

TEST REPORT

Applicant: E&S International Enterprises, Inc.
Address: 7801 Hayvenhurst Avenue, Van Nuys, California
91406 USA
Equipment Type: Laptop
Model Name: GWN5B1657 (refer to section 2.3)
Brand Name: GATEWAY
FCC ID: 2AYPE-GWN5B1657
Test Standard: 47 CFR Part 15 Subpart C
(refer to section 3.1)
Sample Arrival Date: Jun. 03, 2025
Test Date: Jun. 07, 2025 - Jun. 15, 2025
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ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Julie Zhu**Checked by:** Ye Hongji**Approved by:** Sunny Zou
(Technical Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Jul. 10, 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.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	E&S International Enterprises, Inc.
Address	7801 Hayvenhurst Avenue, Van Nuys, California 91406 USA

2.2 Manufacturer Information

Manufacturer	Shenzhen Yuko Technology Co., Ltd.
Address	6th, A9 Bldg, Tianrui Industrial Park, Fuyuan 1st Rd, Fuyong, Boanan, Shenzhen

2.3 General Description for Equipment under Test (EUT)

EUT Name	Laptop
Model Name Under Test	GWNR5B1657
Series Model Name	GWNR5B1657-GRY, AM1636YD, N1636, GWNR5B1657-GRY-S
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name. (this information provided by the applicant)
Hardware Version	EM_AB336
Software Version	Windows 11 Home
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac
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The requirement for the following technical information of the EUT was tested in this report:

Frequency Range	802.11b/g/n(20 MHz): 2.412 GHz - 2.462 GHz $f_c = 2412 \text{ MHz} + (N-1)*5 \text{ MHz}$, where - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 1 to 11. 802.11n(40 MHz): 2.422 GHz - 2.452 GHz $f_c = 2412 \text{ MHz} + (N-1)*5 \text{ MHz}$, where - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 3 to 9.	
Modulation Technology	DSSS, OFDM	
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	
Categorization as Correlated or Completely Uncorrelated	Categorization as Correlated for 802.11b/g Categorization as Uncorrelated for 802.11n	
Antenna Type	Main Antenna Aux. Antenna	FPC Antenna
Antenna Gain	Main Antenna Aux. Antenna	1.93 dBi 2.84 dBi
Total directional gain	For power spectral density (PSD) measurements	Correlated: 5.41 dBi Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: 2.41 dBi Formulas: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / NANT]$ dBi
	For power measurements	Correlated: 5.41 dBi Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: 2.41 dBi Formulas: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / NANT]$ dBi
	For Conducted Out-of-Band	Correlated: 5.41 dBi

	and Spurious Measurements	Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: 2.41 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 and 802.11n (HT20/40) was tested in this report.

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

Modulation technology	Modulation Type	Transfer Rate (Mbps)(Single RF path)
DSSS (802.11b)	DBPSK	1
	DQPSK	2
	CCK	5.5/11
OFDM (802.11g)	BPSK	6/9
	QPSK	12/18
	16QAM	24/36
	64QAM	48/54
OFDM (802.11n-20 MHz)	BPSK	6.5/7.2
	QPSK	13/19.5/14.4/21.7
	16QAM	26/39/28.9/43.3
	64QAM	52/58.5/65/57.8/65/72.2
OFDM (802.11n-40 MHz)	BPSK	13.5/15
	QPSK	27/40.5/30/45
	16QAM	54/81/60/90
	64QAM	108/121.5/135/120/150

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

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

Note: The above EUT information in section 2.4 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	KDB Publication 662911 D01v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)
3	ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
4	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.	Test Result	Verdict
1	Antenna Requirement	15.203	N/A	Pass ^{Note 1}
2	Output Power	15.247 (b)	ANNEX A.1	Pass
3	Occupied Bandwidth	15.247 (a)	ANNEX A.2	Pass
4	Conducted Spurious Emission	15.247 (d)	ANNEX A.3	Pass
5	Band Edge(Authorized-band band-edge)	15.247 (d)	ANNEX A.4	Pass
6	Conducted Emission	15.207	ANNEX A.5	Pass
7	Radiated Spurious Emission	15.209; 15.247 (d)	ANNEX A.6	Pass
8	Band Edge(Restricted-band band-edge)	15.209; 15.247 (d)	ANNEX A.7	Pass
9	Power spectral density (PSD)	15.247 (e)	ANNEX A.8	Pass

Note 1: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	45% to 61%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+20.5℃ to +24.4℃
Working Voltage of the EUT	NV (Normal Voltage)	11.55 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY46471071	2024.07.04	2025.07.03
Power Sensor	KEYSIGHT	U2063XA	MY58000247	2024.07.04	2025.07.03
Spectrum Analyzer	KEYSIGHT	N9020A	MY50531259	2024.08.01	2025.07.31
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	02460	2024.05.16	2027.05.15
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2024.06.15	2027.06.14
Anechoic Chamber	RAINFORD	9m*6m*6m	140	2024.07.28	2027.07.27
Amplifier	COM-MV	LSCX_LNA1-12G-01	7210214	2024.08.01	2025.07.31
Amplifier	COM-MV	XKu_LNA7-18G-01	7210209	2024.08.01	2025.07.31
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2024.08.01	2025.07.31
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	Agilent	N9038A	MY55330120	2024.08.01	2025.07.31
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9168	9168-00867	2025.03.23	2028.03.22
Amplifier	COM-MV	ZT30-1000M	B2017119081	2024.11.28	2025.11.27
Anechoic Chamber	YiHeng	9m*6m*6m	142	2024.07.21	2027.07.20
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2024.08.01	2025.07.31
LISN	SCHWARZBECK	NSLK 8127	8127-687	2025.04.29	2026.04.28
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%

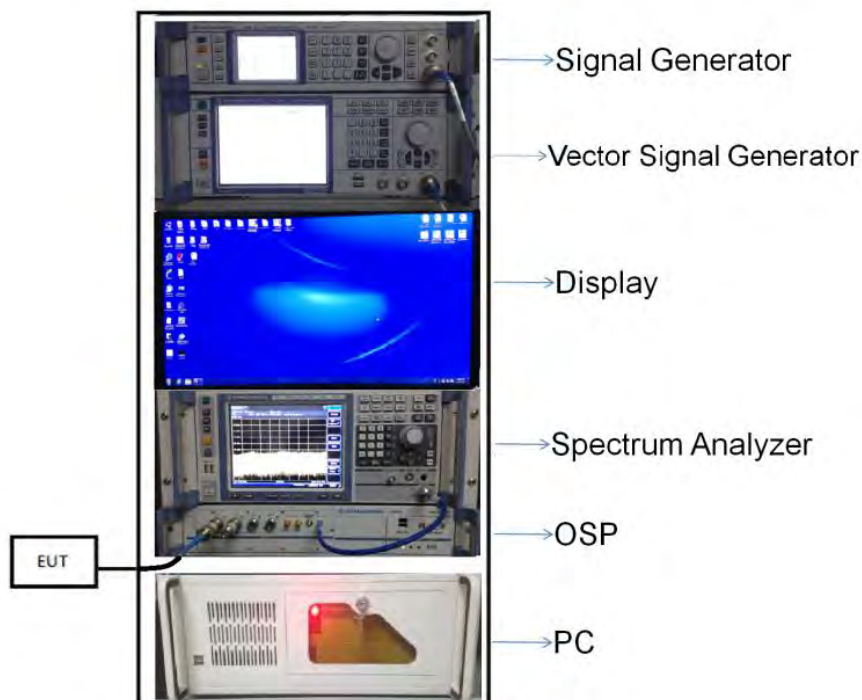
4.5 Description of Test Setup

4.5.1 For Antenna Port Test

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

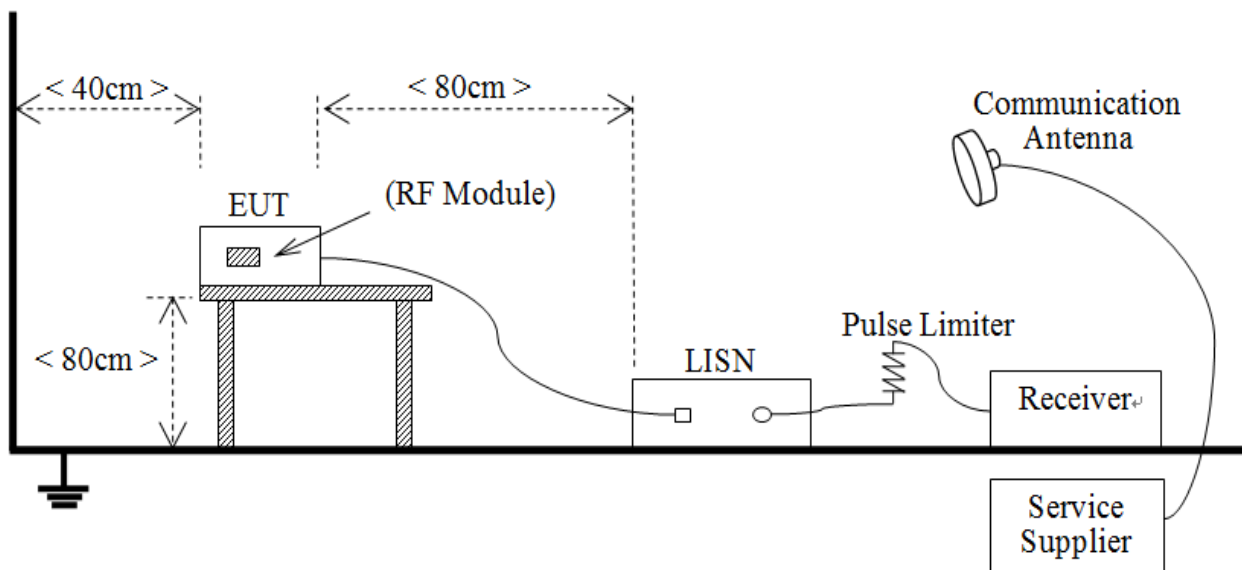
For example: the measurement value is 10 dBm and the cable 0.5dBm used, then the final result of EUT:

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



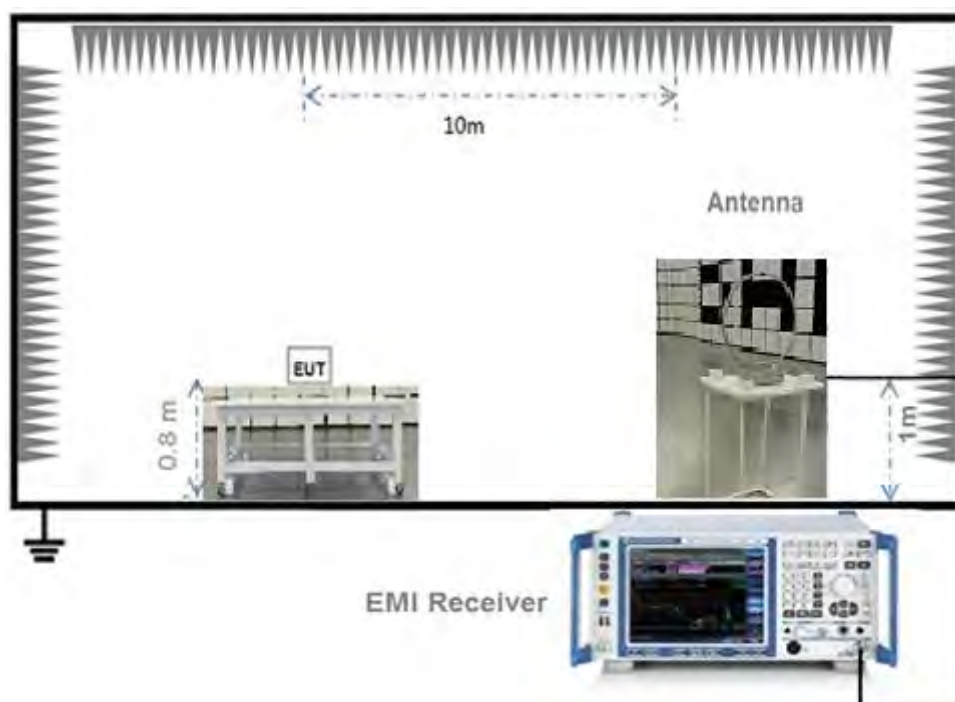
(Diagram 1)

4.5.2 For AC Power Supply Port Test



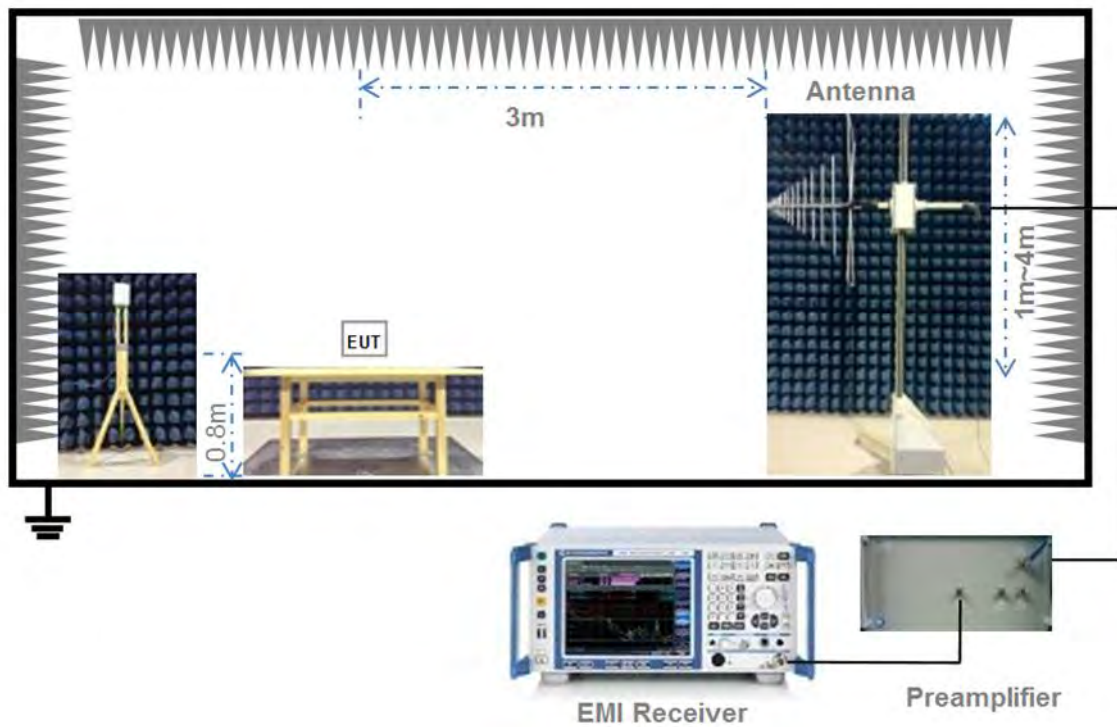
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



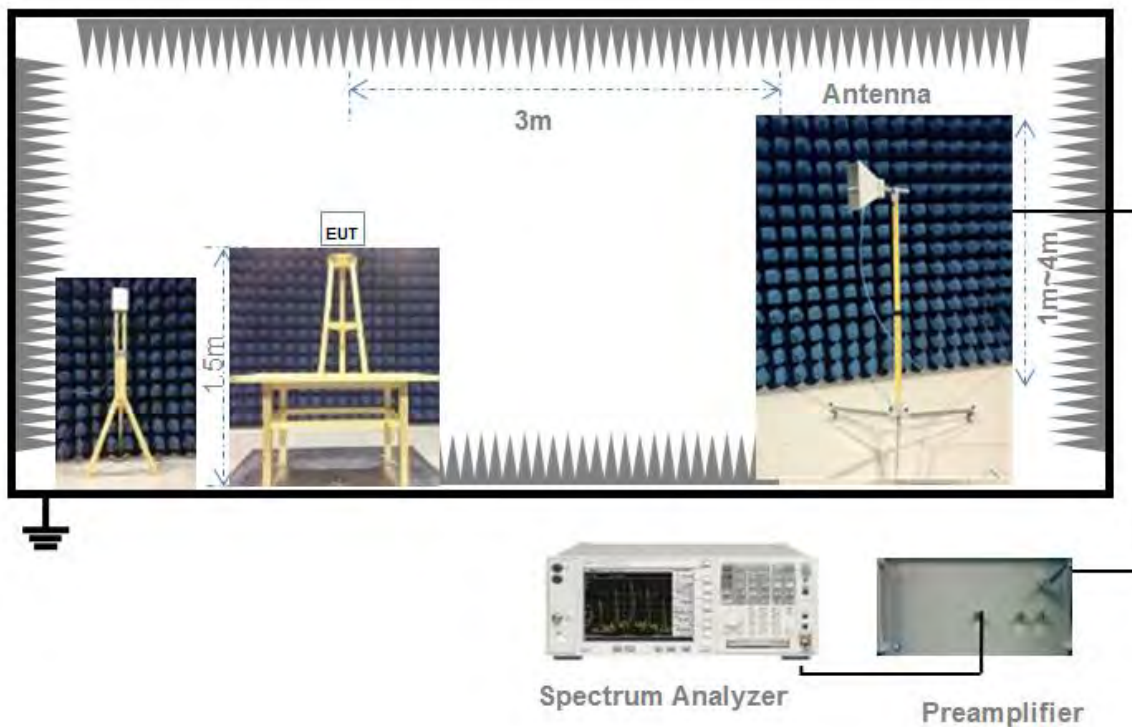
(Diagram 3)

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

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)

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.

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)

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)

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)

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

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)

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 ($\mu\text{V/m}$)	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)

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)

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	8.1850	8.299	98.63%	0.06
802.11g	1.3580	1.464	92.76%	0.33
802.11n-20 MHz	1.2640	1.376	91.86%	0.37
802.11n-40 MHz	0.6287	0.736	85.42%	0.68

Peak Power Test Data**SISO-Main Antenna****802.11b Mode:**

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	17.63	57.94	30	1000	Pass
Middle	17.42	55.21			Pass
High	17.68	58.61			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.90	48.98	30	1000	Pass
Middle	20.04	100.93			Pass
High	18.02	63.39			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.42	43.85	30	1000	Pass
Middle	18.12	64.86			Pass
High	16.49	44.57			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.59	28.77	30	1000	Pass
Middle	19.02	79.80			Pass
High	14.16	26.06			Pass

SISO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	18.03	63.53	30	1000	Pass
Middle	17.82	60.53			Pass
High	17.98	62.81			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.80	47.86	30	1000	Pass
Middle	20.24	105.68			Pass
High	17.82	60.53			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.32	42.85	30	1000	Pass
Middle	18.02	63.39			Pass
High	16.49	44.57			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.89	30.83	30	1000	Pass
Middle	19.12	81.66			Pass
High	14.36	27.29			Pass

MIMO-Main Antenna

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.93	31.12	30	1000	Pass
Middle	14.72	29.65			Pass
High	14.68	29.38			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	13.50	22.39	30	1000	Pass
Middle	16.64	46.13			Pass
High	14.32	27.04			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	12.62	18.28	30	1000	Pass
Middle	14.22	26.42			Pass
High	13.09	20.37			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.79	15.10	30	1000	Pass
Middle	15.92	39.08			Pass
High	11.06	12.76			Pass

MIMO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.73	29.72	30	1000	Pass
Middle	14.92	31.05			Pass
High	14.88	30.76			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	13.60	22.91	30	1000	Pass
Middle	16.84	48.31			Pass
High	14.52	28.31			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	12.92	19.59	30	1000	Pass
Middle	14.62	28.97			Pass
High	13.29	21.33			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.99	15.81	30	1000	Pass
Middle	15.72	37.33			Pass
High	11.16	13.06			Pass

MIMO

802.11b Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	17.84	60.83	30	1000	Pass
Middle	17.83	60.69			Pass
High	17.79	60.14			Pass

802.11g Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	16.56	45.30	30	1000	Pass
Middle	19.75	94.44			Pass
High	17.43	55.35			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	15.78	37.87	30	1000	Pass
Middle	17.43	55.40			Pass
High	16.20	41.70			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Peak Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.90	30.91	30	1000	Pass
Middle	18.83	76.41			Pass
High	14.12	25.83			Pass

Average Power Test DataSISO-Main Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	15.43	34.91	30	1000	Pass
Middle	15.16	32.81			Pass
High	15.41	34.75			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.83	12.11	30	1000	Pass
Middle	13.44	22.08			Pass
High	12.12	16.29			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.52	11.27	30	1000	Pass
Middle	11.75	14.96			Pass
High	10.72	11.80			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	8.85	7.67	30	1000	Pass
Middle	12.19	16.56			Pass
High	8.12	6.49			Pass

SISO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	15.39	34.59	30	1000	Pass
Middle	15.06	32.06			Pass
High	15.31	33.96			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.23	13.27	30	1000	Pass
Middle	13.44	22.08			Pass
High	12.22	16.67			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.62	11.53	30	1000	Pass
Middle	12.15	16.41			Pass
High	10.72	11.80			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	8.85	7.67	30	1000	Pass
Middle	12.59	18.16			Pass
High	8.32	6.79			Pass

MIMO-Main Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.79	15.10	30	1000	Pass
Middle	12.46	17.62			Pass
High	12.41	17.42			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.73	5.93	30	1000	Pass
Middle	10.04	10.09			Pass
High	8.82	7.62			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.32	5.40	30	1000	Pass
Middle	8.65	7.33			Pass
High	7.32	5.40			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	5.25	3.35	30	1000	Pass
Middle	8.89	7.74			Pass
High	5.52	3.56			Pass

MIMO-Aux. Antenna

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	11.99	15.81	30	1000	Pass
Middle	12.26	16.83			Pass
High	12.21	16.63			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	8.03	6.35	30	1000	Pass
Middle	10.14	10.33			Pass
High	9.22	8.36			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	7.42	5.52	30	1000	Pass
Middle	8.85	7.67			Pass
High	7.42	5.52			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	5.45	3.51	30	1000	Pass
Middle	9.19	8.30			Pass
High	5.32	3.40			Pass

MIMO

802.11b Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	14.90	30.91	30	1000	Pass
Middle	15.37	34.45			Pass
High	15.32	34.05			Pass

802.11g Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.89	12.28	30	1000	Pass
Middle	13.10	20.42			Pass
High	12.03	15.98			Pass

802.11n-20 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	10.38	10.92	30	1000	Pass
Middle	11.76	15.00			Pass
High	10.38	10.92			Pass

802.11n-40 MHz Mode:

Channel	Measured Output Average Power		Limit		Verdict
	dBm	mW	dBm	mW	
Low	8.36	6.86	30	1000	Pass
Middle	12.05	16.04			Pass
High	8.43	6.97			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-Aux. Antenna

802.11b Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	10.300000	14.916000	≥ 500
Middle	10.300000	14.908000	≥ 500
High	10.200000	14.965000	≥ 500

802.11g Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	16.500000	17.159000	≥ 500
Middle	16.500000	17.174000	≥ 500
High	16.500000	17.178000	≥ 500

802.11n-20MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	17.100000	18.075000	≥ 500
Middle	17.100000	18.109000	≥ 500
High	17.100000	18.044000	≥ 500

802.11n-40MHz Mode:

Channel	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limits (kHz)
Low	35.700000	36.410000	≥ 500
Middle	35.600000	36.375000	≥ 500
High	35.600000	36.387000	≥ 500

Test Plots

SISO-Aux. 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



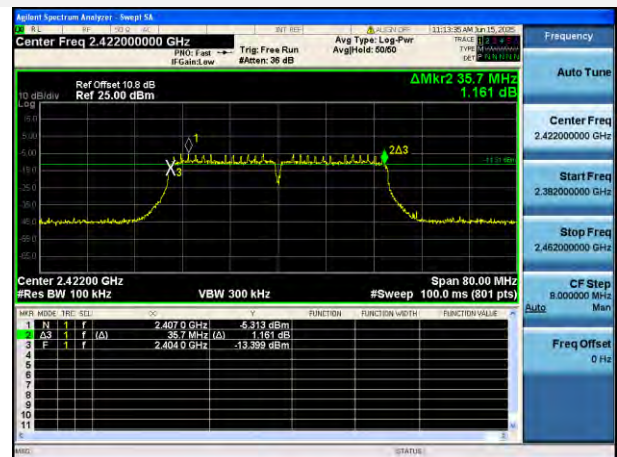
802.11n-20 MHz MIDDLE CHANNEL



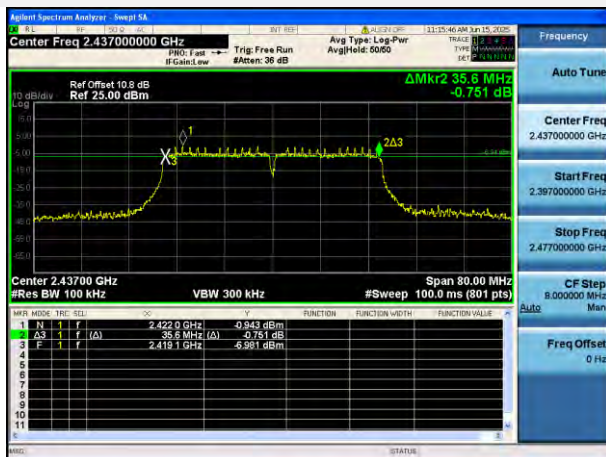
802.11n-20 MHz HIGH CHANNEL



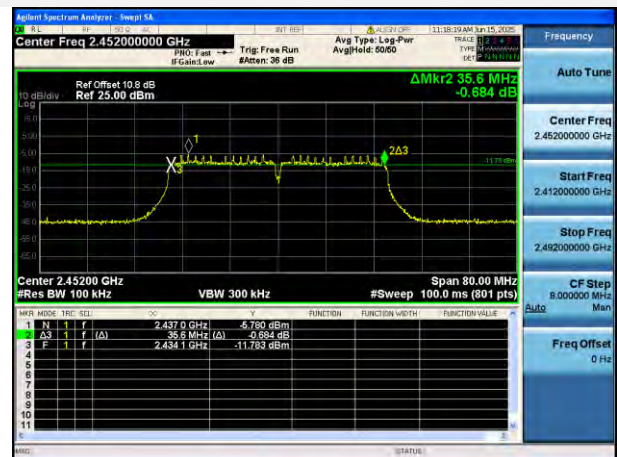
802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL

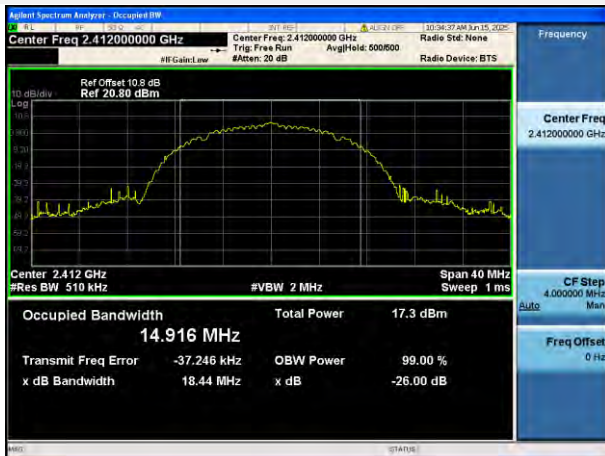


802.11n-40 MHz HIGH CHANNEL



99% Bandwidth

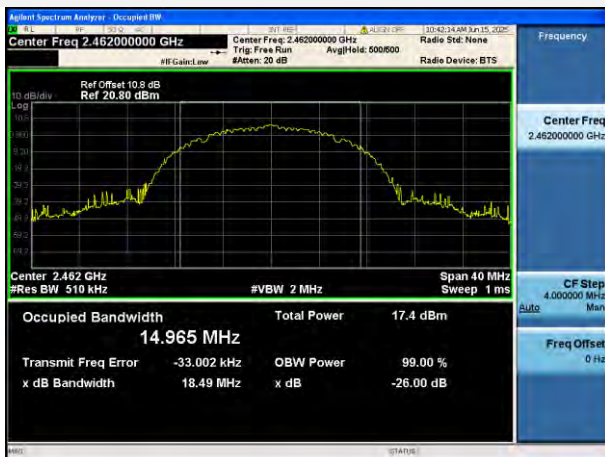
802.11b LOW CHANNEL



802.11b MIDDLE CHANNEL



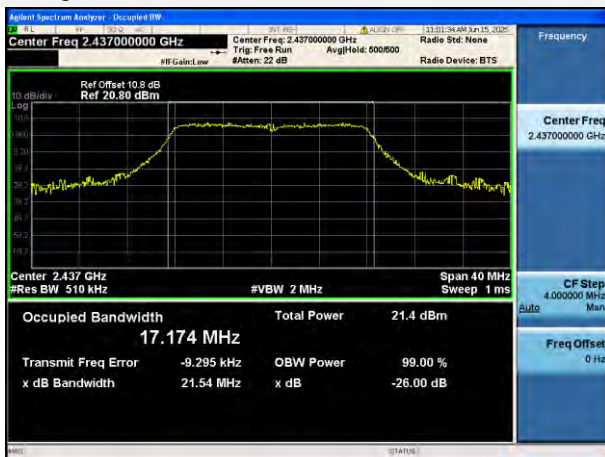
802.11b HIGH CHANNEL



802.11g LOW CHANNEL



802.11g MIDDLE CHANNEL



802.11g HIGH CHANNEL



802.11n-20 MHz LOW CHANNEL



802.11n-20 MHz MIDDLE CHANNEL



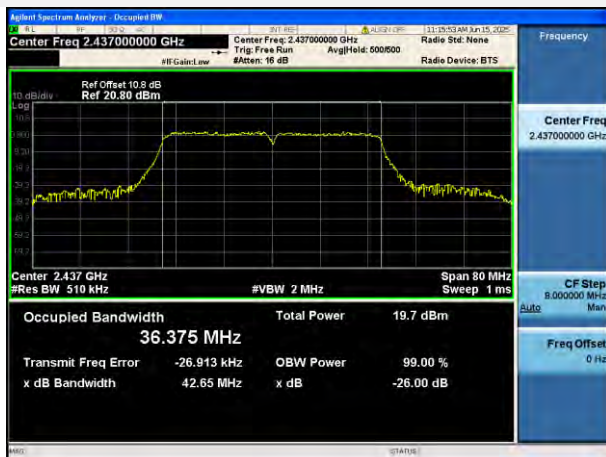
802.11n-20 MHz HIGH CHANNEL



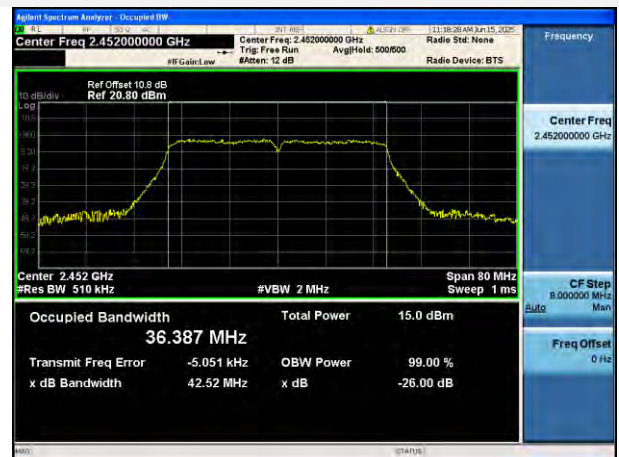
802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL



802.11n-40 MHz HIGH CHANNEL



A.3 Conducted Spurious Emissions

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

Test Data

SISO-Aux. Antenna

802.11b Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-36.67	5.05	-14.95	Pass
Middle	-36.41	4.60	-15.40	Pass
High	-36.50	5.17	-14.83	Pass

802.11g Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-37.56	0.37	-19.63	Pass
Middle	-36.77	4.14	-15.86	Pass
High	-36.62	1.47	-18.53	Pass

802.11n-20MHz Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-36.13	-0.73	-20.73	Pass
Middle	-37.25	1.22	-18.78	Pass
High	-36.40	-0.36	-20.36	Pass

802.11n-40MHz Mode:

Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-36.98	-5.11	-25.11	Pass
Middle	-36.72	-0.74	-20.74	Pass
High	-36.48	-5.56	-25.56	Pass

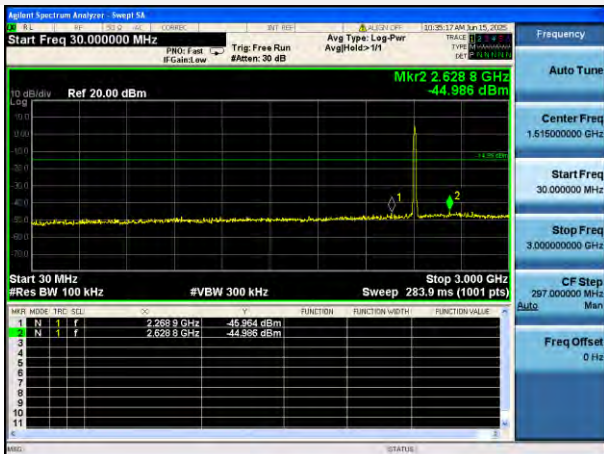
Test Plots

SISO-Aux. Antenna

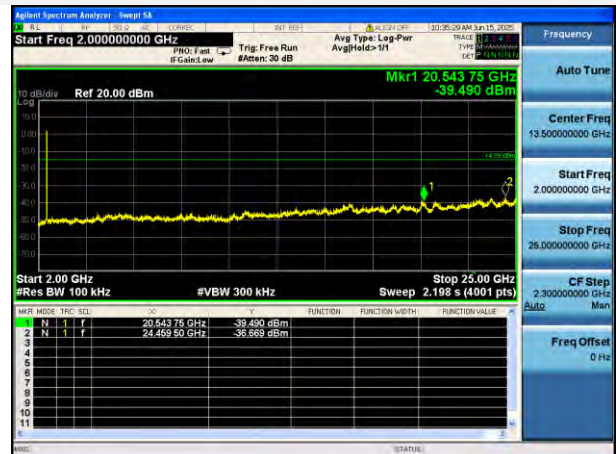
802.11b LOW CHANNEL CARRIER LEVEL



802.11b LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



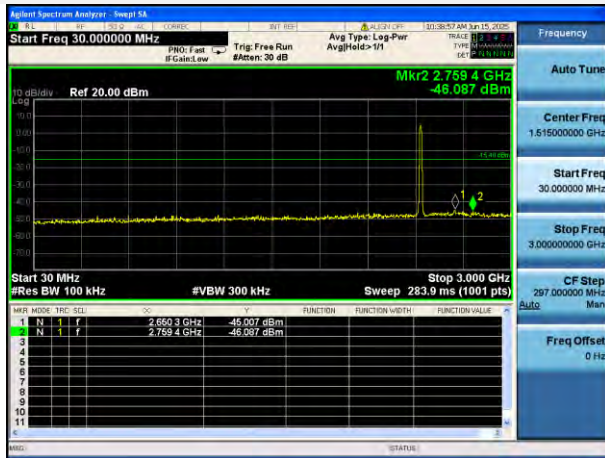
802.11b LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



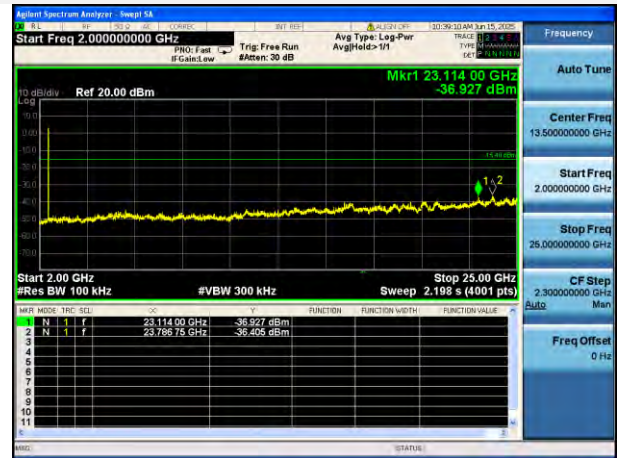
802.11b MIDDLE CHANNEL CARRIER LEVEL



802.11b MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



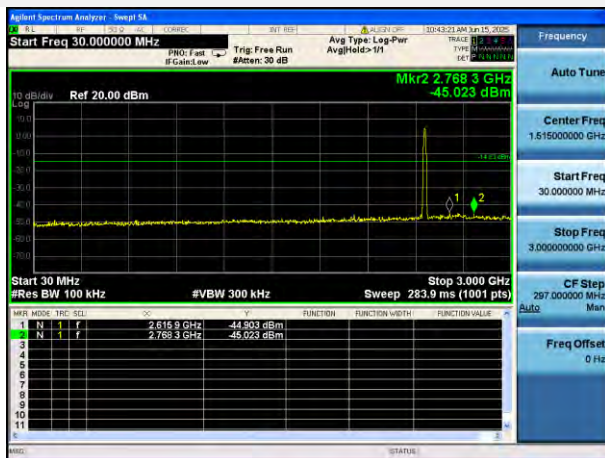
802.11b MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



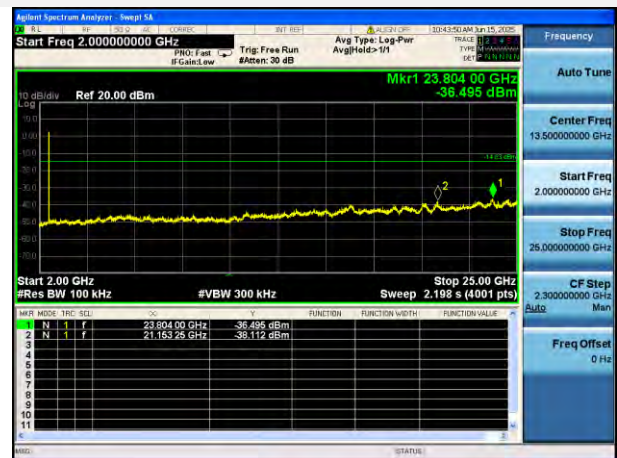
802.11b HIGH CHANNEL CARRIER LEVEL



802.11b HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



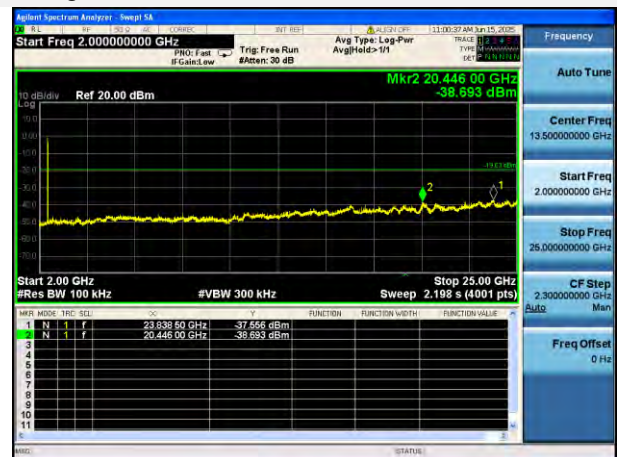
802.11b HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



802.11g LOW CHANNEL CARRIER LEVEL



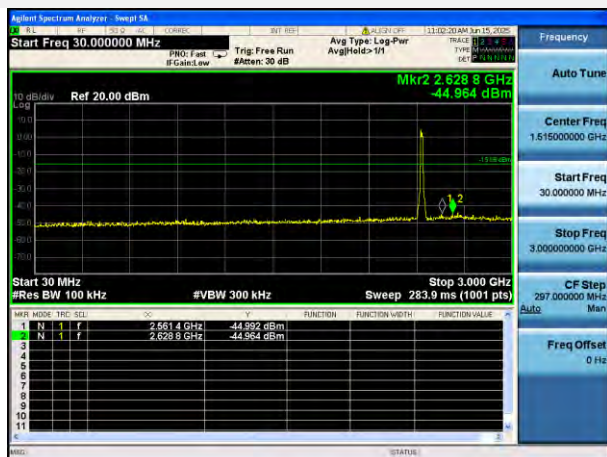
802.11g LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz 802.11g LOW CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



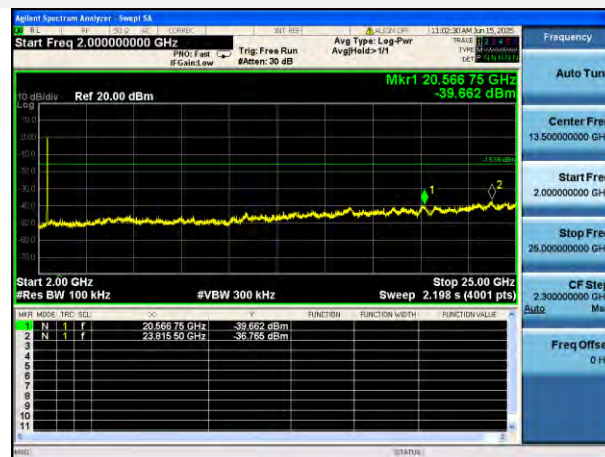
802.11g MIDDLE CHANNEL CARRIER LEVEL



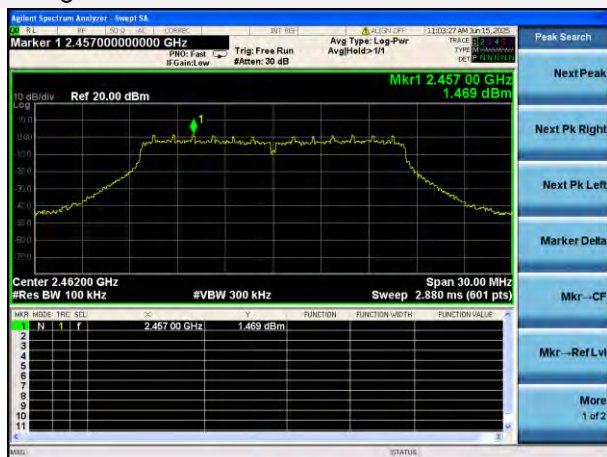
802.11g MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



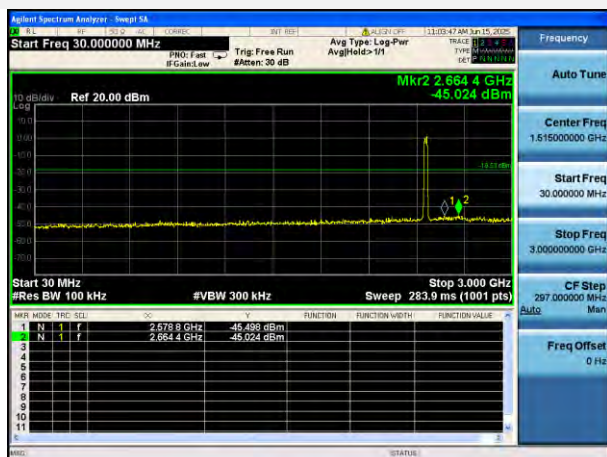
802.11g MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



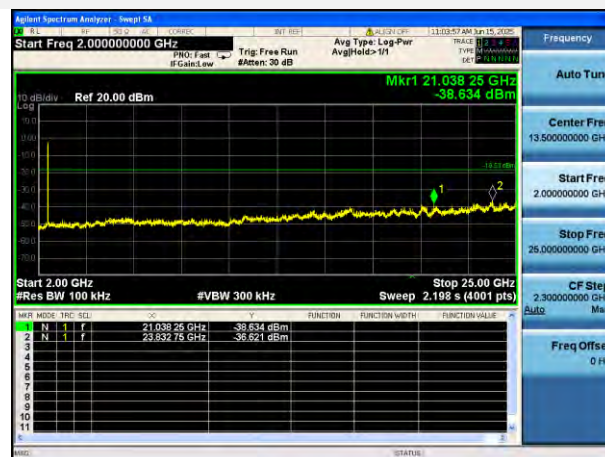
802.11g HIGH CHANNEL CARRIER LEVEL



802.11g HIGH CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



802.11g HIGH CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



Agilent Spectrum Analyzer - Swept SA

Agilent 83470B Spectrum Analyzer

Marker 1 2.40700000000000 GHz

PRO: Fast Trig: Free Run Avg Type: Log-Pwr Avg/Hold>H1

11:09:50 AM Jan 15, 2008

Trace 1B: F.F. Type: BW: 100 Hz Ref: 2.407 GHz

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

Mkr--CF

Mkr--Ref Lvl

More

1 of 2

The screenshot displays the Agilent 83470B Spectrum Analyzer interface. The main display shows a swept spectrum plot with a yellow trace. The y-axis is labeled 'dBm' and ranges from -70 to 10. The x-axis is labeled 'GHz' and ranges from 2.400 to 2.410. A marker is placed at 2.407 GHz, with a value of -0.731 dBm. The plot shows a signal that rises from approximately -45 dBm at 2.400 GHz to a plateau around -10 dBm between 2.405 GHz and 2.409 GHz, then falls back to approximately -45 dBm at 2.410 GHz. The plot is titled 'Ref 20.00 dBm'. The status bar at the bottom shows 'Center 2.41000 GHz', 'Res BW 100 kHz', 'Span 30.00 MHz', and 'Sweep 2.880 ms (601 pts)'. The bottom right corner shows '(STATUS)'.

Ref 20.00 dBm

Mkr1 2.407 00 GHz
-0.731 dBm

Center 2.41000 GHz
#Res BW 100 kHz

#VBW 300 kHz

Span 30.00 MHz
Sweep 2.880 ms (601 pts)

Marker 1: 2.407 00 GHz, -0.731 dBm

Table:

Marker	Hz	dBm	Function	Function Width	Function Value
1	2.407 00 GHz	-0.731 dBm			
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

More

1 of 2

(STATUS)

Agilent Spectrum Analyzer - Swept SA

Start Freq 30.000000 MHz

Ref 20.00 dBm

Mkr2 2.6317 GHz -45.449 dBm

Start 30 MHz #Res BW 100 kHz #VBW 300 kHz Stop 3.000 GHz Sweep 283.9 ms (1001 pts)

MNR	MODE	TRC	SCN	F	V	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	1	2.6317 GHz	-45.157 dBm			
2	N	1	1	2.6317 GHz	-45.449 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency

Auto Tune

Center Freq 1.515000000 GHz

Start Freq 30.000000 MHz

Stop Freq 3.000000000 GHz

CF Stop 267.000000 MHz

Auto Man

Freq Offset 0 Hz

Agilent Spectrum Analyzer - Swept 5A

Start Freq 2.000000000 GHz

Stop Freq 25.000000000 GHz

Ref 20.00 dBm

Mkr1 20.509 25 GHz
-38.410 dBm

Start 2.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.198 s (4001 pts)

Mkr	Mode	Freq	Power	Function	Function Width	Function Value
1	N	20.509 25 GHz	-38.410 dBm			
2	N	23.775 25 GHz	-36.128 dBm			
3						
4						
5						
6						
7						
8						
9						
10						
11						

Marker 1 2.430750000000 GHz
 FWD: Fast $\rightarrow$ Trip: Free Run
 0 dBm/100 kHz $\rightarrow$ 30 dB

Avg Type: Log-Pwr
Avg/Hold: 1/1

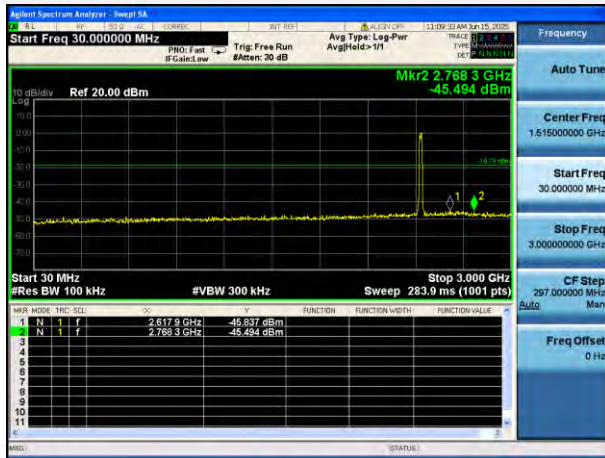
Trace 1 2.43075 GHz
 Type: Power Spectral Density
 Ref: 20.00 dBm

Center 2.430700 GHz
Res BW 100 kHz
Span 30.00 MHz
Sweep 2.880 ms (601 pts)

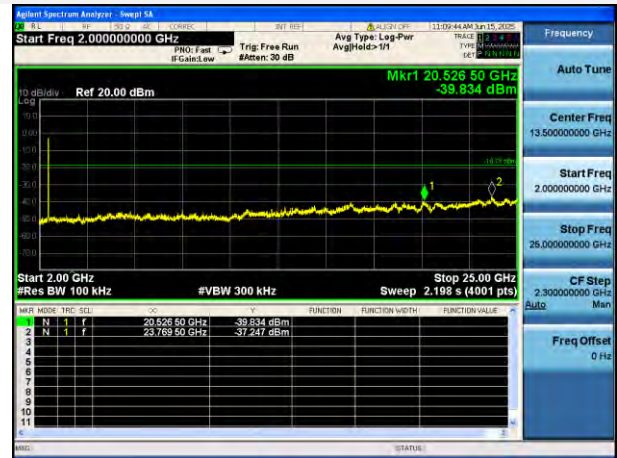
Mkr 1 2.43075 GHz
 -1.219 dBm

Mkr	Hz	dBm	Function	Function Width	Function Value
1	2.43075 GHz	-1.219 dBm			

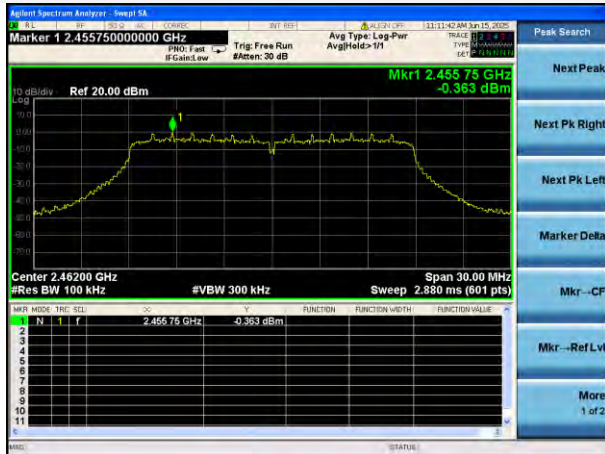
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



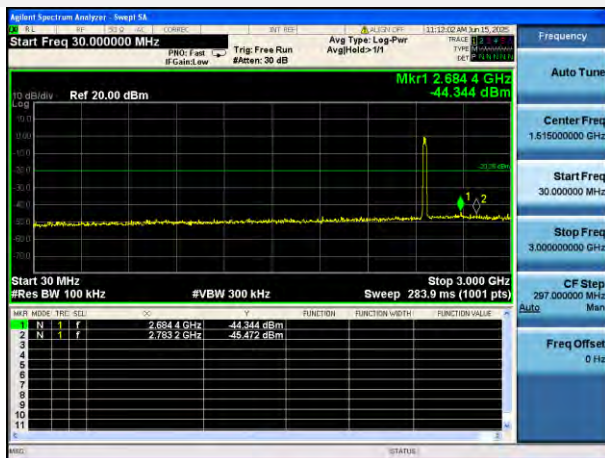
802.11n-20 MHz MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



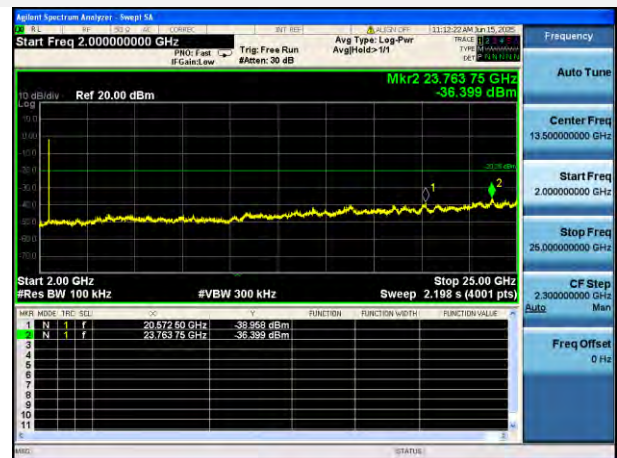
802.11n-20 MHz HIGH CHANNEL CARRIER LEVEL



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



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



[illegible]

Signal Spectrum Analyzer - Sweep 5A

Start Freq 30.000000 MHz

Ref 20.00 dBm

Mkr2 2.676 GHz
-45.581 dBm

Stop 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 283.9 ms (1001 pts)

MNR	MODE	TRF	SCN	F	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	1	2.676 GHz			-45.581 dBm
2	N	1	1	2.676 GHz			-45.581 dBm

Mkr	Freq	Power	Function	Function Width	Function Value
1	24.58025 GHz	-36.975 dBm			
2	21.17625 GHz	-39.598 dBm			

Agilent Spectrum Analyzer - Swept SA

Marker 1 2.422000000000 GHz

PRO: Fast IF Gain: Low

Trig: Free Run

Ref: 20.00 dBm

Span: 60.00 MHz

Sweep: 5.760 ms (601 pts)

Center: 2.43700 GHz

#Res BW: 100 kHz

#VBW: 300 kHz

Marker 1 2.422 0 GHz -0.739 dBm

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

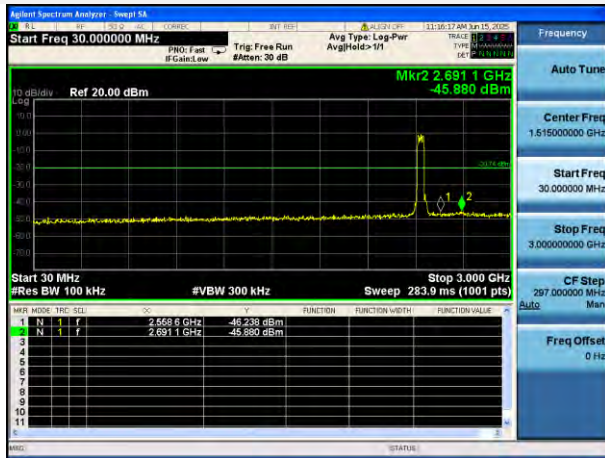
Marker--CF

Marker--Ref Lvl

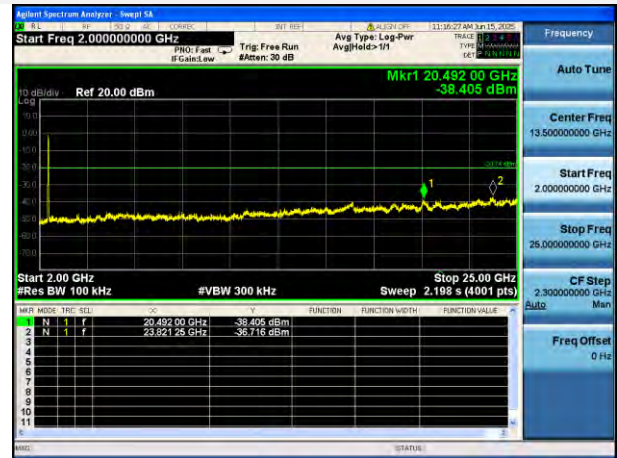
More

1 of 2

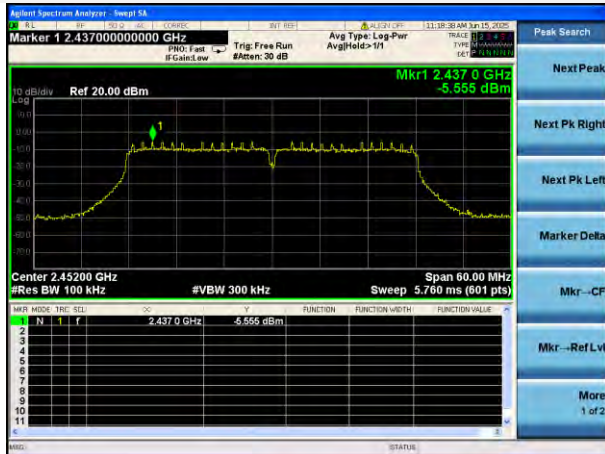
802.11n-40 MHz MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



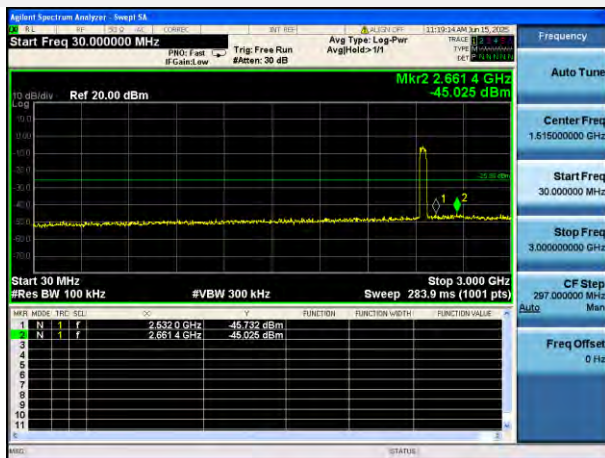
802.11n-40 MHz MIDDLE CHANNEL, SPURIOUS 2 GHz ~ 25 GHz



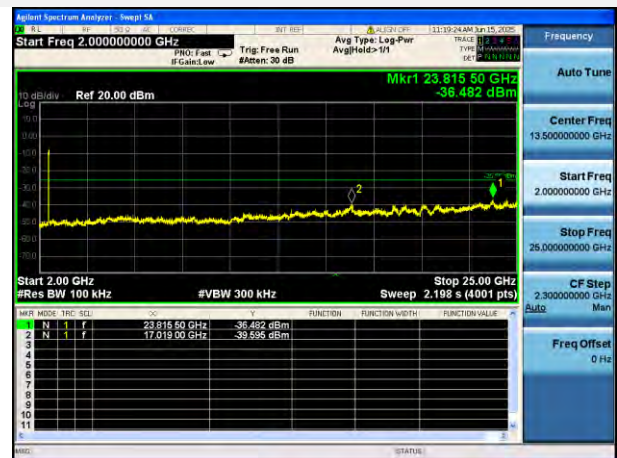
802.11n-40 MHz HIGH CHANNEL CARRIER LEVEL



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



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



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

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-Aux. Antenna

802.11b Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-38.02	5.05	-14.95	Pass
High Channel	-47.89	5.17	-14.83	Pass

802.11g Mode:

Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-39.71	0.37	-19.63	Pass
High Channel	-47.03	1.47	-18.53	Pass

802.11n-20 MHz Mode:

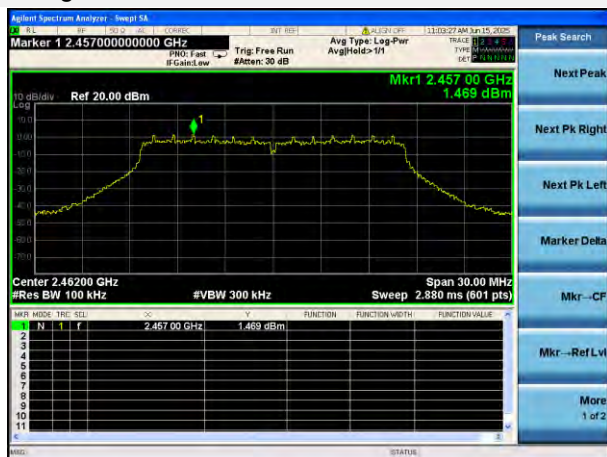
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-39.06	-0.73	-20.73	Pass
High Channel	-48.18	-0.36	-20.36	Pass

802.11n-40 MHz Mode:

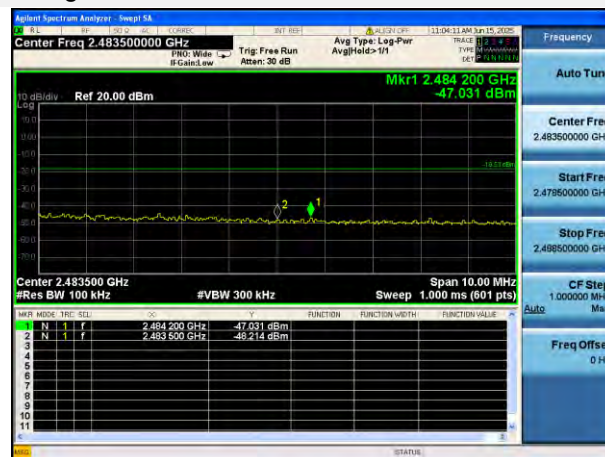
Channel	Measured Max. Band Edge Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low Channel	-41.31	-5.11	-25.11	Pass
High Channel	-47.23	-5.56	-25.56	Pass



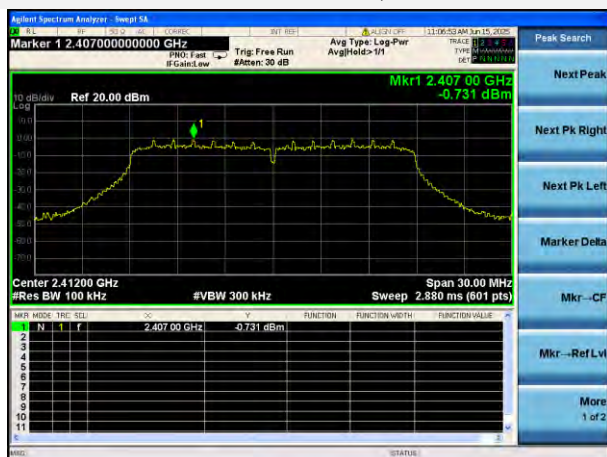
802.11g HIGH CHANNEL, CARRIER LEVEL



802.11g HIGH CHANNEL, BAND EDGE



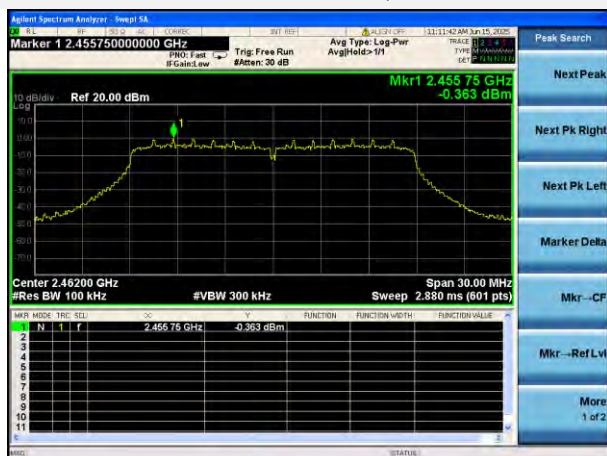
802.11n-20 MHz LOW CHANNEL, CARRIER LEVEL



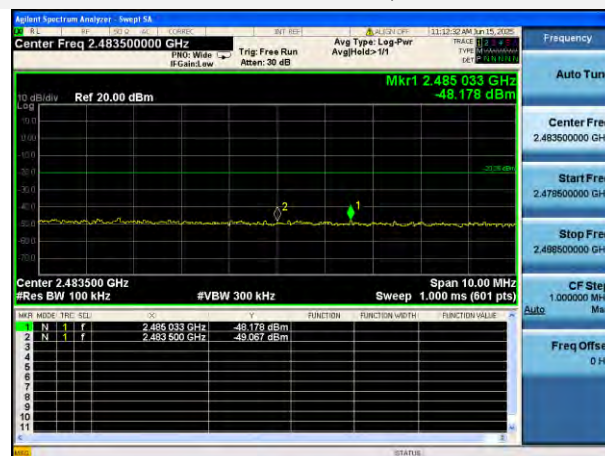
802.11n-20 MHz LOW CHANNEL, BAND EDGE



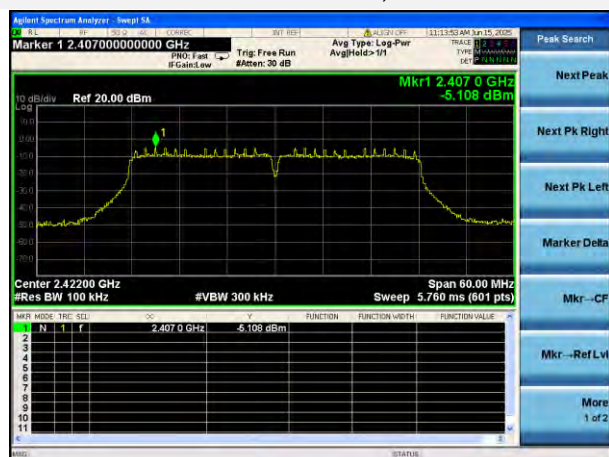
802.11n-20 MHz HIGH CHANNEL, CARRIER LEVEL



802.11n-20 MHz HIGH CHANNEL, BAND EDGE



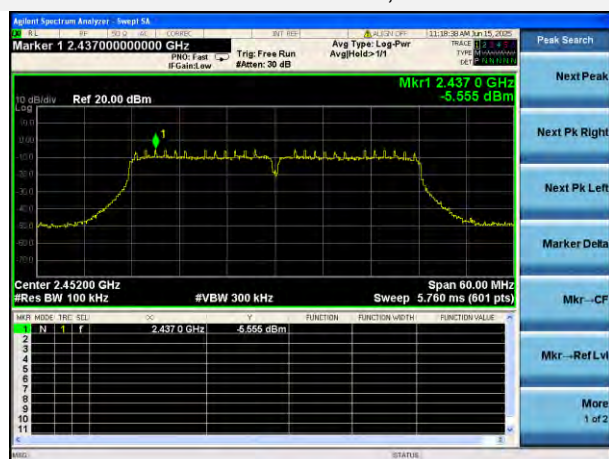
802.11n-40 MHz LOW CHANNEL, CARRIER LEVEL



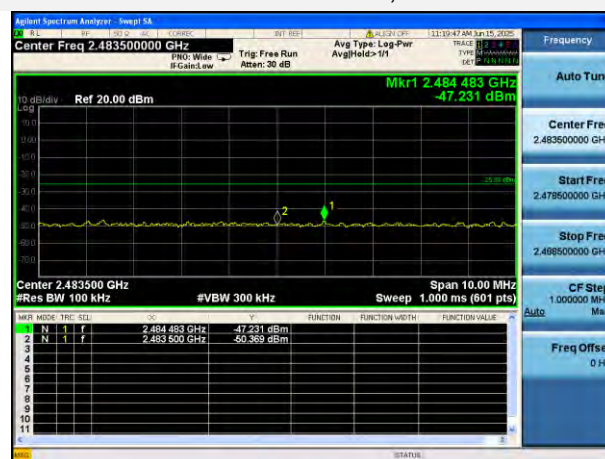
802.11n-40 MHz LOW CHANNEL, BAND EDGE



802.11n-40 MHz HIGH CHANNEL, CARRIER LEVEL



802.11n-40 MHz HIGH CHANNEL, BAND EDGE



A.5 Conducted Emissions

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

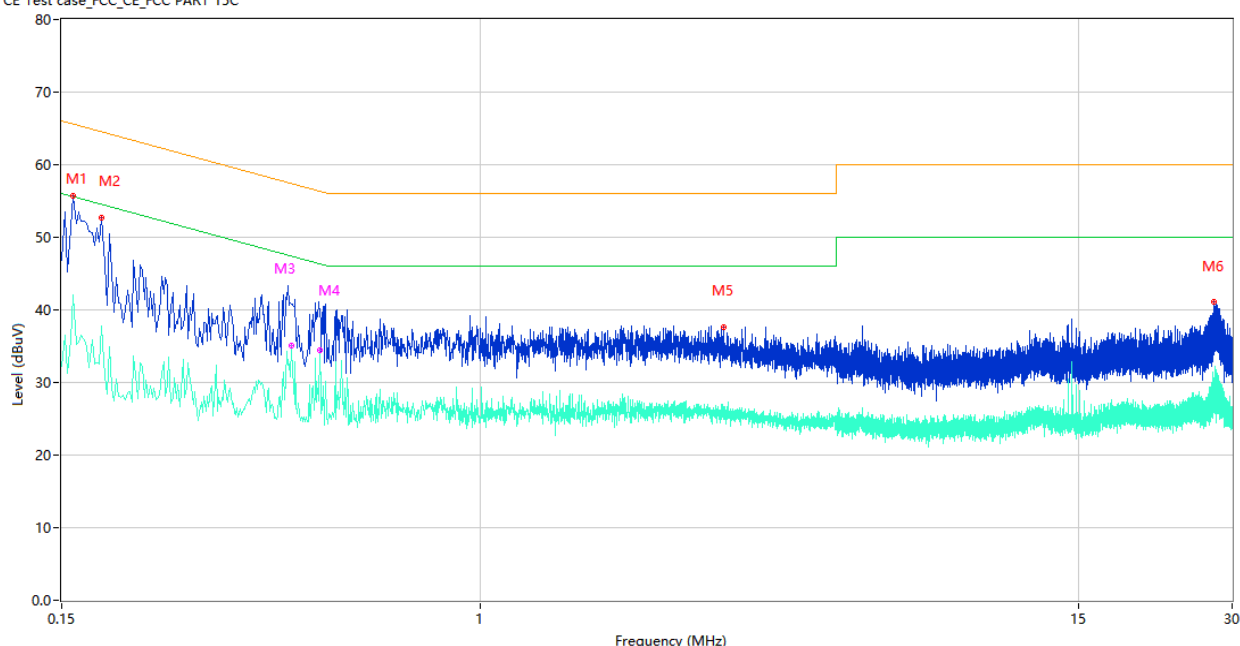
Note²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration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

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

Test Data and Plots

PHASE L

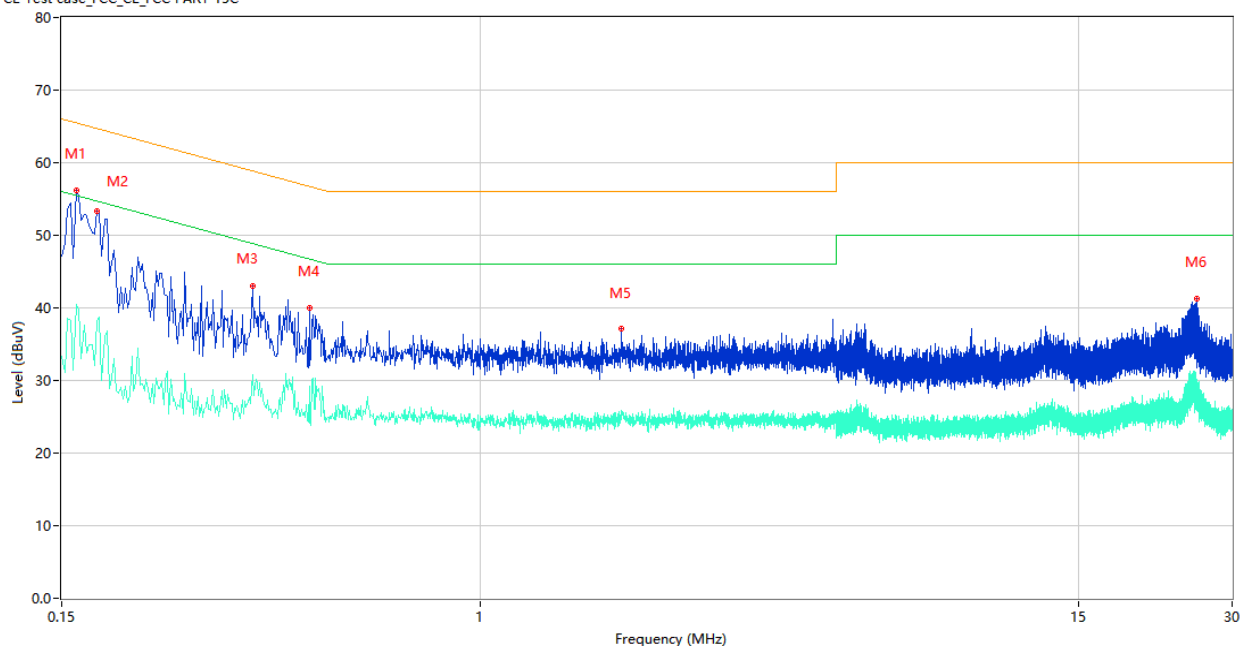
CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.158	55.72	9.86	65.57	9.85	Peak	L	Pass
1**	0.158	42.00	9.86	55.57	13.57	AV	L	Pass
2	0.180	52.75	9.85	64.49	11.74	Peak	L	Pass
2**	0.180	37.79	9.85	54.49	16.70	AV	L	Pass
3	0.424	40.77	10.36	57.37	16.60	Peak	L	Pass
3**	0.424	35.15	10.36	47.37	12.22	AV	L	Pass
4	0.482	39.59	10.06	56.30	16.71	Peak	L	Pass
4**	0.482	34.52	10.06	46.30	11.78	AV	L	Pass
5	2.996	37.67	10.34	56.00	18.33	Peak	L	Pass
5**	2.996	26.74	10.34	46.00	19.26	AV	L	Pass
6	27.684	41.09	11.02	60.00	18.91	Peak	L	Pass
6**	27.684	29.46	11.02	50.00	20.54	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	0.160	56.24	9.85	65.46	9.22	Peak	N	Pass
1**	0.160	40.47	9.85	55.46	14.99	AV	N	Pass
2	0.176	53.32	9.85	64.67	11.35	Peak	N	Pass
2**	0.176	38.22	9.85	54.67	16.45	AV	N	Pass
3	0.356	43.05	10.79	58.82	15.77	Peak	N	Pass
3**	0.356	30.79	10.79	48.82	18.03	AV	N	Pass
4	0.460	40.03	10.08	56.69	16.66	Peak	N	Pass
4**	0.460	29.17	10.08	46.69	17.52	AV	N	Pass
5	1.894	37.08	10.76	56.00	18.92	Peak	N	Pass
5**	1.894	25.26	10.76	46.00	20.74	AV	N	Pass
6	25.604	41.31	10.99	60.00	18.69	Peak	N	Pass
6**	25.604	27.94	10.99	50.00	22.06	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.

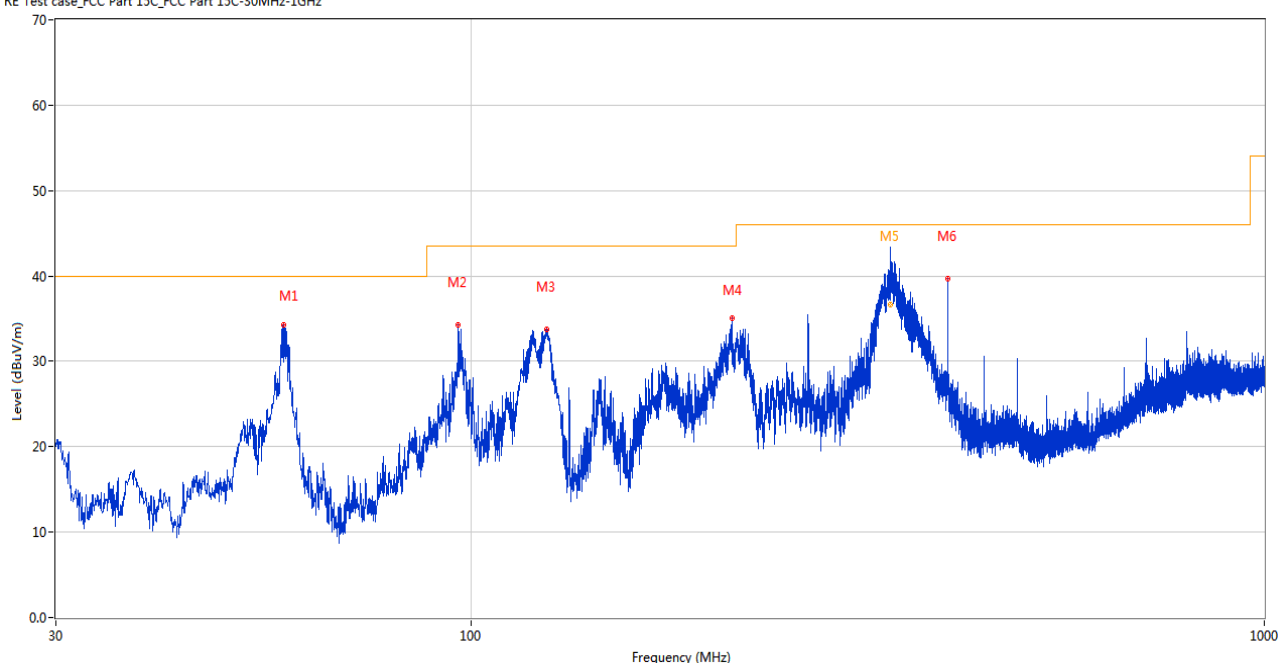
Note³: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

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

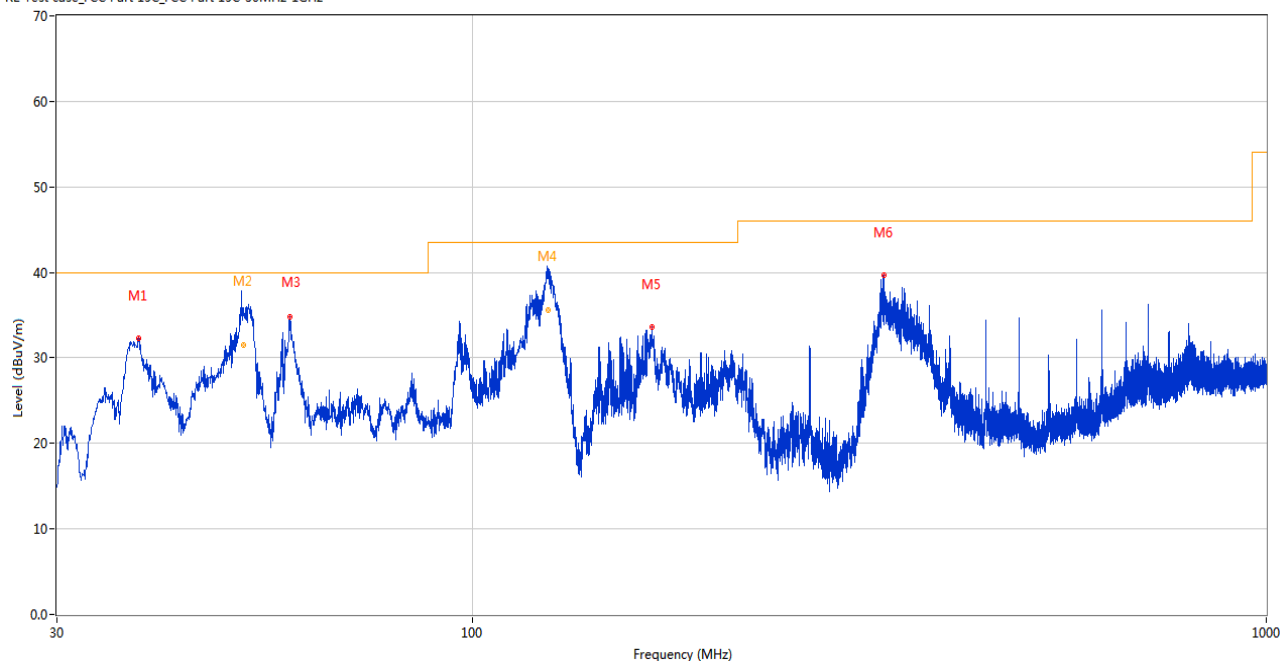
RE Test case_FCC Part 15C_FCC Part 15C-30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	58.033	34.25	-27.71	40.0	5.75	Peak	240.00	200	Horizontal	Pass
2	96.348	34.23	-29.99	43.5	9.27	Peak	168.00	200	Horizontal	Pass
3	124.623	33.77	-27.72	43.5	9.73	Peak	43.00	200	Horizontal	Pass
4	213.281	35.11	-29.08	43.5	8.39	Peak	83.00	100	Horizontal	Pass
5	337.804	41.93	-23.90	46.0	4.07	Peak	274.00	101	Horizontal	N/A
5*	337.804	36.62	-23.90	46.0	9.38	QP	274.00	101	Horizontal	Pass
6	399.230	39.65	-21.26	46.0	6.35	Peak	360.00	100	Horizontal	Pass

30 MHz to 1 GHz, ANT V

RE Test case_FCC Part 15C_FCC Part 15C-30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	38.051	32.31	-26.78	40.0	7.69	Peak	101.00	100	Vertical	Pass
2	51.608	35.11	-26.27	40.0	4.89	Peak	187.00	117	Vertical	N/A
2*	51.608	31.54	-26.27	40.0	8.46	QP	187.00	117	Vertical	Pass
3	59.003	34.81	-27.07	40.0	5.19	Peak	297.00	100	Vertical	Pass
4	124.767	39.46	-27.79	43.5	4.04	Peak	289.00	100	Vertical	N/A
4*	124.767	35.59	-27.79	43.5	7.91	QP	289.00	100	Vertical	Pass
5	168.468	33.61	-25.59	43.5	9.89	Peak	154.00	100	Vertical	Pass
6	329.730	39.64	-23.33	46.0	6.36	Peak	0.00	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-Aux. 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	1328.461	46.66	74.0	27.34	Peak	219.00	400	Horizontal	Pass
1**	1328.461	39.49	54.0	14.51	AV	219.00	400	Horizontal	Pass
2	2992.816	48.77	74.0	25.23	Peak	275.00	100	Horizontal	Pass
2**	2992.816	43.67	54.0	10.33	AV	275.00	100	Horizontal	Pass
3	4937.905	48.79	74.0	25.21	Peak	328.00	200	Horizontal	Pass
3**	4937.905	38.87	54.0	15.13	AV	328.00	200	Horizontal	Pass
4	6804.409	54.86	74.0	19.14	Peak	122.00	100	Horizontal	Pass
4**	6804.409	46.91	54.0	7.09	AV	122.00	100	Horizontal	Pass
5	13410.438	54.54	74.0	19.46	Peak	23.00	100	Horizontal	Pass
5**	13410.438	47.20	54.0	6.80	AV	23.00	100	Horizontal	Pass
6	17424.385	58.23	74.0	15.77	Peak	169.00	200	Horizontal	Pass
6**	17424.385	46.25	54.0	7.75	AV	169.00	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	1331.530	43.80	74.0	30.20	Peak	174.00	300	Vertical	Pass
1**	1331.530	38.01	54.0	15.99	AV	174.00	300	Vertical	Pass
2	2984.183	50.86	74.0	23.14	Peak	244.00	400	Vertical	Pass
2**	2984.183	39.94	54.0	14.06	AV	244.00	400	Vertical	Pass
3	4856.064	49.58	74.0	24.42	Peak	228.00	200	Vertical	Pass
3**	4856.064	42.36	54.0	11.64	AV	228.00	200	Vertical	Pass
4	6610.880	55.34	74.0	18.66	Peak	83.00	100	Vertical	Pass
4**	6610.880	45.57	54.0	8.43	AV	83.00	100	Vertical	Pass
5	13436.558	57.53	74.0	16.47	Peak	81.00	400	Vertical	Pass
5**	13436.558	48.89	54.0	5.11	AV	81.00	400	Vertical	Pass
6	17415.003	57.87	74.0	16.13	Peak	84.00	100	Vertical	Pass
6**	17415.003	44.51	54.0	9.49	AV	84.00	100	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	1330.564	41.62	74.0	32.38	Peak	1.00	400	Horizontal	Pass
1**	1330.564	33.89	54.0	20.11	AV	1.00	400	Horizontal	Pass
2	2993.080	47.40	74.0	26.60	Peak	88.00	200	Horizontal	Pass
2**	2993.080	38.51	54.0	15.49	AV	88.00	200	Horizontal	Pass
3	4933.621	51.59	74.0	22.41	Peak	40.00	200	Horizontal	Pass
3**	4933.621	44.20	54.0	9.80	AV	40.00	200	Horizontal	Pass
4	6806.937	56.48	74.0	17.52	Peak	188.00	300	Horizontal	Pass
4**	6806.937	46.83	54.0	7.17	AV	188.00	300	Horizontal	Pass
5	13414.643	57.66	74.0	16.34	Peak	136.00	100	Horizontal	Pass
5**	13414.643	48.93	54.0	5.07	AV	136.00	100	Horizontal	Pass
6	17426.234	57.40	74.0	16.60	Peak	83.00	100	Horizontal	Pass
6**	17426.234	46.66	54.0	7.34	AV	83.00	100	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	1330.844	47.13	74.0	26.87	Peak	61.00	200	Vertical	Pass
1**	1330.844	35.14	54.0	18.86	AV	61.00	200	Vertical	Pass
2	2985.216	52.24	74.0	21.76	Peak	325.00	300	Vertical	Pass
2**	2985.216	40.98	54.0	13.02	AV	325.00	300	Vertical	Pass
3	4852.715	50.12	74.0	23.88	Peak	103.00	200	Vertical	Pass
3**	4852.715	43.31	54.0	10.69	AV	103.00	200	Vertical	Pass
4	6608.615	56.90	74.0	17.10	Peak	352.00	300	Vertical	Pass
4**	6608.615	45.29	54.0	8.71	AV	352.00	300	Vertical	Pass
5	13437.849	53.37	74.0	20.63	Peak	128.00	400	Vertical	Pass
5**	13437.849	48.04	54.0	5.96	AV	128.00	400	Vertical	Pass
6	17415.714	54.47	74.0	19.53	Peak	249.00	100	Vertical	Pass
6**	17415.714	45.65	54.0	8.35	AV	249.00	100	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	1330.018	45.46	74.0	28.54	Peak	278.00	400	Horizontal	Pass
1**	1330.018	38.23	54.0	15.77	AV	278.00	400	Horizontal	Pass
2	2999.145	47.78	74.0	26.22	Peak	189.00	400	Horizontal	Pass
2**	2999.145	43.24	54.0	10.76	AV	189.00	400	Horizontal	Pass
3	4936.341	54.53	74.0	19.47	Peak	82.00	200	Horizontal	Pass
3**	4936.341	41.16	54.0	12.84	AV	82.00	200	Horizontal	Pass
4	6807.557	52.47	74.0	21.53	Peak	105.00	400	Horizontal	Pass
4**	6807.557	43.18	54.0	10.82	AV	105.00	400	Horizontal	Pass
5	13409.608	56.33	74.0	17.67	Peak	297.00	100	Horizontal	Pass
5**	13409.608	44.41	54.0	9.59	AV	297.00	100	Horizontal	Pass
6	17427.112	55.28	74.0	18.72	Peak	16.00	400	Horizontal	Pass
6**	17427.112	45.66	54.0	8.34	AV	16.00	400	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	1329.334	44.50	74.0	29.50	Peak	20.00	300	Vertical	Pass
1**	1329.334	37.17	54.0	16.83	AV	20.00	300	Vertical	Pass
2	2982.209	50.02	74.0	23.98	Peak	274.00	200	Vertical	Pass
2**	2982.209	41.83	54.0	12.17	AV	274.00	200	Vertical	Pass
3	4852.862	51.55	74.0	22.45	Peak	103.00	200	Vertical	Pass
3**	4852.862	39.31	54.0	14.69	AV	103.00	200	Vertical	Pass
4	6610.585	57.22	74.0	16.78	Peak	287.00	100	Vertical	Pass
4**	6610.585	43.45	54.0	10.55	AV	287.00	100	Vertical	Pass
5	13435.517	53.44	74.0	20.56	Peak	223.00	300	Vertical	Pass
5**	13435.517	43.83	54.0	10.17	AV	223.00	300	Vertical	Pass
6	17419.947	58.61	74.0	15.39	Peak	186.00	300	Vertical	Pass
6**	17419.947	45.79	54.0	8.21	AV	186.00	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	1332.902	47.12	74.0	26.88	Peak	62.00	200	Horizontal	Pass
1**	1332.902	37.00	54.0	17.00	AV	62.00	200	Horizontal	Pass
2	3000.014	50.57	74.0	23.43	Peak	48.00	300	Horizontal	Pass
2**	3000.014	43.29	54.0	10.71	AV	48.00	300	Horizontal	Pass
3	4931.074	52.83	74.0	21.17	Peak	249.00	200	Horizontal	Pass
3**	4931.074	44.40	54.0	9.60	AV	249.00	200	Horizontal	Pass
4	6808.085	57.07	74.0	16.93	Peak	317.00	100	Horizontal	Pass
4**	6808.085	42.78	54.0	11.22	AV	317.00	100	Horizontal	Pass
5	13413.397	57.66	74.0	16.34	Peak	9.00	300	Horizontal	Pass
5**	13413.397	46.12	54.0	7.88	AV	9.00	300	Horizontal	Pass
6	17428.337	57.32	74.0	16.68	Peak	291.00	200	Horizontal	Pass
6**	17428.337	46.05	54.0	7.95	AV	291.00	200	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	1334.105	47.57	74.0	26.43	Peak	131.00	300	Vertical	Pass
1**	1334.105	35.34	54.0	18.66	AV	131.00	300	Vertical	Pass
2	2979.986	47.74	74.0	26.26	Peak	295.00	100	Vertical	Pass
2**	2979.986	40.91	54.0	13.09	AV	295.00	100	Vertical	Pass
3	4853.993	46.66	74.0	27.34	Peak	10.00	200	Vertical	Pass
3**	4853.993	38.28	54.0	15.72	AV	10.00	200	Vertical	Pass
4	6608.172	56.57	74.0	17.43	Peak	349.00	100	Vertical	Pass
4**	6608.172	44.11	54.0	9.89	AV	349.00	100	Vertical	Pass
5	13437.990	55.06	74.0	18.94	Peak	263.00	200	Vertical	Pass
5**	13437.990	44.41	54.0	9.59	AV	263.00	200	Vertical	Pass
6	17414.584	57.65	74.0	16.35	Peak	284.00	200	Vertical	Pass
6**	17414.584	44.45	54.0	9.55	AV	284.00	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	1333.317	42.36	74.0	31.64	Peak	186.00	400	Horizontal	Pass
1**	1333.317	38.97	54.0	15.03	AV	186.00	400	Horizontal	Pass
2	2997.078	48.79	74.0	25.21	Peak	85.00	100	Horizontal	Pass
2**	2997.078	41.48	54.0	12.52	AV	85.00	100	Horizontal	Pass
3	4935.867	49.26	74.0	24.74	Peak	314.00	200	Horizontal	Pass
3**	4935.867	42.15	54.0	11.85	AV	314.00	200	Horizontal	Pass
4	6810.770	55.58	74.0	18.42	Peak	61.00	100	Horizontal	Pass
4**	6810.770	42.68	54.0	11.32	AV	61.00	100	Horizontal	Pass
5	13411.476	58.06	74.0	15.94	Peak	79.00	300	Horizontal	Pass
5**	13411.476	49.10	54.0	4.90	AV	79.00	300	Horizontal	Pass
6	17423.447	58.68	74.0	15.32	Peak	57.00	400	Horizontal	Pass
6**	17423.447	48.63	54.0	5.37	AV	57.00	400	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	1330.967	45.22	74.0	28.78	Peak	288.00	200	Vertical	Pass
1**	1330.967	35.97	54.0	18.03	AV	288.00	200	Vertical	Pass
2	2984.283	49.22	74.0	24.78	Peak	128.00	100	Vertical	Pass
2**	2984.283	40.48	54.0	13.52	AV	128.00	100	Vertical	Pass
3	4853.562	48.90	74.0	25.10	Peak	275.00	200	Vertical	Pass
3**	4853.562	42.61	54.0	11.39	AV	275.00	200	Vertical	Pass
4	6609.624	52.48	74.0	21.52	Peak	86.00	400	Vertical	Pass
4**	6609.624	43.48	54.0	10.52	AV	86.00	400	Vertical	Pass
5	13438.733	54.99	74.0	19.01	Peak	260.00	300	Vertical	Pass
5**	13438.733	45.10	54.0	8.90	AV	260.00	300	Vertical	Pass
6	17420.084	56.86	74.0	17.14	Peak	139.00	400	Vertical	Pass
6**	17420.084	48.20	54.0	5.80	AV	139.00	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	1329.122	46.76	74.0	27.24	Peak	123.00	300	Horizontal	Pass
1**	1329.122	36.12	54.0	17.88	AV	123.00	300	Horizontal	Pass
2	2998.692	52.83	74.0	21.17	Peak	337.00	100	Horizontal	Pass
2**	2998.692	39.94	54.0	14.06	AV	337.00	100	Horizontal	Pass
3	4932.765	51.09	74.0	22.91	Peak	52.00	200	Horizontal	Pass
3**	4932.765	42.43	54.0	11.57	AV	52.00	200	Horizontal	Pass
4	6808.110	55.99	74.0	18.01	Peak	160.00	100	Horizontal	Pass
4**	6808.110	47.58	54.0	6.42	AV	160.00	100	Horizontal	Pass
5	13415.165	57.49	74.0	16.51	Peak	207.00	300	Horizontal	Pass
5**	13415.165	46.84	54.0	7.16	AV	207.00	300	Horizontal	Pass
6	17428.099	55.69	74.0	18.31	Peak	20.00	100	Horizontal	Pass
6**	17428.099	48.67	54.0	5.33	AV	20.00	100	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	1331.940	47.69	74.0	26.31	Peak	353.00	300	Vertical	Pass
1**	1331.940	38.76	54.0	15.24	AV	353.00	300	Vertical	Pass
2	2981.724	48.88	74.0	25.12	Peak	22.00	100	Vertical	Pass
2**	2981.724	43.51	54.0	10.49	AV	22.00	100	Vertical	Pass
3	4853.751	50.87	74.0	23.13	Peak	305.00	200	Vertical	Pass
3**	4853.751	40.60	54.0	13.40	AV	305.00	200	Vertical	Pass
4	6603.594	54.98	74.0	19.02	Peak	20.00	300	Vertical	Pass
4**	6603.594	44.35	54.0	9.65	AV	20.00	300	Vertical	Pass
5	13433.121	57.66	74.0	16.34	Peak	191.00	200	Vertical	Pass
5**	13433.121	48.75	54.0	5.25	AV	191.00	200	Vertical	Pass
6	17417.148	55.72	74.0	18.28	Peak	44.00	300	Vertical	Pass
6**	17417.148	47.00	54.0	7.00	AV	44.00	300	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	1330.286	41.65	74.0	32.35	Peak	169.00	100	Horizontal	Pass
1**	1330.286	39.65	54.0	14.35	AV	169.00	100	Horizontal	Pass
2	2993.776	48.84	74.0	25.16	Peak	120.00	100	Horizontal	Pass
2**	2993.776	40.76	54.0	13.24	AV	120.00	100	Horizontal	Pass
3	4932.307	52.10	74.0	21.90	Peak	111.00	200	Horizontal	Pass
3**	4932.307	44.20	54.0	9.80	AV	111.00	200	Horizontal	Pass
4	6810.385	51.94	74.0	22.06	Peak	126.00	200	Horizontal	Pass
4**	6810.385	46.76	54.0	7.24	AV	126.00	200	Horizontal	Pass
5	13408.579	56.42	74.0	17.58	Peak	307.00	200	Horizontal	Pass
5**	13408.579	48.63	54.0	5.37	AV	307.00	200	Horizontal	Pass
6	17425.988	54.57	74.0	19.43	Peak	305.00	100	Horizontal	Pass
6**	17425.988	48.82	54.0	5.18	AV	305.00	100	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	1335.290	45.78	74.0	28.22	Peak	232.00	300	Vertical	Pass
1**	1335.290	35.69	54.0	18.31	AV	232.00	300	Vertical	Pass
2	2978.538	48.34	74.0	25.66	Peak	185.00	200	Vertical	Pass
2**	2978.538	43.09	54.0	10.91	AV	185.00	200	Vertical	Pass
3	4850.306	52.25	74.0	21.75	Peak	79.00	200	Vertical	Pass
3**	4850.306	37.70	54.0	16.30	AV	79.00	200	Vertical	Pass
4	6605.106	56.84	74.0	17.16	Peak	103.00	400	Vertical	Pass
4**	6605.106	45.16	54.0	8.84	AV	103.00	400	Vertical	Pass
5	13436.124	53.09	74.0	20.91	Peak	255.00	400	Vertical	Pass
5**	13436.124	46.01	54.0	7.99	AV	255.00	400	Vertical	Pass
6	17420.639	59.56	74.0	14.44	Peak	138.00	100	Vertical	Pass
6**	17420.639	48.71	54.0	5.29	AV	138.00	100	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	1329.933	42.52	74.0	31.48	Peak	207.00	200	Horizontal	Pass
1**	1329.933	38.93	54.0	15.07	AV	207.00	200	Horizontal	Pass
2	2998.465	50.81	74.0	23.19	Peak	1.00	100	Horizontal	Pass
2**	2998.465	38.75	54.0	15.25	AV	1.00	100	Horizontal	Pass
3	4933.525	51.28	74.0	22.72	Peak	29.00	200	Horizontal	Pass
3**	4933.525	42.77	54.0	11.23	AV	29.00	200	Horizontal	Pass
4	6807.028	56.67	74.0	17.33	Peak	201.00	400	Horizontal	Pass
4**	6807.028	45.29	54.0	8.71	AV	201.00	400	Horizontal	Pass
5	13412.348	56.49	74.0	17.51	Peak	85.00	200	Horizontal	Pass
5**	13412.348	49.49	54.0	4.51	AV	85.00	200	Horizontal	Pass
6	17425.522	58.59	74.0	15.41	Peak	167.00	200	Horizontal	Pass
6**	17425.522	48.48	54.0	5.52	AV	167.00	200	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	1336.577	45.28	74.0	28.72	Peak	332.00	400	Vertical	Pass
1**	1336.577	39.50	54.0	14.50	AV	332.00	400	Vertical	Pass
2	2984.946	49.79	74.0	24.21	Peak	115.00	300	Vertical	Pass
2**	2984.946	43.32	54.0	10.68	AV	115.00	300	Vertical	Pass
3	4857.524	49.99	74.0	24.01	Peak	78.00	200	Vertical	Pass
3**	4857.524	37.77	54.0	16.23	AV	78.00	200	Vertical	Pass
4	6603.456	56.33	74.0	17.67	Peak	267.00	200	Vertical	Pass
4**	6603.456	47.93	54.0	6.07	AV	267.00	200	Vertical	Pass
5	13432.308	56.12	74.0	17.88	Peak	348.00	300	Vertical	Pass
5**	13432.308	49.39	54.0	4.61	AV	348.00	300	Vertical	Pass
6	17420.194	54.20	74.0	19.80	Peak	242.00	400	Vertical	Pass
6**	17420.194	47.84	54.0	6.16	AV	242.00	400	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	1333.403	42.69	74.0	31.31	Peak	357.00	400	Horizontal	Pass
1**	1333.403	34.05	54.0	19.95	AV	357.00	400	Horizontal	Pass
2	2999.825	50.08	74.0	23.92	Peak	294.00	400	Horizontal	Pass
2**	2999.825	41.04	54.0	12.96	AV	294.00	400	Horizontal	Pass
3	4933.823	50.28	74.0	23.72	Peak	78.00	200	Horizontal	Pass
3**	4933.823	42.03	54.0	11.97	AV	78.00	200	Horizontal	Pass
4	6809.820	54.72	74.0	19.28	Peak	208.00	100	Horizontal	Pass
4**	6809.820	42.22	54.0	11.78	AV	208.00	100	Horizontal	Pass
5	13413.298	57.98	74.0	16.02	Peak	358.00	400	Horizontal	Pass
5**	13413.298	45.72	54.0	8.28	AV	358.00	400	Horizontal	Pass
6	17429.458	56.50	74.0	17.50	Peak	67.00	100	Horizontal	Pass
6**	17429.458	48.78	54.0	5.22	AV	67.00	100	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	1333.436	42.63	74.0	31.37	Peak	130.00	100	Vertical	Pass
1**	1333.436	39.31	54.0	14.69	AV	130.00	100	Vertical	Pass
2	2980.206	49.51	74.0	24.49	Peak	284.00	400	Vertical	Pass
2**	2980.206	40.57	54.0	13.43	AV	284.00	400	Vertical	Pass
3	4854.090	46.88	74.0	27.12	Peak	136.00	200	Vertical	Pass
3**	4854.090	37.74	54.0	16.26	AV	136.00	200	Vertical	Pass
4	6605.894	54.04	74.0	19.96	Peak	359.00	300	Vertical	Pass
4**	6605.894	45.92	54.0	8.08	AV	359.00	300	Vertical	Pass
5	13432.322	57.60	74.0	16.40	Peak	276.00	200	Vertical	Pass
5**	13432.322	43.55	54.0	10.45	AV	276.00	200	Vertical	Pass
6	17413.607	54.42	74.0	19.58	Peak	230.00	400	Vertical	Pass
6**	17413.607	44.88	54.0	9.12	AV	230.00	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	1333.321	47.03	74.0	26.97	Peak	139.00	100	Horizontal	Pass
1**	1333.321	35.15	54.0	18.85	AV	139.00	100	Horizontal	Pass
2	2993.477	50.60	74.0	23.40	Peak	343.00	300	Horizontal	Pass
2**	2993.477	39.18	54.0	14.82	AV	343.00	300	Horizontal	Pass
3	4931.131	53.65	74.0	20.35	Peak	213.00	200	Horizontal	Pass
3**	4931.131	43.52	54.0	10.48	AV	213.00	200	Horizontal	Pass
4	6809.265	57.09	74.0	16.91	Peak	337.00	200	Horizontal	Pass
4**	6809.265	47.51	54.0	6.49	AV	337.00	200	Horizontal	Pass
5	13413.088	54.46	74.0	19.54	Peak	244.00	400	Horizontal	Pass
5**	13413.088	49.50	54.0	4.50	AV	244.00	400	Horizontal	Pass
6	17424.530	54.50	74.0	19.50	Peak	50.00	400	Horizontal	Pass
6**	17424.530	48.11	54.0	5.89	AV	50.00	400	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	1336.517	45.34	74.0	28.66	Peak	56.00	200	Vertical	Pass
1**	1336.517	40.44	54.0	13.56	AV	56.00	200	Vertical	Pass
2	2984.825	50.66	74.0	23.34	Peak	200.00	300	Vertical	Pass
2**	2984.825	43.66	54.0	10.34	AV	200.00	300	Vertical	Pass
3	4853.317	50.17	74.0	23.83	Peak	281.00	200	Vertical	Pass
3**	4853.317	39.10	54.0	14.90	AV	281.00	200	Vertical	Pass
4	6607.875	56.21	74.0	17.79	Peak	243.00	200	Vertical	Pass
4**	6607.875	48.02	54.0	5.98	AV	243.00	200	Vertical	Pass
5	13433.179	56.26	74.0	17.74	Peak	235.00	100	Vertical	Pass
5**	13433.179	44.49	54.0	9.51	AV	235.00	100	Vertical	Pass
6	17420.526	56.89	74.0	17.11	Peak	21.00	200	Vertical	Pass
6**	17420.526	47.14	54.0	6.86	AV	21.00	200	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	1330.931	43.82	74.0	30.18	Peak	126.00	200	Horizontal	Pass
1**	1330.931	34.11	54.0	19.89	AV	126.00	200	Horizontal	Pass
2	2999.056	47.97	74.0	26.03	Peak	250.00	300	Horizontal	Pass
2**	2999.056	39.23	54.0	14.77	AV	250.00	300	Horizontal	Pass
3	4935.609	49.46	74.0	24.54	Peak	84.00	200	Horizontal	Pass
3**	4935.609	42.88	54.0	11.12	AV	84.00	200	Horizontal	Pass
4	6809.713	53.73	74.0	20.27	Peak	185.00	400	Horizontal	Pass
4**	6809.713	44.67	54.0	9.33	AV	185.00	400	Horizontal	Pass
5	13411.710	58.41	74.0	15.59	Peak	66.00	400	Horizontal	Pass
5**	13411.710	49.51	54.0	4.49	AV	66.00	400	Horizontal	Pass
6	17427.383	55.52	74.0	18.48	Peak	28.00	400	Horizontal	Pass
6**	17427.383	49.54	54.0	4.46	AV	28.00	400	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	1332.792	47.88	74.0	26.12	Peak	292.00	100	Vertical	Pass
1**	1332.792	38.86	54.0	15.14	AV	292.00	100	Vertical	Pass
2	2984.738	47.87	74.0	26.13	Peak	356.00	100	Vertical	Pass
2**	2984.738	39.36	54.0	14.64	AV	356.00	100	Vertical	Pass
3	4852.006	48.41	74.0	25.59	Peak	187.00	200	Vertical	Pass
3**	4852.006	38.09	54.0	15.91	AV	187.00	200	Vertical	Pass
4	6606.242	53.73	74.0	20.27	Peak	281.00	200	Vertical	Pass
4**	6606.242	43.44	54.0	10.56	AV	281.00	200	Vertical	Pass
5	13432.627	52.93	74.0	21.07	Peak	262.00	200	Vertical	Pass
5**	13432.627	46.20	54.0	7.80	AV	262.00	200	Vertical	Pass
6	17413.778	58.19	74.0	15.81	Peak	206.00	300	Vertical	Pass
6**	17413.778	44.56	54.0	9.44	AV	206.00	300	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	1328.719	46.62	74.0	27.38	Peak	52.00	100	Horizontal	Pass
1**	1328.719	34.27	54.0	19.73	AV	52.00	100	Horizontal	Pass
2	2994.260	51.15	74.0	22.85	Peak	103.00	400	Horizontal	Pass
2**	2994.260	39.64	54.0	14.36	AV	103.00	400	Horizontal	Pass
3	4938.236	52.81	74.0	21.19	Peak	43.00	200	Horizontal	Pass
3**	4938.236	43.05	54.0	10.95	AV	43.00	200	Horizontal	Pass
4	6805.690	57.18	74.0	16.82	Peak	18.00	100	Horizontal	Pass
4**	6805.690	41.84	54.0	12.16	AV	18.00	100	Horizontal	Pass
5	13408.330	52.58	74.0	21.42	Peak	57.00	300	Horizontal	Pass
5**	13408.330	49.05	54.0	4.95	AV	57.00	300	Horizontal	Pass
6	17425.460	57.61	74.0	16.39	Peak	147.00	100	Horizontal	Pass
6**	17425.460	47.86	54.0	6.14	AV	147.00	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	1331.406	42.27	74.0	31.73	Peak	200.00	200	Vertical	Pass
1**	1331.406	36.06	54.0	17.94	AV	200.00	200	Vertical	Pass
2	2985.506	50.29	74.0	23.71	Peak	330.00	400	Vertical	Pass
2**	2985.506	39.98	54.0	14.02	AV	330.00	400	Vertical	Pass
3	4854.959	48.19	74.0	25.81	Peak	142.00	200	Vertical	Pass
3**	4854.959	37.96	54.0	16.04	AV	142.00	200	Vertical	Pass
4	6605.376	51.50	74.0	22.50	Peak	27.00	300	Vertical	Pass
4**	6605.376	47.01	54.0	6.99	AV	27.00	300	Vertical	Pass
5	13437.087	52.84	74.0	21.16	Peak	191.00	400	Vertical	Pass
5**	13437.087	46.13	54.0	7.87	AV	191.00	400	Vertical	Pass
6	17418.964	59.01	74.0	14.99	Peak	280.00	200	Vertical	Pass
6**	17418.964	48.24	54.0	5.76	AV	280.00	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-Aux. Antenna

802.11b LOW CHANNEL

No.	Frequency (MHz)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2389.000	57.26	74.0	16.74	Peak	185.00	100	Horizontal	Pass
1**	2389.000	44.37	54.0	9.63	AV	185.00	100	Horizontal	Pass
2	2389.833	55.29	74.0	18.71	Peak	238.00	100	Horizontal	Pass
2**	2389.833	46.12	54.0	7.88	AV	238.00	100	Horizontal	Pass
3	2379.167	54.52	74.0	19.48	Peak	185.00	100	Horizontal	Pass
3**	2379.167	47.04	54.0	6.96	AV	185.00	100	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	2483.500	53.65	74.0	20.35	Peak	186.00	100	Horizontal	Pass
1**	2483.500	44.16	54.0	9.84	AV	186.00	100	Horizontal	Pass
2	2495.900	56.49	74.0	17.51	Peak	360.00	150	Horizontal	Pass
2**	2495.900	43.60	54.0	10.40	AV	360.00	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	2388.667	66.32	74.0	7.68	Peak	169.00	150	Horizontal	Pass
1**	2388.667	49.08	54.0	4.92	AV	169.00	150	Horizontal	Pass
2	2389.833	63.36	74.0	10.64	Peak	165.00	200	Horizontal	Pass
2**	2389.833	50.79	54.0	3.21	AV	165.00	200	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	2483.550	63.94	74.0	10.06	Peak	230.00	200	Horizontal	Pass
1**	2483.550	49.88	54.0	4.12	AV	230.00	200	Horizontal	Pass
2	2483.750	65.27	74.0	8.73	Peak	203.00	200	Horizontal	Pass
2**	2483.750	50.67	54.0	3.33	AV	203.00	200	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	2389.167	67.87	74.0	6.13	Peak	167.00	200	Horizontal	Pass
1**	2389.167	50.40	54.0	3.60	AV	167.00	200	Horizontal	Pass
2	2389.833	68.67	74.0	5.33	Peak	172.00	150	Horizontal	Pass
2**	2389.833	50.81	54.0	3.19	AV	172.00	150	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	2483.500	65.30	74.0	8.70	Peak	238.00	150	Horizontal	Pass
1**	2483.500	49.40	54.0	4.60	AV	238.00	150	Horizontal	Pass
2	2483.950	67.32	74.0	6.68	Peak	204.00	150	Horizontal	Pass
2**	2483.950	48.76	54.0	5.24	AV	204.00	150	Horizontal	Pass
3	2483.650	66.63	74.0	7.37	Peak	224.00	100	Horizontal	Pass
3**	2483.650	50.88	54.0	3.12	AV	224.00	100	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	2389.167	70.48	74.0	3.52	Peak	166.00	150	Horizontal	Pass
1**	2389.167	50.01	54.0	3.99	AV	166.00	150	Horizontal	Pass
2	2389.833	69.32	74.0	4.68	Peak	188.00	100	Horizontal	Pass
2**	2389.833	50.97	54.0	3.03	AV	188.00	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	65.19	74.0	8.81	Peak	217.00	150	Horizontal	Pass
1**	2483.500	49.15	54.0	4.85	AV	217.00	150	Horizontal	Pass
2	2483.950	66.01	74.0	7.99	Peak	203.00	150	Horizontal	Pass
2**	2483.950	49.24	54.0	4.76	AV	203.00	150	Horizontal	Pass
3	2483.650	63.49	74.0	10.51	Peak	212.00	100	Horizontal	Pass
3**	2483.650	50.72	54.0	3.28	AV	212.00	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-Aux. Antenna

802.11b Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-8.62	8
Middle	-10.19	8
High	-9.75	8

802.11g Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-15.10	8
Middle	-11.23	8
High	-14.01	8

802.11n-20 MHz Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-15.60	8
Middle	-13.65	8
High	-15.13	8

802.11n-40 MHz Mode:

Channel	Spectral power density (dBm/3kHz)	Limit (dBm/3kHz)
Low	-20.43	8
Middle	-15.83	8
High	-20.21	8

Test Plots

SISO-Aux. Antenna

802.11b LOW CHANNEL



802.11b MIDDLE CHANNEL



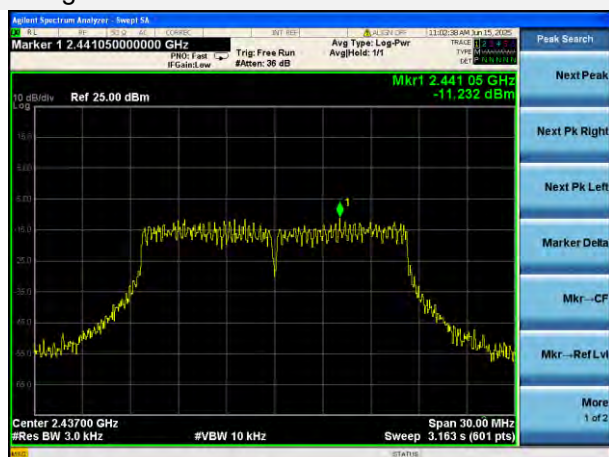
802.11b HIGH CHANNEL



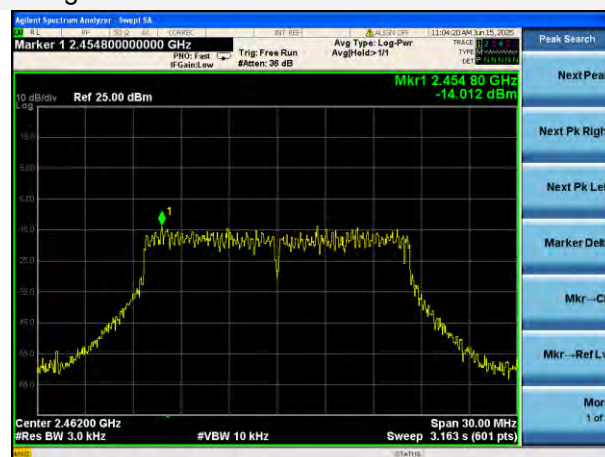
802.11g LOW CHANNEL



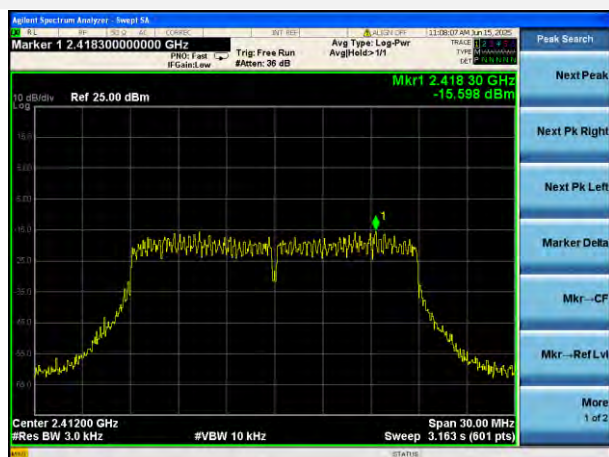
802.11g MIDDLE CHANNEL



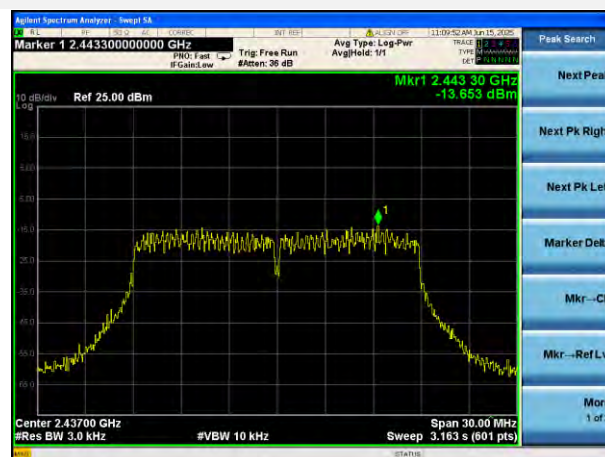
802.11g HIGH CHANNEL



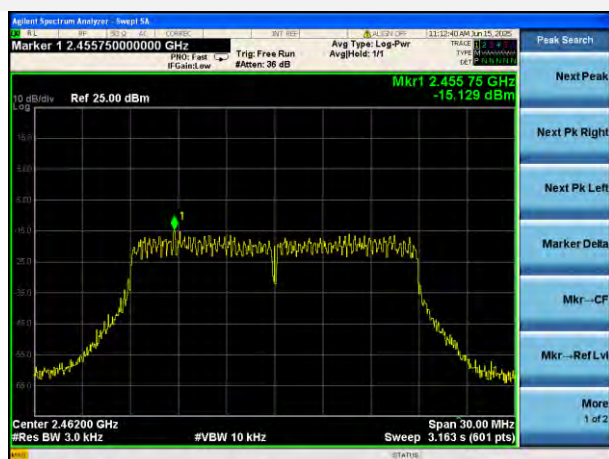
802.11n-20 MHz LOW CHANNEL



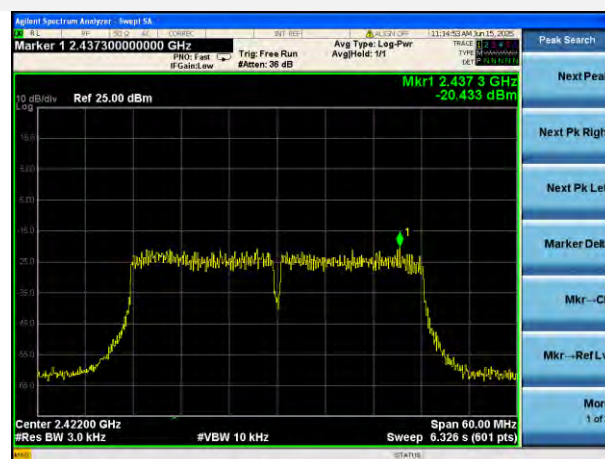
802.11n-20 MHz MIDDLE CHANNEL



802.11n-20 MHz HIGH CHANNEL



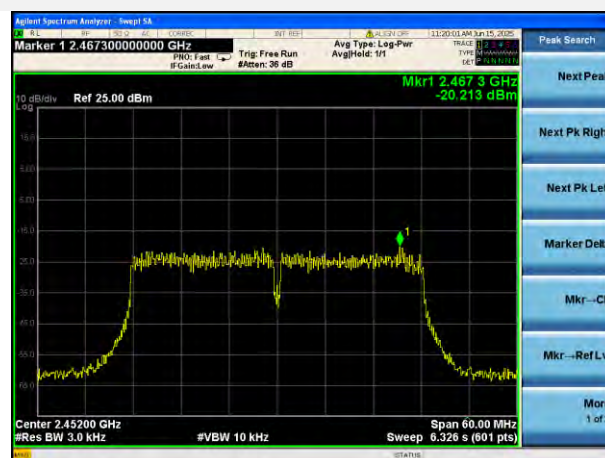
802.11n-40 MHz LOW CHANNEL



802.11n-40 MHz MIDDLE CHANNEL



802.11n-40 MHz HIGH CHANNEL



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2560127-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2560127-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2560127-AI.PDF”.

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