

ETSI EN 300 328 V2.2.2

TEST REPORT

For

WIFI+BT Module

MODEL NUMBER: WXT52M2511

REPORT NUMBER: 4791023025-1-RF-3

ISSUE DATE: October 26, 2023

Prepared for

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Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	October 26, 2023	Initial Issue	

Summary of Test Results

Test Item	Clause	Limit/Requirement	Result
NORMAL AND EXTREME CONDITIONS	N/A	Clause 5.1.2	Pass
RF output power	Clause 5.4.2.2.1.2	Clause 4.3.2.2	Pass
Power Spectral Density	Clause 5.4.3.2.1	Clause 4.3.2.3	Pass
Duty Cycle, Tx-sequence, Tx-gap	Clause 5.4.2.2.1.3	Clause 4.3.2.4	N/A
Medium Utilization (MU) factor	Clause 5.4.2.2.1.4	Clause 4.3.2.5	N/A
Adaptivity (non-FHSS)	Clause 5.4.6.2.1	Clause 4.3.2.6	Pass
Occupied Channel Bandwidth	Clause 5.4.7.2.1	Clause 4.3.2.7	Pass
Transmitter unwanted emissions in the out-of-band domain	Clause 5.4.8.2.1	Clause 4.3.2.8	Pass
Transmitter unwanted emissions in the spurious domain	Clause 5.4.9.2.1& Clause 5.4.9.2.2	Clause 4.3.2.9	Pass
Receiver spurious emissions	Clause 5.4.10.2.1& Clause 5.4.10.2.2	Clause 4.3.2.10	Pass
Receiver Blocking	Clause 5.4.11.2.1	Clause 4.3.2.11	Pass
Geo-location capability	N/A	Clause 4.3.2.12	N/A

Note:

1. N/A: In this whole report not applicable.

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

*The measurement result for the sample received is <Pass> according to <ETSI EN 300 328 V2.2.2> when <Simple Acceptance> decision rule is applied.

CONTENTS

1. ATTESTATION OF TEST RESULTS	6
2. TEST METHODOLOGY	7
3. FACILITIES AND ACCREDITATION	7
4. CALIBRATION AND UNCERTAINTY	8
4.1. MEASURING INSTRUMENT CALIBRATION	8
4.2. MEASUREMENT UNCERTAINTY	8
5. EQUIPMENT UNDER TEST	9
5.1. DESCRIPTION OF EUT	9
5.2. DESCRIPTION OF EQUIPMENT CATEGORY	9
5.3. CHANNEL LIST	10
5.4. MAXIMUM POWER	10
5.5. TEST CHANNEL CONFIGURATION	11
5.6. THE WORSE CASE POWER SETTING PARAMETER	11
5.7. DESCRIPTION OF AVAILABLE ANTENNAS	13
5.8. SUPPORT UNITS FOR SYSTEM TEST	14
5.9. TEST SYSTEM CONFIGURATION	15
5.10. DESCRIPTION OF THE EQUIPMENT UNDER TESTED	16
6. MEASURING EQUIPMENT AND SOFTWARE USED	18
7. TEST PROCEDURES AND RESULTS	21
7.1. NORMAL AND EXTREME CONDITIONS	21
7.2. RF OUTPUT POWER	22
7.3. POWER SPECTRAL DENSITY	24
7.4. ADAPTIVITY (NON-FHSS)	25
7.5. OCCUPIED CHANNEL BANDWIDTH	28
7.6. TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN	29
7.7. TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN	31
7.8. RECEIVER SPURIOUS EMISSIONS	34
7.9. RECEIVER BLOCKING	36
8. TEST DATA	40
8.1. APPENDIX A: RF OUTPUT POWER	40
8.1.1. Test Result	40
8.2. APPENDIX B: POWER SPECTRAL DENSITY	42
8.2.1. Test Result	42
8.2.2. Test Graphs	43

8.3.	<i>APPENDIX C: OCCUPIED CHANNEL BANDWIDTH</i>	57
8.3.1.	Test Result	57
8.3.2.	Test Graphs.....	58
8.4.	<i>APPENDIX D: TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN</i>	62
8.4.1.	Test Result	62
8.4.2.	Test Graphs.....	81
8.5.	<i>APPENDIX E: TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN</i>	88
8.5.1.	Test Result-Pre-scan	88
8.5.2.	Test Result- Emissions identified during the pre-scan	89
8.5.3.	Test Graphs-Pre-scan	90
8.5.4.	Test Graphs- Emissions identified during the pre-scan	94
8.5.5.	TX Radiated Test Result	95
8.6.	<i>APPENDIX F: RECEIVER SPURIOUS EMISSIONS</i>	109
8.6.1.	Test Result-Pre-scan	109
8.6.2.	Test Graphs-Pre-scan	109
8.6.3.	RX Radiated Test Result	112
8.7.	<i>APPENDIX G: RECEIVER BLOCKING</i>	114
8.7.1.	Test Result	114
8.8.	<i>APPENDIX H: ADAPTIVITY</i>	115
	Adaptivity	115
	Adaptivity COT	120
	APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION	125

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Hui Zhou Gaoshengda Technology Co.,LTD
Address: No.2,Jin-da Road,Huinan High-tech Industrial Park,Hui-ao Avenue,Huizhou City,Guangdong,China

Manufacturer Information

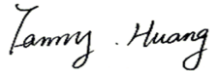
Company Name: Hui Zhou Gaoshengda Technology Co.,LTD
Address: No.2,Jin-da Road,Huinan High-tech Industrial Park,Hui-ao Avenue,Huizhou City,Guangdong,China

EUT Information

EUT Name: WIFI+BT Module
Model: WXT52M2511
Brand: GSD
Sample Received Date: October 8, 2023
Sample Status: Normal
Sample ID: 6522183
Date of Tested: October 11, 2023 to October 26, 2023

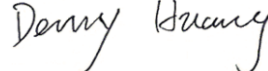
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
ETSI EN 300 328 V2.2.2	Pass

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2. TEST METHODOLOGY

All tests were performed in accordance with the standard ETSI EN 300 328 V2.2.2

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules ISED (Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046. VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011
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Note 1:

All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China.

Note 2:

The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3:

For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz had been correlated to measurements performed on an OFS.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Case	Description	Limit	Uncertainties
5.3.2.2.1.1	RF Output Power	± 1.5 dB	1.15
5.3.2.2.1.2	Duty Cycle	± 5 %	0.03
	Tx Sequence	± 5 %	0.03
	Tx Gap	± 5 %	0.03
5.3.2.2.1.3	Medium Utilisation	± 5 %	0.10
5.3.3.2.1	Power Spectral Density	± 3 dB	1.21
5.3.4.2.1	Accumulated Dwell Time	± 5 %	0.05
	Minimum Frequency Occupation Time	± 5 %	0.15
5.3.5.2.1	Hopping Frequency Separation	-	0.24
5.3.8.2.1	Occupied Channel Bandwidth	± 5 %	1.71
5.3.9..2.1	Out-of-band emissions	± 3 dB	1.39
5.3.10.2.1	Transmitter unwanted emissions in the spurious domain		
	30 MHz to 1 GHz	± 3 dB	0.64
	1 GHz to 12.75GHz	± 3 dB	1.68
5.3.11.2.1	Receiver Spurious emission		
	30 MHz to 1 GHz	± 3 dB	0.64
	1 GHz to 12.75GHz	± 3 dB	1.68

Test Item	Uncertainty
Uncertainty for Radiation Emission test	4.62 dB (30 MHz-1 GHz)
	3.50 dB (1 GHz-18 GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name	WIFI+BT Module
Model	WXT52M2511

Frequency Range:	2412 MHz to 2472 MHz
Type of Modulation:	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g/n: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA(1024-QAM, 64-QAM, 16-QAM, QPSK, BPSK)
Radio Technology:	IEEE802.11b/g, IEEE802.11n HT20/n HT40, IEEE802.11ax HE20/ax HE40
Normal Test Voltage:	DC 5 V

5.2. DESCRIPTION OF EQUIPMENT CATEGORY

EUT belong to	Receiver category	Relevant receiver clauses
☒	1	Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p.
☐	2	Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p.
☐	3	Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p.

5.3. CHANNEL LIST

Channel List For Bandwidth=20 MHz							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452	13	2472
2	2417	6	2437	10	2457	/	/
3	2422	7	2442	11	2462	/	/
4	2427	8	2447	12	2467	/	/

Channel List For Bandwidth=40 MHz							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442	11	2462	/	/
4	2427	8	2447	/	/	/	/
5	2432	9	2452	/	/	/	/
6	2437	10	2457	/	/	/	/

5.4. MAXIMUM POWER

IEEE Std. 802.11	Frequency (MHz)	Channel Number	Maximum AVG EIRP (dBm)
b	2412 ~ 2472	1-13[13]	17.02
g	2412 ~ 2472	1-13[13]	18.33
n HT20	2412 ~ 2472	1-13[13]	19.07
n HT40	2422 ~ 2462	3-11[9]	19.39
ax HE20	2412 ~ 2472	1-13[13]	19.39
ax HE40	2422 ~ 2462	3-11[9]	17.70

5.5. TEST CHANNEL CONFIGURATION

IEEE Std. 802.11	Test Channel Number	Frequency
b	CH 1(Low Channel), CH 7(MID Channel), CH 13(High Channel)	2412 MHz, 2442 MHz, 2472 MHz
g	CH 1(Low Channel), CH 7(MID Channel), CH 13(High Channel)	2412 MHz, 2442 MHz, 2472 MHz
n HT20	CH 1(Low Channel), CH 7(MID Channel), CH 13(High Channel)	2412 MHz, 2442 MHz, 2472 MHz
n HT40	CH 3(Low Channel), CH 7(MID Channel), CH 11(High Channel)	2422 MHz, 2442 MHz, 2462 MHz
ax HE20	CH 1(Low Channel), CH 7(MID Channel), CH 13(High Channel)	2412 MHz, 2442 MHz, 2472 MHz
ax HE40	CH 3(Low Channel), CH 7(MID Channel), CH 11(High Channel)	2422 MHz, 2442 MHz, 2462 MHz

5.6. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5 MHz Band							
Test Software		QA Tool					
Modulation Mode	Transmit Antenna Number	Test Channel					
		NCB: 20 MHz			NCB: 40 MHz		
		CH 1	CH 7	CH 13	CH 3	CH 7	CH 11
b	1	14	14	14	/		
	2	13.5	13.5	13.5			
g	1	14	14	14			
	2	14	14	14			
n HT20	1	12	13	12			
	2	12	13	12			
n HT40	1	/			14	14	14
	2				14	14	14
ax HE20	1	14	14	14	/		
	2	14	14	14			
ax HE40	1	/			14	14	14
	2				14	14	14

The EUT was tested in the following configuration(s):

Controlled in test mode using a software application on the EUT supplied by customer. The application was used to enable a continuous transmission and to select the mode, test channels, bandwidth, data rates as required.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ax HE20 mode: MCS0
802.11ax HE40 mode: MCS0

The EUT has 2 separate antennas which correspond to 2 separate antenna ports. Core 1 and Core 2 correspond to antenna 1 and antenna 2 respectively.

802.11b/g support SISO mode, two antenna have the same power setting, so only the worst data for antenna 2 are recorded in the report.

The measured additional path loss was included in any path loss calculations for all RF cable used during tested.

Radiated unwanted emissions tests were performed with the MIMO modes if supported. These were found to be the worst modulation scheme with regards to emissions after preliminary investigations and, as this mode emits the highest conducted output power level, it was deemed to be the worst case.

5.7. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
1	2412 ~ 2472	PCB Antenna	2.80
2	2412 ~ 2472	PCB Antenna	2.78

IEEE Std. 802.11	Transmit and Receive Mode	Description
b	☒ 2TX, 2RX	Antenna 1 to 2 can be used as transmitting/receiving antenna.
g	☒ 2TX, 2RX	Antenna 1 to 2 can be used as transmitting/receiving antenna.
n HT20	☒ 2TX, 2RX	Antenna 1 to 2 can be used as transmitting/receiving antenna.
n HT40	☒ 2TX, 2RX	Antenna 1 to 2 can be used as transmitting/receiving antenna.
ax HE20	☒ 2TX, 2RX	Antenna 1 to 2 can be used as transmitting/receiving antenna.
ax HE40	☒ 2TX, 2RX	Antenna 1 to 2 can be used as transmitting/receiving antenna.

Note: The value of the antenna gain was declared by customer.

5.8. SUPPORT UNITS FOR SYSTEM TEST

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Remarks
1	Laptop	Lenovo	E42-80	R303U5AG

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	/	/	1.0	/

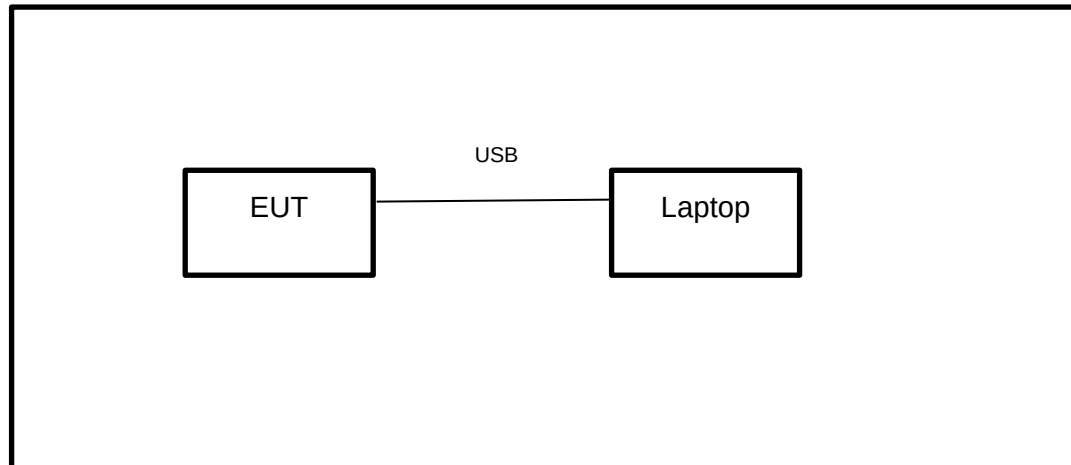
ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
/	/	/	/	/

TEST SETUP

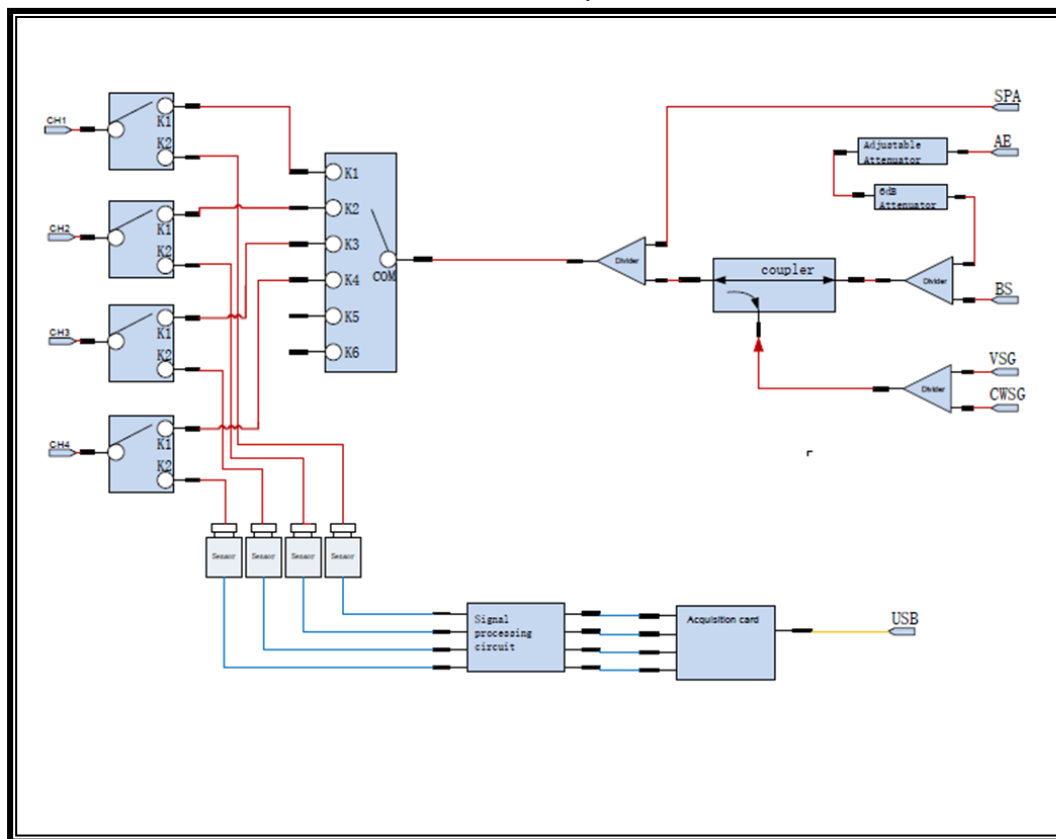
The EUT can work in engineering mode with a software through a Laptop.

SETUP DIAGRAM FOR TESTS



5.9. TEST SYSTEM CONFIGURATION

Tonsend SRD Test System



5.10. DESCRIPTION OF THE EQUIPMENT UNDER TESTED

(INFORMATION AS REQUIRED BY EN 300 328 V2.2.2, CLAUSE 5.4.1)

a)	Modulation Type		
	☐ FHSS		
	☒ non-FHSS		
b)	FHSS Equipment Description		
	The Number of Hopping Frequencies	The Maximum	/
		The Minimum	/
	The (average) dwell time		/
c)	Adaptive / Non-adaptive Equipment		
	☐ Non-adaptive Equipment		
	☒ Adaptive Equipment Without the Possibility to Switch to A Non-adaptive Mode		
	☐ Adaptive Equipment Which can also operate in A Non-adaptive Mode		
d)	Adaptive Equipment Description		
	The maximum Channel Occupancy Time implemented by the equipment		/
	☒ The equipment has implemented an LBT mechanism		
	☐ The equipment has implemented a DAA mechanism		
	☐ The equipment can operate in more than one adaptive mode		
e)	The different transmit operating modes		
	☒ Operating mode 1 (single antenna)	☐ Equipment with only one antenna	
		☒ Equipment with two diversity antennas but only one antenna active at any moment in time	
		☐ Smart Antenna Systems with two or more antennas, but operating in a (legacy) mode where only one antenna is used (e.g. IEEE 802.11™ legacy mode in smart antenna systems)	
	☒ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming	☐ Single spatial stream/Standard throughput/(e.g. IEEE 802.11™ legacy mode)	
		☒ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1	
		☒ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2	
	☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming	☐ Single spatial stream/Standard throughput (e.g. IEEE 802.11™ legacy mode)	
		☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1	
		☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2	
f)	In case of Smart Antenna Systems		
	The number of Receive chains		2
	The number of Transmit chains		2
	In case of beam forming, the maximum (additional) beam forming gain:		/
g)	Operating Frequency Range(s) of the equipment		
	Operating Frequency Range 1	2412 MHz to 2472 MHz for 802.11b/g/n HT20/ax HE20	
	Operating Frequency Range 2	2422 MHz to 2462 MHz for 802 n HT40/ax HE40	
h)	Nominal Channel Bandwidth(s)		
	Occupied Channel Bandwidth 1	18.877 MHz	

	Occupied Channel Bandwidth 2	37.731 MHz			
i)	Type of Equipment				
	☒ Stand-Alone				
	☐ Plug-in radio Equipment				
	☐ Combined Equipment				
j)	The extreme operating conditions that apply to the equipment				
	Operating temperature range		-10 °C to 70 °C		
k)	The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels				
	Antenna Type	☒ Integral Antenna	Antenna Gain	ANT1	2.80 dBi
				ANT2	2.78 dBi
		☐ Dedicated Antennas (equipment with antenna connector)	☐ Single power level with corresponding antenna(s)	Gain	
			☐ Multiple power settings and corresponding antenna(s)	Power Level 1	
				Power Level 2	
				Power Level 3	
l)	The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:				
	Details provided are for the	☒ Testing of stand-alone equipment			
		☐ Combined equipment			
		☐ Test jig			
	Supply Voltage	☐ AC mains	State AC voltage		
		☒ DC	State DC voltage	☐ Internal Power Supply	
				☐ External Power Supply or AC/DC adapter	
				☐ Battery	
				☒ Other	DC 5 V
m)	The equipment type				
	☐ Bluetooth®				
	☒ IEEE 802.11™ [i.3]				
	☐ Proprietary				
n)	Geo-location capability supported by the equipment		☐ Yes ☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.		
			☒ No		

6. MEASURING EQUIPMENT AND SOFTWARE USED

R&S TS 8997 Test System						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
Power sensor, Power Meter	R&S	OSP120	100921	/	Mar.31, 2023	Mar.30, 2024
Vector Signal Generator	R&S	SMBV100A	261637	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Signal Generator	R&S	SMB100A	178553	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Signal Analyzer	R&S	FSV40	101118	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Software						
Description	Manufacturer		Name		Version	
For R&S TS 8997 Test System	Rohde & Schwarz		EMC 32		10.60.10	
Tonsend RF Test System						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
Wideband Radio Communication Tester	R&S	CMW500	155523	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Wireless Connectivity Tester	R&S	CMW270	1201.0002N75-102	Sep.28, 2022	Sep.27, 2023	Sep.26, 2024
PXA Signal Analyzer	Keysight	N9030A	MY55410512	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
MXG Vector Signal Generator	Keysight	N5182B	MY56200284	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
MXG Vector Signal Generator	Keysight	N5172B	MY56200301	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
DC power supply	Keysight	E3642A	MY55159130	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Temperature & Humidity Chamber	SANMOOD	SG-80-CC-2	2088	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Attenuator	Aglient	8495B	2814a12853	Oct.18, 2022	Oct.12, 2023	Oct.11, 2024
RF Control Unit	Tonscend	JS0806-2	23B80620666	/	April 18,2023	April 17,2024
Software						
Description	Manufacturer	Name			Version	
Tonsend SRD Test System	Tonsend	JS1120-3 RF Test System			V3.2.22	

RSE Test System						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
Spectrum Analyzer	R&S	FSW	1312.8000K26-103950-sj	Oct. 18, 2022	Oct.12, 2023	Oct.11, 2024
Trilog broadband antenna	Schwarzbeck	VULB9163	01061	/	Feb.7,2023	Feb.6,2026
Horn Antenna	ETS-Lindgren	3117	00213191	/	Feb.7,2023	Feb.6,2026
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Preamplifier	TDK	PA-02-0118	TRS-305-00066	Jun.19,2023	Oct.12, 2023	Oct.11, 2024
High Gain Horn Antenna	Schwarzbeck	BBHA-9170	697	/	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-2	TRS-307-00002	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Preamplifier	TDK	PA-02-3	TRS-308-00002	Oct.17, 2022	Oct.12, 2023	Oct.11, 2024
Band Reject Filter	Wainwright	WRCJV12-5695-5725-5850-5880-40SS	4	/	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCJV20-5120-5150-5350-5380-60SS	2	/	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCJV20-5440-5470-5725-5755-60SS	1	/	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	/	Dec.01,2022	Nov.30,2023
Notch Filter	Wainwright	WRCT5-901.6-902.3-902.5-903.2-40SS	1	/	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCD5-1746.4-1747.25-1747.55-1748.4-40SS	1	/	Dec.01,2022	Nov.30,2023
Highpass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	/	Dec.01,2022	Nov.30,2023
Highpass Filter	Wainwright	WHKX10-2700-3000-1800-40SS	24	/	Dec.01,2022	Nov.30,2023

Software			
Description	Manufacturer	Name	Version
For TDK RSE Test System	TDK	TDK Emission lab	V10.81

Other Instrument						
Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Due. Date
Temperature humidity probe	OMEGA	ITHX-SD-5	18470007	Oct.22, 2022	Oct.19, 2023	Oct.18, 2024
Barometer	Yiyi	Baro	N/A	Oct.24, 2022	Oct.19, 2023	Oct.18, 2024
Attenuator	Agilent	8495B	2814a12853	Oct.18, 2022	Oct.12, 2023	Oct.11, 2024

7. TEST PROCEDURES AND RESULTS

7.1. NORMAL AND EXTREME CONDITIONS

REQUIREMENT

None; for reporting purposes only.

RESULTS

	Normal Test Conditions	Extreme Test Conditions
Relative Humidity	45 % ~ 70 %	/
Atmospheric Pressure	100 kPa ~ 102 kPa	/
Temperature	NT (Normal Temperature): 22 °C ~ 28 °C	/
Supply Voltage	NV (Normal Voltage): DC 5 V	LT (Low Temperature): -10 °C
		HT (High Temperature): 70 °C
		/

DESCRIPTION

Pass

7.2. RF OUTPUT POWER

LIMITS

RF OUTPUT POWER	
Condition	Limit
☐ Non-adaptive non-FHSS Equipment	For non-adaptive non-FHSS equipment, where the manufacturer has declared an RF output power of less than 20 dBm e.i.r.p., the RF output power shall be equal to or less than that declared value.
☒ Adaptive non-FHSS Equipment	non-FHSS equipment shall be equal to or less than 20 dBm.

TEST PROCEDURE

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.2

The power sensor was used for power measurement, and it use a fast power sensor with a minimum sensitivity of -40 dBm and capable of minimum 1 MS/s.

The test software was used to control the power detector and the sampling unit.

For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) are captured.

Measurement	
☒ Conducted measurement	☐ Radiated measurement

CALCULATIONS

Add the (stated) antenna assembly gain G in dBi of the individual antenna.

- In case of smart antenna systems operating in mode with beamforming (see clause 5.3.2.2.4), add the additional beamforming gain Y in dB.
- If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used.
- The RF Output Power (P_{out}) shall be calculated using the formula below:

$$P_{out} = A + G + Y$$

TEST ENVIRONMENT

Temperature	24.2℃	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix A

7.3. POWER SPECTRAL DENSITY

LIMITS

Power Spectral Density	
Condition	Limit
All types of non-FHSS equipment	10 dBm/MHz

TEST PROCEDURE

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.3

R&S EMC32 software is used to control the spectrum analyzer to use the following settings:

Start Frequency	2400 MHz
Stop Frequency	2483.5 MHz
Detector	RMS
Sweep Point	> 8 350; for spectrum analyzers not supporting this number of sweep points, the frequency band may be segmented
RBW	10 kHz
VBW	30 kHz
Trace Mode	Max Hold
Sweep Time	For non-continuous transmissions: $2 \times \text{Channel Occupancy Time} \times \text{number of sweep points}$ For non-adaptive equipment use the maximum TX-sequence time in the formula above instead of the Channel Occupancy Time For continuous transmissions: 10 s; the sweep time may be increased further until a value where the sweep time has no further impact anymore on the RMS value of the signal

The test software acquires the trace data and calculate the Spectral Density in 1 MHz.

TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix C

7.4. ADAPTIVITY (NON-FHSS)

LIMITS

Requirement	Operational Mode		
	Adaptive non-FHSS using DAA	Adaptive non-FHSS using LBT	
		Frame Based Equipment	Load Based Equipment
Minimum Clear Channel Assessment (CCA) Time	/	18 us (see note 1)	18 us (see note 1)
Minimum Marked Unavailable Time	1s	/	/
Maximum Channel Occupancy (COT) Time	40 ms	1ms to 10 ms	13ms
Minimum Idle Period	5% of COT (see note 2)	5% of COT	/
Extended CCA check	/	/	18μs ~160μs
Detection Threshold Level	-70 dBm/MHz + $10 \times \log_{10} (100 \text{ mW} / P_{\text{out}})$ (see note 3)		
Short Control Signalling Transmissions	Shall have a maximum TxOn / (TxOn + TxOff) ratio of 10 % within any observation period of 50 ms (see note 4)		
Note 1: The CCA time used by the equipment shall be declared by the supplier.			
Note 2: The minimum idle period is 100μs.			
Note 3: For a 20 dBm e.i.r.p. transmitter the detection threshold level shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly.			
Note 4: Adaptive equipment may or may not have Short Control Signaling Transmissions.			

Unwanted Signal Parameters				
Equipment Type (LBT/ non-LBT)	Wanted Signal Mean Power from Companion Device	Unwanted Signal Frequency [MHz]	Unwanted Signal Power [dBm]	Type Interfering Signal
Adaptive non- FHSS using LBT	Sufficient to maintain the link (see note 2)	2395 or 2488.5 (see note 1)	-35 (see note 3)	Band limited noise signal with a 100 % duty cycle & CW
Adaptive non- FHSS using DAA	-30 dBm			
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1.				
NOTE 2: A typical conducted value which can be used in most cases is -50 dBm/MHz.				
NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density in front of the UUT antenna.				

TEST PROCEDURE

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.6.2

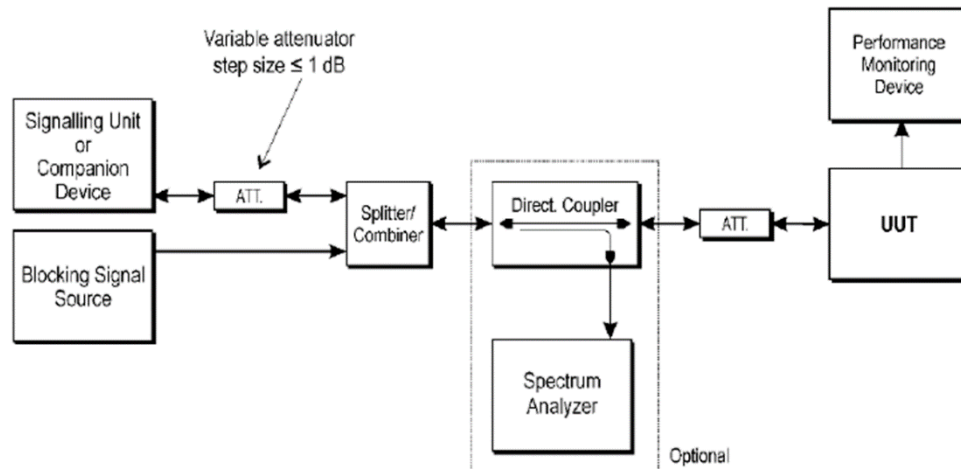
Measurement		
☒ Conducted measurement	☐ Radiated measurement	

UUT operational Mode		
☐ Non-FHSS equipment using DAA	☐ Non-FHSS equipment using LBT Frame Based Equipment	☒ Non-FHSS equipment using LBT Load Based Equipment

The analyzer shall be set as follows:

Centre Frequency	Equal to the centre frequency of the operating channel
Span	0Hz
Detector	RMS
Sweep Time	> maximum Channel Occupancy Time
RBW	$\geq$ Occupied Channel Bandwidth (if the analyzer does not support this setting, the highest available setting shall be used)
VBW	$3 \times$ RBW (if the analyzer does not support this setting, the highest available setting shall be used)
Trigger Mode	Video
Trace Mode	Clear Write

TEST SETUP



TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix H

7.5. OCCUPIED CHANNEL BANDWIDTH

LIMITS

OCCUPIED CHANNEL BANDWIDTH		
Condition		Limit
All types of equipment		Each hopping frequency shall be within the 2400 to 2483.5 MHz band
Additional requirement	For non-adaptive non-FHSS equipment with e.i.r.p. greater than 10 dBm	Each hopping frequency shall be equal to or less than 20 MHz

TEST PROCEDURE

Refer to ETSI EN 300 328 V2.2.2 (2019-07) clause 5.4.7

Measurement	
☒ Conducted measurement	☐ Radiated measurement

Connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Frequency Span	2 × Nominal Channel Bandwidth
Detector	RMS
RBW	~ 1 % of the span without going below 1 %
VBW	3 × RBW
Trace	Max hold
Sweep Time	1s

TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix C

7.6. TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN

LIMITS

Transmitter Unwanted Emissions in The Out-Of-Band Domain	
Condition	Limit
Under Normal Test Condition	The transmitter unwanted emissions in the out-of-band domain shall not exceed the values provided by the mask in figure 3.

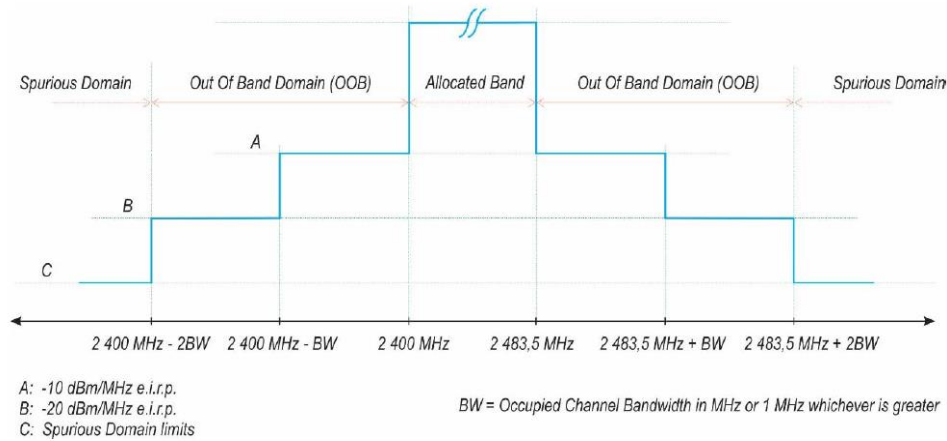


Figure 3: Transmit mask

TEST PROCEDURE

Refer to ETSI EN 300 328 V2.2.2 (2019-07) clause 5.4.8

Measurement	
☒ Conducted measurement	☐ Radiated measurement

Connect the UUT to the spectrum analyzer and use the following settings:

Span	Zero Span
Filter Mode	Channel Filter
Trace Mode	Max Hold
Trigger Mode	Video
Detector	RMS
Sweep Points	Sweep time [μs] / (1 μs) with a maximum of 30 000
RBW / VBW	1 MHz / 3 MHz
Measurement Mode	Time Domain Power
Sweep Time	> 120 % of the duration of the longest burst detected during the measurement of the RF Output Power

TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix D

7.7. TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

LIMITS

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in table 12.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

Table 12: Transmitter limits for spurious emissions

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

TEST PROCEDURE

Refer to Refer to ETSI EN 300 328 V2.2.2 (2019-07) clause 5.4.9

Measurement	
☒ Conducted measurement	☒ Radiated measurement

Spectrum analyser settings for pre-scan:

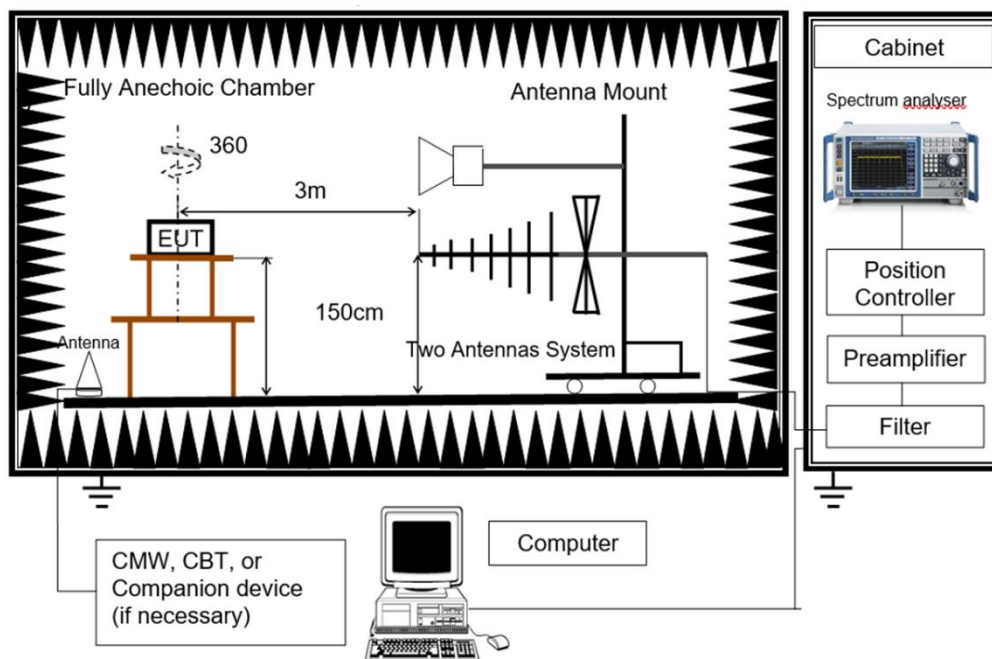
RBW	100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
VBW	300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
Detector Mode	Peak
Filter type	3 dB (Gaussian)
Trace Mode	Max hold
Sweep Points	$\geq 19\,400$ (< 1 GHz); $\geq 23\,500$ (> 1 GHz); for spectrum analyzers not supporting this high number of sweep points, the frequency band may be segmented.

Sweep Time	For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 100 kHz frequency step, the measurement time is greater than two transmissions of the UUT, on any channel. For FHSS equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on any of the hopping frequencies. The above sweep time setting may result in long measuring times in case of FHSS equipment. To avoid such long measuring times, an FFT analyzer may be used.
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Spectrum analyser settings for the emissions identified during the pre-scan:

Measurement Mode	Time Domain Power
Centre Frequency	Frequency of the emission identified during the pre-scan
RBW	100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
VBW	300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
Frequency Span	Zero Span
Sweep Mode	Single Sweep
Detector Mode	RMS
Trace Mode	Max hold
Trigger Mode	Video (burst signals) or Manual (continuous signals)
Sweep Points	Sweep time [μ s] / (1 μ s) with a maximum of 30 000
Sweep Time	> 120 % of the duration of the longest burst detected during the measurement of the RF Output Power

TEST SETUP



TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix E

7.8. RECEIVER SPURIOUS EMISSIONS

LIMITS

The spurious emissions of the receiver shall not exceed the values given in table 13.
In case of non-FHSS equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or for emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Table 13: Spurious emission limits for receivers

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

TEST PROCEDURE

Please refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.10

Measurement	
☒ Conducted measurement	☒ Radiated measurement

Please refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.10

Spectrum analyser settings for pre-scan:

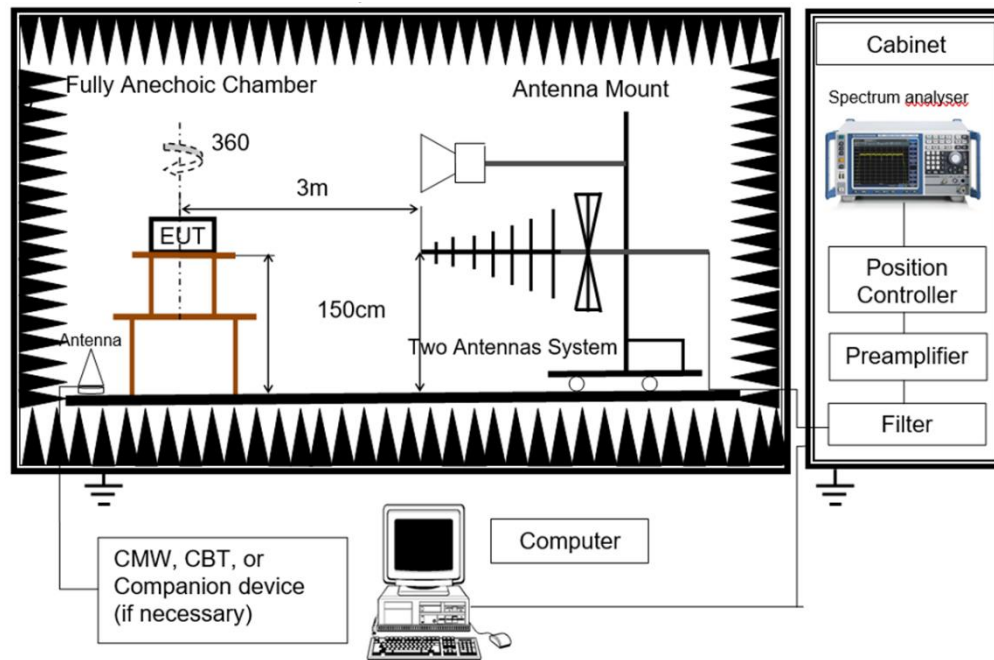
RBW	100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
VBW	300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
Detector Mode	Peak
Filter type	3 dB (Gaussian)
Trace Mode	Max hold
Sweep Points	$\geq 19\,400$ (< 1 GHz); $\geq 23\,500$ (> 1 GHz); for spectrum analyzers not supporting this high number of sweep points, the frequency band may be segmented.
Sweep Time	Auto

Spectrum analyser settings for the emissions identified during the pre-scan:

Measurement Mode	Time Domain Power
Centre Frequency	Frequency of the emission identified during the pre-scan
RBW	100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
VBW	300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
Frequency Span	Zero Span
Sweep Mode	Single Sweep

Detector Mode	RMS
Trace Mode	Max hold
Trigger Mode	Video (burst signals) or Manual (continuous signals)
Sweep Points	$\geq 30\,000$
Sweep Time	30 ms

TEST SETUP



TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix F

7.9. RECEIVER BLOCKING

LIMITS

Performance Criteria

For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment.

While maintaining the minimum performance criteria as defined in clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 14, table 15 or table 16.

☒ Receiver Category 1

Table 14: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
$(-133 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 20 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

☐ Receiver Category 2

Table 15: Receiver Blocking parameters receiver Category 2 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB}$) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

☐ Receiver Category 3

Table 16: Receiver Blocking parameters receiver Category 3 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB}$) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 30 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

TEST PROCEDURE

Please refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.11

Measurement	
☒ Conducted measurement	☐ Radiated measurement

Step 1:

- For non-FHSS equipment, the UUT shall be set to the lowest operating channel on which the blocking test has to be performed (see clause 5.4.11.1).

Step 2:

- The blocking signal generator is set to the first frequency as defined in the appropriate table corresponding to the receiver category and type of equipment.

Step 3:

- With the blocking signal generator switched off, a communication link is established between the UUT and the associated companion device using the test setup shown in figure 6.
- Unless the option provided in note 2 of the applicable table referred to in clause 5.4.11.2.1 is used, the level of the wanted signal shall be set to the value provided in the table corresponding to the receiver category and type of equipment. The test procedure defined in clause 5.4.2, and more in particular clause 5.4.2.2.1.2, can be used to measure the (conducted) level of the wanted signal however no correction shall be made for antenna gain of the companion device (step 6 in clause 5.4.2.2.1.2 shall be ignored). This level may be measured directly at the output of the companion device and a correction is made for the coupling loss into the UUT. The actual level for the wanted signal shall be recorded in the test report.
- When the option provided in note 2 of the applicable table referred to in clause 5.4.11.2.1 is used, the attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still met. The resulting level for the wanted signal at the input of the UUT is P_{min}. This signal level (P_{min}) is increased by the value provided in note 2 of the applicable table corresponding to the receiver category and type of equipment.

Step 4:

- The blocking signal at the UUT is set to the level provided in the table corresponding to the receiver category and type of equipment.
- If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 are met then proceed to step 6.

Step 5:

- If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is not met, step 3 and step 4 shall be repeated after that the frequency of the blocking signal set in step 2 has been increased with a value equal to the Occupied Channel Bandwidth except:
 - For the blocking frequency 2 380 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be increased by 3 dB.
 - For the blocking frequency 2 503,5 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be decreased by 3 dB.
- If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still not met, step 3 and step 4 shall be repeated after that the frequency of the blocking signal set in step 2 has been decreased with a value equal to the Occupied Channel Bandwidth except:
 - For the blocking frequency 2 380 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be decreased by 3 dB.
 - For the blocking frequency 2 503,5 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be increased by 3 dB.
- If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still not met, the UUT fails to comply with the Receiver Blocking requirement and step 6 and step 7 are no longer required.

- It shall be recorded in the test report whether the shift of blocking frequencies as described in the present step was used.

Step 6:

- Repeat step 4 and step 5 for each remaining combination of frequency and level for the blocking signal as provided in the table corresponding to the receiver category and type of equipment.

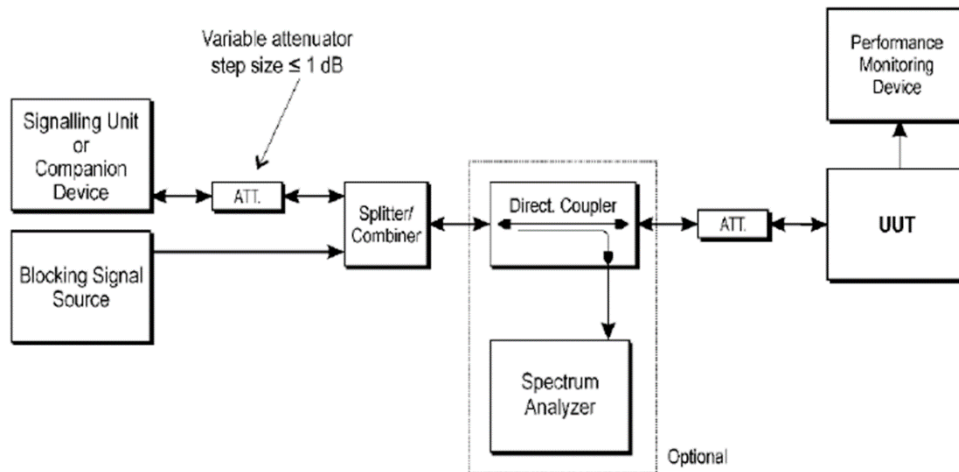
Step 7:

- For non-FHSS equipment, repeat step 2 to step 6 with the UUT operating at the highest operating channel on which the blocking test has to be performed (see clause 5.4.11.1).

Step 8:

- It shall be assessed and recorded in the test report whether the UUT complies with the Receiver Blocking requirement.

TEST SETUP



TEST ENVIRONMENT

Temperature	24.2°C	Relative Humidity	68.0%
Atmosphere Pressure	101kPa	Test Voltage	DC 5 V

TEST DATE / ENGINEER

Test Date	October 14, 2023	Test By	Johnson Liu
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TEST RESULTS

Please refer to section "Test Data" - Appendix G

8. TEST DATA

8.1. APPENDIX A: RF OUTPUT POWER

8.1.1. Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	EIRP[dBm]	Limit[dBm]	Verdict
NTNV	11B	Ant1	2412	16.96	20	PASS
		Ant2	2412	16.92	20	PASS
		Ant1	2442	16.96	20	PASS
		Ant2	2442	16.93	20	PASS
		Ant1	2472	16.92	20	PASS
		Ant2	2472	17.02	20	PASS
	11G	Ant1	2412	17.67	20	PASS
		Ant2	2412	18.19	20	PASS
		Ant1	2442	16.45	20	PASS
		Ant2	2442	17.27	20	PASS
		Ant1	2472	17.66	20	PASS
		Ant2	2472	18.33	20	PASS
	11N20MIMO	total	2412	19.07	20	PASS
		total	2442	18.77	20	PASS
		total	2472	18.92	20	PASS
	11N40MIMO	total	2422	19.36	20	PASS
		total	2442	19.39	20	PASS
		total	2462	19.35	20	PASS
	11AX20MIMO	total	2412	19.20	20	PASS
		total	2442	17.82	20	PASS
		total	2472	19.39	20	PASS
	11AX40MIMO	total	2422	17.65	20	PASS
		total	2442	17.64	20	PASS
		total	2462	17.70	20	PASS

Test Condition	Test Mode	Antenna	Frequency[MHz]	EIRP[dBm]	Limit[dBm]	Verdict
LTVN	11B	Ant1	2412	16.59	20	PASS
		Ant2	2412	16.57	20	PASS
		Ant1	2442	16.60	20	PASS
		Ant2	2442	16.64	20	PASS
		Ant1	2472	16.66	20	PASS
		Ant2	2472	16.74	20	PASS
	11G	Ant1	2412	17.35	20	PASS
		Ant2	2412	17.87	20	PASS
		Ant1	2442	16.07	20	PASS
		Ant2	2442	16.92	20	PASS
		Ant1	2472	17.40	20	PASS
		Ant2	2472	17.93	20	PASS
	11N20MIMO	total	2412	18.74	20	PASS
		total	2442	18.52	20	PASS
		total	2472	18.67	20	PASS
	11N40MIMO	total	2422	19.09	20	PASS
		total	2442	19.06	20	PASS
		total	2462	18.97	20	PASS
	11AX20MIMO	total	2412	18.90	20	PASS
		total	2442	17.49	20	PASS
		total	2472	19.02	20	PASS
	11AX40MIMO	total	2422	17.30	20	PASS
		total	2442	17.28	20	PASS
		total	2462	17.43	20	PASS

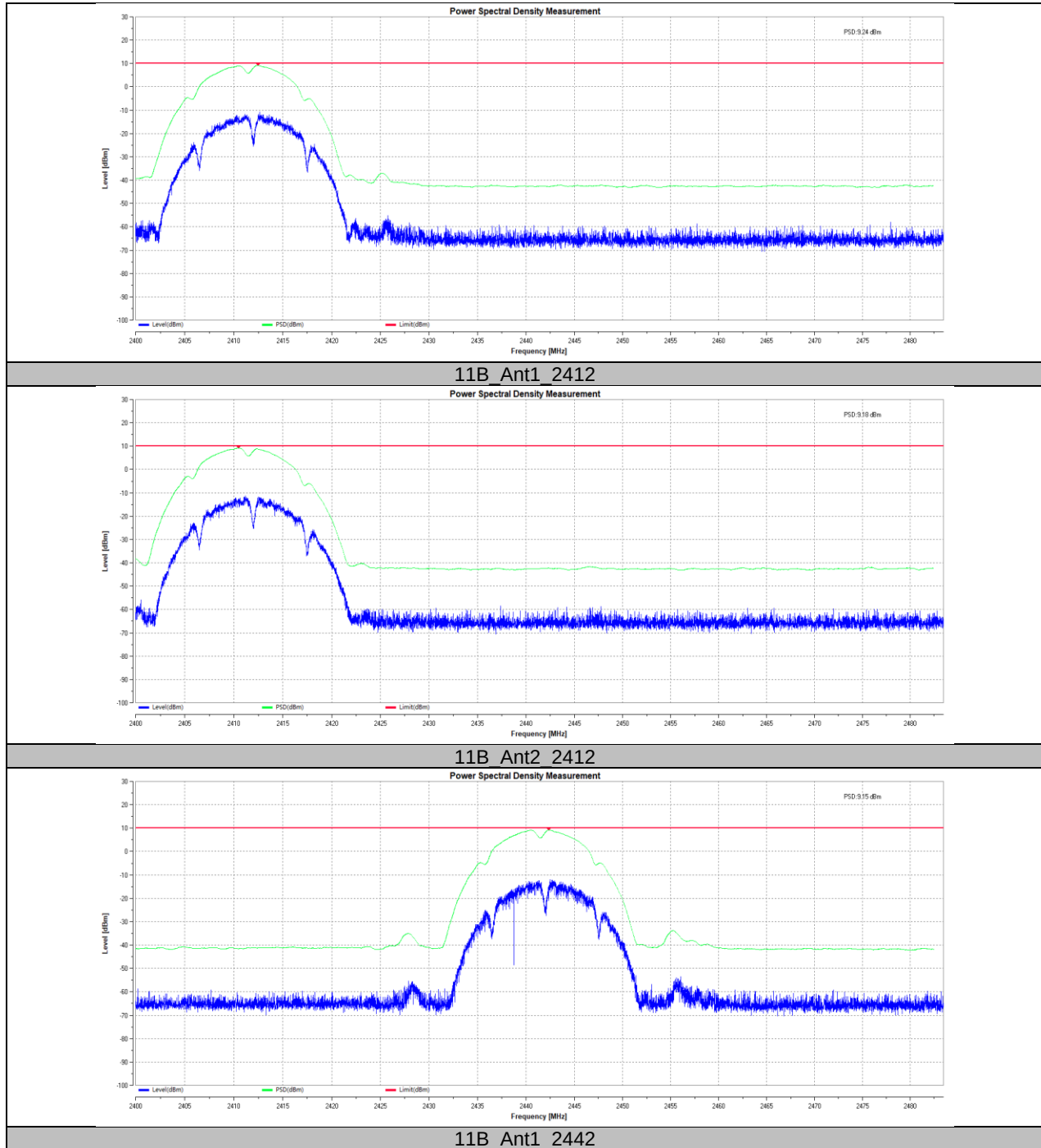
Test Condition	Test Mode	Antenna	Frequency[MHz]	EIRP[dBm]	Limit[dBm]	Verdict
HTNV	11B	Ant1	2412	16.63	20	PASS
		Ant2	2412	16.60	20	PASS
		Ant1	2442	16.59	20	PASS
		Ant2	2442	16.65	20	PASS
		Ant1	2472	16.58	20	PASS
		Ant2	2472	16.76	20	PASS
	11G	Ant1	2412	17.34	20	PASS
		Ant2	2412	17.87	20	PASS
		Ant1	2442	16.13	20	PASS
		Ant2	2442	16.88	20	PASS
		Ant1	2472	17.40	20	PASS
		Ant2	2472	17.93	20	PASS
	11N20MIMO	total	2412	18.82	20	PASS
		total	2442	18.45	20	PASS
		total	2472	18.59	20	PASS
	11N40MIMO	total	2422	18.97	20	PASS
		total	2442	19.01	20	PASS
		total	2462	19.02	20	PASS
	11AX20MIMO	total	2412	18.87	20	PASS
		total	2442	17.49	20	PASS
		total	2472	19.14	20	PASS
	11AX40MIMO	total	2422	17.31	20	PASS
		total	2442	17.31	20	PASS
		total	2462	17.30	20	PASS

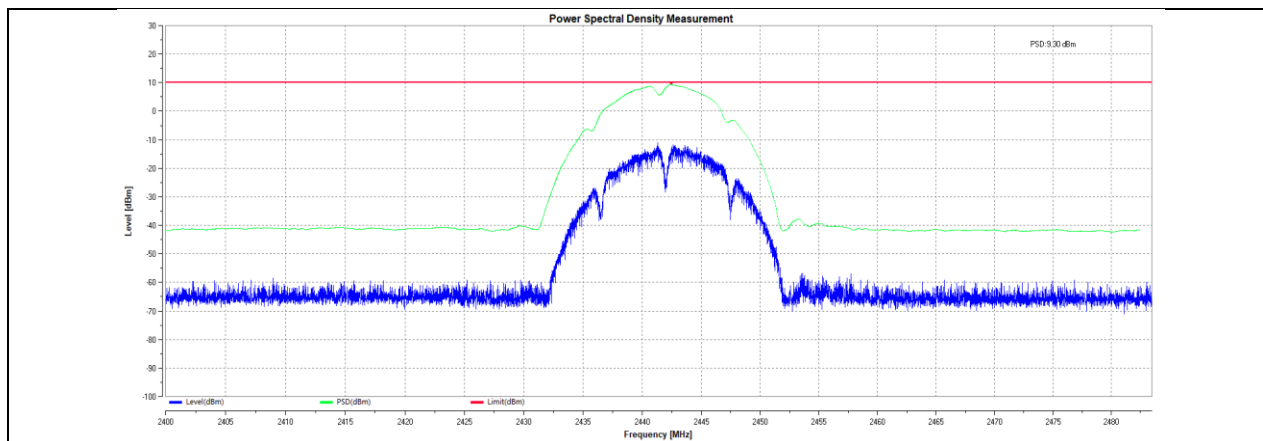
8.2. APPENDIX B: POWER SPECTRAL DENSITY

8.2.1. Test Result

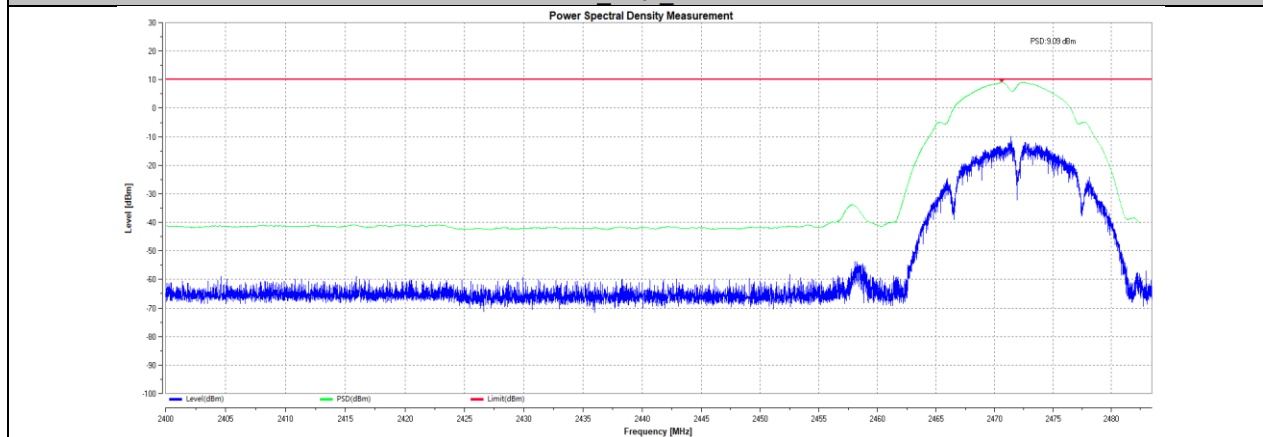
Test Mode	Antenna	Frequency[MHz]	PSD[dBm/MHz]	Limit[dBm/MHz]	Verdict
11B	Ant1	2412	9.24	10	PASS
	Ant2	2412	9.18	10	PASS
	Ant1	2442	9.15	10	PASS
	Ant2	2442	9.30	10	PASS
	Ant1	2472	9.09	10	PASS
	Ant2	2472	9.25	10	PASS
11G	Ant1	2412	7.21	10	PASS
	Ant2	2412	7.98	10	PASS
	Ant1	2442	5.75	10	PASS
	Ant2	2442	6.73	10	PASS
	Ant1	2472	7.30	10	PASS
	Ant2	2472	7.92	10	PASS
11N20MIMO	Ant1	2412	4.94	10	PASS
	Ant2	2412	6.23	10	PASS
	total	2412	8.44	10	PASS
	Ant1	2442	4.72	10	PASS
	Ant2	2442	5.32	10	PASS
	total	2442	8.04	10	PASS
	Ant1	2472	5.14	10	PASS
	Ant2	2472	5.66	10	PASS
11N40MIMO	total	2472	8.40	10	PASS
	Ant1	2422	2.63	10	PASS
	Ant2	2422	2.89	10	PASS
	total	2422	5.05	10	PASS
	Ant1	2442	2.35	10	PASS
	Ant2	2442	3.26	10	PASS
	total	2442	5.58	10	PASS
	Ant1	2462	2.79	10	PASS
11AX20MIMO	Ant2	2462	2.76	10	PASS
	total	2462	5.75	10	PASS
	Ant1	2412	4.94	10	PASS
	Ant2	2412	5.55	10	PASS
	total	2412	8.13	10	PASS
	Ant1	2442	3.37	10	PASS
	Ant2	2442	3.68	10	PASS
	total	2442	6.49	10	PASS
11AX40MIMO	Ant1	2472	4.97	10	PASS
	Ant2	2472	5.70	10	PASS
	total	2472	8.31	10	PASS
	Ant1	2422	0.61	10	PASS
	Ant2	2422	0.53	10	PASS
	total	2422	2.68	10	PASS
	Ant1	2442	0.61	10	PASS
	Ant2	2442	0.48	10	PASS
11AX20MIMO	total	2442	3.30	10	PASS
	Ant1	2462	0.70	10	PASS
	Ant2	2462	0.61	10	PASS
	total	2462	3.62	10	PASS

8.2.2. Test Graphs

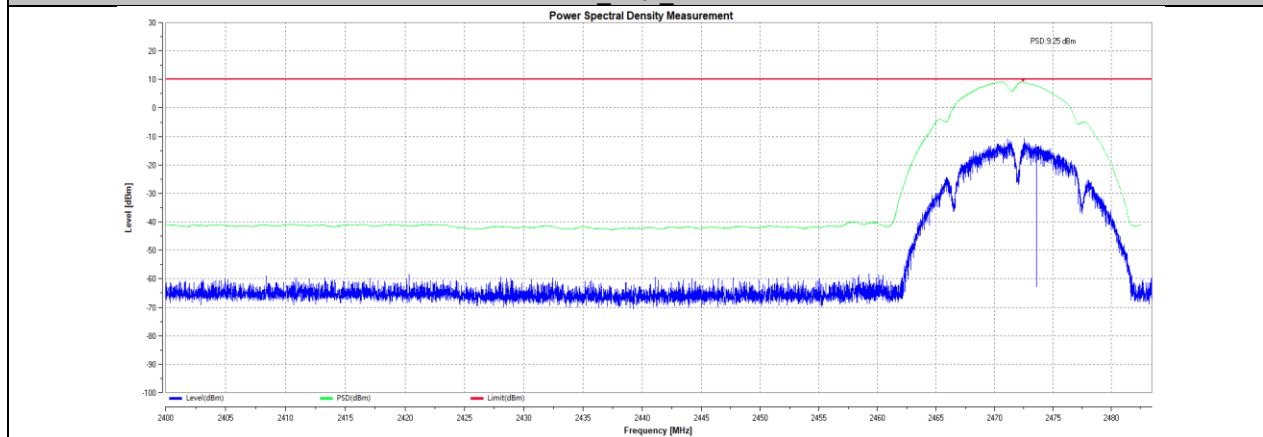




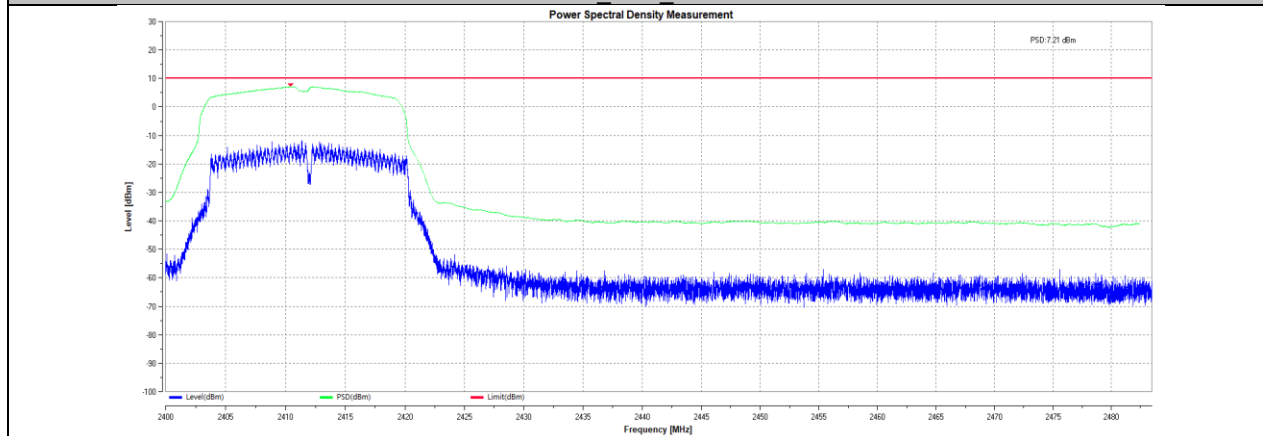
11B_Ant2_2442



11B_Ant1_2472

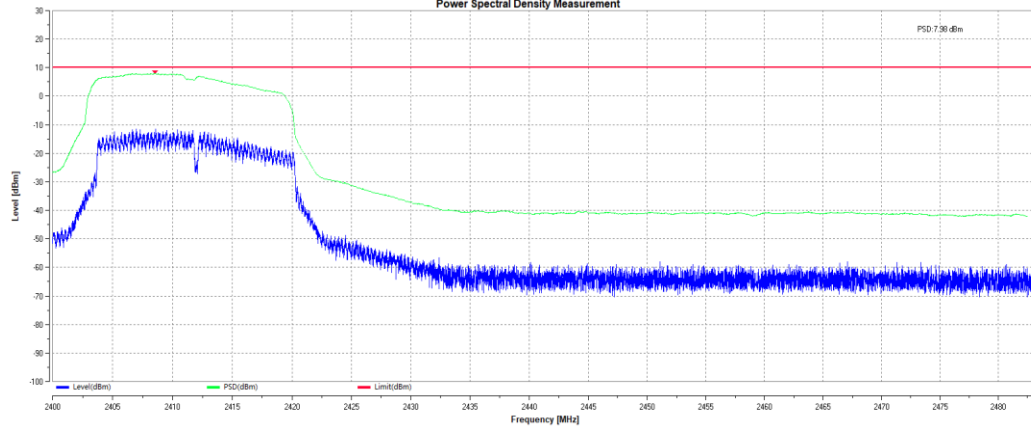


11B_Ant2_2472



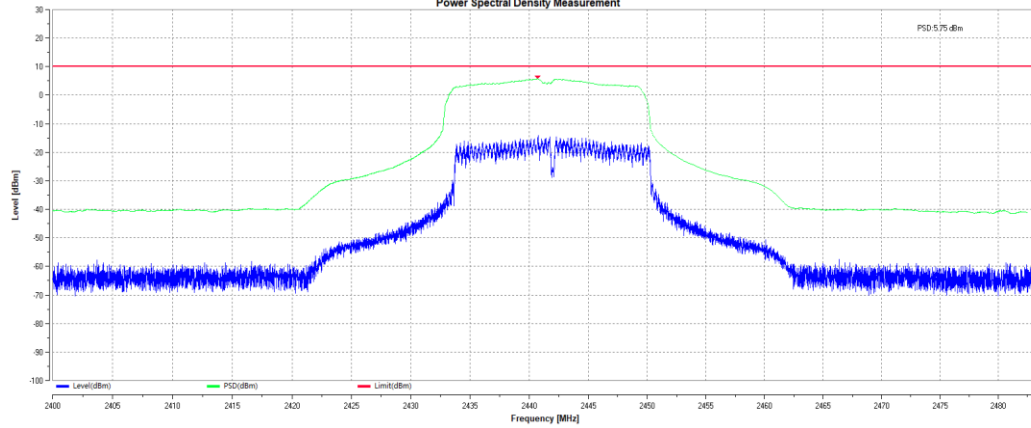
11G_Ant1_2412

Power Spectral Density Measurement



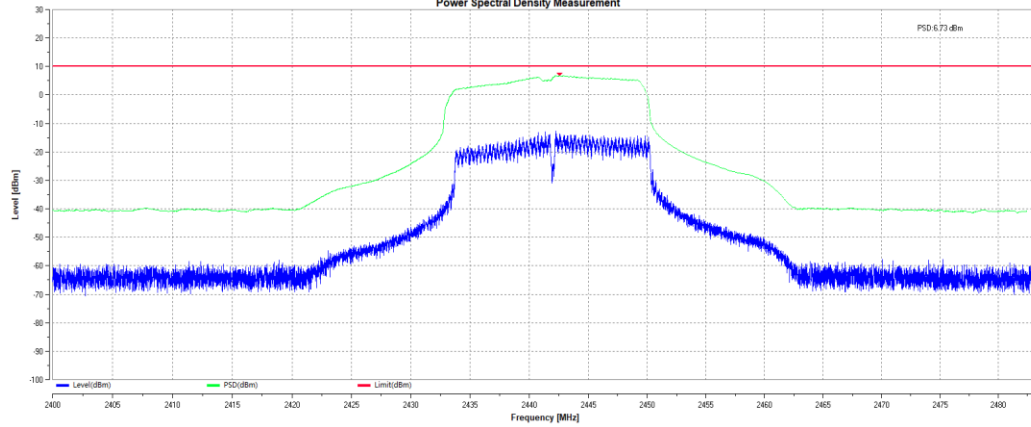
11G_Ant2_2412

Power Spectral Density Measurement

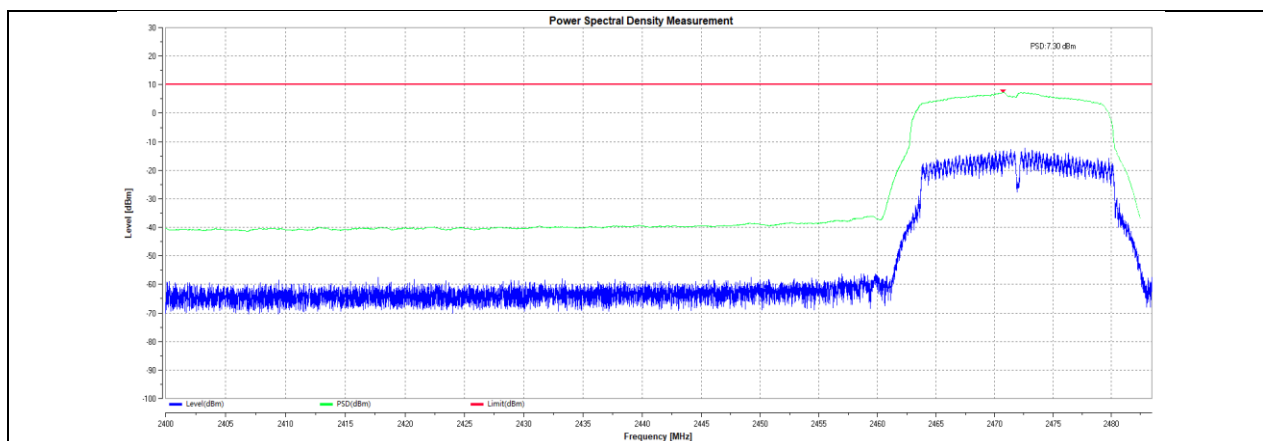


11G_Ant1_2442

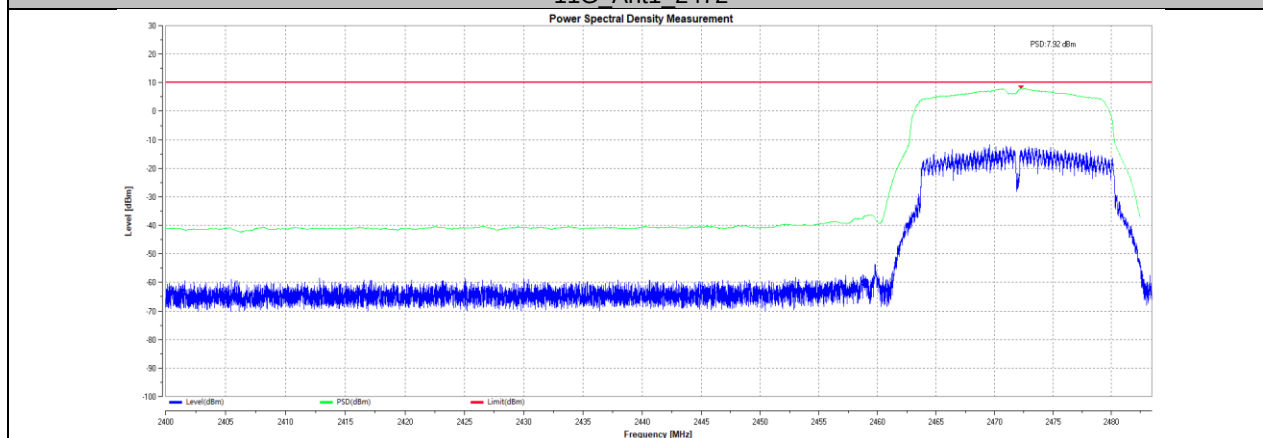
Power Spectral Density Measurement



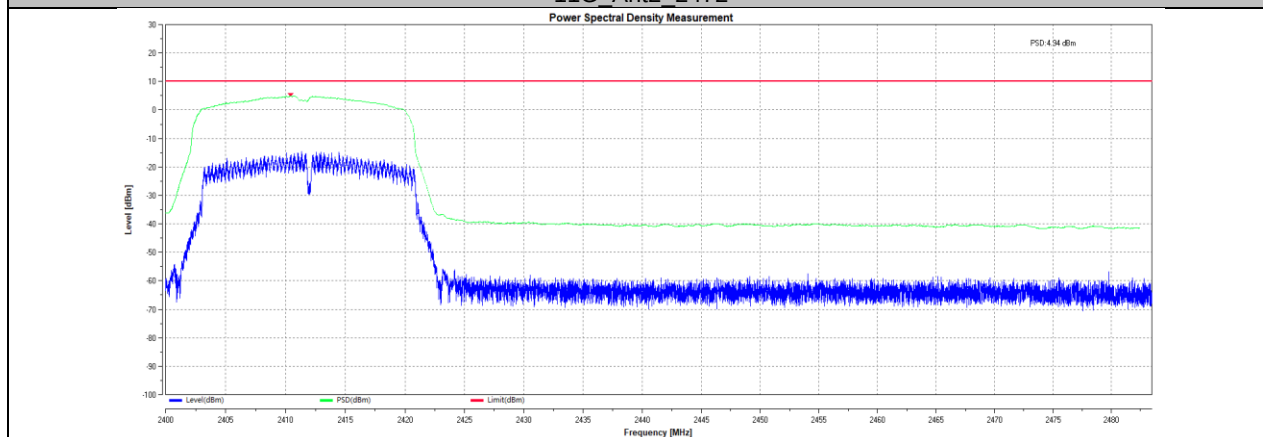
11G_Ant2_2442



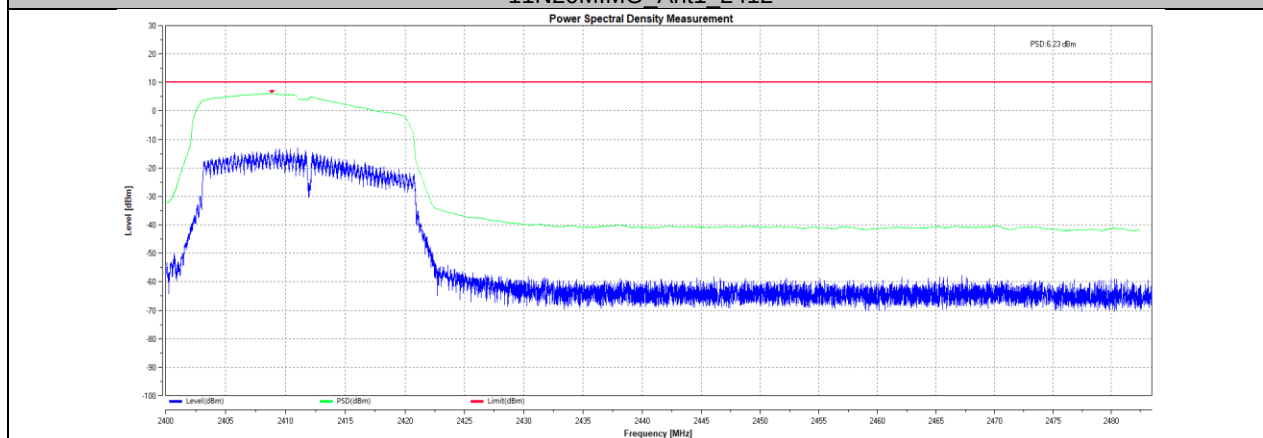
11G Ant1 2472



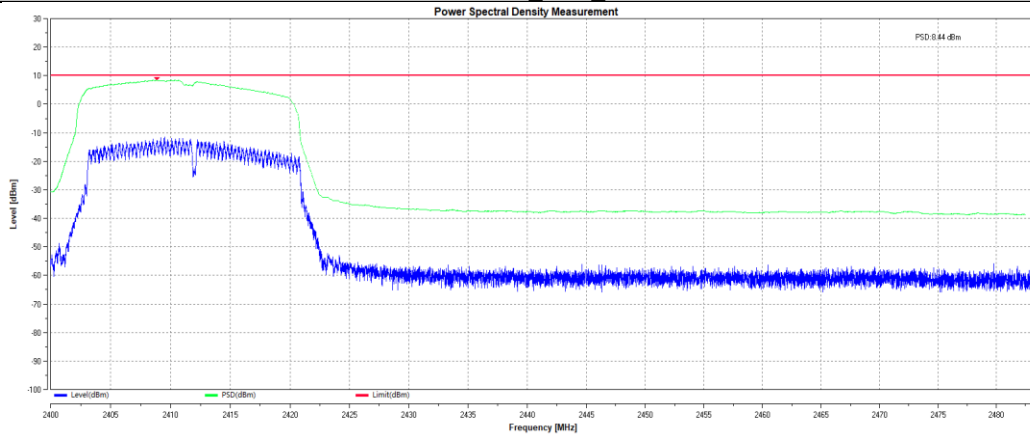
11G Ant2 2472



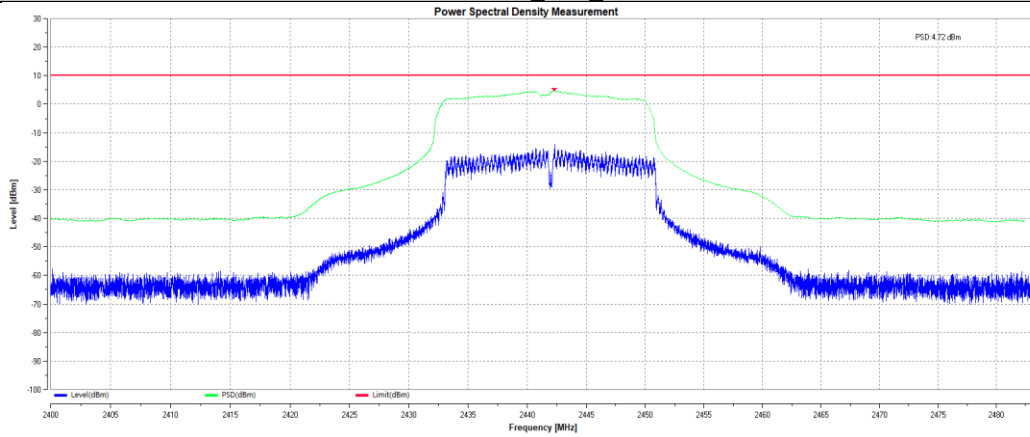
11N20MIMO Ant1 2412



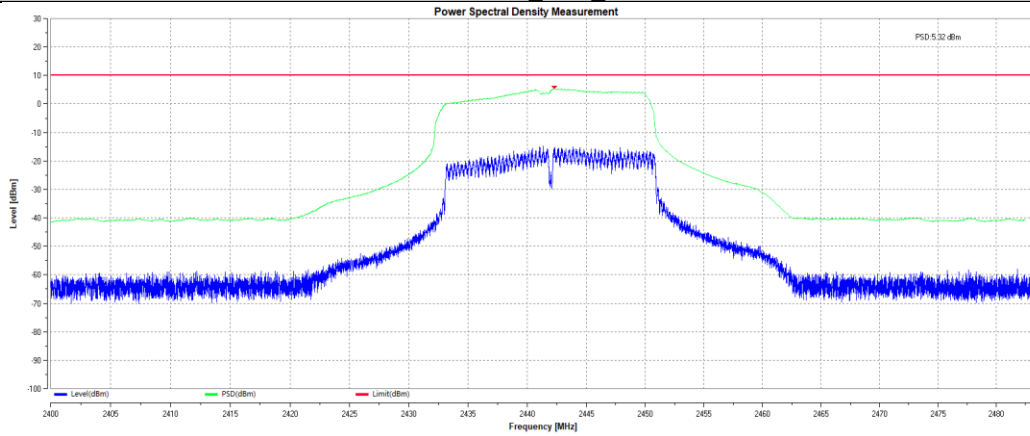
11N20MIMO_Ant2_2412



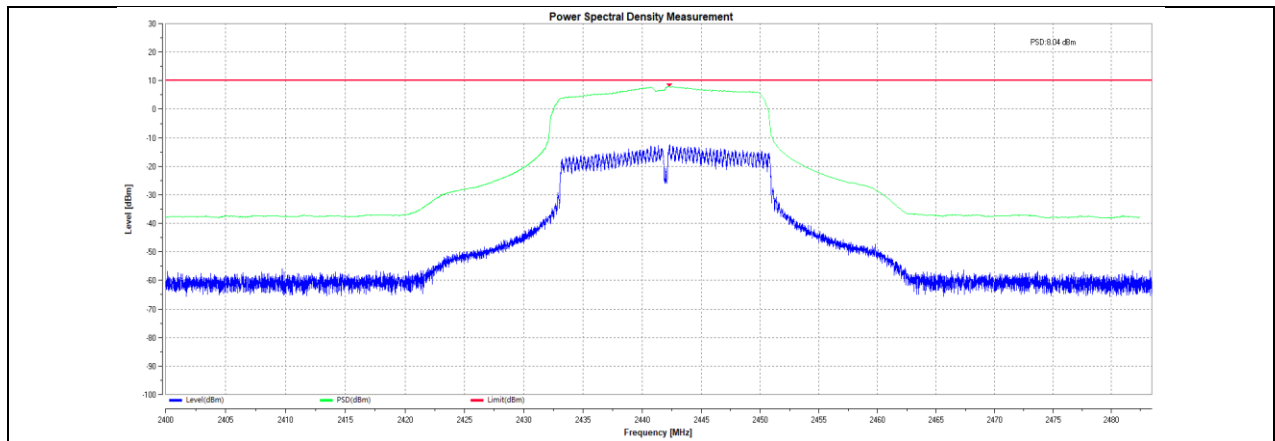
11N20MIMO_total_2412



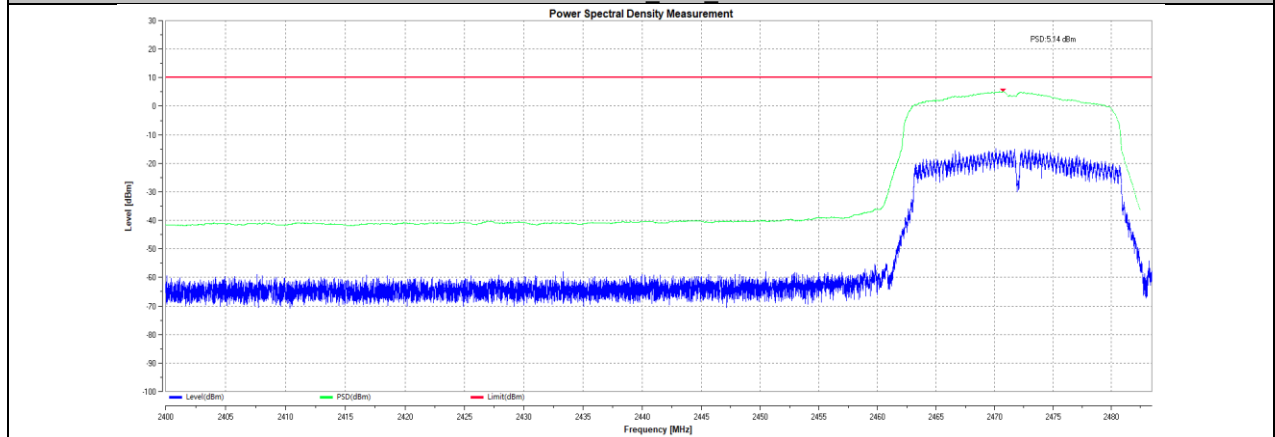
11N20MIMO_Ant1_2442



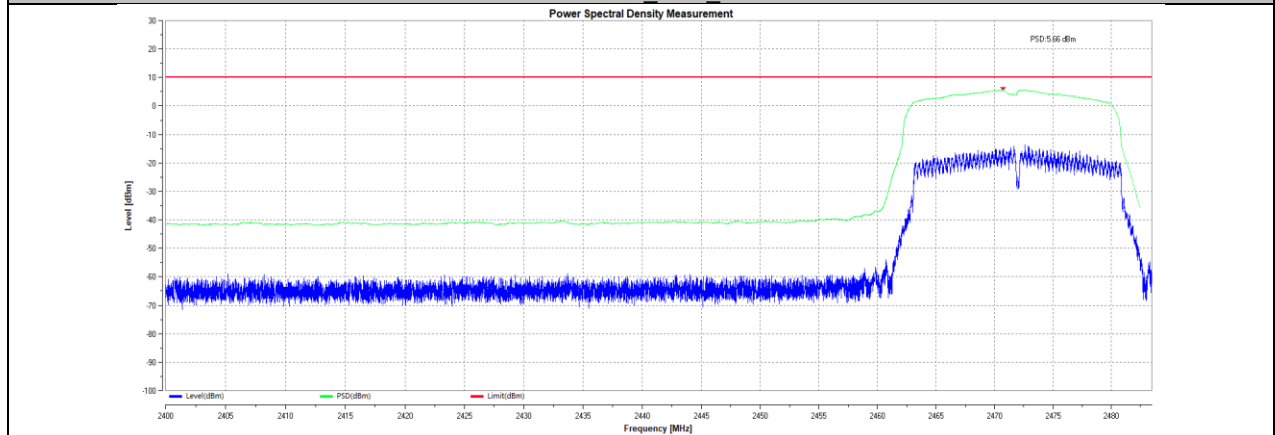
11N20MIMO_Ant2_2442



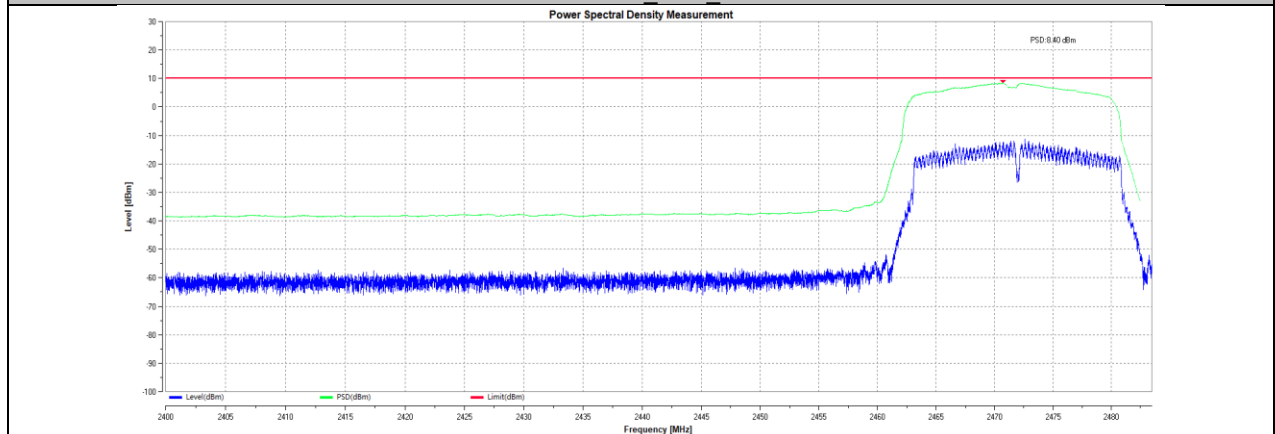
11N20MIMO total 2442



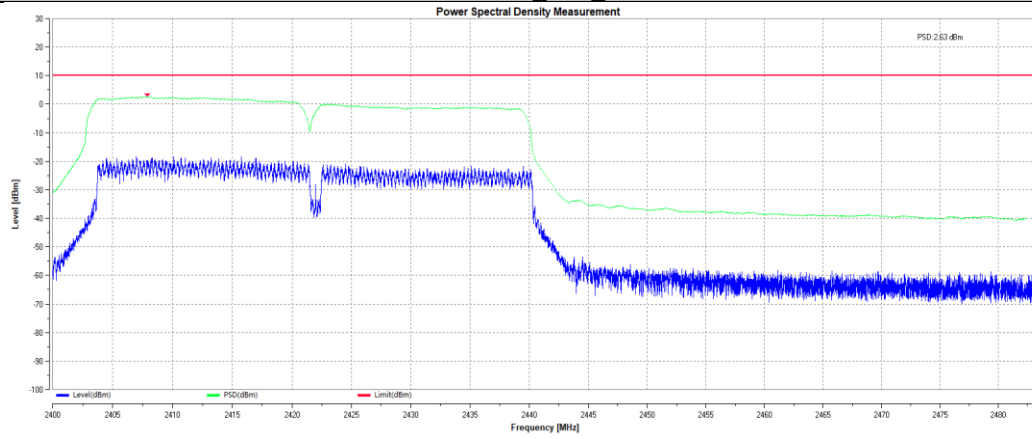
11N20MIMO Ant1 2472



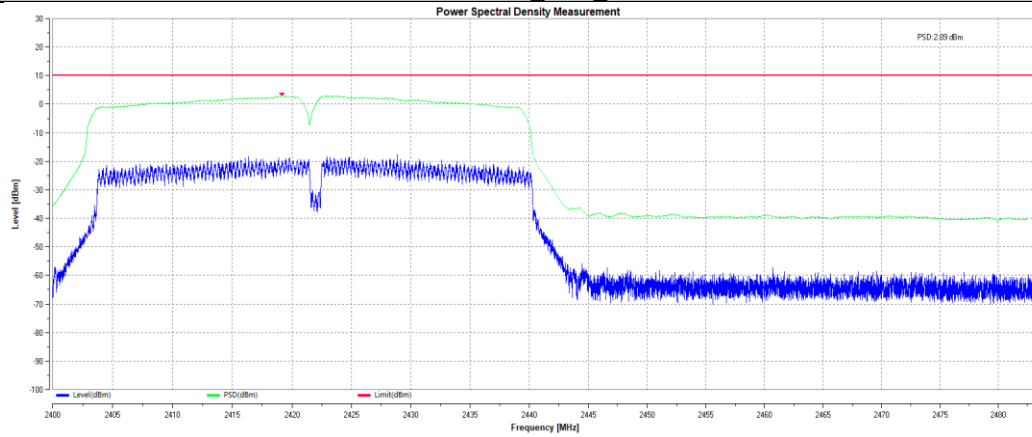
11N20MIMO Ant2 2472



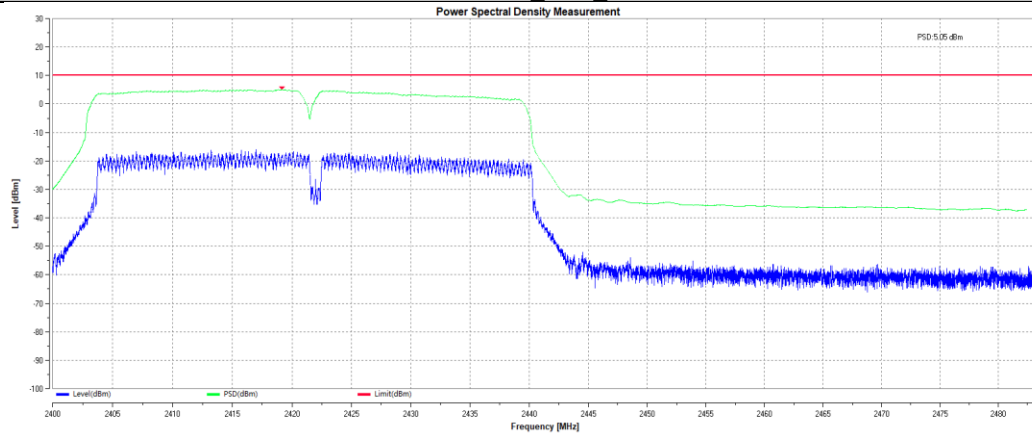
11N20MIMO_total_2472



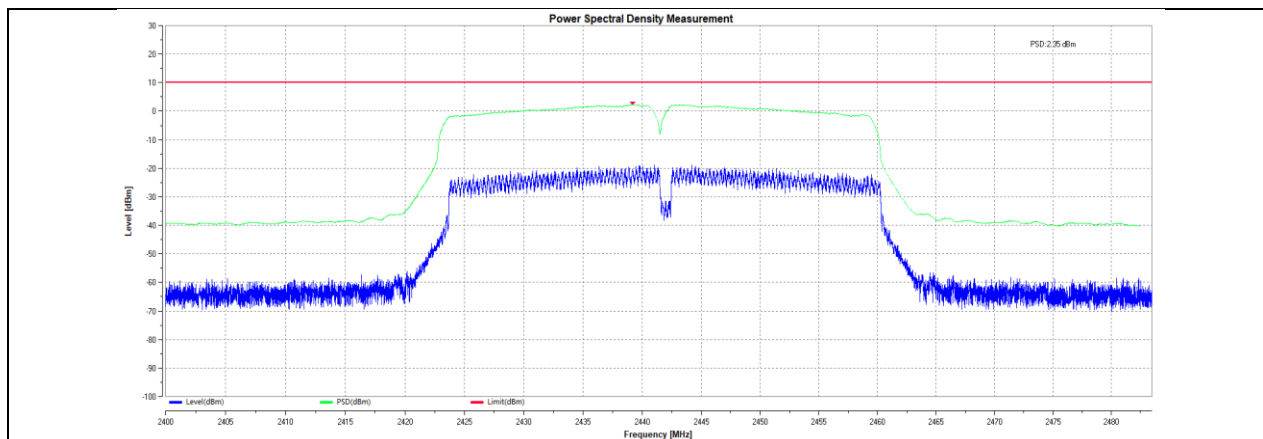
11N40MIMO_Ant1_2422



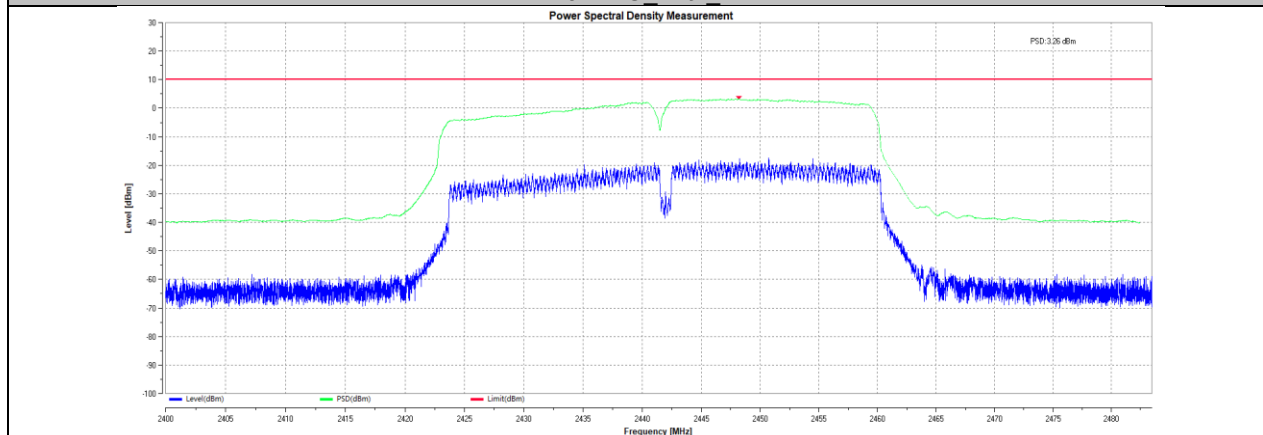
11N40MIMO_Ant2_2422



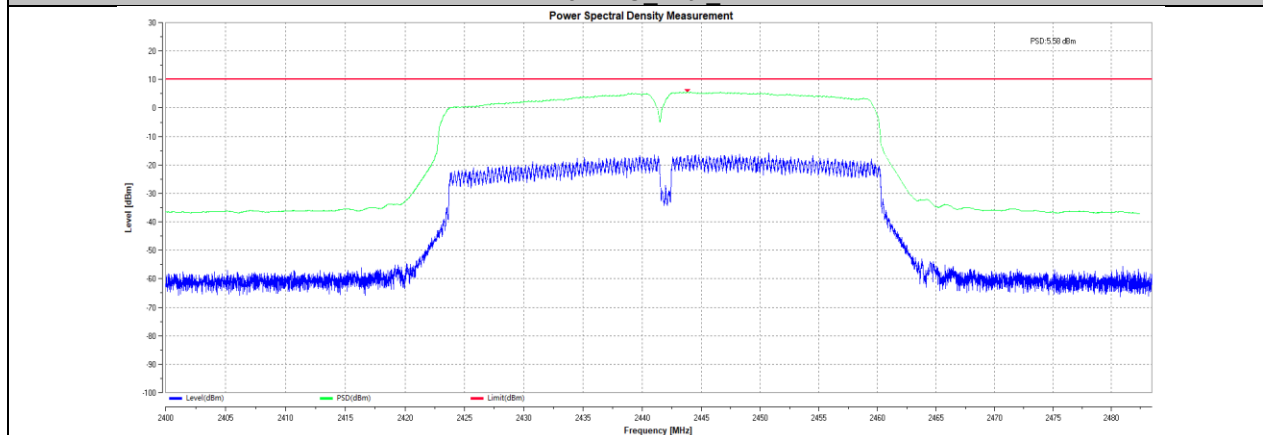
11N40MIMO_total_2422



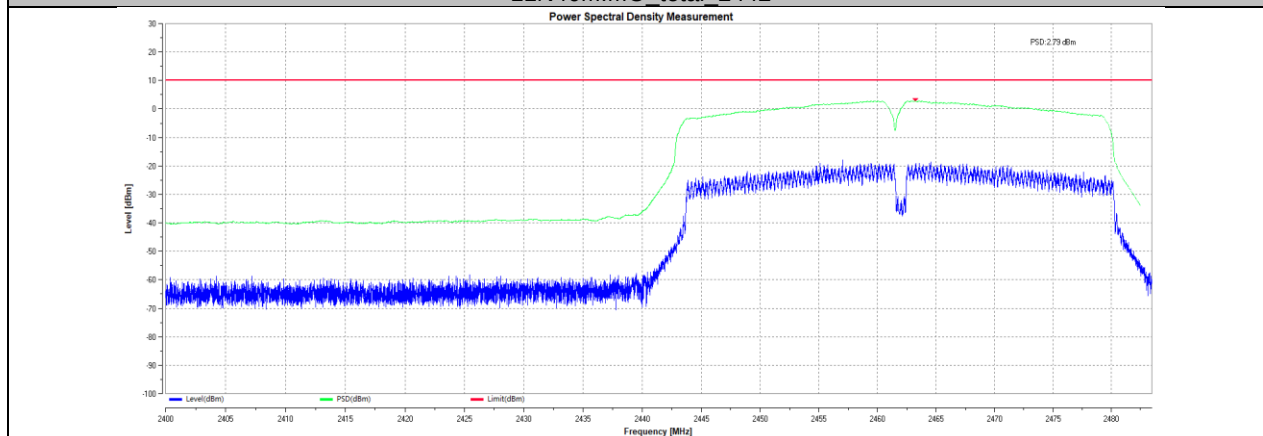
11N40MIMO Ant1_2442



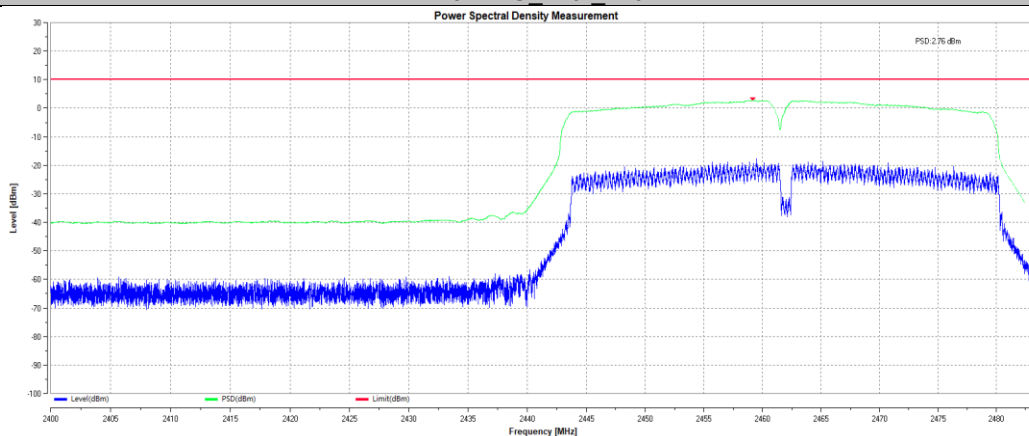
11N40MIMO Ant2_2442



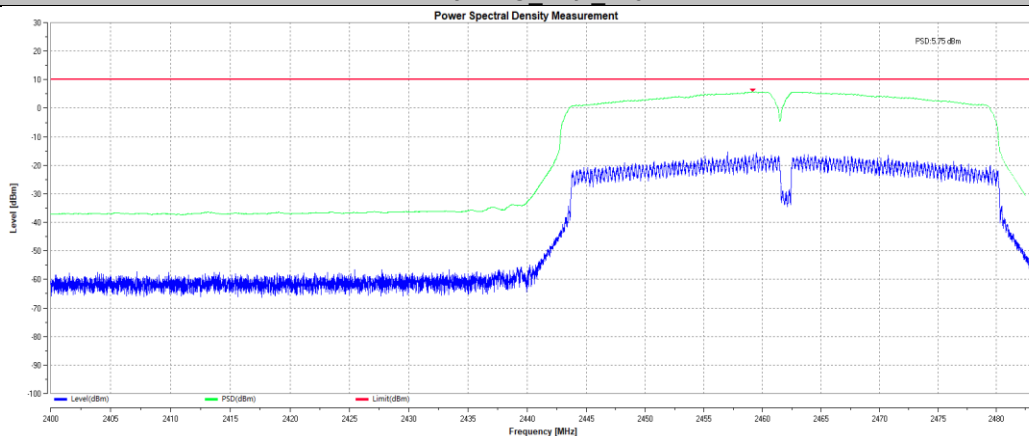
11N40MIMO total_2442



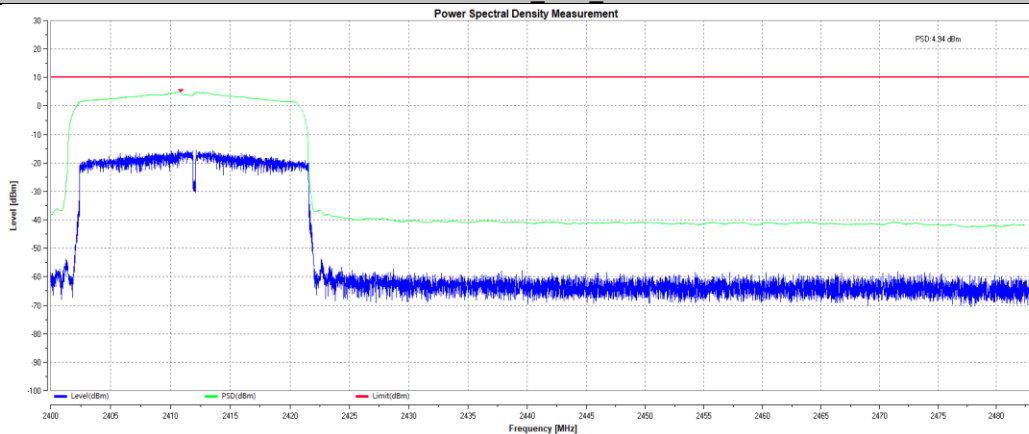
11N40MIMO_Ant1_2462



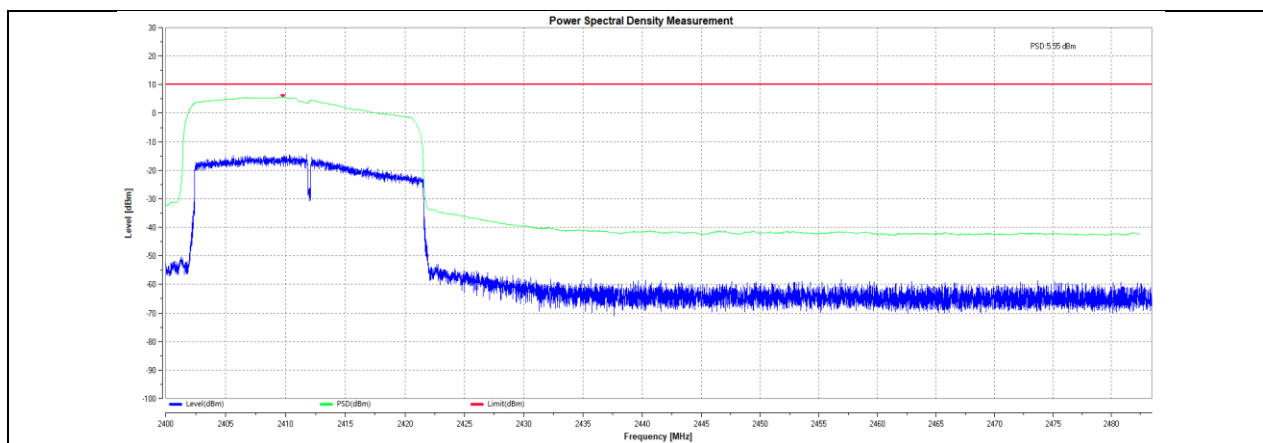
11N40MIMO_Ant2_2462



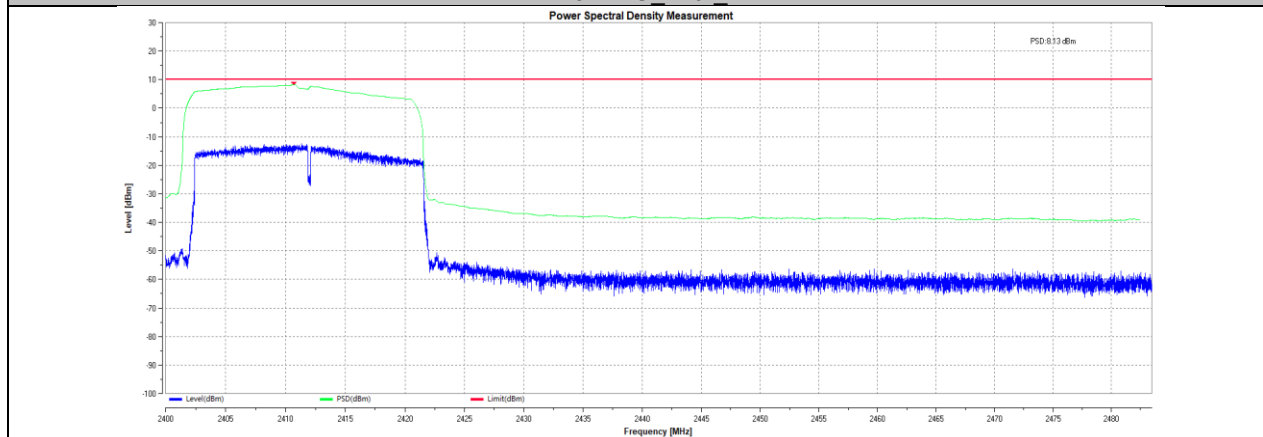
11N40MIMO_total_2462



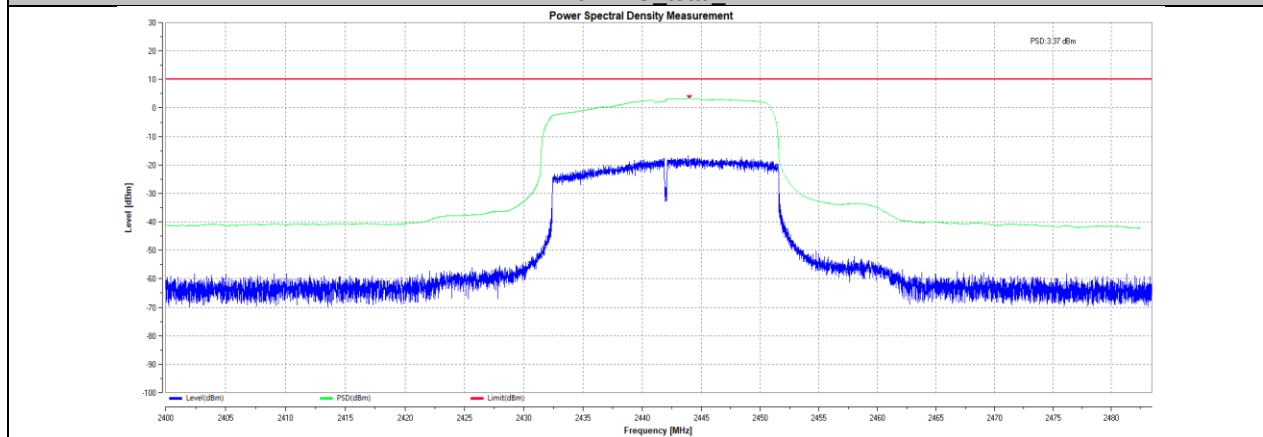
11AX20MIMO_Ant1_2412



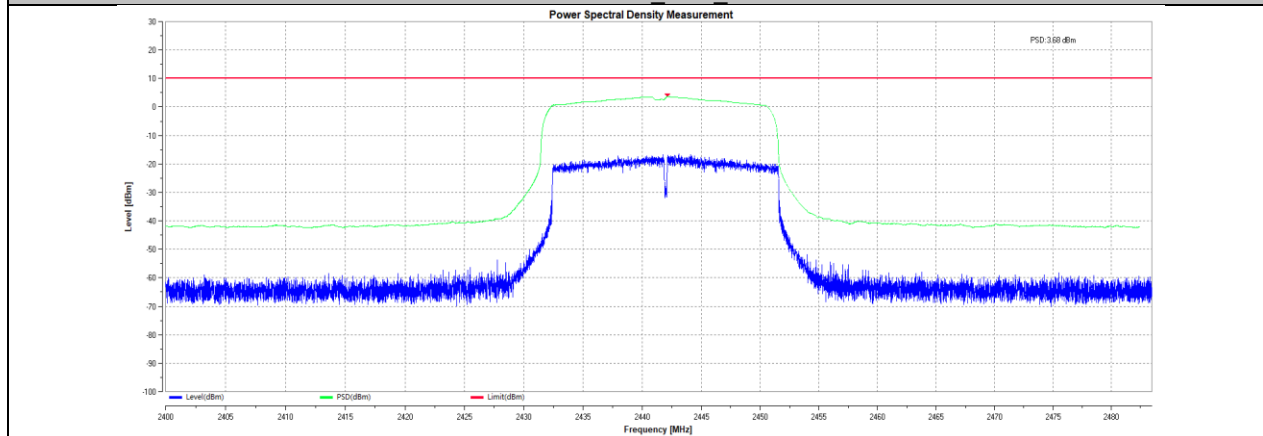
11AX20MIMO_Ant2_2412



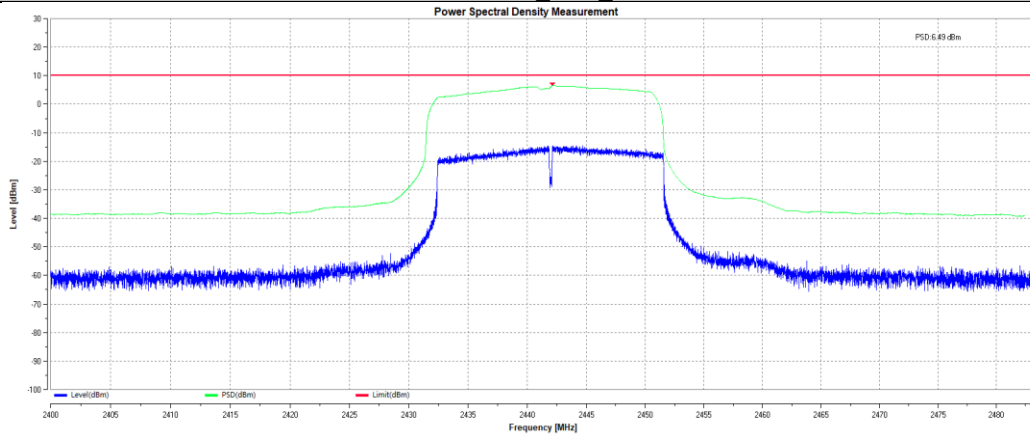
11AX20MIMO_total_2412



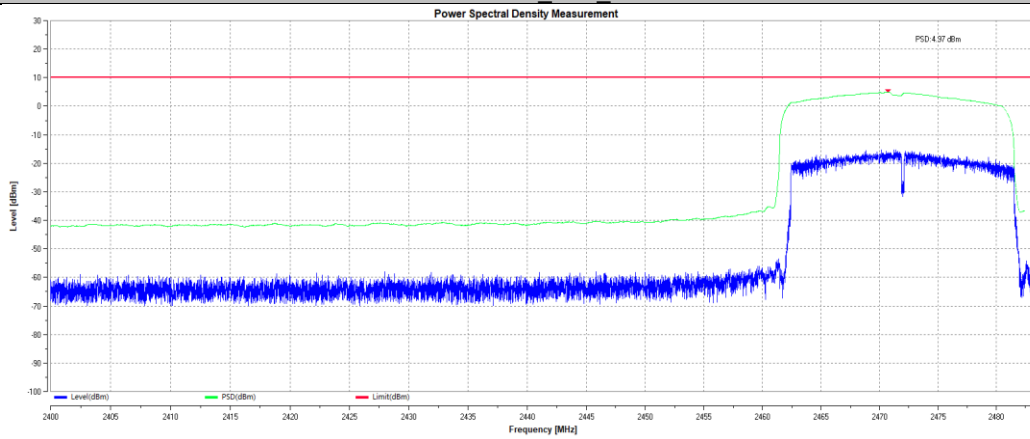
11AX20MIMO_Ant1_2442



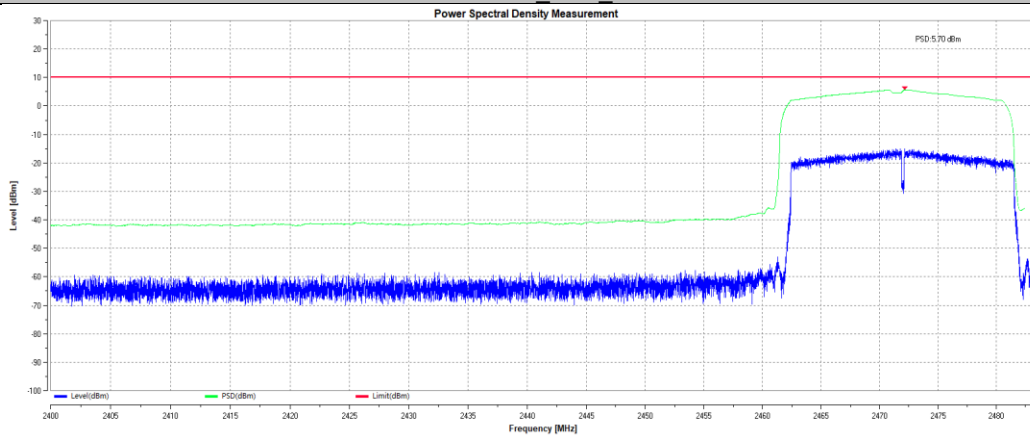
11AX20MIMO_Ant2_2442



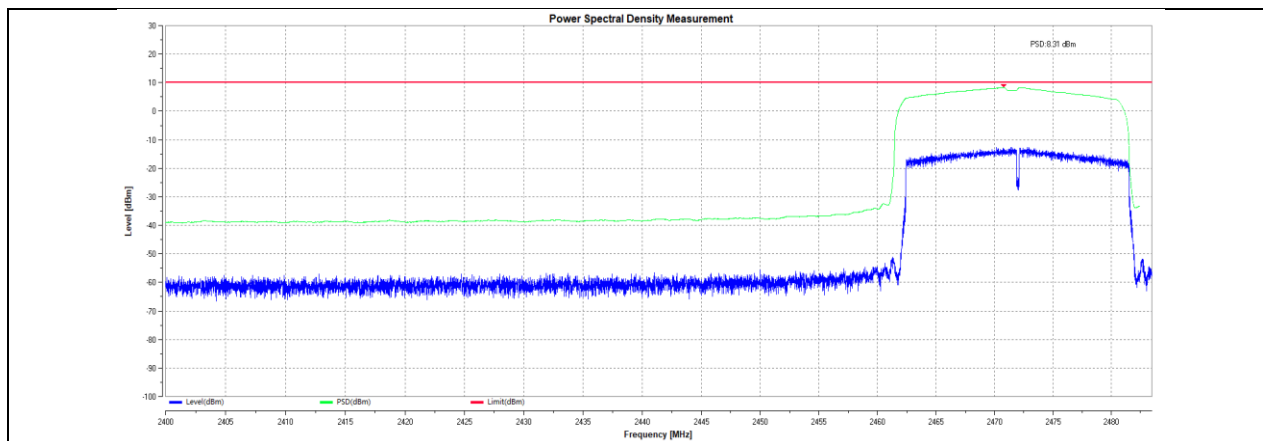
11AX20MIMO_total_2442



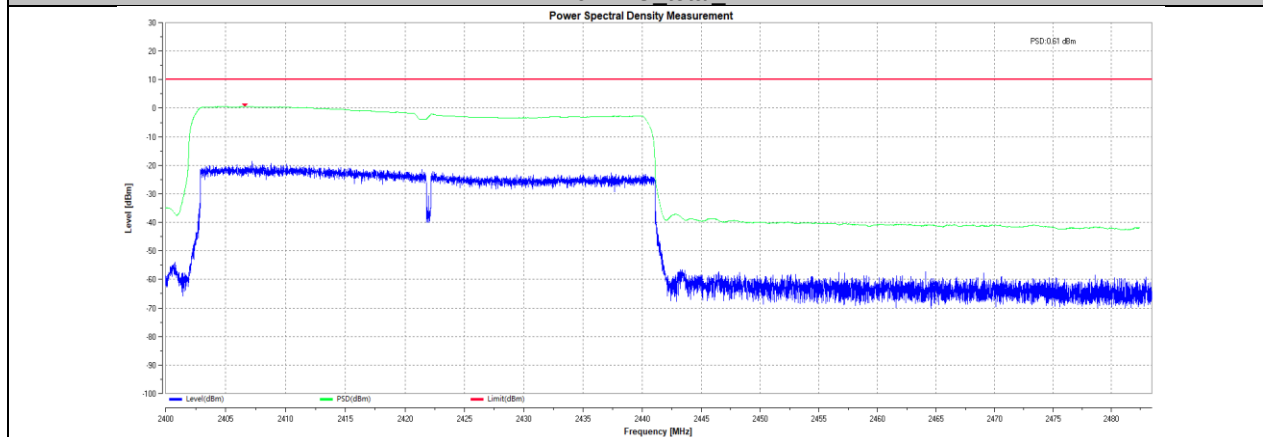
11AX20MIMO_Ant1_2472



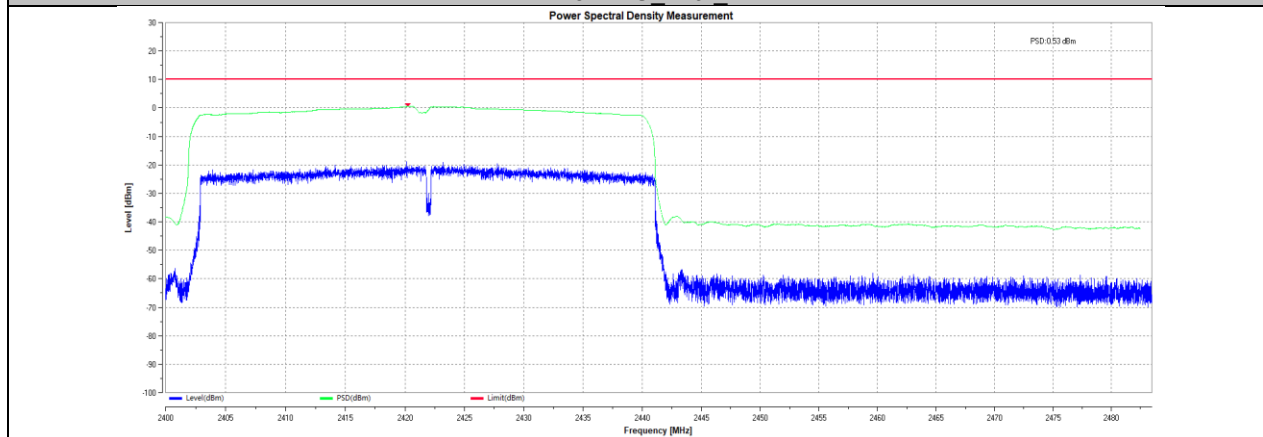
11AX20MIMO_Ant2_2472



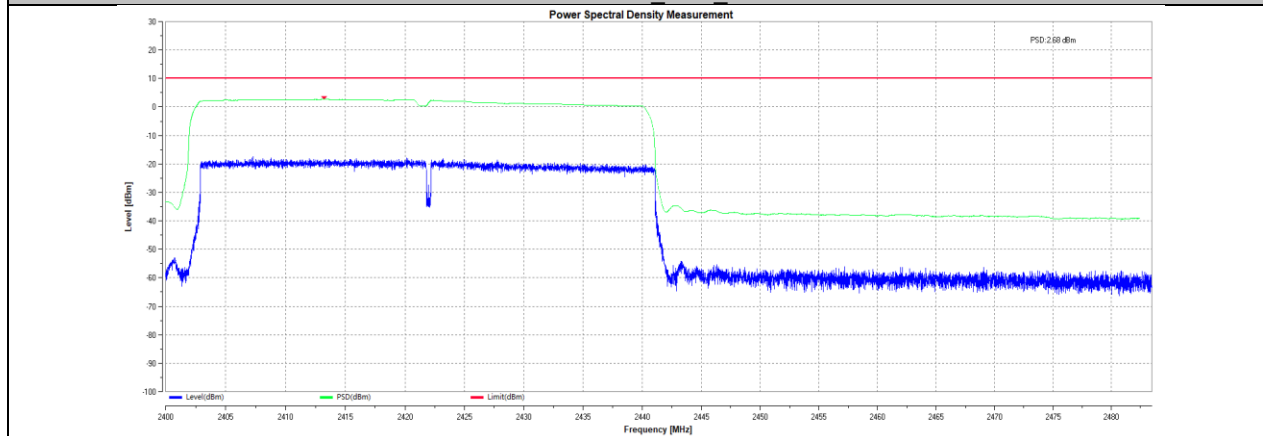
11AX20MIMO_total_2472

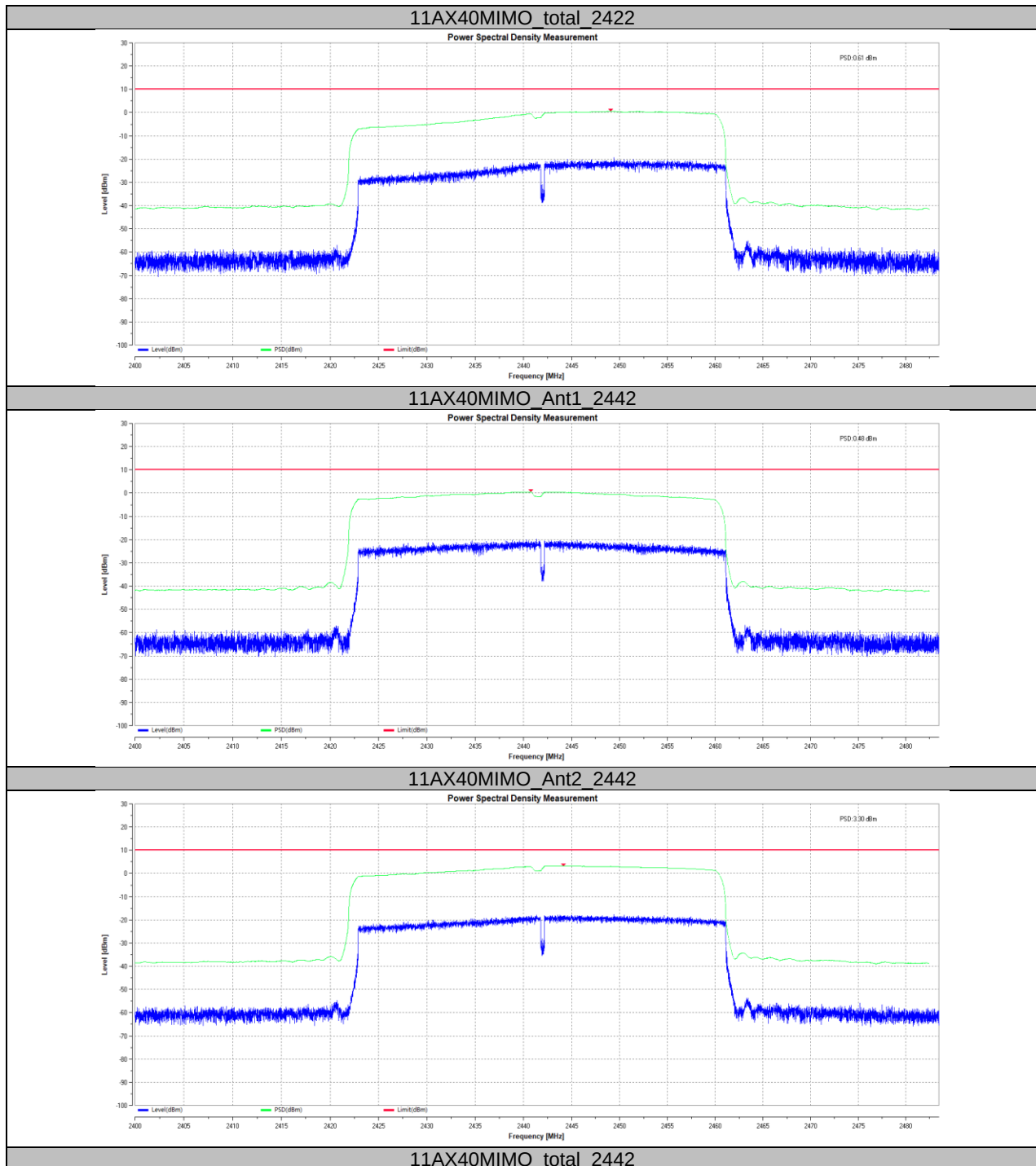


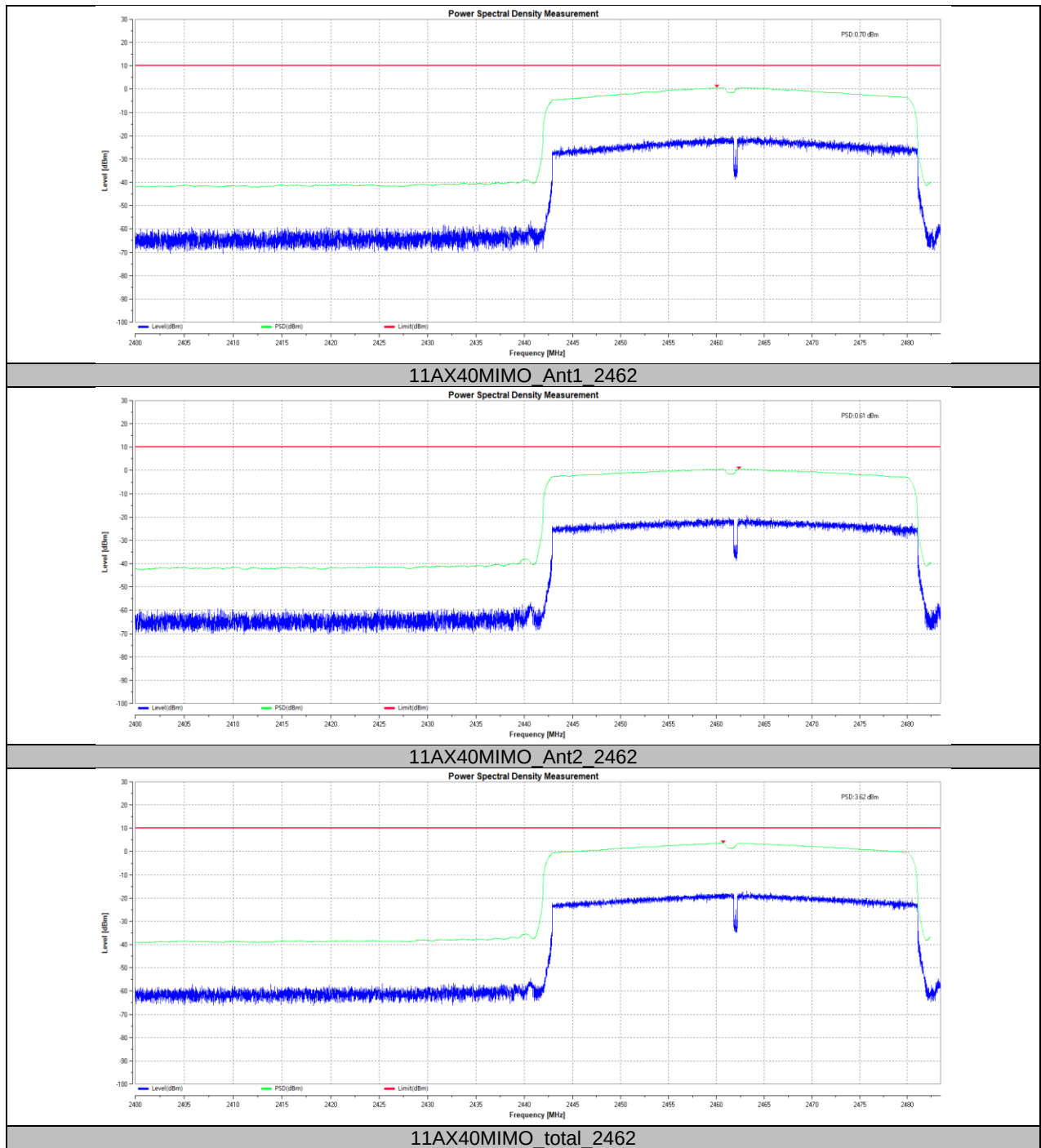
11AX40MIMO_Ant1_2422



11AX40MIMO_Ant2_2422







8.3. APPENDIX C: OCCUPIED CHANNEL BANDWIDTH

8.3.1. Test Result

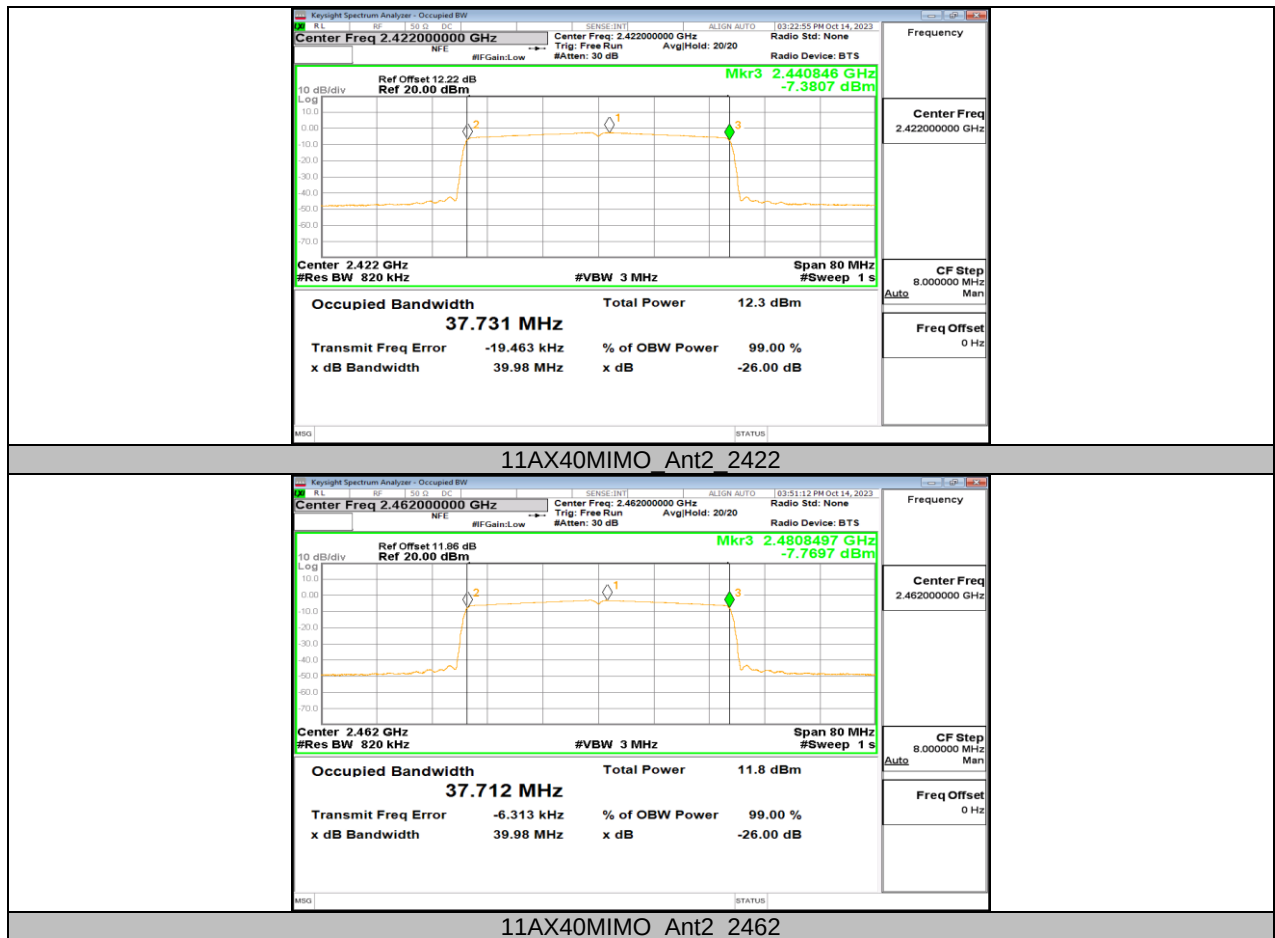
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant2	2412	12.697	2405.6351	2418.3321	2400 to 2483.5	PASS
		2472	12.608	2465.6868	2478.2948	2400 to 2483.5	PASS
11G	Ant2	2412	16.408	2403.7865	2420.1945	2400 to 2483.5	PASS
		2472	16.406	2463.7934	2480.1994	2400 to 2483.5	PASS
11N20MIMO	Ant2	2412	17.592	2403.1947	2420.7867	2400 to 2483.5	PASS
		2472	17.589	2463.1916	2480.7806	2400 to 2483.5	PASS
11N40MIMO	Ant2	2422	36.034	2403.9654	2439.9994	2400 to 2483.5	PASS
		2462	36.013	2443.9785	2479.9915	2400 to 2483.5	PASS
11AX20MIMO	Ant2	2412	18.874	2402.5496	2421.4236	2400 to 2483.5	PASS
		2472	18.877	2462.5452	2481.4222	2400 to 2483.5	PASS
11AX40MIMO	Ant2	2422	37.731	2403.1150	2440.8460	2400 to 2483.5	PASS
		2462	37.712	2443.1377	2480.8497	2400 to 2483.5	PASS

8.3.2. Test Graphs





11AX20MIMO_Ant2_2472



8.4. APPENDIX D: TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BANDDOMAIN

8.4.1. Test Result

Test Mode	Antenna	Frequency[MHz]	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
11B	Ant2	2412	2374.803	-52.20	-20.00	PASS
			2375.106	-52.04	-20.00	PASS
			2375.803	-51.81	-20.00	PASS
			2376.803	-52.51	-20.00	PASS
			2377.803	-52.76	-20.00	PASS
			2378.803	-52.49	-20.00	PASS
			2379.803	-52.67	-20.00	PASS
			2380.803	-52.18	-20.00	PASS
			2381.803	-51.85	-20.00	PASS
			2382.803	-51.57	-20.00	PASS
			2383.803	-51.51	-20.00	PASS
			2384.803	-51.74	-20.00	PASS
			2385.803	-51.69	-20.00	PASS
			2386.803	-51.52	-20.00	PASS
			2387.5	-51.62	-10.00	PASS
			2387.803	-51.68	-10.00	PASS
			2388.5	-51.79	-10.00	PASS
			2389.5	-51.58	-10.00	PASS
			2390.5	-51.43	-10.00	PASS
			2391.5	-51.11	-10.00	PASS
			2392.5	-49.22	-10.00	PASS
			2393.5	-47.96	-10.00	PASS
			2394.5	-48.08	-10.00	PASS
			2395.5	-46.48	-10.00	PASS
			2396.5	-44.38	-10.00	PASS
			2397.5	-44.08	-10.00	PASS
			2398.5	-42.71	-10.00	PASS
			2399.5	-42.06	-10.00	PASS
			2484	-53.44	-10.00	PASS
			2485	-53.43	-10.00	PASS
			2486	-53.36	-10.00	PASS
			2487	-53.30	-10.00	PASS
			2488	-53.26	-10.00	PASS
			2489	-53.14	-10.00	PASS
			2490	-52.65	-10.00	PASS
			2491	-53.10	-10.00	PASS
			2492	-53.83	-10.00	PASS
			2493	-53.14	-10.00	PASS
			2494	-53.32	-10.00	PASS
			2495	-53.52	-10.00	PASS
			2495.697	-53.68	-10.00	PASS
			2496	-53.79	-10.00	PASS
			2496.697	-53.86	-20.00	PASS
			2497.697	-54.09	-20.00	PASS
			2498.697	-54.08	-20.00	PASS
			2499.697	-54.20	-20.00	PASS
			2500.697	-54.06	-20.00	PASS
			2501.697	-54.11	-20.00	PASS
			2502.697	-54.07	-20.00	PASS
			2503.697	-54.01	-20.00	PASS
			2504.697	-54.03	-20.00	PASS
			2505.697	-54.04	-20.00	PASS
			2506.697	-54.03	-20.00	PASS
			2507.697	-54.02	-20.00	PASS
			2508.394	-54.05	-20.00	PASS

		2472	2508.697	-54.04	-20.00	PASS
			2374.892	-54.57	-20.00	PASS
			2375.284	-54.57	-20.00	PASS
			2375.892	-54.59	-20.00	PASS
			2376.892	-54.58	-20.00	PASS
			2377.892	-54.53	-20.00	PASS
			2378.892	-54.45	-20.00	PASS
			2379.892	-54.50	-20.00	PASS
			2380.892	-54.09	-20.00	PASS
			2381.892	-54.08	-20.00	PASS
			2382.892	-54.06	-20.00	PASS
			2383.892	-53.95	-20.00	PASS
			2384.892	-54.08	-20.00	PASS
			2385.892	-54.03	-20.00	PASS
			2386.892	-53.88	-20.00	PASS
			2387.5	-53.80	-10.00	PASS
			2387.892	-53.75	-10.00	PASS
			2388.5	-53.69	-10.00	PASS
			2389.5	-53.57	-10.00	PASS
			2390.5	-53.04	-10.00	PASS
			2391.5	-53.02	-10.00	PASS
			2392.5	-53.21	-10.00	PASS
			2393.5	-53.05	-10.00	PASS
			2394.5	-53.21	-10.00	PASS
			2395.5	-53.35	-10.00	PASS
			2396.5	-53.27	-10.00	PASS
			2397.5	-53.23	-10.00	PASS
			2398.5	-53.15	-10.00	PASS
			2399.5	-53.18	-10.00	PASS
			2484	-42.44	-10.00	PASS
			2485	-42.48	-10.00	PASS
			2486	-40.56	-10.00	PASS
			2487	-43.15	-10.00	PASS
			2488	-42.53	-10.00	PASS
			2489	-43.22	-10.00	PASS
			2490	-46.21	-10.00	PASS
			2491	-45.94	-10.00	PASS
			2492	-49.14	-10.00	PASS
			2493	-51.24	-10.00	PASS
			2494	-51.77	-10.00	PASS
			2495	-51.84	-10.00	PASS
			2495.608	-51.69	-10.00	PASS
			2496	-51.52	-10.00	PASS
			2496.608	-51.46	-20.00	PASS
			2497.608	-51.38	-20.00	PASS
			2498.608	-51.60	-20.00	PASS
			2499.608	-52.10	-20.00	PASS
			2500.608	-51.89	-20.00	PASS
			2501.608	-52.02	-20.00	PASS
			2502.608	-52.11	-20.00	PASS
			2503.608	-52.13	-20.00	PASS
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			2506.608	-52.03	-20.00	PASS
			2507.608	-52.00	-20.00	PASS
			2508.216	-51.96	-20.00	PASS
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			2371.092	-45.93	-20.00	PASS
			2372.092	-45.76	-20.00	PASS
			2373.092	-45.81	-20.00	PASS

			2374.092	-45.76	-20.00	PASS
			2375.092	-45.79	-20.00	PASS
			2376.092	-45.74	-20.00	PASS
			2377.092	-45.75	-20.00	PASS
			2378.092	-45.76	-20.00	PASS
			2379.092	-45.72	-20.00	PASS
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			2392.5	-42.29	-10.00	PASS
			2393.5	-41.89	-10.00	PASS
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			2494	-49.29	-10.00	PASS
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			2390.5	-48.70	-10.00	PASS
			2391.5	-48.58	-10.00	PASS
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			2491	-41.79	-10.00	PASS
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			2494	-43.73	-10.00	PASS
			2495	-44.04	-10.00	PASS
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			2514.406	-45.31	-20.00	PASS
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			2366.908	-45.21	-23.01	PASS
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			2370.908	-44.41	-23.01	PASS
			2371.908	-44.99	-23.01	PASS
			2372.908	-44.85	-23.01	PASS
			2373.908	-44.50	-23.01	PASS
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			2378.908	-44.51	-23.01	PASS
			2379.908	-44.43	-23.01	PASS
			2380.908	-43.86	-23.01	PASS
			2381.908	-43.87	-23.01	PASS
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			2386.5	-39.53	-13.01	PASS
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			2399.5	-27.80	-13.01	PASS
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			2486	-46.88	-13.01	PASS
			2487	-46.91	-13.01	PASS
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			2356.466	-46.95	-23.01	PASS
			2357.466	-46.92	-23.01	PASS
			2358.466	-46.83	-23.01	PASS
			2359.466	-46.61	-23.01	PASS
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			2374.5	-45.17	-13.01	PASS
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			2376.5	-44.81	-13.01	PASS
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			2394.5	-43.10	-13.01	PASS
			2395.5	-41.30	-13.01	PASS
			2396.5	-42.35	-13.01	PASS
			2397.5	-39.85	-13.01	PASS
			2398.5	-41.51	-13.01	PASS
			2399.5	-39.83	-13.01	PASS
			2484	-46.93	-13.01	PASS
			2485	-47.03	-13.01	PASS
			2486	-47.17	-13.01	PASS
			2487	-47.28	-13.01	PASS
			2488	-47.49	-13.01	PASS
			2489	-47.53	-13.01	PASS
			2490	-47.61	-13.01	PASS
			2491	-48.01	-13.01	PASS
			2492	-48.03	-13.01	PASS
			2493	-48.17	-13.01	PASS
			2494	-48.25	-13.01	PASS
			2495	-48.37	-13.01	PASS
			2496	-48.52	-13.01	PASS
			2497	-48.51	-13.01	PASS
			2498	-48.65	-13.01	PASS
			2499	-48.66	-13.01	PASS
			2500	-48.77	-13.01	PASS

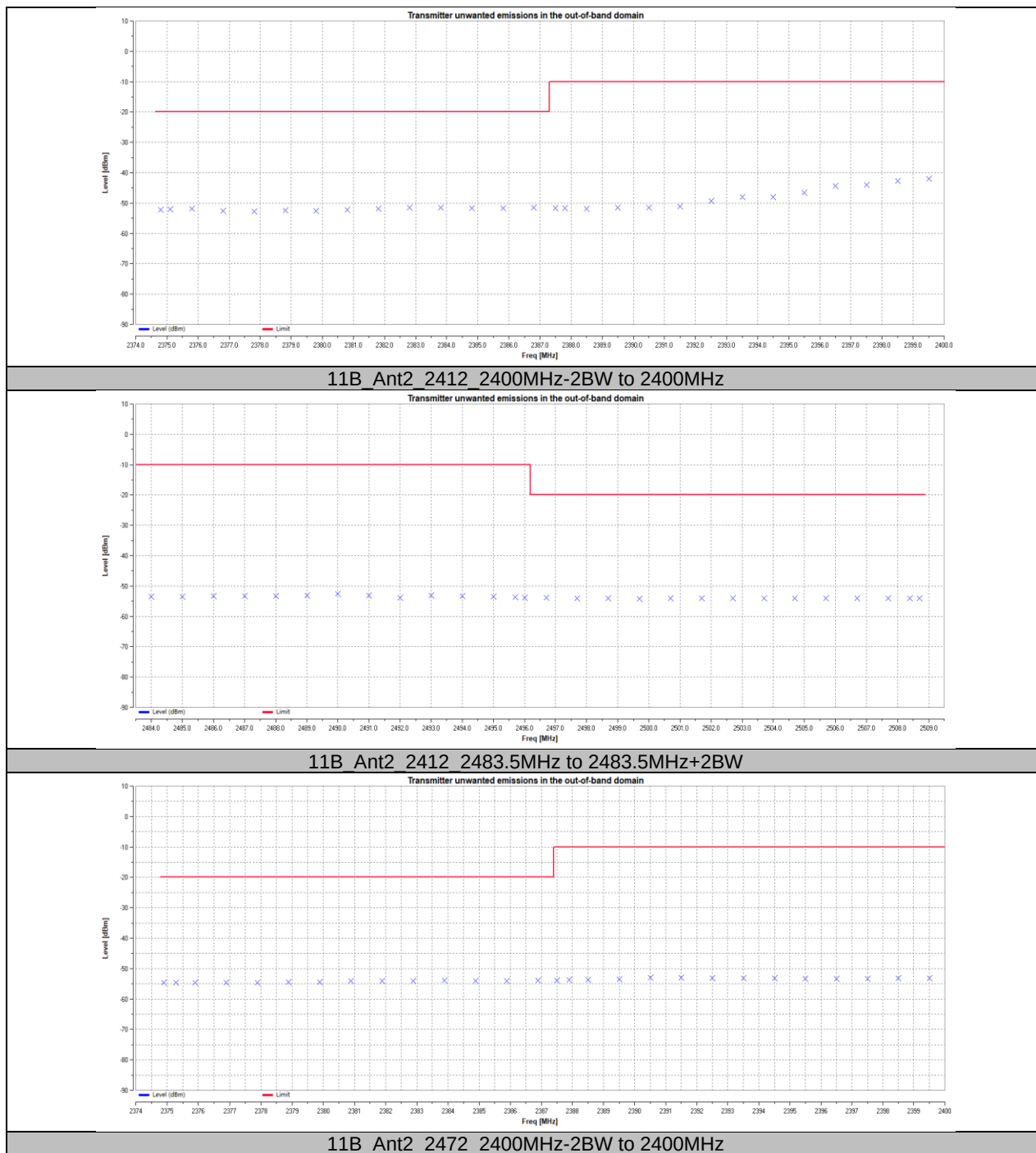
			2501	-48.69	-13.01	PASS
			2502	-48.81	-13.01	PASS
			2503	-48.83	-13.01	PASS
			2504	-48.89	-13.01	PASS
			2505	-48.93	-13.01	PASS
			2506	-48.97	-13.01	PASS
			2507	-49.07	-13.01	PASS
			2508	-49.10	-13.01	PASS
			2509	-49.14	-13.01	PASS
			2510	-49.25	-13.01	PASS
			2511	-48.90	-13.01	PASS
			2512	-48.98	-13.01	PASS
			2513	-48.96	-13.01	PASS
			2514	-49.03	-13.01	PASS
			2515	-49.09	-13.01	PASS
			2516	-49.01	-13.01	PASS
			2517	-49.09	-13.01	PASS
			2518	-49.07	-13.01	PASS
			2519	-49.13	-13.01	PASS
			2520	-49.19	-13.01	PASS
			2520.731	-49.53	-13.01	PASS
			2521	-49.50	-13.01	PASS
			2521.731	-49.62	-23.01	PASS
			2522.731	-49.64	-23.01	PASS
			2523.731	-49.69	-23.01	PASS
			2524.731	-49.78	-23.01	PASS
			2525.731	-49.82	-23.01	PASS
			2526.731	-49.93	-23.01	PASS
			2527.731	-50.05	-23.01	PASS
			2528.731	-50.04	-23.01	PASS
			2529.731	-50.23	-23.01	PASS
			2530.731	-50.21	-23.01	PASS
			2531.731	-50.29	-23.01	PASS
			2532.731	-50.36	-23.01	PASS
			2533.731	-50.45	-23.01	PASS
			2534.731	-50.59	-23.01	PASS
			2535.731	-50.67	-23.01	PASS
			2536.731	-50.72	-23.01	PASS
			2537.731	-50.80	-23.01	PASS
			2538.731	-50.89	-23.01	PASS
			2539.731	-50.91	-23.01	PASS
			2540.731	-50.82	-23.01	PASS
			2541.731	-50.91	-23.01	PASS
			2542.731	-50.97	-23.01	PASS
			2543.731	-51.10	-23.01	PASS
			2544.731	-51.15	-23.01	PASS
			2545.731	-51.22	-23.01	PASS
			2546.731	-51.32	-23.01	PASS
			2547.731	-50.52	-23.01	PASS
			2548.731	-51.57	-23.01	PASS
			2549.731	-51.61	-23.01	PASS
			2550.731	-51.75	-23.01	PASS
			2551.731	-51.79	-23.01	PASS
			2552.731	-51.89	-23.01	PASS
			2553.731	-51.94	-23.01	PASS
			2554.731	-51.99	-23.01	PASS
			2555.731	-52.06	-23.01	PASS
			2556.731	-52.11	-23.01	PASS
			2557.731	-52.25	-23.01	PASS
			2558.462	-52.25	-23.01	PASS
			2558.731	-52.29	-23.01	PASS
		2462	2324.788	-52.62	-23.01	PASS
			2325.076	-52.56	-23.01	PASS
			2325.788	-52.49	-23.01	PASS

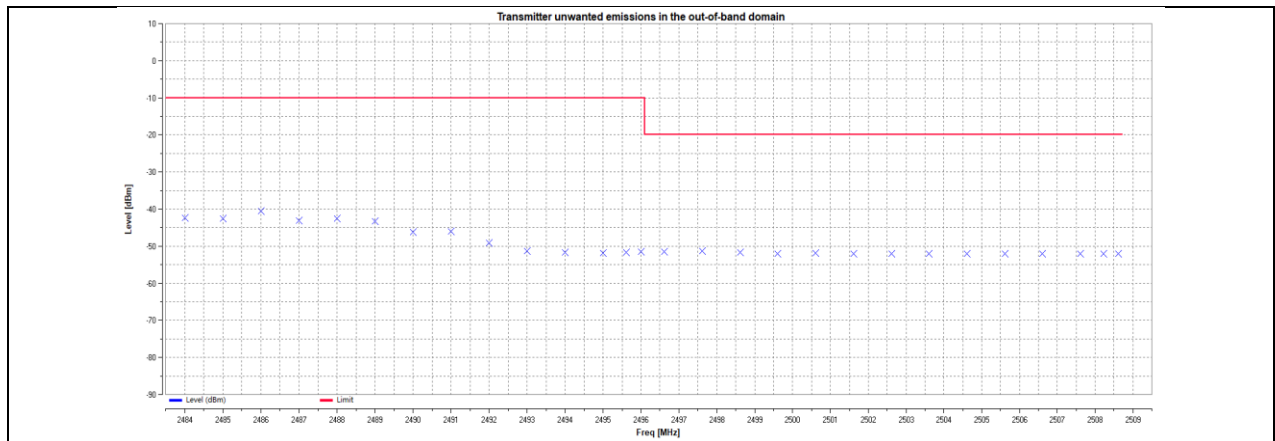
			2326.788	-52.42	-23.01	PASS
			2327.788	-52.39	-23.01	PASS
			2328.788	-52.33	-23.01	PASS
			2329.788	-52.28	-23.01	PASS
			2330.788	-52.32	-23.01	PASS
			2331.788	-52.27	-23.01	PASS
			2332.788	-52.12	-23.01	PASS
			2333.788	-52.09	-23.01	PASS
			2334.788	-52.04	-23.01	PASS
			2335.788	-51.97	-23.01	PASS
			2336.788	-51.77	-23.01	PASS
			2337.788	-51.67	-23.01	PASS
			2338.788	-51.52	-23.01	PASS
			2339.788	-51.47	-23.01	PASS
			2340.788	-51.64	-23.01	PASS
			2341.788	-51.50	-23.01	PASS
			2342.788	-51.47	-23.01	PASS
			2343.788	-51.31	-23.01	PASS
			2344.788	-51.19	-23.01	PASS
			2345.788	-51.04	-23.01	PASS
			2346.788	-51.02	-23.01	PASS
			2347.788	-50.90	-23.01	PASS
			2348.788	-50.87	-23.01	PASS
			2349.788	-50.78	-23.01	PASS
			2350.788	-50.46	-23.01	PASS
			2351.788	-50.37	-23.01	PASS
			2352.788	-50.29	-23.01	PASS
			2353.788	-50.15	-23.01	PASS
			2354.788	-50.13	-23.01	PASS
			2355.788	-50.14	-23.01	PASS
			2356.788	-50.03	-23.01	PASS
			2357.788	-49.95	-23.01	PASS
			2358.788	-49.85	-23.01	PASS
			2359.788	-49.81	-23.01	PASS
			2360.788	-49.53	-23.01	PASS
			2361.788	-49.43	-23.01	PASS
			2362.5	-49.39	-13.01	PASS
			2362.788	-49.37	-13.01	PASS
			2363.5	-49.38	-13.01	PASS
			2364.5	-49.23	-13.01	PASS
			2365.5	-49.18	-13.01	PASS
			2366.5	-49.10	-13.01	PASS
			2367.5	-49.10	-13.01	PASS
			2368.5	-49.05	-13.01	PASS
			2369.5	-48.99	-13.01	PASS
			2370.5	-49.36	-13.01	PASS
			2371.5	-49.34	-13.01	PASS
			2372.5	-49.25	-13.01	PASS
			2373.5	-49.12	-13.01	PASS
			2374.5	-49.10	-13.01	PASS
			2375.5	-49.07	-13.01	PASS
			2376.5	-48.97	-13.01	PASS
			2377.5	-48.88	-13.01	PASS
			2378.5	-48.81	-13.01	PASS
			2379.5	-48.76	-13.01	PASS
			2380.5	-48.31	-13.01	PASS
			2381.5	-48.23	-13.01	PASS
			2382.5	-48.15	-13.01	PASS
			2383.5	-48.16	-13.01	PASS
			2384.5	-47.98	-13.01	PASS
			2385.5	-47.89	-13.01	PASS
			2386.5	-47.79	-13.01	PASS
			2387.5	-47.77	-13.01	PASS
			2388.5	-47.65	-13.01	PASS

			2389.5	-47.54	-13.01	PASS
			2390.5	-47.27	-13.01	PASS
			2391.5	-47.21	-13.01	PASS
			2392.5	-47.15	-13.01	PASS
			2393.5	-47.09	-13.01	PASS
			2394.5	-46.99	-13.01	PASS
			2395.5	-46.93	-13.01	PASS
			2396.5	-46.89	-13.01	PASS
			2397.5	-46.75	-13.01	PASS
			2398.5	-46.62	-13.01	PASS
			2399.5	-46.57	-13.01	PASS
			2484	-39.71	-13.01	PASS
			2485	-40.39	-13.01	PASS
			2486	-40.40	-13.01	PASS
			2487	-41.77	-13.01	PASS
			2488	-41.63	-13.01	PASS
			2489	-42.84	-13.01	PASS
			2490	-43.06	-13.01	PASS
			2491	-44.02	-13.01	PASS
			2492	-42.99	-13.01	PASS
			2493	-44.11	-13.01	PASS
			2494	-43.88	-13.01	PASS
			2495	-44.55	-13.01	PASS
			2496	-44.51	-13.01	PASS
			2497	-44.82	-13.01	PASS
			2498	-44.49	-13.01	PASS
			2499	-45.04	-13.01	PASS
			2500	-44.94	-13.01	PASS
			2501	-45.08	-13.01	PASS
			2502	-44.97	-13.01	PASS
			2503	-45.26	-13.01	PASS
			2504	-45.47	-13.01	PASS
			2505	-45.53	-13.01	PASS
			2506	-45.53	-13.01	PASS
			2507	-45.69	-13.01	PASS
			2508	-45.72	-13.01	PASS
			2509	-45.90	-13.01	PASS
			2510	-45.99	-13.01	PASS
			2511	-45.75	-13.01	PASS
			2512	-45.80	-13.01	PASS
			2513	-45.85	-13.01	PASS
			2514	-45.95	-13.01	PASS
			2515	-46.01	-13.01	PASS
			2516	-46.16	-13.01	PASS
			2517	-46.31	-13.01	PASS
			2518	-46.36	-13.01	PASS
			2519	-46.53	-13.01	PASS
			2520	-46.55	-13.01	PASS
			2520.712	-46.98	-13.01	PASS
			2521	-47.03	-13.01	PASS
			2521.712	-46.95	-23.01	PASS
			2522.712	-47.18	-23.01	PASS
			2523.712	-47.33	-23.01	PASS
			2524.712	-47.55	-23.01	PASS
			2525.712	-47.62	-23.01	PASS
			2526.712	-47.79	-23.01	PASS
			2527.712	-47.90	-23.01	PASS
			2528.712	-48.00	-23.01	PASS
			2529.712	-48.05	-23.01	PASS
			2530.712	-48.13	-23.01	PASS
			2531.712	-48.21	-23.01	PASS
			2532.712	-48.33	-23.01	PASS
			2533.712	-48.41	-23.01	PASS
			2534.712	-48.49	-23.01	PASS

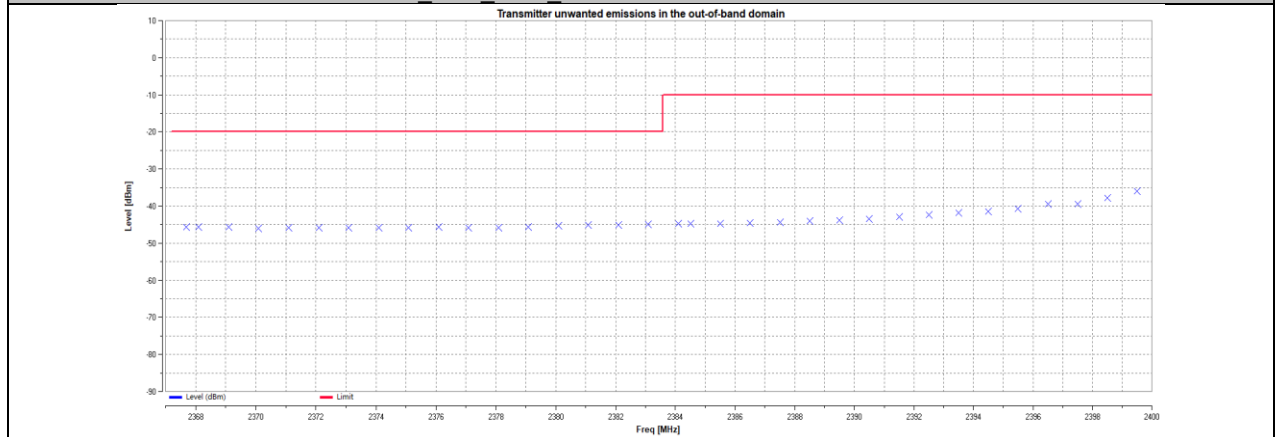
			2535.712	-48.60	-23.01	PASS
			2536.712	-48.62	-23.01	PASS
			2537.712	-48.73	-23.01	PASS
			2538.712	-48.82	-23.01	PASS
			2539.712	-48.91	-23.01	PASS
			2540.712	-48.79	-23.01	PASS
			2541.712	-48.93	-23.01	PASS
			2542.712	-49.03	-23.01	PASS
			2543.712	-49.19	-23.01	PASS
			2544.712	-49.21	-23.01	PASS
			2545.712	-49.30	-23.01	PASS
			2546.712	-49.41	-23.01	PASS
			2547.712	-49.47	-23.01	PASS
			2548.712	-49.61	-23.01	PASS
			2549.712	-49.67	-23.01	PASS
			2550.712	-49.87	-23.01	PASS
			2551.712	-49.87	-23.01	PASS
			2552.712	-49.96	-23.01	PASS
			2553.712	-49.99	-23.01	PASS
			2554.712	-50.10	-23.01	PASS
			2555.712	-50.17	-23.01	PASS
			2556.712	-50.17	-23.01	PASS
			2557.712	-50.20	-23.01	PASS
			2558.424	-50.23	-23.01	PASS
			2558.712	-50.25	-23.01	PASS

8.4.2. Test Graphs

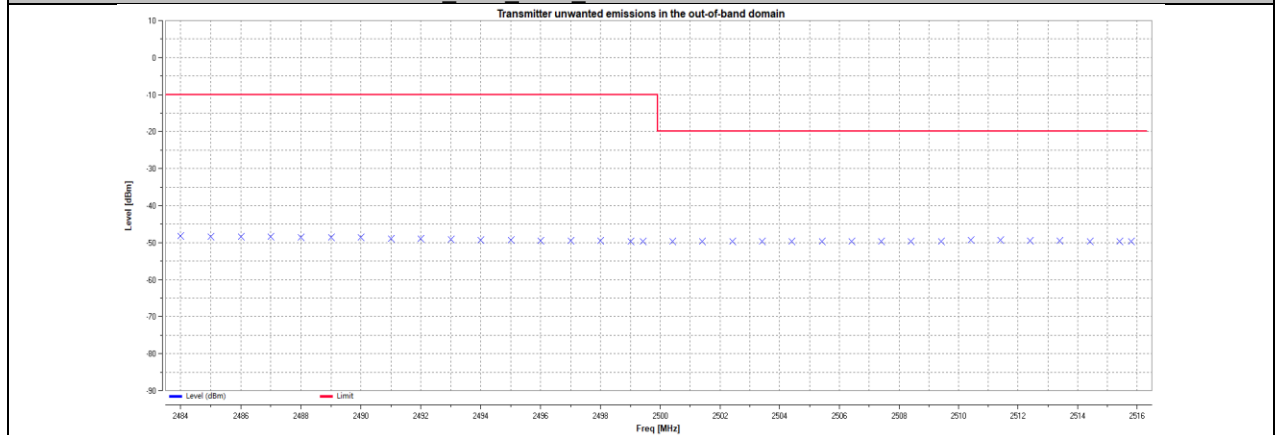




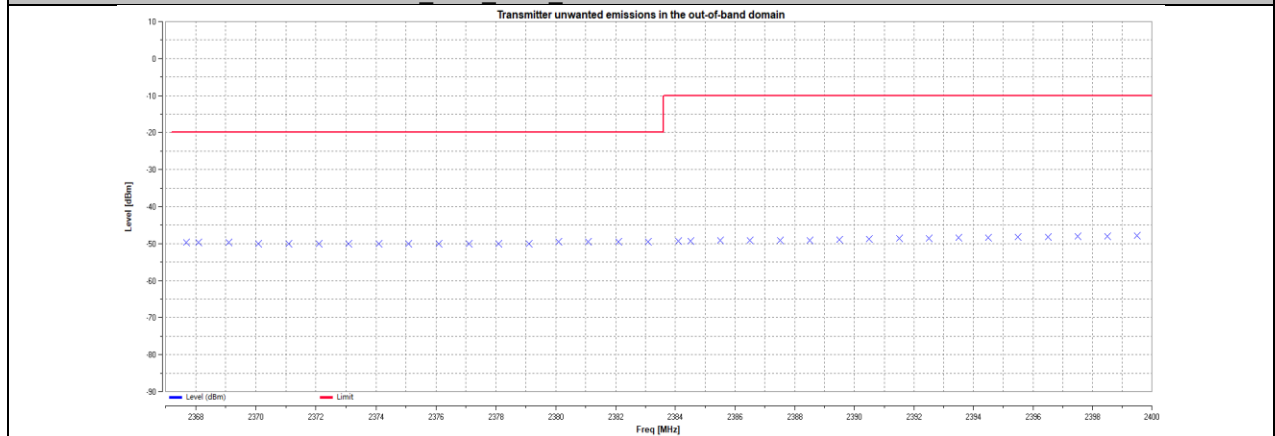
11B_Ant2 2472 2483.5MHz to 2483.5MHz+2BW



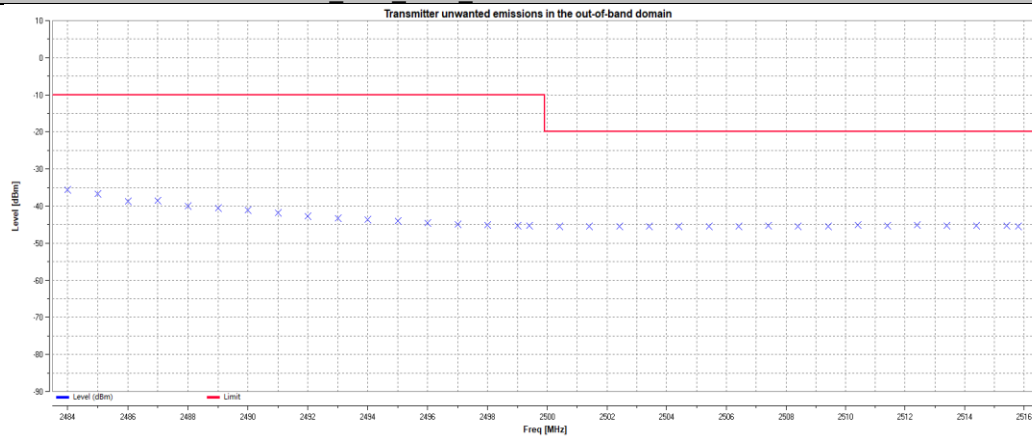
11G_Ant2 2412 2400MHz-2BW to 2400MHz



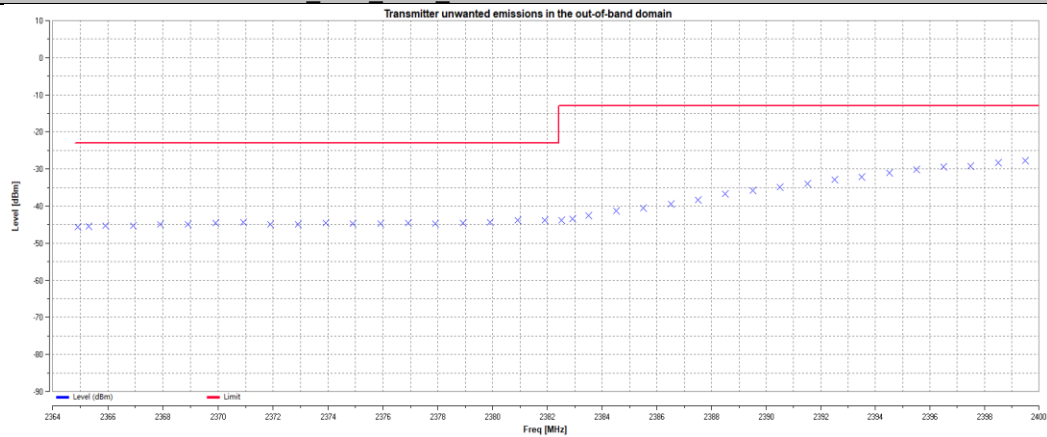
11G_Ant2 2412 2483.5MHz to 2483.5MHz+2BW



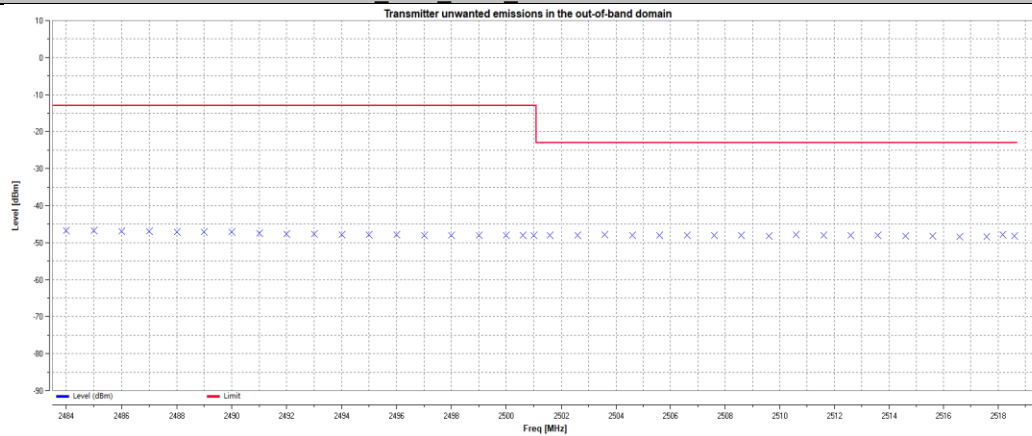
11G_Ant2_2472_2400MHz-2BW to 2400MHz



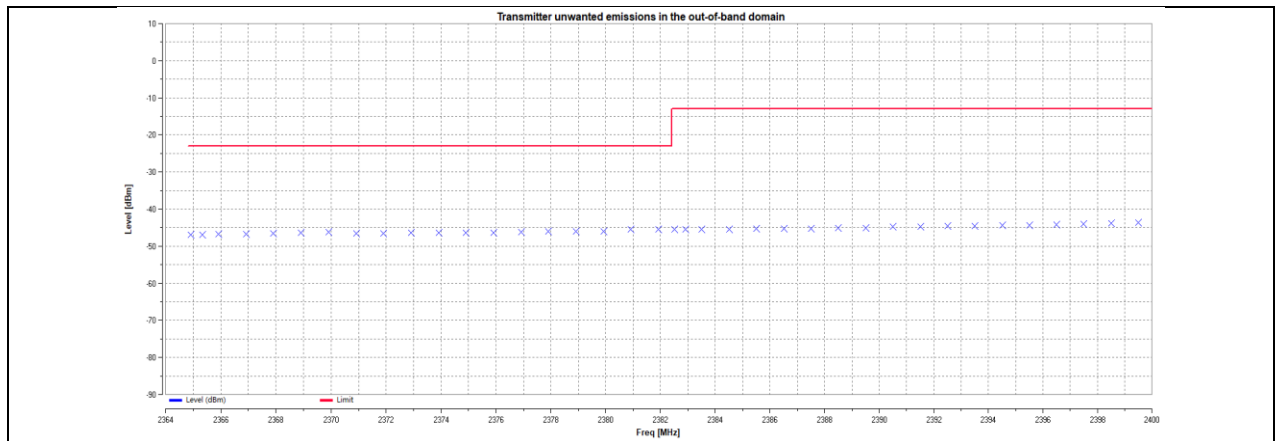
11G_Ant2_2472_2483.5MHz to 2483.5MHz+2BW



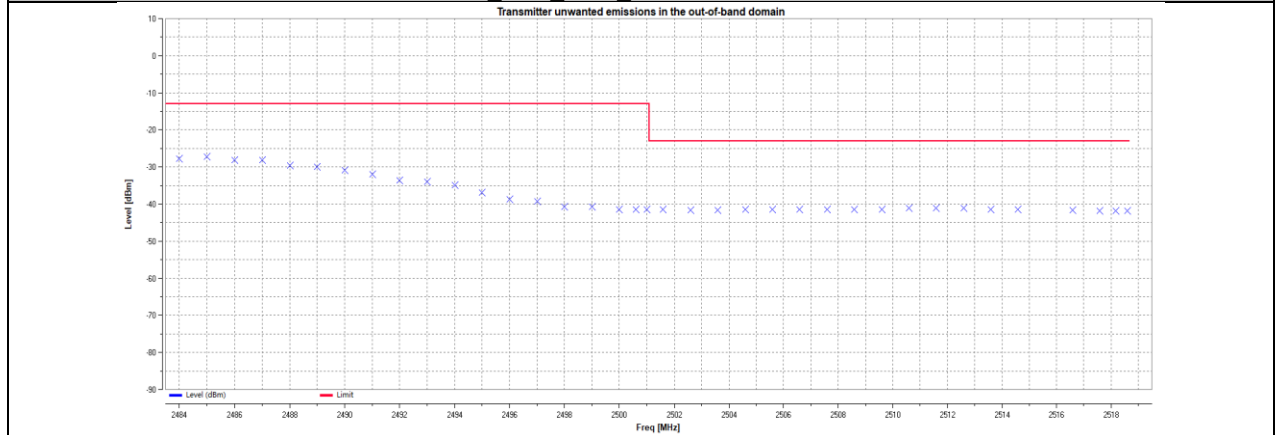
11N20MIMO_Ant2_2412_2400MHz-2BW to 2400MHz



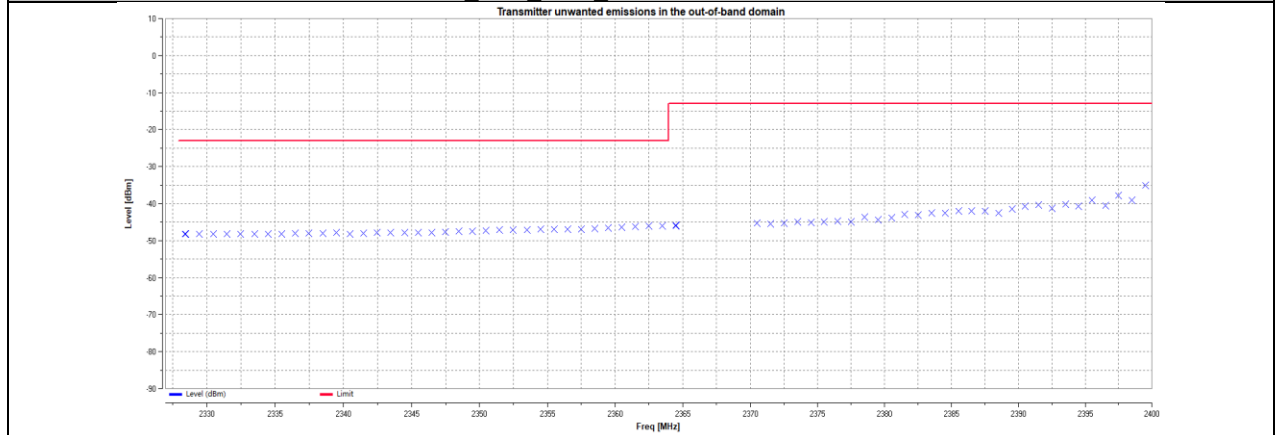
11N20MIMO_Ant2_2412_2483.5MHz to 2483.5MHz+2BW



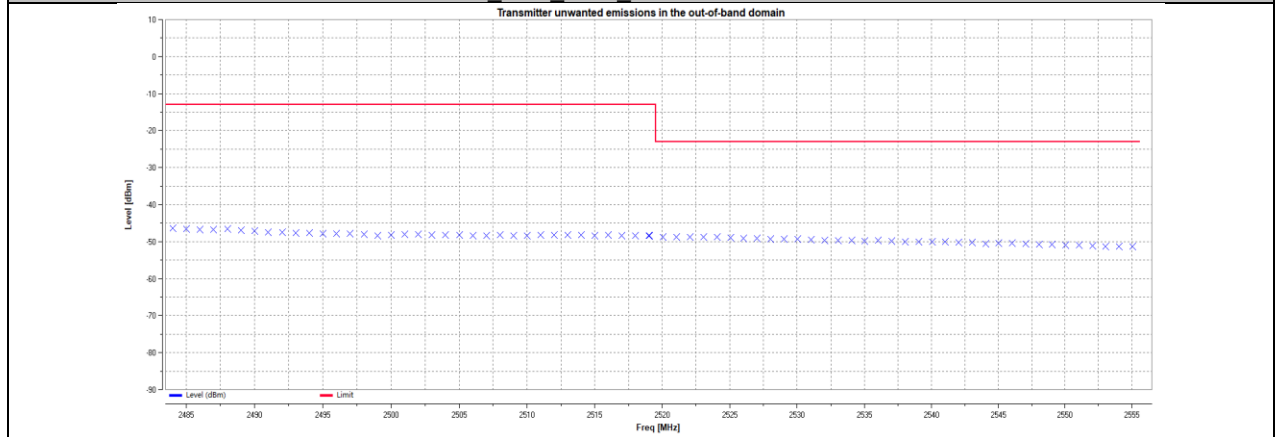
11N20MIMO_Ant2_2472_2400MHz-2BW to 2400MHz



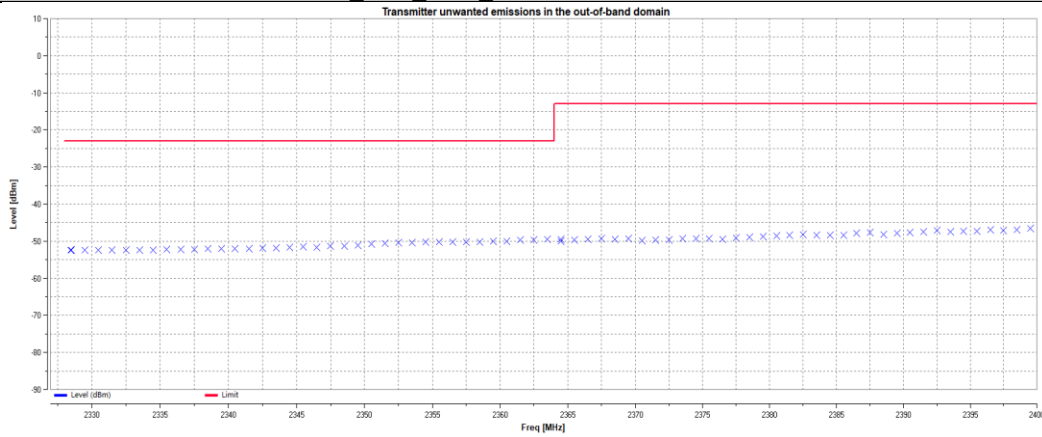
11N20MIMO_Ant2_2472_2483.5MHz to 2483.5MHz+2BW



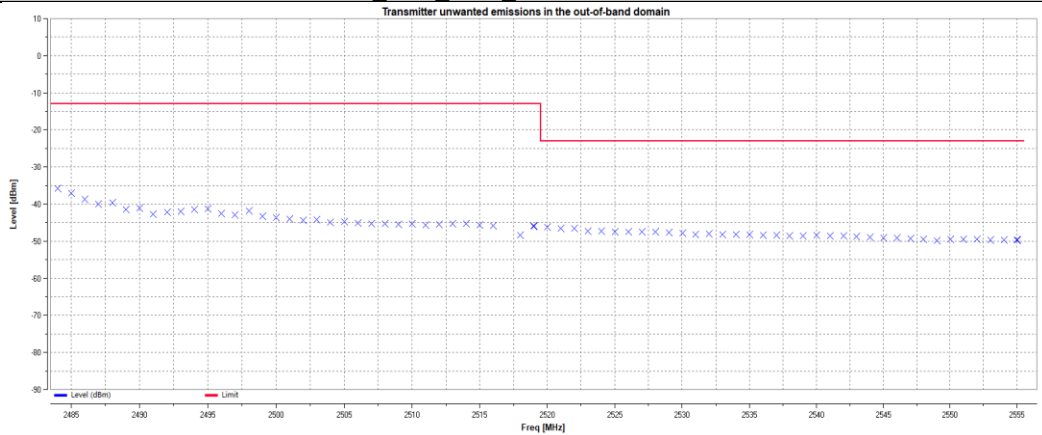
11N40MIMO_Ant2_2422_2400MHz-2BW to 2400MHz



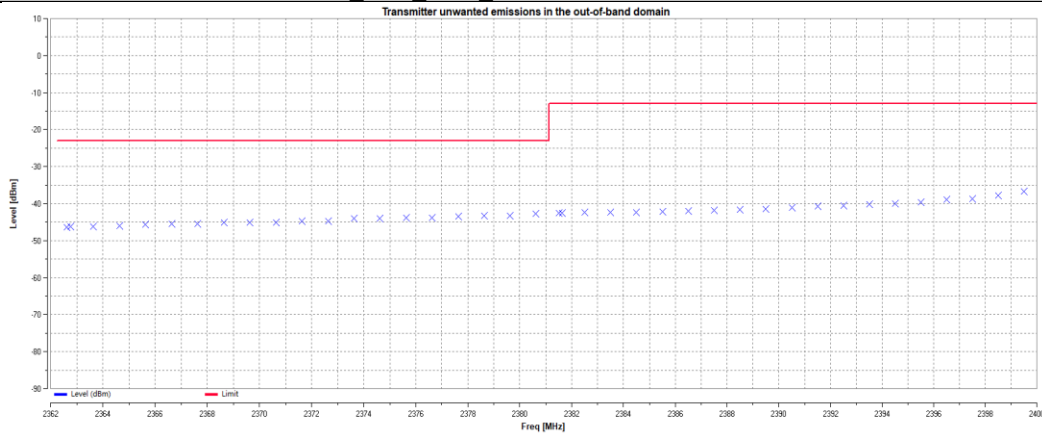
11N40MIMO_Ant2_2422_2483.5MHz to 2483.5MHz+2BW



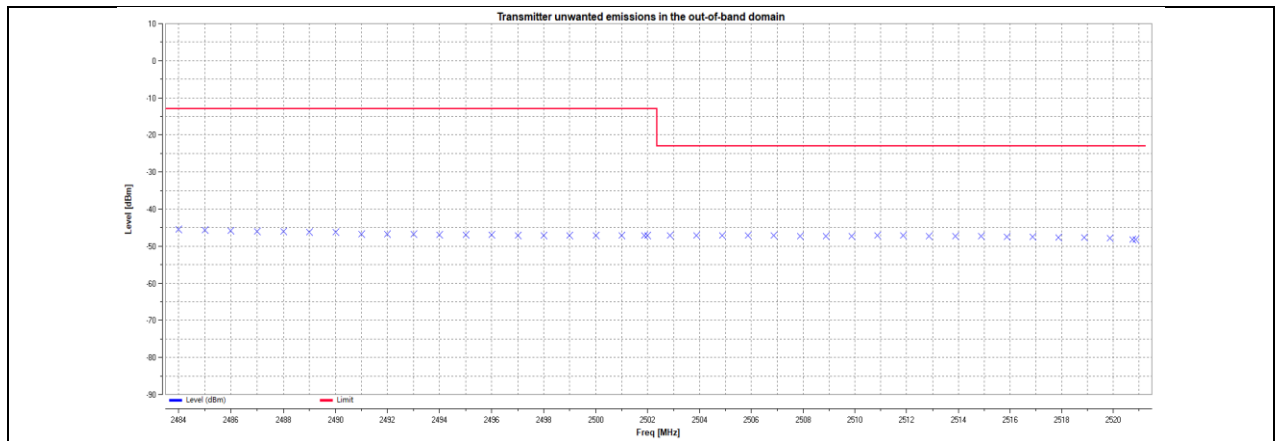
11N40MIMO_Ant2_2462_2400MHz-2BW to 2400MHz



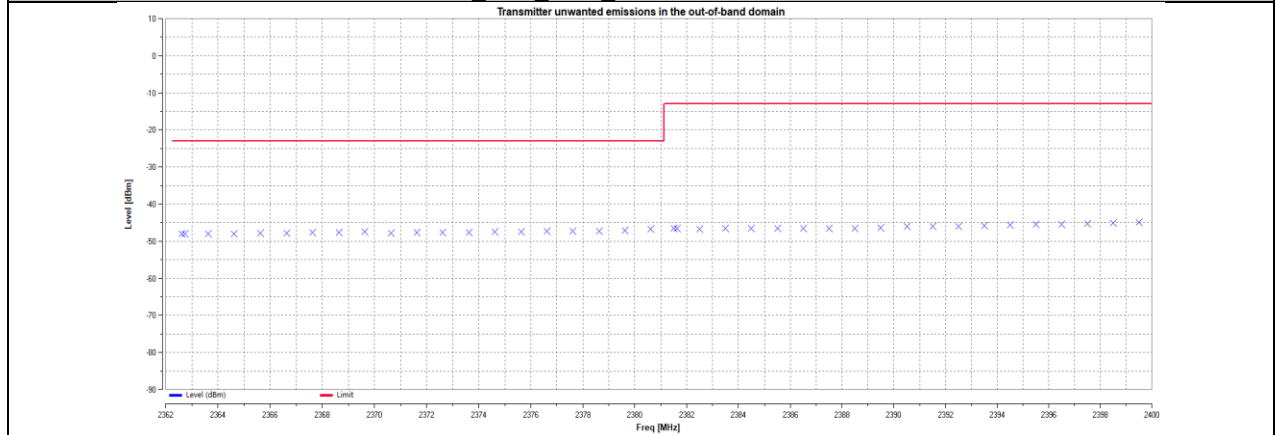
11N40MIMO_Ant2_2462_2483.5MHz to 2483.5MHz+2BW



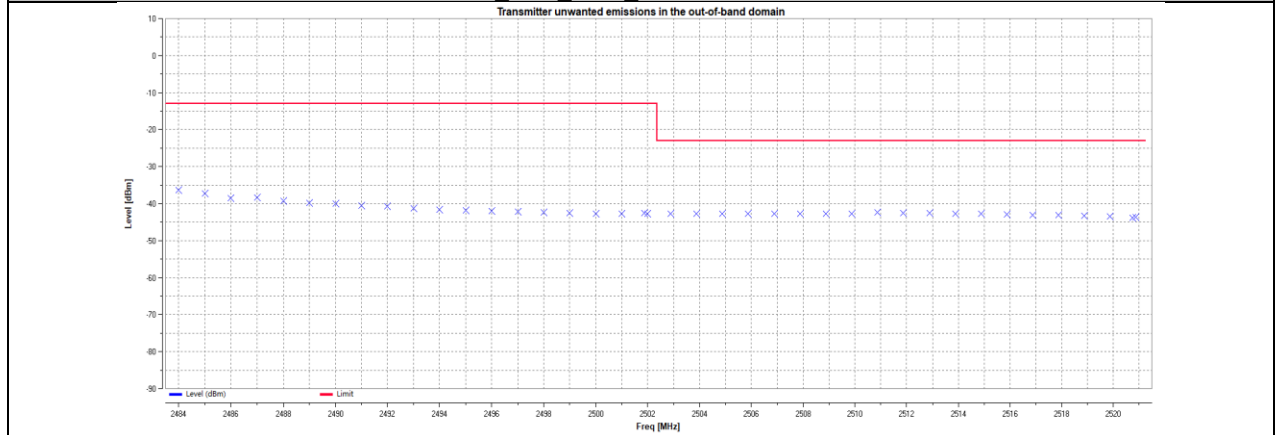
11AX20MIMO_Ant2_2412_2400MHz-2BW to 2400MHz



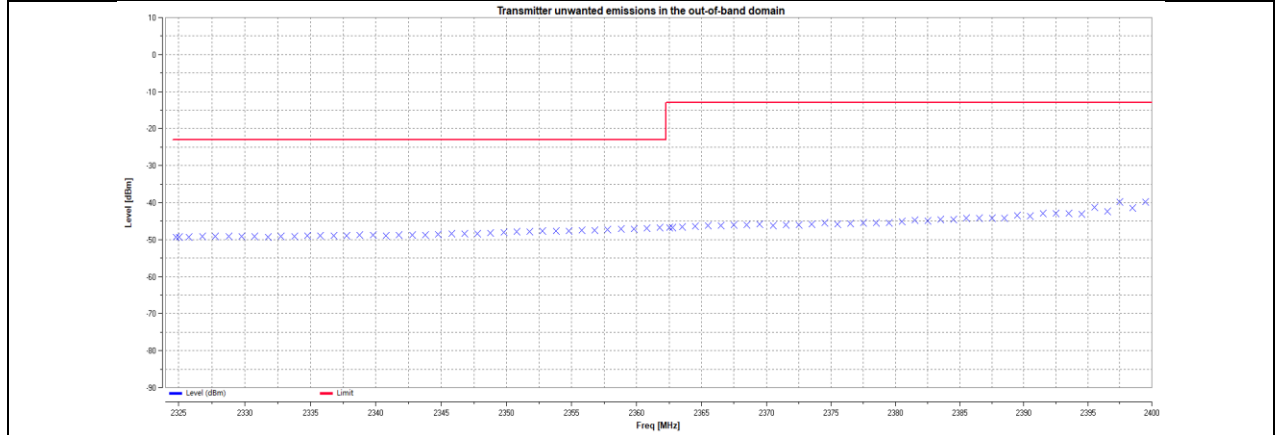
11AX20MIMO_Ant2_2412_2483.5MHz to 2483.5MHz+2BW



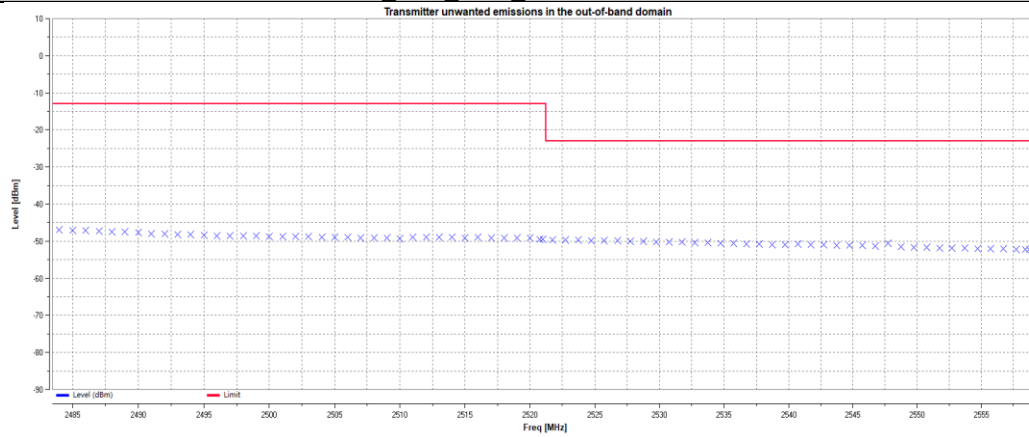
11AX20MIMO_Ant2_2472_2400MHz-2BW to 2400MHz



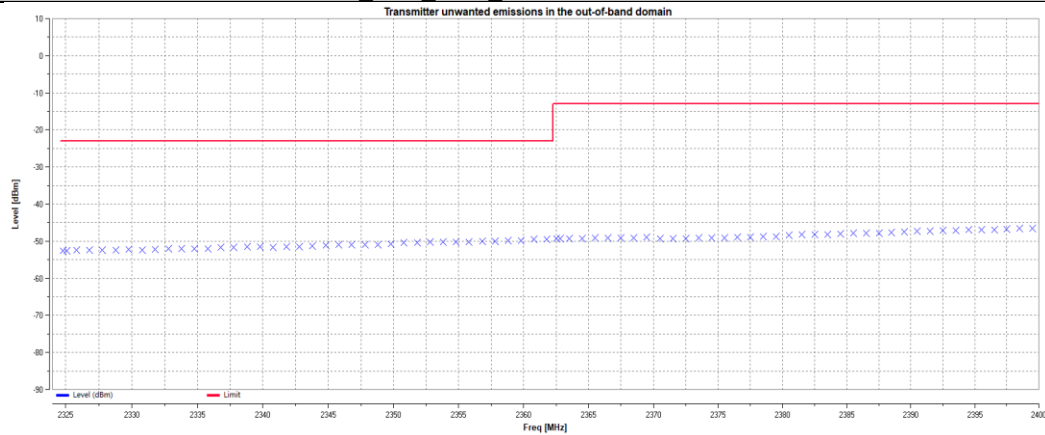
11AX20MIMO_Ant2_2472_2483.5MHz to 2483.5MHz+2BW



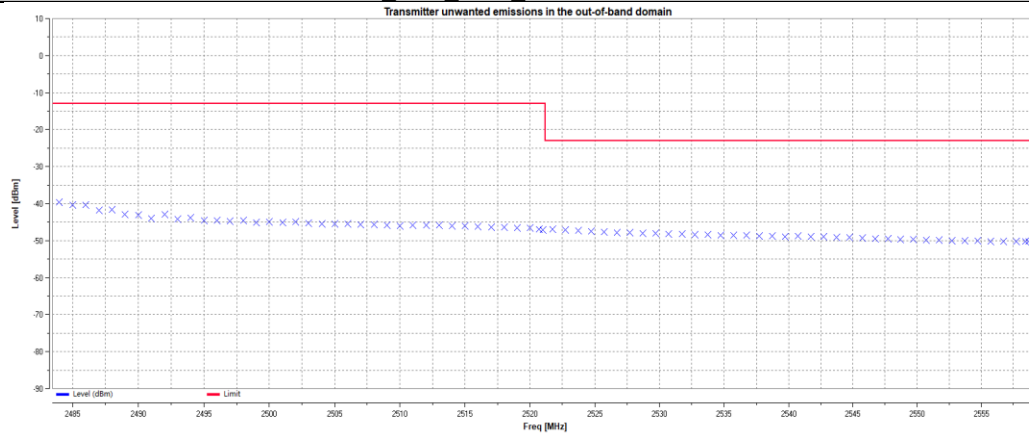
11AX40MIMO_Ant2_2422_2400MHz-2BW to 2400MHz



11AX40MIMO_Ant2_2422_2483.5MHz to 2483.5MHz+2BW



11AX40MIMO_Ant2_2462_2400MHz-2BW to 2400MHz



11AX40MIMO_Ant2_2462_2483.5MHz to 2483.5MHz+2BW

8.5. APPENDIX E: TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

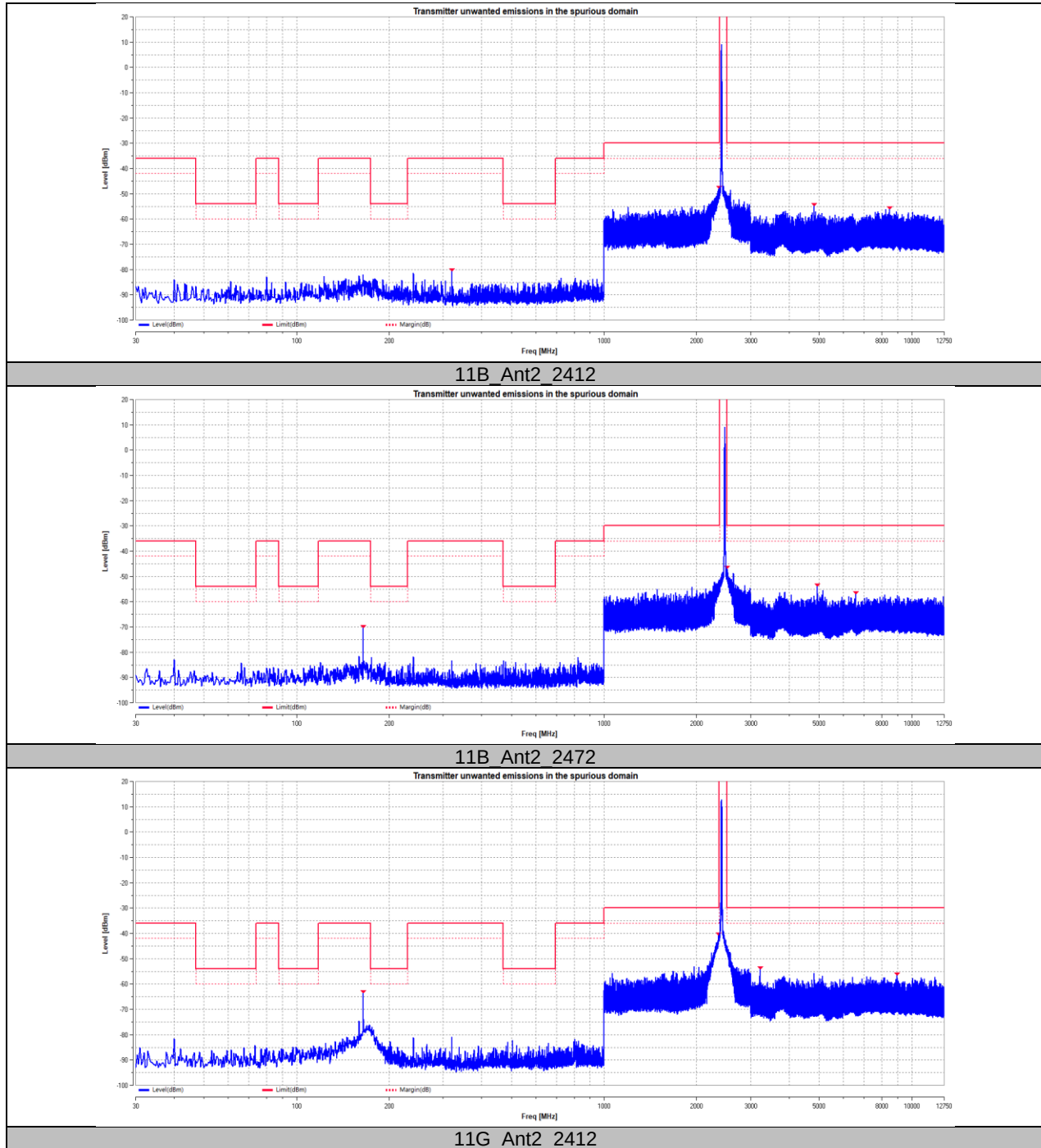
8.5.1. Test Result-Pre-scan

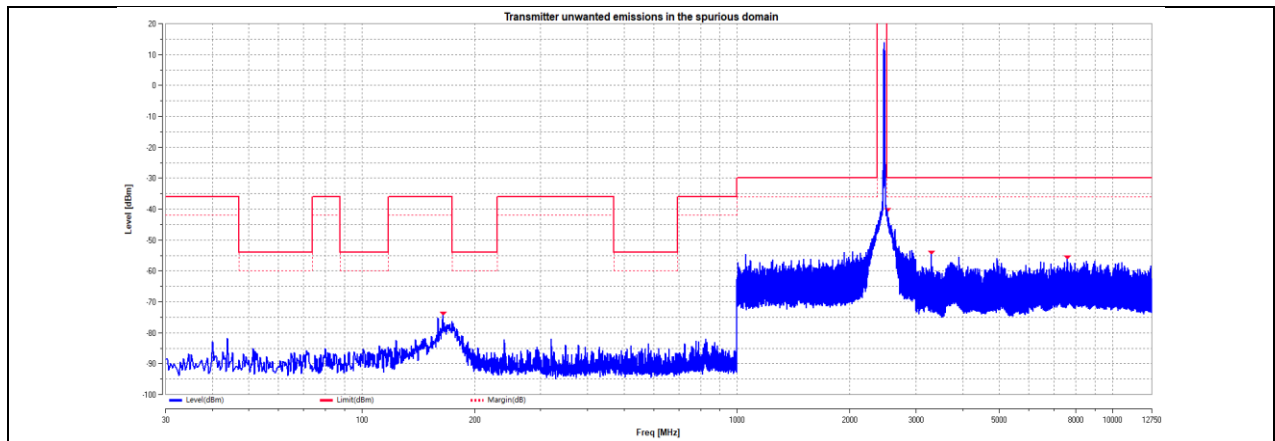
Test Mode	Antenna	Frequency[MHz]	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
11B	Ant2	2412	320.03	-80.81	-36	PASS
			2369.33	-48.01	-30	PASS
			4824.3	-54.79	-30	PASS
			8501.61	-56.11	-30	PASS
		2472	164.83	-70.54	-36	PASS
			2509.33	-46.91	-30	PASS
			4944	-53.99	-30	PASS
			6591.95	-57.12	-30	PASS
11G	Ant2	2412	164.83	-63.62	-36	PASS
			2359	-40.83	-30	PASS
			3216	-54.22	-30	PASS
			8968.24	-56.66	-30	PASS
		2472	164.83	-74.44	-36	PASS
			2518.33	-40.84	-30	PASS
			3296.1	-54.68	-30	PASS
			7586.54	-56.28	-30	PASS
11N20MIMO	Ant2	2412	164.83	-59.76	-39.01	PASS
			2362.67	-39.71	-33.01	PASS
			3215.7	-54.16	-33.01	PASS
			8944.47	-56.35	-33.01	PASS
		2472	164.83	-61.06	-39.01	PASS
			2521.33	-36.86	-33.01	See table below
			3296.1	-54.11	-33.01	PASS
			7046.25	-57.12	-33.01	PASS
11N40MIMO	Ant2	2422	30	-63.37	-39.01	PASS
			2322.33	-44.1	-33.01	PASS
			3229.2	-54.13	-33.01	PASS
			8892.23	-56.24	-33.01	PASS
		2462	30	-64.89	-39.01	PASS
			2568.67	-45.16	-33.01	PASS
			3282.6	-53.14	-33.01	PASS
			6564.95	-56.13	-33.01	PASS
11AX20MIMO	Ant2	2412	159.98	-73.14	-39.01	PASS
			2360.33	-39.33	-33.01	PASS
			3216.3	-55.34	-33.01	PASS
			7631.15	-56.26	-33.01	PASS
		2472	164.83	-62.21	-39.01	PASS
			2522.67	-38.96	-33.01	See table below
			3749.4	-55.64	-33.01	PASS
			9760.92	-57.05	-33.01	PASS
11AX40MIMO	Ant2	2422	165.48	-58.99	-39.01	PASS
			2323.67	-44.82	-33.01	PASS
			3229.5	-52.37	-33.01	PASS
			6458.12	-56.26	-33.01	PASS
		2462	30	-64.15	-39.01	PASS
			2559.33	-46.66	-33.01	PASS
			3282.3	-55.04	-33.01	PASS
			9272.58	-57.5	-33.01	PASS

8.5.2. Test Result- Emissions identified during the pre-scan

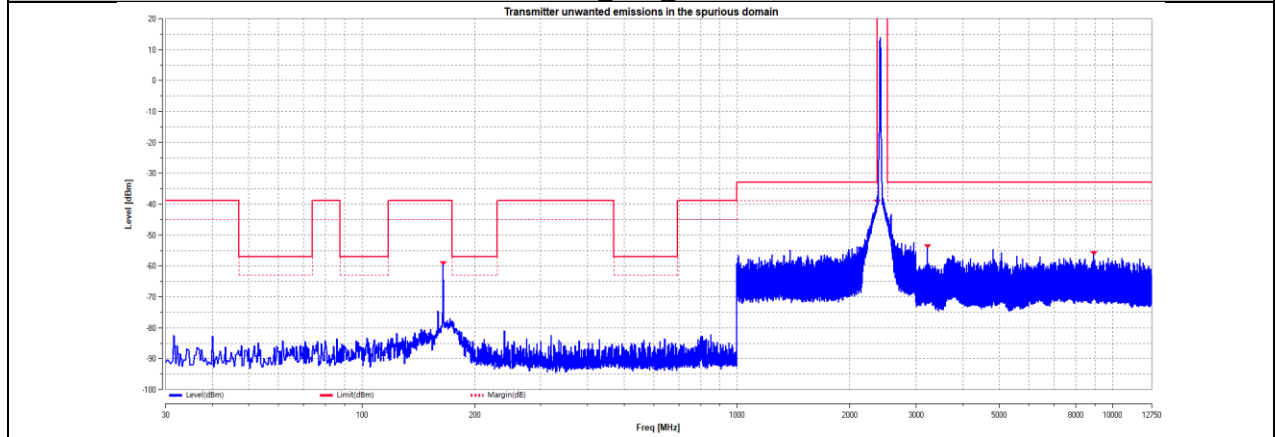
Test Mode	Antenna	Frequency[MHz]	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
11N20MIMO	total	2472	2521.33	-45.69	-30	PASS
11AX20MIMO	total	2472	2522.67	-47.63	-30	PASS

8.5.3. Test Graphs-Pre-scan

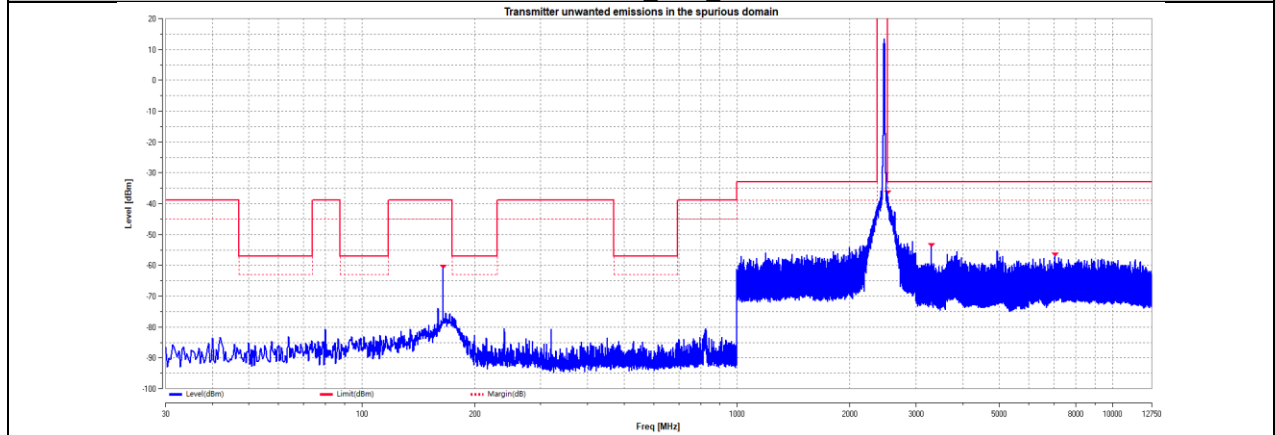




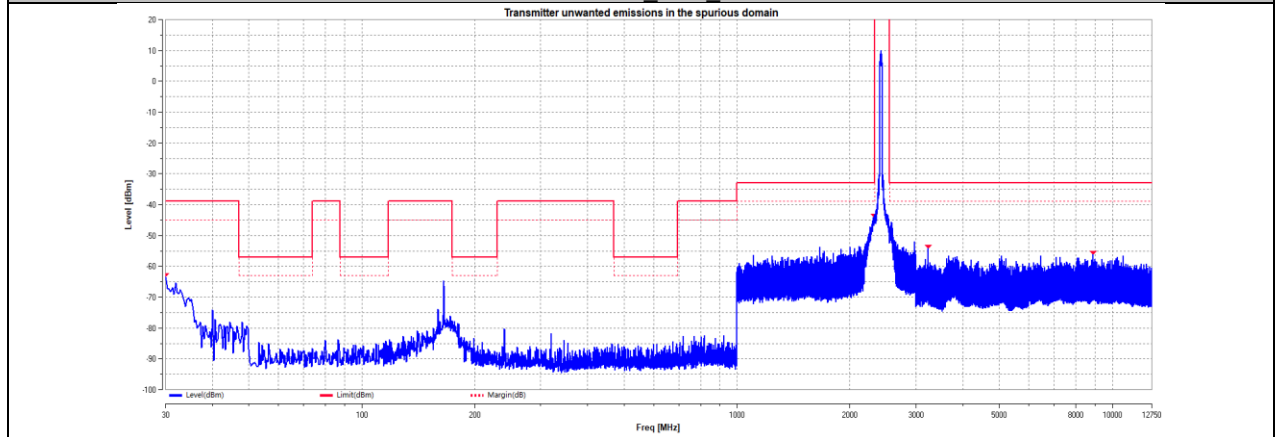
11G Ant2 2472



11N20MIMO Ant2 2412

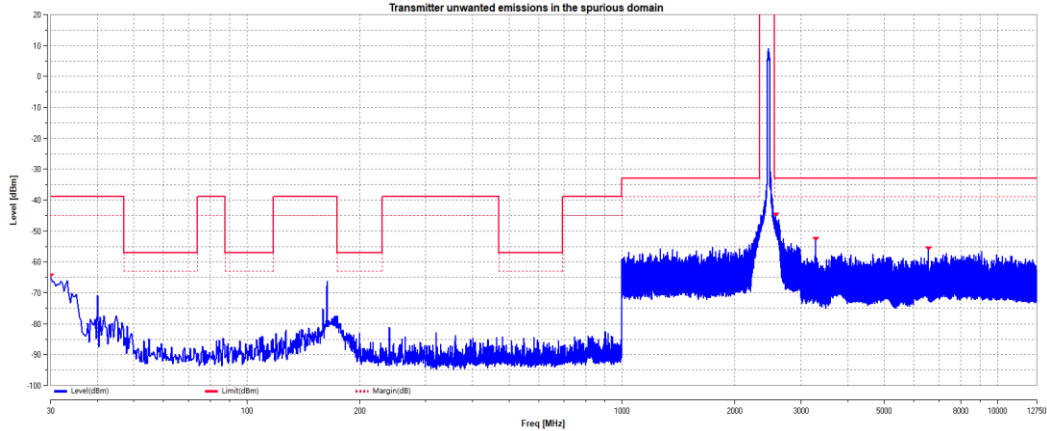


11N20MIMO Ant2 2472



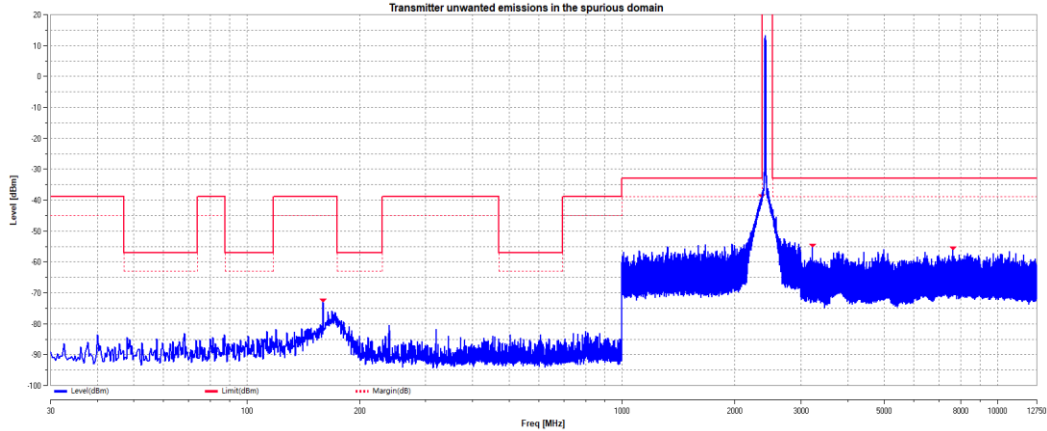
11N40MIMO_Ant2_2422

Transmitter unwanted emissions in the spurious domain



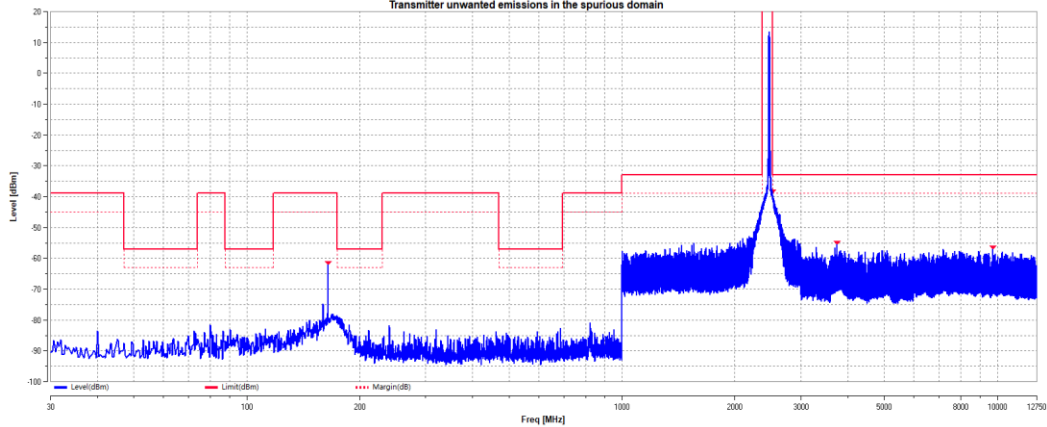
11N40MIMO_Ant2_2462

Transmitter unwanted emissions in the spurious domain

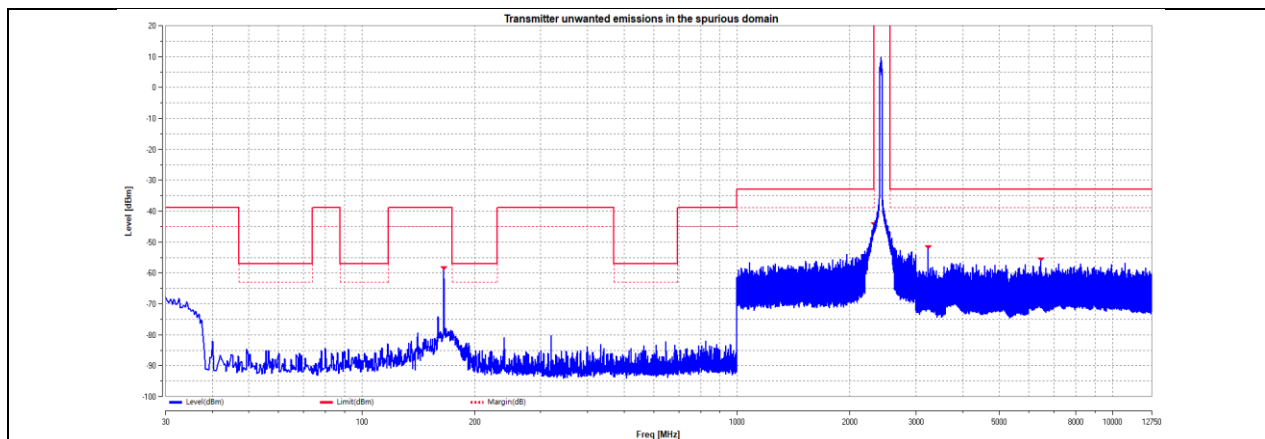


11AX20MIMO_Ant2_2412

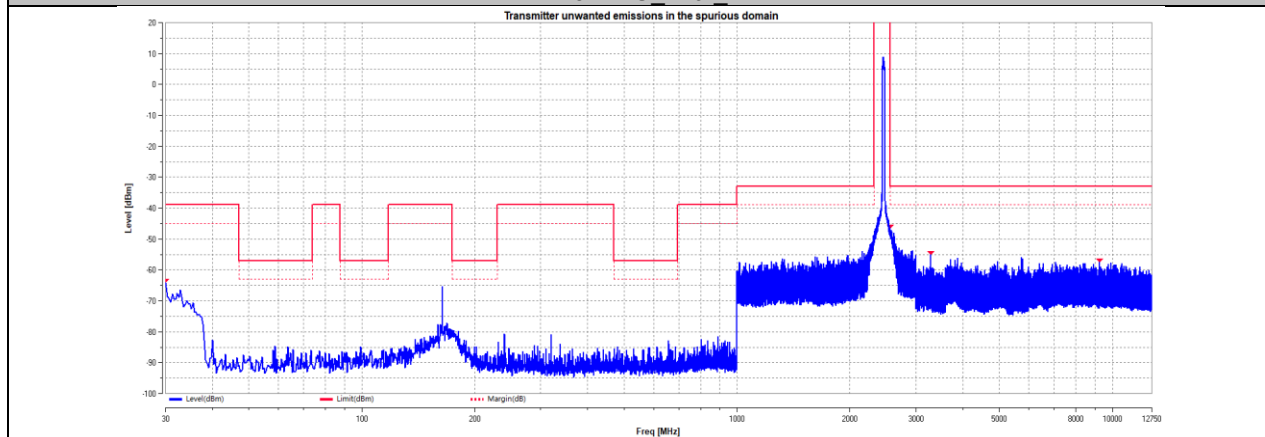
Transmitter unwanted emissions in the spurious domain



11AX20MIMO_Ant2_2472

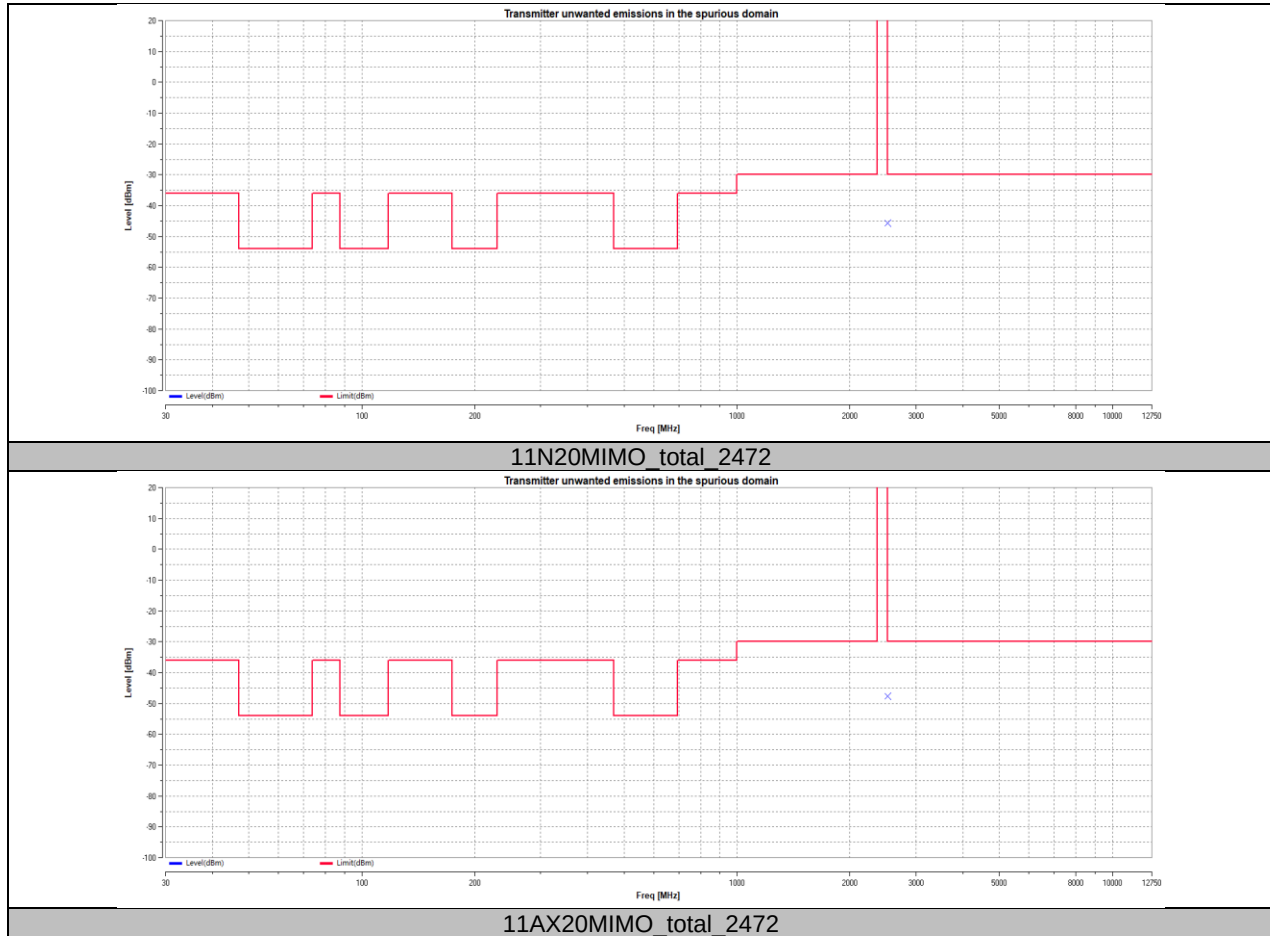


11AX40MIMO_Ant2_2422



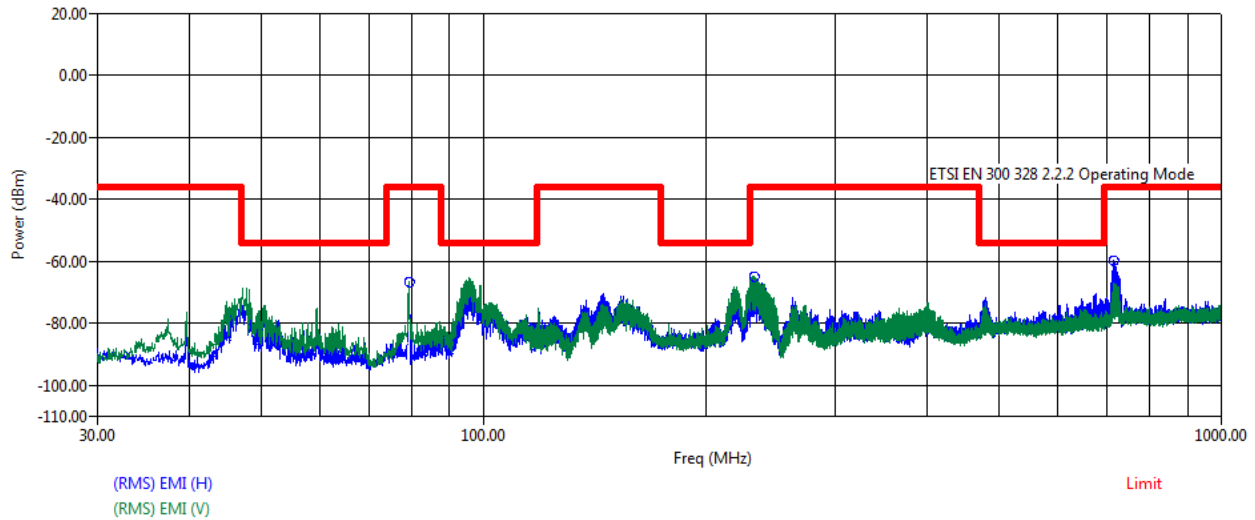
11AX40MIMO_Ant2_2462

8.5.4. Test Graphs- Emissions identified during the pre-scan



8.5.5. TX Radiated Test Result

Transmitter unwanted emissions in the spurious domain 30 MHz ~ 1 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11b SISO	Test Channel:	CH 1



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
79.25	59.61	-86.81	0.00	1.12	43.00	-69.08	-36.00	-33.08
232.80	58.58	-86.60	0.00	2.05	43.07	-69.04	-36.00	-33.04
715.00	56.56	-77.21	0.00	3.61	42.75	-59.79	-36.00	-23.79
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
79.25	62.96	-87.41	0.00	1.12	43.00	-66.32	-36.00	-30.32
232.80	62.92	-86.61	0.00	2.05	43.07	-64.71	-36.00	-28.71
715.00	47.26	-76.64	0.00	3.61	42.75	-68.52	-36.00	-32.52

Note:

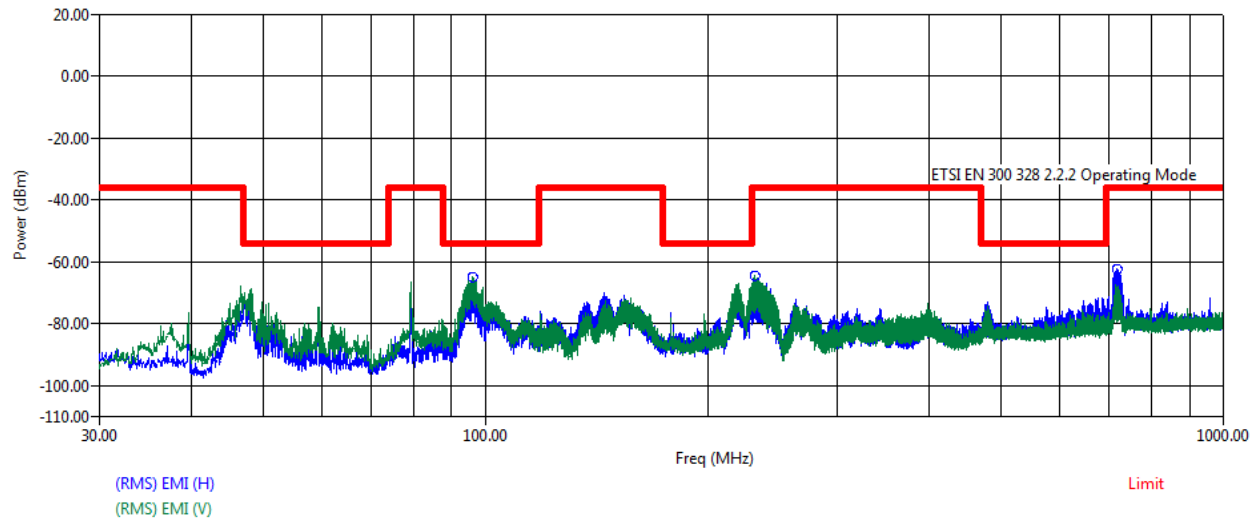
(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Premp (H)

(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Premp (V)

(RMS) Margin (H) = (RMS) EMI (H) – Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Transmitter unwanted emissions in the spurious domain 30 MHz ~ 1 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11b SISO	Test Channel:	CH 13



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
96.15	58.15	-87.28	0.00	1.27	43.00	-70.87	-54.00	-16.87
231.60	57.36	-86.48	0.00	2.03	43.07	-70.15	-36.00	-34.15
717.80	53.82	-77.09	0.00	3.63	42.75	-62.38	-36.00	-26.38
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
96.15	63.92	-86.96	0.00	1.27	43.00	-64.77	-54.00	-10.77
231.60	63.06	-86.50	0.00	2.03	43.07	-64.48	-36.00	-28.48
717.80	47.01	-76.47	0.00	3.63	42.75	-68.57	-36.00	-32.57

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamp (H)

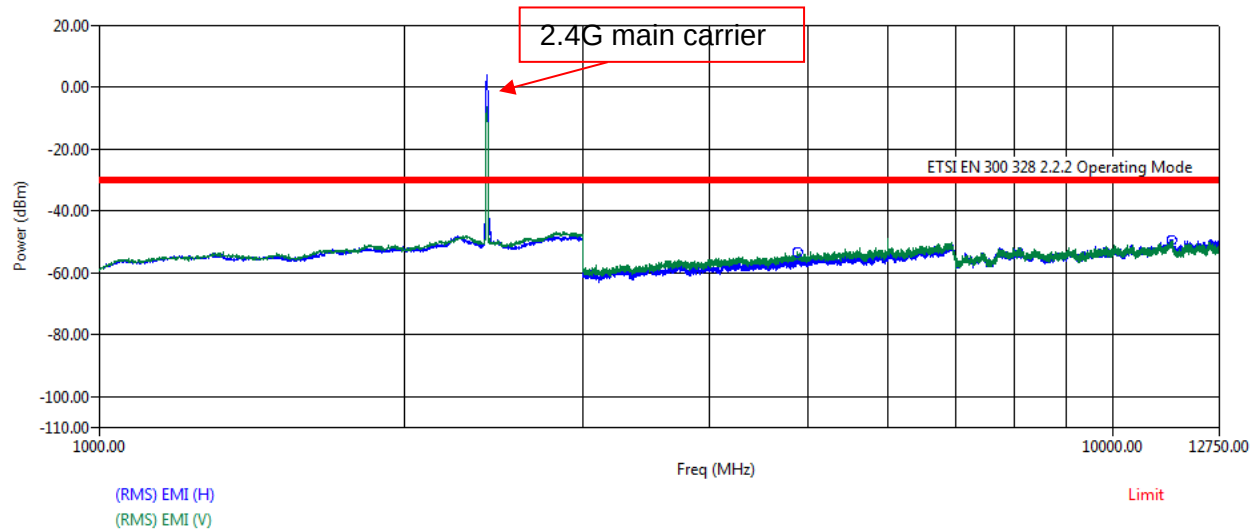
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamp (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note All the modes and antennas had been tested, but only the worst data was recorded in the report.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11b SISO	Test Channel:	CH 1



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
4884.50	37.88	-61.65	0.00	10.52	43.41	-56.66	-30.00	-26.66
11436.50	32.65	-56.22	0.00	16.44	42.02	-49.14	-30.00	-19.14
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
4884.50	39.73	-59.81	0.00	10.52	43.41	-52.97	-30.00	-22.97
11436.50	30.98	-56.73	0.00	16.44	42.02	-51.33	-30.00	-21.33

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

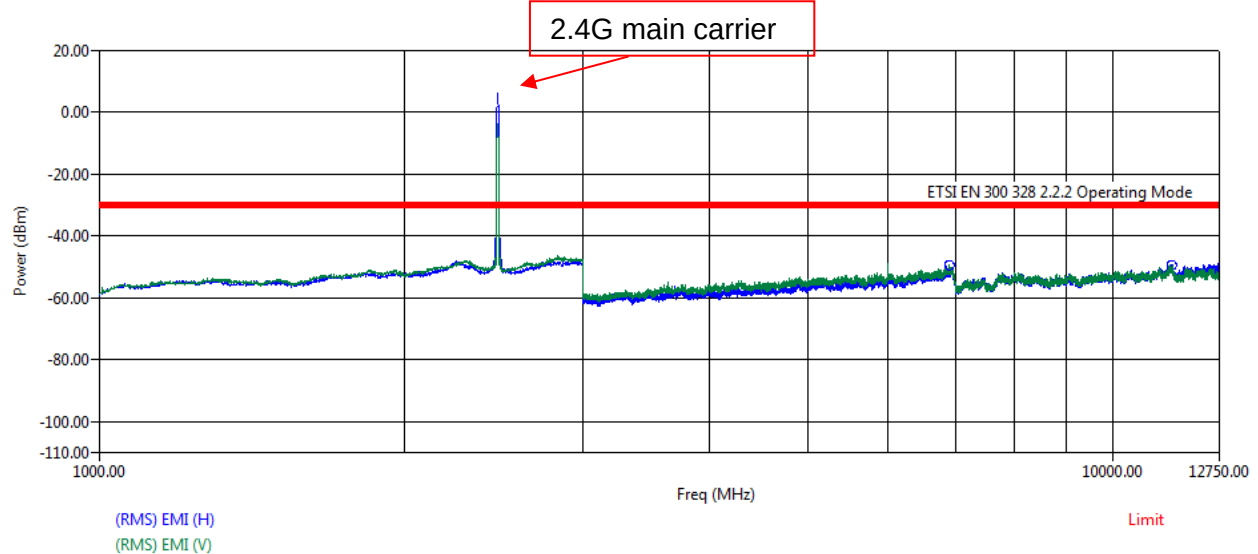
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11b SISO	Test Channel:	CH 13



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6900.00	36.72	-58.73	0.00	12.22	41.69	-51.48	-30.00	-21.48
11450.50	32.38	-55.96	0.00	16.41	42.02	-49.18	-30.00	-19.18
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6900.00	38.43	-58.23	0.00	12.22	41.69	-49.28	-30.00	-19.28
11450.50	30.97	-56.46	0.00	16.41	42.02	-51.10	-30.00	-21.10

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Premp (H)

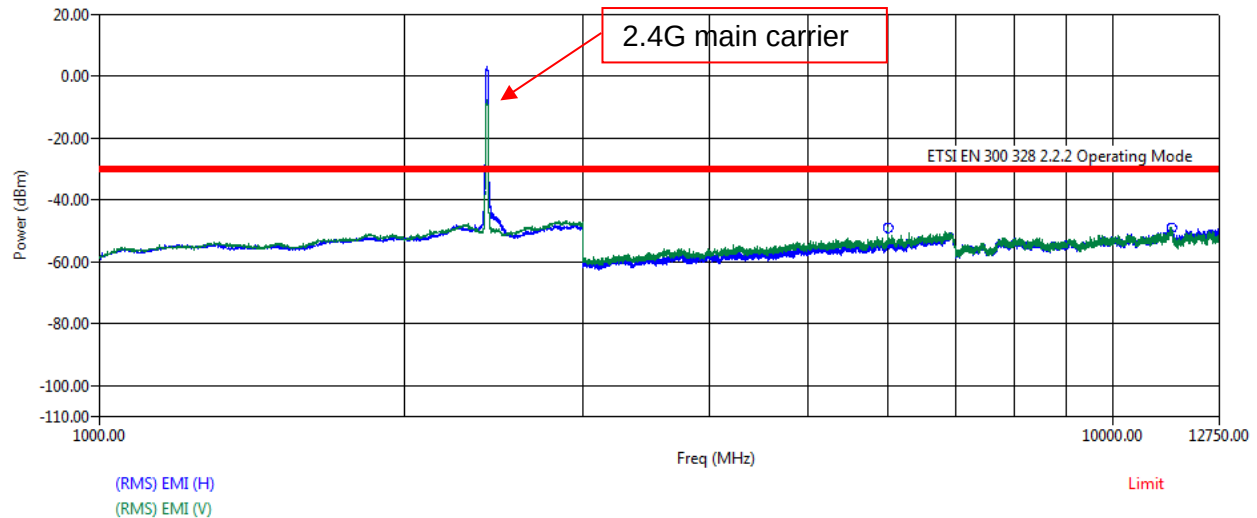
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Premp (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11g SISO	Test Channel:	CH 1



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6000.00	40.19	-60.88	0.00	11.59	42.60	-51.70	-30.00	-21.70
11431.00	32.96	-56.33	0.00	16.46	42.02	-48.94	-30.00	-18.94
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6000.00	41.45	-59.45	0.00	11.59	42.60	-49.01	-30.00	-19.01
11431.00	30.79	-56.86	0.00	16.46	42.02	-51.64	-30.00	-21.64

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Premp (H)

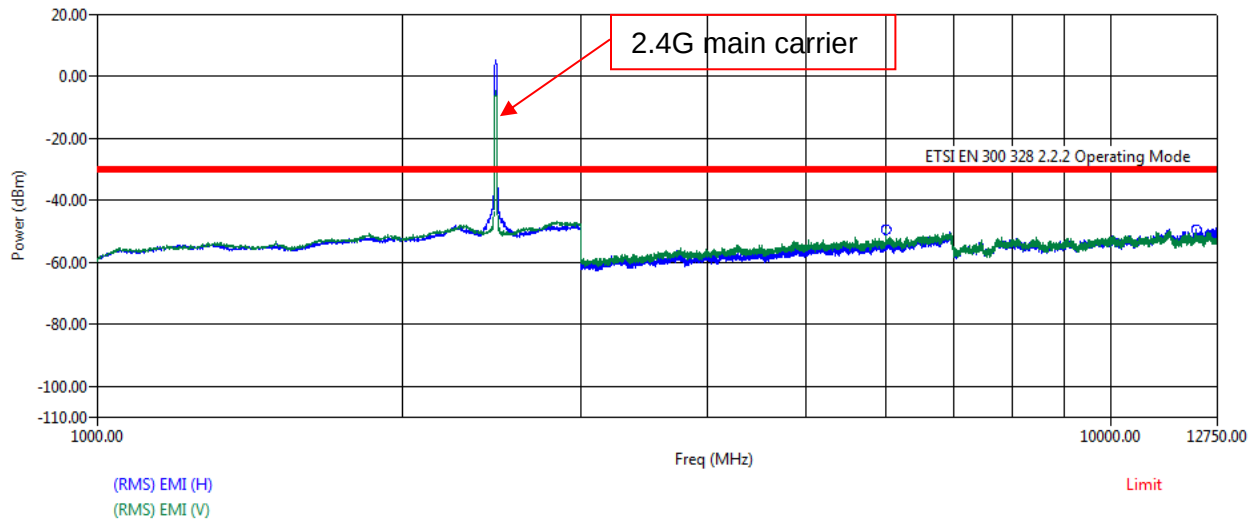
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Premp (V)

(RMS) Margin (H) = (RMS) EMI (H) – Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11g SISO	Test Channel:	CH 13



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6000.00	39.14	-60.88	0.00	11.59	42.60	-52.75	-30.00	-22.75
12153.00	33.69	-57.92	0.00	16.71	41.72	-49.23	-30.00	-19.23
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6000.00	41.17	-59.45	0.00	11.59	42.60	-49.29	-30.00	-19.29
12153.00	31.23	-58.67	0.00	16.71	41.72	-52.45	-30.00	-22.45

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

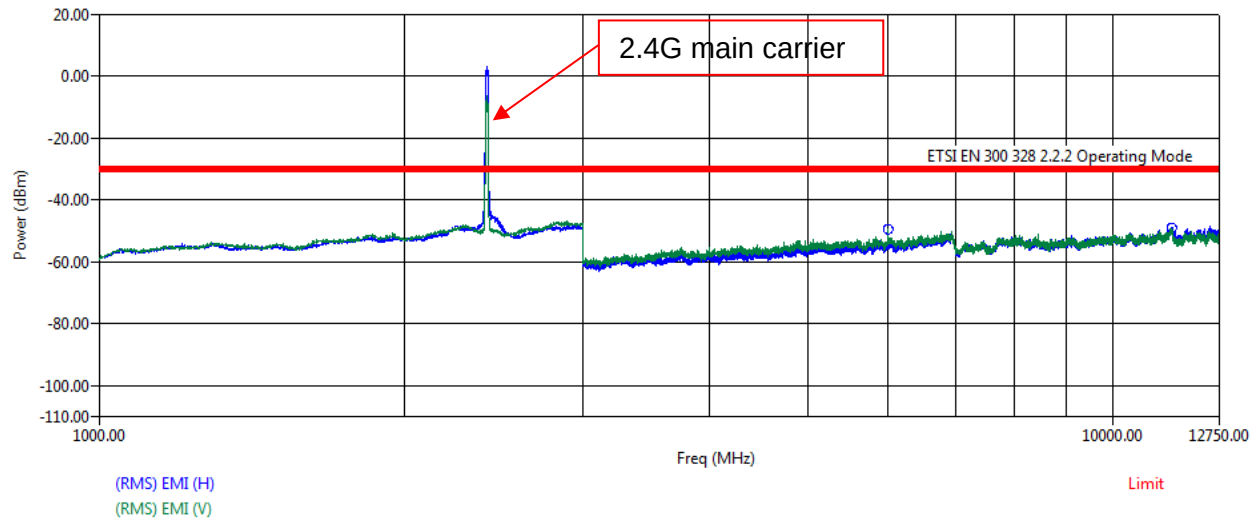
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11n HT20 MIMO	Test Channel:	CH 1



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6000.00	39.20	-60.88	0.00	11.59	42.60	-52.69	-30.00	-22.69
11421.00	33.24	-56.54	0.00	16.48	42.03	-48.85	-30.00	-18.85
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6000.00	40.96	-59.45	0.00	11.59	42.60	-49.50	-30.00	-19.50
11421.00	31.60	-57.08	0.00	16.48	42.03	-51.04	-30.00	-21.04

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

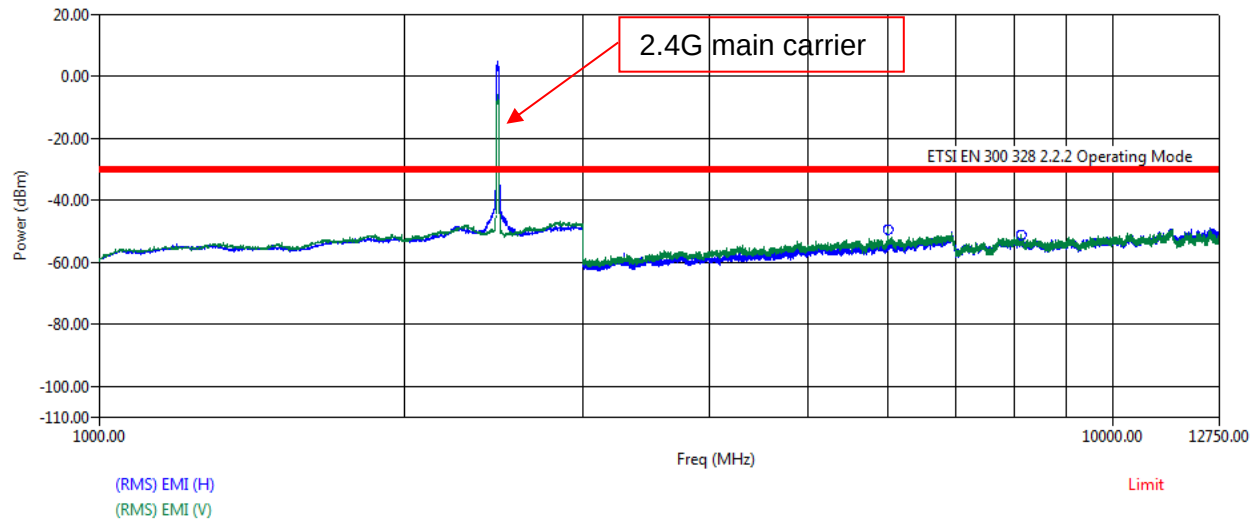
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11n HT20 MIMO	Test Channel:	CH 13



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6000.00	38.59	-60.88	0.00	11.59	42.60	-53.30	-30.00	-23.30
8112.50	32.76	-60.21	0.00	13.76	40.81	-54.51	-30.00	-24.51
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6000.00	41.31	-59.45	0.00	11.59	42.60	-49.15	-30.00	-19.15
8112.50	35.83	-59.75	0.00	13.76	40.81	-50.98	-30.00	-20.98

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

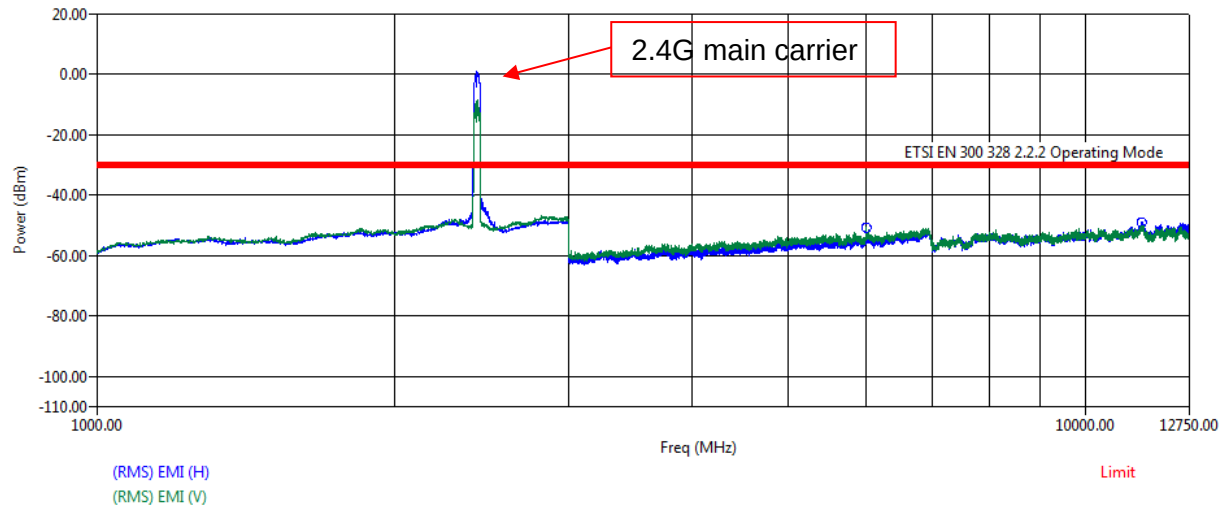
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11n HT40 MIMO	Test Channel:	CH 3



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
5999.50	37.65	-60.88	0.00	11.59	42.60	-54.24	-30.00	-24.24
11400.00	33.81	-56.99	0.00	16.53	42.04	-48.69	-30.00	-18.69
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
5999.50	39.87	-59.45	0.00	11.59	42.60	-50.59	-30.00	-20.59
11400.00	31.11	-57.56	0.00	16.53	42.04	-51.95	-30.00	-21.95

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

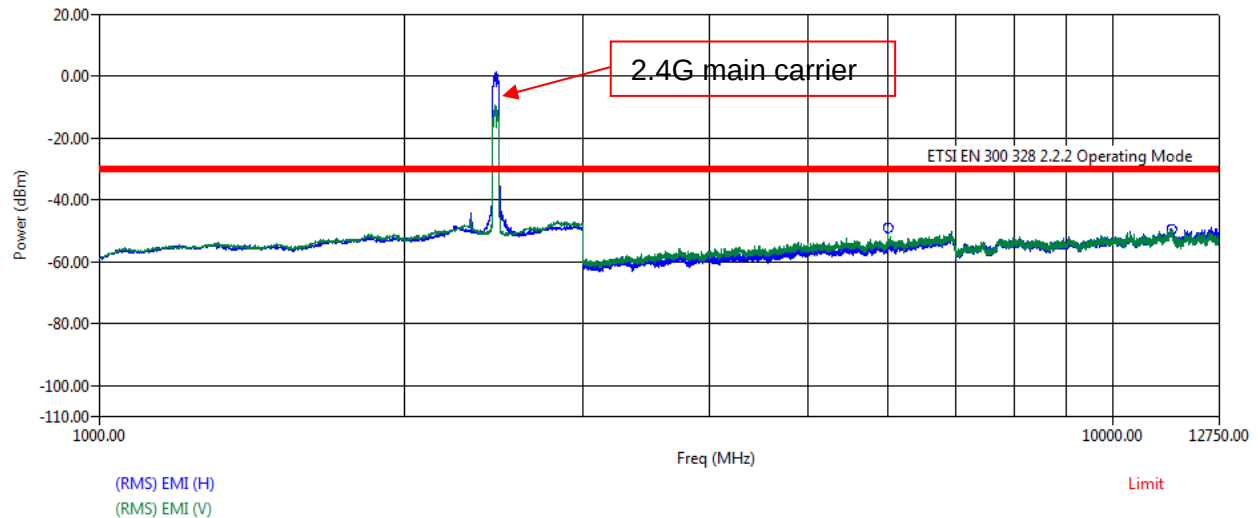
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) – Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11n HT40 MIMO	Test Channel:	CH 11



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6000.00	40.12	-60.88	0.00	11.59	42.60	-51.77	-30.00	-21.77
11445.00	32.40	-56.04	0.00	16.42	42.02	-49.23	-30.00	-19.23
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6000.00	41.58	-59.45	0.00	11.59	42.60	-48.88	-30.00	-18.88
11445.00	31.07	-56.54	0.00	16.42	42.02	-51.07	-30.00	-21.07

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

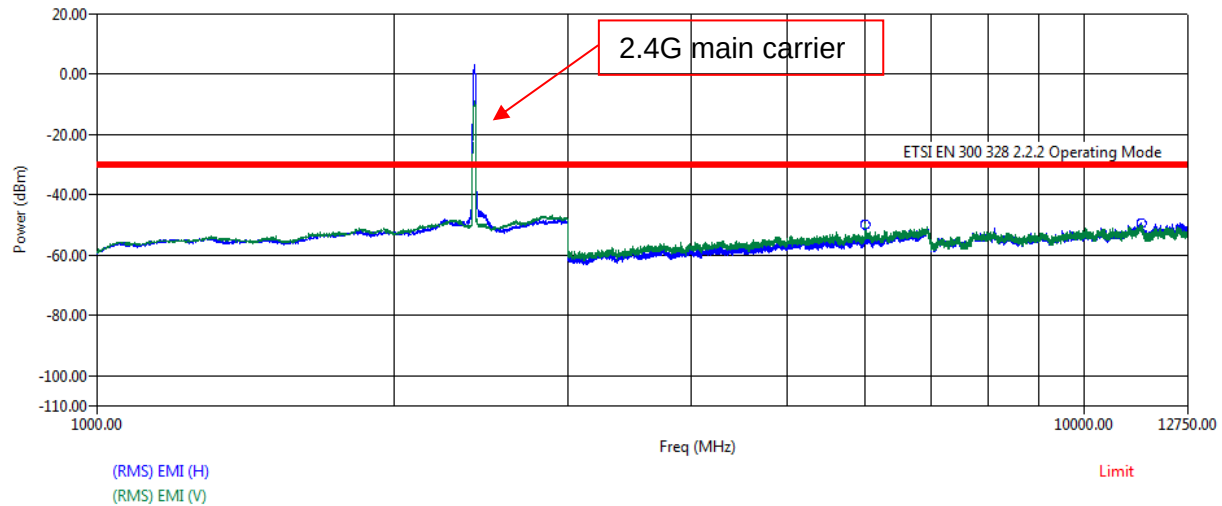
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11ax HE20 MIMO	Test Channel:	CH 1



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
5999.50	38.14	-60.88	0.00	11.59	42.60	-53.75	-30.00	-23.75
11436.00	32.52	-56.23	0.00	16.44	42.02	-49.28	-30.00	-19.28
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
5999.50	40.58	-59.45	0.00	11.59	42.60	-49.89	-30.00	-19.89
11436.00	30.82	-56.75	0.00	16.44	42.02	-51.50	-30.00	-21.50

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Premp (H)

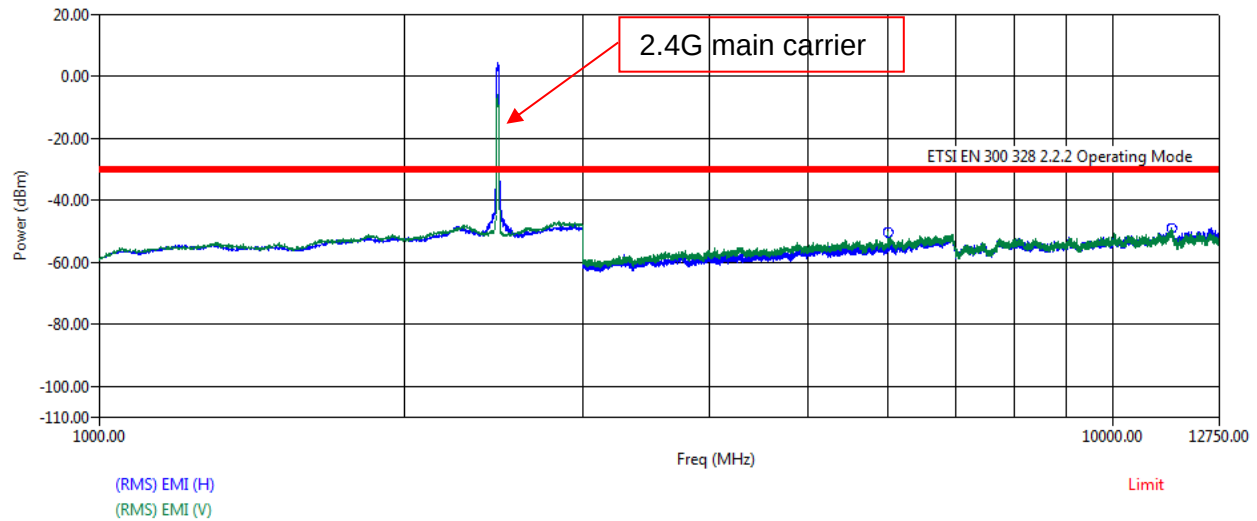
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Premp (V)

(RMS) Margin (H) = (RMS) EMI (H) – Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11ax HE20 MIMO	Test Channel:	CH 13



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6000.00	38.70	-60.88	0.00	11.59	42.60	-53.19	-30.00	-23.19
11450.50	32.53	-55.96	0.00	16.41	42.02	-49.03	-30.00	-19.03
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6000.00	40.09	-59.45	0.00	11.59	42.60	-50.37	-30.00	-20.37
11450.50	30.95	-56.46	0.00	16.41	42.02	-51.12	-30.00	-21.12

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

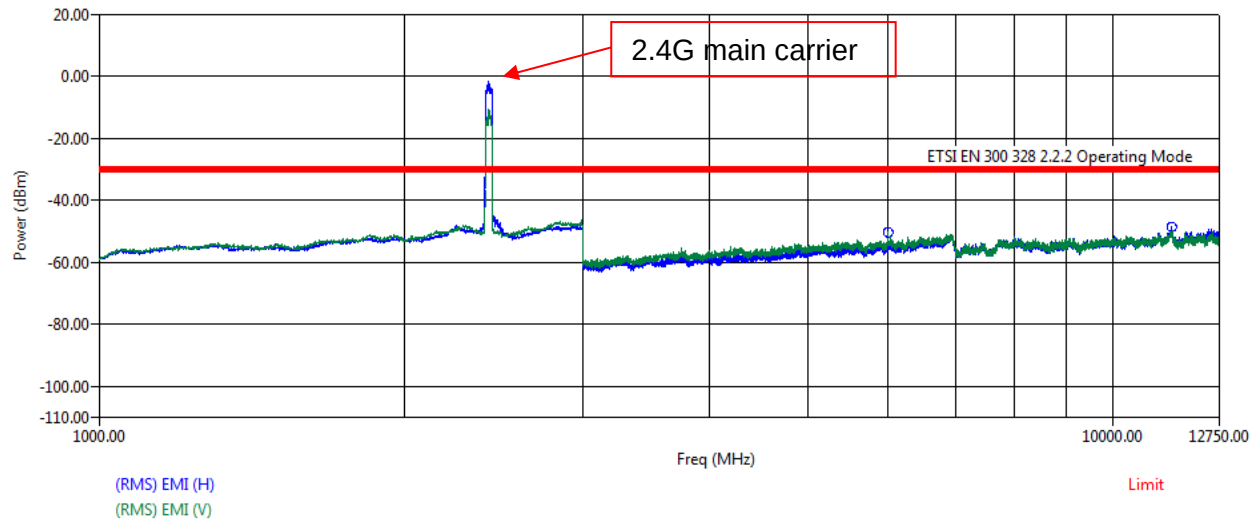
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11ax HE40 MIMO	Test Channel:	CH 3



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamplifier (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
5999.50	37.50	-60.88	0.00	11.59	42.60	-54.38	-30.00	-24.38
11437.50	33.25	-56.19	0.00	16.44	42.02	-48.53	-30.00	-18.53
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamplifier (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
5999.50	40.36	-59.45	0.00	11.59	42.60	-50.10	-30.00	-20.10
11437.50	31.08	-56.71	0.00	16.44	42.02	-51.22	-30.00	-21.22

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamplifier (H)

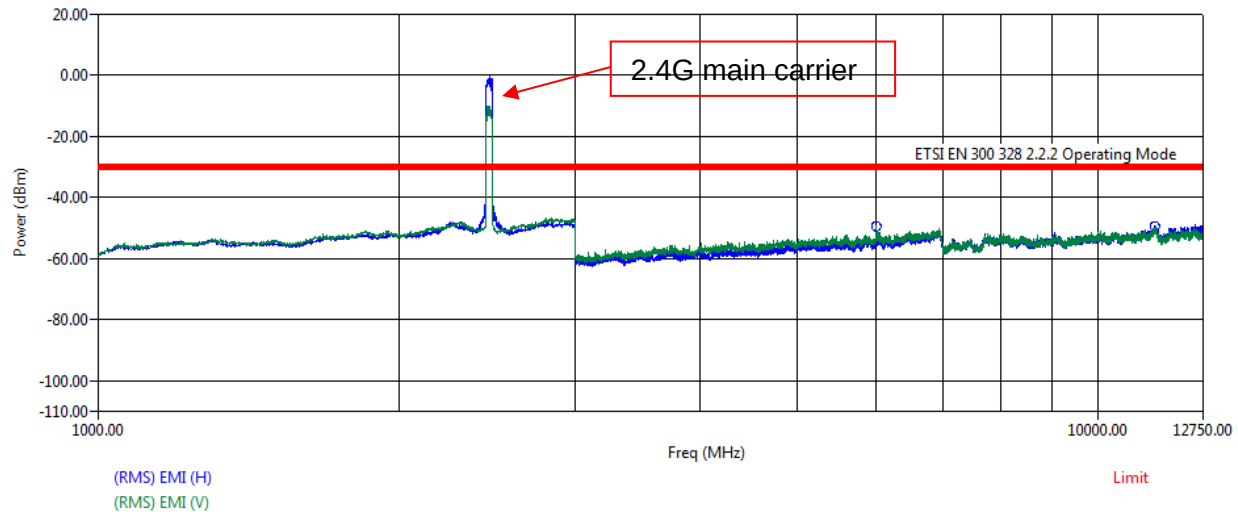
(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamplifier (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note: 2.4G main carrier was recorded in the plot.

Transmitter unwanted emissions in the spurious domain 1 GHz ~ 12.75 GHz			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11ax HE40 MIMO	Test Channel:	CH 11



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
6000.00	38.56	-60.88	0.00	11.59	42.60	-53.33	-30.00	-23.33
11391.50	33.39	-57.08	0.00	16.56	42.04	-49.16	-30.00	-19.16
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
6000.00	41.09	-59.45	0.00	11.59	42.60	-49.37	-30.00	-19.37
11391.50	31.16	-57.64	0.00	16.56	42.04	-51.96	-30.00	-21.96

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Premp (H)

(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Premp (V)

(RMS) Margin (H) = (RMS) EMI (H) – Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

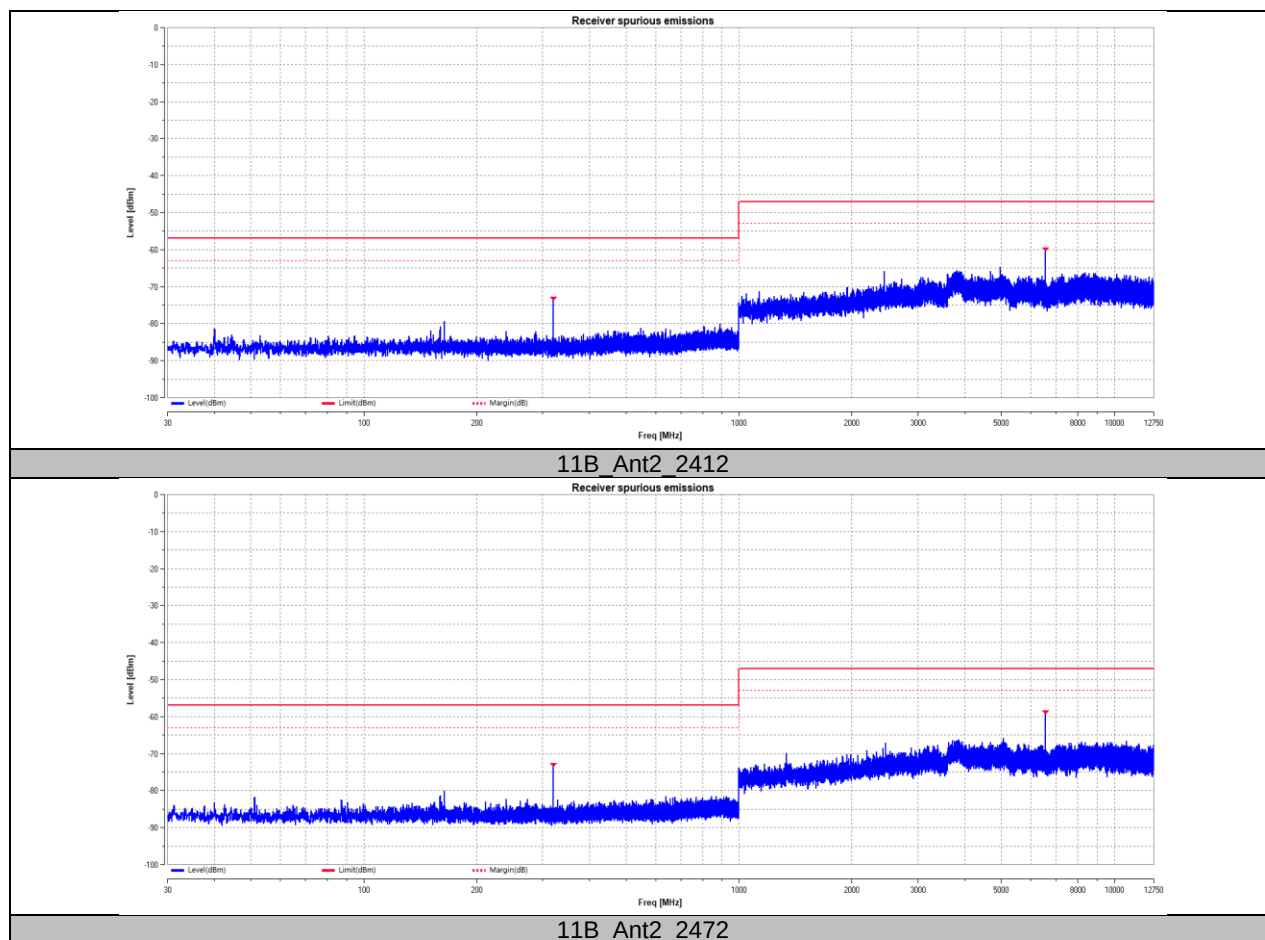
Note: 2.4G main carrier was recorded in the plot.

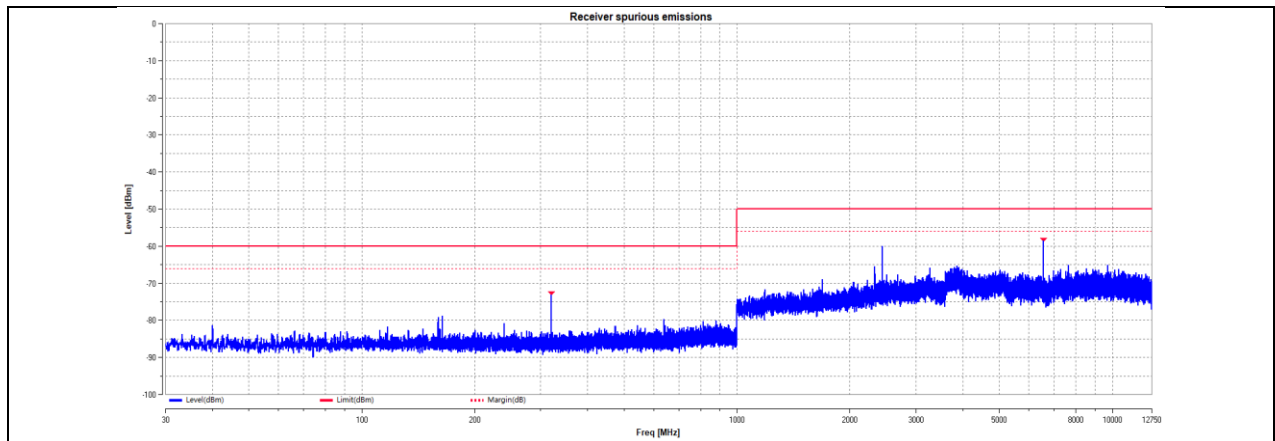
8.6. APPENDIX F: RECEIVER SPURIOUS EMISSIONS

8.6.1. Test Result-Pre-scan

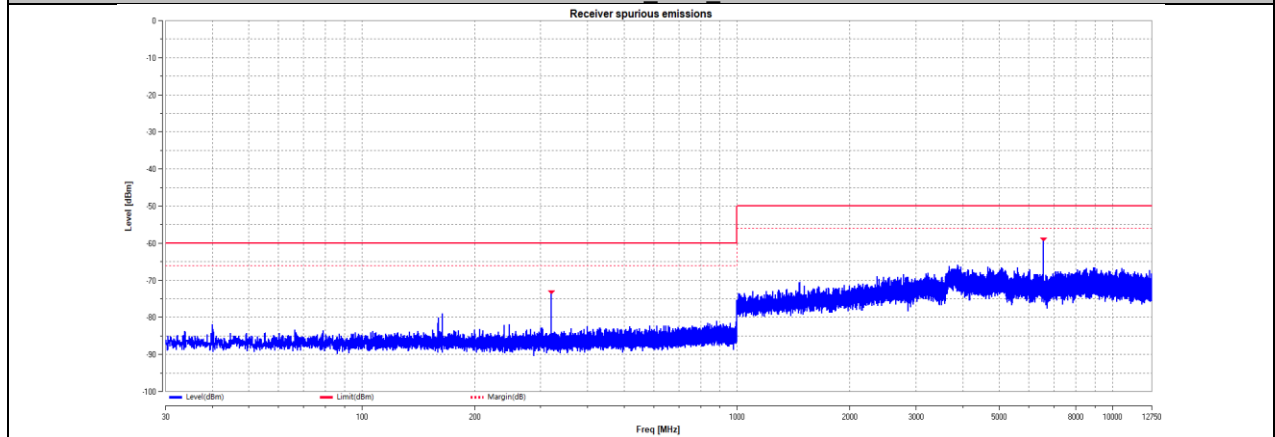
Test Mode	Antenna	Frequency[MHz]	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
11B	Ant2	2412	320.03	-73.7	-57.00	PASS
			6565.58	-60.38	-47.00	PASS
		2472	320.03	-73.46	-57.00	PASS
			6565.98	-59.37	-47.00	PASS
11N40MIMO	Ant2	2422	320.03	-73.12	-60.01	PASS
			6565.98	-58.67	-50.01	PASS
		2462	320.03	-73.69	-60.01	PASS
			6565.98	-59.41	-50.01	PASS
11AX20MIMO	Ant2	2412	320.03	-72.97	-60.01	PASS
			6565.98	-59.78	-50.01	PASS
		2472	320.03	-75.46	-60.01	PASS
			6565.98	-59.56	-50.01	PASS
11AX40MIMO	Ant2	2422	320.03	-75.5	-60.01	PASS
			6565.98	-59.64	-50.01	PASS
		2462	320.03	-75.74	-60.01	PASS
			6565.98	-58.96	-50.01	PASS

8.6.2. Test Graphs-Pre-scan

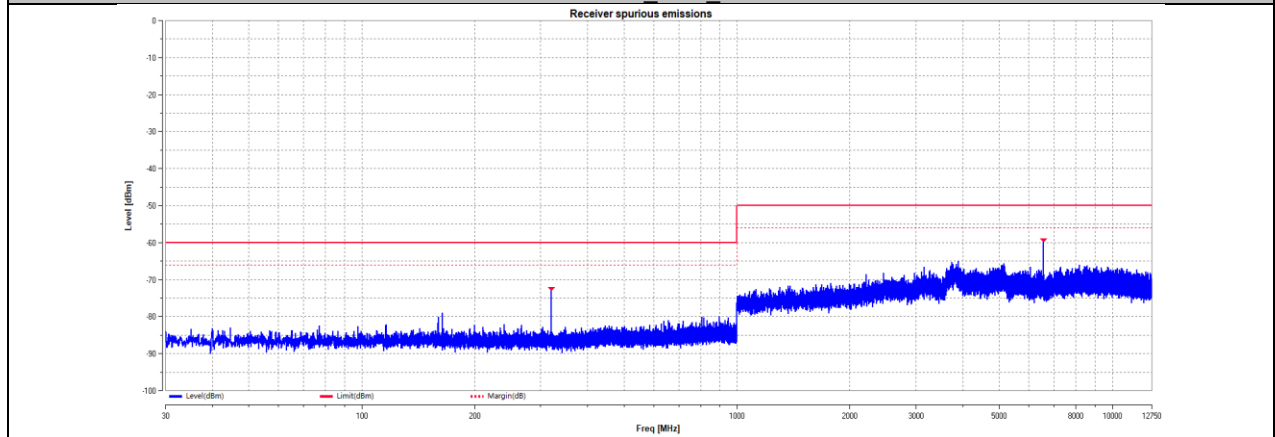




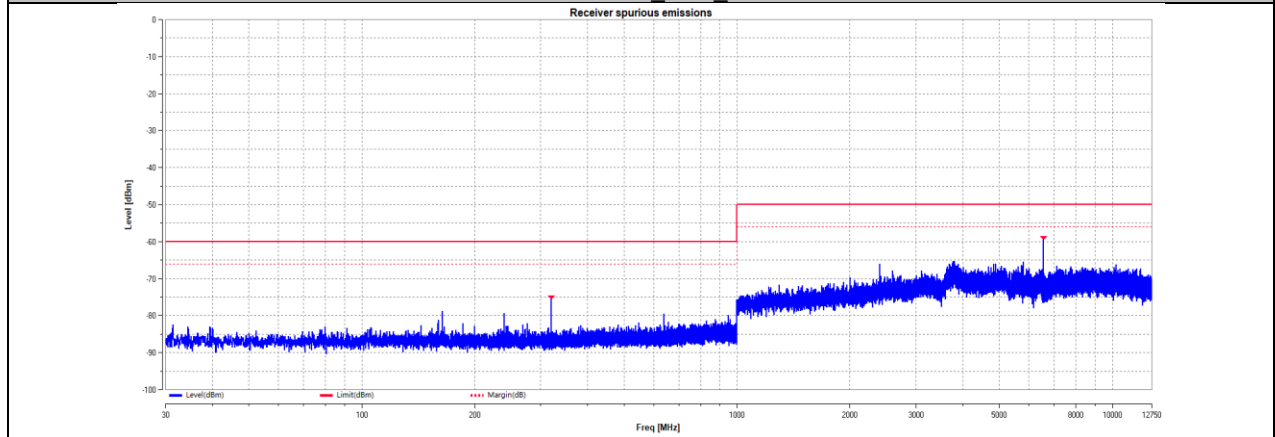
11N40MIMO_Ant2_2422

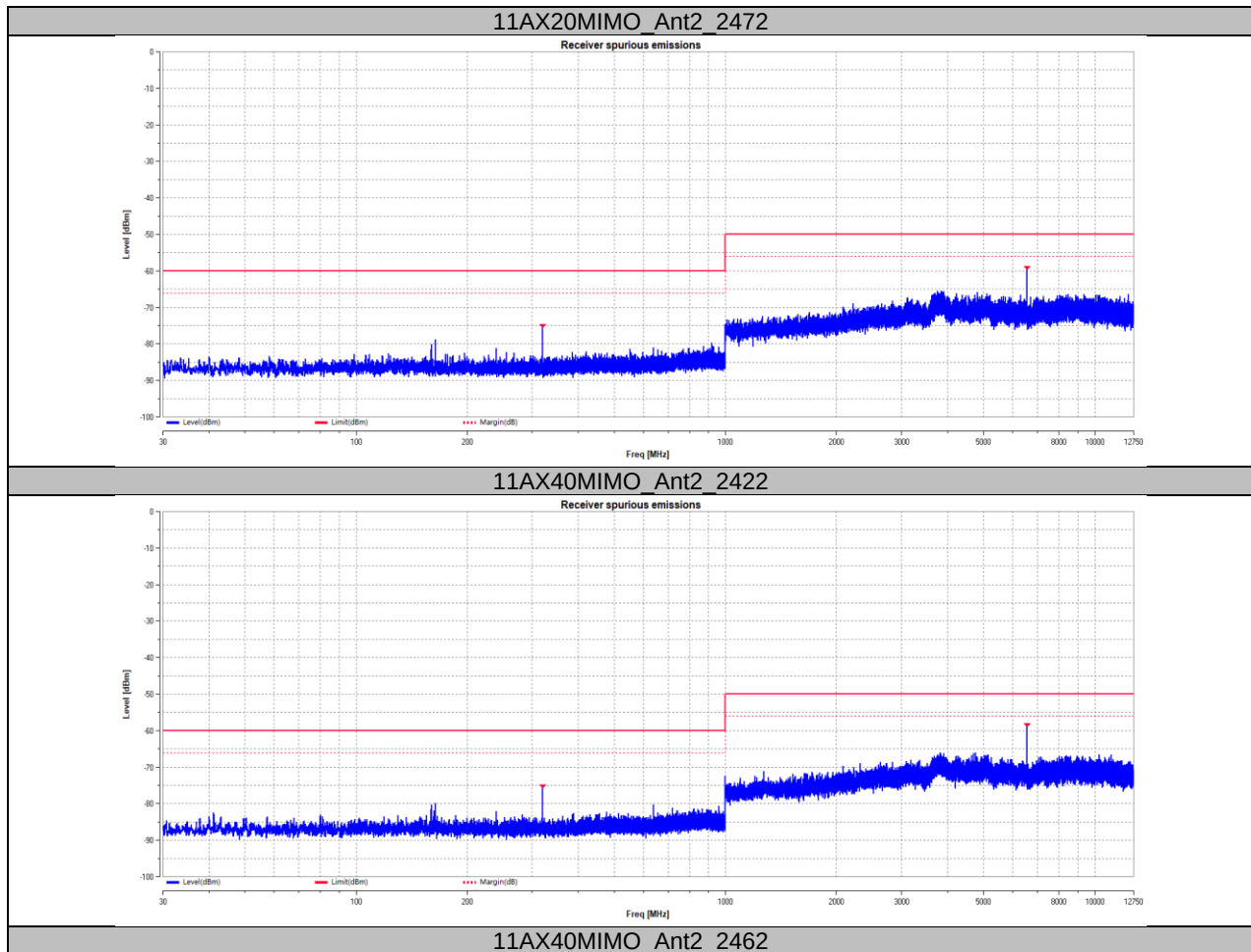


11N40MIMO_Ant2_2462



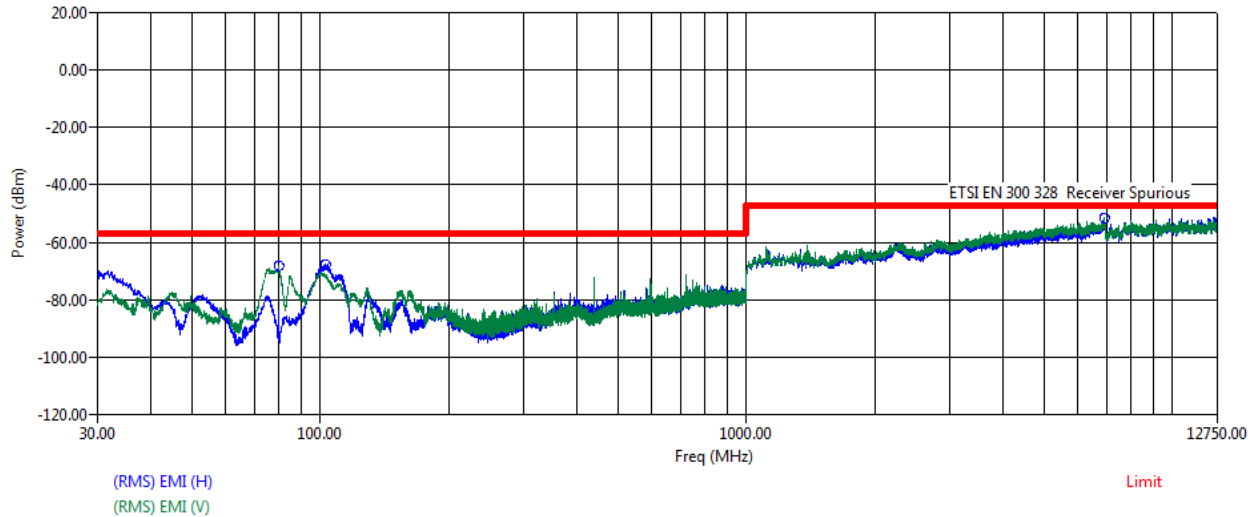
11AX20MIMO_Ant2_2412





8.6.3. RX Radiated Test Result

Receiver spurious emissions above 1 GHz worst case			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11b SISO	Test Channel:	CH 1



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
80.00	44.80	-86.76	0.00	1.13	43.00	-83.83	-57.00	-26.83
102.65	60.20	-86.17	0.00	1.28	43.00	-67.69	-57.00	-10.69
6919.50	33.95	-58.51	0.00	11.54	41.68	-54.68	-47.00	-7.68
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
80.00	61.32	-87.41	0.00	1.13	43.00	-67.96	-57.00	-10.96
102.65	56.38	-86.25	0.00	1.28	43.00	-71.59	-57.00	-14.59
6919.50	36.83	-58.15	0.00	11.54	41.68	-51.45	-47.00	-4.45

Note:

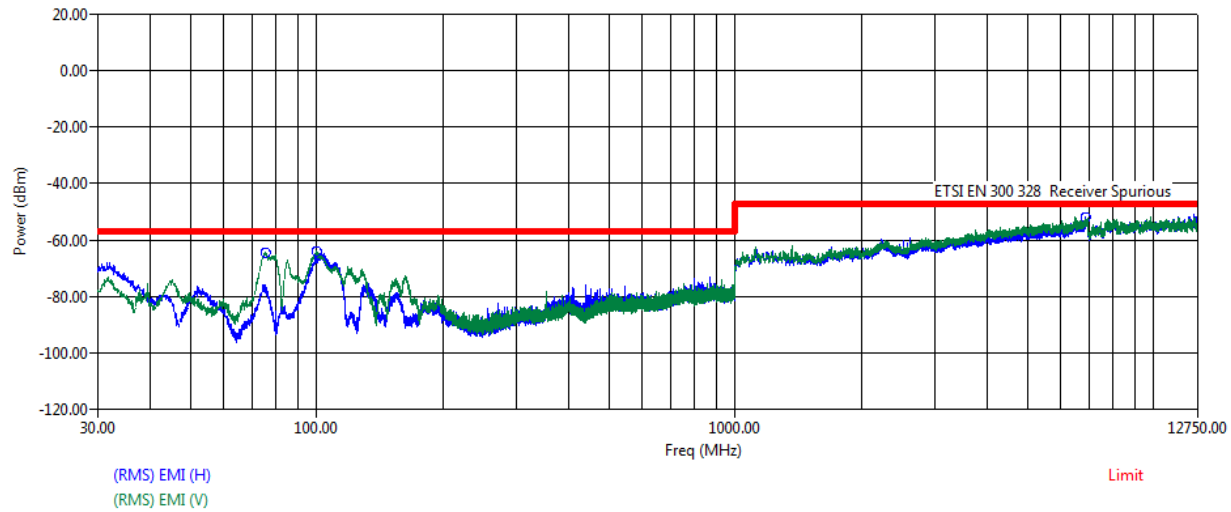
(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Premp (H)

(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Premp (V)

(RMS) Margin (H) = (RMS) EMI (H) - Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Receiver spurious emissions above 1 GHz worst case			
Measurement Method	Radiated	Polar:	Horizontal/Vertical
Test Mode:	802.11b SISO	Test Channel:	CH 13



Freq (MHz)	(RMS) Trace (H) (dBuV)	ERP Factor (H) (dB)	Transducer (H) (dB)	Cable (H) (dB)	Preamp (H) (dB)	(RMS) EMI (H) (dBm)	Limit (dBm)	(RMS) Margin (H) (dB)
75.55	49.77	-87.04	0.00	1.10	43.00	-79.17	-57.00	-22.17
99.65	61.06	-86.70	0.00	1.27	43.00	-67.37	-57.00	-10.37
6886.50	37.13	-58.88	0.00	11.46	41.71	-52.00	-47.00	-5.00
Freq (MHz)	(RMS) Trace (V) (dBuV)	ERP Factor (V) (dB)	Transducer (V) (dB)	Cable (V) (dB)	Preamp (V) (dB)	(RMS) EMI (V) (dBm)	Limit (dBm)	(RMS) Margin (V) (dB)
75.55	64.73	-87.39	0.00	1.10	43.00	-64.57	-57.00	-7.57
99.65	64.06	-86.40	0.00	1.27	43.00	-64.08	-57.00	-7.08
6886.50	33.93	-58.27	0.00	11.46	41.71	-54.60	-47.00	-7.60

Note:

(RMS) EMI (H) = (RMS) Trace (H) + ERP Factor (H) + Transducer (H) + Cable (H) - Preamp (H)

(RMS) EMI (V) = (RMS) Trace (V) + ERP Factor (V) + Transducer (V) + Cable (H) - Preamp (V)

(RMS) Margin (H) = (RMS) EMI (H) – Limit

(RMS) Margin (V) = (RMS) EMI (V) - Limit

Note All the modes and antennas had been tested, but only the worst data was recorded in the report.

8.7. APPENDIX G: RECEIVER BLOCKING

8.7.1. Test Result

Test Mode	Antenna	Channel	Wanted signal [dBm]	Freq. [MHz]	CW [dBm]	PER [%]	Limit [%]	Verdict
11B	Ant1	2412	-71.20	2300	-31.20	1.50	≤10	PASS
			-71.20	2330	-31.20	0.70	≤10	PASS
			-71.20	2360	-31.20	0.20	≤10	PASS
			-65.20	2380	-31.20	0.50	≤10	PASS
		2472	-65.20	2504	-31.20	2.00	≤10	PASS
			-71.20	2524	-31.20	0.40	≤10	PASS
			-71.20	2584	-31.20	2.20	≤10	PASS
			-71.20	2674	-31.20	0.90	≤10	PASS

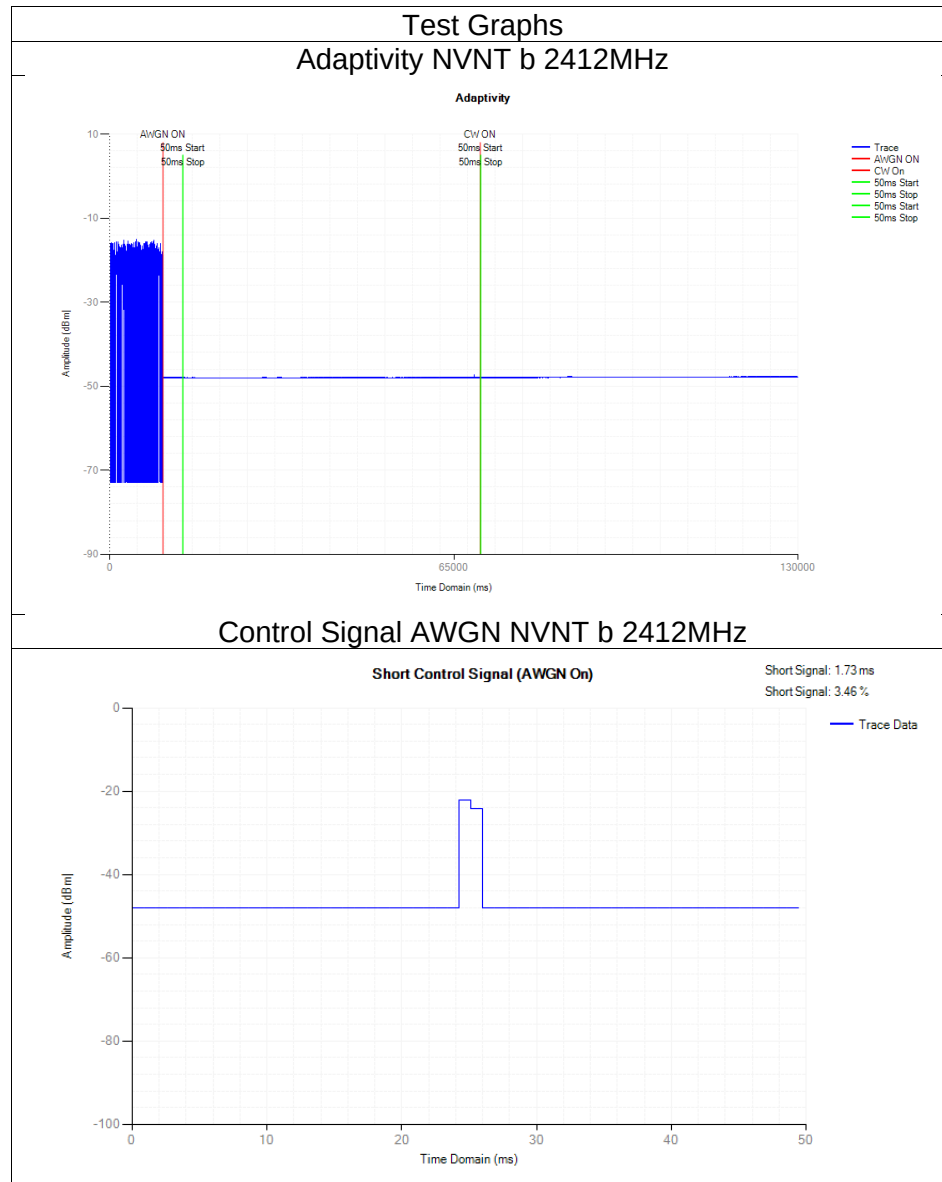
Note All the modes and antennas had been tested, but only the worst data was recorded in the report.

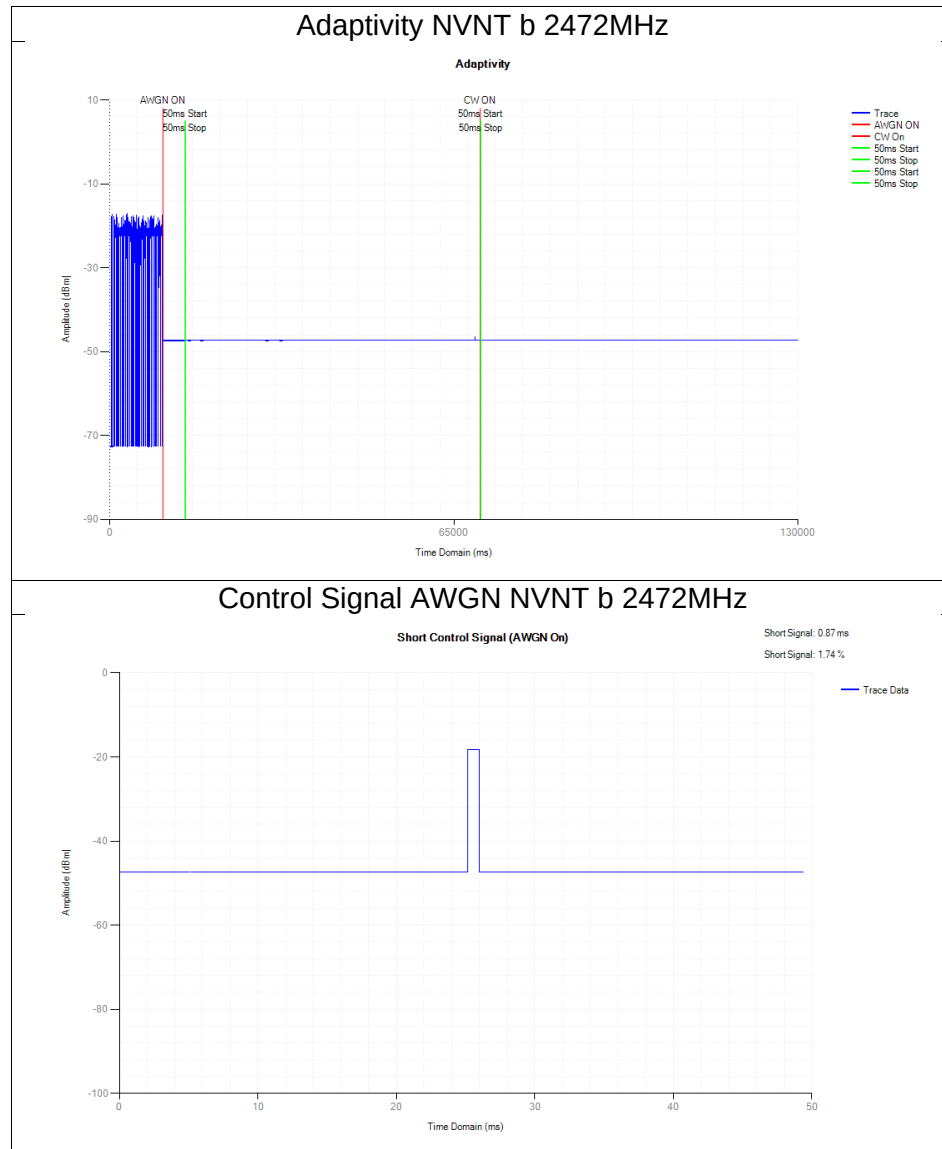
8.8. APPENDIX H: ADAPTIVITY

Adaptivity

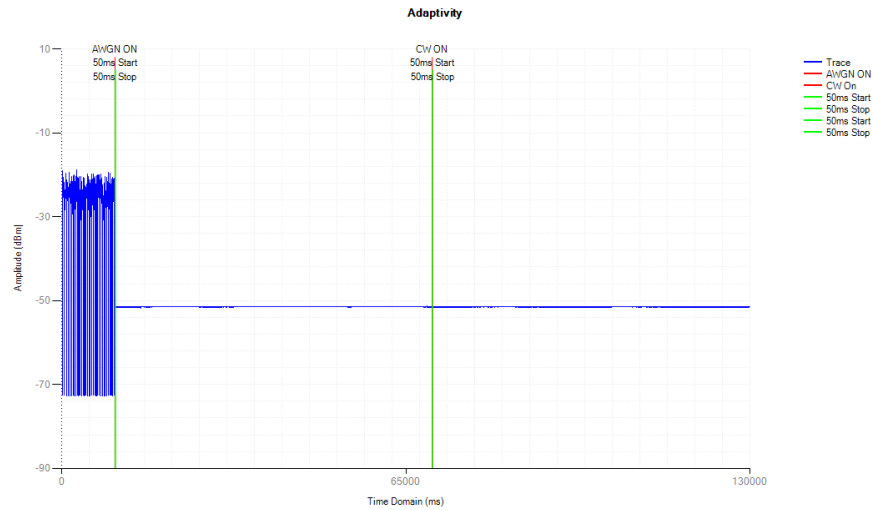
Mode	Frequency (MHz)	Antenna	AWGN Level (dBm)	CW Level (dBm)	AWGN Short Control(%)	CW Short Control(%)	Limit (%)	Verdict
b	2412	Ant1	-68	-35	3.46	0	<=10	Pass
b	2472	Ant1	-67	-35	1.74	0	<=10	Pass
n40	2422	Ant1	-69.5	-35	0	0	<=10	Pass
n40	2462	Ant1	-69.5	-35	1.74	0	<=10	Pass

Note All the modes and antennas had been tested, but only the worst data was recorded in the report.

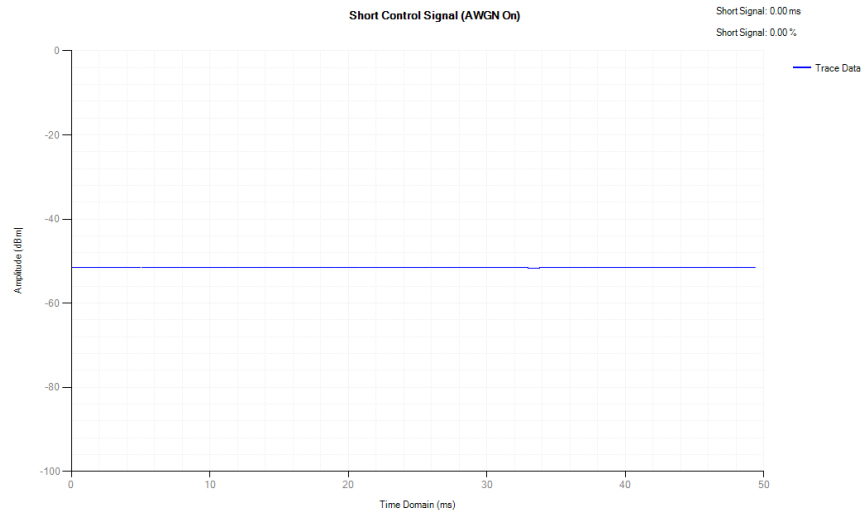




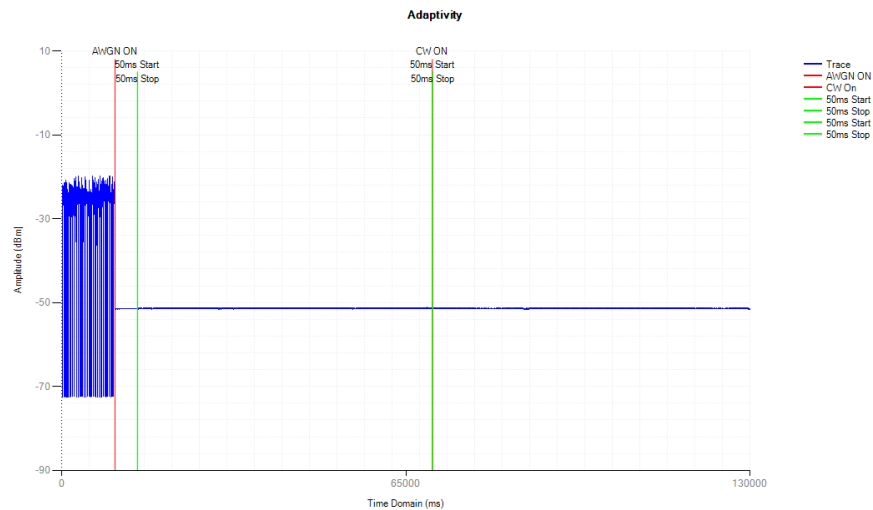
Adaptivity NVNT n40 2422MHz

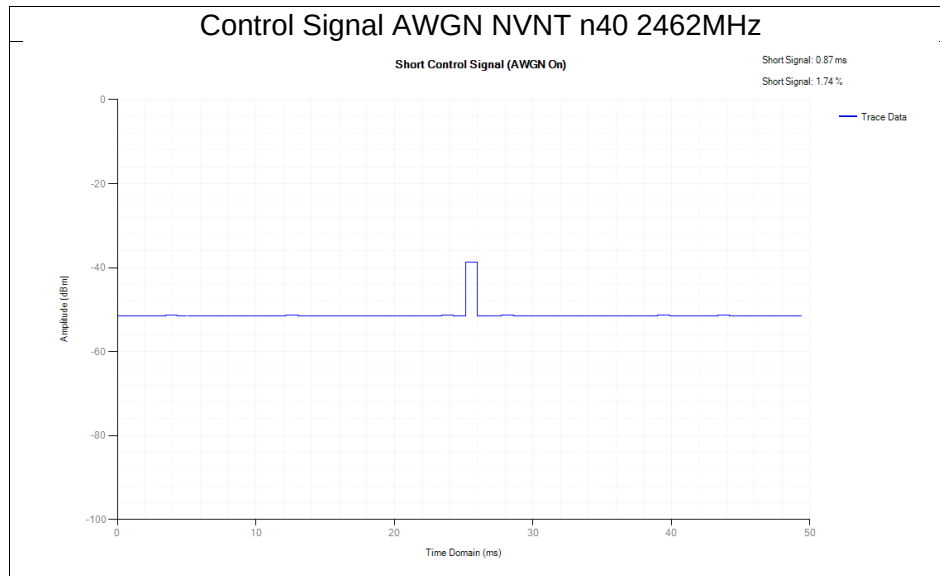


Control Signal AWGN NVNT n40 2422MHz



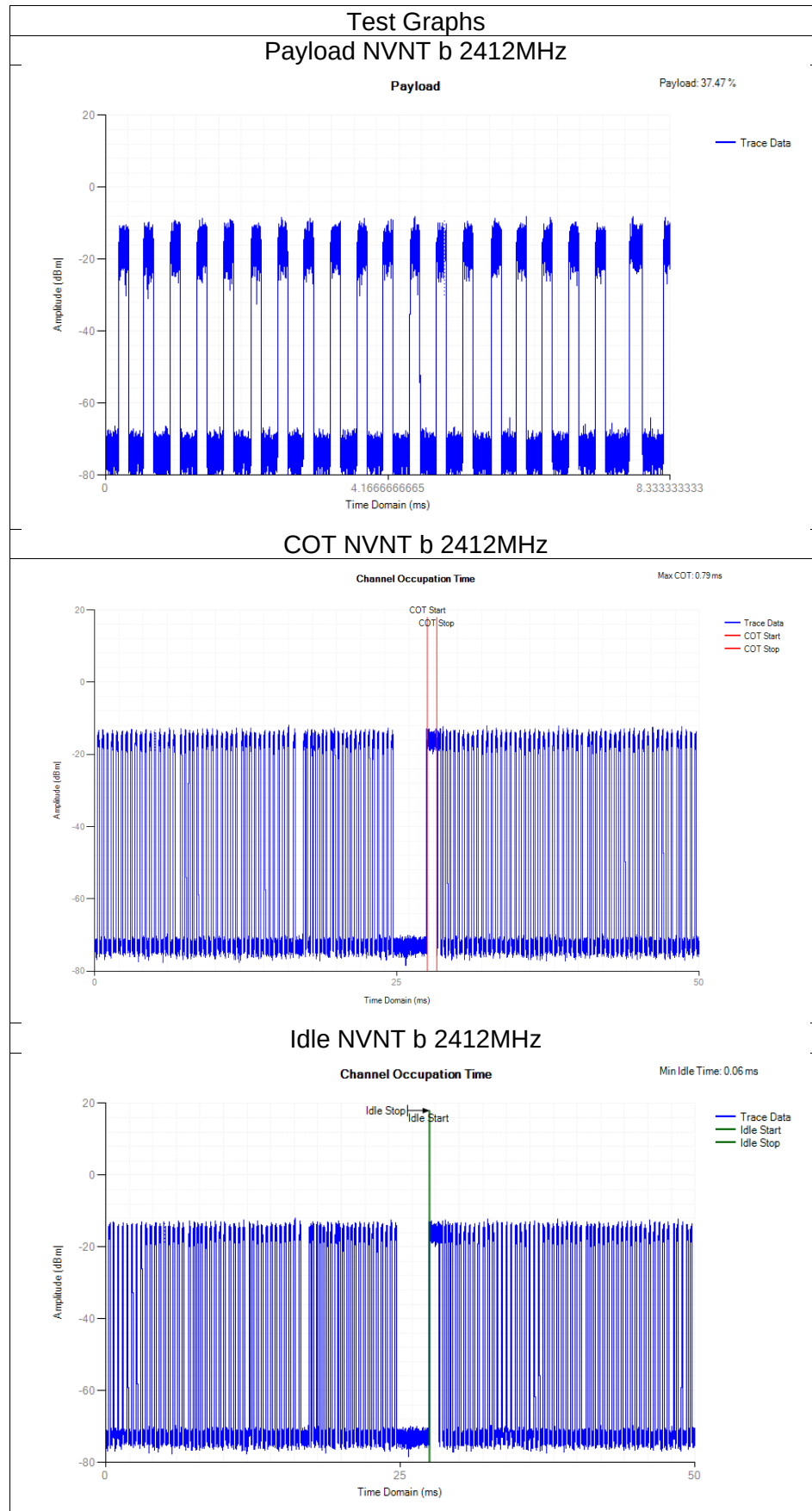
Adaptivity NVNT n40 2462MHz

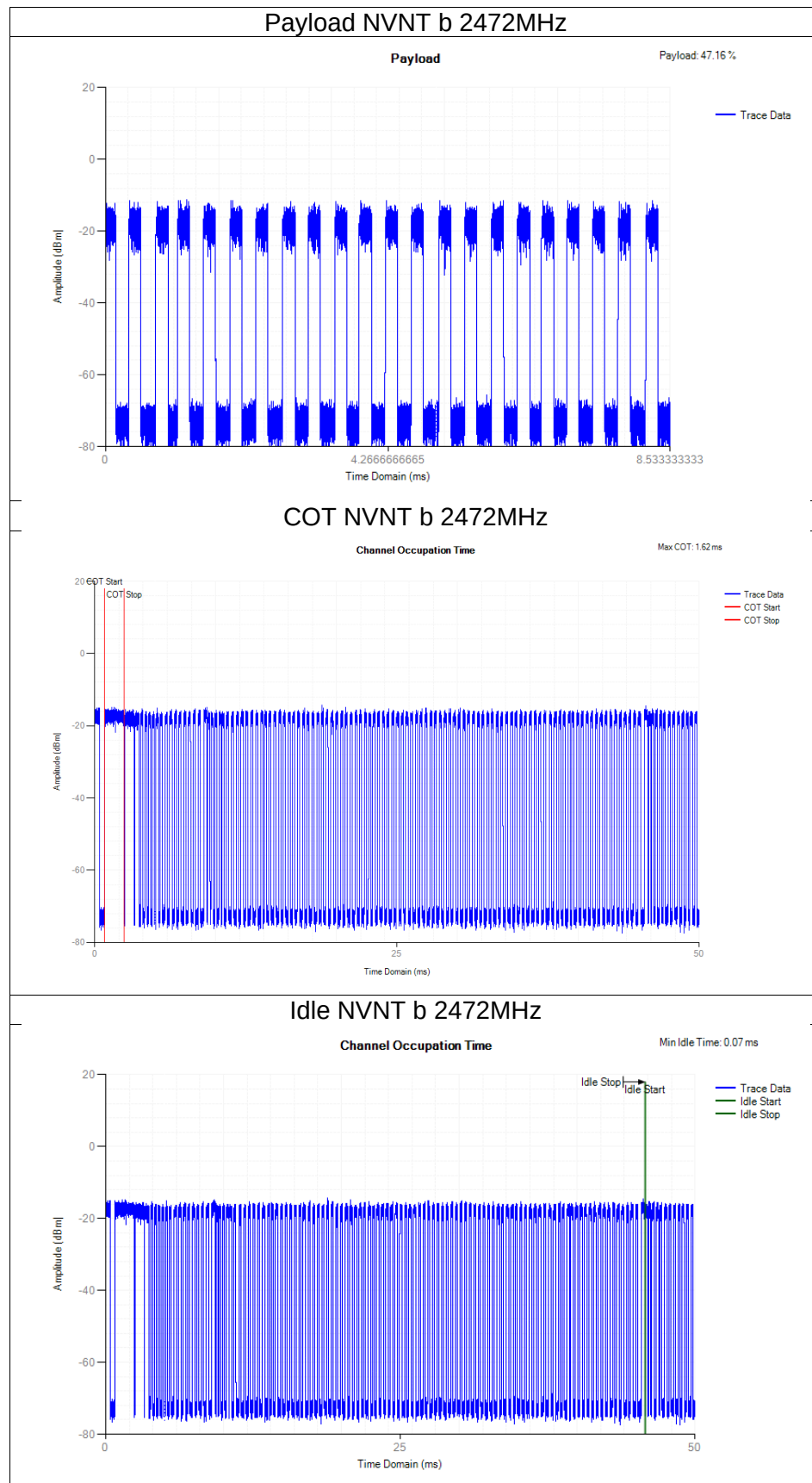




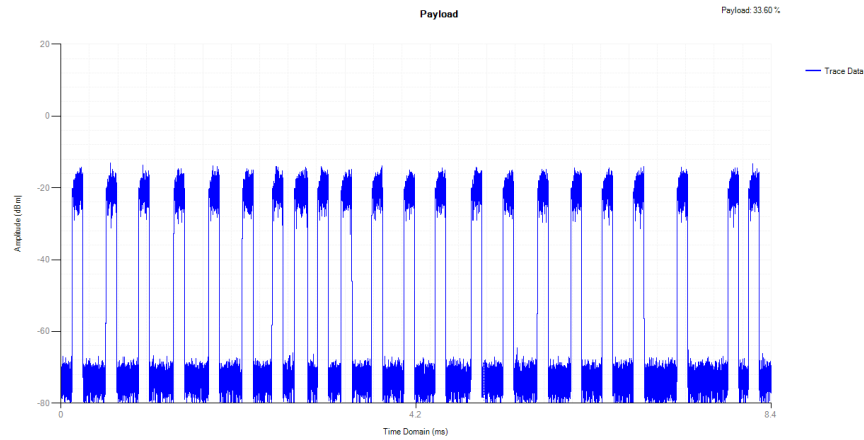
Adaptivity COT

Mode	Frequency (MHz)	Antenna	Payload	Max COT (ms)	Limit COT (ms)	Min Idle Time (ms)	Limit Idle Time (ms)	Verdict
b	2412	Ant1	37.47	0.788	<=13	0.062	>0.018	Pass
b	2472	Ant1	47.16	1.62	<=13	0.065	>0.018	Pass
n40	2422	Ant1	33.6	0.96	<=13	0.06	>0.018	Pass
n40	2462	Ant1	37.32	0.728	<=13	0.065	>0.018	Pass

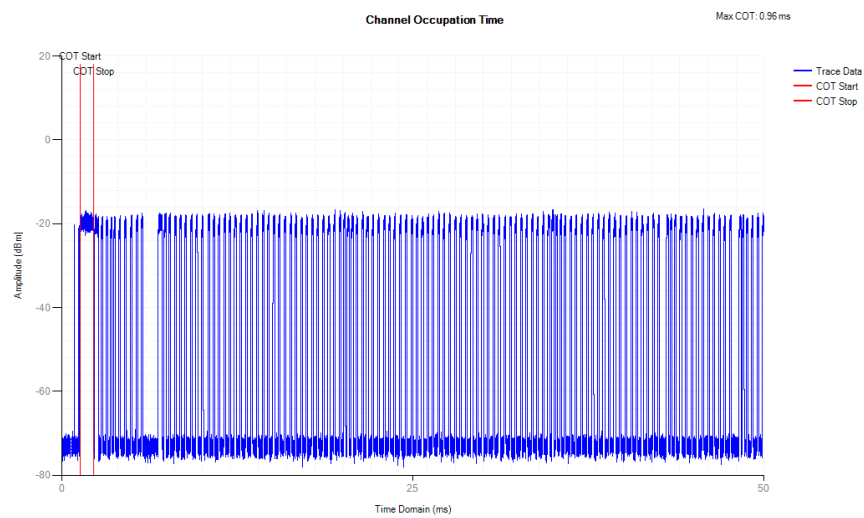




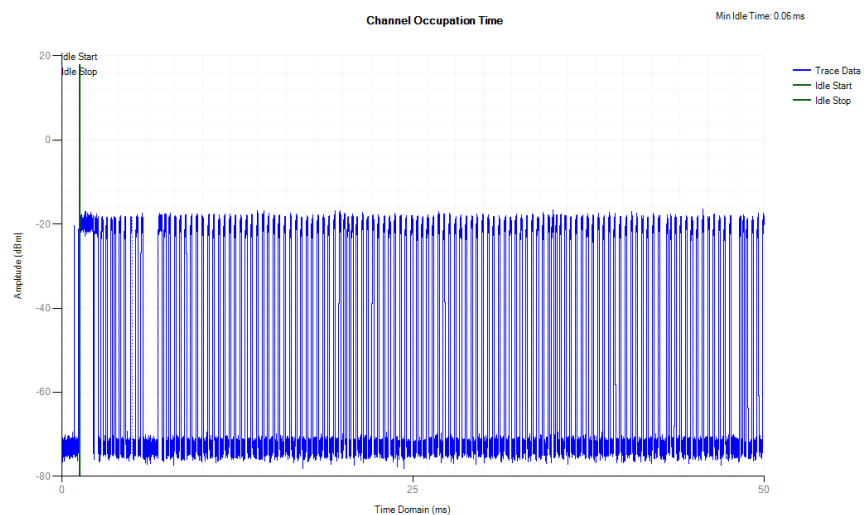
Payload NVNT n40 2422MHz



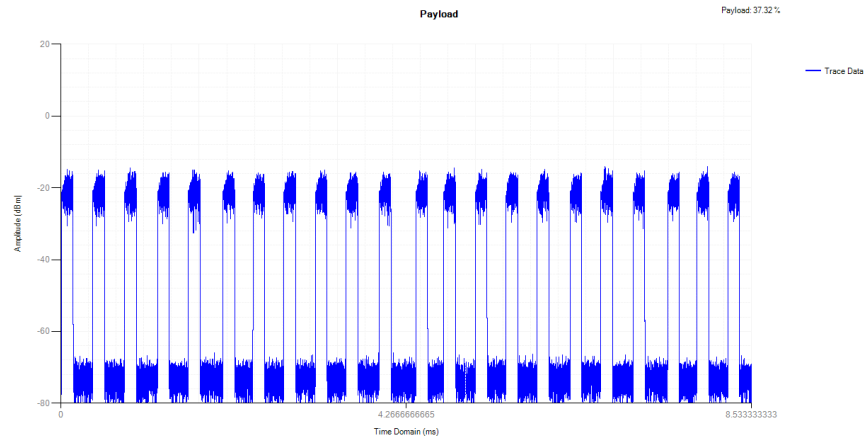
COT NVNT n40 2422MHz



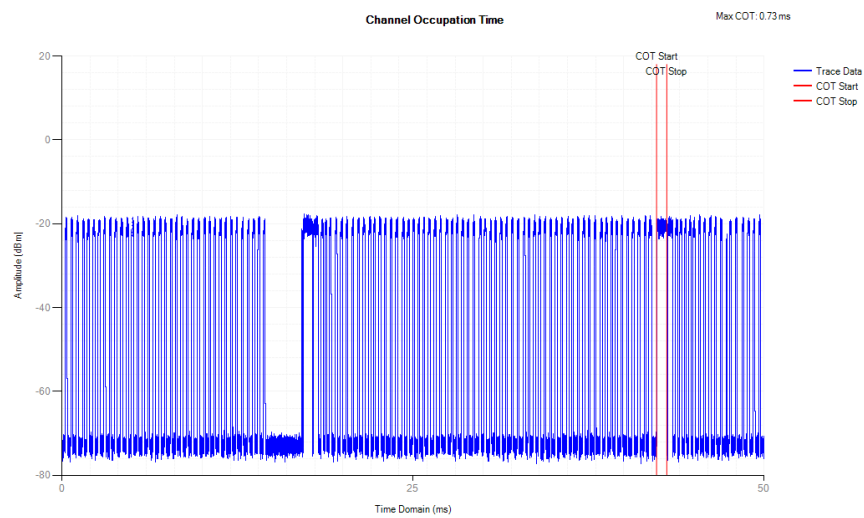
Idle NVNT n40 2422MHz



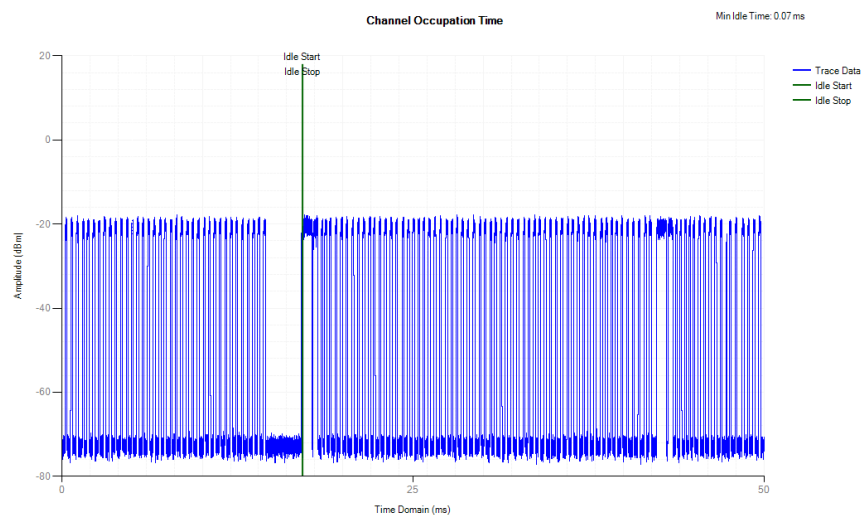
Payload NVNT n40 2462MHz



COT NVNT n40 2462MHz

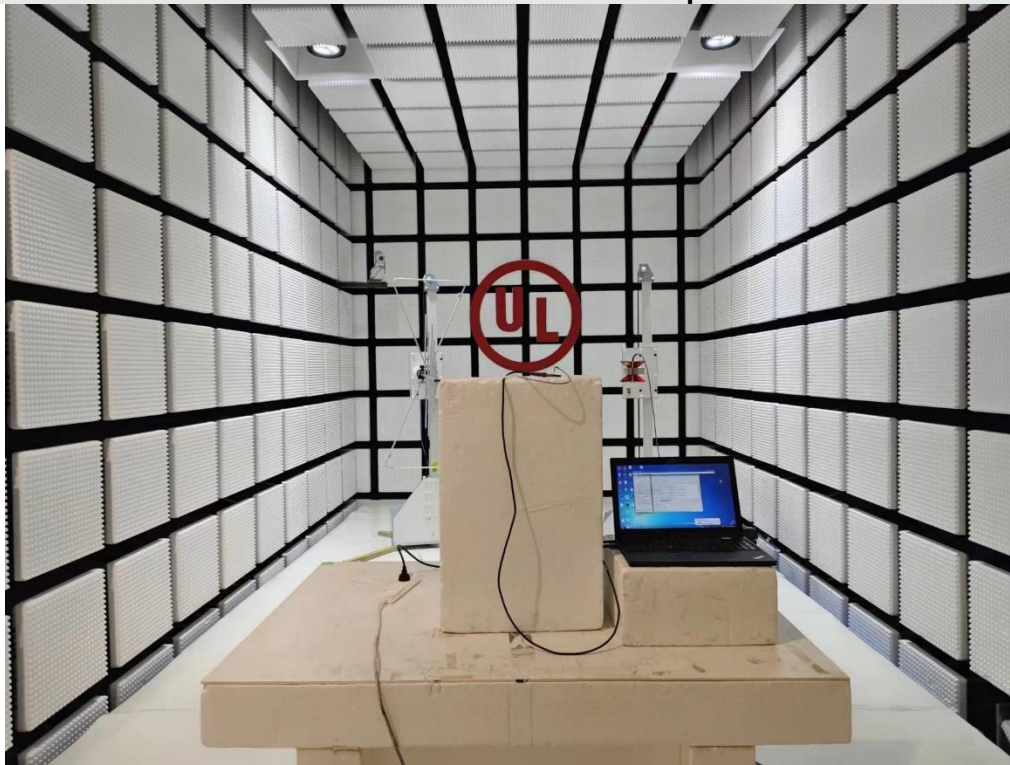


Idle NVNT n40 2462MHz



APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

Transmitter unwanted emissions in the spurious domain



END OF REPORT