FCC PART 15.249
TEST REPORT

For

Toplight Sensor Technology (Xiamen) Co.,Ltd.

Unit 301, No. 52, Huli Industrial Park, Meixi Road, Tongan District, Xiamen, Fujian, China

FCC ID: 2BF56-TRFK216

Report Type:	**Product Name:**
Original Report	24GHz radar module

Report Number:	RXM250320050-00A
Report Date:	2025-04-18
Reviewed By:	Bard Liu
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

TABLE OF CONTENTS

REPORT REVISION HISTORY

Number of Revisions	Report No.	Issue Date	Description
0	RXM250320050-00A	2025-04-18	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Toplight Sensor Technology (Xiamen) Co.,Ltd.
Tested Model:	TRFK216
Product Name:	24GHz radar module
Power Supply:	DC 5V
RF Function:	24G SRD
Operating Band/Frequency:	24.048 GHz - 24.216 GHz
Maximum Field Strength of Fundamental:	100.40 dBμV/m @3m
Modulation Type:	FMCW
Antenna Type:	Microstrip Antenna
★Maximum Antenna Gain:	7.9 dBi

EUT Type	Differences
1	Potting Type A Housing with Horizontal Terminal Block
2	Potting Type B Housing with Horizontal Terminal Block
3	Ultrasonic Welding Housing with Vertical Terminal Block
Note: TRFK216 shares the same circuit schematic and antenna design, with the only variations being the external packaging and terminal block configurations. Therefore, only type 1 was been tested.	

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: RXM250320050-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2025-03-20.)

Objective

This type approval report is prepared for *Toplight Sensor Technology (Xiamen) 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
	40GHz ~50GHz	4.92dB
	50GHz ~75GHz	5.16dB
	75GHz ~100GHz	5.64dB
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

Justification

Operation Frequency Details:

Sweep Start Frequency (MHz)	Sweep Stop Frequency (MHz)
24048	24216
The below frequencies were tested:	
Low Channel	24048
Middle Channel	24140
High Channel	24216

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

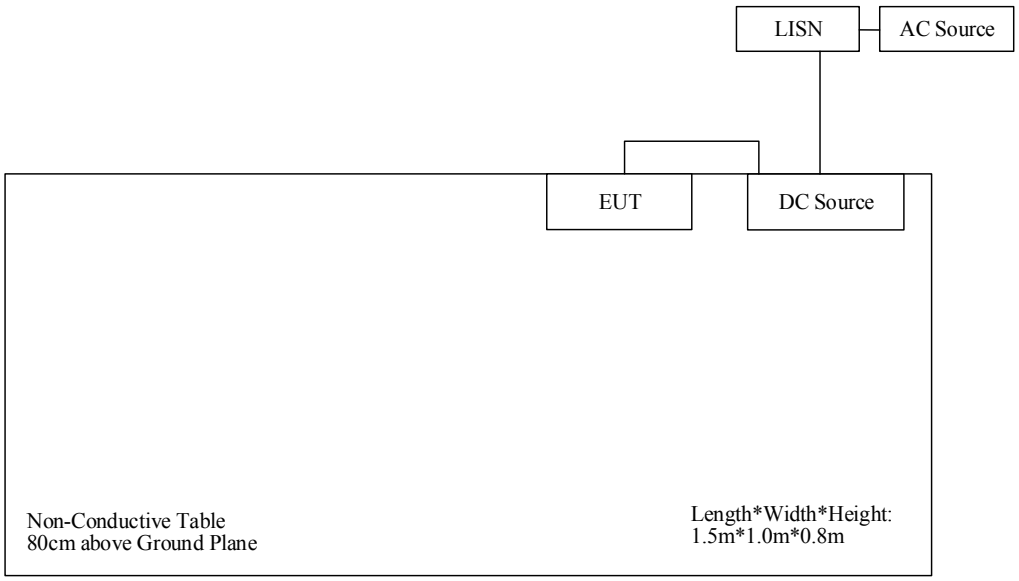
Manufacturer	Description	Model	Serial Number
ZHAOXIN	DC Source	RXN-1503D	18R1503D09012
ZHAOXIN	DC Source	PS-6005D	18P6005D10724

External I/O Cable

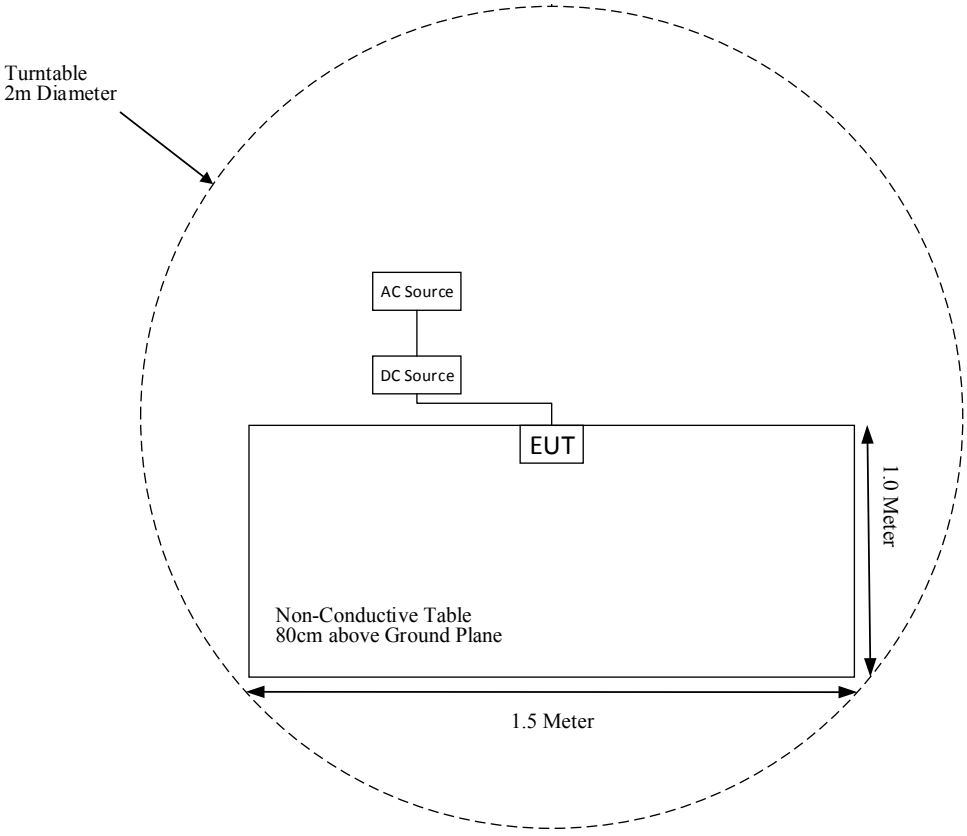
Cable Description	Length (m)	From Port	To Port
Power Cable 1	1.0	EUT	DC Source
Power Cable 2	1.0	DC Source	LISN/AC Source

Block Diagram of Test Setup

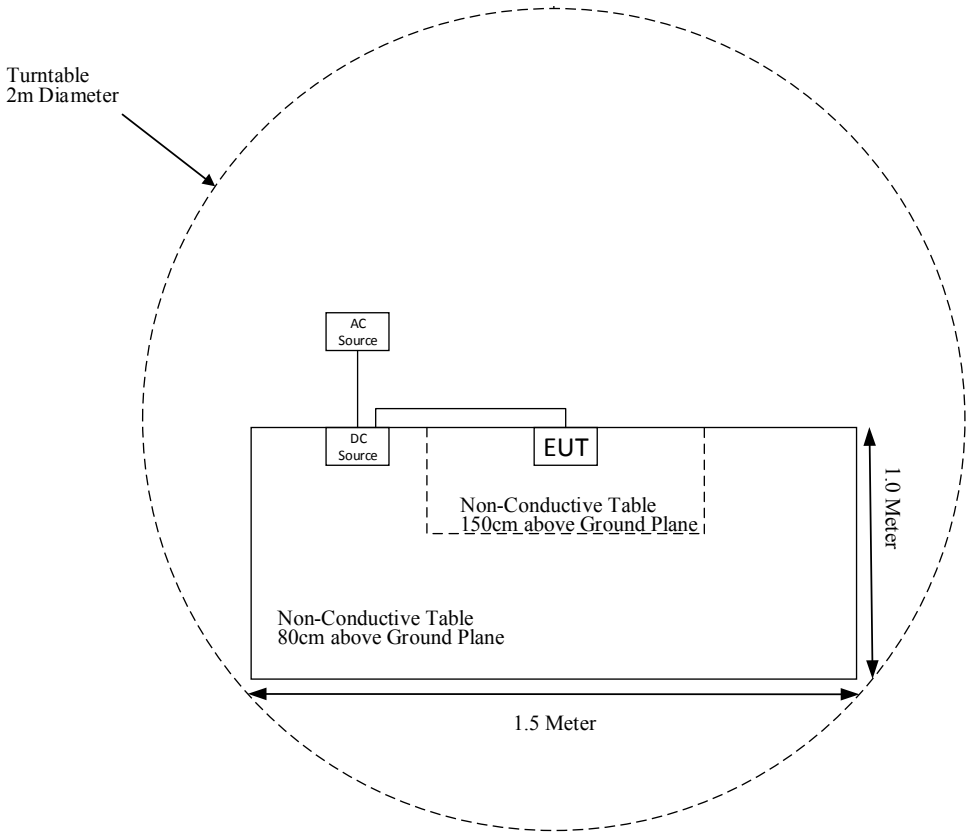
For Conducted Emissions:



For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 (b) (3) &§2.1091	RF EXPOSURE	Compliant
§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

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	Hybrid Antenna	JB3	A090314-1	2024-11-08	2027-11-07
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
BACL	Active Loop Antenna	1313-1A	4041511	2024-11-22	2027-11-21
Narda	6 dB Attenuator	773-6	10690812-2-1	2024-11-08	2027-11-07
Radiated Emission Test (Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2024-04-25	2025-04-24
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2023-06-27	2026-06-26
ETS-LINDGREN	Horn Antenna	3116	2516	2024-12-12	2027-12-11
A.H.Systems, inc	Amplifier	PAM-0118P	512	2024-04-25	2025-04-24
SELECTOR	Amplifier	EM18G40G	060726	2024-04-25	2025-04-24
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
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
FMI	Horn Antenna	24245-AB	51	2024-04-25	2025-04-24
HP	Harmonic Mixer	11970U	2332A00837	2024-04-25	2025-04-24
SAGE	WR-15 Rectangular Gain Horn	SAR-2408-15-S2	13563-08	2024-04-25	2025-04-24
HP	Harmonic Mixer	11970V	611	2024-04-25	2025-04-24
SAGE	Horn Antenna	SAR-2309-10-S2	15633-04	2024-04-25	2025-04-24
HP	Harmonic Mixer	11970W	2521A00535	2024-04-25	2025-04-24
Narda	Attenuator	10dB	10dB-01	2024-04-24	2025-04-23
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2024-04-25	2025-04-24

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	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
Rohde & Schwarz	Pulse limiter	ESH3-Z2	100552	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).

§1.1307 (b) (3) &§2.1091 – RF EXPOSURE

Applicable Standard

According to subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] to support an exemptionfrom further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

R is the minimum separation distance in meters
f = frequency in MHz

Result

Mode	Frequency Range (GHz)	★Tune up EIRP (dBm)	ERP		Evaluation Distance (m)	ERP Limit (W)
			(dBm)	(W)		
SRD	24.048-24.216	5.5	3.35	0.00216	0.2	0.768

Note:
1. For SRD, the power of EUT: E Field@3m is 100.40 dBuV/m, so the eirp =5.2 dBm
2. E[dBμV/m] = EIRP[dBm] + 95.2 for d = 3 m.
3. The tune-up power provide by applicant.

Result: Compliance

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 one patch antenna for TX and one antenna for RX, which were permanently attached to the EUT, fulfill the requirement of this section, please refer to the EUT photos.

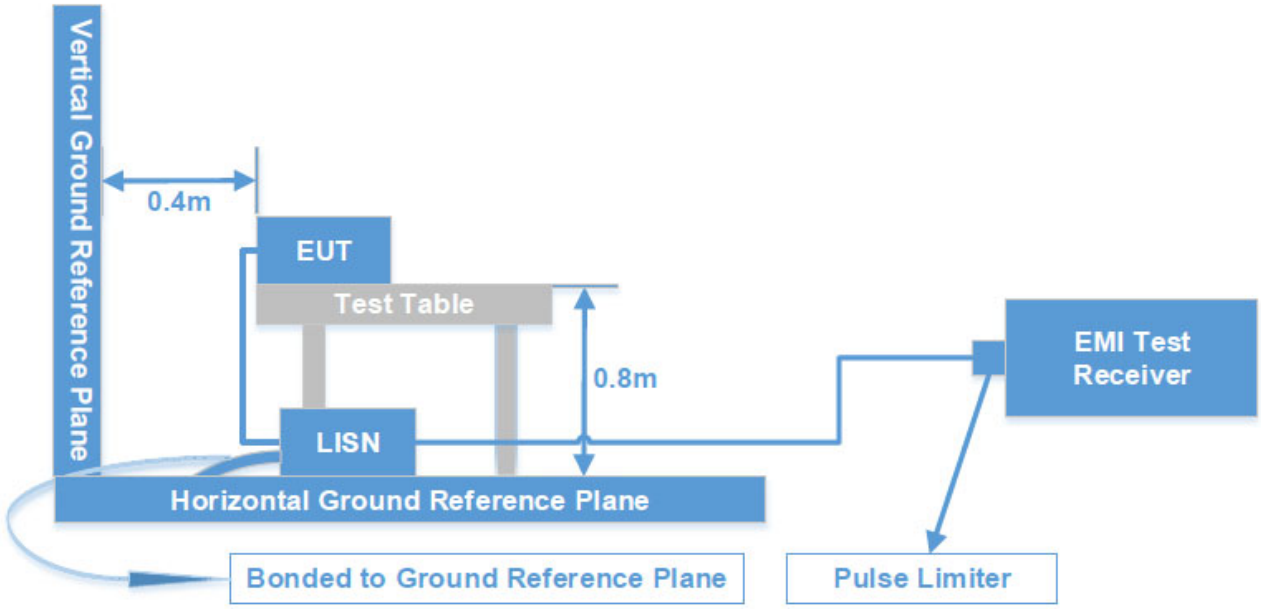
Result: Compliant.

FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

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 (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 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:

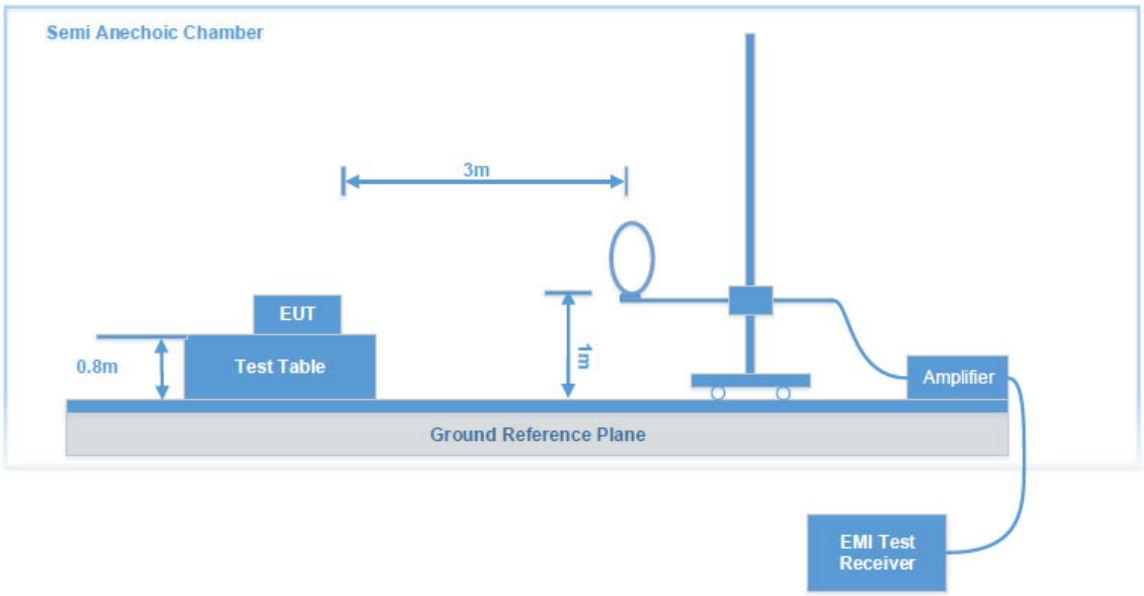
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24GHz-24.25GHz	250	2500

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

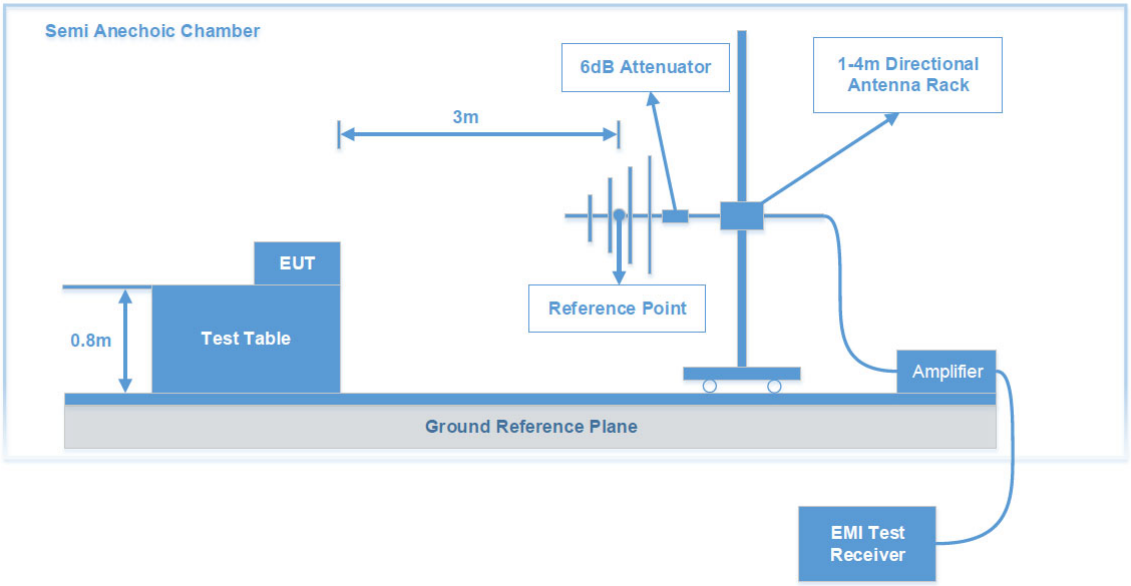
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test System Setup

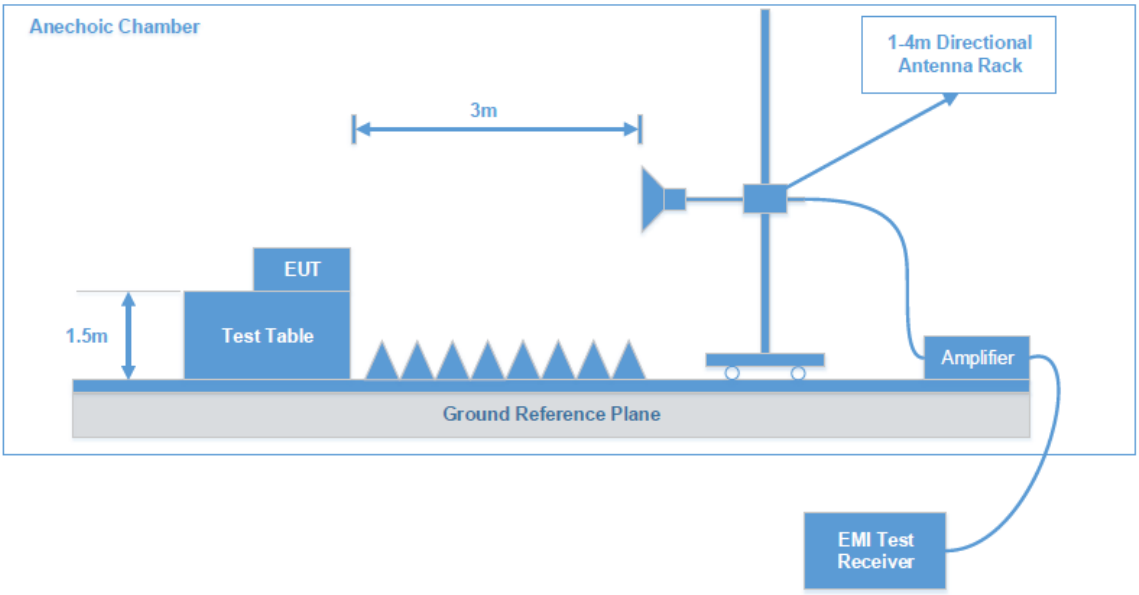
9 kHz - 30 MHz:



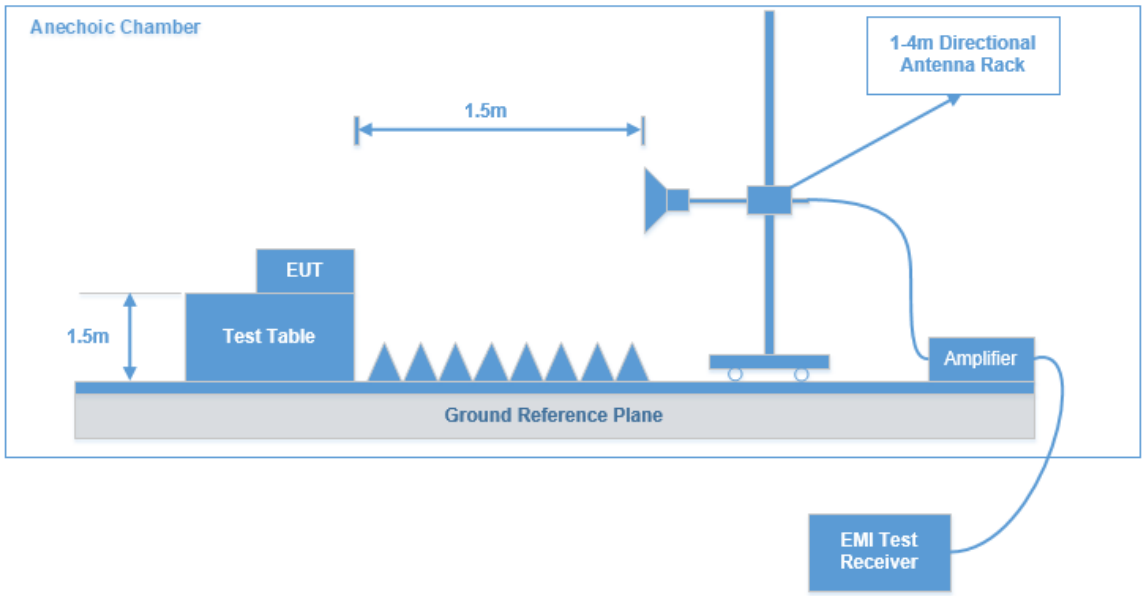
30 MHz - 1 GHz:



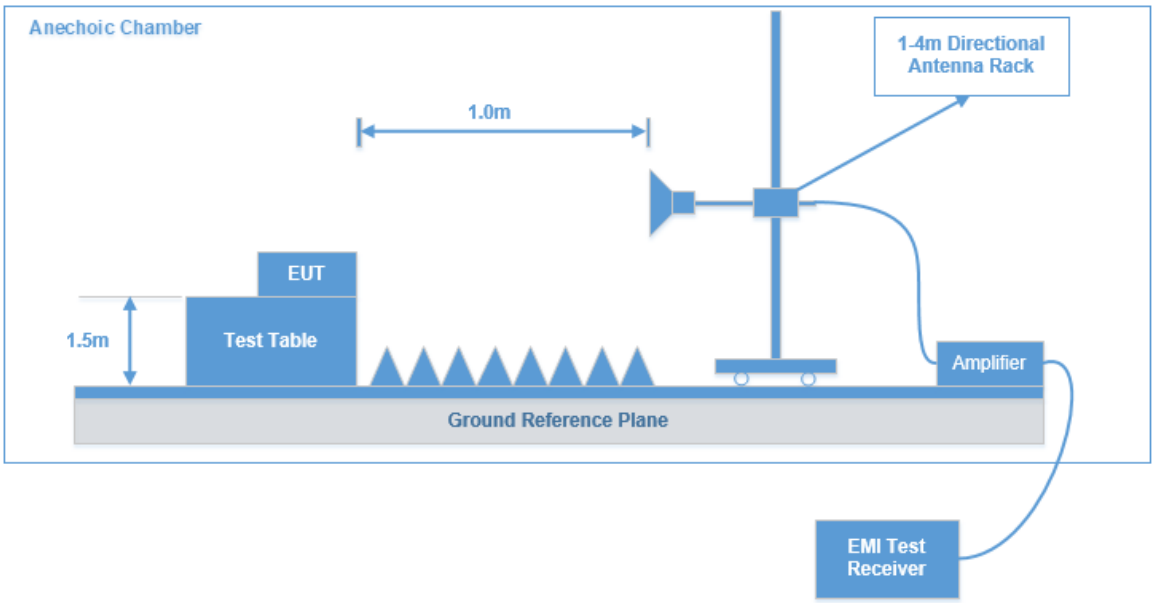
1 GHz - 18 GHz:



18 GHz - 40 GHz:



40 GHz - 100 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 100 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	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	200 Hz	QP/Average	QP/Average
150 kHz – 30 MHz	9 kHz	30 kHz	9 kHz	QP/ Average	QP/ Average
30 MHz – 1000 MHz	100 kHz	300 kHz	/	Peak	Peak
	/	/	120 kHz	QP	QP
1 GHz-40 GHz	1MHz	3 MHz	/	Peak	Peak
	1MHz	3 MHz	/	Average	Average
40 GHz-100 GHz	1MHz	3 MHz	/	Peak	Peak
	1MHz	10Hz	/	Peak	Average

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

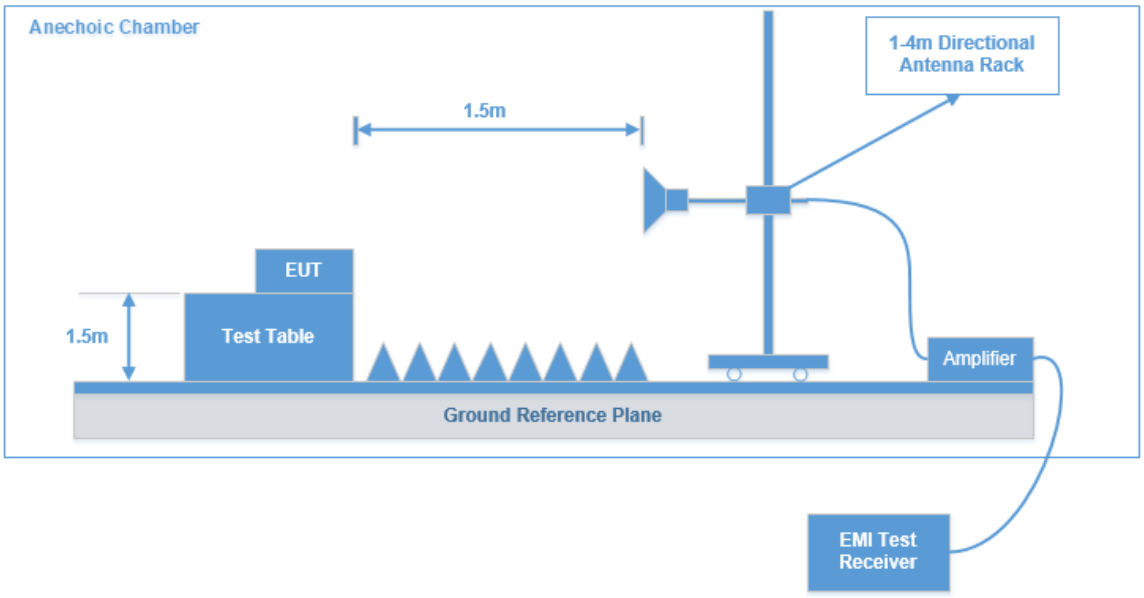
Applicable Standard

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. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test System Setup



Test Data: See Appendix

APPENDIX - TEST DATA

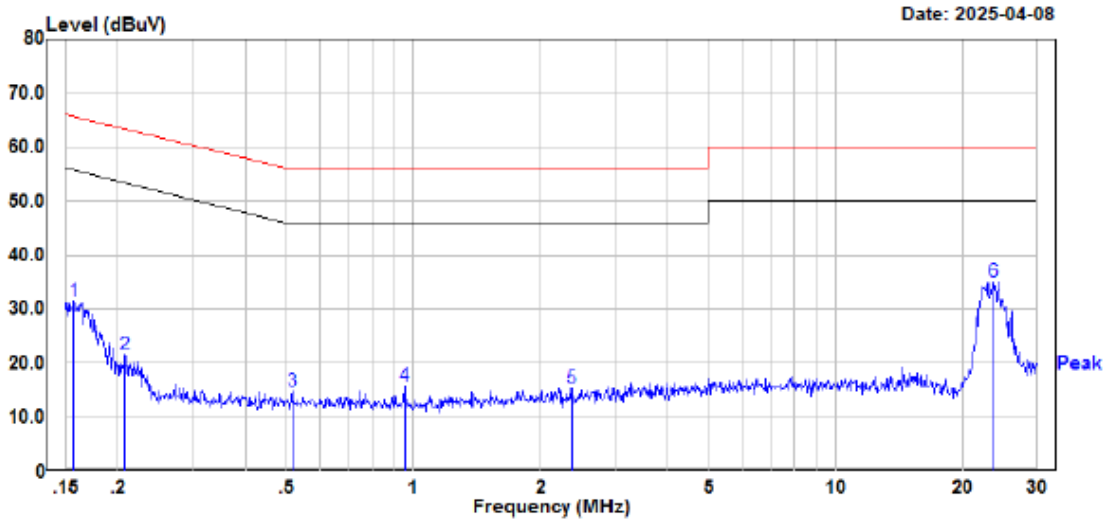
CONDUCTED EMISSIONS

Environmental Conditions & Test Information

Test Date:	2025-04-08
Temperature:	20.8℃
Relative Humidity:	45 %
ATM Pressure:	101.6 kPa
Test Result:	Pass
Test Engineer:	Myles Miao

EUT operation mode: Transmitting in maximum output power channel (Low channel)

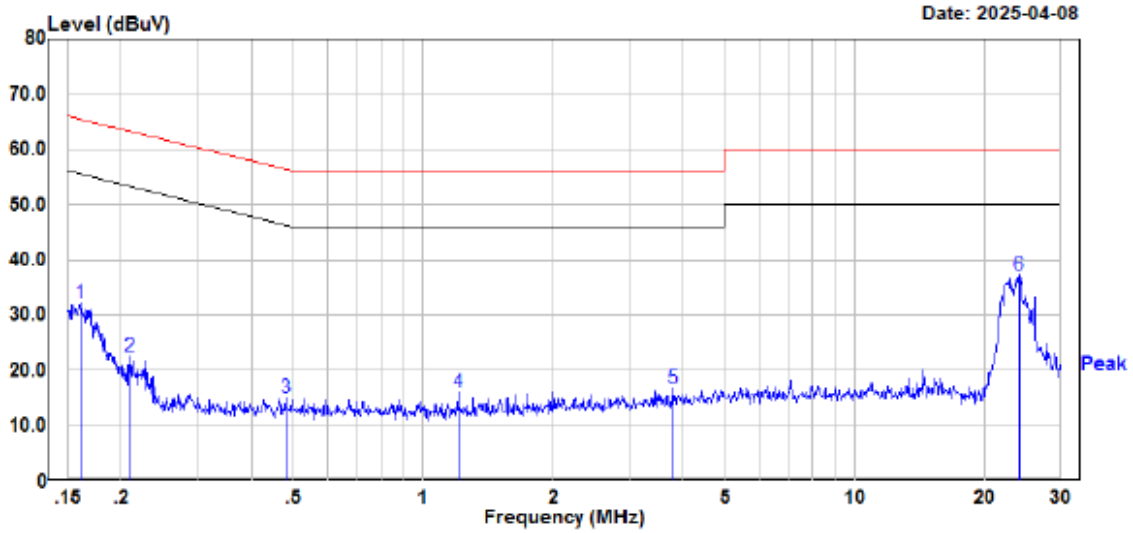
Line:




```
Site                : CE
Condition           : limit\FCC PART 15.207
                    : DET:Peak
Project No.         : RXM250320050
Model               : TRFK216
Phase               : L
Voltage             : 120V/60Hz
Mode                : transmitting
Test Equipment      : ENV216,ESR
Receiver Setting    : RBW: 9 kHz, Sweep Time: Auto
Temperature         : 20.8℃
Humidity            : 45%
Atmospheric pressure: 101.6kPa
Test Engineer       : Myles Miao
```

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.157	11.33	20.11	31.44	65.63	-34.19	Peak
2	0.207	1.33	20.12	21.45	63.31	-41.86	Peak
3	0.516	-5.48	20.12	14.64	56.00	-41.36	Peak
4	0.953	-3.98	19.77	15.79	56.00	-40.21	Peak
5	2.373	-4.88	20.19	15.31	56.00	-40.69	Peak
6	23.617	15.27	19.79	35.06	60.00	-24.94	Peak

Neutral:




```
Site                : CE
Condition           : limit\FCC PART 15.207
                    : DET:Peak
Project No.         : RXM250320050
Model               : TRFK216
Phase               : N
Voltage             : 120V/60Hz
Mode                : transmitting
Test Equipment      : ENV216,ESR
Receiver Setting    : RBW: 9 kHz, Sweep Time: Auto
Temperature         : 20.8℃
Humidity            : 45%
Atmospheric pressure: 101.6kPa
Test Engineer       : Myles Miao
```

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.161	12.00	20.11	32.11	65.42	-33.31	Peak
2	0.209	2.41	20.12	22.53	63.23	-40.70	Peak
3	0.482	-5.08	20.16	15.08	56.31	-41.23	Peak
4	1.205	-3.98	19.84	15.86	56.00	-40.14	Peak
5	3.791	-3.60	20.25	16.65	56.00	-39.35	Peak
6	23.972	17.32	19.80	37.12	60.00	-22.88	Peak

RADIATED EMISSIONS

Environmental Conditions & Test Information

Test Item:	RADIATED EMISSIONS				
	9kHz - 30MHz	**30MHz - 1 GHz**	**1 GHz - 18 GHz**	**18 GHz - 40 GHz**	**40 GHz - 100 GHz**
Test Date:	2025-04-09	2025-04-09	2025-03-31	2025-03-31	2025-04-15
Temperature:	20.8 ℃	20.8 ℃	19.1 ℃	19.1 ℃	26.5℃
Relative Humidity:	48 %	48 %	41 %	41 %	51 %
ATM Pressure:	101.6 kPa	101.6 kPa	102.5 kPa	102.5 kPa	102.0 kPa
Test Result:	Pass	Pass	Pass	Pass	Pass
Test Engineer:	Jerry Yan	Jerry Yan	Destine Hu	Hugh Wu	Hugh Wu

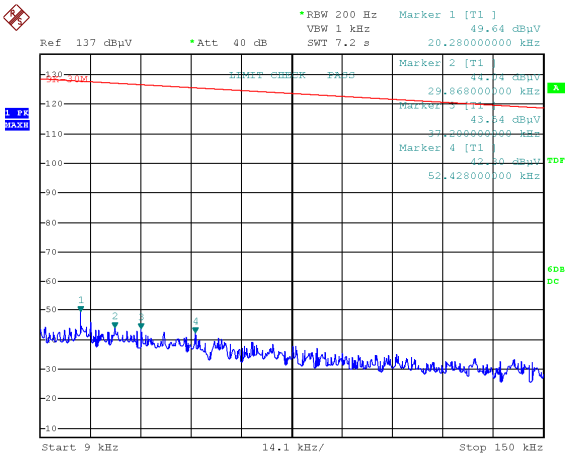
Test Item:	RADIATED EMISSIONS				
	Fundamental and band edge Test	/	/	/	/
Test Date:	2025-04-15	/	/	/	/
Temperature:	26.5℃	/	/	/	/
Relative Humidity:	51 %	/	/	/	/
ATM Pressure:	102.0 kPa	/	/	/	/
Test Result:	Pass	/	/	/	/
Test Engineer:	Hugh Wu	/	/	/	/

Test Result: Compliant
EUT operation mode: Transmitting
After pre-scan in the X, Y and Z axes of orientation, the worst case X axes is below:

9 kHz-30MHz: *Transmitting in maximum output power channel (Low channel)*

Parallel (worst case):

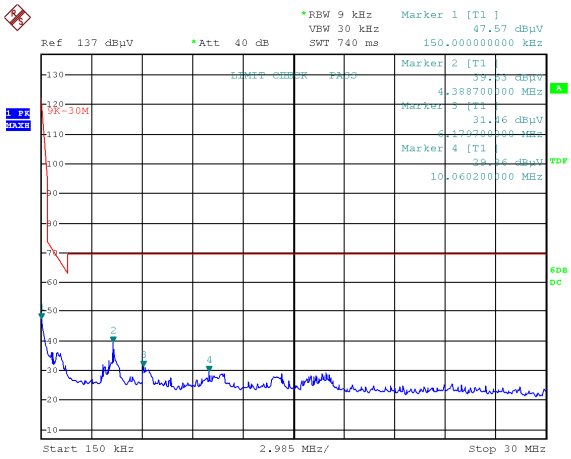
9 kHz-150 kHz



Project No.RXM250320050 Tester:Jerry Yan

Date: 9.APR.2025 19:53:24

150 kHz -30 MHz



Project No.RXM250320050 Tester:Jerry Yan

Date: 9.APR.2025 19:56:23

9 kHz-150 kHz:

Frequency	Corrected Amplitude	Detector	Corrected Factor	Limit	Margin
(kHz)	(dBµV/m) @3m	PK/QP/Ave.	(dB/m)	(dBµV/m @ 3m)	(dB)
20.28	49.64	PK	-0.56	121.46	71.82
29.86	44.04	PK	-0.61	118.10	74.06
37.2	43.64	PK	-1.76	116.19	72.55
52.43	42.30	PK	-4.09	113.21	70.91

150 kHz-30 MHz:

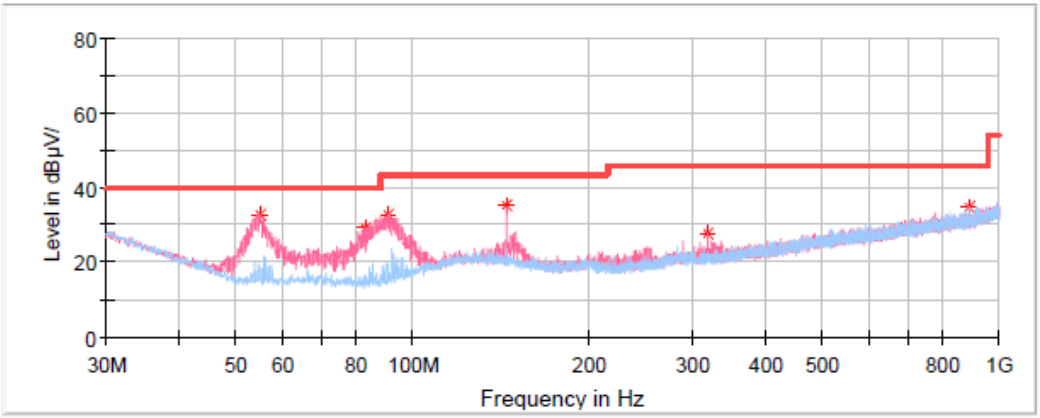
Frequency	Corrected Amplitude	Detector	Corrected Factor	Limit	Margin
(MHz)	(dBµV/m) @3m	PK/QP/Ave.	(dB/m)	(dBµV/m @ 3m)	(dB)
0.15	47.57	PK	-11.34	104.08	56.51
4.39	39.63	PK	-31.97	69.54	29.91
6.18	31.46	PK	-32.24	69.54	38.08
10.06	29.86	PK	-32.82	69.54	39.68

30 MHz - 1 GHz:

Frequency: 24.048 GHz

Common Information

Project No:	RXM250320050
EUT Model:	TRFK216
Test Mode:	Transmitting
Standard:	FCC Part 15.205 &FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Receiver Setting:	RBW:100 kHz, VBW: 300 kHz, Sweep Time: Auto
Temperature:	20.8℃
Humidity:	48%
Barometric Pressure:	101.6kPa
Test Engineer:	Jerry Yan
Test Date:	2025/4/9



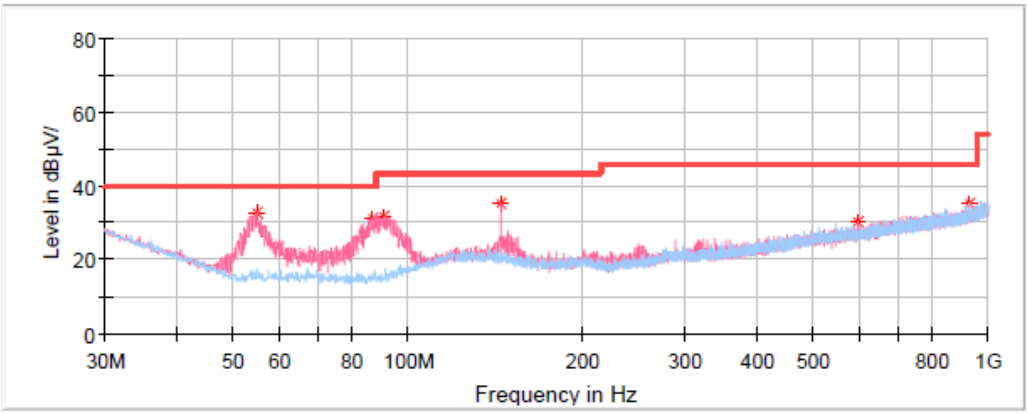
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
55.098750	32.75	40.00	7.25	V	-17.0
82.865000	29.37	40.00	10.63	V	-17.1
90.988750	32.75	43.50	10.75	V	-16.6
144.338750	34.97	43.50	8.53	V	-11.4
318.211250	27.47	46.00	18.53	V	-9.9
885.661250	34.68	46.00	11.32	H	0.0

Frequency: 24.140 GHz

Common Information

Project No:	RXM250320050
EUT Model:	TRFK216
Test Mode:	Transmitting
Standard:	FCC Part 15.205 &FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Receiver Setting:	RBW:100 kHz, VBW: 300 kHz, Sweep Time: Auto
Temperature:	20.8℃
Humidity:	48%
Barometric Pressure:	101.6kPa
Test Engineer:	Jerry Yan
Test Date:	2025/4/9



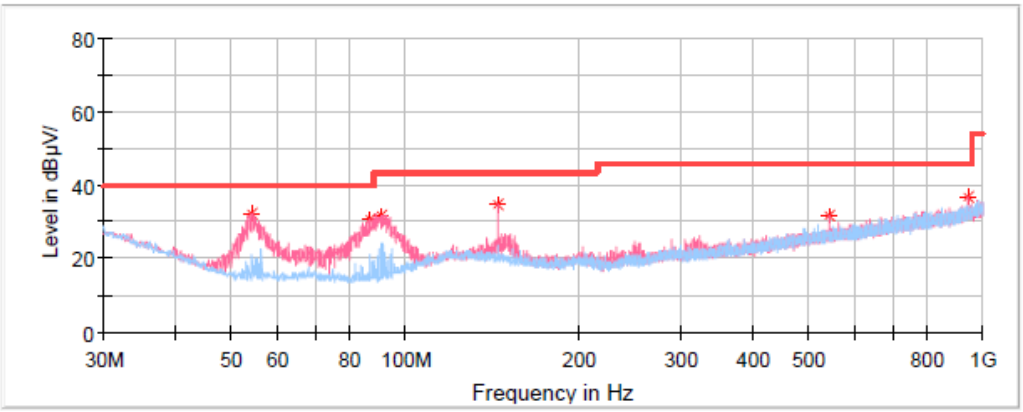
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
54.977500	32.52	40.00	7.48	V	-17.0
86.866250	31.04	40.00	8.96	V	-17.0
90.867500	31.89	43.50	11.61	V	-16.6
144.217500	35.24	43.50	8.26	V	-11.4
597.086250	30.11	46.00	15.89	V	-4.0
931.857500	35.06	46.00	10.94	H	1.0

Frequency: 24.216 GHz

Common Information

Project No:	RXM250320050
EUT Model:	TRFK216
Test Mode:	Transmitting
Standard:	FCC Part 15.205 &FCC Part 15.209&FCC Part 15.249
Test Equipment:	ESCI, JB3, 310N
Receiver Setting:	RBW:100 kHz, VBW: 300 kHz, Sweep Time: Auto
Temperature:	20.8℃
Humidity:	48%
Barometric Pressure:	101.6kPa
Test Engineer:	Jerry Yan
Test Date:	2025/4/9



Critical_Freqs

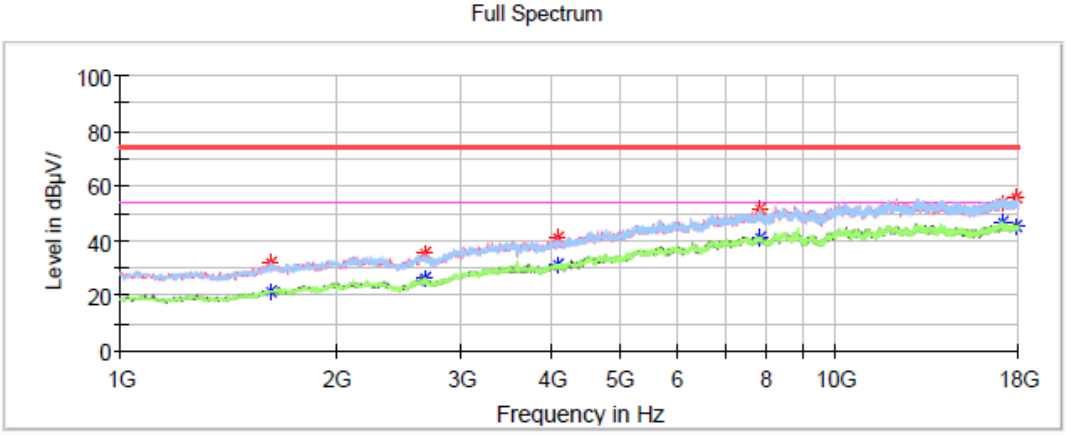
Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
54.250000	32.29	40.00	7.71	V	-17.0
86.987500	30.61	40.00	9.39	V	-17.0
90.867500	31.83	43.50	11.67	V	-16.6
144.338750	34.61	43.50	8.89	V	-11.4
542.523750	31.65	46.00	14.35	V	-4.8
943.497500	36.50	46.00	9.50	V	1.3

1 GHz – 18 GHz

Frequency: 24.048 GHz

Common Information

Project No.:	RXM250320050
EUT Model:	TRFK216
Test Mode:	Transmitting
Standard:	FCC Part 15.205& FCC Part 15.209& FCC Part 15.249
Test Equipment:	ESU40,3115,PAM-0118P
Receiver Setting:	RBW: 1MHz, VBW: 3MHz, Sweep Time: Auto
Temperature:	19.1℃
Humidity:	41%
Atmospheric Pressure:	102.5kPa
Test Engineer:	Destine Hu
Test Date:	2025/3/31



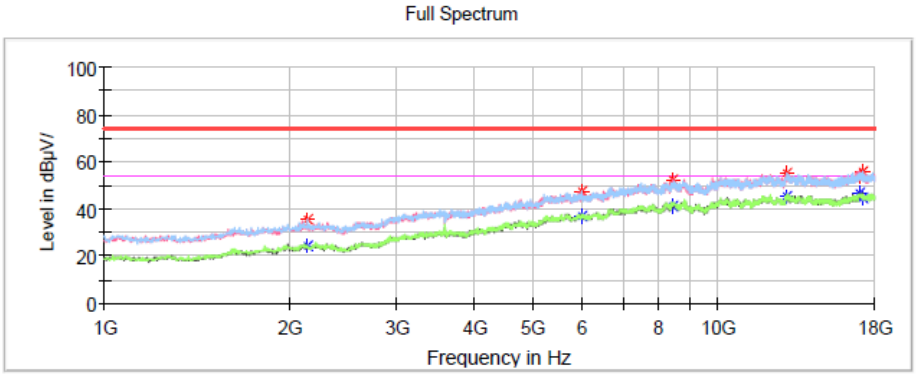
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1625.600000	31.97	---	74.00	42.03	H	-14.0
1625.600000	---	21.90	54.00	32.10	H	-14.0
2669.400000	35.71	---	74.00	38.29	V	-9.6
2669.400000	---	26.89	54.00	27.11	V	-9.6
4097.400000	41.39	---	74.00	32.61	V	-5.6
4097.400000	---	31.22	54.00	22.78	V	-5.6
7851.000000	---	41.27	54.00	12.73	H	3.9
7851.000000	51.94	---	74.00	22.06	H	3.9
17095.600000	---	46.85	54.00	7.15	H	12.1
17095.600000	53.94	---	74.00	20.06	H	12.1
17901.400000	---	45.35	54.00	8.65	H	11.9
17901.400000	55.68	---	74.00	18.32	H	11.9

Frequency: 24.140 GHz

Common Information

Project No.:	RXM250320050
EUT Model:	TRFK216
Test Mode:	Transmitting
Standard:	FCC Part 15.205& FCC Part 15.209& FCC Part 15.249
Test Equipment:	ESU40,3115,PAM-0118P
Receiver Setting:	RBW: 1MHz, VBW: 3MHz, Sweep Time: Auto
Temperature:	19.1℃
Humidity:	41%
Atmospheric Pressure:	102.5kPa
Test Engineer:	Destine Hu
Test Date:	2025/3/31



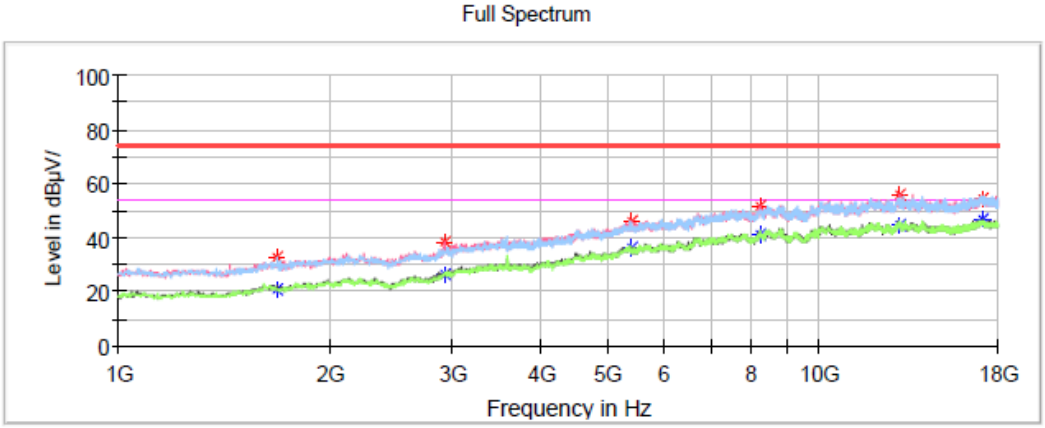
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2145.800000	---	24.40	54.00	29.60	H	-11.3
2145.800000	35.40	---	74.00	38.60	H	-11.3
5998.000000	---	36.79	54.00	17.21	H	0.0
5998.000000	47.51	---	74.00	26.49	H	0.0
8449.400000	---	41.19	54.00	12.81	V	5.3
8449.400000	52.31	---	74.00	21.69	V	5.3
12971.400000	---	45.70	54.00	8.30	H	9.7
12971.400000	55.57	---	74.00	18.43	H	9.7
17000.400000	53.73	---	74.00	20.27	V	12.3
17000.400000	---	46.60	54.00	7.40	V	12.3
17279.200000	---	45.03	54.00	8.97	H	11.9
17279.200000	55.78	---	74.00	18.22	H	11.9

Frequency: 24.216 GHz

Common Information

Project No.:	RXM250320050
EUT Model:	TRFK216
Test Mode:	Transmitting
Standard:	FCC Part 15.205& FCC Part 15.209& FCC Part 15.249
Test Equipment:	ESU40,3115,PAM-0118P
Receiver Setting:	RBW: 1MHz, VBW: 3MHz, Sweep Time: Auto
Temperature:	19.1℃
Humidity:	41%
Atmospheric Pressure:	102.5kPa
Test Engineer:	Destine Hu
Test Date:	2025/3/31



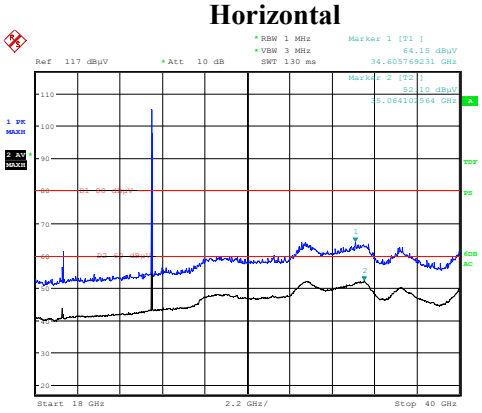
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1686.800000	---	21.11	54.00	32.89	H	-13.6
1686.800000	32.74	---	74.00	41.26	H	-13.6
2917.600000	---	26.80	54.00	27.20	V	-8.7
2917.600000	38.51	---	74.00	35.49	V	-8.7
5392.800000	---	36.07	54.00	17.93	V	-0.8
5392.800000	45.89	---	74.00	28.11	V	-0.8
8242.000000	---	41.27	54.00	12.73	V	4.6
8242.000000	51.81	---	74.00	22.19	V	4.6
13053.000000	55.79	---	74.00	18.21	V	9.7
13053.000000	---	44.80	54.00	9.20	V	9.7
17092.200000	54.64	---	74.00	19.36	H	12.1
17092.200000	---	46.53	54.00	7.47	H	12.1

18 GHz - 40 GHz:

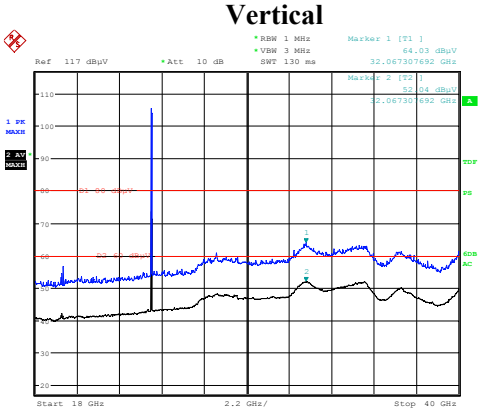
Frequency: 24.048 GHz

Horizontal



Project No :RXM250320050 Tester :Hugh Wu
Date: 31.MAR.2025 15:29:33

Vertical



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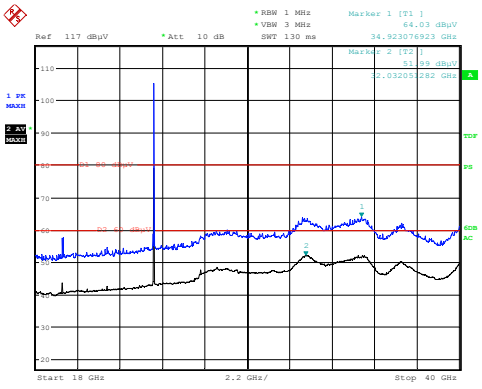
Date: 31.MAR.2025 16:03:04

Frequency: 24.140 GHz

Horizontal



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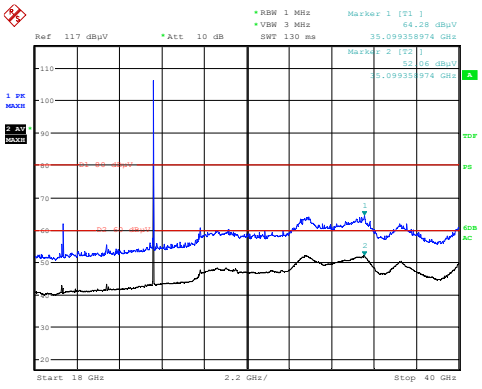
Date: 31.MAR.2025 19:43:21

Vertical



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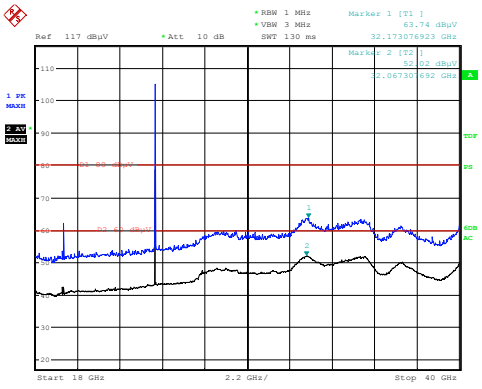
Date: 31.MAR.2025 20:16:41

Frequency: 24.216 GHz

Horizontal



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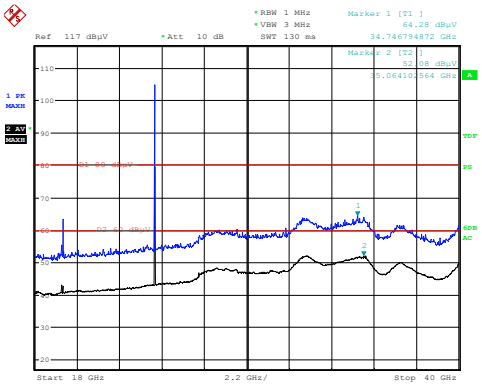
Date: 31.MAR.2025 20:49:54

Vertical



Project No :RXM250320050 Tester :Hugh Wu
Date: 31.MAR.2025 21:24:52

18 GHz - 40 GHz

Frequency (GHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
Low Channel						
32.07	---	52.04	60	7.96	V	23.21
32.07	64.03	---	80	15.97	V	23.21
35.06	---	52.10	60	7.90	H	22.44
34.61	64.15	---	80	15.85	H	23.59
Middle Channel						
35.10	---	52.06	60	7.94	V	22.32
35.10	64.28	---	80	15.72	V	22.32
32.03	---	51.99	60	8.01	H	23.17
34.92	64.03	---	80	15.97	H	22.83
High Channel						
35.06	---	52.08	60	7.92	V	22.44
34.75	64.28	---	80	15.72	V	23.25
32.07	---	52.02	60	7.98	H	23.21
32.17	63.74	---	80	16.26	H	23.31

Note: Extrapolation factor of 20dB/decade from 3m to 1.5m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB
Limit = Specific limits(dBµV/m) + distance extrapolation factor (6 dB)

40 GHz - 50 GHz:

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
Low Channel							
48096	59.89	97.50	37.61	150	H	133	38.9
48096	59.72	97.50	37.78	200	V	159	38.9
Middle Channel							
48280	60.05	97.50	37.45	150	H	149	38.9
48280	61.22	97.50	36.28	150	V	39	38.9
High Channel							
48432	59.55	97.50	37.95	150	H	55	38.9
48432	62.05	97.50	35.45	150	V	277	38.9

50 GHz - 75 GHz:

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
Low Channel							
57960	55.78	83.54	27.76	200	H	95	41.3
57960	54.78	83.54	28.76	150	V	177	41.3
Middle Channel							
54380	55.95	83.54	27.59	150	H	136	41.3
54380	55.03	83.54	28.51	200	V	199	41.3
High Channel							
58710	56.12	83.54	27.42	150	H	210	41.3
58710	56.95	83.54	26.59	150	V	185	41.3

Note: The limit on the peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, when the measured peak level of the emissions is at least 20 dB below the peak emission limit, there's no need to record the measured AV level of the emissions.
Extrapolation factor of 20dB/decade from 3m to 1.0m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1m]) dB
Limit = Specific limits(dBµV/m) + distance extrapolation factor (9.54dB)

75 GHz - 100 GHz:

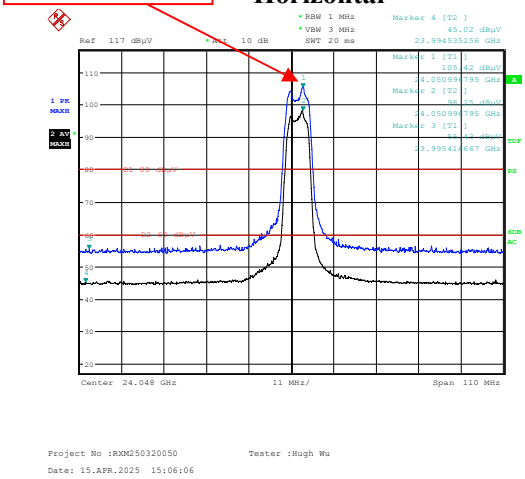
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
Low Channel							
91420	63.58	83.54	19.96	150	v	155	45.5
91420	62.47	83.54	21.07	200	V	210	45.5
Middle Channel							
93710	62.54	83.54	21.00	150	V	223	45.5
93710	61.77	83.54	21.77	150	V	200	45.5
High Channel							
90830	63.5	83.54	20.04	150	V	15	45.5
90830	62.3	83.54	21.24	150	H	183	45.5

Note: The limit on the peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, when the measured peak level of the emissions is at least 20 dB below the peak emission limit, there's no need to record the measured AV level of the emissions.
Extrapolation factor of 20dB/decade from 3m to 1.0m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.0m]) dB
Limit = Specific limits(dBµV/m) + distance extrapolation factor (9.54dB)

Fundamental and band edge Test

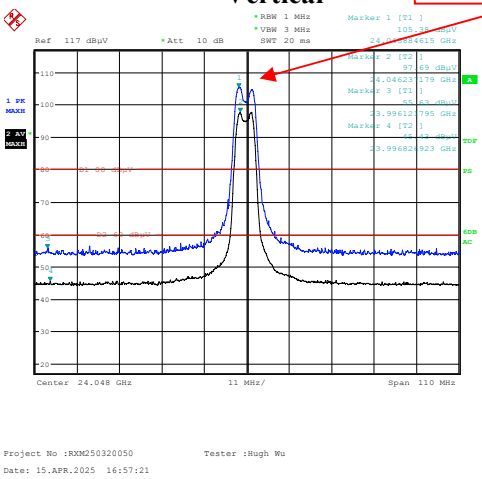
Frequency: 24.048 GHz

Horizontal



Project No :RXM250320050 Tester :Hugh Wu
Date: 15.APR.2025 15:06:06

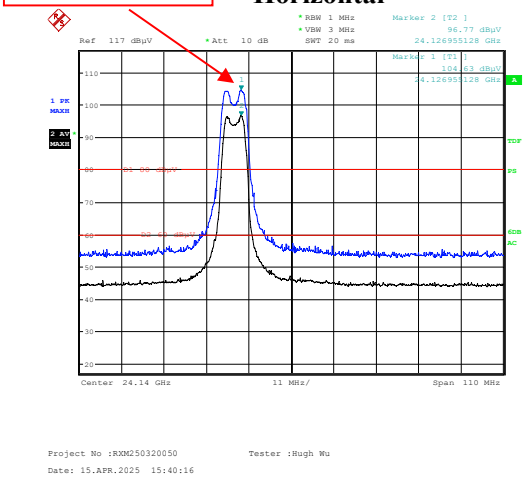
Vertical



Project No :RXM250320050 Tester :Hugh Wu
Date: 15.APR.2025 16:57:21

Frequency: 24.140 GHz

Horizontal



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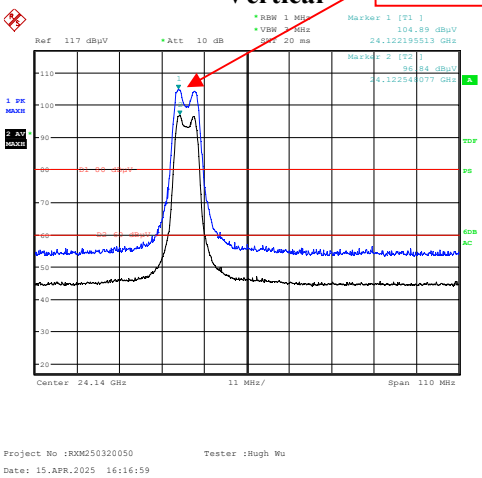
Date: 15.APR.2025 15:40:16

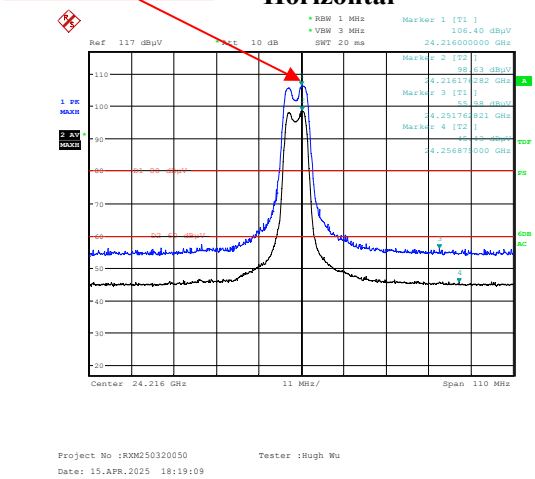
Vertical



Project No :RXM250320050 Tester :Hugh Wu
Date: 15.APR.2025 16:16:59

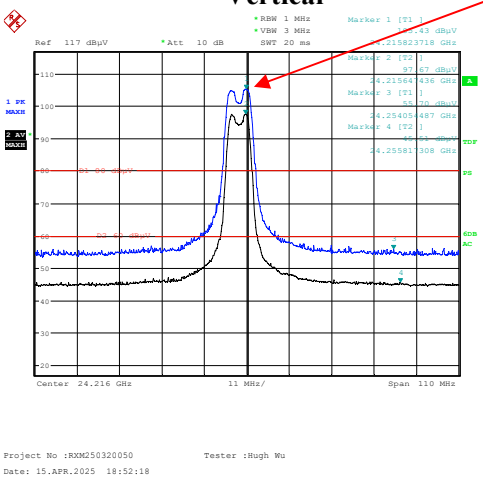
Frequency: 24.216 GHz

Horizontal



Project No :RXM250320050 Tester :Hugh Wu
Date: 15.APR.2025 18:19:09

Vertical



Project No :RXM250320050 Tester :Hugh Wu
Date: 15.APR.2025 18:52:18

Note: The unit of limit and test level are dBµV/m.

Fundamental:

Frequency (GHz)	Pol	Average Field strength of fundamental@1.5m (dBuV/m)	Peak Field strength of fundamental @1.5m (dBuV/m)	Limit@1.5m (dBuV/m)	Margin	Corr. (dB/m)
24.048	H	/	105.42	133.96	28.54	9.4
	H	98.25	/	113.96	15.71	9.4
	V	/	105.38	133.96	28.58	9.5
	V	97.69	/	113.96	16.27	9.5
24.140	H	/	104.63	133.96	29.33	9.4
	H	96.77	/	113.96	17.19	9.4
	V	/	104.89	133.96	29.07	9.5
	V	96.84	/	113.96	17.12	9.5
24.216	H	/	106.40	133.96	27.56	9.4
	H	98.63	/	113.96	15.33	9.4
	V	/	105.43	133.96	28.53	9.5
	V	97.67	/	113.96	16.29	9.5

Band Edge:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
Low channel								
24000	55.43	---	80	24.57	150	H	58	9.4
24000	---	45.02	60	14.98	150	H	58	9.4
24000	55.63	---	80	24.37	150	V	58	9.5
24000	---	45.43	60	14.57	150	V	58	9.5
High Channel								
24250	55.98	---	80	24.02	150	H	58	9.4
24250	---	45.43	60	14.57	150	H	58	9.4
24250	55.70	---	80	24.30	150	V	58	9.5
24250	---	45.51	60	14.49	150	V	58	9.5

Note: Extrapolation factor of 20dB/decade from 3m to 1.5m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB
Limit = Specific limits(dBµV/m) + distance extrapolation factor (6 dB)
Maximum Field Strength of Fundamental (specific distance [3m]) = Peak Field strength of fundamental (test distance [1.5m])-distance extrapolation factor (6 dB), So Maximum Field Strength of Fundamental is 100.40 dBµV/m at 3m.

20 dB BANDWIDTH TESTING

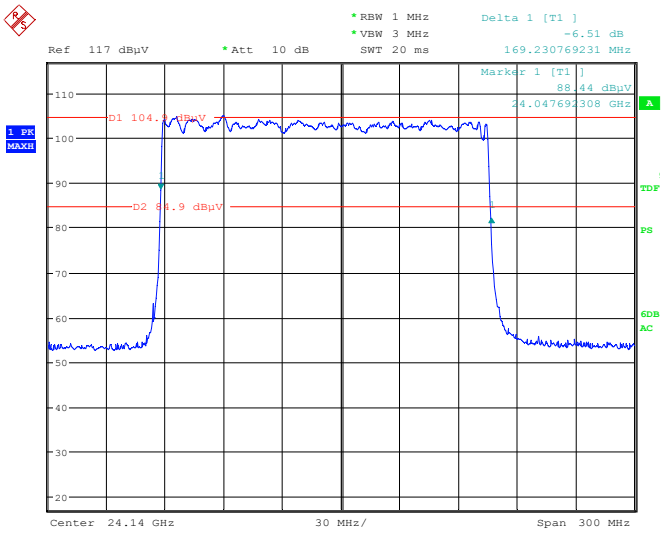
Environmental Conditions & Test Information

Test Date:	2025-04-15
Temperature:	26.5℃
Relative Humidity:	51 %
ATM Pressure:	102.0 kPa
Test Result:	Pass
Test Engineer:	Hugh Wu

Test Result: Compliant.

Test Mode: Transmitting

Mode	20 dB BANDWIDTH (MHz)	F_L (GHz)	Limit (GHz)	F_H (GHz)	Limit (GHz)
Sweep	169.231	24.04769	24	24.21692	24.25



Project No :RXM250320050 Tester :Hugh Wu
Date: 15.APR.2025 21:21:22

EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT A - EUT EXTERNAL PHOTOGRAPHS, 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*******