Prüfbericht-Nr.: *Test report no.:*	NN22KPLT 001	**Auftrags-Nr.:** *Order no.:*	168361677	*Seite 1 von 22* *Page 1 of 22*
Kunden-Referenz-Nr.: *Client reference no.:*		**Auftragsdatum:** *Order date:*	2022-03-04	
Auftraggeber: *Client:*	Hui Zhou Gaoshengda Technology Co.,LTD No.75 Zhongkai Development Area, Huizhou, Guangdong, China			
Prüfgegenstand: *Test item:*	WIFI Module			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	W2LM2200 (Trademark: GSD)			
Auftrags-Inhalt: *Order content:*	Test Report			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.247 FCC KDB 558074 D01 15.247 Meas Guidance v05r02 FCC KDB 662911 D01 Multiple Transmitter Output v02r01 RSS-247 Issue 2 February 2017 RSS-Gen Issue 5 February 2021 ANSI C63.10:2013			
Wareneingangsdatum: *Date of sample receipt:*	2022-03-07	Please refer to Photo Documents		
Prüfmuster-Nr.: *Test sample no:*	A003220063-001--003			
Prüfzeitraum: *Testing period:*	2022-03-07 - 2022-03-28			
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: *Test result*:*	Pass			

geprüft von: *tested by:*	X Tim.zhang Signed by: Tim Zhang	**genehmigt von:** *authorized by:*	X Lin Lin Signed by: Lin Lin
Datum: *Date:* 2022-04-13		**Ausstellungsdatum:** *Issue date:* 2022-04-13	
Stellung */ Position:*	Project Manager	**Stellung** */ Position:*	Reviewer
Sonstiges */ Other:*	FCC ID: 2AC23-W2L IC: 12290A-W2L HVIN: W2LM2200		

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY
RESULT: Pass

5.1.4 6DB BANDWIDTH
RESULT: Pass

5.1.5 99% BANDWIDTH
RESULT: Pass

5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH
RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION
RESULT: Pass

5.1.8 CONDUCTED EMISSION ON AC MAINS
RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of Wi-Fi 802.11 b/g/n

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.
No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China.

FCC Registration No.: 694916
ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (SRD-Tonscend)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	2022-09-28
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	2022-09-28
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	2022-09-28
DC power supply	Keysight	E3642A	MY61276100	2022-09-28
Power Control Unit	Tonscend	JS0806-4ADC	N/A	2022-09-28
Automation Control Unit	Tonscend	JS0806-2	21C8060396	2022-09-28
Test Software	Tonscend	JS1120-3	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A
Shielding Room 8#	Albatross	SR8	APC17151-SR8	2024-06-22
Unwanted Emission Testing (TS9975)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	2022-08-10
Signal Analyzer	R&S	FSV 40	101439	2022-08-09
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	2022-08-09
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2022-08-09
Amplifier	R&S	SCU-18F	180070	2022-08-09
Amplifier	R&S	SCU40A	100475	2022-08-09
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2022-08-08
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2022-08-08
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2022-08-08
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2022-09-13
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2024-06-22

Conducted Emission				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESR3	102428	2022-08-10
Artificial Mains Network	R&S	ENV216	102333	2022-08-10
Artificial Mains Network	R&S	ENV432	101411	2022-08-10
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Parameter	Uncertainty
Radio Frequency	±1 x 10-7
RF Power (conducted)	±2.5 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	±6 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	±6 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB
Temperature	±1 °C
Humidity	±5 %
Voltage (DC)	±1 %
Voltage (AC, <10kHz)	±2 %

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China. is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a WIFI Module, which supports 2.4GHz Wi-Fi 802.11 b/g/n wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment:	WIFI Module
Type Designation:	W2LM2200
Trademark:	GSD
FCC ID:	2AC23-W2L
IC:	12290A-W2L
HVIN:	W2LM2200
Normal supply voltage of the module:	DC 3.3V
Testing Voltage:	DC 5V(via USB port)
Technical Specification of Wi-Fi 802.11 b/g/n	
Operating Frequency:	2412 - 2462 MHz for 802.11b/g/n(HT20) 2422 - 2452 MHz for 802.11n(HT40)
Type of Modulation:	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
Data Rate:	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 Mbps for 802.11n(HT20) MCS0 ~ MCS7 Mbps for 802.11n(HT40)
Channel Number:	11 channels for 802.11b/g/n(HT20) 7 channels for 802.11n(HT40)
Channel Separation:	5 MHz
Antenna Type:	PIFA Antenna
Number of Antenna:	2
Antenna Gain 1:	2.0dBi
Antenna Gain 2:	2.0dBi
Note: 1. The EUT supports MIMO 2*2, any transmit signals are correlated with each other, so Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=5.01dBi;	

Table 3: RF Channel and Frequency of Wi-Fi 802.11 b/g/n

RF Channel	802.11 b/g/n(HT20)	802.11 n(HT40)
	Frequency (MHz)	Frequency (MHz)
01	**2412**	**/**
02	2417	/
03	2422	**2422**
04	2427	2427
05	2432	2432
06	**2437**	**2437**
07	2442	2442
08	2447	2447
09	2452	**2452**
10	2457	/
11	**2462**	**/**

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)
Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Wi-Fi 802.11 b/g/n wireless transmitting mode
   1) Low Channel
   2) Middle Channel
   3) High Channel
B. On, Normal operation (Wi-Fi Link)
C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Operation Description
- Schematics
- Photo Document
- User Manual
- Block Diagram
- FCC/IC Label and Location Info

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model W2LM2200 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 4: Auxiliary Equipment Used during Test

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	10Q67059

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

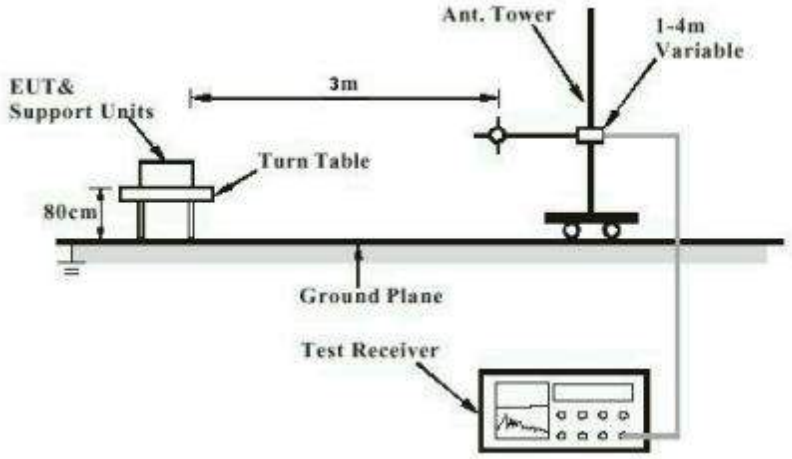


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

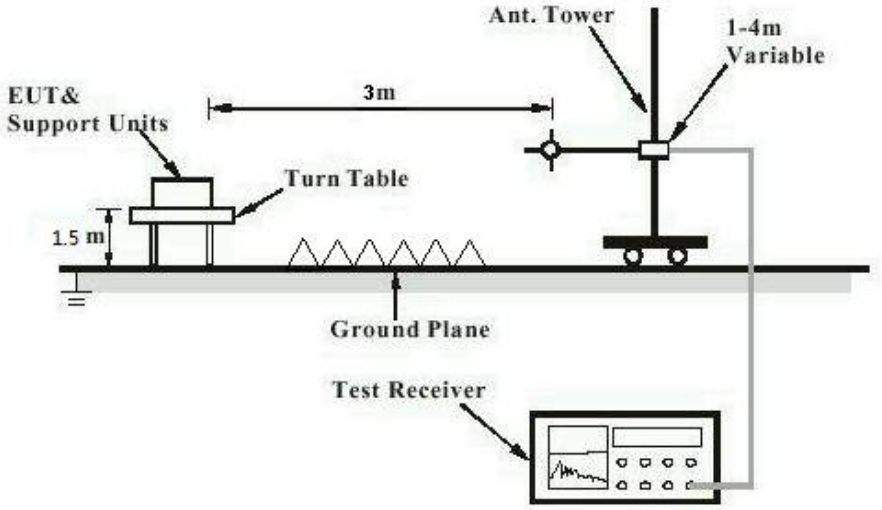


Diagram of Measurement Configuration for Mains Conduction Measurement

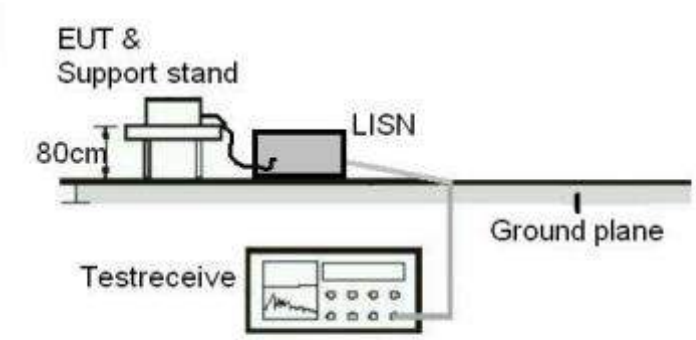
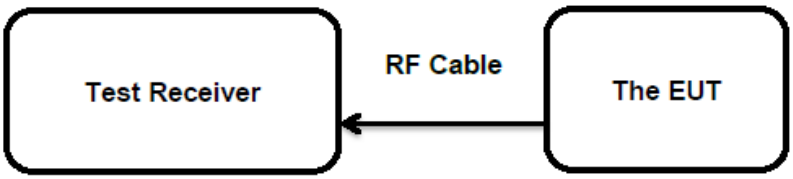


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203
RSS-Gen Clause 6.8

According to the manufacturer declared, the EUT have two PIFA antennas, Each antenna has a Max. antenna gain of 2 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(3) RSS-247 Clause 5.4(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	1.0 Watts e.i.r.p < 4.0 Watts(36dBm)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-03-28
Test voltage	:	DC 5V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

Table 5: Test Result of Maximum Conducted Output Power, SISO mode (Ant1)

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11b	1 Mbps	2412	17.27	0.0533	< 1.0
		2437	16.66	0.0463	
		2462	17.67	0.0585	
802.11g	6 Mbps	2412	20.92	0.1236	
		2437	21.27	0.1340	
		2462	22.10	0.1622	
802.11n (HT20)	MCS0	2412	20.55	0.1135	
		2437	20.92	0.1236	
		2462	20.83	0.1211	
802.11n (HT40)	MCS0	2422	21.21	0.1321	
		2437	21.10	0.1288	
		2452	21.08	0.1282	
Maximum Measured Value			22.21	0.1622	

Table 6: Test Result of Maximum Conducted Output Power, SISO mode (Ant2)

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11b	1 Mbps	2412	17.51	0.0564	< 1.0
		2437	16.46	0.0443	
		2462	17.53	0.0566	
802.11g	6 Mbps	2412	22.14	0.1637	
		2437	22.89	0.1945	
		2462	21.85	0.1531	
802.11n (HT20)	MCS0	2412	21.25	0.1334	
		2437	21.61	0.1449	
		2462	21.29	0.1346	
802.11n (HT40)	MCS0	2422	21.95	0.1567	
		2437	21.61	0.1449	
		2452	21.57	0.1435	
Maximum Measured Value			22.89	0.1945	

Table 7: Test Result of Maximum Conducted Output Power, MIMO mode (Ant1+Ant2)

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11n (HT20)	MCS0	2412	23.92	0.2466	< 1.0
		2437	24.29	0.2685	
		2462	24.08	0.2559	
802.11n (HT40)	MCS0	2422	24.61	0.2891	
		2437	24.37	0.2735	
		2452	24.35	0.2723	
Maximum Measured Value			24.61	0.2891	

Note:
1) The cable loss is taken into account in results.
2) Antenna gain(G) 1: 2.0 dBi
3) Antenna gain(G) 2: 2.0 dBi
4) Directional gain(G)=G_{ANT} + 10 log(N_{ANT}) dBi=5 dBi

5.1.3 Conducted Power Spectral Density

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(e) RSS-247 Clause 5.2(b)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 8 dBm / 3kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-03-28~2022-03-29
Test voltage	:	DC 5V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.4 6dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(2) RSS-247 Clause 5.2(a)
Basic standard	:	ANSI C63.10: 2013
Limits	:	> 500 kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-03-29
Test voltage	:	DC 5V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.5 99% Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a) RSS-Gen Clause 6.7
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-03-28~2022-03-29
Test voltage	:	DC 5V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-03-28~2022-03-29
Test voltage	:	DC 5V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix A.

5.1.7 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Table 5
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2022-03-25
Test voltage	:	DC 5V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	Refer to test result
Relative humidity	:	Refer to test result
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics. All configurations tested for both MIMO and SISO, only worst-case mode data reported.

For the measurement records, refer to the appendix A.

5.1.8 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.207(a) RSS-Gen Section 8.8
Basic standard	:	ANSI C63.10: 2013
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a) RSS-Gen Table 4
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-03-31
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B
Earthing	:	Not connected
Ambient temperature	:	23.1 ℃
Relative humidity	:	52 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the test set-up photo document.

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Appendix A: Test Results of Wi-Fi 802.11 b/g/n

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Appendix A.1: Test Results of Conducted Power Spectral Density

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B-SISO	Ant1	2412	0.3	≤8.00	PASS
	Ant2	2412	0.78	≤8.00	PASS
	Ant1	2437	-0.78	≤8.00	PASS
	Ant2	2437	-0.16	≤8.00	PASS
	Ant1	2462	0.6	≤8.00	PASS
	Ant2	2462	0.78	≤8.00	PASS
11G-SISO	Ant1	2412	-5.76	≤8.00	PASS
	Ant2	2412	-5.66	≤8.00	PASS
	Ant1	2437	-5.47	≤8.00	PASS
	Ant2	2437	-4.25	≤8.00	PASS
	Ant1	2462	-4.79	≤8.00	PASS
	Ant2	2462	-5.7	≤8.00	PASS
11N20MIMO	Ant1	2412	-6.08	≤8.00	PASS
	Ant2	2412	-4.68	≤8.00	PASS
	total	2412	-2.31	≤8.00	PASS
	Ant1	2437	-5.52	≤8.00	PASS
	Ant2	2437	-5.24	≤8.00	PASS
	total	2437	-2.37	≤8.00	PASS
	Ant1	2462	-5.75	≤8.00	PASS
	Ant2	2462	-5.52	≤8.00	PASS
	total	2462	-2.62	≤8.00	PASS
11N40MIMO	Ant1	2422	-7.41	≤8.00	PASS
	Ant2	2422	-6.54	≤8.00	PASS
	total	2422	-3.94	≤8.00	PASS
	Ant1	2437	-7.58	≤8.00	PASS
	Ant2	2437	-6.04	≤8.00	PASS
	total	2437	-3.73	≤8.00	PASS
	Ant1	2452	-8.05	≤8.00	PASS
	Ant2	2452	-8.28	≤8.00	PASS
	total	2452	-5.15	≤8.00	PASS

11B_Ant1_2412

11B_Ant2_2412

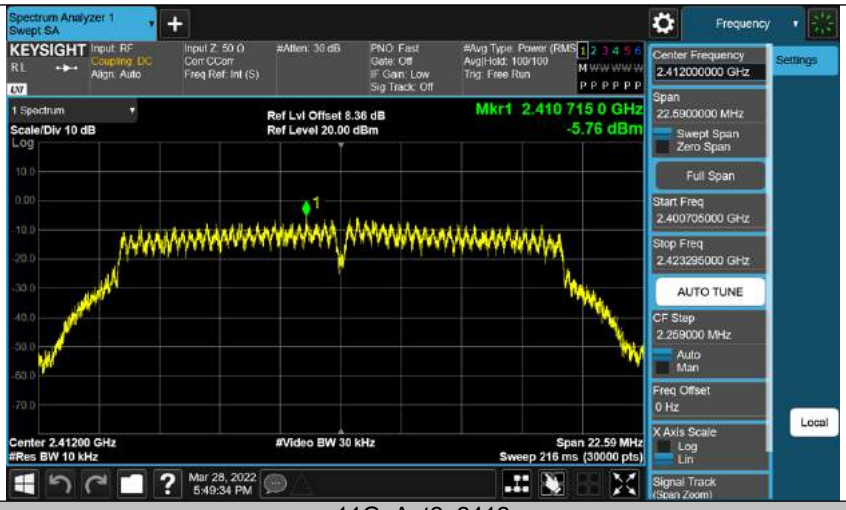
11B_Ant1_2437

11B_Ant2_2437

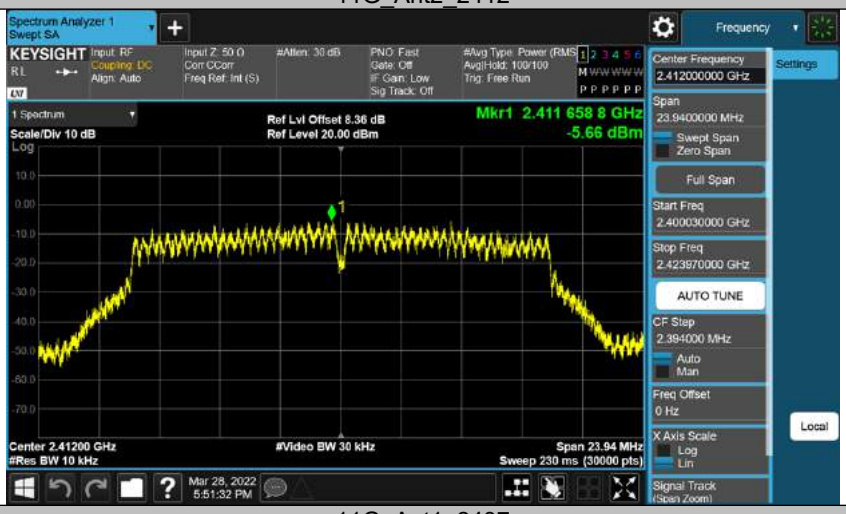
11B_Ant1_2462

11B_Ant2_2462

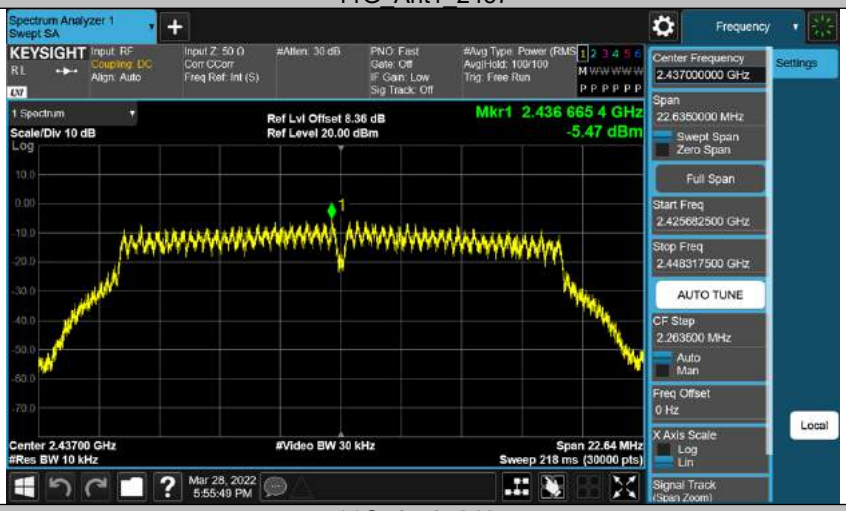
11G_Ant1_2412



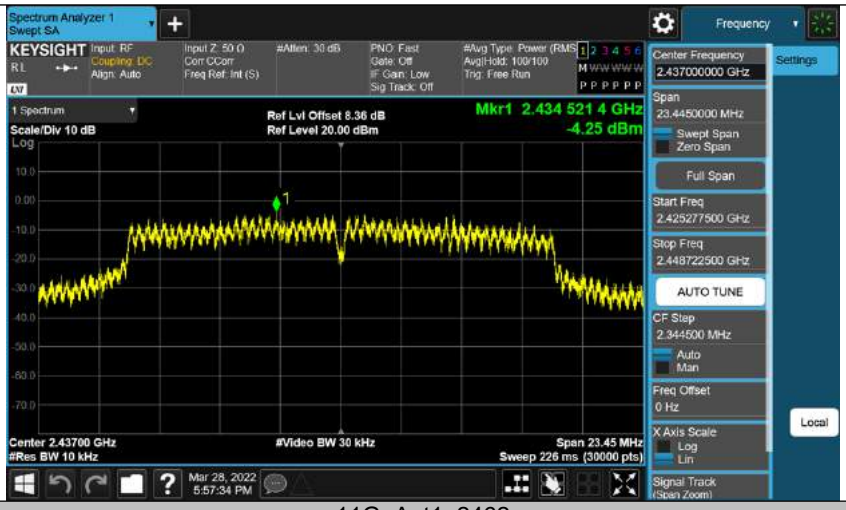
11G_Ant2_2412



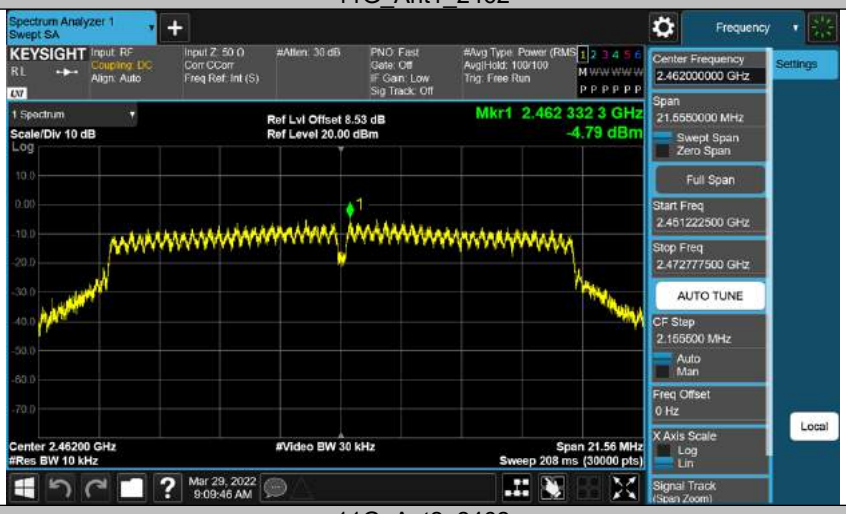
11G_Ant1_2437



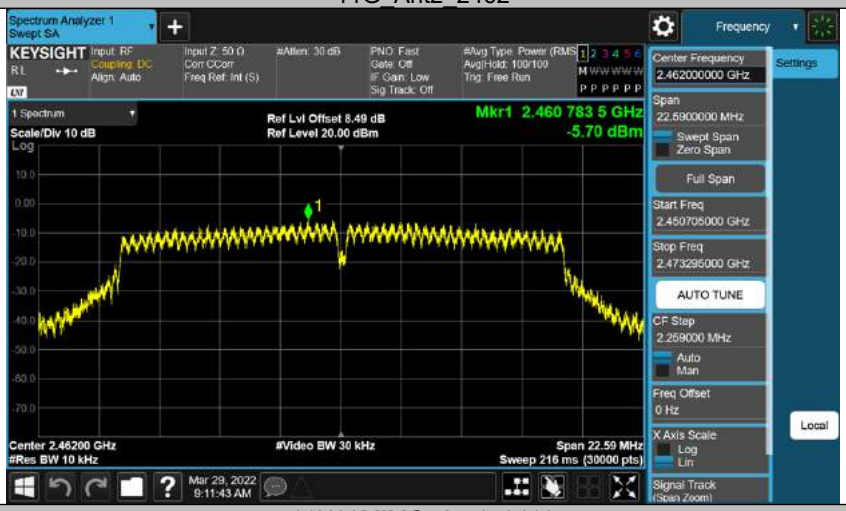
11G_Ant2_2437



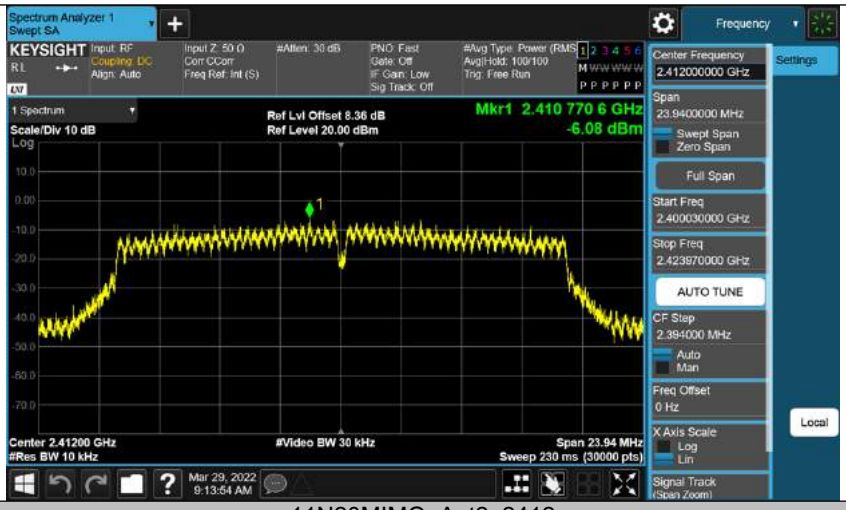
11G_Ant1_2462



11G_Ant2_2462

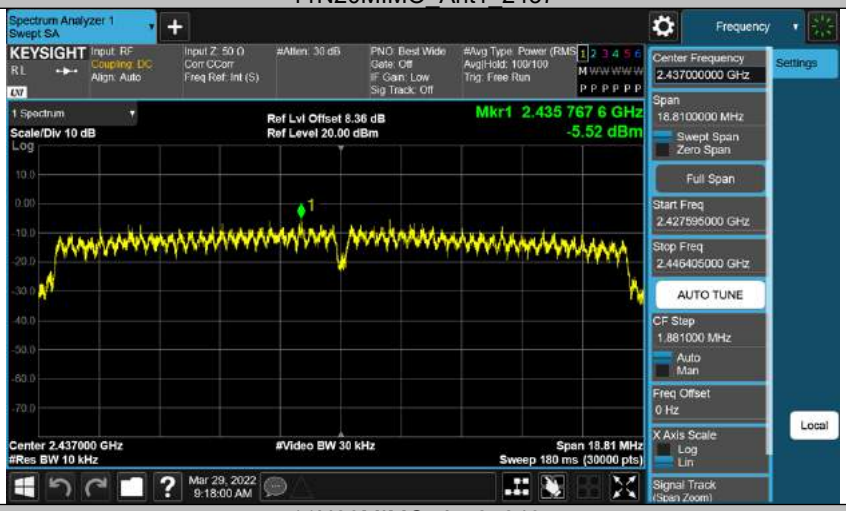


11N20MIMO_Ant1_2412

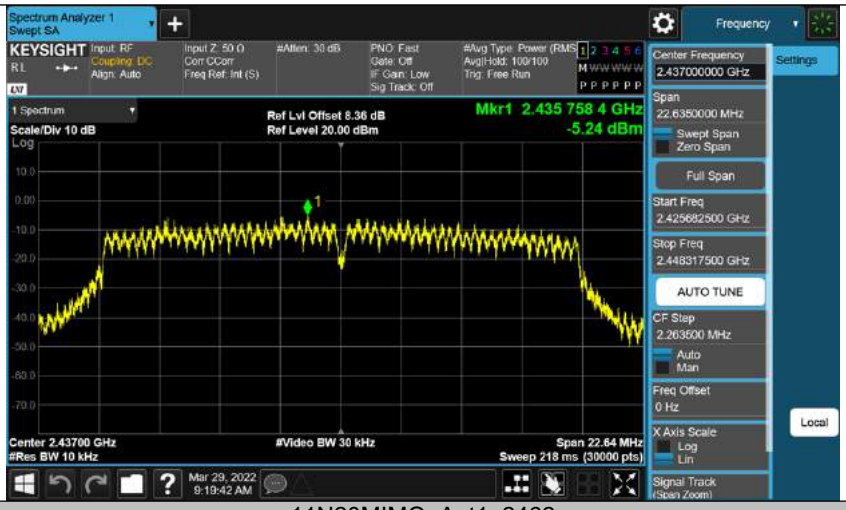


11N20MIMO_Ant2_2412

11N20MIMO_Ant1_2437



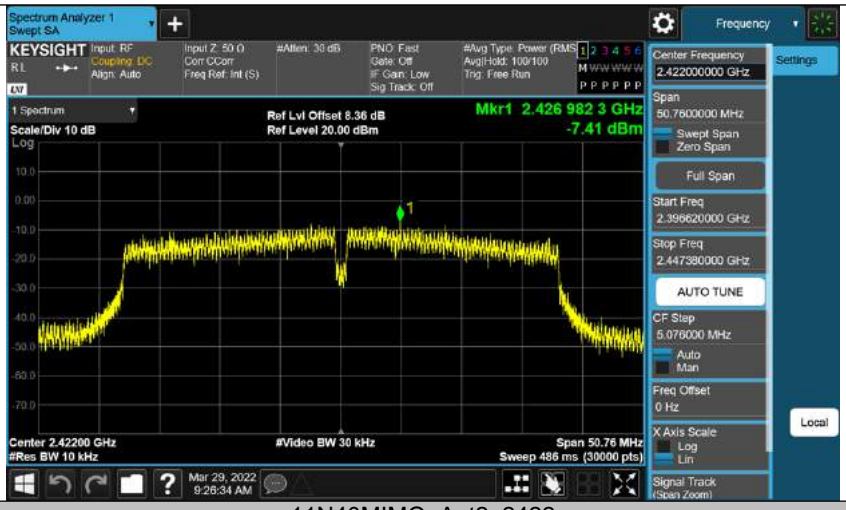
11N20MIMO_Ant2_2437



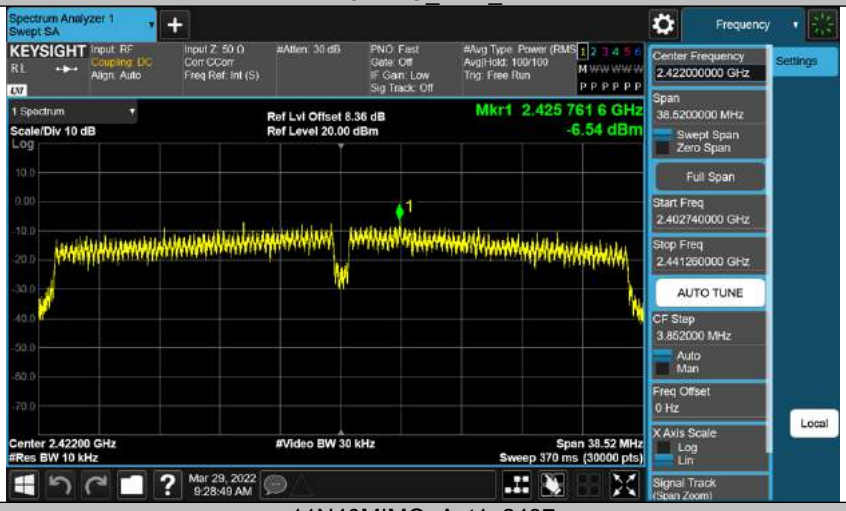
11N20MIMO_Ant1_2462

11N20MIMO_Ant2_2462

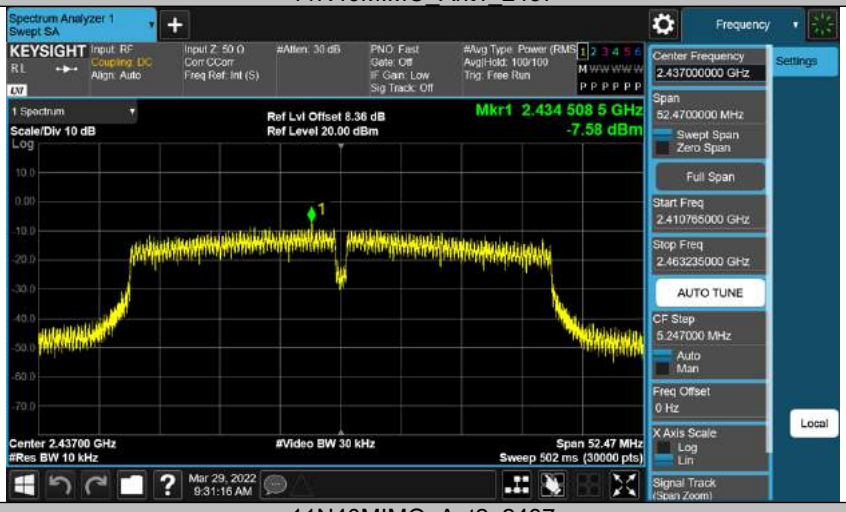
11N40MIMO_Ant1_2422



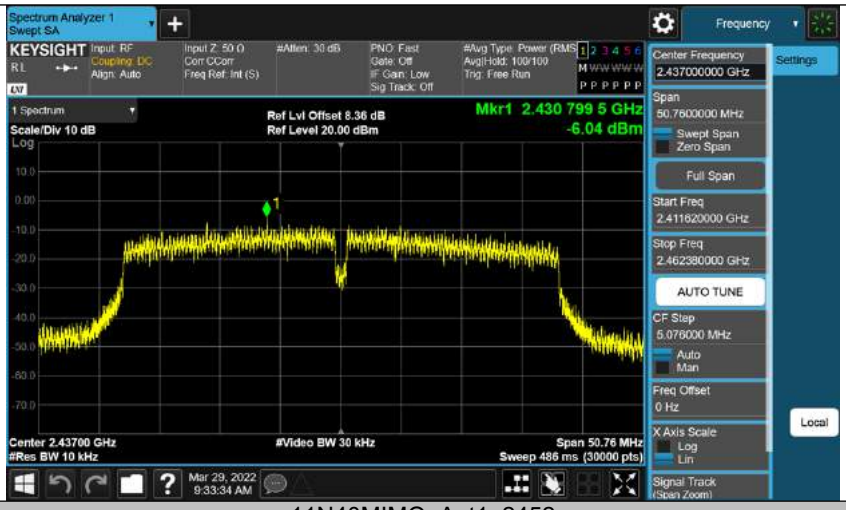
11N40MIMO_Ant2_2422



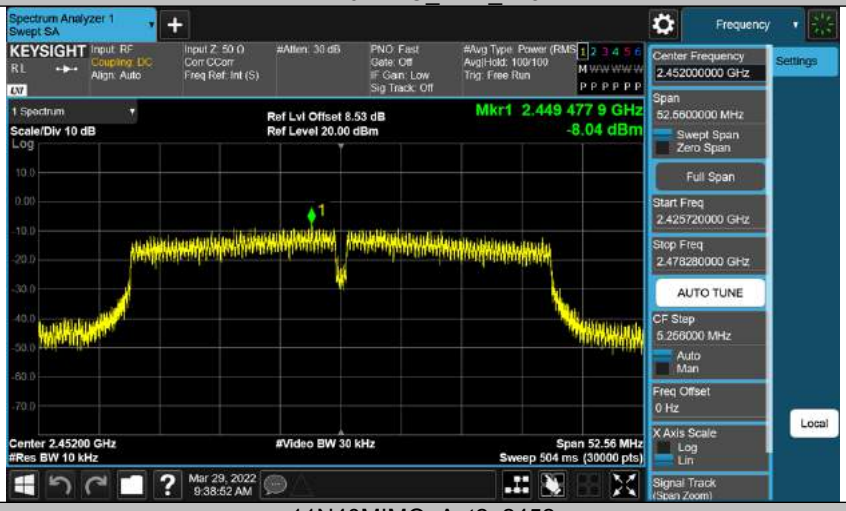
11N40MIMO_Ant1_2437



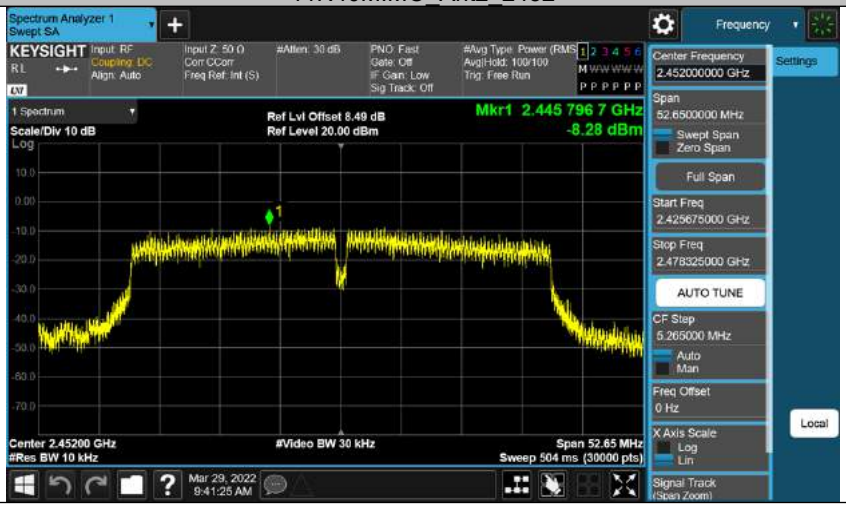
11N40MIMO_Ant2_2437



11N40MIMO_Ant1_2452



11N40MIMO_Ant2_2452



Appendix A.2: Test Results of 6dB Bandwidth

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-SISO	Ant1	2412	9.570	2407.020	2416.590	0.5	PASS
	Ant2	2412	10.050	2407.020	2417.070	0.5	PASS
	Ant1	2437	9.600	2431.990	2441.590	0.5	PASS
	Ant2	2437	9.540	2432.020	2441.560	0.5	PASS
	Ant1	2462	9.600	2457.050	2466.650	0.5	PASS
	Ant2	2462	9.570	2457.530	2467.100	0.5	PASS
11G-SISO	Ant1	2412	15.060	2404.470	2419.530	0.5	PASS
	Ant2	2412	15.030	2404.560	2419.590	0.5	PASS
	Ant1	2437	15.090	2429.470	2444.560	0.5	PASS
	Ant2	2437	15.060	2429.500	2444.560	0.5	PASS
	Ant1	2462	15.060	2454.560	2469.620	0.5	PASS
	Ant2	2462	15.060	2455.130	2470.190	0.5	PASS
11N20MIMO	Ant1	2412	15.120	2404.470	2419.590	0.5	PASS
	Ant2	2412	15.090	2404.500	2419.590	0.5	PASS
	Ant1	2437	15.150	2429.440	2444.590	0.5	PASS
	Ant2	2437	15.090	2428.480	2443.570	0.5	PASS
	Ant1	2462	15.060	2454.500	2469.560	0.5	PASS
	Ant2	2462	15.090	2454.500	2469.590	0.5	PASS
11N40MIMO	Ant1	2422	35.040	2404.480	2439.520	0.5	PASS
	Ant2	2422	34.980	2404.540	2439.520	0.5	PASS
	Ant1	2437	34.980	2419.540	2454.520	0.5	PASS
	Ant2	2437	33.840	2419.480	2453.320	0.5	PASS
	Ant1	2452	35.100	2434.480	2469.580	0.5	PASS
	Ant2	2452	35.100	2434.480	2469.580	0.5	PASS

11B_Ant1_2412

11B_Ant2_2412

11B_Ant1_2437

11B_Ant2_2437

11B_Ant1_2462

11B_Ant2_2462

11G_Ant1_2412

11G_Ant2_2412

11G_Ant1_2437

11G_Ant2_2437

11G_Ant1_2462

11G_Ant2_2462

11N20MIMO_Ant1_2412

11N20MIMO_Ant2_2412

11N20MIMO_Ant1_2437

11N20MIMO_Ant2_2437

11N20MIMO_Ant1_2462

11N20MIMO_Ant2_2462

11N40MIMO_Ant1_2422

11N40MIMO_Ant2_2422

11N40MIMO_Ant1_2437

11N40MIMO_Ant2_2437

11N40MIMO_Ant1_2452

11N40MIMO_Ant2_2452

Appendix A.3: Test Results of 99% Bandwidth

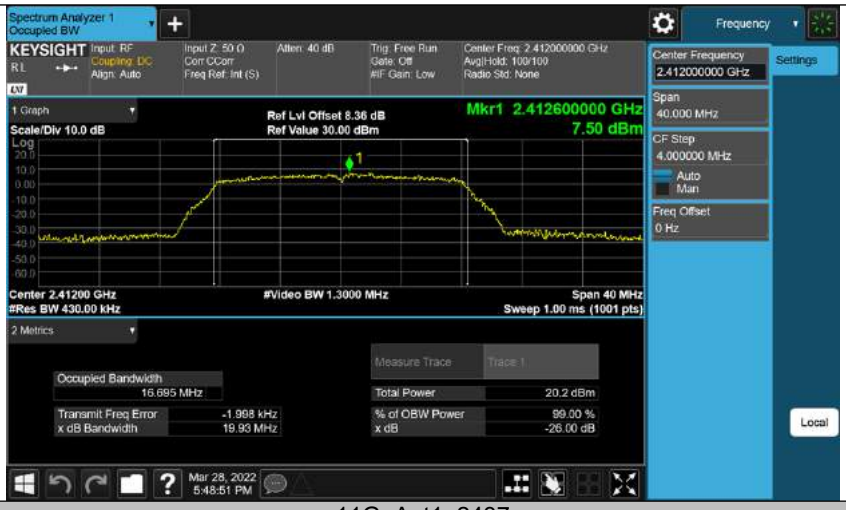
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-SISO	Ant1	2412	14.469	2404.742	2419.211	---	PASS
		2437	14.393	2429.744	2444.137	---	PASS
		2462	14.435	2454.840	2469.275	---	PASS
11G-SISO	Ant1	2412	16.695	2403.651	2420.346	---	PASS
		2437	16.663	2428.597	2445.260	---	PASS
		2462	16.923	2453.530	2470.453	---	PASS
11N20MIMO	Ant1	2412	17.836	2403.107	2420.943	---	PASS
		2437	17.813	2428.074	2445.887	---	PASS
		2462	17.884	2453.123	2471.007	---	PASS
11N40MIMO	Ant1	2422	35.924	2404.004	2439.928	---	PASS
		2437	35.835	2419.044	2454.879	---	PASS
		2452	36.168	2433.920	2470.088	---	PASS

11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

11G_Ant1_2412



11G_Ant1_2437

11G_Ant1_2462

11N20MIMO_Ant1_2412

11N20MIMO_Ant1_2437

11N20MIMO_Ant1_2462

11N40MIMO_Ant1_2422

11N40MIMO_Ant1_2437

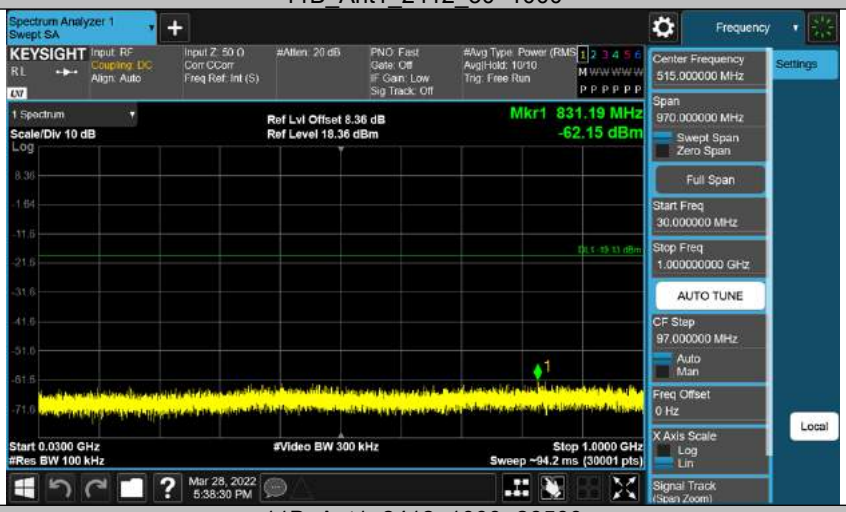
11N40MIMO_Ant1_2452

Appendix A.4: Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Conducted Spurious Emission

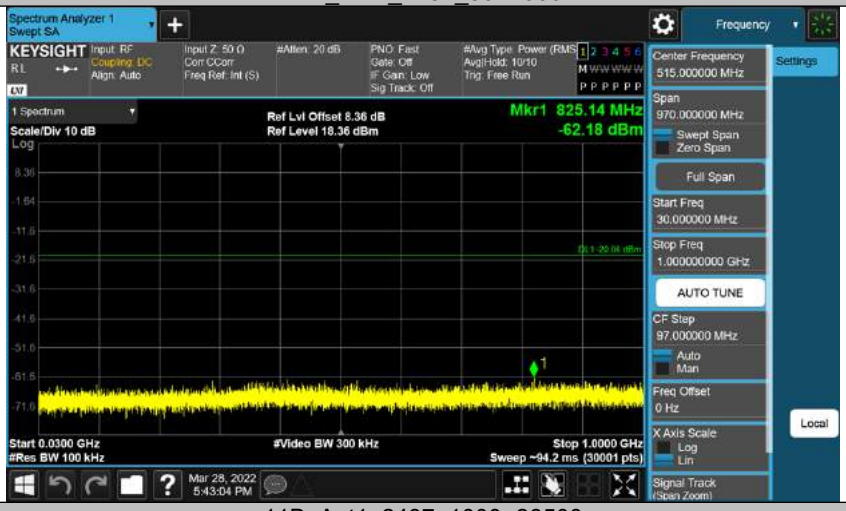
TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B-SISO	Ant2	2412	Reference	0.87	0.87	---	PASS
			30~1000	0.87	-62.15	≤-19.13	PASS
			1000~26500	0.87	-49.8	≤-19.13	PASS
		2437	Reference	-0.06	-0.06	---	PASS
			30~1000	-0.06	-62.18	≤-20.06	PASS
			1000~26500	-0.06	-52.11	≤-20.06	PASS
		2462	Reference	1.54	1.54	---	PASS
			30~1000	1.54	-62.6	≤-18.46	PASS
			1000~26500	1.54	-50.27	≤-18.46	PASS
11G-SISO	Ant2	2412	Reference	2.17	2.17	---	PASS
			30~1000	2.17	-55.72	≤-17.83	PASS
			1000~26500	2.17	-49.38	≤-17.83	PASS
		2437	Reference	3.04	3.04	---	PASS
			30~1000	3.04	-60.22	≤-16.96	PASS
			1000~26500	3.04	-52.32	≤-16.96	PASS
		2462	Reference	1.27	1.27	---	PASS
			30~1000	1.27	-58.29	≤-18.73	PASS
			1000~26500	1.27	-51.78	≤-18.73	PASS
11N20MIMO	Ant1+ Ant2	2412	Reference	0.49	0.49	---	PASS
			30~1000	0.49	-59.58	≤-19.51	PASS
			1000~26500	0.49	-52.62	≤-19.51	PASS
		2437	Reference	0.35	0.35	---	PASS
			30~1000	0.35	-58.91	≤-19.65	PASS
			1000~26500	0.35	-53.59	≤-19.65	PASS
		2462	Reference	1.88	1.88	---	PASS
			30~1000	1.88	-58.49	≤-18.12	PASS
			1000~26500	1.88	-53.1	≤-18.12	PASS
11N40MIMO	Ant1+ Ant2	2422	Reference	-0.15	-0.15	---	PASS
			30~1000	-0.15	-58.18	≤-20.15	PASS
			1000~26500	-0.15	-53.03	≤-20.15	PASS
		2437	Reference	-2.02	-2.02	---	PASS
			30~1000	-2.02	-58.48	≤-22.02	PASS
			1000~26500	-2.02	-52.91	≤-22.02	PASS
		2452	Reference	0.61	0.61	---	PASS
			30~1000	0.61	-57.2	≤-19.39	PASS
			1000~26500	0.61	-53.75	≤-19.39	PASS

11B_Ant1_2412_0~Reference

11B_Ant1_2412_30~1000

11B_Ant1_2412_1000~26500

11B_Ant1_2437_0~Reference

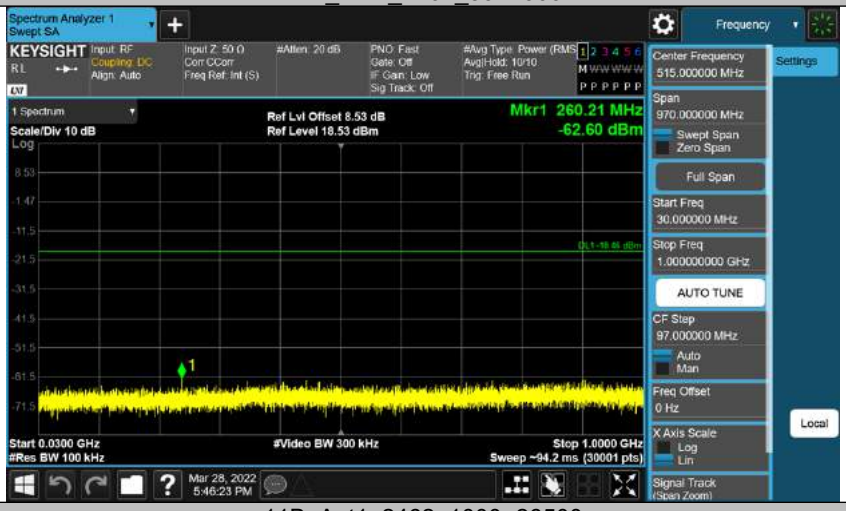
11B_Ant1_2437_30~1000



11B_Ant1_2437_1000~26500

11B_Ant1_2462_0~Reference

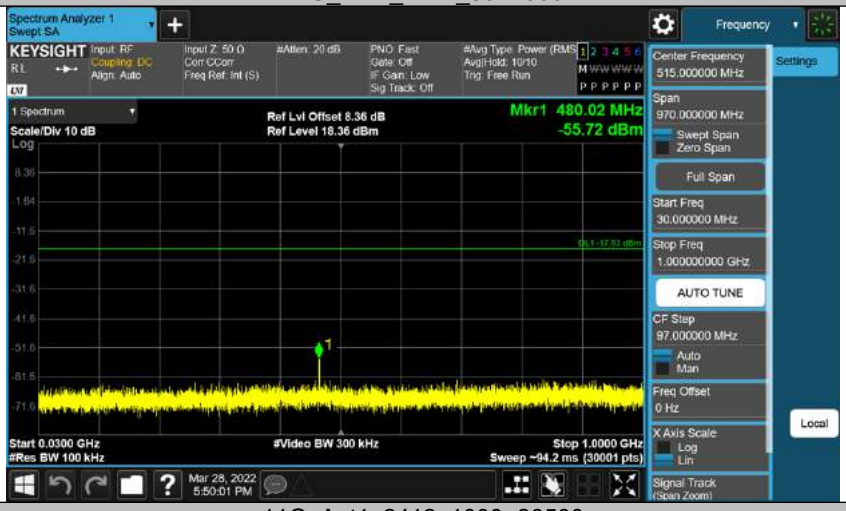
11B_Ant1_2462_30~1000



11B_Ant1_2462_1000~26500

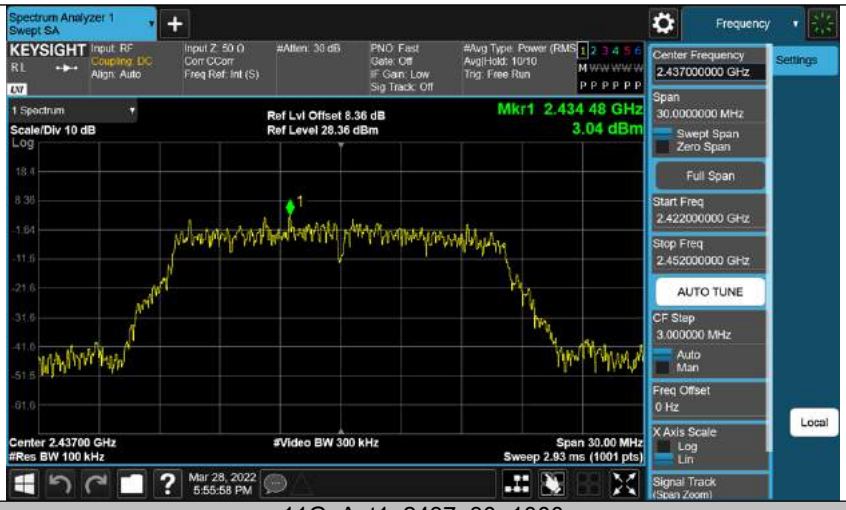
11G_Ant1_2412_0~Reference

11G_Ant1_2412_30~1000

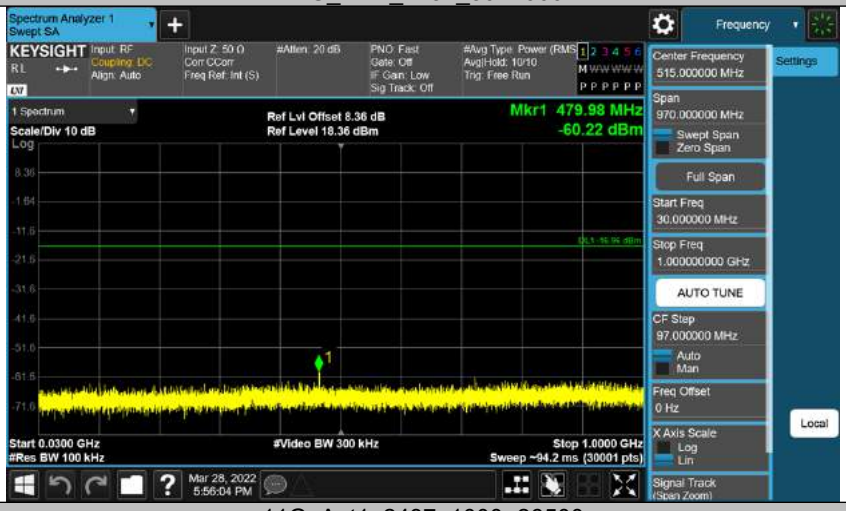


11G_Ant1_2412_1000~26500

11G_Ant1_2437_0~Reference



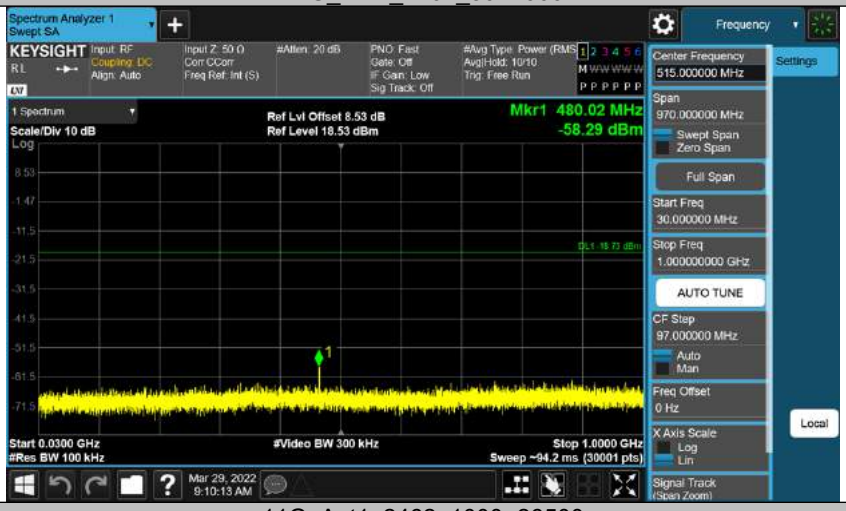
11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500

11G_Ant1_2462_0~Reference

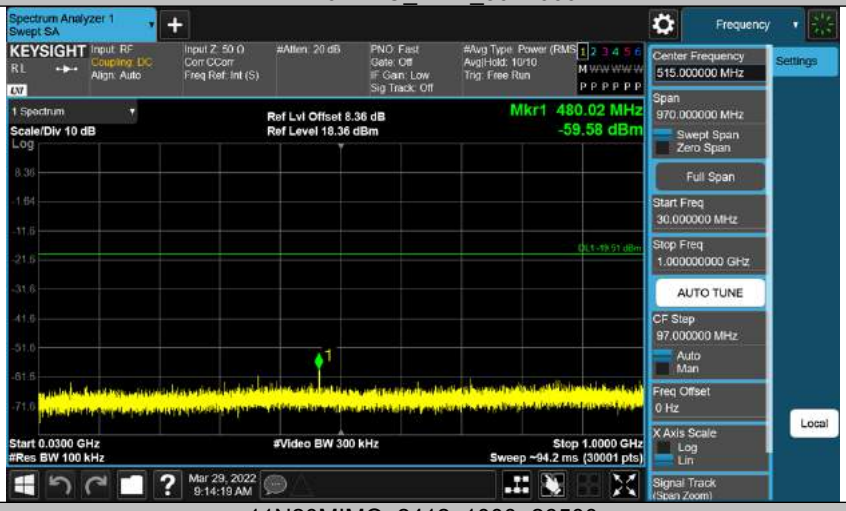
11G_Ant1_2462_30~1000



11G_Ant1_2462_1000~26500

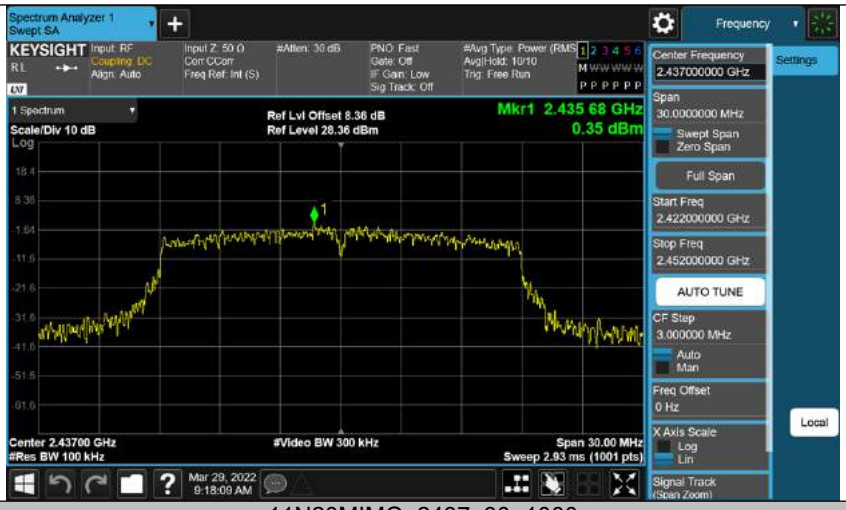
11N20MIMO_2412_0~Reference

11N20MIMO_2412_30~1000

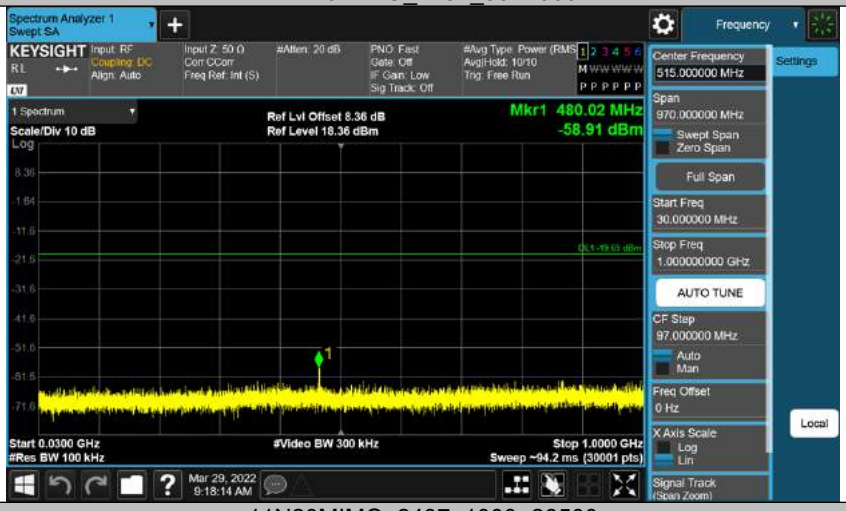


11N20MIMO_2412_1000~26500

11N20MIMO_2437_0~Reference

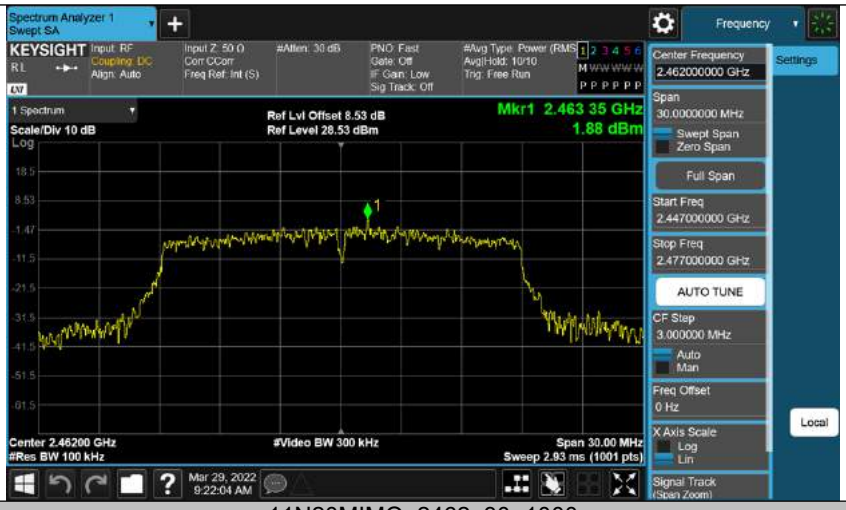


11N20MIMO_2437_30~1000

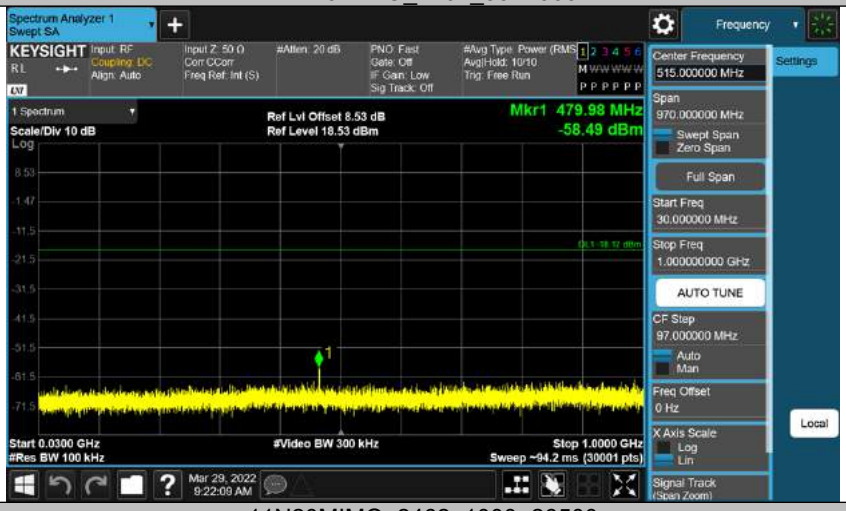


11N20MIMO_2437_1000~26500

11N20MIMO_2462_0~Reference



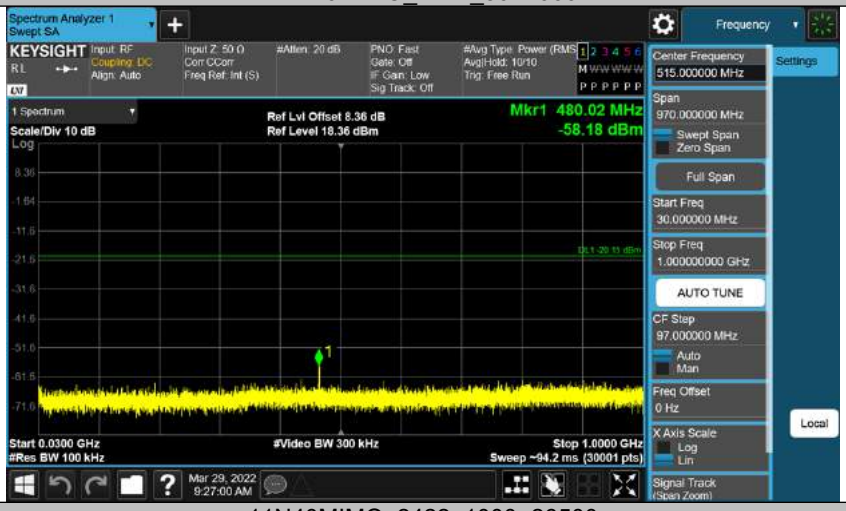
11N20MIMO_2462_30~1000



11N20MIMO_2462_1000~26500

11N40MIMO_2422_0~Reference

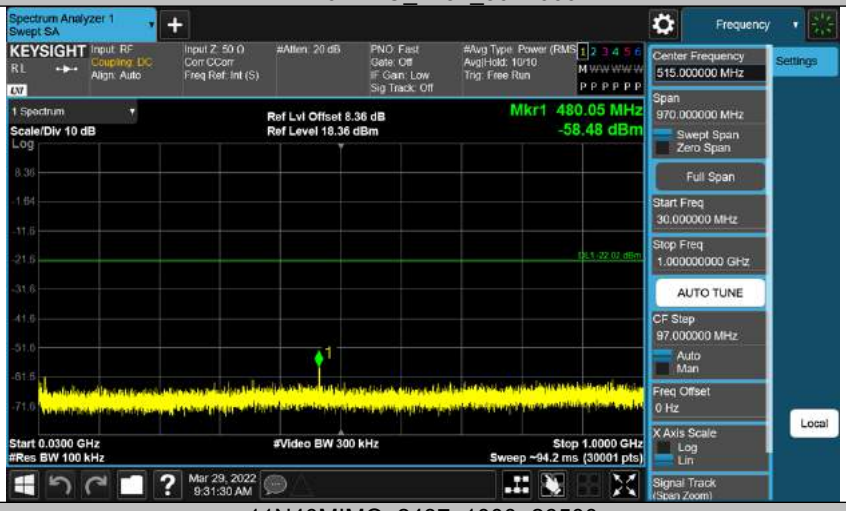
11N40MIMO_2422_30~1000



11N40MIMO_2422_1000~26500

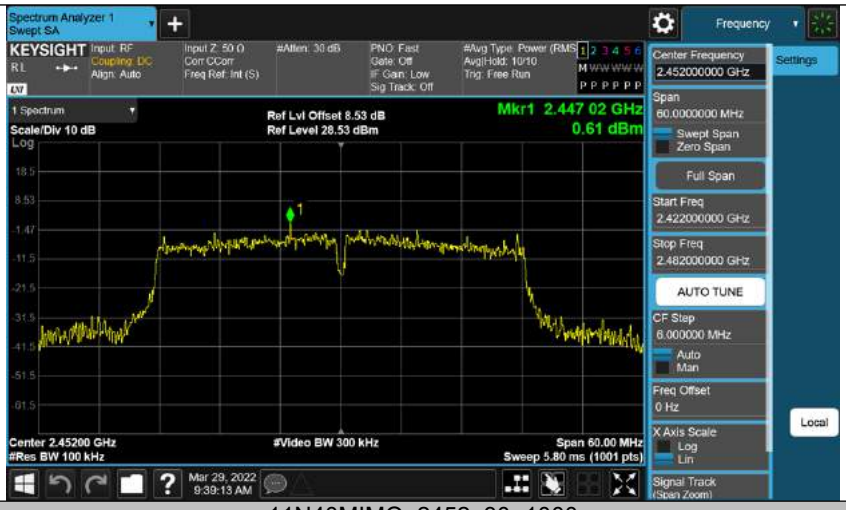
11N40MIMO_2437_0~Reference

11N40MIMO_2437_30~1000

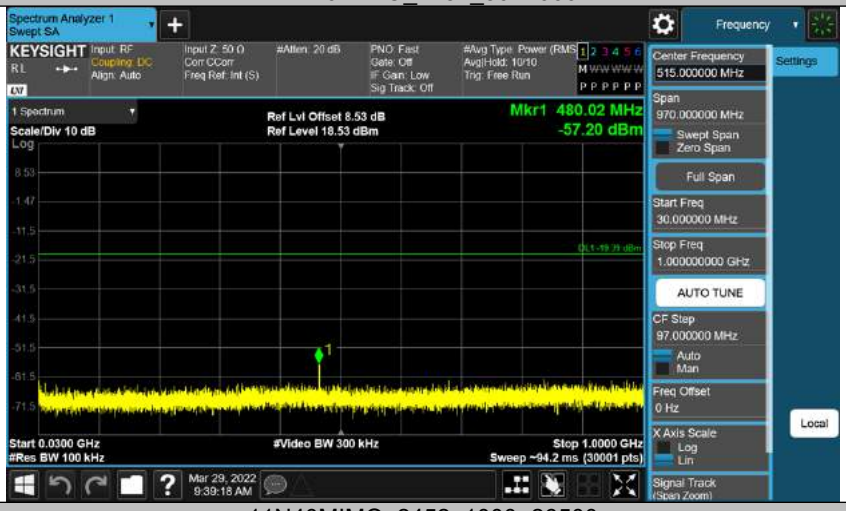


11N40MIMO_2437_1000~26500

11N40MIMO_2452_0~Reference



11N40MIMO_2452_30~1000



11N40MIMO_2452_1000~26500

Band Edge

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B-SISO	Ant2	Low	2412	1.38	-41.49	≤-18.62	PASS
		High	2462	1.70	-49.73	≤-18.3	PASS
11G-SISO	Ant2	Low	2412	4.35	-40.13	≤-15.65	PASS
		High	2462	4.61	-43.27	≤-15.39	PASS
11N20MIMO	Ant1+ Ant2	Low	2412	3.61	-30.56	≤-16.39	PASS
		High	2462	4.09	-43.46	≤-15.91	PASS
11N40MIMO	Ant1+ Ant2	Low	2422	1.95	-31.22	≤-18.05	PASS
		High	2452	1.52	-35.2	≤-18.48	PASS

11B_Ant1_Low_2412

11B_Ant1_High_2462

11G_Ant1_Low_2412

11G_Ant1_High_2462

11N20MIMO_Low_2412

11N20MIMO_High_2462

11N40MIMO_Low_2422

11N40MIMO_High_2452

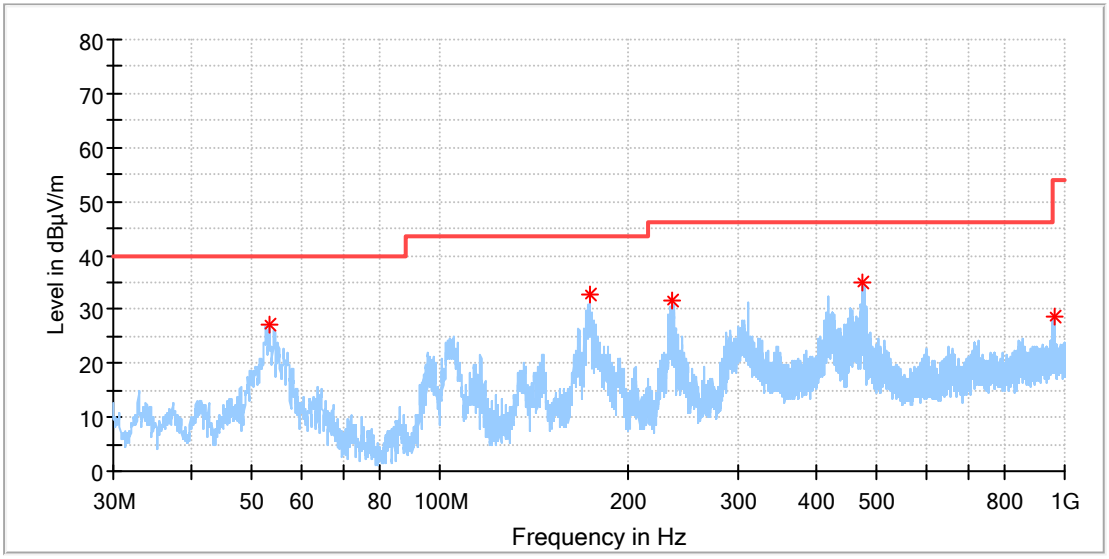
Note: 1. Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported. 2. This testing was carried out on different modulations, but only the worst case was presented in this report.

Appendix A.5: Test Results of Radiated Spurious Emissions

30MHz - 1GHz (Worst case)

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

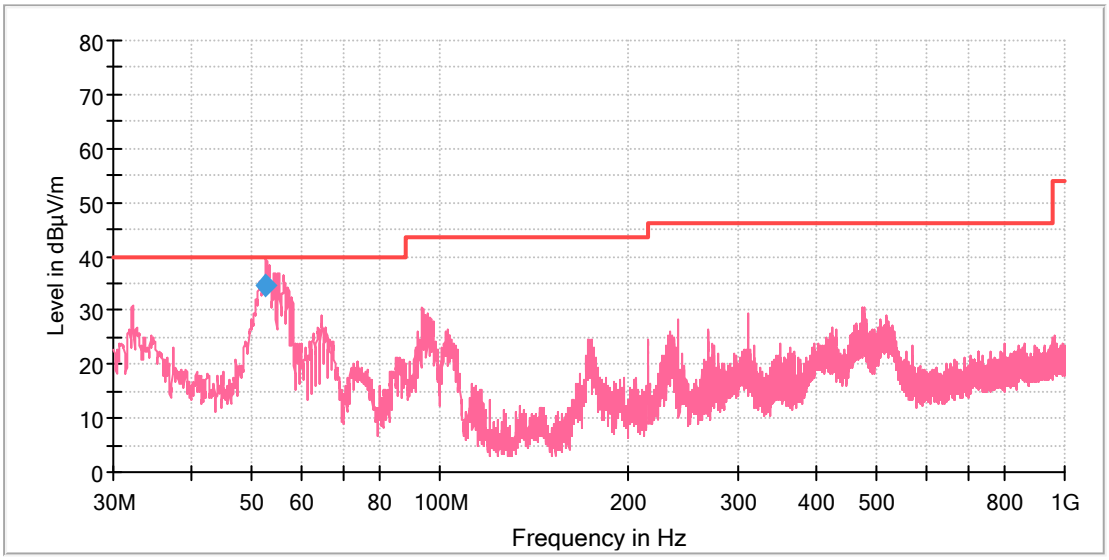


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
53.354615	27.04	40.00	12.96	100.0	H	135.0	-18.7
173.485385	32.68	43.50	10.82	100.0	H	321.0	-21.4
235.266923	31.59	46.00	14.41	100.0	H	313.0	-18.2
475.416539	34.87	46.00	11.13	100.0	H	214.0	-12.7
961.983462	28.52	54.00	25.48	100.0	H	86.0	-4.7

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

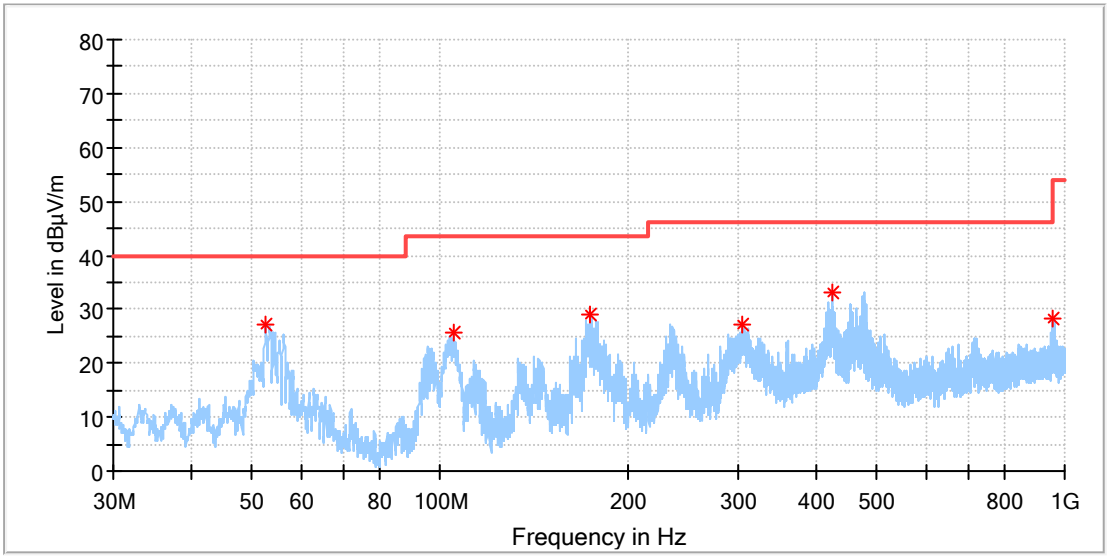
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.672508	40.15	40.00	-0.15	103.0	V	290.0	-18.7
93.758846	30.46	43.50	13.04	100.0	V	0.0	-20.4
173.261539	24.63	43.50	18.87	100.0	V	303.0	-21.4
311.971539	29.43	46.00	16.57	100.0	V	0.0	-16.3
474.334615	30.64	46.00	15.36	100.0	V	206.0	-12.7

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.672508	34.66	40.00	5.34	105.0	V	290.0	-18.7

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

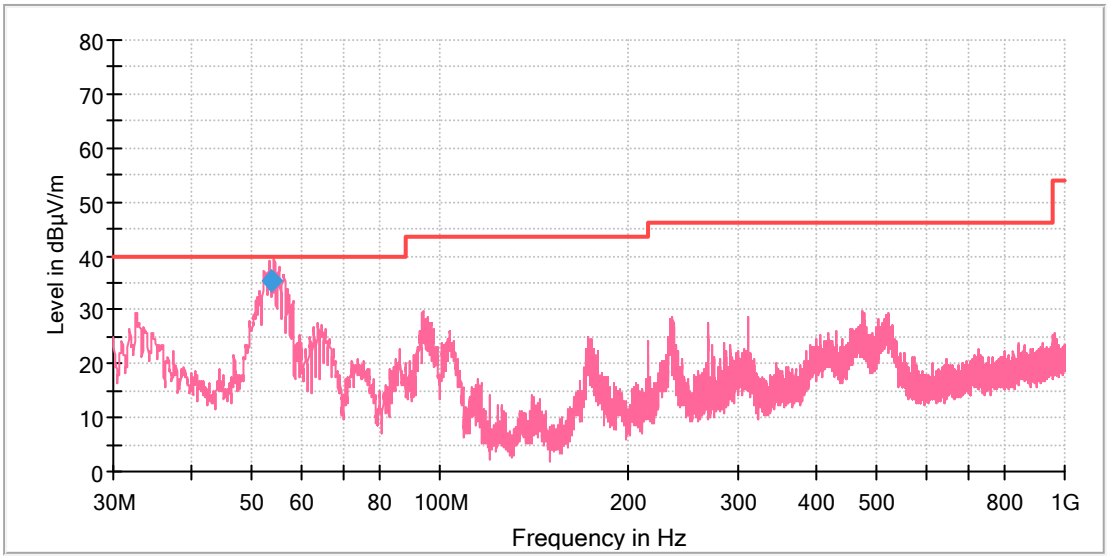
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.571154	27.00	40.00	13.00	100.0	H	200.0	-18.7
105.398846	25.57	43.50	17.93	100.0	H	0.0	-19.1
173.448077	29.20	43.50	14.30	100.0	H	207.0	-21.4
304.845769	27.13	46.00	18.87	100.0	H	328.0	-16.5
424.640769	33.01	46.00	12.99	100.0	H	4.0	-13.7
958.103462	28.30	46.00	17.70	100.0	H	99.0	-4.7

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
53.650000	41.22	40.00	-1.22	100.0	V	71.0	-18.7
93.870769	29.58	43.50	13.92	100.0	V	11.0	-20.3
172.552692	25.11	43.50	18.39	100.0	V	287.0	-21.4
236.013077	28.64	46.00	17.36	100.0	V	257.0	-18.2
476.162692	29.66	46.00	16.34	100.0	V	203.0	-12.7

Final_Result

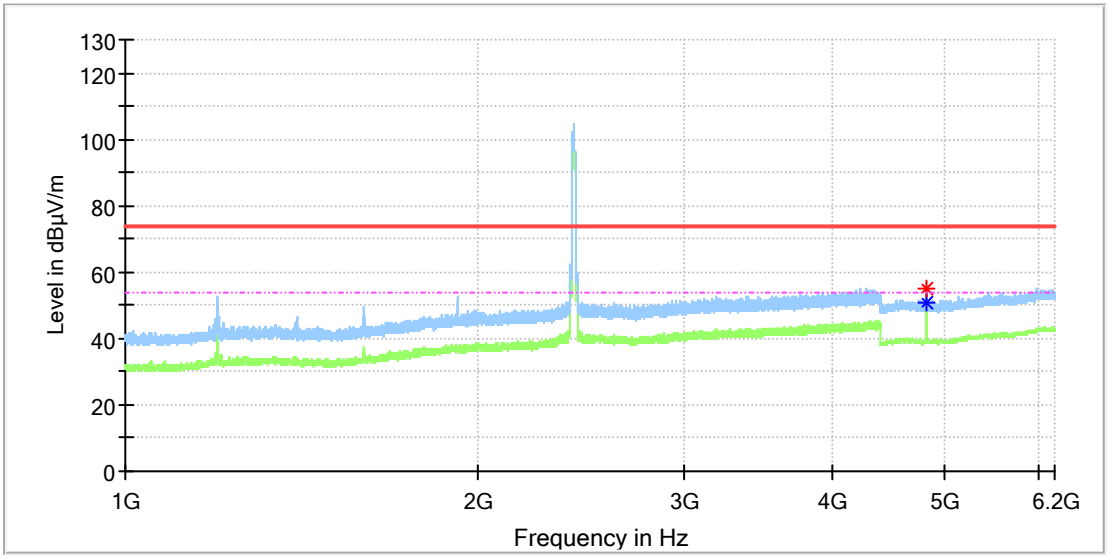
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
53.650000	35.41	40.00	4.59	100.0	V	71.0	-18.7

1GHz - 18GHz

Note: The highest waveform in the figure is Wi-Fi Fundamental.

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

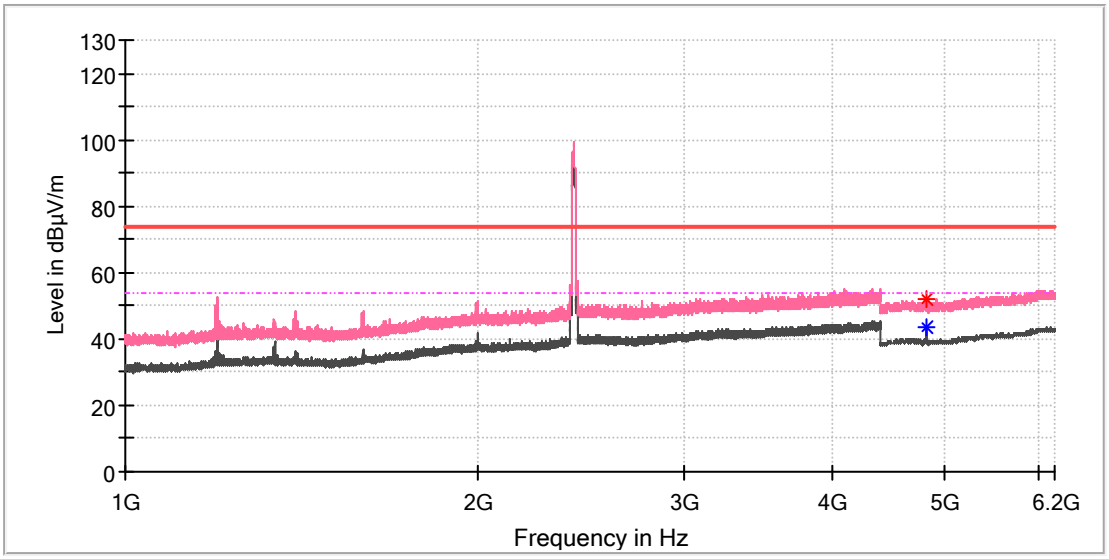


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4823.500000	54.79	---	74.00	19.21	100.0	H	108.0	11.8
4824.000000	---	50.93	54.00	3.07	100.0	H	80.0	11.8

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

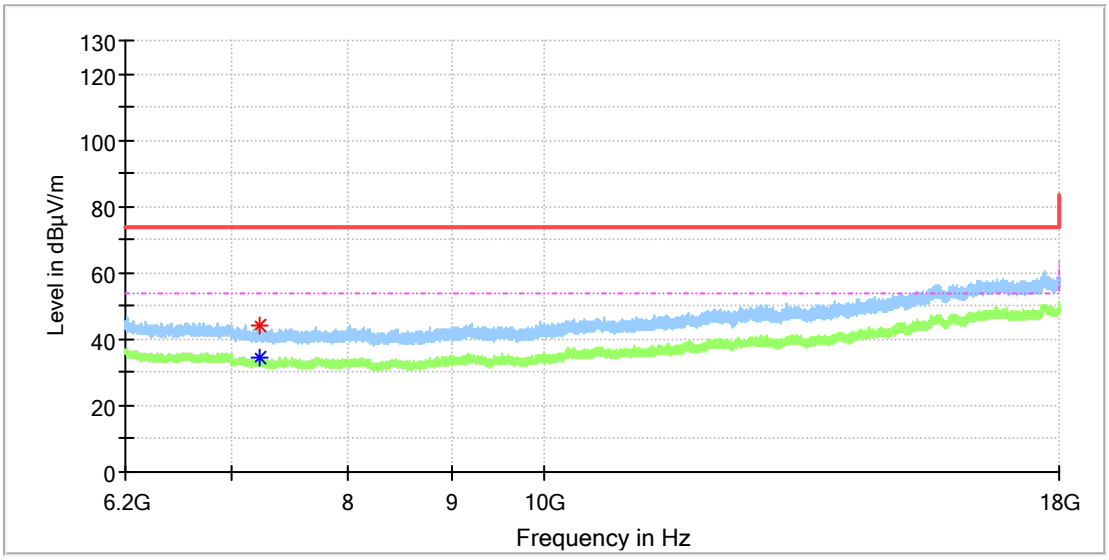
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4824.000000	52.30	---	74.00	21.70	100.0	V	96.0	11.8
4824.000000	---	43.49	54.00	10.51	100.0	V	96.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

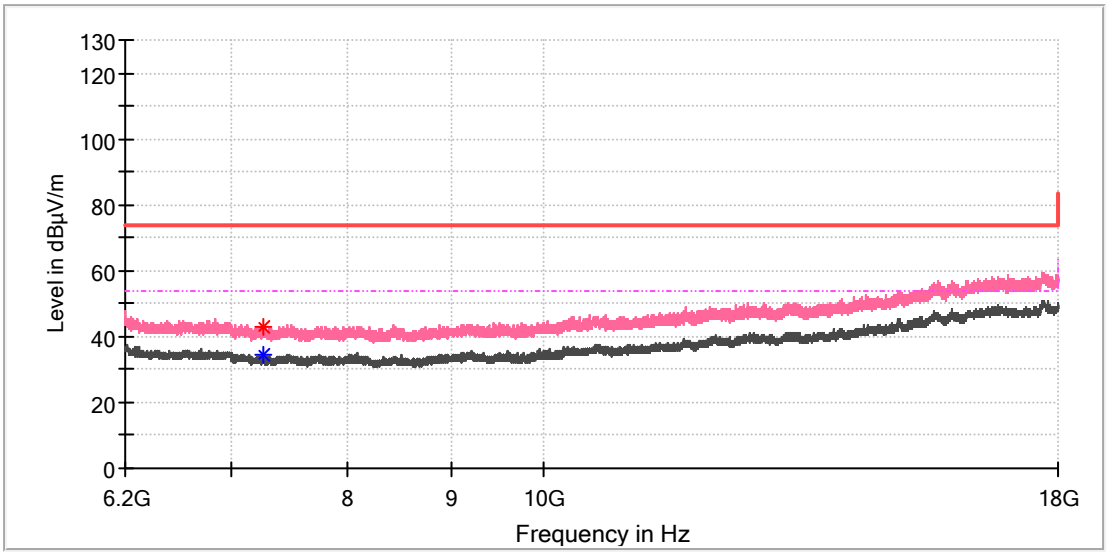
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7225.125000	---	34.28	54.00	19.72	100.0	H	174.0	8.7
7234.466667	43.92	---	74.00	30.08	100.0	H	12.0	8.6

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

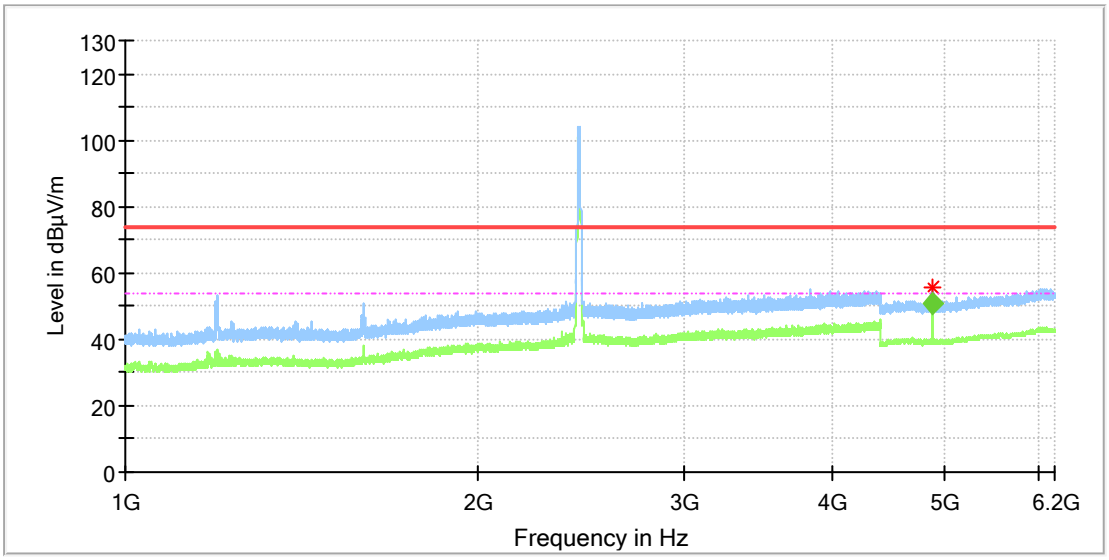
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7258.558333	---	34.25	54.00	19.75	100.0	V	0.0	8.5
7263.475000	43.04	---	74.00	30.96	100.0	V	308.0	8.5

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Mid channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

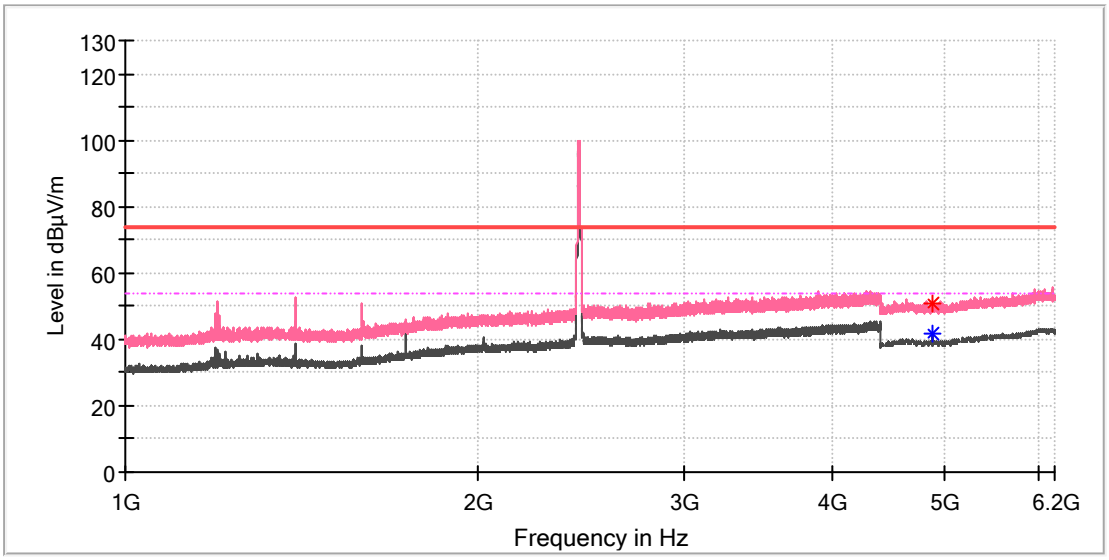
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4874.000000	55.72	---	74.00	18.28	100.0	H	133.0	11.8

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4874.038889	50.84	54.00	3.16	105.0	H	128.0	11.8

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Mid channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

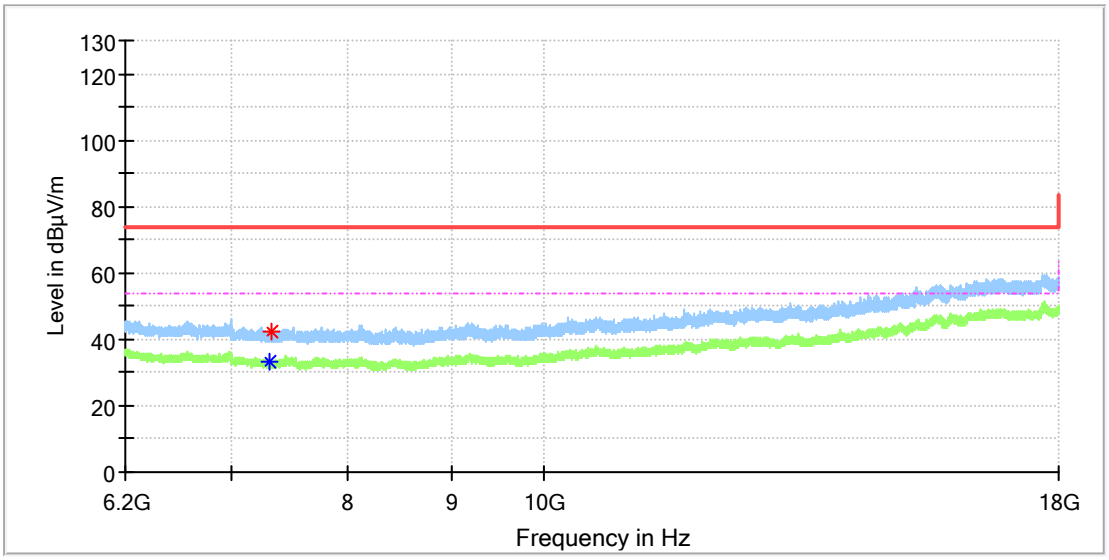
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4874.000000	50.91	---	74.00	23.09	100.0	V	118.0	11.8
4874.000000	---	41.48	54.00	12.52	100.0	V	118.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Mid channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

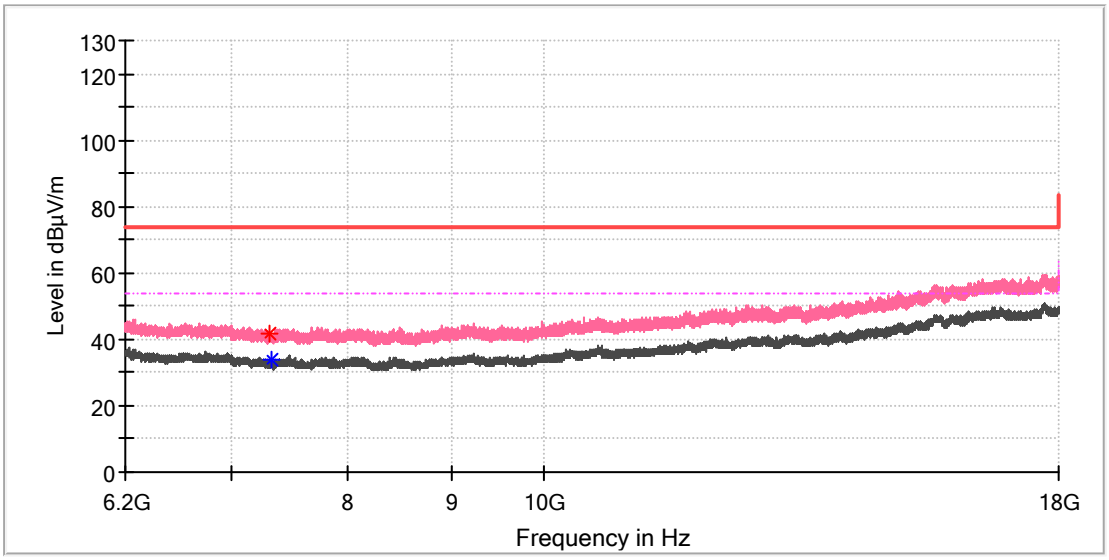
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7312.150000	---	33.52	54.00	20.48	100.0	H	329.0	8.2
7328.375000	42.35	---	74.00	31.65	100.0	H	181.0	8.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Mid channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

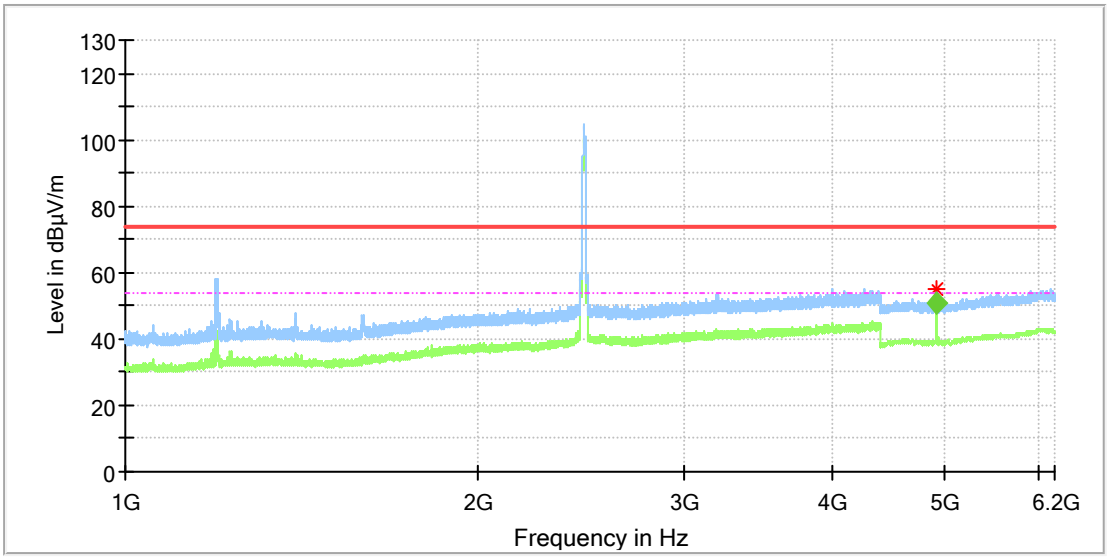
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7316.575000	41.58	---	74.00	32.42	100.0	V	71.0	8.2
7326.900000	---	33.59	54.00	20.41	100.0	V	0.0	8.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

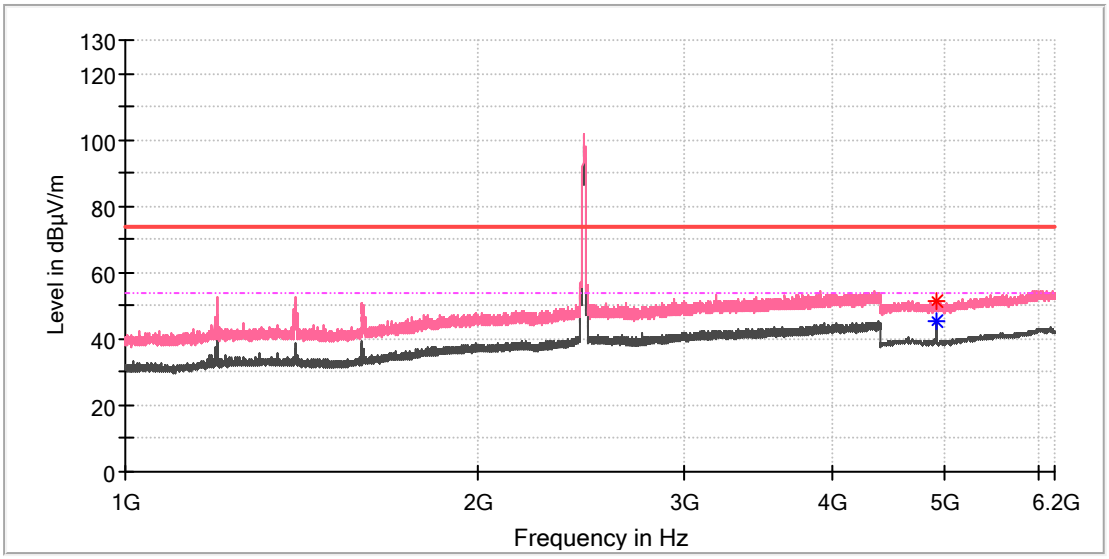
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4924.000000	55.22	---	74.00	18.78	100.0	H	137.0	11.8

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4924.058333	50.57	54.00	3.43	105.0	H	136.0	11.8

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

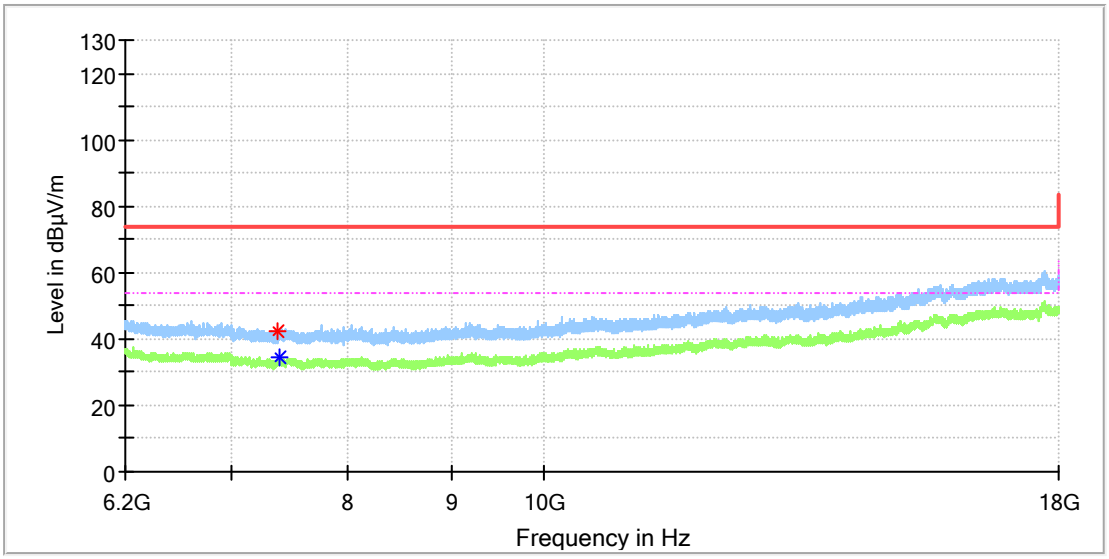
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4924.000000	51.62	---	74.00	22.38	100.0	V	121.0	11.8
4924.000000	---	45.17	54.00	8.83	100.0	V	121.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

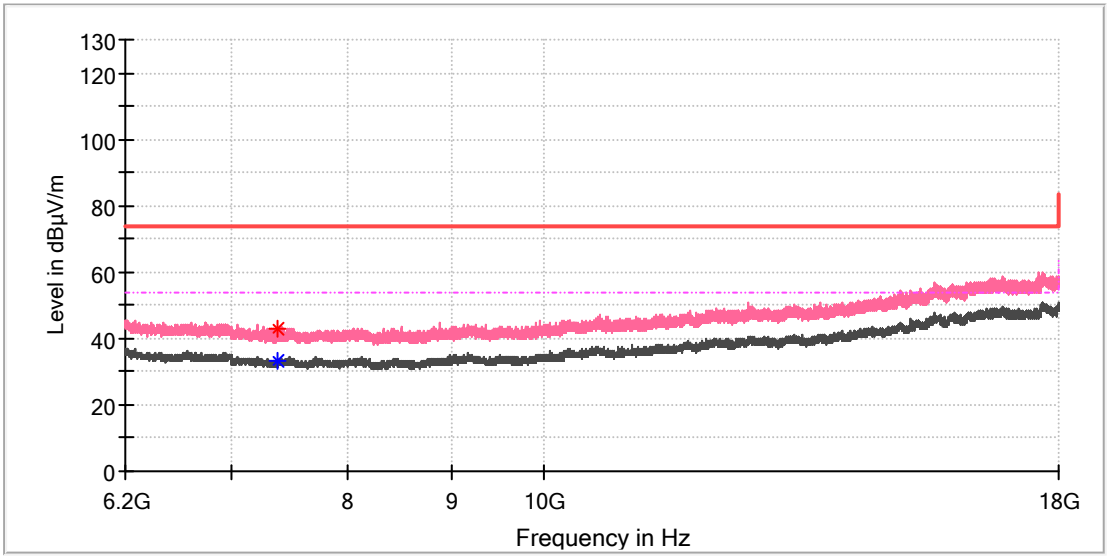
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7370.166667	42.13	---	74.00	31.87	100.0	H	0.0	8.2
7391.308333	---	34.36	54.00	19.64	100.0	H	342.0	8.3

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7373.116667	43.18	---	74.00	30.82	100.0	V	0.0	8.2
7375.083333	---	33.52	54.00	20.48	100.0	V	77.0	8.2

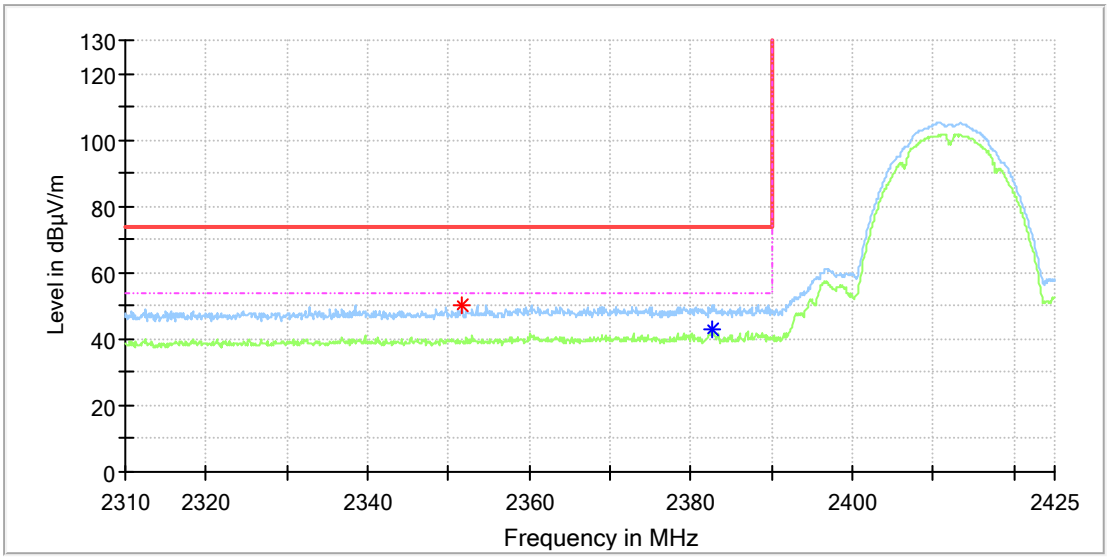
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Appendix A.6: Test Results of Radiated Emissions in Restricted Bands

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

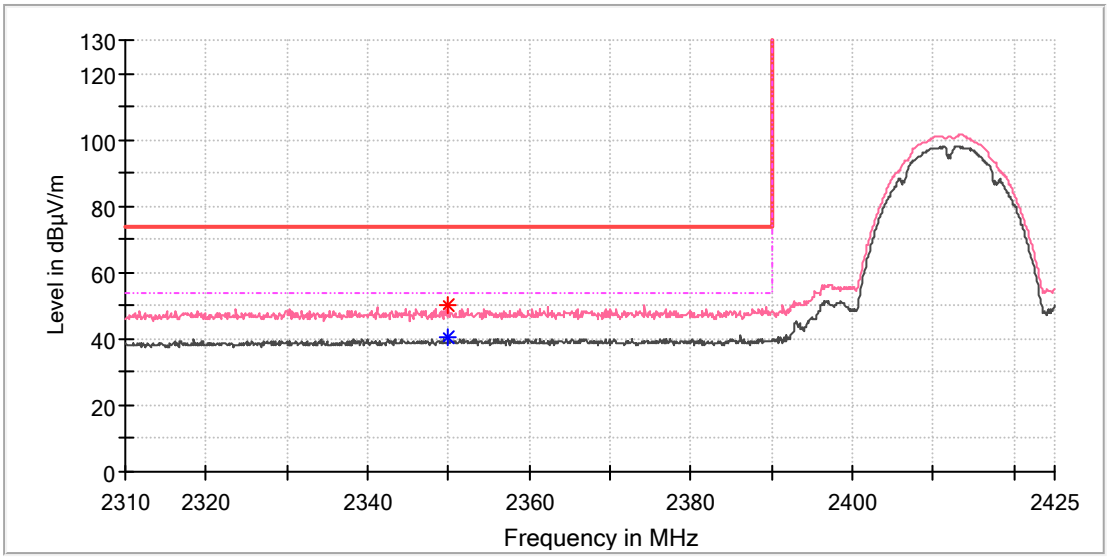
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2351.700000	50.41	---	74.00	23.59	100.0	H	91.0	6.9
2382.500000	---	42.96	54.00	11.04	100.0	H	81.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

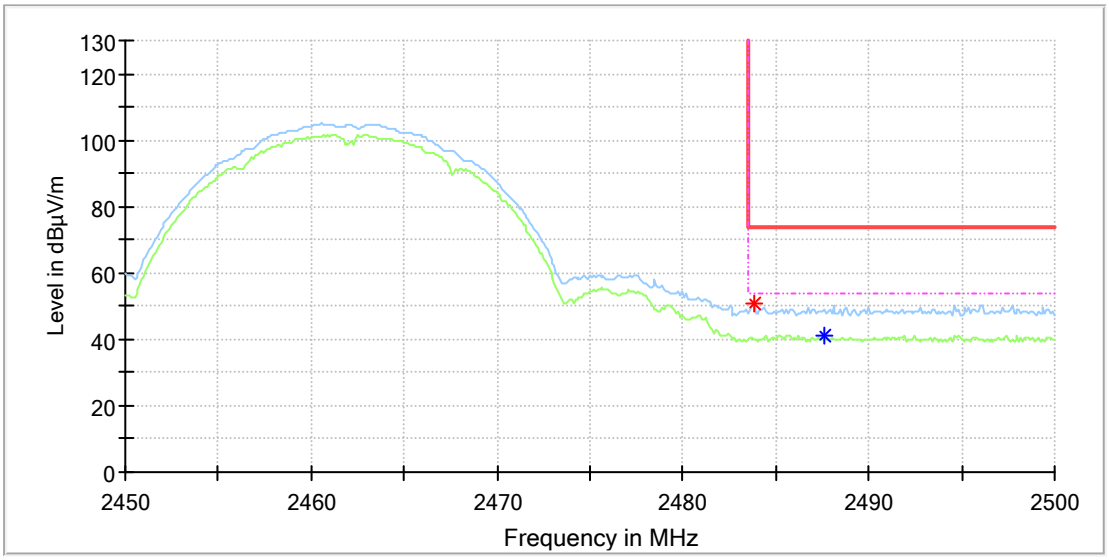
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2350.000000	---	40.25	54.00	13.75	100.0	V	151.0	6.9
2350.000000	50.02	---	74.00	23.98	100.0	V	151.0	6.9

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

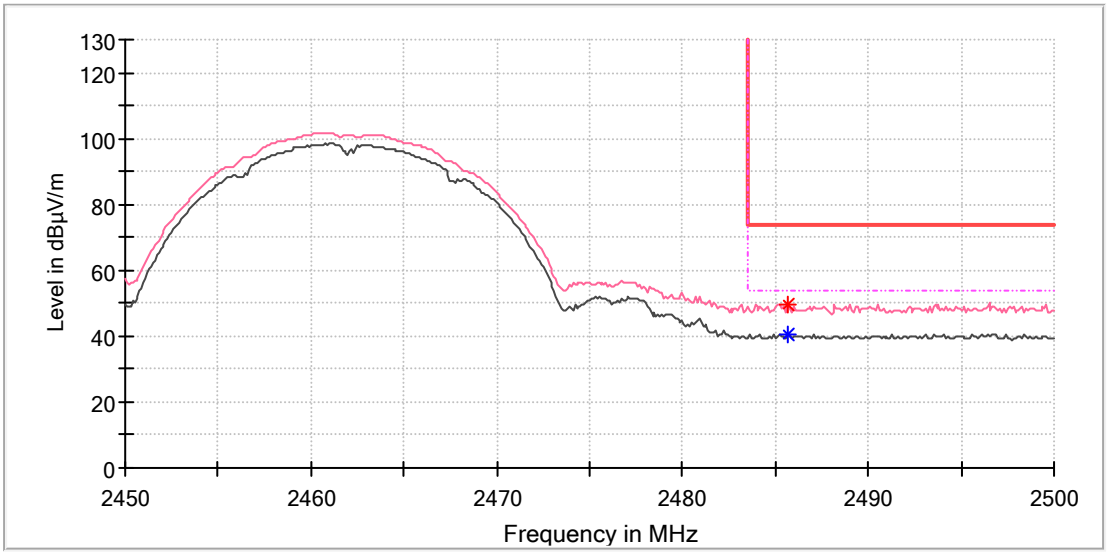
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.800000	50.92	---	74.00	23.08	100.0	H	69.0	7.4
2487.600000	---	41.39	54.00	12.61	100.0	H	24.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11b_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

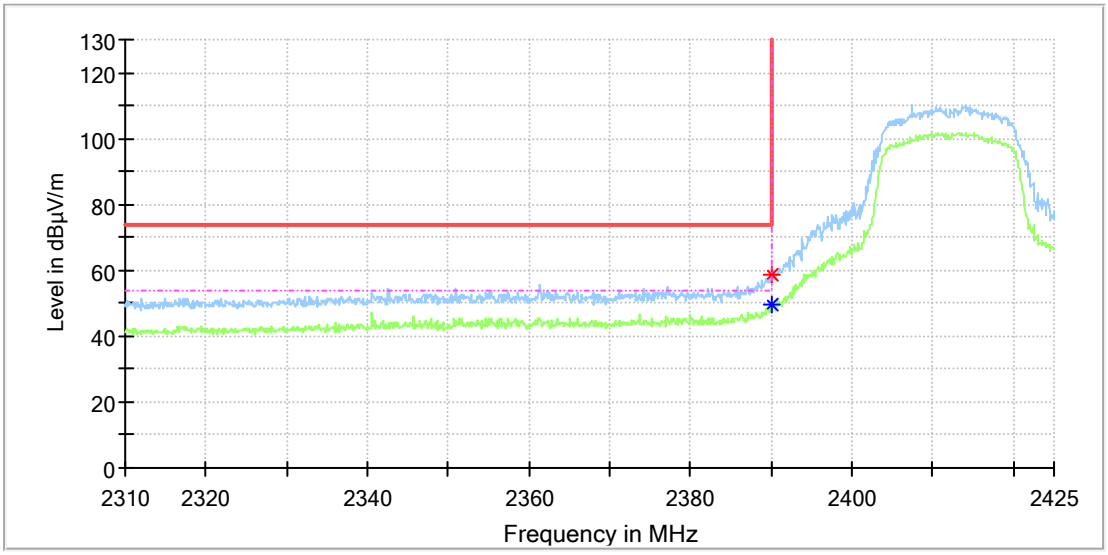
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2485.700000	---	40.60	54.00	13.40	100.0	V	337.0	7.4
2485.700000	49.58	---	74.00	24.42	100.0	V	337.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11g_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

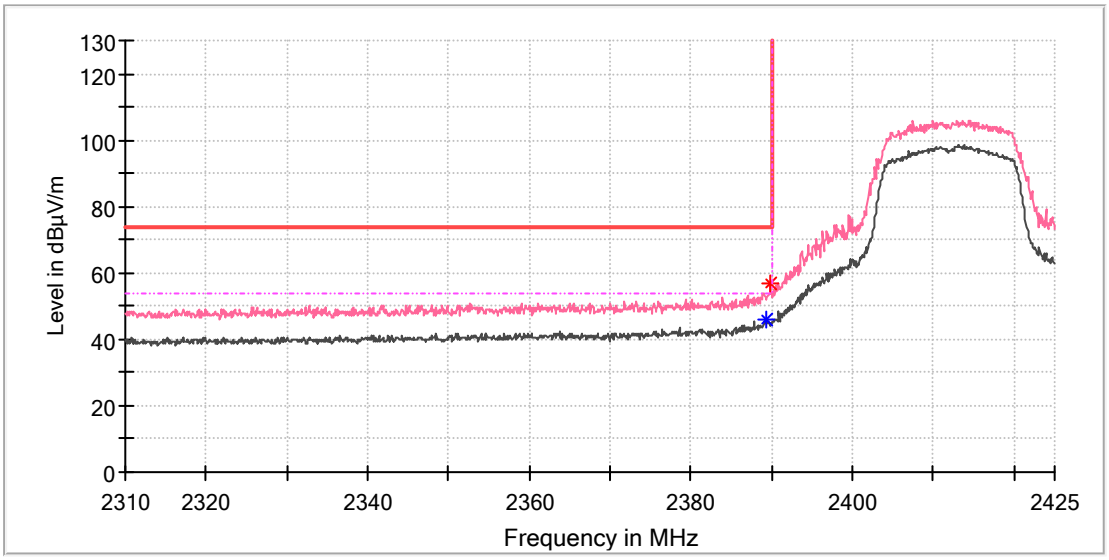
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2390.000000	58.68	---	74.00	15.32	100.0	H	58.0	7.0
2390.000000	---	49.41	54.00	4.59	100.0	H	58.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11g_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

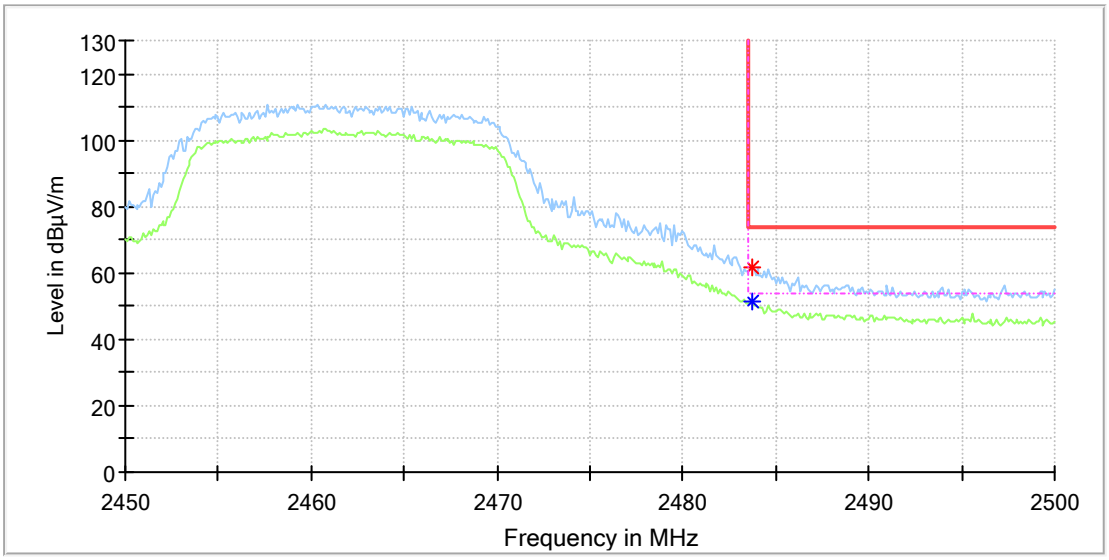
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.400000	---	45.68	54.00	8.32	100.0	V	151.0	7.0
2389.800000	57.08	---	74.00	16.92	100.0	V	141.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11g_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

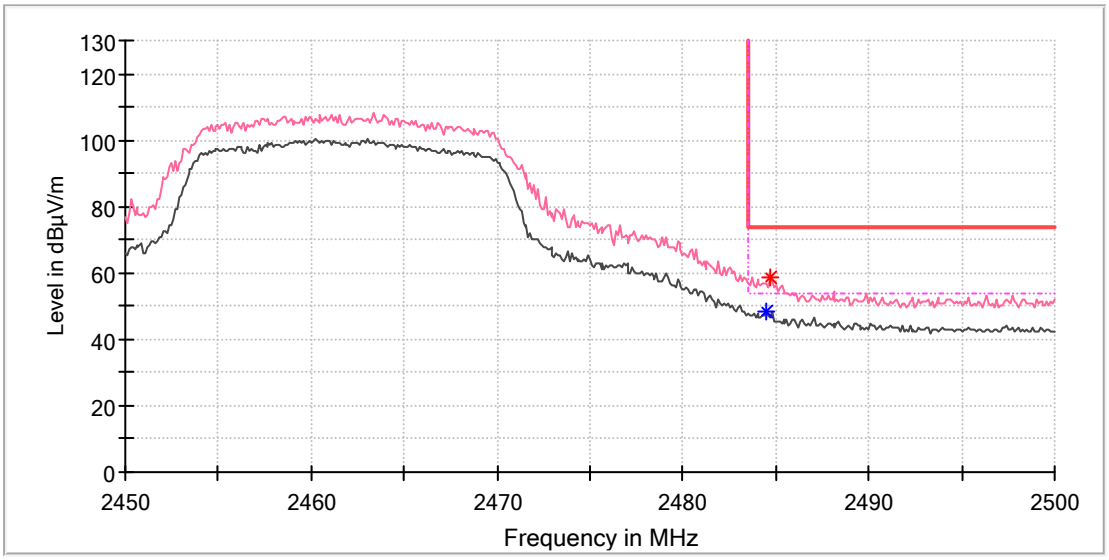
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.700000	61.75	---	74.00	12.25	100.0	H	249.0	7.4
2483.700000	---	51.44	54.00	2.56	100.0	H	249.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11g_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

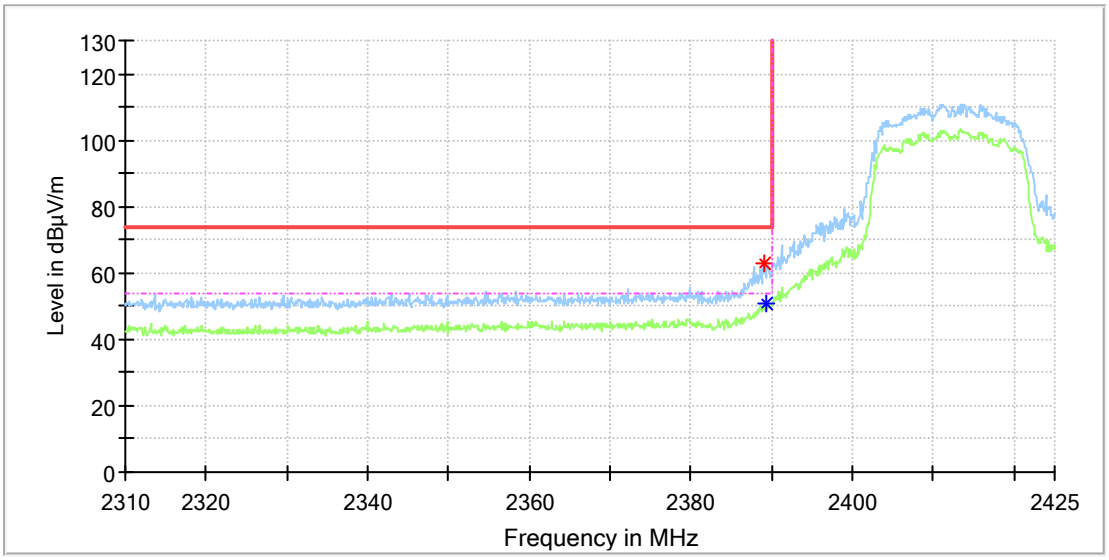
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.500000	---	48.37	54.00	5.63	100.0	V	133.0	7.4
2484.700000	58.57	---	74.00	15.43	100.0	V	247.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

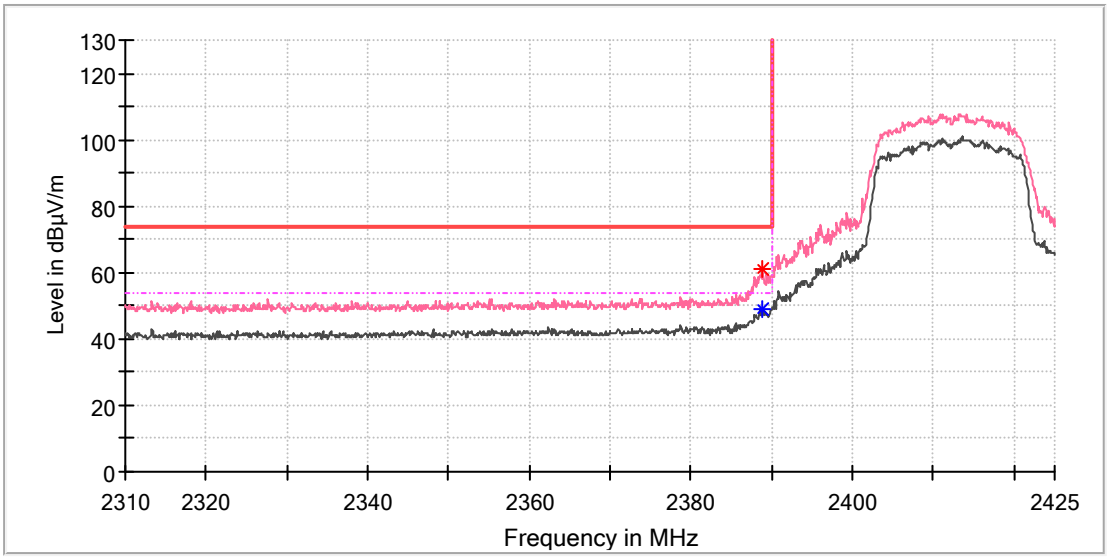
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.000000	63.01	---	74.00	10.99	100.0	H	94.0	7.0
2389.200000	---	50.81	54.00	3.19	100.0	H	62.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

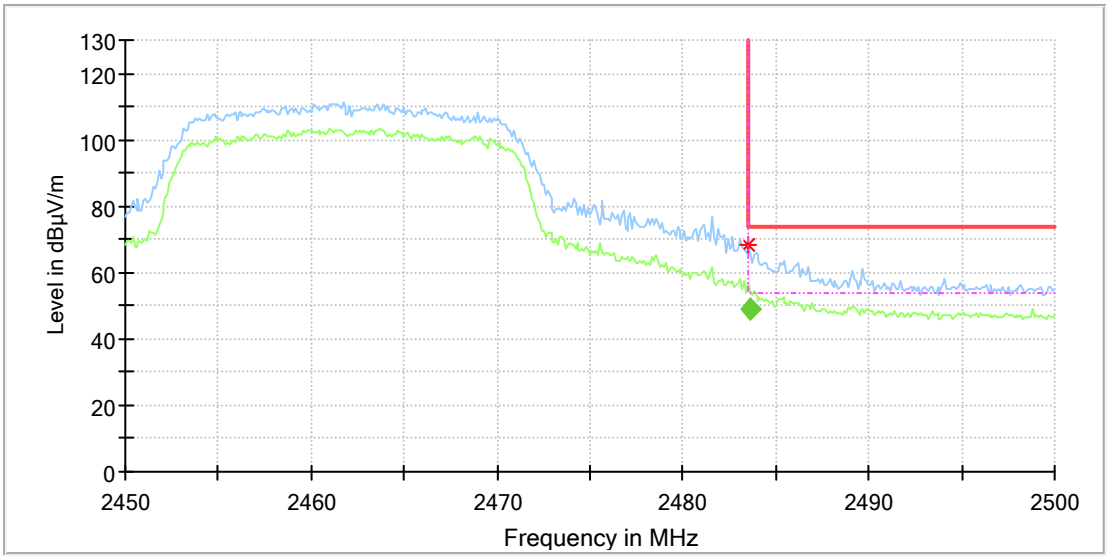
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2388.800000	60.87	---	74.00	13.13	100.0	V	137.0	7.0
2388.800000	---	49.11	54.00	4.89	100.0	V	137.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

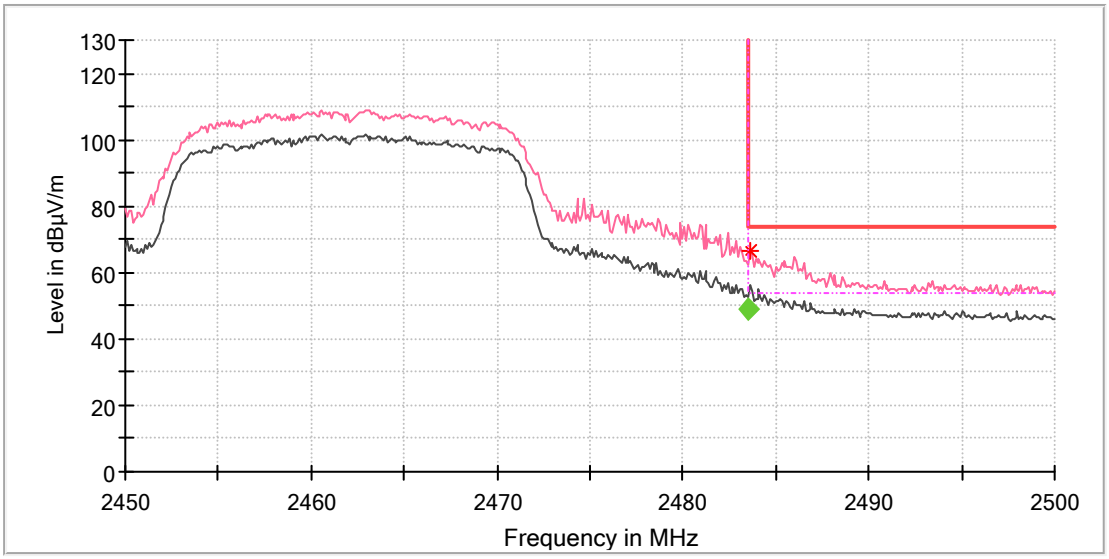
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.500000	68.46	---	74.00	5.54	100.0	H	98.0	7.4

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.619000	48.99	54.00	5.01	100.0	H	62.0	7.4

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

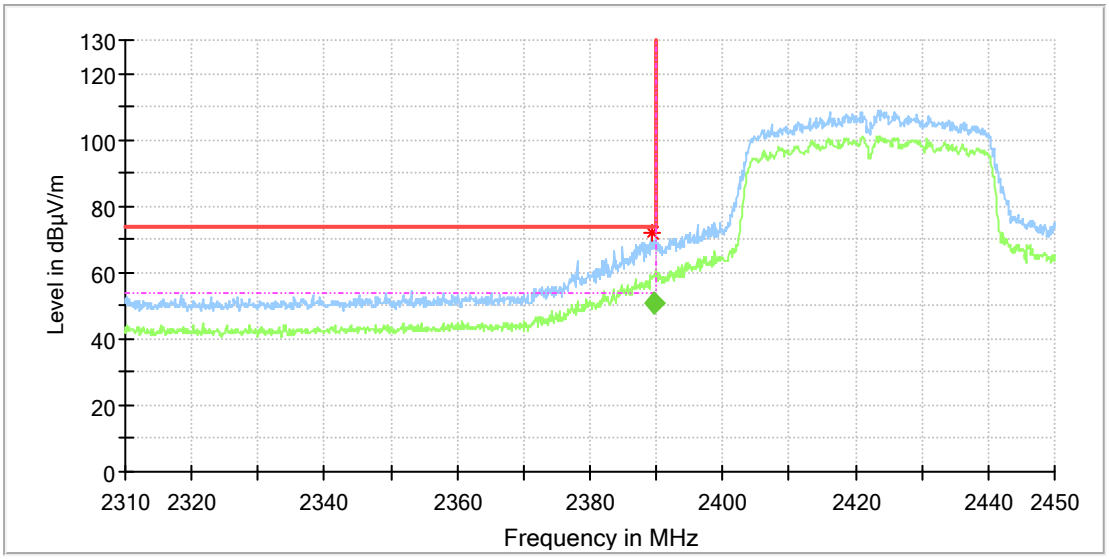
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.600000	66.56	---	74.00	7.44	100.0	V	131.0	7.4

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.514400	49.04	54.00	4.96	100.0	V	126.0	7.4

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n40_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

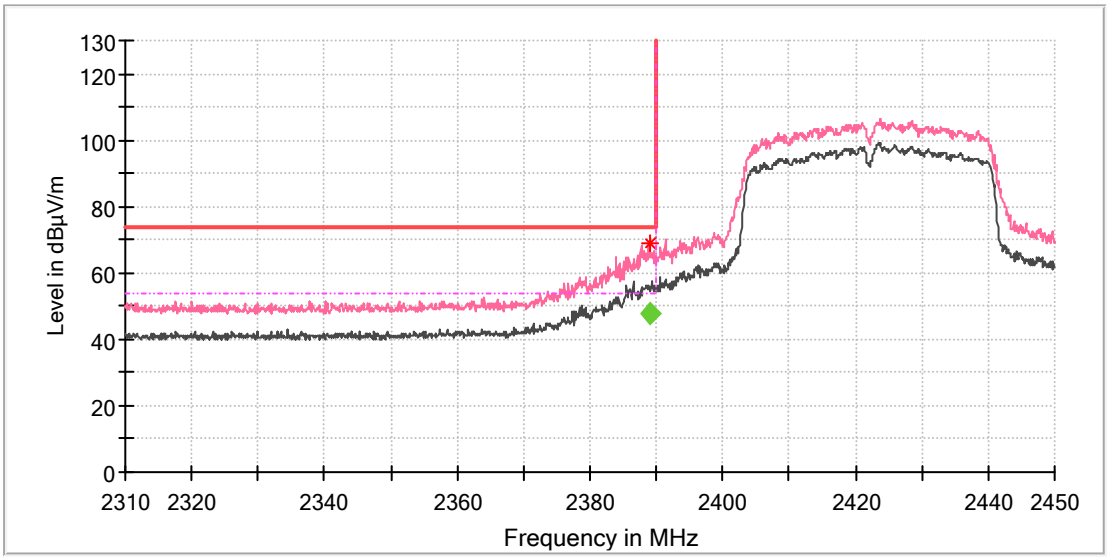
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.300000	71.99	---	74.00	2.01	100.0	H	59.0	7.0

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.574000	50.76	54.00	3.24	105.0	H	93.0	7.0

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n40_Low channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

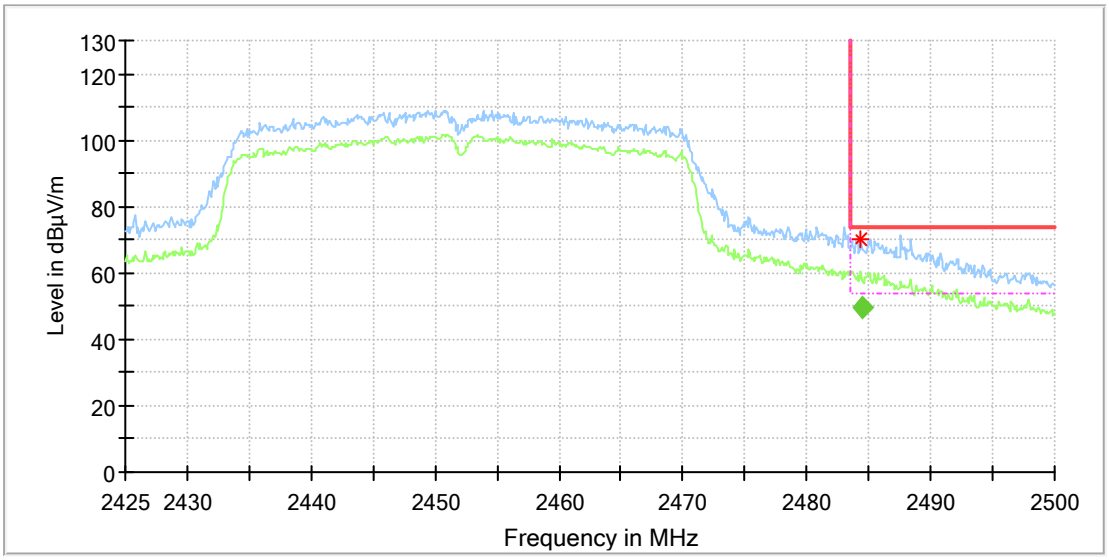
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.000000	69.15	---	74.00	4.85	100.0	V	128.0	7.0

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.035700	47.62	54.00	6.38	100.0	V	206.0	7.0

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n40_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

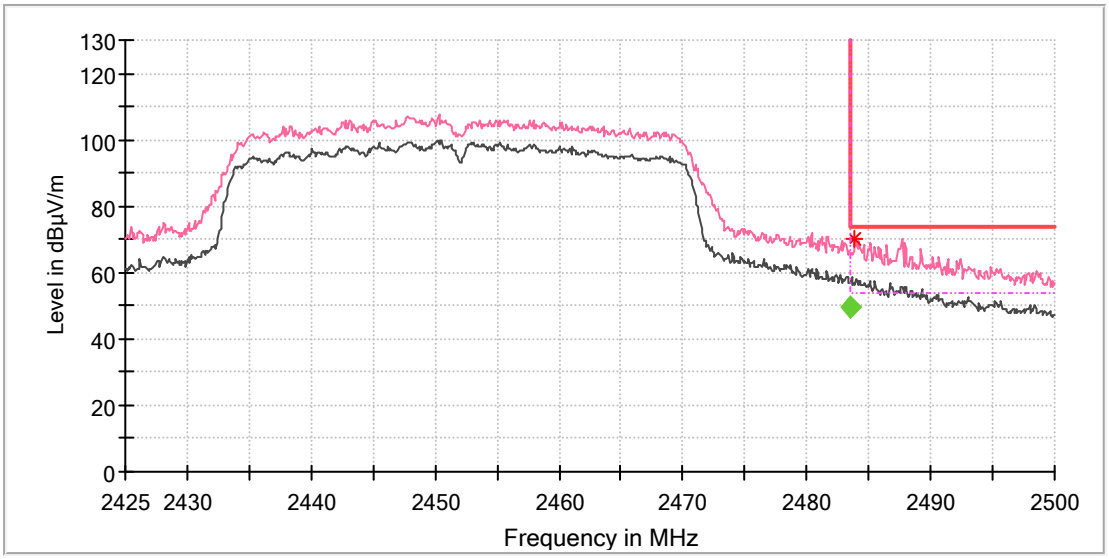
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.400000	70.24	---	74.00	3.76	100.0	H	257.0	7.4

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.543650	49.80	54.00	4.20	100.0	H	330.0	7.4

EUT Information

EUT Name:	WIFI Module
Model:	W2LM2200
Test Mode:	WiFi 2.4G_11n40_High channel
Order No/Sample No:	168361677/A003220063-001
Test Voltage::	DC 5V(via USB port)
Remark:	Temp 22 Humi:55%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.900000	70.02	---	74.00	3.98	100.0	V	274.0	7.4

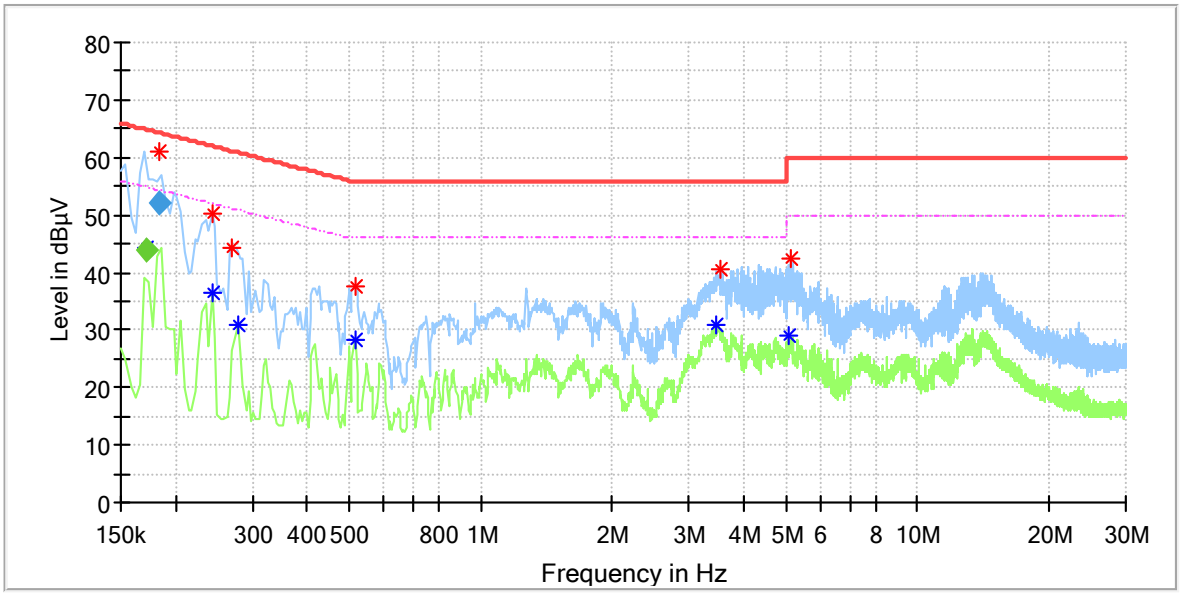
Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.549350	49.68	54.00	4.32	100.0	V	122.0	7.4

Appendix A.7: Test Results of Conducted Emission

EUT Information

EUT Name:	WIFI Module
Order No:	168361677
Model:	W2LM2200
Test Mode:	WIFI operation
Test Voltage:	AC 120V/60Hz
Test By:	Kevin Zhou
Review By:	Gary Chen



Critical_Freqs

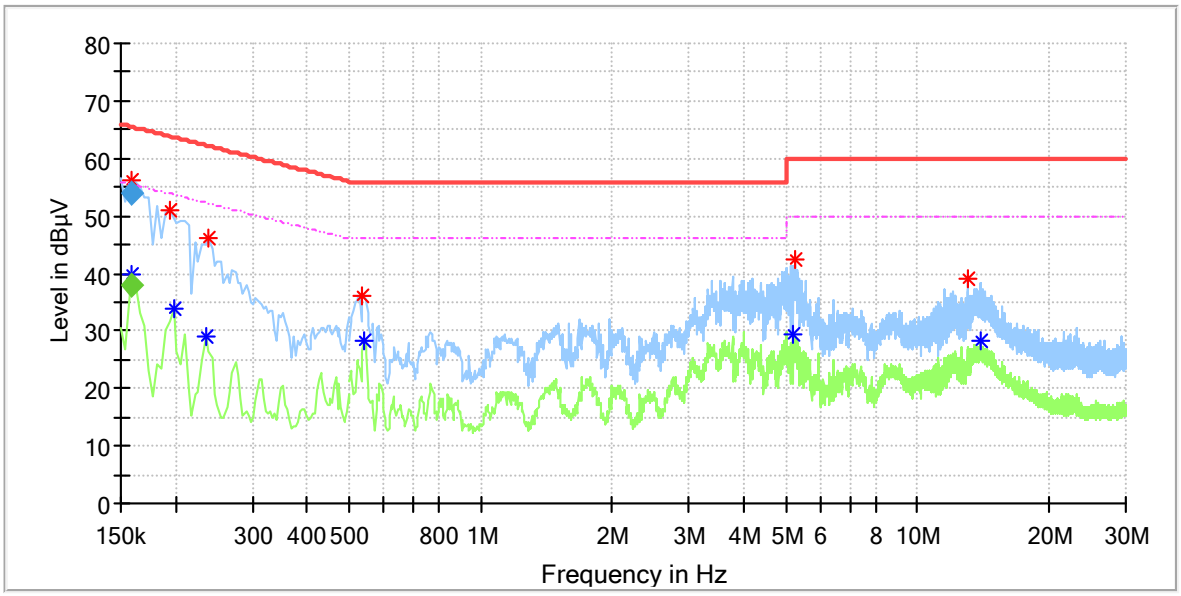
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.172500	---	44.45	54.21	9.76	L1	9.6
0.183500	60.99	---	64.96	3.97	L1	9.6
0.242000	---	36.53	52.03	15.50	L1	9.6
0.242000	50.28	---	62.03	11.75	L1	9.6
0.270000	44.21	---	61.12	16.91	L1	9.6
0.278000	---	30.74	50.88	20.13	L1	9.6
0.516000	---	28.42	46.00	17.58	L1	9.7
0.516000	37.71	---	56.00	18.29	L1	9.7
3.472000	---	30.81	46.00	15.19	L1	9.9
3.544000	40.56	---	56.00	15.44	L1	9.9
5.068000	---	28.88	50.00	21.12	L1	10.0
5.156000	42.41	---	60.00	17.59	L1	10.0

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.172500	---	44.02	54.84	10.82	1000.0	9.000	L1	9.6
0.183500	52.03	---	64.33	12.30	1000.0	9.000	L1	9.6

EUT Information

EUT Name:	WIFI Module
Order No:	168361677
Model:	W2LM2200
Test Mode:	WIFI operation
Test Voltage:	AC 120V/60Hz
Test By:	Kevin Zhou
Review By:	Gary Chen



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	---	39.63	55.57	15.94	N	9.6
0.158000	56.01	---	65.57	9.56	N	9.6
0.194000	50.80	---	63.86	13.06	N	9.6
0.198000	---	33.86	53.69	19.83	N	9.6
0.234000	---	29.17	52.31	23.14	N	9.6
0.238000	46.00	---	62.17	16.17	N	9.6
0.536000	36.17	---	56.00	19.83	N	9.7
0.540000	---	28.15	46.00	17.85	N	9.7
5.216000	---	29.53	50.00	20.47	N	10.0
5.232000	42.24	---	60.00	17.76	N	10.0
13.104000	39.11	---	60.00	20.89	N	10.2
13.948000	---	28.37	50.00	21.63	N	10.2

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.158000	54.06	---	65.57	11.51	1000.0	9.000	N	9.6
0.158000	---	38.00	55.57	17.57	1000.0	9.000	N	9.6