

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

OF

**Applicant:** Z Com, Inc.  
5F, No.8, HSIN ANN RD., HSINCH SCIENCE PARK, HSINCHU,  
30078 TAIWAN

**Product Name:** 5GHz 11ac Wireless Bridge

**Brand Name:** ZCOM

**Marketing Name:** SP220-C03

**Model No.:** SP220-C03

**Model Difference:** N/A

**Report Number:** T190516W01-RP

**FCC ID:** M4Y-SP220C03

**FCC Rule Part:** §15.407, Cat: NII

**Issue Date:** Jan. 03, 2020

**Date of Test:** May 20, 2019 ~ Jun. 19, 2019

**Date of EUT Received:** May 20, 2019

**Issued by:** Compliance Certification Services Inc. Wugu Lab.  
No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan.  
(R.O.C.)  
service@ccsrf.com

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report. The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory).

**Tested By:****Hone Hsieh / Engineer****Approved By:****Kevin Tsai / Deputy Manager**

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## Revision History

Revision	Description	Issue Date	Remark
Rev.00	Original	Jan. 03, 2020	Revised by Elle Chang

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## 1 GENERAL INFORMATION

### 1.1 Product Description

Product Name:	5GHz 11ac Wireless Bridge	
Brand Name:	ZCOM	
Marketing Name:	SP220-C03	
Model No.:	SP220-C03	
Model Difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
Power Supply:	48V by POE Injector	
	POE Injector:	Model No.: PSE301G, Supplier: N/A

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm)	Modulation Technology
a	5150~5250	4	23.98	OFDM
	5725-5850	5	23.99	
n_HT ac_VHT 20M	5150~5250	4	HT: 25.34	OFDM
	5725-5850	5	HT: 26.78	
n_HT ac_VHT 40M	5150~5250	2	HT: 25.15	OFDM
	5725-5850	2	HT: 26.99	
ac_VHT 80M	5150~5250	1	13.13	OFDM
	5725~5850	1	16.47	
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 – 216.7Mbps 802.11 n_40MHz: 13.5 – 450.0Mbps 802.11 ac_20MHz: 6.5 –288.9Mbps 802.11 ac_40MHz: 13.5 –600.0Mbps 802.11 ac_80MHz: 29.3 – 1300.0Mbps		

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## 1.2 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
Patch Array	ZWA	TDJ-5800-2xPNF	5150~5250	23.80	V
			5725~5850	25.13	V
Dual Polarization Directional	SmartAnt	SAA08-200140	5150~5250	20	
			5725~5850	20	
Directional	SmartAnt	SAA12-200090	5150~5250	15.5	
			5725~5850	15.5	

Note: Pre-scanned was done on the above 3 antennas, the TDJ-5800-2xPNF results higher emission at 5GHz. Therefore, the completed set of measurement was done on the antenna to be presented on this test report.

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### 1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules V02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013

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

### 1.4 Test Facility

Compliance Certification Services Inc. Wugu Lab. No.11, Wugong 6th Rd.,  
Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.) (TAF code 1309)

FCC Designation number: TW1309

### 1.5 Special Accessories

There are no special accessories used while test was conducted.

### 1.6 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 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 50uH/50 ohm 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 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

#### 2.3.3 Radiated Emissions

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

### 2.4 Measurement Results Explanation Example

#### For all conducted test items:

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

#### Note:

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

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## 2.5 Configuration of Tested System

### Fig. 2-1 Radiated Emission



Fig 2-2 Conducted (Antenna Port) Configuration

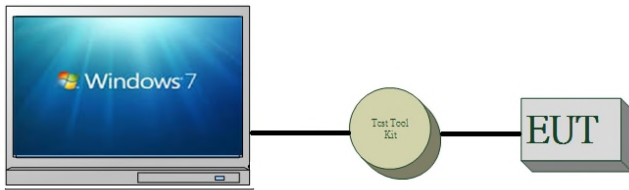


Fig 2-3 Conduction (AC Power Line) Emission

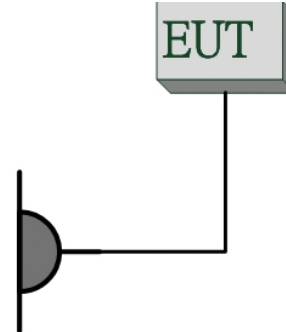


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	T420	S0012407	N/A	N/A
3.	Test Tool Kit	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 Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.205 §15.209 §15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

### 4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

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

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

802.11ac VHT80 Mode	
channel	Frequency
42	5210

Operated band in 5745 MHz ~5850 MHz:

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

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

802.11ac VHT80 Mode	
channel	Frequency
155	5775

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## 4.2 The Worst Test Modes and Channel Details

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

Modulation	Transmission Chain		Multiple Transmission Spatial
<input checked="" type="checkbox"/> 802.11 a	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> 2TX
<input checked="" type="checkbox"/> 802.11 n	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input checked="" type="checkbox"/> MIMO
<input checked="" type="checkbox"/> 802.11 ac	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input checked="" type="checkbox"/> MIMO

4. Therefore, below summary is the modes of test configuration that yield the highest reading and generate the highest emission chosen to carry out the relevantly mandatory test items.

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**AC POWER LINE CONDUCTED EMISSION TEST:**

<b>Test Condition</b>	AC Power line conducted emission for line and neutral
<b>Worst Case</b>	Operation in normal mode

**RADIATED EMISSION TEST:**

<b>RADIATED EMISSION TEST (BELOW 1 GHz)</b>						
MODE	FRE- QUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULA- TION	DATA RATE (Mbps)	AN- TENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Ch1
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Ch1
802.11ac_VHT80	5150~5250	42	42	OFDM	MCS0	MIMO
802.11ac_VHT80	5725-5850	155	155	OFDM	MCS0	MIMO
<b>RADIATED EMISSION TEST (ABOVE 1 GHz)</b>						
MODE	FRE- QUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULA- TION	DATA RATE (Mbps)	AN- TENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Ch1
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5150~5250	42	42	OFDM	MCS8	MIMO
802.11ac_VHT80	5725-5850	155	155	OFDM	MCS8	MIMO

**Note:**

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

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# ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FRE- QUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULA- TION	DATA RATE (Mbps)	AN- TENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Ch1
802.11n_HT20				OFDM	MCS8	MIMO
802.11ac_VHT20					MCS0	
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT40					MCS8	
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	Ch1
802.11n_HT20				OFDM	MCS8	MIMO
802.11ac_VHT20					MCS8	
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT40					MCS8	
802.11ac_VHT80	5775	155	155	OFDM	MCS0	MIMO

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## 5 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575 dB
26dB & 6dB Emission Bandwidth	+/- 147.256 Hz
The Maximum Output Power	+/- 2.128 dB
Peak Power Spectral Density	+/- 2.878 dB
Frequency Stability	+/- 147.256 Hz
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12 dB
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68 dB
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18 dB
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47 dB
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81 dB
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87 dB

### Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.
3. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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

### 6.2 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
CABLE	EMCI	CFD300-NL	CERF	06/29/2018	06/28/2019
EMI Test Receiver	R&S	ESCI	100064	07/24/2018	07/23/2019
LISN	SCHWARZBECK	NSLK 8127	8127-541	01/31/2019	01/30/2020
LISN	SCHAFFNER	NNB 41	03/10013	02/13/2019	02/12/2020
ADAPTER	POE Injector	PSE301G	N/A	N/A	N/A
Software	EZ-EMC(CCS-3A1-CE)				

### 6.3 EUT Setup

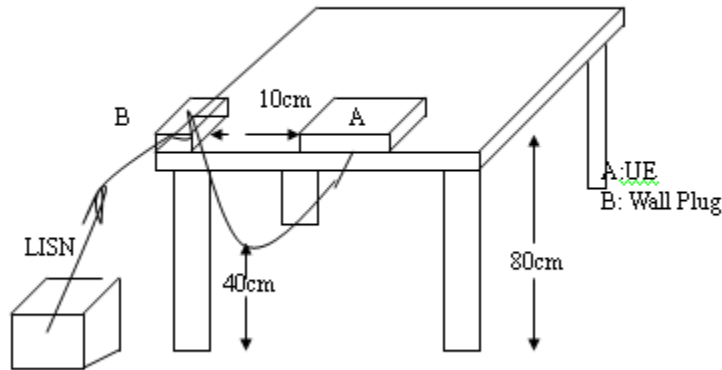
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the table top.
3. The LISN was connected with 120Vac/60Hz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

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## 6.4 Test SET-UP



## 6.5 Measurement Procedure

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

## 6.6 Measurement Result

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

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

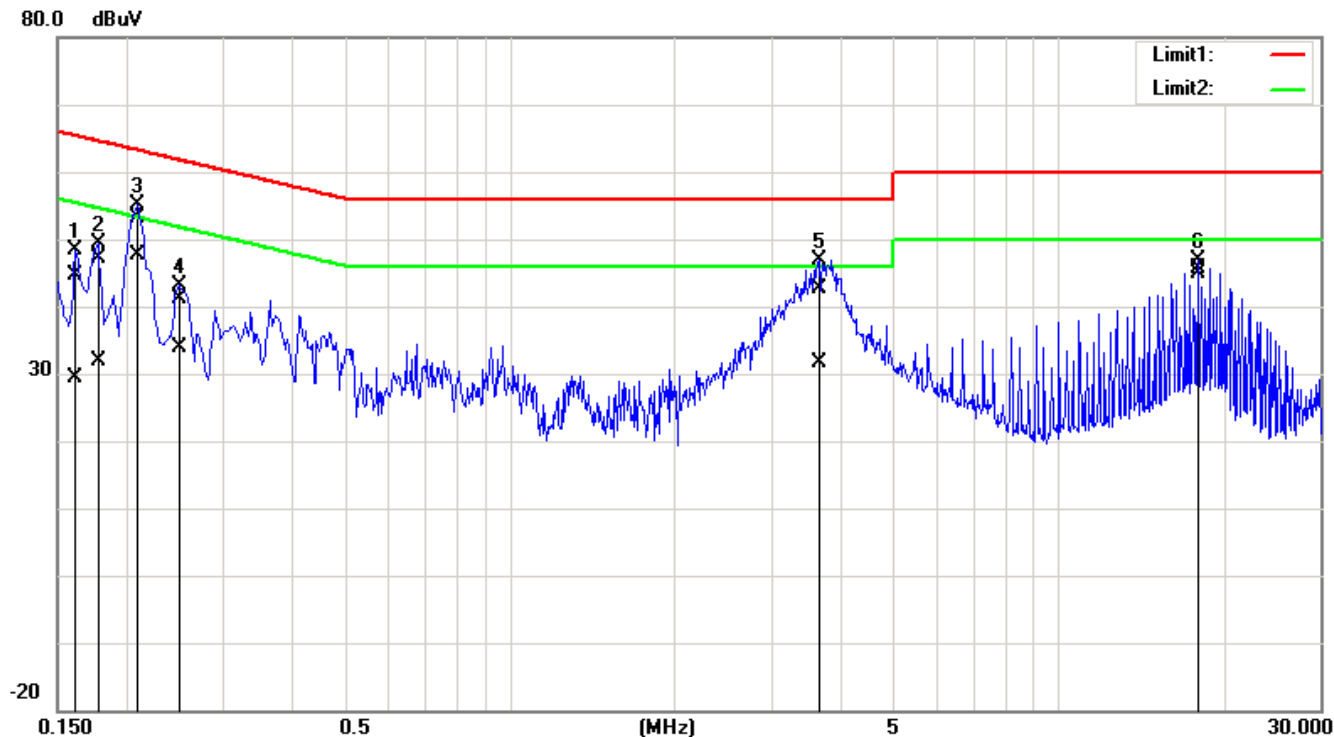
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Description:	Operation	Date:	2019/6/21
Line:	L1	Temp.(°C)/Hum.(%):	26.9(°C)/67%
Test Voltage:	AC 120V/60Hz	Test By:	Henry



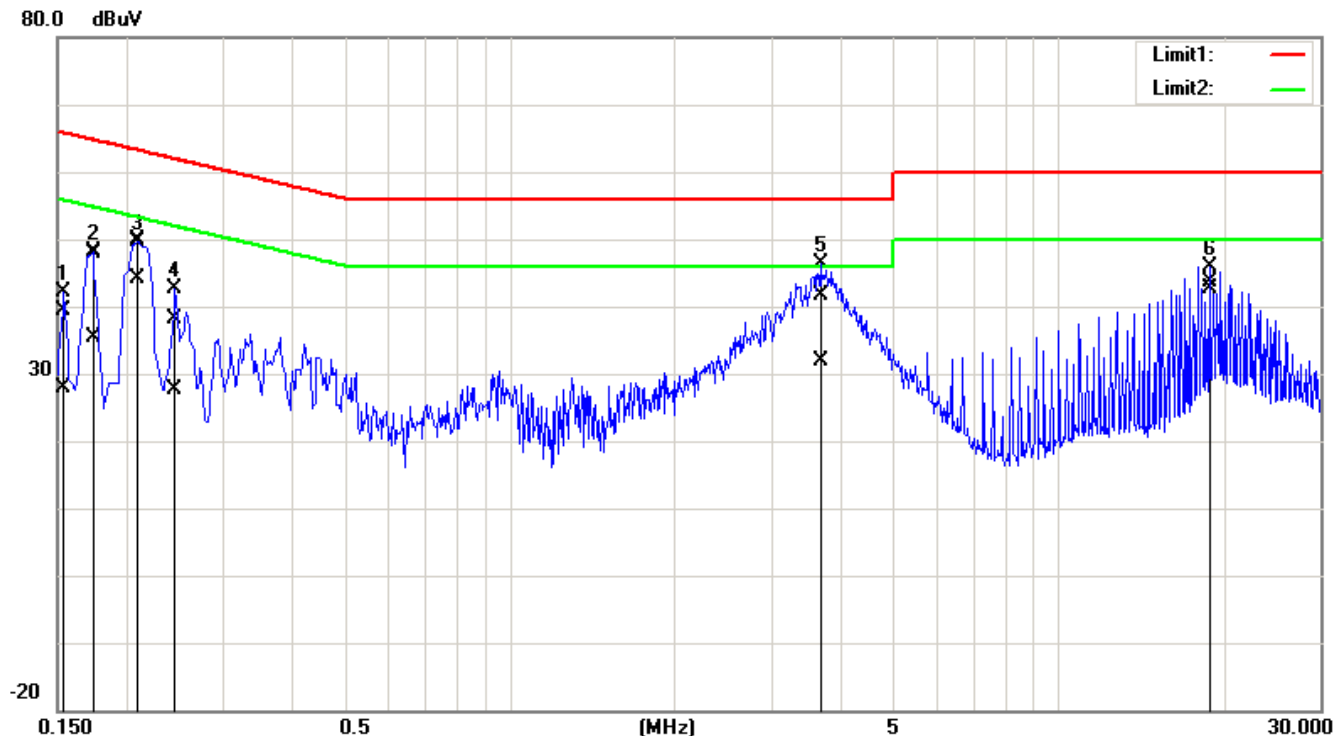
No.	Fre- quency	Qua- siPeak reading	Average reading	Cor- rection factor	Qua- siPeak result	Average result	Qua- siPeak limit	Average limit	Qua- siPeak margin	Aver- age margin	Re- mark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1620	34.38	19.27	10.14	44.52	29.41	65.36	55.36	-20.84	-25.95	Pass
2	0.1780	36.95	21.86	10.13	47.08	31.99	64.57	54.58	-17.49	-22.59	Pass
3	0.2100	42.97	37.41	10.13	53.10	47.54	63.20	53.21	-10.10	-5.67	Pass
4	0.2500	30.92	23.73	10.13	41.05	33.86	61.75	51.76	-20.70	-17.90	Pass
5	3.6700	32.36	21.27	10.24	42.60	31.51	56.00	46.00	-13.40	-14.49	Pass
6*	17.9619	35.16	34.63	10.36	45.52	44.99	60.00	50.00	-14.48	-5.01	Pass

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Description:	Operation	Date:	2019/6/21
Line:	N	Temp.(°C)/Hum.(%):	26.9°C)/67%
Test Voltage:	AC 120V/60Hz	Test By:	Henry



No.	Fre- quency	Qua- siPeak reading	Average reading	Cor- rection factor	Qua- siPeak result	Average result	Qua- siPeak limit	Average limit	Qua- siPeak margin	Aver- age margin	Re- mark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1539	29.28	17.83	10.02	39.30	27.85	65.78	55.79	-26.48	-27.94	Pass
2	0.1740	37.85	25.33	10.02	47.87	35.35	64.76	54.77	-16.89	-19.42	Pass
3	0.2100	39.87	34.01	10.02	49.89	44.03	63.20	53.21	-13.31	-9.18	Pass
4	0.2460	28.03	17.59	10.02	38.05	27.61	61.89	51.89	-23.84	-24.28	Pass
5	3.6860	31.61	21.79	10.10	41.71	31.89	56.00	46.00	-14.29	-14.11	Pass
6*	18.8740	33.35	32.29	10.27	43.62	42.56	60.00	50.00	-16.38	-7.44	Pass

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## 7 DUTY CYCLE TEST SIGNAL

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

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

### Formula:

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

### Measurement Procedure:

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

Duty Cycle:

Mode	Duty Cycle (%)	Duty Factor (dB) =10*log ( 1/Duty Cycle )	1/T (kHz)	VBW setting (kHz)
802.11a	97.14	0.13	0.48	1.00
802.11n_20	97.46	0.11	0.40	1.00
802.11n_40	95.47	0.20	0.81	1.00
802.11ac_80	86.23	0.64	2.45	3.00

■ Duty Cycle Factor:  $10 * \log(1/0.9714) = 0.13$

■ Duty Cycle Factor:  $10 * \log(1/0.9746) = 0.11$

■ Duty Cycle Factor:  $10 * \log(1/0.9547) = 0.2$

■ Duty Cycle Factor:  $10 * \log(1/0.8623) = 0.64$

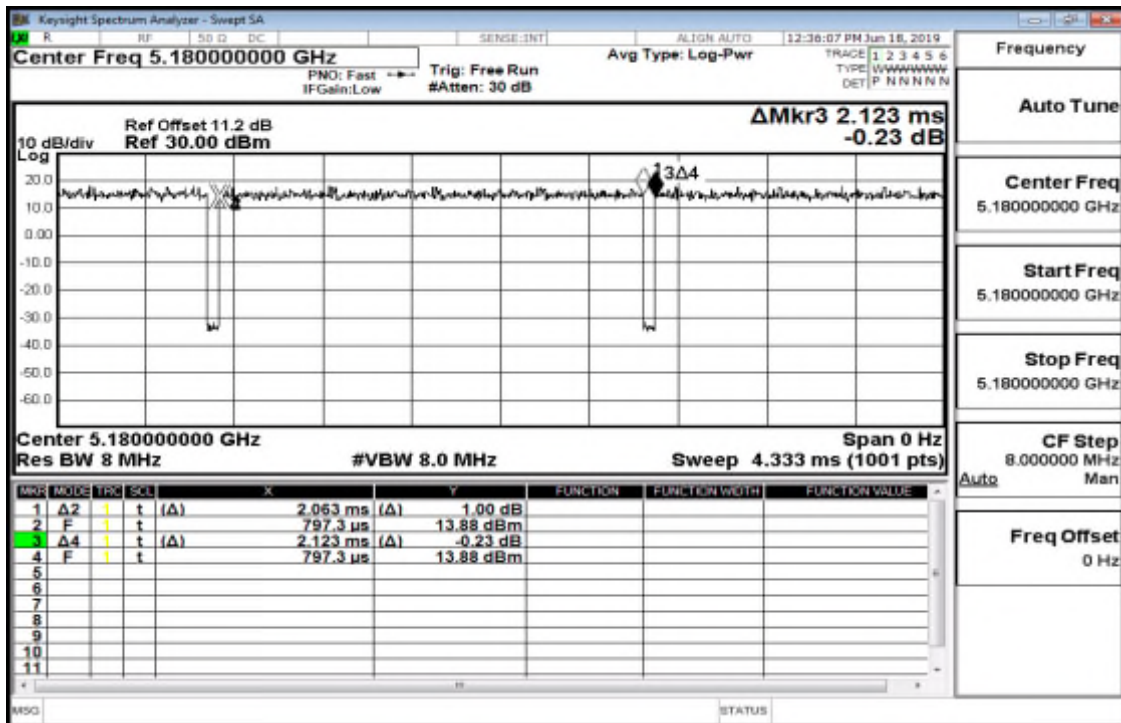
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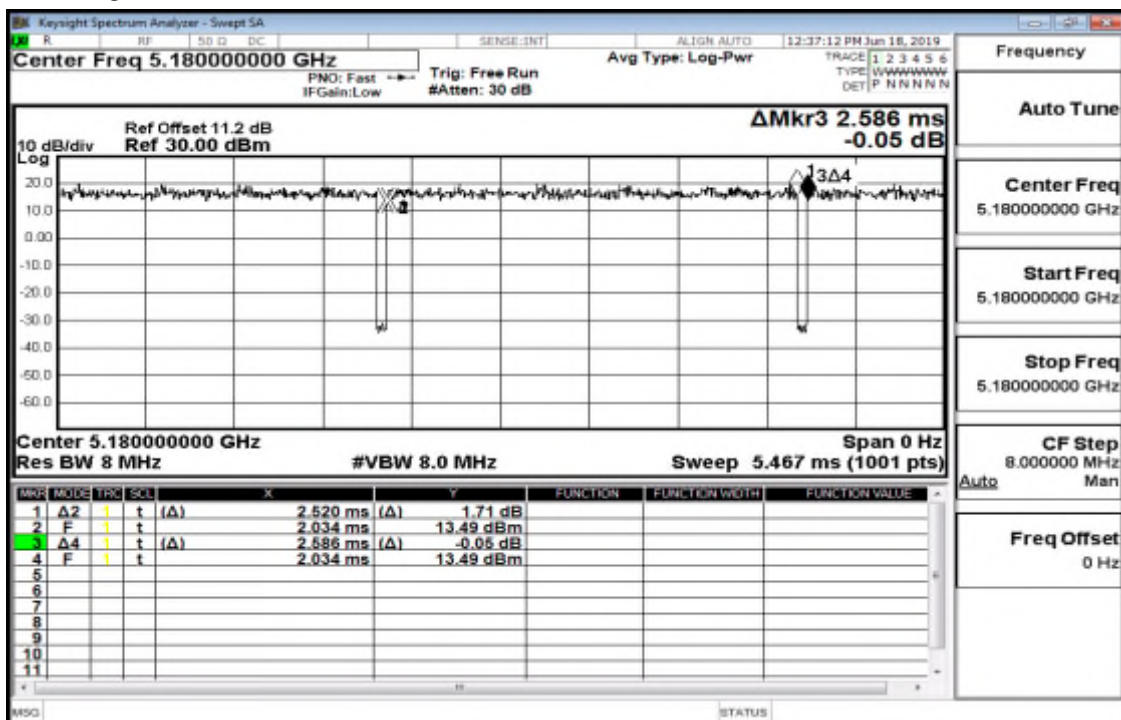
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## DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

### 802.11a



### 802.11n HT20

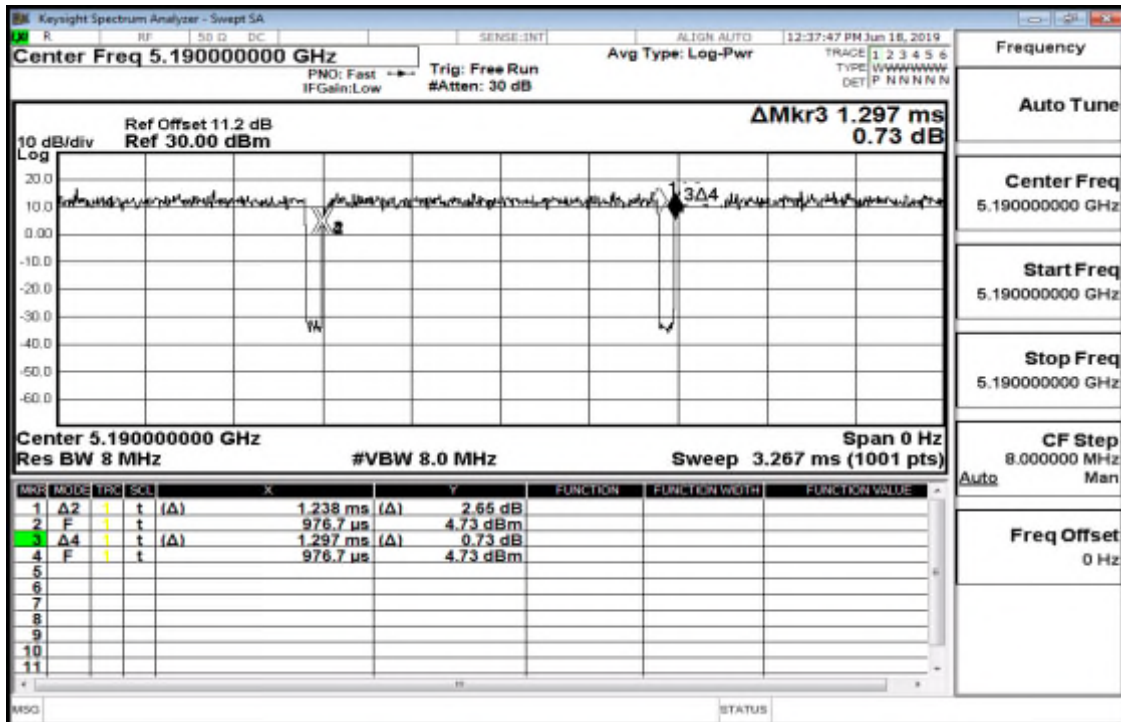


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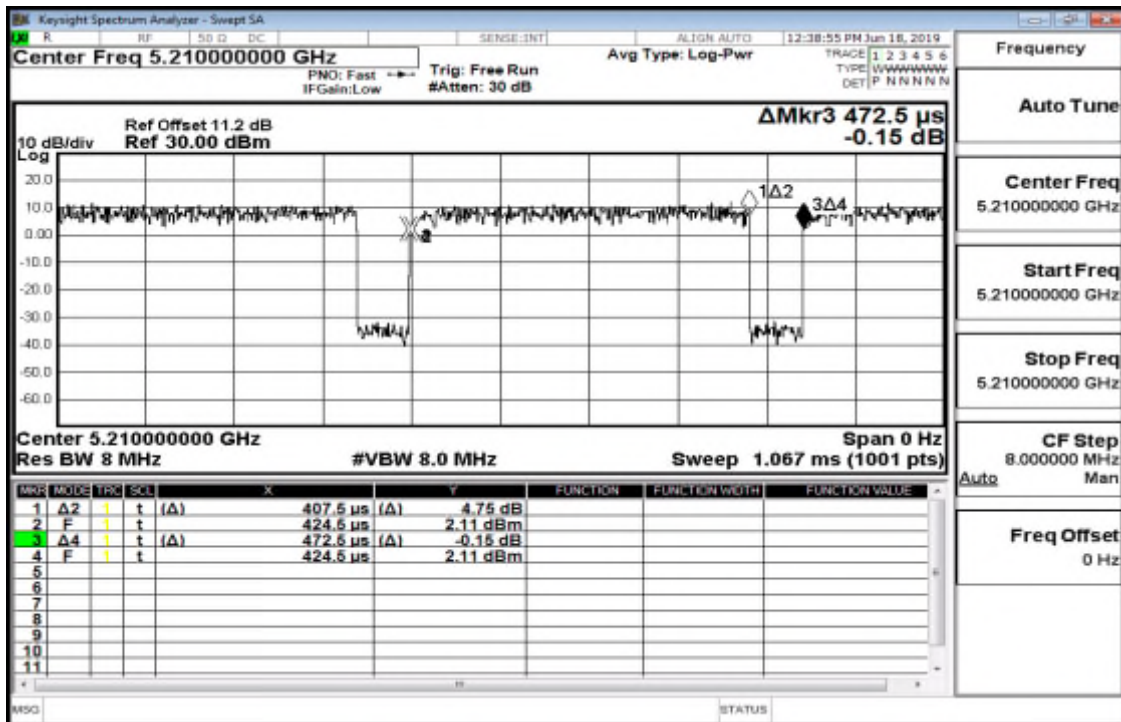
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## 802.11n HT 40



## 802.11 ac VHT 80



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## 8 26DB & 6DB EMISSION BANDWIDTH MEASUREMENT

### 8.1 Standard Applicable

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

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

### 8.2 Measurement Procedure

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

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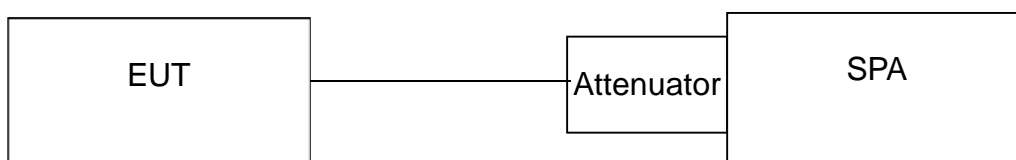
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### 8.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
DC Block	PASTER-NACK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
TEMPERATURE	TEMPERATURE	HTC-1	EC-HY-01	04/18/2019	04/17/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

### 8.4 Test Set-up



### 8.5 Measurement Result

#### 26dB Bandwidth

802.11a\_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	19.19	12.831
5220	19.31	12.858
5240	19.14	12.819

802.11a\_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	19.21	12.835
5220	19.23	12.840
5240	19.57	12.916

802.11n\_HT20\_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.63	13.351
5220	22.06	13.436
5240	22.25	13.473

802.11n\_HT20\_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.52	13.328
5220	22.3	13.483
5240	23.27	13.668

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802.11n\_HT40\_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	43.04	16.339
5230	42.79	16.313

802.11n\_HT40\_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.78	16.312
5230	44.06	16.440

802.11ac\_VHT80\_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	83.87	19.236

802.11ac\_VHT80\_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	83.59	19.222

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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	16.35	12.135
5785	16.32	12.127
5825	16.31	12.125

802.11a\_Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.37	12.140
5785	16.34	12.133
5825	16.31	12.125

802.11n\_HT20\_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.65	12.467
5785	17.78	12.499
5825	17.71	12.482

802.11n\_HT20\_Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.61	12.458
5785	17.65	12.467
5825	17.68	12.475

802.11n\_HT40\_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.1	15.575
5795	35.66	15.522

802.11n\_HT40\_Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.11	15.576
5795	35.47	15.499

802.11ac\_VHT80\_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	75.84	18.799

802.11ac\_VHT80\_Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	75.84	18.799

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## 99% BW Verification of DFS Function

802.11a\_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.13	< 5250
5745	5736.75	> 5725

802.11a\_Ch1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.13	< 5250
5745	5736.75	> 5725

802.11n\_HT20\_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.91	< 5250
5745	5736.06	> 5725

802.11n\_HT20\_Ch1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.94	< 5250
5745	5736.09	> 5725

802.11n\_HT40\_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5243.10	< 5250
5755	5736.35	> 5725

802.11n\_HT40\_Ch1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5243.10	< 5250
5755	5736.90	> 5725

802.11ac\_VHT80\_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5247.90	< 5250
5775	5736.90	> 5725

802.11n\_HT80\_Ch1

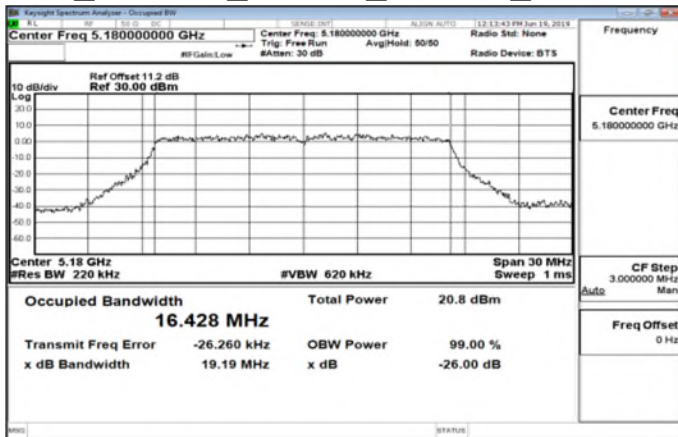
Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5247.80	< 5250
5775	5737.00	> 5725

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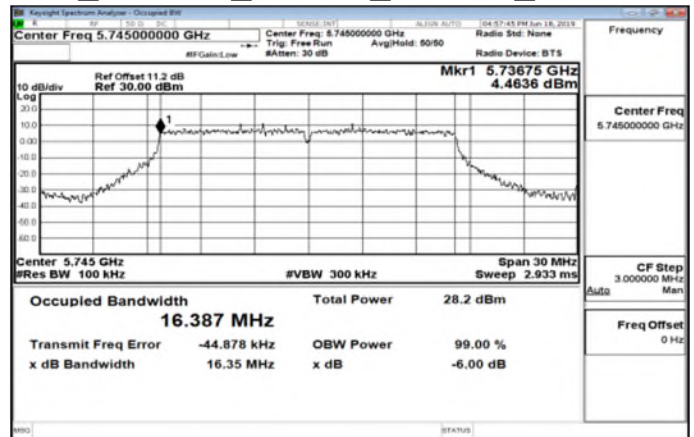
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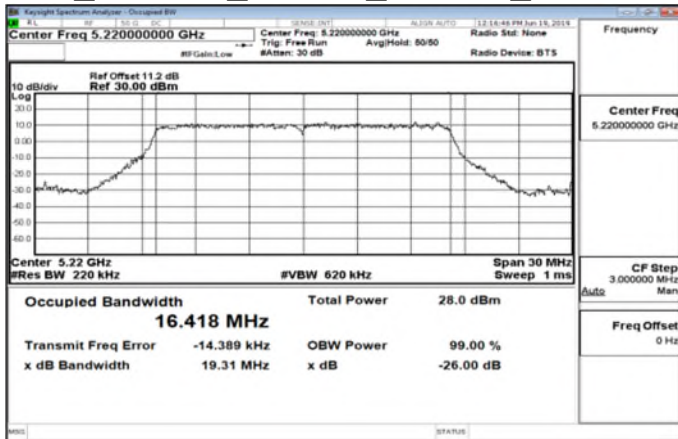
## FCC\_802.11a\_20MHz\_Chain0\_5180MHz



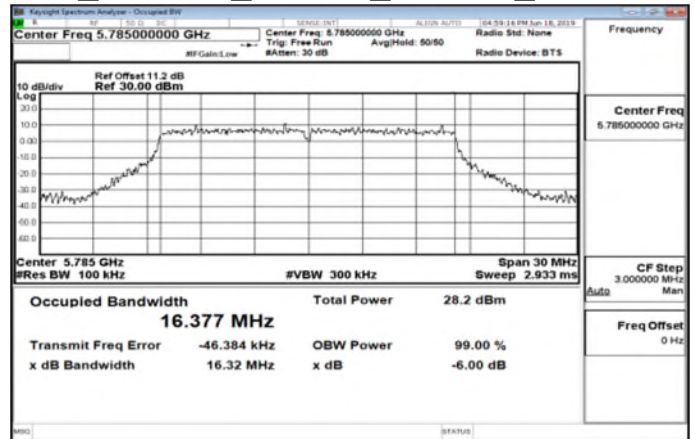
## FCC\_802.11a\_20MHz\_Chain0\_5745MHz



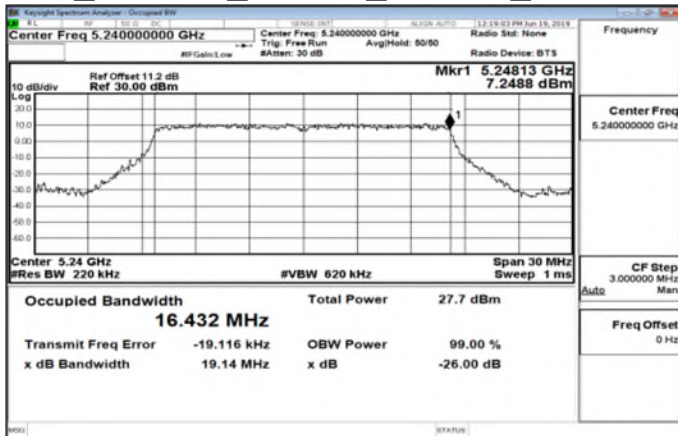
## FCC\_802.11a\_20MHz\_Chain0\_5220MHz



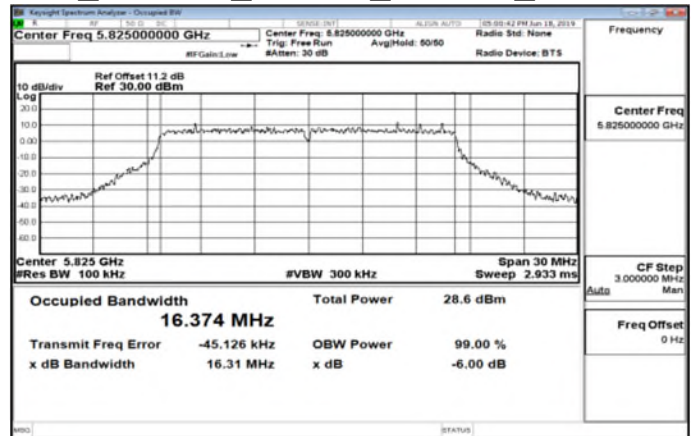
## FCC\_802.11a\_20MHz\_Chain0\_5785MHz



## FCC\_802.11a\_20MHz\_Chain0\_5240MHz



## FCC\_802.11a\_20MHz\_Chain0\_5825MHz

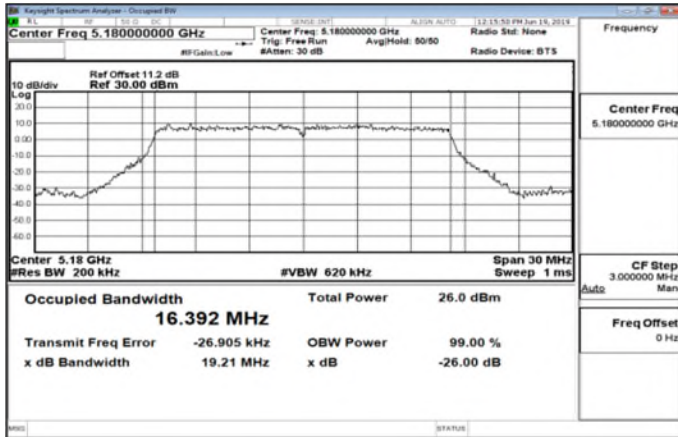


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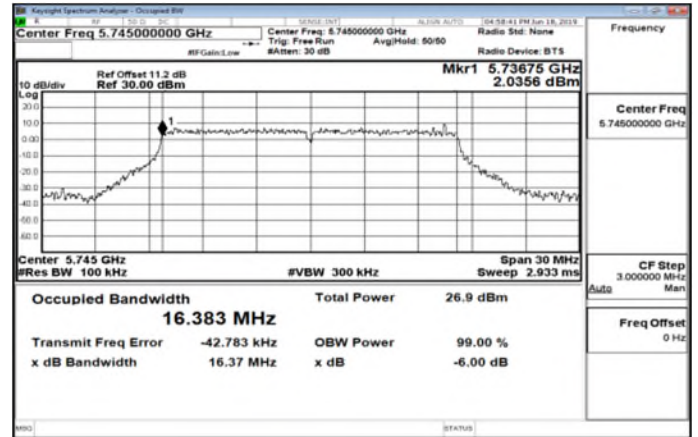
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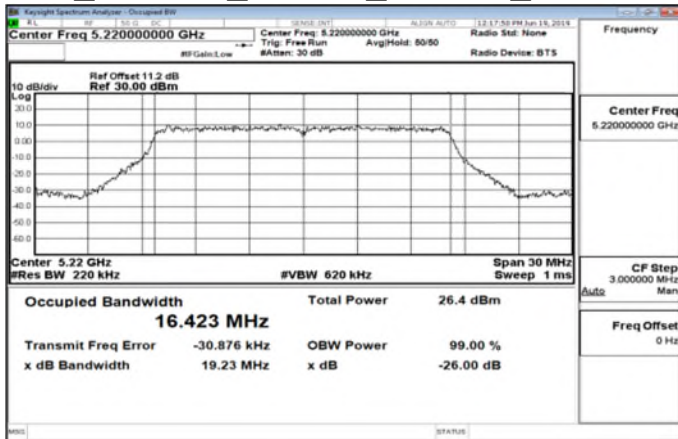
### FCC\_802.11a\_20MHz\_Chain1\_5180MHz



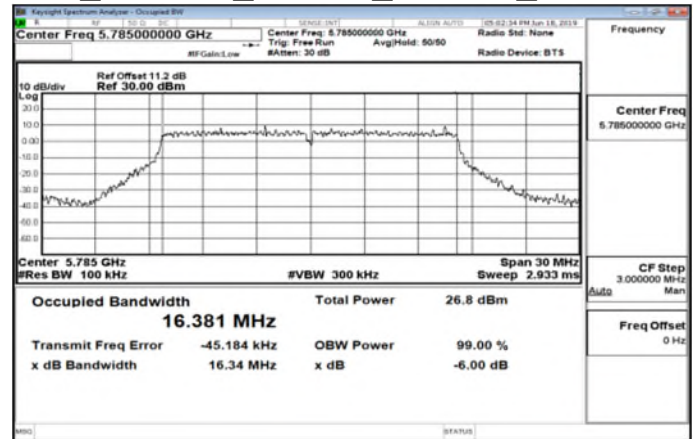
### FCC\_802.11a\_20MHz\_Chain1\_5745MHz



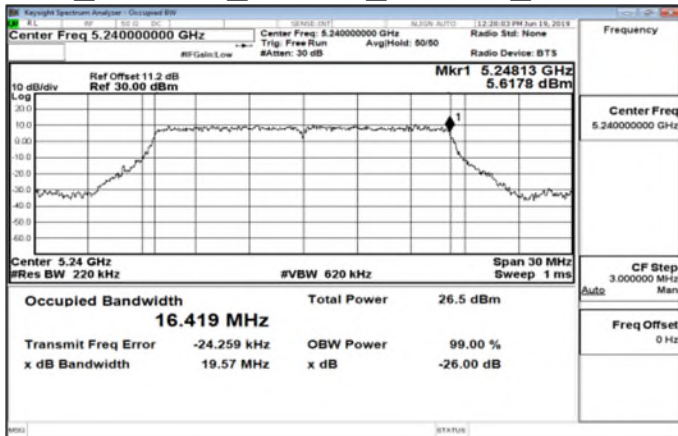
### FCC\_802.11a\_20MHz\_Chain1\_5220MHz



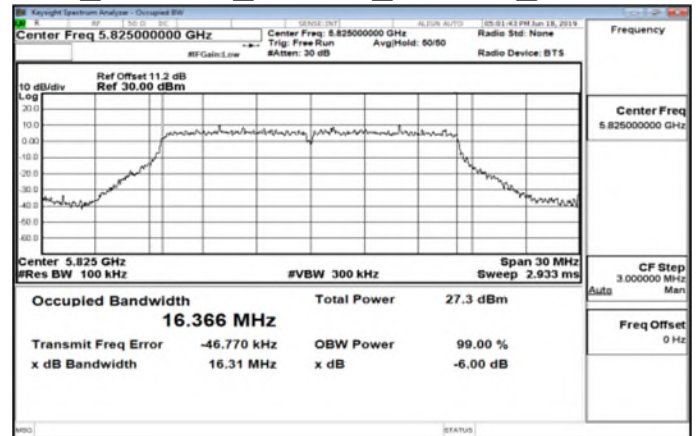
### FCC\_802.11a\_20MHz\_Chain1\_5785MHz



### FCC\_802.11a\_20MHz\_Chain1\_5240MHz



### FCC\_802.11a\_20MHz\_Chain1\_5825MHz

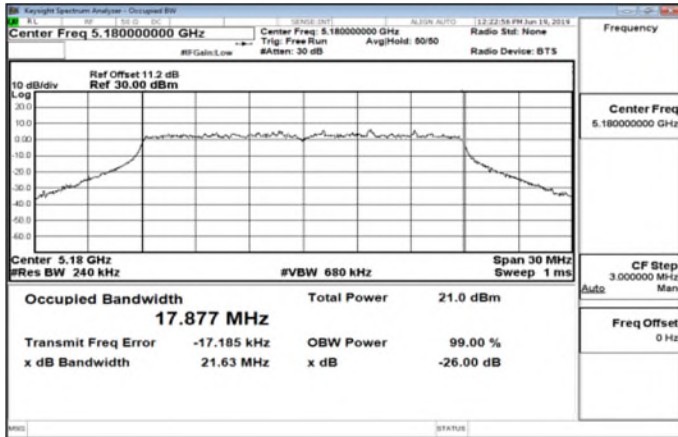


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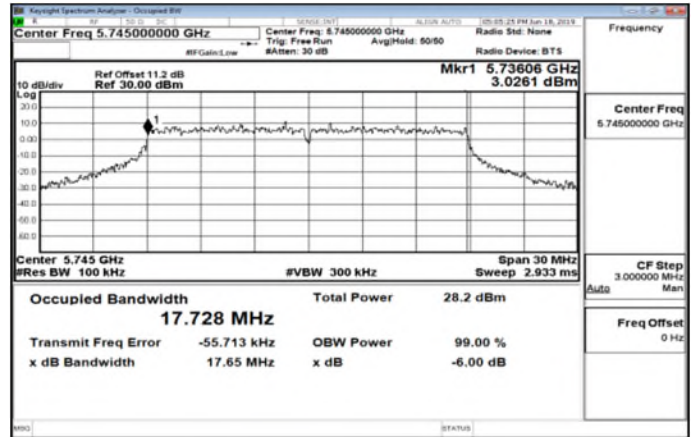
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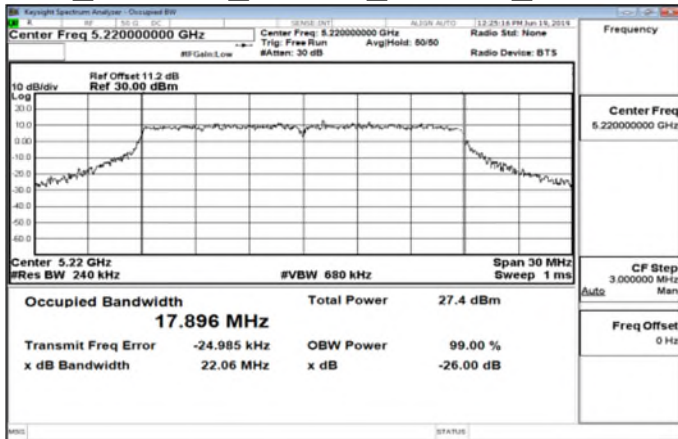
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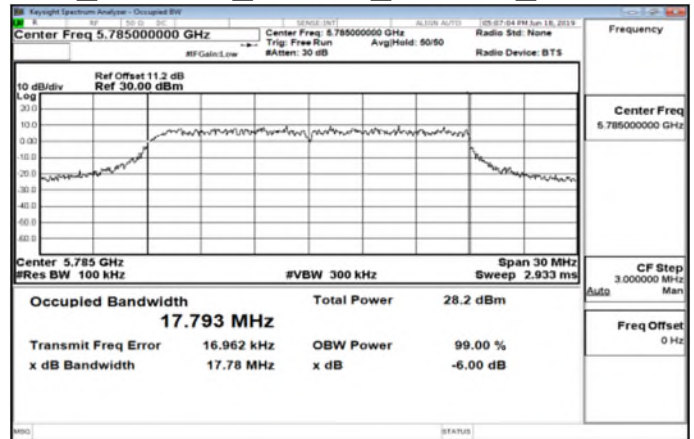
## FCC\_802.11n\_20MHz\_Chain0\_5745MHz



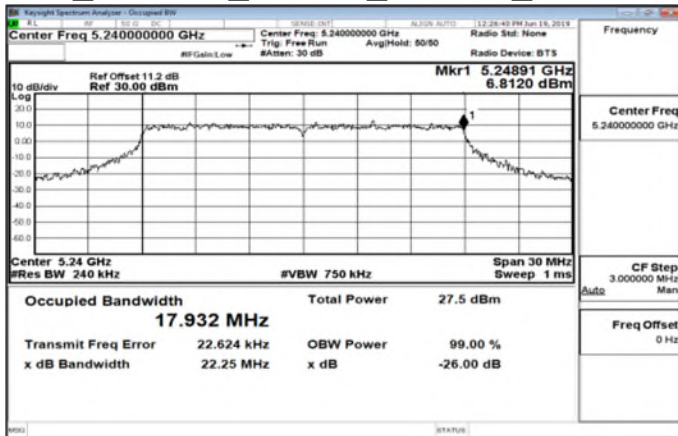
## FCC\_802.11n\_20MHz\_Chain0\_5220MHz



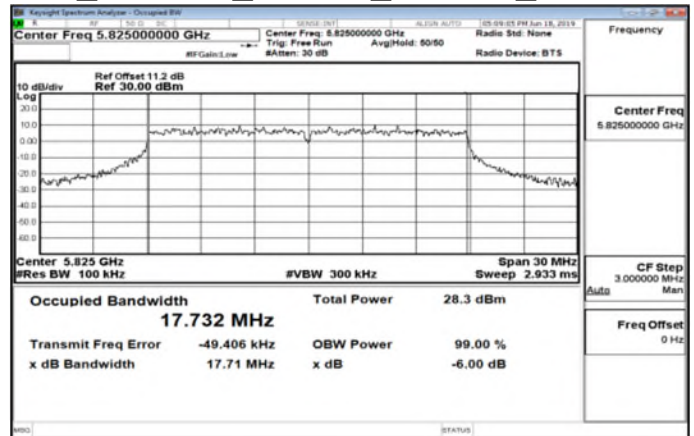
## FCC\_802.11n\_20MHz\_Chain0\_5785MHz



## FCC\_802.11n\_20MHz\_Chain0\_5240MHz



## FCC\_802.11n\_20MHz\_Chain0\_5825MHz

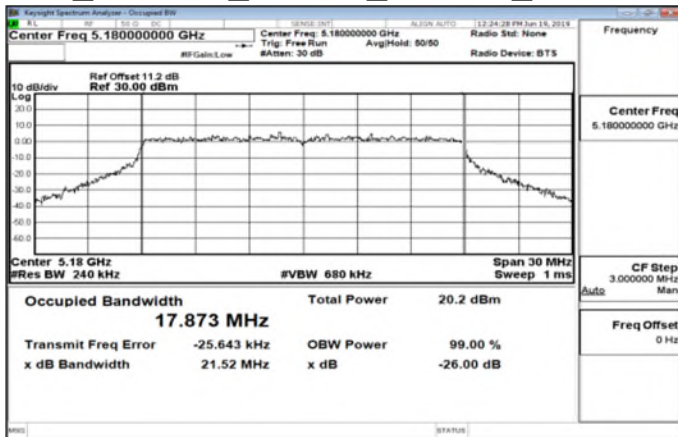


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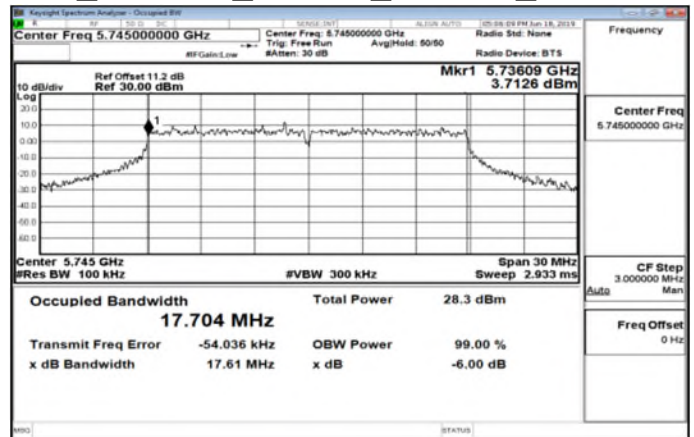
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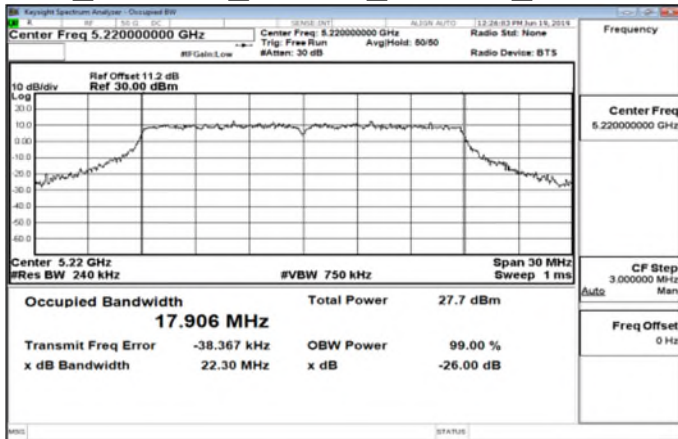
## FCC\_802.11n\_20MHz\_Chain1\_5180MHz



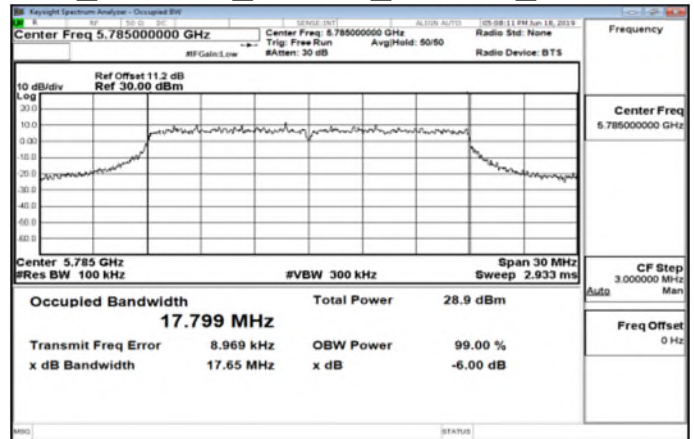
## FCC\_802.11n\_20MHz\_Chain1\_5745MHz



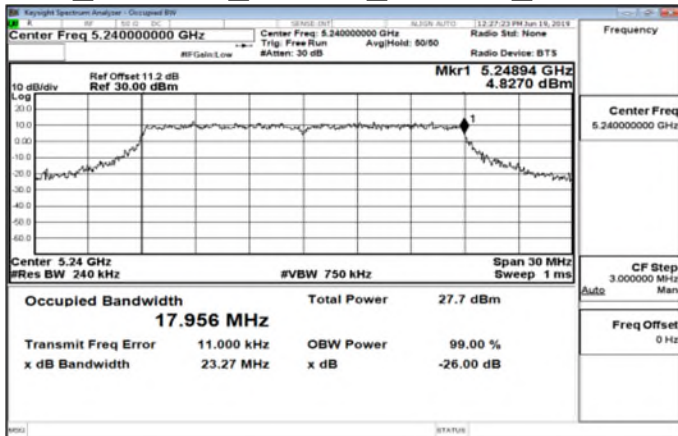
## FCC\_802.11n\_20MHz\_Chain1\_5220MHz



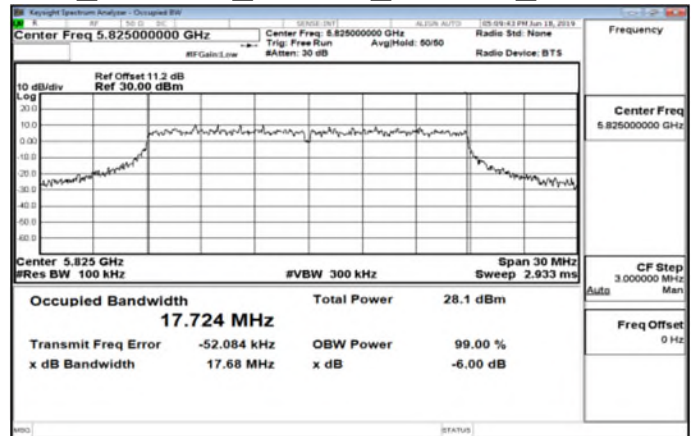
## FCC\_802.11n\_20MHz\_Chain1\_5785MHz



## FCC\_802.11n\_20MHz\_Chain1\_5240MHz



## FCC\_802.11n\_20MHz\_Chain1\_5825MHz

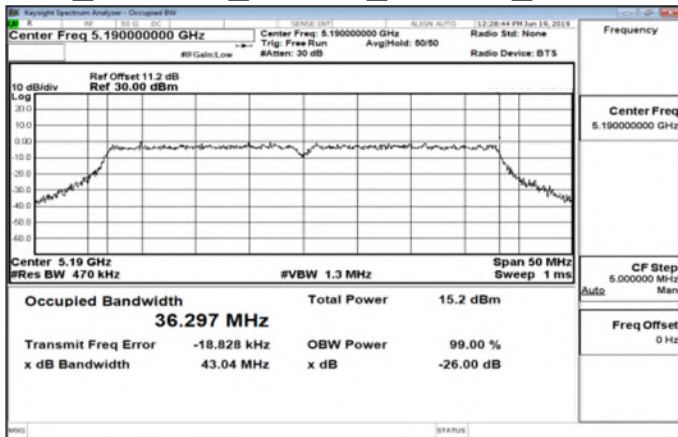


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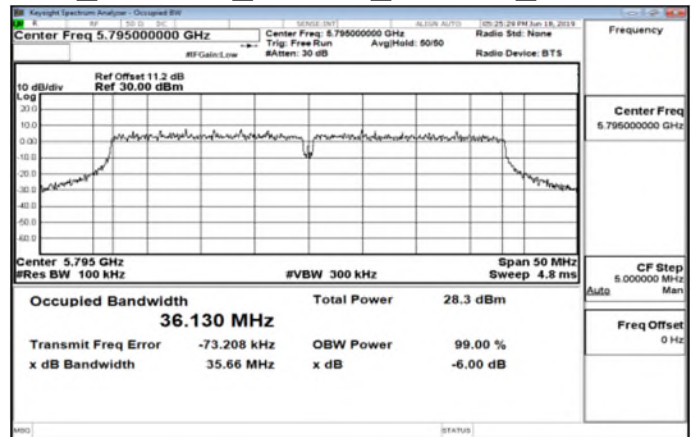
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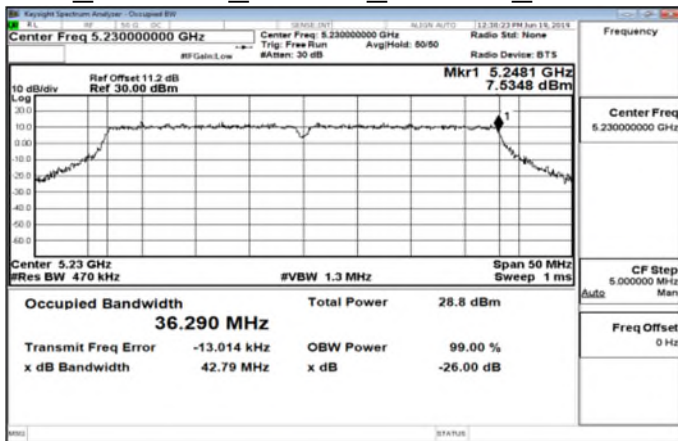
## FCC\_802.11n\_40MHz\_Chain0\_5190MHz



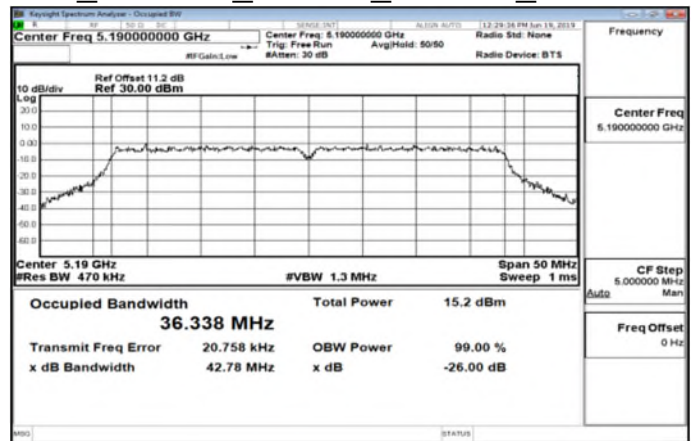
## FCC\_802.11n\_40MHz\_Chain0\_5795MHz



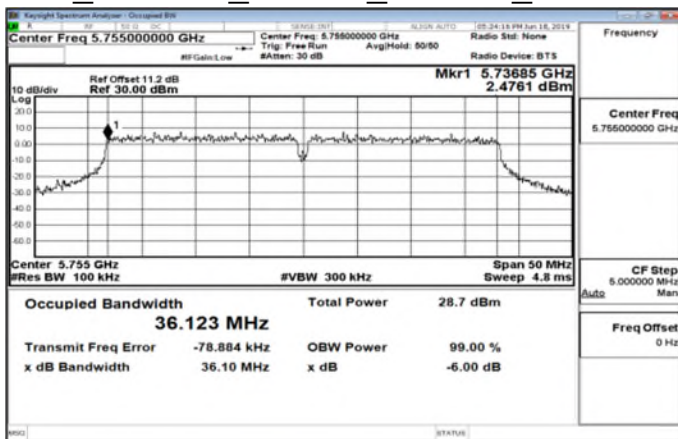
## FCC\_802.11n\_40MHz\_Chain0\_5230MHz



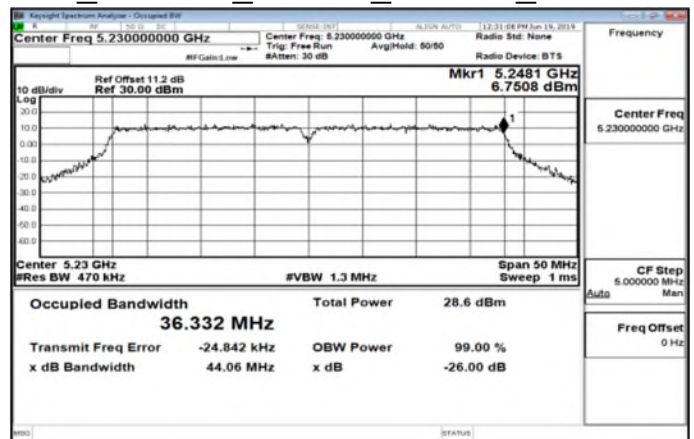
## FCC\_802.11n\_40MHz\_Chain1\_5190MHz



## FCC\_802.11n\_40MHz\_Chain0\_5755MHz



## FCC\_802.11n\_40MHz\_Chain1\_5230MHz

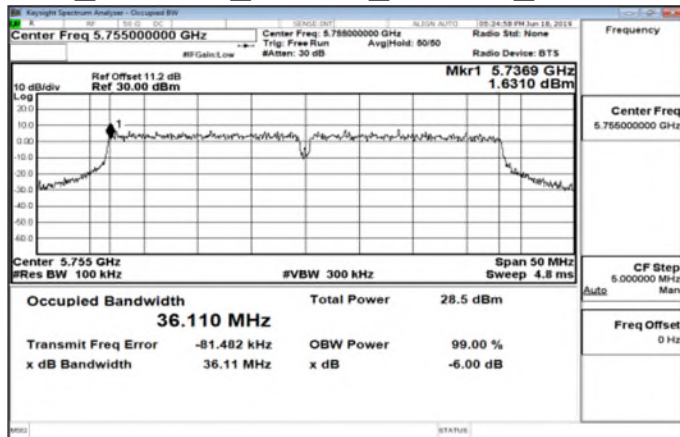


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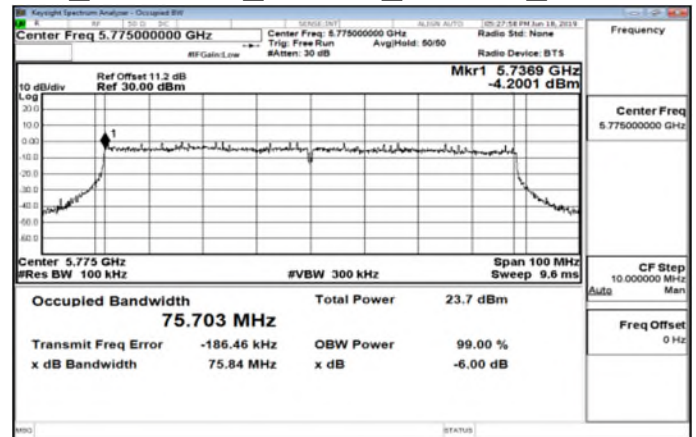
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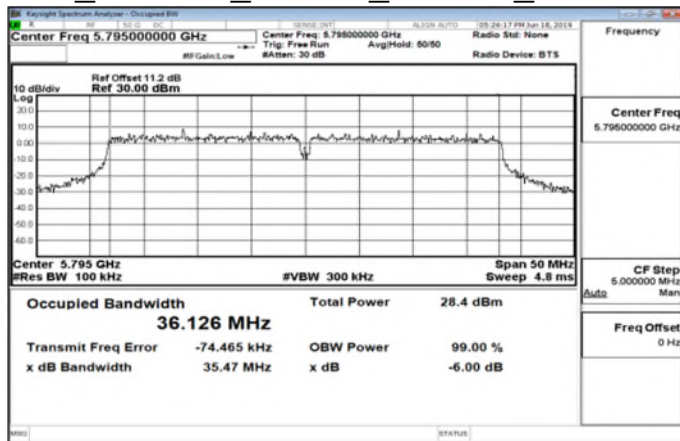
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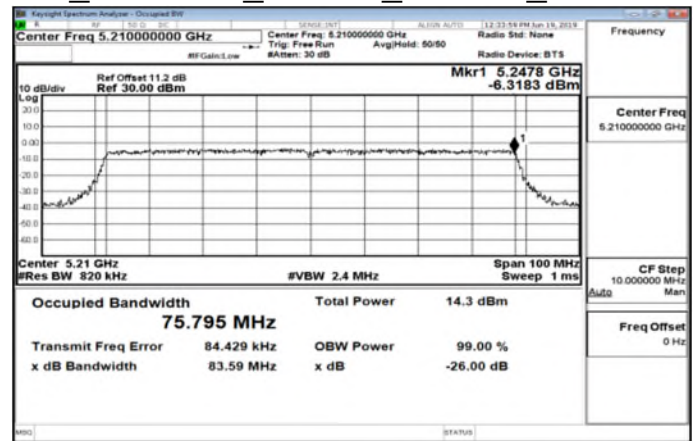
## FCC\_802.11ac\_80MHz\_Chain0\_5775MHz



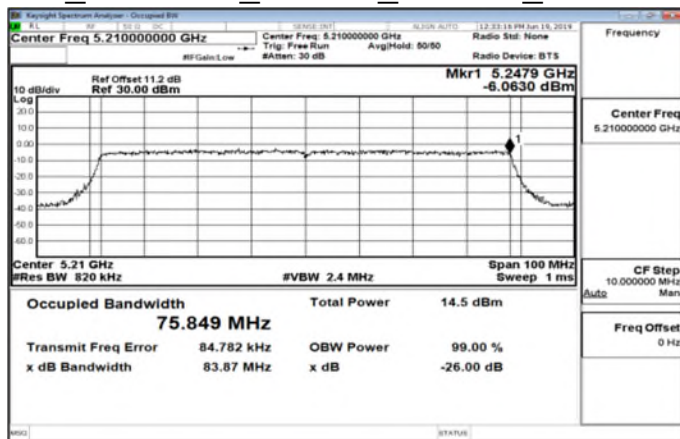
## FCC\_802.11n\_40MHz\_Chain1\_5795MHz



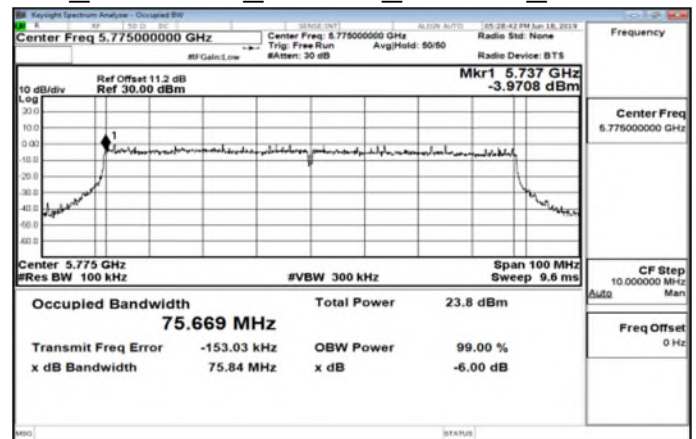
## FCC\_802.11ac\_80MHz\_Chain1\_5210MHz



## FCC\_802.11ac\_80MHz\_Chain0\_5210MHz



## FCC\_802.11ac\_80MHz\_Chain1\_5775MHz



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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 direction-al gain of the antenna exceeds 6 dBi.			

#### Note:

As per FCC KDB 662911 D01

(f)Cyclic Delay Diversity (CDD) [also known as cyclic shift diversity (CSD)]. CDD signals are correlated and create unintended array gain that varies with signal bandwidth, antenna geometry, and cyclic delay values. Consequently, depending on system parameters, it may be appropriate to use different values of array gain for compliance with power limits versus compliance with power spectral density limits.

(i) For power measurements on IEEE 802.11 devices, 1,2

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less, for 20-MHz channel widths with NANT ≥ 5.

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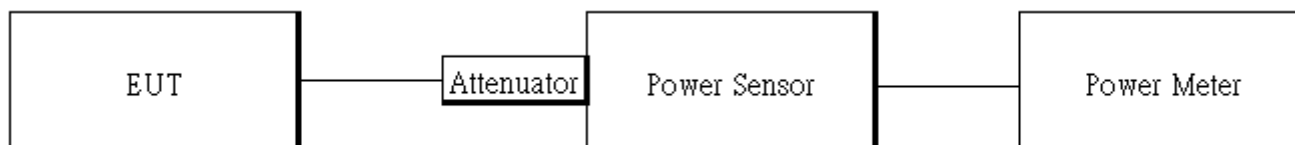
## 9.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
4. Power Meter is used as the auxiliary test equipment to conduct the output power measurement.
5. Record the max. reading and add 10 log(1/duty cycle).
6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.
7. The path loss was compensated to the results of each measurement.
8. Limit: a mode:  $23.80-23=0.8$ ,  $30-0.8=29.2$ , n20, n40, ac80:  $29.2-3.01=26.19$

## 9.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1326001	08/03/2018	08/02/2019
Power Sensor	Anritsu	MA2411B	1315048	08/03/2018	08/02/2019
Power Sensor	Anritsu	MA2411B	1315049	08/03/2018	08/02/2019
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

## 9.4 Test Set-up



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## 9.5 Measurement Result

### 802.11a\_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	17.28	53.514	29.2	PASS
44	5220	6	23.97	249.728	29.2	PASS
48	5240	6	<b>23.98</b>	250.304	29.2	PASS
149	5745	6	23.72	235.759	30	PASS
157	5785	6	<b>23.99</b>	250.881	30	PASS
165	5825	6	23.86	243.483	30	PASS

### 802.11n\_HT20\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
36	5180	MCS8	15.96	17.15	19.72	93.725	26.18970004	PASS
44	5220	MCS8	21.57	22.68	25.28	337.543	26.18970004	PASS
48	5240	MCS8	21.54	22.8	<b>25.34</b>	341.858	26.18970004	PASS
149	5745	MCS8	22.29	22.96	25.76	376.776	30	PASS
157	5785	MCS8	23.27	24.02	<b>26.78</b>	476.881	30	PASS
165	5825	MCS8	22.99	24.13	26.72	469.919	30	PASS

### 802.11n\_HT40\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
38	5190	MCS8	9.65	11.04	13.61	22.977	26.18970004	PASS
46	5230	MCS8	21.35	22.45	<b>25.15</b>	327.135	26.18970004	PASS
151	5755	MCS8	22.02	22.51	25.48	353.545	30	PASS
159	5795	MCS8	23.45	24.09	<b>26.99</b>	500.532	30	PASS

### 802.11ac\_VHT80\_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
42	5210	MCS0	8.61	9.88	<b>13.13</b>	20.557	26.18970004	PASS
155	5775	MCS0	12.85	12.4	<b>16.47</b>	44.353	30	PASS

Off set: 11.2dB

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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	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

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

#### Note:

As per FCC KDB 662911 D01

(f)Cyclic Delay Diversity (CDD) [also known as cyclic shift diversity (CSD)]. CDD signals are correlated and create unintended array gain that varies with signal bandwidth, antenna geometry, and cyclic delay values. Consequently, depending on system parameters, it may be appropriate to use different values of array gain for compliance with power limits versus compliance with power spectral density limits.

(i) If all antennas have the same gain, GANT, Directional gain = GANT + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,  

$$\text{Array Gain} = 10 \log(\text{NANT}/\text{NSS}) \text{ dB.}$$

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

	Effective Legacy Gain (dBi)	PSD Limit	
UNII-1	26.81	-3.81	dBm/MHz
U-NII-3	28.14	7.86	dBm/500 kHz

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## 10.2 Measurement Procedure

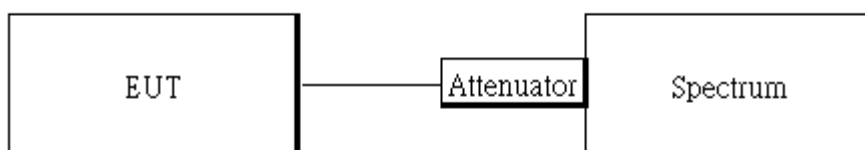
1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. **For U-NII1, U-NII-2A, U-NII-2C Band:**  
Set 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. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.
8. 802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.
9. Limit: a mode: 23.80-23=0.8, 17-0.8=16.2, n20, n40, ac80: 16.2-3.01=13.19

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

## 10.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
DC Block	PASTER-NACK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
TEMPERATURE	TEMPERATURE	HTC-1	EC-HY-01	04/18/2019	04/17/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

## 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)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180.00	5.14	0.13	5.27	16.20	-10.93
5220.00	11.84	0.13	11.97	16.20	-4.23
5240.00	11.69	0.13	11.82	16.20	-4.38
5745.00	8.63	0.13	8.76	30.00	-21.24
5785.00	9.06	0.13	9.19	30.00	-20.81
5825.00	8.70	0.13	8.83	30.00	-21.17
POWER DENSITY 802.11n HT20 MODE					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	6.82	0.11	6.93	13.1897	-6.26
5220	12.49	0.11	12.60	13.1897	-0.59
5240	12.65	0.11	12.76	13.1897	-0.43
5745	11.40	0.11	11.51	30	-18.49
5785	11.02	0.11	11.13	30	-18.87
5825	10.82	0.11	10.93	30	-19.07
POWER DENSITY 802.11n HT40 MODE					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5190	-2.94	0.20	-2.74	13.1897	-15.93
5230	9.42	0.20	9.62	13.1897	-3.57
5755	7.19	0.20	7.39	30	-22.61
5795	8.22	0.20	8.42	30	-21.58
POWER DENSITY 802.11ac VHT80 MODE					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5210	-7.00	0.64	-6.36	13.1897	-19.55
5775	-4.92	0.64	-4.28	30	-34.28

### Note:

Cable Loss=

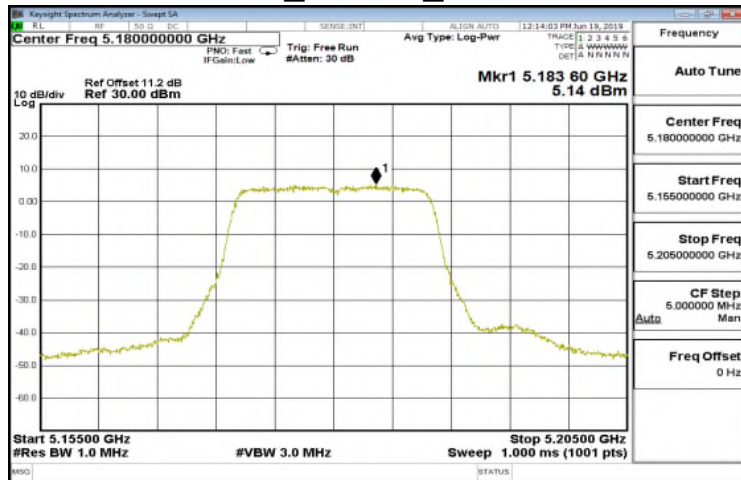
11.2 dB

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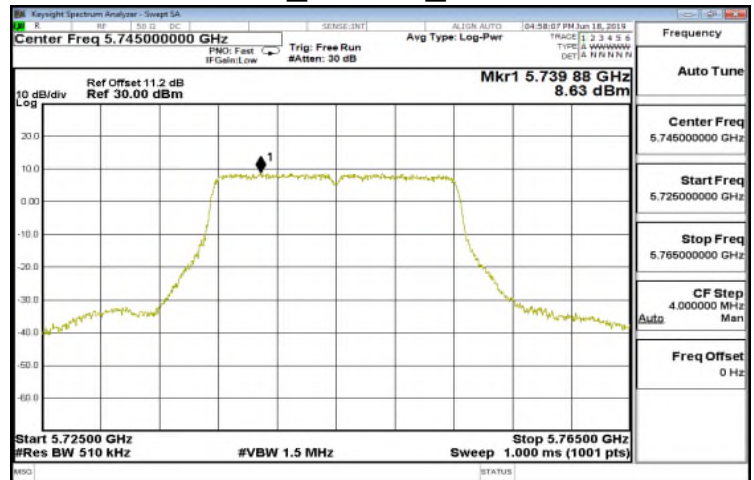
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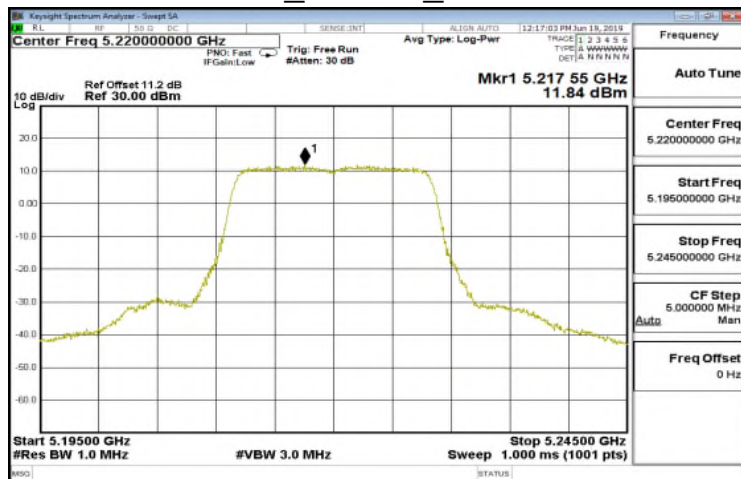
## 802.11a\_20MHz\_5180MHz



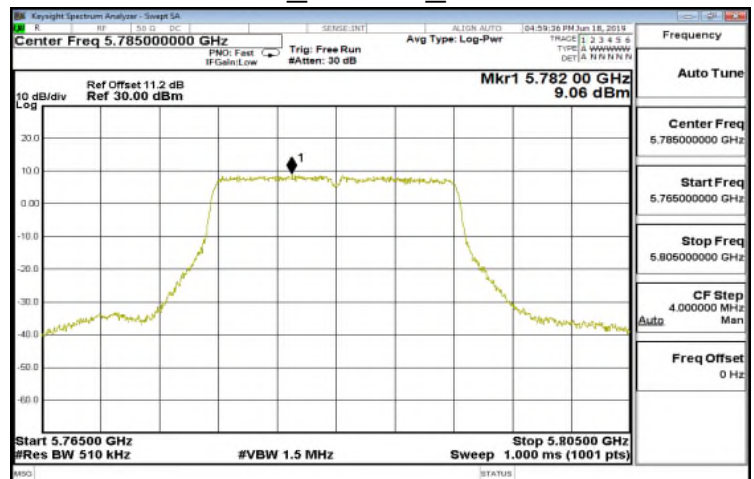
## 802.11a\_20MHz\_5745MHz



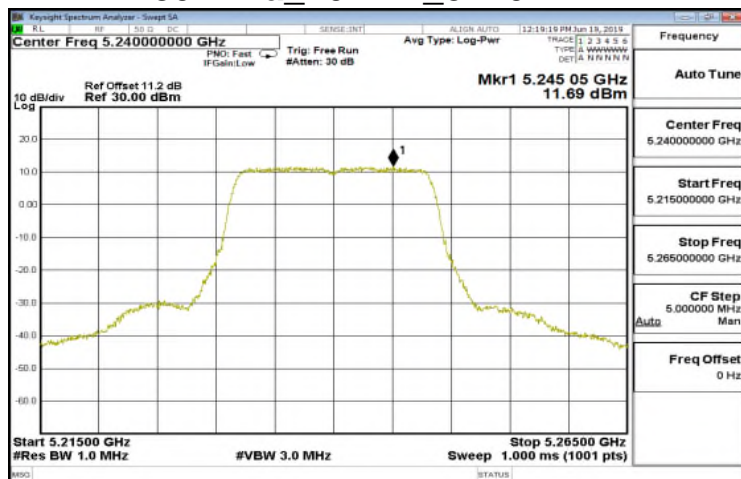
## 802.11a\_20MHz\_5220MHz



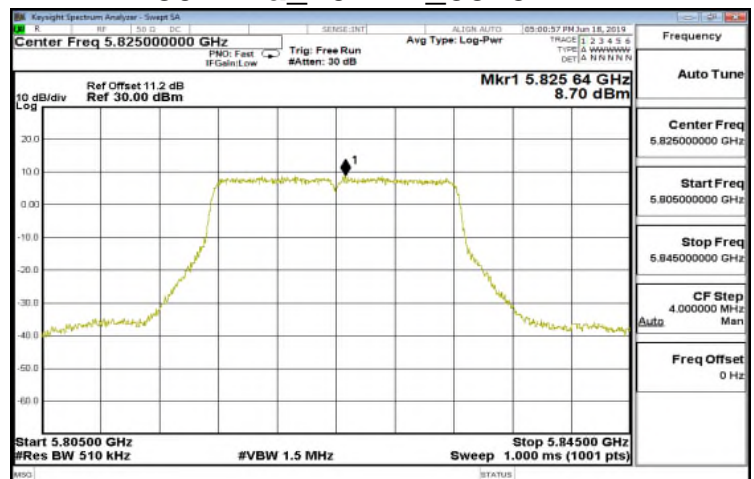
## 802.11a\_20MHz\_5785MHz



## 802.11a\_20MHz\_5240MHz



## 802.11a\_20MHz\_5825MHz

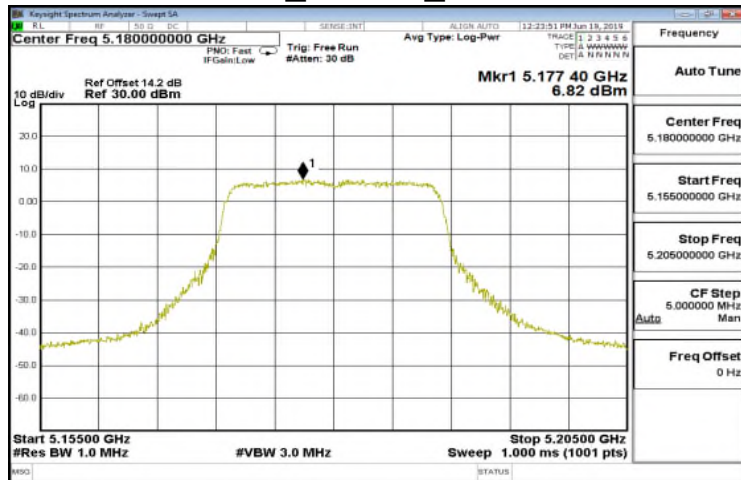


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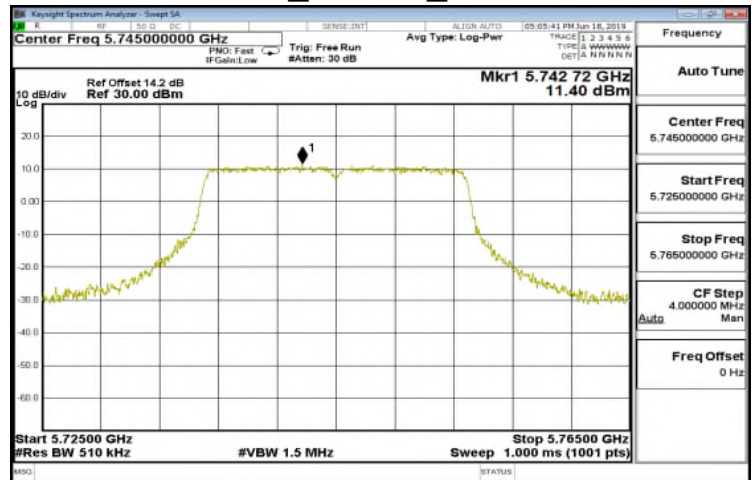
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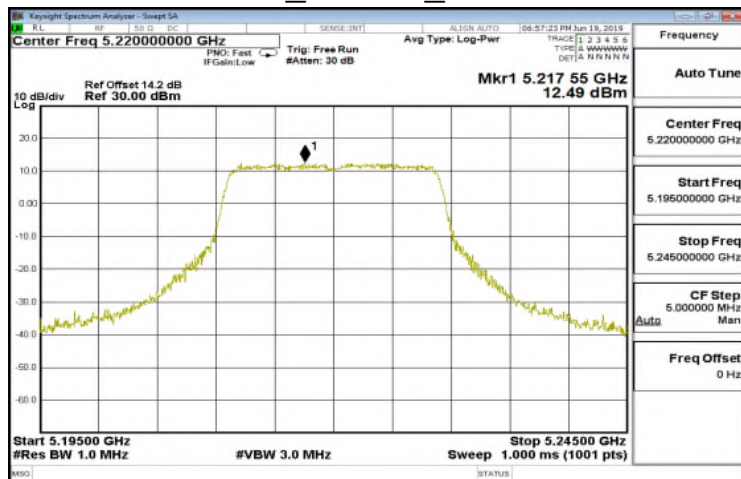
## 802.11n\_20MHz\_5180MHz



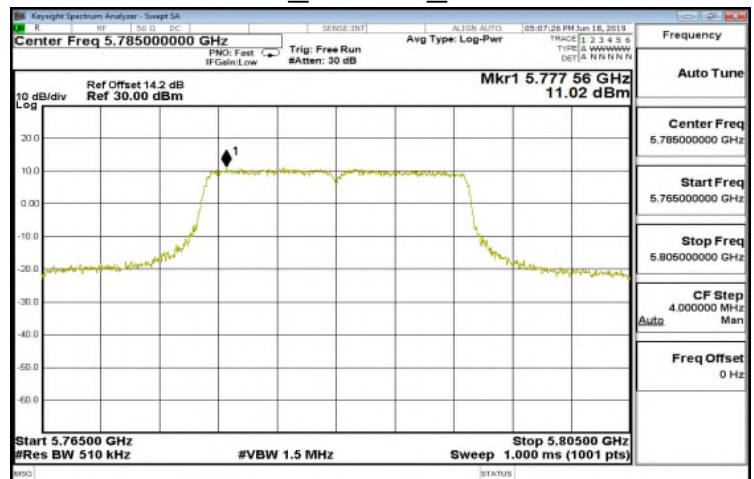
## 802.11n\_20MHz\_5745MHz



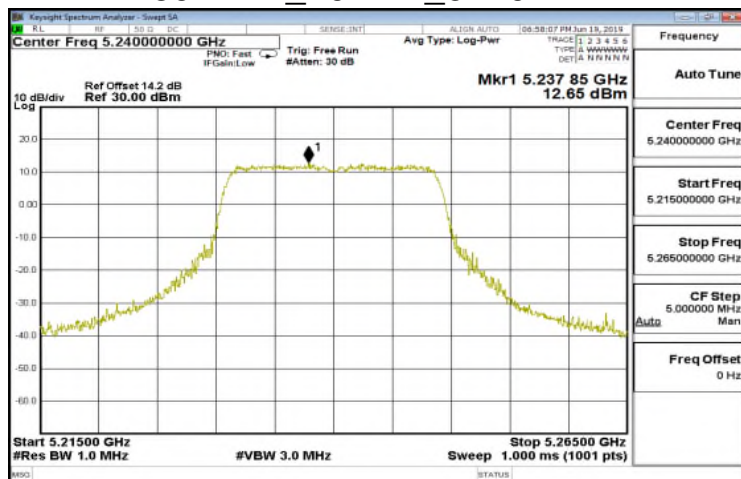
## 802.11n\_20MHz\_5220MHz



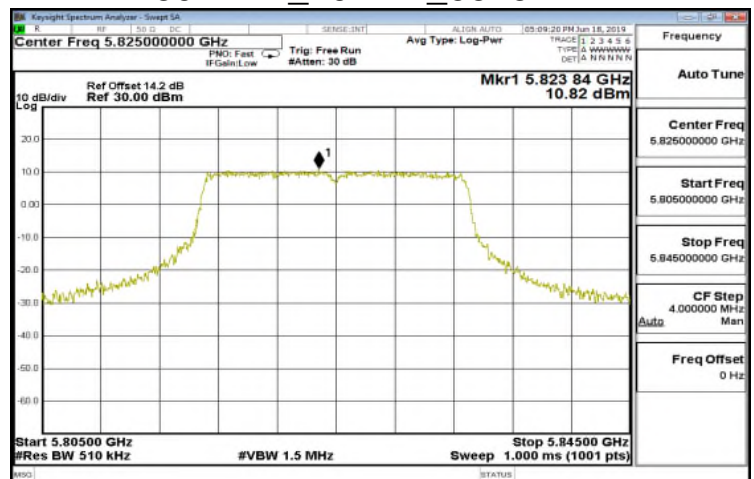
## 802.11n\_20MHz\_5785MHz



## 802.11n\_20MHz\_5240MHz



## 802.11n\_20MHz\_5825MHz

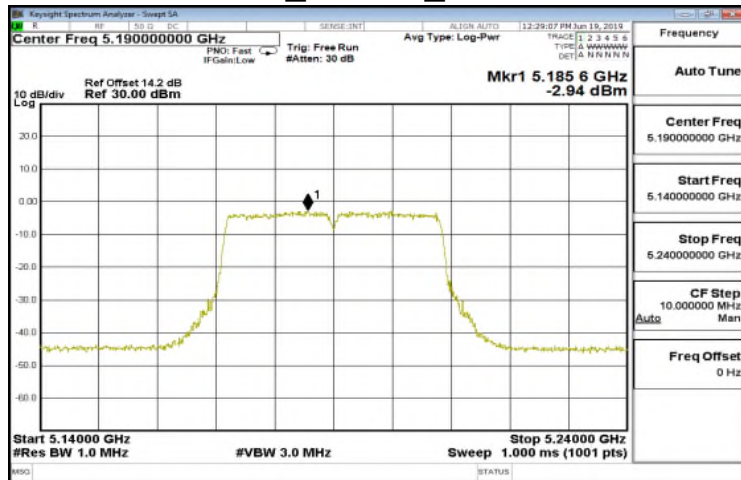


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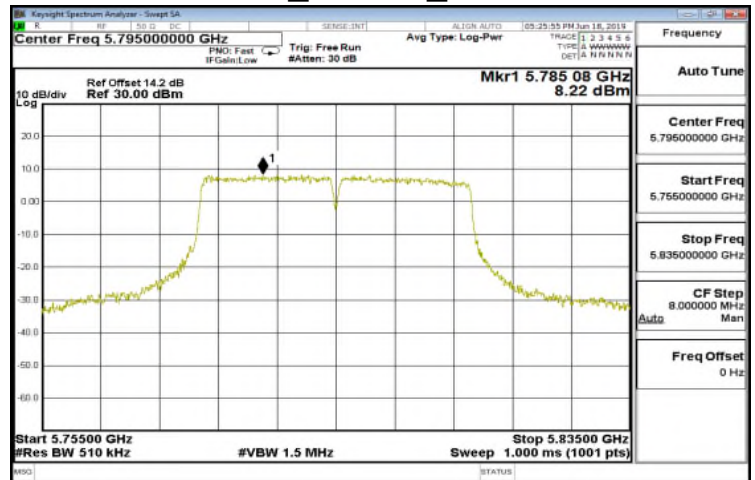
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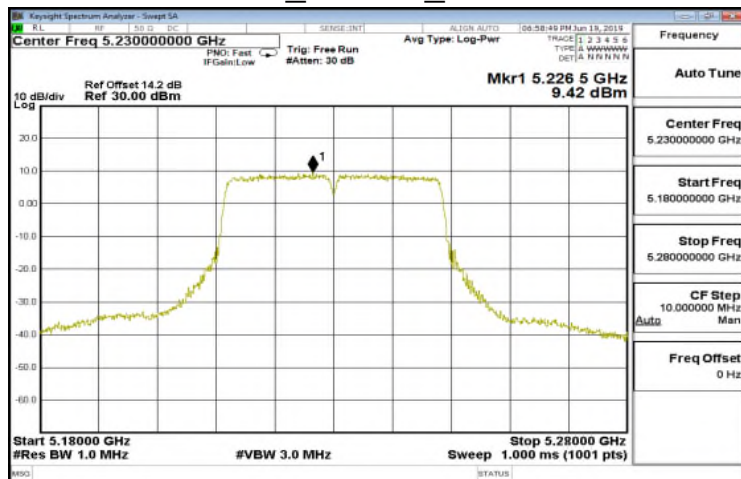
### 802.11n\_40MHz\_5190MHz



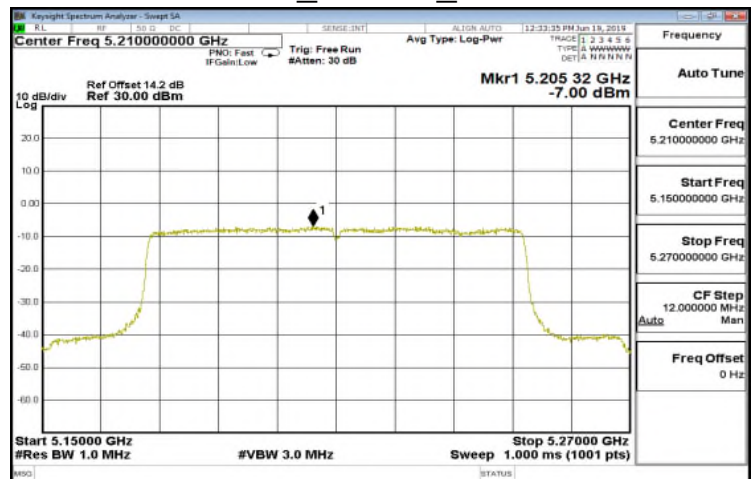
### 802.11n\_40MHz\_5795MHz



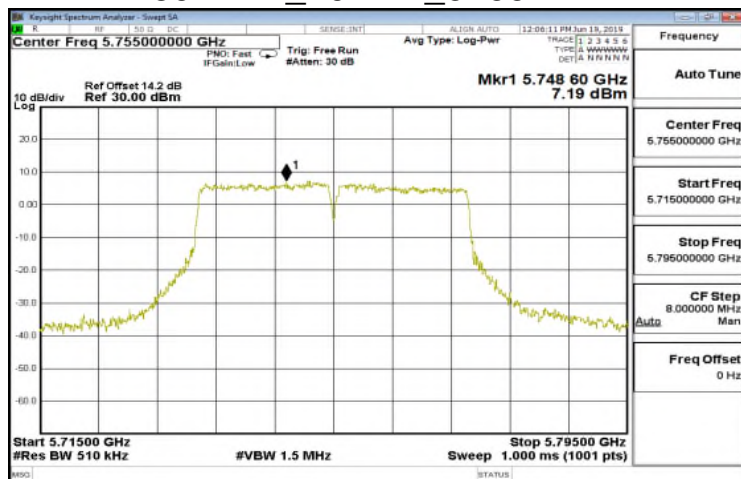
### 802.11n\_40MHz\_5230MHz



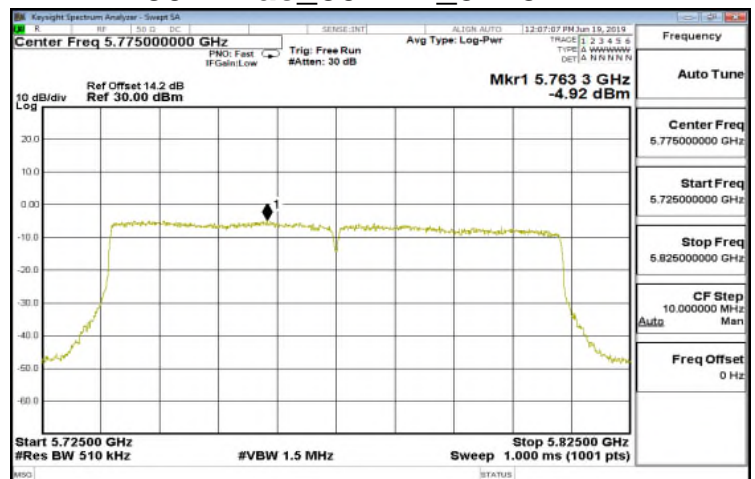
### 802.11ac\_80MHz\_5210MHz



### 802.11n\_40MHz\_5755MHz



### 802.11ac\_80MHz\_5775MHz



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## 11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

### 11.1 Standard Applicable

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

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

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

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

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

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

**Note:**

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

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## 11.2 Measurement Equipment Used

966A Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Horn Antenna	ETS LINDGREN	3116	00026370	12/26/2018	12/25/2019
Bilog Antenna	Sunol Sciences	JB3	A030105	07/13/2018	07/12/2019
Cable	HUBER SU-HNER	SUCOFLEX 104PEA	25157	06/29/2018	06/28/2019
Cable	HUBER SU-HNER	SUCOFLEX 104PEA	20995	06/29/2018	06/28/2019
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	08/20/2018	08/19/2019
High Pass Filters	MICRO TRONICS	HPM13195	003	05/14/2018	05/13/2019
Horn Antenna	ETS LINDGREN	3116	00026370	12/26/2018	12/25/2019
Loop Ant	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	06/29/2018	06/28/2019
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	06/21/2018	06/20/2019
Pre-Amplifier	HP	8449B	3008A00965	06/29/2018	06/28/2019
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Software	e3 V6.11-20180413				

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

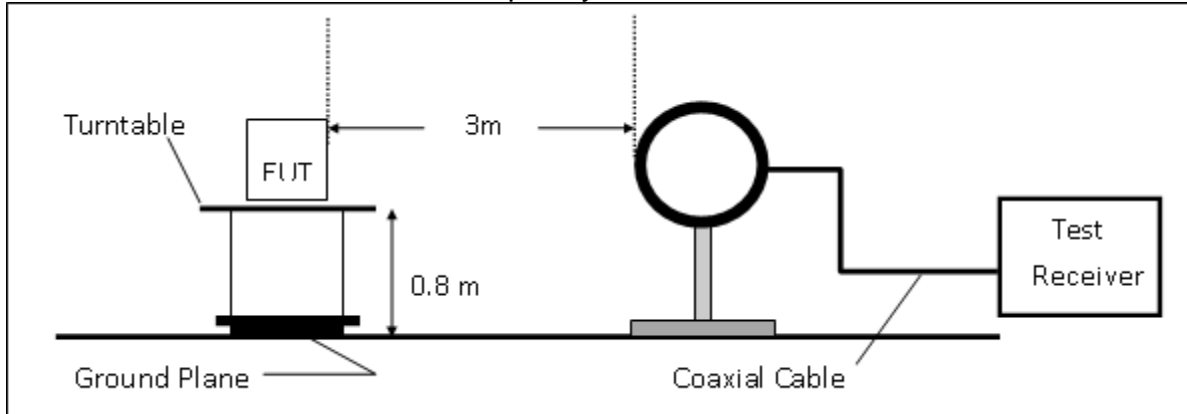
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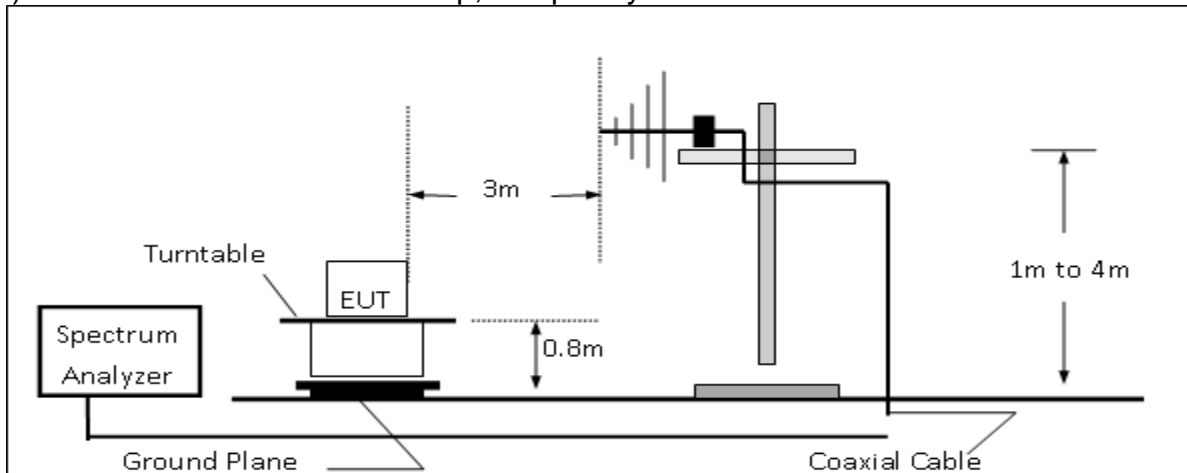
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## 11.3 Test SET-UP

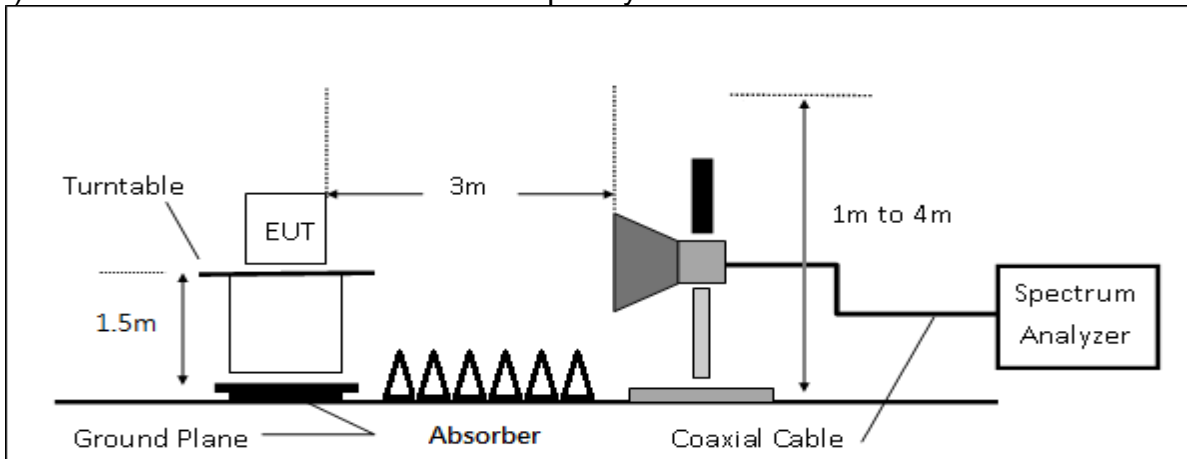
### (A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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## 11.4 Measurement Procedure

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

## 11.5 Field Strength Calculation

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

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

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

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

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

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

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

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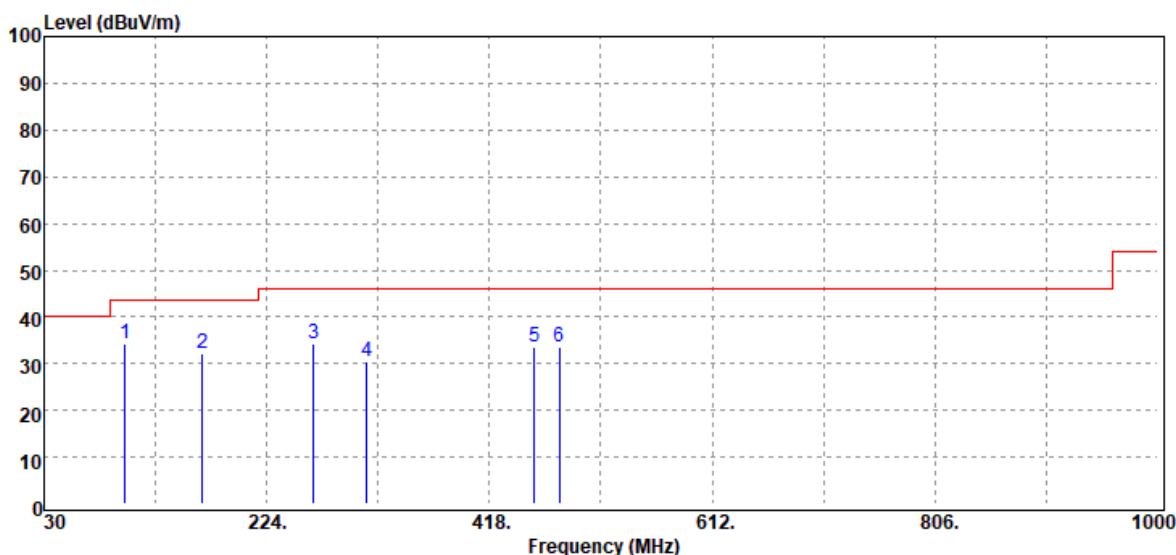
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## 11.7 Measurement Result

### Radiated Spurious Emission Measurement Result

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

Project Number	:T190516W01	Test Date	:2019-05-23
Operation Band	:802.11a/Band1	Temp./Humi.	:21/55
Frequency	:5220 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Tx CH Mid	Engineer	:Jerry
EUT Pol.	:E2 Plan		



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
100.81	Peak	46.54	-12.44	34.10	43.50	-9.40
167.74	Peak	42.76	-10.56	32.20	43.50	-11.30
264.74	Peak	43.23	-8.95	34.28	46.00	-11.72
311.30	Peak	38.39	-7.86	30.53	46.00	-15.47
456.80	Peak	37.45	-3.76	33.69	46.00	-12.31
479.11	Peak	36.68	-2.98	33.70	46.00	-12.30

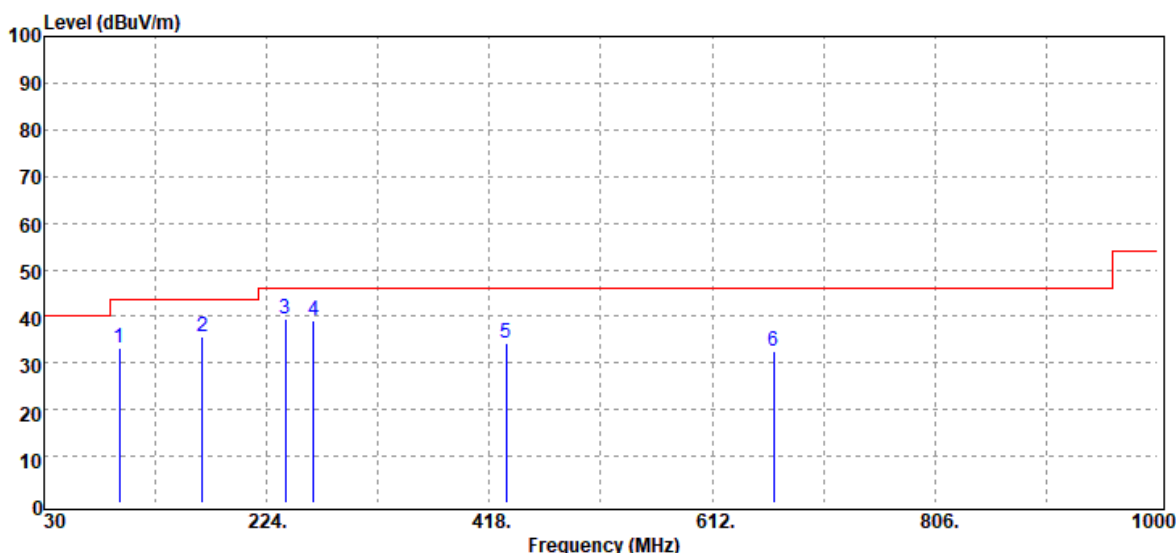
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5220 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
95.96	Peak	47.29	-13.95	33.34	43.50	-10.16
167.74	Peak	46.06	-10.56	35.50	43.50	-8.00
240.49	Peak	49.69	-10.25	39.44	46.00	-6.56
264.74	Peak	48.00	-8.95	39.05	46.00	-6.95
432.55	Peak	38.58	-4.32	34.26	46.00	-11.74
665.35	Peak	32.75	-0.09	32.66	46.00	-13.34

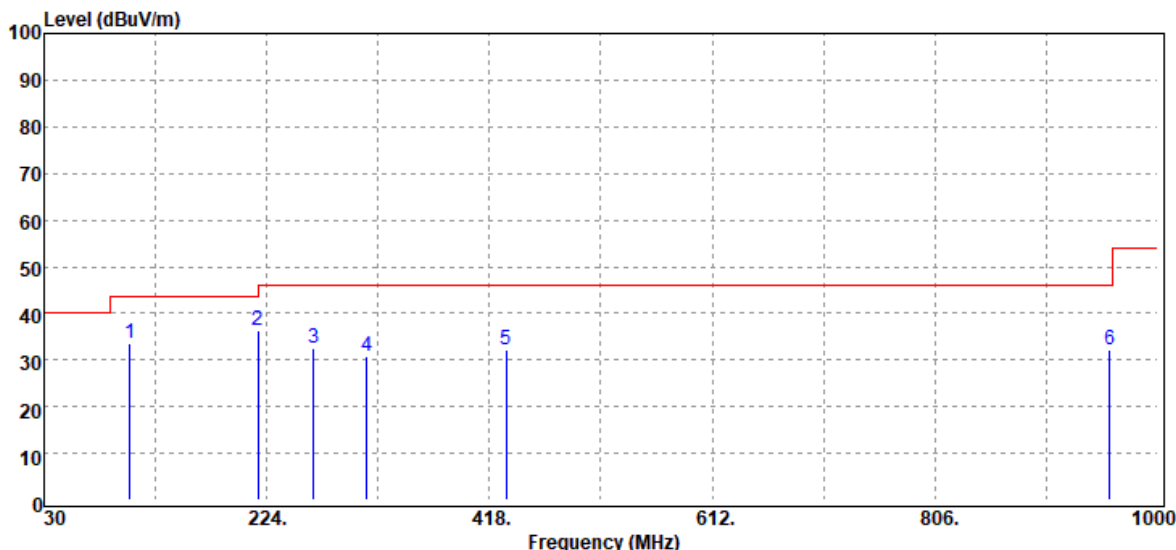
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5785 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
104.69	Peak	44.66	-11.18	33.48	43.50	-10.02
216.24	Peak	47.94	-11.45	36.49	46.00	-9.51
264.74	Peak	41.51	-8.95	32.56	46.00	-13.44
311.30	Peak	38.80	-7.86	30.94	46.00	-15.06
432.55	Peak	36.50	-4.32	32.18	46.00	-13.82
958.29	Peak	27.60	4.42	32.02	46.00	-13.98

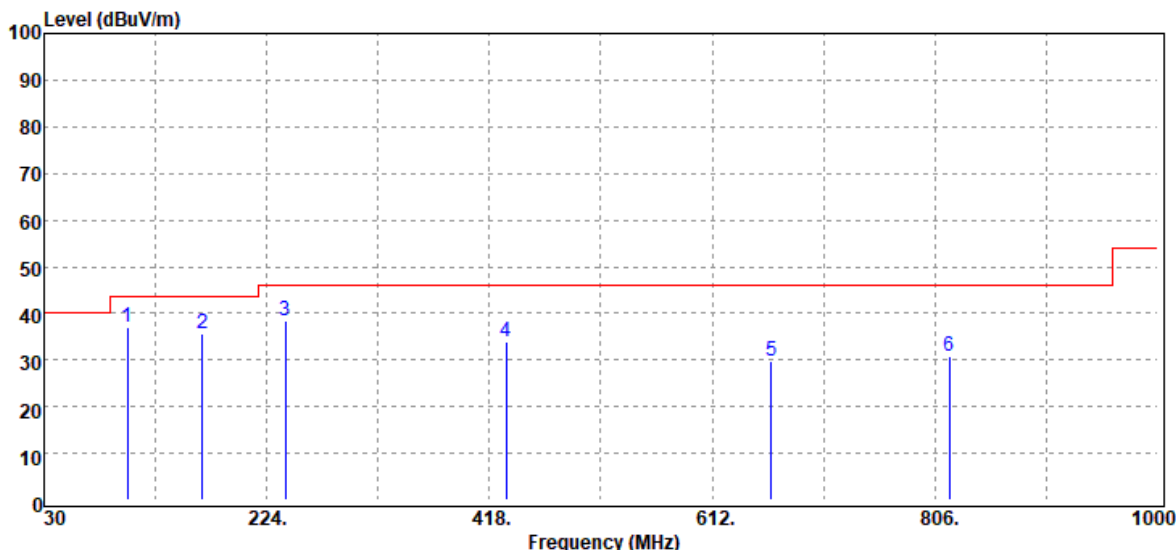
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5785 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
102.75	Peak	49.06	-11.87	37.19	43.50	-6.31
167.74	Peak	46.22	-10.56	35.66	43.50	-7.84
240.49	Peak	48.51	-10.25	38.26	46.00	-7.74
432.55	Peak	38.12	-4.32	33.80	46.00	-12.20
663.41	Peak	29.56	0.05	29.61	46.00	-16.39
818.61	Peak	27.91	2.92	30.83	46.00	-15.17

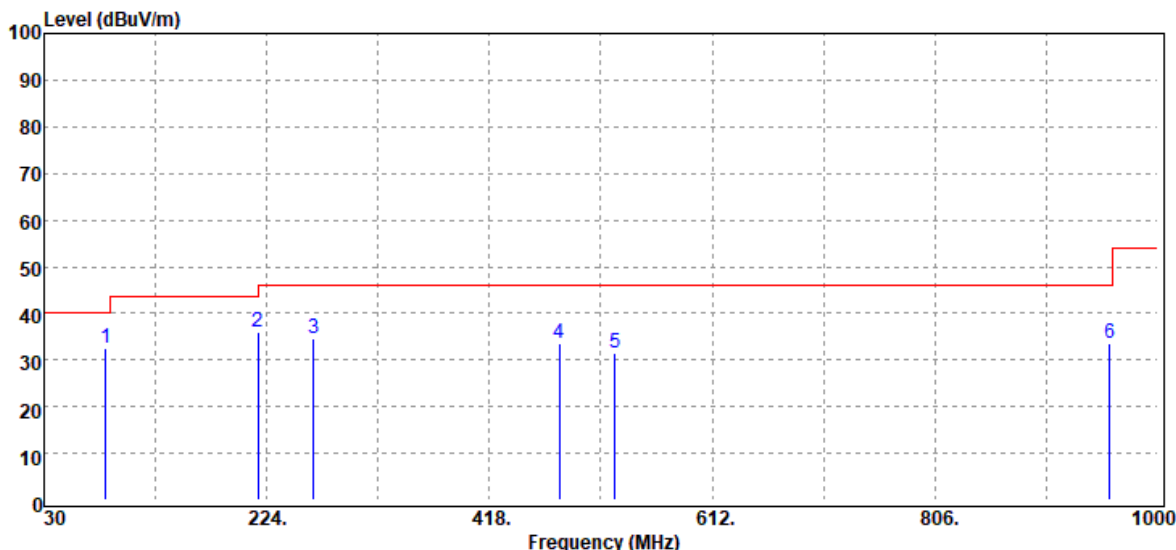
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
83.35	Peak	47.98	-15.52	32.46	40.00	-7.54
216.24	Peak	47.57	-11.45	36.12	46.00	-9.88
264.74	Peak	43.57	-8.95	34.62	46.00	-11.38
479.11	Peak	36.38	-2.98	33.40	46.00	-12.60
527.61	Peak	33.71	-2.38	31.33	46.00	-14.67
958.29	Peak	29.18	4.42	33.60	46.00	-12.40

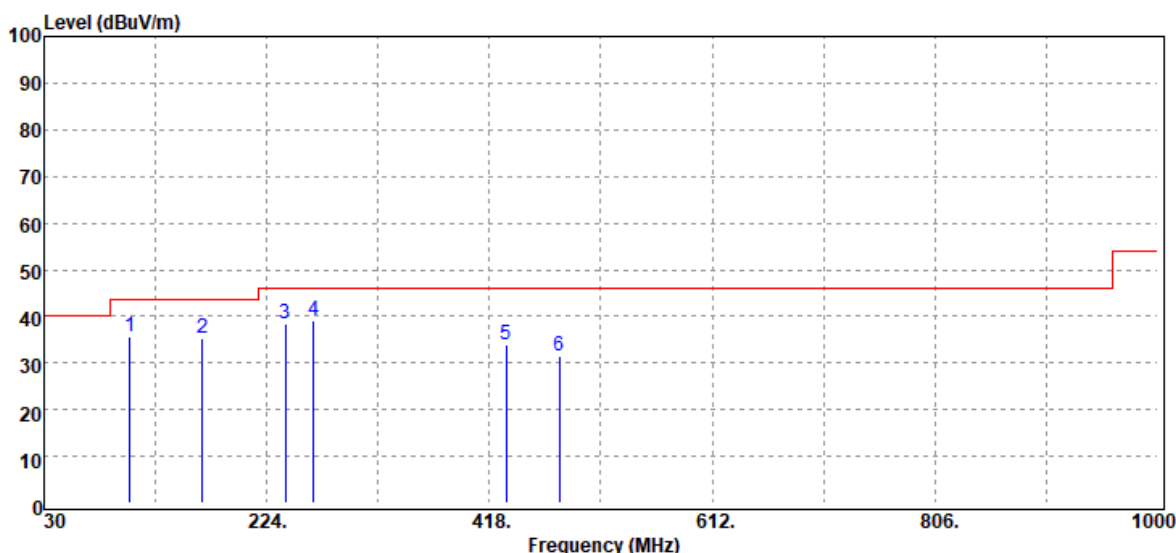
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
104.69	Peak	46.79	-11.18	35.61	43.50	-7.89
167.74	Peak	45.77	-10.56	35.21	43.50	-8.29
240.49	Peak	48.64	-10.25	38.39	46.00	-7.61
264.74	Peak	48.11	-8.95	39.16	46.00	-6.84
432.55	Peak	38.26	-4.32	33.94	46.00	-12.06
479.11	Peak	34.57	-2.98	31.59	46.00	-14.41

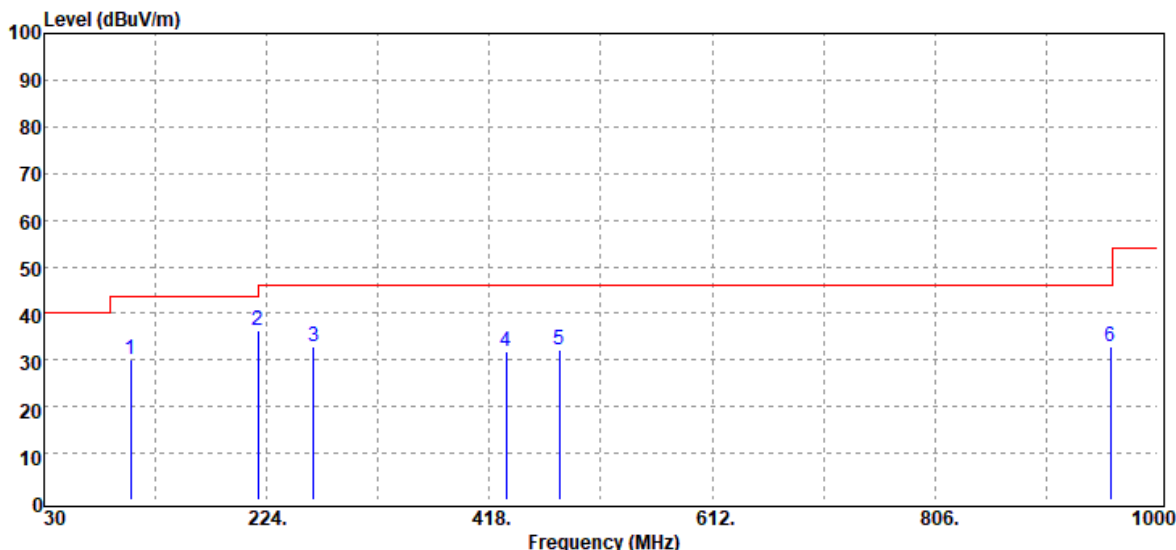
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
105.66	Peak	41.12	-11.02	30.10	43.50	-13.40
216.24	Peak	47.80	-11.45	36.35	46.00	-9.65
264.74	Peak	41.71	-8.95	32.76	46.00	-13.24
432.55	Peak	36.14	-4.32	31.82	46.00	-14.18
479.11	Peak	35.12	-2.98	32.14	46.00	-13.86
959.26	Peak	28.53	4.48	33.01	46.00	-12.99

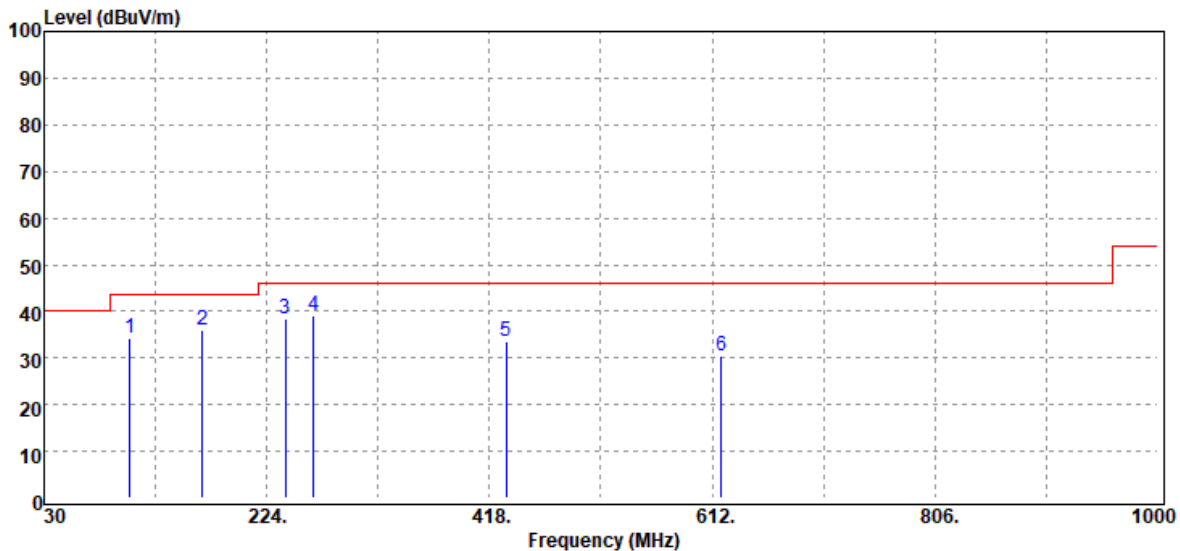
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
104.69	Peak	45.40	-11.18	34.22	43.50	-9.28
167.74	Peak	46.43	-10.56	35.87	43.50	-7.63
240.49	Peak	48.55	-10.25	38.30	46.00	-7.70
264.74	Peak	48.12	-8.95	39.17	46.00	-6.83
432.55	Peak	37.85	-4.32	33.53	46.00	-12.47
619.76	Peak	31.26	-0.75	30.51	46.00	-15.49

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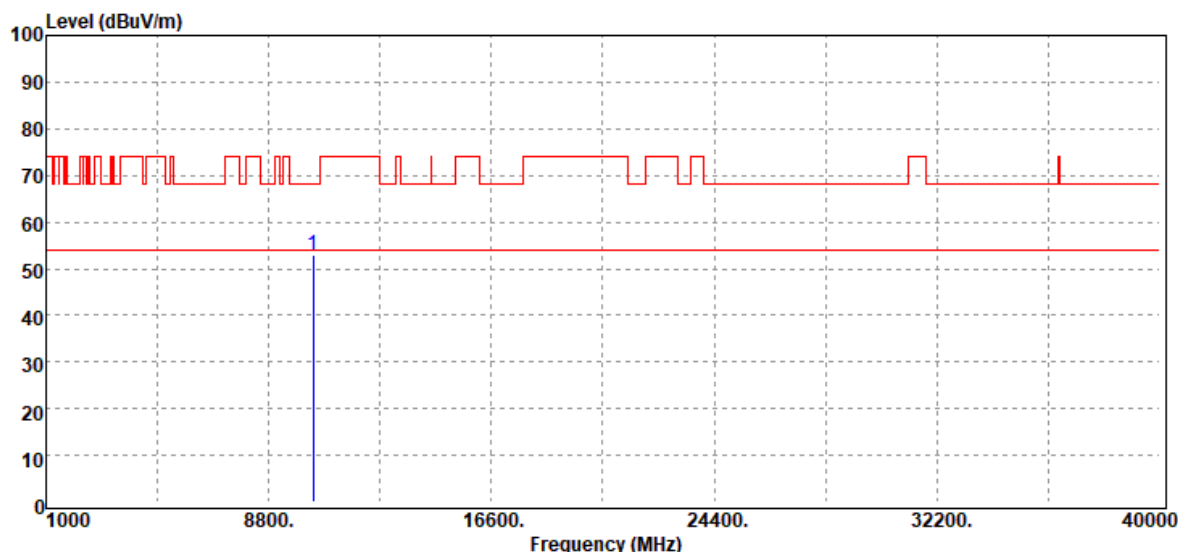
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### Above 1GHz Data:

Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5180 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
10360.00	Peak	38.35	14.73	53.08	68.20	-15.12

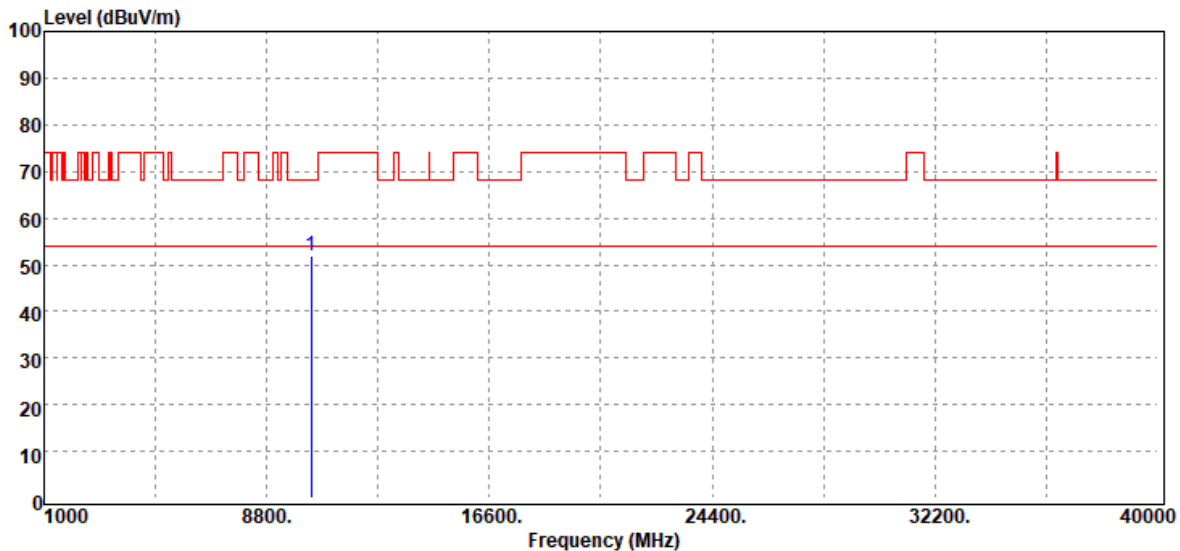
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5180 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10360.00	Peak	37.23	14.73	51.96	68.20	-16.24

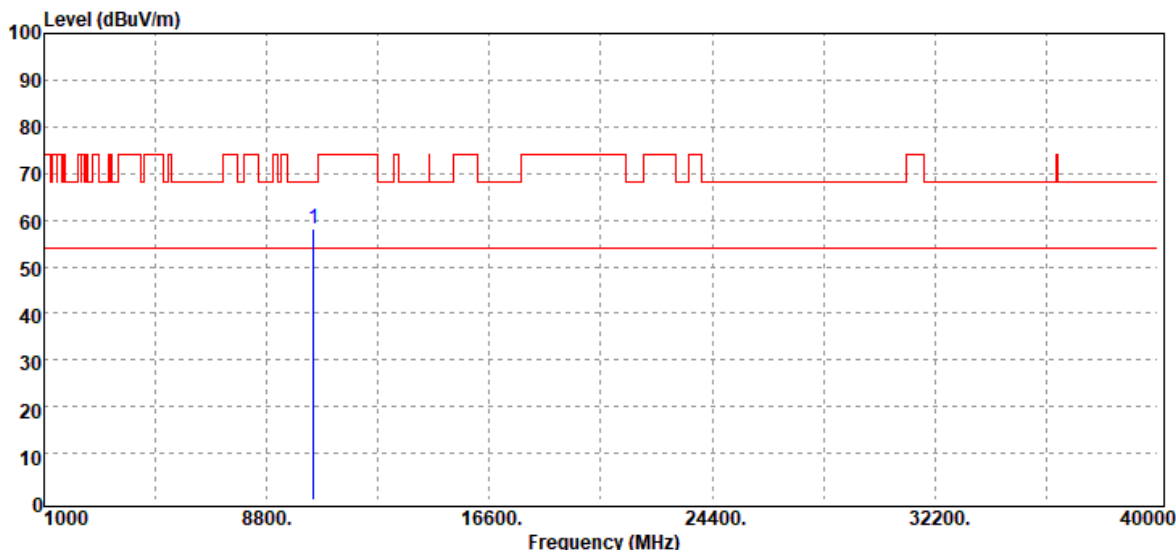
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5220 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10440.00	Peak	42.31	15.66	57.97	68.20	-10.23

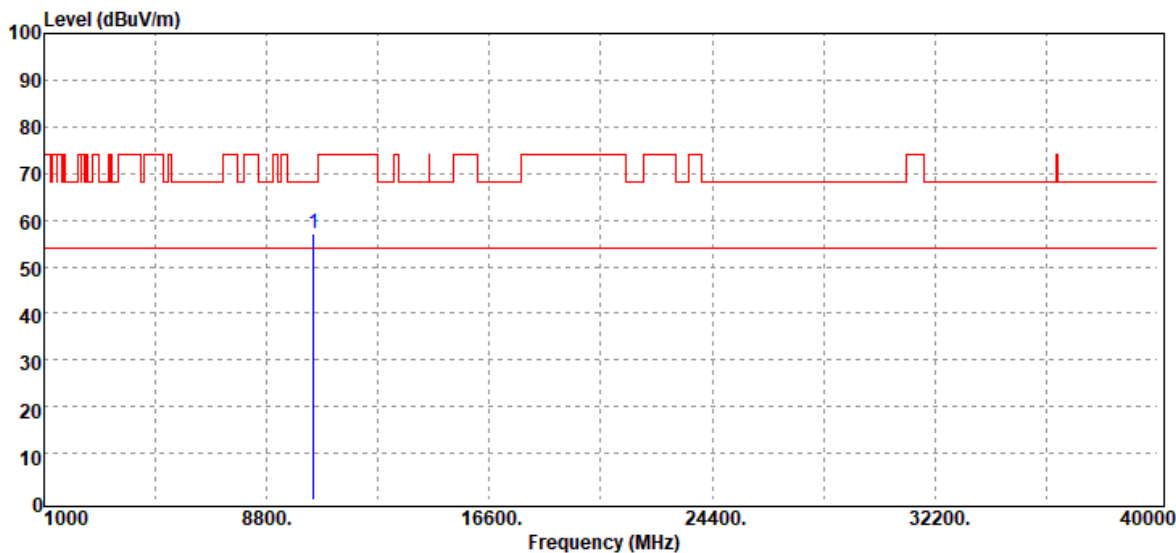
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5220 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10440.00	Peak	41.36	15.66	57.02	68.20	-11.18

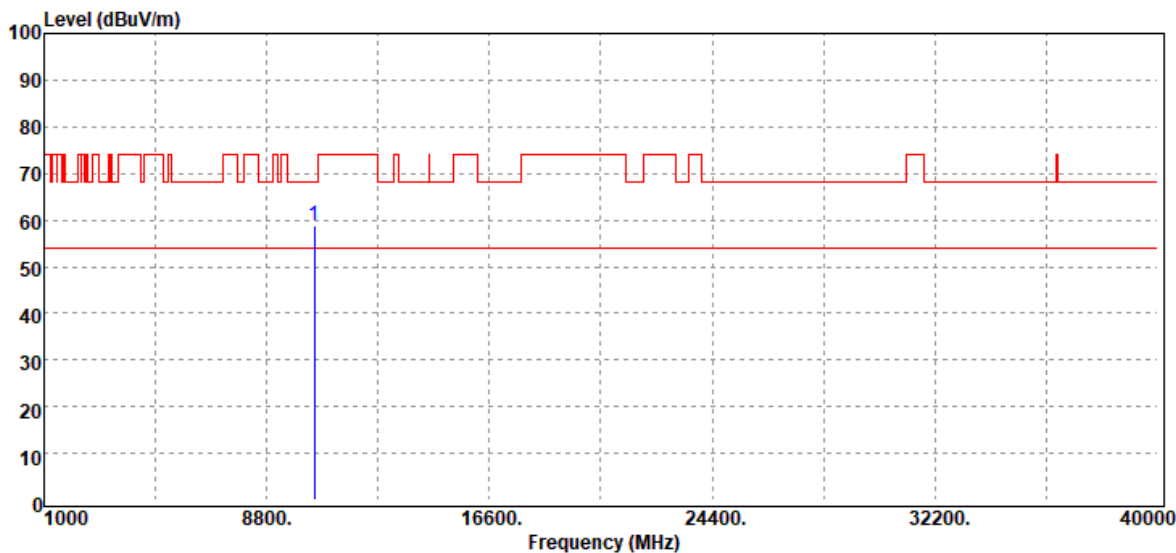
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5240 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10480.00	Peak	42.19	16.48	58.67	68.20	-9.53

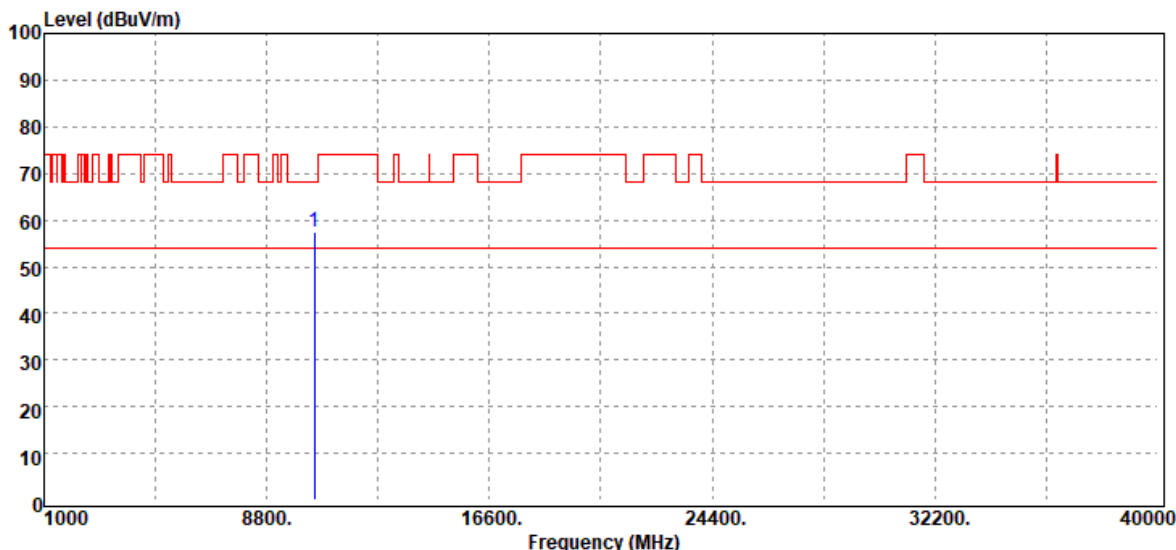
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5240 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBμV		dBμV/m	dBμV/m	
10480.00	Peak	41.05	16.48	57.53	68.20	-10.67

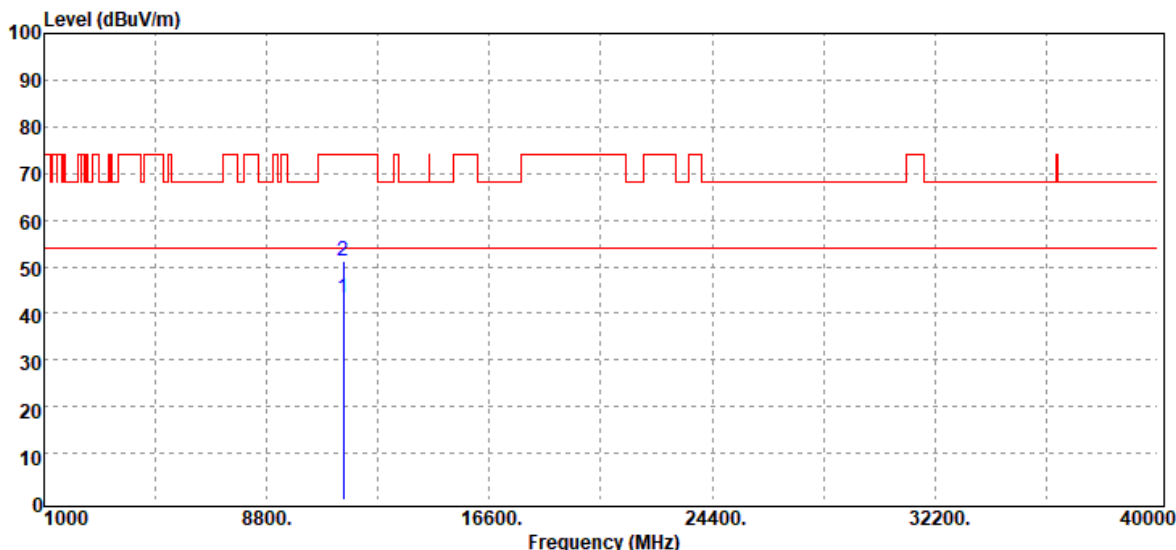
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5745 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11490.00	Average	27.32	15.95	43.27	54.00	-10.73
11490.00	Peak	35.23	15.95	51.18	74.00	-22.82

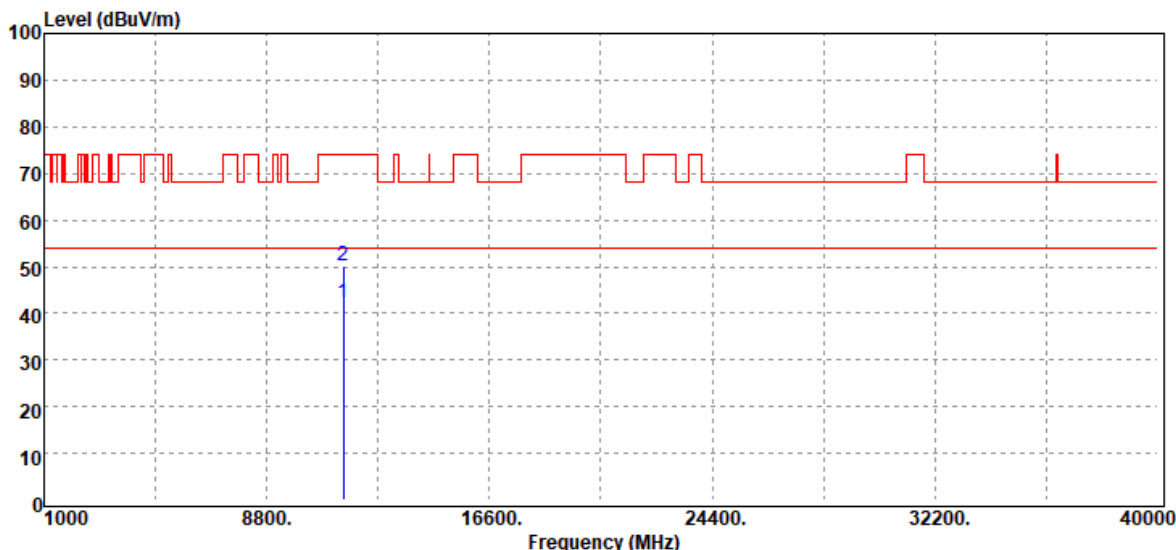
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5745 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11490.00	Average	26.11	15.95	42.06	54.00	-11.94
11490.00	Peak	34.22	15.95	50.17	74.00	-23.83

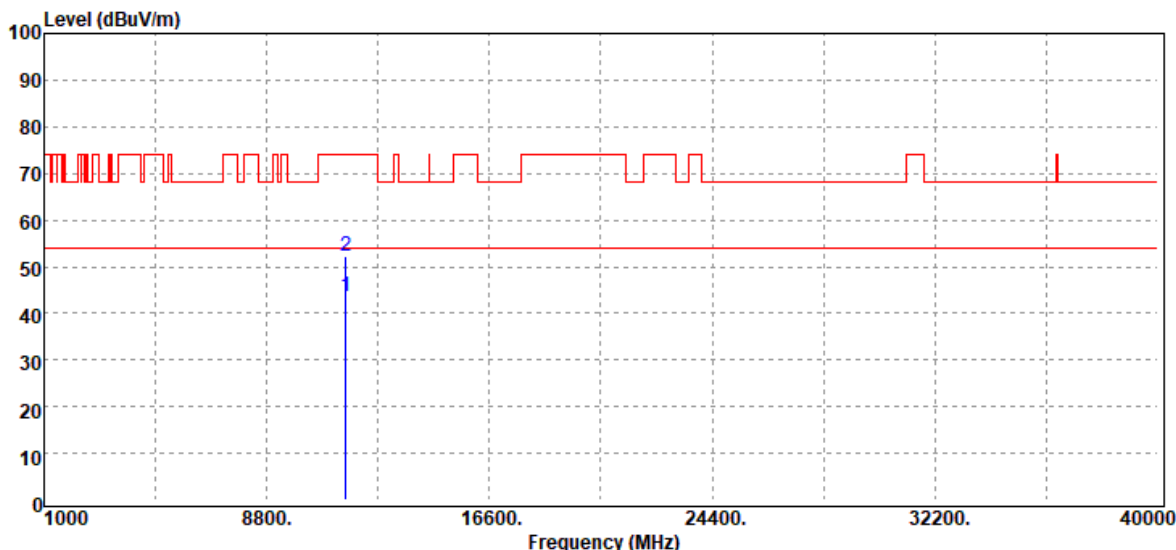
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5785 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11570.00	Average	27.21	16.41	43.62	54.00	-10.38
11570.00	Peak	35.67	16.41	52.08	74.00	-21.92

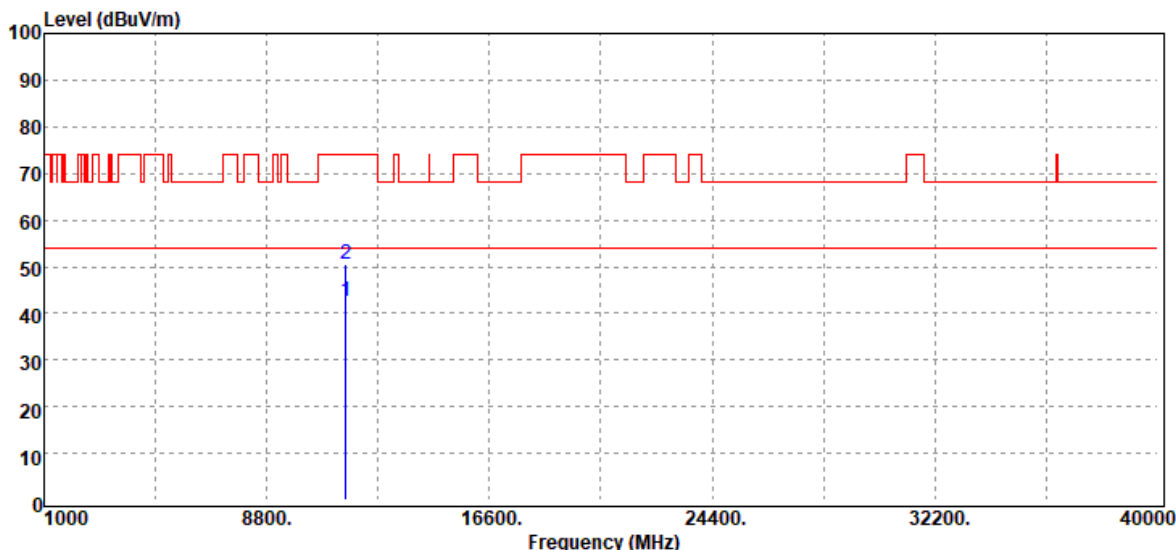
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5785 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11570.00	Average	26.09	16.41	42.50	54.00	-11.50
11570.00	Peak	34.12	16.41	50.53	74.00	-23.47

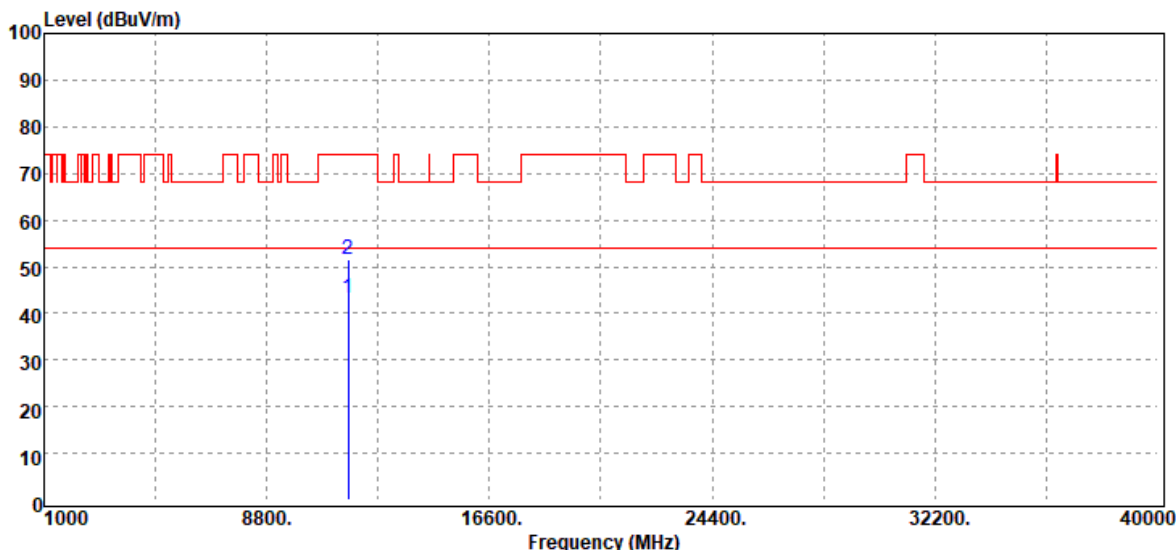
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5825 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11650.00	Average	27.05	16.21	43.26	54.00	-10.74
11650.00	Peak	35.29	16.21	51.50	74.00	-22.50

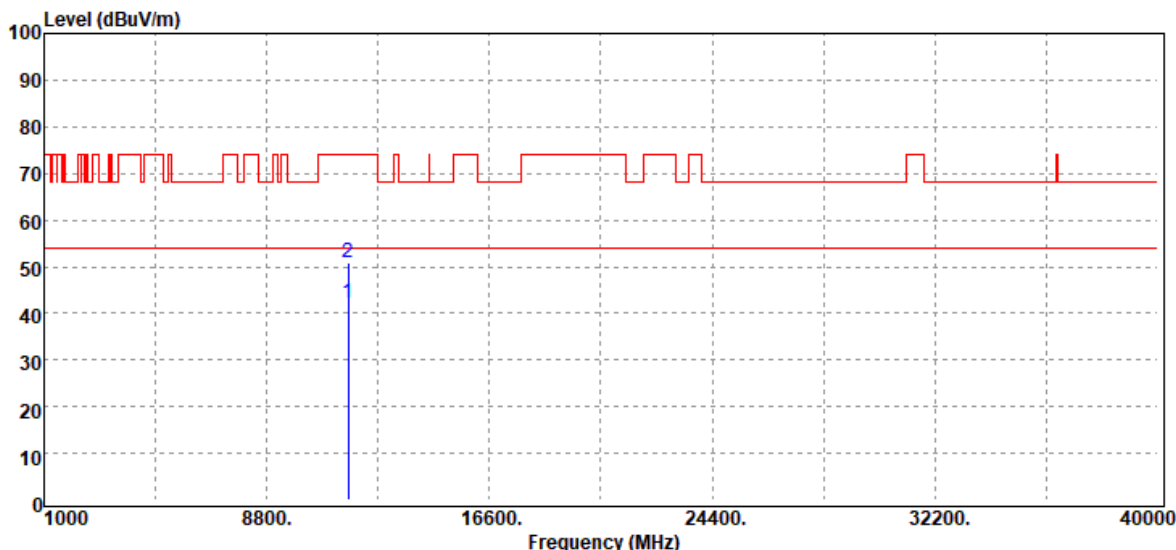
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5825 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11650.00	Average	26.09	16.21	42.30	54.00	-11.70
11650.00	Peak	34.58	16.21	50.79	74.00	-23.21

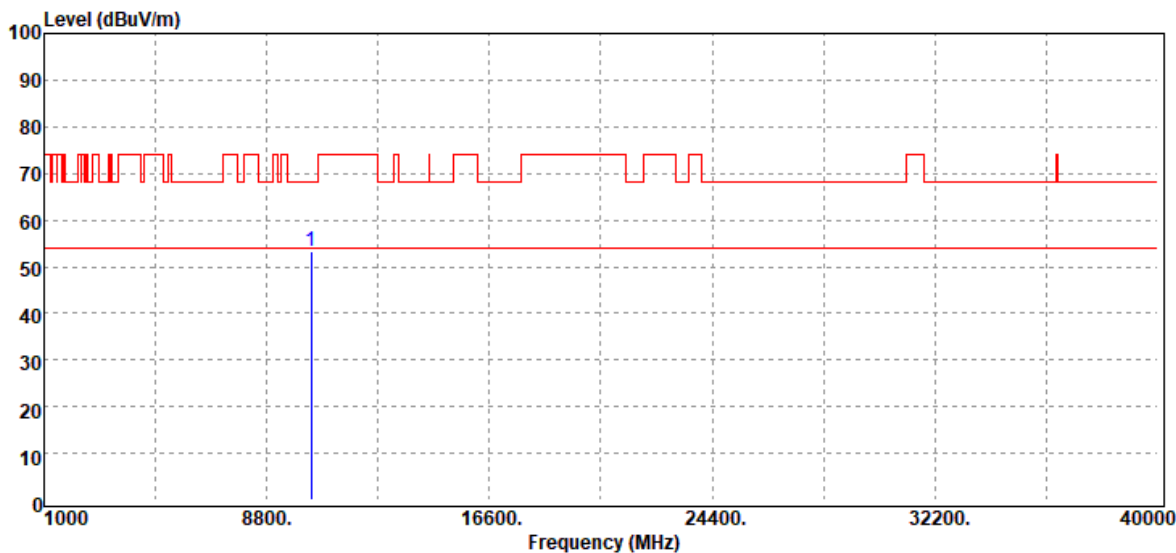
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5180 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10360.00	Peak	38.50	14.73	53.23	68.20	-14.97

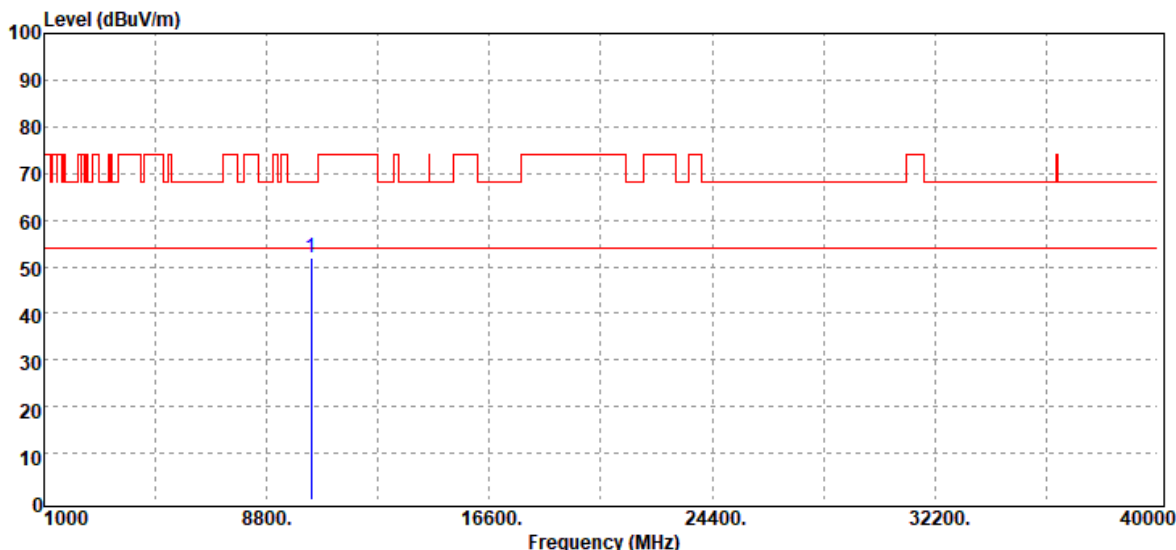
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5180 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10360.00	Peak	37.29	14.73	52.02	68.20	-16.18

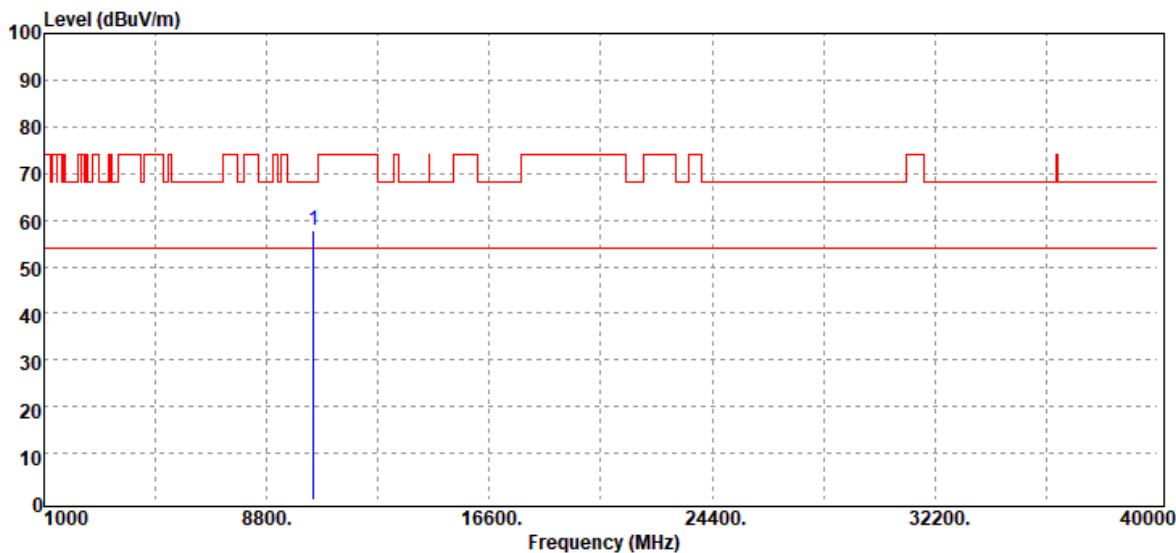
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5220 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10440.00	Peak	42.09	15.66	57.75	68.20	-10.45

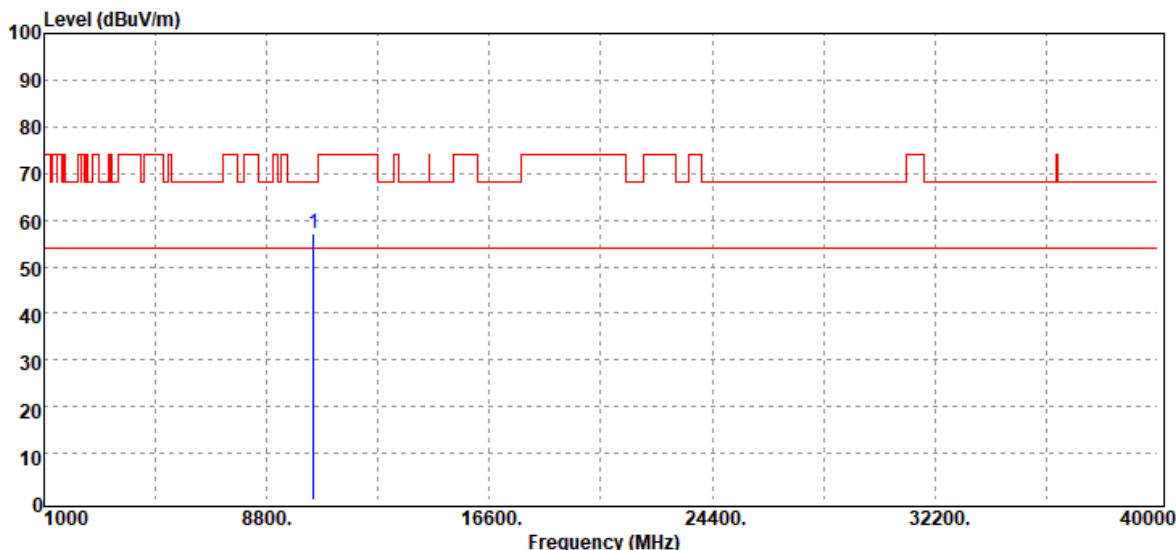
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5220 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10440.00	Peak	41.35	15.66	57.01	68.20	-11.19

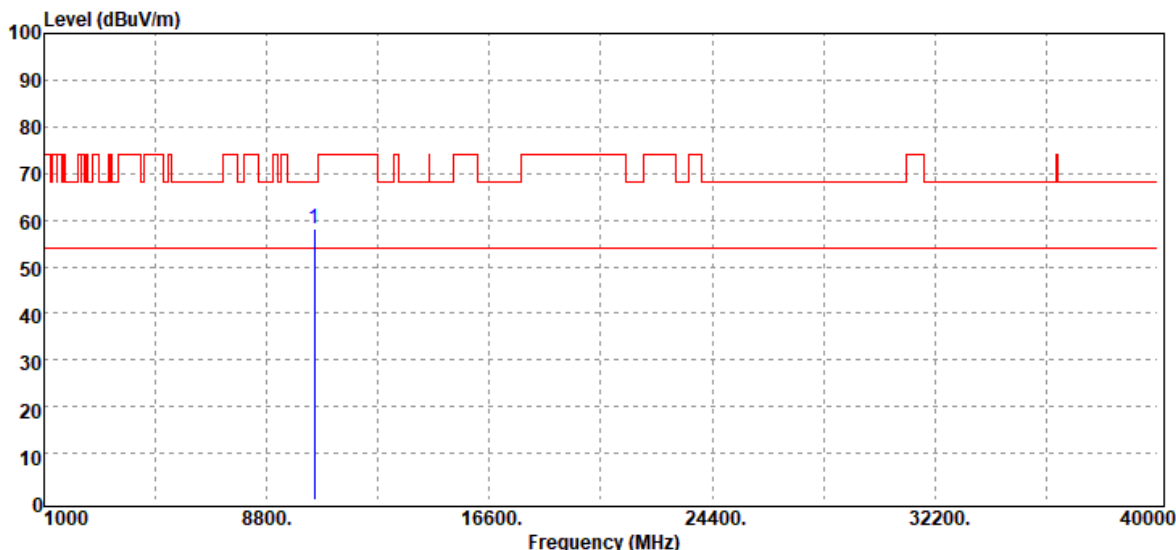
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5240 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10480.00	Peak	41.65	16.48	58.13	68.20	-10.07

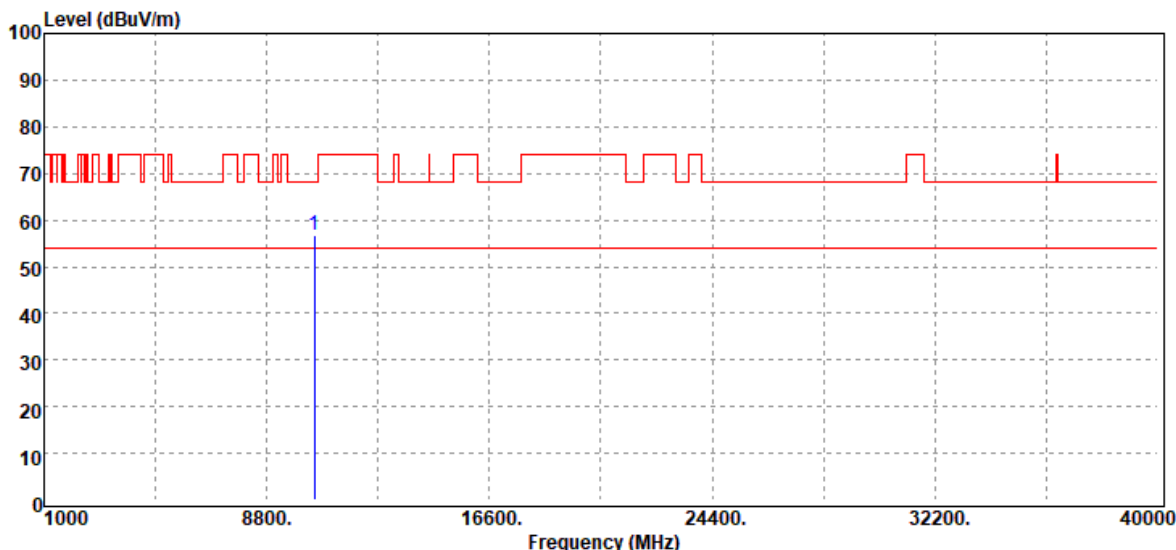
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5240 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10480.00	Peak	40.39	16.48	56.87	68.20	-11.33

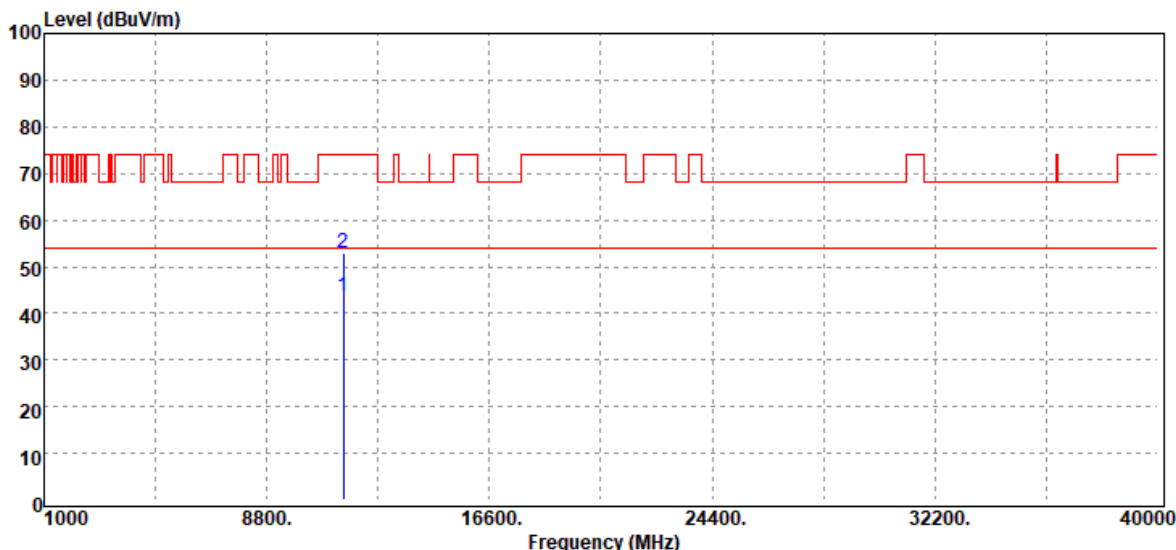
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5745 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11490.00	Average	27.63	15.95	43.58	54.00	-10.42
11490.00	Peak	36.82	15.95	52.77	74.00	-21.23

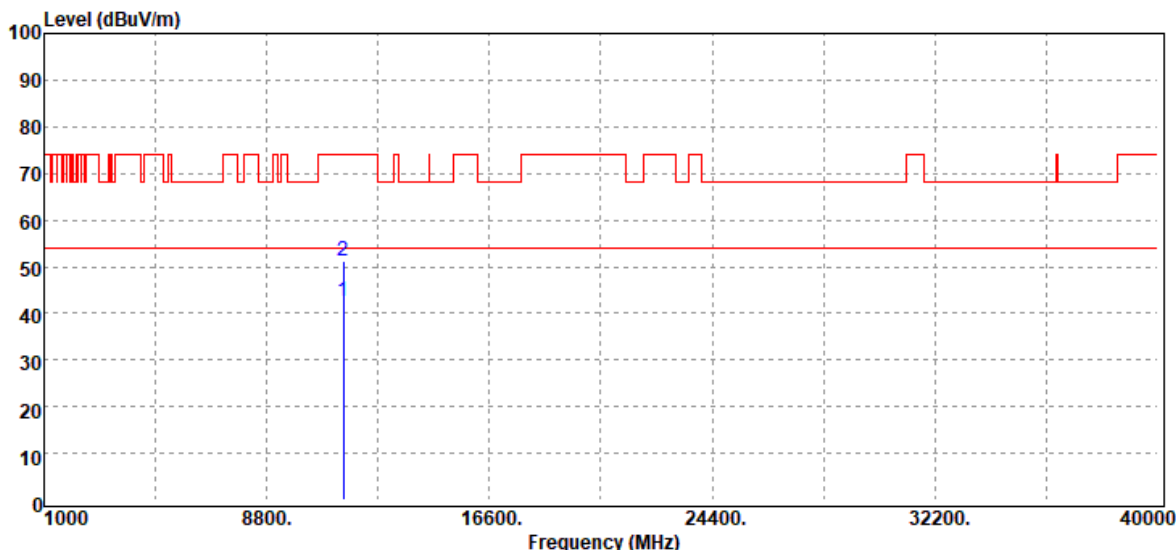
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5745 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11490.00	Average	26.71	15.95	42.66	54.00	-11.34
11490.00	Peak	35.22	15.95	51.17	74.00	-22.83

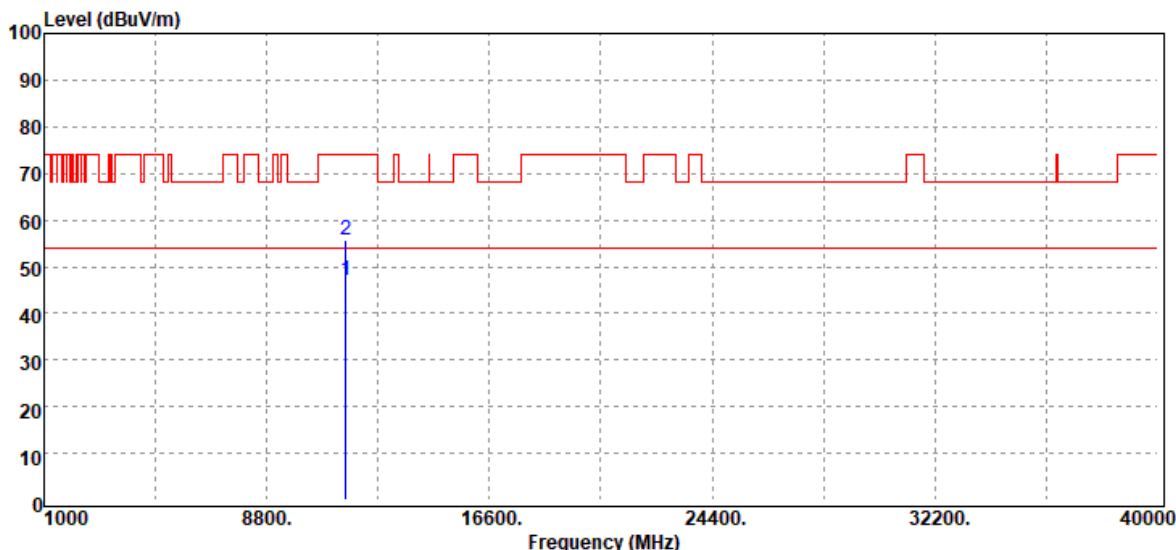
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5785 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11570.00	Average	30.56	16.41	46.97	54.00	-7.03
11570.00	Peak	39.21	16.41	55.62	74.00	-18.38

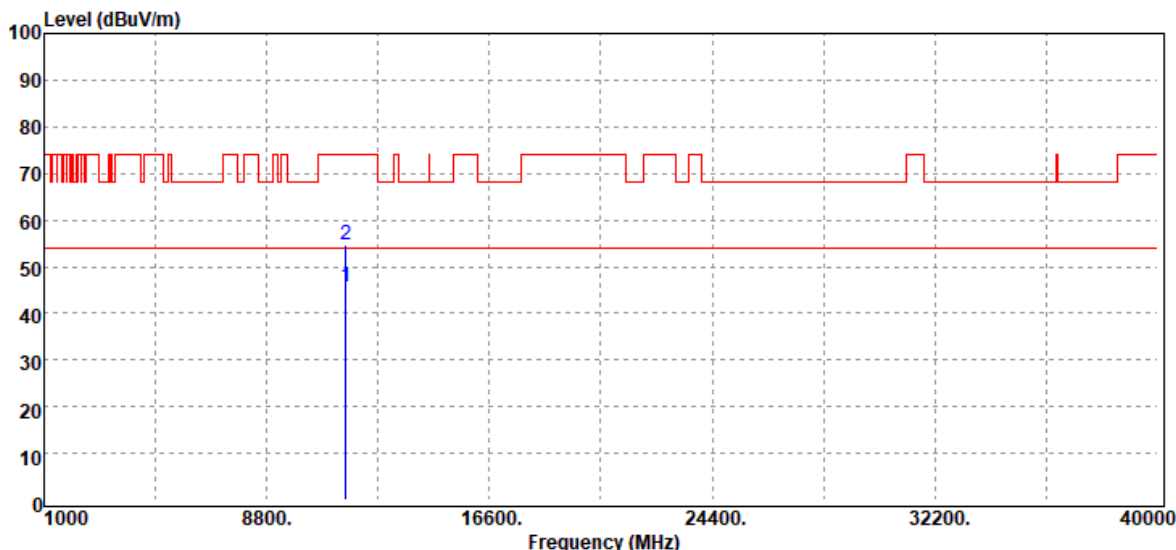
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5785 MHz  
Operation Mode :Tx CH Mid  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11570.00	Average	29.12	16.41	45.53	54.00	-8.47
11570.00	Peak	38.09	16.41	54.50	74.00	-19.50

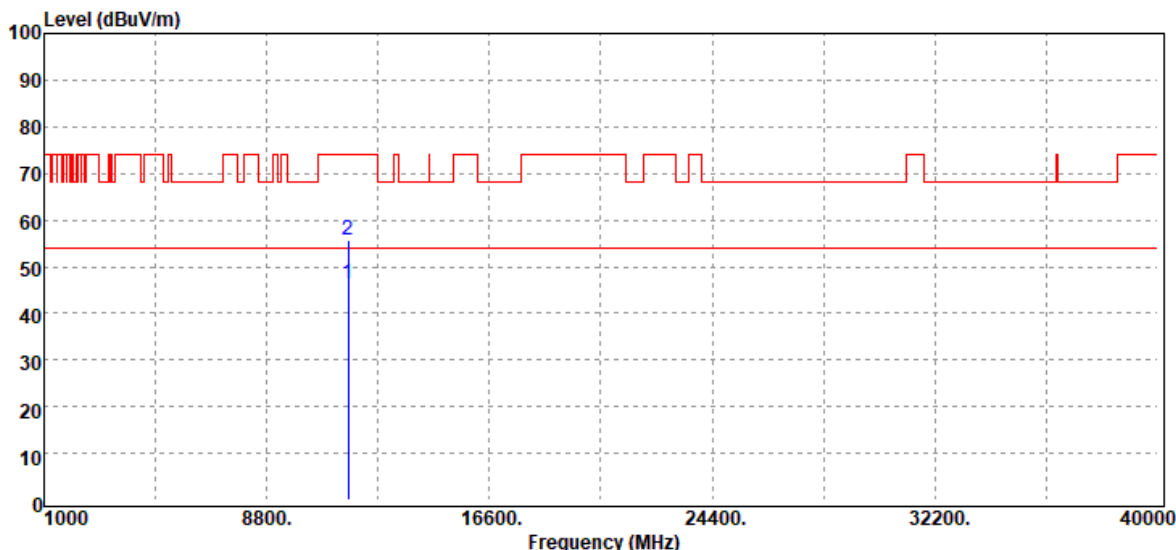
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5825 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11650.00	Average	30.05	16.21	46.26	54.00	-7.74
11650.00	Peak	39.63	16.21	55.84	74.00	-18.16

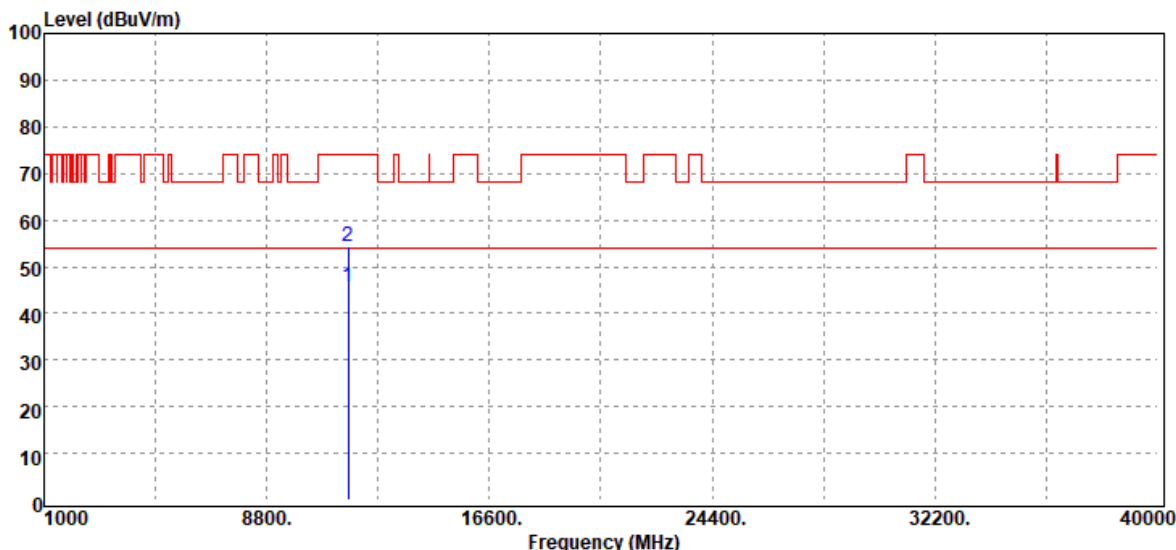
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5825 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11650.00	Average	29.38	16.21	45.59	54.00	-8.41
11650.00	Peak	38.26	16.21	54.47	74.00	-19.53

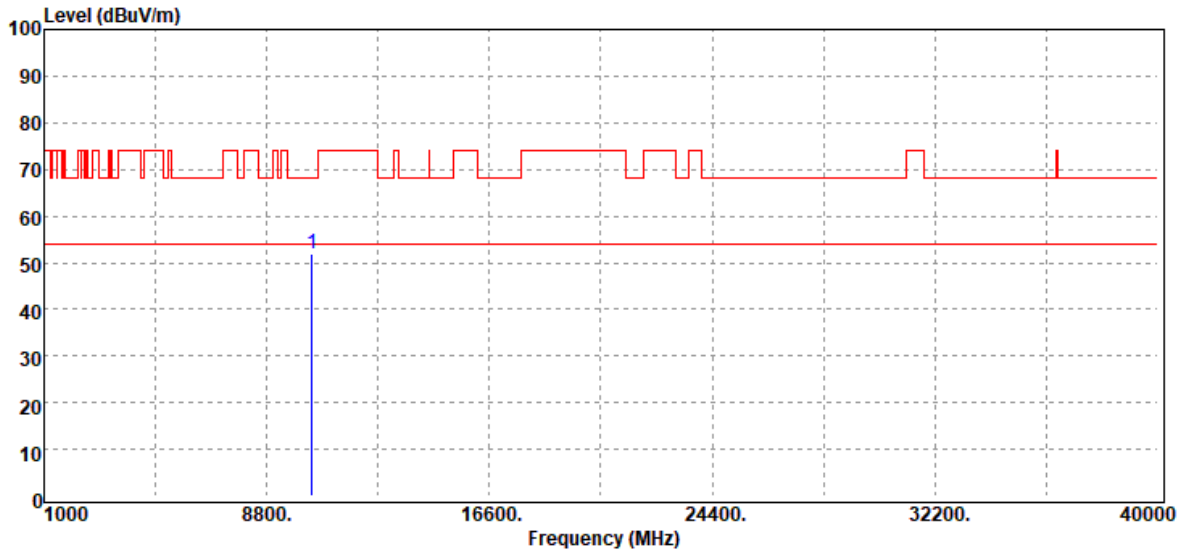
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5190 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10380.00	Peak	37.23	14.82	52.05	68.20	-16.15

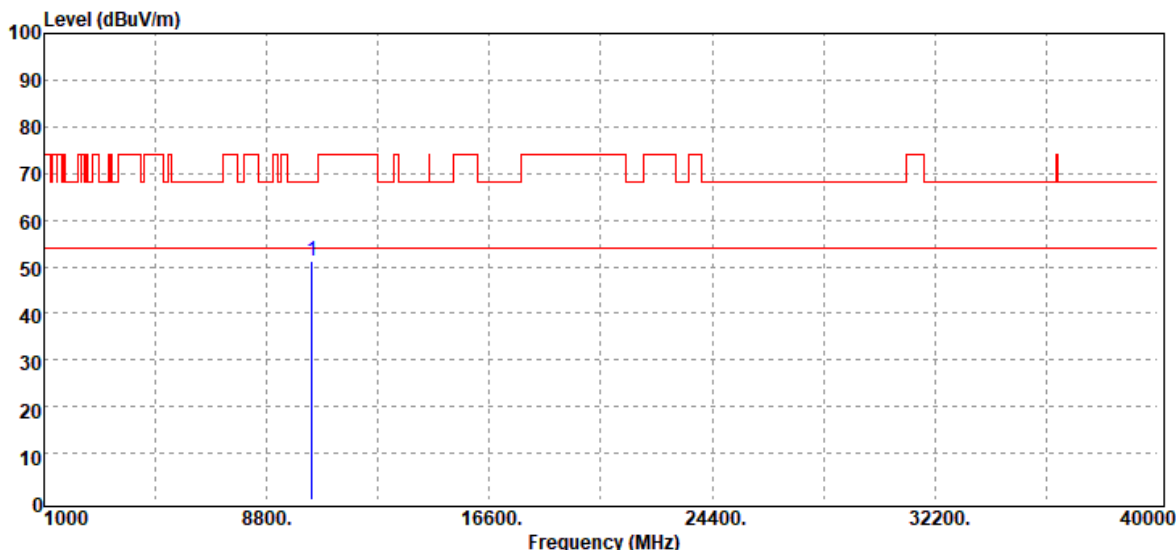
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5190 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBuV	dB	dBuV/m	dBuV/m	dB
10380.00	Peak	36.22	14.82	51.04	68.20	-17.16

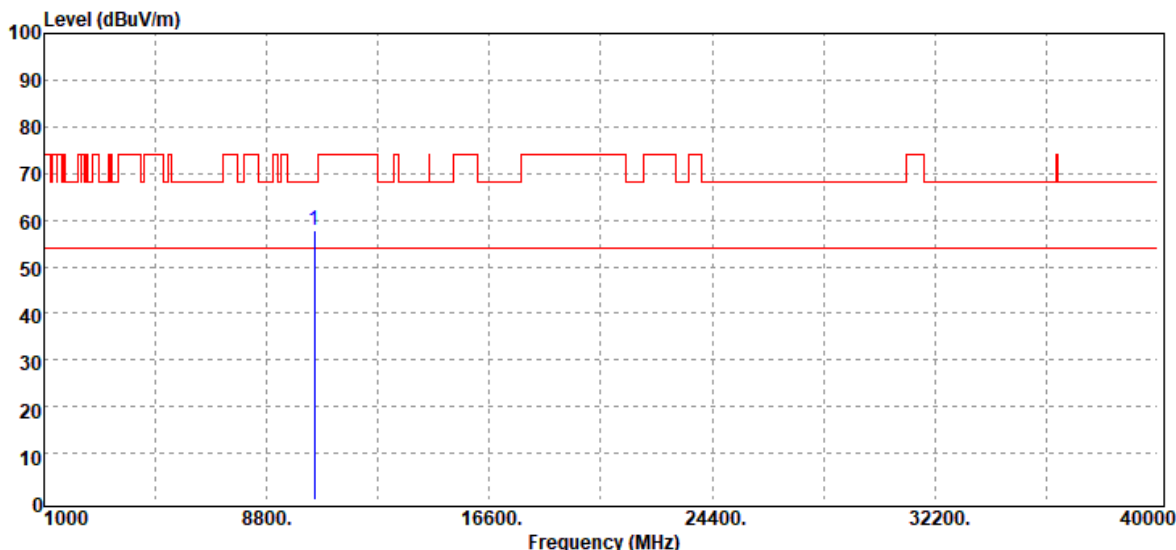
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5230 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10460.00	Peak	41.69	16.01	57.70	68.20	-10.50

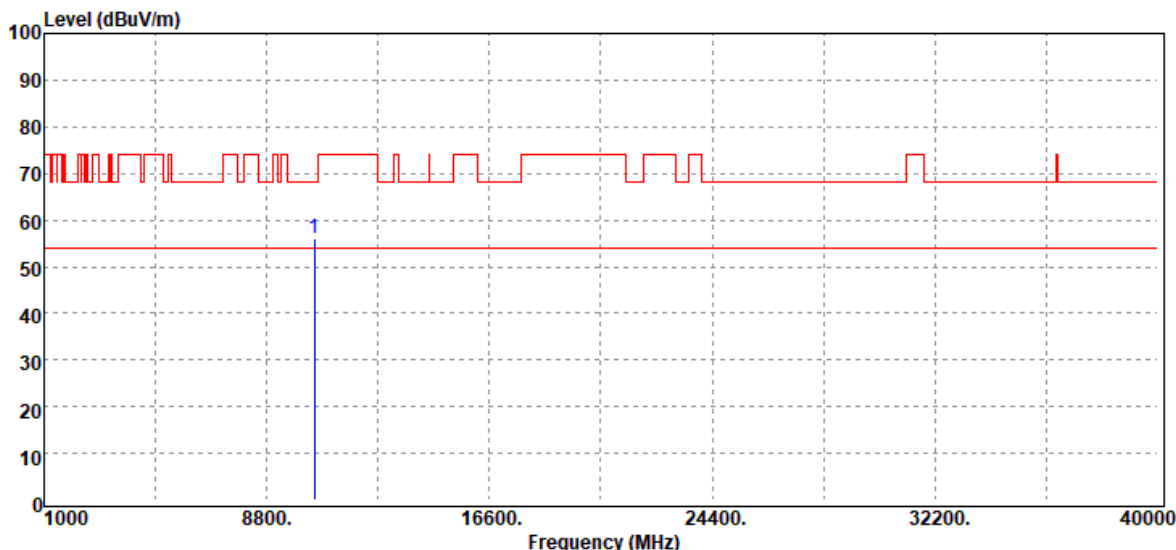
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5230 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBμV		dBμV/m	dBμV/m	
10460.00	Peak	40.17	16.01	56.18	68.20	-12.02

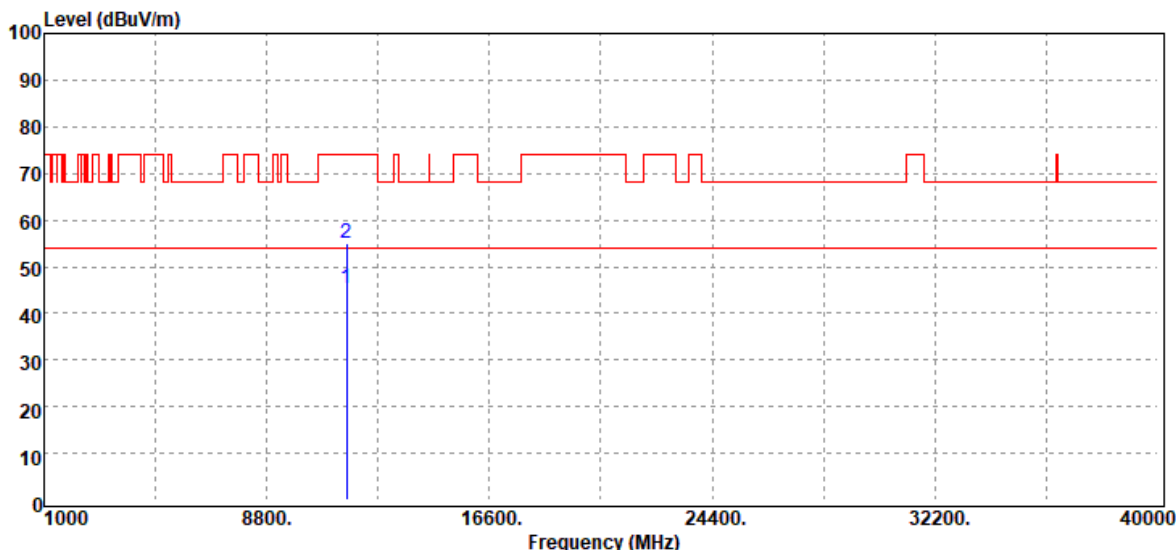
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Project Number :T190516W01  
Operation Band :802.11n40/Band4  
Frequency :5795 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11590.00	Average	28.72	16.74	45.46	54.00	-8.54
11590.00	Peak	38.31	16.74	55.05	74.00	-18.95

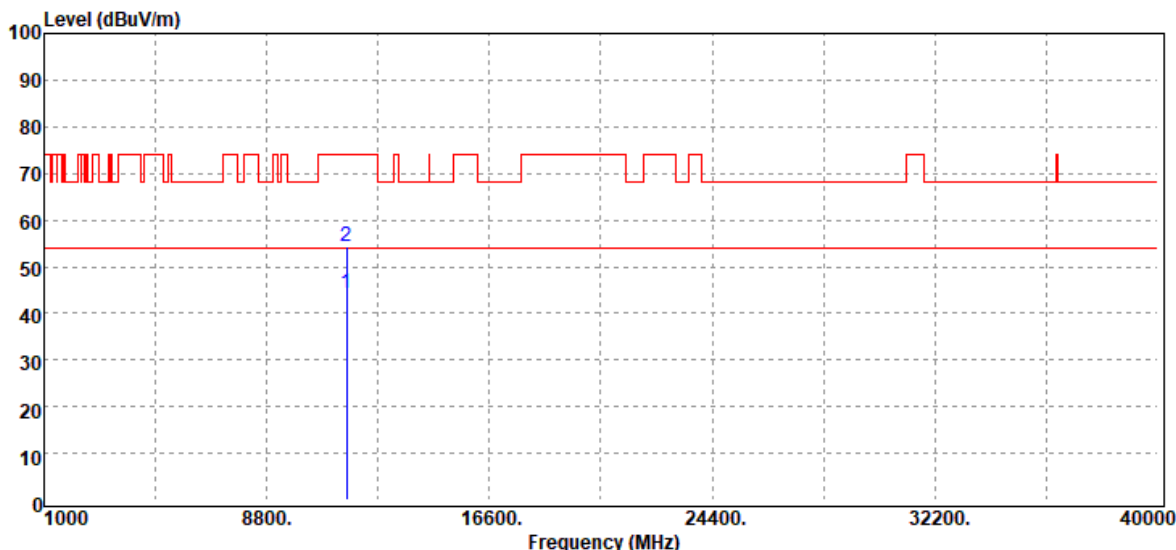
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Project Number :T190516W01  
Operation Band :802.11n40/Band4  
Frequency :5795 MHz  
Operation Mode :Tx CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11590.00	Average	27.55	16.74	44.29	54.00	-9.71
11590.00	Peak	37.64	16.74	54.38	74.00	-19.62

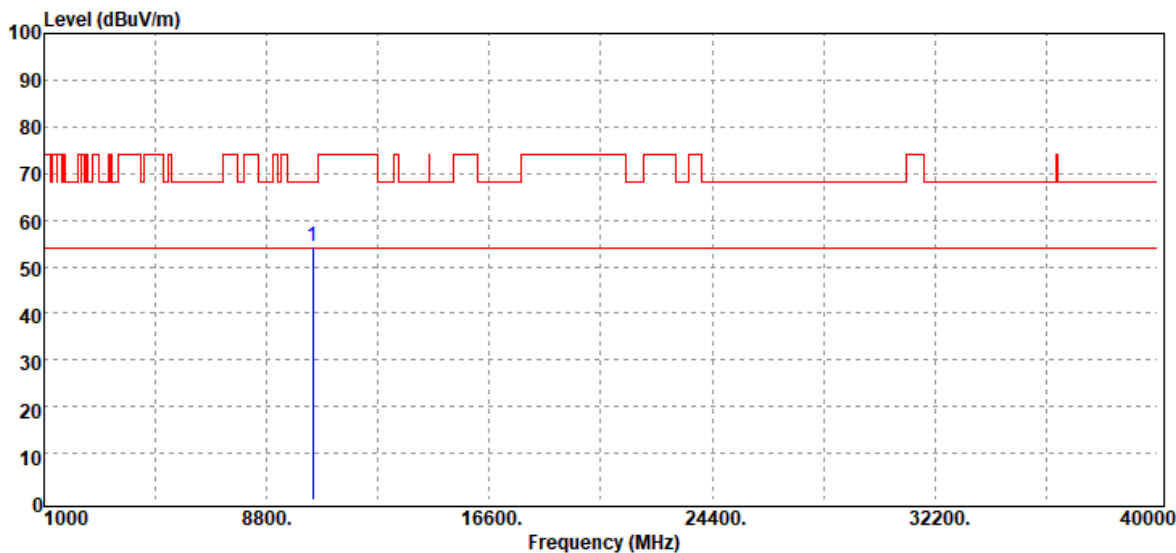
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10420.00	Peak	38.93	15.31	54.24	68.20	-13.96

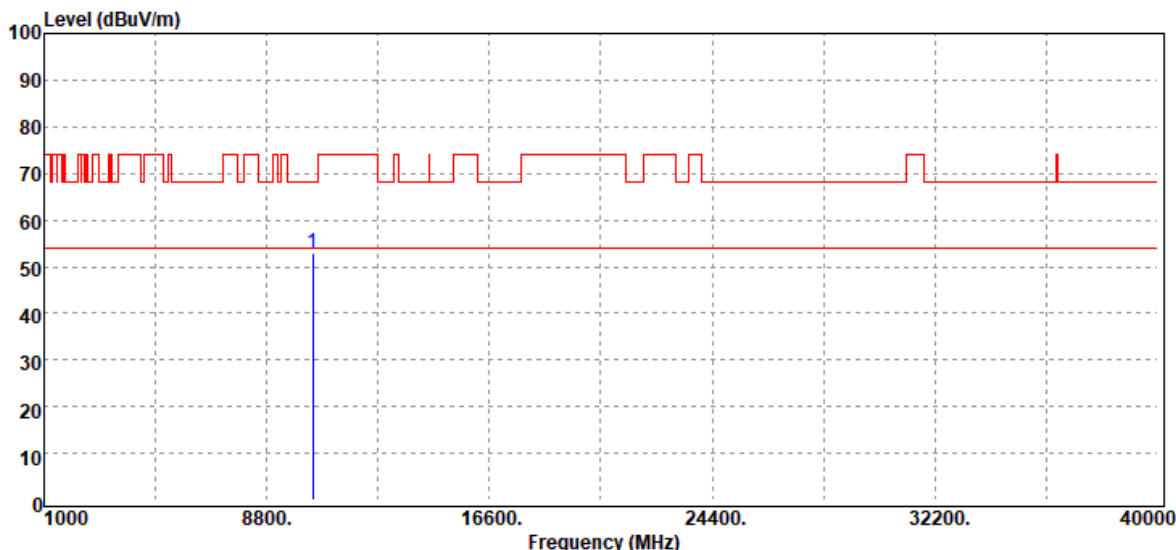
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level	dB	FS	@3m	dB
	PK/QP/AV	dBuV		dBuV/m	dBuV/m	
10420.00	Peak	37.65	15.31	52.96	68.20	-15.24

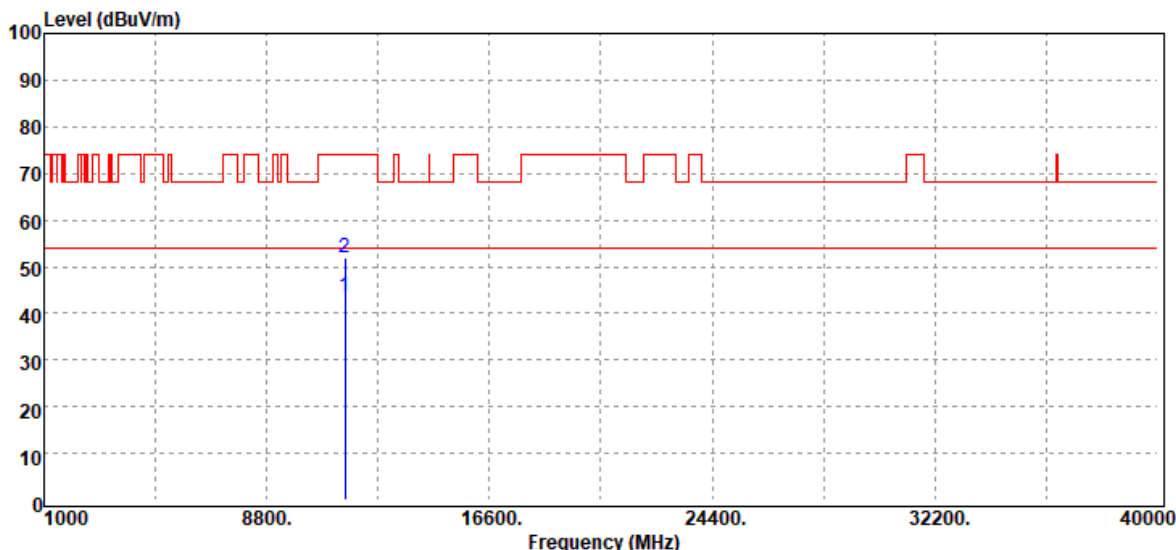
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11550.00	Average	27.63	16.09	43.72	54.00	-10.28
11550.00	Peak	35.83	16.09	51.92	74.00	-22.08

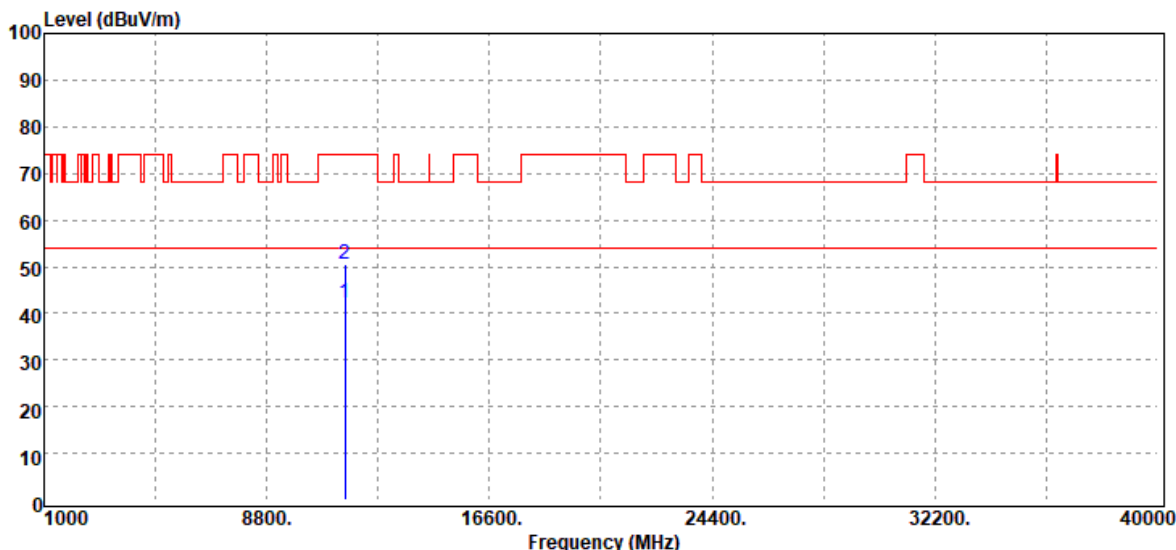
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :Tx CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-23  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
11550.00	Average	26.28	16.09	42.37	54.00	-11.63
11550.00	Peak	34.26	16.09	50.35	74.00	-23.65

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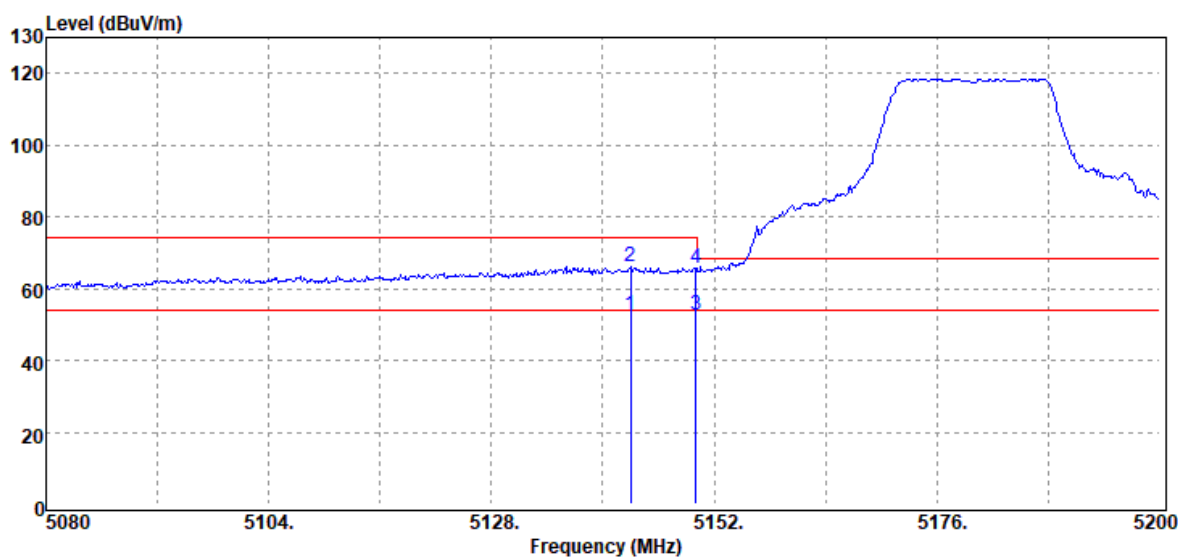
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## Band edge falling to restricted band

Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5180 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
5143.00	Average	47.50	4.92	52.42	54.00	-1.58
5143.00	Peak	61.26	4.92	66.18	74.00	-7.82
5150.00	Average	47.92	4.92	52.84	54.00	-1.16
5150.00	Peak	60.75	4.92	65.67	74.00	-8.33

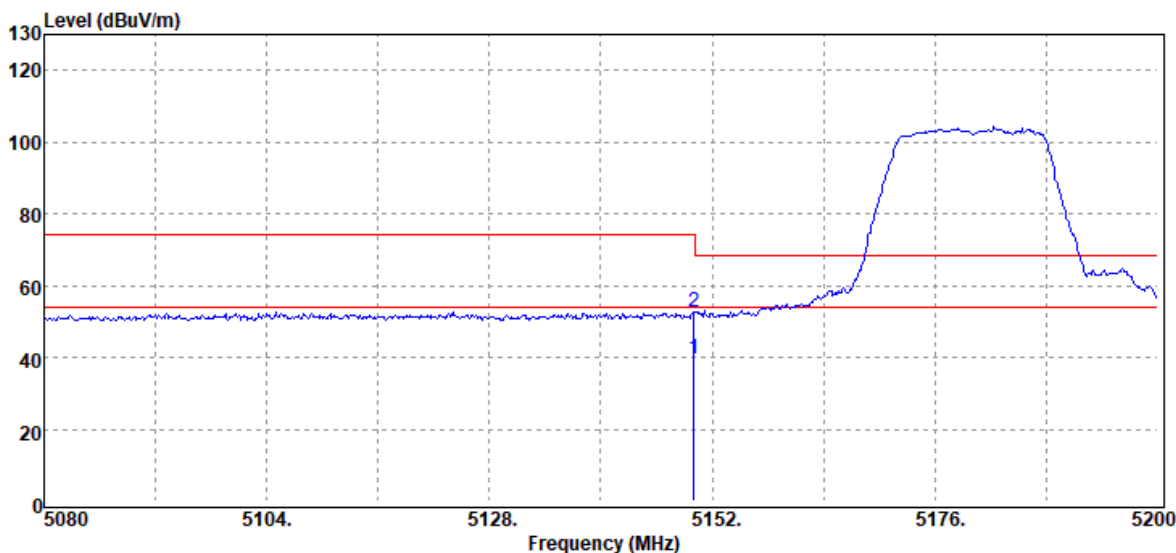
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5180 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5150.00	Average	34.86	4.92	39.78	54.00	-14.22
5150.00	Peak	47.73	4.92	52.65	74.00	-21.35

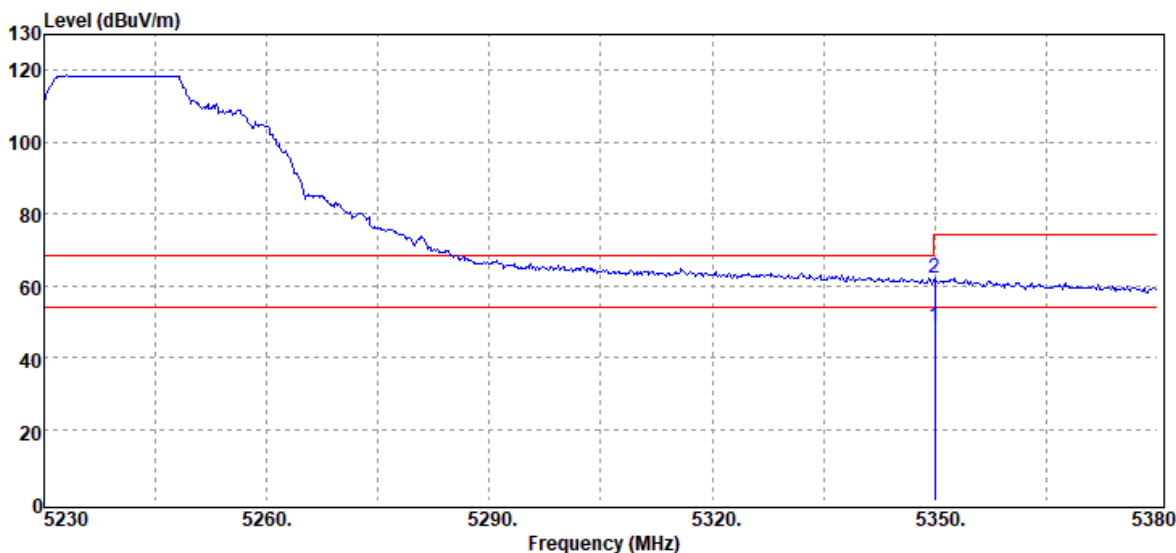
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5240 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5350.00	Average	43.38	5.21	48.59	54.00	-5.41
5350.00	Peak	56.81	5.21	62.02	74.00	-11.98

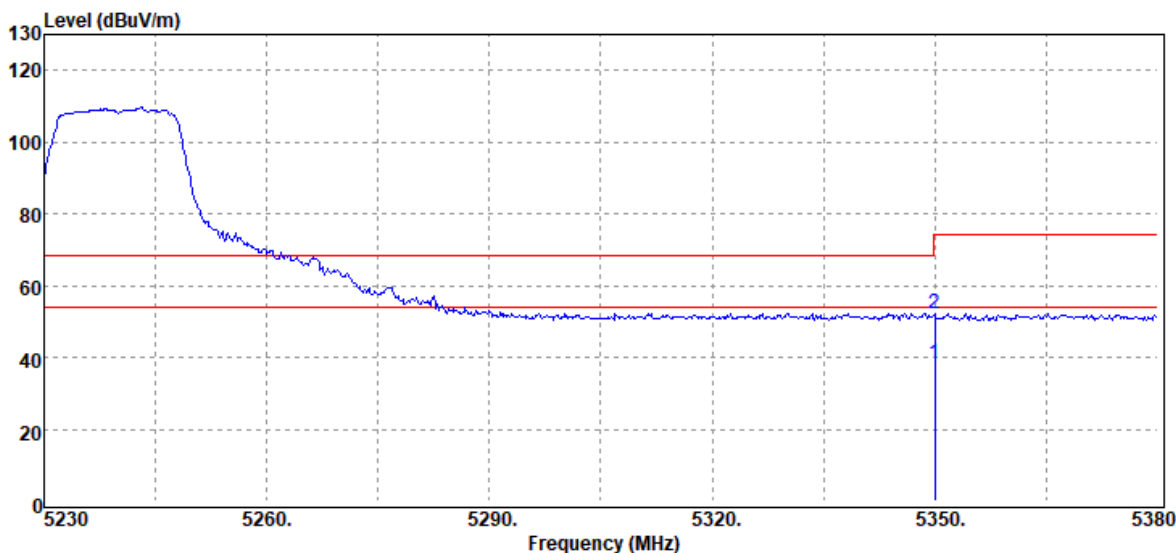
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Project Number :T190516W01  
Operation Band :802.11a/Band1  
Frequency :5240 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5350.00	Average	33.19	5.21	38.40	54.00	-15.60
5350.00	Peak	46.77	5.21	51.98	74.00	-22.02

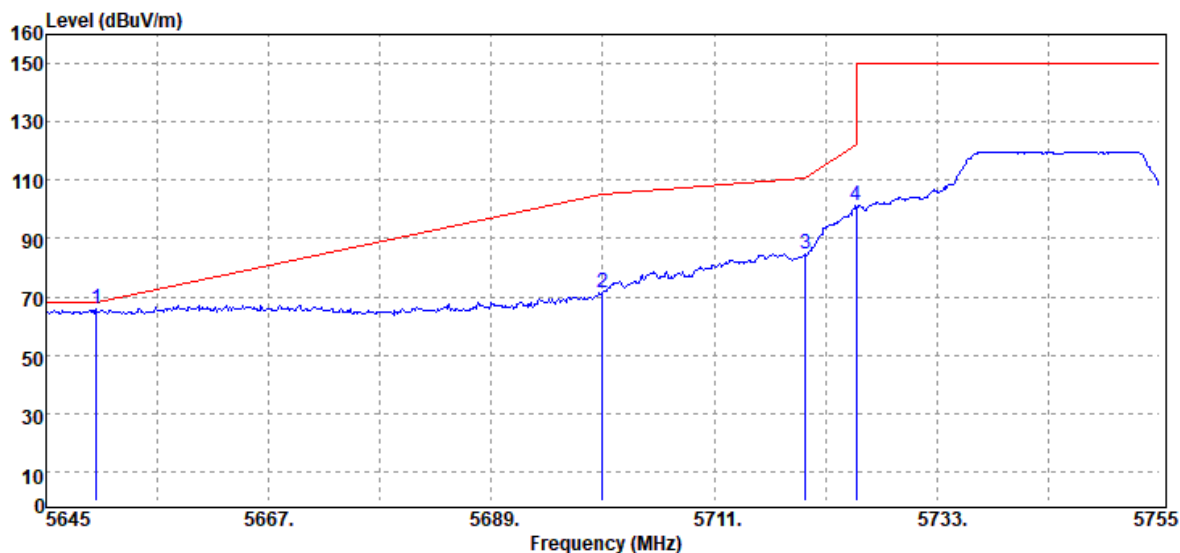
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5745 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5650.00	Peak	60.04	6.04	66.08	68.20	-2.12
5700.00	Peak	65.01	6.32	71.33	105.20	-33.87
5720.02	Peak	78.12	6.34	84.46	110.85	-26.39
5725.00	Peak	94.77	6.34	101.11	122.20	-21.09

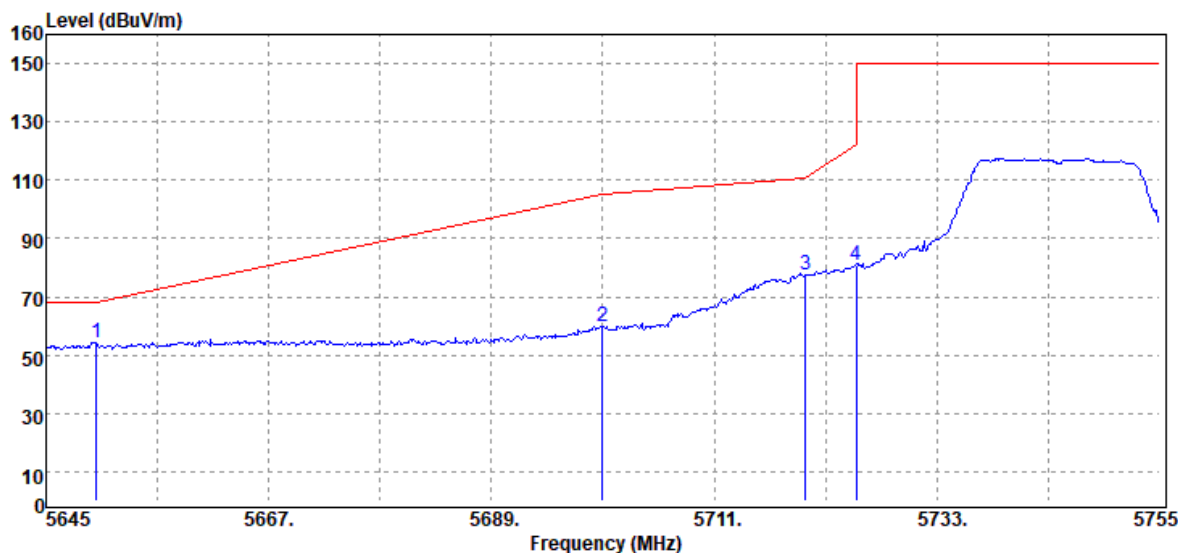
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5745 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
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	48.45	6.04	54.49	68.20	-13.71
5700.00	Peak	53.54	6.32	59.86	105.20	-45.34
5720.00	Peak	71.45	6.33	77.78	110.80	-33.02
5725.00	Peak	74.74	6.34	81.08	122.20	-41.12

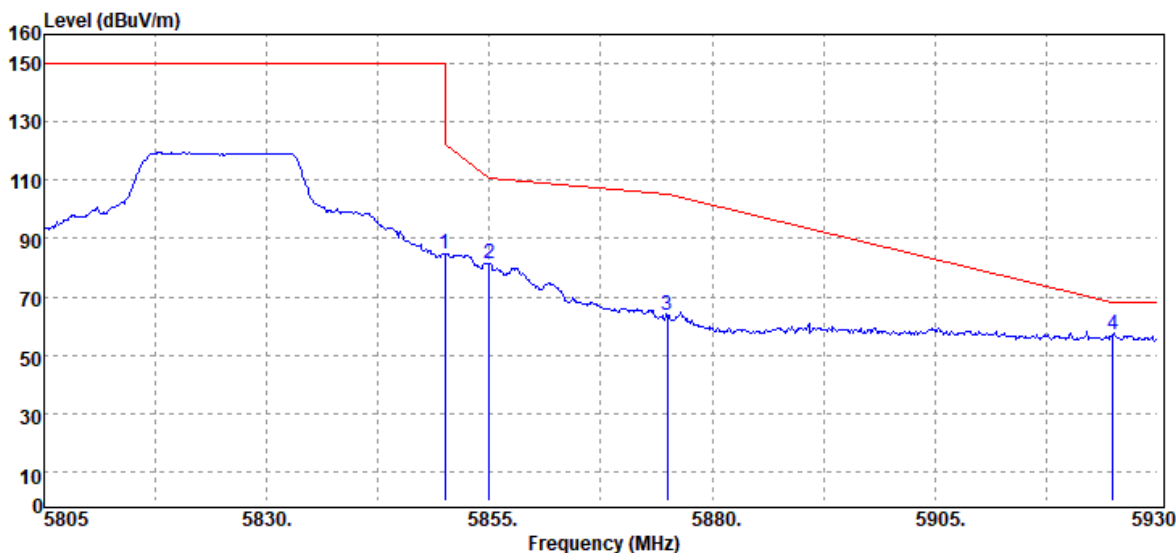
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5825 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5850.00	Peak	78.53	6.39	84.92	122.20	-37.28
5855.00	Peak	75.10	6.38	81.48	110.80	-29.32
5875.00	Peak	57.17	6.37	63.54	105.20	-41.66
5925.00	Peak	50.86	6.42	57.28	68.20	-10.92

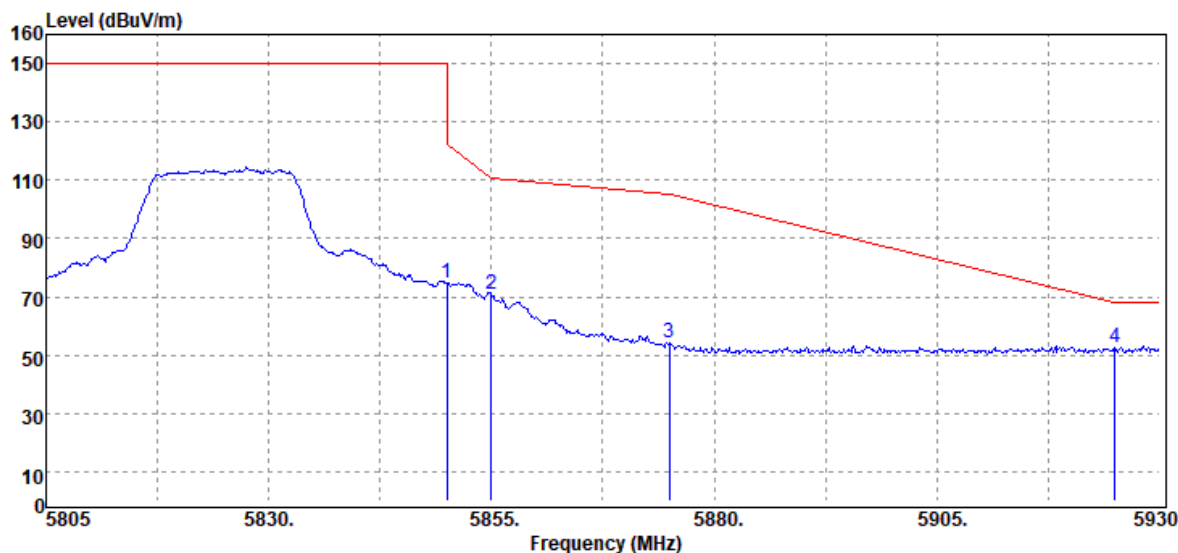
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Project Number :T190516W01  
Operation Band :802.11a/Band4  
Frequency :5825 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5850.00	Peak	68.23	6.39	74.62	122.20	-47.58
5855.00	Peak	64.57	6.38	70.95	110.80	-39.85
5875.00	Peak	48.00	6.37	54.37	105.20	-50.83
5925.00	Peak	45.90	6.42	52.32	68.20	-15.88

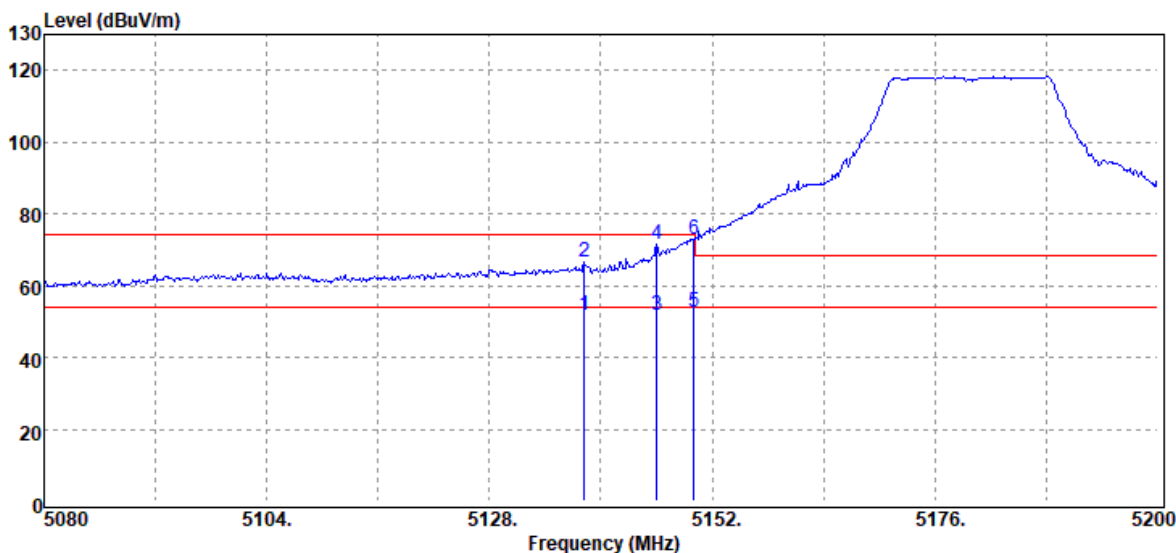
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5180 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5138.20	Average	46.90	4.91	51.81	54.00	-2.19
5138.20	Peak	61.82	4.91	66.73	74.00	-7.27
5146.00	Average	46.59	4.92	51.51	54.00	-2.49
5146.00	Peak	66.69	4.92	71.61	74.00	-2.39
5150.00	Average	47.69	4.92	52.61	54.00	-1.39
5150.00	Peak	67.98	4.92	72.90	74.00	-1.10

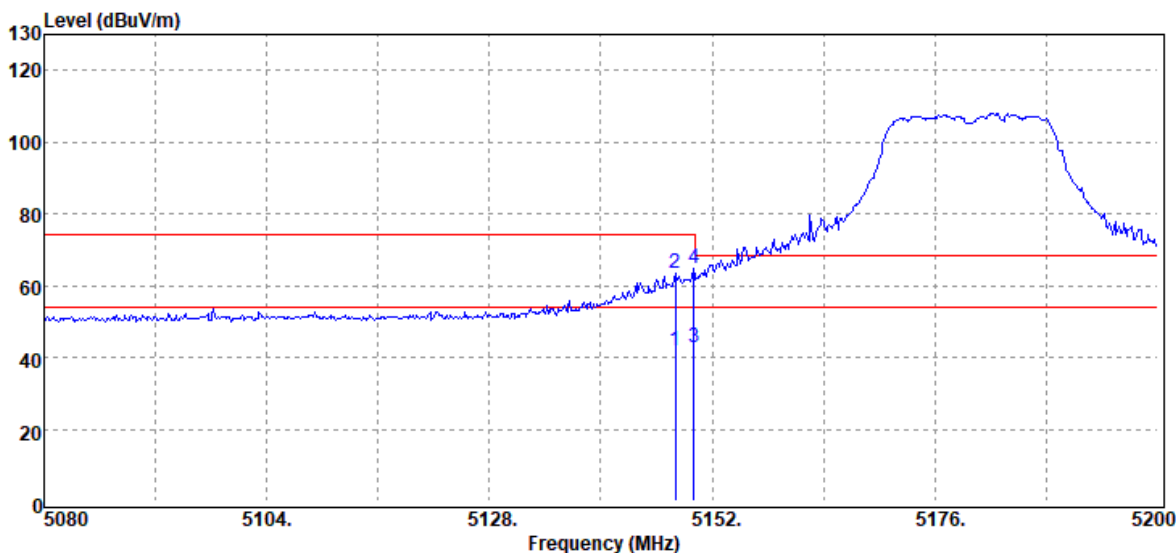
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5180 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5148.04	Average	37.12	4.92	42.04	54.00	-11.96
5148.04	Peak	58.46	4.92	63.38	74.00	-10.62
5150.00	Average	37.66	4.92	42.58	54.00	-11.42
5150.00	Peak	59.77	4.92	64.69	74.00	-9.31

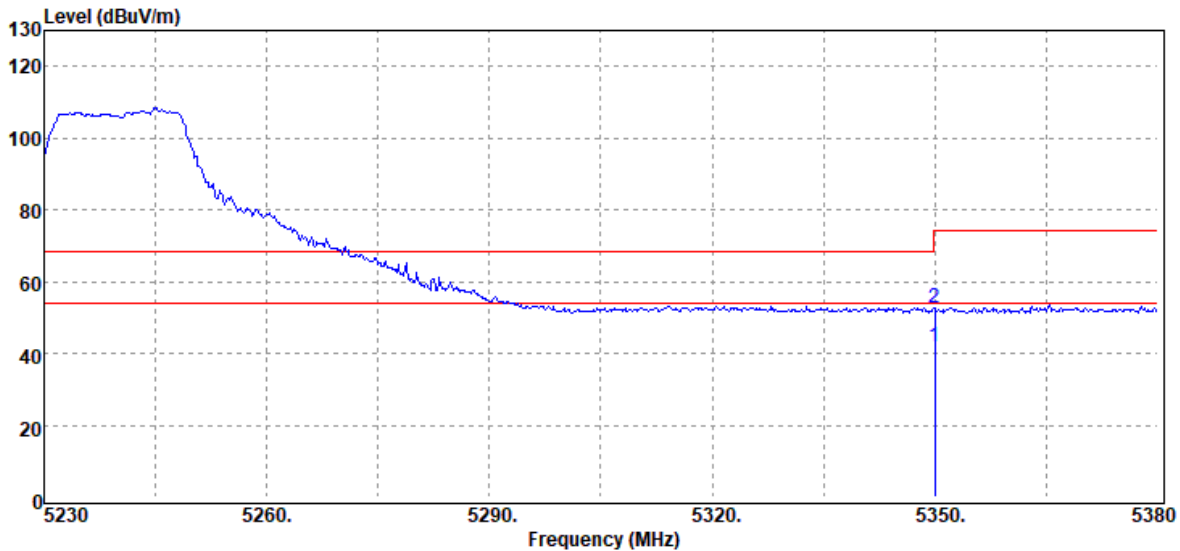
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5240 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
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	36.53	5.21	41.74	54.00	-12.26
5350.00	Peak	47.31	5.21	52.52	74.00	-21.48

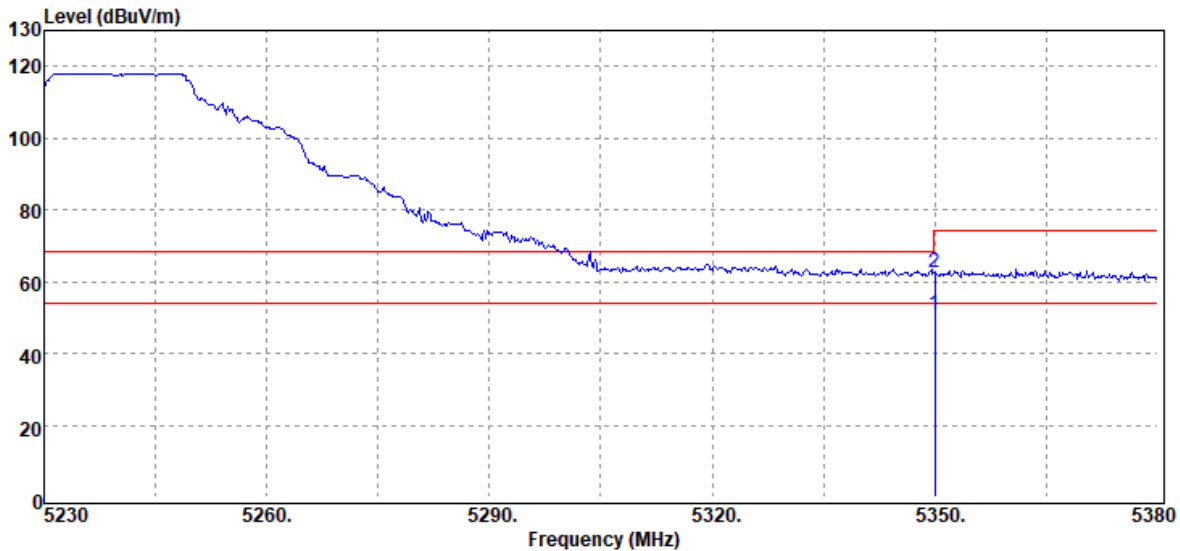
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Project Number :T190516W01  
Operation Band :802.11n20/Band1  
Frequency :5240 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5350.00	Average	45.83	5.21	51.04	54.00	-2.96
5350.00	Peak	57.44	5.21	62.65	74.00	-11.35

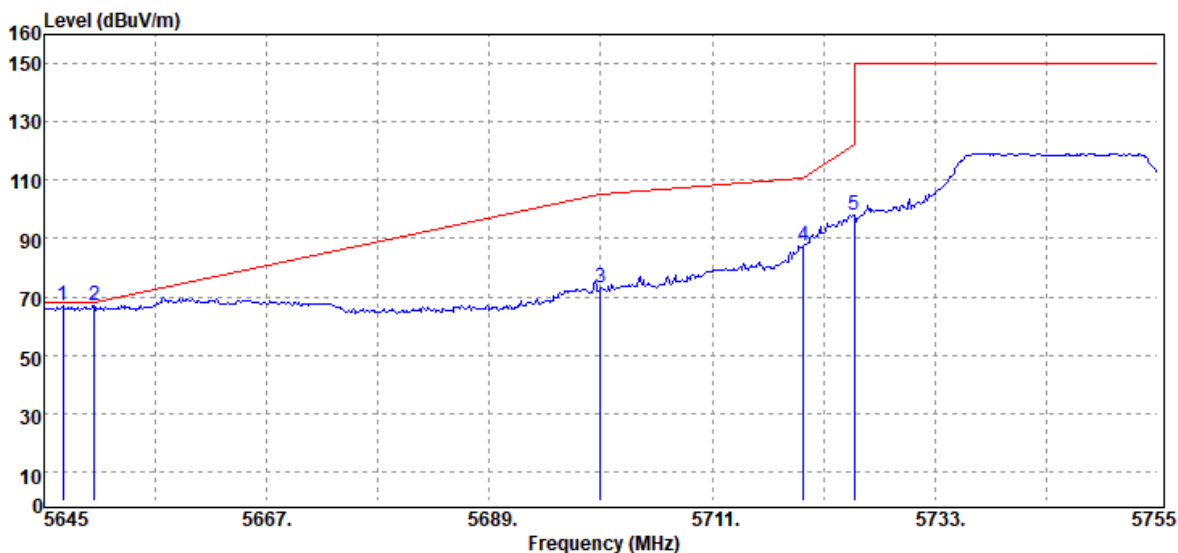
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5745 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5646.87	Peak	60.90	6.02	66.92	68.20	-1.28
5650.00	Peak	61.08	6.04	67.12	68.20	-1.08
5700.00	Peak	66.72	6.32	73.04	105.20	-32.16
5720.00	Peak	81.39	6.33	87.72	110.80	-23.08
5725.00	Peak	91.93	6.34	98.27	122.20	-23.93

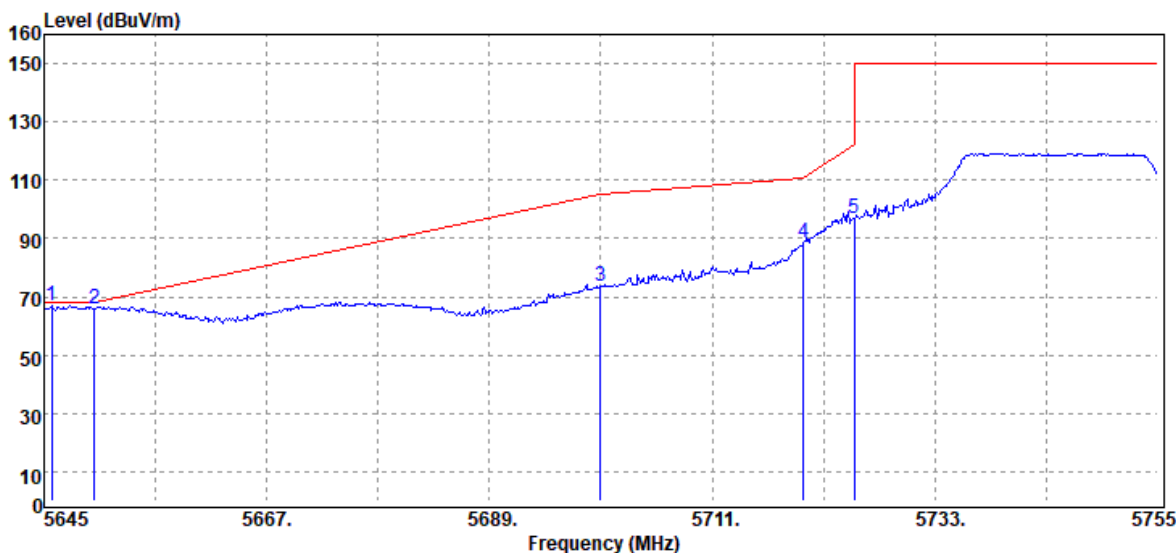
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5745 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5645.77	Peak	60.79	6.02	66.81	68.20	-1.39
5650.00	Peak	59.86	6.04	65.90	68.20	-2.30
5700.00	Peak	67.23	6.32	73.55	105.20	-31.65
5720.00	Peak	82.18	6.33	88.51	110.80	-22.29
5725.00	Peak	90.80	6.34	97.14	122.20	-25.06

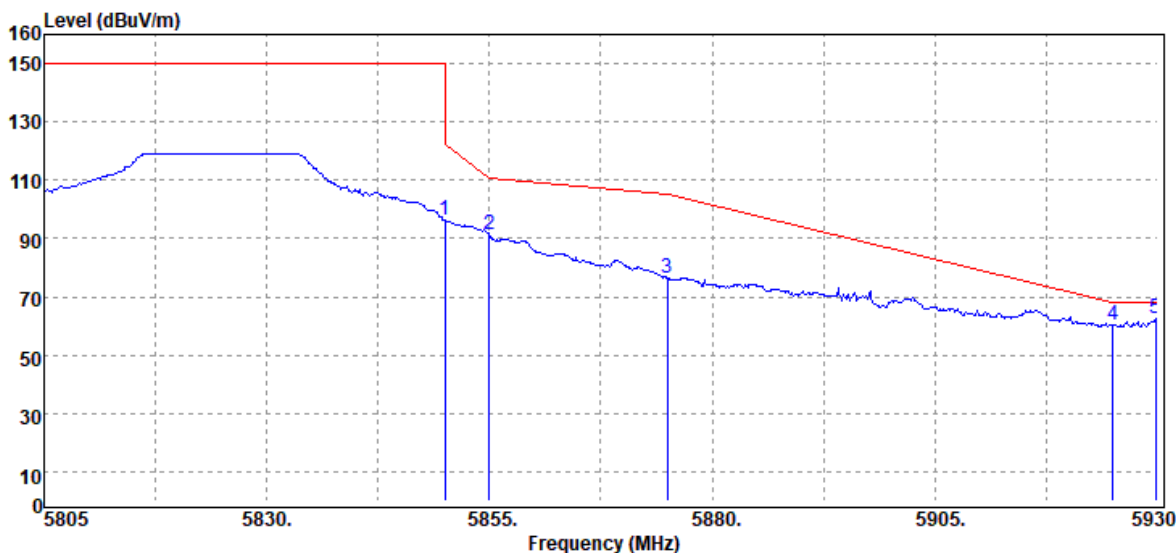
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5825 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5850.00	Peak	89.98	6.39	96.37	122.20	-25.83
5855.00	Peak	85.04	6.38	91.42	110.80	-19.38
5875.00	Peak	70.15	6.37	76.52	105.20	-28.68
5925.00	Peak	53.76	6.42	60.18	68.20	-8.02
5929.75	Peak	55.97	6.43	62.40	68.20	-5.80

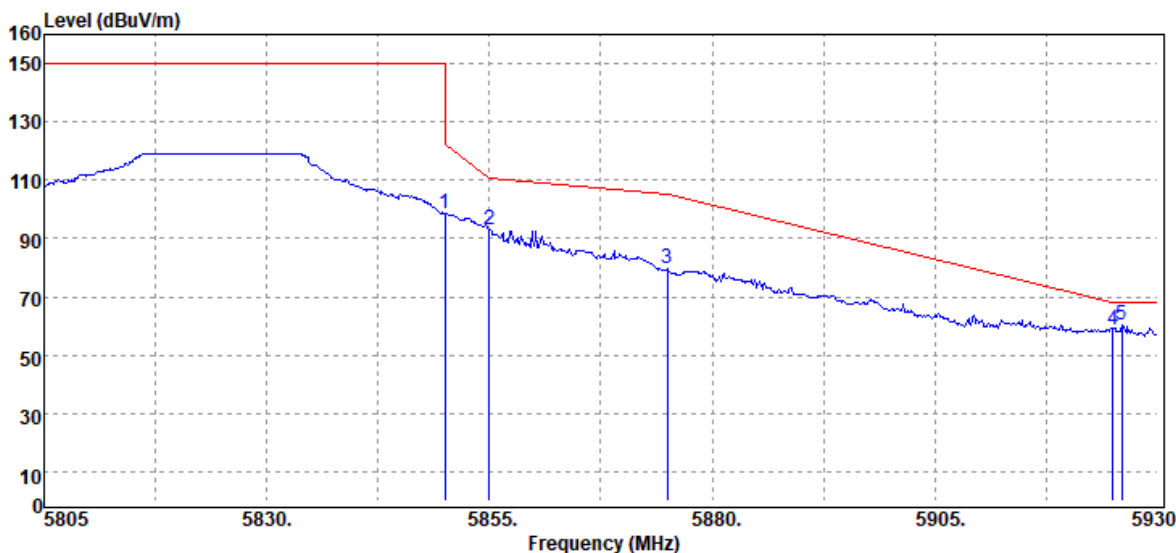
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Project Number :T190516W01  
Operation Band :802.11n20/Band4  
Frequency :5825 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5850.00	Peak	91.95	6.39	98.34	122.20	-23.86
5855.00	Peak	86.76	6.38	93.14	110.80	-17.66
5875.00	Peak	73.49	6.37	79.86	105.20	-25.34
5925.00	Peak	52.48	6.42	58.90	68.20	-9.30
5926.00	Peak	53.88	6.42	60.30	68.20	-7.90

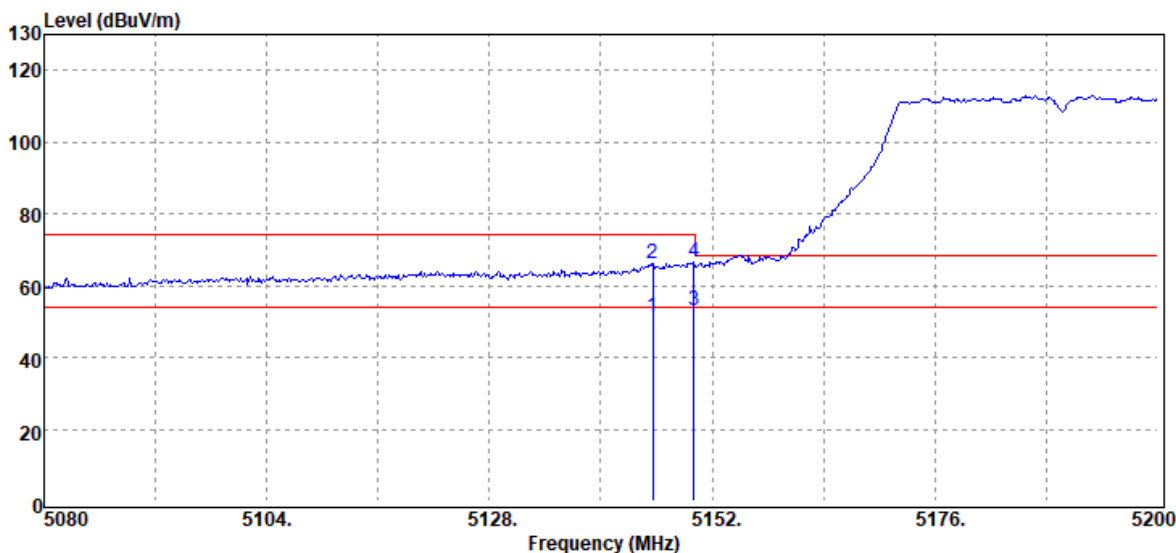
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5190 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5145.64	Average	46.55	4.92	51.47	54.00	-2.53
5145.64	Peak	61.35	4.92	66.27	74.00	-7.73
5150.00	Average	47.96	4.92	52.88	54.00	-1.12
5150.00	Peak	61.62	4.92	66.54	74.00	-7.46

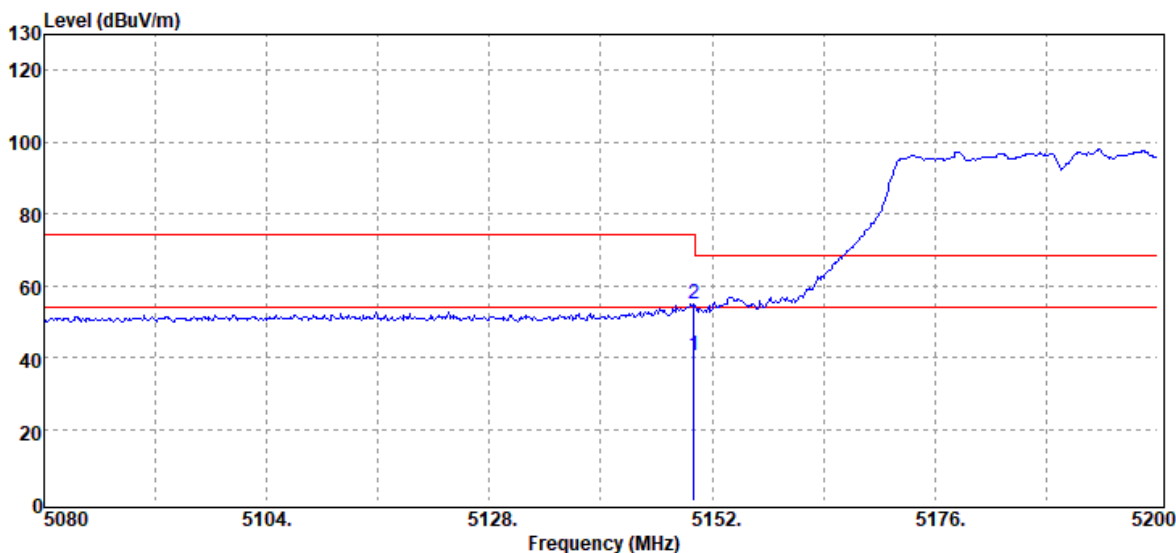
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5190 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5150.00	Average	35.73	4.92	40.65	54.00	-13.35
5150.00	Peak	49.92	4.92	54.84	74.00	-19.16

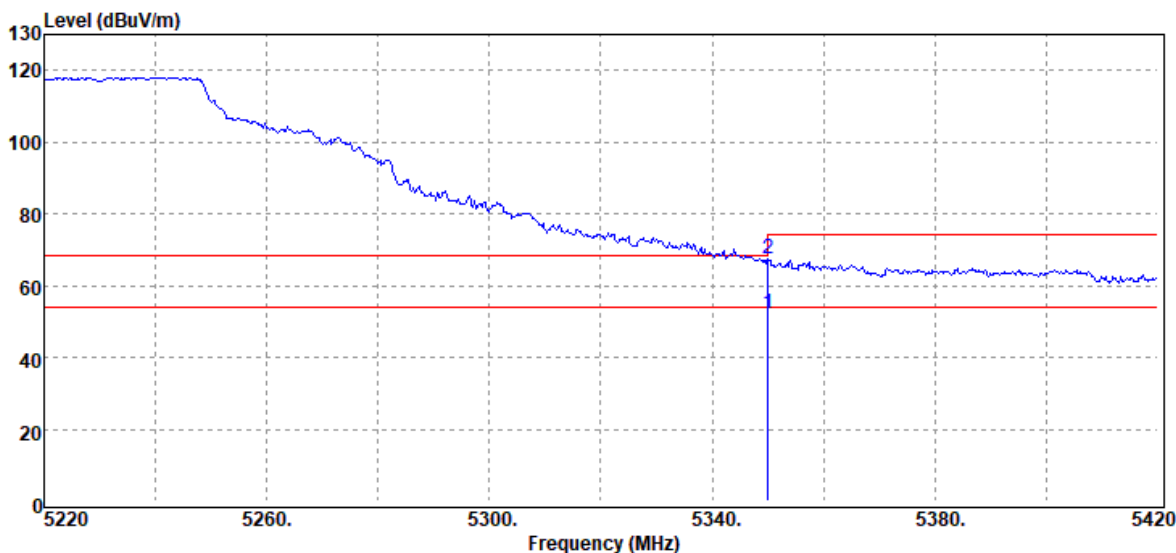
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5230 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5350.00	Average	47.12	5.21	52.33	54.00	-1.67
5350.00	Peak	62.04	5.21	67.25	74.00	-6.75

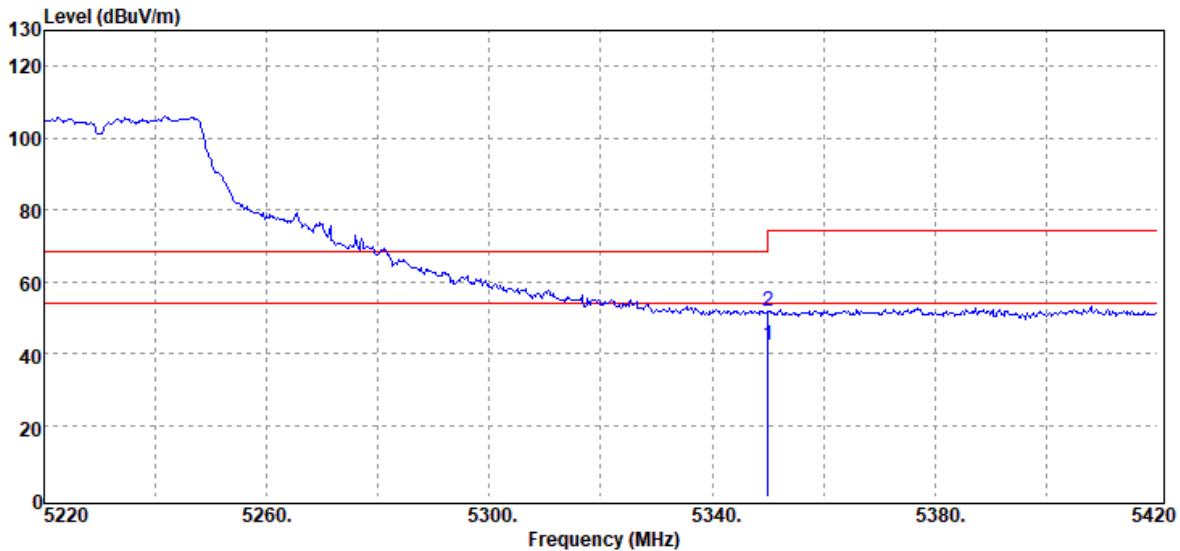
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Project Number :T190516W01  
Operation Band :802.11n40/Band1  
Frequency :5230 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-18  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5350.00	Average	36.88	5.21	42.09	54.00	-11.91
5350.00	Peak	46.36	5.21	51.57	74.00	-22.43

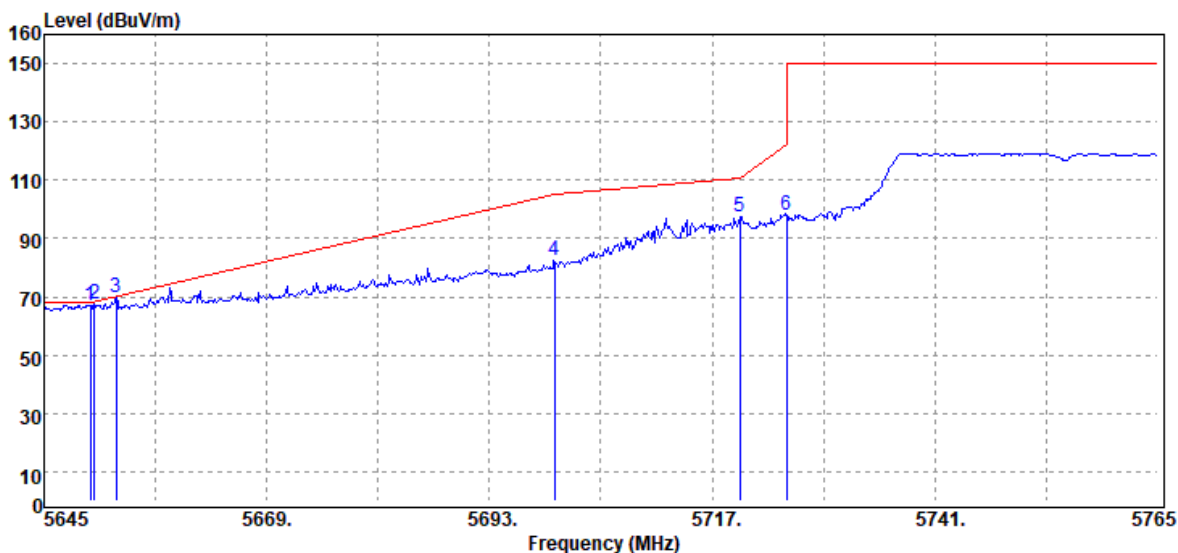
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Project Number :T190516W01  
Operation Band :802.11n40/Band4  
Frequency :5755 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5650.00	Peak	61.12	6.04	67.16	68.20	-1.04
5650.40	Peak	61.61	6.03	67.64	68.50	-0.86
5652.80	Peak	63.46	6.05	69.51	70.27	-0.76
5700.00	Peak	76.33	6.32	82.65	105.20	-22.55
5720.00	Peak	91.24	6.33	97.57	110.80	-13.23
5725.00	Peak	91.63	6.34	97.97	122.20	-24.23

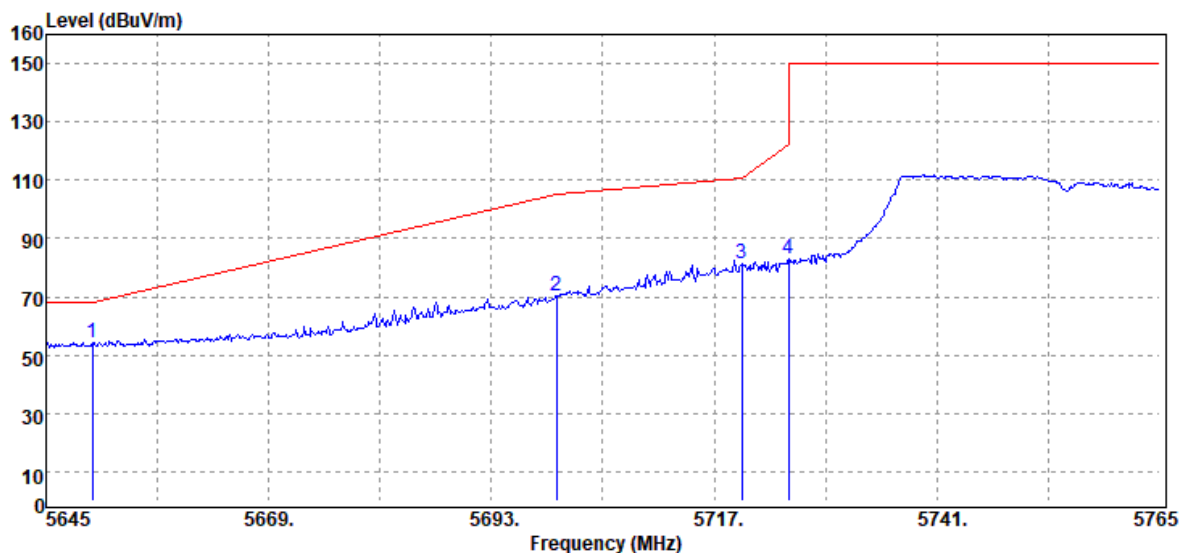
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Project Number :T190516W01  
Operation Band :802.11n40/Band4  
Frequency :5755 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5650.00	Peak	48.21	6.04	54.25	68.20	-13.95
5700.00	Peak	64.01	6.32	70.33	105.20	-34.87
5720.00	Peak	75.11	6.33	81.44	110.80	-29.36
5725.00	Peak	76.77	6.34	83.11	122.20	-39.09

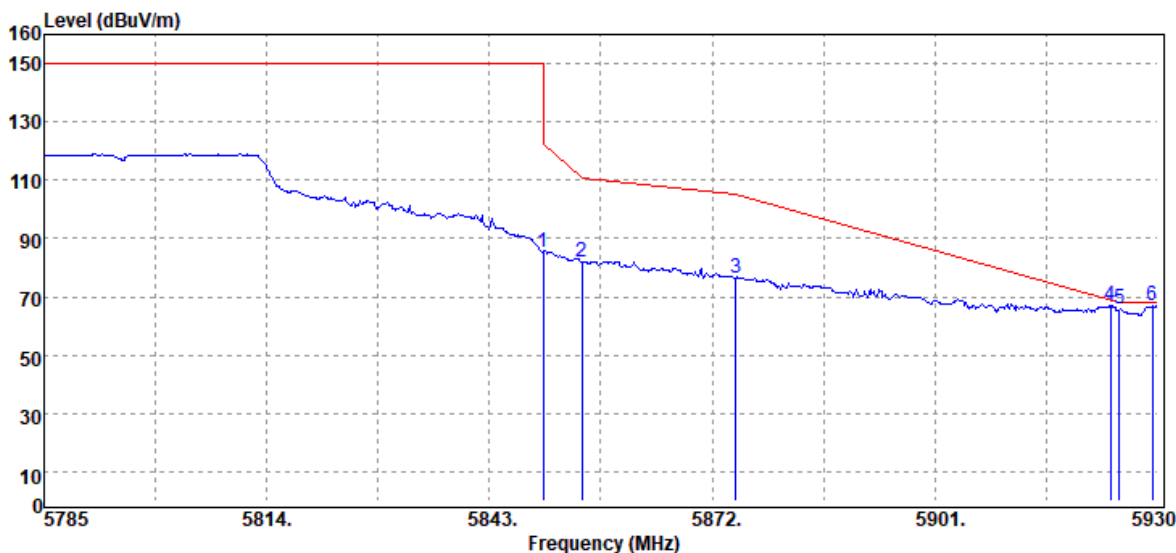
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Project Number :T190516W01  
Operation Band :802.11n40/Band4  
Frequency :5795 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5849.96	Peak	79.06	6.39	85.45	150.00	-64.55
5855.04	Peak	75.60	6.38	81.98	110.79	-28.81
5875.05	Peak	70.05	6.37	76.42	105.17	-28.75
5923.91	Peak	60.76	6.42	67.18	69.01	-1.83
5925.00	Peak	59.21	6.42	65.63	68.20	-2.57
5929.28	Peak	60.50	6.43	66.93	68.20	-1.27

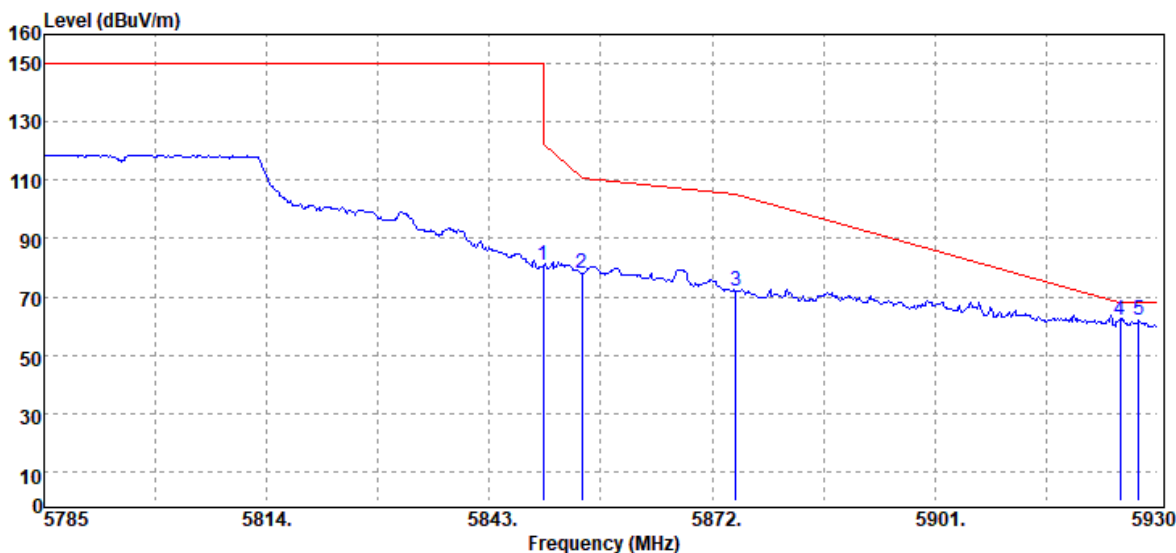
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Project Number :T190516W01  
Operation Band :802.11n40/Band4  
Frequency :5795 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-06-14  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5849.96	Peak	74.26	6.39	80.65	150.00	-69.35
5855.04	Peak	71.77	6.38	78.15	110.79	-32.64
5875.05	Peak	65.80	6.37	72.17	105.17	-33.00
5925.07	Peak	55.64	6.42	62.06	68.20	-6.14
5927.54	Peak	55.47	6.43	61.90	68.20	-6.30

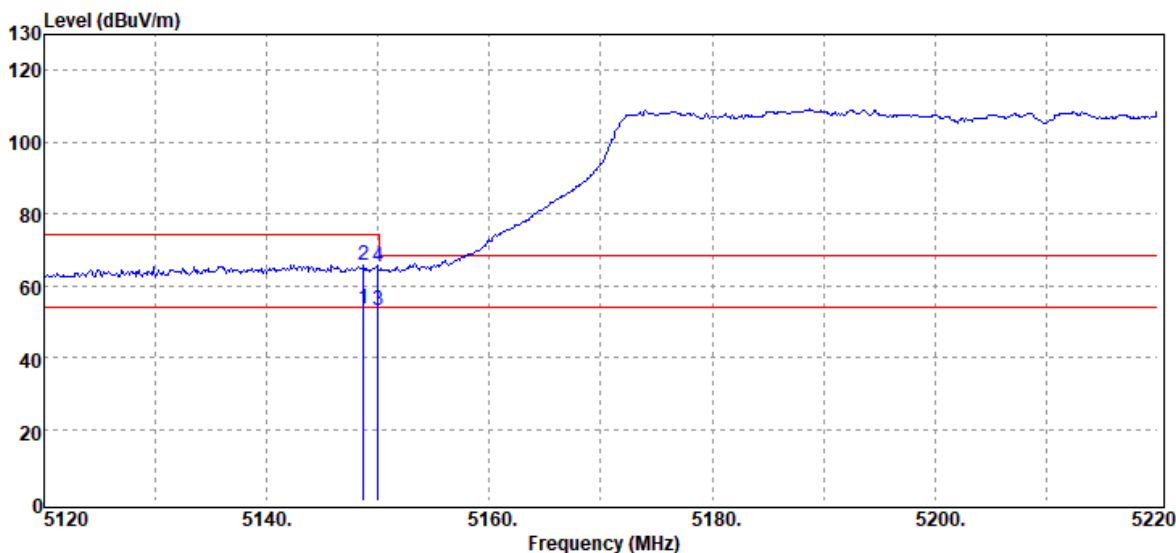
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5148.70	Average	48.42	4.92	53.34	54.00	-0.66
5148.70	Peak	60.84	4.92	65.76	74.00	-8.24
5150.00	Average	48.02	4.92	52.94	54.00	-1.06
5150.00	Peak	60.21	4.92	65.13	74.00	-8.87

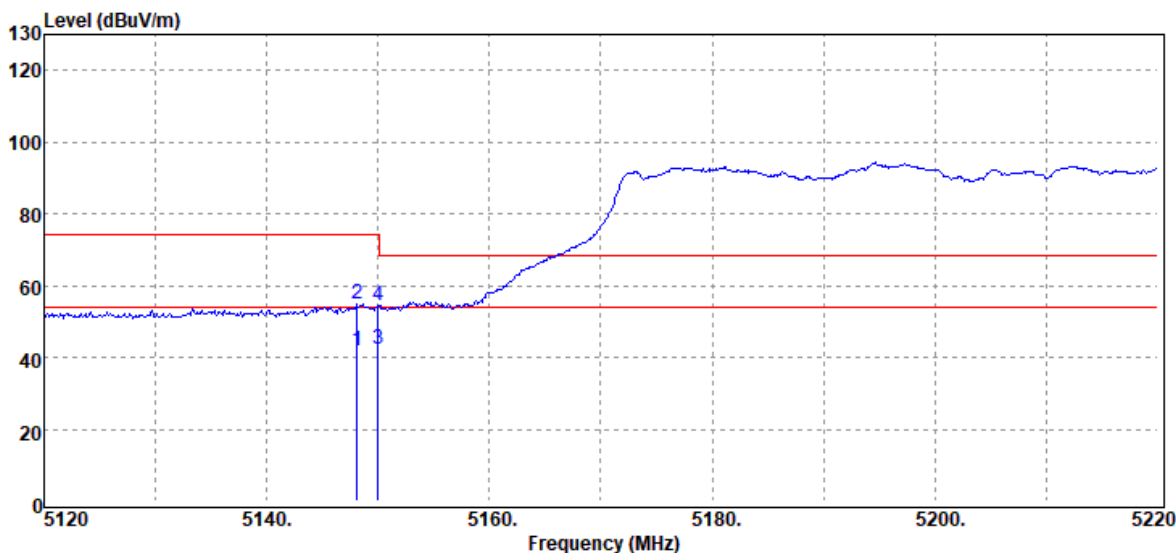
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
5148.10	Average	36.89	4.92	41.81	54.00	-12.19
5148.10	Peak	49.89	4.92	54.81	74.00	-19.19
5150.00	Average	37.18	4.92	42.10	54.00	-11.90
5150.00	Peak	49.44	4.92	54.36	74.00	-19.64

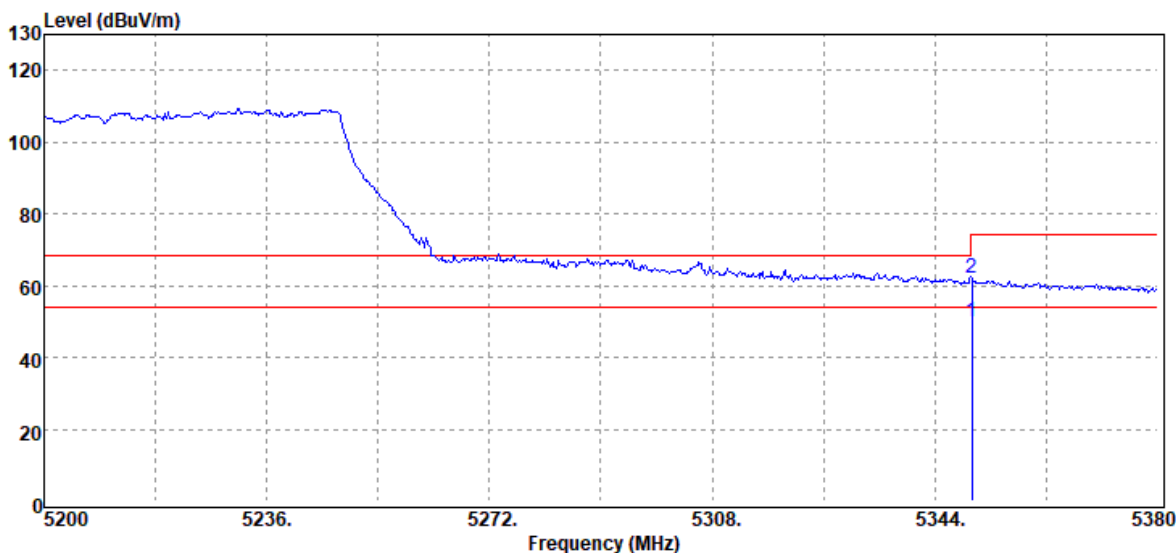
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5350.00	Average	44.52	5.21	49.73	54.00	-4.27
5350.00	Peak	56.87	5.21	62.08	74.00	-11.92

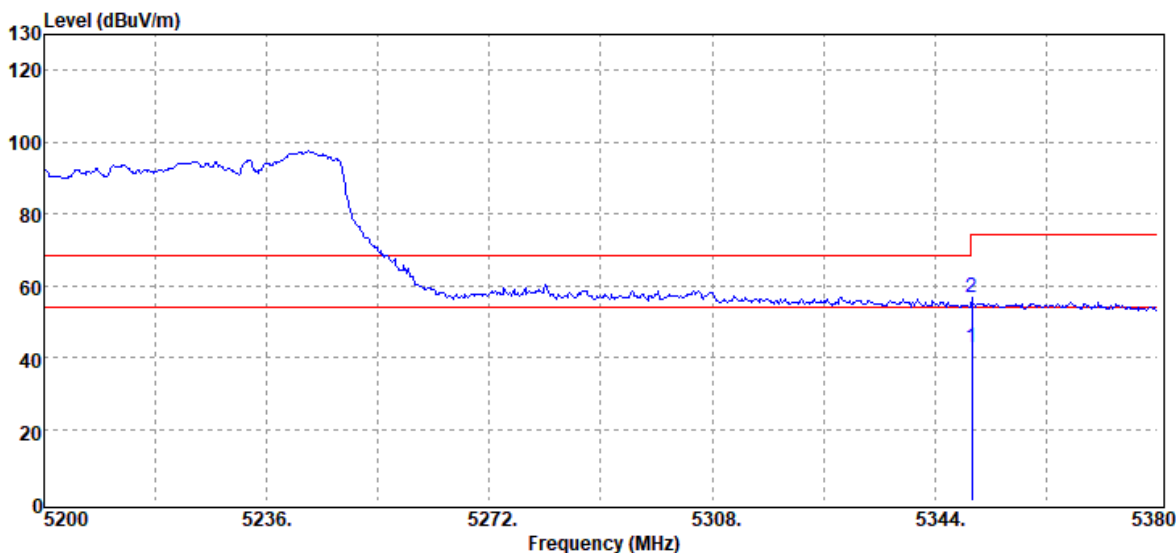
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Project Number :T190516W01  
Operation Band :802.11ac80/Band1  
Frequency :5210 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-22  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	Average	37.66	5.21	42.87	54.00	-11.13
5350.00	Peak	51.35	5.21	56.56	74.00	-17.44

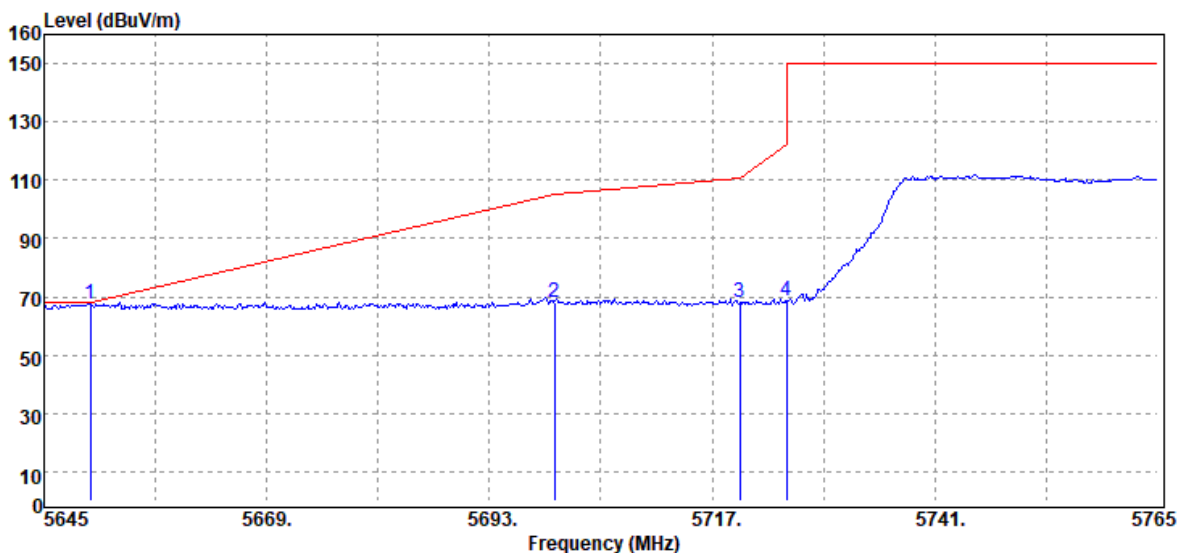
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :VERTICAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5650.00	Peak	61.29	6.04	67.33	68.20	-0.87
5700.00	Peak	62.05	6.32	68.37	105.20	-36.83
5720.00	Peak	62.04	6.33	68.37	110.80	-42.43
5725.00	Peak	62.51	6.34	68.85	122.20	-53.35

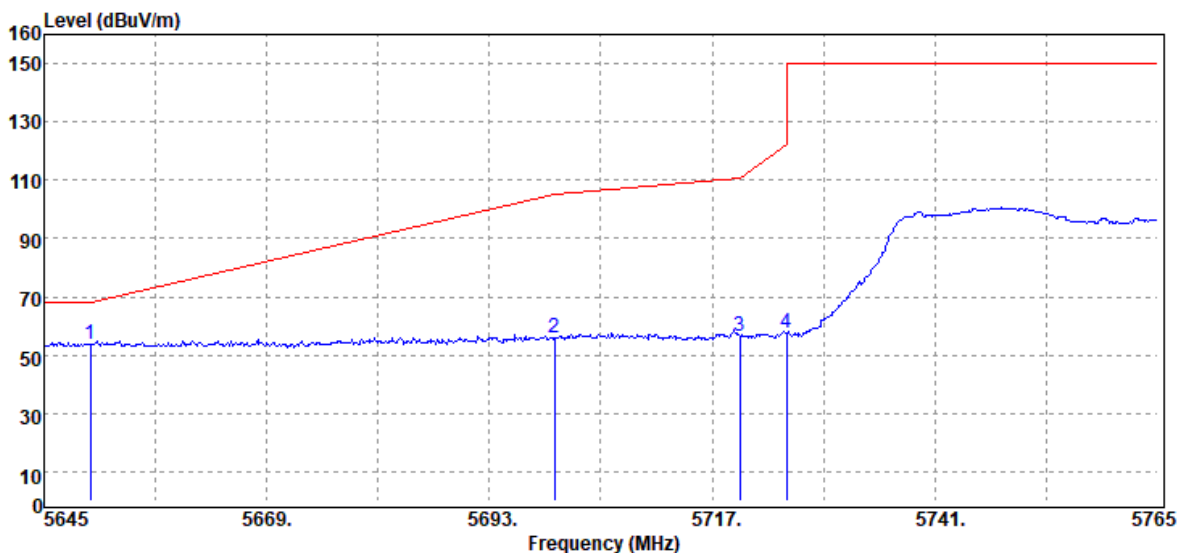
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :BE CH Low  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5650.00	Peak	47.58	6.04	53.62	68.20	-14.58
5700.00	Peak	49.79	6.32	56.11	105.20	-49.09
5720.00	Peak	50.19	6.33	56.52	110.80	-54.28
5725.00	Peak	51.12	6.34	57.46	122.20	-64.74

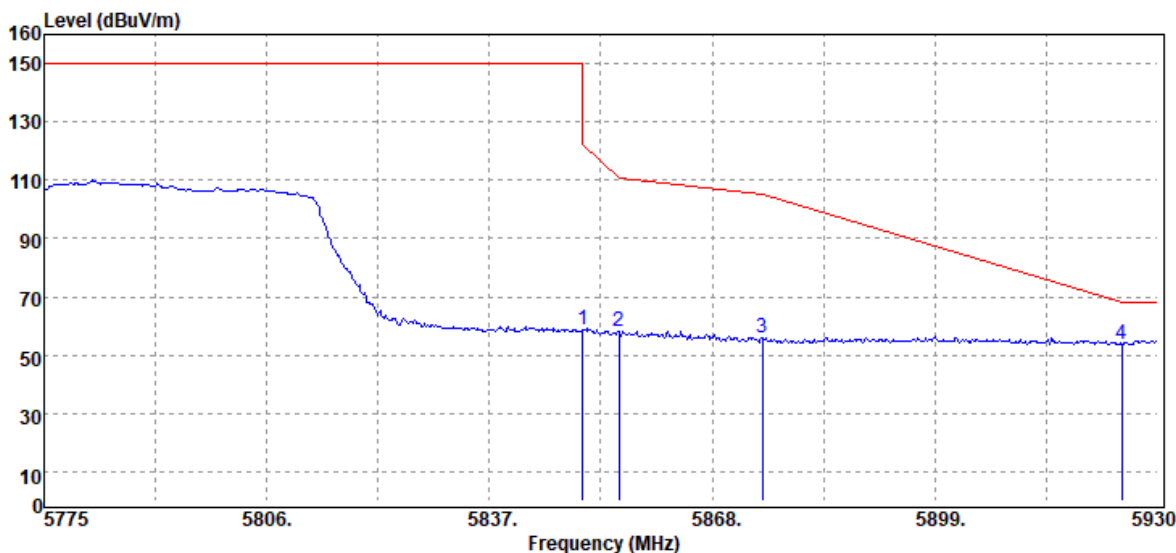
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
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	52.44	6.39	58.83	122.20	-63.37
5855.00	Peak	51.65	6.38	58.03	110.80	-52.77
5875.00	Peak	49.70	6.37	56.07	105.20	-49.13
5925.00	Peak	47.47	6.42	53.89	68.20	-14.31

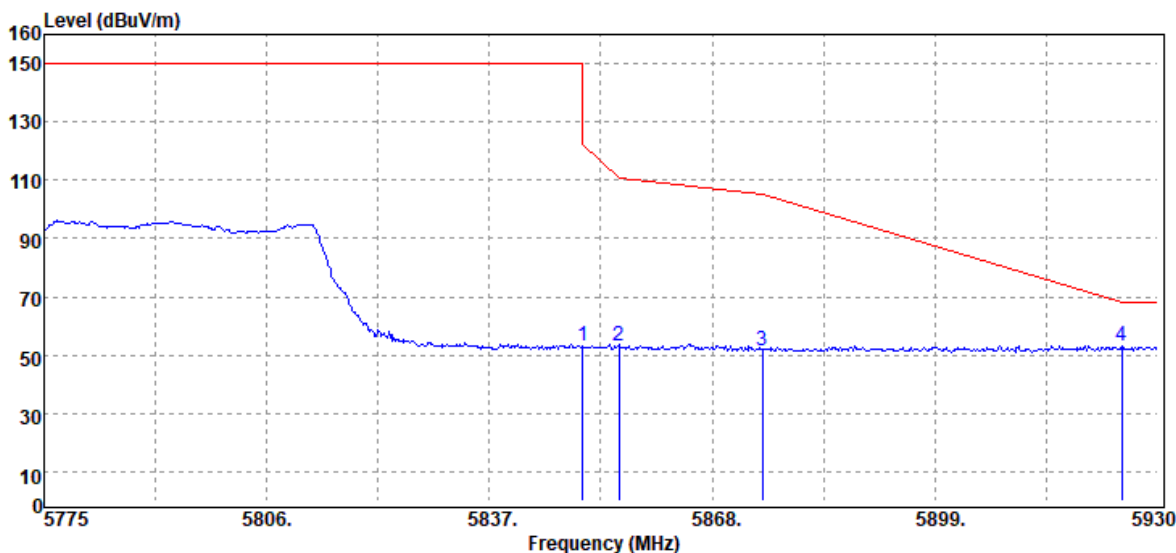
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Project Number :T190516W01  
Operation Band :802.11ac80/Band4  
Frequency :5775 MHz  
Operation Mode :BE CH High  
EUT Pol. :E2 Plan

Test Date :2019-05-29  
Temp./Humi. :21/55  
Antenna Pol. :HORIZONTAL  
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d $\mu$ V	Factor dB	Actual FS d $\mu$ V/m	Limit @3m d $\mu$ V/m	Margin dB
5850.00	Peak	46.96	6.39	53.35	122.20	-68.85
5855.00	Peak	46.97	6.38	53.35	110.80	-57.45
5875.00	Peak	45.37	6.37	51.74	105.20	-53.46
5925.00	Peak	46.51	6.42	52.93	68.20	-15.27

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## 12 TRANSMISSION IN THE ABSENCE OF DATA

### 12.1 Standard Applicable

According to §15.407(c)

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

### 12.2 Result

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

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## 13 FREQUENCY STABILITY

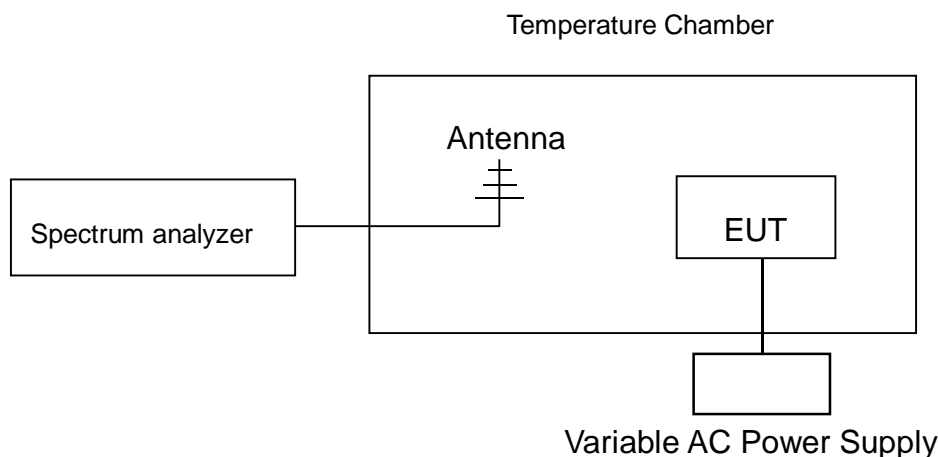
### 13.1 Standard Applicable

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

### 13.2 Measurement Procedure

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

### 13.3 Test SET-UP



### 13.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
DC Block	PASTER-NACK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
TEMPERATURE	TEMPERATURE	HTC-1	EC-HY-01	04/18/2019	04/17/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

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### 13.5 Measurement Result

#### Startup:

Operation Mode	802.11 a	Test Date	2019.06.19
Temperature	: 23.9°C	Test By	Hone
Humidity	: 58%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-40	48	36	5180	5,179.99210	0.00000153
	48	36	5180	5,809.98950	-0.12161959
25	48	36	5180	5,179.98460	0.00000297
70	48	36	5180	5,179.99130	0.00000168
	48	36	5180	5,179.98150	0.00000357

#### 2 minutes:

Operation Mode	802.11 a	Test Date	2019.06.19
Temperature	: 23.9°C	Test By	Hone
Humidity	: 58%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-40	48	36	5180	5,179.98720	0.00000247
	48	36	5180	5,809.98920	-0.12161954
25	48	36	5180	5,179.99410	0.00000114
70	48	36	5180	5,179.98400	0.00000309
	48	36	5180	5,179.98710	0.00000249

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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### 5 minutes:

Operation Mode	802.11 a	Test Date	2019.06.19
Temperature	: 23.9°C	Test By	Hone
Humidity	: 58%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-40	48	36	5180	5,179.99620	0.00000073
	48	36	5180	5,809.98230	-0.12161820
25	48	36	5180	5,179.99070	0.00000180
70	48	36	5180	5,179.99710	0.00000056
	48	36	5180	5,179.99830	0.00000033

### 10 minutes:

Operation Mode	802.11 a	Test Date	2019.06.19
Temperature	: 23.9°C	Test By	Hone
Humidity	: 58%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-40	48	36	5180	5,179.99720	0.00000054
	48	36	5180	5,809.99650	-0.12162095
25	48	36	5180	5,179.99570	0.00000083
70	48	36	5180	5,179.98140	0.00000359
	48	36	5180	5,179.98270	0.00000334

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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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