

FCC PART 15.407

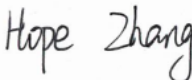

TEST REPORT

For

Shanghai Rising Digital Co.,Ltd.

No 318 ,Chuanda Road , Pudong New District Shanghai China

FCC ID: 2AJONSEED-10IA-01

Report Type: Original Report		Product Type: SEED-10IA-01 display screen	
Test Engineer:	Hope Zhang		
Report Number:	RSHA181207002-00D		
Report Date:	2019-03-21		
Reviewed By:	Oscar Ye RF Leader		
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn		

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shanghai Rising Digital Co.,Ltd.
Tested Model	SEED-10IA-01
Series Model	SEED-10IA-01 (L)
Product Type	SEED-10IA-01 display screen
Dimension	274mm(L)*212mm(W)*47.9mm(H)
Power Supply	DC 12-24V

**All measurement and test data in this report was gathered from production sample serial number: 20181207002.
(Assigned by the BACL. The EUT supplied by the applicant was received on 2018-12-07)*

Objective

This type approval report is prepared on behalf of Shanghai Rising Digital Co.,Ltd. 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, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

FCC Part 27 TNB and Part 15.247 DTS submissions with FCC ID: 2AJONSEED-10IA-01.

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%

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) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. 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,

For 802.11a and 802.11n-HT20 mode, EUT was tested with channel 36, 40 and 48.

For 802.11n-HT40 mode, EUT was tested with channel 38 and 46.

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

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

For 802.11a and 802.11n-HT20 mode, EUT was tested with channel 149, 157 and 165.

For 802.11n-HT40 mode, EUT was tested with channel 151 and 159.

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

EUT Exercise Software

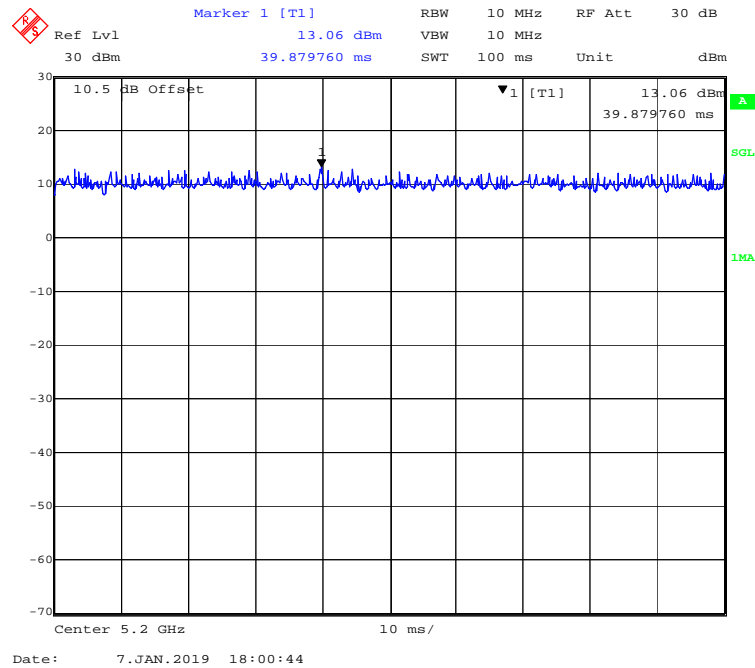
RF test tool: S-CRT

The worst case was performed under:

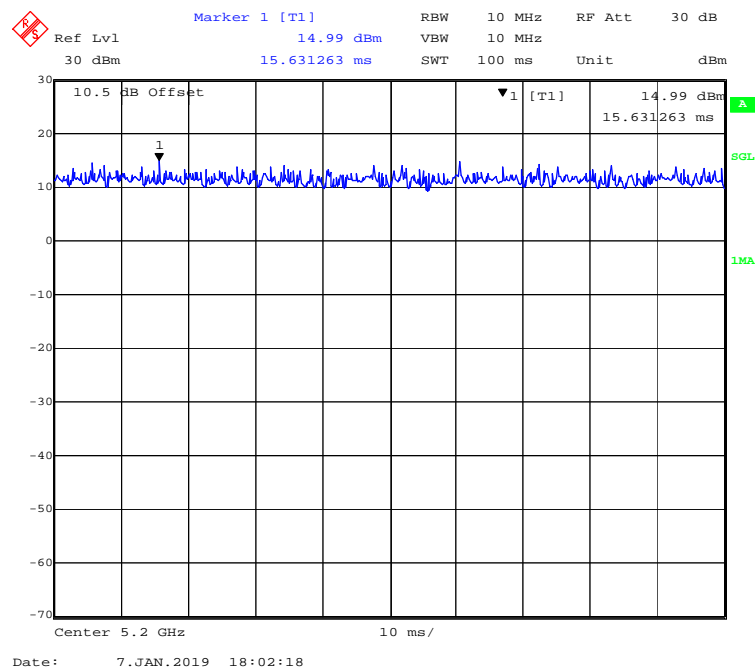
Mode	Data rate	Power level	
		5150-5250 Band	5725-5850 Band
802.11a	6 Mbps	10	13
802.11n-HT20	MCS0	10	14
802.11n-HT40	MCS0	11	14

5150MHz-5250MHz Band Duty Cycle:

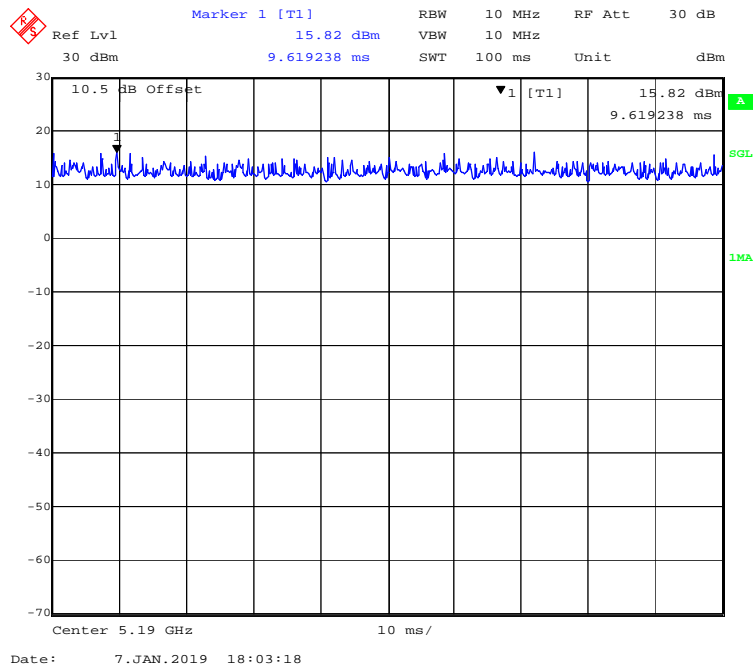
802.11a mode



802.11n-HT20 mode

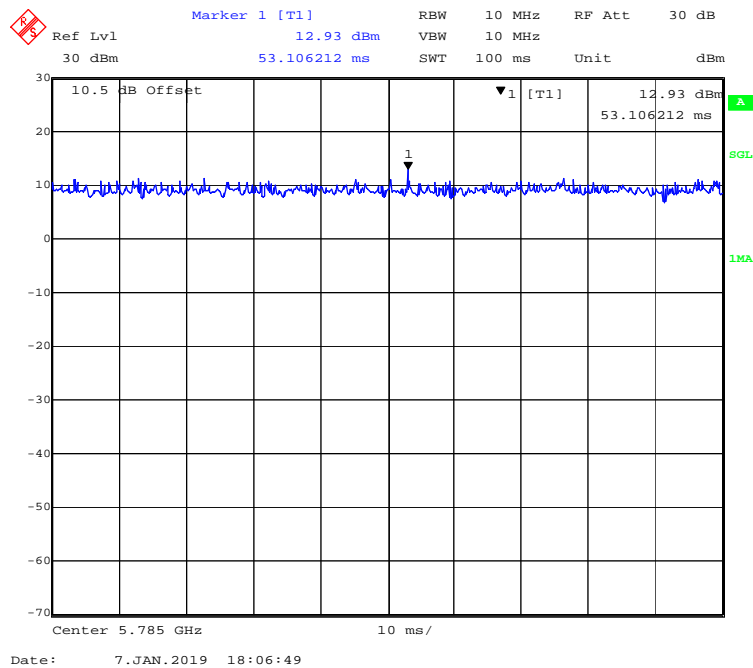


802.11n-HT40 mode

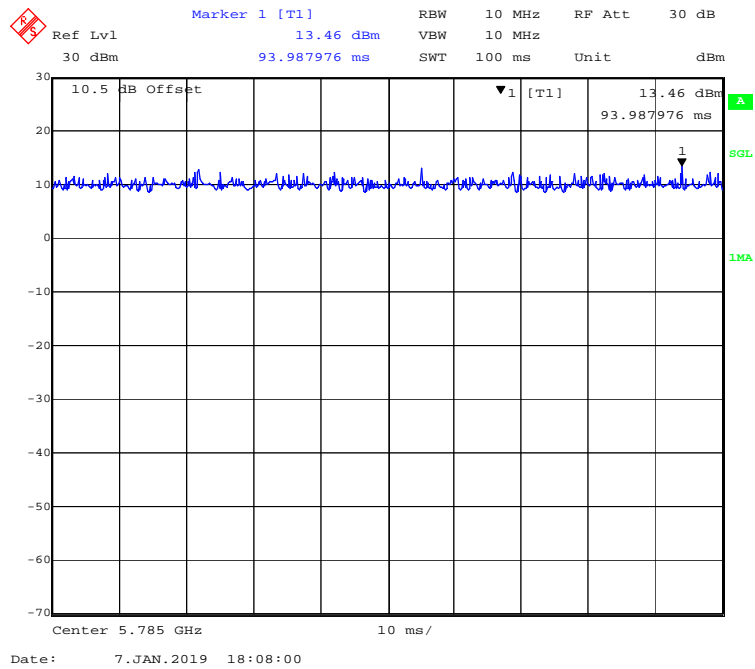


5725MHz-5850MHz Band Duty Cycle:

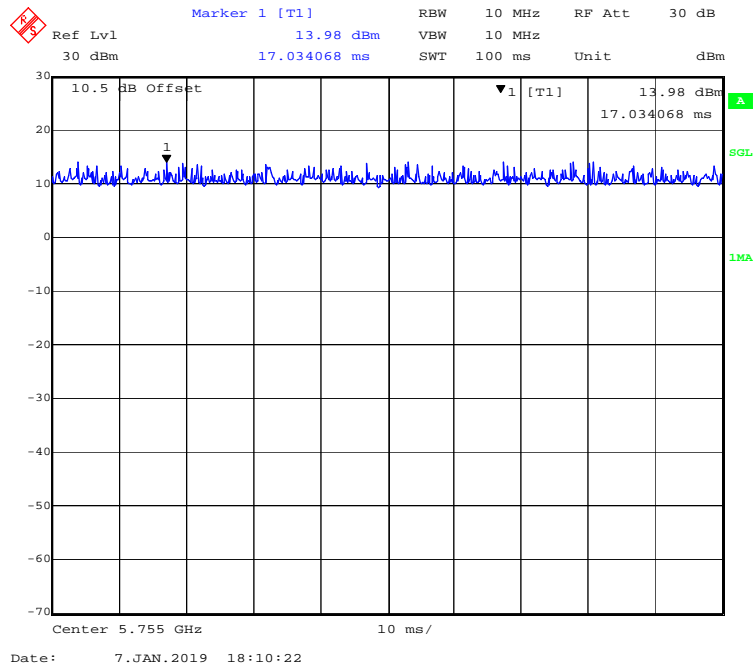
802.11a mode



802.11n-HT20 mode



802.11n-HT40 mode



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

Note: “x” means duty cycle.

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

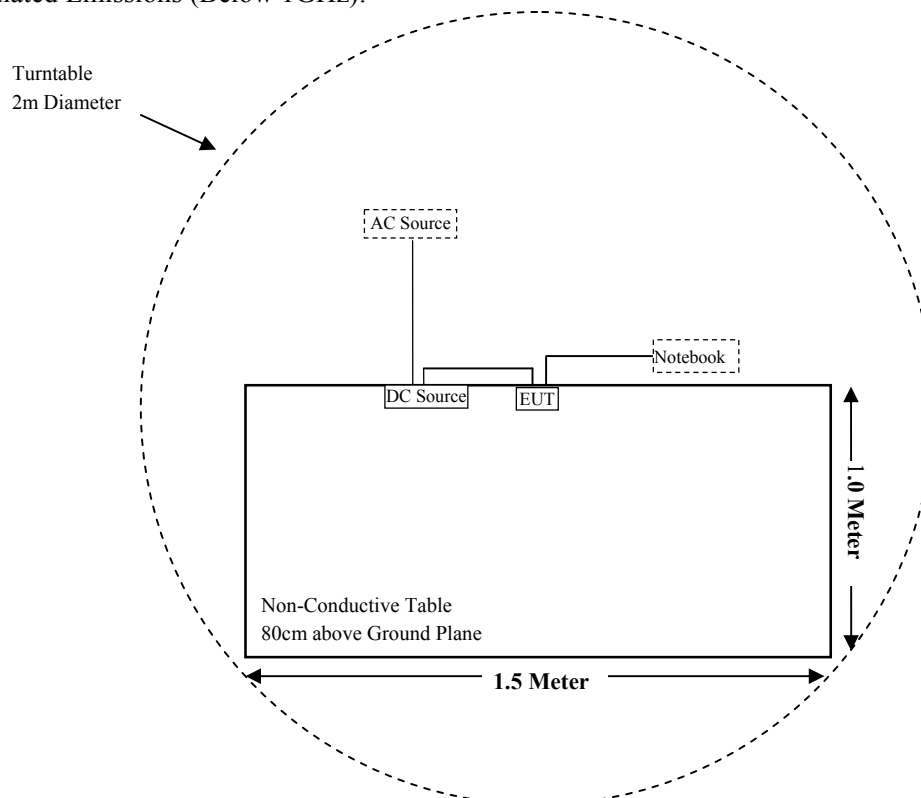
Manufacturer	Description	Model	Serial Number
ZHAOXIN	DC Power Supply	RXN-605D	DC002
DELL	Notebook	E6410	3094742521

External I/O Cable

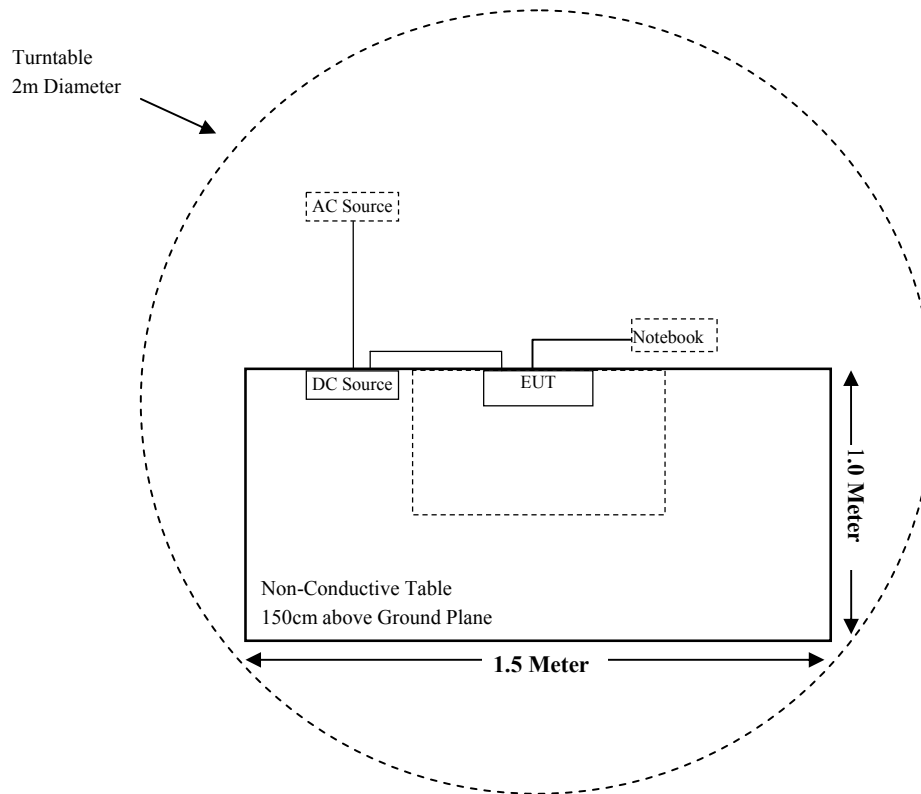
Cable Description	Length (m)	From Port	To
DC Cable	1.0	EUT	DC Power Supply
RJ45 Cable	3.0	EUT	Notebook

Block Diagram of Test Setup

For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407(f) & §2.1091	Maximum Permissible Exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
FCC §15.207 & §15.407(b) (6)	AC Power Line Conducted Emissions	Not Applicable (See Note)
§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

Note: The EUT will be used in the vehicular environment.

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	2018-11-12	2019-11-11
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2018-08-15	2019-08-14
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-9	009	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2018-08-15	2019-08-14
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2018-08-27	2019-08-26
ETS-LINDGREN	Horn Antenna	3115	6229	2019-01-11	2022-01-10
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-10-18	2019-10-17
Mini-Circuits	Amplifier	ZVA-183W-S+	220701818	2018-05-20	2019-05-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2018-03-22	2019-03-21
MICRO-TRONICS	Band Reject Filter	BRC50703	G094	2018-08-05	2019-08-04
MICRO-TRONICS	Band Reject Filter	BRC50705	G085	2018-08-05	2019-08-04
Narda	Attenuator	10dB	010	2018-08-15	2019-08-14
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-11	011	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2018-08-15	2019-08-14
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2018-11-12	2019-11-11
Agilent	Power Meter	N1912A	MY5000492	2018-11-18	2019-11-17
Agilent	Power Sensor	N1921A	MY54210024	2018-11-18	2019-11-17
Narda	Attenuator	10dB	010	2018-08-15	2019-08-14
BACL	Temperature & Humidity Chamber	BTH-150	30023	2018-07-20	2019-07-19
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	2018-07-20	2019-07-19
Rising	RF Cable	RisingC01	C01	Each Time	/

* **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).

FCC §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to §2.1091 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.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:**For LTE mode:**

Mode	Frequency Range (MHz)	Max Antenna Gain		Target Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
LTE Band 5	824-849	2.70	1.86	22	158.49	20	0.0587	0.55
LTE Band 41	2516-2670	3.70	2.34	23	199.53	20	0.0930	1.00

For Wi-Fi mode:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412-2462	2.20	1.66	17.00	50.12	20	0.0165	1.00
802.11g		2.20	1.66	16.00	39.81	20	0.0131	1.00
802.11n-HT20		2.20	1.66	15.00	31.62	20	0.0104	1.00
802.11n-HT40	2422-2452	2.20	1.66	15.00	31.62	20	0.0104	1.00

Mode	Frequency (MHz)	Antenna Gain		Conducted output power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5150-5250	2.20	1.66	14.00	25.12	20	0.0083	1.00
802.11n-HT20		2.20	1.66	15.00	31.62	20	0.0104	1.00
802.11n-HT40		2.20	1.66	15.00	31.62	20	0.0104	1.00
802.11a	5725-5850	2.20	1.66	14.00	25.12	20	0.0083	1.00
802.11n-HT20		2.20	1.66	15.00	31.62	20	0.0104	1.00
802.11n-HT40		2.20	1.66	16.00	39.81	20	0.0131	1.00

Note:

(1) The target output power was declared by the Manufacturer.

(2) 2.4GWi-Fi and 5GWi-Fi cannot transmit simultaneously.

(3) Wi-Fi and LTE can transmit simultaneously, The worst condition is 802.11b of 2.4G Wi-Fi and LTE Band 5, as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.0165/1.00 + 0.0587/0.55 = 0.0165 + 0.1067 = 0.1232 < 1.0$$

Result: The device meet FCC MPE at 20 cm distance.

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 a PCB antenna for Wi-Fi, and the antenna gain is 2.2 dBi, which is permanently attached to the unit, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliant.

§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

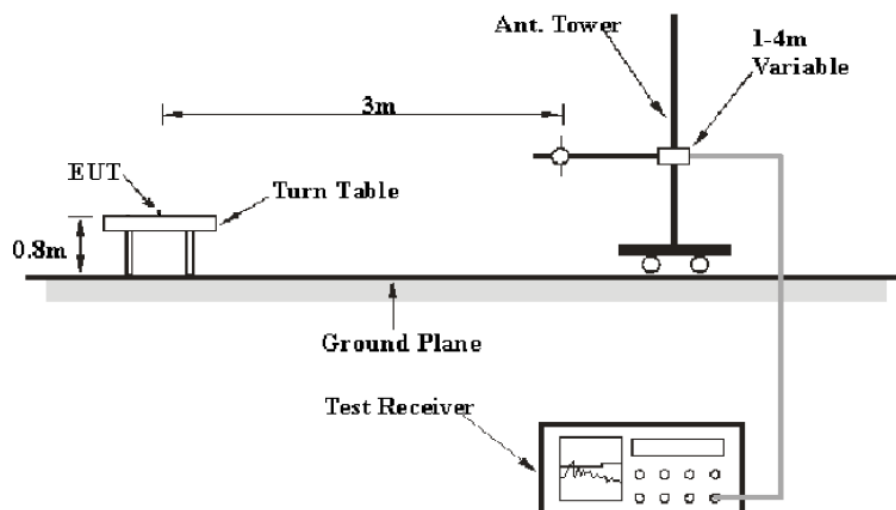
For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to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

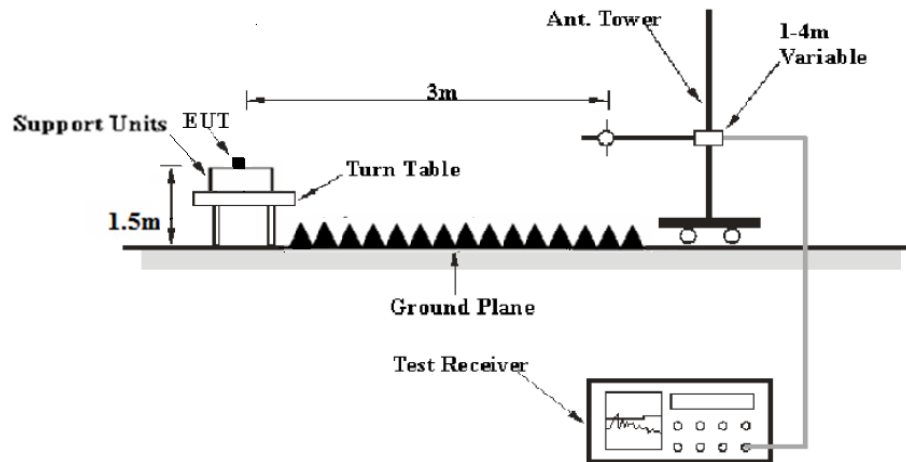
According to 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: $E \text{ [dB}\mu\text{V/m]} = \text{EIRP [dBm]} + 95.2$, for $d = 3$ meters.

EUT Setup

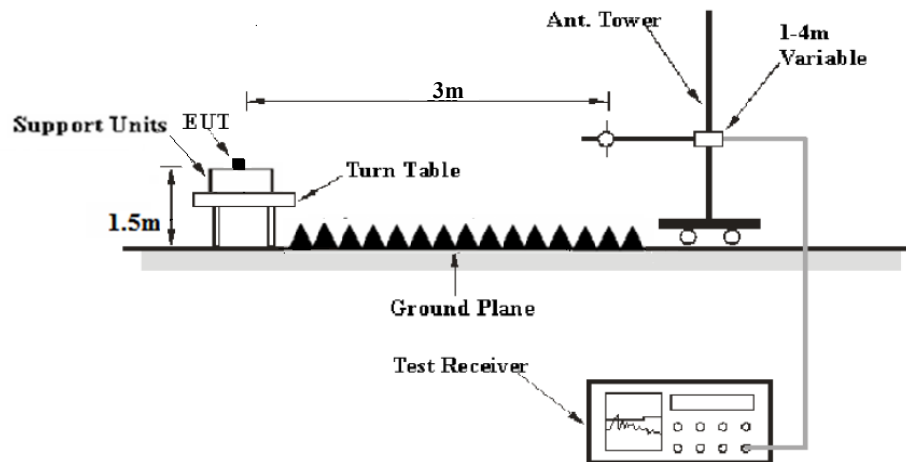
Below 1 GHz:



1 GHz-18GHz:



18 GHz-40GHz:



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.

The Radiated measurements was performed, The EIRP converted to field strength as follows:

According to C63.4, 18-40GHz test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m

Distance extrapolation factor = $20 \log (\text{specific distance [3m]}/\text{test distance [1.5m]})$ dB

Extrapolation result = Corrected Amplitude (dBμV/m) - distance extrapolation factor (6dB)

or Limit line = Specific limits(dBμV) + distance extrapolation factor (6dB)

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:	20.2-24.3 °C
Relative Humidity:	48-51 %
ATM Pressure:	100.6-101.3 kPa

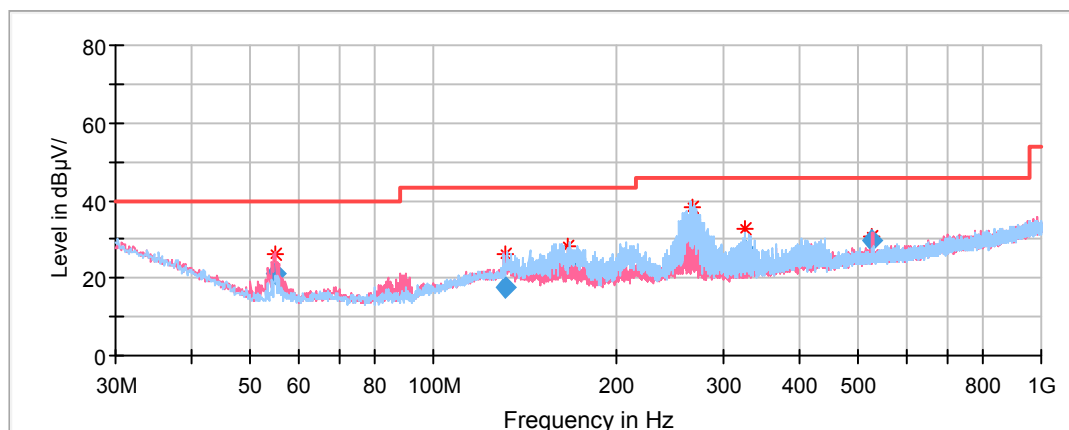
The testing was performed by Hope Zhang from 2019-01-11 to 2019-03-10.

Mode: Transmitting

Spurious Emission Test

30MHz-1GHz:

Pre-scan with 802.11a, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case **802.11n-HT40 mode in channel 5795MHz in X-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)				
55.073800	21.26	101.0	V	70.0	-17.7	40.00	18.74
131.797350	17.79	101.0	V	86.0	-11.7	43.50	25.71
166.157900	23.77	199.0	H	314.0	-13.0	43.50	19.73
265.927750	33.47	101.0	H	264.0	-11.6	46.00	12.53
325.209450	27.40	101.0	H	171.0	-10.0	46.00	18.60
527.980650	29.50	101.0	V	230.0	-5.9	46.00	16.50

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

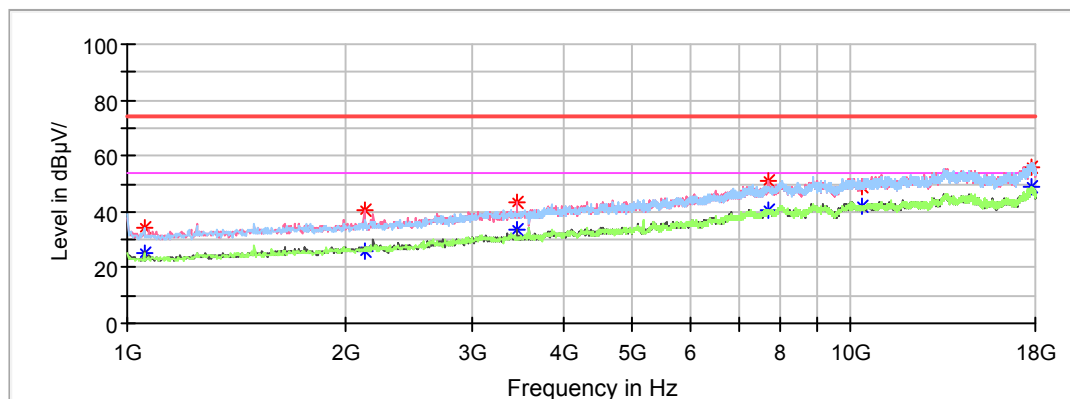
(Pre-scan in the X, Y and Z axes of orientation, the worst case **X-axis of orientation** was recorded.)

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

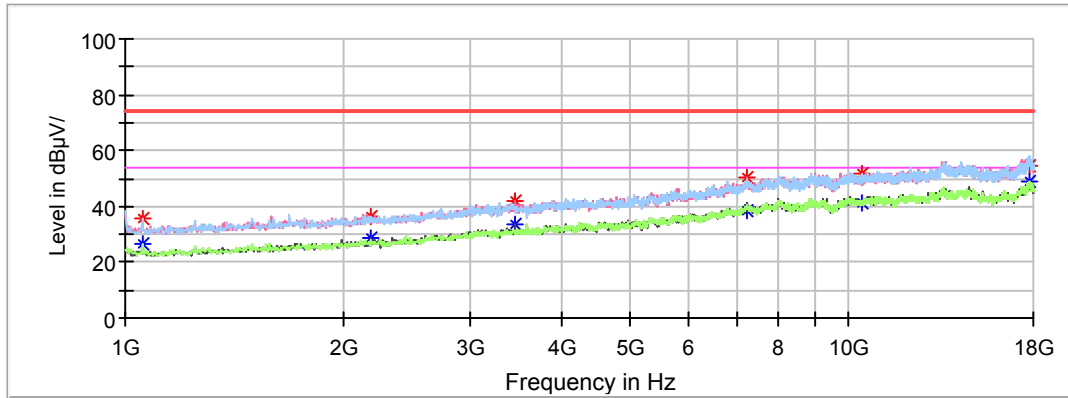
Full Spectrum



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)				
1054.400000	---	25.18	150.0	H	30.0	-10.1	54.00	28.82
1054.400000	34.28	---	150.0	H	30.0	-10.1	74.00	39.72
2125.400000	40.55	---	150.0	V	358.0	-5.4	68.20	27.65
3454.800000	43.36	---	150.0	V	63.0	-0.9	68.20	24.84
7694.600000	---	40.35	150.0	V	170.0	10.1	54.00	13.65
7694.600000	50.81	---	150.0	V	170.0	10.1	74.00	23.19
10360.000000	49.13	---	150.0	V	170.0	12.7	68.20	19.07
15540.000000	56.09	---	150.0	V	126.0	17.4	74.00	17.91
15540.000000	---	48.85	150.0	V	126.0	17.4	54.00	5.15

Middle Channel: 5200MHz

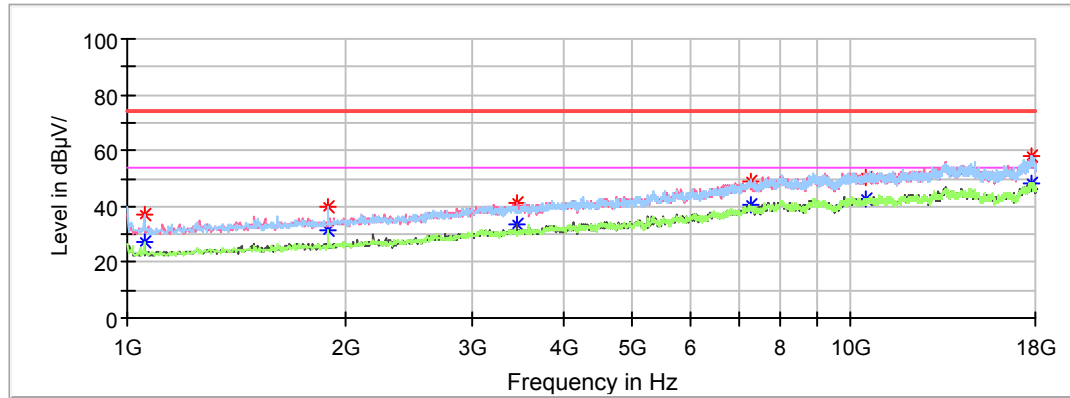
Full Spectrum



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)				
1054.400000	---	26.70	150.0	H	11.0	-10.1	54.00	27.30
1054.400000	35.94	---	150.0	H	11.0	-10.1	74.00	38.06
2190.000000	36.54	---	150.0	V	42.0	-5.2	68.20	31.66
3454.800000	42.23	---	150.0	V	63.0	-0.9	68.20	25.97
7218.600000	50.12	---	150.0	V	127.0	8.9	68.20	18.08
10400.000000	51.45	---	150.0	V	308.0	12.7	68.20	16.75
15600.000000	54.80	---	150.0	V	179.0	17.5	74.00	19.20
15600.000000	---	49.20	150.0	V	179.0	17.5	54.00	4.80

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)				
1054.400000	37.14	---	150.0	H	26.0	-10.1	74.00	36.86
1054.400000	---	27.31	150.0	H	26.0	-10.1	54.00	26.69
1894.200000	39.54	---	150.0	H	26.0	-6.2	68.20	28.66
3454.800000	41.26	---	150.0	V	69.0	-0.9	68.20	26.94
7273.000000	49.18	---	150.0	V	165.0	9.1	74.00	24.82
7273.000000	---	40.84	150.0	V	165.0	9.1	54.00	13.16
10480.000000	50.50	---	150.0	V	165.0	12.7	68.20	17.70
15720.000000	---	48.09	150.0	V	315.0	17.5	54.00	5.91
15720.000000	58.12	---	150.0	V	315.0	17.5	74.00	15.88

802.11n-HT20 Mode:

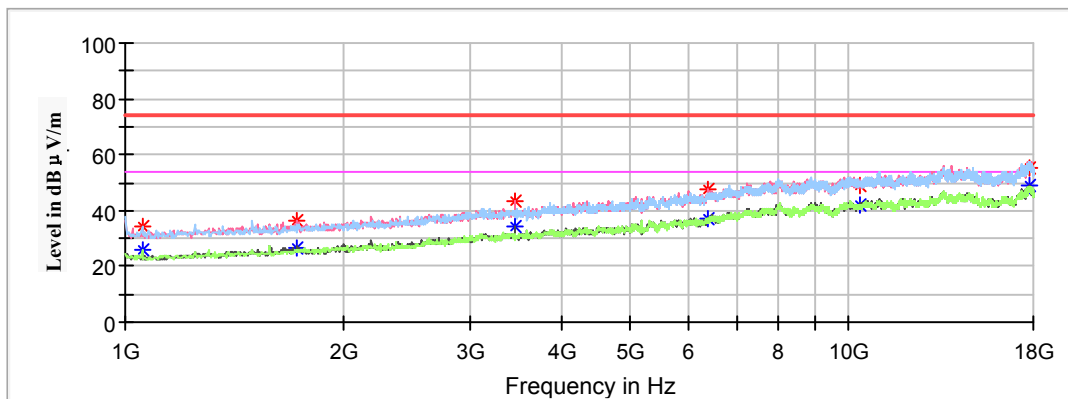
(Pre-scan in the X,Y and Z axes of orientation, the worst case **X-axis of orientation** was recorded)

Note:

1. This test was performed with the 5.150-5.250GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Low Channel: 5180MHz

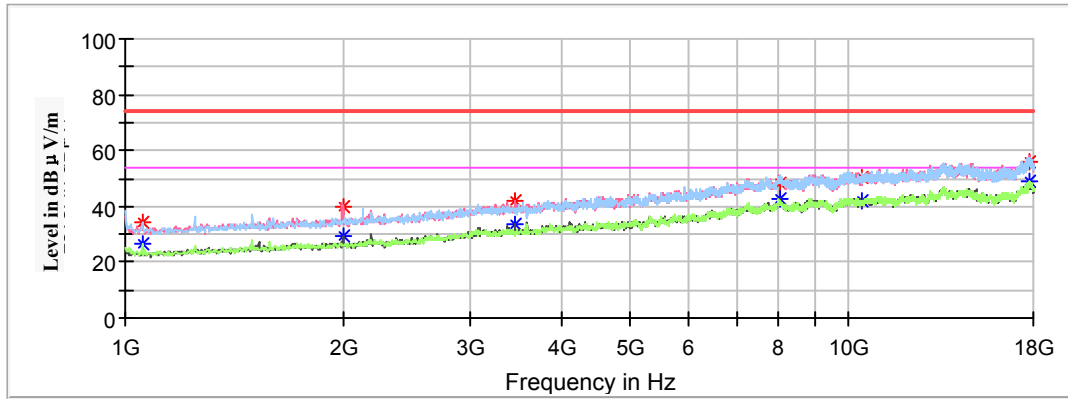
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1054.400000	---	25.81	150.0	H	18.0	-10.1	54.00	28.19
1054.400000	34.23	---	150.0	H	18.0	-10.1	74.00	39.77
1724.200000	36.34	---	150.0	V	95.0	-6.8	68.20	31.86
3454.800000	43.40	---	150.0	V	84.0	-0.9	68.20	24.80
6402.600000	47.89	---	150.0	V	116.0	6.3	68.20	20.31
10360.000000	48.81	---	150.0	V	314.0	12.7	68.20	19.39
15540.000000	55.50	---	150.0	V	159.0	17.5	74.00	18.50
15540.000000	---	48.71	150.0	V	159.0	17.5	54.00	5.29

Middle Channel: 5200MHz

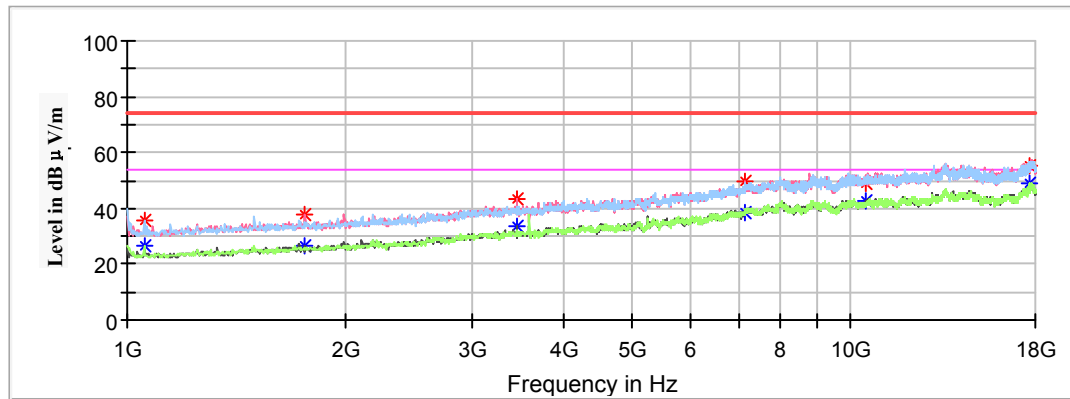
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1054.400000	---	26.86	150.0	H	26.0	-10.1	54.00	27.14
1054.400000	34.55	---	150.0	H	26.0	-10.1	74.00	39.45
1999.600000	40.00	---	150.0	V	68.0	-5.8	68.20	28.20
3454.800000	41.88	---	150.0	V	68.0	-0.9	68.20	26.32
8048.200000	48.54	---	150.0	V	25.0	10.7	74.00	25.46
8048.200000	---	42.32	150.0	V	25.0	10.7	54.00	11.68
10400.000000	50.05	---	150.0	V	89.0	12.7	68.20	18.15
15600.000000	55.63	---	150.0	V	79.0	17.5	74.00	18.37
15600.000000	---	49.08	150.0	V	79.0	17.5	54.00	4.92

High Channel: 5240MHz

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1054.400000	---	26.71	150.0	H	35.0	-10.1	54.00	27.29
1054.400000	35.91	---	150.0	H	35.0	-10.1	74.00	38.09
1761.600000	37.90	---	150.0	V	342.0	-6.6	68.20	30.30
3454.800000	43.16	---	150.0	V	68.0	-0.9	68.20	25.04
7137.000000	49.78	---	150.0	V	36.0	8.7	68.20	18.42
10480.000000	49.24	---	150.0	V	261.0	12.7	68.20	18.96
15720.000000	55.48	---	150.0	V	292.0	17.3	74.00	18.52
15720.000000	---	48.67	150.0	V	292.0	17.3	54.00	5.33

802.11n-HT40 Mode:

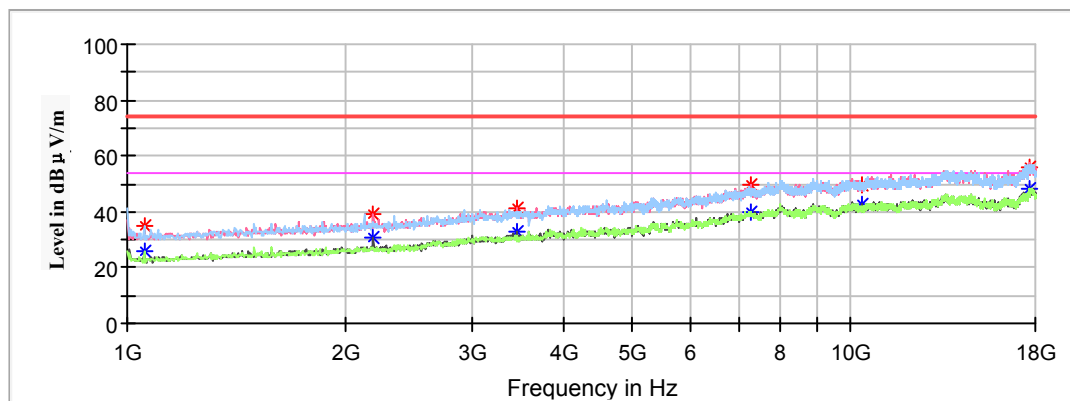
(Pre-scan in the X,Y and Z axes of orientation, the worst case **X-axis of orientation** was recorded)

Note:

1. This test was performed with the 5.150-5.250GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Low Channel: 5190MHz

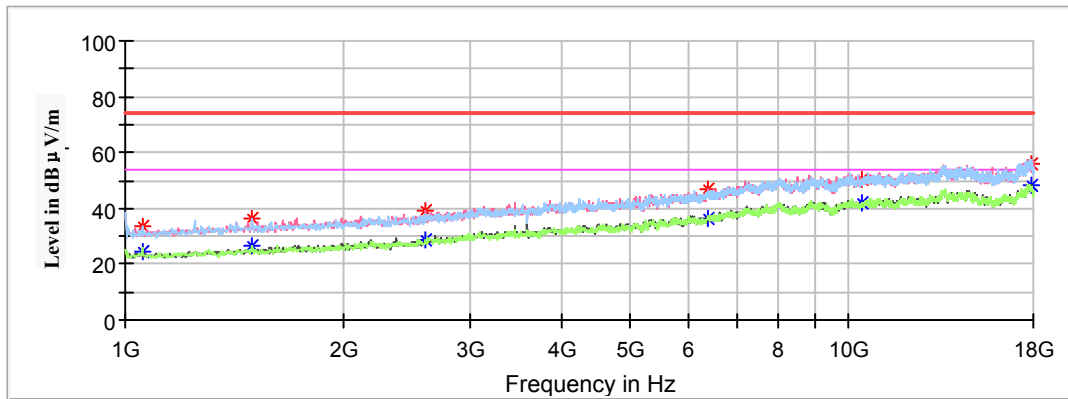
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1054.400000	35.11	---	150.0	H	25.0	-10.1	74.00	38.89
1054.400000	---	25.62	150.0	H	25.0	-10.1	54.00	28.38
2190.000000	39.51	---	150.0	V	37.0	-5.2	68.20	28.69
3454.800000	41.47	---	150.0	V	80.0	-0.9	68.20	26.73
7269.600000	49.86	---	150.0	V	144.0	9.1	74.00	24.14
7269.600000	---	39.71	150.0	V	144.0	9.1	54.00	14.29
10380.000000	49.67	---	150.0	V	219.0	12.7	68.20	18.53
15570.000000	56.00	---	150.0	V	56.0	17.3	74.00	18.00
15570.000000	---	48.17	150.0	V	56.0	17.3	54.00	5.83

High Channel: 5230MHz

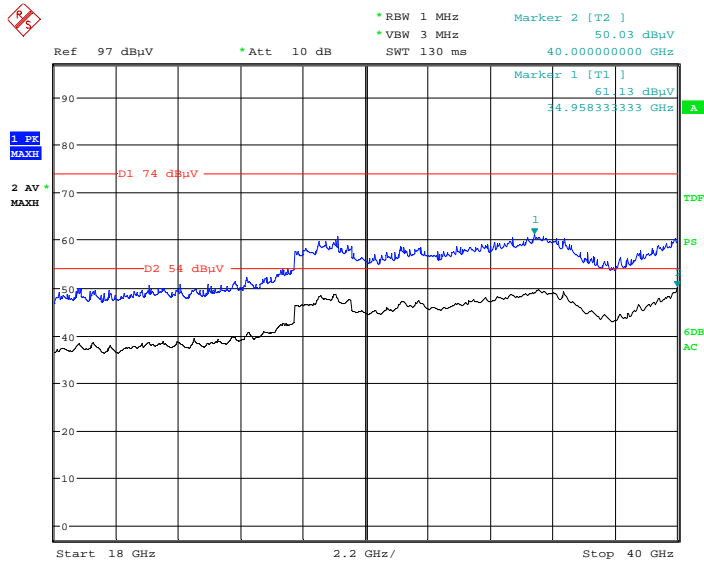
Full Spectrum



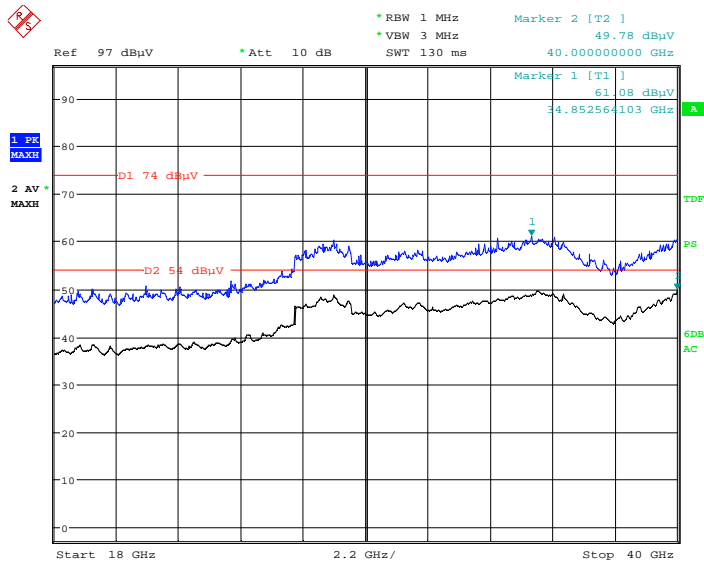
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1054.400000	---	24.13	150.0	V	149.0	-10.1	54.00	29.87
1054.400000	33.87	---	150.0	V	149.0	-10.1	74.00	40.13
1499.800000	---	26.70	150.0	H	26.0	-7.6	54.00	27.30
1499.800000	36.34	---	150.0	H	26.0	-7.6	74.00	37.66
2594.600000	39.40	---	150.0	V	53.0	-3.8	68.20	28.80
6385.600000	46.78	---	150.0	V	42.0	6.2	68.20	21.42
10460.000000	50.25	---	150.0	V	165.0	12.7	68.20	17.95
15690.000000	55.79	---	150.0	V	31.0	17.6	74.00	18.21
15690.000000	---	48.56	150.0	V	31.0	17.6	54.00	5.44

18GHz-40GHz(5150MHz-5250MHz):**Note:**

Pre-scan with 802.11a, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X, Y and Z axes of orientation, the worst case **channel 5230MHz of 802.11n-HT40 mode in X-axis of orientation** was recorded.

Horizontal

Date: 10.MAR.2019 09:55:59

Vertical

Date: 10.MAR.2019 10:11:03

Fundamental Test & Restricted Bands Emissions Test (5150MHz-5250MHz):

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)**802.11a Mode:** (Pre-scan in the X, Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5180.000000	97.04	---	200.0	H	194.0	11.9	/	/
5180.000000	---	89.14	200.0	H	194.0	11.9	/	/
5180.000000	94.67	---	100.0	V	42.0	11.9	/	/
5180.000000	---	87.04	100.0	V	42.0	11.9	/	/
5150.000000	---	45.76	150.0	H	342.0	11.9	54.00	8.24
5150.000000	55.37	---	150.0	H	342.0	11.9	74.00	18.63
Middle Channel: 5200MHz								
5200.000000	96.46	---	150.0	H	295.0	11.9	/	/
5200.000000	---	89.48	150.0	H	295.0	11.9	/	/
5200.000000	94.11	---	200.0	V	97.0	11.9	/	/
5200.000000	---	87.22	200.0	V	97.0	11.9	/	/
High Channel: 5240MHz								
5240.000000	97.32	---	200.0	H	310.0	12.0	/	/
5240.000000	---	90.35	200.0	H	310.0	12.0	/	/
5240.000000	94.87	---	150.0	V	154.0	12.0	/	/
5240.000000	---	87.98	150.0	V	154.0	12.0	/	/
5350.000000	54.17	---	150.0	H	20.0	12.2	74.00	19.83
5350.000000	---	46.05	150.0	H	20.0	12.2	54.00	7.95

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

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5180MHz								
5180.000000	97.74	---	150.0	H	249.0	11.9	/	/
5180.000000	---	90.70	150.0	H	249.0	11.9	/	/
5180.000000	95.27	---	200.0	V	284.0	11.9	/	/
5180.000000	---	88.55	200.0	V	284.0	11.9	/	/
5150.000000	---	46.03	200.0	H	234.0	11.9	54.00	7.97
5150.000000	55.06	---	200.0	H	234.0	11.9	74.00	18.94
Middle Channel: 5200MHz								
5200.000000	97.68	---	200.0	H	295.0	11.9	/	/
5200.000000	---	90.63	200.0	H	295.0	11.9	/	/
5200.000000	95.50	---	200.0	V	146.0	11.9	/	/
5200.000000	---	88.18	200.0	V	146.0	11.9	/	/
High Channel: 5240MHz								
5240.000000	97.39	---	200.0	H	37.0	12.0	/	/
5240.000000	---	90.34	200.0	H	37.0	12.0	/	/
5240.000000	95.16	---	150.0	V	243.0	12.0	/	/
5240.000000	---	87.88	150.0	V	243.0	12.0	/	/
5350.000000	54.84	---	250.0	H	205.0	12.2	74.00	19.16
5350.000000	---	45.67	250.0	H	205.0	12.2	54.00	8.33

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

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5190MHz								
5190.000000	95.32	---	150.0	H	44.0	12.0	/	/
5190.000000	---	88.21	150.0	H	44.0	12.0	/	/
5190.000000	93.04	---	200.0	V	352.0	12.0	/	/
5190.000000	---	86.07	200.0	V	352.0	12.0	/	/
5150.000000	---	47.02	100.0	H	30.0	11.9	54.00	6.98
5150.000000	56.82	---	100.0	H	30.0	11.9	74.00	17.18
High Channel: 5230MHz								
5230.000000	95.76	---	200.0	H	295.0	12.0	/	/
5230.000000	---	88.63	200.0	H	295.0	12.0	/	/
5230.000000	93.35	---	150.0	V	215.0	12.0	/	/
5230.000000	---	86.54	150.0	V	215.0	12.0	/	/
5350.000000	54.92	---	250.0	H	281.0	12.2	74.00	19.08
5350.000000	---	46.68	250.0	H	281.0	12.2	54.00	7.32

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

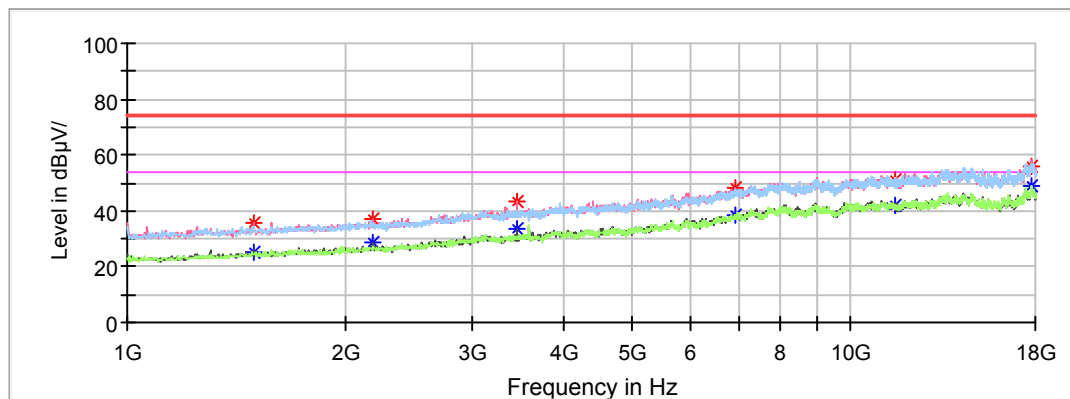
(Pre-scan in the X,Y and Z axes of orientation, the worst case **X-axis of orientation** was recorded.)

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

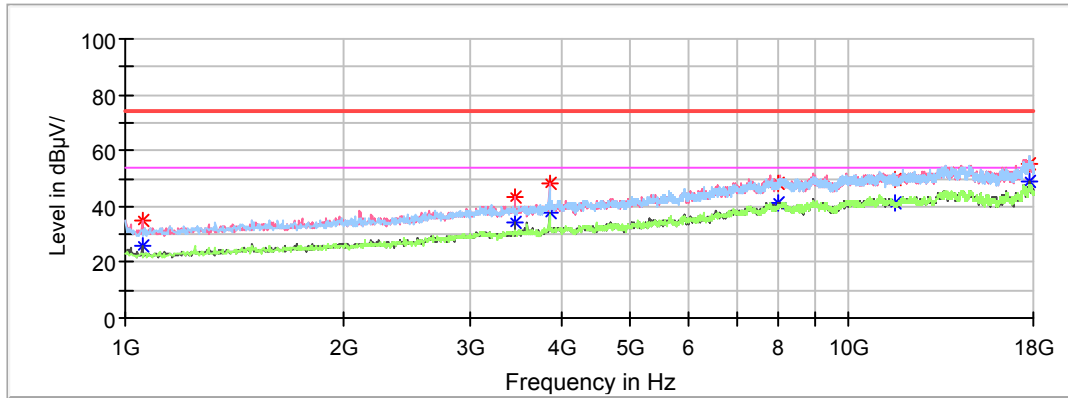
Full Spectrum



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)				
1496.400000	---	25.45	200.0	V	240.0	-7.6	54.00	28.55
1496.400000	35.89	---	200.0	V	240.0	-7.6	74.00	38.11
2190.000000	37.32	---	200.0	V	89.0	-5.2	68.20	30.88
3454.800000	43.28	---	200.0	V	229.0	-0.9	68.20	24.92
6929.600000	48.35	---	100.0	V	0.0	8.0	68.20	19.85
11490.000000	---	41.76	100.0	V	195.0	12.9	54.00	12.24
11490.000000	50.79	---	100.0	V	195.0	12.9	74.00	23.21
17235.000000	56.00	---	200.0	V	0.0	17.5	68.20	12.20

Middle Channel: 5785MHz

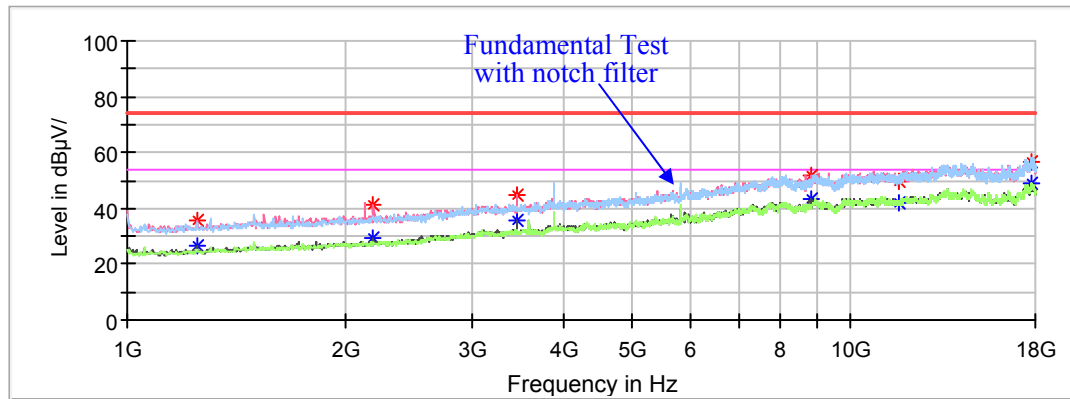
Full Spectrum



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)				
1054.400000	---	25.76	150.0	V	308.0	-10.1	54.00	28.24
1054.400000	35.15	---	150.0	V	308.0	-10.1	74.00	38.85
3454.800000	43.26	---	150.0	V	233.0	-0.9	68.20	24.94
3856.000000	---	37.87	150.0	V	35.0	0.3	54.00	16.13
3856.000000	48.25	---	150.0	V	35.0	0.3	74.00	25.75
8000.600000	47.92	---	150.0	V	276.0	10.7	74.00	26.08
8000.600000	---	41.17	150.0	V	276.0	10.7	54.00	12.83
11570.000000	---	40.93	150.0	V	169.0	12.9	54.00	13.07
11570.000000	49.96	---	150.0	V	169.0	12.9	74.00	24.04
17355.000000	55.58	---	150.0	V	105.0	17.5	68.20	12.62

High Channel: 5825MHz

Full Spectrum



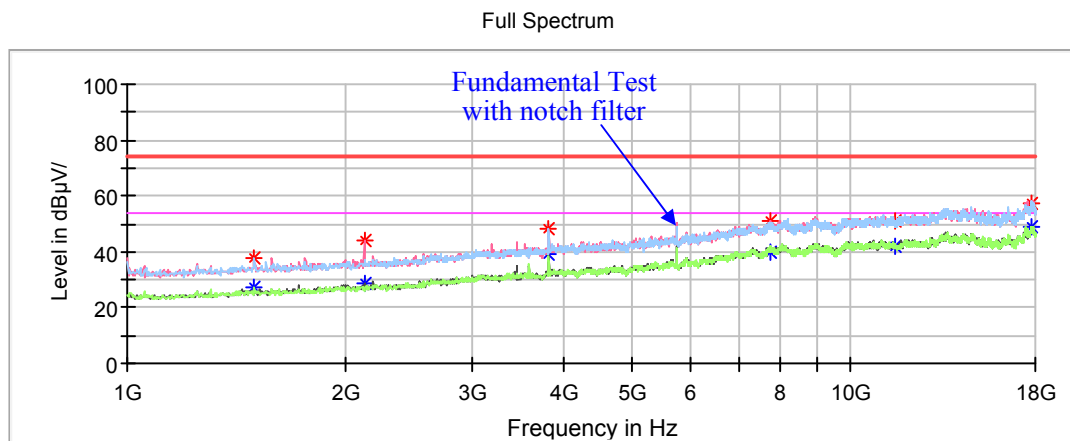
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1248.200000	35.60	---	200.0	V	43.0	-9.0	68.20	32.60
2190.000000	40.97	---	150.0	V	26.0	-5.2	68.20	27.23
3454.800000	44.81	---	200.0	V	64.0	-0.9	68.20	23.39
8830.200000	51.66	---	200.0	V	160.0	11.3	68.20	16.54
11650.000000	49.40	---	150.0	V	95.0	13.0	74.00	24.60
11650.000000	---	42.30	150.0	V	95.0	13.0	54.00	11.70
17475.000000	56.91	---	150.0	V	304.0	17.5	68.20	11.29

802.11n-HT20 Mode:

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

Note:

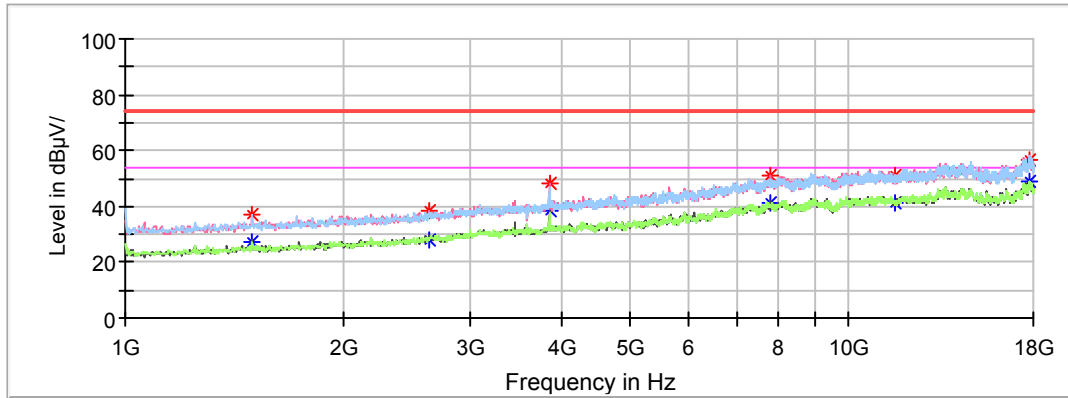
1. This test was performed with the 5725-5850MHz band reject filter.
2. Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

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)				
1499.800000	---	27.11	100.0	H	25.0	-7.6	54.00	26.89
1499.800000	37.61	---	100.0	H	25.0	-7.6	74.00	36.39
2125.400000	43.90	---	100.0	V	358.0	-5.4	68.20	24.30
3828.800000	48.51	---	150.0	V	287.0	0.3	74.00	25.49
3828.800000	---	39.48	150.0	V	287.0	0.3	54.00	14.52
7742.200000	---	39.96	200.0	V	121.0	10.2	54.00	14.04
7742.200000	50.82	---	200.0	V	121.0	10.2	74.00	23.18
11490.000000	50.81	---	100.0	V	41.0	12.9	74.00	23.19
11490.000000	---	42.03	100.0	V	41.0	12.9	54.00	11.97
17235.000000	57.42	---	100.0	V	9.0	17.5	68.20	10.78

Middle Channel: 5785MHz

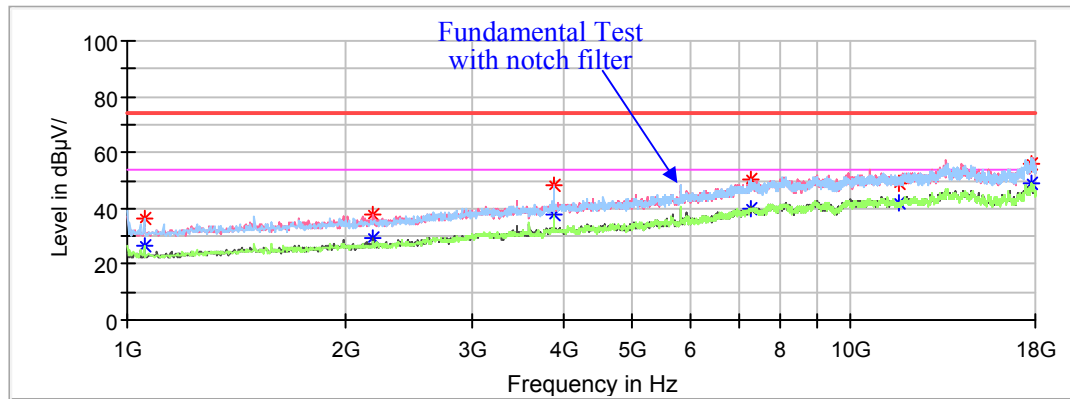
Full Spectrum



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)				
1499.800000	---	26.96	150.0	H	25.0	-7.6	54.00	27.04
1499.800000	36.82	---	150.0	H	25.0	-7.6	74.00	37.18
2635.400000	38.63	---	150.0	V	31.0	-3.6	68.20	29.57
3856.000000	48.00	---	150.0	V	321.0	0.3	74.00	26.00
3856.000000	---	38.61	150.0	V	321.0	0.3	54.00	15.39
7786.400000	50.94	---	150.0	V	117.0	10.3	68.20	17.26
11570.000000	---	41.59	150.0	V	25.0	12.9	54.00	12.41
11570.000000	51.23	---	150.0	V	25.0	12.9	74.00	22.77
17355.000000	56.69	---	150.0	V	117.0	17.5	68.20	11.51

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)				
1054.400000	36.57	---	150.0	H	25.0	-10.1	74.00	37.43
1054.400000	---	26.26	150.0	H	25.0	-10.1	54.00	27.74
2190.000000	37.85	---	150.0	V	31.0	-5.2	68.20	30.35
3883.200000	48.07	---	150.0	V	293.0	0.4	74.00	25.93
3883.200000	---	37.56	150.0	V	293.0	0.4	54.00	16.44
7290.000000	50.22	---	150.0	H	126.0	9.1	74.00	23.78
7290.000000	---	39.81	150.0	H	126.0	9.1	54.00	14.19
11650.000000	---	41.70	150.0	V	160.0	13.0	54.00	12.30
11650.000000	49.03	---	150.0	V	160.0	13.0	74.00	24.97
17475.000000	56.21	---	150.0	V	186.0	17.5	68.20	11.99

802.11n-HT40 Mode:

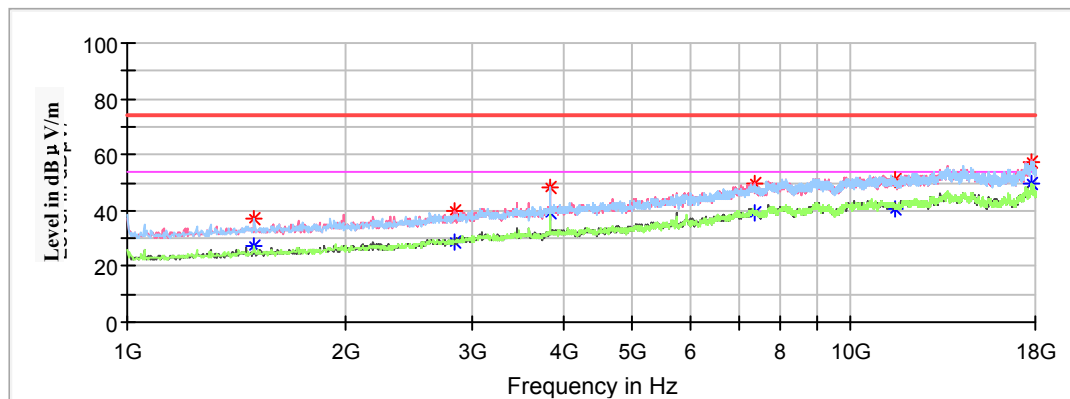
(Pre-scan in the X,Y and Z axes of orientation, the worst case **X-axis of orientation** was recorded)

Note:

1. This test was performed with the 5.725-5.850GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
 Corrected Amplitude (dB μ V /m) = Corrected Factor (dB/m) + Reading (dB μ V)
 Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Low Channel: 5755MHz

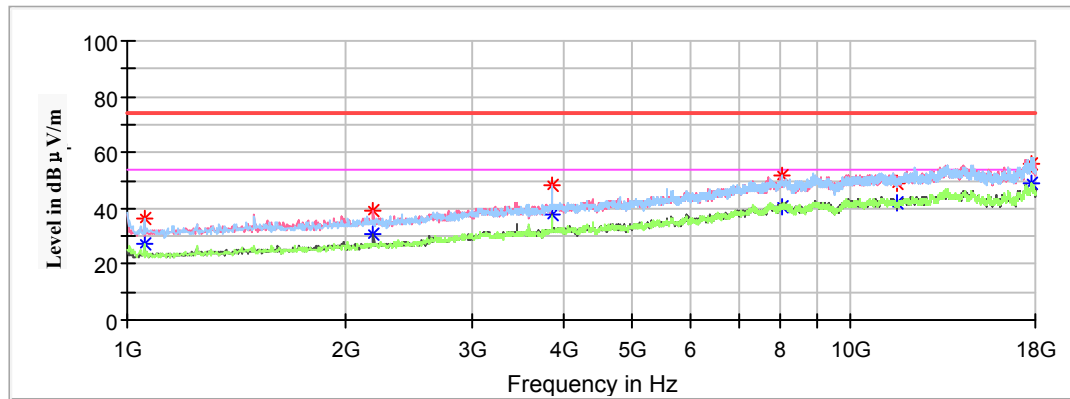
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
	MaxPeak (dB μ V /m)	Average (dB μ V /m)	Height (cm)	Polar (H/V)				
1499.800000	---	27.19	150.0	H	324.0	-7.6	54.00	26.81
1499.800000	36.96	---	150.0	H	324.0	-7.6	74.00	37.04
2829.200000	---	28.97	150.0	V	110.0	-2.6	54.00	25.03
2829.200000	40.06	---	150.0	V	110.0	-2.6	74.00	33.94
3835.600000	---	39.03	150.0	V	325.0	0.3	54.00	14.97
3835.600000	48.47	---	150.0	V	325.0	0.3	74.00	25.53
7385.200000	---	38.94	150.0	V	78.0	9.4	54.00	15.06
7385.200000	49.53	---	150.0	V	78.0	9.4	74.00	24.47
11510.000000	---	40.62	150.0	V	2.0	12.8	54.00	13.38
11510.000000	51.19	---	150.0	V	2.0	12.8	74.00	22.81
17265.000000	57.55	---	150.0	V	11.0	17.5	68.20	10.65

High Channel: 5795MHz

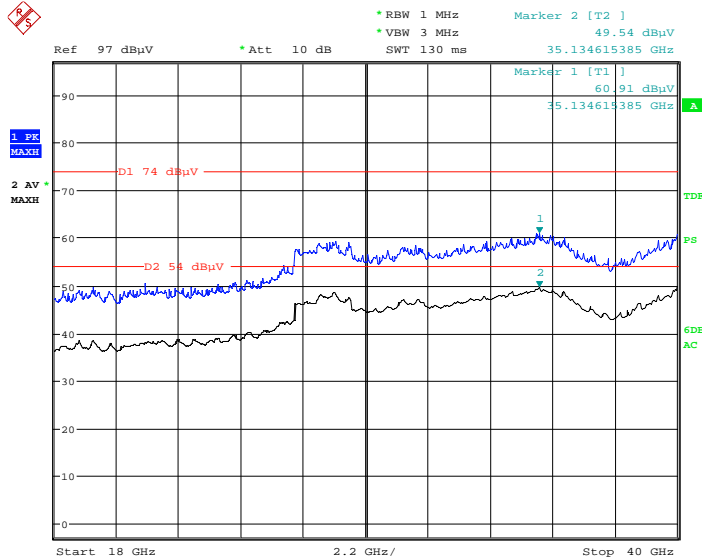
Full Spectrum



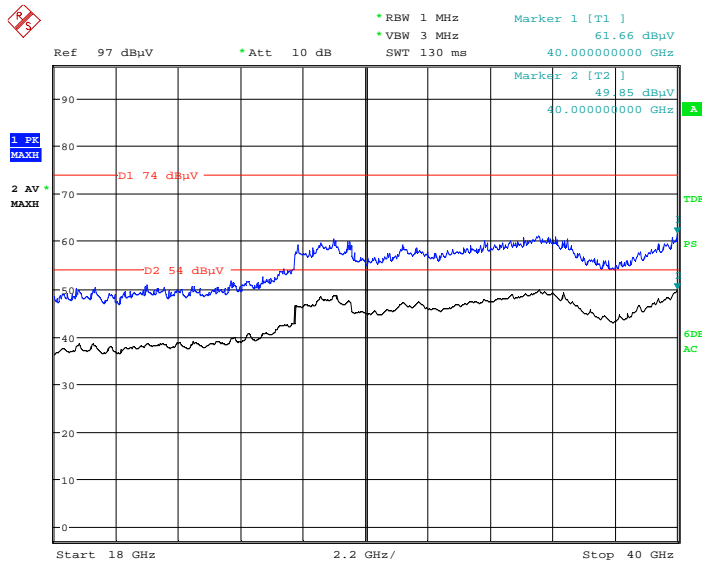
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1054.400000	---	27.55	150.0	H	26.0	-10.1	54.00	26.45
1054.400000	36.66	---	150.0	H	26.0	-10.1	74.00	37.34
2190.000000	39.20	---	150.0	V	37.0	-5.2	68.20	29.00
3862.800000	---	38.05	150.0	V	315.0	0.4	54.00	15.95
3862.800000	48.38	---	150.0	V	315.0	0.4	74.00	25.62
8038.000000	---	40.58	150.0	H	340.0	10.7	54.00	13.42
8038.000000	51.60	---	150.0	H	340.0	10.7	74.00	22.40
11590.000000	49.06	---	150.0	V	3.0	12.9	74.00	24.94
11590.000000	---	42.18	150.0	V	3.0	12.9	54.00	11.82
17385.000000	55.78	---	150.0	V	37.0	17.5	68.20	12.42

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

Pre-scan with 802.11a, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case **channel 5795MHz of 802.11n-HT40 mode in X-axis of orientation** was recorded

Horizontal

Date: 10.MAR.2019 10:22:45

Vertical

Date: 10.MAR.2019 10:33:39

Fundamental Test & 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 X-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								
5745.000000	97.28	---	250.0	H	112.0	12.7	/	/
5745.000000	---	90.30	250.0	H	112.0	12.7	/	/
5745.000000	95.19	---	250.0	V	275.0	12.7	/	/
5745.000000	---	88.01	250.0	V	275.0	12.7	/	/
5650.000000	54.74	---	100.0	H	26.0	12.7	68.20	13.46
5700.000000	55.78	---	200.0	H	61.0	12.7	105.20	49.42
5720.000000	55.91	---	200.0	H	13.0	12.7	110.80	54.89
5725.000000	55.30	---	250.0	H	207.0	12.7	122.20	66.90
Middle Channel: 5785MHz								
5785.000000	98.17	---	200.0	H	128.0	11.9	/	/
5785.000000	---	91.17	200.0	H	128.0	11.9	/	/
5785.000000	95.77	---	150.0	V	69.0	11.9	/	/
5785.000000	---	88.95	150.0	V	69.0	11.9	/	/
High Channel: 5825MHz								
5825.000000	96.52	---	200.0	H	202.0	12.8	/	/
5825.000000	---	89.46	200.0	H	202.0	12.8	/	/
5825.000000	94.19	---	250.0	V	10.0	12.8	/	/
5825.000000	---	87.02	250.0	V	10.0	12.8	/	/
5850.000000	57.07	---	250.0	H	10.0	12.8	122.20	65.13
5855.000000	56.63	---	250.0	H	10.0	12.8	110.80	54.17
5875.000000	55.32	---	250.0	H	10.0	12.8	105.20	49.88
5925.000000	56.66	---	250.0	H	10.0	12.8	68.20	11.54

802.11n-HT20 Mode: (Pre-scan in the X, Y and Z axes of orientation, the worst case in X-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								
5745.000000	98.69	---	200.0	H	71.0	12.7	/	/
5745.000000	---	91.63	200.0	H	71.0	12.7	/	/
5745.000000	96.40	---	200.0	V	230.0	12.7	/	/
5745.000000	---	89.61	200.0	V	230.0	12.7	/	/
5650.000000	56.60	---	200.0	H	137.0	12.7	67.80	11.20
5700.000000	56.12	---	150.0	H	252.0	12.7	105.20	49.08
5720.000000	57.06	---	200.0	H	150.0	12.7	110.80	53.74
5725.000000	56.78	---	100.0	H	151.0	12.7	122.20	65.42
Middle Channel: 5785MHz								
5785.000000	97.58	---	200.0	H	338.0	11.9	/	/
5785.000000	---	90.42	200.0	H	338.0	11.9	/	/
5785.000000	95.18	---	150.0	V	239.0	11.9	/	/
5785.000000	---	88.26	150.0	V	239.0	11.9	/	/
High Channel: 5825MHz								
5825.000000	97.80	---	100.0	H	59.0	12.8	/	/
5825.000000	---	90.79	100.0	H	59.0	12.8	/	/
5825.000000	95.67	---	250.0	V	136.0	12.8	/	/
5825.000000	---	88.38	250.0	V	136.0	12.8	/	/
5850.000000	56.38	---	250.0	H	136.0	12.8	122.20	65.82
5855.000000	56.77	---	250.0	H	136.0	12.8	110.80	54.03
5875.000000	57.10	---	250.0	H	136.0	12.8	105.20	48.10
5925.000000	57.21	---	250.0	H	136.0	12.8	68.20	10.99

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

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
Low Channel: 5755MHz								
5755.000000	94.40	---	200.0	H	81.0	12.7	/	/
5755.000000	---	87.36	200.0	H	81.0	12.7	/	/
5755.000000	92.33	---	100.0	V	33.0	12.7	/	/
5755.000000	---	84.90	100.0	V	33.0	12.7	/	/
5650.000000	56.28	---	150.0	H	10.0	12.7	68.73	12.45
5700.000000	55.79	---	150.0	H	278.0	12.7	105.20	49.41
5720.000000	55.61	---	200.0	H	316.0	12.7	110.80	55.19
5725.000000	56.12	---	150.0	H	51.0	12.7	122.20	66.08
High Channel: 5795MHz								
5795.000000	96.38	---	150.0	H	356.0	12.7	/	/
5795.000000	---	89.45	150.0	H	356.0	12.7	/	/
5795.000000	94.03	---	250.0	V	86.0	12.7	/	/
5795.000000	---	87.15	250.0	V	86.0	12.7	/	/
5850.000000	55.79	---	250.0	H	86.0	12.7	122.20	66.41
5855.000000	55.67	---	250.0	H	86.0	12.7	110.80	55.13
5875.000000	55.33	---	250.0	H	86.0	12.8	105.20	49.87
5925.000000	55.91	---	250.0	H	86.0	12.8	68.20	12.29

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

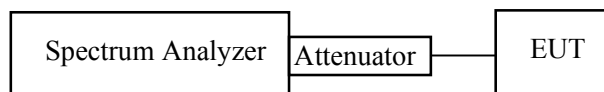
1. Emission Bandwidth (EBW)

- 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:	22.1-23.5 °C
Relative Humidity:	48-50 %
ATM Pressure:	100.6-101.2 kPa

The testing was performed by Hope Zhang from 2019-01-07 to 2019-03-06.

Test Result: Pass.

5150-5250 MHz:

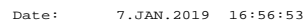
Test mode	Channel	Frequency (MHz)	26dB Bandwidth(MHz)	99% Bandwidth(MHz)
802.11a	Low	5180	19.238	16.653
	Middle	5200	19.178	16.653
	High	5240	19.960	16.653
802.11n-HT20	Low	5180	19.479	17.615
	Middle	5200	19.479	17.615
	High	5240	19.479	17.615
802.11n-HT40	Low	5190	39.920	36.192
	High	5230	39.679	36.072

5725-5850MHz:

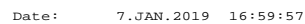
Test mode	Channel	Frequency (MHz)	6dB Bandwidth(MHz)	99% Bandwidth(MHz)	Limit (MHz)
802.11a	Low	5745	15.691	16.593	≥0.5
	Middle	5785	15.631	16.593	≥0.5
	High	5825	15.391	16.593	≥0.5
802.11n-HT20	Low	5745	17.074	17.615	≥0.5
	Middle	5785	15.932	17.615	≥0.5
	High	5825	15.992	17.615	≥0.5
802.11n-HT40	Low	5755	34.870	36.192	≥0.5
	High	5795	34.990	36.192	≥0.5

26dB Bandwidth:

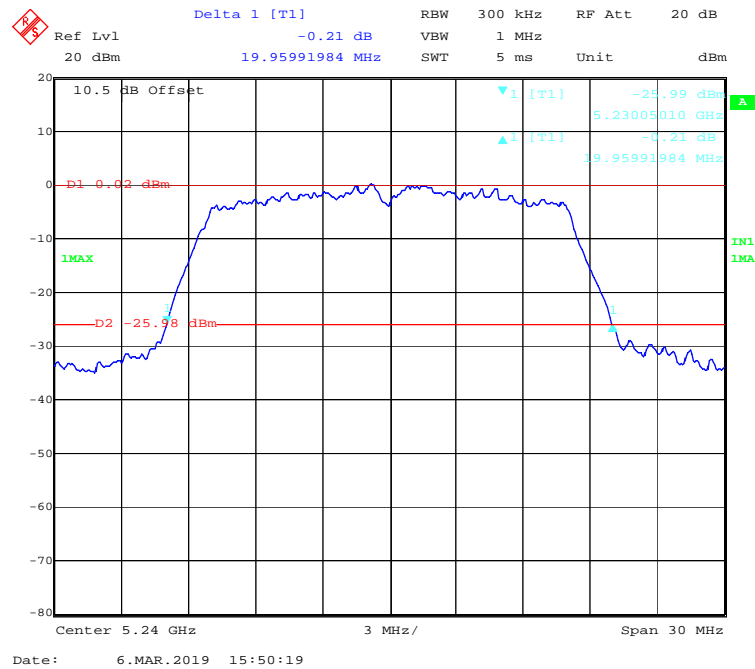
802.11a mode, 5180MHz



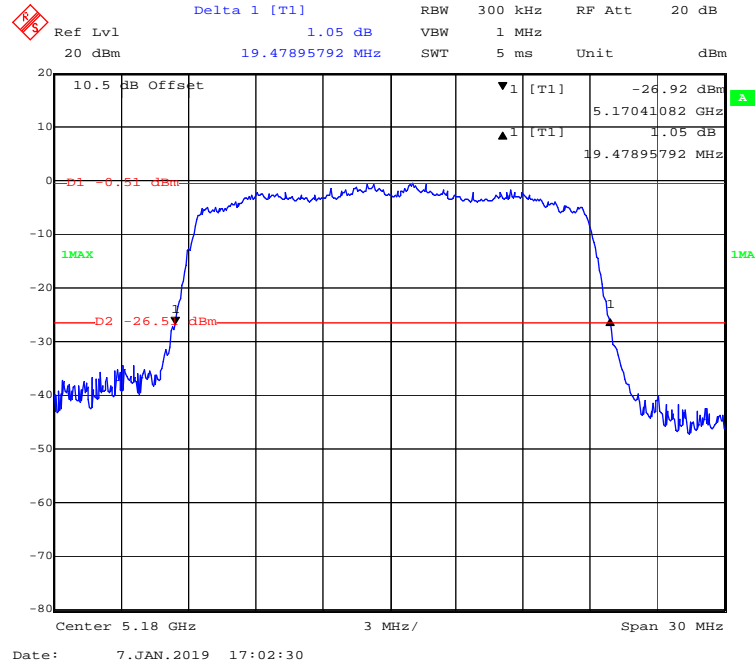
802.11a mode, 5200MHz



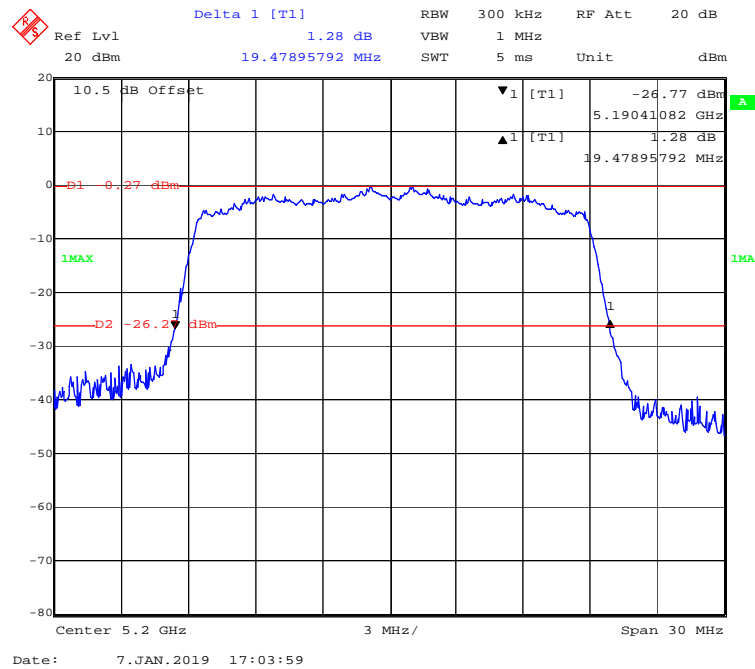
802.11a mode, 5240MHz



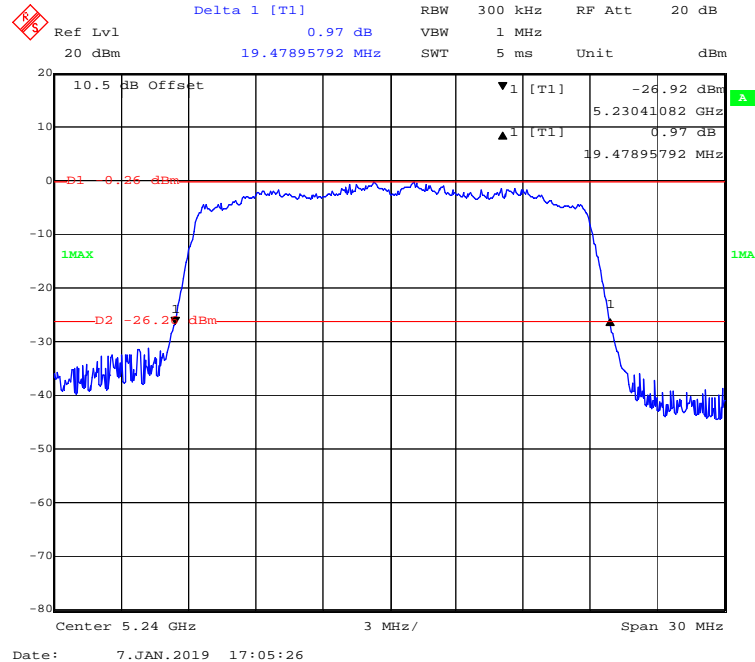
802.11n-HT20 mode, 5180MHz



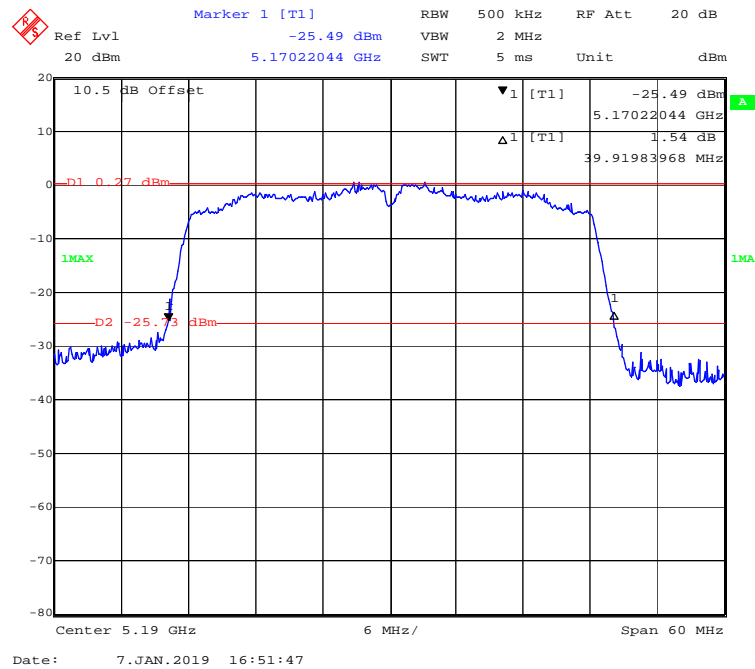
802.11n-HT20 mode, 5200MHz



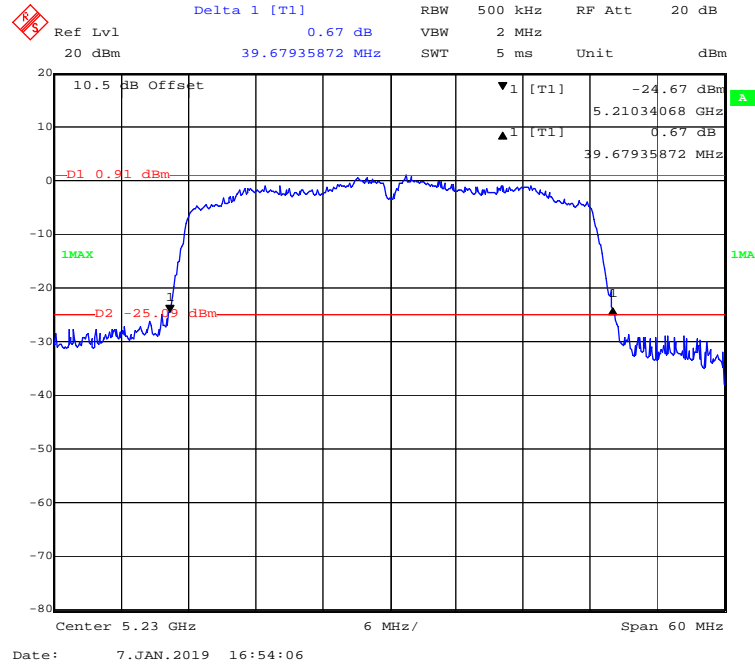
802.11n-HT20 mode, 5240MHz

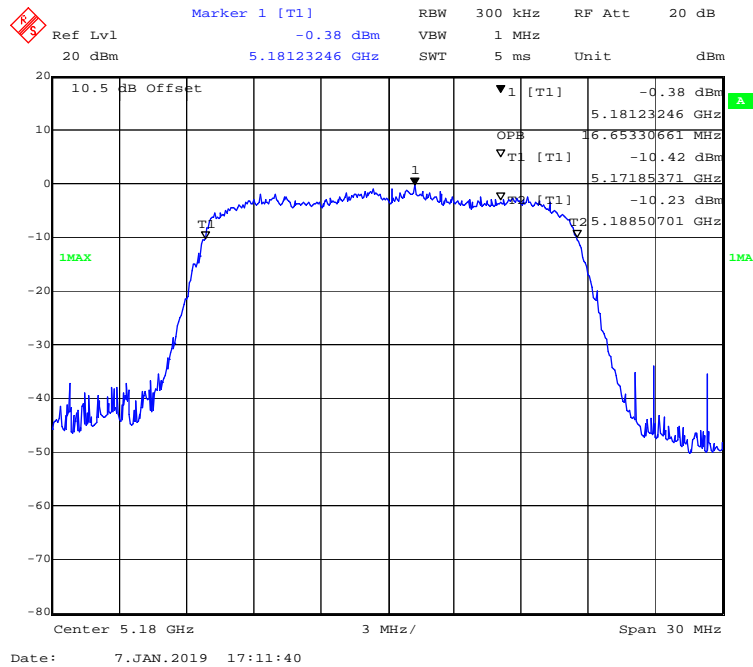
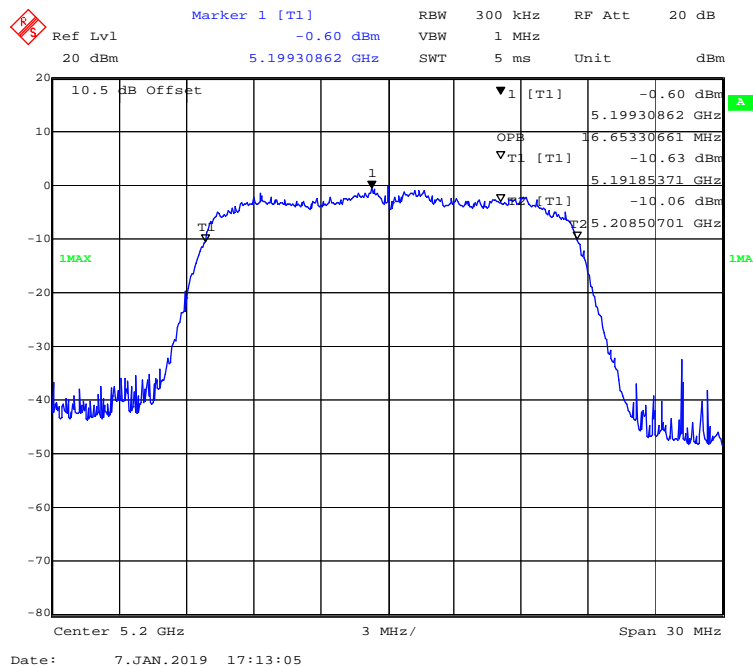


802.11n-HT40 mode, 5190MHz

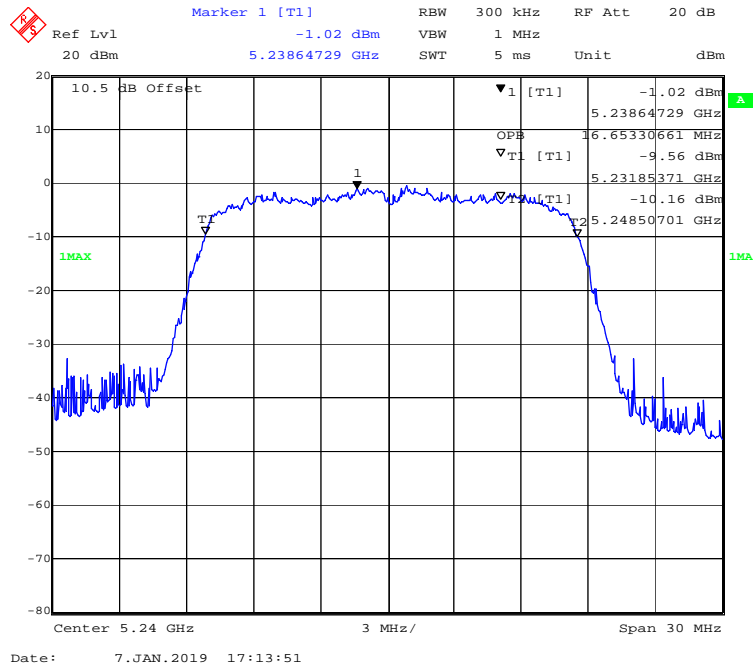


802.11n-HT40 mode, 5230MHz

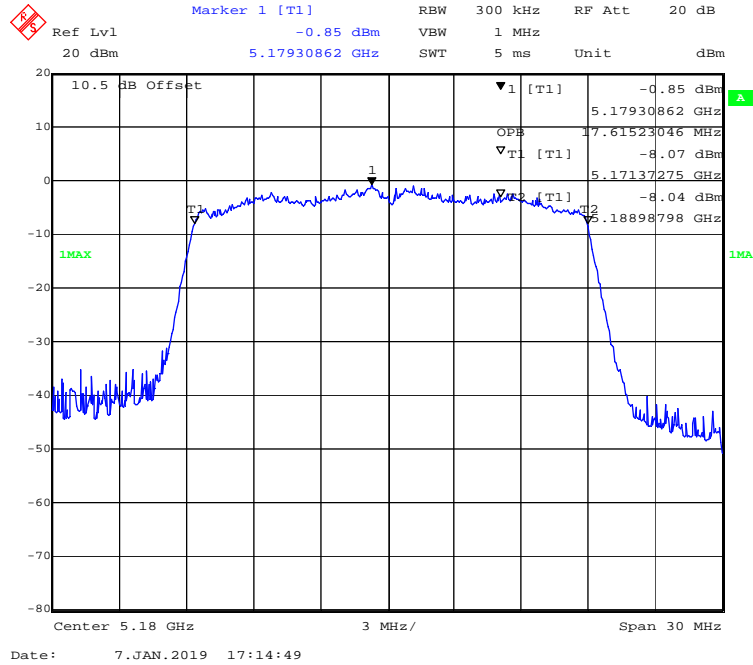


99% Occupied Bandwidth:**802.11a mode, 5180MHz****802.11a mode, 5200MHz**

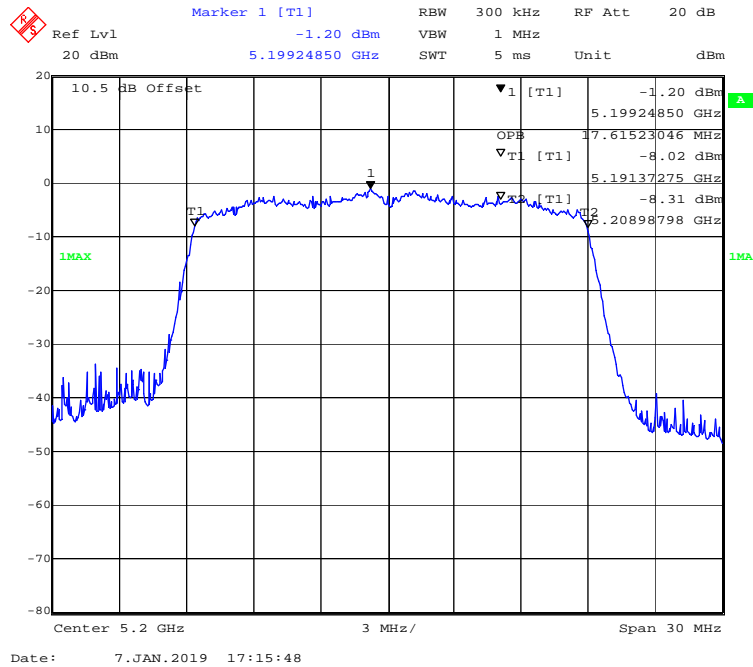
802.11a mode, 5240MHz



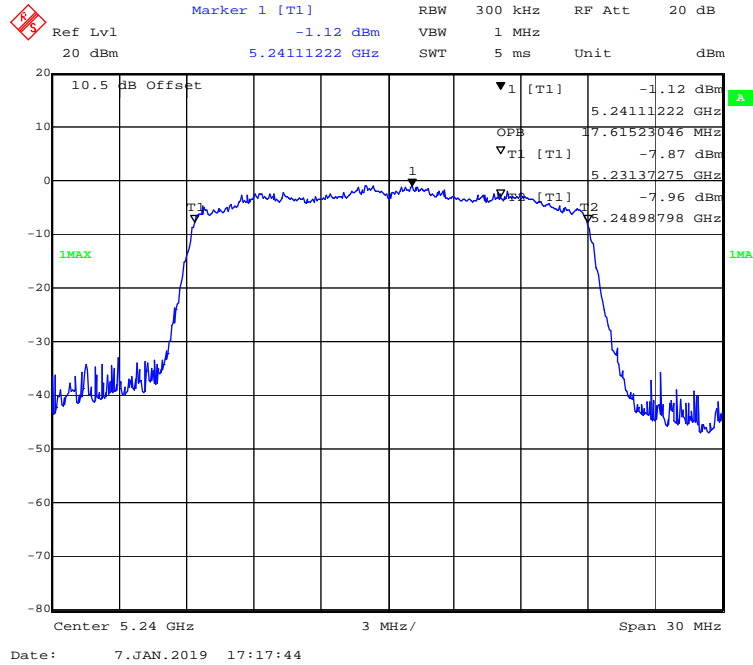
802.11n-HT20 mode, 5180MHz



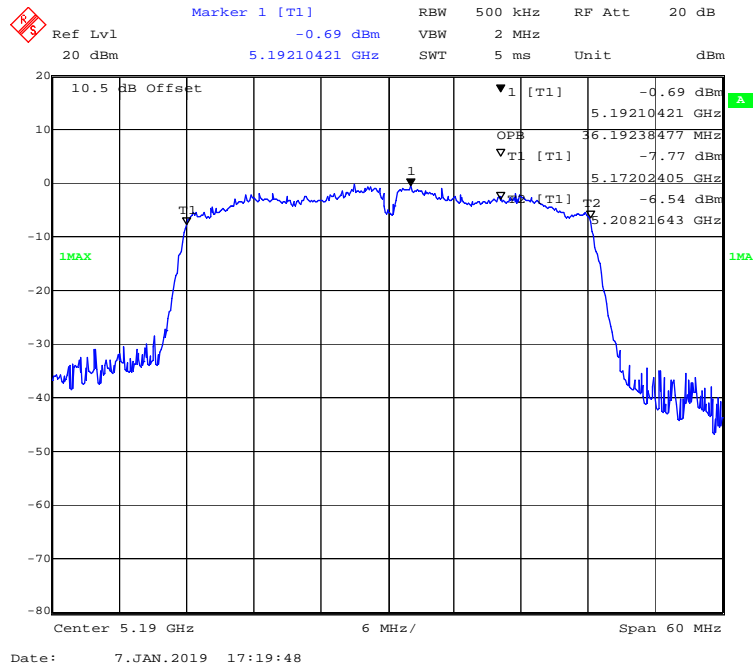
802.11n-HT20 mode, 5200MHz



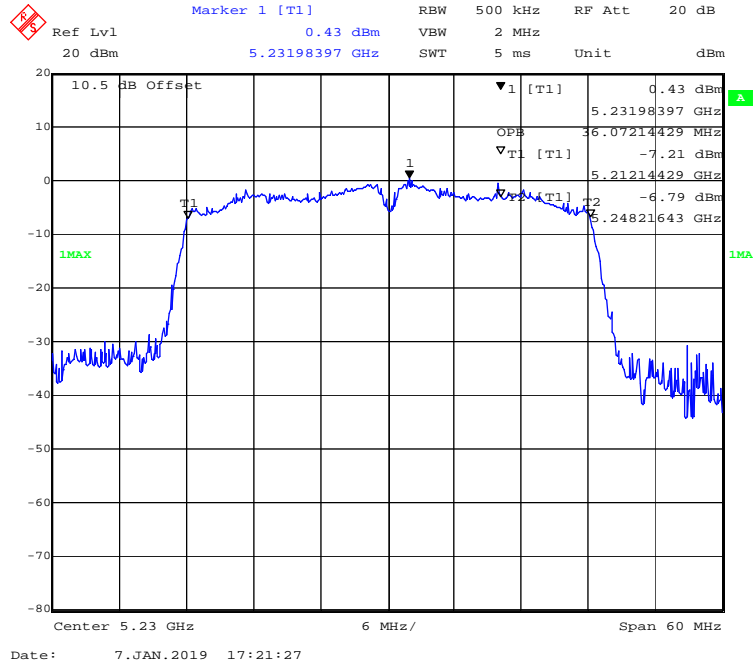
802.11n-HT20 mode, 5240MHz

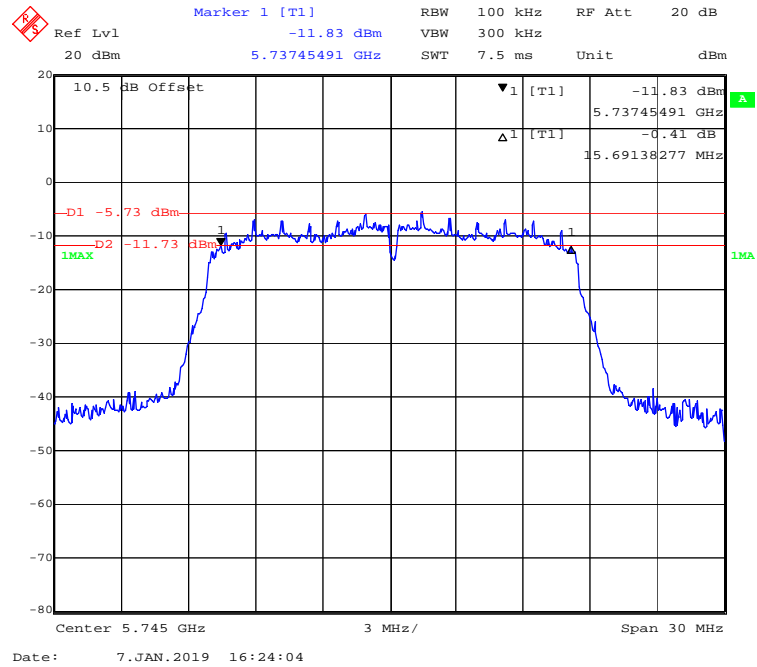
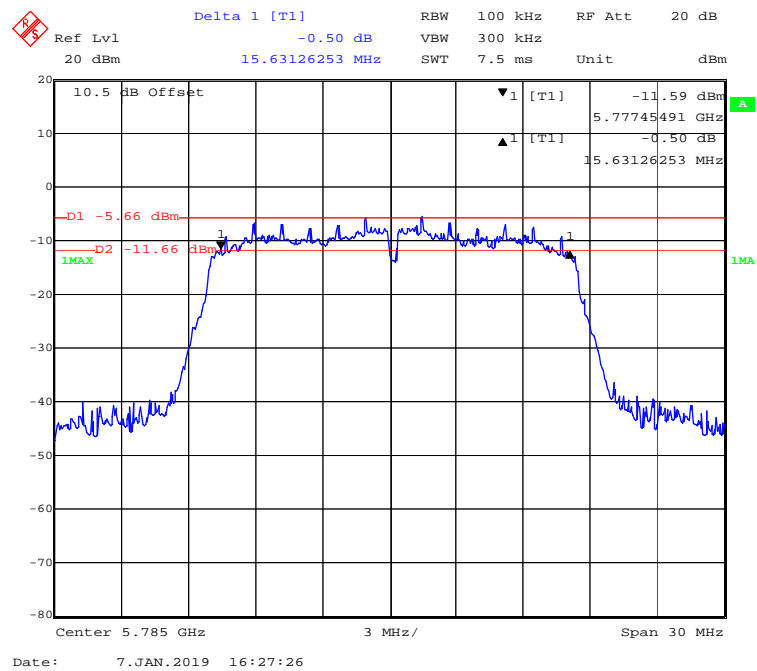


802.11n-HT40 mode, 5190MHz

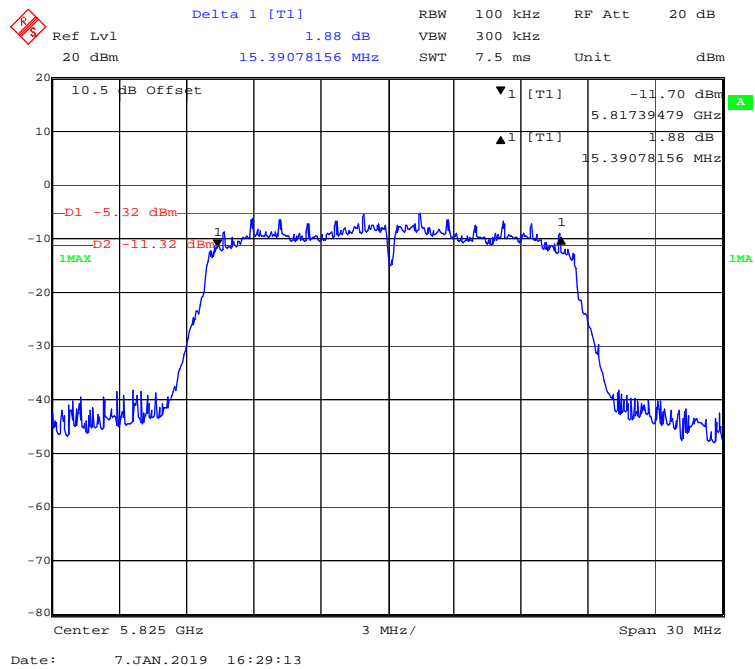


802.11n-HT40 mode, 5230MHz

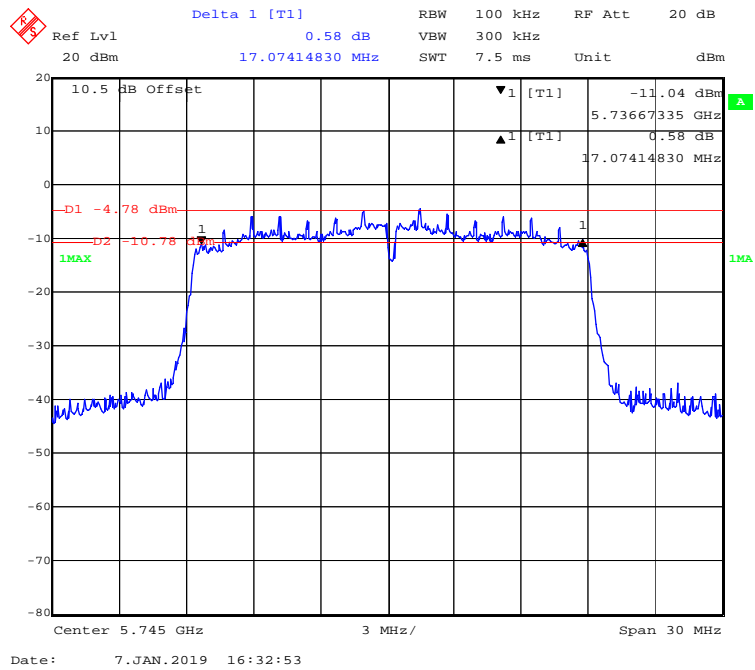


5725-5850 MHz Band:**6dB Bandwidth:****802.11a mode, 5745MHz****802.11a mode, 5785MHz**

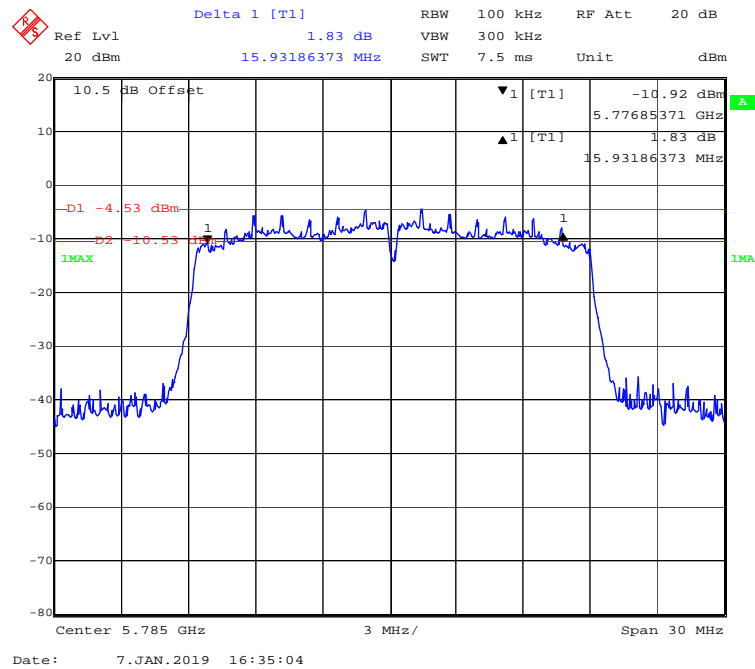
802.11a mode, 5825MHz



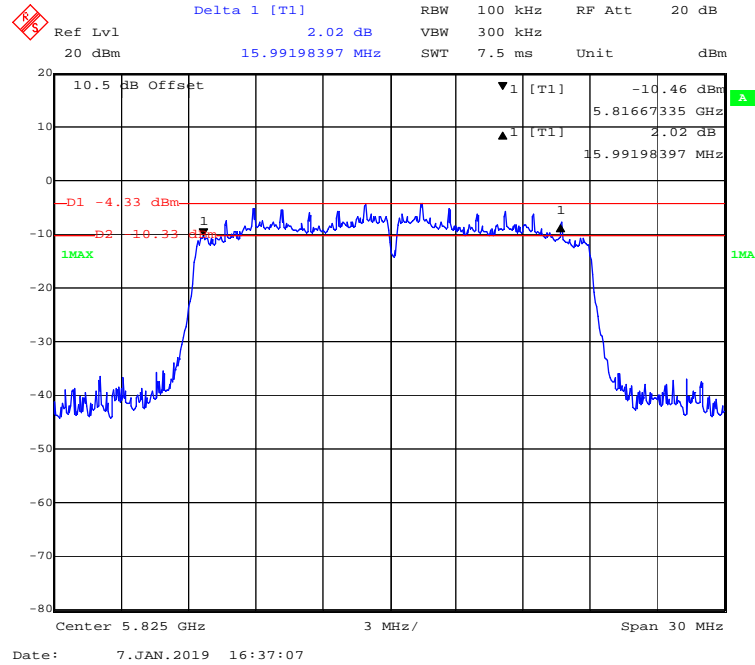
802.11n-HT20 mode, 5745MHz



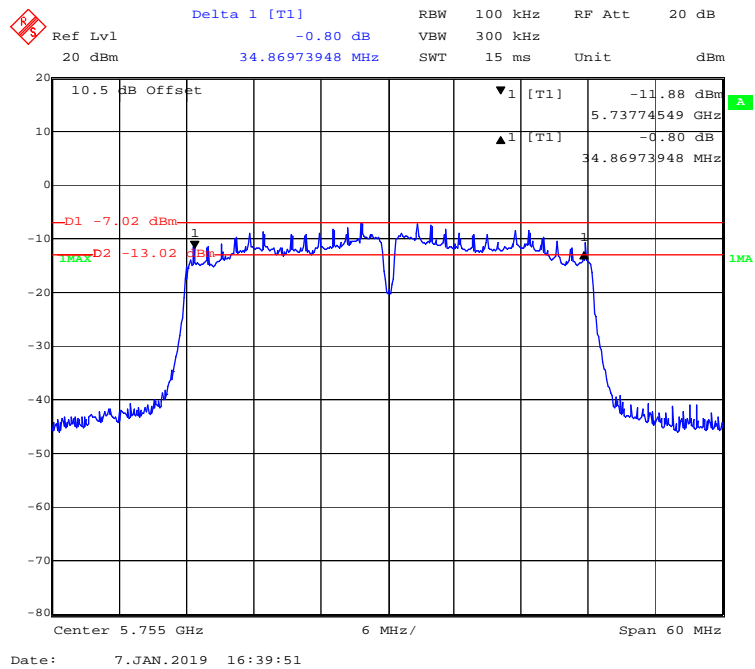
802.11n-HT20 mode, 5785MHz



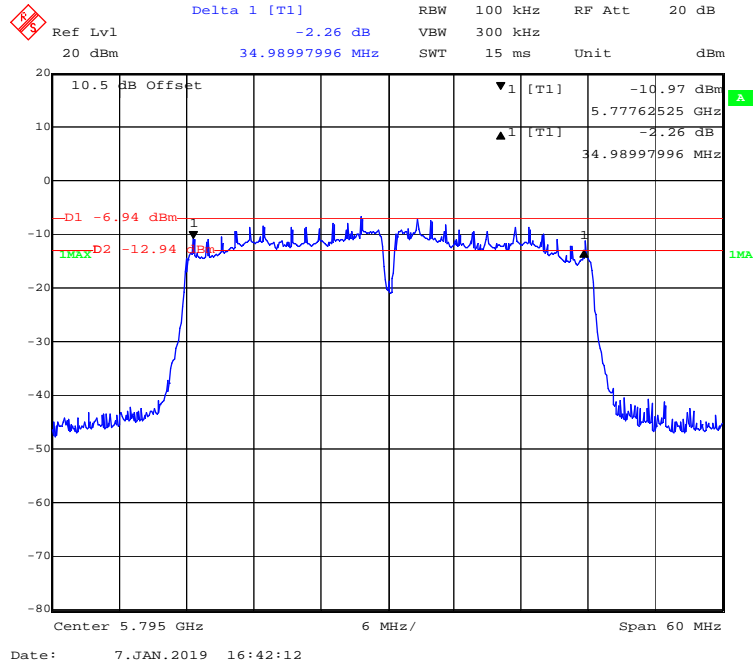
802.11n-HT20 mode, 5825MHz

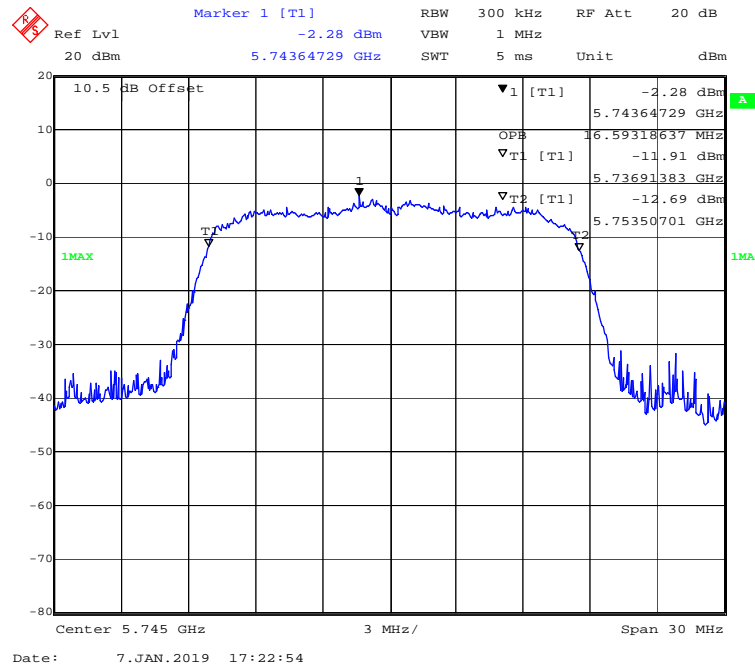
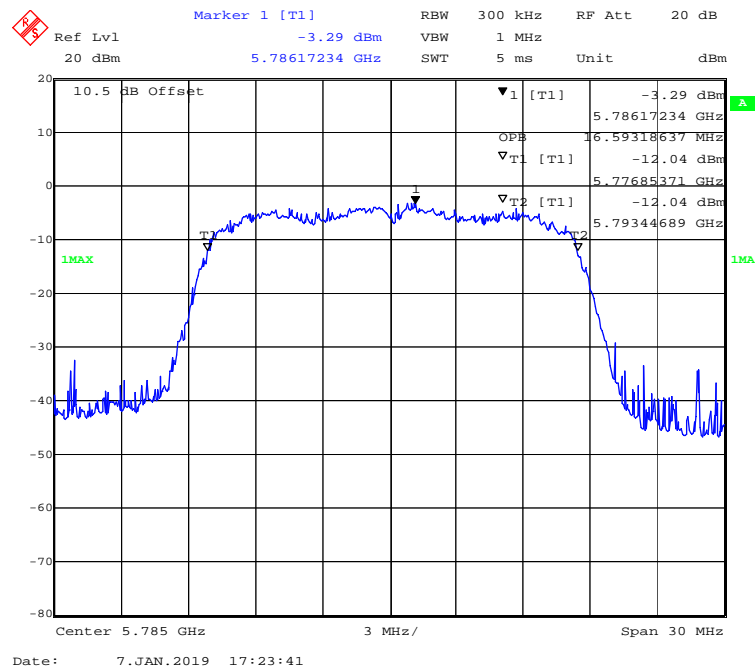


802.11n-HT40 mode, 5755MHz

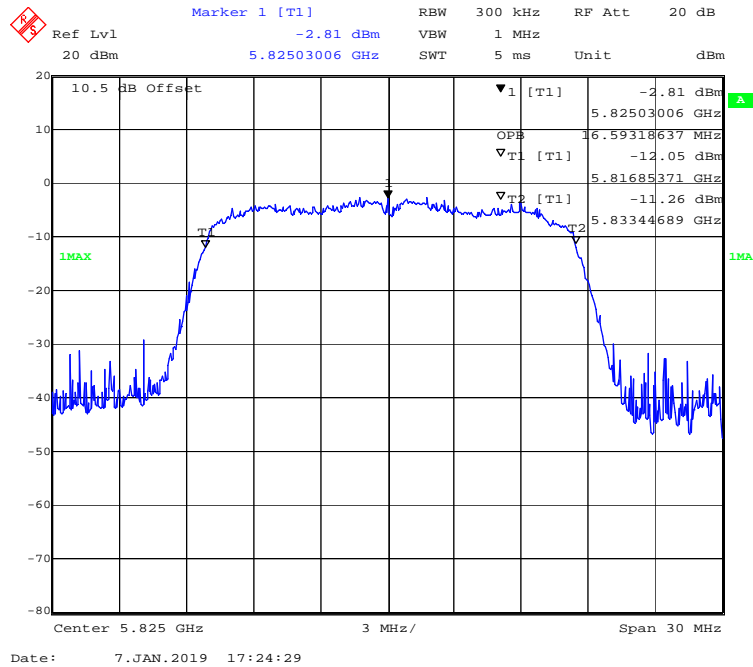


802.11n-HT40 mode, 5795MHz

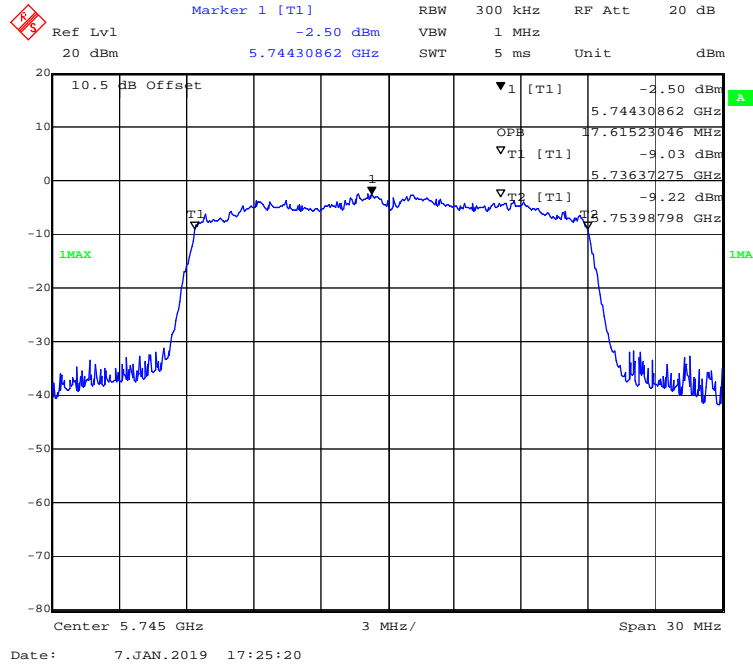


99% Occupied Bandwidth:**802.11a mode, 5745MHz****802.11a mode, 5785MHz**

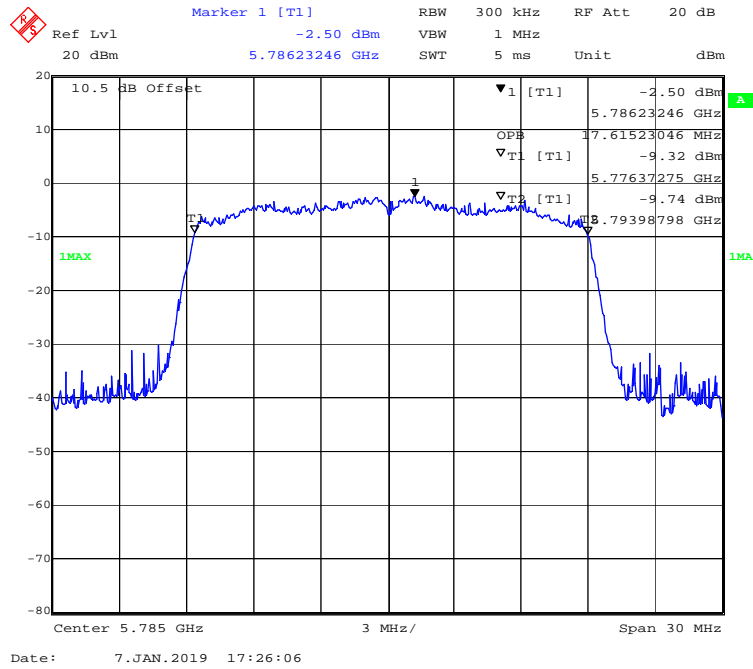
802.11a mode, 5825MHz



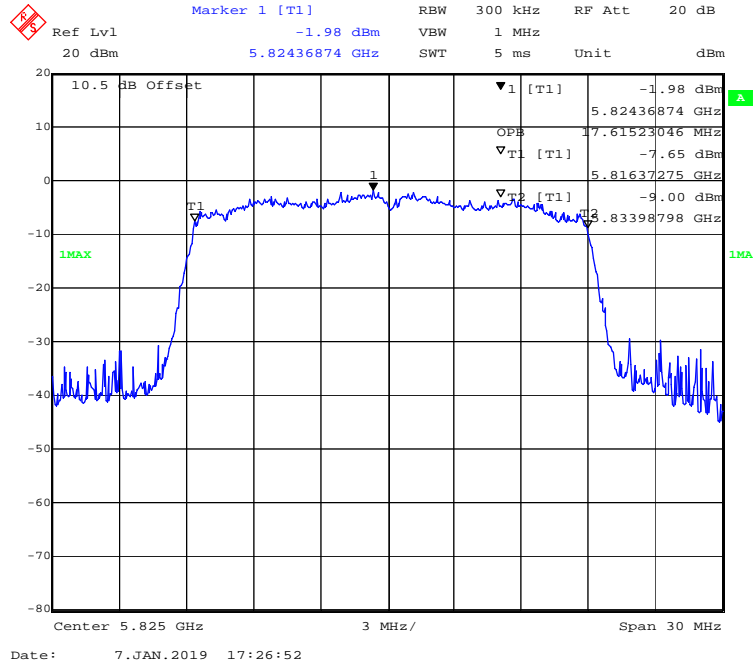
802.11n-HT20 mode, 5745MHz



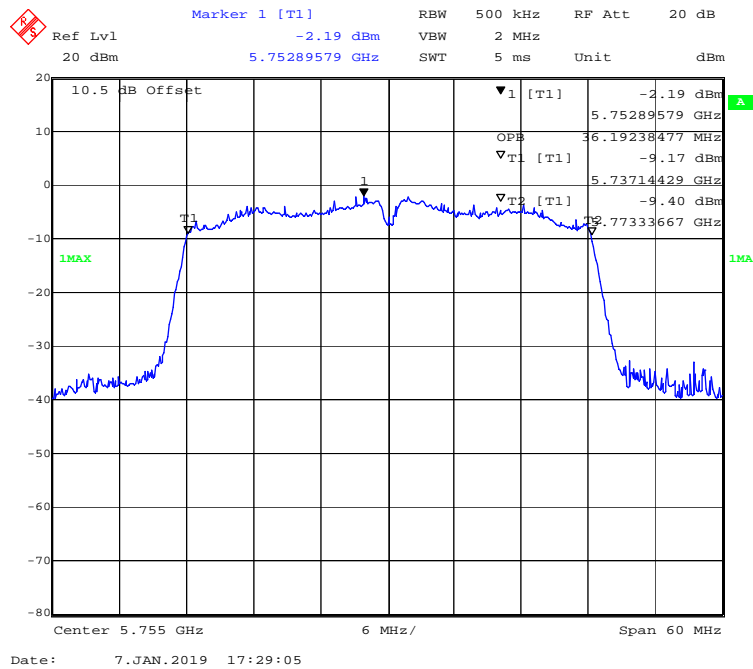
802.11n-HT20 mode, 5785MHz



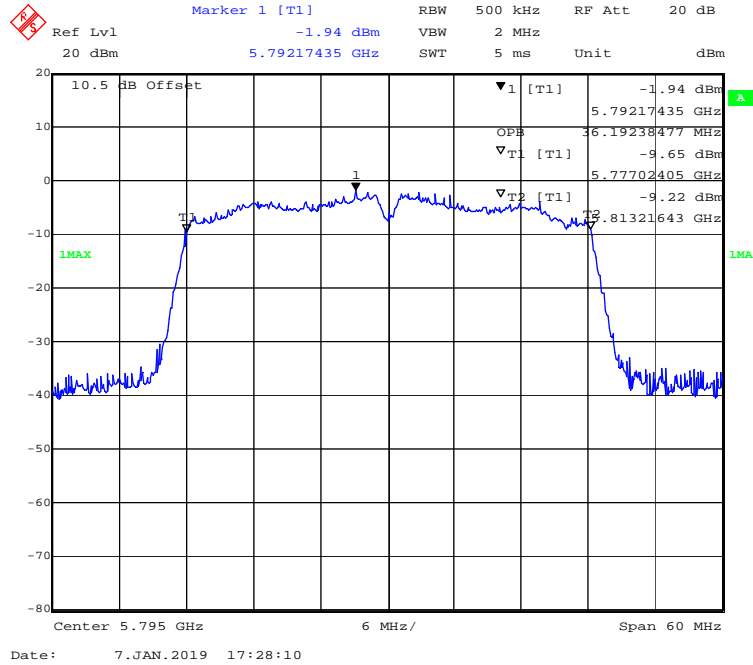
802.11n-HT20 mode, 5825MHz



802.11n-HT40 mode, 5755MHz



802.11n-HT40 mode, 5795MHz



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

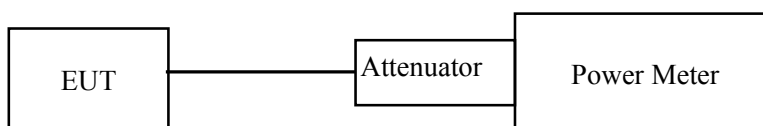
According to §15.407(a)(1)

(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.

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 Hope Zhang on 2019-01-07.

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
802.11a	5150-5250 MHz	Low	5180	13.54	24	PASS
		Middle	5200	13.45	24	PASS
		High	5240	13.69	24	PASS
	5725-5850 MHz	Low	5745	12.88	30	PASS
		Middle	5785	13.14	30	PASS
		High	5825	13.37	30	PASS
802.11n-HT20	5150-5250 MHz	Low	5180	14.07	24	PASS
		Middle	5200	14.16	24	PASS
		High	5240	13.82	24	PASS
	5725-5850 MHz	Low	5745	13.86	30	PASS
		Middle	5785	14.09	30	PASS
		High	5825	14.35	30	PASS
802.11n-HT40	5150-5250 MHz	Low	5190	14.84	24	PASS
		High	5230	14.91	24	PASS
	5725-5850 MHz	Low	5755	14.03	30	PASS
		High	5795	15.05	30	PASS

FCC §15.407(a) (1) (5) - 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:	23.5 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

The testing was performed by Hope Zhang on 2019-03-21.

*Test Mode: Transmitting***5150MHz-5250MHz:**

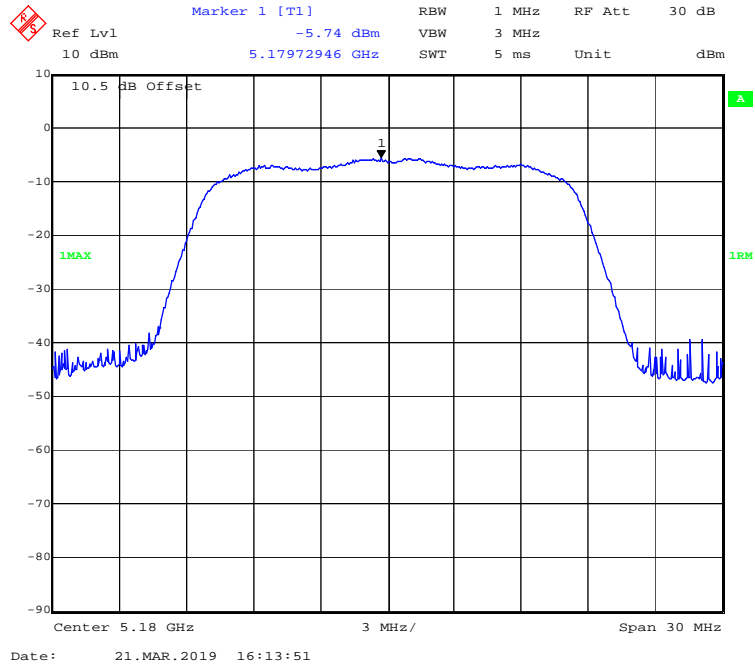
Mode	Channel	Frequency (MHz)	PSD (dBm/MHz)	Limit (dBm/MHz)	Result
802.11a	Low	5180	-5.74	11	PASS
	Middle	5200	-5.28	11	PASS
	High	5240	-6.82	11	PASS
802.11n20	Low	5180	-6.28	11	PASS
	Middle	5200	-5.95	11	PASS
	High	5240	-7.11	11	PASS
802.11n40	Low	5190	-6.83	11	PASS
	High	5230	-8.05	11	PASS

5725MHz-5850MHz:

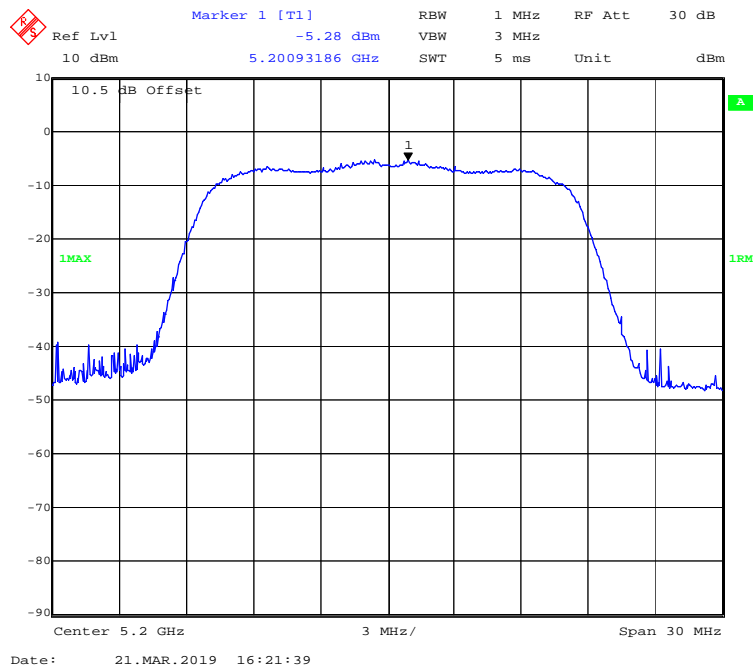
Mode	Channel	Frequency MHz	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
802.11a	Low	5745	-6.56	30	PASS
	Middle	5785	-4.40	30	PASS
	High	5825	-5.30	30	PASS
802.11n20	Low	5745	-5.97	30	PASS
	Middle	5785	-3.73	30	PASS
	High	5825	-4.45	30	PASS
802.11n40	Low	5755	-7.37	30	PASS
	High	5795	-6.14	30	PASS

5150MHz-5250MHz Band:

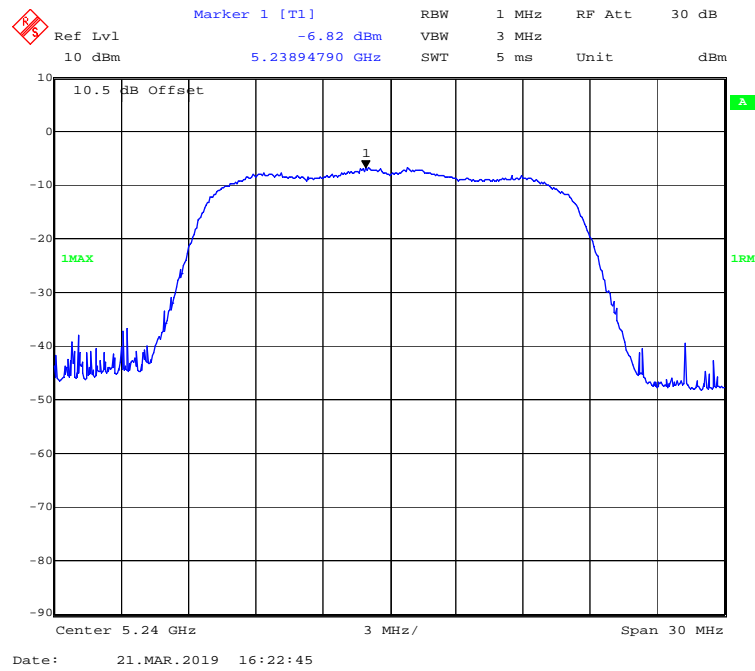
802.11a mode, Power spectral density-5180MHz



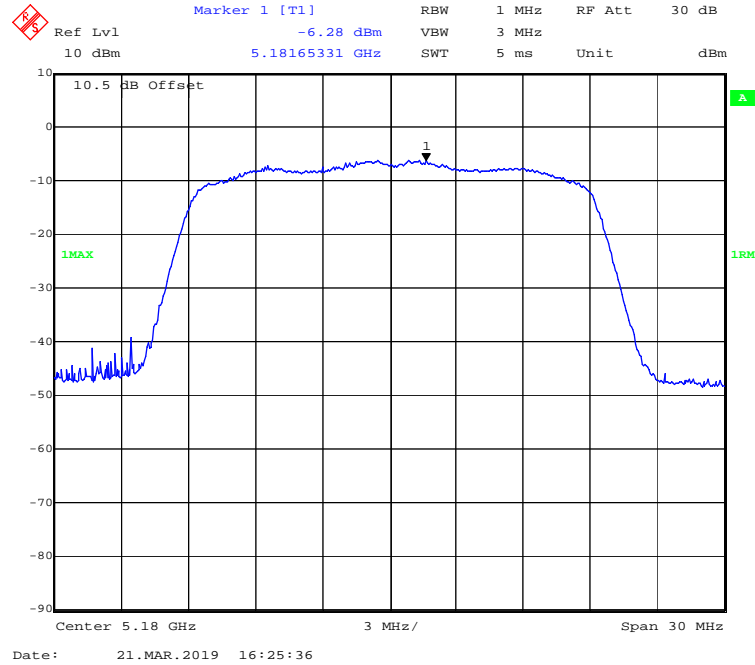
802.11a mode, Power spectral density-5200MHz



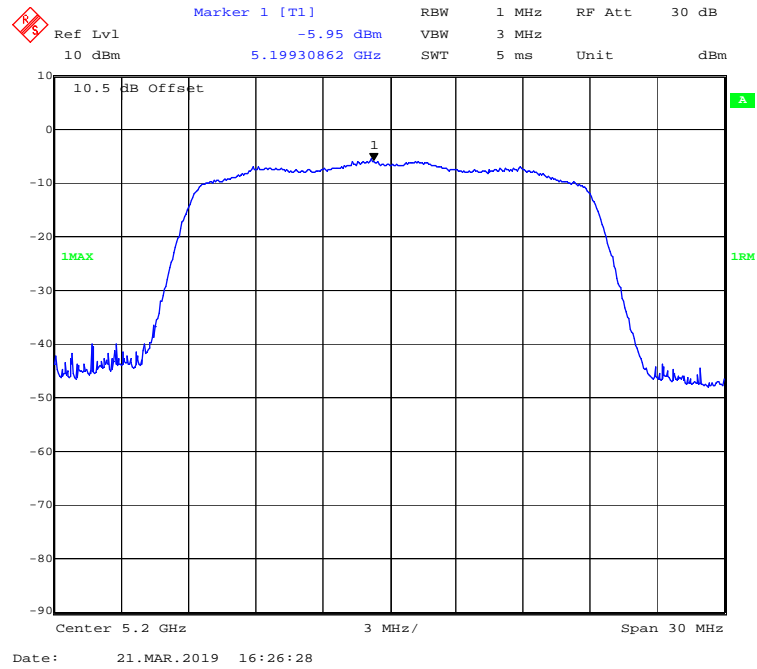
802.11a mode, Power spectral density-5240MHz



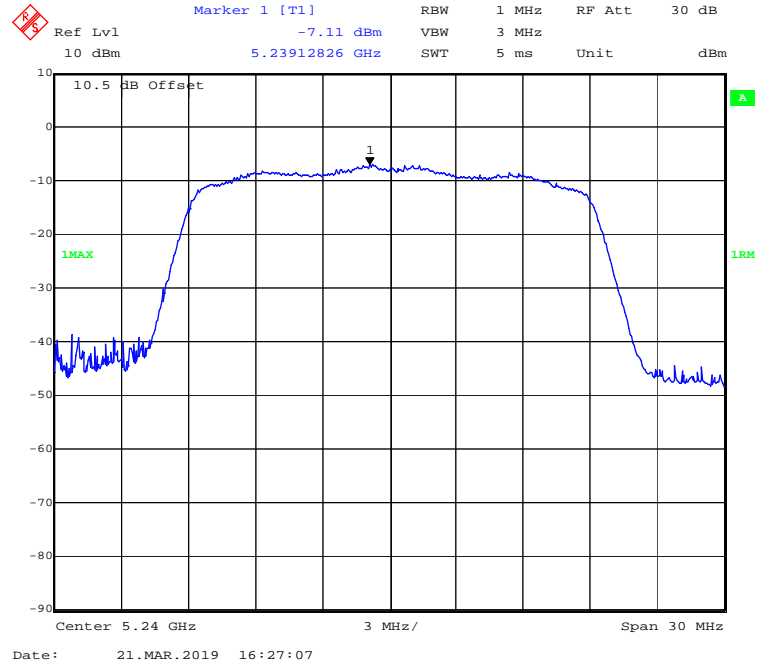
802.11n-HT20 mode, Power spectral density-5180MHz



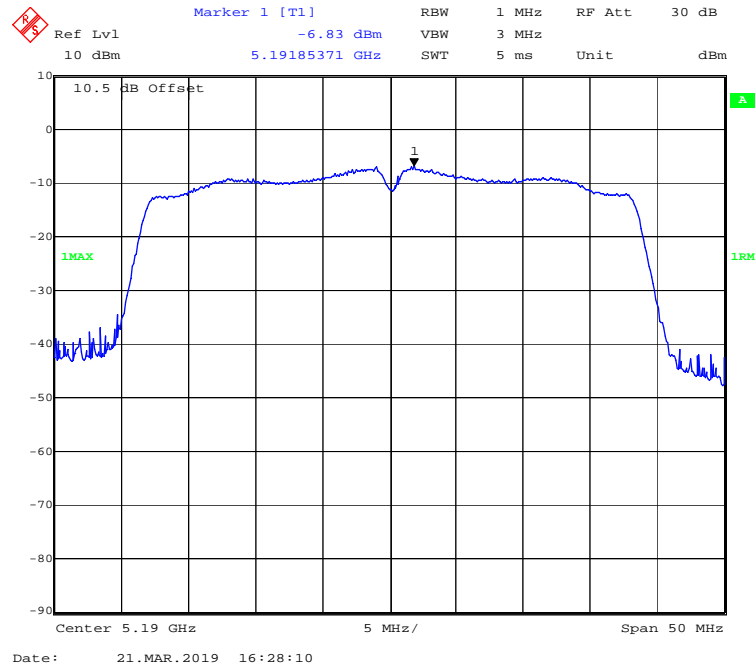
802.11n-HT20 mode, Power spectral density-5200MHz



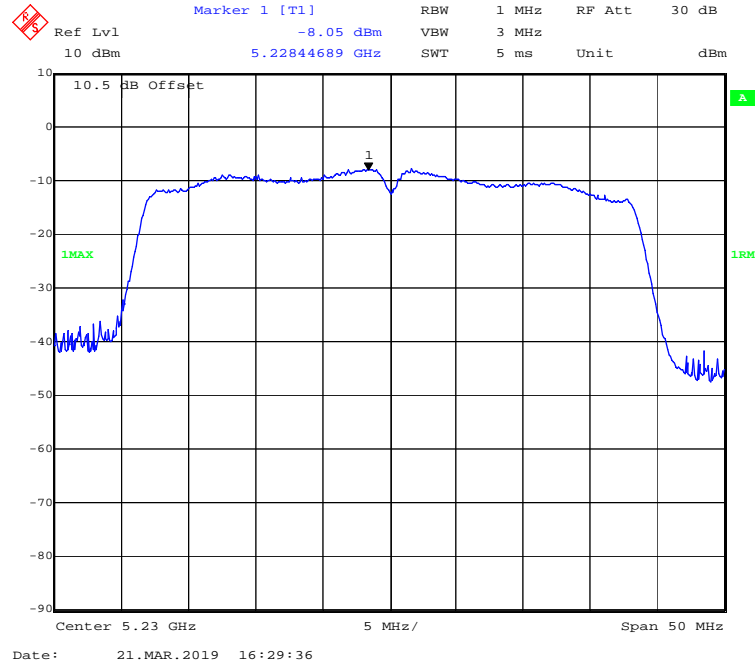
802.11n-HT20 mode, Power spectral density-5240MHz

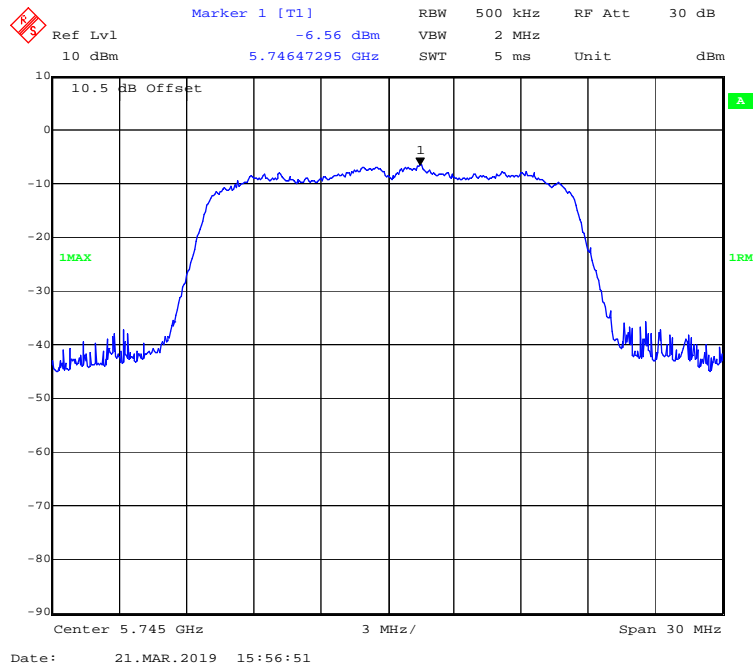
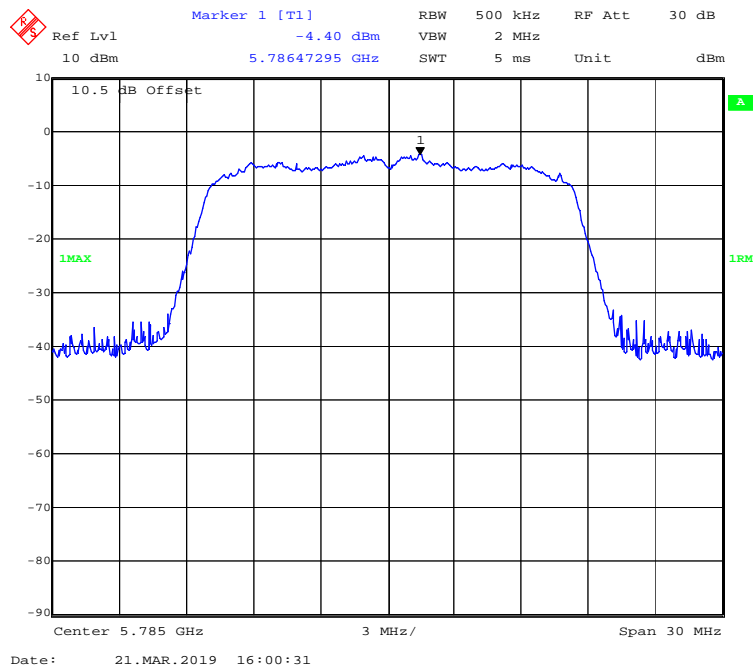


802.11n-HT40 mode, Power spectral density-5190MHz

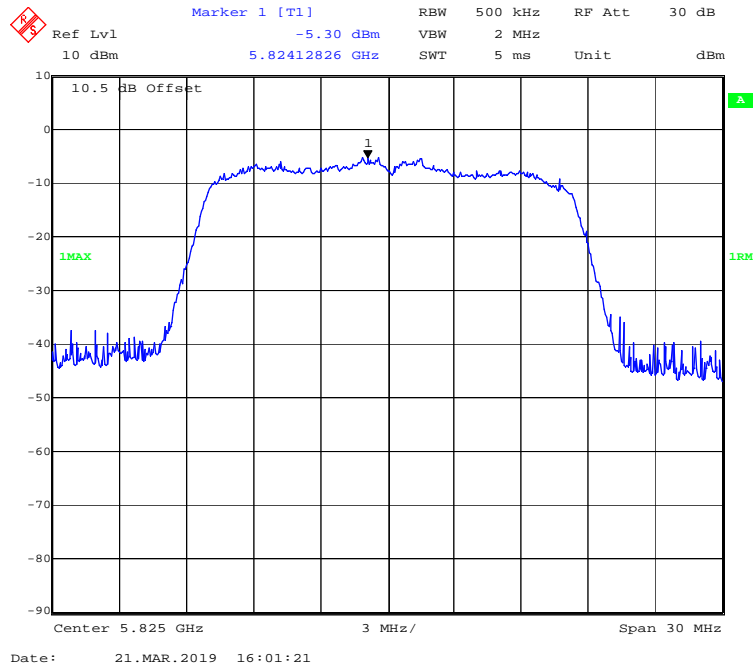


802.11n-HT40 mode, Power spectral density-5230MHz

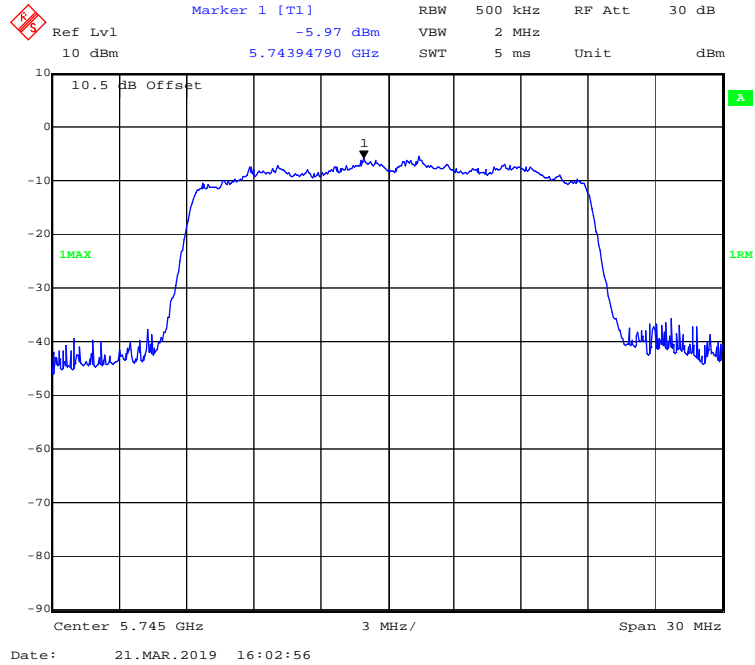


5725MHz-5850 MHz Band:**802.11a mode, Power spectral density-5745MHz****802.11a mode, Power spectral density-5785MHz**

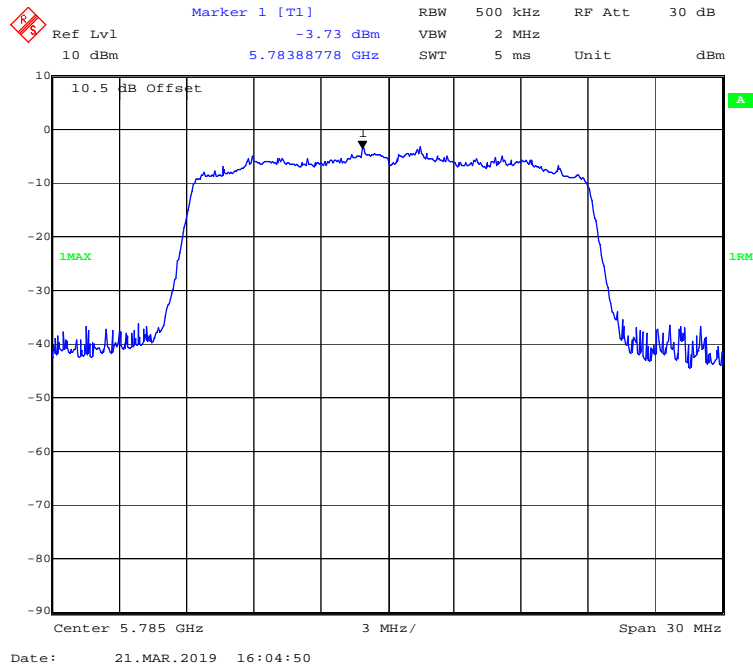
802.11a mode, Power spectral density-5825MHz



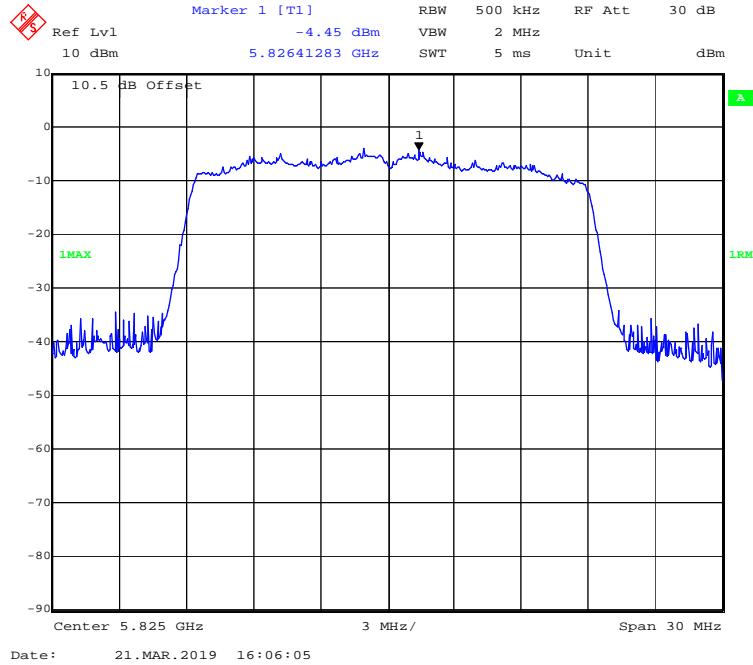
802.11n-HT20 mode, Power spectral density-5745MHz



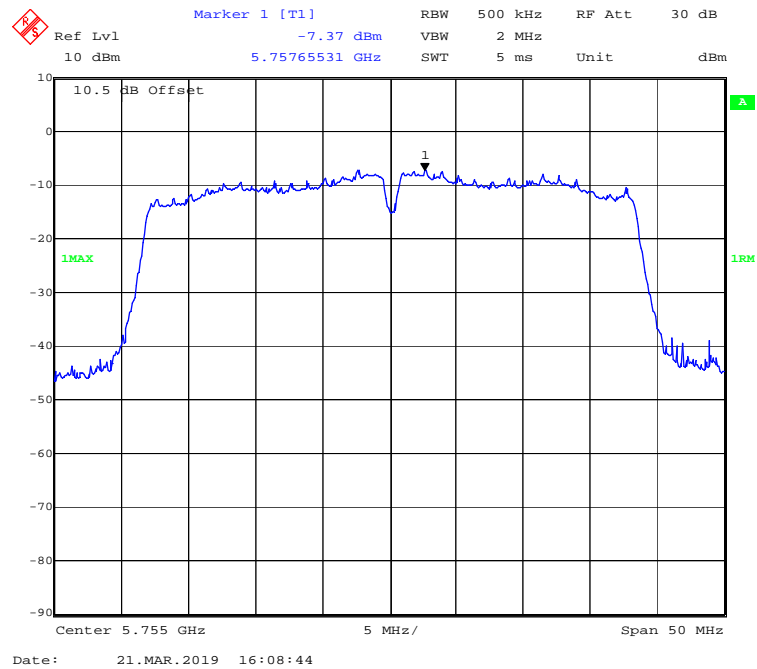
802.11n-HT20 mode, Power spectral density-5785MHz



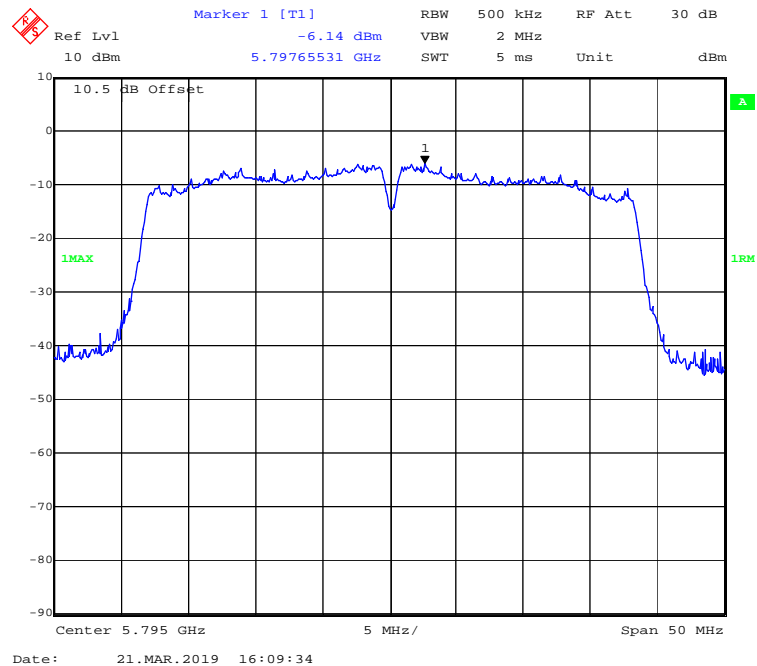
802.11n-HT20 mode, Power spectral density-5825MHz



802.11n-HT40 mode, Power spectral density-5755MHz



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



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