

FCC PART 15.407

TEST REPORT

For

CloudMinds Technology Inc.

4500 Great America Parkway, Suite 230 Santa Clara, California, 95054 United States

FCC ID: 2ASQT-MR-5S

Report Type: Original Report	Product Type: Raman Spectrometer
Test Engineer: Max Min	
Report Number: RKSA190116001-00E	
Report Date: 2019-08-25	
Reviewed By: RF Leader	
Test Laboratory:	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	CloudMinds Technology Inc.
Tested Model	MR-5S
Product Type	Raman Spectrometer
Dimension	159 mm(L)*78.9 mm(W)*27 mm(H)
Power Supply	DC 3.6V-6.5V or 6.5V-9V or 9V-12V from adapter and DC 3.8V from battery

Adapter information:

Model: NKA02U

Input: AC 100-240V, 50/60Hz 0.6A

Output: DC 3.6~6.5V, 3A or DC 6.5~9V, 2A or DC 9~12V, 1.5A

**All measurement and test data in this report was gathered from production sample serial number: 20190116001.
(Assigned by the BACL. The EUT supplied by the applicant was received on 2019-01-16)*

Objective

This type approval report is prepared on behalf of CloudMinds Technology Inc. in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

FCC Part15.247DSS, Part 15.247DTS, Part22H24E27Part90 PCE and Part 15.225 DXX submittals with FCC ID: 2ASQT-MR-5S

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Kunshan).

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01), the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

In **5150~5250 MHz** band, test channel list is as below:

802.11a/802.11ac20/n20 mode Channel 36, 40, 48 were tested.

802.11n40/802.11ac40 mode Channel 38, 46 were tested.

802.11ac80 mode Channel 42 was tested

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240
42	5210	/	/

In **5725~5850 MHz** band, test channel list is as below:

802.11a/802.11ac20/n20 mode Channel 149, 157, 165 were tested.

802.11n40/802.11ac40 mode Channel 151, 159 were tested.

802.11ac80 mode Channel 155 was tested.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	159	5795
151	5755	161	5805
153	5765	165	5825
155	5775	/	/
157	5785	/	/

EUT Exercise Software

RF test tool: QRCT

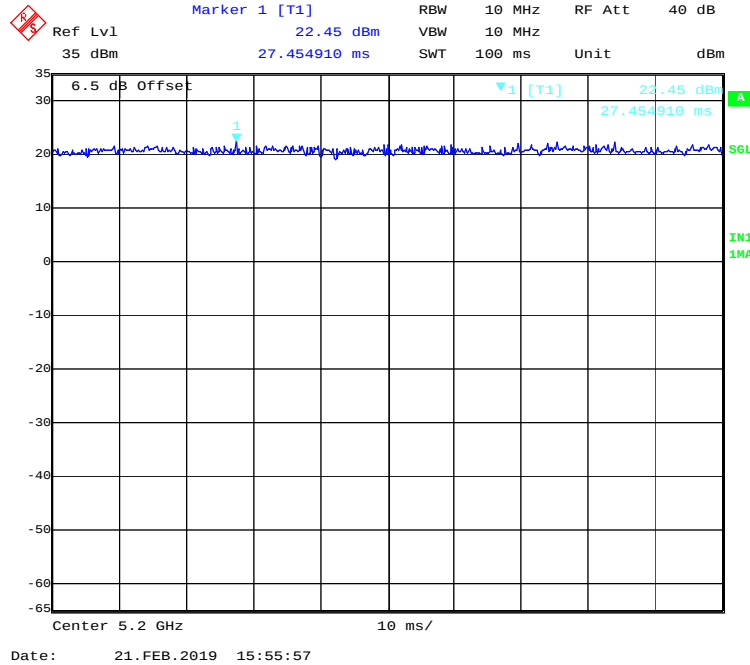
The worst case was performed under:

Mode	Data rate	Power setting	
		5150-5250 Band	5725-5850 Band
802.11a	6 Mbps	14	14
802.11ac20	MCS0	14	14
802.11n-HT20	MCS0	14	14
802.11ac40	MCS0	14	14
802.11n-HT40	MCS0	14	14
802.11ac80	MCS0	14	14

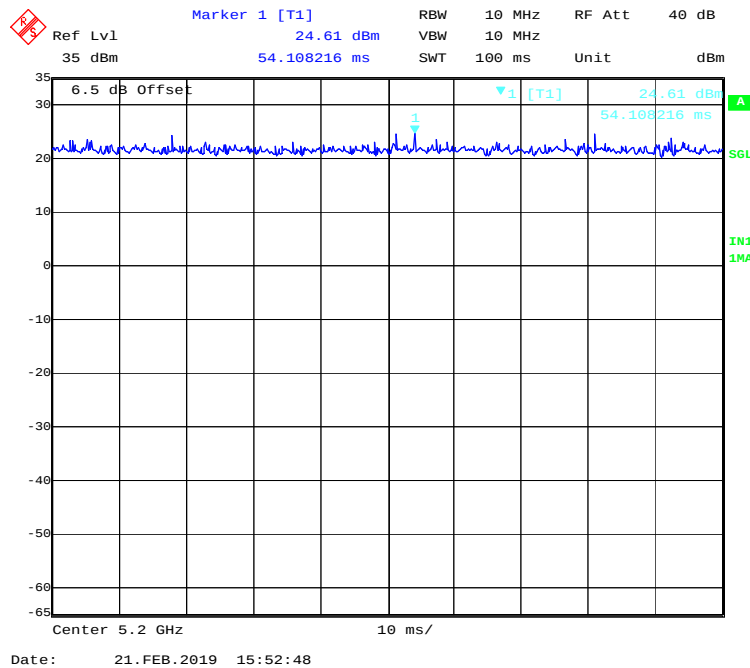
Duty Cycle

5150MHz-5250MHz Band:

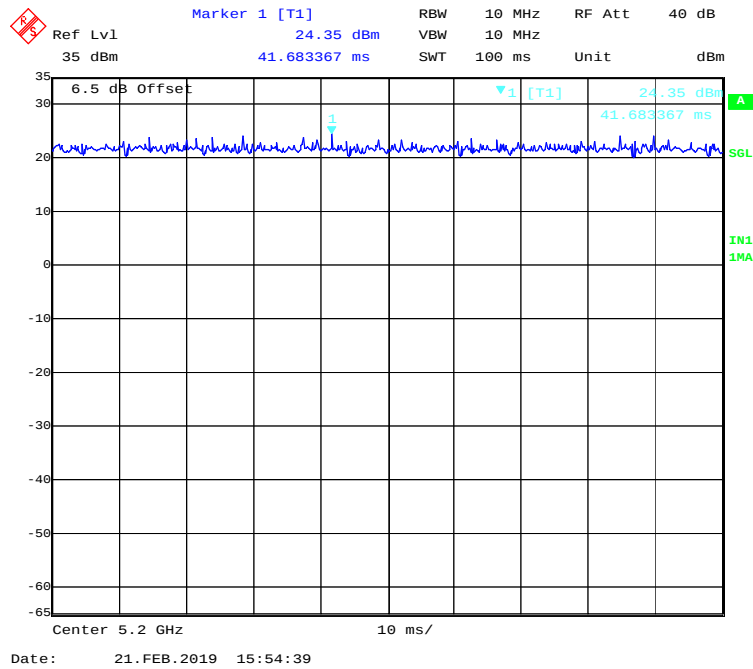
802.11a mode



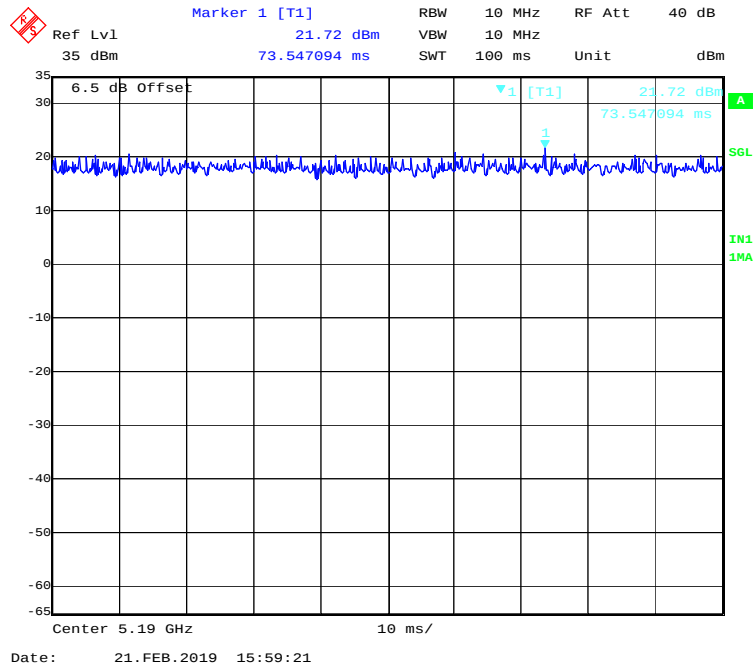
802.11ac20 mode



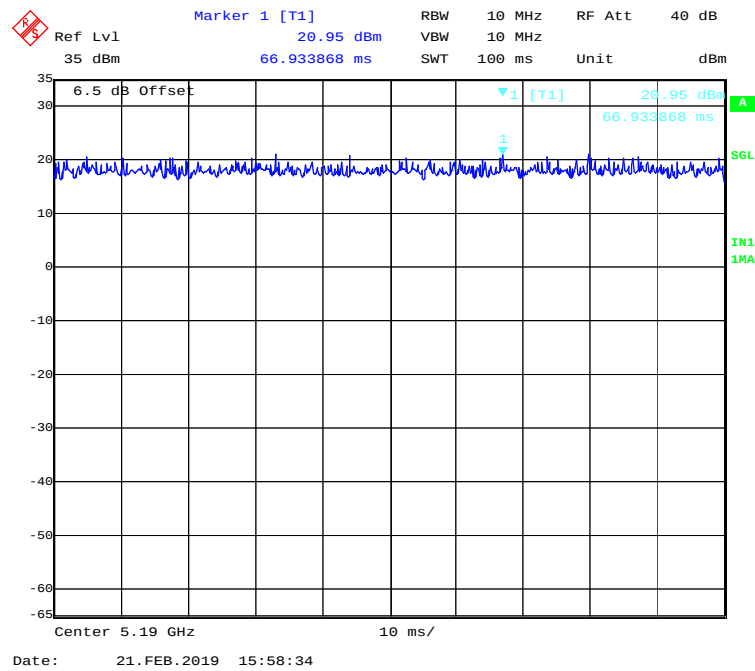
802.11n-HT20 mode



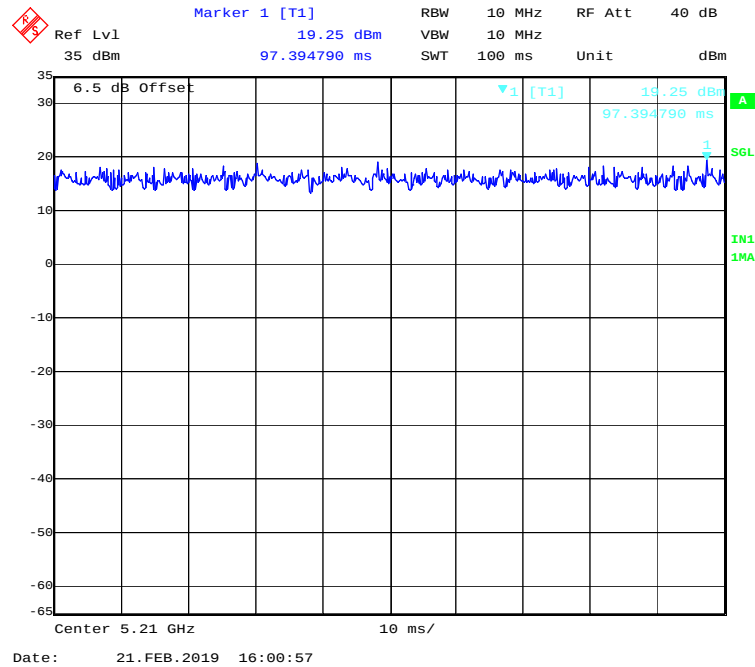
802.11 ac40 mode



802.11n-HT40 mode

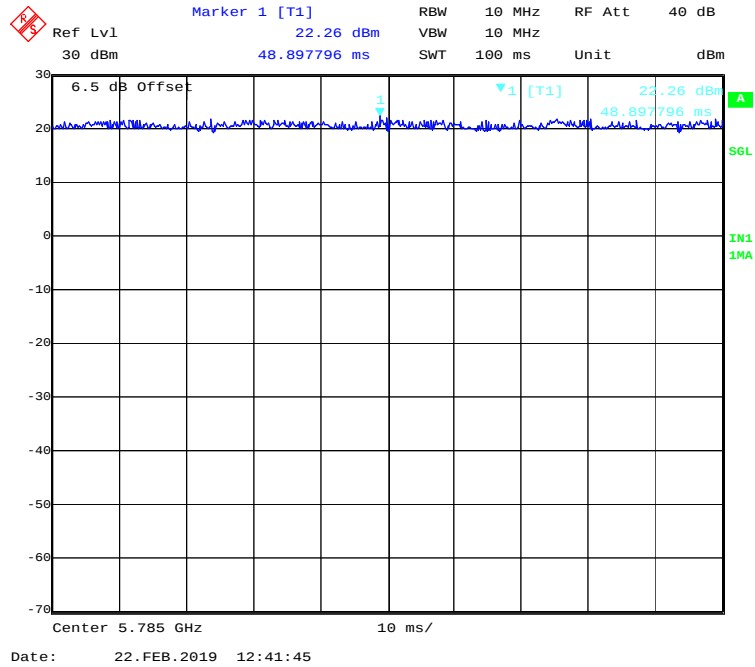


802.11 ac80 mode

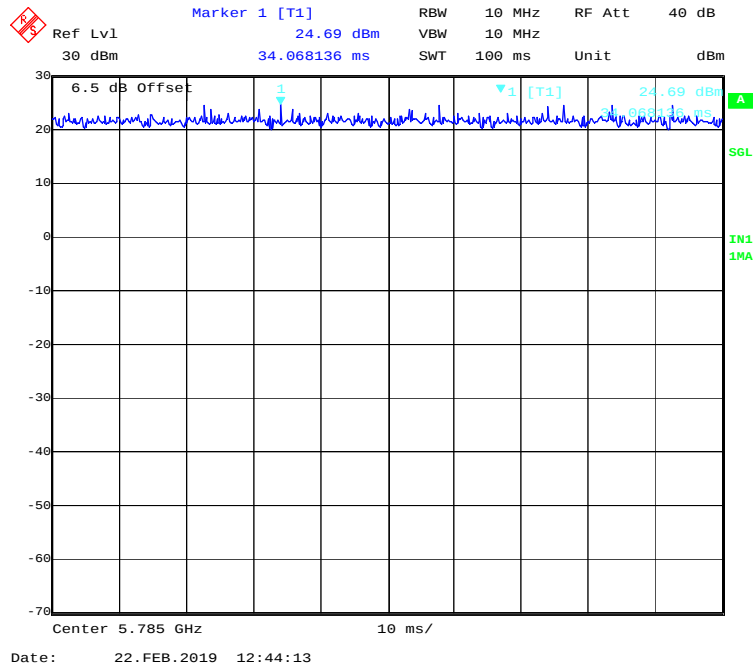


5725MHz-5850MHz Band:

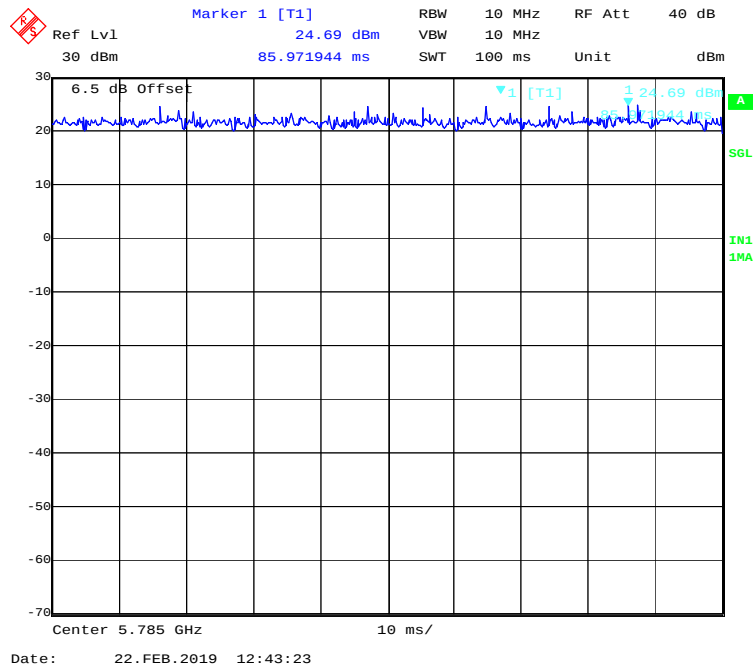
802.11a mode



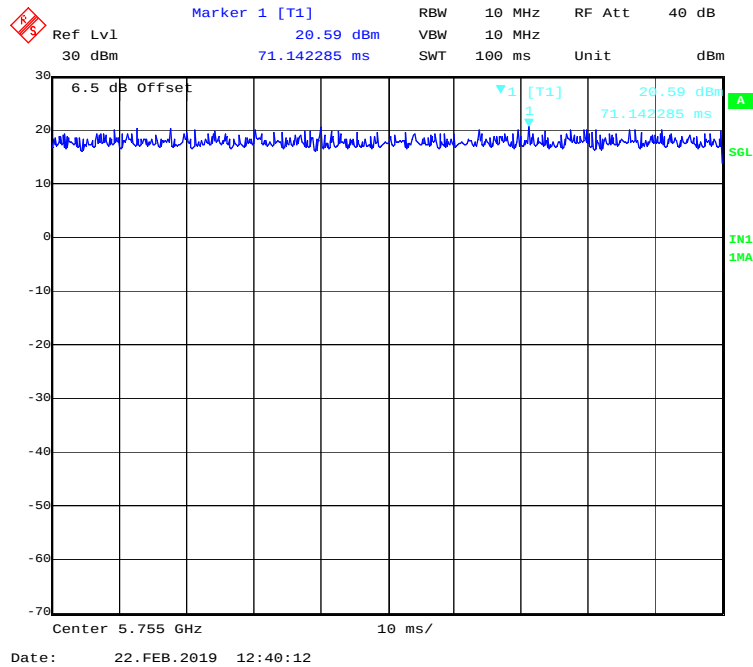
802.11ac20 mode



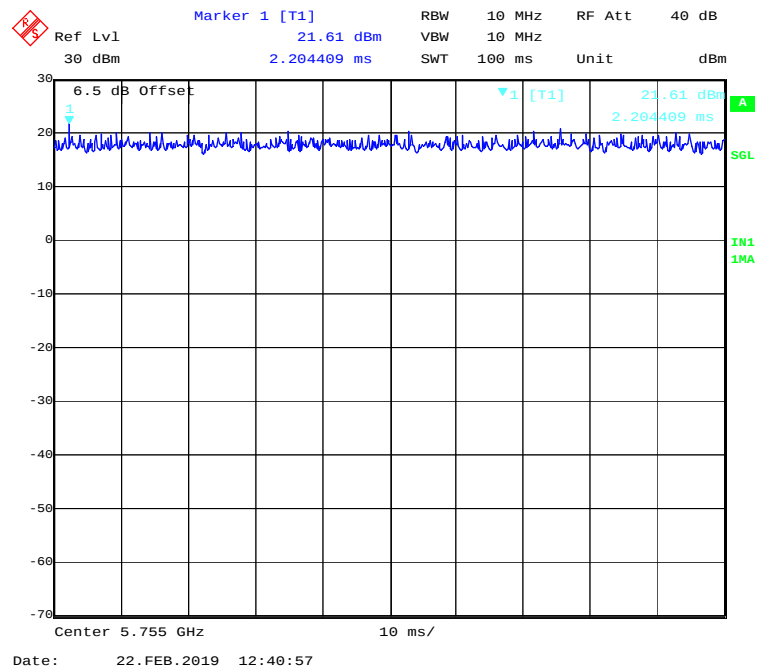
802.11n-HT20 mode



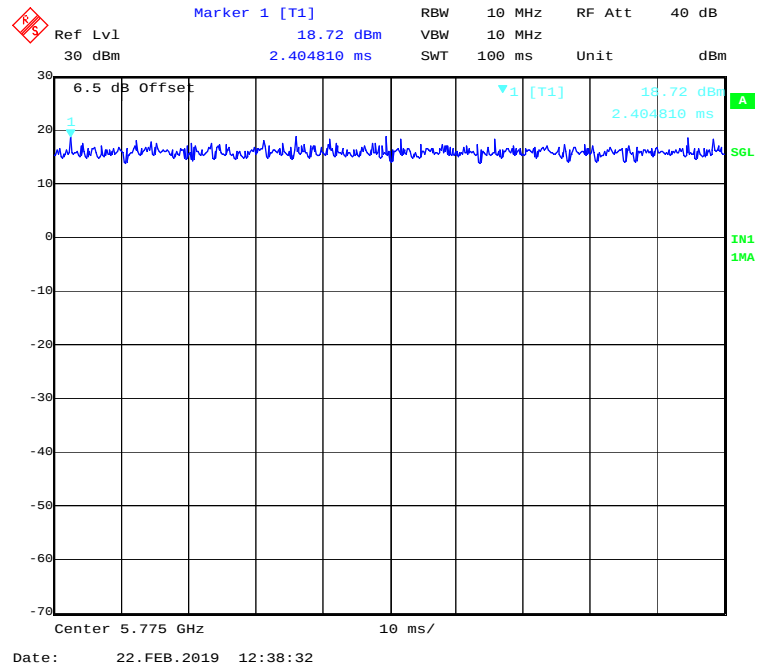
802.11 ac40 mode



802.11n-HT40 mode



802.11n- ac80 mode



Mode	Frequency Range (MHz)	Duty Cycle (%)	T (ms)	1/T (kHz)	10log(1/x)
802.11a	5150-5250	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0
802.11a	5725-5850	100	/	/	0
802.11ac20		100	/	/	0
802.11n-HT20		100	/	/	0
802.11ac40		100	/	/	0
802.11n-HT40		100	/	/	0
802.11ac80		100	/	/	0

Note: “x” means duty cycle.

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

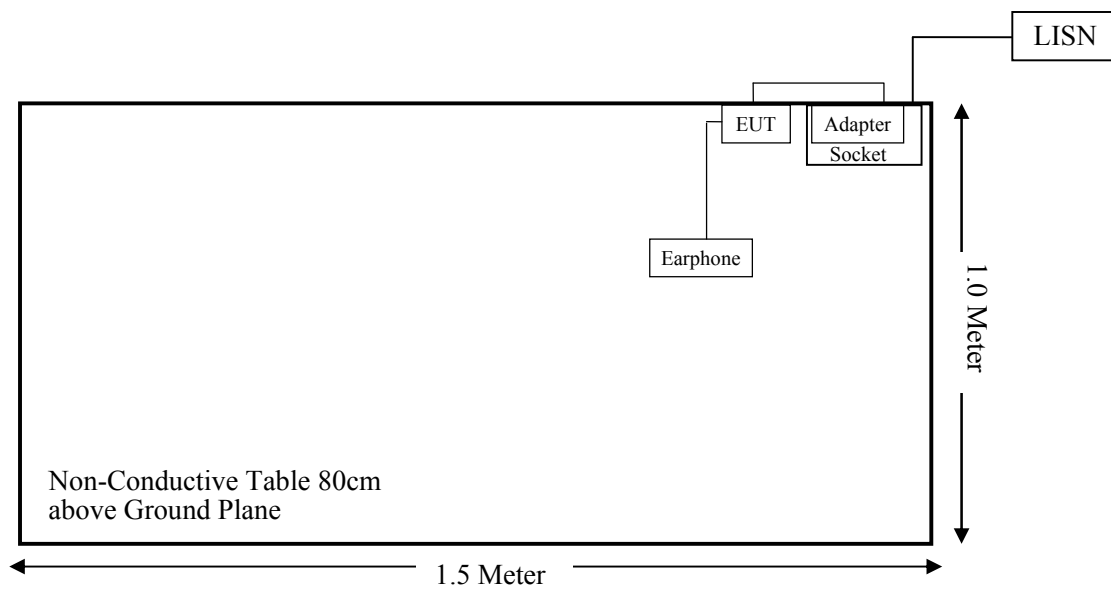
Manufacturer	Description	Model	Serial Number
/	Earphone	/	/

External I/O Cable

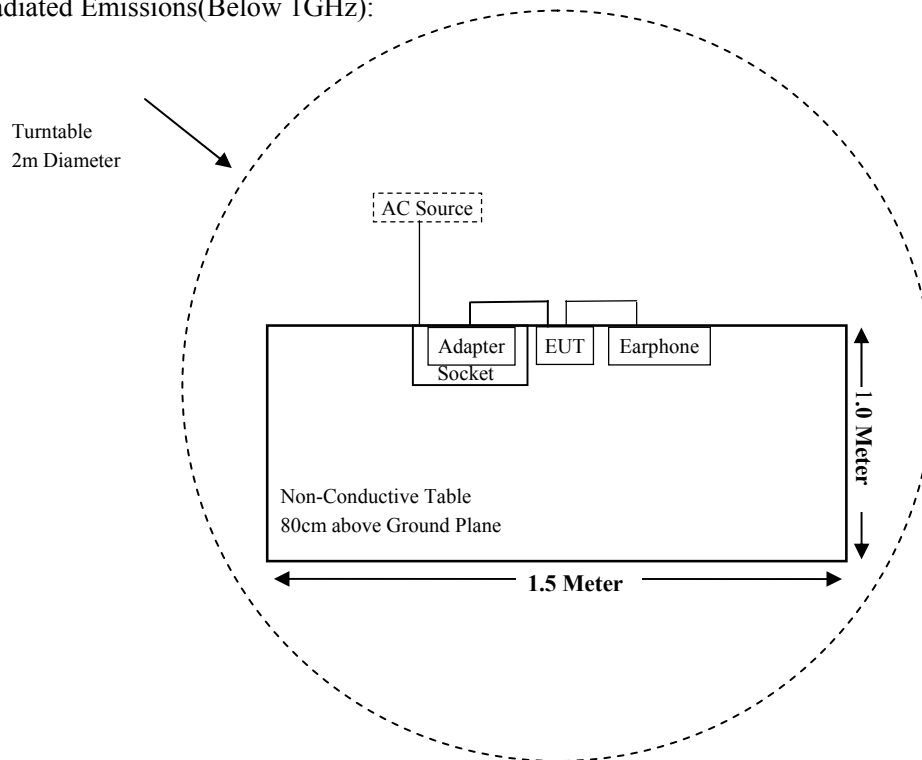
Cable Description	Length (m)	From Port	To
USB Cable	1.0	Adapter	EUT

Block Diagram of Test Setup

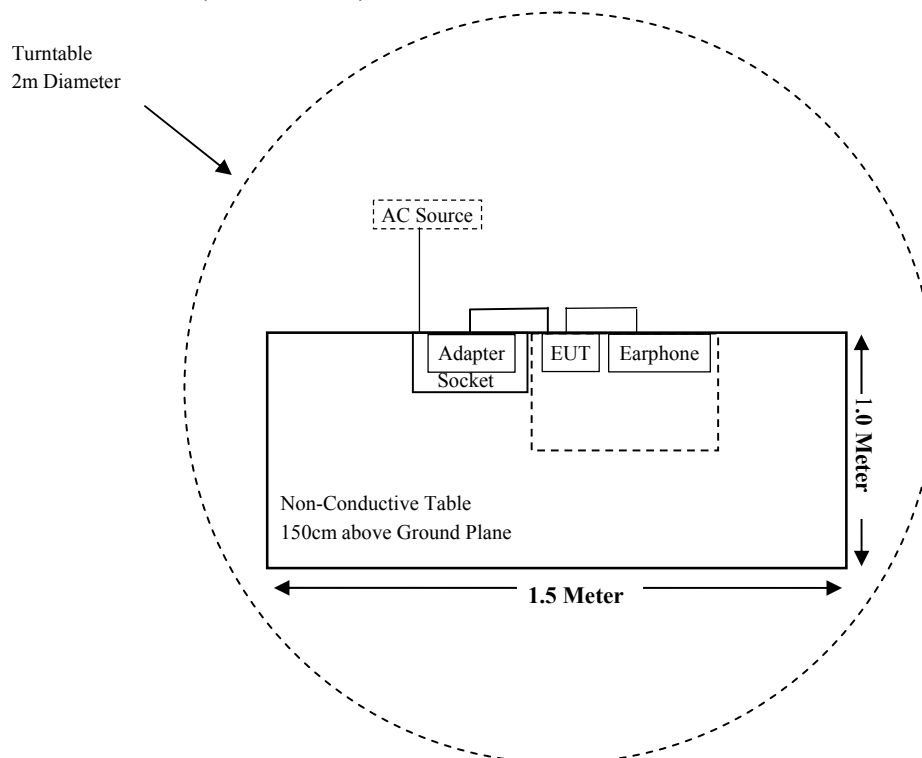
For Conducted Emissions:



For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310 & §2.1093	RF EXPOSURE	Compliant
§15.203	Antenna Requirement	Compliant
FCC §15.207 & §15.407(b) (6)	AC Power Line Conducted Emissions	Compliant
§15.205 & §15.209 & §15.407(b) (1) ,(6) ,(7)	Undesirable Emission & Restricted Bands	Compliant
§15.407(a)(1) (5) & §15.407 (e)	Emission Bandwidth	Compliant
§15.407 (a)(1) (3)	Conducted Transmitter Output Power	Compliant
§15.407 (a)(1) (3)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-30	2019-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2018-08-14	2019-08-13
Sonoma Instrument	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2018-08-27	2019-08-26
ETS-LINDGREN	Horn Antenna	3115	6229	2016-12-12	2019-12-11
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-12-12	2019-12-11
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2018-03-22	2019-03-21
EM Electronics Corporation	Amplifier	EM18G40G	060726	2019-03-22	2020-03-21
MICRO-TRONICS	Band Reject Filter	BRC50703	G094	2018-08-05	2019-08-04
MICRO-TRONICS	Band Reject Filter	BRC50703	G094	2019-08-05	2020-08-04
MICRO-TRONICS	Band Reject Filter	BRC50705	G085	2018-08-05	2019-08-04
MICRO-TRONICS	Band Reject Filter	BRC50705	G085	2019-08-05	2020-08-04
Narda	Attenuator	10dB	010	2018-08-15	2019-08-14
Narda	Attenuator	10dB	010	2019-08-15	2020-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2019-08-15	2020-08-14

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2018-11-30	2019-11-29
Agilent	Power Meter	N1912A	MY5000492	2018-11-18	2019-11-17
Agilent	Power Sensor	N1921A	MY54210024	2018-11-18	2019-11-17
Narda	Attenuator	6dB	006	2019-01-10	2020-01-09
BACL	Temperature & Humidity Chamber	BTH-150	30023	2018-12-20	2019-12-19
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	2018-10-10	2019-10-09
CloudMinds Technology Inc.	RF Cable	CloudMinds Technology Inc. C01	C01	Each Time	/
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2018-07-11	2019-07-10
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-07-11	2020-07-10
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2018-11-30	2019-11-29
Audix	Test Software	e3	V9	N/A	N/A
Narda	Attenuator/6dB	10690812-2	26850-6	2019-01-10	2020-01-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-08-15	2020-08-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

§1.1310 & §2.1093 –RF EXPOSURE

Applicable Standard

According to §2.1093 and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB447498 D01 General RF Exposure Guidance v06:

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR

· $f(\text{GHz})$ is the RF channel transmit frequency in GHz

· Power and distance are rounded to the nearest mW and mm before calculation

· The result is rounded to one decimal place for comparison

· When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

Measurement Result

For BLE&BT3.0 mode:

Mode	Frequency Range (MHz)	Tune-up Conducted Power		Calculated Distance (mm)	Calculated Value	Threshold (1-g)	SAR Test Exclusion
		(dBm)	(mW)				
BT3.0	2402-2480	8.20	6.61	5.00	2.10	3.00	Yes
BLE	2402-2480	0.50	1.12	5.00	0.35	3.00	Yes

Note: 1. The tune-up output power was declared by the manufacturer.

So the stand-alone SAR evaluation is not necessary

For Wi-Fi&GSM&WCDMA<E mode:

Please refer to the SAR report: RKSA190116001-20

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407, if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an IFA antenna for 5G Wi-Fi which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

Antenna Type	Max. Antenna Gain
IFA	0.24 dBi

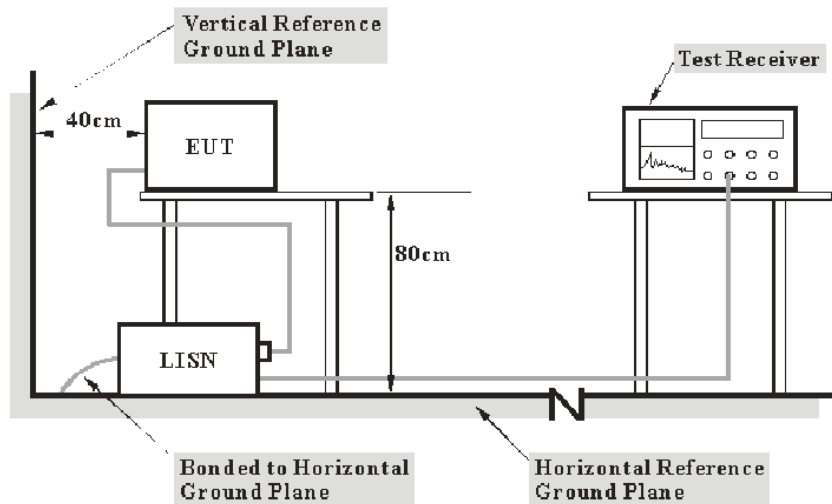
Result: Compliant.

FCC §15.407 (b) (6) §15.207 (a) – AC POWER LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a), §15.407(b) (6)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of 7 dB means the emission is 7 dB above the limit. The equation for over limit calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

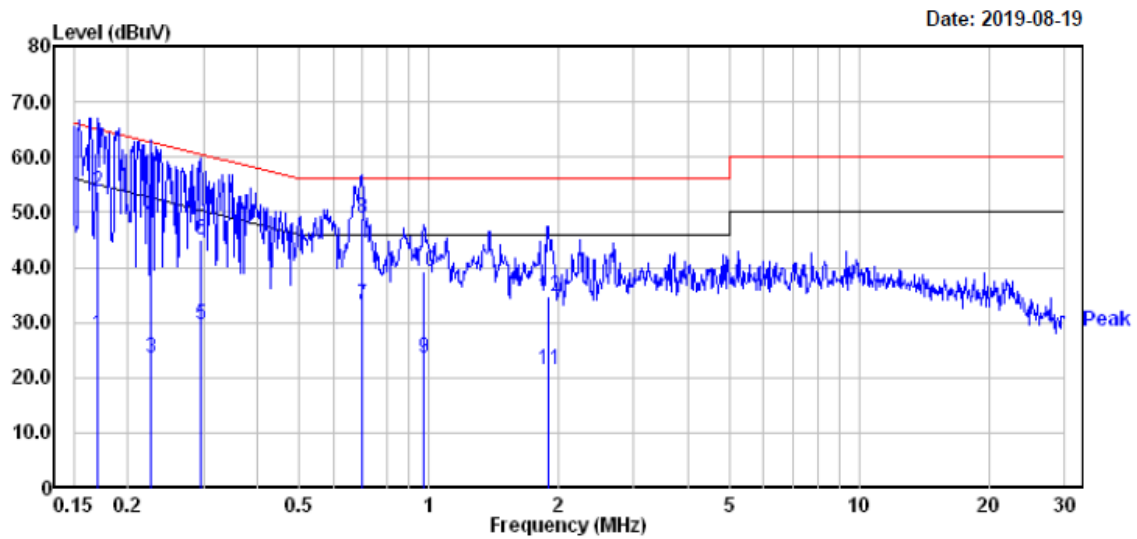
Environmental Conditions

Temperature:	20.2 °C
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

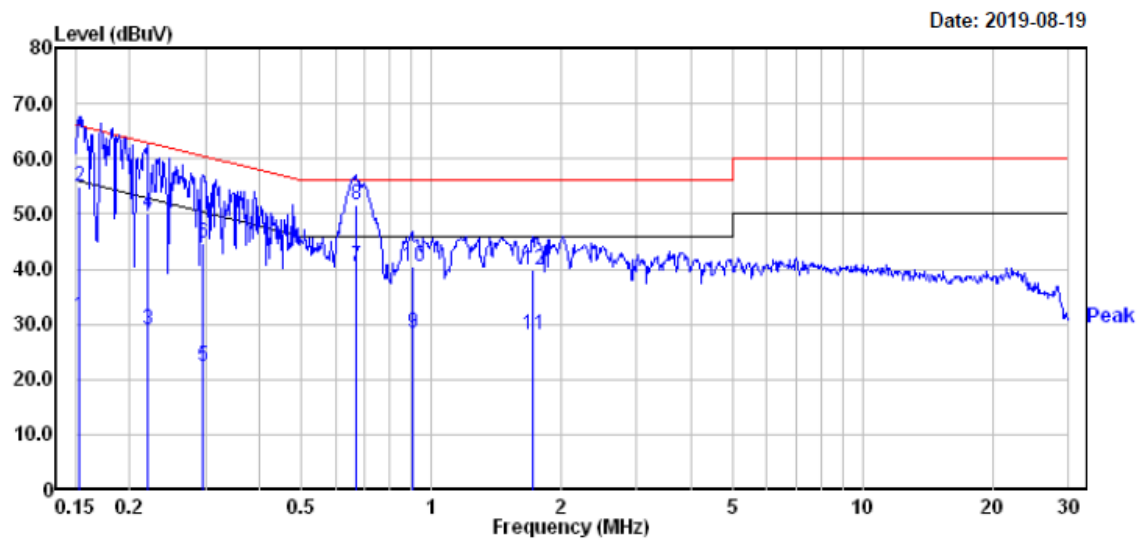
The testing was performed by Max Min on 2019-08-19.

EUT operation mode: Transmitting in 802.11n-HT20 mode middle channel of 5725-5850MHz (worst case)

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.170	7.80	19.83	27.63	54.94	-27.31	Average
2	0.170	33.90	19.83	53.73	64.94	-11.21	QP
3	0.227	3.80	19.82	23.62	52.57	-28.95	Average
4	0.227	29.20	19.82	49.02	62.57	-13.55	QP
5	0.296	9.80	19.83	29.63	50.37	-20.74	Average
6	0.296	25.30	19.83	45.13	60.37	-15.24	QP
7	0.701	13.50	19.75	33.25	46.00	-12.75	Average
8	0.701	29.10	19.75	48.85	56.00	-7.15	QP
9	0.974	3.60	19.80	23.40	46.00	-22.60	Average
10	0.974	19.40	19.80	39.20	56.00	-16.80	QP
11	1.898	1.50	19.83	21.33	46.00	-24.67	Average
12	1.898	14.80	19.83	34.63	56.00	-21.37	QP

AC 120V/60 Hz, Neutral

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	11.50	19.82	31.32	55.87	-24.55	Average
2	0.152	35.20	19.82	55.02	65.87	-10.85	QP
3	0.220	9.30	19.82	29.12	52.83	-23.71	Average
4	0.220	30.30	19.82	50.12	62.83	-12.71	QP
5	0.296	2.50	19.83	22.33	50.37	-28.04	Average
6	0.296	24.80	19.83	44.63	60.37	-15.74	QP
7	0.668	20.70	19.75	40.45	46.00	-5.55	Average
8	0.668	31.80	19.75	51.55	56.00	-4.45	QP
9	0.904	8.50	19.73	28.23	46.00	-17.77	Average
10	0.904	20.69	19.73	40.42	56.00	-15.58	QP
11	1.725	8.30	19.84	28.14	46.00	-17.86	Average
12	1.725	19.90	19.84	39.74	56.00	-16.26	QP

Note:

- 1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
 2) Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

§15.205 & §15.209 & §15.407(B) (1),(6),(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1), (6), (7); §15.209; §15.205;

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 EIRP of –27dBm/MHz

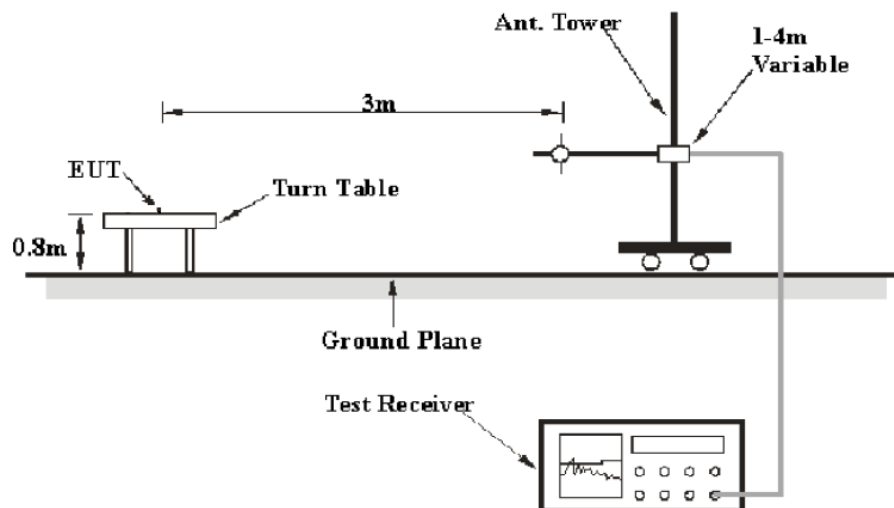
For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to 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.

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz.

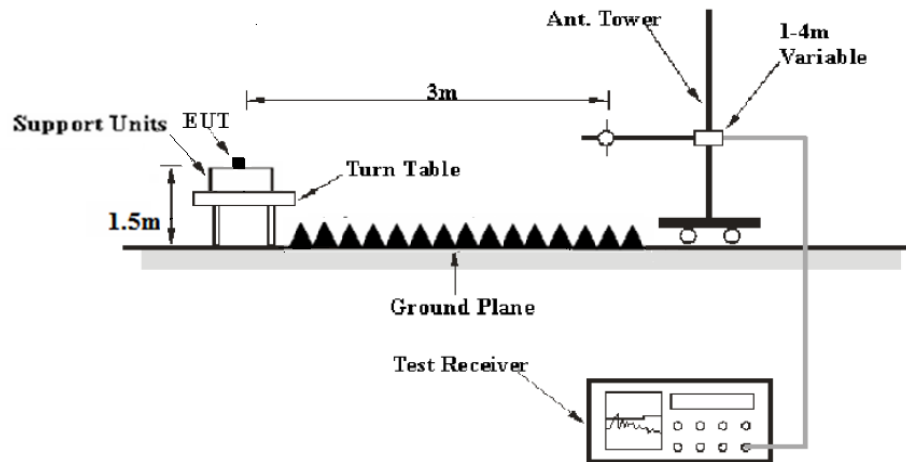
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: $E \text{ [dB}\mu\text{V/m]} = \text{EIRP [dBm]} + 95.2$, for $d = 3$ meters.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	PK
	1MHz	3 MHz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Extrapolation result}$$

Test Data**Environmental Conditions**

Temperature:	20.2 °C
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

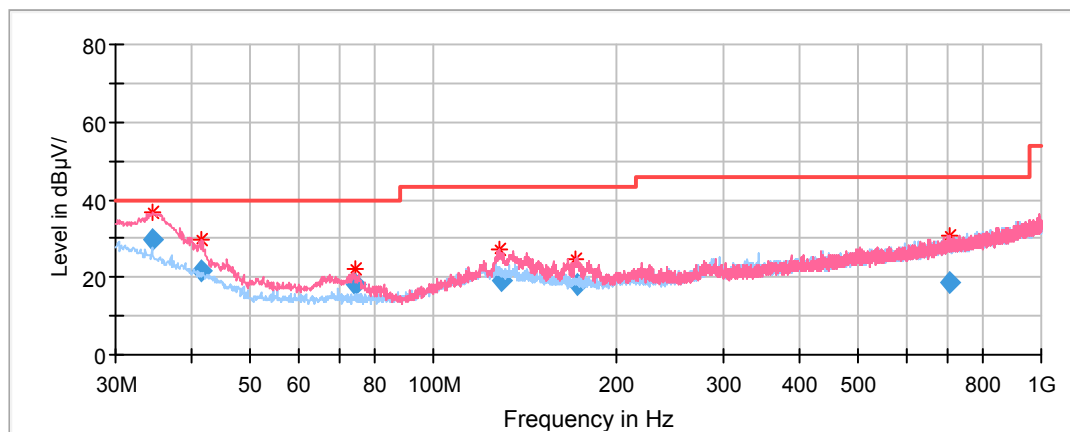
The testing was performed by Max Min on 2019-08-23.

Test Mode: Transmitting

Spurious Emission Test

30MHz-1GHz(5150-5250MHz Band):

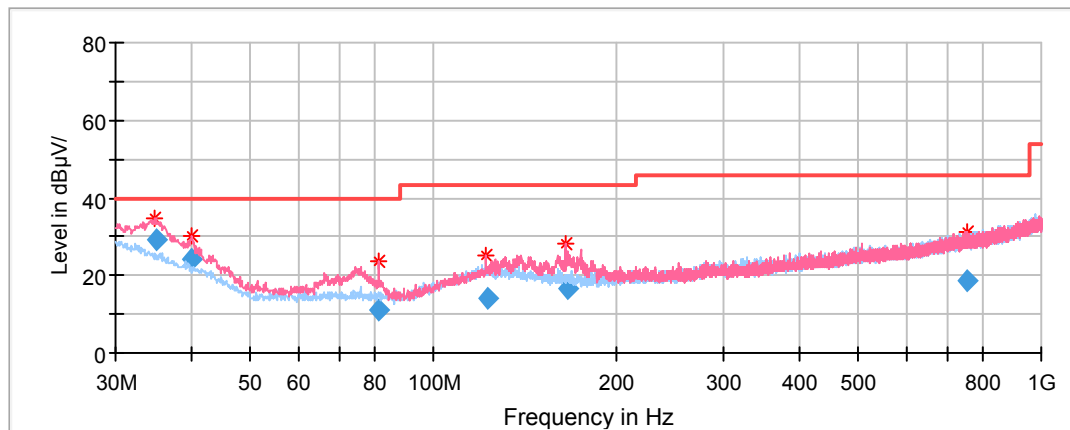
Pre-scan with 802.11a, 802.11a c20, 802.11n-HT20, 802.11a c40, 802.11n-HT40 and 802.11 a c80 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11a c20 mode in channel 5180 in Z-axis of orientation was recorded



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
34.607500	29.53	100.0	V	190.0	-6.9	40.00	10.47
41.640000	21.44	100.0	V	195.0	-11.4	40.00	18.56
74.450100	17.90	100.0	V	92.0	-17.5	40.00	22.10
128.938850	18.91	100.0	V	174.0	-11.6	43.50	24.59
172.100350	18.13	100.0	V	0.0	-13.3	43.50	25.37
708.839400	18.38	100.0	V	0.0	-3.0	46.00	27.62

30MHz-1GHz(5725-5850MHz Band):

Pre-scan with 802.11a, 802.11a c20, 802.11n-HT20, 802.11a c40, 802.11n-HT40 and 802.11 a c80 modes of operation in the X,Y and Z axes of orientation, the worst case 802.11n-HT20 mode in channel 5785 in Z-axis of orientation was recorded



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
34.926550	29.39	100.0	V	72.0	-7.3	40.00	10.61
39.939250	24.22	100.0	V	120.0	-10.7	40.00	15.78
81.288750	10.96	200.0	V	268.0	-17.8	40.00	29.04
122.878350	14.18	100.0	V	191.0	-11.3	43.50	29.32
165.797250	16.71	100.0	V	0.0	-13.0	43.50	26.79
755.709300	18.85	100.0	V	196.0	-2.4	46.00	27.15

1GHz-18GHz (5150-5250MHz Band):**802.11a Mode:**

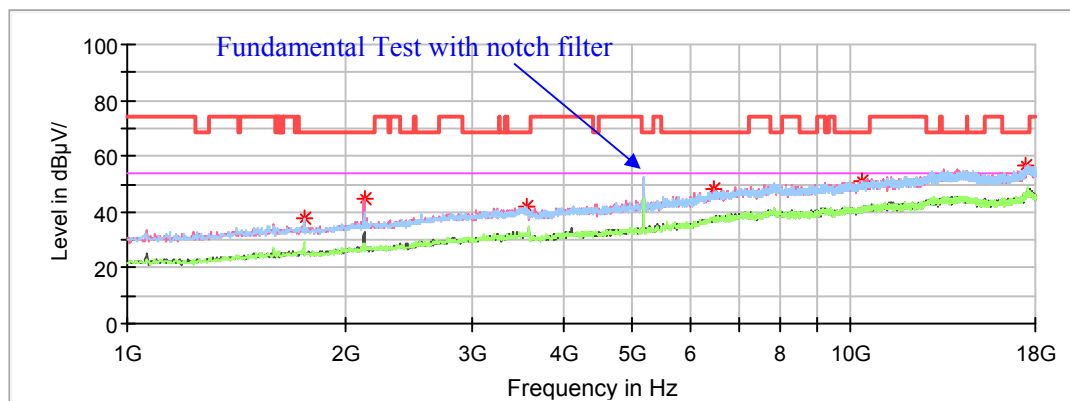
(Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.)

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz

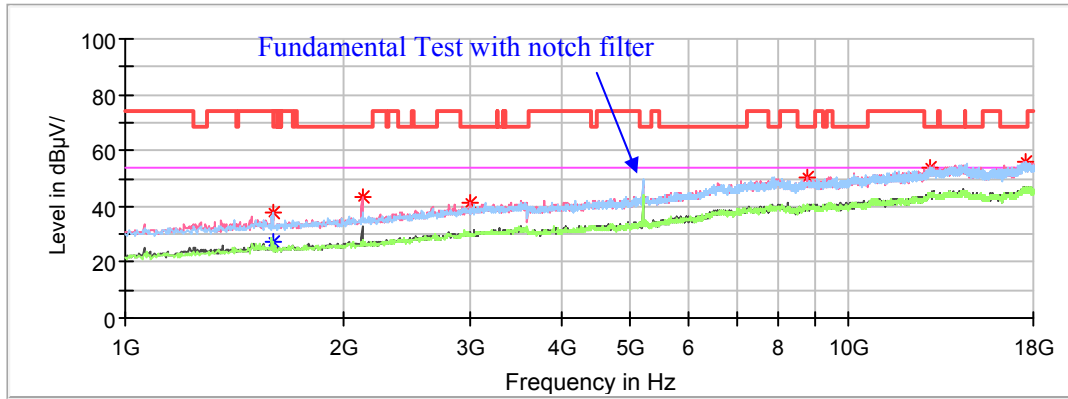
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1754.800000	37.50	---	200.0	H	324.0	-9.1	68.20	30.70
2128.800000	44.41	---	200.0	V	157.0	-7.9	68.20	23.79
3556.800000	41.87	---	200.0	V	192.0	-3.3	68.20	26.33
6460.400000	48.06	---	200.0	V	28.0	4.2	68.20	20.14
10360.000000	50.90	---	100.0	H	228.0	8.8	68.20	17.30
17496.800000	56.45	---	100.0	V	173.0	14.3	68.20	11.75

Middle Channel: 5200MHz

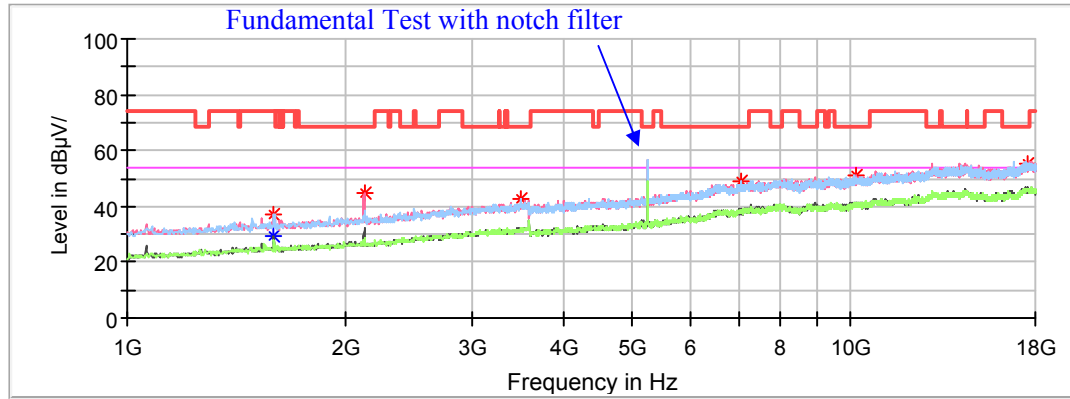
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1598.400000	---	27.04	200.0	H	50.0	-9.6	54.00	26.96
1598.400000	37.92	---	200.0	H	50.0	-9.6	74.00	36.08
2125.400000	43.41	---	200.0	V	151.0	-7.9	68.20	24.79
2992.400000	40.96	---	150.0	V	70.0	-4.4	68.20	27.24
8758.800000	50.02	---	150.0	V	211.0	7.0	68.20	18.18
12971.400000	54.01	---	150.0	H	222.0	12.0	68.20	14.19
17575.000000	55.96	---	200.0	V	0.0	14.2	68.20	12.24

High Channel: 5240MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	29.61	200.0	V	196.0	-9.6	54.00	24.39
1595.000000	37.17	---	200.0	V	196.0	-9.6	74.00	36.83
2125.400000	44.56	---	200.0	V	153.0	-7.9	68.20	23.64
3502.400000	42.41	---	150.0	H	253.0	-3.5	68.20	25.79
7048.600000	48.88	---	200.0	H	269.0	5.4	68.20	19.32
10186.800000	51.26	---	200.0	V	254.0	8.5	68.20	16.94
17513.800000	55.57	---	150.0	H	313.0	14.3	68.20	12.63

802.11ac20 Mode:

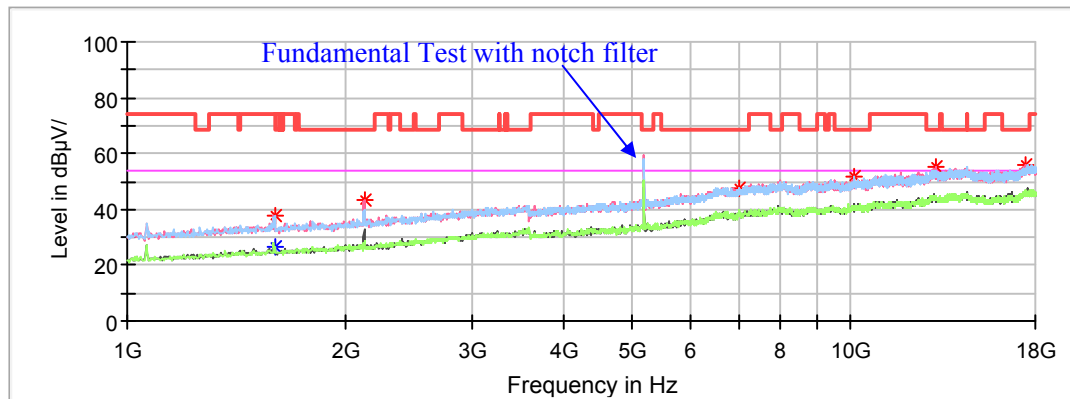
(Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.)

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz

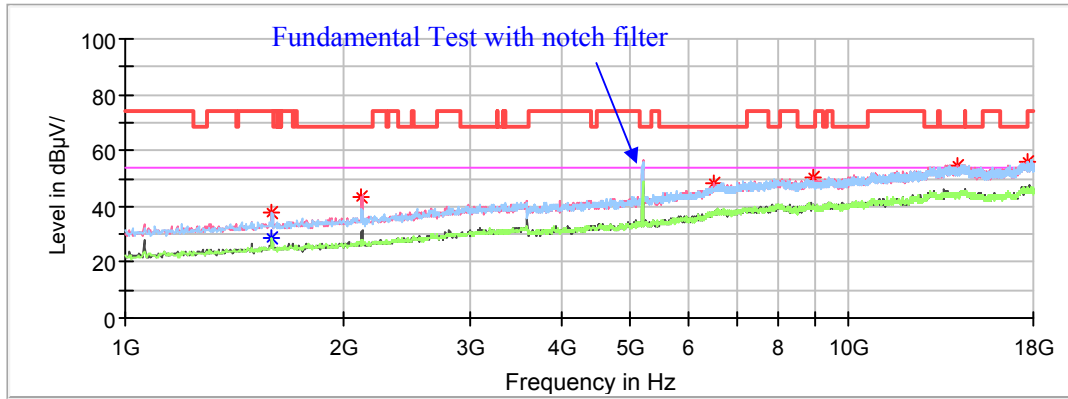
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1598.400000	38.07	---	150.0	H	55.0	-9.6	74.00	35.93
1598.400000	---	26.53	200.0	H	52.0	-9.6	54.00	27.47
2125.400000	43.37	---	200.0	V	141.0	-7.9	68.20	24.83
7004.400000	47.85	---	200.0	V	248.0	5.3	68.20	20.35
10135.800000	51.84	---	150.0	H	13.0	8.4	68.20	16.36
13107.400000	55.00	---	200.0	V	176.0	12.0	68.20	13.20
17473.000000	55.69	---	200.0	V	295.0	14.1	68.20	12.51

Middle Channel: 5200MHz

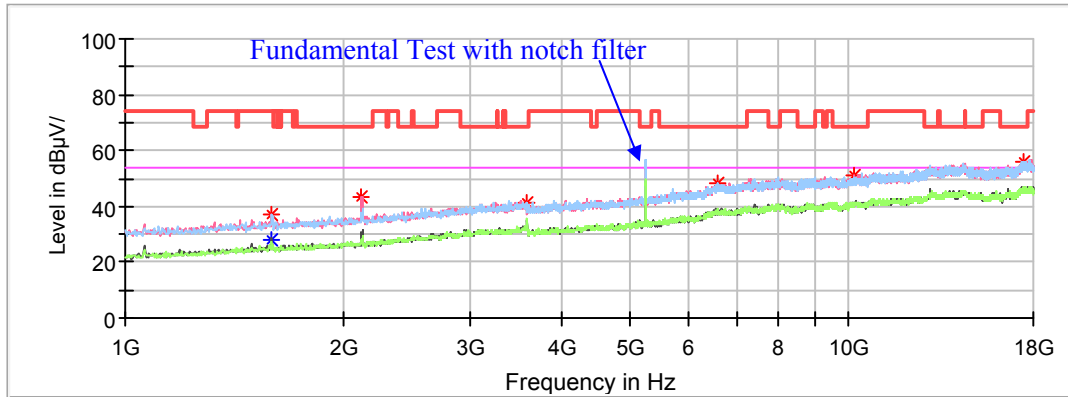
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	28.37	150.0	H	55.0	-9.6	54.00	25.63
1595.000000	37.54	---	200.0	H	46.0	-9.6	74.00	36.46
2122.000000	43.36	---	200.0	V	138.0	-7.9	68.20	24.84
6504.600000	48.11	---	150.0	V	186.0	4.4	68.20	20.09
8942.400000	50.40	---	200.0	V	90.0	7.5	68.20	17.80
14110.400000	54.64	---	200.0	V	319.0	12.5	68.20	13.56
17615.800000	56.27	---	200.0	V	42.0	14.1	68.20	11.93

High Channel: 5240MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	28.15	150.0	V	125.0	-9.6	54.00	25.85
1595.000000	37.41	---	200.0	V	124.0	-9.6	74.00	36.59
2122.000000	43.35	---	200.0	V	148.0	-7.9	68.20	24.85
3594.200000	41.25	---	150.0	H	313.0	-3.2	68.20	26.95
6586.200000	48.18	---	200.0	H	19.0	4.6	68.20	20.02
10163.000000	51.29	---	200.0	V	218.0	8.5	68.20	16.91
17439.000000	55.79	---	150.0	V	183.0	14.0	68.20	12.41

802.11n-HT20 Mode:

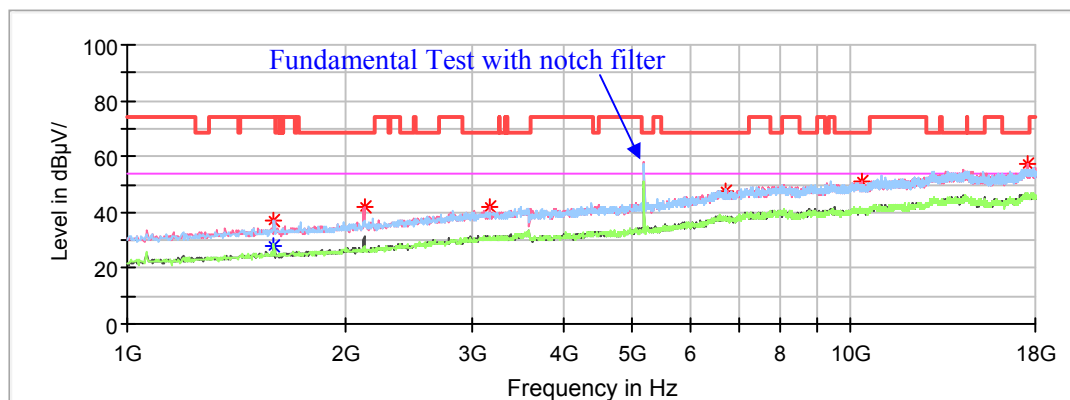
Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5180MHz

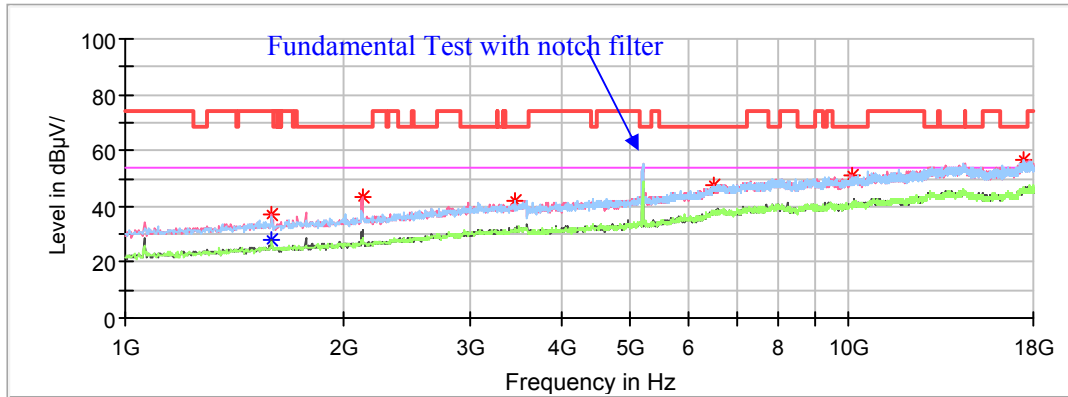
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	27.76	150.0	H	42.0	-9.6	54.00	26.24
1595.000000	37.39	---	200.0	H	59.0	-9.6	74.00	36.61
2125.400000	41.84	---	200.0	V	156.0	-7.9	68.20	26.36
3165.800000	41.64	---	200.0	V	238.0	-4.1	68.20	26.56
6712.000000	47.80	---	200.0	V	296.0	4.8	68.20	20.40
10360.000000	51.17	---	150.0	V	1.0	8.7	68.20	17.03
17595.400000	57.59	---	150.0	V	174.0	14.1	68.20	10.61

Middle Channel: 5200MHz

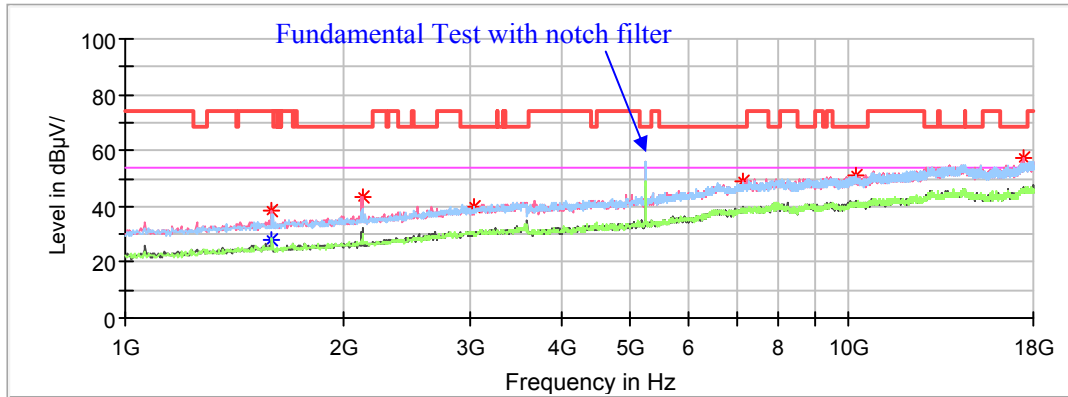
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1591.600000	37.11	---	200.0	V	121.0	-9.6	74.00	36.89
1591.600000	---	27.67	200.0	V	121.0	-9.6	54.00	26.33
2128.800000	43.57	---	200.0	V	156.0	-7.9	68.20	24.63
3454.800000	41.74	---	150.0	H	357.0	-3.6	68.20	26.46
6518.200000	47.72	---	200.0	V	203.0	4.4	68.20	20.48
10132.400000	50.87	---	150.0	V	150.0	8.4	68.20	17.33
17469.600000	56.81	---	200.0	H	153.0	14.1	68.20	11.39

High Channel: 5240MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	27.75	200.0	V	187.0	-9.6	54.00	26.25
1595.000000	38.54	---	150.0	V	153.0	-9.6	74.00	35.46
2128.800000	43.23	---	200.0	V	151.0	-7.9	68.20	24.97
3029.800000	40.06	---	150.0	H	162.0	-4.3	68.20	28.14
7154.000000	48.86	---	150.0	V	106.0	5.6	68.20	19.34
10251.400000	50.90	---	200.0	H	247.0	8.6	68.20	17.30
17442.400000	57.13	---	150.0	V	258.0	14.0	68.20	11.07

802.11ac40 Mode:

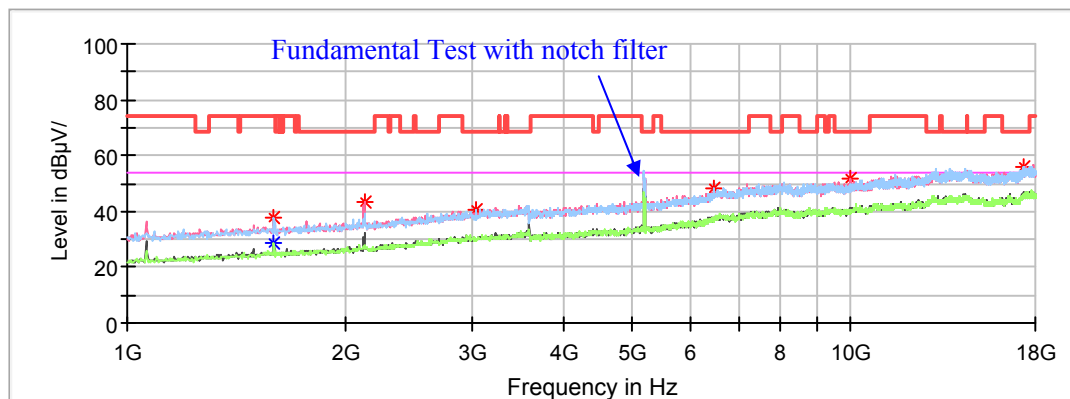
(Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.)

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5190MHz

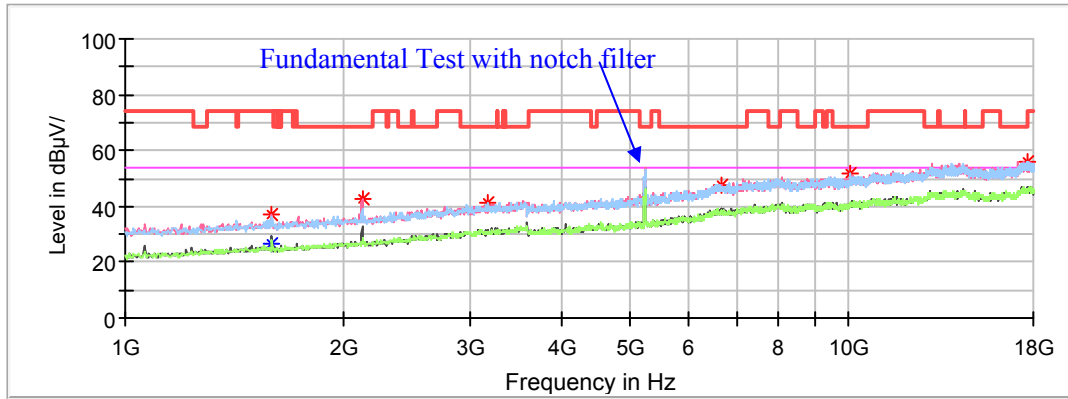
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.00	---	200.0	H	47.0	-9.6	74.00	36.00
1595.000000	---	28.45	150.0	H	352.0	-9.6	54.00	25.55
2128.800000	43.02	---	200.0	V	150.0	-7.9	68.20	25.18
3036.600000	40.33	---	200.0	H	1.0	-4.3	68.20	27.87
6467.200000	48.17	---	150.0	H	197.0	4.3	68.20	20.03
10013.400000	51.50	---	150.0	V	117.0	8.2	68.20	16.70
17316.600000	56.14	---	200.0	H	164.0	13.3	68.20	12.06

High Channel: 5230MHz

Full Spectrum



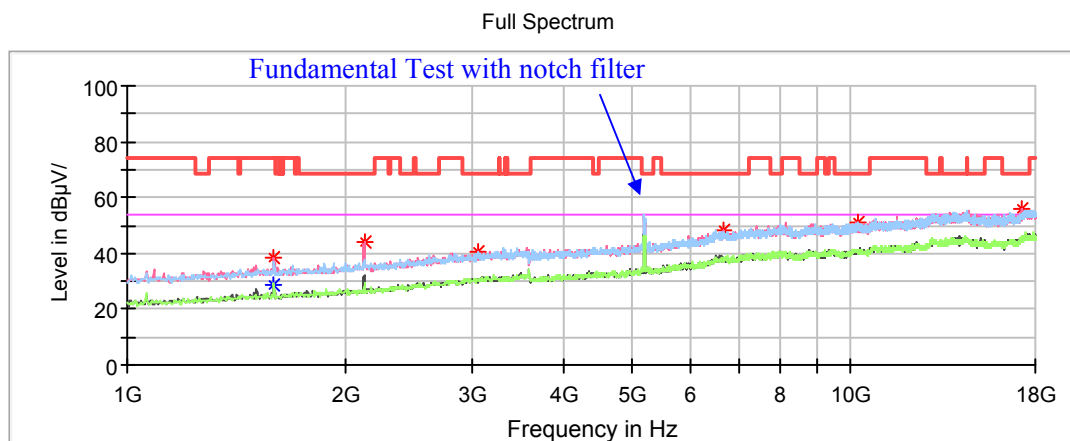
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1591.600000	36.75	---	200.0	V	320.0	-9.6	74.00	37.25
1591.600000	---	26.90	150.0	V	129.0	-9.6	54.00	27.10
2128.800000	42.73	---	200.0	V	156.0	-7.9	68.20	25.47
3179.400000	41.14	---	150.0	H	201.0	-4.1	68.20	27.06
6691.600000	47.64	---	150.0	V	314.0	4.8	68.20	20.56
10061.000000	51.62	---	150.0	H	0.0	8.3	68.20	16.58
17656.600000	56.02	---	150.0	H	307.0	14.0	68.20	12.18

802.11n-HT40 Mode:

Pre-scan with X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded

Note:

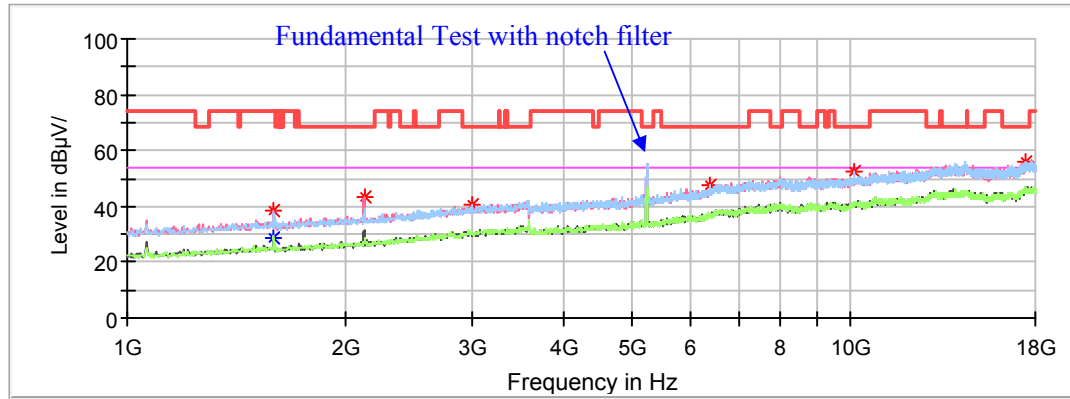
1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5190MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.51	---	200.0	V	116.0	-9.6	74.00	35.49
1595.000000	---	28.72	200.0	V	116.0	-9.6	54.00	25.28
2128.800000	43.72	---	200.0	V	139.0	-7.9	68.20	24.48
3060.400000	40.21	---	200.0	H	13.0	-4.3	68.20	27.99
6667.800000	48.34	---	150.0	V	0.0	4.7	68.20	19.86
10210.600000	50.83	---	150.0	H	31.0	8.5	68.20	17.37
17241.800000	55.94	---	150.0	V	128.0	13.0	68.20	12.26

High Channel: 5230MHz

Full Spectrum



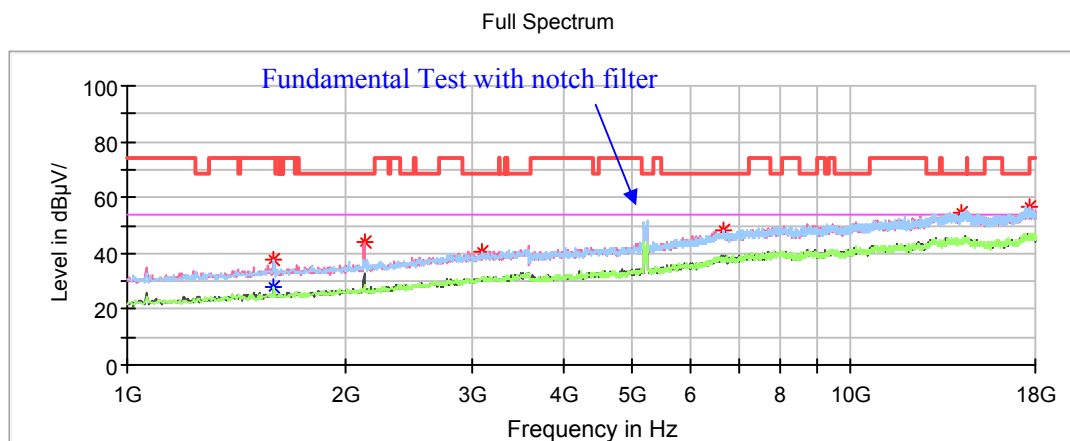
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1591.600000	38.19	---	200.0	V	125.0	-9.6	74.00	35.81
1591.600000	---	28.95	200.0	V	125.0	-9.6	54.00	25.05
2125.400000	43.55	---	200.0	V	149.0	-7.9	68.20	24.65
2989.000000	40.68	---	150.0	H	278.0	-4.4	68.20	27.52
6378.800000	47.51	---	200.0	H	0.0	3.9	68.20	20.69
10129.000000	52.39	---	200.0	H	29.0	8.4	68.20	15.81
17476.400000	55.89	---	150.0	H	54.0	14.2	68.20	12.31

802.11ac80 Mode:

Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded

Note:

1. This test was performed with the 5150-5250MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5210MHz

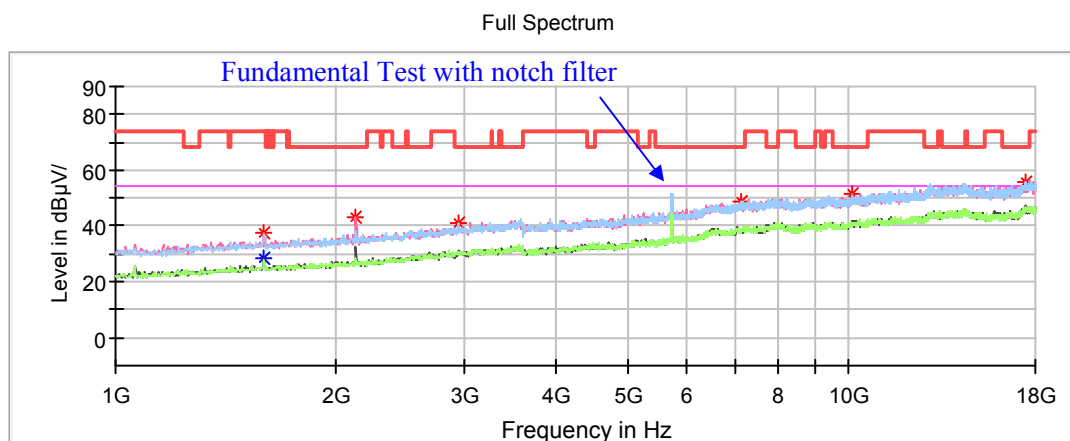
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.10	---	150.0	H	54.0	-9.6	74.00	35.90
1595.000000	---	28.29	200.0	H	35.0	-9.6	54.00	25.71
2125.400000	44.07	---	200.0	V	138.0	-7.9	68.20	24.13
3094.400000	40.24	---	150.0	H	208.0	-4.2	68.20	27.96
6654.200000	48.47	---	200.0	H	140.0	4.7	68.20	19.73
14185.200000	54.54	---	200.0	H	245.0	12.6	68.20	13.66
17660.000000	56.49	---	150.0	H	220.0	14.0	68.20	11.71

1GHz-18GHz (5725-5850MHz Band):**802.11a Mode:**

(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

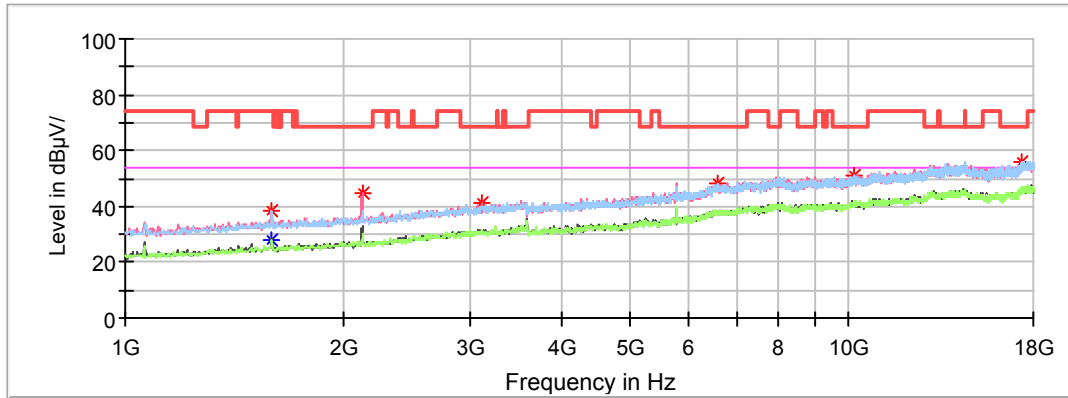
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	37.81	---	200.0	V	118.0	-9.6	74.00	36.19
1595.000000	---	28.21	200.0	V	118.0	-9.6	54.00	25.79
2125.400000	43.23	---	200.0	V	118.0	-7.9	68.20	24.97
2931.200000	40.76	---	200.0	H	1.0	-4.7	68.20	27.44
7147.200000	48.56	---	150.0	H	338.0	5.6	68.20	19.64
10122.200000	51.58	---	150.0	V	176.0	8.4	68.20	16.62
17483.200000	55.65	---	200.0	V	165.0	14.2	68.20	12.55

Middle Channel: 5785MHz

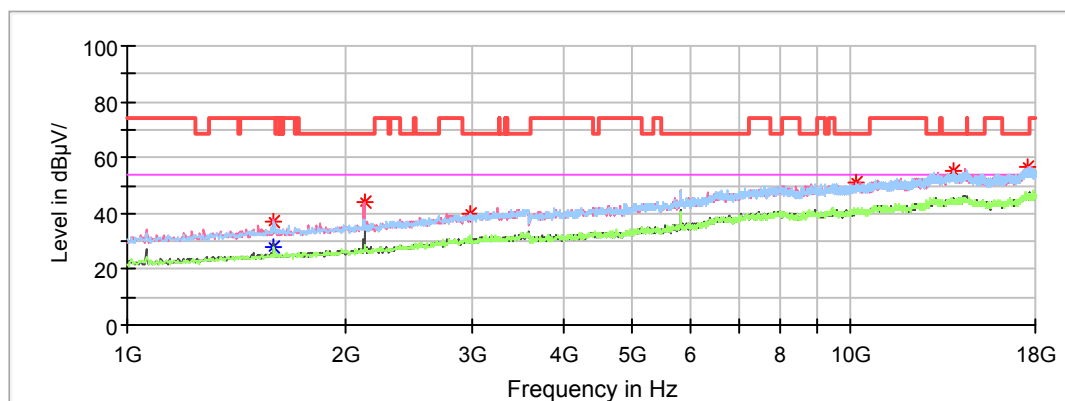
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.78	---	200.0	H	67.0	-9.6	74.00	35.22
1595.000000	---	27.99	200.0	H	67.0	-9.6	54.00	26.01
2128.800000	44.78	---	200.0	V	150.0	-7.9	68.20	23.42
3118.200000	41.06	---	200.0	V	162.0	-4.2	68.20	27.14
6610.000000	48.11	---	200.0	H	1.0	4.6	68.20	20.09
10159.600000	51.10	---	200.0	H	43.0	8.5	68.20	17.10
17350.600000	56.07	---	200.0	H	160.0	13.5	68.20	12.13

High Channel: 5825MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	37.32	---	200.0	H	44.0	-9.6	74.00	36.68
1595.000000	---	28.06	200.0	H	44.0	-9.6	54.00	25.94
2125.400000	43.77	---	200.0	V	137.0	-7.9	68.20	24.43
2982.200000	40.18	---	150.0	H	102.0	-4.5	68.20	28.02
10197.000000	51.13	---	200.0	V	306.0	8.5	68.20	17.07
13872.400000	54.92	---	200.0	H	4.0	12.4	68.20	13.28
17510.400000	56.71	---	200.0	V	341.0	14.3	68.20	11.49

802.11ac20 Mode:

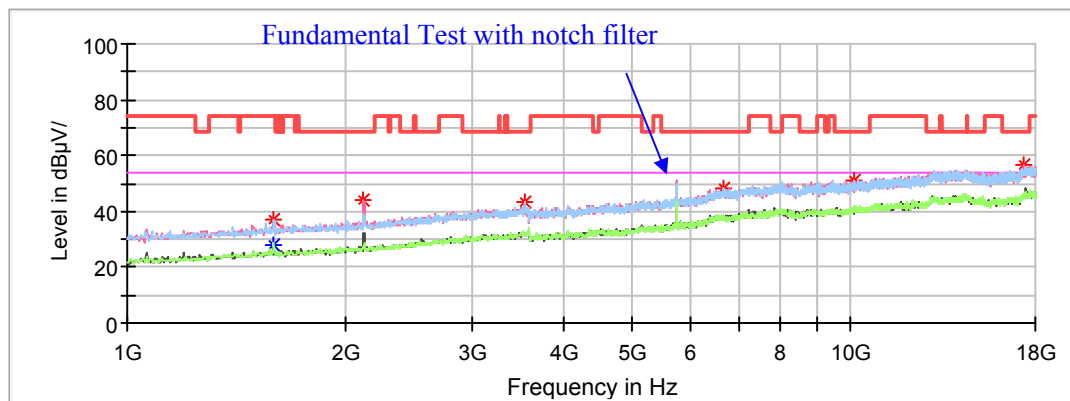
(Pre-scan in the X,Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.)

Note:

1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz

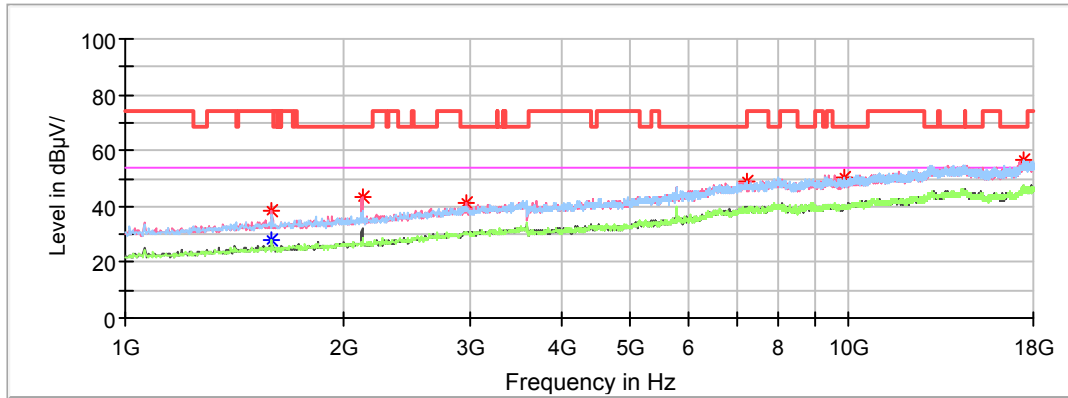
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	37.09	---	150.0	H	54.0	-9.6	74.00	36.91
1595.000000	---	27.96	150.0	H	54.0	-9.6	54.00	26.04
2122.000000	44.32	---	200.0	V	150.0	-7.9	68.20	23.88
3543.200000	43.07	---	200.0	H	14.0	-3.4	68.20	25.13
6681.400000	48.56	---	200.0	H	106.0	4.7	68.20	19.64
10139.200000	50.76	---	200.0	H	130.0	8.4	68.20	17.44
17364.200000	56.70	---	150.0	V	149.0	13.6	68.20	11.50

Middle Channel: 5785MHz

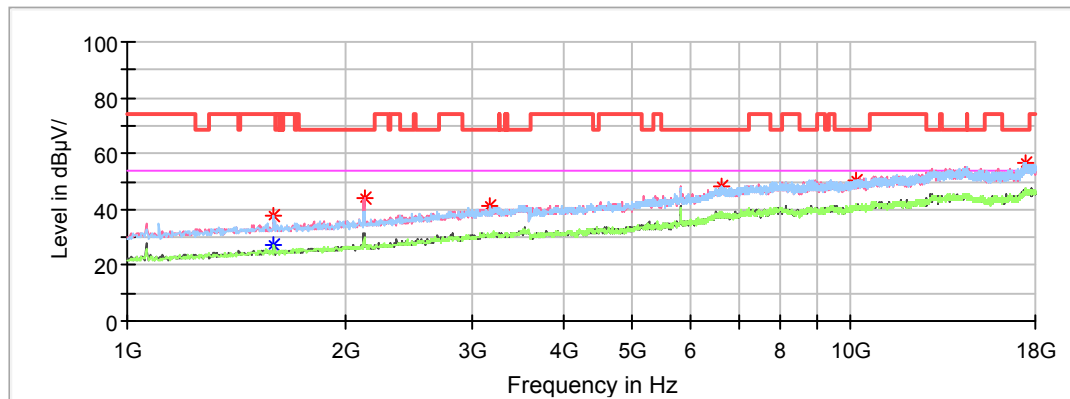
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1591.600000	38.62	---	200.0	V	127.0	-9.6	74.00	35.38
1591.600000	---	28.32	200.0	V	127.0	-9.6	54.00	25.68
2125.400000	43.53	---	200.0	V	150.0	-7.9	68.20	24.67
2965.200000	41.25	---	200.0	V	359.0	-4.6	68.20	26.95
7235.600000	48.74	---	150.0	H	312.0	5.7	68.20	19.46
9833.200000	50.66	---	200.0	H	31.0	8.0	68.20	17.54
17503.600000	56.46	---	150.0	H	300.0	14.3	68.20	11.74

High Channel: 5825MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1591.600000	37.51	---	200.0	H	41.0	-9.6	74.00	36.49
1591.600000	---	27.09	200.0	H	41.0	-9.6	54.00	26.91
2128.800000	44.33	---	200.0	V	164.0	-7.9	68.20	23.87
3179.400000	41.25	---	200.0	H	207.0	-4.1	68.20	26.95
6630.400000	48.22	---	150.0	H	148.0	4.7	68.20	19.98
10173.200000	50.68	---	150.0	V	211.0	8.5	68.20	17.52
17493.400000	56.79	---	200.0	H	0.0	14.2	68.20	11.41

802.11n-HT20 Mode:

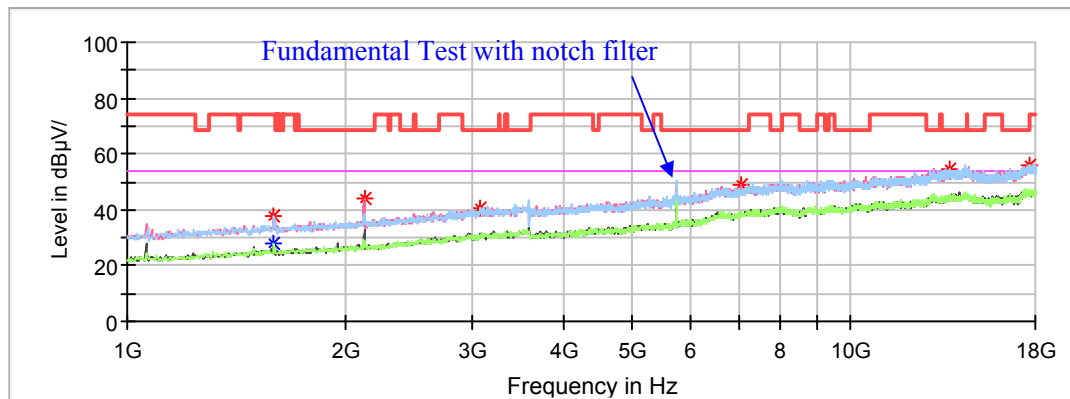
(Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5745MHz

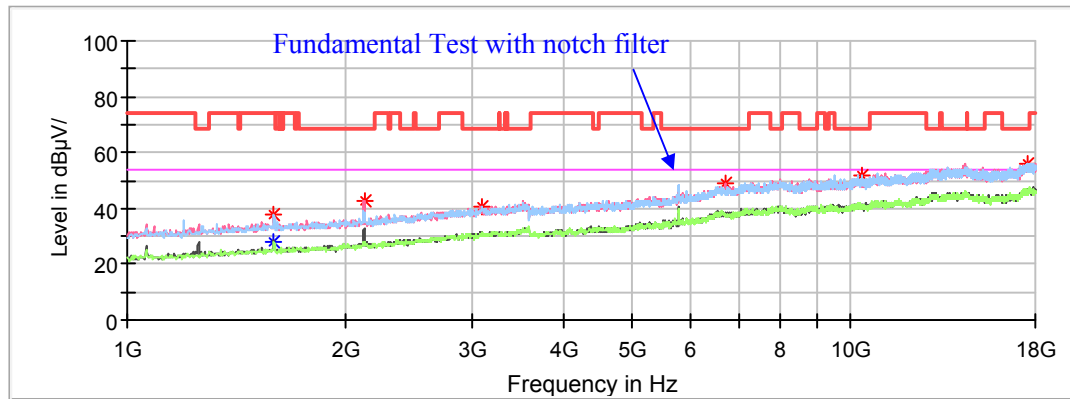
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	37.74	---	150.0	H	58.0	-9.6	74.00	36.26
1595.000000	---	27.94	200.0	H	42.0	-9.6	54.00	26.06
2125.400000	43.90	---	200.0	V	153.0	-7.9	68.20	24.30
3070.600000	40.84	---	200.0	H	260.0	-4.3	68.20	27.36
7058.800000	49.01	---	200.0	V	6.0	5.4	68.20	19.19
13719.400000	54.48	---	150.0	H	339.0	12.2	68.20	13.72
17615.800000	56.28	---	150.0	V	230.0	14.1	68.20	11.92

Middle Channel: 5785MHz

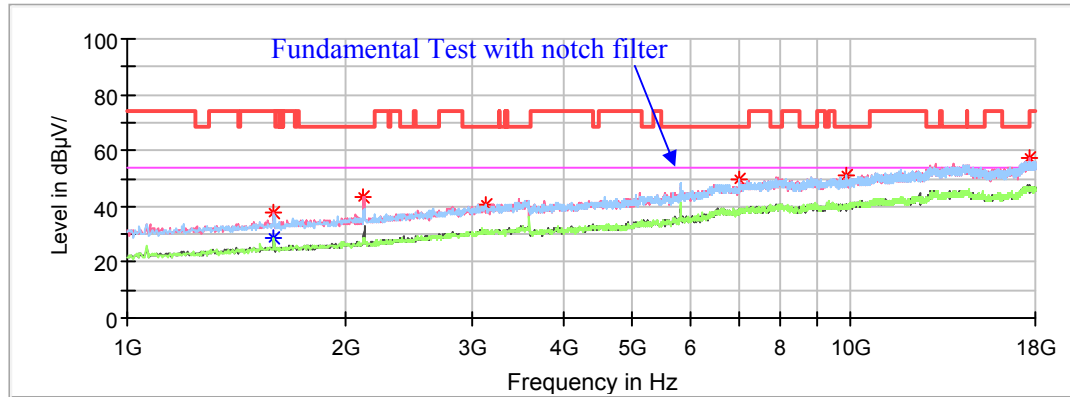
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	37.82	---	200.0	H	41.0	-9.6	74.00	36.18
1595.000000	---	27.67	150.0	H	60.0	-9.6	54.00	26.33
2128.800000	42.94	---	200.0	V	165.0	-7.9	68.20	25.26
3087.600000	40.80	---	150.0	H	223.0	-4.2	68.20	27.40
6695.000000	48.83	---	200.0	V	223.0	4.8	68.20	19.37
10336.400000	51.77	---	150.0	H	118.0	8.7	68.20	16.43
17510.400000	56.27	---	150.0	H	6.0	14.3	68.20	11.93

High Channel: 5825MHz

Full Spectrum



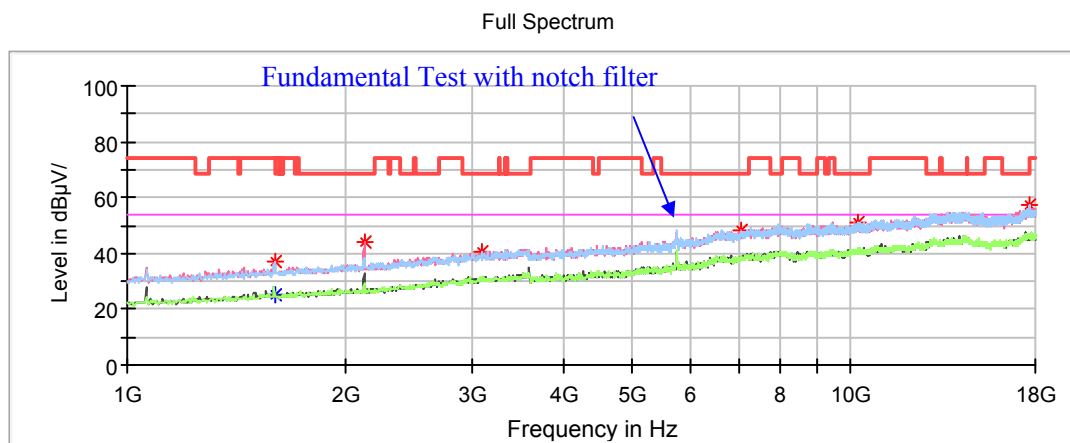
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	28.42	200.0	V	137.0	-9.6	54.00	25.58
1595.000000	37.83	---	150.0	V	294.0	-9.6	74.00	36.17
2122.000000	43.38	---	200.0	V	55.0	-7.9	68.20	24.82
3135.200000	40.64	---	150.0	H	165.0	-4.2	68.20	27.56
7014.600000	49.35	---	150.0	H	19.0	5.4	68.20	18.85
9863.800000	50.80	---	200.0	H	301.0	8.1	68.20	17.40
17646.400000	57.06	---	200.0	V	4.0	14.0	68.20	11.14

802.11ac40 Mode:

(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

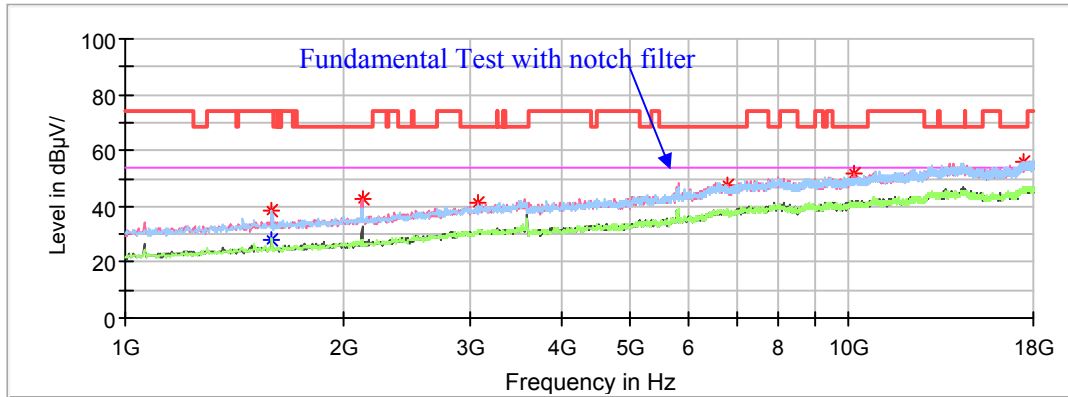
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5755MHz

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1598.400000	37.03	---	150.0	H	60.0	-9.6	74.00	36.97
1598.400000	---	25.02	200.0	H	46.0	-9.6	54.00	28.98
2128.800000	44.09	---	200.0	V	130.0	-7.9	68.20	24.11
3091.000000	40.22	---	200.0	H	282.0	-4.2	68.20	27.98
7065.600000	47.91	---	200.0	V	83.0	5.4	68.20	20.29
10220.800000	50.90	---	150.0	H	295.0	8.6	68.20	17.30
17670.200000	57.01	---	200.0	H	270.0	14.0	68.20	11.19

High Channel: 5795MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1591.600000	38.18	---	150.0	H	65.0	-9.6	74.00	35.82
1591.600000	---	27.75	150.0	H	65.0	-9.6	54.00	26.25
2125.400000	42.99	---	200.0	V	147.0	-7.9	68.20	25.21
3070.600000	41.05	---	200.0	V	65.0	-4.3	68.20	27.15
6793.600000	47.88	---	150.0	V	49.0	5.0	68.20	20.32
10203.800000	51.89	---	150.0	V	204.0	8.5	68.20	16.31
17425.400000	56.19	---	150.0	V	359.0	13.9	68.20	12.01

802.11n-HT40 Mode:

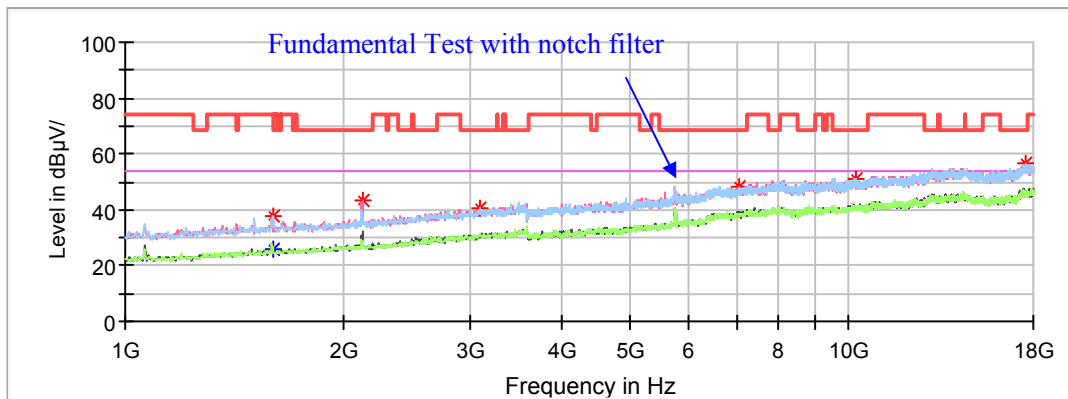
(Pre-scan with X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded)

Note:

1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5755MHz

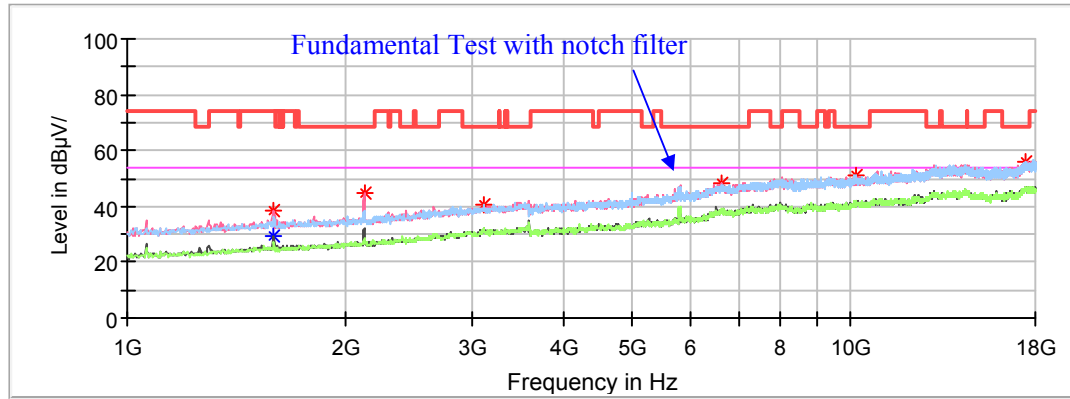
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV/m)	Average (dBμV/m)	Height (cm)	Polar (H/V)				
1598.400000	37.66	---	150.0	V	121.0	-9.6	74.00	36.34
1598.400000	---	25.74	200.0	V	206.0	-9.6	54.00	28.26
2128.800000	43.69	---	200.0	V	147.0	-7.9	68.20	24.51
3097.800000	40.53	---	150.0	H	0.0	-4.2	68.20	27.67
7048.600000	48.11	---	200.0	V	112.0	5.4	68.20	20.09
10254.800000	51.10	---	150.0	H	301.0	8.6	68.20	17.10
17527.400000	56.65	---	200.0	V	30.0	14.2	68.20	11.55

High Channel: 5795MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	38.52	---	200.0	V	123.0	-9.6	74.00	35.48
1595.000000	---	29.30	200.0	V	123.0	-9.6	54.00	24.70
2125.400000	44.83	---	200.0	V	158.0	-7.9	68.20	23.37
3114.800000	40.37	---	200.0	H	347.0	-4.2	68.20	27.83
6630.400000	48.10	---	150.0	V	173.0	4.7	68.20	20.10
10190.200000	50.87	---	200.0	H	347.0	8.5	68.20	17.33
17486.600000	56.01	---	150.0	H	319.0	14.2	68.20	12.19

802.11ac80 Mode:

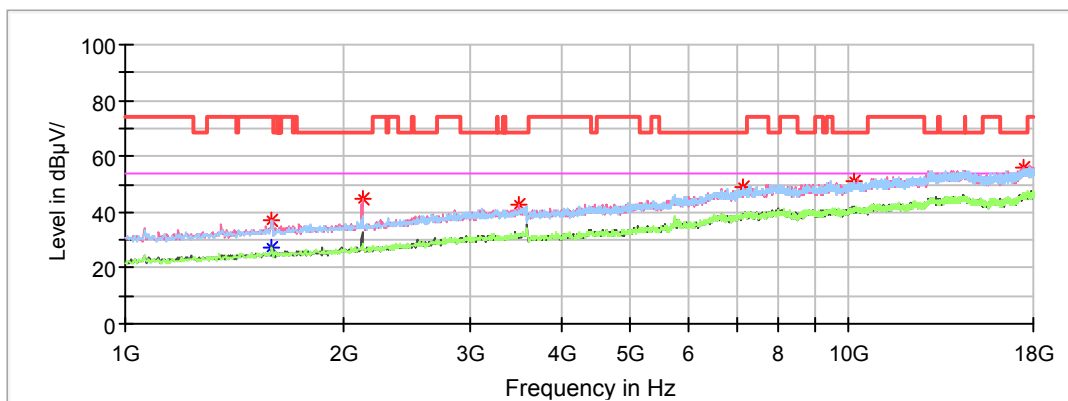
(Pre-scan in the X,Y and Z axes of orientation, the worst case **Z-axis of orientation** was recorded.)

Note:

1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

Low Channel: 5775MHz

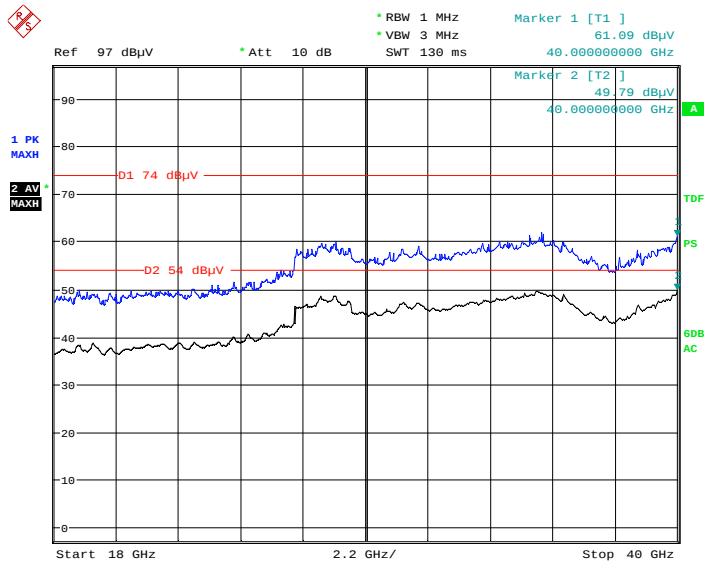
Full Spectrum



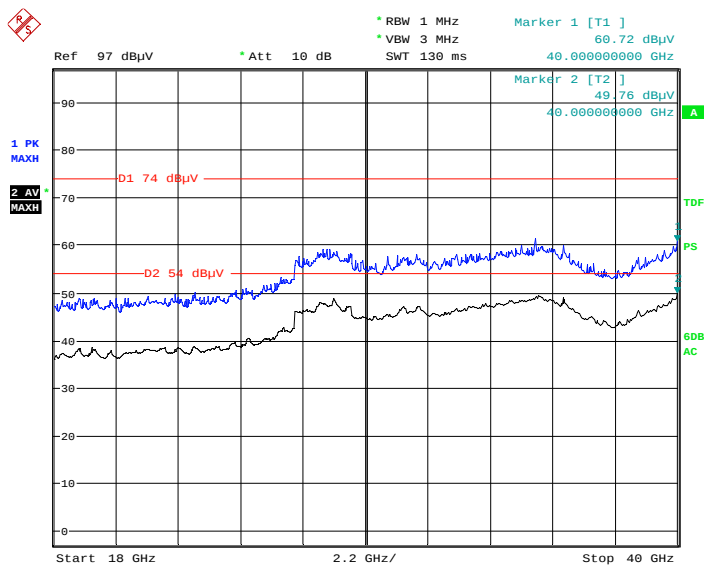
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1595.000000	---	27.17	150.0	H	35.0	-9.6	54.00	26.83
1595.000000	37.40	---	200.0	H	41.0	-9.6	74.00	36.60
2128.800000	44.54	---	200.0	V	129.0	-7.9	68.20	23.66
3499.000000	42.69	---	200.0	V	258.0	-3.5	68.20	25.51
7164.200000	48.72	---	200.0	H	166.0	5.6	68.20	19.48
10197.000000	50.72	---	200.0	H	294.0	8.5	68.20	17.48
17479.800000	55.68	---	200.0	V	270.0	14.2	68.20	12.52

18GHz-40GHz (5150-5250MHz Band):

Pre-scan with 802.11a, 802.11a c20, 802.11n-HT20, 802.11a c40, 802.11n-HT40 and 802.11 a c80 modes of operation in the X,Y and Z axes of orientation, the worst case **low channel of 802.11ac20 mode in Z-axis of orientation** was recorded

Horizontal

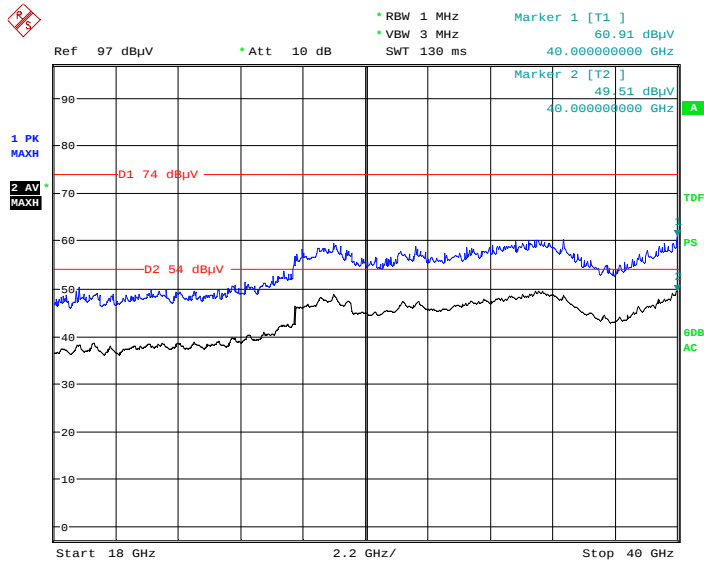
Date: 23.AUG.2019 11:38:37

Vertical

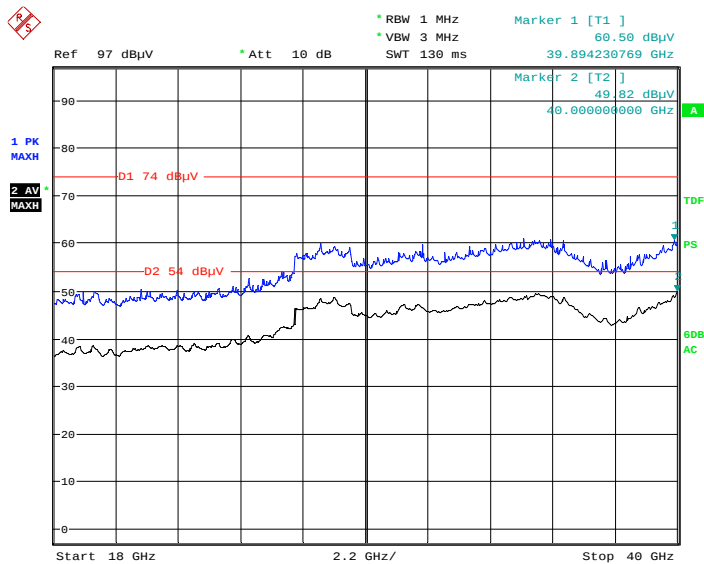
Date: 23.AUG.2019 12:11:13

18GHz-40GHz (5725-5850 Band):

Pre-scan with 802.11a, 802.11a c20, 802.11n-HT20, 802.11a c40, 802.11n-HT40 and 802.11 a c80 modes of operation in the X,Y and Z axes of orientation, the worst case **middle channel of 802.11n-HT20 mode in Z-axis of orientation** was recorded

Horizontal

Date: 23.AUG.2019 12:53:42

Vertical

Date: 23.AUG.2019 13:26:28

Restricted Bands Emissions Test (5150-5250MHz Band):

Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Corrected Amplitude = Corrected Factor + Reading

Margin = Limit - Corrected. Amplitude

802.11a Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5150.000000	---	48.68	150.0	H	17.0	10.2	54.00	5.32
5150.000000	57.76	---	150.0	H	17.0	10.2	74.00	16.24
5150.000000	---	48.33	200.0	V	242.0	10.2	54.00	5.67
5150.000000	57.25	---	200.0	V	242.0	10.2	74.00	16.75
High Channel: 5240MHz								
5350.000000	---	49.03	100.0	H	55.0	10.9	54.00	4.97
5350.000000	58.54	---	100.0	H	55.0	10.9	74.00	15.46
5350.000000	57.83	---	100.0	V	308.0	10.9	74.00	16.17
5350.000000	---	48.76	100.0	V	308.0	10.9	54.00	5.24

802.11ac20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5150.000000	---	47.91	200.0	H	78.0	10.2	54.00	6.09
5150.000000	57.84	---	200.0	H	78.0	10.2	74.00	16.16
5150.000000	---	47.46	200.0	V	233.0	10.2	54.00	6.54
5150.000000	57.56	---	200.0	V	233.0	10.2	74.00	16.44
High Channel: 5240MHz								
5350.000000	---	48.66	100.0	H	346.0	10.9	54.00	5.34
5350.000000	58.85	---	100.0	H	346.0	10.9	74.00	15.15
5350.000000	58.79	---	200.0	V	224.0	10.9	74.00	15.21
5350.000000	---	47.72	200.0	V	224.0	10.9	54.00	6.28

802.11n-HT20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5150.000000	57.68	---	100.0	H	169.0	10.2	74.00	16.32
5150.000000	---	48.03	100.0	H	169.0	10.2	54.00	5.97
5150.000000	---	47.44	100.0	V	4.0	10.2	54.00	6.56
5150.000000	57.37	---	100.0	V	4.0	10.2	74.00	16.63
High Channel: 5240MHz								
5350.000000	---	48.31	100.0	H	149.0	10.9	54.00	5.69
5350.000000	58.80	---	100.0	H	149.0	10.9	74.00	15.20
5350.000000	57.75	---	100.0	V	291.0	10.9	74.00	16.25
5350.000000	---	47.87	100.0	V	291.0	10.9	54.00	6.13

802.11ac40 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5190MHz								
5150.000000	---	48.61	200.0	H	120.0	10.2	54.00	5.39
5150.000000	60.94	---	200.0	H	120.0	10.2	74.00	13.06
5150.000000	---	47.17	100.0	V	219.0	10.2	54.00	6.83
5150.000000	59.86	---	100.0	V	219.0	10.2	74.00	14.14
High Channel: 5230MHz								
5350.000000	---	48.39	100.0	H	351.0	10.9	54.00	5.61
5350.000000	58.39	---	100.0	H	351.0	10.9	74.00	15.61
5350.000000	---	47.64	200.0	V	75.0	10.9	54.00	6.36
5350.000000	57.99	---	200.0	V	75.0	10.9	74.00	16.01

802.11n-HT40 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5190MHz								
5150.000000	---	50.38	150.0	H	103.0	10.2	54.00	3.62
5150.000000	59.62	---	150.0	H	103.0	10.2	74.00	14.38
5150.000000	---	49.24	200.0	V	311.0	10.2	54.00	4.76
5150.000000	58.83	---	200.0	V	311.0	10.2	74.00	15.17
Middle Channel: 5230MHz								
5350.000000	---	48.98	200.0	H	268.0	10.9	54.00	5.02
5350.000000	59.61	---	200.0	H	268.0	10.9	74.00	14.39
5350.000000	58.78	---	100.0	V	136.0	10.9	74.00	15.22
5350.000000	---	47.81	100.0	V	136.0	10.9	54.00	6.19

802.11ac80 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Channel: 5210MHz								
5150.000000	60.12	---	200.0	H	21.0	10.2	74.00	13.88
5150.000000	---	50.13	200.0	H	114.0	10.2	54.00	3.87
5150.000000	---	48.86	100.0	V	184.0	10.2	54.00	5.14
5150.000000	59.89	---	100.0	V	184.0	10.2	74.00	14.11
5350.000000	---	49.88	200.0	H	268.0	10.9	54.00	4.12
5350.000000	58.16	---	200.0	H	268.0	10.9	74.00	15.84
5350.000000	57.38	---	100.0	V	136.0	10.9	74.00	16.62
5350.000000	---	49.18	100.0	V	136.0	10.9	54.00	4.82

Restricted Bands Emissions Test (5725-5850MHz band):

Note:

1. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
2. Corrected Amplitude = Corrected Factor + Reading
3. Margin = Limit - Corrected. Amplitude

802.11a Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5745MHz								
5650.000000	58.80	---	150.0	V	312.0	11.7	68.20	9.40
5700.000000	59.92	---	150.0	V	358.0	11.7	105.20	45.28
5720.000000	60.11	---	250.0	V	131.0	11.7	110.80	50.69
5725.000000	61.38	---	200.0	V	58.0	11.7	122.20	60.82
High Channel: 5825MHz								
5850.000000	64.87	---	150.0	H	344.0	12.2	122.20	57.33
5855.000000	62.66	---	150.0	H	344.0	12.2	110.80	48.14
5875.000000	61.51	---	150.0	H	44.0	12.2	105.20	43.69
5925.000000	60.34	---	150.0	H	44.0	12.2	68.20	7.86

802.11ac20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5745MHz								
5650.000000	59.02	---	200.0	H	120.0	11.7	68.20	9.18
5700.000000	60.89	---	200.0	H	120.0	11.7	105.20	44.31
5720.000000	62.33	---	150.0	H	315.0	11.7	110.80	48.47
5725.000000	63.74	---	250.0	H	315.0	11.7	122.20	58.46
High Channel: 5825MHz								
5850.000000	63.94	---	250.0	V	105.0	12.2	122.20	58.26
5855.000000	62.73	---	250.0	V	105.0	12.2	110.80	48.07
5875.000000	60.28	---	250.0	V	105.0	12.2	105.20	44.92
5925.000000	59.87	---	250.0	V	105.0	12.2	68.20	8.33

802.11n-HT20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5745MHz								
5650.000000	60.00	---	200.0	H	286.0	11.7	68.20	8.20
5700.000000	60.23	---	200.0	H	286.0	11.7	105.20	44.97
5720.000000	61.58	---	200.0	H	153.0	11.7	110.80	49.22
5725.000000	62.98	---	250.0	H	153.0	11.7	122.20	59.22
High Channel: 5825MHz								
5850.000000	62.67	---	150.0	V	154.0	12.2	122.20	59.53
5855.000000	62.08	---	150.0	V	154.0	12.2	110.80	48.72
5875.000000	61.23	---	150.0	V	154.0	12.2	105.20	43.97
5925.000000	60.57	---	150.0	V	154.0	12.2	68.20	7.63

802.11ac40 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5755MHz								
5650.000000	60.43	---	100.0	H	90.0	11.6	68.20	7.77
5700.000000	61.88	---	150.0	H	90.0	11.6	105.20	43.32
5720.000000	62.46	---	200.0	H	22.0	11.6	110.80	48.34
5725.000000	63.00	---	150.0	H	22.0	11.6	122.20	59.20
High Channel: 5795MHz								
5850.000000	62.59	---	150.0	V	100.0	12.2	122.20	59.61
5855.000000	61.22	---	150.0	V	100.0	12.2	110.80	49.58
5875.000000	60.75	---	150.0	V	100.0	12.2	105.20	44.45
5925.000000	60.03	---	150.0	V	100.0	12.2	68.20	8.17

802.11n-HT40 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5755MHz								
5650.000000	58.76	---	100.0	H	324.0	11.7	68.20	9.44
5700.000000	59.63	---	100.0	H	324.0	11.7	105.20	45.57
5720.000000	61.20	---	150.0	H	12.0	11.7	110.80	49.60
5725.000000	62.09	---	150.0	H	12.0	11.7	122.20	60.11
High Channel: 5795MHz								
5850.000000	62.49	---	200.0	V	17.0	12.2	122.20	59.71
5855.000000	61.66	---	200.0	V	17.0	12.2	110.80	49.14
5875.000000	60.31	---	200.0	V	17.0	12.2	105.20	44.89
5925.000000	59.49	---	200.0	V	17.0	12.2	68.20	8.71

802.11ac80 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in Z-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5775MHz								
5650.000000	60.10	---	250.0	H	217.0	11.7	68.20	8.10
5700.000000	61.02	---	150.0	H	217.0	11.7	105.20	44.18
5720.000000	62.30	---	100.0	H	26.0	11.7	110.80	48.50
5725.000000	62.85	---	250.0	H	26.0	11.7	122.20	59.35
5850.000000	62.39	---	250.0	H	40.0	12.2	122.20	59.81
5855.000000	61.56	---	250.0	H	40.0	12.2	110.80	49.24
5875.000000	61.07	---	250.0	H	40.0	12.2	105.20	44.13
5925.000000	60.29	---	250.0	H	40.0	12.2	68.20	7.91

FCC §15.407(a) & §15.407(e)–EMISSION BANDWIDTH

Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

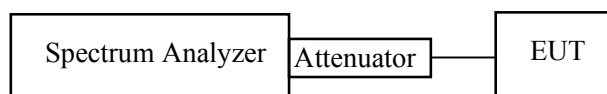
1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data**Environmental Conditions**

Temperature:	23.5 °C~24.5 °C
Relative Humidity:	50 %~52 %
ATM Pressure:	101.2 kPa~101.4 kPa

The testing was performed by Max Min from 2019-02-21 to 2019-02-26.

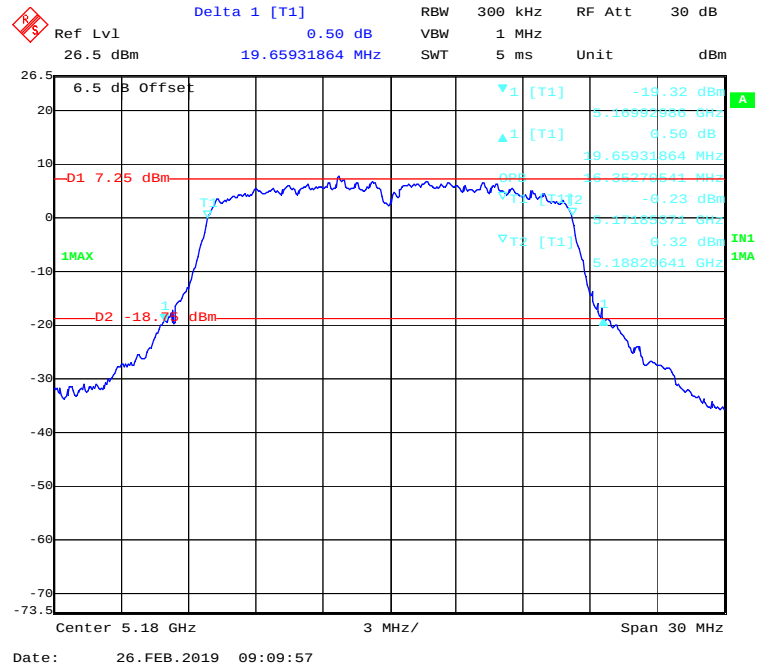
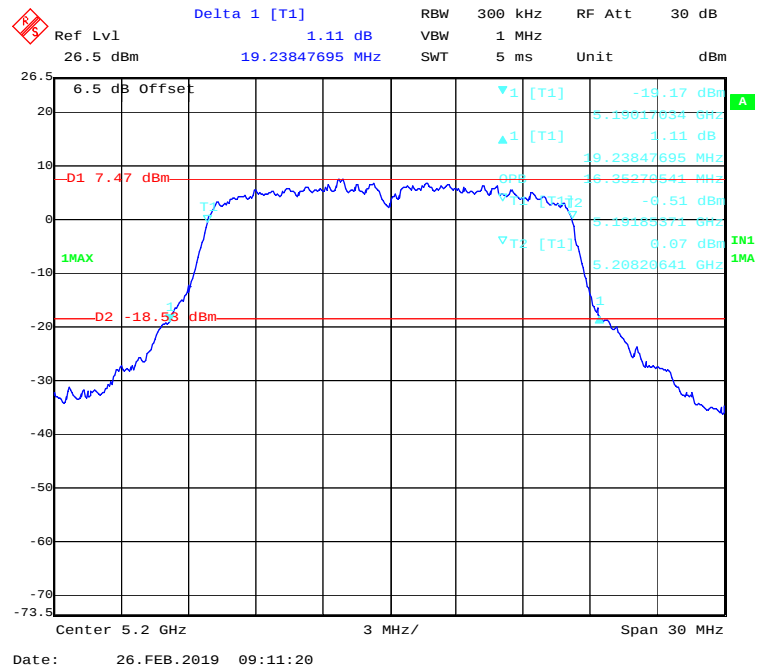
Test Result: Pass.

5150-5250 MHz:

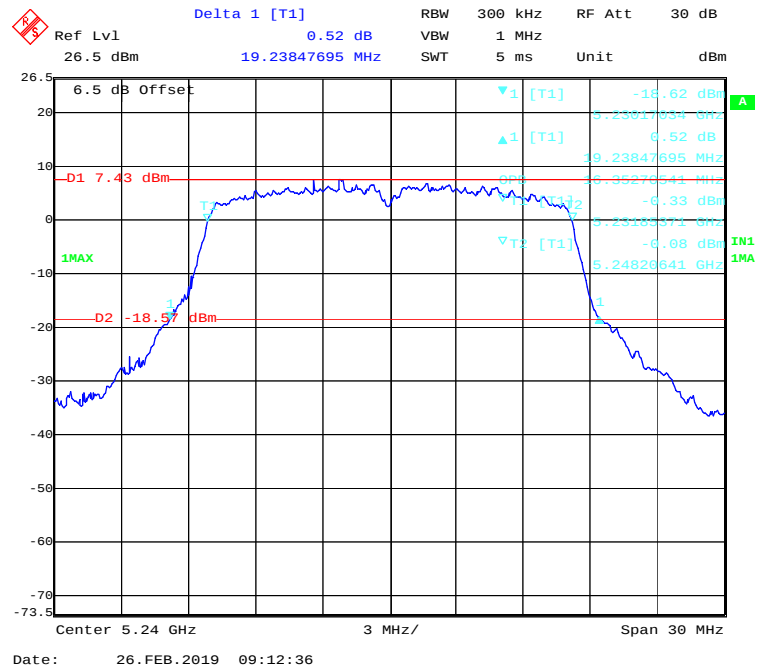
Test mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	Low	5180	19.659	16.353
	Middle	5200	19.238	16.353
	High	5240	19.238	16.353
802.11ac20	Low	5180	20.441	17.495
	Middle	5200	20.381	17.495
	High'	5240	20.261	17.435
802.11n-HT20	Low	5180	20.561	17.495
	Middle	5200	20.321	17.495
	High	5240	20.381	17.435
802.11ac40	Low	5190	40.281	35.832
	High'	5230	40.281	35.832
802.11n-HT40	Low	5190	40.281	35.832
	High	5230	40.160	35.832
802.11ac80	Low	5210	84.168	75.030

5725-5850MHz:

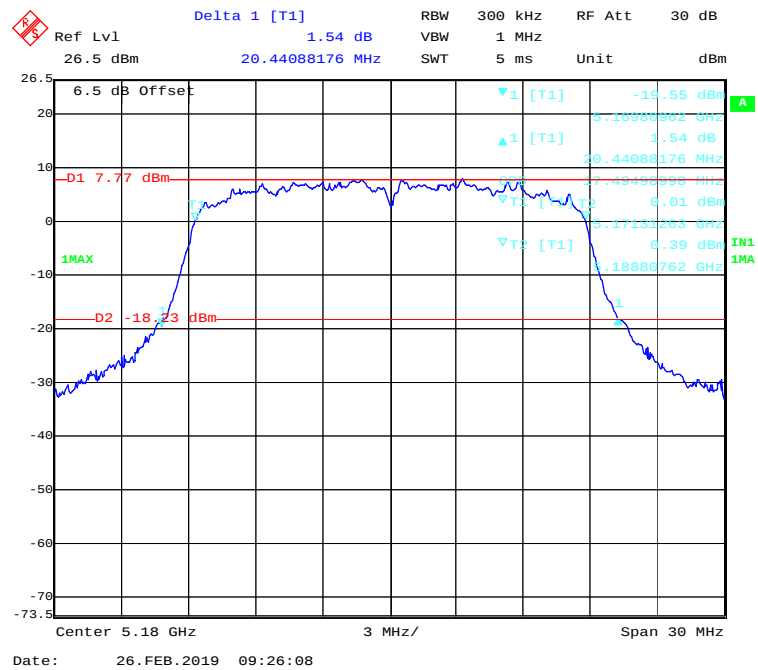
Test mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (MHz)
802.11a	Low	5745	15.391	16.413	≥ 0.5
	Middle	5785	15.451	16.353	≥ 0.5
	High	5825	15.451	16.353	≥ 0.5
802.11ac20	Low	5745	15.271	17.435	≥ 0.5
	Middle	5785	15.331	17.435	≥ 0.5
	High	5825	15.271	17.495	≥ 0.5
802.11n-HT20	Low	5745	15.631	17.435	≥ 0.5
	Middle	5785	15.271	17.495	≥ 0.5
	High	5825	15.271	17.495	≥ 0.5
802.11ac40	Low	5755	35.351	35.711	≥ 0.5
	High	5795	35.351	35.711	≥ 0.5
802.11n-HT40	Low	5755	35.351	35.711	≥ 0.5
	High	5795	35.351	35.832	≥ 0.5
802.11ac80	Low	5775	75.511	75.030	≥ 0.5

5150-5250 MHz Band:**26 Bandwidth&99% Occupied Bandwidth****802.11a mode, 5180MHz****802.11a mode, 5200MHz**

802.11a mode, 5240MHz



802.11ac20 mode, 5180MHz



[illegible][illegible]

Delta 1 [T1] 1.29 dB

Ref Lvl 26.5 dBm

20.56112224 MHz

RBW 300 kHz

RF Att 30 dB

SWT 5 ms

Unit dBm

6.5 dB Offset

-D1 7.49 dBm

1MAX

-D2 -18.51 dBm

IN1 1MA

Center 5.18 GHz

3 MHz/

Span 30 MHz

Date: 26. FEB. 2019 09:34:34

Ref Lvl 26.5 dBm Delta 1 [T1] 1.50 dB RBW 300 kHz RF Att 30 dB

26.5 dB Offset 20.32064128 MHz 1 MHz 5 ms Unit dBm

6.5 dB Offset -D1 7.41 dBm 1MAX IN1 1MAX

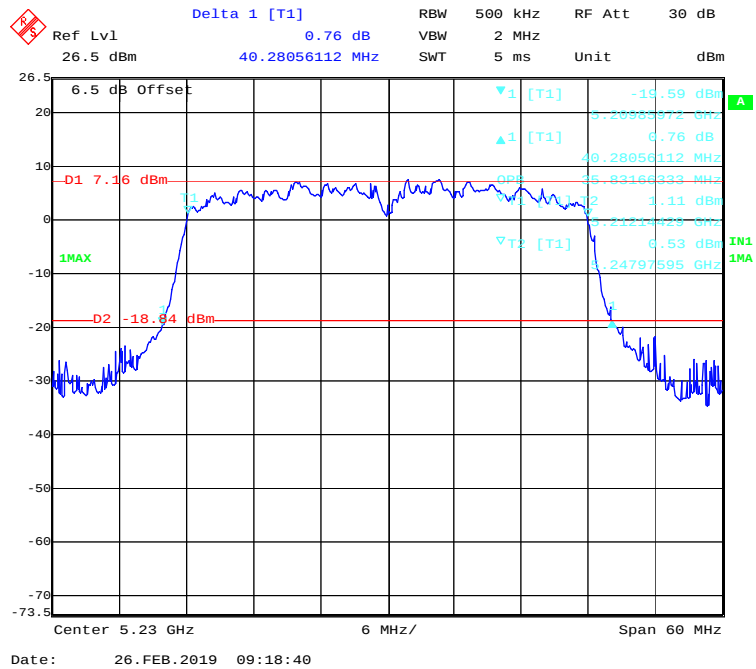
Center 5.2 GHz 3 MHz/ Span 30 MHz

Date: 26. FEB. 2019 09:33:02

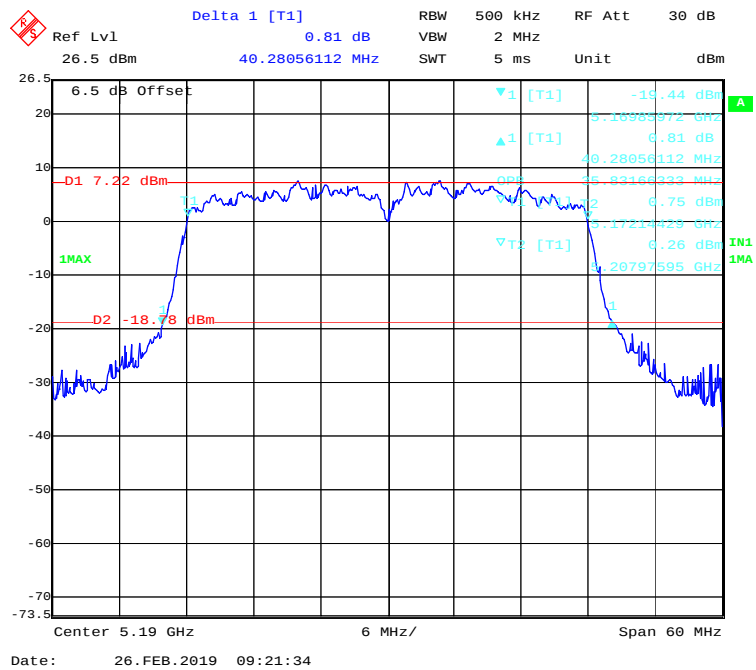
Delta 1 [T1] 0.89 dB
 Ref Lvl 26.5 dBm
 RBW 300 kHz
 SWT 5 ms
 RF Att 30 dB
 Unit dBm
 20.38076152 MHz
 6.5 dB Offset
 -D1 7.44 dBm
 -D2 -18.56 dBm
 1MAX
 IN1 1MA
 Center 5.24 GHz
 3 MHz/
 Span 30 MHz
 Date: 26. FEB. 2019 09:30:46

Delta 1 [T1] 0.54 dB
 Ref Lvl 26.5 dBm
 RBW 500 kHz
 RF Att 30 dB
 VBW 2 MHz
 Unit dBm
 SWT 5 ms
 6.5 dB Offset
 -D1 7.42 dBm
 1MAX
 -D2 -18.58 dBm
 -73.5
 Center 5.19 GHz
 6 MHz/
 Span 60 MHz
 Date: 26. FEB. 2019 09:20:23

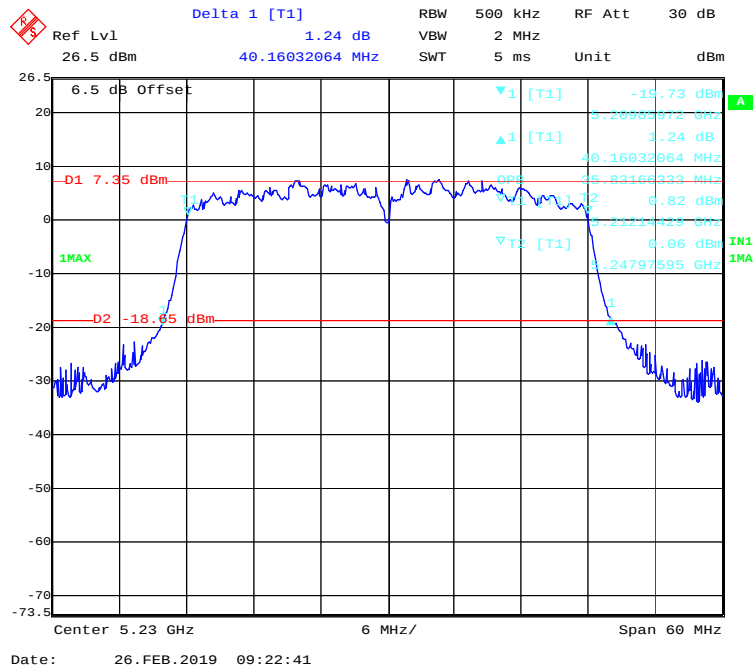
802.11 ac40 mode, 5230MHz



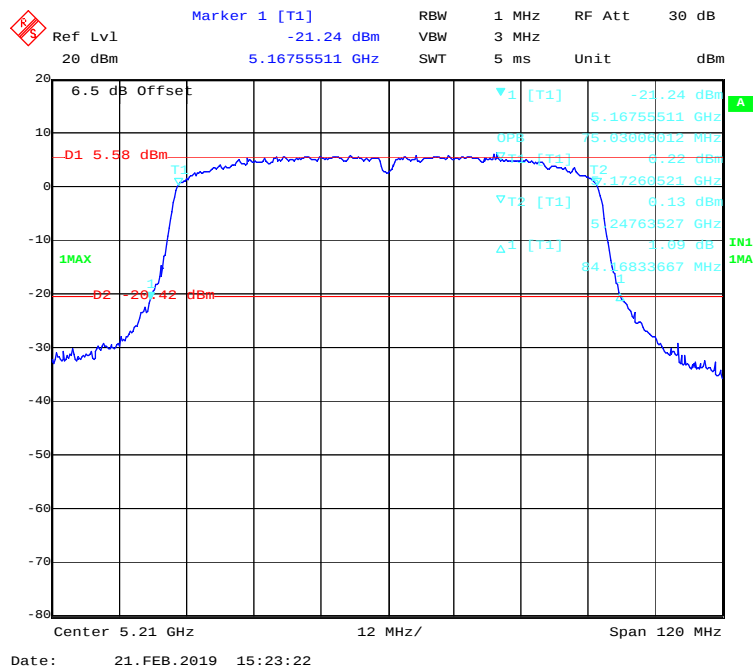
802.11n-HT40 mode, 5190MHz



802.11n-HT40 mode, 5230MHz



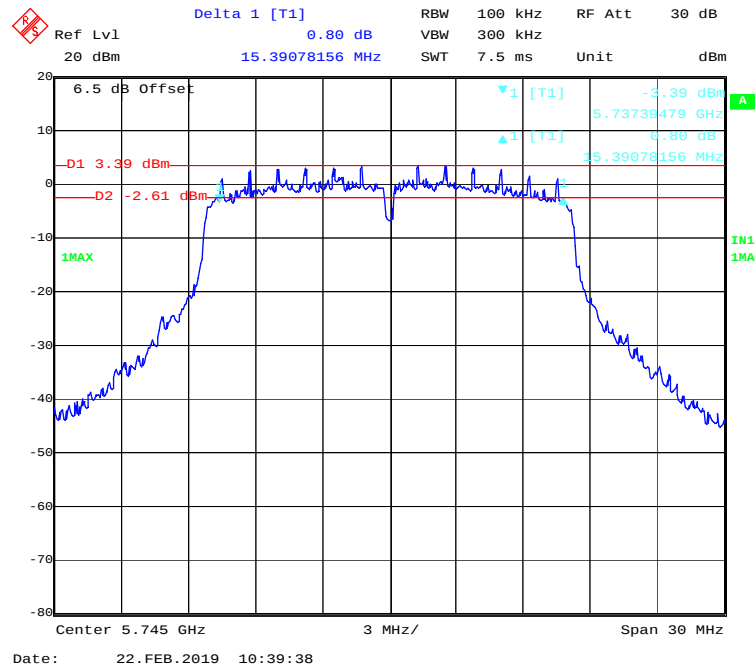
802.11ac80 mode, 5210MHz



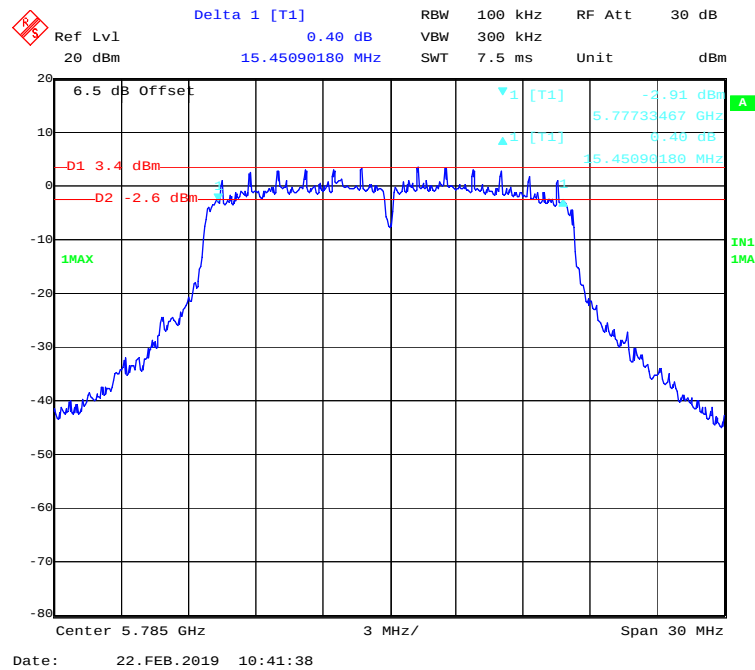
5725-5850 MHz Band

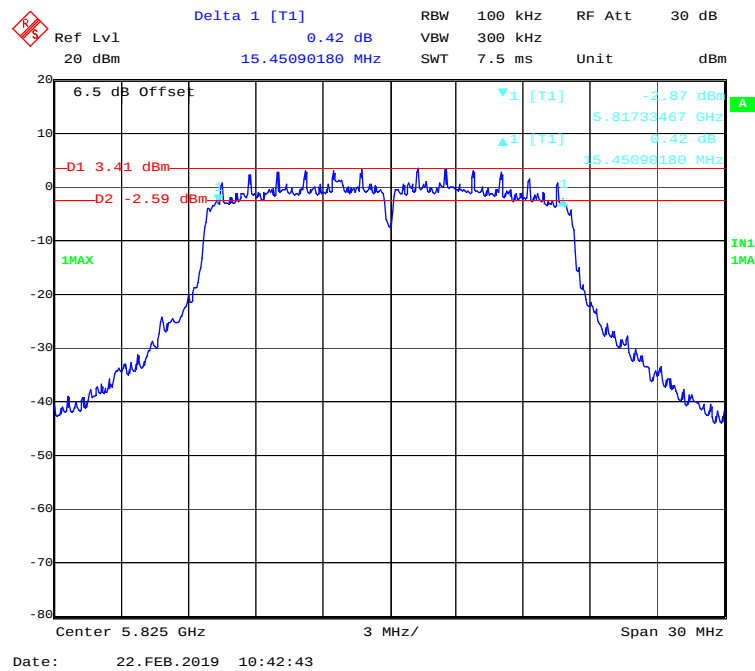
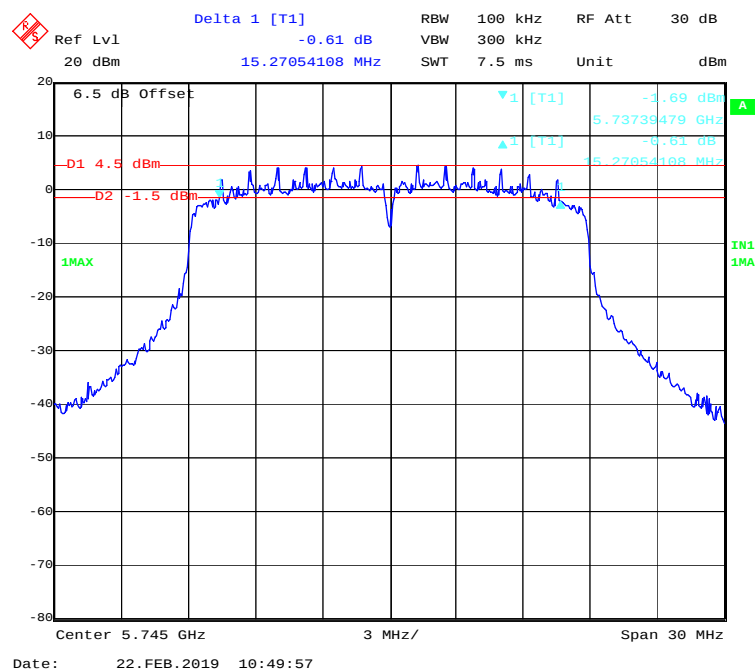
6 Bandwidth

802.11a mode, 5745MHz

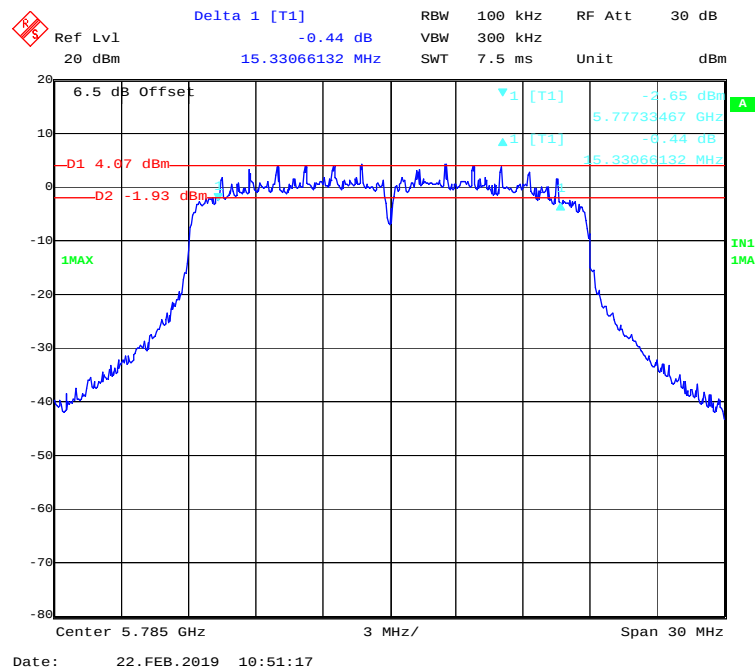


802.11a mode, 5785MHz

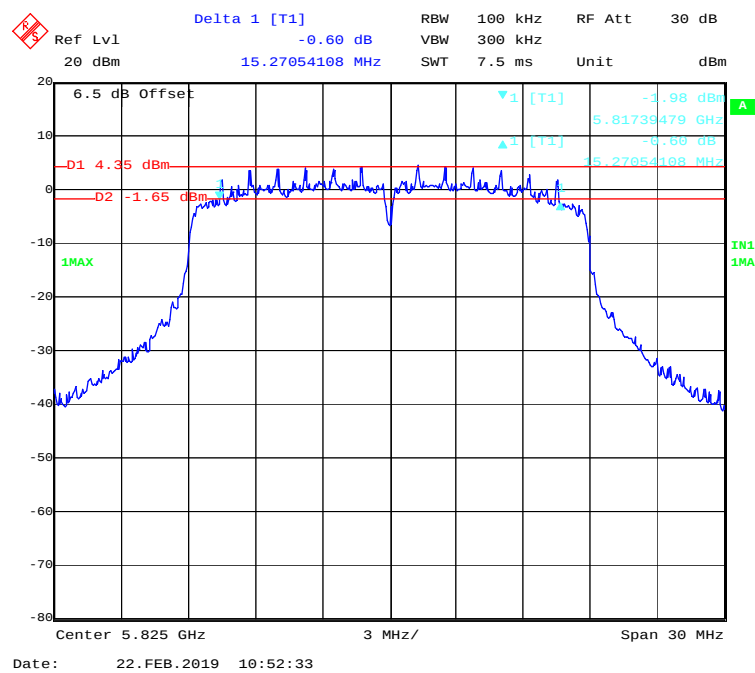


802.11a mode, 5825MHz**802.11ac20 mode, 5745MHz**

802.11ac20 mode, 5785MHz



802.11ac20 mode, 5825MHz



Delta 1 [T1] 0.20 dB
 RBW 100 kHz RF Att 30 dB
 Ref Lvl 20 dBm
 15.63126253 MHz
 SWT 7.5 ms Unit dBm

6.5 dB Offset
 -D1 4.12 dBm
 D2 -1.88 dBm
 1MAX
 -2.21 dBm
 5.73793407 GHz
 6.28 dB
 15.63126253 MHz
 IN1
 1MA

Center 5.745 GHz 3 MHz/
 Span 30 MHz

Date: 22.FEB.2019 10:48:07

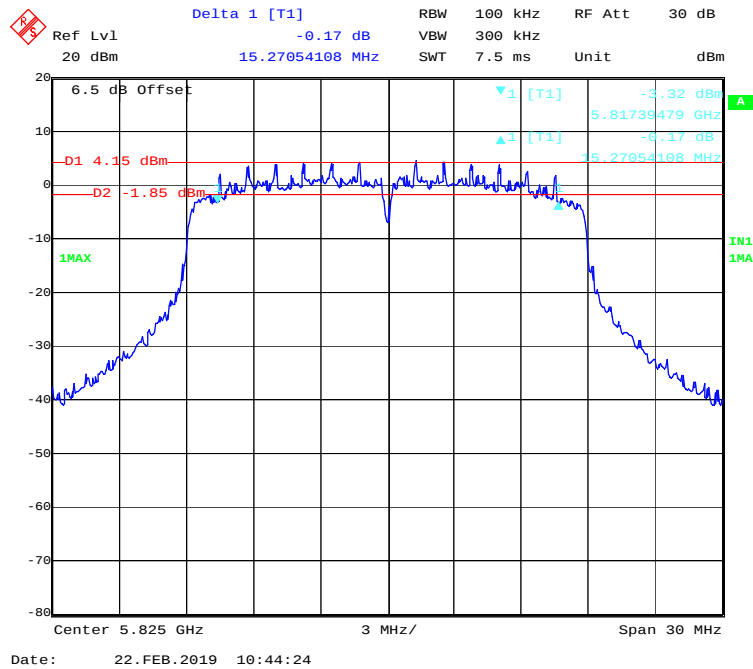
Delta 1 [T1] -0.63 dB
 Ref Lvl 20 dBm
 RBW 100 kHz
 RF Att 30 dB
 15.27054108 MHz
 SWT 7.5 ms
 Unit dBm

6.5 dB Offset
 -D1 4.44 dBm
 D2 -1.56 dBm
 1MAX
 IN1
 1MA

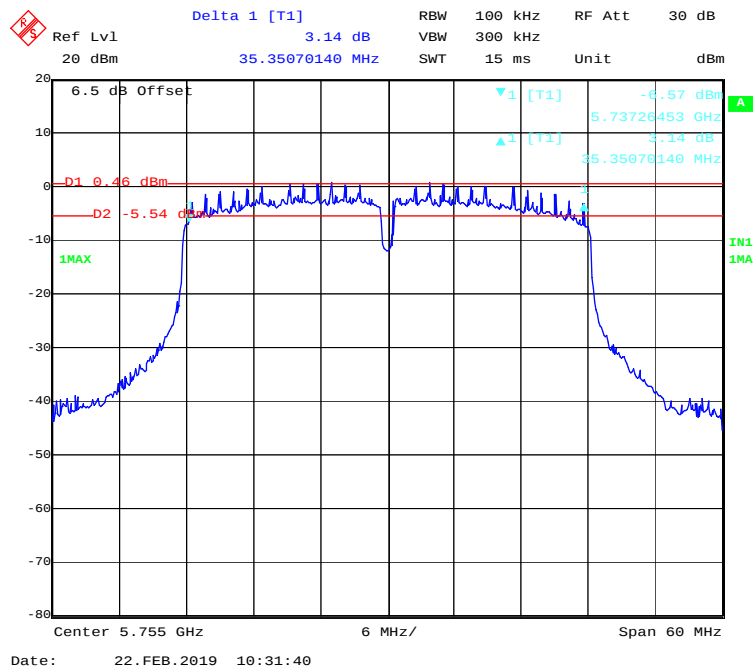
Center 5.785 GHz
 3 MHz/
 Span 30 MHz

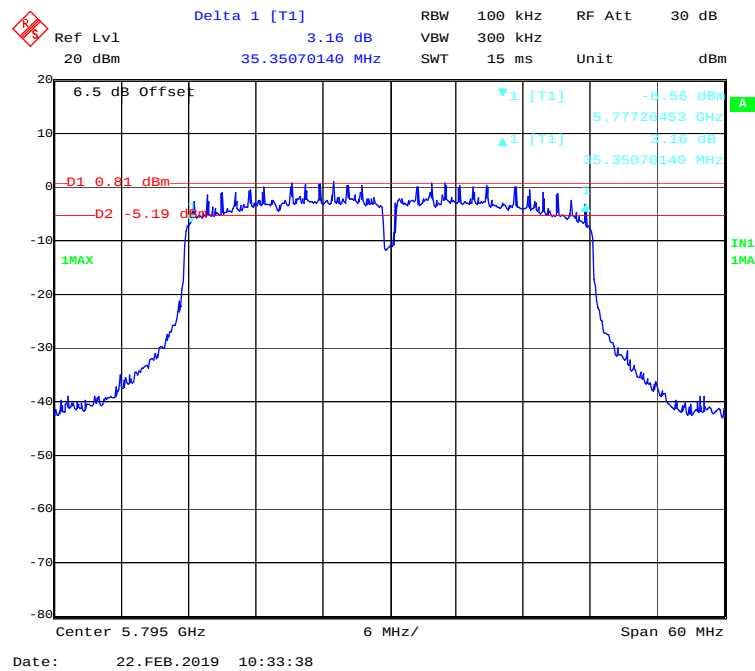
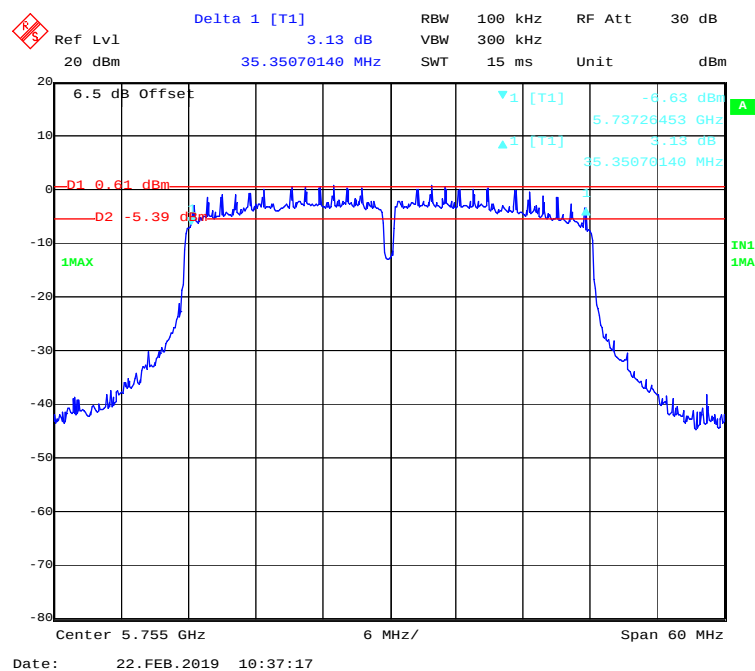
Date: 22.FEB.2019 10:46:42

802.11n-HT20 mode, 5825MHz

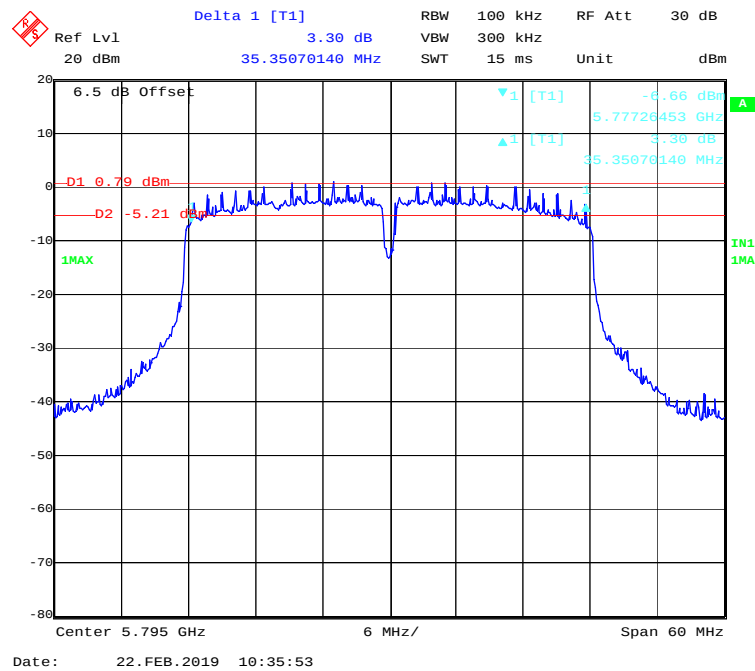


802.11ac40 mode, 5755MHz

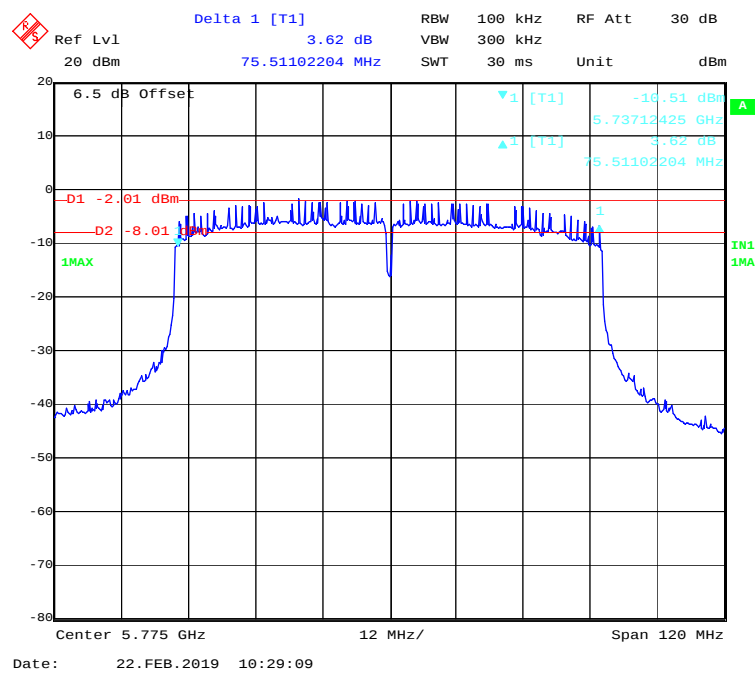


802.11ac40 mode, 5795MHz**802.11n-HT40 mode, 5755MHz**

802.11n-HT40 mode, 5795MHz

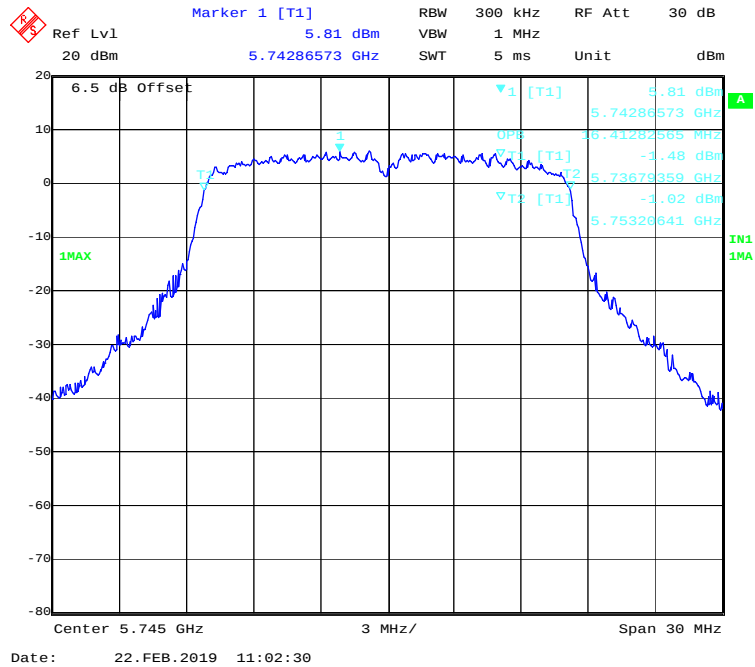


802.11ac80 mode, 5775MHz

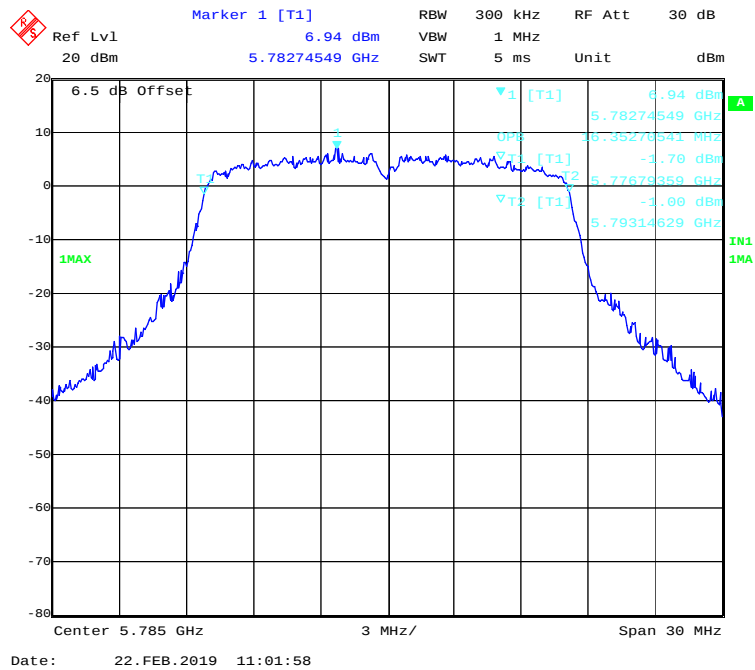


99% Occupied Bandwidth

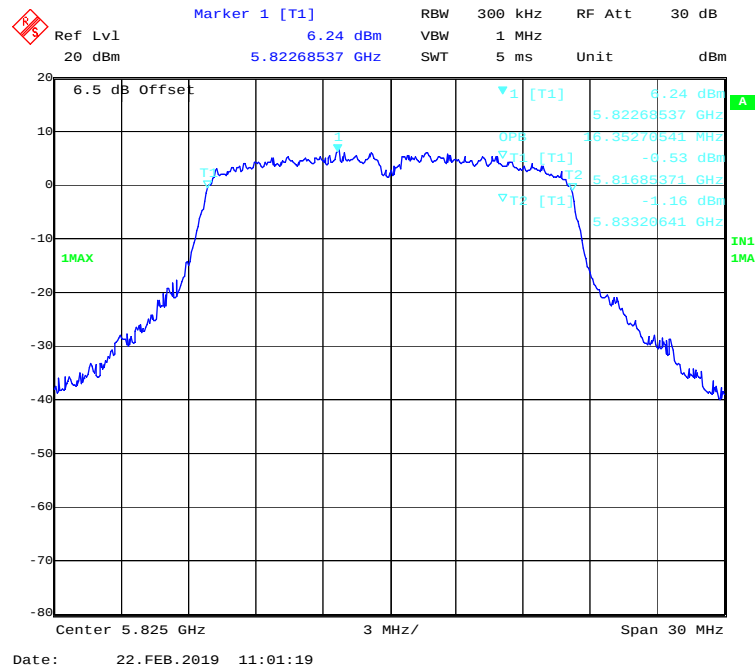
802.11a mode, 5745MHz



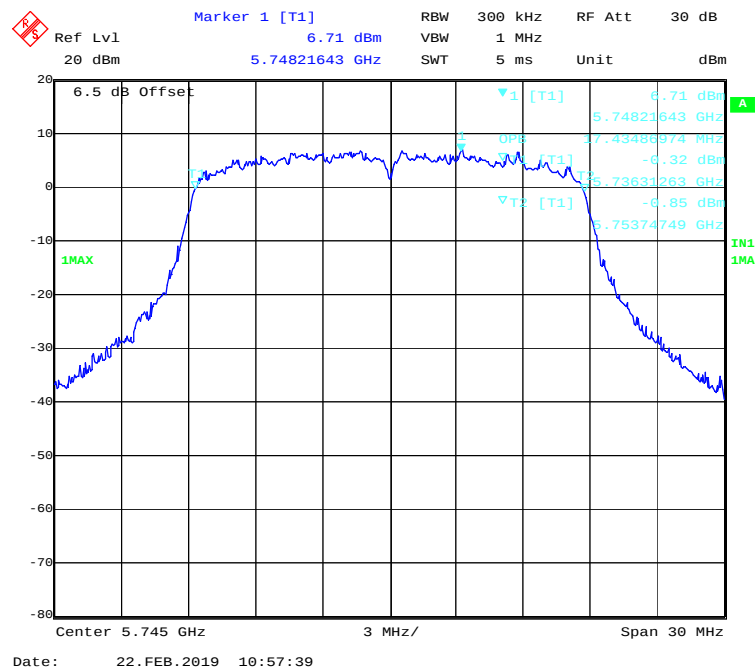
802.11a mode, 5785MHz



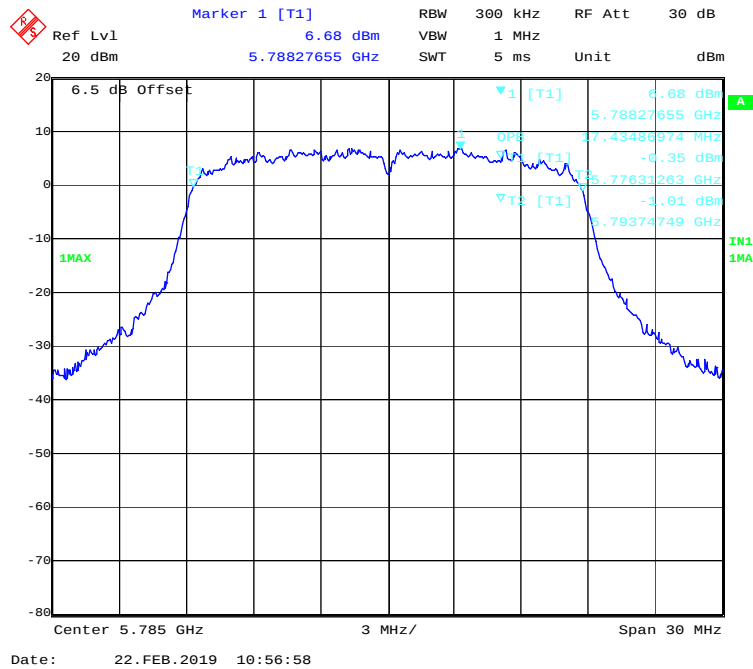
802.11a mode, 5825MHz



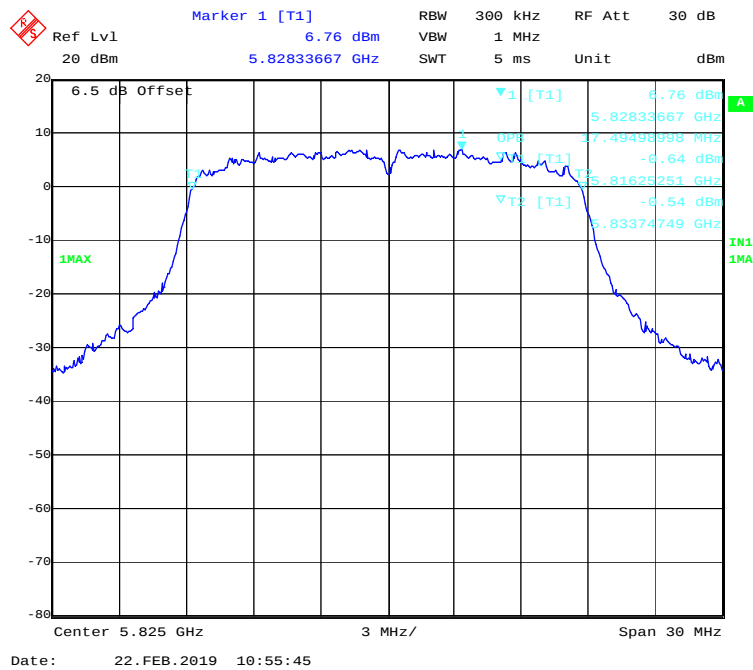
802.11ac20 mode, 5745MHz



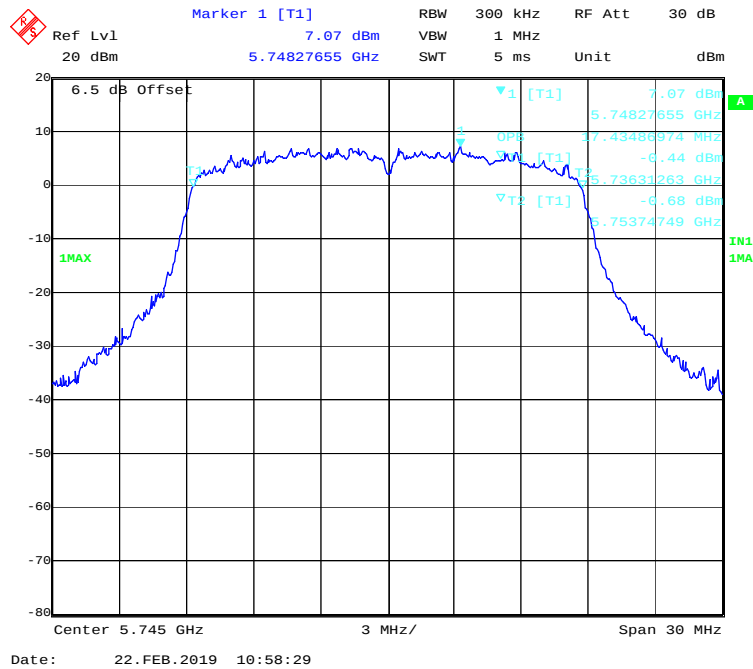
802.11ac20 mode, 5785MHz



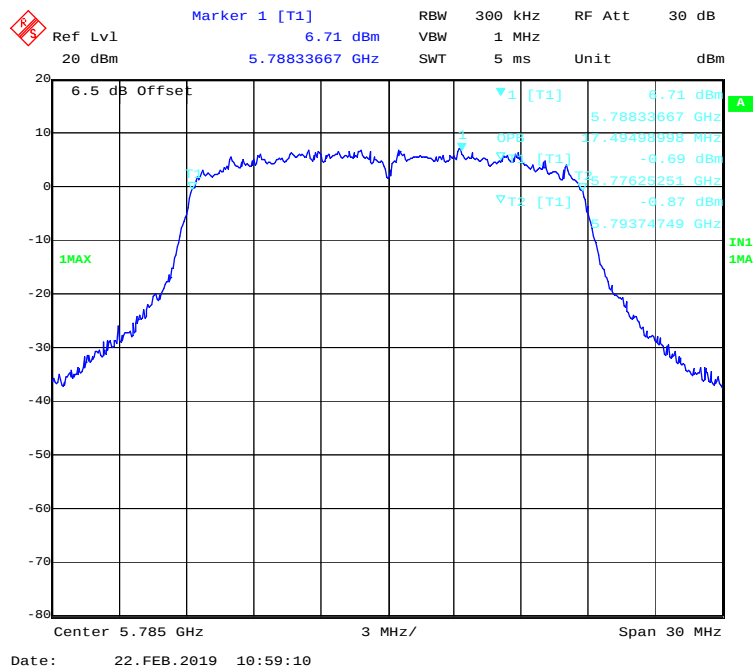
802.11ac20 mode, 5825MHz



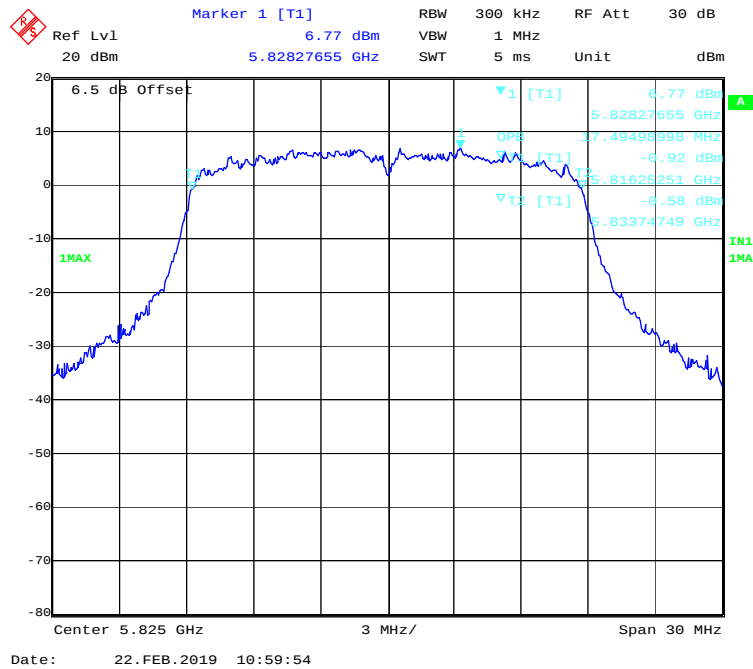
802.11n-HT20 mode, 5745MHz



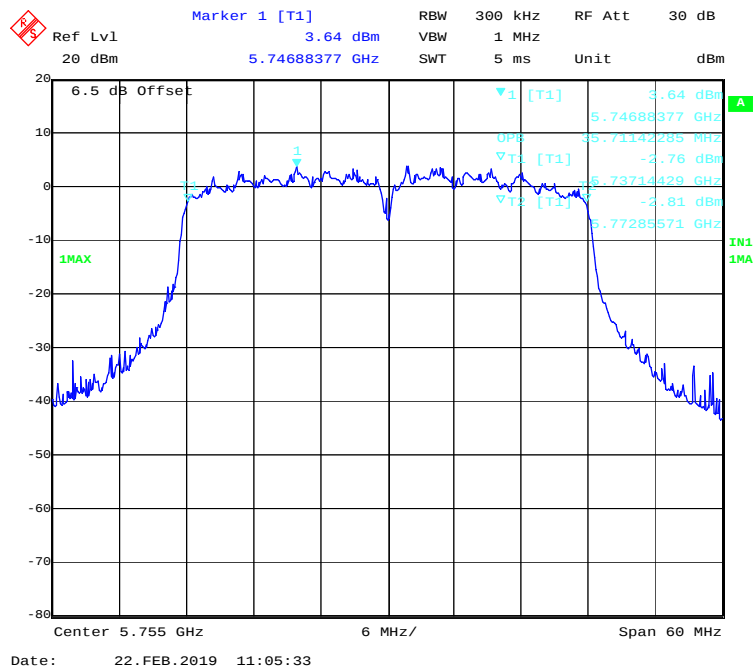
802.11n-HT20 mode, 5785MHz



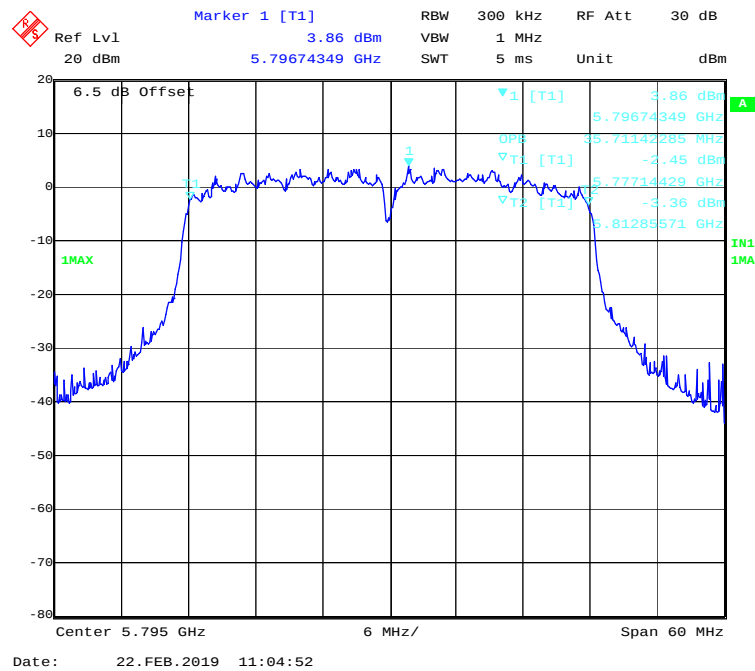
802.11n-HT20 mode, 5825MHz



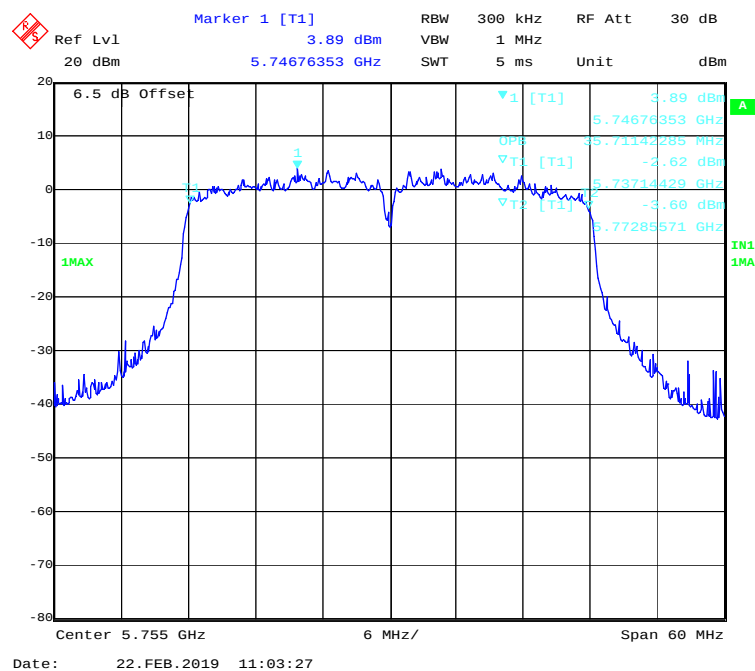
802.11ac40 mode, 5755MHz



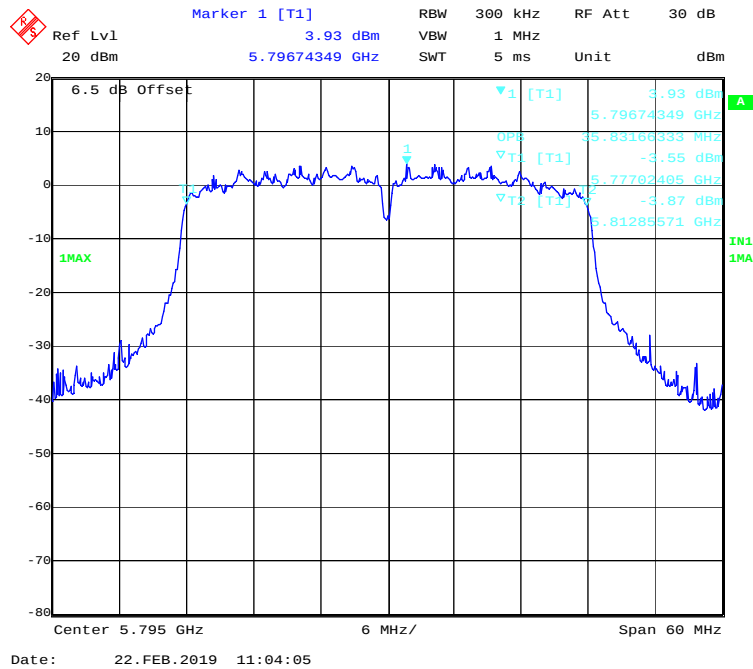
802.11ac40 mode, 5795MHz



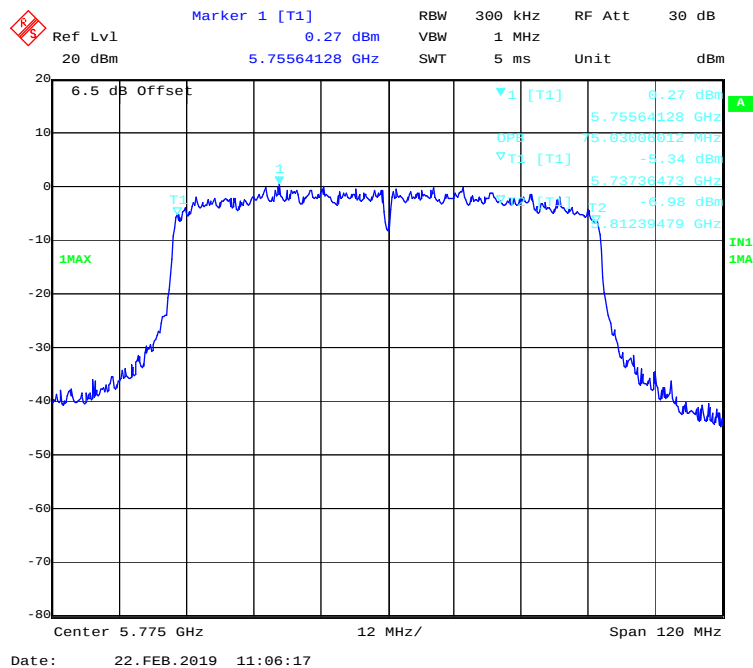
802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz



802.11ac80 mode, 5775MHz



FCC §15.407(a) (1) (3) – CONDUCTED TRANSMITTER OUTPUT POWER**Applicable Standard**

According to §15.407(a)(1)

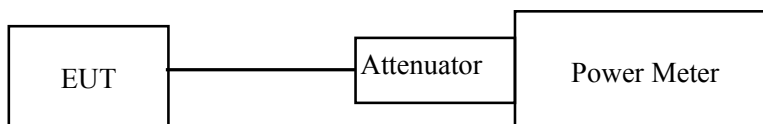
(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. 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..

According to §15.407(a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.

**Test Data****Environmental Conditions**

Temperature:	23.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Max Min on 2019-08-23.

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)	Limit (dBm)	Result
802.11a	5150-5250 MHz	Low	5180	15.30	24	PASS
		Middle	5200	15.12	24	PASS
		High	5240	15.02	24	PASS
	5725-5850 MHz	Low	5745	15.41	30	PASS
		Middle	5785	15.36	30	PASS
		High	5825	15.21	30	PASS
802.11ac20	5150-5250 MHz	Low	5180	15.91	24	PASS
		Middle	5200	15.83	24	PASS
		High	5240	15.90	24	PASS
	5725-5850 MHz	Low	5745	15.87	30	PASS
		Middle	5785	15.90	30	PASS
		High	5825	15.85	30	PASS
802.11n-HT20	5150-5250 MHz	Low	5180	15.87	24	PASS
		Middle	5200	15.80	24	PASS
		High	5240	15.90	24	PASS
	5725-5850 MHz	Low	5745	15.76	30	PASS
		Middle	5785	15.98	30	PASS
		High	5825	15.89	30	PASS
802.11ac40	5150-5250 MHz	Low	5190	15.42	24	PASS
		High	5230	15.31	24	PASS
	5725-5850 MHz	Low	5755	15.46	30	PASS
		High	5795	15.64	30	PASS
802.11n-HT40	5150-5250 MHz	Low	5190	15.51	24	PASS
		High	5230	15.37	24	PASS
	5725-5850 MHz	Low	5755	15.47	30	PASS
		High	5795	15.41	30	PASS
802.11ac80	5150-5250 MHz	/	5210	15.42	24	PASS
	5725-5850 MHz	/	5775	15.43	30	PASS

Note: The maximum antenna gain is 0.24 dBi.

FCC §15.407(a) (1) (3) - POWER SPECTRAL DENSITY**Applicable Standard**

According to §15.407(a) (1)

(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. 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.

According to §15.407(a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Proceidyres New Rules v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Maximum power spectral density (PPSD)

Test Data**Environmental Conditions**

Temperature:	22.5. °C~24.5 °C
Relative Humidity:	50 %~52 %
ATM Pressure:	101.2 kPa~101. 3 kPa

The testing was performed by Max Min from 2019-02-21 to 2019-02-02.

Test Mode: Transmitting

5150MHz-5250MHz:

Mode	Channel	Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	Low	5180	4.46	11	PASS
	Middle	5200	4.30	11	PASS
	High	5240	4.36	11	PASS
802.11ac20	Low	5180	5.50	11	PASS
	Middle	5200	5.34	11	PASS
	High	5240	5.05	11	PASS
802.11n20	Low	5180	5.61	11	PASS
	Middle	5200	5.51	11	PASS
	High	5240	5.64	11	PASS
802.11ac40	Low	5190	1.90	11	PASS
	High	5230	2.01	11	PASS
802.11n40	Low	5190	2.22	11	PASS
	High	5230	2.22	11	PASS
802.11ac80	/	5210	-1.71	11	PASS

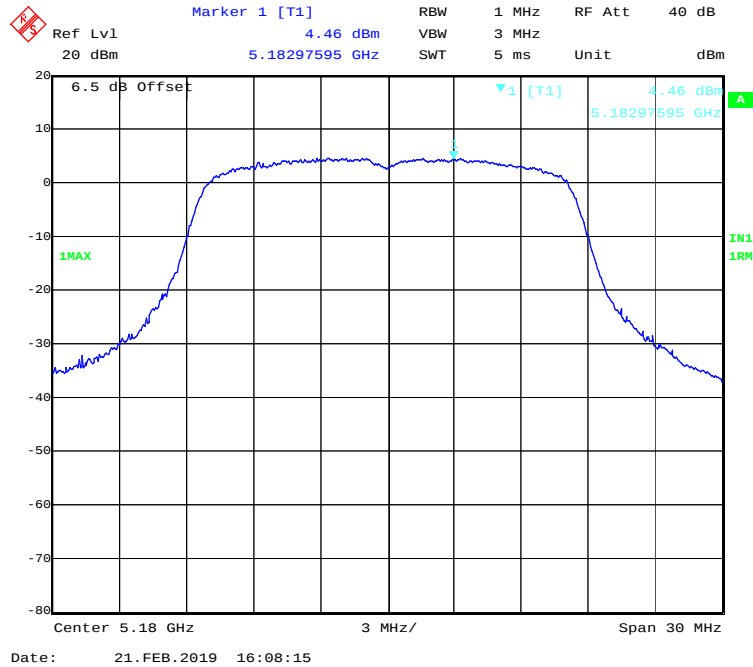
5725MHz-5850MHz:

Mode	Channel	Frequency (MHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
802.11a	Low	5745	3.43	30	PASS
	Middle	5785	3.58	30	PASS
	High	5825	3.75	30	PASS
802.11ac20	Low	5745	4.68	30	PASS
	Middle	5785	4.65	30	PASS
	High	5825	4.67	30	PASS
802.11n20	Low	5745	4.52	30	PASS
	Middle	5785	4.68	30	PASS
	High	5825	4.85	30	PASS
802.11ac40	Low	5755	0.81	30	PASS
	High	5795	0.69	30	PASS
802.11n40	Low	5755	1.20	30	PASS
	High	5795	1.07	30	PASS
802.11ac80	/	5775	-2.01	30	PASS

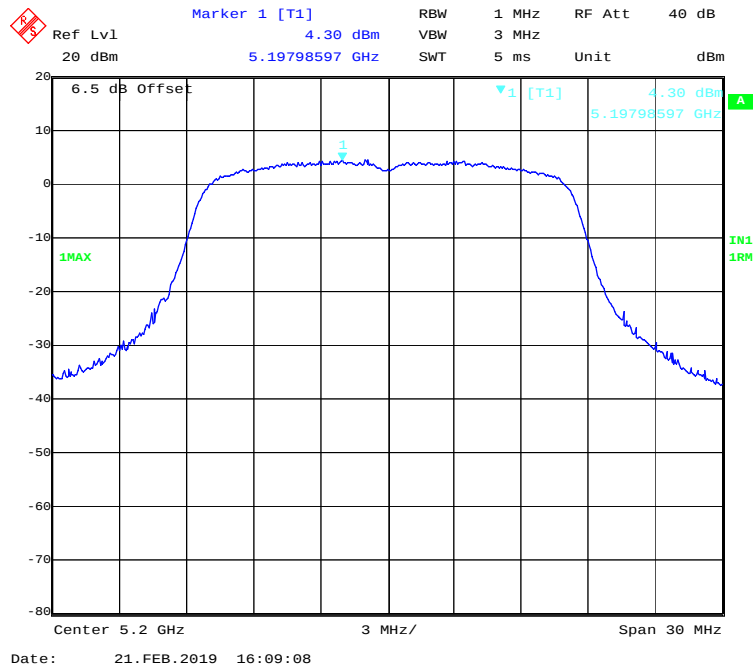
Note: The maximum antenna gain is 0.24 dBi.

5150MHz-5250MHz Band :

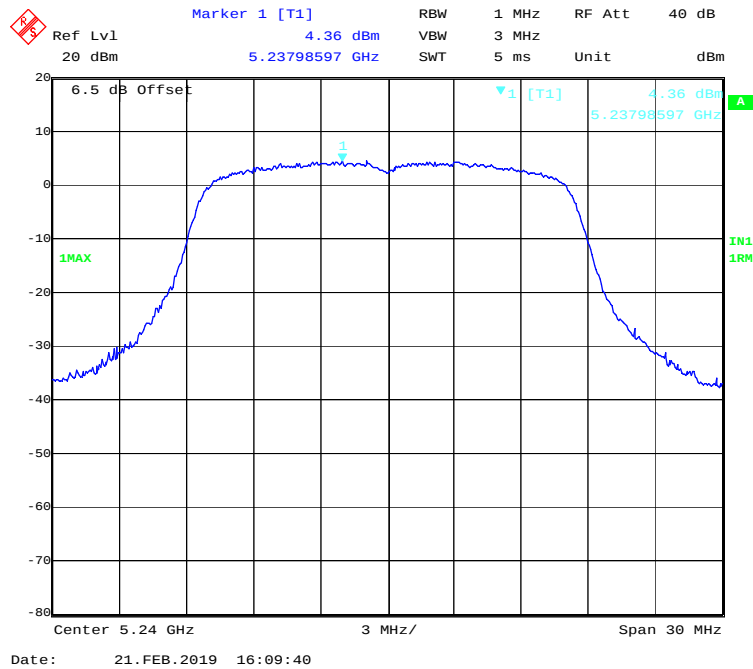
802.11a mode, Power spectral density-5180MHz



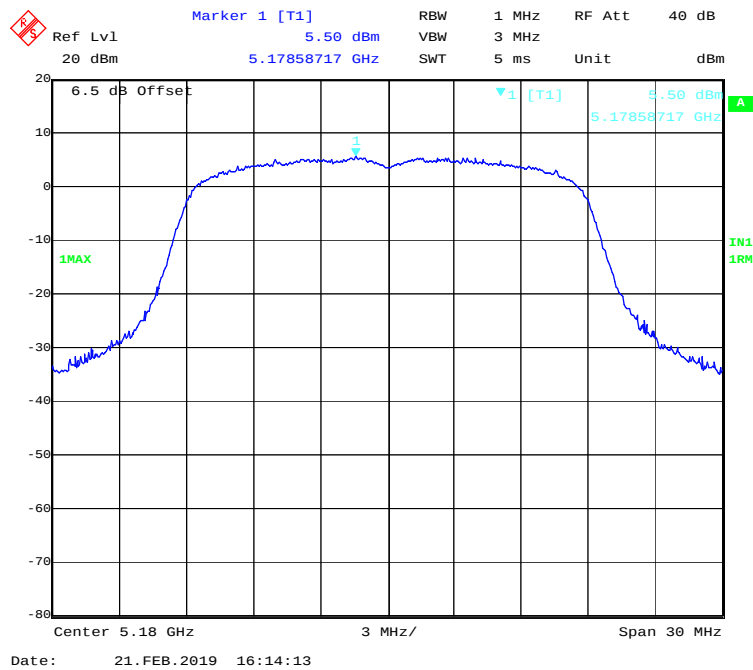
802.11a mode, Power spectral density-5200MHz

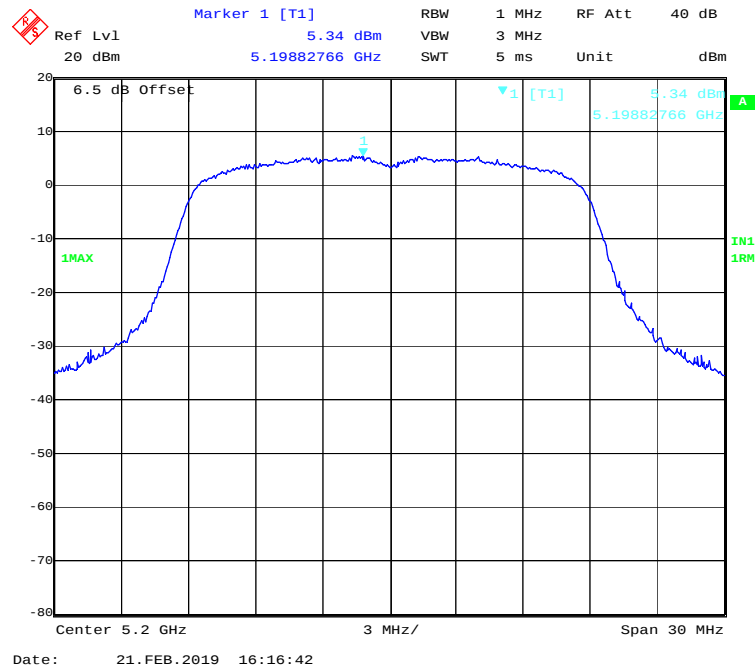
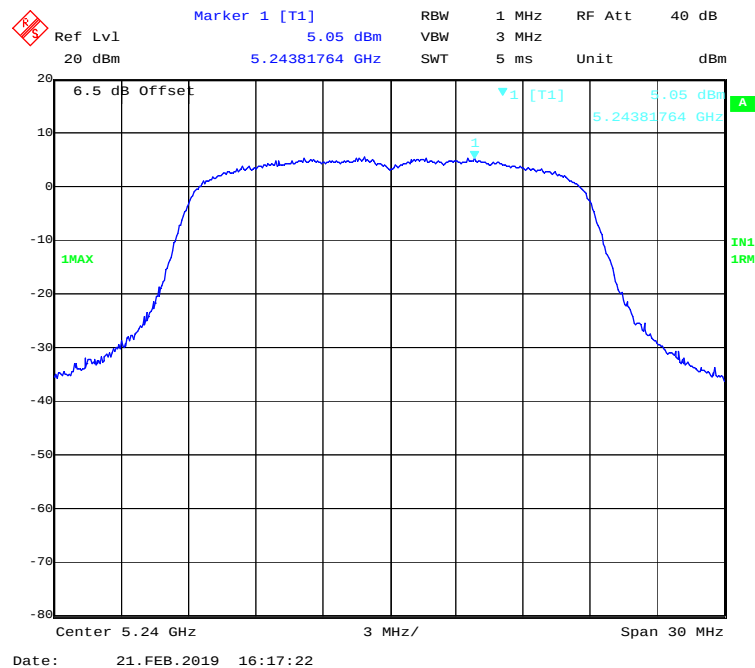


802.11a mode, Power spectral density-5240MHz

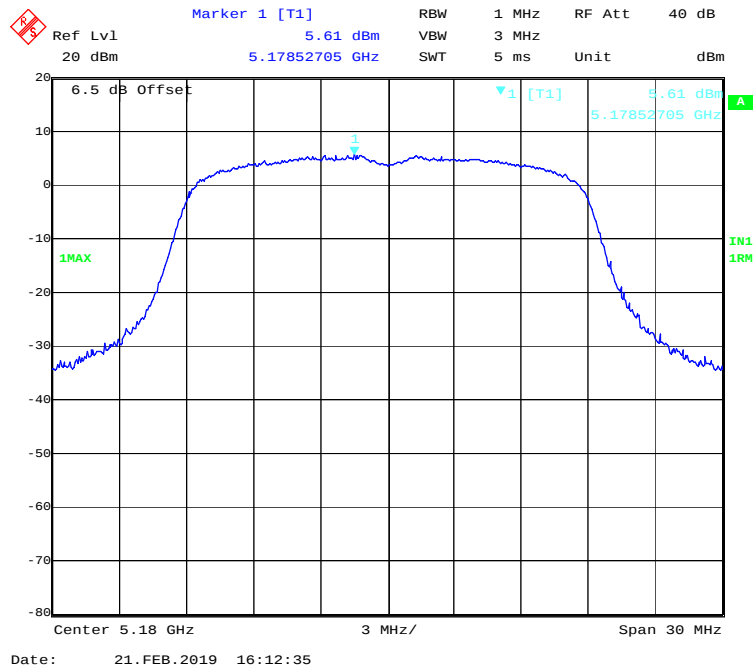


802.11ac20 mode, Power spectral density-5180MHz

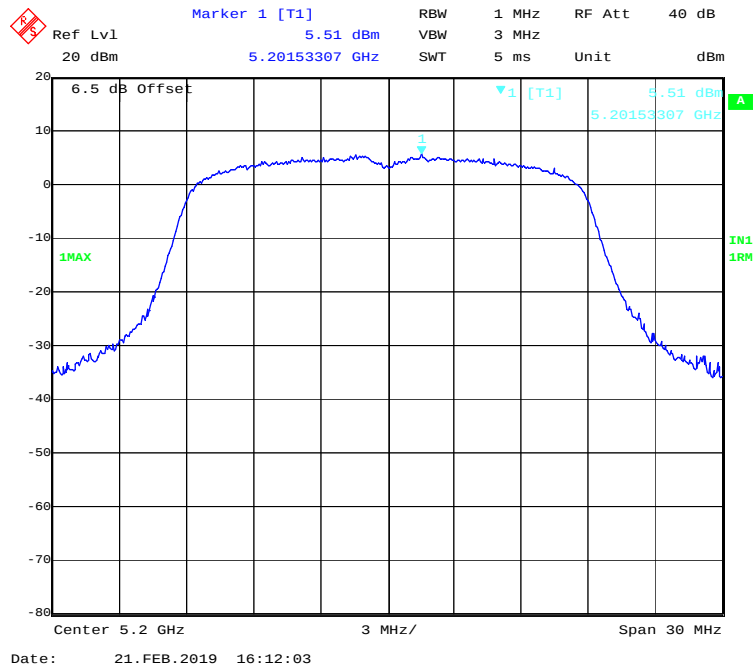


802.11 ac20 mode, Power spectral density-5200MHz**802.11ac20 mode, Power spectral density-5240MHz**

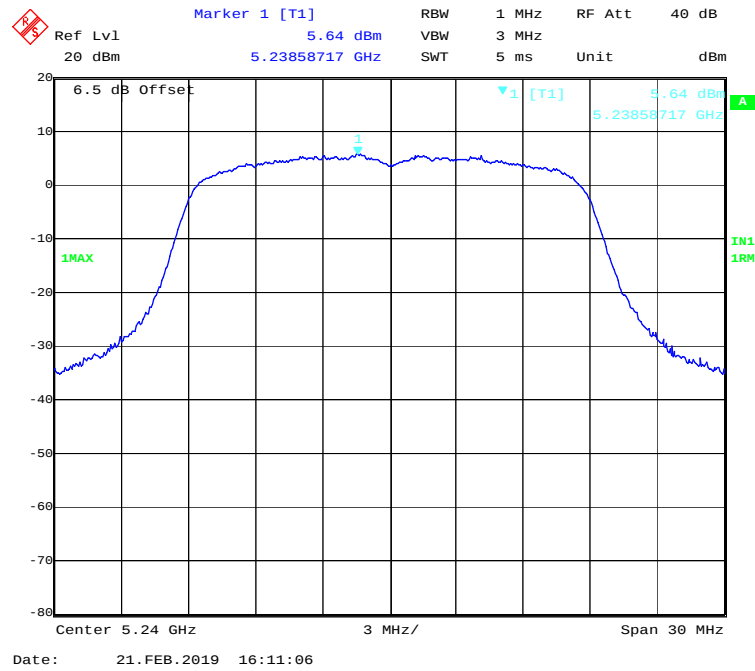
802.11n-HT20 mode, Power spectral density-5180MHz



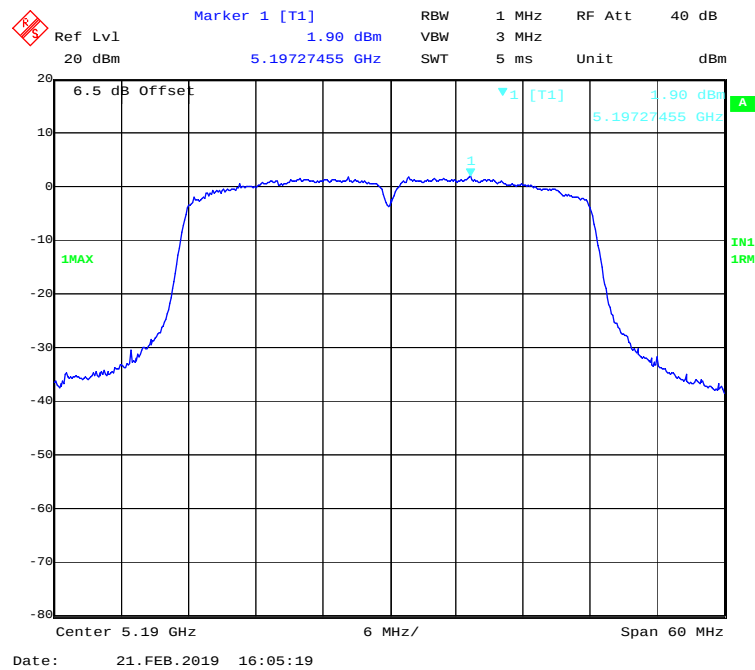
802.11n-HT20 mode, Power spectral density-5200MHz

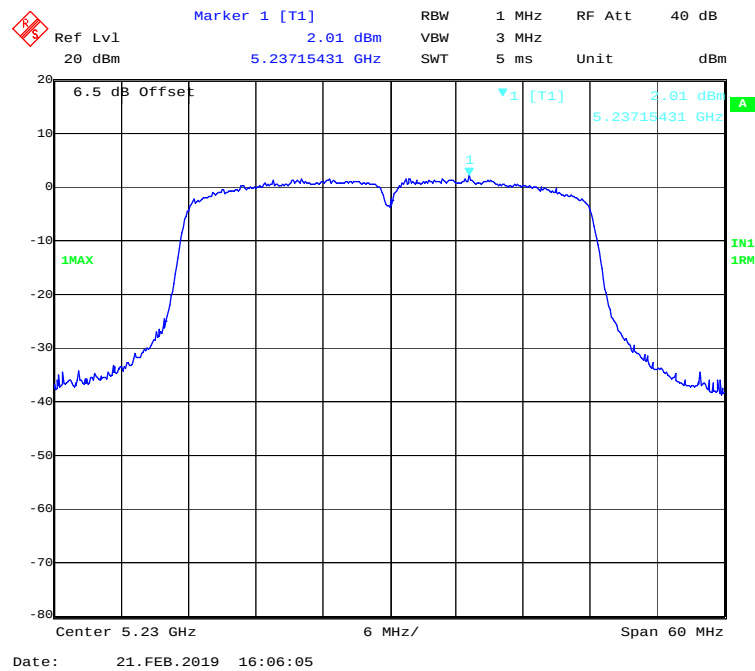
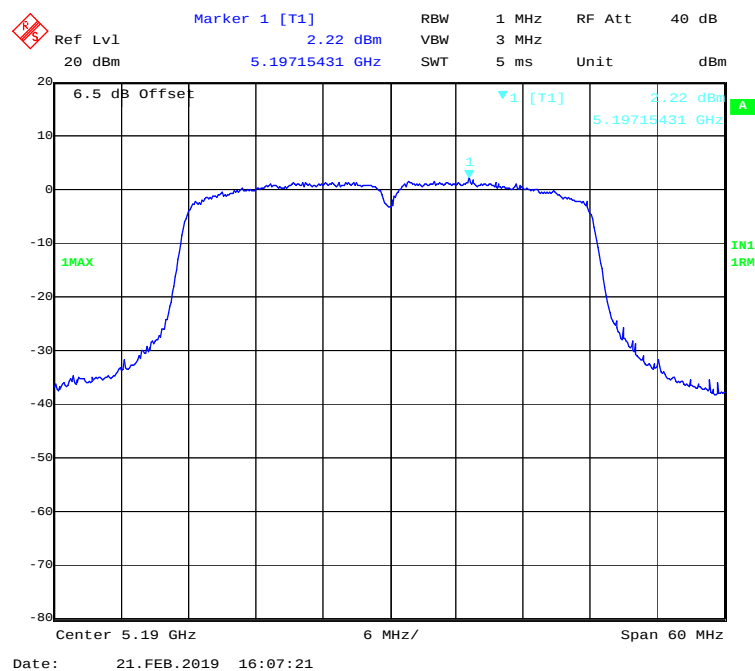


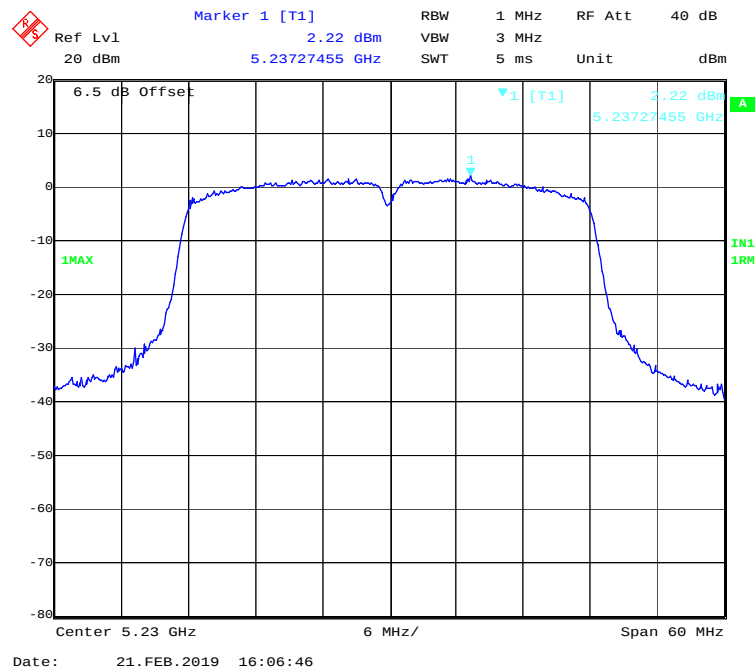
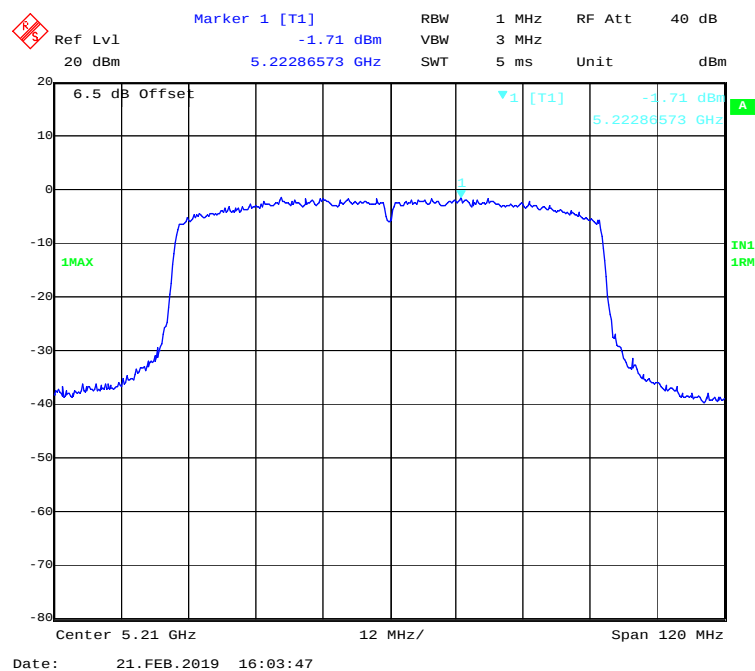
802.11n-HT20 mode, Power spectral density-5240MHz

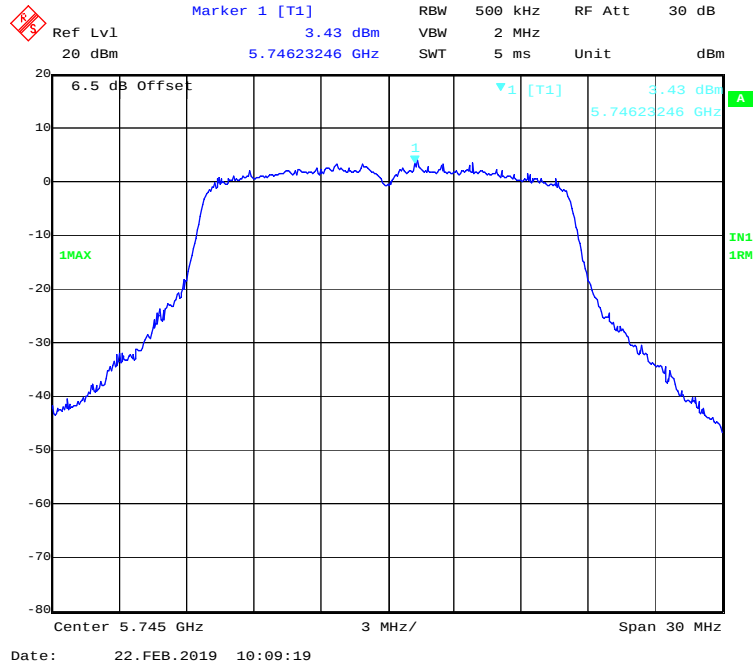
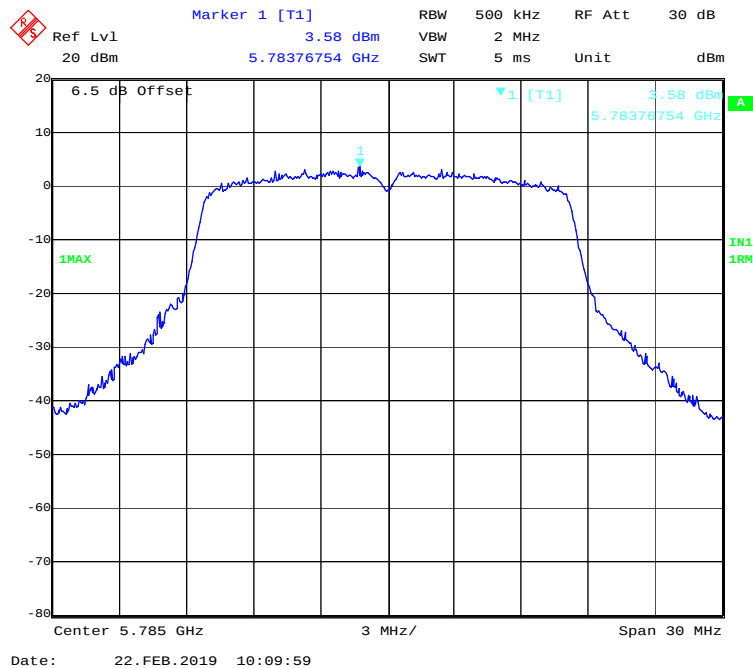


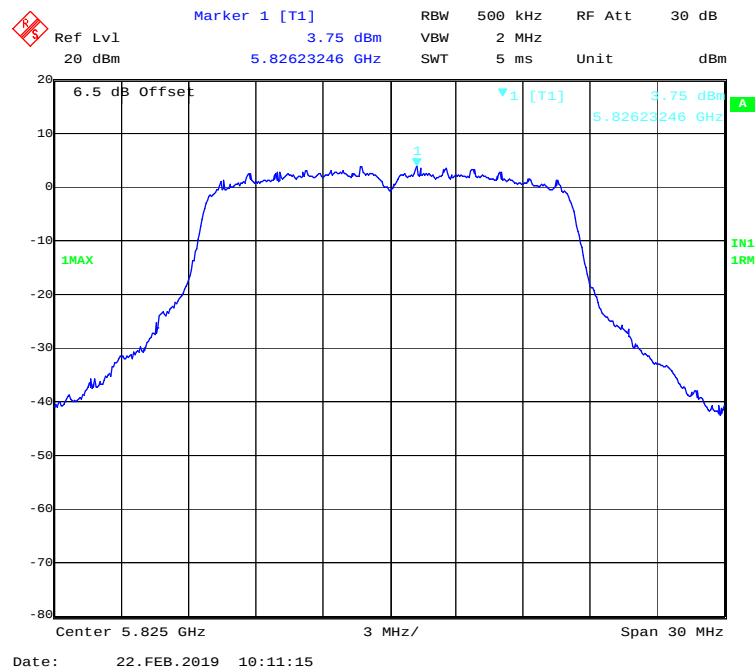
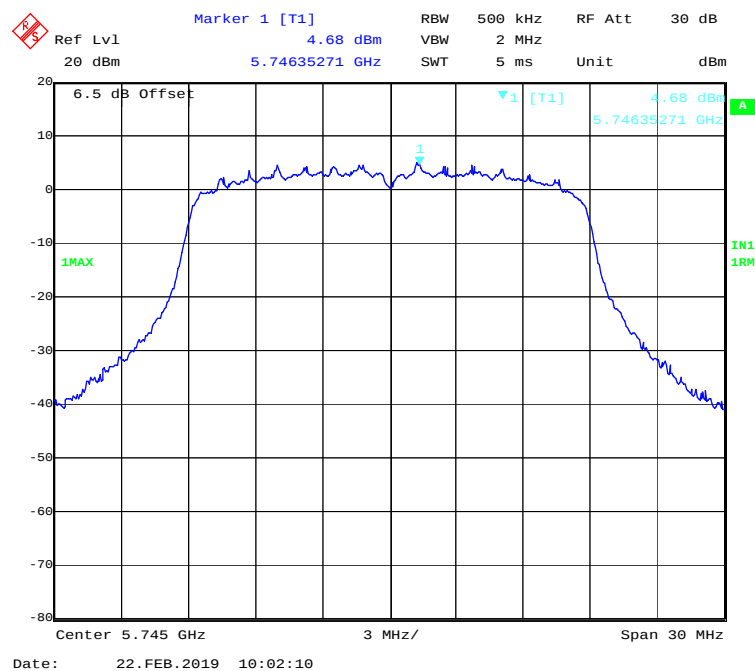
802.11ac40 mode, Power spectral density-5190MHz



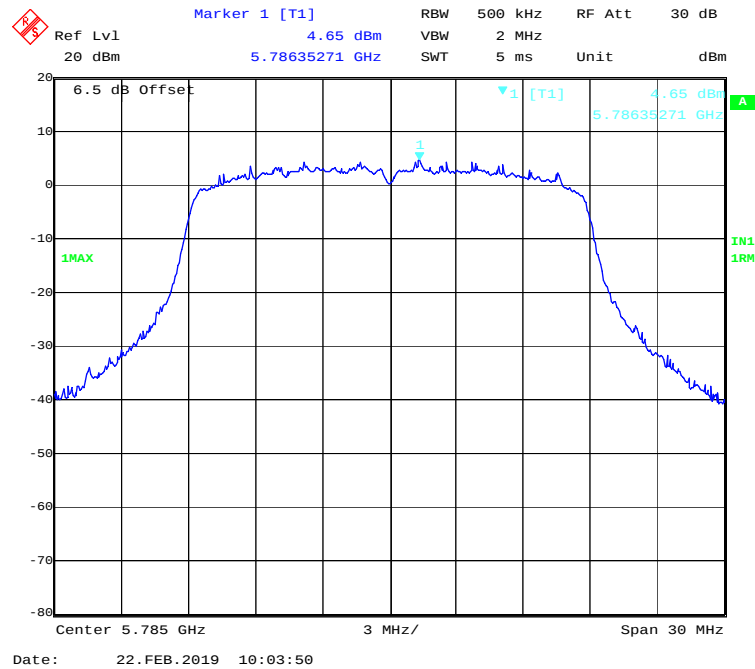
802.11ac40 mode, Power spectral density-5230MHz**802.11n-HT40 mode, Power spectral density-5190MHz**

802.11n-HT40 mode, Power spectral density-5230MHz**802.11n- ac80 mode, Power spectral density-5210MHz**

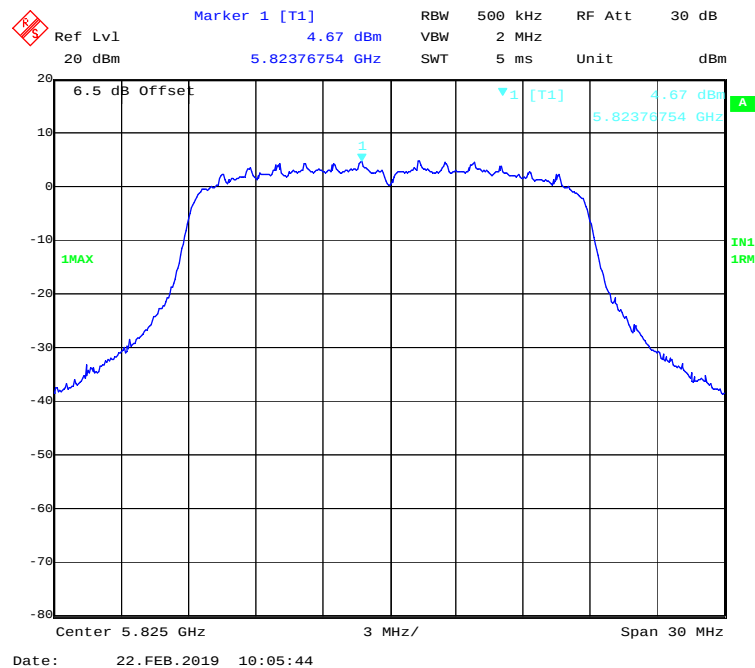
5725MHz-5850 MHz Band:**802.11a mode, Power spectral density-5745MHz****802.11a mode, Power spectral density-5785MHz**

802.11a mode, Power spectral density-5825MHz**802.11ac20 mode, Power spectral density-5745MHz**

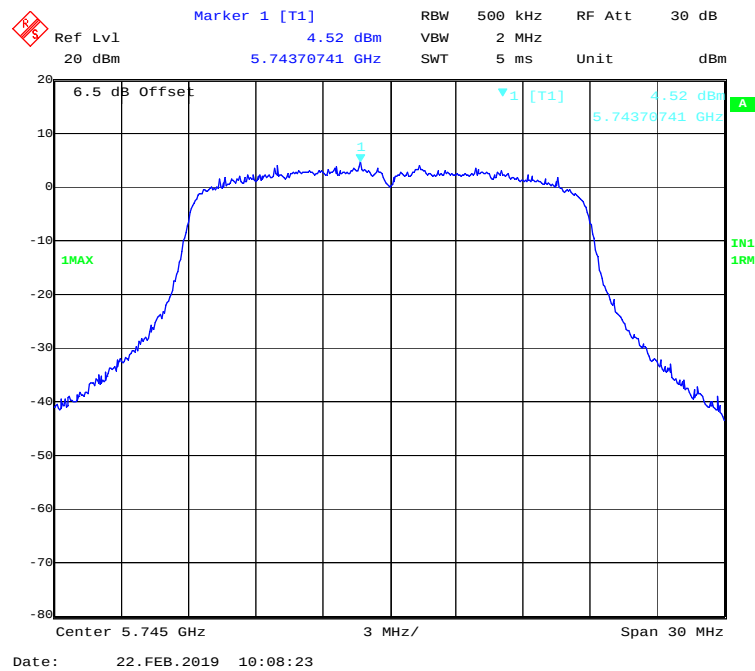
802.11 ac20 mode, Power spectral density-5785MHz



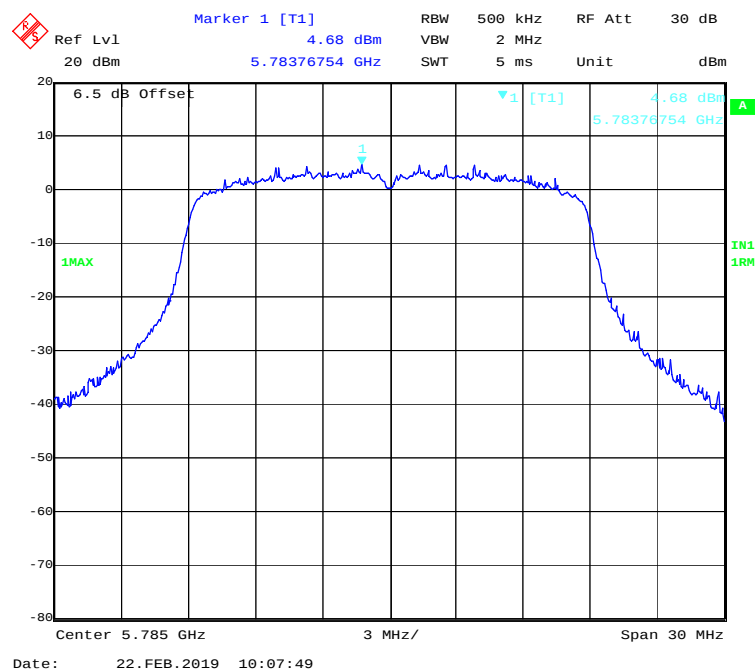
802.11 ac20 mode, Power spectral density-5825MHz

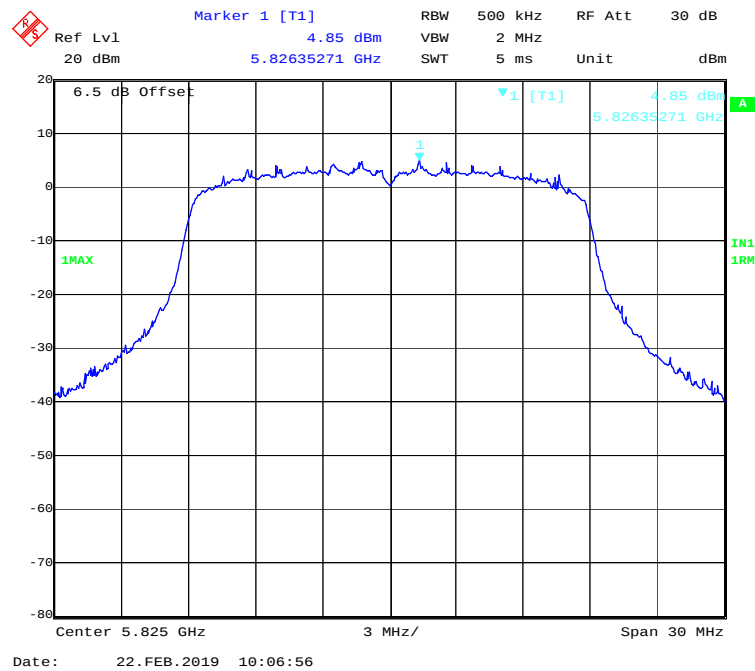
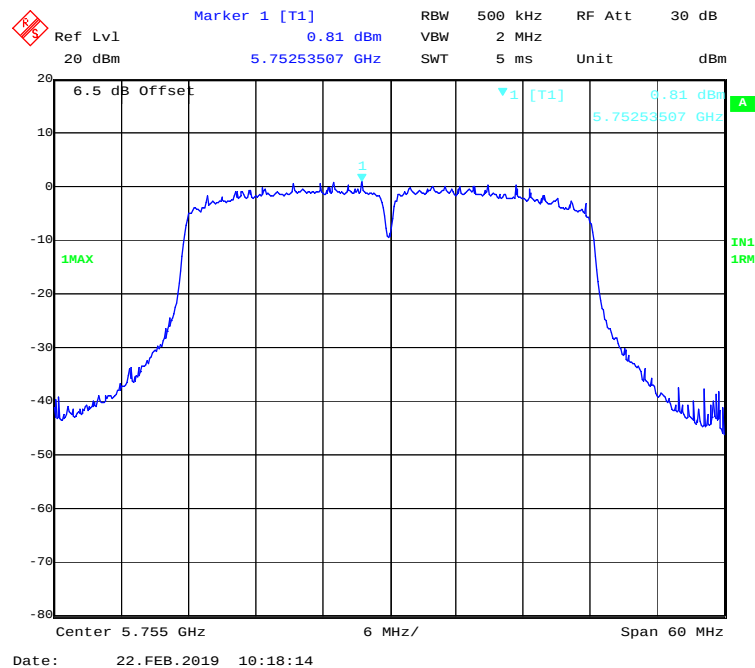


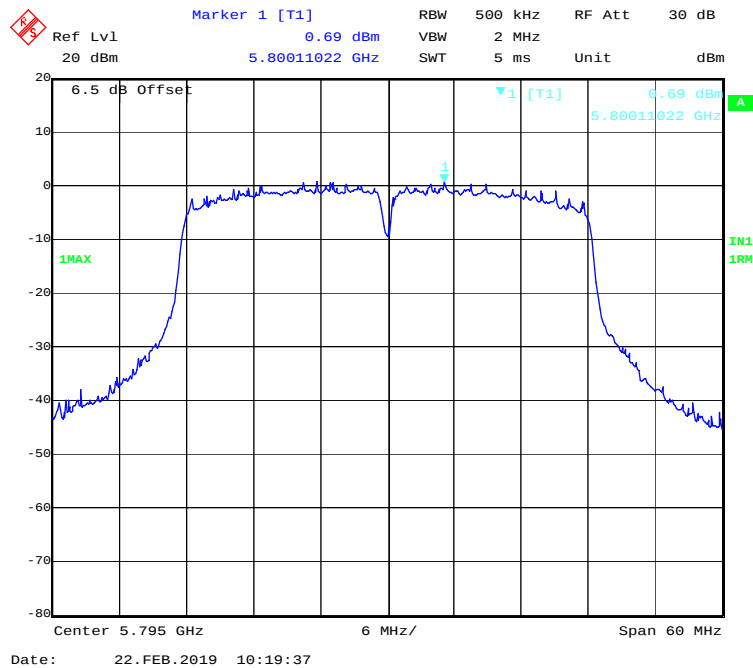
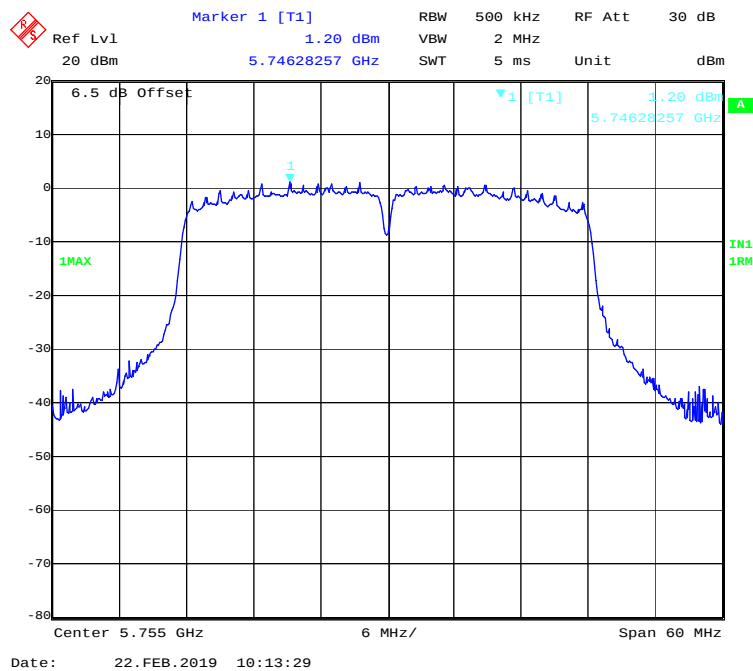
802.11n-HT20 mode, Power spectral density-5745MHz



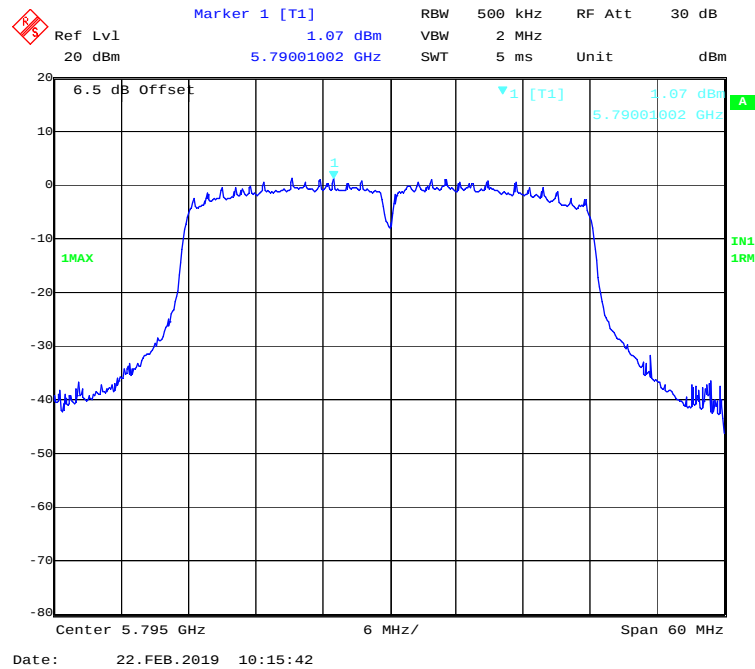
802.11n-HT20 mode, Power spectral density-5785MHz



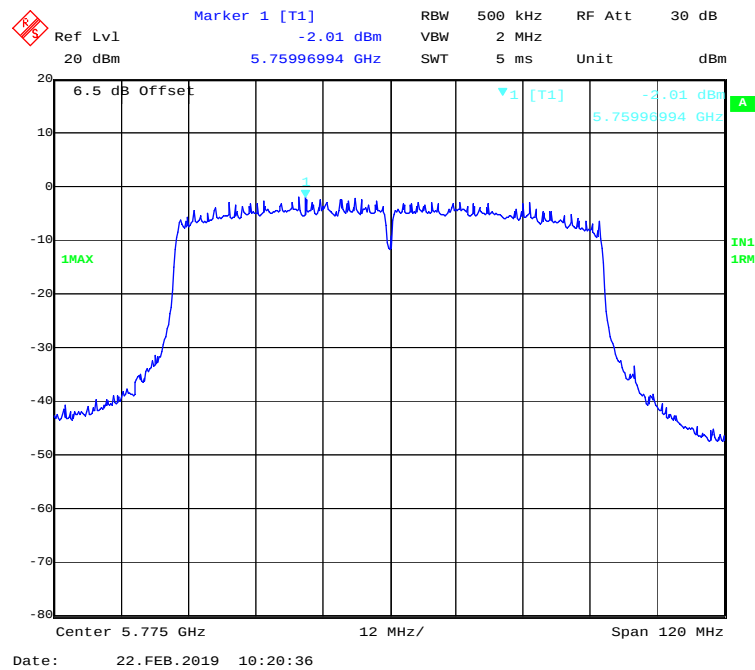
802.11n-HT20 mode, Power spectral density-5825MHz**802.11ac40 mode, Power spectral density-5755MHz**

802.11ac40 mode, Power spectral density-5795MHz**802.11n-HT40 mode, Power spectral density-5755MHz**

802.11n-HT40 mode, Power spectral density-5795MHz



802.11ac80 mode, Power spectral density-5775MHz



***** END OF REPORT *****