EMTEK
Access to the World

TEST REPORT

Product Name : Dash Cam
Model Number : A500S, A500S-1
FCC ID : 2AOK9-A500SHS

Prepared for	:	70mai Co., Ltd.
Address	:	Room2220, building2, No.588, Zixingroad, MinHangDistrict, Shanghai. CHINA
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Building 69, Majialong Industry Zone,Nanshan District, Shenzhen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282
Report Number	:	ENS2202280072W00501R
Date(s) of Tests	:	February 28, 2022 to March 29, 2022
Date of issue	:	April 1, 2022

TABLE OF CONTENTS

1 TEST RESULT CERTIFICATION

Applicant	:	70mai Co., Ltd.
Address	:	Room2220, building2, No.588, Zixingroad, MinHangDistrict, Shanghai. CHINA
Manufacturer	:	70mai Co., Ltd.
Address	:	Room2220, building2, No.588, Zixingroad, MinHangDistrict, Shanghai. CHINA
EUT	:	Dash Cam
Model Name	:	A500S, A500S-1
Trademark	:	N/A

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C	PASS

The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 15.247

The test results of this report relate only to the tested sample identified in this report.

Date of Test : February 28, 2022 to March 29, 2022

Prepared by : Una Yu /Editor

Reviewer : Joe Xia /Supervisor

Approved & Authorized Signer : Lisa Wang/Manager

EMTEK (SHENZHEN) CO., LTD. TESTING

2 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Product	Dash Cam
Model Number	A500S, A500S-1 (These model numbers are identical in circuitry and electrical, mechanical and physical construction, only model A500S-1 contains Rear Camera Package for different market purposes. We choose A500S-1 as the final test prototype)
Sample	1#
IEEE 802.11 WLAN Mode Supported	☒ 802.11b ☒ 802.11g ☒ 802.11n(20MHz channel bandwidth)
Data Rate	802.11 b:1,2,5.5,11Mbps; 802.11 g:6,9,12,18,24,36,48,54Mbps; 802.11n(HT20): up to 72.2Mbps;
Modulation	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Operating Frequency Range	☒ 2412-2462MHz for 802.11b/g/n(HT20);
Number of Channels	☒ 11 channels for 802.11b/g n(HT20);
Transmit Power Max	15.68dBm
Antenna Type	Internal Antenna
Antenna Gain	2.58 dBi
Power supply	☒ DC supply: DC 3.7V from internal battery DC 5V from charger
Date of Received	February 28, 2022
Temperature Range	-10°C ~ +60°C

Note: *for more details, please refer to the User's manual of the EUT.*

3 SUMMARY OF TEST RESULT

FCC PartClause	Test Parameter	Verdict	Remark
15.247(a)(2)	DTS (6dB) Bandwidth	PASS	
15.247(b)(3)	Maximum Peak Conducted Output Power	PASS	
15.247(e)	Maximum Power Spectral Density Level	PASS	
15.247(d)	Unwanted Emission Into Non-Restricted Frequency Bands	PASS	
15.247(d) 15.209	Unwanted Emission Into Restricted Frequency Bands (conducted)	PASS	
15.247(d) 15.209	Radiated Spurious Emission	PASS	
15.207	Conducted EmissionTest	N/A	
15.247(b)	Antenna Application	PASS	
	NOTE1:N/A (Not Applicable) NOTE2: According to FCC OET KDB 558074, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.		

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2AOK9-A500SHS filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
FCC 47 CFR Part 2, Subpart J
FCC 47 CFR Part 15, Subpart C
FCC KDB 558074 D01 15.247 Meas Guidance v05r02

4.2 MEASUREMENT EQUIPMENT USED

4.2.1 Radiated Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
Pre-Amplifier	HP	8447F	2944A07999	2021/5/15	1Year
EMI Test Receiver	Rohde & Schwarz	ESCI	101414	2021/5/15	1Year
Bilog Antenna	Schwarzbeck	VULB9163	712	2021/7/5	2 Year
Horn antenna	Schwarzbeck	BBHA9120D	9120D-1178	2020/7/4	2 Year
Pre-Amplifie	Lunar EM	LNA1G18-48	J1011131010001	2021/5/15	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100967	2021/5/15	1Year
Horn antenna	Schwarzbeck	BBHA9170	9170-399	2021/6/12	2 Year
Loop Antenna	Schwarzbeck	FMZB1519	1519-012	2021/6/12	2 Year
Cable	H+B	NmSm-05-C15052	N/A	2021/5/15	1 Year
Cable	H+B	NmSm-2-C15201	N/A	2021/5/15	1 Year
Cable	H+B	NmNm-7-C15702	N/A	2021/5/15	1 Year
EMI Test Receiver	Rohde & Schwarz	ESU 26	100154	2021/5/15	1Year
Pre-Amplifie	Lunar EM	LNA30M3G-25	J10100000070	2021/5/15	1Year
Bilog Antenna	Schwarzbeck	VULB9163	659	2021/8/22	2 Year
Horn antenna	Schwarzbeck	BBHA9120D	9120D-1177	2020/7/4	2 Year
Pre-Amplifie	SKET	LNPA_0118G-45	SK2019051801	2021/5/15	1Year
Loop Antenna	Schwarzbeck	FMZB1519	1519-012	2021/6/12	2 Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100967	2021/5/15	1Year
Horn antenna	Schwarzbeck	BBHA9170	9170-399	2021/6/12	2 Year
Cable	H+B	SAC-40G-1	414	2021/5/15	1 Year
Cable	H+B	SUCOFLEX104	MY14871/4	2021/5/15	1 Year
Cable	H+B	BLU18A-NmSm-6500	D8501	2021/5/15	1 Year
Band reject Filter(50dB)	WI/DE	WRCGV-2400(2400-2485M	2	2021/5/15	1 Year

4.2.2 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LASTCAL.	DUE CAL.
Signal Analyzer	Agilent	N9010A	My53470879	2021/5/16	1 Year
Power meter	Anritsu	ML2495A	0824006	2021/5/15	1 Year
Power sensor	Anritsu	MA2411B	0738172	2021/5/15	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100967	2021/5/15	1 Year

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (☒ 802.11b:1 Mbps;☒ 802.11g: 6 Mbps;☒ 802.11n(HT20): MCS0;☐ 802.11n(HT40): MCS0) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

☒ Frequency and Channel list for 802.11b/g/n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		

☒ Test Frequency and Channel for 802.11b/g/n (HT20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : **Accredited by CNAS**
The Certificate Registration Number is L2291.
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by A2LA
The Certificate Number is 4321.01.

Accredited by Industry Canada
The Conformity Assessment Body Identifier is CN0008

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
Site Location : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

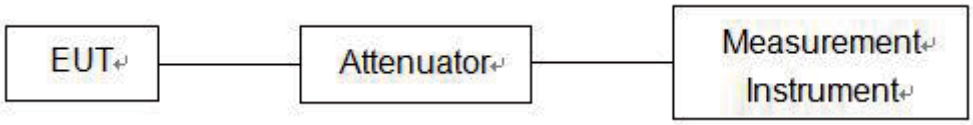
Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0dB
Conducted Emissions Test	±2.0dB
Radiated Emission Test	±2.0dB
Power Density	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%

7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP 1

The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

Below 30MHz：

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT androtated about its vertical axis formaximum response at each azimuth about the EUT. The center of the loopshall be 1 m above the ground.For certain applications, the loop antennaplane may also need to be positioned horizontally at the specified distance from the EUT.

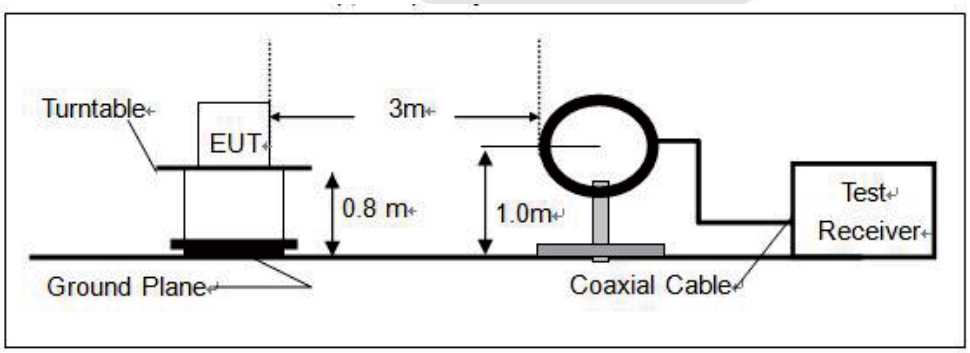
30MHz-1GHz：

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

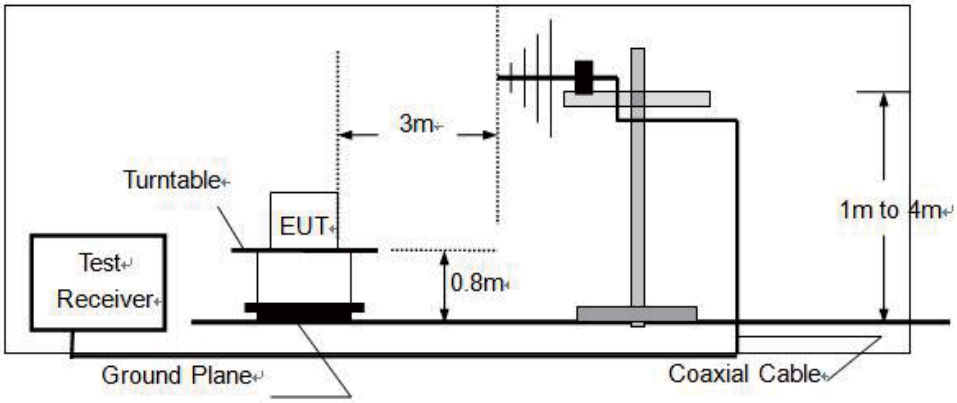
Above 1GHz：

The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

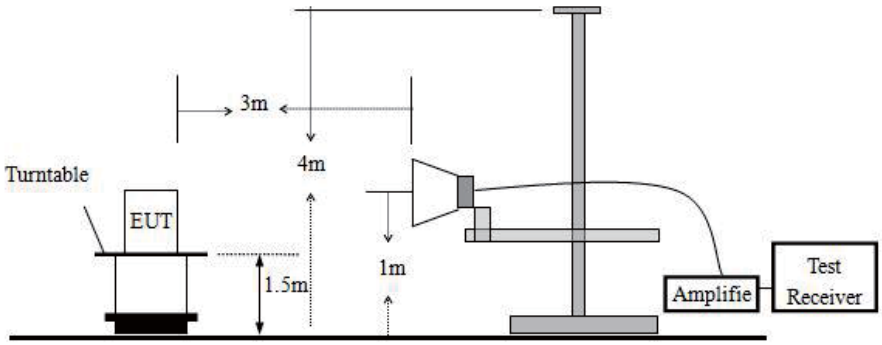
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b)Radiated Emission Test Set-Up, Frequency Below 1000MHz

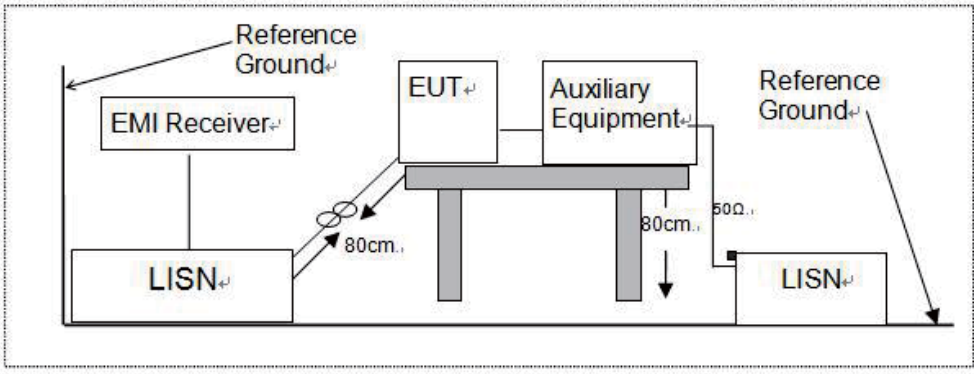


(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

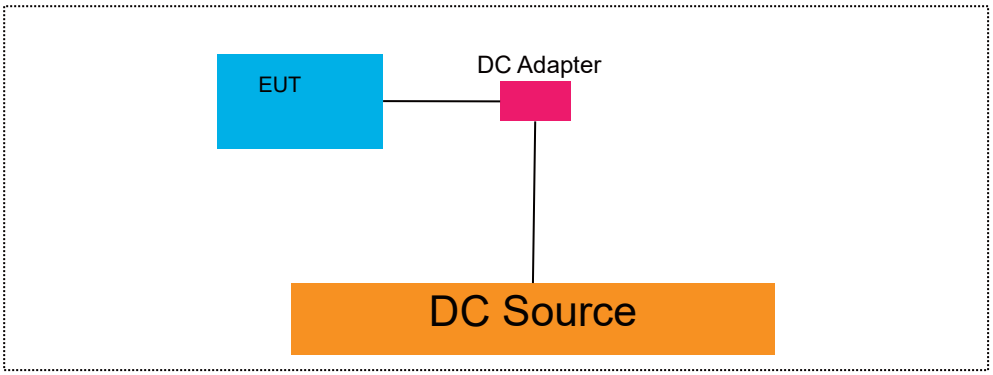


7.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.
According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



7.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



7.5 SUPPORT EQUIPMENT

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/
/	/	/	/

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*
3. *Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment*

8 TEST REQUIREMENTS

8.1 DTS (6DB) BANDWIDTH

8.1.1 Applicable Standard

According to FCC Part15.247 (a)(2) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.1.2 Conformance Limit

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

8.1.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.1.4 Test Procedure

The EUT was operating in IEEE 802.11b/g/n mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.
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.
Set to the maximum power setting and enable the EUT transmit continuously
Set RBW = 100 kHz.
Set the video bandwidth (VBW) =300kHz.
Set Span=2 times OBW
Set Detector = Peak.
Set Trace mode = max hold.
Set 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.
Measure and record the results in the test report.

8.1.5 Test Results

Temperature:	2° C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.520	2407.440	2416.960	0.5	PASS
		2437	10.120	2431.920	2442.040	0.5	PASS
		2462	9.760	2457.120	2466.880	0.5	PASS
11G	Ant1	2412	16.440	2403.760	2420.200	0.5	PASS
		2437	16.480	2428.760	2445.240	0.5	PASS
		2462	16.440	2453.760	2470.200	0.5	PASS
11N20SISO	Ant1	2412	17.680	2403.120	2420.800	0.5	PASS
		2437	17.640	2428.160	2445.800	0.5	PASS
		2462	17.640	2453.160	2470.800	0.5	PASS

11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

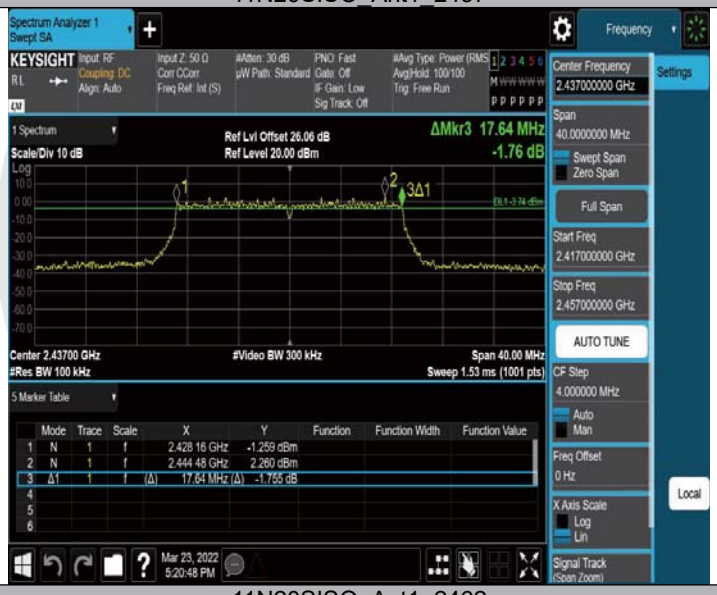
11G_Ant1_2412

11G_Ant1_2437

11G_Ant1_2462

11N20SISO_Ant1_2412

11N20SISO_Ant1_2437



11N20SISO_Ant1_2462


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
μW Path: Standard
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS)
Avg|Hold: 100/100
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 25.97 dB
Ref Level 20.00 dBm
ΔMkr3 17.64 MHz
-0.43 dB
Center 2.46200 GHz
#Res BW 100 kHz
#Video BW 300 kHz
Span 40.00 MHz
Sweep 1.53 ms (1001 pts)
5 Marker Table
Mode Trace Scale X Y Function Function Width Function Value
1 N 1 f 2.453 16 GHz -2.051 dBm
2 N 1 f 2.455 72 GHz 2.090 dBm
3 Δ1 1 f (Δ) 17.64 MHz (Δ) -0.4319 dB
Mar 23, 2022
5:25:25 PM
Frequency
Settings
Center Frequency
2.462000000 GHz
Span
40.0000000 MHz
Swept Span
Zero Span
Full Span
Start Freq
2.442000000 GHz
Stop Freq
2.482000000 GHz
AUTO TUNE
CF Step
4.000000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Local

8.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

8.2.1 Applicable Standard

According to FCC Part15.247 (b)(3) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.2.2 Conformance Limit

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm).

8.2.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.2.4 Test Procedure

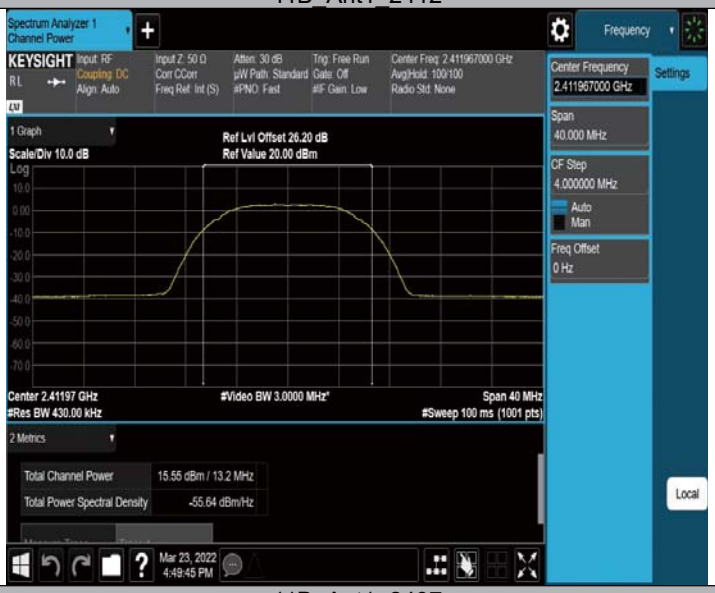
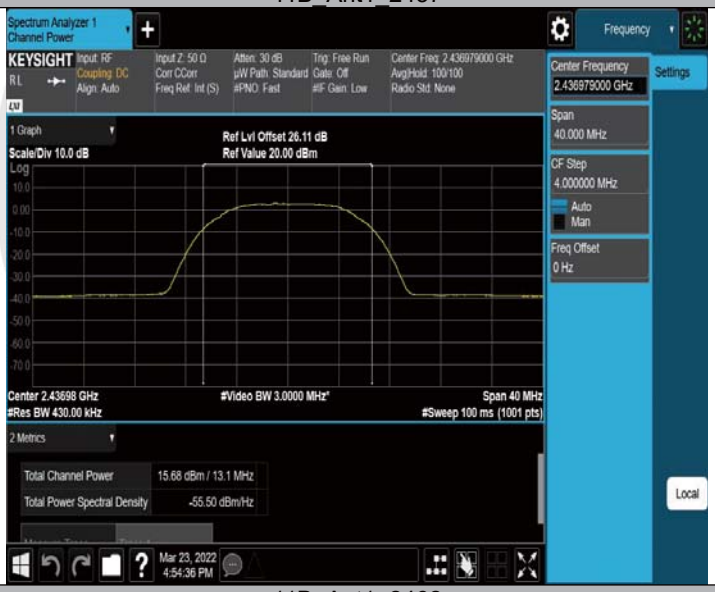
a) Set span to at least 1.5 times the OBW.
b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
c) Set VBW ≥ 3 x RBW.
d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
e) Sweep time = auto.
f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

■ According to FCC Part 15.247(b)(4):
Conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
Note: If antenna Gain exceeds 6 dBi, then Output power Limit=30-(Gain- 6)

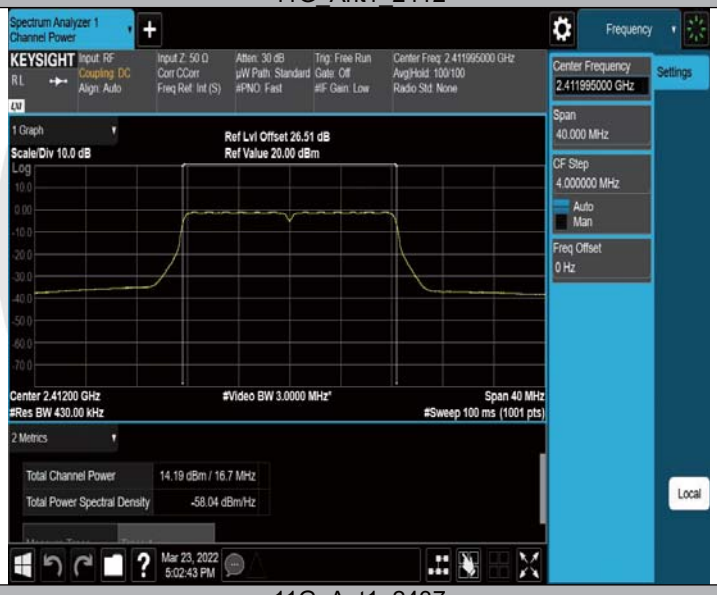
8.2.5 Test Results

Temperature:	25 ˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

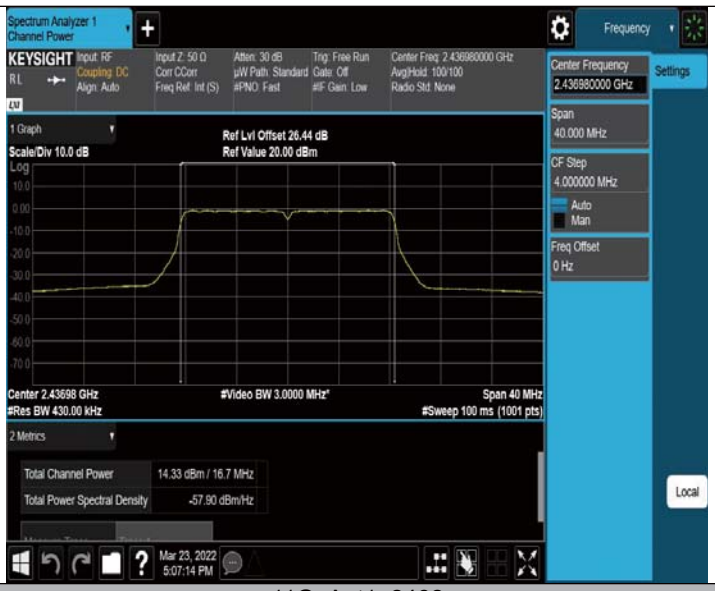
TestMode	Antenna	Frequency[MHz]	Powert[dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit[dBm]	Verdict
11B	Ant1	2412	15.55	≤30.00	18.13	≤36.00	PASS
		2437	15.68	≤30.00	18.26	≤36.00	PASS
		2462	15.58	≤30.00	18.16	≤36.00	PASS
11G	Ant1	2412	14.19	≤30.00	16.77	≤36.00	PASS
		2437	14.33	≤30.00	16.91	≤36.00	PASS
		2462	14.19	≤30.00	16.77	≤36.00	PASS
11N20SISO	Ant1	2412	13.62	≤30.00	16.20	≤36.00	PASS
		2437	13.75	≤30.00	16.33	≤36.00	PASS
		2462	13.61	≤30.00	16.19	≤36.00	PASS

11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

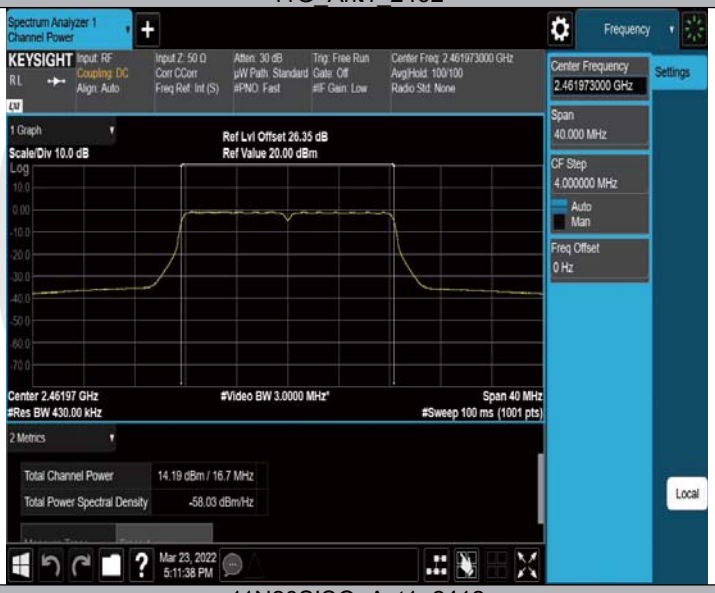
11G_Ant1_2412



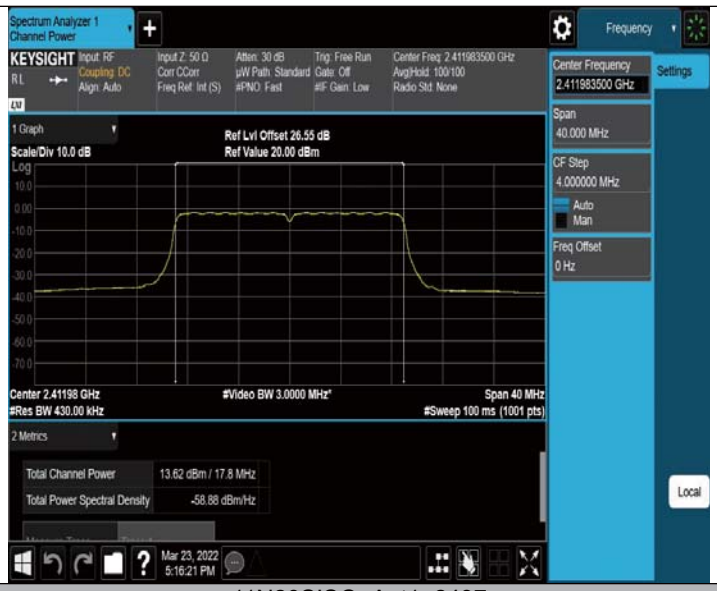
11G_Ant1_2437



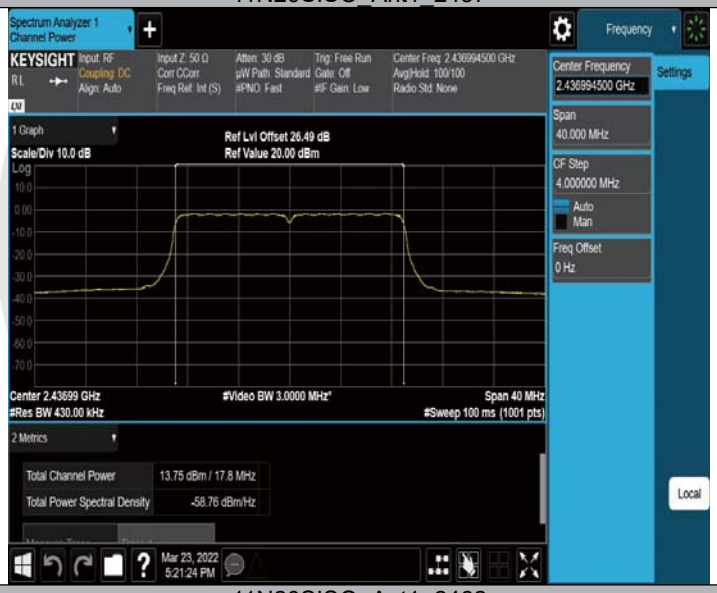
11G_Ant1_2462



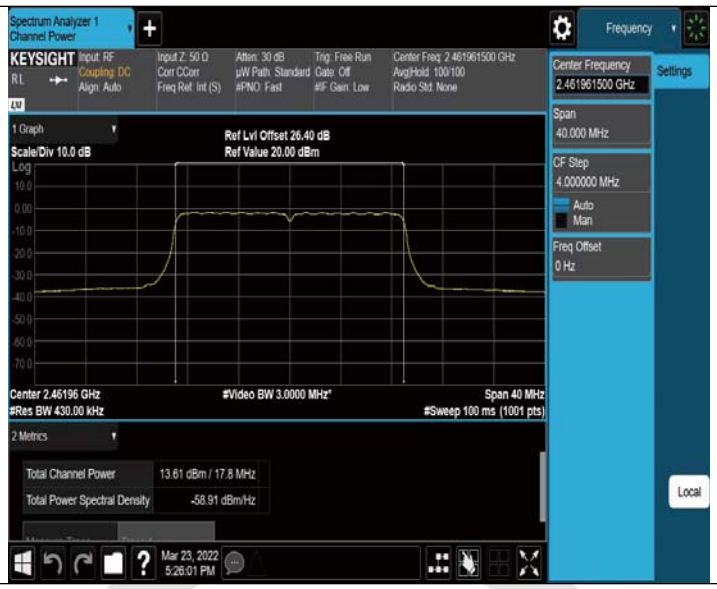
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462


Spectrum Analyzer 1
Channel Power
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
Atten: 30 dB
μW Path: Standard
#PNO: Fast
Trig: Free Run
Gate: Off
#IF Gain: Low
Center Freq: 2.461961500 GHz
Avg/Hold: 100/100
Radio Std: None
Frequency
Center Frequency
2.461961500 GHz
Settings
Span
40.000 MHz
CF Step
4.000000 MHz
Auto
Man
Freq Offset
0 Hz
1 Graph
Ref Lvl Offset 26.40 dB
Scale/Div 10.0 dB
Ref Value 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.46196 GHz
#Res BW 430.00 kHz
#Video BW 3.0000 MHz*
Span 40 MHz
#Sweep 100 ms (1001 pts)
2 Metrics
Total Channel Power
13.61 dBm / 17.8 MHz
Total Power Spectral Density
-58.91 dBm/Hz
Local
Mar 23, 2022
5:26:01 PM

8.3 MAXIMUM POWER SPECTRAL DENSITY

8.3.1 Applicable Standard

According to FCC Part15.247(e) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.3.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.3.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

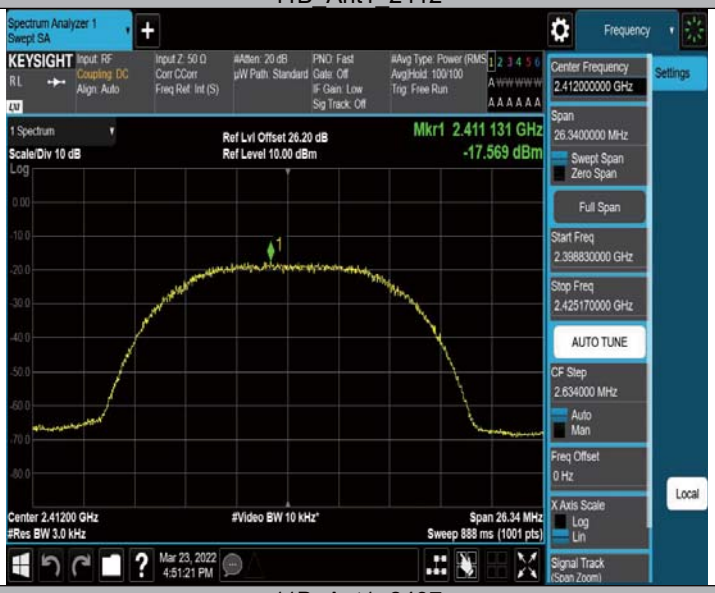
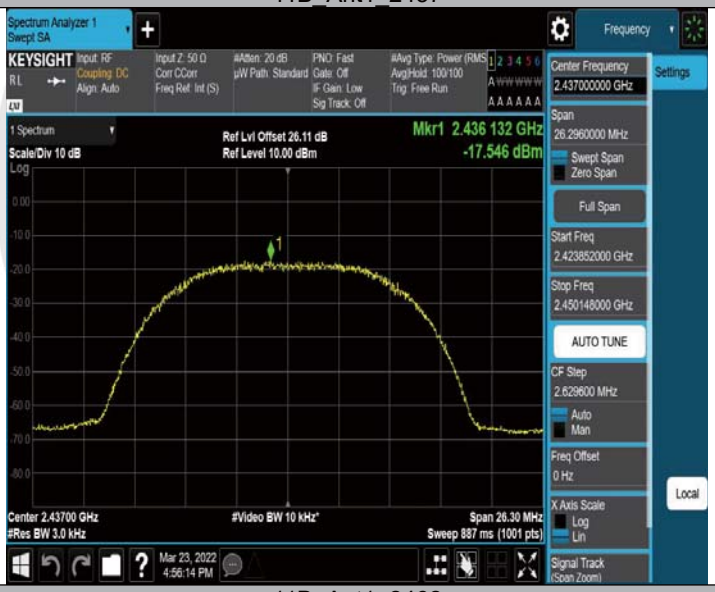
8.3.4 Test Procedure

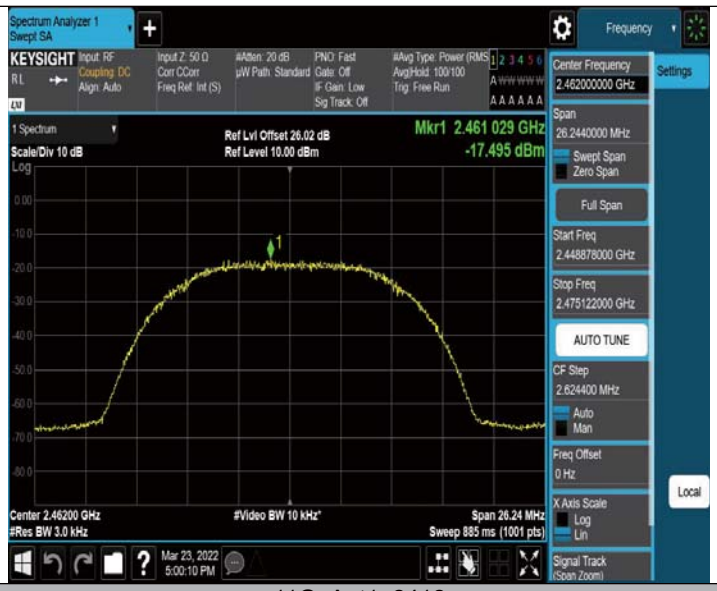
This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance
The transmitter output (antenna port) was connected to the spectrum analyzer
Set analyzer center frequency to DTS channel center frequency.
Set the span to 1.5 times the DTS bandwidth.
Set the RBW to: 3 kHz
Set the VBW to:10 kHz.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level within the RBW.
Note: If antenna Gain exceeds 6 dBi, then PSD Limit=8-(Gain- 6)

8.3.5 Test Results

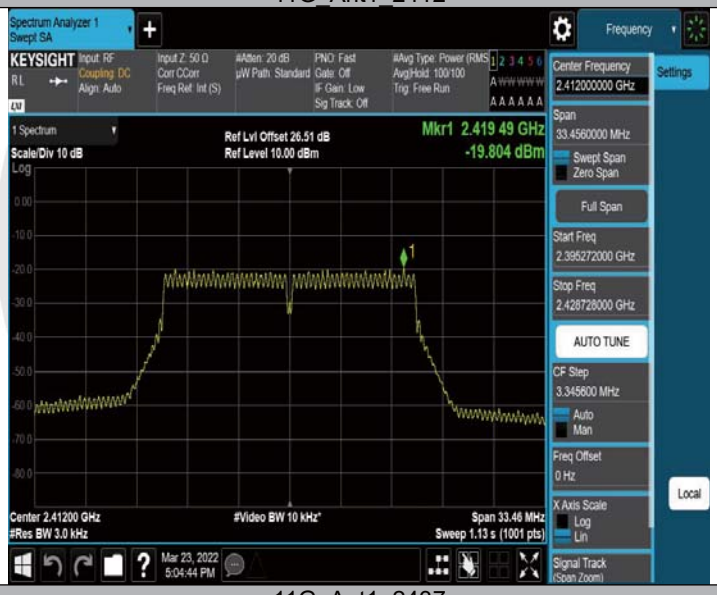
Temperature:	25° C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-17.57	≤8.00	PASS
		2437	-17.55	≤8.00	PASS
		2462	-17.5	≤8.00	PASS
11G	Ant1	2412	-19.8	≤8.00	PASS
		2437	-19.57	≤8.00	PASS
		2462	-19.82	≤8.00	PASS
11N20SISO	Ant1	2412	-19.76	≤8.00	PASS
		2437	-19.25	≤8.00	PASS
		2462	-19.62	≤8.00	PASS

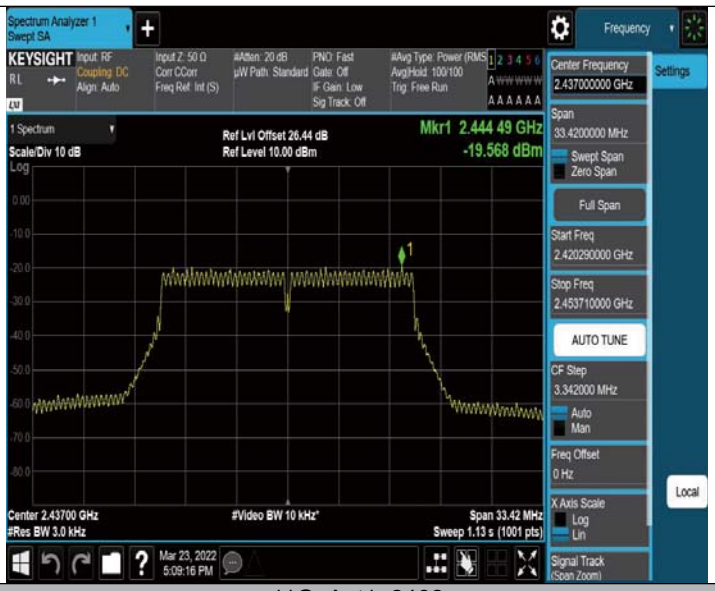
11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462



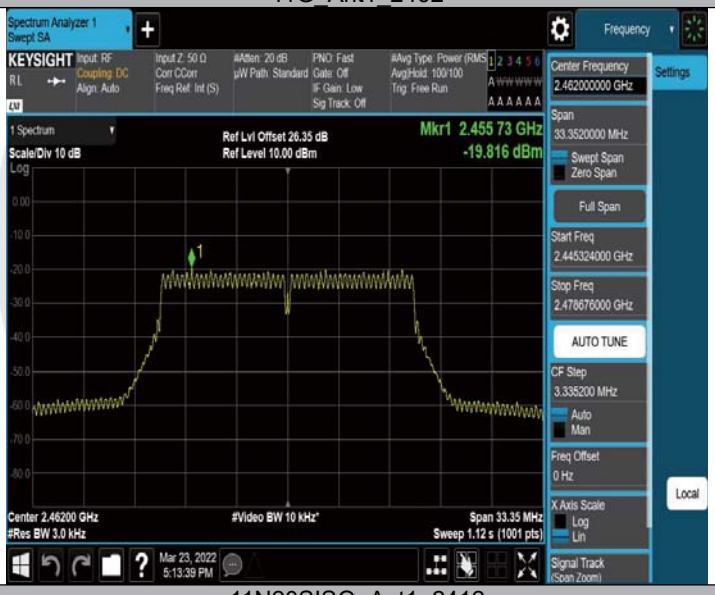
11G_Ant1_2412



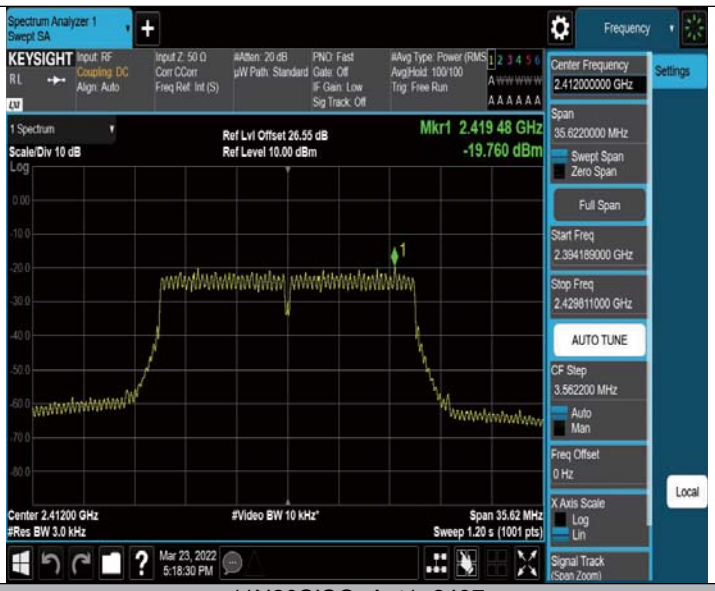
11G_Ant1_2437



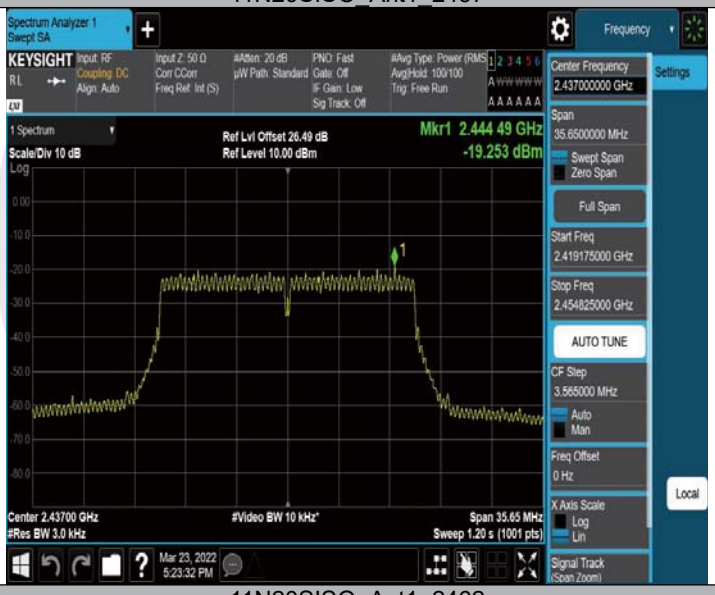
11G_Ant1_2462



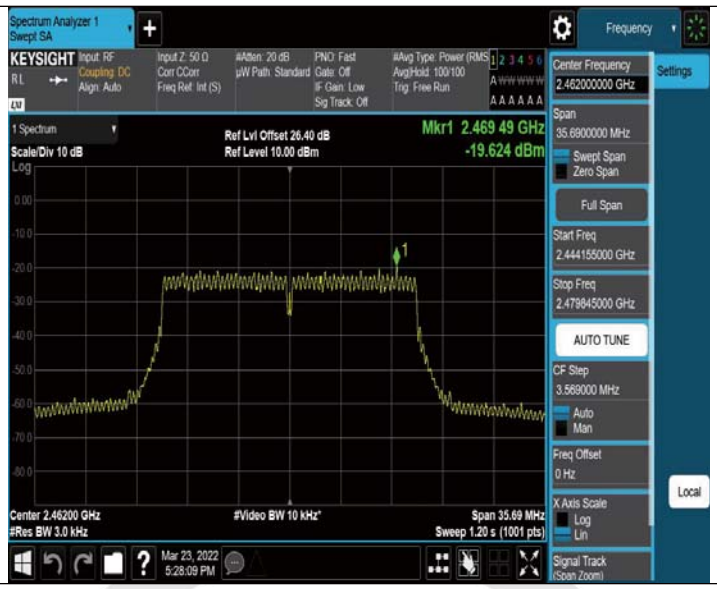
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 20 dB
μW Path: Standard
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS)
Avg|Hold: 100/100
Trig: Free Run
1 Spectrum
Ref Lvl Offset 26.40 dB
Ref Level 10.00 dBm
Mkr1 2.469 49 GHz
-19.624 dBm
Scale/Div 10 dB
Log
Center 2.46200 GHz
#Res BW 3.0 kHz
#Video BW 10 kHz*
Span 35.69 MHz
Sweep 1.20 s (1001 pts)
Mar 23, 2022
5:28:09 PM
Frequency
Center Frequency
2.462000000 GHz
Span
35.6800000 MHz
Swept Span
Zero Span
Full Span
Start Freq
2.444155000 GHz
Stop Freq
2.479845000 GHz
AUTO TUNE
CF Step
3.569000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Settings
Local

8.4 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

8.4.1 Applicable Standard

According to FCC Part15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.4.2 Conformance Limit

According to FCC Part 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, provided the transmitter demonstrates compliance with the peak conducted power limits. 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.

8.4.3 Test Configuration

Test according toclause 7.1 radio frequency test setup 1

8.4.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

- **Reference level measurement**

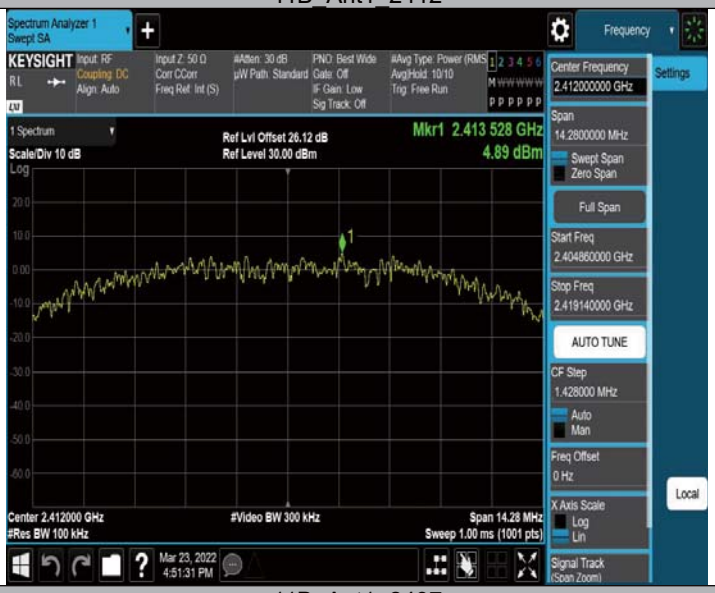
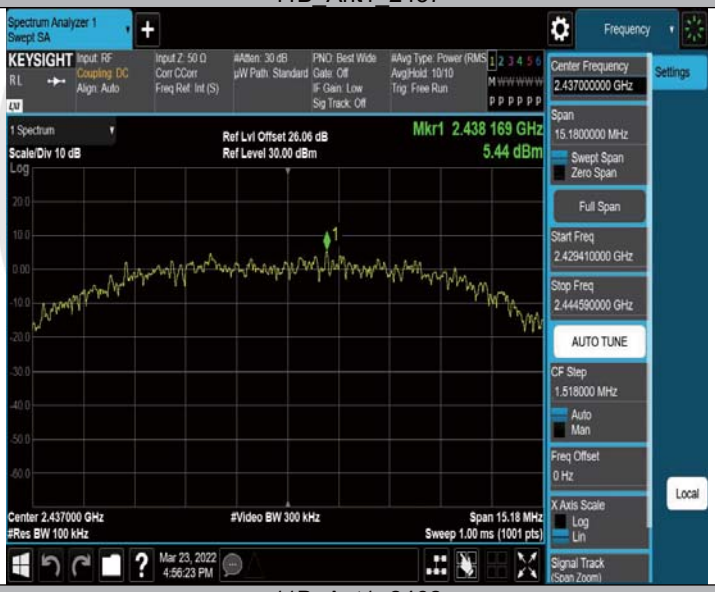
Establish a reference level by using the following procedure:
Set instrument center frequency to DTS channel center frequency.
Set the span to ≥ 1.5 times the DTS bandwidth.
Set the RBW = 100 kHz.
Set the VBW ≥ 3 x RBW.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

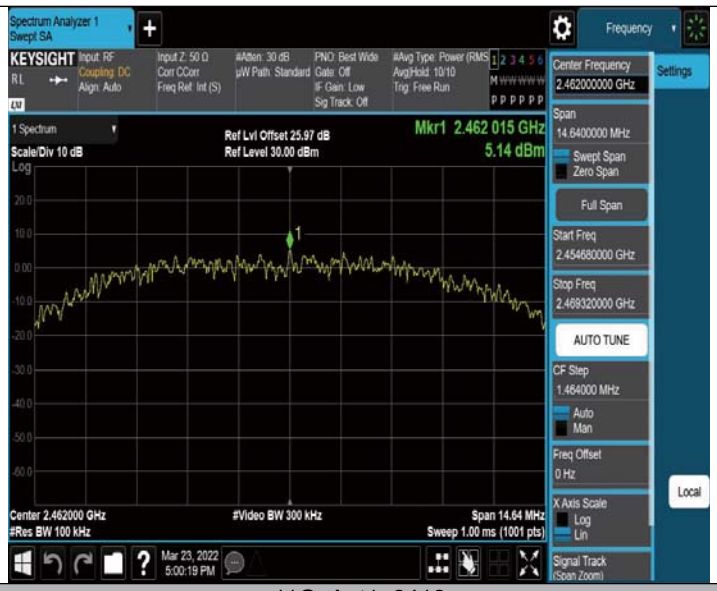
- **Emission level measurement**

Set the center frequency and span to encompass frequency range to be measured.
Set the RBW = 100 kHz.
Set the VBW =300 kHz.
Set 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 . Report the three highest emissions relative to the limit.

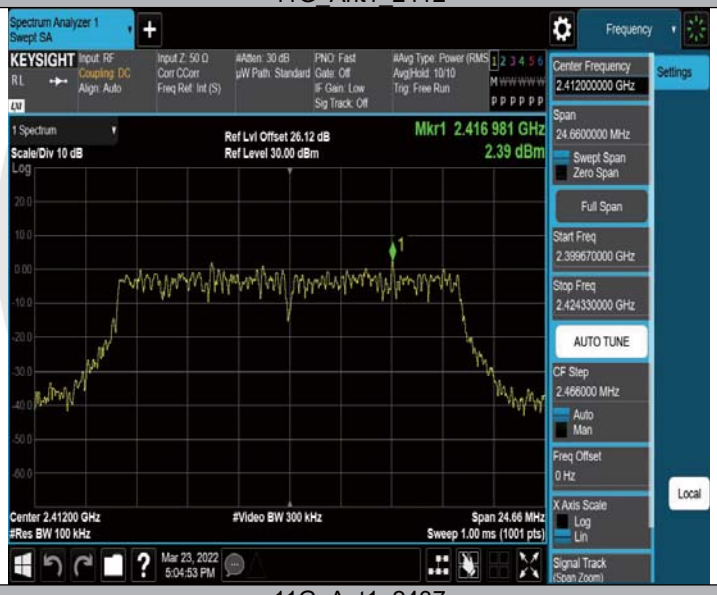
8.4.5 Test Results

TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
11B	Ant1	2412	2413.53	4.89
		2437	2438.17	5.44
		2462	2462.01	5.14
11G	Ant1	2412	2416.98	2.39
		2437	2430.70	1.25
		2462	2465.77	0.58
11N20SISO	Ant1	2412	2406.99	1.88
		2437	2441.97	1.33
		2462	2464.49	1.80

11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

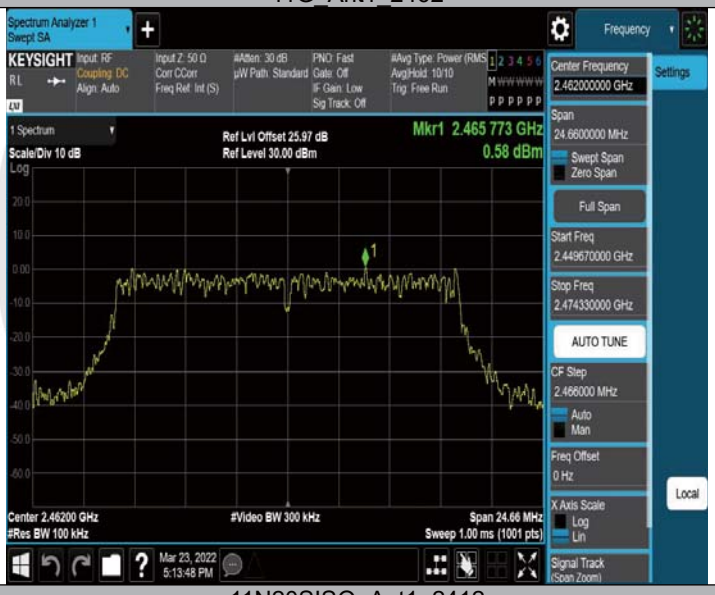


11G_Ant1_2412



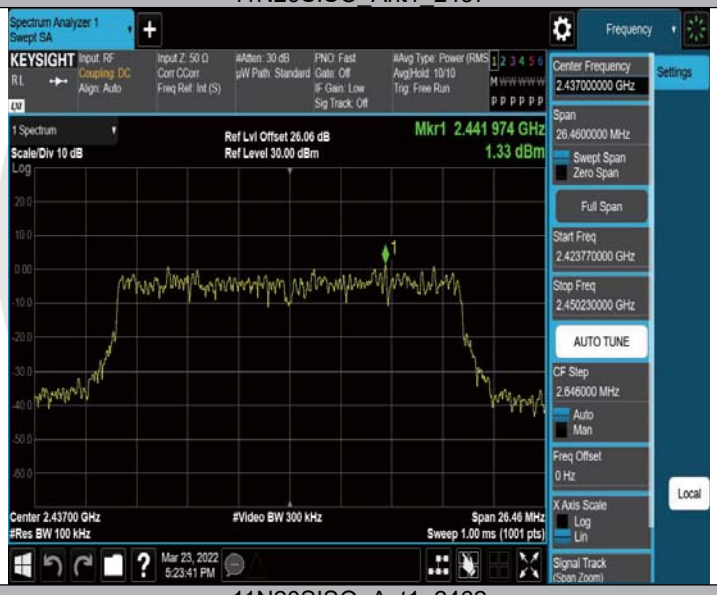
11G_Ant1_2437

11G_Ant1_2462



11N20SISO_Ant1_2412

11N20SISO_Ant1_2437



11N20SISO_Ant1_2462


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
μW Path: Standard
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS)
Avg|Hold: 10/10
Trig: Free Run
1 Spectrum
Ref Lvl Offset 25.97 dB
Ref Level 30.00 dBm
Mkr1 2.464 487 GHz
1.80 dBm
Scale/Div 10 dB
Log
Center 2.46200 GHz
#Res BW 100 kHz
#Video BW 300 kHz
Span 26.46 MHz
Sweep 1.00 ms (1001 pts)
Mar 23, 2022
5:28:18 PM
Frequency
Settings
Center Frequency
2.462000000 GHz
Span
26.4600000 MHz
Swept Span
Zero Span
Full Span
Start Freq
2.448770000 GHz
Stop Freq
2.475230000 GHz
AUTO TUNE
CF Step
2.646000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Local

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	4.89	-47.03	≤-25.11	PASS
			1000~26500	4.89	-28.52	≤-25.11	PASS
		2437	30~1000	5.44	-46.05	≤-24.56	PASS
			1000~26500	5.44	-27.99	≤-24.56	PASS
		2462	30~1000	5.14	-46.01	≤-24.86	PASS
			1000~26500	5.14	-27.38	≤-24.86	PASS
11G	Ant1	2412	30~1000	2.39	-38.17	≤-27.61	PASS
			1000~26500	2.39	-35.79	≤-27.61	PASS
		2437	30~1000	1.25	-46.39	≤-28.75	PASS
			1000~26500	1.25	-34.37	≤-28.75	PASS
		2462	30~1000	0.58	-45.72	≤-29.42	PASS
			1000~26500	0.58	-35.75	≤-29.42	PASS
11N20SISO	Ant1	2412	30~1000	1.88	-33.69	≤-28.12	PASS
			1000~26500	1.88	-34.73	≤-28.12	PASS
		2437	30~1000	1.33	-30.26	≤-28.67	PASS
			1000~26500	1.33	-35.25	≤-28.67	PASS
		2462	30~1000	1.80	-45.44	≤-28.2	PASS
			1000~26500	1.80	-35.96	≤-28.2	PASS

11B_Ant1_2412_30~1000

11B_Ant1_2412_1000~26500

11B_Ant1_2437_30~1000

11B_Ant1_2437_1000~26500

11B_Ant1_2462_30~1000

11B_Ant1_2462_1000~26500

11G_Ant1_2412_30~1000

11G_Ant1_2412_1000~26500

11G_Ant1_2437_30~1000

11G_Ant1_2437_1000~26500

11G_Ant1_2462_30~1000

11G_Ant1_2462_1000~26500

11N20SISO_Ant1_2412_30~1000

11N20SISO_Ant1_2412_1000~26500

11N20SISO_Ant1_2437_30~1000

11N20SISO_Ant1_2437_1000~26500

11N20SISO_Ant1_2462_30~1000

11N20SISO_Ant1_2462_1000~26500

8.5 RADIATED SPURIOUS EMISSION

8.5.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 D01 15.247 Meas Guidance v05r02

8.5.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	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	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			

According to FCC Part15.205,the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

8.5.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.5.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz(1GHz to 25GHz), 100 kHz for f < 1 GHz(30MHz to 1GHz), 200Hz for f<150KHz(9KHz to 150KHz), 9KHz for f<30MHz(150KHz to 30KHz)
VBW ≥ RBW
Sweep = auto
Detector function = peak

Trace = max hold
Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.
Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.
Repeat above procedures until all frequency measured was complete.

8.5.5 Test Results

Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

■ Spurious Emission below 30MHz(9KHz to 30MHz)

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) PK	Emission Level(dBuV/m) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Over(dB) PK	Over(dB) AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor

- Spurious Emission Above 1GHz(1GHz to 25GHz)
- All modes 2.4G 802.11b/g/n have been tested, and the worst result of 802.11b recorded was report as below:

Test mode: 802.11b Frequency: Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4831.962	V	63.77	51.97	74	54	-10.23	-2.03
11269.85	V	54.13	38.24	74	54	-19.87	-15.76
18000.00	V	65.57	48.17	74	54	-8.43	-5.83
4831.962	H	57.72	45.32	74	54	-16.28	-8.68
7943.838	H	52.51	36.17	74	54	-21.49	-17.83
18000.00	H	65.97	48.35	74	54	-8.03	-5.65

Test mode: 802.11b Frequency: Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4888.151	V	60.57	48.23	74	54	-13.43	-5.77
10980.46	V	54.22	36.29	74	54	-19.78	-17.71
18000.00	V	64.92	46.74	74	54	-9.08	-7.26
4888.151	H	54.88	41.15	74	54	-19.12	-12.85
7943.838	H	52.90	34.98	74	54	-21.10	-19.02
18000.00	H	65.74	48.22	74	54	-8.26	-5.78

Test mode: 802.11b Frequency: Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4930.721	V	61.69	50.36	74	54	-12.31	-3.64
9178.971	V	52.53	36.79	74	54	-21.47	-17.21
18000.00	V	65.27	48.48	74	54	-8.73	-5.52
4930.721	H	56.02	44.17	74	54	-17.98	-9.83
9232.186	H	54.06	38.29	74	54	-19.94	-15.71
18000.00	H	65.78	48.33	74	54	-8.22	-5.67

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor +Cable Loss.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4)The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

All modes 2.4G 802.11b/g/n have been tested, and the worst result of802.11b recorded was report as below:

Test mode: 802.11b Frequency: Channel 1: 2412MHz

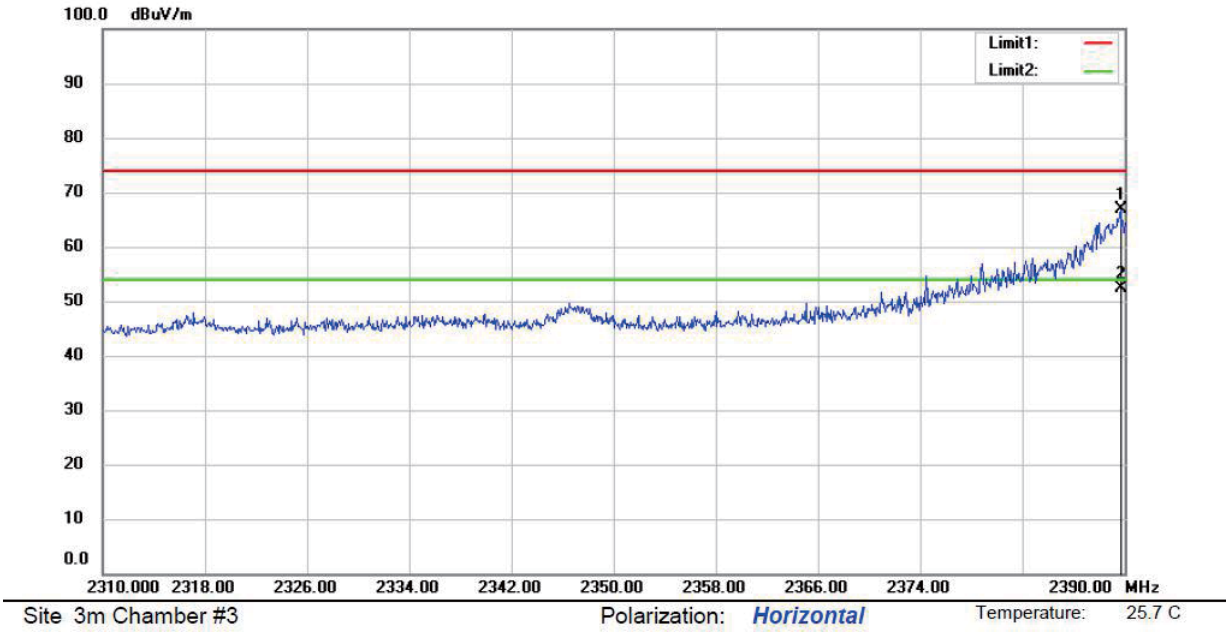
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2390.000	H	63.87	74	51.15	54
2389.680	V	66.94	74	52.47	54

Test mode: 802.11b Frequency: Channel 11: 2462MHz

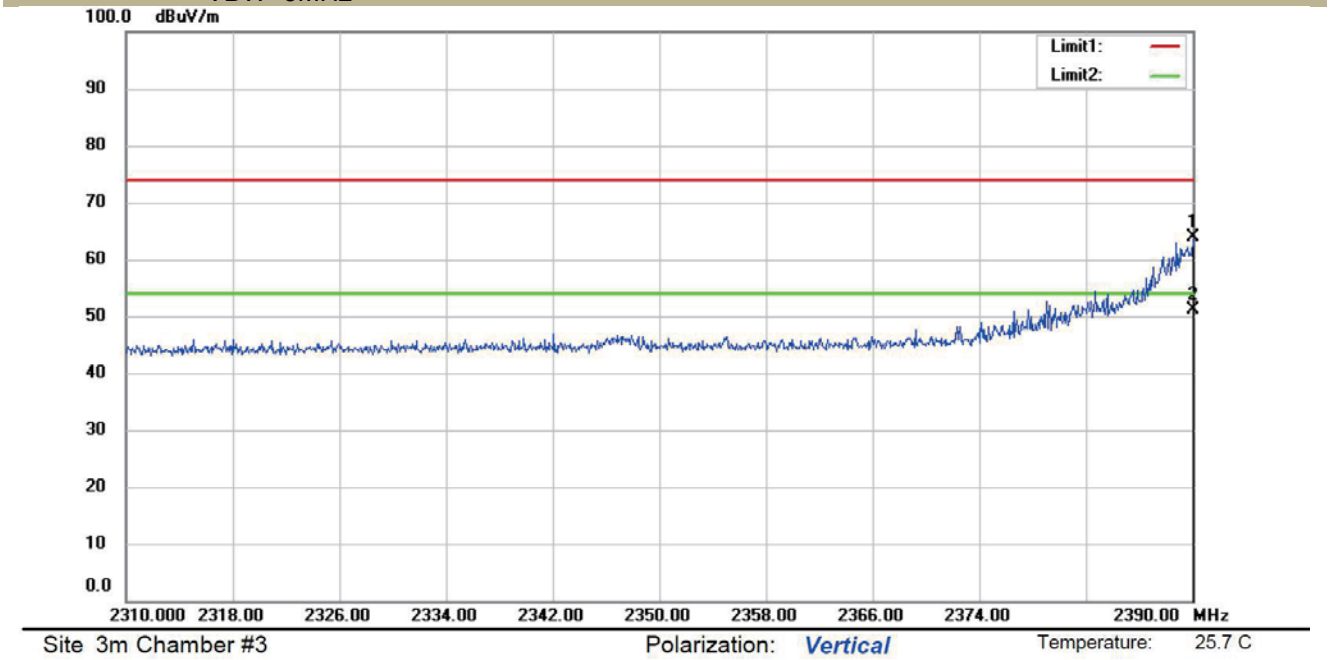
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2483.648	V	56.29	74	41.78	54
2483.533	H	56.99	74	41.33	54

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor +Cable Loss.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

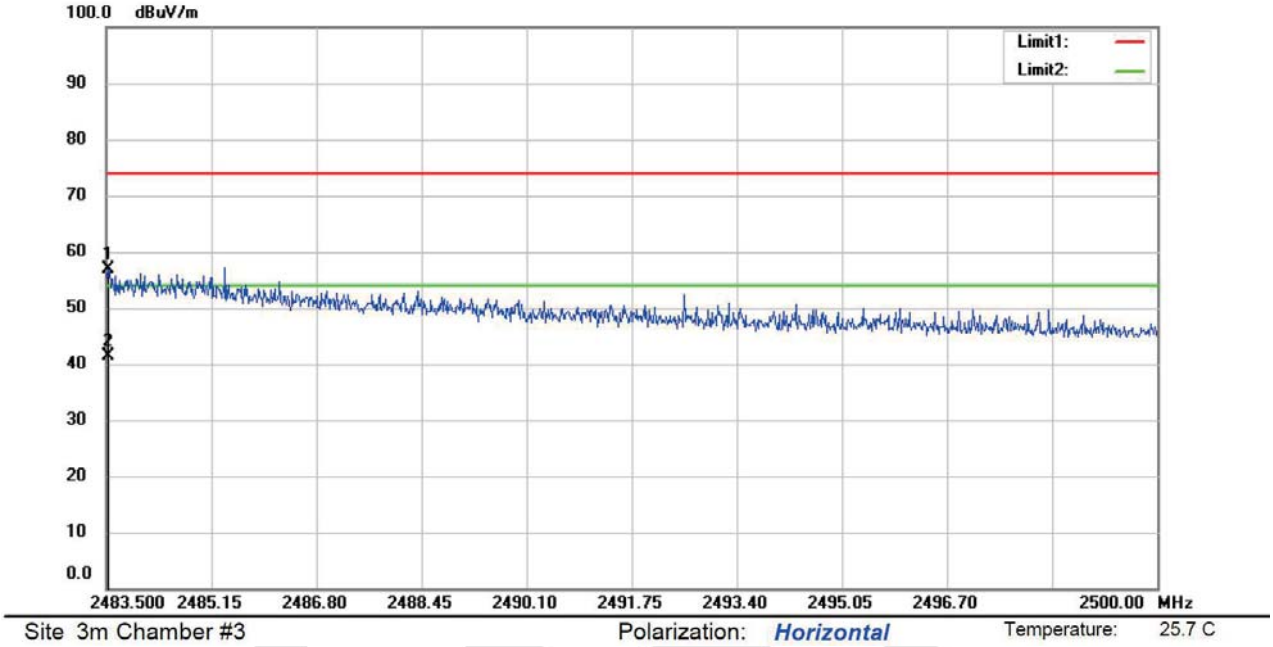
Spurious Emission in Restricted Band 2310-2390MHz				
Test Model	☒802.11b	☐802.11g	☐802.11n(HT20)	☐802.11n(HT40)
	☒Channel 1: 2412MHz	☐Channel 3: 2422MHz		Polarity: H
	VBW=3MHz			



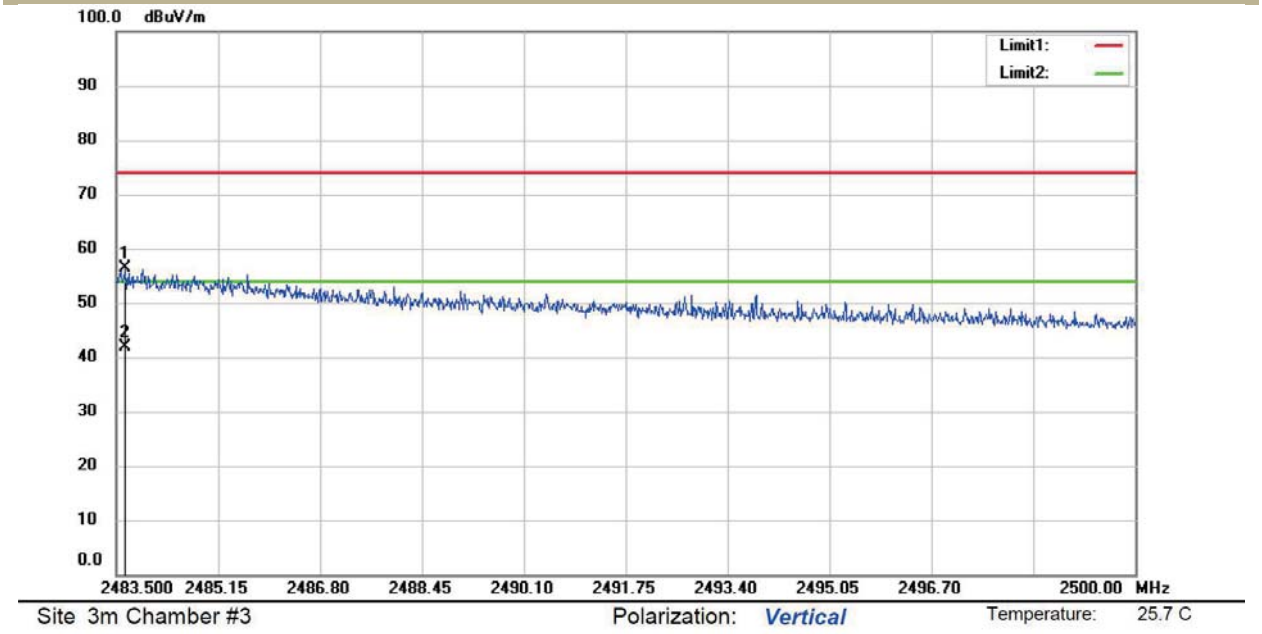
Spurious Emission in Restricted Band 2310-2390MHz				
Test Model	☒802.11b	☐802.11g	☐802.11n(HT20)	☐802.11n(HT40)
	☒Channel 1: 2412MHz	☐Channel 3: 2422MHz		Polarity:V
	VBW=3MHz			



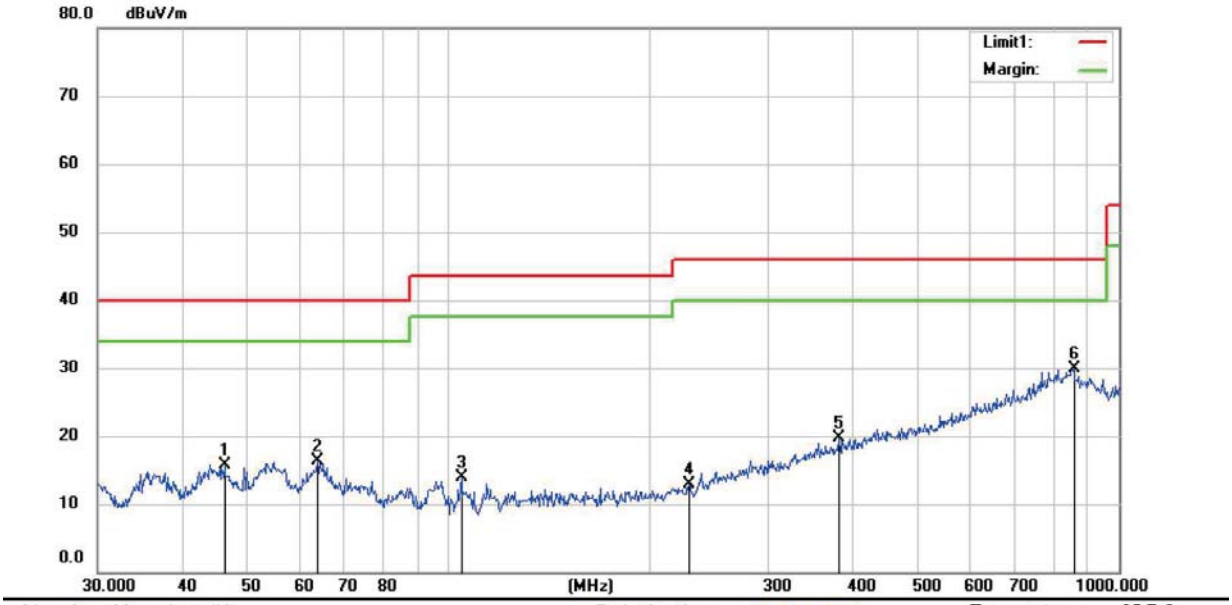
Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz ☒802.11b ☐802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz Polarity: H VBW=3MHz



Test Model	Spurious Emission in Restricted Band2483.5-2500MHz ☒802.11b ☐802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz Polarity: V VBW=3MHz



- Spurious Emission below 1GHz (30MHz to 1GHz)
- All modes 2.4G 802.11b/g/n have been tested, and the worst resultof 802.11b recorded was report as below:



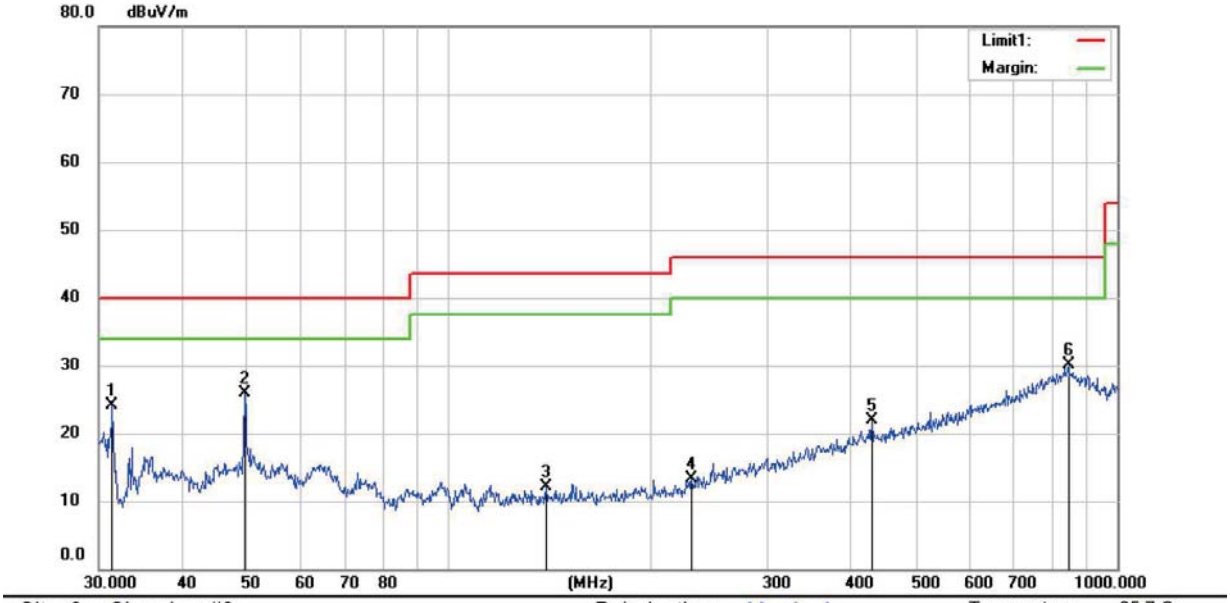
Site 3m Chamber #3 Polarization: *Horizontal* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: DC 5V by USB port Humidity: 55 %

Mode:WIFI 2412

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		46.3402	30.97	-15.25	15.72	40.00	-24.28	QP			
2		63.7588	31.13	-14.81	16.32	40.00	-23.68	QP			
3		104.5361	31.13	-17.26	13.87	43.50	-29.63	QP			
4		228.4904	29.11	-16.19	12.92	46.00	-33.08	QP			
5		382.5880	29.85	-10.10	19.75	46.00	-26.25	QP			
6	*	857.0247	29.45	0.51	29.96	46.00	-16.04	QP			



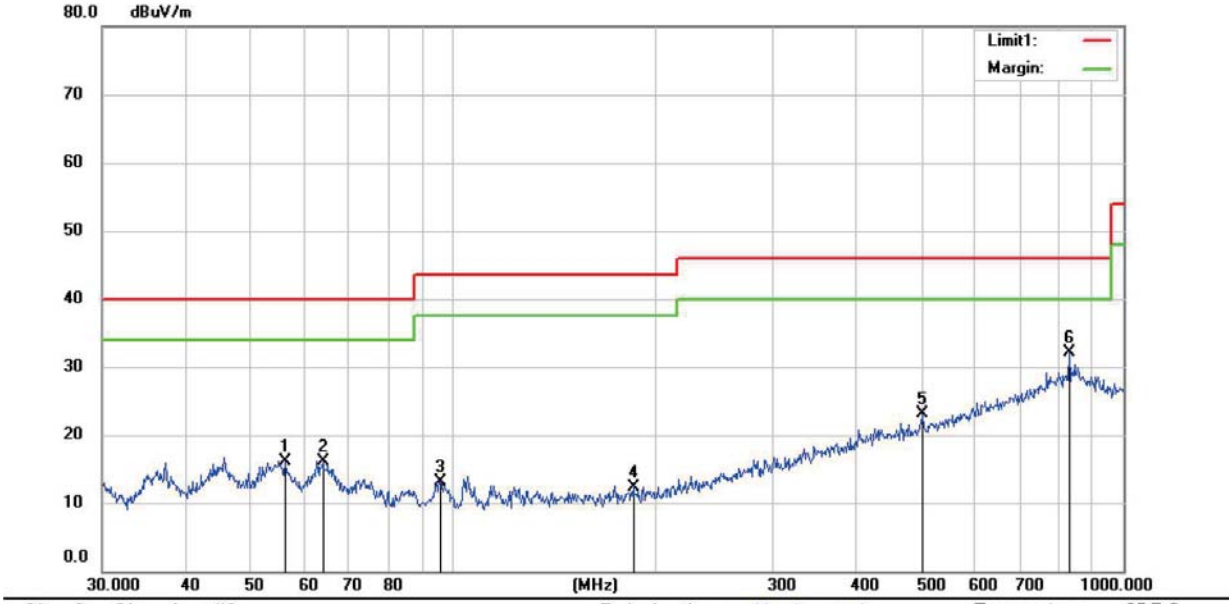
Site 3m Chamber #3 Polarization: *Vertical* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: DC 5V by USB port Humidity: 55 %

Mode:WIFI 2412

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.3992	41.32	-17.15	24.17	40.00	-15.83	QP			
2	*	49.5328	40.82	-14.95	25.87	40.00	-14.13	QP			
3		139.8508	29.90	-17.71	12.19	43.50	-31.31	QP			
4		230.9068	29.30	-16.09	13.21	46.00	-32.79	QP			
5		429.5228	30.30	-8.49	21.81	46.00	-24.19	QP			
6		845.0878	28.96	1.07	30.03	46.00	-15.97	QP			



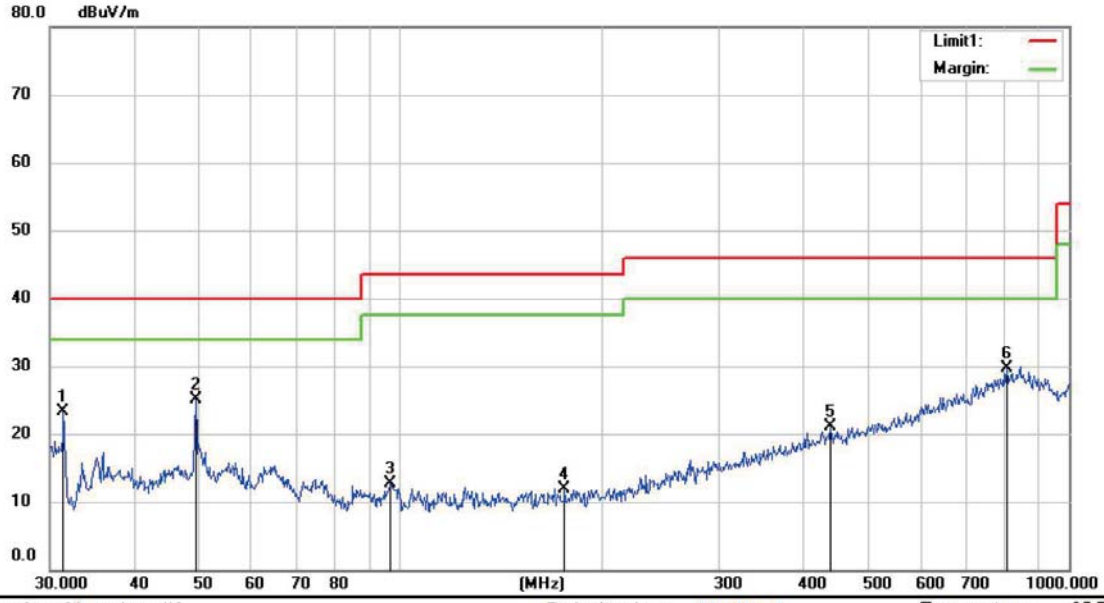
Site 3m Chamber #3 Polarization: *Horizontal* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: DC 5V by USB port Humidity: 55 %

Mode:WIFI 2437

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		56.1974	30.81	-14.71	16.10	40.00	-23.90	QP			
2		63.9828	30.91	-14.82	16.09	40.00	-23.91	QP			
3		95.7622	30.72	-17.54	13.18	43.50	-30.32	QP			
4		185.7882	29.48	-17.08	12.40	43.50	-31.10	QP			
5		501.1790	30.40	-7.22	23.18	46.00	-22.82	QP			
6	*	830.4002	31.49	0.69	32.18	46.00	-13.82	QP			



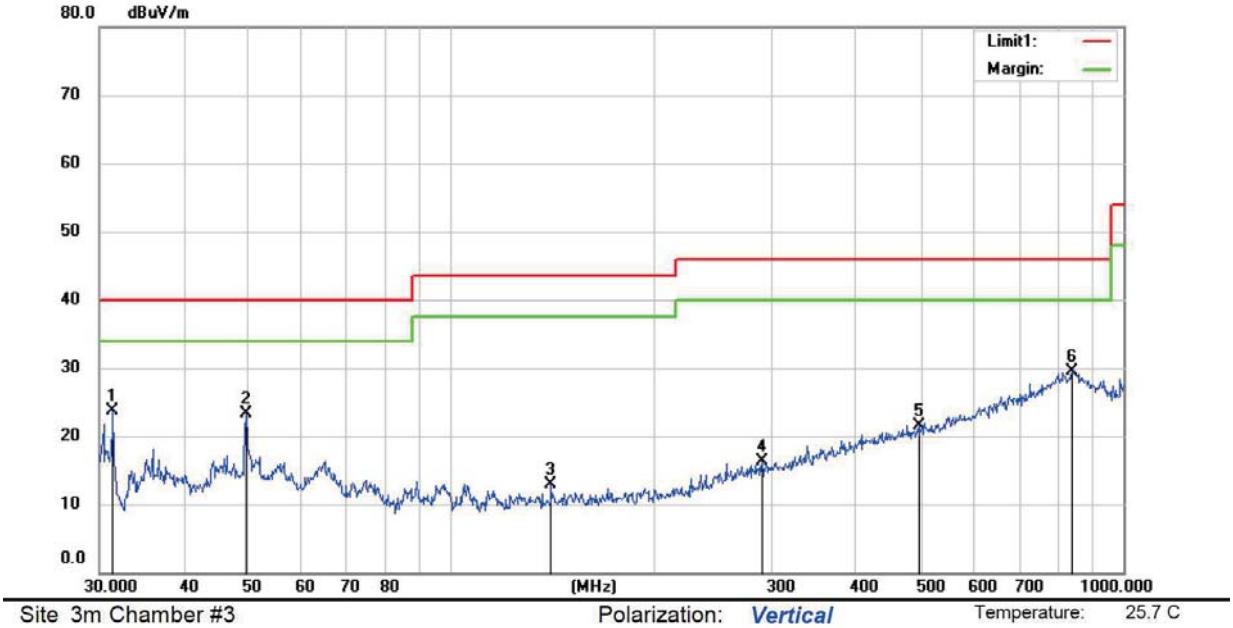
Site 3m Chamber #3 Polarization: *Vertical* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: DC 5V by USB port Humidity: 55 %

Mode:WIFI 2437

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		31.3992	40.44	-17.15	23.29	40.00	-16.71	QP			
2	*	49.5328	40.10	-14.95	25.15	40.00	-14.85	QP			
3		96.7750	30.34	-17.57	12.77	43.50	-30.73	QP			
4		176.2686	29.10	-17.28	11.82	43.50	-31.68	QP			
5		440.1963	29.68	-8.62	21.06	46.00	-24.94	QP			
6		807.4291	29.50	0.17	29.67	46.00	-16.33	QP			



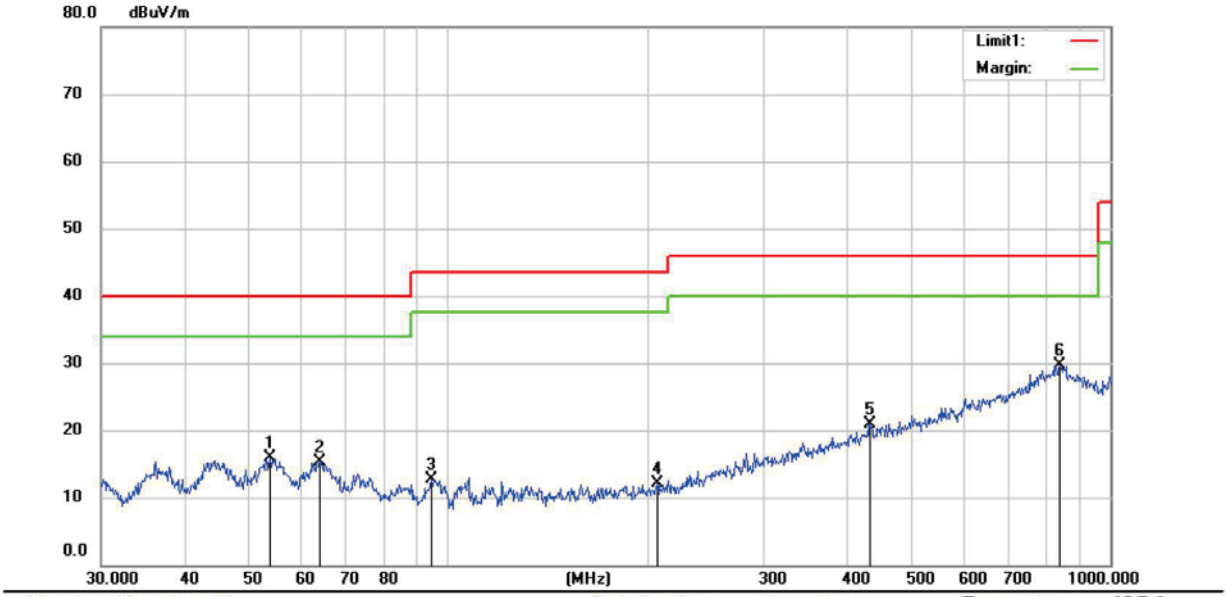
Site 3m Chamber #3 Polarization: *Vertical* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: DC 5V by USB port Humidity: 55 %

Mode:WIFI 2462

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	31.3992	40.78	-17.15	23.63	40.00	-16.37	QP			
2		49.5328	38.34	-14.95	23.39	40.00	-16.61	QP			
3		140.8351	30.51	-17.68	12.83	43.50	-30.67	QP			
4		290.0172	29.66	-13.32	16.34	46.00	-29.66	QP			
5		497.6765	28.85	-7.34	21.51	46.00	-24.49	QP			
6		839.1818	28.56	1.04	29.60	46.00	-16.40	QP			



Site 3m Chamber #3 Polarization: *Horizontal* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: DC 5V by USB port Humidity: 55 %

Mode:WIFI 2462

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		53.8818	30.76	-14.80	15.96	40.00	-24.04	QP			
2		63.9828	30.22	-14.82	15.40	40.00	-24.60	QP			
3		94.4284	30.43	-17.63	12.80	43.50	-30.70	QP			
4		207.1226	29.20	-17.01	12.19	43.50	-31.31	QP			
5		434.0651	29.37	-8.53	20.84	46.00	-25.16	QP			
6	*	839.1818	28.57	1.04	29.61	46.00	-16.39	QP			

8.6 CONDUCTED EMISSIONS TEST

8.6.1 Applicable Standard

According to FCC Part 15.207(a)

8.6.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.6.3 Test Configuration

Test according to clause 7.3conducted emission test setup

8.6.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.6.5 Test Results

N/A

8.7 ANTENNA APPLICATION

8.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part15.203	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 intentionalradiators 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.

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), 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.

8.7.2 Result

PASS.

- The EUT has a Internal Antenna for WIFI 2.4G, the antenna gain is 2.58 dBi.

Note: ☒ Antenna uses a permanently attached antenna which is not replaceable.
☐ Not using a standard antenna jack or electrical connector for antenna replacement
☐ The antenna has to be professionally installed (please provide method of installation)

Which in accordance to section 15.203, please refer to the internal photos.

Detail of factor for radiated emission

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

*** End of Report ***