FCC PART 15.247

TEST REPORT

For

Heilongjiang Huida Technology Co., Ltd

Building 1, Science and Technology Innovation Headquarters, Shenzhen (Harbin) Industrial Park, No. 288, Zhigu Street, Songbei District, Harbin, China

FCC ID: 2BBNT-HD402

Report Type:	**Product Name:**
Original Report	Intelligent Remote Control

Report Number:	RSHA240322001-00D
Report Date:	2024-12-30
Reviewed By:	Jenny Yang
Approved By:	Oscar Ye
Prepared By:	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

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RSHA240322001-00D	R1V1	2024-12-30	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Heilongjiang Huida Technology Co., Ltd
Tested Model:	HD402
Product Name:	Intelligent Remote Control
Power Supply:	DC 7.4V from battery and charging by DC 7.3V battery
RF Function:	2.4G SRD
Operating Band/Frequency:	2411-2466 MHz
Maximum Peak Output Power:	22.14 dBm
Channel Number:	6
Channel Separation:	11 MHz
Modulation Type:	BPSK
Antenna Type:	Omni Antenna
★Maximum Antenna Gain:	3.94 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: RSHA240322001-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-03-22.)

Objective

This report is prepared for *Heilongjiang Huida Technology Co., Ltd* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions' rules.

The tests were performed in order to determine Compliant with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliant Testing of Unlicensed Wireless Devices and FCC 558074 D01 15.247 Meas Guidance v05r02.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
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℃
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

Description of Test Configuration

Test channel list as below:

EUT was tested with Channel 1, 4 and 6.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2411	4	2444
2	2422	5	2455
3	2433	6	2466

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

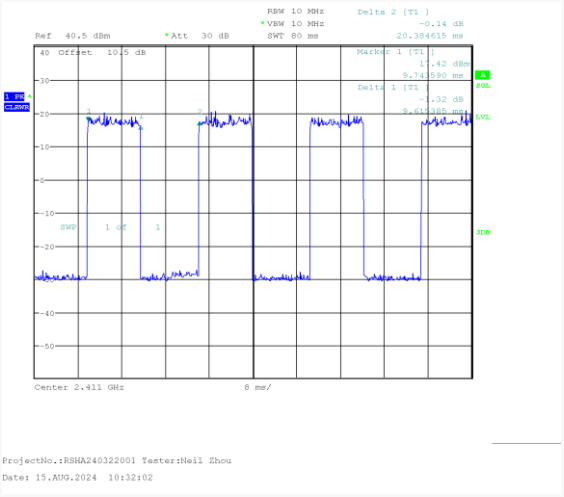
RF Test Software: Artosyn8030PCTool

Mode	Channel	Frequency (MHz)	★Power Level
SRD (BW: 1.25 MHz)	Low	2411	15
	Middle	2444	15
	High	2466	15
SRD (BW: 10 MHz)	Low	2411	15
	Middle	2444	15
	High	2466	15

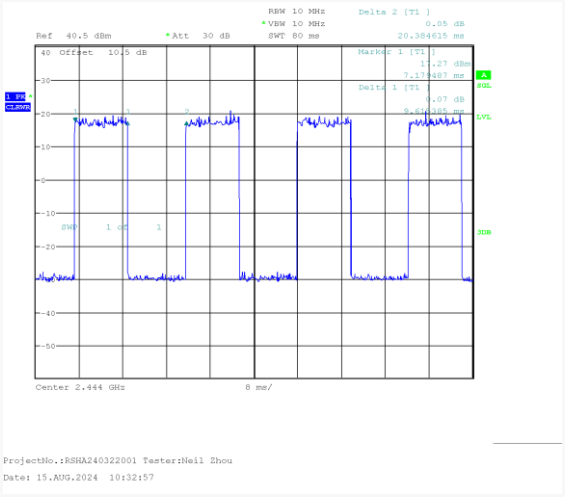
Note: The power level was declared by the applicant.

Duty Cycle:
BW: 1.25 MHz

Low Channel: 2411 MHz

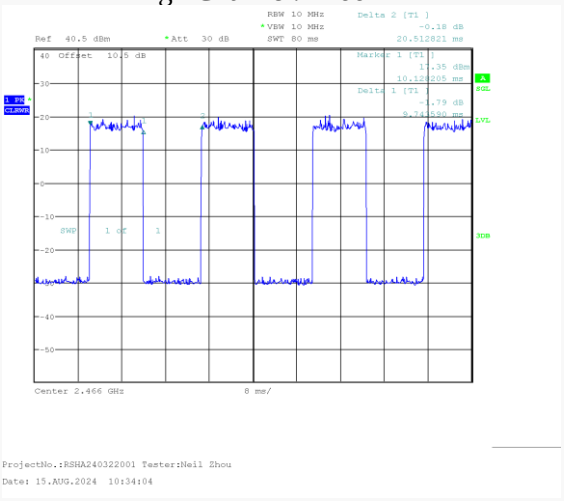


Middle Channel: 2444 MHz

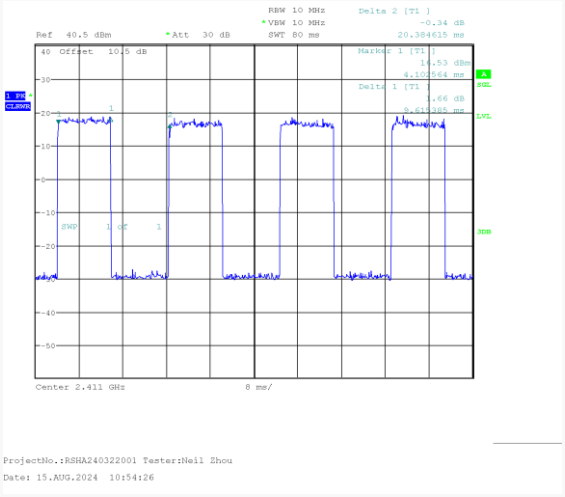


BW: 10 MHz

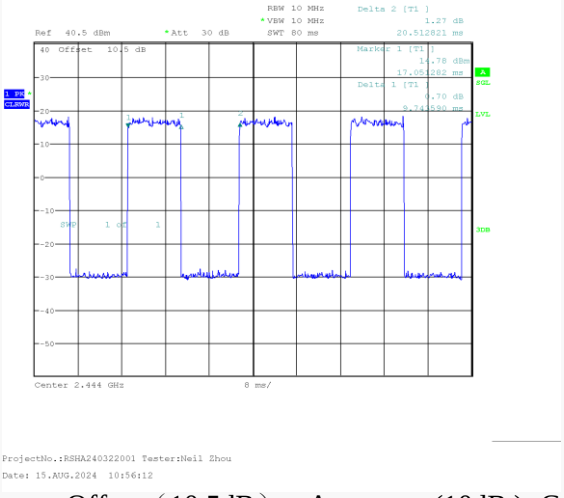
High Channel: 2466 MHz



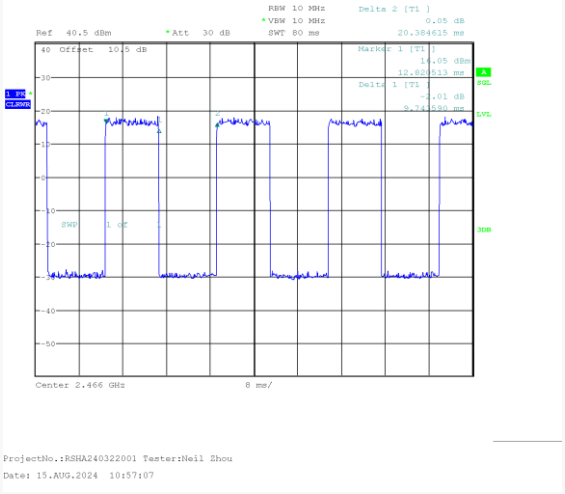
Low Channel: 2411 MHz



Middle Channel: 2444 MHz



High Channel: 2466 MHz



Note： Offset（10.5dB）= Attenuator(10dB)+Cable loss(0.5dB)

Mode	Channel	Duty Cycle (%)	Ton (ms)	Ton+off (ms)	10log(1/x)(dB)
SRD (BW: 1.25 MHz)	Low	47.20	9.62	20.38	3.26
	Middle	47.20	9.62	20.38	3.26
	High	47.49	9.74	20.51	3.23
SRD (BW: 10 MHz)	Low	47.20	9.62	20.38	3.26
	Middle	47.49	9.74	20.51	3.23
	High	47.79	9.74	20.38	3.21

Note: “x” means the Duty Cycle.

Support Equipment List and Details

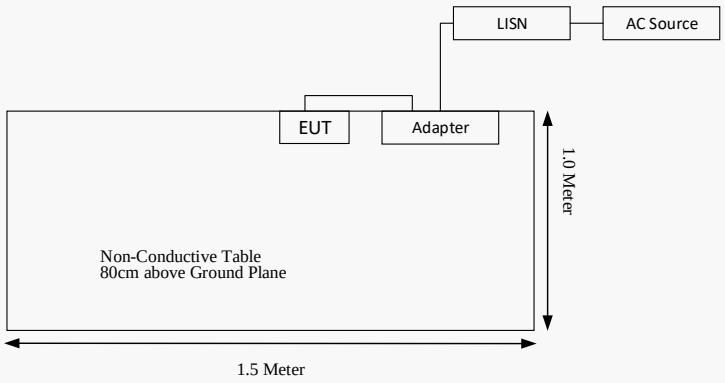
Manufacturer	Description	Model	Serial Number
Huntkey	Adapter	HK06520033-0C1	/

External I/O Cable

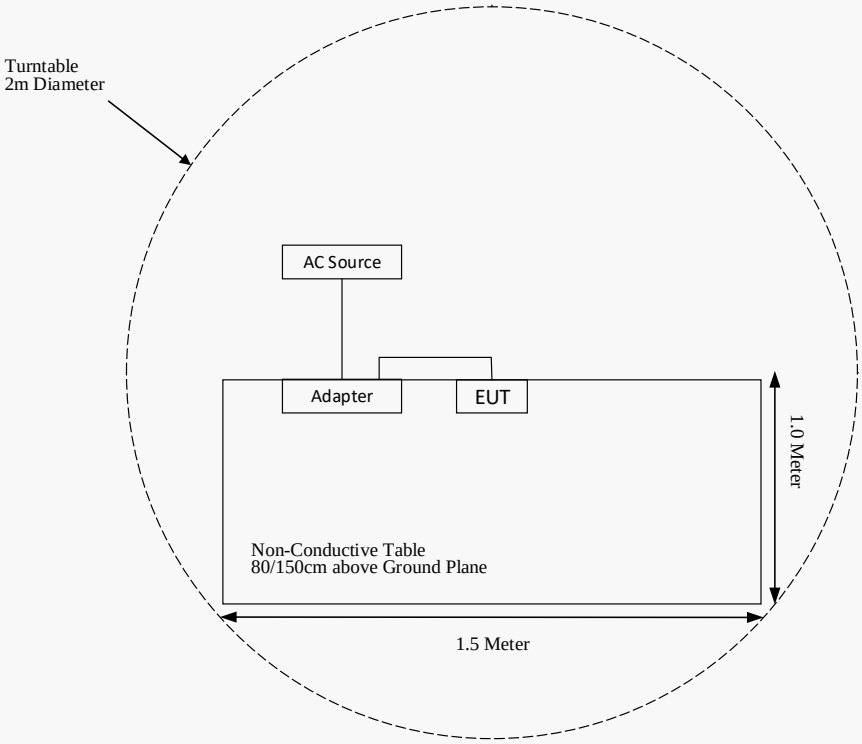
Cable Description	Length(m)	From Port	To
Power Cable	1.0	LISN/AC Source	Adapter
USB Cable	1.0	Adapter	EUT

Block Diagram of Test Setup

For Conducted Emissions:



For Radiated Emissions(Below 1GHz & Above 1 GHz):



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, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.247 (I), §1.1310 & §2.1093	RF Exposure	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber #1)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2024-04-23	2025-04-22
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2023-11-11	2024-11-10
Narda	6dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
ETS-LINDGREN	Loop Antenna	6512	108100	2024-11-03	2027-11-02
Sonoma Instrument	Pre-amplifier	310N	171205	2024-04-23	2025-04-22
Rohde & Schwarz	Auto Test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2024-04-23	2025-04-22
Radiated Emission Test (Chamber #2)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207/040	2024-04-25	2025-04-24
ETS-LINDGREN	Horn Antenna	3115	9311-4159	N/A	N/A
ETS-LINDGREN	Horn Antenna	3116	2516	2023-12-08	2024-12-07
A.H.Systems, inc	Amplifier	PAM-0118P	512	2024-04-25	2025-04-24
SELECTOR	Amplifier	EM18G40G	060726	2024-04-25	2025-04-24
MICRO-TRONICS	Band Reject Filter	BRM50702	G024	2023-08-05	2024-08-04
Narda	Attenuator	10dB	010	2023-08-15	2024-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-11	011	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-12	012	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-13	013	2024-04-25	2025-04-24
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200103	2024-04-24	2025-04-23
Narda	Attenuator	10dB	010	2024-04-23	2025-04-22
Anritsu	Power Sensor	MA24418A	12621	2023-09-27	2024-09-26
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102154	2024-04-23	2025-04-22
Rohde & Schwarz	LISN	ENV216	101115	2024-04-23	2025-04-22
Audix	Test Software	e3	V9	N/A	N/A
Narda	Attenuator	10 dB	N/A	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-15	015	2024-04-23	2025-04-22

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 §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

According to§15.247(i) and §1.1310, 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 KDB447498 D01 General RF Exposure Guidance v06:

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:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
• f(GHz) is the RF channel transmit frequency in GHz
• Power and distance are rounded to the nearest mW and mm before calculation
• The result is rounded to one decimal place for comparison
• 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Calculation Results

Frequency Range (MHz)	Max Tune-up Conducted Average Power		Calculated Distance (mm)	Calculated Value	Threshold (1-g SAR)	SAR Test Exclusion
	(dBm)	(mW)				
2411-2466	8.0	6.31	5	2.0	3.0	Yes

Result: So the stand-alone SAR evaluation is not necessary.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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 with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine Compliant with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an Omni antenna for SRD and the antenna gain is 3.94 dBi, the antenna use a unique type of connector to attach to the EUT, fulfill the requirement of this section. Please refer to the EUT photos.

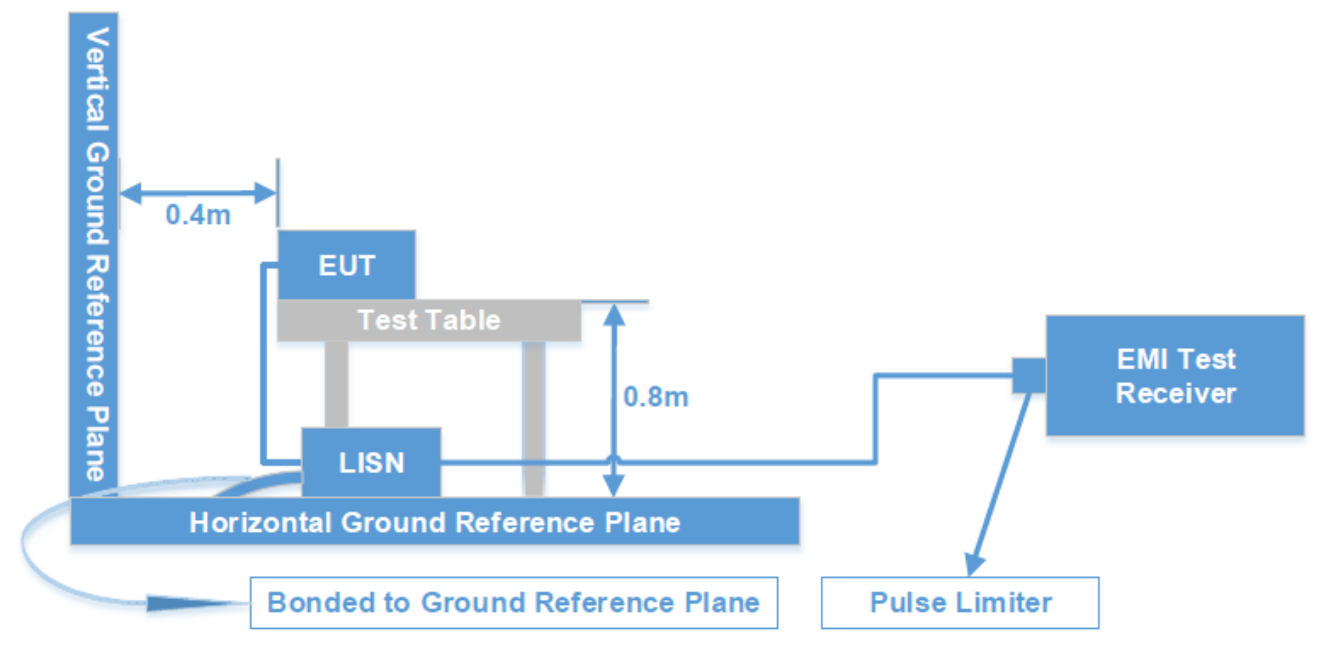
Result: Compliant.

FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT 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

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

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

ANSI C63.10-2013 clause 6.2

During the conducted emission test, the adapter was connected to the outlet of the LISN.

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

Factor & Over Limit Calculation

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

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (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) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

Test Results Summary

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

Test Data: See Appendix

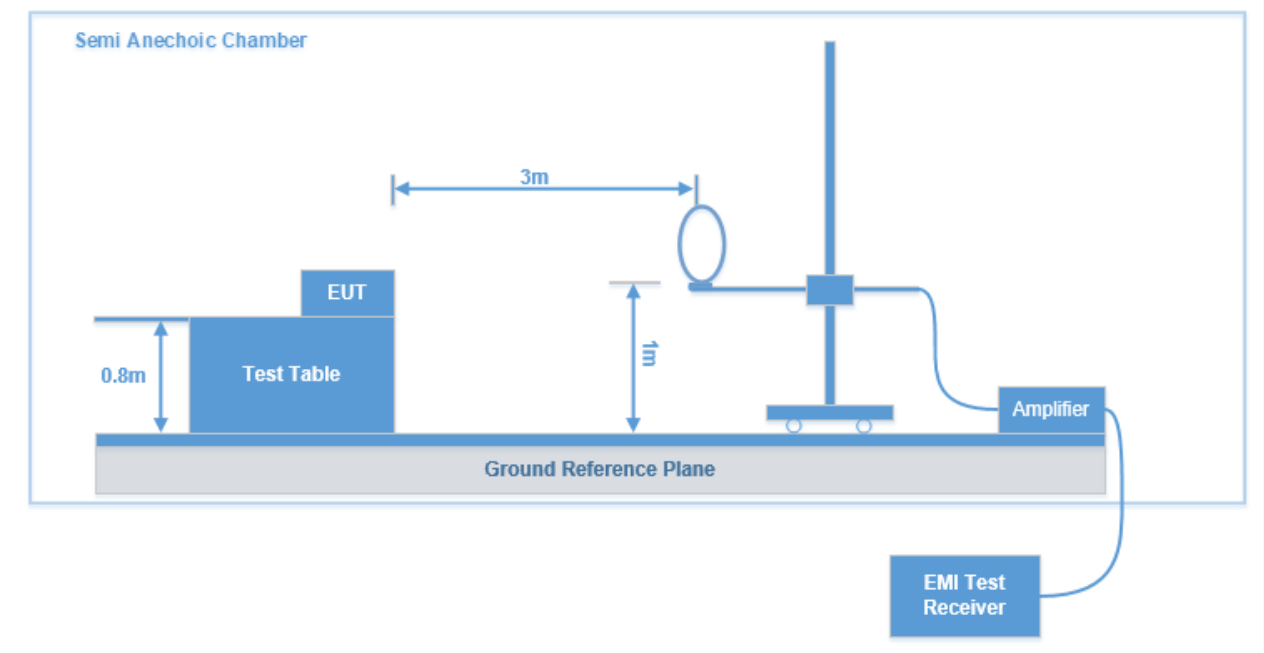
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

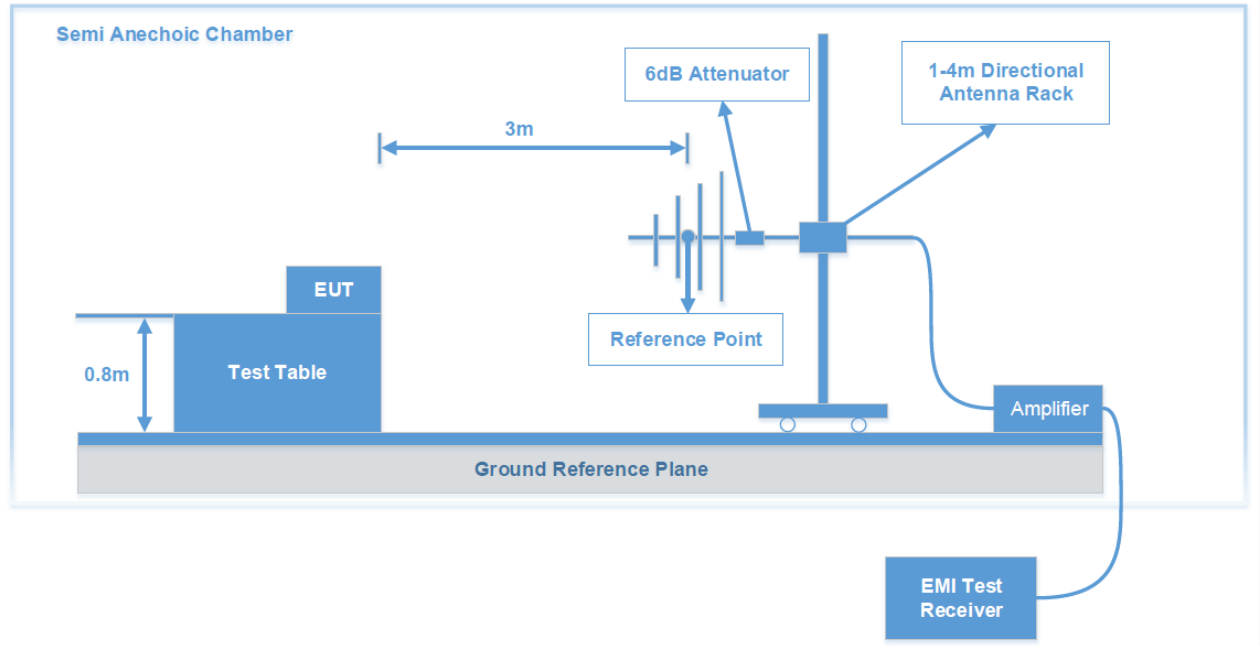
FCC §15.247 (d); §15.209; §15.205;

Test System Setup

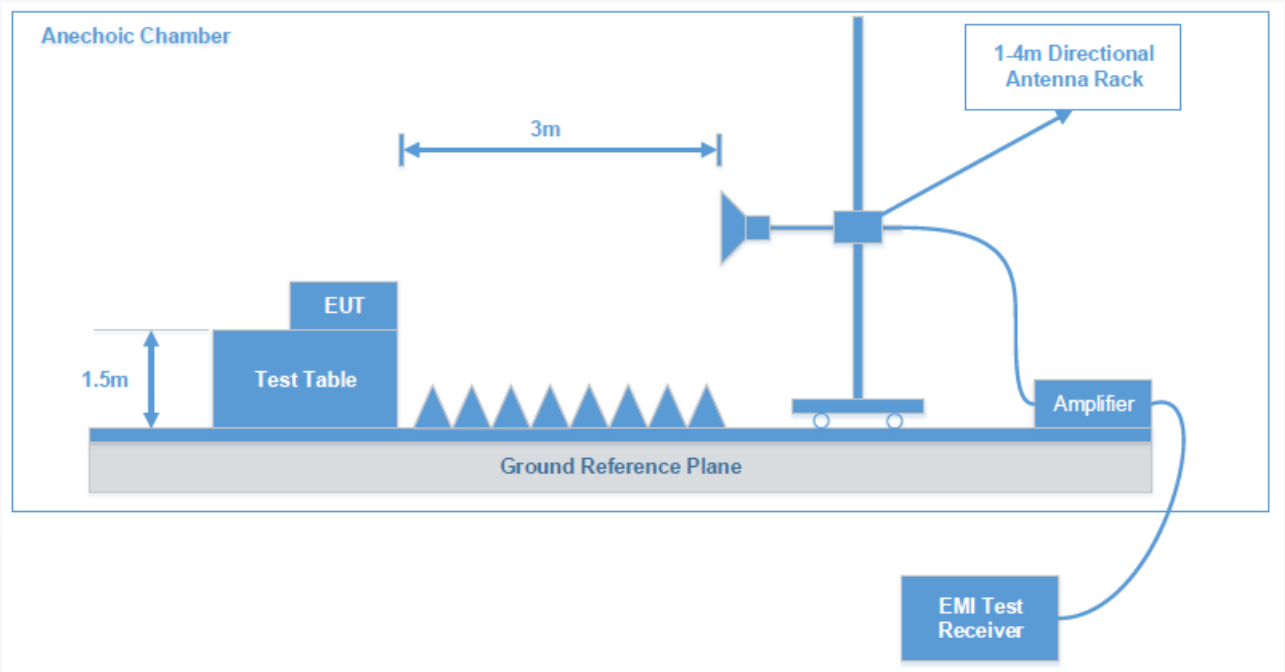
9 kHz - 30 MHz:



30 MHz - 1 GHz:



1 GHz - 25 GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver Setup

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

Test Procedure

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

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 6 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)

The "**Margin**" 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)

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data: See Appendix

FCC §15.247(A) (2) - 6 DB EMISSION BANDWIDTH

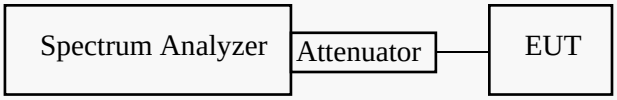
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.8.1

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 * RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Note： Offset（10.5dB）= Attenuator(10dB)+Cable loss(0.5dB)

Test Data: See Appendix

FCC §15.247(B) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, Compliant with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

11.9.2.3.2 Method AVGPM-G

Method AVGPM-G is a measurement using a gated RF average power meter.
Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Test Data: See Appendix

FCC §15.247(D) - 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

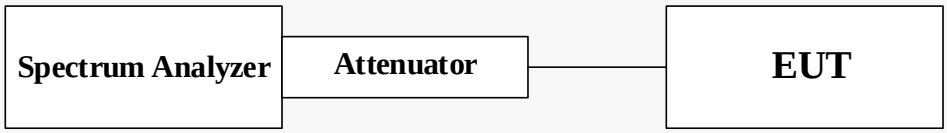
Applicable Standard

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 Compliant with the peak conducted power limits. If the transmitter complies with the conducted 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

According to ANSI C63.10-2013 sub-clause 6.10.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Note： Offset（10.5dB）= Attenuator(10dB)+Cable loss(0.5dB)

Test Data: See Appendix

FCC §15.247(E) - POWER SPECTRAL DENSITY

Applicable Standard

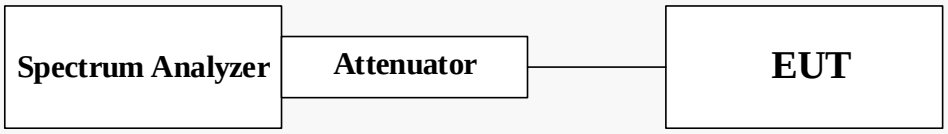
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.10.2

The following procedure shall be used if maximum peak conducted output power was used to determine Compliant, and it is optional if the maximum conducted (average) output power was used to determine Compliant:

1. Set the RBW to: 3kHz≤ RBW≤100 kHz.
2. Set the VBW ≥ 3*RBW.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Note： Offset（10.5dB）= Attenuator(10dB)+Cable loss(0.5dB)

Test Data: See Appendix

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APPENDIX - TEST DATA

Environmental Conditions & Test Information

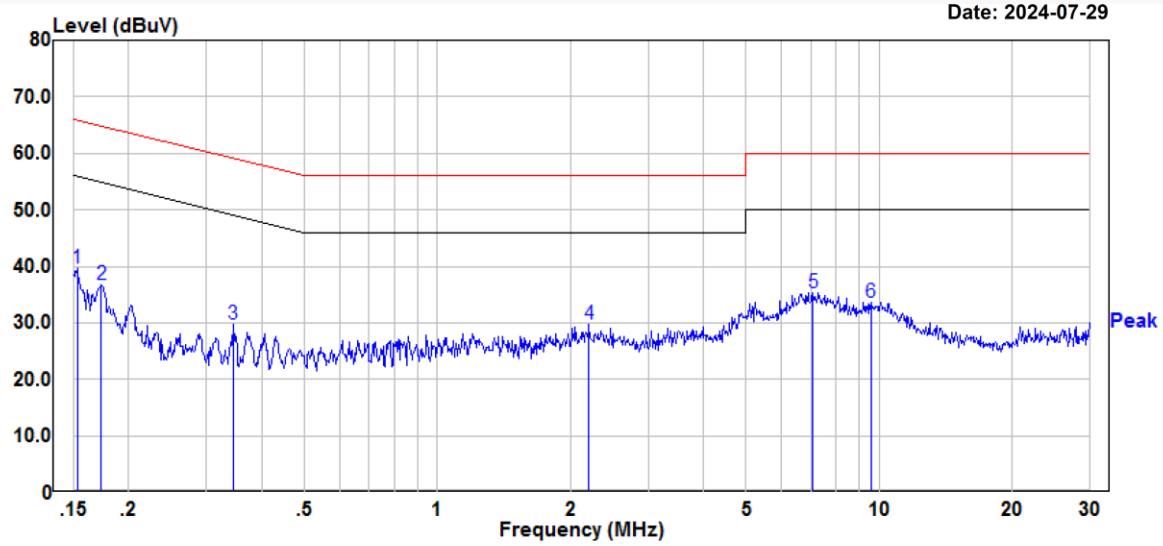
Test Item:	DUTY CYCLE	AC LINE CONDUCTED EMISSIONS
Test Date:	2024-08-15	2024-07-29
Temperature:	23 ℃	28.1 ℃
Relative Humidity:	50 %	56 %
ATM Pressure:	100.5 kPa	101.1kPa
Test Result:	/	Pass
Test Engineer:	Neil Zhou	Leah Li

Test Item:	SPURIOUS EMISSIONS			
	9 kHz – 30MHz	30MHz - 1GHz	1 GHz - 18 GHz	18 GHz - 25 GHz
Test Date:	2024-12-06	2024-07-17	2024-07-20	2024-07-13
Temperature:	25 ℃	23.4 ℃	22.8 ℃	25.5 ℃
Relative Humidity:	55 %	52 %	53 %	52 %
ATM Pressure:	101.2 kPa	100.9 kPa	100.5kPa	100.5kPa
Test Result:	Pass	Pass	Pass	Pass
Test Engineer:	Jerry Yan	Leah Li	Klein Zhu	Hugh Wu

Test Item:	6 DB EMISSION BANDWIDTH	MAXIMUM CONDUCTED OUTPUT POWER	100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE	POWER SPECTRAL DENSITY
Test Date:	2024-08-15	2024-08-15	2024-08-15	2024-08-15
Temperature:	23 ℃	23 ℃	23 ℃	23 ℃
Relative Humidity:	50 %	50 %	50 %	50 %
ATM Pressure:	100.5 kPa	100.5 kPa	100.5 kPa	100.5 kPa
Test Result:	Pass	Pass	Pass	Pass
Test Engineer:	Neil Zhou	Neil Zhou	Neil Zhou	Neil Zhou

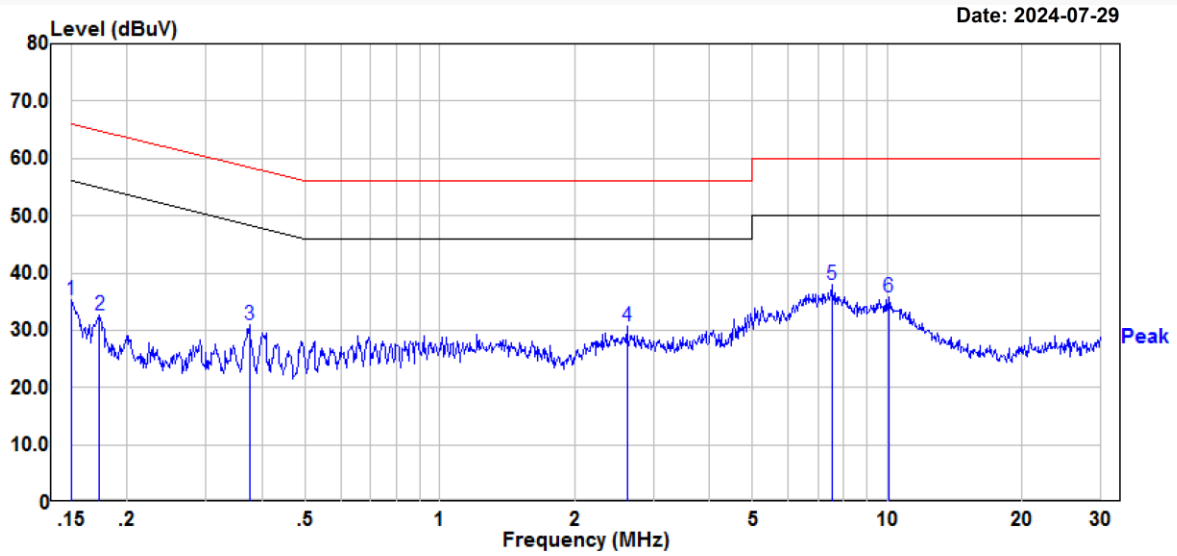
AC LINE CONDUCTED EMISSIONS

EUT operation mode: Transmitting in maximum output power BW: 1.25MHz middle channel




```
Site                : CE
Condition           : limit\FCC PART 15.207
                    : DET:Peak
Project No.         : RSHA240322001
Model               : HD402
Phase               : L
Voltage             : 120V/60Hz
Mode                : 2.4G SRD
Test Equipment      : ENV216,ESR
Temperature         : 28.1℃
Humidity            : 56%
Atmospheric pressure: 101.1kPa
Test Engineer       : Leah Li
```

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.153	19.49	20.12	39.61	65.83	-26.22	Peak
2	0.173	16.69	20.11	36.80	64.80	-28.00	Peak
3	0.345	9.63	20.19	29.82	59.09	-29.27	Peak
4	2.202	9.46	20.17	29.63	56.00	-26.37	Peak
5	7.069	15.18	20.18	35.36	60.00	-24.64	Peak
6	9.581	13.59	20.03	33.62	60.00	-26.38	Peak



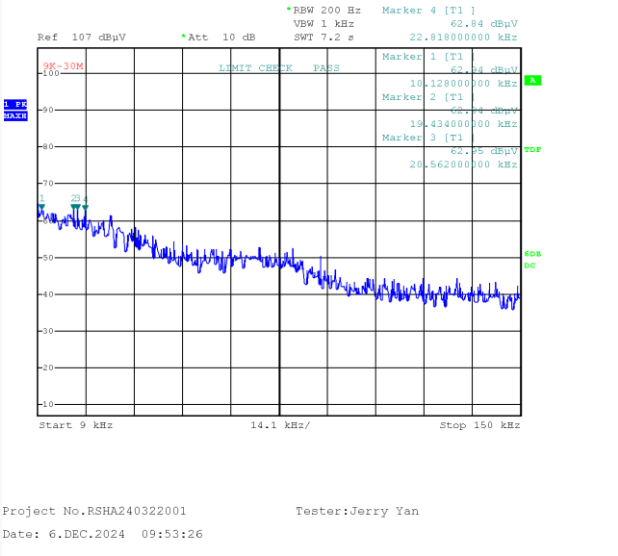
Site : CE
Condition : limit\FCC PART 15.207
: DET:Peak
Project No. : RSHA240322001
Model : HD402
Phase : N
Voltage : 120V/60Hz
Mode : 2.4G SRD
Test Equipment : ENV216,ESR
Temperature : 28.1℃
Humidity : 56%
Atmospheric pressure: 101.1kPa
Test Engineer : Leah Li

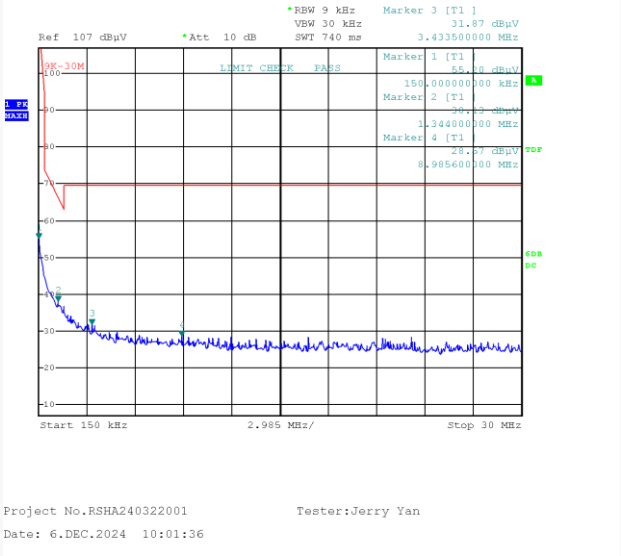
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	15.27	20.12	35.39	66.00	-30.61	Peak
2	0.173	12.44	20.11	32.55	64.80	-32.25	Peak
3	0.375	10.68	20.19	30.87	58.38	-27.51	Peak
4	2.622	10.44	20.20	30.64	56.00	-25.36	Peak
5	7.505	17.80	20.14	37.94	60.00	-22.06	Peak
6	10.071	15.67	20.00	35.67	60.00	-24.33	Peak

SPURIOUS EMISSIONS

EUT operation 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 BW: 1.25 MHz and Middle channel)*
(Parallel worst)





9 kHz - 150 kHz

Frequency (MHz)	Corrected Amplitude (dBµV/m) @3m	Detector PK/QP/Ave.	Corrected Factor (dB/m)	Limit (dBµV/m) @3m	Margin (dB)
0.010128	62.94	PK	56.28	127.49	64.55
0.019434	62.94	PK	50.36	121.83	58.89
0.020562	62.95	PK	49.84	121.34	58.39
0.022818	62.84	PK	49.21	120.44	57.60

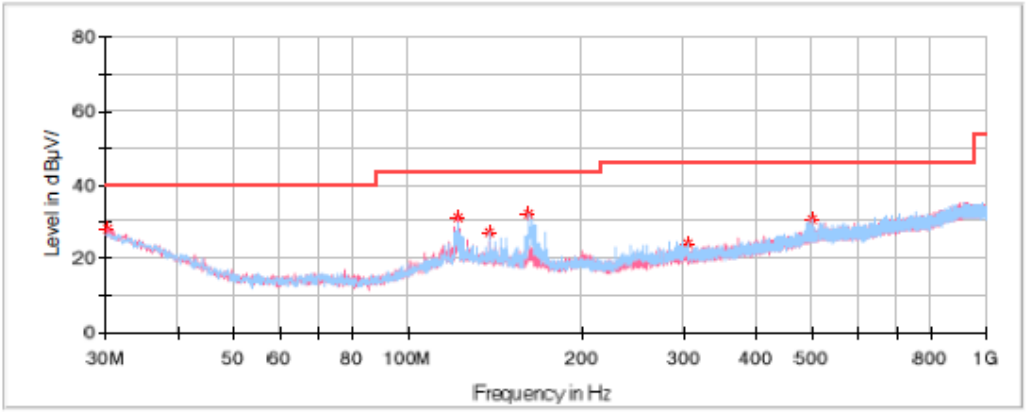
150 kHz - 30 MHz

Frequency (MHz)	Corrected Amplitude (dBµV/m) @3m	Detector PK/QP/Ave.	Corrected Factor (dB/m)	Limit (dBµV/m) @3m	Margin (dB)
0.15000	55.2	PK	50.90	104.08	48.88
1.34400	38.13	PK	5.87	65.04	26.91
3.43350	31.87	PK	14.02	69.54	37.67
8.98560	28.57	PK	6.40	69.54	40.97

30MHz - 1GHz: SRD (BW: 1.25 MHz) (worst case)
Low Channel: 2411 MHz

Common Information

Project No:	RSHA240322001
Test Mode:	Transmitting in 2411 channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Leah Li



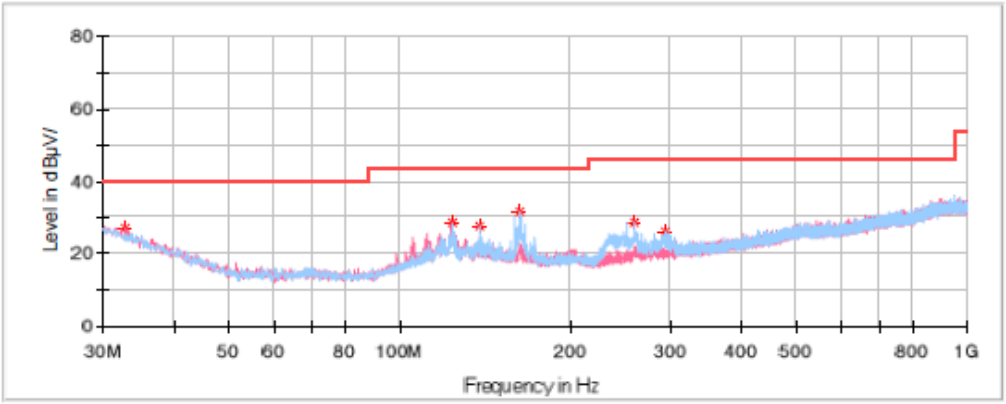
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.242500	27.95	40.00	12.05	V	-4.6
122.150000	31.05	43.50	12.45	V	-11.3
138.155000	27.24	43.50	16.26	H	-11.5
161.435000	32.06	43.50	11.44	H	-12.6
304.025000	24.17	46.00	21.83	H	-10.9
498.267500	30.86	46.00	15.14	H	-5.8

Middle Channel: 2444 MHz

Common Information

Project No:	RSHA240322001
Test Mode:	Transmitting in 2444 channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Leah Li



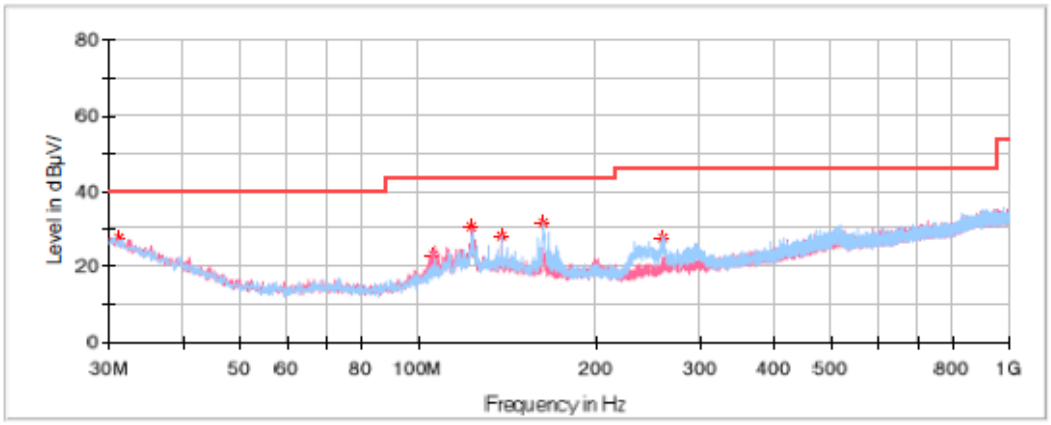
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
32.788750	27.06	40.00	12.94	V	-6.3
123.605000	28.57	43.50	14.93	V	-11.3
138.518750	27.58	43.50	15.92	H	-11.5
162.768750	31.91	43.50	11.59	H	-12.7
258.798750	28.80	46.00	17.20	H	-12.4
294.688750	26.00	46.00	20.00	H	-11.0

High Channel: 2466 MHz

Common Information

Project No:	RSHA240322001
Test Mode:	Transmitting in 2466 channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Leah Li



Critical_Freqs

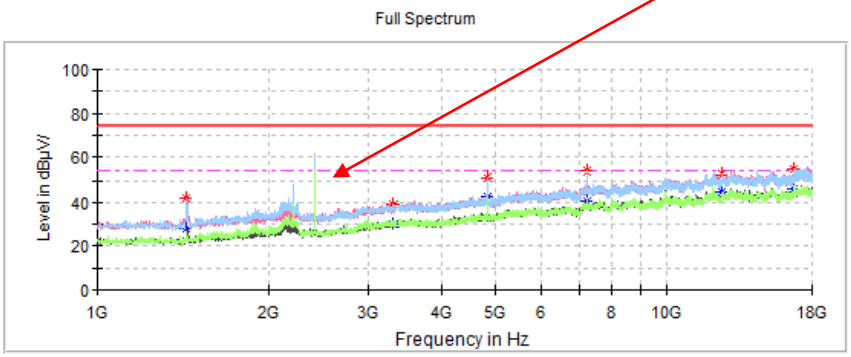
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
31.222380	27.77	40.00	12.23	H	-4.9
105.865400	23.23	43.50	20.27	V	-13.6
123.284750	30.80	43.50	12.70	V	-11.3
138.155000	28.07	43.50	15.43	H	-11.5
162.526250	31.87	43.50	11.63	H	-12.7
259.890000	27.52	46.00	18.48	H	-12.4

1GHz - 18GHz:
SRD (BW: 1.25 MHz)

Low Channel: 2411 MHz

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



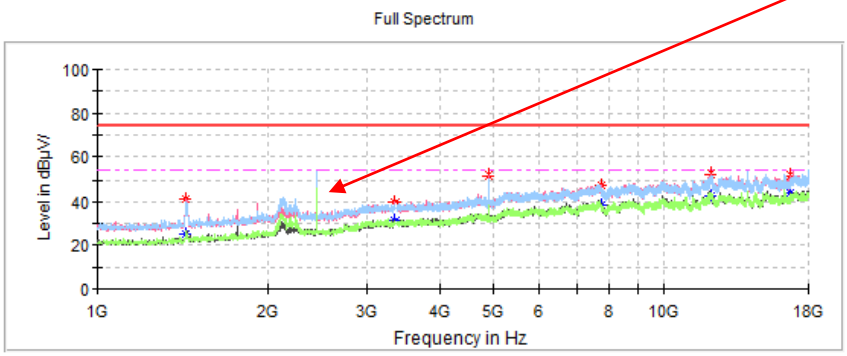
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1436.900000	---	27.98	54.00	26.02	V	-14.8
1436.900000	41.95	---	74.00	32.05	V	-14.8
3306.900000	---	29.87	54.00	24.13	H	-7.1
3306.900000	39.32	---	74.00	34.68	H	-7.1
4821.600000	---	42.59	54.00	11.41	H	-3.1
4821.600000	50.73	---	74.00	23.27	H	-3.1
7230.500000	---	40.88	54.00	13.12	H	3.2
7230.500000	53.81	---	74.00	20.19	H	3.2
12512.400000	---	44.74	54.00	9.26	V	9.7
12512.400000	52.12	---	74.00	21.88	V	9.7
16738.600000	---	45.90	54.00	8.10	V	11.5
16738.600000	54.45	---	74.00	19.55	V	11.5

Middle Channel: 2444 MHz

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



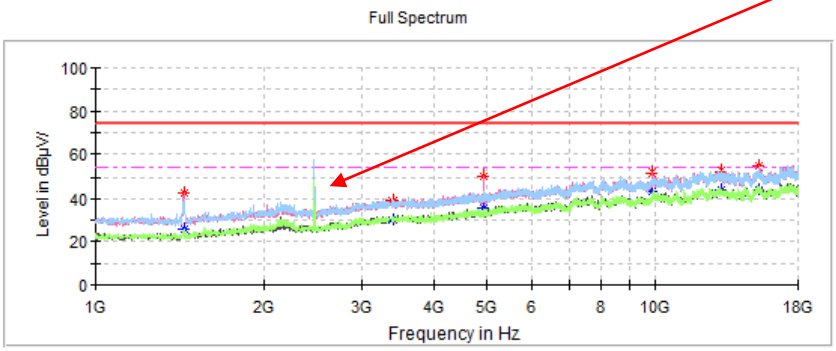
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1436.900000	---	25.42	54.00	28.58	V	-14.8
1436.900000	40.98	---	74.00	33.02	V	-14.8
3347.700000	---	31.30	54.00	22.70	H	-7.0
3347.700000	39.98	---	74.00	34.02	H	-7.0
4887.900000	---	39.20	54.00	14.80	V	-2.8
4887.900000	51.50	---	74.00	22.50	V	-2.8
7723.500000	---	38.30	54.00	15.70	V	3.9
7723.500000	47.78	---	74.00	26.22	V	3.9
12065.300000	---	42.62	54.00	11.38	V	9.1
12065.300000	52.47	---	74.00	21.53	V	9.1
16747.100000	---	44.24	54.00	9.76	H	11.5
16747.100000	51.66	---	74.00	22.34	H	11.5

High Channel: 2466 MHz

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



Critical_Freqs

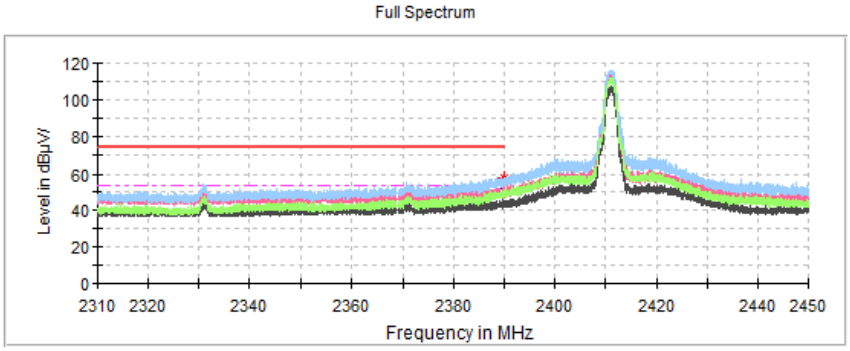
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	26.17	54.00	27.83	V	-14.8
1438.600000	42.33	---	74.00	31.67	V	-14.8
3386.800000	---	30.08	54.00	23.92	H	-6.8
3386.800000	39.01	---	74.00	34.99	H	-6.8
4932.100000	---	35.53	54.00	18.47	V	-2.7
4932.100000	50.26	---	74.00	23.74	V	-2.7
9863.800000	---	43.61	54.00	10.39	V	6.7
9863.800000	51.70	---	74.00	22.30	V	6.7
13092.100000	---	43.93	54.00	10.07	V	9.7
13092.100000	52.72	---	74.00	21.28	V	9.7
15285.100000	---	43.98	54.00	10.02	H	9.6
15285.100000	54.42	---	74.00	19.58	H	9.6

Band Edge:

Low Channel

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



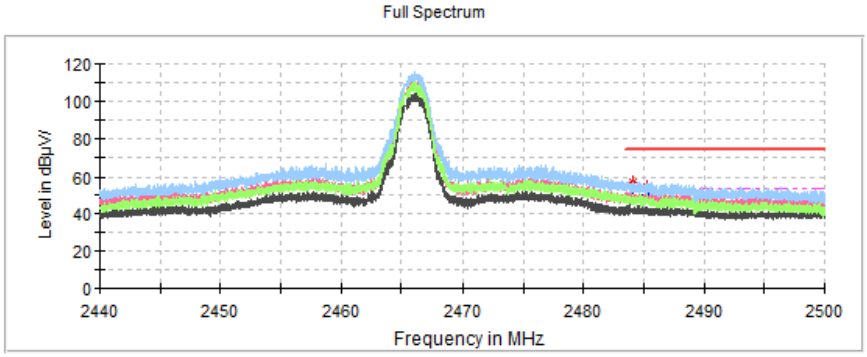
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2389.912000	58.17	---	74.00	15.83	H	-0.6
2389.912000	---	50.05	54.00	3.95	H	-0.6
2389.996000	55.64	---	74.00	18.36	H	-0.6
2389.996000	---	50.58	54.00	3.42	H	-0.6

High Channel

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



Critical_Freqs

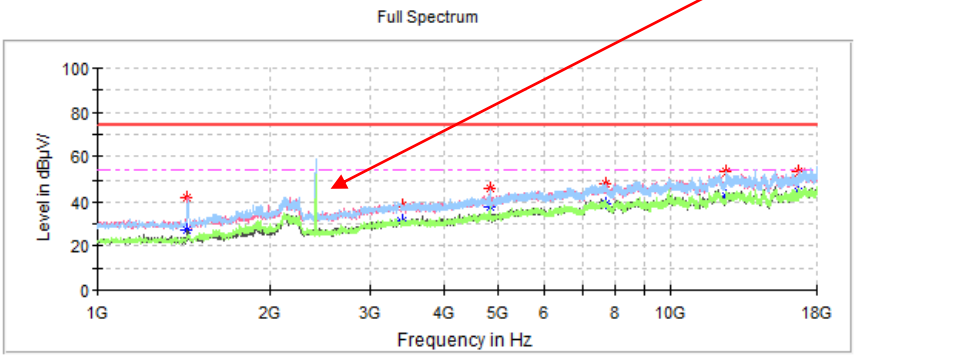
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2484.148000	57.43	---	74.00	16.57	H	-0.3
2484.148000	---	48.91	54.00	5.09	H	-0.3
2485.276000	54.95	---	74.00	19.05	H	-0.2
2485.276000	---	50.35	54.00	3.65	H	-0.2

SRD (BW: 10 MHz)

Low Channel: 2411 MHz

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



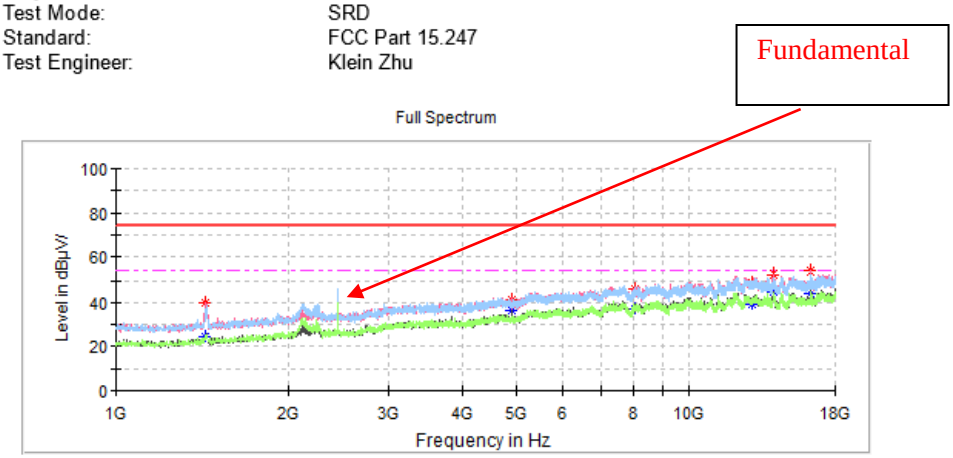
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1436.900000	---	27.18	54.00	26.82	V	-14.8
1436.900000	42.21	---	74.00	31.79	V	-14.8
3388.500000	---	31.41	54.00	22.59	H	-6.8
3388.500000	38.29	---	74.00	35.71	H	-6.8
4821.600000	---	37.60	54.00	16.40	H	-3.1
4821.600000	46.35	---	74.00	27.65	H	-3.1
7687.800000	---	39.03	54.00	14.97	H	3.9
7687.800000	48.50	---	74.00	25.50	H	3.9
12486.900000	---	42.87	54.00	11.13	V	9.6
12486.900000	53.05	---	74.00	20.95	V	9.6
16747.100000	---	44.56	54.00	9.44	V	11.5
16747.100000	53.23	---	74.00	20.77	V	11.5

Middle Channel: 2444 MHz

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



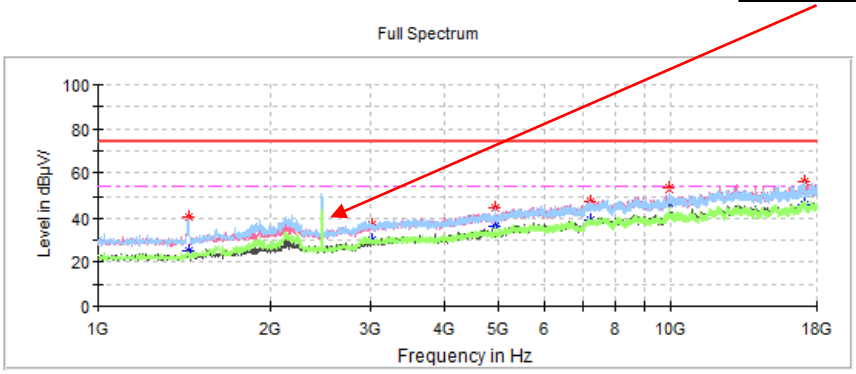
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1436.900000	39.64	---	74.00	34.36	V	-14.8
1436.900000	---	24.41	54.00	29.59	V	-14.8
4887.900000	---	36.40	54.00	17.60	V	-2.8
4887.900000	41.39	---	74.00	32.61	V	-2.8
8022.700000	46.06	---	74.00	27.94	V	4.0
8022.700000	---	37.40	54.00	16.60	V	4.0
12847.300000	49.27	---	74.00	24.73	H	9.7
12847.300000	---	39.45	54.00	14.55	H	9.7
14001.600000	52.11	---	74.00	21.89	V	9.8
14001.600000	---	44.79	54.00	9.21	V	9.8
16308.500000	---	43.95	54.00	10.05	V	10.3
16308.500000	53.57	---	74.00	20.43	V	10.3

High Channel: 2466 MHz

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



Critical_Freqs

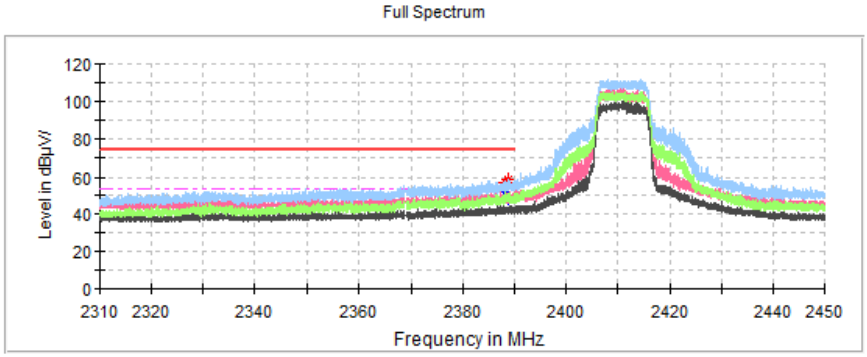
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	25.11	54.00	28.89	V	-14.8
1438.600000	40.72	---	74.00	33.28	V	-14.8
3023.000000	---	29.80	54.00	24.20	H	-8.3
3023.000000	37.23	---	74.00	36.77	H	-8.3
4928.700000	---	36.06	54.00	17.94	H	-2.7
4928.700000	45.01	---	74.00	28.99	H	-2.7
7237.300000	---	39.33	54.00	14.67	V	3.2
7237.300000	47.80	---	74.00	26.20	V	3.2
9908.000000	---	47.10	54.00	6.90	V	6.8
9908.000000	53.01	---	74.00	20.99	V	6.8
17080.300000	55.83	---	74.00	18.17	V	12.2
17080.300000	---	46.02	54.00	7.98	V	12.2

Band Edge:

Low Channel

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu



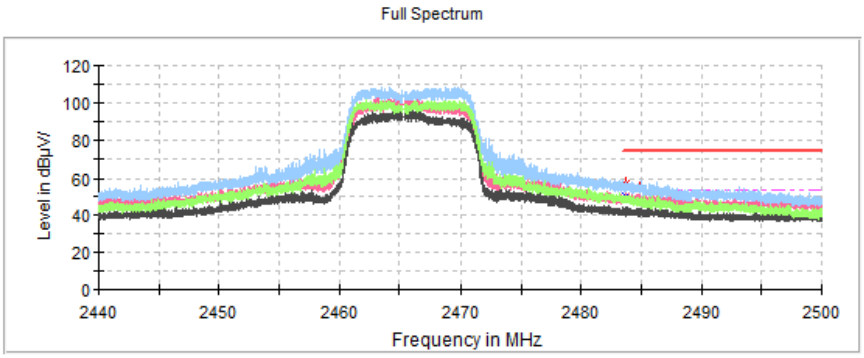
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2388.176000	---	51.95	54.00	2.05	H	-0.6
2388.176000	56.91	---	74.00	17.09	H	-0.6
2388.680000	---	48.20	54.00	5.80	H	-0.6
2388.680000	59.09	---	74.00	14.91	H	-0.6

High Channel

Common Information

Project No.:	RSHA240322001
Test Mode:	SRD
Standard:	FCC Part 15.247
Test Engineer:	Klein Zhu

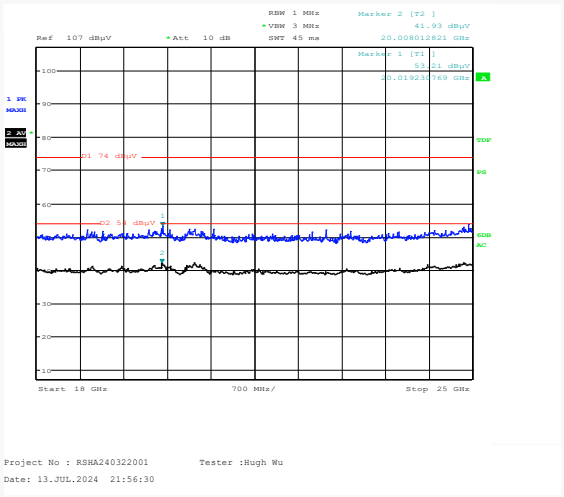


Critical_Freqs

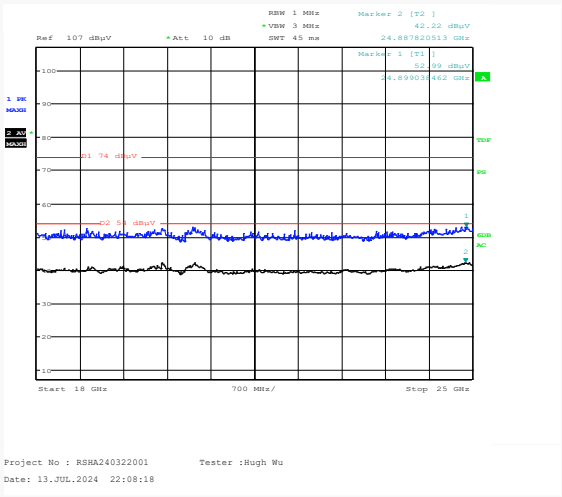
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2483.656000	57.27	---	74.00	16.73	H	-0.3
2483.656000	---	50.49	54.00	3.51	H	-0.3
2484.928000	---	47.95	54.00	6.05	H	-0.3
2484.928000	54.48	---	74.00	19.52	H	-0.3

18GHz-25GHz: Transmitting in maximum output power BW1.25MHz middle channel

Horizontal



Vertical



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
24887.82	---	42.22	54	11.78	V	15.19
24899.04	52.99	---	74	21.01	V	15.21
20008.01	---	41.93	54	12.07	H	12.72
20019.23	53.21	---	74	20.79	H	12.75

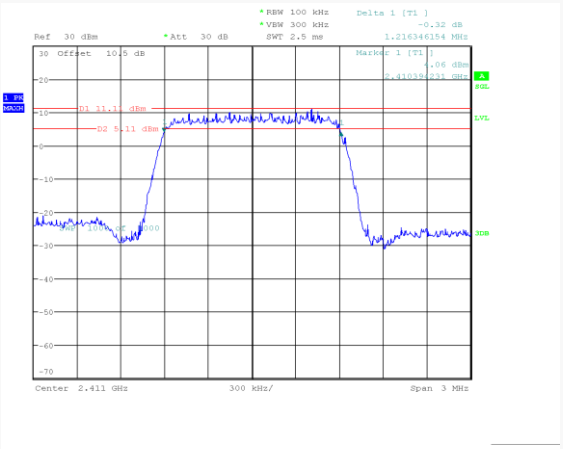
6 dB EMISSION BANDWIDTH

EUT operation mode: Transmitting

Mode	Channel	Frequency (MHz)	Result (MHz)	Limit (MHz)
SRD(1.25M)	Low	2411	1.216	0.5
	Middle	2444	1.216	
	High	2466	1.231	
SRD(10M)	Low	2411	9.487	0.5
	Middle	2444	9.519	
	High	2466	9.551	

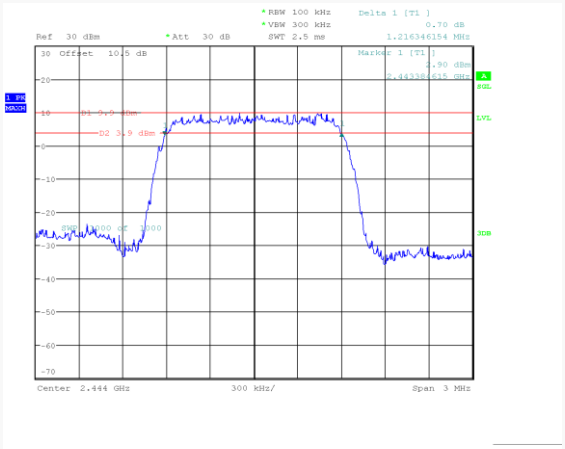
BW： 1.5 MHz

Low Channel



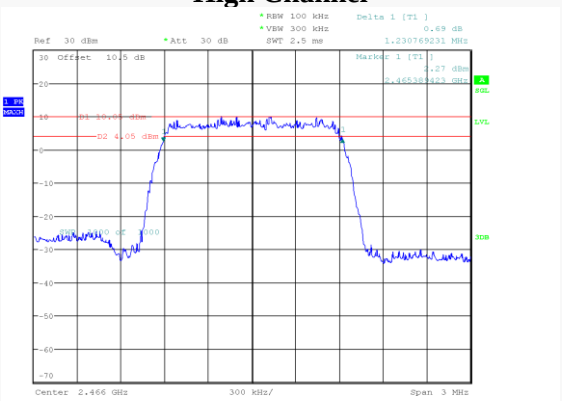
ProjectNo.:RSHA240322001 Tester:Neil Zhou
Date: 15.AUG.2024 09:32:26

Middle Channel



ProjectNo.:RSHA240322001 Tester:Neil Zhou
Date: 15.AUG.2024 09:34:12

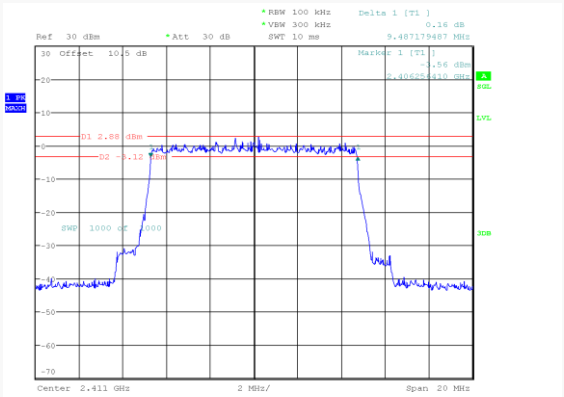
High Channel



ProjectNo.:RSHA240322001 Tester:Neil Zhou
Date: 15.AUG.2024 09:36:30

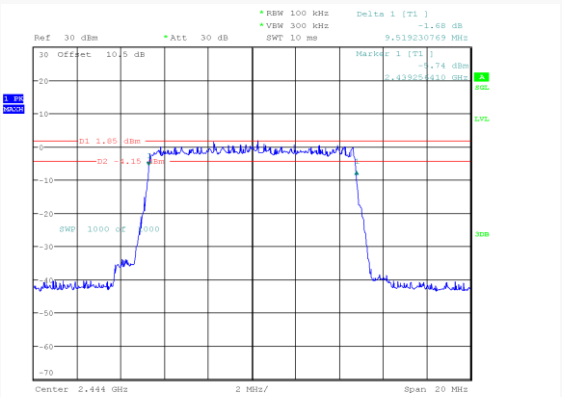
BW： 10 MHz

Low Channel



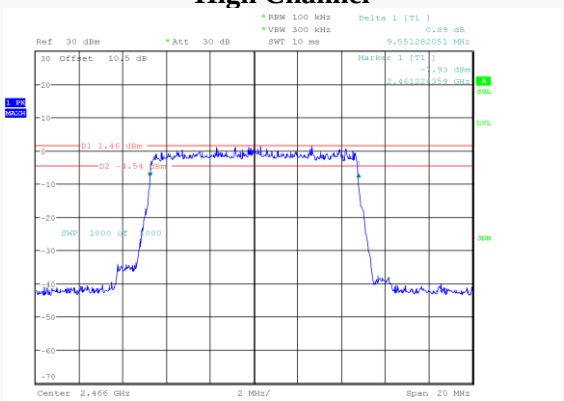
ProjectNo.:RSHA240322001 Tester:Neil Zhou
Date: 15.AUG.2024 09:44:29

Middle Channel



ProjectNo.:RSHA240322001 Tester:Neil Zhou
Date: 15.AUG.2024 09:47:04

High Channel



ProjectNo.:RSHA240322001 Tester:Neil Zhou
Date: 15.AUG.2024 09:50:56

MAXIMUM CONDUCTED OUTPUT POWER

EUT operation mode: Transmitting

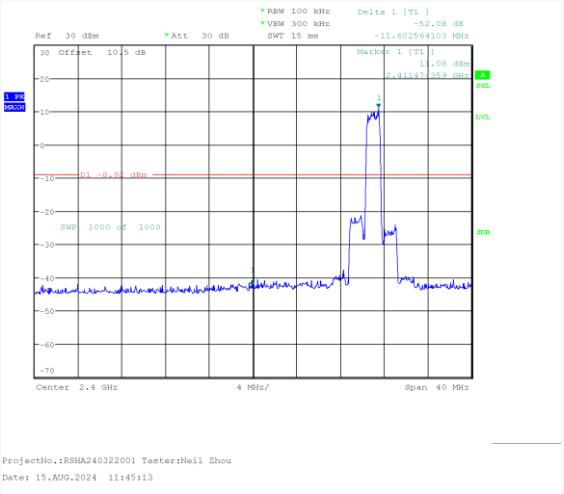
Mode	Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Max Conducted Average Output Power (dBm)	Limit (dBm)
SRD(1.25M)	Low	2411	22.08	7.79	30
	Middle	2444	22.14	7.84	
	High	2466	21.76	7.49	
SRD(10M)	Low	2411	21.66	6.43	30
	Middle	2444	21.79	6.56	
	High	2466	21.39	6.17	

100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

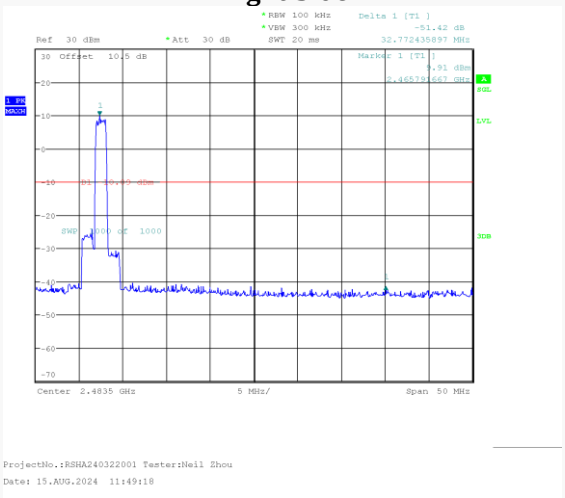
EUT operation mode: Transmitting

BW： 1.25 MHz

Left Side

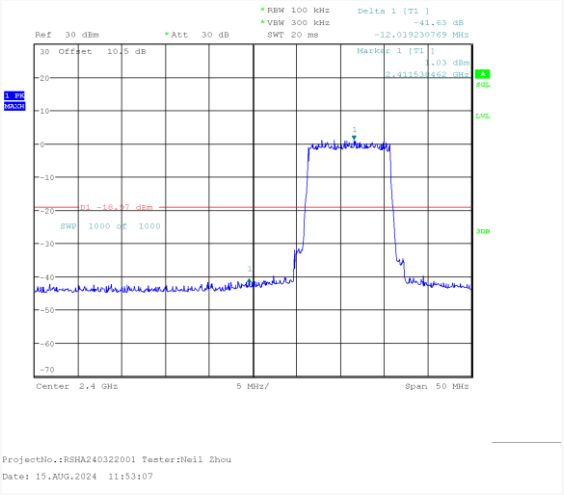


Right Side

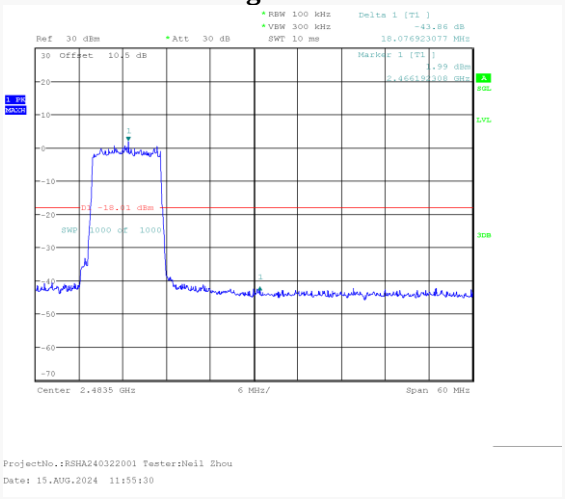


BW： 10 MHz

Left Side



Right Side



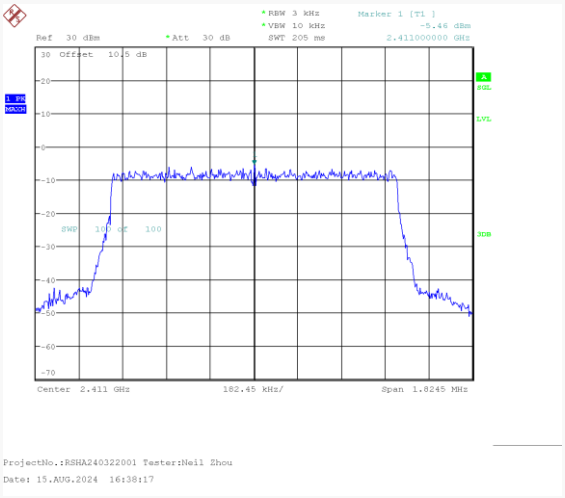
POWER SPECTRAL DENSITY

EUT operation mode: Transmitting

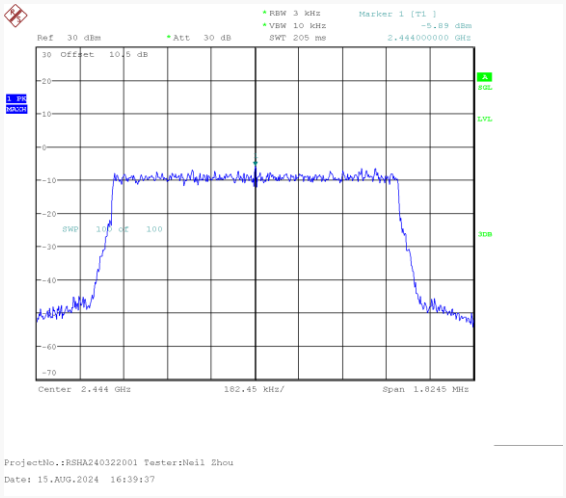
Mode	Channel	Frequency (MHz)	Result (dBm/3kHz)	Limit (dBm/3kHz)
SRD (BW: 1.25 MHz)	Low	2411	-5.46	8
	Middle	2444	-5.89	
	High	2466	-6.21	
SRD (BW: 10 MHz)	Low	2411	-9.34	8
	Middle	2444	-9.63	
	High	2466	-9.68	

BW： 1.25 MHz

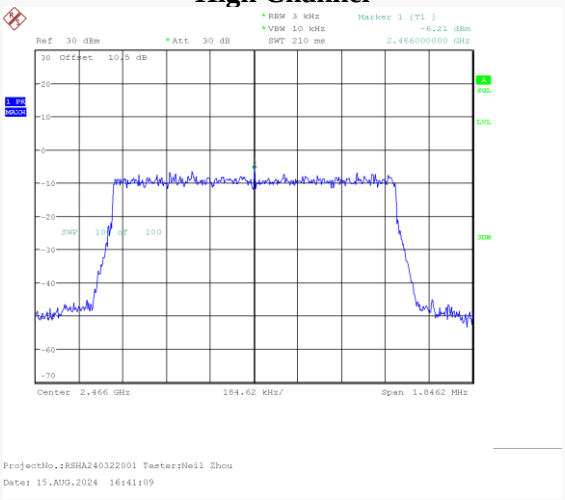
Low Channel



Middle Channel

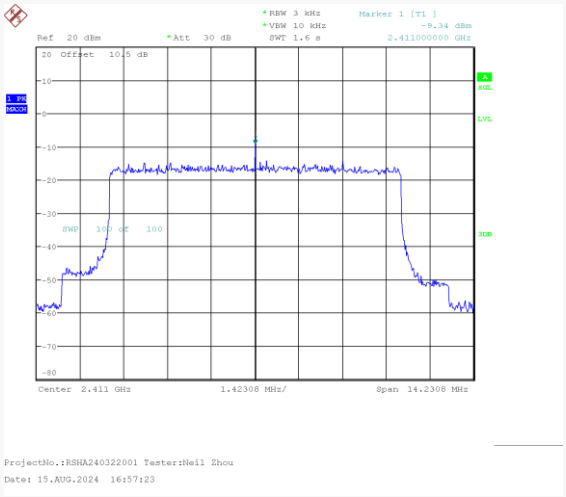


High Channel

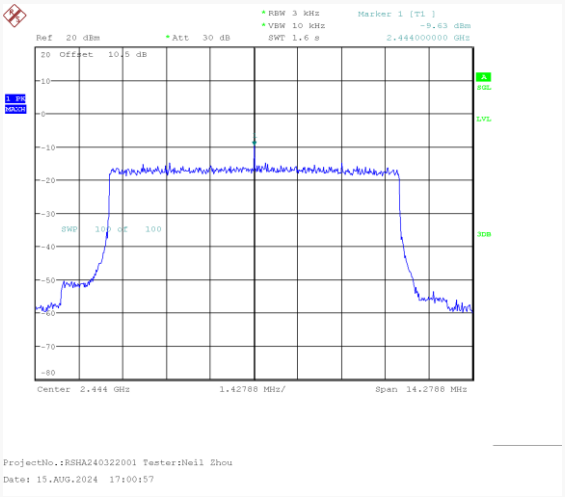


BW： 10 MHz

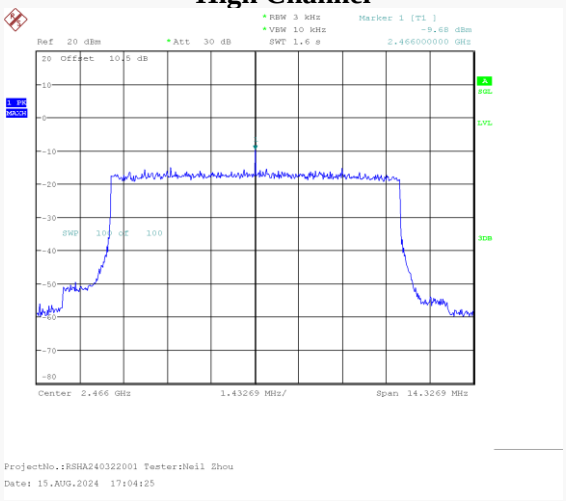
Low Channel



Middle Channel



High Channel



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 *******