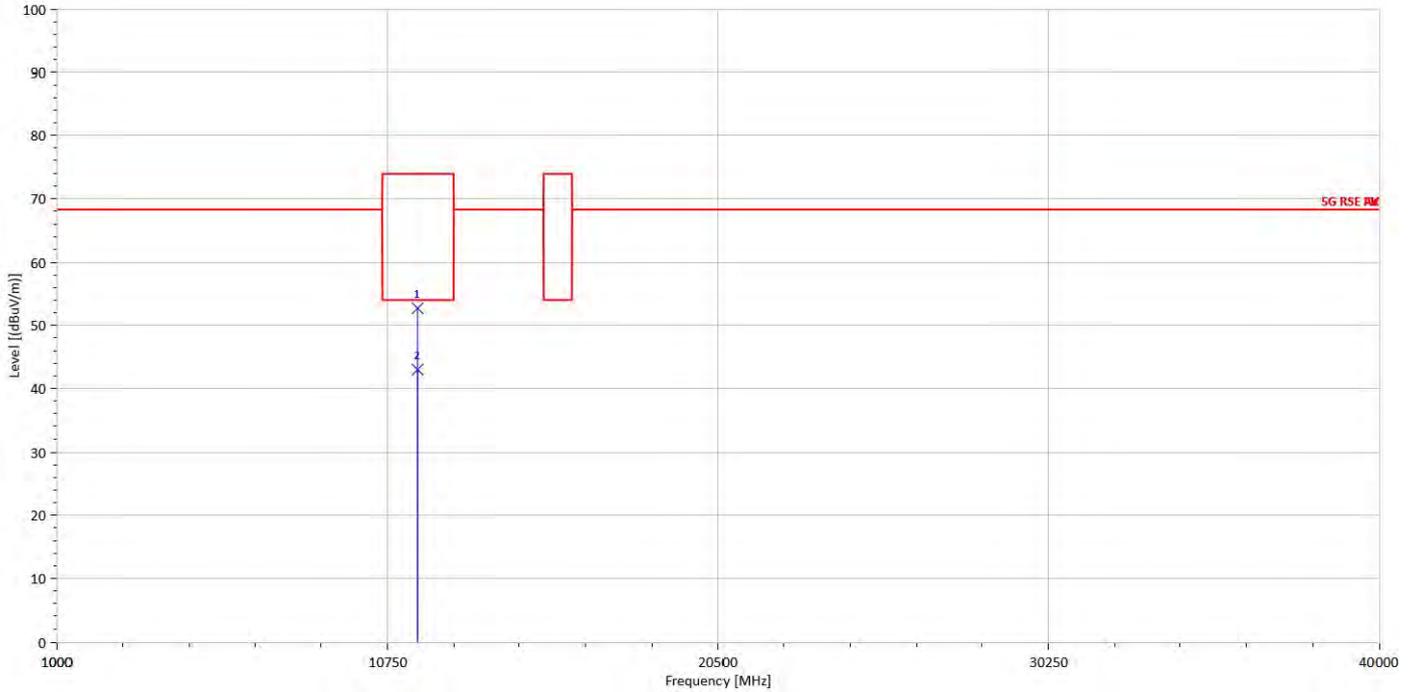
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Operation Mode : 802.11aB4 Test Date : 2017/8/30  
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11650.00	H	Peak	30.67	22.02	52.69	74	-21.31
11650.00	H	Average	21.05	22.02	43.07	54	-10.93

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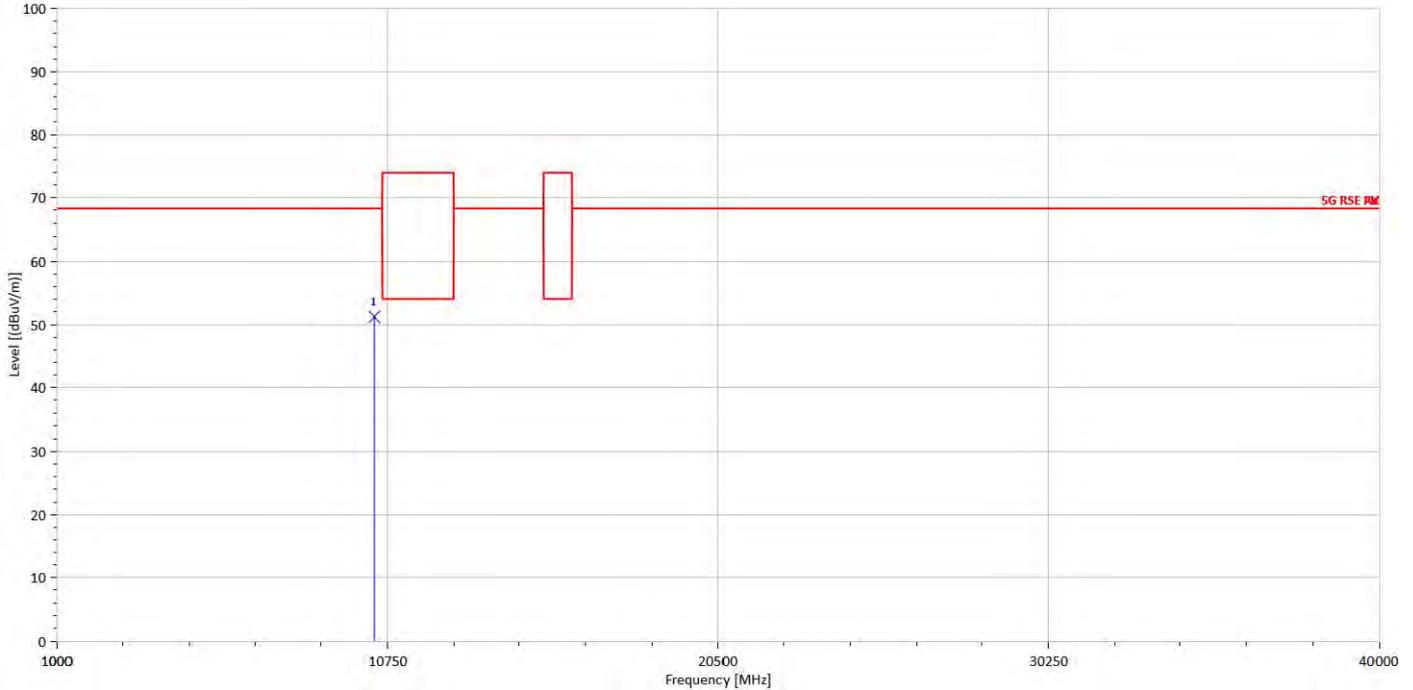
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### Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz

Operation Mode :	802.11n20B1	Test Date :	2017/8/30
Fundamental Frequency :	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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	H	Peak	31.06	20.18	51.23	68.3	-17.07

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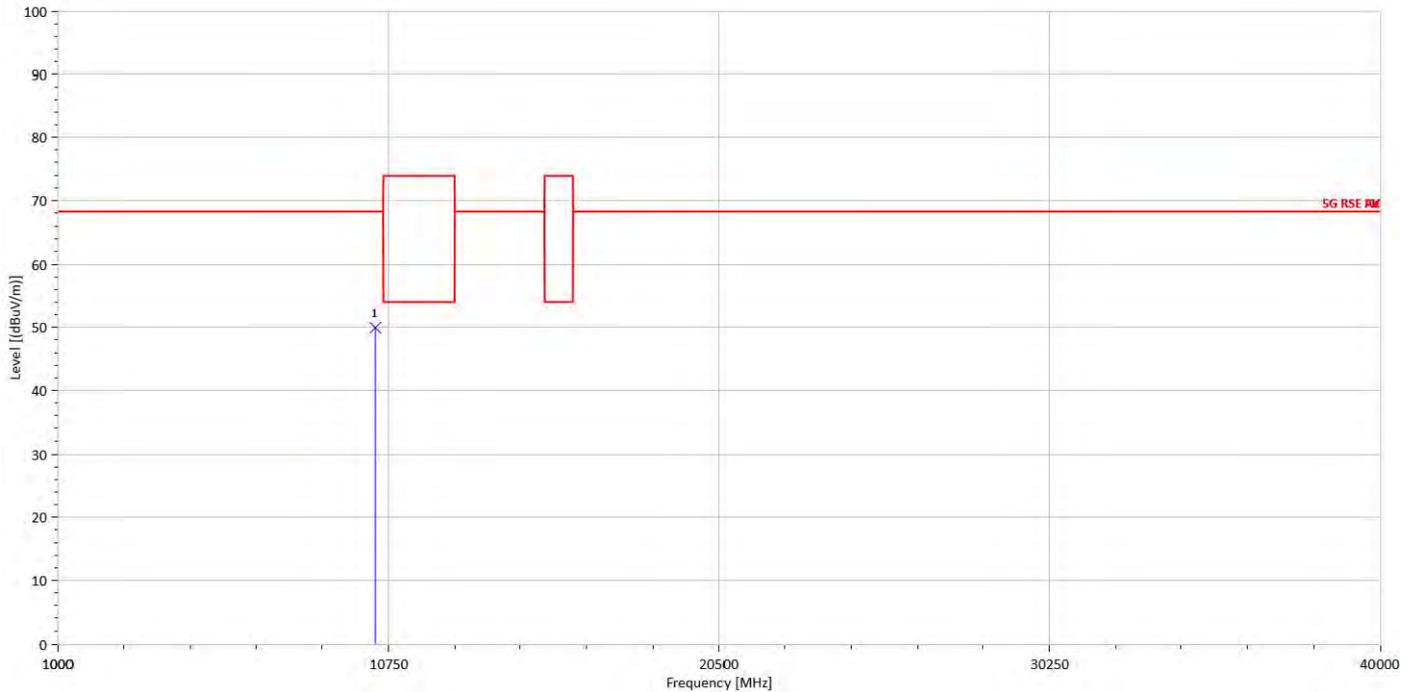
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Operation Mode : 802.11n20B1      Test Date : 2017/8/30  
 Fundamental Frequency : 5180 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10360.00	H	Peak	29.74	20.18	49.91	68.3	-18.39

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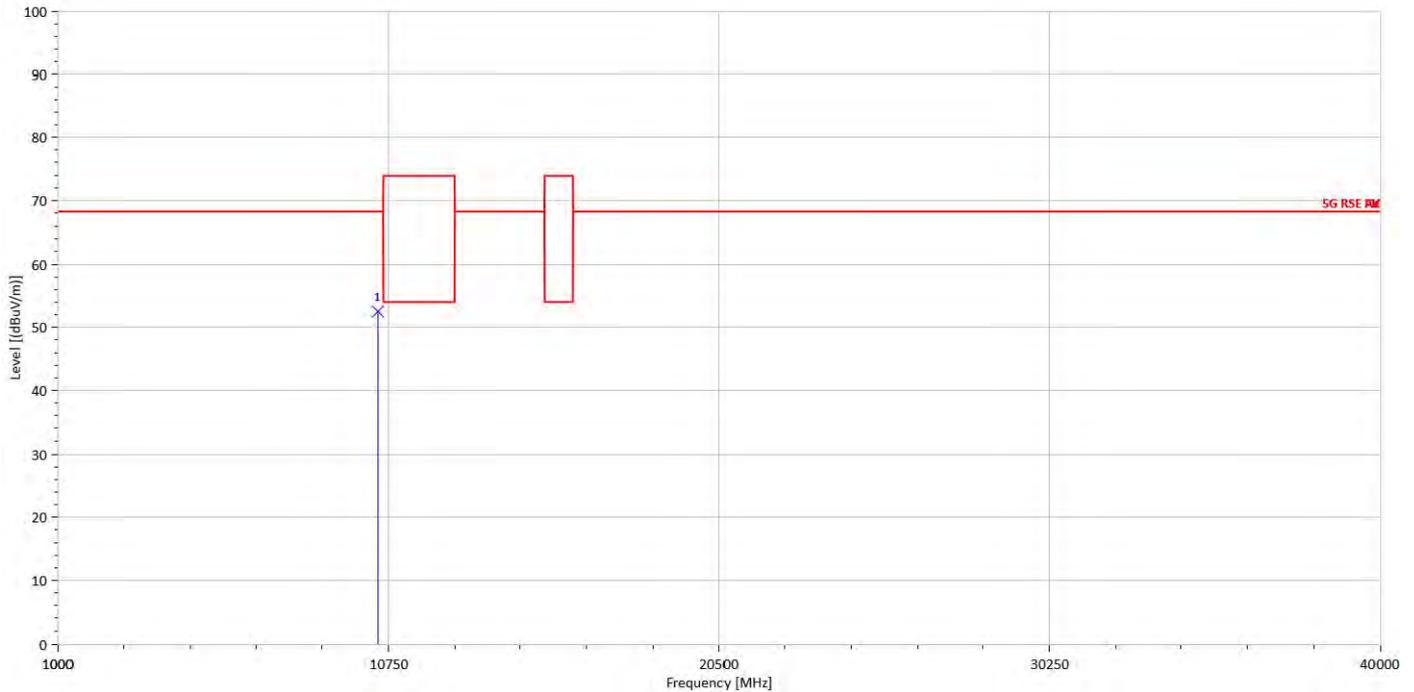
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Operation Mode : 802.11n20B1      Test Date : 2017/8/30  
 Fundamental Frequency : 5220 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10440.00	H	Peak	32.21	20.29	52.51	68.3	-15.79

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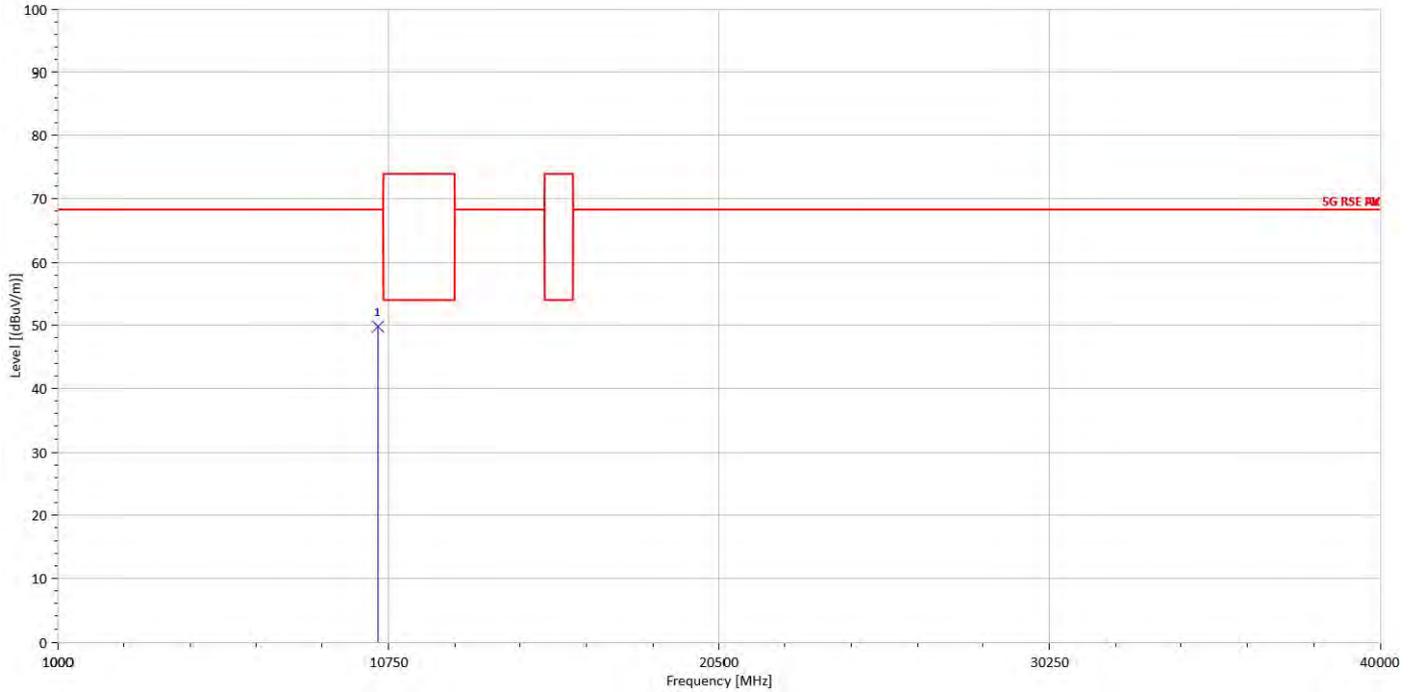
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Operation Mode : 802.11n20B1      Test Date : 2017/8/30  
 Fundamental Frequency : 5220 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10440.00	H	Peak	29.49	20.29	49.78	68.3	-18.52

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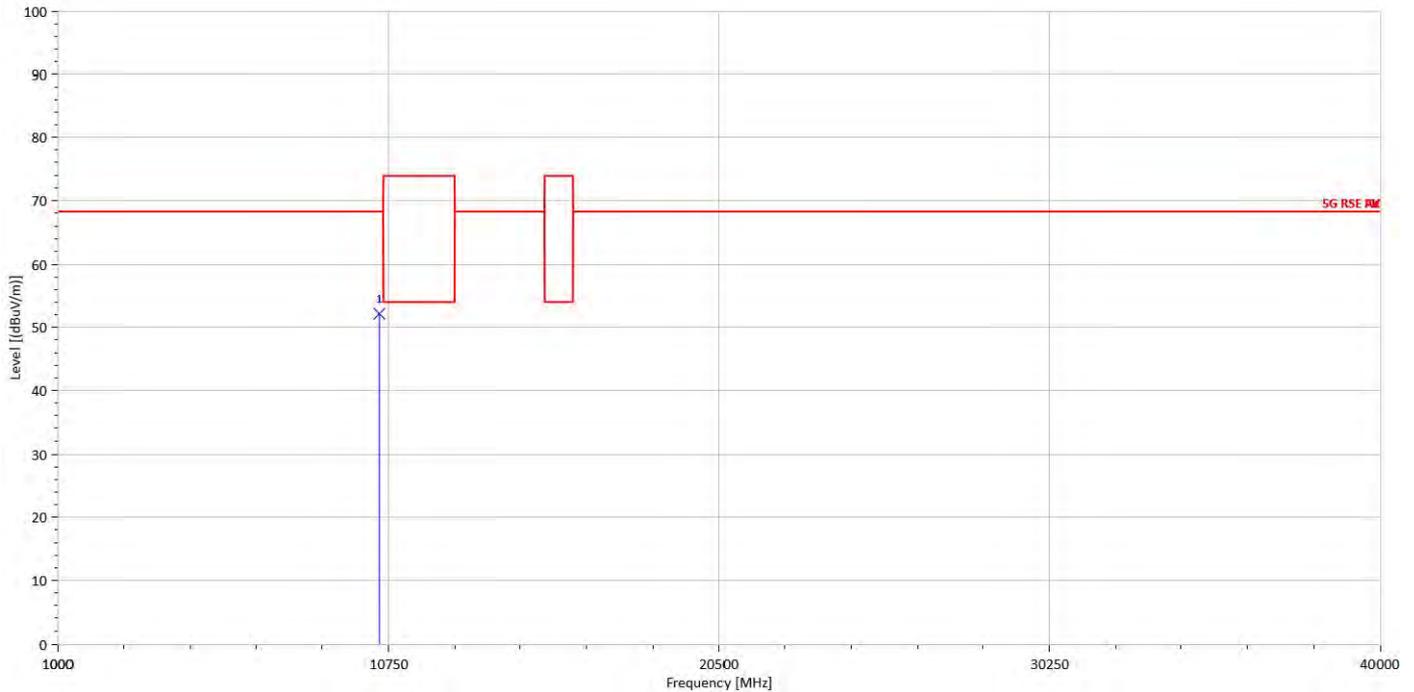
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Operation Mode : 802.11n20B1      Test Date : 2017/8/30  
 Fundamental Frequency : 5240 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10480.00	H	Peak	31.47	20.68	52.14	68.3	-16.16

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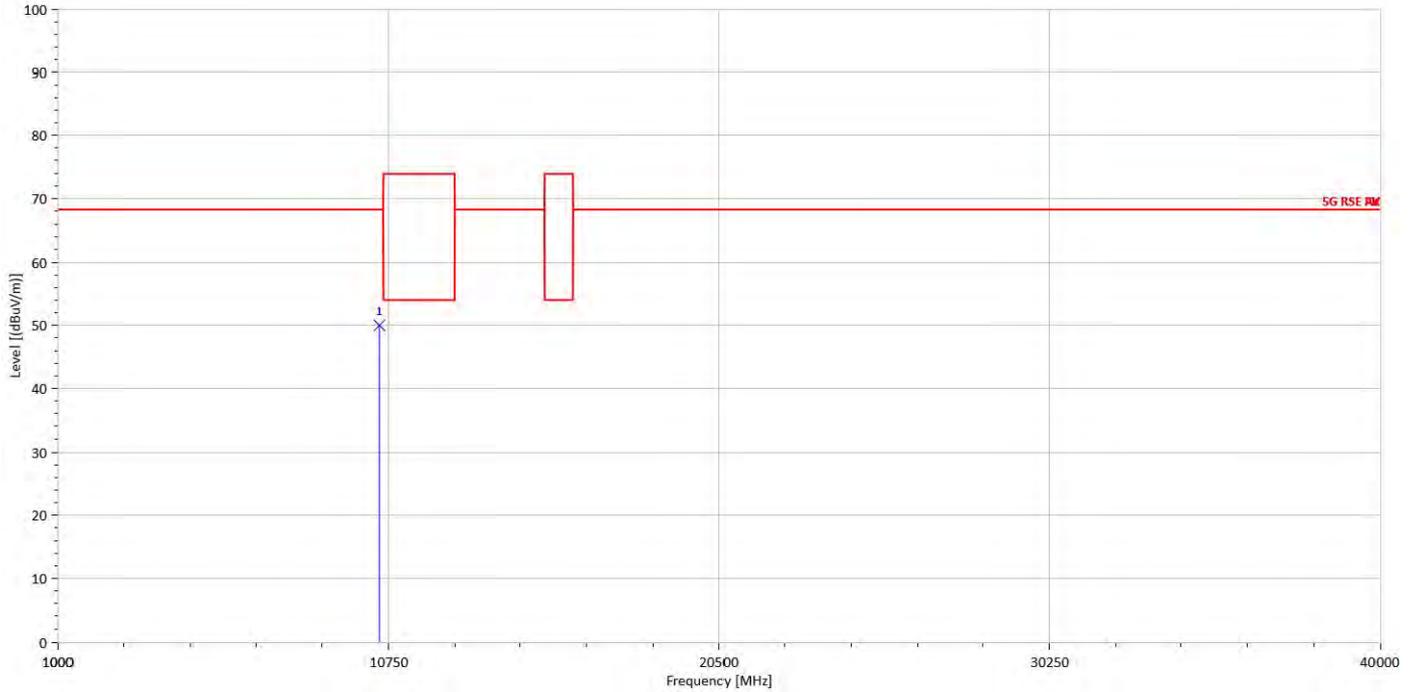
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Operation Mode : 802.11n20B1      Test Date : 2017/8/30  
 Fundamental Frequency : 5240 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10480.00	H	Peak	29.29	20.68	49.97	68.3	-18.33

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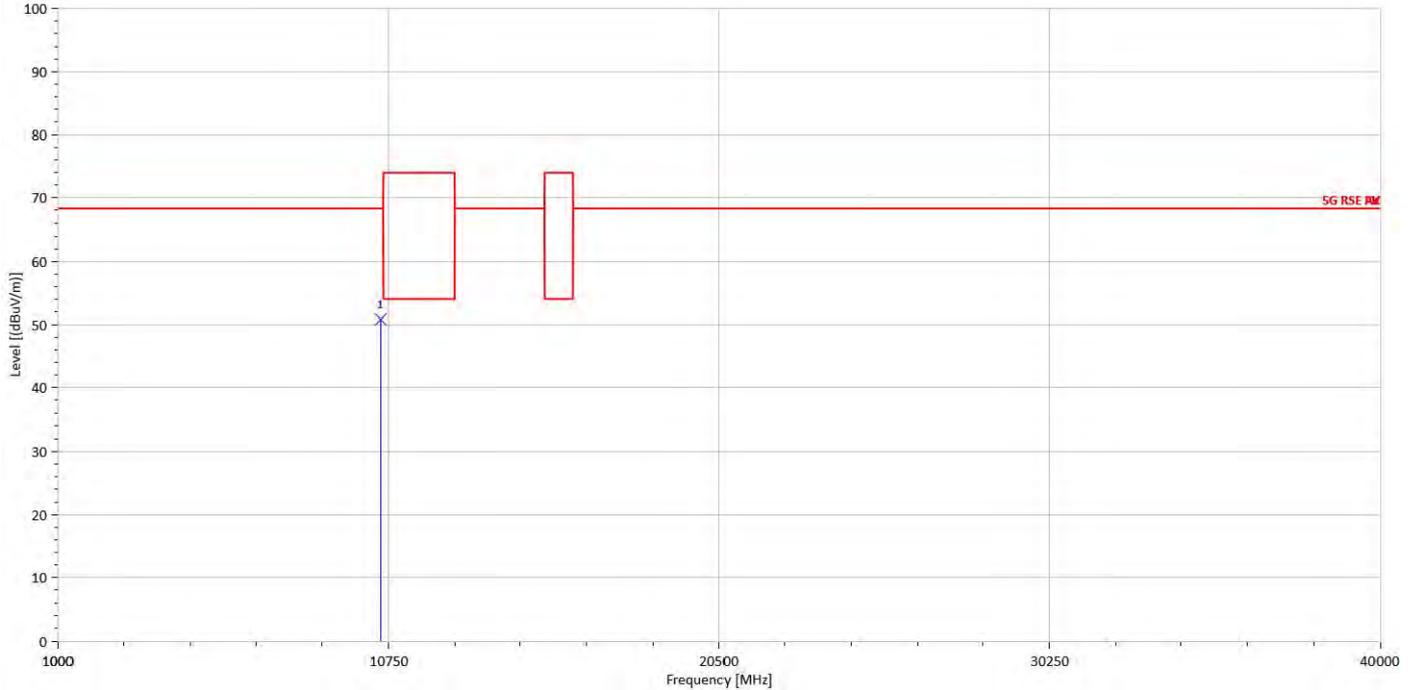
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### Radiated Spurious Emission Measurement Result 802.11n HT20, 5250~5350 MHz

Operation Mode :	802.11n20B2	Test Date :	2017/8/30
Fundamental Frequency :	5260 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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	H	Peak	30.74	20.10	50.84	68.3	-17.46

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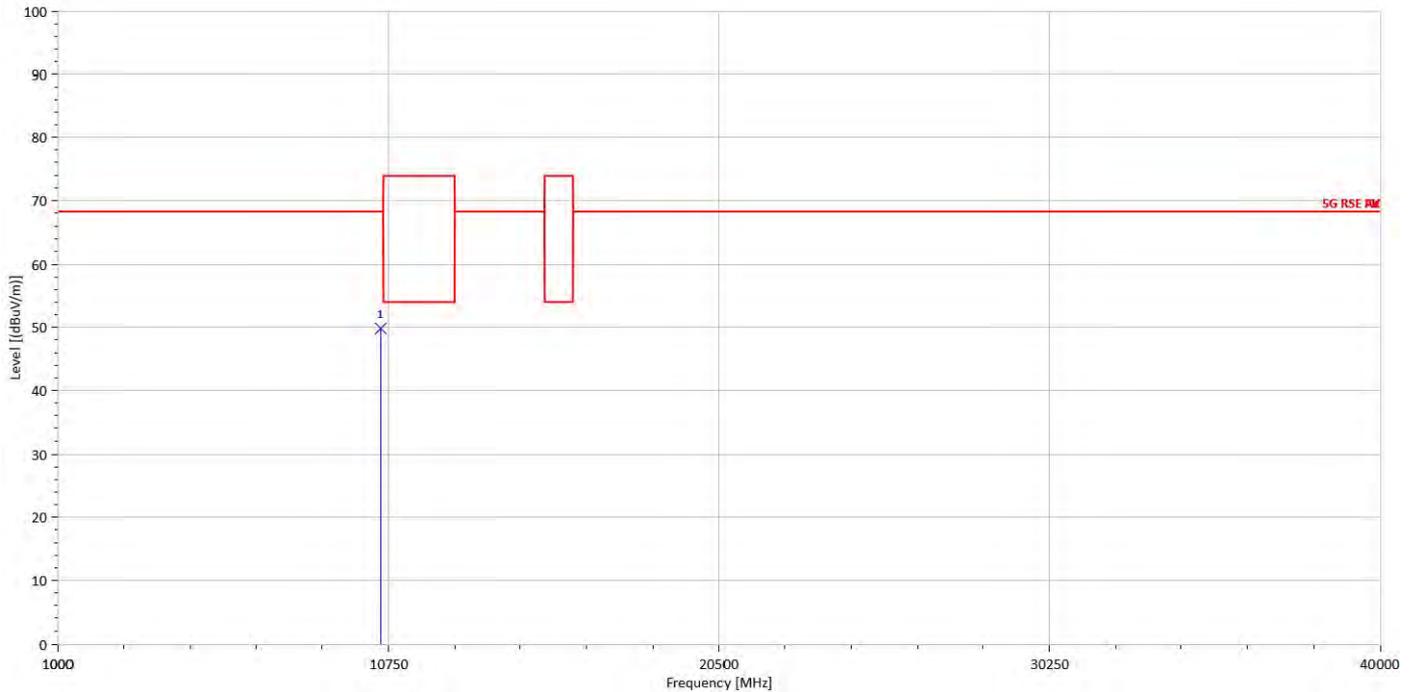
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Operation Mode : 802.11n20B2      Test Date : 2017/8/30  
 Fundamental Frequency : 5260 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10520.00	H	Peak	29.70	20.10	49.80	68.3	-18.50

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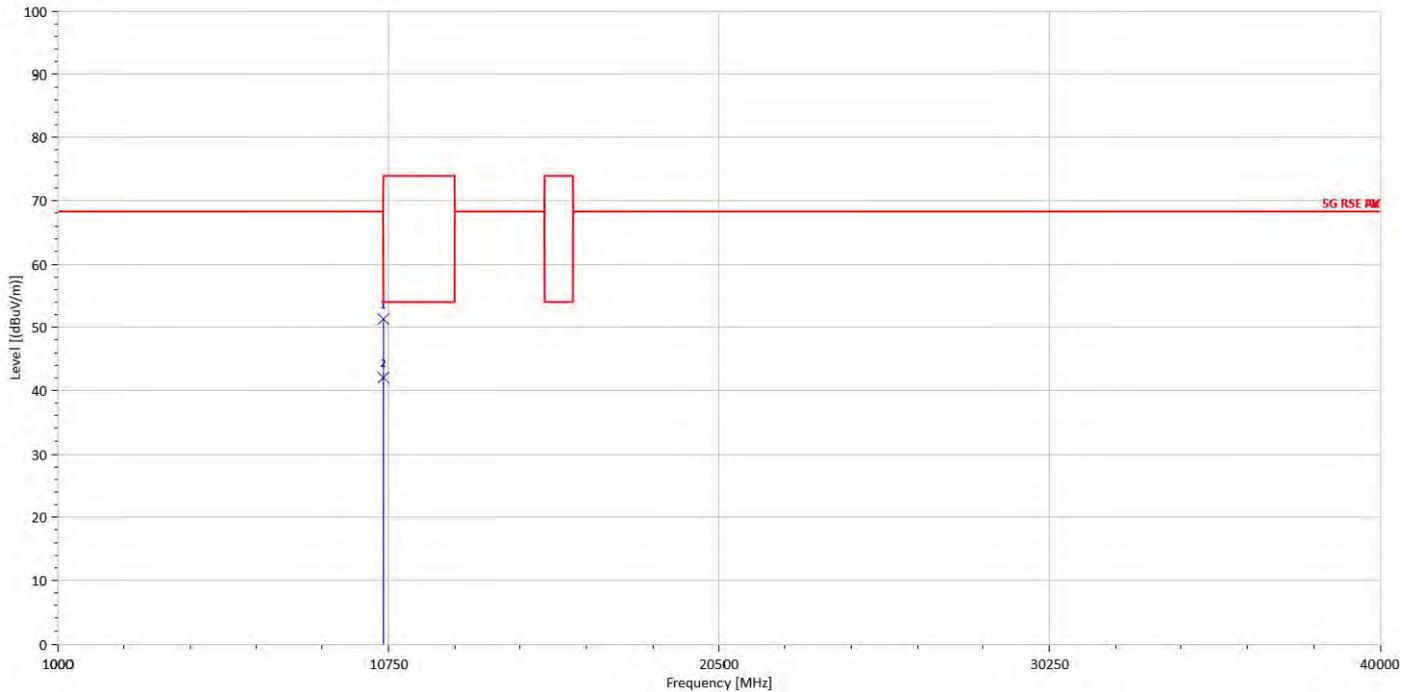
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Operation Mode : 802.11n20B2 Test Date : 2017/8/30  
 Fundamental Frequency : 5300 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10600.00	H	Peak	31.14	20.17	51.31	74	-22.69
10600.00	H	Average	21.93	20.17	42.10	54	-11.90

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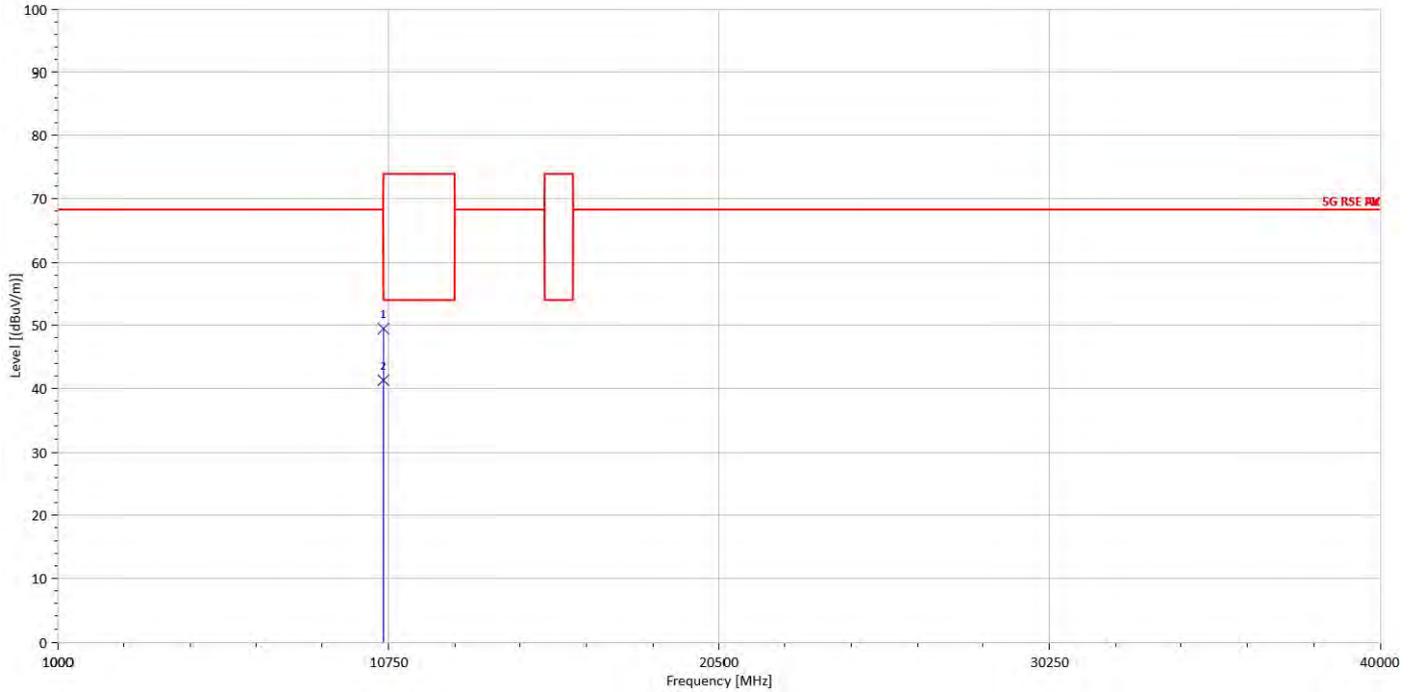
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Operation Mode : 802.11n20B2      Test Date : 2017/8/30  
 Fundamental Frequency : 5300 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10600.00	H	Peak	29.29	20.17	49.45	74	-24.55
10600.00	H	Average	21.21	20.17	41.38	54	-12.62

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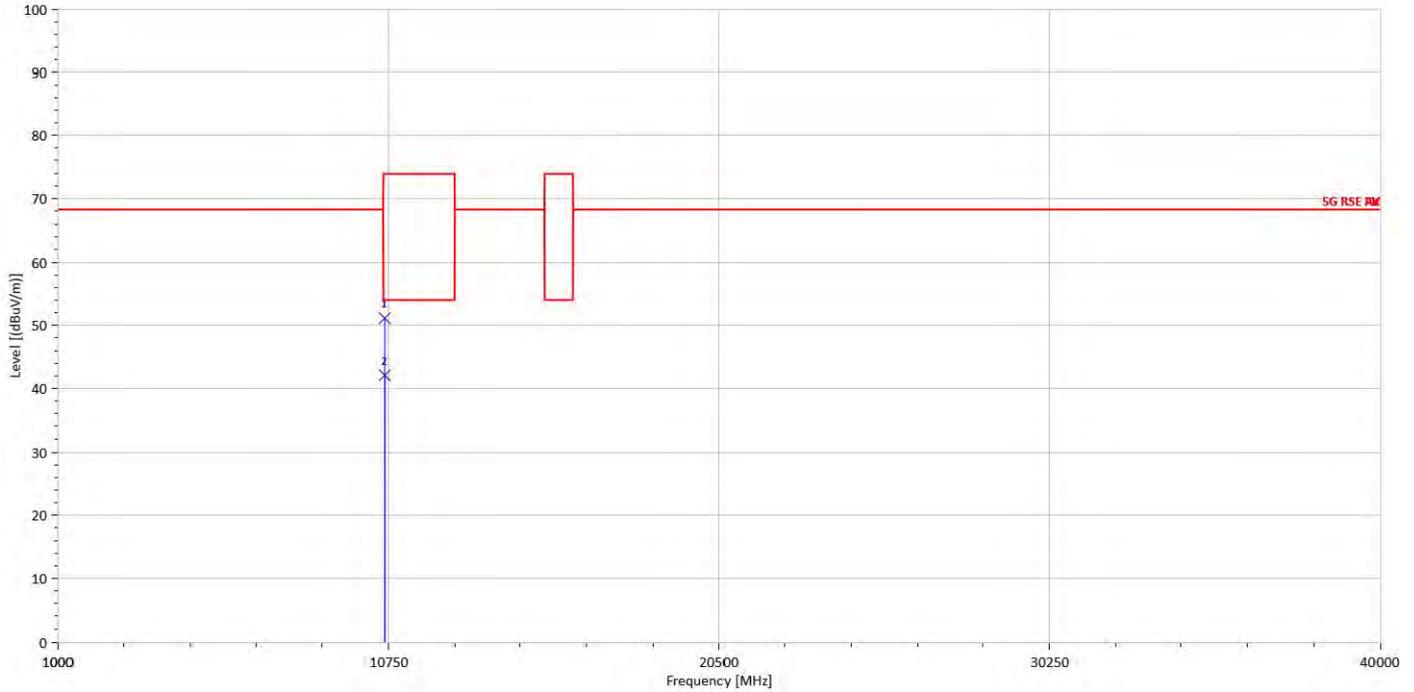
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Operation Mode : 802.11n20B2 Test Date : 2017/8/30  
 Fundamental Frequency : 5320 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10640.00	H	Peak	30.78	20.34	51.12	74	-22.88
10640.00	H	Average	21.83	20.34	42.17	54	-11.83

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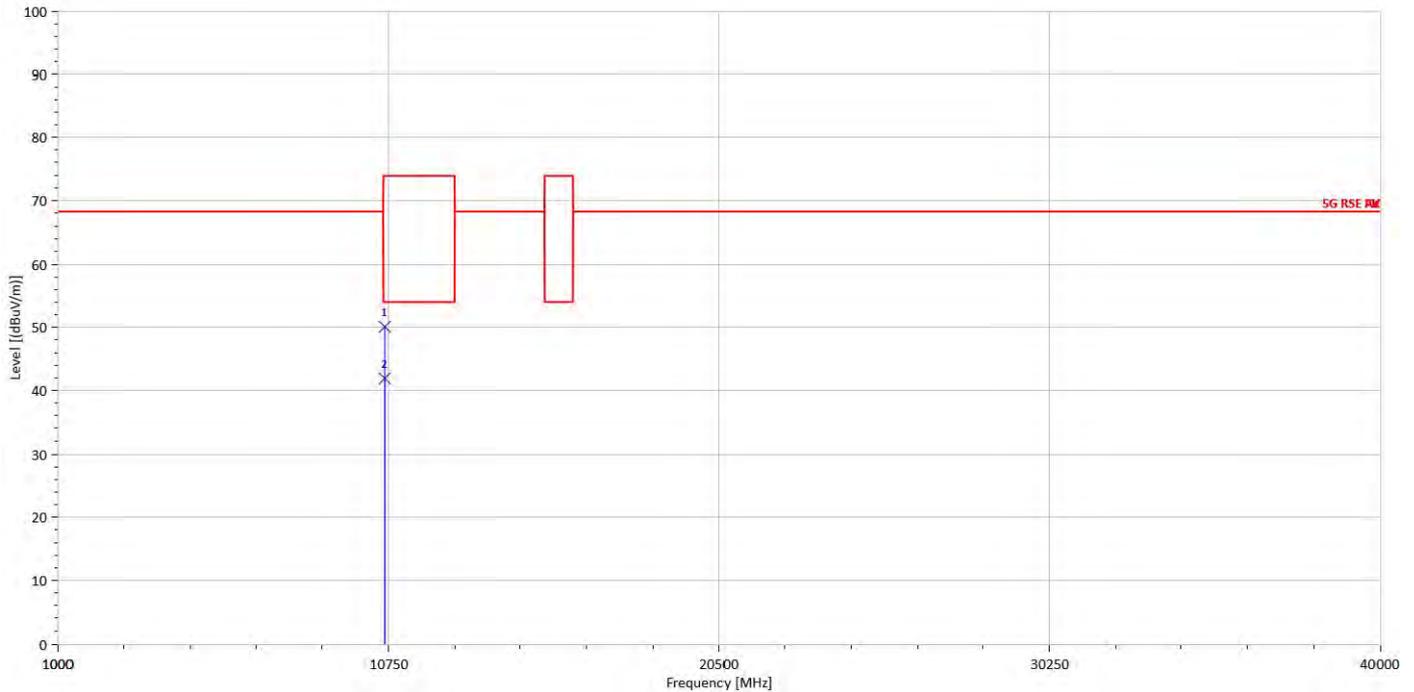
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Operation Mode : 802.11n20B2 Test Date : 2017/8/30  
 Fundamental Frequency : 5320 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10640.00	H	Peak	29.72	20.34	50.07	74	-23.93
10640.00	H	Average	21.63	20.34	41.97	54	-12.03

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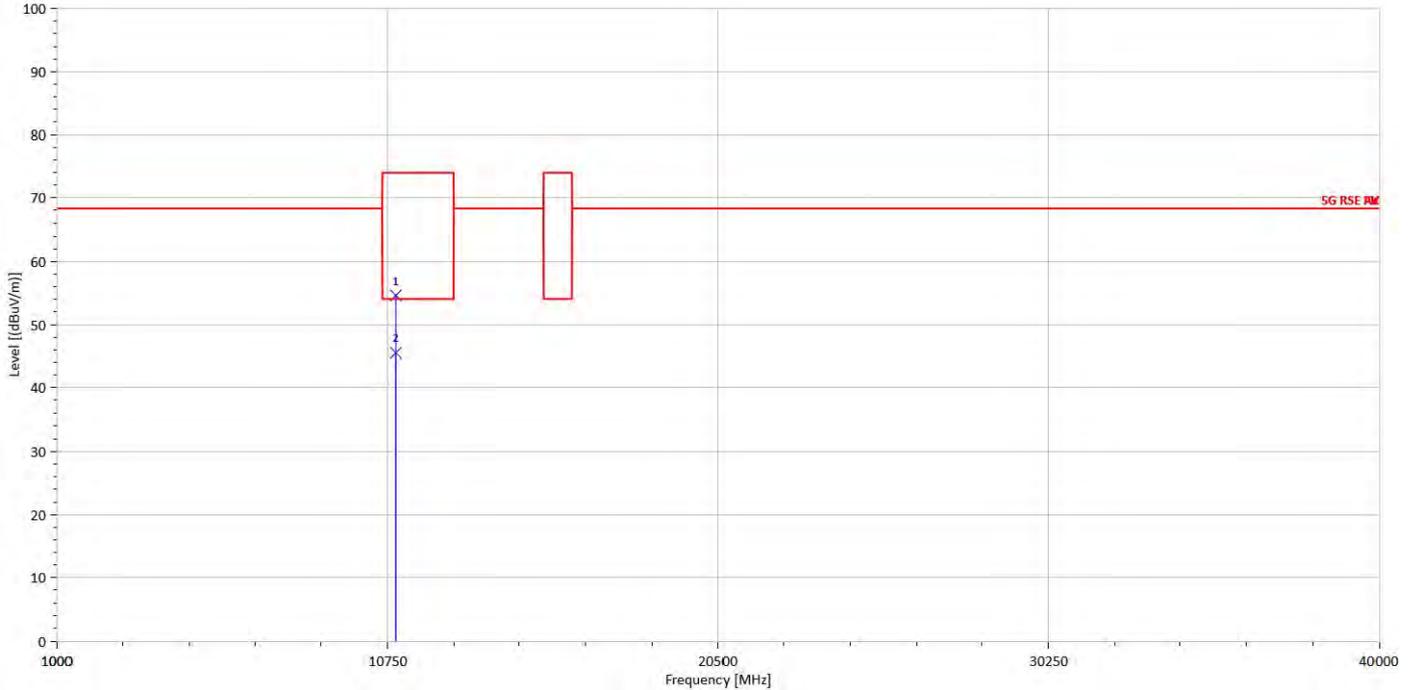
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### Radiated Spurious Emission Measurement Result 802.11n HT20, 5470~5725 MHz

Operation Mode :	802.11n20B3	Test Date :	2017/8/30
Fundamental Frequency :	5500 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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	H	Peak	32.48	22.11	54.59	74	-19.41
11000.00	H	Average	23.47	22.11	45.58	54	-8.42

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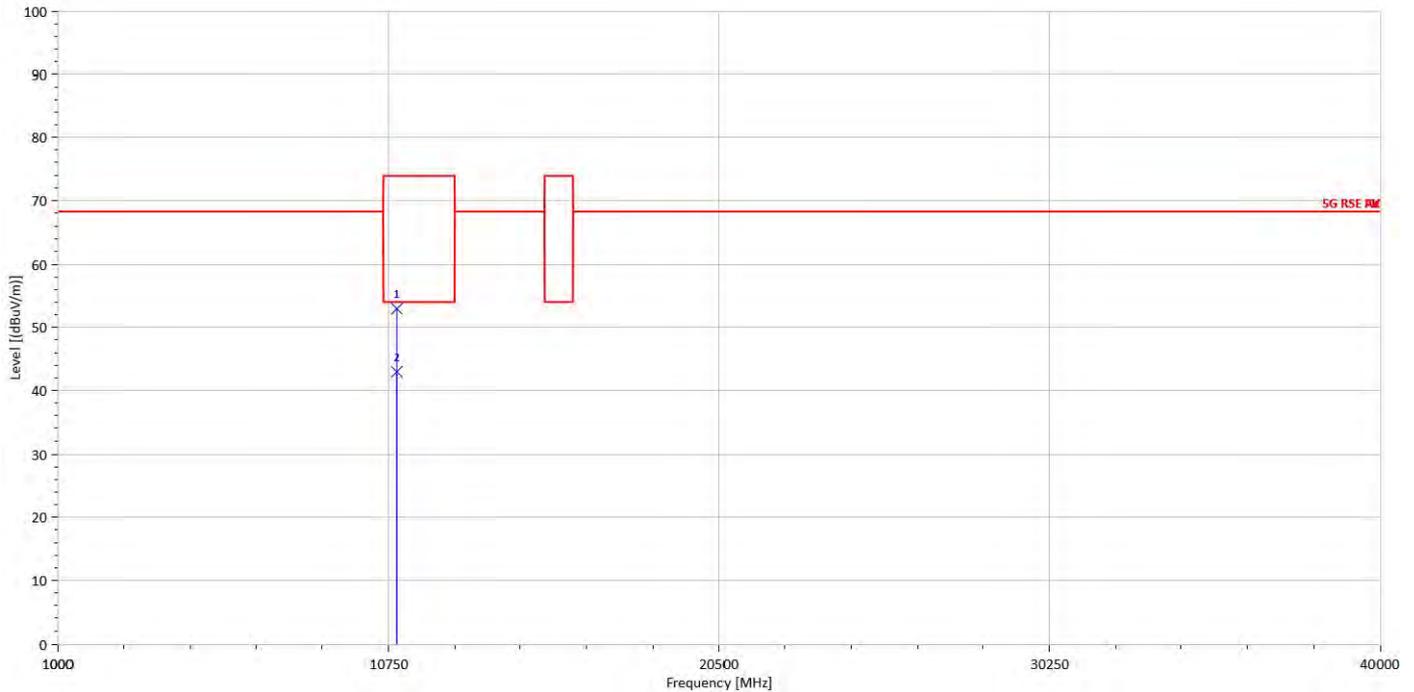
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Operation Mode : 802.11n20B3 Test Date : 2017/8/30  
 Fundamental Frequency : 5500 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11000.00	H	Peak	30.84	22.11	52.95	74	-21.05
11000.00	H	Average	20.92	22.11	43.03	54	-10.97

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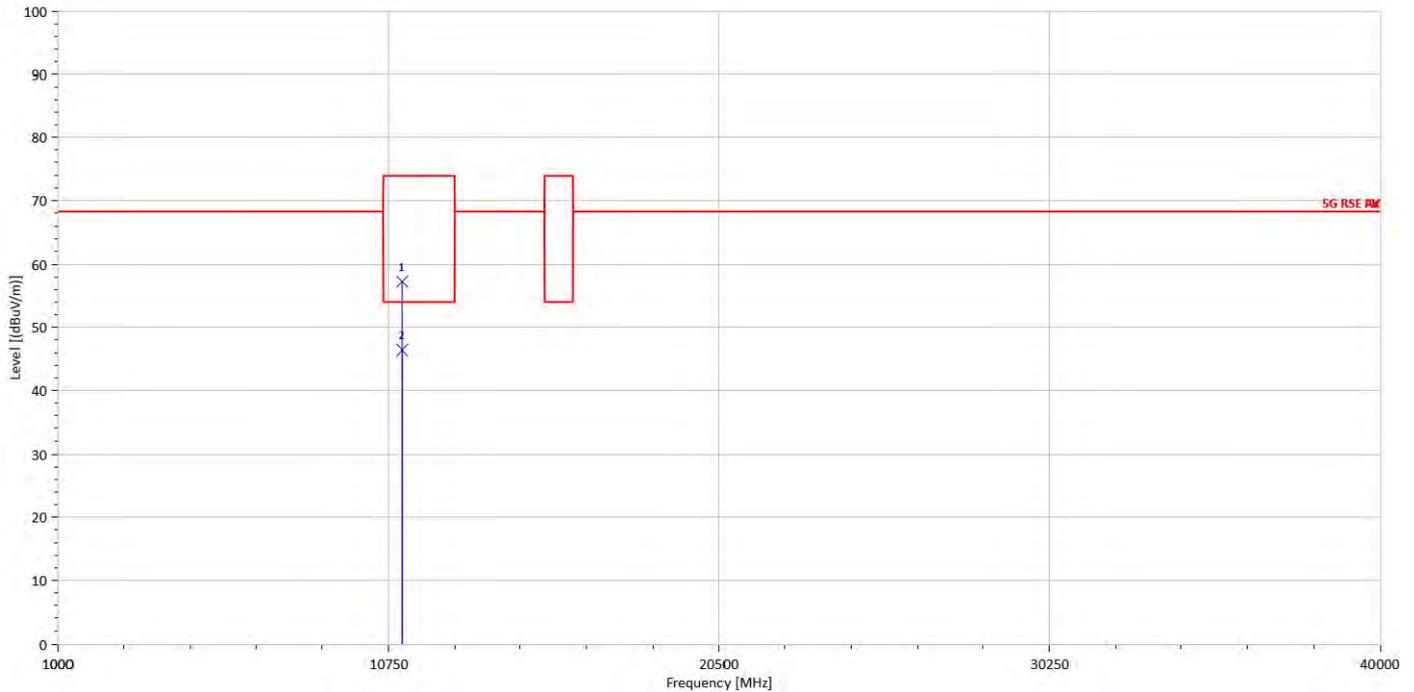
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Operation Mode : 802.11n20B3 Test Date : 2017/8/30  
 Fundamental Frequency : 5580 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11160.00	H	Peak	35.24	22.04	57.28	74	-16.72
11160.00	H	Average	24.39	22.04	46.43	54	-7.57

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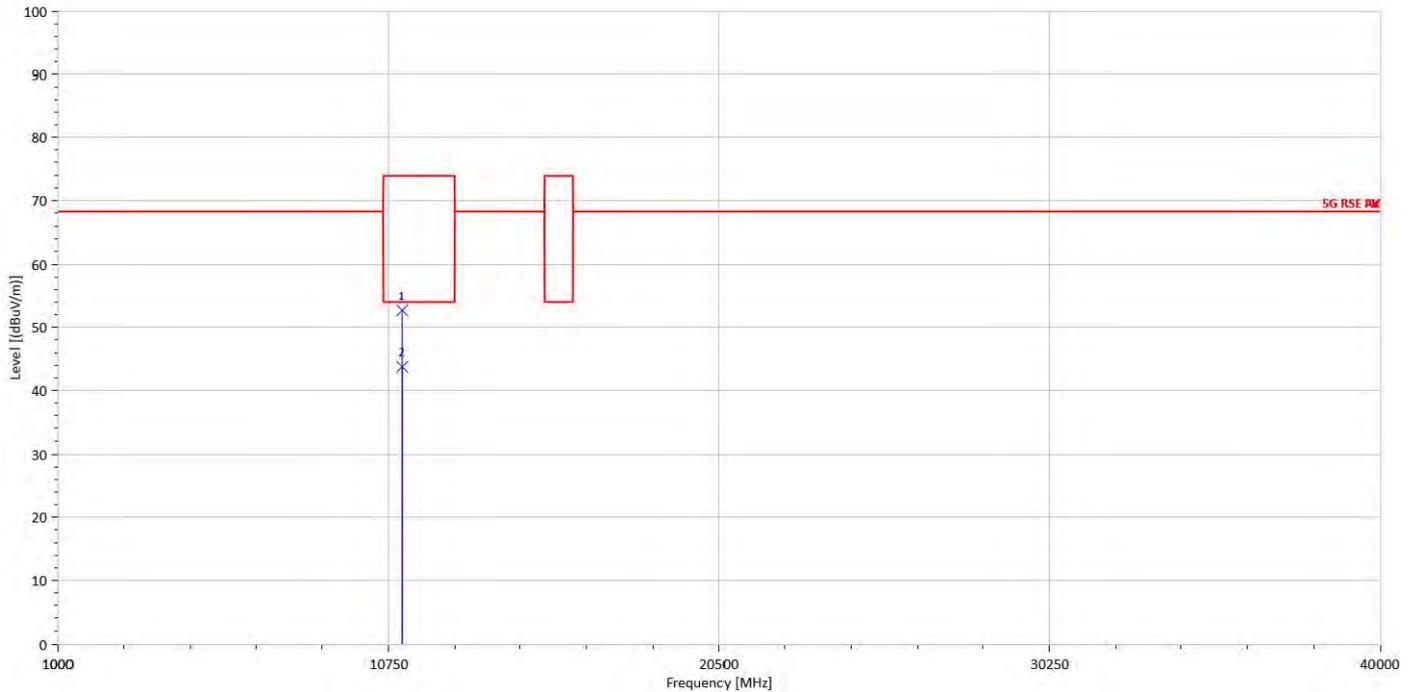
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 Fundamental Frequency : 5580 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11160.00	H	Peak	30.66	22.04	52.70	74	-21.30
11160.00	H	Average	21.79	22.04	43.83	54	-10.17

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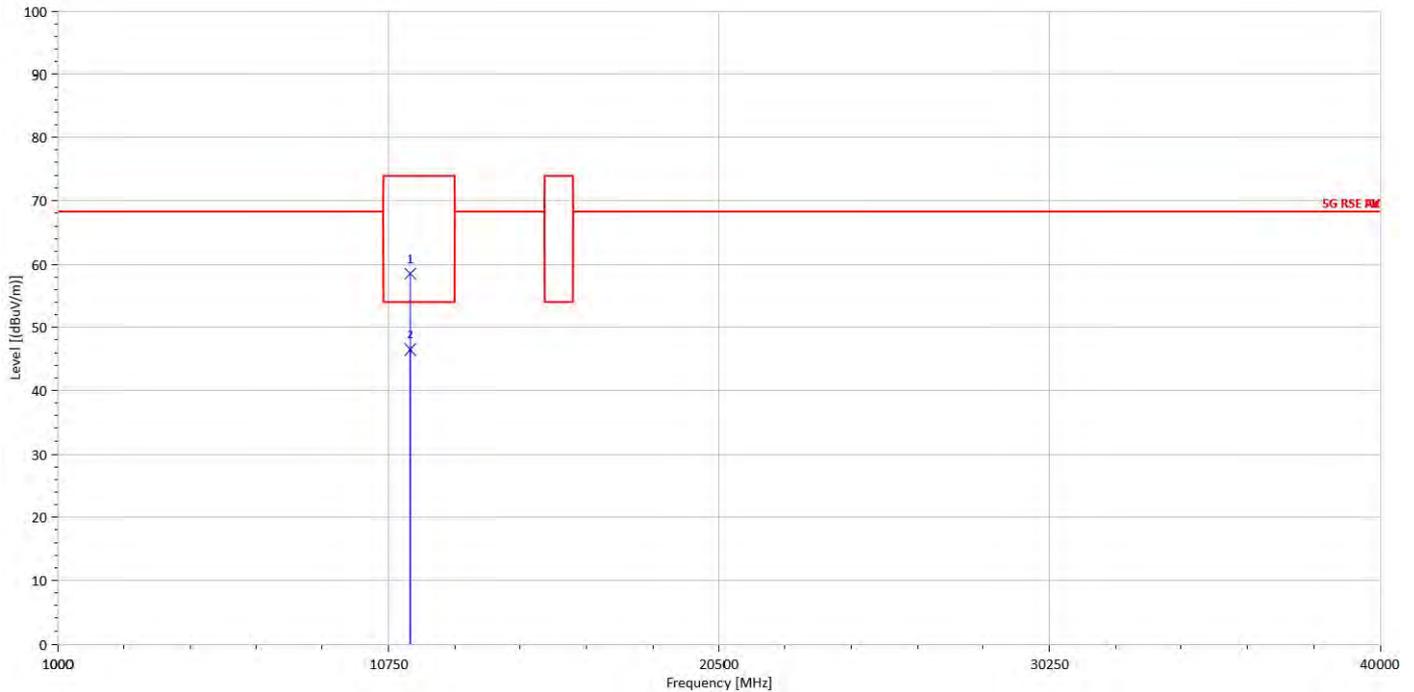
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Operation Mode : 802.11n20B3 Test Date : 2017/8/30  
 Fundamental Frequency : 5700 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11400.00	H	Peak	37.33	21.22	58.55	74	-15.45
11400.00	H	Average	25.29	21.22	46.51	54	-7.49

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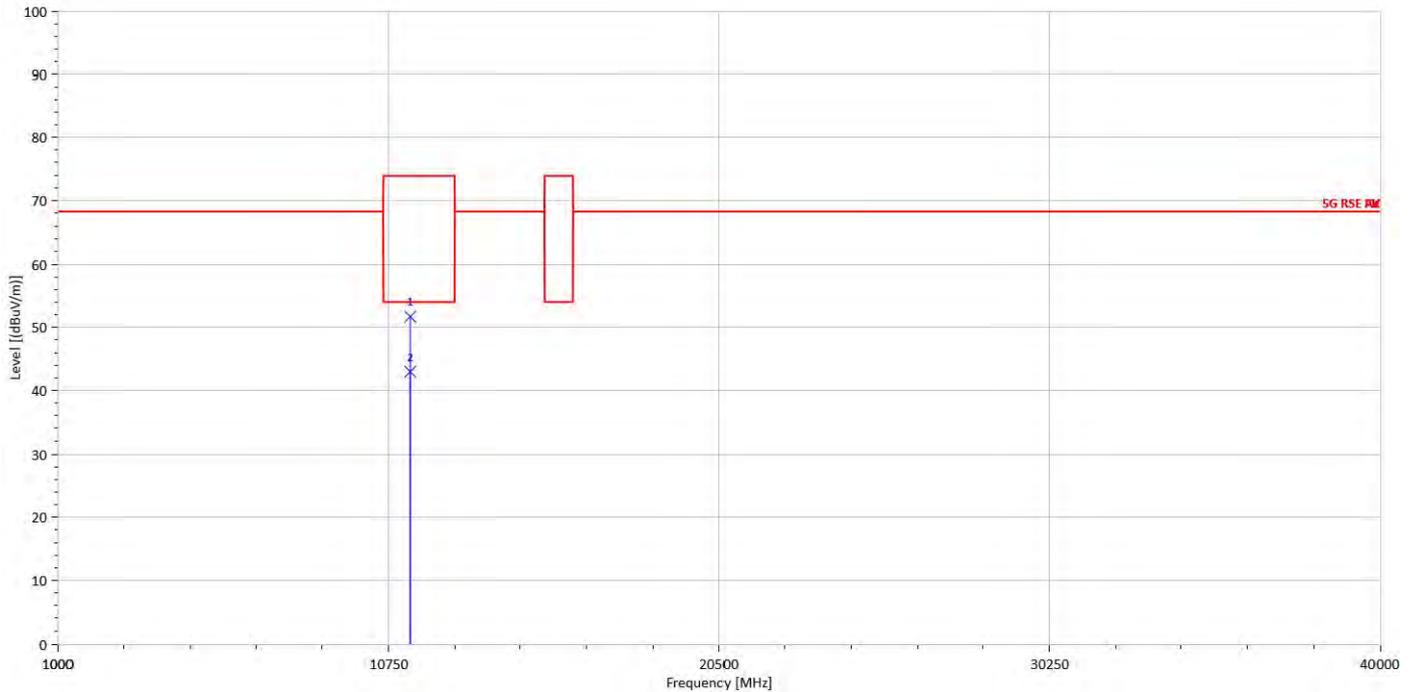
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Operation Mode : 802.11n20B3      Test Date : 2017/8/30  
 Fundamental Frequency : 5700 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11400.00	H	Peak	30.47	21.22	51.69	74	-22.31
11400.00	H	Average	21.83	21.22	43.05	54	-10.95

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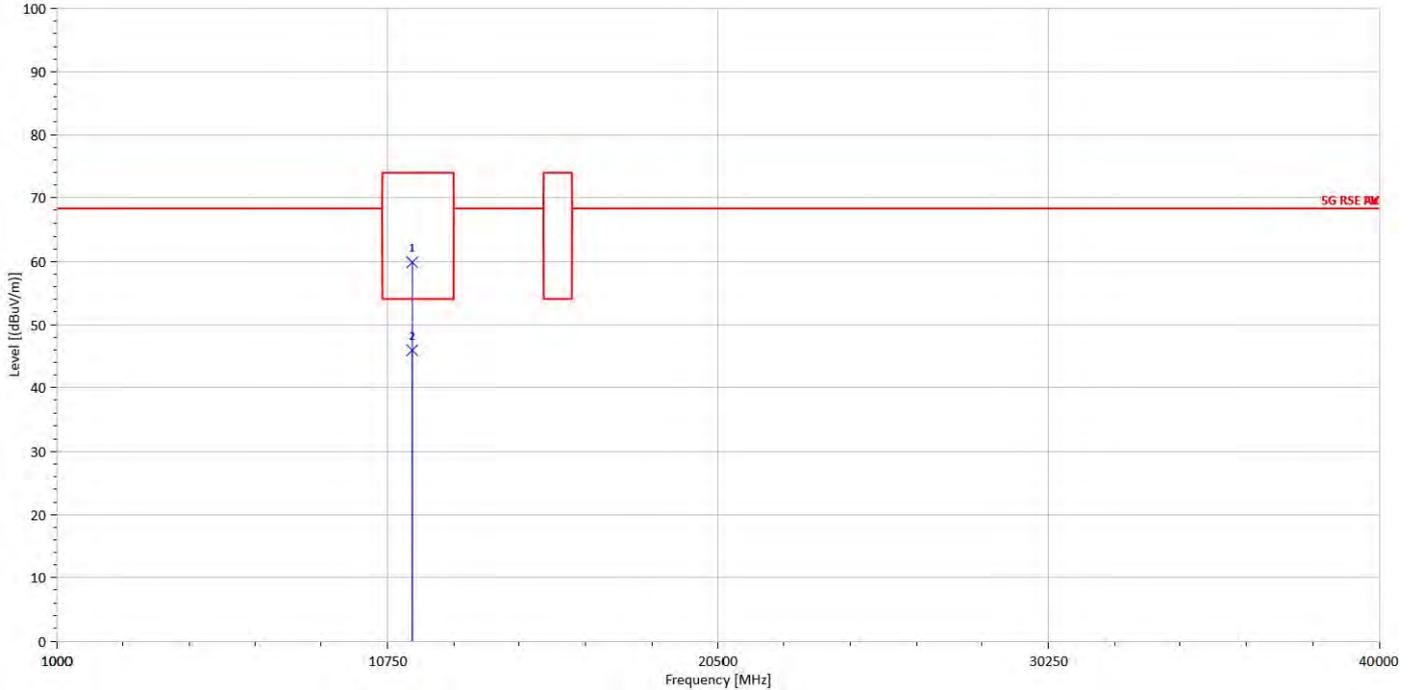
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### Radiated Spurious Emission Measurement Result 802.11n HT20,

Operation Mode :	802.11n20B4	Test Date :	2017/8/30
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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
11490.00	H	Peak	39.15	20.70	59.86	74	-14.14
11490.00	H	Average	25.27	20.70	45.97	54	-8.03

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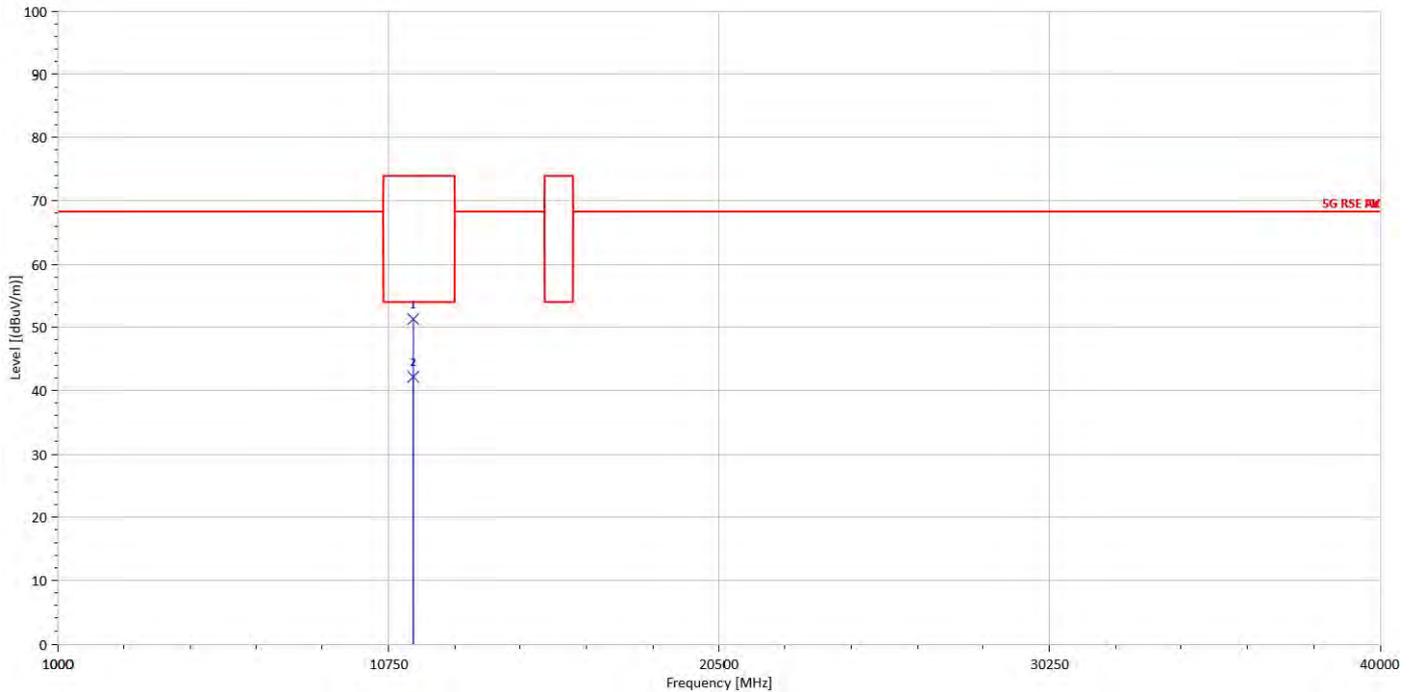
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Operation Mode : 802.11n20B4 Test Date : 2017/8/30  
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11490.00	H	Peak	30.58	20.70	51.28	74	-22.72
11490.00	H	Average	21.52	20.70	42.22	54	-11.78

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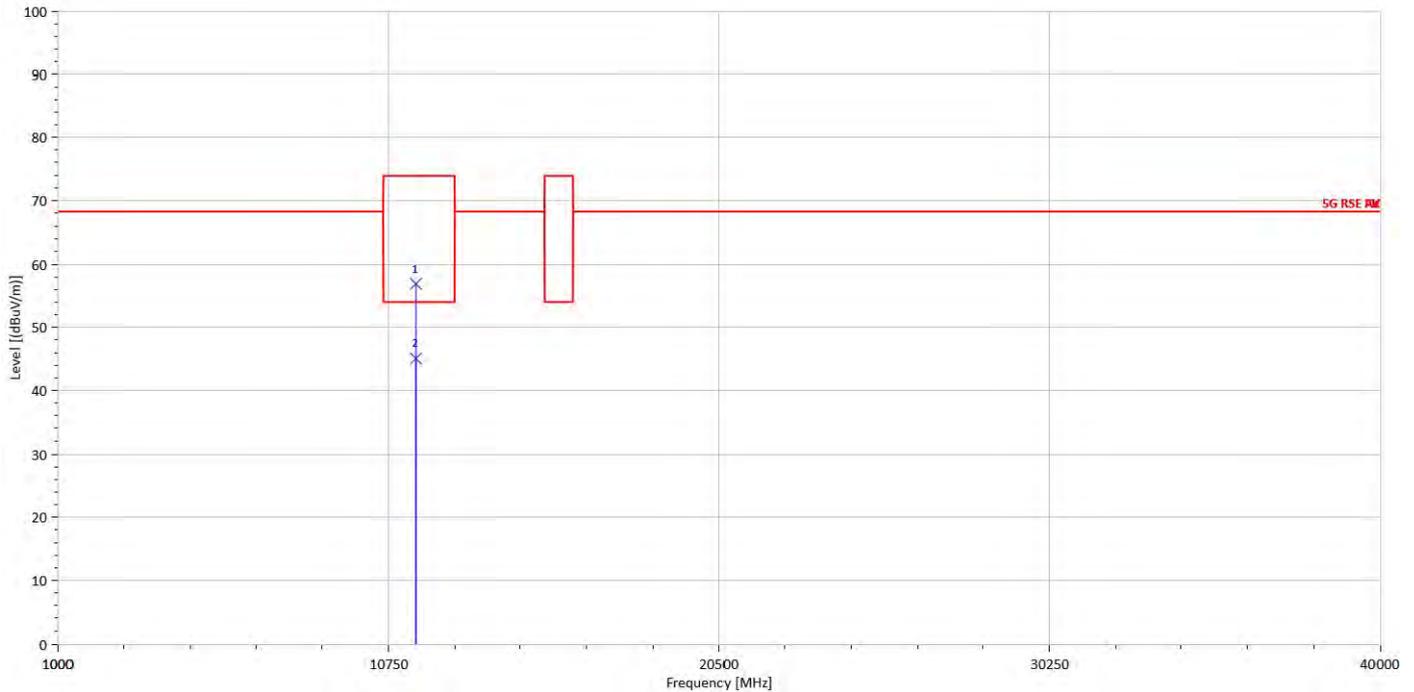
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Operation Mode : 802.11n20B4 Test Date : 2017/8/30  
 Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11570.00	H	Peak	35.48	21.44	56.93	74	-17.07
11570.00	H	Average	23.71	21.44	45.15	54	-8.85

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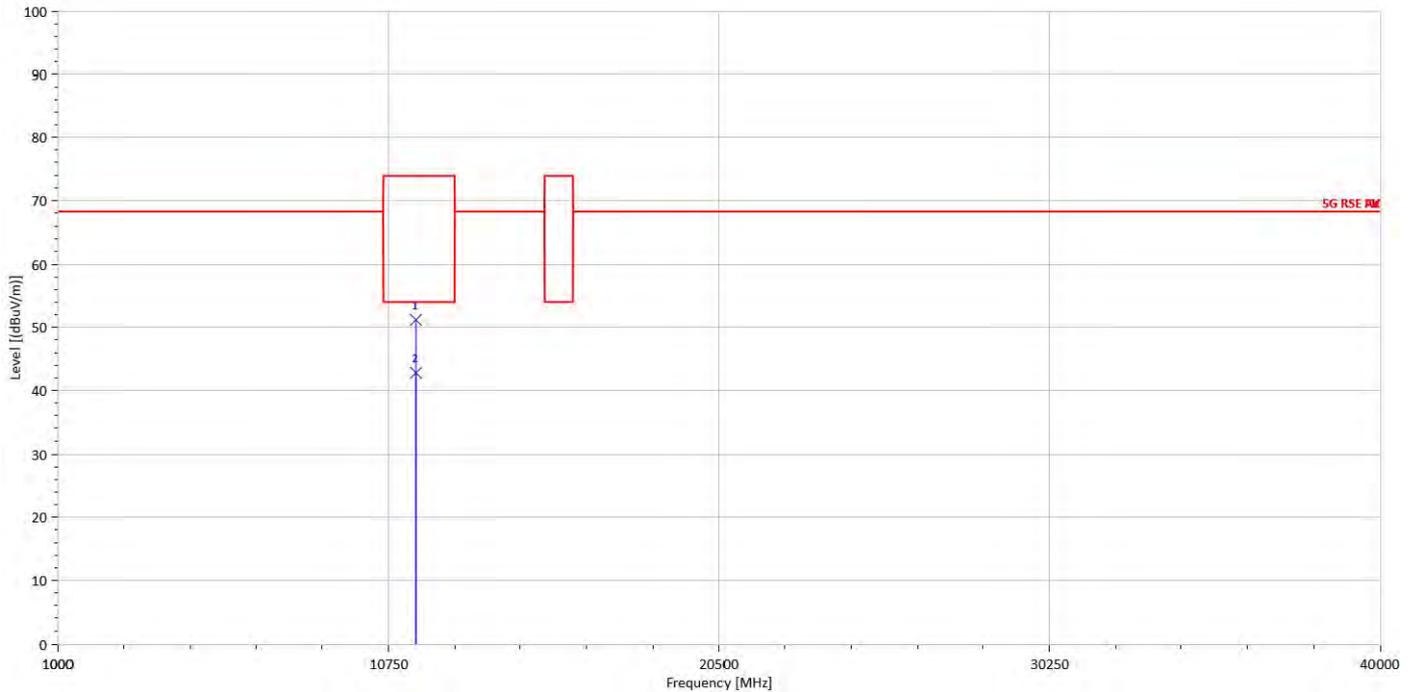
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Operation Mode : 802.11n20B4      Test Date : 2017/8/30  
 Fundamental Frequency : 5785 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
11570.00	H	Peak	29.74	21.44	51.18	74	-22.82
11570.00	H	Average	21.42	21.44	42.86	54	-11.14

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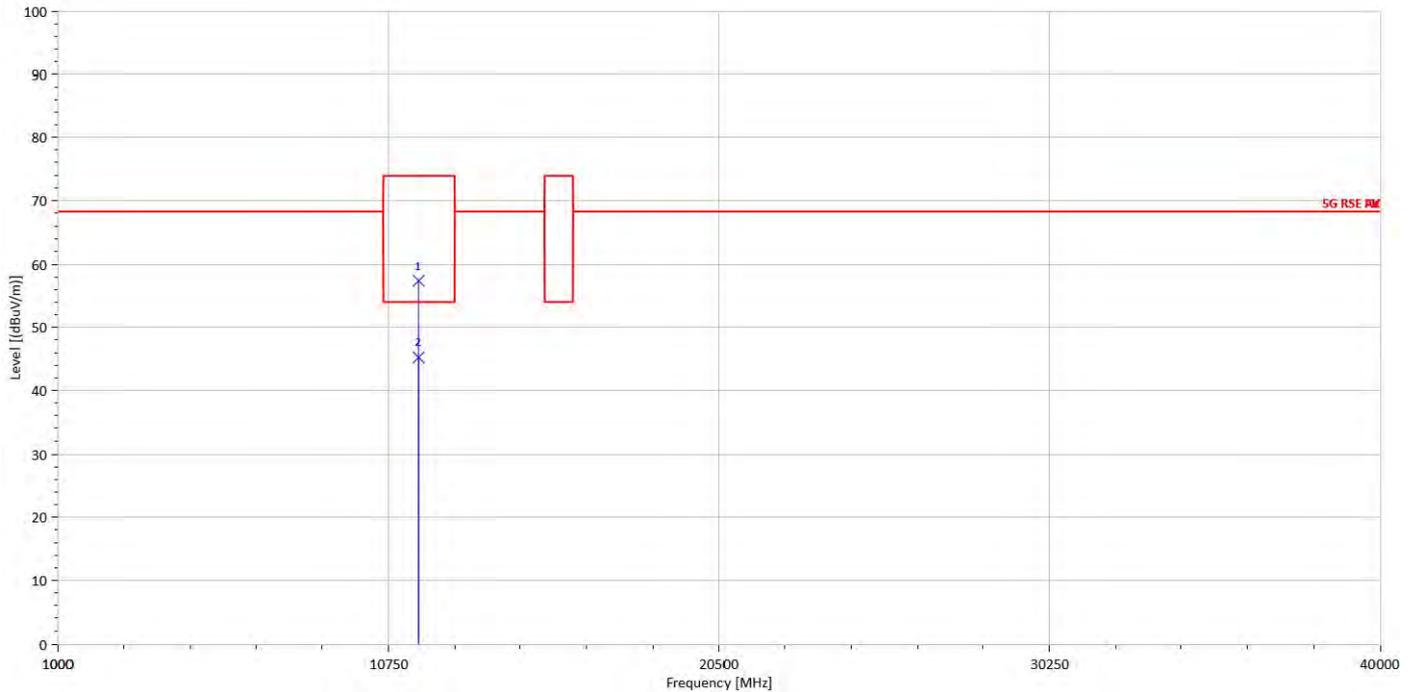
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Operation Mode :	802.11n20B4	Test Date :	2017/8/30
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11650.00	H	Peak	35.39	22.02	57.41	74	-16.59
11650.00	H	Average	23.30	22.02	45.32	54	-8.68

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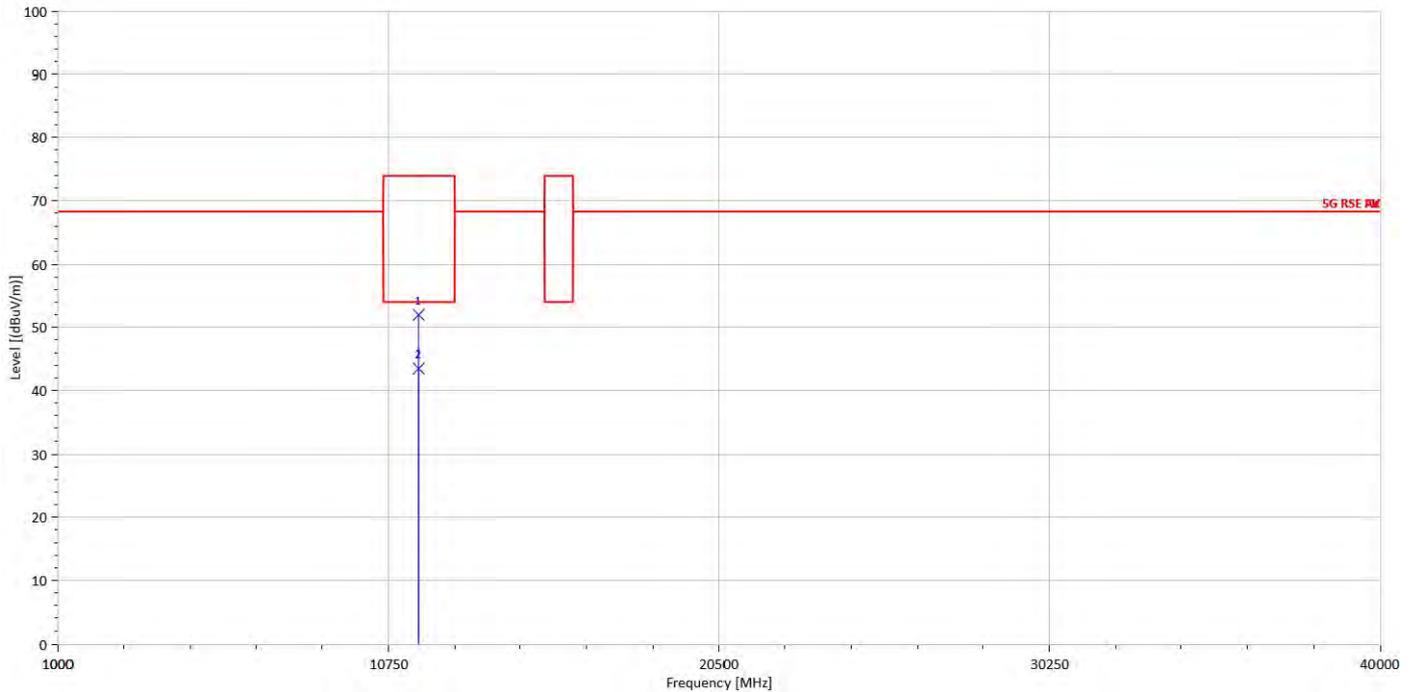
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 Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11650.00	H	Peak	29.95	22.02	51.97	74	-22.03
11650.00	H	Average	21.52	22.02	43.54	54	-10.46

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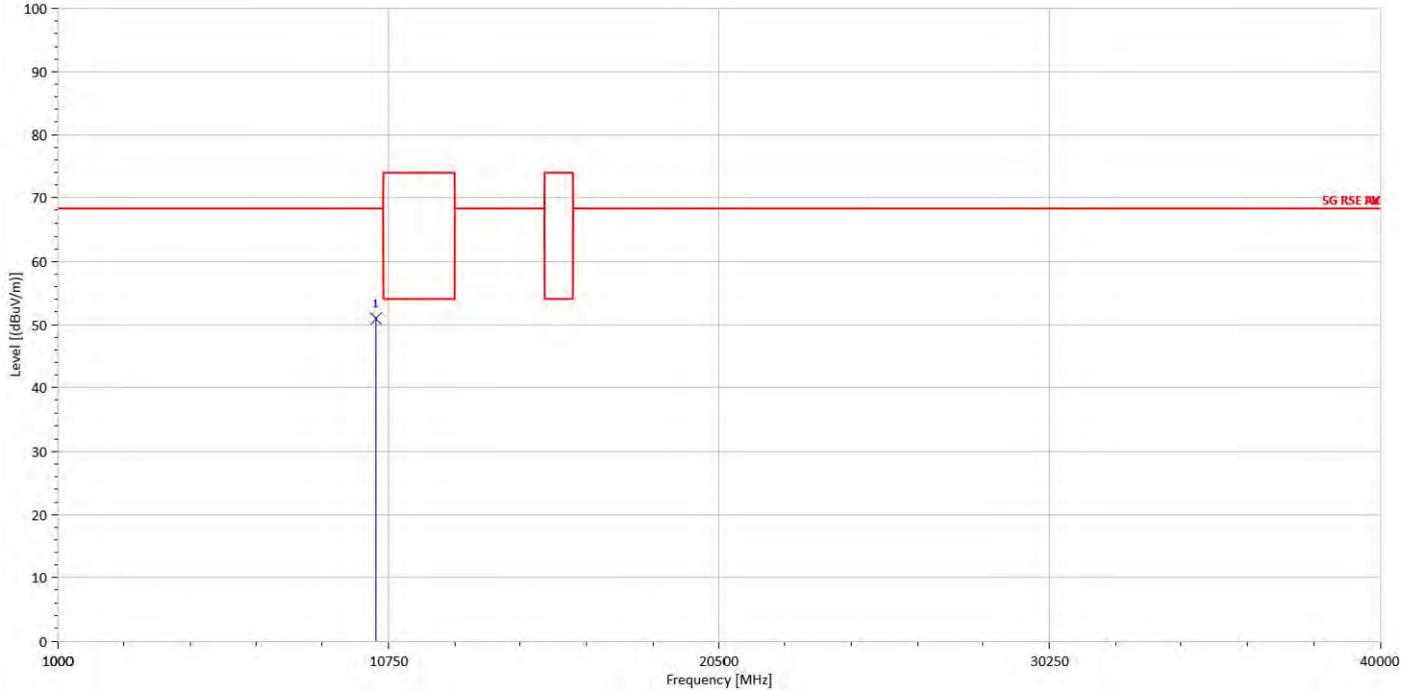
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### Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

Operation Mode :	802.11n40B1	Test Date :	2017/8/30
Fundamental Frequency :	5190 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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	H	Peak	30.01	20.95	50.96	68.3	-17.34

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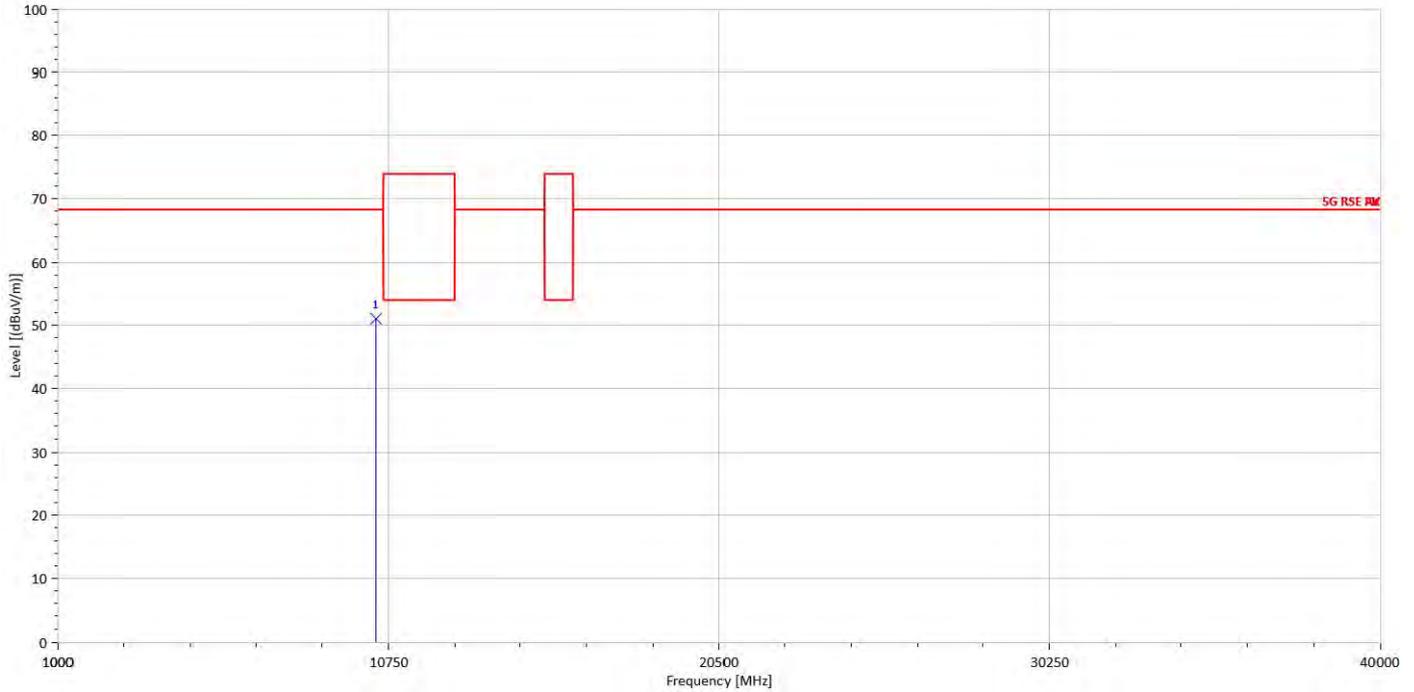
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Operation Mode : 802.11n40B1      Test Date : 2017/8/30  
 Fundamental Frequency : 5190 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10380.00	H	Peak	30.09	20.95	51.04	68.3	-17.26

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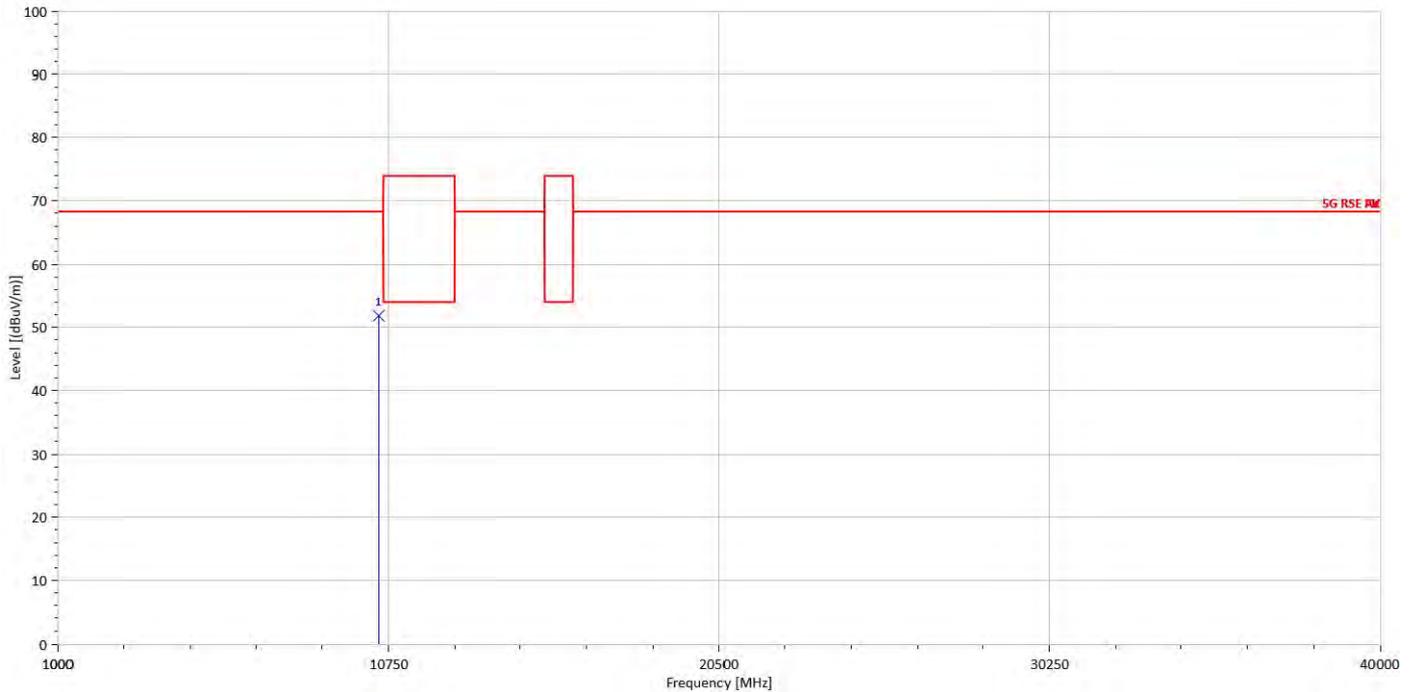
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Operation Mode : 802.11n40B1 Test Date : 2017/8/30  
 Fundamental Frequency : 5230 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10460.00	H	Peak	30.88	20.95	51.83	68.3	-16.47

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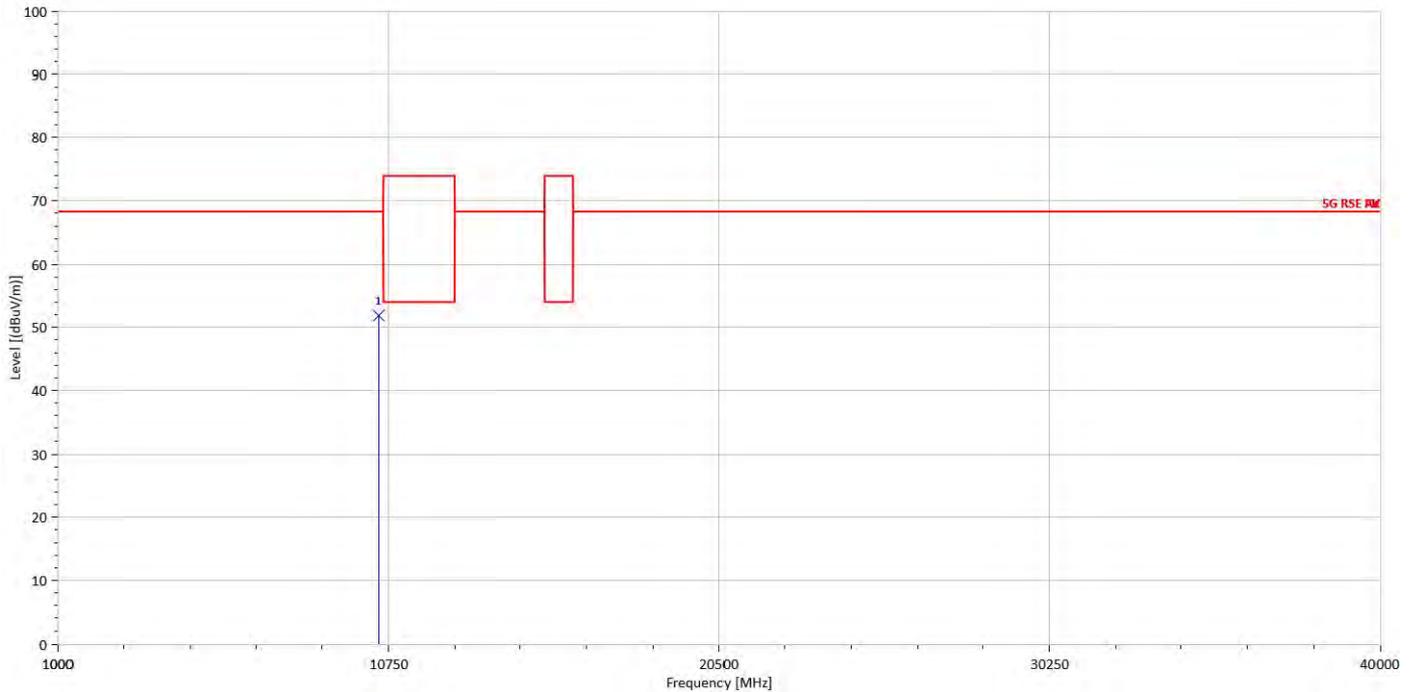
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Operation Mode :	802.11n40B1	Test Date :	2017/8/30
Fundamental Frequency :	5230 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10460.00	H	Peak	30.90	20.95	51.85	68.3	-16.45

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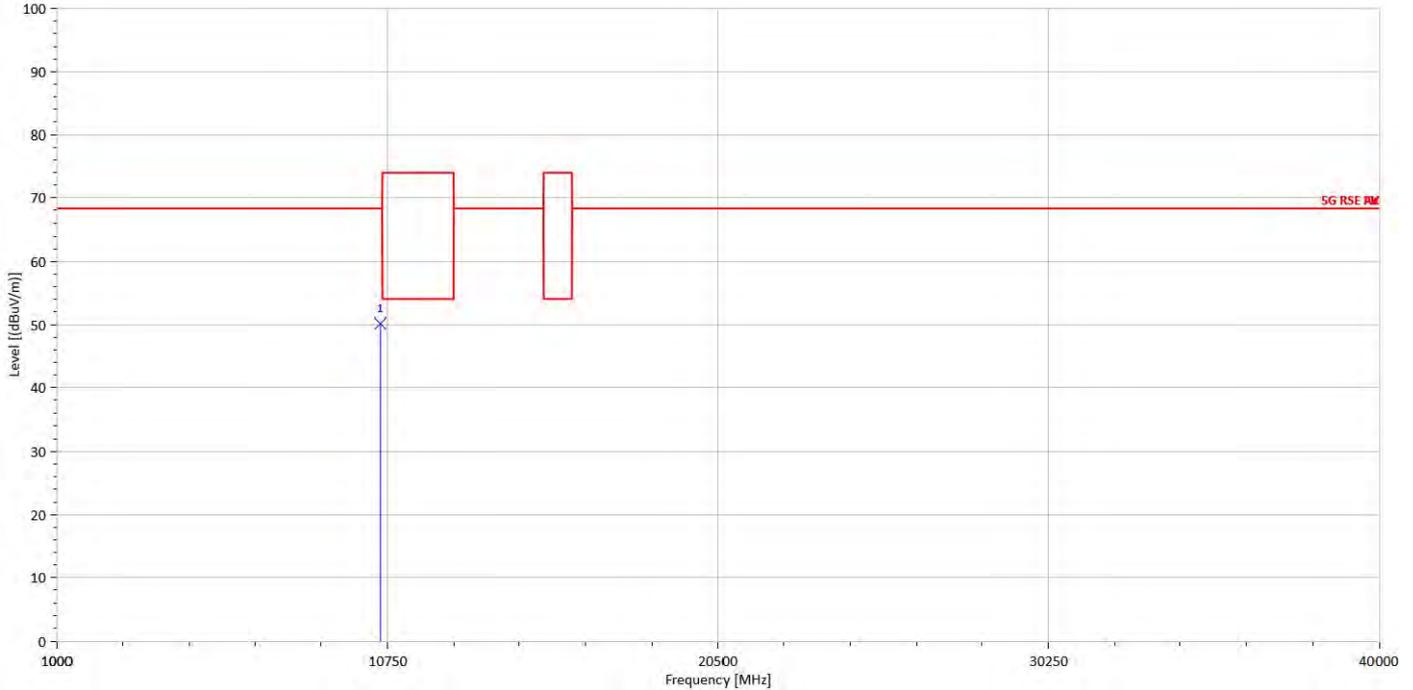
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### Radiated Spurious Emission Measurement Result 802.11n HT40, 5250~5350 MHz

Operation Mode :	802.11n40B2	Test Date :	2017/8/30
Fundamental Frequency :	5270 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	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	H	Peak	30.17	20.06	50.23	68.3	-18.07

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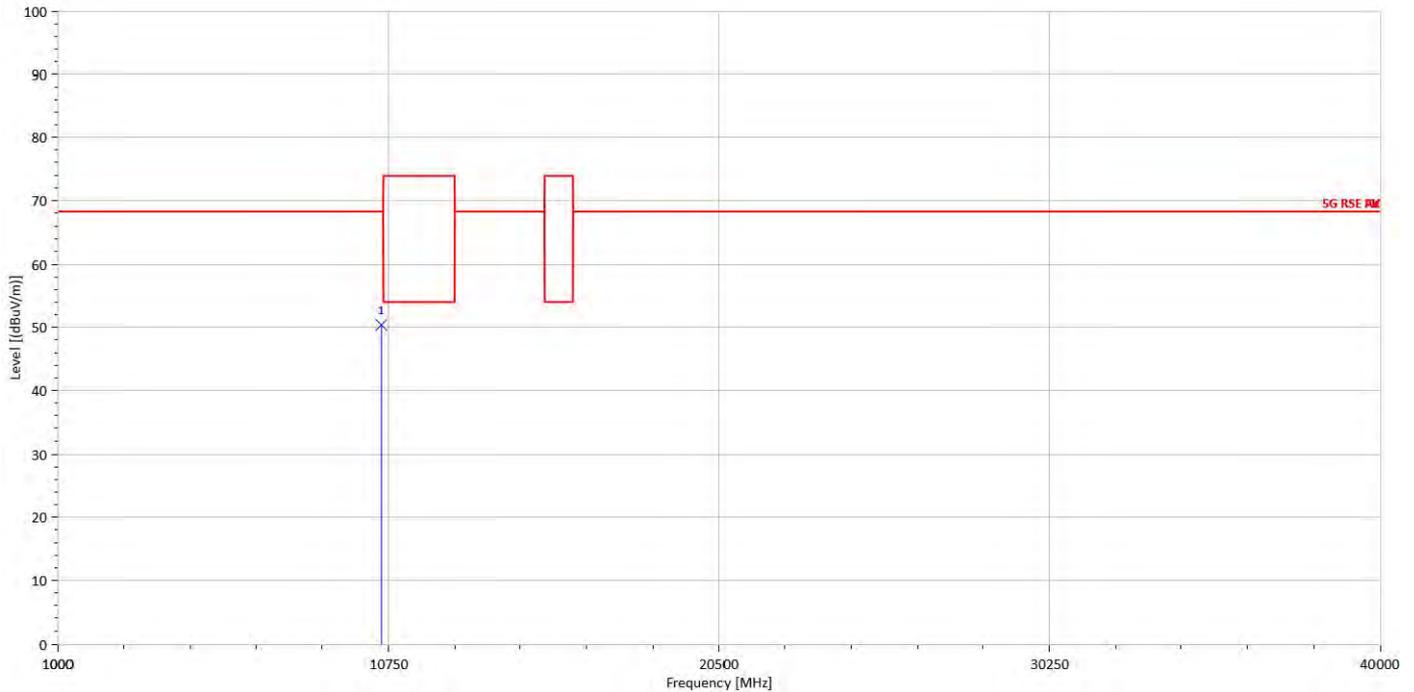
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Operation Mode : 802.11n40B2      Test Date : 2017/8/30  
 Fundamental Frequency : 5270 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10540.00	H	Peak	30.31	20.06	50.37	68.3	-17.93

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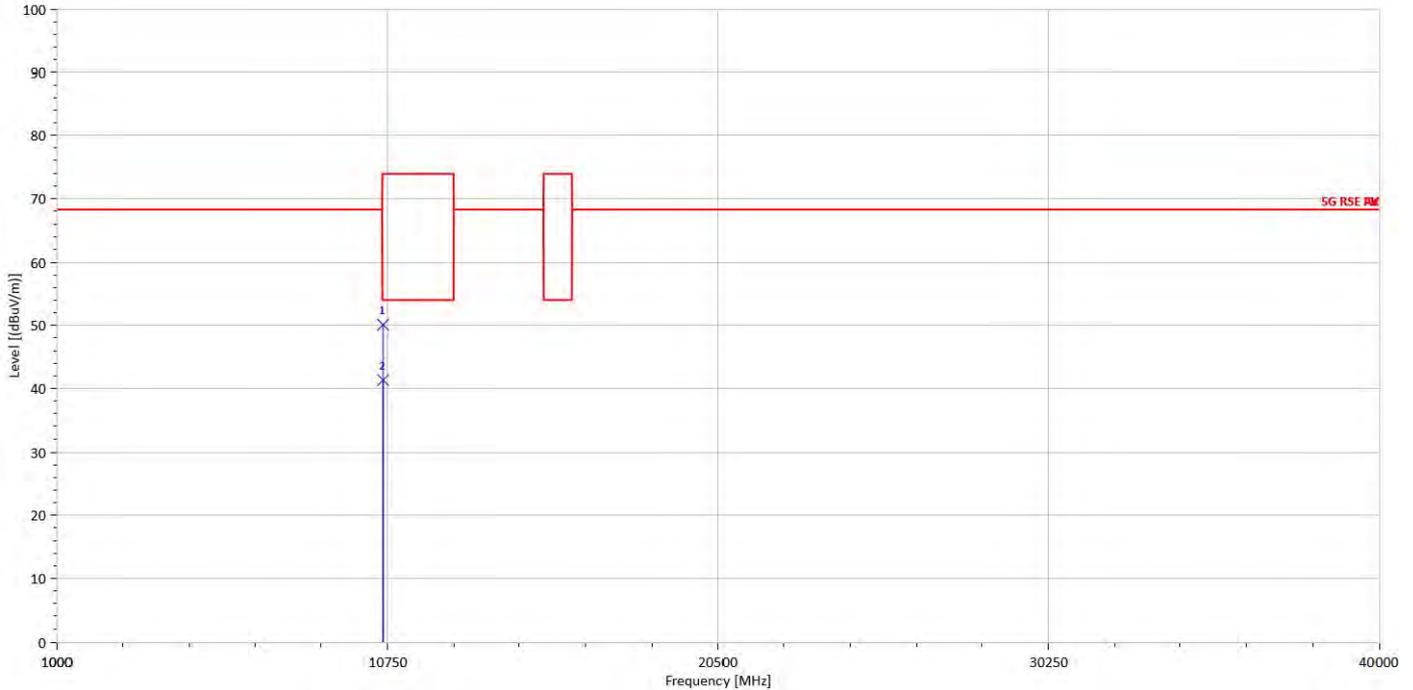
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 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10620.00	H	Peak	29.79	20.29	50.08	74	-23.92
10620.00	H	Average	21.11	20.29	41.40	54	-12.60

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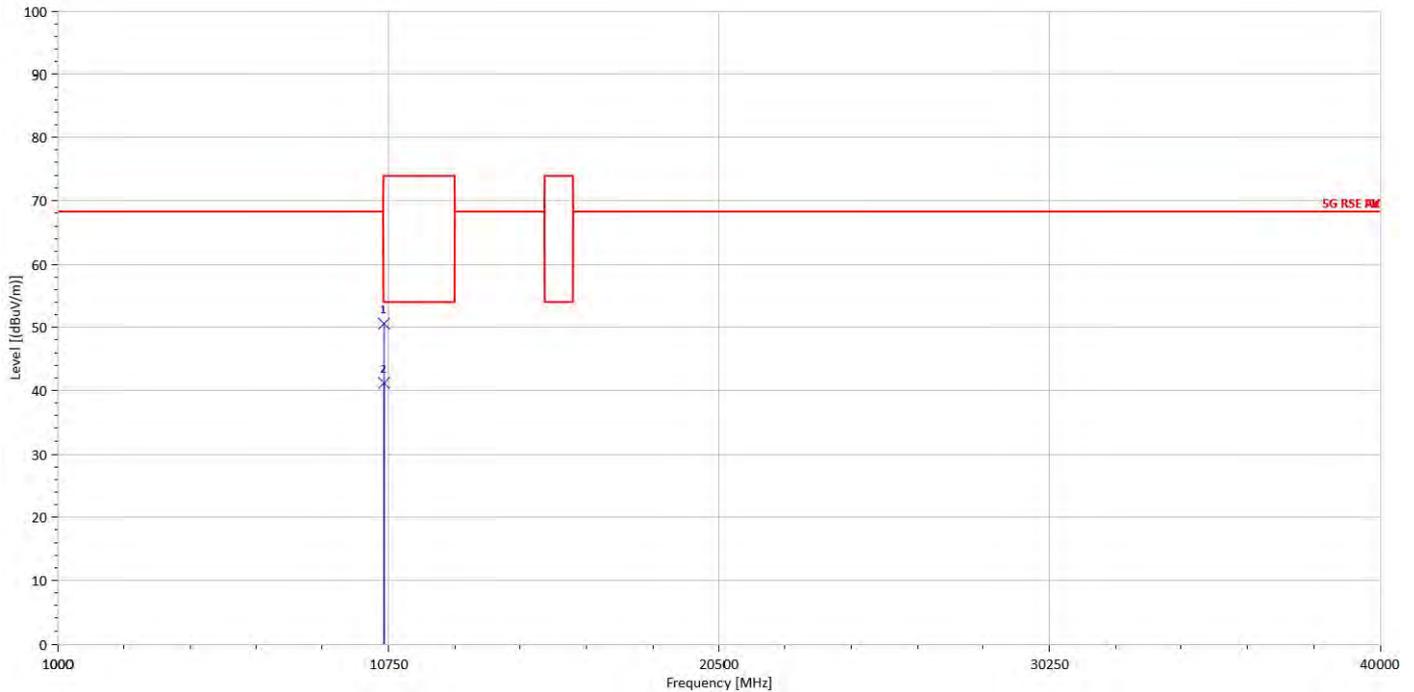
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 Fundamental Frequency : 5310 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
10620.00	H	Peak	30.28	20.29	50.57	74	-23.43
10620.00	H	Average	20.97	20.29	41.26	54	-12.74

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