

FCC - TEST REPORT

Report Number	:	68.910.20.0038.01	Date of Issue:	<u>April 23, 2021</u>
Model	:	J300; J300S; J300U; J300SU; J301; J301S; J301U; J301SU; J302; J302S; J302U; J302SU; J306; J306S; J306U; J306SU		
Product Type	:	Robotic Vacuum Cleaner		
Applicant	:	Guangdong Wangjia Intelligent Robot Co., Ltd.		
Address	:	3rd Floor, No. 2 Plant, Yuxinfeng Industrial Park Phase I, Chigang Junma Road, Humen Town, Dongguan, Guangdong, China		
Production Facility	:	Guangdong Wangjia Intelligent Robot Co., Ltd.		
Address	:	3rd Floor, No. 2 Plant, Yuxinfeng Industrial Park Phase I, Chigang Junma Road, Humen Town, Dongguan, Guangdong, China		
Test Result	:	☒ Positive ☐ Negative		
Total pages including Appendices	:	<u>80</u>		

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China

FCC Registration
Number: 514049

ISED#: 10320A

CAB identifier: CN0077

Telephone: 86 755 8828 6998
Fax: 86 755 8828 5299

3 Description of the Equipment under Test

Product/PMN:	Robotic Vacuum Cleaner
Model no./HVIN:	J300; J300S; J306; J306U
FCC ID:	2AVYJ-J300
Ratings:	100-240V $\sim$; 50/60Hz; 0,75A or 100-240V $\sim$; 50/60Hz; 0,6A (for adapter) 24V $\equiv$; 1000mA (for robotic vacuum cleaner)
RF Transmission Frequency:	2412MHz-2462MHz
No. of Operated Channel:	11
Modulation:	CCK, DQPSK, DBPSK for 802.11b QPSK, BPSK for 802.11g/n
Antenna Type:	Integrated Antenna
Antenna Gain:	2dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Robotic Vacuum Cleaner supports 2.4GHz WIFI function.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2019 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 DTS Meas Guidance v05r02 and ANSI C63.10 (2013).

5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C						
Test Condition		Pages	Test Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	10	Site 1	☒	☐	☐
§15.247 (b) (1)	Conducted peak output power	13	Site 1	☒	☐	☐
§15.247(a)(1)	20dB bandwidth	---	---	☐	☐	☒
§15.247(a)(1)	Carrier frequency separation	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Dwell Time	---	---	☐	☐	☒
§15.247(a)(2)	6dB bandwidth	16	Site 1	☒	☐	☐
§15.247(e)	Power spectral density	19	Site 1	☒	☐	☐
§15.247(d)	Spurious RF conducted emissions	22	Site 1	☒	☐	☐
§15.247(d)	Band edge	28	Site 1	☒	☐	☐
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	30	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 2		☒	☐	☐

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an Integrated Antenna, which gain is 2dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

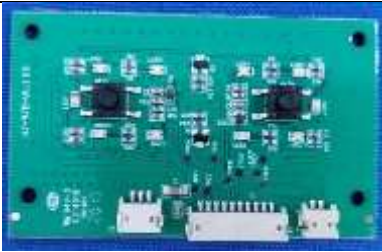
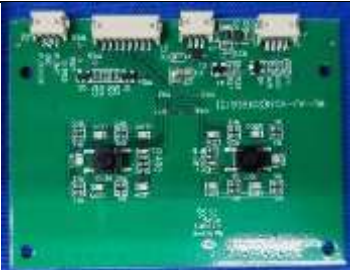
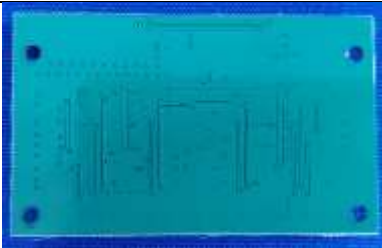
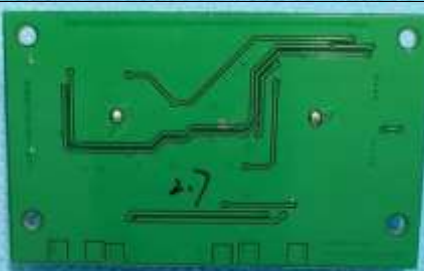
6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AVYJ-J300 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

All models use the same WIFI module.

Model differences:

Model No.	Fan motor		UV function	Control PCB			Others			
	20N704P 110	20N704K5 00		1#	2#	3#				
J300	√	—	—	√	—	—	All models are same except the appearance and colour.			
J300S	—	√						√		
J300U	√	—	—							
J300SU	—	√								
J301	√	—	—							
J301S	—	√								
J301U	√	—	√							
J301SU	—	√								
J302	√	—	—	√						
J302S	—	√								
J302U	√	—	√							
J302SU	—	√								
J306	√	—	—	—	√					
J306S	—	√								
J306U	√	—	√							
J306SU	—	√								
Control PCB 1#		Control PCB 2#				Control PCB 3#				
										
										
Remark: Control PCB 1# and control PCB 2# are same except PCB layout.										

Remark: Control PCB 1# and control PCB 2# are same except PCB layout.

Unless otherwise specified, the models J300, were chosen as the representative model to perform all the tests, the additional Conducted Emission test was applied on models J300S and J306, other models are deemed to fulfill relevant requirement without further testing.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: June 15, 2020

Testing Start Date: June 17, 2020

Testing End Date: October 21, 2020

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch –

Reviewed by:



Dawi Xu
EMC Project Manager



Prepared by:



Myron Yu
EMC Project Engineer

Tested by:

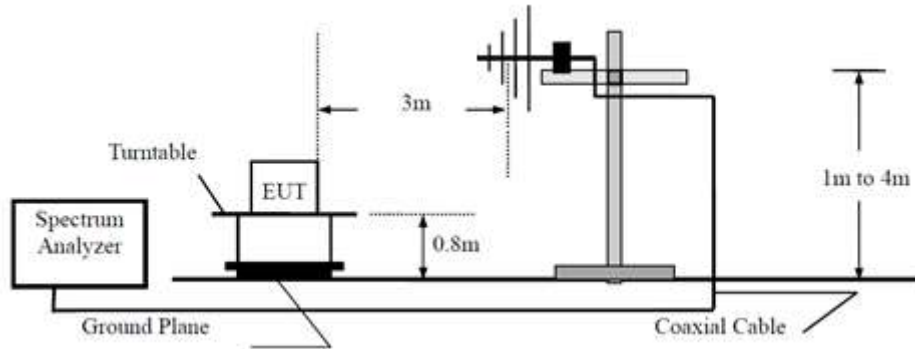


Louise Liu
EMC Test Engineer

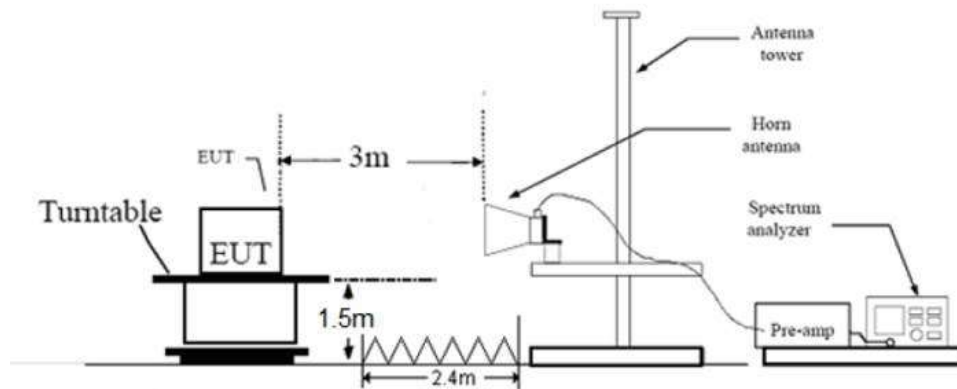
7 Test Setups

7.1 Radiated test setups

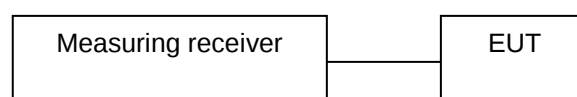
Below 1GHz



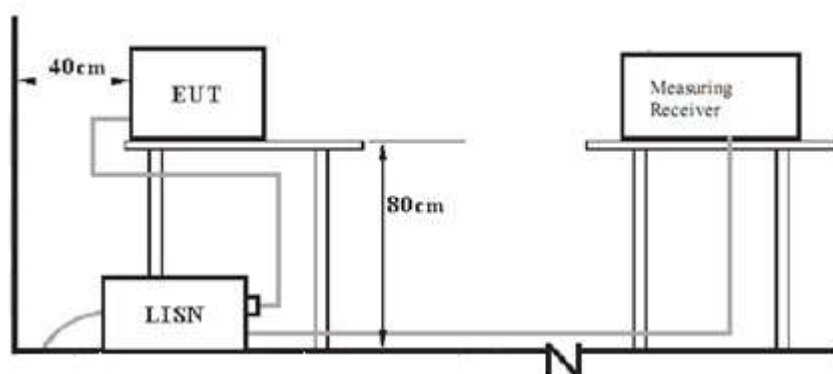
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
---	---	---	---

Test software information:

Test Software Version		
Modulation	Setting TX Power	Packet Type
802.11b	Default	---
802.11g	Default	---
802.11nHT20	Default	---
802.11 nHT40	Default	---

The system was configured to channel 1, 6, and 11 for the test.

9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remarks for test data:

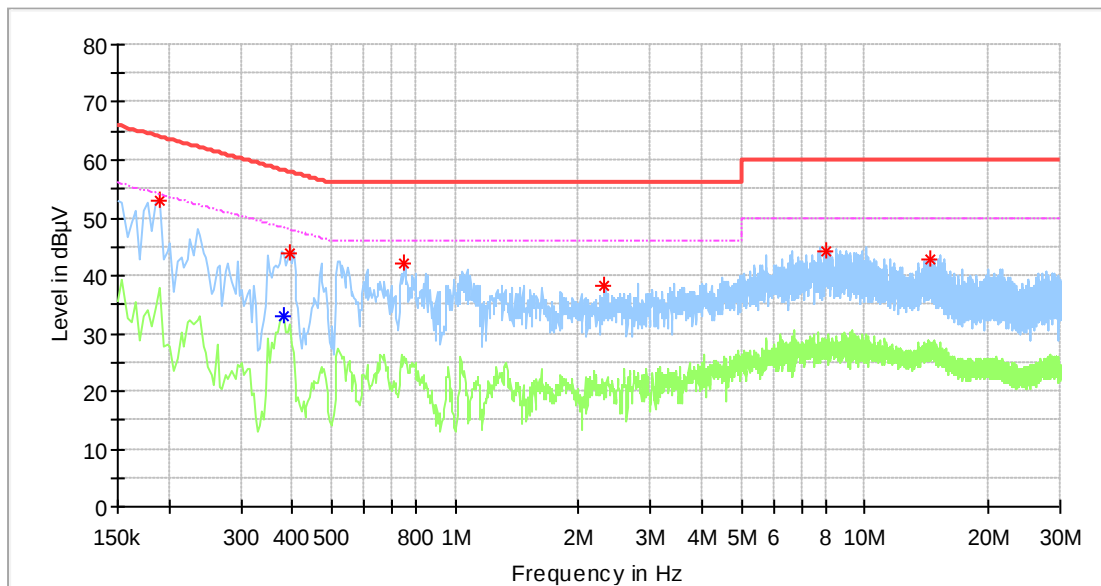
Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

Conducted Emission

Product Type : Robotic Vacuum Cleaner
 M/N : J300
 Operating Condition : Charging
 Test Specification : Power Line, Live
 Test Voltage : AC 120V/60Hz
 Remark : YN-24WA240100EU adapter

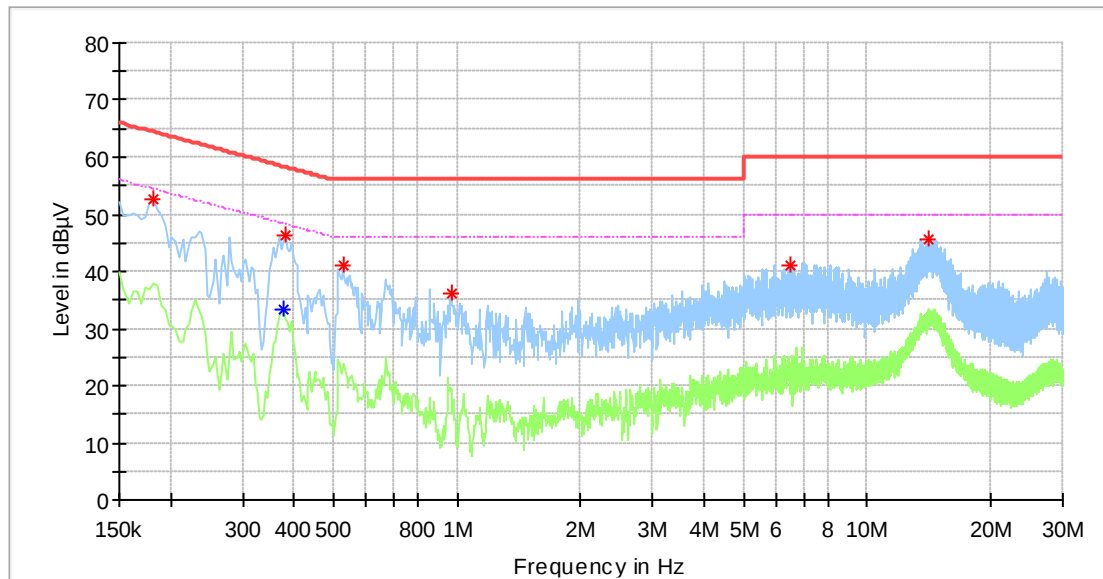


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.190000	52.84	---	64.04	11.20	L1	10.3
0.382000	---	32.83	48.24	15.41	L1	10.3
0.394000	43.93	---	57.98	14.05	L1	10.3
0.750000	42.05	---	56.00	13.95	L1	10.3
2.318000	38.16	---	56.00	17.84	L1	10.4
8.066000	44.31	---	60.00	15.69	L1	10.6
14.510000	42.64	---	60.00	17.36	L1	10.8

Conducted Emission

Product Type : Robotic Vacuum Cleaner
 M/N : J300
 Operating Condition : Charging
 Test Specification : Power Line, Neutral
 Test Voltage : AC 120V/60Hz
 Remark : YN-24WA240100EU adapter

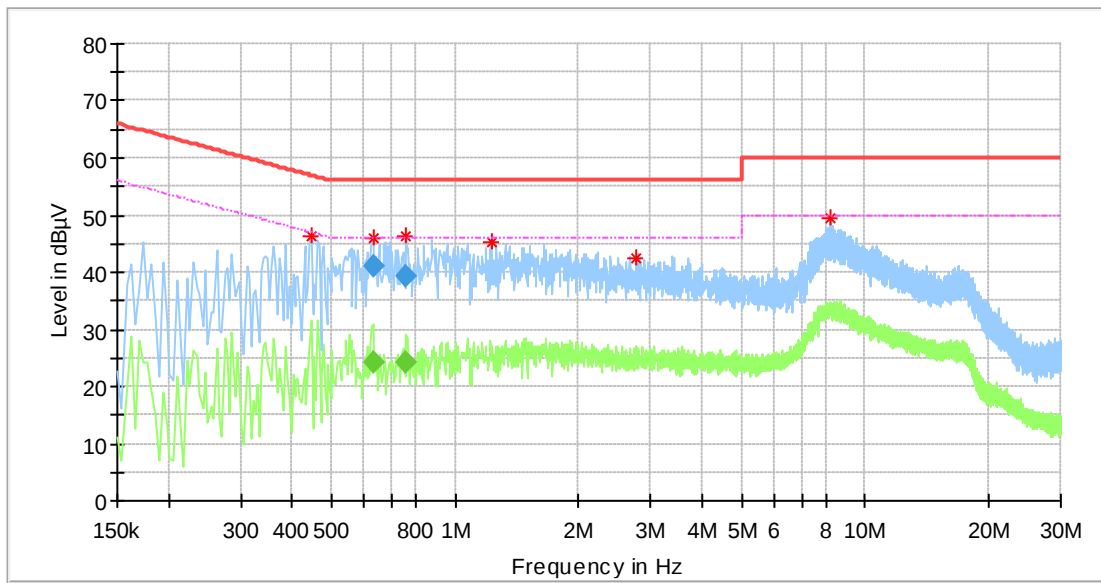


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.182000	52.61	---	64.39	11.78	N	10.3
0.378000	---	33.40	48.32	14.92	N	10.3
0.382000	46.44	---	58.24	11.80	N	10.3
0.526000	40.94	---	56.00	15.06	N	10.3
0.966000	36.31	---	56.00	19.69	N	10.3
6.526000	41.01	---	60.00	18.99	N	10.6
14.094000	45.67	---	60.00	14.33	N	11.0

Conducted Emission

Product Type : Robotic Vacuum Cleaner
 M/N : J300S
 Operating Condition : Charging
 Test Specification : Power Line, Live
 Test Voltage : AC 120V/60Hz
 Remark : YN-24WA240100EU adapter



Critical_Freqs

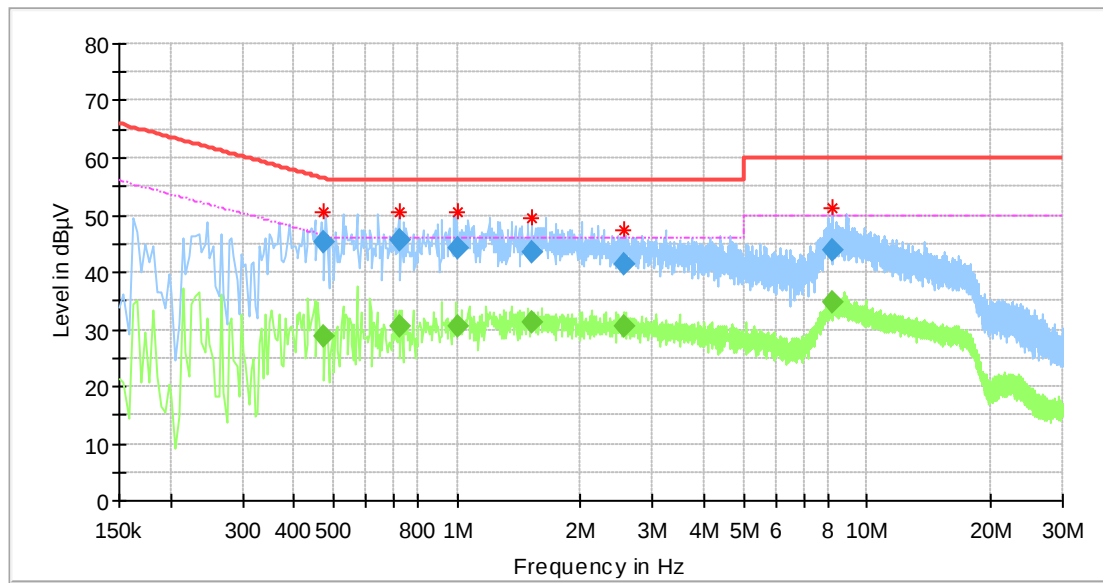
Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.446000	46.33	---	56.95	10.62	L1	10.3
0.630500	46.05	---	56.00	9.95	L1	10.3
0.757500	46.16	---	56.00	9.84	L1	10.3
1.226000	45.31	---	56.00	10.69	L1	10.3
2.774000	42.38	---	56.00	13.62	L1	10.4
8.270000	49.30	---	60.00	10.70	L1	10.6

Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.630500	---	24.13	46.00	21.87	L1	10.3
0.630500	41.13	---	56.00	14.87	L1	10.3
0.757500	---	24.11	46.00	21.89	L1	10.3
0.757500	39.43	---	56.00	16.57	L1	10.3

Conducted Emission

Product Type : Robotic Vacuum Cleaner
 M/N : J300S
 Operating Condition : Charging
 Test Specification : Power Line, Neutral
 Test Voltage : AC 120V/60Hz
 Remark : YN-24WA240100EU adapter



Critical_Freqs

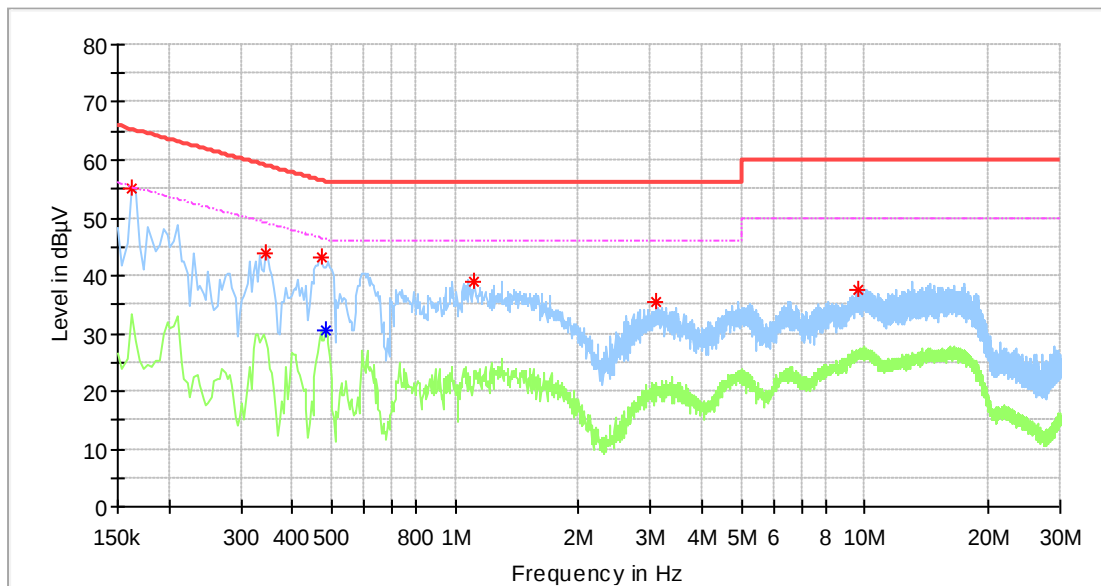
Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.473500	50.55	---	56.37	5.82	N	10.3
0.725500	50.58	---	56.00	5.42	N	10.3
1.002500	50.42	---	56.00	5.58	N	10.3
1.525500	49.65	---	56.00	6.35	N	10.3
2.553500	47.32	---	56.00	8.68	N	10.4
8.205500	51.25	---	60.00	8.75	N	10.7

Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.473500	---	28.72	46.45	17.73	N	10.3
0.473500	45.12	---	56.45	11.33	N	10.3
0.725500	---	30.40	46.00	15.60	N	10.3
0.725500	45.48	---	56.00	10.52	N	10.3
1.002500	---	30.51	46.00	15.49	N	10.3
1.002500	44.25	---	56.00	11.75	N	10.3
1.525500	---	31.29	46.00	14.71	N	10.3
1.525500	43.53	---	56.00	12.47	N	10.3
2.553500	---	30.44	46.00	15.56	N	10.4
2.553500	41.23	---	56.00	14.77	N	10.4
8.205500	---	34.89	50.00	15.11	N	10.7
8.205500	43.80	---	60.00	16.20	N	10.7

Conducted Emission

Product Type : Robotic Vacuum Cleaner
 M/N : J306
 Operating Condition : Charging
 Test Specification : Power Line, Live
 Test Voltage : AC 120V/60Hz
 Remark : NLD100240W1U4 adapter

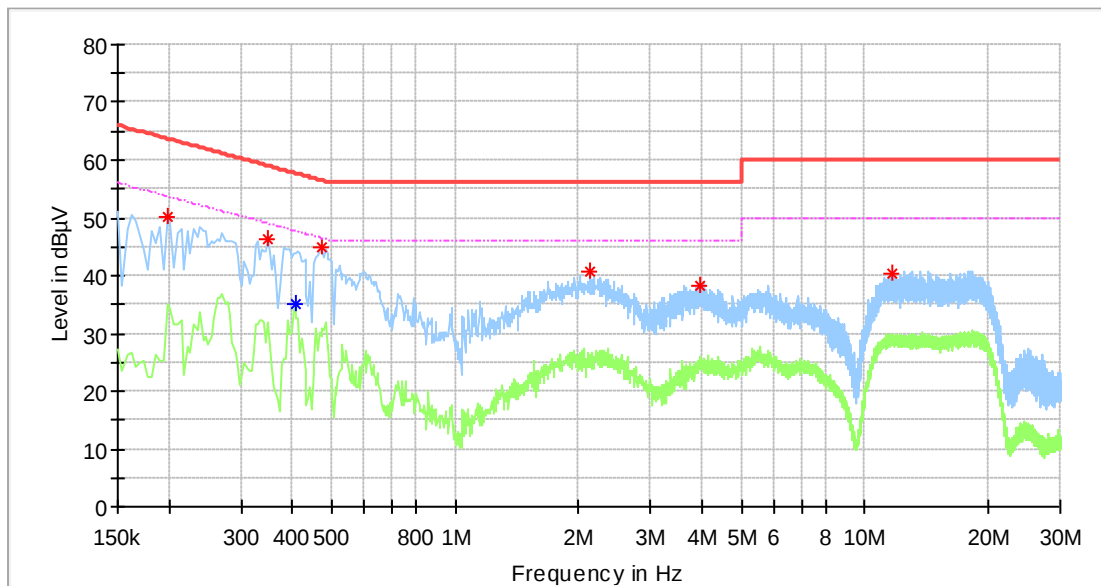


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.162000	55.14	---	65.36	10.22	L1	10.3
0.346000	43.98	---	59.06	15.08	L1	10.3
0.470000	43.19	---	56.51	13.32	L1	10.3
0.482000	---	30.62	46.30	15.69	L1	10.3
1.110000	38.84	---	56.00	17.16	L1	10.3
3.102000	35.38	---	56.00	20.62	L1	10.4
9.638000	37.59	---	60.00	22.41	L1	10.7

Conducted Emission

Product Type : Robotic Vacuum Cleaner
 M/N : J306
 Operating Condition : Charging
 Test Specification : Power Line, Neutral
 Test Voltage : AC 120V/60Hz
 Remark : NLD100240W1U4 adapter



Critical Freqs

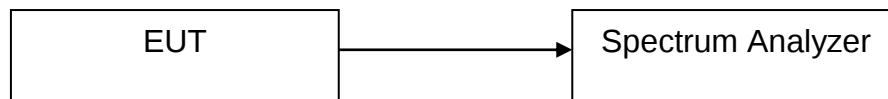
Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.198000	50.05	---	63.69	13.64	N	10.3
0.350000	46.40	---	58.96	12.56	N	10.3
0.406000	---	35.04	47.73	12.69	N	10.3
0.470000	44.93	---	56.51	11.58	N	10.3
2.130000	40.75	---	56.00	15.25	N	10.4
3.958000	38.30	---	56.00	17.70	N	10.5
11.670000	40.25	---	60.00	19.75	N	10.9

9.2 Conducted Peak output power

Test Method

1. The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Setting the highest output power level of the EUT
3. Use the following spectrum analyzer settings:
RBW $\geq$ DTS bandwidth, VBW $\geq$ 3RBW, Sweep = auto, Detector function = peak, Trace = max hold, allow trace to fully stabilize.
4. Record the peak power value.

Test Setup



Limits

According to §15.247 (b) (3), conducted AV output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

Test result as below table:

802.11b:

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	10.42	Pass
Middle channel 2437MHz	12.63	Pass
Bottom channel 2462MHz	12.24	Pass

802.11g:

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	6.27	Pass
Middle channel 2437MHz	6.96	Pass
Bottom channel 2462MHz	6.34	Pass

802.11nHT20:

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	5.74	Pass
Middle channel 2437MHz	4.82	Pass
Bottom channel 2462MHz	4.09	Pass

802.11nHT40:

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2422MHz	3.47	Pass
Middle channel 2437MHz	3.83	Pass
Bottom channel 2452MHz	3.15	Pass

9.3 6dB and 99% bandwidth

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Use the following spectrum analyzer settings:
Set RBW $\geq 1\%$ of the 99% bandwidth, VBW $\geq$ RBW.
Sweep = auto, Detector function = peak, Trace = max hold
3. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
4. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

Limit [kHz]

≥ 500

Test result

802.11b

Frequency MHz	6dB bandwidth MHz	99% bandwidth MHz	Result
Bottom channel 2412MHz	9.120	13.506	Pass
Middle channel 2437MHz	9.120	13.626	Pass
Top channel 2462MHz	8.600	13.467	Pass

802.11g

Frequency MHz	6dB bandwidth MHz	99% bandwidth MHz	Result
Bottom channel 2412MHz	16.440	17.383	Pass
Middle channel 2437MHz	16.440	17.423	Pass
Top channel 2462MHz	16.440	17.502	Pass

802.11nHT20

Frequency MHz	6dB bandwidth MHz	99% bandwidth MHz	Result
Bottom channel 2412MHz	16.440	17.502	Pass
Middle channel 2437MHz	17.640	18.302	Pass
Top channel 2462MHz	17.640	18.262	Pass

802.11nHT40

Frequency MHz	6dB bandwidth MHz	99% bandwidth MHz	Result
Bottom channel 2422MHz	36.240	36.763	Pass
Middle channel 2437MHz	36.240	36.603	Pass
Top channel 2452MHz	36.000	36.603	Pass

Test Graphs:

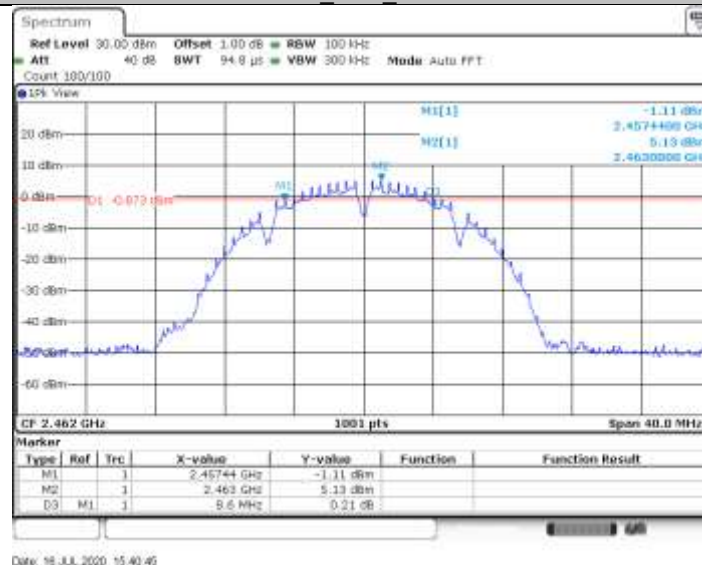
11B_Ant1_2412



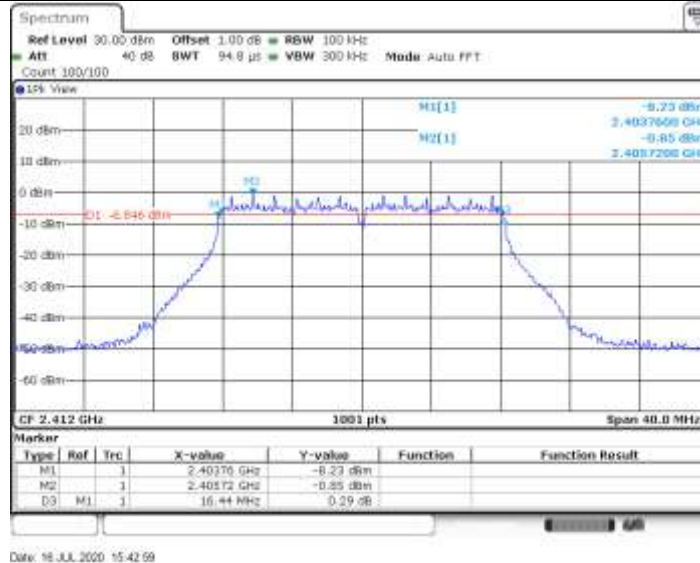
11B_Ant1_2437



11B_Ant1_2462



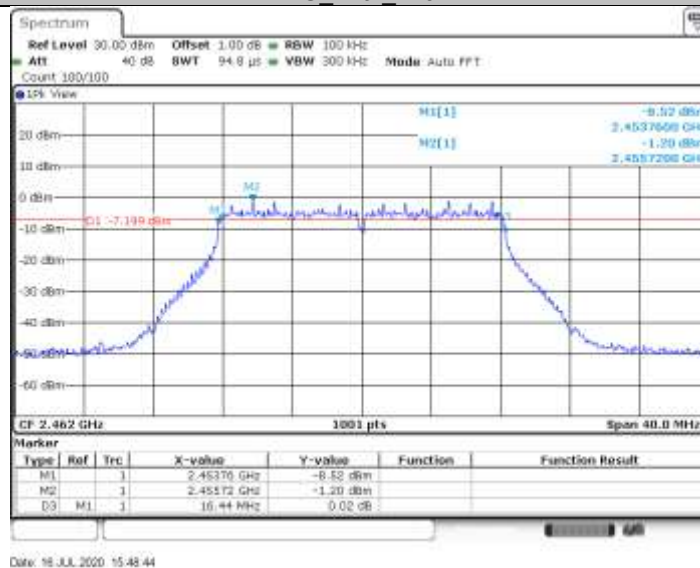
11G Ant1 2412



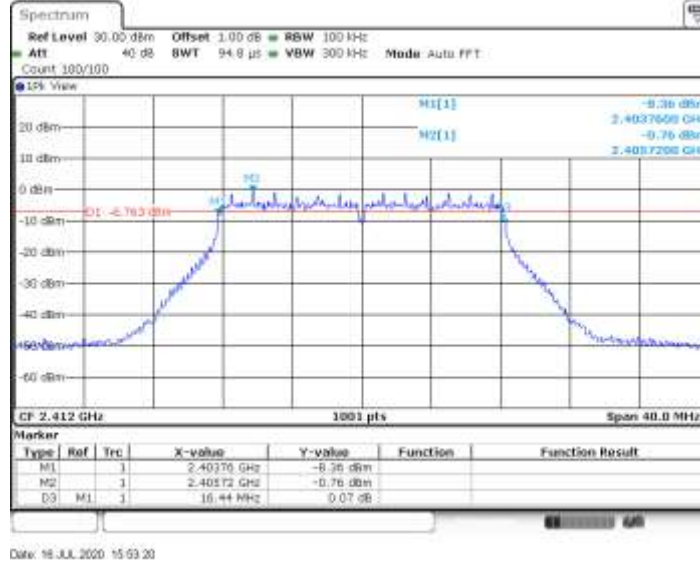
11G Ant1 2437



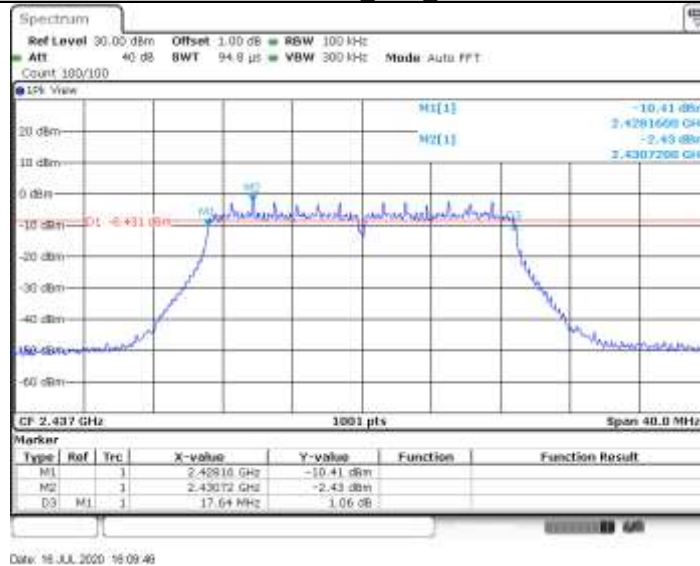
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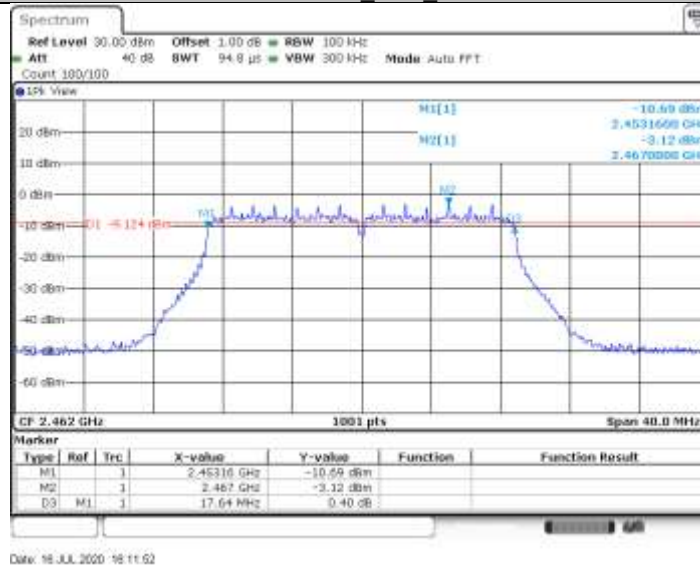
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11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

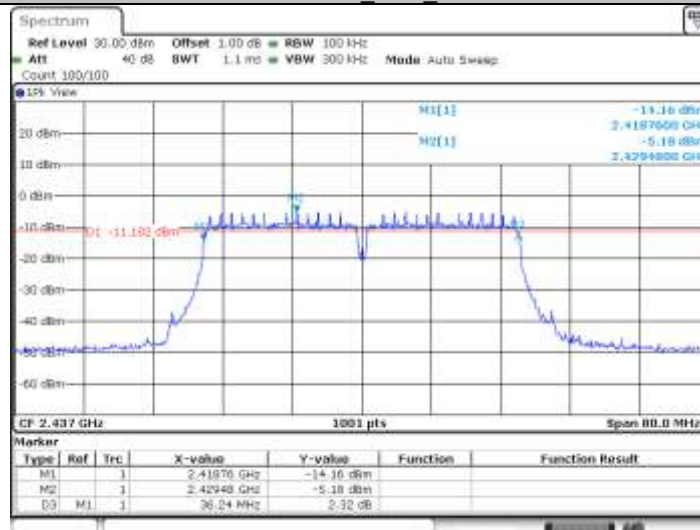


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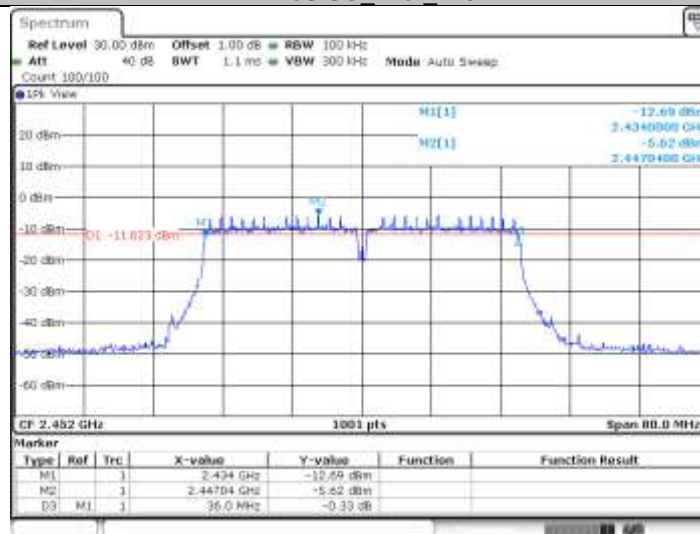
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11N40SISO_Ant1_2437



Date: 16 JUL 2020 16:16:14

11N40SISO_Ant1_2452



Date: 16 JUL 2020 16:18:02

9.4 Power spectral density

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
3. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
4. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm/3KHz]

≤8

Test result

802.11b

Frequency MHz	Power spectral density dBm/10kHz	Result
Top channel 2412MHz	-16.84	Pass
Middle channel 2437MHz	-14.81	Pass
Bottom channel 2462MHz	-15.23	Pass

802.11g

Frequency MHz	Power spectral density dBm/10kHz	Result
Top channel 2412MHz	-19.5	Pass
Middle channel 2437MHz	-19.66	Pass
Bottom channel 2462MHz	-19.25	Pass

802.11nHT20

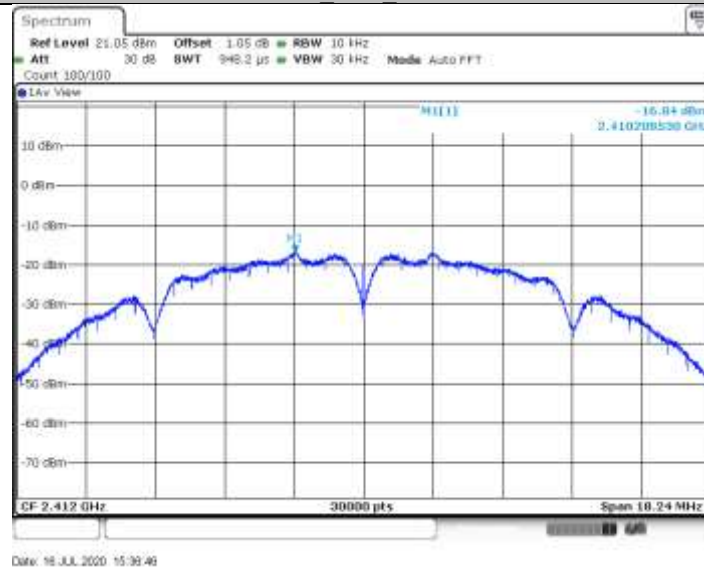
Frequency MHz	Power spectral density dBm/10kHz	Result
Top channel 2412MHz	-19.28	Pass
Middle channel 2437MHz	-20.13	Pass
Bottom channel 2462MHz	-19.9	Pass

802.11nHT40

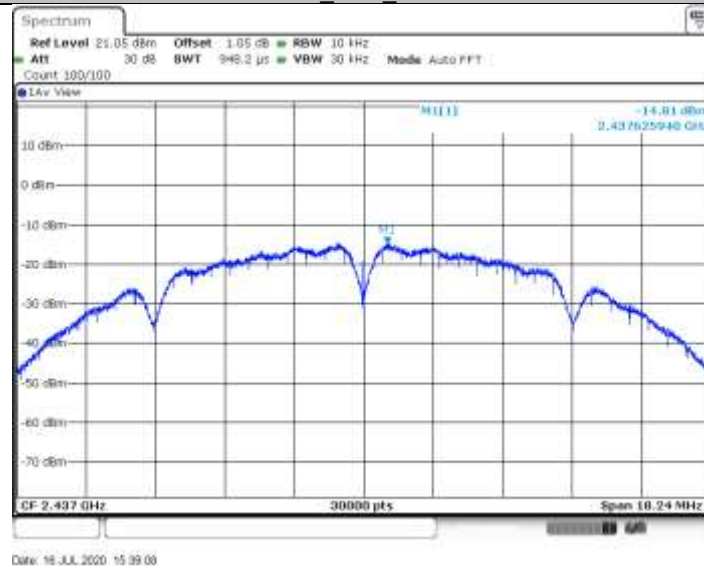
Frequency MHz	Power spectral density dBm/10kHz	Result
Top channel 2422MHz	-20.82	Pass
Middle channel 2437MHz	-21.52	Pass
Bottom channel 2452MHz	-21.15	Pass

Test Graphs:

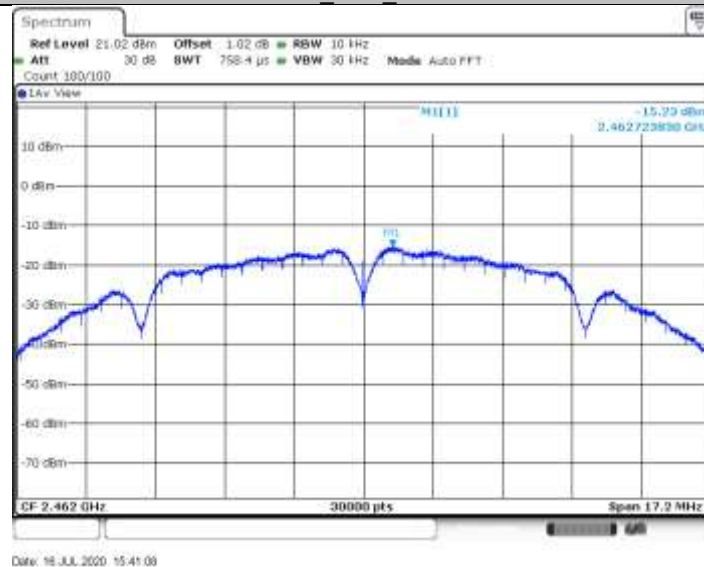
11B_Ant1_2412



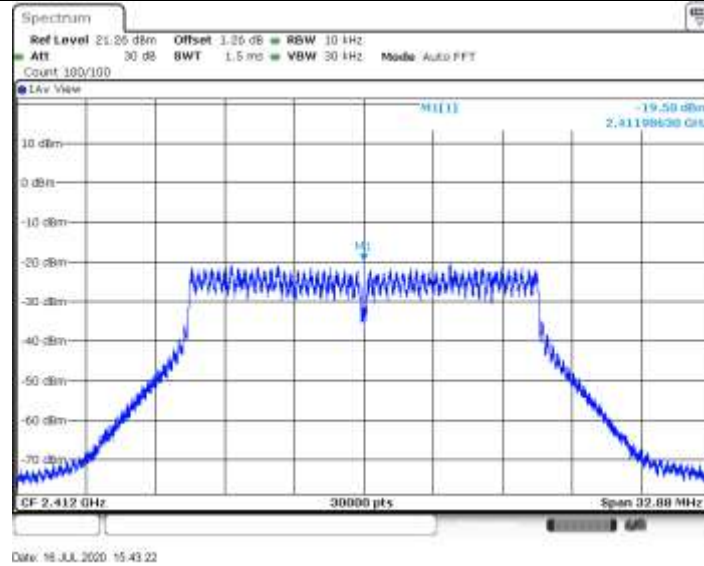
11B_Ant1_2437



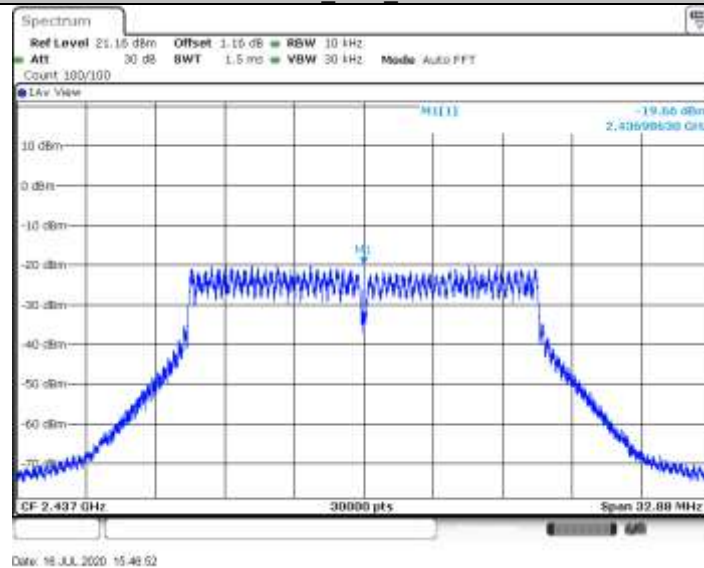
11B_Ant1_2462



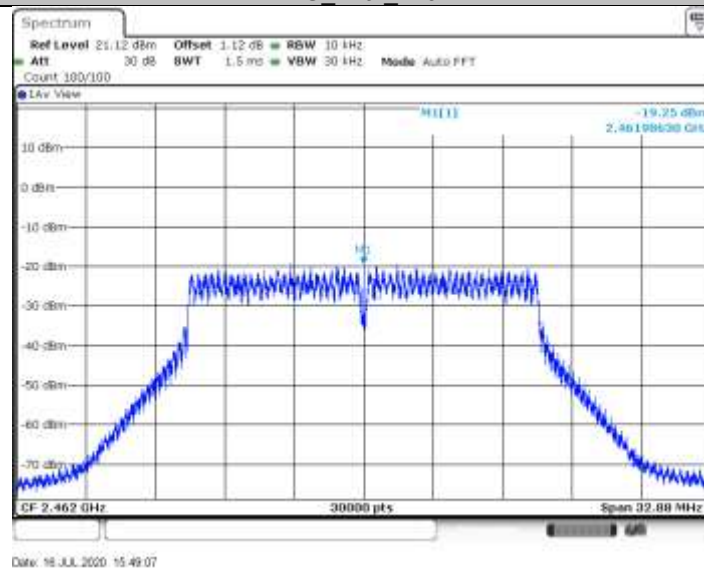
11G Ant1 2412



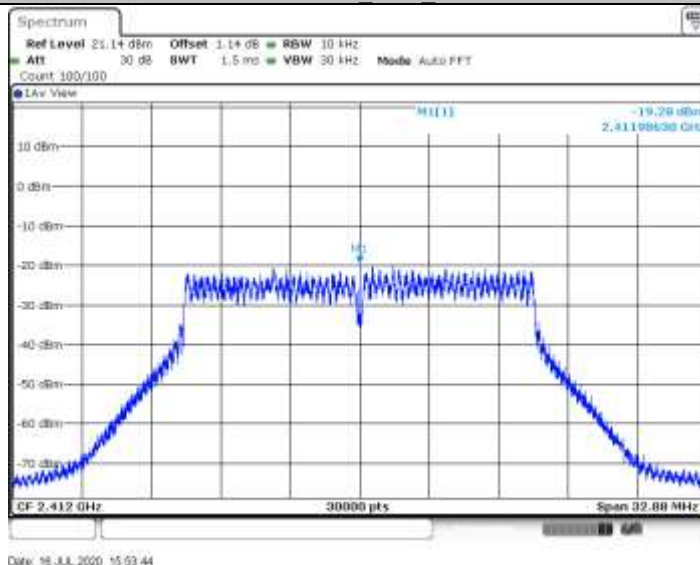
11G Ant1 2437



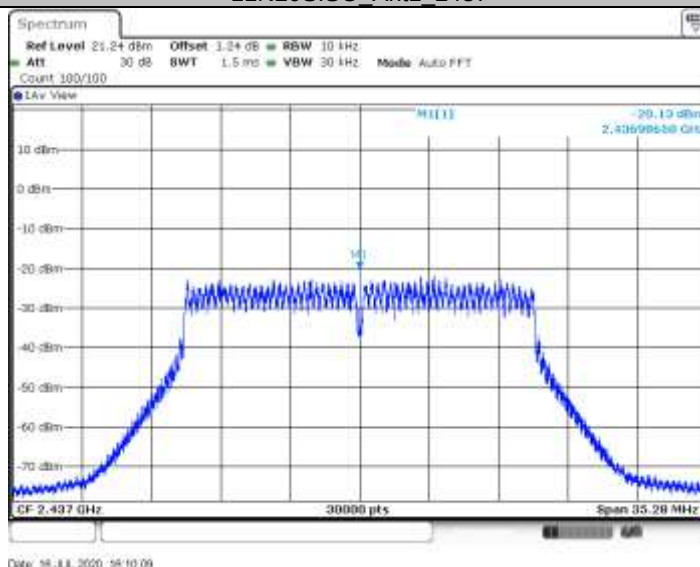
11G Ant1 2462



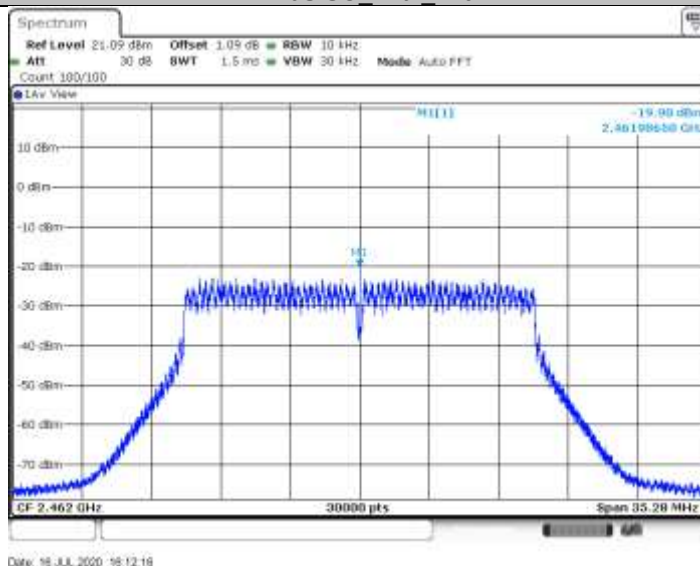
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



Spectrum

Ref Level 25.51 dBm Offset 3.51 dB RBW 10 kHz
 Att 30 dB BW 3.2 ms VBW 30 kHz Mode Auto FFT
 Count 100/100

• Live View

10 dBm
 0 dBm
 -10 dBm
 -20 dBm
 -30 dBm
 -40 dBm
 -50 dBm
 -60 dBm
 -70 dBm

CF 2.422 GHz 30000 pts Span 72.48 MHz

MU111
 -29.02 dBm
 2.82198678 GHz

Date: 16 JUL 2020 16:14:42

Spectrum

Ref Level 25.63 dBm Offset 1.65 dB RBW 10 kHz
 Att 30 dB BW 3.2 ms VBW 30 kHz Mode Auto FFT
 Count 100/100

• Live View

12 dBm
 0 dBm
 -10 dBm
 -20 dBm
 -30 dBm
 -40 dBm
 -50 dBm
 -60 dBm
 -70 dBm

2.437 GHz 30000 pts Span 72.40 MHz

-21.52 dBm
 2.43699478 GHz

Date: 18 JUL 2020 16:16:37

Spectrum

Ref Level 21.37 dBm Offset 1.37 dB RBW 10 kHz

Att 30 dB BWT 3.2 ms VBW 30 kHz Mode Auto FFT

Count 100/100

Live View

10 dBm

0 dBm

-10 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

CF 2.452 GHz

30000 pts

Span 72.0 MHz

M111

-21.15 dBm

2.45195880 GHz

Date: 18 JUL 2020 16:18:25

9.5 Spurious RF conducted emissions

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
 - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
3. Use the maximum PSD level to establish the reference level.
 - a. Set the center frequency and span to encompass frequency range to be measured.
 - b. 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.
4. Repeat above procedures until other frequencies measured were completed.

Limit

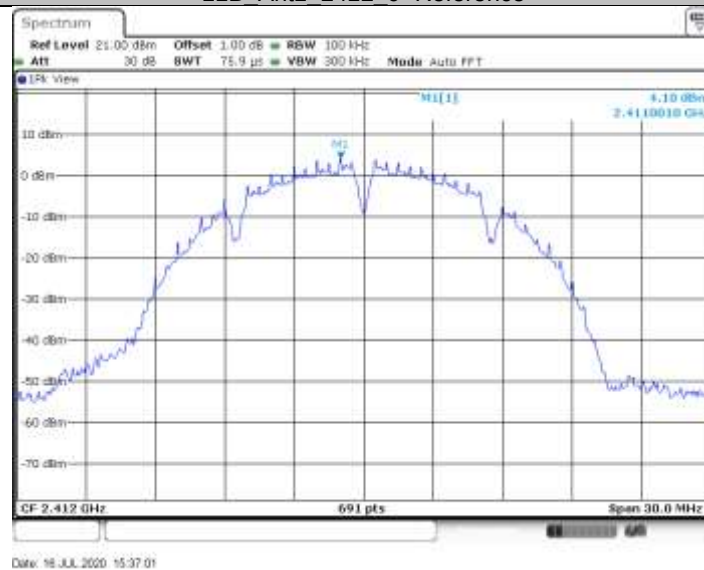
Frequency Range MHz	Limit (dBc)
30-25000	-20

Test Result

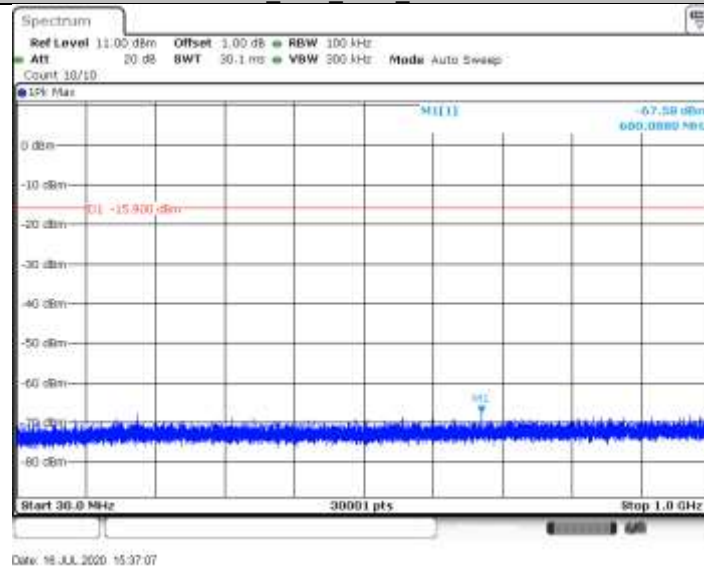
Test Mode	Antenna	Channel (MHz)	Freq Range (MHz)	Ref Level (MHz)	Result (dBm)	Limit (dBm)	Verdict
11B	Ant1	2412	30~1000	30~1000	-67.58	<=-15.9	PASS
		2412	1000~26500	1000~26500	-42.41	<=-15.9	PASS
		2437	30~1000	30~1000	-67.92	<=-14.25	PASS
		2437	1000~26500	1000~26500	-42.89	<=-14.25	PASS
		2462	30~1000	30~1000	-67.75	<=-14.58	PASS
		2462	1000~26500	1000~26500	-45.14	<=-14.58	PASS
11G	Ant1	2412	30~1000	30~1000	-67.71	<=-20.77	PASS
		2412	1000~26500	1000~26500	-39.87	<=-20.77	PASS
		2437	30~1000	30~1000	-67.89	<=-21.85	PASS
		2437	1000~26500	1000~26500	-52.68	<=-21.85	PASS
		2462	30~1000	30~1000	-68.14	<=-21.22	PASS
		2462	1000~26500	1000~26500	-52.33	<=-21.22	PASS
11N20SISO	Ant1	2412	30~1000	30~1000	-68.27	<=-20.91	PASS
		2412	1000~26500	1000~26500	-39.13	<=-20.91	PASS
		2437	30~1000	30~1000	-67.92	<=-22.83	PASS
		2437	1000~26500	1000~26500	-51.9	<=-22.83	PASS
		2462	30~1000	30~1000	-68.47	<=-23.13	PASS
		2462	1000~26500	1000~26500	-51.8	<=-23.13	PASS
11N40SISO	Ant1	2422	30~1000	30~1000	-68.19	<=-25.84	PASS
		2422	1000~26500	1000~26500	-40.17	<=-25.84	PASS
		2437	30~1000	30~1000	-67.3	<=-25.46	PASS
		2437	1000~26500	1000~26500	-51.69	<=-25.46	PASS
		2452	30~1000	30~1000	-67.97	<=-25.63	PASS
		2452	1000~26500	1000~26500	-52.26	<=-25.63	PASS

Test Graphs:

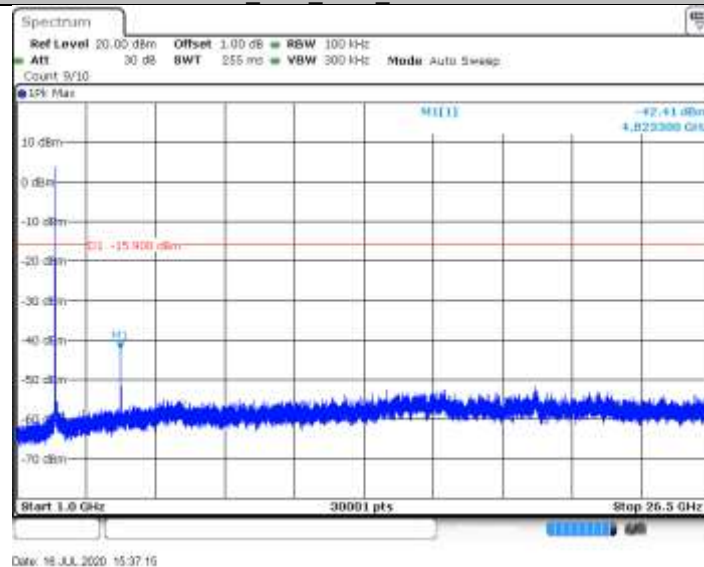
11B_Ant1_2412_0~Reference



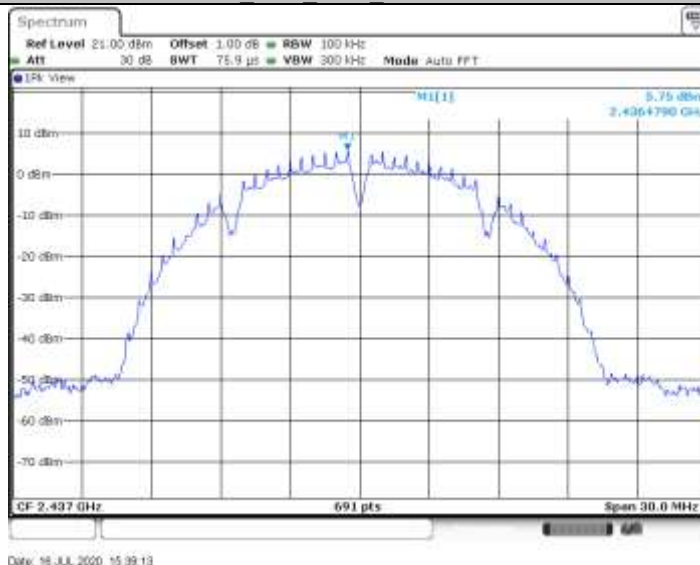
11B_Ant1_2412_30~1000



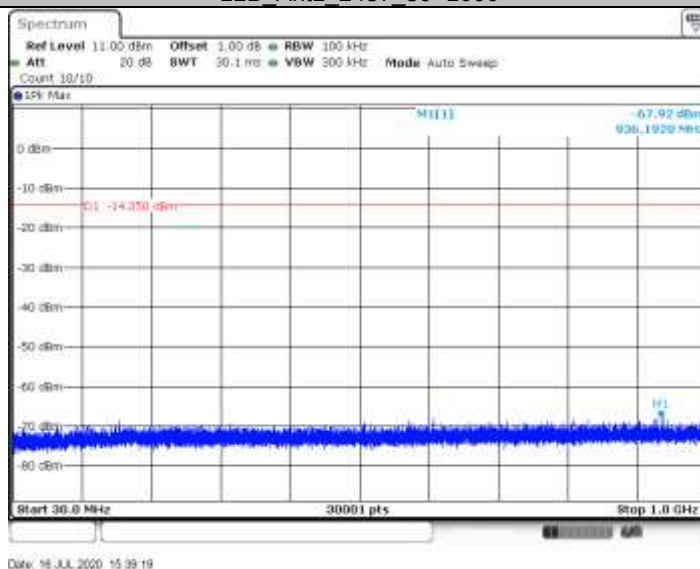
11B_Ant1_2412_1000~26500



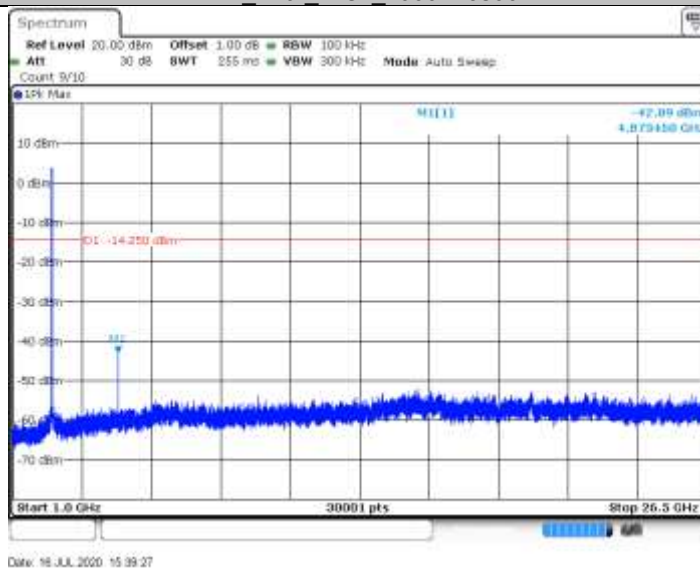
11B_Ant1_2437_0-Reference



11B_Ant1_2437_30-1000



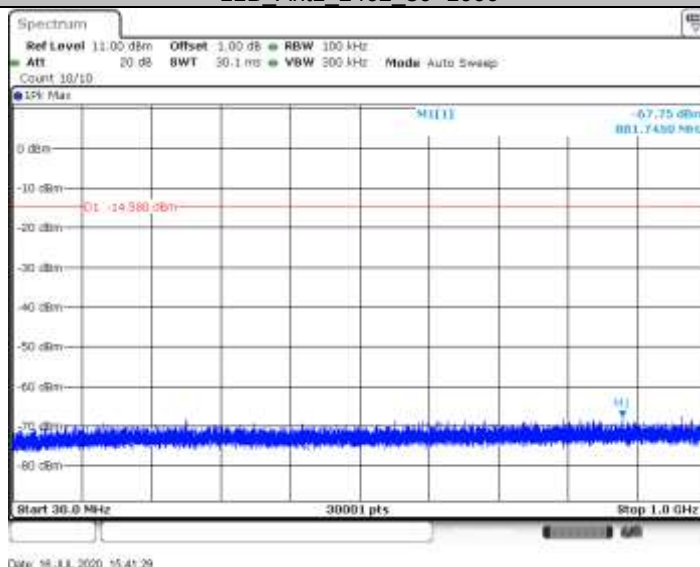
11B_Ant1_2437_1000-26500



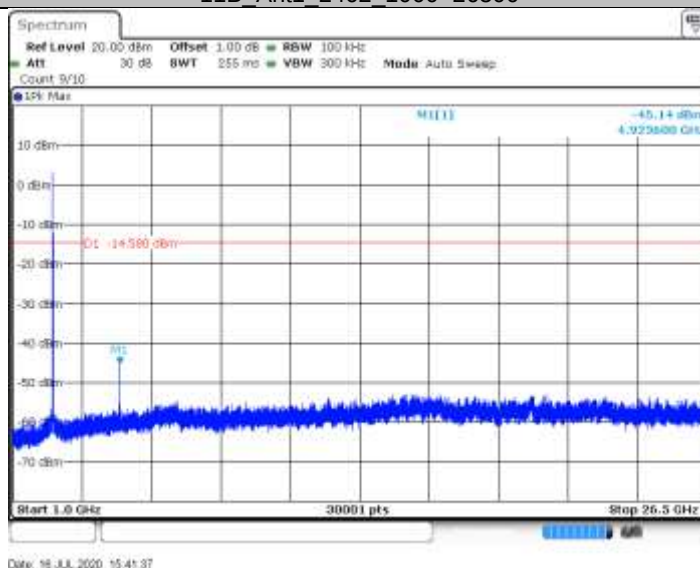
11B_Ant1_2462_0-Reference



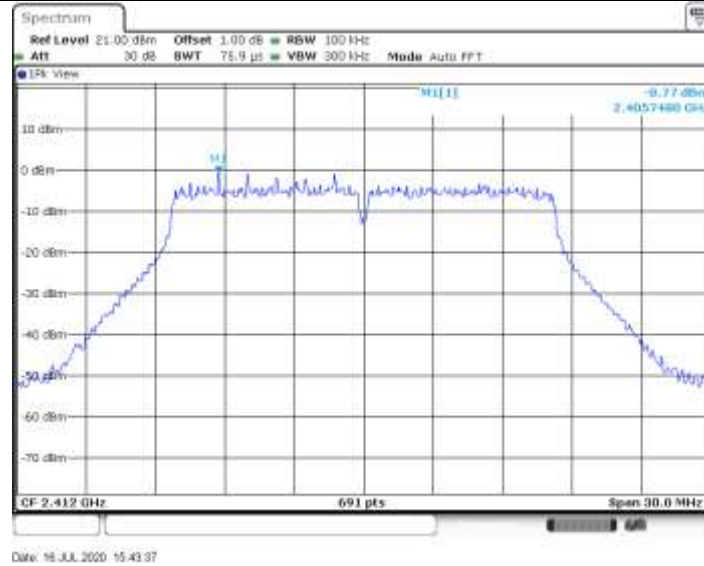
11B_Ant1_2462_30-1000



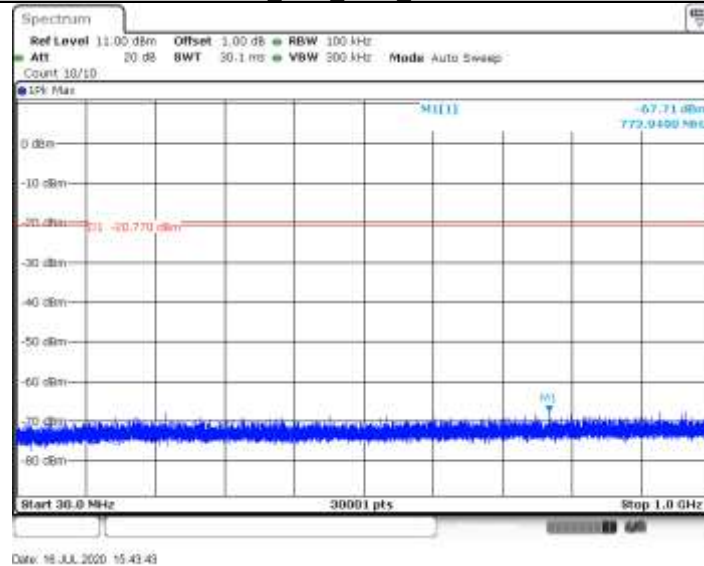
11B_Ant1_2462_1000-26500



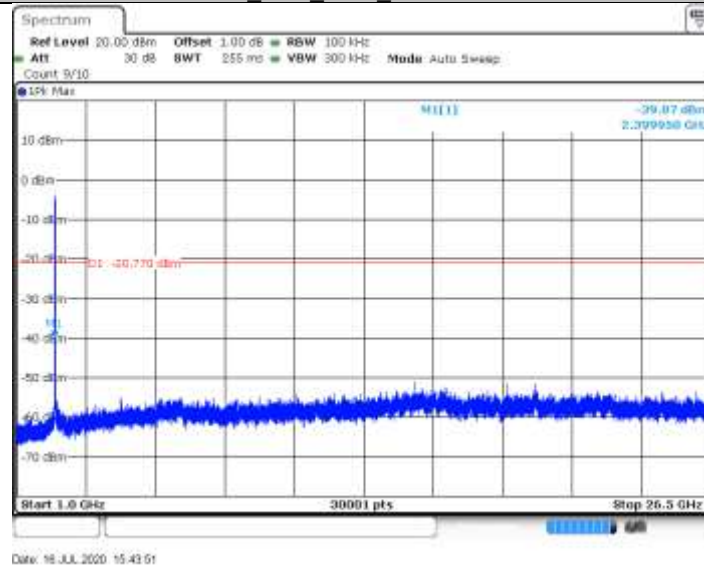
11G_Ant1_2412_0-Reference



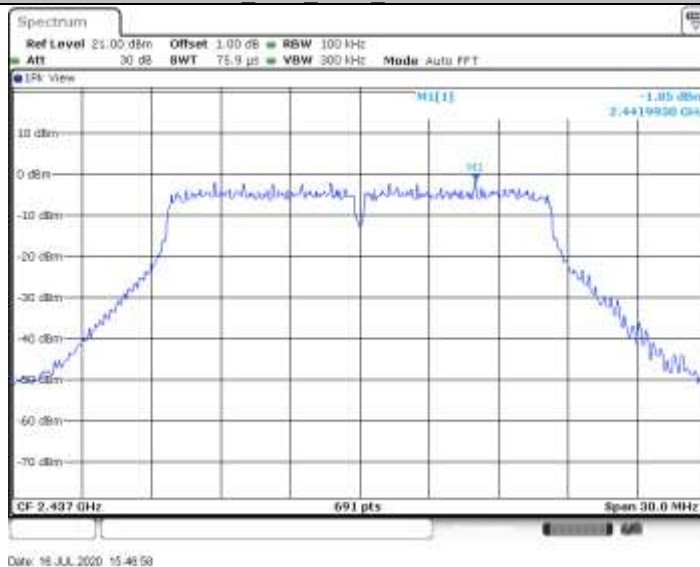
11G_Ant1_2412_30-1000



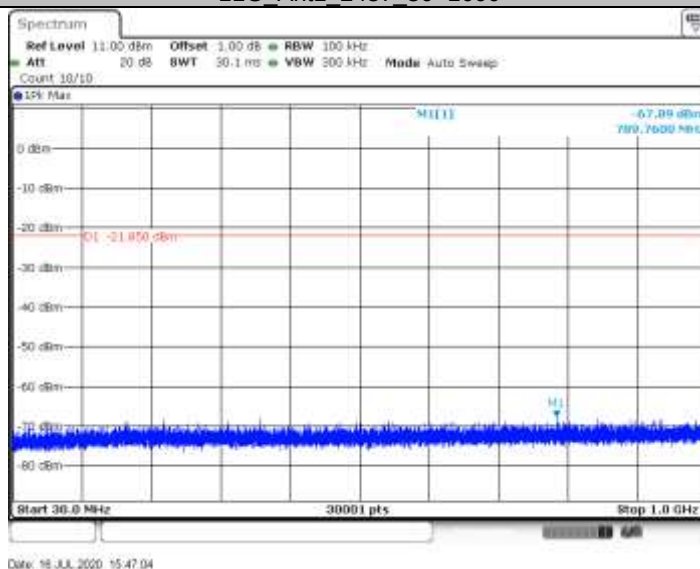
11G_Ant1_2412_1000-26500



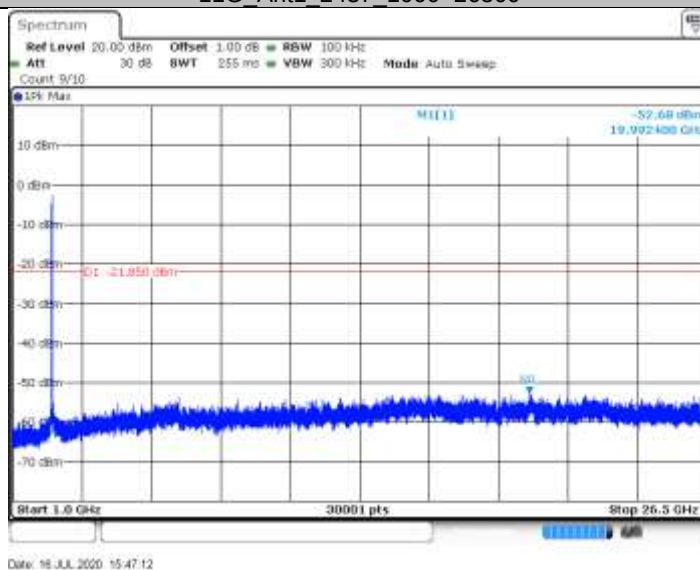
11G_Ant1_2437_0-Reference



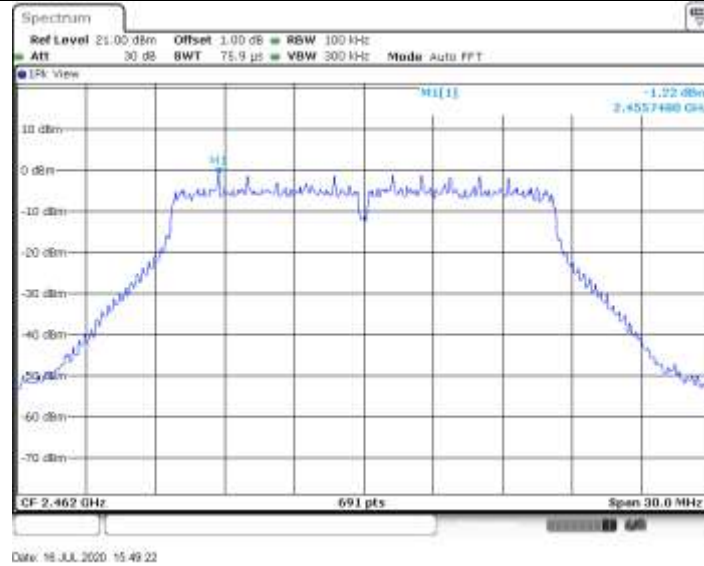
11G_Ant1_2437_30-1000



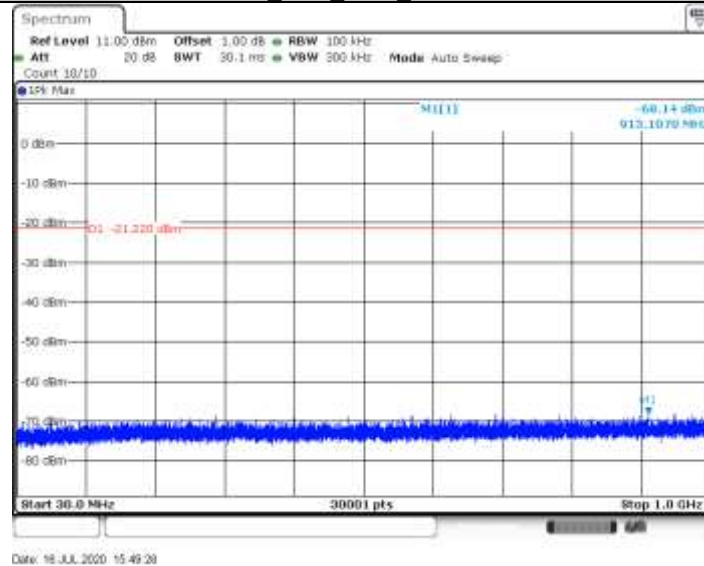
11G_Ant1_2437_1000-26500



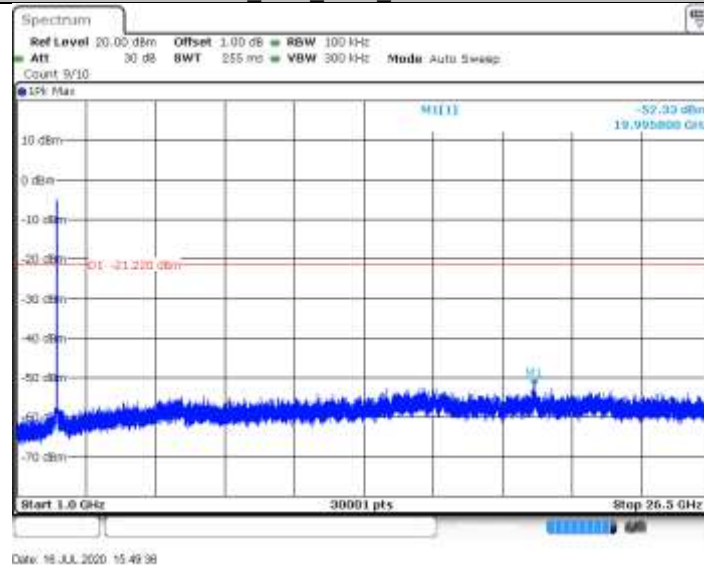
11G_Ant1_2462_0-Reference



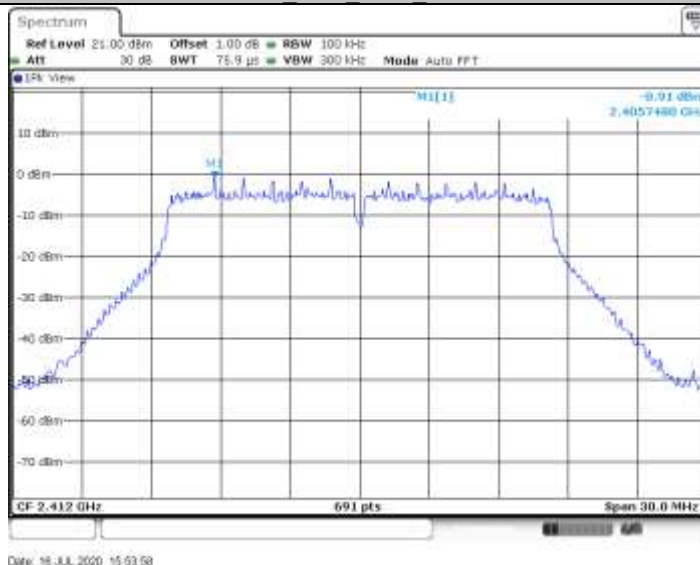
11G_Ant1_2462_30-1000



11G_Ant1_2462_1000-26500

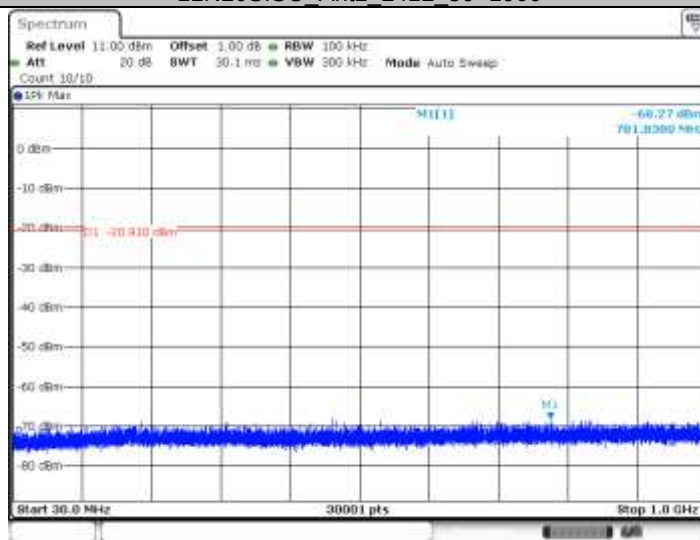


11N20SISO Ant1 2412 0~Reference



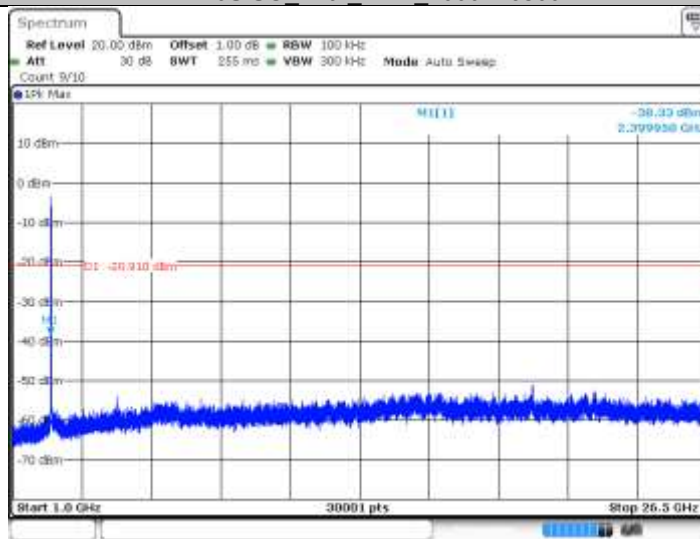
Date: 16 JUL 2020 15:53:58

11N20SISO Ant1 2412 30~1000



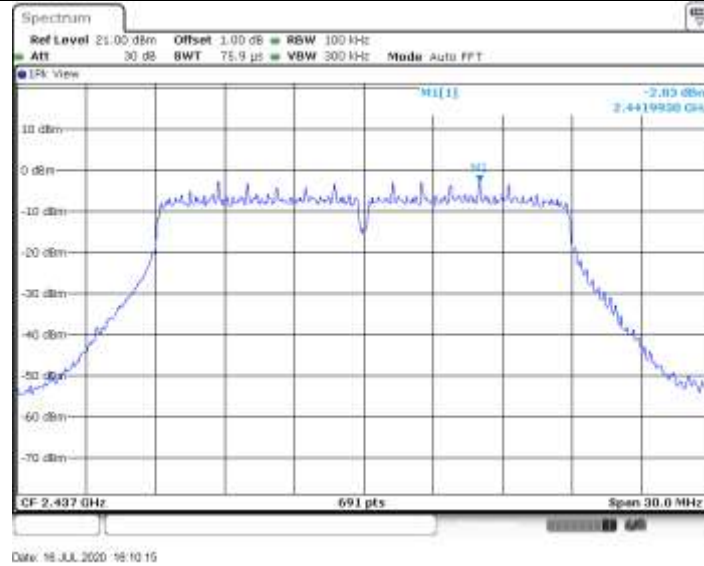
Date: 16 JUL 2020 15:54:04

11N20SISO Ant1 2412 1000~26500

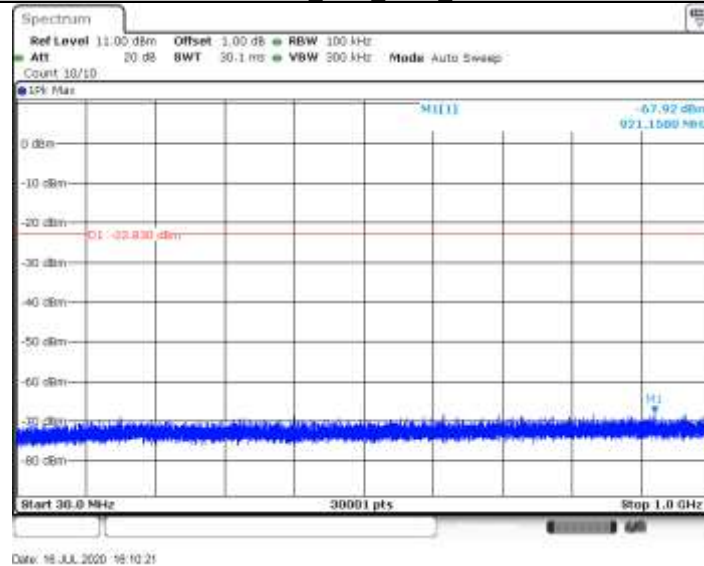


Date: 16 JUL 2020 15:54:12

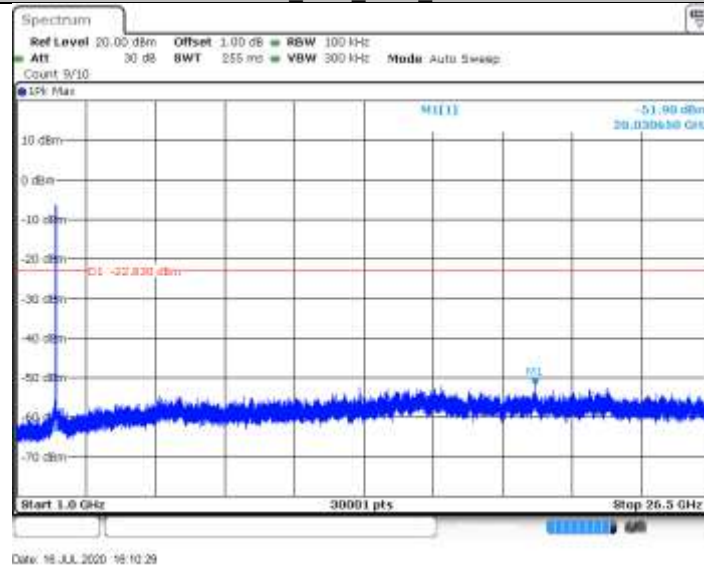
11N20SISO Ant1 2437 0-Reference



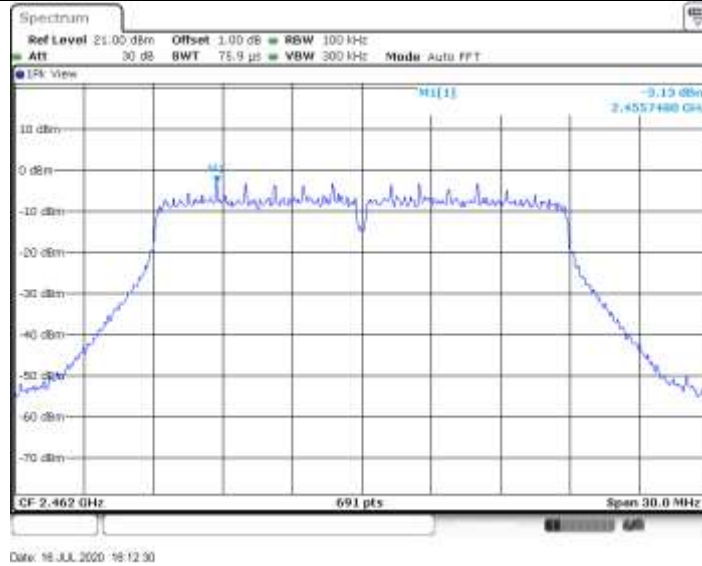
11N20SISO Ant1 2437 30-1000



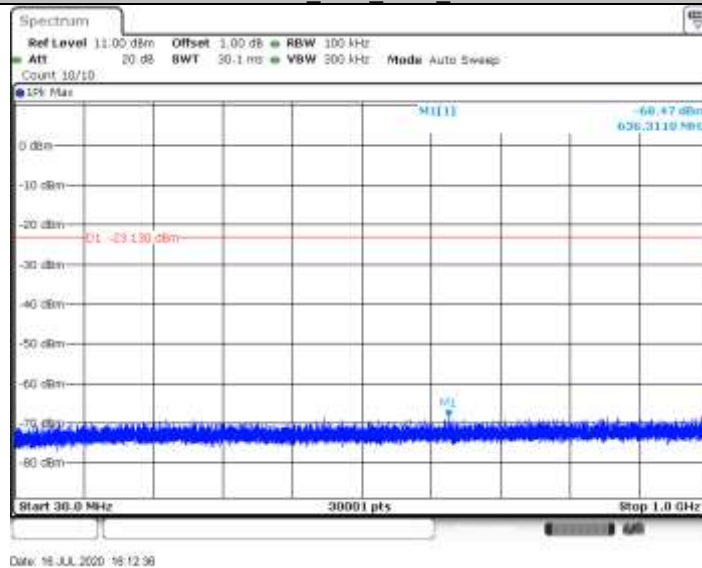
11N20SISO Ant1 2437 1000-26500



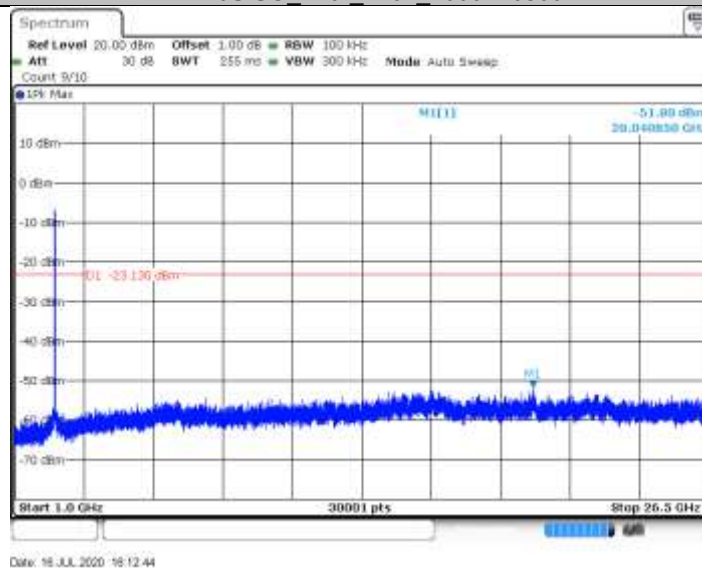
11N20SISO Ant1 2462 0~Reference



11N20SISO Ant1 2462 30~1000



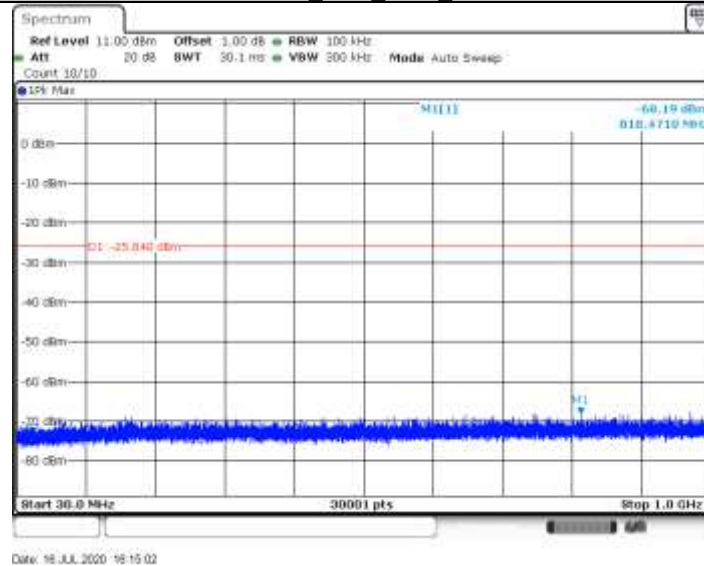
11N20SISO Ant1 2462 1000~26500



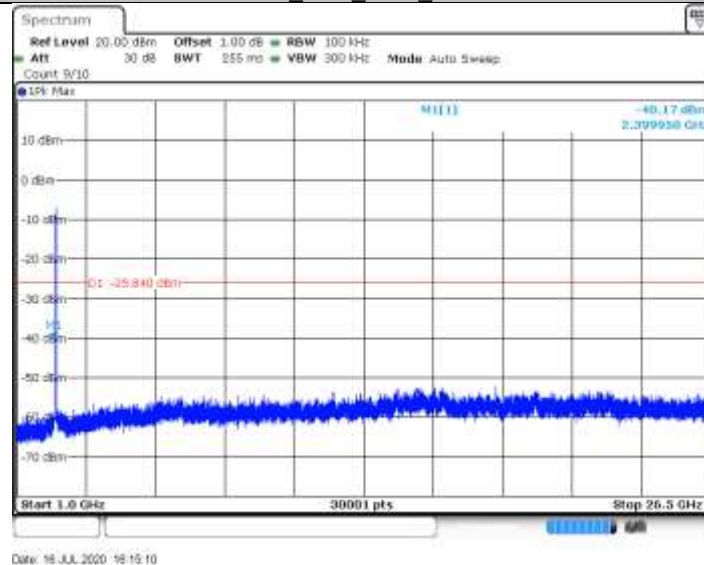
11N40SISO Ant1 2422 0-Reference



11N40SISO Ant1 2422 30-1000



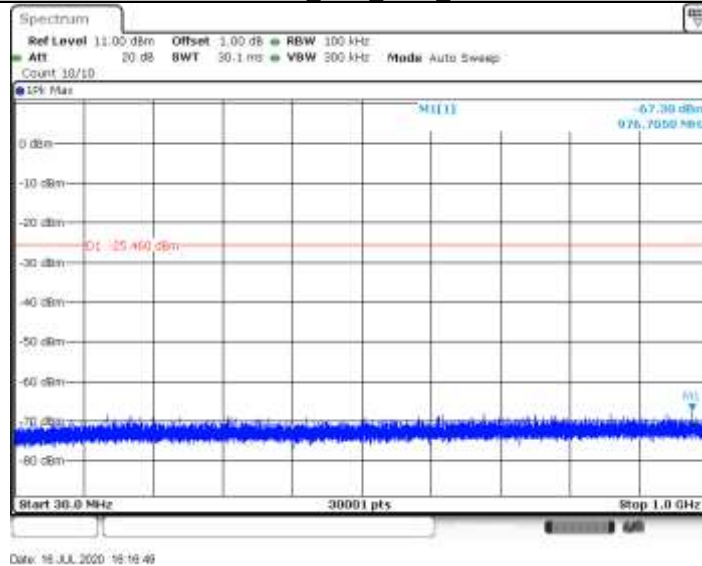
11N40SISO Ant1 2422 1000-26500



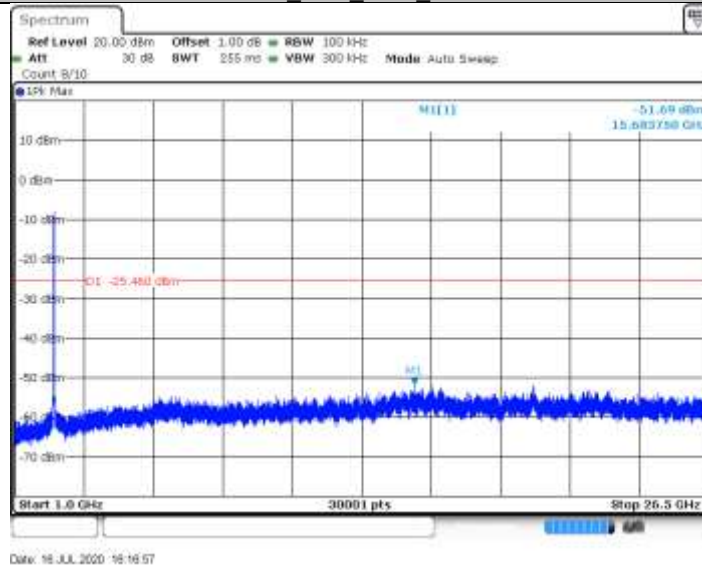
11N40SISO Ant1 2437 0-Reference



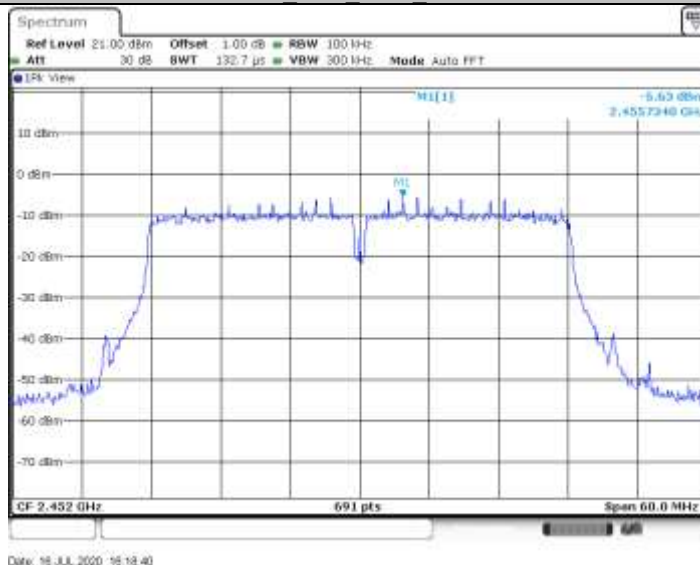
11N40SISO Ant1 2437 30-1000



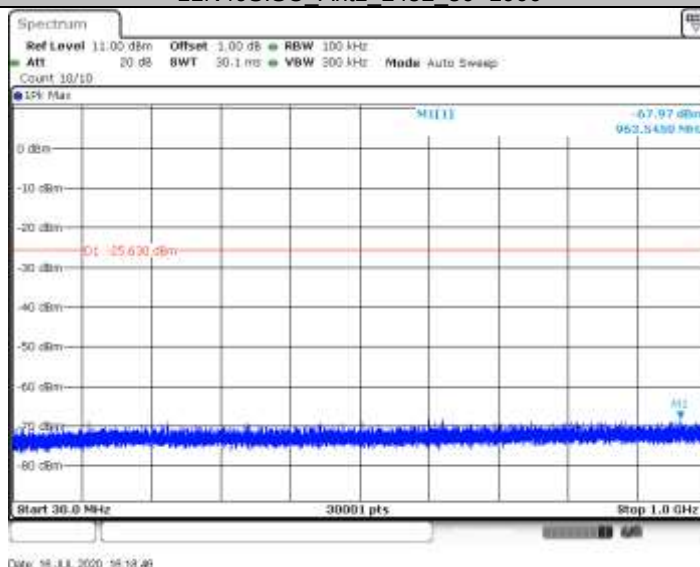
11N40SISO Ant1 2437 1000-26500



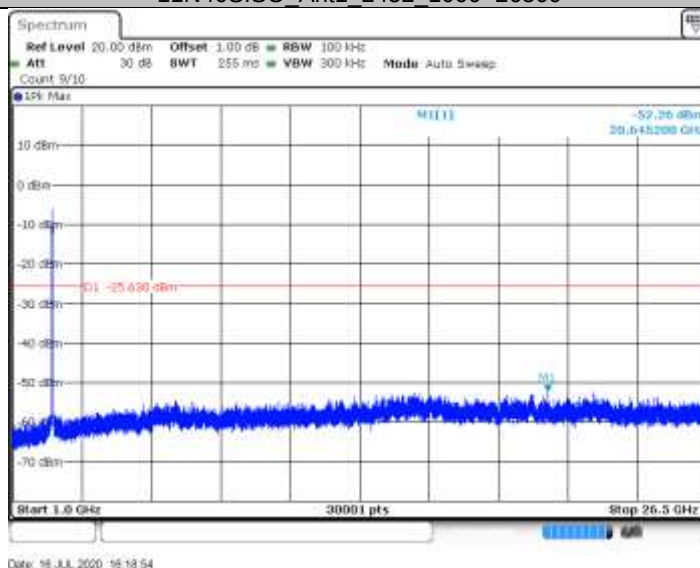
11N40SISO Ant1 2452 0-Reference



11N40SISO Ant1 2452 30-1000



11N40SISO Ant1 2452 1000-26500



9.6 Band edge

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Set spectrum analyzer setting as below:
Set RBW $\geq$ 1% of the span, VBW $\geq$ RBW.
Set Sweep = auto. Set Detector function = peak. Allow the trace to stabilize.
Set Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
3. Repeat above procedures until all frequencies measured were complete.

Limit

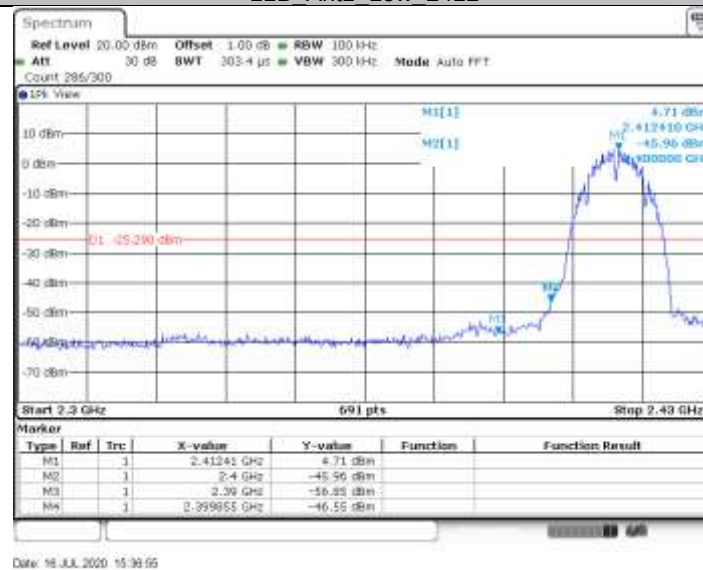
Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result

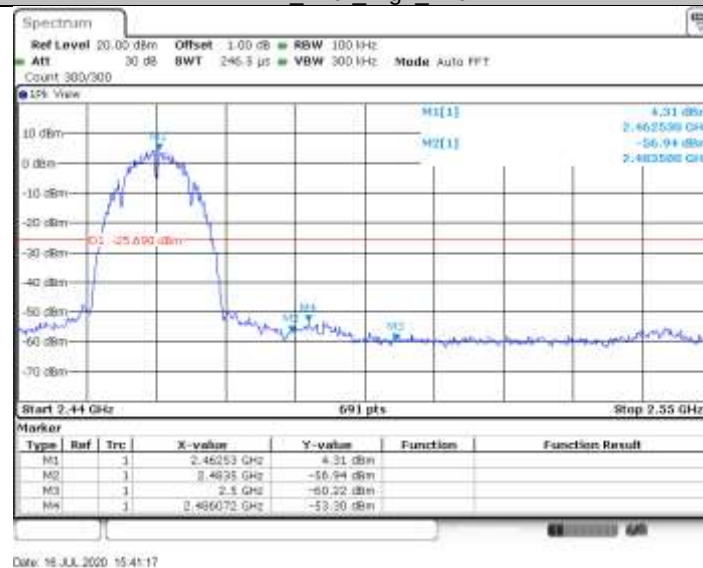
Test Mode	Antenna	Ch Name	Channel (MHz)	Ref Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
11B	Ant1	Low	2412	4.71	-46.55	≤ -25.29	PASS
		High	2462	4.31	-53.3	≤ -25.69	PASS
11G	Ant1	Low	2412	-2.97	-43.45	≤ -32.97	PASS
		High	2462	-0.90	-55.04	≤ -30.9	PASS
11N20SISO	Ant1	Low	2412	-3.16	-43.1	≤ -33.16	PASS
		High	2462	-2.77	-56.59	≤ -32.77	PASS
11N40SISO	Ant1	Low	2422	-5.89	-42.93	≤ -35.89	PASS
		High	2452	-6.93	-54.41	≤ -36.93	PASS

Test Graphs:

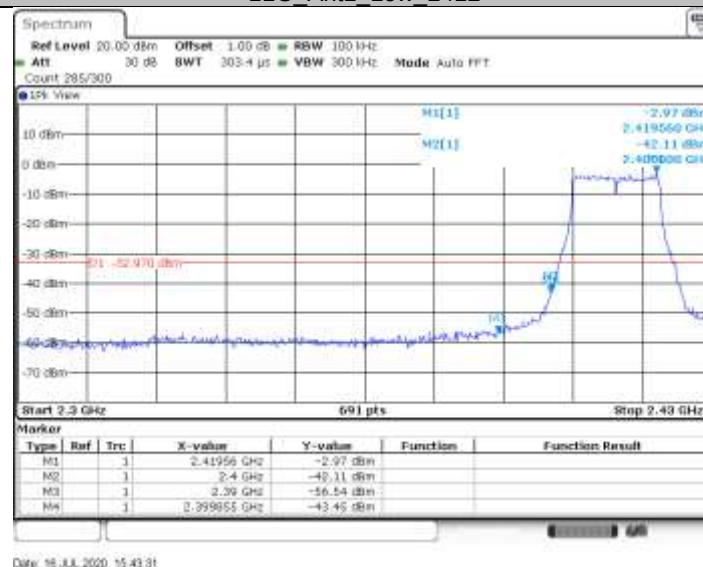
11B_Ant1_Low_2412



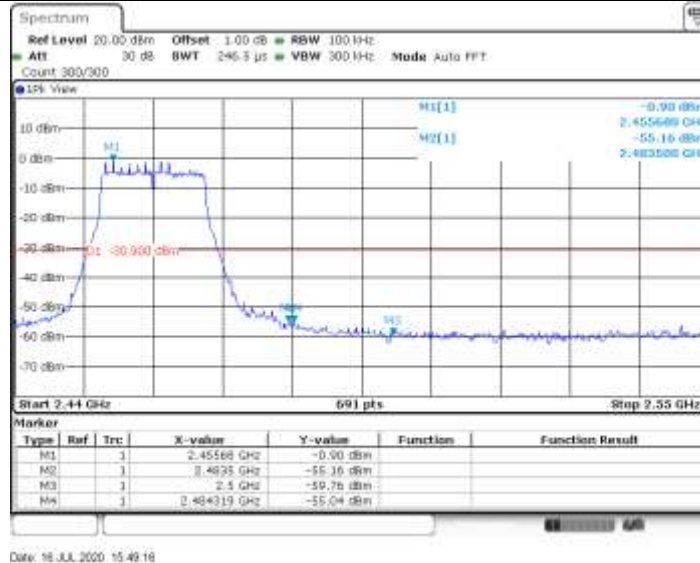
11B_Ant1_High_2462



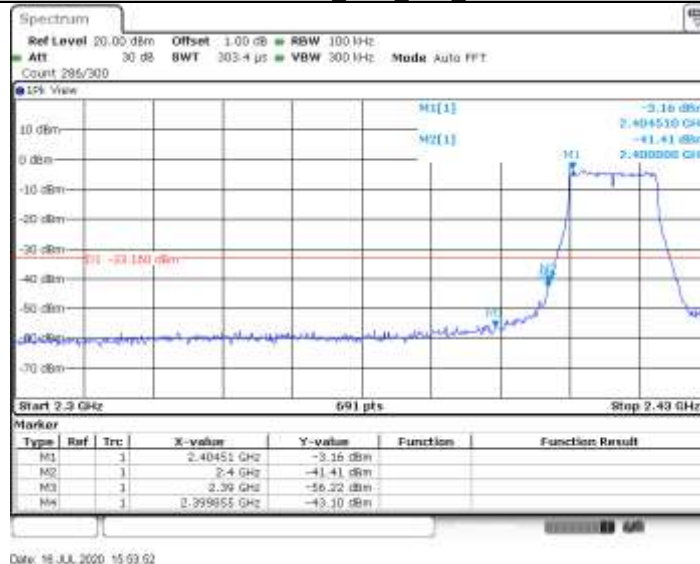
11G_Ant1_Low_2412



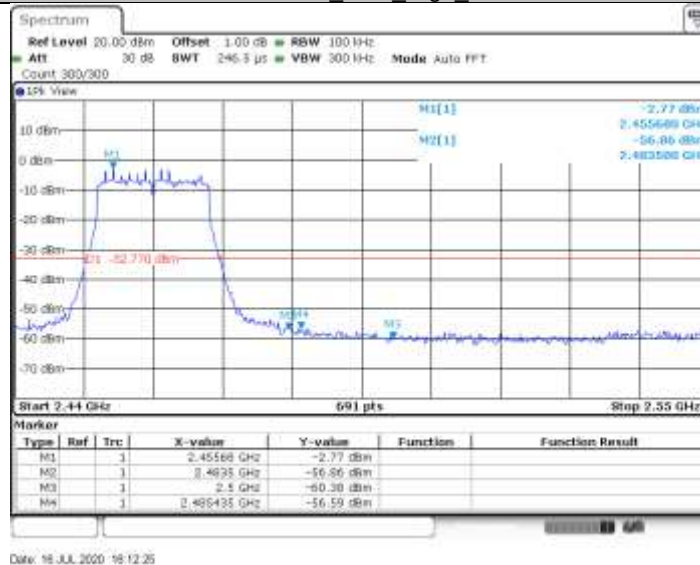
11G Ant1 High 2462



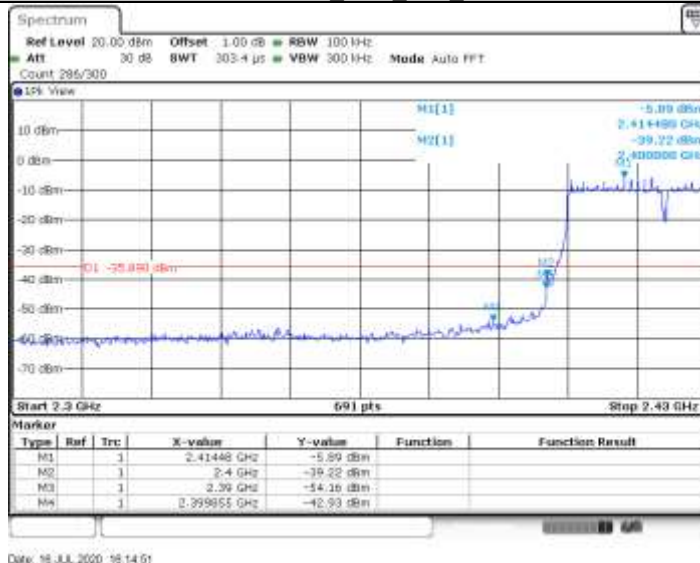
11N20SISO Ant1 Low 2412



11N20SISO Ant1 High 2462



11N40SISO Ant1 Low 2422



11N40SISO Ant1 High 2452



9.7 Spurious radiated emissions for transmitter

Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings According to C63.10:

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 100 KHz to 120KHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 1MHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

- a) RBW = 1 MHz.
- b) VBW ≥ $[3 \times \text{RBW}]$.
- c) Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq \text{RBW} / 2$.
 Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
- d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
- e) Sweep time = auto.
- f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of $1 / D$, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
- g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
 1) If power averaging (rms) mode was used in the preceding step e), then the correction

factor is $[10 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is $[20 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Limit

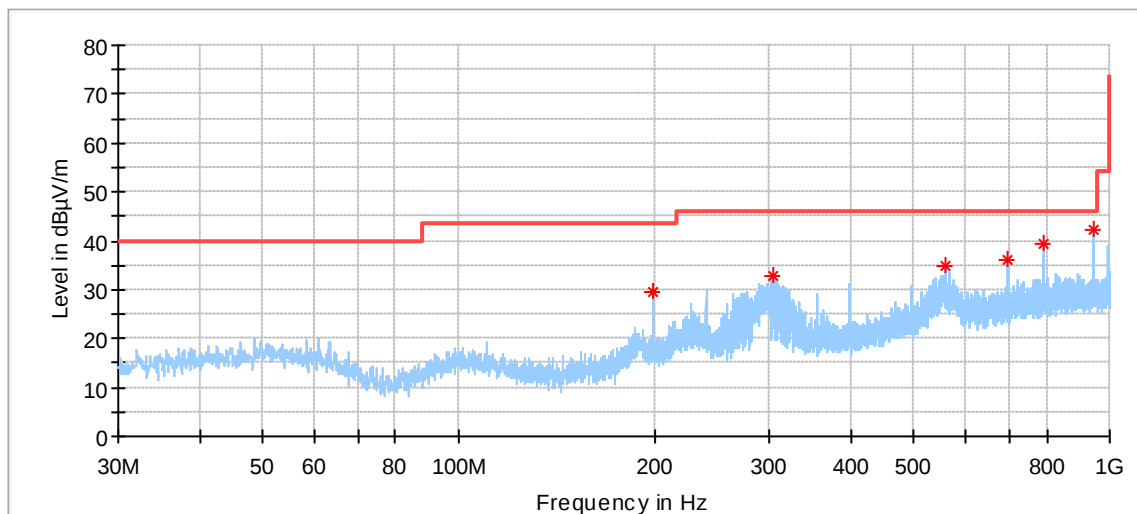
The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

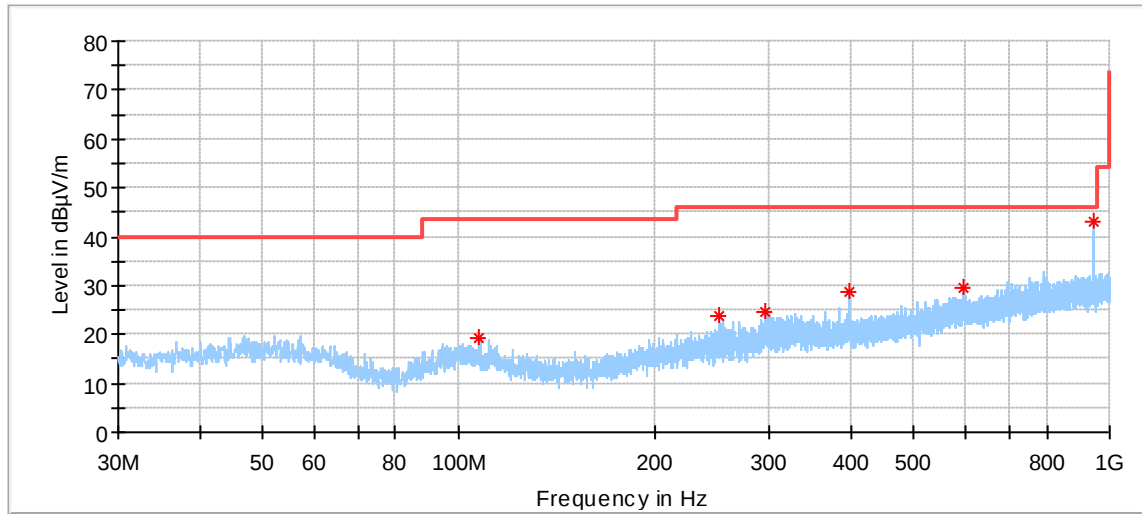
802.11b
2412MHz (30MHz – 1GHz)
Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
198.402778	29.69	43.50	13.81	150.0	H	325.0	12.1
303.216667	33.01	46.00	12.99	150.0	H	186.0	14.4
559.673889	34.83	46.00	11.17	150.0	H	119.0	19.1
694.503889	36.19	46.00	9.81	150.0	H	174.0	21.2
792.042778	39.26	46.00	6.74	150.0	H	0.0	22.4
943.686111	42.23	46.00	3.77	150.0	H	0.0	24.1

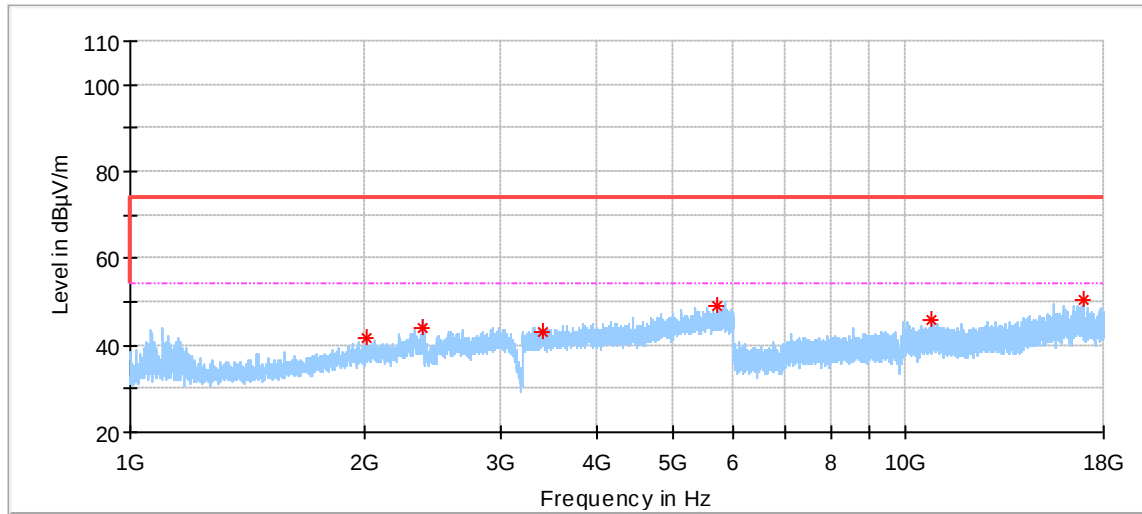
802.11b
2412MHz (30MHz – 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
107.168889	19.23	43.50	24.27	150.0	V	7.0	12.8
251.267778	23.75	46.00	22.25	150.0	V	130.0	13.5
296.049444	24.46	46.00	21.54	150.0	V	71.0	14.3
396.875556	28.78	46.00	17.22	150.0	V	290.0	16.5
594.486111	29.51	46.00	16.49	150.0	V	0.0	19.7
945.680000	42.89	46.00	3.11	150.0	V	118.0	24.1

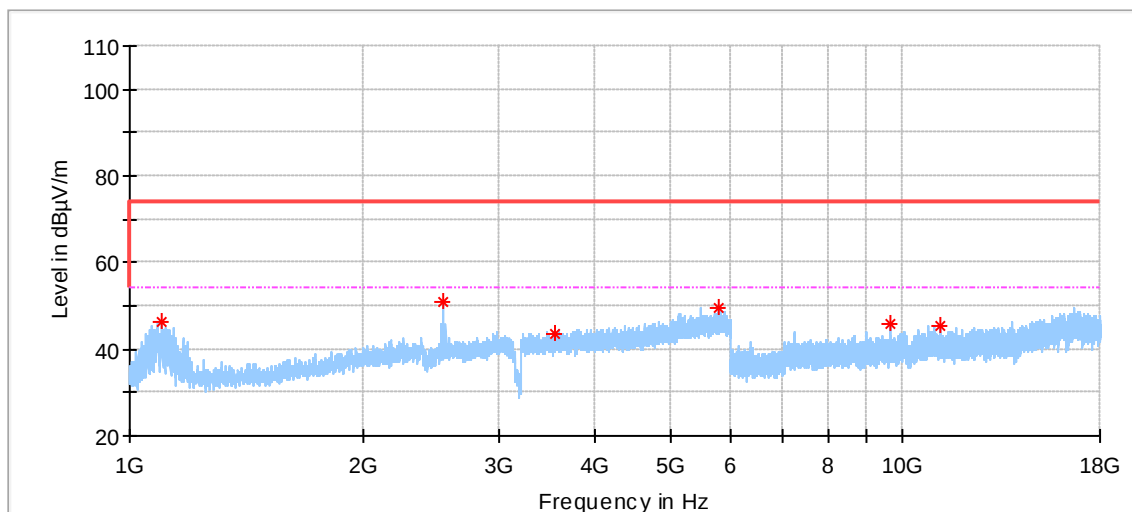
802.11b
2412MHz (Above 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2012.000000	41.68	74.00	32.32	150.0	H	281.0	-4.3
2386.500000	44.05	74.00	29.95	150.0	H	347.0	-3.2
3397.000000	43.22	74.00	30.78	150.0	H	0.0	-0.6
5727.000000	49.30	74.00	24.70	150.0	H	315.0	5.0
10810.500000	45.99	74.00	28.01	150.0	H	95.0	8.4
16974.500000	50.33	74.00	23.67	150.0	H	253.0	16.4

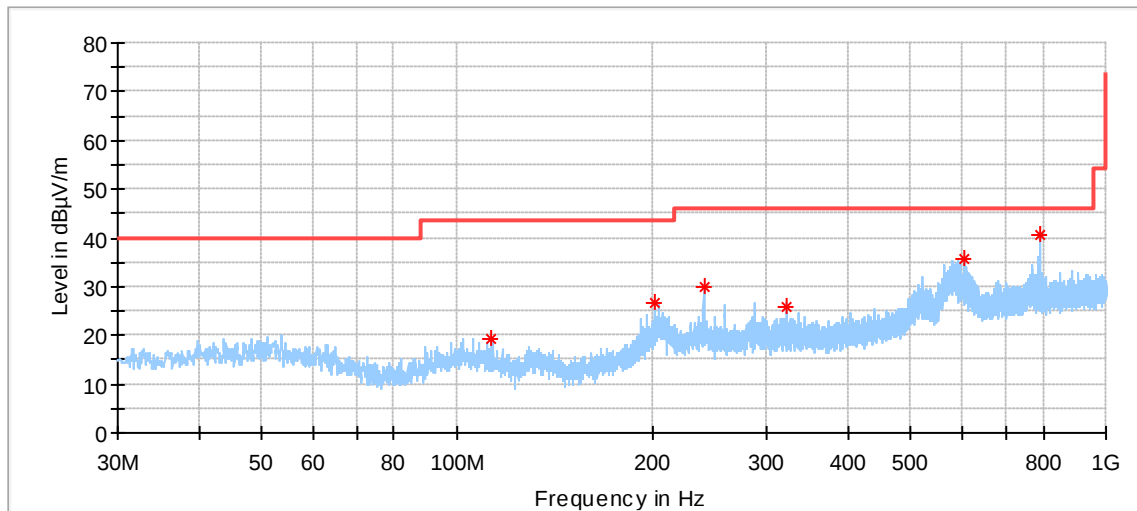
802.11b
2412MHz (Above 1GHz)
Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1099.500000	46.37	74.00	27.63	100.0	V	189.0	-9.8
2546.500000	51.06	74.00	22.94	100.0	V	297.0	-2.8
3550.500000	43.50	74.00	30.50	100.0	V	189.0	-0.1
5786.500000	49.37	74.00	24.63	100.0	V	255.0	5.2
9648.000000	45.66	74.00	28.34	100.0	V	15.0	7.6
11202.500000	45.38	74.00	28.62	100.0	V	233.0	8.5

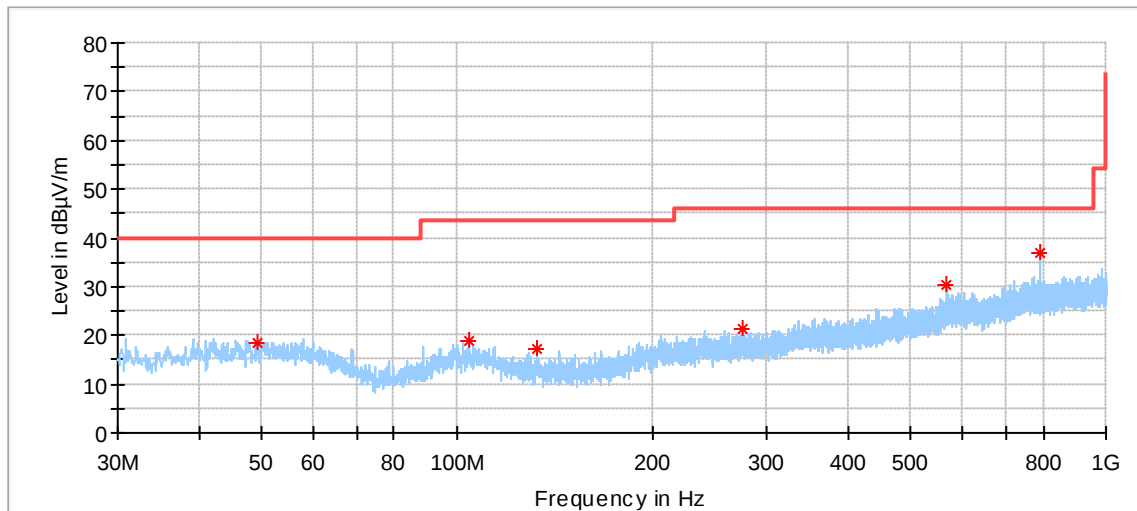
802.11b
2437MHz (30MHz – 1GHz)
Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
113.204444	19.46	43.50	24.04	150.0	H	243.0	12.2
202.121111	26.52	43.50	16.98	150.0	H	321.0	12.1
239.951111	30.01	46.00	15.99	150.0	H	160.0	13.2
322.832222	25.71	46.00	20.29	150.0	H	265.0	15.0
603.539444	35.70	46.00	10.30	150.0	H	243.0	19.9
792.042778	40.59	46.00	5.41	150.0	H	352.0	22.4

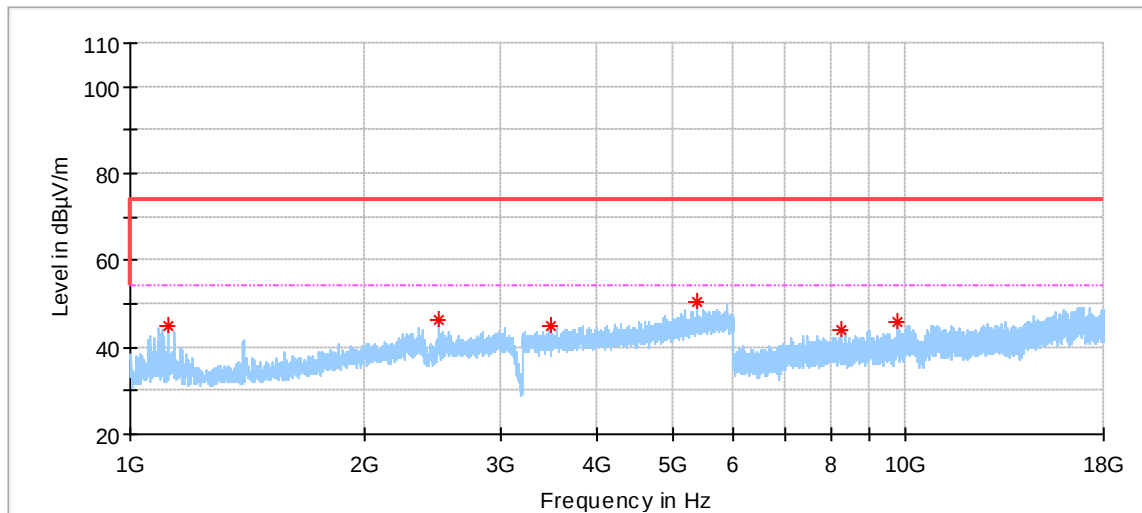
802.11b
2437MHz (30MHz – 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.400000	18.55	40.00	21.45	150.0	V	212.0	14.7
104.151111	19.02	43.50	24.48	150.0	V	342.0	13.0
132.766111	17.33	43.50	26.17	150.0	V	212.0	9.6
276.056667	21.14	46.00	24.86	150.0	V	131.0	13.9
569.320000	30.18	46.00	15.82	150.0	V	200.0	19.3
792.042778	36.96	46.00	9.04	150.0	V	307.0	22.4

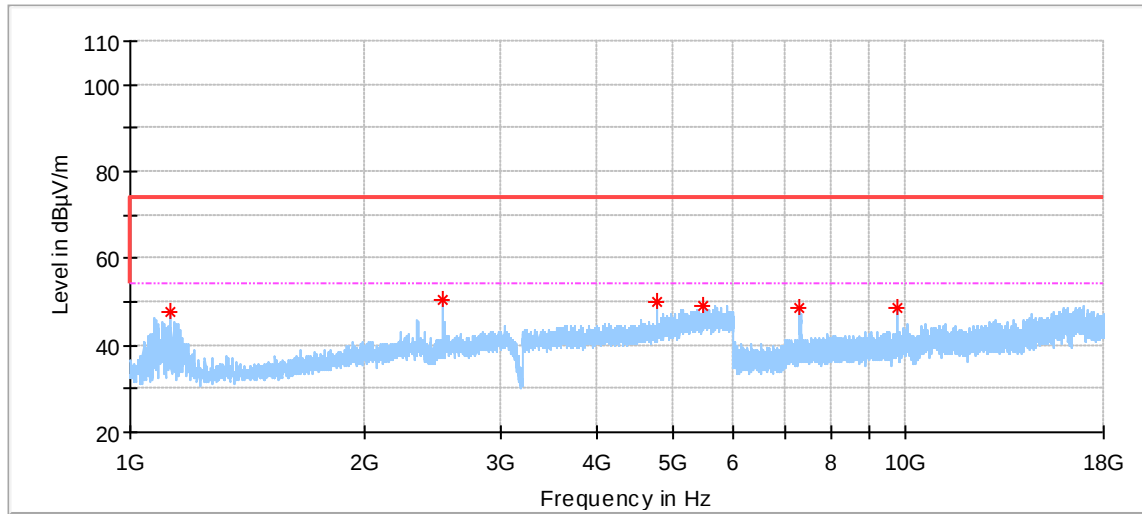
802.11b
2437MHz (Above 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1119.500000	44.93	74.00	29.07	150.0	H	265.0	-9.7
2502.000000	46.30	74.00	27.70	150.0	H	356.0	-2.9
3485.500000	44.89	74.00	29.11	150.0	H	0.0	-0.4
5385.500000	50.29	74.00	23.71	150.0	H	158.0	4.0
8245.000000	43.82	74.00	30.19	150.0	H	0.0	6.2
9748.000000	45.83	74.00	28.17	150.0	H	132.0	7.8

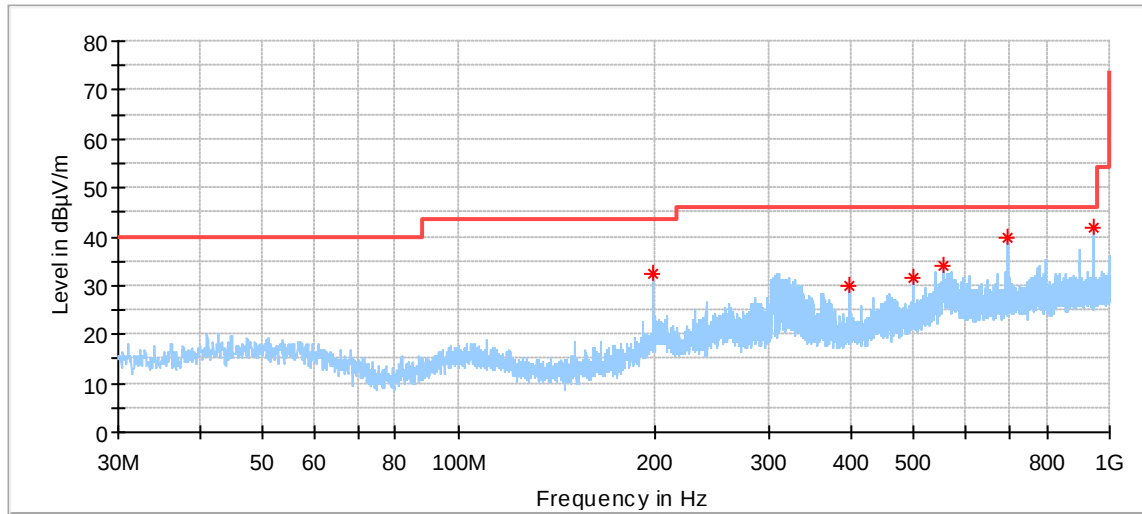
802.11b
2437MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1126.000000	47.48	74.00	26.52	100.0	V	344.0	-9.6
2522.500000	50.57	74.00	23.43	100.0	V	35.0	-2.9
4780.000000	49.96	74.00	24.04	100.0	V	331.0	2.7
5484.500000	49.17	74.00	24.83	100.0	V	122.0	4.4
7310.500000	48.71	74.00	25.29	100.0	V	114.0	5.3
9748.000000	48.55	74.00	25.45	100.0	V	95.0	7.8

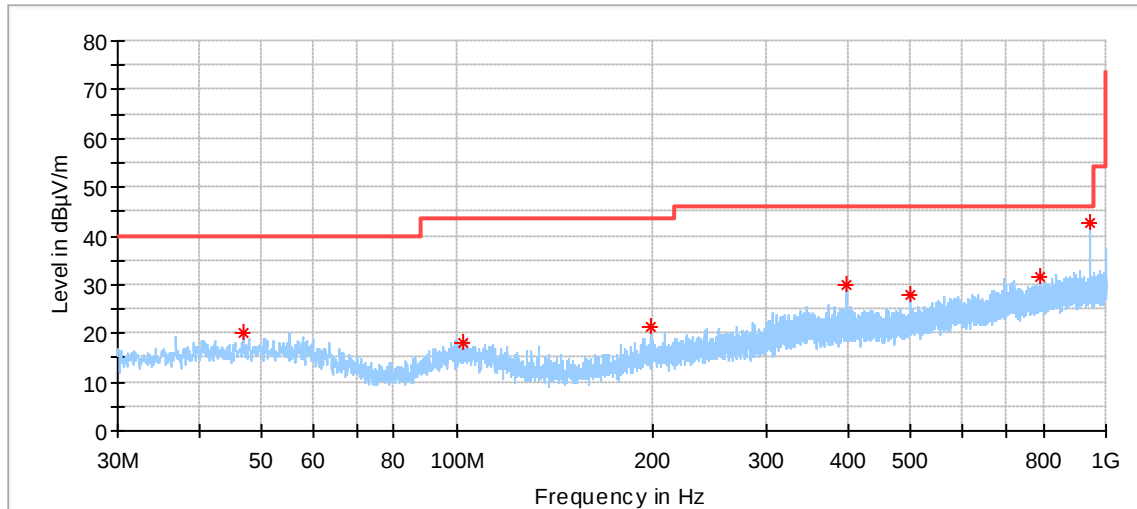
802.11b
2462MHz (30MHz – 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
199.318889	32.42	43.50	11.08	150.0	H	224.0	12.1
398.600000	30.10	46.00	15.90	150.0	H	13.0	16.5
498.294444	31.78	46.00	14.22	150.0	H	104.0	18.1
555.524444	34.07	46.00	11.93	150.0	H	293.0	19.0
697.629444	39.84	46.00	6.16	150.0	H	165.0	21.2
945.626111	41.65	46.00	4.35	150.0	H	212.0	24.1

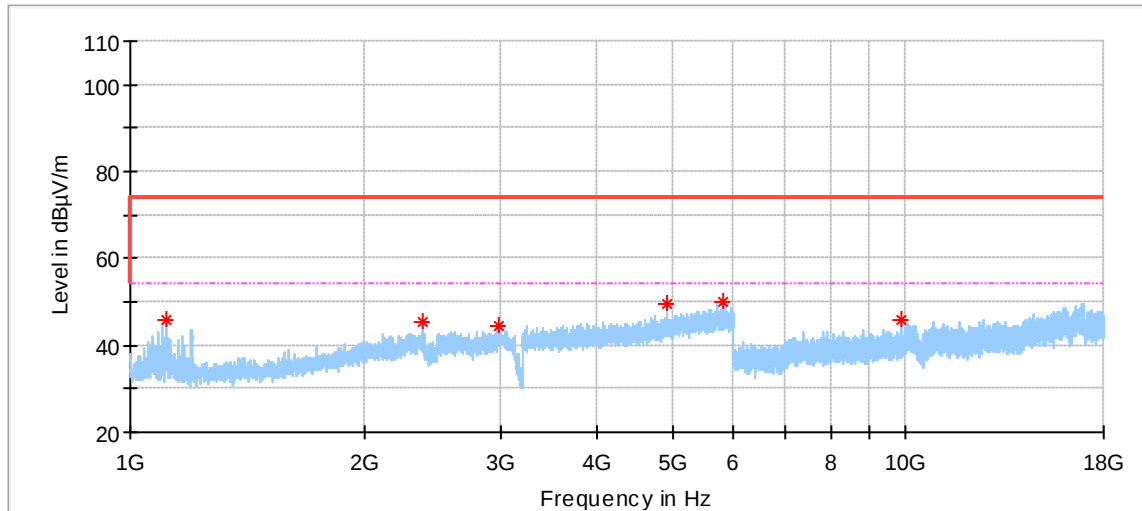
802.11b
2462MHz (30MHz – 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
46.921111	20.09	40.00	19.91	150.0	V	327.0	14.7
101.941667	18.12	43.50	25.38	150.0	V	339.0	12.9
199.372778	21.52	43.50	21.99	150.0	V	339.0	12.1
398.761667	29.90	46.00	16.10	150.0	V	170.0	16.5
498.348333	27.93	46.00	18.07	150.0	V	27.0	18.1
791.935000	31.63	46.00	14.37	150.0	V	144.0	22.4
945.680000	42.84	46.00	3.16	150.0	V	214.0	24.1

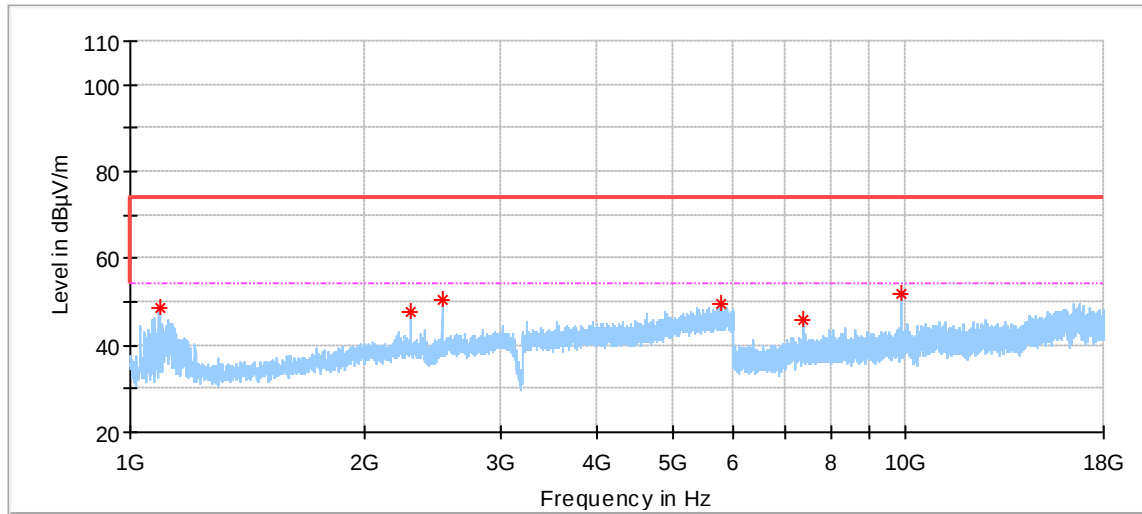
802.11b
2462MHz (Above 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1113.000000	45.83	74.00	28.17	150.0	H	225.0	-9.7
2380.000000	45.31	74.00	28.69	150.0	H	47.0	-3.2
2988.000000	44.48	74.00	29.52	150.0	H	158.0	-1.5
4924.500000	49.72	74.00	24.28	150.0	H	0.0	2.9
5806.500000	49.84	74.00	24.16	150.0	H	138.0	5.2
9847.500000	45.79	74.00	28.21	150.0	H	188.0	7.9

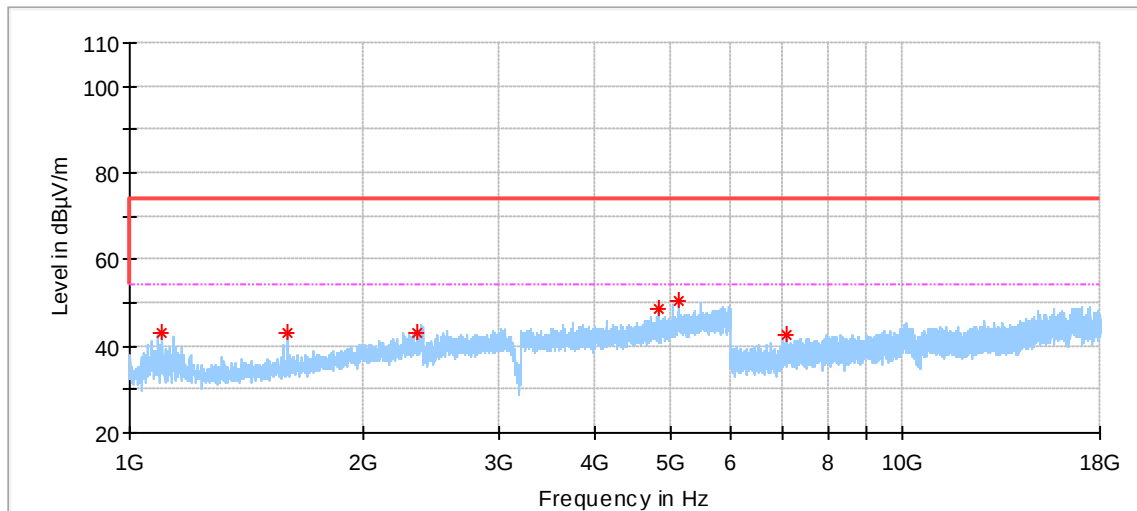
802.11b
2462MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1090.500000	48.65	74.00	25.35	100.0	V	95.0	-9.8
2294.500000	47.86	74.00	26.14	100.0	V	323.0	-3.4
2522.000000	50.43	74.00	23.57	100.0	V	357.0	-2.9
5797.000000	49.41	74.00	24.59	100.0	V	28.0	5.2
7381.500000	45.98	74.00	28.02	100.0	V	114.0	5.5
9848.000000	51.75	74.00	22.25	100.0	V	95.0	7.9

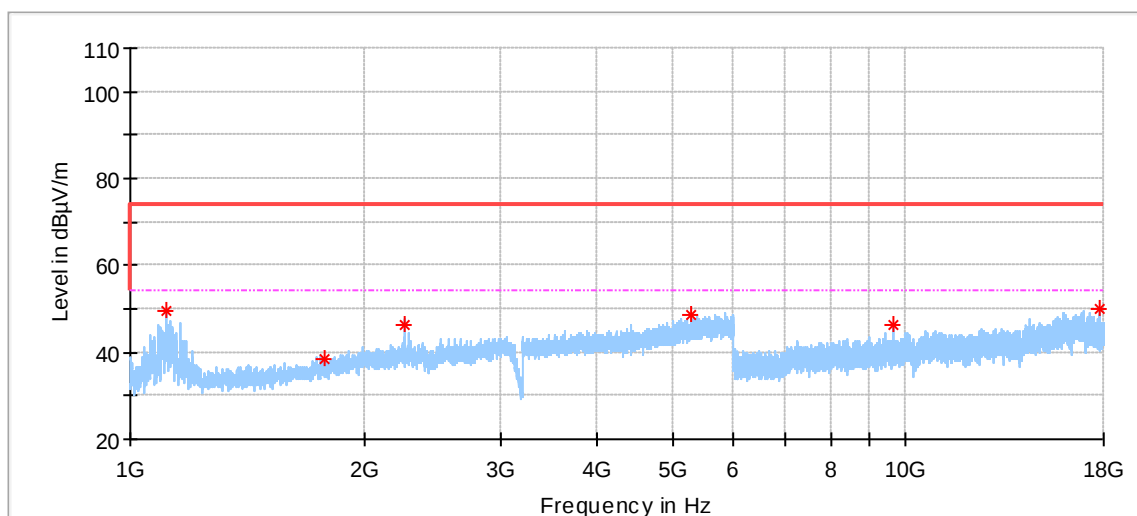
802.11g
2412MHz (Above 1GHz)
Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1102.500000	42.90	74.00	31.10	150.0	H	271.0	-9.7
1598.000000	43.20	74.00	30.80	150.0	H	0.0	-7.3
2353.000000	43.15	74.00	30.85	150.0	H	53.0	-3.3
4824.000000	48.42	74.00	25.58	150.0	H	100.0	2.8
5133.500000	50.30	74.00	23.70	150.0	H	19.0	3.7
7079.500000	42.61	74.00	31.39	150.0	H	359.0	4.9

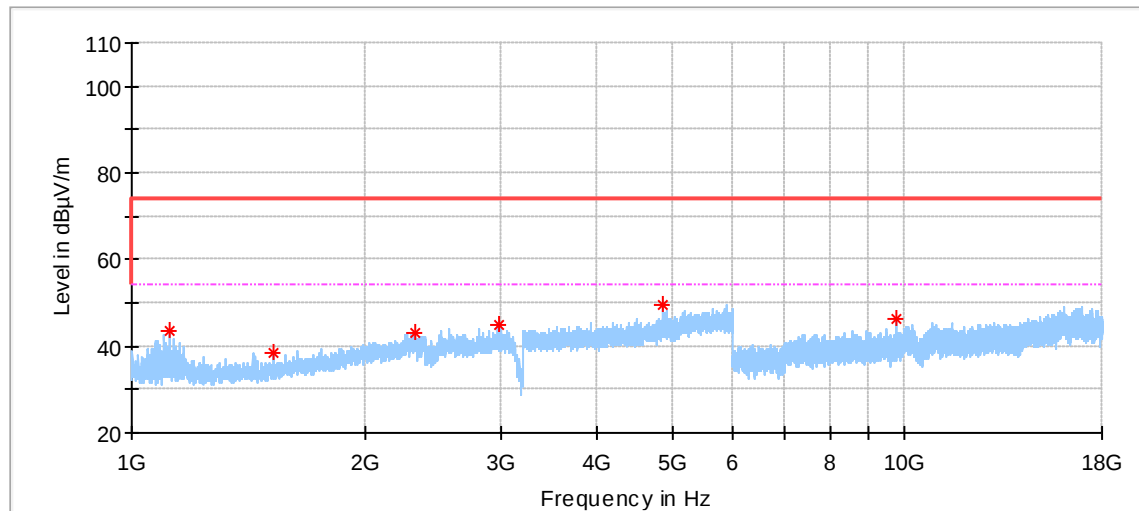
802.11g
2412MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1113.000000	49.61	74.00	24.39	100.0	V	211.0	-9.7
1776.000000	38.68	74.00	35.32	100.0	V	129.0	-5.9
2254.000000	46.30	74.00	27.70	100.0	V	317.0	-3.5
5291.000000	48.43	74.00	25.57	100.0	V	198.0	3.7
9648.000000	46.32	74.00	27.68	100.0	V	174.0	7.6
17765.500000	49.80	74.00	24.20	100.0	V	1.0	16.5

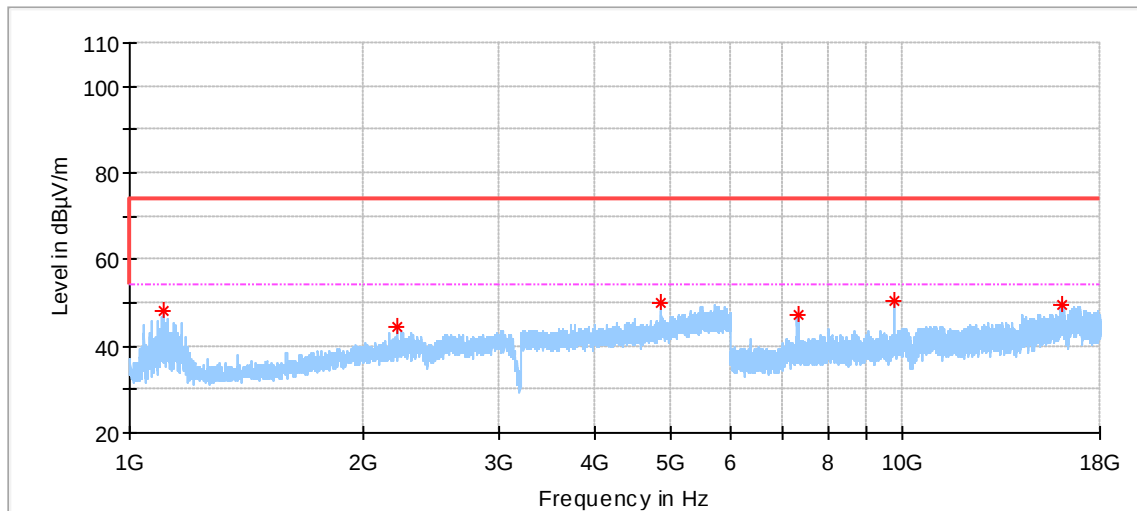
802.11g
2437MHz (Above 1GHz)
Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1120.000000	43.59	74.00	30.41	150.0	H	265.0	-9.7
1524.000000	38.58	74.00	35.42	150.0	H	37.0	-8.0
2328.000000	42.98	74.00	31.02	150.0	H	191.0	-3.3
2978.500000	45.07	74.00	28.93	150.0	H	37.0	-1.5
4874.500000	49.73	74.00	24.27	150.0	H	24.0	2.8
9748.000000	46.34	74.00	27.66	150.0	H	4.0	7.8

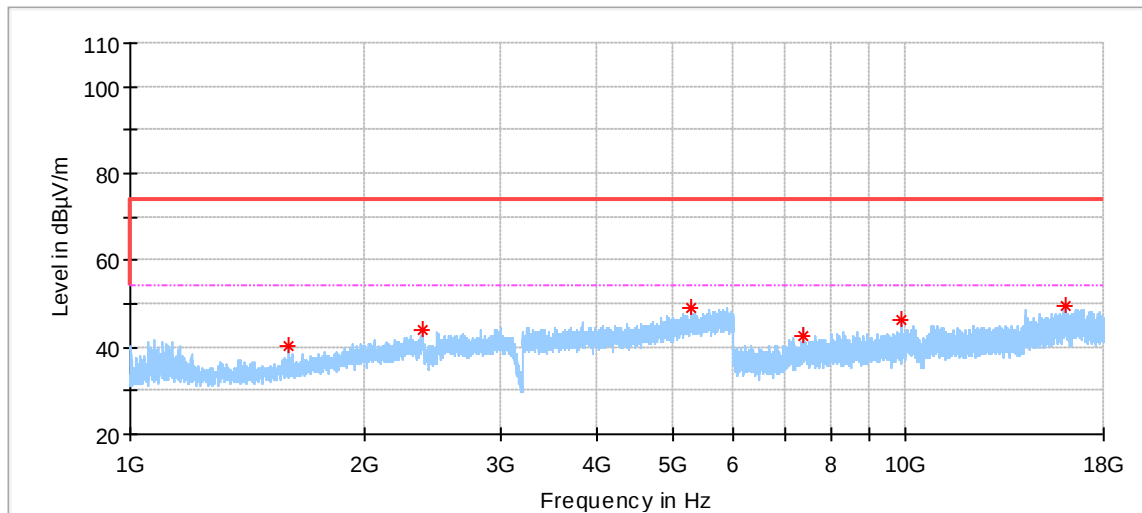
802.11g
2437MHz (Above 1GHz)
Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1104.500000	47.97	74.00	26.03	100.0	V	218.0	-9.7
2216.500000	44.25	74.00	29.75	100.0	V	325.0	-3.7
4874.500000	49.77	74.00	24.23	100.0	V	30.0	2.8
7311.500000	47.02	74.00	26.98	100.0	V	107.0	5.3
9748.000000	50.33	74.00	23.67	100.0	V	88.0	7.8
16048.500000	49.59	74.00	24.41	100.0	V	107.0	14.8

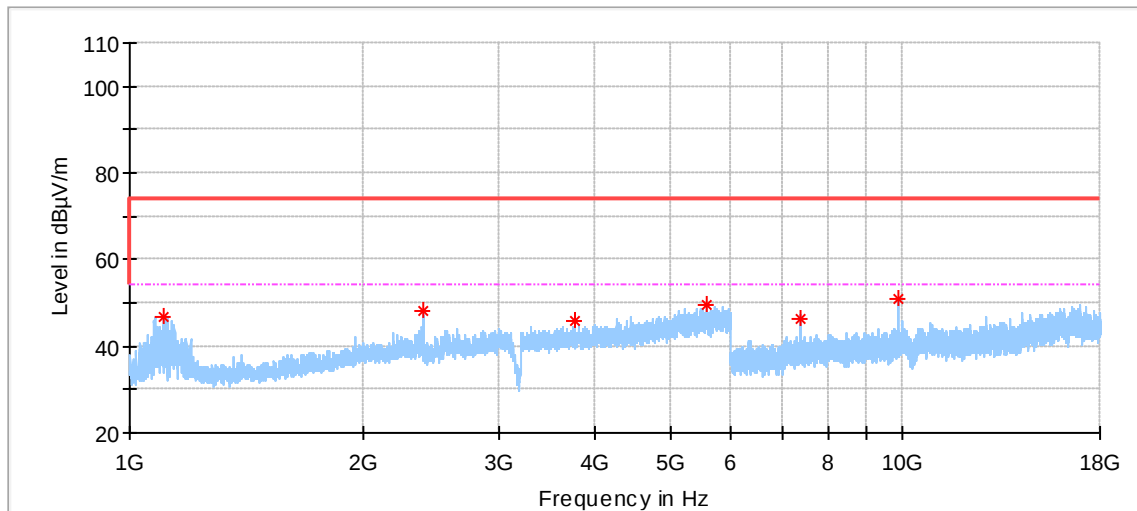
802.11g
2462MHz (Above 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1596.000000	40.30	74.00	33.70	150.0	H	0.0	-7.4
2381.000000	43.85	74.00	30.15	150.0	H	1.0	-3.2
5301.500000	49.00	74.00	25.00	150.0	H	158.0	3.7
7384.500000	42.80	74.00	31.20	150.0	H	26.0	5.6
9848.500000	46.27	74.00	27.73	150.0	H	128.0	7.9
16053.500000	49.40	74.00	24.60	150.0	H	267.0	14.8

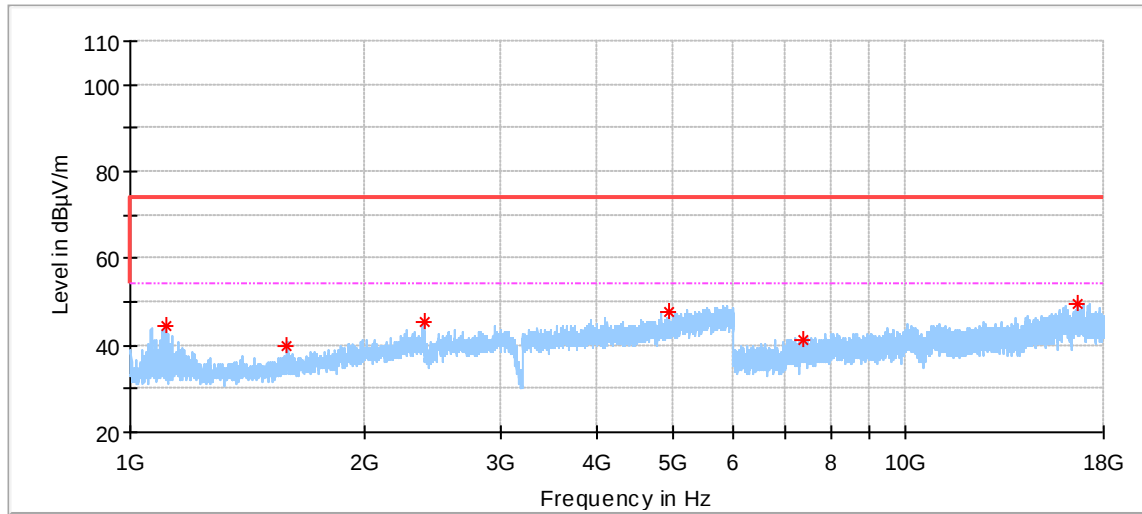
802.11g
2462MHz (Above 1GHz)
Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1108.000000	46.79	74.00	27.21	100.0	V	216.0	-9.7
2402.500000	48.19	74.00	25.81	100.0	V	35.0	-3.1
3756.500000	45.68	74.00	28.32	100.0	V	9.0	0.6
5562.000000	49.32	74.00	24.68	100.0	V	4.0	4.4
7384.500000	46.42	74.00	27.58	100.0	V	134.0	5.6
9848.000000	50.75	74.00	23.25	100.0	V	95.0	7.9

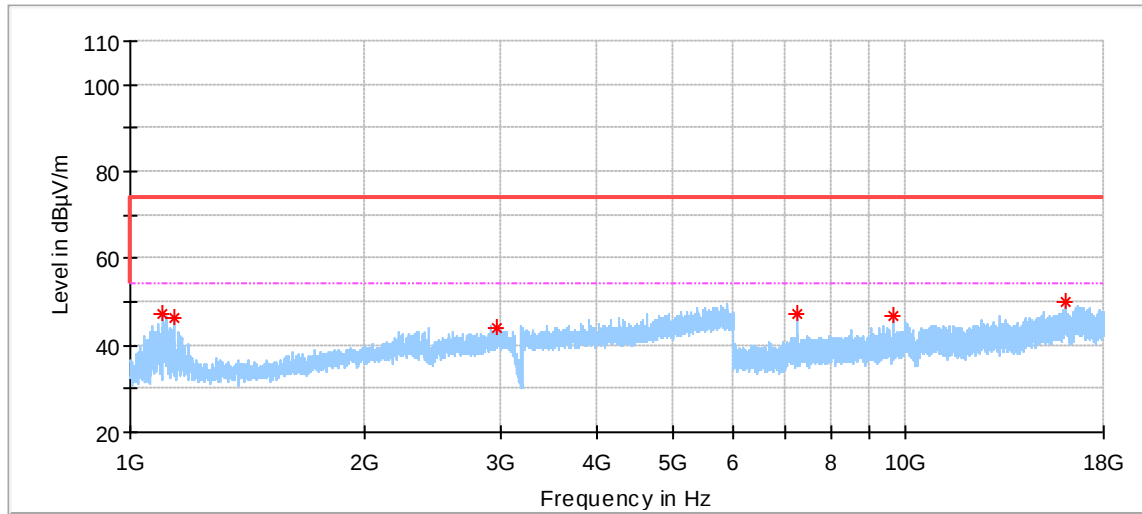
802.11nHT20
2412MHz (Above 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1110.000000	44.43	74.00	29.57	150.0	H	264.0	-9.7
1594.000000	39.64	74.00	34.36	150.0	H	0.0	-7.4
2390.000000	45.27	74.00	28.73	150.0	H	73.0	-3.2
4965.500000	47.81	74.00	26.19	150.0	H	305.0	2.8
7395.000000	41.26	74.00	32.74	150.0	H	191.0	5.6
16668.500000	49.46	74.00	24.54	150.0	H	26.0	15.9

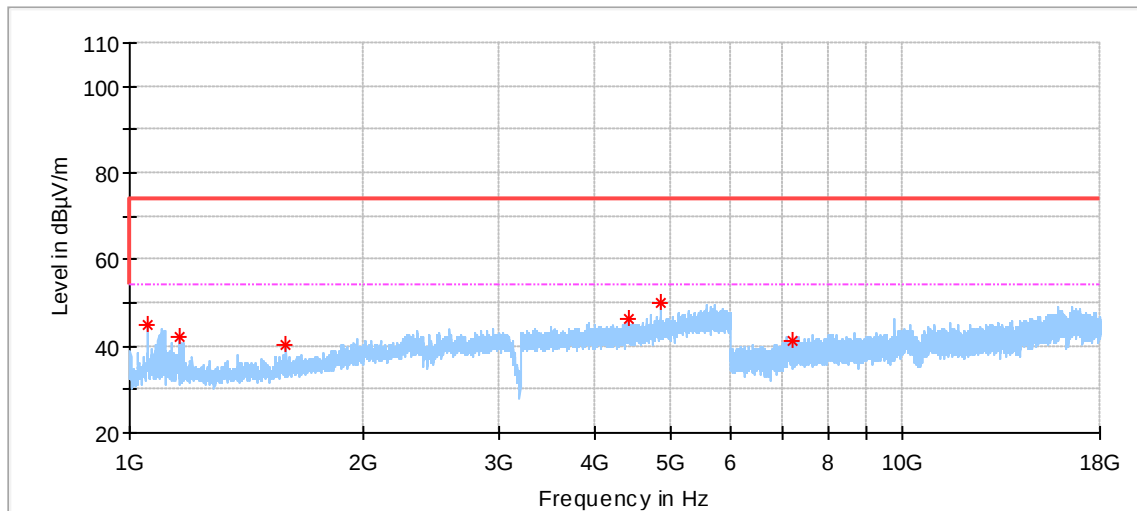
802.11nHT20
2412MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1102.500000	47.13	74.00	26.87	100.0	V	256.0	-9.7
1141.500000	46.38	74.00	27.62	100.0	V	356.0	-9.6
2977.500000	44.01	74.00	29.99	100.0	V	82.0	-1.5
7236.000000	47.04	74.00	26.96	100.0	V	113.0	5.3
9648.000000	46.86	74.00	27.14	100.0	V	14.0	7.6
16035.500000	50.01	74.00	23.99	100.0	V	133.0	14.7

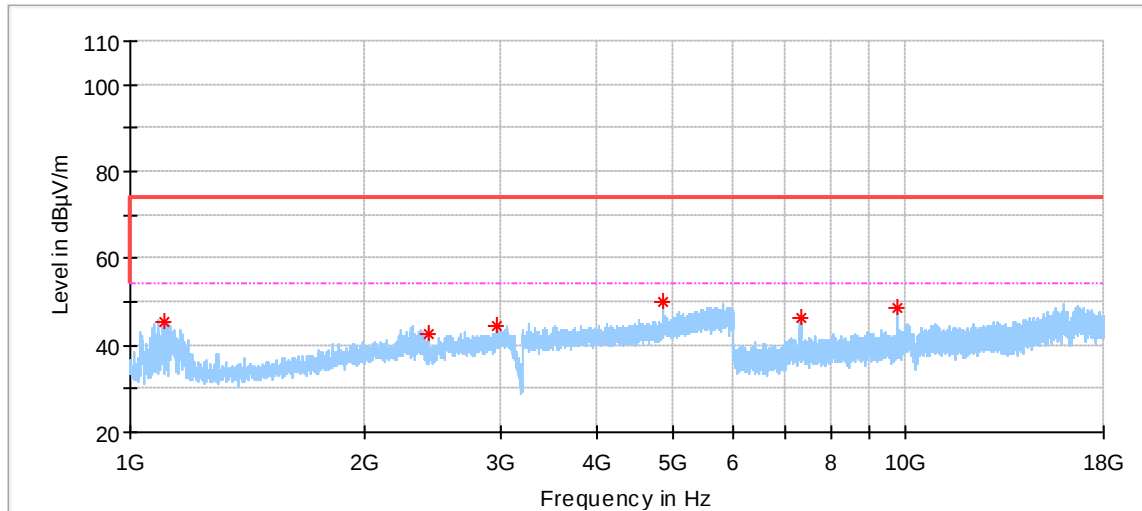
802.11nHT20
2437MHz (Above 1GHz)
Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1057.000000	44.84	74.00	29.16	150.0	H	84.0	-9.9
1158.000000	41.93	74.00	32.07	150.0	H	265.0	-9.5
1594.000000	40.14	74.00	33.86	150.0	H	351.0	-7.4
4424.000000	46.44	74.00	27.56	150.0	H	57.0	2.3
4874.500000	50.18	74.00	23.82	150.0	H	24.0	2.8
7191.000000	41.43	74.00	32.57	150.0	H	265.0	5.0

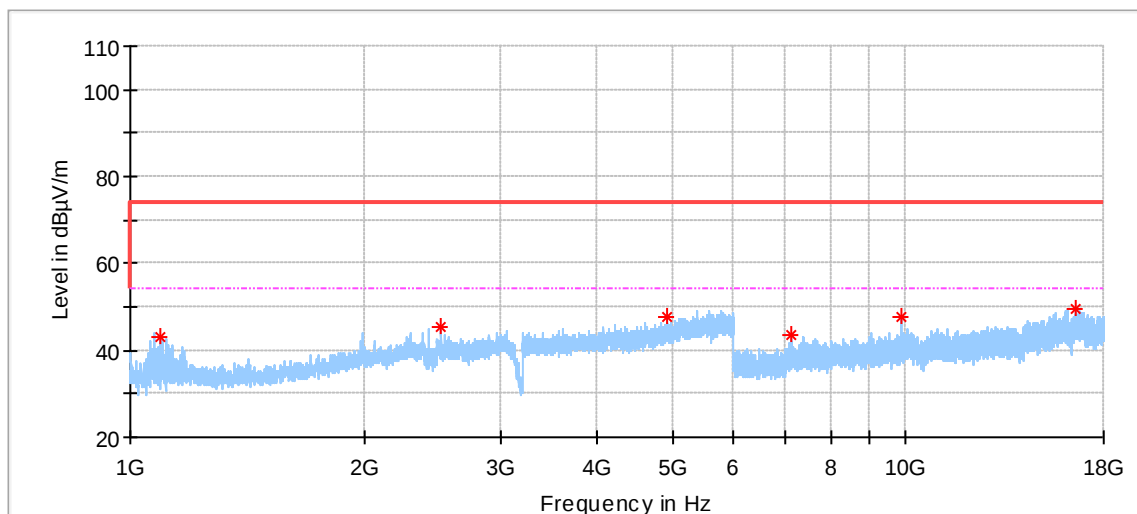
802.11nHT20
2437MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1108.000000	45.28	74.00	28.72	100.0	V	9.0	-9.7
2425.500000	42.74	74.00	31.26	100.0	V	278.0	-3.1
2970.500000	44.63	74.00	29.37	100.0	V	95.0	-1.5
4875.000000	50.22	74.00	23.78	100.0	V	89.0	2.8
7311.000000	46.22	74.00	27.78	100.0	V	113.0	5.3
9748.000000	48.42	74.00	25.58	100.0	V	91.0	7.8

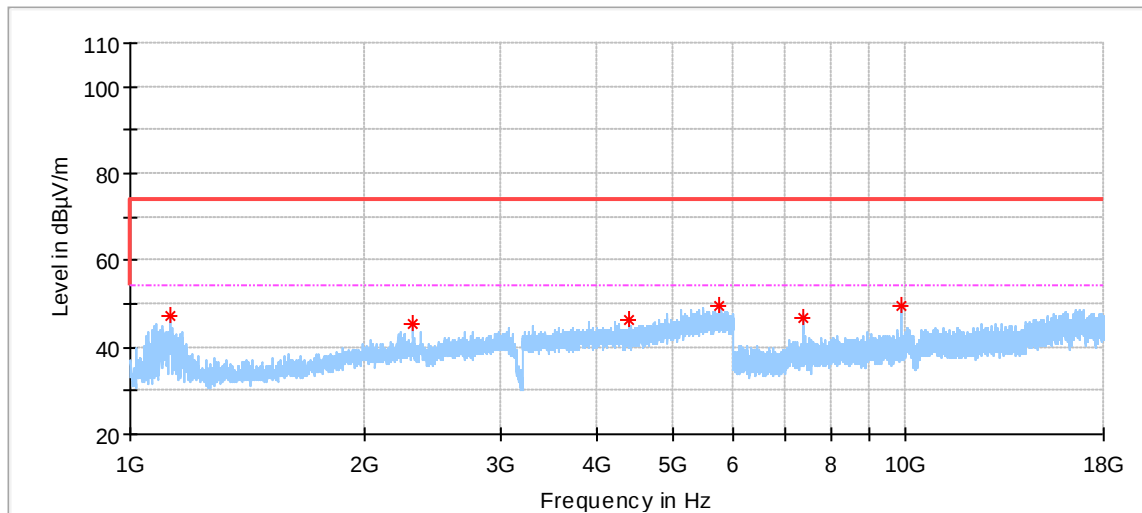
802.11nHT20
2462MHz (Above 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1093.000000	43.07	74.00	30.93	150.0	H	265.0	-9.8
2520.000000	45.53	74.00	28.47	150.0	H	68.0	-2.9
4925.000000	47.82	74.00	26.18	150.0	H	21.0	2.9
7104.000000	43.68	74.00	30.32	150.0	H	306.0	4.9
9848.000000	47.51	74.00	26.49	150.0	H	227.0	7.9
16582.000000	49.69	74.00	24.31	150.0	H	148.0	15.7

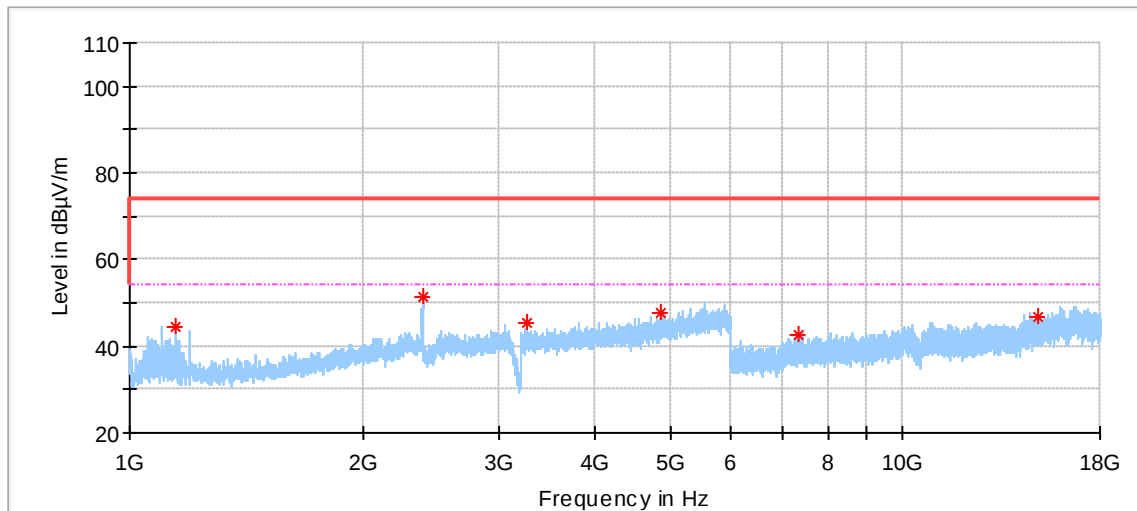
802.11nHT20
2462MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1127.000000	47.06	74.00	26.94	100.0	V	225.0	-9.6
2319.000000	45.20	74.00	28.80	100.0	V	305.0	-3.3
4387.000000	46.34	74.00	27.66	100.0	V	198.0	2.2
5750.500000	49.69	74.00	24.31	100.0	V	345.0	5.1
7387.000000	46.86	74.00	27.14	100.0	V	107.0	5.6
9848.000000	49.38	74.00	24.62	100.0	V	68.0	7.9

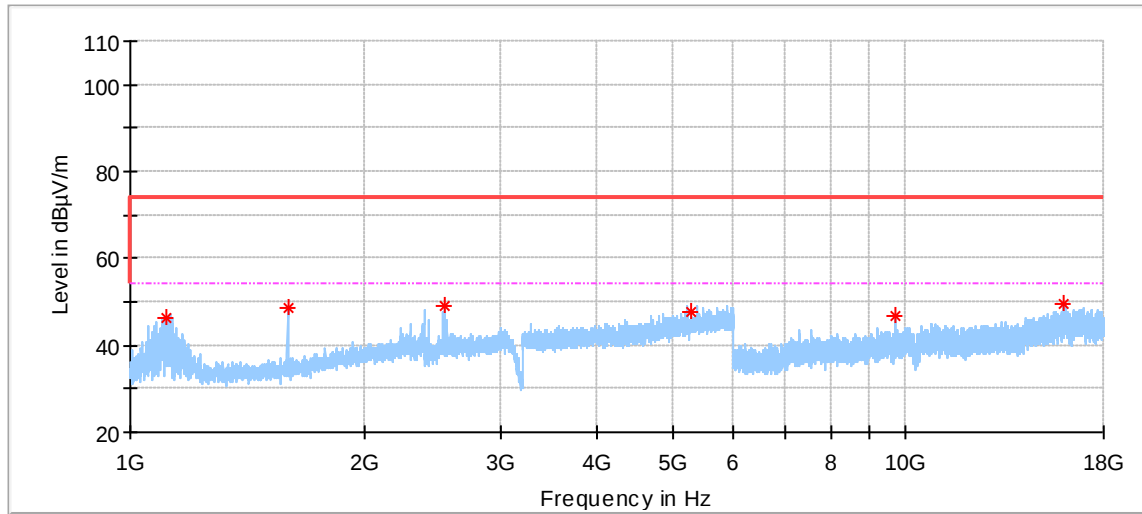
802.11nHT40
2422MHz (Above 1GHz)
Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1144.000000	44.57	74.00	29.43	150.0	H	271.0	-9.6
2392.000000	51.34	74.00	22.66	150.0	H	3.0	-3.2
3263.000000	45.36	74.00	28.64	150.0	H	351.0	-0.8
4864.000000	47.91	74.00	26.09	150.0	H	19.0	2.8
7314.500000	42.73	74.00	31.27	150.0	H	349.0	5.3
14973.000000	46.67	74.00	27.33	150.0	H	92.0	12.3

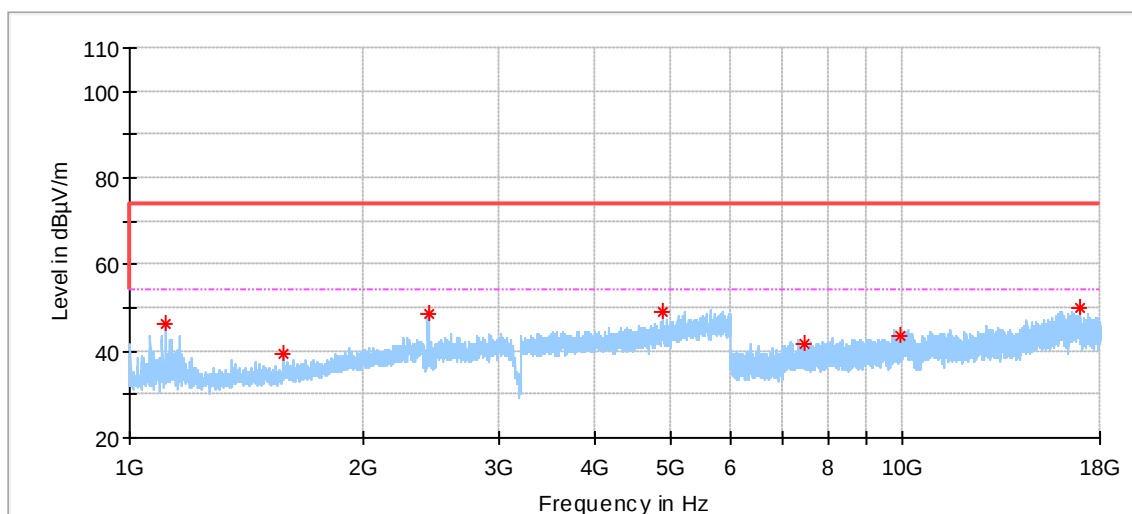
802.11nHT40
2422MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1115.500000	46.32	74.00	27.68	100.0	V	218.0	-9.7
1595.000000	48.44	74.00	25.56	100.0	V	317.0	-7.4
2546.500000	49.10	74.00	24.90	100.0	V	354.0	-2.8
5284.000000	47.61	74.00	26.39	100.0	V	178.0	3.7
9688.000000	46.86	74.00	27.14	100.0	V	91.0	7.7
15944.500000	49.67	74.00	24.33	100.0	V	1.0	14.1

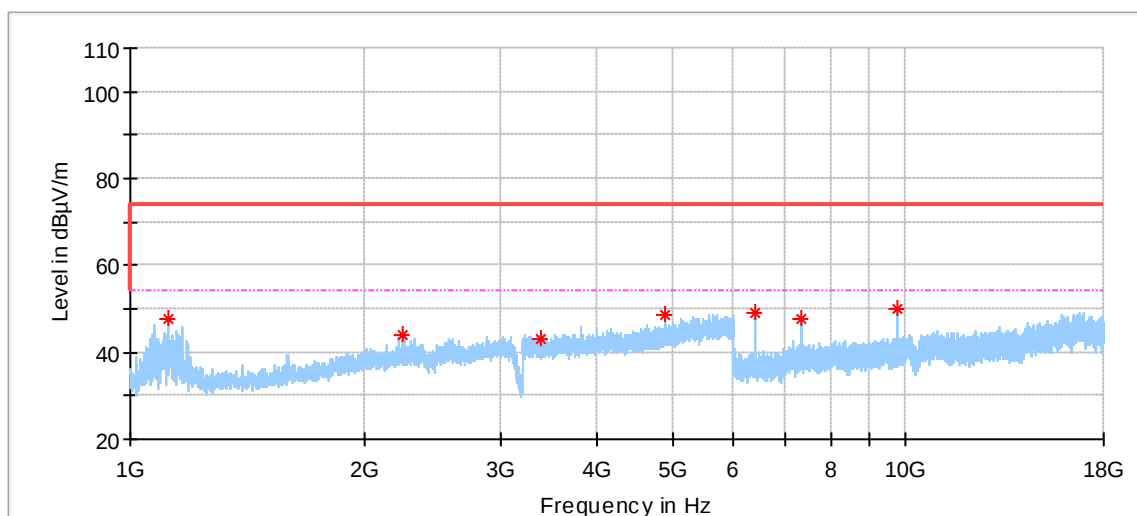
802.11nHT40
2437MHz (Above 1GHz)
Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1113.500000	46.24	74.00	27.76	150.0	H	265.0	-9.7
1584.000000	39.56	74.00	34.44	150.0	H	0.0	-7.5
2434.500000	48.53	74.00	25.47	150.0	H	191.0	-3.1
4895.000000	48.88	74.00	25.12	150.0	H	0.0	2.9
7447.500000	41.77	74.00	32.23	150.0	H	88.0	5.5
9937.500000	43.32	74.00	30.68	150.0	H	88.0	8.1
16968.500000	49.86	74.00	24.14	150.0	H	327.0	16.4

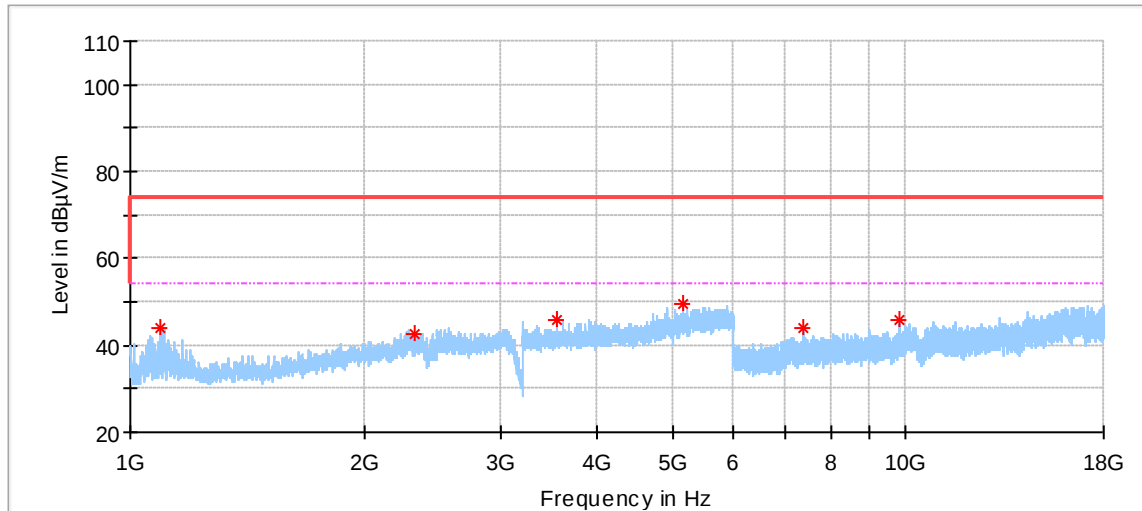
802.11nHT40
2437MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1120.500000	47.88	74.00	26.12	100.0	V	225.0	-9.7
2251.500000	44.05	74.00	29.95	100.0	V	298.0	-3.5
3382.000000	42.99	74.00	31.01	100.0	V	17.0	-0.6
4891.500000	48.46	74.00	25.54	100.0	V	90.0	2.9
6383.500000	48.86	74.00	25.14	100.0	V	309.0	4.4
7340.000000	47.88	74.00	26.12	100.0	V	109.0	5.4
9748.000000	49.93	74.00	24.07	100.0	V	89.0	7.8

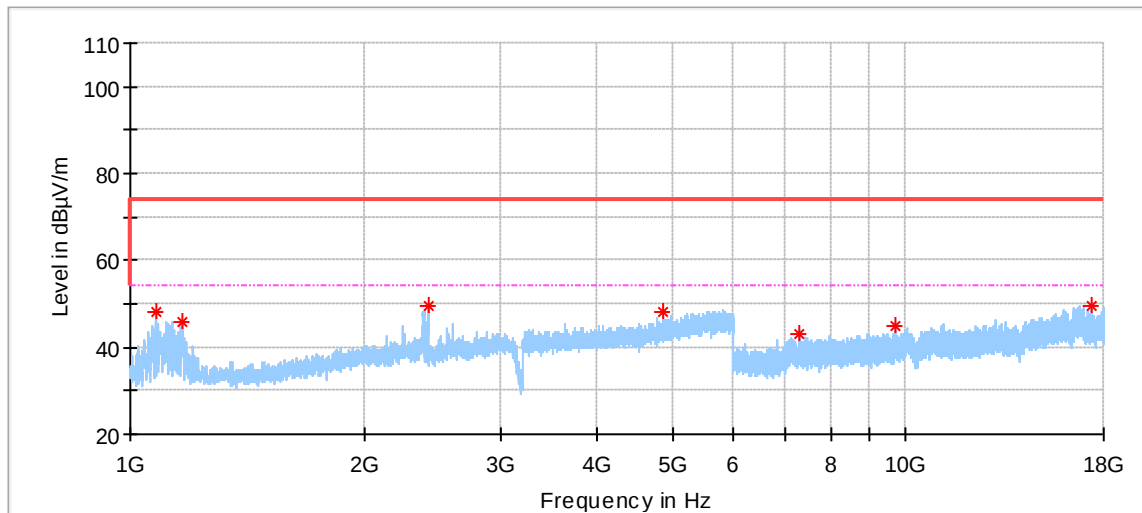
802.11nHT40
2452MHz (Above 1GHz)
Horizontal



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1093.000000	43.89	74.00	30.11	150.0	H	238.0	-9.8
2321.000000	42.83	74.00	31.17	150.0	H	30.0	-3.3
3542.500000	45.76	74.00	28.24	150.0	H	0.0	-0.1
5163.500000	49.38	74.00	24.62	150.0	H	77.0	3.9
7387.500000	43.86	74.00	30.14	150.0	H	26.0	5.6
9808.500000	45.73	74.00	28.27	150.0	H	4.0	7.9

802.11nHT40
2452MHz (Above 1GHz)
Vertical



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1077.500000	48.10	74.00	25.90	100.0	V	182.0	-9.8
1165.500000	45.79	74.00	28.21	100.0	V	339.0	-9.5
2421.000000	49.55	74.00	24.45	100.0	V	298.0	-3.1
4858.500000	48.20	74.00	25.80	100.0	V	82.0	2.8
7285.500000	43.11	74.00	30.89	100.0	V	93.0	5.3
9681.500000	45.07	74.00	28.93	100.0	V	93.0	7.7
17326.500000	49.63	74.00	24.37	100.0	V	232.0	16.2

Remarks for test data:

- (1) Data of measurement within frequency range 18-26GHz are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report;
- (2) Level=Reading Level + Correction Factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

10 Test Equipment List

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-14-001	101782	1	2021-6-29
LISN	Rohde & Schwarz	ENV432	68-4-87-16-001	101318	1	2021-6-12
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2021-6-21
Test software	Rohde & Schwarz	EMC32	68-4-90-14-003-A10	Version9.15.00	N/A	N/A
Shielding Room	TDK	CSR #1	68-4-90-19-004	----	1	2022-11-07

RF Conducted Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	1	2021-6-21
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	68-4-93-14-003	101226/100851	1	2021-6-21
Power Splitter	Weinschel	1580	68-4-85-14-001	SC319	1	2021-7-16
10dB Attenuator	Weinschel	4M-10	68-4-81-14-003	43152	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-004	DNF-001	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-005	DNF-002	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-006	DNF-003	1	2021-6-21
10dB Attenuator	R&S	DNF	68-4-81-14-007	DNF-004	1	2021-6-21
Test software	Tonscend	System for BT/WIFI	68-4-74-14-006-A13	Version 2.6.77.0518	N/A	N/A
Shielding Room	TDK	TS8997	68-4-90-19-003	----	1	2022-12-6

Spurious Radiated Emissions Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-003	101031	1	2021-6-22
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	68-4-80-14-003	708	1	2021-7-3
Horn Antenna	Rohde & Schwarz	HF907	68-4-80-14-004	102295	1	2021-8-5
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	1	2021-8-5
Pre-amplifier	Rohde & Schwarz	SCU 18	68-4-29-14-001	102230	1	2021-6-21
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	1	2021-7-30
Fully Anechoic Chamber	TDK	8X4X4	68-4-90-14-002	--	3	2022-12-6
Test software	Rohde & Schwarz	EMC32	68-4-90-14-002-A10	Version 9.15.00	N/A	N/A

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Site 1:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz	3.21dB
Uncertainty for Radiated Spurious Emission 30MHz-1000MHz	Horizontal: 4.35dB; Vertical: 4.44dB
Uncertainty for Radiated Spurious Emission 1000MHz-18000MHz	Horizontal: 4.30dB; Vertical: 4.29dB
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.51dB; Vertical: 4.50dB
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10 ⁻⁷ or 1%