

**FCC PART 15.249
TEST REPORT**

For

Arctech Solar

No.190 Huayang Road, Lujia Town, Kunshan, Jiangsu, China

FCC ID: 2AWQQ-WS2G4

Report Type: Original Report	Product Name: 2.4G LoRa wireless module
Report Number:	RSHA240108005-00A
Report Date:	2024-07-15
Reviewed By:	Jenny Yang
Approved By:	Kyle Xu
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu Province, China Tel: +86-512-86175000 Fax: +86-512-88934268 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RSHA240108005-00A	R1 V1	2024-07-15	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Arcotech Solar
Tested Model:	WS2G4
Product Name:	2.4G LoRa wireless module
Power Supply:	DC 5V
RF Function:	2.4G LoRa
maximum E-Field:	100.43dB μ V/m
Modulation type:	Chirp Spread Spectrum
Operating Band/Frequency:	Data Rate: 10Kbps: 2402 MHz - 2479 MHz Data Rate: 20Kbps/30Kbps 2402 MHz - 2478 MHz Data Rate: 40Kbps/50Kbps: 2404 MHz - 2476 MHz
Channel Number:	Data Rate: 10Kbps: 78 Data Rate: 20Kbps/30Kbps 39 Data Rate: 40Kbps/50Kbps: 19
Antenna Type:	Sucker antenna
★Maximum Antenna Gain:	3.0 dBi

Note: The maximum antenna gain is provided by the applicant.

All measurement and test data in this report was gathered from production sample serial number: RSHA240108005-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-01-08.)

Objective

This type approval report is prepared for *Arcotech Solar* in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commission rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209, 15.215 and 15.249 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	9 kHz~150 kHz	3.8dB
	150 kHz~30 MHz	3.4dB
	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu Province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN5055.

SYSTEM TEST CONFIGURATION**Justification**

Channel list:

Data Rate: 10Kbps

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	40	2441
2	2403	...	...
...	...	...	...
...	...	77	2478
39	2440	78	2479

EUT was tested with Channel 1, 39, 78.

Data Rate: 20Kbps/30Kbps

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	21	2442
2	2404	...	...
...	...	...	...
...	...	38	2476
19	2438	39	2478
20	2440	/	/

EUT was tested with Channel 1, 19, 39.

Data Rate: 40Kbps/50Kbps

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2404	10	2440
2	2408	...	...
...	...	...	...
8	2432	19	2476
9	2436	/	/

EUT was tested with Channel 1, 9, 19.

EUT Exercise Software

“2.4GLoRaDebugger(0.0.0.2)_boxed.exe” was used during the test.

Pre-scan with all the data rates, and the worst case was performed as below:

Data Rate	Channel	★Power Level
10 Kbps	Low	5
	Middle	5
	High	5
20 Kbps	Low	5
	Middle	5
	High	5
40 Kbps	Low	5
	Middle	5
	High	5

Note: The power level was declared by the applicant.

Support Equipment List and Details

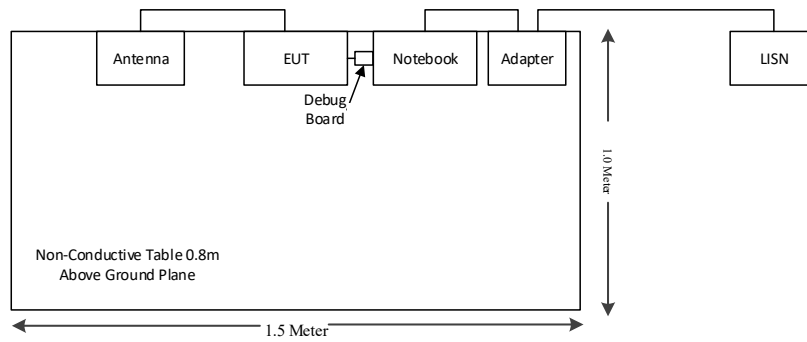
Manufacturer	Description	Model	Serial Number
Lenovo	Notebook	Thinkpad T470S	R9-0FYHD4 15/05
/	Debug Board	USB2Uart KT6c V1.1	/

External I/O Cable

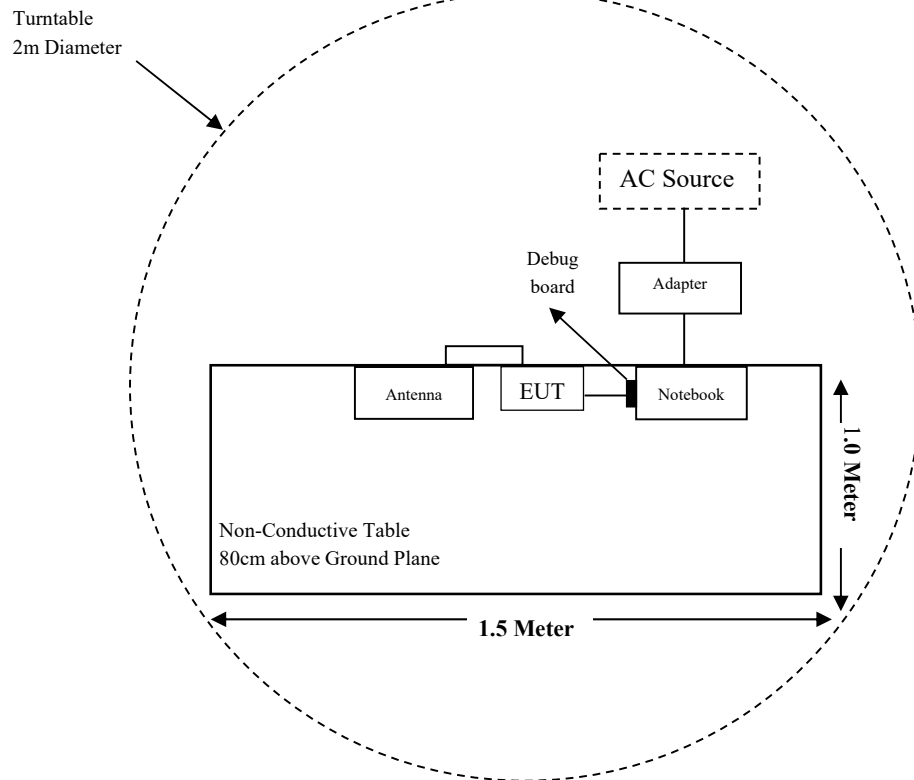
Cable Description	Length (m)	From Port	To
Data cable	0.2	Debug Board	EUT
Power Cable 1	2.0	Adapter	Notebook
USB Cable	6.0	Debug Board	Notebook
Power Cable 3	1.0	Adapter	AC Source/LiSN

Block Diagram of Test Setup

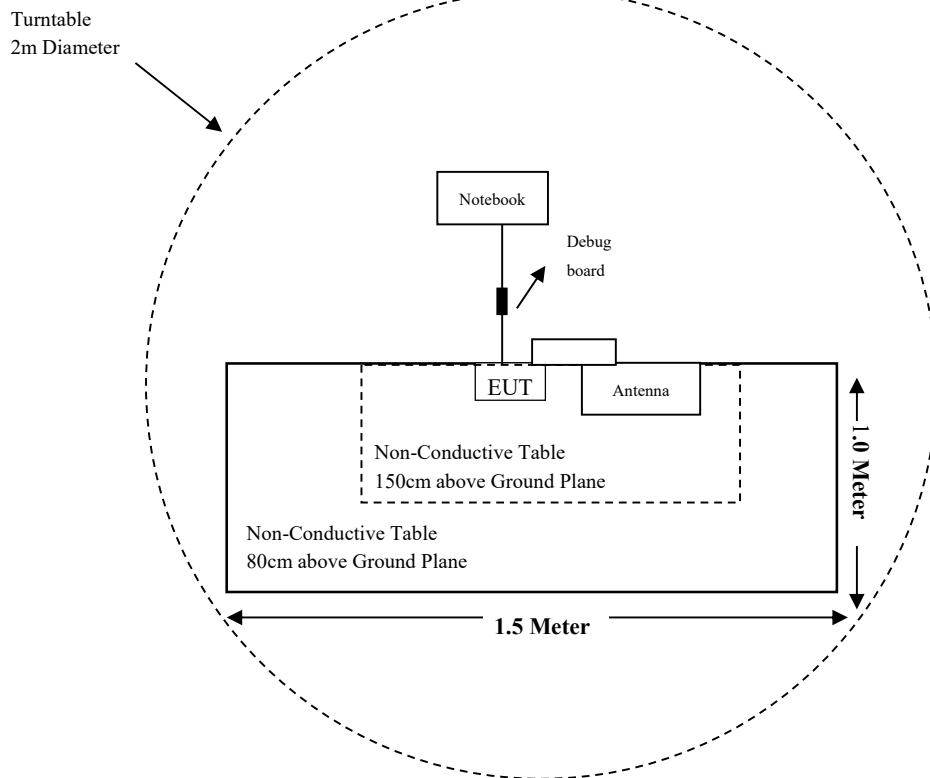
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	AC Line Conducted Emissions	Compliant
15.205, §15.209, §15.249	Radiated Emissions & Out of Band Emission	Compliant
§15.215 (c)	20 dB Bandwidth	Compliant
§1.1310 & §2.1093	RF exposure	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 2#)					
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2023-06-27	2024-06-26
ETS-LINDGREN	Horn Antenna	3116	2516	2023-12-08	2024-12-07
MICRO-TRONICS	Notch Filter	BRM50702	G024	2023-08-05	2024-08-04
A.H.Systems, inc	Amplifier	PAM-0118P	512	2023-05-23	2024-05-22
SELECTOR	Amplifier	EM18G40G	060726	2023-05-23	2024-05-22
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-11	011	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-12	012	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-13	013	2023-05-23	2024-05-22
Rohde & Schwarz	EMI Test Receiver	ESU40	100207/040	2023-05-23	2024-05-22
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2023-05-23	2024-05-22
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10
Narda	6dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
Sonoma Instrument	Amplifier	310N	171205	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-8	008	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2023-05-23	2024-05-22
Rohde & Schwarz	Test Software	EMC32	100361	N/A	N/A
ETS-LINDGREN	loop Antenna	6512	108100	2023-11-09	2024-11-08
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2023-05-23	2024-05-22
Eastsheep	Attenuator	20dB-01	2W-N-JK-18G	2023-05-23	2024-05-22
XHFDZ	RG316 Coaxial Cable	SMA-316	XHF-1175	Each time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	101746	2023-05-23	2024-05-22
ROHDE&SCHWARZ	LISN	ENV216	101115	2023-05-23	2024-05-22
Rohde & Schwarz	Pulse Limiter	ESH3-Z2	0357.8810.54	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-15	015	2023-05-23	2024-05-22
Audix	Test Software	e3	V9	N/A	N/A

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has a Sucker antenna for SRD, use a unique type of connector to attach to the EUT, antenna gain is 3.0 dBi, fulfill the requirement of this section, please refer to the EUT photos.

Result: Compliant.

§1.1310 & §2.1093 - RF EXPOSURE

Applicable Standard

According to §2.1093 and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})]}{[\sqrt{f(\text{GHz})}]} \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

1. f (GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Calculation results

For worst case:

Mode	Max Tune-up Conducted Power		Calculated Distance (mm)	Calculated Value	Threshold (1-g SAR)	SAR Test Exclusion
	(dBm)	(mW)				
2.4G SRD	3.0	2.0	5	0.6	3.0	Yes

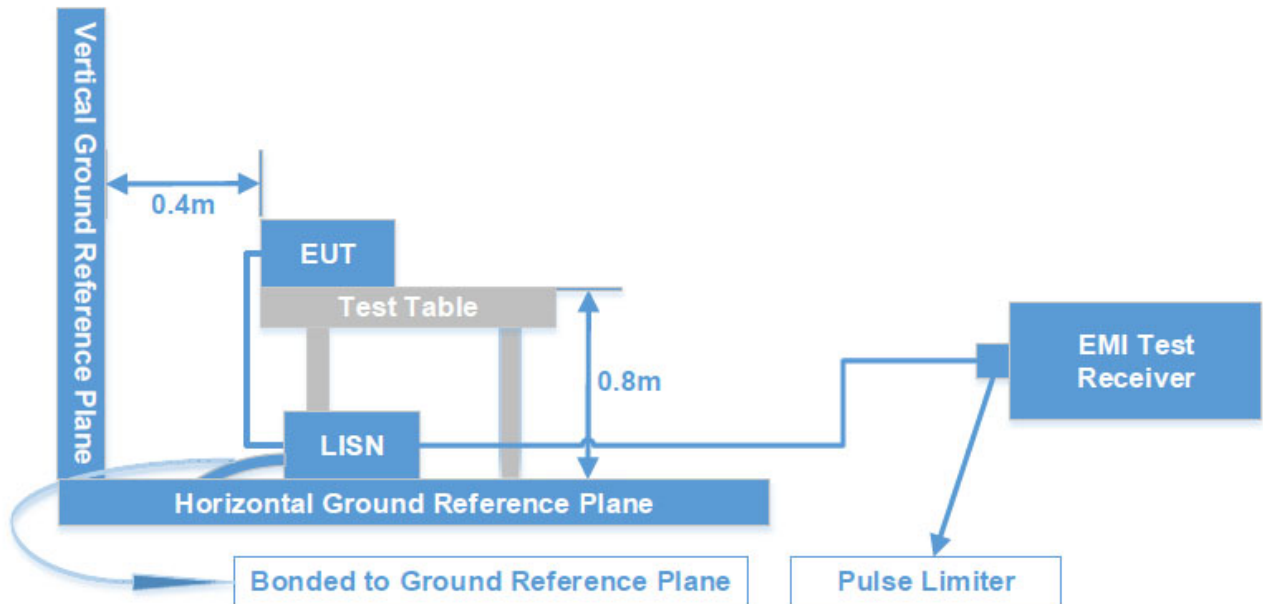
Note:

1. This device maximum E-Field level is 100.43dB μ V/m at 3m, so the EIRP power is 5.23 dBm, Antenna Gain is 3.0dBi, so the Maximum Conduct Power is 2.23dBm.
2. $\text{EIRP(dBm)} = \text{Field Strength of Fundamental(dBuV/m)} - 95.2$,
 $\text{Maximum Conduct Power (dBm)} = \text{EIRP(dBm)} - \text{Antenna Gain(dBi)}$

Result: No SAR test is required.

FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS**Applicable Standard**

FCC §15.207(a)

Test System Setup

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	VBW
150 kHz - 30 MHz	9 kHz	30 kHz

Test Procedure

ANSI C63.10-2013 clause 6.2

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

If the maximum peak value of the emissions is below the average limit, the QP value and average value measurement will not need to be performed and only record the maximum peak measured value to meet the requirements.

Level & Over Limit Calculation

The Level is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation from the Meter Reading. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)

Level (dBμV) = Read level (dBμV) + Factor (dB)

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

Over Limit (dB) = Level (dBμV) - Limit (dBμV)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, FCC Part 15.207.

Test Data: See APPENDIX

FCC§15.205, §15.209&§15.249 - RADIATED EMISSIONS& OUT OF BAND EMISSION

Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

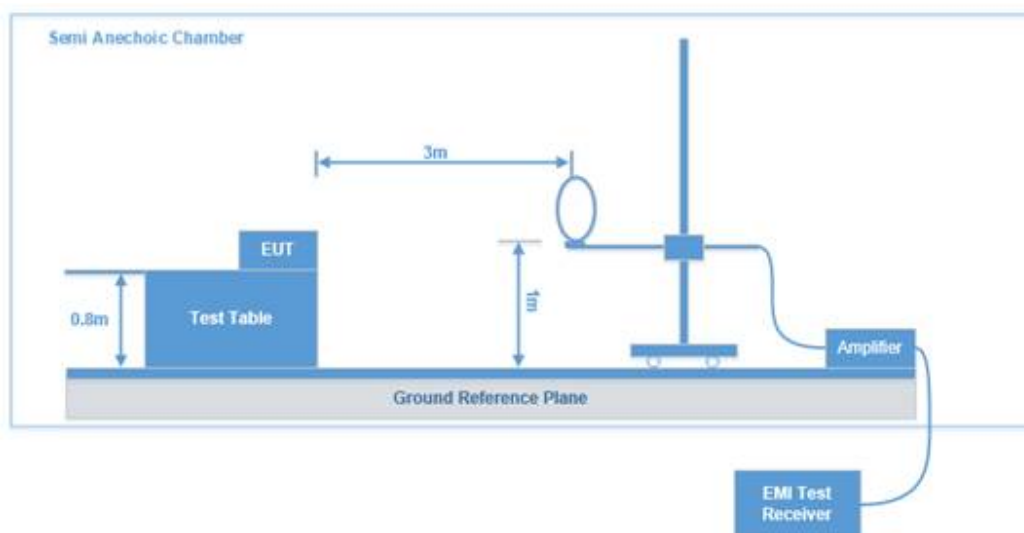
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24GHz-24.25GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

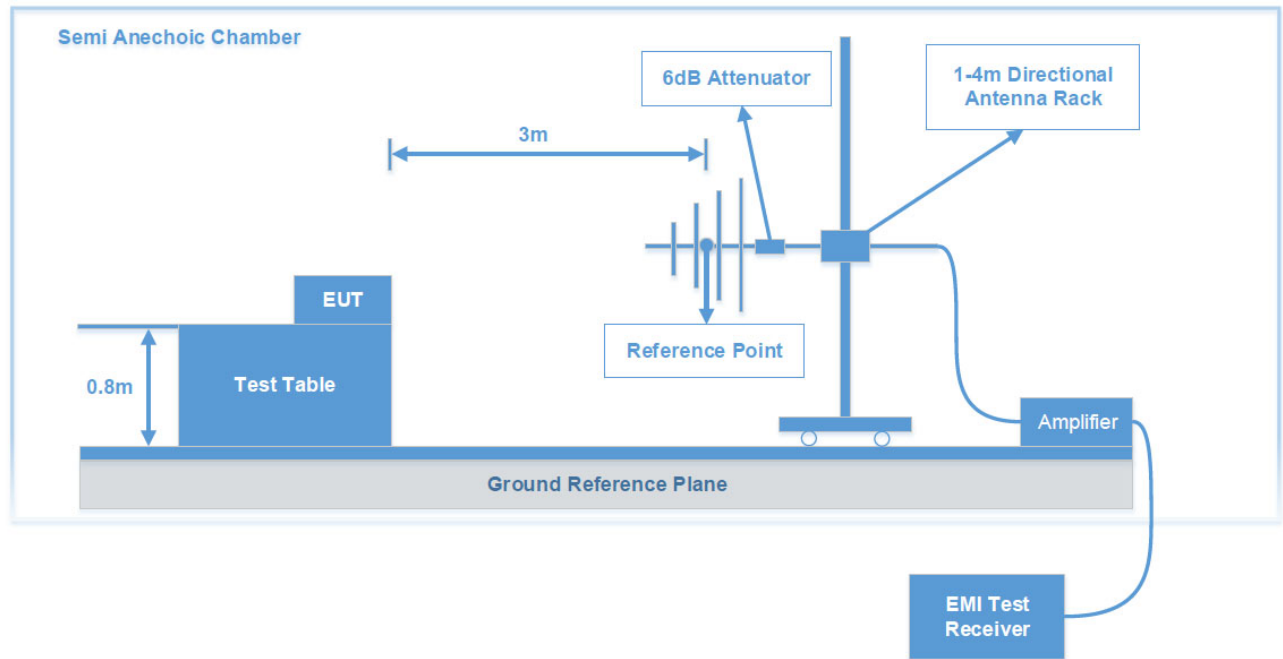
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test System Setup

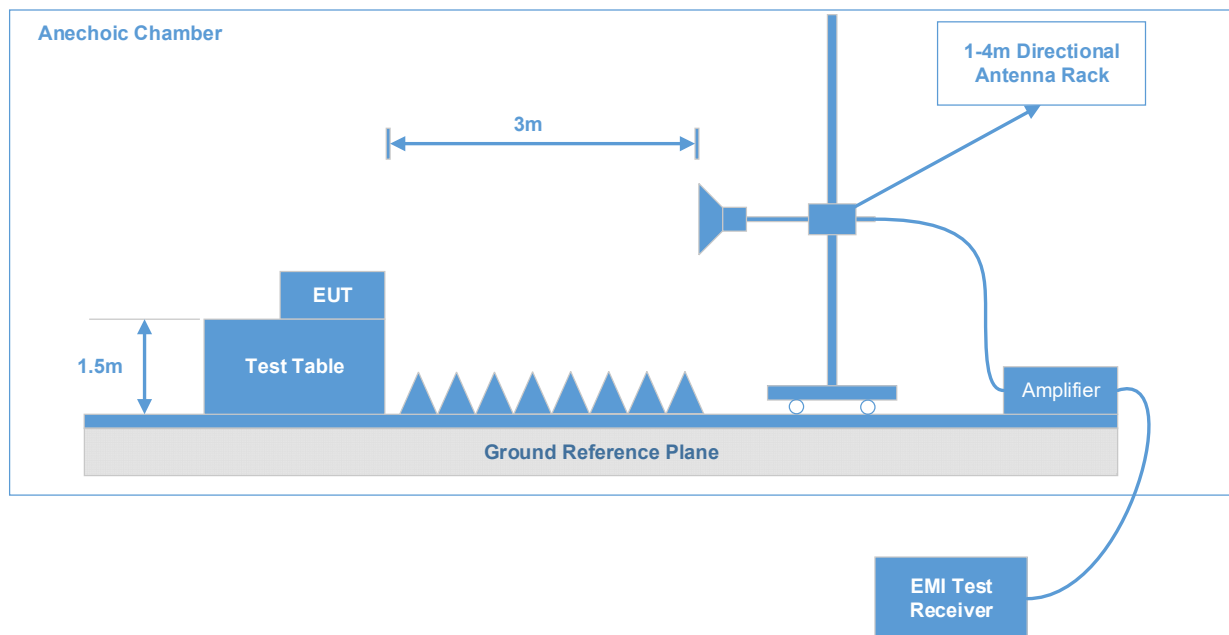
9 kHz - 30 MHz:



30 MHz - 1 GHz:



Above 1 GHz:



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

Test Equipment Setup

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	VBW	IF B/W	Measurement
9 kHz - 150 kHz	200 Hz	1 kHz	200 Hz	QP/Average
150 kHz - 30 MHz	9 kHz	30 kHz	9 kHz	QP/ Average
30 MHz - 1000 MHz	100 kHz	300 kHz	/	Peak
	/	/	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	/	Average

For fundamental and Bandedge test

Frequency Range	RBW	VBW	IF B/W	Measurement
Above 1GHz	1MHz	3 MHz	/	Peak
	1MHz	10 Hz	/	Average

Note: If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 10 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

For 9 kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude (dBμV/m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

Note: The QuasiPeak (dBμV/m), MaxPeak (dBμV/m), Average (dBμV/m) which shown in the data table are all Corrected Amplitude.

The “**Margin/ Over Limit**” column of the following data tables indicates the degree of Compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)
Over Limit (dB) = Level (dBμV/m) - Limit (dBμV/m)

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 &15.205 & 15.249.

Test Data: See APPENDIX

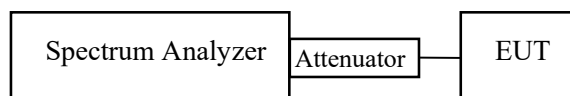
FCC §15.215(c) - 20 dB BANDWIDTH TESTING

Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Procedure

1. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
2. Repeat above procedures until all frequencies measured were complete.

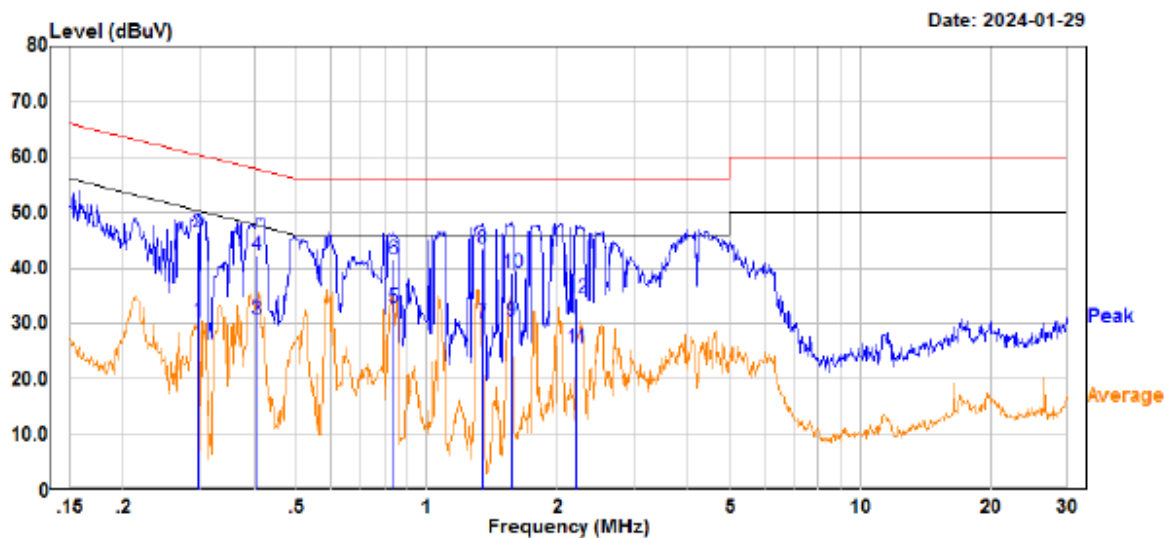


Test Data: See APPENDIX

APPENDIX - TEST DATA

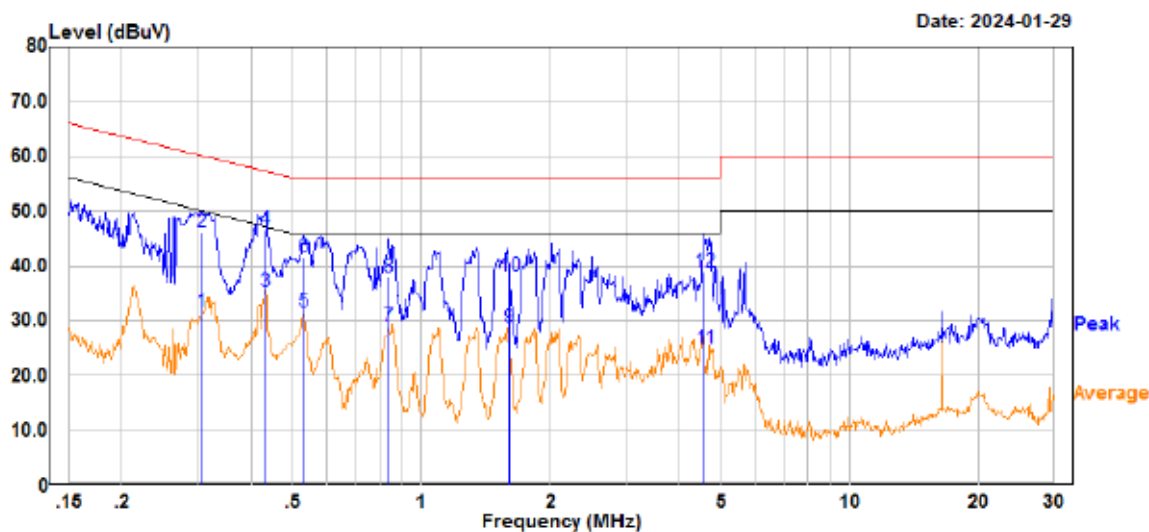
Environmental Conditions & Test Information

Test Item:	AC LINE CONDUCTED EMISSIONS	RADIATED EMISSIONS& OUT OF BAND EMISSION	20 dB BANDWIDTH TESTING
Test Date:	2024-01-29	2024-02-06 to 2024-05-06	2024-03-22
Temperature:	18.4 °C	16.5 °C ~ 20.3 °C	20.5 °C
Relative Humidity:	31 %	46 % ~ 52 %	35 %
ATM Pressure:	103.1 kPa	102.6 kPa ~ 103.1 kPa	102.5 kPa
Test Result:	Pass	Pass	Pass
Test Engineer:	Aaron Sun	Joe Zhang &Peter Wang& Klein Zhu& Hugh Wu	Hardy Huang

AC LINE CONDUCTED EMISSIONS**Data Rate: 10Kbps (Transmitting in maximum output power middle channel)**

Site : CE
Condition : limit\FCC Part 15.207
: DET:Peak
Model : WS2G4
Phase : L
Voltage : 120V/60Hz
Mode : Transmitting
Test Equipment : ENV216,ESR
Temperature : 18.4°C
Humidity : 31%
Atmospheric pressure: 103.1kPa
Test Engineer : Aaron Sun

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.297	10.40	20.01	30.41	50.33	-19.92	Average
2	0.297	26.30	20.01	46.31	60.33	-14.02	QP
3	0.406	10.70	20.07	30.77	47.72	-16.95	Average
4	0.406	22.30	20.07	42.37	57.72	-15.35	QP
5	0.837	12.90	19.91	32.81	46.00	-13.19	Average
6	0.837	21.70	19.91	41.61	56.00	-14.39	QP
7	1.344	10.10	19.94	30.04	46.00	-15.96	Average
8	1.344	23.60	19.94	43.54	56.00	-12.46	QP
9	1.569	10.31	20.04	30.35	46.00	-15.65	Average
10	1.569	19.21	20.04	39.25	56.00	-16.75	QP
11	2.213	5.40	20.22	25.62	46.00	-20.38	Average
12	2.213	14.40	20.22	34.62	56.00	-21.38	QP

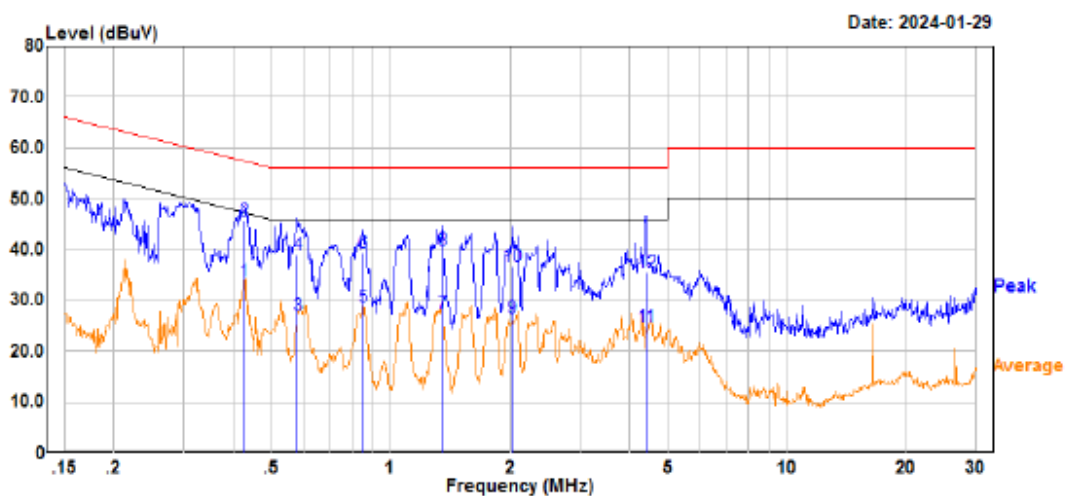


Trace: 1

Site : CE
 Condition : limit\FCC Part 15.207
 : DET:Peak
 Model : WS2G4
 Phase : N
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 18.4℃
 Humidity : 31%
 Atmospheric pressure: 103.1kPa
 Test Engineer : Aaron Sun

	Read			Limit	Over	
Freq	Level	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.307	11.60	20.02	31.62	50.04	-18.42 Average
2	0.307	26.10	20.02	46.12	60.04	-13.92 QP
3	0.432	15.10	20.08	35.18	47.22	-12.04 Average
4	0.432	26.60	20.08	46.68	57.22	-10.54 QP
5	0.532	11.50	20.10	31.60	46.00	-14.40 Average
6	0.532	21.60	20.10	41.70	56.00	-14.30 QP
7	0.837	9.00	19.91	28.91	46.00	-17.09 Average
8	0.837	18.00	19.91	37.91	56.00	-18.09 QP
9	1.601	8.60	20.06	28.66	46.00	-17.34 Average
10	1.601	18.10	20.06	38.16	56.00	-17.84 QP
11	4.582	4.70	20.30	25.00	46.00	-21.00 Average
12	4.582	18.70	20.30	39.00	56.00	-17.00 QP

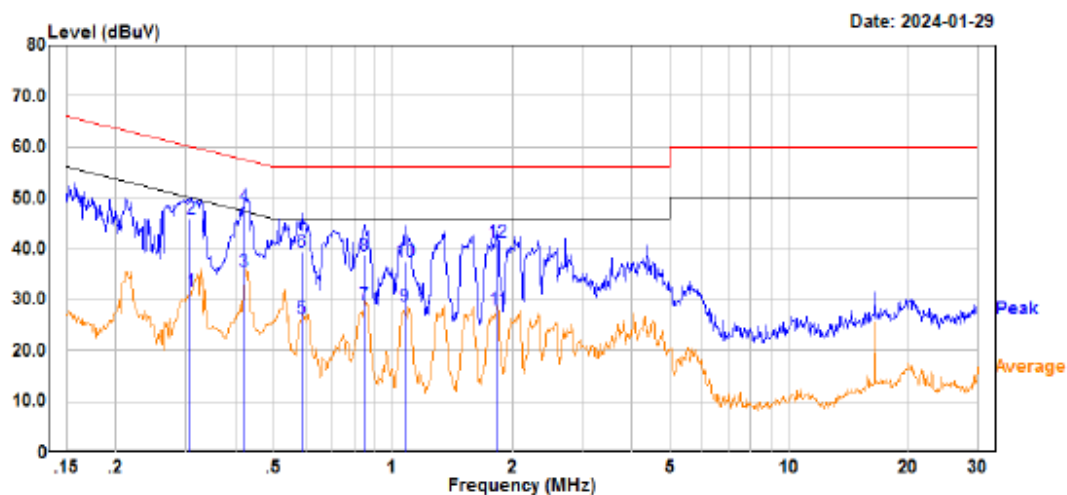
Data Rate: 20Kbps (Transmitting in maximum output power middle channel)



Trace: 1

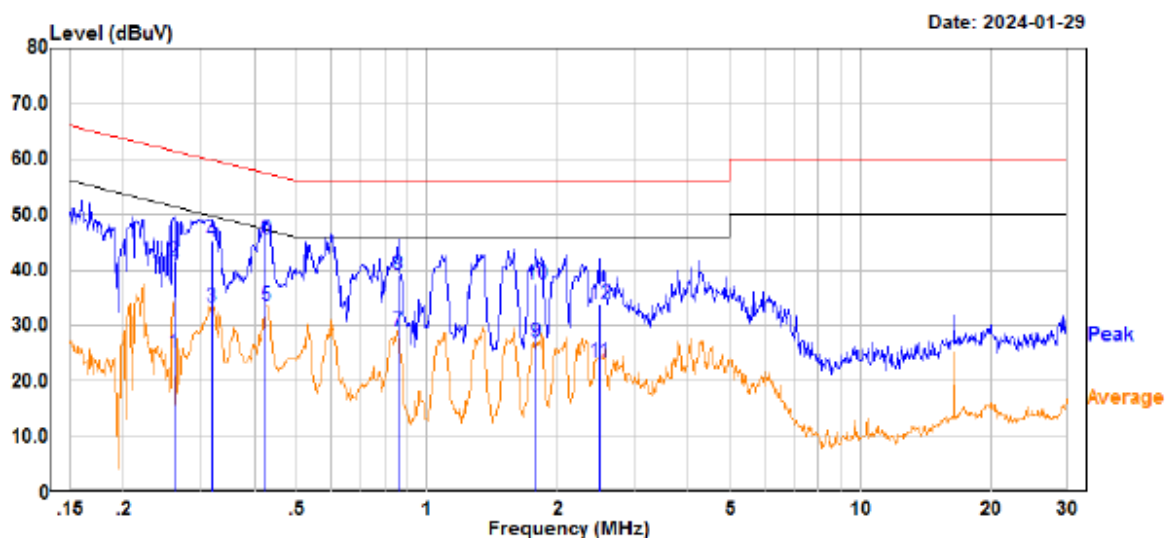
Site : CE
 Condition : limit\FCC Part 15.207
 : DET:Peak
 Model : WS2G4
 Phase : L
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 18.4℃
 Humidity : 31%
 Atmospheric pressure: 103.1kPa
 Test Engineer : Aaron Sun

	Read		Limit	Over	
Freq	Level	Factor	Level	Line	Limit Remark
MHz	dBuV	dB	dBuV	dBuV	dB
1	0.427	13.80	20.08	33.88	47.31 -13.43 Average
2	0.427	25.70	20.08	45.78	57.31 -11.53 QP
3	0.582	7.00	20.09	27.09	46.00 -18.91 Average
4	0.582	18.80	20.09	38.89	56.00 -17.11 QP
5	0.850	9.00	19.89	28.89	46.00 -17.11 Average
6	0.850	19.60	19.89	39.49	56.00 -16.51 QP
7	1.351	7.51	19.94	27.45	46.00 -18.55 Average
8	1.351	19.91	19.94	39.85	56.00 -16.15 QP
9	2.023	6.30	20.21	26.51	46.00 -19.49 Average
10	2.023	16.50	20.21	36.71	56.00 -19.29 QP
11	4.403	4.70	20.29	24.99	46.00 -21.01 Average
12	4.403	15.30	20.29	35.59	56.00 -20.41 QP



Site : CE
 Condition : limit\FCC Part 15.207
 : DET:Peak
 Model : WS2G4
 Phase : N
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 18.4°C
 Humidity : 31%
 Atmospheric pressure: 103.1kPa
 Test Engineer : Aaron Sun

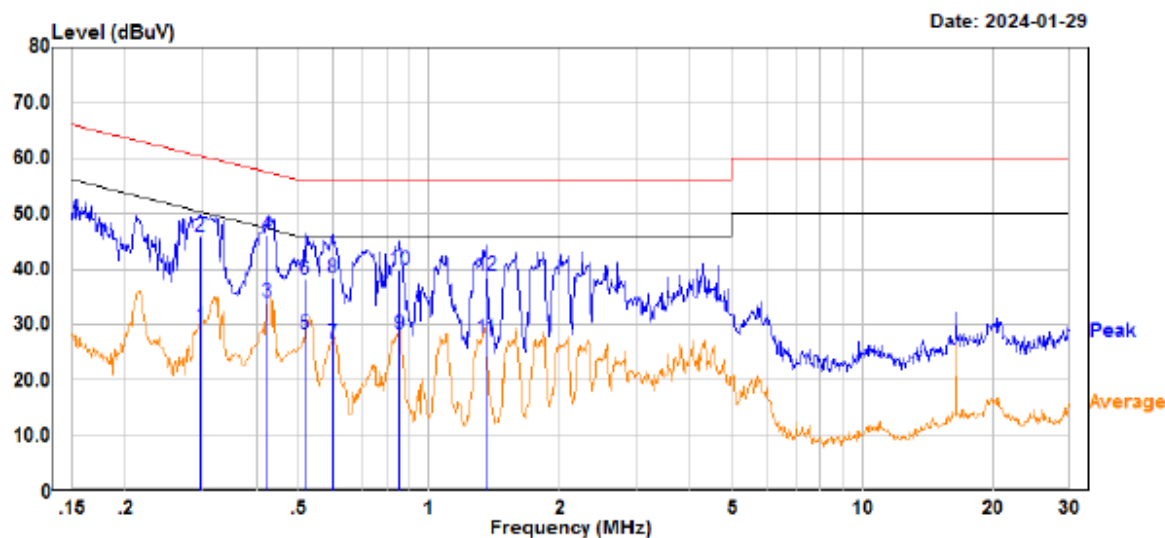
	Read			Limit	Over	
Freq	Level	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.309	11.70	20.02	31.72	50.00	-18.28 Average
2	0.309	26.00	20.02	46.02	60.00	-13.98 QP
3	0.421	15.41	20.07	35.48	47.43	-11.95 Average
4	0.421	28.21	20.07	48.28	57.43	-9.15 QP
5	0.588	6.30	20.09	26.39	46.00	-19.61 Average
6	0.588	19.20	20.09	39.29	56.00	-16.71 QP
7	0.846	9.00	19.90	28.90	46.00	-17.10 Average
8	0.846	18.70	19.90	38.60	56.00	-17.40 QP
9	1.069	8.90	19.79	28.69	46.00	-17.31 Average
10	1.069	17.60	19.79	37.39	56.00	-18.61 QP
11	1.831	7.80	20.15	27.95	46.00	-18.05 Average
12	1.831	21.10	20.15	41.25	56.00	-14.75 QP

Data Rate: 40Kbps (Transmitting in maximum output power middle channel)

Trace: 1

Site : CE
 Condition : limit\FCC Part 15.207
 : DET:Peak
 Model : WS2G4
 Phase : L
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 18.4°C
 Humidity : 31%
 Atmospheric pressure: 103.1kPa
 Test Engineer : Aaron Sun

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.261	5.10	19.99	25.09	51.40	-26.31	Average
2	0.261	21.50	19.99	41.49	61.40	-19.91	QP
3	0.318	13.30	20.02	33.32	49.75	-16.43	Average
4	0.318	25.30	20.02	45.32	59.75	-14.43	QP
5	0.425	13.60	20.08	33.68	47.35	-13.67	Average
6	0.425	25.50	20.08	45.58	57.35	-11.77	QP
7	0.858	9.09	19.89	28.98	46.00	-17.02	Average
8	0.858	19.29	19.89	39.18	56.00	-16.82	QP
9	1.786	6.90	20.13	27.03	46.00	-18.97	Average
10	1.786	17.40	20.13	37.53	56.00	-18.47	QP
11	2.494	3.30	20.23	23.53	46.00	-22.47	Average
12	2.494	13.70	20.23	33.93	56.00	-22.07	QP



Site : CE
 Condition : limit\FCC Part 15.207
 : DET:Peak
 Model : WS2G4
 Phase : N
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 18.4°C
 Humidity : 31%
 Atmospheric pressure: 103.1kPa
 Test Engineer : Aaron Sun

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.297	9.80	20.01	29.81	50.33	-20.52	Average
2	0.297	25.90	20.01	45.91	60.33	-14.42	QP
3	0.423	13.91	20.07	33.98	47.39	-13.41	Average
4	0.423	26.11	20.07	46.18	57.39	-11.21	QP
5	0.516	8.21	20.10	28.31	46.00	-17.69	Average
6	0.516	18.11	20.10	38.21	56.00	-17.79	QP
7	0.600	6.60	20.09	26.69	46.00	-19.31	Average
8	0.600	18.30	20.09	38.39	56.00	-17.61	QP
9	0.854	8.50	19.89	28.39	46.00	-17.61	Average
10	0.854	20.00	19.89	39.89	56.00	-16.11	QP
11	1.351	7.61	19.94	27.55	46.00	-18.45	Average
12	1.351	19.01	19.94	38.95	56.00	-17.05	QP

RADIATED EMISSIONS& OUT OF BAND EMISSION

Test Result: Compliant.

Test mode: Transmitting

After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

9 kHz-30 MHz (Transmitting in maximum output power mode and channel)

The amplitude of spurious emissions attenuated more than 20 dB below the limit was not be recorded.

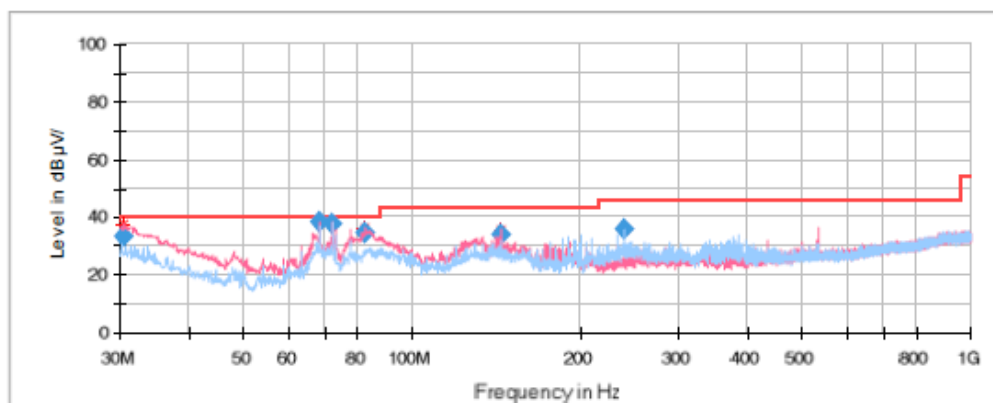
30MHz - 1GHz:

Data Rate: 10Kbps

2402 MHz:

Common Information

Project No:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.5°C
Humidity:	46%
Barometric Pressure:	103.0kPa
Test Engineer:	Joe Zhang
Test Date:	2024/2/6

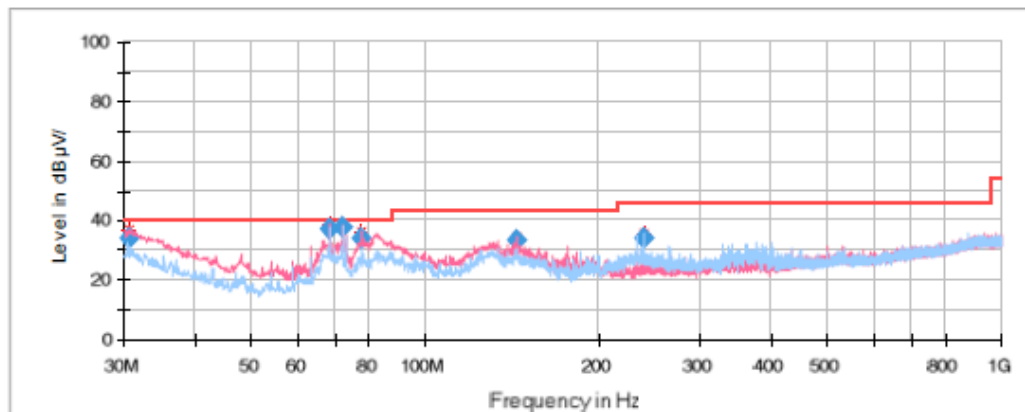
**Final Result**

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.480000	33.26	40.00	6.74	V	-5.0
68.190000	38.38	40.00	1.62	V	-16.9
71.950000	37.85	40.00	2.15	V	-16.9
82.250000	34.59	40.00	5.41	V	-17.5
143.970000	34.12	43.50	9.38	V	-11.7
240.000000	35.65	46.00	10.35	H	-13.0

2440 MHz:

Common Information

Project No:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.5°C
Humidity:	46%
Barometric Pressure:	103.0kPa
Test Engineer:	Joe Zhang
Test Date:	2024/2/6

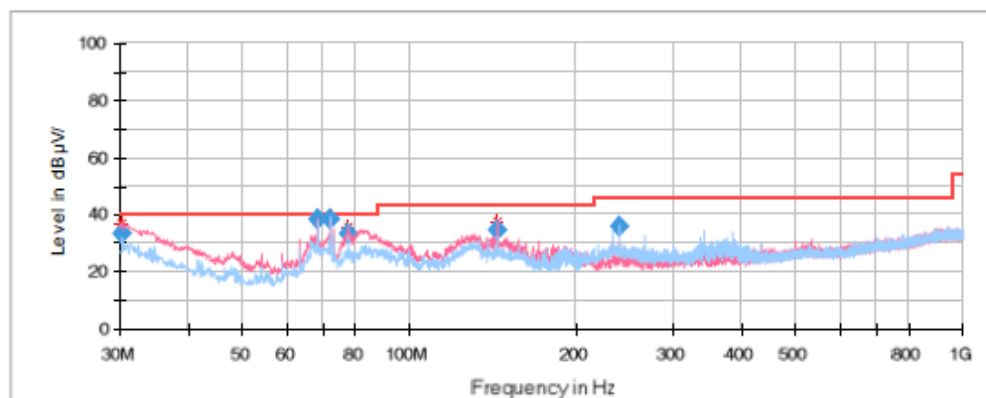
**Final Result**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.720000	33.86	40.00	6.14	V	-4.5
68.190000	37.23	40.00	2.77	V	-16.9
71.950000	38.00	40.00	2.00	V	-16.9
77.530000	33.79	40.00	6.21	V	-17.4
143.970000	33.19	43.50	10.31	V	-11.7
240.000000	34.16	46.00	11.84	H	-13.0

2479 MHz:

Common Information

Project No:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.5°C
Humidity:	46%
Barometric Pressure:	103.0kPa
Test Engineer:	Joe Zhang
Test Date:	2024/2/6

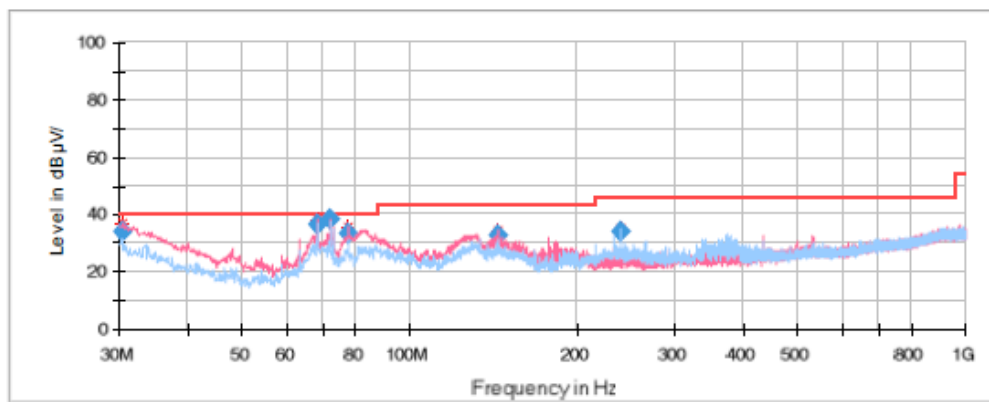
**Final Result**

Frequency (MHz)	QuasiPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.120000	33.18	40.00	6.82	V	-4.6
68.190000	38.28	40.00	1.72	V	-16.9
71.950000	38.08	40.00	1.92	H	-16.9
77.530000	33.51	40.00	6.49	V	-17.4
143.970000	34.30	43.50	9.20	V	-11.7
240.000000	35.82	46.00	10.18	H	-13.0

Data Rate: 20Kbps
2402 MHz:

Common Information

Project No:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.5°C
Humidity:	46%
Barometric Pressure:	103.0kPa
Test Engineer:	Joe Zhang
Test Date:	2024/2/6



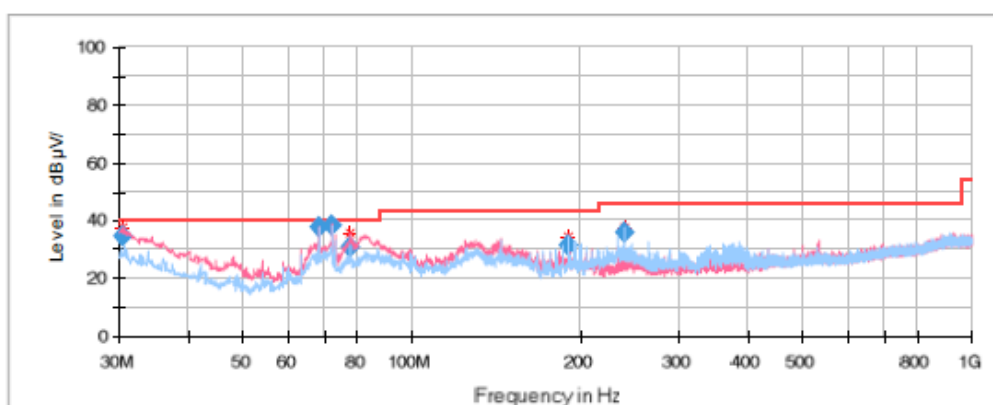
Final Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.480000	34.16	40.00	5.84	V	-4.8
68.190000	36.71	40.00	3.29	V	-16.9
71.950000	38.42	40.00	1.58	V	-16.9
77.530000	33.40	40.00	6.60	V	-17.4
143.970000	32.68	43.50	10.82	V	-11.7
240.003800	34.16	46.00	11.84	H	-13.0

2438 MHz:

Common Information

Project No: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESCI, JB3, 310N
Temperature: 16.5°C
Humidity: 46%
Barometric Pressure: 103.0kPa
Test Engineer: Joe Zhang
Test Date: 2024/2/6

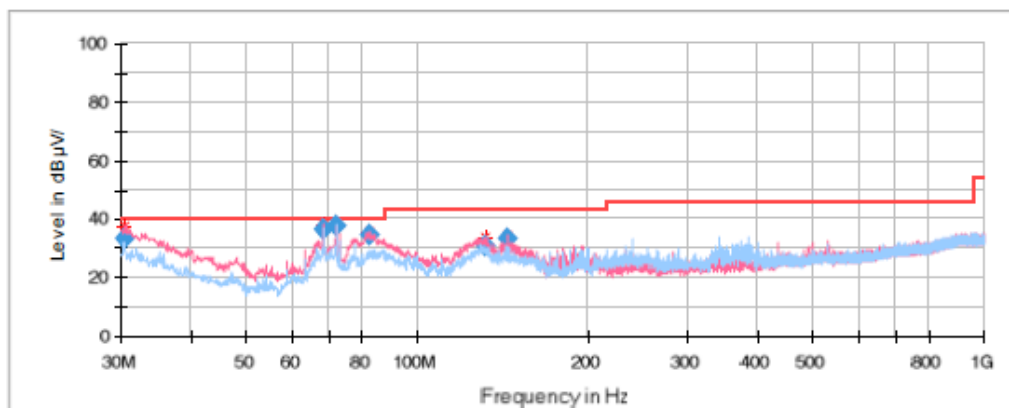
**Final Result**

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.480000	34.46	40.00	5.54	V	-4.8
68.190000	37.75	40.00	2.25	V	-16.9
71.950000	38.30	40.00	1.70	V	-16.9
77.530000	30.57	40.00	9.43	V	-17.4
190.530000	31.68	43.50	11.82	H	-12.9
240.008900	35.60	46.00	10.40	H	-13.0

2478 MHz:

Common Information

Project No: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESCI, JB3, 310N
Temperature: 16.5°C
Humidity: 46%
Barometric Pressure: 103.0kPa
Test Engineer: Joe Zhang
Test Date: 2024/2/6

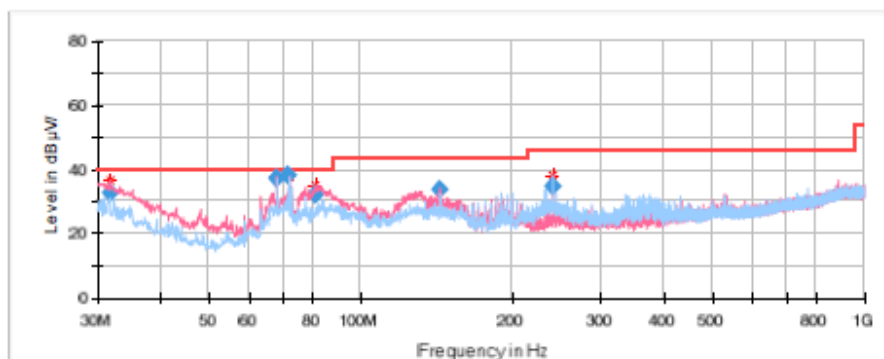
**Final Result**

Frequency (MHz)	QuasiPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.480000	33.36	40.00	6.64	V	-4.6
68.196450	36.51	40.00	3.49	V	-16.9
71.950000	37.87	40.00	2.13	H	-16.9
82.250000	34.62	40.00	5.38	V	-17.5
131.720000	30.85	43.50	12.65	V	-11.4
143.970000	33.29	43.50	10.21	V	-11.7

Data Rate: 40Kbps
2404 MHz:

Common Information

Project No:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.5°C
Humidity:	46%
Barometric Pressure:	103.0kPa
Test Engineer:	Joe Zhang
Test Date:	2024/2/6



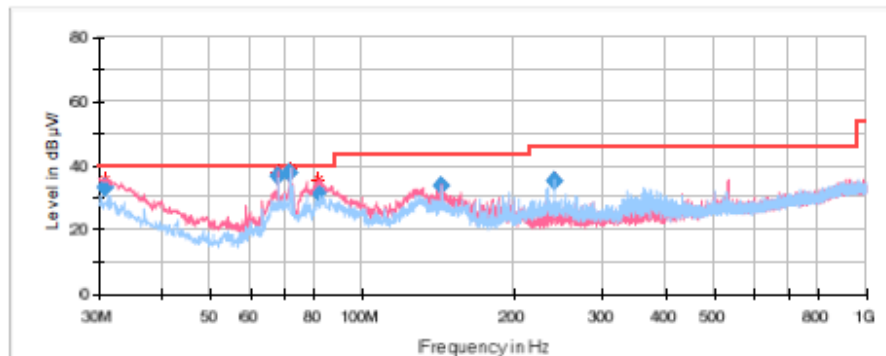
Final Result

Frequency (MHz)	QuasiPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB/m)
31.810000	32.82	40.00	7.18	V	-4.9
68.190000	37.14	40.00	2.86	V	-16.9
71.950000	38.29	40.00	1.71	H	-16.9
81.160000	32.42	40.00	7.58	V	-17.5
143.970000	33.84	43.50	9.66	V	-11.7
240.000000	34.75	46.00	11.25	H	-13.0

2436 MHz:

Common Information

Project No: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESCI, JB3, 310N
Temperature: 16.5°C
Humidity: 46%
Barometric Pressure: 103.0kPa
Test Engineer: Joe Zhang
Test Date: 2024/2/6

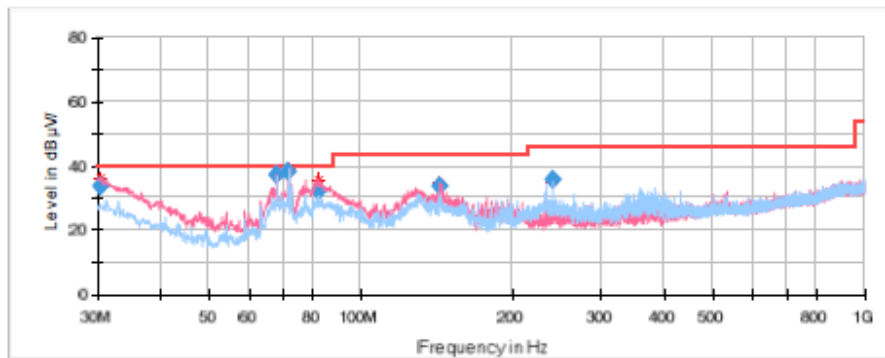
**Final Result**

Frequency (MHz)	QuasiPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.970000	33.11	40.00	6.89	V	-4.6
68.190000	36.87	40.00	3.13	V	-16.9
71.950000	37.91	40.00	2.09	V	-16.9
81.890000	31.63	40.00	8.37	V	-17.5
143.970000	33.62	43.50	9.88	V	-11.7
240.001400	35.26	46.00	10.74	H	-13.0

2476 MHz:

Common Information

Project No: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESCI, JB3, 310N
Temperature: 16.5°C
Humidity: 46%
Barometric Pressure: 103.0kPa
Test Engineer: Joe Zhang
Test Date: 2024/2/6

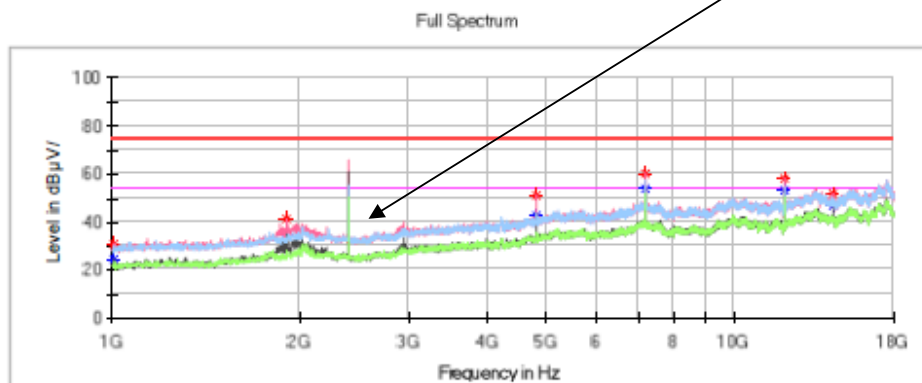
**Final Result**

Frequency (MHz)	QuasiPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.480000	33.54	40.00	6.46	V	-4.8
68.190000	37.21	40.00	2.79	V	-16.9
71.950000	38.23	40.00	1.77	H	-16.9
82.250000	32.16	40.00	7.84	V	-17.5
143.970000	33.85	43.50	9.65	V	-11.7
240.000000	35.55	46.00	10.45	H	-13.0

1 GHz - 18 GHz:**Data Rate: 10Kbps****2402 MHz:****Common Information**

Project No.:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESU40,3115,PAM-0118P
Temperature:	20.3°C
Humidity:	52%
Atmospheric pressure:	103.1kPa
Test Engineer:	Peter Wang
Test Date:	2024/3/1

Fundamental Test with notch filter

**Critical Freqs**

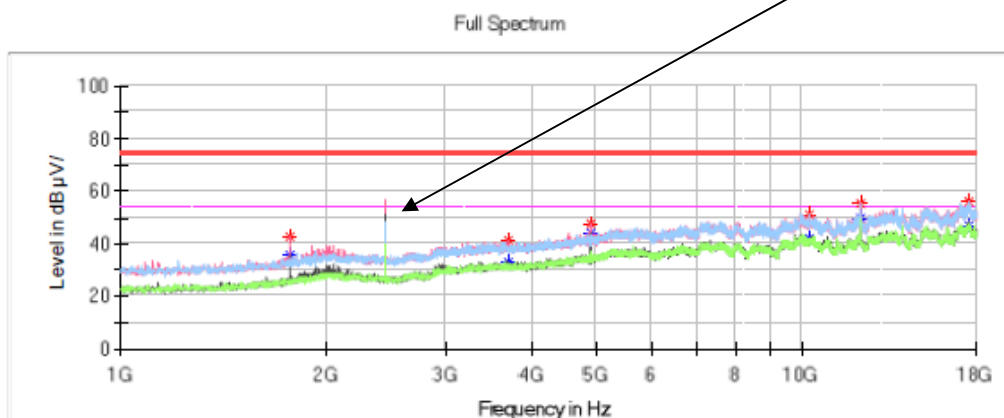
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1008.500000	—	24.28	54.00	29.72	V	-15.5
1008.500000	30.93	—	74.00	43.07	V	-15.5
1911.200000	—	34.74	54.00	19.26	V	-11.2
1911.200000	40.95	—	74.00	33.05	V	-11.2
4802.900000	—	42.31	54.00	11.69	V	-2.2
4802.900000	50.81	—	74.00	23.19	V	-2.2
7203.300000	—	53.95	54.00	0.05	V	4.0
7203.300000	60.41	—	74.00	13.59	V	4.0
12005.800000	—	53.12	54.00	0.88	V	6.8
12005.800000	57.94	—	74.00	16.06	V	6.8
14406.200000	—	46.96	54.00	7.04	V	8.6
14406.200000	52.05	—	74.00	21.95	V	8.6

2440 MHz:

Common Information

Project No.:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESU40,3115,PAM-0118P
Temperature:	20.3°C
Humidity:	52%
Atmospheric pressure:	102.6kPa
Test Engineer:	Peter Wang
Test Date:	2024/3/8

Fundamental Test with notch filter

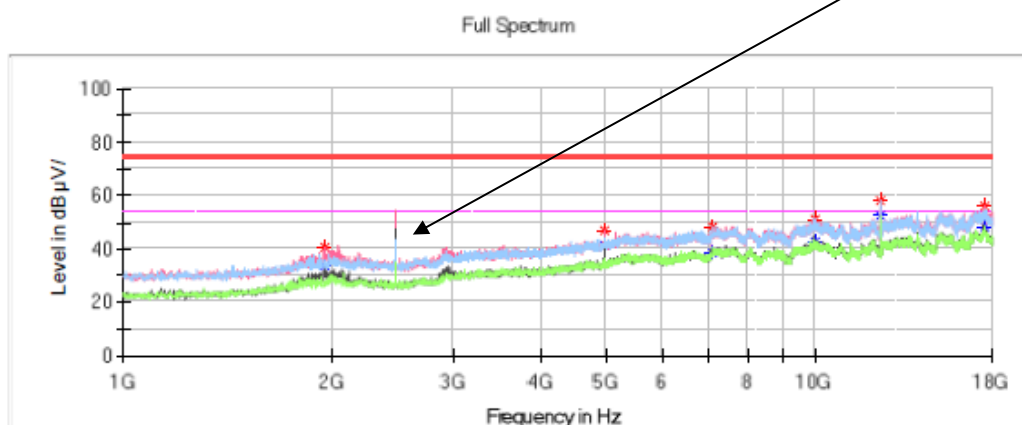
**Critical Freqs**

Frequency (MHz)	MaxPeak (dBμ V/m)	Average (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1771.800000	---	35.95	54.00	18.05	V	-12.1
1771.800000	42.87	---	74.00	31.13	V	-12.1
3701.300000	---	32.80	54.00	21.20	V	-5.7
3701.300000	41.41	---	74.00	32.59	V	-5.7
4879.400000	47.37	---	74.00	26.63	V	-1.8
4879.400000	---	44.08	54.00	9.92	V	-1.8
10229.300000	51.20	---	74.00	22.80	H	7.6
10229.300000	---	41.71	54.00	12.29	H	7.6
12199.600000	55.28	---	74.00	18.72	V	7.5
12199.600000	---	49.35	54.00	4.65	H	7.5
17534.200000	---	46.92	54.00	7.08	V	13.5
17534.200000	55.89	---	74.00	18.11	V	13.5

2479 MHz:

Common Information

Project No.: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESU40,3115,PAM-0118P
Temperature: 20.3°C
Humidity: 52%
Atmospheric pressure: 102.6kPa
Test Engineer: Peter Wang
Test Date: 2024/3/8

Fundamental Test
with notch filter**Critical Freqs**

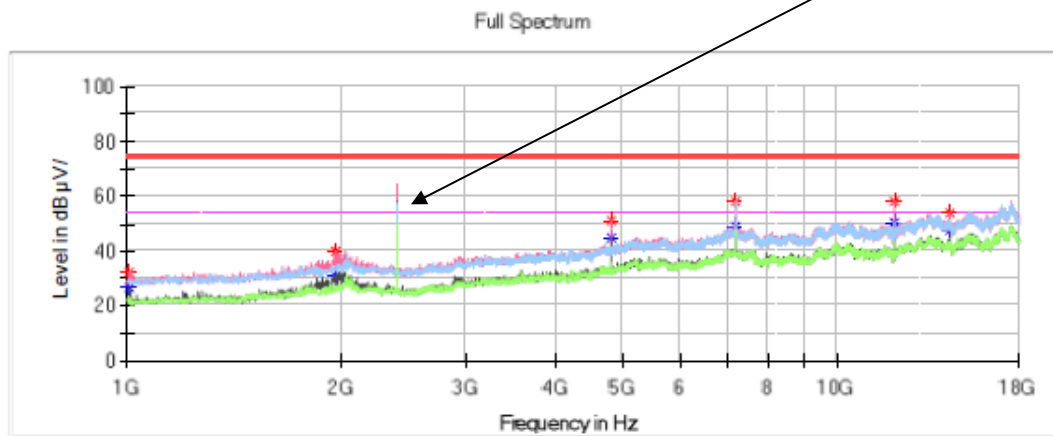
Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1950.300000	40.87	---	74.00	33.13	V	-10.9
1950.300000	---	33.62	54.00	20.38	V	-10.9
4957.600000	---	41.50	54.00	12.50	V	-1.4
4957.600000	47.17	---	74.00	26.83	V	-1.4
7116.600000	---	38.62	54.00	15.38	H	3.9
7116.600000	48.38	---	74.00	25.62	H	3.9
9993.000000	---	42.76	54.00	11.24	V	7.8
9993.000000	50.95	---	74.00	23.05	V	7.8
12395.100000	57.71	---	74.00	16.29	H	8.1
12395.100000	---	52.22	54.00	1.78	H	8.1
17605.600000	---	48.16	54.00	5.84	H	13.2
17605.600000	55.74	---	74.00	18.26	V	13.2

Data Rate: 20Kbps
2402 MHz:

Common Information

Project No.:	RSHA240108005
EUT Model:	WS2G4
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESU40,3115,PAM-0118P
Temperature:	20.3℃
Humidity:	52%
Atmospheric pressure:	103.1kPa
Test Engineer:	Peter Wang
Test Date:	2024/3/1

Fundamental Test with notch filter



Critical Freqs

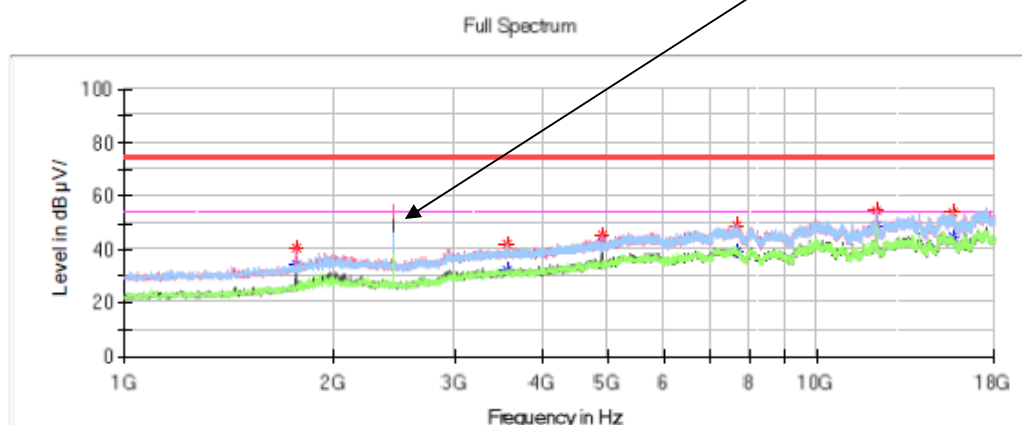
Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1008.500000	---	26.44	54.00	27.56	V	-15.5
1008.500000	32.51	---	74.00	41.49	V	-15.5
1962.200000	---	30.98	54.00	23.02	V	-10.8
1962.200000	39.71	---	74.00	34.29	V	-10.8
4804.600000	---	44.97	54.00	9.03	V	-2.2
4804.600000	50.93	---	74.00	23.07	V	-2.2
7206.700000	---	49.18	54.00	4.82	V	4.0
7206.700000	58.25	---	74.00	15.75	V	4.0
12009.200000	---	50.38	54.00	3.62	V	6.8
12009.200000	57.83	---	74.00	16.17	V	6.8
14414.700000	---	47.54	54.00	6.46	V	8.5
14414.700000	54.14	---	74.00	19.86	V	8.5

2438 MHz:

Common Information

Project No.: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESU40,3115,PAM-0118P
Temperature: 20.3°C
Humidity: 52%
Atmospheric pressure: 102.6kPa
Test Engineer: Peter Wang
Test Date: 2024/3/8

Fundamental Test with notch filter

**Critical Freqs**

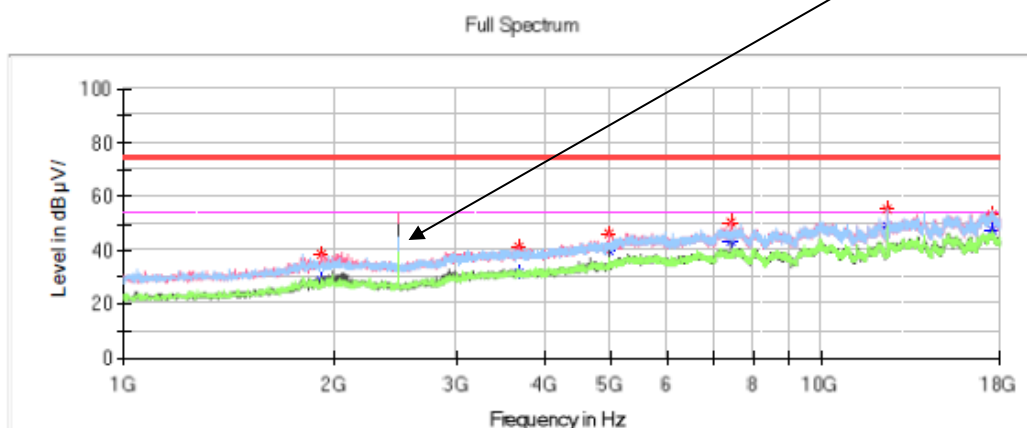
Frequency (MHz)	MaxPeak (dBµ V/m)	Average (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1765.000000	---	34.02	54.00	19.98	V	-12.1
1765.000000	40.44	---	74.00	33.56	V	-12.1
3560.200000	---	32.32	54.00	21.68	H	-6.0
3560.200000	41.79	---	74.00	32.21	H	-6.0
4879.400000	45.52	---	74.00	28.48	V	-1.8
4879.400000	---	42.80	54.00	11.20	V	-1.8
7640.200000	---	39.25	54.00	14.75	H	4.1
7640.200000	49.04	---	74.00	24.96	H	4.1
12199.600000	54.64	---	74.00	19.36	H	7.5
12199.600000	---	48.89	54.00	5.11	H	7.5
15665.900000	53.66	---	74.00	20.34	H	10.8
15665.900000	---	44.61	54.00	9.39	H	10.8

2478 MHz:

Common Information

Project No.: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESU40,3115,PAM-0118P
Temperature: 20.3°C
Humidity: 52%
Atmospheric pressure: 102.6kPa
Test Engineer: Peter Wang
Test Date: 2024/3/8

Fundamental Test with notch filter

**Critical Freqs**

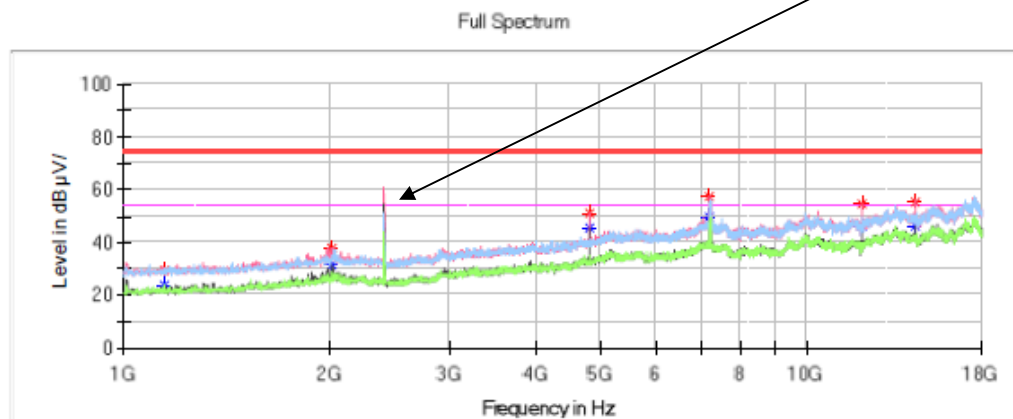
Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1923.100000	---	28.36	54.00	25.64	V	-11.1
1923.100000	38.57	---	74.00	35.43	V	-11.1
3687.700000	---	31.41	54.00	22.59	V	-5.7
3687.700000	41.32	---	74.00	32.68	V	-5.7
4955.900000	46.44	---	74.00	27.56	V	-1.4
4955.900000	---	40.20	54.00	13.80	V	-1.4
7432.800000	---	43.46	54.00	10.54	V	4.1
7432.800000	50.02	---	74.00	23.98	V	4.1
12390.000000	55.11	---	74.00	18.89	H	8.1
12390.000000	---	48.86	54.00	5.14	H	8.1
17547.800000	53.36	---	74.00	20.64	V	13.4
17547.800000	---	47.39	54.00	6.61	V	13.4

Data Rate: 40Kbps
2404 MHz:

Common Information

Project No.: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESU40,3115,PAM-0118P
Temperature: 20.3°C
Humidity: 52%
Atmospheric pressure: 103.1kPa
Test Engineer: Peter Wang
Test Date: 2024/3/1

Fundamental Test with notch filter



Critical Freqs

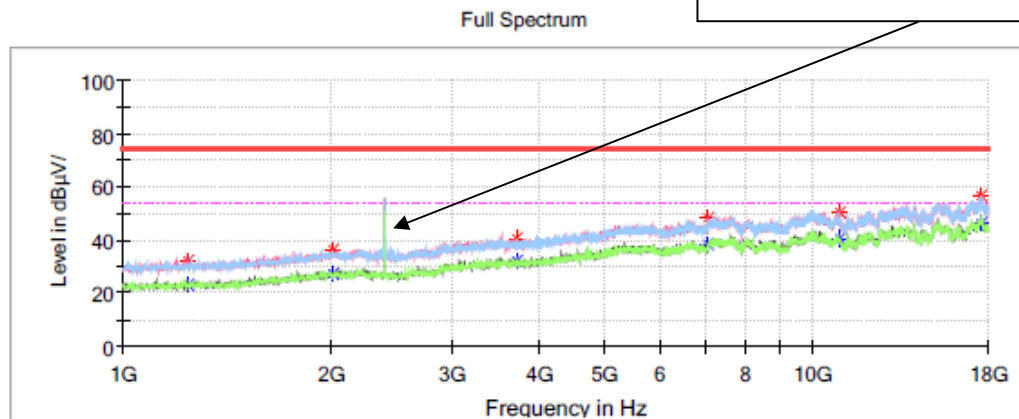
Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1142.800000	29.54	---	74.00	44.46	V	-15.1
1142.800000	---	23.83	54.00	30.17	V	-15.1
2021.700000	---	31.59	54.00	22.41	V	-10.5
2021.700000	38.05	---	74.00	35.95	V	-10.5
4808.000000	---	45.50	54.00	8.50	V	-2.2
4808.000000	50.84	---	74.00	23.16	V	-2.2
7210.100000	---	49.79	54.00	4.21	V	4.0
7210.100000	57.01	---	74.00	16.99	V	4.0
12019.400000	---	46.14	54.00	7.86	V	6.9
12019.400000	54.23	---	74.00	19.77	V	6.9
14423.200000	---	46.39	54.00	7.61	V	8.5
14423.200000	54.91	---	74.00	19.09	V	8.5

2436 MHz:

Common Information

Project No.: RSHA240108005
 Test Mode: Transmitting
 Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
 Test Engineer: Peter Wang

Fundamental Test with notch filter

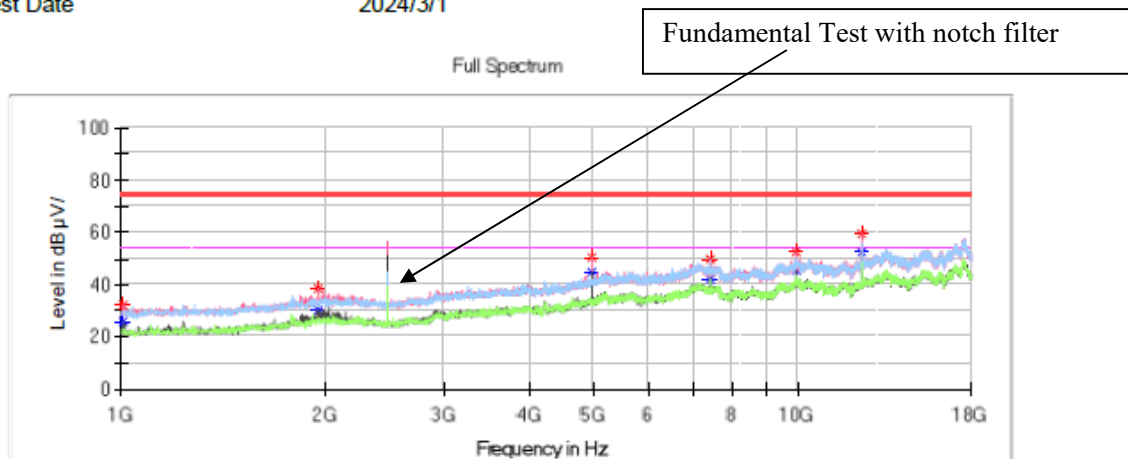
**Critical Freqs**

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1239.700000	32.28	---	74.00	41.72	V	-14.8
1239.700000	---	23.16	54.00	30.84	V	-14.8
2014.900000	36.59	---	74.00	37.41	V	-10.5
2014.900000	---	27.06	54.00	26.94	V	-10.5
3733.600000	40.44	---	74.00	33.56	V	-5.6
3733.600000	---	31.92	54.00	22.08	V	-5.6
7067.300000	48.36	---	74.00	25.64	V	3.8
7067.300000	---	38.31	54.00	15.69	V	3.8
10926.300000	50.04	---	74.00	23.96	V	6.4
10926.300000	---	40.79	54.00	13.21	V	6.4
17571.600000	---	46.36	54.00	7.64	H	13.3
17571.600000	56.70	---	74.00	17.30	H	13.3

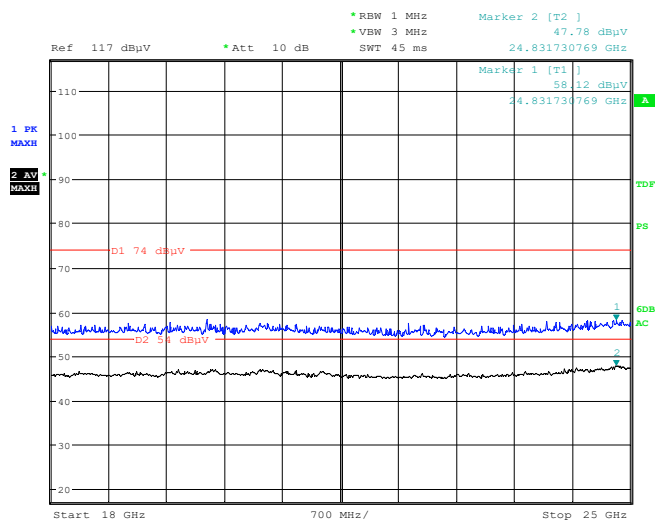
2476 MHz:

Common Information

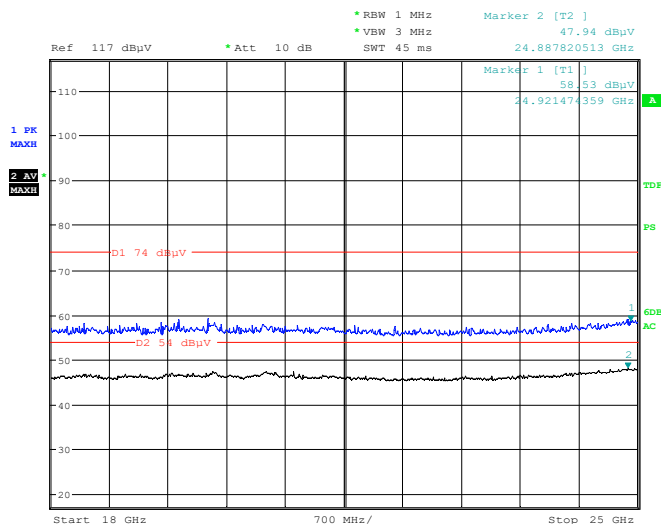
Project No.: RSHA240108005
EUT Model: WS2G4
Test Mode: Transmitting
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment: ESU40,3115,PAM-0118P
Temperature: 20.3°C
Humidity: 52%
Atmospheric pressure: 103.1kPa
Test Engineer: Peter Wang
Test Date: 2024/3/1

**Critical Freqs**

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1008.500000	32.09	---	74.00	41.91	V	-15.5
1008.500000	---	26.13	54.00	27.87	V	-15.5
1955.400000	38.30	---	74.00	35.70	V	-10.9
1955.400000	---	30.40	54.00	23.60	V	-10.9
4952.500000	---	44.43	54.00	9.57	V	-1.5
4952.500000	50.49	---	74.00	23.51	V	-1.5
7426.000000	---	41.92	54.00	12.08	V	4.1
7426.000000	49.59	---	74.00	24.41	V	4.1
9908.000000	---	45.40	54.00	8.60	V	7.5
9908.000000	52.19	---	74.00	21.81	V	7.5
12383.200000	---	52.78	54.00	1.22	V	8.1
12383.200000	59.46	---	74.00	14.54	V	8.1

**18 GHz - 25 GHz: transmit in Data Rate: 10Kbps 2440MHz (worst case)
Horizontal**

Project No. RSHA240108005 Tester: Peter Wang
Date: 6.MAY.2024 18:44:01

Vertical

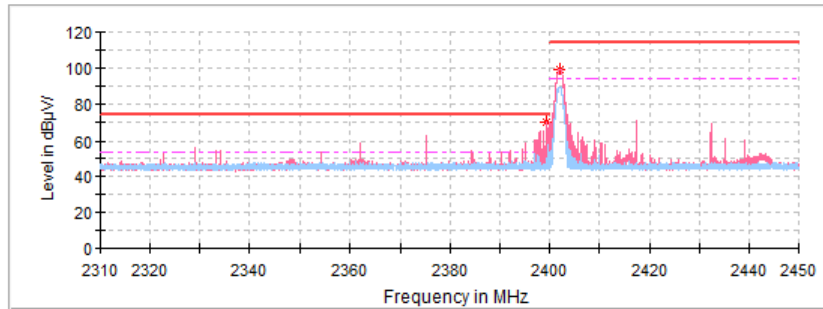
Project No. RSHA240108005 Tester: Peter Wang
Date: 6.MAY.2024 19:02:58

Note: The test distance is 3m. The limit is 74dBμV/m(Peak) and 54dBμV/m(Average).

Fundamental and Bandedge:**Data Rate: 10Kbps****Low Channel: 2402MHz****Common Information**

Project No.: RSHA240108005
Test Mode: SRD
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Engineer: Peter Wang

Full Spectrum

**Critical Freqs**

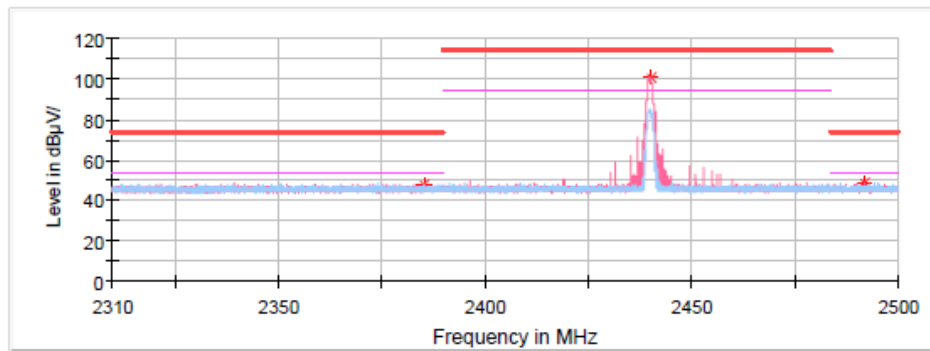
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2399.320000	69.76	---	74.00	4.24	V	0.1
2399.320000	---	50.59	54.00	3.41	V	0.1
2401.952000	98.84	---	114.00	15.16	V	0.1
2401.952000	---	89.22	94.00	4.78	V	0.1

Middle Channel: 2440MHz

Common Information

Project No.: RSHA240108005
 Test Mode: SRD
 Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
 Test Engineer: Klein Zhu

Full Spectrum



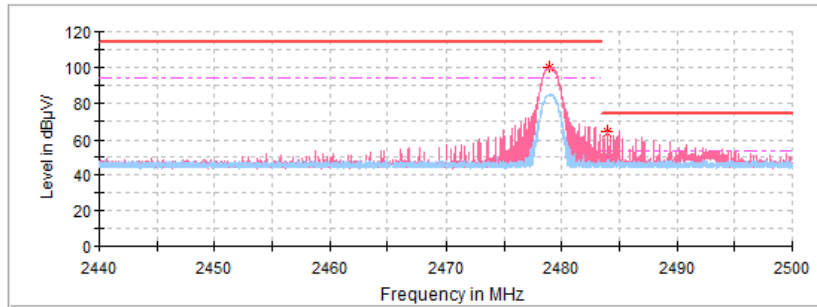
Critical Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2440.017000	100.43	---	114.00	13.57	V	0.1
2440.017000	---	91.28	94.00	2.72	V	0.1

High Channel: 2479MHz**Common Information**

Project No.: RSHA240108005
Test Mode: SRD
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Engineer: Peter Wang

Full Spectrum

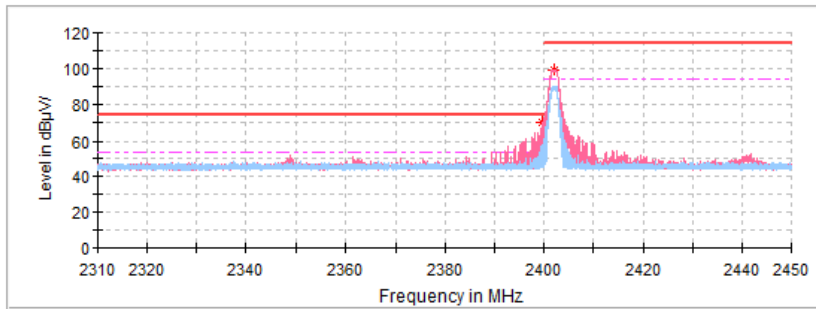
**Critical Freqs**

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2478.916000	99.69	---	114.00	14.31	V	0.2
2478.916000	---	92.08	94.00	1.92	V	0.2
2483.980000	64.08	---	74.00	9.92	V	0.2
2483.980000	---	51.47	54.00	2.53	V	0.2

Data Rate: 20Kbps**Low Channel: 2402MHz****Common Information**

Project No.: RSHA240108005
Test Mode: SRD
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Engineer: Peter Wang

Full Spectrum

**Critical Freqs**

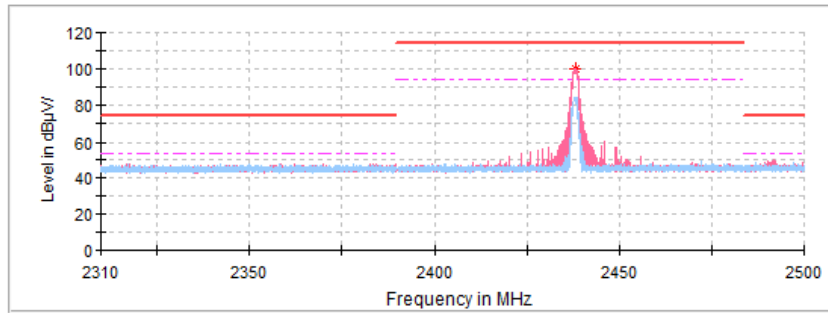
Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2399.740000	69.96	---	74.00	4.04	V	0.1
2399.740000	---	48.27	54.00	5.73	V	0.1
2402.064000	98.86	---	114.00	15.14	V	0.1
2402.064000	---	82.80	94.00	13.20	V	0.1

Middle Channel: 2438MHz

Common Information

Project No.: RSHA240108005
 Test Mode: SRD
 Standard: FCC Part 15C
 Test Engineer: Hugh Wu

Full Spectrum



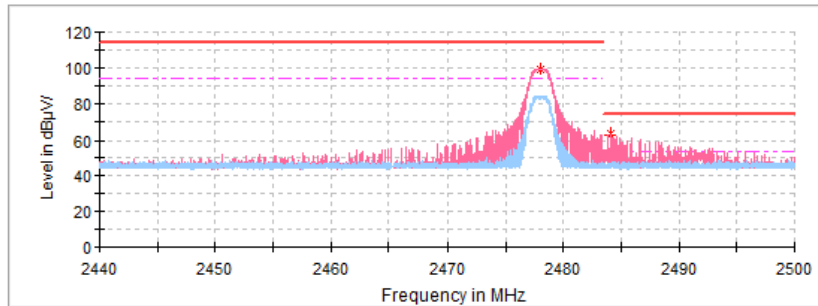
Critical_Freqs

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Poi	Corr. (dB/m)
2438.212000	---	84.56	94.00	9.44	V	-0.4
2438.212000	99.82	---	114.00	14.18	V	-0.4

High Channel: 2478MHz**Common Information**

Project No.: RSHA240108005
Test Mode: SRD
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Engineer: Peter Wang

Full Spectrum

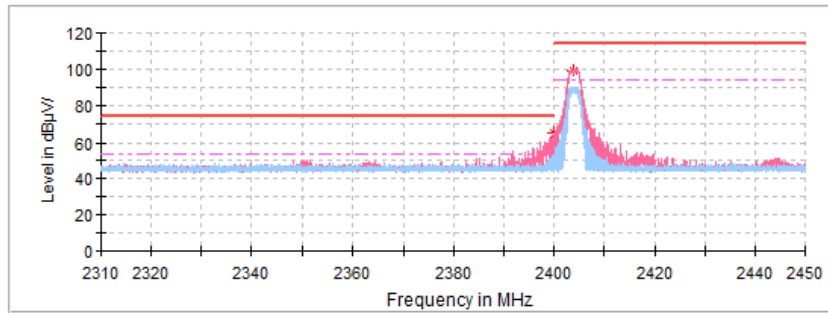
**Critical Freqs**

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
2477.980000	99.08	---	114.00	14.92	V	0.2
2477.980000	---	82.67	94.00	11.33	V	0.2
2484.118000	62.69	---	74.00	11.31	V	0.2
2484.118000	---	44.56	54.00	11.44	V	0.2

Data Rate: 40Kbps**Low Channel: 2404MHz****Common Information**

Project No.: RSHA240108005
Test Mode: SRD
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Engineer: Peter Wang

Full Spectrum

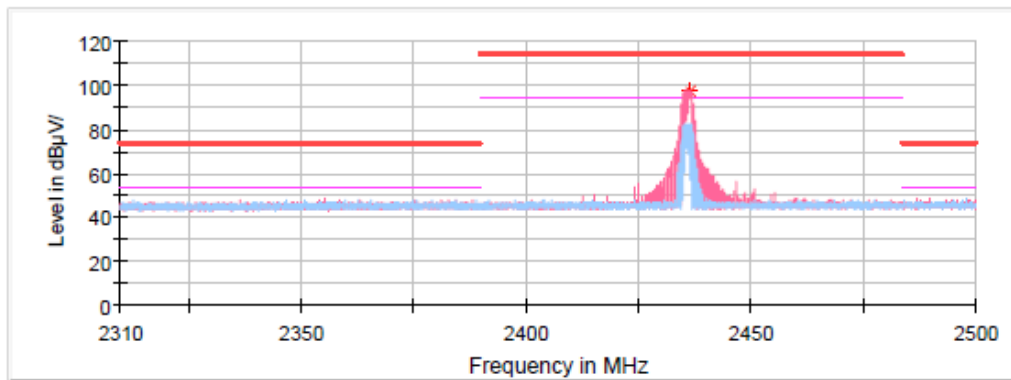
**Critical Freqs**

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2399.964000	64.32	---	74.00	9.68	V	0.1
2399.964000	---	40.96	54.00	13.04	V	0.1
2403.898000	99.35	---	114.00	14.65	V	0.1
2403.898000	---	85.72	94.00	8.28	V	0.1

Middle Channel: 2436MHz**Common Information**

Project No.: RSHA240108005
Test Mode: SRD
Standard: FCC Part 15C
Test Engineer: Hugh Wu

Full Spectrum

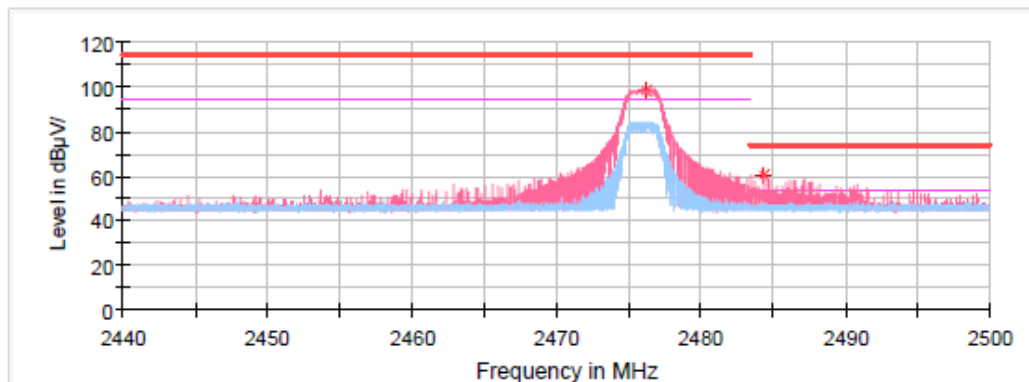
**Critical Freqs**

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2436.711000	97.64	---	114.00	16.36	V	-0.4
2436.711000	---	85.14	94.00	8.86	V	-0.4

High Channel: 2476MHz**Common Information**

Project No.: RSHA240108005
Test Mode: SRD
Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Engineer: Peter Wang

Full Spectrum

**Critical Freqs**

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2476.186000	98.45	---	114.00	15.55	V	0.2
2476.186000	---	86.12	94.00	7.88	V	0.2
2484.376000	60.01	---	74.00	13.99	V	0.2
2484.376000	---	45.11	54.00	9.89	V	0.2

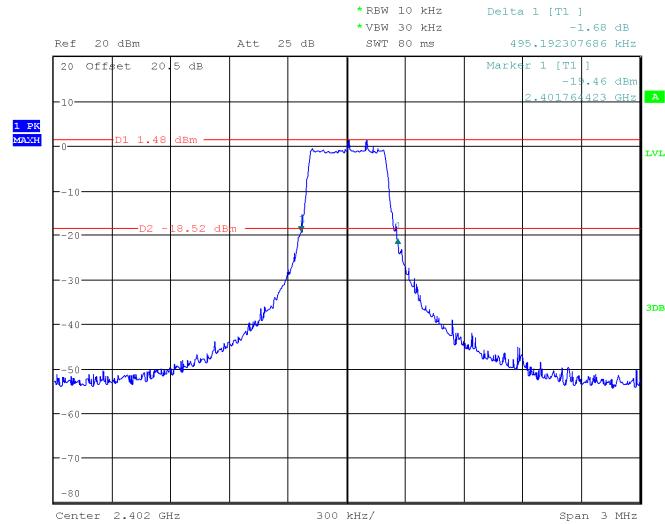
20 dB BANDWIDTH TESTING

Test Mode: Transmitting

Data Rate: 10Kbps

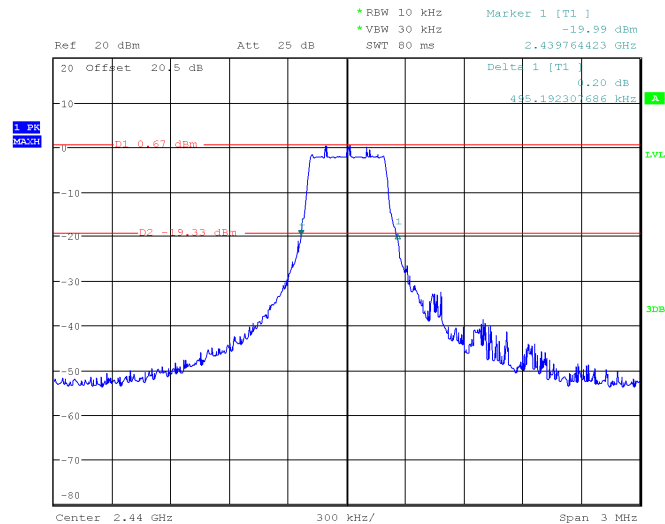
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.495
Middle	2440	0.495
High	2479	0.495

Low Channel



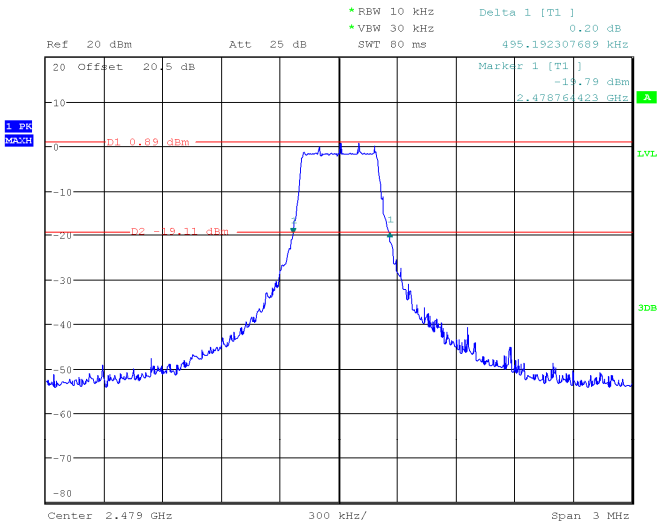
ProjectNo.:RSHA240108005 Tester:Hardy Huang
Date: 22.MAR.2024 15:45:00

Middle Channel



ProjectNo.:RSHA240108005 Tester:Hardy Huang
Date: 22.MAR.2024 15:49:25

High Channel

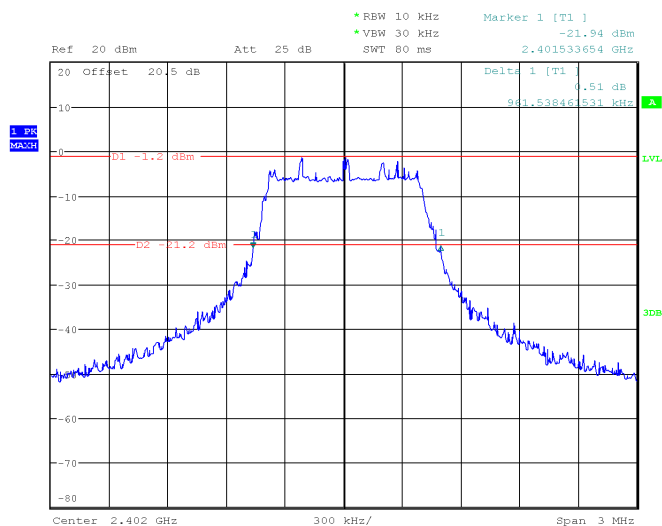


ProjectNo.:RSHA240108005 Tester:Hardy Huang
Date: 22.MAR.2024 15:51:38

Data Rate: 20Kbps

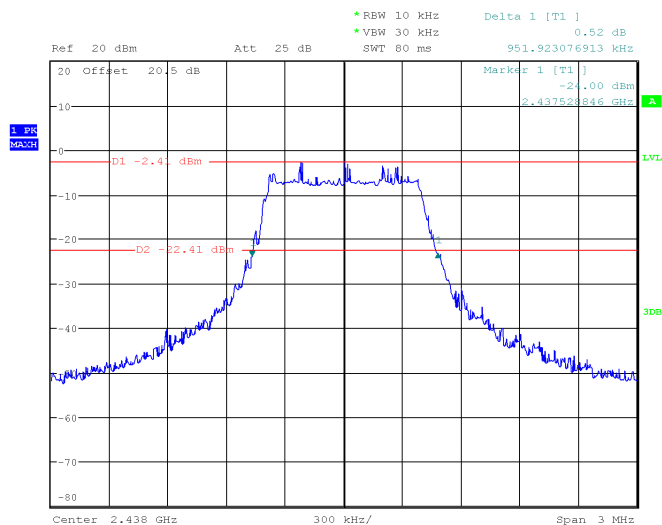
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.962
Middle	2438	0.952
High	2478	0.942

Low Channel



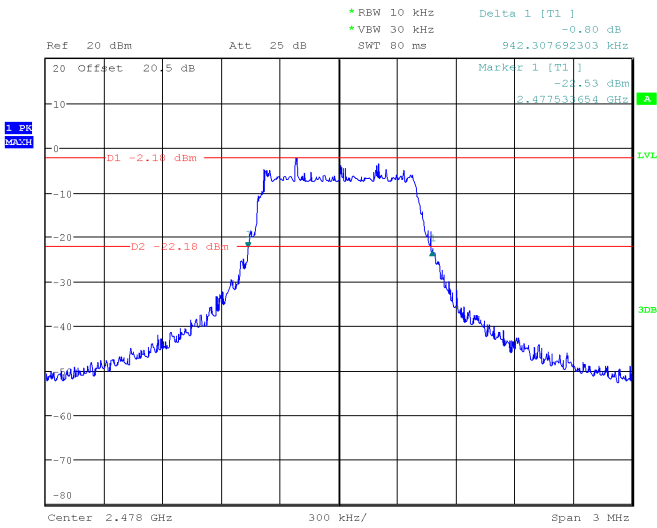
ProjectNo.:RSHA240108005 Tester:Hardy Huang
Date: 22.MAR.2024 15:56:54

Middle Channel



ProjectNo.:RSHA240108005 Tester:Hardy Huang
Date: 22.MAR.2024 16:00:16

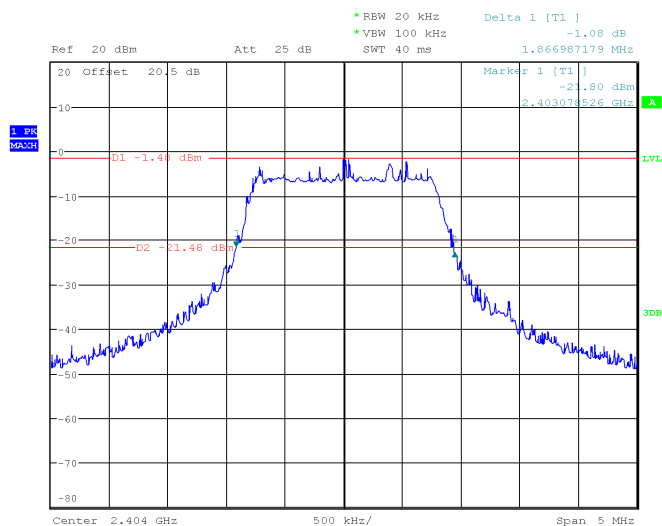
High Channel



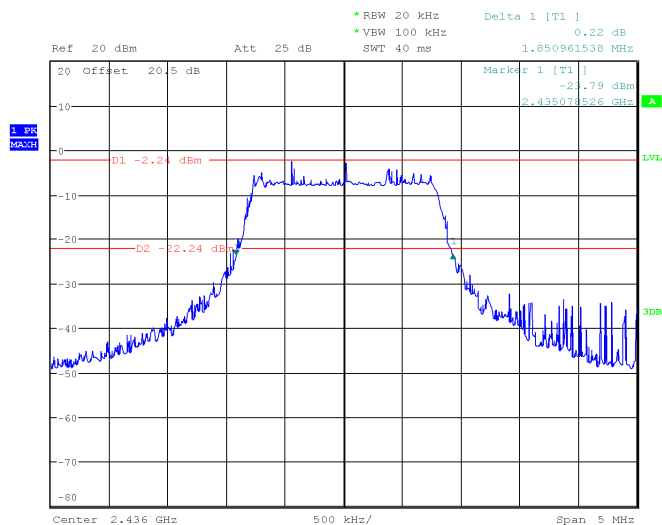
ProjectNo.:RSHA240108005 Tester:Hardy Huang
Date: 22.MAR.2024 16:03:03

Data Rate: 40Kbps

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2404	1.867
Middle	2436	1.851
High	2476	1.891

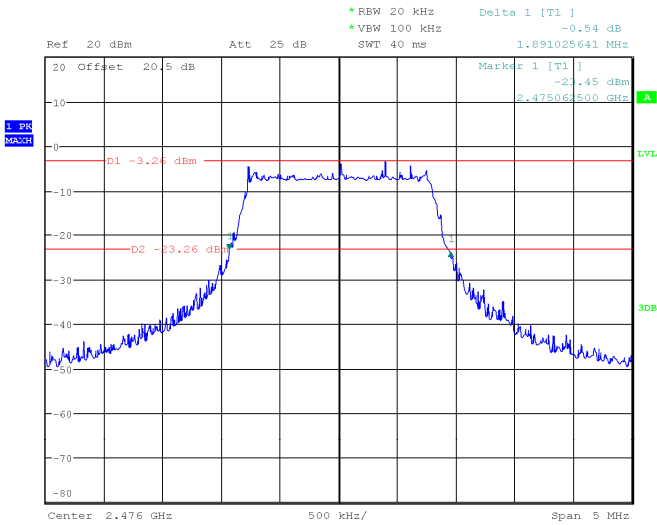
Low Channel

ProjectNo.:RSHA240108005 Tester:Hardy Huang
 Date: 22.MAR.2024 17:43:50

Middle Channel

ProjectNo.:RSHA240108005 Tester:Hardy Huang
 Date: 22.MAR.2024 17:46:36

High Channel



ProjectNo.:RSHA240108005 Tester:Hardy Huang
Date: 22.MAR.2024 17:48:46

EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT A-EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B-EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment EXHIBIT C-TEST SETUP PHOTOGRAPHS.

Declarations

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with “★”.
2. The test data was only valid for the test sample(s).
3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor $k=2$ with the 95.45% confidence interval.

*******END OF REPORT*******