FCC / ISED - TEST REPORT

Report Number	:	**64.790.21.05634.01-R1**	Date of Issue:	**March 4, 2022**
Model	:	EU-SK106, US-SK106, EU-OSK106, US-OSK106		
Product Type	:	Smart kit		
Applicant	:	GD Midea Air-conditioning Equipment Co., Ltd.		
Address of applicant	:	Lingang Road, Beijiao, Shunde, Foshan, 528311, Guangdong, China		
Manufacturer	:	GD Midea Air-conditioning Equipment Co., Ltd.		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	45		

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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
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3 Description of the Equipment under Test

Product:	Smart Kit
PMN:	Smart Kit
Model no.:	US-OSK106, EU-OSK106, US-SK106, EU-SK106
Model difference:	All models are only difference in model name.
HVIN:	US-OSK106, EU-OSK106, US-SK106, EU-SK106
FVIN:	N/A
FCC ID:	2ADQOMDNA22
IC:	12575A-MDNA22
Options and accessories:	N/A
Rating:	DC 5V (by USB port)
RF Transmission Frequency:	2412-2462MHz
No. of Operated Channel:	11
Modulation:	CCK, DQPSK, DBPSK for 802.11b QPSK, BPSK for 802.11g/n
Antenna Type:	PCB Antenna
Antenna Gain:	2.0dBi
Description of the EUT:	Products are smart kits with WIFI and Bluetooth function, they are only can be used in Midea Group's household appliances for controling function. It can not connet to computer for any other function.

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4 Summary of Test Standards

Test Standards	
RSS-Gen Issue 5 Amendment 2 (February 2021)	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
FCC Part 15 Subpart C 10-1-2020 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

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

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5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition			Pages	Test Result
§15.207	RSS-GEN 8.8	Conducted emission AC power port	10	Pass
§15.247(b)(1)	RSS-247 Clause 5.4(d)	Conducted peak output power	13	Pass
§15.247(a)(2)	RSS-247 Clause 5.2(a)	6dB bandwidth and 99% Occupied Bandwidth	14	Pass
§15.247(e)	RSS-247 Clause 5.2(b)	Power spectral density	22	Pass
§15.247(d)	RSS-247 Clause 5.5	Spurious RF conducted emissions	26	Pass
§15.247(d)	RSS-247 Clause 5.5	Band edge	37	Pass
§15.247(d) & §15.209 &	RSS-247 Clause 5.5 & RSS-GEN 6.13	Spurious radiated emissions for transmitter	40	Pass
§15.203	RSS-GEN 6.8	Antenna requirement	See note 1	Pass

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses a PCB antenna, which gain is 2.0dBi. According to §15.203 & RSS-Gen 6.8, it is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID:2ADQOMDNA22 complies with Section 15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C rules; and IC:12575A-MDNA22 complies with RSS-GEN issue 5 and RSS-247 issue 2.
All models are identical in circuit design, PCB layout and components used but only different in model name. Tests were only performed on US-SK106.
This report is only for the WIFI part.

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:	2021-11-20
Testing Start Date:	2021-11-29
Testing End Date:	2021-12-09

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

Reviewed by:	Prepared by:	Tested by:
Tony Liu	Kevin Ouyang	Louise Liu
Reviewer	Project Handler	EMC Test Engineer

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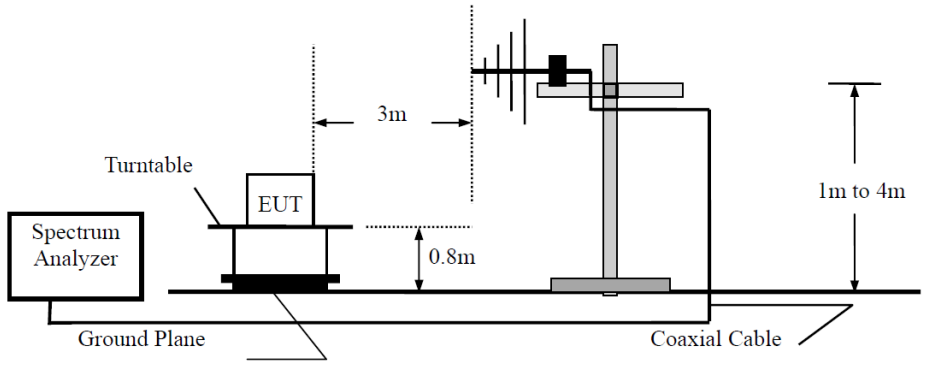
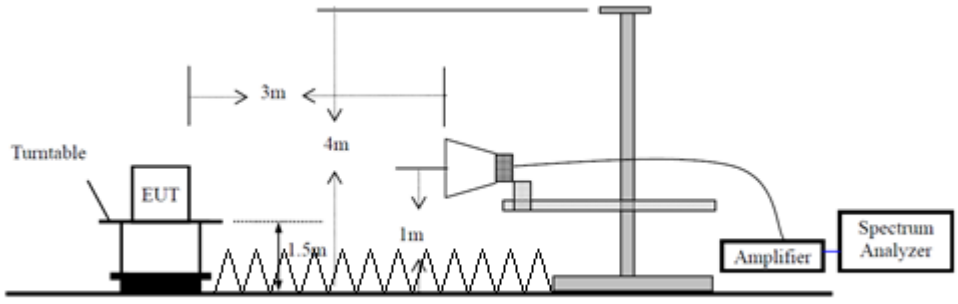
7 Test Setups

7.1 Radiated test setups

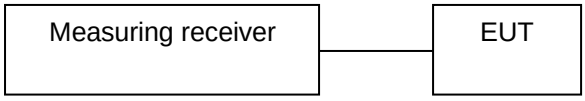
Below 1GHz



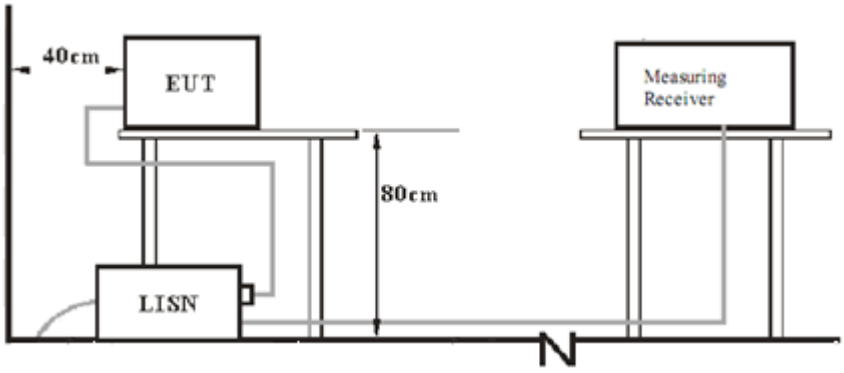
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Mobile Phone	Apple	iPhone 6	---
APP	Midea	MSmartHome	---
Mainboard	Midea	/	---
Laptop	Lenovo	X240	L34015282
Software	/	DOGO_VP2.0.1	---

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

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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

According to §15.207, conducted emissions limit as below:

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

Remark: “*” Decreasing linearly with logarithm of the frequency

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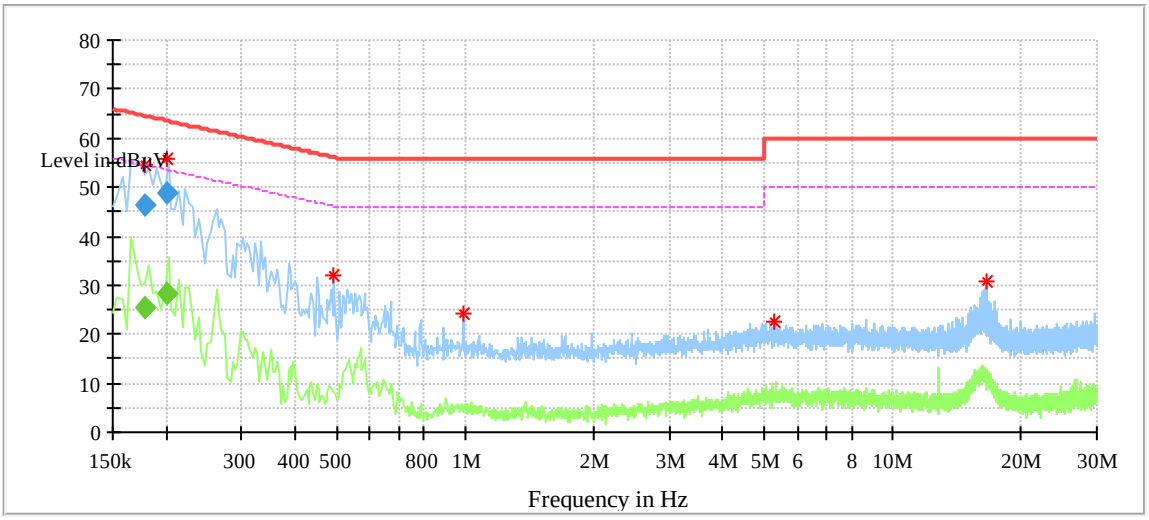
Conducted Emission Test 150kHz – 30MHz

M/N: US-SK106
Op Cond.: WIFI communication mode.
Test Spec.: Power Line, Live

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.177500	---	25.25	54.60	29.35	L1	9.25
0.177500	46.20	---	64.60	18.40	L1	9.25
0.201500	---	28.36	53.55	25.18	L1	9.23
0.201500	48.86	---	63.55	14.69	L1	9.23

Remark： Correct factor=cable loss + LISN factor

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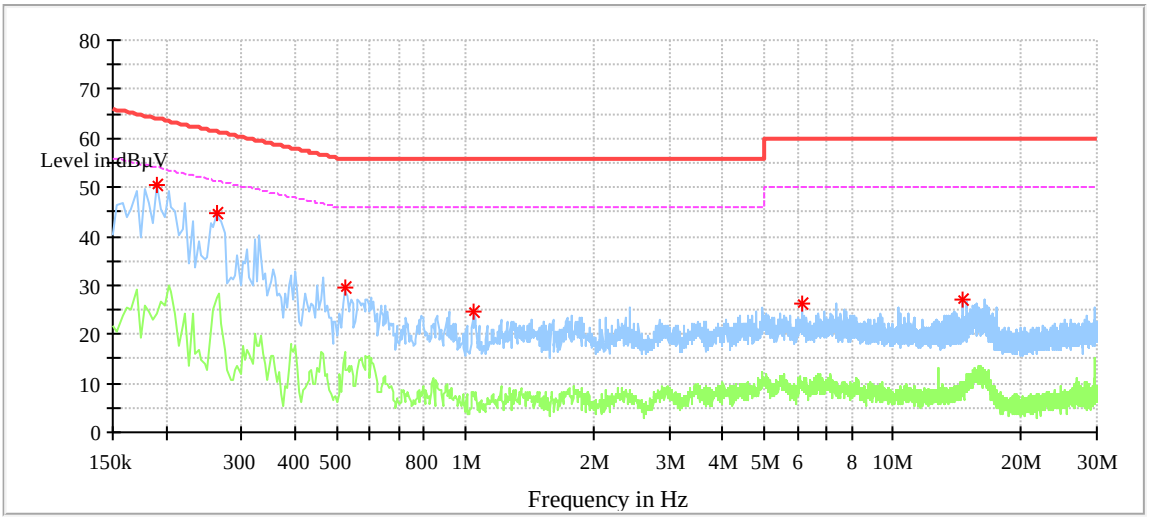
Conducted Emission Test 150kHz – 30MHz

M/N: US-SK106
Op Cond.: WIFI communication mode.
Test Spec.: Power Line, Neutral

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



No significant emission was detected within 10 dB to limit

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9.2 Conducted peak output power

Test Method

1. Connect the power meter to the EUT
   a) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
   b) At all times the EUT is transmitting at its maximum power control level.
   c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Adjust the measurement in dBm by adding 10log (1/x), where x is the duty cycle to the measurement result.

Limits

Conducted Peak Output Power Limit:

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

EIRP Limit :

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤4	≤36

Test result as below table

TestMode	Channel(MHz)	Conducted Peak Power(dBm)	EIRP(dBm)	Limit(dBm)	Verdict
11B	2412	13.7	15.7	≤30	PASS
	2437	13.6	15.6	≤30	PASS
	2462	15.6	17.6	≤30	PASS
11G	2412	14.9	16.9	≤30	PASS
	2437	14.7	16.7	≤30	PASS
	2462	16.4	18.4	≤30	PASS
11N20SISO	2412	14.6	16.6	≤30	PASS
	2437	14.6	16.6	≤30	PASS
	2462	16.3	18.3	≤30	PASS

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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 ≥ 1% of the 99% bandwidth, VBW ≥ 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

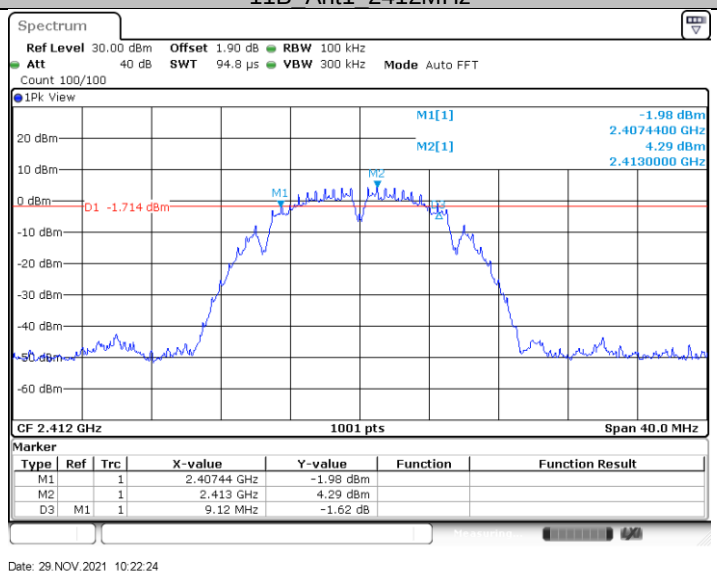
Test result

6dB bandwidth

TestMode	Channel[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	2412	9.120	2407.440	2416.560	0.5	PASS
	2437	9.160	2432.400	2441.560	0.5	PASS
	2462	8.640	2457.920	2466.560	0.5	PASS
11G	2412	16.440	2403.760	2420.200	0.5	PASS
	2437	16.440	2428.760	2445.200	0.5	PASS
	2462	16.480	2453.760	2470.240	0.5	PASS
11N20SISO	2412	17.400	2403.400	2420.800	0.5	PASS
	2437	17.640	2428.160	2445.800	0.5	PASS
	2462	17.640	2453.160	2470.800	0.5	PASS

Test Graphs

11B_Ant1_2412MHz



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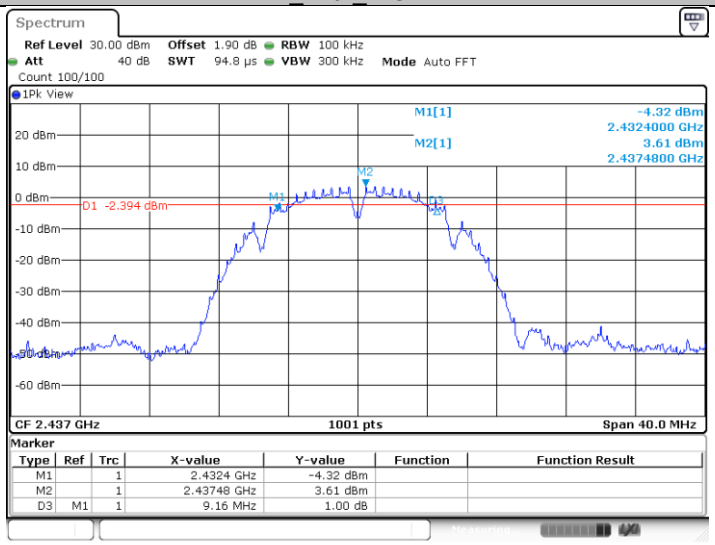
11B_Ant1_2437MHz



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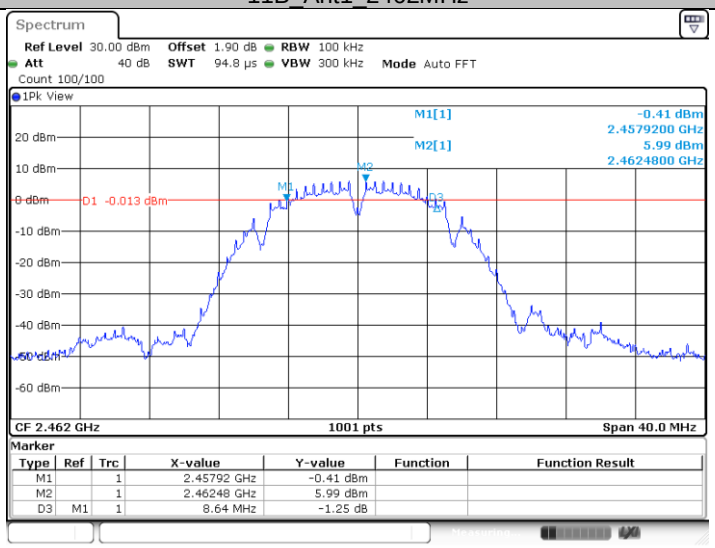

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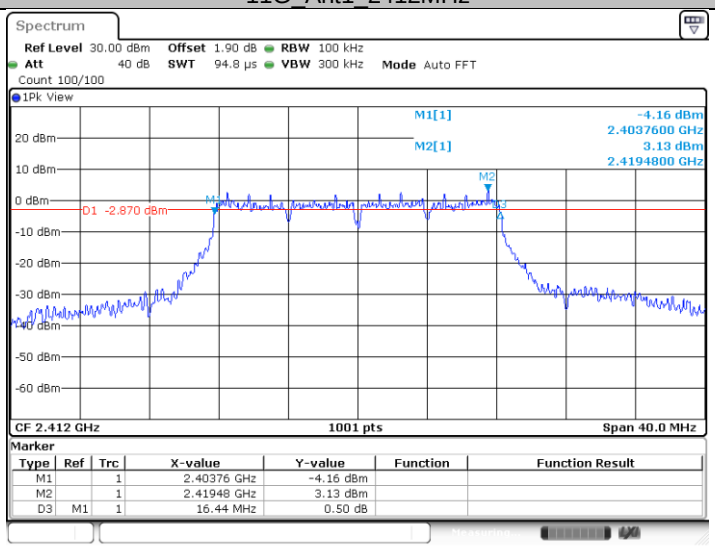

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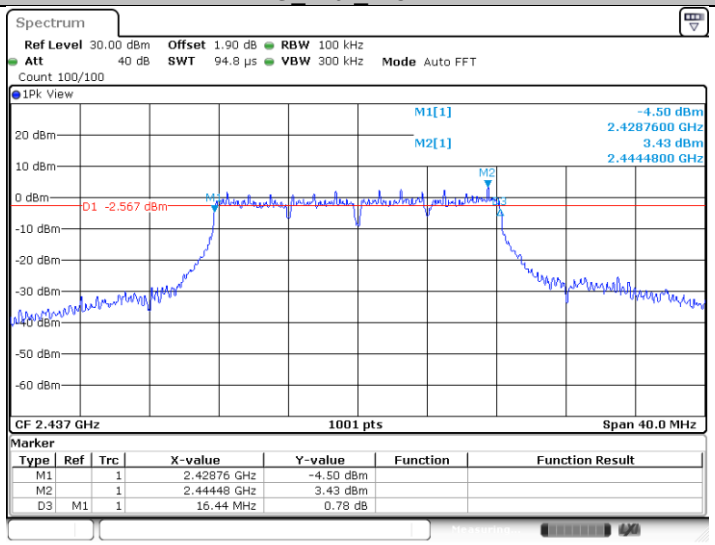
11G_Ant1_2437MHz



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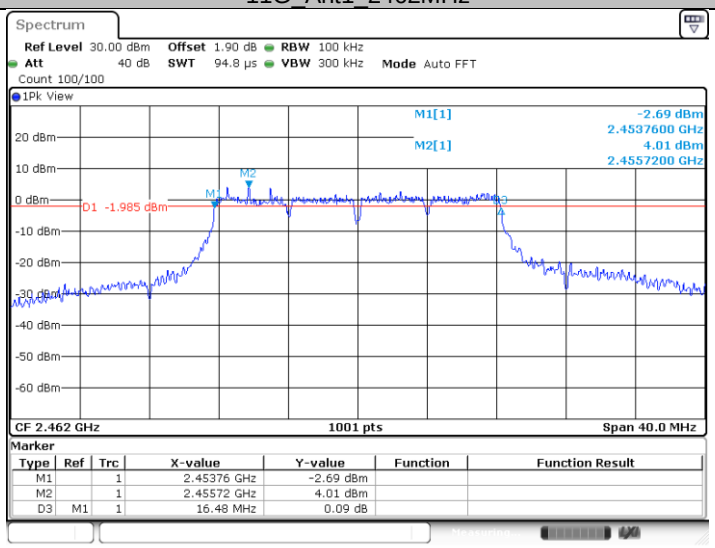

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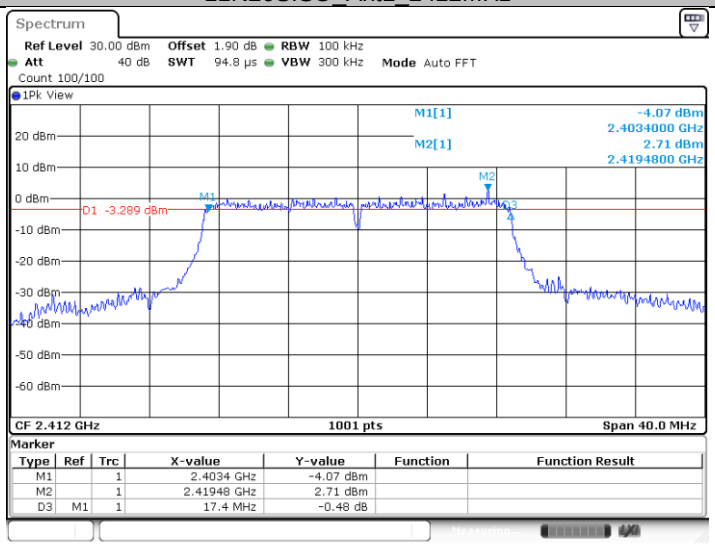

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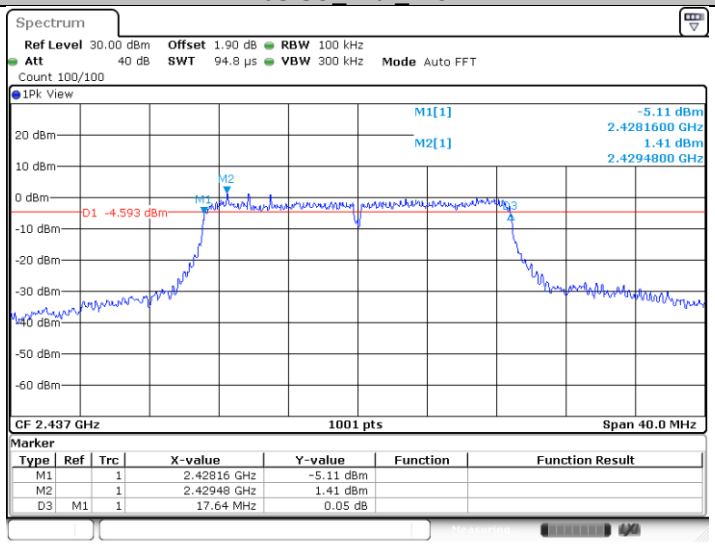
11N20SISO_Ant1_2437MHz
 Date: 29.NOV.2021 10:40:40
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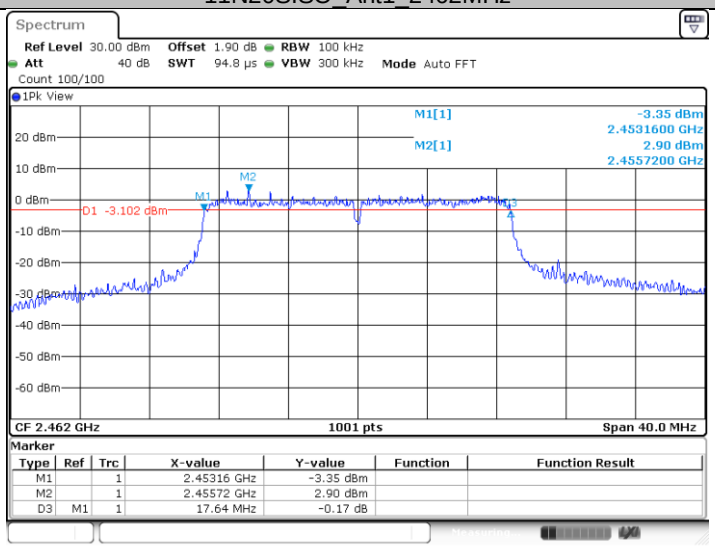 Date: 29.NOV.2021 10:42:07

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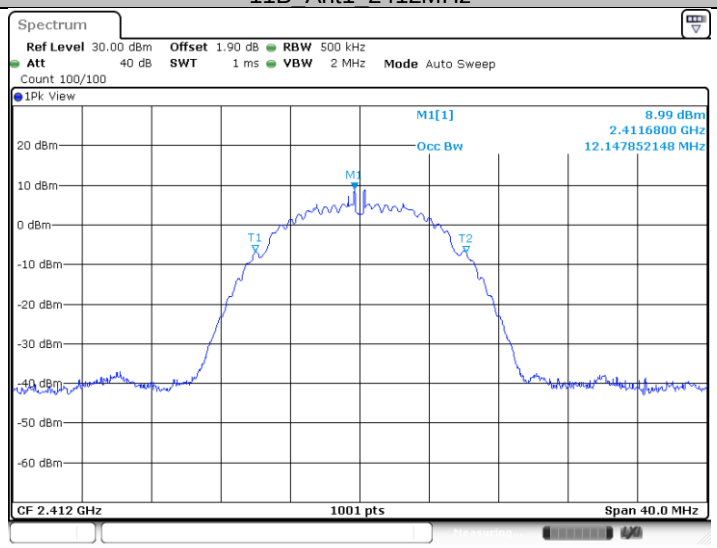
99% bandwidth

Test Result

TestMode	Channel[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	2412	12.148	2405.966	2418.114	---	PASS
	2437	12.148	2430.966	2443.114	---	PASS
	2462	12.148	2455.966	2468.114	---	PASS
11G	2412	17.502	2403.329	2420.831	---	PASS
	2437	17.542	2428.329	2445.871	---	PASS
	2462	18.022	2453.209	2471.231	---	PASS
11N20SISO	2412	18.302	2402.889	2421.191	---	PASS
	2437	18.302	2427.929	2446.231	---	PASS
	2462	18.701	2452.729	2471.431	---	PASS

Test Graphs

11B_Ant1_2412MHz



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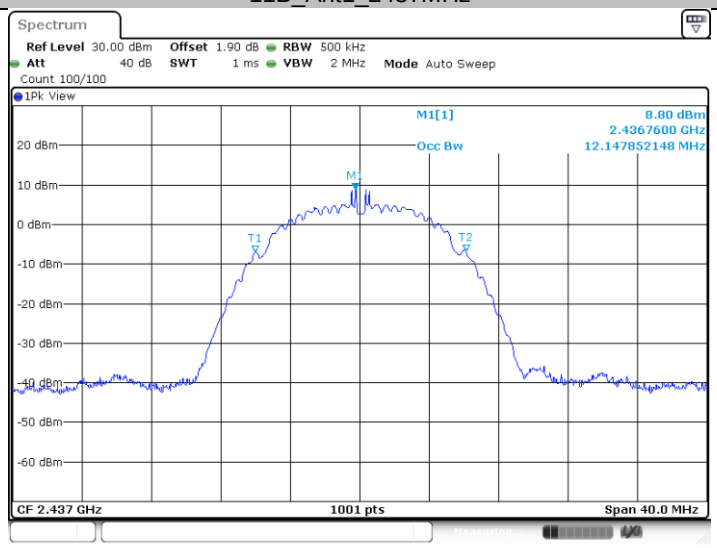

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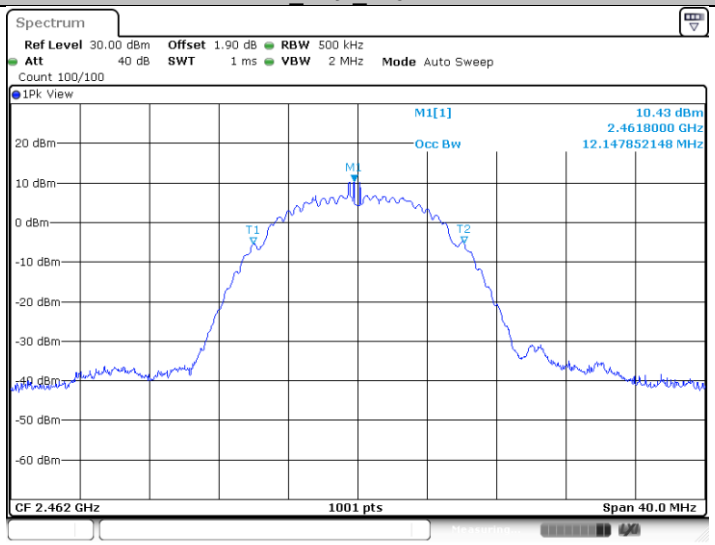
11B_Ant1_2462MHz



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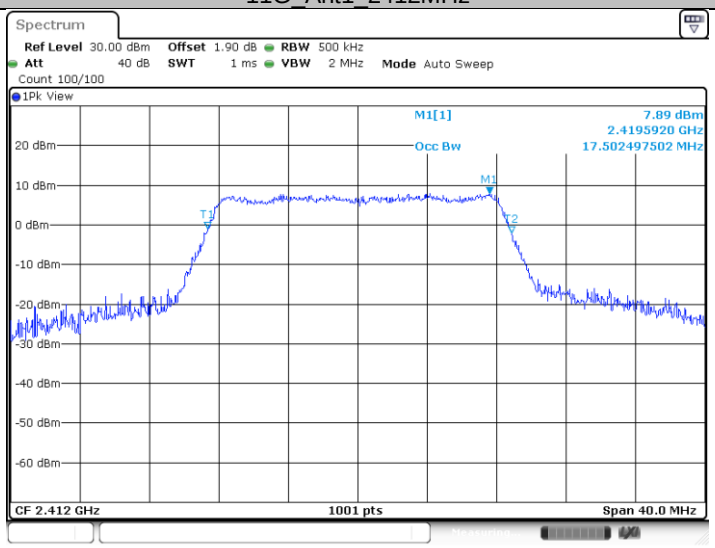

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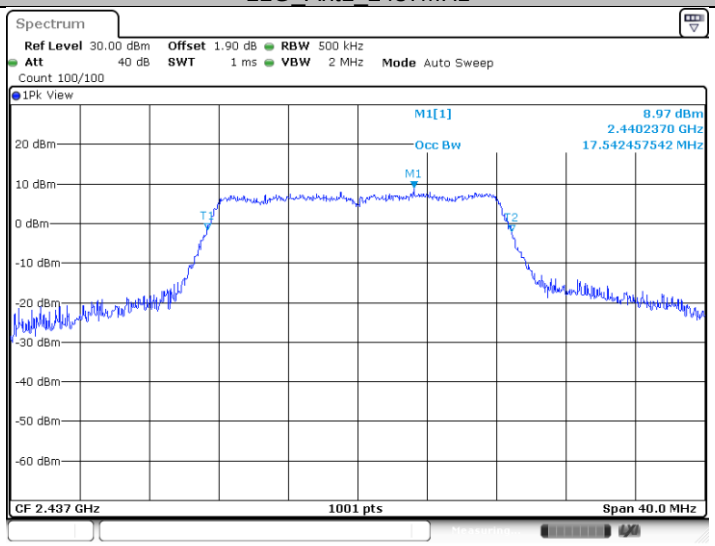

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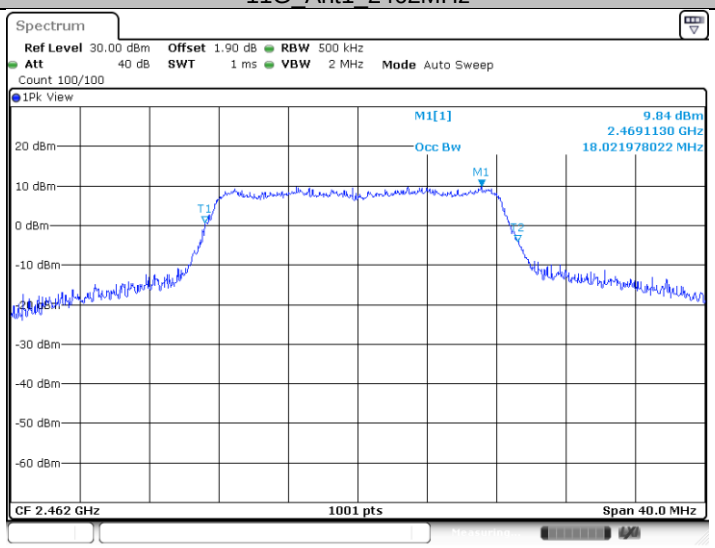
11G_Ant1_2462MHz
 Date: 29.NOV.2021 10:36:23
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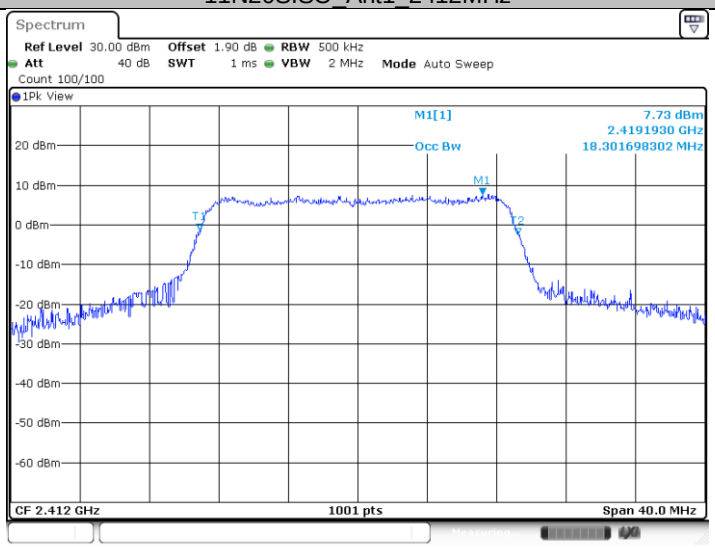 Date: 29.NOV.2021 10:39:07
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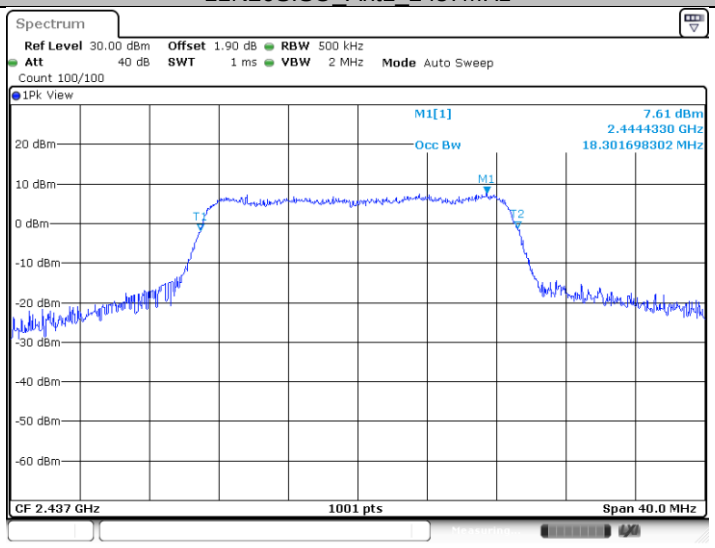 Date: 29.NOV.2021 10:40:50

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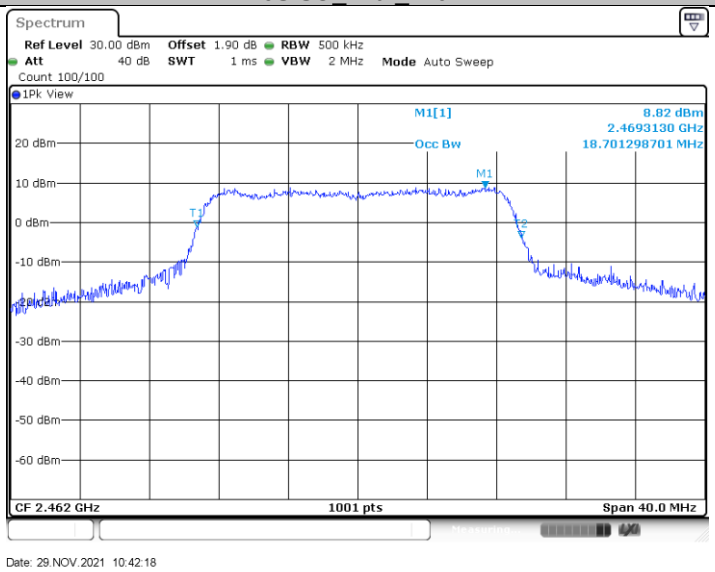
11N20SISO_Ant1_2462MHz


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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

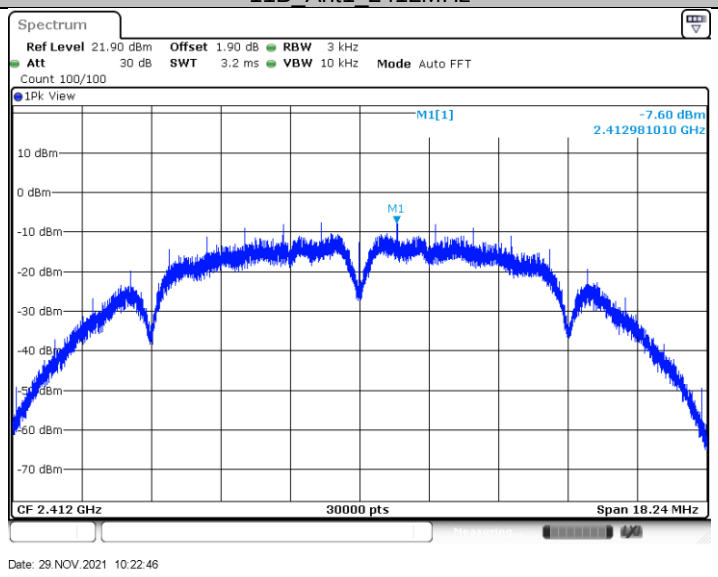
Limit [dBm/3KHz]
≤8

Test result

TestMode	Channel(MHz)	Result(dBm/3KHz)	Limit(dBm/3KHz)	Verdict
11B	2412	-7.6	<=8	PASS
	2437	-8.71	<=8	PASS
	2462	-6.77	<=8	PASS
11G	2412	-10.86	<=8	PASS
	2437	-11.39	<=8	PASS
	2462	-9.47	<=8	PASS
11N20SISO	2412	-10.91	<=8	PASS
	2437	-10.8	<=8	PASS
	2462	-9.76	<=8	PASS

Test Graphs

11B_Ant1_2412MHz



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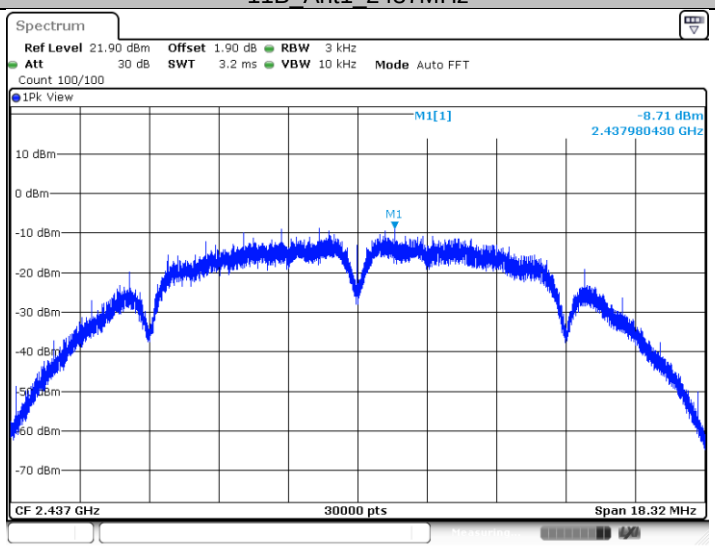
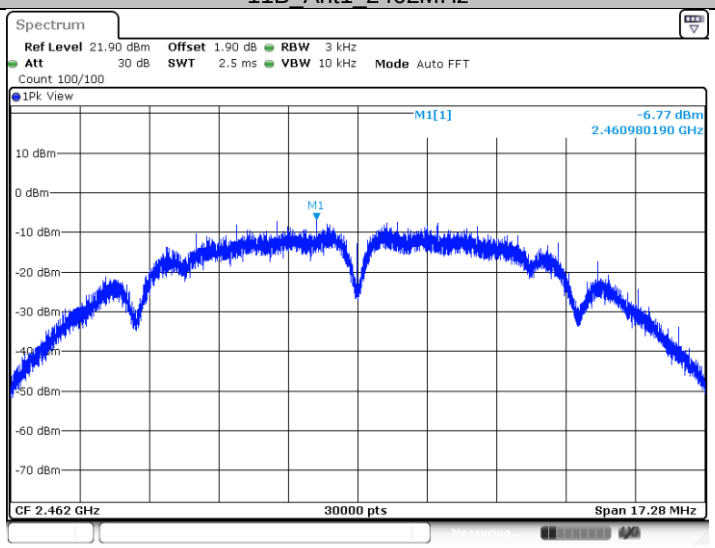
11B_Ant1_2437MHz
 Date: 29.NOV.2021 10:25:06
11B_Ant1_2462MHz
 Date: 29.NOV.2021 10:27:50
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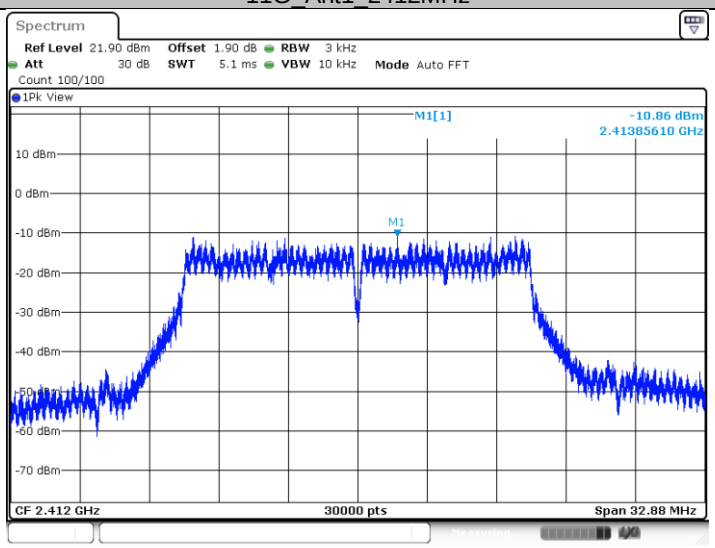 Date: 29.NOV.2021 10:30:36

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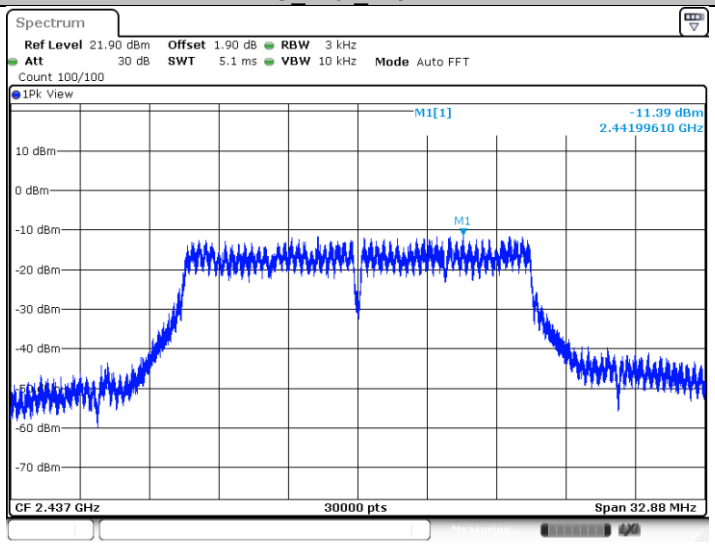
11G_Ant1_2437MHz



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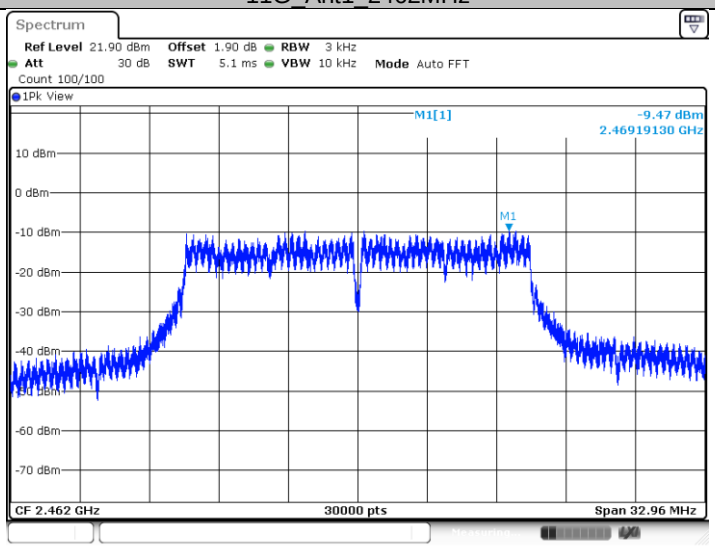
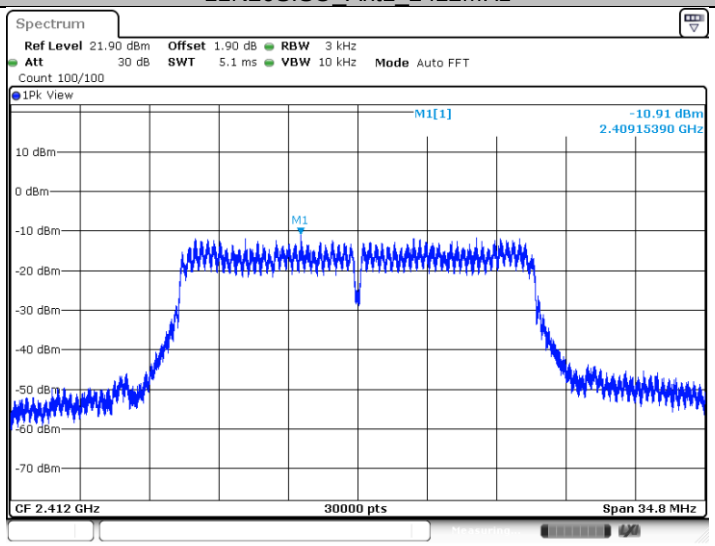
11G_Ant1_2462MHz



Date: 29.NOV.2021 10:36:34

11N20SISO_Ant1_2412MHz



Date: 29.NOV.2021 10:39:19

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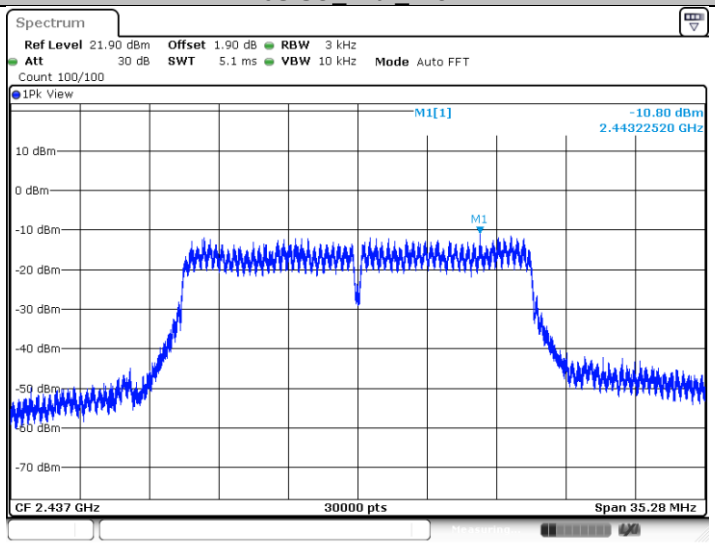
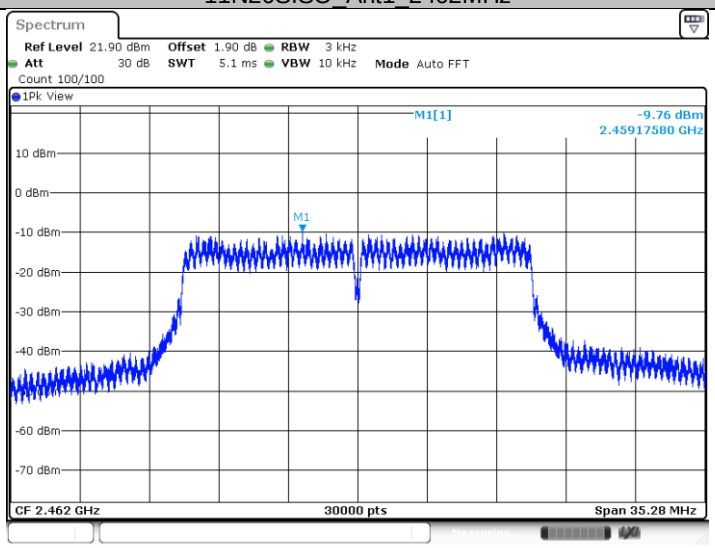
11N20SISO_Ant1_2437MHz
 Date: 29.NOV.2021 10:41:02
11N20SISO_Ant1_2462MHz
 Date: 29.NOV.2021 10:42:30

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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

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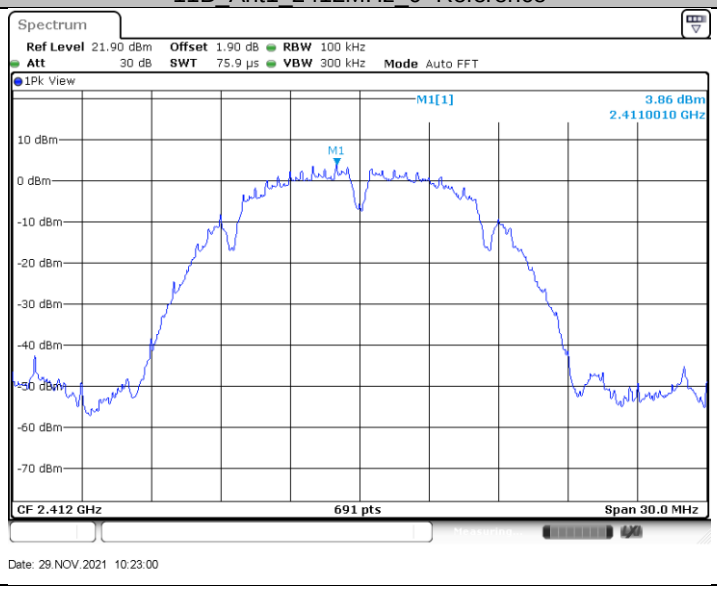
Spurious RF conducted emissions

Test Result

TestMode	Channel(MHz)	FreqRange(MHz)	RefLevel (dBm)	Result(dBm)	Limit(dBm)	Verdict
11B	2412	Reference	3.86	3.86	---	PASS
		30~1000 MHz	30~1000 MHz	-64.25	<=-16.14	PASS
		1000~26500 MHz	1000~26500 MHz	-49.49	<=-16.14	PASS
	2437	Reference	4.36	4.36	---	PASS
		30~1000 MHz	30~1000 MHz	-64.14	<=-15.64	PASS
		1000~26500 MHz	1000~26500 MHz	-50.05	<=-15.64	PASS
	2462	Reference	5.91	5.91	---	PASS
		30~1000 MHz	30~1000 MHz	-64.37	<=-14.09	PASS
		1000~26500 MHz	1000~26500 MHz	-46.64	<=-14.09	PASS
11G	2412	Reference	2.42	2.42	---	PASS
		30~1000 MHz	30~1000 MHz	-63.11	<=-17.58	PASS
		1000~26500 MHz	1000~26500 MHz	-33.81	<=-17.58	PASS
	2437	Reference	1.91	1.91	---	PASS
		30~1000 MHz	30~1000 MHz	-64.07	<=-18.09	PASS
		1000~26500 MHz	1000~26500 MHz	-50.57	<=-18.09	PASS
	2462	Reference	4.05	4.05	---	PASS
		30~1000 MHz	30~1000 MHz	-64.75	<=-15.95	PASS
		1000~26500 MHz	1000~26500 MHz	-35.18	<=-15.95	PASS
11N20SISO	2412	Reference	1.38	1.38	---	PASS
		30~1000 MHz	30~1000 MHz	-64.43	<=-18.62	PASS
		1000~26500 MHz	1000~26500 MHz	-31.18	<=-18.62	PASS
	2437	Reference	-0.78	-0.78	---	PASS
		30~1000 MHz	30~1000 MHz	-65.47	<=-20.78	PASS
		1000~26500 MHz	1000~26500 MHz	-51.39	<=-20.78	PASS
	2462	Reference	3.26	3.26	---	PASS
		30~1000 MHz	30~1000 MHz	-63.31	<=-16.74	PASS
		1000~26500 MHz	1000~26500 MHz	-34.34	<=-16.74	PASS

Test Graphs

11B_Ant1_2412MHz_0~Reference



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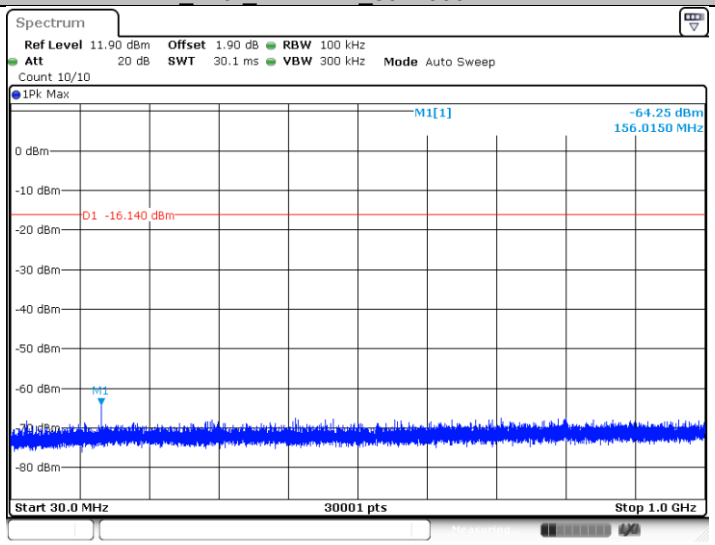
11B_Ant1_2412MHz_30~1000 MHz MHz



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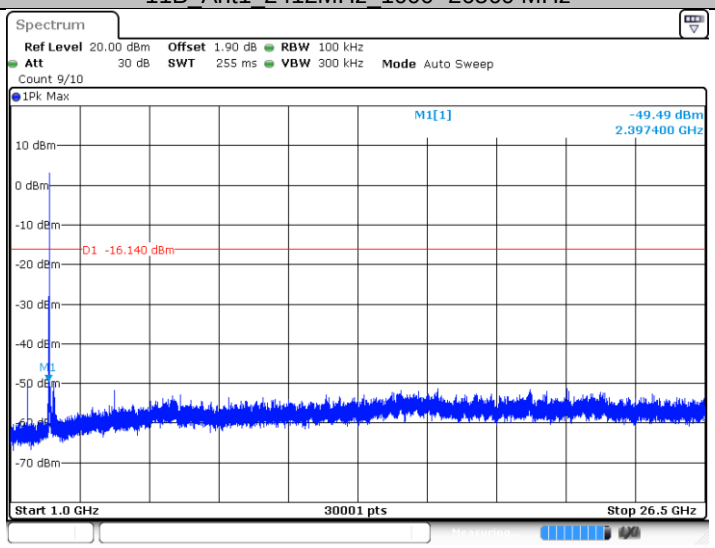
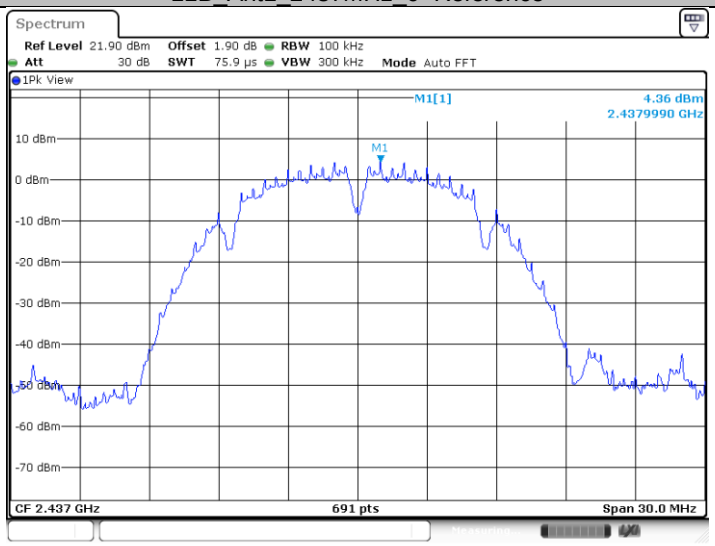
11B_Ant1_2412MHz_1000~26500 MHz



Date: 29.NOV.2021 10:23:14

11B_Ant1_2437MHz_0~Reference



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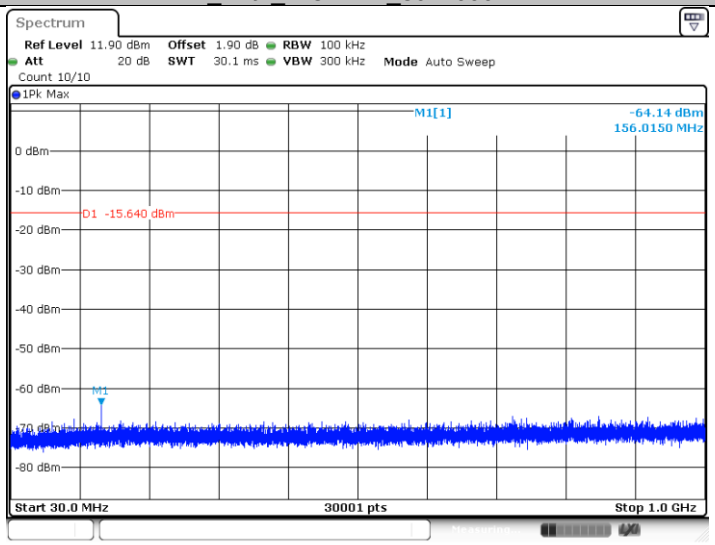
11B_Ant1_2437MHz_30~1000 MHz



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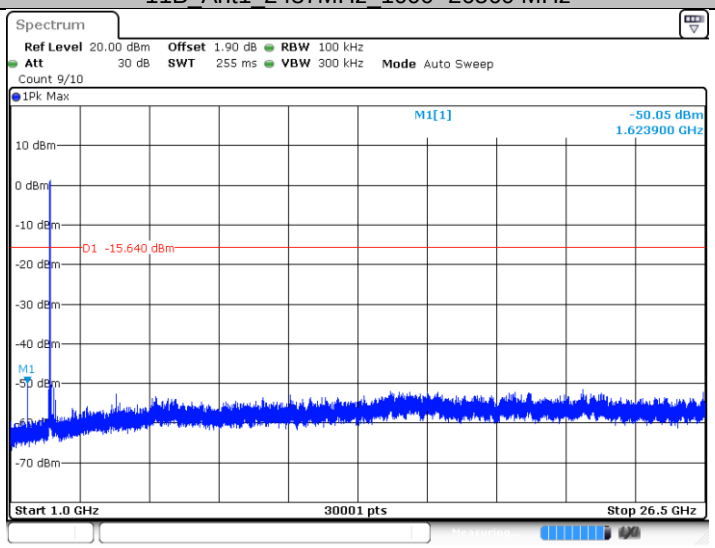
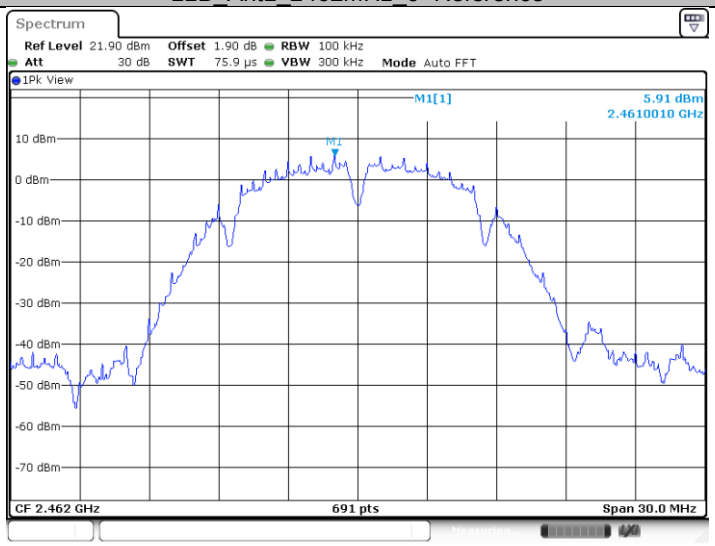
11B_Ant1_2437MHz_1000~26500 MHz



Date: 29.NOV.2021 10:25:26

11B_Ant1_2462MHz_0~Reference



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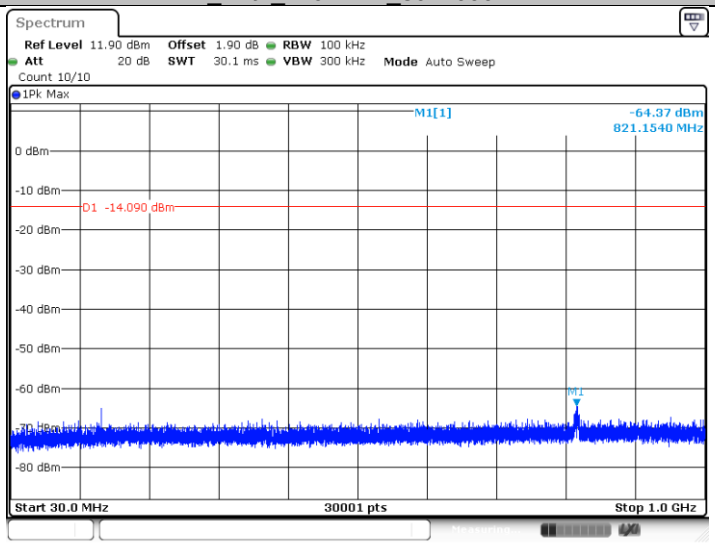
11B_Ant1_2462MHz_30~1000 MHz



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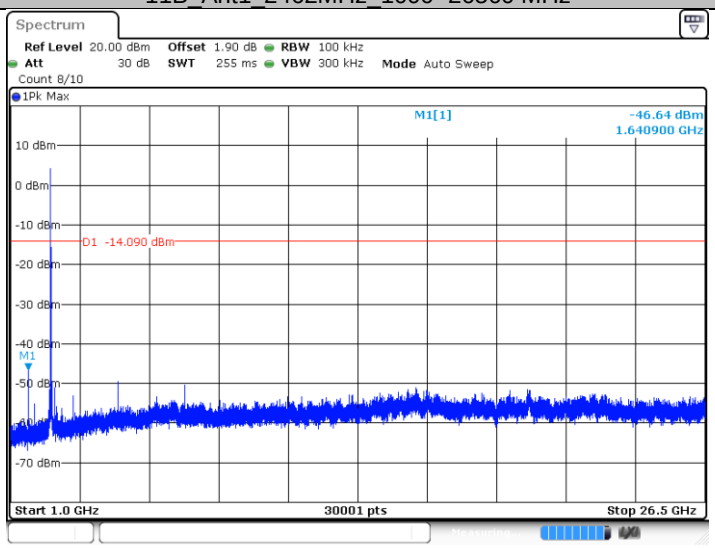
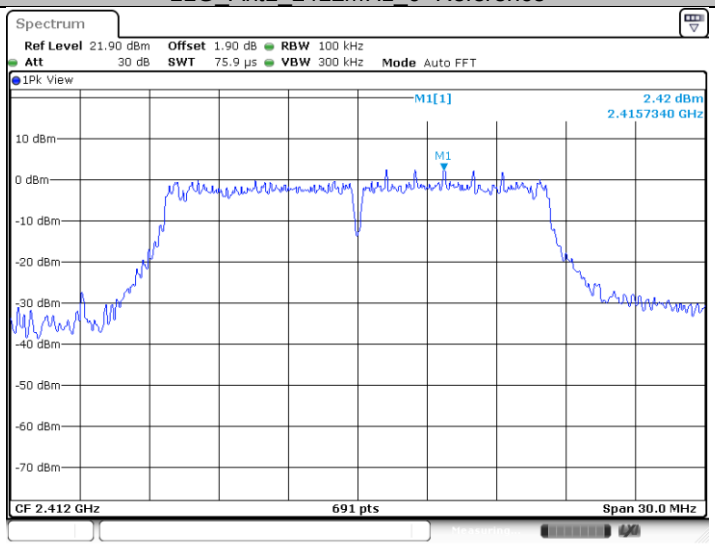
11B_Ant1_2462MHz_1000~26500 MHz



Date: 29.NOV.2021 10:28:19

11G_Ant1_2412MHz_0~Reference



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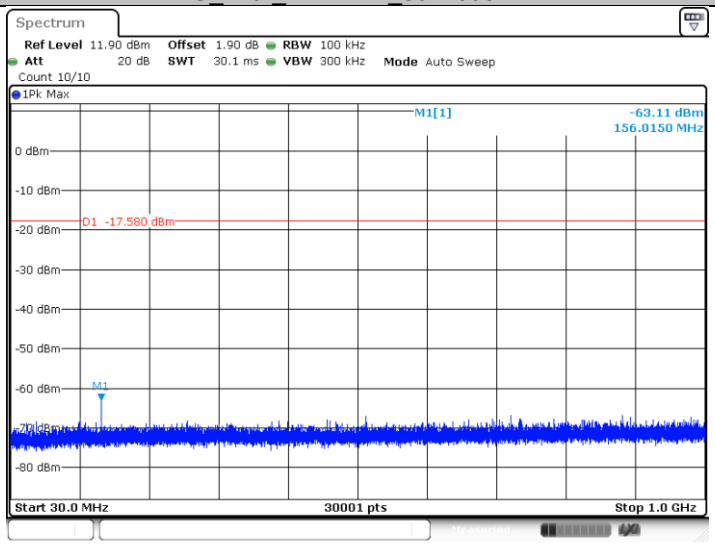
11G_Ant1_2412MHz_30~1000 MHz



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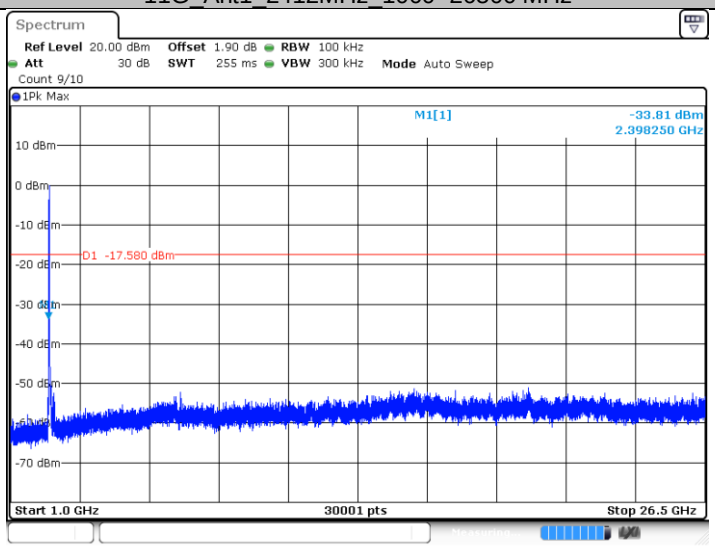
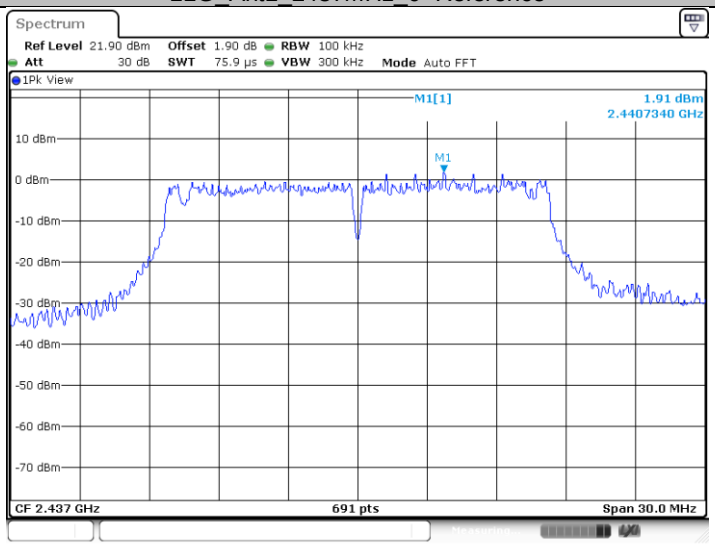
11G_Ant1_2412MHz_1000~26500 MHz



Date: 29.NOV.2021 10:31:04

11G_Ant1_2437MHz_0~Reference



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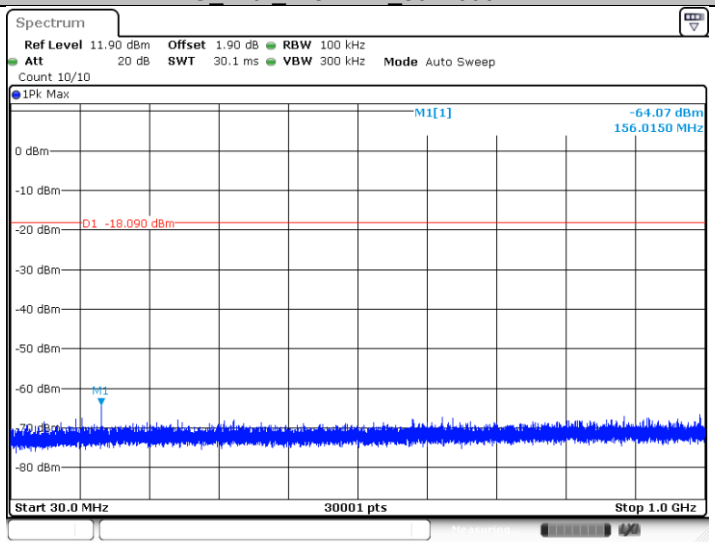
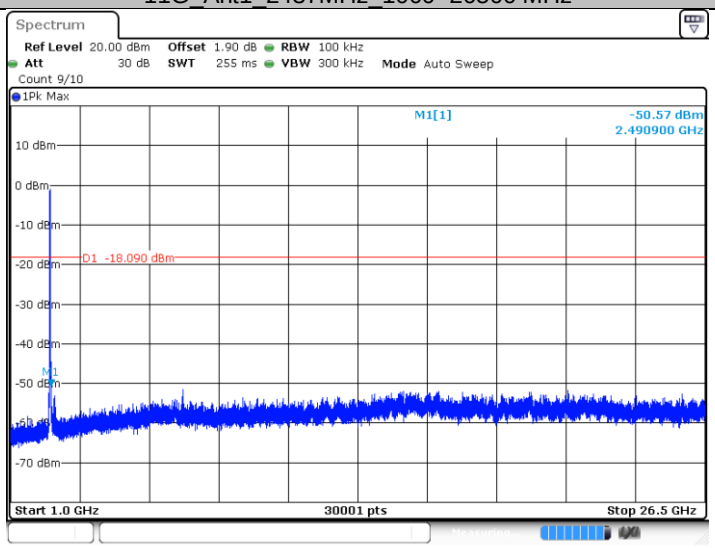
11G_Ant1_2437MHz_30~1000 MHz



Date: 29.NOV.2021 10:33:02

11G_Ant1_2437MHz_1000~26500 MHz



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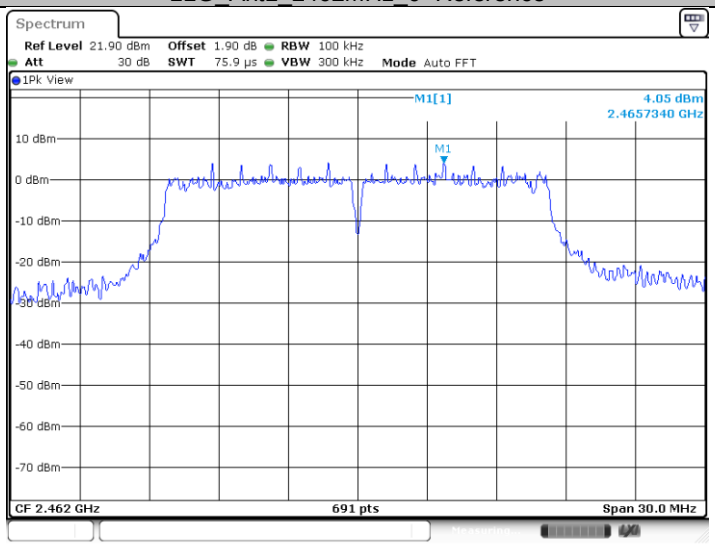
11G_Ant1_2462MHz_0~Reference



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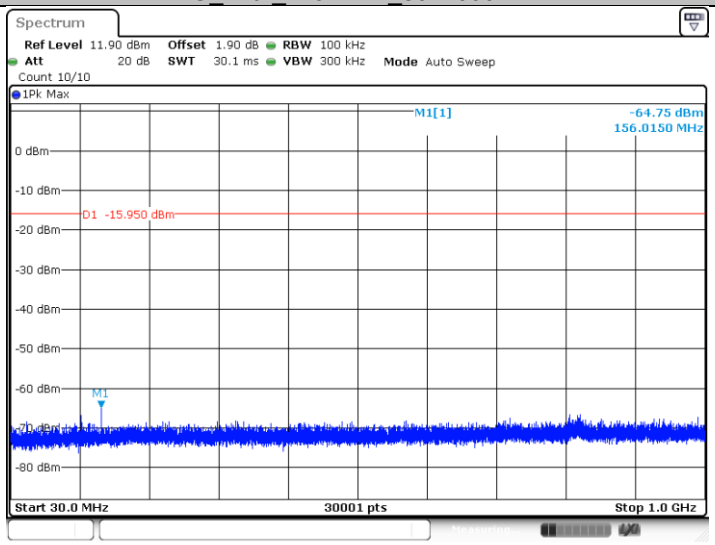
11G_Ant1_2462MHz_30~1000 MHz



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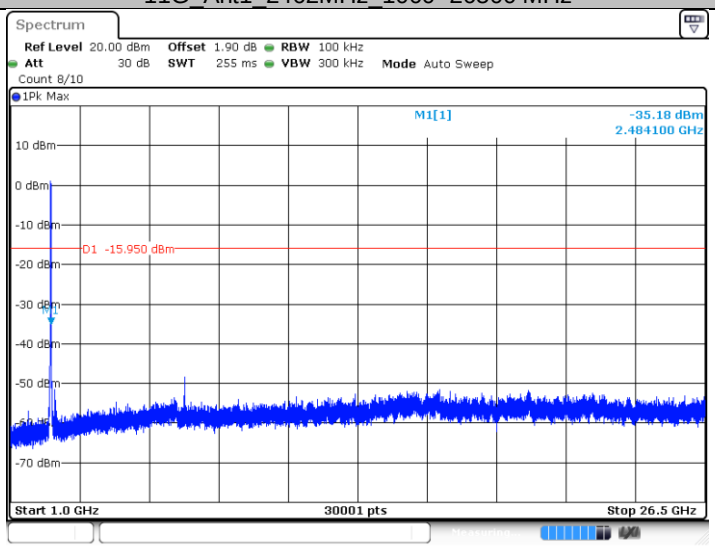
11G_Ant1_2462MHz_1000~26500 MHz



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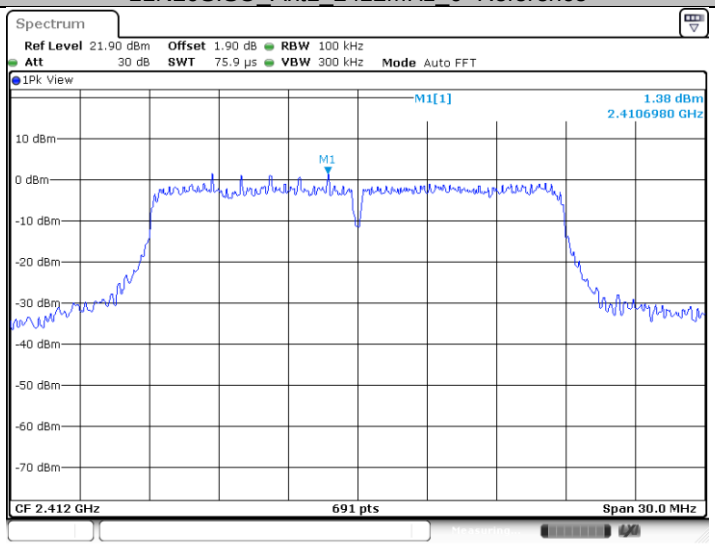
11N20SISO_Ant1_2412MHz_0~Reference



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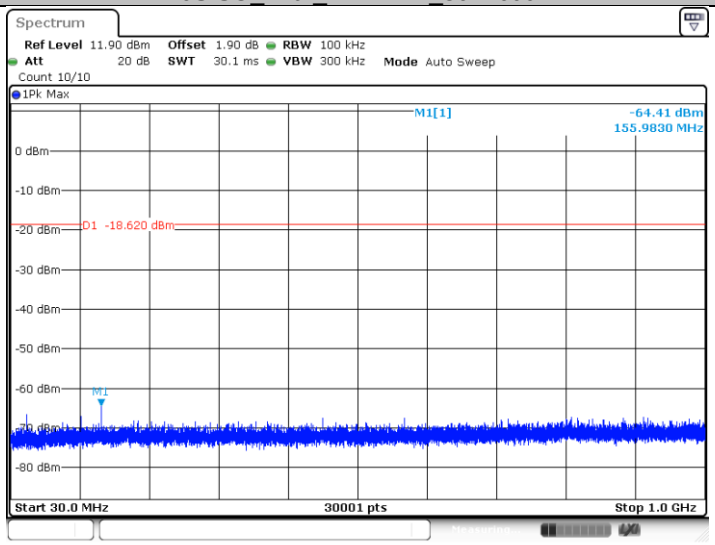
11N20SISO_Ant1_2412MHz_30~1000 MHz



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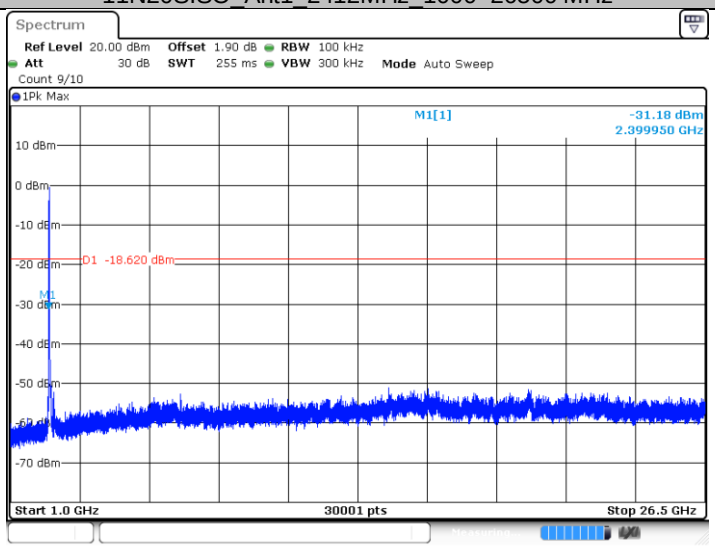

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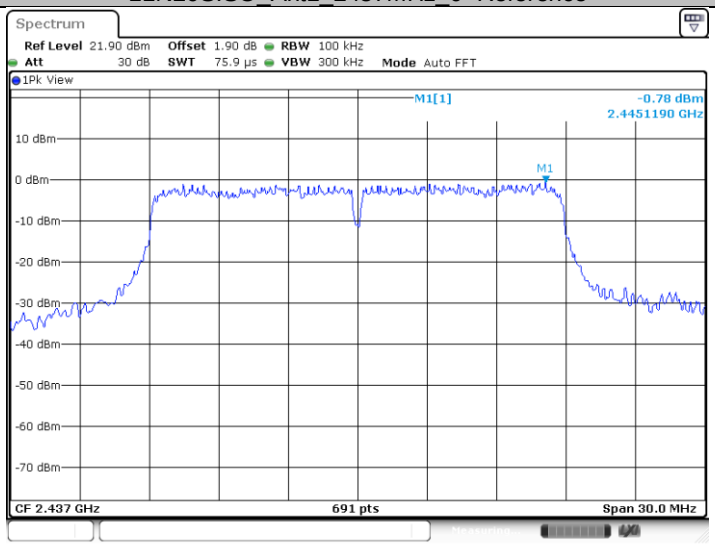
11N20SISO_Ant1_2437MHz_0~Reference



Date: 29.NOV.2021 10:41:07

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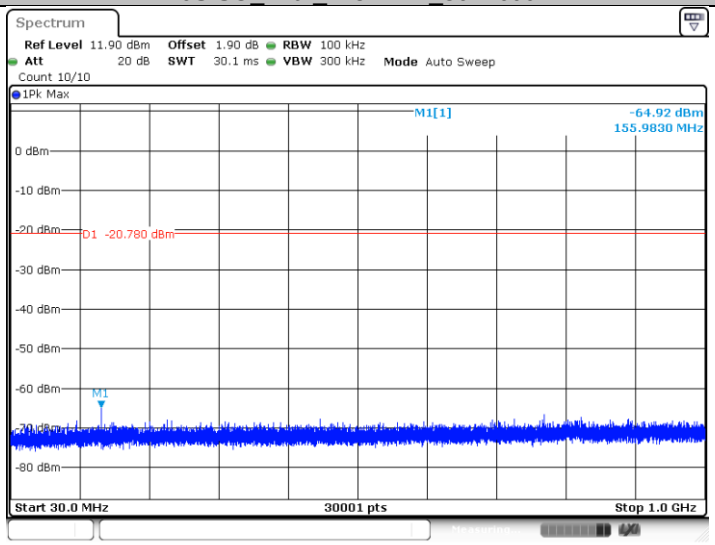
11N20SISO_Ant1_2437MHz_30~1000 MHz
 Date: 29.NOV.2021 10:41:13
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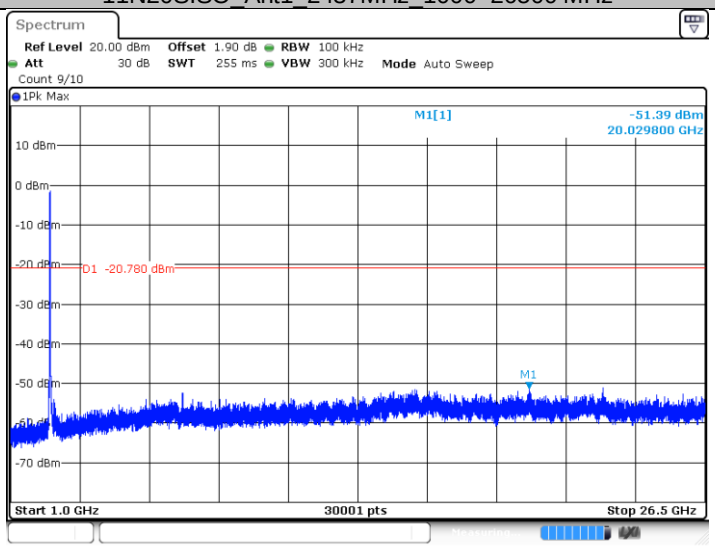
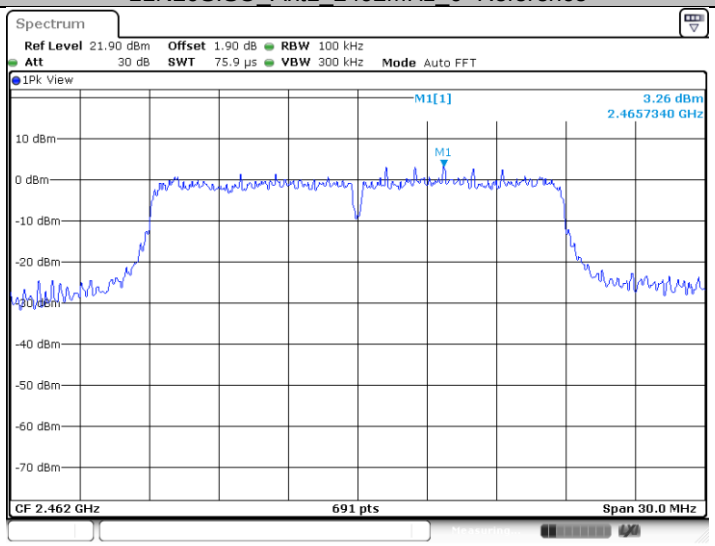
 Date: 29.NOV.2021 10:41:21
11N20SISO_Ant1_2462MHz_0~Reference
 Date: 29.NOV.2021 10:43:35

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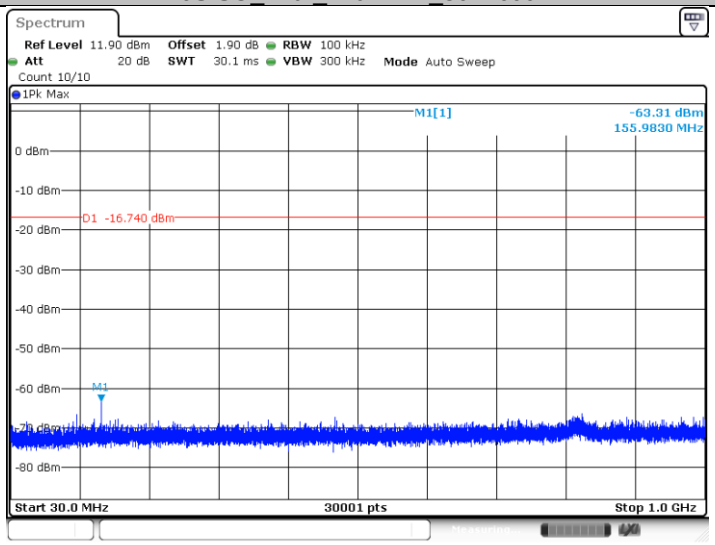
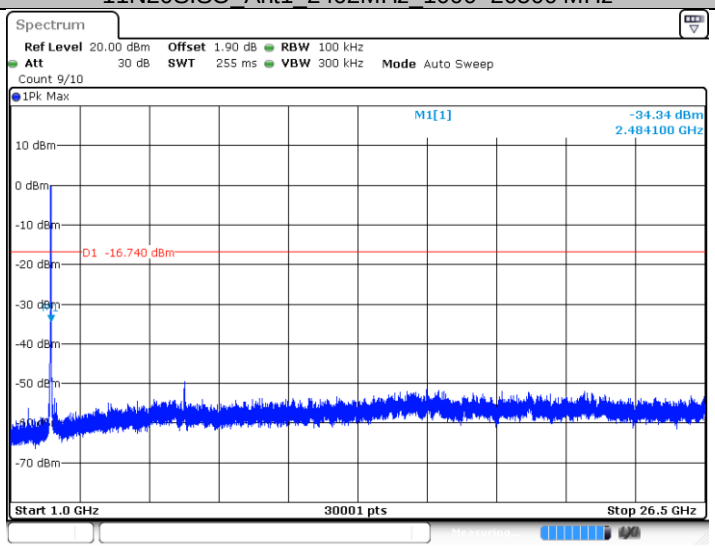
11N20SISO_Ant1_2462MHz_30~1000 MHz
 Date: 29.NOV.2021 10:43:41
11N20SISO_Ant1_2462MHz_1000~26500 MHz
 Date: 29.NOV.2021 10:43:49

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9.6 Band edge

Test Method

1. Connect EUT test port to spectrum analyzer.
2. Set spectrum analyzer setting as below:
   Set RBW ≥ 1% of the span, VBW ≥ 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

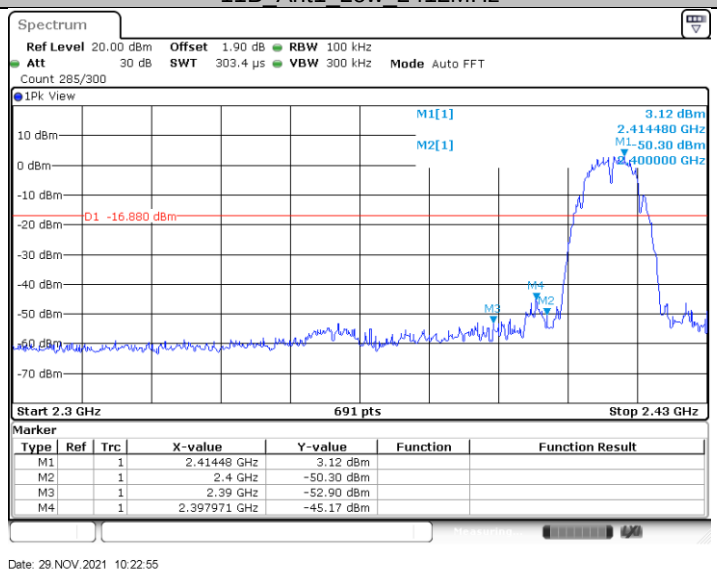
Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result

TestMode	ChName	Channel(MHz)	RefLevel(dBm)	Result(dBm)	Limit(dBm)	Verdict
11B	Low	2412	3.12	-45.17	<=-16.88	PASS
	High	2462	4.86	-47.47	<=-15.14	PASS
11G	Low	2412	0.04	-31.53	<=-19.96	PASS
	High	2462	4.02	-29.08	<=-15.98	PASS
11N20SISO	Low	2412	1.15	-33.13	<=-18.85	PASS
	High	2462	3.80	-30.89	<=-16.2	PASS

Test Graphs

11B_Ant1_Low_2412MHz



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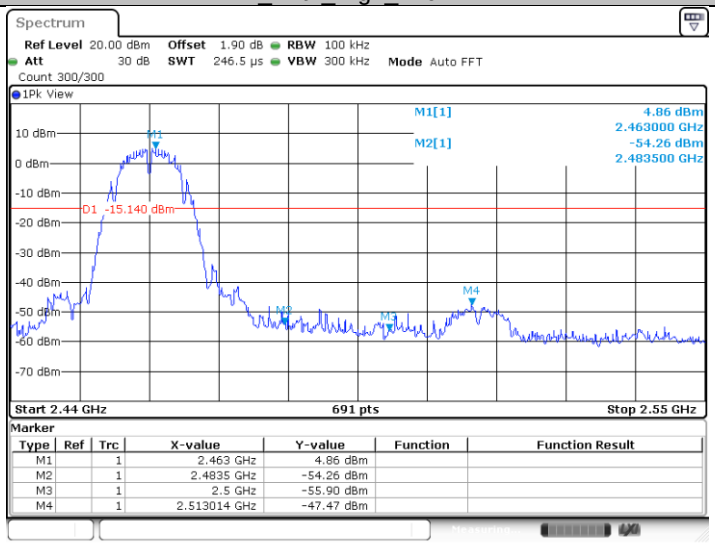
11B_Ant1_High_2462MHz

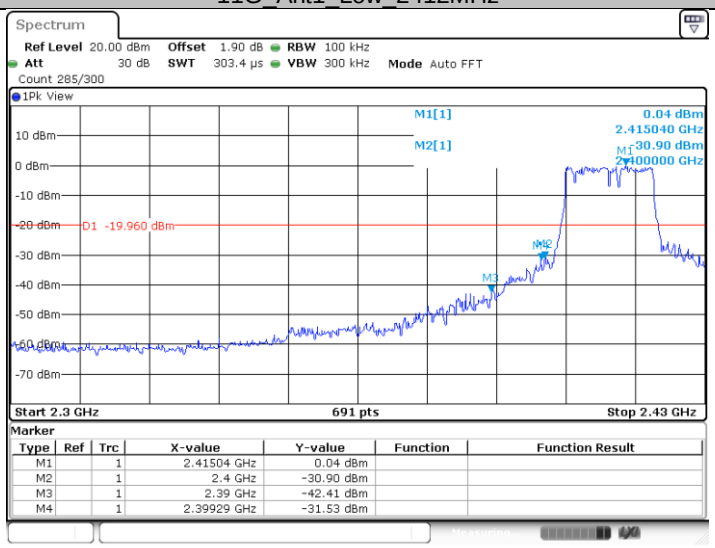


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.463 GHz	4.86 dBm		
M2		1	2.4835 GHz	-54.26 dBm		
M3		1	2.5 GHz	-55.90 dBm		
M4		1	2.513014 GHz	-47.47 dBm		

Date: 29.NOV.2021 10:27:59

11G_Ant1_Low_2412MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41504 GHz	0.04 dBm		
M2		1	2.4 GHz	-30.90 dBm		
M3		1	2.39 GHz	-42.41 dBm		
M4		1	2.39929 GHz	-31.53 dBm		

Date: 29.NOV.2021 10:30:45

11G_Ant1_High_2462MHz

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46316 GHz	4.02 dBm		
M2		1	2.4835 GHz	-29.84 dBm		
M3		1	2.5 GHz	-47.53 dBm		
M4		1	2.483841 GHz	-29.08 dBm		

Date: 29.NOV.2021 10:36:43

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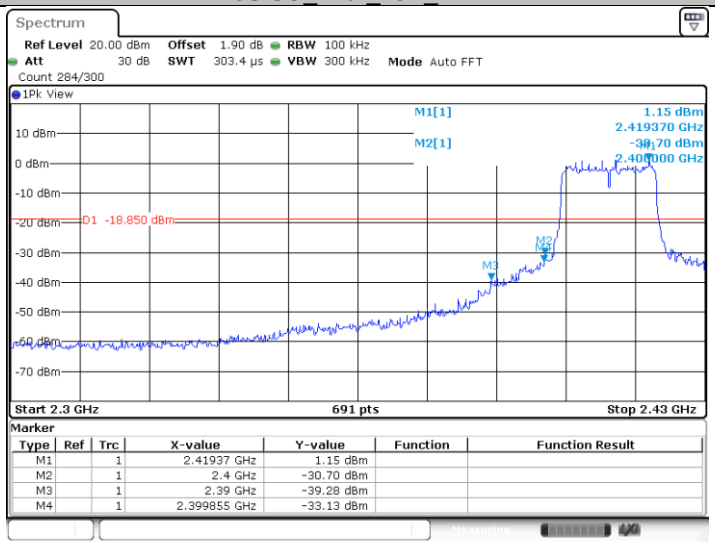
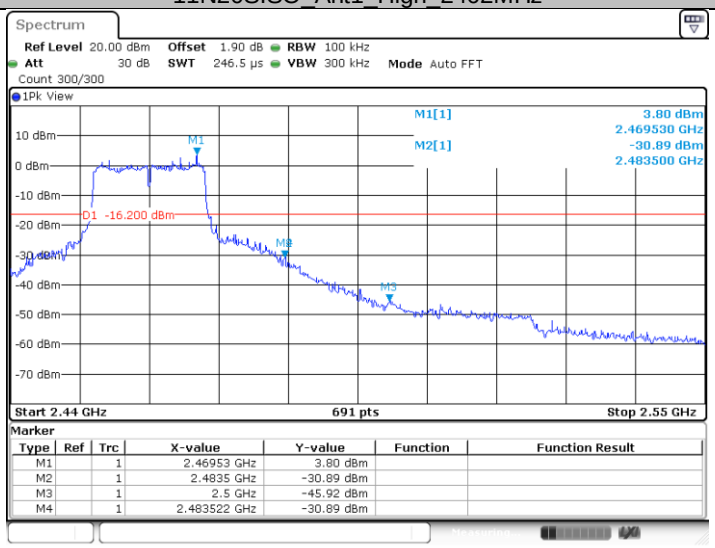
11N20SISO_Ant1_Low_2412MHz
 Date: 29.NOV.2021 10:39:27
11N20SISO_Ant1_High_2462MHz
 Date: 29.NOV.2021 10:42:38

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9.7 Spurious radiated emissions for transmitter

Test Method

1: The EUT was place 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 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] \ 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:

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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 section15.205, 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

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Spurious radiated emissions for transmitter

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:

Only show data of the WORST case for all Test Modes and Channels.

Emission (30MHz – 1GHz)

Frequency (MHz)	QP (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
52.249375	20.00	40.00	20.00	H	20.92
135.608750	26.11	43.50	17.39	H	15.66
204.721250	22.05	43.50	21.45	H	18.82
292.870000	35.89	46.00	10.11	H	21.57
332.276250	33.74	46.00	12.26	H	22.65
480.019375	33.02	46.00	12.98	H	25.62
52.249375	25.25	40.00	14.75	V	20.92
126.696875	23.32	43.50	20.18	V	16.12
184.108750	24.01	43.50	19.49	V	17.49
293.476250	30.01	46.00	15.99	V	21.59
340.581875	28.71	46.00	17.29	V	23.08
944.588750	34.06	46.00	11.94	V	32.76

Emission (Above 1GHz)

802.11N20

2412MHz

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
1000.000000	36.11	54.00	37.89	H	-11.04
2379.523810	47.28	74.00	26.72	H	-2.27
2484.285714	41.95	74.00	32.05	H	-1.83
4821.500000	49.73	74.00	24.27	H	3.53
9860.500000	44.36	74.00	29.64	H	11.83
2379.535714	45.06	74.00	28.94	H	-3.09
2389.928572	51.25	74.00	22.75	H	-3.12
1000.000000	33.26	54.00	40.74	V	-11.04
2382.857143	43.29	74.00	30.71	V	-2.26
2483.809524	42.80	74.00	31.20	V	-1.83
4825.000000	42.50	74.00	31.50	V	3.55
9205.000000	42.60	74.00	31.40	V	9.21
2350.571429	42.58	74.00	31.42	V	-3.19
2381.642857	44.40	74.00	29.60	V	-3.10
2393.714286	46.90	74.00	27.10	V	-3.13

2437MHz

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
1000.000000	34.81	54.00	39.19	H	-11.04
2381.904762	46.24	74.00	27.76	H	-2.26
2483.809524	43.00	74.00	31.00	H	-1.83
4881.500000	46.01	74.00	27.99	H	3.68
9768.500000	45.12	74.00	28.88	H	10.19
1000.000000	36.95	54.00	37.05	V	-11.04
2378.571429	43.76	74.00	30.24	V	-2.28
2484.761905	42.13	74.00	31.87	V	-1.83
4881.000000	41.20	74.00	32.80	V	3.68
9479.500000	42.27	74.00	31.73	V	10.25

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2462MHz

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2382.380952	43.74	74.00	30.26	H	-2.26
2485.238095	41.84	74.00	32.16	H	-1.83
4912.500000	43.69	74.00	30.31	H	3.51
9848.000000	46.18	74.00	27.82	H	11.60
2483.607143	49.45	74.00	24.55	H	-2.76
2499.571429	44.97	74.00	29.03	H	-2.74
2342.857143	47.49	74.00	26.51	V	-2.33
2382.380952	43.47	74.00	30.53	V	-2.26
2490.476191	42.92	74.00	31.08	V	-1.82
4931.000000	40.26	74.00	33.74	V	3.63
9491.500000	42.95	74.00	31.05	V	10.19
2478.500000	49.92	74.00	24.08	V	-2.76
2483.714286	44.43	74.00	29.57	V	-2.76

Remark:

(1) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.

(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)

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10 Test Equipment List

List of Test Instruments

Conducted Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2022-6-4
LISN	Rohde & Schwarz	ENV216	100326	2022-6-5

Radiated Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Schwarzbeck	VULB 9162	101269	2022-6-4
Trilog Super Broadband Test Antenna	ETS	3117	284	2022-2-2
Wave Guide Antenna	Rohde & Schwarz	SCU 18F	00218954	2022-5-24
Pre-amplifier	Rohde & Schwarz	SCU 18F	100745	2022-10-10
Pre-amplifier	Q-PAR	QWH-SL-18-40-K-SG	100746	2022-10-10
Sideband Horn Antenna	Rohde & Schwarz	SCU 40A	12827	2022-7-21
Pre-amplifier	Mini-circuits	UNAT-6+	100432	2022-7-27
Attenuator	TDK	SAC-3 #2	15542	2022-8-23
3m Semi-anechoic chamber	Rohde & Schwarz	EMC32	----	2023-5-28
Test software			Version10.35.02	N/A

RF conducted test

Description	Manufacturer	Model no.	Serial no.	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2022-6-3
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2022-6-3
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2022-6-3
Power Splitter	Weinschel	1580	SC319	2022-6-3
10dB Attenuator	Weinschel	4M-10	43152	2022-6-3
Test software	Rohde & Schwarz	EMC32	Version 10.60.10	N/A
Test software	Tonscend	System for BT/WIFI	Version 2.6.77.0518	N/A

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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:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz	3.31dB
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.28dB; Vertical: 4.36dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.26dB; Vertical: 4.25dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.51dB; Vertical: 4.50dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 1.27dB Frequency test involved: 0.6×10^{-7} or 1%

Remark:
Measurement Uncertainty Decision Rule
Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.

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