中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **Hangzhou Arenti Technology Co., Ltd.**

Address: Zandsteen 50, 2132 MR Hoofddorp, Noord-Holland, Netherlands

FCC ID: **2A2MQ-SPEED18-A5**

Product Name: **IP CAMERA**

Standard(s): **47 CFR Part 15, Subpart E(15.407)**
ANSI C63.10-2013
KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

The above equipment has been tested and found compliance with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR21090042-00B**

Date Of Issue: **2021-11-15**

Reviewed By: **Sun Zhong**

Sun Zhong

Title: Manager

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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CONTENTS

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

1.1.1 General:

EUT Name:	IP CAMERA
EUT Model:	Speed 18S
Multiple Models:	PTCam, Speed 18T, Speed 18Q
Operation Frequency:	5180-5240 MHz (802.11a/n ht20) 5190-5230 MHz(802.11n ht40) 5745-5825 MHz (802.11a/n ht20) 5755-5795 MHz(802.11n ht40)
Maximum Output Power (Conducted):	11.41 dBm (5150-5250 MHz) 11.01 dBm (5725-5850 MHz)
Modulation Type:	OFDM
Rated Input Voltage:	DC 5V from adapter
Serial Number:	CR21090042-RF-S2(configuration 1) CR21090042-RF-S3(configuration 2)
EUT Received Date:	2021.10.22
EUT Received Status:	Good
Note: The Multiple models are identical with the test model, please refer to the declaration letter for more detail, which was provided by manufacturer. Test only performed with model: Speed 18S. All the models have two configuration(configuration 1 is AK3918EV300, configuration 2 is AK3918EV330L), both model were tested with AC line conducted emissions and Spurious emissions Below 1GHz, other item test with configuration 1.	

1.1.2 Operation Frequency Detail:

For 802.11a/n ht20:

5150-5250MHz Band		5725-5850MHz Band	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
36	5180	149	5745
40	5200	153	5765
44	5220	157	5785
48	5240	161	5805
/	/	165	5825

Per section 15.31(m), the lowest frequency, middle frequency, and highest frequency were performed the test as below:

Test Channel	Test Frequency (MHz)	
	5150-5250MHz Band	5725-5850MHz Band
Lowest	5180	5745
Middle	5200	5785
Highest	5240	5825

For 802.11n ht40:

5150-5250MHz Band		5725-5850MHz Band	
Channel	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
38	5190	151	5755
46	5230	159	5795

Per section 15.31(m), the lowest frequency, middle frequency, and highest frequency were performed the test as below:

Test Channel	Test Frequency (MHz)	
	5150-5250MHz Band	5725-5850MHz Band
Lowest	5190	5755
Highest	5230	5795

1.1.3 Antenna Information Detail▲:

Antenna Manufacturer	Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range	§15.203& RSS-Gen Requirement
Hangzhou Arenti Technology Co., Ltd.	FPC	50	4.64 dBi/ 5.15~5.85GHz	**Compliance**
The Method of §15.203 Compliance: ☒Antenna must be permanently attached to the unit. ☐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.				

1.1.4 Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
USB Cable	Unknown	Unknown	Unshielded, 2.0m
Adapter #1	Dongguan Green Power One Co., Ltd	GTA92-0501000US	Input: 100~240V, 50/60Hz 0.3A Output: DC 5V 1A
Adapter #2	Shenzhen Tianyin Electronics Co., Ltd	TPA-46B050100UU	Input: 100~240V, 50/60Hz 0.2A Output: DC 5V 1A

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Engineering Mode, which was provided by the manufacturer.
Equipment Modifications:	No
EUT Exercise Software:	Demo.exe

The software " Demo.exe "was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer▲:

Frequency Band	Test Modes	Data Rate	Power Level Setting		
			Lowest Channel	Middle Channel	Highest Channel
5150-5250 MHz	802.11a	6Mbps	-3	-3	-3
	802.11n ht20	MCS0	-3	-3	-3
	802.11n ht40	MCS0	-3	/	-3
5725-5850 MHz	802.11a	6Mbps	-3	-3	-3
	802.11n ht20	MCS0	-3	-3	-3
	802.11n ht40	MCS0	-3	/	-3

The above are the worst-case data rates, which are determined for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations.

1.2.2 Support Equipment List and Details

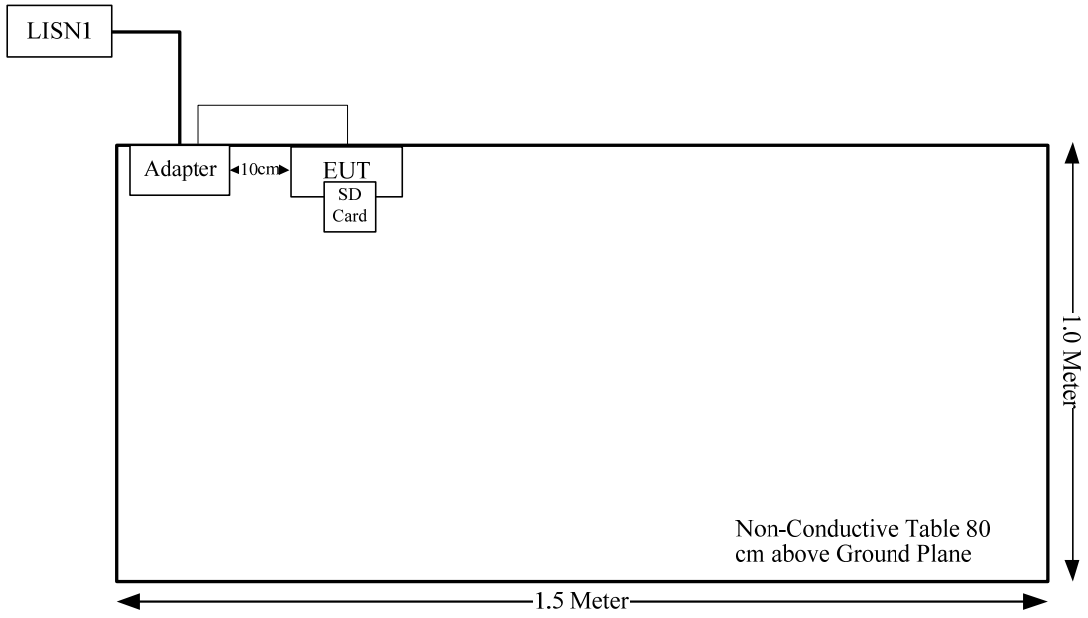
Manufacturer	Description	Model	Serial Number
Sandisk	SD card	32G	72810VCP912S

1.2.3 Support Cable List and Details

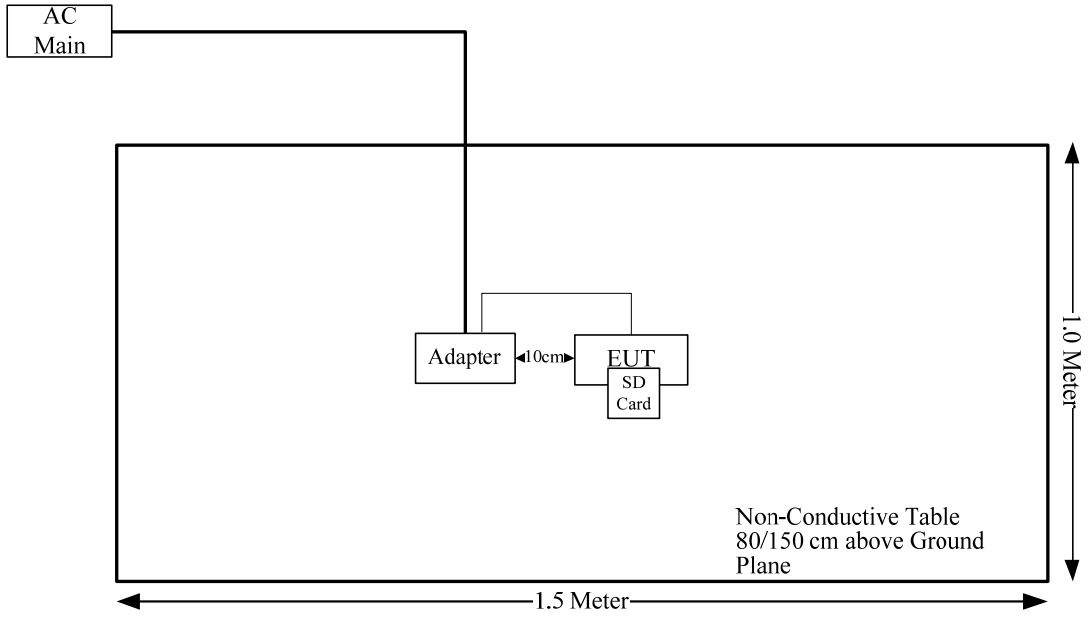
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
AC power cable	No	No	1.0	Adapter	LISN/AC Mains
USB cable	No	No	2.0	Adapter	EUT

1.2.4 Block Diagram of Test Setup

AC line conducted emissions:



Spurious Emissions:



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Unwanted Emissions, conducted	±1.26 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

2. SUMMARY OF TEST RESULTS

Standard(s) Section	Test Items	Result
FCC§15.207(a)	AC line conducted emissions	Compliance
FCC§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliance
FCC§15.407(h) (e)	Emission Bandwidth	Compliance
FCC§15.407(a)	Conducted Transmitter Output Power	Compliance
FCC§15.407 (a)	Power Spectral Density	Compliance
FCC§15.203	Antenna Requirement	Compliance
FCC §15.407 (f) & §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

	Conducted limit (dBμV)	
Frequency of emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

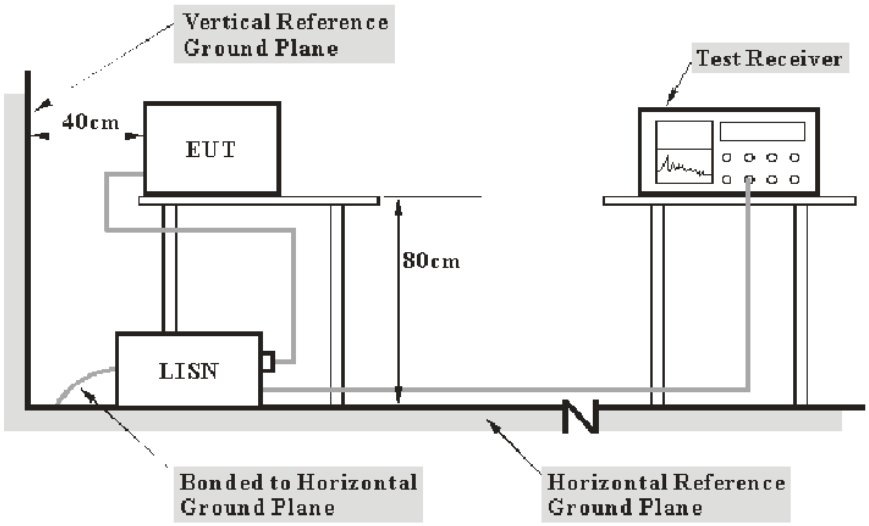
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μV within the frequency band 535-1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

3.1.2 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 or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

3.1.3 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

3.1.4 Test Procedure

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

3.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.2 Radiation Spurious Emissions

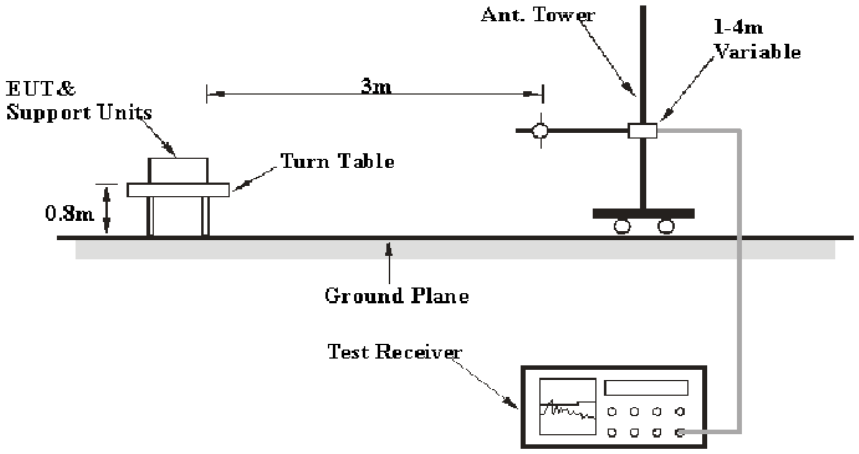
3.2.1 Applicable Standard

FCC §15.407 (b);

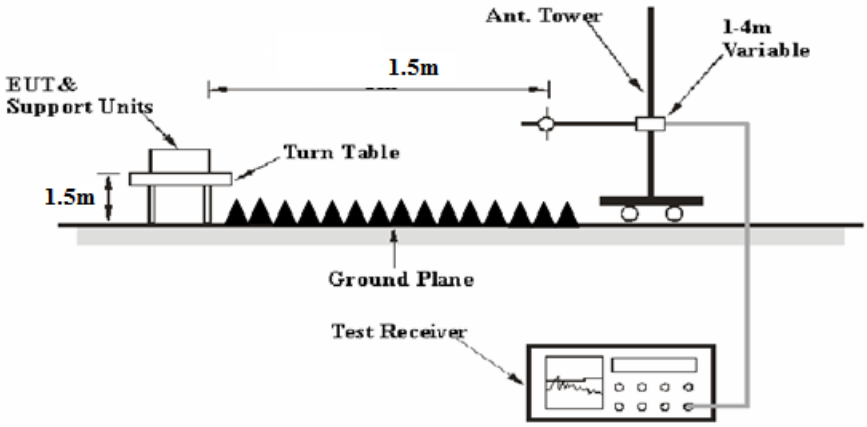
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of – 27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 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.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of – 27 dBm/MHz.
(4) For transmitters operating solely in the 5.725-5.850 GHz band:
(i) 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.
(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.
(8) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(9) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.
(10) The provisions of § 15.205 apply to intentional radiators operating under this section.
(11) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.
(c) The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

3.2.2 EUT Setup

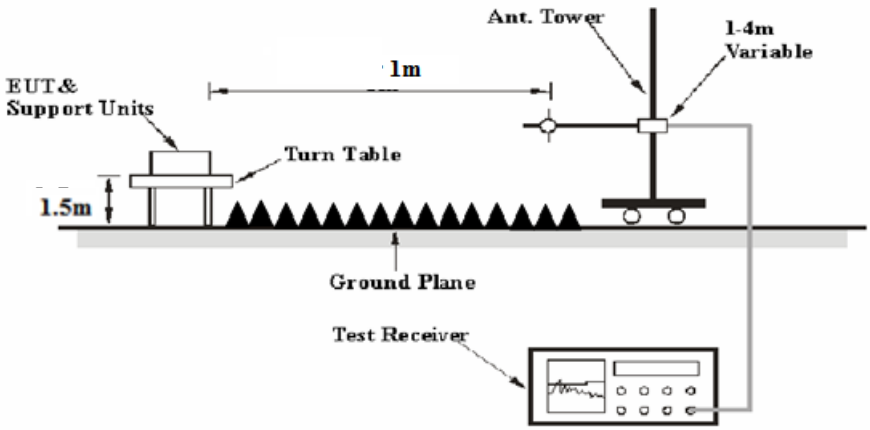
Below 1GHz:



1-26.5 GHz:



26.5-40 GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was FCC 15.209, 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.

3.2.3 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:

30-1000MHz:

Measurement	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 40GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

3.2.4 Test Procedure

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

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

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation Factor of 20dB/decade from 3m to 1.5m or 1m
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB
or
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1m]) dB= 9.54 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Factor = Antenna Factor + Cable Loss- Amplifier Gain

For 30MHz-1GHz:
Result = Reading + Factor

For 1GHz-40GHz
Result = Reading + Factor-Distance extrapolation Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.3 Emission Bandwidth:

3.3.1 Applicable Standard

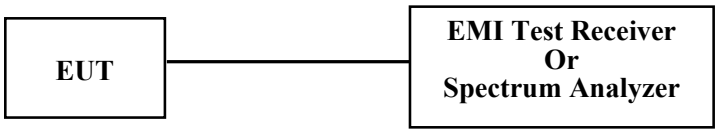
FCC §15.407 (h)

(h)(2) Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

FCC §15.407 (e)

Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

3.3.2 EUT Setup



3.3.3Test Procedure

26dB Emission Bandwidth:

According to ANSI C63.10-2013 Section 12.4.1

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 peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

99% Occupied Bandwidth:

According to ANSI C63.10-2013 Section 12.4.2&6.9.3

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
The following procedure shall be used for measuring 99% power bandwidth:
a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
d) Step a) through step c) might require iteration to adjust within the specified range.
e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6 dB emission bandwidth:

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 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.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

3.4 Maximum conducted output power:

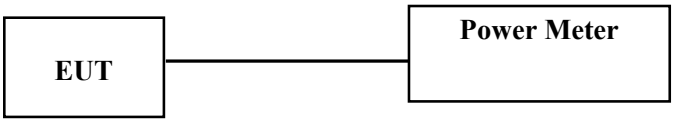
3.4.1 Applicable Standard

FCC §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.

FCC §15.407(a) (3)(i)

For the band 5.725-5.850 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.

3.4.2 EUT Setup



3.4.3Test Procedure

According to ANSI C63.10-2013 Section 11.9.1.3

Method PM-G is measurement using a gated RF average power meter.
Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

3.5 Maximum power spectral density:

3.5.1 Applicable Standard

FCC §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.

FCC §15.407(a) (3)(i)

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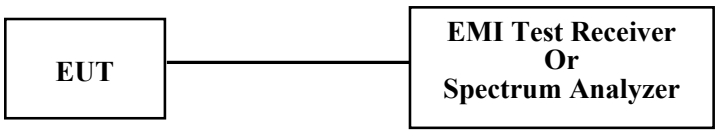
3.5.2 EUT Setup



3.5.3Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Method SA-3 (power averaging (rms) detection with max hold):
(i) Set span to encompass the entire EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set sweep trigger to “free run.”

(iii) Set RBW = 1 MHz.

(iv) Set VBW ≥ 3 MHz

(v) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(vi) Sweep time ≤ (number of points in sweep) × *T*, where *T* is defined in II.B.1.a).
Note: If this results in a sweep time less than the auto sweep time of the analyzer, Method SA-3 Alternative shall not be used. (The purpose of this step is to ensure that averaging time in each bin is less than or equal to the minimum time of a transmission.)
(vii) Detector = power averaging (rms).

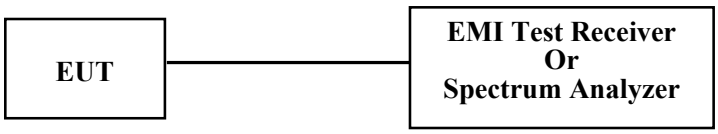
(viii) Trace mode = max hold.

(ix) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

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.

3.7 Duty Cycle:

3.7.1 EUT Setup



3.7.2Test Procedure

According to ANSI C63.10-2013 Section 12.2

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
1) Set the center frequency of the instrument to the center frequency of the transmission.
2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
3) Set VBW ≥ RBW. Set detector = peak or average.
4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if T ≤ 16.7 μs.)

3.8 Antenna Requirement

3.8.1 Applicable Standard

FCC §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 use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

3.8.2 Judgment

Please refer to the Antenna Information detail in Section 1.

4. Test DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	CR21090042-RF-S2(configuration 1) CR21090042-RF-S3(configuration 2)	Test Date:	2021-11-06~2021-11-10
Test Site:	CE	Test Mode:	Transmitting (802.11a 5785MHz was the worst)
Tester:	Allen Wu, Nick Tang	Test Result:	Pass

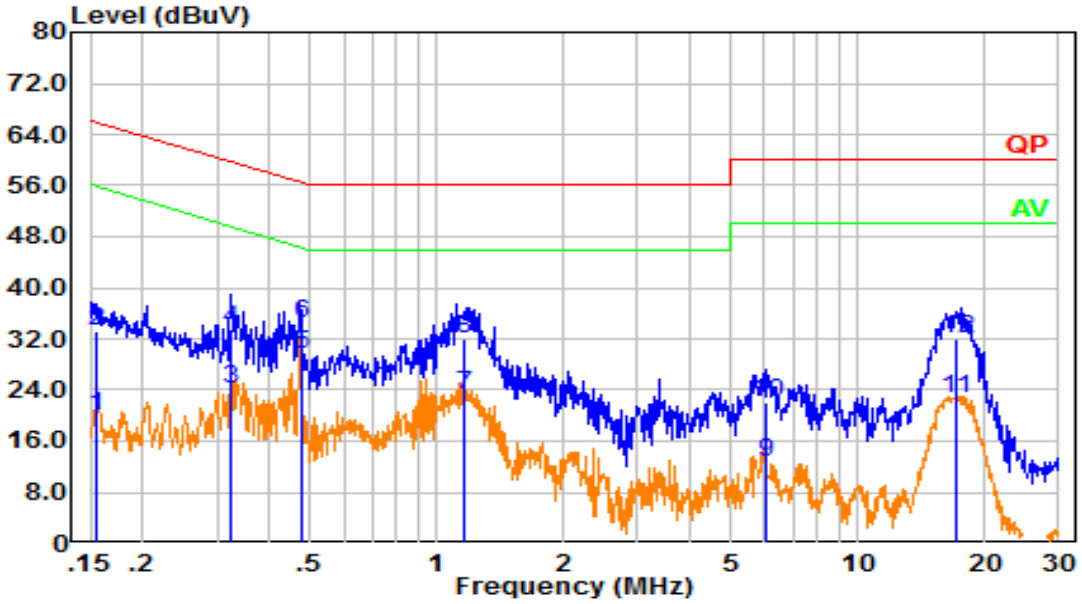
Environmental Conditions:					
Temperature: (℃)	21.1~24.2	Relative Humidity: (%)	66.1~70	ATM Pressure: (kPa)	100.9~101.7

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101132	2021-04-25	2022-04-24
R&S	EMI Test Receiver	ESR3	102726	2021-07-22	2022-07-21
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2021-08-08	2022-08-07
Audix	Test Software	E3	190306 (V9)	N/A	N/A

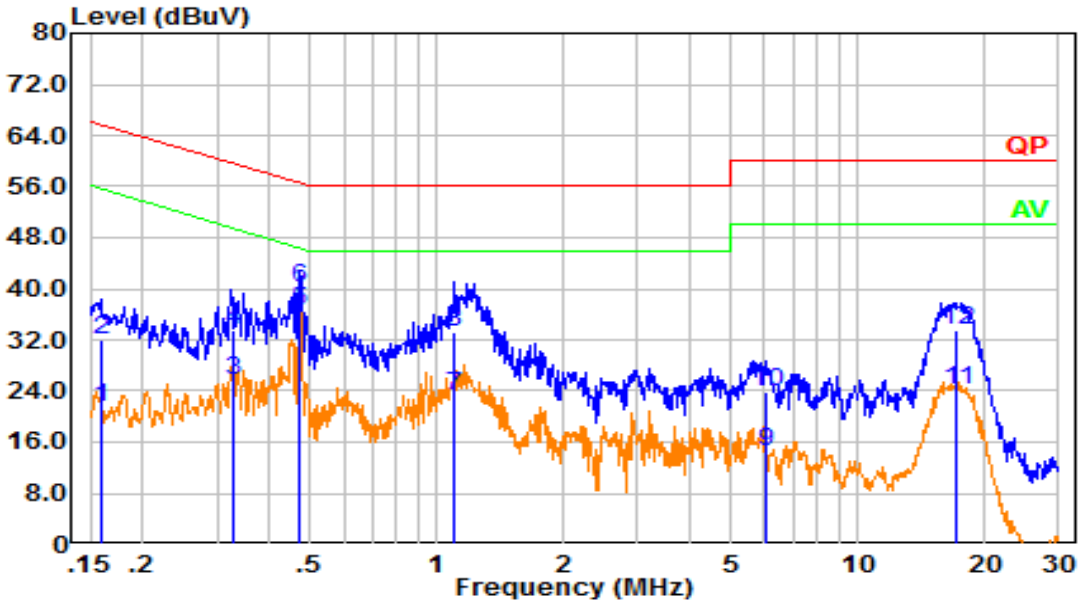
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Adapter #1,Configuration 1:
Line:



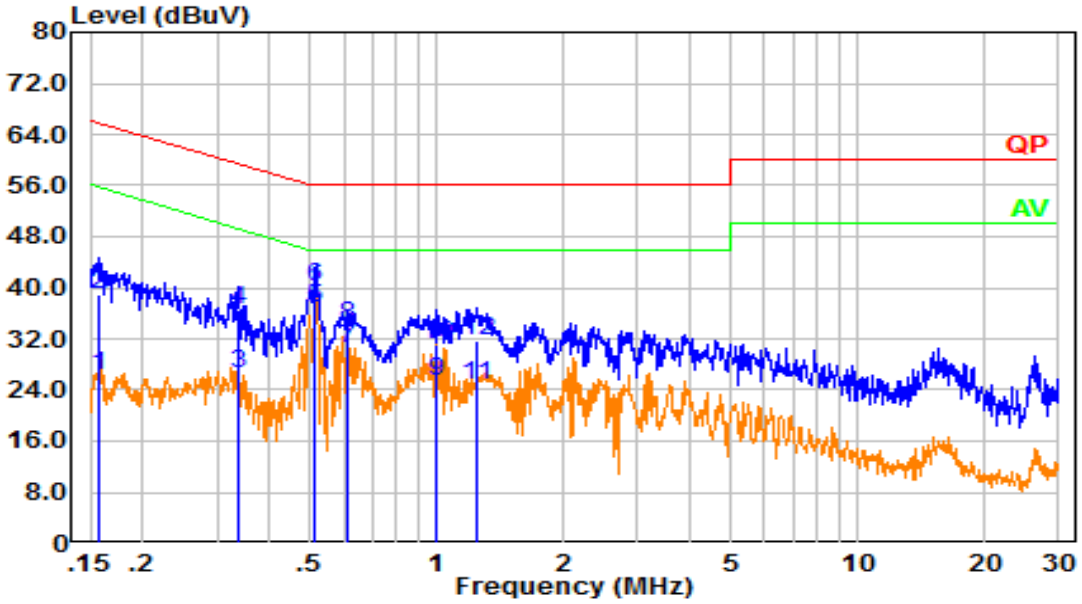
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.154	10.46	9.61	20.07	55.76	35.69	Average
2	0.154	23.56	9.61	33.17	65.76	32.59	QP
3	0.325	14.43	9.61	24.04	49.59	25.55	Average
4	0.325	23.96	9.61	33.57	59.59	26.02	QP
5	0.475	20.03	9.61	29.64	46.43	16.79	Average
6	0.475	24.71	9.61	34.32	56.43	22.11	QP
7	1.164	13.69	9.62	23.31	46.00	22.69	Average
8	1.164	22.53	9.62	32.15	56.00	23.85	QP
9	6.034	3.05	9.66	12.71	50.00	37.29	Average
10	6.034	12.38	9.66	22.04	60.00	37.96	QP
11	17.162	13.01	9.73	22.74	50.00	27.26	Average
12	17.162	22.38	9.73	32.12	60.00	27.88	QP

Neutral:



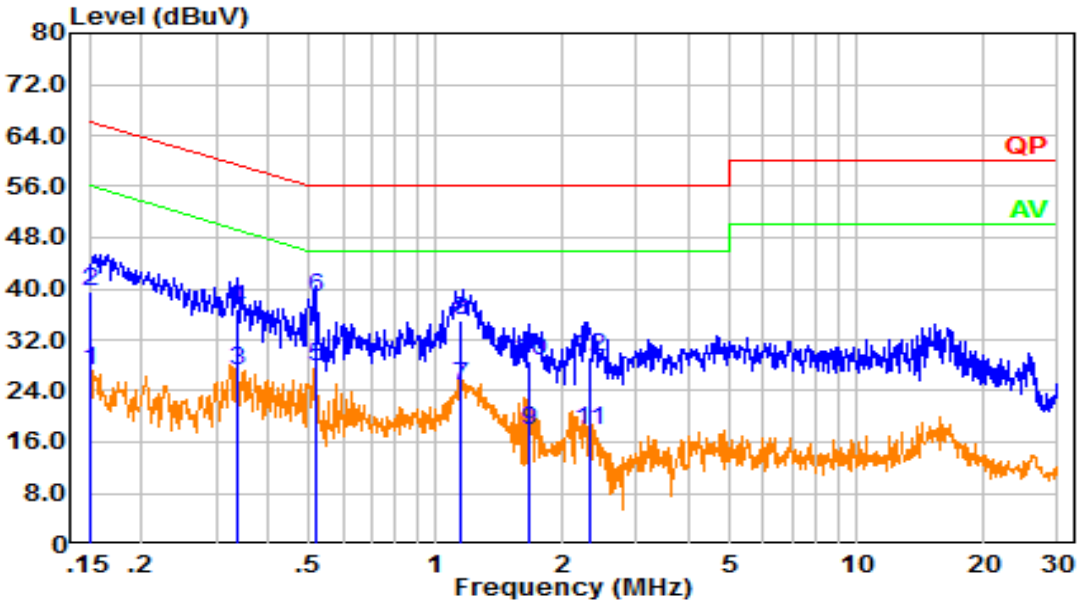
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.158	11.87	9.61	21.48	55.55	34.07	Average
2	0.158	22.48	9.61	32.09	65.55	33.46	QP
3	0.326	15.93	9.61	25.54	49.55	24.01	Average
4	0.326	23.84	9.61	33.45	59.55	26.10	QP
5	0.470	26.79	9.61	36.40	46.52	10.12	Average
6	0.470	30.62	9.61	40.23	56.52	16.29	QP
7	1.098	13.56	9.62	23.18	46.00	22.82	Average
8	1.098	23.58	9.62	33.20	56.00	22.80	QP
9	6.062	4.91	9.66	14.57	50.00	35.43	Average
10	6.062	14.28	9.66	23.94	60.00	36.06	QP
11	17.249	14.46	9.69	24.15	50.00	25.85	Average
12	17.249	23.92	9.69	33.61	60.00	26.39	QP

Adapter #2,Configuration 1:
Line:



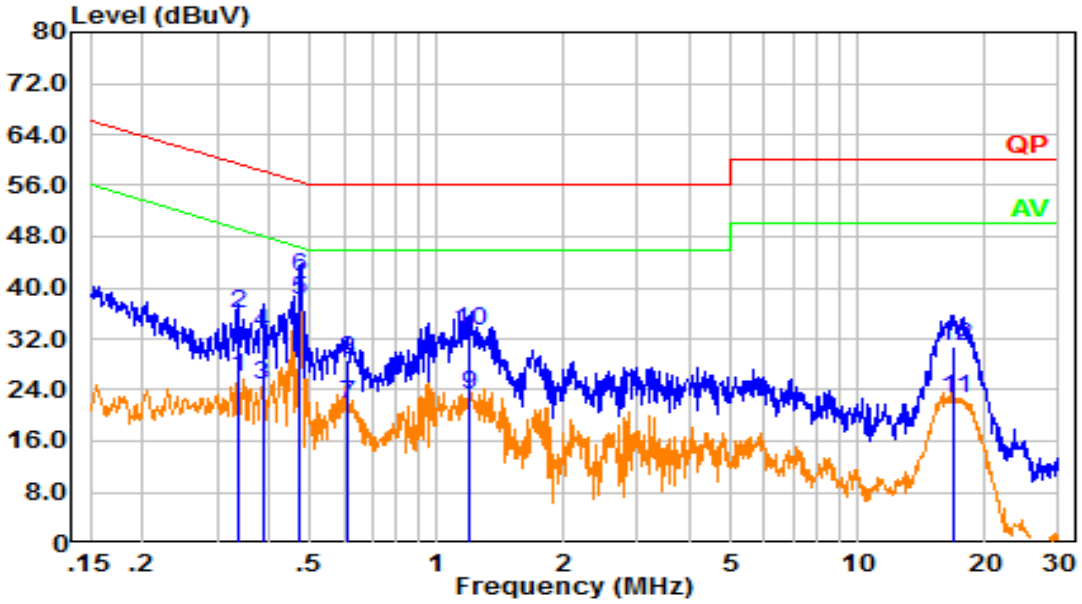
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.157	16.56	9.61	26.17	55.63	29.46	Average
2	0.157	29.48	9.61	39.09	65.63	26.55	QP
3	0.338	17.08	9.61	26.69	49.26	22.57	Average
4	0.338	26.82	9.61	36.43	59.26	22.83	QP
5	0.513	27.23	9.61	36.84	46.00	9.16	Average
6	0.513	30.58	9.61	40.19	56.00	15.81	QP
7	0.616	20.83	9.62	30.45	46.00	15.55	Average
8	0.616	24.64	9.62	34.26	56.00	21.74	QP
9	0.999	15.88	9.62	25.50	46.00	20.50	Average
10	0.999	21.61	9.62	31.23	56.00	24.77	QP
11	1.238	15.10	9.62	24.73	46.00	21.27	Average
12	1.238	22.03	9.62	31.65	56.00	24.35	QP

Neutral:



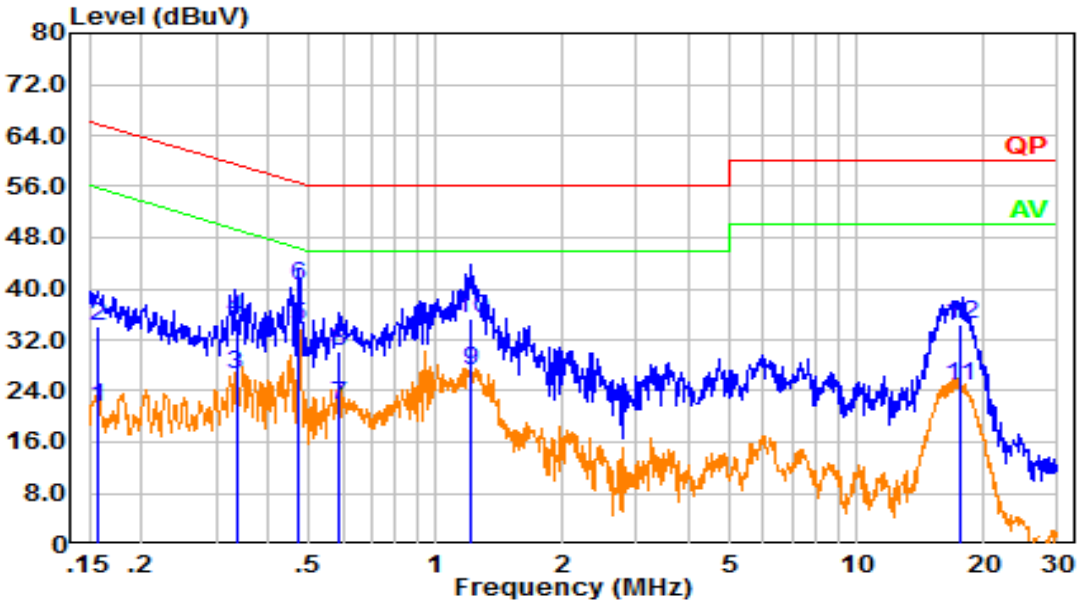
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.152	17.43	9.61	27.04	55.90	28.86	Average
2	0.152	30.02	9.61	39.63	65.90	26.27	QP
3	0.337	17.59	9.61	27.20	49.27	22.06	Average
4	0.337	27.34	9.61	36.95	59.27	22.32	QP
5	0.517	18.07	9.61	27.68	46.00	18.32	Average
6	0.517	28.88	9.61	38.49	56.00	17.51	QP
7	1.146	14.99	9.62	24.61	46.00	21.39	Average
8	1.146	25.52	9.62	35.14	56.00	20.86	QP
9	1.673	8.23	9.63	17.86	46.00	28.14	Average
10	1.673	18.95	9.63	28.58	56.00	27.42	QP
11	2.308	8.07	9.64	17.71	46.00	28.29	Average
12	2.308	19.68	9.64	29.32	56.00	26.68	QP

Adapter #1,Configuration 2:
Line:



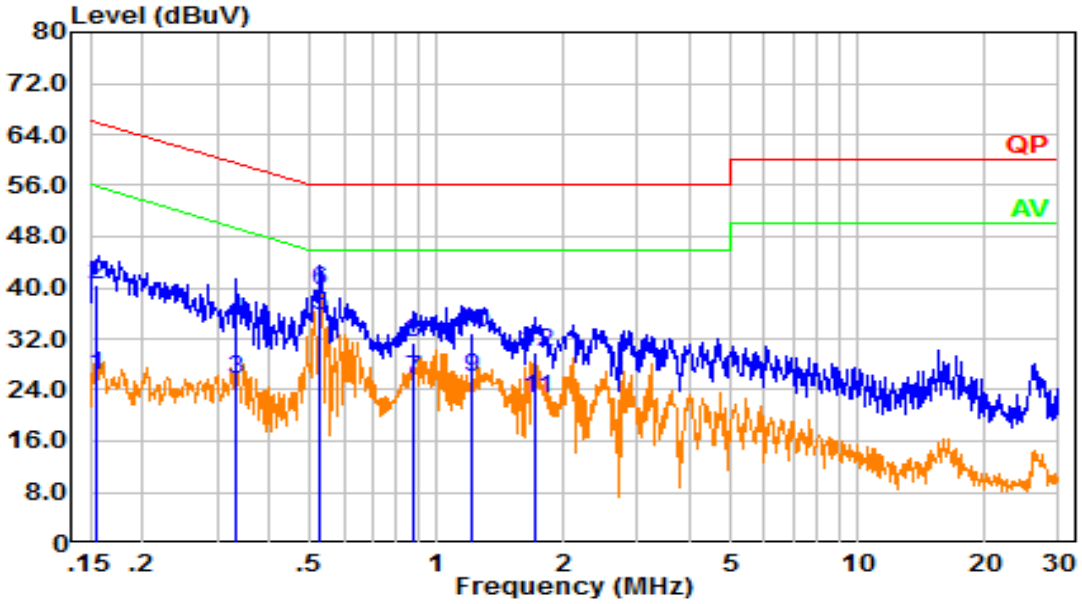
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.335	16.46	9.61	26.07	49.32	23.25	Average
2	0.335	26.32	9.61	35.93	59.32	23.39	QP
3	0.385	15.23	9.61	24.84	48.18	23.34	Average
4	0.385	23.25	9.61	32.86	58.18	25.32	QP
5	0.471	28.50	9.61	38.11	46.49	8.38	Average
6	0.471	31.92	9.61	41.53	56.49	14.96	QP
7	0.614	12.26	9.62	21.88	46.00	24.12	Average
8	0.614	19.07	9.62	28.69	56.00	27.31	QP
9	1.188	13.63	9.62	23.26	46.00	22.74	Average
10	1.188	23.62	9.62	33.24	56.00	22.76	QP
11	16.957	12.78	9.73	22.51	50.00	27.49	Average
12	16.957	21.04	9.73	30.77	60.00	29.23	QP

Neutral:



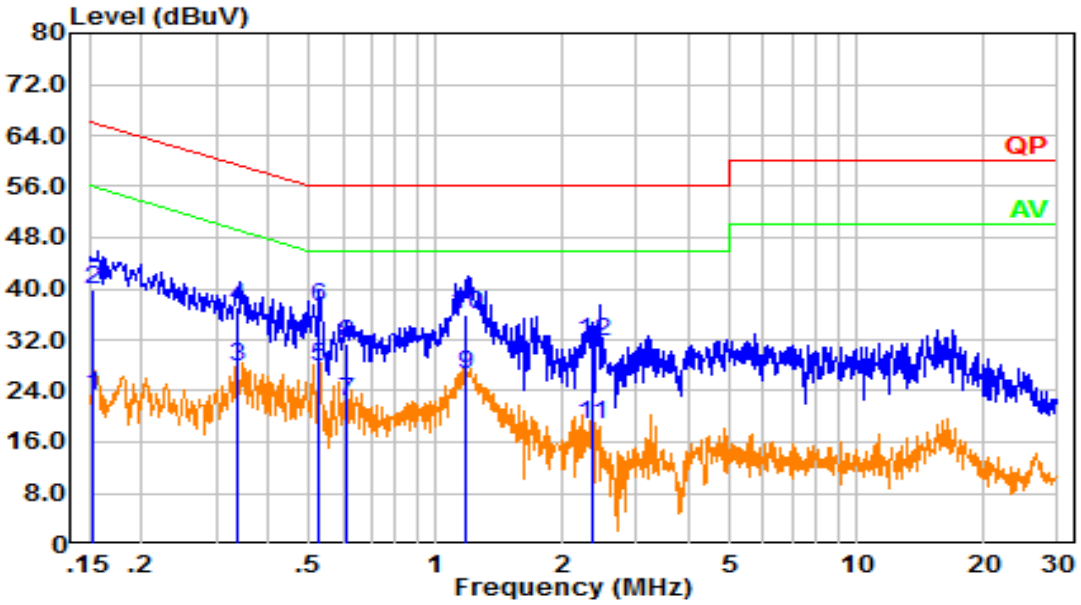
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.157	11.89	9.61	21.50	55.61	34.11	Average
2	0.157	24.57	9.61	34.18	65.61	31.43	QP
3	0.335	17.03	9.61	26.64	49.33	22.69	Average
4	0.335	25.78	9.61	35.39	59.33	23.94	QP
5	0.472	24.42	9.61	34.03	46.48	12.45	Average
6	0.472	30.94	9.61	40.55	56.48	15.93	QP
7	0.589	12.14	9.62	21.76	46.00	24.24	Average
8	0.589	20.58	9.62	30.20	56.00	25.80	QP
9	1.215	17.49	9.62	27.12	46.00	18.88	Average
10	1.215	25.61	9.62	35.23	56.00	20.77	QP
11	17.585	15.13	9.69	24.82	50.00	25.18	Average
12	17.585	24.68	9.69	34.37	60.00	25.63	QP

Adapter #2,Configuration 2:
Line:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.154	16.73	9.61	26.34	55.77	29.43	Average
2	0.154	30.79	9.61	40.40	65.77	25.37	QP
3	0.334	16.12	9.61	25.73	49.36	23.63	Average
4	0.334	25.05	9.61	34.66	59.36	24.70	QP
5	0.526	26.02	9.61	35.63	46.00	10.37	Average
6	0.526	30.06	9.61	39.67	56.00	16.33	QP
7	0.878	15.98	9.62	25.60	46.00	20.40	Average
8	0.878	21.69	9.62	31.31	56.00	24.69	QP
9	1.217	16.21	9.62	25.83	46.00	20.17	Average
10	1.217	23.17	9.62	32.79	56.00	23.21	QP
11	1.720	13.14	9.63	22.77	46.00	23.23	Average
12	1.720	20.34	9.63	29.97	56.00	26.03	QP

Neutral:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.153	13.54	9.61	23.15	55.86	32.71	Average
2	0.153	30.36	9.61	39.97	65.86	25.89	QP
3	0.337	18.18	9.61	27.79	49.29	21.50	Average
4	0.337	27.67	9.61	37.28	59.29	22.01	QP
5	0.529	18.26	9.61	27.87	46.00	18.13	Average
6	0.529	27.59	9.61	37.20	56.00	18.80	QP
7	0.611	12.86	9.62	22.48	46.00	23.53	Average
8	0.611	21.82	9.62	31.44	56.00	24.56	QP
9	1.179	17.09	9.62	26.71	46.00	19.29	Average
10	1.179	26.18	9.62	35.81	56.00	20.19	QP
11	2.356	9.12	9.64	18.76	46.00	27.24	Average
12	2.356	22.15	9.64	31.78	56.00	24.22	QP

4.2 Radiation Spurious Emissions

Serial Number:	CR21090042-RF-S2(configuration 1) CR21090042-RF-S3(configuration 2)	Test Date:	2021-11-06~2021-11-11
Test Site:	966-1,966-2	Test Mode:	Transmitting
Tester:	Allen Wu, Great Qiao	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	20.8~24.2	Relative Humidity: (%)	46~62	ATM Pressure: (kPa)	100.9~101.7

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020-10-19	2023-10-18
R&S	EMI Test Receiver	ESR3	102724	2021-07-22	2022-07-21
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2021-07-18	2022-07-17
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2021-07-18	2022-07-17
Sonoma	Amplifier	310N	186165	2021-07-18	2022-07-17
Audix	Test Software	E3	201021 (V9)	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020-10-13	2023-10-12
PASTERNACK	Horn Antenna	PE9852/2F-20	112002	2021-02-05	2023-02-04
PASTERNACK	Horn Antenna	PE9850/2F-20	072001	2021-02-05	2023-02-04
R&S	Spectrum Analyzer	FSV40	101591	2021-07-22	2022-07-21
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2021-08-08	2022-08-07
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2021-08-08	2022-08-07
MICRO-COAX	Coaxial Cable	UFB142A-1-2362-200200	235772-001	2021-08-08	2022-08-07
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2021-08-08	2022-08-07
AH	Preamplifier	PAM-1840VH	190	2020-11-20	2021-11-19
Mini Circuits	High Pass Filter	VHF-6010+	31119	2021-08-08	2022-08-07
E-Microwave	Band Rejection Filter	5150-5850MHz	OE01902423	2021-08-08	2022-08-07

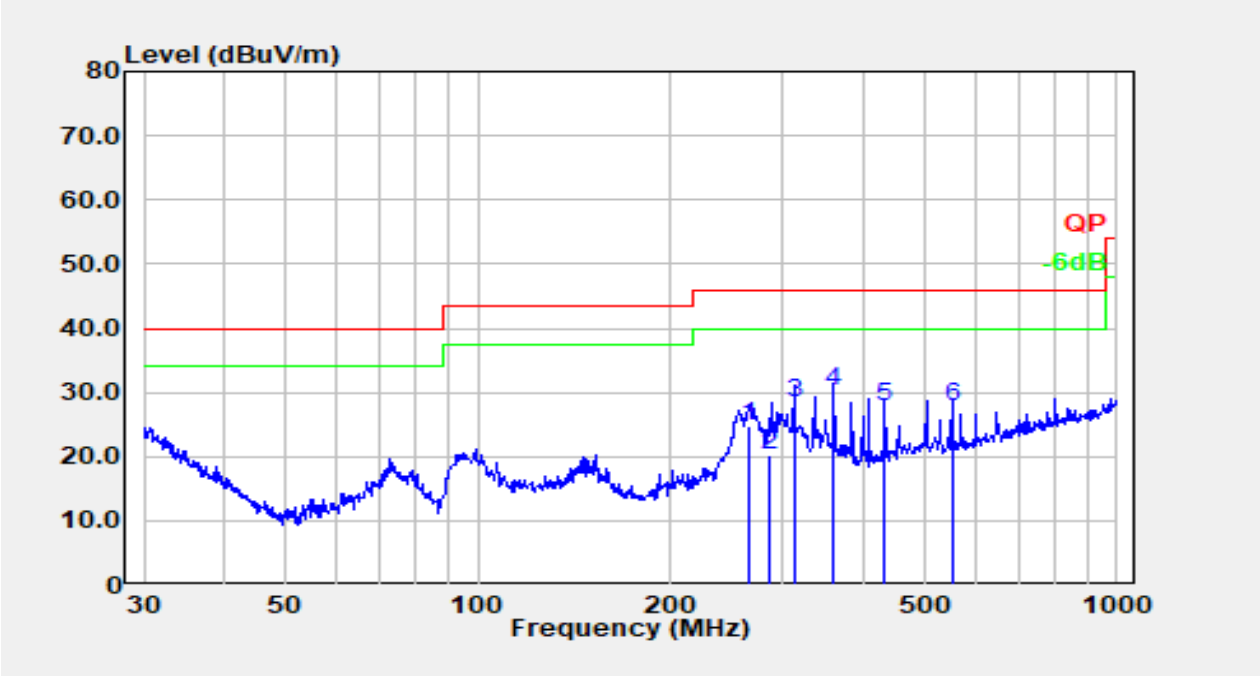
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Please refer to the below table and plots.

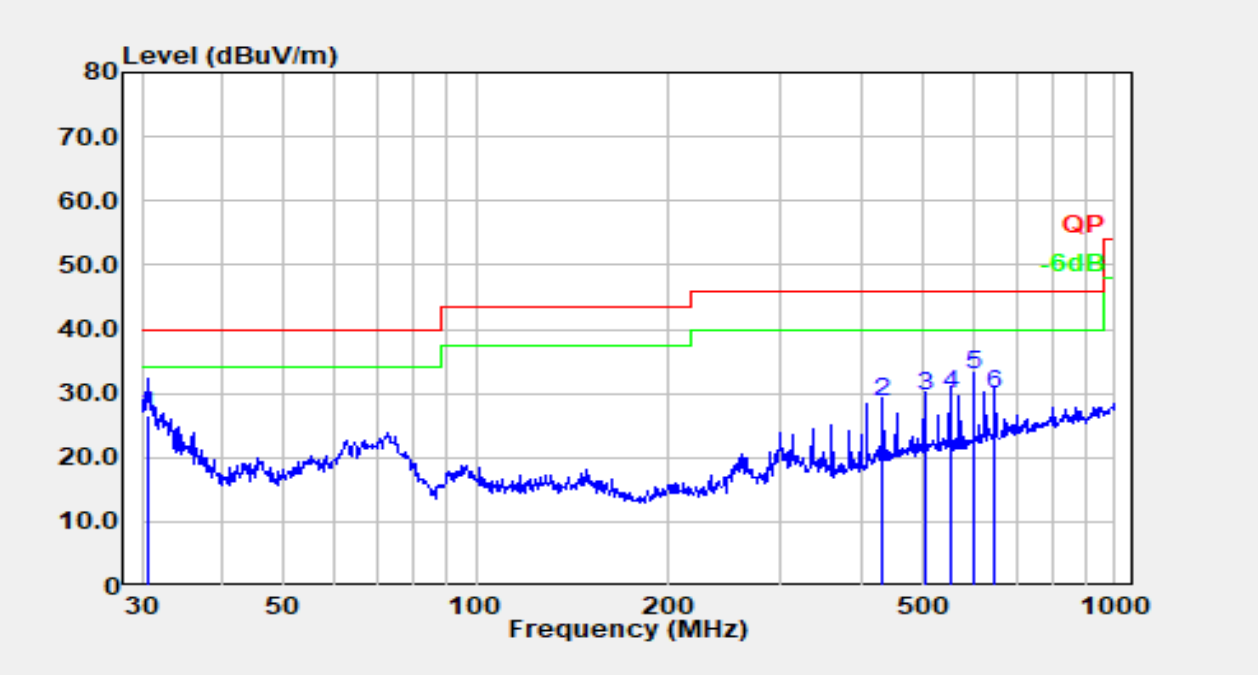
Note: The device can be mounted in multiple orientations, test was performed with X,Y, Z Axis, the worst orientation was photographed and it`s data was recorded.

1) 30MHz-1GHz(802.11a 5785MHz was the worst)
Adapter #1,Configuration 1:
Horizontal:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	266.238	37.13	-12.42	24.71	46.00	21.29	QP
2	286.449	31.62	-11.44	20.17	46.00	25.83	QP
3	311.980	39.04	-10.81	28.24	46.00	17.76	QP
4	360.016	40.39	-10.06	30.33	46.00	15.67	QP
5	431.993	35.46	-7.65	27.81	46.00	18.19	QP
6	552.000	33.78	-5.96	27.82	46.00	18.18	QP

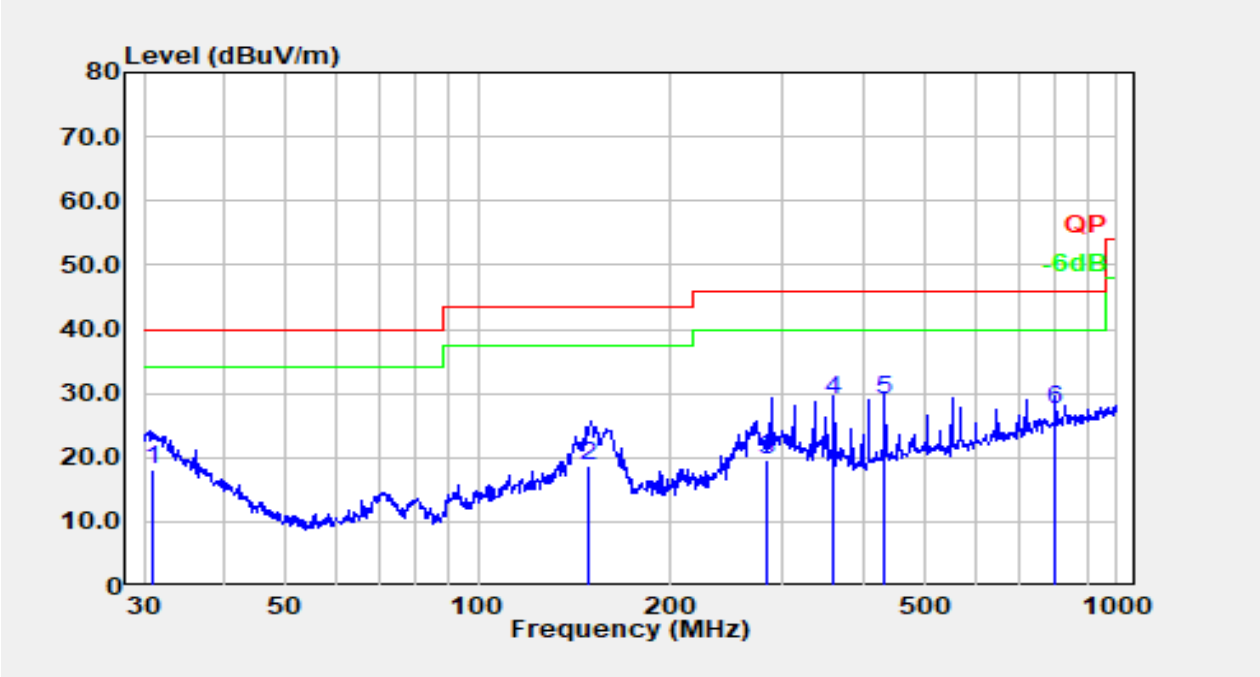
Vertical:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.617	30.98	-4.27	26.71	40.00	13.29	QP
2	432.010	36.44	-7.65	28.79	46.00	17.21	QP
3	504.020	35.79	-6.17	29.62	46.00	16.38	QP
4	552.000	35.75	-5.96	29.78	46.00	16.22	QP
5	600.009	38.26	-5.34	32.92	46.00	13.08	QP
6	647.999	34.43	-4.42	30.01	46.00	15.99	QP

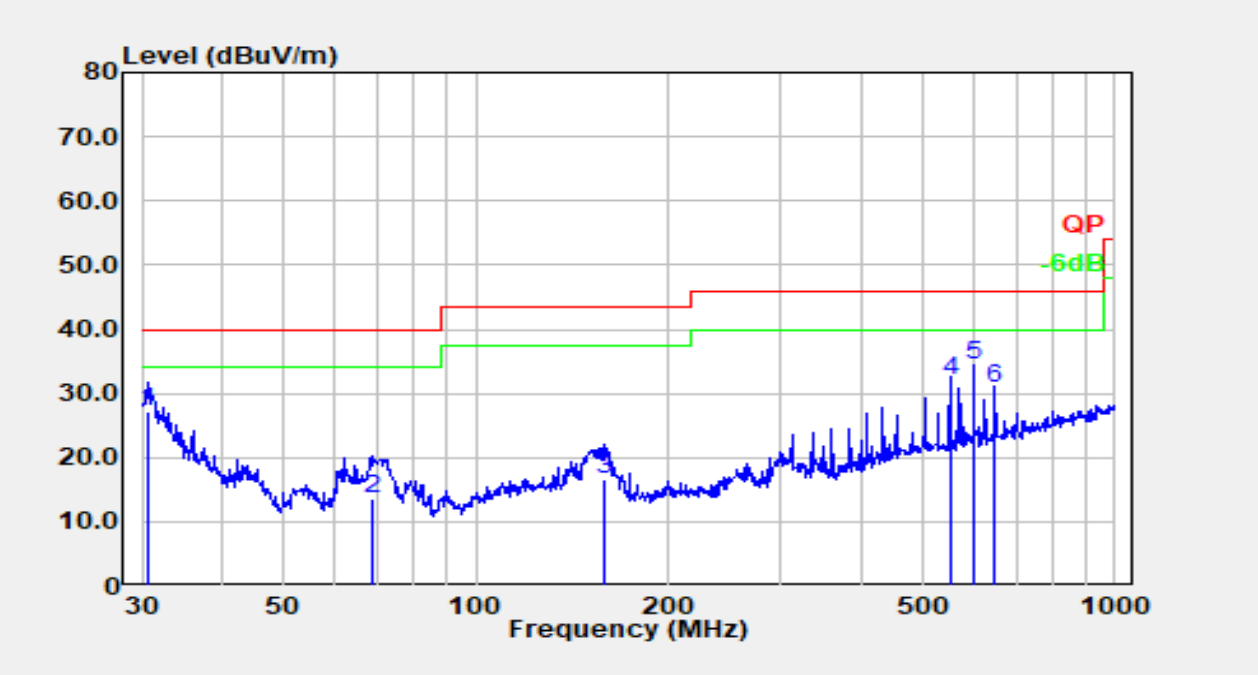
Adapter #2,Configuration 1:

Horizontal:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	31.030	22.57	-4.58	17.99	40.00	22.01	QP
2	148.487	31.11	-12.25	18.86	43.50	24.64	QP
3	283.744	31.17	-11.62	19.55	46.00	26.45	QP
4	360.016	38.94	-10.06	28.88	46.00	17.12	QP
5	432.010	36.61	-7.65	28.96	46.00	17.04	QP
6	800.057	30.06	-2.47	27.59	46.00	18.41	QP

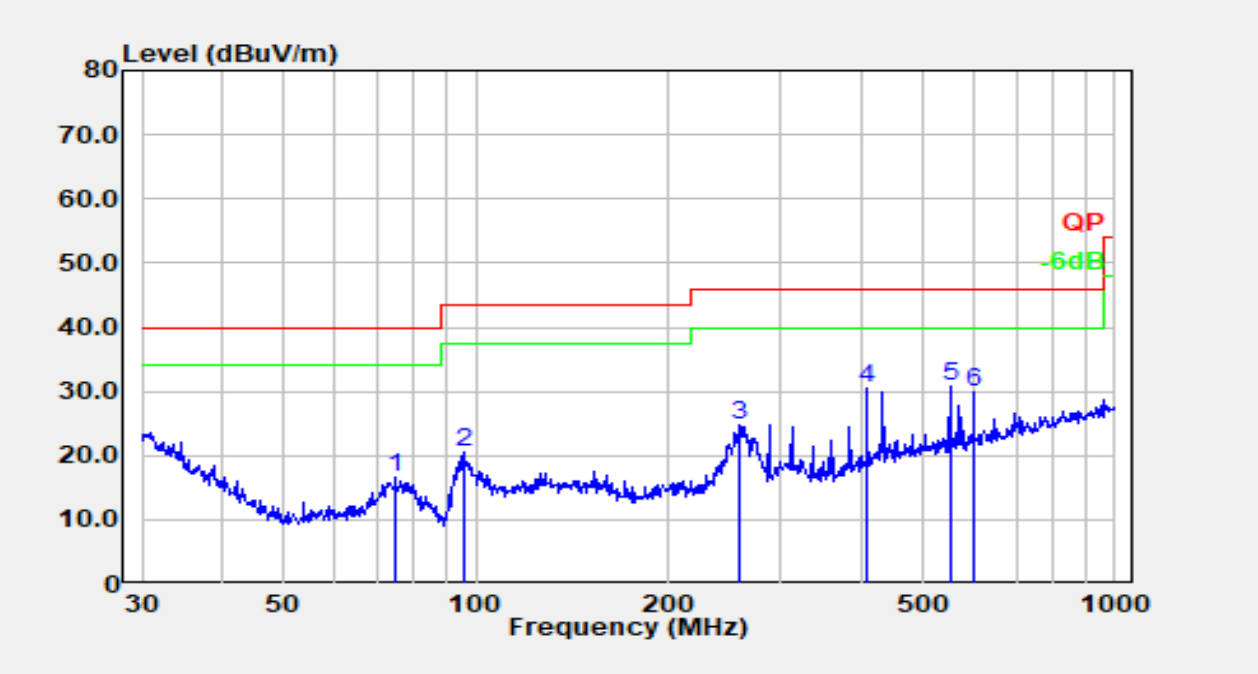
Vertical:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.586	31.55	-4.24	27.31	40.00	12.69	QP
2	68.776	30.30	-16.86	13.44	40.00	26.56	QP
3	158.500	29.02	-12.31	16.72	43.50	26.78	QP
4	552.000	37.92	-5.96	31.95	46.00	14.05	QP
5	600.033	39.71	-5.34	34.38	46.00	11.62	QP
6	647.999	35.25	-4.42	30.83	46.00	15.17	QP

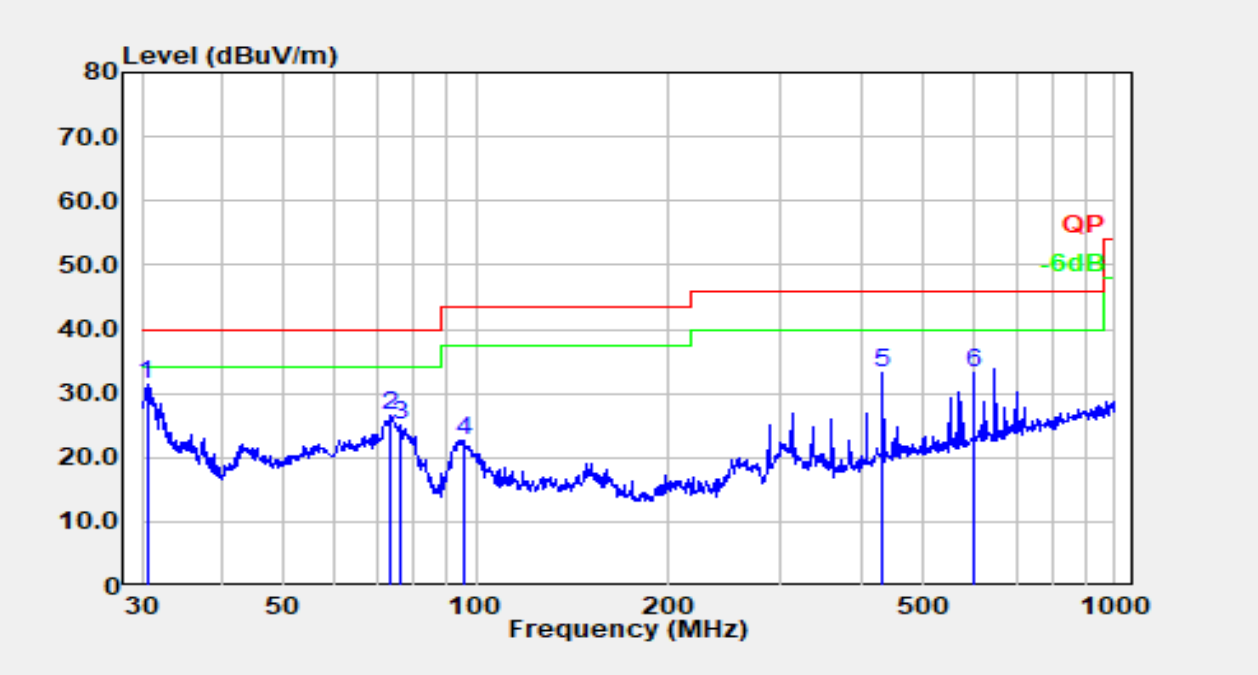
Adapter #1,Configuration 2:

Horizontal:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	74.657	33.64	-17.16	16.47	40.00	23.53	Peak
2	95.427	36.23	-15.74	20.49	43.50	23.01	Peak
3	257.422	37.46	-12.81	24.65	46.00	21.35	Peak
4	408.946	39.02	-8.66	30.37	46.00	15.63	Peak
5	552.883	36.87	-5.95	30.92	46.00	15.08	Peak
6	601.427	35.07	-5.27	29.80	46.00	16.20	Peak

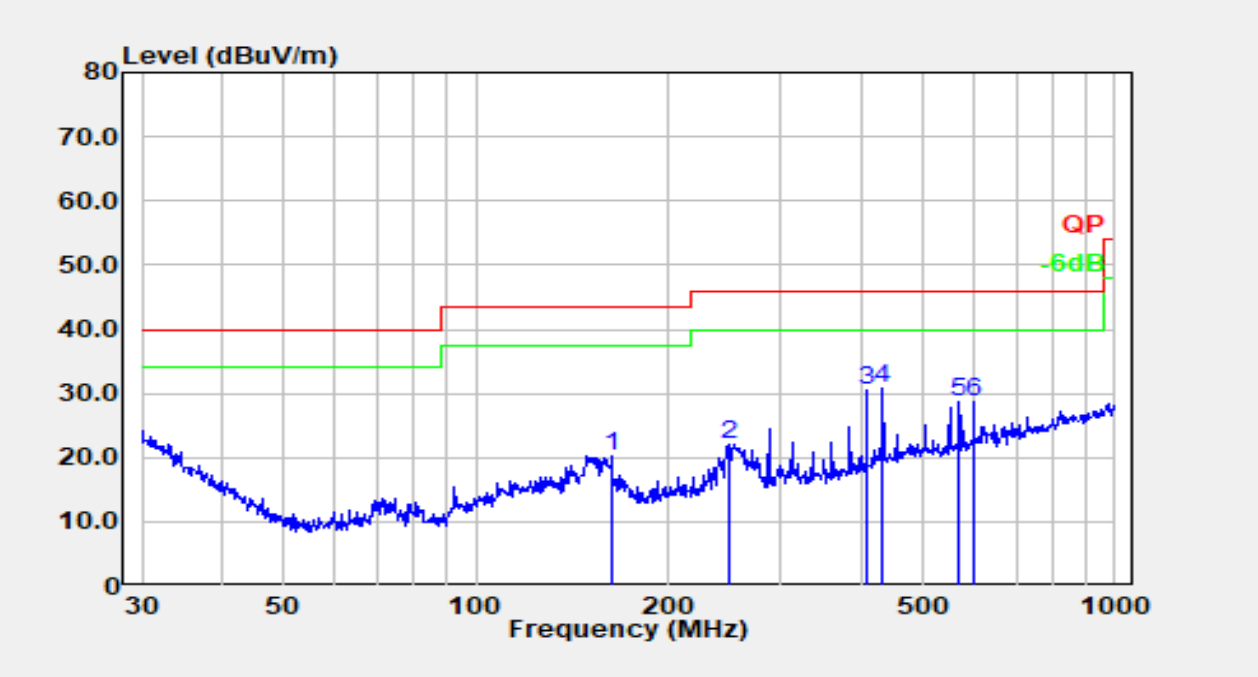
Vertical:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.531	35.52	-4.20	31.32	40.00	8.68	Peak
2	73.617	43.51	-17.08	26.43	40.00	13.57	Peak
3	76.244	42.25	-17.30	24.96	40.00	15.04	Peak
4	95.427	38.39	-15.74	22.65	43.50	20.85	Peak
5	432.546	40.82	-7.63	33.19	46.00	12.81	Peak
6	601.427	38.59	-5.27	33.32	46.00	12.68	Peak

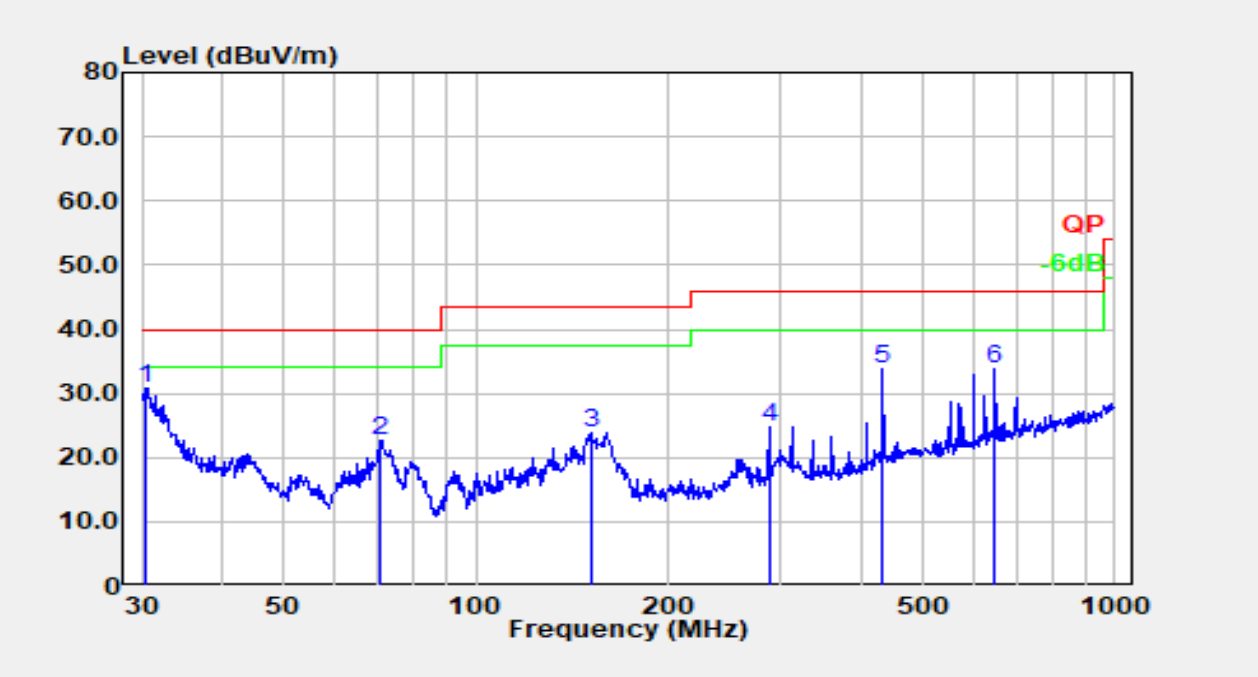
Adapter #2,Configuration 2:

Horizontal:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	163.182	32.86	-12.59	20.26	43.50	23.24	Peak
2	248.552	35.40	-13.23	22.18	46.00	23.82	Peak
3	408.946	39.02	-8.66	30.36	46.00	15.64	Peak
4	432.546	38.49	-7.63	30.86	46.00	15.14	Peak
5	568.613	34.49	-5.85	28.64	46.00	17.36	Peak
6	601.427	34.02	-5.27	28.74	46.00	17.26	Peak

Vertical:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.424	35.00	-4.12	30.89	40.00	9.11	Peak
2	70.832	39.54	-16.81	22.73	40.00	17.27	Peak
3	151.067	36.08	-12.31	23.77	43.50	19.73	Peak
4	287.990	36.23	-11.34	24.88	46.00	21.12	Peak
5	432.546	41.50	-7.63	33.87	46.00	12.13	Peak
6	649.660	38.12	-4.40	33.71	46.00	12.29	Peak

1) **2) 1GHz-40GHz(**Adapter #1, Configuration 1 was the worst):
5150-5250MHz

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
802.11a,Low Channel: 5180MHz							
5180.00	72.09	PK	H	38.68	104.75	N/A	N/A
5180.00	61.75	AV	H	38.68	94.41	N/A	N/A
5180.00	71.52	PK	V	38.68	104.18	N/A	N/A
5180.00	60.95	AV	V	38.68	93.61	N/A	N/A
5150.00	34.84	PK	H	38.64	67.46	74.00	6.54
5150.00	17.61	AV	H	38.64	50.23	54.00	3.77
10360.00	36.56	PK	H	19.18	49.72	68.20	18.48
15540.00	37.67	PK	H	22.44	54.09	74.00	19.91
15540.00	25.39	AV	H	22.44	41.81	54.00	12.19
802.11a,Middle Channel: 5200 MHz							
5200.00	73.54	PK	H	38.70	106.22	N/A	N/A
5200.00	63.53	AV	H	38.70	96.21	N/A	N/A
5200.00	72.03	PK	V	38.70	104.71	N/A	N/A
5200.00	62.08	AV	V	38.70	94.76	N/A	N/A
10400.00	36.28	PK	H	19.16	49.42	68.20	18.78
15600.00	39.00	PK	H	22.41	55.39	74.00	18.61
15600.00	26.81	AV	H	22.41	43.20	54.00	10.80
802.11a,High Channel: 5240 MHz							
5240.00	72.49	PK	H	38.85	105.32	N/A	N/A
5240.00	62.93	AV	H	38.85	95.76	N/A	N/A
5240.00	72.40	PK	V	38.85	105.23	N/A	N/A
5240.00	62.77	AV	V	38.85	95.60	N/A	N/A
5350.00	29.97	PK	H	39.03	62.98	74.00	11.02
5350.00	16.61	AV	H	39.03	49.62	54.00	4.38
10480.00	36.07	PK	H	18.86	48.91	68.20	19.29
15720.00	39.66	PK	H	22.28	55.92	74.00	18.08
15720.00	27.98	AV	H	22.28	44.24	54.00	9.76
802.11n ht20,Low Channel: 5180MHz							
5180.00	71.56	PK	H	38.68	104.22	N/A	N/A
5180.00	62.22	AV	H	38.68	94.88	N/A	N/A
5180.00	71.22	PK	V	38.68	103.88	N/A	N/A
5180.00	62.83	AV	V	38.68	95.49	N/A	N/A
5150.00	40.32	PK	H	38.64	72.94	74.00	1.06
5150.00	18.30	AV	H	38.64	50.92	54.00	3.08
10360.00	35.98	PK	H	19.18	49.14	68.20	19.06
15540.00	37.63	PK	H	22.44	54.05	74.00	19.95
15540.00	25.37	AV	H	22.44	41.79	54.00	12.21
802.11n ht20, Middle Channel: 5200 MHz							
5200.00	70.99	PK	H	38.70	103.67	N/A	N/A
5200.00	62.38	AV	H	38.70	95.06	N/A	N/A
5200.00	70.89	PK	V	38.70	103.57	N/A	N/A
5200.00	62.32	AV	V	38.70	95.00	N/A	N/A
10400.00	36.30	PK	H	19.16	49.44	68.20	18.76
15600.00	38.88	PK	H	22.41	55.27	74.00	18.73
15600.00	26.85	AV	H	22.41	43.24	54.00	10.76

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
802.11n ht20, High Channel: 5240 MHz							
5240.00	70.68	PK	H	38.85	103.51	N/A	N/A
5240.00	62.50	AV	H	38.85	95.33	N/A	N/A
5240.00	70.46	PK	V	38.85	103.29	N/A	N/A
5240.00	62.23	AV	V	38.85	95.06	N/A	N/A
5350.00	30.24	PK	H	39.03	63.25	74.00	10.75
5350.00	16.66	AV	H	39.03	49.67	54.00	4.33
10480.00	36.03	PK	H	18.86	48.87	68.20	19.33
15720.00	40.52	PK	H	22.28	56.78	74.00	17.22
15720.00	28.00	AV	H	22.28	44.26	54.00	9.74
802.11n ht40,Low Channel: 5190 MHz							
5190.00	68.09	PK	H	38.69	100.76	N/A	N/A
5190.00	59.68	AV	H	38.69	92.35	N/A	N/A
5190.00	68.75	PK	V	38.69	101.42	N/A	N/A
5190.00	60.02	AV	V	38.69	92.69	N/A	N/A
5150.00	30.12	PK	V	38.64	62.74	74.00	11.26
5150.00	19.41	AV	V	38.64	52.03	54.00	1.97
10380.00	36.16	PK	V	19.17	49.31	68.20	18.89
15570.00	39.34	PK	V	22.43	55.75	74.00	18.25
15570.00	26.45	AV	V	22.43	42.86	54.00	11.14
802.11n ht40, High Channel: 5230 MHz							
5230.00	68.16	PK	H	38.81	100.95	N/A	N/A
5230.00	59.54	AV	H	38.81	92.33	N/A	N/A
5230.00	68.00	PK	V	38.81	100.79	N/A	N/A
5230.00	59.21	AV	V	38.81	92.00	N/A	N/A
5350.00	32.27	PK	H	39.03	65.28	74.00	8.72
5350.00	19.58	AV	H	39.03	52.59	54.00	1.41
10460.00	36.01	PK	H	18.94	48.93	68.20	19.27
15690.00	40.47	PK	H	22.29	56.74	74.00	17.26
15690.00	27.90	AV	H	22.29	44.17	54.00	9.83

Note:
Result = Reading + Factor- Distance extrapolation Factor
For 1-26.5GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB
For 26.5-40GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1m]) dB= 9.54 dB

5725-5850MHz:

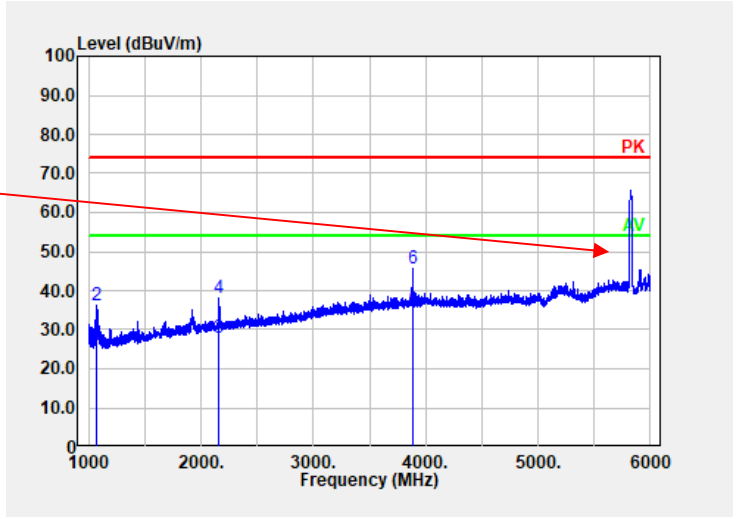
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
802.11a,Low Channel: 5745MHz							
5745.00	71.64	PK	H	39.46	105.08	N/A	N/A
5745.00	61.97	AV	H	39.46	95.41	N/A	N/A
5745.00	75.30	PK	V	39.46	108.74	N/A	N/A
5745.00	65.83	AV	V	39.46	99.27	N/A	N/A
5725.00	48.49	PK	V	39.48	81.95	122.20	40.25
5720.00	44.81	PK	V	39.49	78.28	110.80	32.52
5700.00	33.74	PK	V	39.51	67.23	105.20	37.97
5650.00	31.84	PK	V	39.49	65.31	68.20	2.89
11490.00	44.78	PK	V	20.67	59.43	74.00	14.57
11490.00	32.27	AV	V	20.67	46.92	54.00	7.08
17235.00	35.94	PK	V	26.76	56.68	68.20	11.52
802.11a,Middle Channel: 5785 MHz							
5785.00	71.21	PK	H	39.44	104.63	N/A	N/A
5785.00	61.54	AV	H	39.44	94.96	N/A	N/A
5785.00	75.59	PK	V	39.44	109.01	N/A	N/A
5785.00	66.28	AV	V	39.44	99.70	N/A	N/A
11570.00	46.80	PK	V	20.83	61.61	74.00	12.39
11570.00	33.86	AV	V	20.83	48.67	54.00	5.33
17355.00	35.73	PK	V	27.74	57.45	68.20	10.75
802.11a,High Channel: 5825 MHz							
5825.00	71.88	PK	H	39.46	105.32	N/A	N/A
5825.00	62.38	AV	H	39.46	95.82	N/A	N/A
5825.00	75.29	PK	V	39.46	108.73	N/A	N/A
5825.00	65.48	AV	V	39.46	98.92	N/A	N/A
5850.00	42.25	PK	V	39.49	75.72	122.20	46.48
5855.00	34.97	PK	V	39.51	68.46	110.80	42.34
5875.00	31.47	PK	V	39.60	65.05	105.20	40.15
5925.00	31.42	PK	V	39.68	65.08	68.20	3.12
11650.00	46.72	PK	V	21.07	61.77	74.00	12.23
11650.00	34.69	AV	V	21.07	49.74	54.00	4.26
17475.00	36.20	PK	V	28.61	58.79	68.20	9.41
802.11n ht20,Low Channel: 5745MHz							
5745.00	71.25	PK	H	39.46	104.69	N/A	N/A
5745.00	62.85	AV	H	39.46	96.29	N/A	N/A
5745.00	73.73	PK	V	39.46	107.17	N/A	N/A
5745.00	64.65	AV	V	39.46	98.09	N/A	N/A
5725.00	52.16	PK	V	39.48	85.62	122.20	36.58
5720.00	44.01	PK	V	39.49	77.48	110.80	33.32
5700.00	33.94	PK	V	39.51	67.43	105.20	37.77
5650.00	29.39	PK	V	39.49	62.86	68.20	5.34
11490.00	45.66	PK	V	20.67	60.31	74.00	13.69
11490.00	30.34	AV	V	20.67	44.99	54.00	9.01
17235.00	36.29	PK	V	26.76	57.03	68.20	11.17

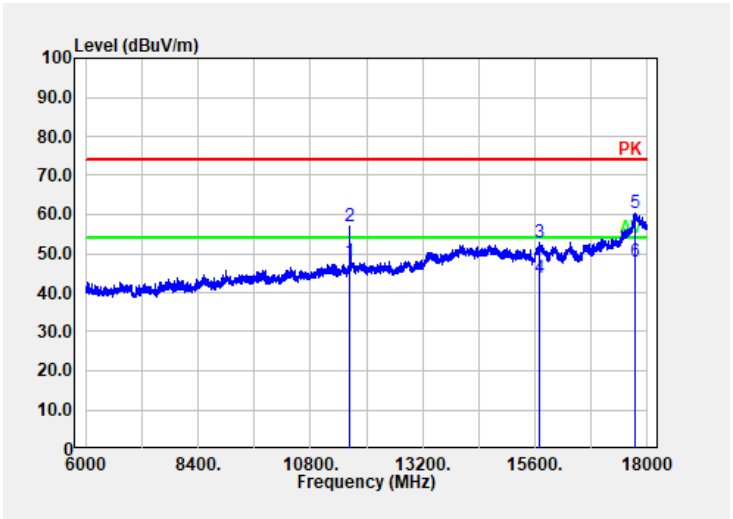
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
802.11n ht20, Middle Channel: 5785 MHz							
5785.00	70.62	PK	H	39.44	104.04	N/A	N/A
5785.00	62.15	AV	H	39.44	95.57	N/A	N/A
5785.00	73.95	PK	V	39.44	107.37	N/A	N/A
5785.00	65.41	AV	V	39.44	98.83	N/A	N/A
11570.00	47.68	PK	V	20.83	62.49	74.00	11.51
11570.00	33.78	AV	V	20.83	48.59	54.00	5.41
17355.00	35.85	PK	V	27.74	57.57	68.20	10.63
802.11n ht20, High Channel: 5825 MHz							
5825.00	70.18	PK	H	39.46	103.62	N/A	N/A
5825.00	61.83	AV	H	39.46	95.27	N/A	N/A
5825.00	73.63	PK	V	39.46	107.07	N/A	N/A
5825.00	64.40	AV	V	39.46	97.84	N/A	N/A
5850.00	42.30	PK	V	39.49	75.77	122.20	46.43
5855.00	35.60	PK	V	39.51	69.09	110.80	41.71
5875.00	31.40	PK	V	39.60	64.98	105.20	40.22
5925.00	31.45	PK	V	39.68	65.11	68.20	3.09
11650.00	49.27	PK	V	21.07	64.32	74.00	9.68
11650.00	34.63	AV	V	21.07	49.68	54.00	4.32
17475.00	36.13	PK	V	28.61	58.72	68.20	9.48
802.11n ht40,Low Channel: 5755 MHz							
5755.00	68.58	PK	H	39.45	102.01	N/A	N/A
5755.00	59.71	AV	H	39.45	93.14	N/A	N/A
5755.00	71.90	PK	V	39.45	105.33	N/A	N/A
5755.00	63.04	AV	V	39.45	96.47	N/A	N/A
5725.00	51.07	PK	V	39.48	84.53	122.20	37.67
5720.00	52.16	PK	V	39.49	85.63	110.80	25.17
5700.00	40.63	PK	V	39.51	74.12	105.20	31.08
5650.00	30.45	PK	V	39.49	63.92	68.20	4.28
11510.00	42.66	PK	V	20.67	57.31	74.00	16.69
11510.00	31.22	AV	V	20.67	45.87	54.00	8.13
17265.00	36.68	PK	V	26.94	57.60	68.20	10.60
802.11n ht40, High Channel: 5795 MHz							
5795.00	68.34	PK	H	39.43	101.75	N/A	N/A
5795.00	59.30	AV	H	39.43	92.71	N/A	N/A
5795.00	71.36	PK	V	39.43	104.77	N/A	N/A
5795.00	62.20	AV	V	39.43	95.61	N/A	N/A
5850.00	38.42	PK	V	39.49	71.89	122.20	50.31
5855.00	35.50	PK	V	39.51	68.99	110.80	41.81
5875.00	32.31	PK	V	39.60	65.89	105.20	39.31
5925.00	31.51	PK	V	39.68	65.17	68.20	3.03
11590.00	45.05	PK	V	20.88	59.91	74.00	14.09
11590.00	33.02	AV	V	20.88	47.88	54.00	6.12
17385.00	36.10	PK	V	28.07	58.15	68.20	10.05

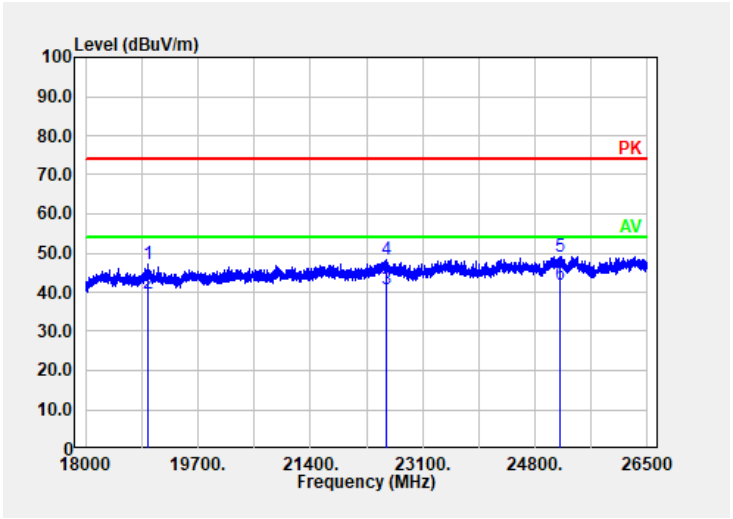
Note:
Result = Reading + Factor- Distance extrapolation Factor
For 1-26.5GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB
For 26.5-40GHz:
Distance extrapolation Factor =20 log (specific distance [3m]/test distance [1m]) dB= 9.54 dB

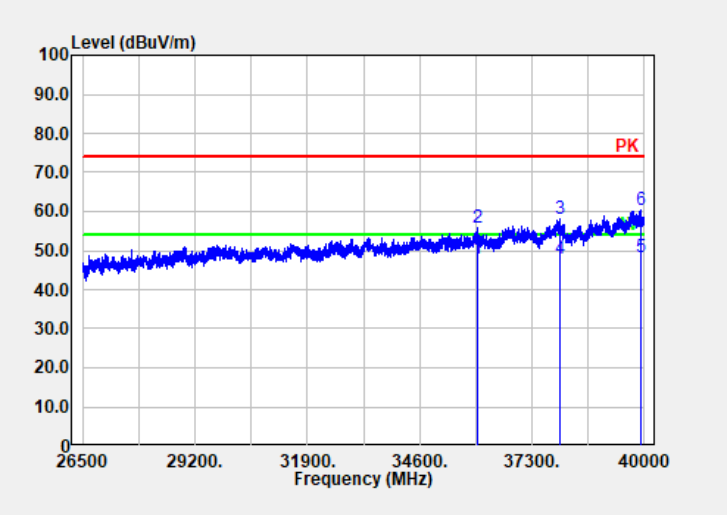
Worst Test plots(802.11n ht20 5825 MHz was the worst)
Horizontal:

Fundamental Test with Band Rejection Filter



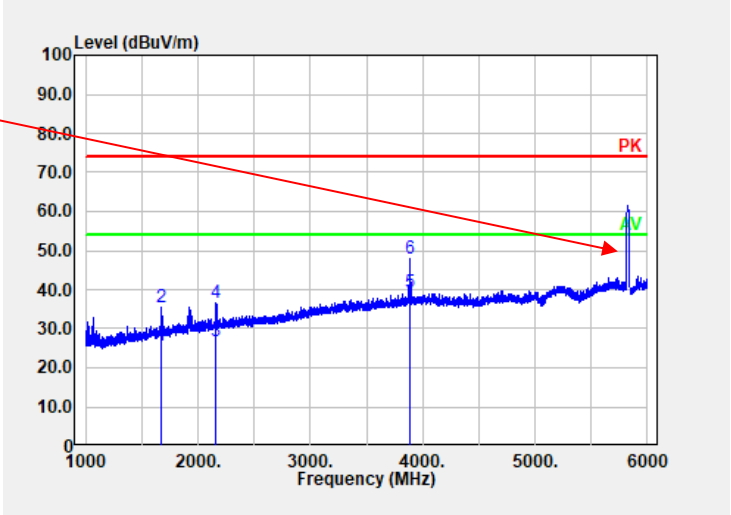


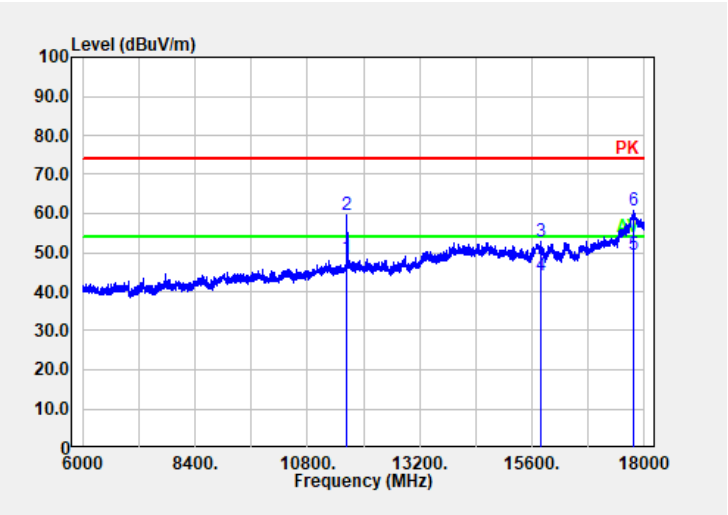


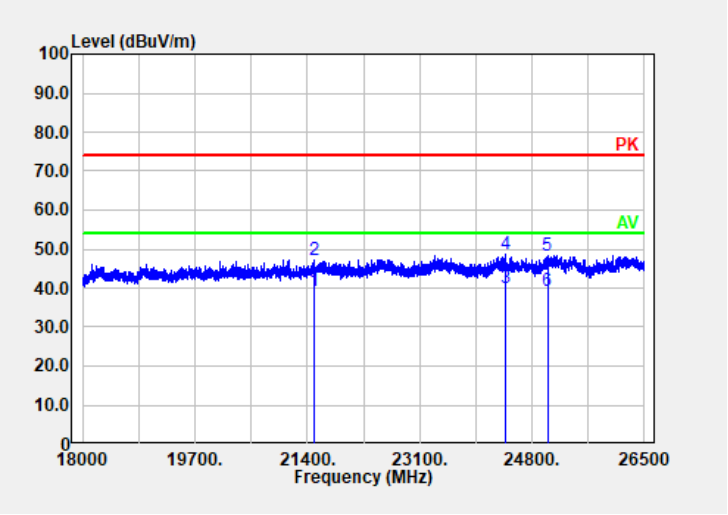


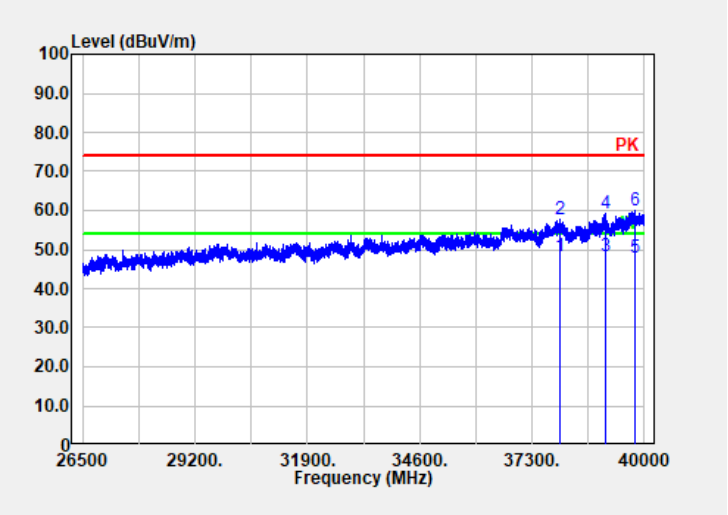
Vertical:

Fundamental Test with Band Rejection Filter






Level (dBuV/m)
100
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
PK
AV
1
2
3
4
5
6
18000
19700.
21400.
23100.
24800.
26500
Frequency (MHz)


Level (dBuV/m)
100
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
PK
1
2
3
4
5
6
26500
29200.
31900.
34600.
37300.
40000
Frequency (MHz)

4.3 Emission Bandwidth:

Serial Number:	CR21090042-RF-S2	Test Date:	2021/11/4
Test Site:	RF	Test Mode:	Transmitting
Tester:	Will wei	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25	Relative Humidity: (%)	60	ATM Pressure: (kPa)	101.1

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2021-10-10	2022-10-09
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180	29.760	17.405
	5200	29.840	17.405
	5240	29.040	17.405
802.11n ht20	5180	21.040	18.124
	5200	21.040	18.044
	5240	21.040	18.044
802.11n ht40	5190	48.960	37.206
	5230	52.800	37.365

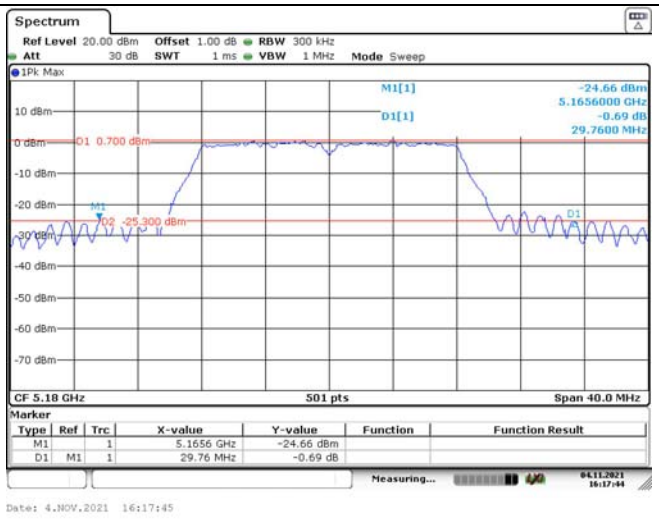
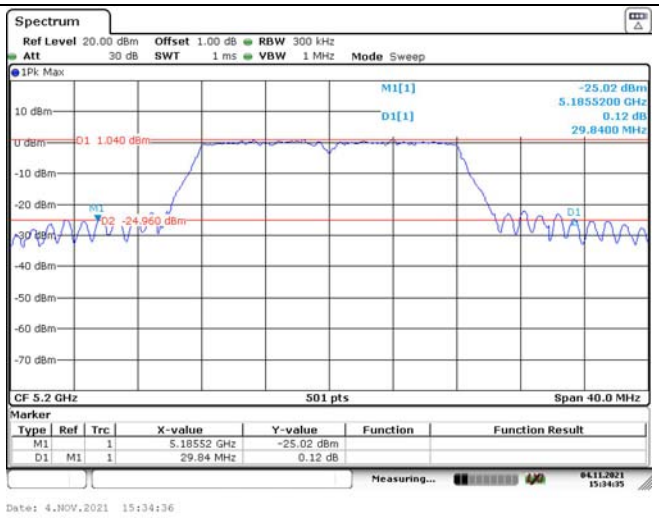
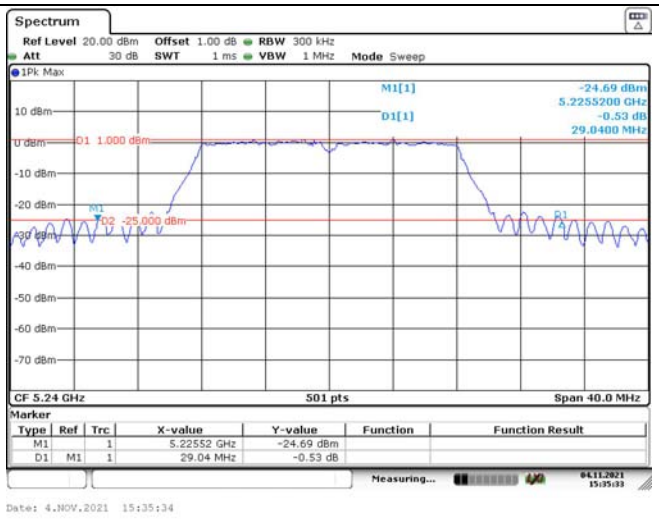
Note: the 99% Occupied Bandwidth have not fall into the band 5250-5350MHz or 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

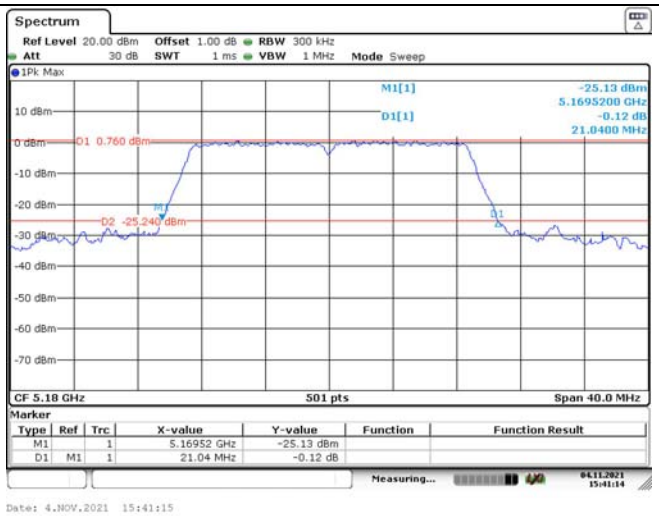
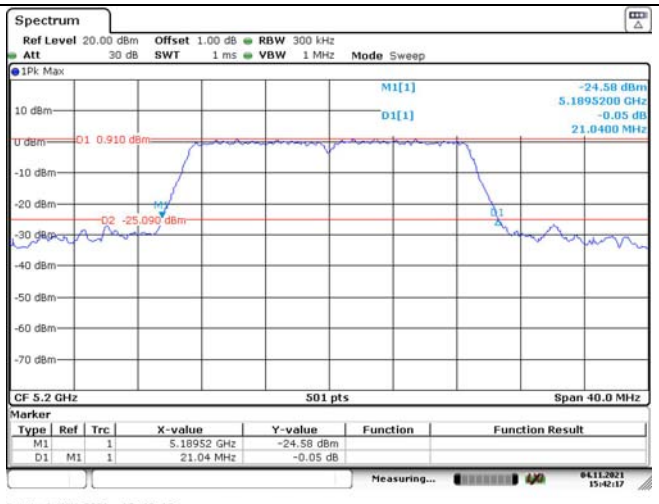
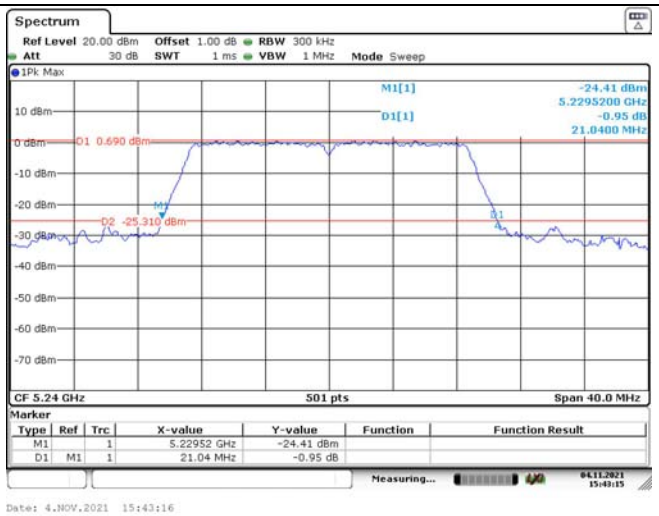
5725-5850 MHz:

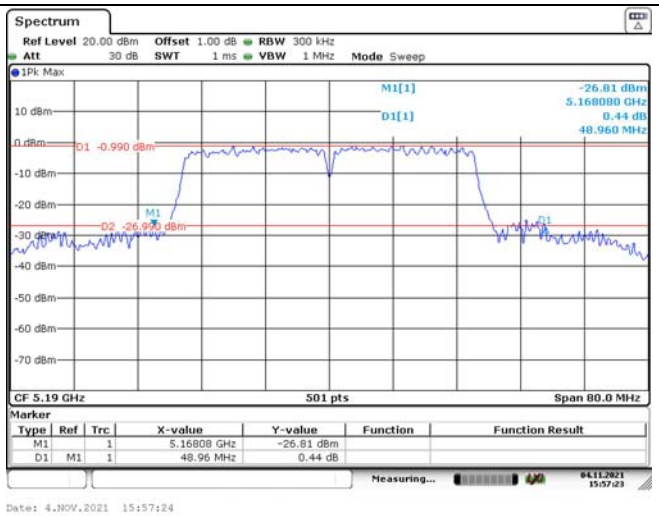
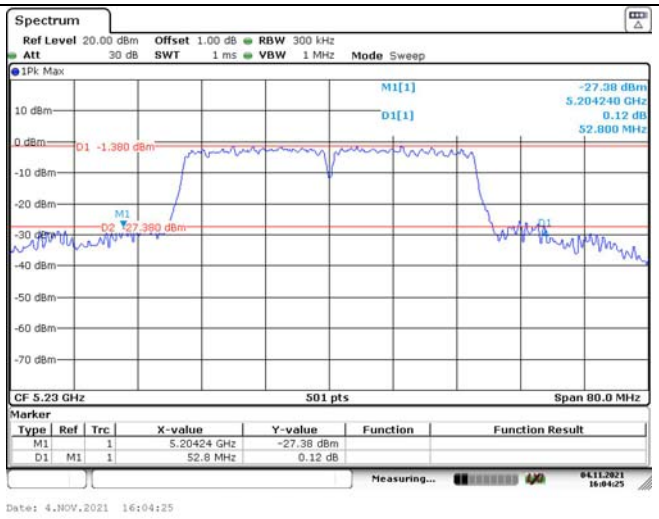
Test Modes	Test Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745	16.480	17.405
	5785	16.400	17.325
	5825	16.480	17.325
802.11n ht20	5745	17.760	18.044
	5785	17.680	18.044
	5825	17.760	18.044
802.11n ht40	5755	36.160	37.206
	5795	36.320	37.206
Note:6dB Emission Bandwidth Limit: ≥0.5 MHz			

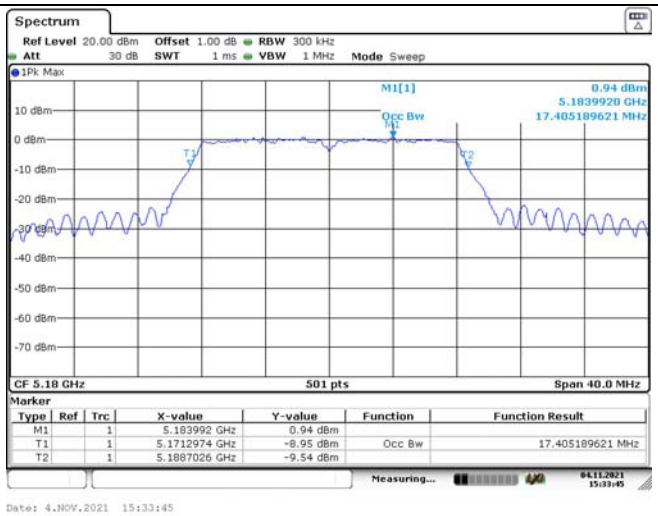
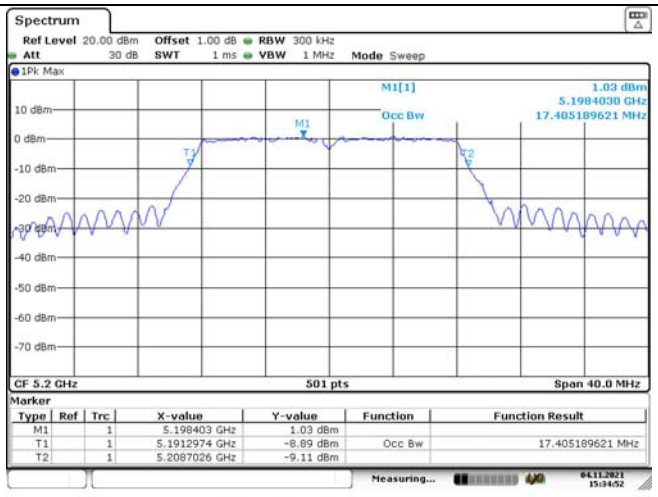
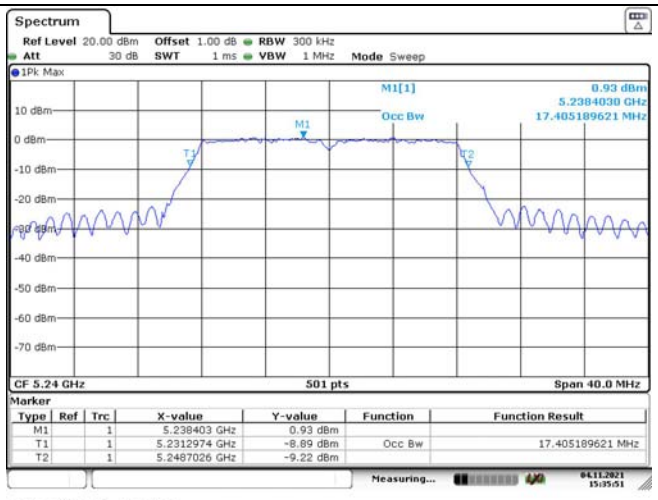
Note: the 99% Occupied Bandwidth have not fall into the band 5250-5350MHz or 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

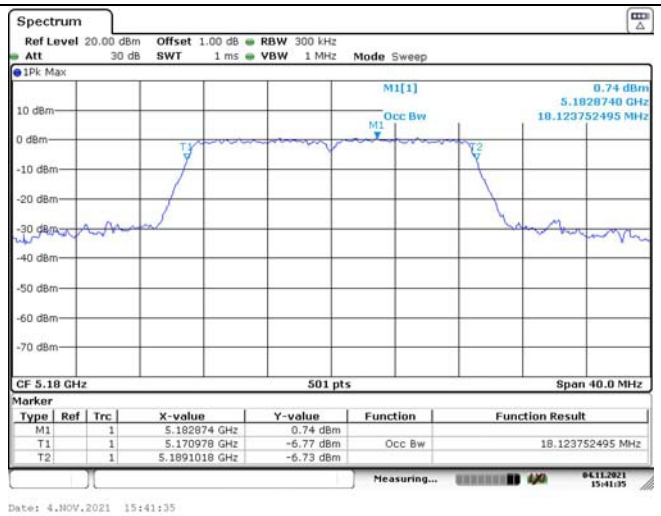
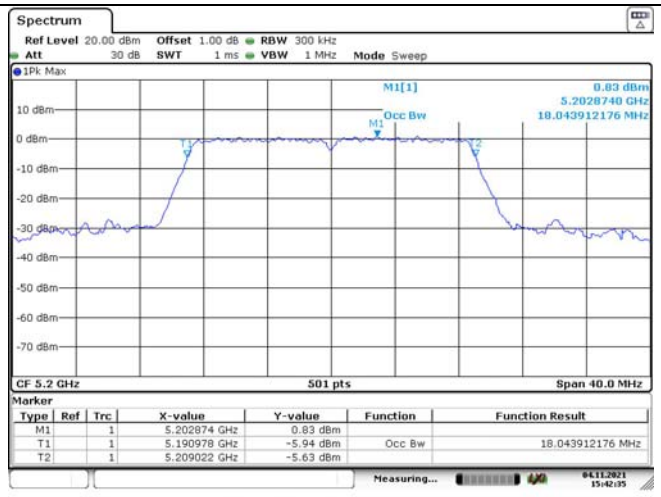
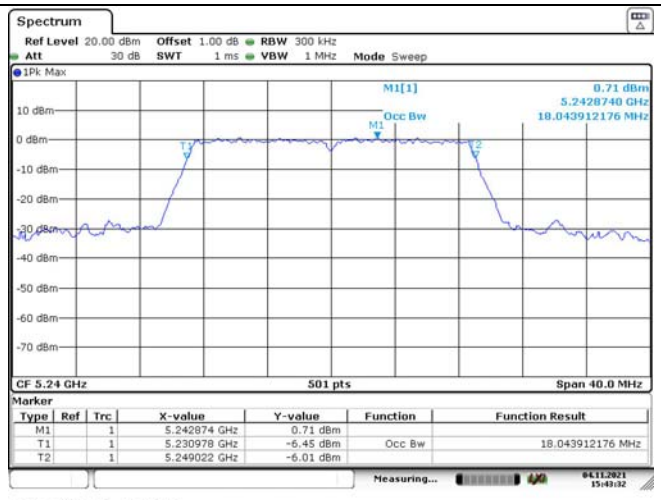
5150-5250MHz:

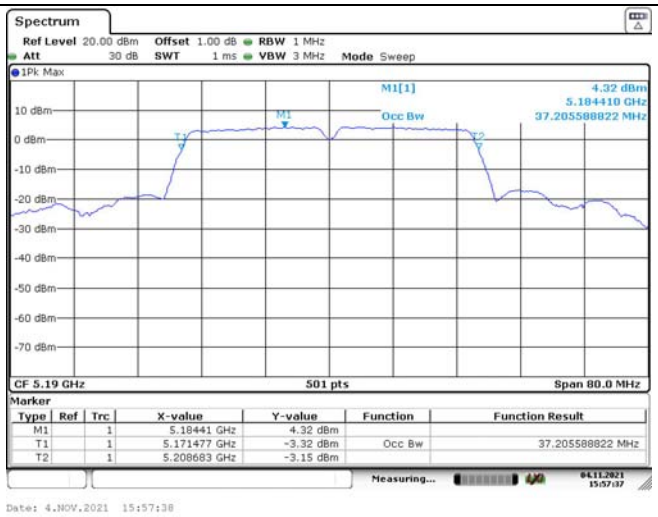
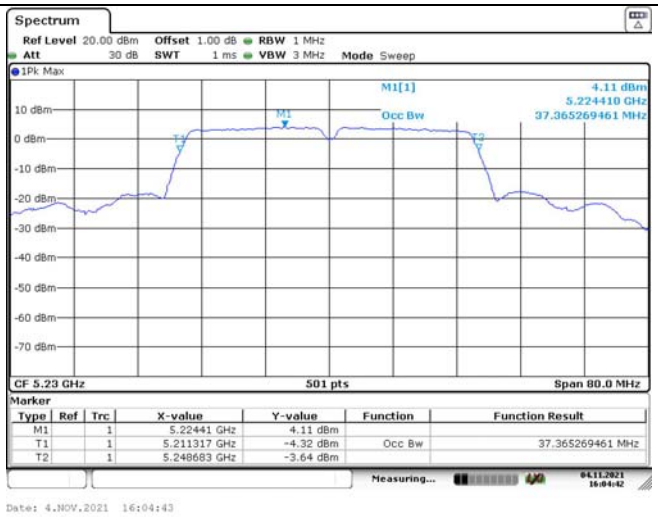
26dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

26dB Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

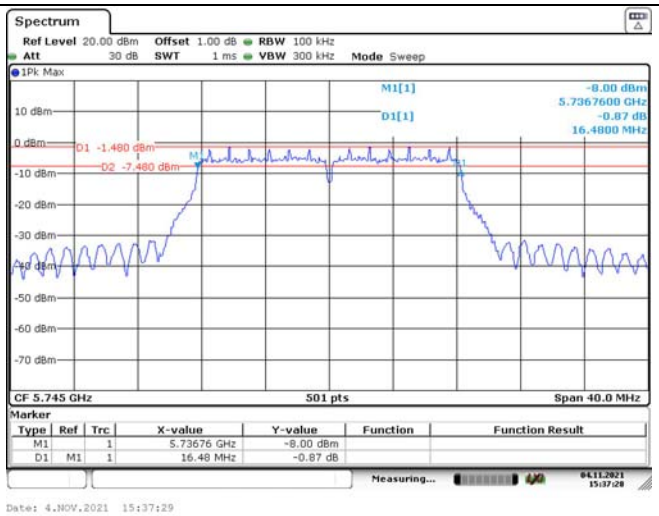
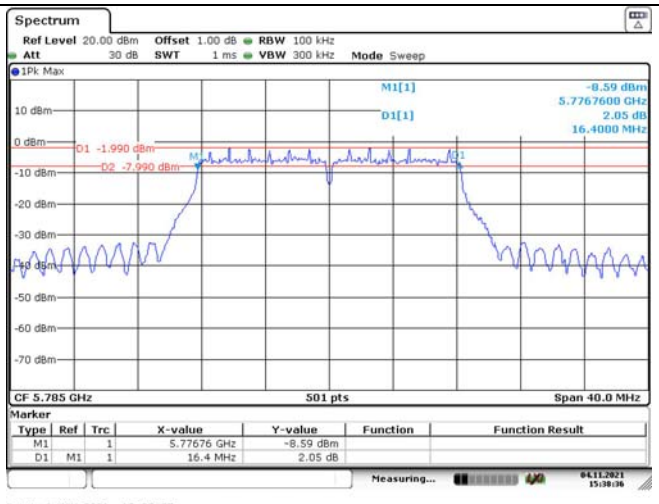
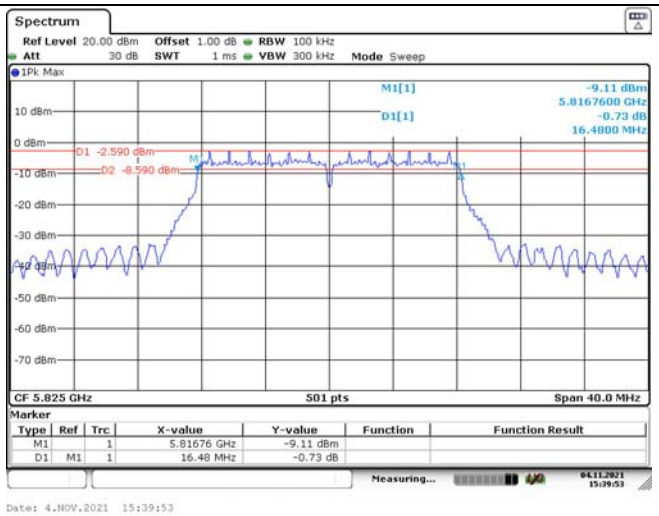
26dB Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

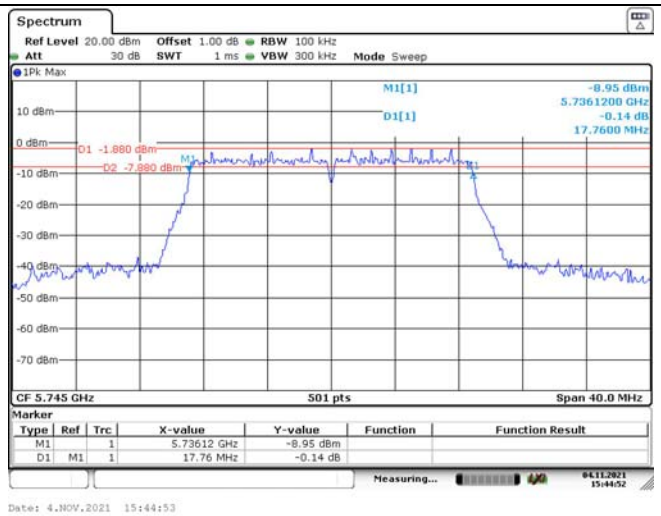
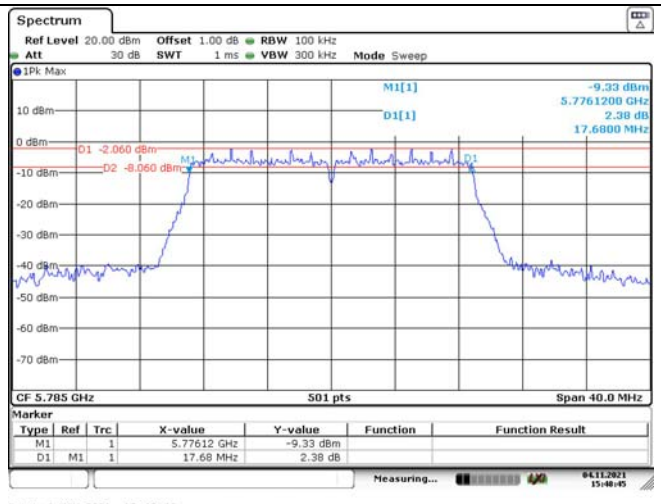
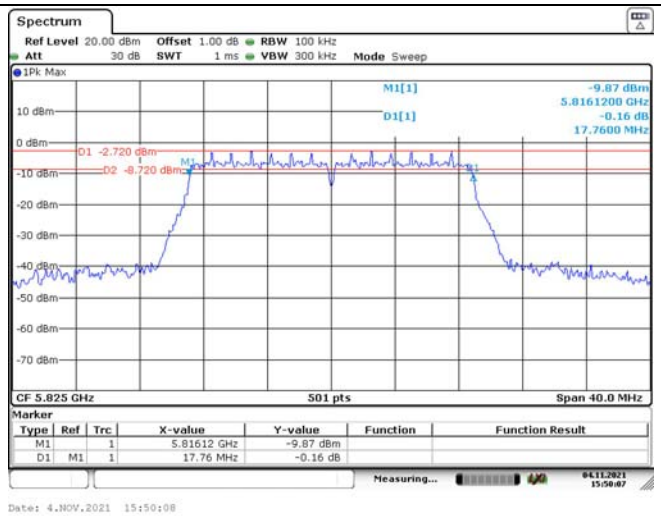
99% Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

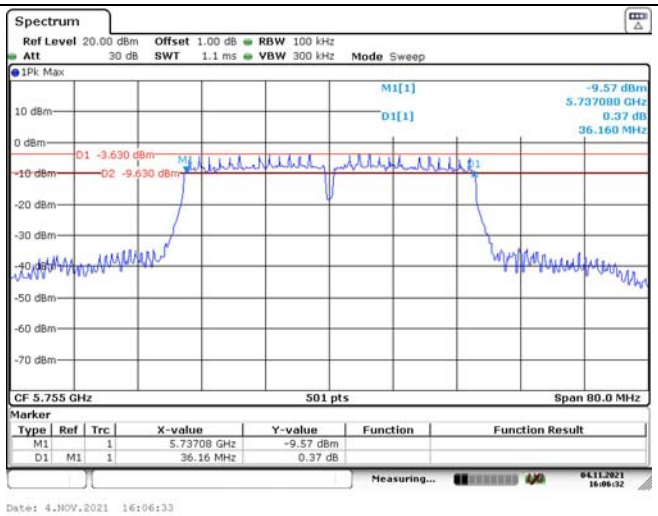
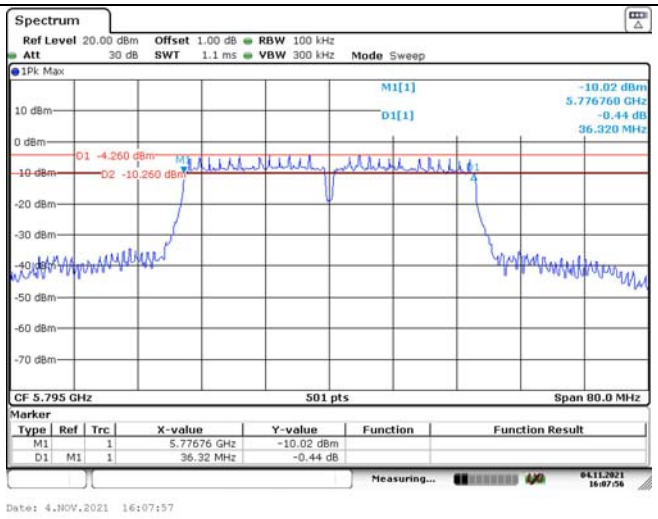
99% Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

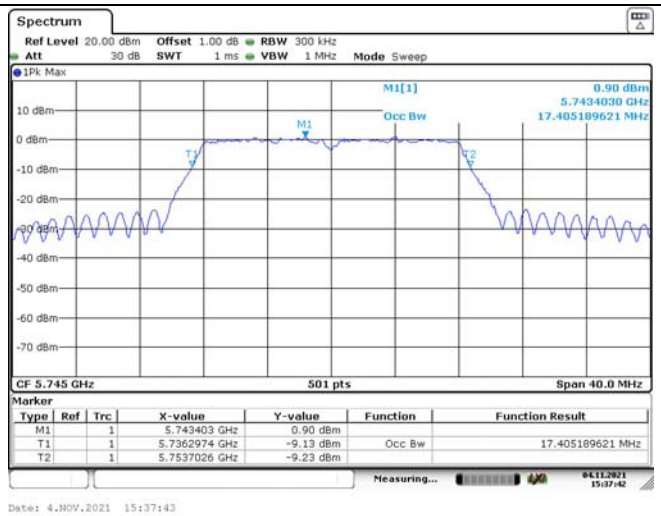
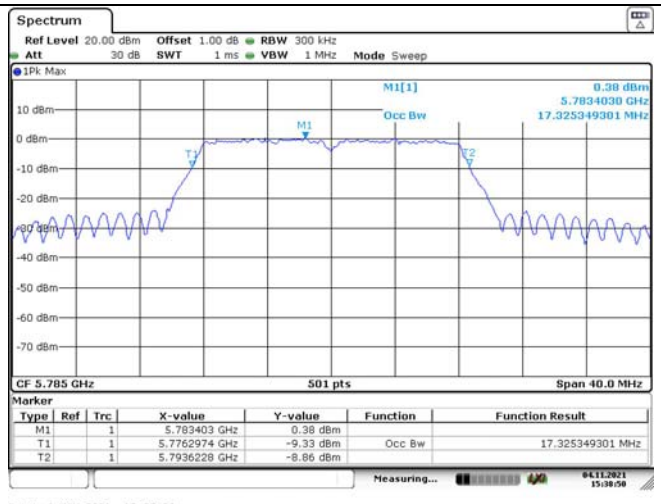
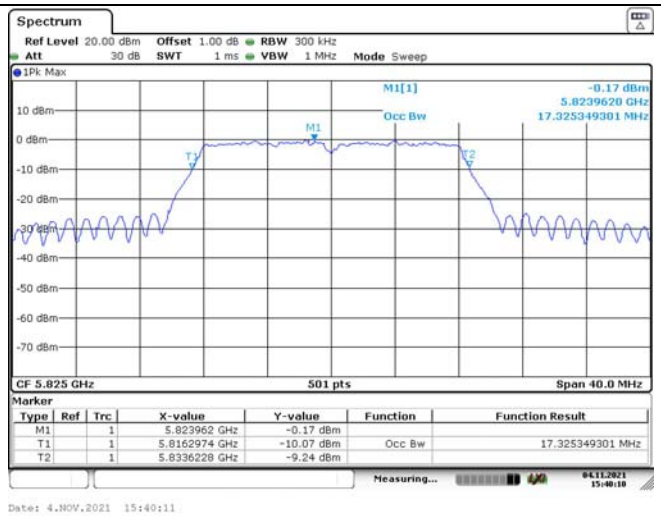
99% Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

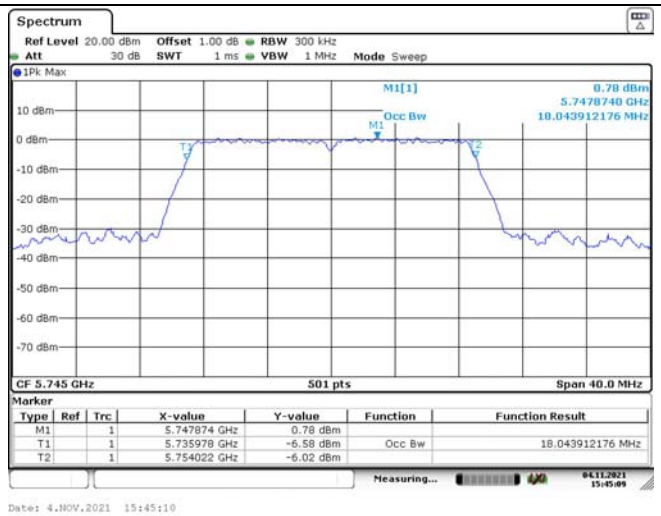
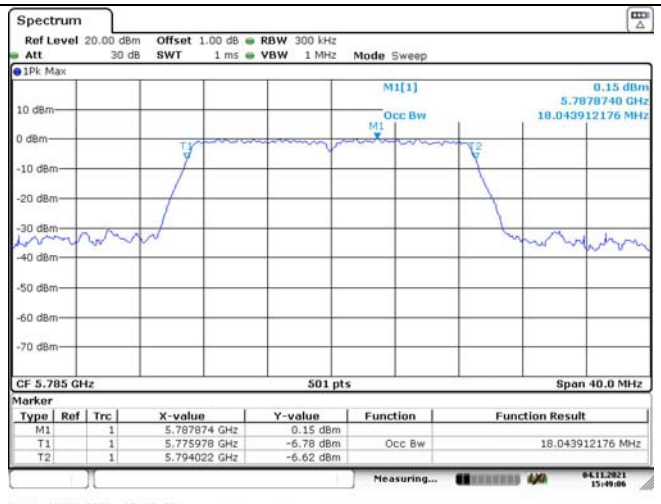
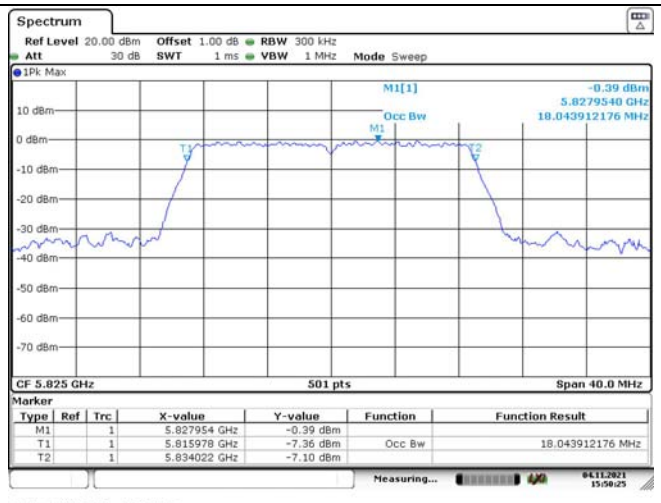
5725-5850MHz:

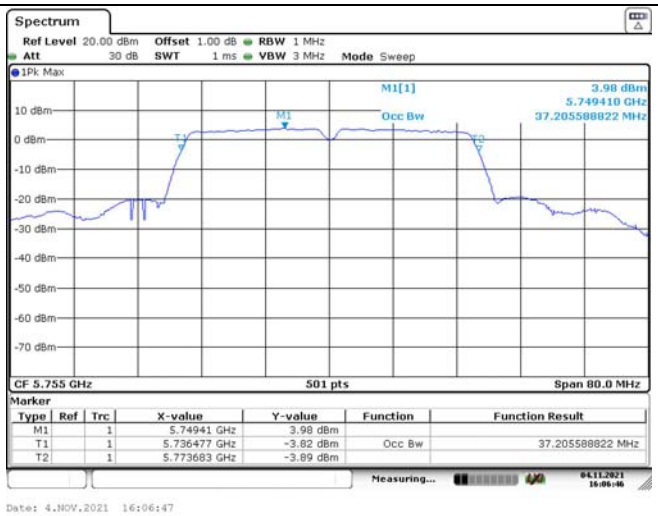
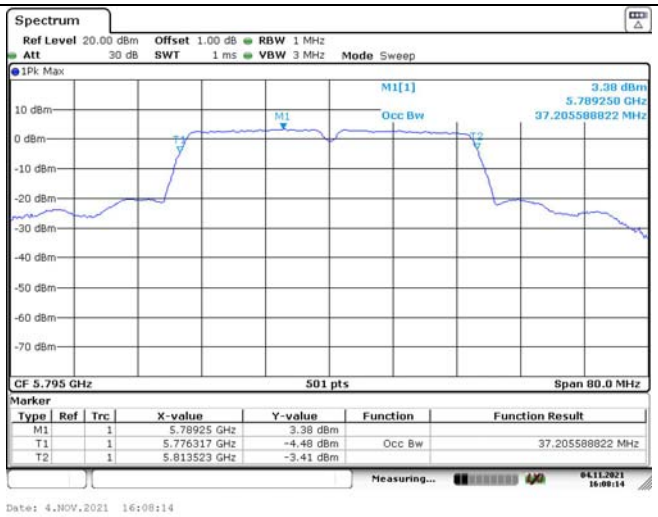
6dB Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

6dB Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

6dB Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

99% Emission Bandwidth	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

99% Emission Bandwidth	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

99% Emission Bandwidth	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

4.4 Maximum Conducted Output Power:

Serial Number:	CR21090042-RF-S2	Test Date:	2021/11/4
Test Site:	RF	Test Mode:	Transmitting
Tester:	Will wei	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25	Relative Humidity: (%)	60	ATM Pressure: (kPa)	101.1

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A
Agilent	USB Wideband Power Sensor	U2021XA	MY54080015	2021-07-22	2022-07-21

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power(dBm)	
		Result	Limit
802.11a	5180	10.61	24
	5200	10.85	24
	5240	10.69	24
802.11n ht20	5180	10.81	24
	5200	11.06	24
	5240	10.77	24
802.11n ht40	5190	11.41	24
	5230	11.39	24
Note: The device is a client device. The duty cycle factor has been calculated into the test data.			

5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power(dBm)	
		Result	Limit
802.11a	5745	10.02	30
	5785	10.14	30
	5825	10.54	30
802.11n ht20	5745	10.19	30
	5785	10.41	30
	5825	10.59	30
802.11n ht40	5755	10.71	30
	5795	11.01	30
Note: The duty cycle factor has been calculated into the test data.			

4.5 Maximum power spectral density:

Serial Number:	CR21090042-RF-S2	Test Date:	2021/11/4
Test Site:	RF	Test Mode:	Transmitting
Tester:	Will wei	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25	Relative Humidity: (%)	60	ATM Pressure: (kPa)	101.1

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2021/10/10	2022/10/9
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5150-5250 MHz:

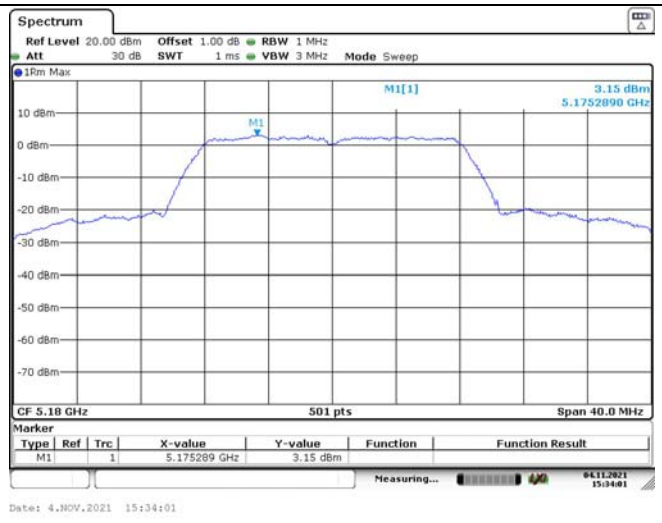
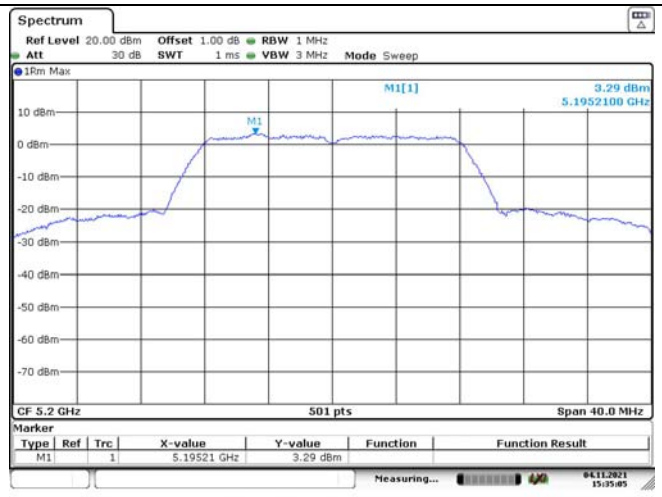
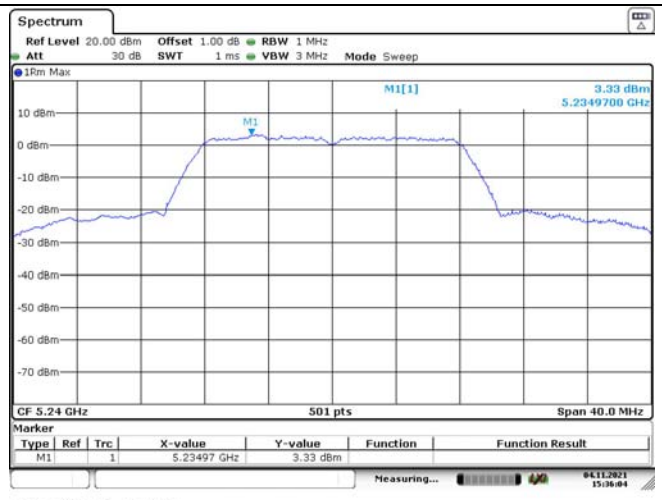
Test Modes	Test Frequency (MHz)	Maximum Power Spectral Density(dBm/MHz)	
		Result	Limit
802.11a	5180	3.15	11
	5200	3.29	11
	5240	3.33	11
802.11n ht20	5180	2.99	11
	5200	3.00	11
	5240	2.98	11
802.11n ht40	5190	0.58	11
	5230	0.48	11

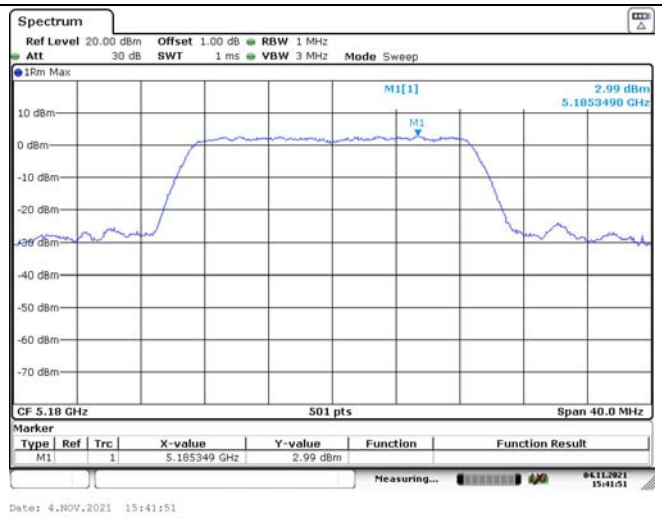
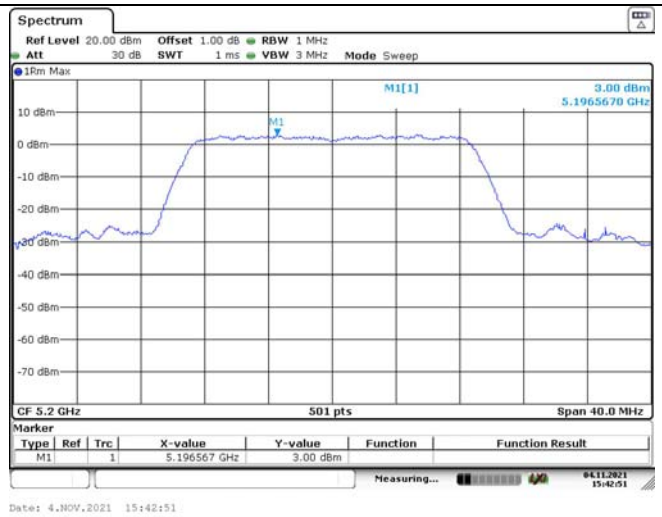
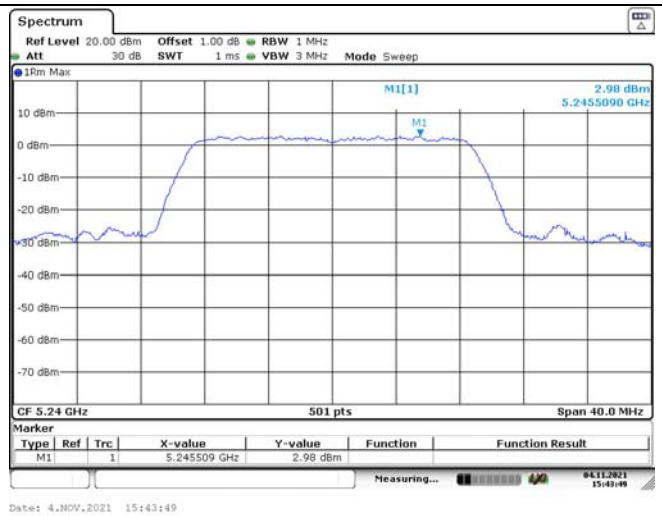
Note:
The device is a client device.
Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.

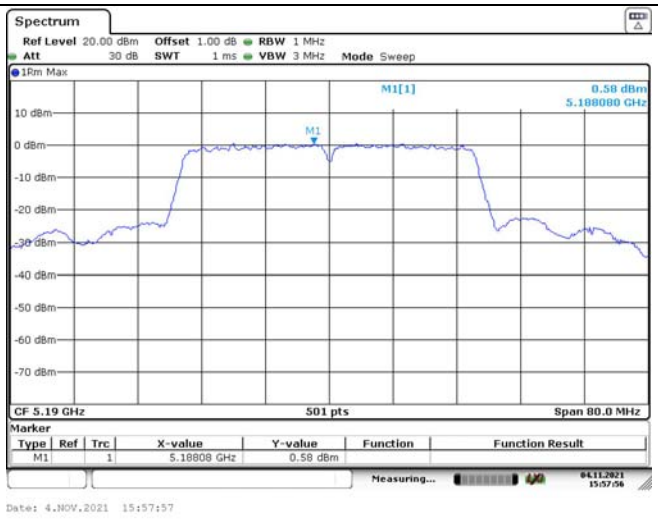
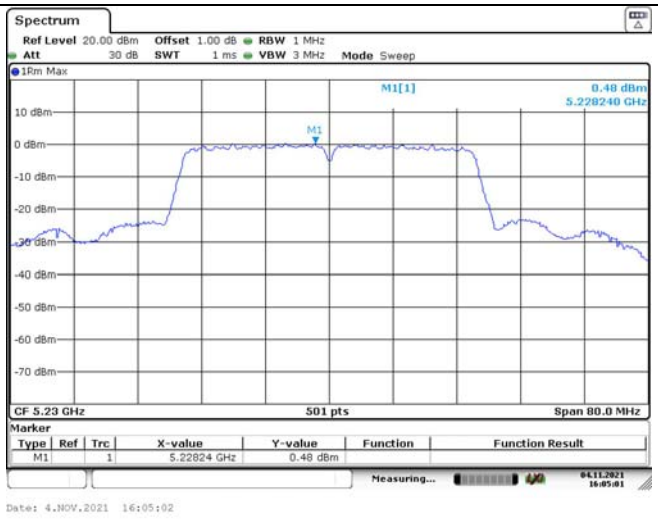
5725-5850 MHz:

Test Modes	Test Frequency (MHz)	Maximum Power Spectral Density(dBm/500kHz)	
		Result	Limit
802.11a	5745	0.01	30
	5785	-0.22	30
	5825	-1.09	30
802.11n ht20	5745	-0.13	30
	5785	-0.72	30
	5825	-1.29	30
802.11n ht40	5755	-2.23	30
	5795	-3.18	30
Note: Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.			

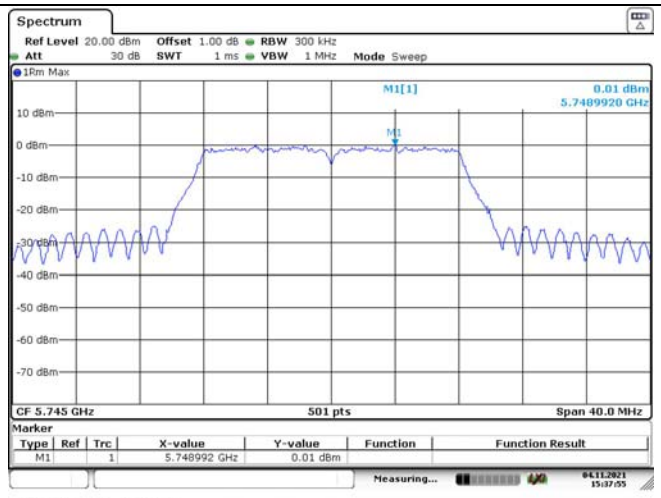
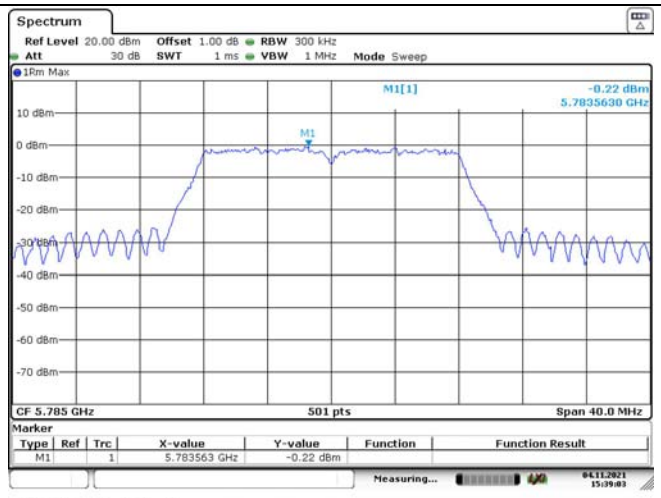
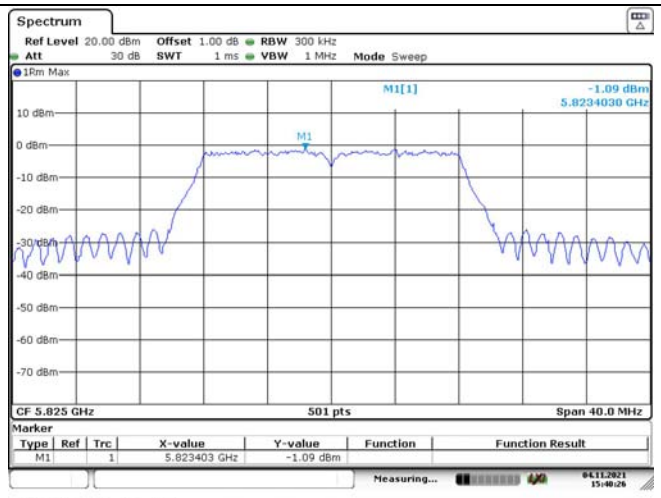
5150-5250MHz:

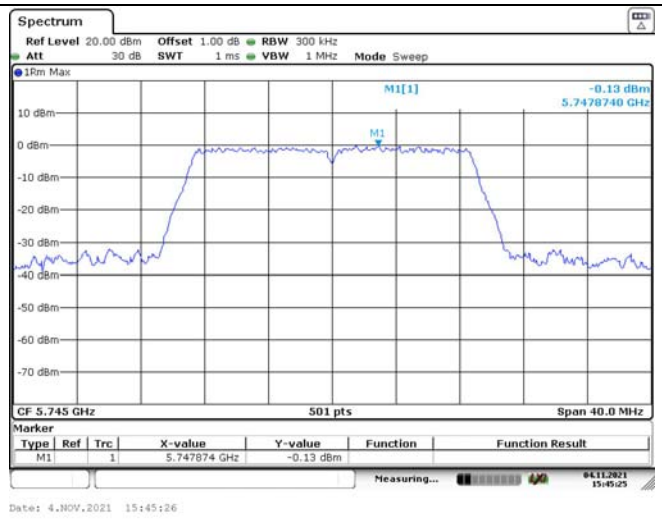
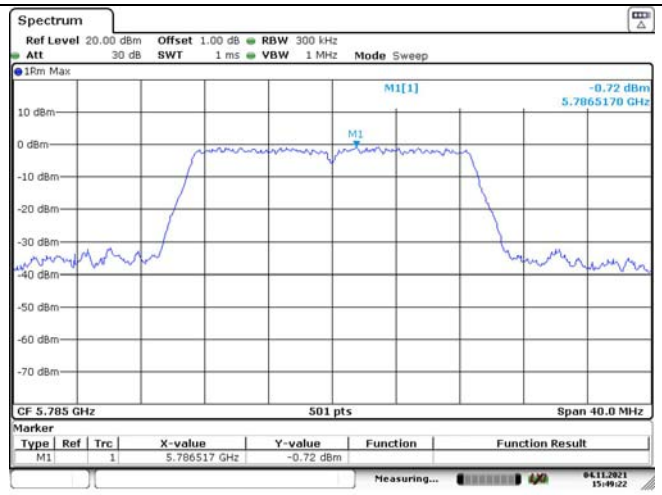
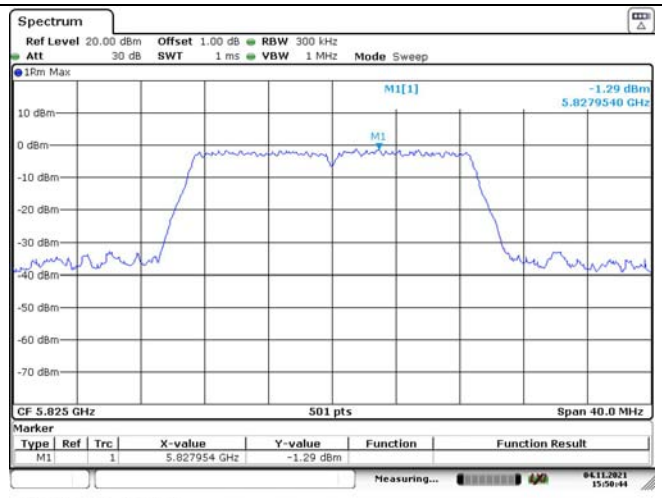
Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

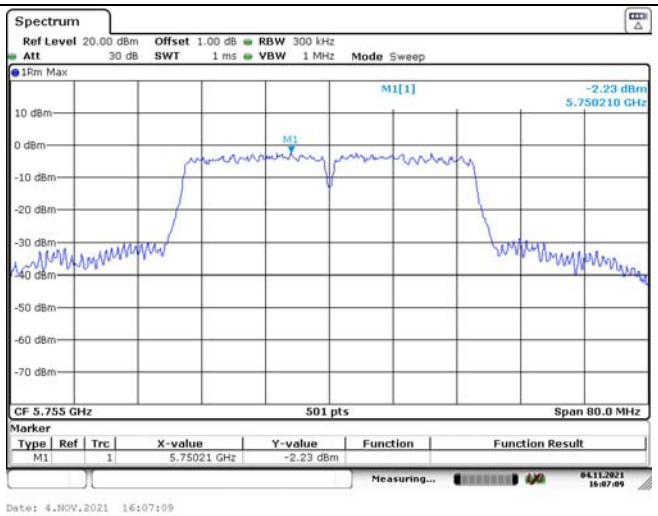
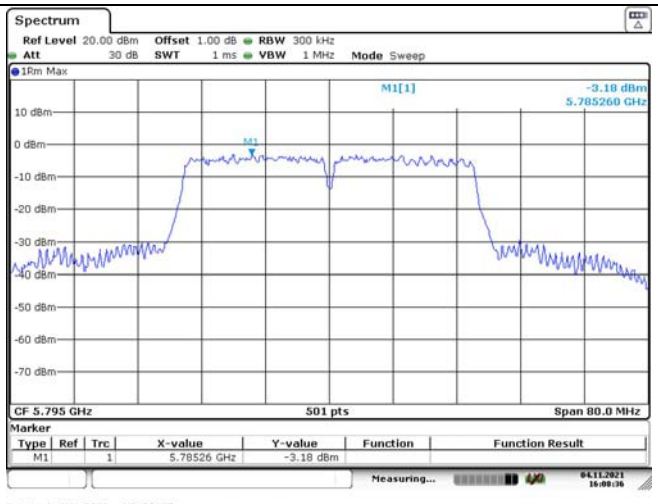
Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

5725-5850MHz

Maximum power spectral density	
802.11a Lowest Channel	
802.11a Middle Channel	
802.11a Highest Channel	

Maximum power spectral density	
802.11n ht20 Lowest Channel	
802.11n ht20 Middle Channel	
802.11n ht20 Highest Channel	

Maximum power spectral density	
802.11n ht40 Lowest Channel	
802.11n ht40 Highest Channel	

4.6 Duty Cycle:

Serial Number:	CR21090042-RF-S2	Test Date:	2021/11/4
Test Site:	RF	Test Mode:	Transmitting
Tester:	Will wei	Test Result:	N/A

Environmental Conditions:					
Temperature: (℃)	25	Relative Humidity: (%)	60	ATM Pressure: (kPa)	101.1

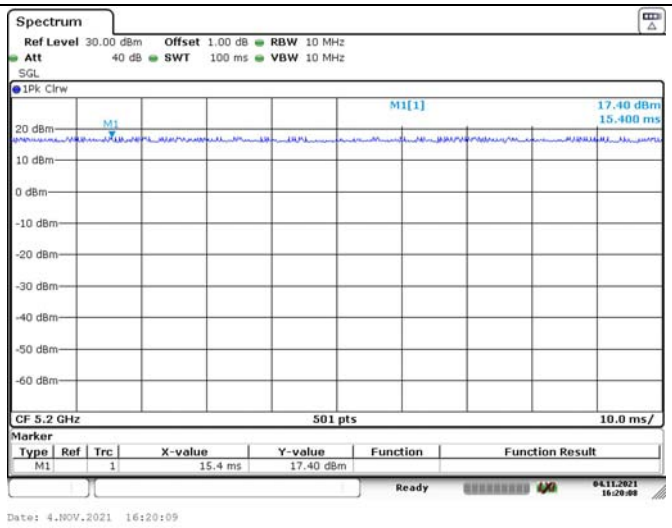
Test Equipment List and Details:

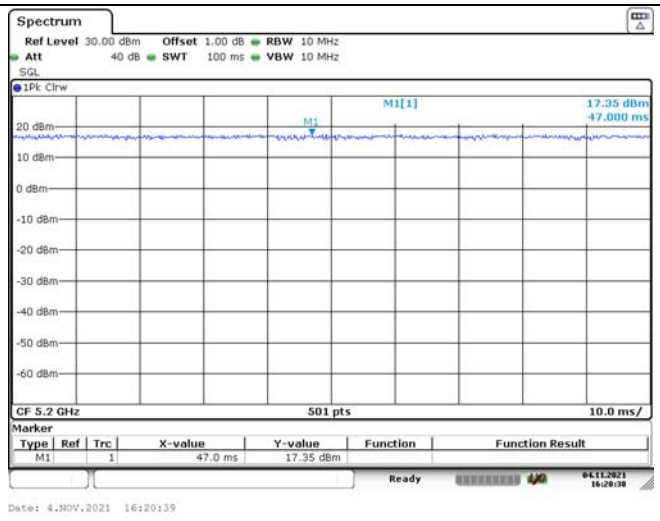
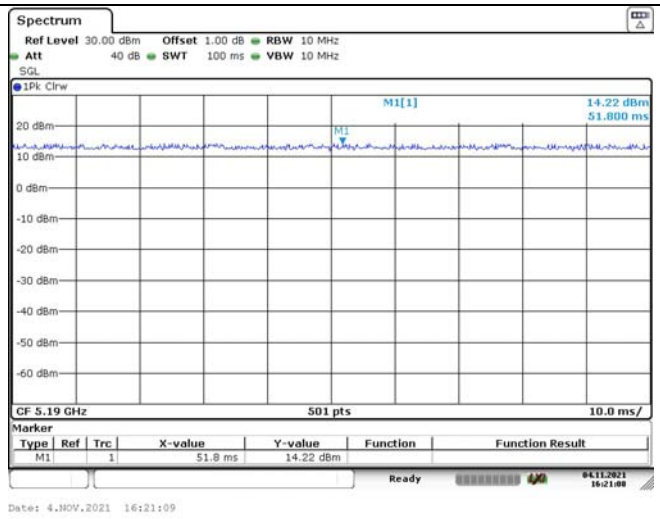
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101943	2021/10/10	2022/10/9
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
Mini-Circuits	DC Block	BLK-18-S+	1554403	2021/8/8	2022/8/7

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Modes	Ton (ms)	Ton+off (ms)	Duty cycle (%)
802.11a	100	100	100.00
802.11n ht20	100	100	100.00
802.11n ht40	100	100	100.00

Duty Cycle	
802.11a	

Duty Cycle	
802.11n ht20	
802.11n ht40	

5. RF EXPOSURE EVALUATION

5.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

5.1.1 Applicable Standard

FCC §15.247 (i) & §1.1310 & §2.1091

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.

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/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;

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

5.1.2 Procedure

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
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);

5.1.3 Calculated Result

Frequency (MHz)	**Antenna Gain**		**Conducted output power including Tune-up Tolerance**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
5150-5850	4.64	2.91	12	15.85	20.00	0.0092	1.0

Note: 2.4G and 5G Wi-Fi can`t transmit simultenously.

Result: The device meet FCC MPE at 20 cm distance

===== END OF REPORT =====