

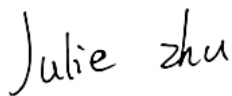
TEST REPORT

Applicant: Libre Wireless Technologies, Inc.
Address: 2100 Geng Road, Suite 210, Palo Alto, CA 94303, USA
Equipment Type: MAVID-3M
Model Name: MAVID-3M (refer section 2.4)
Brand Name: LIBRE
FCC ID: 2ADBM-MAVID-3M
ISED Number: 20276-MAVID3M
Test Standard: 47 CFR Part 15 Subpart C
RSS-Gen Issue 5
RSS-247 Issue 2
(refer section 3.1)
Test Date: Jul. 19, 2022 - Aug. 11, 2022
Date of Issue: Oct. 28, 2022

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie Zhu



Checked by: Ye Hongji



Approved by: Liao Jianming
(Technical Director)



Revision History		
Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Sep. 28, 2022</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Oct. 26, 2022</u>	<u>Modified Chapter 2.5 and pages P33 and P55</u>
<u>Rev. 03</u>	<u>Oct. 28, 2022</u>	<u>Modified Chapter 2.5</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Libre Wireless Technologies, Inc.
Address	2100 Geng Road, Suite 210, Palo Alto, CA 94303, USA

2.2 Manufacturer Information

Manufacturer	Hansong (Nanjing) Technology Ltd.
Address	No.8 Kangping street, Jiangning Economy and Technology development Zone, Nanjing, 211106, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	MAVID-3M
Model Name Under Test	MAVID-3M
Series Model Name	MXD30NSBVK-M, MXD31NSBVK-M, MXD32NSBVK-M, MXD30NSBVK-M-A, MXD32NSBVK-M-A, MXD31NSB00-M, MXD31NSB00-M-A
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name (this information provided by the customer).
Serial Number	202208200001
Hardware Version	V1.3
Software Version	QUBSP_V1003
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Technical Information

Network and Wireless connectivity	Bluetooth BLE WIFI 802.11b, 802.11g, 802.11n
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The requirement for the following technical information of the EUT was tested in this report:

Frequency Range	802.11b/g/n (20 MHz): 2.412 GHz - 2.462 GHz $f_c = 2412 \text{ MHz} + (N-1)*5 \text{ MHz}$, where - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 1 to 11. 802.11n (40 MHz): 2.422 GHz - 2.452 GHz $f_c = 2412 \text{ MHz} + (N-1)*5 \text{ MHz}$, where - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 3 to 9.	
Modulation Type	DSSS, OFDM	
Product Type	<input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable <input type="checkbox"/> Fix Location	
Antenna System (eg., MIMO, Smart Antenna)	N/A	
Categorization as Correlated or Completely Uncorrelated	N/A	
Antenna Type	PCB Antenna	
Antenna Gain	PCB Antenna 1	0.81 dBi
	PCB Antenna 2	1.50 dBi

Mode	Antenna	
	PCB Antenna 1	PCB Antenna 2
802.11b	√	√
802.11g	√	√
802.11n20	√	√
802.11n40	√	√

Note: All the configurations were tested, but only the worst data was shown in this report.

Modulation technology	Modulation Type	Transfer Rate (Mbps)(Single RF path)
DSSS (802.11b)	DBPSK	1
	DQPSK	2
	CCK	5.5/11
OFDM (802.11g)	BPSK	6/9
	QPSK	12/18
	16QAM	24/36
	64QAM	48/54

OFDM (802.11n-20 MHz)	BPSK	6.5/7.2
	QPSK	13/19.5/14.4/21.7
	16QAM	26/39/28.9/43.3
	64QAM	52/58.5/65/57.8/65/72.2
OFDM (802.11n-40 MHz)	BPSK	13.5/15
	QPSK	27/40.5/30/45
	16QAM	54/81/60/90
	64QAM	108/121.5/135/120/150

Note: Preliminary tests were performed in different data rate in above table to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	
Output Power	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
6dB Bandwidth	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Conducted Spurious Emission	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Conducted Emission	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Radiated Spurious Emission	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Band Edge	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9
Power spectral density (PSD)	11b/11g/11n20/11n40	1/6/6.5/13.5 Mbps	1/6/11	3/6/9

Note: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.6 Additional Instructions

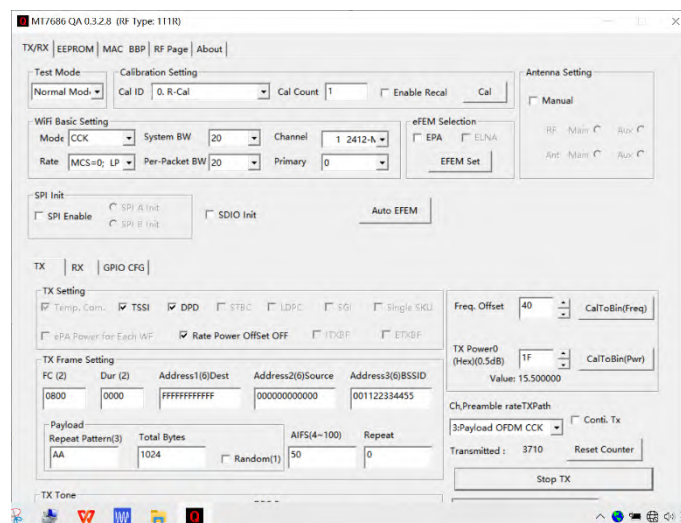
EUT Software Settings:

Mode	<input checked="" type="checkbox"/> Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.
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During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power level setup in software			
Test Software Version	MT7686 QA 0.3.2.8		
Support Units (Software installation media)	Description	Manufacturer	Model
		Notebook	HP
Mode	Channel	Soft Set	
802.11 b	1	1F	
	6	1E	
	11	1C	
802.11 g	1	1F	
	6	23	
	11	20	
802.11 n20	1	1F	
	6	25	
	11	20	
802.11 n40	3	1C	
	6	2B	
	9	1F	

Run software:



3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
2	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
3	RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems(FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
4	KDB Publication 662911 D01v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)
5	ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
6	KDB Publication 558074 D01v05r02	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES

3.2 Test Verdict

No.	Description	FCC PART No.	ISED Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	RSS-247, 5.4 (f)	N/A	Pass ^{Note 1}
2	Output Power	15.247 (b)	RSS-247, 5.4 (d)	ANNEX A.1	Pass
3	6dB Bandwidth	15.247 (a)	RSS-GEN, 6.7; RSS-247, 5.2 (a)	ANNEX A.2	Pass
4	Conducted Spurious Emission	15.247 (d)	RSS-247, 5.5	ANNEX A.3	Pass
5	Band Edge(Authorized-band band-edge)	15.247 (d)	RSS-GEN, 8.9; RSS-247, 5.5	ANNEX A.4	Pass
6	Conducted Emission	15.207	RSS-GEN, 8.8	ANNEX A.5	Pass
7	Radiated Spurious Emission	15.209; 15.247 (d)	RSS-247, 5.5	ANNEX A.6	Pass
8	Band Edge(Restricted-band band-edge)	15.209; 15.247 (d)	RSS-247, 5.5	ANNEX A.7	Pass
9	Power spectral density (PSD)	15.247 (e)	RSS-247, 5.2 (b)	ANNEX A.8	Pass
10	Receiver Spurious Emissions	N/A	RSS-Gen, 7.3	N/A	N/A ^{Note 2}

Note ¹: Please refer to section 5.1.

Note ²: Only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, so this test is not applicable.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	52% to 65%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+21.4°C to +25.5°C
Working Voltage of the EUT	NV (Normal Voltage)	5.0 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY50330200	2022.05.19	2023.05.18
Power Sensor	ROHDE&SCHWARZ	NRP18S	102521	2022.03.09	2023.03.08
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2022.01.04	2023.01.03
Spectrum Analyzer	KEYSIGHT	N9020A	MY50531259	2021.09.08	2022.09.07
Signaling Unit	ROHDE&SCHWARZ	CMW500	171150	2022.06.29	2023.06.28
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	02460	2021.05.19	2024.05.08
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2021.07.02	2024.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2021.08.16	2024.08.15
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2021.10.10	2022.10.09
Test Antenna-Bi-Log(30 MHz-1 GHz)	SCHWARZBECK	VULB 9168	00883	2022.04.01	2025.03.31
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	N/A	2021.08.15	2024.08.14
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2021.10.10	2022.10.09
LISN	SCHWARZBECK	NSLK 8127	8127-687	2022.06.01	2023.05.31
Shielded Enclosure	YiHeng Electronic Co., Ltd	3.5m*3.1m*2.8m	N/A	2022.02.19	2025.02.18

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable test Setup
BL410R	BALUN	V2.1.1.488	N/A	The section 4.5.1
BL410E	BALUN	V19.8.28.435	N/A	The section 4.5.2&4.5.3&4.5.4&4.5.5

4.4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

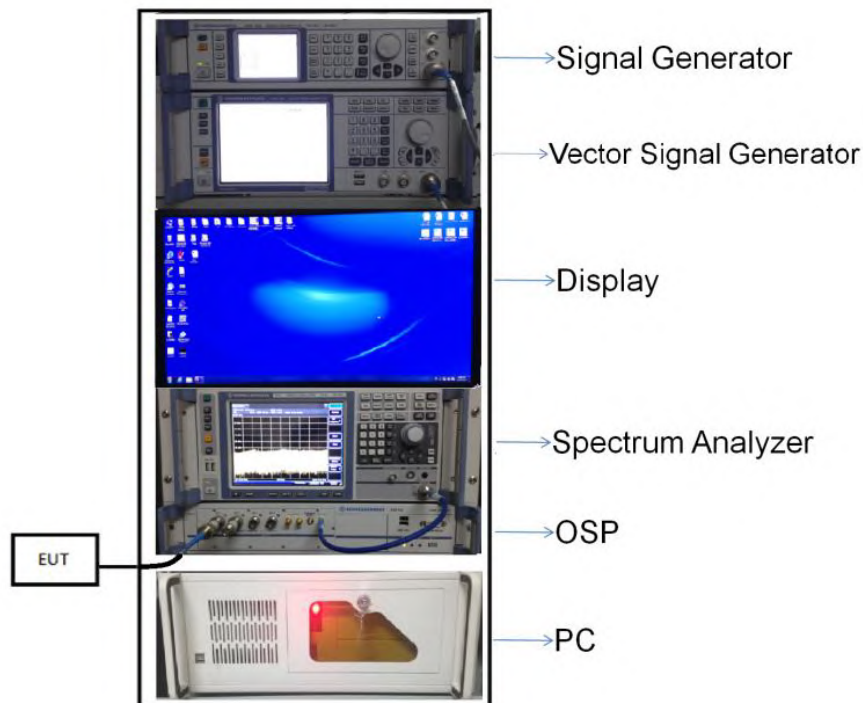
Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.82°C
Humidity	4.1%

4.5 Description of Test Setup

4.5.1 For Antenna Port Test

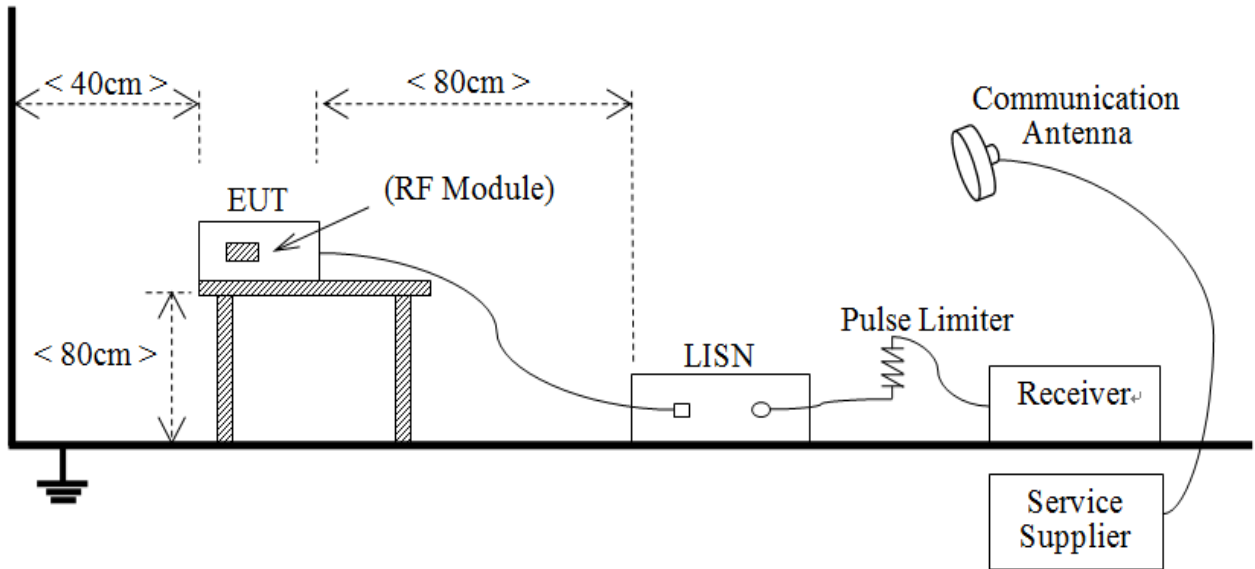
Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:
 Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



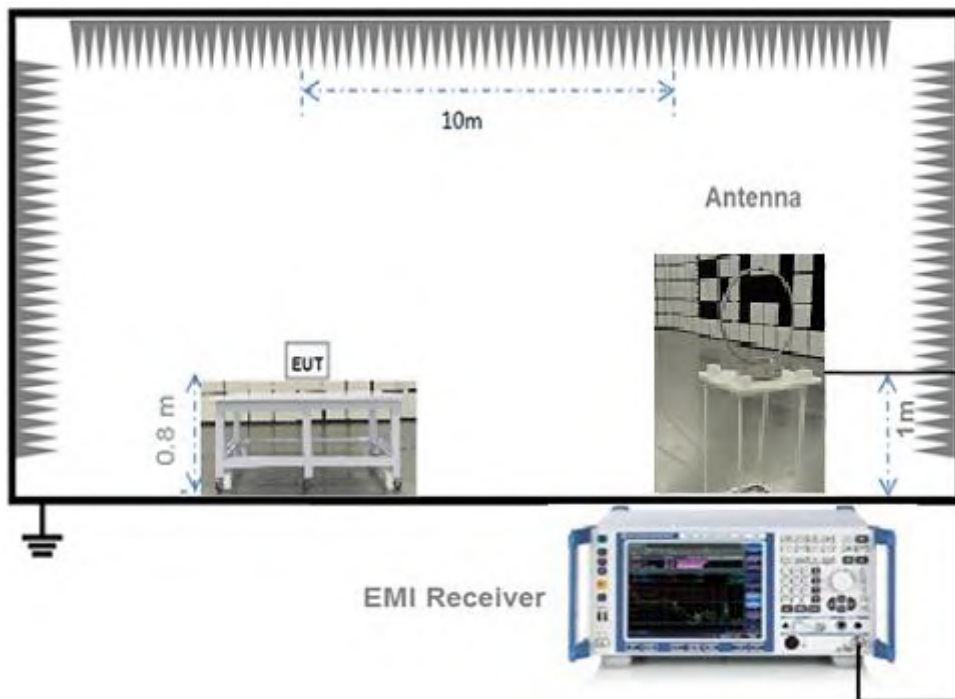
(Diagram 1)

4.5.2 For AC Power Supply Port Test



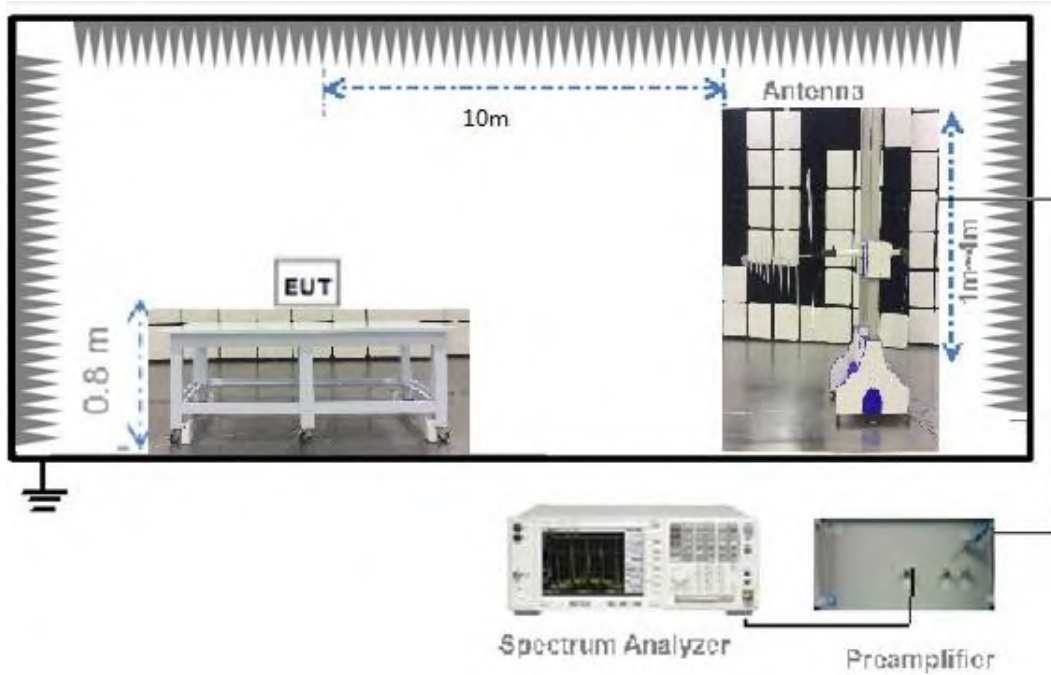
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



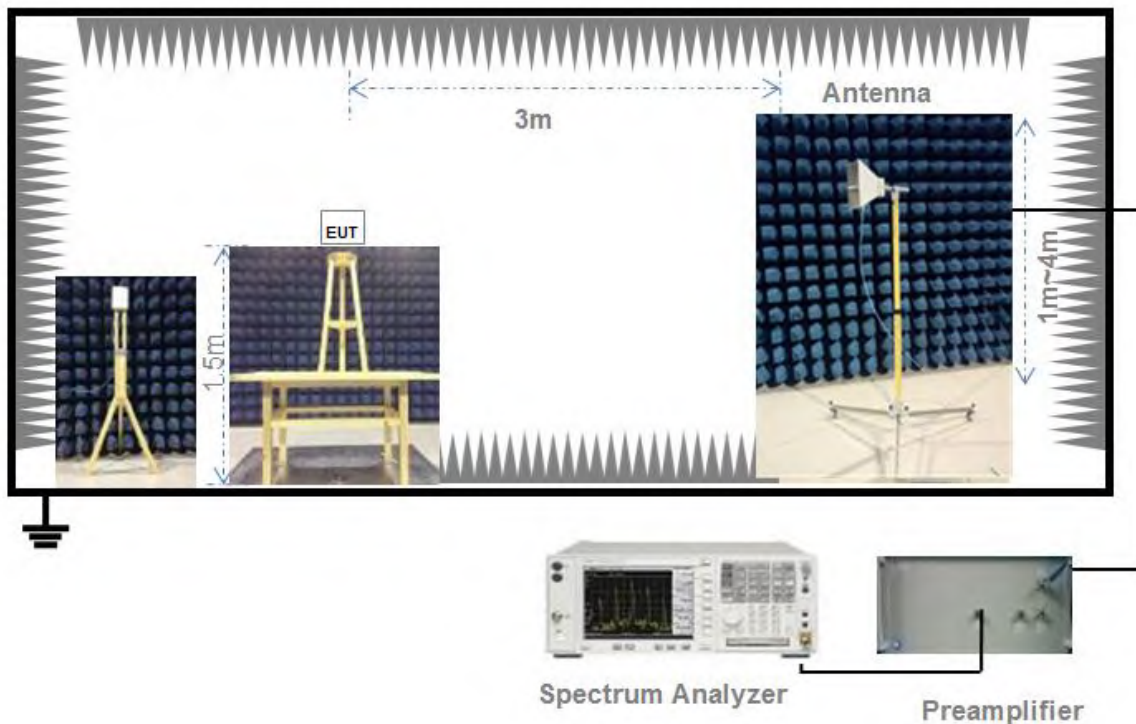
(Diagram 3)

4.5.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.5.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

4.6 Measurement Results Explanation Example

4.6.1 For conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

4.6.2 For radiated band edges and spurious emission test:

$$E = \text{EIRP} - 20 \log D + 104.8$$

where:

E = electric field strength in dB μ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

EIRP = Measure Conducted output power Value (dBm) + Maximum transmit antenna gain (dBi) + the appropriate maximum ground reflection factor (dB)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203; RSS-247, 5.4 (f)

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, or § 15.221. 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.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	An embedded-in antenna design is used.

Reference Documents	Item
Photo	Please refer to the EUT Photo documents.

5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Output Power

5.2.1 Test Limit

FCC § 15.247(b); RSS-247, 5.4 (d)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements.

5.2.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Maximum peak conducted output power

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

Maximum conducted (average) output power (Reporting Only)

a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed

using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

- 1) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
- 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
- 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as

described in Section 6.0.

c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

d) Adjust the measurement in dBm by adding $10\log(1/x)$, where x is the duty cycle to the measurement result.

Measurements of duty cycle

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.

Set the center frequency of the instrument to the center frequency of the transmission.

Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.

Set $VBW \geq RBW$. Set detector = peak or average.

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 duty cycle shall not be used if $T \leq 16.7$ microseconds.)

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 6dB Bandwidth

5.3.1 Limit

FCC §15.247(a); RSS-GEN, 6.7; RSS-247, 5.2 (a)

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.

5.3.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Use the following spectrum analyzer settings:

Set RBW = 100 kHz.

Set the video bandwidth (VBW) \geq 3 RBW.

Detector = Peak.

Trace mode = max hold.

Sweep = auto couple.

Allow the trace to stabilize.

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.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 Conducted Spurious Emission

5.4.1 Limit

FCC §15.247(d); RSS-247, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.4.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

- a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).
- b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).
- c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required.

The following procedures shall be used to demonstrate compliance to these limits. Note that these procedures can be used in either an antenna-port conducted or radiated test set-up. Radiated tests must conform to the test site requirements and utilize maximization procedures defined herein.

Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to ≥ 1.5 times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW $\geq 3 \times$ RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.

Emission level measurement

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

Set the RBW = 100 kHz.

Set the VBW $\geq 3 \times$ RBW.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Band Edge (Authorized-band band-edge)

5.5.1 Limit

FCC §15.247(d); RSS-GEN, 8.9, RSS-247, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.5.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The following procedures may be used to determine the peak or average field strength or power of an unwanted emission that is within 2 MHz of the authorized band edge. If a peak detector is utilized, use the procedure described in 13.2.1. Use the procedure described in 13.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., duty cycle $\geq 98\%$). Use the procedure described in 13.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent). Use the procedure described in 13.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2 percent).

When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used.

Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

Set span to 2 MHz

RBW = 100 kHz.

VBW $\geq 3 \times$ RBW.

Detector = peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweep to continue until the trace stabilizes (required measurement time may increase for low duty cycle applications)

Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission ± 0.5 MHz.

Standard method(The 99% OBW of the fundamental emission is without 2 MHz of the authorized band):

Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.

Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.

Attenuation: Auto (at least 10 dB preferred).

Sweep time: Coupled.

Resolution bandwidth: 100 kHz.

Video bandwidth: 300 kHz.

Detector: Peak.

Trace: Max hold.

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Conducted Emission

5.6.1 Limit

FCC §15.207; RSS-GEN, 8.8

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 within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.6.2 Test Setup

See section 4.5.2 for test setup description for the AC power supply port. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.6.4 Test Result

Please refer to ANNEX A.5.

5.7 Radiated Spurious Emission

5.7.1 Limit

FCC §15.209&15.247(d); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

- For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
- For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.7.2 Test Setup

See section 4.5.3 to 4.5.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dB μ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

- f) Compare the resultant electric field strength level to the applicable limit.
- g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 1.
- b) VBW $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be

longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle, x , of the transmitter output signal as described in section 6.0.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW $\geq 3 \times$ RBW.
- e) Detector = RMS, if $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- f) Averaging type = power (i.e., RMS).
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- g) Sweep time = auto.
- h) Perform a trace average of at least 100 traces.
- i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.
 - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $20 \log(1/x)$, where x is the duty cycle.
 - 3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.7.4 Test Result

Please refer to ANNEX A.6.

5.8 Band Edge (Restricted-band band-edge)

5.8.1 Limit

FCC §15.209&15.247(d); RSS-247, 5.5

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

5.8.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.8.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

For transmitters operating above 1 GHz repeat the measurement with an average detector.

5.8.4 Test Result

Please refer to ANNEX A.7.

5.9 Power Spectral density (PSD)

5.9.1 Limit

FCC §15.247(e); RSS-247, 5.2 (b)

The same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

5.9.2 Test Setup

See section 4.5.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.9.3 Test Procedure

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.

Set the VBW $\geq 3 \text{ RBW}$.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.9.4 Test Result

Please refer to ANNEX A.8.

ANNEX A TEST RESULT

A.1 Output Power

Note: All configurations are tested, only the worst configuration (tested with the highest antenna gain) is shown here.

Duty Cycle

Test Mode	On Time (ms)	On+Off time (ms)	Duty Cycle
802.11b	38.0	85.3	44.57%
802.11g	14.8	30.0	49.17%
802.11n-20 MHz	14.0	31.0	45.16%
802.11n-40 MHz	8.0	31.0	25.81%

Peak Power Test Data

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.62	28.97	30	1000	Pass
Middle	14.72	29.65			Pass
High	14.74	29.79			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	17.93	62.09	30	1000	Pass
Middle	19.13	81.85			Pass
High	18.77	75.34			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.45	44.16	30	1000	Pass
Middle	18.54	71.45			Pass
High	16.91	49.09			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.28	13.43	30	1000	Pass
Middle	18.03	63.53			Pass
High	12.67	18.49			Pass

Average Power Test Data

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.86	30.62	30	1000	Pass
Middle	14.61	28.91			Pass
High	15.11	32.43			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	13.93	24.72	30	1000	Pass
Middle	15.06	32.06			Pass
High	14.84	30.48			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	12.90	19.50	30	1000	Pass
Middle	15.03	31.84			Pass
High	13.29	21.33			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.17	8.26	30	1000	Pass
Middle	15.60	36.31			Pass
High	10.51	11.25			Pass

E.I.R.P Test Data (For ISED)

802.11b Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	16.12	40.93	36	4	Pass
Middle	16.22	41.88			Pass
High	16.24	42.07			Pass

802.11g Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	19.43	87.70	36	4	Pass
Middle	20.63	115.61			Pass
High	20.27	106.41			Pass

802.11n-20 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	17.95	62.37	36	4	Pass
Middle	20.04	100.93			Pass
High	18.41	69.34			Pass

802.11n-40 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	12.78	18.97	36	4	Pass
Middle	19.53	89.74			Pass
High	14.17	26.12			Pass

A.2 Bandwidth

Note: All configurations are tested, only the worst configuration (tested with the highest antenna gain) is shown here.

Test Data

802.11b Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	9.650000	14.661000	≥500
Middle	9.650000	14.537000	≥500
High	9.650000	14.524000	≥500

802.11g Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	15.150000	17.142000	≥500
Middle	15.150000	19.208000	≥500
High	15.150000	17.319000	≥500

802.11n-20MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	15.200000	17.913000	≥500
Middle	15.200000	21.573000	≥500
High	15.150000	17.995000	≥500

802.11n-40MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	33.900000	35.899000	≥500
Middle	32.650000	41.341000	≥500
High	32.550000	35.855000	≥500

Test Plots

6 dB Bandwidth

802.11b LOW CHANNEL



802.11b MIDDLE CHANNEL



802.11b HIGH CHANNEL



802.11g LOW CHANNEL



802.11g MIDDLE CHANNEL



802.11g HIGH CHANNEL



802.11n-20 MHz LOW CHANNEL



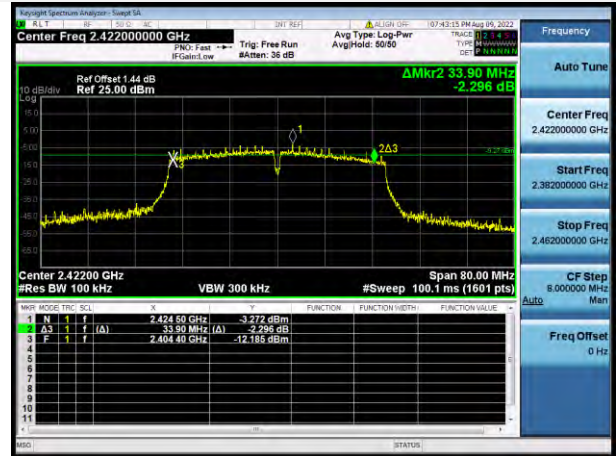
802.11n-20 MHz MIDDLE CHANNEL



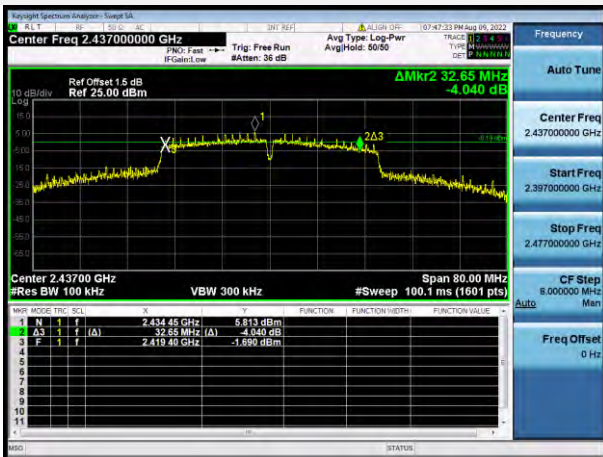
802.11n-20 MHz HIGH CHANNEL



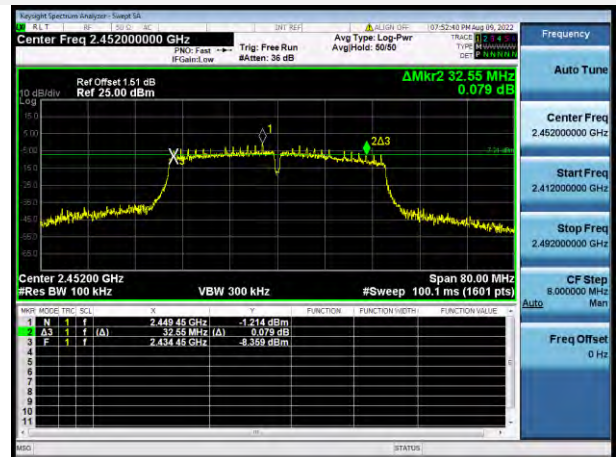
802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL

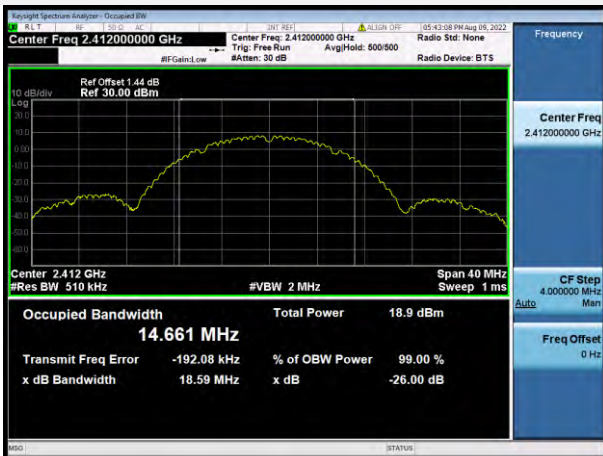


802.11n-40 MHz HIGH CHANNEL

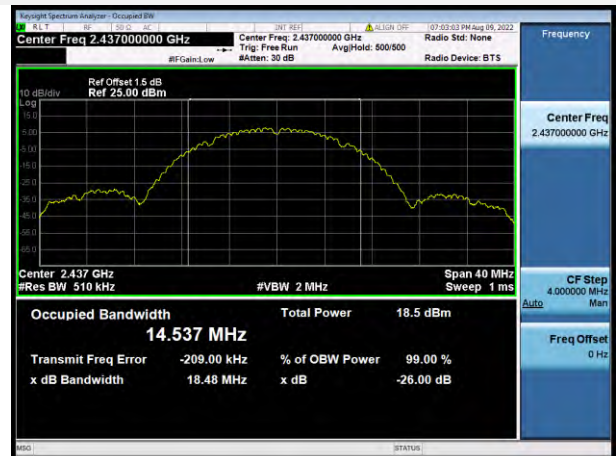


99% Bandwidth

802.11b LOW CHANNEL



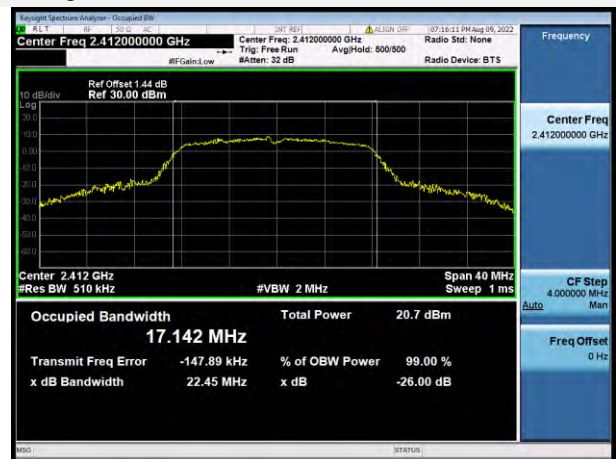
802.11b MIDDLE CHANNEL



802.11b HIGH CHANNEL



802.11g LOW CHANNEL



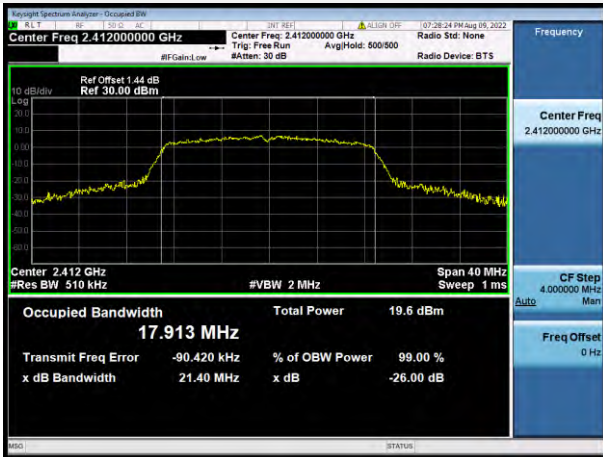
802.11g MIDDLE CHANNEL



802.11g HIGH CHANNEL



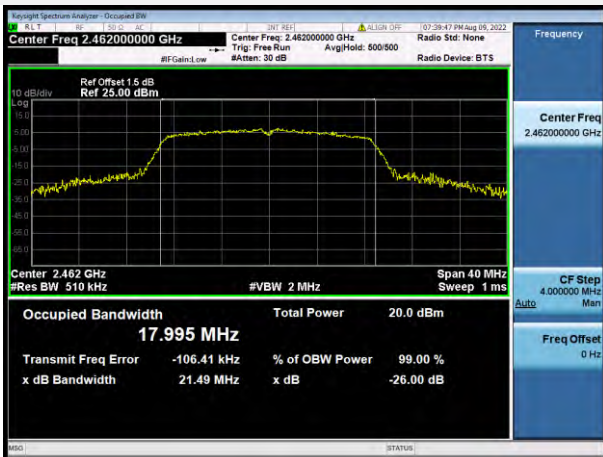
802.11n-20 MHz LOW CHANNEL



802.11n-20 MHz MIDDLE CHANNEL



802.11n-20 MHz HIGH CHANNEL



802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL



802.11n-40 MHz HIGH CHANNEL



A.3 Conducted Spurious Emissions

Note: All configurations are tested, only the worst configuration (tested with the highest antenna gain) is shown here.

Test Data

802.11b Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-50.15	3.81	-16.19	Pass
Middle	-48.69	4.07	-15.93	Pass
High	-48.17	3.77	-16.23	Pass

802.11g Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-49.25	4.75	-15.25	Pass
Middle	-49.42	5.86	-14.14	Pass
High	-48.33	5.69	-14.31	Pass

802.11n-20MHz Mode:

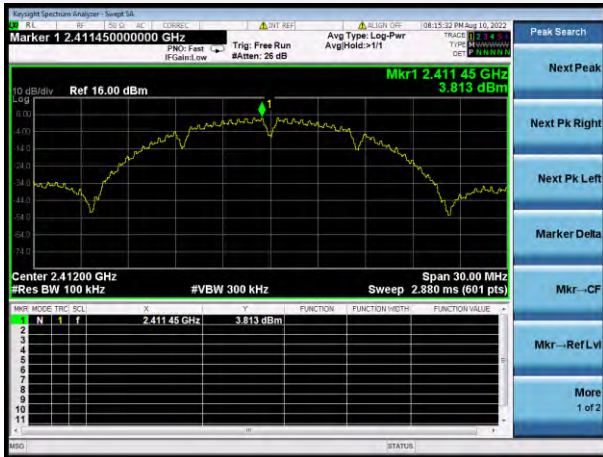
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-47.90	3.89	-16.11	Pass
Middle	-49.36	5.97	-14.03	Pass
High	-48.85	4.20	-15.80	Pass

802.11n-40MHz Mode:

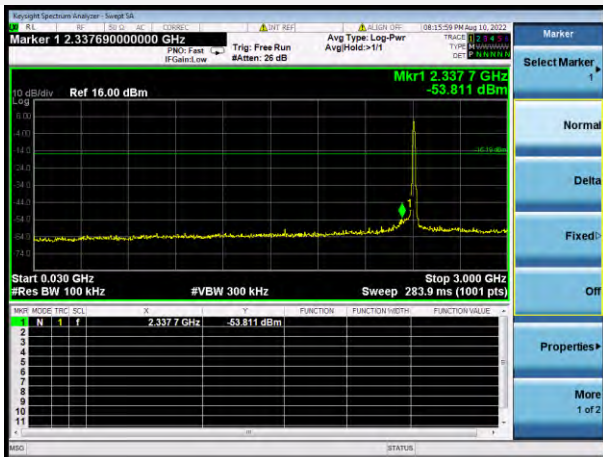
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-49.32	-2.12	-22.12	Pass
Middle	-49.30	4.10	-15.90	Pass
High	-49.10	-1.19	-21.19	Pass

Test Plots

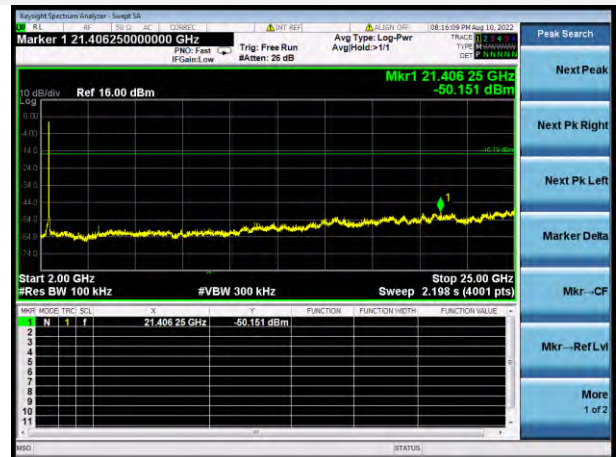
802.11b LOW CHANNEL CARRIER LEVEL



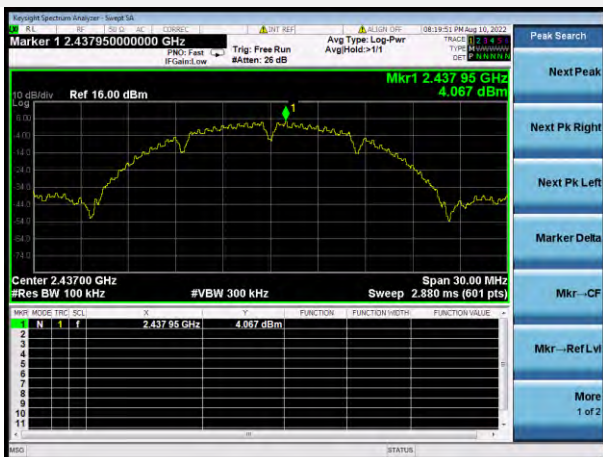
802.11b LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



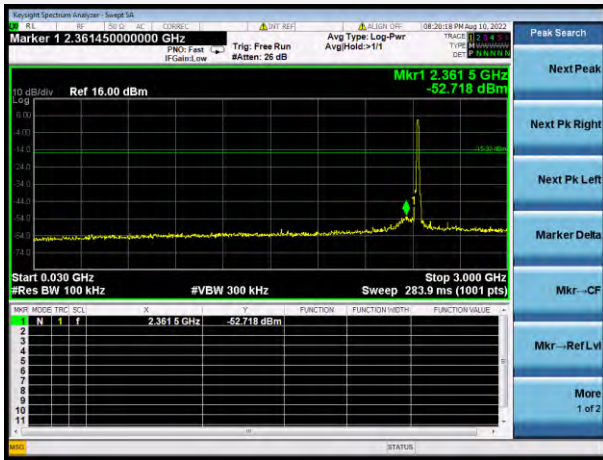
802.11b LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



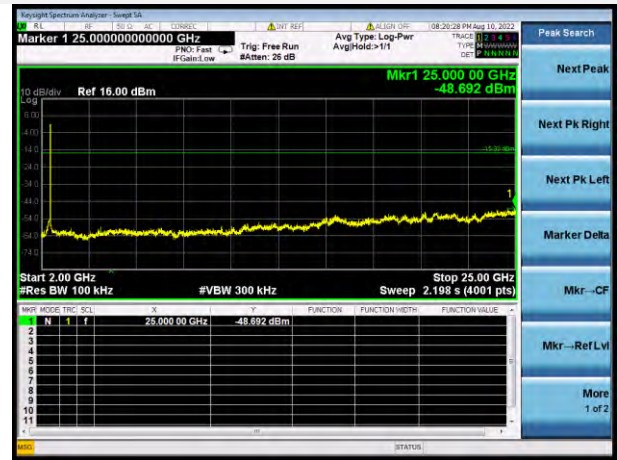
802.11b MIDDLE CHANNEL CARRIER LEVEL



802.11b MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



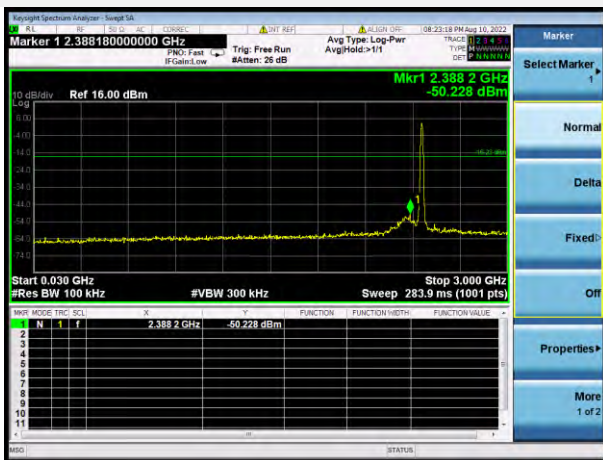
802.11b MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



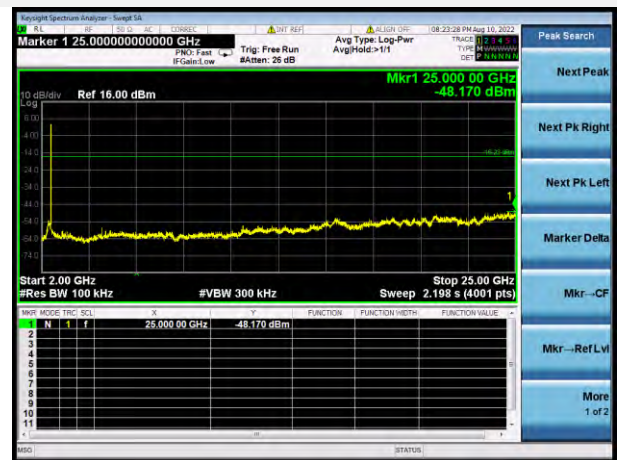
802.11b HIGH CHANNEL CARRIER LEVEL



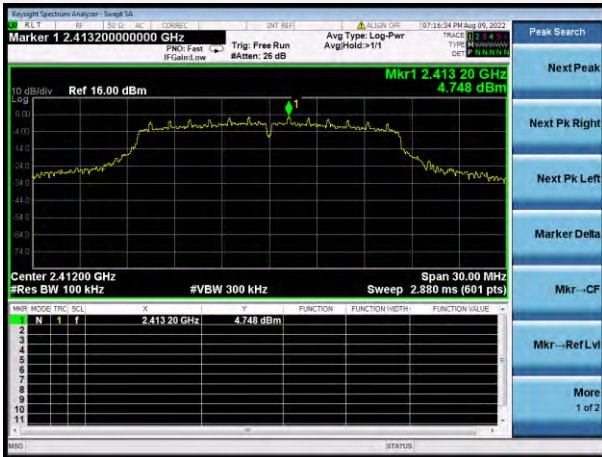
802.11b HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



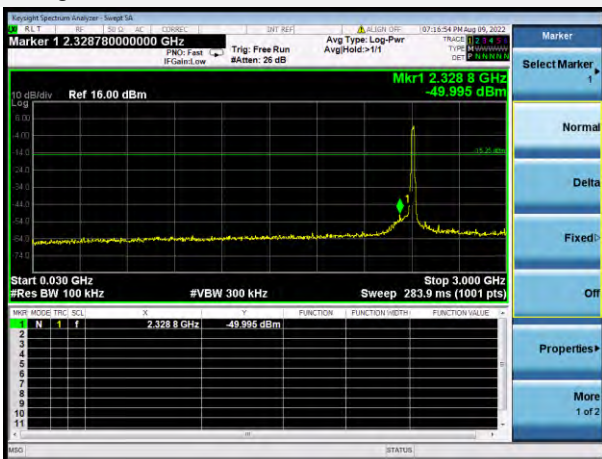
802.11b HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



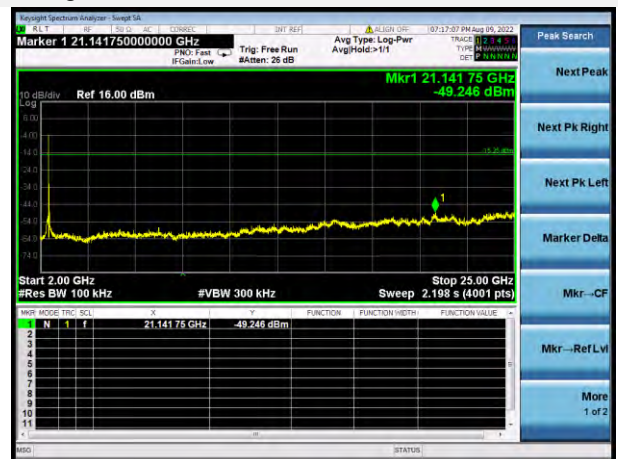
802.11g LOW CHANNEL CARRIER LEVEL



802.11g LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



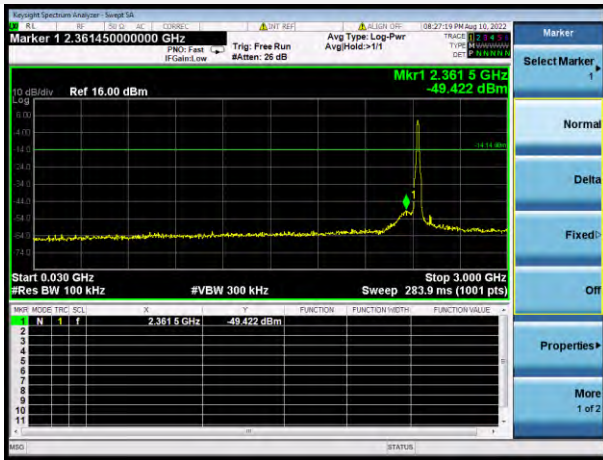
802.11g LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



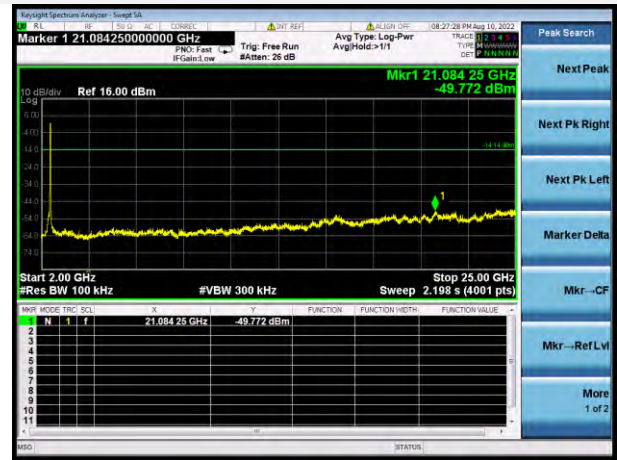
802.11g MIDDLE CHANNEL CARRIER LEVEL



802.11g MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



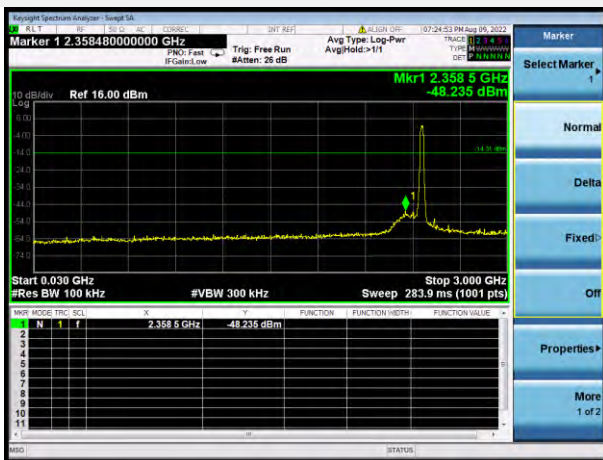
802.11g MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



802.11g HIGH CHANNEL CARRIER LEVEL



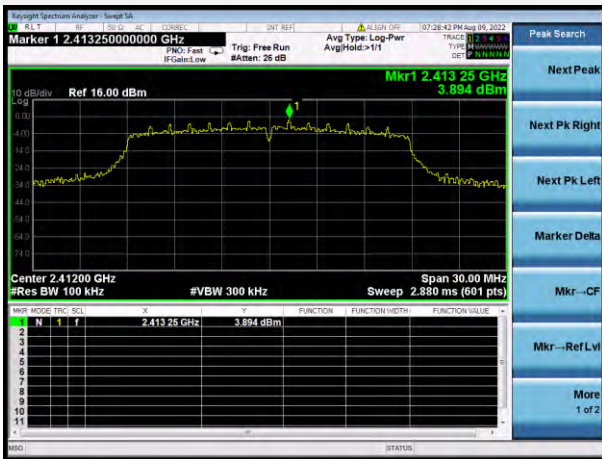
802.11g HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



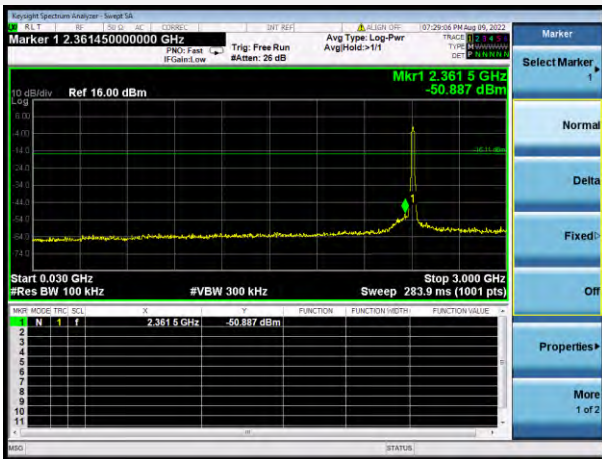
802.11g HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



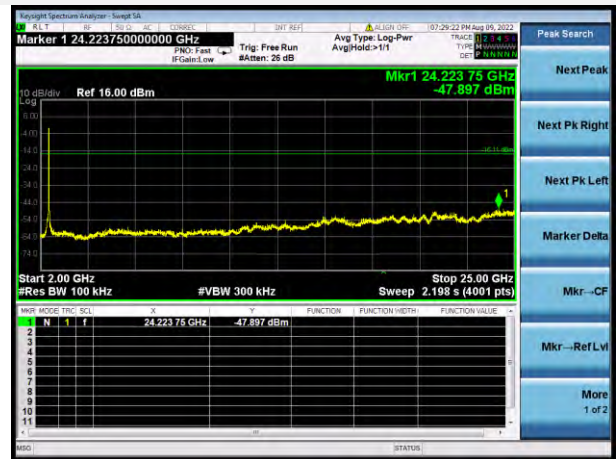
802.11n-20 MHz LOW CHANNEL CARRIER LEVEL



802.11n-20 MHz LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



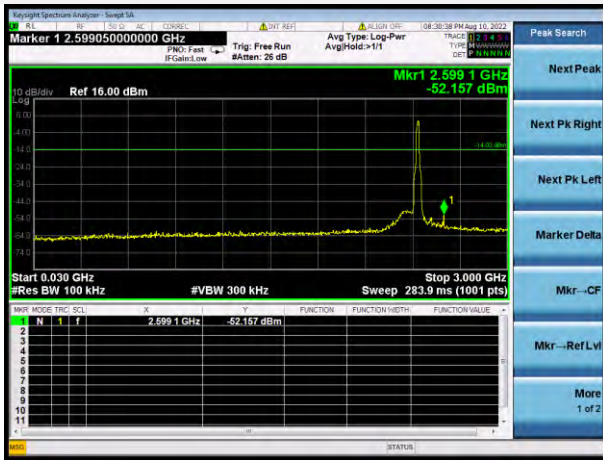
802.11n-20 MHz LOW CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



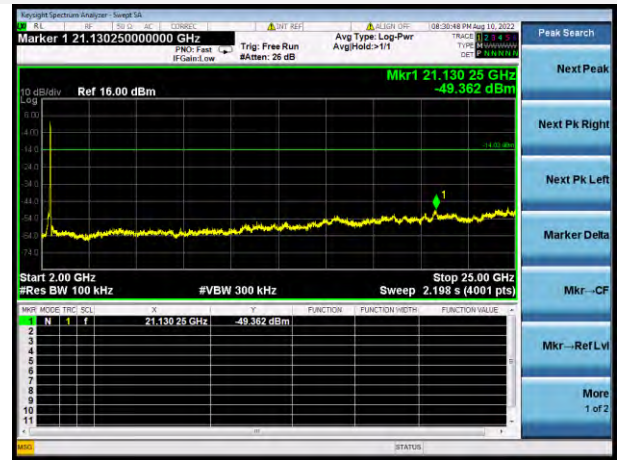
802.11n-20 MHz MIDDLE CHANNEL CARRIER LEVEL



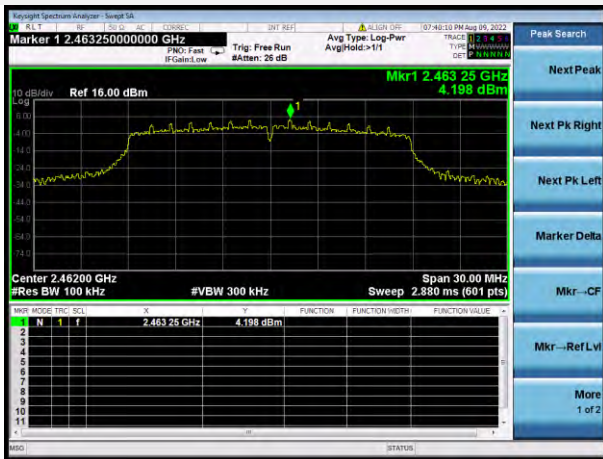
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



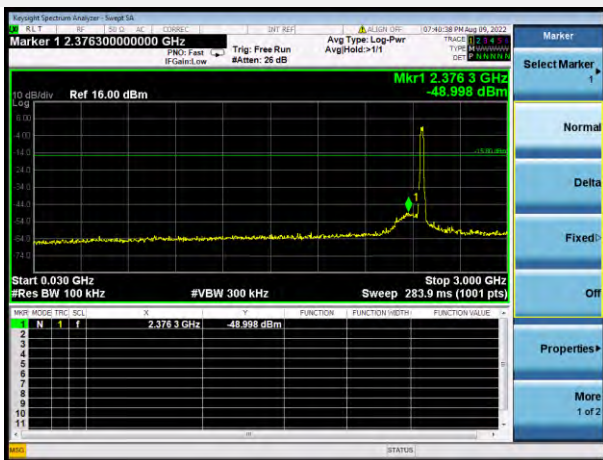
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



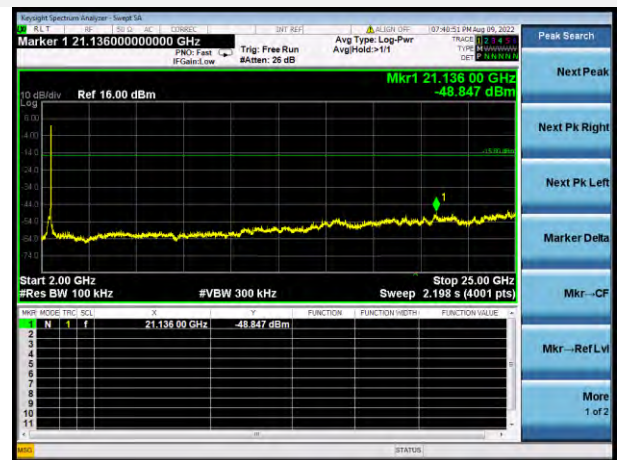
802.11n-20 MHz HIGH CHANNEL CARRIER LEVEL



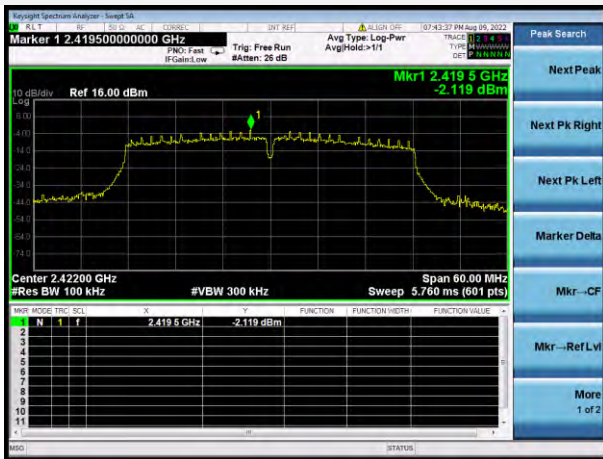
802.11n-20 MHz HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



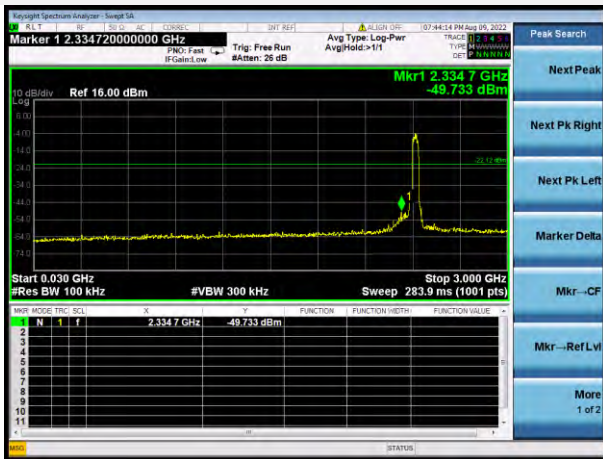
802.11n-20 MHz HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



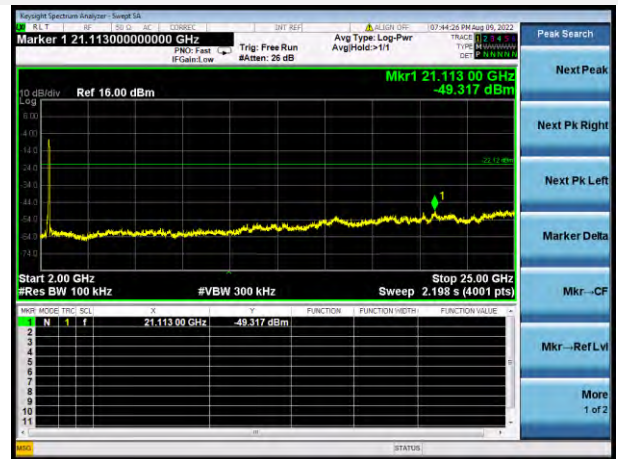
802.11n-40 MHz LOW CHANNEL CARRIER LEVEL



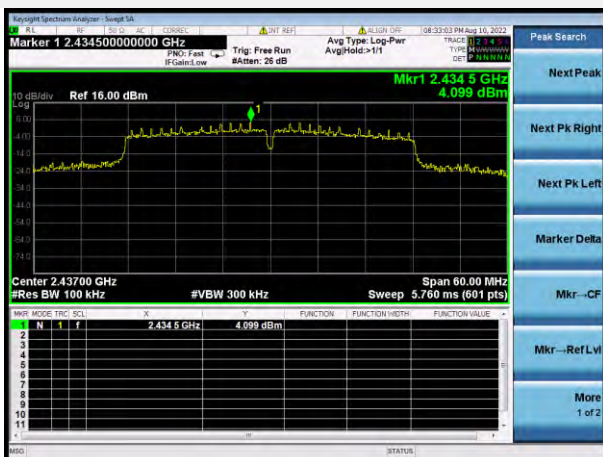
802.11n-40 MHz LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



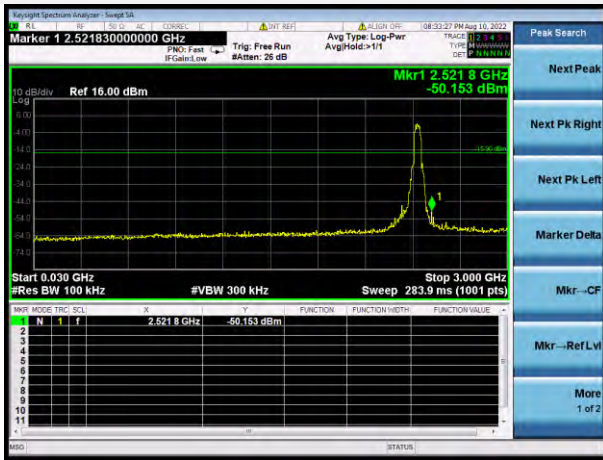
802.11n-40 MHz LOW CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



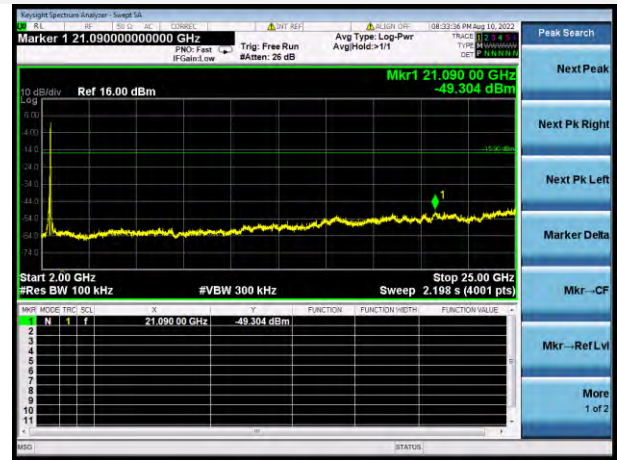
802.11n-40 MHz MIDDLE CHANNEL CARRIER LEVEL



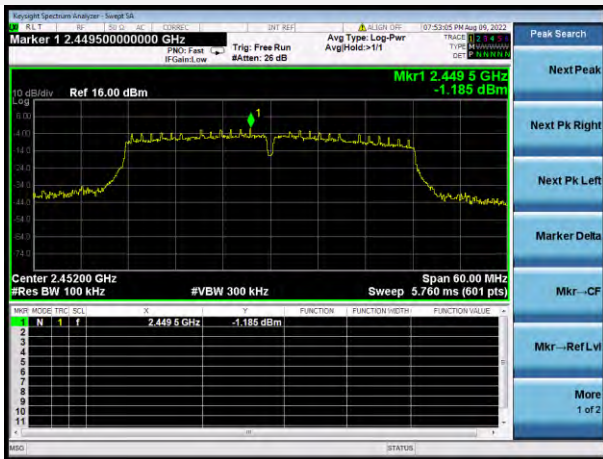
802.11n-40 MHz MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



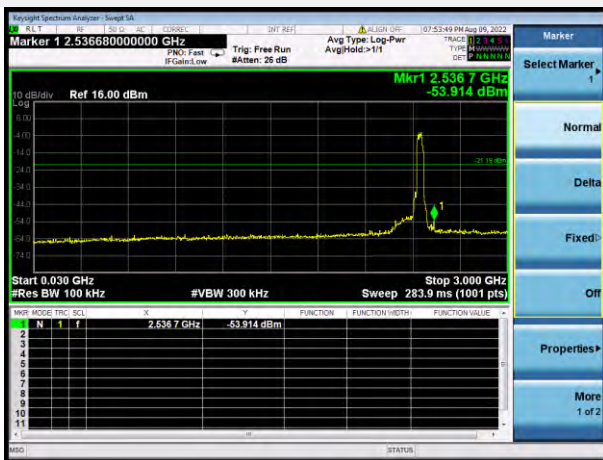
802.11n-40 MHz MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



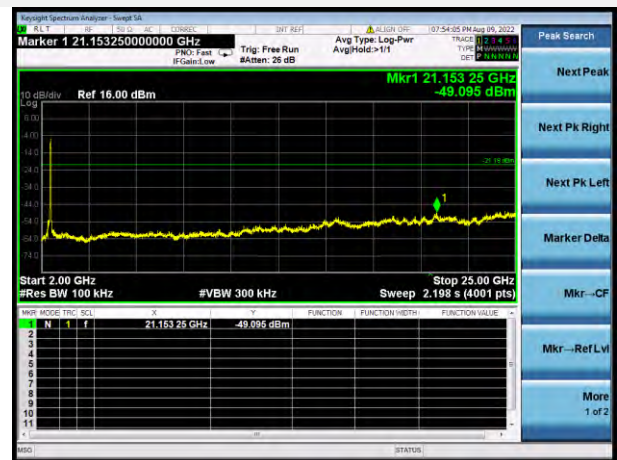
802.11n-40 MHz HIGH CHANNEL CARRIER LEVEL



802.11n-40 MHz HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



802.11n-40 MHz HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



A.4 Band Edge (Authorized-band band-edge)

Note1: The 99% OBW of the fundamental emission is without 2 MHz of the authorized band

Note2: All configurations are tested, only the worst configuration (tested with the highest antenna gain) is shown here..

Test Data

802.11b Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-32.62	3.81	-16.19	Pass
High Channel	-50.92	3.77	-16.23	Pass

802.11g Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-25.65	4.75	-15.25	Pass
High Channel	-42.54	5.69	-14.31	Pass

802.11n-20 MHz Mode:

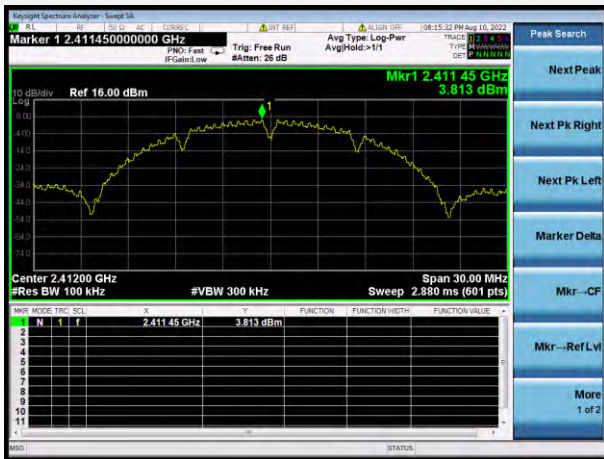
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-28.62	3.89	-16.11	Pass
High Channel	-42.60	4.20	-15.80	Pass

802.11n-40 MHz Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-37.01	-2.12	-22.12	Pass
High Channel	-43.62	-1.19	-21.19	Pass

Test Plots

802.11b LOW CHANNEL, CARRIER LEVEL



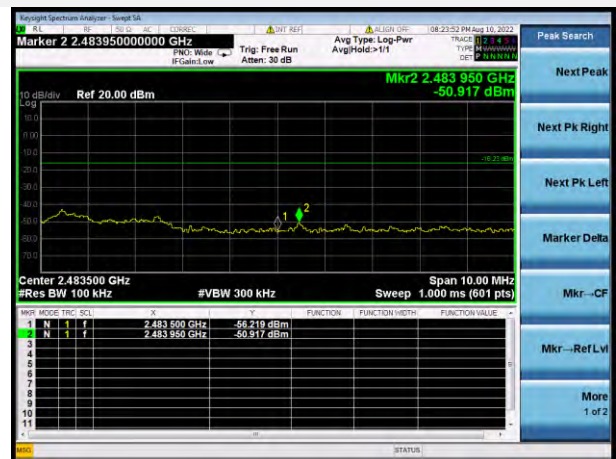
802.11b LOW CHANNEL, BAND EDGE



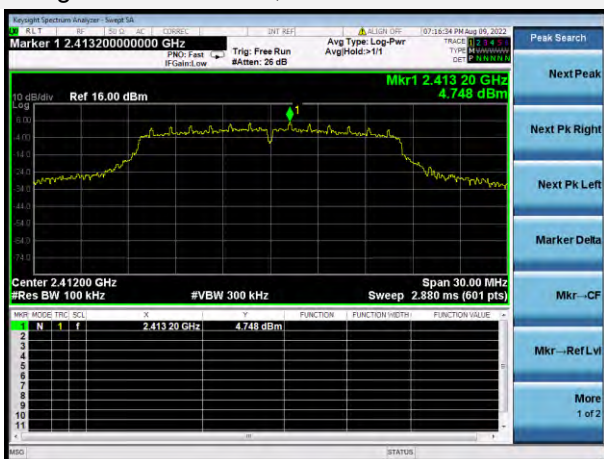
802.11 b HIGH CHANNEL, CARRIER LEVEL



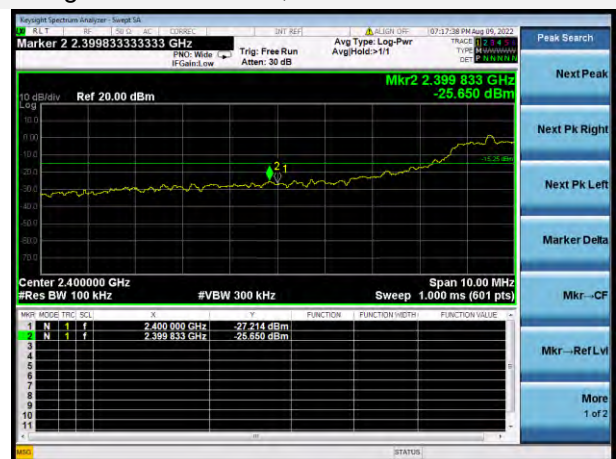
802.11b HIGH CHANNEL, BAND EDGE



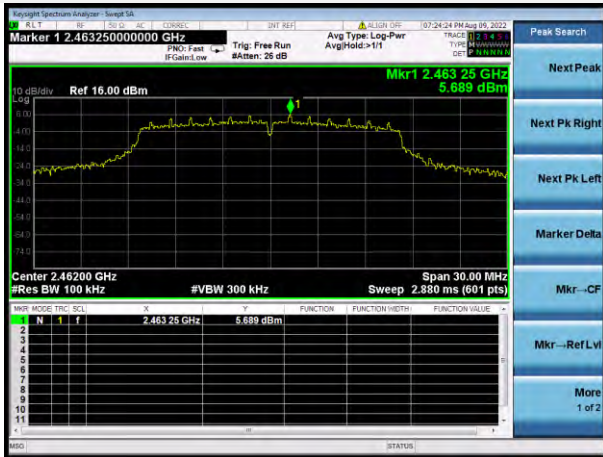
802.11g LOW CHANNEL, CARRIER LEVEL



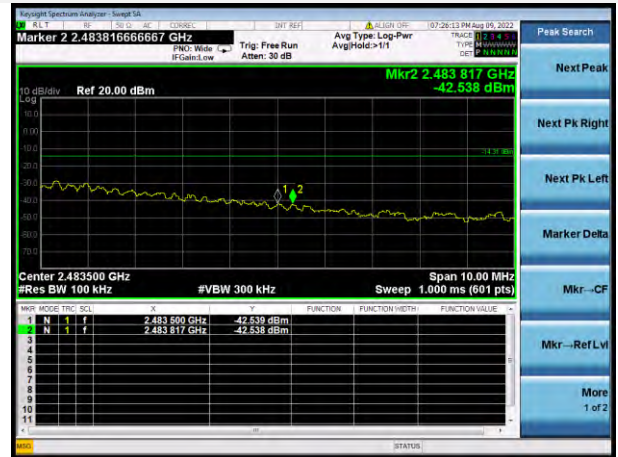
802.11g LOW CHANNEL, BAND EDGE



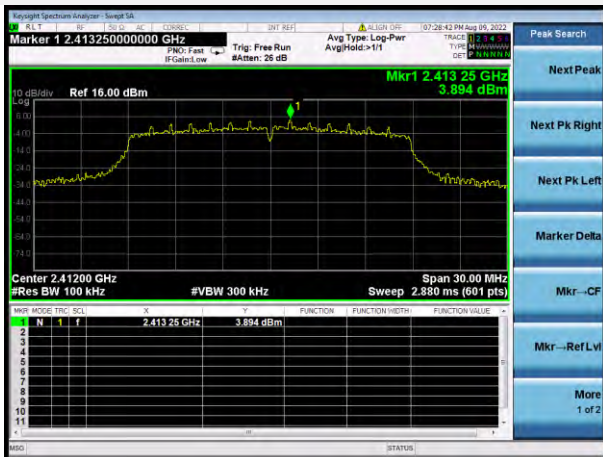
802.11g HIGH CHANNEL, CARRIER LEVEL



802.11g HIGH CHANNEL, BAND EDGE



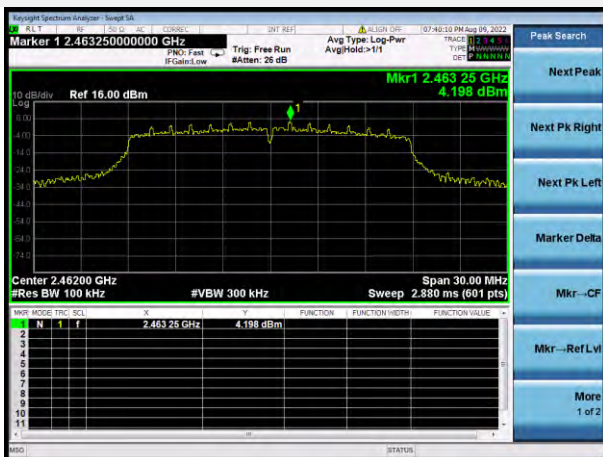
802.11n-20 MHz LOW CHANNEL, CARRIER LEVEL



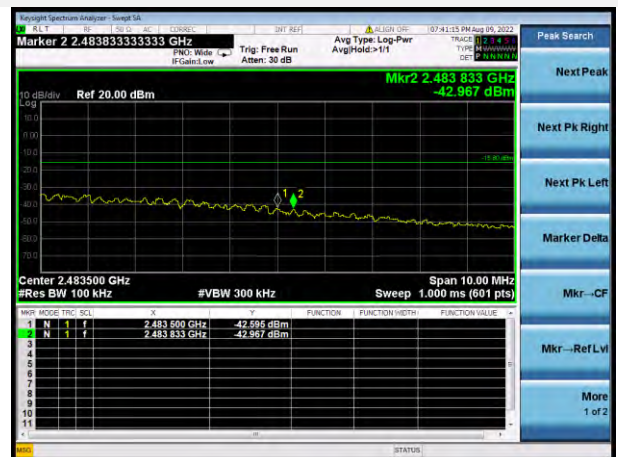
802.11n-20 MHz LOW CHANNEL, BAND EDGE



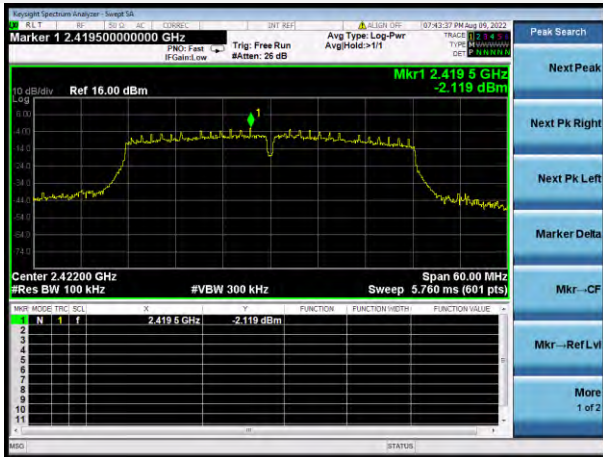
802.11n-20 MHz HIGH CHANNEL, CARRIER LEVEL



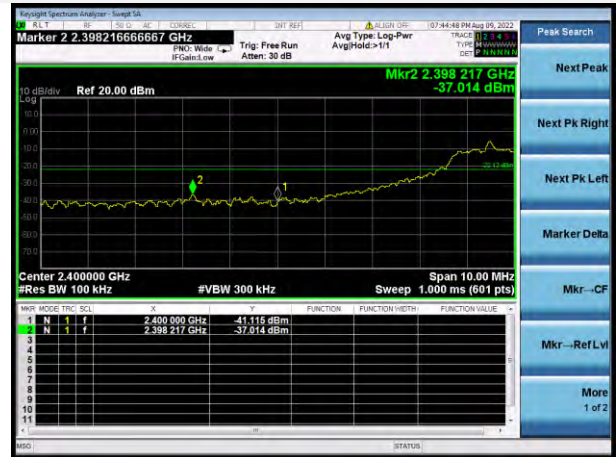
802.11n-20 MHz HIGH CHANNEL, BAND EDGE



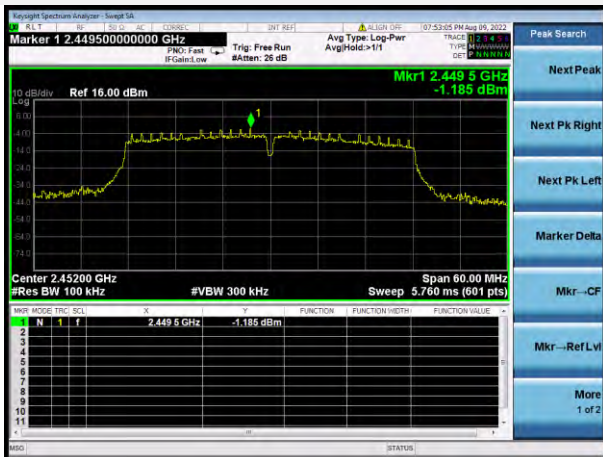
802.11n-40 MHz LOW CHANNEL, CARRIER LEVEL



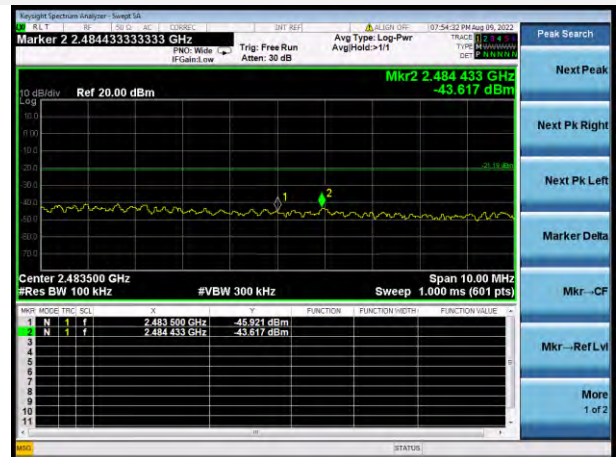
802.11n-40 MHz LOW CHANNEL, BAND EDGE



802.11n-40 MHz HIGH CHANNEL, CARRIER LEVEL



802.11n-40 MHz HIGH CHANNEL, BAND EDGE



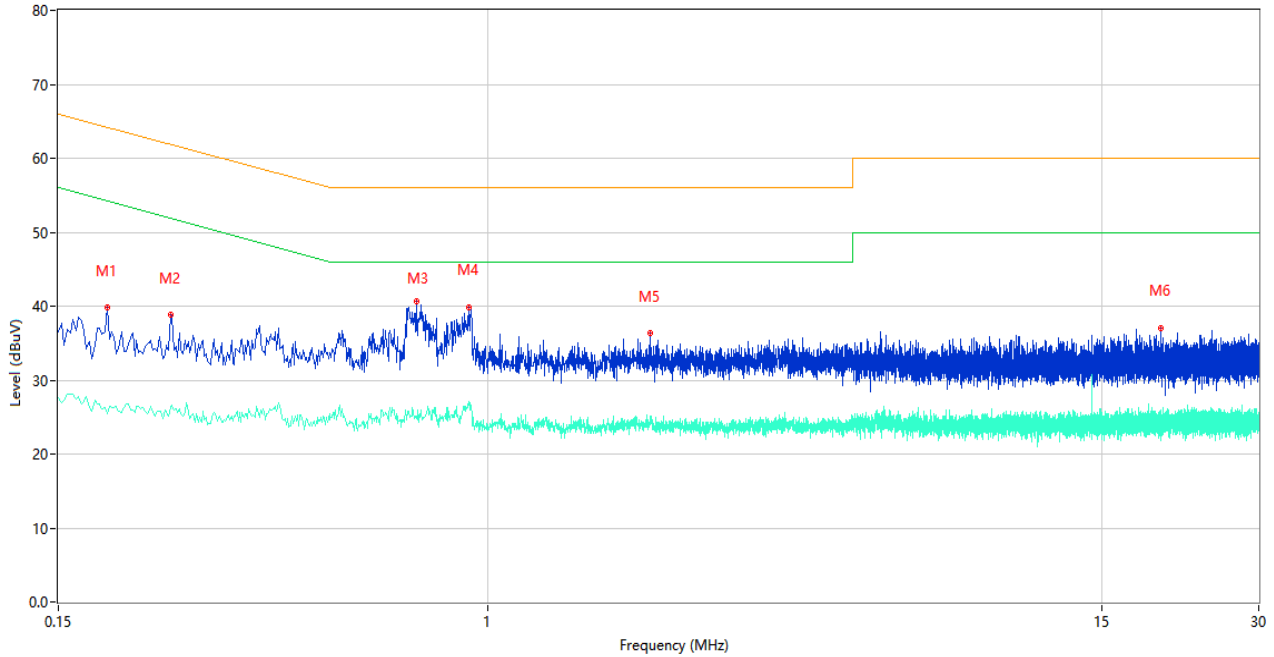
A.5 Conducted Emissions

Note 1: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

Test Data and Plots

PHASE L

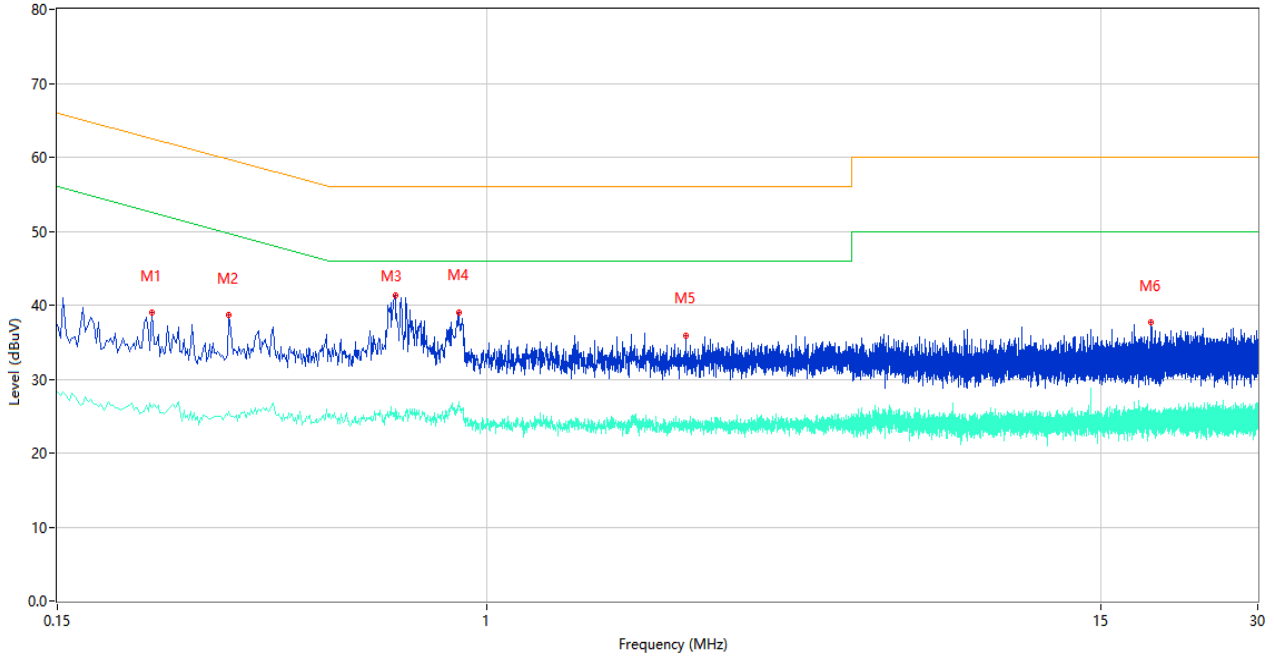
CE Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.186	39.77	10.06	64.21	-24.44	Peak	L	Pass
1**	0.186	25.47	10.06	54.21	-28.74	AV	L	Pass
2	0.246	38.76	10.02	61.89	-23.13	Peak	L	Pass
2**	0.246	26.22	10.02	51.89	-25.67	AV	L	Pass
3	0.728	40.68	10.54	56.00	-15.32	Peak	L	Pass
3**	0.728	25.17	10.54	46.00	-20.83	AV	L	Pass
4	0.918	39.89	10.26	56.00	-16.11	Peak	L	Pass
4**	0.918	26.80	10.26	46.00	-19.20	AV	L	Pass
5	2.044	36.30	10.56	56.00	-19.70	Peak	L	Pass
5**	2.044	25.04	10.56	46.00	-20.96	AV	L	Pass
6	19.496	37.04	10.28	60.00	-22.96	Peak	L	Pass
6**	19.496	24.92	10.28	50.00	-25.08	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.228	38.97	10.03	62.52	-23.55	Peak	N	Pass
1**	0.228	26.08	10.03	52.52	-26.44	AV	N	Pass
2	0.320	38.66	10.38	59.71	-21.05	Peak	N	Pass
2**	0.320	25.57	10.38	49.71	-24.14	AV	N	Pass
3	0.666	41.36	10.52	56.00	-14.64	Peak	N	Pass
3**	0.666	25.96	10.52	46.00	-20.04	AV	N	Pass
4	0.882	39.07	10.46	56.00	-16.93	Peak	N	Pass
4**	0.882	26.94	10.46	46.00	-19.06	AV	N	Pass
5	2.404	35.79	10.37	56.00	-20.21	Peak	N	Pass
5**	2.404	23.78	10.37	46.00	-22.22	AV	N	Pass
6	18.714	37.67	10.57	60.00	-22.33	Peak	N	Pass
6**	18.714	24.76	10.57	50.00	-25.24	AV	N	Pass

A.6 Radiated Emission

Note ¹: The symbol of "--" in the table which means not application.

Note ²: For the test data above 1 GHz, According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

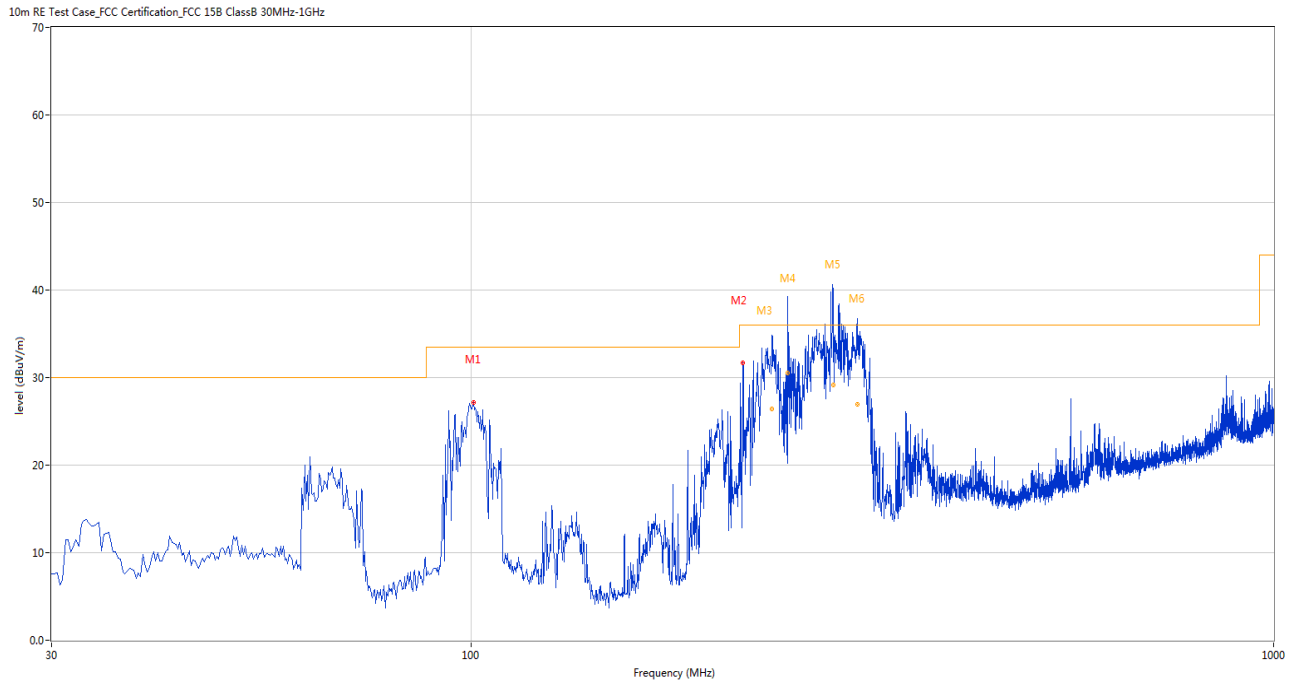
Note ³: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note ⁴: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and normal link mode is worst.

PCB Antenna 2

Test Data and Plots

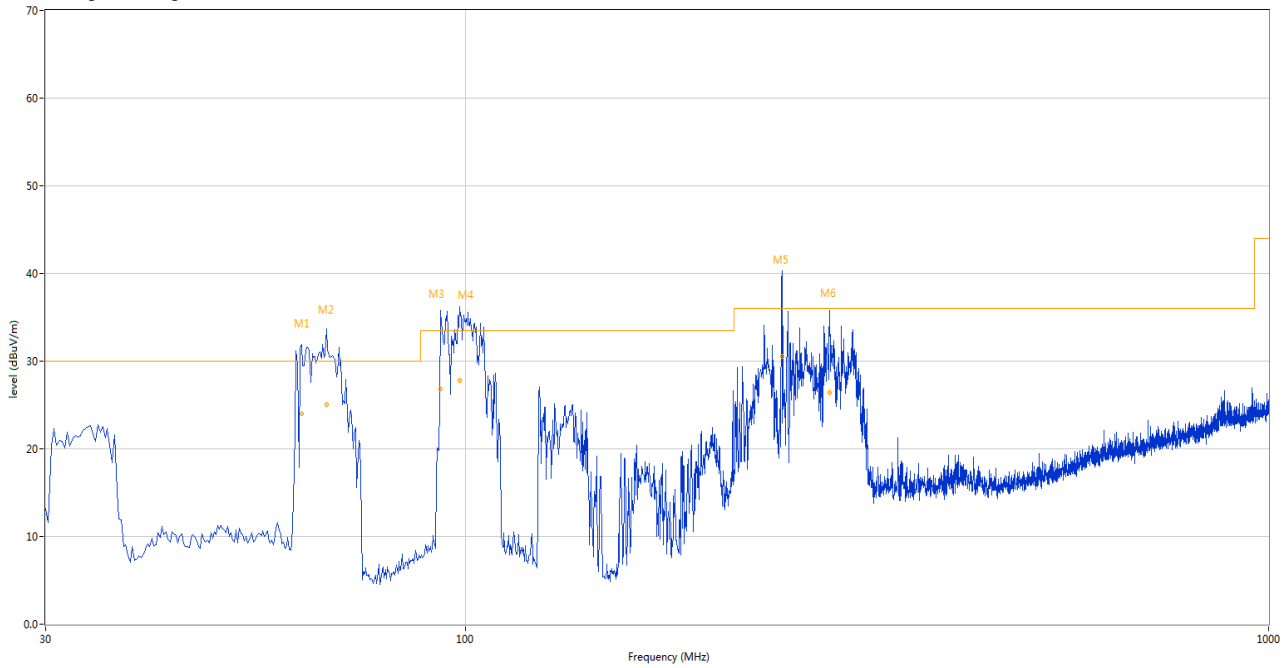
30 MHz to 1 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	100.792	27.20	-27.98	33.5	-6.30	Peak	73.00	200	Horizontal	Pass
2	218.133	31.69	-27.71	36.0	-4.31	Peak	260.00	200	Horizontal	Pass
3	237.043	34.83	-26.62	36.0	-1.17	Peak	250.00	200	Horizontal	N/A
3*	237.043	26.38	-26.62	36.0	-9.62	QP	250.00	200	Horizontal	Pass
4	247.711	39.29	-26.49	36.0	3.29	Peak	58.00	200	Horizontal	N/A
4*	247.711	30.51	-26.49	36.0	-5.49	QP	58.00	200	Horizontal	Pass
5	282.497	41.57	-25.72	36.0	5.57	Peak	99.00	188	Horizontal	N/A
5*	282.497	29.17	-25.72	36.0	-6.83	QP	99.00	188	Horizontal	Pass
6	302.744	36.70	-25.10	36.0	0.70	Peak	225.00	200	Horizontal	N/A
6*	302.744	26.90	-25.10	36.0	-9.10	QP	225.00	200	Horizontal	Pass

30 MHz to 1 GHz, ANT V

10m RE Test Case_FCC Certification_FCC 15B ClassB 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	62.487	31.87	-28.05	30.0	1.87	Peak	80.00	100	Vertical	N/A
1*	62.487	23.95	-28.05	30.0	-6.05	QP	80.00	100	Vertical	Pass
2	67.093	33.64	-28.90	30.0	3.64	Peak	110.00	100	Vertical	N/A
2*	67.093	25.10	-28.90	30.0	-4.90	QP	110.00	100	Vertical	Pass
3	93.034	35.81	-29.11	33.5	2.31	Peak	0.00	200	Vertical	N/A
3*	93.034	26.89	-29.11	33.5	-6.61	QP	0.00	200	Vertical	Pass
4	98.368	36.18	-28.16	33.5	2.68	Peak	65.00	100	Vertical	N/A
4*	98.368	27.84	-28.16	33.5	-5.66	QP	65.00	100	Vertical	Pass
5	247.711	40.27	-26.49	36.0	4.27	Peak	90.00	100	Vertical	N/A
5*	247.711	30.51	-26.49	36.0	-5.49	QP	90.00	100	Vertical	Pass
6	283.834	35.79	-25.57	36.0	-0.21	Peak	191.00	100	Vertical	N/A
6*	283.834	26.43	-25.57	36.0	-9.57	QP	191.00	100	Vertical	Pass

Note 1: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal.

Note 2: The spurious above 18G is noise only, do not show on the report.

PCB Antenna 1

1 GHz to 18 GHz, ANT H 802.11b Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1599.900	42.84	-17.75	74.0	-31.16	Peak	347.00	300	Horizontal	Pass
1**	1599.900	37.83	-17.75	54.0	-16.17	AV	347.00	300	Horizontal	Pass
2	2413.200	101.85	-13.42	74.0	27.85	Peak	158.00	150	Horizontal	N/A
2**	2413.200	98.96	-13.42	54.0	44.96	AV	158.00	150	Horizontal	N/A
3	4824.000	49.56	-3.03	74.0	-24.44	Peak	111.00	100	Horizontal	Pass
3**	4824.000	46.45	-3.03	54.0	-7.55	AV	111.00	100	Horizontal	Pass
4	7695.250	52.89	1.75	74.0	-21.11	Peak	181.00	200	Horizontal	Pass
4**	7695.250	43.73	1.75	54.0	-10.27	AV	181.00	200	Horizontal	Pass
5	12695.612	49.25	-2.33	74.0	-24.75	Peak	70.00	100	Horizontal	Pass
5**	12695.612	39.32	-2.33	54.0	-14.68	AV	70.00	100	Horizontal	Pass
6	17270.512	52.84	1.96	74.0	-21.16	Peak	176.00	400	Horizontal	Pass
6**	17270.512	44.17	1.96	54.0	-9.83	AV	176.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11b Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1331.300	43.77	-17.46	74.0	-30.23	Peak	351.00	100	Vertical	Pass
1**	1331.300	35.88	-17.46	54.0	-18.12	AV	351.00	100	Vertical	Pass
2	2410.700	104.44	-13.48	74.0	30.44	Peak	236.00	100	Vertical	N/A
2**	2410.700	101.56	-13.48	54.0	47.56	AV	236.00	100	Vertical	N/A
3	4824.250	49.65	-3.03	74.0	-24.35	Peak	57.00	300	Vertical	Pass
3**	4824.250	47.93	-3.03	54.0	-6.07	AV	57.00	300	Vertical	Pass
4	7234.750	53.69	-0.99	74.0	-20.31	Peak	24.00	200	Vertical	Pass
4**	7234.750	47.08	-0.99	54.0	-6.92	AV	24.00	200	Vertical	Pass
5	12678.038	49.54	-2.32	74.0	-24.46	Peak	19.00	200	Vertical	Pass
5**	12678.038	40.21	-2.32	54.0	-13.79	AV	19.00	200	Vertical	Pass
6	16810.875	52.88	0.57	74.0	-21.12	Peak	10.00	400	Vertical	Pass
6**	16810.875	43.41	0.57	54.0	-10.59	AV	10.00	400	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11b Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	43.01	-17.70	74.0	-30.99	Peak	353.00	200	Horizontal	Pass
1**	1535.700	38.56	-17.70	54.0	-15.44	AV	353.00	200	Horizontal	Pass
2	2435.700	103.93	-12.12	74.0	29.93	Peak	160.00	200	Horizontal	N/A
2**	2435.700	101.04	-12.12	54.0	47.04	AV	160.00	200	Horizontal	N/A
3	4874.000	49.62	-3.66	74.0	-24.38	Peak	108.00	100	Horizontal	Pass
3**	4874.000	46.52	-3.66	54.0	-7.48	AV	108.00	100	Horizontal	Pass
4	7832.000	52.93	2.18	74.0	-21.07	Peak	328.00	300	Horizontal	Pass
4**	7832.000	44.82	2.18	54.0	-9.18	AV	328.00	300	Horizontal	Pass
5	12447.425	48.93	-2.19	74.0	-25.07	Peak	68.00	300	Horizontal	Pass
5**	12447.425	39.51	-2.19	54.0	-14.49	AV	68.00	300	Horizontal	Pass
6	17487.073	53.14	3.08	74.0	-20.86	Peak	188.00	200	Horizontal	Pass
6**	17487.073	44.06	3.08	54.0	-9.94	AV	188.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11b Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1536.000	42.55	-17.70	74.0	-31.45	Peak	192.00	200	Vertical	Pass
1**	1536.000	37.62	-17.70	54.0	-16.38	AV	192.00	200	Vertical	Pass
2	2435.600	105.39	-12.11	74.0	31.39	Peak	229.00	150	Vertical	N/A
2**	2435.600	102.59	-12.11	54.0	48.59	AV	229.00	150	Vertical	N/A
3	4874.250	52.01	-3.64	74.0	-21.99	Peak	225.00	200	Vertical	Pass
3**	4874.250	49.47	-3.64	54.0	-4.53	AV	225.00	200	Vertical	Pass
4	7514.500	52.95	0.79	74.0	-21.05	Peak	52.00	100	Vertical	Pass
4**	7514.500	43.62	0.79	54.0	-10.38	AV	52.00	100	Vertical	Pass
5	12684.450	48.88	-2.32	74.0	-25.12	Peak	202.00	200	Vertical	Pass
5**	12684.450	40.46	-2.32	54.0	-13.54	AV	202.00	200	Vertical	Pass
6	17281.538	53.15	1.98	74.0	-20.85	Peak	116.00	300	Vertical	Pass
6**	17281.538	43.76	1.98	54.0	-10.24	AV	116.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11b High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1599.800	42.62	-17.74	74.0	-31.38	Peak	239.00	100	Horizontal	Pass
1**	1599.800	37.43	-17.74	54.0	-16.57	AV	239.00	100	Horizontal	Pass
2	2460.700	102.89	-12.62	74.0	28.89	Peak	59.00	200	Horizontal	N/A
2**	2460.700	99.97	-12.62	54.0	45.97	AV	59.00	200	Horizontal	N/A
3	4923.750	49.77	-3.72	74.0	-24.23	Peak	59.00	400	Horizontal	Pass
3**	4923.750	43.19	-3.72	54.0	-10.81	AV	59.00	400	Horizontal	Pass
4	7510.750	53.25	0.52	74.0	-20.75	Peak	34.00	100	Horizontal	Pass
4**	7510.750	44.36	0.52	54.0	-9.64	AV	34.00	100	Horizontal	Pass
5	12638.137	49.28	-2.37	74.0	-24.72	Peak	212.00	300	Horizontal	Pass
5**	12638.137	39.20	-2.37	54.0	-14.80	AV	212.00	300	Horizontal	Pass
6	17137.688	53.14	1.55	74.0	-20.86	Peak	170.00	400	Horizontal	Pass
6**	17137.688	42.72	1.55	54.0	-11.28	AV	170.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11b High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1599.800	43.32	-17.74	74.0	-30.68	Peak	189.00	400	Vertical	Pass
1**	1599.800	37.80	-17.74	54.0	-16.20	AV	189.00	400	Vertical	Pass
2	2460.800	104.47	-12.61	74.0	30.47	Peak	231.00	100	Vertical	N/A
2**	2460.800	101.58	-12.61	54.0	47.58	AV	231.00	100	Vertical	N/A
3	4924.000	52.11	-3.73	74.0	-21.89	Peak	225.00	300	Vertical	Pass
3**	4924.000	49.75	-3.73	54.0	-4.25	AV	225.00	300	Vertical	Pass
4	7813.500	53.33	0.98	74.0	-20.67	Peak	284.00	200	Vertical	Pass
4**	7813.500	44.26	0.98	54.0	-9.74	AV	284.00	200	Vertical	Pass
5	12863.662	49.06	-2.04	74.0	-24.94	Peak	206.00	100	Vertical	Pass
5**	12863.662	39.23	-2.04	54.0	-14.77	AV	206.00	100	Vertical	Pass
6	16807.463	53.25	0.53	74.0	-20.75	Peak	308.00	200	Vertical	Pass
6**	16807.463	43.29	0.53	54.0	-10.71	AV	308.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11g Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1599.900	42.86	-17.75	74.0	-31.14	Peak	342.00	300	Horizontal	Pass
1**	1599.900	37.95	-17.75	54.0	-16.05	AV	342.00	300	Horizontal	Pass
2	2407.400	104.25	-13.42	74.0	30.25	Peak	58.00	150	Horizontal	N/A
2**	2407.400	95.26	-13.42	54.0	41.26	AV	58.00	150	Horizontal	N/A
3	5177.000	49.79	-2.56	74.0	-24.21	Peak	25.00	100	Horizontal	Pass
3**	5177.000	41.94	-2.56	54.0	-12.06	AV	25.00	100	Horizontal	Pass
4	7832.250	52.95	2.21	74.0	-21.05	Peak	15.00	200	Horizontal	Pass
4**	7832.250	44.03	2.21	54.0	-9.97	AV	15.00	200	Horizontal	Pass
5	12667.825	49.63	-2.31	74.0	-24.37	Peak	296.00	300	Horizontal	Pass
5**	12667.825	39.85	-2.31	54.0	-14.15	AV	296.00	300	Horizontal	Pass
6	17313.036	53.24	1.98	74.0	-20.76	Peak	88.00	200	Horizontal	Pass
6**	17313.036	44.62	1.98	54.0	-9.38	AV	88.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11g Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1329.300	43.62	-17.22	74.0	-30.38	Peak	237.00	300	Vertical	Pass
1**	1329.300	34.75	-17.22	54.0	-19.25	AV	237.00	300	Vertical	Pass
2	2410.900	107.15	-13.47	74.0	33.15	Peak	237.00	150	Vertical	N/A
2**	2410.900	99.72	-13.47	54.0	45.72	AV	237.00	150	Vertical	N/A
3	4826.500	50.32	-3.03	74.0	-23.68	Peak	59.00	100	Vertical	Pass
3**	4826.500	41.09	-3.03	54.0	-12.91	AV	59.00	100	Vertical	Pass
4	7233.500	53.89	-0.83	74.0	-20.11	Peak	23.00	400	Vertical	Pass
4**	7233.500	44.04	-0.83	54.0	-9.96	AV	23.00	400	Vertical	Pass
5	12681.362	49.74	-2.32	74.0	-24.26	Peak	0.00	100	Vertical	Pass
5**	12681.362	39.87	-2.32	54.0	-14.13	AV	0.00	100	Vertical	Pass
6	17291.250	53.17	2.00	74.0	-20.83	Peak	234.00	100	Vertical	Pass
6**	17291.250	44.77	2.00	54.0	-9.23	AV	234.00	100	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11g Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	42.66	-17.70	74.0	-31.34	Peak	102.00	300	Horizontal	Pass
1**	1535.700	37.93	-17.70	54.0	-16.07	AV	102.00	300	Horizontal	Pass
2	2435.300	106.27	-12.06	74.0	32.27	Peak	155.00	100	Horizontal	N/A
2**	2435.300	99.14	-12.06	54.0	45.14	AV	155.00	100	Horizontal	N/A
3	5184.500	50.27	-2.27	74.0	-23.73	Peak	250.00	200	Horizontal	Pass
3**	5184.500	41.73	-2.27	54.0	-12.27	AV	250.00	200	Horizontal	Pass
4	7824.250	53.53	2.00	74.0	-20.47	Peak	172.00	100	Horizontal	Pass
4**	7824.250	43.23	2.00	54.0	-10.77	AV	172.00	100	Horizontal	Pass
5	12689.912	49.33	-2.33	74.0	-24.67	Peak	237.00	300	Horizontal	Pass
5**	12689.912	40.47	-2.33	54.0	-13.53	AV	237.00	300	Horizontal	Pass
6	16782.525	52.75	0.43	74.0	-21.25	Peak	160.00	300	Horizontal	Pass
6**	16782.525	43.74	0.43	54.0	-10.26	AV	160.00	300	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11g Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1599.800	42.70	-17.74	74.0	-31.30	Peak	6.00	300	Vertical	Pass
1**	1599.800	37.26	-17.74	54.0	-16.74	AV	6.00	300	Vertical	Pass
2	2438.100	106.83	-12.39	74.0	32.83	Peak	229.00	100	Vertical	N/A
2**	2438.100	100.04	-12.39	54.0	46.04	AV	229.00	100	Vertical	N/A
3	5324.750	56.52	-3.32	74.0	-17.48	Peak	317.00	100	Vertical	Pass
3**	5324.750	41.14	-3.32	54.0	-12.86	AV	317.00	100	Vertical	Pass
4	7839.750	52.39	1.91	74.0	-21.61	Peak	42.00	200	Vertical	Pass
4**	7839.750	43.69	1.91	54.0	-10.31	AV	42.00	200	Vertical	Pass
5	11384.375	48.94	-4.30	74.0	-25.06	Peak	345.00	300	Vertical	Pass
5**	11384.375	38.74	-4.30	54.0	-15.26	AV	345.00	300	Vertical	Pass
6	16903.801	52.88	1.45	74.0	-21.12	Peak	44.00	300	Vertical	Pass
6**	16903.801	43.91	1.45	54.0	-10.09	AV	44.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11g High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	42.98	-17.70	74.0	-31.02	Peak	0.00	100	Horizontal	Pass
1**	1535.700	38.03	-17.70	54.0	-15.97	AV	0.00	100	Horizontal	Pass
2	2463.000	105.27	-12.66	74.0	31.27	Peak	60.00	100	Horizontal	N/A
2**	2463.000	97.58	-12.66	54.0	43.58	AV	60.00	100	Horizontal	N/A
3	5210.000	49.95	-3.37	74.0	-24.05	Peak	189.00	200	Horizontal	Pass
3**	5210.000	40.98	-3.37	54.0	-13.02	AV	189.00	200	Horizontal	Pass
4	7823.250	53.53	1.80	74.0	-20.47	Peak	309.00	100	Horizontal	Pass
4**	7823.250	43.37	1.80	54.0	-10.63	AV	309.00	100	Horizontal	Pass
5	12427.237	49.22	-2.50	74.0	-24.78	Peak	360.00	100	Horizontal	Pass
5**	12427.237	40.33	-2.50	54.0	-13.67	AV	360.00	100	Horizontal	Pass
6	16901.963	53.15	1.48	74.0	-20.85	Peak	146.00	400	Horizontal	Pass
6**	16901.963	43.52	1.48	54.0	-10.48	AV	146.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11g High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.500	43.72	-17.69	74.0	-30.28	Peak	146.00	200	Vertical	Pass
1**	1535.500	37.37	-17.69	54.0	-16.63	AV	146.00	200	Vertical	Pass
2	2457.300	106.75	-12.66	74.0	32.75	Peak	236.00	200	Vertical	N/A
2**	2457.300	97.99	-12.66	54.0	43.99	AV	236.00	200	Vertical	N/A
3	5315.000	51.06	-3.54	74.0	-22.94	Peak	310.00	100	Vertical	Pass
3**	5315.000	40.93	-3.54	54.0	-13.07	AV	310.00	100	Vertical	Pass
4	7830.750	52.67	2.00	74.0	-21.33	Peak	60.00	200	Vertical	Pass
4**	7830.750	43.98	2.00	54.0	-10.02	AV	60.00	200	Vertical	Pass
5	12662.600	49.16	-2.31	74.0	-24.84	Peak	308.00	300	Vertical	Pass
5**	12662.600	39.99	-2.31	54.0	-14.01	AV	308.00	300	Vertical	Pass
6	17281.276	53.28	1.98	74.0	-20.72	Peak	174.00	200	Vertical	Pass
6**	17281.276	44.04	1.98	54.0	-9.96	AV	174.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n20 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.900	43.39	-17.70	74.0	-30.61	Peak	0.00	100	Horizontal	Pass
1**	1535.900	38.17	-17.70	54.0	-15.83	AV	0.00	100	Horizontal	Pass
2	2410.700	103.97	-13.48	74.0	29.97	Peak	53.00	200	Horizontal	N/A
2**	2410.700	97.17	-13.48	54.0	43.17	AV	53.00	200	Horizontal	N/A
3	5182.250	49.88	-2.11	74.0	-24.12	Peak	100.00	300	Horizontal	Pass
3**	5182.250	41.93	-2.11	54.0	-12.07	AV	100.00	300	Horizontal	Pass
4	7850.750	52.96	1.10	74.0	-21.04	Peak	281.00	100	Horizontal	Pass
4**	7850.750	43.39	1.10	54.0	-10.61	AV	281.00	100	Horizontal	Pass
5	12680.412	49.74	-2.32	74.0	-24.26	Peak	99.00	300	Horizontal	Pass
5**	12680.412	40.77	-2.32	54.0	-13.23	AV	99.00	300	Horizontal	Pass
6	16824.262	52.65	0.75	74.0	-21.35	Peak	0.00	200	Horizontal	Pass
6**	16824.262	43.40	0.75	54.0	-10.60	AV	0.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n20 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.800	43.75	-17.70	74.0	-30.25	Peak	144.00	100	Vertical	Pass
1**	1535.800	37.78	-17.70	54.0	-16.22	AV	144.00	100	Vertical	Pass
2	2408.200	106.49	-13.50	74.0	32.49	Peak	234.00	100	Vertical	N/A
2**	2408.200	98.53	-13.50	54.0	44.53	AV	234.00	100	Vertical	N/A
3	5188.000	50.38	-2.53	74.0	-23.62	Peak	272.00	300	Vertical	Pass
3**	5188.000	42.24	-2.53	54.0	-11.76	AV	272.00	300	Vertical	Pass
4	7232.750	55.83	-0.98	74.0	-18.17	Peak	32.00	100	Vertical	Pass
4**	7232.750	43.68	-0.98	54.0	-10.32	AV	32.00	100	Vertical	Pass
5	12694.662	49.04	-2.33	74.0	-24.96	Peak	0.00	400	Vertical	Pass
5**	12694.662	39.66	-2.33	54.0	-14.34	AV	0.00	400	Vertical	Pass
6	16815.600	52.81	0.63	74.0	-21.19	Peak	0.00	200	Vertical	Pass
6**	16815.600	42.75	0.63	54.0	-11.25	AV	0.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n20 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.800	43.25	-17.70	74.0	-30.75	Peak	0.00	200	Horizontal	Pass
1**	1535.800	38.62	-17.70	54.0	-15.38	AV	0.00	200	Horizontal	Pass
2	2433.800	106.10	-12.19	74.0	32.10	Peak	154.00	200	Horizontal	N/A
2**	2433.800	98.30	-12.19	54.0	44.30	AV	154.00	200	Horizontal	N/A
3	4454.250	49.91	-4.18	74.0	-24.09	Peak	360.00	100	Horizontal	Pass
3**	4454.250	40.39	-4.18	54.0	-13.61	AV	360.00	100	Horizontal	Pass
4	7509.500	53.34	0.53	74.0	-20.66	Peak	278.00	100	Horizontal	Pass
4**	7509.500	43.91	0.53	54.0	-10.09	AV	278.00	100	Horizontal	Pass
5	12624.838	49.03	-2.46	74.0	-24.97	Peak	316.00	300	Horizontal	Pass
5**	12624.838	39.77	-2.46	54.0	-14.23	AV	316.00	300	Horizontal	Pass
6	17278.913	52.50	1.98	74.0	-21.50	Peak	260.00	200	Horizontal	Pass
6**	17278.913	43.30	1.98	54.0	-10.70	AV	260.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n20 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1599.900	43.02	-17.75	74.0	-30.98	Peak	193.00	400	Vertical	Pass
1**	1599.900	38.38	-17.75	54.0	-15.62	AV	193.00	400	Vertical	Pass
2	2435.100	107.23	-12.08	74.0	33.23	Peak	225.00	200	Vertical	N/A
2**	2435.100	100.31	-12.08	54.0	46.31	AV	225.00	200	Vertical	N/A
3	5192.250	50.44	-2.78	74.0	-23.56	Peak	60.00	100	Vertical	Pass
3**	5192.250	41.18	-2.78	54.0	-12.82	AV	60.00	100	Vertical	Pass
4	7310.500	53.55	-1.09	74.0	-20.45	Peak	95.00	100	Vertical	Pass
4**	7310.500	42.92	-1.09	54.0	-11.08	AV	95.00	100	Vertical	Pass
5	11795.250	50.01	-3.58	74.0	-23.99	Peak	60.00	300	Vertical	Pass
5**	11795.250	40.26	-3.58	54.0	-13.74	AV	60.00	300	Vertical	Pass
6	17295.188	52.89	2.01	74.0	-21.11	Peak	304.00	200	Vertical	Pass
6**	17295.188	43.94	2.01	54.0	-10.06	AV	304.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n20 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1505.000	42.95	-17.42	74.0	-31.05	Peak	65.00	300	Horizontal	Pass
1**	1505.000	32.59	-17.42	54.0	-21.41	AV	65.00	300	Horizontal	Pass
2	2463.100	104.28	-12.67	74.0	30.28	Peak	45.00	100	Horizontal	N/A
2**	2463.100	97.13	-12.67	54.0	43.13	AV	45.00	100	Horizontal	N/A
3	5183.000	50.48	-2.08	74.0	-23.52	Peak	293.00	100	Horizontal	Pass
3**	5183.000	42.60	-2.08	54.0	-11.40	AV	293.00	100	Horizontal	Pass
4	7833.500	52.97	2.26	74.0	-21.03	Peak	232.00	400	Horizontal	Pass
4**	7833.500	44.15	2.26	54.0	-9.85	AV	232.00	400	Horizontal	Pass
5	11809.025	48.93	-3.48	74.0	-25.07	Peak	208.00	200	Horizontal	Pass
5**	11809.025	39.15	-3.48	54.0	-14.85	AV	208.00	200	Horizontal	Pass
6	17292.562	53.77	2.00	74.0	-20.23	Peak	0.00	400	Horizontal	Pass
6**	17292.562	44.02	2.00	54.0	-9.98	AV	0.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n20 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1327.400	43.74	-17.22	74.0	-30.26	Peak	347.00	300	Vertical	Pass
1**	1327.400	32.74	-17.22	54.0	-21.26	AV	347.00	300	Vertical	Pass
2	2460.200	105.69	-12.63	74.0	31.69	Peak	227.00	150	Vertical	N/A
2**	2460.200	97.30	-12.63	54.0	43.30	AV	227.00	150	Vertical	N/A
3	4455.000	49.66	-4.26	74.0	-24.34	Peak	276.00	100	Vertical	Pass
3**	4455.000	44.07	-4.26	54.0	-9.93	AV	276.00	100	Vertical	Pass
4	7510.500	53.87	0.53	74.0	-20.13	Peak	242.00	100	Vertical	Pass
4**	7510.500	44.38	0.53	54.0	-9.62	AV	242.00	100	Vertical	Pass
5	11784.325	49.16	-3.67	74.0	-24.84	Peak	84.00	300	Vertical	Pass
5**	11784.325	39.19	-3.67	54.0	-14.81	AV	84.00	300	Vertical	Pass
6	16521.600	52.92	0.01	74.0	-21.08	Peak	230.00	200	Vertical	Pass
6**	16521.600	43.36	0.01	54.0	-10.64	AV	230.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n40 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.500	43.26	-17.69	74.0	-30.74	Peak	0.00	400	Horizontal	Pass
1**	1535.500	38.47	-17.69	54.0	-15.53	AV	0.00	400	Horizontal	Pass
2	2424.800	102.57	-12.82	74.0	28.57	Peak	154.00	100	Horizontal	N/A
2**	2424.800	95.23	-12.82	54.0	41.23	AV	154.00	100	Horizontal	N/A
3	4454.750	49.77	-4.23	74.0	-24.23	Peak	360.00	200	Horizontal	Pass
3**	4454.750	44.31	-4.23	54.0	-9.69	AV	360.00	200	Horizontal	Pass
4	7863.250	52.93	1.45	74.0	-21.07	Peak	190.00	400	Horizontal	Pass
4**	7863.250	43.75	1.45	54.0	-10.25	AV	190.00	400	Horizontal	Pass
5	12687.537	49.34	-2.33	74.0	-24.66	Peak	145.00	100	Horizontal	Pass
5**	12687.537	40.00	-2.33	54.0	-14.00	AV	145.00	100	Horizontal	Pass
6	17322.750	53.17	1.95	74.0	-20.83	Peak	187.00	200	Horizontal	Pass
6**	17322.750	43.79	1.95	54.0	-10.21	AV	187.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n40 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	42.92	-17.69	74.0	-31.08	Peak	144.00	200	Vertical	Pass
1**	1535.600	37.79	-17.69	54.0	-16.21	AV	144.00	200	Vertical	Pass
2	2424.100	104.64	-12.82	74.0	30.64	Peak	225.00	100	Vertical	N/A
2**	2424.100	96.20	-12.82	54.0	42.20	AV	225.00	100	Vertical	N/A
3	5180.000	50.65	-2.21	74.0	-23.35	Peak	222.00	200	Vertical	Pass
3**	5180.000	40.95	-2.21	54.0	-13.05	AV	222.00	200	Vertical	Pass
4	7252.750	53.54	-0.54	74.0	-20.46	Peak	45.00	400	Vertical	Pass
4**	7252.750	42.60	-0.54	54.0	-11.40	AV	45.00	400	Vertical	Pass
5	11553.000	49.66	-4.36	74.0	-24.34	Peak	353.00	100	Vertical	Pass
5**	11553.000	39.89	-4.36	54.0	-14.11	AV	353.00	100	Vertical	Pass
6	16877.813	53.17	1.32	74.0	-20.83	Peak	41.00	300	Vertical	Pass
6**	16877.813	43.11	1.32	54.0	-10.89	AV	41.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n40 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1599.700	42.70	-17.72	74.0	-31.30	Peak	310.00	400	Horizontal	Pass
1**	1599.700	34.82	-17.72	54.0	-19.18	AV	310.00	400	Horizontal	Pass
2	2435.500	104.35	-12.09	74.0	30.35	Peak	151.00	100	Horizontal	N/A
2**	2435.500	96.75	-12.09	54.0	42.75	AV	151.00	100	Horizontal	N/A
3	5177.750	50.05	-2.42	74.0	-23.95	Peak	305.00	200	Horizontal	Pass
3**	5177.750	41.24	-2.42	54.0	-12.76	AV	305.00	200	Horizontal	Pass
4	7510.000	52.61	0.55	74.0	-21.39	Peak	55.00	400	Horizontal	Pass
4**	7510.000	43.44	0.55	54.0	-10.56	AV	55.00	400	Horizontal	Pass
5	12681.600	49.54	-2.32	74.0	-24.46	Peak	337.00	100	Horizontal	Pass
5**	12681.600	40.19	-2.32	54.0	-13.81	AV	337.00	100	Horizontal	Pass
6	17375.775	52.89	2.34	74.0	-21.11	Peak	142.00	400	Horizontal	Pass
6**	17375.775	43.48	2.34	54.0	-10.52	AV	142.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n40 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	43.14	-17.70	74.0	-30.86	Peak	143.00	200	Vertical	Pass
1**	1535.700	38.73	-17.70	54.0	-15.27	AV	143.00	200	Vertical	Pass
2	2435.500	104.58	-12.09	74.0	30.58	Peak	221.00	200	Vertical	N/A
2**	2435.500	97.00	-12.09	54.0	43.00	AV	221.00	200	Vertical	N/A
3	5333.250	53.03	-3.54	74.0	-20.97	Peak	93.00	300	Vertical	Pass
3**	5333.250	40.61	-3.54	54.0	-13.39	AV	93.00	300	Vertical	Pass
4	7836.750	52.71	2.09	74.0	-21.29	Peak	33.00	200	Vertical	Pass
4**	7836.750	43.81	2.09	54.0	-10.19	AV	33.00	200	Vertical	Pass
5	12929.287	49.56	-1.75	74.0	-24.44	Peak	186.00	100	Vertical	Pass
5**	12929.287	39.48	-1.75	54.0	-14.52	AV	186.00	100	Vertical	Pass
6	17055.000	52.86	0.96	74.0	-21.14	Peak	0.00	200	Vertical	Pass
6**	17055.000	42.92	0.96	54.0	-11.08	AV	0.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n40 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	43.41	-17.69	74.0	-30.59	Peak	0.00	300	Horizontal	Pass
1**	1535.600	38.10	-17.69	54.0	-15.90	AV	0.00	300	Horizontal	Pass
2	2450.300	102.89	-12.73	74.0	28.89	Peak	56.00	100	Horizontal	N/A
2**	2450.300	95.10	-12.73	54.0	41.10	AV	56.00	100	Horizontal	N/A
3	5185.250	50.30	-2.35	74.0	-23.70	Peak	9.00	200	Horizontal	Pass
3**	5185.250	41.07	-2.35	54.0	-12.93	AV	9.00	200	Horizontal	Pass
4	7832.250	53.28	2.21	74.0	-20.72	Peak	360.00	300	Horizontal	Pass
4**	7832.250	44.05	2.21	54.0	-9.95	AV	360.00	300	Horizontal	Pass
5	12696.800	49.54	-2.33	74.0	-24.46	Peak	326.00	100	Horizontal	Pass
5**	12696.800	39.29	-2.33	54.0	-14.71	AV	326.00	100	Horizontal	Pass
6	17291.512	53.56	2.00	74.0	-20.44	Peak	70.00	200	Horizontal	Pass
6**	17291.512	43.94	2.00	54.0	-10.06	AV	70.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n40 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.400	43.33	-17.69	74.0	-30.67	Peak	151.00	300	Vertical	Pass
1**	1535.400	38.43	-17.69	54.0	-15.57	AV	151.00	300	Vertical	Pass
2	2455.400	104.58	-12.95	74.0	30.58	Peak	235.00	200	Vertical	N/A
2**	2455.400	95.98	-12.95	54.0	41.98	AV	235.00	200	Vertical	N/A
3	5333.000	51.84	-3.57	74.0	-22.16	Peak	207.00	100	Vertical	Pass
3**	5333.000	40.65	-3.57	54.0	-13.35	AV	207.00	100	Vertical	Pass
4	7863.500	52.79	1.48	74.0	-21.21	Peak	207.00	200	Vertical	Pass
4**	7863.500	43.55	1.48	54.0	-10.45	AV	207.00	200	Vertical	Pass
5	12448.612	50.02	-2.17	74.0	-23.98	Peak	267.00	200	Vertical	Pass
5**	12448.612	39.16	-2.17	54.0	-14.84	AV	267.00	200	Vertical	Pass
6	16899.599	52.60	1.51	74.0	-21.40	Peak	288.00	300	Vertical	Pass
6**	16899.599	44.26	1.51	54.0	-9.74	AV	288.00	300	Vertical	Pass

PCB Antenna 2

1 GHz to 18 GHz, ANT H 802.11b Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	43.78	-17.70	74.0	-30.22	Peak	343.00	100	Horizontal	Pass
1**	1535.700	39.82	-17.70	54.0	-14.18	AV	343.00	100	Horizontal	Pass
2	2410.700	100.45	-13.48	74.0	26.45	Peak	131.00	150	Horizontal	N/A
2**	2410.700	97.56	-13.48	54.0	43.56	AV	131.00	150	Horizontal	N/A
3	2754.500	49.55	-11.24	74.0	-24.45	Peak	358.00	150	Horizontal	Pass
3**	2754.500	39.92	-11.24	54.0	-14.08	AV	358.00	150	Horizontal	Pass
4	7830.000	53.58	1.96	74.0	-20.42	Peak	360.00	100	Horizontal	Pass
4**	7830.000	44.50	1.96	54.0	-9.50	AV	360.00	100	Horizontal	Pass
5	12944.513	49.42	-1.67	74.0	-24.58	Peak	228.00	400	Horizontal	Pass
5**	12944.513	39.55	-1.67	54.0	-14.45	AV	228.00	400	Horizontal	Pass
6	17274.450	53.04	1.97	74.0	-20.96	Peak	18.00	200	Horizontal	Pass
6**	17274.450	43.22	1.97	54.0	-10.78	AV	18.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11b Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	44.64	-17.69	74.0	-29.36	Peak	168.00	400	Vertical	Pass
1**	1535.600	41.28	-17.69	54.0	-12.72	AV	168.00	400	Vertical	Pass
2	2410.800	95.07	-13.48	74.0	21.07	Peak	281.00	200	Vertical	N/A
2**	2410.800	92.17	-13.48	54.0	38.17	AV	281.00	200	Vertical	N/A
3	4824.000	48.94	-3.03	74.0	-25.06	Peak	270.00	200	Vertical	Pass
3**	4824.000	44.48	-3.03	54.0	-9.52	AV	270.00	200	Vertical	Pass
4	7840.000	53.52	1.88	74.0	-20.48	Peak	0.00	300	Vertical	Pass
4**	7840.000	43.40	1.88	54.0	-10.60	AV	0.00	300	Vertical	Pass
5	12451.225	49.44	-2.16	74.0	-24.56	Peak	68.00	400	Vertical	Pass
5**	12451.225	39.88	-2.16	54.0	-14.12	AV	68.00	400	Vertical	Pass
6	16899.338	53.07	1.51	74.0	-20.93	Peak	2.00	100	Vertical	Pass
6**	16899.338	43.53	1.51	54.0	-10.47	AV	2.00	100	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11b Middle Channel

No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB)	Limit (dBUV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1536.000	44.13	-17.70	74.0	-29.87	Peak	332.00	100	Horizontal	Pass
1**	1536.000	38.90	-17.70	54.0	-15.10	AV	332.00	100	Horizontal	Pass
2	2437.800	102.24	-12.75	74.0	28.24	Peak	133.00	100	Horizontal	N/A
2**	2437.800	99.28	-12.75	54.0	45.28	AV	133.00	100	Horizontal	N/A
3	2532.400	50.37	-12.70	74.0	-23.63	Peak	248.00	150	Horizontal	Pass
3**	2532.400	38.72	-12.70	54.0	-15.28	AV	248.00	150	Horizontal	Pass
4	7863.500	53.03	1.48	74.0	-20.97	Peak	136.00	300	Horizontal	Pass
4**	7863.500	43.88	1.48	54.0	-10.12	AV	136.00	300	Horizontal	Pass
5	12695.850	50.19	-2.33	74.0	-23.81	Peak	111.00	200	Horizontal	Pass
5**	12695.850	39.86	-2.33	54.0	-14.14	AV	111.00	200	Horizontal	Pass
6	17284.162	53.29	1.99	74.0	-20.71	Peak	235.00	300	Horizontal	Pass
6**	17284.162	43.63	1.99	54.0	-10.37	AV	235.00	300	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11b Middle Channel

No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB)	Limit (dBUV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	44.67	-17.69	74.0	-29.33	Peak	165.00	200	Vertical	Pass
1**	1535.600	40.27	-17.69	54.0	-13.73	AV	165.00	200	Vertical	Pass
2	2436.800	96.19	-12.75	74.0	22.19	Peak	277.00	100	Vertical	N/A
2**	2436.800	93.32	-12.75	54.0	39.32	AV	277.00	100	Vertical	N/A
3	2657.500	52.49	-12.48	74.0	-21.51	Peak	221.00	100	Vertical	Pass
3**	2657.500	40.29	-12.48	54.0	-13.71	AV	221.00	100	Vertical	Pass
4	7852.750	53.02	0.85	74.0	-20.98	Peak	193.00	300	Vertical	Pass
4**	7852.750	43.26	0.85	54.0	-10.74	AV	193.00	300	Vertical	Pass
5	12438.162	49.33	-2.33	74.0	-24.67	Peak	329.00	400	Vertical	Pass
5**	12438.162	40.30	-2.33	54.0	-13.70	AV	329.00	400	Vertical	Pass
6	16519.239	52.28	0.01	74.0	-21.72	Peak	0.00	400	Vertical	Pass
6**	16519.239	42.36	0.01	54.0	-11.64	AV	0.00	400	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11b High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.800	44.17	-17.70	74.0	-29.83	Peak	325.00	300	Horizontal	Pass
1**	1535.800	39.98	-17.70	54.0	-14.02	AV	325.00	300	Horizontal	Pass
2	2460.800	102.53	-12.61	74.0	28.53	Peak	132.00	200	Horizontal	N/A
2**	2460.800	99.61	-12.61	54.0	45.61	AV	132.00	200	Horizontal	N/A
3	2540.900	50.53	-12.59	74.0	-23.47	Peak	99.00	150	Horizontal	Pass
3**	2540.900	41.57	-12.59	54.0	-12.43	AV	99.00	150	Horizontal	Pass
4	7934.500	53.12	0.77	74.0	-20.88	Peak	109.00	400	Horizontal	Pass
4**	7934.500	42.02	0.77	54.0	-11.98	AV	109.00	400	Horizontal	Pass
5	12429.850	49.35	-2.46	74.0	-24.65	Peak	160.00	200	Horizontal	Pass
5**	12429.850	40.33	-2.46	54.0	-13.67	AV	160.00	200	Horizontal	Pass
6	17260.276	52.00	1.94	74.0	-22.00	Peak	8.00	200	Horizontal	Pass
6**	17260.276	43.01	1.94	54.0	-10.99	AV	8.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11b High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.500	44.66	-17.69	74.0	-29.34	Peak	161.00	100	Vertical	Pass
1**	1535.500	40.85	-17.69	54.0	-13.15	AV	161.00	100	Vertical	Pass
2	2460.800	96.46	-12.61	74.0	22.46	Peak	279.00	200	Vertical	N/A
2**	2460.800	93.55	-12.61	54.0	39.55	AV	279.00	200	Vertical	N/A
3	2655.300	54.31	-12.46	74.0	-19.69	Peak	119.00	200	Vertical	Pass
3**	2655.300	41.86	-12.46	54.0	-12.14	AV	119.00	200	Vertical	Pass
4	7384.750	53.38	-0.90	74.0	-20.62	Peak	158.00	300	Vertical	Pass
4**	7384.750	46.30	-0.90	54.0	-7.70	AV	158.00	300	Vertical	Pass
5	12624.125	49.42	-2.46	74.0	-24.58	Peak	72.00	300	Vertical	Pass
5**	12624.125	39.07	-2.46	54.0	-14.93	AV	72.00	300	Vertical	Pass
6	17272.349	53.10	1.96	74.0	-20.90	Peak	24.00	200	Vertical	Pass
6**	17272.349	42.86	1.96	54.0	-11.14	AV	24.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11g Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.800	43.21	-17.70	74.0	-30.79	Peak	322.00	400	Horizontal	Pass
1**	1535.800	39.77	-17.70	54.0	-14.23	AV	322.00	400	Horizontal	Pass
2	2407.200	104.58	-13.38	74.0	30.58	Peak	126.00	150	Horizontal	N/A
2**	2407.200	97.07	-13.38	54.0	43.07	AV	126.00	150	Horizontal	N/A
3	2880.100	49.70	-10.44	74.0	-24.30	Peak	60.00	100	Horizontal	Pass
3**	2880.100	40.16	-10.44	54.0	-13.84	AV	60.00	100	Horizontal	Pass
4	7236.000	55.71	-1.10	74.0	-18.29	Peak	100.00	100	Horizontal	Pass
4**	7236.000	42.853	-1.10	54.0	-11.147	AV	100.00	100	Horizontal	Pass
5	12680.412	50.33	-2.32	74.0	-23.67	Peak	243.00	100	Horizontal	Pass
5**	12680.412	39.88	-2.32	54.0	-14.12	AV	243.00	100	Horizontal	Pass
6	16899.599	53.05	1.51	74.0	-20.95	Peak	73.00	300	Horizontal	Pass
6**	16899.599	43.74	1.51	54.0	-10.26	AV	73.00	300	Horizontal	Pass
6**	16899.599	43.74	1.51	54.0	-10.26	AV	73.00	300	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11g Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.300	45.17	-17.69	74.0	-28.83	Peak	156.00	200	Vertical	Pass
1**	1535.300	38.62	-17.69	54.0	-15.38	AV	156.00	200	Vertical	Pass
2	2407.300	99.85	-13.40	74.0	25.85	Peak	278.00	150	Vertical	N/A
2**	2407.300	90.77	-13.40	54.0	36.77	AV	278.00	150	Vertical	N/A
3	2656.900	53.36	-12.37	74.0	-20.64	Peak	109.00	100	Vertical	Pass
3**	2656.900	44.18	-12.37	54.0	-9.82	AV	109.00	100	Vertical	Pass
4	7234.750	55.79	-0.99	74.0	-18.21	Peak	140.00	100	Vertical	Pass
4**	7234.750	50.52	-0.99	54.0	-3.48	AV	140.00	100	Vertical	Pass
5	12374.038	49.04	-2.87	74.0	-24.96	Peak	7.00	300	Vertical	Pass
5**	12374.038	38.87	-2.87	54.0	-15.13	AV	7.00	300	Vertical	Pass
6	17274.712	53.62	1.97	74.0	-20.38	Peak	339.00	300	Vertical	Pass
6**	17274.712	43.26	1.97	54.0	-10.74	AV	339.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11g Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.400	43.06	-17.69	74.0	-30.94	Peak	243.00	300	Horizontal	Pass
1**	1535.400	37.40	-17.69	54.0	-16.60	AV	243.00	300	Horizontal	Pass
2	2435.700	105.47	-12.12	74.0	31.47	Peak	136.00	200	Horizontal	N/A
2**	2435.700	99.60	-12.12	54.0	45.60	AV	136.00	200	Horizontal	N/A
3	2926.600	49.65	-10.78	74.0	-24.35	Peak	133.00	100	Horizontal	Pass
3**	2926.600	39.70	-10.78	54.0	-14.30	AV	133.00	100	Horizontal	Pass
4	7315.000	54.99	-0.97	74.0	-19.01	Peak	119.00	100	Horizontal	Pass
4**	7315.000	48.64	-0.97	54.0	-5.36	AV	119.00	100	Horizontal	Pass
5	12440.300	49.07	-2.30	74.0	-24.93	Peak	80.00	100	Horizontal	Pass
5**	12440.300	40.48	-2.30	54.0	-13.52	AV	80.00	100	Horizontal	Pass
6	17313.563	53.30	1.98	74.0	-20.70	Peak	302.00	100	Horizontal	Pass
6**	17313.563	45.29	1.98	54.0	-8.71	AV	302.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11g Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	43.25	-17.69	74.0	-30.75	Peak	241.00	300	Vertical	Pass
1**	1535.600	38.94	-17.69	54.0	-15.06	AV	241.00	300	Vertical	Pass
2	2437.800	104.50	-12.38	74.0	30.50	Peak	298.00	150	Vertical	N/A
2**	2437.800	97.27	-12.38	54.0	43.27	AV	298.00	150	Vertical	N/A
3	2655.300	51.82	-12.46	74.0	-22.18	Peak	121.00	200	Vertical	Pass
3**	2655.300	40.24	-12.46	54.0	-13.76	AV	121.00	200	Vertical	Pass
4	7308.000	57.11	-1.27	74.0	-16.89	Peak	216.00	200	Vertical	Pass
4**	7308.000	50.77	-1.27	54.0	-3.23	AV	216.00	200	Vertical	Pass
5	10683.987	48.86	-4.79	74.0	-25.14	Peak	278.00	400	Vertical	Pass
5**	10683.987	40.19	-4.79	54.0	-13.81	AV	278.00	400	Vertical	Pass
6	17334.036	52.76	1.92	74.0	-21.24	Peak	353.00	300	Vertical	Pass
6**	17334.036	42.94	1.92	54.0	-11.06	AV	353.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11g High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.800	43.48	-17.70	74.0	-30.52	Peak	111.00	400	Horizontal	Pass
1**	1535.800	38.40	-17.70	54.0	-15.60	AV	111.00	400	Horizontal	Pass
2	2463.200	104.70	-12.67	74.0	30.70	Peak	138.00	150	Horizontal	N/A
2**	2463.200	98.06	-12.67	54.0	44.06	AV	138.00	150	Horizontal	N/A
3	2543.200	51.44	-12.53	74.0	-22.56	Peak	100.00	150	Horizontal	Pass
3**	2543.200	40.82	-12.53	54.0	-13.18	AV	100.00	150	Horizontal	Pass
4	7849.750	53.11	1.22	74.0	-20.89	Peak	115.00	400	Horizontal	Pass
4**	7849.750	43.48	1.22	54.0	-10.52	AV	115.00	400	Horizontal	Pass
5	10219.437	50.57	-4.78	74.0	-23.43	Peak	159.00	100	Horizontal	Pass
5**	10219.437	38.53	-4.78	54.0	-15.47	AV	159.00	100	Horizontal	Pass
6	16407.412	53.08	0.28	74.0	-20.92	Peak	151.00	400	Horizontal	Pass
6**	16407.412	43.47	0.28	54.0	-10.53	AV	151.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11g High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.500	43.46	-17.69	74.0	-30.54	Peak	241.00	300	Vertical	Pass
1**	1535.500	39.19	-17.69	54.0	-14.81	AV	241.00	300	Vertical	Pass
2	2464.500	103.03	-12.73	74.0	29.03	Peak	293.00	200	Vertical	N/A
2**	2464.500	95.72	-12.73	54.0	41.72	AV	293.00	200	Vertical	N/A
3	2658.900	53.16	-12.64	74.0	-20.84	Peak	302.00	200	Vertical	Pass
3**	2658.900	41.28	-12.64	54.0	-12.72	AV	302.00	200	Vertical	Pass
4	7382.000	54.75	-1.23	74.0	-19.25	Peak	126.00	400	Vertical	Pass
4**	7382.000	46.17	-1.23	54.0	-7.83	AV	126.00	400	Vertical	Pass
5	11791.688	48.97	-3.61	74.0	-25.03	Peak	141.00	200	Vertical	Pass
5**	11791.688	39.68	-3.61	54.0	-14.32	AV	141.00	200	Vertical	Pass
6	17383.387	53.25	2.47	74.0	-20.75	Peak	314.00	300	Vertical	Pass
6**	17383.387	43.14	2.47	54.0	-10.86	AV	314.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n20 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	42.98	-17.70	74.0	-31.02	Peak	244.00	400	Horizontal	Pass
1**	1535.700	38.47	-17.70	54.0	-15.53	AV	244.00	400	Horizontal	Pass
2	2413.100	104.89	-13.42	74.0	30.89	Peak	166.00	200	Horizontal	N/A
2**	2413.100	97.27	-13.42	54.0	43.27	AV	166.00	200	Horizontal	N/A
3	2773.900	51.49	-10.81	74.0	-22.51	Peak	182.00	200	Horizontal	Pass
3**	2773.900	41.23	-10.81	54.0	-12.77	AV	182.00	200	Horizontal	Pass
4	7226.000	54.93	-1.31	74.0	-19.07	Peak	69.00	200	Horizontal	Pass
4**	7226.000	49.31	-1.31	54.0	-4.69	AV	69.00	200	Horizontal	Pass
5	11384.849	49.35	-4.30	74.0	-24.65	Peak	0.00	100	Horizontal	Pass
5**	11384.849	39.12	-4.30	54.0	-14.88	AV	0.00	100	Horizontal	Pass
6	16871.512	52.57	1.27	74.0	-21.43	Peak	196.00	400	Horizontal	Pass
6**	16871.512	43.15	1.27	54.0	-10.85	AV	196.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n20 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.500	43.46	-17.69	74.0	-30.54	Peak	241.00	300	Vertical	Pass
1**	1535.500	39.19	-17.69	54.0	-14.81	AV	241.00	300	Vertical	Pass
2	2464.500	103.03	-12.73	74.0	29.03	Peak	293.00	200	Vertical	N/A
2**	2464.500	95.72	-12.73	54.0	41.72	AV	293.00	200	Vertical	N/A
3	2658.900	53.16	-12.64	74.0	-20.84	Peak	302.00	200	Vertical	Pass
3**	2658.900	41.28	-12.64	54.0	-12.72	AV	302.00	200	Vertical	Pass
4	7382.000	54.75	-1.23	74.0	-19.25	Peak	126.00	400	Vertical	Pass
4**	7382.000	46.17	-1.23	54.0	-7.83	AV	126.00	400	Vertical	Pass
5	11791.688	48.97	-3.61	74.0	-25.03	Peak	141.00	200	Vertical	Pass
5**	11791.688	39.68	-3.61	54.0	-14.32	AV	141.00	200	Vertical	Pass
6	17383.387	53.25	2.47	74.0	-20.75	Peak	314.00	300	Vertical	Pass
6**	17383.387	43.14	2.47	54.0	-10.86	AV	314.00	300	Vertical	Pass
6**	16891.988	42.98	1.45	54.0	-11.02	AV	339.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n20 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1536.000	43.04	-17.70	74.0	-30.96	Peak	145.00	100	Horizontal	Pass
1**	1536.000	37.91	-17.70	54.0	-16.09	AV	145.00	100	Horizontal	Pass
2	2435.900	105.72	-12.15	74.0	31.72	Peak	116.00	100	Horizontal	N/A
2**	2435.900	98.54	-12.15	54.0	44.54	AV	116.00	100	Horizontal	N/A
3	2523.100	51.46	-12.69	74.0	-22.54	Peak	129.00	200	Horizontal	Pass
3**	2523.100	38.79	-12.69	54.0	-15.21	AV	129.00	200	Horizontal	Pass
4	7311.000	51.76	-1.11	74.0	-22.24	Peak	140.00	100	Horizontal	Pass
4**	7311.000	48.05	-1.11	54.0	-5.95	AV	140.00	100	Horizontal	Pass
5	12696.325	49.69	-2.33	74.0	-24.31	Peak	249.00	100	Horizontal	Pass
5**	12696.325	40.21	-2.33	54.0	-13.79	AV	249.00	100	Horizontal	Pass
6	16797.750	52.20	0.43	74.0	-21.80	Peak	328.00	300	Horizontal	Pass
6**	16797.750	42.70	0.43	54.0	-11.30	AV	328.00	300	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n20 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.900	44.63	-17.70	74.0	-29.37	Peak	234.00	100	Vertical	Pass
1**	1535.900	39.47	-17.70	54.0	-14.53	AV	234.00	100	Vertical	Pass
2	2435.800	103.83	-12.13	74.0	29.83	Peak	286.00	200	Vertical	N/A
2**	2435.800	97.51	-12.13	54.0	43.51	AV	286.00	200	Vertical	N/A
3	2656.300	51.33	-12.28	74.0	-22.67	Peak	109.00	200	Vertical	Pass
3**	2656.300	43.12	-12.28	54.0	-10.88	AV	109.00	200	Vertical	Pass
4	7309.250	55.05	-1.14	74.0	-18.95	Peak	113.00	200	Vertical	Pass
4**	7309.250	50.71	-1.14	54.0	-3.29	AV	113.00	200	Vertical	Pass
5	12920.887	49.24	-1.79	74.0	-24.76	Peak	65.00	300	Vertical	Pass
5**	12920.887	39.78	-1.79	54.0	-14.22	AV	65.00	300	Vertical	Pass
6	17315.138	53.02	1.97	74.0	-20.98	Peak	91.00	200	Vertical	Pass
6**	17315.138	44.13	1.97	54.0	-9.87	AV	91.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n20 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.800	43.59	-17.70	74.0	-30.41	Peak	119.00	200	Horizontal	Pass
1**	1535.800	38.72	-17.70	54.0	-15.28	AV	119.00	200	Horizontal	Pass
2	2463.300	104.77	-12.68	74.0	30.77	Peak	123.00	100	Horizontal	N/A
2**	2463.300	97.07	-12.68	54.0	43.07	AV	123.00	100	Horizontal	N/A
3	2543.400	50.47	-12.54	74.0	-23.53	Peak	192.00	200	Horizontal	Pass
3**	2543.400	43.44	-12.54	54.0	-10.56	AV	192.00	200	Horizontal	Pass
4	7462.500	52.94	1.09	74.0	-21.06	Peak	48.00	100	Horizontal	Pass
4**	7462.500	44.27	1.09	54.0	-9.73	AV	48.00	100	Horizontal	Pass
5	12560.000	49.08	-2.23	74.0	-24.92	Peak	180.00	400	Horizontal	Pass
5**	12560.000	38.94	-2.23	54.0	-15.06	AV	180.00	400	Horizontal	Pass
6	17300.699	52.82	2.01	74.0	-21.18	Peak	224.00	400	Horizontal	Pass
6**	17300.699	43.77	2.01	54.0	-10.23	AV	224.00	400	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n20 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	42.95	-17.69	74.0	-31.05	Peak	227.00	100	Vertical	Pass
1**	1535.600	39.99	-17.69	54.0	-14.01	AV	227.00	100	Vertical	Pass
2	2461.100	102.47	-12.62	74.0	28.47	Peak	240.00	150	Vertical	N/A
2**	2461.100	95.78	-12.62	54.0	41.78	AV	240.00	150	Vertical	N/A
3	2665.300	51.15	-12.44	74.0	-22.85	Peak	110.00	200	Vertical	Pass
3**	2665.300	39.95	-12.44	54.0	-14.05	AV	110.00	200	Vertical	Pass
4	7383.750	54.77	-1.02	74.0	-19.23	Peak	212.00	100	Vertical	Pass
4**	7383.750	49.21	-1.02	54.0	-4.79	AV	212.00	100	Vertical	Pass
5	12672.338	49.46	-2.32	74.0	-24.54	Peak	255.00	100	Vertical	Pass
5**	12672.338	40.09	-2.32	54.0	-13.91	AV	255.00	100	Vertical	Pass
6	16509.525	53.19	0.00	74.0	-20.81	Peak	46.00	300	Vertical	Pass
6**	16509.525	41.27	0.00	54.0	-12.73	AV	46.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n40 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	42.72	-17.69	74.0	-31.28	Peak	144.00	100	Horizontal	Pass
1**	1535.600	38.84	-17.69	54.0	-15.16	AV	144.00	100	Horizontal	Pass
2	2420.400	102.89	-13.06	74.0	28.89	Peak	205.00	150	Horizontal	N/A
2**	2420.400	94.64	-13.06	54.0	40.64	AV	205.00	150	Horizontal	N/A
3	2775.200	49.48	-10.94	74.0	-24.52	Peak	129.00	150	Horizontal	Pass
3**	2775.200	39.96	-10.94	54.0	-14.04	AV	129.00	150	Horizontal	Pass
4	7281.000	54.00	-0.71	74.0	-20.00	Peak	142.00	400	Horizontal	Pass
4**	7281.000	44.52	-0.71	54.0	-9.48	AV	142.00	400	Horizontal	Pass
5	10225.613	49.10	-4.68	74.0	-24.90	Peak	121.00	100	Horizontal	Pass
5**	10225.613	39.72	-4.68	54.0	-14.28	AV	121.00	100	Horizontal	Pass
6	16905.114	53.10	1.43	74.0	-20.90	Peak	46.00	200	Horizontal	Pass
6**	16905.114	43.93	1.43	54.0	-10.07	AV	46.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n40 Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.800	42.70	-17.70	74.0	-31.30	Peak	228.00	100	Vertical	Pass
1**	1535.800	38.96	-17.70	54.0	-15.04	AV	228.00	100	Vertical	Pass
2	2420.600	101.21	-13.06	74.0	27.21	Peak	204.00	150	Vertical	N/A
2**	2420.600	92.80	-13.06	54.0	38.80	AV	204.00	150	Vertical	N/A
3	2663.200	51.92	-12.48	74.0	-22.08	Peak	104.00	100	Vertical	Pass
3**	2663.200	39.27	-12.48	54.0	-14.73	AV	104.00	100	Vertical	Pass
4	7255.750	55.65	-0.27	74.0	-18.35	Peak	117.00	150	Vertical	Pass
4**	7255.750	50.16	-0.27	54.0	-3.84	AV	117.00	150	Vertical	Pass
5	12671.150	49.31	-2.31	74.0	-24.69	Peak	353.00	200	Vertical	Pass
5**	12671.150	40.53	-2.31	54.0	-13.47	AV	353.00	200	Vertical	Pass
6	17321.437	52.28	1.96	74.0	-21.72	Peak	9.00	100	Vertical	Pass
6**	17321.437	42.64	1.96	54.0	-11.36	AV	9.00	100	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n40 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.300	43.10	-17.69	74.0	-30.90	Peak	119.00	300	Horizontal	Pass
1**	1535.300	36.68	-17.69	54.0	-17.32	AV	119.00	300	Horizontal	Pass
2	2435.400	104.88	-12.08	74.0	30.88	Peak	137.00	150	Horizontal	N/A
2**	2435.400	95.94	-12.08	54.0	41.94	AV	137.00	150	Horizontal	N/A
3	5271.500	50.70	-3.27	74.0	-23.30	Peak	153.00	150	Horizontal	Pass
3**	5271.500	41.16	-3.27	54.0	-12.84	AV	153.00	150	Horizontal	Pass
4	7461.250	53.02	1.13	74.0	-20.98	Peak	246.00	100	Horizontal	Pass
4**	7461.250	43.43	1.13	54.0	-10.57	AV	246.00	100	Horizontal	Pass
5	12542.662	49.55	-2.18	74.0	-24.45	Peak	85.00	100	Horizontal	Pass
5**	12542.662	39.05	-2.18	54.0	-14.95	AV	85.00	100	Horizontal	Pass
6	17315.138	52.83	1.97	74.0	-21.17	Peak	282.00	150	Horizontal	Pass
6**	17315.138	44.78	1.97	54.0	-9.22	AV	282.00	150	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n40 Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.600	44.50	-17.69	74.0	-29.50	Peak	237.00	200	Vertical	Pass
1**	1535.600	38.26	-17.69	54.0	-15.74	AV	237.00	200	Vertical	Pass
2	2430.500	100.14	-12.43	74.0	26.14	Peak	237.00	100	Vertical	N/A
2**	2430.500	91.74	-12.43	54.0	37.74	AV	237.00	100	Vertical	N/A
3	2658.600	51.58	-12.65	74.0	-22.42	Peak	119.00	200	Vertical	Pass
3**	2658.600	39.83	-12.65	54.0	-14.17	AV	119.00	200	Vertical	Pass
4	7307.500	51.56	-1.27	74.0	-22.44	Peak	104.00	100	Vertical	Pass
4**	7307.500	48.41	-1.27	54.0	-5.59	AV	104.00	100	Vertical	Pass
5	10686.599	49.35	-4.79	74.0	-24.65	Peak	266.00	300	Vertical	Pass
5**	10686.599	40.24	-4.79	54.0	-13.76	AV	266.00	300	Vertical	Pass
6	17290.199	52.57	2.00	74.0	-21.43	Peak	360.00	200	Vertical	Pass
6**	17290.199	42.96	2.00	54.0	-11.04	AV	360.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11n40 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	43.91	-17.70	74.0	-30.09	Peak	148.00	200	Horizontal	Pass
1**	1535.700	38.49	-17.70	54.0	-15.51	AV	148.00	200	Horizontal	Pass
2	2454.800	102.42	-13.09	74.0	28.42	Peak	115.00	100	Horizontal	N/A
2**	2454.800	94.68	-13.09	54.0	40.68	AV	115.00	100	Horizontal	N/A
3	2773.300	49.69	-10.75	74.0	-24.31	Peak	182.00	100	Horizontal	Pass
3**	2773.300	41.07	-10.75	54.0	-12.93	AV	182.00	100	Horizontal	Pass
4	7464.500	53.19	0.86	74.0	-20.81	Peak	241.00	400	Horizontal	Pass
4**	7464.500	43.87	0.86	54.0	-10.13	AV	241.00	400	Horizontal	Pass
5	12516.062	49.41	-2.36	74.0	-24.59	Peak	166.00	300	Horizontal	Pass
5**	12516.062	40.68	-2.36	54.0	-13.32	AV	166.00	300	Horizontal	Pass
6	17267.626	52.97	1.96	74.0	-21.03	Peak	64.00	300	Horizontal	Pass
6**	17267.626	43.78	1.96	54.0	-10.22	AV	64.00	300	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11n40 High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1535.700	42.62	-17.70	74.0	-31.38	Peak	228.00	300	Vertical	Pass
1**	1535.700	39.58	-17.70	54.0	-14.42	AV	228.00	300	Vertical	Pass
2	2450.200	100.46	-12.72	74.0	26.46	Peak	165.00	150	Vertical	N/A
2**	2450.200	93.51	-12.72	54.0	39.51	AV	165.00	150	Vertical	N/A
3	2656.900	52.58	-12.37	74.0	-21.42	Peak	99.00	150	Vertical	Pass
3**	2656.900	43.04	-12.37	54.0	-10.96	AV	99.00	150	Vertical	Pass
4	7339.000	54.31	-0.23	74.0	-19.69	Peak	225.00	400	Vertical	Pass
4**	7339.000	43.66	-0.23	54.0	-10.34	AV	225.00	400	Vertical	Pass
5	12302.075	49.00	-2.45	74.0	-25.00	Peak	252.00	100	Vertical	Pass
5**	12302.075	40.09	-2.45	54.0	-13.91	AV	252.00	100	Vertical	Pass
6	17284.950	53.87	1.99	74.0	-20.13	Peak	199.00	200	Vertical	Pass
6**	17284.950	44.76	1.99	54.0	-9.24	AV	199.00	200	Vertical	Pass

A.7 Band Edge (Restricted-band band-edge)

Note ¹: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

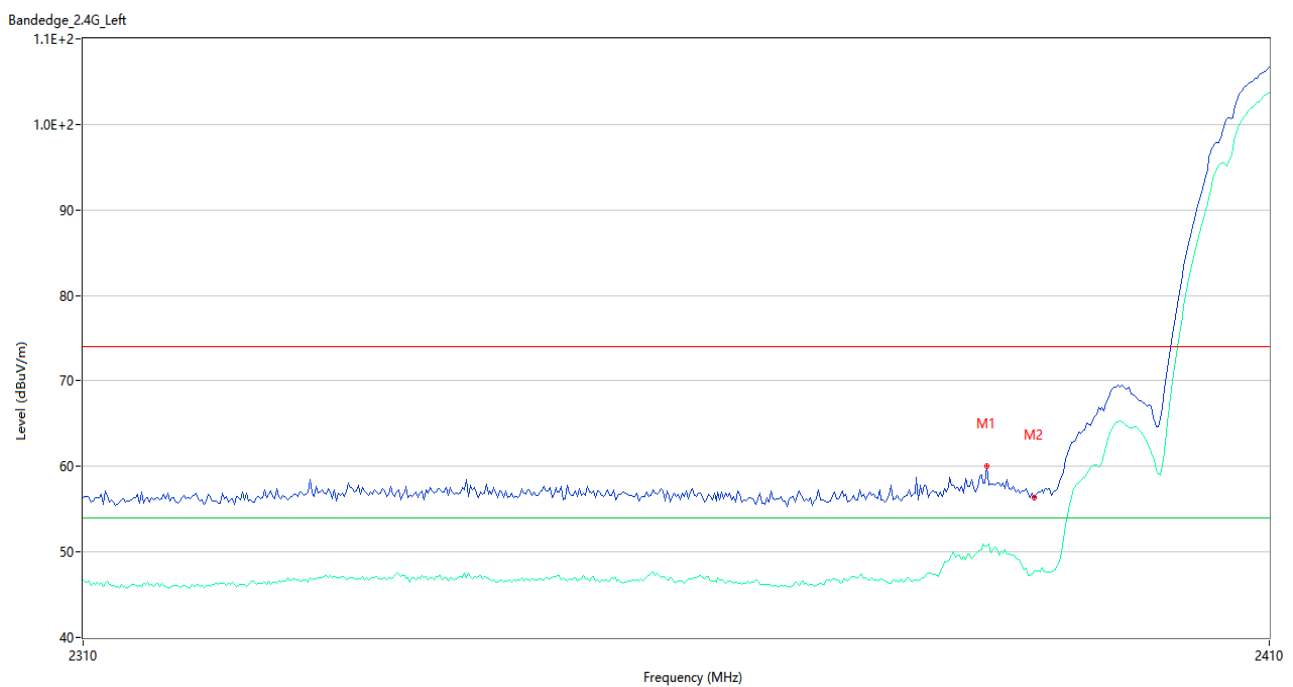
Note ²: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

Note ³: According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Test Data and Plots

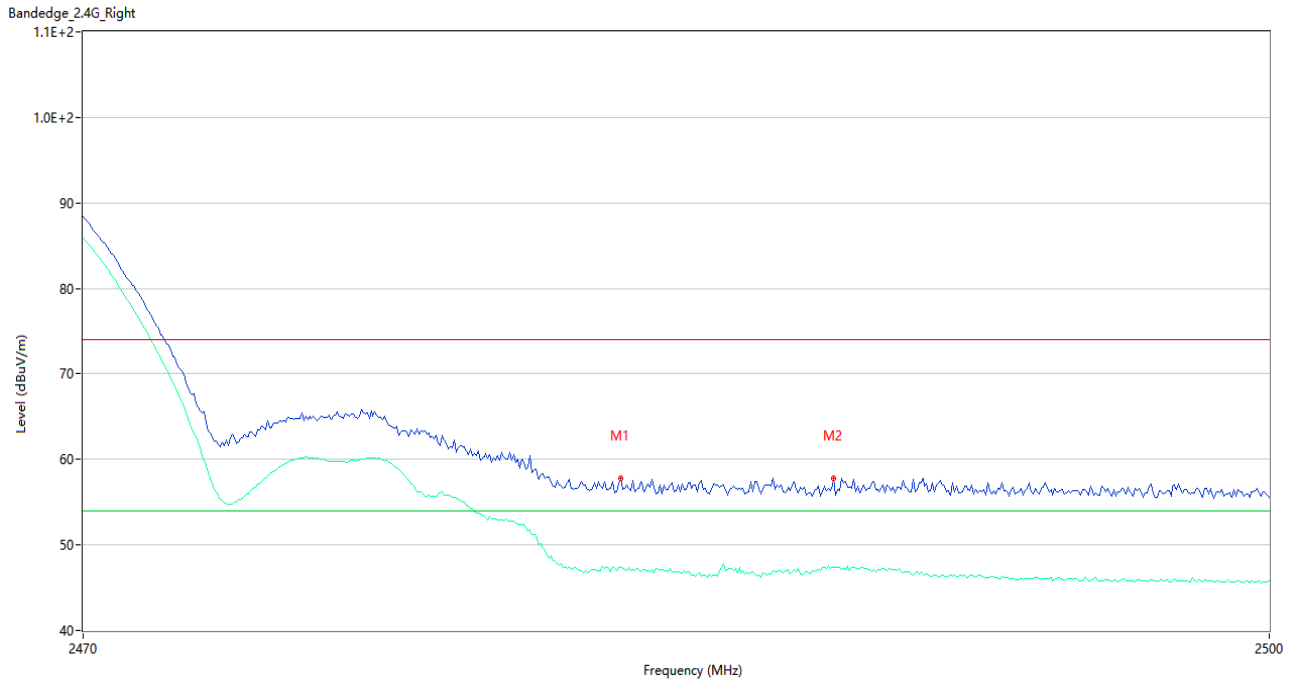
PCB Antenna 1

802.11b LOW CHANNEL



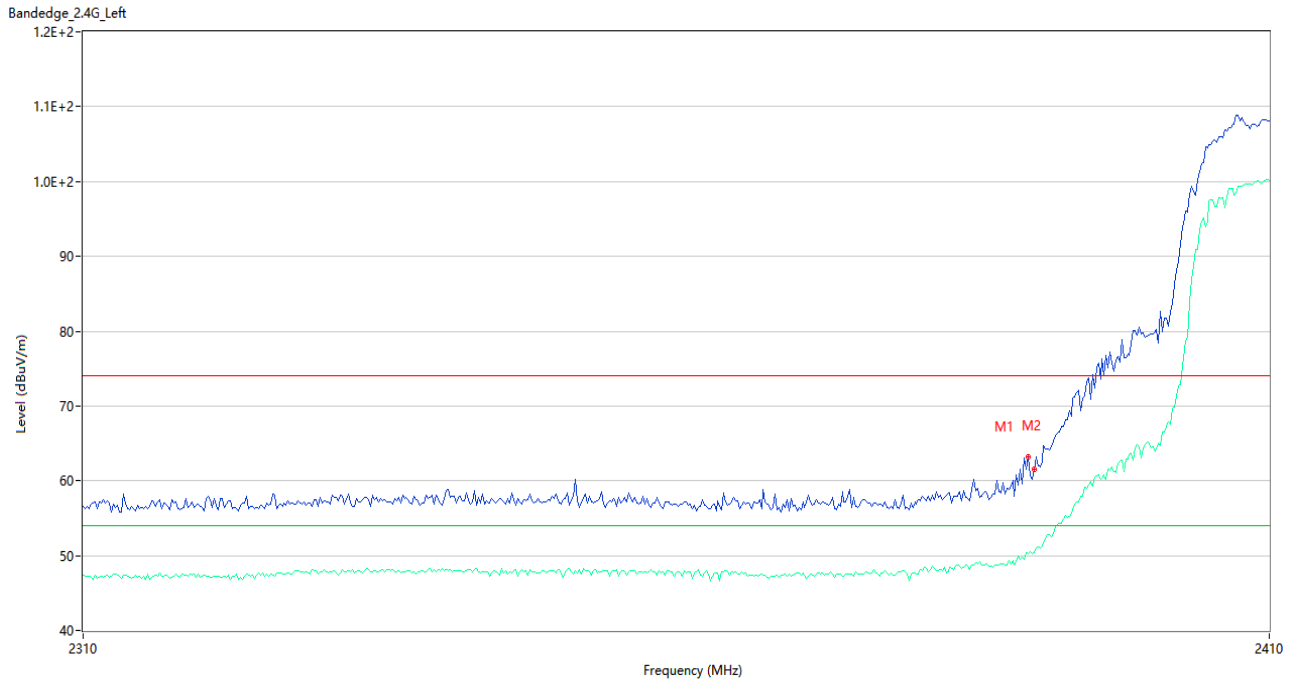
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2385.833	60.01	1.84	74.0	-13.99	Peak	235.00	200	Vertical	Pass
1**	2385.833	50.70	1.84	54.0	-3.30	AV	235.00	200	Vertical	Pass
2	2389.833	56.33	1.64	74.0	-17.67	Peak	244.00	200	Vertical	Pass
2**	2389.833	47.81	1.64	54.0	-6.19	AV	244.00	200	Vertical	Pass

802.11b HIGH CHANNEL



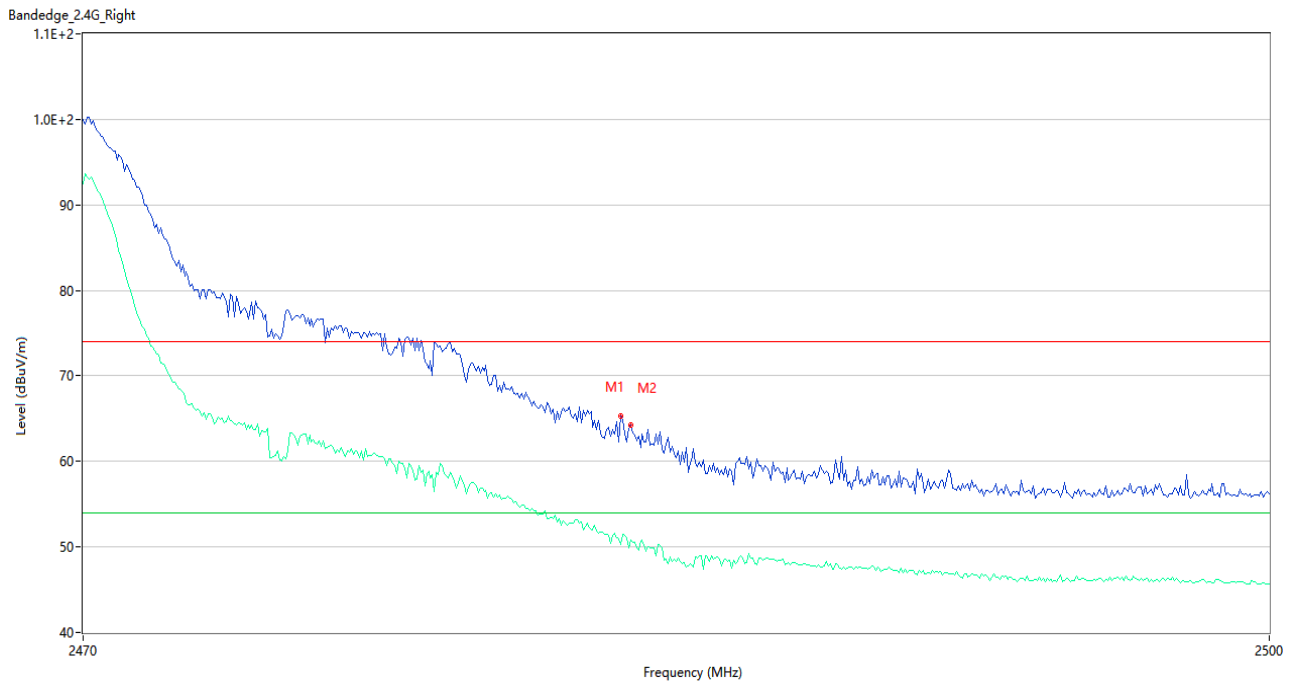
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.550	57.76	1.98	74.0	-16.24	Peak	63.00	100	Vertical	Pass
1**	2483.550	47.41	1.98	54.0	-6.59	AV	63.00	100	Vertical	Pass
2	2488.950	57.86	1.76	74.0	-16.14	Peak	227.00	200	Vertical	Pass
2**	2488.950	47.38	1.76	54.0	-6.62	AV	227.00	200	Vertical	Pass

802.11g LOW CHANNEL



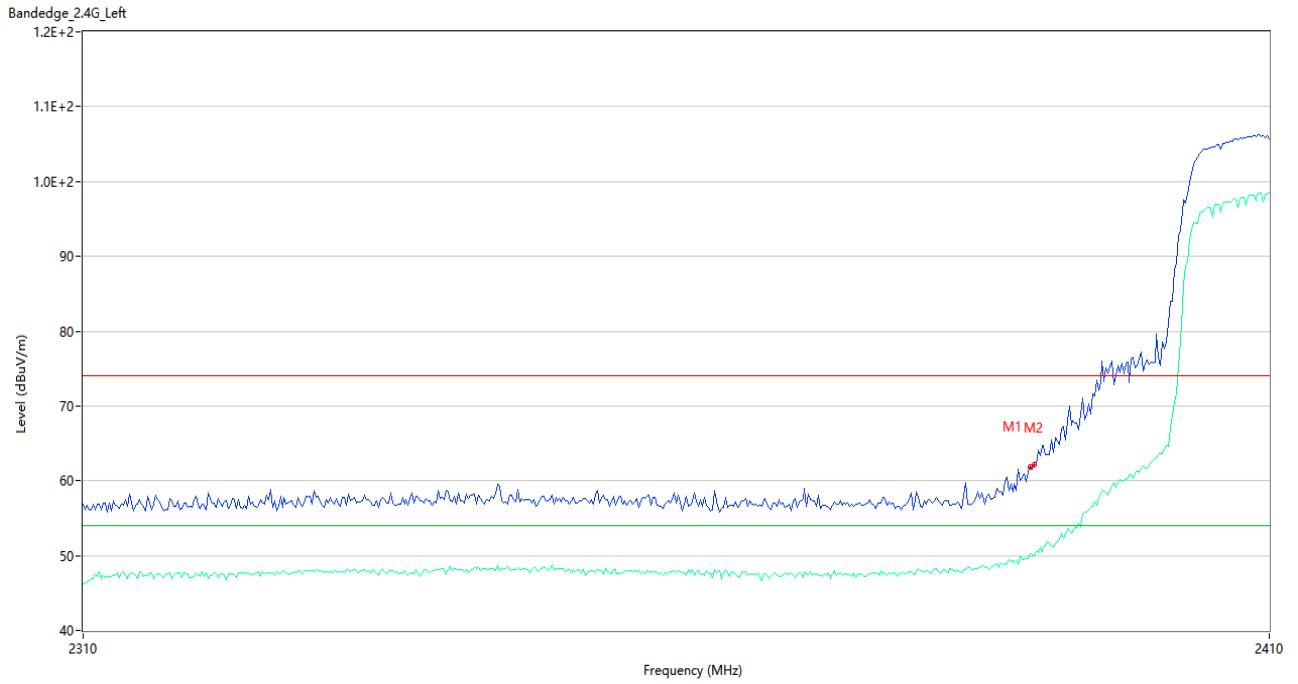
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2389.333	63.16	1.67	74.0	-10.84	Peak	232.00	100	Vertical	Pass
1**	2389.333	50.18	1.67	54.0	-3.82	AV	232.00	100	Vertical	Pass
2	2389.833	61.54	1.64	74.0	-12.46	Peak	232.00	200	Vertical	Pass
2**	2389.833	50.38	1.64	54.0	-3.62	AV	232.00	200	Vertical	Pass

802.11g HIGH CHANNEL



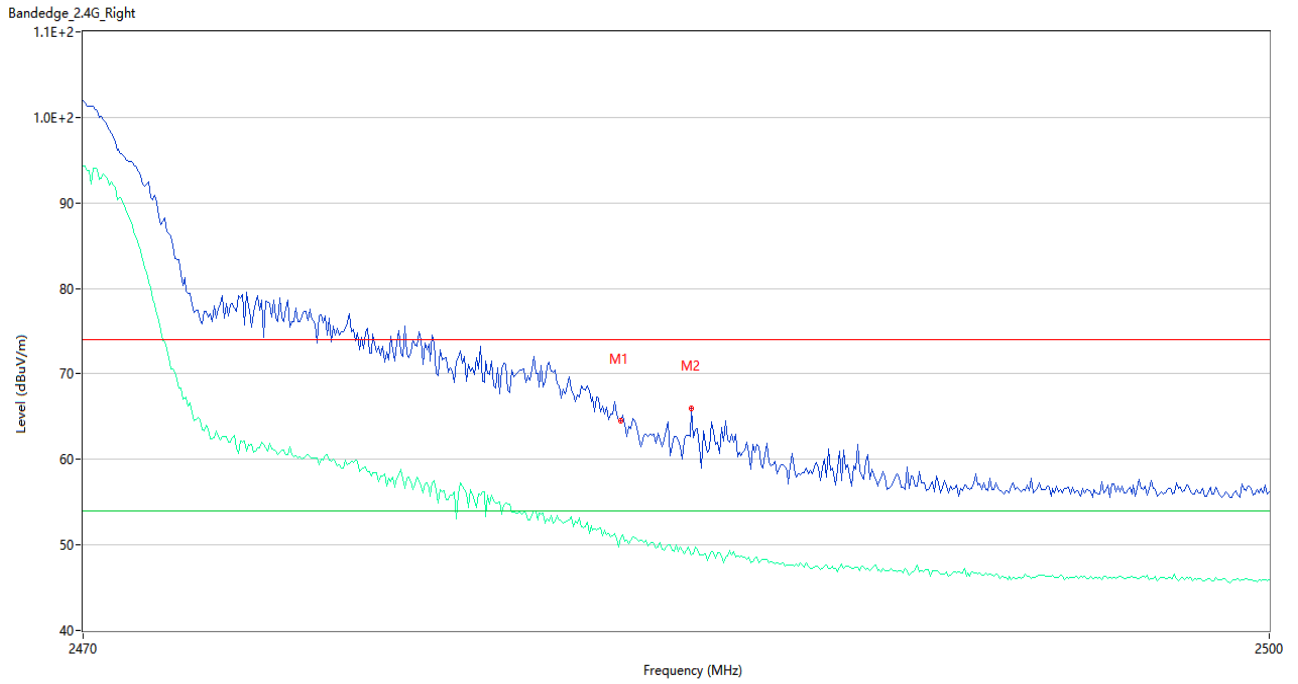
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.550	65.34	1.98	74.0	-8.66	Peak	229.00	100	Vertical	Pass
1**	2483.550	50.22	1.98	54.0	-3.78	AV	229.00	100	Vertical	Pass
2	2483.800	64.22	1.99	74.0	-9.78	Peak	229.00	100	Vertical	Pass
2**	2483.800	50.78	1.99	54.0	-3.22	AV	229.00	100	Vertical	Pass

802.11n20 LOW CHANNEL



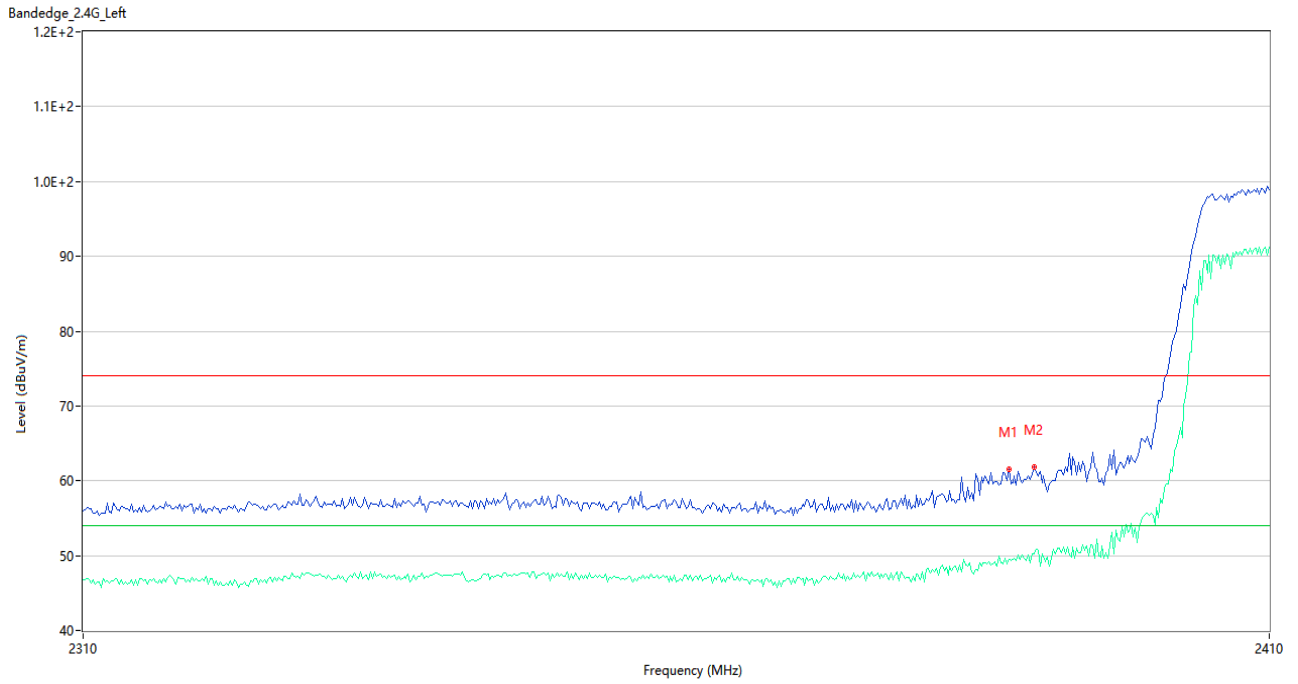
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2389.500	61.80	1.66	74.0	-12.20	Peak	238.00	100	Vertical	Pass
1**	2389.500	50.32	1.66	54.0	-3.68	AV	238.00	100	Vertical	Pass
2	2389.833	62.10	1.64	74.0	-11.90	Peak	238.00	100	Vertical	Pass
2**	2389.833	49.94	1.64	54.0	-4.06	AV	238.00	100	Vertical	Pass

802.11n20 HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.550	64.58	1.98	74.0	-9.42	Peak	235.00	200	Vertical	Pass
1**	2483.550	50.76	1.98	54.0	-3.24	AV	235.00	200	Vertical	Pass
2	2485.350	65.92	1.90	74.0	-8.08	Peak	242.00	200	Vertical	Pass
2**	2485.350	48.82	1.90	54.0	-5.18	AV	242.00	200	Vertical	Pass

802.11n40 LOW CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2387.667	61.55	1.77	74.0	-12.45	Peak	231.00	150	Vertical	Pass
1**	2387.667	49.45	1.77	54.0	-4.55	AV	231.00	150	Vertical	Pass
2	2389.833	61.86	1.64	74.0	-12.14	Peak	237.00	150	Vertical	Pass
2**	2389.833	50.30	1.64	54.0	-3.70	AV	237.00	150	Vertical	Pass

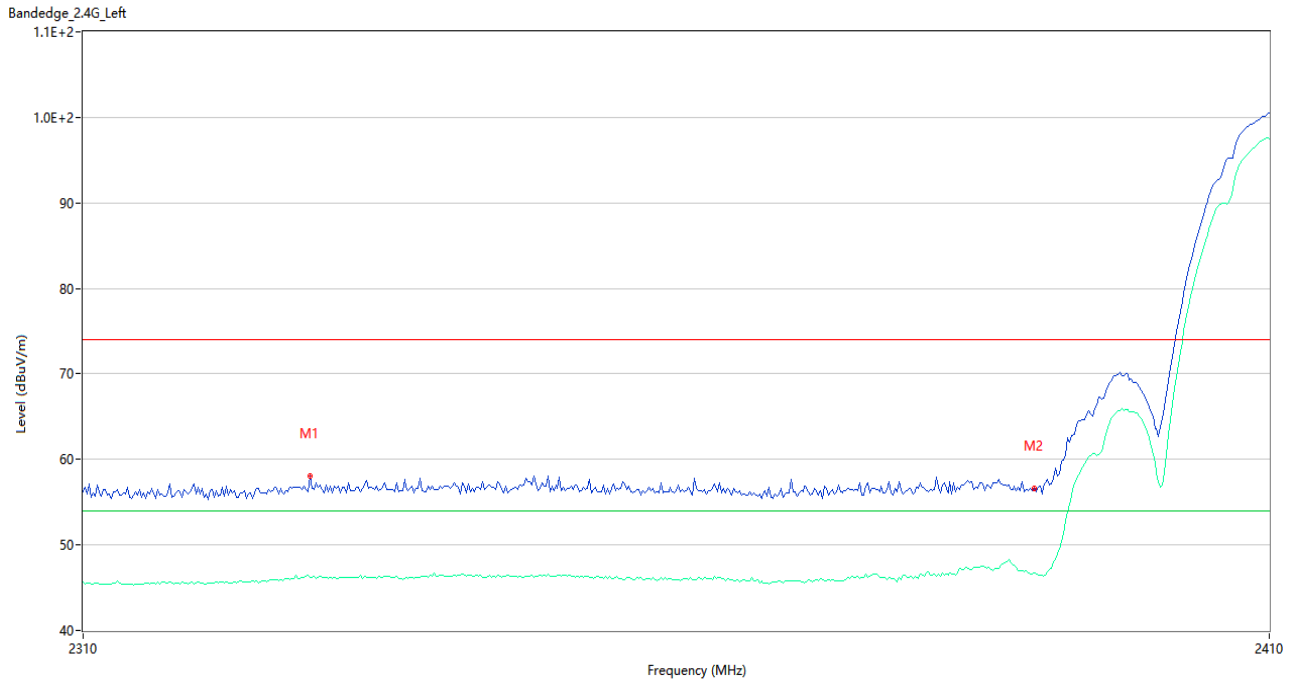
802.11n40 HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.550	62.57	1.98	74.0	-11.43	Peak	225.00	200	Vertical	Pass
1**	2483.550	48.91	1.98	54.0	-5.09	AV	225.00	200	Vertical	Pass
2	2483.800	66.54	1.99	74.0	-7.46	Peak	232.00	200	Vertical	Pass
2**	2483.800	50.11	1.99	54.0	-3.89	AV	232.00	200	Vertical	Pass

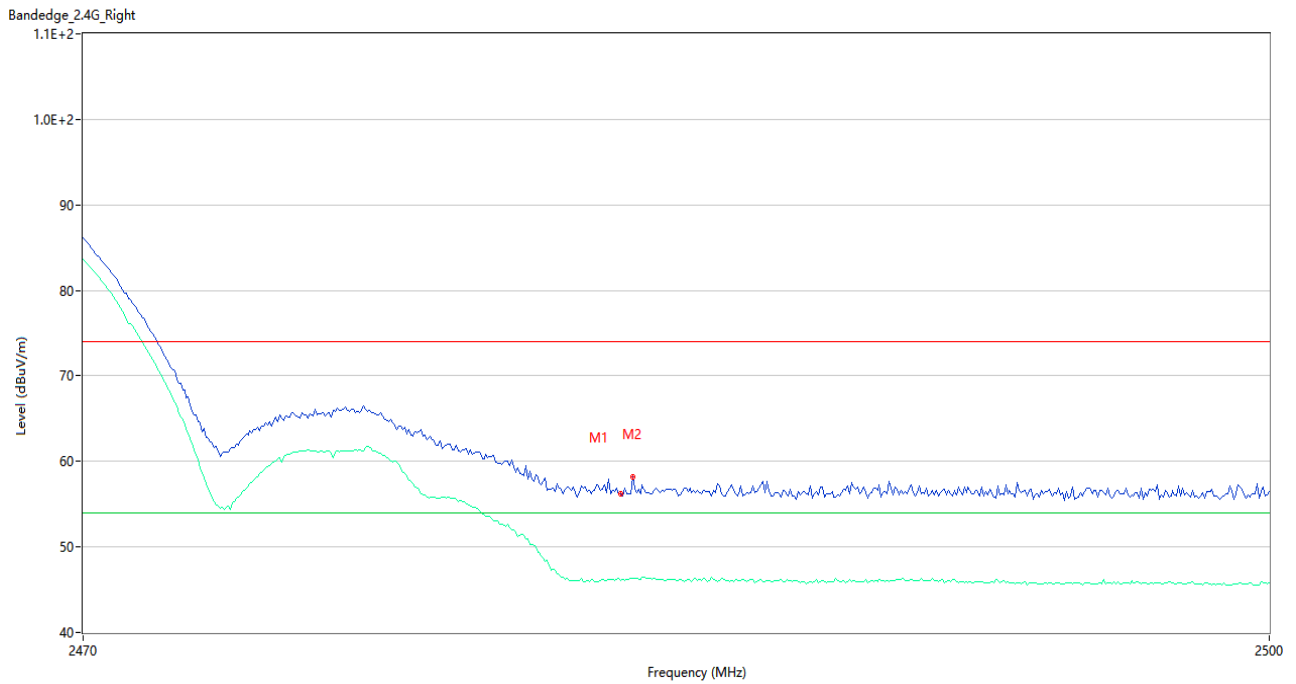
PCB Antenna 2

802.11b LOW CHANNEL



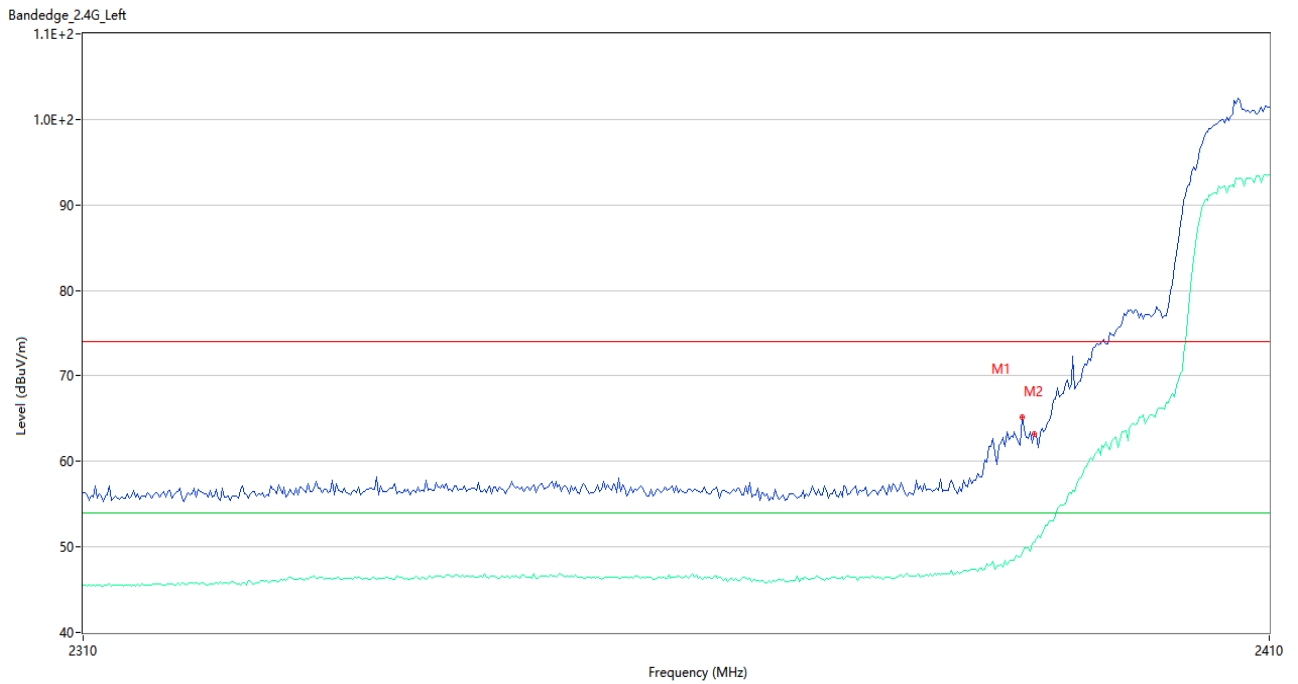
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2328.833	58.07	2.44	74.0	-15.93	Peak	55.00	100	Horizontal	Pass
1**	2328.833	46.18	2.44	54.0	-7.82	AV	55.00	100	Horizontal	Pass
2	2389.833	56.67	1.64	74.0	-17.33	Peak	316.00	100	Horizontal	Pass
2**	2389.833	46.76	1.64	54.0	-7.24	AV	316.00	100	Horizontal	Pass

802.11b HIGH CHANNEL



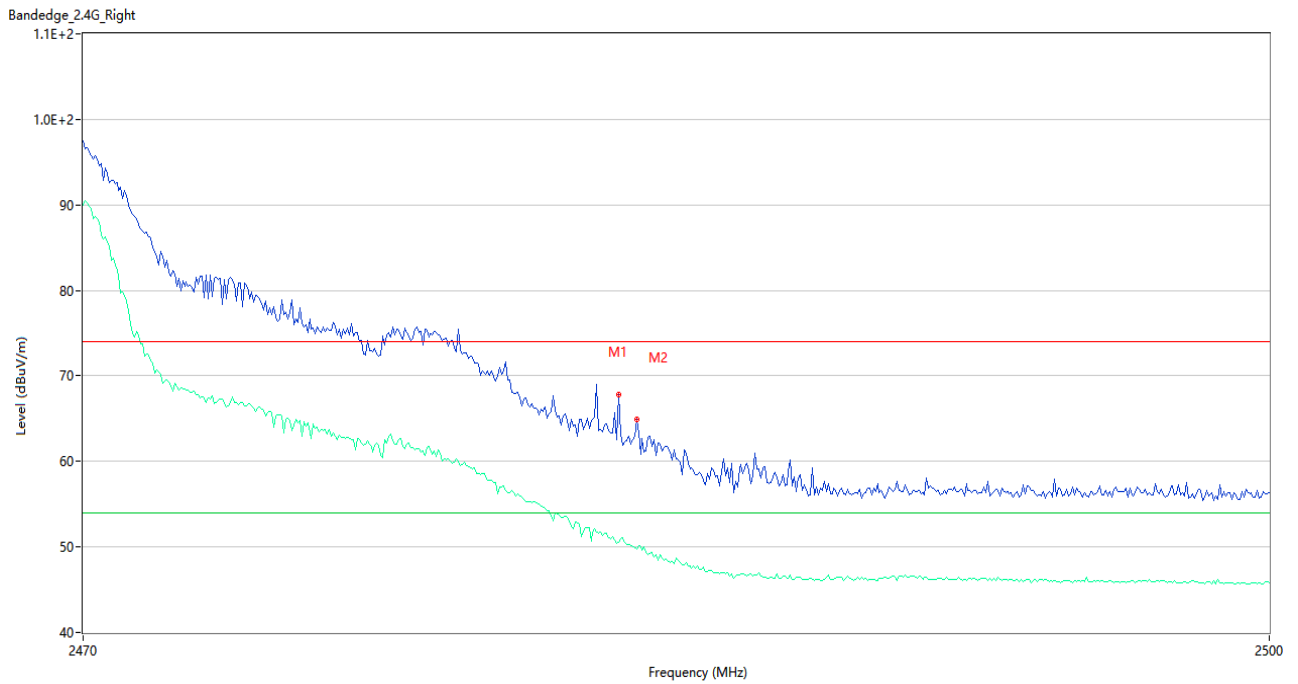
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.550	56.20	1.98	74.0	-17.80	Peak	360.00	150	Horizontal	Pass
1**	2483.550	46.08	1.98	54.0	-7.92	AV	360.00	150	Horizontal	Pass
2	2483.850	58.15	1.99	74.0	-15.85	Peak	293.00	100	Horizontal	Pass
2**	2483.850	46.36	1.99	54.0	-7.64	AV	293.00	100	Horizontal	Pass

802.11g LOW CHANNEL



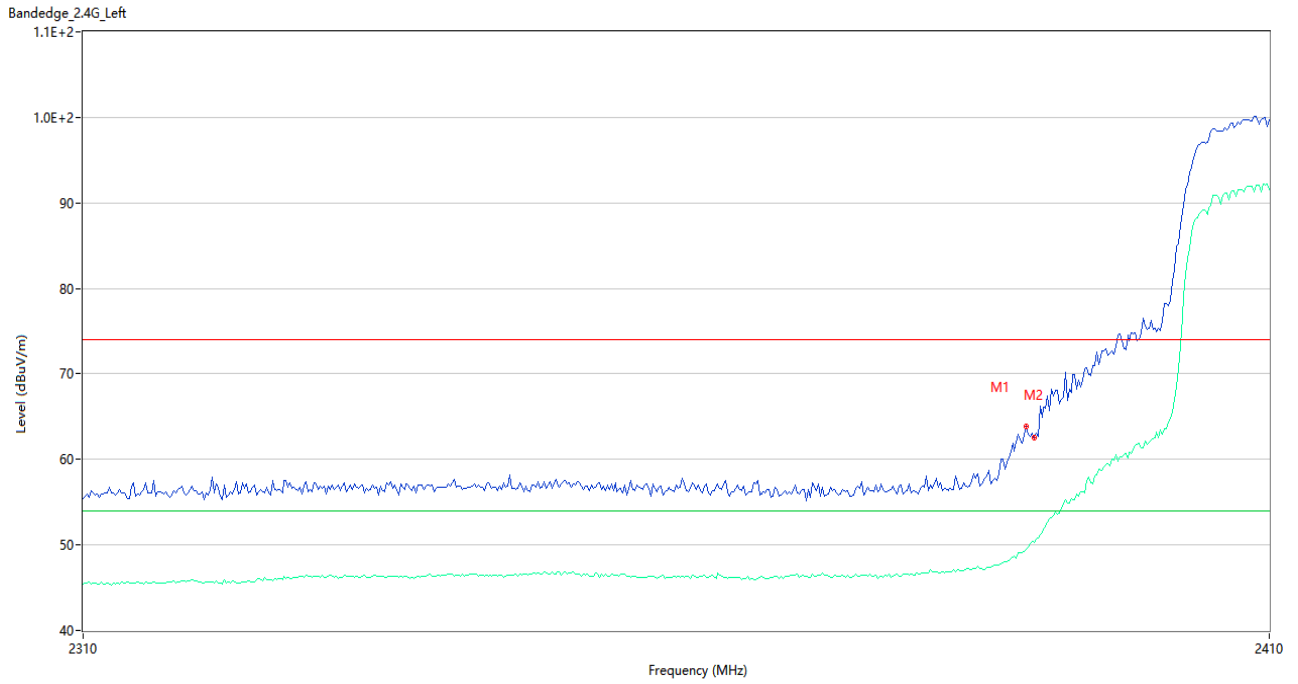
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2388.833	65.12	1.71	74.0	-8.88	Peak	283.00	150	Horizontal	Pass
1**	2388.833	49.19	1.71	54.0	-4.81	AV	283.00	150	Horizontal	Pass
2	2389.833	63.15	1.64	74.0	-10.85	Peak	137.00	100	Horizontal	Pass
2**	2389.833	50.61	1.64	54.0	-3.39	AV	137.00	100	Horizontal	Pass

802.11g HIGH CHANNEL



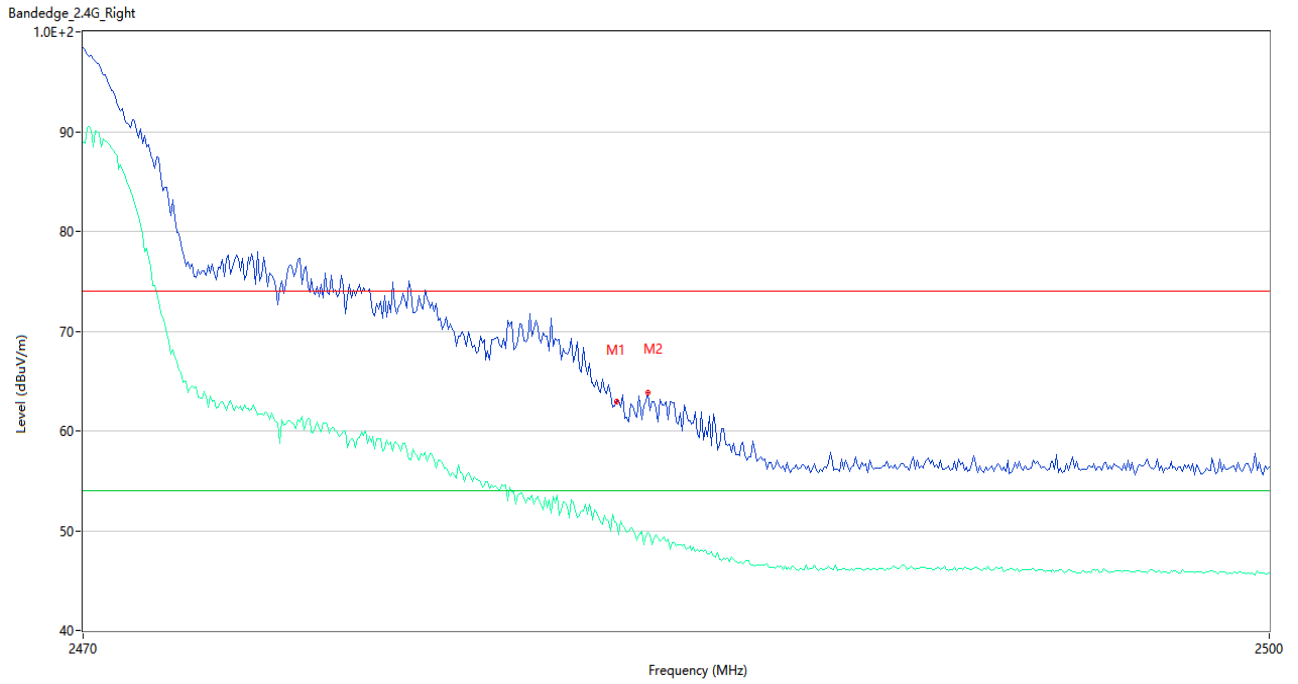
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	67.80	1.98	74.0	-6.20	Peak	138.00	200	Horizontal	Pass
1**	2483.500	50.59	1.98	54.0	-3.41	AV	138.00	200	Horizontal	Pass
2	2483.950	64.88	1.99	74.0	-9.12	Peak	138.00	100	Horizontal	Pass
2**	2483.950	49.82	1.99	54.0	-4.18	AV	138.00	100	Horizontal	Pass

802.11n20 LOW CHANNEL



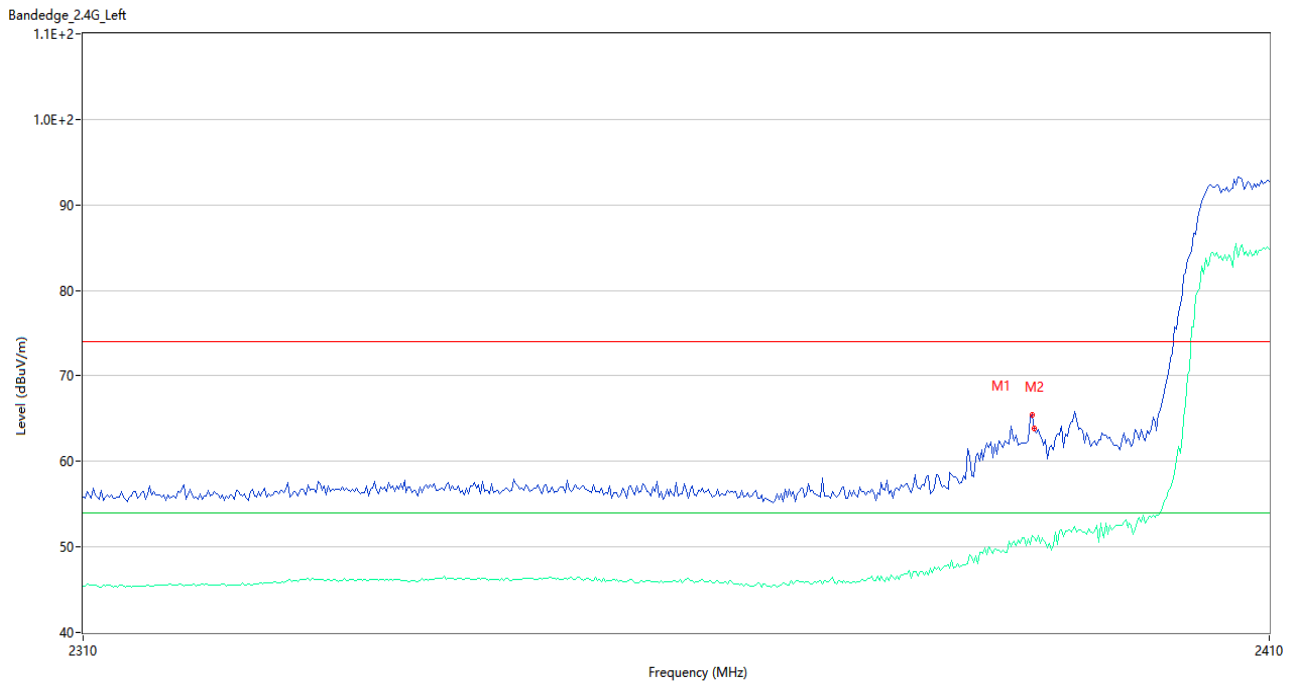
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2389.167	63.92	1.69	74.0	-10.08	Peak	151.00	150	Horizontal	Pass
1**	2389.167	49.48	1.69	54.0	-4.52	AV	151.00	150	Horizontal	Pass
2	2389.833	62.57	1.64	74.0	-11.43	Peak	136.00	150	Horizontal	Pass
2**	2389.833	50.29	1.64	54.0	-3.71	AV	136.00	150	Horizontal	Pass

802.11n20 HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.550	62.88	1.98	74.0	-11.12	Peak	135.00	150	Horizontal	Pass
1**	2483.550	50.72	1.98	54.0	-3.28	AV	135.00	150	Horizontal	Pass
2	2484.250	63.80	1.99	74.0	-10.20	Peak	135.00	150	Horizontal	Pass
2**	2484.250	49.86	1.99	54.0	-4.14	AV	135.00	150	Horizontal	Pass

802.11n40 LOW CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2389.667	65.60	1.65	74.0	-8.40	Peak	148.00	100	Horizontal	Pass
1**	2389.667	50.89	1.65	54.0	-3.11	AV	148.00	100	Horizontal	Pass
2	2389.833	64.06	1.64	74.0	-9.94	Peak	148.00	150	Horizontal	Pass
2**	2389.833	50.53	1.64	54.0	-3.47	AV	148.00	150	Horizontal	Pass

802.11n40 HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	63.48	1.98	74.0	-10.52	Peak	113.00	150	Horizontal	Pass
1**	2483.500	51.90	1.98	54.0	-3.10	AV	113.00	150	Horizontal	Pass
2	2484.400	66.34	1.98	74.0	-7.66	Peak	162.00	200	Horizontal	Pass
2**	2484.400	50.48	1.98	54.0	-3.52	AV	162.00	200	Horizontal	Pass

A.8 Power Spectral Density (PSD)

Note: All configurations are tested, only the worst configuration (tested with the highest antenna gain) is shown here.

Test Data

802.11b Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-20.49	8
Middle	-20.68	8
High	-19.30	8

802.11g Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-22.31	8
Middle	-20.49	8
High	-20.58	8

802.11n-20 MHz Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-24.13	8
Middle	-21.67	8
High	-23.14	8

802.11n-40 MHz Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-33.49	8
Middle	-27.35	8
High	-31.03	8

Test Plots

802.11b LOW CHANNEL



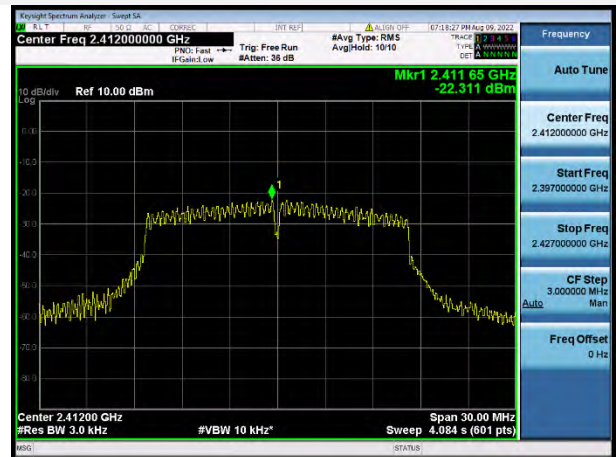
802.11b MIDDLE CHANNEL



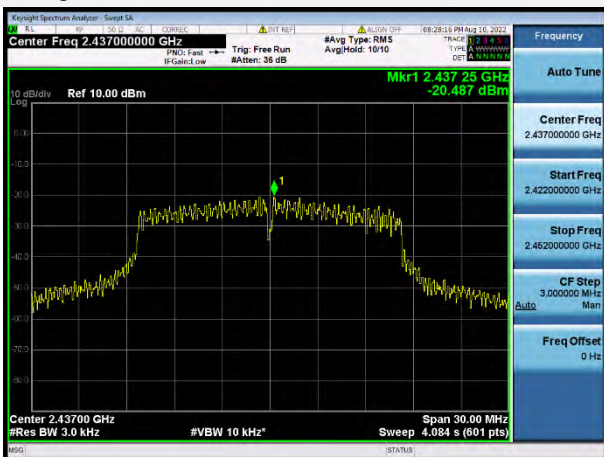
802.11b HIGH CHANNEL



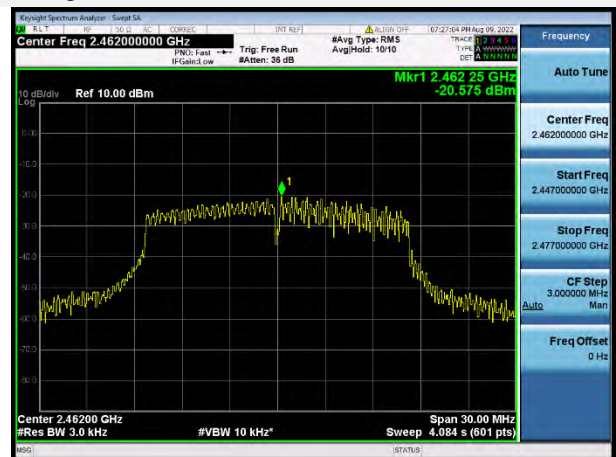
802.11g LOW CHANNEL



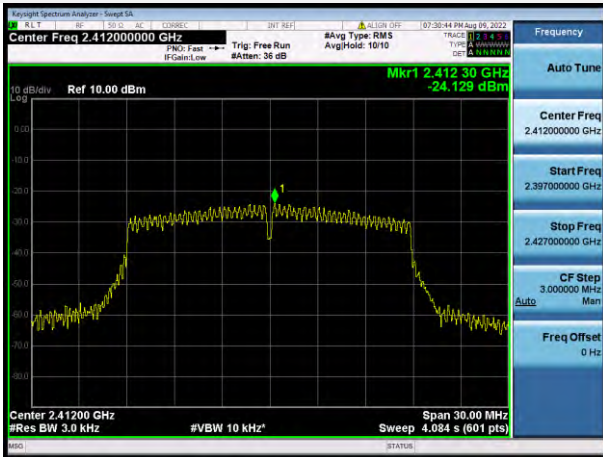
802.11g MIDDLE CHANNEL



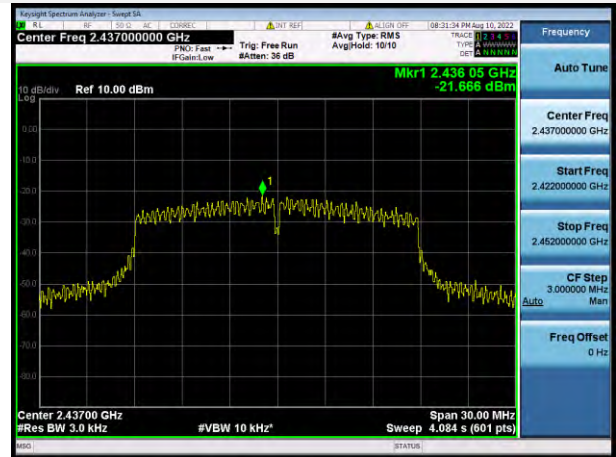
802.11g HIGH CHANNEL



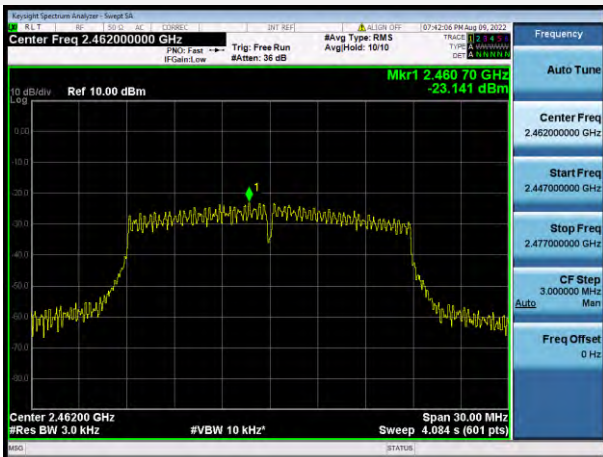
802.11n-20 MHz LOW CHANNEL



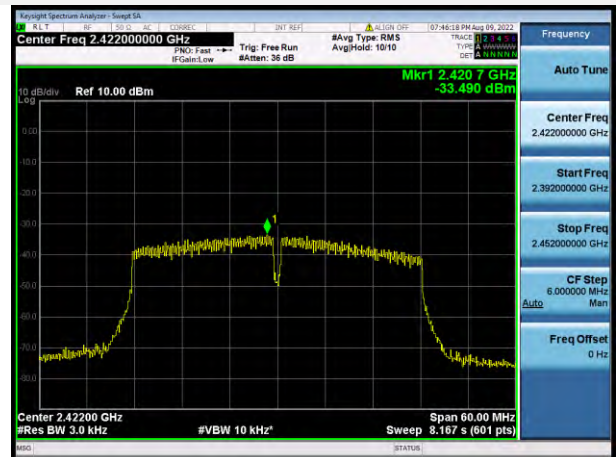
802.11n-20 MHz MIDDLE CHANNEL



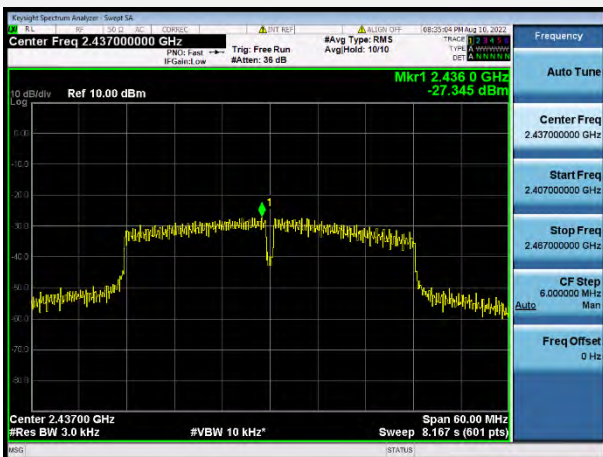
802.11n-20 MHz HIGH CHANNEL



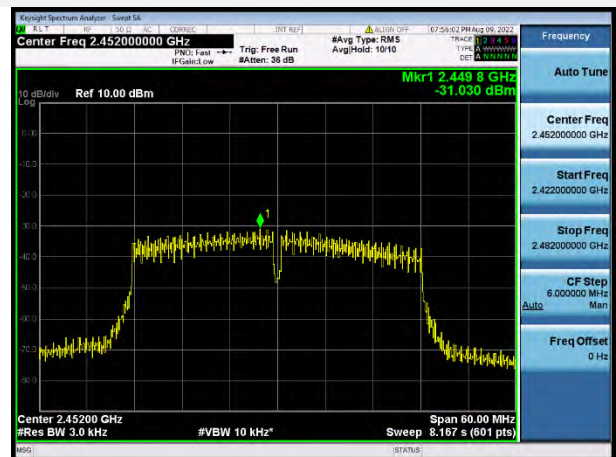
802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL



802.11n-40 MHz HIGH CHANNEL



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2270325-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2270325-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2270325-AI.PDF”.

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1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
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4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the "inspection and testing dedicated stamp" or test report stamp.
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--END OF REPORT--