ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	Cisco Systems 125 West Tasman Drive San Jose California United States 95134-1706
Manufacturer:	Cisco Systems 125 West Tasman Drive San Jose California United States 95134-1706
Product Name:	FM3200
Brand Name:	Fluidmesh FM3200
Model No.:	FM3200, FM4200
Model Difference:	1. Some passive components of the DCIN circuit are mounted on PCB in FM4200 model. 2. Antenna connectors are different: RP-SMA on FM3200, QMA on FM4200. 3. Bottom part of FM4200 enclosure has M12 connectors instead of RJ45 ports: M12 DCIN port is added on FM4200.
Report Number:	ER/2020/30132
FCC ID:	R5SX200
FCC Rule Part:	§15.407, Cat: NII
Issue Date:	March 15, 2021
Date of Test:	April 1, 2020 - November 11, 2020
Date of EUT Received:	March 24, 2020

We hereby certify that:

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

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

Approved By: _____

Jim Chang / Manager

Testing Laboratory
3702

Revision History				
Report Number	**Revision**	**Description**	**Issue Date**	**Remark**
ER/2020/30132	Rev.00	Original.	March 15, 2021	Revised By: Violetta Tang

Note:

1、Multiple Model numbers or Trademarks
The variant model numbers are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.

2、Disclaimer
Variant information between model numbers is provided by the applicant, test results of this report are applicable to the sample EUT received.

3、Disclaimer
Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

Contents

1 GENERAL INFORMATION

1.1 Product Description

Product Name:	FM3200
Brand Name:	Fluidmesh FM3200
Model No.:	FM3200, FM4200
Model Difference:	1. Some passive components of the DCIN circuit are mounted on PCB in FM4200 model. 2. Antenna connectors are different: RP-SMA on FM3200, QMA on FM4200. 3. Bottom part of FM4200 enclosure has M12 connectors instead of RJ45 ports: M12 DCIN port is added on FM4200.
Hardware Version:	N/A
Software Version:	N/A
Power Supply:	48V from AC/DC Adapter
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps

1.2 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
Sector	N/A	JHS-5159-16D90A	5470~5725	16	V
			5725~5850	16	V
Bidirectional	Fluidmesh	FM-SHARK-DUAL	5470~5725	13	
			5725~5850	13	
Note: Pre-scanned was done on the above 2 antennas, the JHS-5159-16D90A results higher emission at 5GHz. Therefore, the completed set of measurement was done on the antenna to be presented on this test report.					

1.3 FCC worst power

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (Avg.) (dBm) (Worst case)	Modulation Technology
n_HT 20M	5470~5725	12	10.95	OFDM
	5725~5850	5	16.53	
n_HT 40M	5470~5725	6	10.56	
	5725~5850	2	16.94	

1.4 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

1.5 Test Facility

SGS Taiwan Ltd. Central RF Lab (TAF code 3702)
No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803
FCC Designation number: TW0027

1.6 Special Accessories

There are no special accessories used while test was conducted.

1.7 Equipment Modifications

There was no modification incorporated into the EUT.

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 a 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. 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 a 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

2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

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

2.4.2 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.

2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

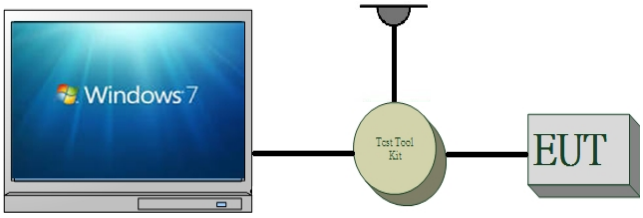


Fig. 2-2 Conducted (Antenna Port) Emission Configuration

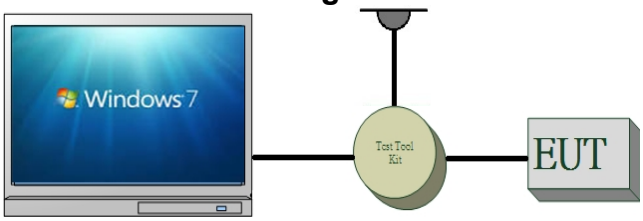


Fig. 2-3 Conducted (AC Power Line) Emission Configuration

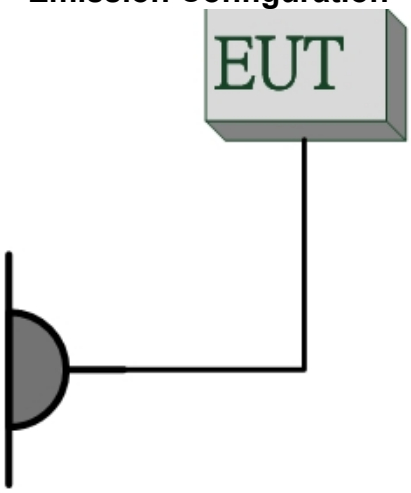


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Test Tool Kit	N/A	N/A	N/A	N/A	N/A
3.	Notebook	Lenovo	L480	PF-1S9Q32	N/A	N/A

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

4 DESCRIPTION OF TEST MODES

4.1 802.11n operated in U-NII Bands

Operated band in 5470 MHz ~5725 MHz:

20 M	
CH	Freq (MHz)
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700
144	5720

40 M	
CH	Freq (MHz)
102	5510
110	5550
118	5590
126	5630
134	5670
142	5710

Operated band in 5745 MHz ~5850 MHz:

20 M	
CH	Freq (MHz)
149	5745
153	5765
157	5785
161	5805
165	5825

40 M	
CH	Freq (MHz)
151	5755
159	5795

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				Single Transmission Spatial	Multiple Transmission Spatial
☒ 802.11 n	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☐ SISO	☒ 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.

4.2.1 RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	AN-TENNA PORT
802.11n_HT20	5500~5720	100 to 144	100,116,140	OFDM	MCS8	MIMO
	5745~5825	149 to 165	149,157,165			

RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	AN-TENNA PORT
802.11n_HT20	5500~5720	100 to 144	100,116,140,144	OFDM	MCS8	MIMO
	5745~5825	149 to 165	149,157,165			
802.11n_HT40	5510~5710	102 to 142	102,110,134,142		MCS8	MIMO
	5755~5795	151 to 159	151,159			

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

4.2.2 ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	AN-TENNA PORT
802.11n_HT20	5500~5720	100 to 144	100,116,140,144	OFDM	MCS8	MIMO
	5745~5825	149 to 165	149,157,165			
802.11n_HT40	5510~5710	102 to 142	102,110,134,142		MCS8	MIMO
	5755~5795	151 to 159	151,159			

5 MEASUREMENT UNCERTAINTY

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

Radiated Spurious Emission Measurement Uncertainty	
Polarization: Vertical	9kHz~30MHz: +-2.3dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB
Polarization: Horizontal	9kHz~30MHz: +-2.3dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

6 CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

6.2 Measurement Equipment Used

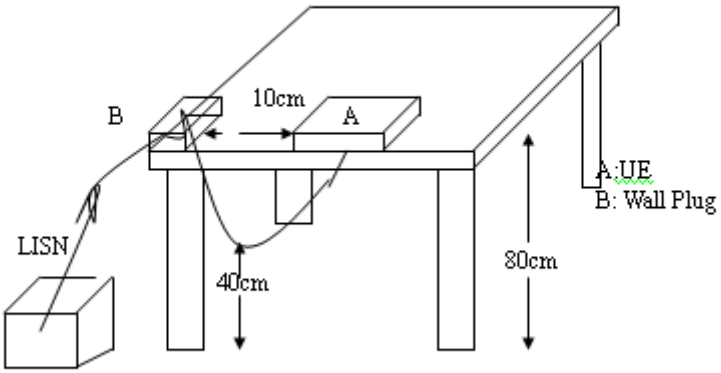
Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCI 7	1166.5950.07	07/04/2019	07/03/2020
LISN	SCHWARZ-BECK	NSLK 8127	8127-649	06/02/2019	06/01/2020
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R	N.C.R
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2020	01/01/2021

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

6.3 EUT Setup

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

6.4 Test SET-UP



6.5 Measurement Procedure

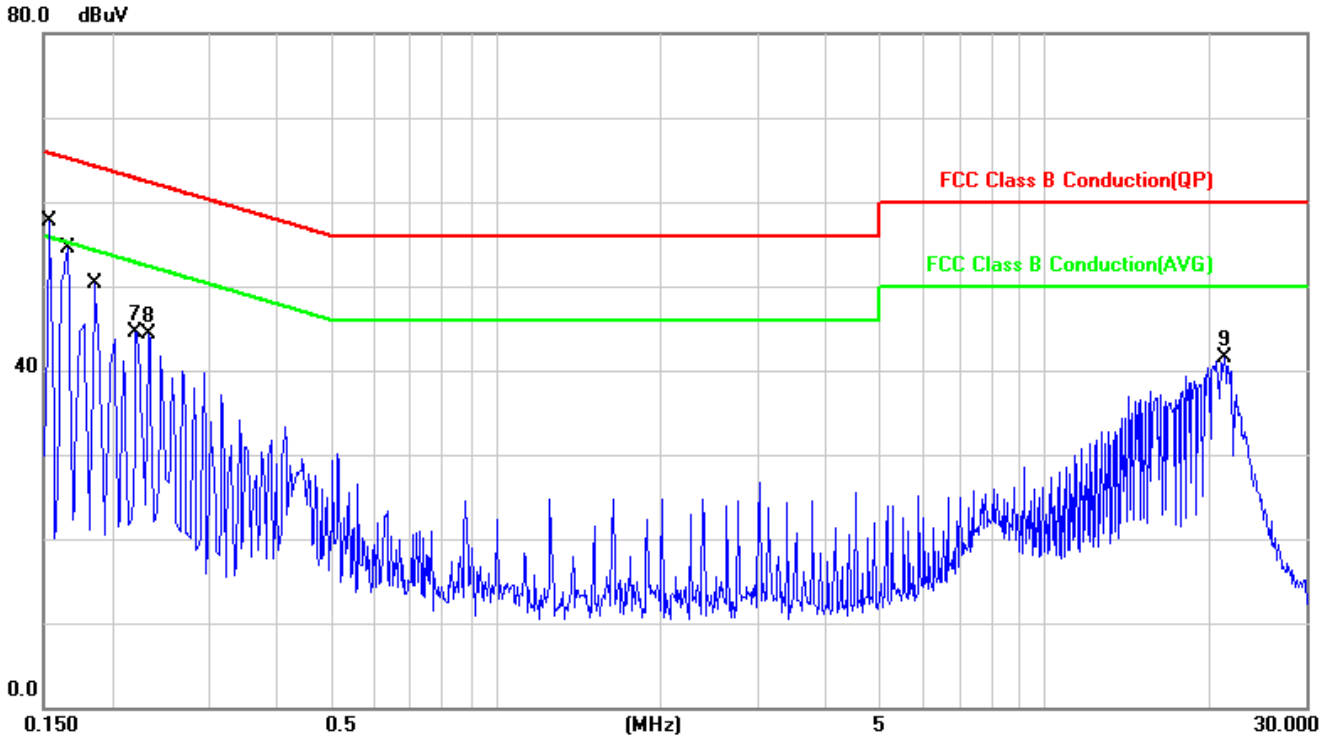
1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed.

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.

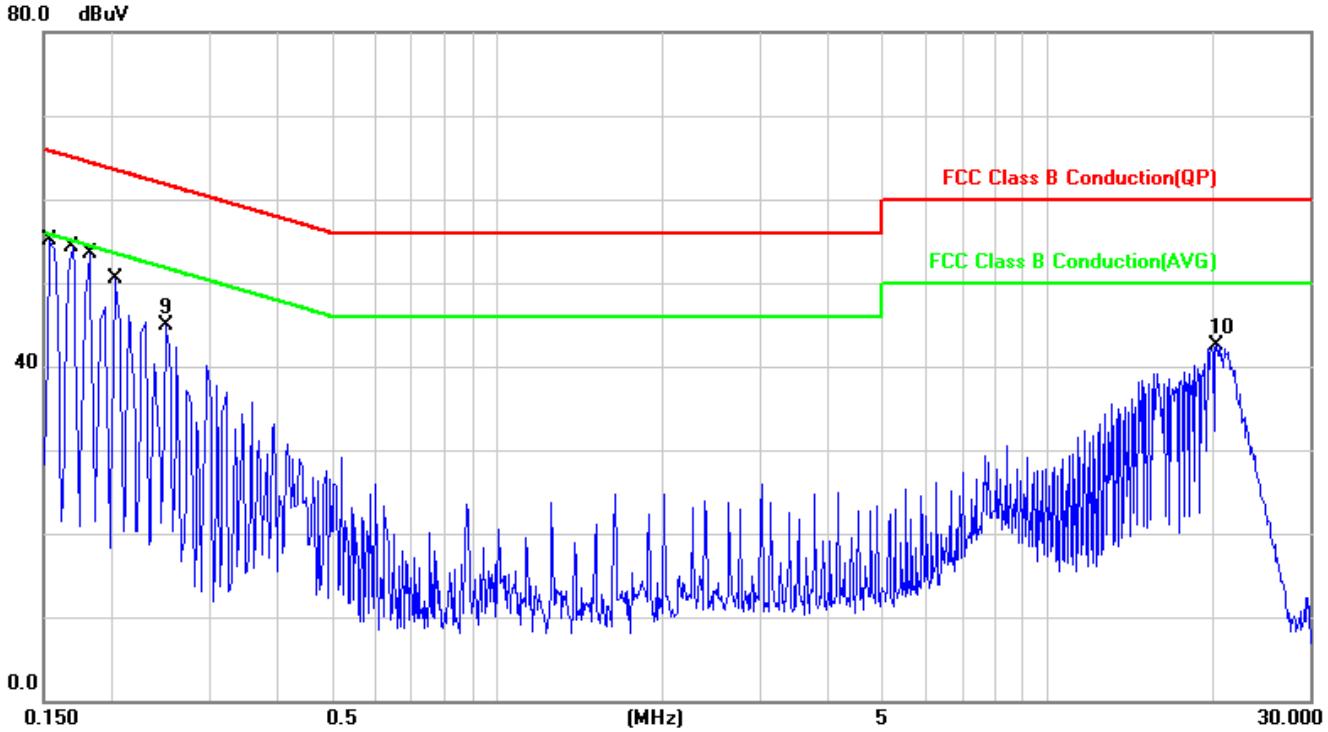
AC POWER LINE CONDUCTED EMISSION TEST DATA

Description:	**Operation**	**Date:**	**2020/04/14**
Line:	**L1**	**Temp.(℃)/Hum.(%):**	**22(℃)/46%**
Test Voltage:	**AC 120V/60Hz**	**Test By:**	**Nick**
Note:	**ER/2020/30132**		



No.	Mk.	Freq.	Reading	Factor	Measure-ment	Limit	Over	Detector	Comment
		(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)		
1	*	0.1540	52.22	0.00	52.22	65.78	-13.56	QP	
2		0.1540	26.65	0.00	26.65	55.78	-29.13	AVG	
3		0.1660	49.26	0.00	49.26	65.16	-15.90	QP	
4		0.1660	23.90	0.00	23.90	55.16	-31.26	AVG	
5		0.1860	45.59	0.01	45.60	64.21	-18.61	QP	
6		0.1860	21.03	0.01	21.04	54.21	-33.17	AVG	
7		0.2220	44.56	0.01	44.57	62.74	-18.17	peak	
8		0.2340	44.35	0.01	44.36	62.31	-17.95	peak	
9		21.3060	41.08	0.42	41.50	60.00	-18.50	peak	

Description:	**Operation**	**Date:**	**2020/04/14**
Line:	**N**	**Temp.(℃)/Hum.(%):**	**22(℃)/46%**
Test Voltage:	**AC 120V/60Hz**	**Test By:**	**Nick**
Note:	**ER/2020/30132**		



No.	Mk.	Freq.	Reading	Factor	Measure-ment	Limit	Over	Detector	Comment
		(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)		
1	*	0.1540	52.50	0.03	52.53	65.78	-13.25	QP	
2		0.1540	26.77	0.03	26.80	55.78	-28.98	AVG	
3		0.1700	48.84	0.03	48.87	64.96	-16.09	QP	
4		0.1700	23.82	0.03	23.85	54.96	-31.11	AVG	
5		0.1820	46.77	0.03	46.80	64.39	-17.59	QP	
6		0.1820	21.99	0.03	22.02	54.39	-32.37	AVG	
7		0.2020	43.59	0.03	43.62	63.53	-19.91	QP	
8		0.2020	19.19	0.03	19.22	53.53	-34.31	AVG	
9		0.2500	44.78	0.03	44.81	61.76	-16.95	peak	
10		20.2940	42.04	0.42	42.46	60.00	-17.54	peak	

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.

7.1 Measurement Procedure:

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

Duty Cycle:

Mode	Duty Cycle (%) =Ton / (Ton+Toff)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11n_20	96.76	0.14	0.63	1.00
802.11n_40	94.12	0.26	0.63	1.00

Duty Cycle Factor: 10 * log(1/0.9676) = 0.14
Duty Cycle Factor: 10 * log(1/0.9412) = 0.26

7.2 DUTY CYCLE TEST SIGNAL MEASUREMENT RESULT

802.11n_20MHz\5500 MHz-5500

802.11n_40MHz\5550 MHz-5550

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.

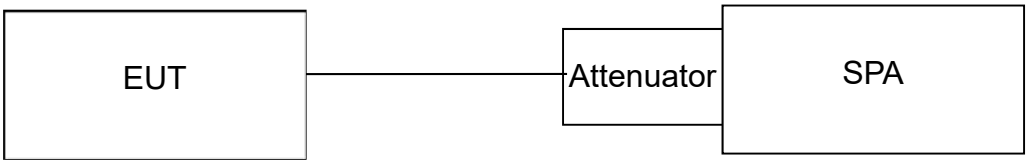
   3.a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW
   Sweep=auto,
   Detector = Peak,
   Trace Mode = Max Hold,
   Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.

   3.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.

8.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY57120290	02/20/2020	02/19/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021

8.4 Test Set-up



8.5 Measurement Result

8.5.1 FCC 26dB Bandwidth

802.11n_HT20_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5500	22.54	13.530
5580	22.63	13.547
5700	22.69	13.558
5720	22.23	13.469

802.11n_HT20_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5500	22.47	13.516
5580	22.15	13.454
5700	22.57	13.535
5720	22.66	13.553

802.11n _HT40_Ch0

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5510	43.49	16.384
5550	**46.17**	16.644
5670	47.57	16.773
5710	47.5	16.767

802.11n _HT40_Ch1

Freq. (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5510	43.48	16.383
5550	**45.19**	16.550
5670	47.37	16.755
5710	43.75	16.410

8.5.2 6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC

802.11n_HT20_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.39	12.146
5785	16.96	12.294
5825	16.45	12.162

802.11n_HT20_Ch1

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.06	12.057
5785	16.59	12.198
5825	16.96	12.294

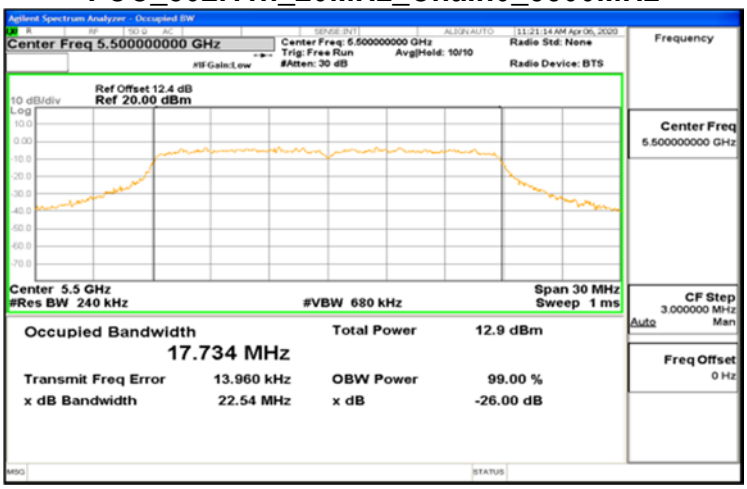
802.11n_HT40_Ch0

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	35.77	15.535
5795	35.21	15.467

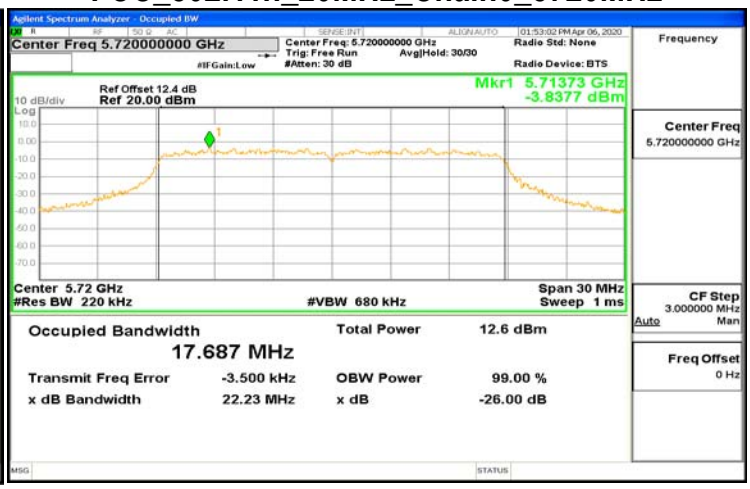
802.11n_HT40_Ch1

Freq. (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	35.74	15.532
5795	35.22	15.468

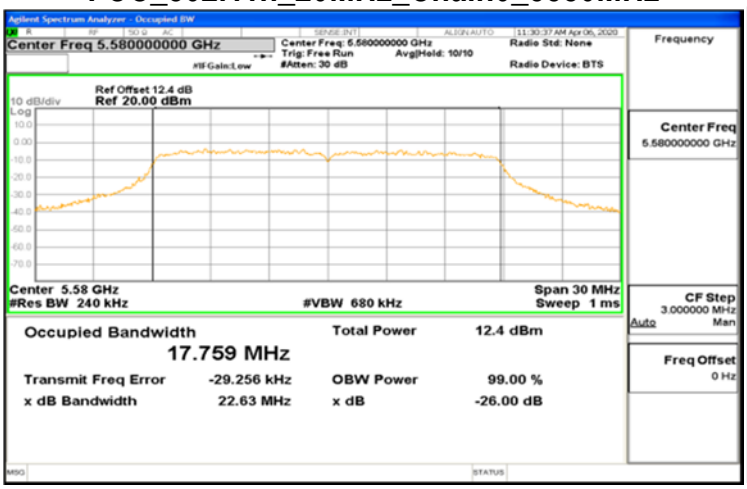
FCC_802.11n_20MHz_Chain0_5500MHz



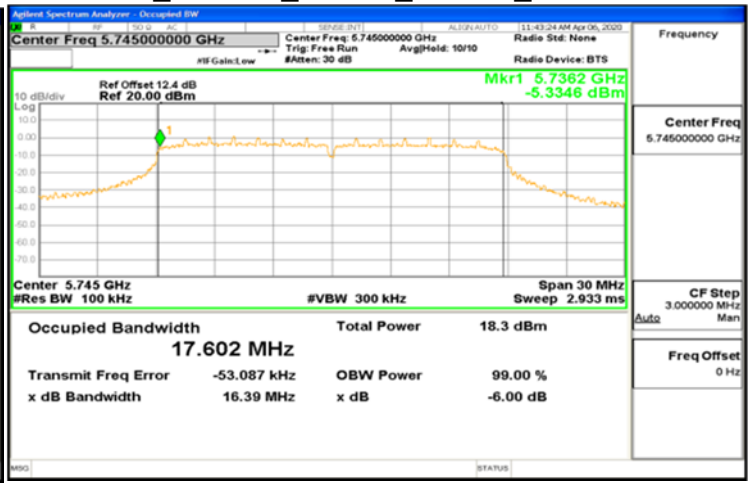
FCC_802.11n_20MHz_Chain0_5720MHz



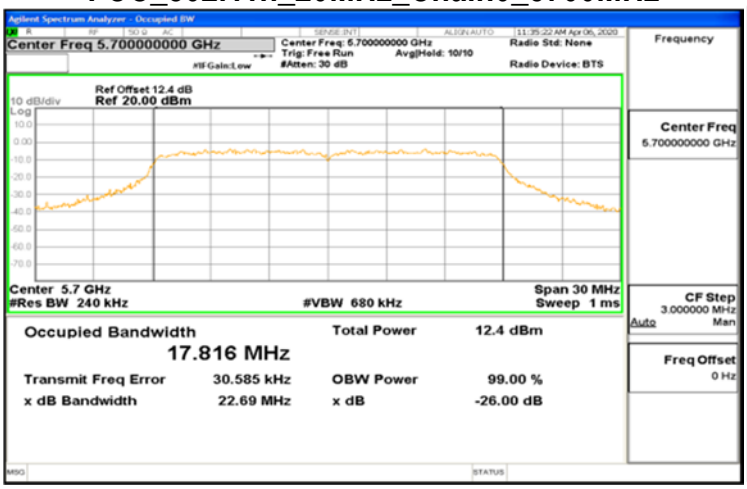
FCC_802.11n_20MHz_Chain0_5580MHz



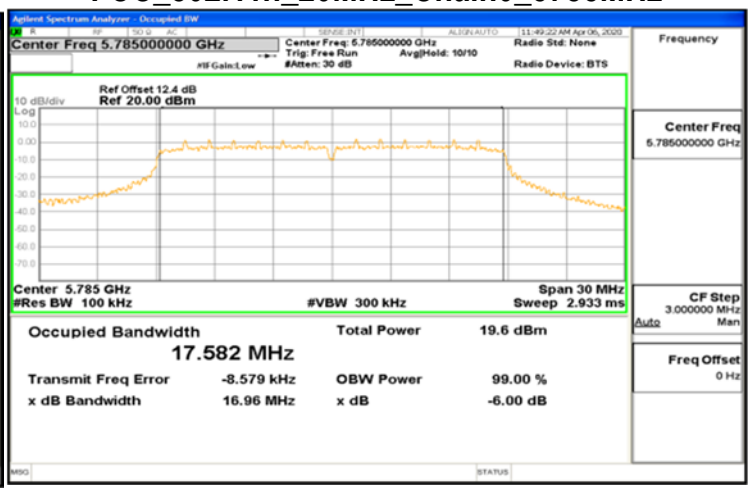
FCC_802.11n_20MHz_Chain0_5745MHz



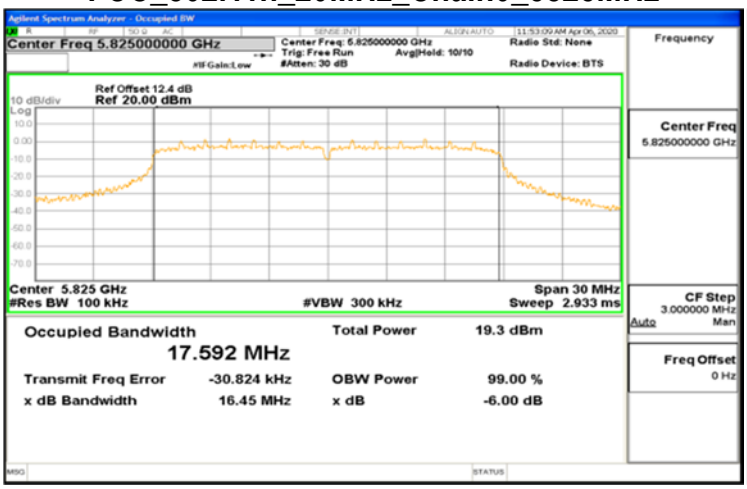
FCC_802.11n_20MHz_Chain0_5700MHz



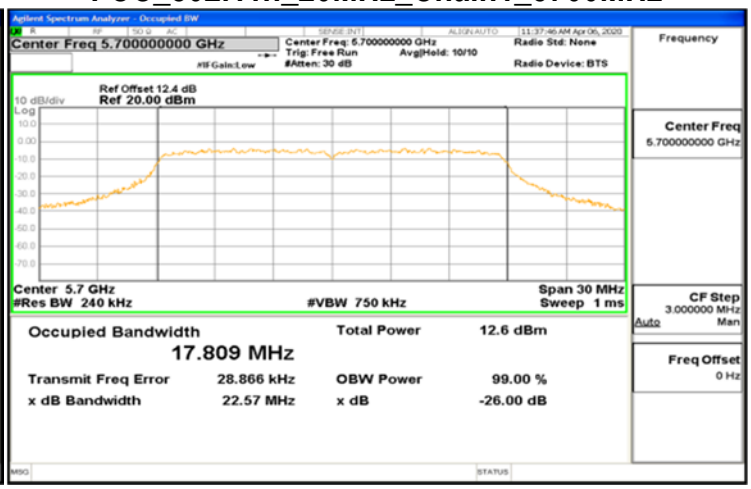
FCC_802.11n_20MHz_Chain0_5785MHz



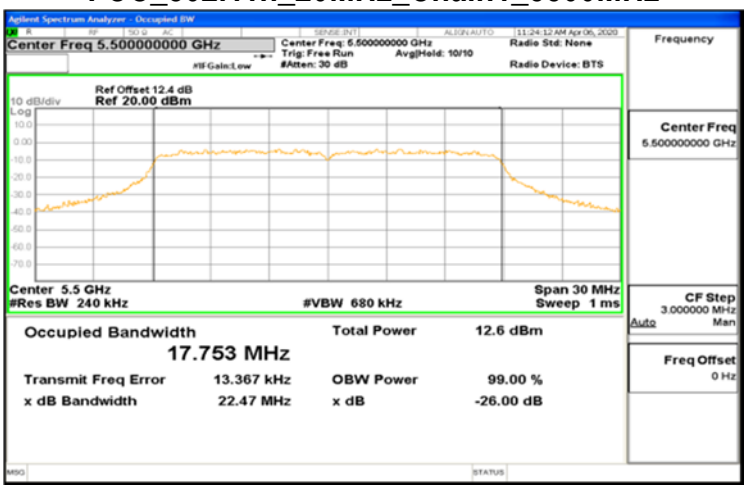
FCC_802.11n_20MHz_Chain0_5825MHz



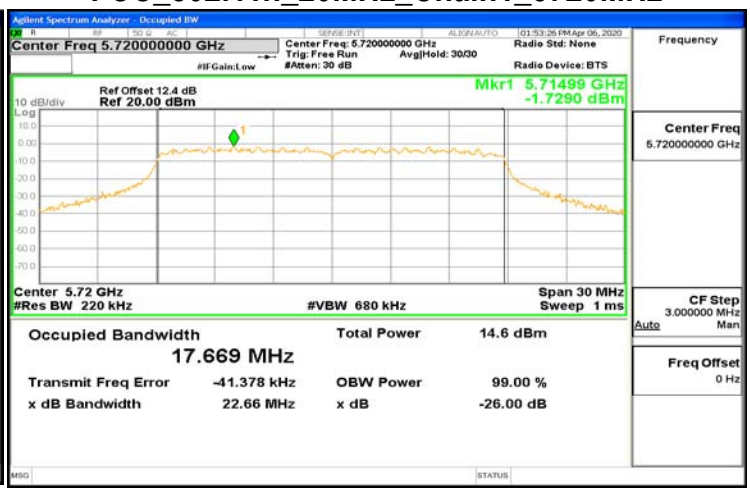
FCC_802.11n_20MHz_Chain1_5700MHz



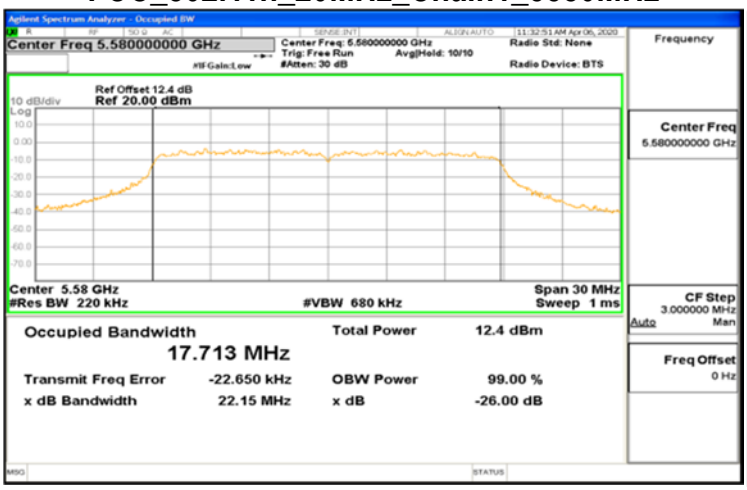
FCC_802.11n_20MHz_Chain1_5500MHz



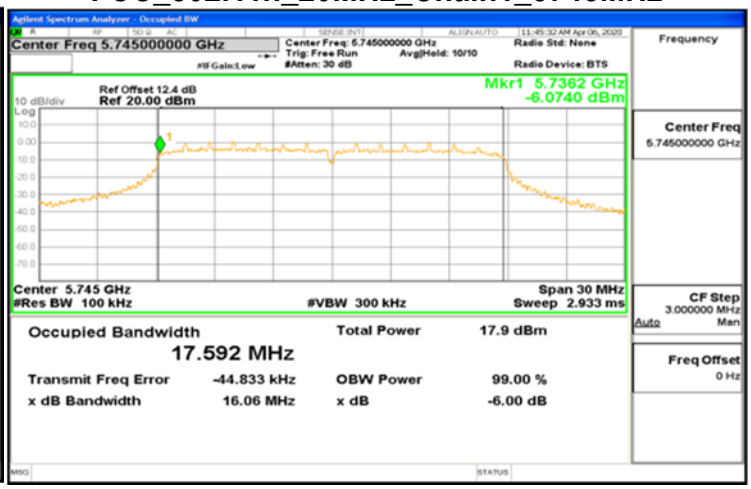
FCC_802.11n_20MHz_Chain1_5720MHz



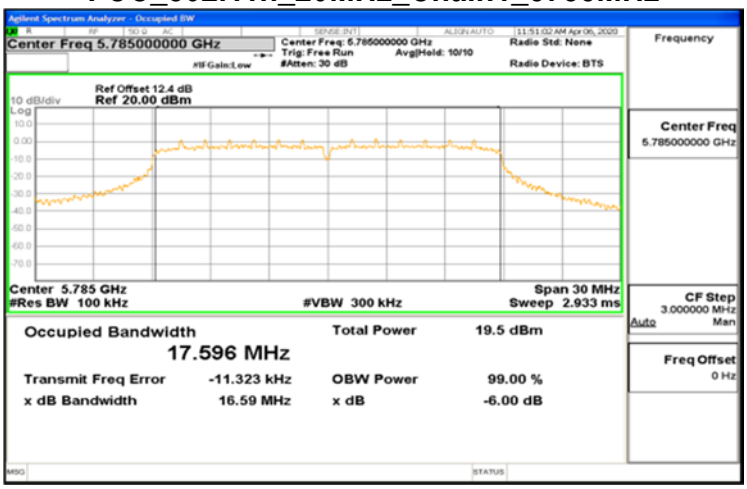
FCC_802.11n_20MHz_Chain1_5580MHz



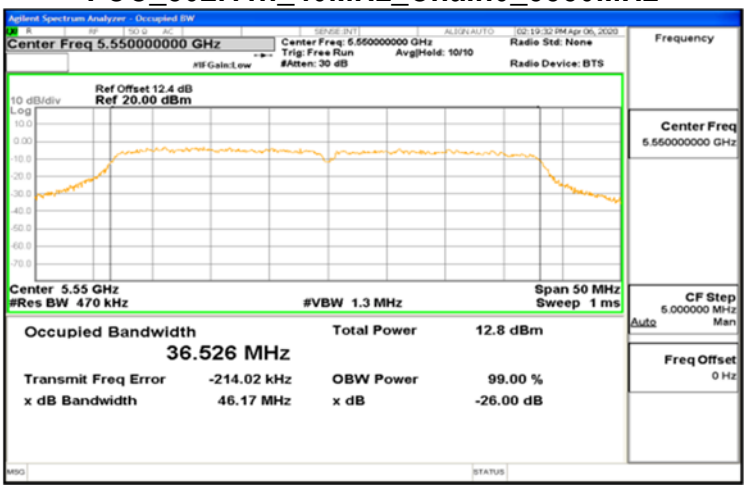
FCC_802.11n_20MHz_Chain1_5745MHz



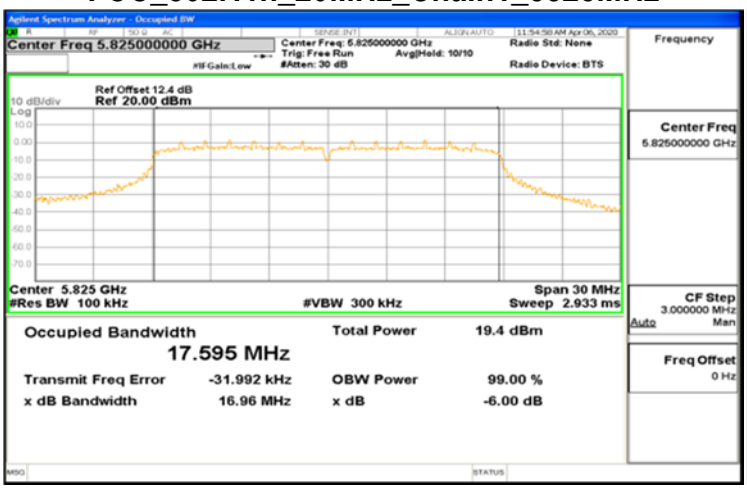
FCC_802.11n_20MHz_Chain1_5785MHz



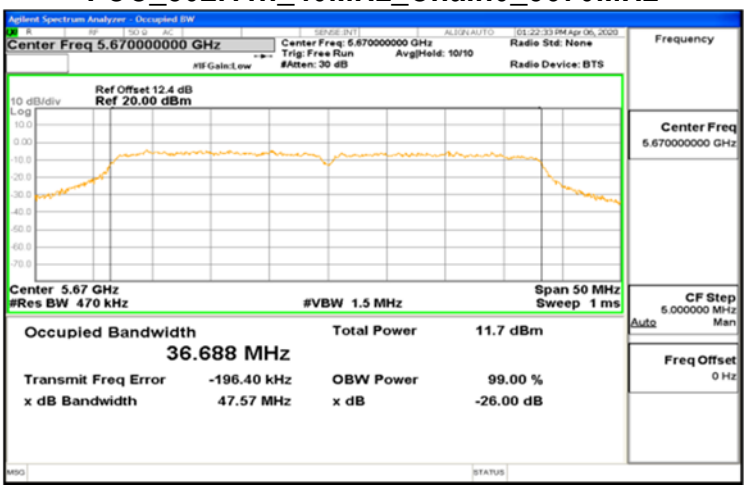
FCC_802.11n_40MHz_Chain0_5550MHz



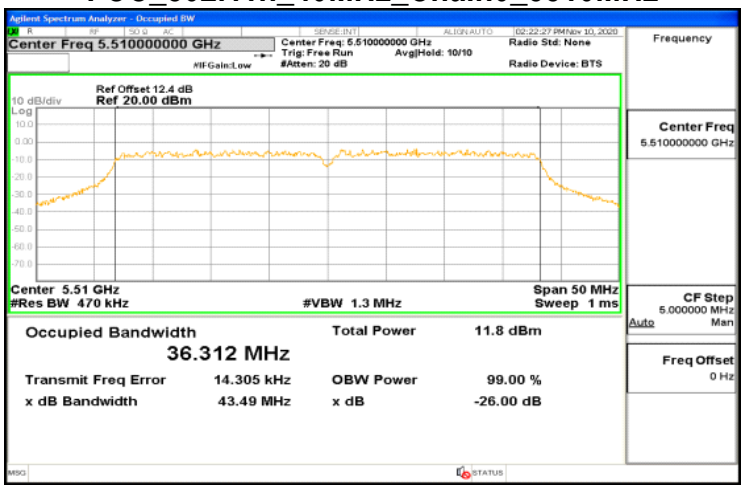
FCC_802.11n_20MHz_Chain1_5825MHz



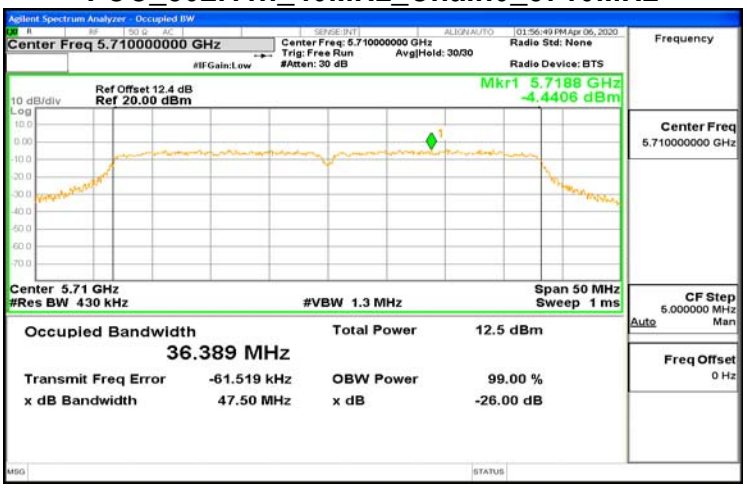
FCC_802.11n_40MHz_Chain0_5670MHz



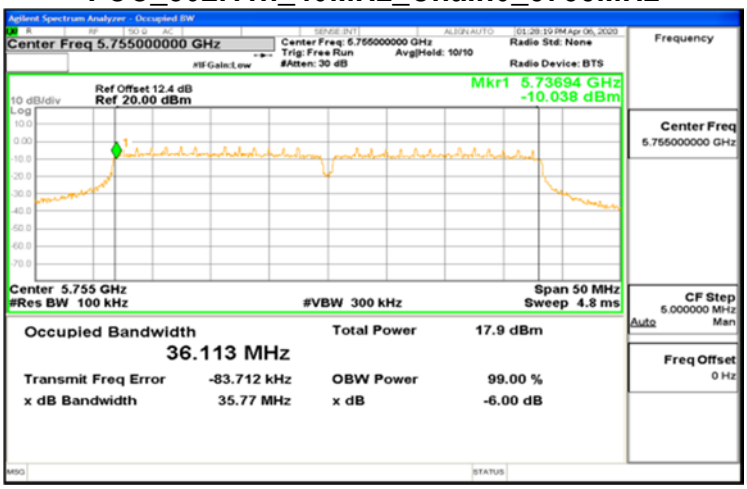
FCC_802.11n_40MHz_Chain0_5510MHz



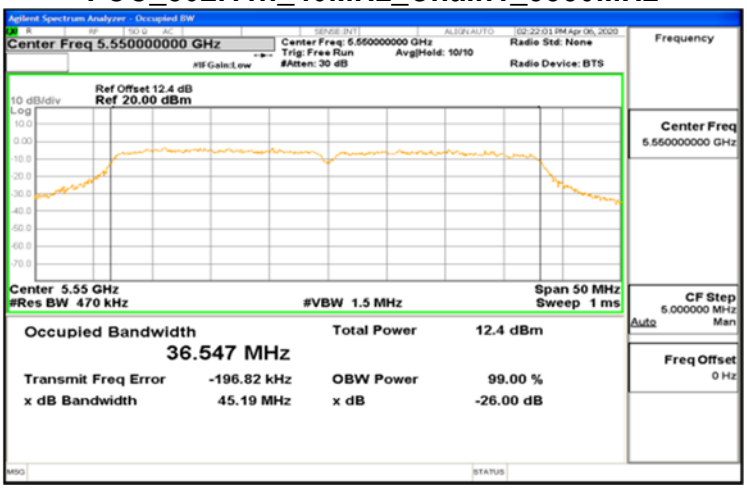
FCC_802.11n_40MHz_Chain0_5710MHz



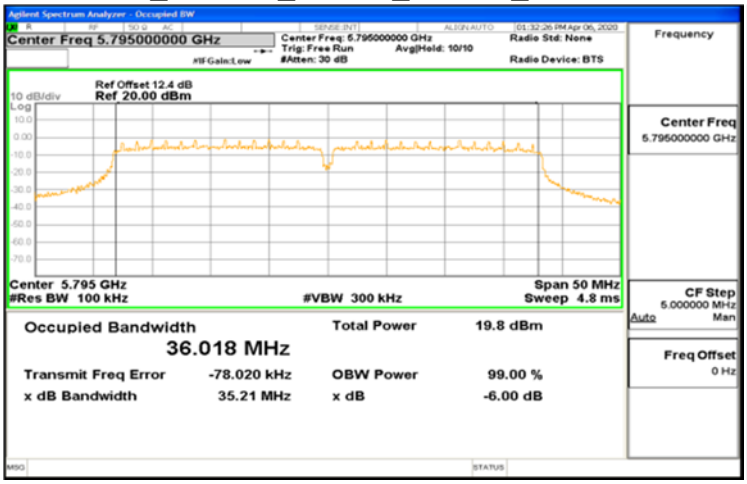
FCC_802.11n_40MHz_Chain0_5755MHz



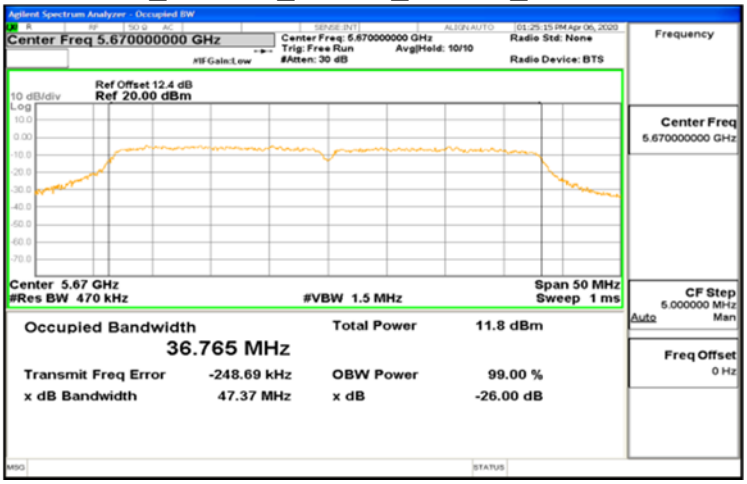
FCC_802.11n_40MHz_Chain1_5550MHz



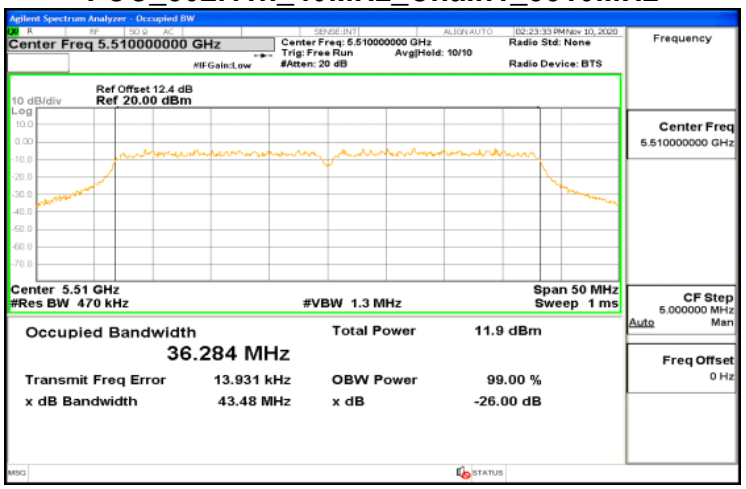
FCC_802.11n_40MHz_Chain0_5795MHz



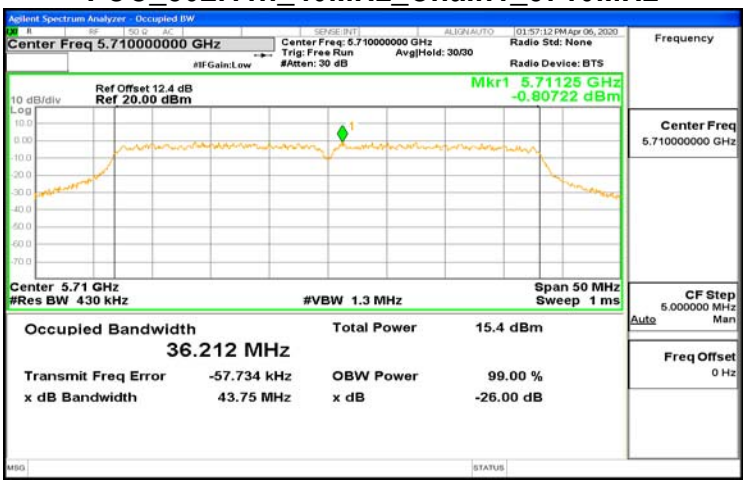
FCC_802.11n_40MHz_Chain1_5670MHz



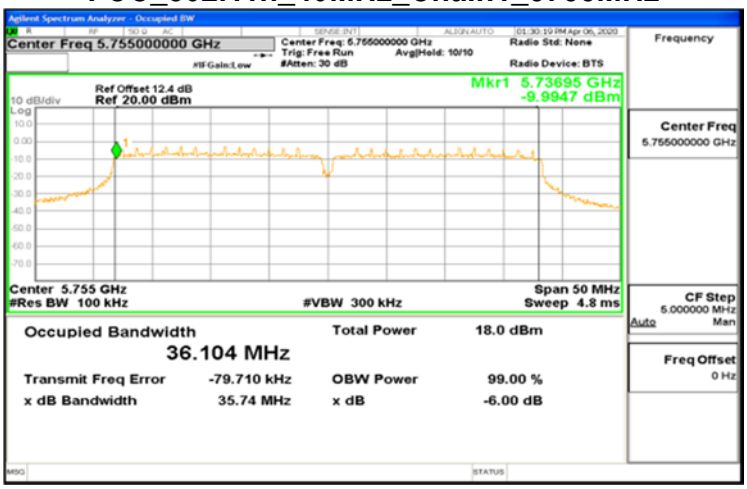
FCC_802.11n_40MHz_Chain1_5510MHz



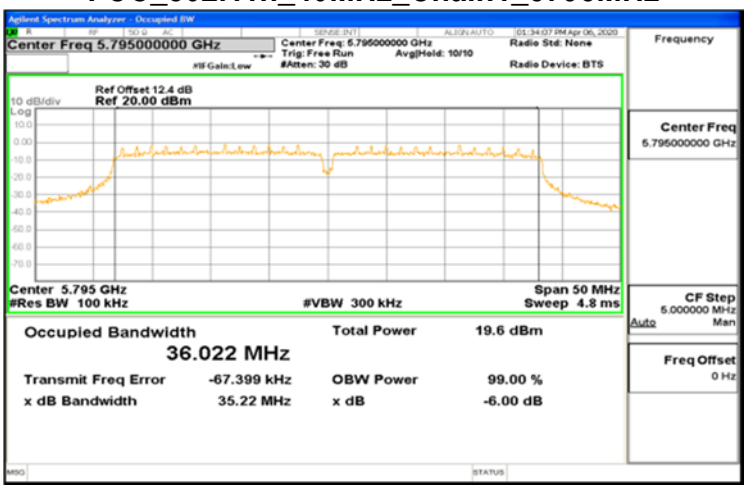
FCC_802.11n_40MHz_Chain1_5710MHz



FCC_802.11n_40MHz_Chain1_5755MHz



FCC_802.11n_40MHz_Chain1_5795MHz



8.5.3 99% BW Verification for DFS Function

802.11n_HT20_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5745	5736.20	> 5725

802.11n_HT20_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5745	5736.20	> 5725

802.11n _HT40_Ch0

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5755	5736.94	> 5725

802.11n _HT40_Ch1

Freq. (MHz)	Measured Freq. (MHz)	Limit (MHz)
5755	5736.95	> 5725

9 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 Standard Applicable

FCC

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 section F. 2). e). (ii) of FCC KDB 662911 D01

If antenna gains are not equal and each transmit antenna is driven by only one spatial stream, directional gain may be calculated by either of the following formulas.

- $$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

NSS = the number of independent spatial streams of data;

NANT = the total number of antennas

$g_{j,k}$ = / 20 10Gk if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

The antenna gain is grater than 6 dBi, therefore the power limit autenuation has been applied in the test results.

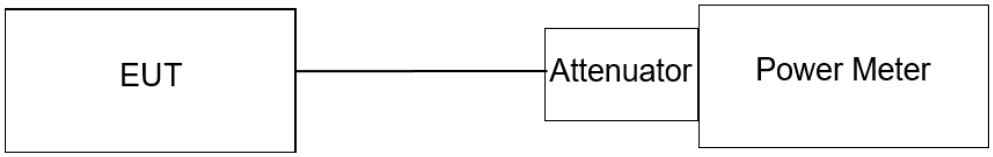
9.2 Measurement Procedure

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

9.3 Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1804001	02/20/2020	02/19/2021
Power Sensor	Anritsu	MA2411B	1726104	02/20/2020	02/19/2021
Power Sensor	Anritsu	MA2411B	1726107	02/20/2020	02/19/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021

9.4 Test Set-up



9.5 Measurement Result

9.5.1 Conducted output power (FCC)

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						
100	5500	MCS8	7.52	7.48	10.65	11.624	10.97	or 11+10log(B) =	24.52	PASS
116	5580	MCS8	7.98	6.77	10.57	11.403	10.97	or 11+10log(B) =	24.45	PASS
140	5700	MCS8	8.56	6.86	**10.95**	12.434	10.97	or 11+10log(B) =	24.54	PASS
144	5720(U-NII 2C)	MCS8	7.13	5.25	**9.46**	8.821	10.97	or 11+10log(B) =	24.47	PASS
144	5720 (U-NII 3)	MCS8	2.92	1.13	**5.25**	3.347	16.99			PASS
149	5745	MCS8	14.03	12.53	16.50	44.646	16.99			PASS
157	5785	MCS8	13.73	12.95	16.51	44.780	16.99			PASS
165	5825	MCS8	13.53	13.21	**16.53**	44.940	16.99			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						
102	5510	MCS8	7.63	6.92	**10.56**	11.384	10.97	or 11+10log(B) =	27.38	PASS
110	5550	MCS8	7.58	6.89	10.52	11.278	10.97	or 11+10log(B) =	27.55	PASS
134	5670	MCS8	7.93	6.41	10.51	11.245	10.97	or 11+10log(B) =	27.76	PASS
142	5710(U-NII 2C)	MCS8	7.39	6.17	**10.03**	10.075	10.97	or 11+10log(B) =	27.41	PASS
142	5720 (U-NII 3)	MCS8	0.92	-1.13	**3.57**	2.275	16.99			PASS
151	5755	MCS8	13.96	12.48	16.56	45.250	16.99			PASS
159	5795	MCS8	14.07	13.22	**16.94**	49.422	16.99			PASS

10 MAXIMUM POWER SPECTRAL DENSITY

10.1 Standard Applicable

FCC

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 section F. 2). e). (ii) of FCC KDB 662911 D01

If antenna gains are not equal and each transmit antenna is driven by only one spatial stream, directional gain may be calculated by either of the following formulas.

- $$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

where

Each antenna is driven by no more than one spatial stream;
NSS = the number of independent spatial streams of data;
NANT = the total number of antennas
$g_{j,k}$ = / 20 10Gk if the kth antenna is being fed by spatial stream j, or zero if it is not;
G_k is the gain in dBi of the kth antenna.

The antenna gain is grater than 6 dBi in MIMO mode, therefore the the power density limit autenuation has been applied in the test results.

10.2 Measurement Procedure

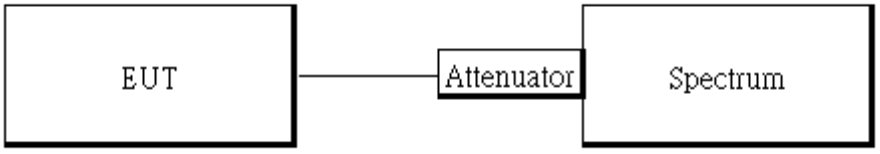
1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. **For U-NII1, U-NII-2A, U-NII-2C Band**:
   Set 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≥ 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. User the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.
8. 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.

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.
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY57120290	02/20/2020	02/19/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021

10.4 Test Set-up



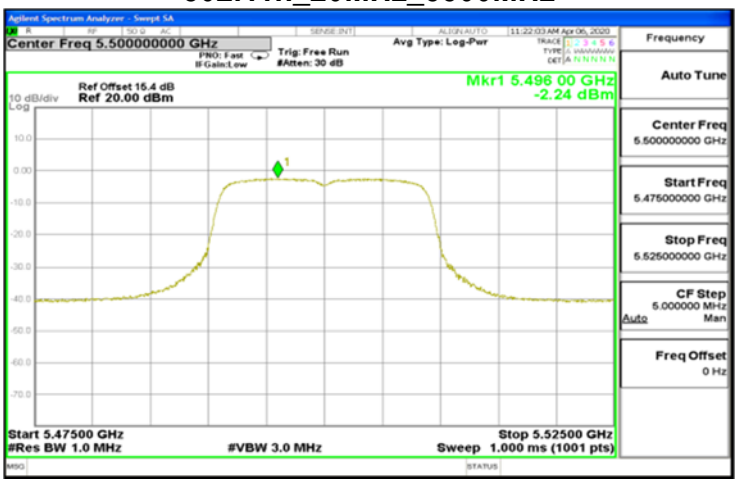
10.5 Measurement Result

10.5.1 Power spectral density

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)
5500	-2.24	0.14	-2.10	-2.01	-0.09
5580	-2.60	0.14	-2.46	-2.01	-0.45
5700	-2.91	0.14	-2.77	-2.01	-0.76
5720 (U-NII 2C)	-2.40	0.14	-2.26	-2.01	-0.25
5720 (U-NII 3)	-5.80	0.14	-5.66	16.99	-22.65
5745	-0.57	0.14	-0.43	16.99	-17.42
5785	0.95	0.14	1.09	16.99	-15.90
5825	0.55	0.14	0.69	16.99	-16.30

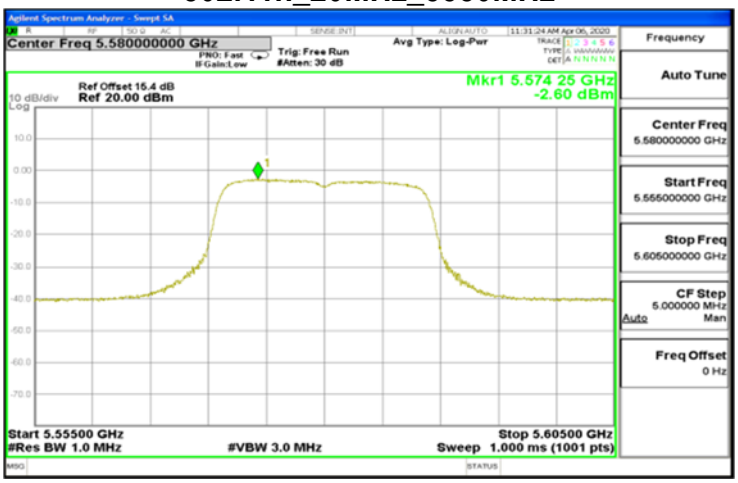
POWER DENSITY 802.11n HT40 MODE					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5510	-6.97	0.26	-6.71	-2.01	-4.70
5550	-5.23	0.26	-4.97	-2.01	-2.96
5670	-6.63	0.26	-6.37	-2.01	-4.36
5710 (U-NII 2C)	-5.65	0.26	-5.39	-2.01	-3.38
5710 (U-NII 3)	-9.34	0.26	-9.08	16.99	-26.07
5755	-3.87	0.26	-3.61	16.99	-20.60
5795	-2.08	0.26	-1.82	16.99	-18.81

802.11n_20MHz_5500MHz

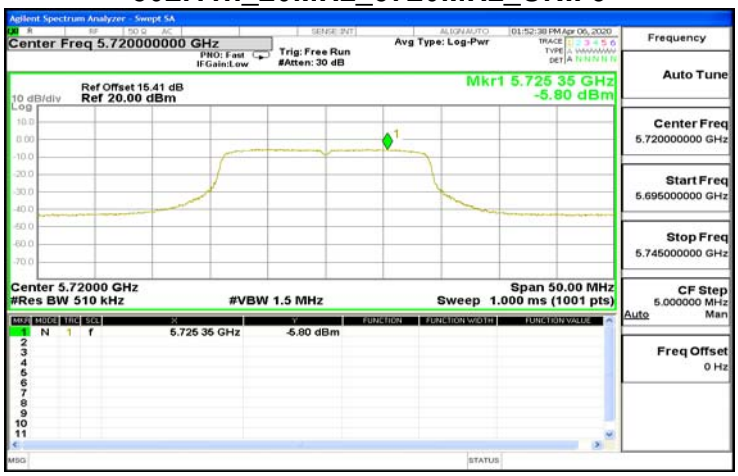


802.11n_20MHz_5720MHz_UNII 2C

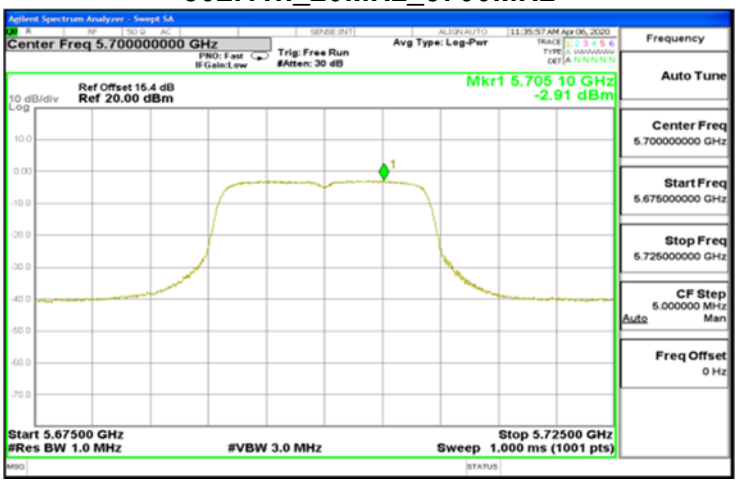
802.11n_20MHz_5580MHz



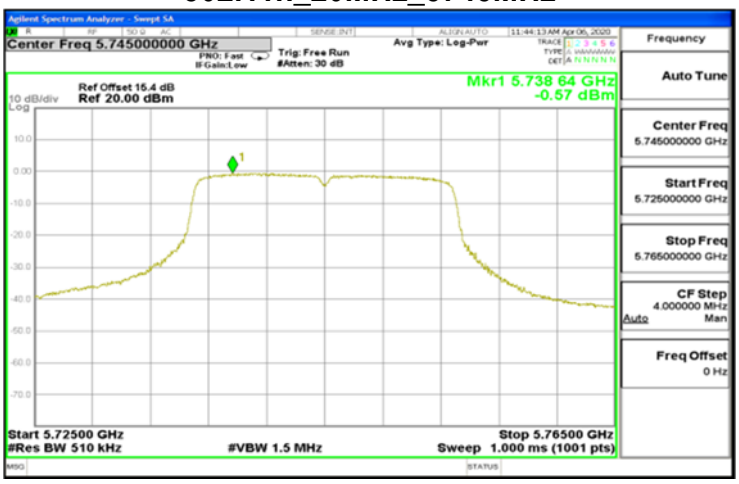
802.11n_20MHz_5720MHz_UNII 3



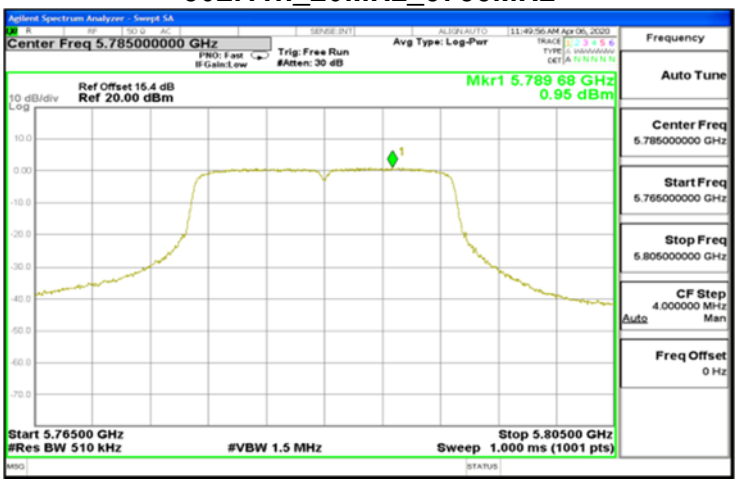
802.11n_20MHz_5700MHz



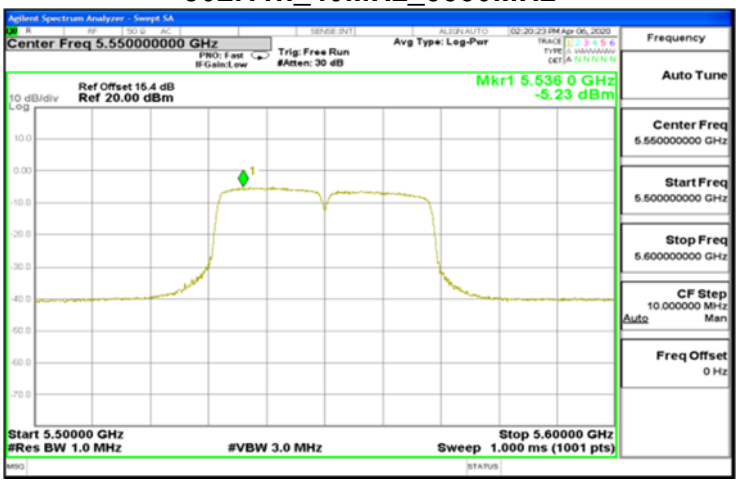
802.11n_20MHz_5745MHz



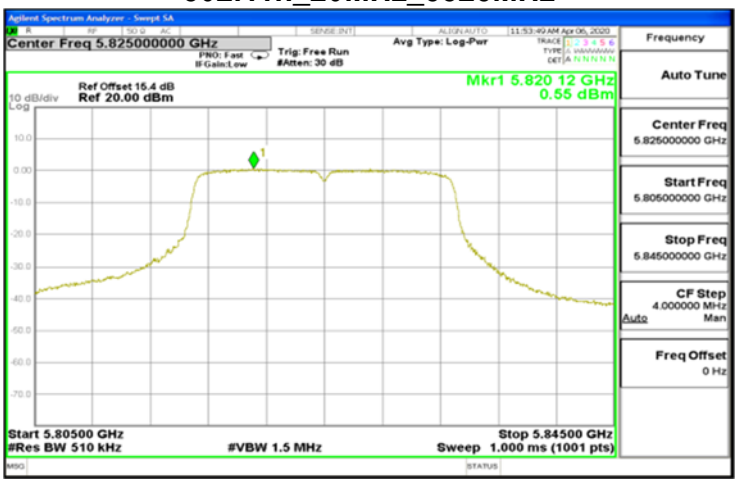
802.11n_20MHz_5785MHz



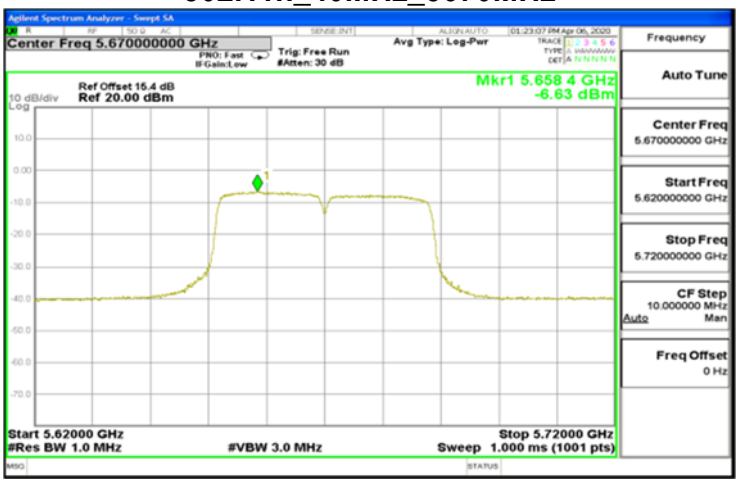
802.11n_40MHz_5550MHz



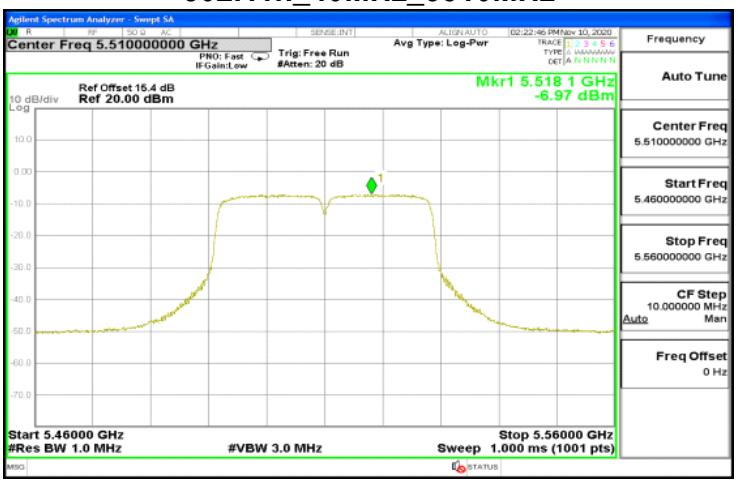
802.11n_20MHz_5825MHz



802.11n_40MHz_5670MHz



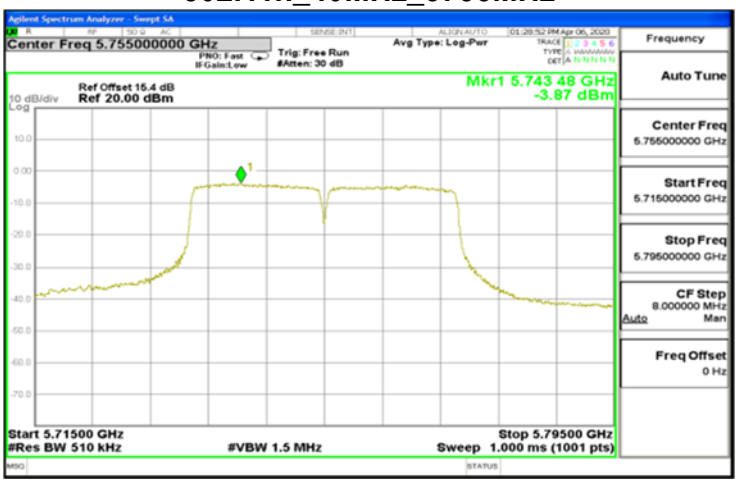
802.11n_40MHz_5510MHz



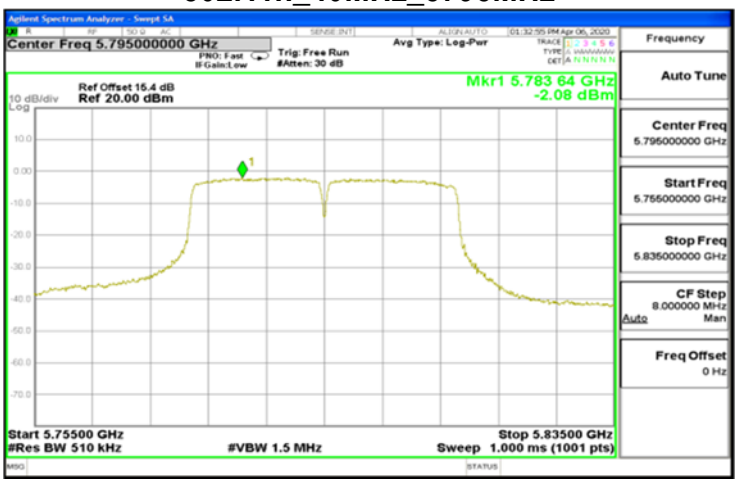
802.11n_40MHz_5710MHz_UNII 2C

802.11n_40MHz_5710MHz_UNII 3

802.11n_40MHz_5755MHz



802.11n_40MHz_5795MHz



11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

11.1 Standard Applicable

11.1.1 Band Edge

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	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*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.*

11.1.2 Spurious Emission

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:

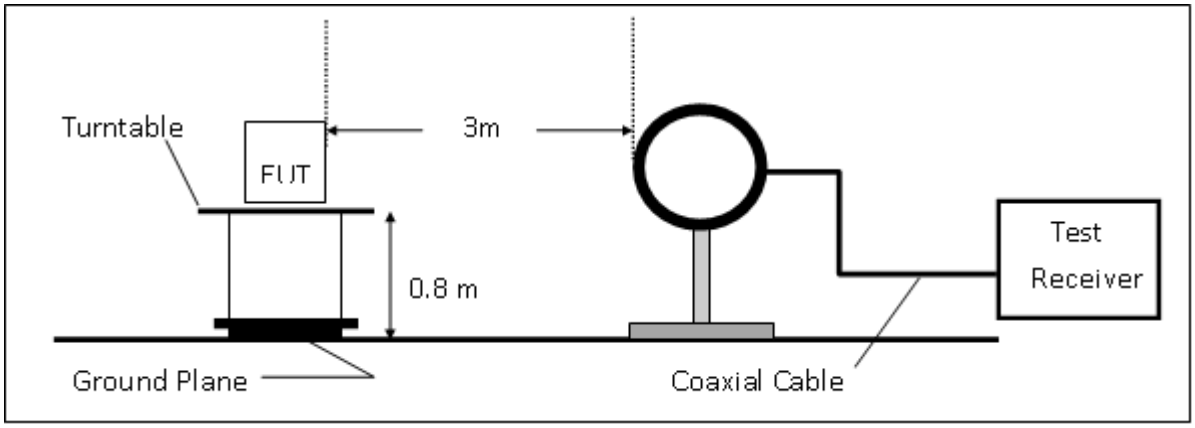
1. *The lower limit shall apply at the transition frequencies.*
2. *Emission level (dBμV/m) = 20 log Emission level (μV/m)*

11.2 Measurement Equipment Used

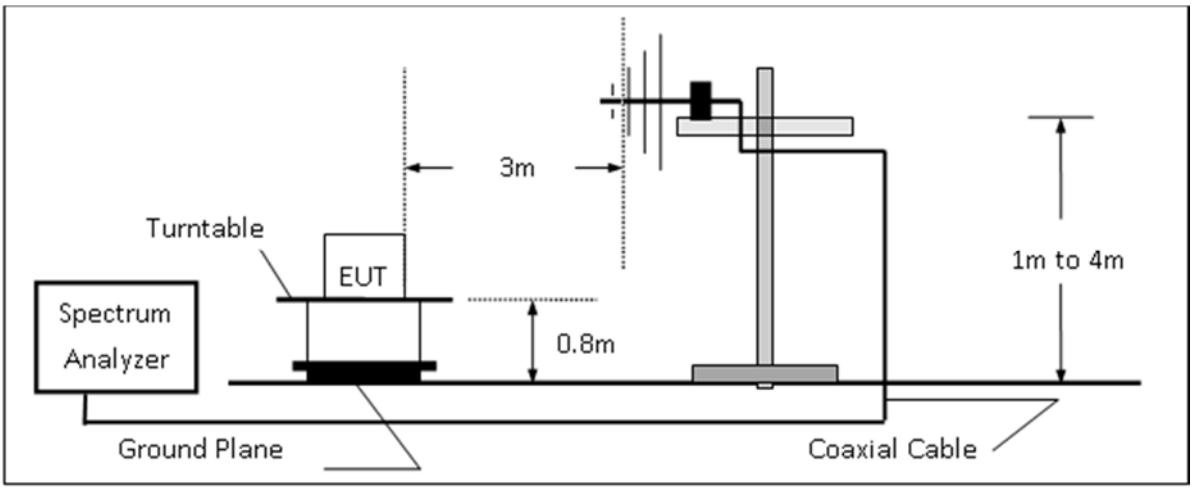
EQUIPMENT TYPE	MFR	MODEL NUM-BER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Bi-log Antenna	SCHWAZBECK	VULB9168	378	01/03/2020	01/02/2021
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/20/2019	08/19/2020
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2019	12/24/2020
3m Site NSA	SGS	966 chamber	N/A	01/02/2019	01/01/2021
Loop Antenna	ETS.LIND-GREN	6502	148045	10/15/2019	10/14/2020
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/22/2019	04/21/2020
EMI Test Receiver	R&S	ESCI 7	1166.5950.07	07/04/2019	07/03/2020
Pre-Amplifier	HP	8449B	3008A00578	01/02/2020	01/01/2021
Pre-Amplifier	HP	8447D	2944A07676	01/02/2020	01/01/2021
Pre-Amplifier	EMC Instru-ments	EMC184045B	980135	01/02/2020	01/01/2021
Filter 5470-5725 MHz	Micro-Tronics	BRM50704	1	01/02/2020	01/01/2021
Filter 5725-5875 MHz	Micro-Tronics	BRM50705	1	01/02/2020	01/01/2021
High Pass Filter	WI	WHKX7.0/18G-8SS	45	01/02/2020	01/01/2021
Low Loss Cable	Huber Suhner	966_RX	9	01/02/2020	01/01/2021

11.3 Test SET-UP

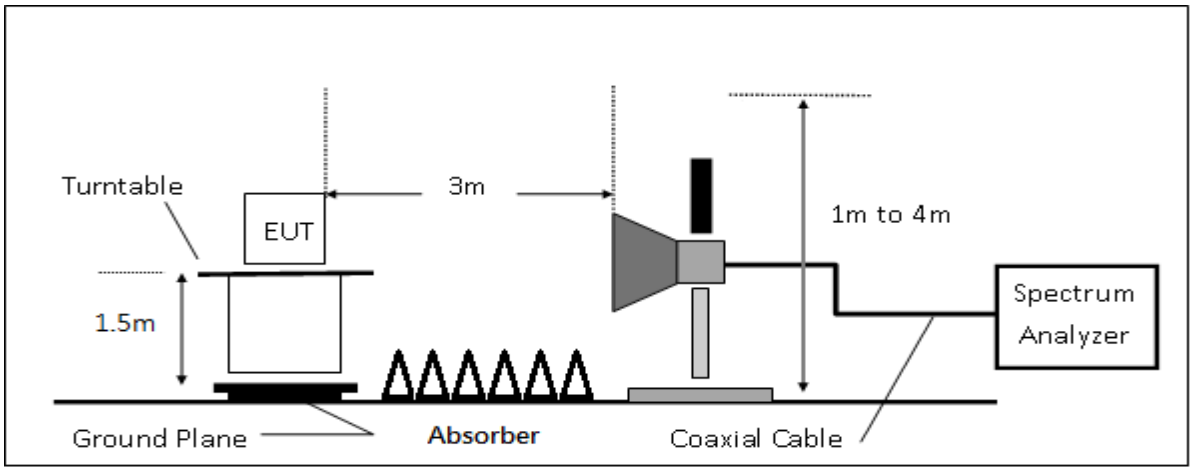
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



11.4 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
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. At frequency above 1 GHz, Set the spectrum analyzer:
   A. RBW=1 MHz, VBW=3 MHz for **Peak** Detector.
   B. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for **Average** Detector.
8. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
9. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
10. 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

*The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)*

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

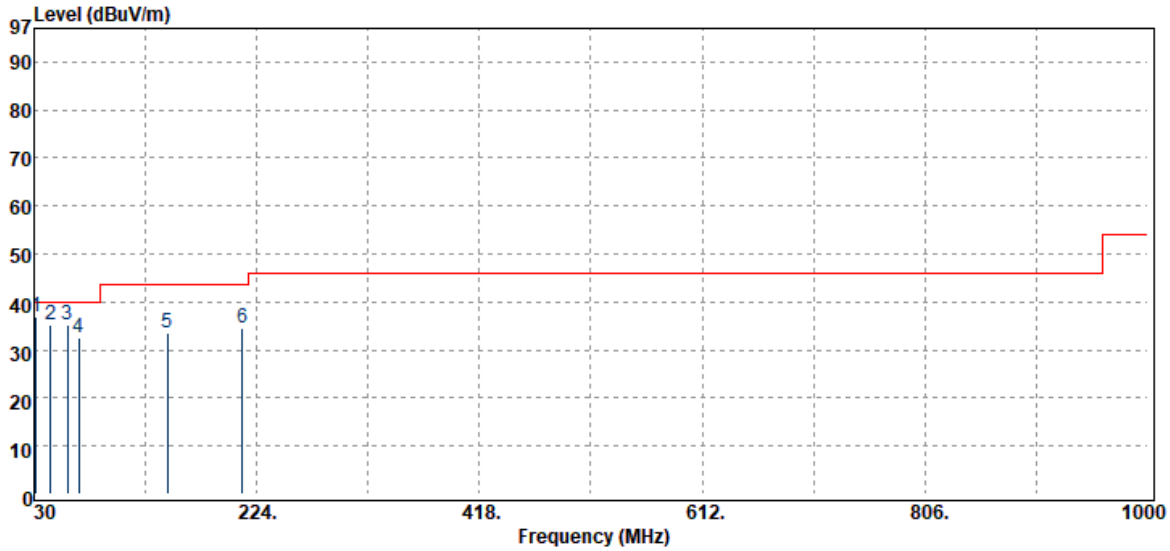
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

Pre-scanned was done at frequency 5.47 GHz and 5.85 GHz for bandedge measurement of straddle channels 142 and 144 which was 20dB lower than the limit per 15.31(o) was not reported.

11.7 Radiated Spurious Emission Measurement Result

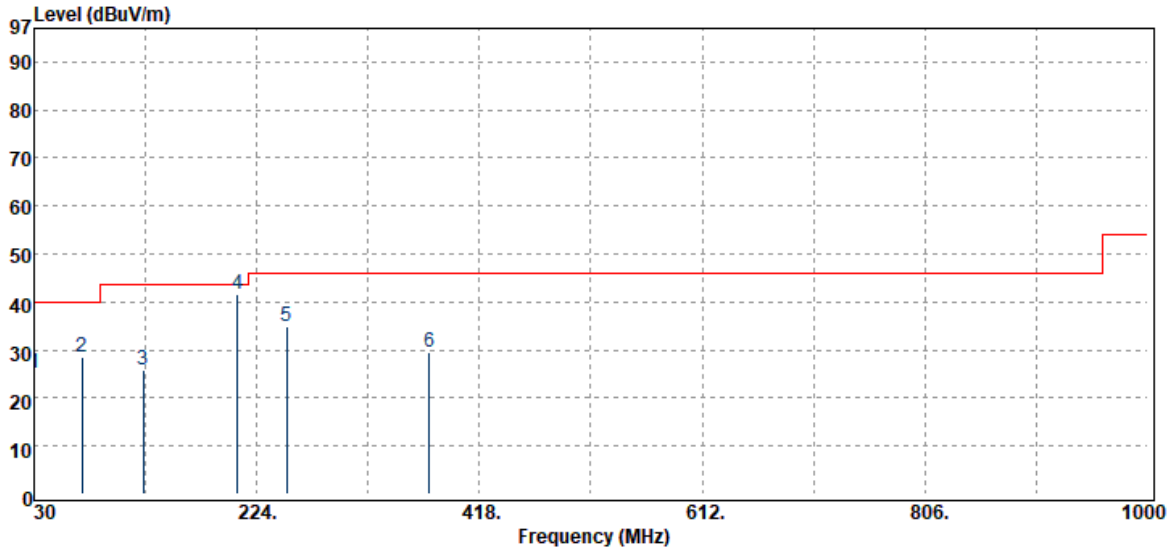
11.7.1 Below 1GHz Worst-Case Data:

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5580 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



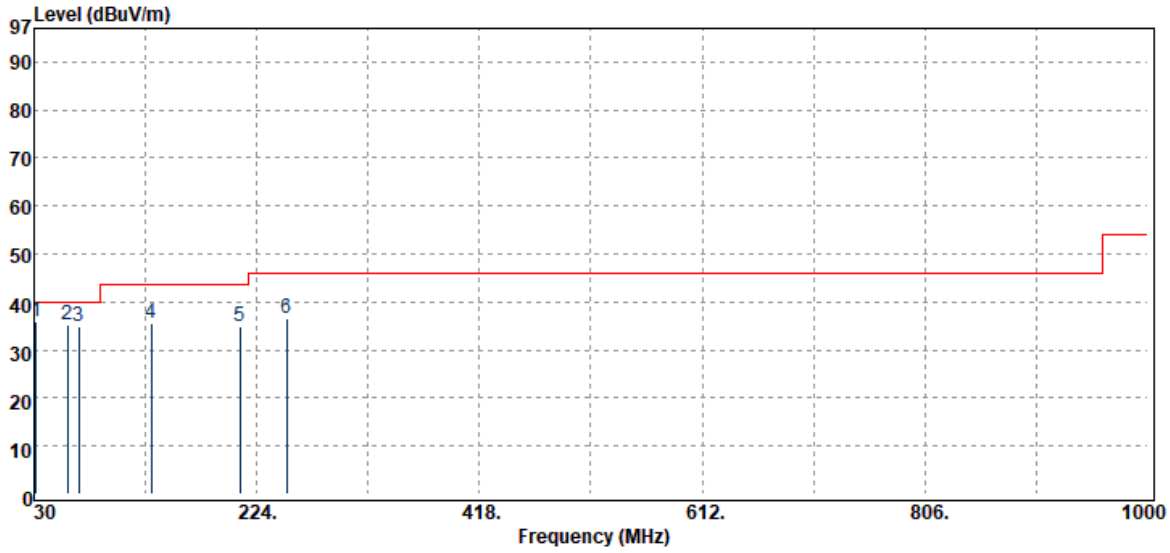
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
31.94	QP	46.04	-9.01	37.03	40.00	-2.97
44.55	QP	43.56	-8.20	35.36	40.00	-4.64
59.10	QP	43.97	-8.70	35.27	40.00	-4.73
68.80	QP	42.55	-10.13	32.42	40.00	-7.58
146.40	Peak	40.97	-7.44	33.53	43.50	-9.97
211.39	Peak	44.16	-9.59	34.57	43.50	-8.93

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5580 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



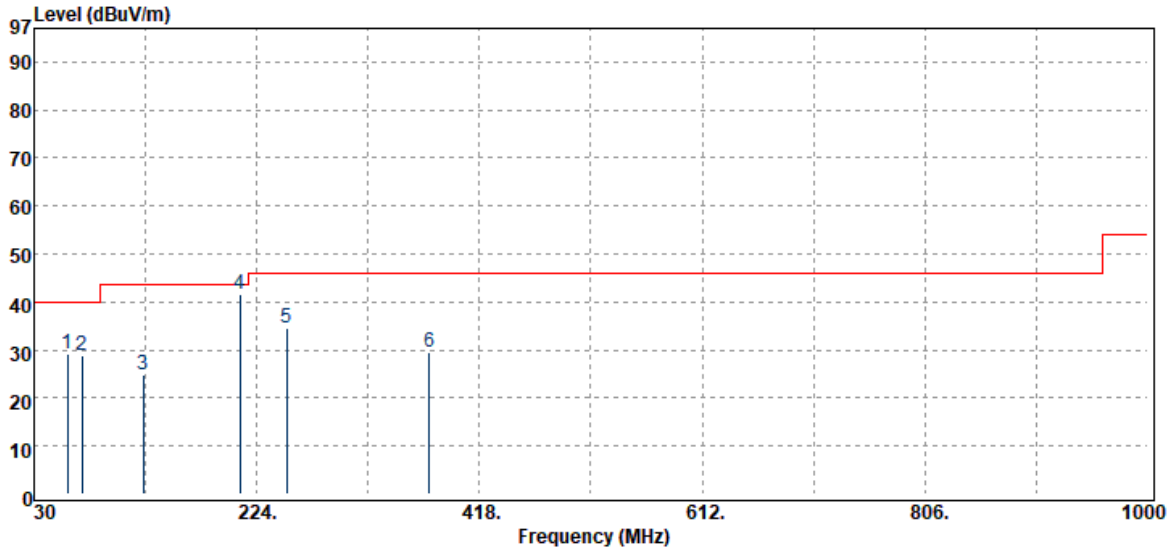
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.00	Peak	34.04	-8.72	25.32	40.00	-14.68
71.71	Peak	39.31	-10.62	28.69	40.00	-11.31
125.06	Peak	35.01	-9.19	25.82	43.50	-17.68
207.51	QP	51.30	-9.75	41.55	43.50	-1.95
250.19	Peak	42.67	-7.90	34.77	46.00	-11.23
374.35	Peak	34.14	-4.66	29.48	46.00	-16.52

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5785 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
31.94	QP	45.04	-9.01	36.03	40.00	-3.97
59.10	QP	43.93	-8.70	35.23	40.00	-4.77
68.80	QP	45.06	-10.13	34.93	40.00	-5.07
131.85	Peak	44.08	-8.42	35.66	43.50	-7.84
209.45	Peak	44.74	-9.73	35.01	43.50	-8.49
250.19	Peak	44.45	-7.90	36.55	46.00	-9.45

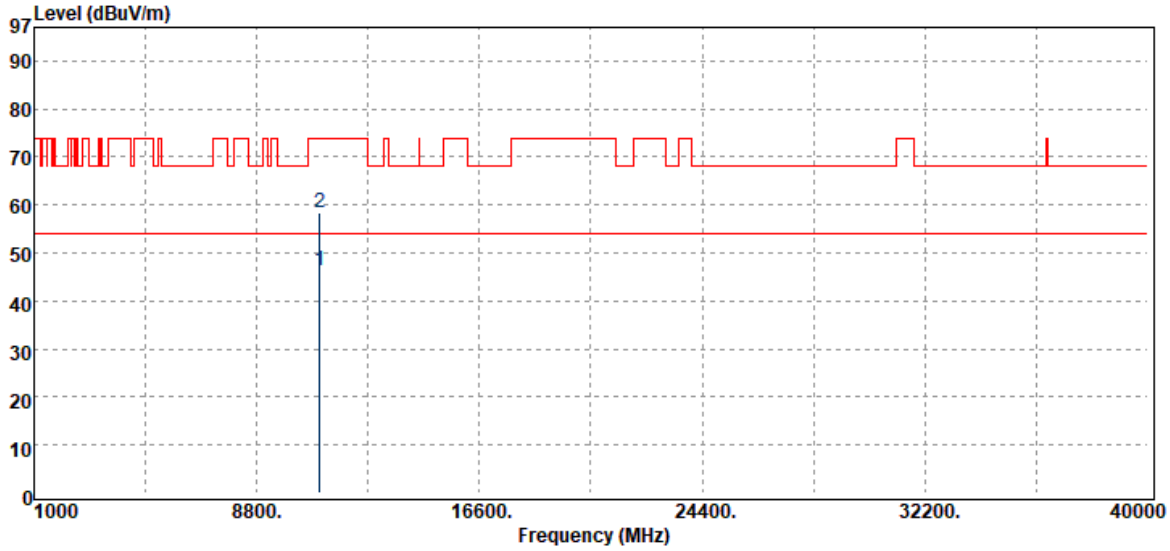
Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5785 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
59.10	Peak	37.94	-8.70	29.24	40.00	-10.76
71.71	Peak	39.56	-10.62	28.94	40.00	-11.06
125.06	Peak	34.19	-9.19	25.00	43.50	-18.50
209.45	QP	51.28	-9.73	41.55	43.50	-1.95
250.19	Peak	42.35	-7.90	34.45	46.00	-11.55
374.35	Peak	34.10	-4.66	29.44	46.00	-16.56

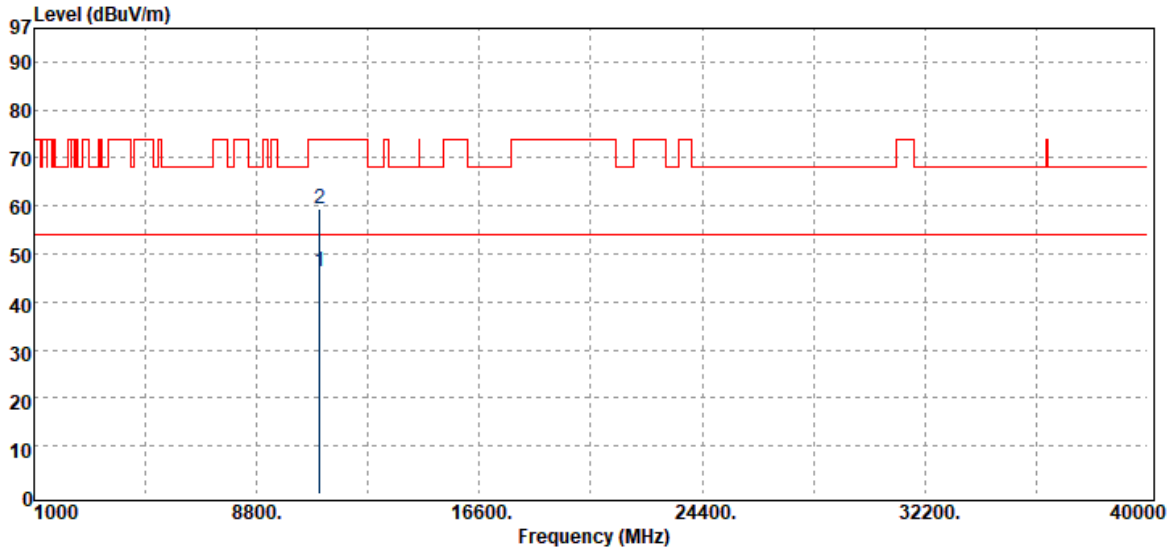
11.7.2 Above 1GHz Worst-Case Data:

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5500 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



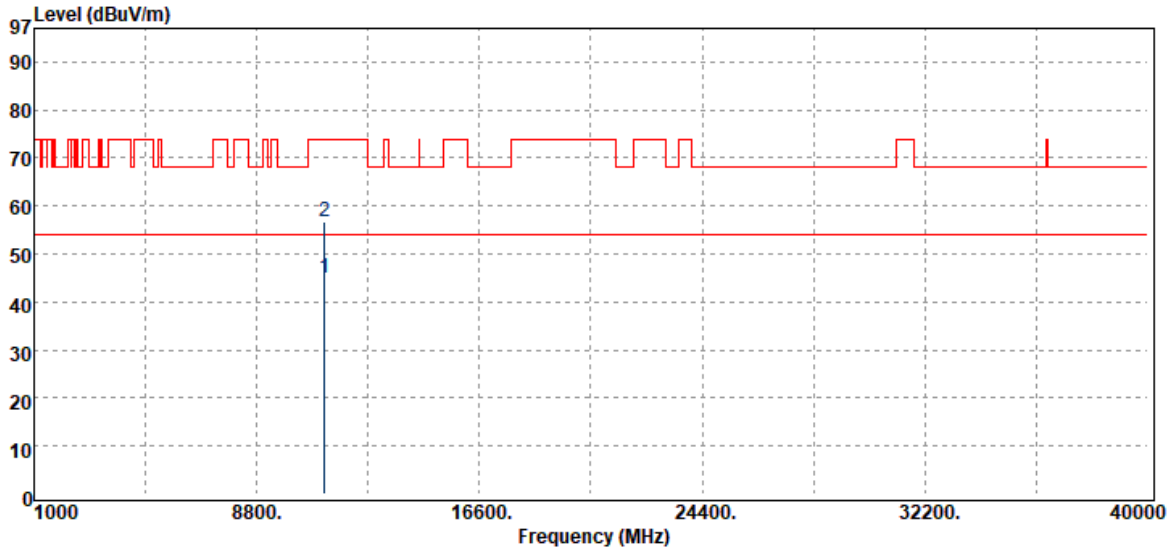
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11000.00	Average	22.98	23.37	46.35	54.00	-7.65
11000.00	Peak	34.91	23.37	58.28	74.00	-15.72

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5500 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



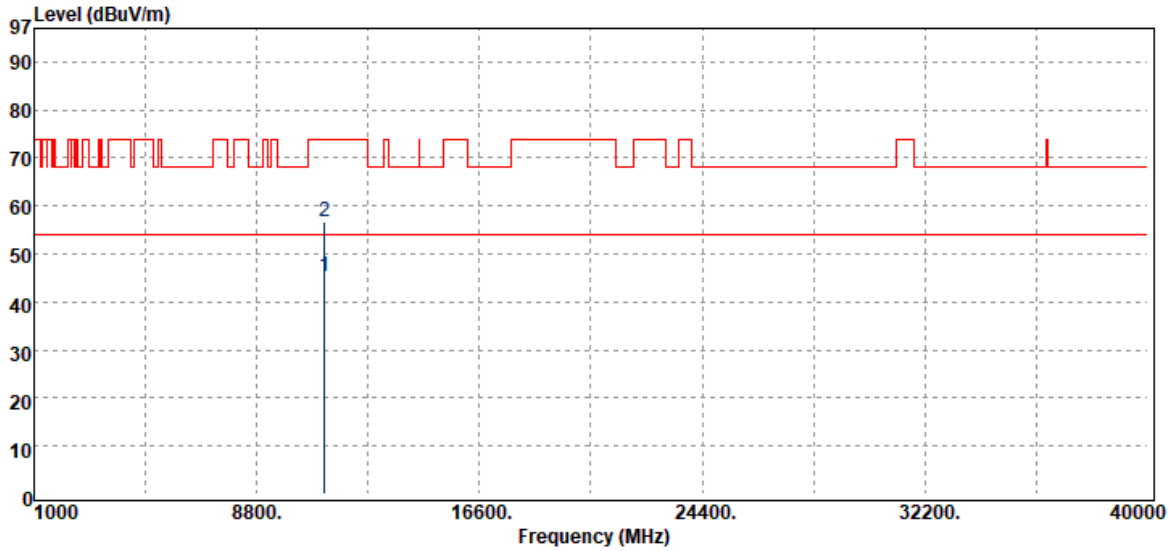
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11000.00	Average	22.86	23.37	46.23	54.00	-7.77
11000.00	Peak	35.98	23.37	59.35	74.00	-14.65

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5580 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



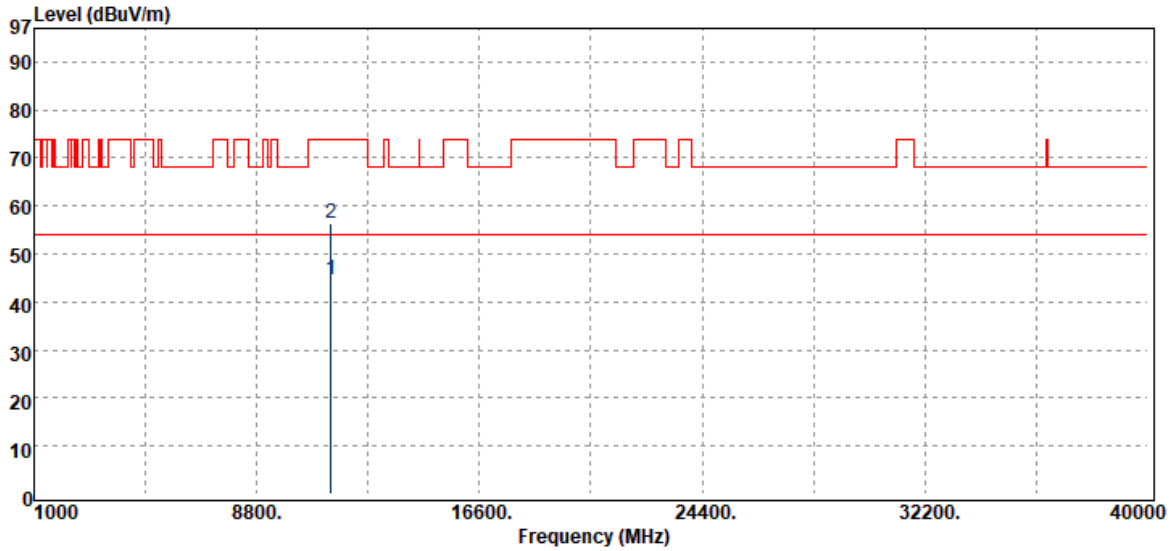
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11160.00	Average	22.90	22.20	45.10	54.00	-8.90
11160.00	Peak	34.59	22.20	56.79	74.00	-17.21

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5580 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



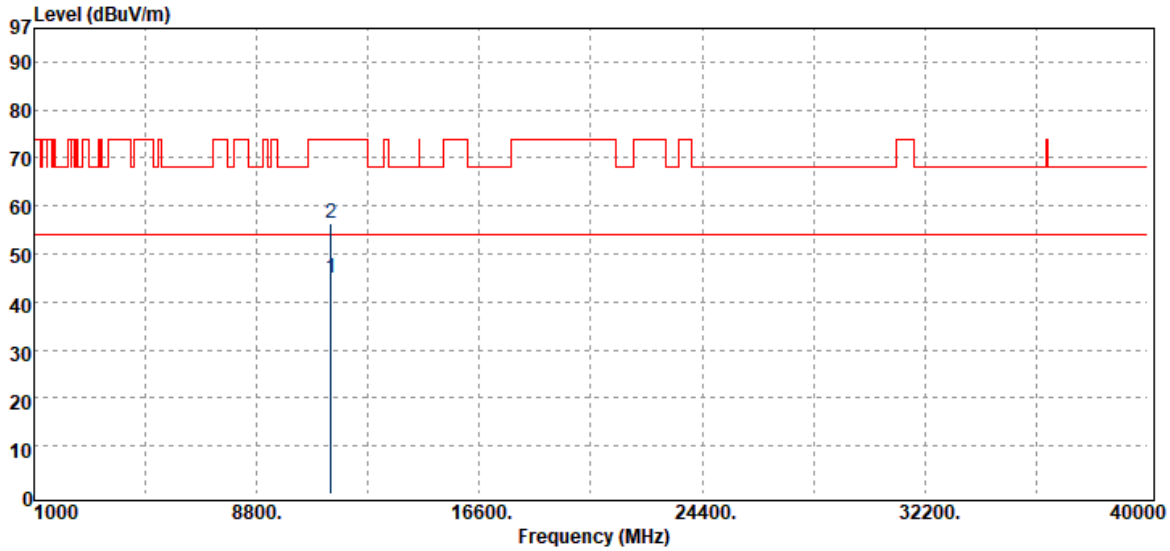
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11160.00	Average	22.96	22.20	45.16	54.00	-8.84
11160.00	Peak	34.49	22.20	56.69	74.00	-17.31

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5700 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



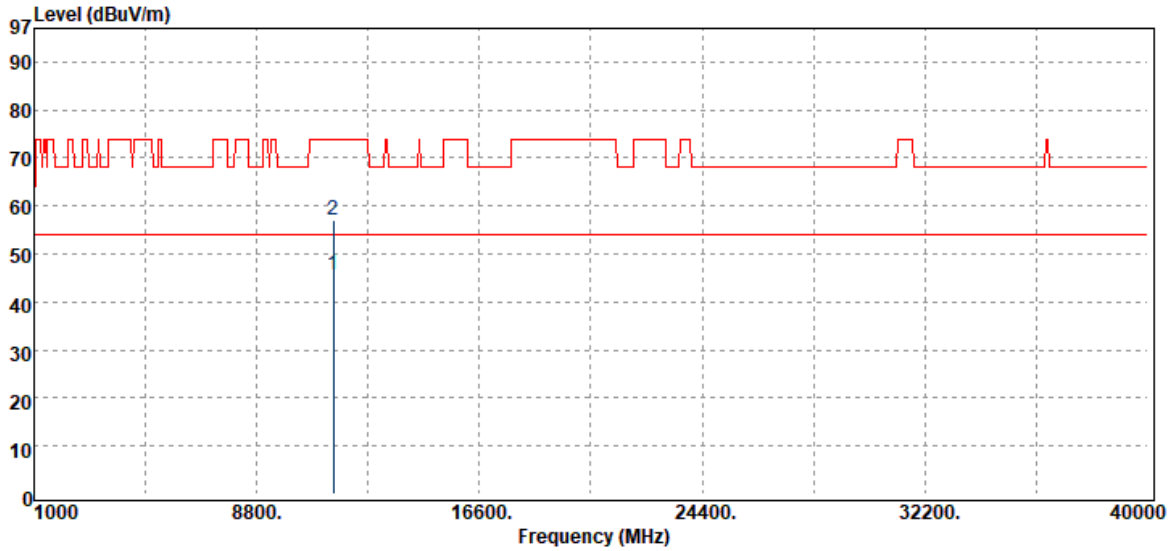
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11400.00	Average	22.46	22.22	44.68	54.00	-9.32
11400.00	Peak	34.07	22.22	56.29	74.00	-17.71

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5700 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



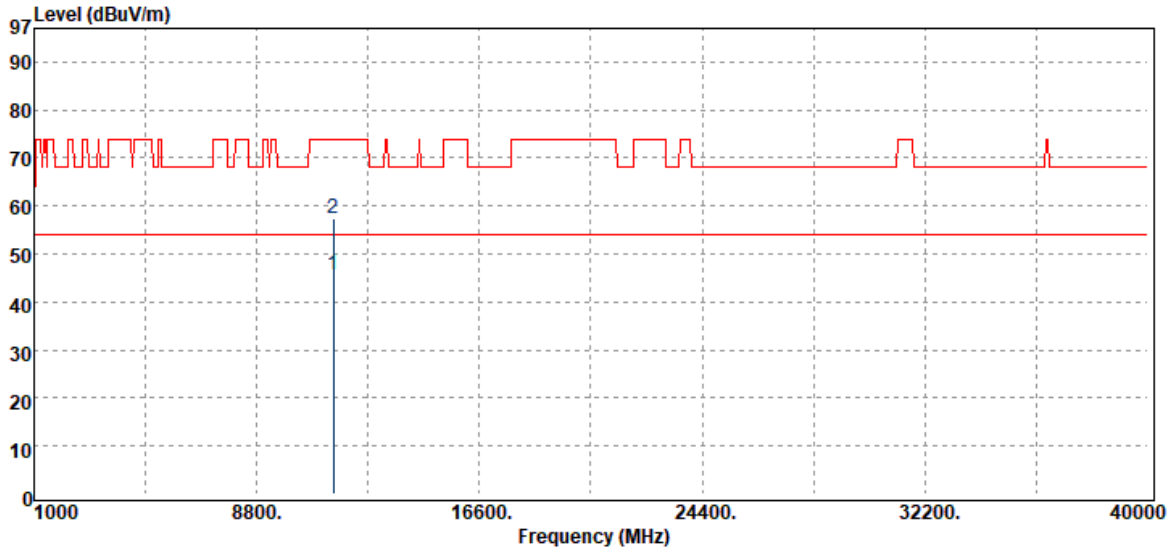
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11400.00	Average	22.64	22.22	44.86	54.00	-9.14
11400.00	Peak	34.03	22.22	56.25	74.00	-17.75

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5720 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



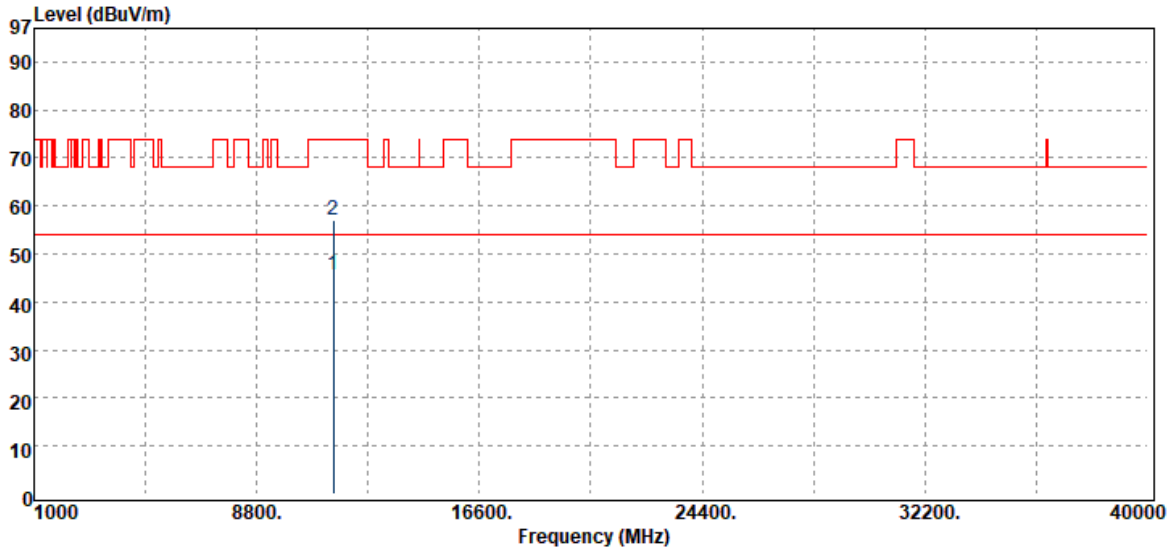
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11490.00	Average	22.29	23.24	45.53	54.00	-8.47
11490.00	Peak	33.70	23.24	56.94	74.00	-17.06

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5720 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



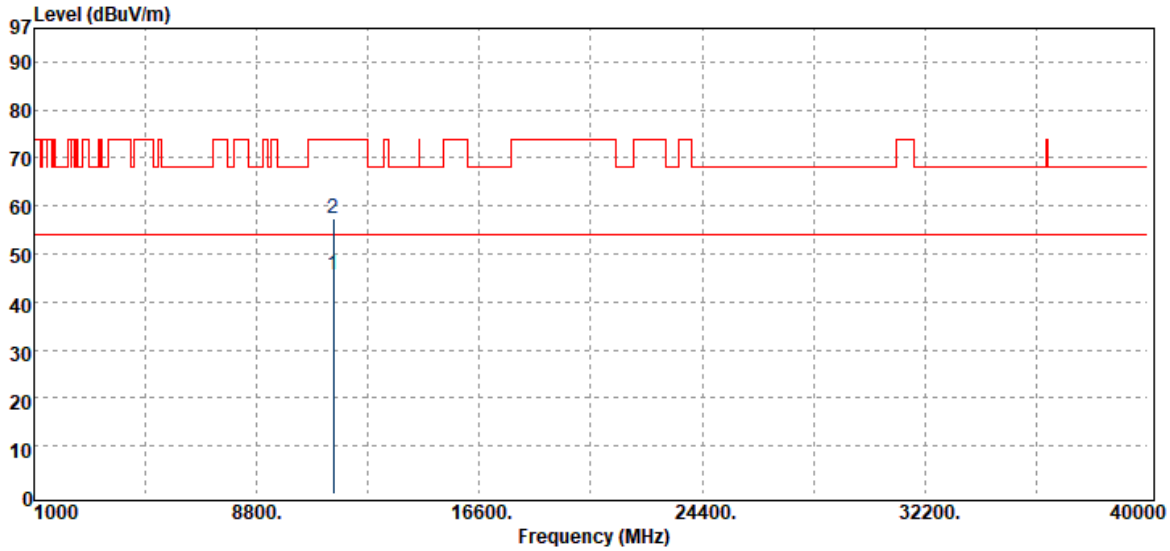
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11490.00	Average	22.28	23.24	45.52	54.00	-8.48
11490.00	Peak	34.19	23.24	57.43	74.00	-16.57

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5745 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



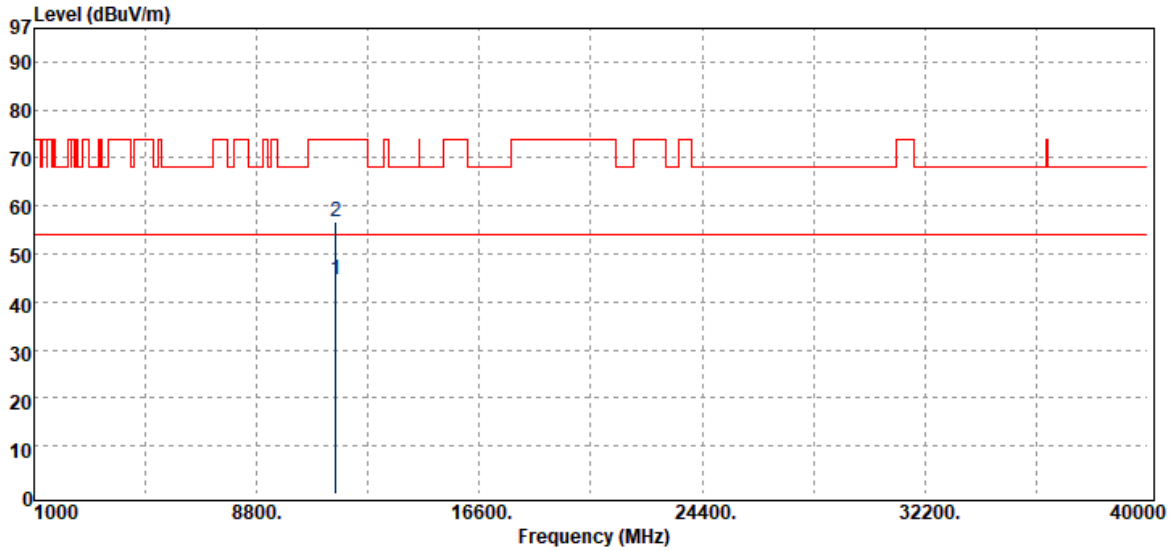
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11490.00	Average	22.27	23.24	45.51	54.00	-8.49
11490.00	Peak	33.75	23.24	56.99	74.00	-17.01

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5745 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



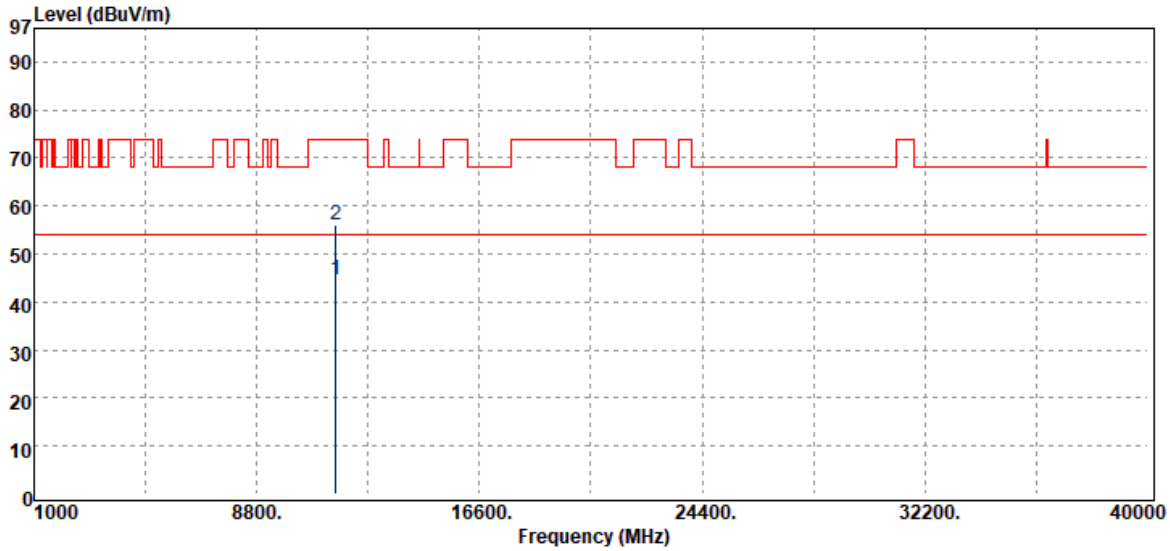
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11490.00	Average	22.30	23.24	45.54	54.00	-8.46
11490.00	Peak	34.12	23.24	57.36	74.00	-16.64

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5785 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



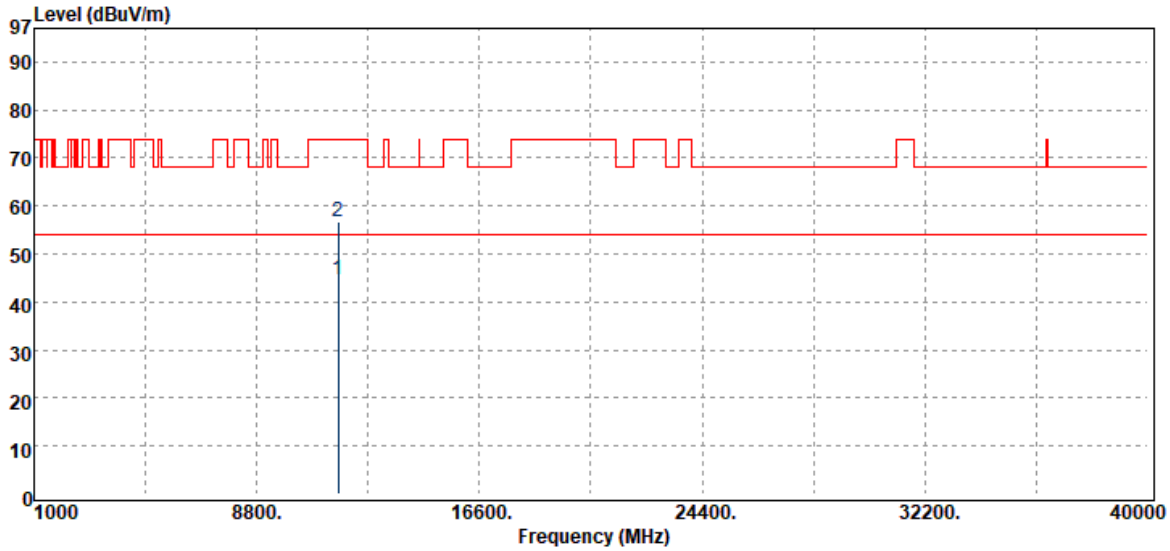
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11570.00	Average	22.67	22.01	44.68	54.00	-9.32
11570.00	Peak	34.60	22.01	56.61	74.00	-17.39

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5785 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



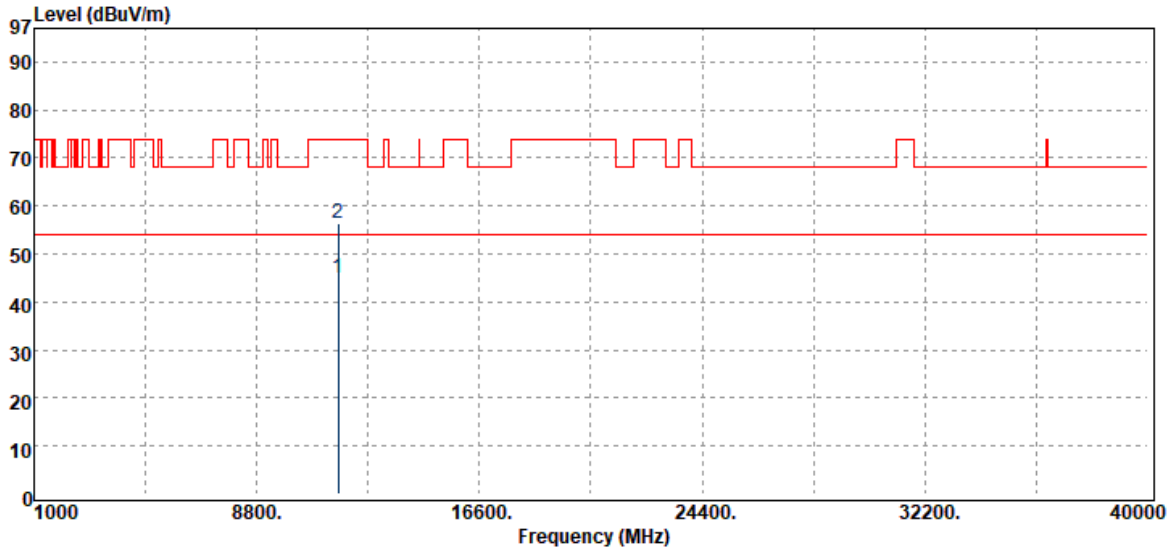
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11570.00	Average	22.73	22.01	44.74	54.00	-9.26
11570.00	Peak	33.98	22.01	55.99	74.00	-18.01

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5825 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH high	Engineer	:Nick
EUT Pol	:H Plane		



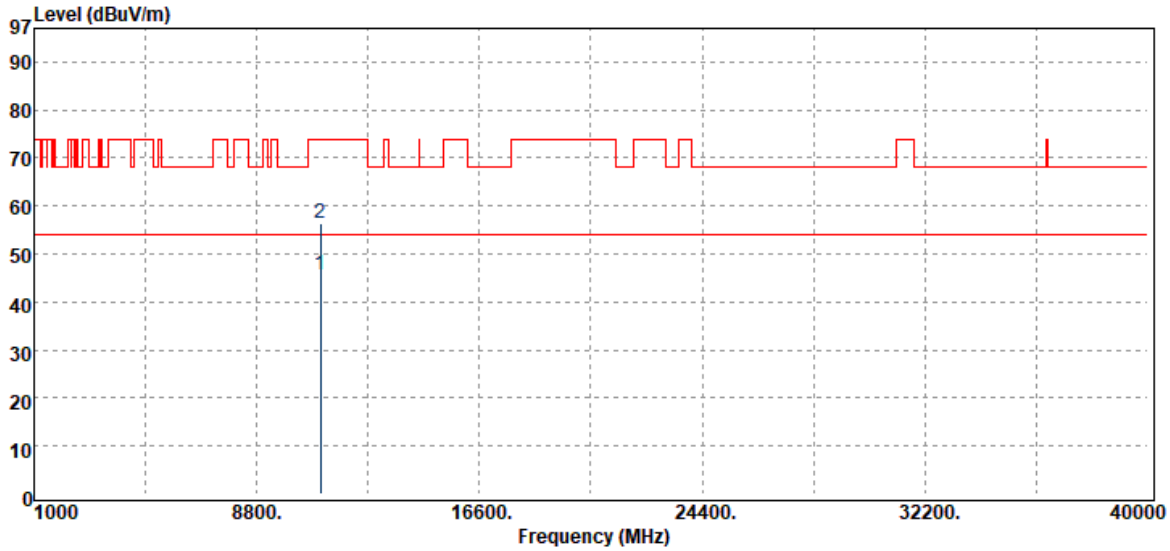
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11650.00	Average	22.30	22.45	44.75	54.00	-9.25
11650.00	Peak	34.27	22.45	56.72	74.00	-17.28

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5825 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH high	Engineer	:Nick
EUT Pol	:H Plane		



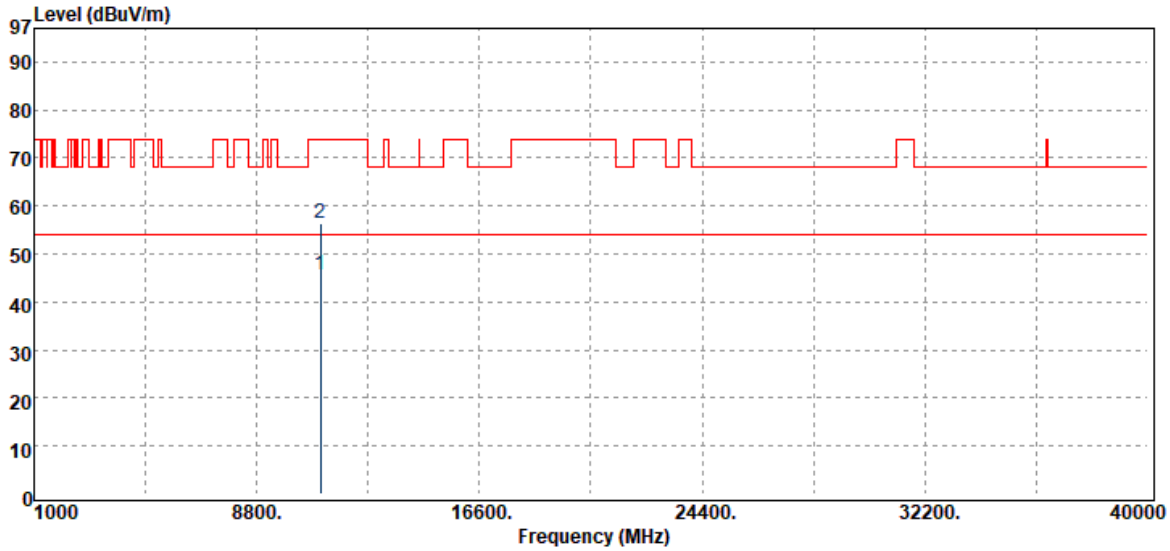
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11650.00	Average	22.36	22.45	44.81	54.00	-9.19
11650.00	Peak	33.85	22.45	56.30	74.00	-17.70

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5510 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



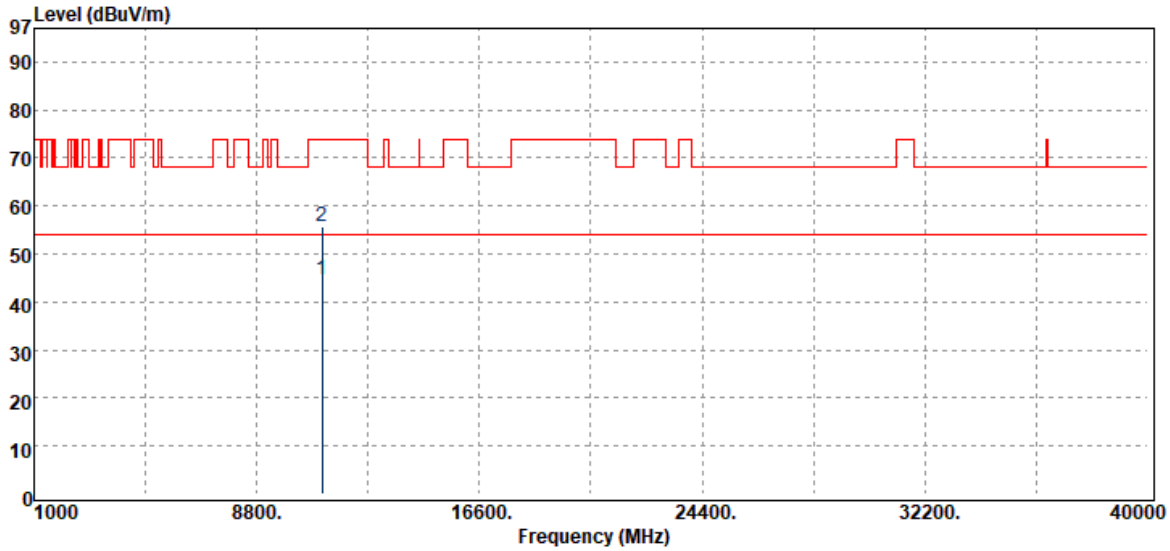
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11020.00	Average	22.75	22.85	45.60	54.00	-8.40
11020.00	Peak	33.48	22.85	56.33	74.00	-17.67

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5510 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



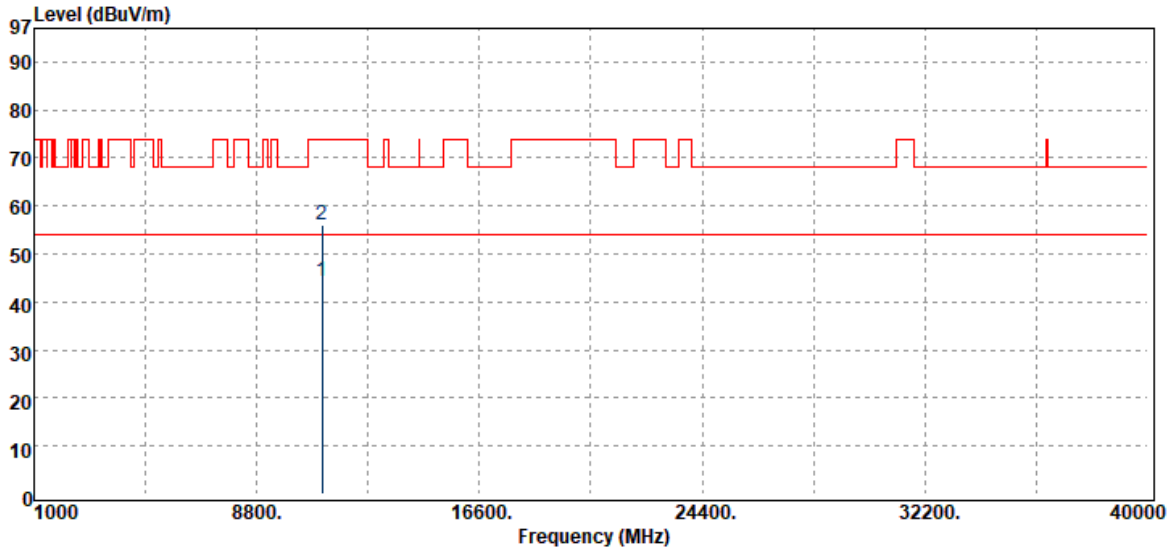
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11020.00	Average	22.65	22.85	45.50	54.00	-8.50
11020.00	Peak	33.69	22.85	56.54	74.00	-17.46

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5550 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



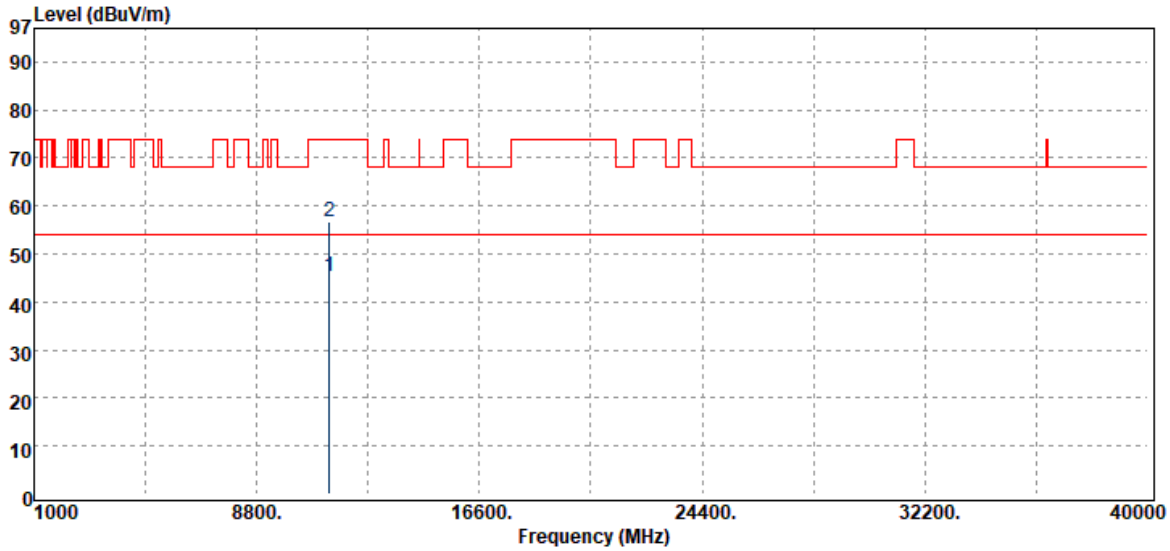
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11100.00	Average	22.75	21.82	44.57	54.00	-9.43
11100.00	Peak	33.76	21.82	55.58	74.00	-18.42

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5550 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Mid	Engineer	:Nick
EUT Pol	:H Plane		



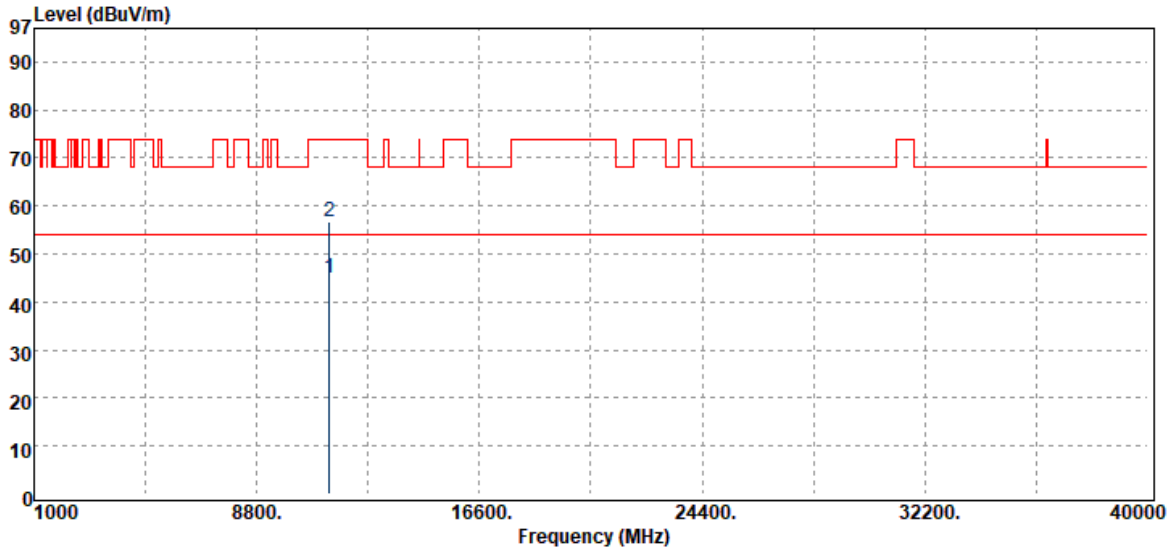
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11100.00	Average	22.65	21.82	44.47	54.00	-9.53
11100.00	Peak	34.32	21.82	56.14	74.00	-17.86

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5670 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



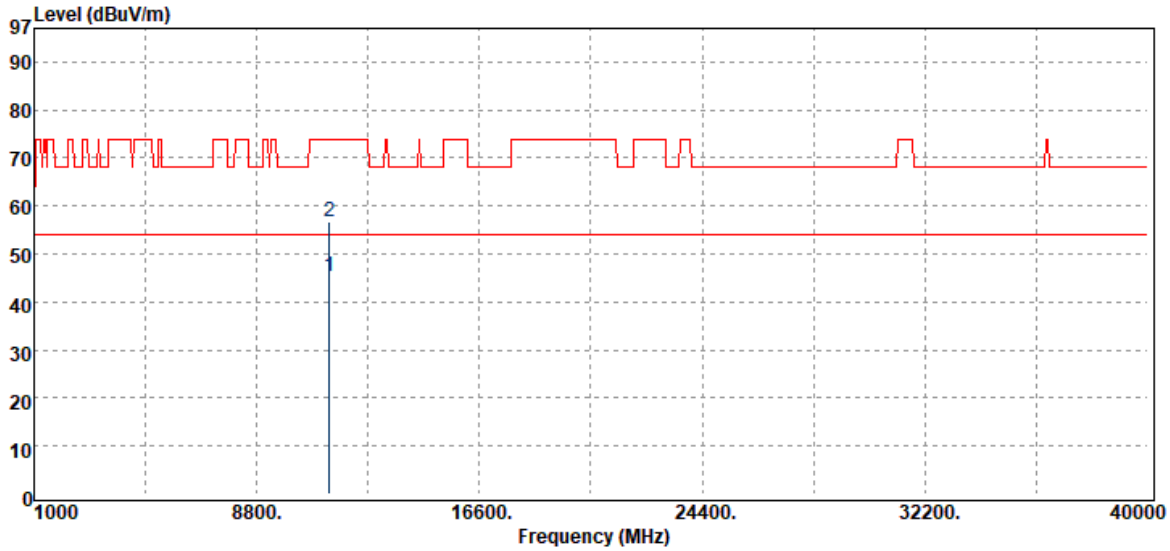
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11340.00	Average	22.96	22.34	45.30	54.00	-8.70
11340.00	Peak	34.44	22.34	56.78	74.00	-17.22

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5670 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



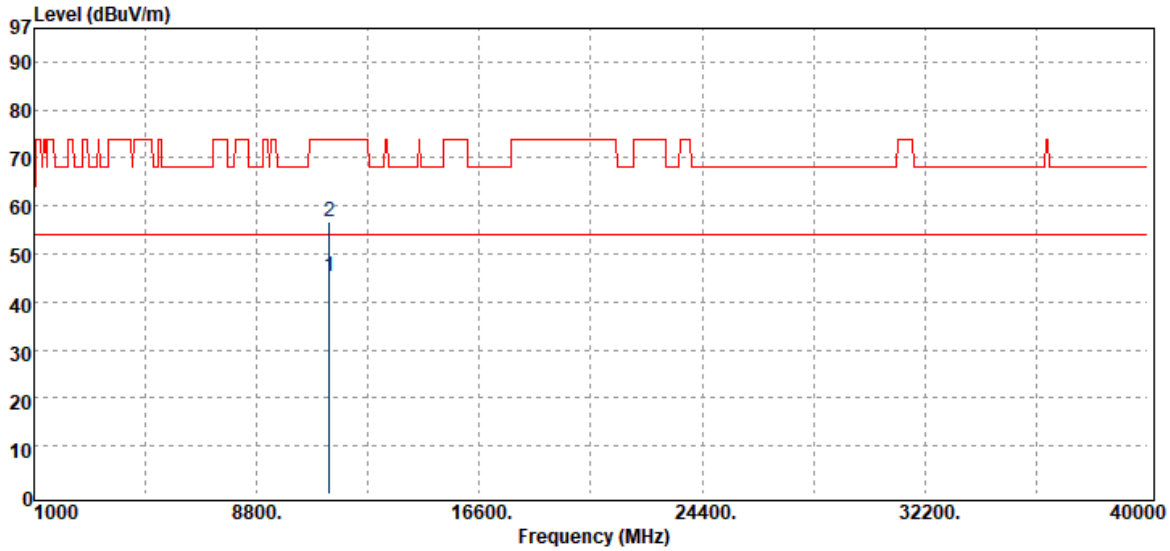
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11340.00	Average	22.79	22.34	45.13	54.00	-8.87
11340.00	Peak	34.24	22.34	56.58	74.00	-17.42

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5710 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



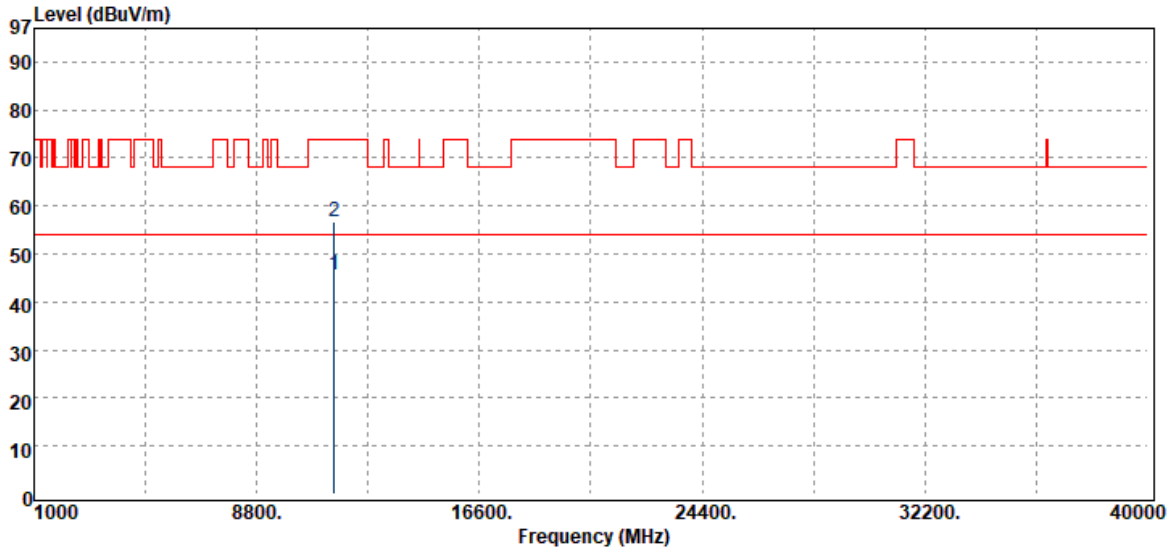
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11340.00	Average	22.98	22.34	45.32	54.00	-8.68
11340.00	Peak	34.48	22.34	56.82	74.00	-17.18

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5710 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



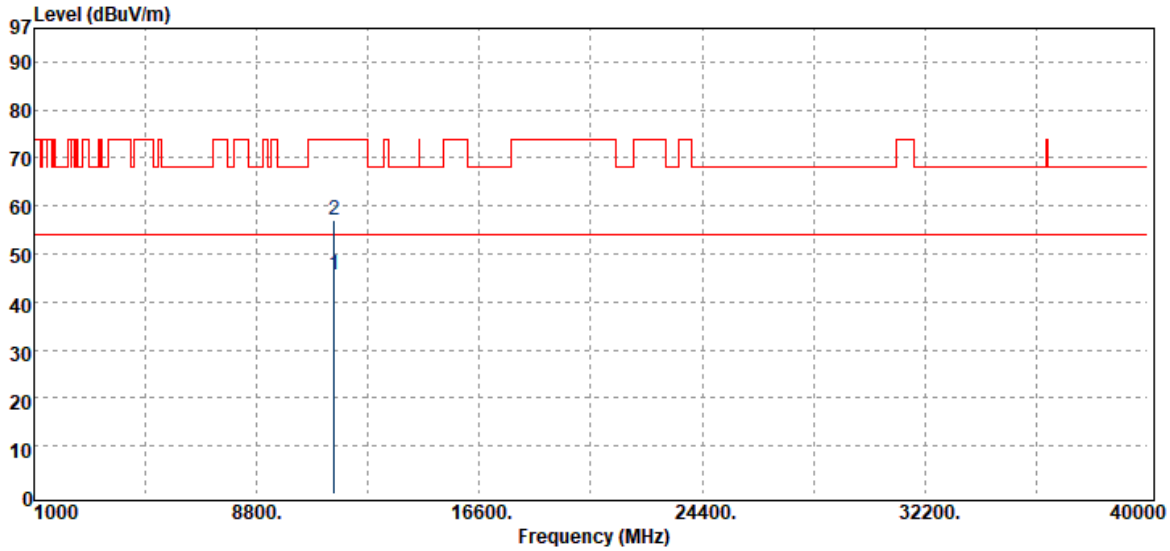
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11340.00	Average	22.81	22.34	45.15	54.00	-8.85
11340.00	Peak	34.27	22.34	56.61	74.00	-17.39

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5755 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



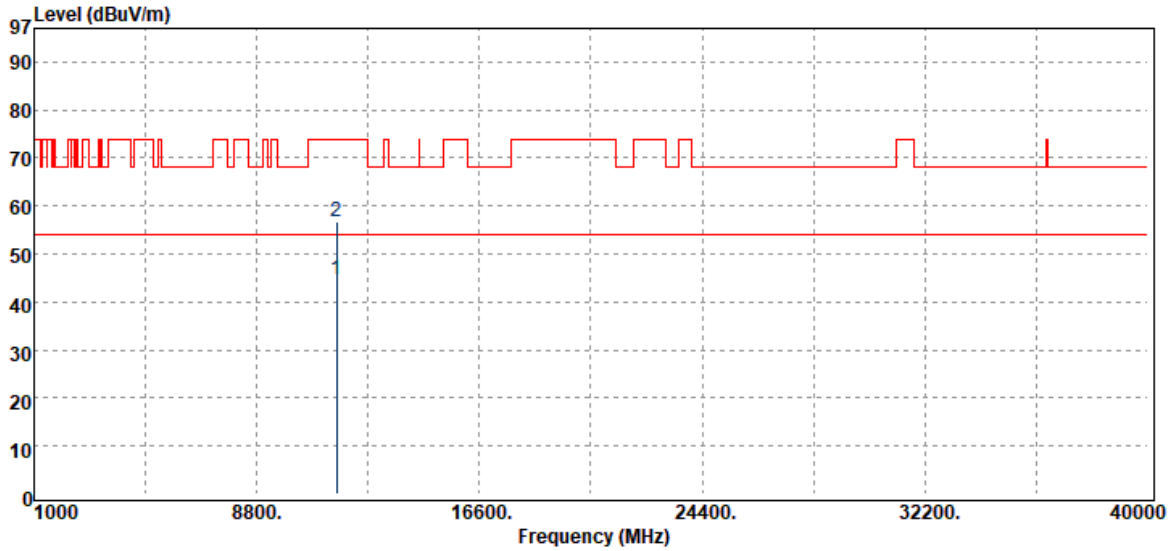
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11510.00	Average	22.41	23.13	45.54	54.00	-8.46
11510.00	Peak	33.53	23.13	56.66	74.00	-17.34

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5755 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH Low	Engineer	:Nick
EUT Pol	:H Plane		



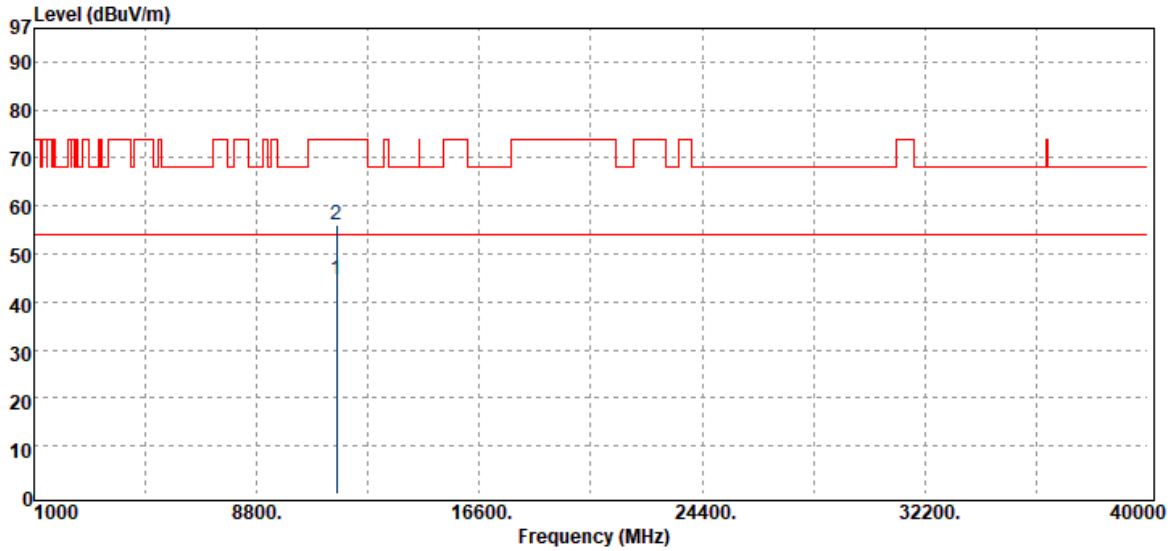
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11510.00	Average	22.39	23.13	45.52	54.00	-8.48
11510.00	Peak	33.91	23.13	57.04	74.00	-16.96

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5795 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11590.00	Average	22.87	21.84	44.71	54.00	-9.29
11590.00	Peak	34.73	21.84	56.57	74.00	-17.43

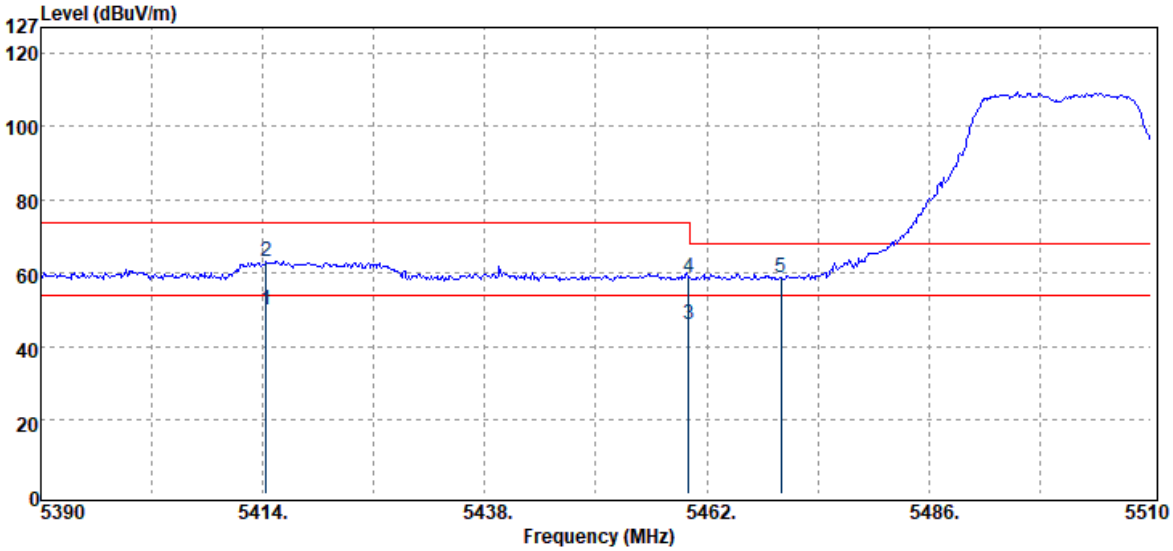
Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5795 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Tx CH High	Engineer	:Nick
EUT Pol	:H Plane		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
11590.00	Average	22.91	21.84	44.75	54.00	-9.25
11590.00	Peak	34.21	21.84	56.05	74.00	-17.95

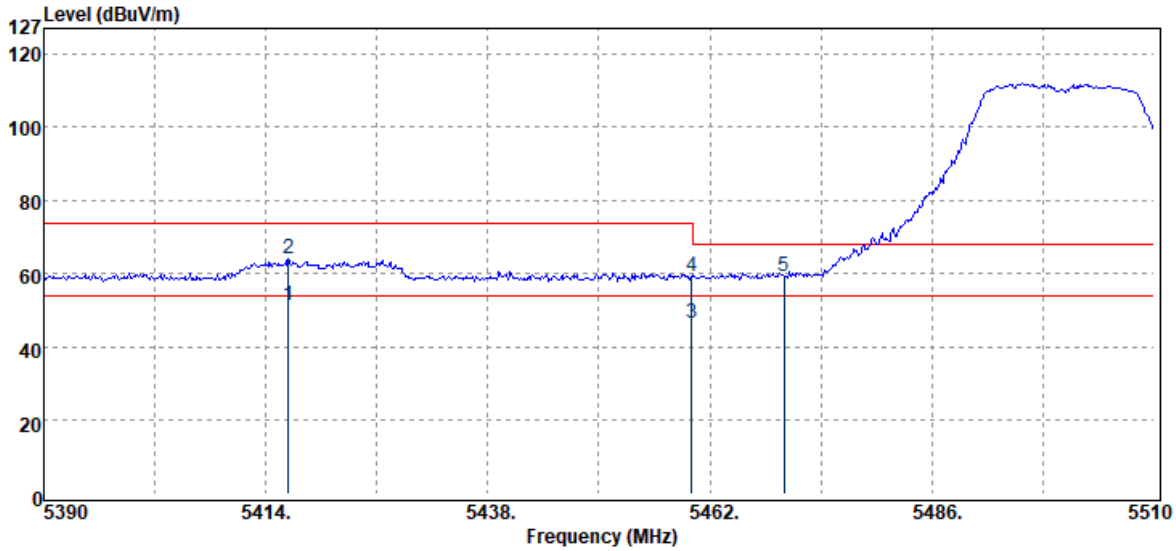
11.7.3 Band edge falling to restricted band

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5500 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



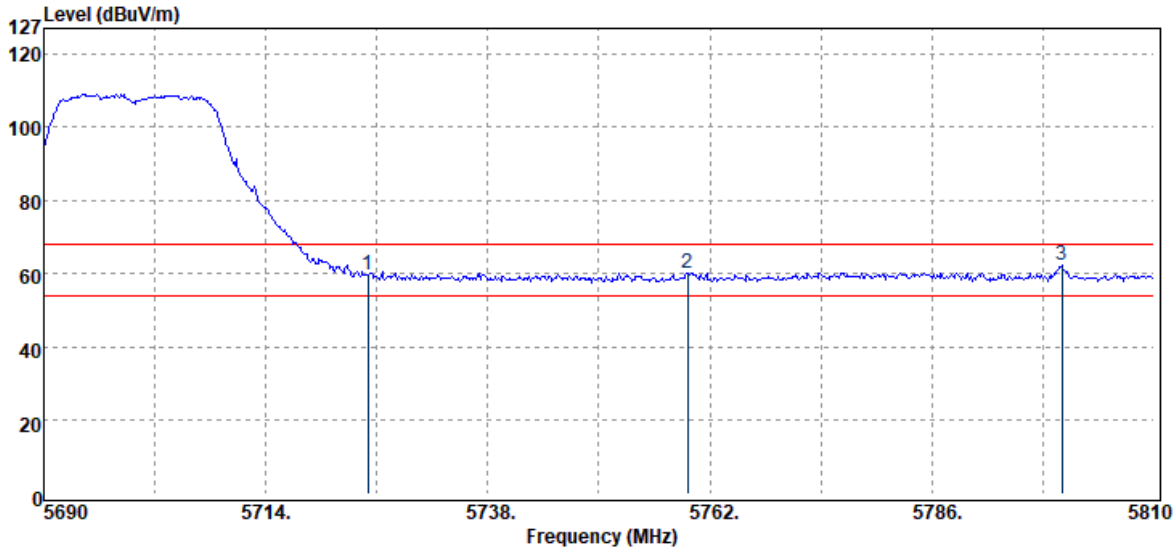
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5414.36	Average	42.17	8.11	50.28	54.00	-3.72
5414.36	Peak	55.18	8.11	63.29	74.00	-10.71
5460.00	Average	37.96	8.06	46.02	54.00	-7.98
5460.00	Peak	50.62	8.06	58.68	74.00	-15.32
5470.00	Peak	50.95	8.07	59.02	68.20	-9.18

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5500 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



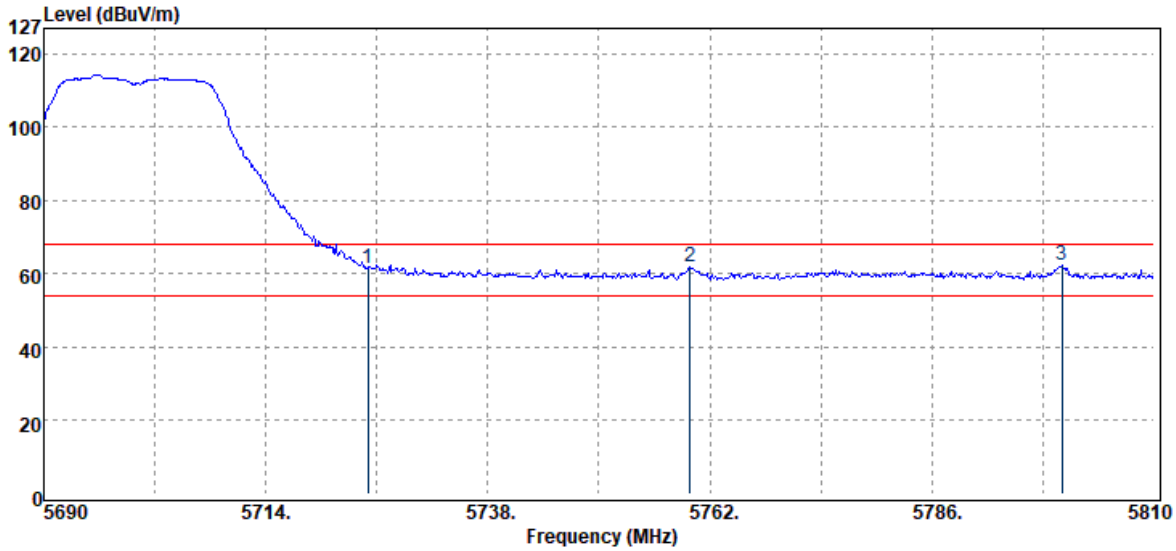
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5416.40	Average	43.12	8.11	51.23	54.00	-2.77
5416.40	Peak	55.88	8.11	63.99	74.00	-10.01
5460.00	Average	38.69	8.06	46.75	54.00	-7.25
5460.00	Peak	51.10	8.06	59.16	74.00	-14.84
5470.00	Peak	51.43	8.07	59.50	68.20	-8.70

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5700 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



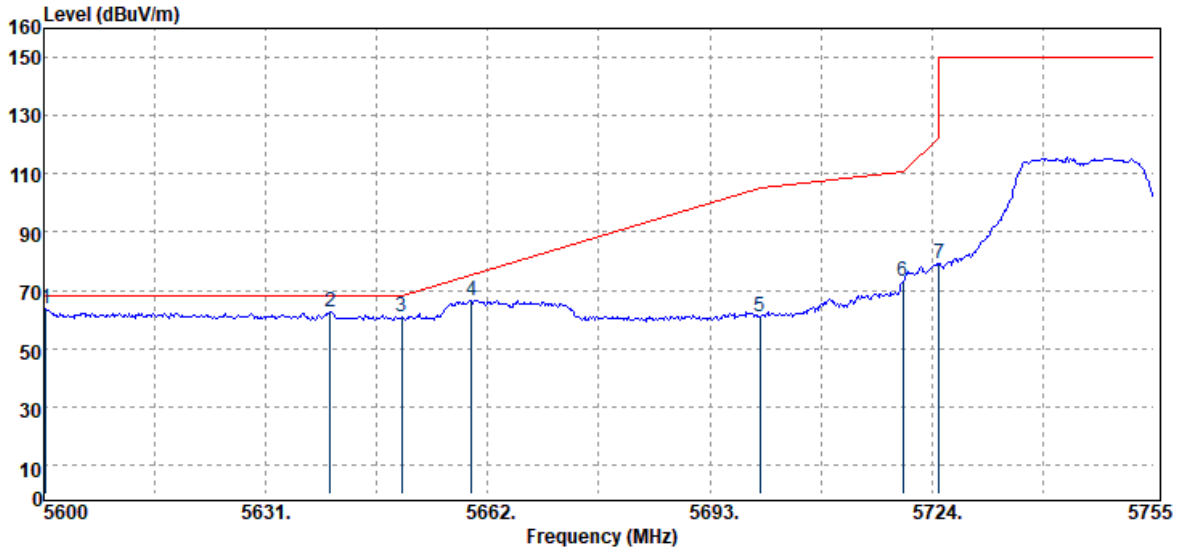
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5725.00	Peak	50.88	8.81	59.69	68.20	-8.51
5759.60	Peak	51.17	8.99	60.16	68.20	-8.04
5800.04	Peak	53.12	9.27	62.39	68.20	-5.81

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5700 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



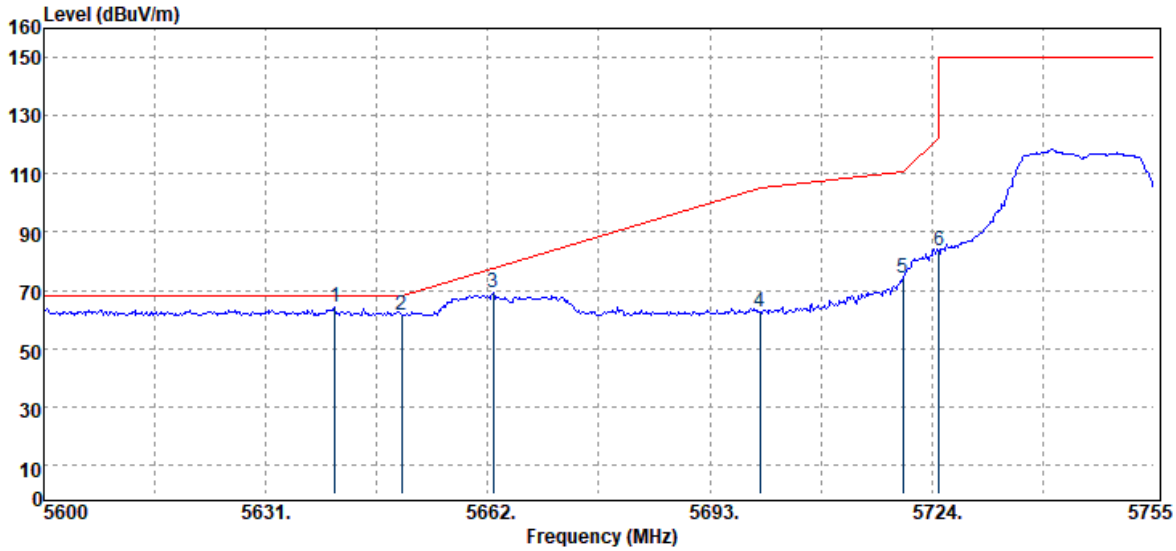
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5725.00	Peak	52.65	8.81	61.46	68.20	-6.74
5759.84	Peak	52.80	8.99	61.79	68.20	-6.41
5800.04	Peak	53.12	9.27	62.39	68.20	-5.81

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5745 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



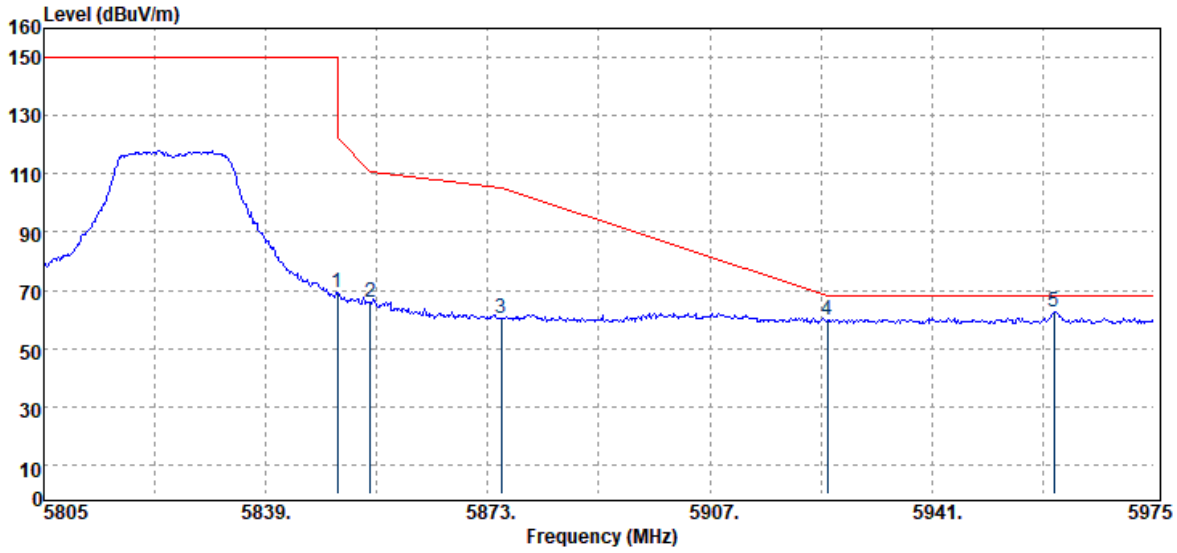
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5600.31	Peak	55.54	8.15	63.69	68.20	-4.51
5639.99	Peak	54.36	8.28	62.64	68.20	-5.56
5650.00	Peak	52.39	8.32	60.71	68.20	-7.49
5659.68	Peak	58.21	8.39	66.60	75.36	-8.76
5700.00	Peak	52.24	8.69	60.93	105.20	-44.27
5720.00	Peak	64.34	8.78	73.12	110.80	-37.68
5725.00	Peak	70.23	8.81	79.04	122.20	-43.16

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5745 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



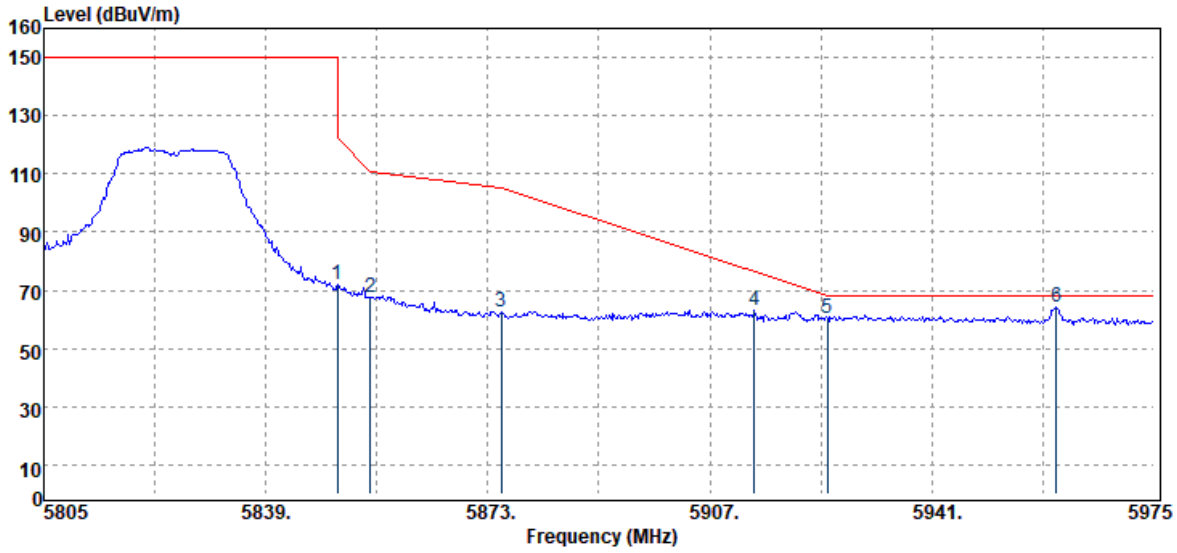
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5640.61	Peak	55.76	8.28	64.04	68.20	-4.16
5650.00	Peak	53.20	8.32	61.52	68.20	-6.68
5662.78	Peak	60.85	8.41	69.26	77.65	-8.39
5700.00	Peak	53.64	8.69	62.33	105.20	-42.87
5720.00	Peak	65.34	8.78	74.12	110.80	-36.68
5725.00	Peak	74.63	8.81	83.44	122.20	-38.76

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5825 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



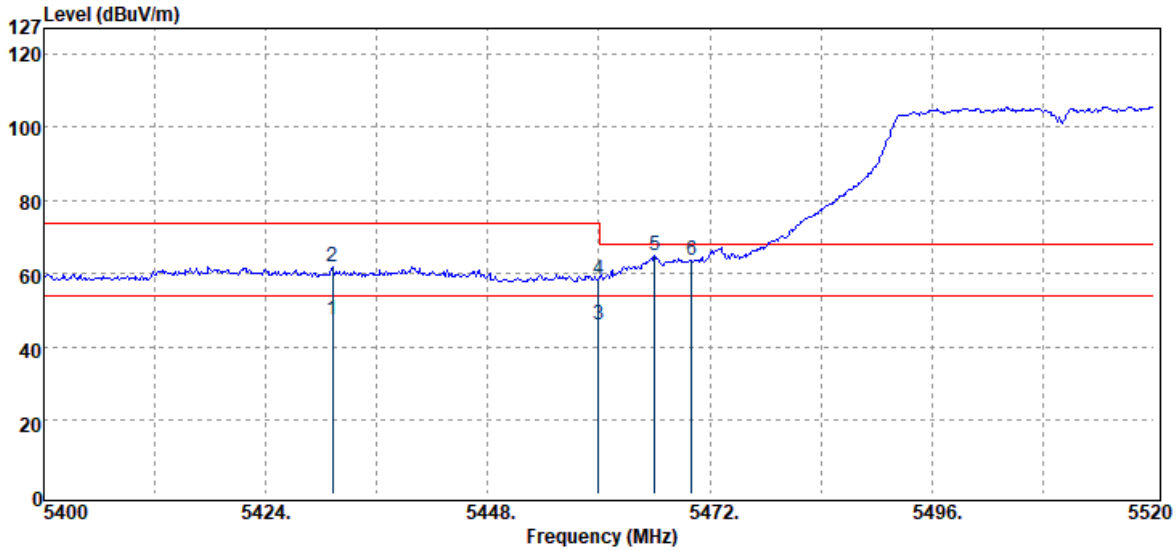
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5850.00	Peak	59.53	9.42	68.95	122.20	-53.25
5855.00	Peak	56.17	9.44	65.61	110.80	-45.19
5875.00	Peak	50.86	9.50	60.36	105.20	-44.84
5925.00	Peak	50.11	9.65	59.76	68.20	-8.44
5959.70	Peak	53.09	9.70	62.79	68.20	-5.41

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n20	Temp./Humi.	:20.4/51
Test Frequency	:5825 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



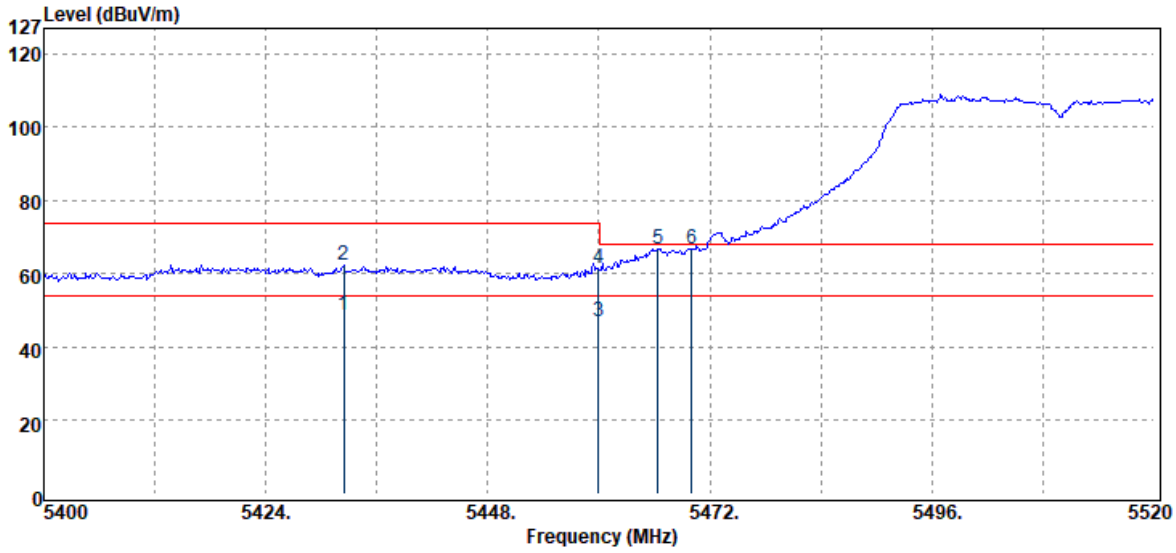
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5850.00	Peak	62.70	9.42	72.12	122.20	-50.08
5855.00	Peak	58.34	9.44	67.78	110.80	-43.02
5875.00	Peak	52.93	9.50	62.43	105.20	-42.77
5913.80	Peak	53.74	9.63	63.37	76.49	-13.12
5925.00	Peak	50.54	9.65	60.19	68.20	-8.01
5960.04	Peak	54.64	9.70	64.34	68.20	-3.86

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5510 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



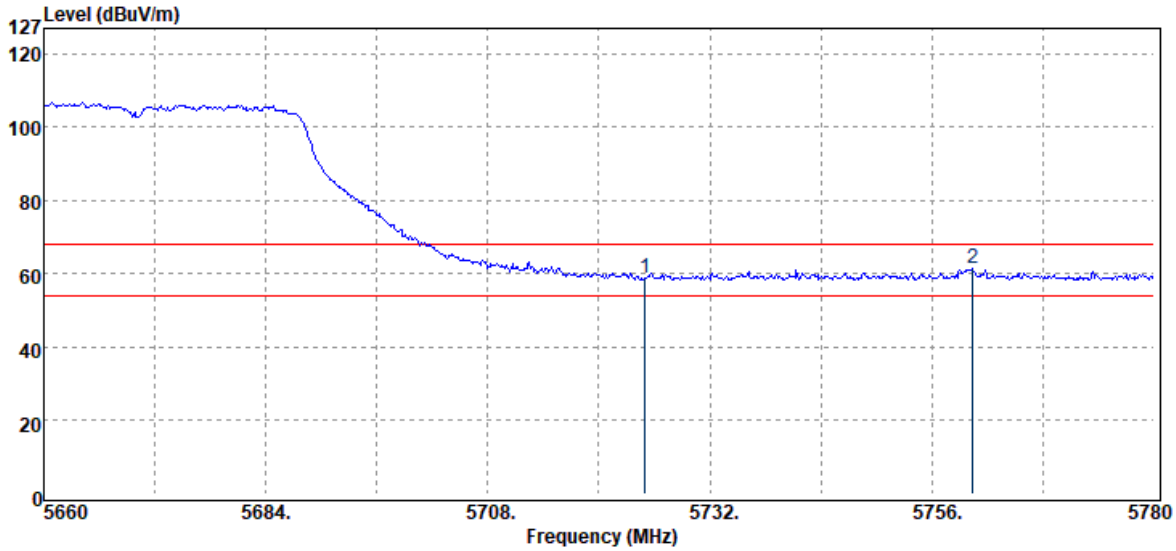
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5431.20	Average	39.36	8.09	47.45	54.00	-6.55
5431.20	Peak	53.96	8.09	62.05	74.00	-11.95
5460.00	Average	38.04	8.06	46.10	54.00	-7.90
5460.00	Peak	50.43	8.06	58.49	74.00	-15.51
5466.00	Peak	56.88	8.07	64.95	68.20	-3.25
5470.00	Peak	55.47	8.07	63.54	68.20	-4.66

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5510 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



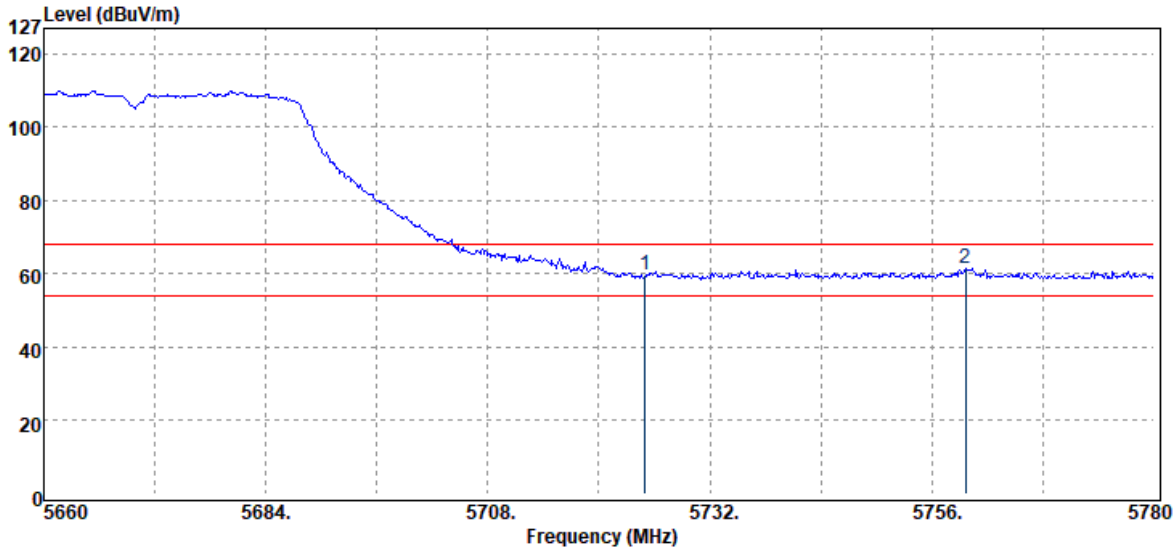
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5432.40	Average	40.82	8.08	48.90	54.00	-5.10
5432.40	Peak	54.22	8.08	62.30	74.00	-11.70
5460.00	Average	39.06	8.06	47.12	54.00	-6.88
5460.00	Peak	53.51	8.06	61.57	74.00	-12.43
5466.36	Peak	58.77	8.08	66.85	68.20	-1.35
5470.00	Peak	58.71	8.07	66.78	68.20	-1.42

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5670 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



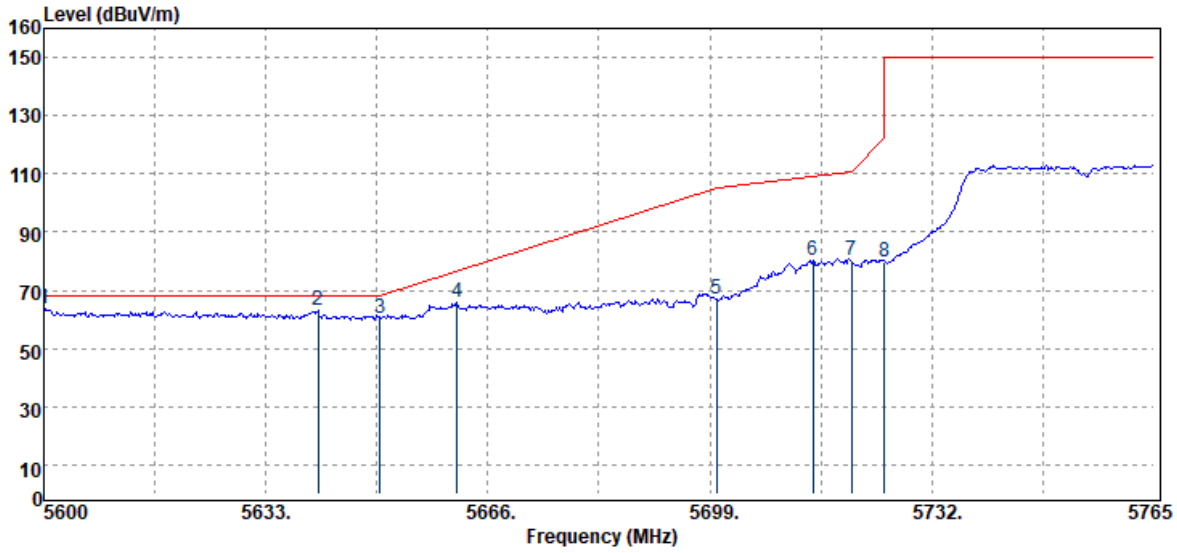
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5725.00	Peak	50.23	8.81	59.04	68.20	-9.16
5760.44	Peak	52.31	9.00	61.31	68.20	-6.89

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5670 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



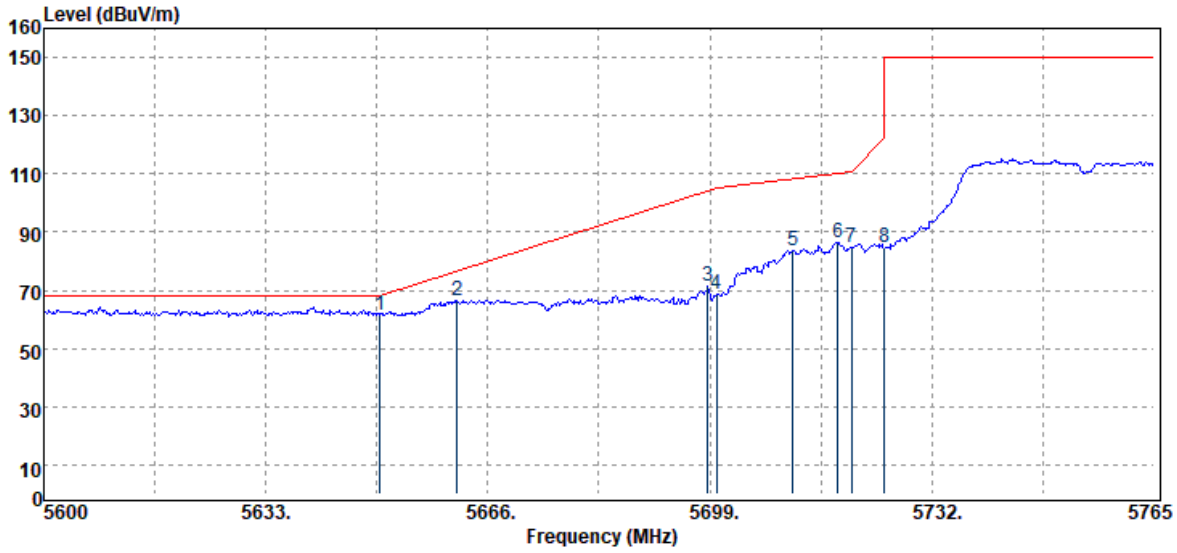
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5725.00	Peak	50.90	8.81	59.71	68.20	-8.49
5759.60	Peak	52.32	8.99	61.31	68.20	-6.89

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5755 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



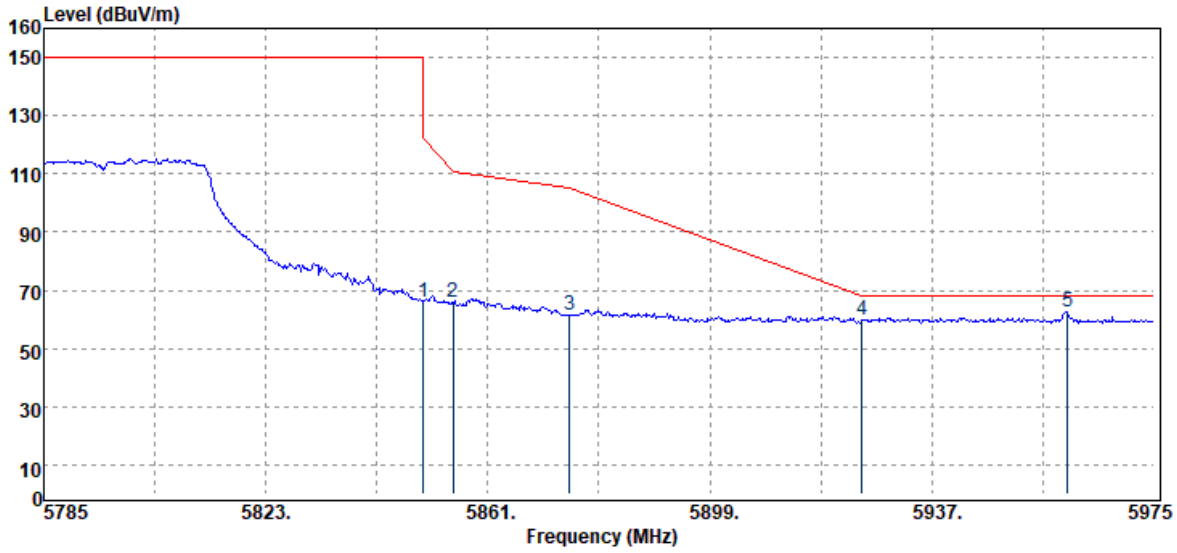
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5600.00	Peak	55.36	8.15	63.51	68.20	-4.69
5640.76	Peak	54.62	8.29	62.91	68.20	-5.29
5650.00	Peak	51.98	8.32	60.30	68.20	-7.90
5661.38	Peak	57.26	8.41	65.67	76.62	-10.95
5700.00	Peak	58.26	8.69	66.95	105.20	-38.25
5714.35	Peak	71.75	8.76	80.51	109.22	-28.71
5720.00	Peak	71.24	8.78	80.02	110.80	-30.78
5725.00	Peak	71.10	8.81	79.91	122.20	-42.29

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5755 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH Low	Engineer	:Nick
EUT Pol	:H Plane		



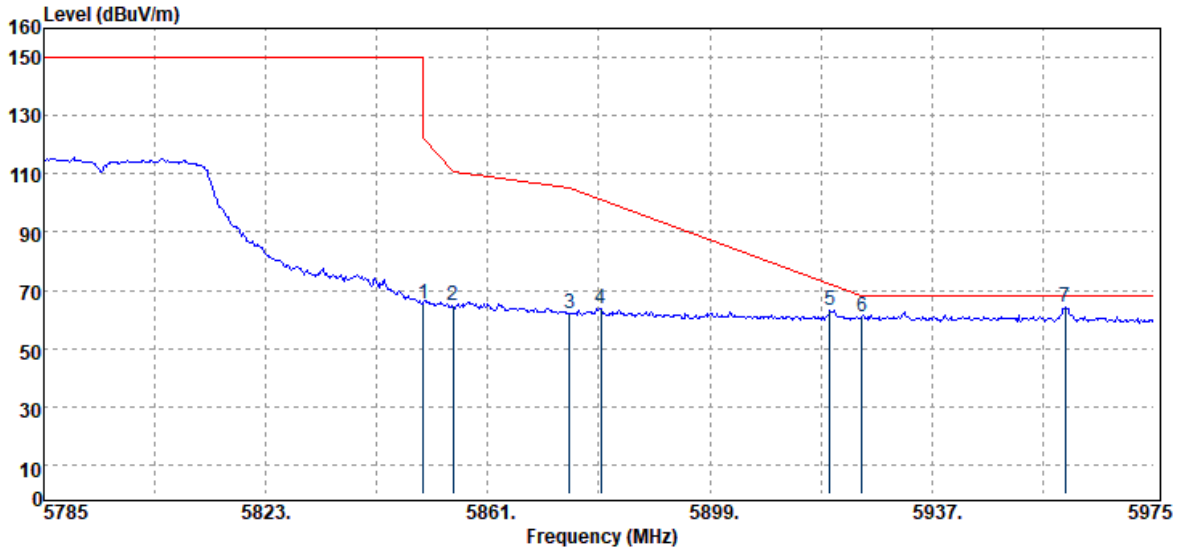
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5650.00	Peak	53.38	8.32	61.70	68.20	-6.50
5661.38	Peak	58.09	8.41	66.50	76.62	-10.12
5698.67	Peak	62.81	8.67	71.48	104.22	-32.74
5700.00	Peak	59.70	8.69	68.39	105.20	-36.81
5711.38	Peak	75.02	8.74	83.76	108.39	-24.63
5717.98	Peak	77.84	8.78	86.62	110.23	-23.61
5720.00	Peak	76.14	8.78	84.92	110.80	-25.88
5725.00	Peak	75.96	8.81	84.77	122.20	-37.43

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5795 MHz	Antenna Pol.	:VERTICAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5850.00	Peak	56.65	9.42	66.07	122.20	-56.13
5855.00	Peak	56.29	9.44	65.73	110.80	-45.07
5875.00	Peak	51.83	9.50	61.33	105.20	-43.87
5925.00	Peak	50.01	9.65	59.66	68.20	-8.54
5960.18	Peak	53.10	9.70	62.80	68.20	-5.40

Report Number	:ER-2020-30132	Test Date	:2020-04-14
Operation Mode	:802.11n40	Temp./Humi.	:20.4/51
Test Frequency	:5795 MHz	Antenna Pol.	:HORIZONTAL
Test Mode	:Bandedge CH High	Engineer	:Nick
EUT Pol	:H Plane		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5850.00	Peak	55.97	9.42	65.39	122.20	-56.81
5855.00	Peak	55.57	9.44	65.01	110.80	-45.79
5875.00	Peak	52.65	9.50	62.15	105.20	-43.05
5880.38	Peak	54.41	9.51	63.92	101.22	-37.30
5919.52	Peak	53.42	9.64	63.06	72.26	-9.20
5925.00	Peak	51.30	9.65	60.95	68.20	-7.25
5959.80	Peak	54.53	9.70	64.23	68.20	-3.97

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.

13 FREQUENCY STABILITY

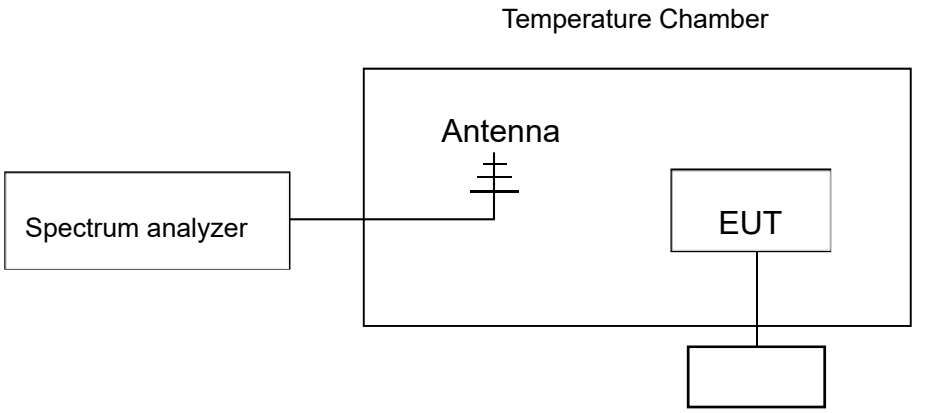
13.1 Standard Applicable

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.
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2019	05/16/2020
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY57120290	02/20/2020	02/19/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2020	01/01/2021
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2020	01/01/2021

13.5 Measurement Result

Start up

Operation Mode	802.11 n20	Test Date	2020.04.06
Temperature	: 25℃	Test By	Tom
Humidity	: 50%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
0	60	100	5500	5,500.08800	-0.00001600
	24	100	5500	5,499.91500	0.00001545
25	48	100	5500	5,499.95000	0.00000909
50	60	100	5500	5,500.00100	-0.00000018
	24	100	5500	5,499.93700	0.00001145

2 minutes

Operation Mode	802.11 n20	Test Date	2020.04.06
Temperature	: 25℃	Test By	Tom
Humidity	: 50%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
0	60	100	5500	5,499.90400	0.00001745
	24	100	5500	5,499.95200	0.00000873
25	48	100	5500	5,500.00700	-0.00000127
50	60	100	5500	5,499.95400	0.00000836
	24	100	5500	5,499.93300	0.00001218

5 minutes

Operation Mode	802.11 n20	Test Date	2020.04.06
Temperature	: 25℃	Test By	Tom
Humidity	: 50%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
0	60	100	5500	5,499.95700	0.00000782
	24	100	5500	5,499.95800	0.00000764
25	48	100	5500	5,499.97000	0.00000545
50	60	100	5500	5,499.96900	0.00000564
	24	100	5500	5,500.10000	-0.00001818

10 minutes

Operation Mode	802.11 n20	Test Date	2020.04.06
Temperature	: 25℃	Test By	Tom
Humidity	: 50%		

Test Temp.(℃)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
0	60	100	5500	5,500.06100	-0.00001109
	24	100	5500	5,500.08400	-0.00001527
25	48	100	5500	5,499.99900	0.00000018
50	60	100	5500	5,500.05400	-0.00000982
	24	100	5500	5,499.95900	0.00000745

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 ~