

TEST REPORT

Applicant: Botslab Inc.
Address: 919 North Market Street, Suite 950, Wilmington,
New Castle, Delaware, USA
Equipment Type: HomeBase
Model Name: HB-BD07-C8 (refer to section 2.3)
Brand Name: Botslab
FCC ID: 2A22Z-H200
ISED Number: 27673-H200
Test Standard: 47 CFR Part 15 Subpart C
RSS-Gen Issue 5
RSS-247 Issue 3
(refer to section 3.1)
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ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

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(Technical Director)*Li Ganming**Ye Hongji**Sunny Zou*

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>May 07, 2025</u>	<u>Initial Issue</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	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 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	Botslab Inc.
Address	919 North Market Street, Suite 950, Wilmington, New Castle, Delaware, USA

2.2 Manufacturer Information

Manufacturer	Botslab Inc.
Address	919 North Market Street, Suite 950, Wilmington, New Castle, Delaware, USA

2.3 General Description for Equipment under Test (EUT)

EUT Name	HomeBase
Model Name Under Test	HB-BD07-C8
Series Model Name	HB-BD07-C8-V0, HB-BD07-C8-V1, HB-BD07-C8-V2, HB-BD07-C8-V3, HB-BD07-C8-V4, HB-BD07-C8-V5, HB-BD07-C8-V6, HB-BD07-C8-V7, HB-BD07-C8-V8, HB-BD07-C8-V9
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in shell color and model name. (this information provided by the applicant).
Serial Number	TYXC20014450000260
Hardware Version	V1.0
Software Version	V1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	Bluetooth (BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac and 802.11ax
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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/ax(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/ax(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 Technology	DSSS, OFDM, OFDMA	
Product Type	☒ Mobile ☐ Portable ☐ Fix Location	
Antenna System (eg., MIMO, Smart Antenna)	Cyclic Delay Diversity (CDD) for 802.11b/g Multi Input Multi Output (MIMO) for 802.11n/ax	
Categorization as Correlated or Completely Uncorrelated	Categorization as Correlated for 802.11b/g Categorization as Uncorrelated for 802.11n/ax	
Antenna Type	Main Antenna	FPC Antenna
	Aux. Antenna	
Antenna Gain	Main Antenna	4.4 dBi
	Aux. Antenna	3.86 dBi
Total directional gain	For power spectral density (PSD) measurements	Correlated: 7.14 dBi Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: 4.14 dBi Formulas: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / NANT]$ dBi
	For power measurements	Correlated: 7.14 dBi Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: 4.14 dBi Formulas: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / NANT]$ dBi
	For Conducted Out-of-Band	Correlated: 7.14 dBi

	and Spurious Measurements	Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: 4.14 dBi Formulas: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / NANT]$ dBi
About the Product		Only the WIFI 802.11b, 802.11g, 802.11n (HT20/40) and 802.11ax (HE20/40) was tested in this report.

Mode	Antenna		
	Main Antenna	Aux. Antenna	MIMO
802.11b	√	√	√
802.11g	√	√	√
802.11n20	√	√	√
802.11n40	√	√	√
802.11ax20	√	√	√
802.11ax40	√	√	√
Note: All the configurations were tested, but only the worst case was reported in this report.			

802.11ax RU configuration table					
Mode	Full RU (SU)	RU_26	RU_52	RU_106	RU_242
802.11ax20	√	--	--	--	--
802.11ax40	√	--	--	--	--

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
OFDMA (802.11ax-20 MHz)	BPSK	4
	QPSK	16/24/17/26
	16QAM	33/49/34/52
	64QAM	65/73/81/69/77/86
	256QAM	98/108/103/115
	1024QAM	122/135/129/143
OFDMA (802.11ax-40 MHz)	BPSK	8/9
	QPSK	33/49/34/52
	16QAM	65/98/69/103
	64QAM	130/146/163/138/155/172
	256QAM	195/217/207/229
	1024QAM	244/271/258/287

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/ 11ax20/11ax40	1/6/6.5/13.5/ 4/8 Mbps	1/6/11	3/6/9
Occupied Bandwidth	11b/11g/11n20/11n40/ 11ax20/11ax40	1/6/6.5/13.5/ 4/8 Mbps	1/6/11	3/6/9
Conducted Spurious Emission	11b/11g/11n20/11n40/ 11ax20/11ax40	1/6/6.5/13.5/ 4/8 Mbps	1/6/11	3/6/9
Conducted Emission	11b/11g/11n20/11n40/ 11ax20/11ax40	1/6/6.5/13.5/ 4/8 Mbps	1/6/11	3/6/9
Radiated Spurious Emission	11b/11g/11n20/11n40/ 11ax20/11ax40	1/6/6.5/13.5/ 4/8 Mbps	1/6/11	3/6/9
Band Edge	11b/11g/11n20/11n40/ 11ax20/11ax40	1/6/6.5/13.5/ 4/8 Mbps	1/6/11	3/6/9
Power spectral density (PSD)	11b/11g/11n20/11n40/ 11ax20/11ax40	1/6/6.5/13.5/ 4/8 Mbps	1/6/11	3/6/9

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

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Intentional radiators of radio frequency equipment
2	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
3	RSS-247 Issue 3	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	Occupied 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: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

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	45% to 69%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+20.8℃ to +25.1℃
Working Voltage of the EUT	NV (Normal Voltage)	12.0 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY56060183	2024.08.01	2025.07.31
Power Sensor	KEYSIGHT	U2063XA	MY58000247	2024.07.04	2025.07.03
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2024.08.01	2025.07.31
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	01631	2022.02.23	2025.02.22
				2025.02.22	2028.02.21
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2024.06.15	2027.06.14
Anechoic Chamber	RAINFORD	9m*6m*6m	144	2022.02.19	2025.09.03
Amplifier	COM-MV	LSCX_LNA1-12G-01	180602	2024.08.01	2025.07.31
Amplifier	COM-MV	XKu_LNA7-18G-01	180601	2024.08.01	2025.07.31
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2024.08.01	2025.07.31
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9168	9168-01162	2023.08.04	2026.08.03
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2024.01.23	2027.01.22
Amplifier	COM-MV	ZT30-1000M	B2018054558	2024.11.28	2025.11.27
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2024.07.13	2027.07.12
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2024.08.01	2025.07.31
LISN	SCHWARZBECK	NSLK 8127	8127-687	2024.05.09	2025.05.08
Shielded Enclosure	YiHeng Electronic Co., Ltd	3.5m*3.1m*2.8m	112	2025.02.14	2028.02.13

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	V22.930	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	0.8℃
Humidity	4%

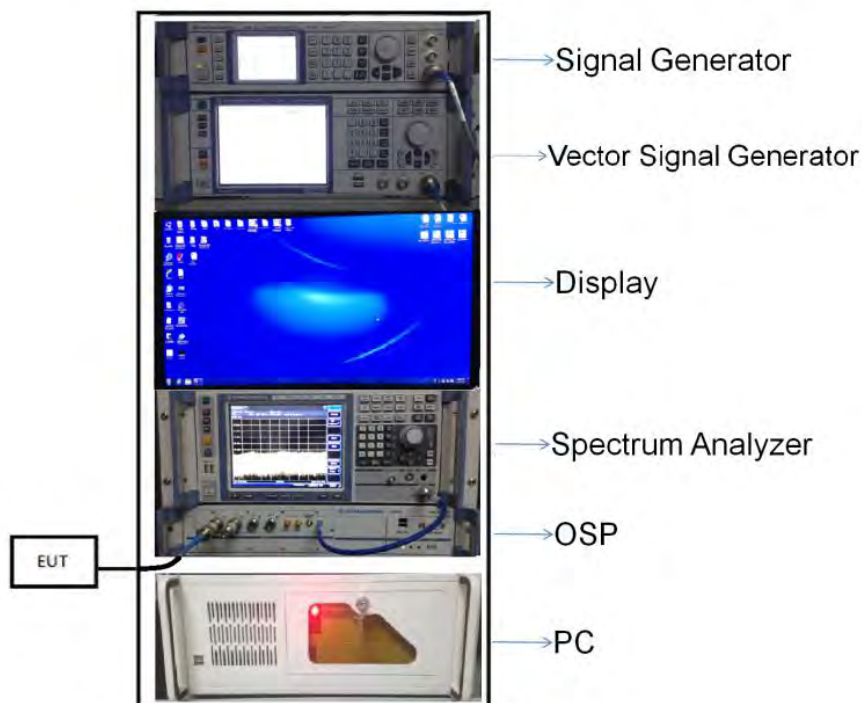
4.5 Description of Test Setup

4.5.1 For Antenna Port Test

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

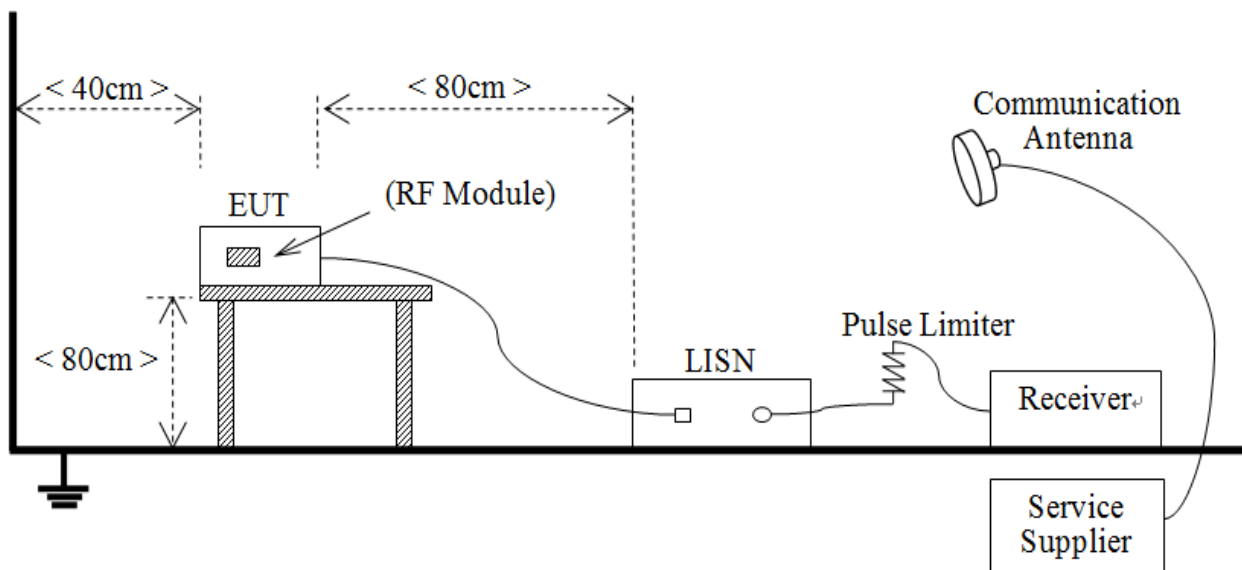
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



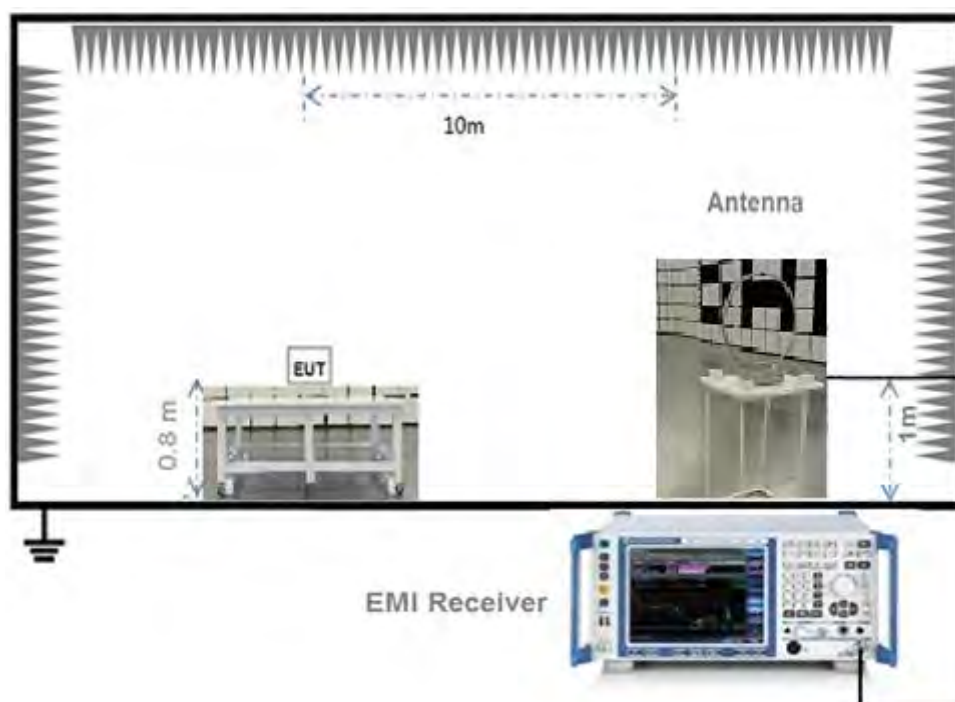
(Diagram 1)

4.5.2 For AC Power Supply Port Test



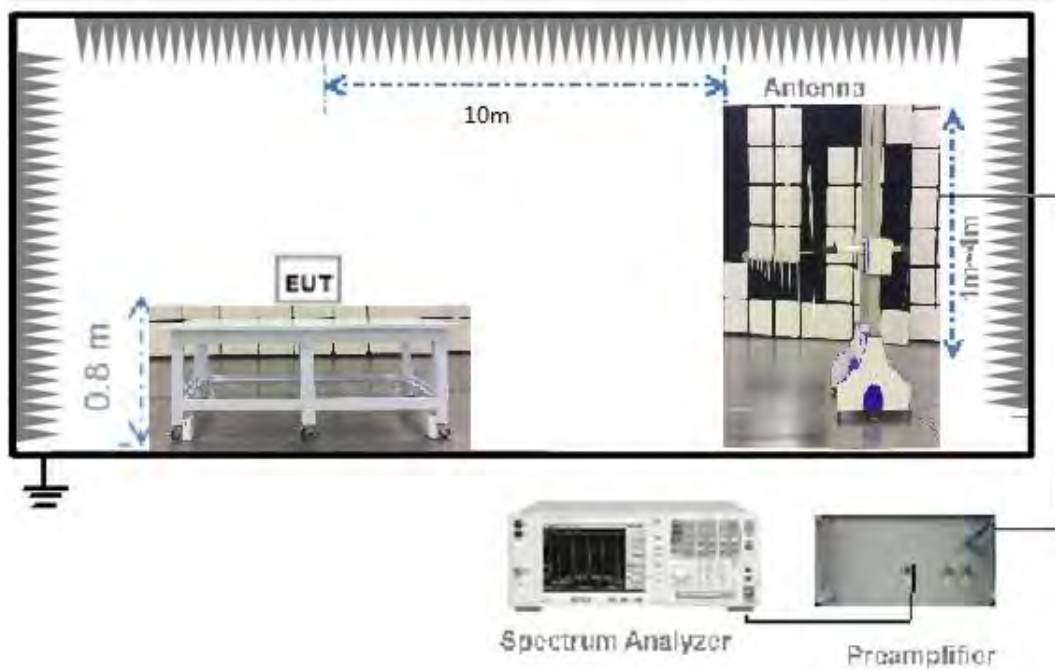
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



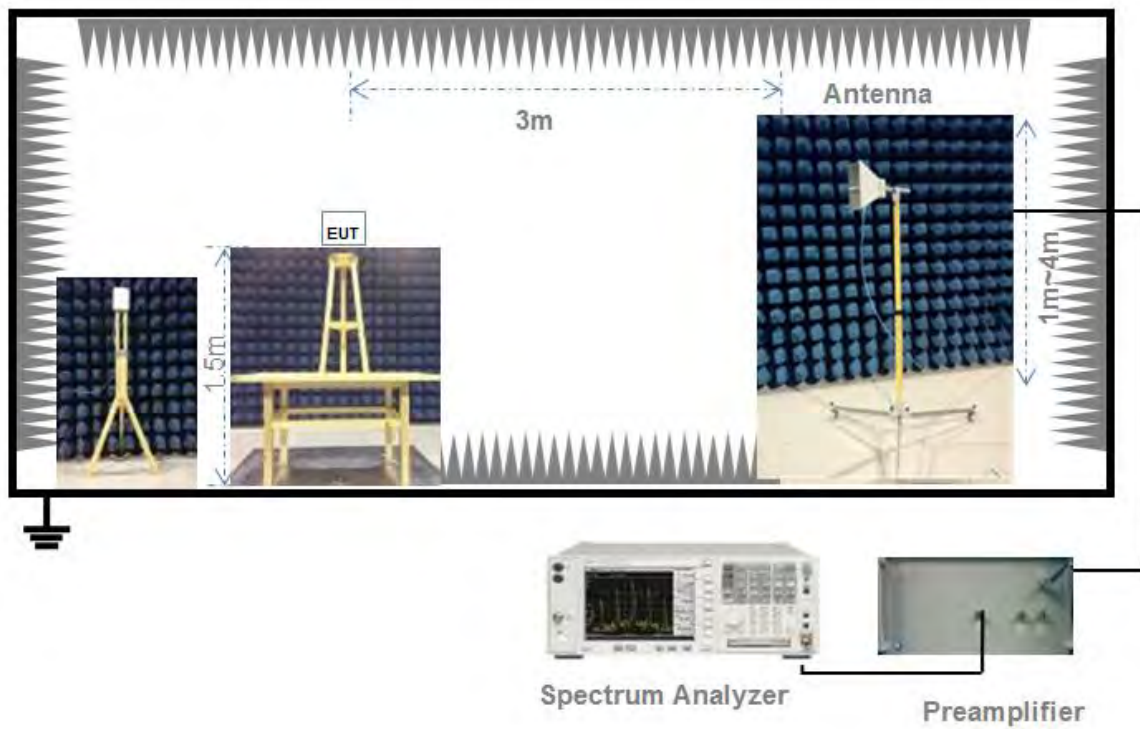
(Diagram 3)

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.

The EUT shall be transmitted at its maximum power control level.

$EIRP = \text{Maximum peak conducted output power} + \text{Antenna Gain}$.

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.
- 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.

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 Occupied 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) ≥ 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 $[10 \log (\text{OBW/RBW})]$ 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:

1. 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.
2. 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

Duty Cycle

Test Mode	On Time (ms)	On+Off time (ms)	Duty Cycle	Duty Factor
802.11b	8.374	9.405	89.04%	0.50
802.11g	1.388	2.416	57.45%	2.41
802.11n-20 MHz	1.299	2.325	55.87%	2.53
802.11n-40 MHz	0.6409	1.667	38.45%	4.15
802.11ax-20 MHz	1.011	2.037	49.63%	3.04
802.11ax-40 MHz	0.53	1.556	34.06%	4.68

Peak Power Test DataSISO-Main Antenna

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	12.13	16.33	30	1000	Pass
Middle	13.00	19.95			Pass
High	12.76	18.88			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	20.57	114.02	30	1000	Pass
Middle	20.63	115.61			Pass
High	20.79	119.95			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	22.96	197.70	30	1000	Pass
Middle	21.33	135.83			Pass
High	20.35	108.39			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	18.77	75.34	30	1000	Pass
Middle	19.45	88.10			Pass
High	18.92	77.98			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	20.59	114.55	30	1000	Pass
Middle	20.52	112.72			Pass
High	20.71	117.76			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	19.72	93.76	30	1000	Pass
Middle	19.33	85.70			Pass
High	19.74	94.19			Pass

SISO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	12.40	17.38	30	1000	Pass
Middle	13.23	21.04			Pass
High	13.04	20.14			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	20.78	119.67	30	1000	Pass
Middle	20.72	118.03			Pass
High	20.87	122.18			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	23.01	199.99	30	1000	Pass
Middle	21.45	139.64			Pass
High	20.45	110.92			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	18.88	77.27	30	1000	Pass
Middle	19.52	89.54			Pass
High	19.07	80.72			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	20.81	120.50	30	1000	Pass
Middle	20.71	117.76			Pass
High	20.79	119.95			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	20.02	100.46	30	1000	Pass
Middle	19.61	91.41			Pass
High	19.86	96.83			Pass

MIMO-Main Antenna

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	8.73	7.46	30	1000	Pass
Middle	9.73	9.40			Pass
High	9.65	9.23			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	17.19	52.36	30	1000	Pass
Middle	17.53	56.62			Pass
High	17.61	57.68			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	19.79	95.28	30	1000	Pass
Middle	18.17	65.61			Pass
High	17.29	53.58			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	15.38	34.51	30	1000	Pass
Middle	16.23	41.98			Pass
High	15.75	37.58			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	17.36	54.45	30	1000	Pass
Middle	17.17	52.12			Pass
High	17.47	55.85			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.66	46.34	30	1000	Pass
Middle	15.97	39.54			Pass
High	16.40	43.65			Pass

MIMO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.04	8.02	30	1000	Pass
Middle	10.14	10.33			Pass
High	9.96	9.91			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	17.41	55.08	30	1000	Pass
Middle	17.58	57.28			Pass
High	17.76	59.70			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	19.77	94.84	30	1000	Pass
Middle	18.36	68.55			Pass
High	17.15	51.88			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	15.66	36.81	30	1000	Pass
Middle	16.14	41.11			Pass
High	15.88	38.73			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	17.67	58.48	30	1000	Pass
Middle	17.49	56.10			Pass
High	17.71	59.02			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.64	46.13	30	1000	Pass
Middle	16.47	44.36			Pass
High	16.79	47.75			Pass

MIMO**802.11b Mode:**

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.90	15.48	28.86	769	Pass
Middle	12.95	19.72			Pass
High	12.82	19.13			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	20.31	107.44	28.86	769	Pass
Middle	20.57	113.90			Pass
High	20.70	117.38			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	22.79	190.12	30	1000	Pass
Middle	21.28	134.16			Pass
High	20.23	105.46			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	18.53	71.33	30	1000	Pass
Middle	19.20	83.09			Pass
High	18.83	76.31			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	20.53	112.93	30	1000	Pass
Middle	20.34	108.22			Pass
High	20.60	114.87			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	S	92.48	30	1000	Pass
Middle	19.24	83.90			Pass
High	19.61	91.40			Pass

Average Power Test DataSISO-Main Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.46	8.83	30	1000	Pass
Middle	9.90	9.77			Pass
High	9.82	9.59			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.51	8.93	30	1000	Pass
Middle	8.85	7.67			Pass
High	8.47	7.03			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.55	11.35	30	1000	Pass
Middle	9.88	9.73			Pass
High	9.64	9.20			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.29	10.69	30	1000	Pass
Middle	10.17	10.40			Pass
High	10.44	11.07			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.53	11.30	30	1000	Pass
Middle	9.99	9.98			Pass
High	9.55	9.02			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.21	10.50	30	1000	Pass
Middle	9.93	9.84			Pass
High	10.32	10.76			Pass

SISO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.59	9.10	30	1000	Pass
Middle	10.12	10.28			Pass
High	10.00	10.00			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.69	9.31	30	1000	Pass
Middle	9.02	7.98			Pass
High	8.53	7.13			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.82	12.08	30	1000	Pass
Middle	10.12	10.28			Pass
High	9.86	9.68			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.59	11.46	30	1000	Pass
Middle	10.28	10.67			Pass
High	10.58	11.43			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.78	11.97	30	1000	Pass
Middle	10.06	10.14			Pass
High	9.83	9.62			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.44	11.07	30	1000	Pass
Middle	10.13	10.30			Pass
High	10.37	10.89			Pass

MIMO-Main Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	6.26	4.23	30	1000	Pass
Middle	6.80	4.79			Pass
High	6.75	4.73			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	6.35	4.32	30	1000	Pass
Middle	5.63	3.66			Pass
High	5.16	3.28			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.38	5.47	30	1000	Pass
Middle	6.66	4.63			Pass
High	6.31	4.28			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.22	5.27	30	1000	Pass
Middle	6.90	4.90			Pass
High	7.34	5.42			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.45	5.56	30	1000	Pass
Middle	6.84	4.83			Pass
High	6.22	4.19			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	6.98	4.99	30	1000	Pass
Middle	6.79	4.78			Pass
High	7.24	5.30			Pass

MIMO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	6.24	4.21	30	1000	Pass
Middle	6.90	4.90			Pass
High	6.66	4.63			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	6.56	4.53	30	1000	Pass
Middle	5.80	3.80			Pass
High	5.15	3.27			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.66	5.83	30	1000	Pass
Middle	6.94	4.94			Pass
High	6.79	4.78			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.40	5.50	30	1000	Pass
Middle	7.13	5.16			Pass
High	7.26	5.32			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.49	5.61	30	1000	Pass
Middle	6.71	4.69			Pass
High	6.44	4.41			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.32	5.40	30	1000	Pass
Middle	7.06	5.08			Pass
High	7.24	5.30			Pass

MIMO**802.11b Mode:**

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.26	8.43	28.86	769	Pass
Middle	9.86	9.68			Pass
High	9.72	9.37			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	9.47	8.84	28.86	769	Pass
Middle	8.73	7.46			Pass
High	8.17	6.55			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.53	11.30	30	1000	Pass
Middle	9.81	9.58			Pass
High	9.57	9.05			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.32	10.77	30	1000	Pass
Middle	10.03	10.06			Pass
High	10.31	10.74			Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.48	11.17	30	1000	Pass
Middle	9.79	9.52			Pass
High	9.34	8.59			Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.16	10.38	30	1000	Pass
Middle	9.94	9.86			Pass
High	10.25	10.59			Pass

E.I.R.P Test Data (For ISSED)SISO-Main Antenna

802.11b Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	16.53	44.98	36	4	Pass
Middle	17.40	54.95			Pass
High	17.16	52.00			Pass

802.11g Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.97	314.05	36	4	Pass
Middle	25.03	318.42			Pass
High	25.19	330.37			Pass

802.11n-20 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	27.36	544.50	36	4	Pass
Middle	25.73	374.11			Pass
High	24.75	298.54			Pass

802.11n-40 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	23.17	207.49	36	4	Pass
Middle	23.85	242.66			Pass
High	23.32	214.78			Pass

802.11ax-20 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.99	315.50	36	4	Pass
Middle	24.92	310.46			Pass
High	25.11	324.34			Pass

802.11ax-40 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.12	258.23	36	4	Pass
Middle	23.73	236.05			Pass
High	24.14	259.42			Pass

SISO-Aux. Antenna

802.11b Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	16.26	42.27	36	4	Pass
Middle	17.09	51.17			Pass
High	16.90	48.98			Pass

802.11g Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.64	291.07	36	4	Pass
Middle	24.58	287.08			Pass
High	24.73	297.17			Pass

802.11n-20 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	26.87	486.41	36	4	Pass
Middle	25.31	339.63			Pass
High	24.31	269.77			Pass

802.11n-40 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	22.74	187.93	36	4	Pass
Middle	23.38	217.77			Pass
High	22.93	196.34			Pass

802.11ax-20 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.67	293.09	36	4	Pass
Middle	24.57	286.42			Pass
High	24.65	291.74			Pass

802.11ax-40 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	23.88	244.34	36	4	Pass
Middle	23.47	222.33			Pass
High	23.72	235.50			Pass

MIMO-Main Antenna**802.11b Mode:**

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	13.13	20.56	36	4	Pass
Middle	14.13	25.88			Pass
High	14.05	25.41			Pass

802.11g Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	21.59	144.21	36	4	Pass
Middle	21.93	155.96			Pass
High	22.01	158.85			Pass

802.11n-20 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.19	262.42	36	4	Pass
Middle	22.57	180.72			Pass
High	21.69	147.57			Pass

802.11n-40 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	19.78	95.06	36	4	Pass
Middle	20.63	115.61			Pass
High	20.15	103.51			Pass

802.11ax-20 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	21.76	149.97	36	4	Pass
Middle	21.57	143.55			Pass
High	21.87	153.82			Pass

802.11ax-40 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	21.06	127.64	36	4	Pass
Middle	20.37	108.89			Pass
High	20.80	120.23			Pass

MIMO-Aux. Antenna

802.11b Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	12.90	19.50	36	4	Pass
Middle	14.00	25.12			Pass
High	13.82	24.10			Pass

802.11g Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	21.27	133.97	36	4	Pass
Middle	21.44	139.32			Pass
High	21.62	145.21			Pass

802.11n-20 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	23.63	230.67	36	4	Pass
Middle	22.22	166.72			Pass
High	21.01	126.18			Pass

802.11n-40 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	19.52	89.54	36	4	Pass
Middle	20.00	100.00			Pass
High	19.74	94.19			Pass

802.11ax-20 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	21.53	142.23	36	4	Pass
Middle	21.35	136.46			Pass
High	21.57	143.55			Pass

802.11ax-40 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	20.50	112.20	36	4	Pass
Middle	20.33	107.89			Pass
High	20.65	116.14			Pass

MIMO**802.11b Mode:**

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	16.03	40.06	36	4	Pass
Middle	17.08	51.00			Pass
High	16.95	49.51			Pass

802.11g Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.44	278.18	36	4	Pass
Middle	24.70	295.27			Pass
High	24.83	304.07			Pass

802.11n-20 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	26.93	493.10	36	4	Pass
Middle	25.41	347.44			Pass
High	24.37	273.75			Pass

802.11n-40 MHz Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	22.66	184.60	36	4	Pass
Middle	23.34	215.61			Pass
High	22.96	197.70			Pass

802.11ax-20 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	24.66	292.20	36	4	Pass
Middle	24.47	280.01			Pass
High	24.73	297.36			Pass

802.11ax-40 MHz(SU) Mode:

Channel	E.I.R.P		Limit		Verdict
	dBm	mW	dBm	W	
Low	23.80	239.85	36	4	Pass
Middle	23.36	216.79			Pass
High	23.74	236.37			Pass

A.2 Occupied Bandwidth

Note: All antenna were pre tested, but only the worst case has been reported in this report.

Test Data

SISO-Main Antenna

802.11b Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	9.300000	12.439000	≥500
Middle	8.800000	12.450000	≥500
High	8.800000	12.470000	≥500

802.11g Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	15.300000	16.927000	≥500
Middle	15.300000	16.896000	≥500
High	15.300000	16.936000	≥500

802.11n-20MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	15.300000	18.043000	≥500
Middle	15.300000	18.054000	≥500
High	15.300000	18.028000	≥500

802.11n-40MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	35.300000	36.112000	≥500
Middle	35.300000	36.186000	≥500
High	35.300000	36.054000	≥500

802.11ax-20 MHz(SU) Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	16.400000	19.012000	≥500
Middle	16.300000	19.027000	≥500
High	15.600000	19.012000	≥500

802.11ax-40 MHz(SU) Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	35.300000	37.661000	≥ 500
Middle	35.300000	37.670000	≥ 500
High	35.300000	37.518000	≥ 500

Test Plots

SISO-Main Antenna

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



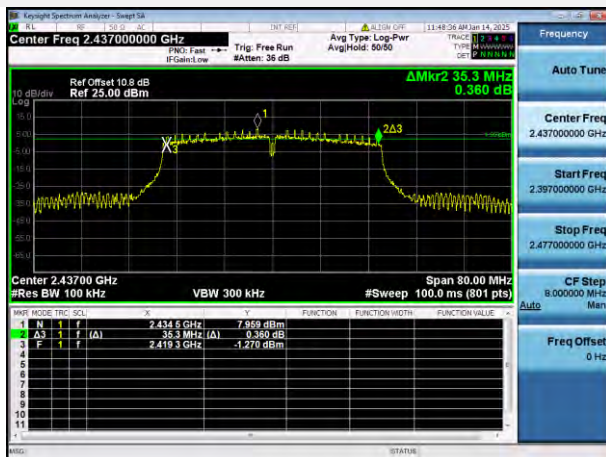
802.11n-20 MHz HIGH CHANNEL



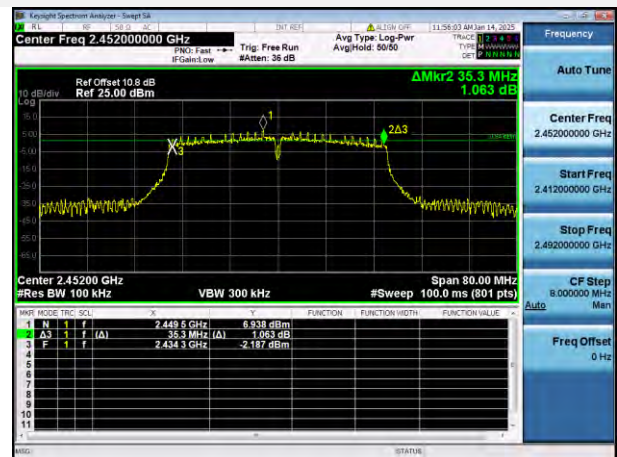
802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL



802.11n-40 MHz HIGH CHANNEL



802.11ax-20 MHz(SU) LOW CHANNEL



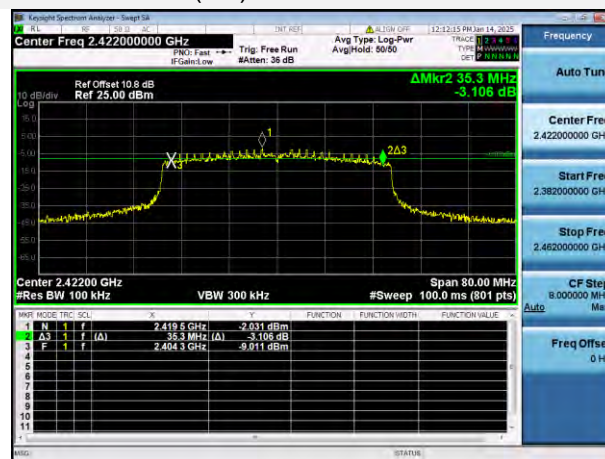
802.11ax-20 MHz(SU) MIDDLE CHANNEL



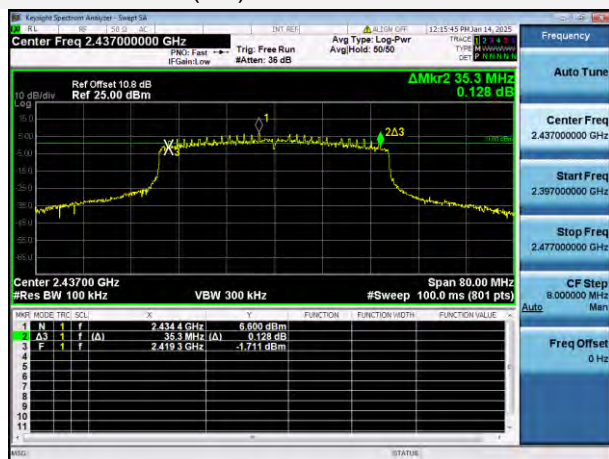
802.11ax-20 MHz(SU) HIGH CHANNEL



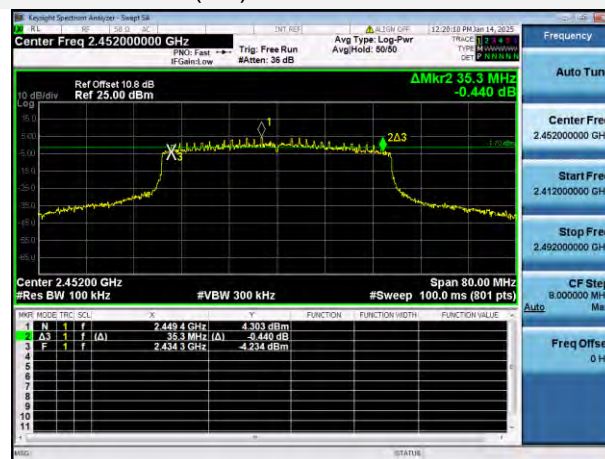
802.11ax-40 MHz(SU) LOW CHANNEL



802.11ax-40 MHz(SU) MIDDLE CHANNEL

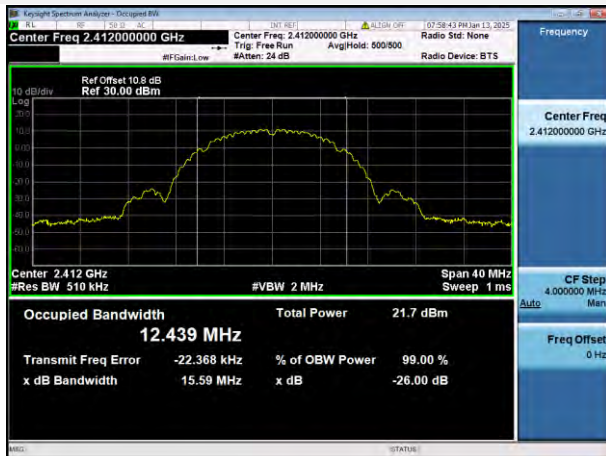


802.11ax-40 MHz(SU) HIGH CHANNEL

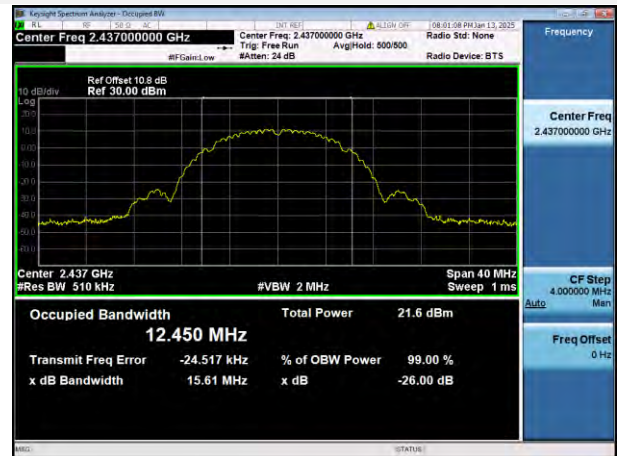


99% Bandwidth

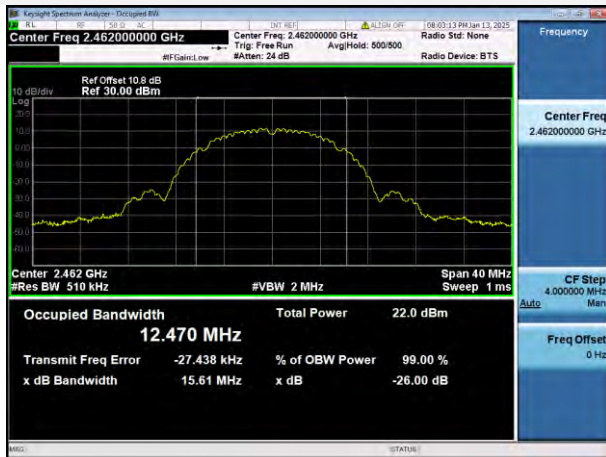
802.11b LOW CHANNEL



802.11b MIDDLE CHANNEL



802.11b HIGH CHANNEL



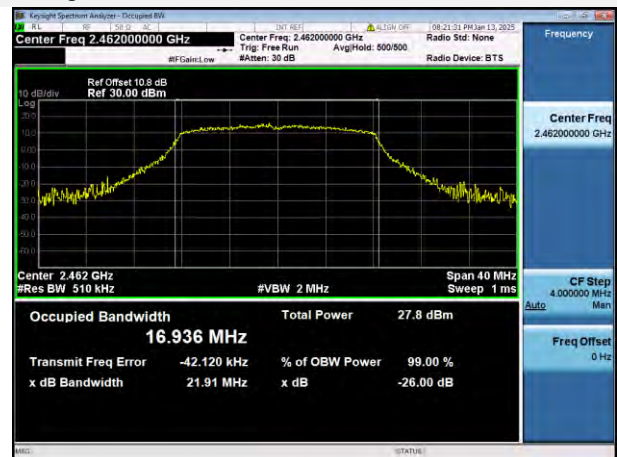
802.11g LOW CHANNEL



802.11g MIDDLE CHANNEL



802.11g HIGH CHANNEL



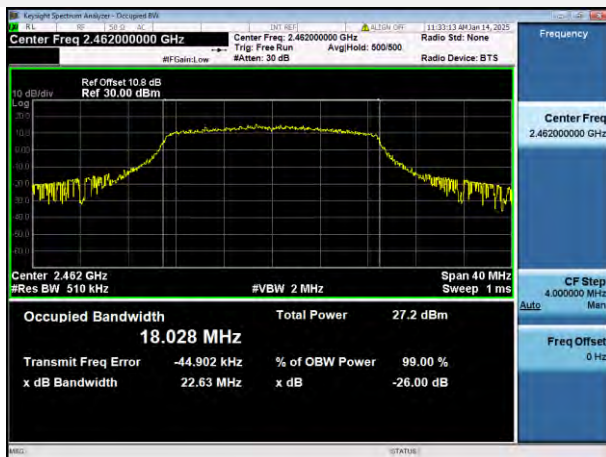
802.11n-20 MHz LOW CHANNEL



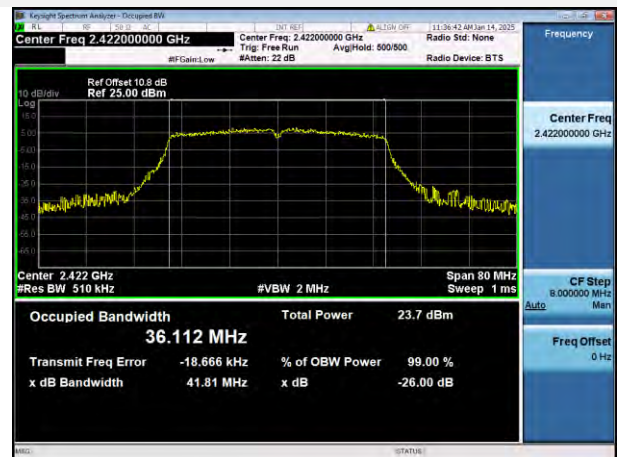
802.11n-20 MHz MIDDLE CHANNEL



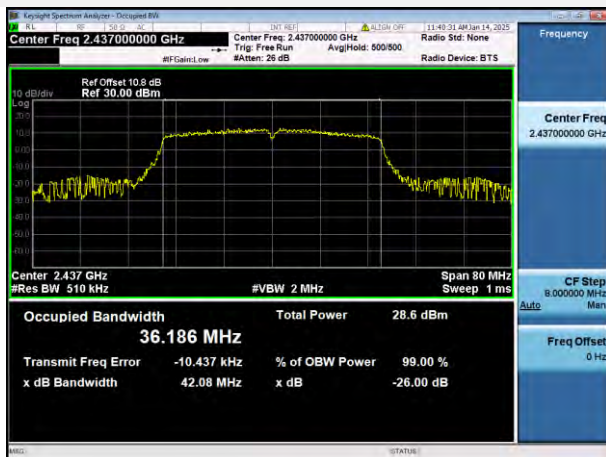
802.11n-20 MHz HIGH CHANNEL



802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL



802.11n-40 MHz HIGH CHANNEL



802.11ax-20 MHz(SU) LOW CHANNEL



802.11ax-20 MHz(SU) MIDDLE CHANNEL



802.11ax-20 MHz(SU) HIGH CHANNEL



802.11ax-40 MHz(SU) LOW CHANNEL



802.11ax-40 MHz(SU) MIDDLE CHANNEL



802.11ax-40 MHz(SU) HIGH CHANNEL



A.3 Conducted Spurious Emissions

Note: All antenna were pre tested, but only the worst case has been reported in this report.

Test Data

SISO-Main Antenna

802.11b Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-38.73	2.01	-17.99	Pass
Middle	-39.52	2.62	-17.38	Pass
High	-38.46	2.60	-17.40	Pass

802.11g Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-38.54	1.38	-18.62	Pass
Middle	-39.25	1.08	-18.92	Pass
High	-39.00	0.73	-19.27	Pass

802.11n-20MHz Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-38.84	1.01	-18.99	Pass
Middle	-39.65	0.64	-19.36	Pass
High	-39.25	0.49	-19.51	Pass

802.11n-40MHz Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-36.97	-2.21	-22.21	Pass
Middle	-38.73	-2.40	-22.40	Pass
High	-39.50	-1.65	-21.65	Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-38.86	0.86	-19.14	Pass
Middle	-38.95	0.93	-19.07	Pass
High	-39.14	0.81	-19.19	Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-38.41	-1.98	-21.98	Pass
Middle	-39.39	-2.28	-22.28	Pass
High	-39.08	-1.92	-21.92	Pass

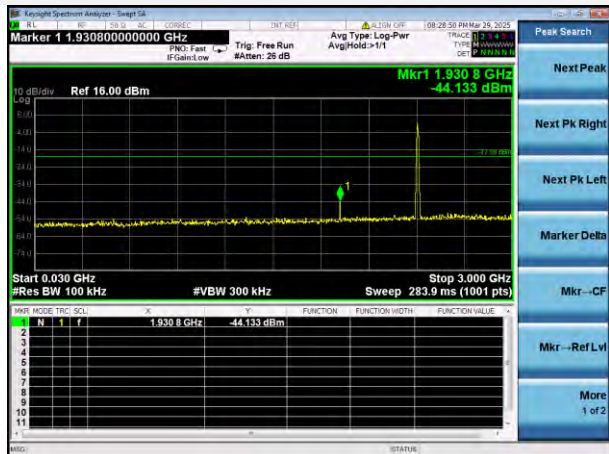
Test Plots

SISO-Main Antenna

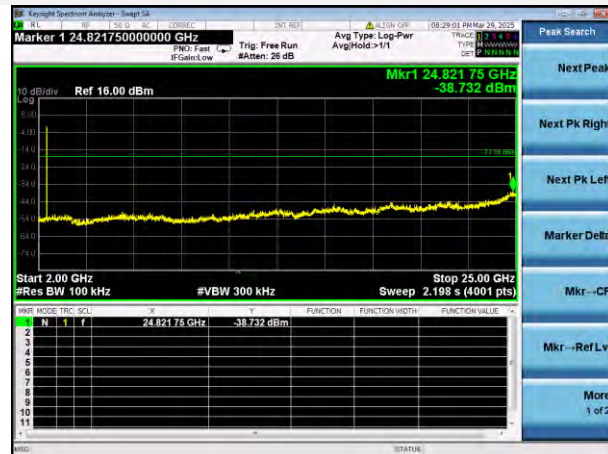
802.11b LOW CHANNEL CARRIER LEVEL



802.11b LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



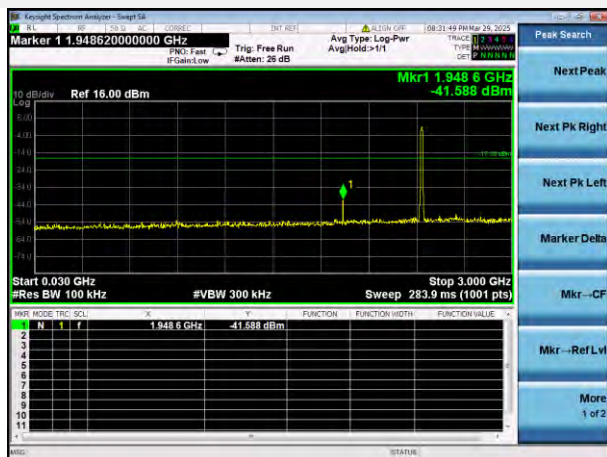
802.11b LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



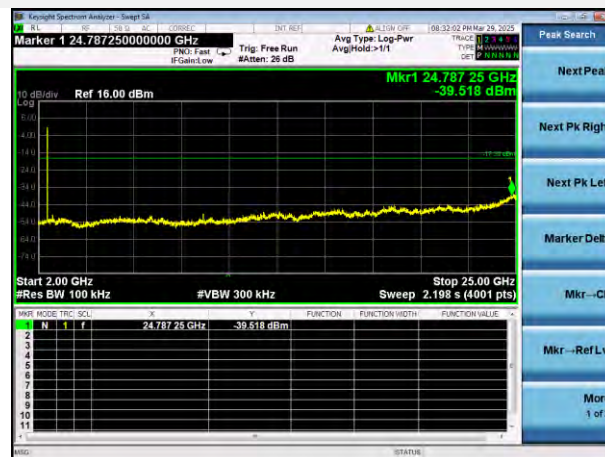
802.11b MIDDLE CHANNEL CARRIER LEVEL



802.11b MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



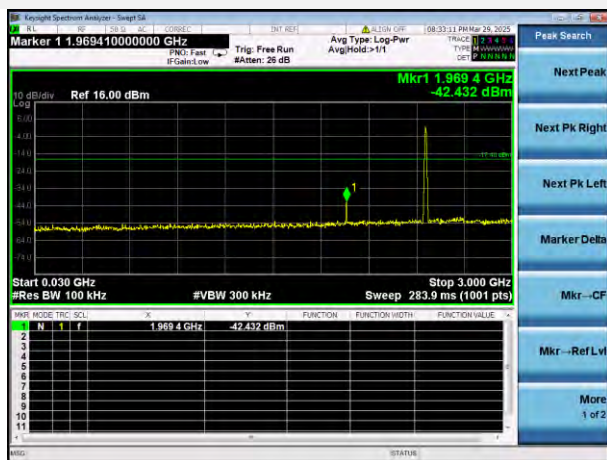
802.11b MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



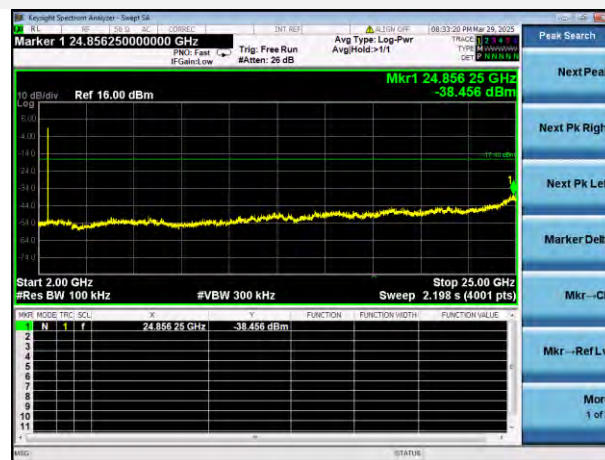
802.11b HIGH CHANNEL CARRIER LEVEL



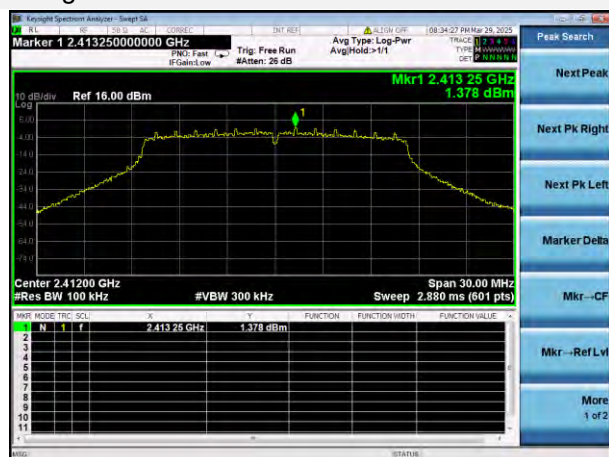
802.11b HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



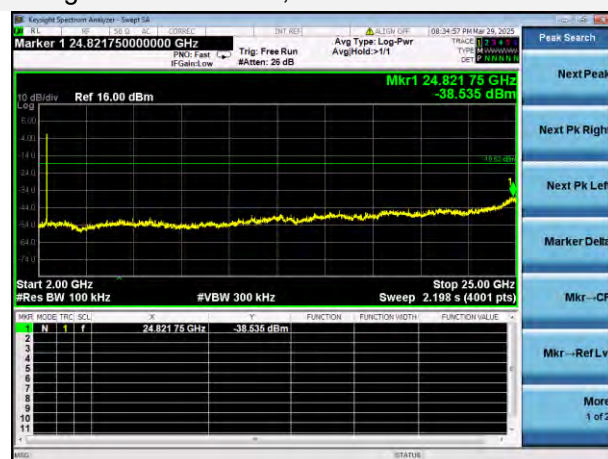
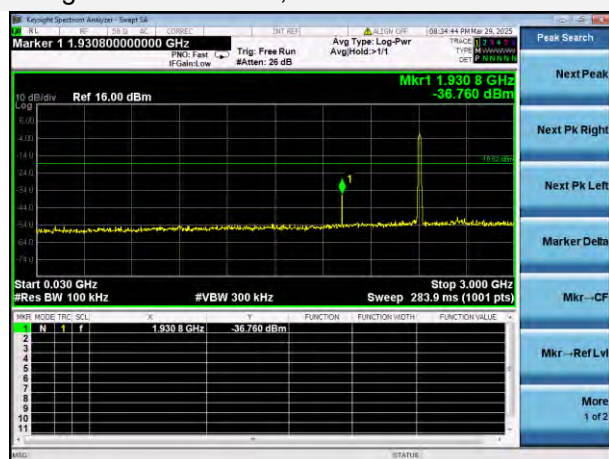
802.11b HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



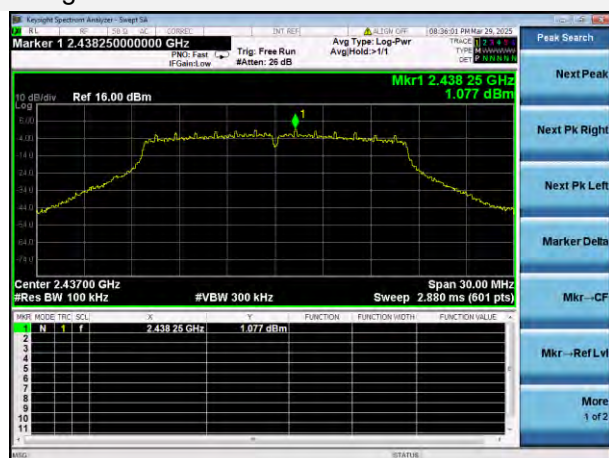
802.11g LOW CHANNEL CARRIER LEVEL



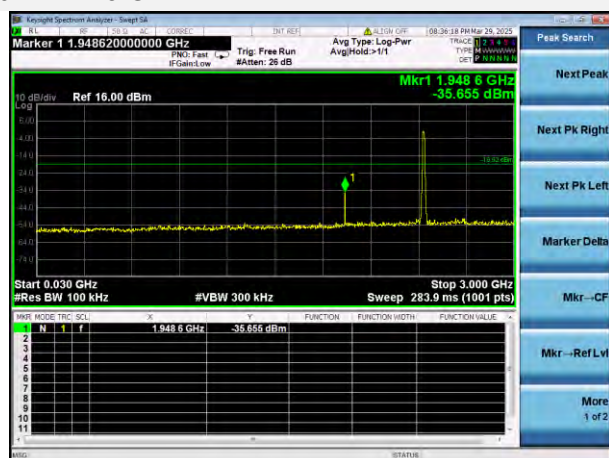
802.11g LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



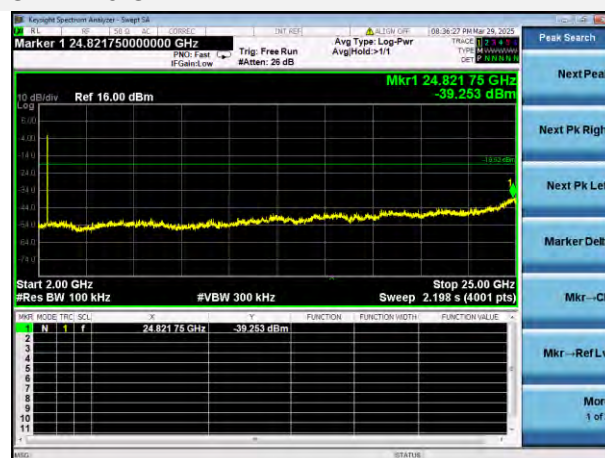
802.11g MIDDLE CHANNEL CARRIER LEVEL



802.11g MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



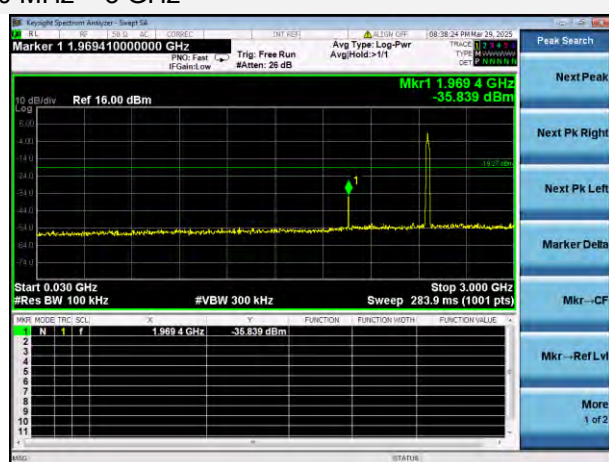
802.11g MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



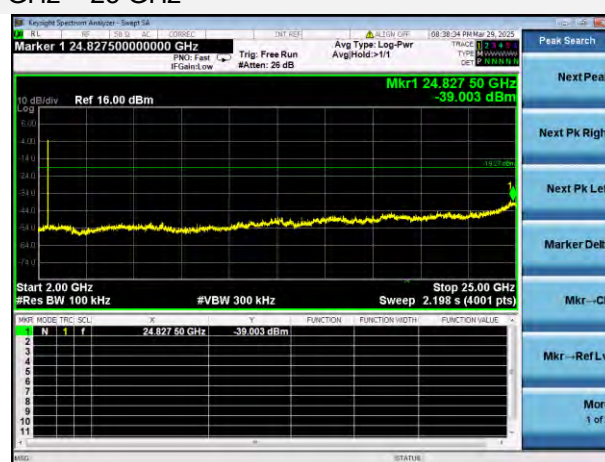
802.11g HIGH CHANNEL CARRIER LEVEL



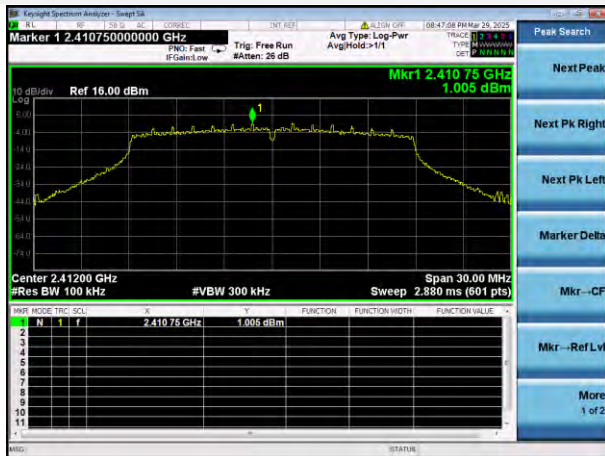
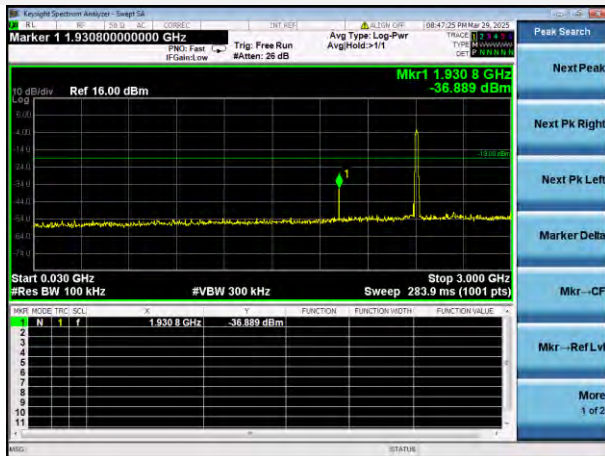
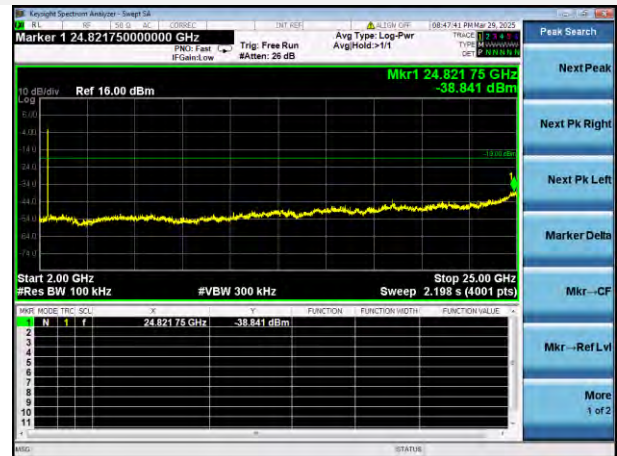
802.11g HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



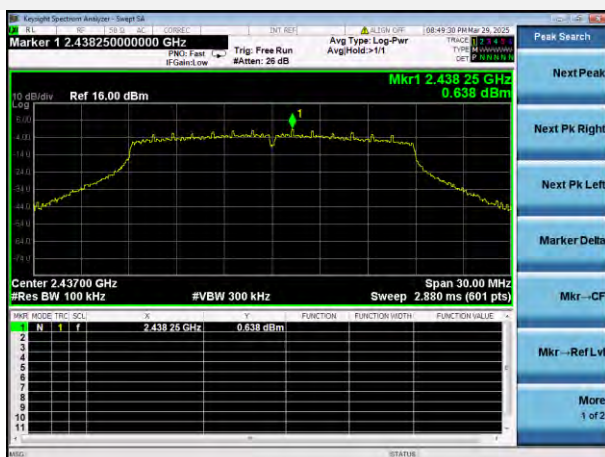
802.11g HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



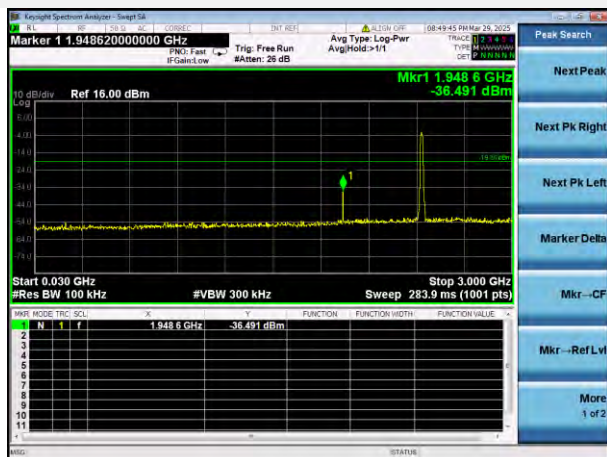
802.11n-20 MHz LOW CHANNEL CARRIER LEVEL

802.11n-20 MHz LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz802.11n-20 MHz LOW CHANNEL, SPURIOUS
2 GHz ~ 25 GHz

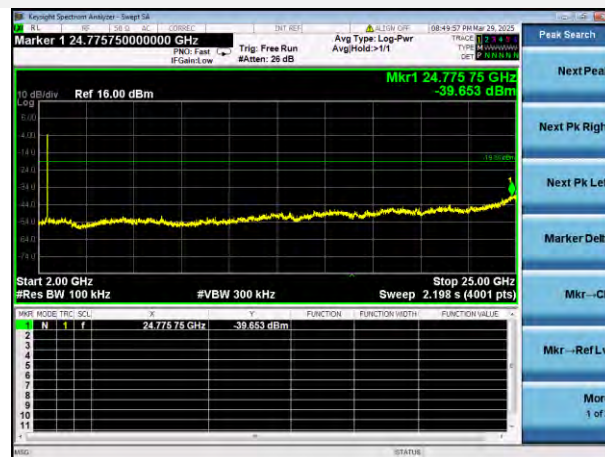
802.11n-20 MHz MIDDLE CHANNEL CARRIER LEVEL



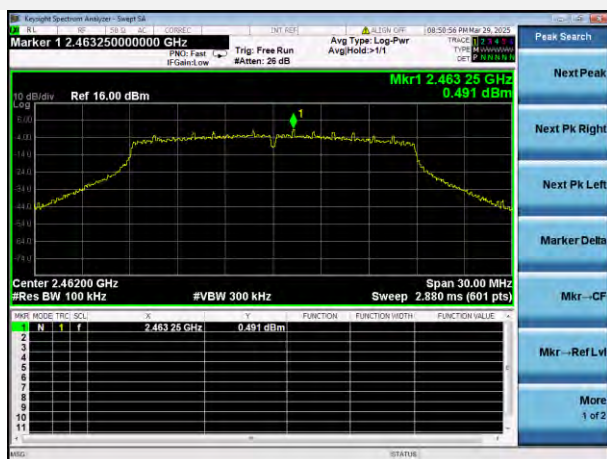
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



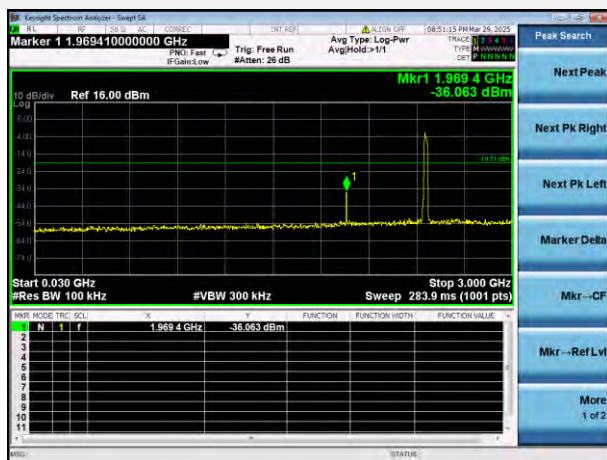
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



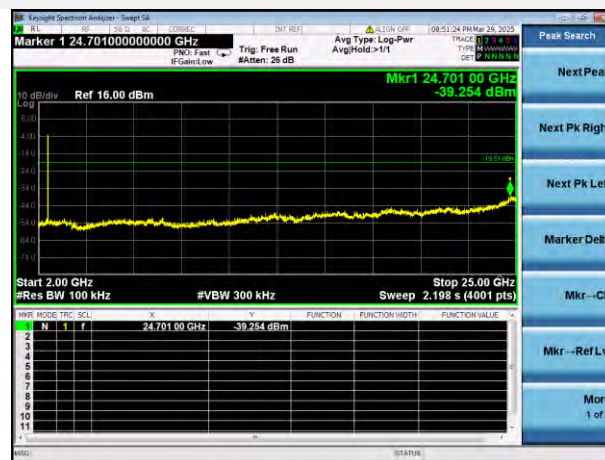
802.11n-20 MHz HIGH CHANNEL CARRIER LEVEL



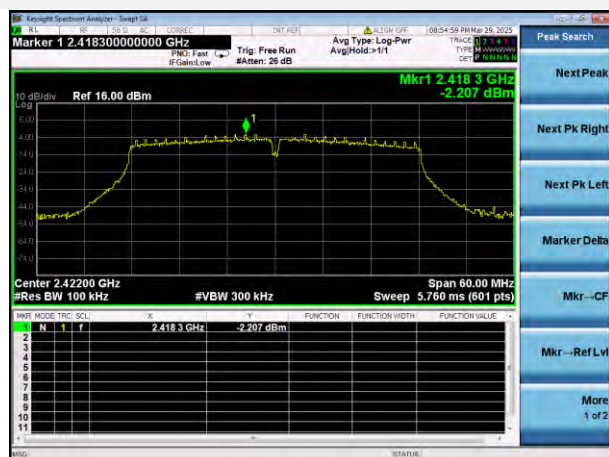
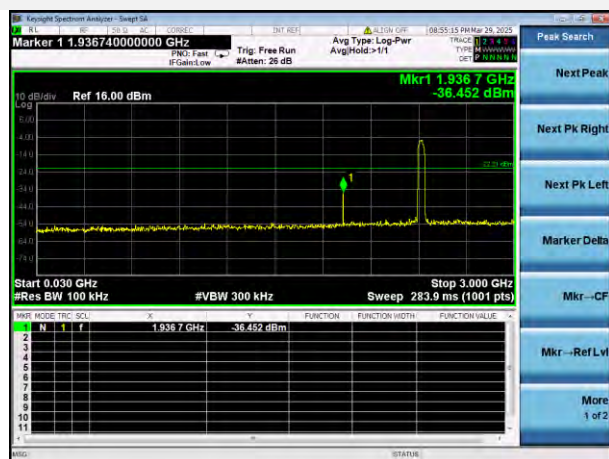
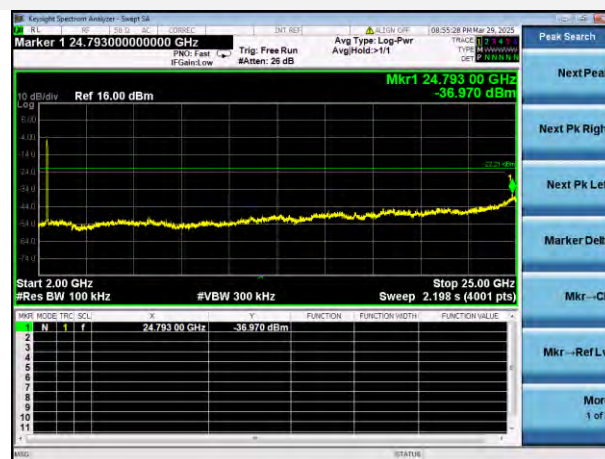
802.11n-20 MHz HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



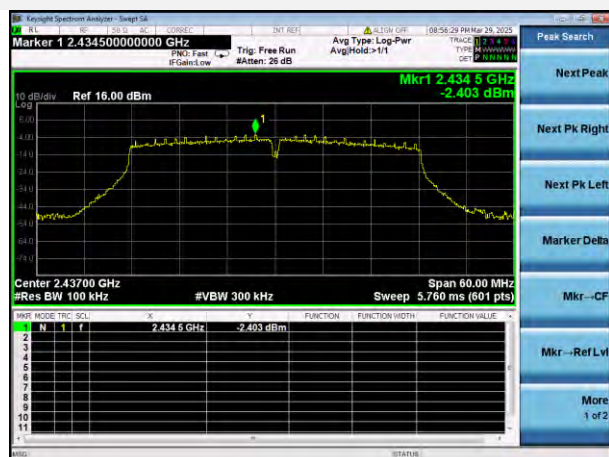
802.11n-20 MHz HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



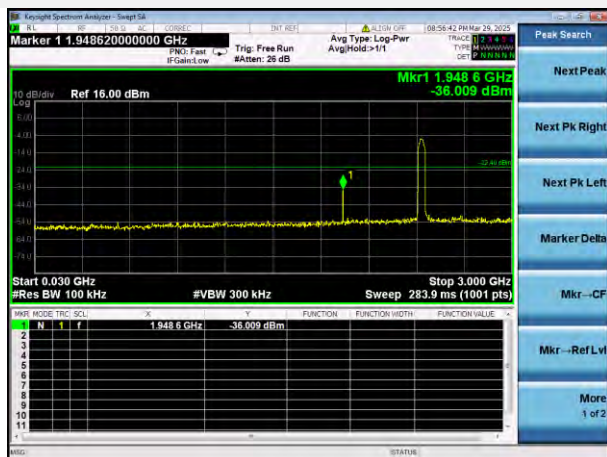
802.11n-40 MHz LOW CHANNEL CARRIER LEVEL

802.11n-40 MHz LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz802.11n-40 MHz LOW CHANNEL, SPURIOUS
2 GHz ~ 25 GHz

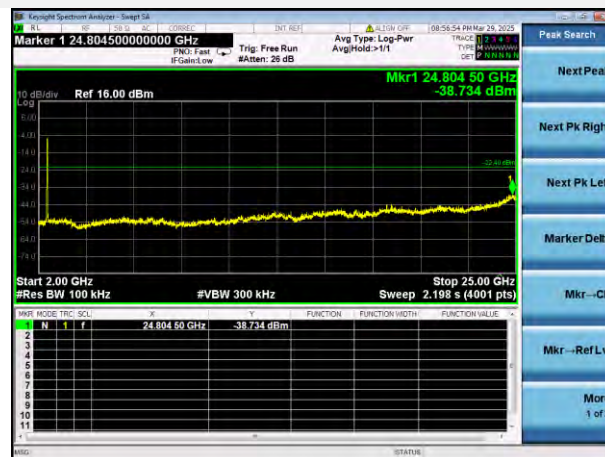
802.11n-40 MHz MIDDLE CHANNEL CARRIER LEVEL



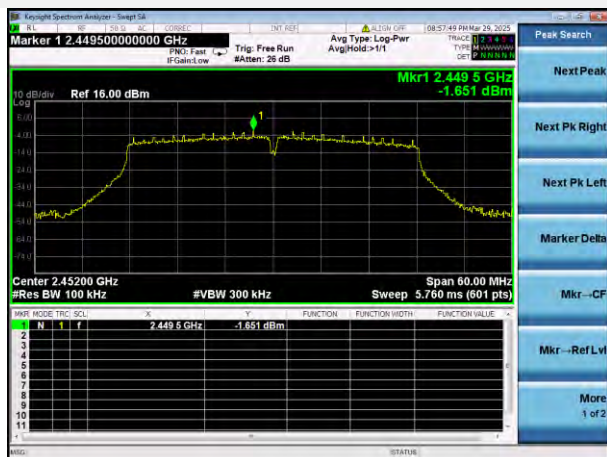
802.11n-40 MHz MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



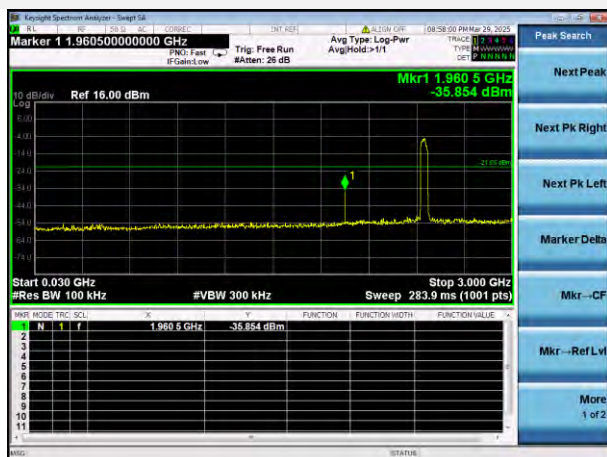
802.11n-40 MHz MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



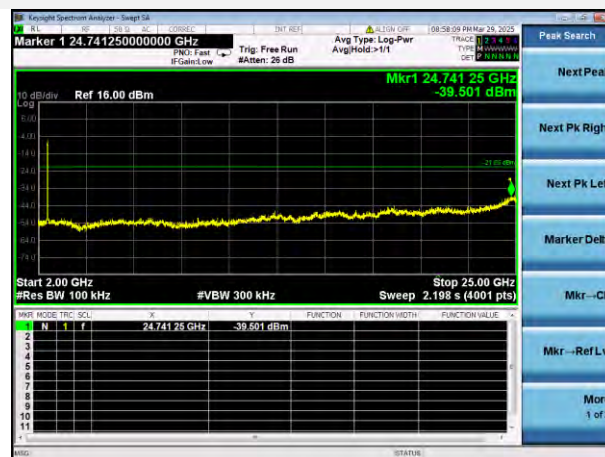
802.11n-40 MHz HIGH CHANNEL CARRIER LEVEL



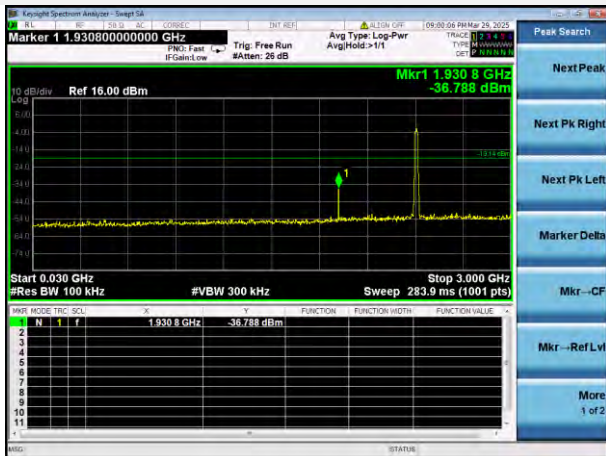
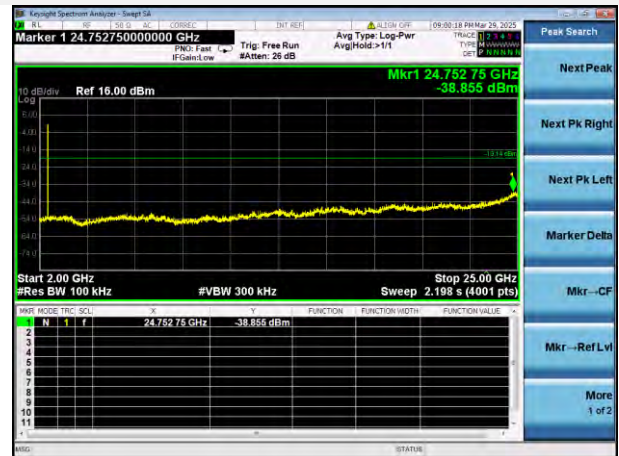
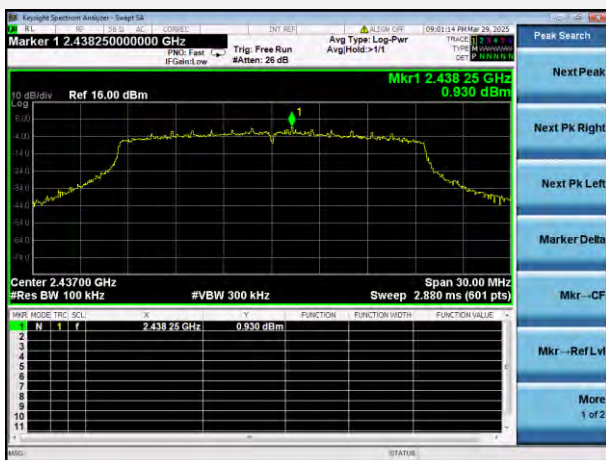
802.11n-40 MHz HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



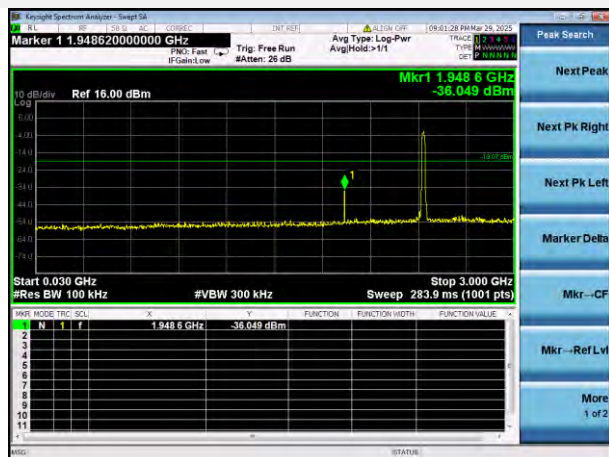
802.11n-40 MHz HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



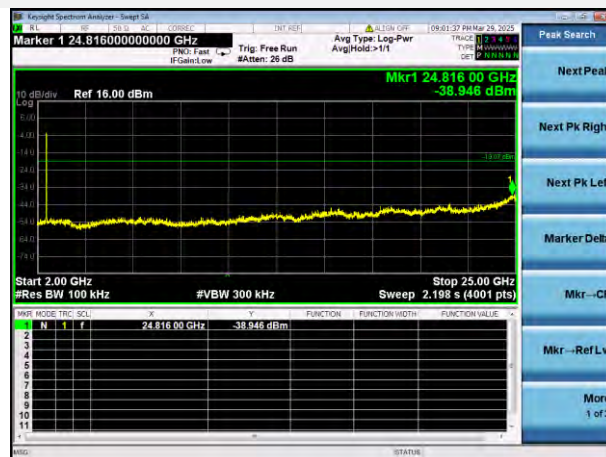
802.11ax-20 MHz(SU) LOW CHANNEL CARRIER LEVEL

802.11ax-20 MHz(SU) LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz802.11ax-20 MHz(SU) LOW CHANNEL, SPURIOUS
2 GHz ~ 25 GHz802.11ax-20 MHz(SU) MIDDLE CHANNEL CARRIER
LEVEL

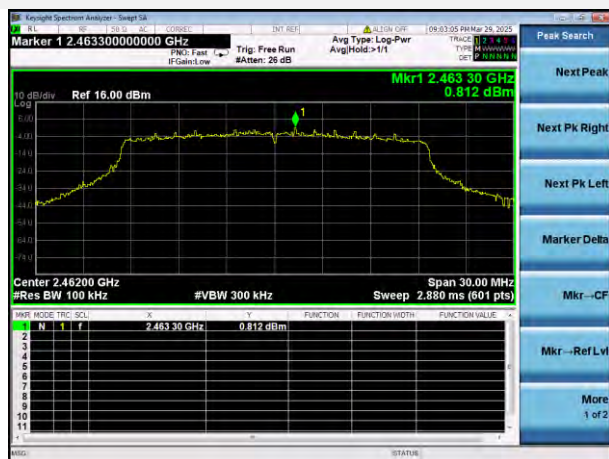
802.11ax-20 MHz(SU) MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



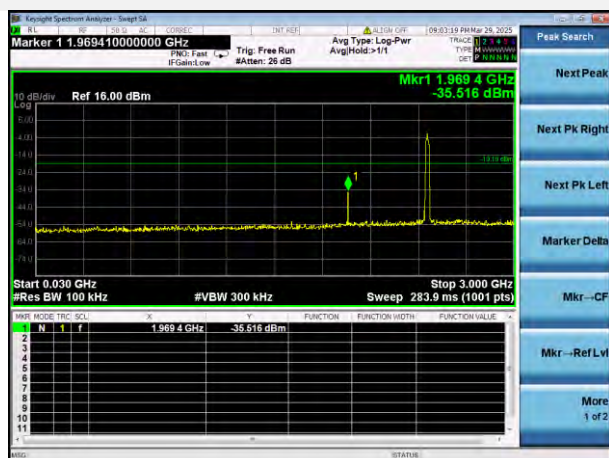
802.11ax-20 MHz(SU) MIDDLE CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



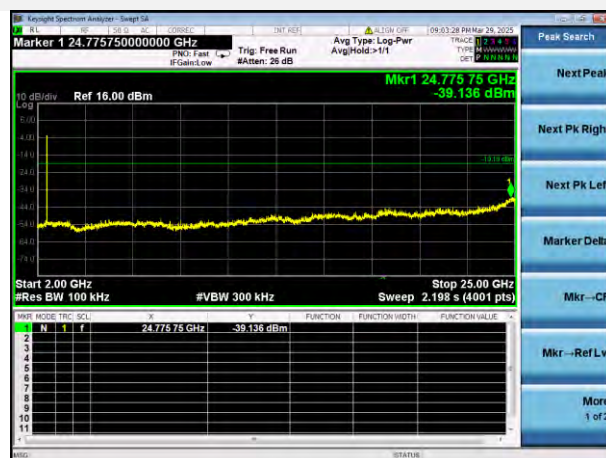
802.11ax-20 MHz(SU) HIGH CHANNEL CARRIER
LEVEL



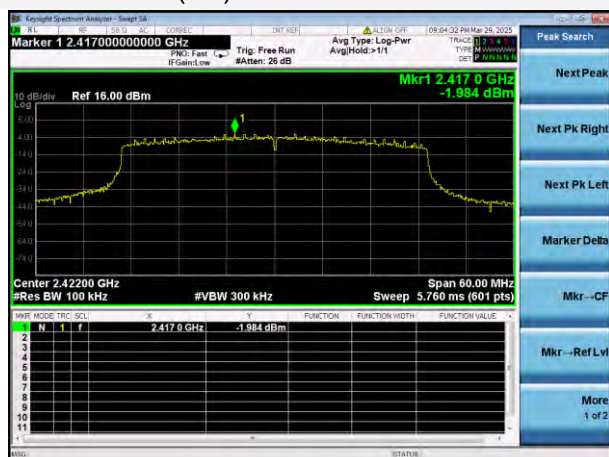
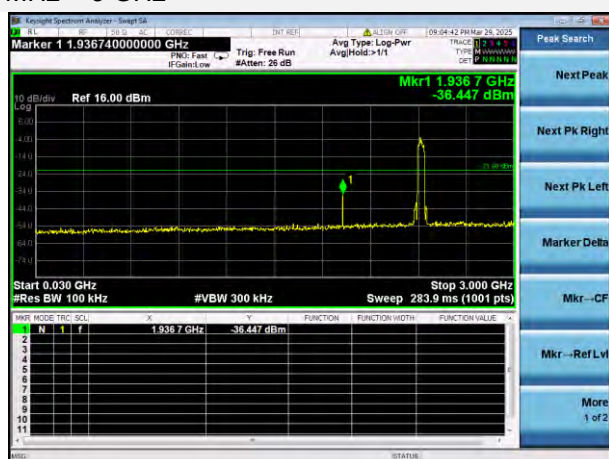
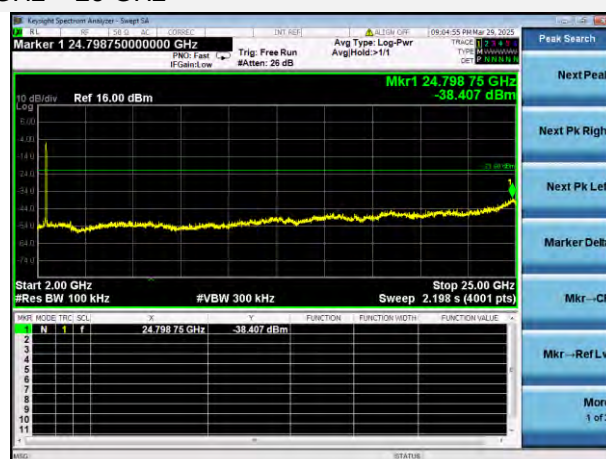
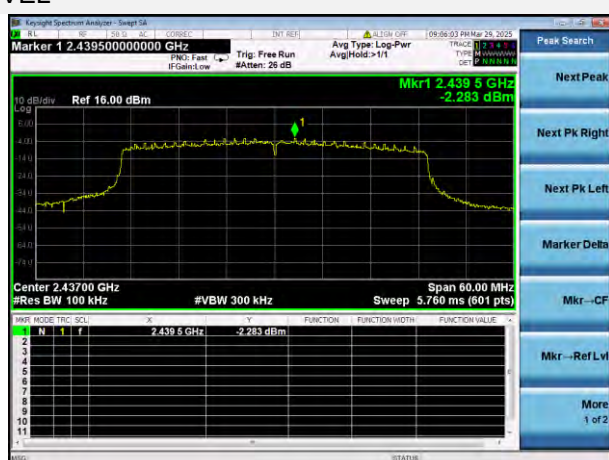
802.11ax-20 MHz(SU) HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



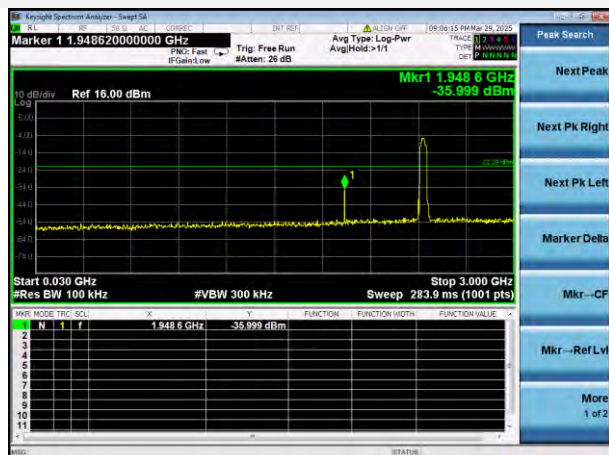
802.11ax-20 MHz(SU) HIGH CHANNEL, SPURIOUS
2 GHz ~ 25 GHz



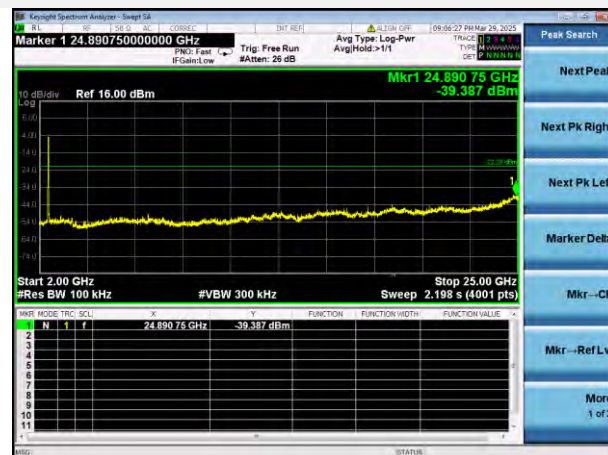
802.11ax-40 MHz(SU) LOW CHANNEL CARRIER LEVEL

802.11ax-40 MHz(SU) LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz802.11ax-40 MHz(SU) LOW CHANNEL, SPURIOUS
2 GHz ~ 25 GHz802.11ax-40 MHz(SU) MIDDLE CHANNEL CARRIER
LEVEL

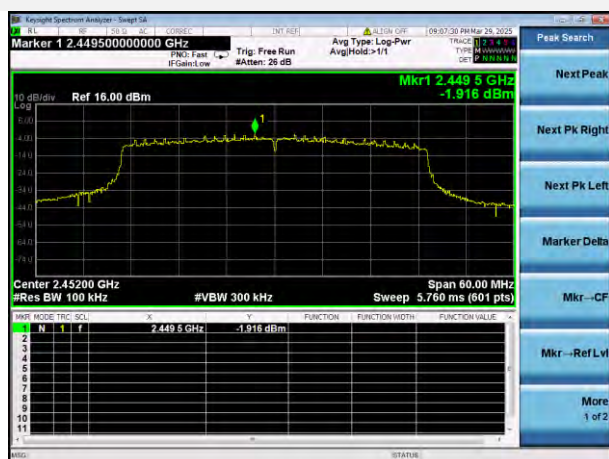
802.11ax-40 MHz(SU) MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



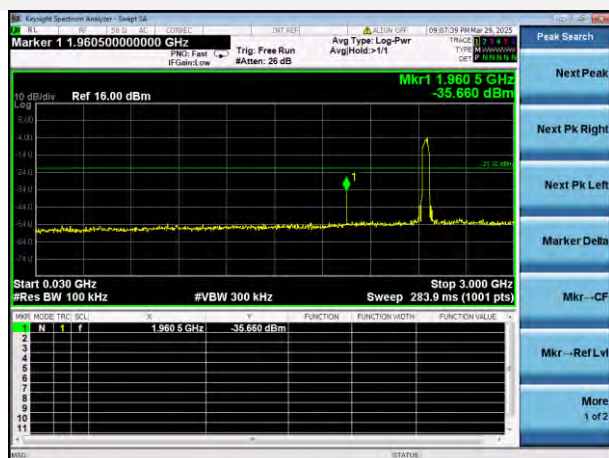
802.11ax-40 MHz(SU) MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



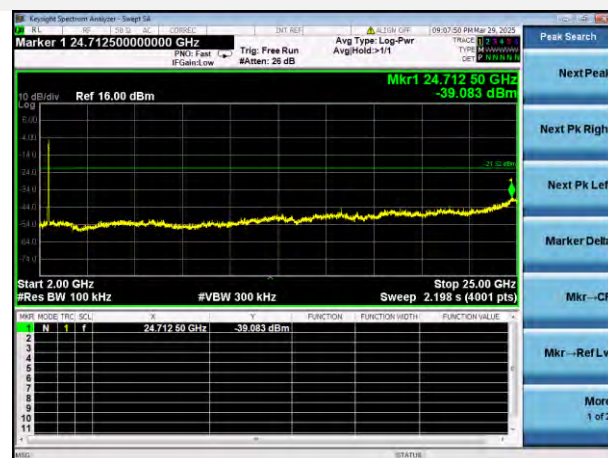
802.11ax-40 MHz(SU) HIGH CHANNEL CARRIER LEVEL



802.11ax-40 MHz(SU) HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



802.11ax-40 MHz(SU) HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



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

Note ¹: The 99% OBW of the fundamental emission is without 2 MHz of the authorized band.

Note ²: All antenna were pre tested, but only the worst case has been reported in this report.

Test Data

SISO-Main Antenna

802.11b Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-49.29	2.01	-17.99	Pass
High Channel	-51.45	2.60	-17.40	Pass

802.11g Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-36.13	1.38	-18.62	Pass
High Channel	-47.99	0.73	-19.27	Pass

802.11n-20 MHz Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-34.76	1.01	-18.99	Pass
High Channel	-46.93	0.49	-19.51	Pass

802.11n-40 MHz Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-39.60	-2.21	-22.21	Pass
High Channel	-46.41	-1.65	-21.65	Pass

802.11ax-20 MHz(SU) Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-32.31	0.86	-19.14	Pass
High Channel	-50.68	0.81	-19.19	Pass

802.11ax-40 MHz(SU) Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-33.95	-1.98	-21.98	Pass
High Channel	-43.54	-1.92	-21.92	Pass

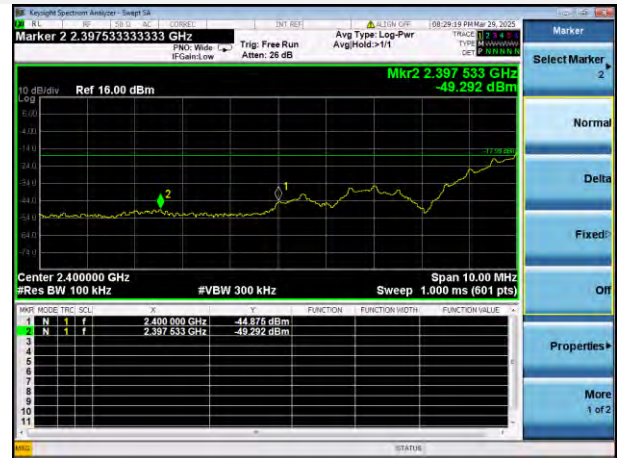
Test Plots

SISO-Main Antenna

802.11b LOW CHANNEL, CARRIER LEVEL



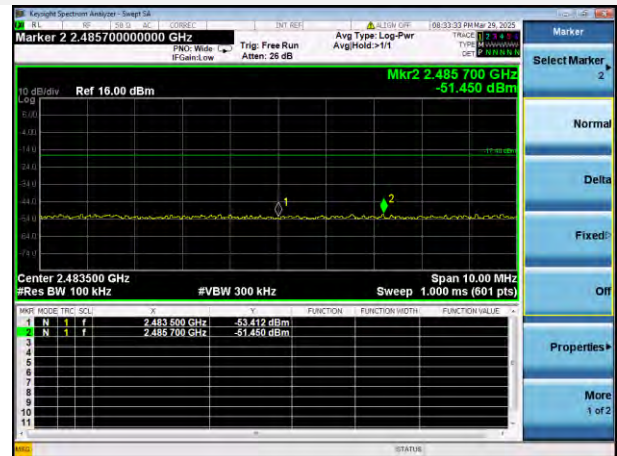
802.11b LOW CHANNEL, BAND EDGE



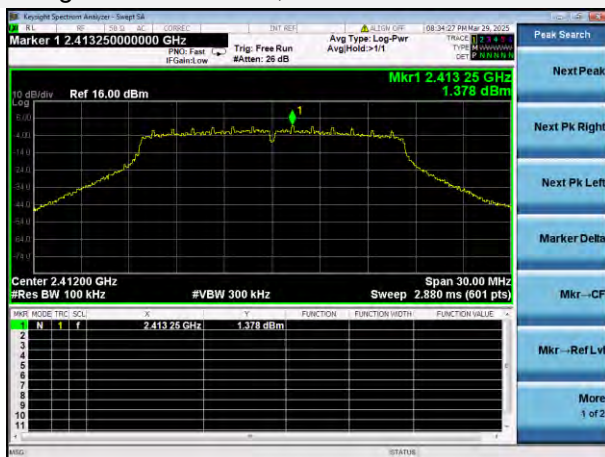
802.11b HIGH CHANNEL, CARRIER LEVEL



802.11b HIGH CHANNEL, BAND EDGE



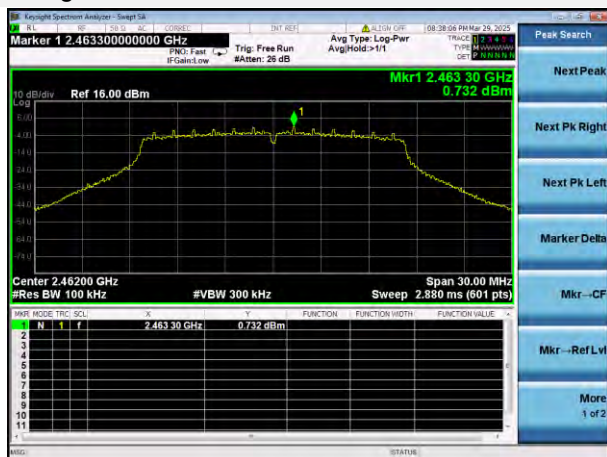
802.11g LOW CHANNEL, CARRIER LEVEL



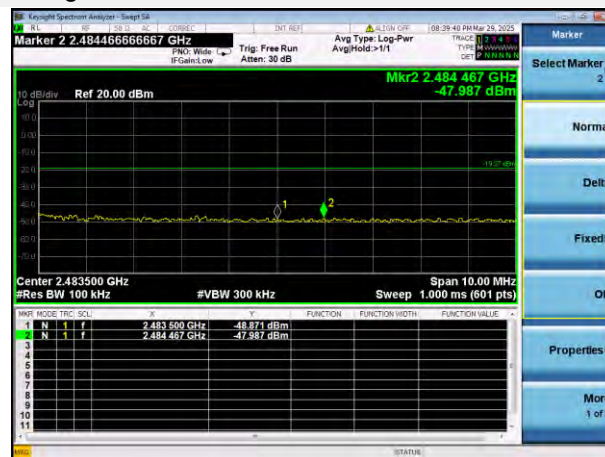
802.11g LOW CHANNEL, BAND EDGE



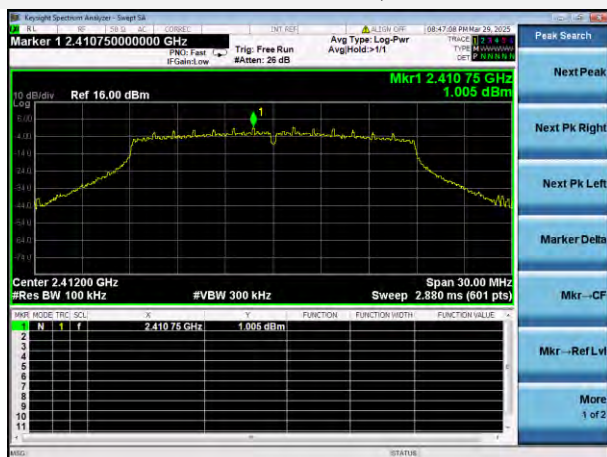
802.11g HIGH CHANNEL, CARRIER LEVEL



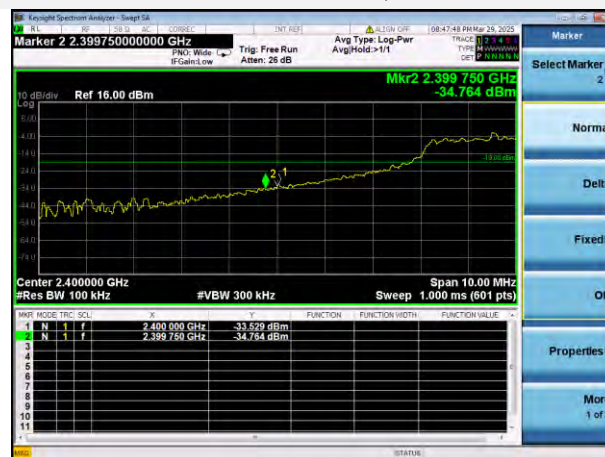
802.11g HIGH CHANNEL, BAND EDGE



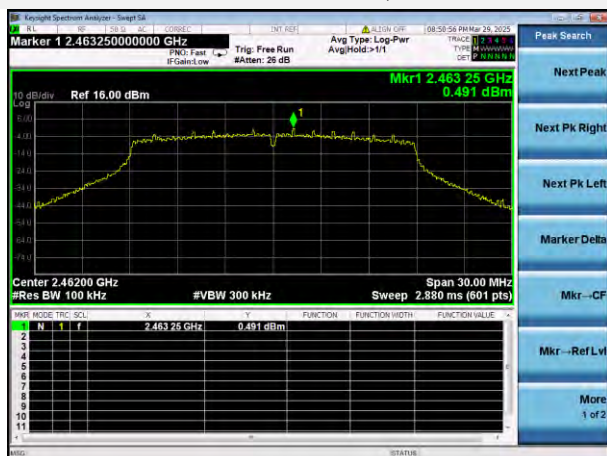
802.11n-20 MHz LOW CHANNEL, CARRIER LEVEL



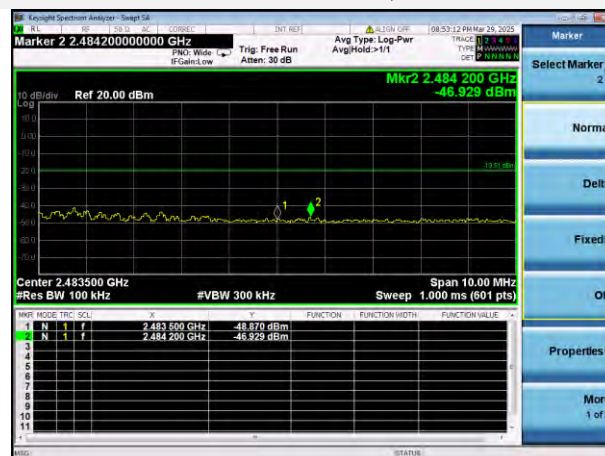
802.11n-20 MHz LOW CHANNEL, BAND EDGE



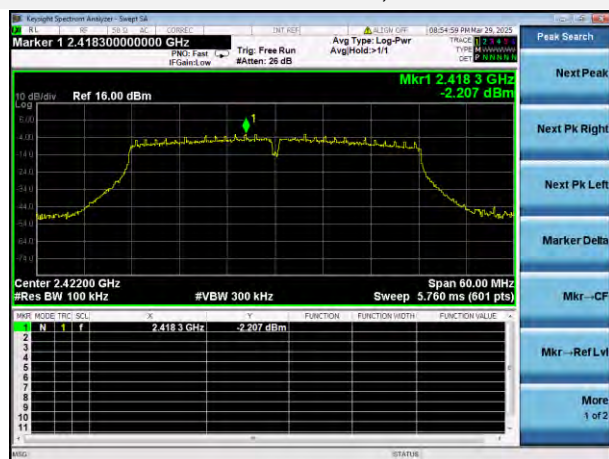
802.11n-20 MHz HIGH CHANNEL, CARRIER LEVEL



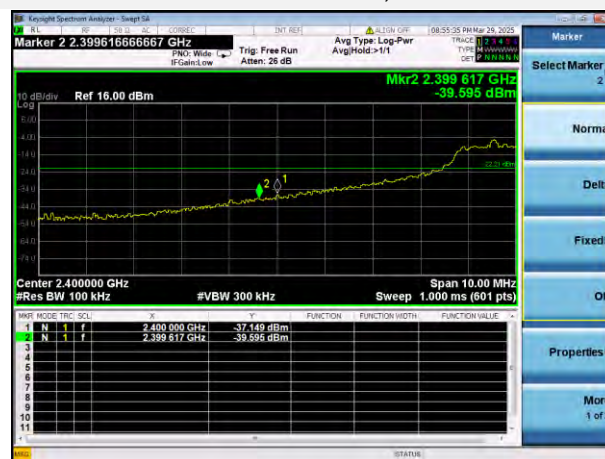
802.11n-20 MHz HIGH CHANNEL, BAND EDGE



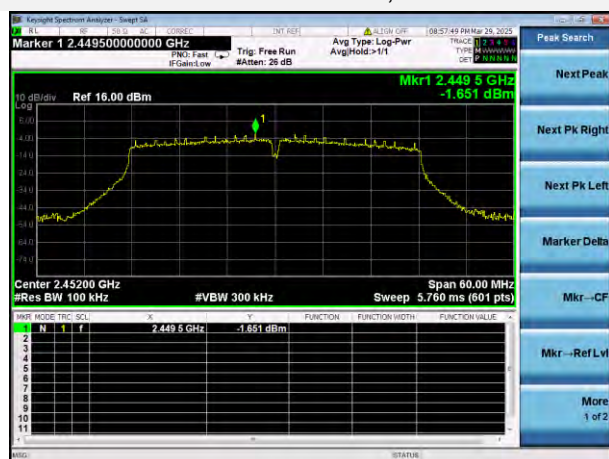
802.11n-40 MHz LOW CHANNEL, CARRIER LEVEL



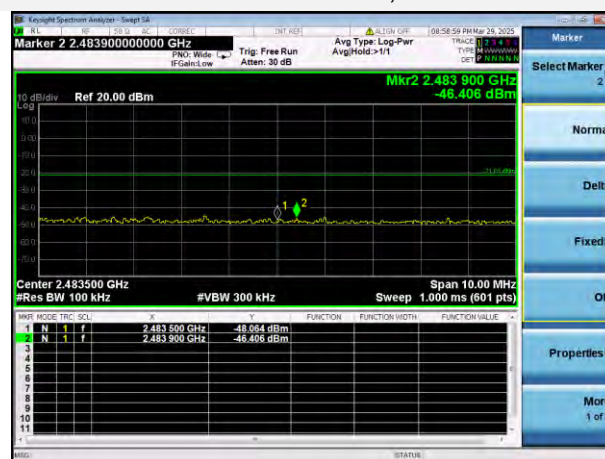
802.11n-40 MHz LOW CHANNEL, BAND EDGE



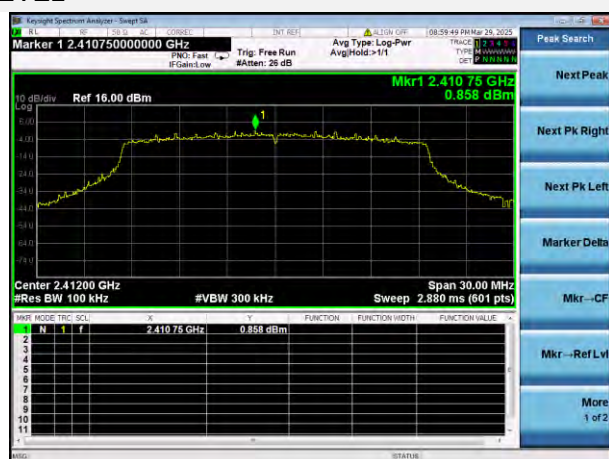
802.11n-40 MHz HIGH CHANNEL, CARRIER LEVEL



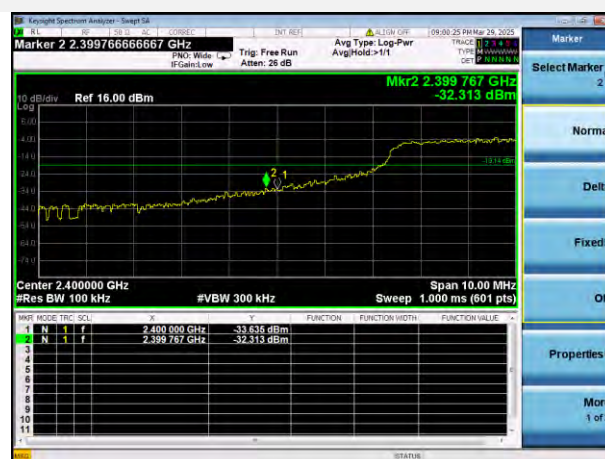
802.11n-40 MHz HIGH CHANNEL, BAND EDGE



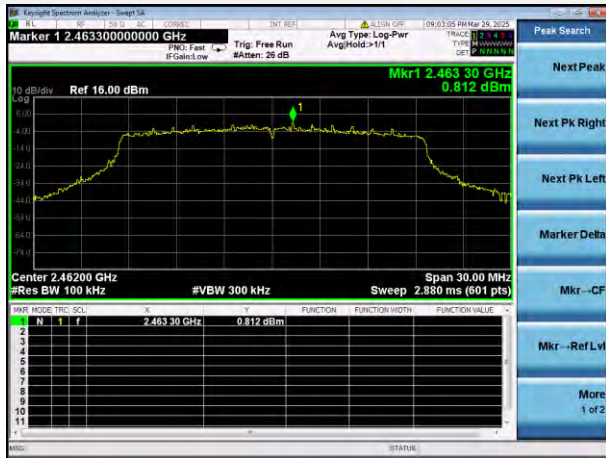
802.11ax-20 MHz(SU) LOW CHANNEL, CARRIER LEVEL



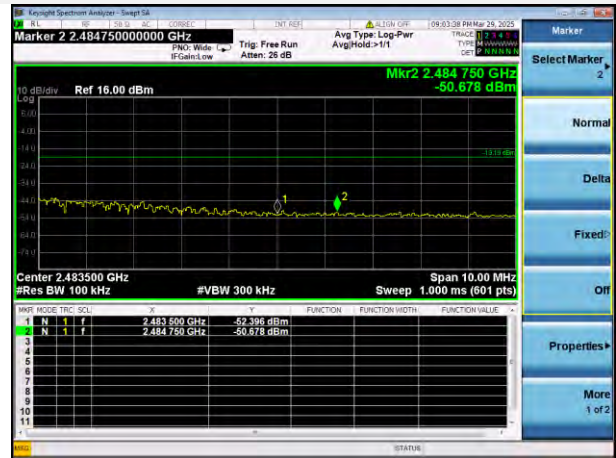
802.11ax-20 MHz(SU) LOW CHANNEL, BAND EDGE



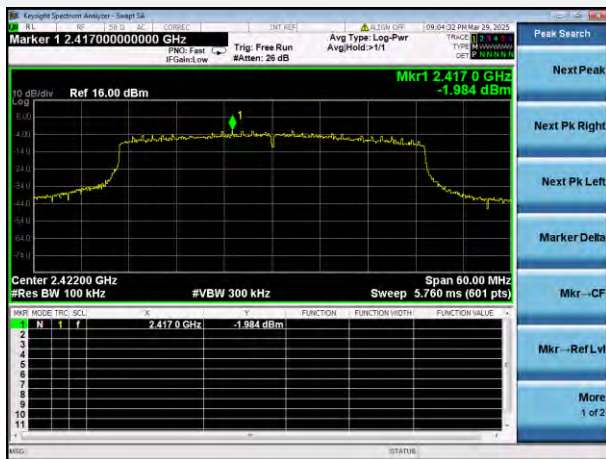
802.11ax-20 MHz(SU) HIGH CHANNEL, CARRIER LEVEL



802.11ax-20 MHz(SU) HIGH CHANNEL, BAND EDGE



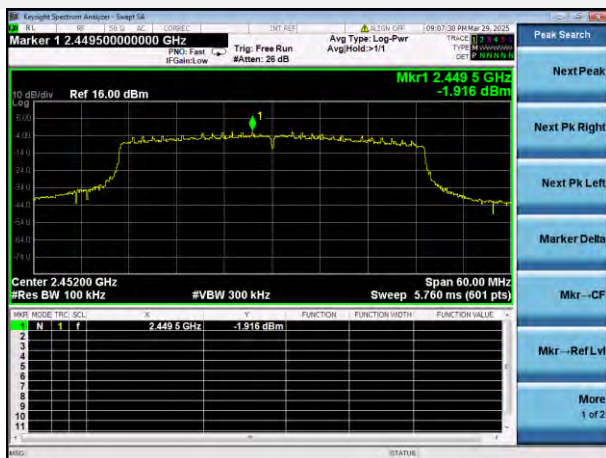
802.11ax-40 MHz(SU) LOW CHANNEL, CARRIER LEVEL



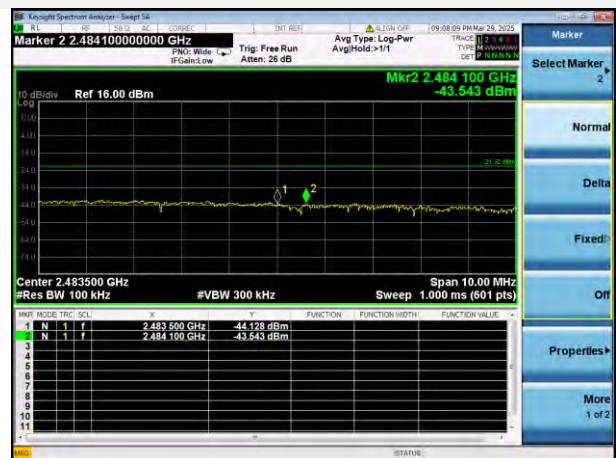
802.11ax-40 MHz(SU) LOW CHANNEL, BAND EDGE



802.11ax-40 MHz(SU) HIGH CHANNEL, CARRIER LEVEL



802.11ax-40 MHz(SU) HIGH CHANNEL, BAND EDGE



A.5 Conducted Emissions

Note¹: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

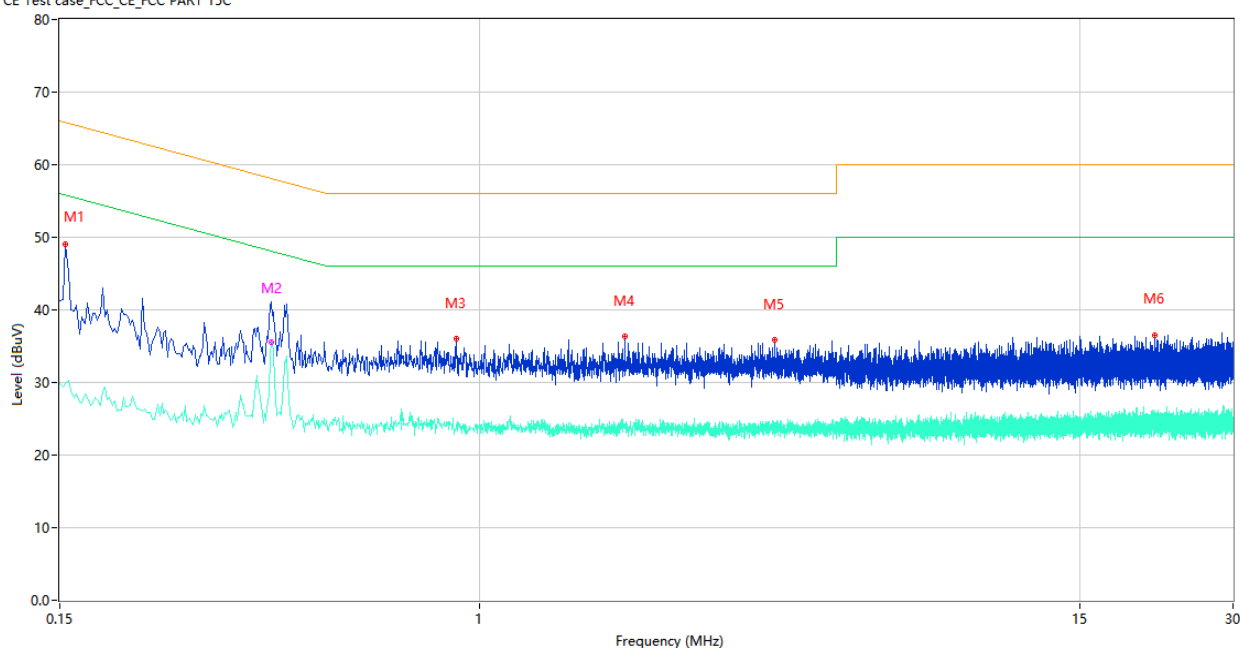
Note²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Note³: Results (dBuV) = Original reading level of Spectrum Analyzer (dBuV) + Factor (dB)

Test Data and Plots

PHASE L

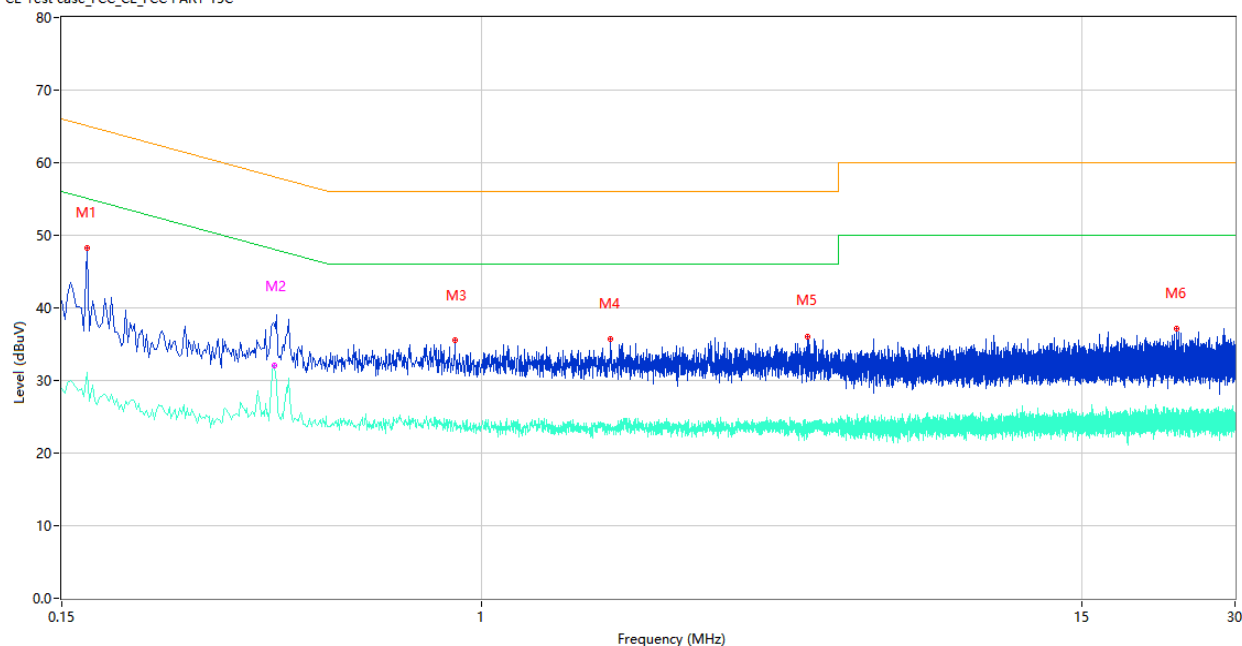
CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.154	49.05	9.78	65.78	16.73	Peak	L	Pass
1**	0.154	29.90	9.78	55.78	25.88	AV	L	Pass
2	0.390	41.08	10.59	58.06	16.98	Peak	L	Pass
2**	0.390	35.57	10.59	48.06	12.49	AV	L	Pass
3	0.898	35.96	10.19	56.00	20.04	Peak	L	Pass
3**	0.898	23.62	10.19	46.00	22.38	AV	L	Pass
4	1.924	36.29	10.45	56.00	19.71	Peak	L	Pass
4**	1.924	24.05	10.45	46.00	21.95	AV	L	Pass
5	3.792	35.87	10.34	56.00	20.13	Peak	L	Pass
5**	3.792	24.38	10.34	46.00	21.62	AV	L	Pass
6	21.114	36.49	11.04	60.00	23.51	Peak	L	Pass
6**	21.114	25.08	11.04	50.00	24.92	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.168	48.18	9.78	65.06	16.88	Peak	N	Pass
1**	0.168	31.17	9.78	55.06	23.89	AV	N	Pass
2	0.392	37.77	10.59	58.02	20.25	Peak	N	Pass
2**	0.392	32.09	10.59	48.02	15.93	AV	N	Pass
3	0.886	35.48	10.29	56.00	20.52	Peak	N	Pass
3**	0.886	23.88	10.29	46.00	22.12	AV	N	Pass
4	1.790	35.71	10.18	56.00	20.29	Peak	N	Pass
4**	1.790	23.94	10.18	46.00	22.06	AV	N	Pass
5	4.354	36.07	10.07	56.00	19.93	Peak	N	Pass
5**	4.354	23.62	10.07	46.00	22.38	AV	N	Pass
6	23.088	37.08	10.64	60.00	22.92	Peak	N	Pass
6**	23.088	25.33	10.64	50.00	24.67	AV	N	Pass

A.6 Radiated Emission

Note¹: The symbol of “--” in the table which means not application.

Note²: 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.

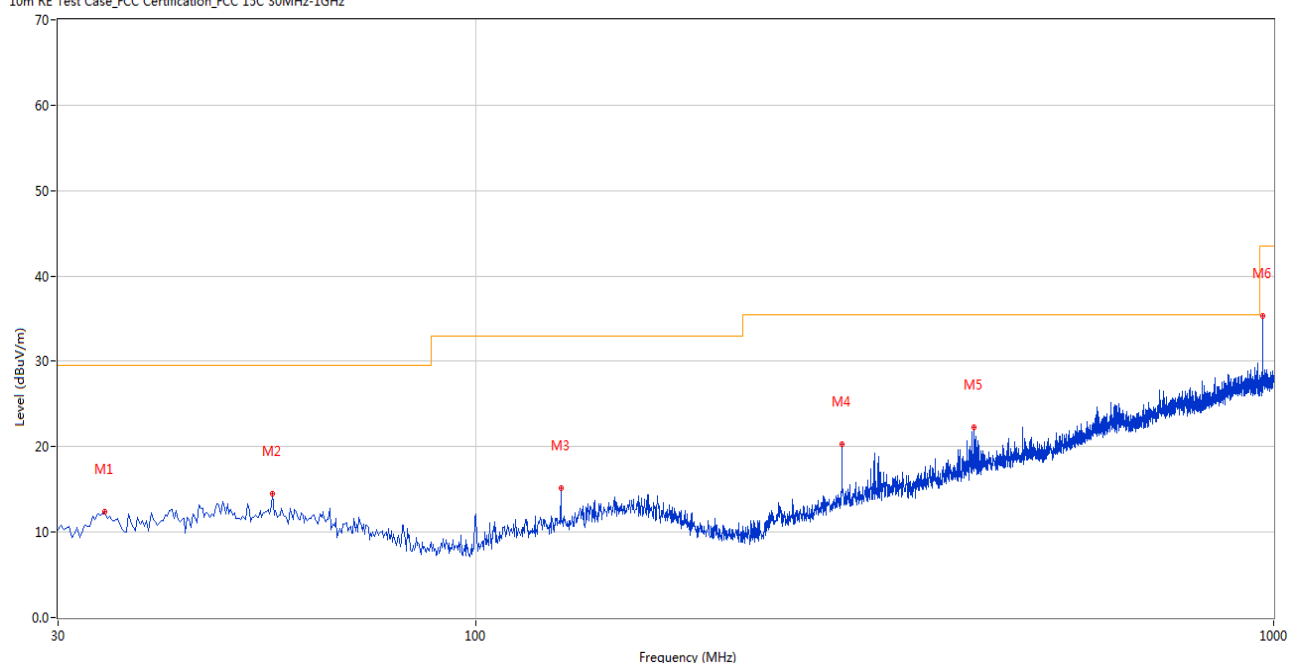
Note³: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note⁴: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and normal link mode is worst.

Test Data and Plots

30 MHz to 1 GHz, ANT H

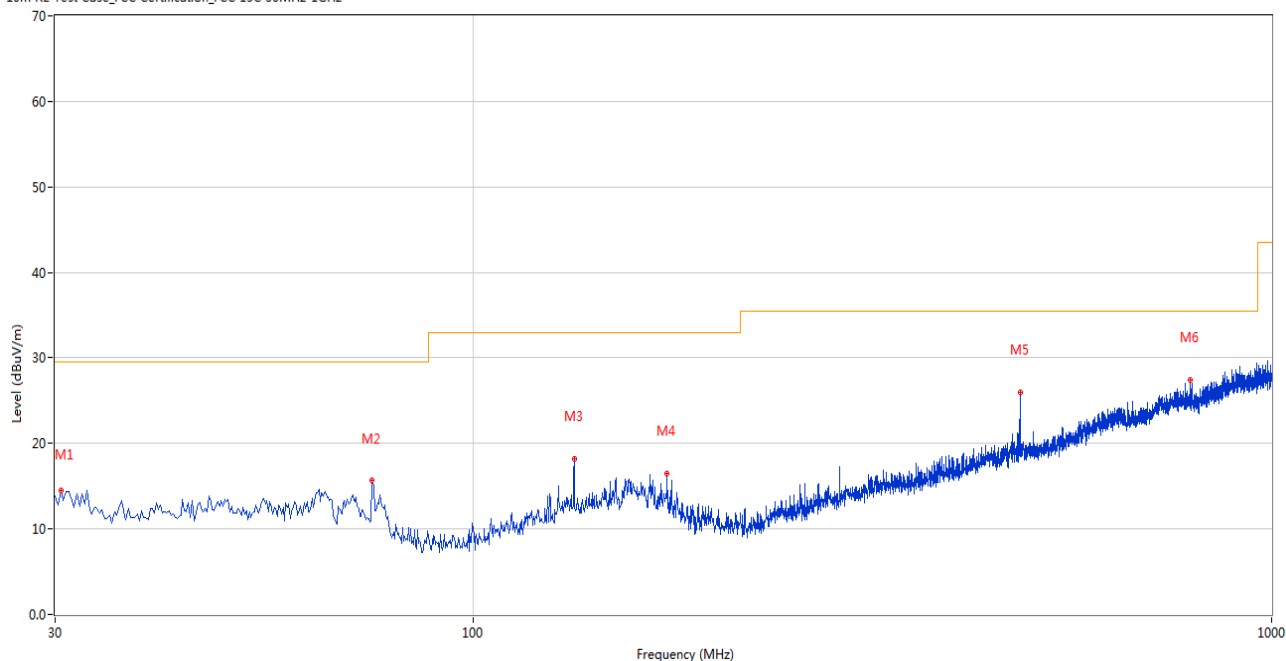
10m RE Test Case_FCC Certification_FCC 15C 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	34.364	12.34	-27.18	29.5	17.16	Peak	137.00	100	Horizontal	Pass
2	55.699	14.48	-26.18	29.5	15.02	Peak	360.00	200	Horizontal	Pass
3	127.946	15.11	-27.27	33.0	17.89	Peak	360.00	200	Horizontal	Pass
4	287.956	20.33	-25.18	35.5	15.17	Peak	360.00	200	Horizontal	Pass
5	421.297	22.29	-21.61	35.5	13.21	Peak	236.00	200	Horizontal	Pass
6	968.725	35.31	-10.30	43.5	8.19	Peak	267.00	100	Horizontal	Pass

30 MHz to 1 GHz, ANT V

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



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	30.485	14.52	-27.76	29.5	14.98	Peak	360.00	200	Vertical	Pass
2	74.851	15.63	-29.13	29.5	13.87	Peak	46.00	200	Vertical	Pass
3	134.006	18.19	-26.74	33.0	14.81	Peak	252.00	100	Vertical	Pass
4	174.979	16.44	-26.69	33.0	16.56	Peak	345.00	100	Vertical	Pass
5	484.331	26.01	-19.82	35.5	9.49	Peak	0.00	100	Vertical	Pass
6	791.502	27.46	-12.95	35.5	8.04	Peak	168.00	200	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.

Note ³: All antenna were pre tested, but only the worst case has been reported in this report.

SISO-Main Antenna

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1929.600	52.05	74.0	21.95	Peak	184.00	150	Horizontal	Pass
1**	1929.600	49.79	54.0	4.21	AV	184.00	150	Horizontal	Pass
2	2410.700	99.82	74.0	-25.82	Peak	184.00	100	Horizontal	N/A
2**	2410.700	96.83	54.0	-42.83	AV	184.00	100	Horizontal	N/A
3	4983.600	51.71	74.0	22.29	Peak	360.00	150	Horizontal	Pass
3**	4983.600	42.70	54.0	11.30	AV	360.00	150	Horizontal	Pass
4	6975.000	54.80	74.0	19.20	Peak	232.00	300	Horizontal	Pass
4**	6975.000	46.46	54.0	7.54	AV	232.00	300	Horizontal	Pass
5	11323.425	52.20	74.0	21.80	Peak	67.00	100	Horizontal	Pass
5**	11323.425	42.37	54.0	11.63	AV	67.00	100	Horizontal	Pass
6	15841.988	55.36	74.0	18.64	Peak	0.00	200	Horizontal	Pass
6**	15841.988	45.26	54.0	8.74	AV	0.00	200	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1328.500	46.31	74.0	27.69	Peak	78.00	200	Vertical	Pass
1**	1328.500	35.00	54.0	19.00	AV	78.00	200	Vertical	Pass
2	2410.700	93.68	74.0	-19.68	Peak	104.00	200	Vertical	N/A
2**	2410.700	90.73	54.0	-36.73	AV	104.00	200	Vertical	N/A
3	5140.000	53.25	74.0	20.75	Peak	167.00	150	Vertical	Pass
3**	5140.000	42.80	54.0	11.20	AV	167.00	150	Vertical	Pass
4	6806.600	55.43	74.0	18.57	Peak	167.00	100	Vertical	Pass
4**	6806.600	46.11	54.0	7.89	AV	167.00	100	Vertical	Pass
5	12823.763	51.81	74.0	22.19	Peak	360.00	400	Vertical	Pass
5**	12823.763	42.57	54.0	11.43	AV	360.00	400	Vertical	Pass
6	16751.025	55.69	74.0	18.31	Peak	360.00	200	Vertical	Pass
6**	16751.025	45.34	54.0	8.66	AV	360.00	200	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1414.100	42.05	74.0	31.95	Peak	256.00	200	Horizontal	Pass
1**	1414.100	32.63	54.0	21.37	AV	256.00	200	Horizontal	Pass
2	2435.700	99.02	74.0	-25.02	Peak	191.00	200	Horizontal	N/A
2**	2435.700	96.19	54.0	-42.19	AV	191.00	200	Horizontal	N/A
3	4977.600	51.74	74.0	22.26	Peak	72.00	150	Horizontal	Pass
3**	4977.600	42.43	54.0	11.57	AV	72.00	150	Horizontal	Pass
4	6634.400	54.94	74.0	19.06	Peak	49.00	300	Horizontal	Pass
4**	6634.400	44.93	54.0	9.07	AV	49.00	300	Horizontal	Pass
5	11926.887	52.44	74.0	21.56	Peak	360.00	300	Horizontal	Pass
5**	11926.887	42.81	54.0	11.19	AV	360.00	300	Horizontal	Pass
6	15735.675	55.29	74.0	18.71	Peak	281.00	400	Horizontal	Pass
6**	15735.675	44.78	54.0	9.22	AV	281.00	400	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1166.800	45.73	74.0	28.27	Peak	51.00	300	Vertical	Pass
1**	1166.800	33.70	54.0	20.30	AV	51.00	300	Vertical	Pass
2	2435.600	94.39	74.0	-20.39	Peak	106.00	200	Vertical	N/A
2**	2435.600	91.31	54.0	-37.31	AV	106.00	200	Vertical	N/A
3	4996.400	51.46	74.0	22.54	Peak	197.00	100	Vertical	Pass
3**	4996.400	42.37	54.0	11.63	AV	197.00	100	Vertical	Pass
4	6989.800	55.17	74.0	18.83	Peak	29.00	400	Vertical	Pass
4**	6989.800	45.80	54.0	8.20	AV	29.00	400	Vertical	Pass
5	11330.326	52.21	74.0	21.79	Peak	276.00	100	Vertical	Pass
5**	11330.326	43.00	54.0	11.00	AV	276.00	100	Vertical	Pass
6	17437.989	55.74	74.0	18.26	Peak	341.00	300	Vertical	Pass
6**	17437.989	45.10	54.0	8.90	AV	341.00	300	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1000.400	44.81	74.0	29.19	Peak	144.00	400	Horizontal	Pass
1**	1000.400	32.03	54.0	21.97	AV	144.00	400	Horizontal	Pass
2	2460.600	97.64	74.0	-23.64	Peak	315.00	150	Horizontal	N/A
2**	2460.600	94.70	54.0	-40.70	AV	315.00	150	Horizontal	N/A
3	4973.200	51.88	74.0	22.12	Peak	298.00	100	Horizontal	Pass
3**	4973.200	42.29	54.0	11.71	AV	298.00	100	Horizontal	Pass
4	6342.200	54.84	74.0	19.16	Peak	161.00	200	Horizontal	Pass
4**	6342.200	45.16	54.0	8.84	AV	161.00	200	Horizontal	Pass
5	10926.099	52.42	74.0	21.58	Peak	114.00	400	Horizontal	Pass
5**	10926.099	44.23	54.0	9.77	AV	114.00	400	Horizontal	Pass
6	17434.051	55.47	74.0	18.53	Peak	358.00	200	Horizontal	Pass
6**	17434.051	46.39	54.0	7.61	AV	358.00	200	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1162.800	46.73	74.0	27.27	Peak	65.00	300	Vertical	Pass
1**	1162.800	36.03	54.0	17.97	AV	65.00	300	Vertical	Pass
2	2460.700	92.36	74.0	-18.36	Peak	102.00	100	Vertical	N/A
2**	2460.700	89.42	54.0	-35.42	AV	102.00	100	Vertical	N/A
3	4972.000	51.44	74.0	22.56	Peak	65.00	150	Vertical	Pass
3**	4972.000	42.32	54.0	11.68	AV	65.00	150	Vertical	Pass
4	6627.400	55.27	74.0	18.73	Peak	10.00	400	Vertical	Pass
4**	6627.400	45.25	54.0	8.75	AV	10.00	400	Vertical	Pass
5	12575.487	51.85	74.0	22.15	Peak	344.00	100	Vertical	Pass
5**	12575.487	42.17	54.0	11.83	AV	344.00	100	Vertical	Pass
6	15519.375	55.80	74.0	18.20	Peak	178.00	300	Vertical	Pass
6**	15519.375	45.98	54.0	8.02	AV	178.00	300	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1929.500	56.16	74.0	17.84	Peak	177.00	150	Horizontal	Pass
1**	1929.500	54.68	54.0	--	AV	177.00	150	Horizontal	N/A
2	2410.200	100.82	74.0	-26.82	Peak	177.00	150	Horizontal	N/A
2**	2410.200	92.83	54.0	-38.83	AV	177.00	150	Horizontal	N/A
3	4807.000	51.81	74.0	22.19	Peak	173.00	200	Horizontal	Pass
3**	4807.000	41.84	54.0	12.16	AV	173.00	200	Horizontal	Pass
4	6995.000	55.13	74.0	18.87	Peak	360.00	400	Horizontal	Pass
4**	6995.000	46.55	54.0	7.45	AV	360.00	400	Horizontal	Pass
5	12847.912	52.77	74.0	21.23	Peak	140.00	400	Horizontal	Pass
5**	12847.912	41.88	54.0	12.12	AV	140.00	400	Horizontal	Pass
6	15232.201	55.44	74.0	18.56	Peak	317.00	100	Horizontal	Pass
6**	15232.201	45.82	54.0	8.18	AV	317.00	100	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1332.700	45.44	74.0	28.56	Peak	114.00	400	Vertical	Pass
1**	1332.700	40.56	54.0	13.44	AV	114.00	400	Vertical	Pass
2	2413.400	94.96	74.0	-20.96	Peak	100.00	100	Vertical	N/A
2**	2413.400	86.88	54.0	-32.88	AV	100.00	100	Vertical	N/A
3	4960.200	51.52	74.0	22.48	Peak	263.00	150	Vertical	Pass
3**	4960.200	41.60	54.0	12.40	AV	263.00	150	Vertical	Pass
4	6793.400	54.91	74.0	19.09	Peak	174.00	100	Vertical	Pass
4**	6793.400	45.58	54.0	8.42	AV	174.00	100	Vertical	Pass
5	11331.763	52.18	74.0	21.82	Peak	360.00	300	Vertical	Pass
5**	11331.763	43.07	54.0	10.93	AV	360.00	300	Vertical	Pass
6	15489.450	55.13	74.0	18.87	Peak	360.00	200	Vertical	Pass
6**	15489.450	45.18	54.0	8.82	AV	360.00	200	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1949.400	56.90	74.0	17.10	Peak	170.00	150	Horizontal	Pass
1**	1949.400	55.07	54.0	--	AV	170.00	150	Horizontal	N/A
2	2435.600	100.05	74.0	-26.05	Peak	183.00	150	Horizontal	N/A
2**	2435.600	92.82	54.0	-38.82	AV	183.00	150	Horizontal	N/A
3	4988.600	52.17	74.0	21.83	Peak	163.00	150	Horizontal	Pass
3**	4988.600	43.46	54.0	10.54	AV	163.00	150	Horizontal	Pass
4	6804.600	55.14	74.0	18.86	Peak	232.00	200	Horizontal	Pass
4**	6804.600	45.92	54.0	8.08	AV	232.00	200	Horizontal	Pass
5	11903.887	52.19	74.0	21.81	Peak	0.00	200	Horizontal	Pass
5**	11903.887	42.60	54.0	11.40	AV	0.00	200	Horizontal	Pass
6	17437.725	55.05	74.0	18.95	Peak	219.00	100	Horizontal	Pass
6**	17437.725	46.20	54.0	7.80	AV	219.00	100	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1164.100	47.76	74.0	26.24	Peak	77.00	300	Vertical	Pass
1**	1164.100	38.57	54.0	15.43	AV	77.00	300	Vertical	Pass
2	2437.900	95.17	74.0	-21.17	Peak	97.00	200	Vertical	N/A
2**	2437.900	87.35	54.0	-33.35	AV	97.00	200	Vertical	N/A
3	4819.200	51.50	74.0	22.50	Peak	346.00	200	Vertical	Pass
3**	4819.200	41.83	54.0	12.17	AV	346.00	200	Vertical	Pass
4	6972.800	55.18	74.0	18.82	Peak	186.00	300	Vertical	Pass
4**	6972.800	46.20	54.0	7.80	AV	186.00	300	Vertical	Pass
5	11214.175	52.12	74.0	21.88	Peak	0.00	100	Vertical	Pass
5**	11214.175	42.64	54.0	11.36	AV	0.00	100	Vertical	Pass
6	17466.864	55.00	74.0	19.00	Peak	21.00	400	Vertical	Pass
6**	17466.864	46.25	54.0	7.75	AV	21.00	400	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1969.400	55.83	74.0	18.17	Peak	171.00	150	Horizontal	Pass
1**	1969.400	53.94	54.0	--	AV	171.00	150	Horizontal	N/A
2	2460.500	98.27	74.0	-24.27	Peak	309.00	200	Horizontal	N/A
2**	2460.500	91.04	54.0	-37.04	AV	309.00	200	Horizontal	N/A
3	4822.200	51.72	74.0	22.28	Peak	360.00	200	Horizontal	Pass
3**	4822.200	42.09	54.0	11.91	AV	360.00	200	Horizontal	Pass
4	6805.600	54.97	74.0	19.03	Peak	35.00	100	Horizontal	Pass
4**	6805.600	46.15	54.0	7.85	AV	35.00	100	Horizontal	Pass
5	11333.200	52.25	74.0	21.75	Peak	169.00	400	Horizontal	Pass
5**	11333.200	42.38	54.0	11.62	AV	169.00	400	Horizontal	Pass
6	17431.163	55.99	74.0	18.01	Peak	176.00	300	Horizontal	Pass
6**	17431.163	46.99	54.0	7.01	AV	176.00	300	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1166.200	49.07	74.0	24.93	Peak	88.00	200	Vertical	Pass
1**	1166.200	34.29	54.0	19.71	AV	88.00	200	Vertical	Pass
2	2457.800	92.65	74.0	-18.65	Peak	102.00	200	Vertical	N/A
2**	2457.800	85.59	54.0	-31.59	AV	102.00	200	Vertical	N/A
3	4974.400	51.89	74.0	22.11	Peak	105.00	200	Vertical	Pass
3**	4974.400	43.19	54.0	10.81	AV	105.00	200	Vertical	Pass
4	6620.400	55.28	74.0	18.72	Peak	60.00	300	Vertical	Pass
4**	6620.400	44.87	54.0	9.13	AV	60.00	300	Vertical	Pass
5	11949.312	52.63	74.0	21.37	Peak	171.00	300	Vertical	Pass
5**	11949.312	42.68	54.0	11.32	AV	171.00	300	Vertical	Pass
6	15501.263	55.52	74.0	18.48	Peak	118.00	400	Vertical	Pass
6**	15501.263	46.48	54.0	7.52	AV	118.00	400	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1929.500	55.59	74.0	18.41	Peak	348.00	150	Horizontal	Pass
1**	1929.500	53.56	54.0	--	AV	348.00	150	Horizontal	N/A
2	2413.600	98.90	74.0	-24.90	Peak	195.00	150	Horizontal	N/A
2**	2413.600	91.51	54.0	-37.51	AV	195.00	150	Horizontal	N/A
3	4991.600	51.76	74.0	22.24	Peak	316.00	150	Horizontal	Pass
3**	4991.600	42.00	54.0	12.00	AV	316.00	150	Horizontal	Pass
4	6624.000	54.82	74.0	19.18	Peak	333.00	300	Horizontal	Pass
4**	6624.000	45.20	54.0	8.80	AV	333.00	300	Horizontal	Pass
5	12195.700	51.90	74.0	22.10	Peak	70.00	100	Horizontal	Pass
5**	12195.700	41.19	54.0	12.81	AV	70.00	100	Horizontal	Pass
6	16397.963	55.49	74.0	18.51	Peak	29.00	300	Horizontal	Pass
6**	16397.963	46.71	54.0	7.29	AV	29.00	300	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1327.400	43.56	74.0	30.44	Peak	103.00	400	Vertical	Pass
1**	1327.400	33.23	54.0	20.77	AV	103.00	400	Vertical	Pass
2	2407.500	91.45	74.0	-17.45	Peak	226.00	100	Vertical	N/A
2**	2407.500	81.59	54.0	-27.59	AV	226.00	100	Vertical	N/A
3	4980.400	51.42	74.0	22.58	Peak	289.00	100	Vertical	Pass
3**	4980.400	43.18	54.0	10.82	AV	289.00	100	Vertical	Pass
4	6806.400	55.14	74.0	18.86	Peak	241.00	400	Vertical	Pass
4**	6806.400	46.65	54.0	7.35	AV	241.00	400	Vertical	Pass
5	11919.126	52.15	74.0	21.85	Peak	140.00	200	Vertical	Pass
5**	11919.126	43.47	54.0	10.53	AV	140.00	200	Vertical	Pass
6	16881.750	55.14	74.0	18.86	Peak	85.00	400	Vertical	Pass
6**	16881.750	45.20	54.0	8.80	AV	85.00	400	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1949.200	55.65	74.0	18.35	Peak	321.00	150	Horizontal	Pass
1**	1949.200	52.49	54.0	--	AV	321.00	150	Horizontal	N/A
2	2437.500	94.58	74.0	-20.58	Peak	168.00	200	Horizontal	N/A
2**	2437.500	87.03	54.0	-33.03	AV	168.00	200	Horizontal	N/A
3	4983.000	52.00	74.0	22.00	Peak	217.00	200	Horizontal	Pass
3**	4983.000	42.62	54.0	11.38	AV	217.00	200	Horizontal	Pass
4	6807.000	55.16	74.0	18.84	Peak	360.00	200	Horizontal	Pass
4**	6807.000	47.30	54.0	6.70	AV	360.00	200	Horizontal	Pass
5	11324.287	52.36	74.0	21.64	Peak	122.00	400	Horizontal	Pass
5**	11324.287	42.60	54.0	11.40	AV	122.00	400	Horizontal	Pass
6	15523.049	55.51	74.0	18.49	Peak	360.00	100	Horizontal	Pass
6**	15523.049	45.79	54.0	8.21	AV	360.00	100	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1000.100	44.21	74.0	29.79	Peak	239.00	200	Vertical	Pass
1**	1000.100	33.63	54.0	20.37	AV	239.00	200	Vertical	Pass
2	2434.000	90.73	74.0	-16.73	Peak	89.00	100	Vertical	N/A
2**	2434.000	84.72	54.0	-30.72	AV	89.00	100	Vertical	N/A
3	4778.800	51.44	74.0	22.56	Peak	321.00	200	Vertical	Pass
3**	4778.800	42.14	54.0	11.86	AV	321.00	200	Vertical	Pass
4	6807.600	55.06	74.0	18.94	Peak	28.00	100	Vertical	Pass
4**	6807.600	46.85	54.0	7.15	AV	28.00	100	Vertical	Pass
5	12999.638	52.72	74.0	21.28	Peak	58.00	100	Vertical	Pass
5**	12999.638	42.85	54.0	11.15	AV	58.00	100	Vertical	Pass
6	16864.949	55.70	74.0	18.30	Peak	302.00	300	Vertical	Pass
6**	16864.949	46.58	54.0	7.42	AV	302.00	300	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1593.200	41.91	74.0	32.09	Peak	355.00	300	Horizontal	Pass
1**	1593.200	31.54	54.0	22.46	AV	355.00	300	Horizontal	Pass
2	2458.800	94.42	74.0	-20.42	Peak	331.00	150	Horizontal	N/A
2**	2458.800	88.40	54.0	-34.40	AV	331.00	150	Horizontal	N/A
3	4659.600	51.54	74.0	22.46	Peak	311.00	150	Horizontal	Pass
3**	4659.600	41.52	54.0	12.48	AV	311.00	150	Horizontal	Pass
4	6979.000	54.70	74.0	19.30	Peak	131.00	300	Horizontal	Pass
4**	6979.000	46.27	54.0	7.73	AV	131.00	300	Horizontal	Pass
5	12864.451	52.55	74.0	21.45	Peak	360.00	200	Horizontal	Pass
5**	12864.451	42.83	54.0	11.17	AV	360.00	200	Horizontal	Pass
6	17415.412	55.52	74.0	18.48	Peak	38.00	200	Horizontal	Pass
6**	17415.412	45.94	54.0	8.06	AV	38.00	200	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1165.500	45.41	74.0	28.59	Peak	59.00	100	Vertical	Pass
1**	1165.500	34.19	54.0	19.81	AV	59.00	100	Vertical	Pass
2	2464.400	90.65	74.0	-16.65	Peak	35.00	200	Vertical	N/A
2**	2464.400	84.23	54.0	-30.23	AV	35.00	200	Vertical	N/A
3	4972.600	51.41	74.0	22.59	Peak	182.00	200	Vertical	Pass
3**	4972.600	43.93	54.0	10.07	AV	182.00	200	Vertical	Pass
4	6610.400	54.76	74.0	19.24	Peak	182.00	200	Vertical	Pass
4**	6610.400	45.06	54.0	8.94	AV	182.00	200	Vertical	Pass
5	11334.925	52.10	74.0	21.90	Peak	185.00	100	Vertical	Pass
5**	11334.925	43.34	54.0	10.66	AV	185.00	100	Vertical	Pass
6	16853.401	55.75	74.0	18.25	Peak	121.00	400	Vertical	Pass
6**	16853.401	45.58	54.0	8.42	AV	121.00	400	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1937.600	55.80	74.0	18.20	Peak	179.00	150	Horizontal	Pass
1**	1937.600	54.34	54.0	--	AV	179.00	150	Horizontal	N/A
2	2417.600	94.00	74.0	-20.00	Peak	179.00	200	Horizontal	N/A
2**	2417.600	86.55	54.0	-32.55	AV	179.00	200	Horizontal	N/A
3	4999.800	52.47	74.0	21.53	Peak	184.00	200	Horizontal	Pass
3**	4999.800	42.11	54.0	11.89	AV	184.00	200	Horizontal	Pass
4	6978.600	54.73	74.0	19.27	Peak	198.00	300	Horizontal	Pass
4**	6978.600	46.60	54.0	7.40	AV	198.00	300	Horizontal	Pass
5	11912.513	51.99	74.0	22.01	Peak	238.00	400	Horizontal	Pass
5**	11912.513	42.07	54.0	11.93	AV	238.00	400	Horizontal	Pass
6	16807.199	55.10	74.0	18.90	Peak	195.00	200	Horizontal	Pass
6**	16807.199	45.03	54.0	8.97	AV	195.00	200	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1010.300	46.14	74.0	27.86	Peak	121.00	100	Vertical	Pass
1**	1010.300	35.28	54.0	18.72	AV	121.00	100	Vertical	Pass
2	2420.400	89.53	74.0	-15.53	Peak	40.00	100	Vertical	N/A
2**	2420.400	82.80	54.0	-28.80	AV	40.00	100	Vertical	N/A
3	4981.600	52.59	74.0	21.41	Peak	0.00	200	Vertical	Pass
3**	4981.600	42.23	54.0	11.77	AV	0.00	200	Vertical	Pass
4	6810.600	55.69	74.0	18.31	Peak	93.00	400	Vertical	Pass
4**	6810.600	45.76	54.0	8.24	AV	93.00	400	Vertical	Pass
5	11330.900	52.79	74.0	21.21	Peak	216.00	300	Vertical	Pass
5**	11330.900	43.05	54.0	10.95	AV	216.00	300	Vertical	Pass
6	17468.176	55.59	74.0	18.41	Peak	247.00	100	Vertical	Pass
6**	17468.176	46.18	54.0	7.82	AV	247.00	100	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1949.500	55.76	74.0	18.24	Peak	13.00	150	Horizontal	Pass
1**	1949.500	54.63	54.0	--	AV	13.00	150	Horizontal	N/A
2	2438.000	94.77	74.0	-20.77	Peak	129.00	150	Horizontal	N/A
2**	2438.000	86.97	54.0	-32.97	AV	129.00	150	Horizontal	N/A
3	4987.800	51.15	74.0	22.85	Peak	300.00	100	Horizontal	Pass
3**	4987.800	42.67	54.0	11.33	AV	300.00	100	Horizontal	Pass
4	6805.400	54.93	74.0	19.07	Peak	134.00	200	Horizontal	Pass
4**	6805.400	46.19	54.0	7.81	AV	134.00	200	Horizontal	Pass
5	11327.737	52.35	74.0	21.65	Peak	354.00	300	Horizontal	Pass
5**	11327.737	42.84	54.0	11.16	AV	354.00	300	Horizontal	Pass
6	15078.112	55.71	74.0	18.29	Peak	29.00	300	Horizontal	Pass
6**	15078.112	46.22	54.0	7.78	AV	29.00	300	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1329.700	42.41	74.0	31.59	Peak	158.00	300	Vertical	Pass
1**	1329.700	35.78	54.0	18.22	AV	158.00	300	Vertical	Pass
2	2433.600	86.30	74.0	-12.30	Peak	110.00	100	Vertical	N/A
2**	2433.600	77.73	54.0	-23.73	AV	110.00	100	Vertical	N/A
3	4870.000	51.75	74.0	22.25	Peak	159.00	150	Vertical	Pass
3**	4870.000	42.29	54.0	11.71	AV	159.00	150	Vertical	Pass
4	5319.600	57.30	74.0	16.70	Peak	98.00	200	Vertical	Pass
4**	5319.600	46.63	54.0	7.37	AV	98.00	200	Vertical	Pass
5	11323.425	52.27	74.0	21.73	Peak	21.00	300	Vertical	Pass
5**	11323.425	43.05	54.0	10.95	AV	21.00	300	Vertical	Pass
6	15523.049	55.17	74.0	18.83	Peak	138.00	200	Vertical	Pass
6**	15523.049	44.66	54.0	9.34	AV	138.00	200	Vertical	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1961.500	56.31	74.0	17.69	Peak	198.00	150	Horizontal	Pass
1**	1961.500	55.07	54.0	--	AV	198.00	150	Horizontal	N/A
2	2443.800	95.26	74.0	-21.26	Peak	353.00	200	Horizontal	N/A
2**	2443.800	86.76	54.0	-32.76	AV	353.00	200	Horizontal	N/A
3	4985.600	51.56	74.0	22.44	Peak	300.00	200	Horizontal	Pass
3**	4985.600	42.61	54.0	11.39	AV	300.00	200	Horizontal	Pass
4	6976.400	55.00	74.0	19.00	Peak	177.00	300	Horizontal	Pass
4**	6976.400	46.33	54.0	7.67	AV	177.00	300	Horizontal	Pass
5	12801.450	51.75	74.0	22.25	Peak	360.00	100	Horizontal	Pass
5**	12801.450	42.17	54.0	11.83	AV	360.00	100	Horizontal	Pass
6	17392.839	55.34	74.0	18.66	Peak	275.00	100	Horizontal	Pass
6**	17392.839	45.15	54.0	8.85	AV	275.00	100	Horizontal	Pass

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

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1331.800	43.67	74.0	30.33	Peak	159.00	100	Vertical	Pass
1**	1331.800	32.73	54.0	21.27	AV	159.00	100	Vertical	Pass
2	2453.600	86.42	74.0	-12.42	Peak	111.00	100	Vertical	N/A
2**	2453.600	79.65	54.0	-25.65	AV	111.00	100	Vertical	N/A
3	4809.800	51.59	74.0	22.41	Peak	119.00	100	Vertical	Pass
3**	4809.800	42.59	54.0	11.41	AV	119.00	100	Vertical	Pass
4	6804.600	54.81	74.0	19.19	Peak	0.00	100	Vertical	Pass
4**	6804.600	45.73	54.0	8.27	AV	0.00	100	Vertical	Pass
5	11778.825	52.61	74.0	21.39	Peak	167.00	400	Vertical	Pass
5**	11778.825	43.06	54.0	10.94	AV	167.00	400	Vertical	Pass
6	15816.787	55.44	74.0	18.56	Peak	27.00	400	Vertical	Pass
6**	15816.787	45.73	54.0	8.27	AV	27.00	400	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11ax20(SU) Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1929.600	55.16	74.0	18.84	Peak	6.00	150	Horizontal	Pass
1**	1929.600	54.14	54.0	--	AV	6.00	150	Horizontal	N/A
2	2410.600	92.36	74.0	-18.36	Peak	354.00	100	Horizontal	N/A
2**	2410.600	83.89	54.0	-29.89	AV	354.00	100	Horizontal	N/A
3	4768.600	51.47	74.0	22.53	Peak	333.00	100	Horizontal	Pass
3**	4768.600	41.78	54.0	12.22	AV	333.00	100	Horizontal	Pass
4	6991.400	55.58	74.0	18.42	Peak	45.00	100	Horizontal	Pass
4**	6991.400	45.48	54.0	8.52	AV	45.00	100	Horizontal	Pass
5	11330.326	52.41	74.0	21.59	Peak	360.00	200	Horizontal	Pass
5**	11330.326	43.33	54.0	10.67	AV	360.00	200	Horizontal	Pass
6	17369.999	55.20	74.0	18.80	Peak	55.00	200	Horizontal	Pass
6**	17369.999	44.52	54.0	9.48	AV	55.00	200	Horizontal	Pass

1 GHz to 18 GHz, ANT V802.11ax20(SU) Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1330.300	43.13	74.0	30.87	Peak	100.00	300	Vertical	Pass
1**	1330.300	34.30	54.0	19.70	AV	100.00	300	Vertical	Pass
2	2413.100	84.41	74.0	-10.41	Peak	233.00	150	Vertical	N/A
2**	2413.100	75.51	54.0	-21.51	AV	233.00	150	Vertical	N/A
3	4988.800	51.77	74.0	22.23	Peak	360.00	150	Vertical	Pass
3**	4988.800	44.15	54.0	9.85	AV	360.00	150	Vertical	Pass
4	6983.000	55.10	74.0	18.90	Peak	196.00	300	Vertical	Pass
4**	6983.000	45.32	54.0	8.68	AV	196.00	300	Vertical	Pass
5	10919.487	52.36	74.0	21.64	Peak	48.00	400	Vertical	Pass
5**	10919.487	43.16	54.0	10.84	AV	48.00	400	Vertical	Pass
6	16433.401	55.08	74.0	18.92	Peak	331.00	200	Vertical	Pass
6**	16433.401	45.20	54.0	8.80	AV	331.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11ax20(SU) Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1949.500	56.28	74.0	17.72	Peak	14.00	150	Horizontal	Pass
1**	1949.500	54.68	54.0	--	AV	14.00	150	Horizontal	N/A
2	2434.600	92.30	74.0	-18.30	Peak	189.00	100	Horizontal	N/A
2**	2434.600	82.72	54.0	-28.72	AV	189.00	100	Horizontal	N/A
3	4998.400	51.93	74.0	22.07	Peak	44.00	150	Horizontal	Pass
3**	4998.400	42.27	54.0	11.73	AV	44.00	150	Horizontal	Pass
4	6973.000	55.09	74.0	18.91	Peak	121.00	100	Horizontal	Pass
4**	6973.000	45.98	54.0	8.02	AV	121.00	100	Horizontal	Pass
5	11821.375	52.32	74.0	21.68	Peak	360.00	200	Horizontal	Pass
5**	11821.375	42.52	54.0	11.48	AV	360.00	200	Horizontal	Pass
6	16806.675	54.96	74.0	19.04	Peak	0.00	100	Horizontal	Pass
6**	16806.675	45.26	54.0	8.74	AV	0.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11ax20(SU) Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1329.100	42.89	74.0	31.11	Peak	152.00	100	Vertical	Pass
1**	1329.100	33.49	54.0	20.51	AV	152.00	100	Vertical	Pass
2	2435.200	82.67	74.0	-8.67	Peak	111.00	150	Vertical	N/A
2**	2435.200	74.79	54.0	-20.79	AV	111.00	150	Vertical	N/A
3	4991.800	51.21	74.0	22.79	Peak	0.00	150	Vertical	Pass
3**	4991.800	42.39	54.0	11.61	AV	0.00	150	Vertical	Pass
4	6807.400	55.32	74.0	18.68	Peak	138.00	400	Vertical	Pass
4**	6807.400	46.07	54.0	7.93	AV	138.00	400	Vertical	Pass
5	11899.862	52.24	74.0	21.76	Peak	282.00	100	Vertical	Pass
5**	11899.862	42.89	54.0	11.11	AV	282.00	100	Vertical	Pass
6	16129.424	55.33	74.0	18.67	Peak	274.00	300	Vertical	Pass
6**	16129.424	45.24	54.0	8.76	AV	274.00	300	Vertical	Pass

1 GHz to 18 GHz, ANT H802.11ax20(SU) High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1969.600	55.54	74.0	18.46	Peak	199.00	150	Horizontal	Pass
1**	1969.600	54.55	54.0	--	AV	199.00	150	Horizontal	N/A
2	2464.400	89.03	74.0	-15.03	Peak	207.00	150	Horizontal	N/A
2**	2464.400	79.87	54.0	-25.87	AV	207.00	150	Horizontal	N/A
3	4876.800	51.60	74.0	22.40	Peak	75.00	150	Horizontal	Pass
3**	4876.800	41.74	54.0	12.26	AV	75.00	150	Horizontal	Pass
4	6970.800	55.11	74.0	18.89	Peak	317.00	400	Horizontal	Pass
4**	6970.800	45.31	54.0	8.69	AV	317.00	400	Horizontal	Pass
5	12405.000	52.71	74.0	21.29	Peak	292.00	200	Horizontal	Pass
5**	12405.000	43.54	54.0	10.46	AV	292.00	200	Horizontal	Pass
6	16679.099	55.33	74.0	18.67	Peak	250.00	100	Horizontal	Pass
6**	16679.099	44.10	54.0	9.90	AV	250.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11ax20(SU) High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1328.400	42.30	74.0	31.70	Peak	152.00	300	Vertical	Pass
1**	1328.400	32.45	54.0	21.55	AV	152.00	300	Vertical	Pass
2	2460.800	82.47	74.0	-8.47	Peak	110.00	100	Vertical	N/A
2**	2460.800	73.62	54.0	-19.62	AV	110.00	100	Vertical	N/A
3	4978.200	52.48	74.0	21.52	Peak	304.00	150	Vertical	Pass
3**	4978.200	42.90	54.0	11.10	AV	304.00	150	Vertical	Pass
4	6151.000	54.29	74.0	19.71	Peak	95.00	150	Vertical	Pass
4**	6151.000	45.43	54.0	8.57	AV	95.00	150	Vertical	Pass
5	10929.263	52.46	74.0	21.54	Peak	187.00	200	Vertical	Pass
5**	10929.263	42.94	54.0	11.06	AV	187.00	200	Vertical	Pass
6	17424.075	55.43	74.0	18.57	Peak	253.00	200	Vertical	Pass
6**	17424.075	46.64	54.0	7.36	AV	253.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11ax40(SU) Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1937.400	55.75	74.0	18.25	Peak	12.00	150	Horizontal	Pass
1**	1937.400	53.48	54.0	--	AV	12.00	150	Horizontal	N/A
2	2420.000	88.79	74.0	-14.79	Peak	187.00	100	Horizontal	N/A
2**	2420.000	80.07	54.0	-26.07	AV	187.00	100	Horizontal	N/A
3	4971.000	51.26	74.0	22.74	Peak	46.00	150	Horizontal	Pass
3**	4971.000	42.35	54.0	11.65	AV	46.00	150	Horizontal	Pass
4	6975.000	54.68	74.0	19.32	Peak	106.00	200	Horizontal	Pass
4**	6975.000	46.15	54.0	7.85	AV	106.00	200	Horizontal	Pass
5	11940.112	52.03	74.0	21.97	Peak	278.00	300	Horizontal	Pass
5**	11940.112	41.76	54.0	12.24	AV	278.00	300	Horizontal	Pass
6	17433.262	55.31	74.0	18.69	Peak	0.00	100	Horizontal	Pass
6**	17433.262	46.12	54.0	7.88	AV	0.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11ax40(SU) Low Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1331.200	43.71	74.0	30.29	Peak	142.00	400	Vertical	Pass
1**	1331.200	34.52	54.0	19.48	AV	142.00	400	Vertical	Pass
2	2422.800	79.26	74.0	-5.26	Peak	109.00	200	Vertical	N/A
2**	2422.800	70.88	54.0	-16.88	AV	109.00	200	Vertical	N/A
3	4767.600	51.06	74.0	22.94	Peak	360.00	150	Vertical	Pass
3**	4767.600	41.59	54.0	12.41	AV	360.00	150	Vertical	Pass
4	6807.200	55.16	74.0	18.84	Peak	252.00	400	Vertical	Pass
4**	6807.200	45.80	54.0	8.20	AV	252.00	400	Vertical	Pass
5	12808.013	52.09	74.0	21.91	Peak	279.00	300	Vertical	Pass
5**	12808.013	42.65	54.0	11.35	AV	279.00	300	Vertical	Pass
6	16411.613	55.44	74.0	18.56	Peak	34.00	200	Vertical	Pass
6**	16411.613	45.00	54.0	9.00	AV	34.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11ax40(SU) Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1949.400	55.35	74.0	18.65	Peak	204.00	150	Horizontal	Pass
1**	1949.400	53.58	54.0	--	AV	204.00	150	Horizontal	N/A
2	2435.400	89.44	74.0	-15.44	Peak	172.00	100	Horizontal	N/A
2**	2435.400	81.01	54.0	-27.01	AV	172.00	100	Horizontal	N/A
3	4809.800	51.56	74.0	22.44	Peak	20.00	100	Horizontal	Pass
3**	4809.800	42.75	54.0	11.25	AV	20.00	100	Horizontal	Pass
4	6994.600	55.02	74.0	18.98	Peak	360.00	200	Horizontal	Pass
4**	6994.600	46.89	54.0	7.11	AV	360.00	200	Horizontal	Pass
5	11946.438	51.74	74.0	22.26	Peak	292.00	100	Horizontal	Pass
5**	11946.438	43.07	54.0	10.93	AV	292.00	100	Horizontal	Pass
6	17433.262	55.93	74.0	18.07	Peak	260.00	100	Horizontal	Pass
6**	17433.262	47.36	54.0	6.64	AV	260.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11ax40(SU) Middle Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1327.000	42.33	74.0	31.67	Peak	112.00	200	Vertical	Pass
1**	1327.000	31.90	54.0	22.10	AV	112.00	200	Vertical	Pass
2	2425.900	80.16	74.0	-6.16	Peak	112.00	100	Vertical	N/A
2**	2425.900	69.62	54.0	-15.62	AV	112.00	100	Vertical	N/A
3	4779.400	51.60	74.0	22.40	Peak	169.00	100	Vertical	Pass
3**	4779.400	41.59	54.0	12.41	AV	169.00	100	Vertical	Pass
4	5313.200	57.57	74.0	16.43	Peak	198.00	200	Vertical	Pass
4**	5313.200	49.36	54.0	4.64	AV	198.00	200	Vertical	Pass
5	11807.863	52.27	74.0	21.73	Peak	360.00	200	Vertical	Pass
5**	11807.863	42.88	54.0	11.12	AV	360.00	200	Vertical	Pass
6	17440.612	55.36	74.0	18.64	Peak	125.00	200	Vertical	Pass
6**	17440.612	45.98	54.0	8.02	AV	125.00	200	Vertical	Pass

1 GHz to 18 GHz, ANT H 802.11ax40(SU) High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1961.600	55.46	74.0	18.54	Peak	152.00	150	Horizontal	Pass
1**	1961.600	54.22	54.0	--	AV	152.00	150	Horizontal	N/A
2	2440.600	88.17	74.0	-14.17	Peak	184.00	200	Horizontal	N/A
2**	2440.600	77.75	54.0	-23.75	AV	184.00	200	Horizontal	N/A
3	4805.800	51.76	74.0	22.24	Peak	102.00	150	Horizontal	Pass
3**	4805.800	43.05	54.0	10.95	AV	102.00	150	Horizontal	Pass
4	6147.400	55.39	74.0	18.61	Peak	238.00	100	Horizontal	Pass
4**	6147.400	44.74	54.0	9.26	AV	238.00	100	Horizontal	Pass
5	11816.487	52.14	74.0	21.86	Peak	210.00	200	Horizontal	Pass
5**	11816.487	42.42	54.0	11.58	AV	210.00	200	Horizontal	Pass
6	16867.838	55.28	74.0	18.72	Peak	84.00	100	Horizontal	Pass
6**	16867.838	45.63	54.0	8.37	AV	84.00	100	Horizontal	Pass

1 GHz to 18 GHz, ANT V 802.11ax40(SU) High Channel

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1330.900	43.69	74.0	30.31	Peak	129.00	200	Vertical	Pass
1**	1330.900	35.30	54.0	18.70	AV	129.00	200	Vertical	Pass
2	2454.600	78.93	74.0	-4.93	Peak	111.00	200	Vertical	N/A
2**	2454.600	71.46	54.0	-17.46	AV	111.00	200	Vertical	N/A
3	4864.800	51.58	74.0	22.42	Peak	360.00	100	Vertical	Pass
3**	4864.800	42.40	54.0	11.60	AV	360.00	100	Vertical	Pass
4	6971.800	54.88	74.0	19.12	Peak	18.00	100	Vertical	Pass
4**	6971.800	44.91	54.0	9.09	AV	18.00	100	Vertical	Pass
5	12826.387	52.67	74.0	21.33	Peak	28.00	100	Vertical	Pass
5**	12826.387	42.51	54.0	11.49	AV	28.00	100	Vertical	Pass
6	16852.088	54.99	74.0	19.01	Peak	308.00	200	Vertical	Pass
6**	16852.088	45.63	54.0	8.37	AV	308.00	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.

Note ⁴: All antenna were pre tested, but only the worst case has been reported in this report.

Test DataSISO-Main Antenna

802.11b LOW CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2341.700	57.61	74.0	16.39	Peak	336.00	200	Horizontal	Pass
1**	2341.700	45.70	54.0	8.30	AV	336.00	200	Horizontal	Pass
2	2389.950	56.03	74.0	17.97	Peak	277.00	150	Horizontal	Pass
2**	2389.950	46.07	54.0	7.93	AV	277.00	150	Horizontal	Pass

802.11b HIGH CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.575	56.18	74.0	17.82	Peak	0.00	200	Horizontal	Pass
1**	2483.575	45.82	54.0	8.18	AV	0.00	200	Horizontal	Pass
2	2484.415	57.05	74.0	16.95	Peak	312.00	150	Horizontal	Pass
2**	2484.415	46.30	54.0	7.70	AV	312.00	150	Horizontal	Pass

802.11g LOW CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2380.750	58.13	74.0	15.87	Peak	360.00	150	Horizontal	Pass
1**	2380.750	46.10	54.0	7.90	AV	360.00	150	Horizontal	Pass
2	2389.950	55.99	74.0	18.01	Peak	243.00	150	Horizontal	Pass
2**	2389.950	46.01	54.0	7.99	AV	243.00	150	Horizontal	Pass

802.11g HIGH CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	57.15	74.0	16.85	Peak	360.00	150	Horizontal	Pass
1**	2483.500	45.84	54.0	8.16	AV	360.00	150	Horizontal	Pass
2	2492.875	57.21	74.0	16.79	Peak	91.00	150	Horizontal	Pass
2**	2492.875	45.79	54.0	8.21	AV	91.00	150	Horizontal	Pass

802.11n20 LOW CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2381.350	57.98	74.0	16.02	Peak	2.00	100	Horizontal	Pass
1**	2381.350	46.37	54.0	7.63	AV	2.00	100	Horizontal	Pass
2	2389.950	55.81	74.0	18.19	Peak	318.00	100	Horizontal	Pass
2**	2389.950	45.83	54.0	8.17	AV	318.00	100	Horizontal	Pass

802.11n20 HIGH CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.515	56.77	74.0	17.23	Peak	190.00	150	Horizontal	Pass
1**	2483.515	46.16	54.0	7.84	AV	190.00	150	Horizontal	Pass
2	2485.120	57.42	74.0	16.58	Peak	291.00	200	Horizontal	Pass
2**	2485.120	45.72	54.0	8.28	AV	291.00	200	Horizontal	Pass

802.11n40 LOW CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2326.550	57.49	74.0	16.51	Peak	340.00	100	Horizontal	Pass
1**	2326.550	46.04	54.0	7.96	AV	340.00	100	Horizontal	Pass
2	2389.950	55.04	74.0	18.96	Peak	61.00	100	Horizontal	Pass
2**	2389.950	45.95	54.0	8.05	AV	61.00	100	Horizontal	Pass

802.11n40 HIGH CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	55.75	74.0	18.25	Peak	14.00	100	Horizontal	Pass
1**	2483.500	46.24	54.0	7.76	AV	14.00	100	Horizontal	Pass
2	2483.800	57.55	74.0	16.45	Peak	6.00	100	Horizontal	Pass
2**	2483.800	46.01	54.0	7.99	AV	6.00	100	Horizontal	Pass

802.11ax20(SU) LOW CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2330.500	58.24	74.0	15.76	Peak	220.00	150	Horizontal	Pass
1**	2330.500	45.97	54.0	8.03	AV	220.00	150	Horizontal	Pass
2	2389.950	55.50	74.0	18.50	Peak	49.00	200	Horizontal	Pass
2**	2389.950	45.74	54.0	8.26	AV	49.00	200	Horizontal	Pass

802.11ax20(SU) HIGH CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.590	55.76	74.0	18.24	Peak	268.00	200	Horizontal	Pass
1**	2483.590	45.98	54.0	8.02	AV	268.00	200	Horizontal	Pass
2	2484.715	57.35	74.0	16.65	Peak	318.00	200	Horizontal	Pass
2**	2484.715	45.77	54.0	8.23	AV	318.00	200	Horizontal	Pass

802.11ax40(SU) LOW CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2331.200	57.39	74.0	16.61	Peak	9.00	100	Horizontal	Pass
1**	2331.200	46.00	54.0	8.00	AV	9.00	100	Horizontal	Pass
2	2389.950	56.00	74.0	18.00	Peak	121.00	150	Horizontal	Pass
2**	2389.950	45.73	54.0	8.27	AV	121.00	150	Horizontal	Pass

802.11ax40(SU) HIGH CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.590	56.31	74.0	17.69	Peak	6.00	150	Horizontal	Pass
1**	2483.590	45.91	54.0	8.09	AV	6.00	150	Horizontal	Pass
2	2496.595	57.29	74.0	16.71	Peak	224.00	100	Horizontal	Pass
2**	2496.595	45.45	54.0	8.55	AV	224.00	100	Horizontal	Pass

A.8 Power Spectral Density (PSD)

Note: All antenna were pre tested, but only the worst case has been reported in this report.

Test Data

SISO-Main Antenna

802.11b Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-12.64	8
Middle	-12.49	8
High	-12.50	8

802.11g Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-13.52	8
Middle	-13.43	8
High	-13.75	8

802.11n-20 MHz Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-13.21	8
Middle	-13.93	8
High	-13.10	8

802.11n-40 MHz Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-15.51	8
Middle	-17.36	8
High	-16.27	8

802.11ax-20 MHz(SU) Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-14.49	8
Middle	-14.65	8
High	-14.91	8

802.11ax-40 MHz(SU) Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-17.49	8
Middle	-17.35	8
High	-17.04	8

Test Plots

SISO-Main Antenna

802.11b LOW CHANNEL



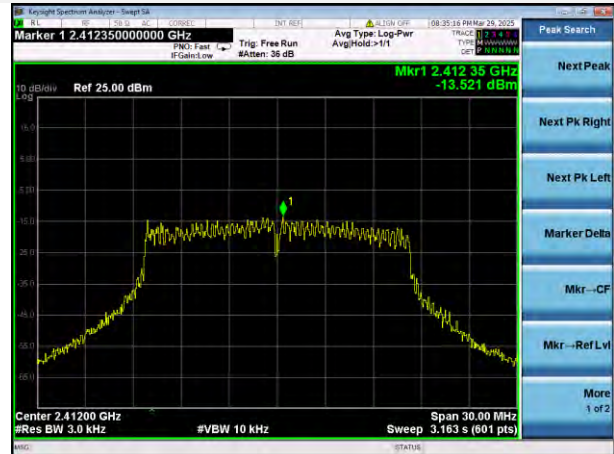
802.11b MIDDLE CHANNEL



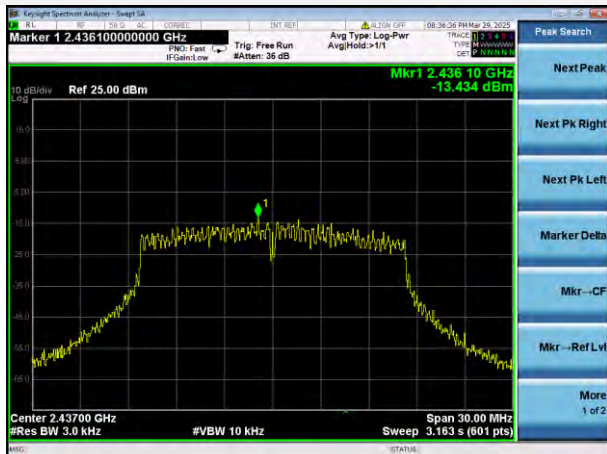
802.11b HIGH CHANNEL



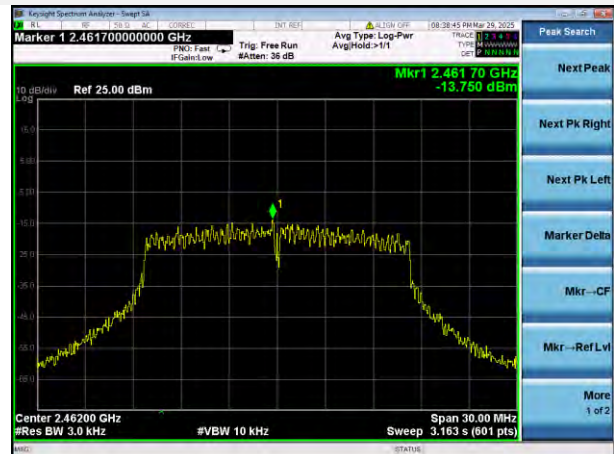
802.11g LOW CHANNEL



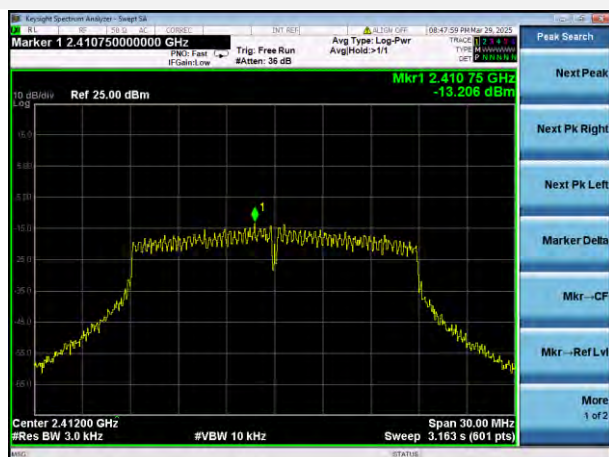
802.11g MIDDLE CHANNEL



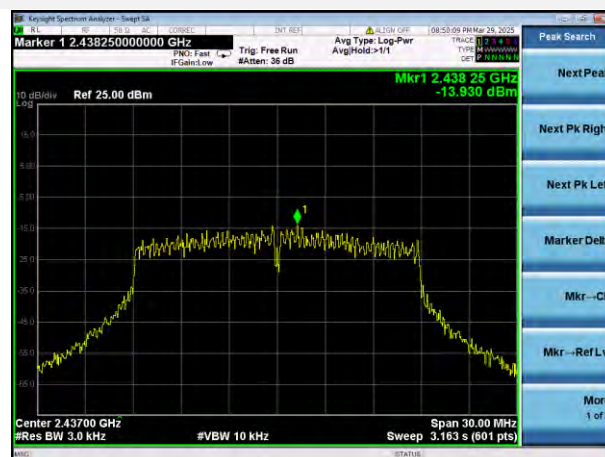
802.11g HIGH CHANNEL



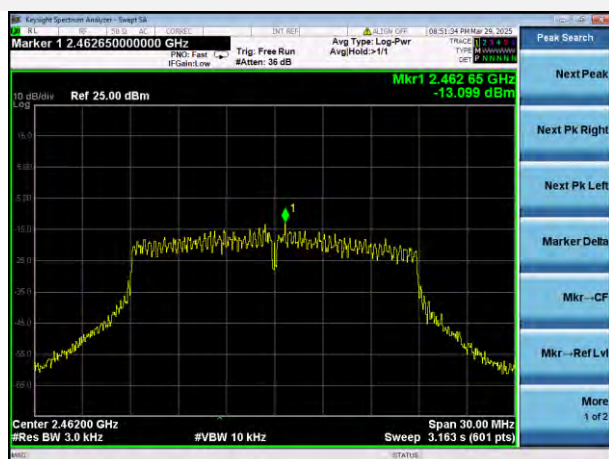
802.11n-20 MHz LOW CHANNEL



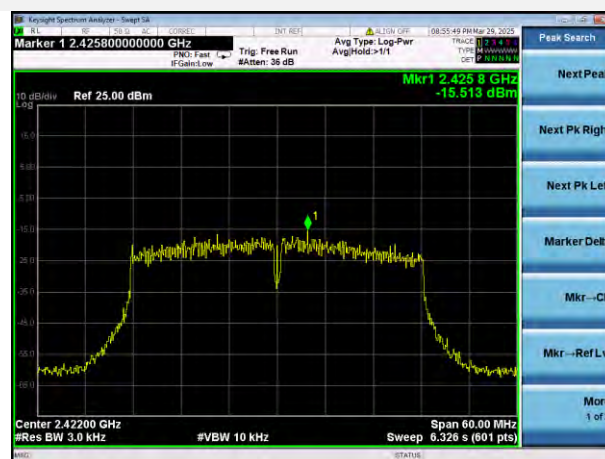
802.11n-20 MHz MIDDLE CHANNEL



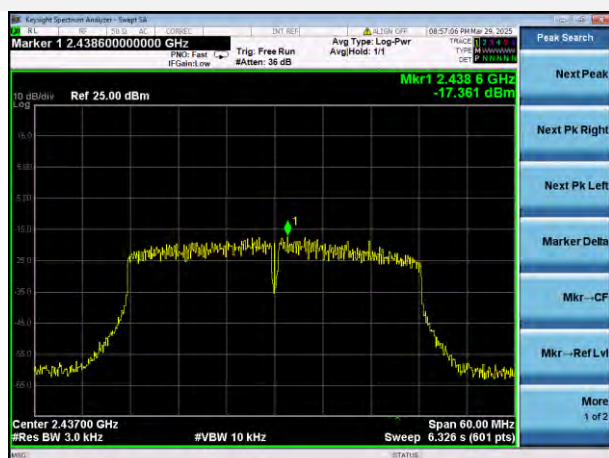
802.11n-20 MHz HIGH CHANNEL



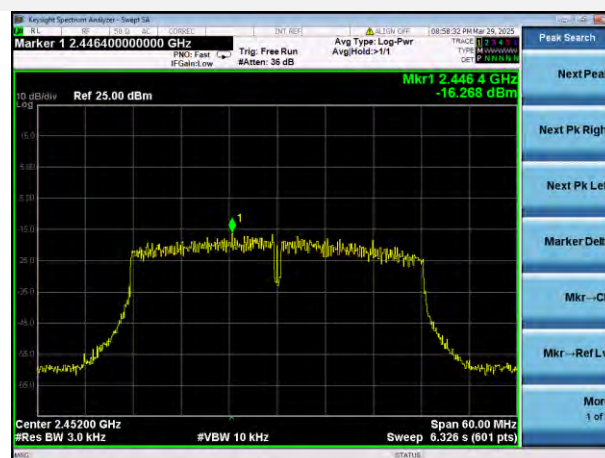
802.11n-40 MHz LOW CHANNEL



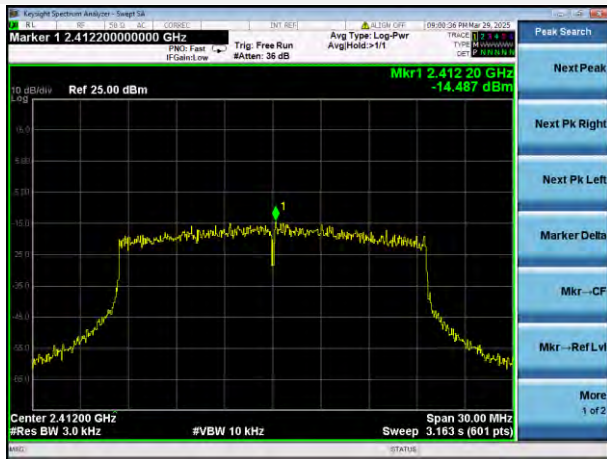
802.11n-40 MHz MIDDLE CHANNEL



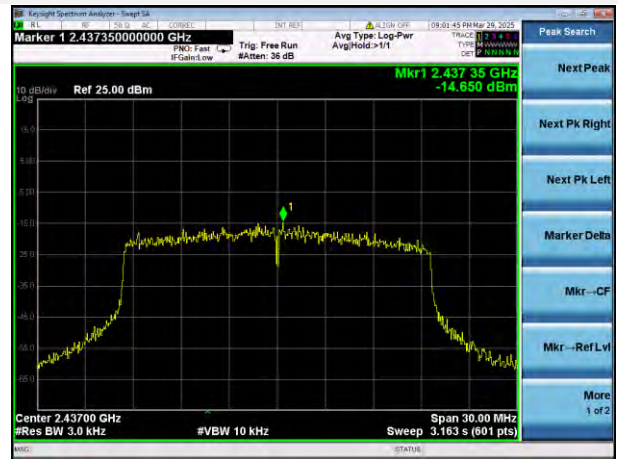
802.11n-40 MHz HIGH CHANNEL



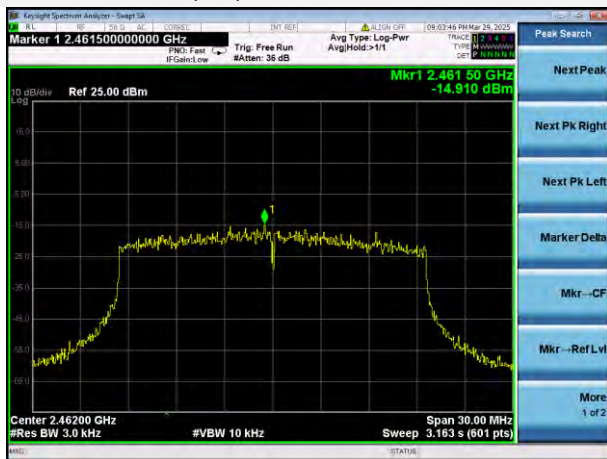
802.11ax-20 MHz(SU) LOW CHANNEL



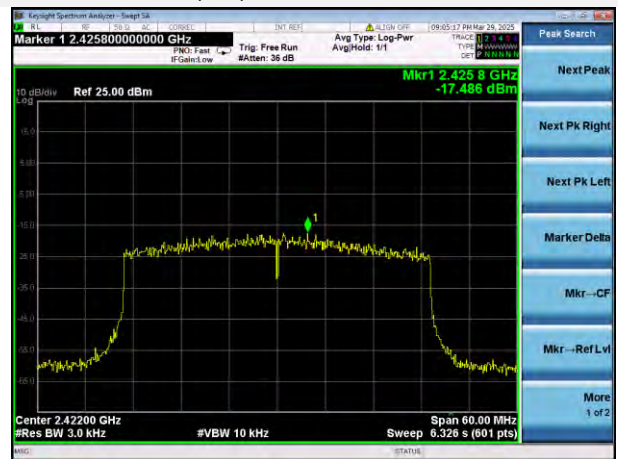
802.11ax-20 MHz(SU) MIDDLE CHANNEL



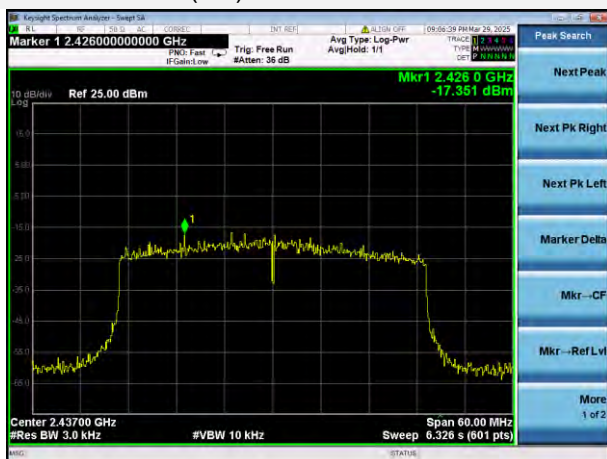
802.11ax-20 MHz(SU) HIGH CHANNEL



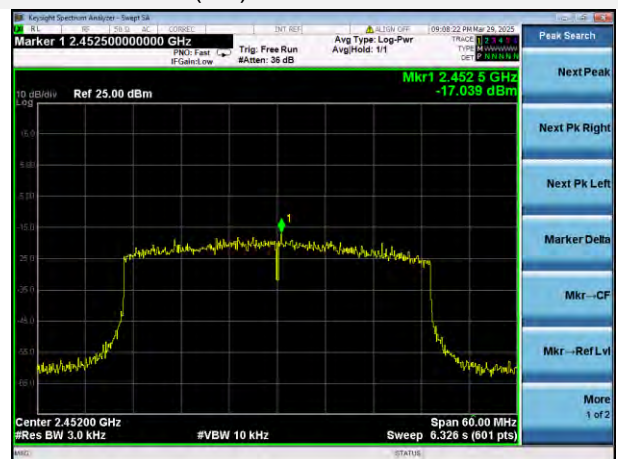
802.11ax-40 MHz(SU) LOW CHANNEL



802.11ax-40 MHz(SU) MIDDLE CHANNEL



802.11ax-40 MHz(SU) HIGH CHANNEL



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ24C0578-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ24C0578-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ24C0578-AI.PDF”.

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--END OF REPORT--