ACCREDITED
TESTING LABORATORY
CERTIFICATE # 4821.01

BACL
Bay Area Compliance Labs Corp.

FCC PART 15.407

TEST REPORT

For

Colorlight (Shenzhen) Cloud Technology Co., Ltd.

Room 101,IC Industrial Park,No.1089 Chaguang Road,Xili Street,Nanshan Distirct,Shenzhen,China

FCC ID: 2AVV2C100CLT

Report Type:	**Product Type:**
Original Report	Player

Report Number:	RSZ200312810-00B
Report Date:	2020-06-10
Reviewed By:	Nancy Wang RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Player
Model	C1
Frequency Range	5G Wi-Fi: 5150-5250 MHz
Conducted Average Ouput Power	5150-5250 MHz: 8.53dBm (802.11a), 8.52dBm(802.11n20)
Modulation Technique	OFDM
Antenna Specification	4.5dBi
Voltage Range	AC 120V 60Hz
Date of Test	2020-06-05 & 2020-06-08
Sample serial number	RSZ200312810-RF-S1(Assigned by BACL, Shenzhen)
Received date	2020-0-3-12
Sample/EUT Status	Good condition

Objective

This type approval report is prepared on behalf of *Colorlight (Shenzhen) Cloud Technology 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, 15.207, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AVV2C100CLT.

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. And KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.73dB
RF conducted test with spectrum		±1.6dB
AC Power Lines Conducted Emissions		±1.95dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1℃
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.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. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The EUT can operate in 802.11a/n20 modes..

For 5150-5250MHz Band, 4 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200
44	5240	48	5240

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

“rftesttool 54” software was used to test.

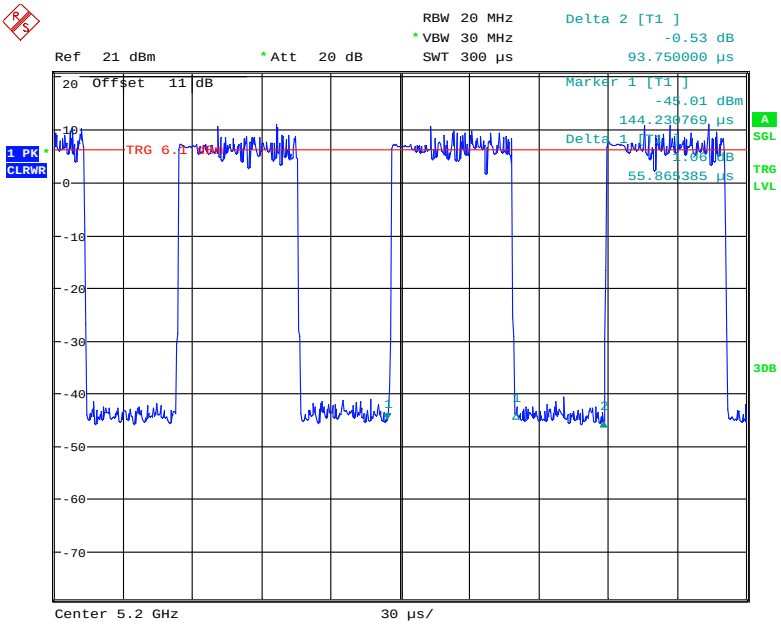
U-NII	Mode	Channel Number	Frequency (MHz)	Rate (Mbps)	Power Level
5150 – 5250MHz	802.11 a	CH36	5180	6 Mbps	Default
		CH40	5200	6 Mbps	Default
		CH48	5240	6 Mbps	Default
	802.11 n20	CH36	5180	MCS0	Default
		CH40	5200	MCS0	Default
		CH48	5240	MCS0	Default

Pre-scan with all the data rates, the above data rate is the worst case.

Duty cycle

5150-5250 MHz

802.11a mode



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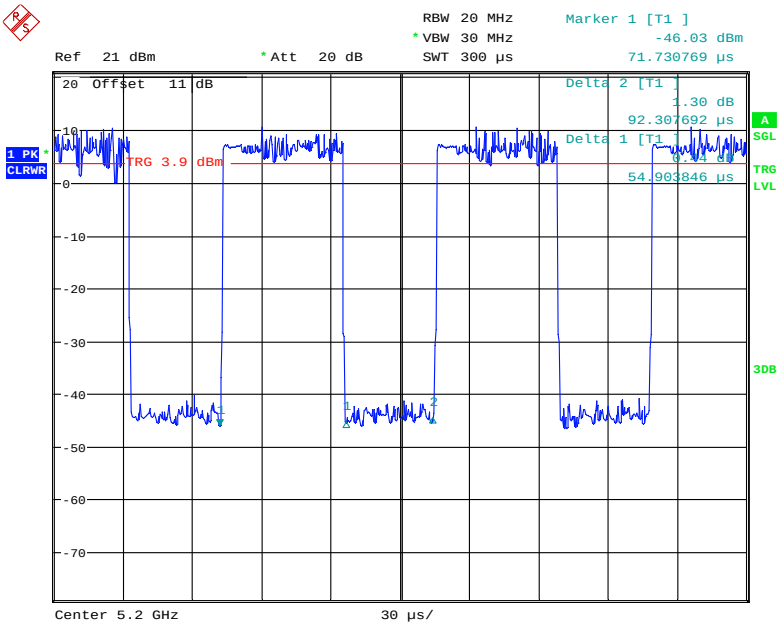
802.11n20 mode



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Mode	Duty Cycle (%)	T(μ s)	1/T(kHz)	VBW Setting
802.11a	59.6	55.87	17.90	20kHz
802.11n20	59.5	54.90	18.21	20kHz

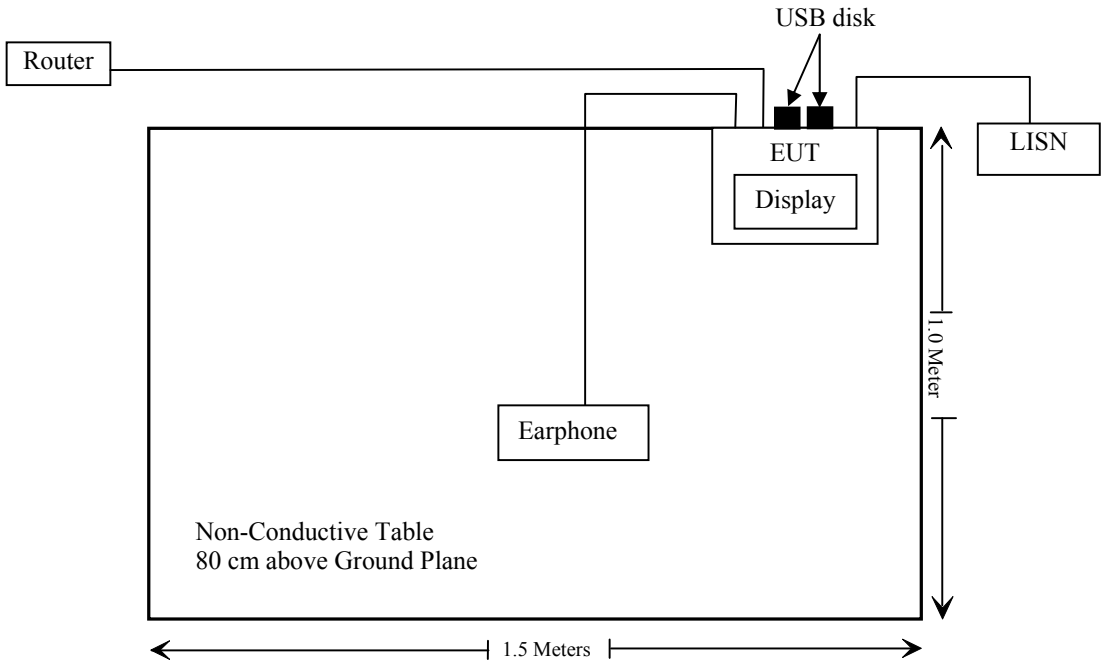
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HIKVISION	Router	DS-3WR03-E	10021642429
Unknown	Earphone	001	Unknown
BRL	USB Disk(*2)	866.275.8378	Unknown
Unknown	Display	Unknown	Unknown

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded detachable AC cable	1.0	EUT	LISN
Unshielded detachable RJ45 cable	8.0	Router	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) (1) & §2.1091	MaximuM Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1), (4),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (5)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliance
§15.407(a)(1)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1)	Power Spectral Density	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2019/7/9	2020/7/8
Rohde & Schwarz	LISN	ENV216	101613	2020/1/22	2021/1/21
Rohde & Schwarz	Transient Limitor	ESH3Z2	DE25985	2019/11/29	2020/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
Sonoma instrument	Pre-amplifier	310 N	186238	2020/4/20	2021/4/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
Unknown	Cable	Chamber Cable 1	F-03-EM236	2019/11/29	2020/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2019/7/22	2020/07/21
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
SNSD	Band Reject filter	BSF5150-5850MN-0899-004	5G filter	2020/4/20	2021/4/20
Ducommun Technolagies	Horn antenna	ARH-4223-02	1007726-02 1304	2017/12/6	2020/12/5
Ducommun Technolagies	Horn antenna	ARH-2823-02	1007726-02 1302	2017/12/6	2020/12/5
RF Conducted Test					
Agilent	USB Wideband Power Sensor	U2021XA	MY54250003	2019/7/10	2020/7/9
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200982	2020/3/2	2021/3/2
WEINSCHEL	10dB Attenuator	5324	AU3842	2019/11/29	2020/11/28
Ducommun technologies	RF Cable	RG-214	3	Each Time	

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

1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**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

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = 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)

Frequency (MHz)	**Antenna Gain**		**Tune up conducted power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
5150-5250	4.5	2.82	9.0	7.94	20	0.004	1.0

Note:
(1) To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.
(2) The equipment is not a simultaneous transmit system.

Result: compliance.

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 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has one external antenna which used non-standard antenna connectors. The antenna gain is 4.5 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

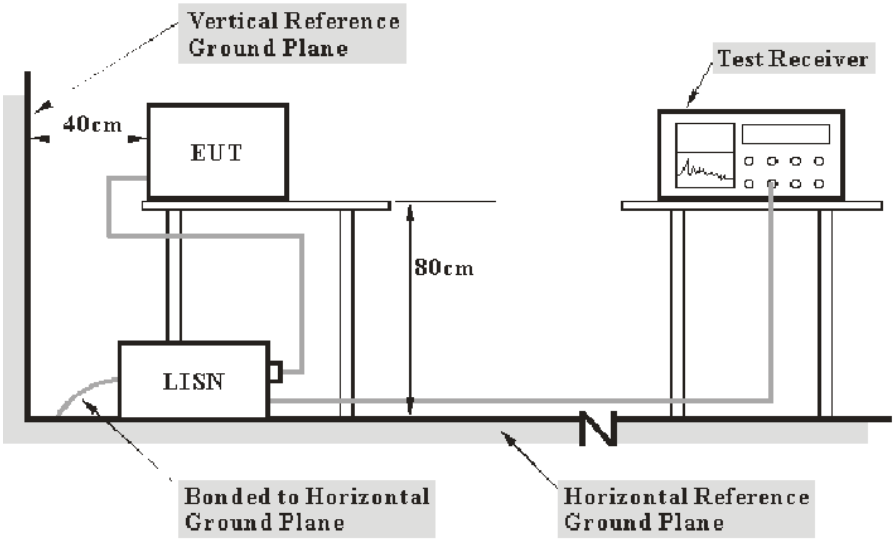
Result: Compliance.

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

Applicable Standard

FCC §15.207, §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.

The adapter was connected to a 120 VAC/60 Hz power source.

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 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.

Test Results Summary

According to the EUT complied with the FCC Part 15.207.

Test Data

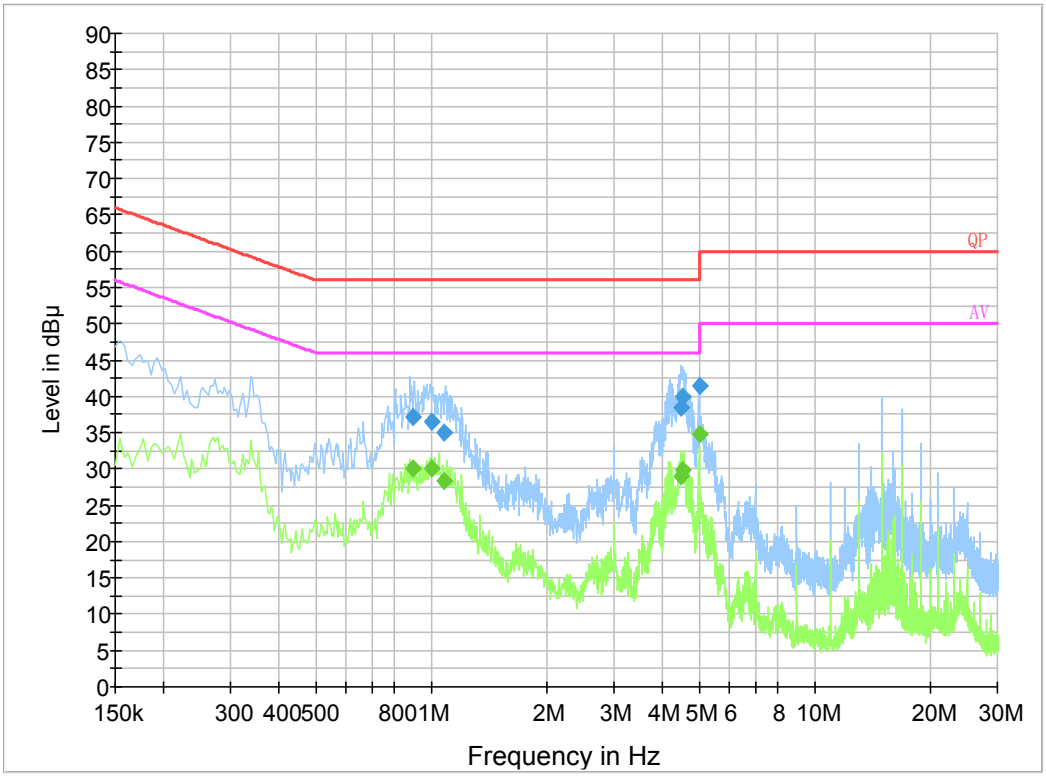
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2020-06-08

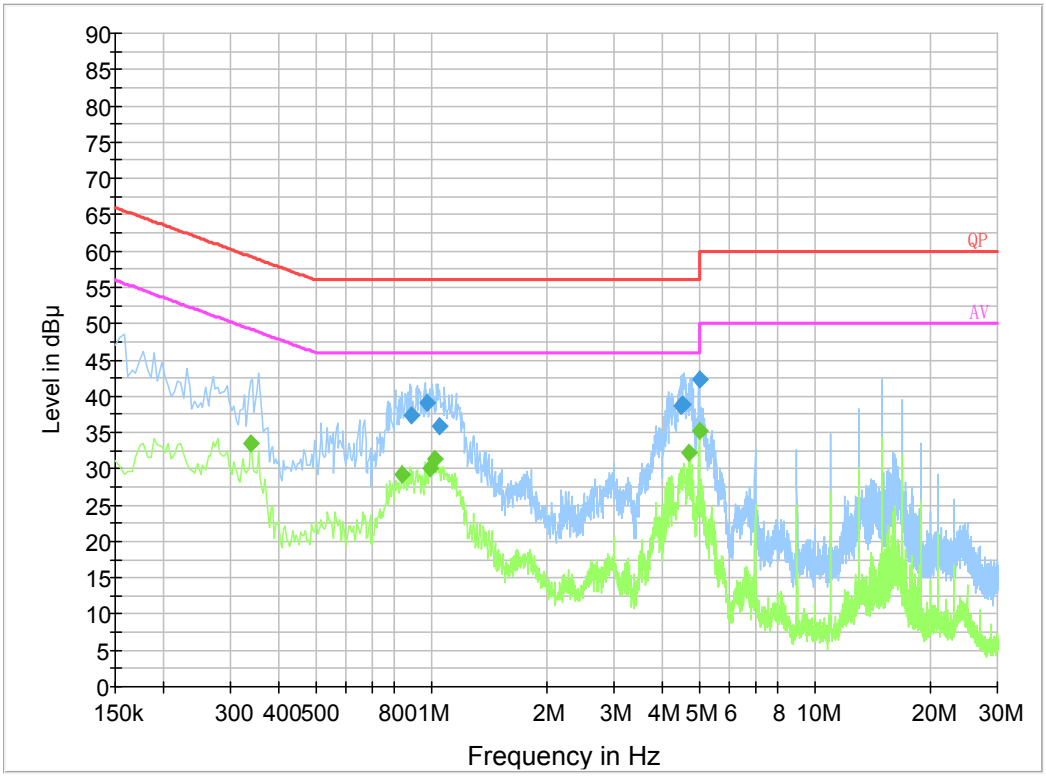
EUT operation mode: Transmitting (worst case is 802.11a mode 5240 MHz)

AC 120V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.895230	37.1	19.8	56.0	18.9	QP
1.003030	36.5	19.9	56.0	19.5	QP
1.081650	35.1	19.9	56.0	20.9	QP
4.487370	38.5	19.9	56.0	17.5	QP
4.518590	39.9	19.9	56.0	16.1	QP
4.999030	41.5	19.9	56.0	14.5	QP
0.895230	30.0	19.8	46.0	16.0	Ave.
1.003030	30.1	19.9	46.0	15.9	Ave.
1.081650	28.4	19.9	46.0	17.6	Ave.
4.487370	29.1	19.9	46.0	16.9	Ave.
4.518590	29.8	19.9	46.0	16.2	Ave.
4.999030	34.7	19.9	46.0	11.3	Ave.

AC120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.888770	37.4	19.7	56.0	18.6	QP
0.976430	39.1	19.8	56.0	16.9	QP
1.049510	36.0	19.8	56.0	20.0	QP
4.492390	38.6	19.9	56.0	17.4	QP
4.545510	38.9	19.9	56.0	17.1	QP
4.999030	42.2	19.9	56.0	13.8	QP
0.338000	33.5	19.8	49.3	15.8	Ave.
0.842000	29.3	19.8	46.0	16.7	Ave.
0.990000	30.0	19.8	46.0	16.0	Ave.
1.022000	31.4	19.8	46.0	14.6	Ave.
4.698000	32.2	19.9	46.0	13.8	Ave.
4.998000	35.2	19.9	46.0	10.8	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

§15.205 & §15.209 & §15.407(B) (1) – UNDESIRABLE EMISSION

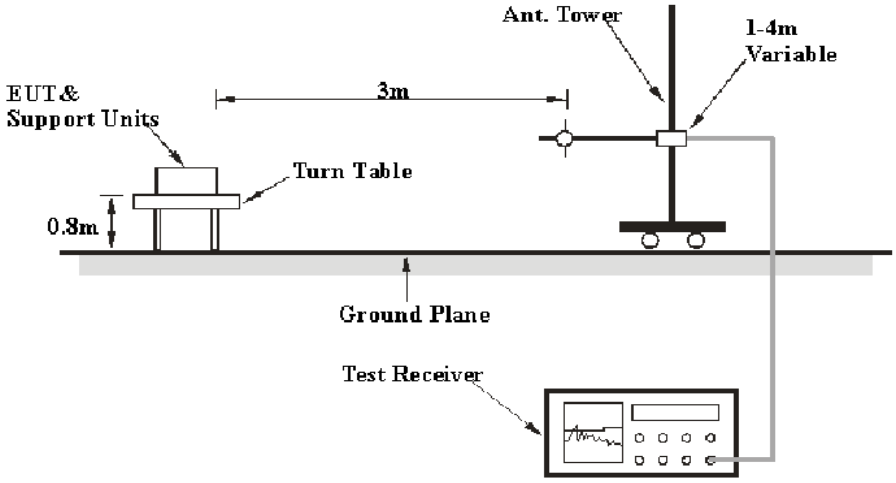
Applicable Standard

FCC §15.407 (b) (1); §15.209; §15.205;

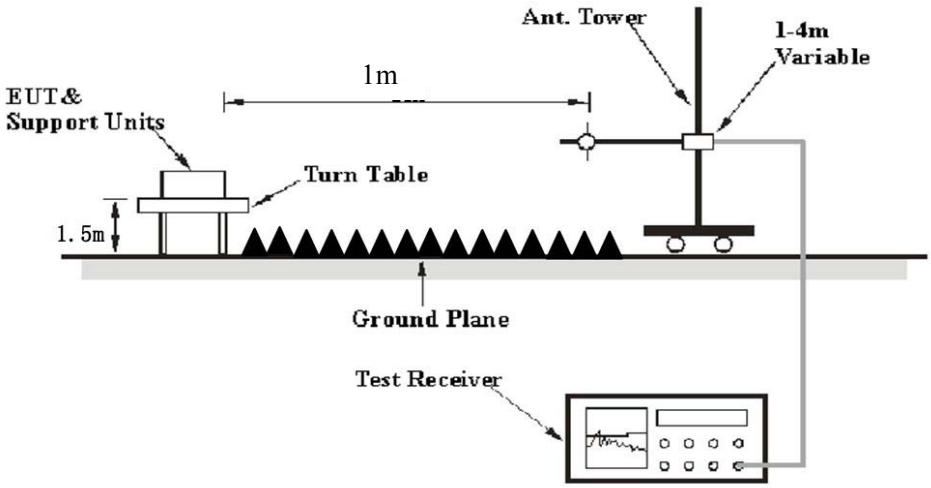
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

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.

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 & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Average
	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

Test Procedure

Radiated Spurious Emission

During the radiated emission test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all the 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 Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart E, section 15.205, 15.209 and 15.407 rules.

Test Data

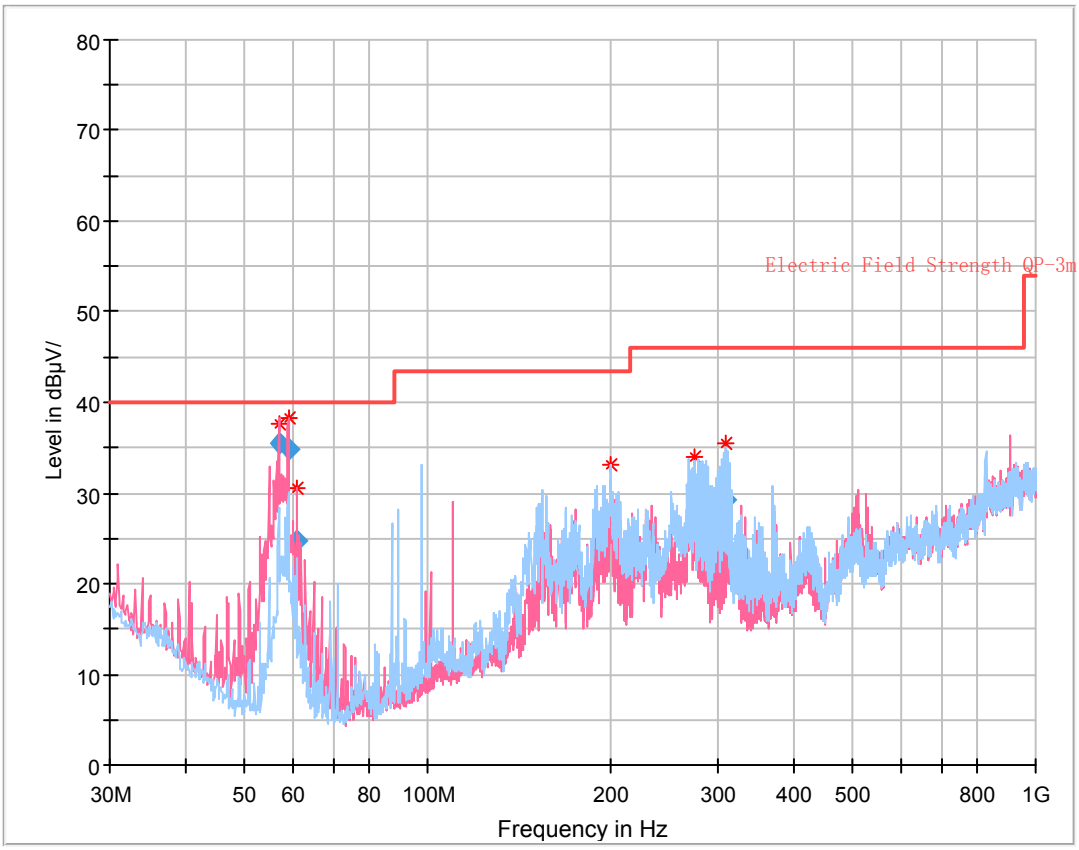
Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	65 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Hams He on 2020-06-08 for below 1G and Leo Huang on 2020-6-05 for above 1G.

EUT operation mode: Transmitting

30 MHz – 1 GHz: *(worst case is 802.11a mode 5240 MHz)*



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
57.010125	35.58	109.0	V	171.0	-20.0	40.00	4.42
58.973500	34.92	110.0	V	128.0	-20.1	40.00	5.08
61.020875	24.81	102.0	V	328.0	-20.2	40.00	15.19
200.240125	26.10	141.0	H	239.0	-13.8	43.50	17.40
274.767625	27.06	119.0	H	210.0	-12.4	46.00	18.94
308.627750	29.32	102.0	H	95.0	-10.7	46.00	16.68

1 ~ 40 GHz:

Note: The test distance is 1m, so the correct factor from 3m to 1m is 20log(3/1)=9.5dB which was added into the final limit.

5150-5250 MHz:

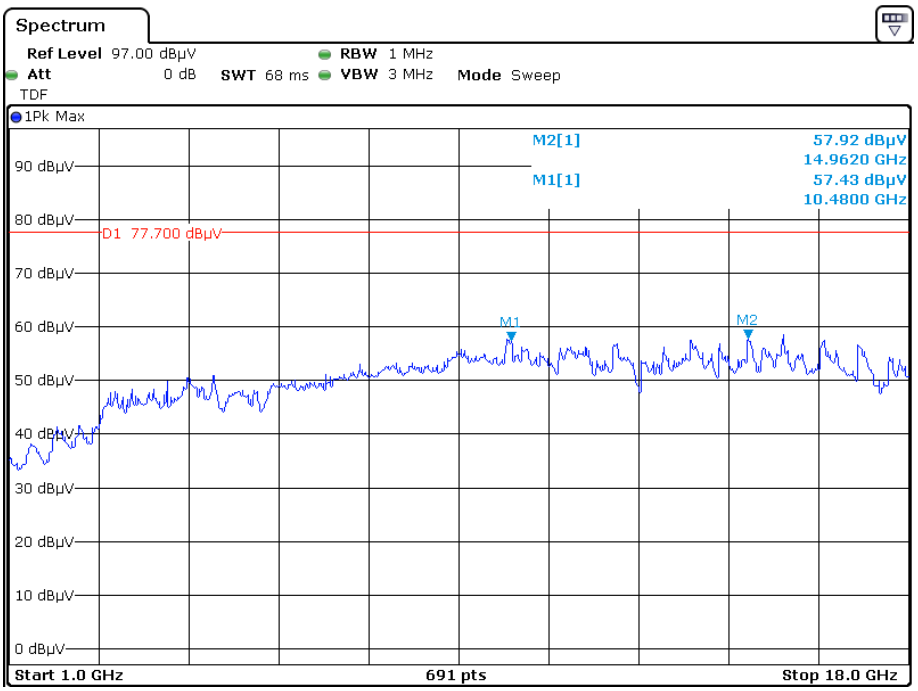
Frequency (MHz)	Receiver		Turntable	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBµV/m)	FCC Part 15.407/205/209	
	Reading (dBµV)	PK/QP/Ave.	Degree	Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
802.11a									
5180 MHz									
5138.58	31.46	PK	186	1.4	H	38.36	69.82	83.5	13.68
5138.58	16.67	Ave.	186	1.4	H	38.36	55.03	63.5	8.47
5356.32	30.26	PK	195	1.9	H	39.09	69.35	83.5	14.15
5356.32	16.13	Ave.	195	1.9	H	39.09	55.22	63.5	8.28
10360.00	39.14	PK	282	1.7	H	17.42	56.56	77.7	21.24
5200 MHz									
10400.00	41.06	PK	141	1.3	H	17.52	58.58	77.7	19.12
5240 MHz									
5142.68	30.23	PK	277	1.8	H	38.36	68.59	83.5	14.91
5142.68	16.19	Ave.	277	1.8	H	38.36	54.55	63.5	8.95
5351.99	31.10	PK	352	2.0	H	39.09	70.19	83.5	13.31
5351.99	16.58	Ave.	352	2.0	H	39.09	55.67	63.5	7.83
10480.00	42.33	PK	221	2.2	H	17.25	59.58	77.7	18.12
802.11n20									
5180 MHz									
5148.69	30.16	PK	299	1.4	H	38.36	68.52	83.5	14.98
5148.69	16.32	Ave.	299	1.4	H	38.36	54.68	63.5	8.82
5352.71	30.06	PK	320	1.4	H	39.09	69.15	83.5	14.35
5352.71	16.25	Ave.	320	1.4	H	39.09	55.34	63.5	8.16
10360.00	41.63	PK	312	1.8	H	17.42	59.05	77.7	18.65
5200 MHz									
10400.00	40.40	PK	169	1.7	H	17.52	57.92	77.7	19.78
5240 MHz									
5146.93	30.16	PK	221	1.1	H	38.36	68.52	83.5	14.98
5146.93	16.21	AV	221	1.1	H	38.36	54.57	63.5	8.93
5352.35	30.23	PK	68	2.2	H	39.09	69.32	83.5	14.18
5352.35	16.34	AV	68	2.2	H	39.09	55.43	63.5	8.07
10480.00	40.18	PK	163	2.5	H	17.25	57.43	77.7	20.27

Note:
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor
Margin = Limit- Corr. Amplitude
All other spurious emissions are 20 dB below the limit or are on the system noise floor level.

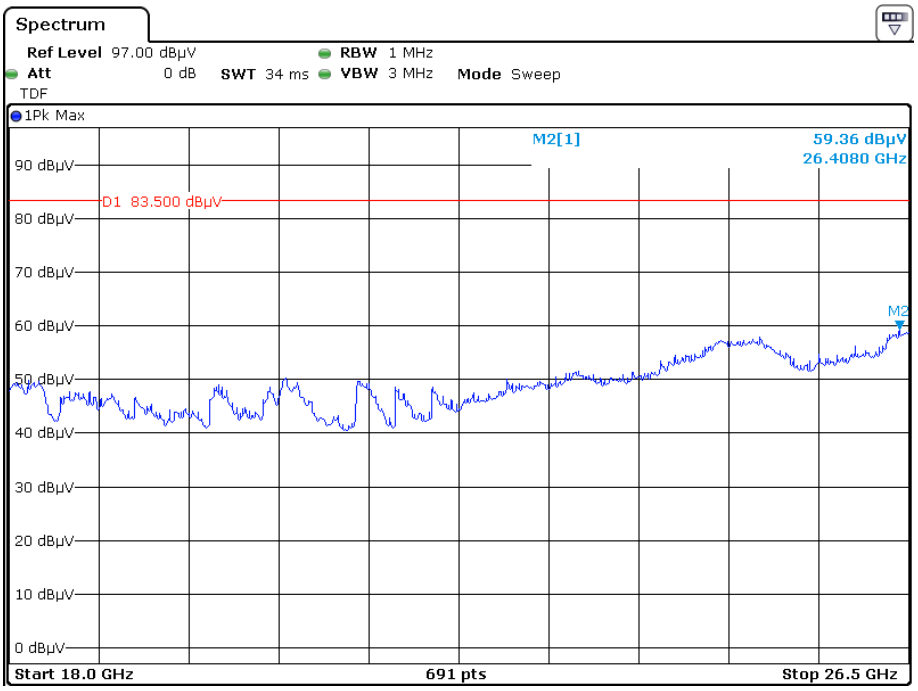
Peak

Pre-scan with 802.11a 5240 MHz

Horizontal



Date: 5.JUN.2020 17:15:59



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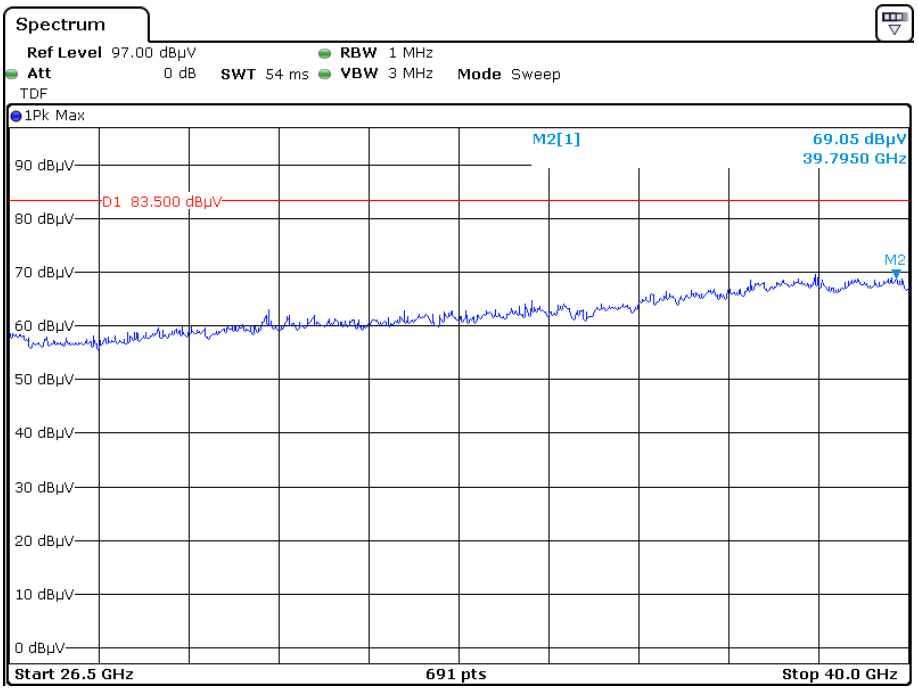
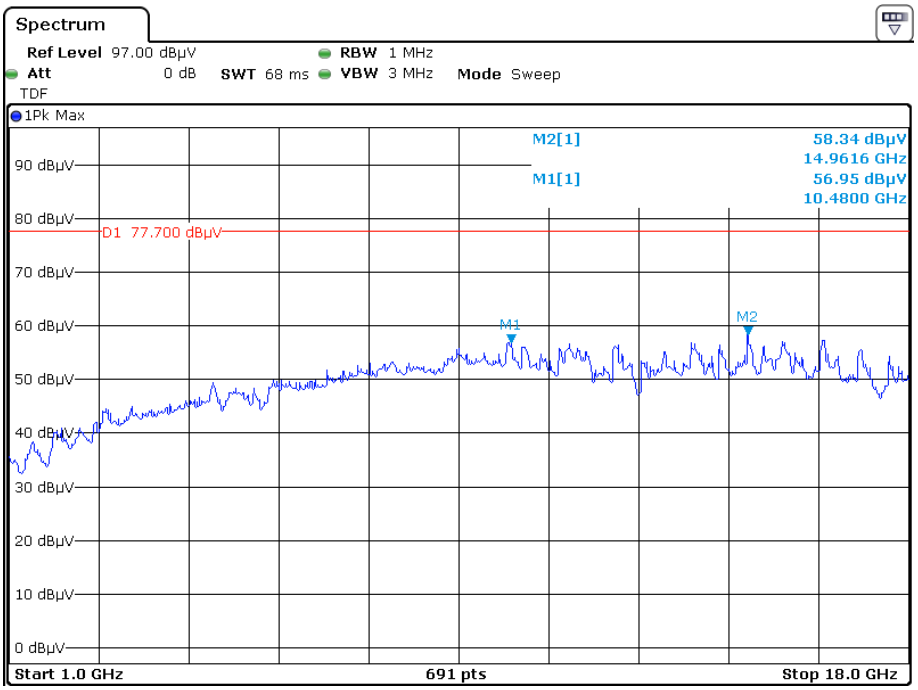


Date: 5.JUN.2020 18:29:52

Vertical



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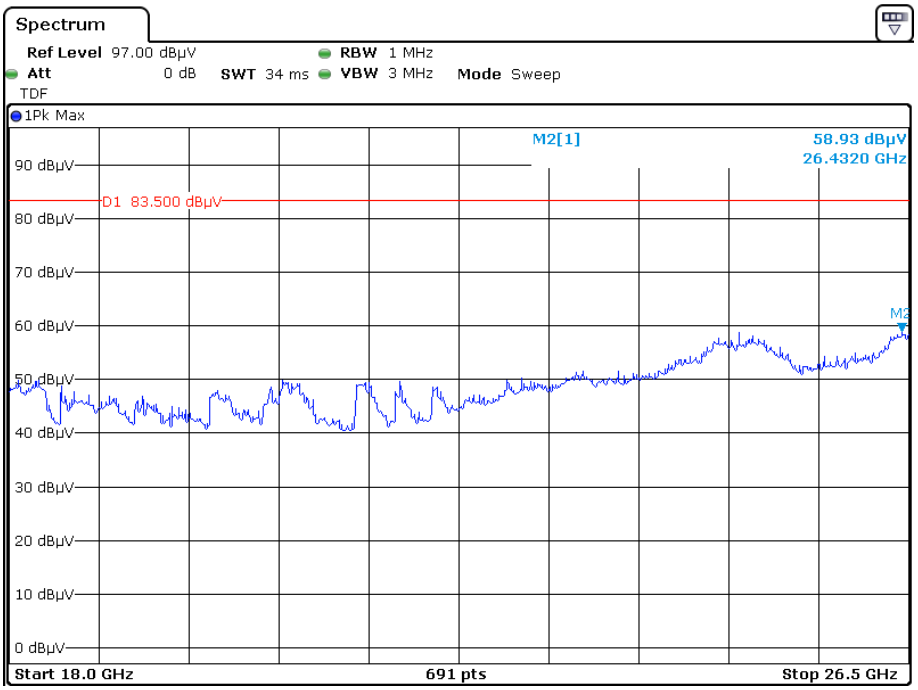

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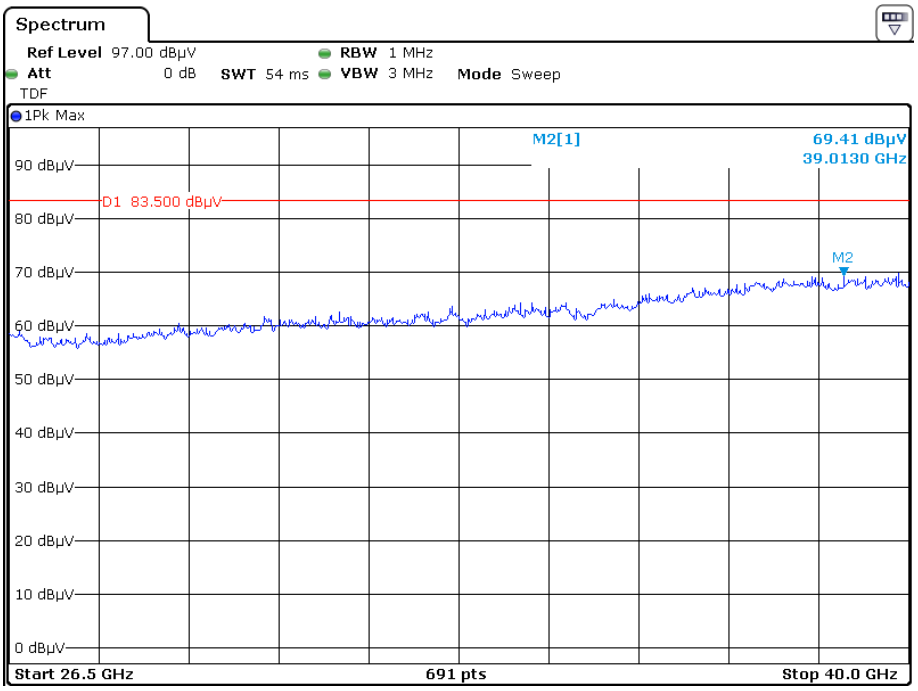

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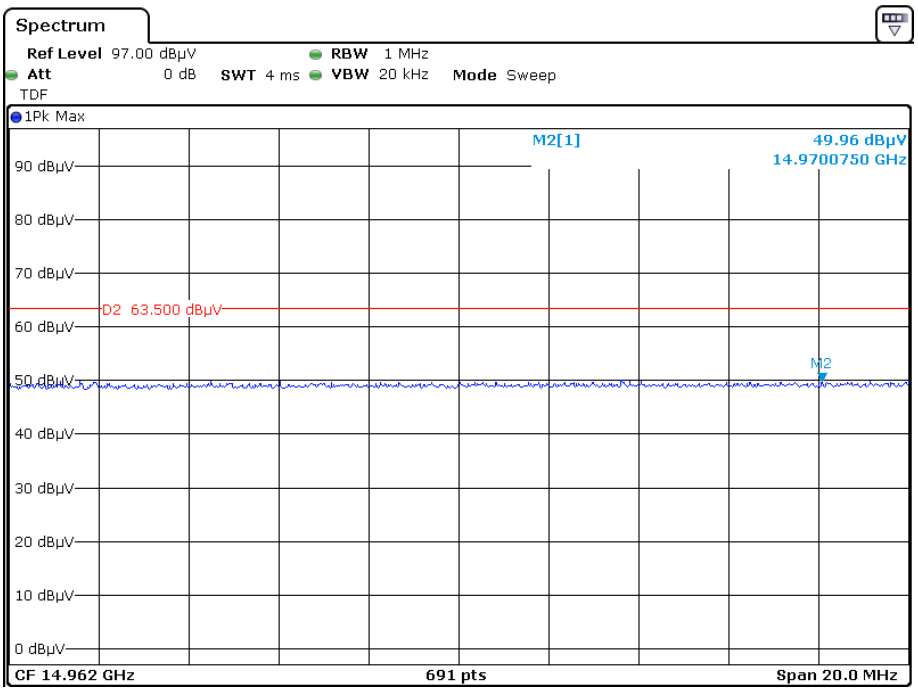
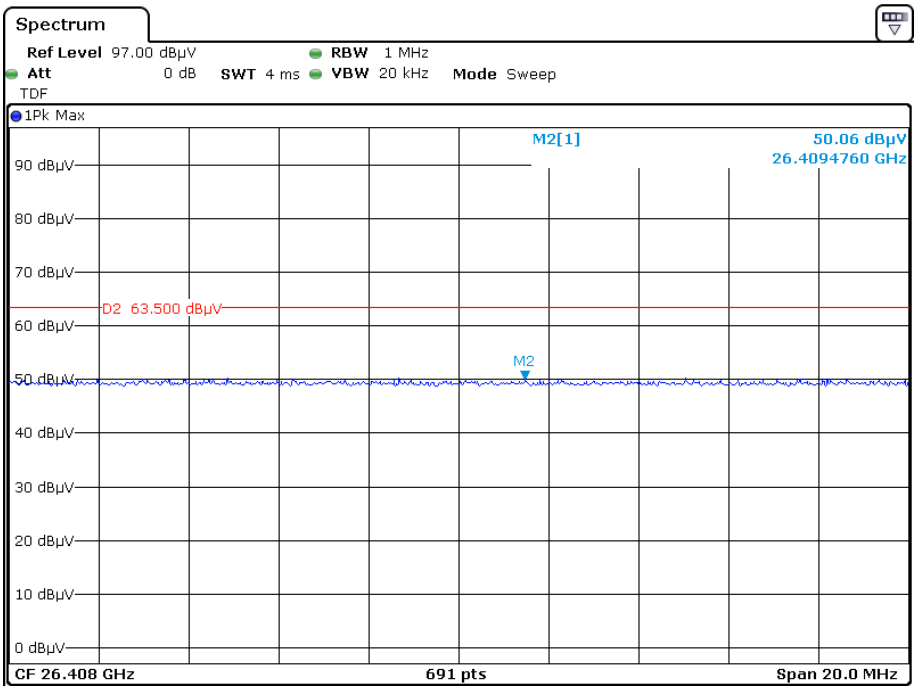
Average
Horizontal



Date: 5.JUN.2020 17:18:28



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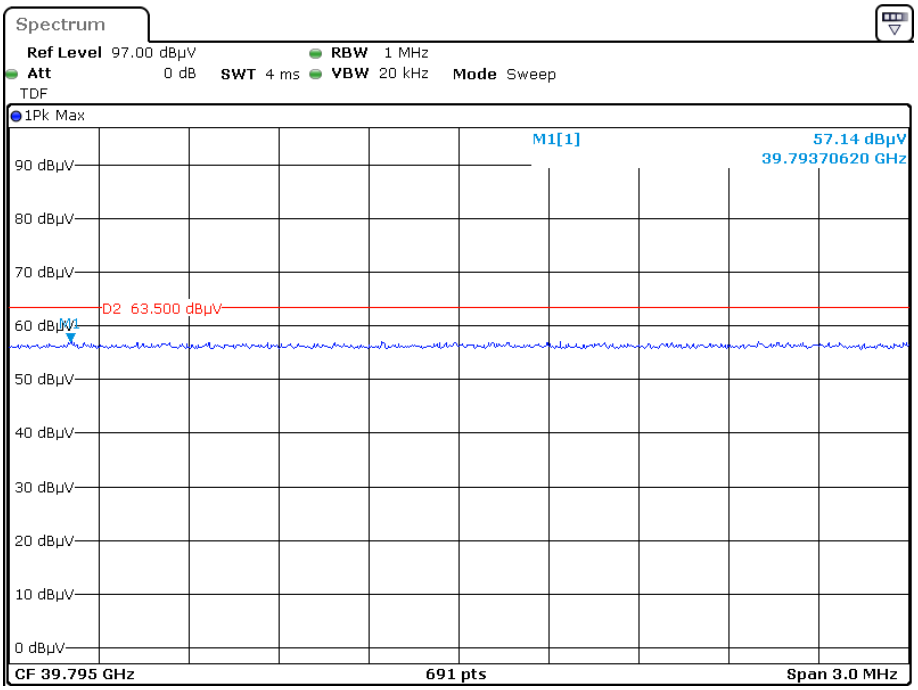
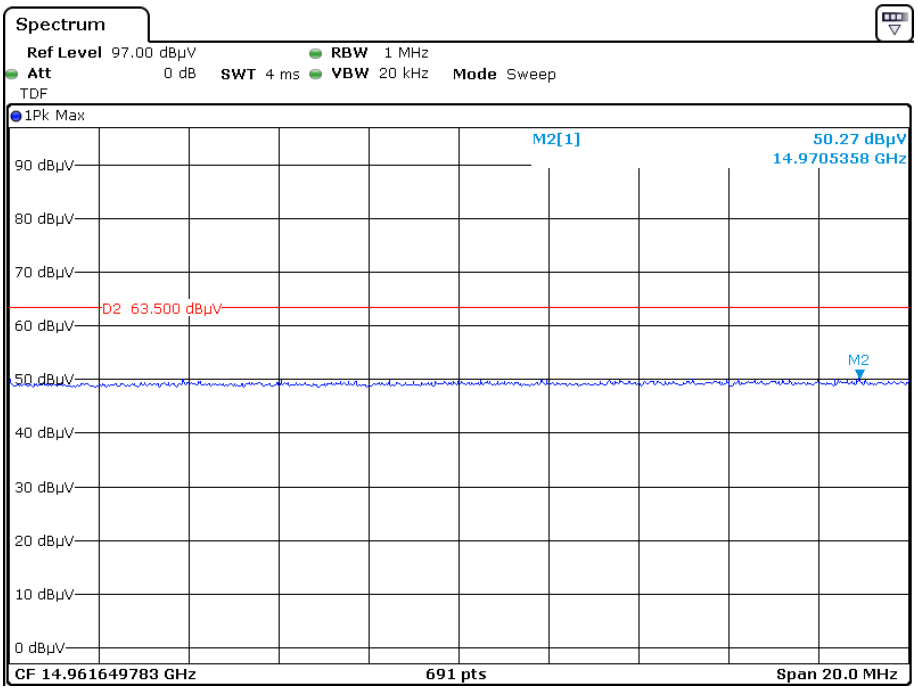


Date: 5.JUN.2020 18:33:20

Vertical



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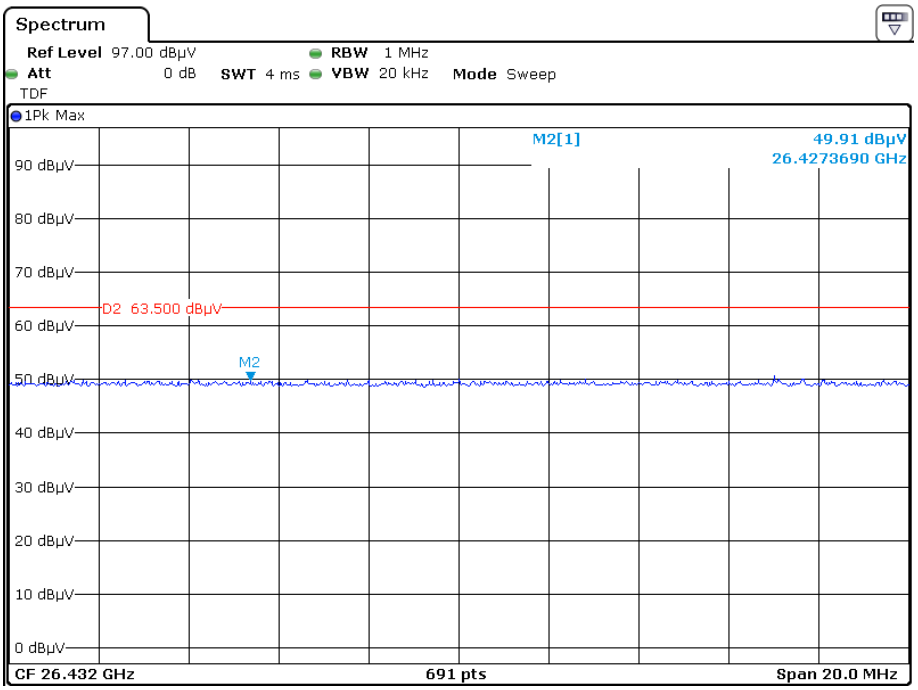

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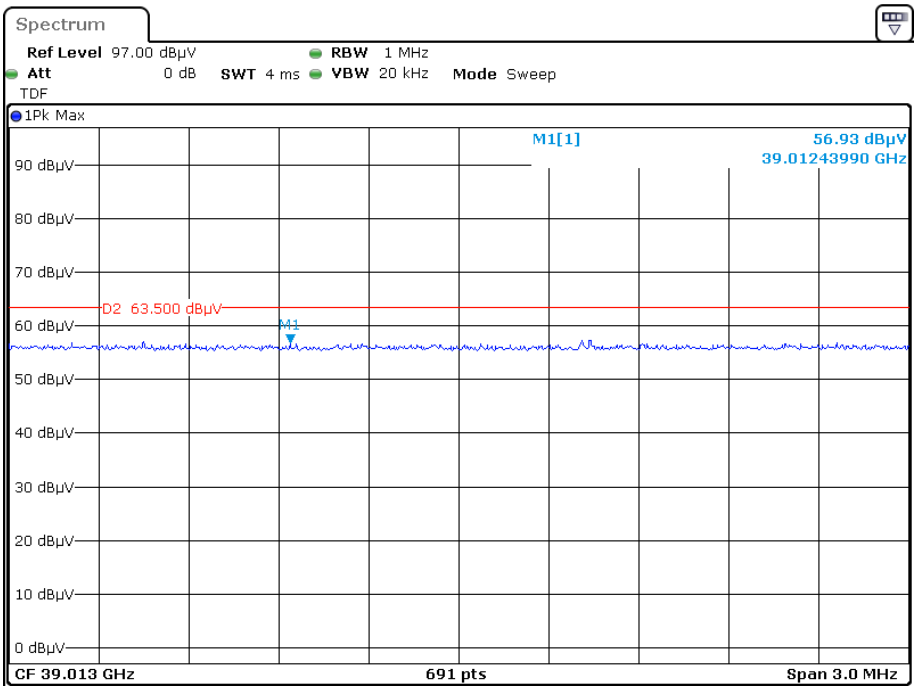


Date: 5.JUN.2020 18:26:32

FCC §15.407(a) (5) – 26 dB & 6dB EMISSION BANDWIDTH

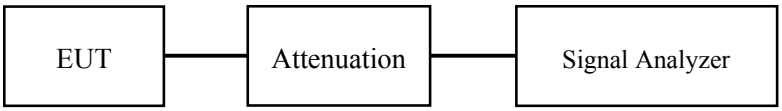
Applicable Standard

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, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands 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.

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%.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Alan He on 2020-06-05.

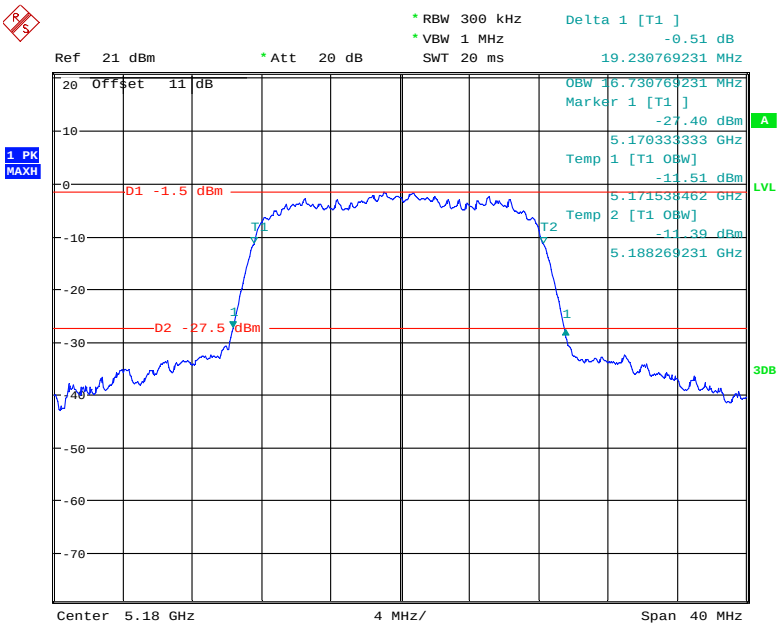
EUT operation mode: Transmitting

Test Result: Pass; please refer to the following tables and plots.

5150 MHz - 5250 MHz:

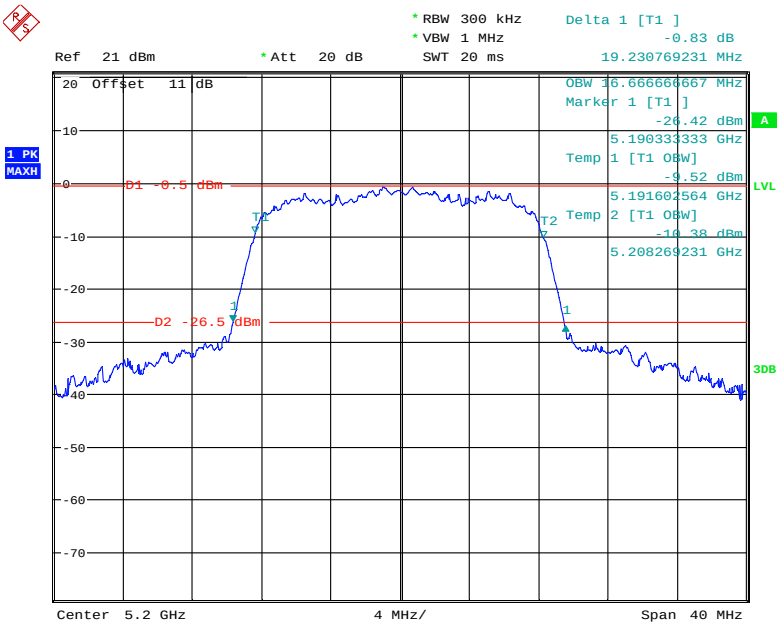
Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Remark
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2A band
5180	19.231	16.731	
5200	19.231	16.667	
5240	19.295	16.795	
802.11n20			
5180	19.167	16.731	
5200	19.231	16.731	
5240	19.269	16.720	

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz



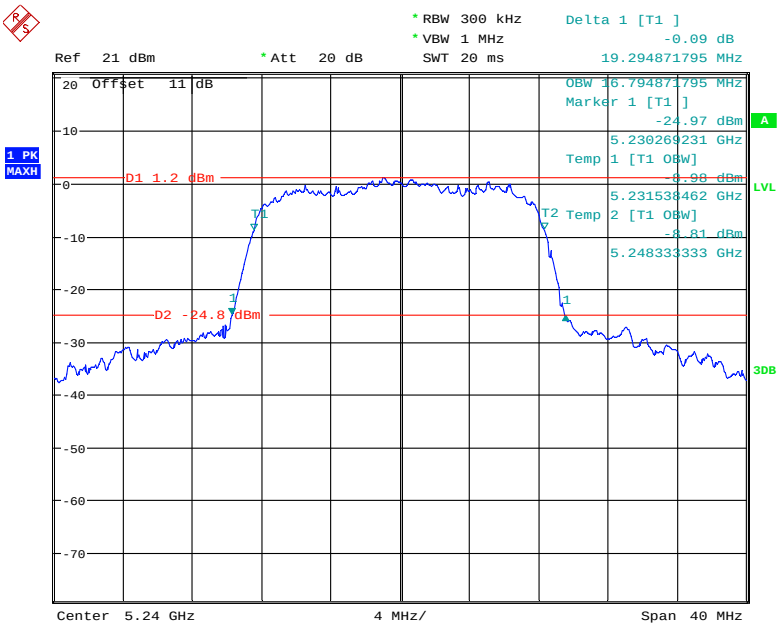
Date: 5.JUN.2020 10:15:07

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz



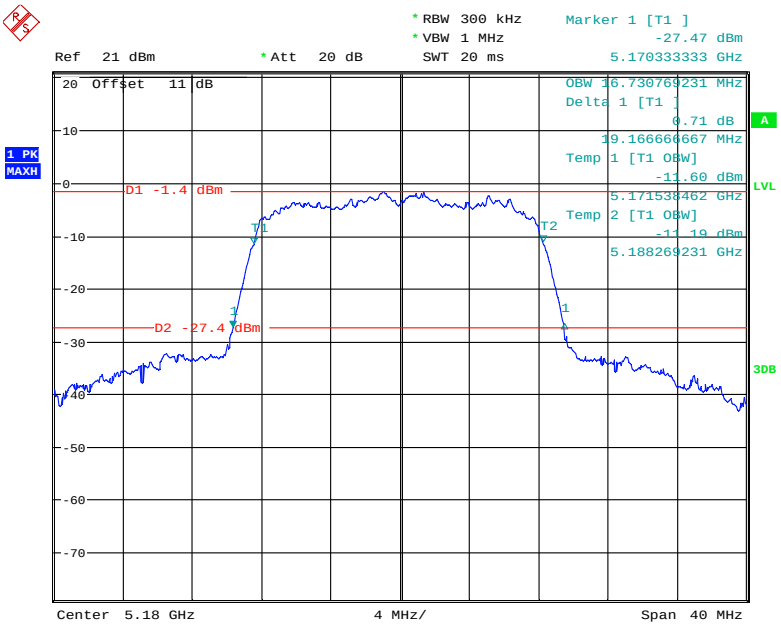
Date: 5.JUN.2020 10:16:49

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz



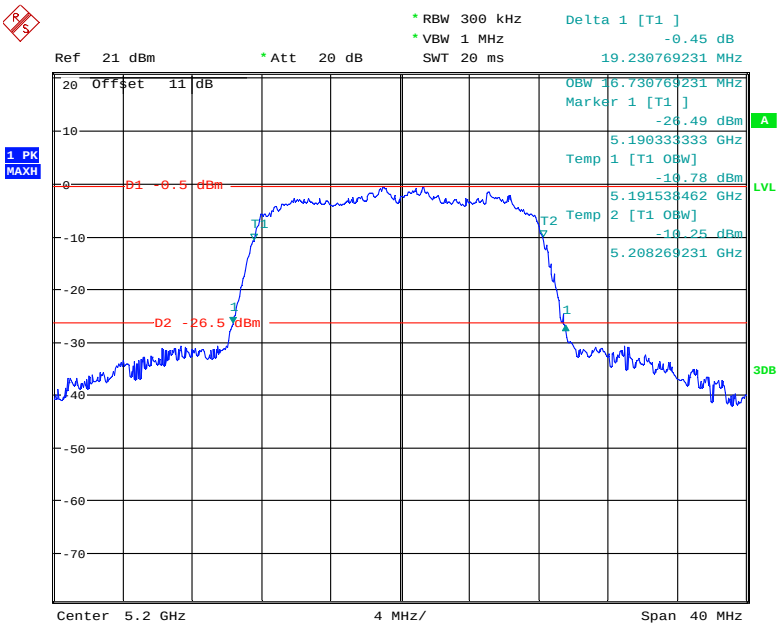
Date: 5.JUN.2020 10:12:05

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz



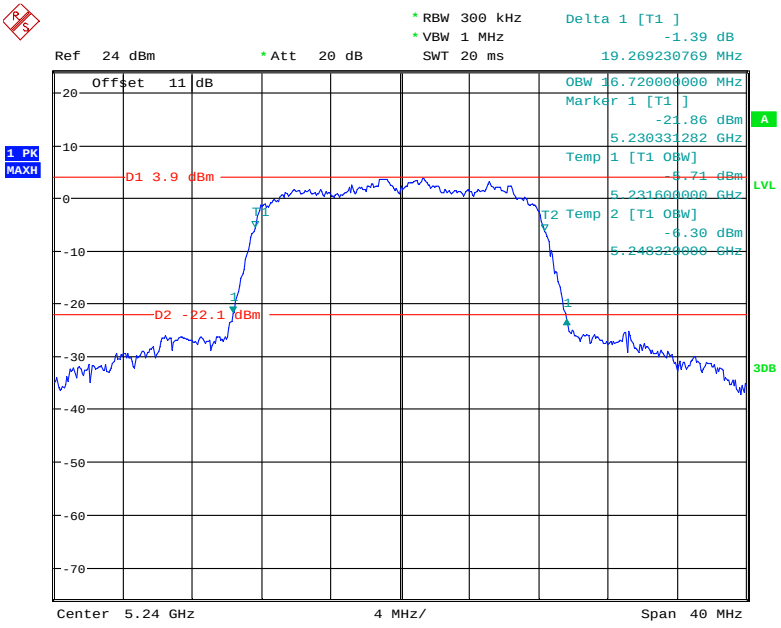
Date: 5.JUN.2020 10:18:24

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz



Date: 5.JUN.2020 10:19:31

802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz



Date: 5.JUN.2020 13:55:50

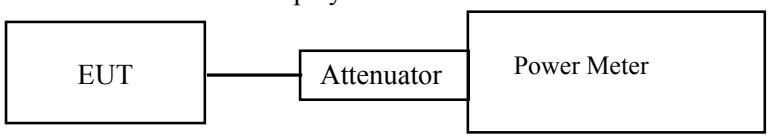
FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

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.

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:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Alan He on 2020-06-05.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

5150 MHz – 5250 MHz (This EUT is a client device)

Frequency (MHz)	Reading(dBm)	Factor	Average Output Power (dBm)	Limit (dBm)
802.11a				
5180	5.76	2.25	8.01	24
5200	6.61	2.25	8.86	
5240	8.53	2.25	10.78	
802.11n20				
5180	5.72	2.25	7.97	24
5200	6.69	2.25	8.94	
5240	8.52	2.25	10.77	

Note: Factor=10 log (1/x), x=Duty Cycle

FCC §15.407(a) (1) - POWER SPECTRAL DENSITY

Applicable Standard

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.

Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW $\geqslant$ 1/T, where T is defined in section II.B.l.a).
b) Set VBW $\geqslant$ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101 kPa

The testing was performed by Alan He on 2020-06-05.

EUT operation mode: Transmitting

Test Result: Pass

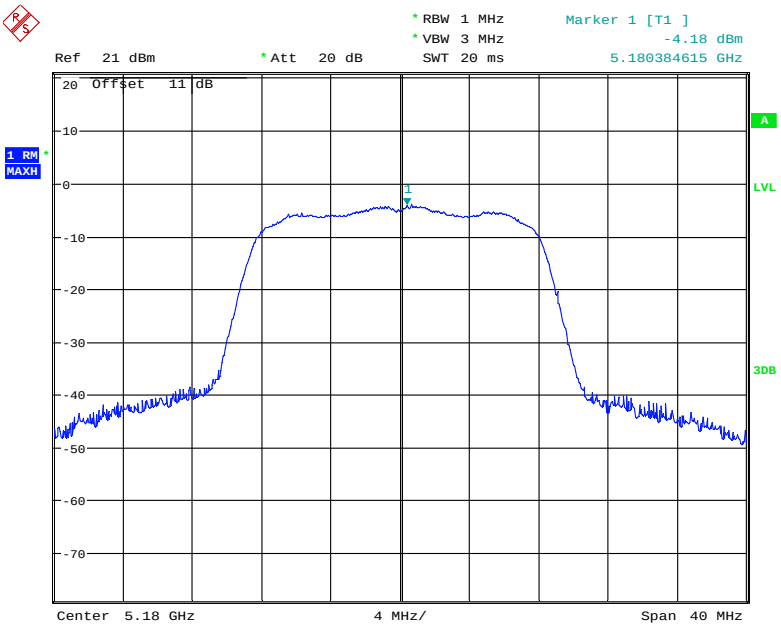
Please refer to the following tables and plots.

5150 MHz – 5250 MHz

Frequency (MHz)	Reading (dBm/MHz)	Factor	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a				
5180	-4.18	2.25	-1.93	11
5200	-2.85	2.25	-0.60	
5240	-1.21	2.25	1.04	
802.11n20				
5180	-4.15	2.25	-1.90	11
5200	-3.30	2.25	-1.05	
5240	-1.26	2.25	0.99	

Note: Factor=10 log (1/x), x=Duty Cycle

802.11a mode, Power Spectral Density, 5180 MHz



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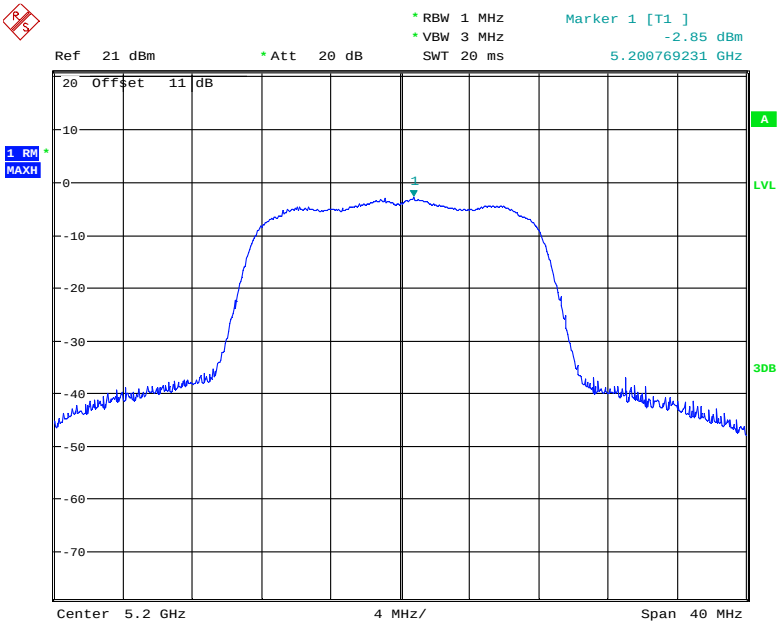
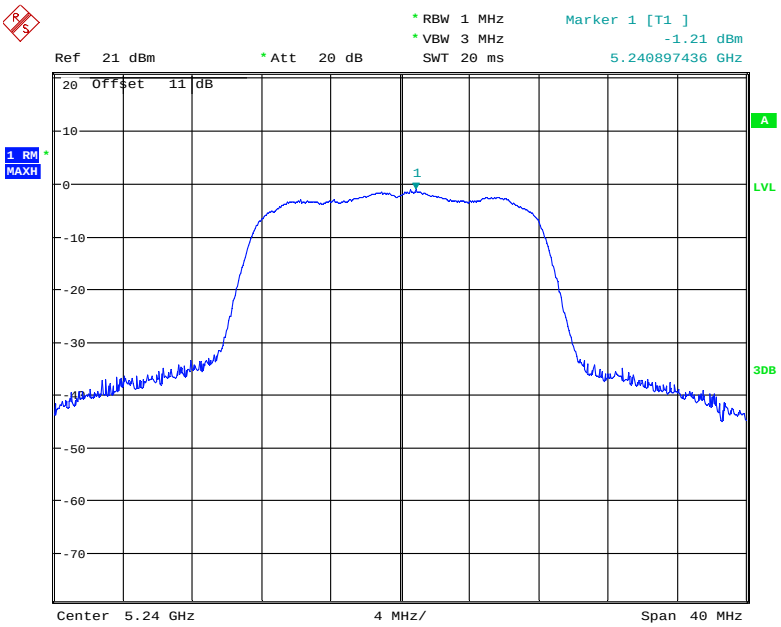
802.11a mode, Power Spectral Density, 5200 MHz



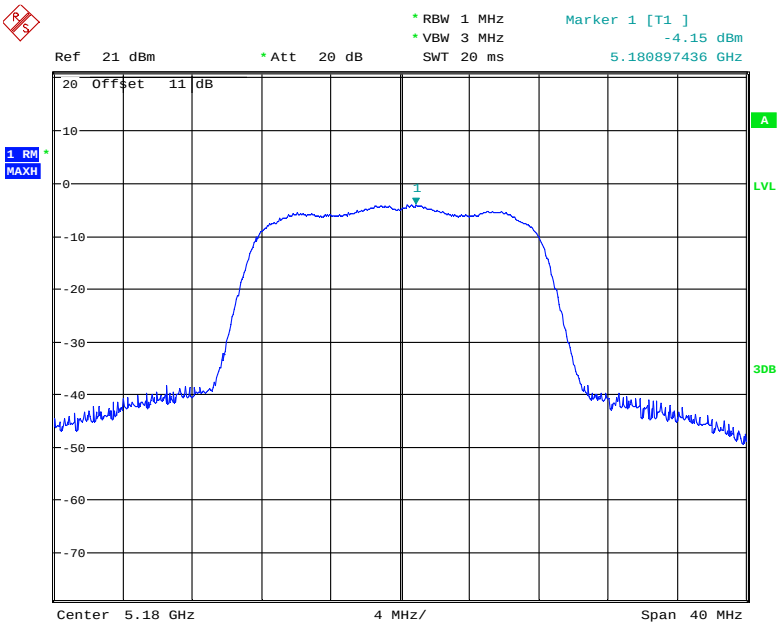
Date: 5.JUN.2020 10:24:51

802.11a mode, Power Spectral Density, 5240 MHz



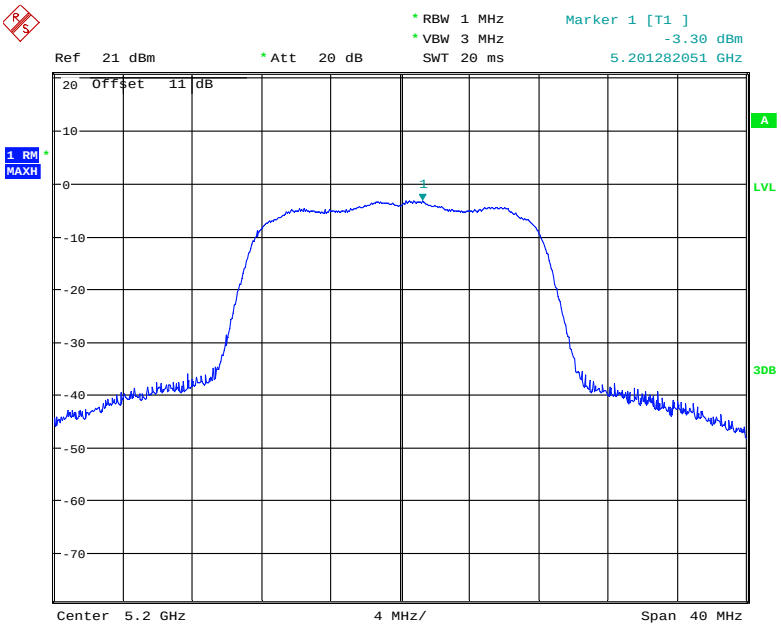
Date: 5.JUN.2020 10:25:15

802.11n20 mode, Power Spectral Density, 5180 MHz



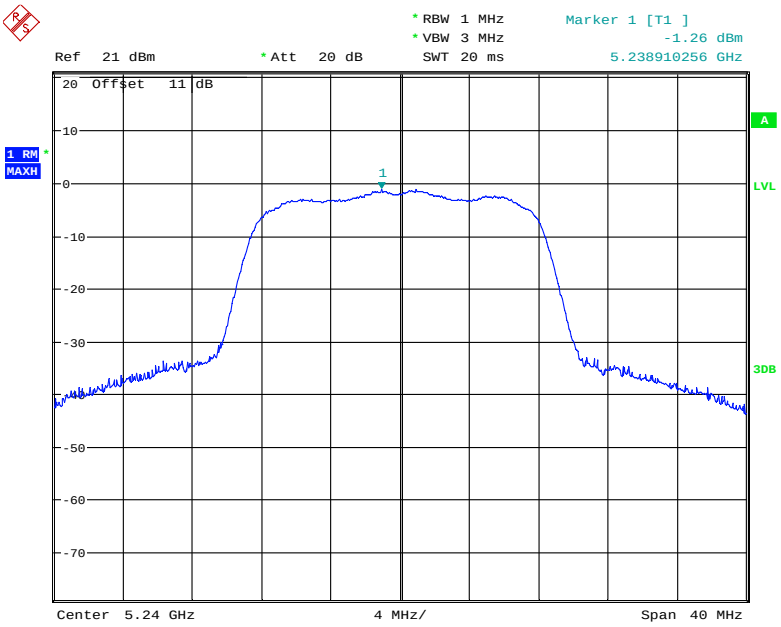
Date: 5.JUN.2020 10:23:49

802.11n20 mode, Power Spectral Density, 5200 MHz



Date: 5.JUN.2020 10:23:18

802.11n20 mode, Power Spectral Density, 5240 MHz



Date: 5.JUN.2020 10:22:45

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