Product Name: Projector	**Report No: ITEZA2-202300405RF3**
Product Model: ZMLF2001, ZMLF2002, ZMLF2003, ZMLF2004, ZMLF2005, ZMLF2006，ZMLF2007, ZMLF2008，ZMLF2009, ZMLF2010	**Security Classification: Open**
Version: V1.0	**Total Page: 78**

TIRT Testing Report

Prepared By:	**Checked By:**	**Approved By:**	
Aaron Long	Stone Tang	Joky Wang	
Aaron Long	Stone Tang	Joky Wang	

FCC Radio Test Report

FCC ID: 2A6K3-ZMLF2001

This report concerns: Original Grant

Equipment	:	Projector
Brand Name	:	ZEEMR
Test Model	:	ZMLF2001, ZMLF2002, ZMLF2003, ZMLF2004, ZMLF2005, ZMLF2006，ZMLF2007, ZMLF2008，ZMLF2009, ZMLF2010
Applicant	:	Jiangsu Golden Vision Legend Technology Co.,Ltd
Address	:	Room 105-7, Building 17, Phase I, HR Service Industrial Park, Nanjing Jiangbei New District, No. 1, Qiliqiaobei Road Jiangbei New District, Nanjing, China
Manufacturer	:	Jiangsu Golden Vision Legend Technology Co.,Ltd
Address	:	Room 105-7, Building 17, Phase I, HR Service Industrial Park, Nanjing Jiangbei New District, No. 1, Qiliqiaobei Road Jiangbei New District, Nanjing, China
Date of Receipt	:	Dec. 13, 2023
Date of Test	:	Dec. 13, 2023~ Dec. 28, 2023
Issued Date	:	Jan. 12, 2024
Report Version	:	V1.0
Test Sample	:	Engineering Sample No.: 1000024292
Standard(s)	:	FCC CFR Title 47, Part 15, Subpart C FCC KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10-2013

- The test result referred exclusively to the presented test model /sample.
- Without written approval of TIRT Inc. the test report shall not reproduced except in full.

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen

Add: 104 Building C, Xinmingsheng Industrial Park No.132, Zhangge Old Village East Zone, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong, P. R. China

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
ITEZA2-202300405RF3	V1.0	Original Report.	2024.01.12	Valid

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart C				
Standard(s) Section	**Test Item**	**Test Result**	**Judgment**	**Remark**
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS	------
15.247(d) 15.205(a) 15.209(a)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS	------
15.247(a)(2)	Bandwidth	APPENDIX E	PASS	------
15.247(b)(3)	Maximum Output Power	APPENDIX F	PASS	------
15.247(d)	Conducted Spurious Emissions	APPENDIX G	PASS	------
15.247(e)	Power Spectral Density	APPENDIX H	PASS	------
15.203	Antenna Requirement	------	PASS	Note(2)

Note:

(1) “N/A” denotes test is not applicable in this test report.

(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

1.1 TEST FACILITY

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	104 Building C, Xinmingsheng Industrial Park No.132, Zhangge Old Village East Zone, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong, P. R. China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number:	6049.01
FCC Accredited Lab. Designation Number:	CN1366
FCC Test Firm Registration Number:	820690
Telephone:	+86-0755-27087573

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))
The TIRT measurement uncertainty as below table:

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±142.12 KHz
Power Spectral Density	±0.75dB
RF power conducted	±0.74dB
RF power radiated	±3.25dB
Spurious emissions, conducted	±1.78dB
Spurious emissions, radiated (30MHz～1GHz)	±4.6dB
Spurious emissions, radiated (1GHz ~ 26.5GHz)	±4.9dB
Conduction Emissions(150kHz~30MHz)	±3.1dB
Humidity	±4.6%
Temprature	±0.7°C
Time	±1.25%

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	25.1°C	52%	AC 120V/60Hz	Stone Tang
Radiated Emissions-9kHz to 30 MHz	24.5°C	50%	AC 120V/60Hz	Stone Tang
Radiated Emissions-30MHz to 1000MHz	24.2°C	53%	AC 120V/60Hz	Stone Tang
Radiated Emissions-Above 1000MHz	26.0°C	53%	AC 120V/60Hz	Stone Tang
Bandwidth	25.0°C	56%	AC 120V/60Hz	Stone Tang
Maximum Output Power	24.9°C	54%	AC 120V/60Hz	Stone Tang
Conducted Spurious Emissions	25.1°C	62%	AC 120V/60Hz	Stone Tang
Power Spectral Density	26.0°C	60%	AC 120V/60Hz	Stone Tang

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Projector
Brand Name	ZEEMR
Test Model	ZMLF2001
Series Model	ZMLF2001, ZMLF2002, ZMLF2003, ZMLF2004, ZMLF2005, ZMLF2006, ZMLF2007, ZMLF2008, ZMLF2009, ZMLF2010
Model Difference(s)	There is no difference except the name of the model
Software Version	v2.1.2
Hardware Version	v1.0.0
Power Source	AC 100-240V, 50/60Hz 2.3A
Power Rating	AC 120V/60Hz
Operation Frequency	2412 MHz ~ 2462 MHz
Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n :OFDM(64QAM, 16QAM, QPSK, BPSK)
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps
Maximum Output Peak Power	IEEE 802.11n40: 12.41 dBm (0.017418 W)

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

CH01 - CH11 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n(HT20) CH03 - CH09 for IEEE 802.11n(HT40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

3. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	BBT076-S7C-I	FPC	N/A	1.75

Note:

1. The antenna gain is provided by the manufacturer.
2. The antenna is for testing purposes only.

2.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX B Mode Channel 01/06/11
Mode 2	TX G Mode Channel 01/06/11
Mode 3	TX N(HT20) Mode Channel 01/06/11
Mode 4	TX N(HT40) Mode Channel 03/06/09
Mode 5	TX G Mode Channel 01

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

AC power line conducted emissions test	
Final Test Mode	Description
Mode 5	TX G Mode Channel 01

Radiated emissions test - Below 1GHz	
Final Test Mode	Description
Mode 5	TX G Mode Channel 01

Radiated emissions test- Above 1GHz	
Final Test Mode	Description
Mode 1	TX B Mode Channel 01/06/11
Mode 2	TX G Mode Channel 01/06/11
Mode 3	TX N(HT20) Mode Channel 01/06/11
Mode 4	TX N(HT40) Mode Channel 03/06/09

Conducted test	
Final Test Mode	Description
Mode 1	TX B Mode Channel 01/06/11
Mode 2	TX G Mode Channel 01/06/11
Mode 3	TX N(HT20) Mode Channel 01/06/11
Mode 4	TX N(HT40) Mode Channel 03/06/09

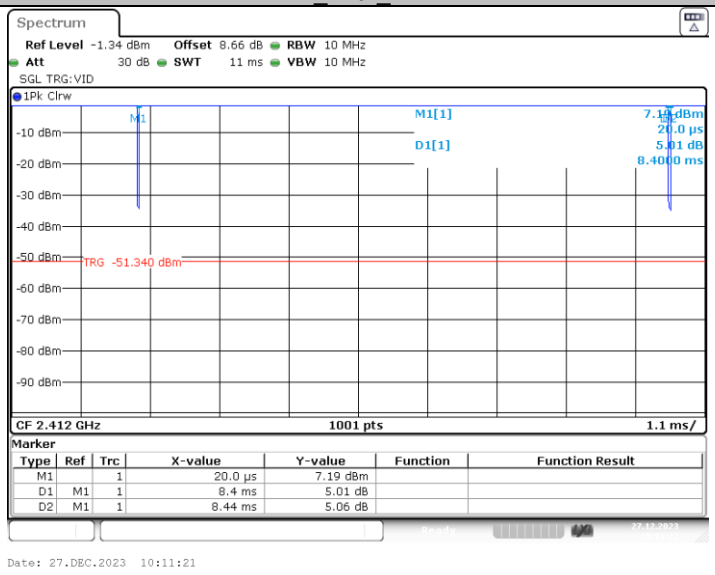
NOTE:
(1) All the bit rate of transmitter have been tested and found the lowest rate is found to be the worst case and recorded.
(2) For radiated emission above 1 GHz test, the spurious points of 1GHz~18GHz and 18GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.

2.3 DUTY CYCLE

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11B	Ant1	2412	8.40	8.44	99.53
		2437	8.38	8.43	99.41
		2462	8.39	8.42	99.64
11G	Ant1	2412	1.40	1.44	97.22
		2437	1.39	1.44	96.53
		2462	1.39	1.44	96.53
11N20SISO	Ant1	2412	1.30	1.35	96.30
		2437	1.30	1.34	97.01
		2462	1.31	1.35	97.04
11N40SISO	Ant1	2422	0.64	0.69	92.75
		2437	0.65	0.70	92.86
		2452	0.65	0.70	92.86

TEST GRAPHS

11B_Ant1_2412



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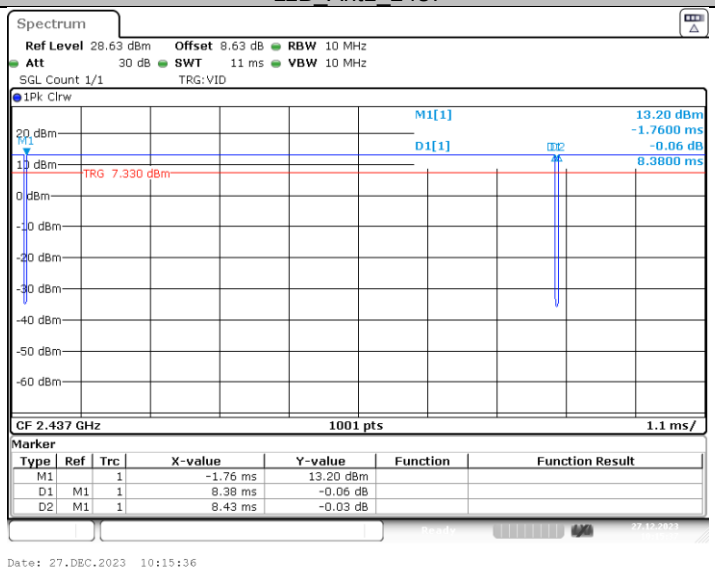

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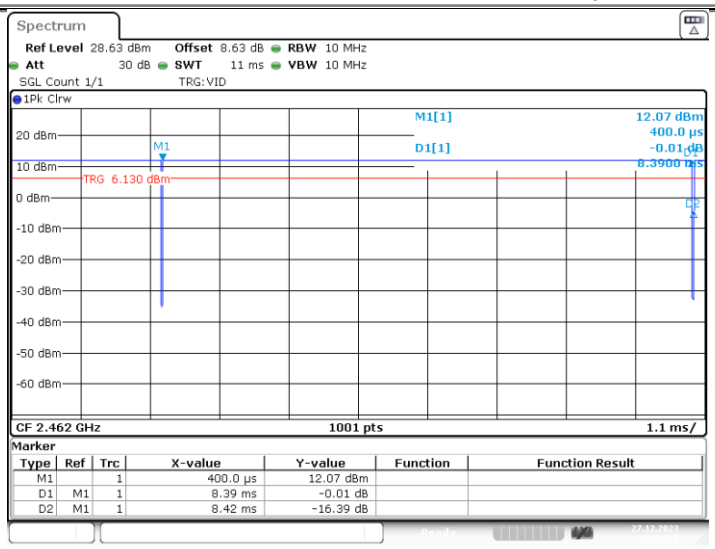
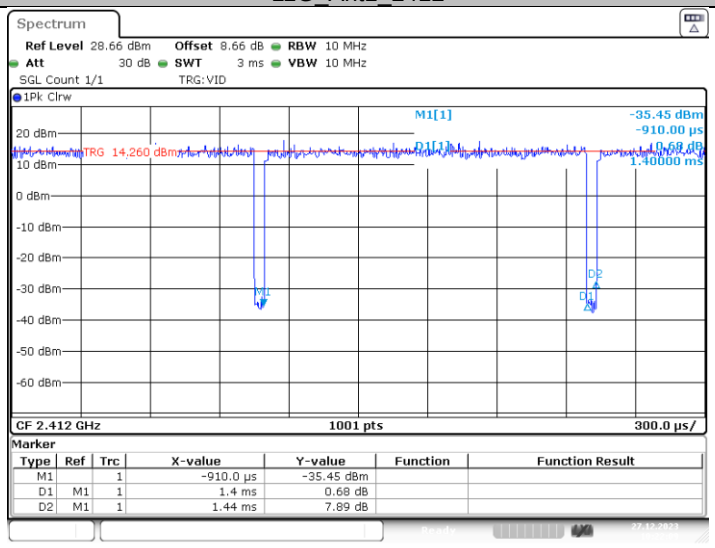


11G_Ant1_2412



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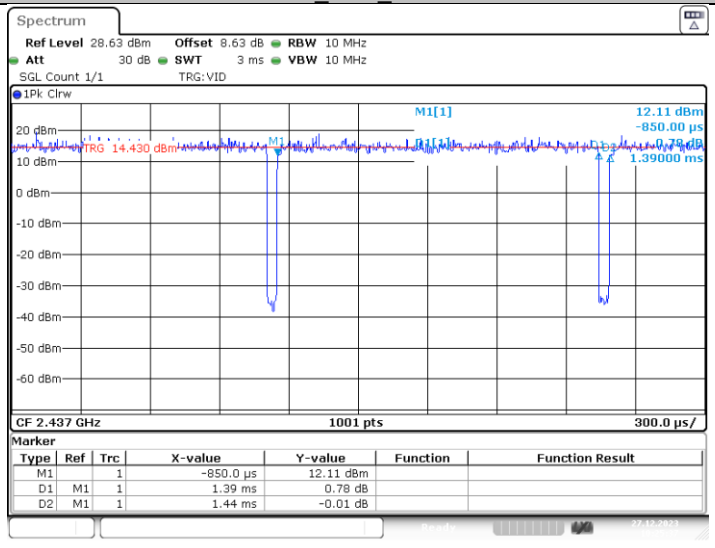

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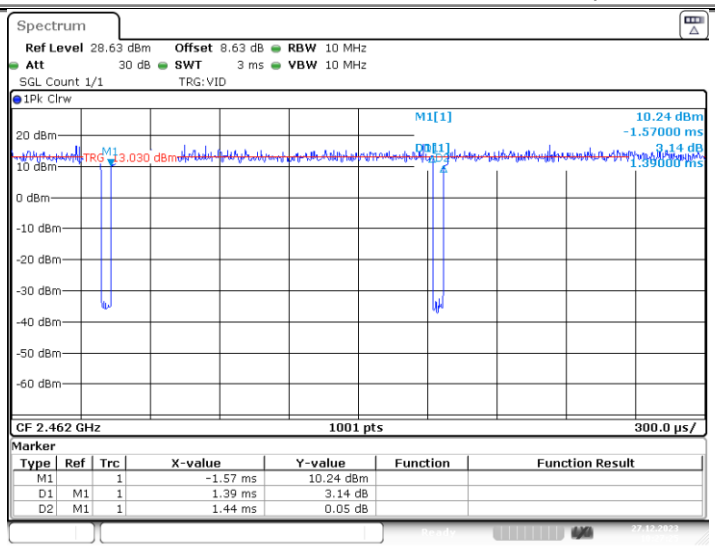

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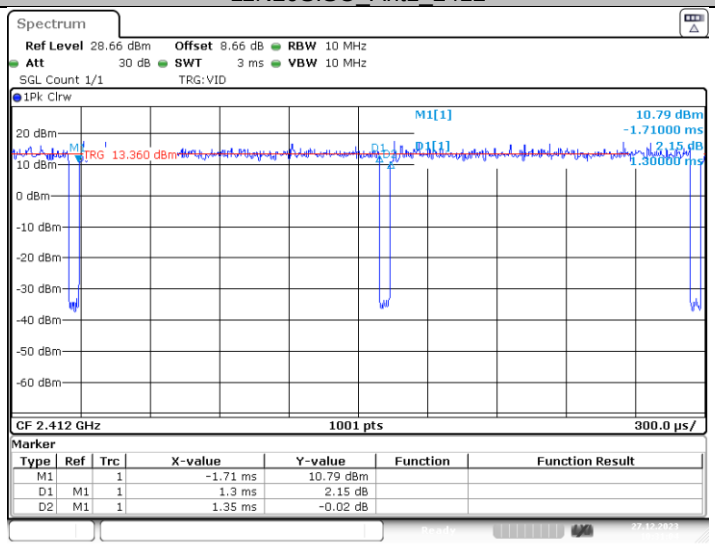

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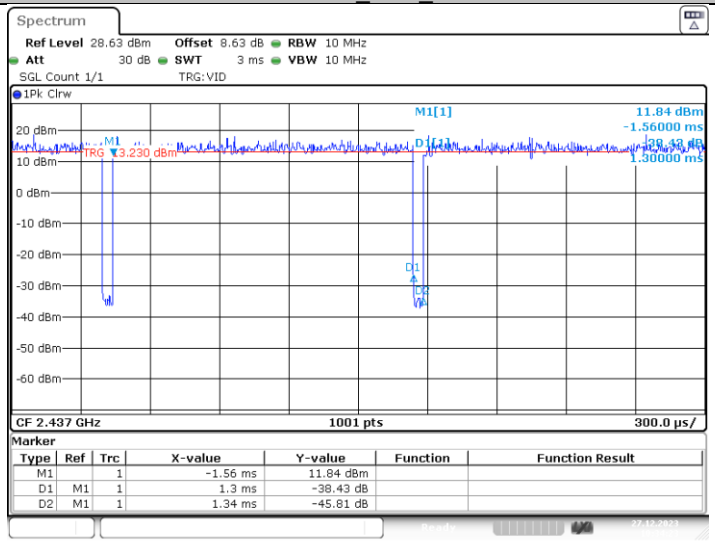

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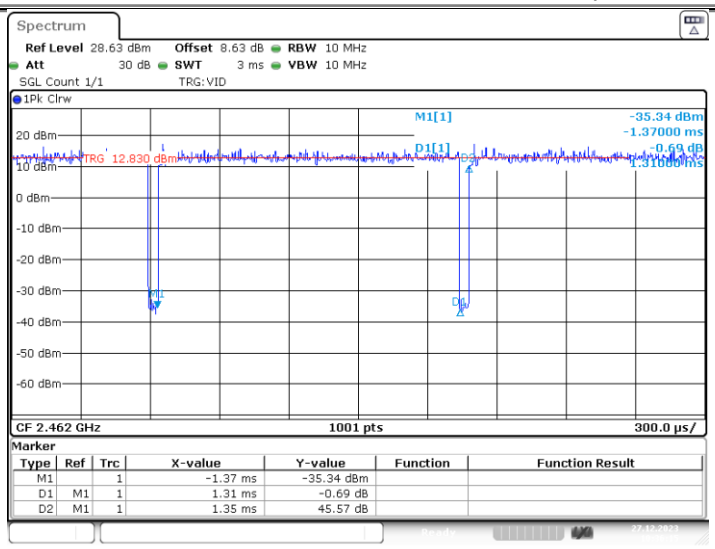

Date: 27.DEC.2023 10:36:16

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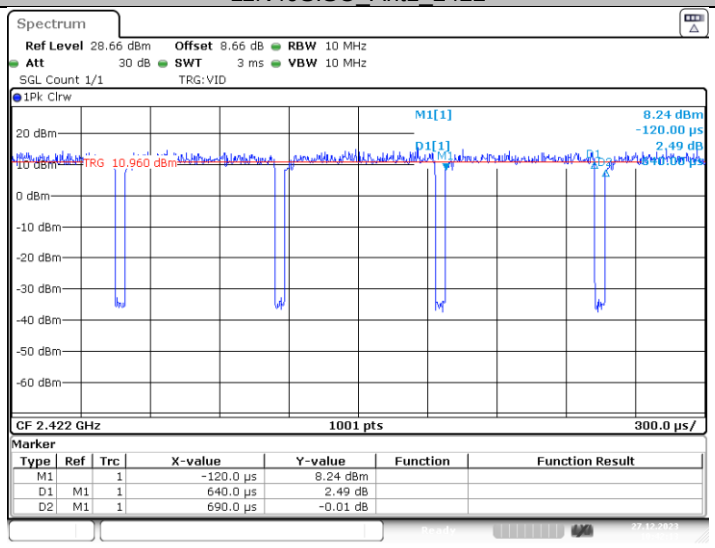

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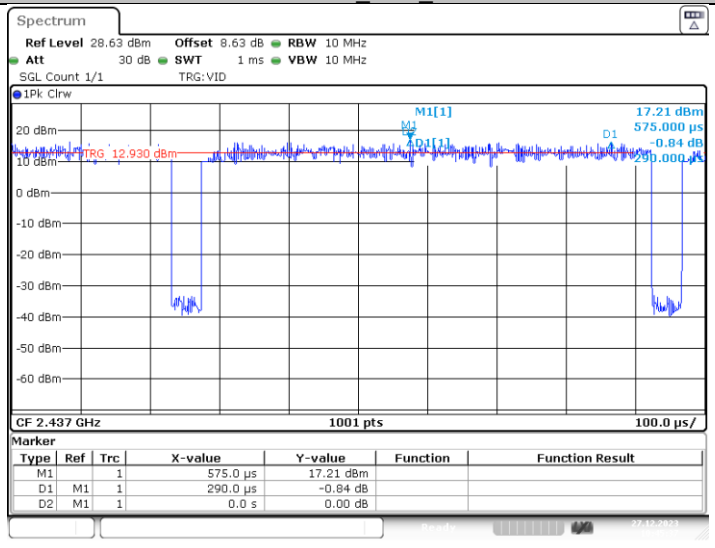
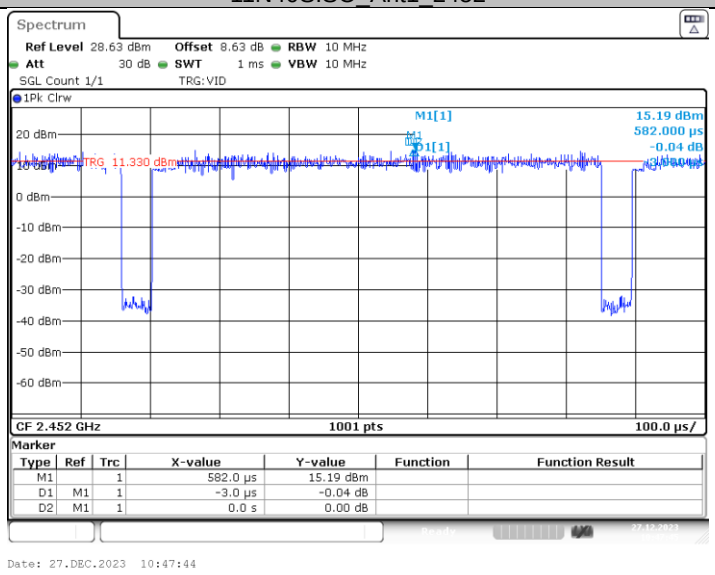
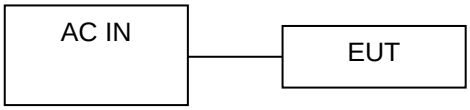


Date: 27.DEC.2023 10:45:36

11N40SISO_Ant1_2452



2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 SUPPORT UNITS

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	N/A	N/A	N/A	N/A

2.6 ANCILLARY EQUIPMENT DETAILS

No.	Description	Manufacturer	Model	Serial Number	Certification or SDoC
1.	Notebook PC	Lenovo	ThinkPad S3-S440	N/A	N/A

3. AC POWER LINE CONDUCTED EMISSIONS

3.1 LIMIT

Frequency of Emission (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:

(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

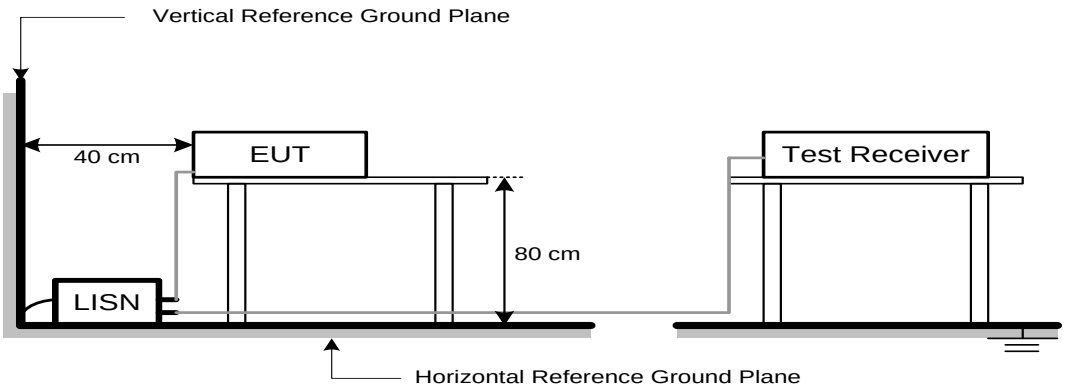
The following table is the setting of the receiver:

Receiver Parameters	Setting
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 EUT OPERATION CONDITIONS

EUT was programmed to be in continuously transmitting mode.

3.6 TEST RESULTS

Please refer to the APPENDIX A.

4. RADIATED EMISSIONS

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	Peak	Average
Above 1000	74	54

NOTE:

(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2 TEST PROCEDURE

a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1 GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1 GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1 GHz)
i. For the actual test configuration, please refer to the related Item -EUT Test Photos.

The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

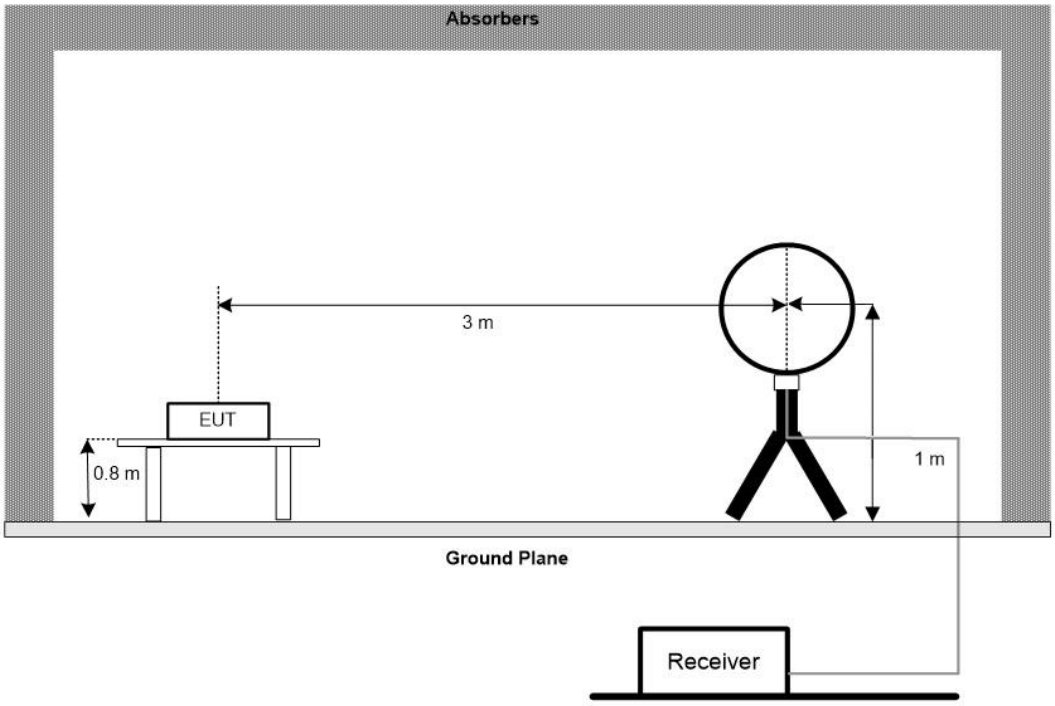
Receiver Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

4.3 DEVIATION FROM TEST STANDARD

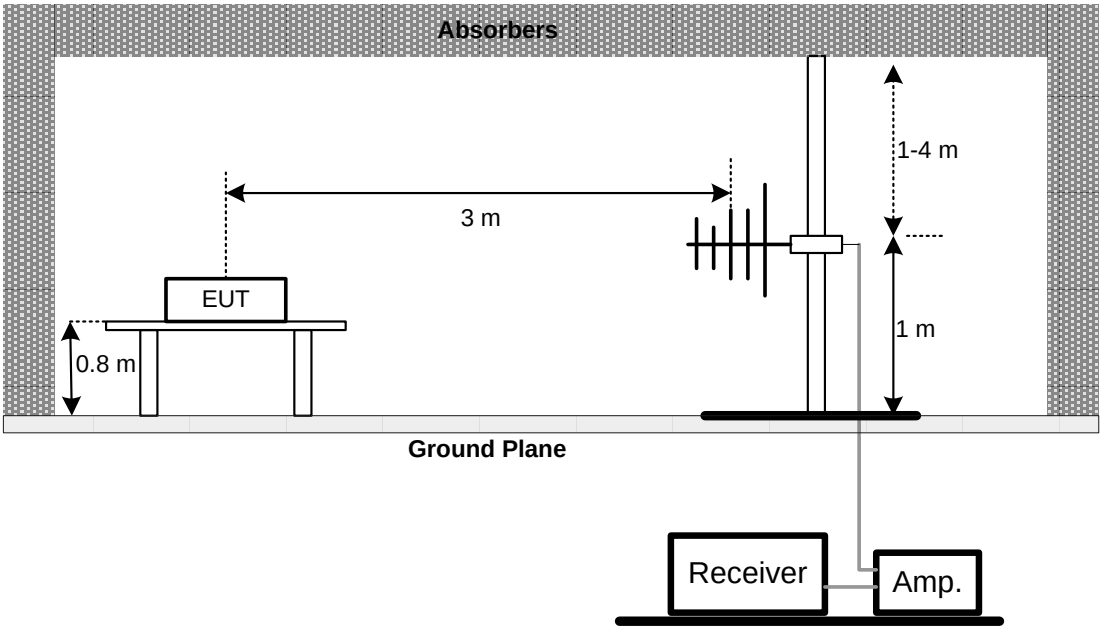
No deviation.

4.4 TEST SETUP

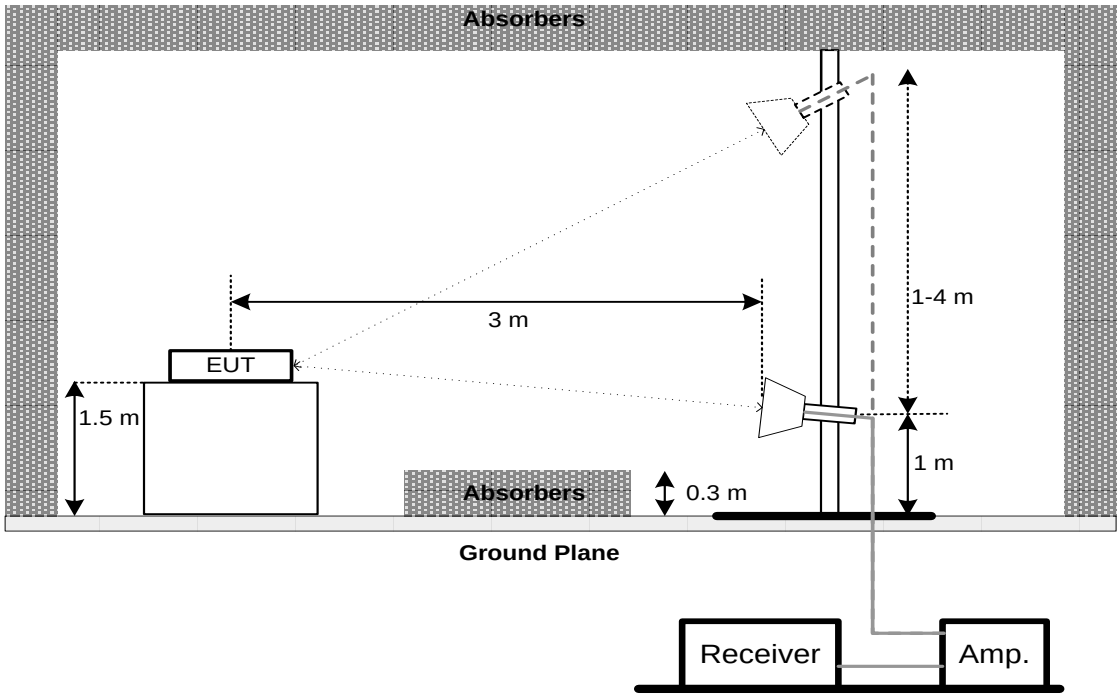
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz


Absorbers
3 m
1-4 m
EUT
1.5 m
Absorbers
0.3 m
1 m
Ground Plane
Receiver
Amp.

4.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULTS - 9 KHZ TO 30 MHZ

Please refer to the APPENDIX B.

Remark:

(1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
(2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.7 TEST RESULTS - 30 MHZ TO 1000 MHZ

Please refer to the APPENDIX C.

4.8 TEST RESULTS - ABOVE 1000 MHZ

Please refer to the APPENDIX D.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5. BANDWIDTH

5.1 LIMIT

Section	Test Item	Limit
FCC 15.247(a)(2)	6 dB Bandwidth	Minimum 500 kHz
	99% Emission Bandwidth	-

5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

For 6 dB Bandwidth:

Spectrum Parameters	Setting
Span Frequency	> Measurement Bandwidth
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

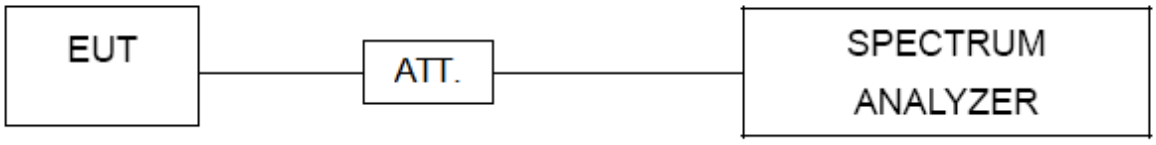
For 99% Emission Bandwidth:

Spectrum Parameters	Setting
Span Frequency	Between 1.5 times and 5.0 times the OBW
RBW	300 kHz For 20MHz 1 MHz For 40MHz
VBW	1 MHz For 20MHz 3 MHz For 40MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS

Please refer to the APPENDIX E.

6. MAXIMUM OUTPUT POWER

6.1 LIMIT

Section	Test Item	Limit
FCC 15.247(b)(3)	Maximum Output Power	1.0000 Watt or 30.00 dBm

6.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The maximum conducted output power was performed in accordance with method 11.9.1.3 (for peak power) of ANSI C63.10-2013 and FCC KDB 662911 D01 v02r01 Multiple Transmitter Output.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP

6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to the APPENDIX F.

7. CONDUCTED SPURIOUS EMISSIONS

7.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

7.2 TEST PROCEDURE

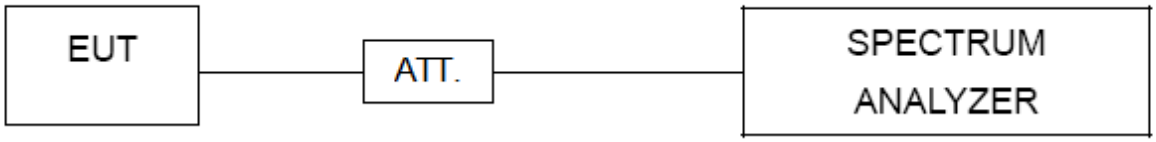
a. The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to the APPENDIX G.

8. POWER SPECTRAL DENSITY

8.1 LIMIT

Section	Test Item	Limit
FCC 15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)

8.2 TEST PROCEDURE

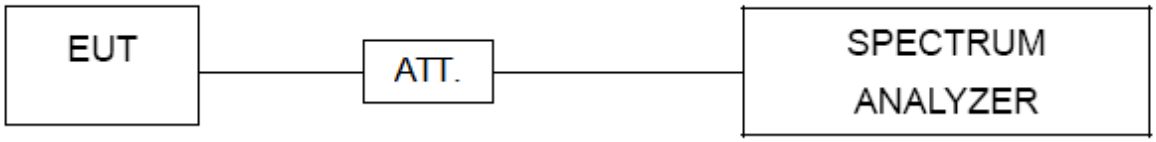
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Span Frequency	1.5 times the DTS bandwidth
RBW	3 kHz
VBW	10 kHz
Detector	RMS
Trace	Max Hold
Sweep Time	Auto

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX H.

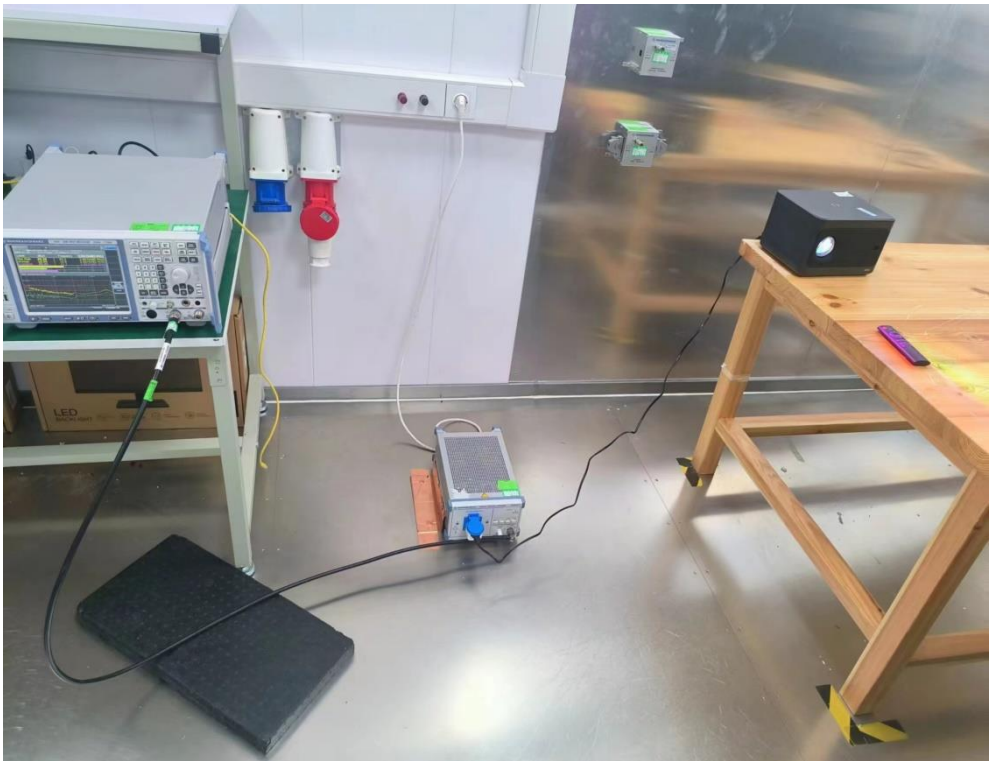
9. MEASUREMENT INSTRUMENTS LIST

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Receiver	Rohde&Schwarz	ESIB 40	YH-TIRT-SAC-966-20220911	2023/01/05	2024/01/04
Integral Antenna	Schwarzbeck	VULB 9168	01314	2023.12.16	2024.12.15
Integral Antenna	Rohde&Schwarz	HF907	RSM2991424	2023.12.16	2024.12.15
Preamplifier	Emtrace	RP01A	02017	2023/01/05	2024/01/04
Preamplifier	Schwarzbeck	BBV9744	00143	2023/01/05	2024/01/04
Loop Antenna	ZHINAN	ZN30900A	12024	2023/01/05	2024/01/04
Exposure Level Tester	narda	ELT-400	N-0925	2023/01/05	2024/01/04
Horn Antenna	Schwarzbeck	BBHA9170	00956	2023/01/05	2024/01/04
RF Cable	/	LMR400UF-NMNM-7.0M	/	2023/01/05	2024/01/04
RF Cable	/	SFT2050PUR-NMNM-7.0M	/	2023/01/05	2024/01/04
EMI Receiver	Rohde&Schwarz	ESR7	1316.3003K07-102611-mk	2023.12.24	2024.10.23
LISN	Rohde&Schwarz	ENV216	3560.655.12-102915-Bp	2023/12/24	2024/12/23
ISN	Schwarzbeck	ENY81	1309.8510.03	2023/03/08	2024/03/07
ISN	Schwarzbeck	ENY81-CAT6	1309.8526.03-101976-kh	2023/03/08	2024/03/07
RF Cable	\	SFT2050PUR-NMNM-2.0M	\	2023/01/05	2024/01/04
CMW500	ROHDE&SCHWARZ	CMW500	120434	2023/01/05	2024/01/04
Spectrum analyzer	ROHDE&SCHWARZ	FSU26	200732	2023/10/25	2024/10/24
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	101722	2023/10/25	2024/10/24
vector Signal Generator	KEYSIGHT	N5182B	MY56200458	2023/01/05	2024/01/04
vector Signal Generator	HEWLETT PACKARD	83752A	3610A02458	2023/10/25	2024/10/24
Filter	Tonscend	JS0806-F	19K8060209	/	/
RF Control Unit	Tonscend	JS0806-2	19K8060209	2023/01/05	2024/01/04
Wireless comprehensive tester	ANRISTU	MT8821C	SN6262170409	2023/01/05	2024/01/04
Wireless comprehensive tester	ANRISTU	MT8000A	SN6262166782	2023/01/05	2024/01/04
Wireless broadband test system	Tonscend	JS1120-3	/	/	/

Remark: “/” denotes no model name, serial no. or calibration specified.

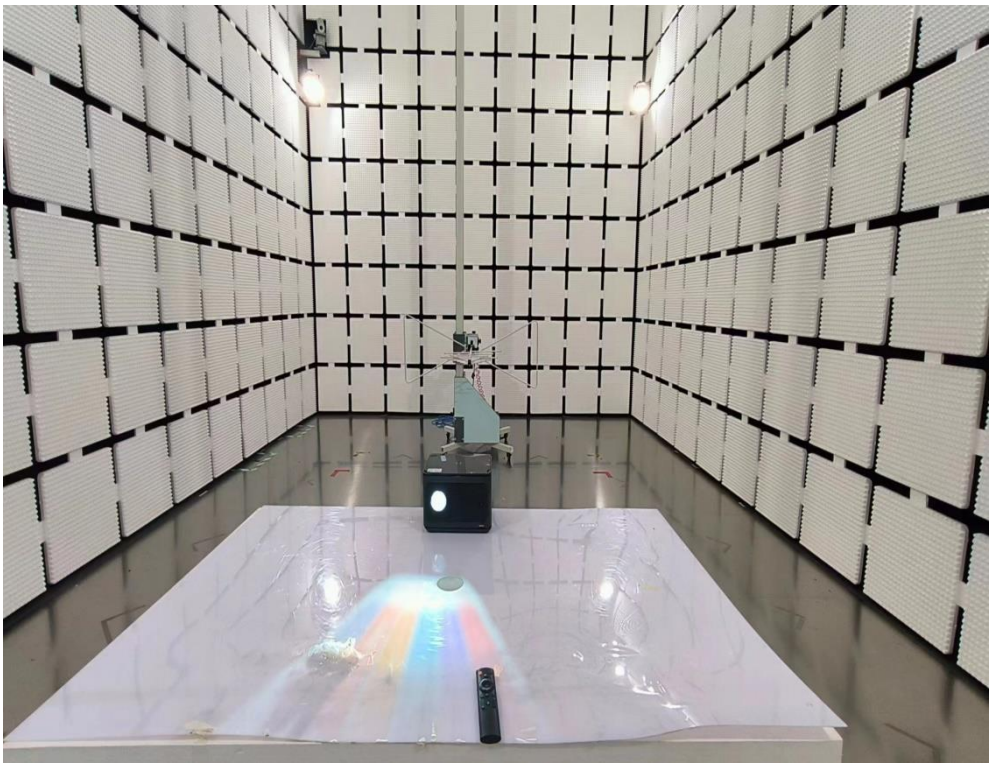
10. EUT TEST PHOTO

AC Power Line Conducted Emissions Test Photos



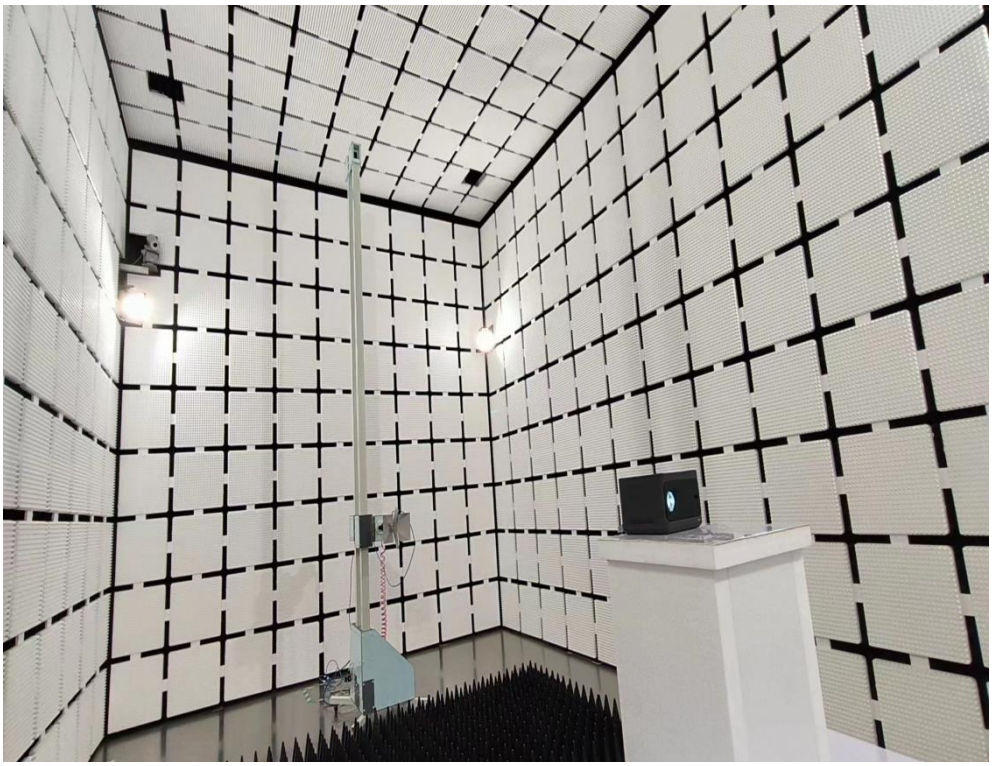
Radiated Emissions Test Photos

30 MHz to 1 GHz



Radiated Emissions Test Photos

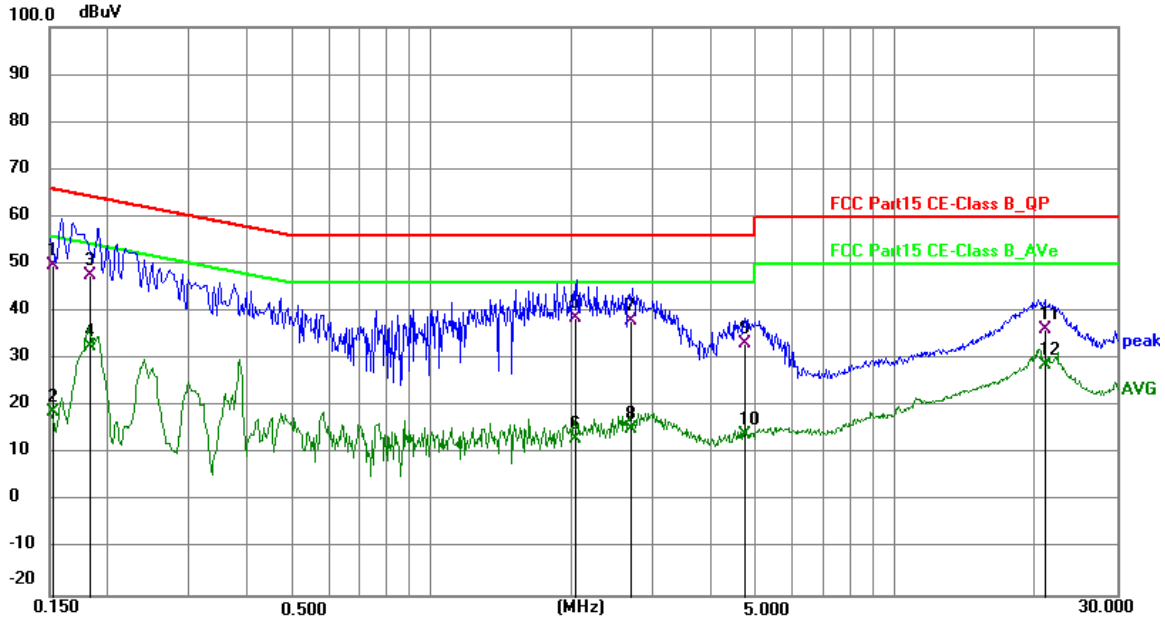
Above 1 GHz



Conducted Test Photos

APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

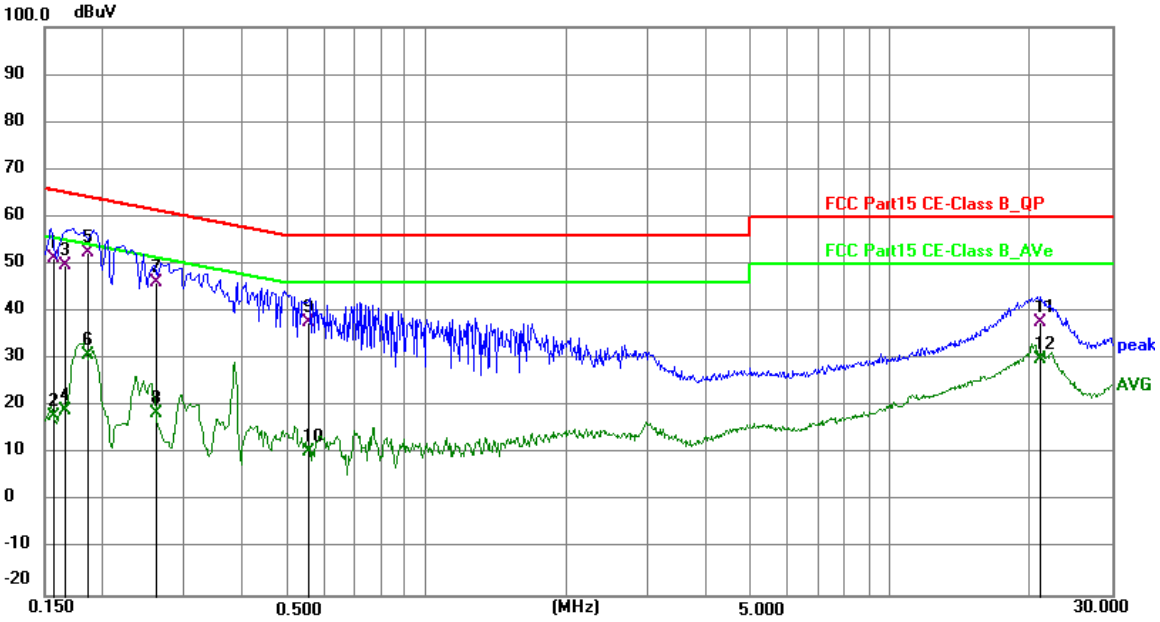
Test Mode	TX G Mode Channel 01	Phase	Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1 *	0.1524	40.17	9.63	49.80	65.87	-16.07	QP
2	0.1524	9.34	9.63	18.97	55.87	-36.90	AVG
3	0.1835	38.09	9.63	47.72	64.33	-16.61	QP
4	0.1835	23.10	9.63	32.73	54.33	-21.60	AVG
5	2.0434	28.96	9.65	38.61	56.00	-17.39	QP
6	2.0434	3.55	9.65	13.20	46.00	-32.80	AVG
7	2.7008	28.37	9.65	38.02	56.00	-17.98	QP
8	2.7008	5.67	9.65	15.32	46.00	-30.68	AVG
9	4.7550	23.53	9.68	33.21	56.00	-22.79	QP
10	4.7550	4.34	9.68	14.02	46.00	-31.98	AVG
11	20.9778	26.60	9.77	36.37	60.00	-23.63	QP
12	20.9778	19.06	9.77	28.83	50.00	-21.17	AVG

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX G Mode Channel 01	Phase	Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1567	41.59	9.62	51.21	65.64	-14.43	QP
2	0.1567	8.36	9.62	17.98	55.64	-37.66	AVG
3	0.1658	40.06	9.62	49.68	65.17	-15.49	QP
4	0.1658	9.44	9.62	19.06	55.17	-36.11	AVG
5 *	0.1869	42.68	9.63	52.31	64.17	-11.86	QP
6	0.1869	21.23	9.63	30.86	54.17	-23.31	AVG
7	0.2613	36.50	9.62	46.12	61.39	-15.27	QP
8	0.2613	8.80	9.62	18.42	51.39	-32.97	AVG
9	0.5592	28.20	9.62	37.82	56.00	-18.18	QP
10	0.5592	0.93	9.62	10.55	46.00	-35.45	AVG
11	21.0919	27.99	9.81	37.80	60.00	-22.20	QP
12	21.0919	20.18	9.81	29.99	50.00	-20.01	AVG

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

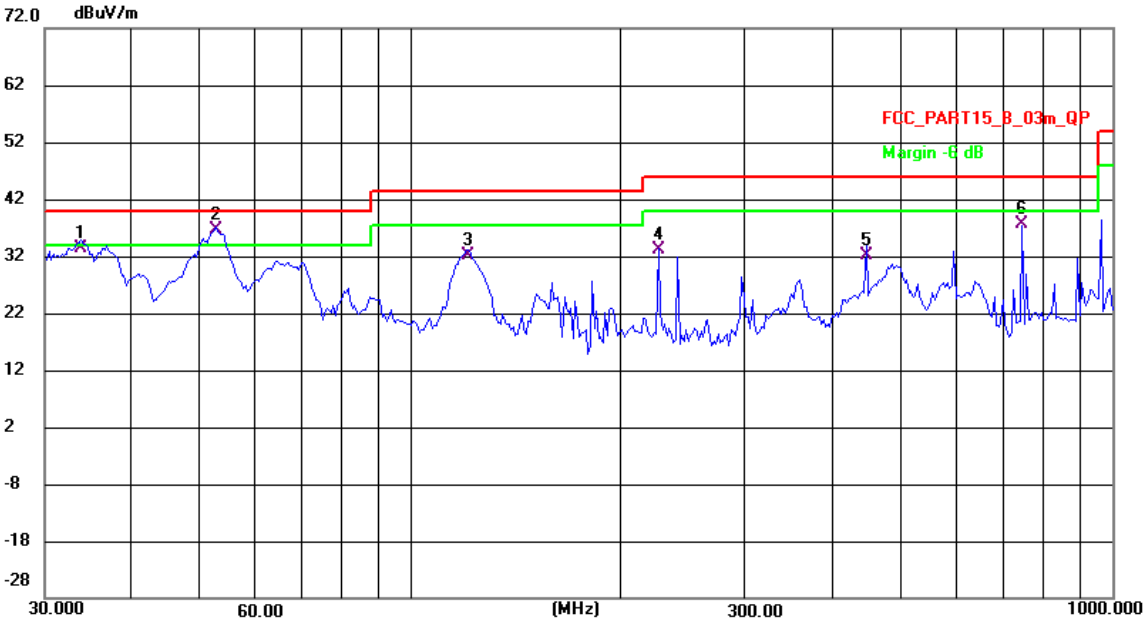
APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

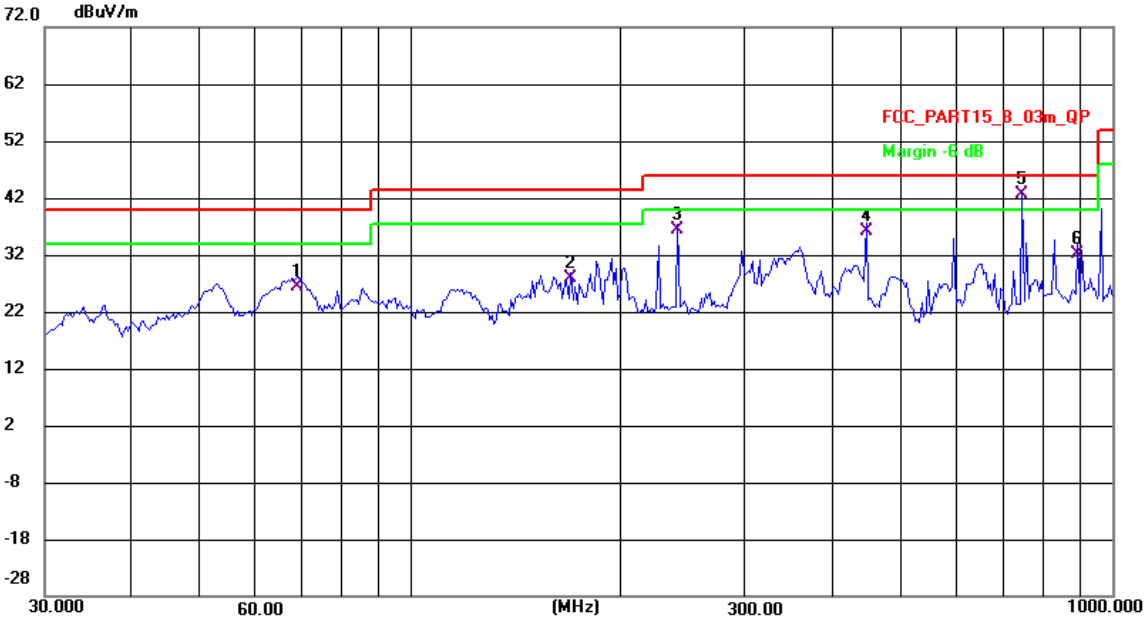
Test Mode	TX G Mode Channel 01	Polarization	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	33.8066	53.38	-19.97	33.41	40.00	-6.59	QP
2 *	52.6343	56.30	-19.76	36.54	40.00	-3.46	QP
3	120.6115	54.30	-22.09	32.21	43.50	-11.29	QP
4	225.4267	58.50	-25.36	33.14	46.00	-12.86	QP
5	445.6931	50.36	-18.22	32.14	46.00	-13.86	QP
6	744.4265	48.64	-11.12	37.52	46.00	-8.48	QP

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX G Mode Channel 01	Polarization	Horizontal



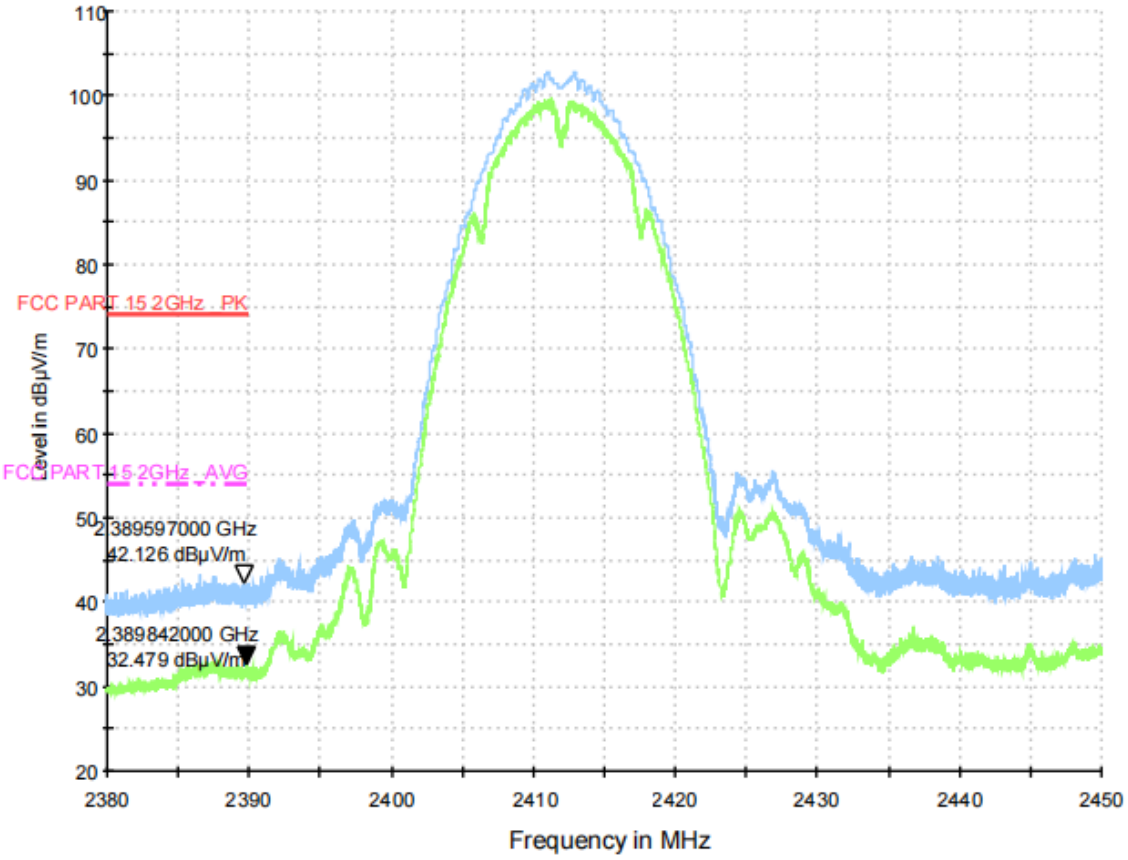
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	68.7450	48.16	-21.85	26.31	40.00	-13.69	QP
2	168.9970	48.96	-21.13	27.83	43.50	-15.67	QP
3	240.1442	60.67	-24.22	36.45	46.00	-9.55	QP
4	445.6931	54.46	-18.22	36.24	46.00	-9.76	QP
5 *	744.4265	53.65	-11.12	42.53	46.00	-3.47	QP
6	893.6556	41.12	-8.98	32.14	46.00	-13.86	QP

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX D - RADIATED EMISSION- ABOVE 1000 MHZ

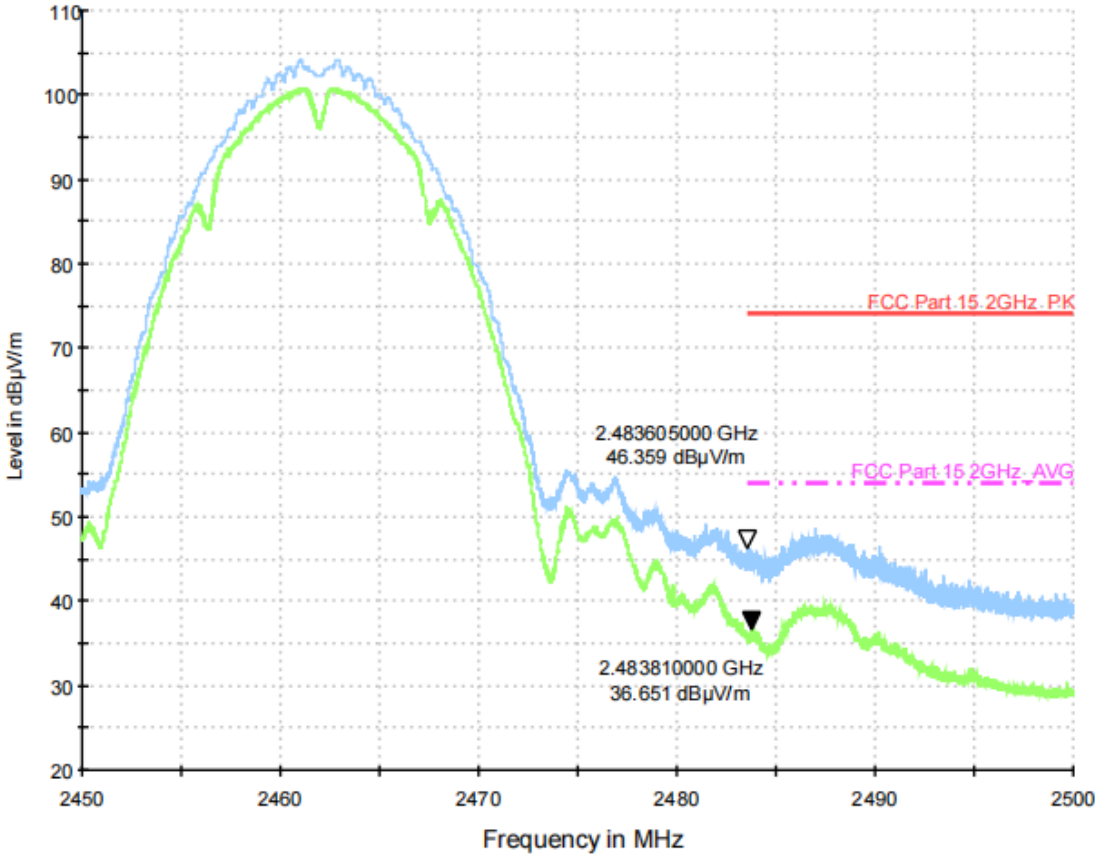
Test Result of Radiated Spurious at Band edges.
Note: All test plots below include both horizontal and vertical

Test Mode	TX B Mode 2412 MHz	Polarization	Vertical/ Horizontal



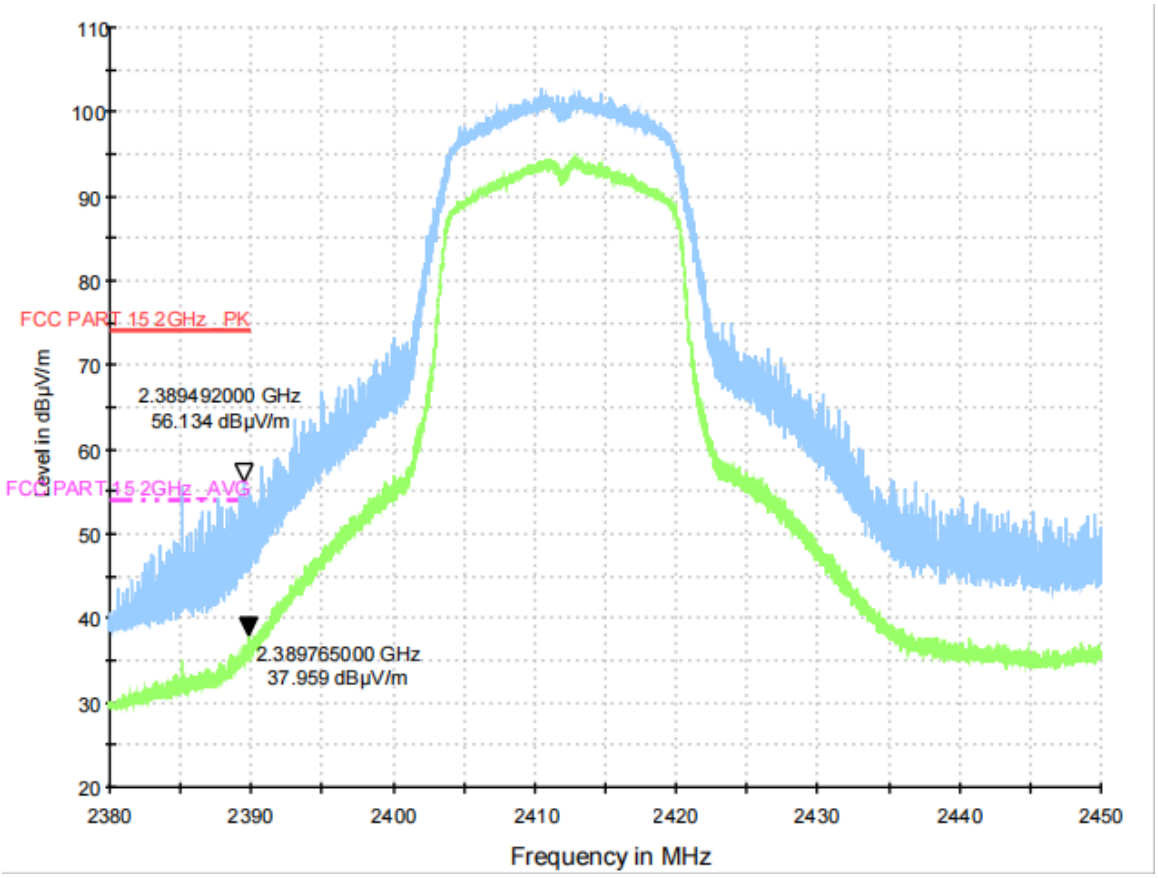
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX B Mode 2462 MHz	Polarization	Vertical/ Horizontal



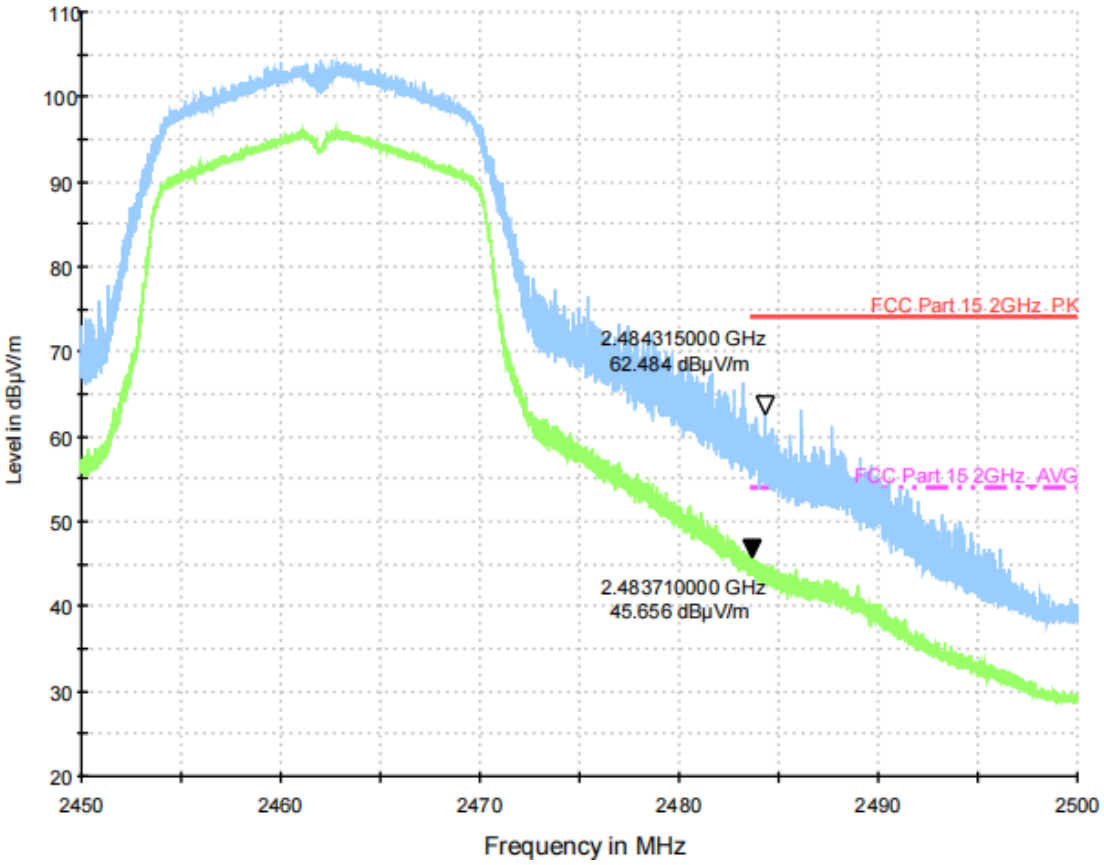
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX G Mode 2412 MHz	Polarization	Vertical/ Horizontal



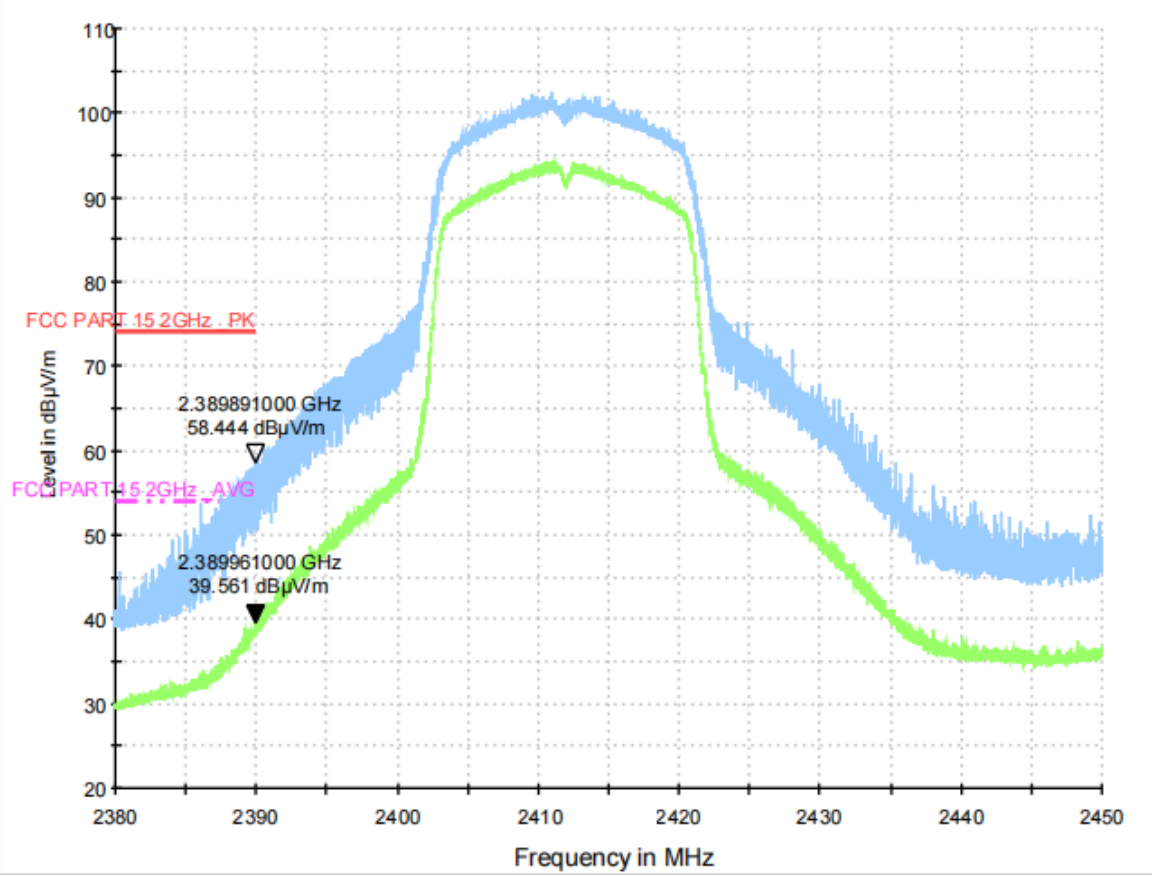
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX G Mode 2462 MHz	Polarization	Vertical/ Horizontal



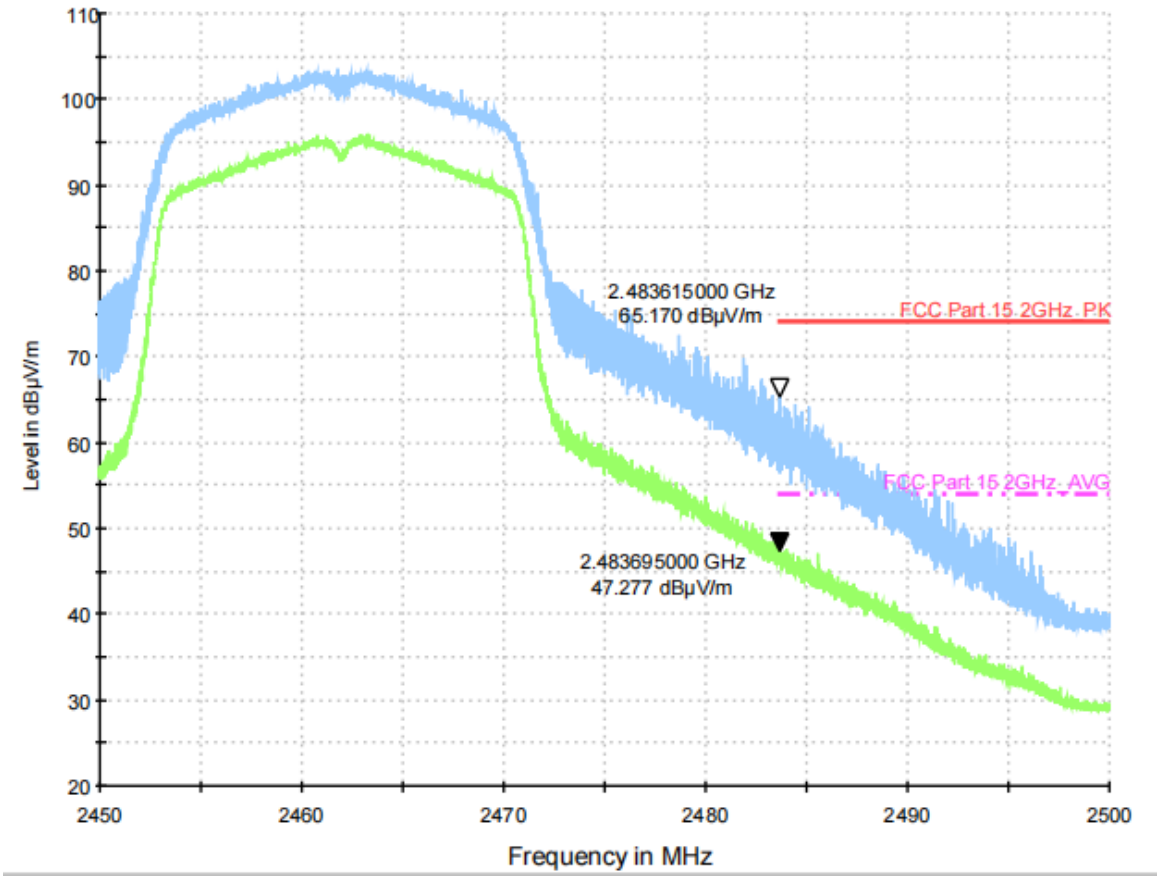
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX N(HT20) Mode 2412 MHz	Polarization	Vertical/ Horizontal

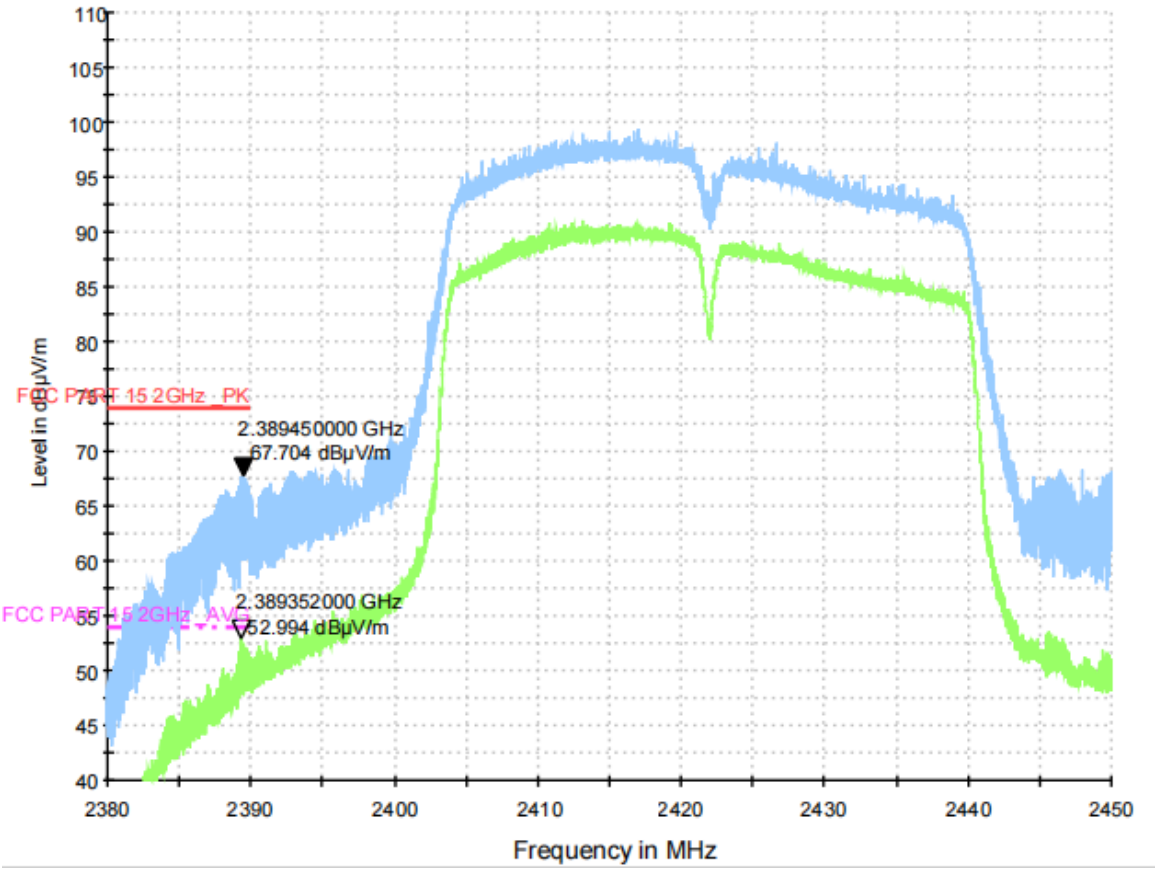


REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

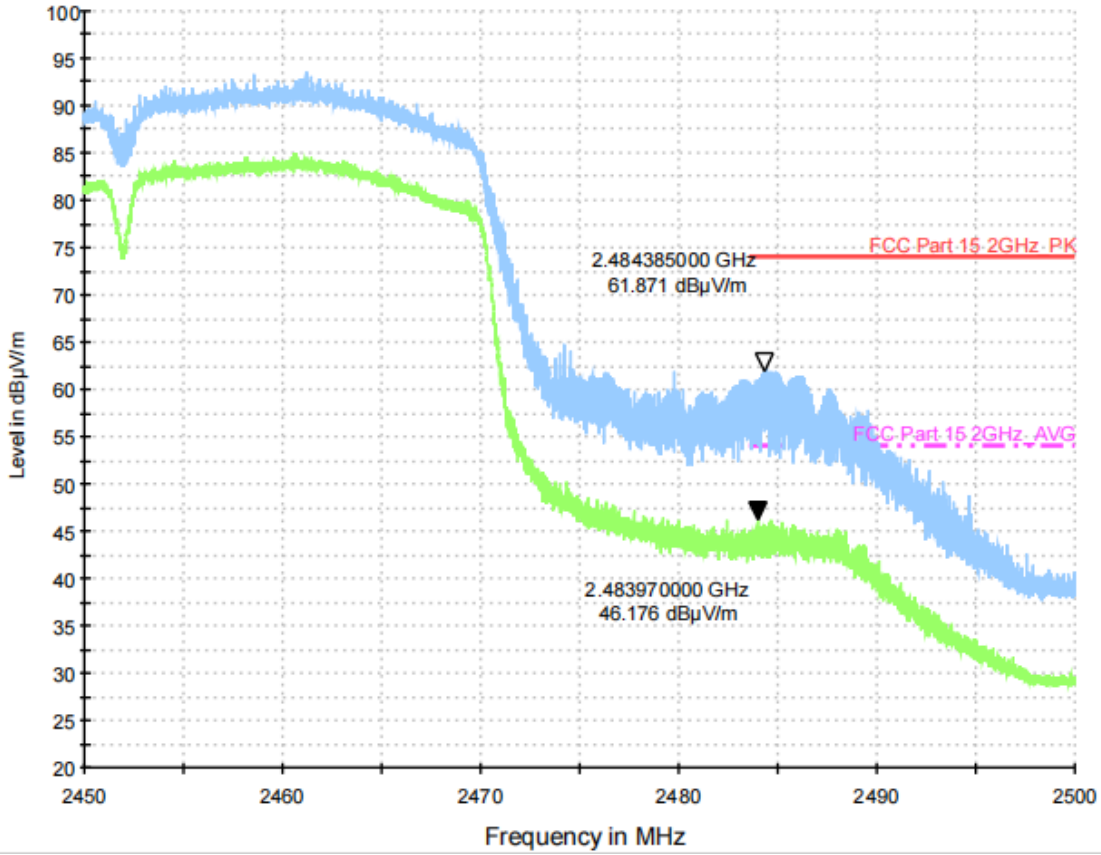
Test Mode	TX N(HT20) Mode 2462 MHz	Polarization	Vertical/ Horizontal



Test Mode	TX N(HT40) Mode 2422 MHz	Polarization	Vertical/ Horizontal



Test Mode	TX N(HT40) Mode 2452 MHz	Polarization	Vertical/ Horizontal



ABOVE 1000 MHz

Note: All the modes have been tested and recorded worst mode in the report.

Modulation Type: 802.11b

Channel 1 / 2412 MHz									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4824.00	H	46.01	---	0.66	46.67	---	74	54	-27.33
7236.00	H	37.32	---	9.5	46.82	---	74	54	-27.18
---	H	---	---	---	---	---	---	---	---
4824.00	V	44.80	---	0.66	45.46	---	74	54	-28.54
7236.00	V	37.31	---	9.5	46.81	---	74	54	-27.19
---	V	---	---	---	---	---	---	---	---

Channel 6 / 2437 MHz									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4874.00	H	47.01	---	0.99	48.00	---	74	54	-26.00
7311.00	H	38.28	---	9.87	48.15	---	74	54	-25.85
---	H	---	---	---	---	---	---	---	---
4874.00	V	56.21	---	-1.59	54.62	---	74	54	-19.38
7311.00	V	40.79	---	8.10	48.89	---	74	54	-25.11
---	V	---	---	---	---	---	---	---	---

Channel 11 / 2462 MHz									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4924.00	H	46.16	---	1.33	47.49	---	74	54	-26.51
7386.00	H	36.23	---	10.22	46.45	---	74	54	-27.55
---	H	---	---	---	---	---	---	---	---
4924.00	V	48.07	---	1.33	49.21	---	74	54	-24.79
7386.00	V	36.98	---	10.22	46.39	---	74	54	-27.61
---	V	---	---	---	---	---	---	---	---

Notes:

1). Radiated emissions measured in frequency range from 9 KHz~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.

2). Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3). Worst case data at 1Mbps at IEEE 802.11b.

4). Measured Level = Reading Level + Factor, Margin = Measured Level – Limit

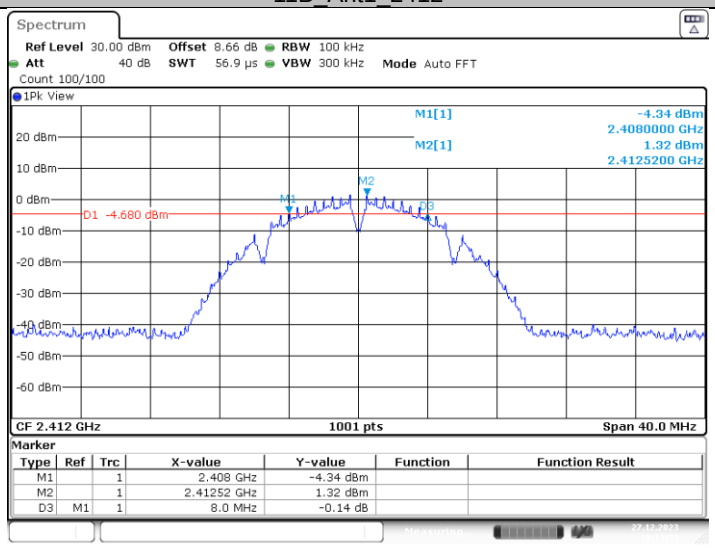
APPENDIX E - BANDWIDTH

1. DTS Bandwidth

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.00	2408.00	2416.00	0.5	PASS
		2437	7.04	2433.48	2440.52	0.5	PASS
		2462	8.08	2457.96	2466.04	0.5	PASS
11G	Ant1	2412	16.32	2403.84	2420.16	0.5	PASS
		2437	15.08	2429.44	2444.52	0.5	PASS
		2462	15.72	2454.44	2470.16	0.5	PASS
11N20SISO	Ant1	2412	16.08	2404.44	2420.52	0.5	PASS
		2437	17.16	2428.60	2445.76	0.5	PASS
		2462	16.72	2454.08	2470.80	0.5	PASS
11N40SISO	Ant1	2422	25.12	2414.48	2439.60	0.5	PASS
		2437	17.28	2429.40	2446.68	0.5	PASS
		2452	35.92	2433.84	2469.76	0.5	PASS

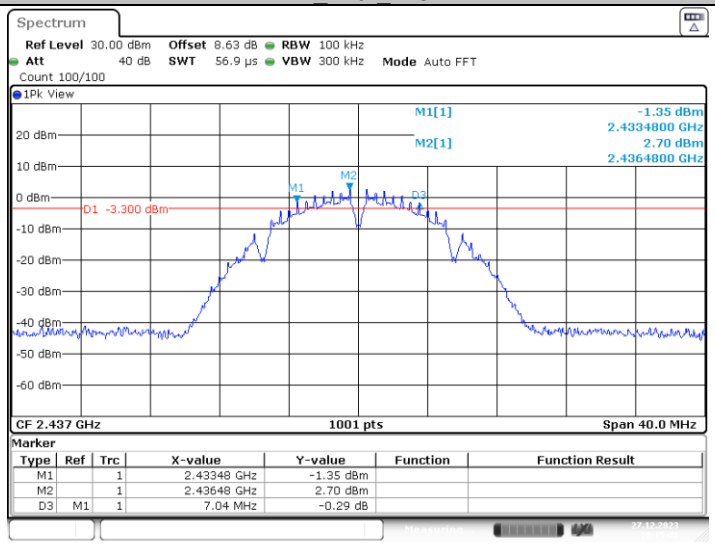
Test Graphs

11B_Ant1_2412



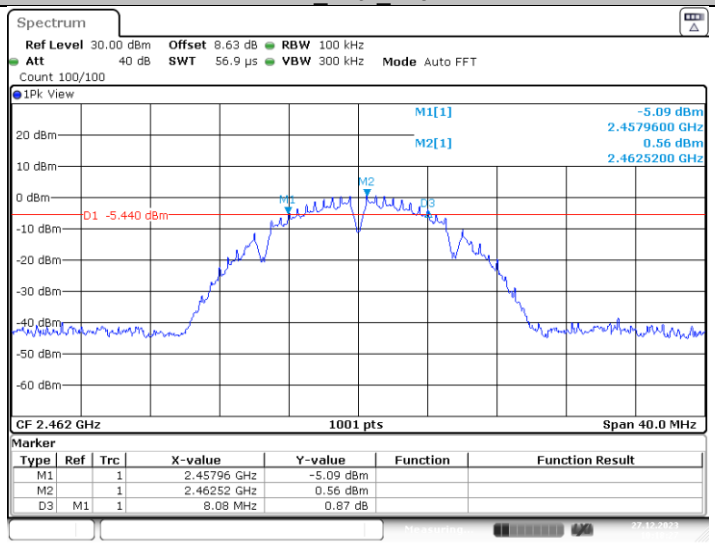
Date: 27.DEC.2023 10:11:31

11B_Ant1_2437



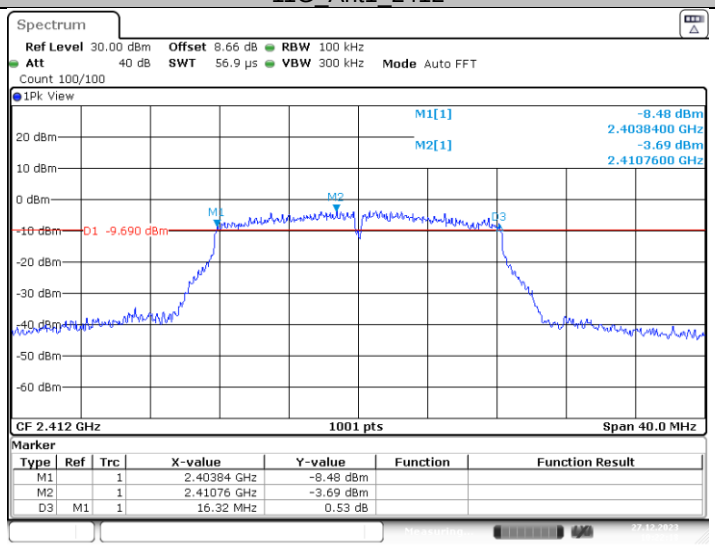
Date: 27.DEC.2023 10:15:45

11B_Ant1_2462



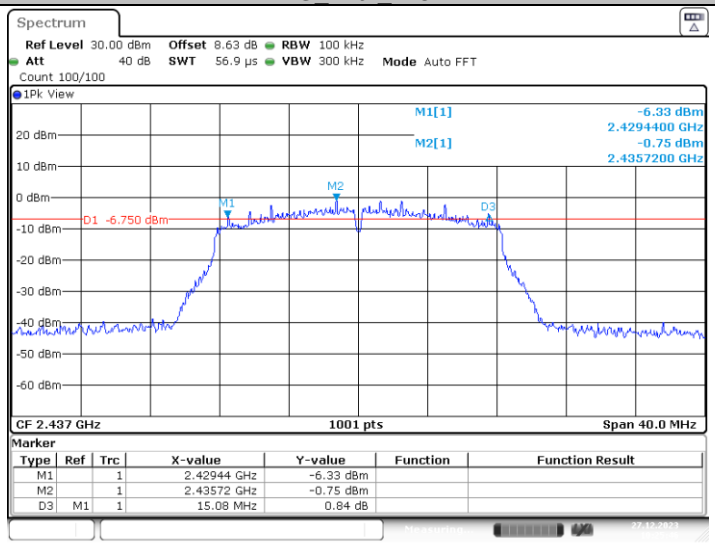
Date: 27.DEC.2023 10:18:27

11G_Ant1_2412



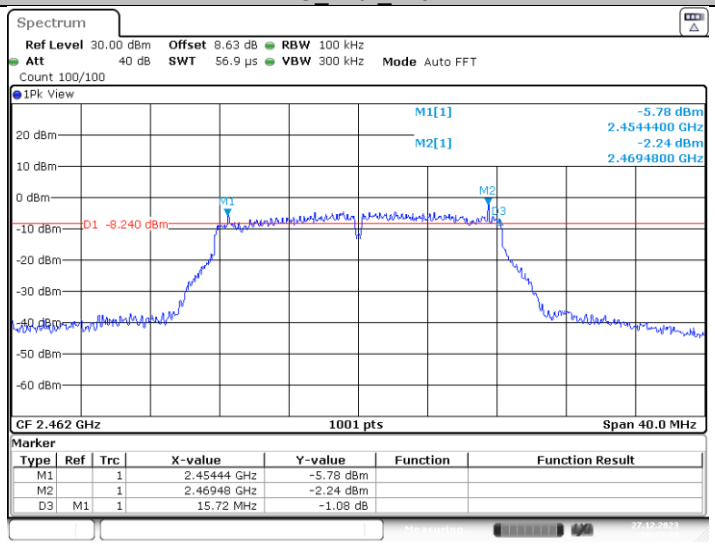
Date: 27.DEC.2023 10:22:17

11G_Ant1_2437



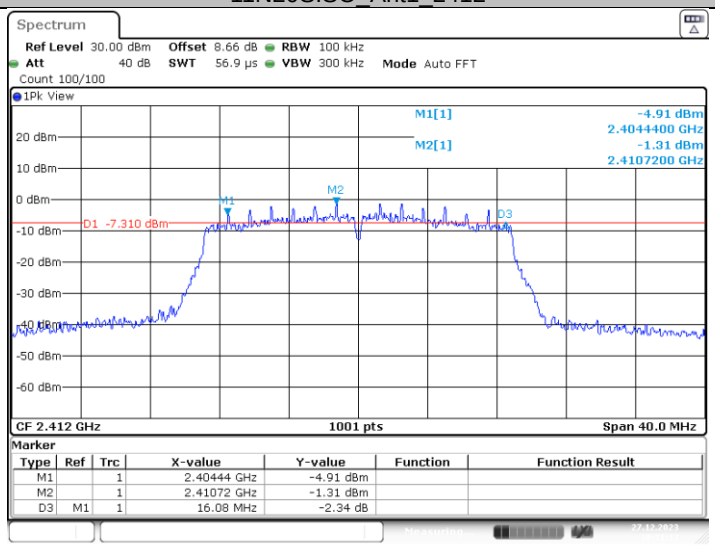
Date: 27.DEC.2023 10:25:46

11G_Ant1_2462



Date: 27.DEC.2023 10:27:34

11N20SISO_Ant1_2412



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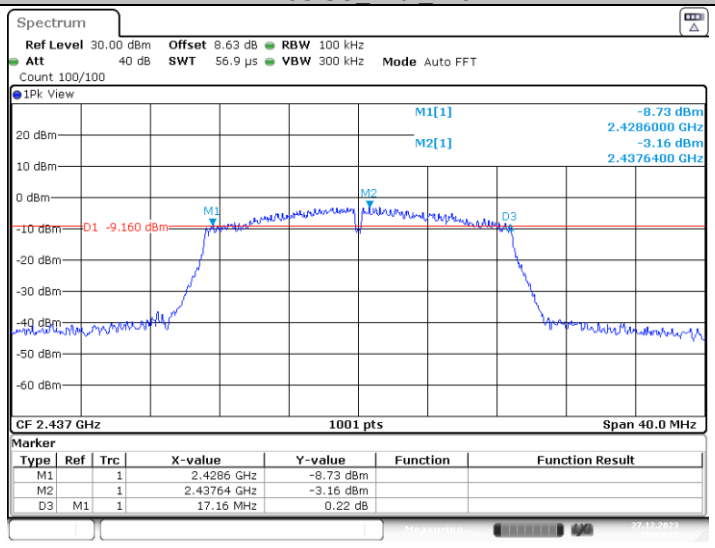
11N20SISO_Ant1_2437



Date: 27.DEC.2023 10:34:31

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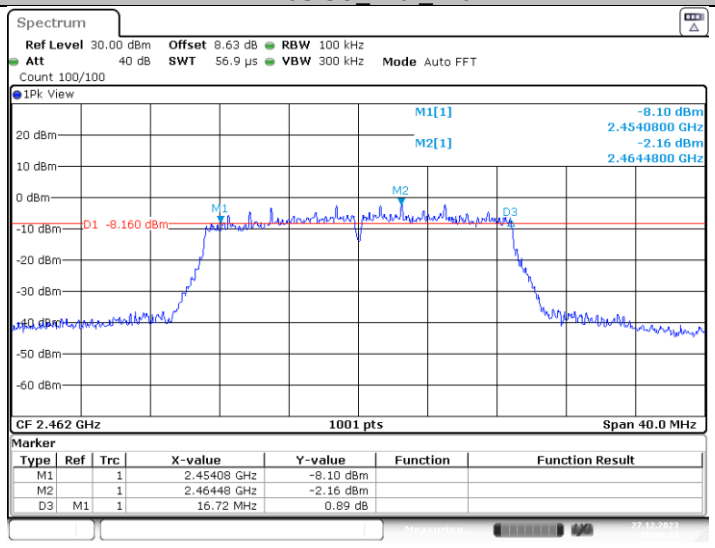

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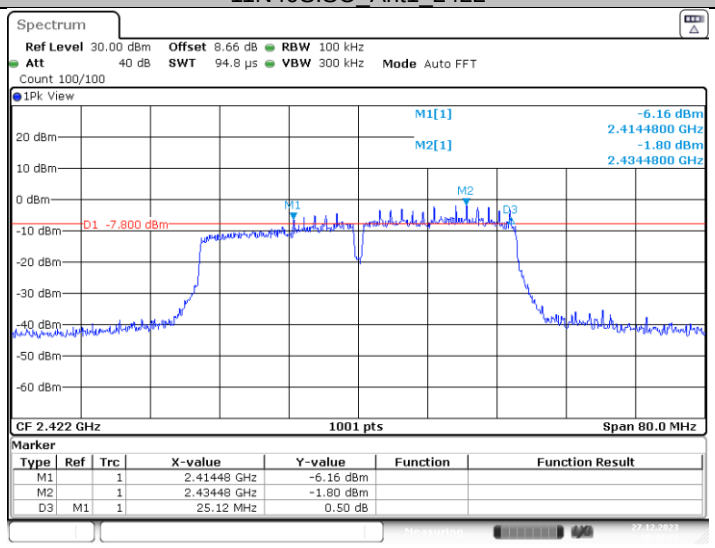
11N40SISO_Ant1_2422



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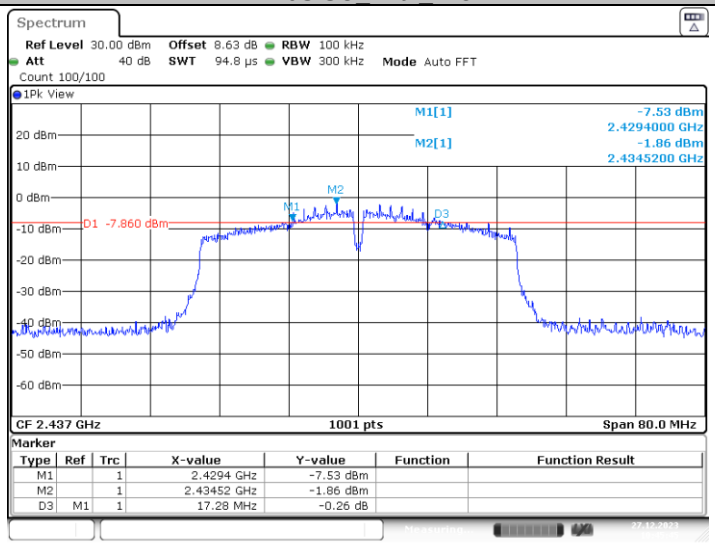
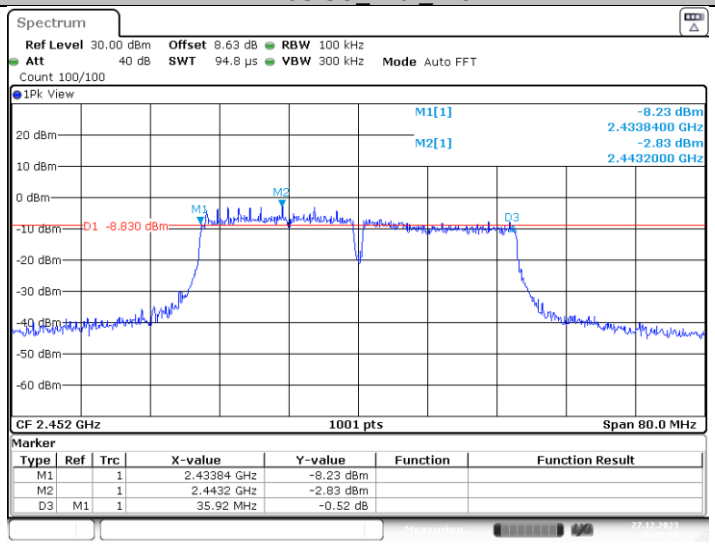
11N40SISO_Ant1_2437



Date: 27.DEC.2023 10:45:45

11N40SISO_Ant1_2452



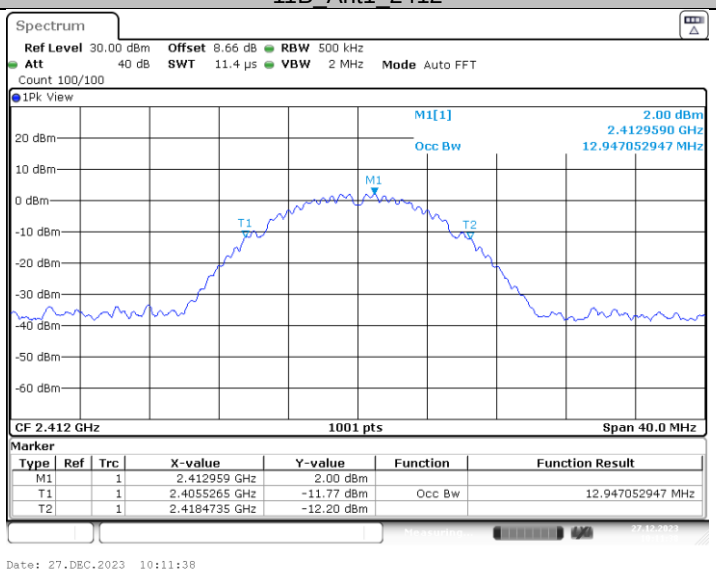
Date: 27.DEC.2023 10:47:53

2. Occupied Channel Bandwidth

TestMode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	12.947	2405.5265	2418.4735	---	---
		2437	12.428	2430.8462	2443.2737	---	---
		2462	13.147	2455.5664	2468.7133	---	---
11G	Ant1	2412	16.863	2403.4885	2420.3516	---	---
		2437	16.503	2428.7283	2445.2318	---	---
		2462	17.183	2453.2887	2470.4715	---	---
11N20SISO	Ant1	2412	17.982	2403.0889	2421.0709	---	---
		2437	17.702	2428.2088	2445.9111	---	---
		2462	18.022	2453.0490	2471.0709	---	---
11N40SISO	Ant1	2422	36.763	2404.0979	2440.8611	---	---
		2437	35.485	2419.3377	2454.8222	---	---
		2452	36.603	2433.3786	2469.9820	---	---

TEST GRAPHS

11B_Ant1_2412



11B_Ant1_2437