RF TEST REPORT

Report No.:	20241117G22198X-W3
Product Name:	VISTA Thermal Imaging Monocular
Main Model No. :	VISTA H50R
Series Model No. :	VISTA H50, VISTA H35, VISTA H35R, VISTA S50R
FCC ID:	2BHFB-3C-00
Applicant:	Inlumen Technologies Co., Ltd.
Address:	Building B3, NO.800 Wangjiang West Road, National High-tech Industry Development District,Hefei, Anhui, China.
Dates of Testing:	06/20/2024 - 07/25/2024
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China

Tel： 86-755-26627338 **E-Mail：** manager@ccic-set.com

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Test Report

Product.....:	VISTA Thermal Imaging Monocular
Trade Name .....:	Nocpix
Applicant.....:	Inlumen Technologies Co., Ltd.
Applicant Address.....:	Building B3, NO.800 Wangjiang West Road, National High-tech Industry Development District,Hefei, Anhui, China.
Manufacturer.....:	Inlumen Technologies Co., Ltd.
Manufacturer Address.....:	Building B3, NO.800 Wangjiang West Road, National High-tech Industry Development District,Hefei, Anhui, China.
Test Standards.....:	47 CFR Part 15 Subpart C ANSI C63.10-2020
Test Result.....:	Pass

Tested by .....: Kim Li 2024.12.05

Kim Li, Test Engineer

Reviewed by.....: Sun Jiaohui 2024.12.05

Sun Jiaohui, Senior Engineer

Approved by.....: Chris You 2024.12.05

Chris You, Manager

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Change History		
Issue	Date	Reason for change
1.0	2024.12.05	First edition

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	VISTA Thermal Imaging Monocular
EUT supports Radios application	WLAN2.4GHz 802.11b/g/n(HT20)
Frequency Range	802.11b/g/n-20MHz: 2.412GHz~2.462GHz
Channel Number	802.11b/g/n-20MHz: 11
Transfer Rate	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n: up to 72.2 Mbps
Modulation Type	DSSS (802.11b), OFDM (802.11g/n)
Antenna Type	Internal antenna
Antenna Gain	2.1dBi
Power supply	Rechargeable Li-ion Battery DC3.6V/4.4Ah

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 2: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

Note 3: The information of antenna gain and cable loss is provided by the manufacturer and our lab is not responsible for the accuracy of the antenna gain and cable loss information.

Note 4: This report is based on the 20240617G10762X-W3 report. Updated the model. This change has no effect on WIFI, so WIFI does not need to be retested.

Note 5: The VISTA H50 have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with VISTA H50R the difference lies only in remove the laser module of the different models. The VISTA H35 have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with VISTA H50R the difference lies only in lens focal length and remove the laser module of the different models. The VISTA H35R have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with VISTA H50R the difference lies only in lens focal length of the different models. The VISTA S50R have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with VISTA H50R the difference lies only in thermal imaging module of the different models.

1.2. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC certification standards:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C	Radio Frequency Devices
2	KDB 558074 D01 15.247 Meas Guidance v05r02	Cuidance for Compliance Measurement on Digital Transmission Systems, Frequency Hopping Spread Spectrum Systems, and Hybrid System Devices Operating under Section 15.247 of the FCC Rules
4	ANSI C63.10-2020	American National Standard for Testing Unlicensed Wireless Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	15.203 15.247(c)	Antenna Requirement	PASS
2	15.247(b)(3)	Peak Conducted Output Power	PASS
3	15.247(a)(2)	6dB and 99% Bandwidth	PASS
4	15.247(d)	Conducted Band Edges and Spurious Emission	PASS
5	15.247(e)	Power spectral density (PSD)	PASS
6	15.207	AC Power Line Conducted Emission	PASS
7	15.205 15.209 15.247(d)	Radiated Band Edges and Spurious Emission	PASS

Note 1: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10-2020.

Note 2: These RF tests were performed according to the method of measurements prescribed in KDB 558074 D01 15.247 Meas Guidance v05r02.

1.3. Channel List

Channel No.	Frequency	Channel No.	Frequency	Channel No.	Frequency
1	2412MHz	5	2432MHz	9	2452MHz
2	2417MHz	6	2437MHz	10	2457MHz
3	2422MHz	7	2442MHz	11	2462MHz
4	2427MHz	8	2447MHz		

Note: Channel 1, 6 & 11 selected for 802.11b/g/n-20MHz as Lowest, Middle and Highest channel.

1.4. Test environment and mode

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

Operating Environment	
Temperature	15°C - 35°C
Humidity	30% -60%
Atmospheric Pressure	86kPa-106kPa
Test mode:	
Continuously transmitting mode	Keep the EUT in continuous transmitting with modulation

Preliminary tests were performed in different data rate 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
Peak Conducted Output Power Power Spectral Density 6dB and 99% Bandwidth Conducted Spurious Emission	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n-HT20/OFDM	MCS 0	1/6/11
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n-HT20/OFDM	MCS 0	1/11

1.5. Table for Supporting Units

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	Note
1	Laptop	HP	TPN-Q221	HP	5CD14347QB	FCC DOC

1.6. EUT Operation Test Setup

For RF test items, an engineering test program was provided and enable to make EUT transmitting.

1.7. Laboratory Facilities

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun. 30th, 2025.

ISED Registration: 11185A

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A on Aug. 04, 2016, valid time is until Jun. 30th, 2025.

CAB number: CN0064

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025.
The accreditation certificate number is 5721.01.

2. Test Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to 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.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2.1.2. Antenna Information

Antenna Category: Internal Antenna

A internal Antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

Antenna General Information:

No.	EUT	Operating frequency range	Ant. Type	Ant. Gain
1	VISTA Thermal Imaging Monocular	2412-2462MHz	Internal	2.1dBi

1.1.1. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Maximum Conducted Output Power

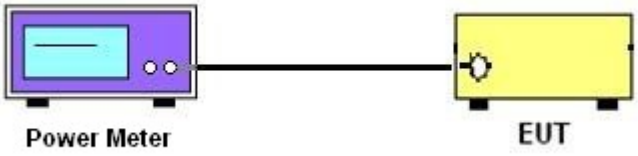
2.2.1. Limit of Maximum Conducted Output Power

For DTSs employing digital modulation techniques operating in the bands 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.9.2.3.1.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Record the measurement results in the test report.

2.2.5. Test Result of Maximum Conducted Output Power

Please refer to Appendix A for detail.

2.3. 6dB and 99% Bandwidth

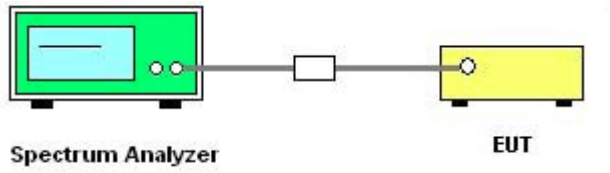
2.3.1. Limit of 6dB Bandwidth

The minimum 6 dB Occupied bandwidth shall be at least 500 kHz.

2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.8.1 and 6.9.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the spectrum analyzer “Channel Bandwidth” function to easurement the 6dB EBW and 99% OBW.
5. For 6dB EBW Use the following spectrum analyzer settings:
   RBW: 100kHz / VBW: 300kHz / Detector: Peak / Trace mode: Max hold / Sweep time: Auto couple / Allow trace to fully stabilize.
6. For 99% OBW Use the following spectrum analyzer settings:
   Set RBW = approximately 1% EBW or 1.5 times to 5.0 times the OBW, VBW ≥ 3 × RBW.
7. Record the measurement results in the test report.

2.3.5. Test Results of 6dB and 99% Bandwidth

Please refer to Appendix A for detail.

2.4. Power spectral density (PSD)

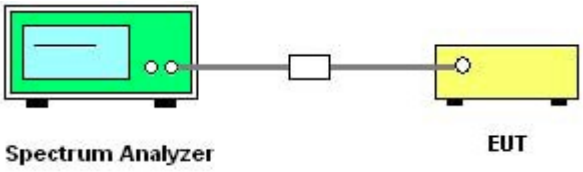
2.4.1. Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.10.5.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:
   Set instrument center frequency to DTS channel center frequency / Set the span to 1.5 times the DTS bandwidth / RBW: 3kHz / VBW: 10kHz / Detector: RMS / Sweep time: Auto couple / Trace mode: Average / Employ trace averaging (rms) mode over a minimum of 100 traces / Use the peak marker function to determine the maximum power level.
5. Add [10 log (1 / D)], where D is the duty cycle), to the measured PSD to compute the average PSD during the actual transmission time.
6. Record the measurement results in the test report.

2.4.5. Test Results of Power Spectral Density

Please refer to Appendix A for detail.

2.5. Conducted Band Edges and Spurious Emissions

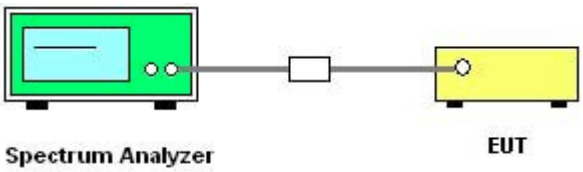
2.5.1. Limit of Conducted Band Edges and Spurious Emissions

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is perating, 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup



2.5.4. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2020 Section 11.11 and 11.12.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:

   Reference level measurement: Set spectrum analyzer center frequency to DTS channel center frequency / Set the span to ≥1.5 times the DTS bandwidth / RBW: 100kHz / VBW: 300kHz / 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 and attenuate it by 30dB.

   Emission level measurement: Set the center frequency and span to encompass frequency range to be measured / RBW: 100kHz / VBW: 300kHz / 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.
5. Record the measurement results in the test report.

2.5.5. Test Results of Conducted Band Edges and Spurious Emissions

Please refer to Appendix A for detail.

2.6. Radiated Band Edge and Spurious Emission

2.6.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the frequency band in which the 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. If the transmitter uses an RMS average conducted power limit, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the estricted bands, as defi ned in §15.205(a), must also comply with the radiated emission limits specifi ed in §15.209(a).

§15.209(a) Radiated emission limits:

Frequency (MHz)	Field Strength (μV/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

Restricted bands of operation refer to §15.205 (a):

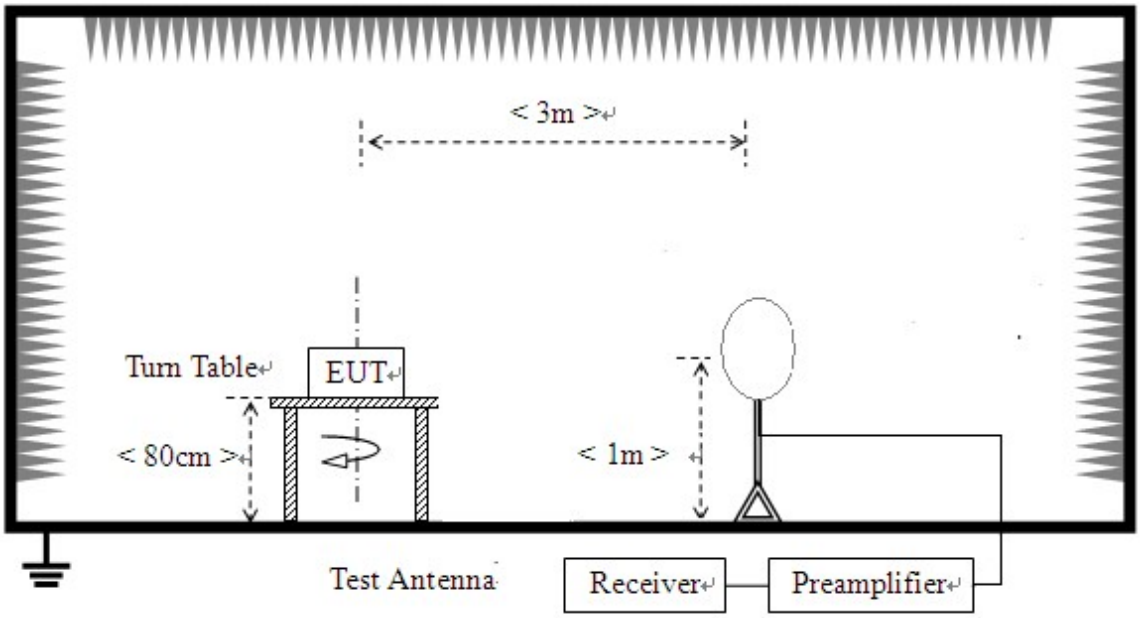
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41	/	/	/
Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. [2]Above 38.6.			

2.6.2. Measuring Instruments

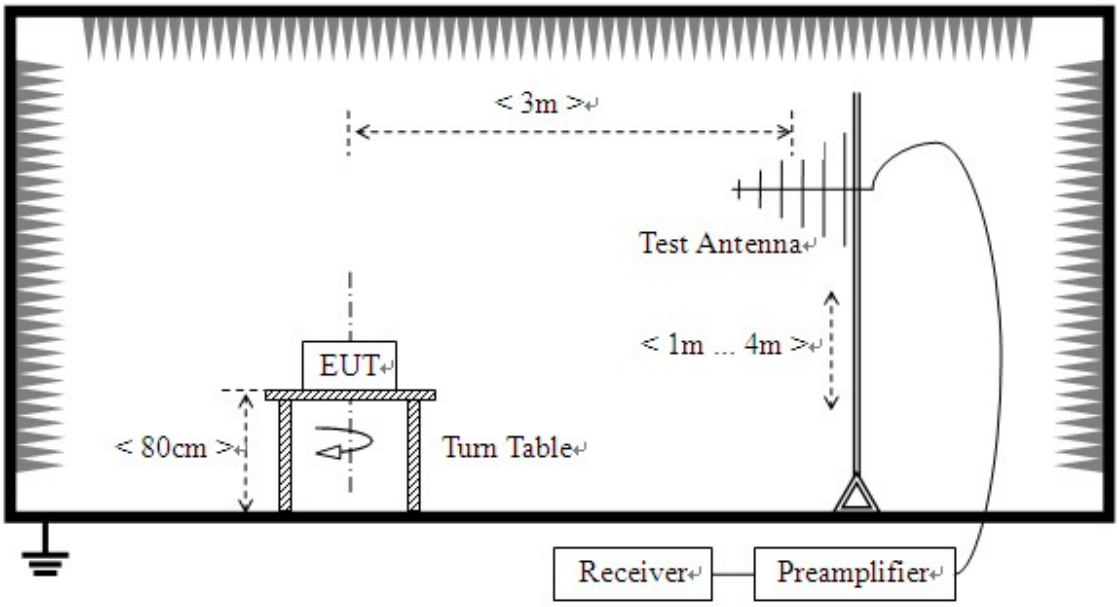
The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup

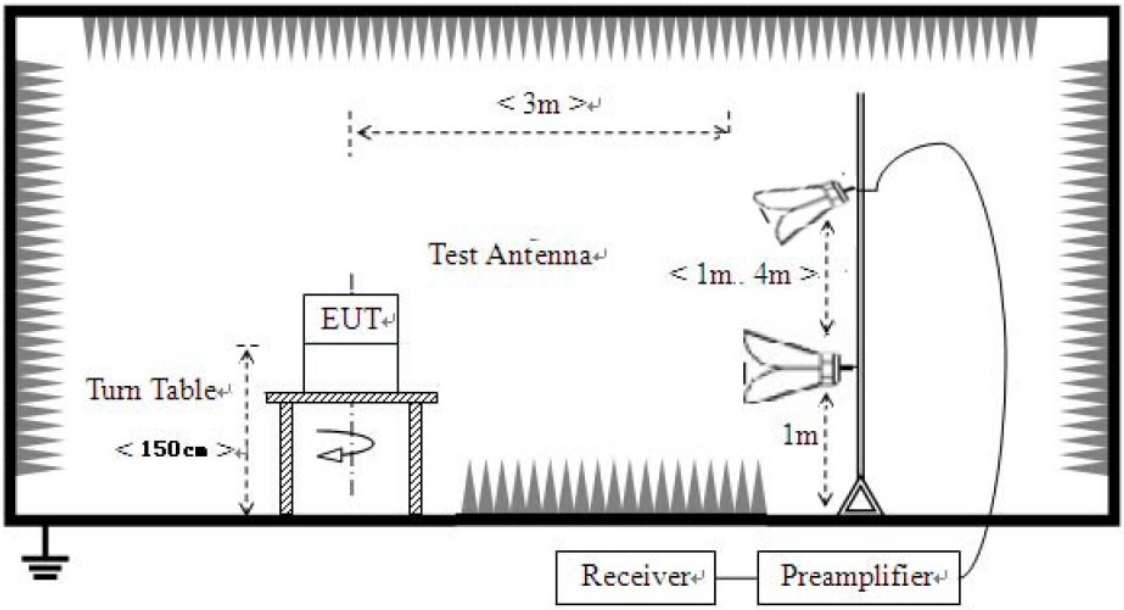
For radiated emissions from 9 kHz to 30 MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.6.4. Test Procedures

1. The EUT was placed on the top of a rotating table 0.8m for below 1GHz and 1.5m for above 1GHz above the ground at a 3 meters semi-anechoic chamber.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on thetop of a variable height antenna tower.
3. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported.Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then

reported in a data sheet.

7. For the radiated emission test above 1GHz:

   Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T(Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

2.6.5. Test Results of Radiated Band Edge and Spurious Emission

For 9 kHz to 30MHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

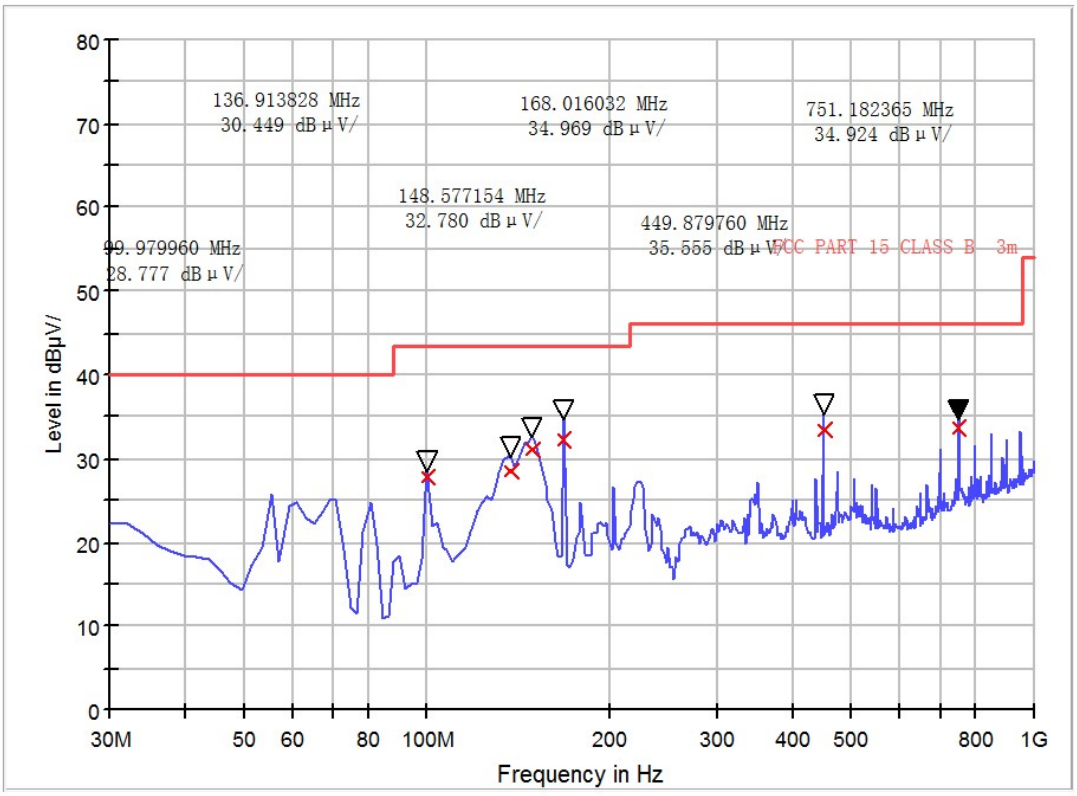
For 30MHz to 1GHz, All of the EUT Configure mode were tested and found 802.11b_2437MHz channel is the worst mode, the worst case is recorded in this report.

For 1GHz to 25GHz, Only worst-case data is reported.

For 30MHz to 1000MHz

Test site:	3M anechoic chamber	Environment:	Temp: 23℃; Humi:48%;101kPa
Operator:	Huang Chaoming	Test Date:	2024.06.27
Test Mode:	WIFI - TX	Test Result:	Pass

EMI Sweep-3M(30-1G)

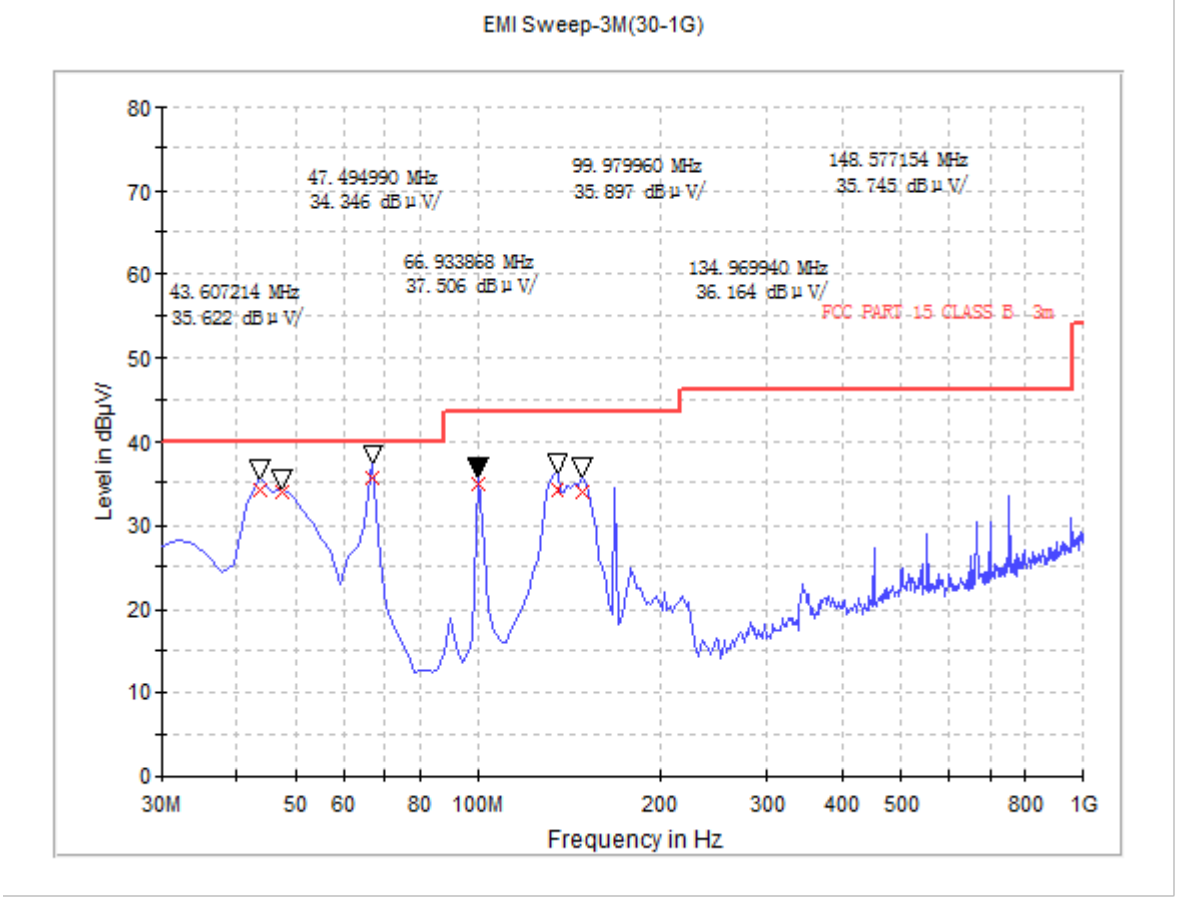


Frequency (MHz)	QuasiPeak (dBÌV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK	Limit - QPK
99.960000	27.83	120.000	100.0	H	12.2	15.67	43.5
136.920000	28.45	120.000	100.0	H	13.8	15.05	43.5
148.560000	31.13	120.000	100.0	H	13.8	12.37	43.5
168.000000	32.32	120.000	100.0	H	12.8	11.18	43.5
449.880000	33.42	120.000	100.0	H	19.3	12.58	46.0
751.200000	33.70	120.000	100.0	H	22.9	12.30	46.0

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value – Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.

Test site:	3M anechoic chamber	Environment:	Temp: 23℃; Humi:48%;101kPa
Operator:	Huang Chaoming	Test Date:	2024.06.27
Test Mode:	WIFI - TX	Test Result:	Pass



Frequency (MHz)	QuasiPeak (dB¦ÌV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK	Limit - QPK
43.600000	34.09	120.000	100.0	V	14.2	5.91	40.0
47.480000	33.83	120.000	100.0	V	11.7	6.17	40.0
66.920000	35.67	120.000	100.0	V	8.0	4.33	40.0
99.960000	34.80	120.000	100.0	V	12.2	8.70	43.5
134.960000	34.19	120.000	100.0	V	13.7	9.31	43.5
148.577154	33.88	120.000	100.0	V	12.2	9.62	43.5

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value – Emission Level.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.

For 1GHz to 25GHz

2.4G Wi-Fi 802.11b_2412MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2390.00	53.90	74.00	-20.10	1.60	130	56.99	-3.09	Horizontal	Peak
2390.00	44.04	54.00	-9.96	1.60	130	47.13	-3.09	Horizontal	Average
4824.00	45.90	74.00	-28.10	1.60	130	44.73	1.17	Horizontal	Peak
4824.00	36.15	54.00	-17.85	1.60	130	34.98	1.17	Horizontal	Average
7236.00	50.55	74.00	-23.45	1.60	130	44.60	5.95	Horizontal	Peak
7236.00	40.53	54.00	-13.47	1.60	130	34.58	5.95	Horizontal	Average
2390.00	52.53	74.00	-21.47	1.50	180	55.62	-3.09	Vertical	Peak
2390.00	43.59	54.00	-10.41	1.50	180	46.68	-3.09	Vertical	Average
4824.00	45.78	74.00	-28.22	1.50	180	44.61	1.17	Vertical	Peak
4824.00	36.67	54.00	-17.33	1.50	180	35.50	1.17	Vertical	Average
7236.00	50.49	74.00	-23.51	1.50	180	44.54	5.95	Vertical	Peak
7236.00	40.54	54.00	-13.46	1.50	180	34.59	5.95	Vertical	Average
2.4G Wi-Fi 802.11b_2437MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
4874.00	46.45	74.00	-27.55	1.60	130	45.49	0.96	Horizontal	Peak
4874.00	35.79	54.00	-18.21	1.60	130	34.83	0.96	Horizontal	Average
7311.00	49.83	74.00	-24.17	1.60	130	44.29	5.54	Horizontal	Peak
7311.00	41.39	54.00	-12.61	1.60	130	35.85	5.54	Horizontal	Average
4874.00	45.81	74.00	-28.19	1.50	180	44.85	0.96	Vertical	Peak
4874.00	36.29	54.00	-17.71	1.50	180	35.33	0.96	Vertical	Average
7311.00	50.05	74.00	-23.95	1.50	180	44.51	5.54	Vertical	Peak
7311.00	40.80	54.00	-13.20	1.50	180	35.26	5.54	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB)

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

2.4G Wi-Fi 802.11b_2462MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2483.50	54.13	74.00	-19.87	1.60	130	58.88	-4.75	Horizontal	Peak
2483.50	44.25	54.00	-9.75	1.60	130	49.00	-4.75	Horizontal	Average
4924.00	45.87	74.00	-28.13	1.60	130	45.27	0.6	Horizontal	Peak
4924.00	35.60	54.00	-18.40	1.60	130	35.00	0.6	Horizontal	Average
7386.00	49.67	74.00	-24.33	1.60	130	43.74	5.93	Horizontal	Peak
7386.00	39.97	54.00	-14.03	1.60	130	34.04	5.93	Horizontal	Average
2483.50	54.01	74.00	-19.99	1.50	180	58.76	-4.75	Vertical	Peak
2483.50	45.05	54.00	-8.95	1.50	180	49.80	-4.75	Vertical	Average
4924.00	45.43	74.00	-28.57	1.50	180	44.83	0.6	Vertical	Peak
4924.00	35.40	54.00	-18.60	1.50	180	34.80	0.6	Vertical	Average
7386.00	50.20	74.00	-23.80	1.50	180	44.27	5.93	Vertical	Peak
7386.00	40.61	54.00	-13.39	1.50	180	34.68	5.93	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Pre-Amplifier Factor(dB)

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

2.7. AC Power Line Conducted Emission

2.7.1. Limit of AC Power Line Conducted Emission

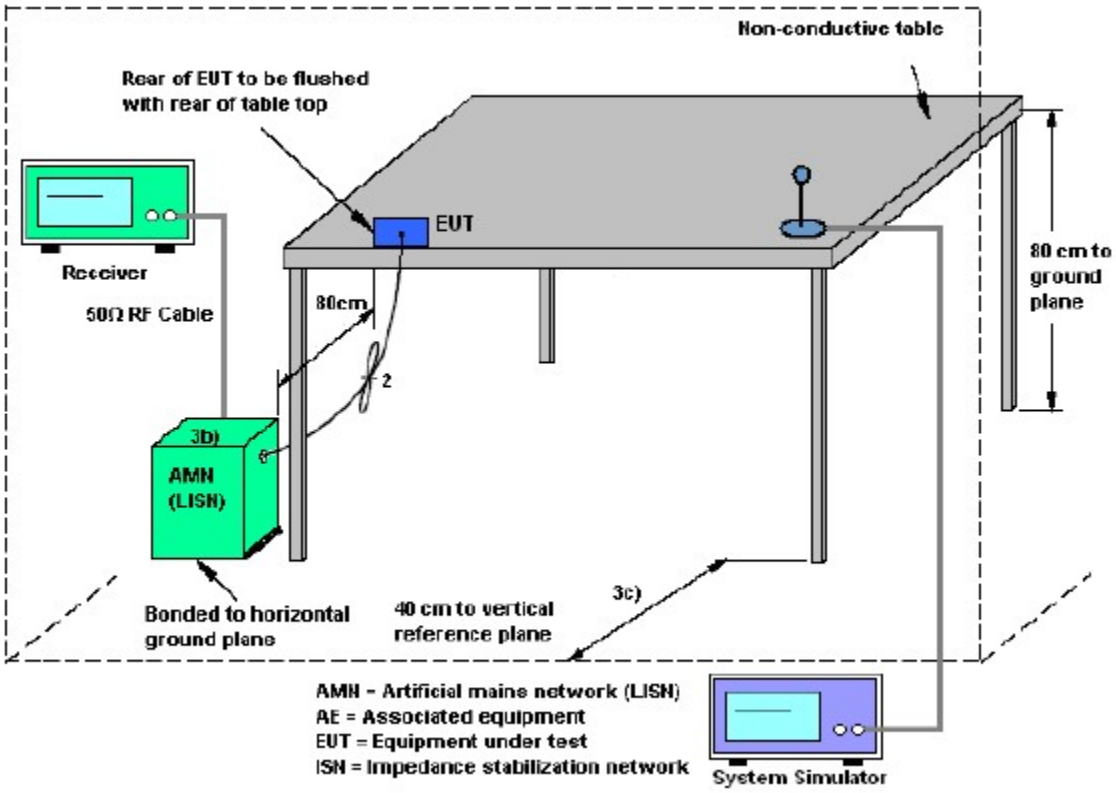
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

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

2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3. Test Setup



2.7.4. Test Procedures

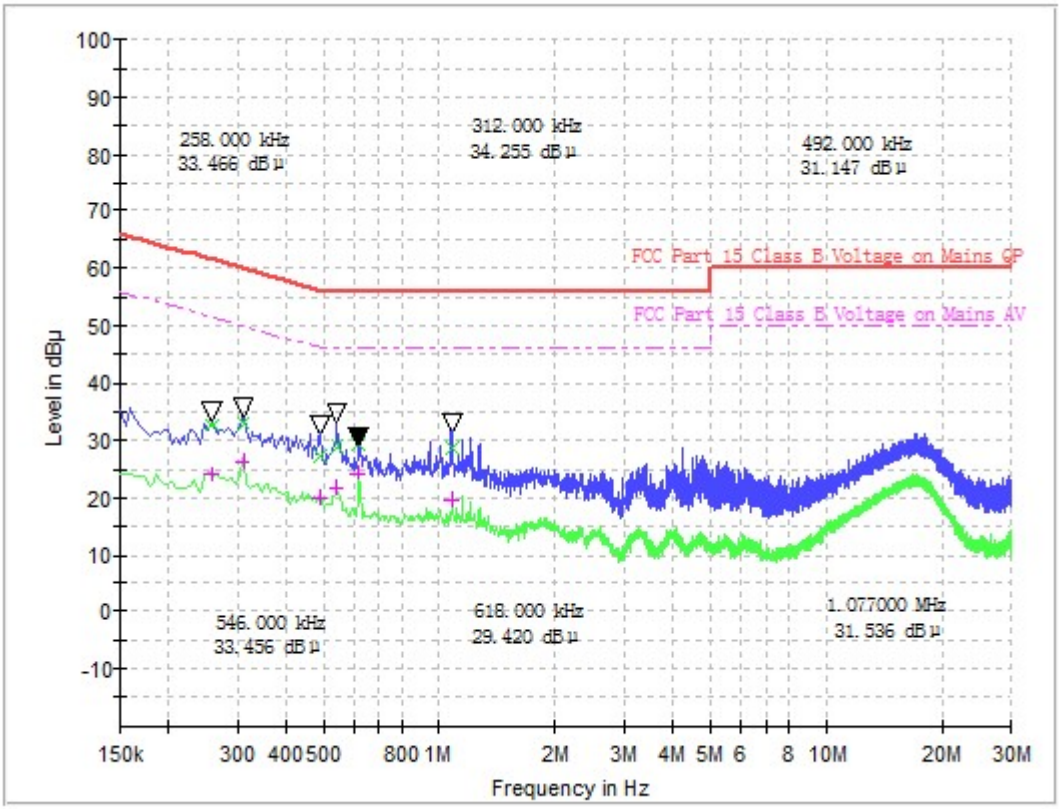
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

2.7.5. Test Results of Conducted Emission

NOTE 1: The EUT configuration of the emission tests is 2.4G WLAN Link + USB Cable (Charging from Adapter).

NOTE 2: All of the EUT Configure mode were tested and found 802.11b 2412MHz channel is the worst mode, the worst case is recorded in this report.

Line Phase

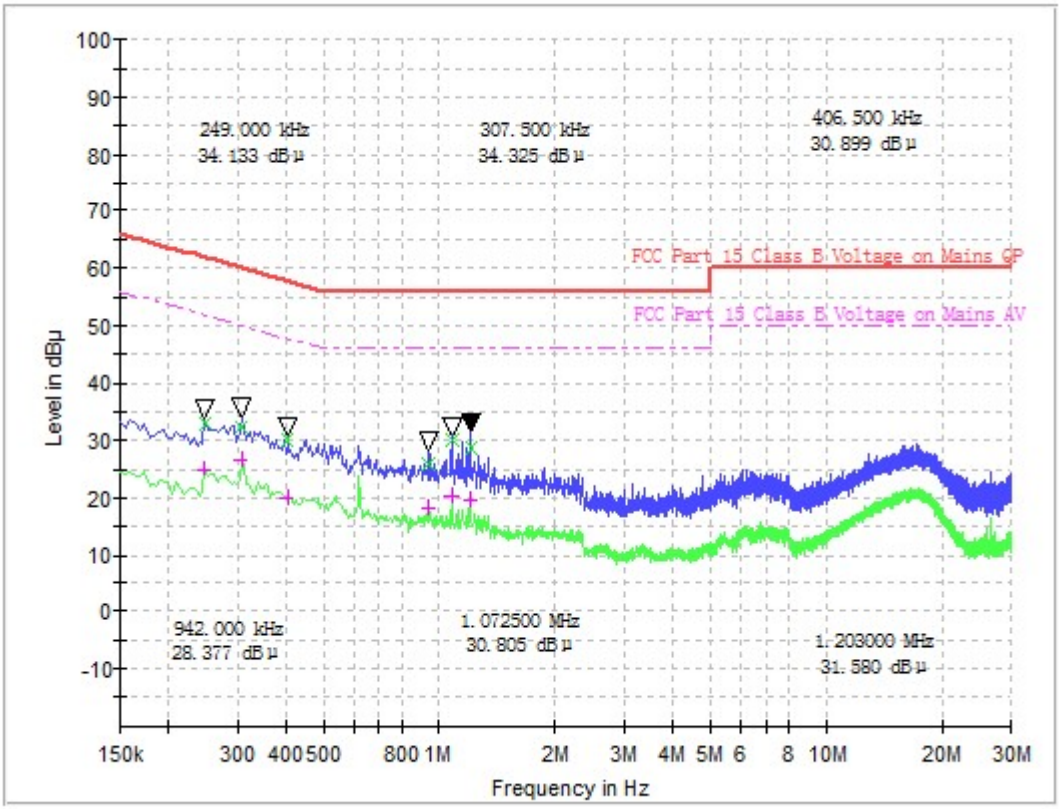


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Corr.Factor (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dBµV)
0.258000	32.75	23.91	10.1	28.75	61.5	27.59	51.5
0.312000	33.03	26.35	10.1	26.89	59.9	23.57	49.9
0.492000	27.11	19.88	10.1	29.02	56.1	26.25	46.1
0.546000	29.04	21.68	10.1	26.96	56.0	24.32	46.0
0.618000	29.30	24.32	10.1	26.70	56.0	21.68	46.0
1.077000	28.56	19.42	10.2	27.44	56.0	26.58	46.0

Test Result : Pass

Note: Final Level = Receiver Read level + Correction factor.

Neutral Phase



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Corr.Factor (dB)	Margin - QPK	Limit - QPK	Margin - AV	Limit - AV (dBµV)
0.249000	32.99	24.95	10.1	28.80	61.8	26.84	51.8
0.307500	32.16	26.61	10.1	27.88	60.0	23.43	50.0
0.406500	29.80	19.97	10.1	27.92	57.7	27.75	47.7
0.942000	25.98	18.14	10.2	30.02	56.0	27.86	46.0
1.072500	29.93	20.21	10.2	26.07	56.0	25.79	46.0
1.203000	28.73	19.40	10.2	27.27	56.0	26.60	46.0

Test Result : Pass

Note: Final Level = Receiver Read level + Correction factor.

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2023.08.01	2026.07.31
2	EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2024.05.23	2025.05.22
3	Loop Antenna	Schwarz beck	HFH2-Z2	A0304220	2022.05.02	2025.05.01
4	Broadband antenna (30MHz~1GHz)	R&S	HL562	A0304224	2023.09.05	2026.09.04
5	EMI Horn Ant. (1-18G)	ETC	MCTD-1209	A150402241	2023.05.16	2026.05.15
6	Horn antenna (18GHz~26.5GHz)	AR	AT4510	A0804450	2023.06.01	2026.05.31
7	Amplifier 30M~1GHz	MILMEGA	80RF1000-10004	A140101634	2023.10.20	2024.10.19
8	Amplifier 1G~18GHz	MILMEGA	AS0104R-800/400	A160302517	2023.10.20	2024.10.19
9	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2024.01.18	2025.01.17
10	Test Receiver	R&S	ESIB7	A0501375	2024.02.28	2025.02.27
11	Broadband Ant.	ETC	MCTD 2786	A150402240	2023.05.22	2026.05.21
12	3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.26
13	Temperature chamber	ESPEC	SU-642	A150802409	2024.02.22	2025.02.21
14	Test Receiver	KEYSIGHT	N9038A	A141202036	2024.06.05	2025.06.04
15	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2024.05.23	2025.05.22

4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2020. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence . The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of AC Power Line Conducted Emission Measurement (150kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (9kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.5dB

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.91dB

Uncertainty of Radiated Emission Measurement (1GHz~18GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.5dB

Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.9dB

Uncertainty of RF Conducted Measurement (9kHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	1.2dB

Appendix A

Duty Cycle

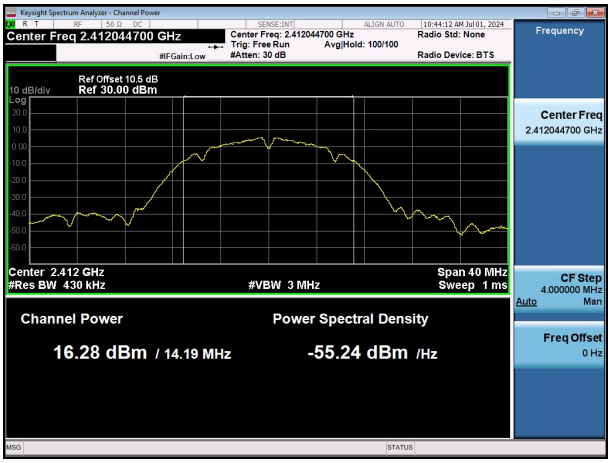
Test Result and Data

Duty Cycle						
Mode	Test Frequency (MHz)	ON Time (ms)	Period (ms)	Duty Cycle (%)	DC Factor	Result
11B	2412	8.42	8.52	98.83	0.05	Pass
11G	2412	1.39	1.49	93.29	0.30	Pass
11N20SISO	2412	1.30	1.41	92.20	0.35	Pass

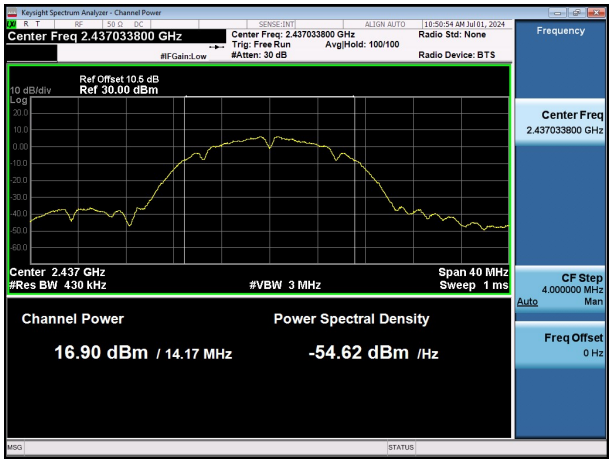
RF Output Power

Test Result and Data

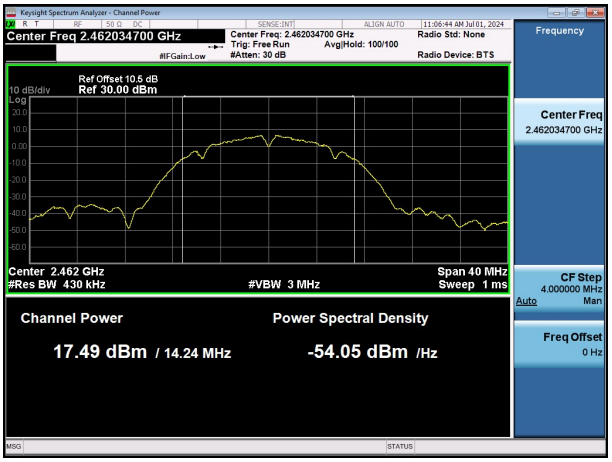
WLAN AVGSA Output Power						
Mode	Test Frequency (MHz)	Average Power (dBm)	DC Factor (dBm)	Result (dBm)	Limit (dBm)	Result
802.11b	2412	16.28	0.05	16.33	≤30.00	Pass
802.11b	2437	16.90	0.05	16.95	≤30.00	Pass
802.11b	2462	17.49	0.05	17.54	≤30.00	Pass
802.11g	2412	14.54	0.30	14.84	≤30.00	Pass
802.11g	2437	15.23	0.30	15.53	≤30.00	Pass
802.11g	2462	15.76	0.30	16.06	≤30.00	Pass
802.11n (20MHz)	2412	14.39	0.35	14.74	≤30.00	Pass
802.11n (20MHz)	2437	15.29	0.35	15.64	≤30.00	Pass
802.11n (20MHz)	2462	15.64	0.35	15.99	≤30.00	Pass



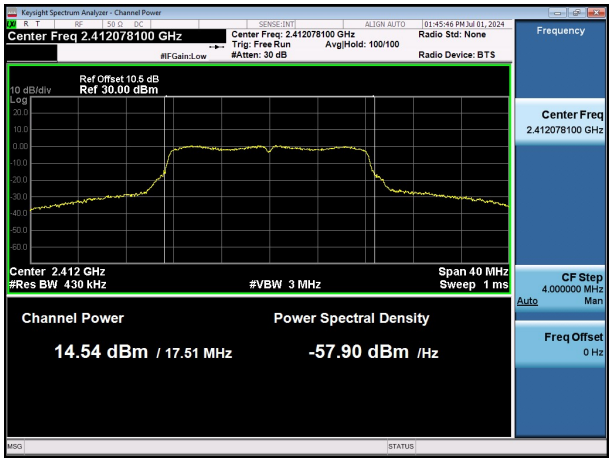
11B-Ant1-2412-PASS



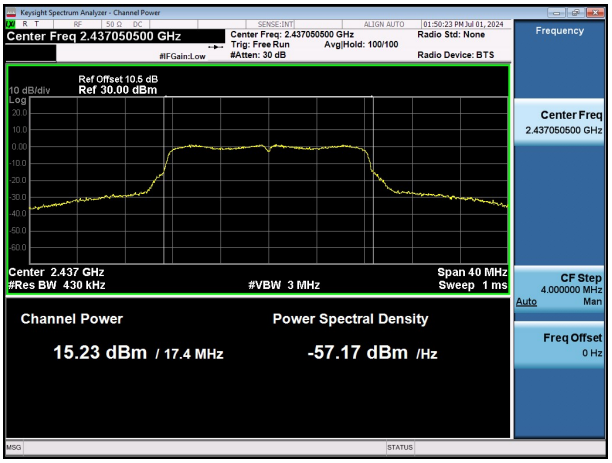
11B-Ant1-2437-PASS



11B-Ant1-2462-PASS



11G-Ant1-2412-PASS



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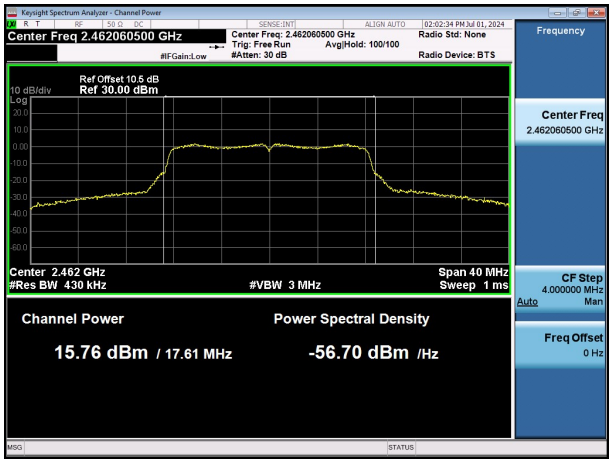

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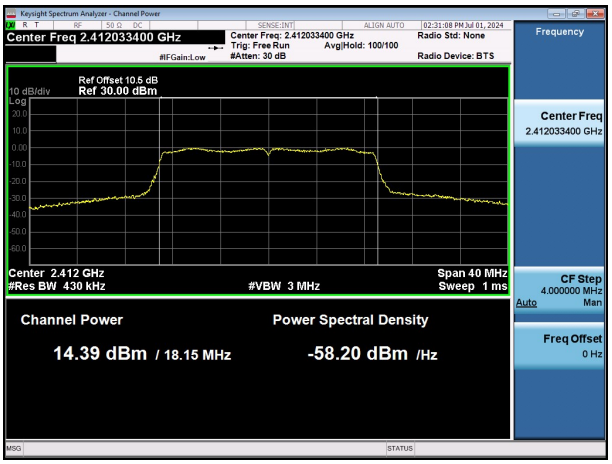

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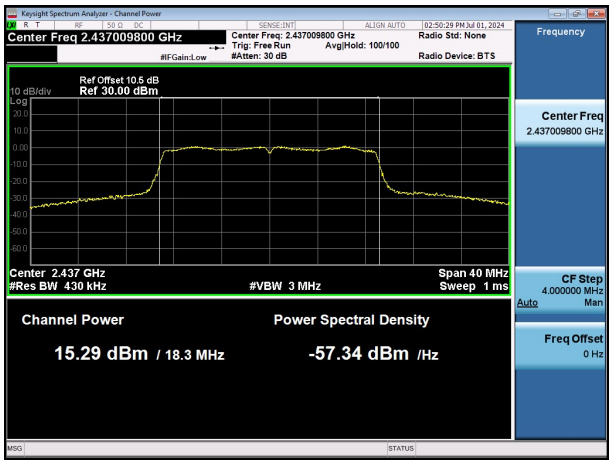

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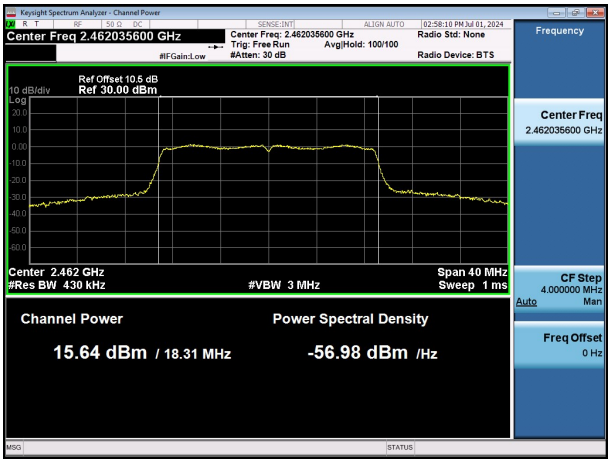
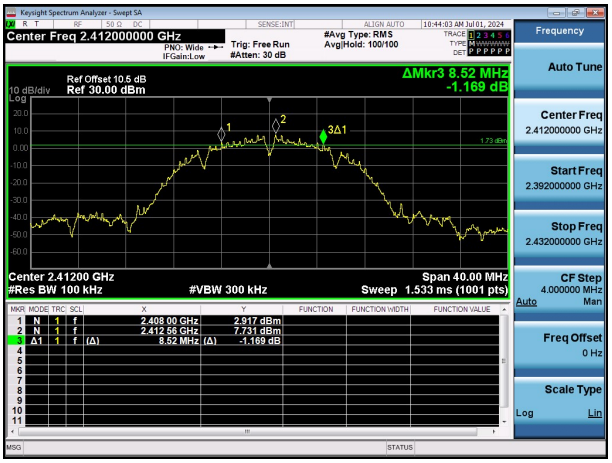


11N20SISO-Ant1-2462-PASS

6dB Bandwidth

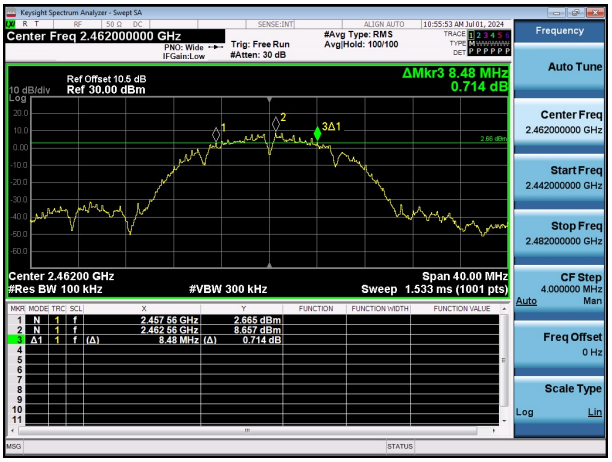
Test Result and Data

WLAN 6dB Bandwidth				
Mode	Test Frequency (MHz)	DTS BW (MHz)	Limit (MHz)	Result
802.11b	2412	8.520	0.5	Pass
802.11b	2437	10.000	0.5	Pass
802.11b	2462	8.480	0.5	Pass
802.11g	2412	15.680	0.5	Pass
802.11g	2437	16.280	0.5	Pass
802.11g	2462	14.480	0.5	Pass
802.11n (20MHz)	2412	17.560	0.5	Pass
802.11n (20MHz)	2437	15.080	0.5	Pass
802.11n (20MHz)	2462	17.560	0.5	Pass



11B-Ant1-2412-PASS

11B-Ant1-2437-PASS



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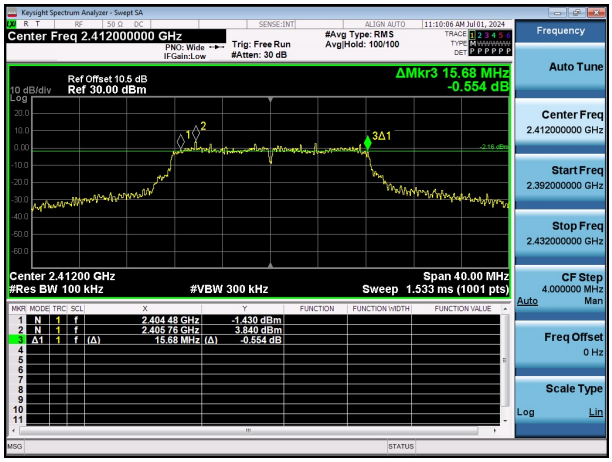
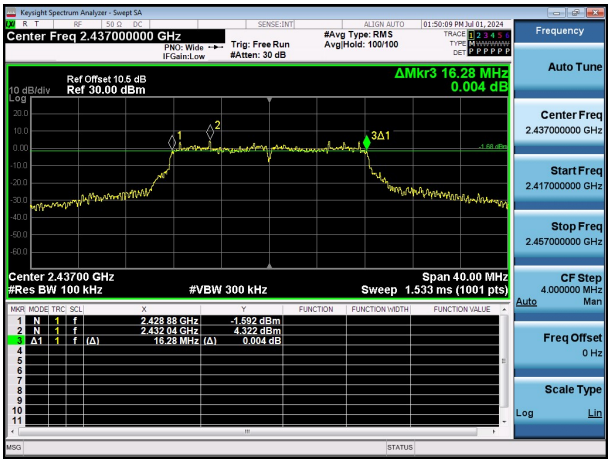
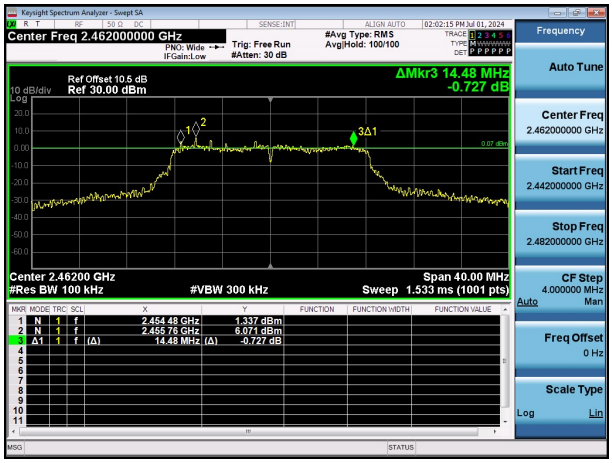


11G-Ant1-2412-PASS



11G-Ant1-2437-PASS



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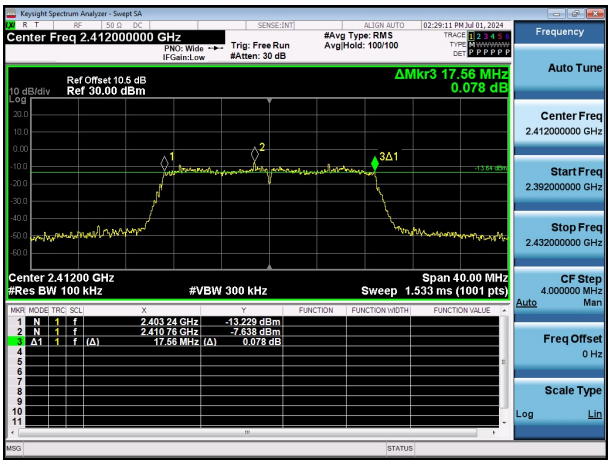

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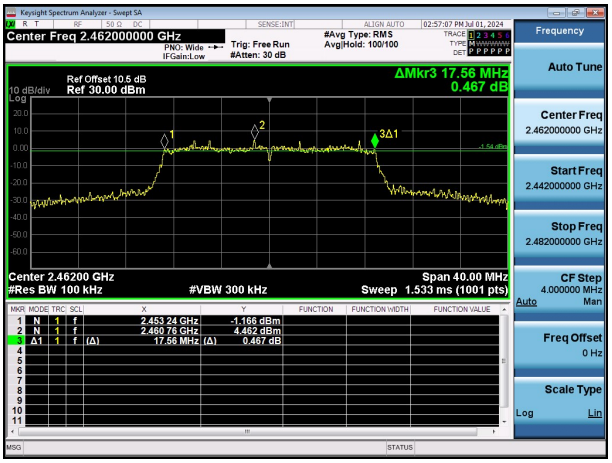
11N20SISO-Ant1-2437-PASS



11N20SISO-Ant1-2462-PASS

99% Occupied Bandwidth

Test Result and Data

WLAN 99% Occupied Bandwidth			
Mode	Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	Result
802.11b	2412	14.186	Pass
802.11b	2437	14.173	Pass
802.11b	2462	14.238	Pass
802.11g	2412	17.514	Pass
802.11g	2437	17.399	Pass
802.11g	2462	17.607	Pass
802.11n (20MHz)	2412	18.154	Pass
802.11n (20MHz)	2437	18.299	Pass
802.11n (20MHz)	2462	18.308	Pass