

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART E AND INDUSTRY CANADA RSS 247
REQUIREMENT**

OF

Applicant: Cal-Comp Big Data, Inc.
5F., No.99, Sec. 5, Nanjing E. Rd., Songshan Dist., Taipei City 10571,
Taiwan (R.O.C.)

Product Name: HiMirror Mini Premium X

Brand Name: HiMirror

Model No.: BM688

Model Difference: N/A

Report Number: T190711W03-RP1

FCC ID: 2AJTF-BM688

IC: 21978-BM688

FCC Rule Part: §15.407, Cat:NII

IC Rule: RSS-247 issue 2 Feb. 2017

Issue Date: Jul. 30, 2019

Date of Test: Jul. 11, 2019 ~ Jul. 22, 2019

Date of EUT Received: Jul. 11, 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

Note: 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

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
T190711W03-RP1	Rev.00	Initial creation of document	All	Jul. 26, 2019	Elle Chang
T190711W03-RP1	Rev.00	Updated antenna type at section 1.1, limit at section 9 & 10	4, 32~36, 39~41	Jul. 30, 2019	Elle Chang

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	HiMirror Mini Premium X	
Brand Name:	HiMirror	
Model No.:	BM688	
Model Difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
Power Supply:	12Vdc from AC/DC Adapter	
	Adapter:	Model No.: WA-36A12FU Supplier: Asian Power Devices Inc.
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM	
Antenna Designation:	PCB Antenna, Gain: 4.9dBi (Main) / 4.41dBi (Aux)	
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 - 300.0Mbps	

FCC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. Power (dBm)	Modulation Technology
11a_20	5150~5250	4	13.91	OFDM
11n_HT 20M	5150~5250	4	12.55	OFDM
11n_HT40M	5150~5250	2	14.87	OFDM

IC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. or EIRP	Rated Power(dBm) (Worst Case)	Modulation Technology
11a	5150~5250	4	EIRP	18.72	OFDM
11n_HT20M	5150~5250	4	EIRP	20.22	OFDM
11n_HT40M	5150~5250	2	EIRP	22.54	OFDM

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

RSS-247 issue 2 Feb. 2017

RSS-Gen. issue 5 Apr. 2018

ANSI C63.10:2013

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

1.3 Test Facility

Compliance Certification Services Inc. Wugong Lab. No.11, Wugong 6th Rd.,

Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.) (TAF code 1309)

FCC Designation number: TW1309

Canada Registration number: 2324G

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a 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.

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2.4 Measurement Results Explanation

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

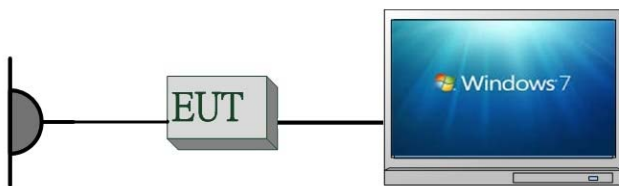


Fig.2-3 Conducted Emission (Antenna Port) Configuration



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

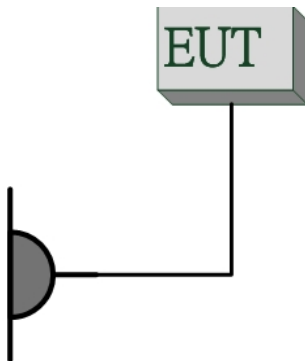


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2	Notebook	Lenovo	T420	S0012483	Shielded	Unshielded
3	Notebook	Lenovo	T420	S0012407	Shielded	Unshielded

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3 SUMMARY OF TEST RESULT

FCC Rules	IC Rules	Description Of Test	Result
§15.207	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	RSS-247 §6.2.1~ 4 (1) RSS-Gen §6.7	26 dB & 6dB & 99% Emission Bandwidth	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Maximum Conducted Output Power	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Power Spectral Density	Compliant
§15.205 §15.209 §15.407(b)	RSS-247 §6.2.1~ 4 (2)	Undesirable Radiated Emissions	Compliant
§15.407(c)	RSS-247 §6.4	Transmission in case of Absence of Information	Compliant
§15.407(g)	RSS-Gen §6.11	Frequency Stability	Compliant
§15.203 §15.407(a)	RSS- Gen §6.7 RSS- Gen §8.3	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

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

802.11 n HT40 Mode	
channel	Frequency
38	5190
46	5230

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 gevin 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"/> Ch2	<input type="checkbox"/> Ch3	<input type="checkbox"/> 2TX
<input checked="" type="checkbox"/> 802.11 n	<input checked="" type="checkbox"/> Ch0	<input checked="" type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input checked="" type="checkbox"/> MIMO
<input type="checkbox"/> 802.11 ac	<input type="checkbox"/> Ch0	<input type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input 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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RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	44	OFDM	6	Ch1
802.11n_HT40	5190~5230	38 to 46	38	OFDM	MCS8	MIMO
RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Ch1
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	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 WLAN Transmitter for channel Low, Mid and High, the worst case E1 position was reported.

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	Ch1
802.11n_HT20				OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO

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5 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.
2. Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable

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

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

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

6.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
CABLE	EMCI	CFD300-NL	CERF	06/27/2019	06/26/2020
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
Software	EZ-EMC(CCS-3A1-CE)				

6.3 EUT Setup

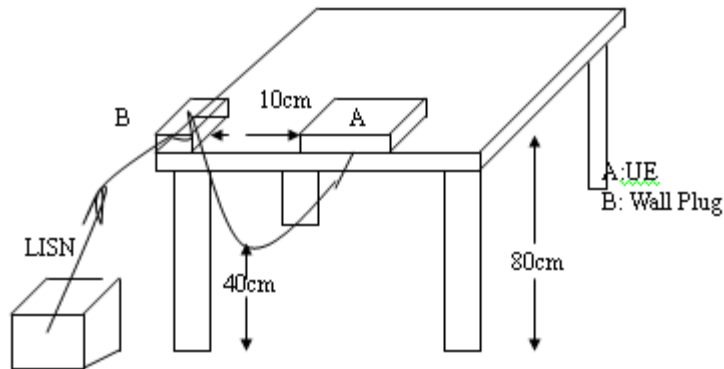
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz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

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6.4 Test SET-UP



6.5 Measurement Procedure

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

6.6 Measurement Result

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

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

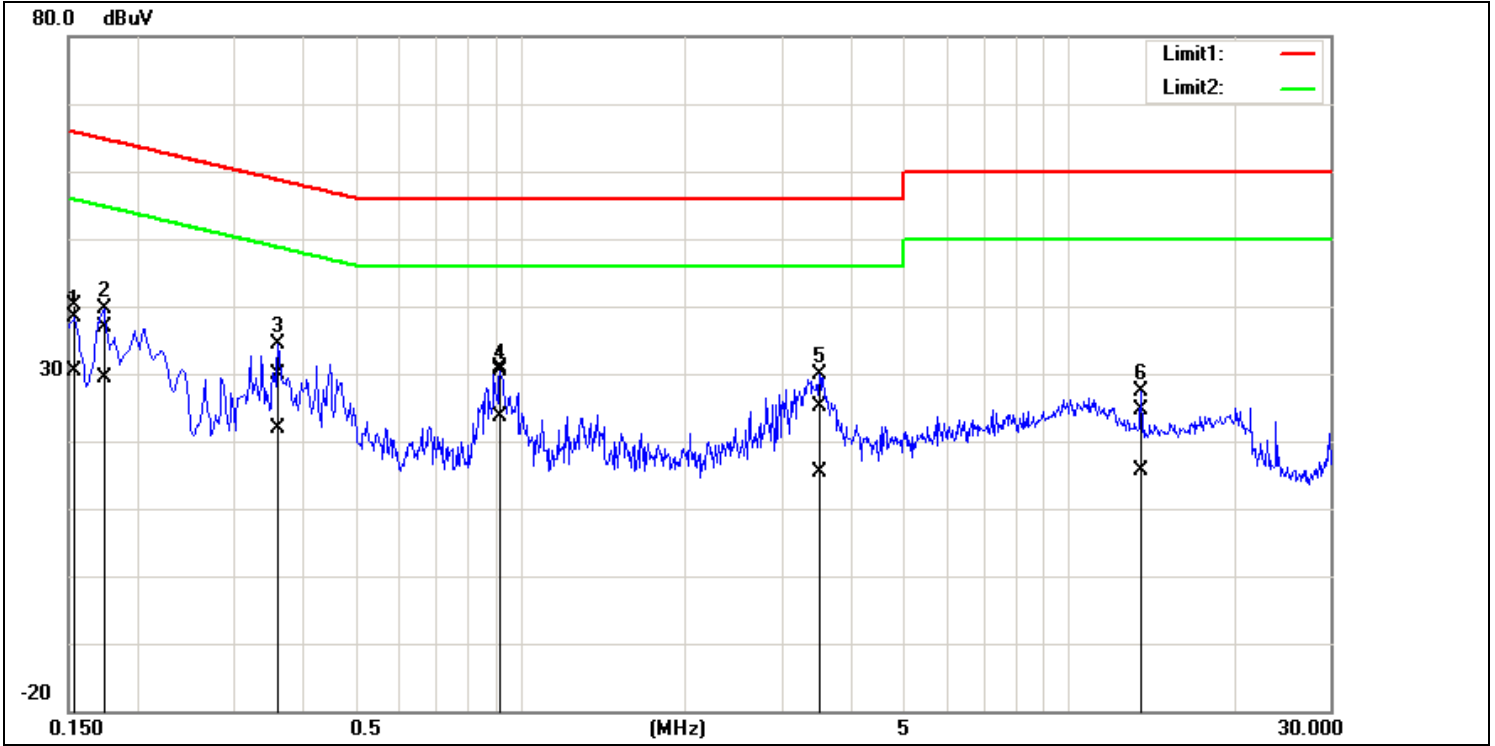
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Description:	Operation	Date:	2019/7/16
Line:	L1	Temp.(°C)/Hum.(%):	25.7(°C)/62%
Test Voltage:	AC 120V/60Hz	Test By:	Henry



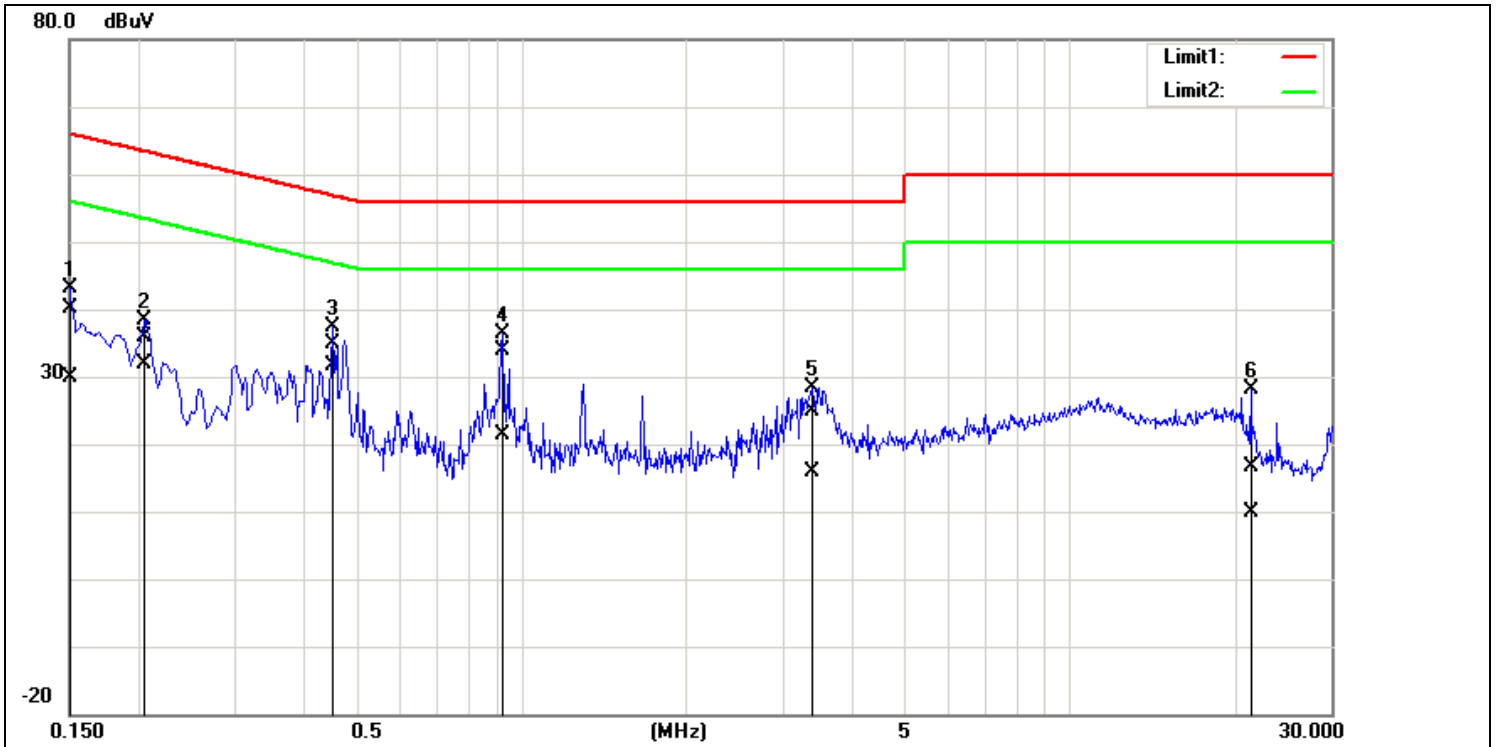
No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1539	30.09	20.23	10.14	40.23	30.37	65.78	55.79	-25.55	-25.42	Pass
2	0.1740	26.80	19.17	10.14	36.94	29.31	64.76	54.77	-27.82	-25.46	Pass
3	0.3620	19.66	11.84	10.14	29.80	21.98	58.68	48.68	-28.88	-26.70	Pass
4*	0.9220	20.76	13.45	10.17	30.93	23.62	56.00	46.00	-25.07	-22.38	Pass
5	3.5100	14.81	5.24	10.22	25.03	15.46	56.00	46.00	-30.97	-30.54	Pass
6	13.5580	14.20	5.35	10.36	24.56	15.71	60.00	50.00	-35.44	-34.29	Pass

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Description:	Operation	Date:	2019/7/16
Line:	N	Temp.(°C)/Hum.(%):	25.7(°C)/62%
Test Voltage:	AC 120V/60Hz	Test By:	Henry



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1500	30.07	19.91	10.02	40.09	29.93	65.99	56.00	-25.90	-26.07	Pass
2	0.2060	25.92	21.94	10.02	35.94	31.96	63.36	53.37	-27.42	-21.41	Pass
3*	0.4540	24.96	21.64	10.03	34.99	31.67	56.80	46.80	-21.81	-15.13	Pass
4	0.9260	23.94	11.34	10.04	33.98	21.38	56.00	46.00	-22.02	-24.62	Pass
5	3.3820	14.78	5.68	10.08	24.86	15.76	56.00	46.00	-31.14	-30.24	Pass
6	21.4540	6.22	-0.45	10.30	16.52	9.85	60.00	50.00	-43.48	-40.15	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:

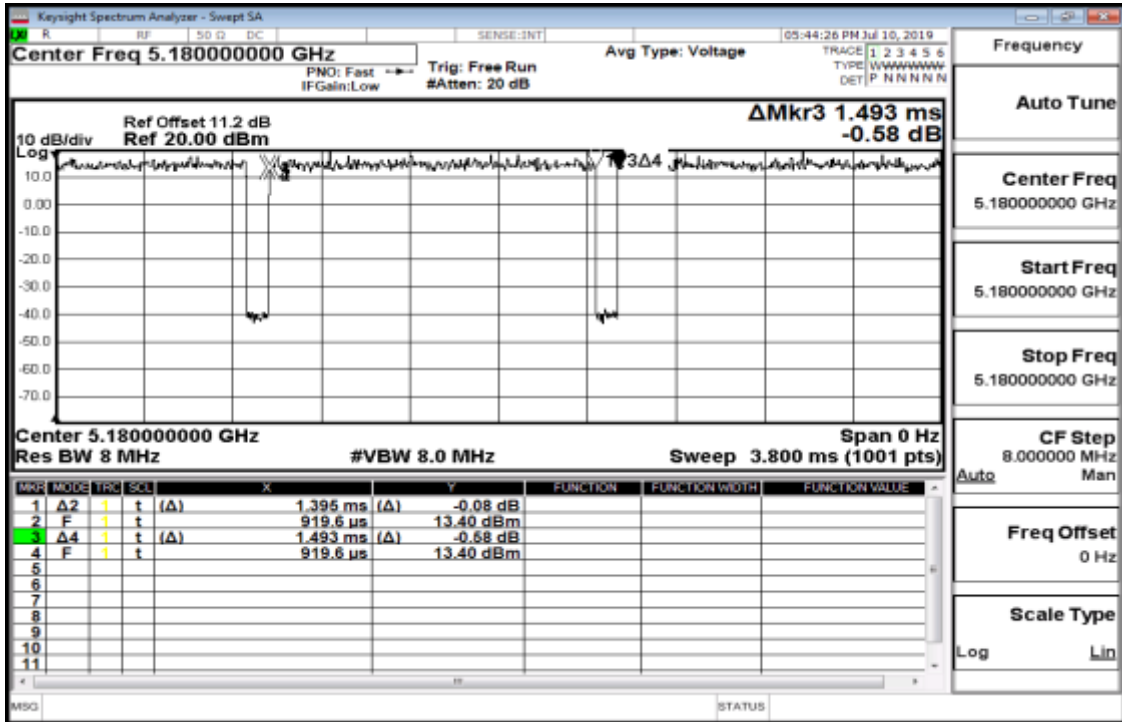
Mode	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	93.43	0.30	0.72	1.00
802.11n_20	92.91	0.32	0.77	1.00
802.11n_40	86.58	0.63	1.57	2.00

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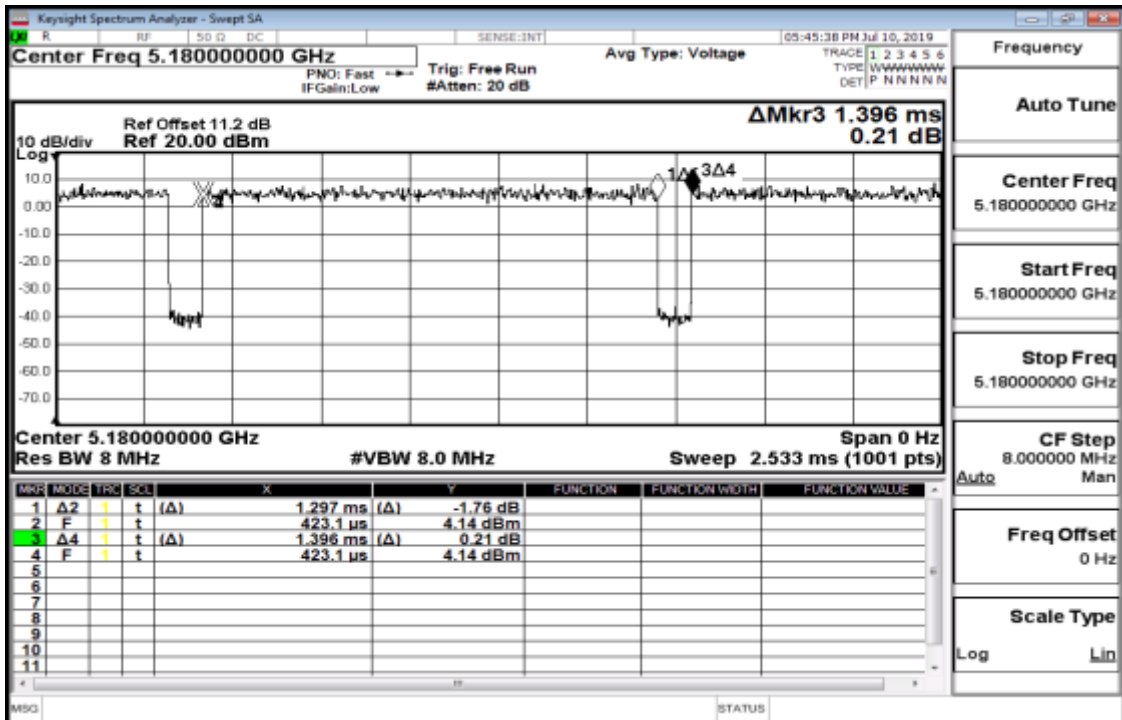
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DUTY CYCLE TEST SIGNAL Measurement Result 802.11a



802.11n HT20

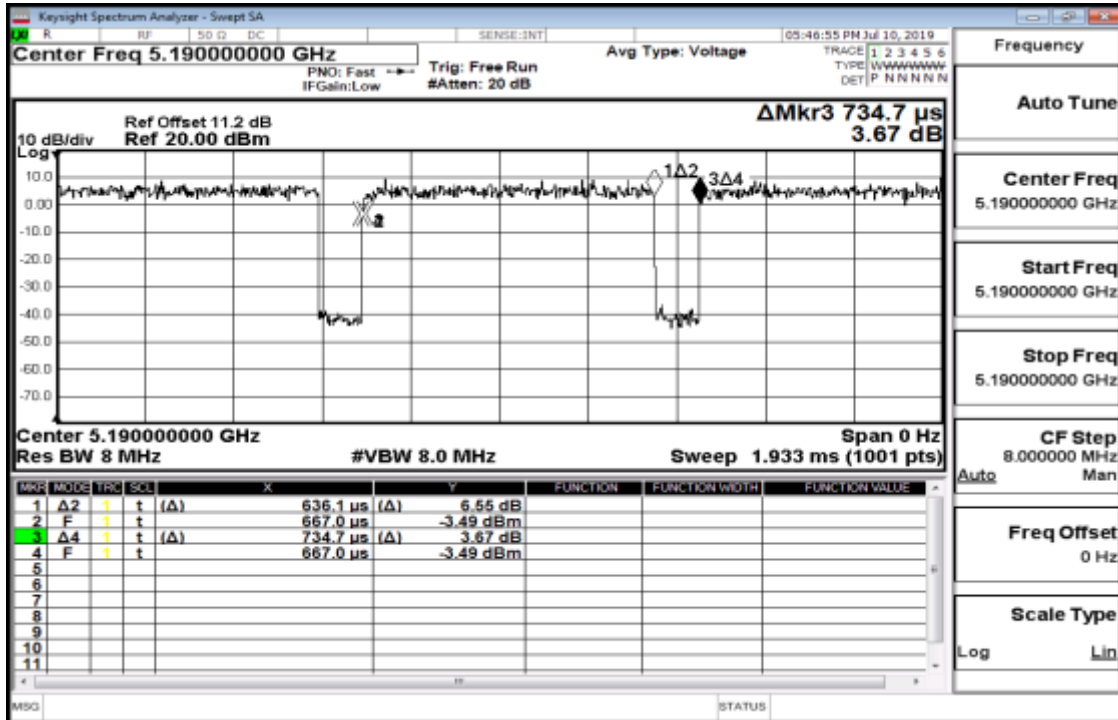


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802.11n HT 40



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8 26DB & 6DB EMISSION BANDWIDTH MEASUREMENT

8.1 Standard Applicable

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

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

8.2 Measurement Procedure

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

Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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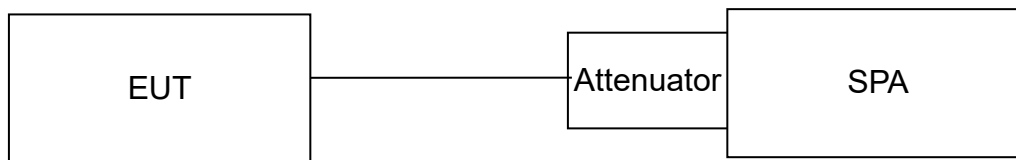
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8.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
DC Block	PASTERNAK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/16/2019	05/15/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

8.4 Test Set-up



8.5 Measurement Result

26dB and 6dB Bandwidth

802.11a_Ch0

802.11a_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	18.08	12.572	5180	18.07	12.570
5220	18.41	12.651	5220	18.45	12.660
5240	18.14	12.586	5240	18.38	12.643

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802.11n_HT20_Ch0
802.11n_HT20_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	20.84	13.189	5180	22.51	13.524
5220	22.49	13.520	5220	20.86	13.193
5240	19.07	12.804	5240	22.49	13.520

802.11n_HT40_Ch0
802.11n_HT40_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	45.15	16.547	5190	45.56	16.586
5230	45.18	16.549	5230	45.29	16.560

99% Bandwidth
802.11a_Ch0
802.11a_Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	16.43	12.156	5180	16.42	12.154
5220	16.44	12.159	5220	16.41	12.151
5240	16.47	12.167	5240	16.46	12.164

802.11n_HT20_Ch0
802.11n_HT20_Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	17.54	12.440	5180	17.54	12.440
5220	17.49	12.428	5220	17.47	12.423
5240	17.46	12.420	5240	17.48	12.425

802.11n_HT40_Ch0
802.11n_HT40_Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5190	36.29	15.598	5190	36.27	15.595
5230	36.23	15.591	5230	36.25	15.593

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99% BW verification for DFS function
802.11a_Ch0
802.11a_Ch0

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)	Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.10	< 5250	5240	5248.10	< 5250

802.11n_HT20_Ch0
802.11n_HT20_Ch1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)	Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.70	< 5250	5240	5248.70	< 5250

802.11n_HT40_Ch0
802.11n_HT40_Ch1

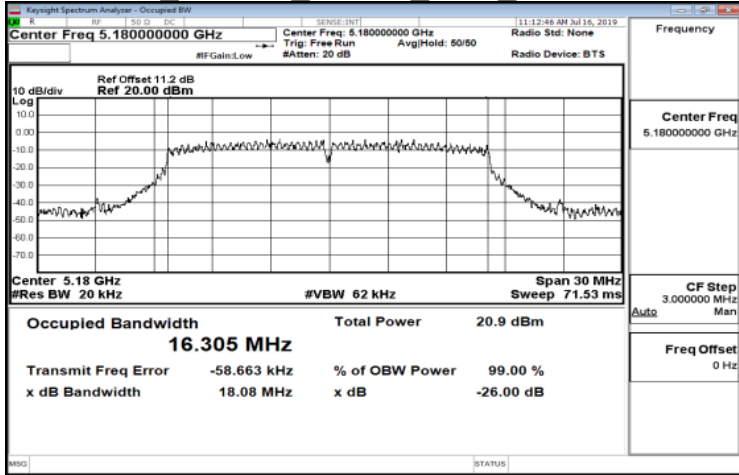
Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)	Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.05	< 5250	5230	5248.10	< 5250

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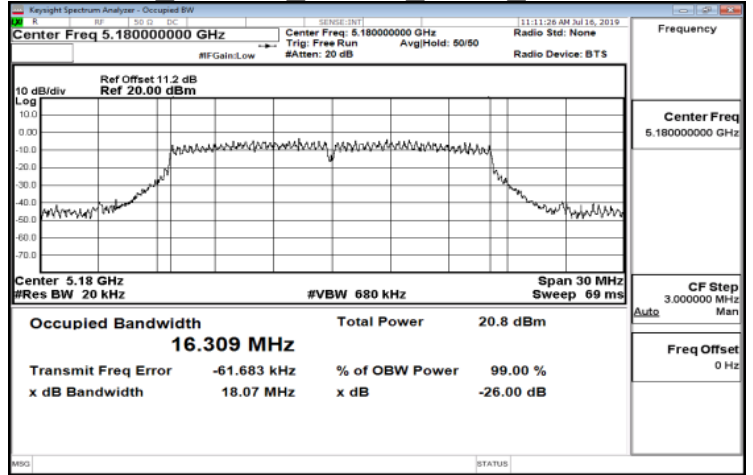
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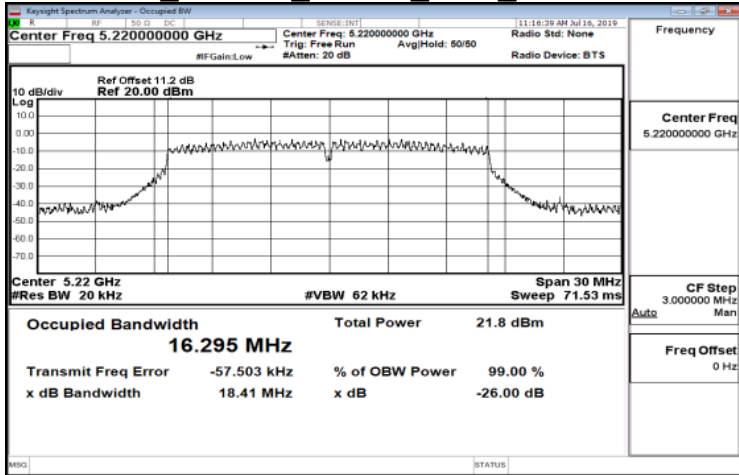
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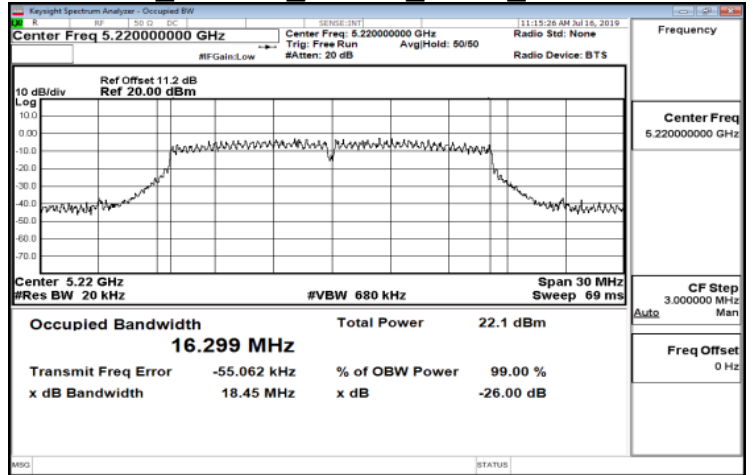
FCC 802.11a 20MHz AUX1 5180MHz



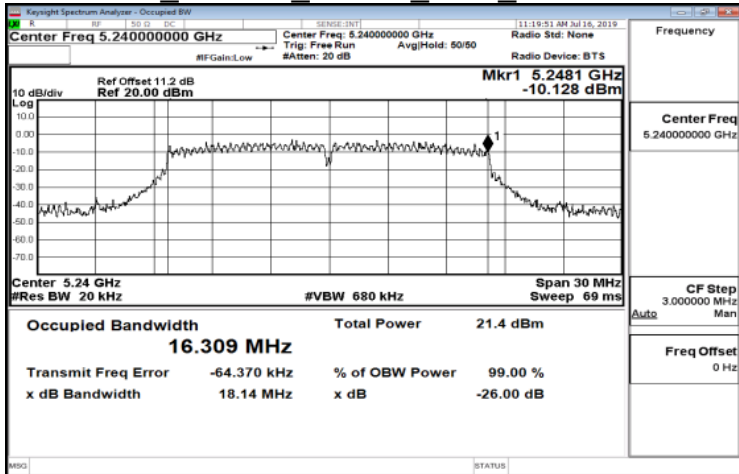
FCC 802.11a 20MHz Main 5220MHz



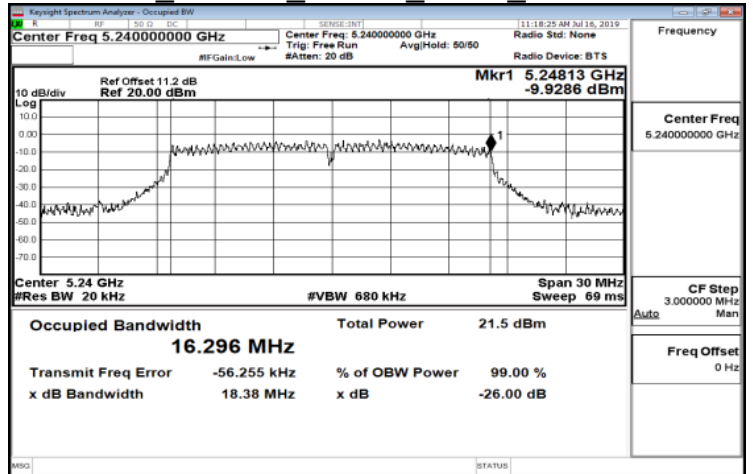
FCC 802.11a 20MHz AUX1 5220MHz



FCC 802.11a 20MHz Main 5240MHz



FCC 802.11a 20MHz AUX1 5240MHz

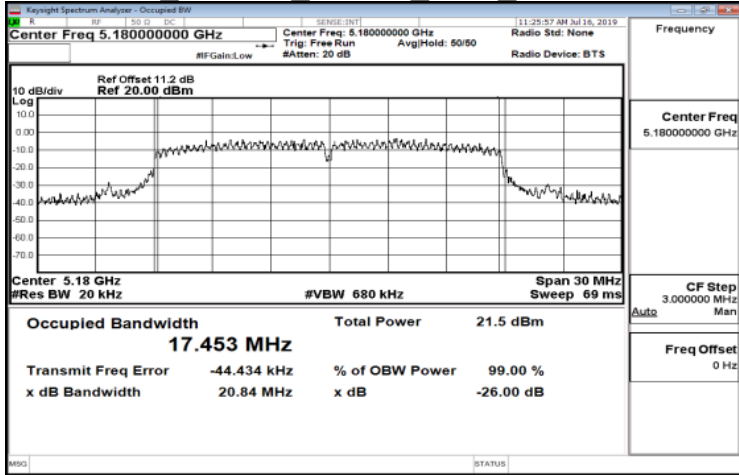


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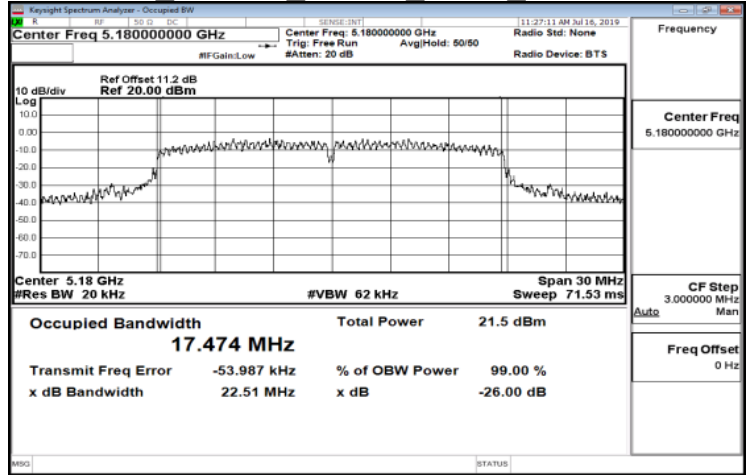
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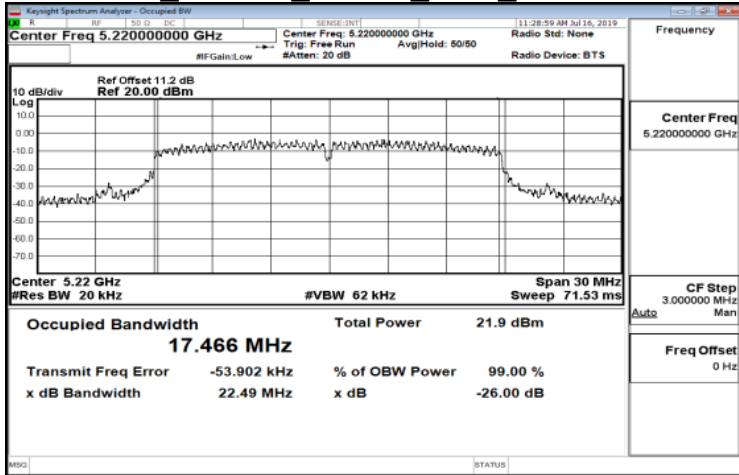
FCC 802.11n 20MHz Main 5180MHz



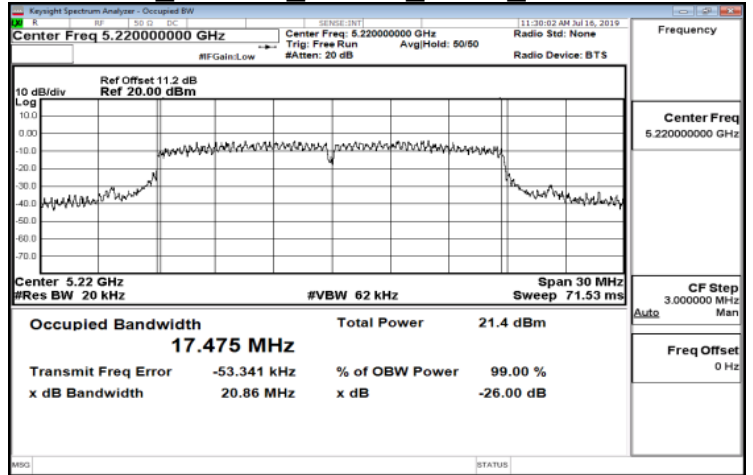
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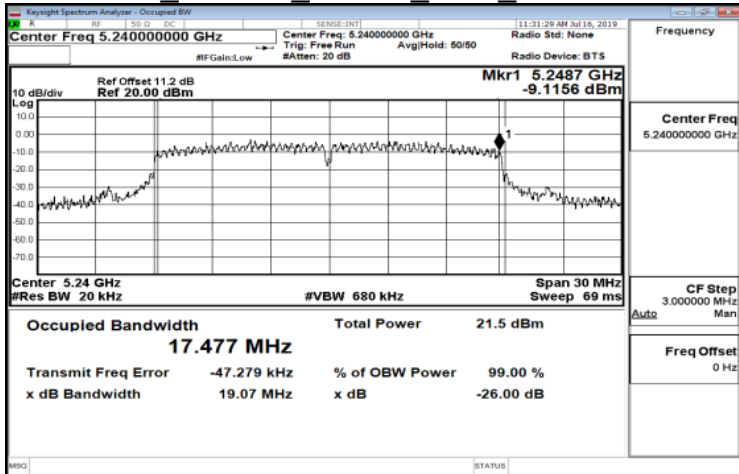
FCC 802.11n 20MHz Main 5220MHz



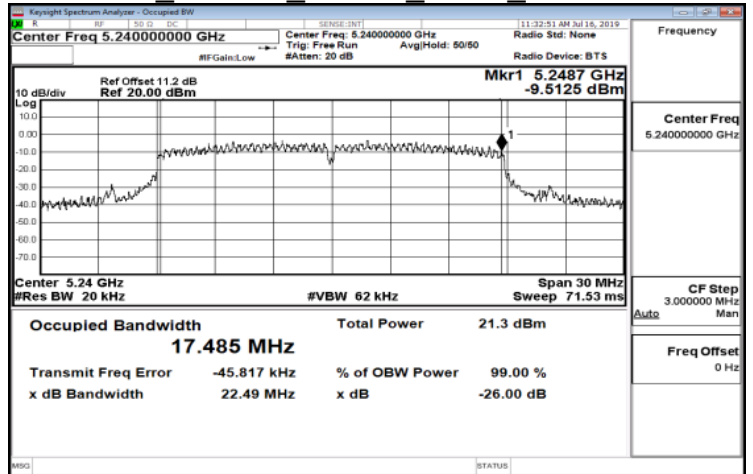
FCC 802.11n 20MHz AUX1 5220MHz



FCC 802.11n 20MHz Main 5240MHz



FCC 802.11n 20MHz AUX1 5240MHz

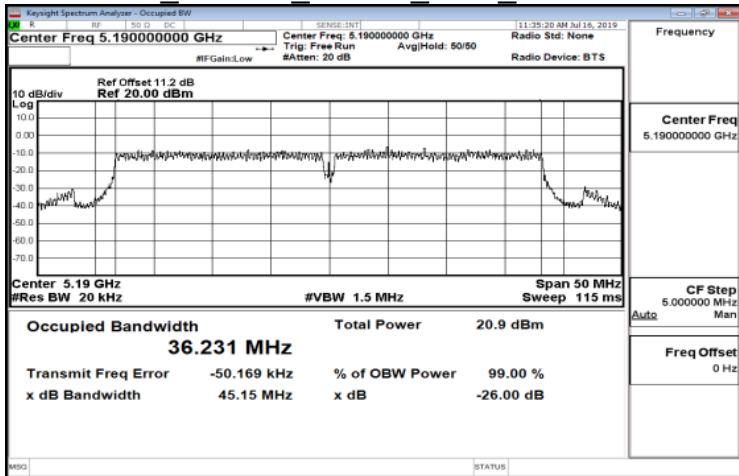


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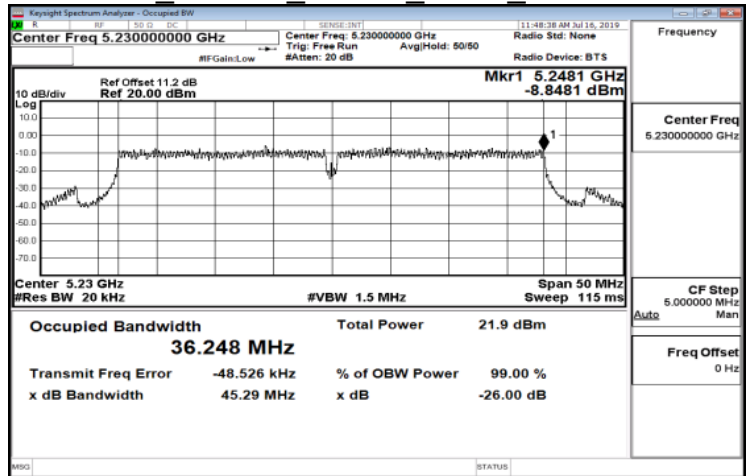
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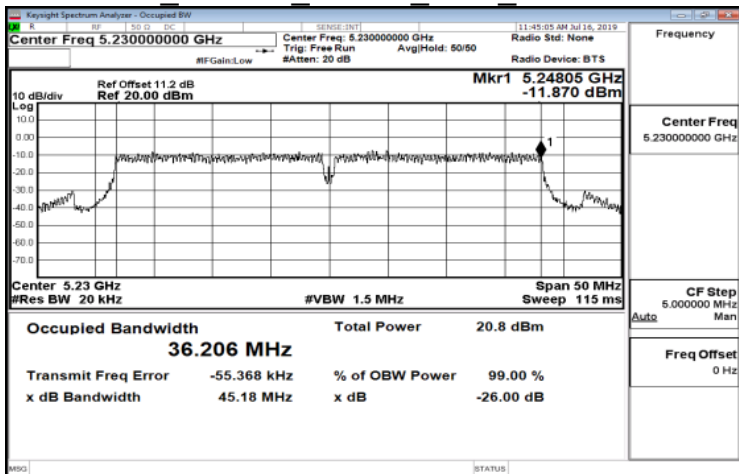
FCC 802.11n 40MHz Main 5190MHz



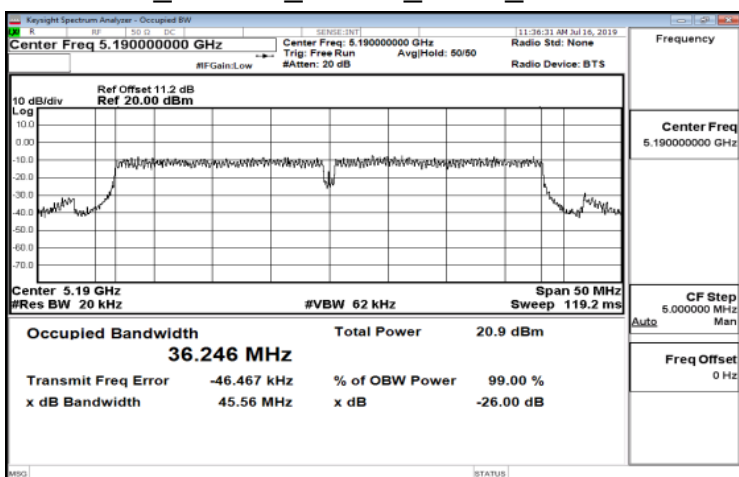
FCC 802.11n 40MHz AUX1 5230MHz



FCC 802.11n 40MHz Main 5230MHz



FCC_802.11n_40MHz_AUX1_5190MHz

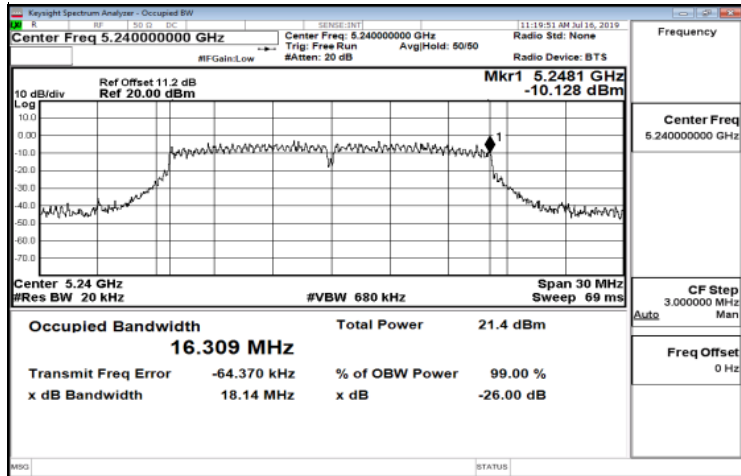


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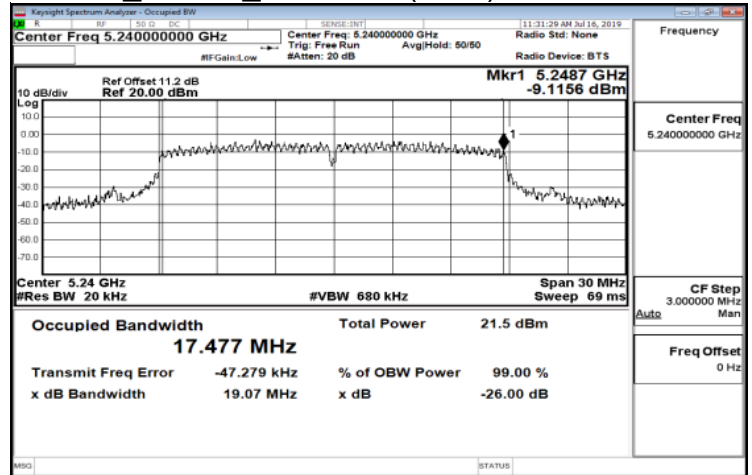
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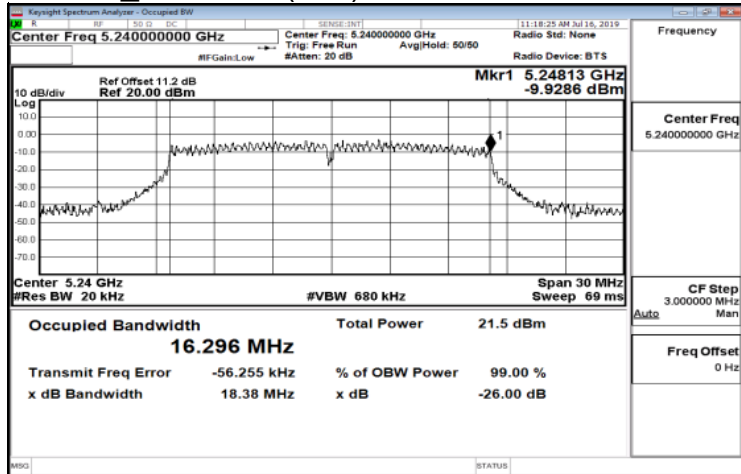
99% BW verification for DFS Function
802.11a_5240MHz (Main)



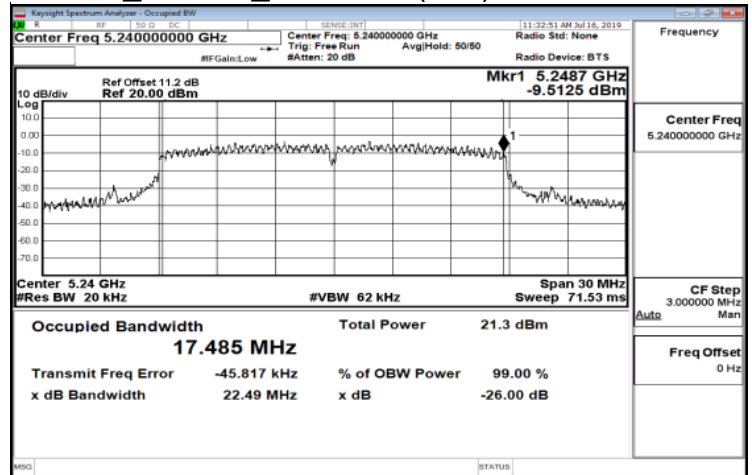
802.11n_20MHz_5240MHz (Main)



802.11a_5240MHz (Aux)



802.11n_20MHz_5240MHz (Aux)

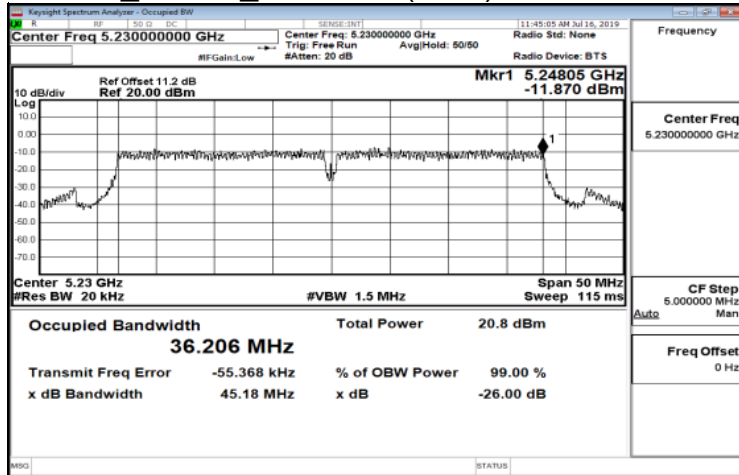


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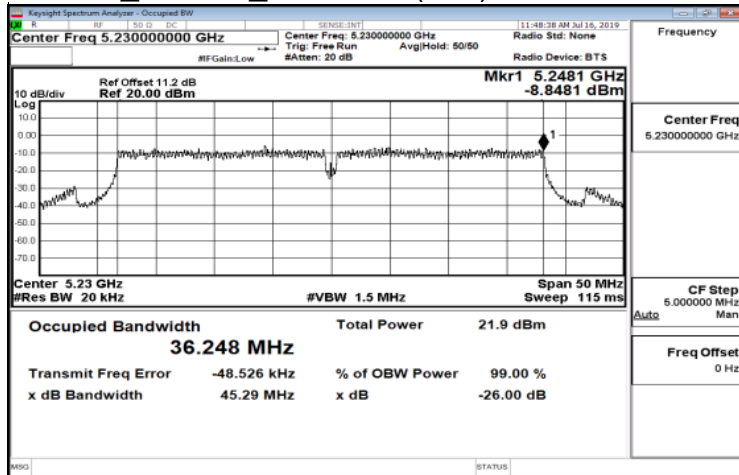
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802.11n_40MHz_5230MHz (Main)



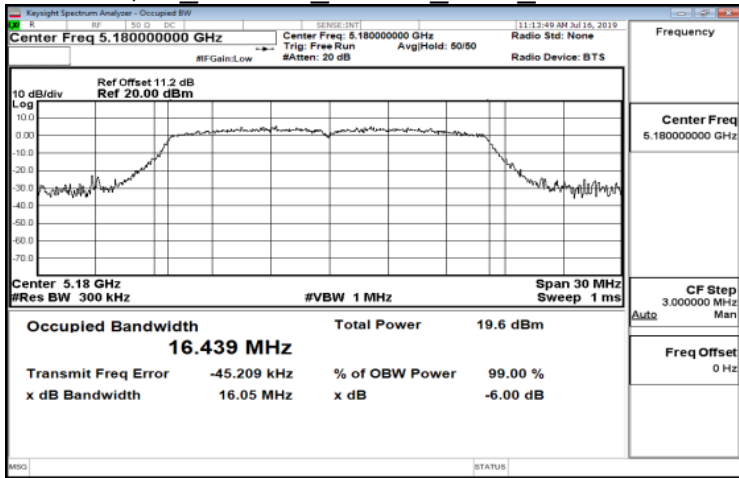
802.11n_40MHz_5230MHz (Aux)



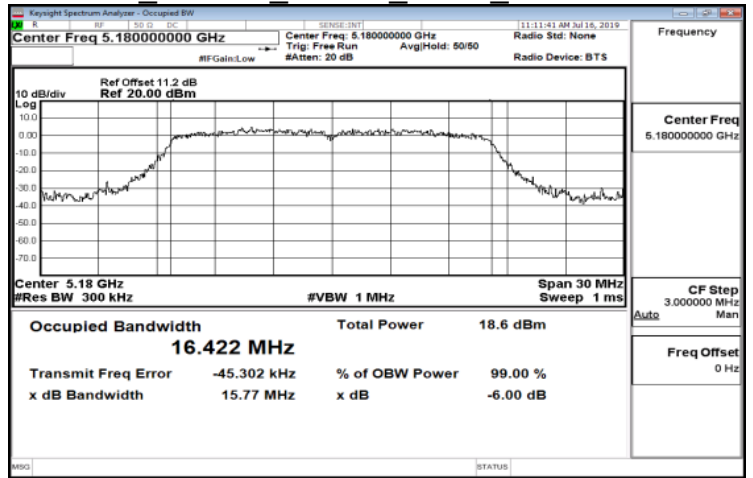
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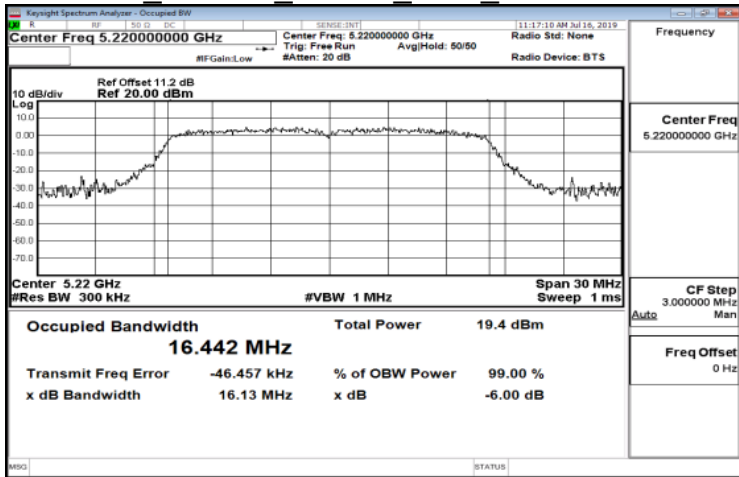
For 99%, IC 802.11a 20MHz Main 5180MHz



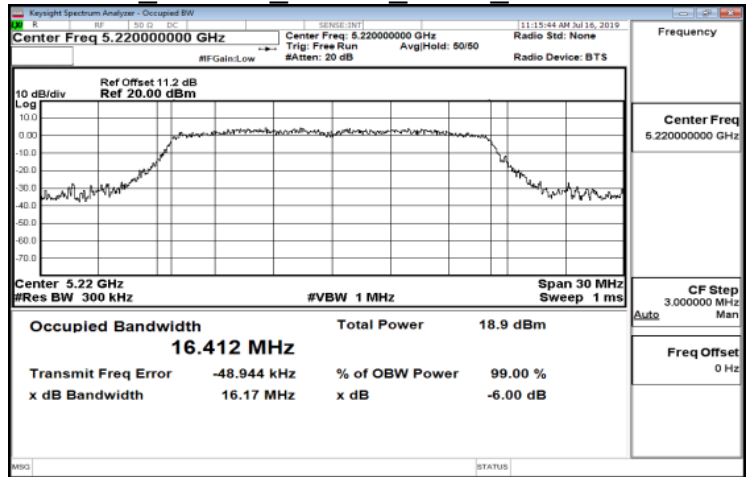
IC 802.11a 20MHz AUX1 5180MHz



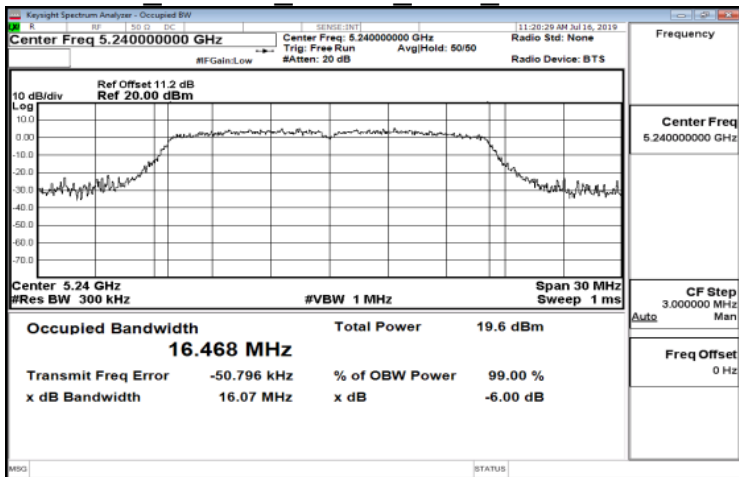
IC 802.11a 20MHz Main 5220MHz



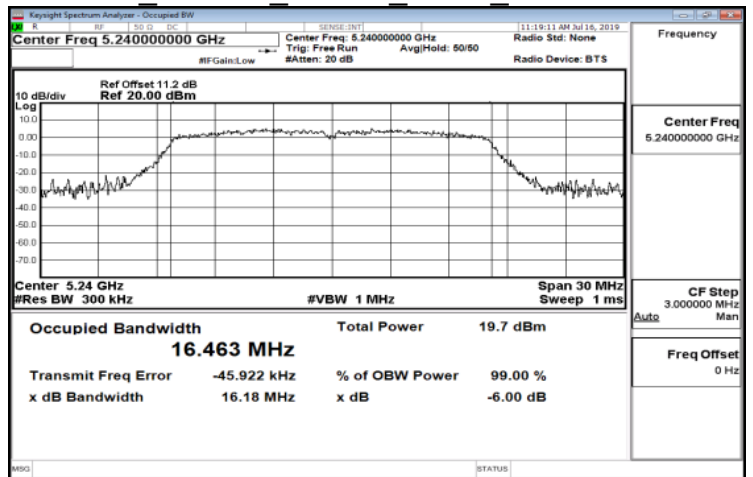
IC 802.11a 20MHz AUX1 5220MHz



IC 802.11a 20MHz Main 5240MHz



IC 802.11a 20MHz AUX1 5240MHz

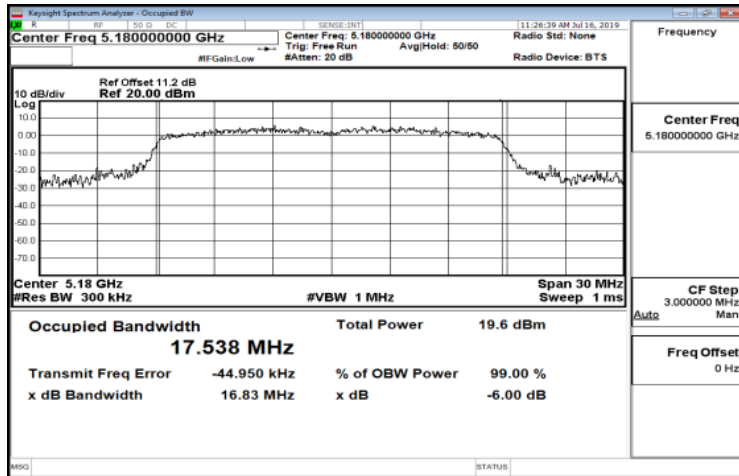


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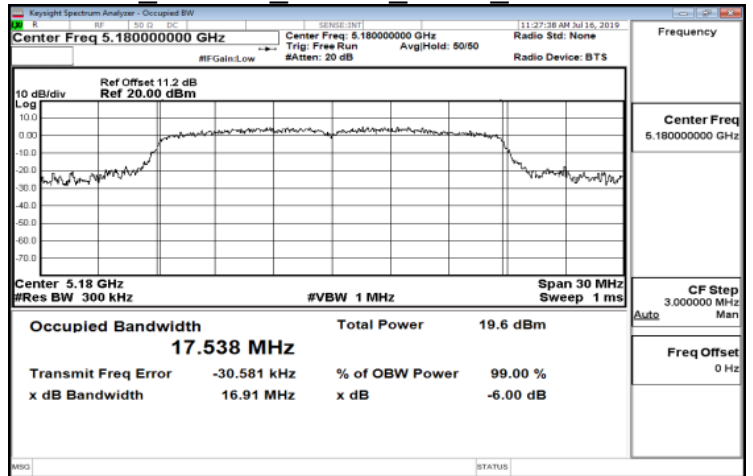
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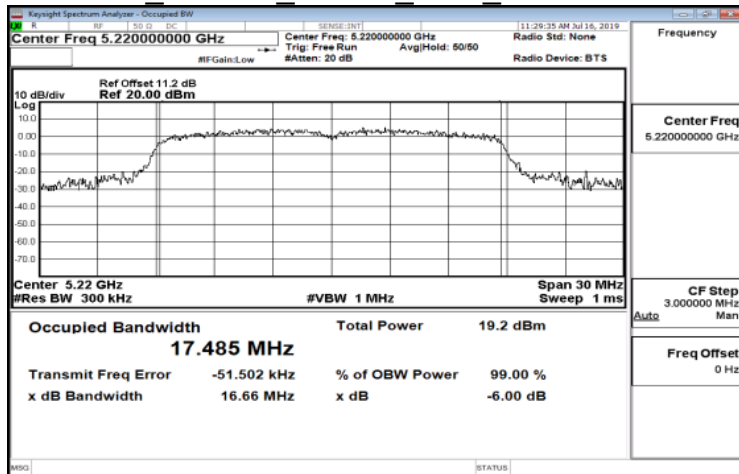
IC_802.11n_20MHz_Main_5180MHz



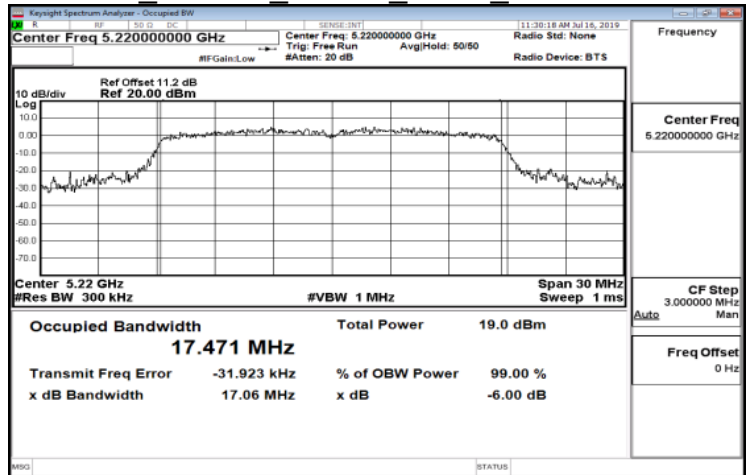
IC 802.11n 20MHz AUX1 5180MHz



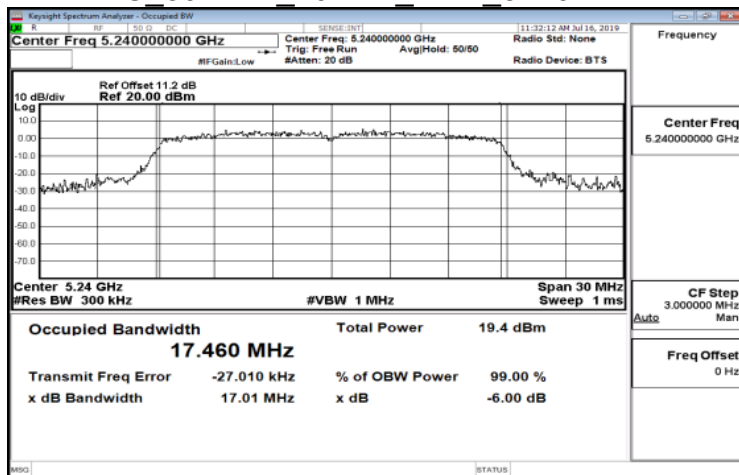
IC 802.11n 20MHz Main 5220MHz



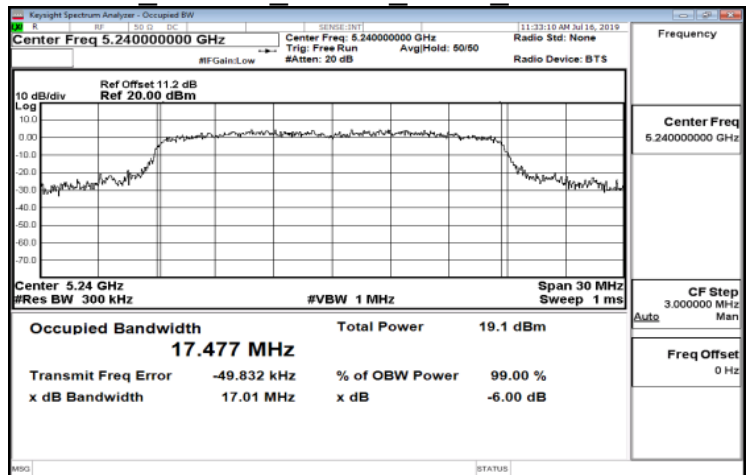
IC 802.11n 20MHz AUX1 5220MHz



IC 802.11n 20MHz Main 5240MHz



IC 802.11n 20MHz AUX1 5240MHz

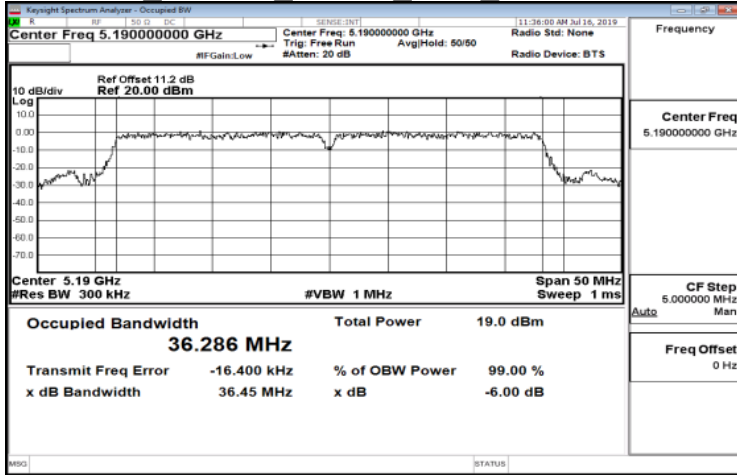


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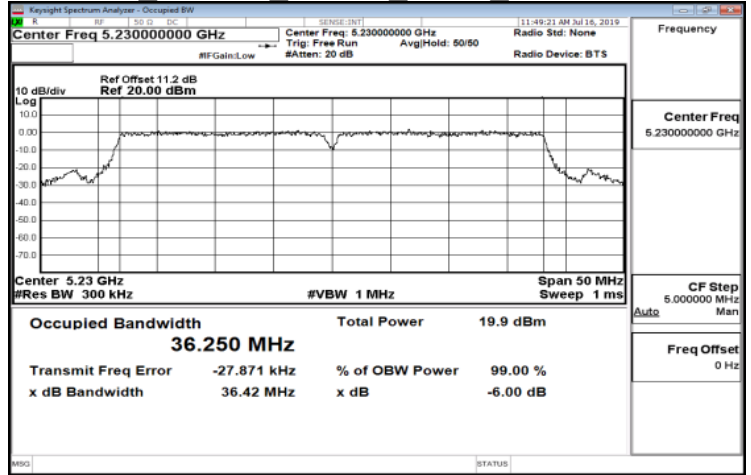
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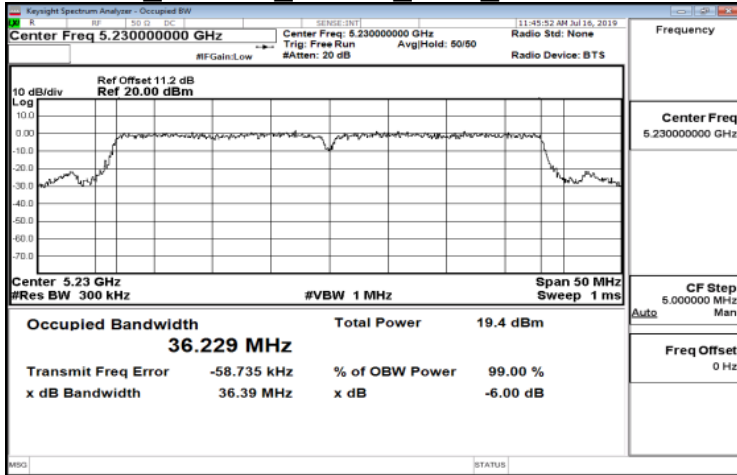
IC 802.11n 40MHz Main 5190MHz



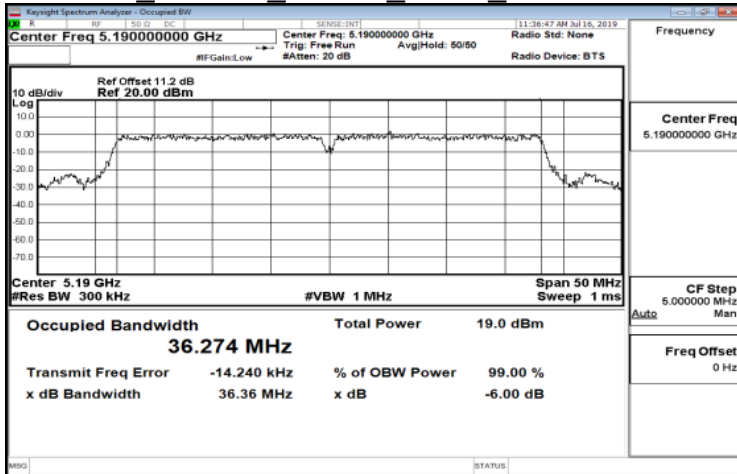
IC 802.11n 40MHz AUX1 5230MHz



IC 802.11n 40MHz Main 5230MHz



IC 802.11n 40MHz AUX1 5190MHz



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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.			

ISED

OPERZTION FREQUENCY BAND	LIMIT
5150~5250 MHz	EIRP shall not exceed 200 mW or $10 + 10 \log_{10}B$, dBm
5250~5350 MHz	Conducted output power shall not exceed 250 mW or $11 + 10 \log_{10}B$ EIRP shall not exceed 1.0 W or $17 + 10 \log_{10}B$, dBm
5470-5600 MHz and 5650-5725 MHz	Conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$ EIRP shall not exceed 1.0 W or $17 + 10 \log_{10}B$, dBm
5725~5850 MHz	Conducted output power shall not exceed 1 W
For equipment operating in the band 5725-5850 MHz, If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum transmit power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	

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Note:

As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi.

(i) If transmit signals are correlated, then Directional gain

$$= 10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] \text{ dBi}$$

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

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

	Effective Legacy Gain (dBi)	Conducted Power Limit (dBm)
UNII-1	7.67	22.31

9.2 Measurement Procedure

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

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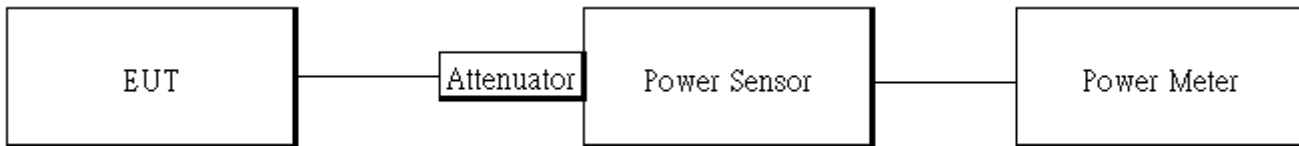
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9.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration 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



9.5 Measurement Result

Conducted output power (FCC)

802.11a_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	13.81	24.017	23.98	PASS
44	5220	6	13.77	23.797	23.98	PASS
48	5240	6	13.82	24.072	23.98	PASS

802.11a_Ch1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	6	13.89	24.463	23.98	PASS
44	5220	6	13.85	24.239	23.98	PASS
48	5240	6	13.91	24.576	23.98	PASS

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802.11n_HT20_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	MCS0	11.84	15.273	23.98	PASS
44	5220	MCS0	11.80	15.133	23.98	PASS
48	5240	MCS0	11.90	15.486	23.98	PASS

802.11n_HT20_Ch1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	MCS0	12.26	16.824	23.98	PASS
44	5220	MCS0	12.18	16.517	23.98	PASS
48	5240	MCS0	12.41	17.416	23.98	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	9.26	9.04	12.48	17.705	22.31	PASS
44	5220	MCS8	9.16	8.81	12.32	17.054	22.31	PASS
48	5240	MCS8	9.31	9.13	12.55	17.991	22.31	PASS

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802.11n_HT40_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
38	5190	MCS0	11.69	14.743	23.98	PASS
46	5230	MCS0	11.65	14.608	23.98	PASS

802.11n_HT40_Ch1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
38	5190	MCS0	11.90	15.473	23.98	PASS
46	5230	MCS0	11.86	15.331	23.98	PASS

802.11n_HT40_MIMO

CH	Frequency (MHz)	Data Rate	Avg. POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
38	5190	MCS8	11.55	10.90	14.87	30.713	22.31	PASS
46	5230	MCS8	11.41	10.97	14.83	30.421	22.31	PASS

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EIRP
802.11a_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	13.81	4.900	18.71	74.219	23.01 or 10+10log(B)= 22.05	PASS
44	5220	13.77	4.900	18.67	73.538	23.01 or 10+10log(B)= 22.08	PASS
48	5240	13.82	4.900	18.72	74.390	23.01 or 10+10log(B)= 22.06	PASS

802.11a_Ch1

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	13.89	4.410	18.30	67.533	23.01 or 10+10log(B)= 21.98	PASS
44	5220	13.85	4.410	18.26	66.913	23.01 or 10+10log(B)= 22.09	PASS
48	5240	13.91	4.410	18.32	67.844	23.01 or 10+10log(B)= 22.09	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	11.84	4.900	16.74	47.200	23.01 or 10+10log(B)= 22.44	PASS
44	5220	11.80	4.900	16.70	46.767	23.01 or 10+10log(B)= 22.43	PASS
48	5240	11.90	4.900	16.80	47.856	23.01 or 10+10log(B)= 22.42	PASS

802.11n_HT20_Ch1

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	12.26	4.410	16.67	46.445	23.01 or 10+10log(B)= 22.44	PASS
44	5220	12.18	4.410	16.59	45.597	23.01 or 10+10log(B)= 22.42	PASS
48	5240	12.41	4.410	16.82	48.077	23.01 or 10+10log(B)= 22.42	PASS

802.11n_HT20_MIMO

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	12.48	7.669	20.15	103.510	23.01 or 10+10log(B)= 22.44	PASS
44	5220	12.32	7.669	19.99	99.700	23.01 or 10+10log(B)= 22.42	PASS
48	5240	12.55	7.669	20.22	105.181	23.01 or 10+10log(B)= 22.42	PASS

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802.11n_HT40_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)		RESULT
38	5190	11.69	4.900	16.59	45.560	23.01	or 10+10log(B)= 25.62	PASS
46	5230	11.65	4.900	16.55	45.142	23.01	or 10+10log(B)= 25.61	PASS

802.11n_HT40_Ch1

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)		RESULT
38	5190	11.90	4.410	16.31	42.715	23.01	or 10+10log(B)= 25.61	PASS
46	5230	11.86	4.410	16.27	42.324	23.01	or 10+10log(B)= 25.61	PASS

802.11n_HT40_MIMO

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)		RESULT
38	5190	14.87	7.669	22.54	179.557	23.01	or 10+10log(B)= 25.61	PASS
46	5230	14.83	7.669	22.50	177.846	23.01	or 10+10log(B)= 25.61	PASS

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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.

ISED

OPERZTION FREQUENCY BAND	LIMIT
5150~5250 MHz	EIRP spectral density 10 dBm / MHz
5250~5350 MHz	11dBm / MHz
5470-5600 MHz and 5650-5725 MHz	11dBm / MHz
5725~5850 MHz	30dBm / 500 kHz

For equipment operating in the band **5725-5850** MHz, 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.

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Note:

As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi.

(i) If transmit signals are correlated, then Directional gain

$$= 10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] \text{ dBi}$$

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

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

	Effective Legacy Gain (dBi)	PSD Limit	
UNII-1	7.67	9.33	dBm/MHz

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. 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.

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

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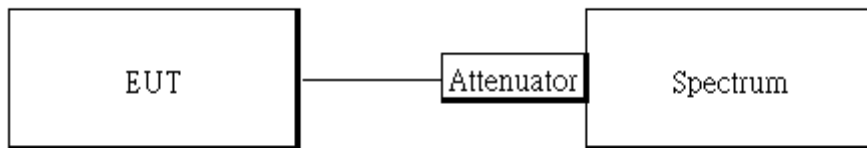
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10.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
DC Block	PASTERNAK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/16/2019	05/15/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

10.4 Test Set-up



10.5 Measurement Result

POWER DENSITY 802.11a MODE_Ch1					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180.00	3.59	0.30	3.89	11.00	-7.11
5220.00	3.81	0.30	4.11	11.00	-6.89
5240.00	3.59	0.30	3.89	11.00	-7.11

POWER DENSITY 802.11n HT20 MODE_Ch0					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	1.88	0.32	2.20	9.33	-7.14
5220	1.78	0.32	2.10	9.33	-7.23
5240	1.83	0.32	2.15	9.33	-7.18

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POWER DENSITY 802.11n HT40 MODE_Ch0					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5190	1.41	0.63	2.04	9.33	-7.30
5230	1.38	0.63	2.01	9.33	-7.33

EIRP spectral density 802.11a MODE					
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)
5180	3.89	4.90	8.79	10	-1.21
5220	4.11	4.90	9.01	10	-0.99
5240	3.89	4.90	8.79	10	-1.21

EIRP spectral density 802.11n HT20 MODE					
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)
5180	2.20	7.67	9.86	10	-0.14
5220	2.10	7.67	9.77	10	-0.23
5240	2.15	7.67	9.82	10	-0.18

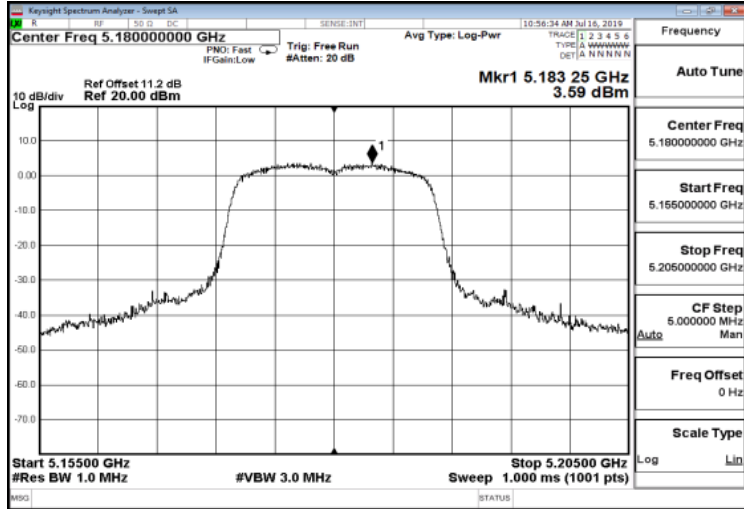
EIRP spectral density 802.11n HT40 MODE					
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)
5180	2.04	7.67	9.70	10	-0.30
5220	2.01	7.67	9.67	10	-0.33

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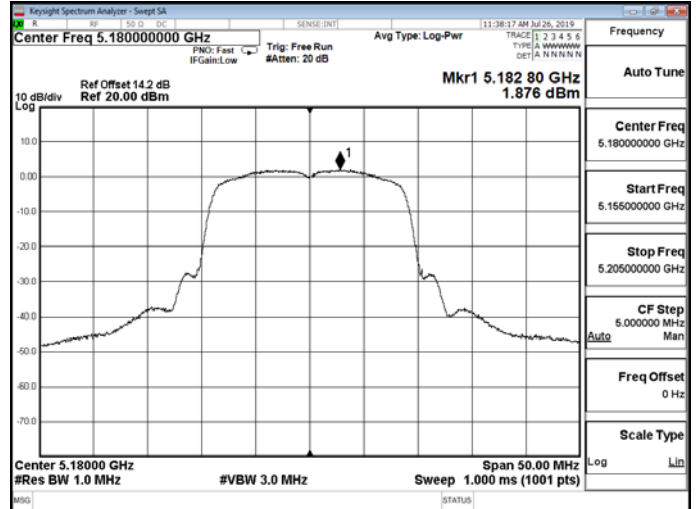
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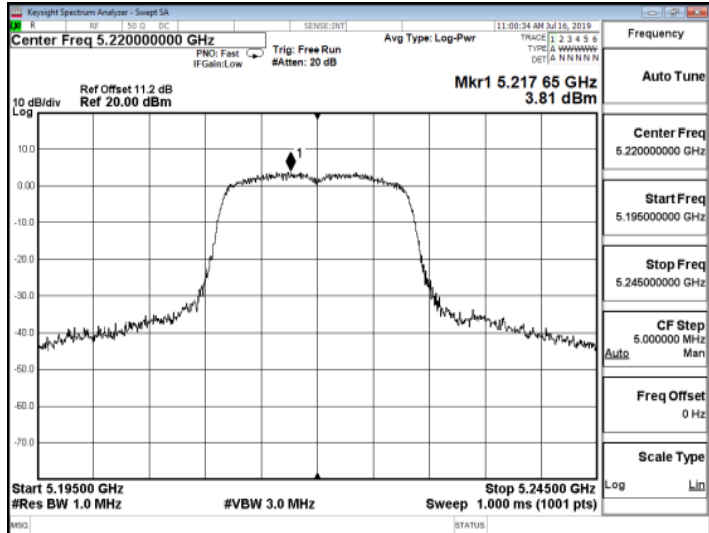
802.11a_20MHz_5180MHz



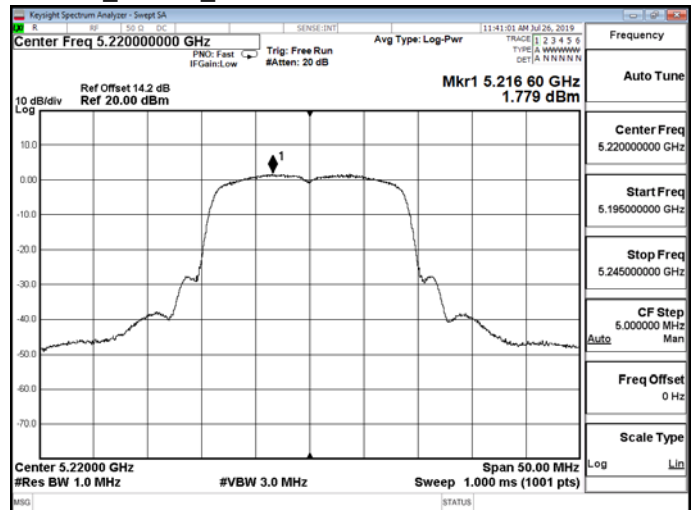
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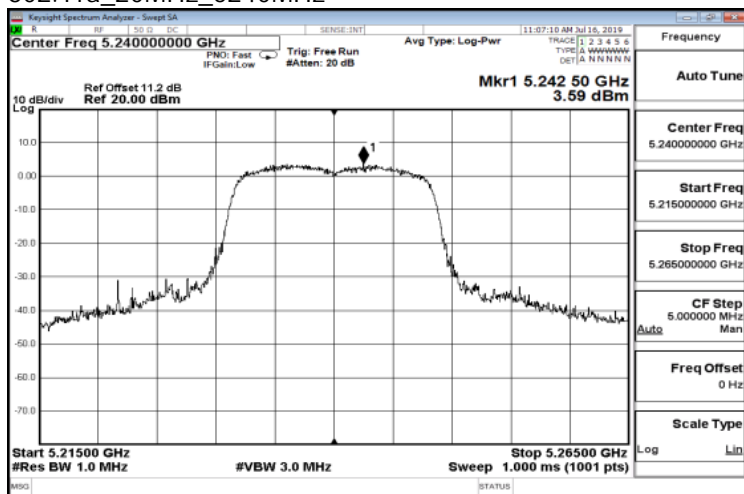
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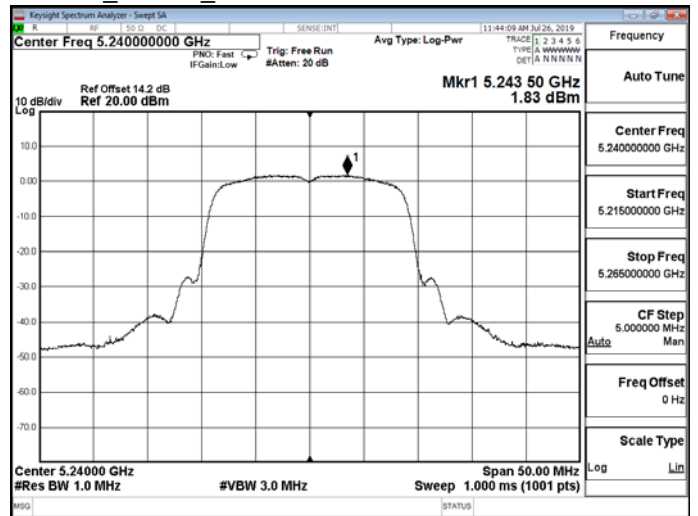
802.11n_20MHz_5220MHz



802.11a_20MHz_5240MHz



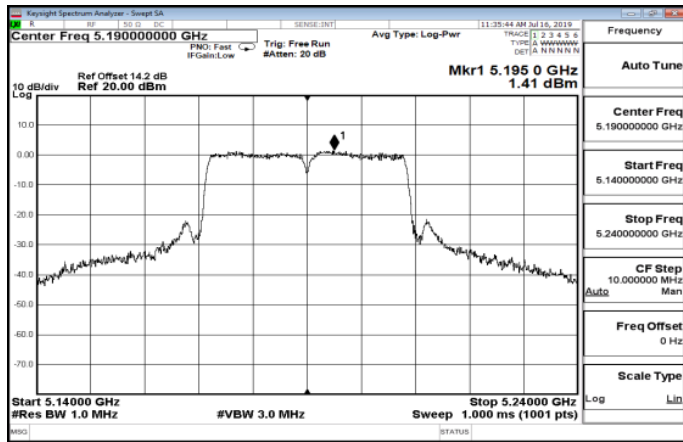
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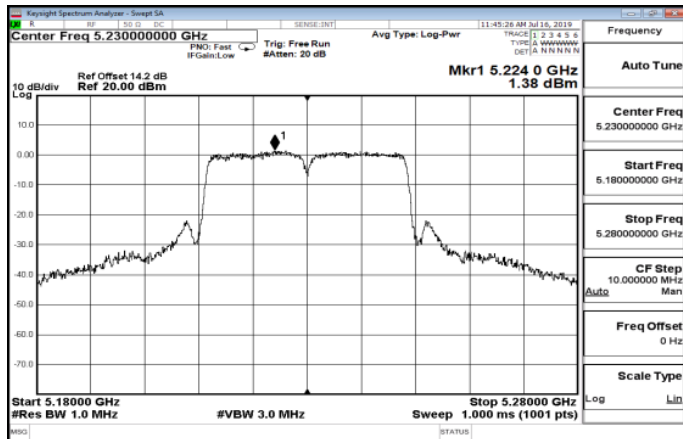
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802.11n_40MHz_5190MHz



802.11n_40MHz_5230MHz



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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:

- 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.
- 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) RSS-247 6.2.1.2	PK: -27 (dBm/MHz)	PK: 68.3 (dBµV/m)
15.407(b)(2) RSS-247 6.2.2.2		
15.407(b)(3) RSS-247 6.2.3.2		
15.407(b)(4)(i) RSS-247 6.2.4.2	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					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB1	A052609	03/06/2019	03/05/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	02/26/2019	02/25/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
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
Low Pass Filter	EWT	EWT-56-0019	RF46	02/26/2019	02/25/2020
High Pass Filter	WI	WHKX7.0/18G-8SS	45	02/26/2019	02/25/2020
Horn Antenna	ETS LINDGREN	3116	00026370	12/26/2018	12/25/2019
Loop Antenna	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
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
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 V6.11-20180413				

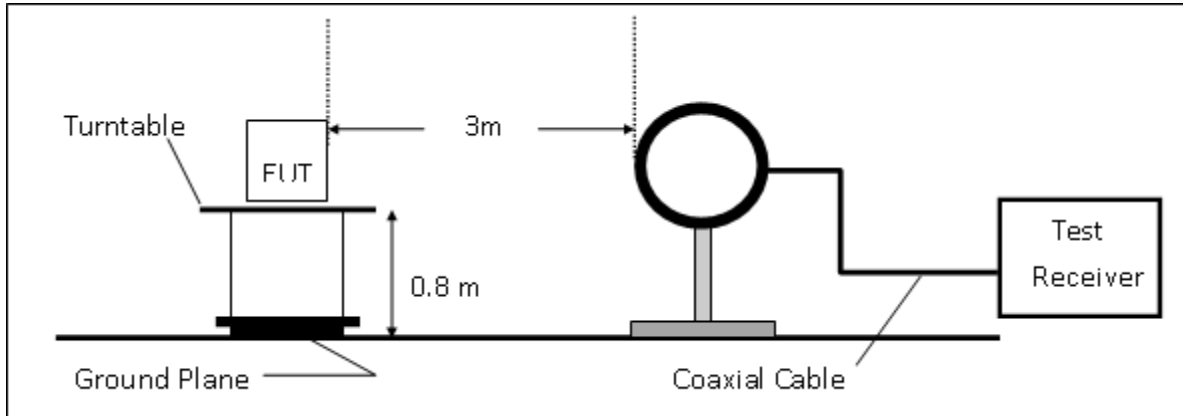
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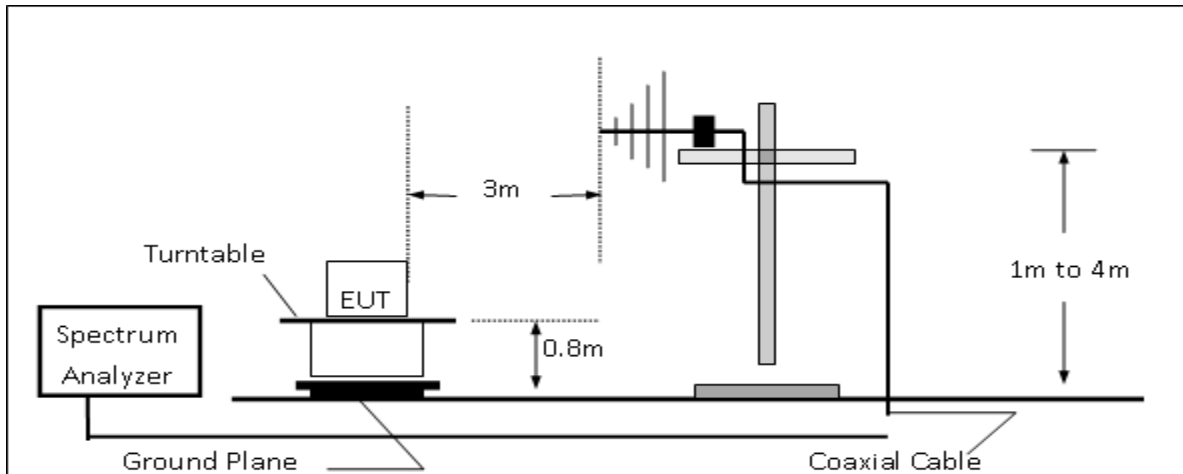
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11.3 Test SET-UP

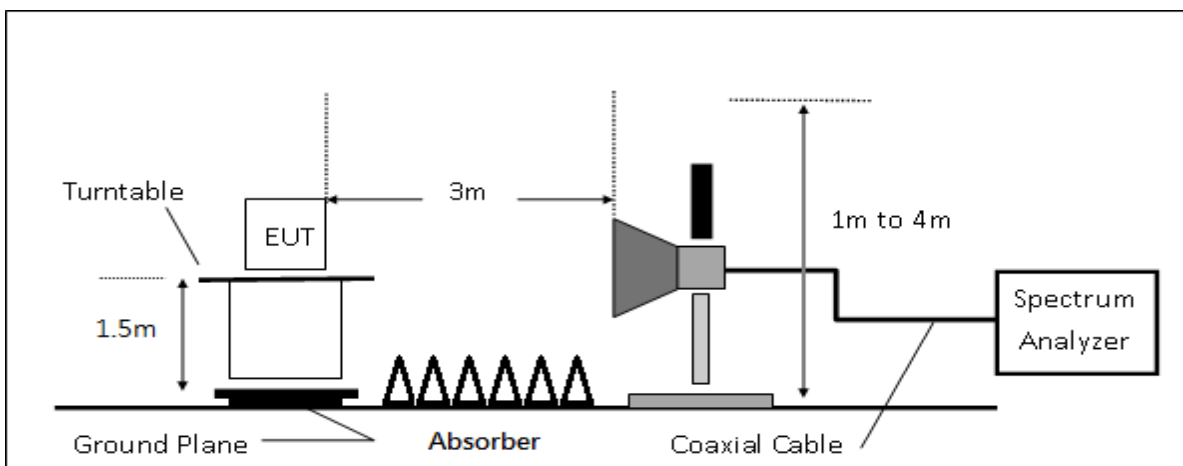
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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)

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

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

11.7 Measurement Result

Refer to next page for tabular data sheets.

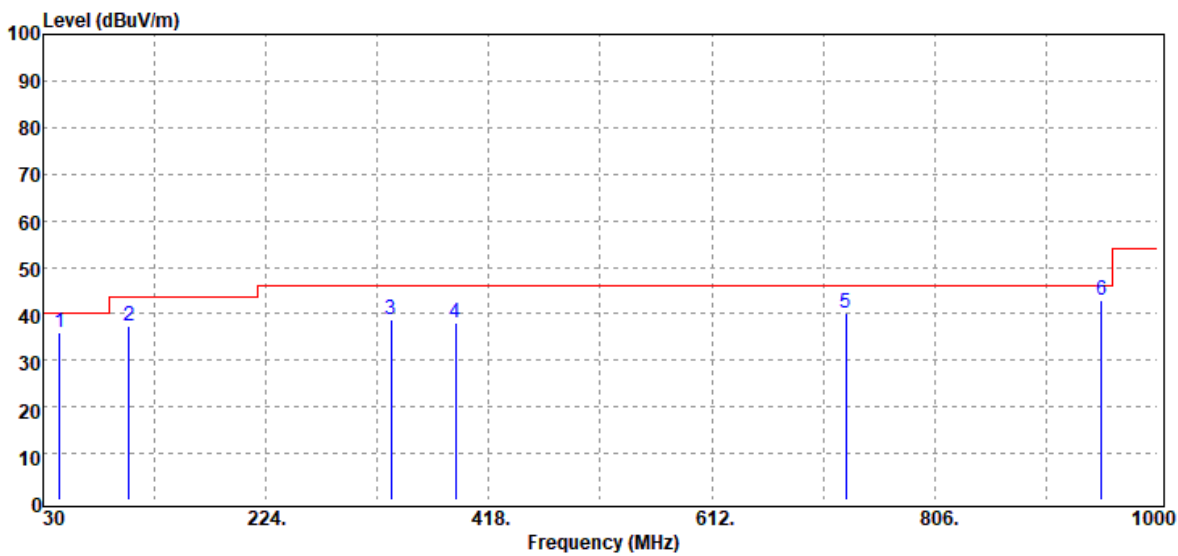
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Radiated Spurious Emission Measurement Result Below 1GHz Worst-Case Data:

Report Number	:T190711W03	Test Date	:2019-07-16
Operation Band	:802.11a / Band 1	Temp./Humi.	:23/43
Frequency	:5220 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX CH MID	Engineer	:Kailin
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
44.55	QP	48.75	-12.72	36.03	40.00	-3.97
104.69	QP	48.59	-11.19	37.40	43.50	-6.10
332.64	Peak	45.84	-7.17	38.67	46.00	-7.33
388.90	Peak	44.00	-6.07	37.93	46.00	-8.07
728.40	Peak	38.97	1.05	40.02	46.00	-5.98
951.50	Peak	38.71	4.19	42.90	46.00	-3.10

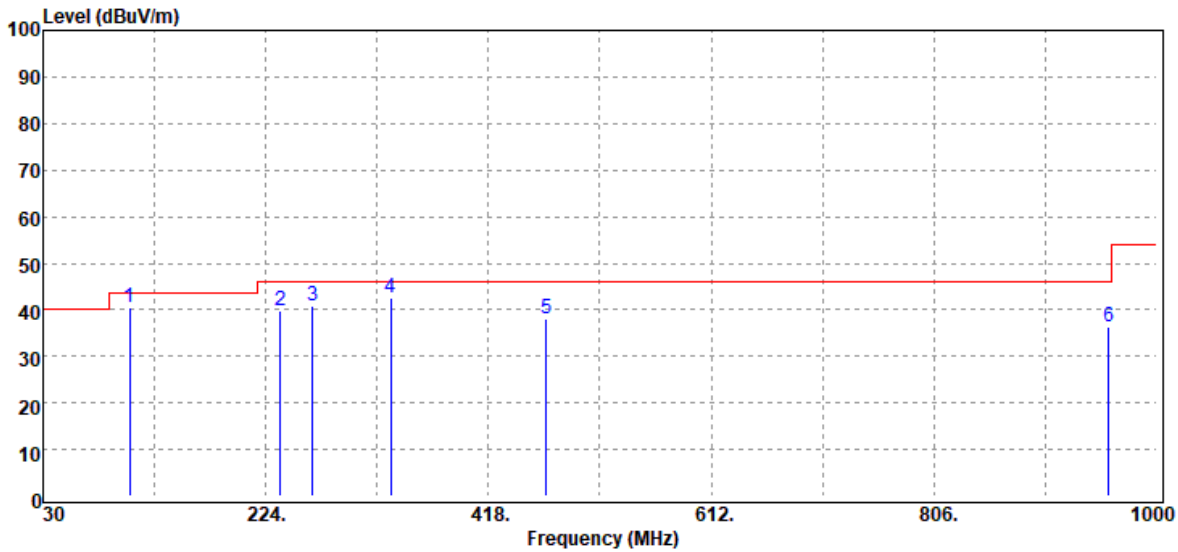
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Report Number :T190711W03
 Operation Band :802.11a / Band 1
 Frequency :5220 MHz
 Operation Mode :TX CH MID
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :23/43
 Antenna Pol. :HORIZONTAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
105.66	Peak	51.56	-11.02	40.54	43.50	-2.96
236.61	Peak	50.16	-10.51	39.65	46.00	-6.35
264.74	Peak	49.74	-8.95	40.79	46.00	-5.21
332.64	Peak	49.74	-7.17	42.57	46.00	-3.43
468.44	Peak	41.62	-3.44	38.18	46.00	-7.82
958.29	Peak	31.94	4.42	36.36	46.00	-9.64

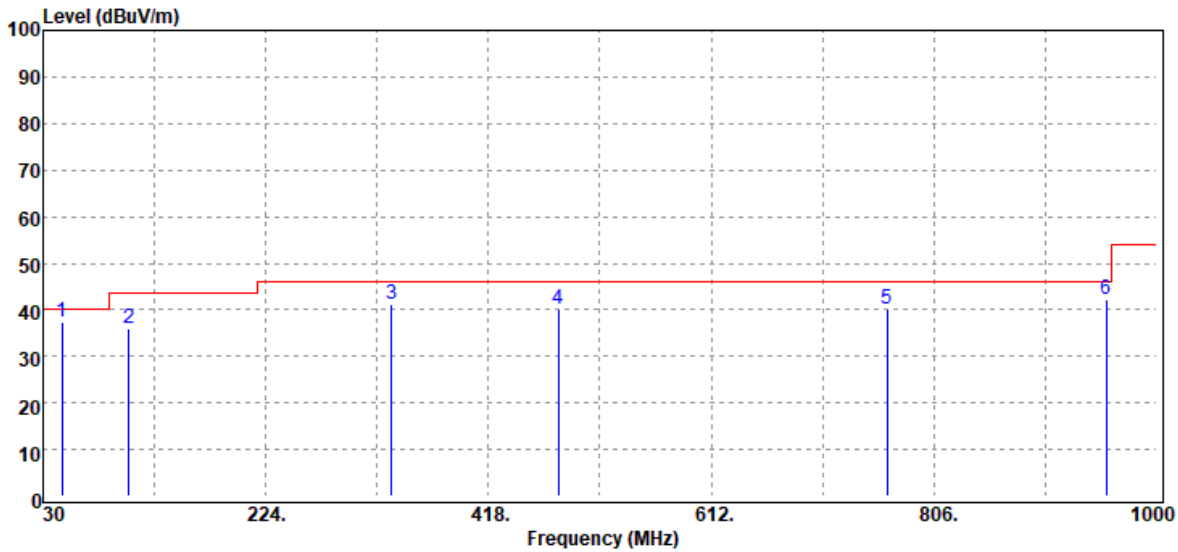
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Report Number :T190711W03
 Operation Band :802.11n40 / Band 1
 Frequency :5190 MHz
 Operation Mode :TX CH LOW
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :23/43
 Antenna Pol. :VERTICAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
46.49	Peak	51.27	-13.77	37.50	40.00	-2.50
104.69	QP	47.06	-11.19	35.87	43.50	-7.63
333.61	Peak	48.25	-7.22	41.03	46.00	-4.97
479.11	Peak	42.96	-2.98	39.98	46.00	-6.02
765.26	Peak	38.52	1.75	40.27	46.00	-5.73
956.35	Peak	37.89	4.25	42.14	46.00	-3.86

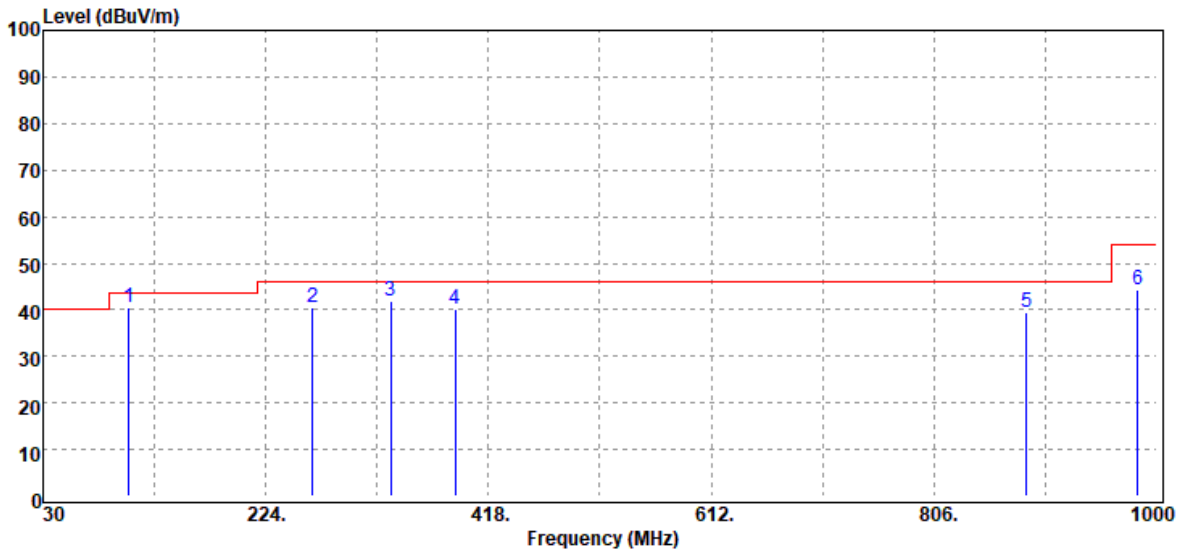
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Report Number :T190711W03
 Operation Band :802.11n40 / Band 1
 Frequency :5190 MHz
 Operation Mode :TX CH LOW
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :23/43
 Antenna Pol. :HORIZONTAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
104.69	Peak	51.50	-11.18	40.32	43.50	-3.18
264.74	Peak	49.35	-8.95	40.40	46.00	-5.60
332.64	Peak	49.10	-7.17	41.93	46.00	-4.07
388.90	Peak	46.25	-6.07	40.18	46.00	-5.82
886.51	Peak	35.68	3.81	39.49	46.00	-6.51
983.51	Peak	38.90	5.45	44.35	54.00	-9.65

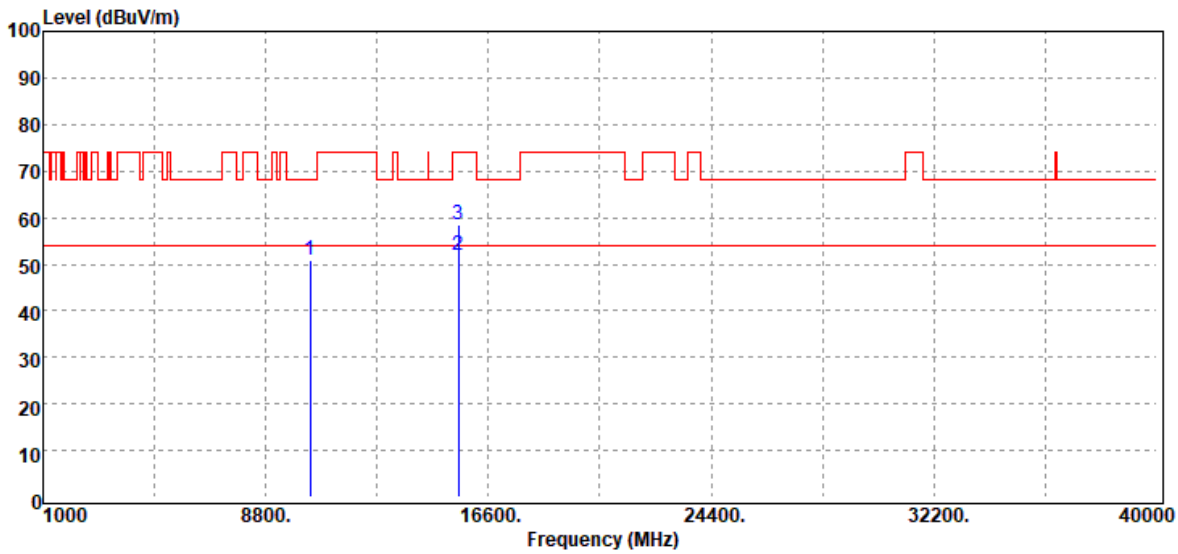
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Above 1GHz Worst-Case Data:

Report Number	:T190711W03	Test Date	:2019-07-16
Operation Band	:802.11a / Band 1	Temp./Humi.	:24/43
Frequency	:5180 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX CH LOW	Engineer	:Kailin
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	Peak	36.79	14.12	50.91	68.20	-17.29
15540.00	Average	33.58	18.28	51.86	54.00	-2.14
15540.00	Peak	40.29	18.28	58.57	74.00	-15.43

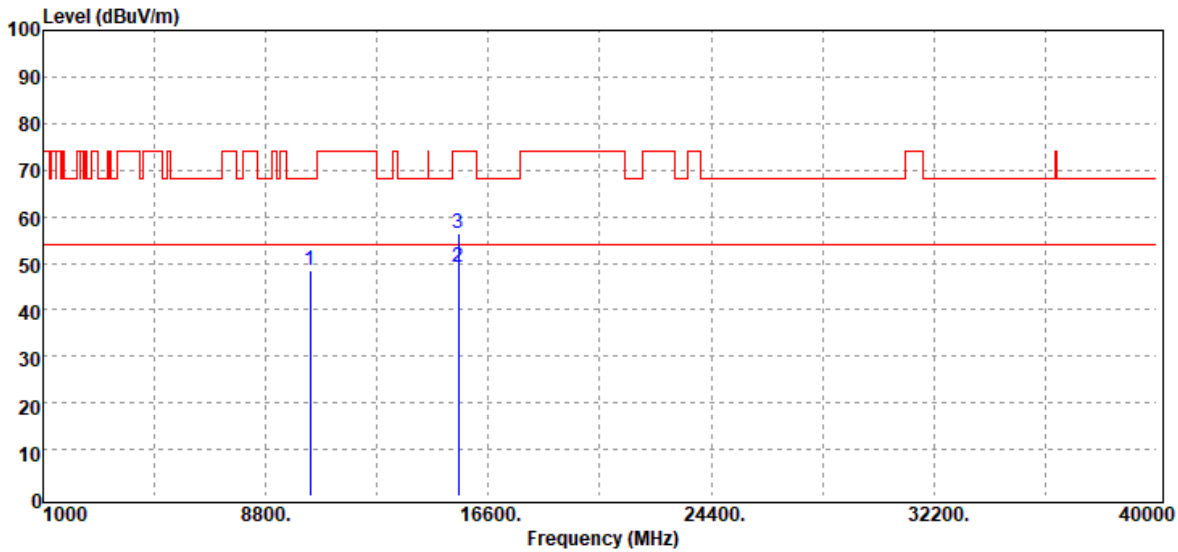
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Report Number :T190711W03
Operation Band :802.11a / Band 1
Frequency :5180 MHz
Operation Mode :TX CH LOW
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10360.00	Peak	34.26	14.12	48.38	68.20	-19.82
15540.00	Average	30.78	18.28	49.06	54.00	-4.94
15540.00	Peak	38.29	18.28	56.57	74.00	-17.43

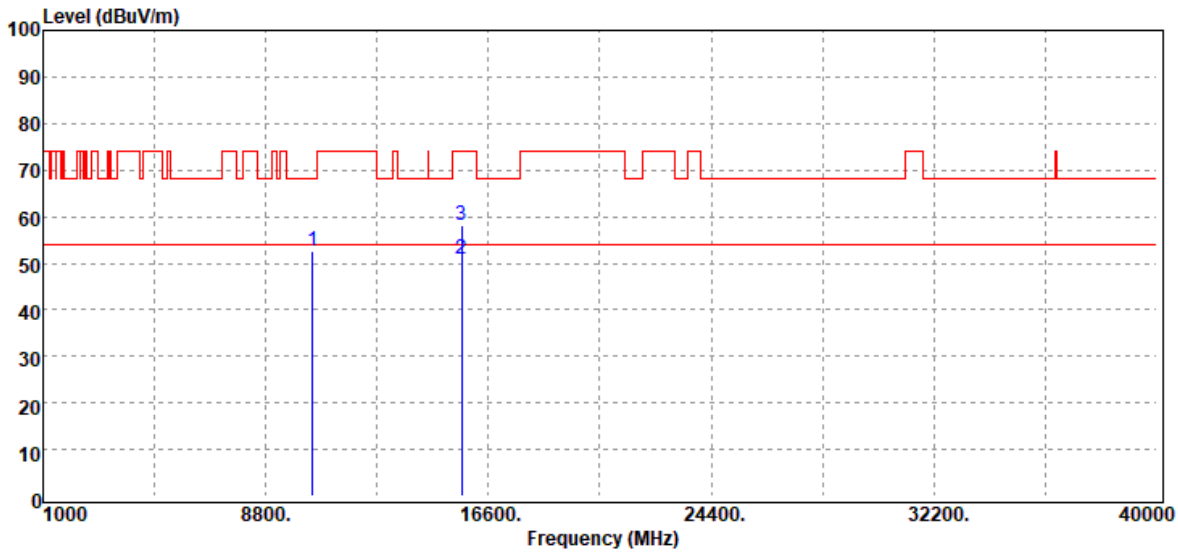
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Report Number :T190711W03
 Operation Band :802.11a / Band 1
 Frequency :5220 MHz
 Operation Mode :TX CH MID
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :VERTICAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
10440.00	Peak	37.22	15.21	52.43	68.20	-15.77
15660.00	Average	32.48	18.47	50.95	54.00	-3.05
15660.00	Peak	39.55	18.47	58.02	74.00	-15.98

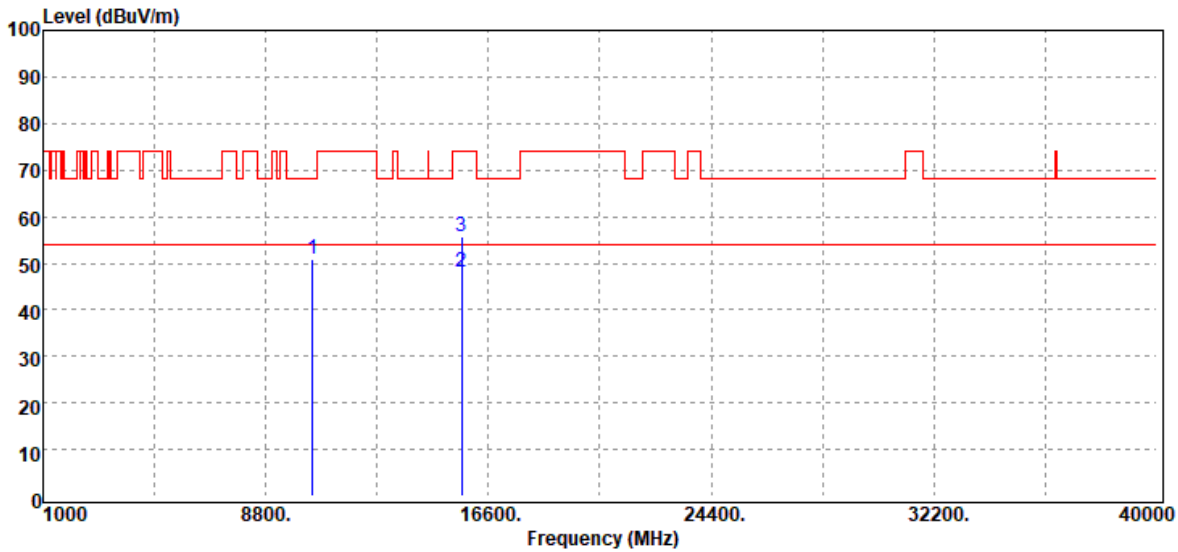
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Report Number :T190711W03
 Operation Band :802.11a / Band 1
 Frequency :5220 MHz
 Operation Mode :TX CH MID
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :HORIZONTAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
10440.00	Peak	35.68	15.21	50.89	68.20	-17.31
15660.00	Average	29.48	18.47	47.95	54.00	-6.05
15660.00	Peak	37.12	18.47	55.59	74.00	-18.41

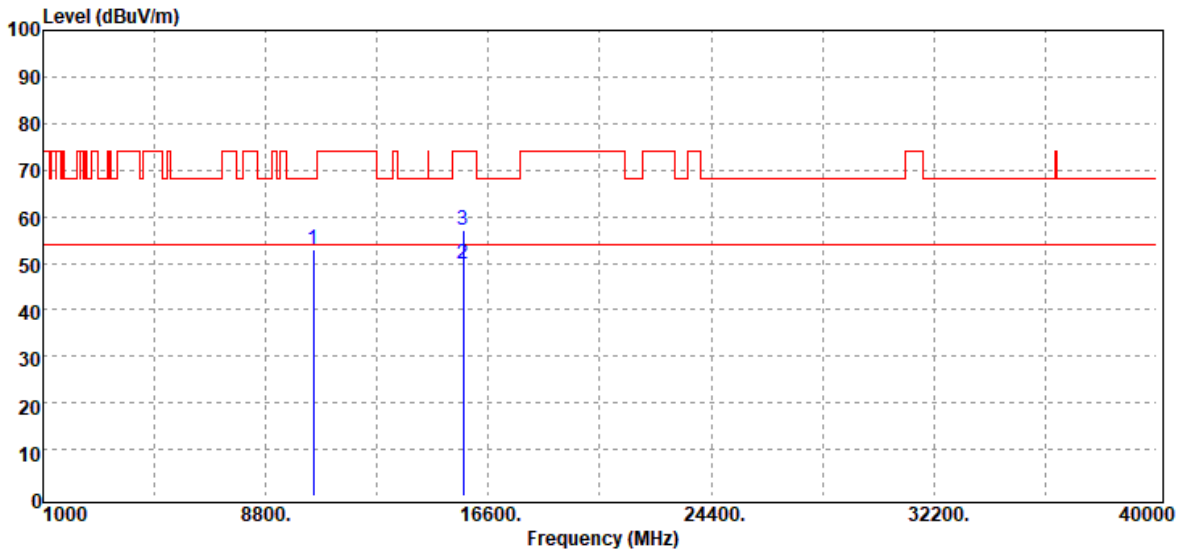
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Report Number :T190711W03
 Operation Band :802.11a / Band 1
 Frequency :5240 MHz
 Operation Mode :TX CH HIGH
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :VERTICAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
10480.00	Peak	36.95	16.09	53.04	68.20	-15.16
15720.00	Average	31.02	18.76	49.78	54.00	-4.22
15720.00	Peak	38.20	18.76	56.96	74.00	-17.04

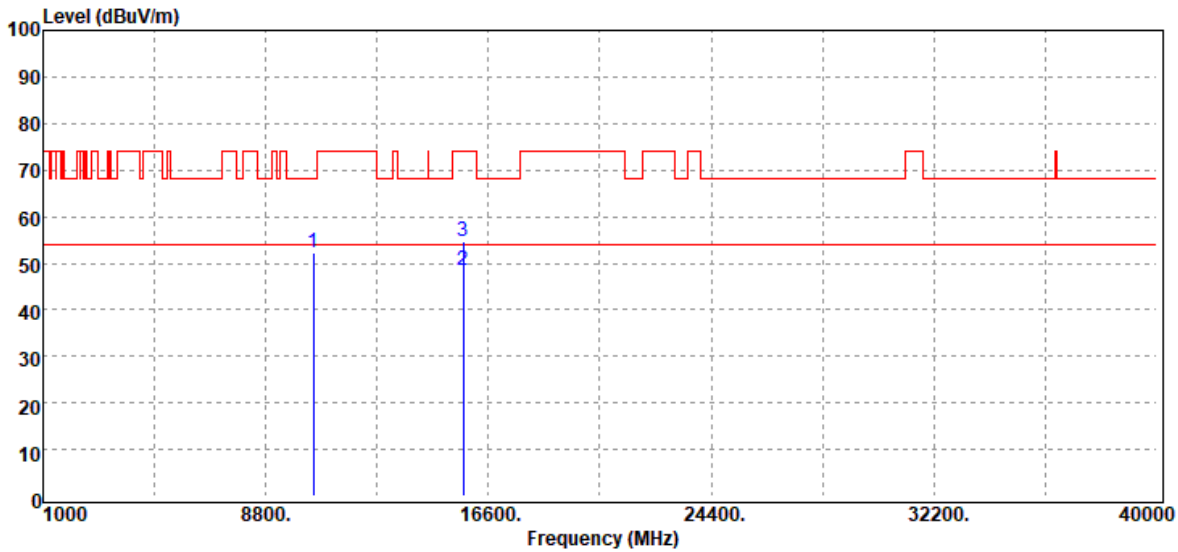
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Report Number :T190711W03
Operation Band :802.11a / Band 1
Frequency :5240 MHz
Operation Mode :TX CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
10480.00	Peak	36.03	16.09	52.12	68.20	-16.08
15720.00	Average	29.69	18.76	48.45	54.00	-5.55
15720.00	Peak	35.97	18.76	54.73	74.00	-19.27

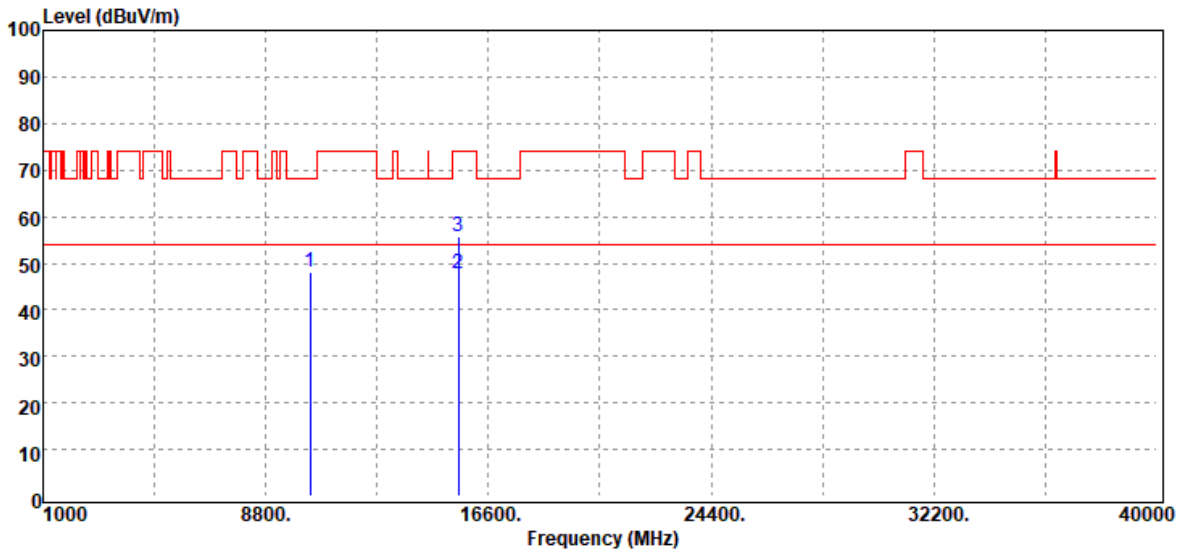
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Report Number :T190711W03
Operation Band :802.11n20 / Band 1
Frequency :5180 MHz
Operation Mode :TX CH LOW
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :VERTICAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10360.00	Peak	33.95	14.12	48.07	68.20	-20.13
15540.00	Average	29.34	18.28	47.62	54.00	-6.38
15540.00	Peak	37.53	18.28	55.81	74.00	-18.19

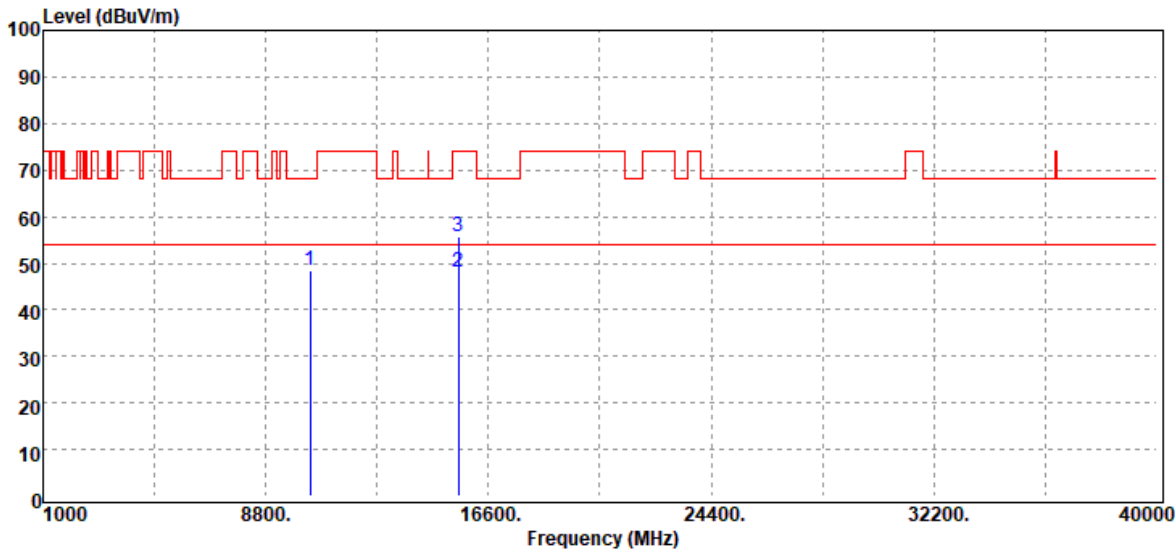
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Report Number :T190711W03
 Operation Band :802.11n20 / Band 1
 Frequency :5180 MHz
 Operation Mode :TX CH LOW
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :HORIZONTAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10360.00	Peak	34.24	14.12	48.36	68.20	-19.84
15540.00	Average	29.85	18.28	48.13	54.00	-5.87
15540.00	Peak	37.40	18.28	55.68	74.00	-18.32

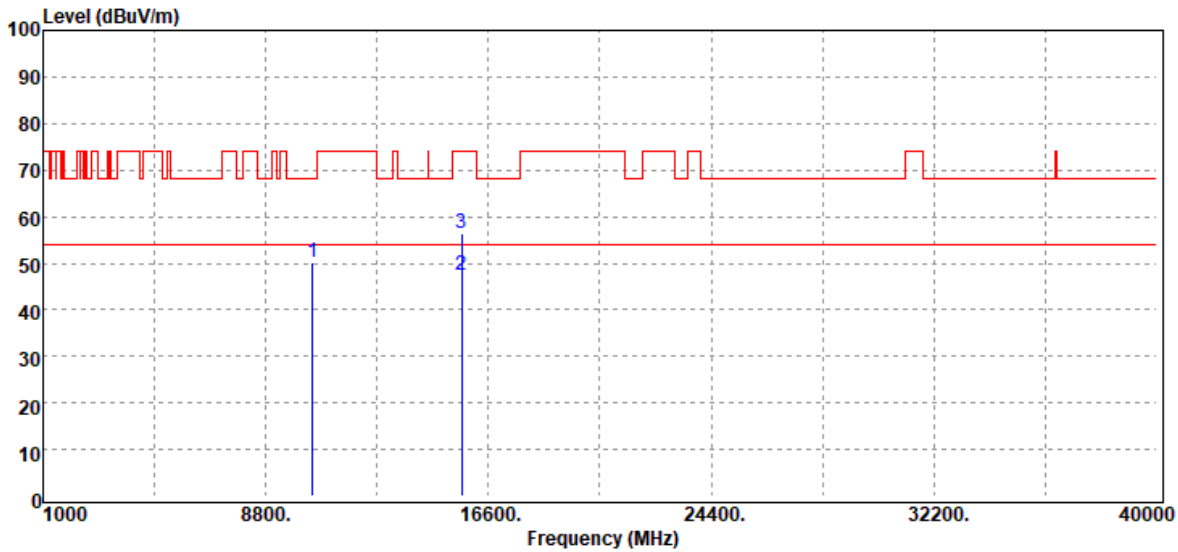
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Report Number :T190711W03
Operation Band :802.11n20 / Band 1
Frequency :5220 MHz
Operation Mode :TX CH MID
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :VERTICAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
10440.00	Peak	35.13	15.21	50.34	68.20	-17.86
15660.00	Average	29.09	18.47	47.56	54.00	-6.44
15660.00	Peak	38.10	18.47	56.57	74.00	-17.43

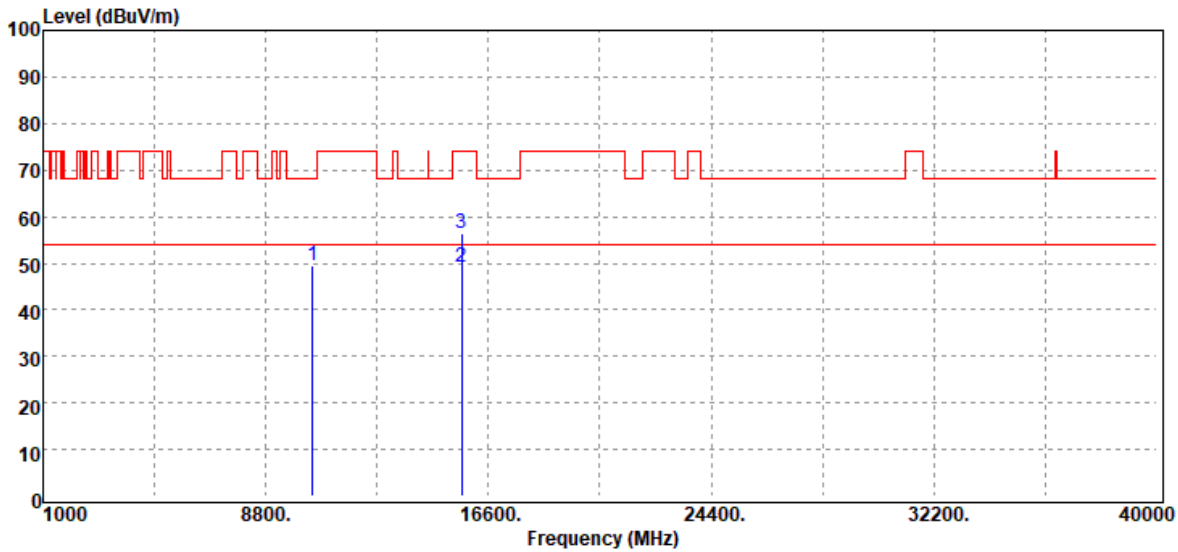
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Report Number :T190711W03
Operation Band :802.11n20 / Band 1
Frequency :5220 MHz
Operation Mode :TX CH MID
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10440.00	Peak	34.31	15.21	49.52	68.20	-18.68
15660.00	Average	30.75	18.47	49.22	54.00	-4.78
15660.00	Peak	38.05	18.47	56.52	74.00	-17.48

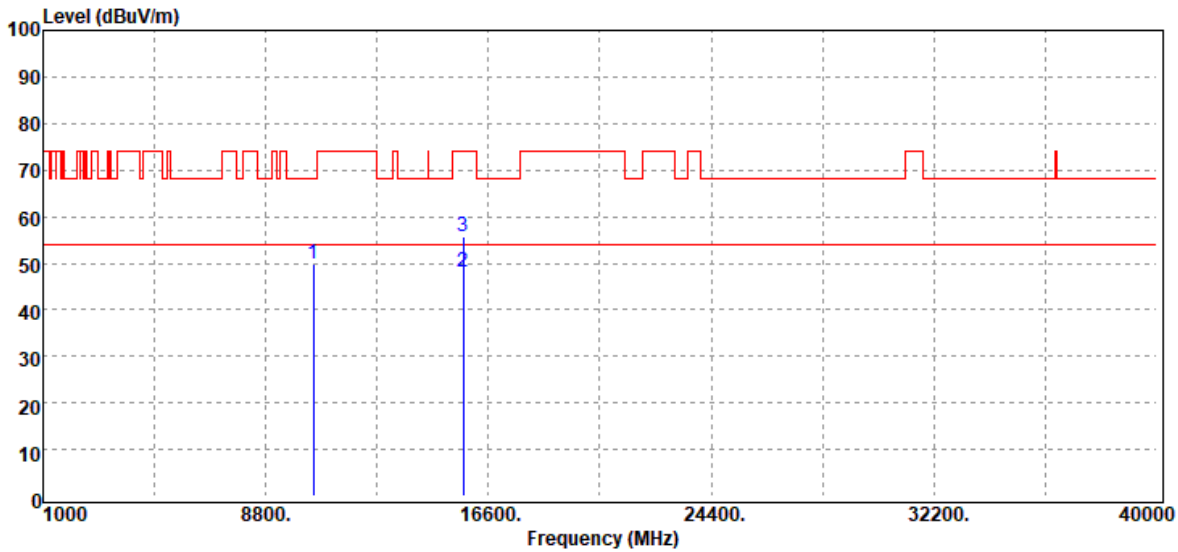
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Report Number :T190711W03
 Operation Band :802.11n20 / Band 1
 Frequency :5240 MHz
 Operation Mode :TX CH HIGH
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :VERTICAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10480.00	Peak	33.78	16.09	49.87	68.20	-18.33
15720.00	Average	29.46	18.76	48.22	54.00	-5.78
15720.00	Peak	36.88	18.76	55.64	74.00	-18.36

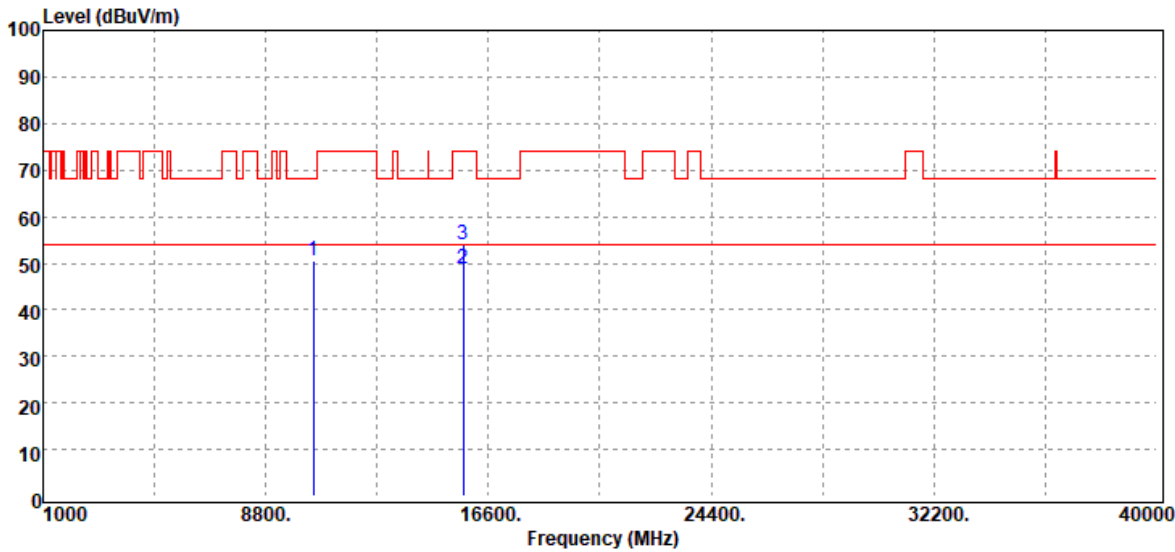
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Report Number :T190711W03
 Operation Band :802.11n20 / Band 1
 Frequency :5240 MHz
 Operation Mode :TX CH HIGH
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :HORIZONTAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10480.00	Peak	34.26	16.09	50.35	68.20	-17.85
15720.00	Average	29.89	18.76	48.65	54.00	-5.35
15720.00	Peak	35.33	18.76	54.09	74.00	-19.91

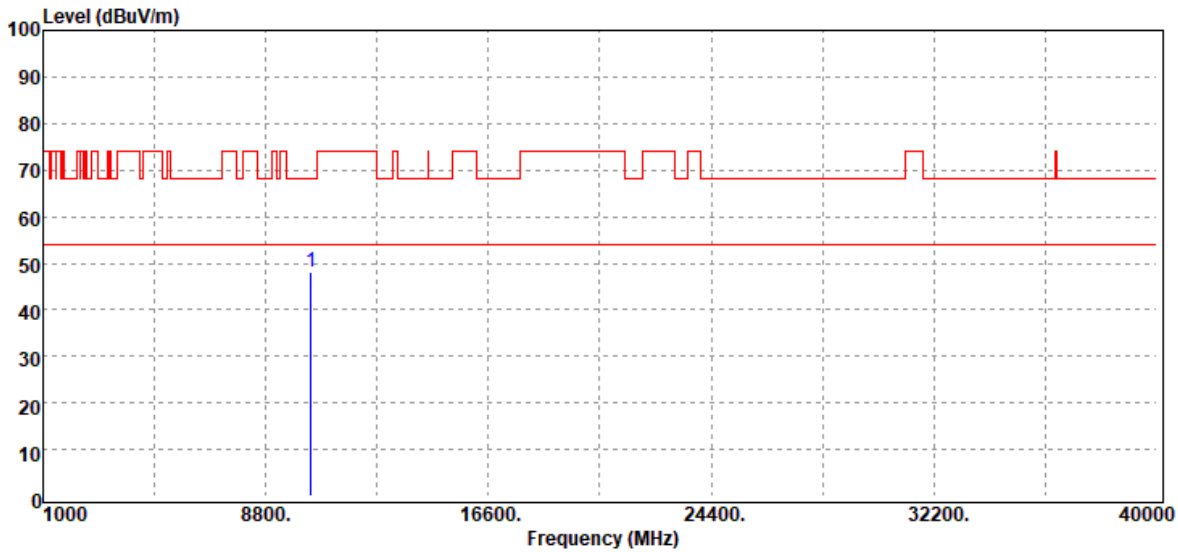
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Report Number :T190711W03
 Operation Band :802.11n40 / Band 1
 Frequency :5190 MHz
 Operation Mode :TX CH LOW
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :VERTICAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10380.00	Peak	33.77	14.23	48.00	68.20	-20.20

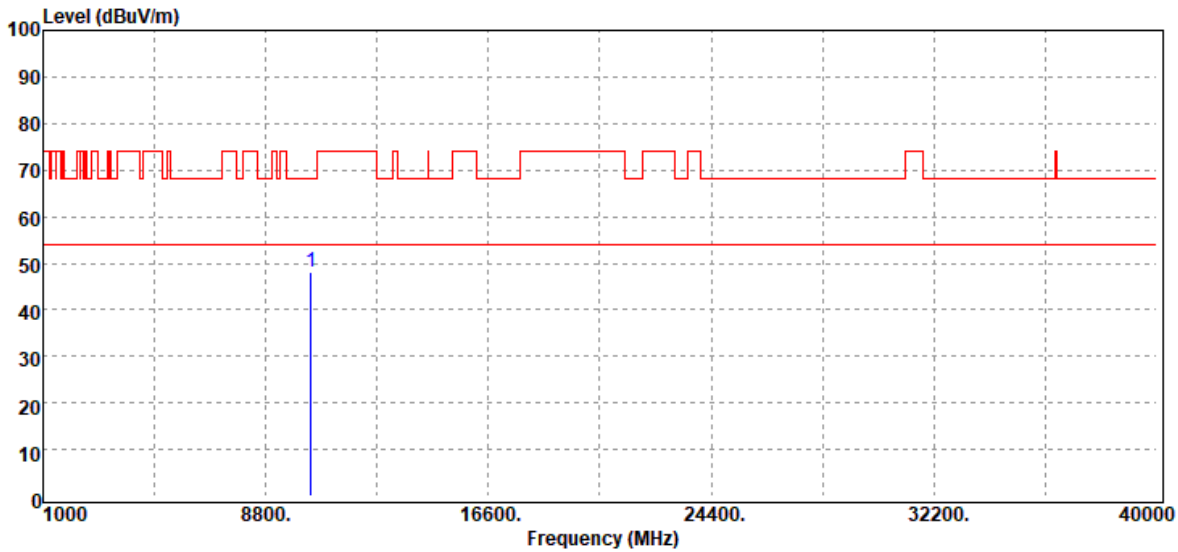
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Report Number :T190711W03
 Operation Band :802.11n40 / Band 1
 Frequency :5190 MHz
 Operation Mode :TX CH LOW
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :HORIZONTAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10380.00	Peak	33.92	14.23	48.15	68.20	-20.05

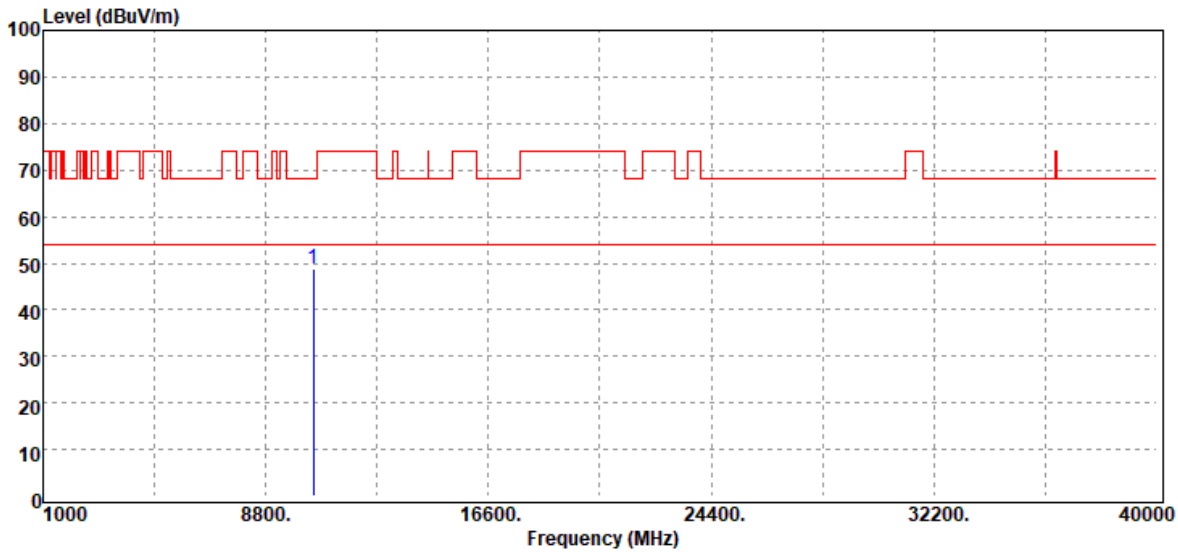
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Report Number :T190711W03
Operation Band :802.11n40 / Band 1
Frequency :5230 MHz
Operation Mode :TX CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :VERTICAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
10460.00	Peak	33.16	15.65	48.81	68.20	-19.39

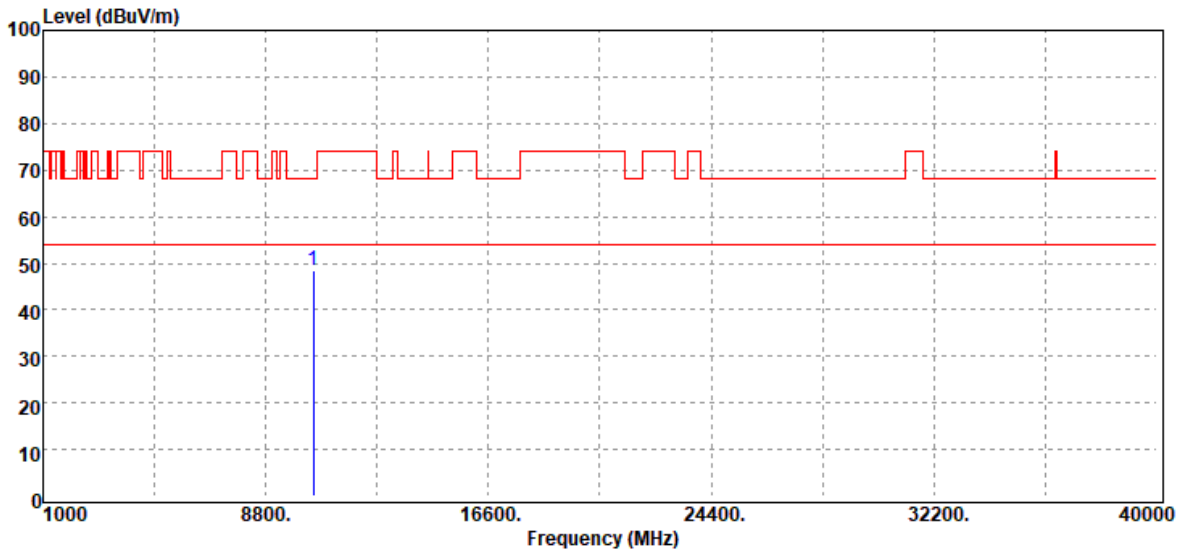
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Report Number :T190711W03
 Operation Band :802.11n40 / Band 1
 Frequency :5230 MHz
 Operation Mode :TX CH HIGH
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :HORIZONTAL
 Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
10460.00	Peak	32.63	15.65	48.28	68.20	-19.92

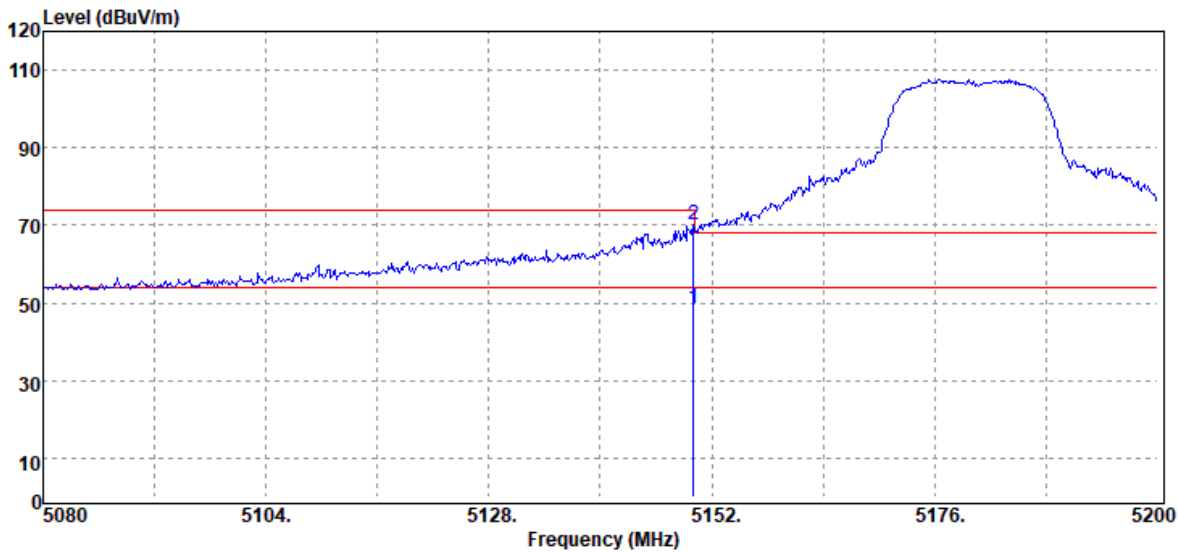
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Band edge falling to restricted band

Report Number	:T190711W03	Test Date	:2019-07-16
Operation Band	:802.11a / Band 1	Temp./Humi.	:24/43
Frequency	:5180 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:BE CH LOW	Engineer	:Kailin
EUT Pol.	:E1 Plan		



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	43.69	4.92	48.61	54.00	-5.39
5150.00	Peak	65.26	4.92	70.18	74.00	-3.82

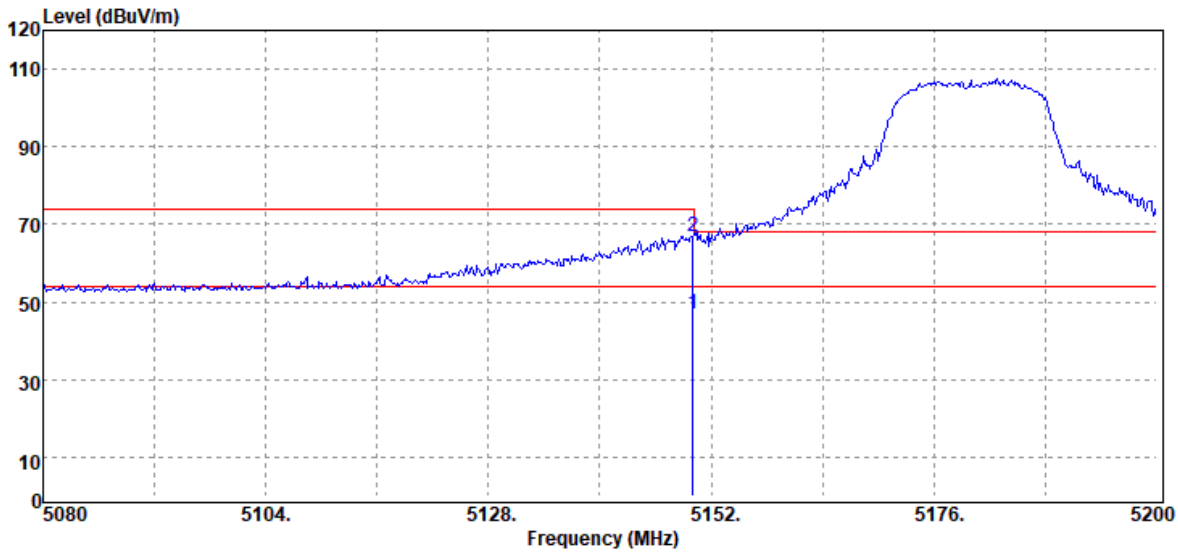
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Report Number :T190711W03
Operation Band :802.11a / Band 1
Frequency :5180 MHz
Operation Mode :BE CH LOW
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
5150.00	Average	42.16	4.92	47.08	54.00	-6.92
5150.00	Peak	61.95	4.92	66.87	74.00	-7.13

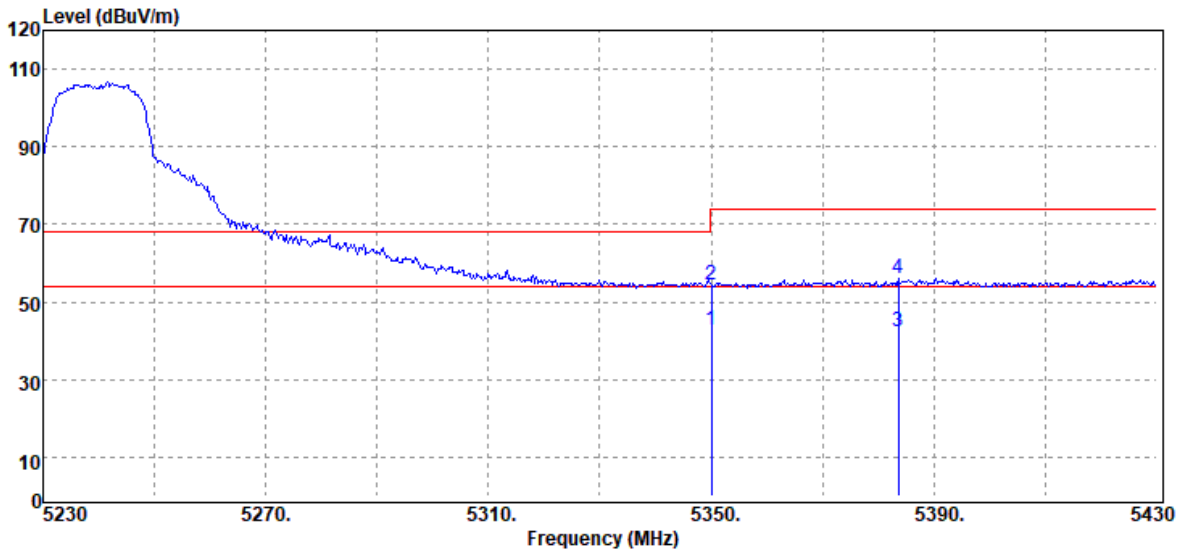
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Report Number :T190711W03
Operation Band :802.11a / Band 1
Frequency :5240 MHz
Operation Mode :BE CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :VERTICAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
5350.00	Average	37.36	5.21	42.57	54.00	-11.43
5350.00	Peak	48.98	5.21	54.19	74.00	-19.81
5383.60	Average	37.20	5.33	42.53	54.00	-11.47
5383.60	Peak	50.84	5.33	56.17	74.00	-17.83

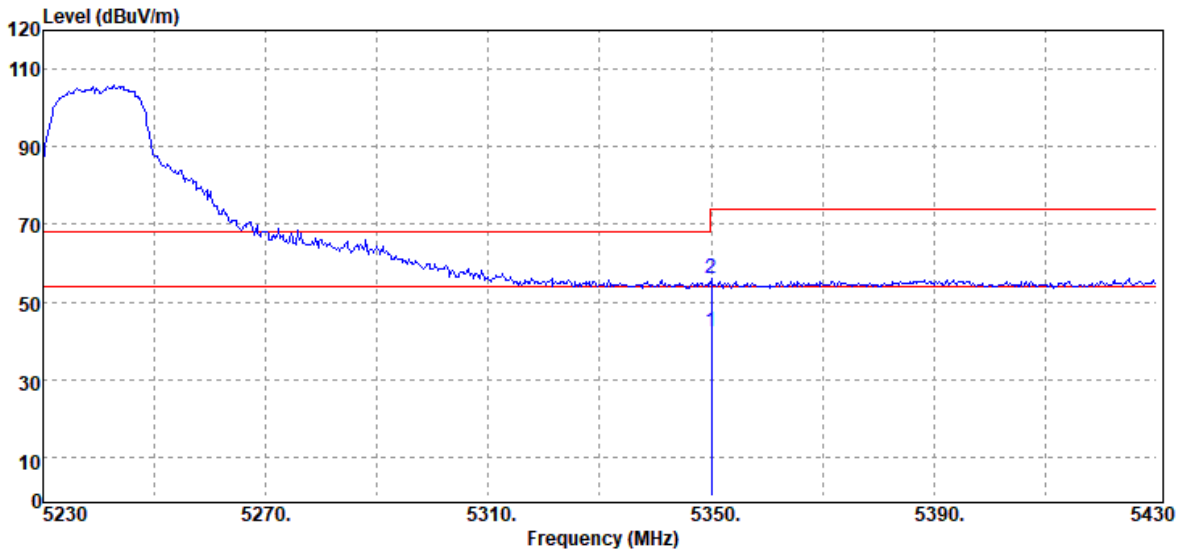
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Report Number :T190711W03
Operation Band :802.11a / Band 1
Frequency :5240 MHz
Operation Mode :BE CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
5350.00	Average	37.26	5.21	42.47	54.00	-11.53
5350.00	Peak	50.73	5.21	55.94	74.00	-18.06

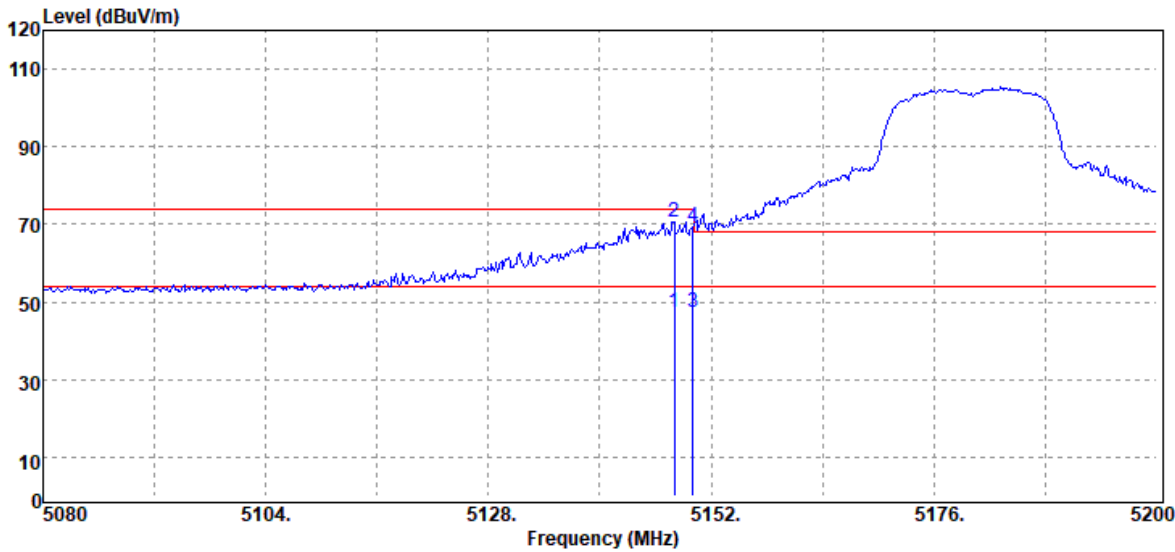
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Report Number :T190711W03
 Operation Band :802.11n20 / Band 1
 Frequency :5180 MHz
 Operation Mode :BE CH LOW
 EUT Pol. :E1 Plan

Test Date :2019-07-16
 Temp./Humi. :24/43
 Antenna Pol. :VERTICAL
 Engineer :Kailin



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	42.21	4.92	47.13	54.00	-6.87
5148.04	Peak	65.58	4.92	70.50	74.00	-3.50
5150.00	Average	42.49	4.92	47.41	54.00	-6.59
5150.00	Peak	64.30	4.92	69.22	74.00	-4.78

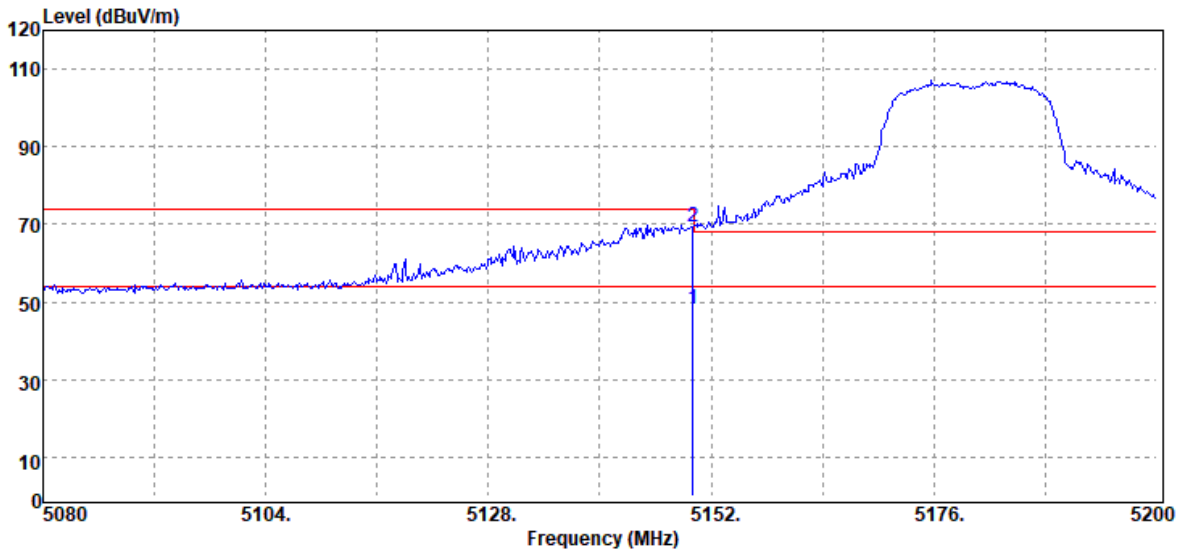
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Report Number :T190711W03
Operation Band :802.11n20 / Band 1
Frequency :5180 MHz
Operation Mode :BE CH LOW
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
5150.00	Average	43.11	4.92	48.03	54.00	-5.97
5150.00	Peak	64.59	4.92	69.51	74.00	-4.49

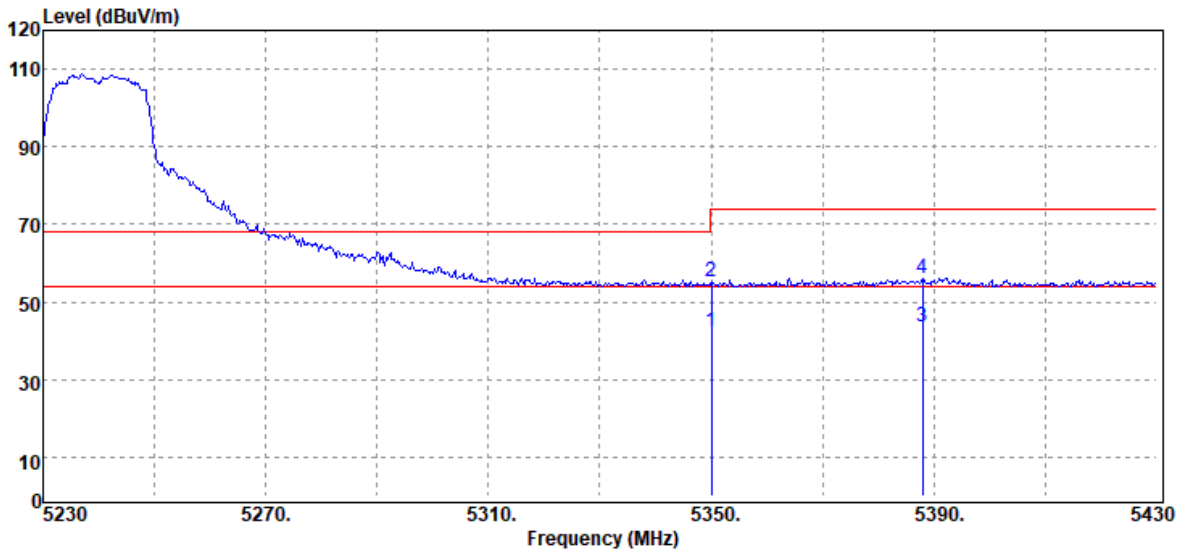
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Report Number :T190711W03
Operation Band :802.11n20 / Band 1
Frequency :5240 MHz
Operation Mode :BE CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :VERTICAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
5350.00	Average	37.09	5.21	42.30	54.00	-11.70
5350.00	Peak	49.90	5.21	55.11	74.00	-18.89
5388.00	Average	38.11	5.35	43.46	54.00	-10.54
5388.00	Peak	50.90	5.35	56.25	74.00	-17.75

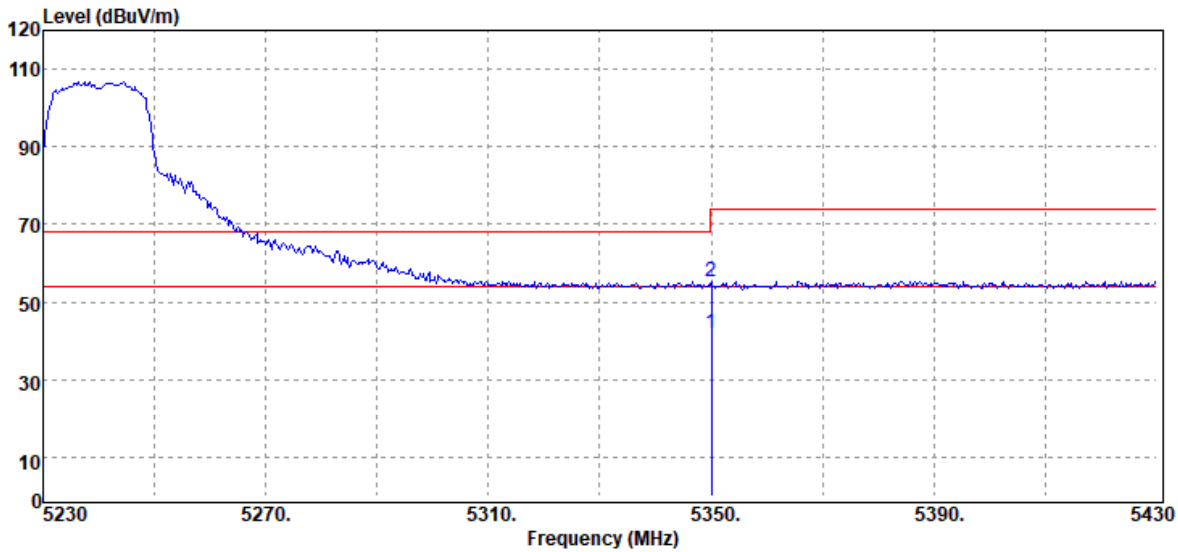
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Report Number :T190711W03
Operation Band :802.11n20 / Band 1
Frequency :5240 MHz
Operation Mode :BE CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level d μ V	Factor dB	Actual FS d μ V/m	Limit @3m d μ V/m	Margin dB
5350.00	Average	36.85	5.21	42.06	54.00	-11.94
5350.00	Peak	50.18	5.21	55.39	74.00	-18.61

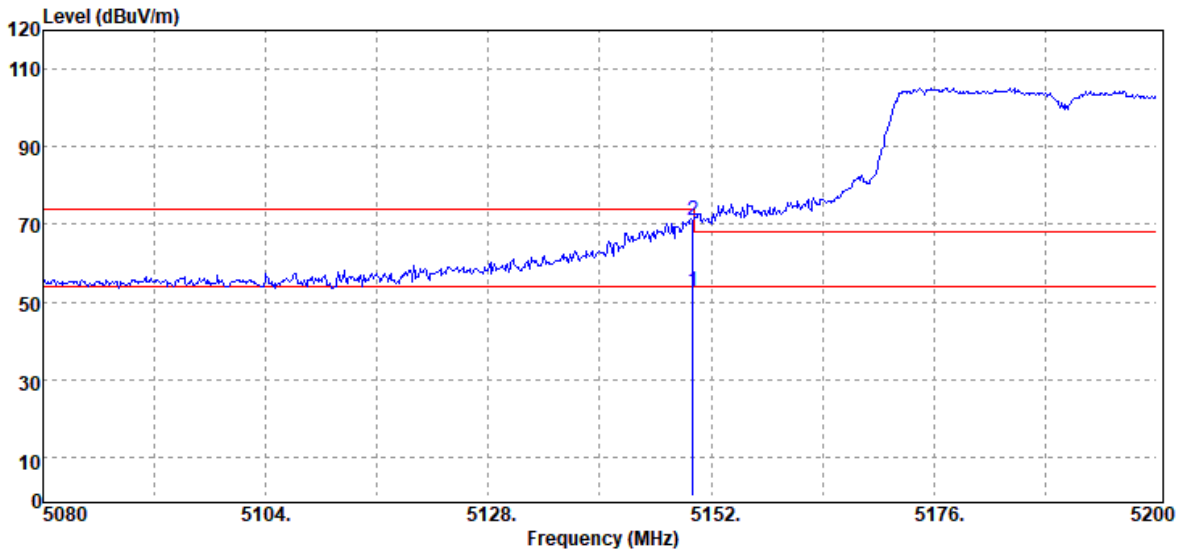
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Report Number :T190711W03
Operation Band :802.11n40 / Band 1
Frequency :5190 MHz
Operation Mode :BE CH LOW
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :VERTICAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
5150.00	Average	47.68	4.92	52.60	54.00	-1.40
5150.00	Peak	65.93	4.92	70.85	74.00	-3.15

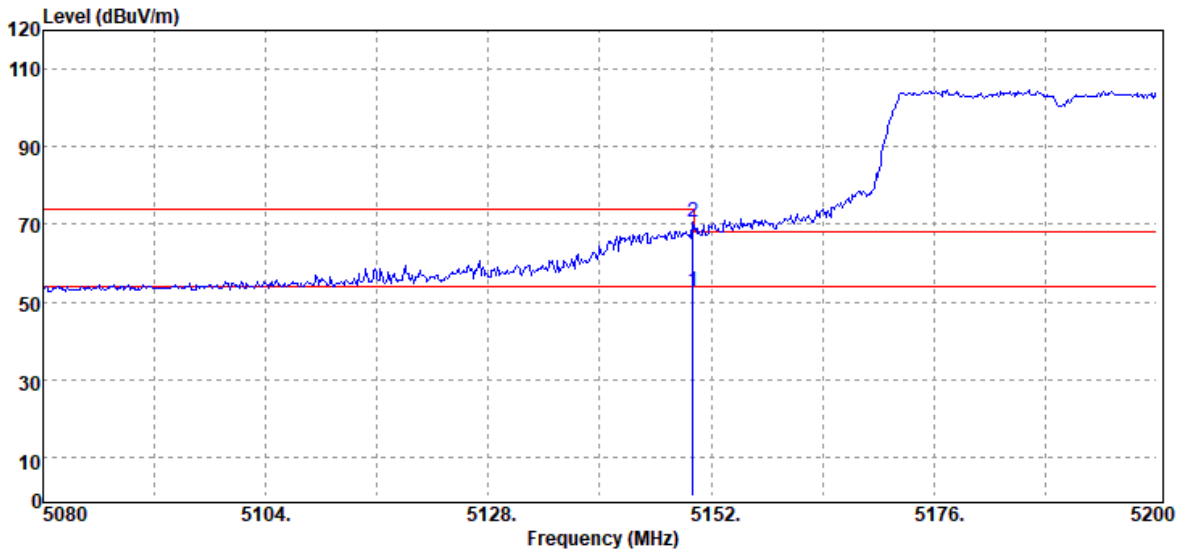
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Report Number :T190711W03
Operation Band :802.11n40 / Band 1
Frequency :5190 MHz
Operation Mode :BE CH LOW
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
5150.00	Average	47.95	4.92	52.87	54.00	-1.13
5150.00	Peak	65.47	4.92	70.39	74.00	-3.61

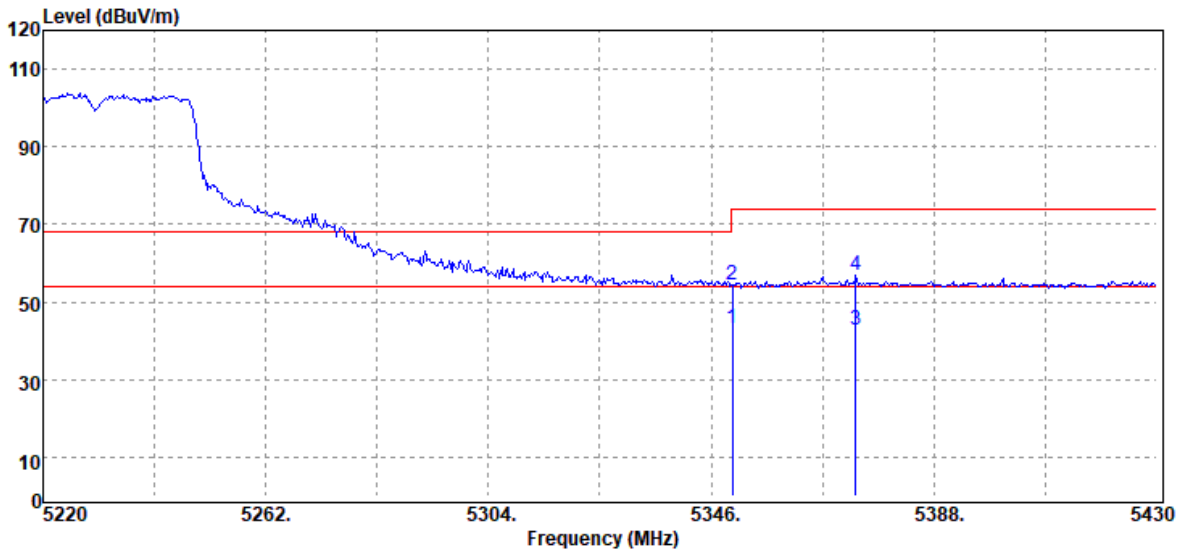
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Report Number :T190711W03
Operation Band :802.11n40 / Band 1
Frequency :5230 MHz
Operation Mode :BE CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :VERTICAL
Engineer :Kailin



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	37.82	5.21	43.03	54.00	-10.97
5350.00	Peak	49.19	5.21	54.40	74.00	-19.60
5373.30	Average	37.25	5.31	42.56	54.00	-11.44
5373.30	Peak	51.39	5.31	56.70	74.00	-17.30

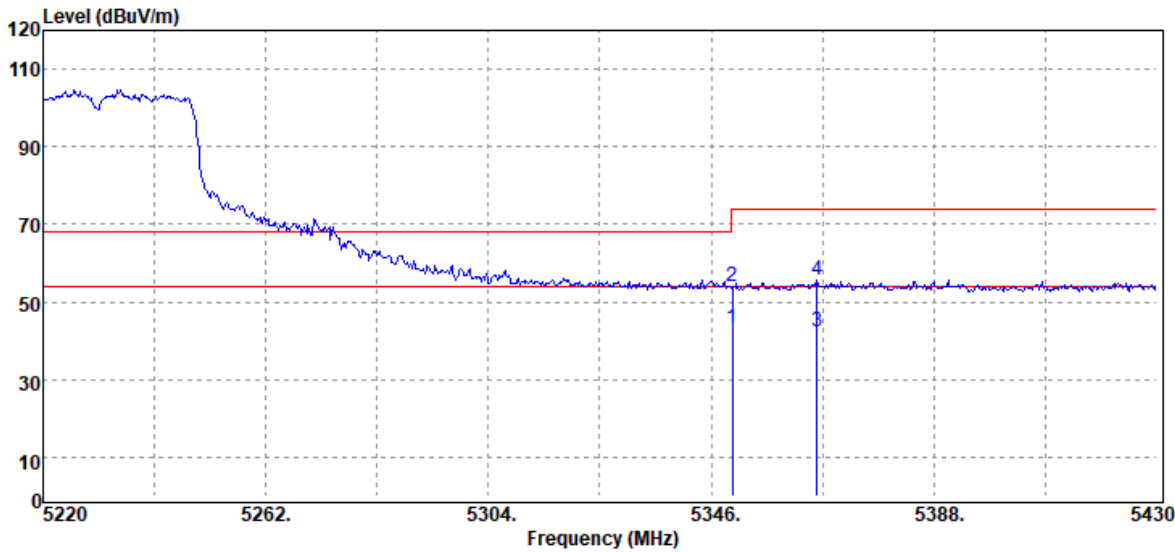
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Report Number :T190711W03
Operation Band :802.11n40 / Band 1
Frequency :5230 MHz
Operation Mode :BE CH HIGH
EUT Pol. :E1 Plan

Test Date :2019-07-16
Temp./Humi. :24/43
Antenna Pol. :HORIZONTAL
Engineer :Kailin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
5350.00	Average	38.09	5.21	43.30	54.00	-10.70
5350.00	Peak	48.67	5.21	53.88	74.00	-20.12
5365.95	Average	37.26	5.28	42.54	54.00	-11.46
5365.95	Peak	50.29	5.28	55.57	74.00	-18.43

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12 TRANSMISSION IN THE ABSENCE OF DATA

12.1 Standard Applicable

According to §15.407(c)

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

12.2 Result

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

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13 FREQUENCY STABILITY

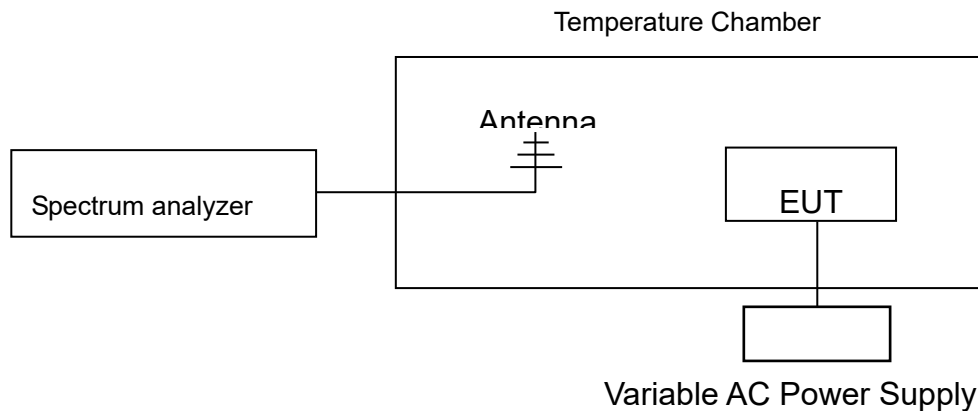
13.1 Standard Applicable

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

13.2 Measurement Procedure

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

13.3 Test SET-UP



13.4 Measurement Equipment Used:

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
DC Block	PASTERNAK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/16/2019	05/15/2020
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	2019.07.16
Temperature	: 27°C	Test By	Hone
Humidity	: 50%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
5	12.6	36	5180	5,179.95173	0.00000932
	11.4	36	5180	5,179.95189	0.00000929
25	12	36	5180	5,179.95146	0.00000937
35	12.6	36	5180	5,179.95154	0.00000936
	11.4	36	5180	5,179.95177	0.00000931

2 Minutes:

Operation Mode	802.11 a	Test Date	2019.07.16
Temperature	: 27°C	Test By	Hone
Humidity	: 50%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
5	12.6	36	5180	5,179.91268	0.00001686
	11.4	36	5180	5,179.98006	0.00000385
25	12	36	5180	5,179.93920	0.00001174
35	12.6	36	5180	5,179.97551	0.00000473
	11.4	36	5180	5,179.92417	0.00001464

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5 Minutes:

Operation Mode	802.11 a	Test Date	2019.07.16
Temperature	: 27°C	Test By	Hone
Humidity	: 50%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
5	12.6	36	5180	5,179.92732	0.00001403
	11.4	36	5180	5,179.90127	0.00001906
25	12	36	5180	5,179.92746	0.00001400
35	12.6	36	5180	5,179.92648	0.00001419
	11.4	36	5180	5,179.90703	0.00001795

10 Minutes:

Operation Mode	802.11 a	Test Date	2019.07.16
Temperature	: 27°C	Test By	Hone
Humidity	: 50%		

Test Temp.(°C)	Test Voltage(V)	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
5	12.6	36	5180	5,179.90971	0.00001743
	11.4	36	5180	5,179.98370	0.00000315
25	12	36	5180	5,179.93855	0.00001186
35	12.6	36	5180	5,179.98033	0.00000380
	11.4	36	5180	5,179.91139	0.00001711

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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 as permanently attached and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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