

FCC PART 15.249
TEST REPORT

For

Shanghai Smarfid Security Equipment Co., Ltd.

#102, Building 12, No.1088 Zhongchun Road, Minhang District, Shanghai, 201109, China

FCC ID: X3A-REX0150-L

Report Type: Original Report	Product Name: Contactless Exit Button
Report Number:	RSHB231228001-00A
Report Date:	2024-05-09
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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	RSHB231228001-00A	R1V1	2024-05-09	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Shanghai Smarfid Security Equipment Co., Ltd.
Tested Model:	REX0159-L-B
Series Model:	REX0150-L-B, REX0150-L-S, REX0159-L-S
Model Differences:	Power supply; Panel
Product Name:	Contactless Exit Button
Power Supply:	REX0150-L-B & REX0150-L-S: DC 3V powered from battery REX0159-L-B & REX0159-L-S: DC 12V or DC 3V powered from battery
RF Function:	2.4G SRD
Operating Band/Frequency:	2404-2412 MHz
Channel Number:	5
Channel Separation:	2 MHz
Modulation Type:	GFSK
Antenna Type:	PCB Antenna
★Maximum Antenna Gain:	2.33 dBi

Note: 1. The maximum antenna gain is provided by the applicant.

2. The product have two types of panels: acrylic panel and stainless steel panel. Pre-scanned two panels, only worst case acrylic panel data recorded in report.

All measurement and test data in this report was gathered from production sample serial number: RSHB231228001-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2023-12-28.)

Objective

This type approval report is prepared for *Shanghai Smarfid Security Equipment Co., Ltd.* 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:

Channel	Frequency (MHz)
1	2404
2	2406
3	2408
4	2410
5	2412

EUT was tested with Channel 1, 5.

EUT Exercise Software

Engineer Mode was used during the test.

★Power level: Default

Note: The power level was declared by the applicant.

Support Equipment List and Details

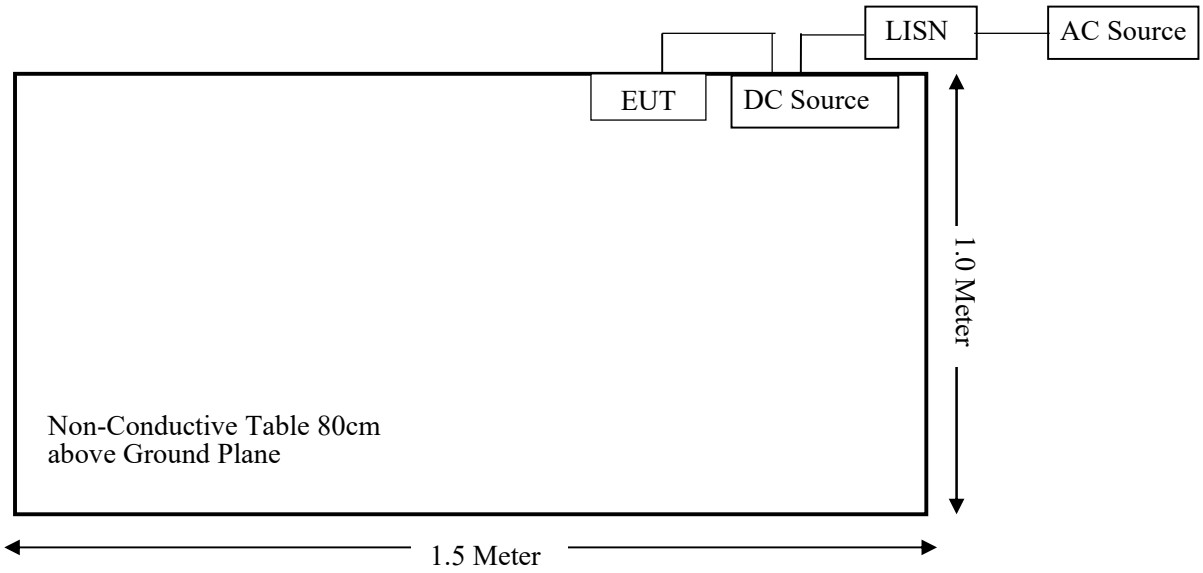
Manufacturer	Description	Model	Serial Number
ZHAOXIN	DC Source	RXN-6050	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Power Cable 1	1.0	DC Source	LISN
Power Cable 2	1.0	EUT	DC Source

Block Diagram of Test Setup

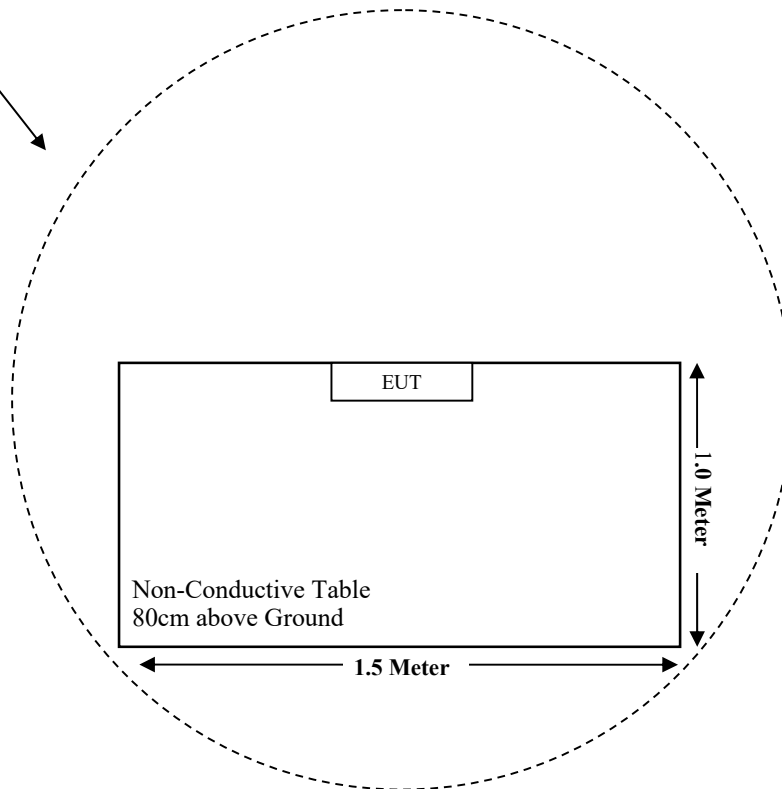
For Conducted Emissions:



For Radiated Emissions(Below 1GHz):

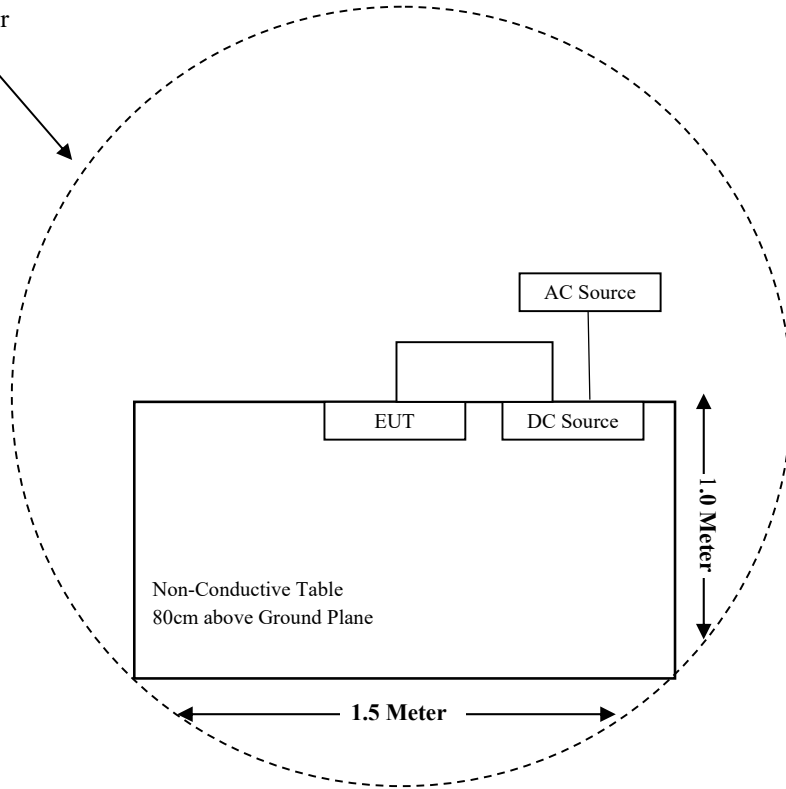
Powered by battery:

Turntable
2m Diameter



Powered by DC:

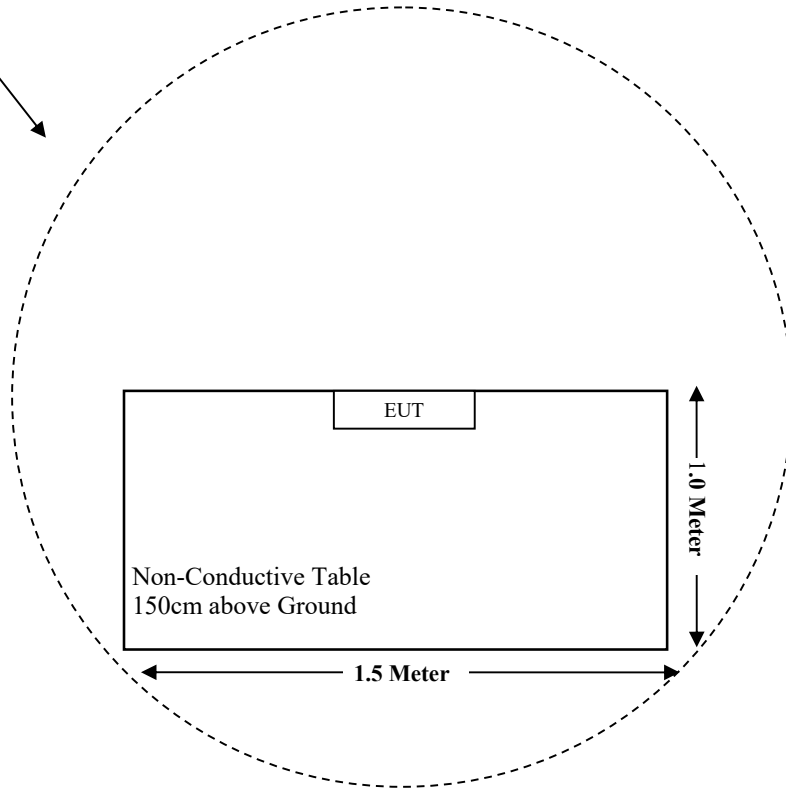
Turntable
2m Diameter



For Radiated Emissions(Above 1GHz):

Powered by battery:

Turntable
2m Diameter



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§1.1307(b)(3)(i)(A)	RF Exposure Evaluation	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

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	2023-05-23	2024-05-22
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10
Sonoma Instrument	Pre-amplifier	310N	171205	2023-05-23	2024-05-22
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
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
ETS-LINDGREN	Loop Antenna	6512	108100	2023-11-09	2024-11-08
Narda	6 dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
Radiated Emission Test (Chamber #2)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2023-05-19	2024-05-18
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-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
RF Conducted Test					
Rohde & Schwarz	EMI Test Receiver	ESIB26	100146	2023-05-23	2024-05-22
Narda	Attenuator	10dB	010	2023-05-23	2024-05-22
XHFDZ	RG178 Coaxial Cable	SMA-178	XHF-1102	Each Time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2023-07-28	2024-07-27
Rohde & Schwarz	LISN	ENV216	101115	2023-05-23	2024-05-22
Audix	Test Software	e3	V9	N/A	N/A
Rohde & Schwarz	Pulse limiter	ESH3-Z2	100552	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-15	015	2023-05-23	2024-05-22

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 §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 PCB Antenna for SRD, which was permanently attached to the EUT, antenna gain is 2.33 dBi, fulfill the requirement of this section, please refer to the EUT photos.

Result: Compliant.

FCC §1.1307(b)(3)(i)(A) RF EXPOSURE EVALUATION

Applicable Standard

According to 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.2- 1-mW Test Exemption:

Per §1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

Measurement Result

Radio	Frequency	Maximum EIRP	Maximum ERP		1-mW
	(MHz)	(dBm)	(dBm)	(mW)	Test Exemption
SRD	2404-2412	-16.75	-18.90	0.01	Compliant

1. Chose the maximum power to do RF exposure analysis.
2. This device maximum E-Field level is 78.45 dBμV/m at 3m, so the EIRP power is -16.75 dBm.
3. EIRP (dBm)=Field Strength of Fundamental(dBuV/m)-95.2 (dB)
- 4 ERP (dBm)= EIRP (dBm) -2.15(dB)

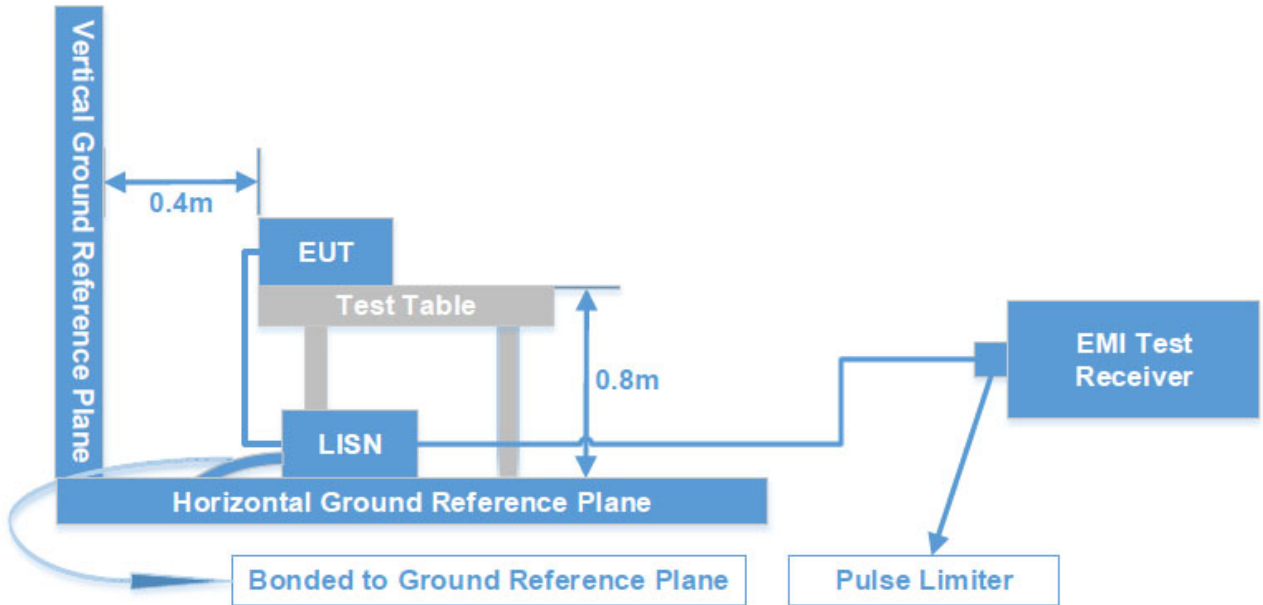
Result: Compliant.

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

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

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 (dB μ V) = Read level (dB μ V) + 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 (dB μ V) - Limit (dB μ V)

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 §15.205, §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:

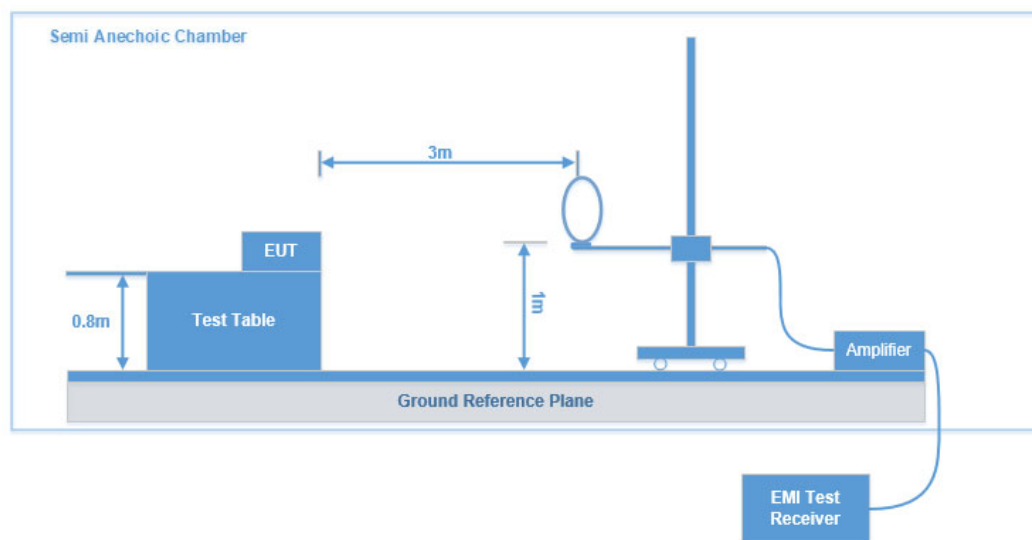
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24GHz-24.25GHz	250	2500

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

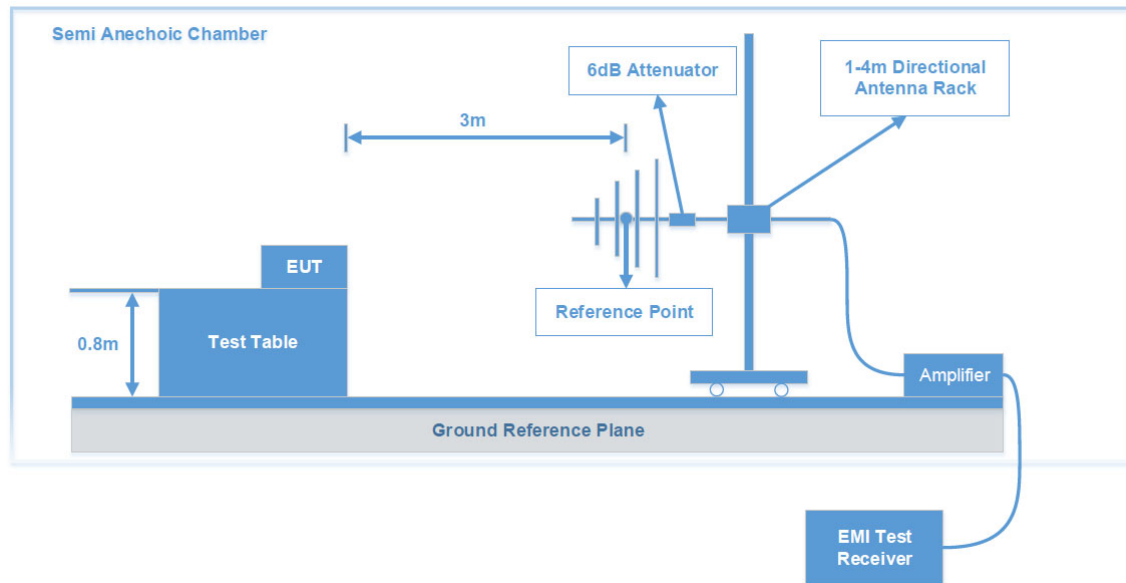
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test System Setup

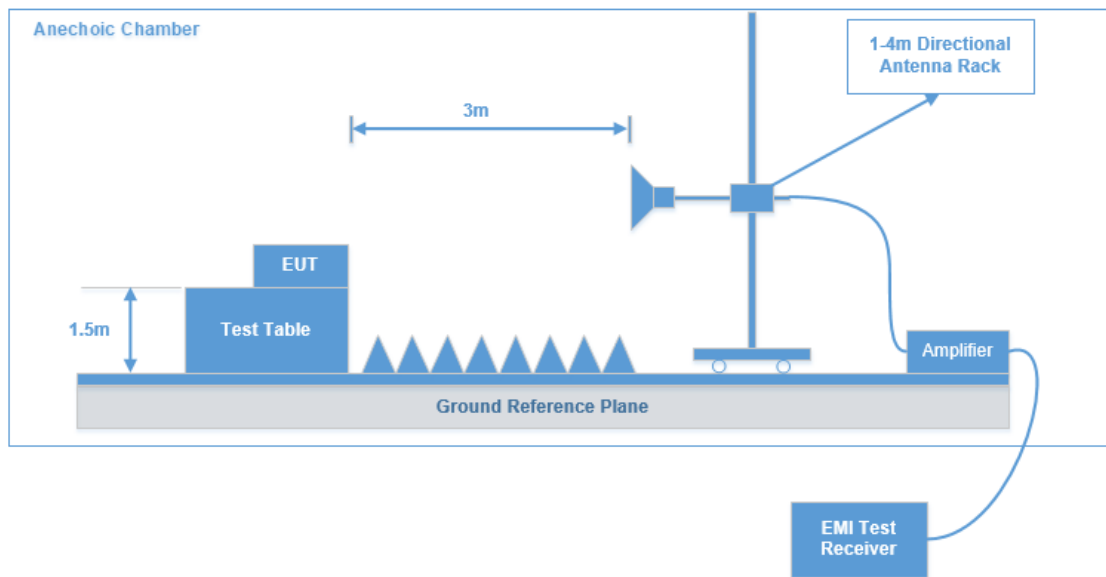
9 kHz-30 MHz:



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	Detector
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

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 (dB μ V/m) = Meter Reading (dB μ V) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

Note: The QuasiPeak (dB μ V/m), MaxPeak (dB μ V/m), Average (dB μ V/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 (dB μ V/m) – Corrected Amplitude (dB μ V/m)
Over Limit (dB) = Level (dB μ V/m) - Limit (dB μ V/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

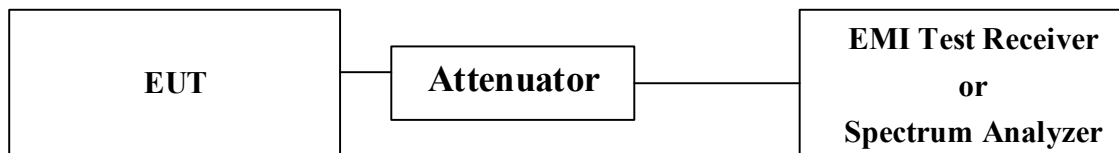
FCC §15.215(c) – 20 dB BANDWIDTH TESTING

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:	CONDUCTED EMISSIONS	RADIATED EMISSIONS	
		9kHz - 1GHz	
Test Date:	2024-03-20	2024-02-20	2024-03-22
Temperature:	16.5 °C	16.2 °C	16.8°C
Relative Humidity:	43 %	52 %	49 %
ATM Pressure:	102.8kPa	102.1kPa	101.1kPa
Test Result:	Pass	Pass	Pass
Test Engineer:	Joe Zhang	Joe Zhang	Leah Li

Test Item:	RADIATED EMISSIONS				20 DB BANDWIDTH
	1 GHz – 18 GHz			18 GHz – 25 GHz	
Test Date:	2024-03-02	2024-03-04	2024-04-02	2024-05-08	2024-03-05
Temperature:	20.3 °C	20.3 °C	20.3 °C	16.2 °C	25.4 °C
Relative Humidity:	52 %	52 %	52 %	52 %	41 %
ATM Pressure:	102.1kPa	101.6kPa	101.1kPa	102.1kPa	102.8kPa
Test Result:	Pass	Pass	Pass	Pass	Pass
Test Engineer:	Peter Wang	Peter Wang	Peter Wang	Peter Wang	Jenny Yang

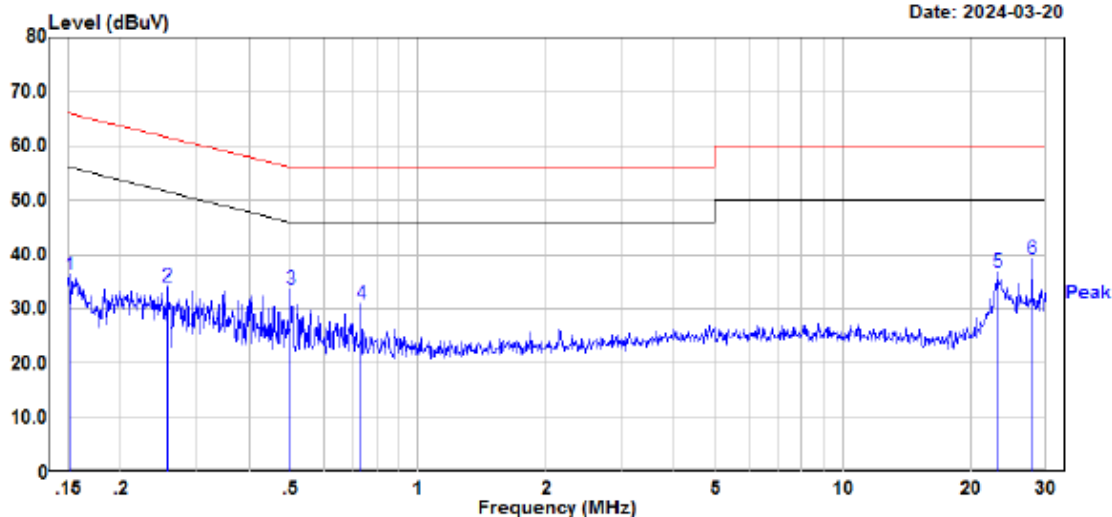
CONDUCTED EMISSIONS

Model: REX0159-L-B

Low channel: 2404MHz

Line:

Date: 2024-03-20



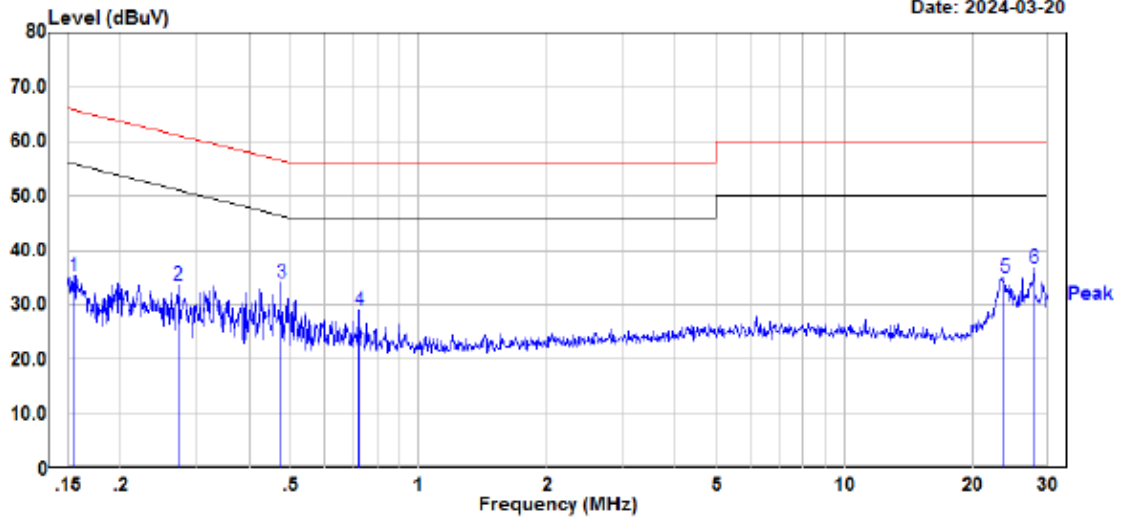
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Site           : CE
Condition      : FCC Part 15.207
                : DET:Peak
Project No.    : RSHB231228001
Model          : REX0159-L-B
Phase         : L
Voltage        : 120V/60Hz
Mode          : Transmitting
Test Equipment : ENV216,ESR
Temperature    : 16.5°C
Humidity       : 43%
Atmospheric pressure: 102.8kPa
Test Engineer  : Joe Zhang
    
```

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	16.28	19.99	36.27	65.92	-29.65	Peak
2	0.257	14.08	20.04	34.12	61.53	-27.41	Peak
3	0.501	13.55	19.98	33.53	56.00	-22.47	Peak
4	0.736	11.11	19.88	30.99	56.00	-25.01	Peak
5	23.150	16.97	19.87	36.84	60.00	-23.16	Peak
6	27.839	19.27	19.99	39.26	60.00	-20.74	Peak

Neutral:

Date: 2024-03-20



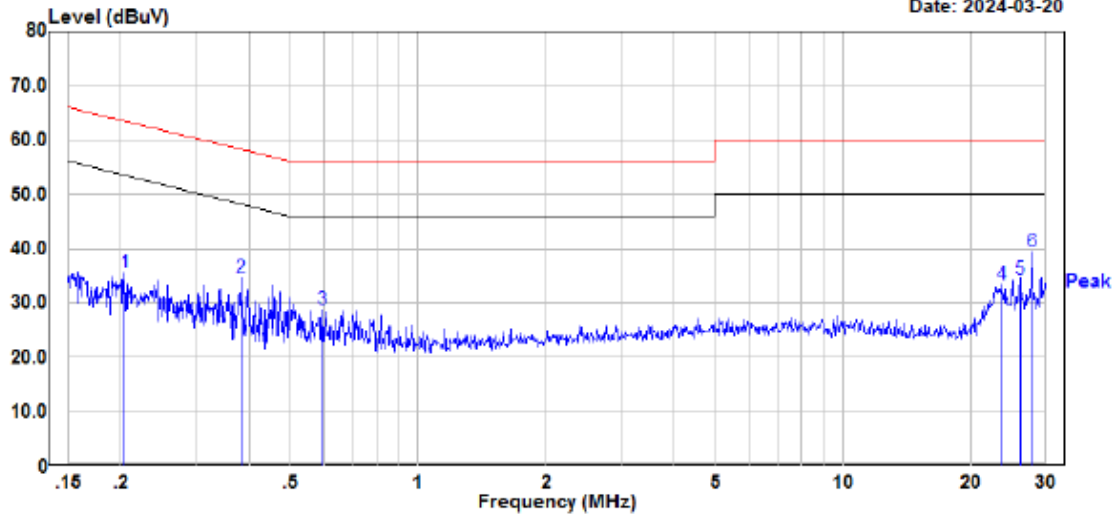
Site : CE
 Condition : FCC Part 15.207
 : DET:Peak
 Project No. : RSHB231228001
 Model : REX0159-L-B
 Phase : N
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 16.5°C
 Humidity : 43%
 Atmospheric pressure: 102.8kPa
 Test Engineer : Joe Zhang

	Read Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.155	15.33	19.99	35.32	65.75	-30.43	Peak
2	0.273	13.66	20.03	33.69	61.03	-27.34	Peak
3	0.477	14.15	19.98	34.13	56.40	-22.27	Peak
4	0.725	9.06	19.90	28.96	56.00	-27.04	Peak
5	23.735	15.19	19.88	35.07	60.00	-24.93	Peak
6	27.839	16.72	19.99	36.71	60.00	-23.29	Peak

High channel: 2412MHz

Line:

Date: 2024-03-20

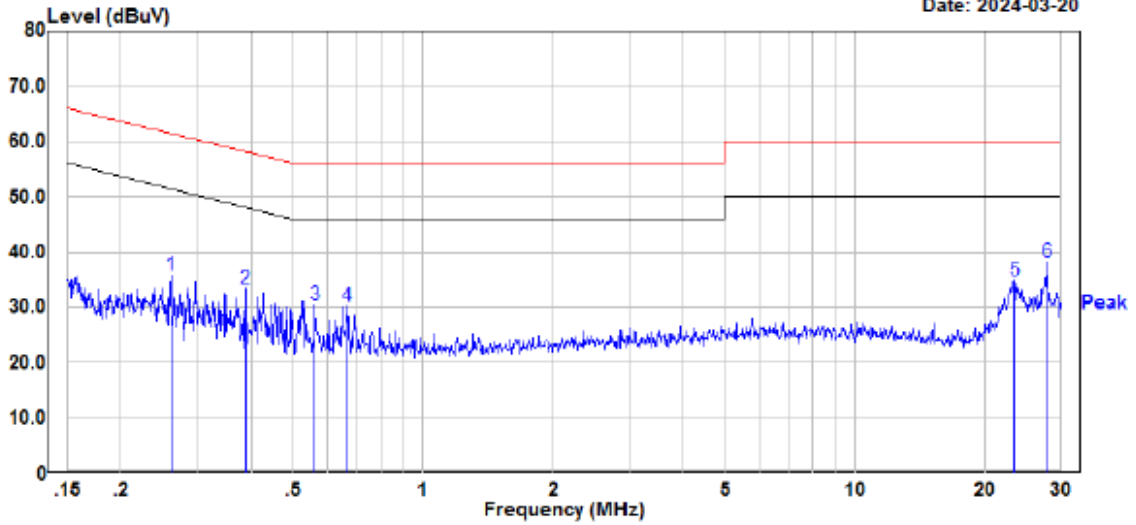


Site : CE
 Condition : FCC Part 15.207
 : DET:Peak
 Project No. : RSHB231228001
 Model : REX0159-L-B
 Phase : L
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 16.5°C
 Humidity : 43%
 Atmospheric pressure: 102.8kPa
 Test Engineer : Joe Zhang

	Read Freq	Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.204	15.47	20.04	35.51	63.43	-27.92	Peak
2	0.383	14.66	20.01	34.67	58.22	-23.55	Peak
3	0.594	8.74	19.95	28.69	56.00	-27.31	Peak
4	23.617	13.40	19.88	33.28	60.00	-26.72	Peak
5	26.092	14.51	19.94	34.45	60.00	-25.55	Peak
6	27.839	19.52	19.99	39.51	60.00	-20.49	Peak

Neutral:

Date: 2024-03-20



Site : CE
 Condition : FCC Part 15.207
 : DET:Peak
 Project No. : RSHB231228001
 Model : REX0159-L-B
 Phase : N
 Voltage : 120V/60Hz
 Mode : Transmitting
 Test Equipment : ENV216,ESR
 Temperature : 16.5°C
 Humidity : 43%
 Atmospheric pressure: 102.8kPa
 Test Engineer : Joe Zhang

	Read	Limit	Over				
Freq	Level	Factor	Level	Line			
MHz	dBuV	dB	dBuV	dBuV			
1	0.261	15.82	20.04	35.86	61.40	-25.54	Peak
2	0.389	13.43	20.01	33.44	58.09	-24.65	Peak
3	0.562	10.61	19.96	30.57	56.00	-25.43	Peak
4	0.666	10.36	19.94	30.30	56.00	-25.70	Peak
5	23.382	15.00	19.87	34.87	60.00	-25.13	Peak
6	27.839	18.09	19.99	38.08	60.00	-21.92	Peak

RADIATED EMISSIONS

Test Result: Compliant

EUT operation mode: Transmitting

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

9 kHz-30MHz:(Transmit in maximum output power high channel)

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

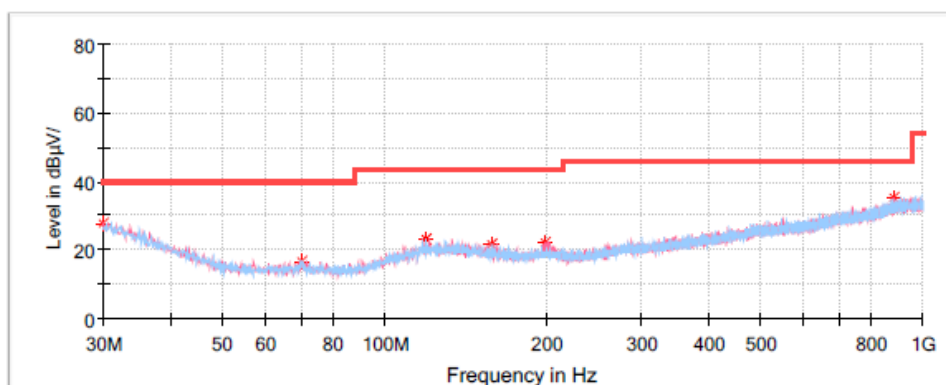
30MHz-1GHz:

Powered by battery:

Low channel: 2404MHz

Common Information

Project No:	RSHB231228001
EUT Model:	REX0159-L-B
Test Mode:	Transmitting
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Temperature:	16.8°C
Humidity:	49%
Barometric Pressure:	101.1kPa
Test Engineer:	Leah Li
Test Date:	2024/3/22



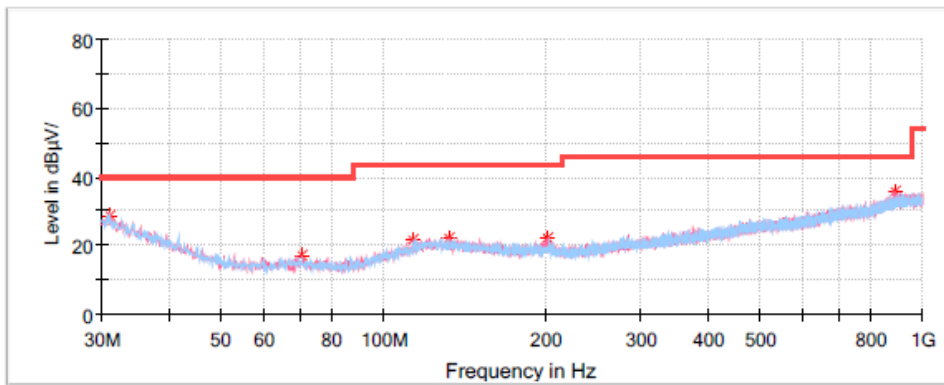
Critical Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.000000	27.91	40.00	12.09	V	-4.4
70.255000	16.76	40.00	23.24	H	-16.8
119.361250	23.14	43.50	20.36	H	-11.3
158.040000	21.42	43.50	22.08	H	-12.5
198.052500	22.33	43.50	21.17	V	-12.6
882.872500	35.05	46.00	10.95	V	0.9

High channel: 2412MHz

Common Information

Project No: RSHB231228001
 EUT Model: REX0159-L-B
 Test Mode: Transmitting
 Standard: FCC Part 15.205&FCC Part 15.209&FCC Part 15.249
 Test Equipment: ESCI, JB3, 310N
 Temperature: 16.8°C
 Humidity: 49%
 Barometric Pressure: 101.1kPa
 Test Engineer: Leah Li
 Test Date: 2024/3/22



Critical_Freqs

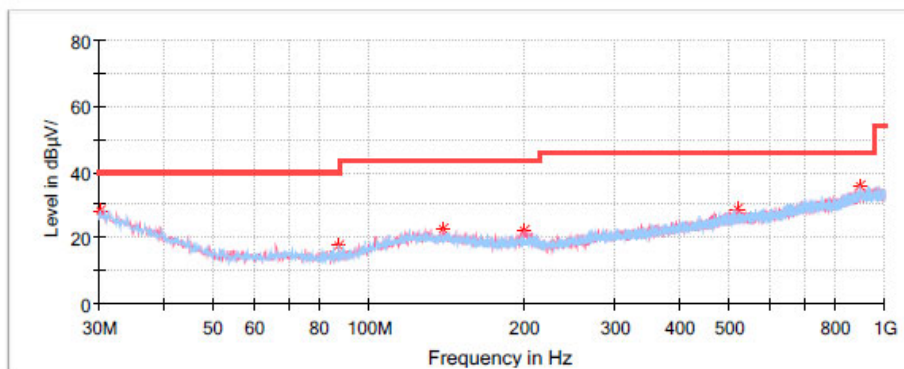
Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
31.212500	28.43	40.00	11.57	V	-5.3
70.740000	17.00	40.00	23.00	V	-16.8
113.298750	21.84	43.50	21.66	V	-12.4
132.092500	22.29	43.50	21.21	V	-11.4
202.053750	22.28	43.50	21.22	V	-12.7
887.843750	35.72	46.00	10.28	V	1.0

Powered by DC:

Low channel: 2404MHz

Common Information

Project No: RSHB231228001
 EUT Model: REX0159-L-B
 Test Mode: Transmitting
 Standard: FCC Part 15.205 & FCC Part 15.209 & FCC Part 15.249
 Test Equipment: ESCI, JB3, 310N
 Temperature: 16.2°C
 Humidity: 52%
 Barometric Pressure: 102.1kPa
 Test Engineer: Joe Zhang
 Test Date: 2024/2/20



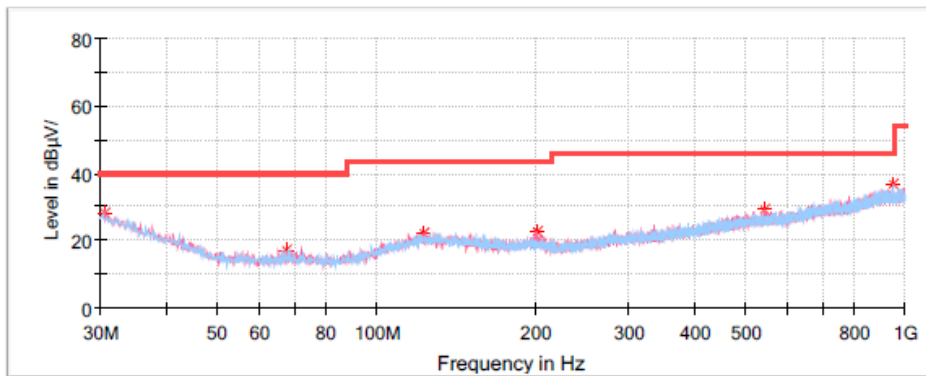
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.121250	28.30	40.00	11.70	H	-4.5
87.593750	17.63	40.00	22.37	H	-17.2
139.246250	22.74	43.50	20.76	V	-11.5
199.386250	22.35	43.50	21.15	V	-12.5
518.395000	28.87	46.00	17.13	V	-5.6
898.028750	35.90	46.00	10.10	H	1.3

High channel: 2412MHz

Common Information

Project No: RSHB231228001
 EUT Model: REX0159-L-B
 Test Mode: Transmitting
 Standard: FCC Part 15.205 & FCC Part 15.209 & FCC Part 15.249
 Test Equipment: ESCI, JB3, 310N
 Temperature: 16.2°C
 Humidity: 52%
 Barometric Pressure: 102.1kPa
 Test Engineer: Joe Zhang
 Test Date: 2024/2/20



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
30.727500	28.19	40.00	11.81	V	-4.9
67.345000	17.25	40.00	22.75	V	-17.0
123.120000	22.25	43.50	21.25	V	-11.3
201.326250	22.65	43.50	20.85	V	-12.6
543.493750	28.99	46.00	17.01	V	-5.4
946.407500	36.50	46.00	9.50	H	1.5

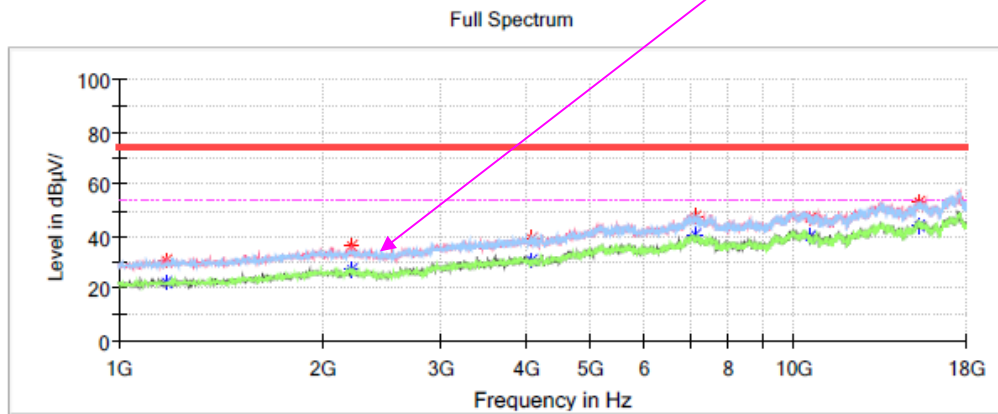
1GHz-18 GHz:
Powered by battery (worst case)

Low channel: 2404MHz

Common Information

Project No.:	RSHB231228001
EUT Model:	REX0159-L-B
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:	102.1kPa
Test Engineer:	Peter Wang
Test Date:	2024/3/2

Fundamental Test with notch filter



Critical Freqs

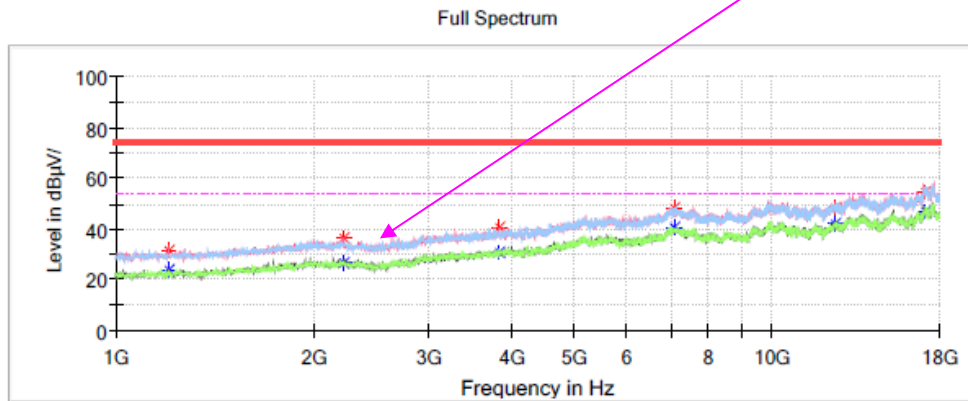
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1171.700000	---	22.49	54.00	31.51	V	-15.0
1171.700000	30.73	---	74.00	43.27	V	-15.0
2208.700000	36.35	---	74.00	37.65	V	-10.2
2208.700000	---	27.28	54.00	26.72	V	-10.2
4085.500000	---	31.06	54.00	22.94	V	-4.8
4085.500000	39.09	---	74.00	34.91	V	-4.8
7130.200000	---	40.58	54.00	13.42	V	3.9
7130.200000	47.43	---	74.00	26.57	V	3.9
10545.500000	---	39.75	54.00	14.25	V	7.2
10545.500000	46.91	---	74.00	27.09	V	7.2
15276.600000	53.08	---	74.00	20.92	H	11.0
15276.600000	---	43.84	54.00	10.16	H	11.0

High channel: 2412MHz

Common Information

Project No.:	RSHB231228001
EUT Model:	REX0159-L-B
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:	101.6kPa
Test Engineer:	Peter Wang
Test Date:	2024/3/4

Fundamental Test with notch filter

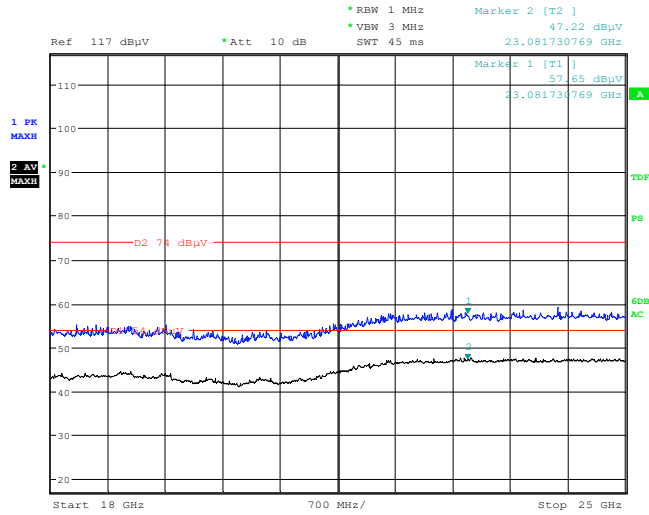


Critical Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1202.300000	---	23.78	54.00	30.22	V	-14.9
1202.300000	31.27	---	74.00	42.73	V	-14.9
2227.400000	---	26.67	54.00	27.33	H	-10.2
2227.400000	36.17	---	74.00	37.83	H	-10.2
3840.700000	---	30.85	54.00	23.15	V	-5.4
3840.700000	40.70	---	74.00	33.30	V	-5.4
7086.000000	---	40.54	54.00	13.46	V	3.9
7086.000000	48.53	---	74.00	25.47	V	3.9
12495.400000	---	42.13	54.00	11.87	V	8.4
12495.400000	48.22	---	74.00	25.78	V	8.4
17158.500000	54.62	---	74.00	19.38	V	12.7
17158.500000	---	46.66	54.00	7.34	V	12.7

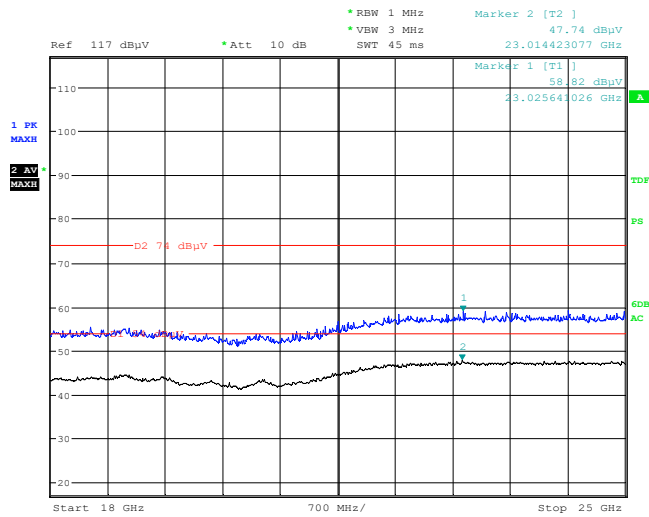
**High channel (worst case):
18GHz-25GHz:**

Horizontal



Project No. RSHB231228001 Tester: Peter Wang
Date: 8.MAY.2024 12:21:35

Vertical



Project No. RSHB231228001 Tester: Peter Wang
Date: 8.MAY.2024 12:53:29

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

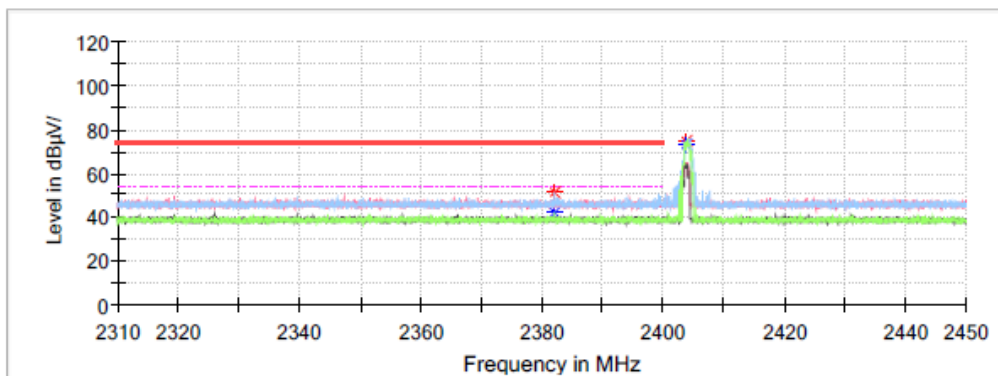
Fundamental and Band edge:

Left Side

Common Information

Project No.: RSHB231228001
 EUT Model: REX0159-L-B
 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: 101.1kPa
 Test Engineer: Peter Wang
 Test Date: 2024/4/2

Full Spectrum



Critical Freqs

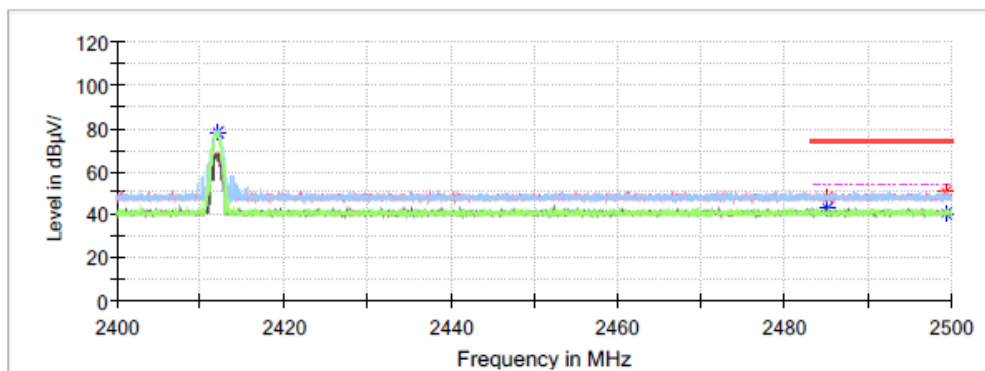
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2382.114000	50.79	---	74.00	23.21	H	0.0
2382.114000	---	42.35	54.00	11.65	H	0.0
2403.708000	---	73.01	94.00	20.99	H	0.1
2403.708000	74.45	---	114.00	39.55	H	0.1

Right Side

Common Information

Project No.: RSHB231228001
 EUT Model: REX0159-L-B
 Test Mode: SRD
 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: 101.1kPa
 Test Engineer: Peter Wang
 Test Date: 2024/4/2

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)
2412.000000	---	77.78	94.00	16.22	H	0.1
2412.000000	78.45	---	114.00	35.55	H	0.1
2485.050000	---	43.10	54.00	10.90	V	0.2
2485.050000	48.10	---	74.00	25.90	V	0.2
2499.400000	---	40.65	54.00	13.35	V	0.2
2499.400000	50.26	---	74.00	23.74	H	0.2

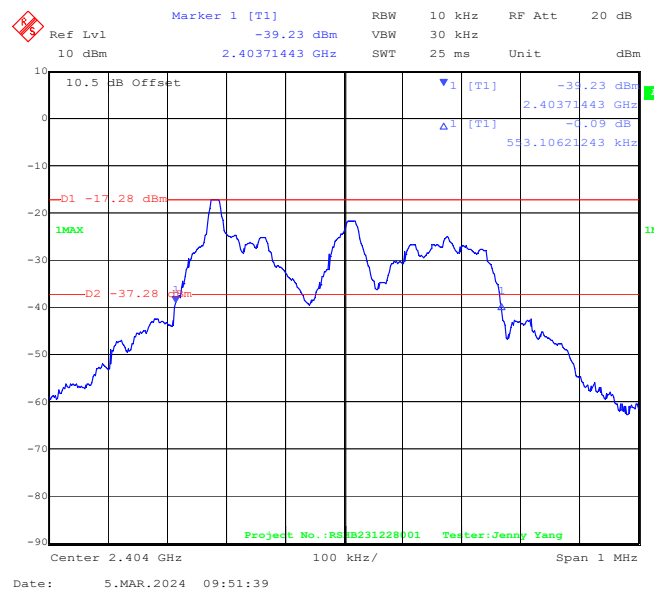
20DB BANDWIDTH

Test Result: Compliant.

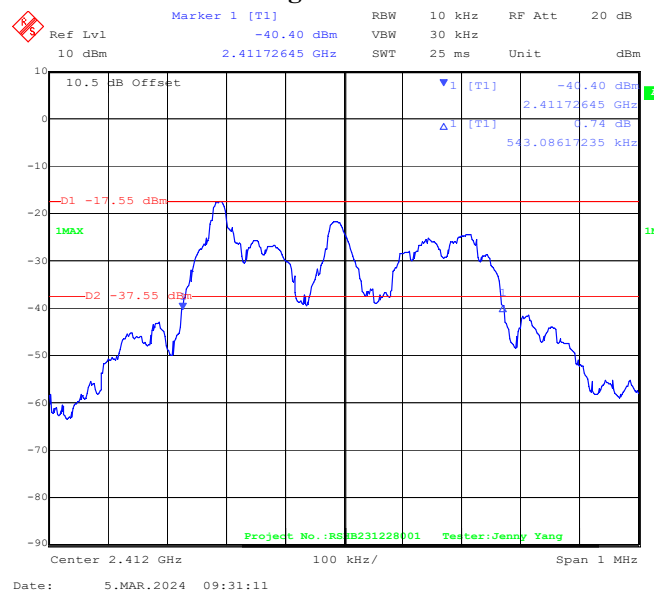
Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB BANDWIDTH (MHz)
Low	2404	0.553
High	2412	0.543

Low 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*******