

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

**Applicant:** Hong Kong AMobile Intelligent Corp. Limited Taiwan Branch  
8F.-1, No.700, Zhongzheng Rd., Zhonghe Dist., New Taipei City 235, Taiwan

**Product Name:** GT78-V Rugged Android Tablet

**Brand Name:** AMobile

**Model No.:** GT78-V8, GT78-V7

**Model Difference:** Difference in screen size and position of light sensor

**FCC ID:** 2AQ5W-GT78V8

**Report Number:** E2/2018/80021

**FCC Rule Part:** §15.407, Cat: NII

**Issue Date:** Jan. 16, 2019

**Date of Test:** Aug. 02, 2018 ~ Sep. 26, 2018

**Date of EUT Received:** Aug. 02, 2018

**We hereby certify that:**

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

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

*Vito*  
**Tested By:**

*Vito Pei / Engineer*

*CHUN-CHIEH, CHEN*  
**Approved By:**

*Chun Chieh Chen / Sr. Engineer*



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## Revision History

Report Number	Revision	Description	Effectuated Page	Issue Date	Revised By
E2/2018/80021	Rev.00	Initial creation of document	All	Nov. 23, 2018	Stefanie Yu / Clerk
E2/2018/80021	Rev.01	Update information for antenna info. and section 11.2	4, 39	Jan. 16, 2019	Stefanie Yu / Clerk

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## 1 GENERAL INFORMATION

### 1.1 Product Description

#### General:

Product Name:	GT78-V Rugged Android Tablet		
Brand Name:	AMobile		
Model No.:	GT78-V8, GT78-V7		
Model Difference:	Difference in screen size and position of light sensor		
Product SW/HW version:	N/A / N/A		
USB Cable	Model No.: N/A, Supplier: N/A		
Power Supply:	3.8Vdc from Rechargeable Li-polymer Battery		
	Battery:	Model No.: DPR999-00 Supplier: AMobile	

#### WLAN 5GHz:

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm)	Modulation Technology	
a	5150~5250	4	8.31	OFDM	
	5725-5850	5	9.08		
n_HT 20M	5150~5250	4	HT: 8.28 (Worst Case)	OFDM	
	5725-5850	5	HT: 8.12 (Worst Case)		
n_HT 40M	5150~5250	2	HT: 7.37 (Worst Case)	OFDM	
	5725-5850	2	HT: 8.25 (Worst Case)		
Modulation type		64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only			
Transition Rate:		802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps 802.11 n_40MHz: 13.5 – 150Mbps			

Vendor	Ant. Type	Part No.	Freq.(MHz)	Peak Gain (dBi)
ARISTOTLE	CBL	RFA-25-AP532-70B-45	5150~5250	5.63
	CBL	RFA-25-AP532-70B-45	5725~5850	7.18

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## 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

ANSI C63.10:2013

Note:

1. 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 Number and Designation are: 735305 / TW0002

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

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## 2.4 Measurement Results Explanation Example

### For all conducted test items:

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

#### Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Following shows an offset computation example.

## 2.5 Configuration of Tested System

**Fig. 2-1 Radiated Emission & Conducted (Antenna Port)**



**Fig. 2-2 Conduction (AC Power Line)**



**Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	Lenovo	L430	R9-WR6X4	Shielded	Unshielded
2.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A

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### 3 SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	26 dB & 6dB & 99% Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

### 4.1 Operated in U-NII Bands

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

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

802.11 n HT40 Mode,	
channel	Frequency
38	5190
46	5230

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

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

802.11 n HT40 Mode,	
channel	Frequency
151	5755
159	5795

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## 4.2 The Worst Test Modes and Channel Details

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

### RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Ch0
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Ch0
RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Ch0
802.11n_HT20				OFDM	MCS0	Ch0
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	Ch0

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MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Ch0
802.11n_HT20				OFDM	MCS0	Ch0
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS0	Ch0

**Note:**

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

**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	Ch0
802.11n_HT20				OFDM	MCS0	Ch0
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	Ch0
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Ch0
802.11n_HT20				OFDM	MCS0	Ch0
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS0	Ch0

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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.
LISN	TESEQ	NNB 51	36076	2018/02/14	2019/2/13
EMI Test Receiver	R&S	ESCI	101300	2017/11/02	2018/11/1
Notebook	Lenovo	L420	S0012467	N/A	N/A

### 6.3 EUT Setup

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

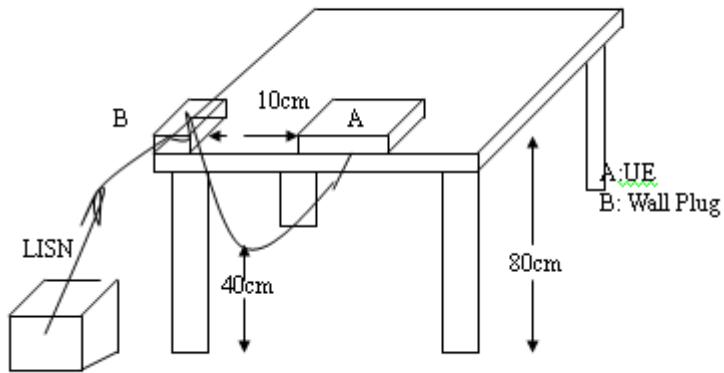
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## 6.4 Test SET-UP



## 6.5 Measurement Procedure

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

## 6.6 Measurement Result

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

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

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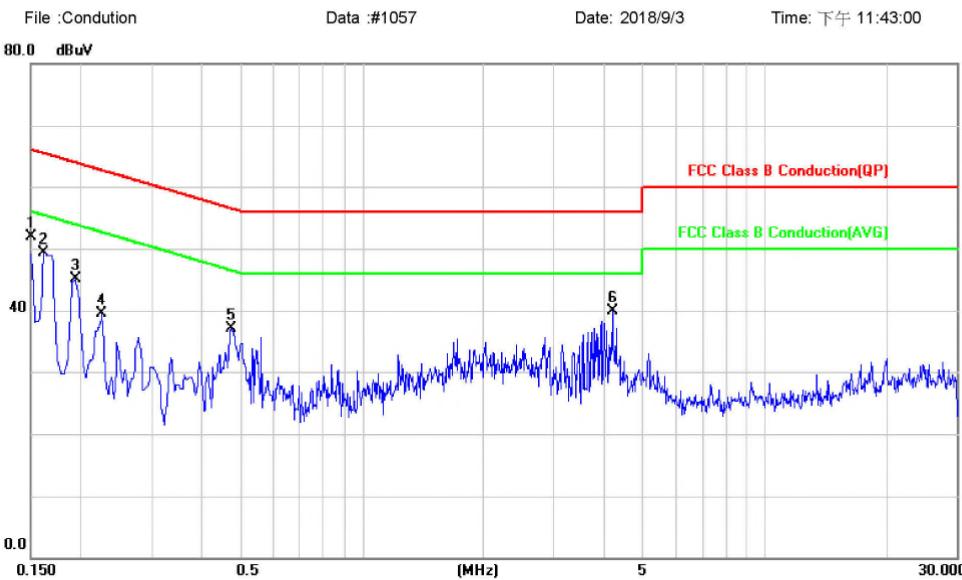
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

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

Phase: **L1**  
 Power: AC 120V/60Hz  
 Temperature: 22 °C  
 Humidity: 64 %

## Conducted Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dB	Detector	Comment
1 *		0.1500	32.18	19.65	51.83	66.00	-14.17	peak
2		0.1620	29.56	19.67	49.23	65.36	-16.13	peak
3		0.1940	25.46	19.73	45.19	63.86	-18.67	peak
4		0.2260	19.72	19.78	39.50	62.60	-23.10	peak
5		0.4740	16.89	20.19	37.08	56.44	-19.36	peak
6		4.1900	19.85	20.14	39.99	56.00	-16.01	peak

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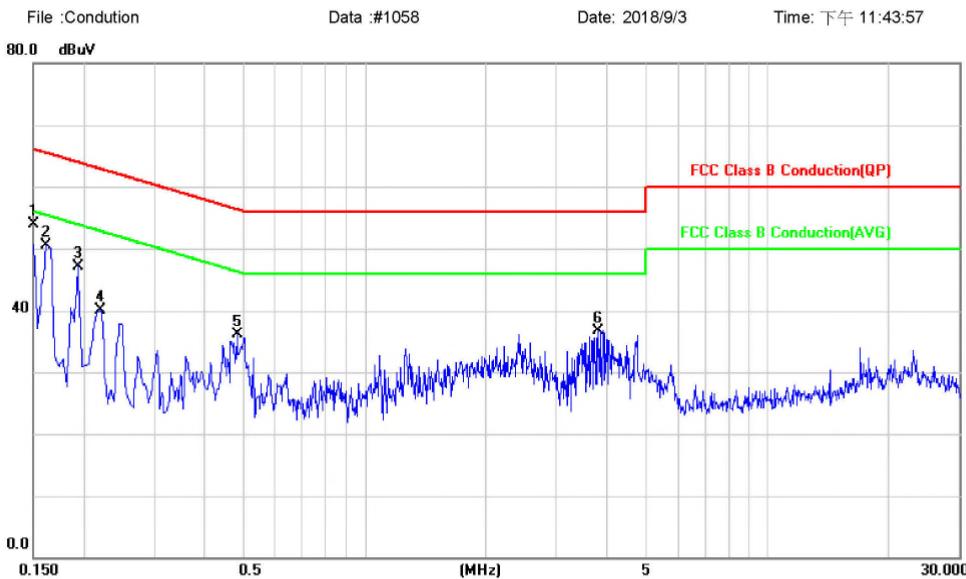
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Site : Conduction Room Phase: **N** Temperature: 22 °C  
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 64 %  
 Mode:  
 Note:

### Conducted Emission



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dB			
1 *		0.1500	34.33	19.64	53.97	66.00	-12.03	peak	
2		0.1620	30.79	19.66	50.45	65.36	-14.91	peak	
3		0.1940	27.49	19.71	47.20	63.86	-16.66	peak	
4		0.2220	20.36	19.76	40.12	62.74	-22.62	peak	
5		0.4820	15.99	20.19	36.18	56.30	-20.12	peak	
6		3.8180	16.59	20.20	36.79	56.00	-19.21	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) $=10 \log (1/\text{Duty Cycle})$	1/T (kHz)	VBW setting (kHz)
802.11a	100.00	0.00	0.00	0.01
802.11n_20	100.00	0.00	0.00	0.01
802.11n_40	100.00	0.00	0.00	0.01

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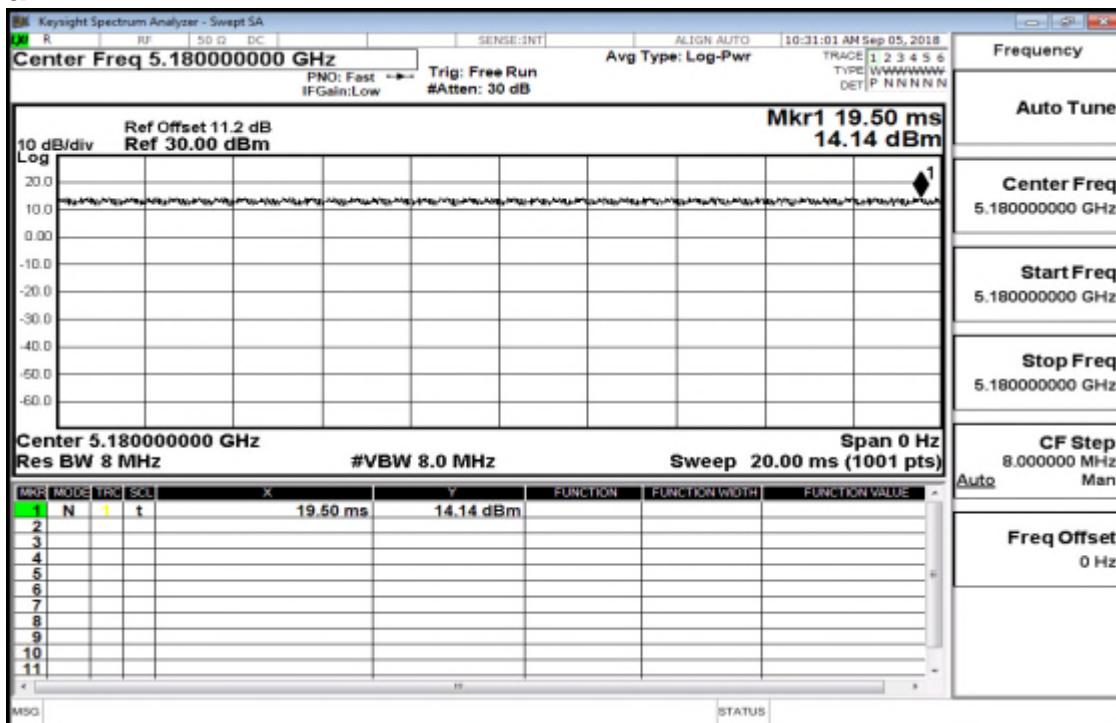
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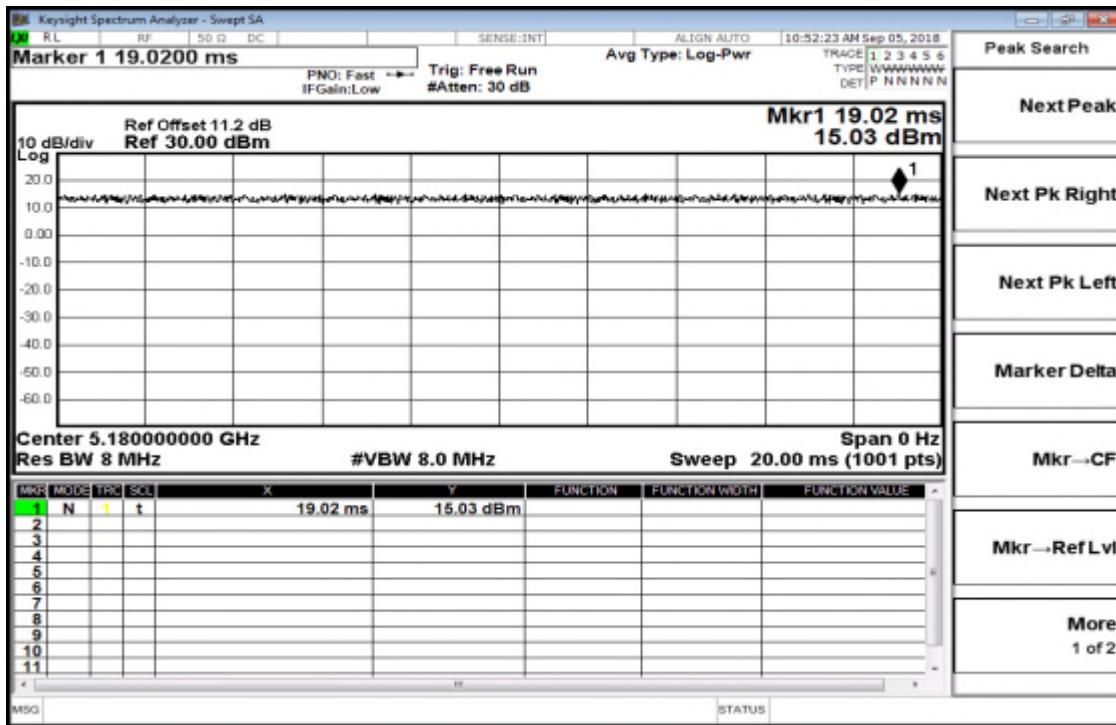
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## DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

### 802.11a



### 802.11n HT20



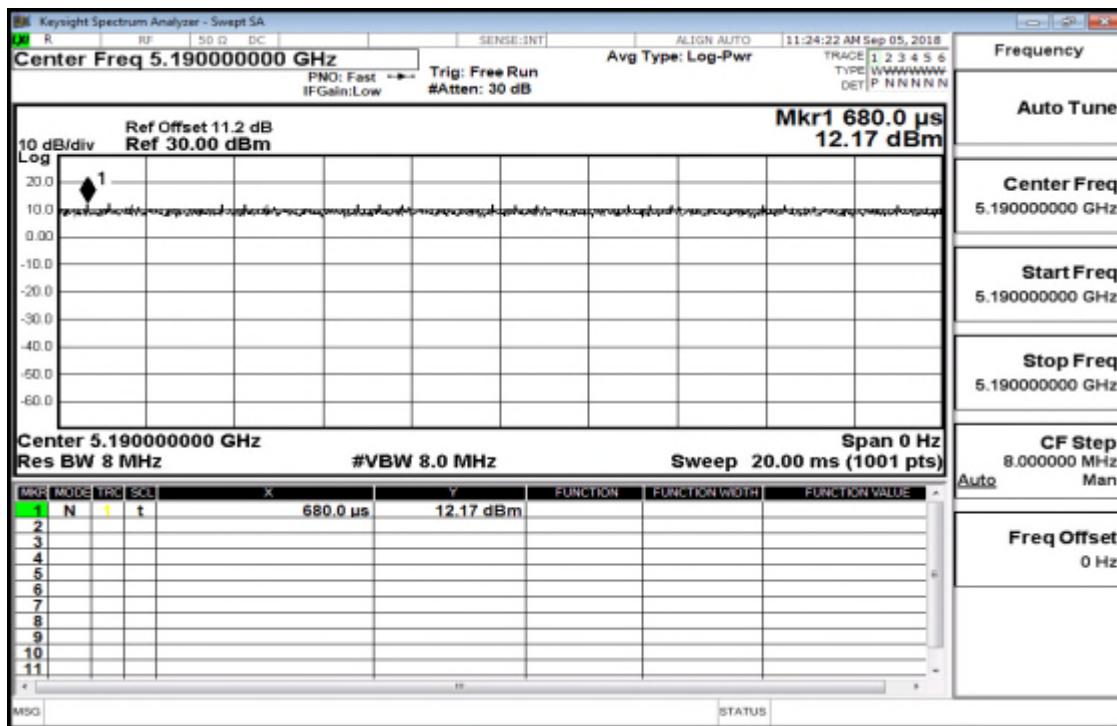
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## 802.11n HT 40



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## 8 26DB & 6DB EMISSION BANDWIDTH MEASUREMENT

### 8.1 Standard Applicable

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

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

### 8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
  - a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
  - b. Mark the peak frequency and -26dB (upper and lower) frequency.
4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
5. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
  - a. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto
  - b. Mark the peak frequency and -6dB (upper and lower) frequency.
6. For 99% Bandwidth:  
Set the spectrum analyzer as RBW=1%, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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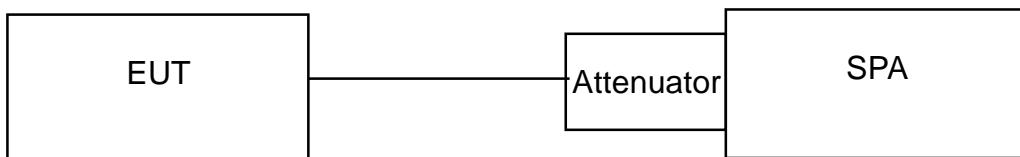
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### 8.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY53400256	2017/10/30	2018/10/29
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25
DC Block	PASTERNACK	PE8210	RF29	2017/12/26	2018/12/25

### 8.4 Test Set-up



### 8.5 Measurement Result

#### 26dB Bandwidth

**802.11a\_Ch0**

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	18.73	12.725
5220	22.37	13.497
5240	20.76	13.171

**802.11n\_HT20\_Ch0**

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.03	13.017
5220	20.78	13.176
5240	21.88	13.401

**802.11n \_HT40\_Ch0**

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.36	16.059
5230	43.04	16.338

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**6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC**
**802.11a\_Ch0**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.38	12.143
5785	16.38	12.143
5825	16.39	12.145

**802.11n\_HT20\_Ch0**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.62	12.460
5785	17.63	12.463
5825	17.62	12.460

**802.11n\_HT40\_Ch0**

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.35	15.605
5795	36.36	15.606

**99% BW verification for DFS Function**
**802.11a\_Ch0**

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.25	< 5250
5745	5736.78	> 5725

**802.11n\_HT20\_Ch0**

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.91	< 5250
5745	5736.09	> 5725

**802.11n\_HT40\_Ch0**

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.05	< 5250
5755	5737.05	> 5725

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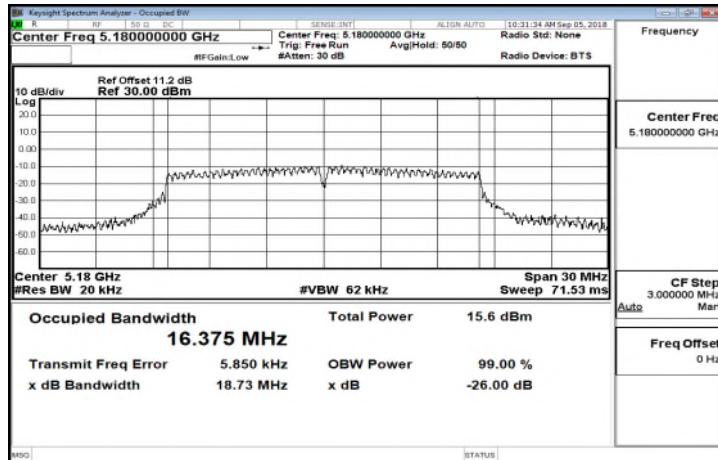
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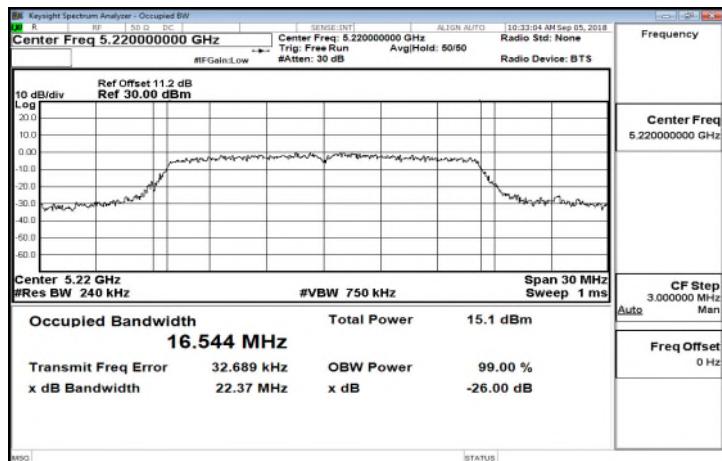
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## 802.11a, 5150~5250 MHz

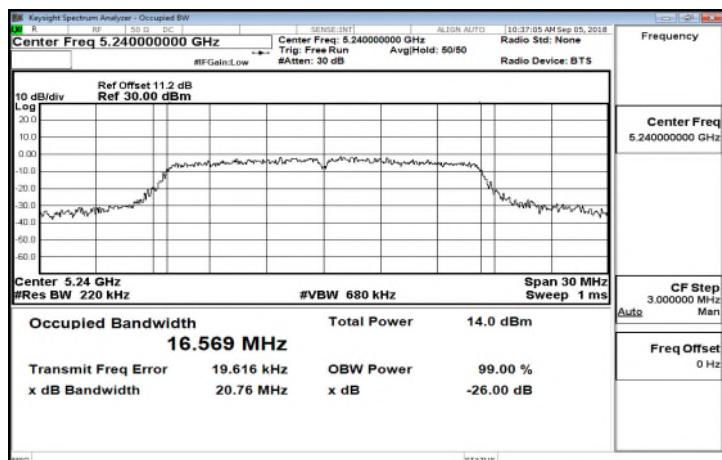
### 26dB Band Width Test Data CH-Low (5180MHz)



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

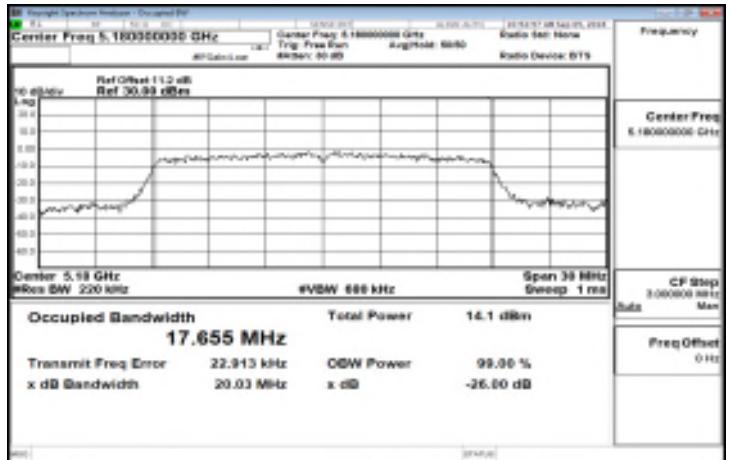


### 26dB Band Width Test Data CH-High (5240MHz)

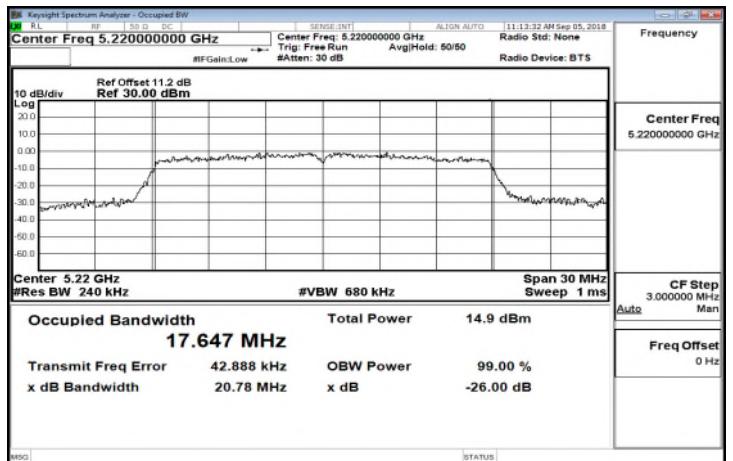


## 802.11n HT20, 5150~5250 MHz

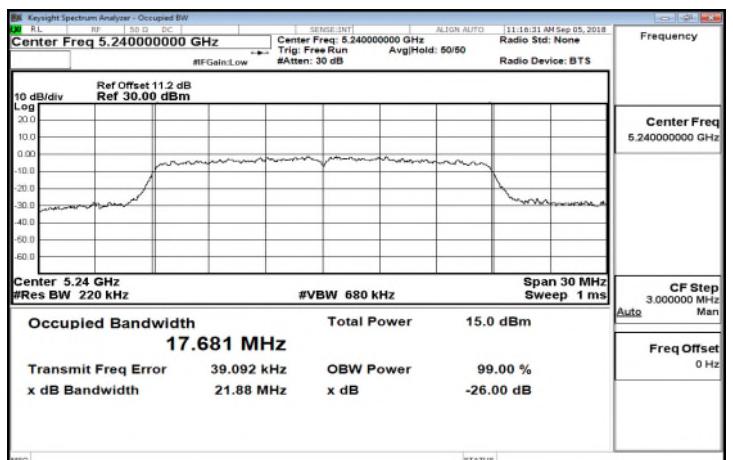
### 26dB Band Width Test Data CH-Low (5180 MHz)



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



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



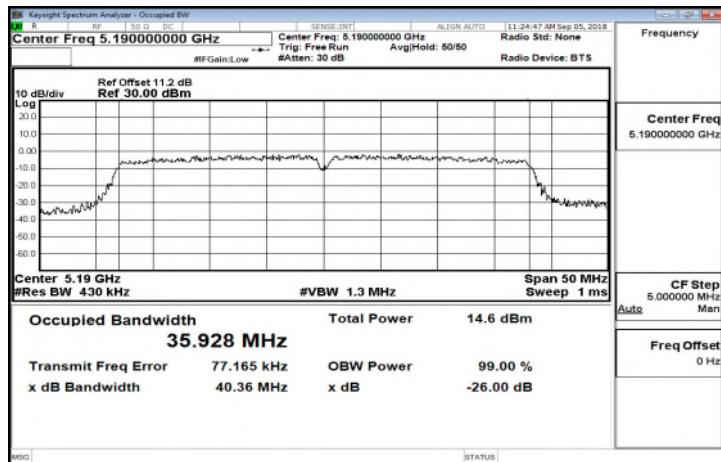
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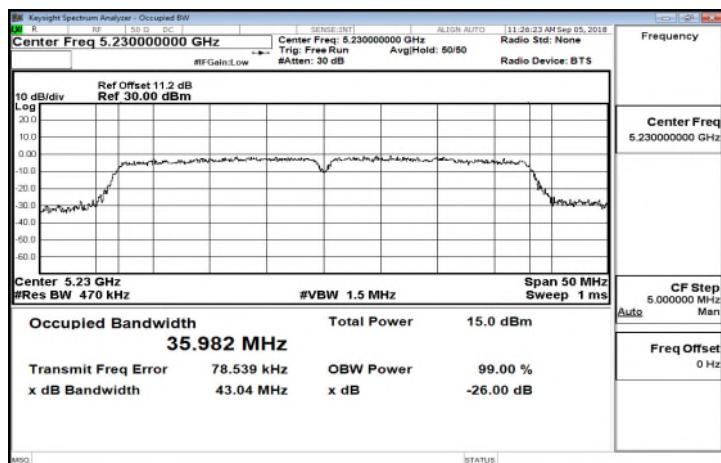
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## 802.11n HT40, 5150~5250 MHz

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



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



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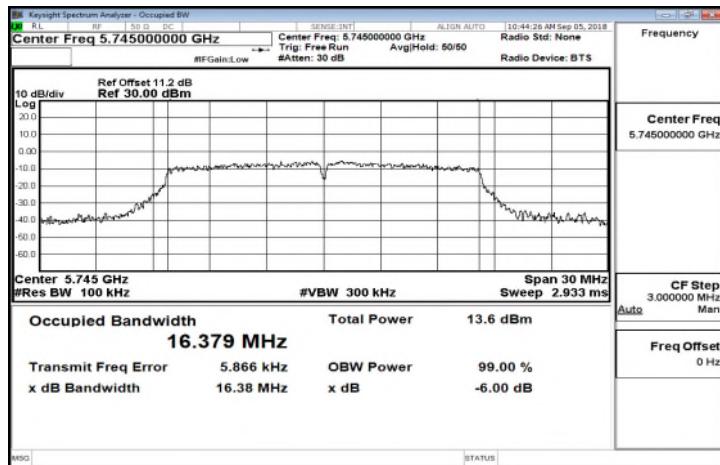
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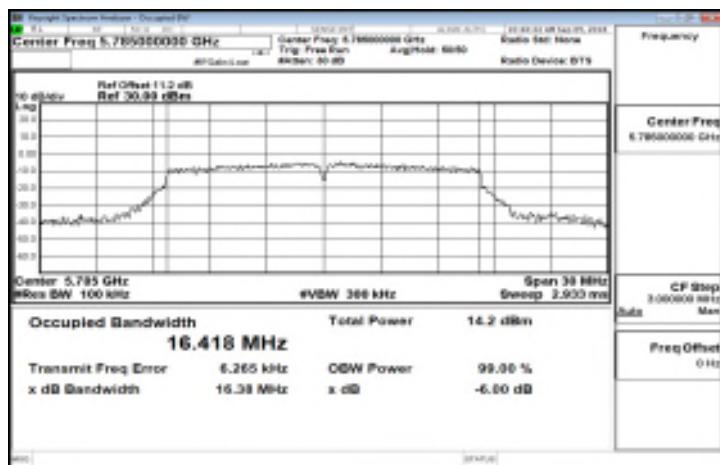
## 6dB Band Width measure with Peak detector for FCC

802.11a, 5725~5850 MHz

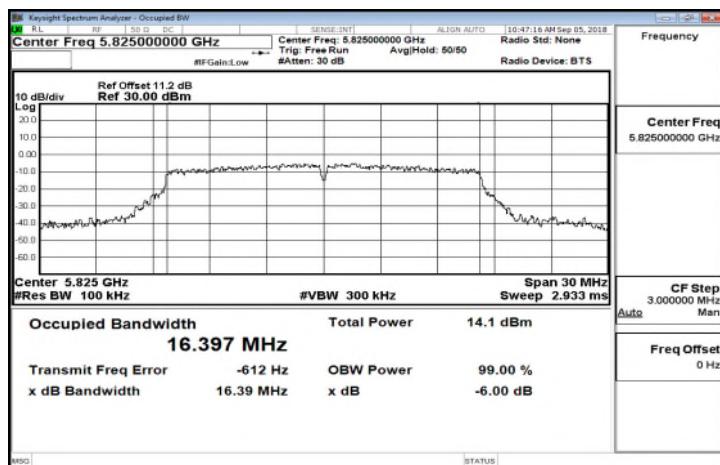
### 6dB Band Width Test Data CH-Low (5745 MHz)



### 6dB Band Width Test Data CH-Mid (5785 MHz)

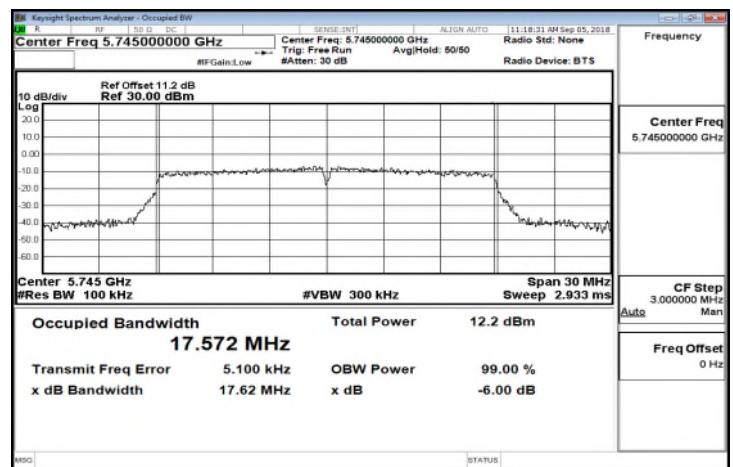


### 6dB Band Width Test Data CH-High (5825 MHz)

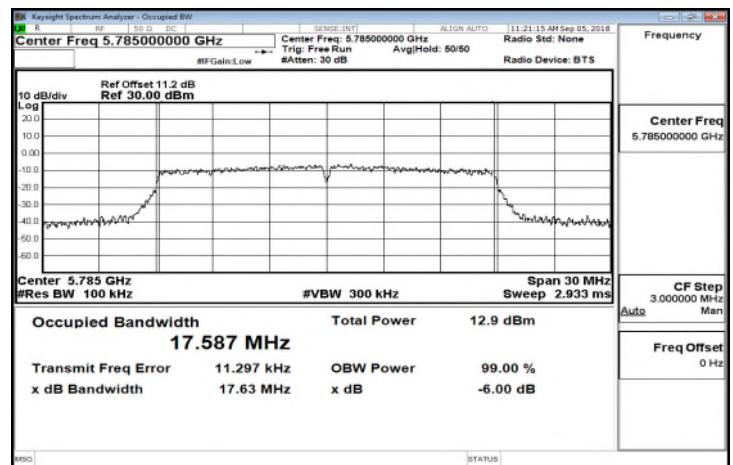


## 802.11n\_HT20, 5725~5850 MHz

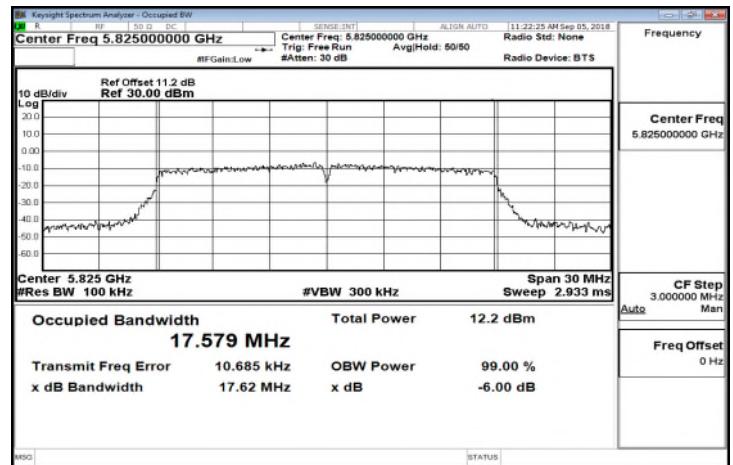
### 6dB Band Width Test Data CH-Low (5745 MHz)



### 6dB Band Width Test Data CH-Mid (5785 MHz)



### 6dB Band Width Test Data CH-High (5825 MHz)



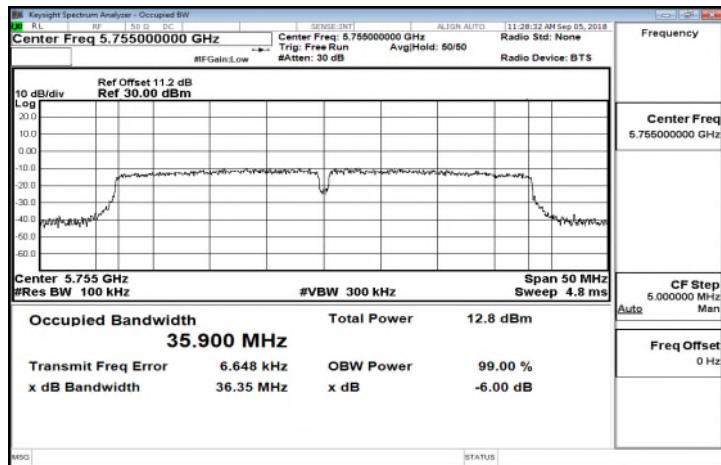
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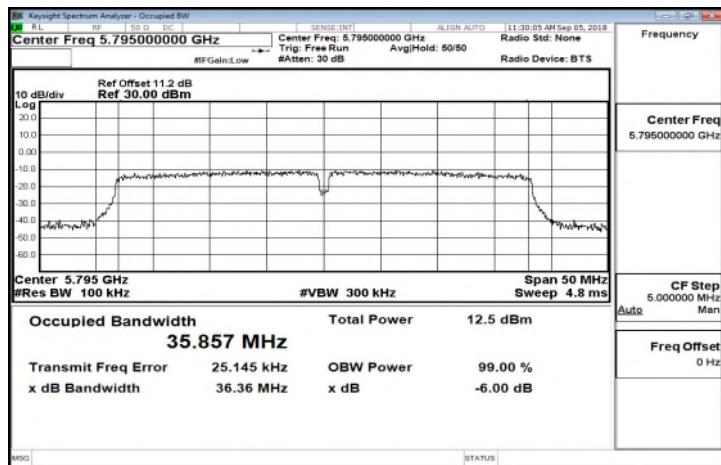
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## 802.11n\_HT40, 5725~5850 MHz

## 6dB Band Width Test Data CH-Low (5755 MHz)



## 6dB Band Width Test Data CH-Mid (5795 MHz)



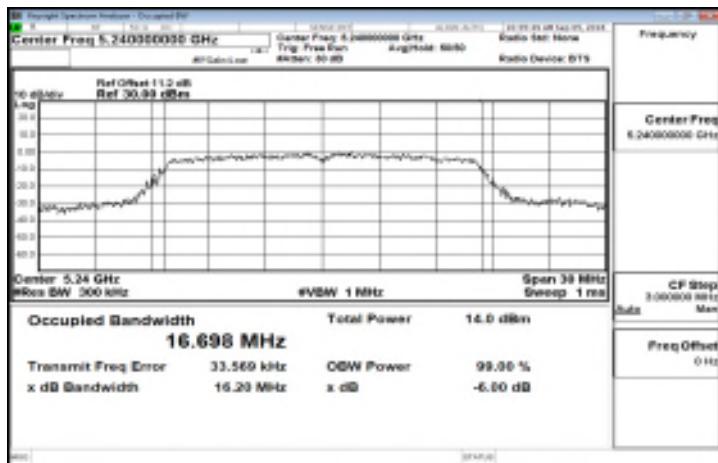
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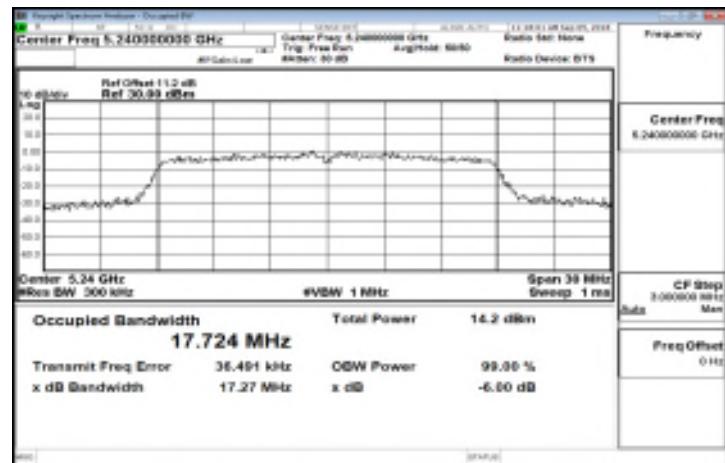
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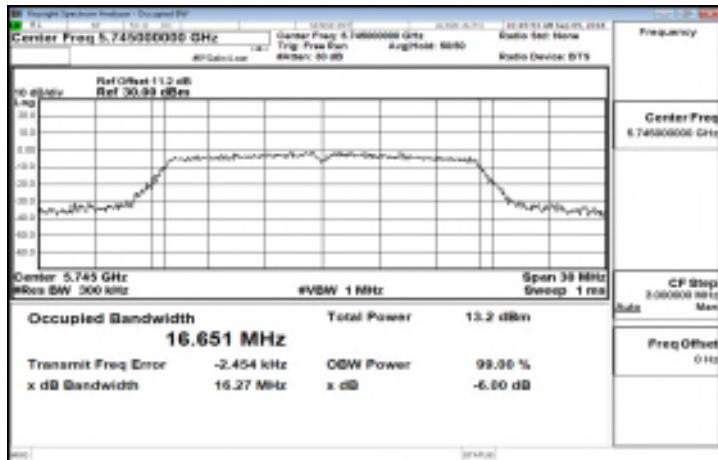
99% BW verification for DFS Function  
802.11a\_5240MHz



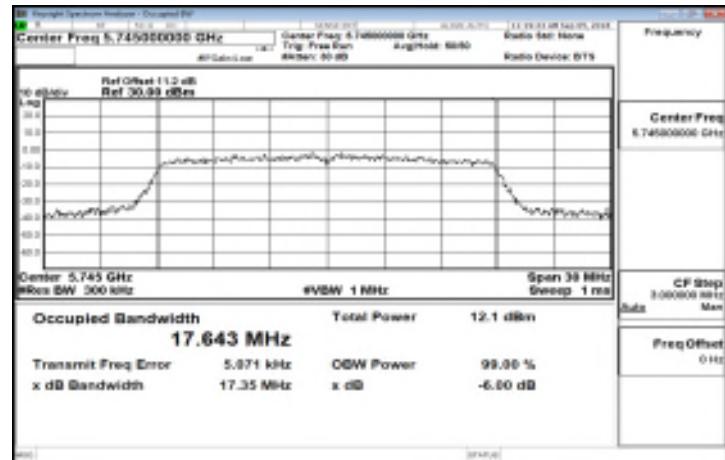
802.11n\_20MHz\_5240MHz



802.11a\_5745MHz



802.11n\_20MHz\_5745MHz

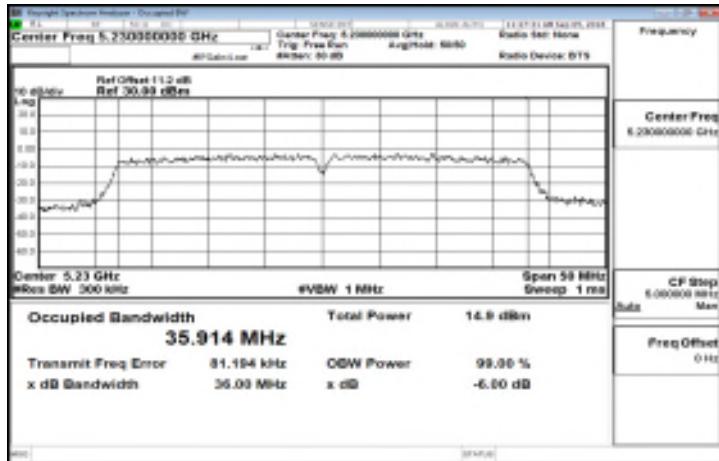


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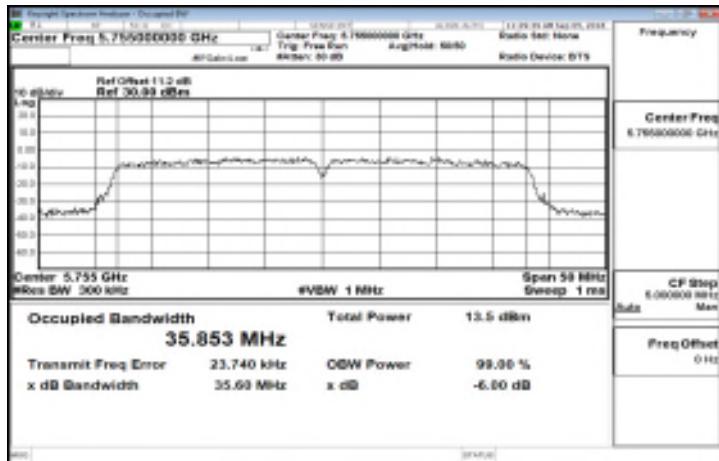
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## 802.11n\_40MHz\_5230MHz



## 802.11n\_40MHz\_5755MHz



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## 9 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

### 9.1 Standard Applicable

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

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

The antenna gain is not grater than 6 dBi. Therefore, reduction of power is not required.

	Effective Legacy Gain (dBi)	Conducted Power Limit (dBm)
UNII-1	5.63	23.98

The antenna gain is grater than 6 dBi , therefore the limit needs to be reduced as below:

	Effective Legacy Gain (dBi)	Conducted Power Limit (dBm)
U-NII-3	7.18	28.82

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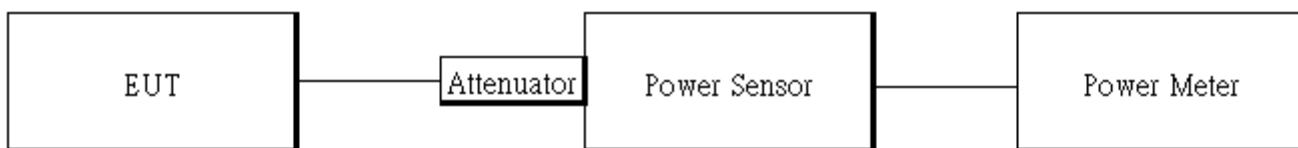
## 9.2 Measurement Procedure

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

## 9.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2496A	1326001	2018/08/09	2019/08/02
Power Sensor	Anritsu	MA2411B	1315048	2018/08/09	2019/08/02
Power Sensor	Anritsu	MA2411B	1315049	2018/08/09	2019/08/02
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25
Attenuator	Marvelous	MVE2213-10	RF31	2017/12/26	2018/12/25

## 9.4 Test Set-up



## 9.5 Measurement Result

### Conducted output power (FCC)

#### 802.11a\_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	7.83	6.067	23.98	PASS
44	5220	6	<b>8.31</b>	6.776	23.98	PASS
48	5240	6	8.26	6.699	23.98	PASS
149	5745	6	9.02	7.980	28.82	PASS
157	5785	6	9.01	7.962	28.82	PASS
165	5825	6	<b>9.08</b>	8.091	28.82	PASS

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## 802.11n\_HT20\_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	MCS0	7.93	6.209	23.98	PASS
44	5220	MCS0	<b>8.28</b>	6.730	23.98	PASS
48	5240	MCS0	8.19	6.592	23.98	PASS
149	5745	MCS0	7.71	5.902	28.82	PASS
157	5785	MCS0	8.03	6.353	28.82	PASS
165	5825	MCS0	<b>8.12</b>	6.486	28.82	PASS

## 802.11n\_HT40\_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
38	5190	MCS0	7.11	5.140	23.98	PASS
46	5230	MCS0	<b>7.37</b>	5.458	23.98	PASS
151	5755	MCS0	<b>8.25</b>	6.683	28.82	PASS
159	5795	MCS0	7.88	6.138	28.82	PASS

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## 10 MAXIMUM POWER SPECTRAL DENSITY

### 10.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT	
U-NII-1	Access Point (Master device )		17dBm/ MHz	
	Fixed point-to-point Access Ponit			
	✓ Mobile and portable client device			
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, the Maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna gain is not grater than 6 dBi. Therefore, reduction of power is not required.

	Effective Legacy Gain (dBi)	PSD Limit	
UNII-1	5.63	11.00	dBm/MHz

The antenna gain is grater than 6 dBi , therefore the limit needs to be reduced as below:

	Effective Legacy Gain (dBi)	PSD Limit	
U-NII-3	7.18	28.82	dBm/500 kHz

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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:

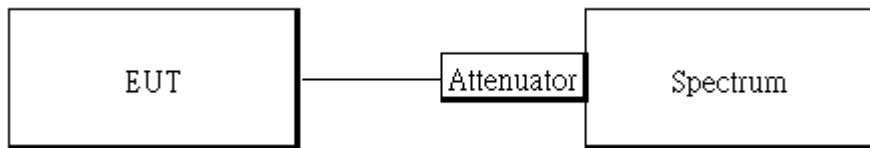
Set RBW=500 kHz, VBW $\geq$  3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

5. User 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.

## 10.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY53400256	2017/10/30	2018/10/29
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25
DC Block	PASTERNACK	PE8210	RF29	2017/12/26	2018/12/25

## 10.4 Test Set-up



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## 10.5 Measurement Result

POWER DENSITY 802.11a MODE						
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	-1.90	11.20	0.00	-1.90	11	-12.90
5220	-1.36	11.20	0.00	-1.36	11	-12.36
5240	-2.45	11.20	0.00	-2.45	11	-13.45
5745	1.33	11.20	0.00	1.33	28.82	-27.49
5785	2.39	11.20	0.00	2.39	28.82	-26.43
5825	2.53	11.20	0.00	2.53	28.82	-26.29
POWER DENSITY 802.11n HT20 MODE						
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	-1.88	11.20	0.00	-1.88	11	-12.88
5220	-1.38	11.20	0.00	-1.38	11	-12.38
5240	-2.45	11.20	0.00	-2.45	11	-13.45
5745	1.40	11.20	0.00	1.40	28.82	-27.42
5785	1.54	11.20	0.00	1.54	28.82	-27.28
5825	0.56	11.20	0.00	0.56	28.82	-28.26
POWER DENSITY 802.11n HT40 MODE						
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5190	-5.97	11.20	0.00	-5.97	11	-16.97
5230	-5.5	11.20	0.00	-5.50	11	-16.50
5755	-2.15	11.20	0.00	-2.15	28.82	-30.97
5795	-2.68	11.20	0.00	-2.68	28.82	-31.50

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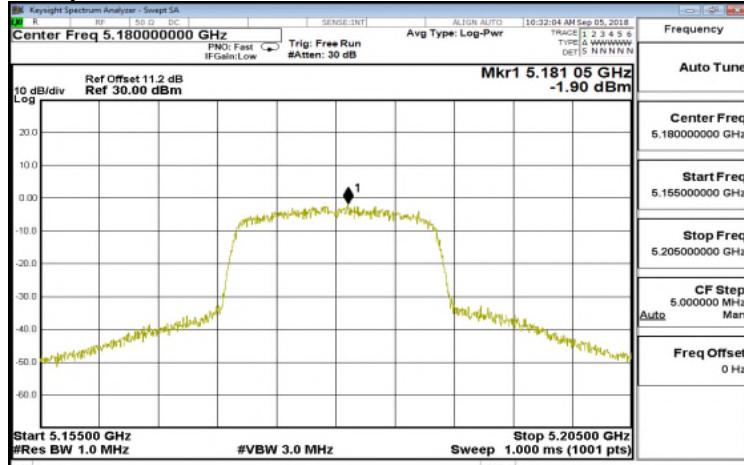
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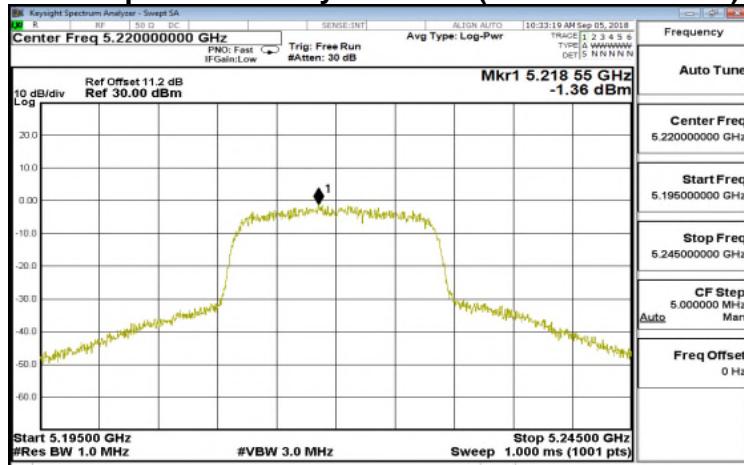
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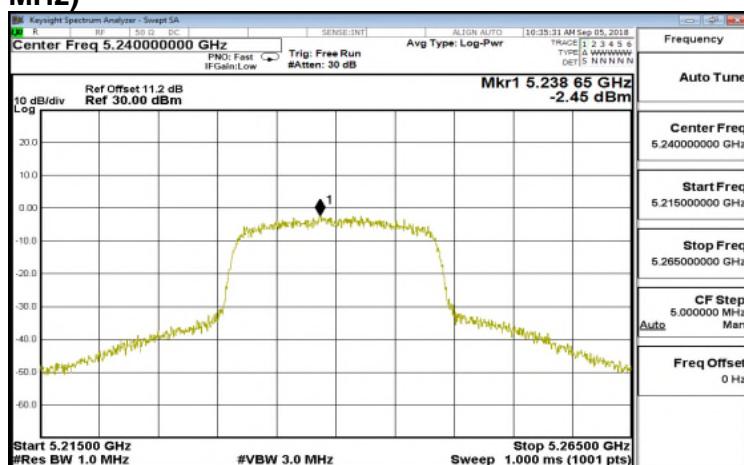
## **802.11a 5150~5250 MHz Power Spectral Density Data Plot (CH Low 5180 MHz)**



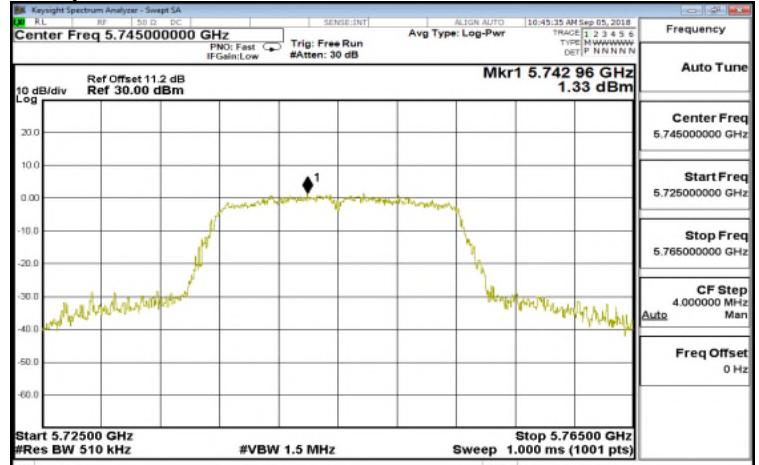
#### Power Spectral Density Data Plot (CH Mid 5220 MHz)



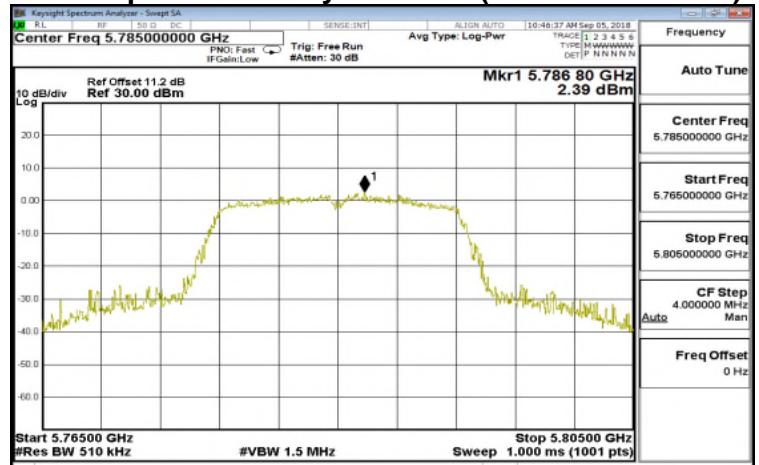
## Power Spectral Density Data Plot (CH High 52400 MHz)



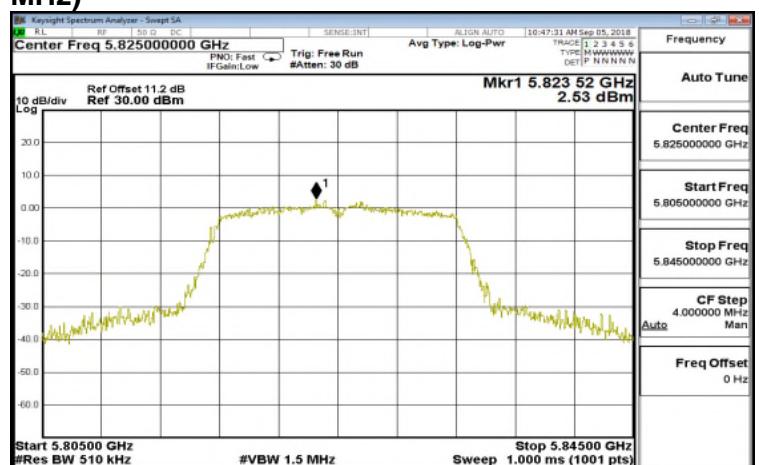
## 802.11a 5725~5850 MHz Power Spectral Density Data Plot (CH Low 5745 MHz)



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



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



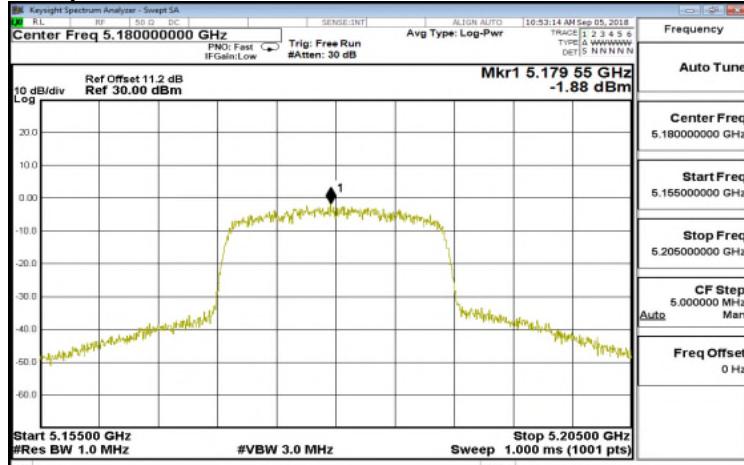
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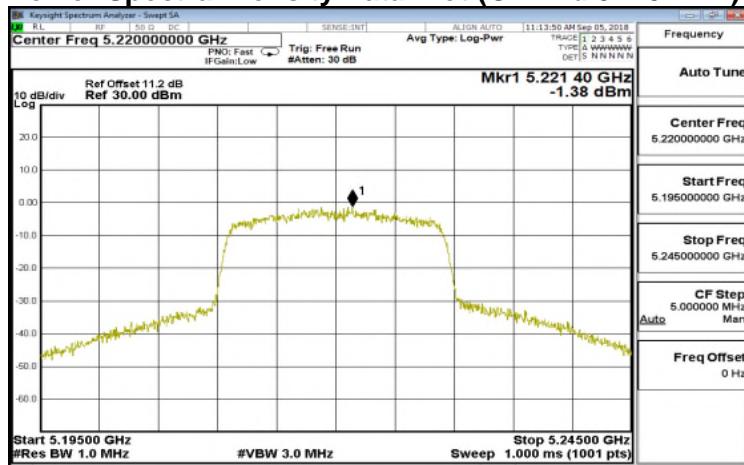
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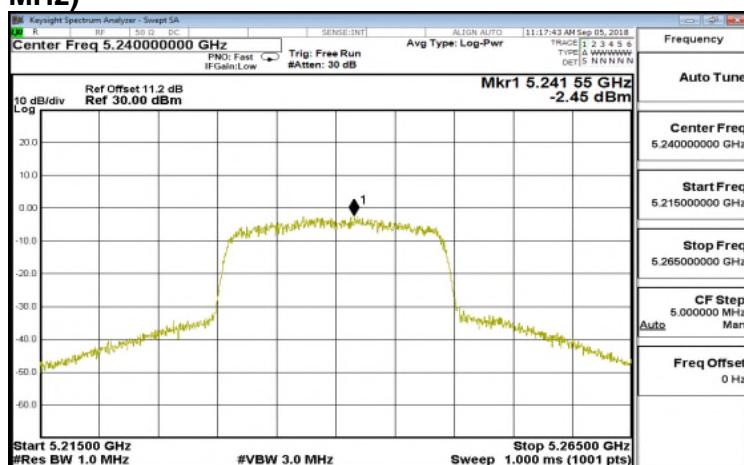
## 802.11n HT20, 5150~5250 MHz Power Spectral Density Data Plot (CH Low 5180 MHz)



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



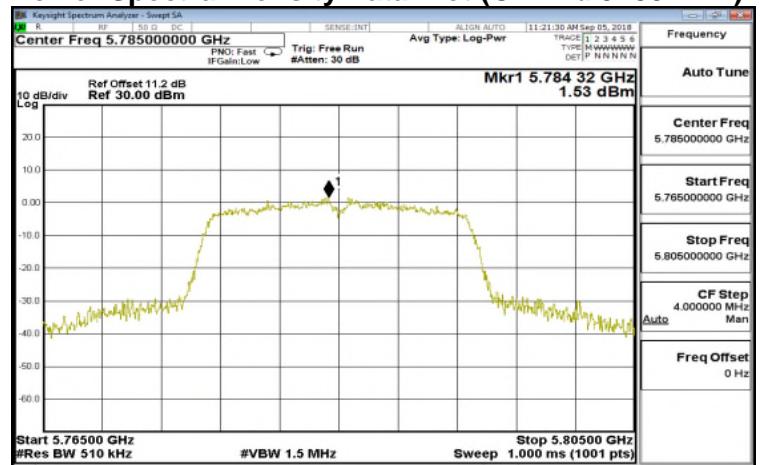
## Power Spectral Density Data Plot (CH High 52400 MHz)



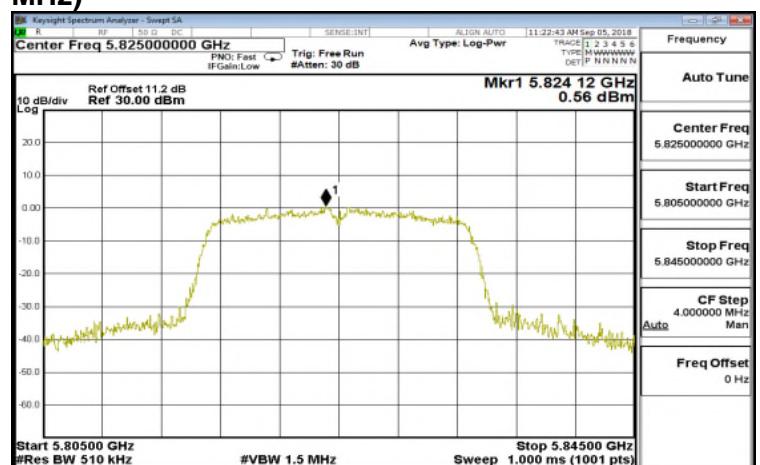
## 802.11n HT20, 5725~5850 MHz Power Spectral Density Data Plot (CH Low 5745 MHz)



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



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



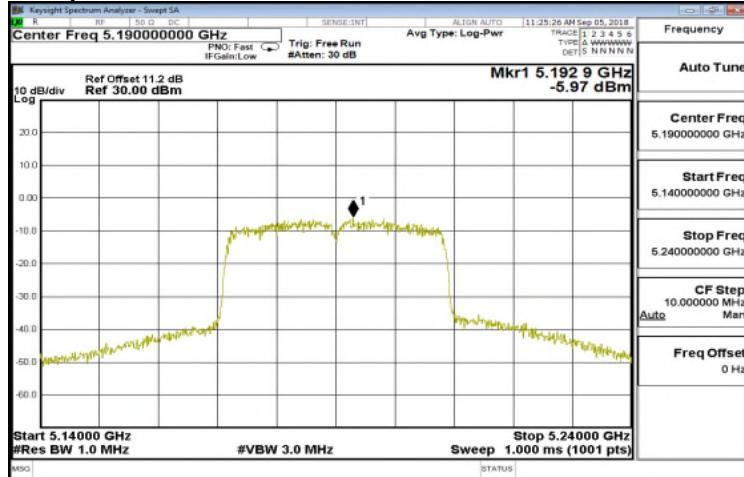
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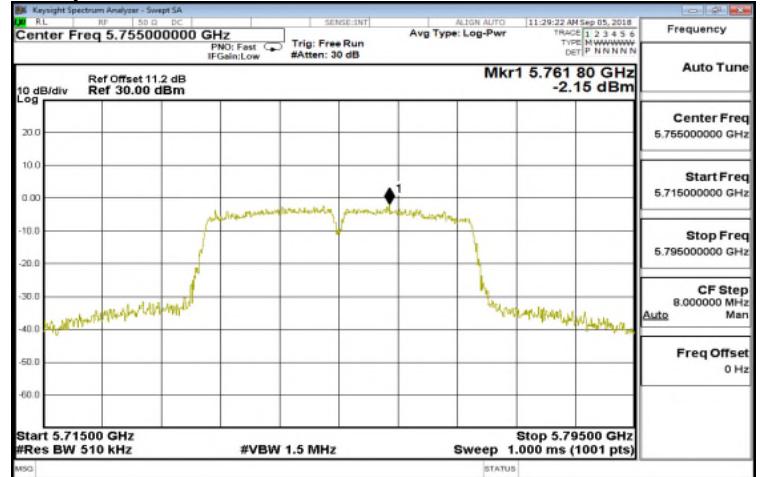
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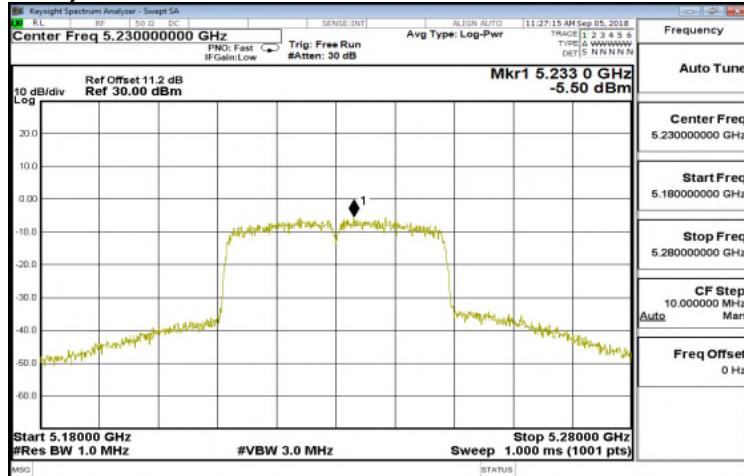
## 802.11n HT40, 5150~5250 MHz Power Spectral Density Data Plot (CH Low 5190 MHz)



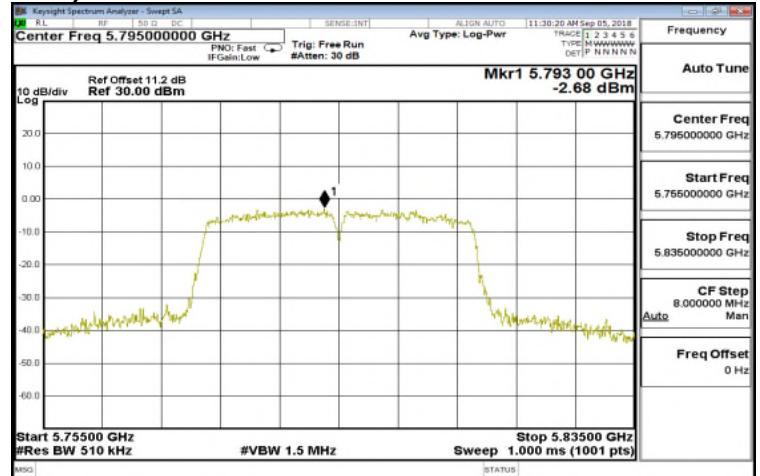
## 802.11n HT40, 5725~5850 MHz Power Spectral Density Data Plot (CH Low 5755 MHz)



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



## Power Spectral Density Data Plot (CH High 5795 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 (dB $\mu$ V/m)	AV 54 (dB $\mu$ V/m)
APPLICABLE TO	EIRP LIMIT	FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.3 (dB $\mu$ V/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(dB $\mu$ V/m) *1 PK:105.2 (dB $\mu$ V/m) *2 PK: 110.8(dB $\mu$ V/m) *3 PK:122.2 (dB $\mu$ V/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\*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 (dB $\mu$ V/m) = 20 log Emission level (dB $\mu$ V/m)

## 11.2 Measurement Equipment Used

SGS SAC-III					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Horn Antenna	Schwarzbeck	BBHA9120D	1341	2018/06/07	2019/06/06
3m Site NSA	SGS	966 chamber D	N/A	2018/07/06	2019/07/05
Spectrum Analyzer	Agilent	N9010A	MY53400256	2017/10/30	2018/10/29
Pre-Amplifier	EMC Instruments	EMC184045B	980135	2017/10/27	2018/10/26
Pre-Amplifier	EMC Instruments	EMC12630SE	980271	2017/12/26	2018/12/25
Attenuator	Marvelous	WATT-218FS-10	RF246	2017/12/26	2018/12/25
DC Block	PASTERNAK	PE8210	RF81	2017/12/26	2018/12/25
Band Rejection Filter	Micro-Tronics	G015	RF100	2017/12/26	2018/12/25
Coaxial Cable	Huber Suhner	EMC106-SM-SM-7200	150703	2017/12/26	2018/12/25
Notebook	Lenovo	L420	S0012467	N/A	N/A
Broadband Antenna	SCHWAZBECK	VULB 9168	9168-617	2018/10/30	2019/10/29

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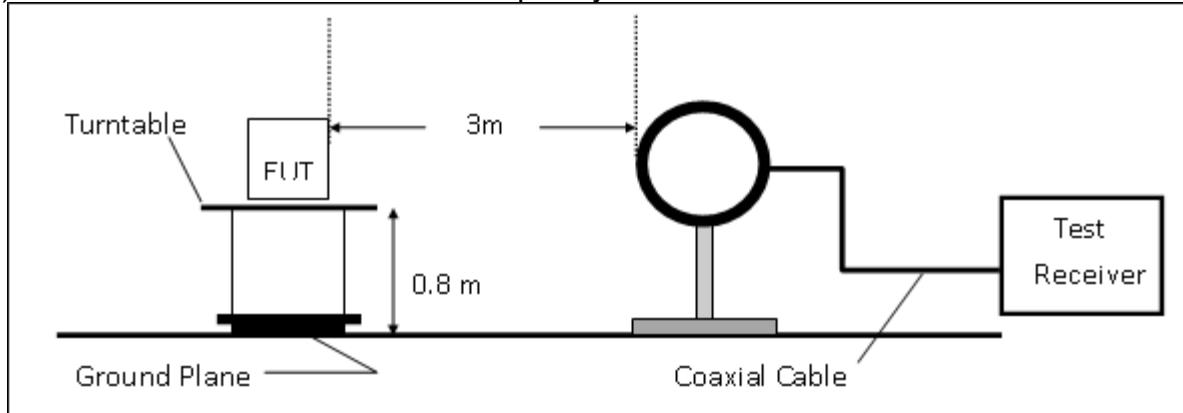
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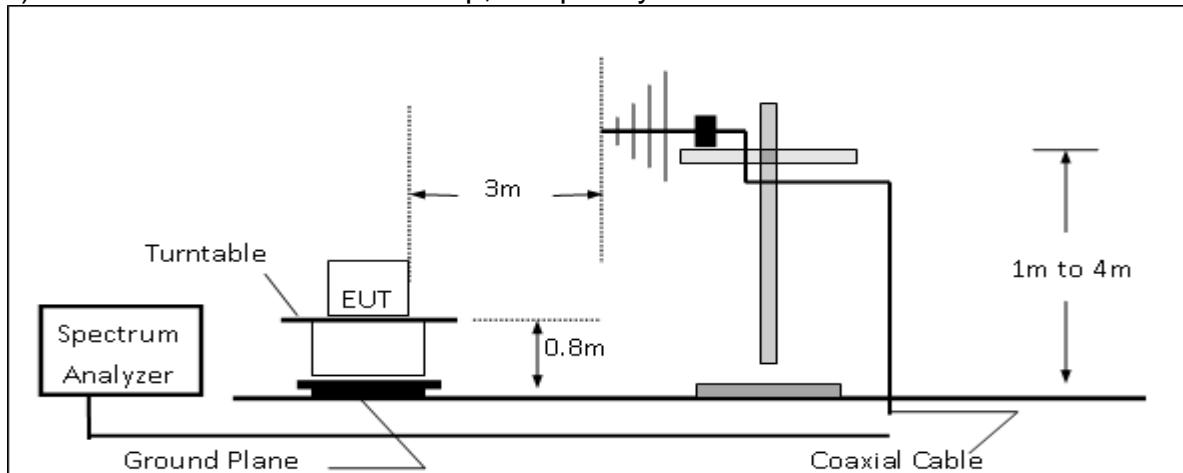
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### 11.3 Test SET-UP

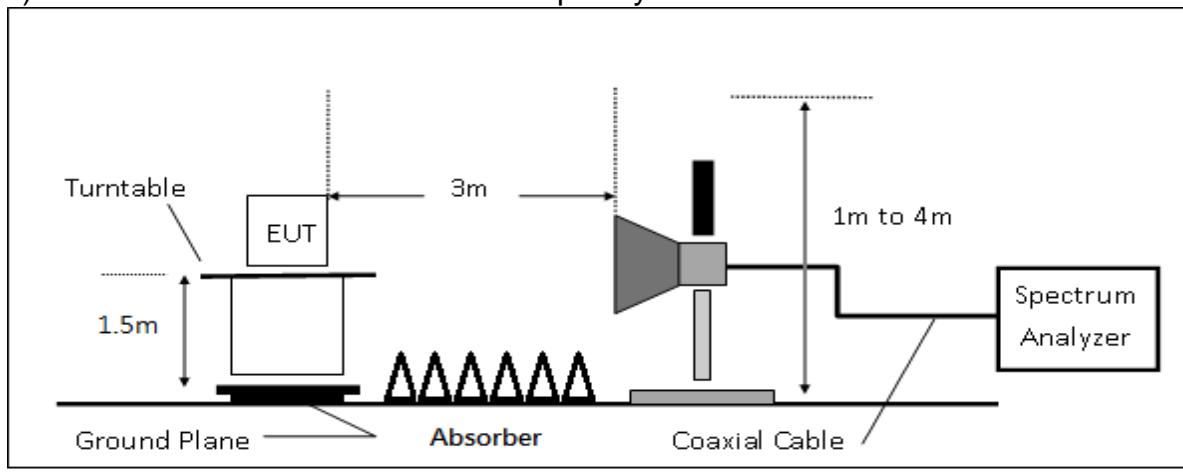
#### (A) Radiated Emission Test Set-UP Frequency Below 30MHz.



#### (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  $\geq$  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(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

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

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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

Refer to attach tabular data sheets.

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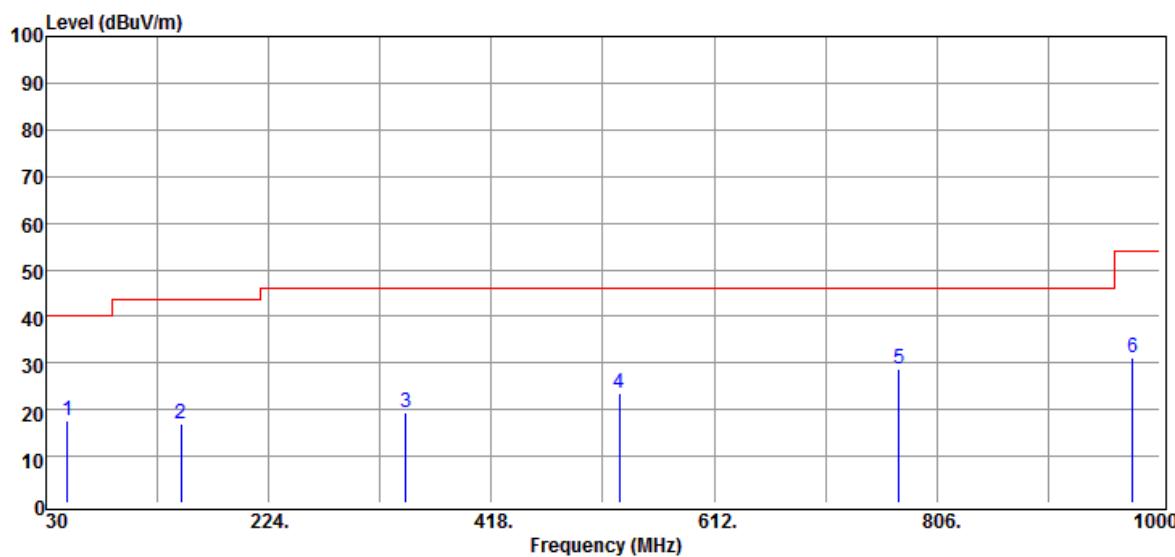
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**Radiated Spurious Emission Measurement Result****Below 1GHz Worst-Case Data:****802.11a 5150~5250 MHz**

Operation Mode	:802.11a / Band1	Test Date	:2018-09-03
Test Mode	:Tx CH Mid	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5220 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
48.43	Peak	34.63	-16.93	17.70	40.00	-22.30
147.37	Peak	33.28	-16.24	17.04	43.50	-26.46
343.31	Peak	33.62	-14.21	19.41	46.00	-26.59
529.55	Peak	33.69	-10.05	23.64	46.00	-22.36
773.02	Peak	35.55	-6.97	28.58	46.00	-17.42
976.72	Peak	34.45	-3.42	31.03	54.00	-22.97

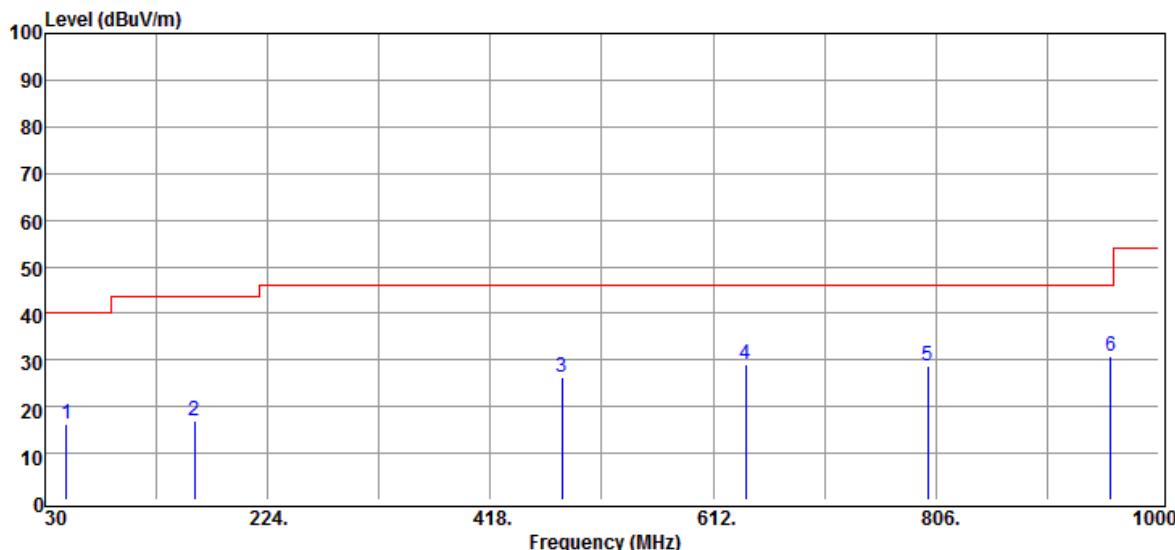
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Operation Mode :802.11a / Band1  
 Test Mode :Tx CH Mid  
 EUT Pol :E1 Plan  
 Test Channel :5220 MHz  
 Test Date :2018-09-03  
 Temp./Humi. :25/60  
 Antenna Pol. :HORIZONTAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
48.43	Peak	33.31	-16.93	16.38	40.00	-23.62
159.98	Peak	33.05	-16.19	16.86	43.50	-26.64
480.08	Peak	37.21	-11.04	26.17	46.00	-19.83
640.13	Peak	37.34	-8.14	29.20	46.00	-16.80
799.21	Peak	35.13	-6.49	28.64	46.00	-17.36
958.29	Peak	34.94	-4.19	30.75	46.00	-15.25

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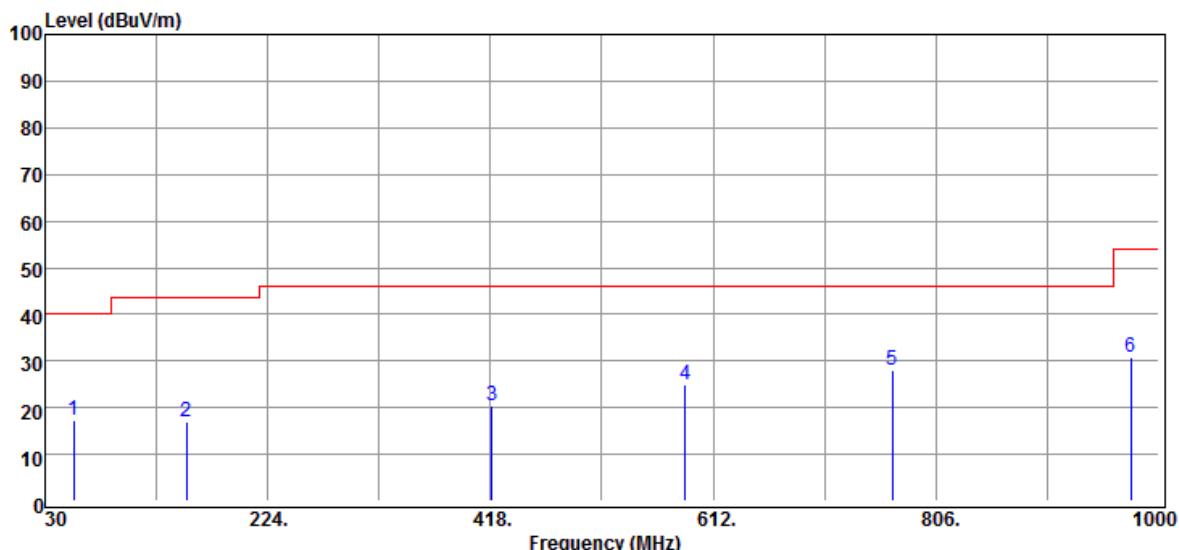
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**802.11a, 5725~5850 MHz**

Operation Mode	:802.11a / Band4	Test Date	:2018-09-03
Test Mode	:Tx CH Mid	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5785 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
55.22	Peak	34.68	-17.26	17.42	40.00	-22.58
153.19	Peak	33.23	-16.17	17.06	43.50	-26.44
418.97	Peak	32.83	-12.26	20.57	46.00	-25.43
587.75	Peak	33.80	-8.77	25.03	46.00	-20.97
768.17	Peak	34.79	-6.87	27.92	46.00	-18.08
975.75	Peak	34.36	-3.40	30.96	54.00	-23.04

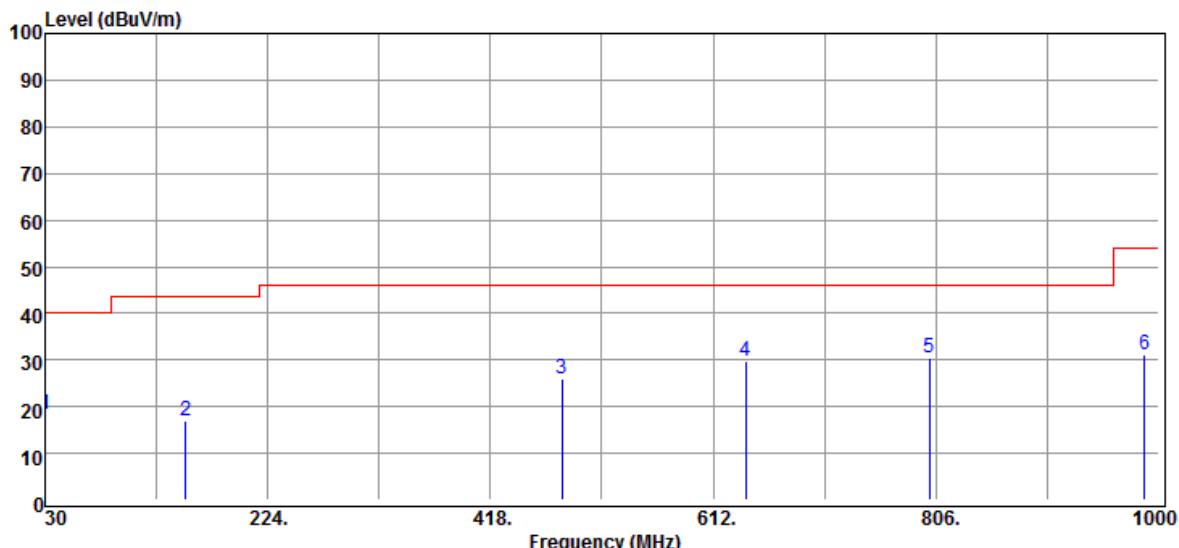
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Operation Mode :802.11a / Band4  
Test Mode :Tx CH Mid  
EUT Pol :E1 Plan  
Test Channel :5785 MHz  
Test Date :2018-09-03  
Temp./Humi. :25/60  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
30.00	Peak	35.28	-17.05	18.23	40.00	-21.77
152.22	Peak	33.01	-16.16	16.85	43.50	-26.65
480.08	Peak	37.02	-11.04	25.98	46.00	-20.02
640.13	Peak	37.88	-8.14	29.74	46.00	-16.26
800.18	Peak	36.92	-6.44	30.48	46.00	-15.52
987.39	Peak	34.97	-3.78	31.19	54.00	-22.81

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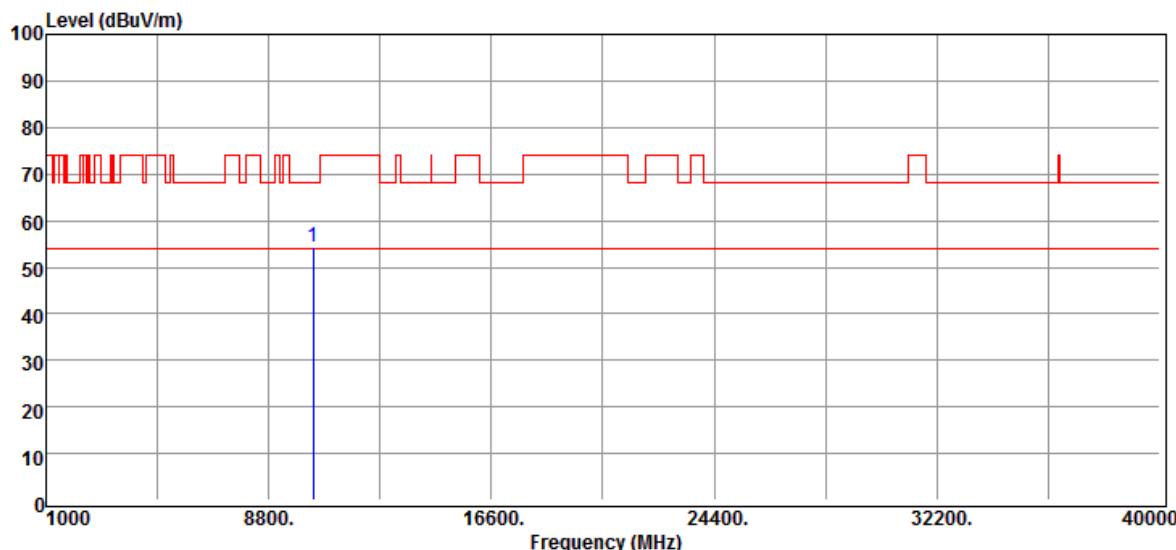
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**Above 1GHz Worst-Case Data:****Radiated Spurious Emission Measurement Result 802.11a, 5150~5250 MHz**

Operation Mode	:802.11a / Band1	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5180 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10360.00	Peak	41.95	12.41	54.36	68.20	-13.84

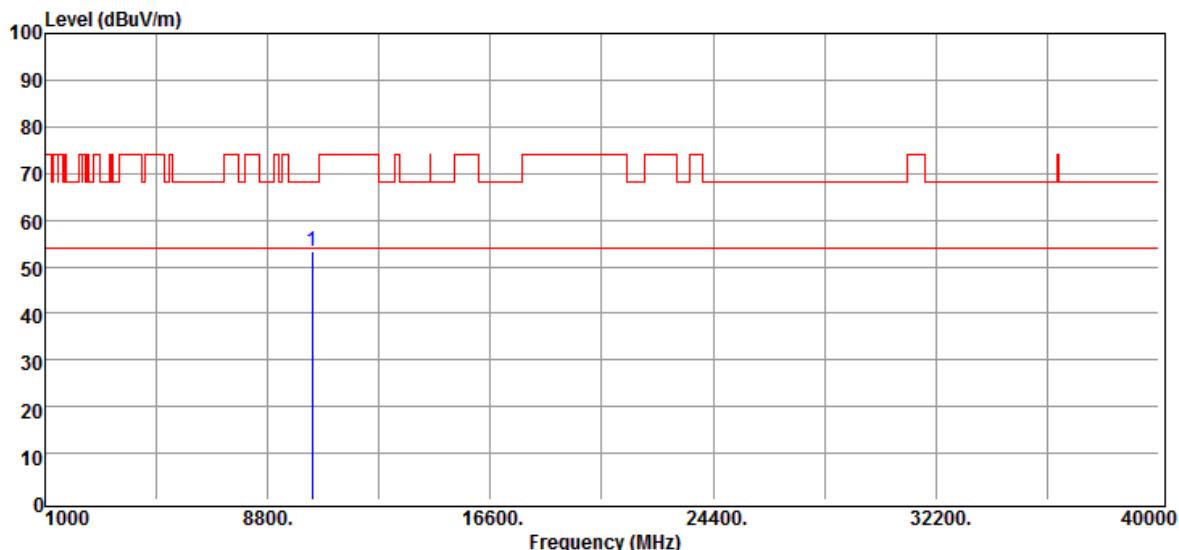
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Operation Mode :802.11a / Band1  
Test Mode :Tx CH Low  
EUT Pol :E1 Plan  
Test Channel :5180 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10360.00	Peak	40.86	12.41	53.27	68.20	-14.93

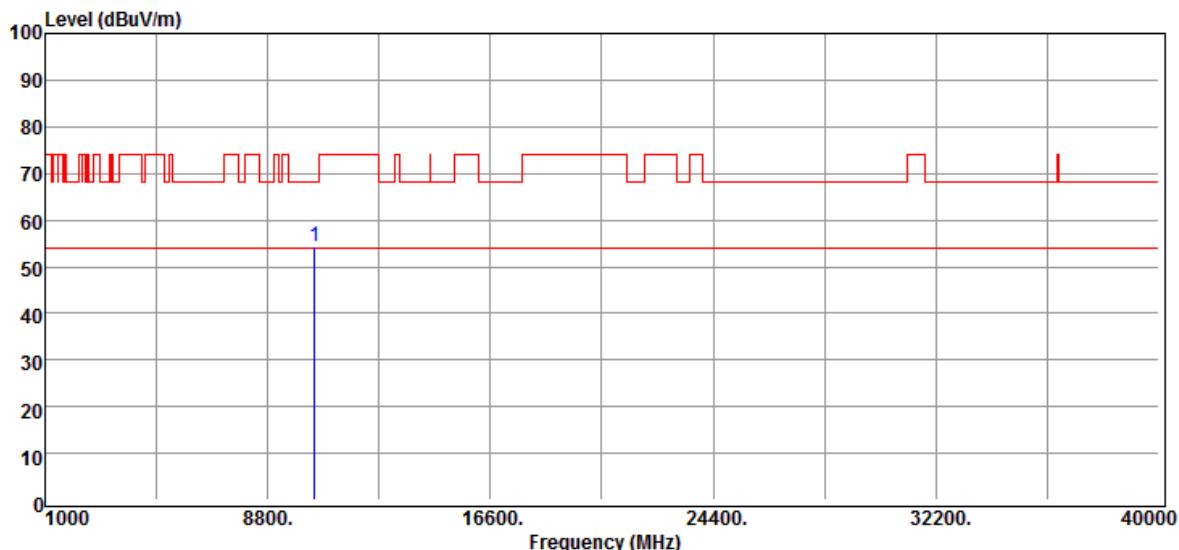
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Operation Mode :802.11a / Band1  
Test Mode :Tx CH Mid  
EUT Pol :E1 Plan  
Test Channel :5220 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10440.00	Peak	41.96	12.52	54.48	68.20	-13.72

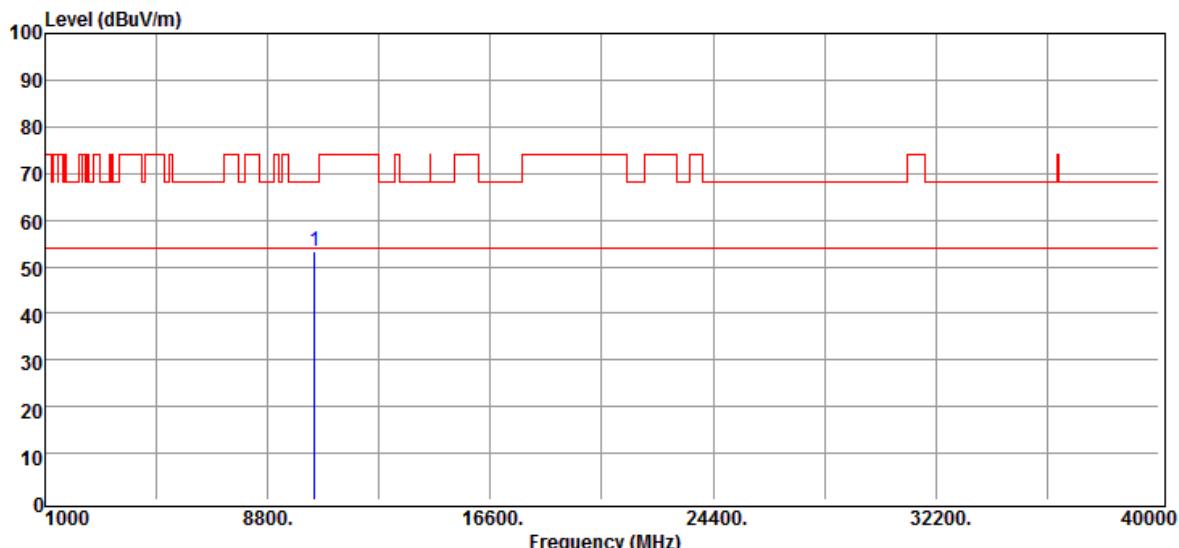
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Operation Mode :802.11a / Band1  
Test Mode :Tx CH Mid  
EUT Pol :E1 Plan  
Test Channel :5220 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10440.00	Peak	40.80	12.52	53.32	68.20	-14.88

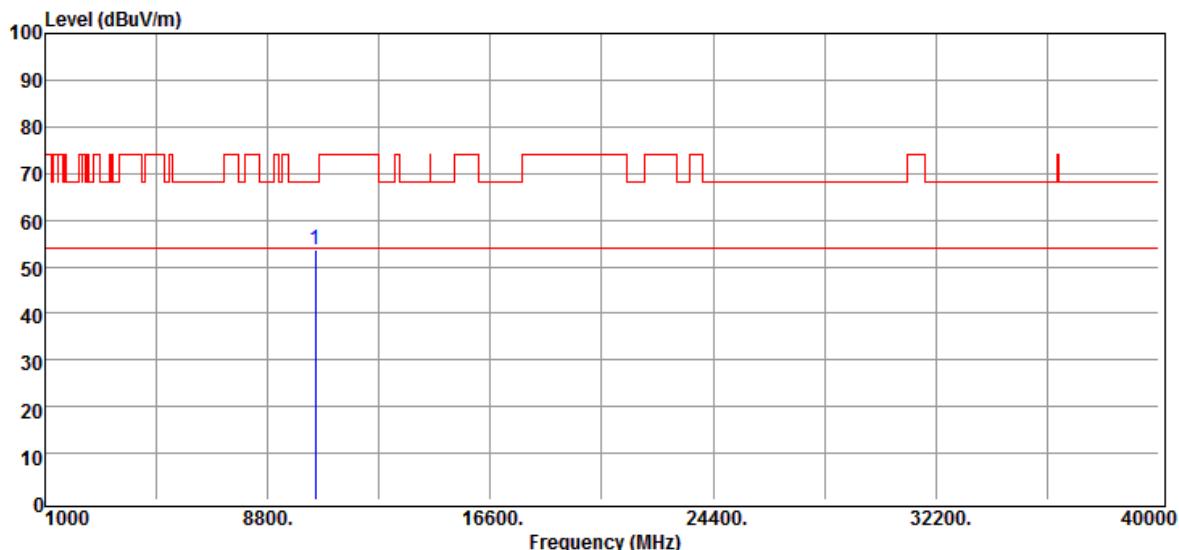
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Operation Mode :802.11a / Band1  
Test Mode :Tx CH High  
EUT Pol :E1 Plan  
Test Channel :5240 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10480.00	Peak	41.12	12.58	53.70	68.20	-14.50

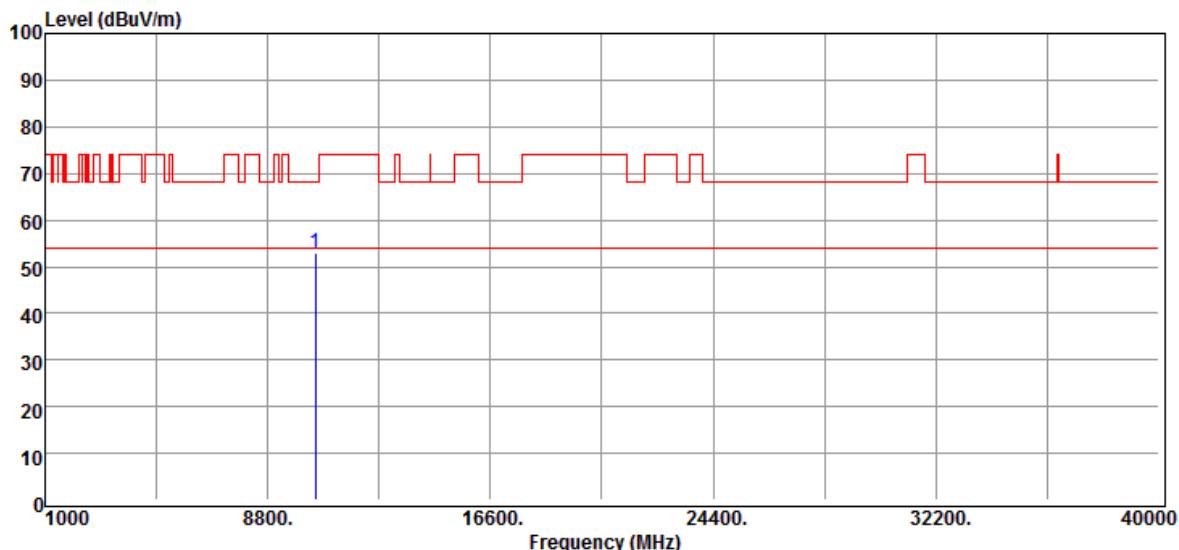
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Operation Mode :802.11a / Band1  
Test Mode :Tx CH High  
EUT Pol :E1 Plan  
Test Channel :5240 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10480.00	Peak	40.51	12.58	53.09	68.20	-15.11

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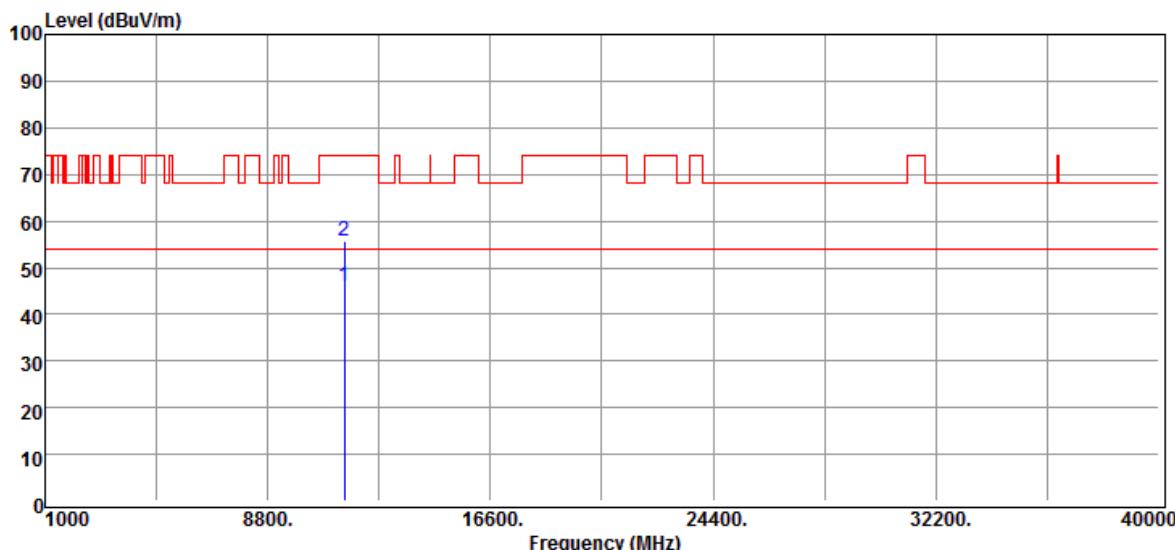
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**Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz**

Operation Mode	:802.11a / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5745 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11490.00	Average	32.83	13.32	46.15	54.00	-7.85
11490.00	Peak	42.33	13.32	55.65	74.00	-18.35

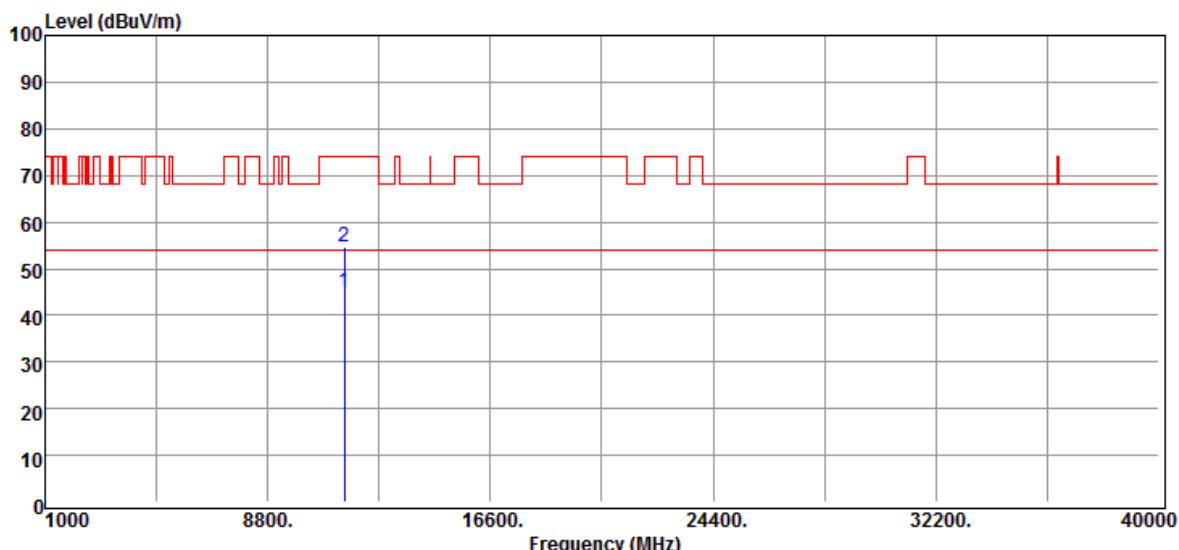
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Operation Mode	:802.11a / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:5745 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11490.00	Average	31.57	13.32	44.89	54.00	-9.11
11490.00	Peak	41.36	13.32	54.68	74.00	-19.32

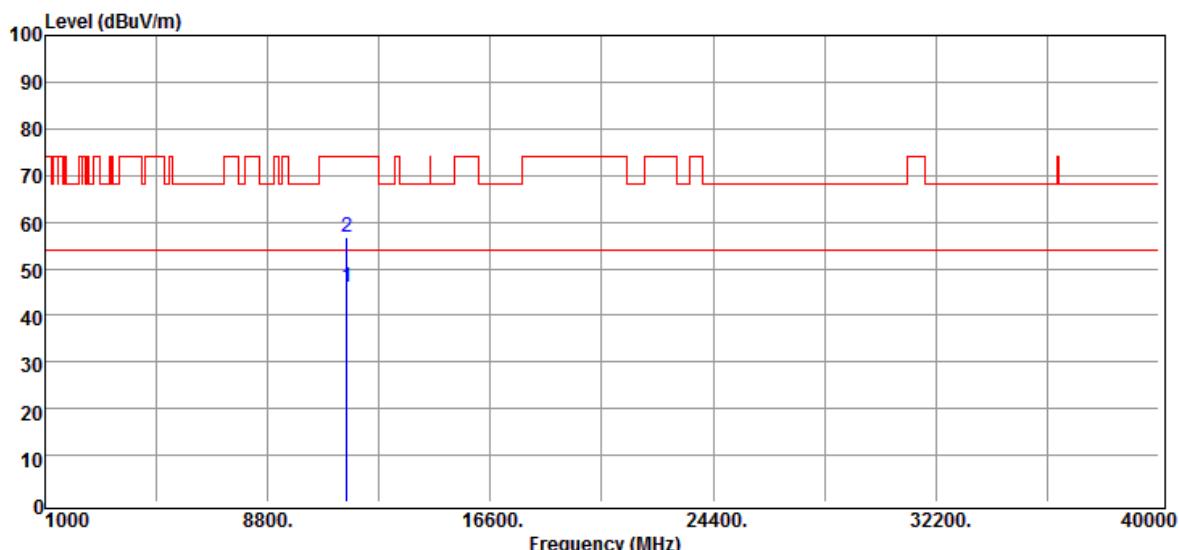
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Operation Mode :802.11a / Band4  
Test Mode :Tx CH Mid  
EUT Pol :E1 Plan  
Test Channel :5785 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11570.00	Average	33.11	13.01	46.12	54.00	-7.88
11570.00	Peak	43.87	13.01	56.88	74.00	-17.12

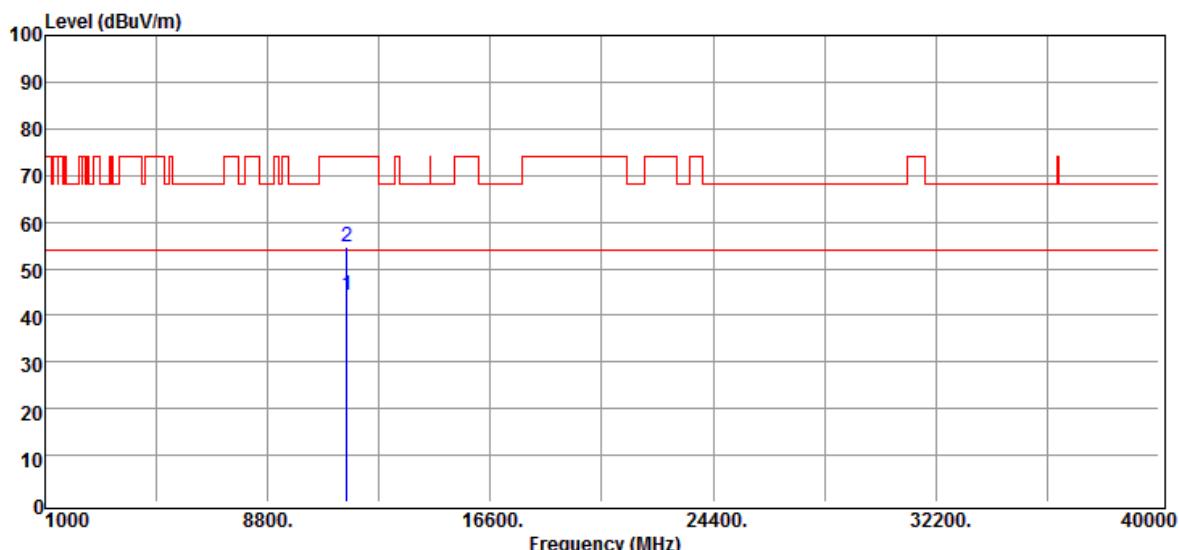
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Operation Mode :802.11a / Band4  
Test Mode :Tx CH Mid  
EUT Pol :E1 Plan  
Test Channel :5785 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11570.00	Average	31.27	13.01	44.28	54.00	-9.72
11570.00	Peak	41.57	13.01	54.58	74.00	-19.42

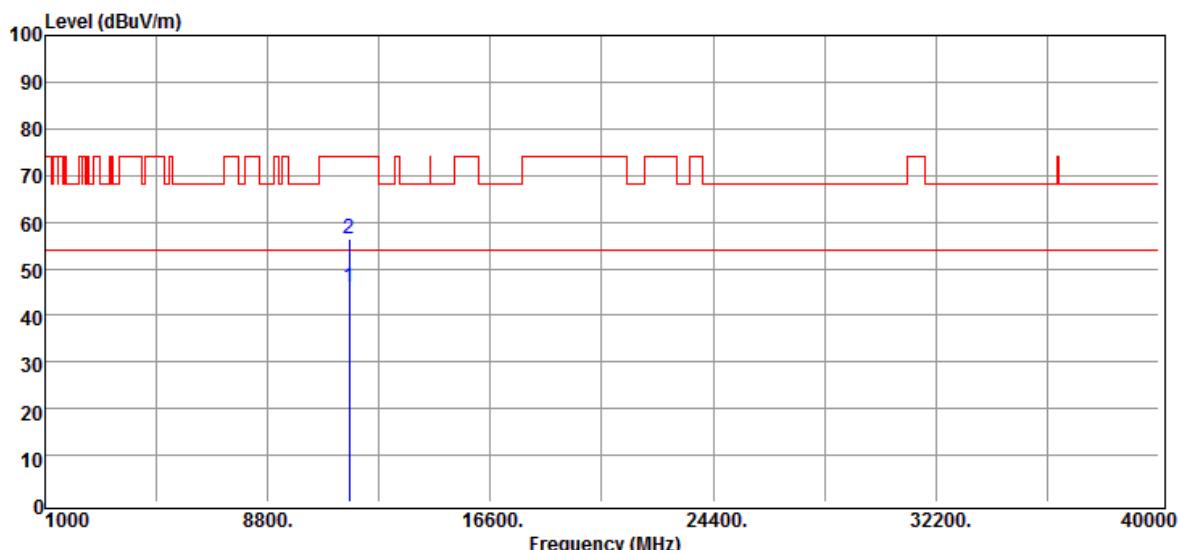
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Operation Mode	:802.11a / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH High	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5825 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11650.00	Average	32.96	12.95	45.91	54.00	-8.09
11650.00	Peak	43.29	12.95	56.24	74.00	-17.76

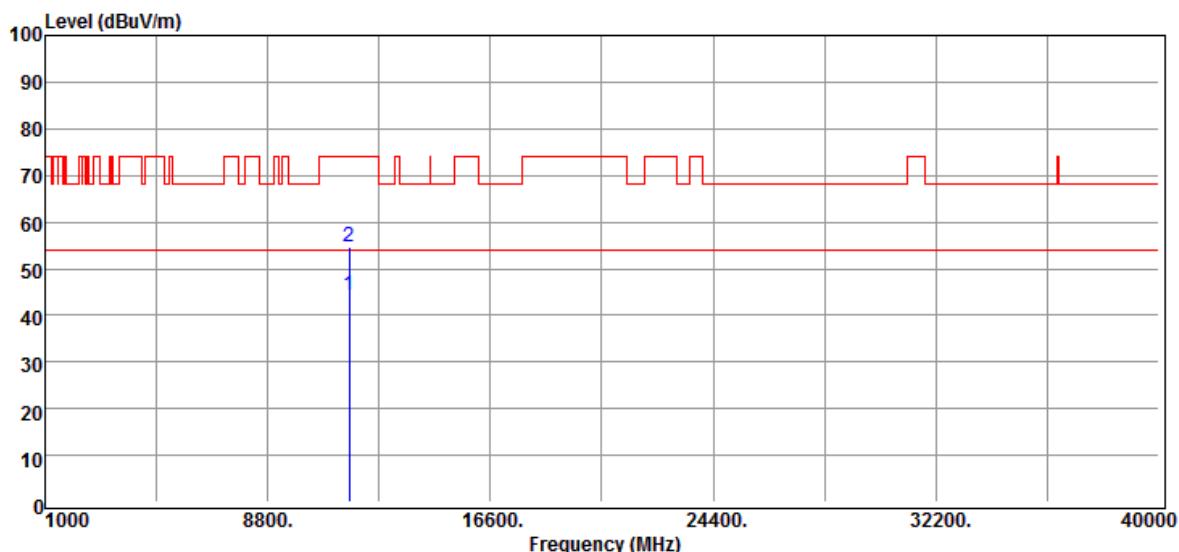
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Operation Mode :802.11a / Band4  
Test Mode :Tx CH High  
EUT Pol :E1 Plan  
Test Channel :5825 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11650.00	Average	31.29	12.95	44.24	54.00	-9.76
11650.00	Peak	41.66	12.95	54.61	74.00	-19.39

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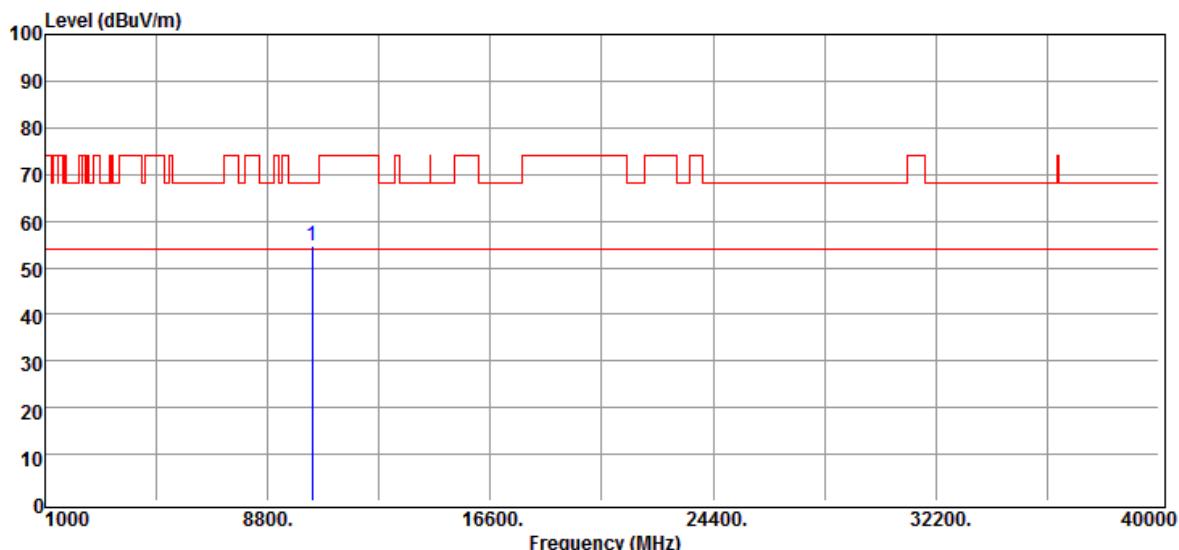
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**Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz**

Operation Mode	:802.11n20 / Band1	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5180 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10360.00	Peak	42.11	12.41	54.52	68.20	-13.68

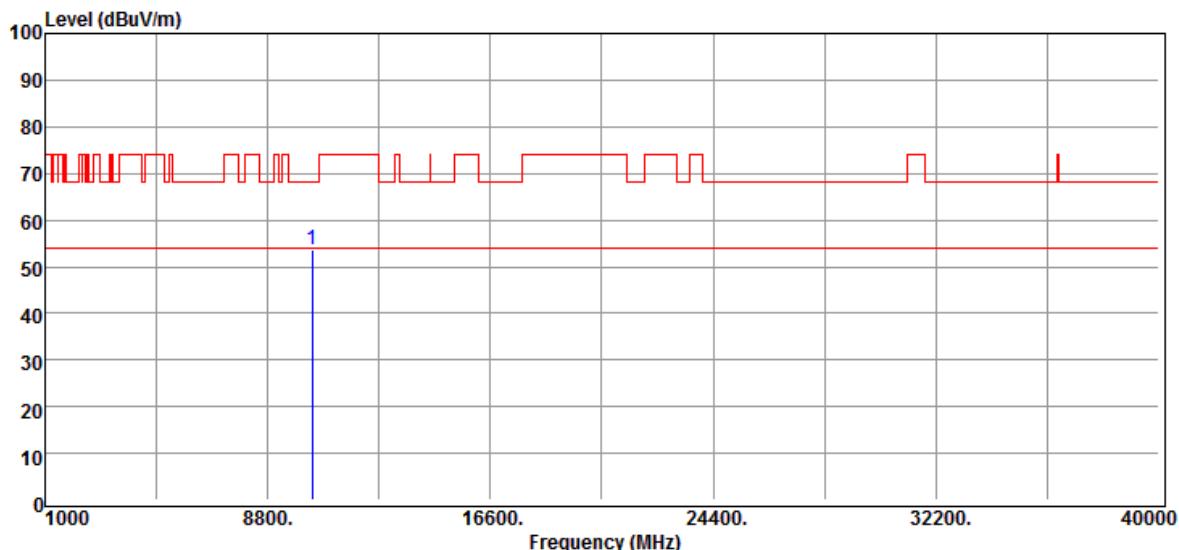
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Operation Mode :802.11n20 / Band1 Test Date :2018-09-01  
Test Mode :Tx CH Low Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
Test Channel :5180 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10360.00	Peak	41.39	12.41	53.80	68.20	-14.40

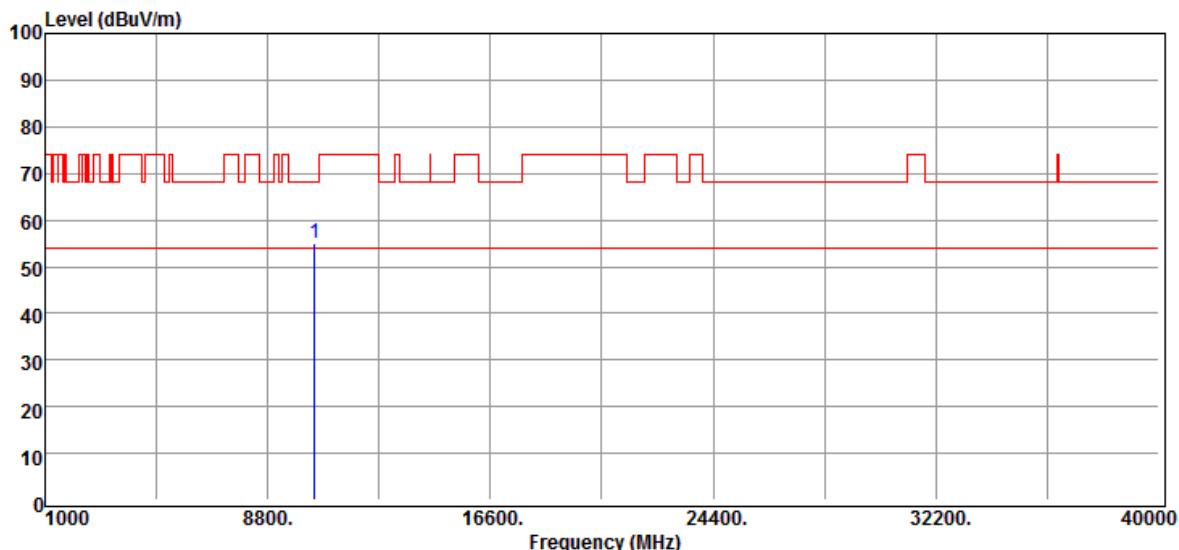
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Operation Mode :802.11n20 / Band1 Test Date :2018-09-01  
Test Mode :Tx CH Mid Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
Test Channel :5220 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10440.00	Peak	42.39	12.52	54.91	68.20	-13.29

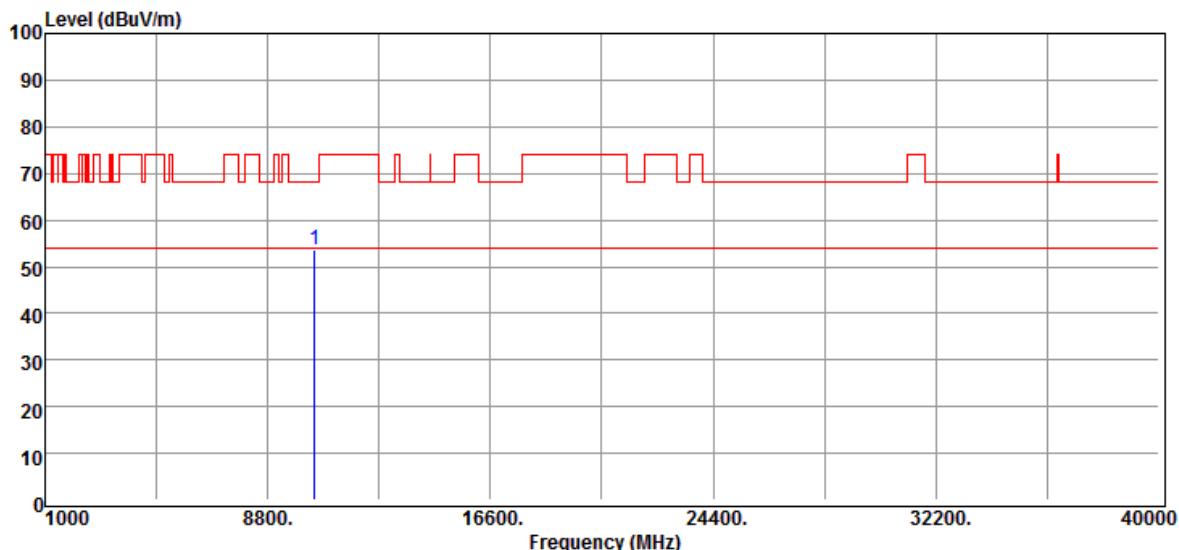
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Operation Mode :802.11n20 / Band1 Test Date :2018-09-01  
Test Mode :Tx CH Mid Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
Test Channel :5220 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB <sub>u</sub> V	Factor dB	Actual FS dB <sub>u</sub> V/m	Limit @3m dB <sub>u</sub> V/m	Margin dB
10440.00	Peak	41.20	12.52	53.72	68.20	-14.48

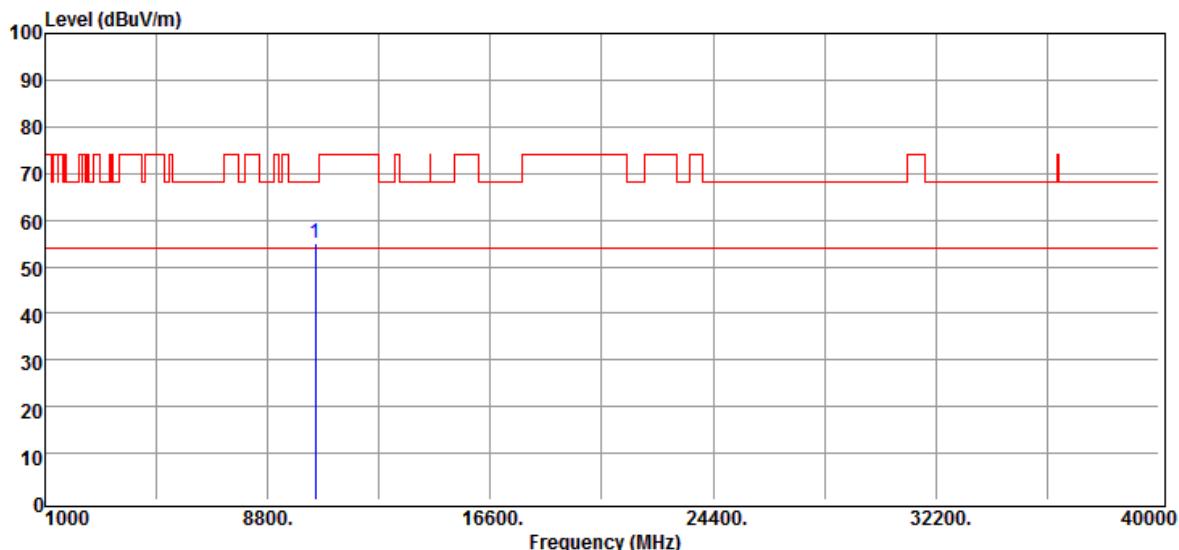
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Operation Mode :802.11n20 / Band1  
Test Mode :Tx CH High  
EUT Pol :E1 Plan  
Test Channel :5240 MHz  
Test Date :2018-09-01  
Temp./Humi. :25/60  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB <sub>u</sub> V	Factor dB	Actual FS dB <sub>u</sub> V/m	Limit @3m dB <sub>u</sub> V/m	Margin dB
10480.00	Peak	42.57	12.58	55.15	68.20	-13.05

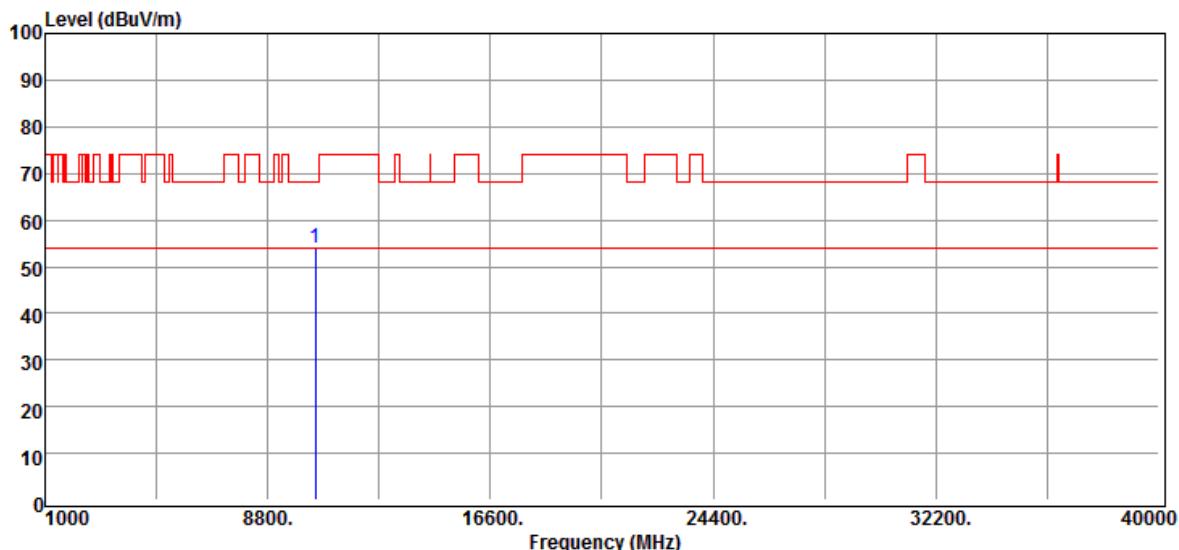
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Operation Mode :802.11n20 / Band1 Test Date :2018-09-01  
Test Mode :Tx CH High Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
Test Channel :5240 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10480.00	Peak	41.39	12.58	53.97	68.20	-14.23

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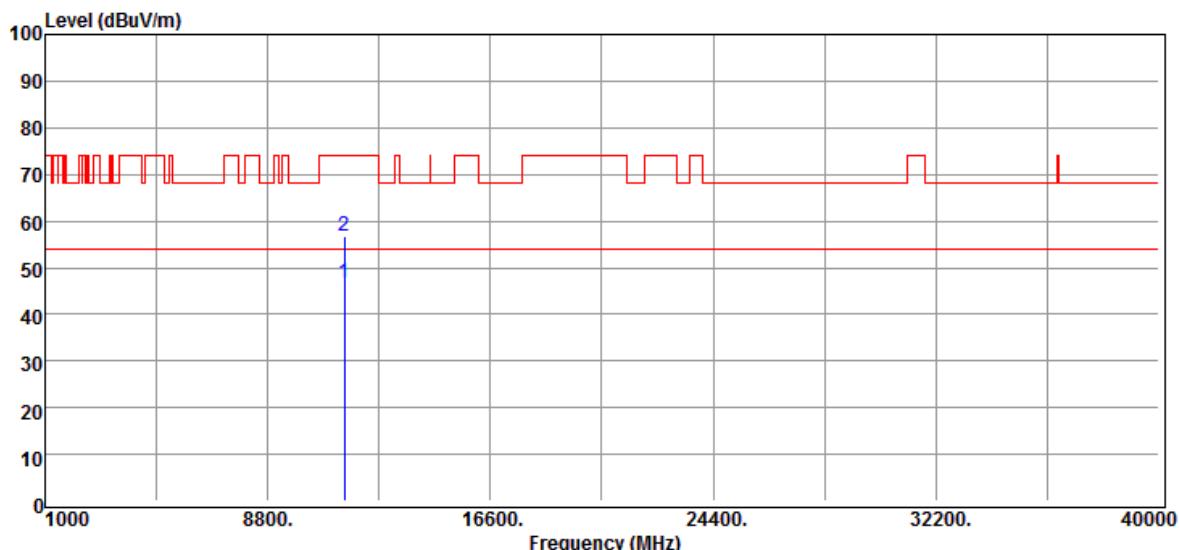
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**Radiated Spurious Emission Measurement Result 802.11n HT20, 5725~5850 MHz**

Operation Mode	:802.11n20 / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5745 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11490.00	Average	33.27	13.32	46.59	54.00	-7.41
11490.00	Peak	43.57	13.32	56.89	74.00	-17.11

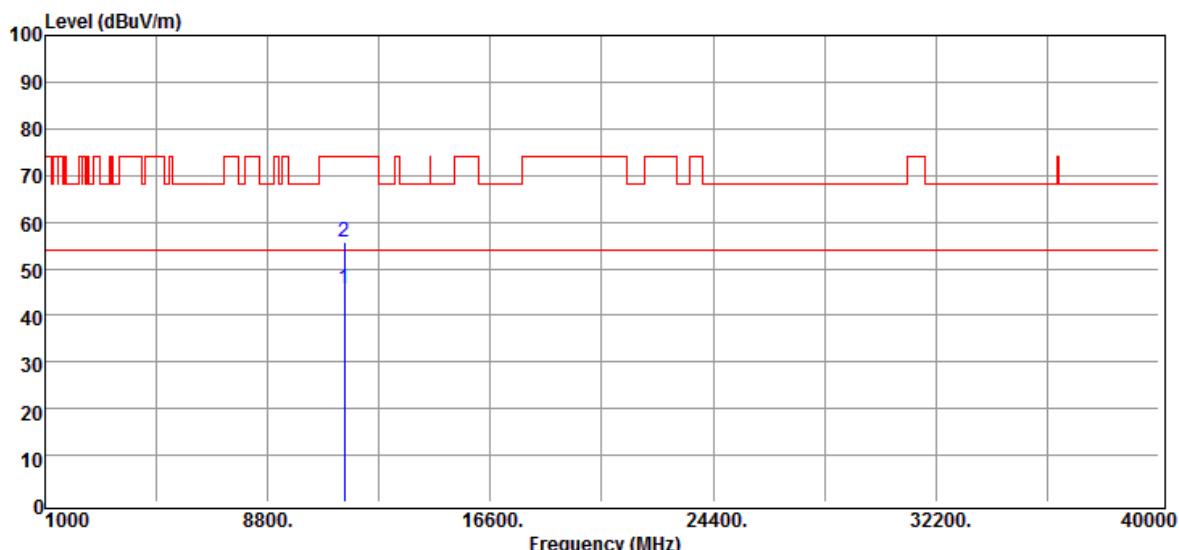
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Operation Mode	:802.11n20 / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:5745 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11490.00	Average	32.28	13.32	45.60	54.00	-8.40
11490.00	Peak	42.39	13.32	55.71	74.00	-18.29

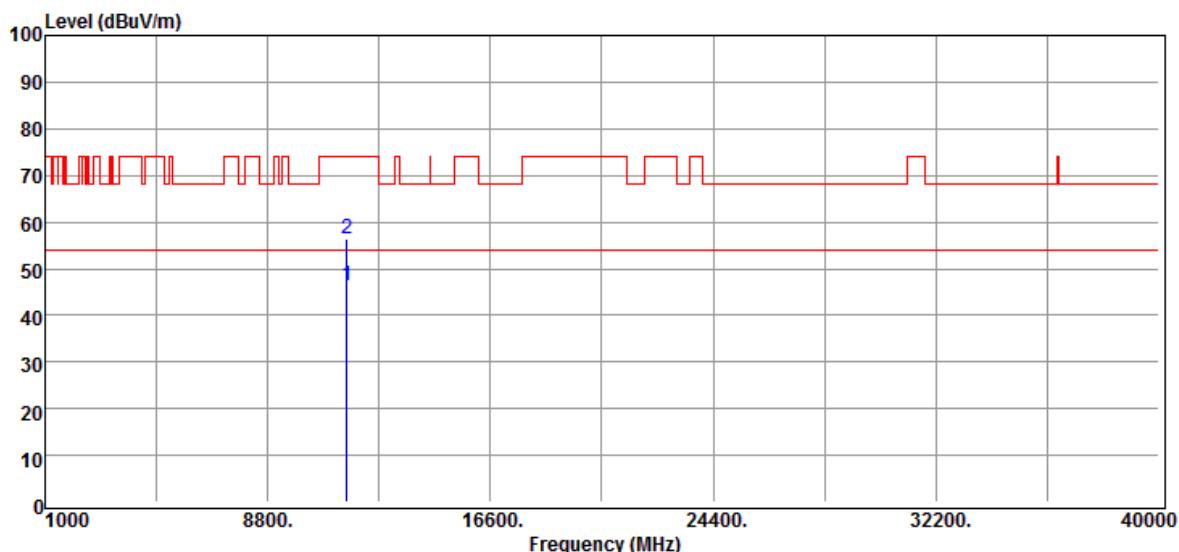
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Operation Mode :802.11n20 / Band4 Test Date :2018-09-01  
Test Mode :Tx CH Mid Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
Test Channel :5785 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11570.00	Average	33.40	13.01	46.41	54.00	-7.59
11570.00	Peak	43.56	13.01	56.57	74.00	-17.43

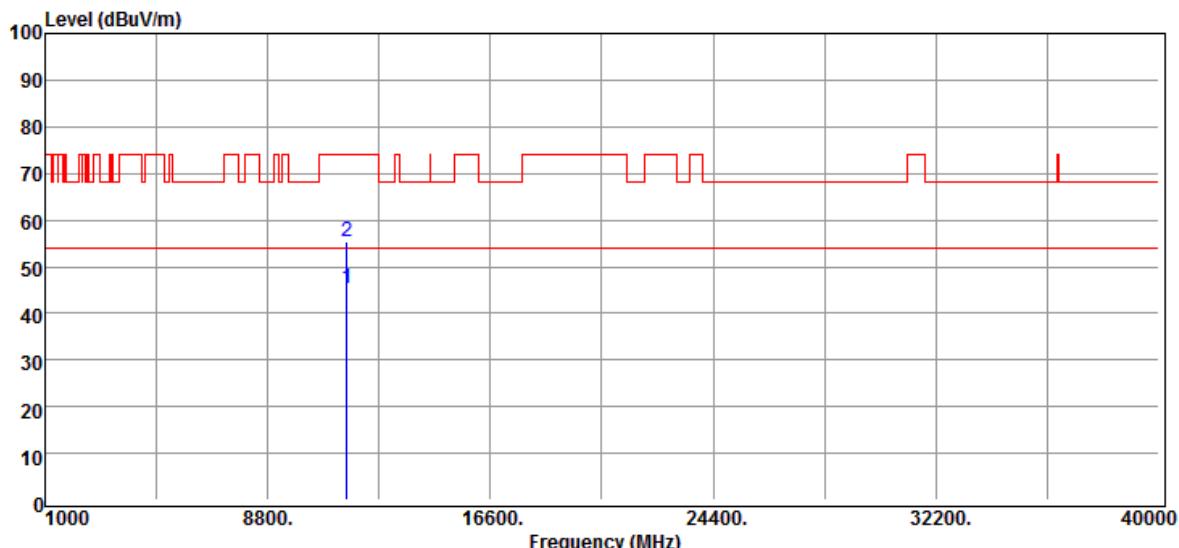
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Operation Mode	:802.11n20 / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH Mid	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:5785 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11570.00	Average	32.16	13.01	45.17	54.00	-8.83
11570.00	Peak	42.30	13.01	55.31	74.00	-18.69

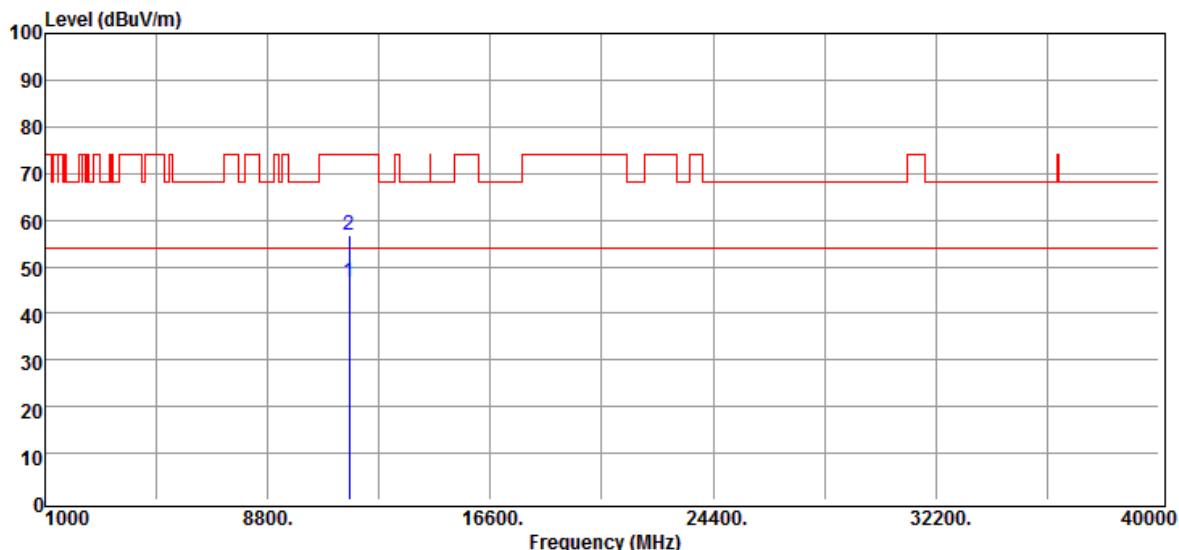
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Operation Mode :802.11n20 / Band4 Test Date :2018-09-01  
Test Mode :Tx CH High Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
Test Channel :5825 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11650.00	Average	33.68	12.95	46.63	54.00	-7.37
11650.00	Peak	43.88	12.95	56.83	74.00	-17.17

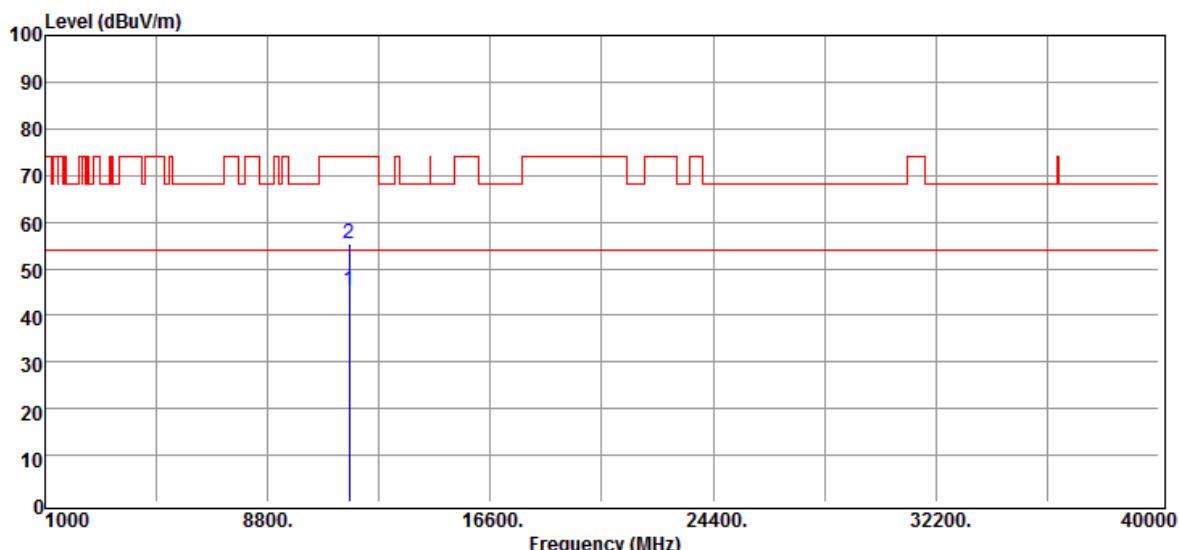
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Operation Mode	:802.11n20 / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH High	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:5825 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11650.00	Average	32.31	12.95	45.26	54.00	-8.74
11650.00	Peak	42.36	12.95	55.31	74.00	-18.69

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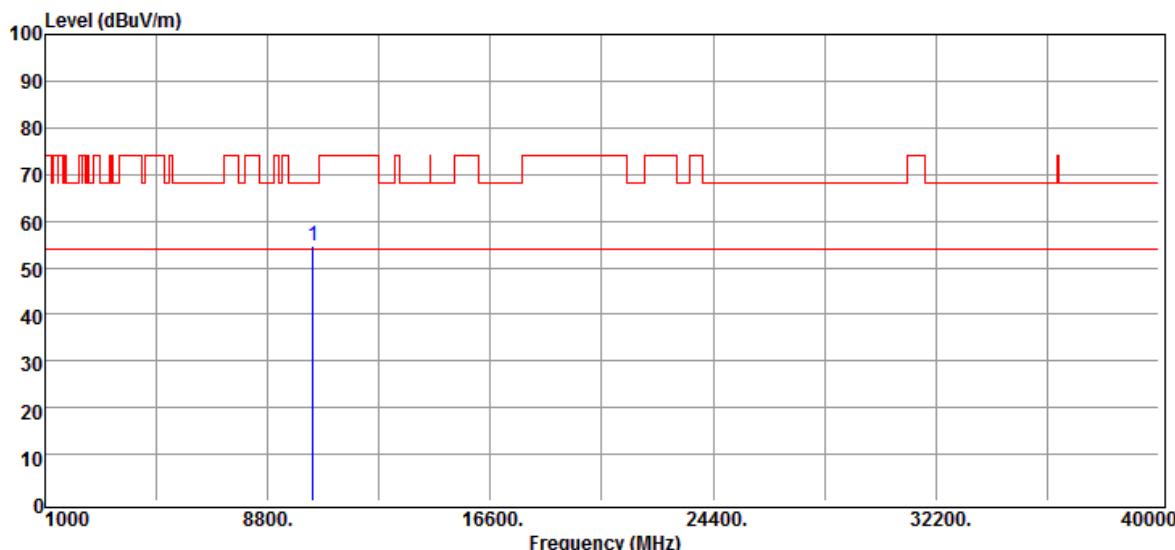
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**Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz**

Operation Mode	:802.11n40 / Band1	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5190 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10380.00	Peak	42.11	12.44	54.55	68.20	-13.65

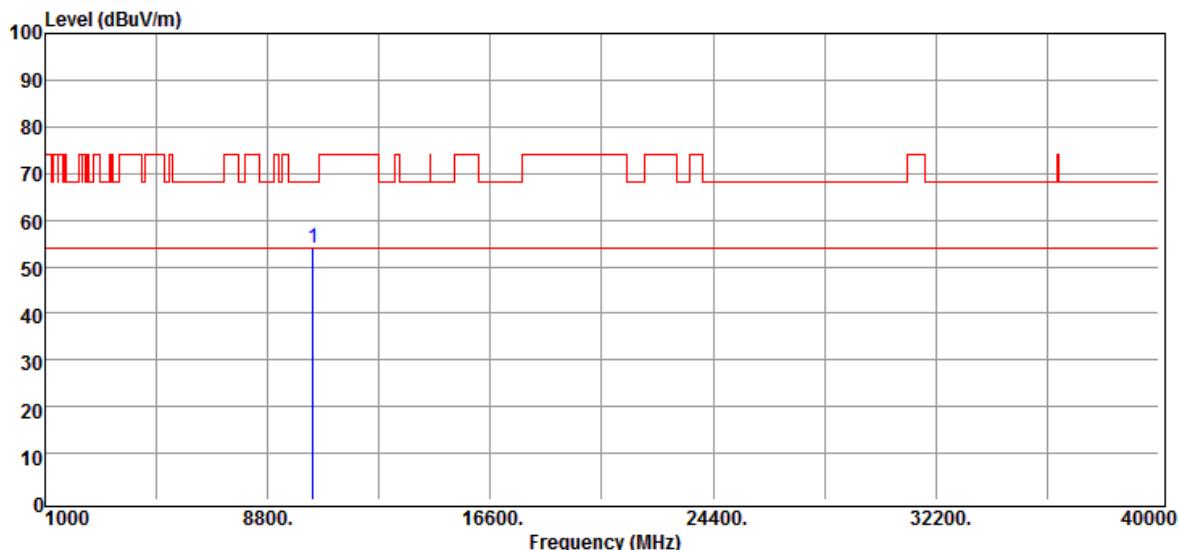
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Operation Mode :802.11n40 / Band1 Test Date :2018-09-01  
Test Mode :Tx CH Low Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
Test Channel :5190 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB <sub>u</sub> V	Factor dB	Actual FS dB <sub>u</sub> V/m	Limit @3m dB <sub>u</sub> V/m	Margin dB
10380.00	Peak	41.38	12.44	53.82	68.20	-14.38

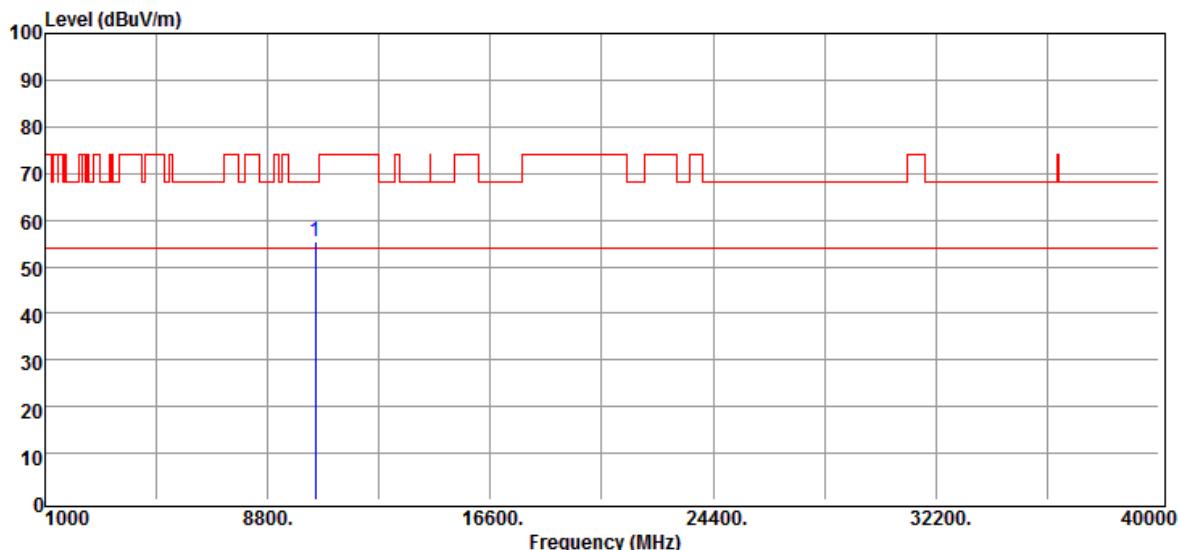
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Operation Mode :802.11n40 / Band1 Test Date :2018-09-01  
Test Mode :Tx CH High Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
Test Channel :5230 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10460.00	Peak	42.86	12.55	55.41	68.20	-12.79

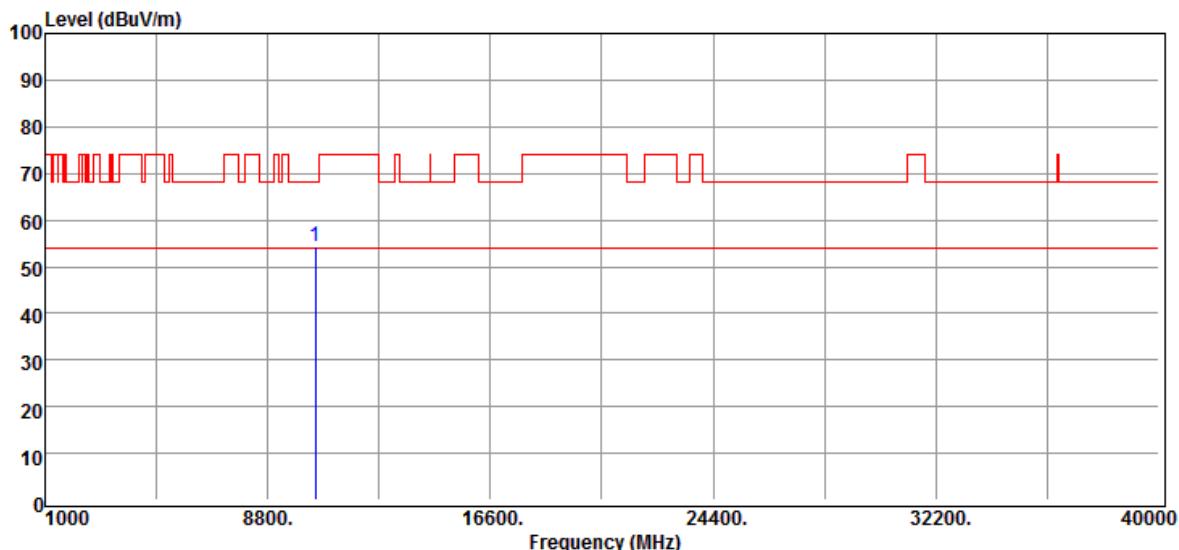
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Operation Mode :802.11n40 / Band1 Test Date :2018-09-01  
Test Mode :Tx CH High Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
Test Channel :5230 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
10460.00	Peak	41.66	12.55	54.21	68.20	-13.99

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

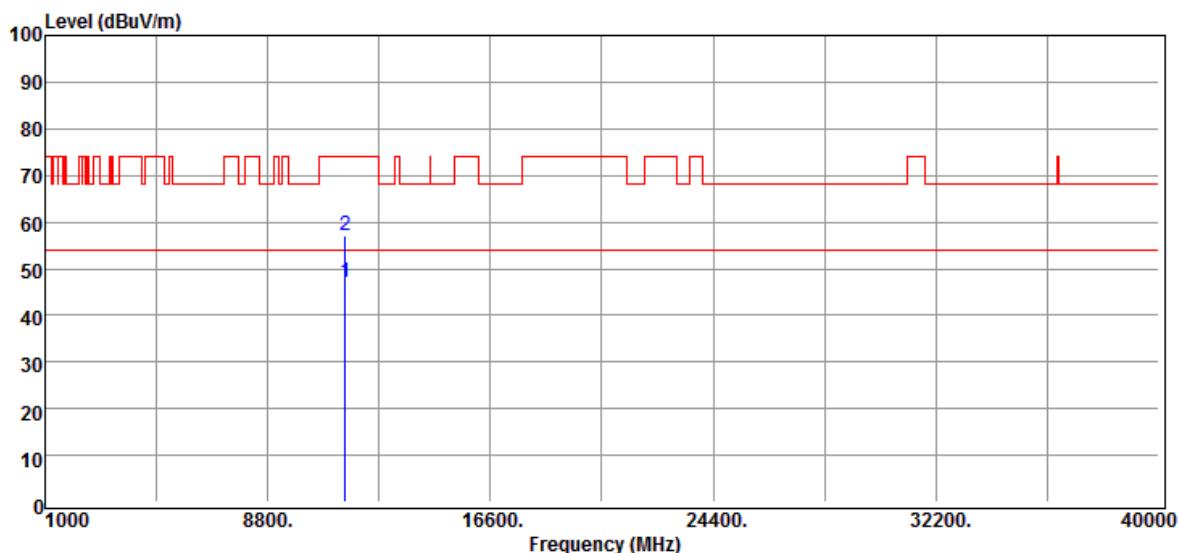
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**Radiated Spurious Emission Measurement Result 802.11n HT40, 5725~5850 MHz**

Operation Mode	:802.11n40 / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5755 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11510.00	Average	33.65	13.31	46.96	54.00	-7.04
11510.00	Peak	43.87	13.31	57.18	74.00	-16.82

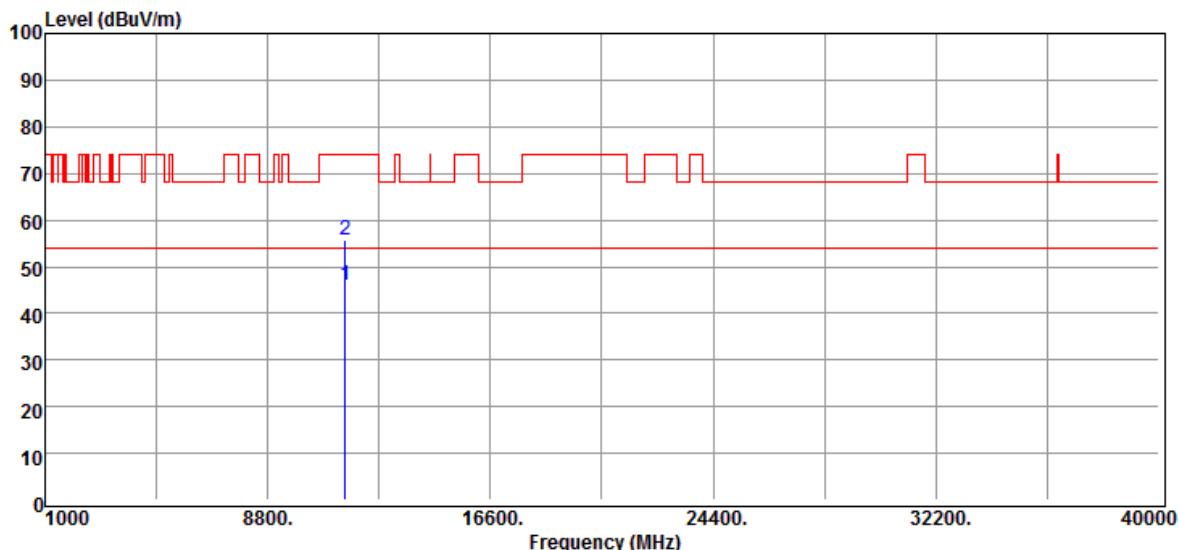
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Operation Mode	:802.11n40 / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:5755 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11510.00	Average	32.63	13.31	45.94	54.00	-8.06
11510.00	Peak	42.51	13.31	55.82	74.00	-18.18

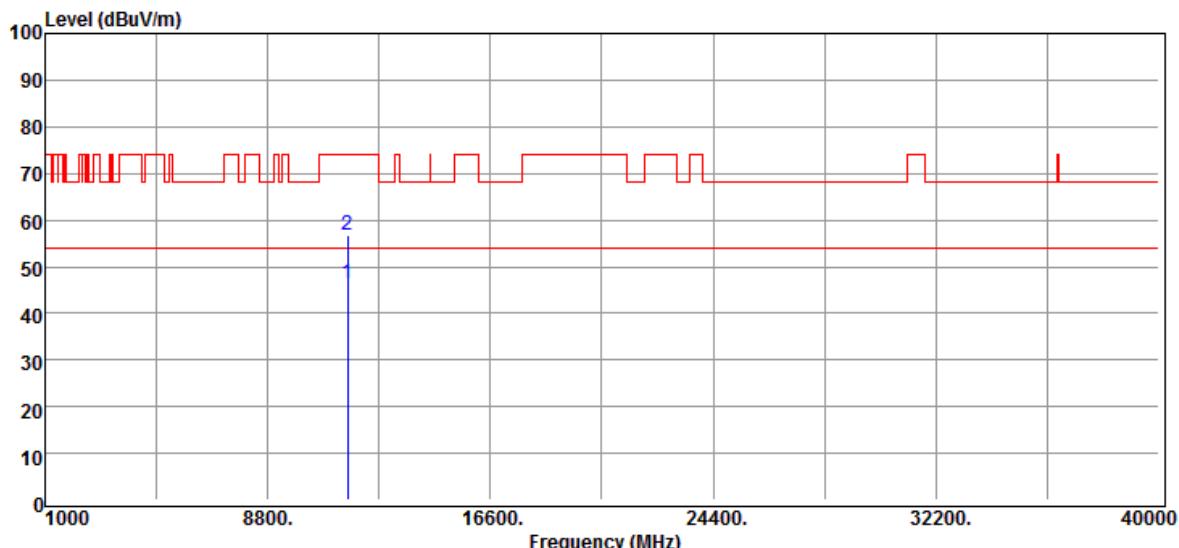
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Operation Mode	:802.11n40 / Band4	Test Date	:2018-09-01
Test Mode	:Tx CH High	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5795 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11590.00	Average	33.57	12.92	46.49	54.00	-7.51
11590.00	Peak	43.66	12.92	56.58	74.00	-17.42

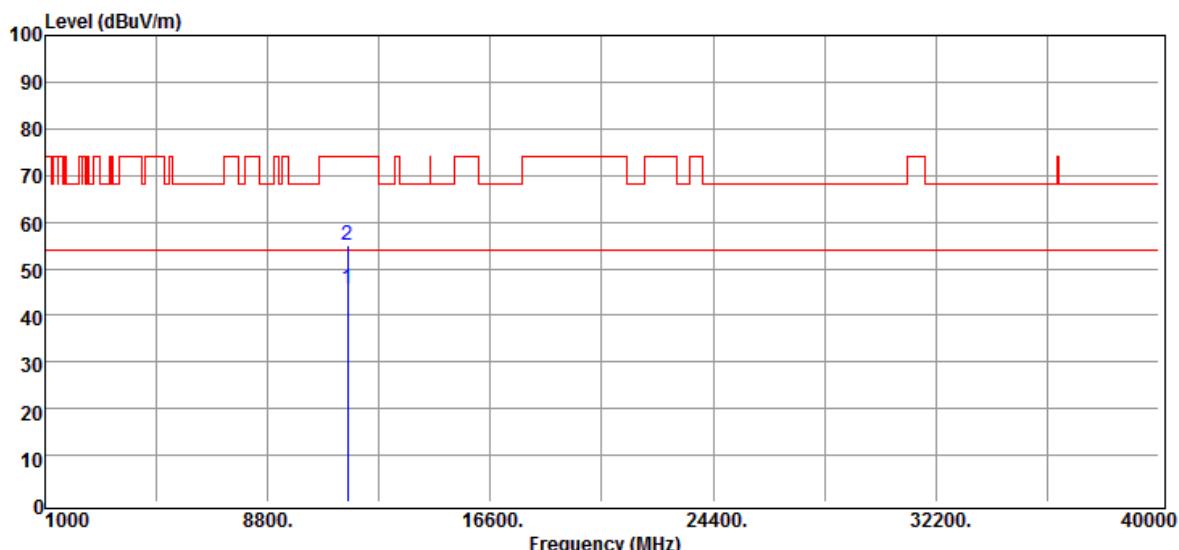
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Operation Mode :802.11n40 / Band4 Test Date :2018-09-01  
Test Mode :Tx CH High Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
Test Channel :5795 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
11590.00	Average	32.68	12.92	45.60	54.00	-8.40
11590.00	Peak	42.18	12.92	55.10	74.00	-18.90

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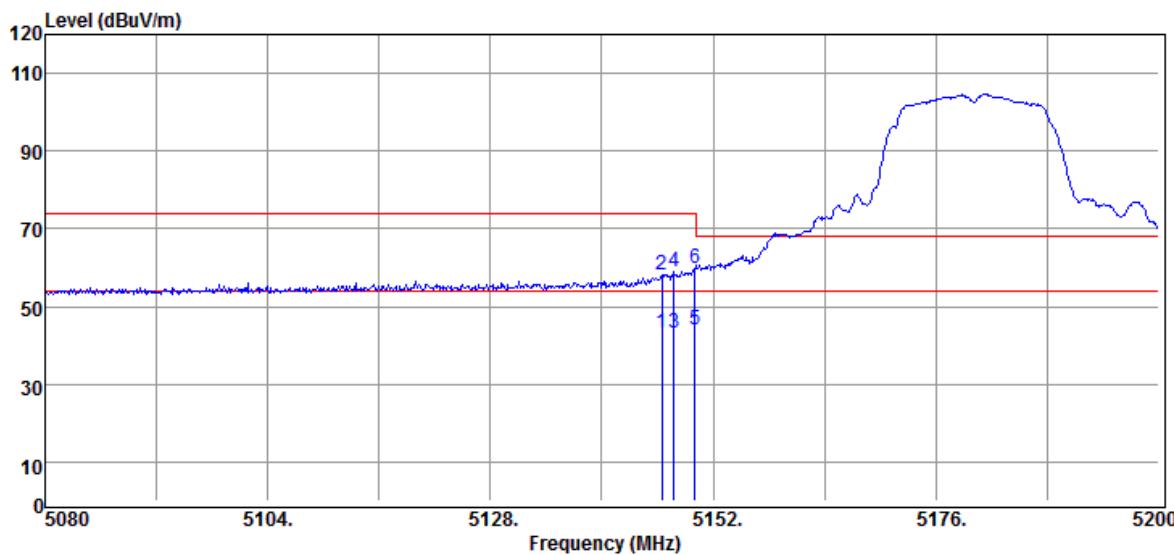
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## Band edge falling to restricted band 802.11a mode

Operation Mode	:802.11a / Band1	Test Date	:2018-08-31
Test Mode	:BE CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5180 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5146.48	Average	41.34	1.83	43.17	54.00	-10.83
5146.48	Peak	56.25	1.83	58.08	74.00	-15.92
5147.80	Average	41.54	1.84	43.38	54.00	-10.62
5147.80	Peak	57.16	1.84	59.00	74.00	-15.00
5150.00	Average	42.08	1.84	43.92	54.00	-10.08
5150.00	Peak	57.96	1.84	59.80	74.00	-14.20

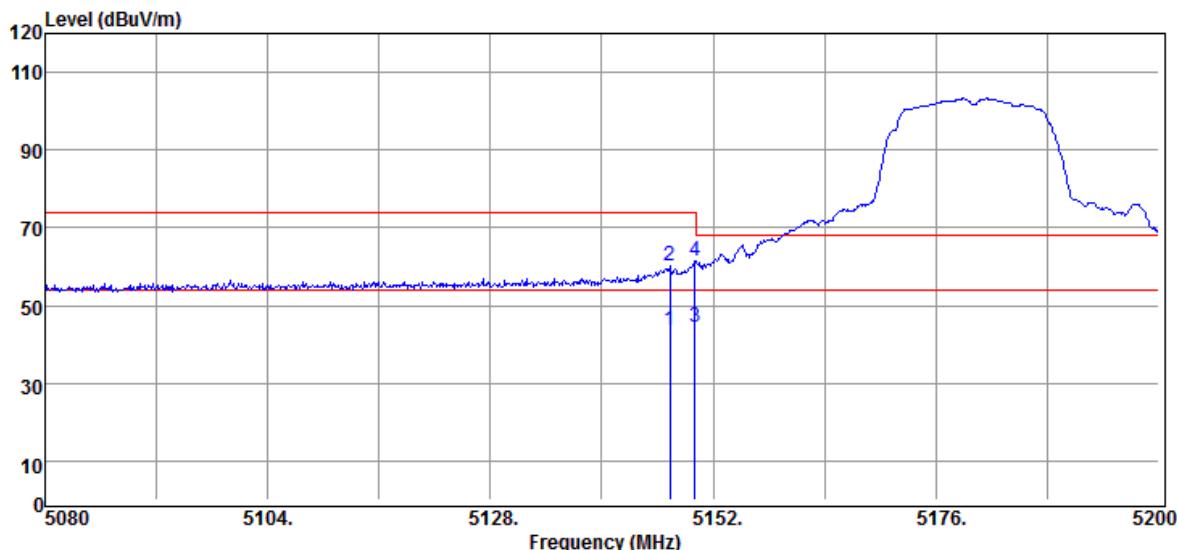
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Operation Mode :802.11a / Band1  
 Test Mode :BE CH Low  
 EUT Pol :E1 Plan  
 Test Channel :5180 MHz  
 Test Date :2018-08-31  
 Temp./Humi. :25/60  
 Antenna Pol. :HORIZONTAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5147.32	Average	41.92	1.84	43.76	54.00	-10.24
5147.32	Peak	58.22	1.84	60.06	74.00	-13.94
5150.00	Average	42.40	1.84	44.24	54.00	-9.76
5150.00	Peak	59.62	1.84	61.46	74.00	-12.54

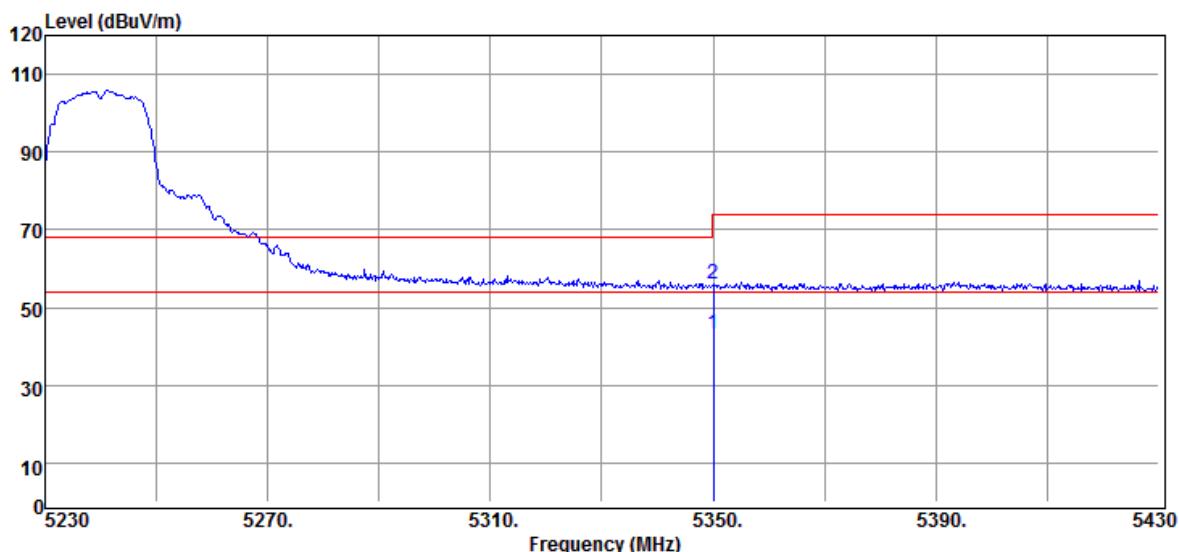
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Operation Mode :802.11a / Band1  
 Test Mode :BE CH High  
 EUT Pol :E1 Plan  
 Test Channel :5240 MHz  
 Test Date :2018-08-31  
 Temp./Humi. :25/60  
 Antenna Pol. :VERTICAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	40.81	2.24	43.05	54.00	-10.95
5350.00	Peak	53.70	2.24	55.94	74.00	-18.06

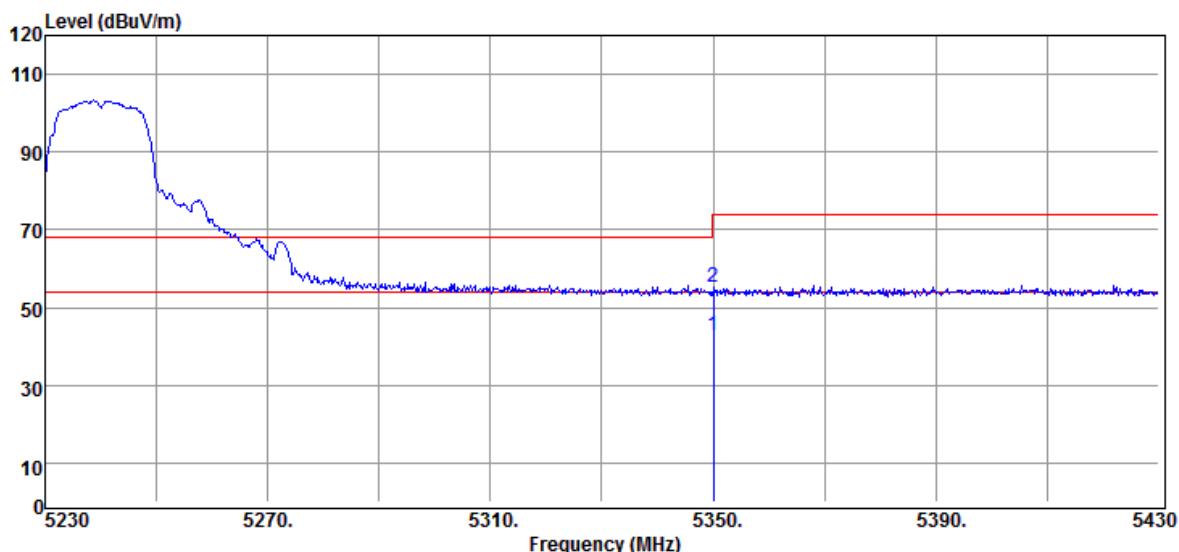
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Operation Mode :802.11a / Band1  
Test Mode :BE CH High  
EUT Pol :E1 Plan  
Test Channel :5240 MHz  
Test Date :2018-08-31  
Temp./Humi. :25/60  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	40.66	2.24	42.90	54.00	-11.10
5350.00	Peak	52.89	2.24	55.13	74.00	-18.87

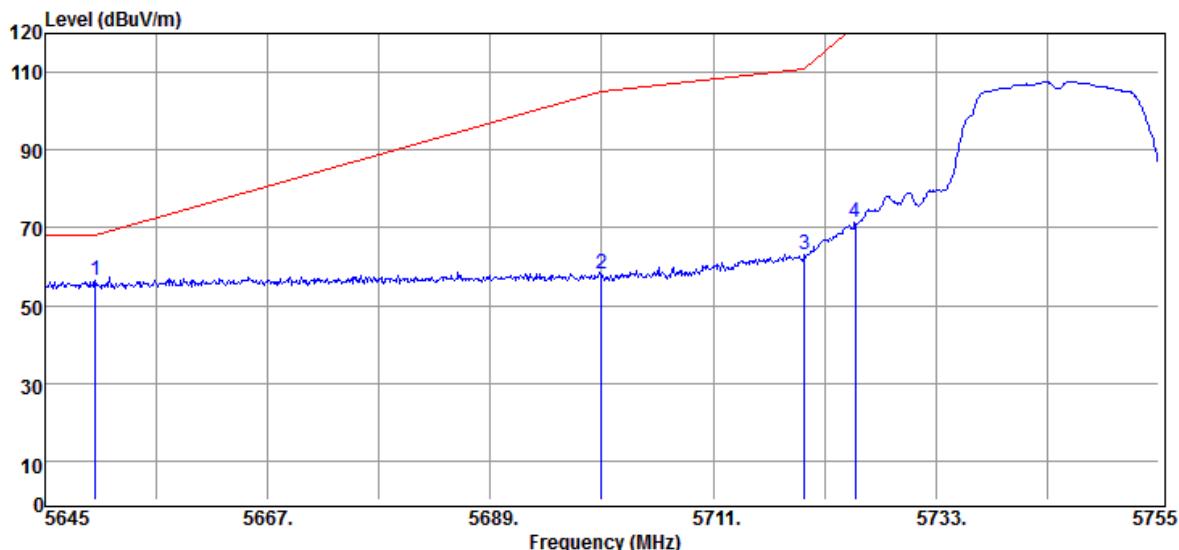
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Operation Mode :802.11a / Band4  
 Test Mode :BE CH Low  
 EUT Pol :E1 Plan  
 Test Channel :5745 MHz  
 Test Date :2018-08-31  
 Temp./Humi. :25/60  
 Antenna Pol. :VERTICAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5650.00	Peak	54.42	2.25	56.67	68.20	-11.53
5700.00	Peak	55.86	2.42	58.28	105.20	-46.92
5720.00	Peak	60.87	2.32	63.19	110.80	-47.61
5725.00	Peak	69.01	2.28	71.29	122.20	-50.91

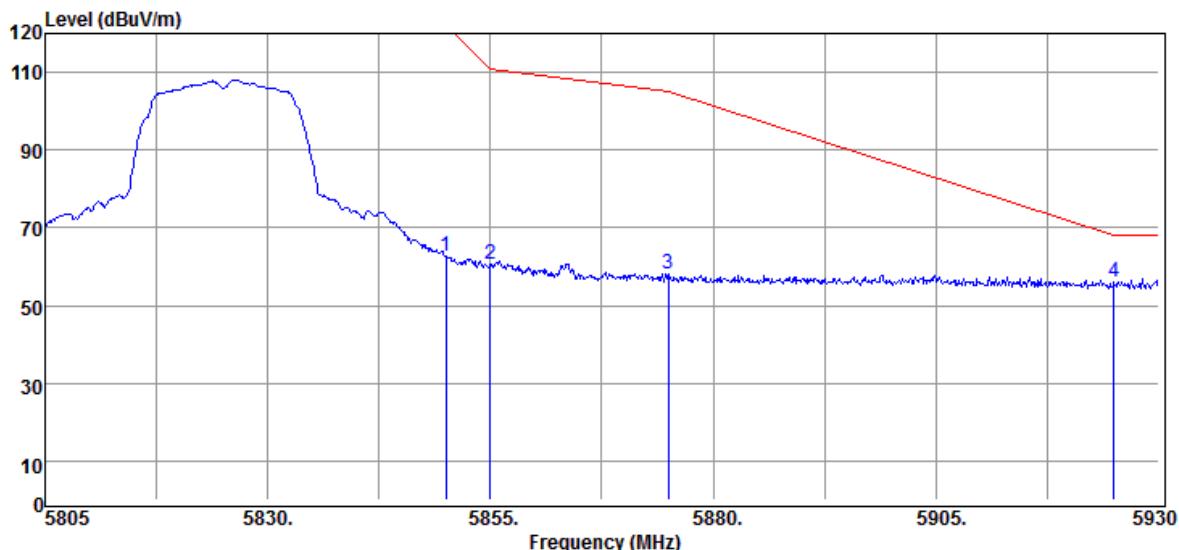
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Operation Mode :802.11a / Band4  
 Test Mode :BE CH High  
 EUT Pol :E1 Plan  
 Test Channel :5825 MHz  
 Test Date :2018-08-31  
 Temp./Humi. :25/60  
 Antenna Pol. :VERTICAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	60.96	1.88	62.84	122.20	-59.36
5855.00	Peak	58.87	1.89	60.76	110.80	-50.04
5875.00	Peak	56.36	1.90	58.26	105.20	-46.94
5925.00	Peak	53.94	2.16	56.10	68.20	-12.10

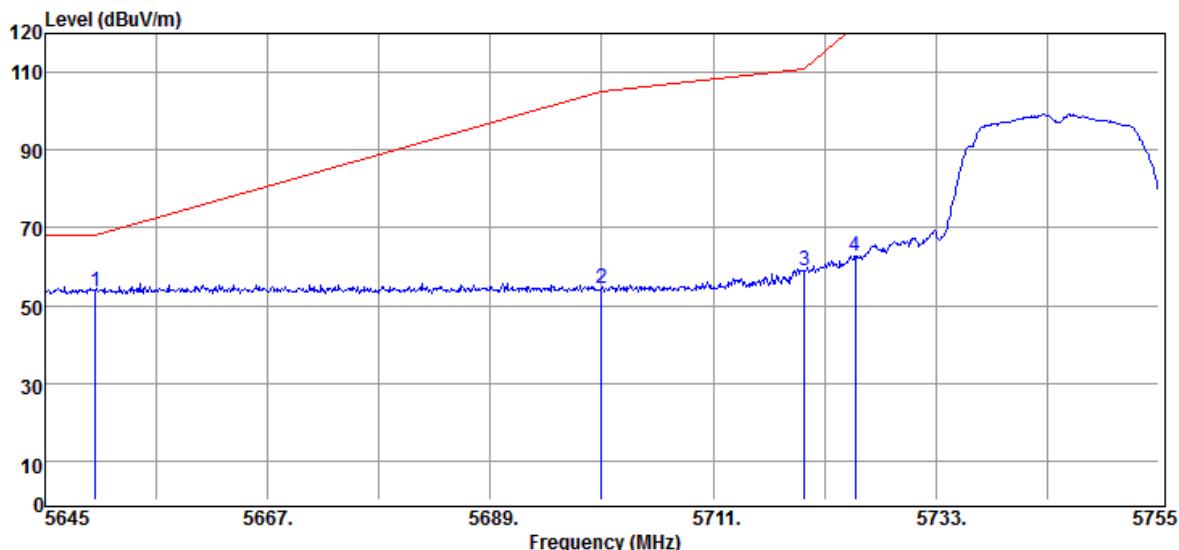
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Operation Mode :802.11a / Band4  
 Test Mode :BE CH Low  
 EUT Pol :E1 Plan  
 Test Channel :5745 MHz  
 Test Date :2018-08-31  
 Temp./Humi. :25/60  
 Antenna Pol. :HORIZONTAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5650.00	Peak	51.34	2.25	53.59	68.20	-14.61
5700.00	Peak	52.10	2.42	54.52	105.20	-50.68
5720.00	Peak	56.82	2.32	59.14	110.80	-51.66
5725.00	Peak	60.51	2.28	62.79	122.20	-59.41

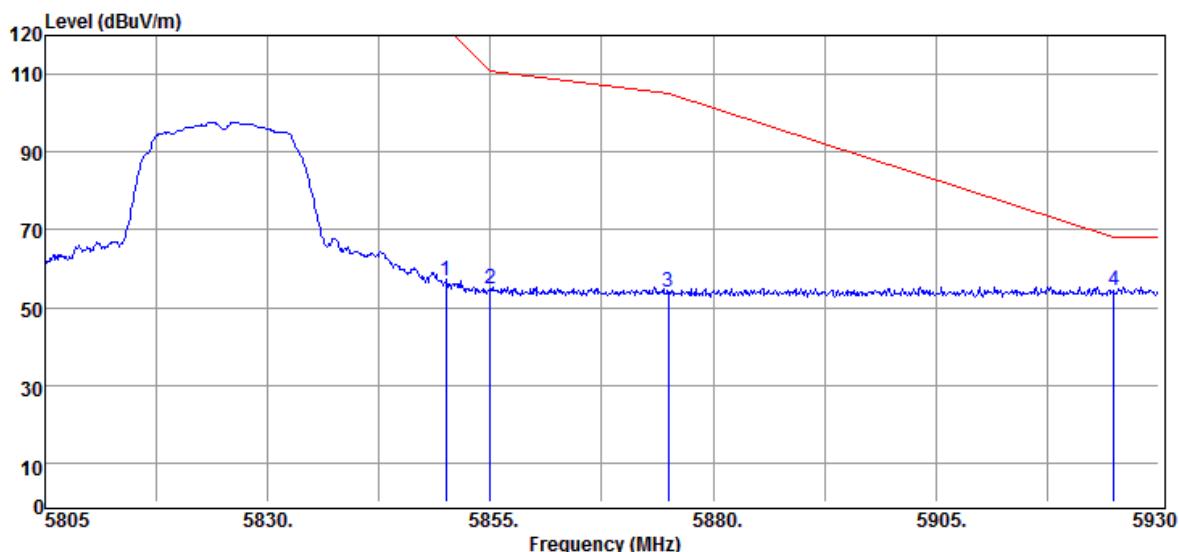
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Operation Mode :802.11a / Band4  
 Test Mode :BE CH High  
 EUT Pol :E1 Plan  
 Test Channel :5825 MHz  
 Test Date :2018-08-31  
 Temp./Humi. :25/60  
 Antenna Pol. :HORIZONTAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	55.10	1.88	56.98	122.20	-65.22
5855.00	Peak	52.88	1.89	54.77	110.80	-56.03
5875.00	Peak	51.95	1.90	53.85	105.20	-51.35
5925.00	Peak	52.19	2.16	54.35	68.20	-13.85

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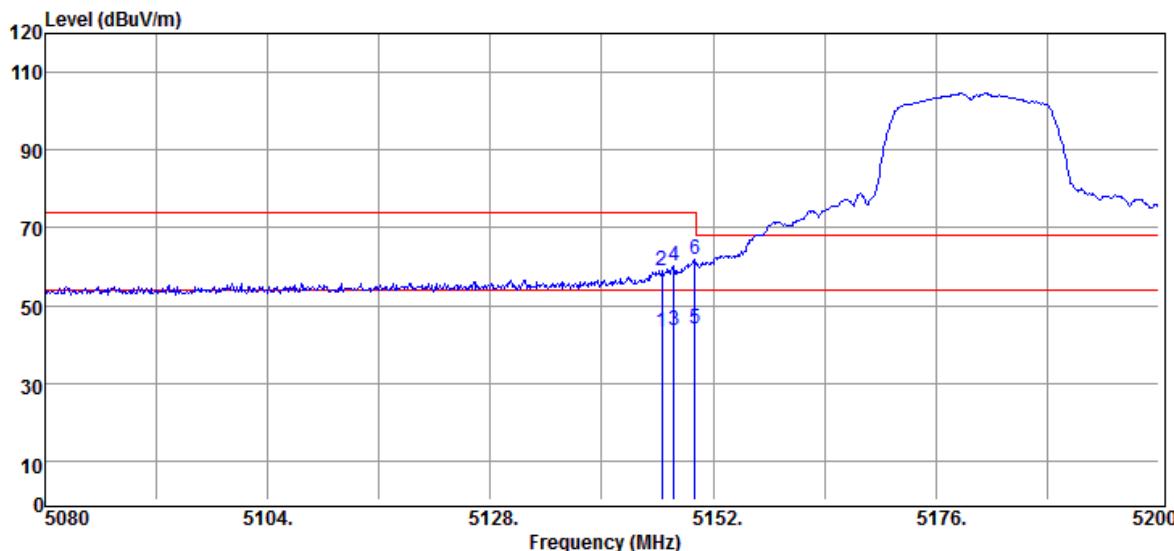
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## 802.11n20 HT mode

Operation Mode	:802.11n20 / Band1	Test Date	:2018-08-31
Test Mode	:BE CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5180 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5146.48	Average	41.49	1.83	43.32	54.00	-10.68
5146.48	Peak	57.17	1.83	59.00	74.00	-15.00
5147.80	Average	41.75	1.84	43.59	54.00	-10.41
5147.80	Peak	58.40	1.84	60.24	74.00	-13.76
5150.00	Average	42.16	1.84	44.00	54.00	-10.00
5150.00	Peak	59.91	1.84	61.75	74.00	-12.25

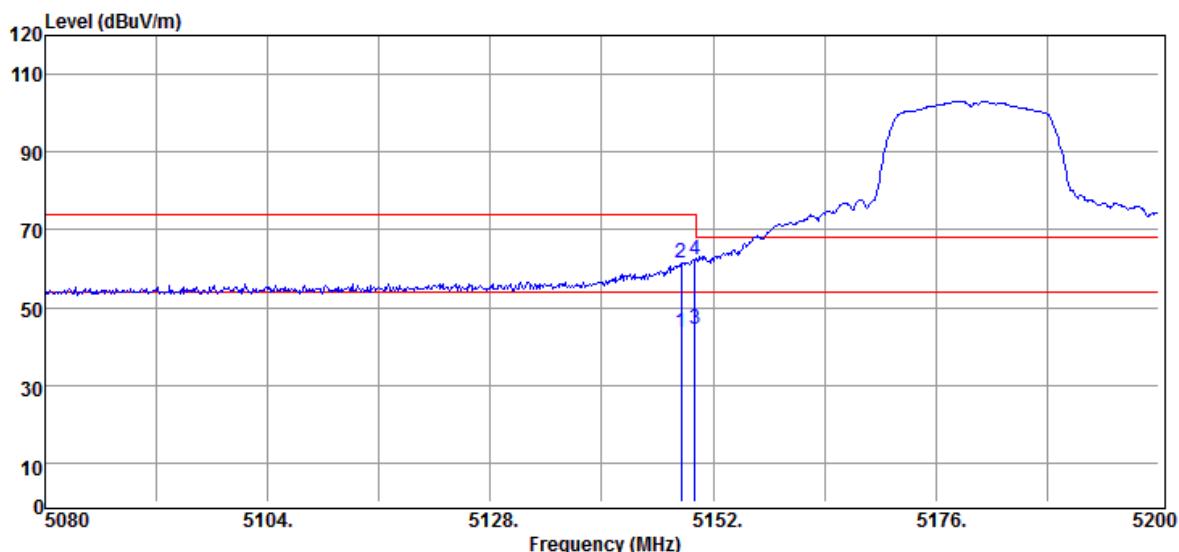
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Operation Mode :802.11n20 / Band1 Test Date :2018-08-31  
 Test Mode :BE CH Low Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
 Test Channel :5180 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5148.52	Average	41.55	1.84	43.39	54.00	-10.61
5148.52	Peak	59.63	1.84	61.47	74.00	-12.53
5150.00	Average	42.59	1.84	44.43	54.00	-9.57
5150.00	Peak	60.61	1.84	62.45	74.00	-11.55

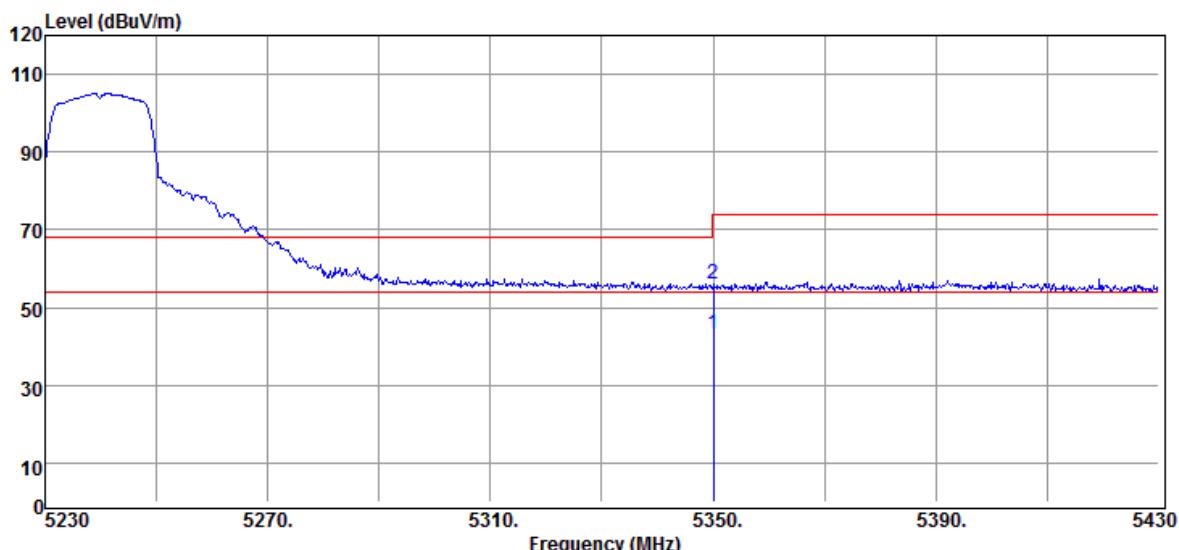
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Operation Mode :802.11n20 / Band1  
 Test Mode :BE CH High  
 EUT Pol :E1 Plan  
 Test Channel :5240 MHz  
 Test Date :2018-08-31  
 Temp./Humi. :25/60  
 Antenna Pol. :VERTICAL  
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	40.87	2.24	43.11	54.00	-10.89
5350.00	Peak	53.74	2.24	55.98	74.00	-18.02

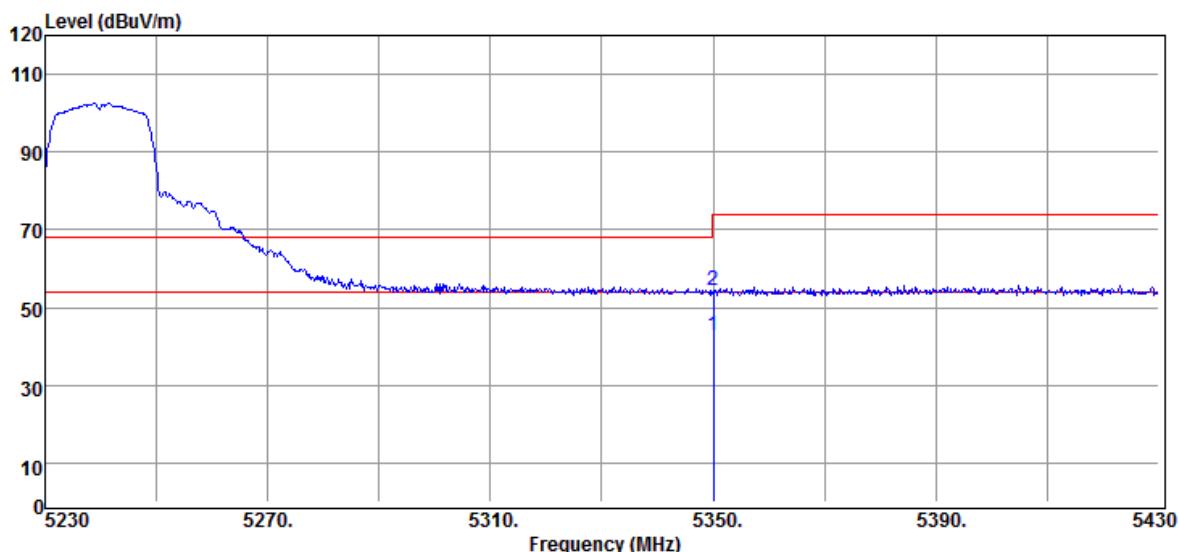
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Operation Mode :802.11n20 / Band1 Test Date :2018-08-31  
Test Mode :BE CH High Temp./Humi. :25/60  
EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
Test Channel :5240 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	40.73	2.24	42.97	54.00	-11.03
5350.00	Peak	52.35	2.24	54.59	74.00	-19.41

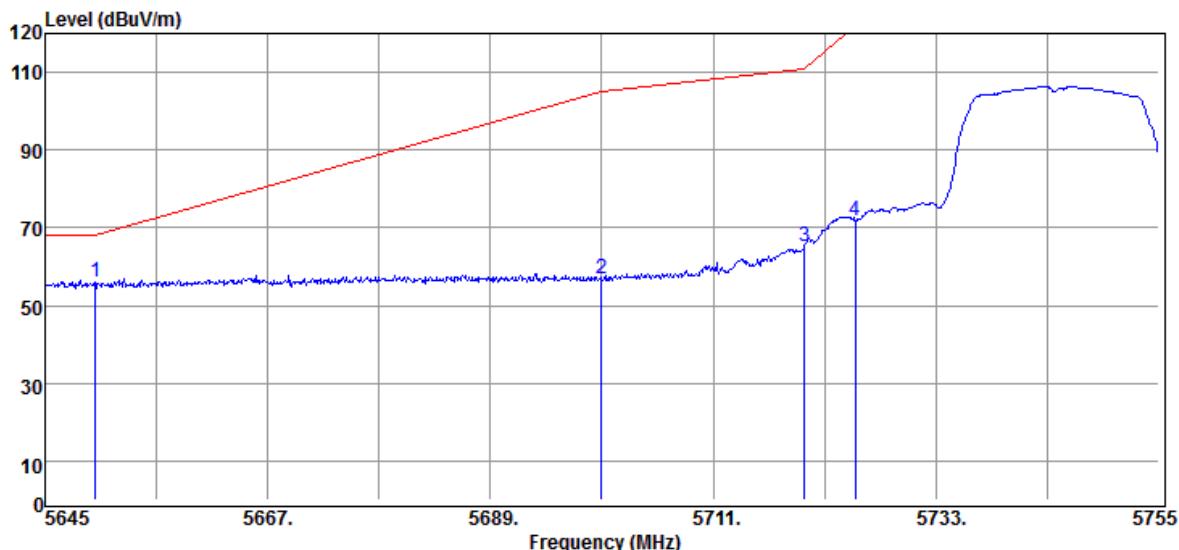
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Operation Mode :802.11n20 / Band4 Test Date :2018-08-31  
 Test Mode :BE CH Low Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
 Test Channel :5745 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5650.00	Peak	53.95	2.25	56.20	68.20	-12.00
5700.00	Peak	54.56	2.42	56.98	105.20	-48.22
5720.00	Peak	62.72	2.32	65.04	110.80	-45.76
5725.00	Peak	69.72	2.28	72.00	122.20	-50.20

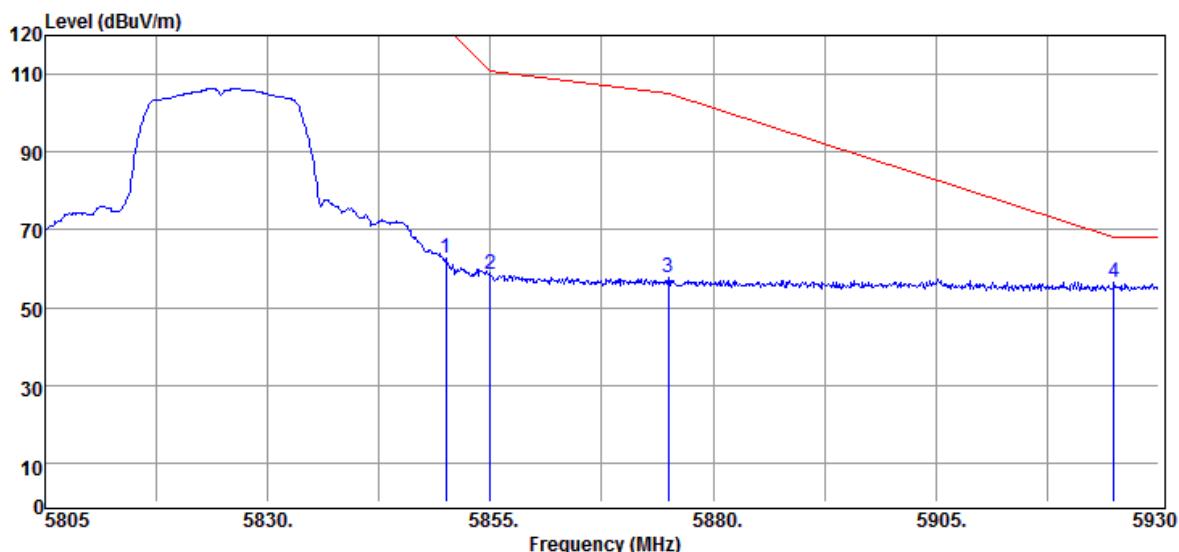
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Operation Mode :802.11n20 / Band4 Test Date :2018-08-31  
 Test Mode :BE CH High Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
 Test Channel :5825 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	60.85	1.88	62.73	122.20	-59.47
5855.00	Peak	56.67	1.89	58.56	110.80	-52.24
5875.00	Peak	55.64	1.90	57.54	105.20	-47.66
5925.00	Peak	54.27	2.16	56.43	68.20	-11.77

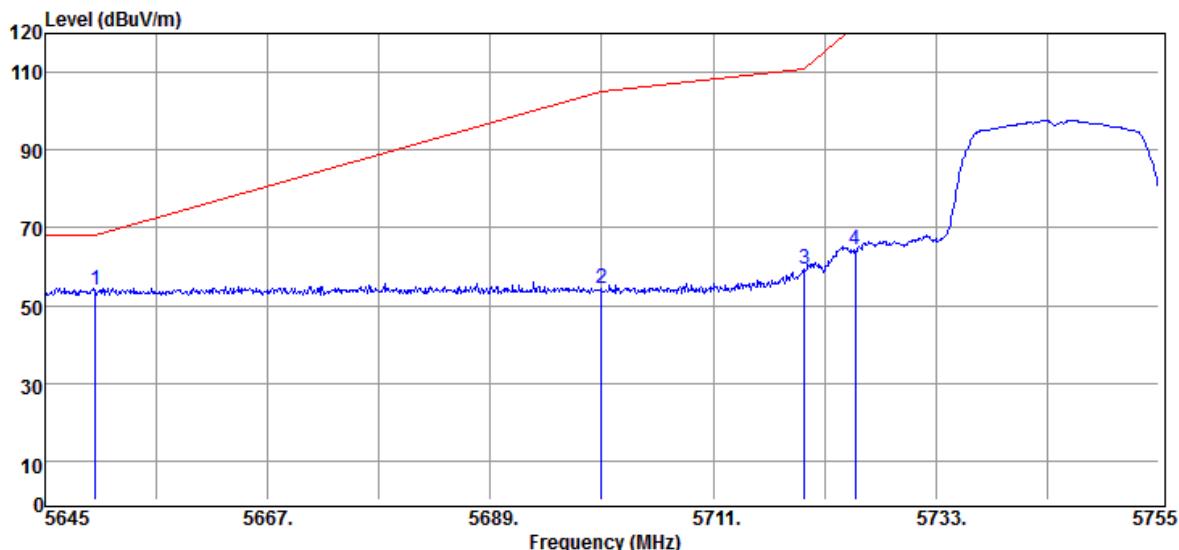
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Operation Mode :802.11n20 / Band4 Test Date :2018-08-31  
 Test Mode :BE CH Low Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
 Test Channel :5745 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5650.00	Peak	51.88	2.25	54.13	68.20	-14.07
5700.00	Peak	51.99	2.42	54.41	105.20	-50.79
5720.00	Peak	56.88	2.32	59.20	110.80	-51.60
5725.00	Peak	61.93	2.28	64.21	122.20	-57.99

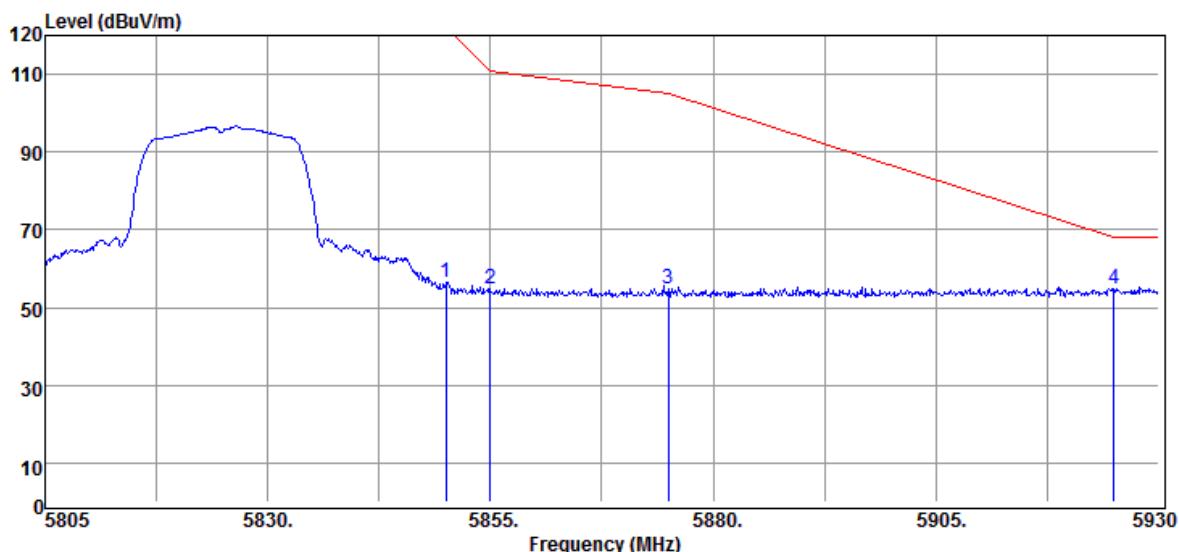
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Operation Mode :802.11n20 / Band4 Test Date :2018-08-31  
 Test Mode :BE CH High Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
 Test Channel :5825 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	54.57	1.88	56.45	122.20	-65.75
5855.00	Peak	52.76	1.89	54.65	110.80	-56.15
5875.00	Peak	53.04	1.90	54.94	105.20	-50.26
5925.00	Peak	52.74	2.16	54.90	68.20	-13.30

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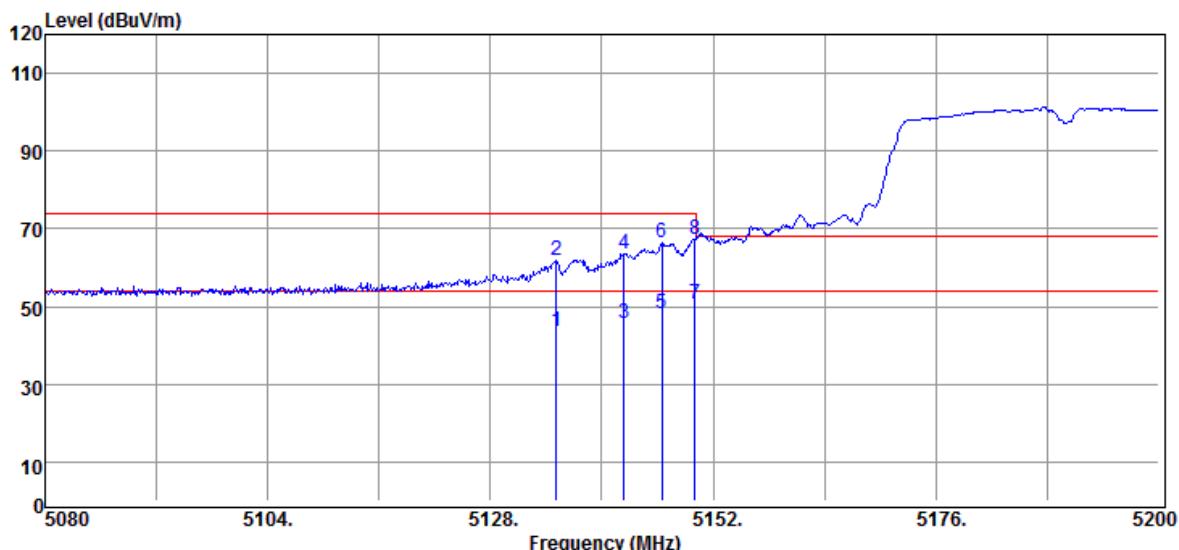
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## 802.11n40 HT mode

Operation Mode	:802.11n40 / Band1	Test Date	:2018-08-31
Test Mode	:BE CH Low	Temp./Humi.	:25/60
EUT Pol	:E1 Plan	Antenna Pol.	:VERTICAL
Test Channel	:5190 MHz	Engineer	:Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5135.08	Average	41.62	1.80	43.42	54.00	-10.58
5135.08	Peak	60.26	1.80	62.06	74.00	-11.94
5142.40	Average	43.88	1.82	45.70	54.00	-8.30
5142.40	Peak	61.89	1.82	63.71	74.00	-10.29
5146.48	Average	46.23	1.83	48.06	54.00	-5.94
5146.48	Peak	64.51	1.83	66.34	74.00	-7.66
5150.00	Average	48.62	1.84	50.46	54.00	-3.54
5150.00	Peak	65.54	1.84	67.38	74.00	-6.62

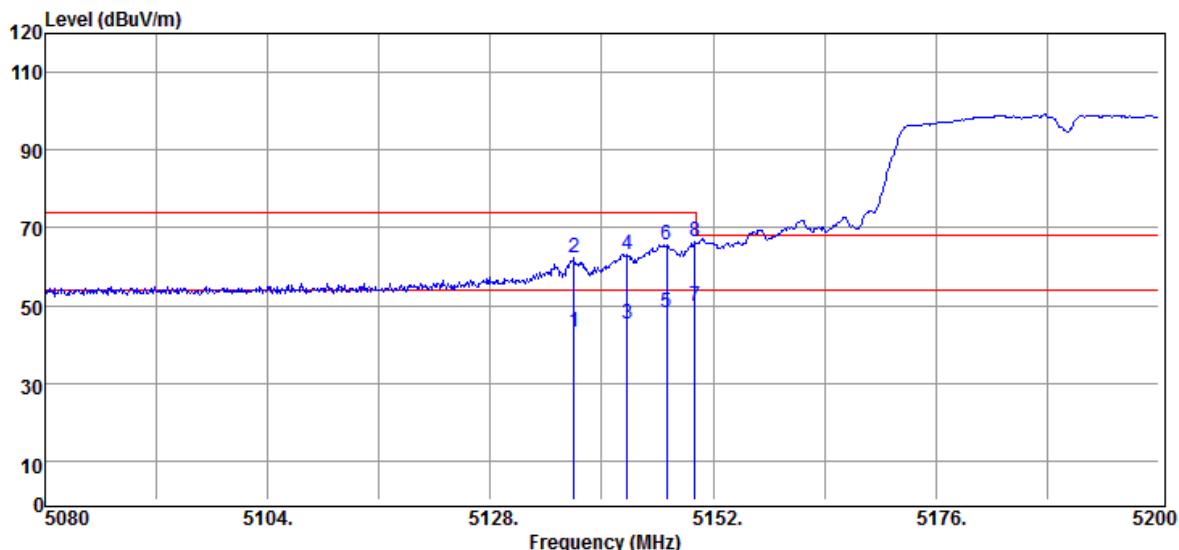
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Operation Mode :802.11n40 / Band1 Test Date :2018-08-31  
 Test Mode :BE CH Low Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
 Test Channel :5190 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5137.00	Average	41.39	1.80	43.19	54.00	-10.81
5137.00	Peak	60.42	1.80	62.22	74.00	-11.78
5142.76	Average	43.50	1.83	45.33	54.00	-8.67
5142.76	Peak	61.35	1.83	63.18	74.00	-10.82
5146.96	Average	46.14	1.84	47.98	54.00	-6.02
5146.96	Peak	63.76	1.84	65.60	74.00	-8.40
5150.00	Average	47.88	1.84	49.72	54.00	-4.28
5150.00	Peak	64.65	1.84	66.49	74.00	-7.51

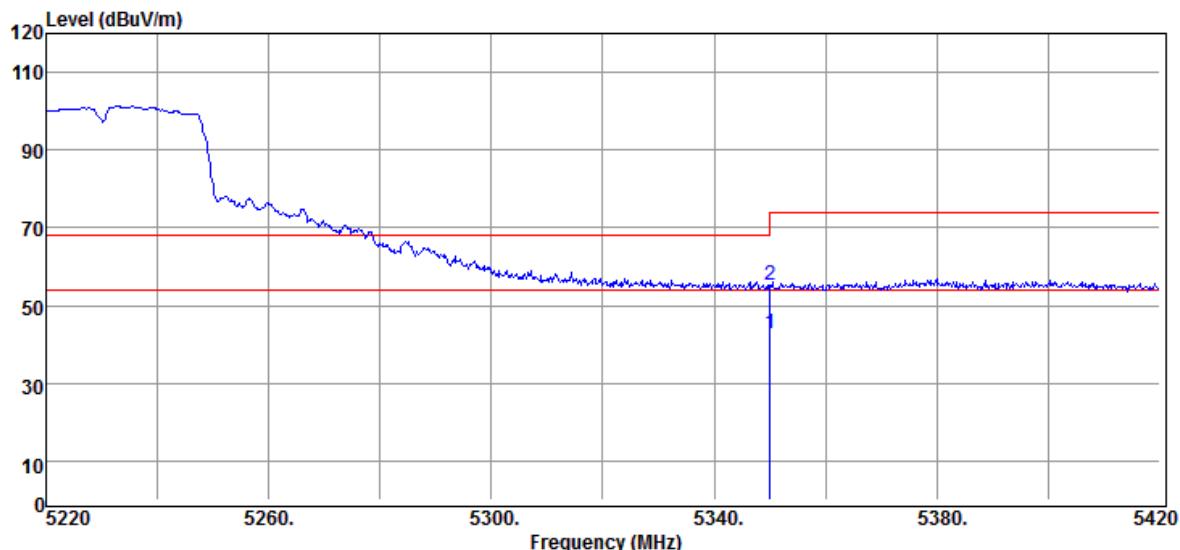
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Operation Mode :802.11n40 / Band1 Test Date :2018-08-31  
 Test Mode :BE CH High Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
 Test Channel :5230 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	40.69	2.24	42.93	54.00	-11.07
5350.00	Peak	52.89	2.24	55.13	74.00	-18.87

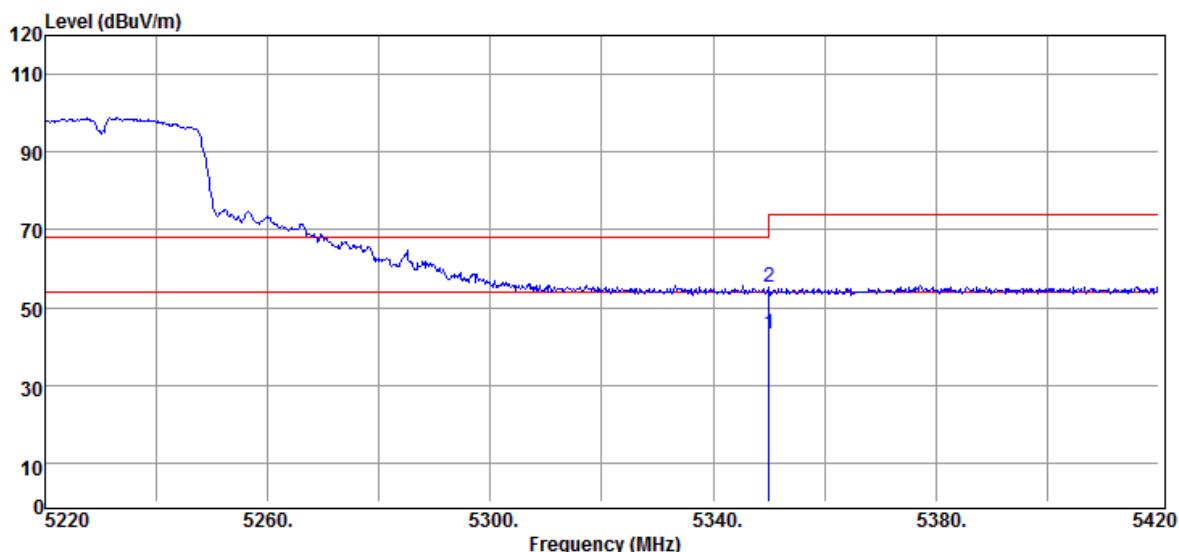
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 Test Mode :BE CH High Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
 Test Channel :5230 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5350.00	Average	40.89	2.24	43.13	54.00	-10.87
5350.00	Peak	52.93	2.24	55.17	74.00	-18.83

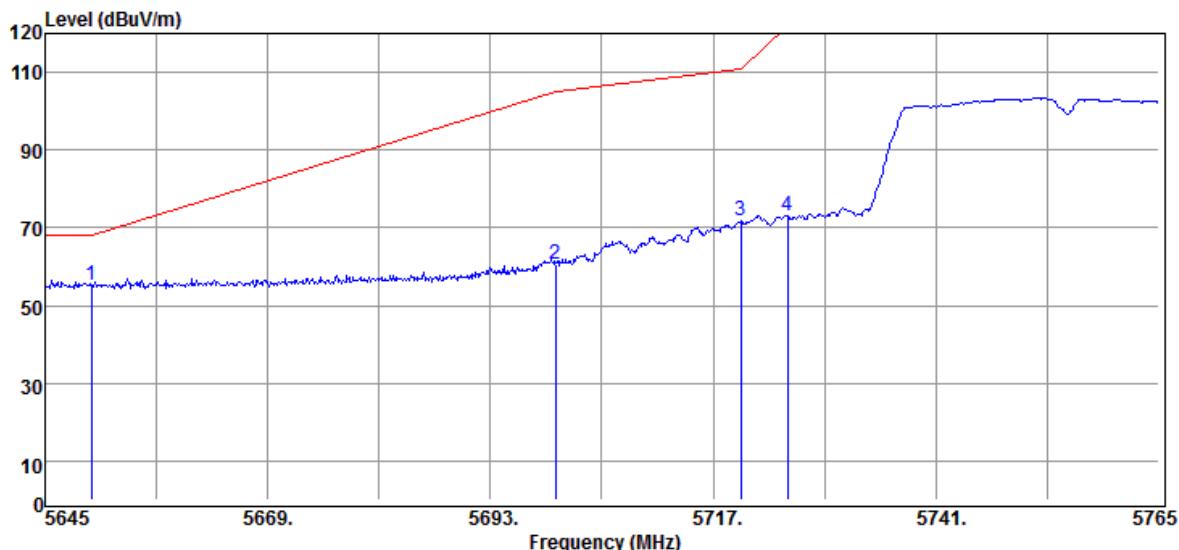
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Operation Mode :802.11n40 / Band4 Test Date :2018-08-31  
 Test Mode :BE CH Low Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
 Test Channel :5755 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5650.00	Peak	53.12	2.25	55.37	68.20	-12.83
5700.00	Peak	58.37	2.42	60.79	105.20	-44.41
5720.00	Peak	69.53	2.32	71.85	110.80	-38.95
5725.00	Peak	70.71	2.28	72.99	122.20	-49.21

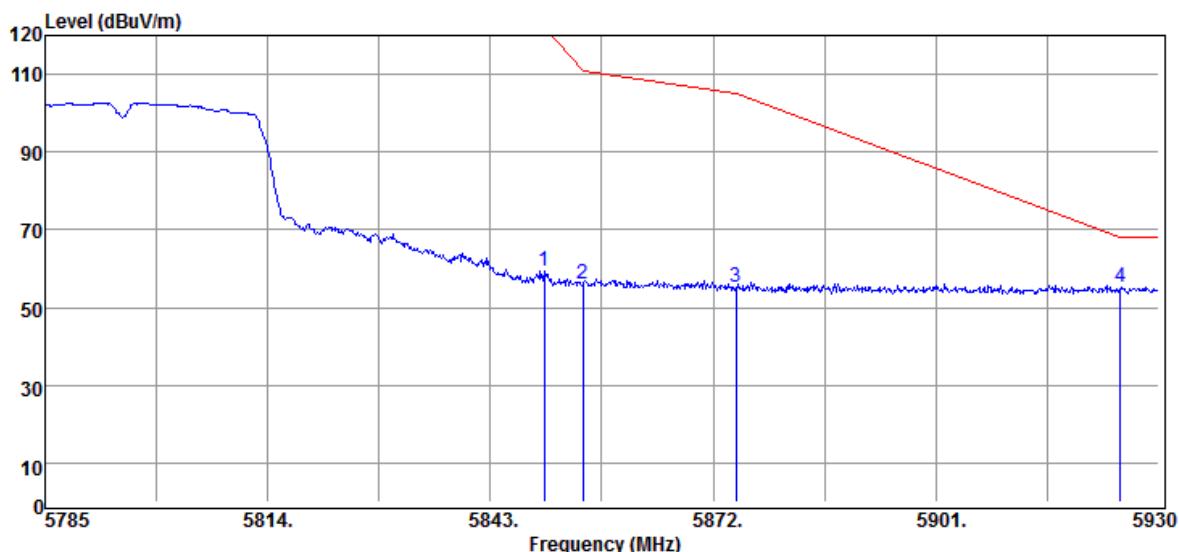
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Operation Mode :802.11n40 / Band4 Test Date :2018-08-31  
 Test Mode :BE CH High Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :VERTICAL  
 Test Channel :5795 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	57.70	1.88	59.58	122.20	-62.62
5855.00	Peak	54.30	1.89	56.19	110.80	-54.61
5875.00	Peak	53.47	1.90	55.37	105.20	-49.83
5925.00	Peak	53.02	2.16	55.18	68.20	-13.02

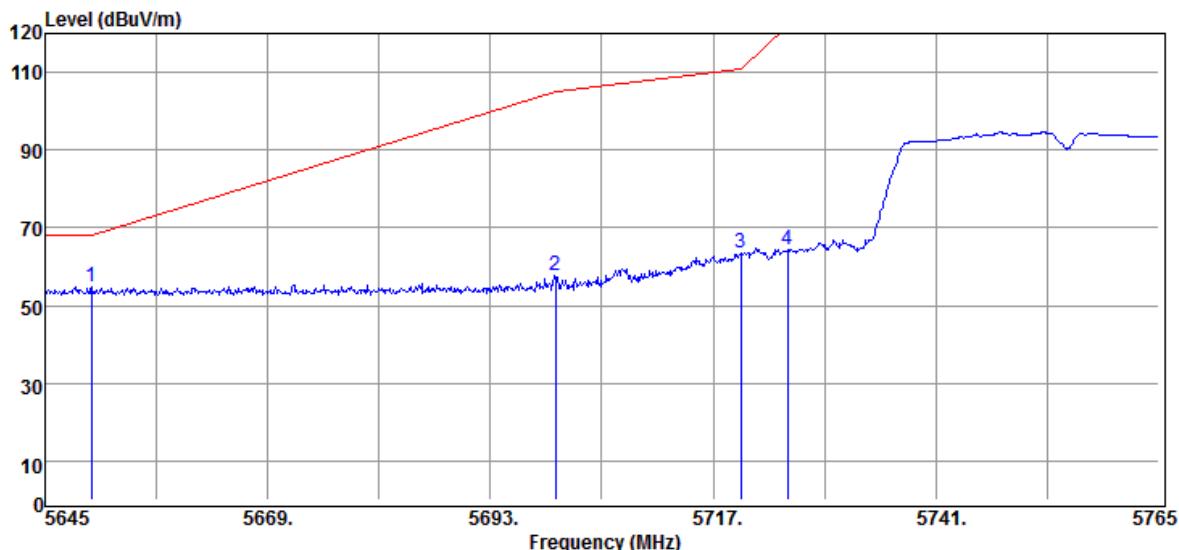
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 Test Mode :BE CH Low Temp./Humi. :25/60  
 EUT Pol :E1 Plan Antenna Pol. :HORIZONTAL  
 Test Channel :5755 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5650.00	Peak	52.47	2.25	54.72	68.20	-13.48
5700.00	Peak	55.10	2.42	57.52	105.20	-47.68
5720.00	Peak	61.30	2.32	63.62	110.80	-47.18
5725.00	Peak	62.10	2.28	64.38	122.20	-57.82

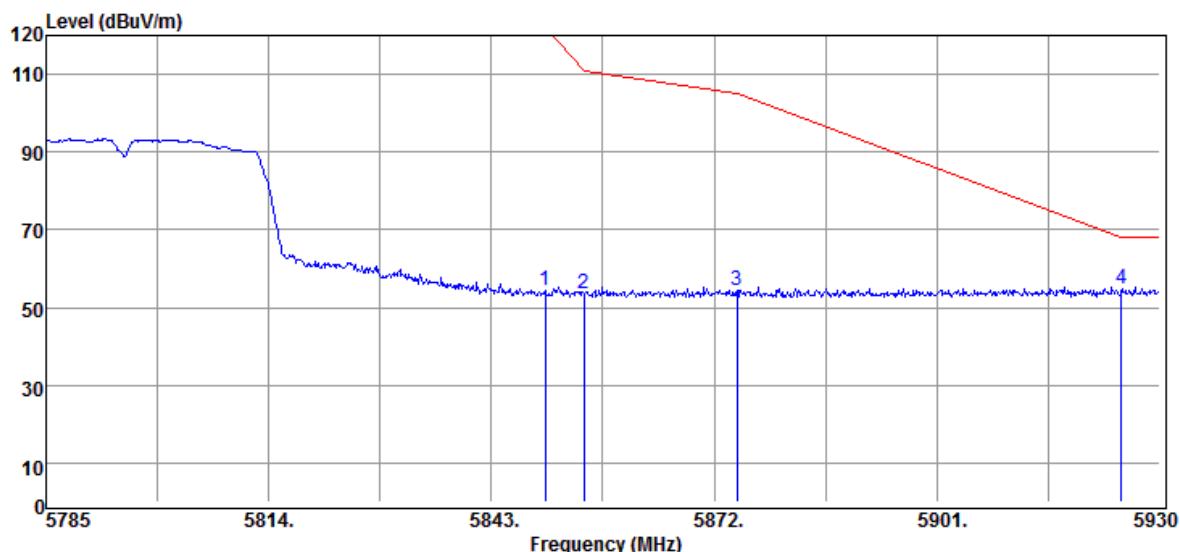
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 Test Channel :5795 MHz Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
5850.00	Peak	52.43	1.88	54.31	122.20	-67.89
5855.00	Peak	51.87	1.89	53.76	110.80	-57.04
5875.00	Peak	52.31	1.90	54.21	105.20	-50.99
5925.00	Peak	52.48	2.16	54.64	68.20	-13.56

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## 12 TRANSMISSION IN THE ABSENCE OF DATA

### 12.1 Standard Applicable

According to §15.407(c)

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

### 12.2 Result

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

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## 13 FREQUENCY STABILITY

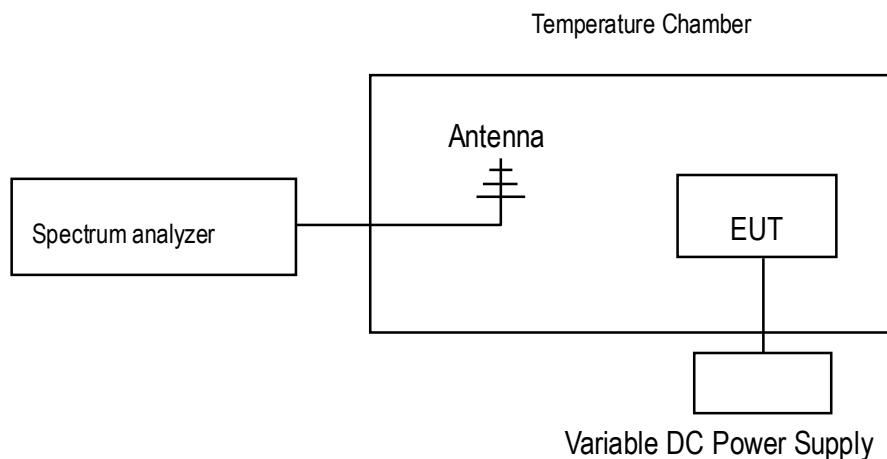
### 13.1 Standard Applicable

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

### 13.2 Measurement Procedure

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

### 13.3 Test SET-UP



### 13.4 Measurement Equipment Used:

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY53400256	2017/10/30	2018/10/29
Attenuator	Marvelous	MVE2213-10	RF30	2017/12/26	2018/12/25
DC Block	PASTERNAK	PE8210	RF29	2017/12/26	2018/12/25

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## 13.5 Measurement Result

## Startup:

Operation Mode	802.11 a	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	36	5180	5,179.99391	0.00000118
		44	5220	5,219.93985	0.00001152
		48	5240	5,239.94593	0.00001032
		52	5260	5,259.97459	0.00000483
		60	5300	5,299.97360	0.00000498
		64	5320	5,319.90917	0.00001707
		100	5500	5,499.94330	0.00001031
		116	5580	5,579.90990	0.00001615
		140	5700	5,699.90215	0.00001717
		144	5720	5,719.97325	0.00000468
		149	5745	5,744.97486	0.00000438
		157	5785	5,784.99362	0.00000110
		165	5825	5,824.92782	0.00001239
	3.42V	36	5180	5,179.99294	0.00000136
		44	5220	5,219.96237	0.00000721
		48	5240	5,239.90434	0.00001826
		52	5260	5,259.91089	0.00001694
		60	5300	5,299.90605	0.00001773
		64	5320	5,319.93261	0.00001267
		100	5500	5,499.91350	0.00001573
		116	5580	5,579.98707	0.00000232
		140	5700	5,699.91302	0.00001526
		144	5720	5,719.94814	0.00000907
		149	5745	5,744.96440	0.00000620
		157	5785	5,784.99162	0.00000145
		165	5825	5,824.96727	0.00000562

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25 °C	3.8V	36	5180	5,179.93415	0.00001271
		44	5220	5,219.94151	0.00001120
		48	5240	5,239.97406	0.00000495
		52	5260	5,259.98977	0.00000194
		60	5300	5,299.99814	0.00000035
		64	5320	5,319.95261	0.00000891
		100	5500	5,499.92149	0.00001427
		116	5580	5,579.98296	0.00000305
		140	5700	5,699.97599	0.00000421
		144	5720	5,719.96151	0.00000673
		149	5745	5,744.96835	0.00000551
		157	5785	5,784.93271	0.00001163
		165	5825	5,824.94459	0.00000951
55 °C	4.18V	36	5180	5,179.94824	0.00000999
		44	5220	5,219.92215	0.00001491
		48	5240	5,239.99573	0.00000081
		52	5260	5,259.94009	0.00001139
		60	5300	5,299.93158	0.00001291
		64	5320	5,319.91700	0.00001560
		100	5500	5,499.95558	0.00000808
		116	5580	5,579.99886	0.00000020
		140	5700	5,699.94625	0.00000943
		144	5720	5,719.93614	0.00001116
		149	5745	5,744.99045	0.00000166
		157	5785	5,784.98825	0.00000203
		165	5825	5,824.92040	0.00001367
55 °C	3.42V	36	5180	5,179.96301	0.00000714
		44	5220	5,219.99807	0.00000037
		48	5240	5,239.98028	0.00000376
		52	5260	5,259.97131	0.00000545
		60	5300	5,299.91257	0.00001650
		64	5320	5,319.95598	0.00000827
		100	5500	5,499.95916	0.00000743
		116	5580	5,579.97249	0.00000493
		140	5700	5,699.92100	0.00001386
		144	5720	5,719.99737	0.00000046
		149	5745	5,744.96851	0.00000548
		157	5785	5,784.91598	0.00001452
		165	5825	5,824.98750	0.00000215

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Operation Mode	802.11 n_HT40	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
	3.42V	159	5795	5,794.96778	0.00000556
		38	5190	5,189.90770	0.00001778
		46	5230	5,229.94043	0.00001139
		54	5270	5,269.96161	0.00000728
		62	5310	5,309.92373	0.00001436
		102	5510	5,509.98161	0.00000334
		110	5550	5,549.92846	0.00001289
		134	5670	5,669.92275	0.00001362
		142	5710	5,709.99287	0.00000125
		151	5755	5,754.96493	0.00000609
		159	5795	5,794.92732	0.00001254

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25 °C	3.8V	38	5190	5,189.94742	0.00001013
		46	5230	5,229.93076	0.00001324
		54	5270	5,269.97818	0.00000414
		62	5310	5,309.98010	0.00000375
		102	5510	5,509.99505	0.00000090
		110	5550	5,549.99032	0.00000174
		134	5670	5,669.99404	0.00000105
		142	5710	5,709.97983	0.00000353
		151	5755	5,754.97267	0.00000475
		159	5795	5,794.95911	0.00000706
55 °C	4.18V	38	5190	5,189.92817	0.00001384
		46	5230	5,229.94746	0.00001005
		54	5270	5,269.94509	0.00001042
		62	5310	5,309.95321	0.00000881
		102	5510	5,509.95633	0.00000793
		110	5550	5,549.96415	0.00000646
		134	5670	5,669.95634	0.00000770
		142	5710	5,709.90930	0.00001588
		151	5755	5,754.91075	0.00001551
		159	5795	5,794.96478	0.00000608
55 °C	3.42V	38	5190	5,189.99603	0.00000076
		46	5230	5,229.93591	0.00001225
		54	5270	5,269.91566	0.00001600
		62	5310	5,309.93164	0.00001287
		102	5510	5,509.90324	0.00001756
		110	5550	5,549.90190	0.00001768
		134	5670	5,669.99040	0.00000169
		142	5710	5,709.91969	0.00001406
		151	5755	5,754.99417	0.00000101
		159	5795	5,794.91914	0.00001395

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**2 Minutes:**

Operation Mode	802.11 a	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	36	5180	5,179.90658	0.00001803
		44	5220	5,219.96113	0.00000745
		48	5240	5,239.97904	0.00000400
		52	5260	5,259.94040	0.00001133
		60	5300	5,299.90238	0.00001842
		64	5320	5,319.92958	0.00001324
		100	5500	5,499.97450	0.00000464
		116	5580	5,579.97422	0.00000462
		140	5700	5,699.94658	0.00000937
		144	5720	5,719.90568	0.00001649
		149	5745	5,744.98978	0.00000178
		157	5785	5,784.98705	0.00000224
		165	5825	5,824.95020	0.00000855
	3.42V	36	5180	5,179.97443	0.00000494
		44	5220	5,219.90447	0.00001830
		48	5240	5,239.93947	0.00001155
		52	5260	5,259.97927	0.00000394
		60	5300	5,299.94719	0.00000996
		64	5320	5,319.91001	0.00001692
		100	5500	5,499.90199	0.00001782
		116	5580	5,579.96072	0.00000704
		140	5700	5,699.98083	0.00000336
		144	5720	5,719.98987	0.00000177
		149	5745	5,744.90470	0.00001659
		157	5785	5,784.97554	0.00000423
		165	5825	5,824.93260	0.00001157

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25 °C	3.8V	36	5180	5,179.91521	0.00001637
		44	5220	5,219.90871	0.00001749
		48	5240	5,239.90131	0.00001883
		52	5260	5,259.90671	0.00001774
		60	5300	5,299.96209	0.00000715
		64	5320	5,319.92971	0.00001321
		100	5500	5,499.96581	0.00000622
		116	5580	5,579.90670	0.00001672
		140	5700	5,699.96732	0.00000573
		144	5720	5,719.96472	0.00000617
		149	5745	5,744.90616	0.00001633
		157	5785	5,784.99697	0.00000052
		165	5825	5,824.92565	0.00001276
		36	5180	5,179.93625	0.00001231
		44	5220	5,219.90164	0.00001884
		48	5240	5,239.91442	0.00001633
55 °C	4.18V	52	5260	5,259.98457	0.00000293
		60	5300	5,299.95883	0.00000777
		64	5320	5,319.91212	0.00001652
		100	5500	5,499.91020	0.00001633
		116	5580	5,579.90605	0.00001684
		140	5700	5,699.93846	0.00001080
		144	5720	5,719.98534	0.00000256
		149	5745	5,744.91453	0.00001488
		157	5785	5,784.93664	0.00001095
		165	5825	5,824.92423	0.00001301
		36	5180	5,179.98055	0.00000375
		44	5220	5,219.91733	0.00001584
		48	5240	5,239.92679	0.00001397
		52	5260	5,259.94562	0.00001034
		60	5300	5,299.90669	0.00001761
55 °C	3.42V	64	5320	5,319.93739	0.00001177
		100	5500	5,499.94965	0.00000915
		116	5580	5,579.99670	0.00000059
		140	5700	5,699.94388	0.00000985
		144	5720	5,719.92340	0.00001339
		149	5745	5,744.92825	0.00001249
		157	5785	5,784.90250	0.00001685
		165	5825	5,824.90149	0.00001691

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Operation Mode	802.11 n_HT40	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
	3.42V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556

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25 °C	3.8V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
55 °C	4.18V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
55 °C	3.42V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556

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**5 Minutes:**

Operation Mode	802.11 a	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	36	5180	5,179.96910	0.00000597
		44	5220	5,219.95025	0.00000953
		48	5240	5,239.99360	0.00000122
		52	5260	5,259.99352	0.00000123
		60	5300	5,299.96819	0.00000600
		64	5320	5,319.90153	0.00001851
		100	5500	5,499.91671	0.00001514
		116	5580	5,579.98508	0.00000267
		140	5700	5,699.98209	0.00000314
		144	5720	5,719.93185	0.00001191
	3.42V	149	5745	5,744.91504	0.00001479
		157	5785	5,784.99378	0.00000108
		165	5825	5,824.93474	0.00001120
		36	5180	5,179.99504	0.00000096
		44	5220	5,219.96915	0.00000591
		48	5240	5,239.94593	0.00001032
		52	5260	5,259.90191	0.00001865
		60	5300	5,299.97723	0.00000430
		64	5320	5,319.94398	0.00001053
		100	5500	5,499.98166	0.00000333

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25 °C	3.8V	36	5180	5,179.99207	0.00000153
		44	5220	5,219.90651	0.00001791
		48	5240	5,239.94897	0.00000974
		52	5260	5,259.97170	0.00000538
		60	5300	5,299.94950	0.00000953
		64	5320	5,319.98382	0.00000304
		100	5500	5,499.95613	0.00000798
		116	5580	5,579.97444	0.00000458
		140	5700	5,699.97283	0.00000477
		144	5720	5,719.94976	0.00000878
		149	5745	5,744.93989	0.00001046
		157	5785	5,784.98464	0.00000266
		165	5825	5,824.92709	0.00001252
		36	5180	5,179.91344	0.00001671
		44	5220	5,219.96632	0.00000645
		48	5240	5,239.99101	0.00000172
55 °C	4.18V	52	5260	5,259.93955	0.00001149
		60	5300	5,299.96782	0.00000607
		64	5320	5,319.96029	0.00000746
		100	5500	5,499.90137	0.00001793
		116	5580	5,579.99857	0.00000026
		140	5700	5,699.97169	0.00000497
		144	5720	5,719.90151	0.00001722
		149	5745	5,744.97646	0.00000410
		157	5785	5,784.97973	0.00000350
		165	5825	5,824.93266	0.00001156
		36	5180	5,179.98894	0.00000214
		44	5220	5,219.96601	0.00000651
		48	5240	5,239.97543	0.00000469
		52	5260	5,259.99549	0.00000086
		60	5300	5,299.96705	0.00000622
55 °C	3.42V	64	5320	5,319.95048	0.00000931
		100	5500	5,499.91629	0.00001522
		116	5580	5,579.92125	0.00001411
		140	5700	5,699.98804	0.00000210
		144	5720	5,719.91293	0.00001522
		149	5745	5,744.94077	0.00001031
		157	5785	5,784.93849	0.00001063
		165	5825	5,824.91521	0.00001456

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Operation Mode	802.11 n_HT40	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
3.42V	3.42V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556

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25 °C	3.8V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
55 °C	4.18V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
55 °C	3.42V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556

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**10 Minutes:**

Operation Mode	802.11 a	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	36	5180	5,179.90778	0.00001780
		44	5220	5,219.97494	0.00000480
		48	5240	5,239.98638	0.00000260
		52	5260	5,259.92997	0.00001331
		60	5300	5,299.90552	0.00001783
		64	5320	5,319.99511	0.00000092
		100	5500	5,499.91635	0.00001521
		116	5580	5,579.95664	0.00000777
		140	5700	5,699.94275	0.00001004
		144	5720	5,719.94753	0.00000917
		149	5745	5,744.95868	0.00000719
		157	5785	5,784.98291	0.00000295
		165	5825	5,824.97455	0.00000437
	3.42V	36	5180	5,179.90207	0.00001891
		44	5220	5,219.98323	0.00000321
		48	5240	5,239.95497	0.00000859
		52	5260	5,259.95709	0.00000816
		60	5300	5,299.93825	0.00001165
		64	5320	5,319.92980	0.00001320
		100	5500	5,499.91399	0.00001564
		116	5580	5,579.96323	0.00000659
		140	5700	5,699.98515	0.00000261
		144	5720	5,719.98237	0.00000308
		149	5745	5,744.92866	0.00001242
		157	5785	5,784.93120	0.00001189
		165	5825	5,824.96609	0.00000582

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25 °C	3.8V	36	5180	5,179.97158	0.00000549
		44	5220	5,219.97043	0.00000566
		48	5240	5,239.91733	0.00001578
		52	5260	5,259.93850	0.00001169
		60	5300	5,299.95096	0.00000925
		64	5320	5,319.99208	0.00000149
		100	5500	5,499.99587	0.00000075
		116	5580	5,579.91442	0.00001534
		140	5700	5,699.95114	0.00000857
		144	5720	5,719.90306	0.00001695
		149	5745	5,744.99100	0.00000157
		157	5785	5,784.91694	0.00001436
		165	5825	5,824.99818	0.00000031
		36	5180	5,179.90192	0.00001893
		44	5220	5,219.98517	0.00000284
		48	5240	5,239.98632	0.00000261
55 °C	4.18V	52	5260	5,259.92620	0.00001403
		60	5300	5,299.90329	0.00001825
		64	5320	5,319.96353	0.00000686
		100	5500	5,499.94902	0.00000927
		116	5580	5,579.92572	0.00001331
		140	5700	5,699.96132	0.00000679
		144	5720	5,719.96592	0.00000596
		149	5745	5,744.92444	0.00001315
		157	5785	5,784.98764	0.00000214
		165	5825	5,824.93108	0.00001183
		36	5180	5,179.90405	0.00001852
		44	5220	5,219.90429	0.00001834
		48	5240	5,239.92355	0.00001459
		52	5260	5,259.98349	0.00000314
		60	5300	5,299.90269	0.00001836
55 °C	3.42V	64	5320	5,319.93734	0.00001178
		100	5500	5,499.90495	0.00001728
		116	5580	5,579.98874	0.00000202
		140	5700	5,699.97644	0.00000413
		144	5720	5,719.92020	0.00001395
		149	5745	5,744.90516	0.00001651
		157	5785	5,784.97815	0.00000378
		165	5825	5,824.99977	0.00000004

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Operation Mode	802.11 n_HT40	Test Date	2018.09.05
Temperature	:24.5 °C	Test By	Scott
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10 °C	4.18V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
	3.42V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556

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25 °C	3.8V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
55 °C	4.18V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556
55 °C	3.42V	38	5190	5,189.90382	0.00001853
		46	5230	5,229.94776	0.00000999
		54	5270	5,269.91336	0.00001644
		62	5310	5,309.92235	0.00001462
		102	5510	5,509.98791	0.00000219
		110	5550	5,549.95966	0.00000727
		134	5670	5,669.95319	0.00000826
		142	5710	5,709.99959	0.00000007
		151	5755	5,754.90729	0.00001611
		159	5795	5,794.96778	0.00000556

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## 14 ANTENNA REQUIREMENT

### 14.1 Standard Applicable

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

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

### 14.2 Antenna Connected Construction

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

*~ End of Report ~*

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