

Prüfbericht-Nr.: Test report no.:	CN2553L4 001	Auftrags-Nr.: Order no.:	326067061	Seite 1 von 41 Page 1 of 41
Kunden-Referenz-Nr.: Client reference no.:	1288983	Auftragsdatum: Order date:	2024-12-05	
Auftraggeber: Client:	IKEA of Sweden AB Box 702, Almhult, Sweden			
Prüfgegenstand: Test item:	Self-ballasted LED lamps			
Bezeichnung / Typ-Nr.: Identification / Type no.:	LED2406G4NA			
Auftrags-Inhalt: Order content:	Test Report			
Prüfgrundlage: Test specification:	FCC CFR47 Part 15, Subpart C Section 15.247 RSS-Gen Issue 5, Amendment 2, February 2021 RSS-247 Issue 3, August 2023 ANSI C63.10: 2013			
Wareneingangsdatum: Date of sample receipt:	2024-12-27	Refer to photo document.		
Prüfmuster-Nr.: Test sample no:	A003898074-001			
Prüfzeitraum: Testing period:	Refer to test report			
Ort der Prüfung: Place of testing:	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:	☒ <u>Hongfei Wu</u>		genehmigt von: authorized by:	☒ <u>Elliot Zhang</u>
Datum: Date:	2025-04-16 Signed by: Hongfei Wu		Datum: Date:	2025-04-16 Signed by: Elliot Zhang
Stellung / Position:	Sachverständige(r)/Expert		Stellung / Position:	Sachverständige(r)/Expert
Sonstiges / Other:	FCC ID: FHO-LED2406G4NA IC: 10912A-LED2406G4NA HVIN: LED2406G4NA PMN: KAJPLATS This report is for Thread.			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
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Anmerkungen
Remarks

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4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 6dB & 99% BANDWIDTH

RESULT: Pass

5.1.3 OUTPUT POWER

RESULT: Pass

5.1.4 POWER SPECTRAL DENSITY

RESULT: Pass

5.1.5 CONDUCTED BAND EDGE AND OUT-OF BAND EMISSIONS

RESULT: Pass

5.2.1 CONDUCTED EMISSION

RESULT: N/A

5.3.1 RADIATED BAND-EDGE

RESULT: Pass

5.3.2 RADIATED SPURIOUS EMISSION

RESULT: Pass

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

2. Test Sites

2.1 Test Facilities

TÜV Rheinland (Shanghai) Co., Ltd.

Workshop14, North Half of Workshop 10 and Workshop 16, Pingqian (Taicang) Modern Industrial Park, No.525, Yuewang Lingang South Road, Shaxi, Taicang, Jiangsu, China

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 930979.

The Innovation, Science and Economic Development Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance. The description of the test facility is listed under chambers filing number 33038.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Equip.	Description	Model	Manufacturer	Due Date DD.MM.YYYY
G1811378	3m semi-anechoic chamber	SAC3	Frankonia	03.12.2026
G1811391	EMI test receiver	ESCI	Rohde & Schwarz	17.10.2025
G1811425	Bilog antenna	CBL 6112D	Teseq	20.04.2026
G1825371	Preamplifier	EMC051845SE	Taiwan EMCI	24.07.2025
G1822694	Double ridged broadband horn antenna	BBHA 9120 D	Schwarzbeck	24.03.2026
G1825372	Preamplifier	EMC184045SE	Taiwan EMCI	24.07.2025
G1831065	Broadband horn antenna	BBHA 9170	Schwarzbeck	18.06.2028
G1822702	Spectrum analyser	FSV40	Rohde & Schwarz	15.07.2025
9053477	OSP	OSP-B157W8	Rohde & Schwarz	10.12.2025
9053474	Signal generator	SMB100B (6 GHz)	Rohde & Schwarz	10.12.2025
9053476	Vector Signal generator	SMW200A	Rohde & Schwarz	10.12.2025
9047770	Wireless connectivity tester	CMW270	Rohde & Schwarz	23.08.2025
G1811391	EMI test receiver	ESCI	Rohde & Schwarz	27.10.2025
9061503	Shielded enclosure	10.055x3.605x3.000	Frankonia	08.11.2028
9023229	EMI test receiver	ESR3	Rohde & Schwarz	03.08.2025
G1830003	Artificial mains network	ENV432	Rohde & Schwarz	11.10.2025
G1824248	Dual display multimeter	F45	Fluke	28.06.2025
software				
	RF measurement software	WMS32-WB (11.40.00)	Rohde & Schwarz	NA
	EMI measurement software	EMC32-MEB (10.60.20)	Rohde & Schwarz	NA
	EMI measurement software	EMC32-E+ (10.60.20)	Rohde & Schwarz	NA

2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

Table 2: Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	±0.39dB
	> 1GHz	±0.68dB
Conducted Emission	150kHz - 30MHz	±2.33dB
Radiated Emission	9kHz - 30MHz	±2.93dB
	30MHz - 1GHz	±5.34dB
	> 1GHz	±5.40dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is a LED lamp which support Bluetooth, Zigbee and Thread.

The aim of this report is to evaluate RF character of Thread of the EUT.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Description of EUT	
Product Name:	Self-ballasted LED lamps
Model No.:	LED2406G4NA
Operation Voltage:	AC 120V, 60Hz
Test Voltage:	DC 3.3V for RF conducted and radiated test AC 120V, 60Hz for conducted emission test
RF Technical:	1) BLE 2) Zigbee 3) Thread
Technical Specification of Thread	
Frequency Range:	2405~2480MHz
Modulation Type:	OQPSK
Antenna Type:	PCB Antenna
Antenna Gain:	-1.51 dBi (declared by client)

Table 4: Operation Channel List

RF Channel	Frequency [MHz]	RF Channel	Frequency [MHz]	RF Channel	Frequency [MHz]	RF Channel	Frequency [MHz]
11	2405	15	2425	19	2445	23	2465
12	2410	16	2430	20	2450	24	2470
13	2415	17	2435	21	2455	25	2475
14	2420	18	2440	22	2460	26	2480

3.3 Independent Operation Modes

Test frequencies are lowest channel: 2405 MHz, middle channel: 2445 MHz and highest channel: 2480 MHz

The basic operation modes are:

- A. Thread transmitting mode
- B. Radio operating mode

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

Test Software: sscom 5.13.1

Table 5: Power parameter value

Mode	Power Parameter Setting Value
Thread	10

4.3 Special Accessories and Auxiliary Equipment

Table 6: Auxiliary Equipment

Equipment	Manufacturer	Model
Laptop	Lenovo	21AJ-S57N0J
Mobile phone	Apple	iPhone 15
Loudspeaker	Apple	HomePod mini
Remote control	IKEA	E2489

4.4 Countermeasures to achieve EMC Compliance

Null.

5. Test Results

5.1 Conducted Testing at Antenna Port

5.1.1 Antenna Requirement

RESULT:**Pass**

According to the manufacturer declared, the EUT has one internal PCB antenna, the directional gain of antenna is -1.51 dBi and the antenna is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Table 7: Antenna Requirement

FCC 15.203 – Antenna Requirement 1		
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device	
Results:	Antenna type:	PCB antenna
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2		
Requirement:	An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.	
Results:	Only one PCB antenna can be used	
Verdict:	Pass	

RSS-Gen 6.4 – External Control		
Requirement:	The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the regulatory requirements, including RSS-Gen and the applicable RSSs	
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.	
Verdict:	PASS	

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Page 13 of 41**RSS-Gen 6.8 – Antenna Requirement**

Requirement: When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

Results:

a) Antenna Type:	PCB Antenna
b) Manufacture:	N/A
c) Model No.:	N/A
d) Gain with reference to an isotropic radiator:	-1.51 dBi

Verdict: PASS

5.1.2 6dB & 99% Bandwidth**RESULT:****Pass**

Date of testing	:	2025-02-13
Ambient temperature	:	24.2°C
Relative humidity	:	59.5%
Atmospheric pressure	:	101kPa
Test requirement	:	FCC Part 15.247(a)(2) RSS-247 Issue 3, August 2023, Clause 5.2(a)
Test procedure	:	ANSI C63.10: 2013
Test voltage	:	DC 3.3V
Test modes applied	:	A

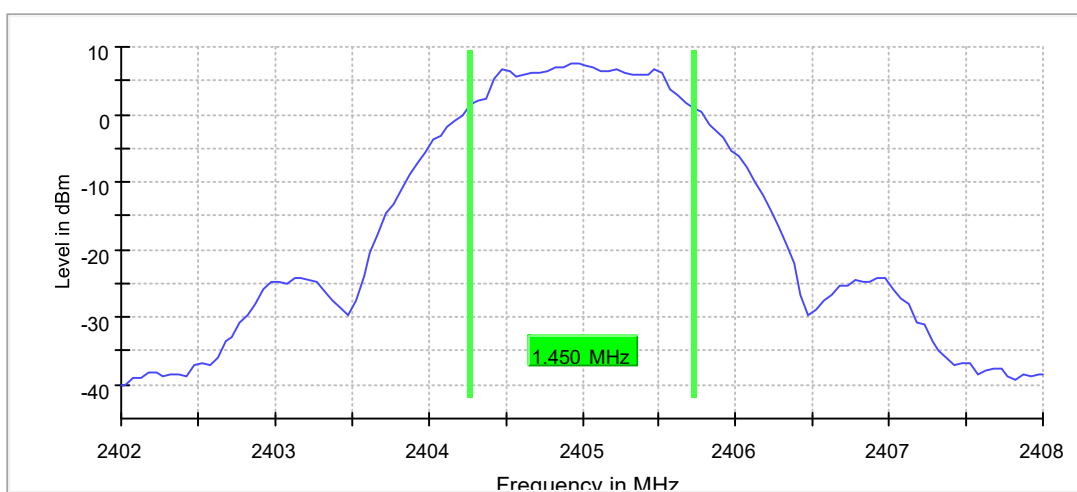
6dB Bandwidth, 2405MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2405.000000	1.450000	0.500000	---	2404.275000	2405.725000

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2405.000000	7.5	PASS

6 dB Bandwidth


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.40800 GHz	2.40800 GHz
Span	6.000 MHz	6.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	120	~ 120
Sweeptime	18.984 µs	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	40.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	26 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.00 dB	0.50 dB

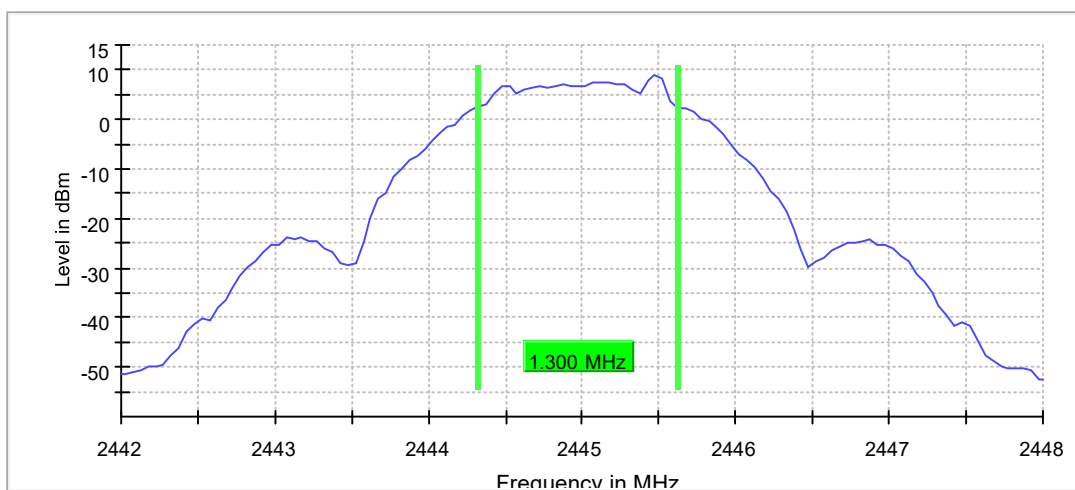
6dB Bandwidth, 2445MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2445.000000	1.300000	0.500000	---	2444.325000	2445.625000

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2445.000000	9.1	PASS

6 dB Bandwidth


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.44200 GHz	2.44200 GHz
Stop Frequency	2.44800 GHz	2.44800 GHz
Span	6.000 MHz	6.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	120	~ 120
Sweeptime	18.984 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	13 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.22 dB	0.50 dB

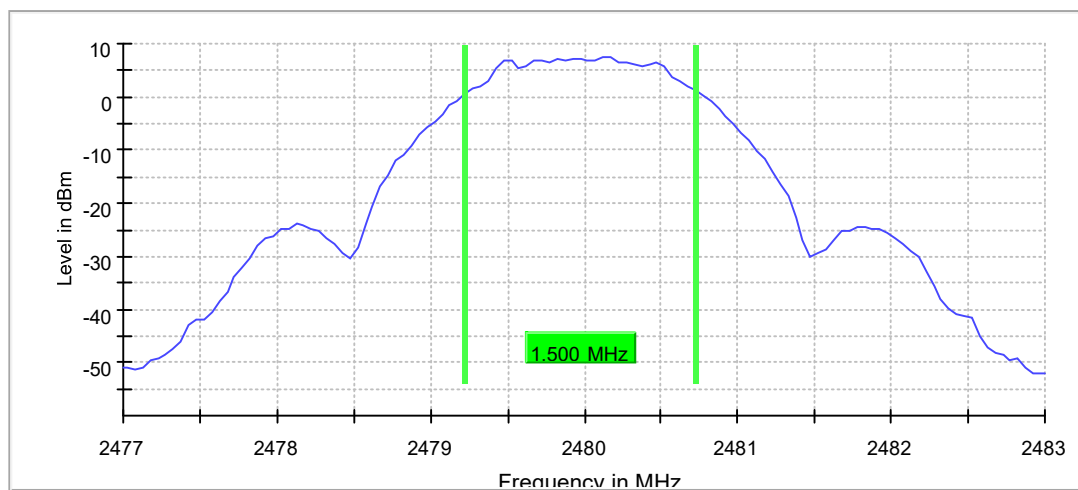
6dB Bandwidth, 2480MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	1.500000	0.500000	---	2479.225000	2480.725000

(continuation of the "6 dB Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	7.5	PASS

6 dB Bandwidth


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47700 GHz	2.47700 GHz
Stop Frequency	2.48300 GHz	2.48300 GHz
Span	6.000 MHz	6.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	120	~ 120
Sweptime	18.984 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	20 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.00 dB	0.50 dB

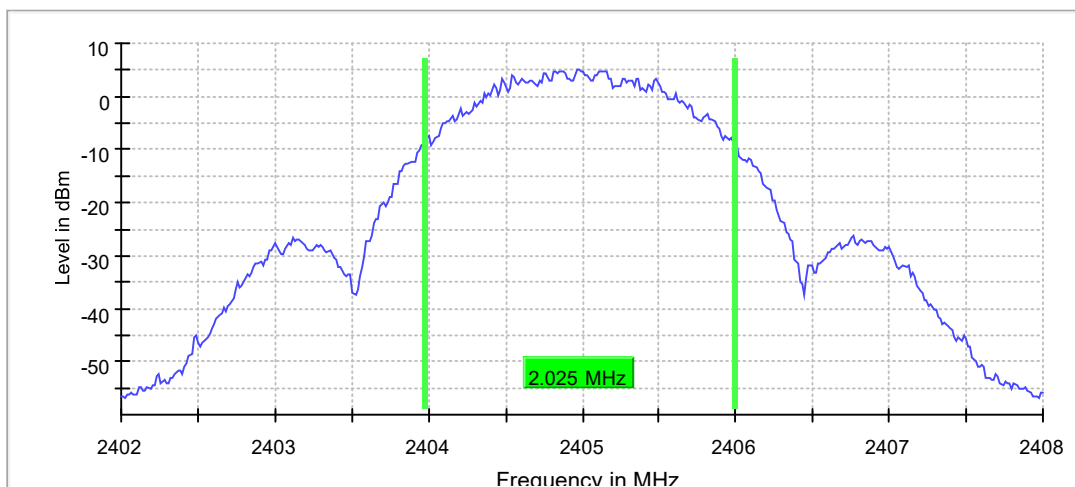
99% Occupied Channel Bandwidth, 2405MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2405.000000	2.025000	---	---	2403.972500	2405.997500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2405.000000	PASS

99 % Bandwidth


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.40800 GHz	2.40800 GHz
Span	6.000 MHz	6.000 MHz
RBW	30.000 kHz	>= 30.000 kHz
VBW	100.000 kHz	>= 90.000 kHz
SweepPoints	400	~ 400
SweepTime	63.216 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	26 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.07 dB	0.30 dB

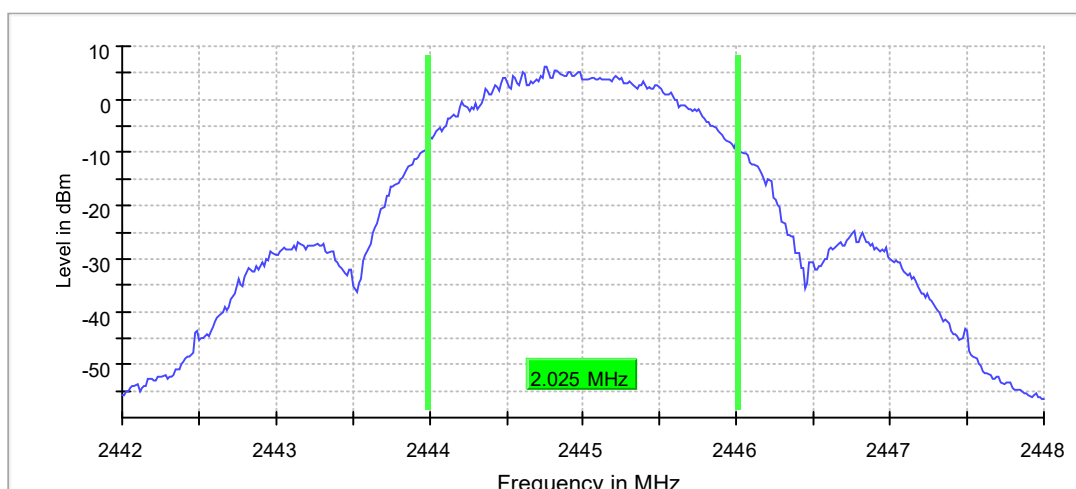
99% Occupied Channel Bandwidth, 2445MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2445.000000	2.025000	---	---	2443.987500	2446.012500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2445.000000	PASS

99 % Bandwidth


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.44200 GHz	2.44200 GHz
Stop Frequency	2.44800 GHz	2.44800 GHz
Span	6.000 MHz	6.000 MHz
RBW	30.000 kHz	>= 30.000 kHz
VBW	100.000 kHz	>= 90.000 kHz
SweepPoints	400	~ 400
Sweeptime	63.216 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	32 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.27 dB	0.30 dB

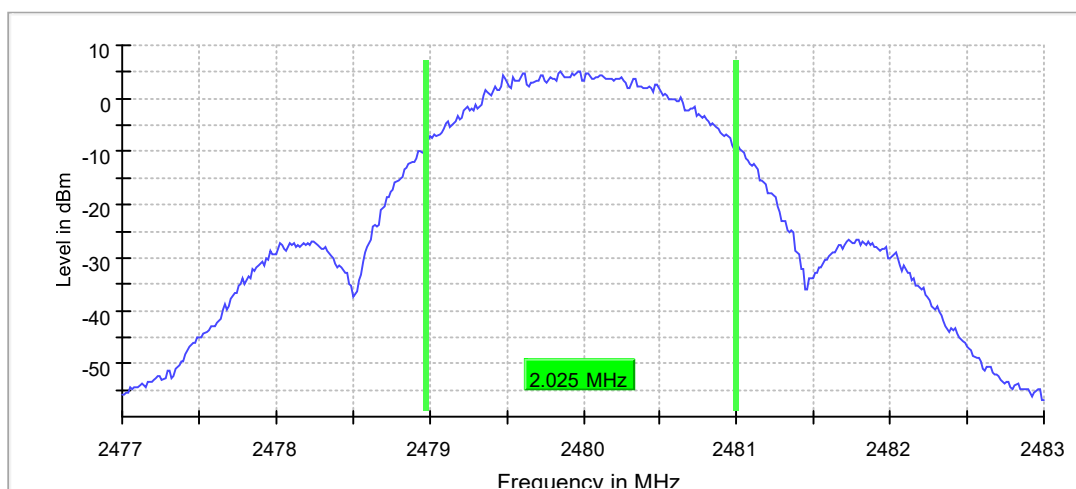
99% Occupied Channel Bandwidth, 2480MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	2.025000	---	---	2478.972500	2480.997500

(continuation of the "99 % Bandwidth" table from column 6 ...)

DUT Frequency (MHz)	Result
2480.000000	PASS

99 % Bandwidth


Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47700 GHz	2.47700 GHz
Stop Frequency	2.48300 GHz	2.48300 GHz
Span	6.000 MHz	6.000 MHz
RBW	30.000 kHz	>= 30.000 kHz
VBW	100.000 kHz	>= 90.000 kHz
SweepPoints	400	~ 400
SweepTime	63.216 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	40 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.08 dB	0.30 dB

5.1.3 Output Power

RESULT:**Pass**

Date of testing : 2025-02-13
Ambient temperature : 24.2°C
Relative humidity : 59.5%
Atmospheric pressure : 101kPa
Test requirement : FCC Part 15.247(b)(3)
RSS-247 Issue 3, August 2023, Clause 5.4(d)
Test procedure : ANSI C63.10: 2013
Test voltage : DC 3.3V
Test modes applied : A

Table 8: Peak Output Power

Frequency [MHz]	Peak Conducted Output Power [dBm]	Limit [dBm]
2405	9.6	30
2445	10.0	30
2480	9.7	30

Note:

1. The cable loss is taken into account in results.
2. EIRP=Conducted Output Power + Antenna Gain (-1.51dBi), which is far below the 4 W (36dBm).

5.1.4 Power Spectral Density

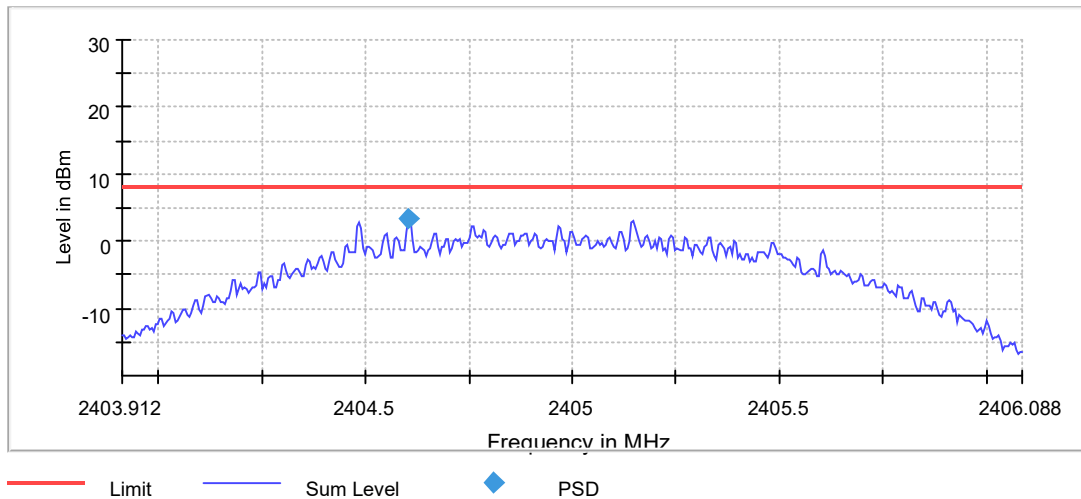
RESULT:**Pass**

Date of testing	:	2025-02-13
Ambient temperature	:	24.2°C
Relative humidity	:	59.5%
Atmospheric pressure	:	101kPa
Test requirement	:	FCC Part 15.247(e) RSS-247 Issue 3, August 2023, Clause 5.2(b)
Test procedure	:	ANSI C63.10: 2013
Test voltage	:	DC 3.3V
Test modes applied	:	A

Power Spectral Density, 2405MHz

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2405.000000	2404.605000	3.367	8.0	PASS

Peak Power Spectral Density

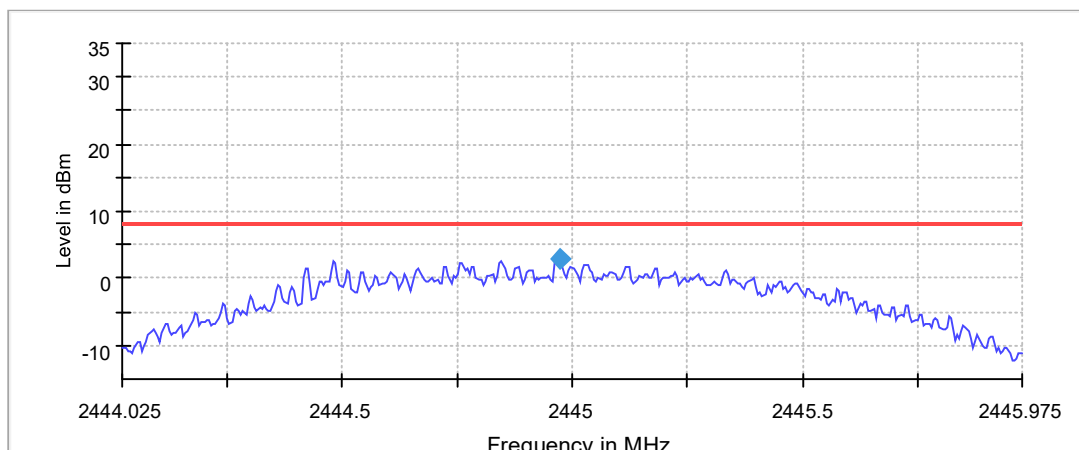

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40391 GHz	2.40391 GHz
Stop Frequency	2.40609 GHz	2.40609 GHz
Span	2.175 MHz	2.175 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	435	~ 435
Sweeptime	2.180 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	36 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.13 dB	0.50 dB

Power Spectral Density, 2445MHz

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2445.000000	2444.972500	2.803	8.0	PASS

Peak Power Spectral Density



— Limit — Sum Level ◆ PSD

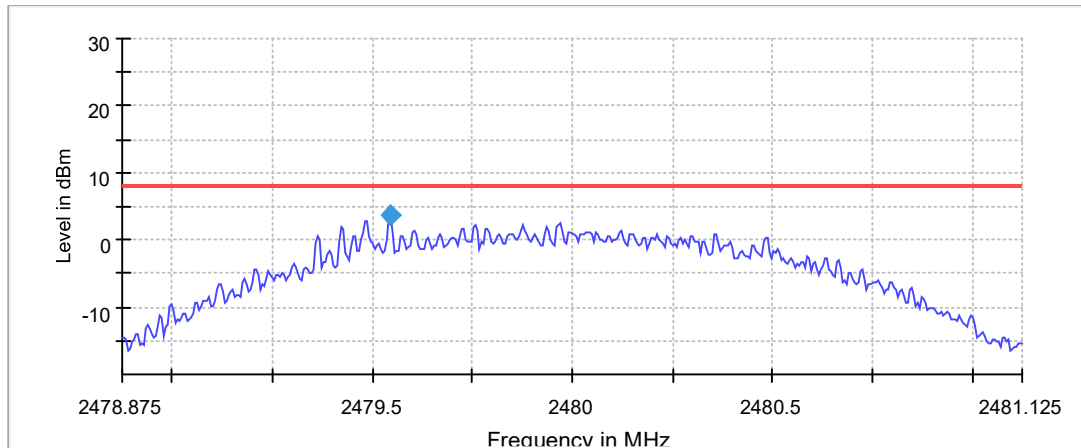
Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.44403 GHz	2.44403 GHz
Stop Frequency	2.44598 GHz	2.44598 GHz
Span	1.950 MHz	1.950 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	390	~ 390
Sweeptime	1.950 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	42 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.30 dB	0.50 dB

Power Spectral Density, 2480MHz

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2479.547500	3.700	8.0	PASS

Peak Power Spectral Density



— Limit — Sum Level ◆ PSD

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47888 GHz	2.47888 GHz
Stop Frequency	2.48113 GHz	2.48113 GHz
Span	2.250 MHz	2.250 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	450	~ 450
SweepTime	2.250 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	62 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.48 dB	0.50 dB

5.1.5 Conducted Band Edge and out-of Band Emissions

RESULT:

Pass

Date of testing	:	2025-01-23
Ambient temperature	:	24.0°C
Relative humidity	:	56.5%
Atmospheric pressure	:	101kPa
Test requirement	:	FCC Part 15.247(d) RSS-247 Issue 3, August 2023, Clause 5.5
Test procedure	:	ANSI C63.10: 2013
Test voltage	:	DC 3.3V
Test modes applied	:	A

Figure 1: Reference level

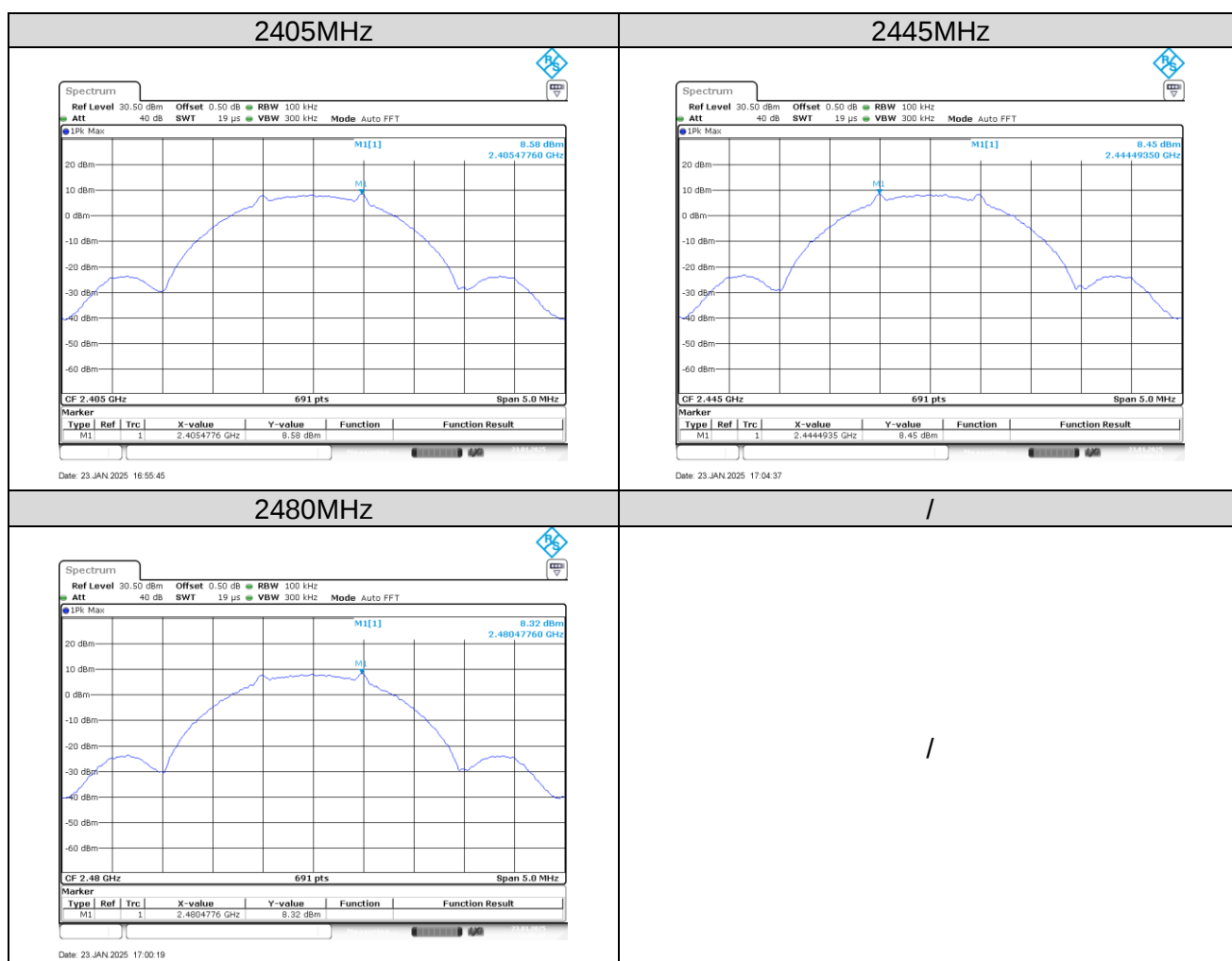
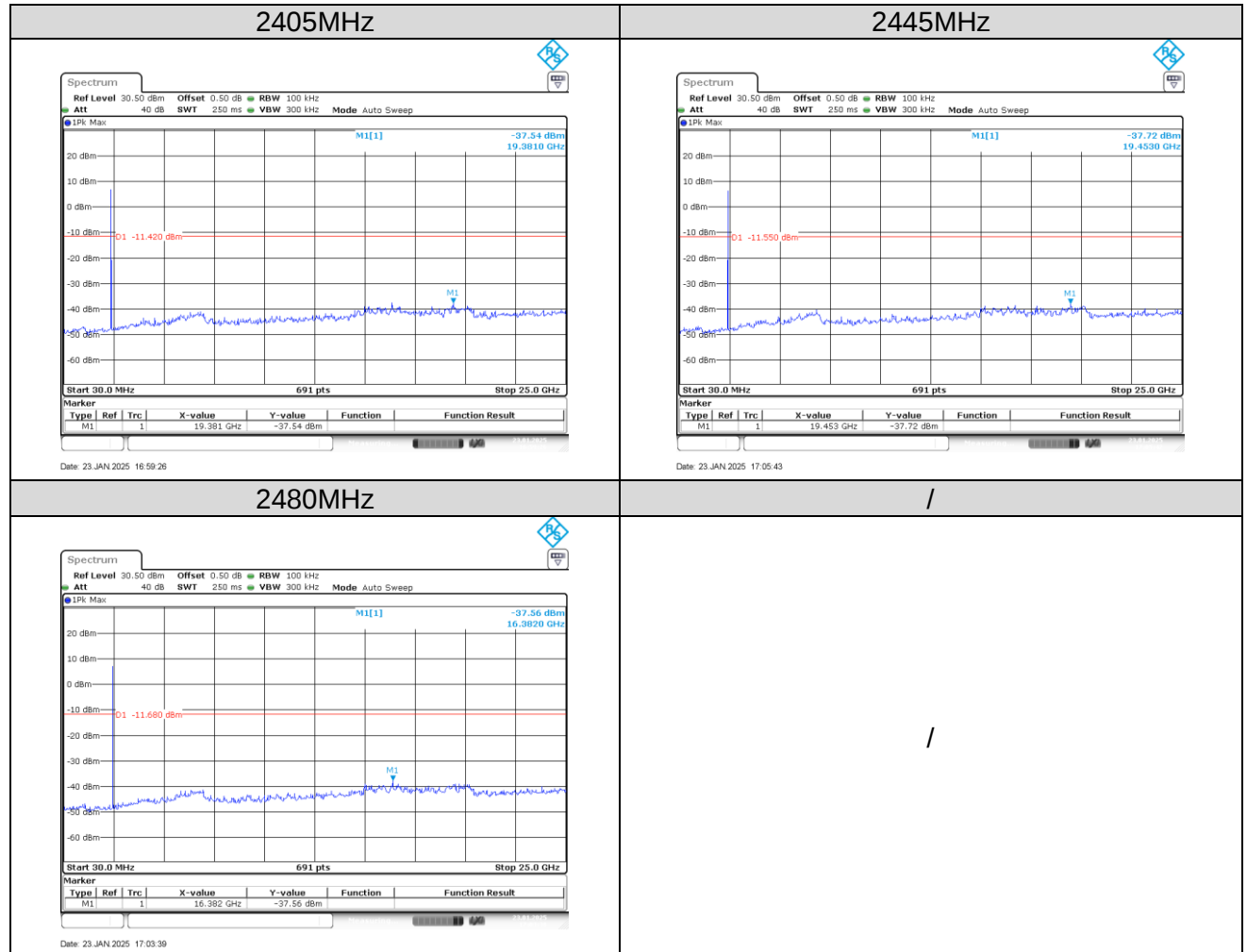
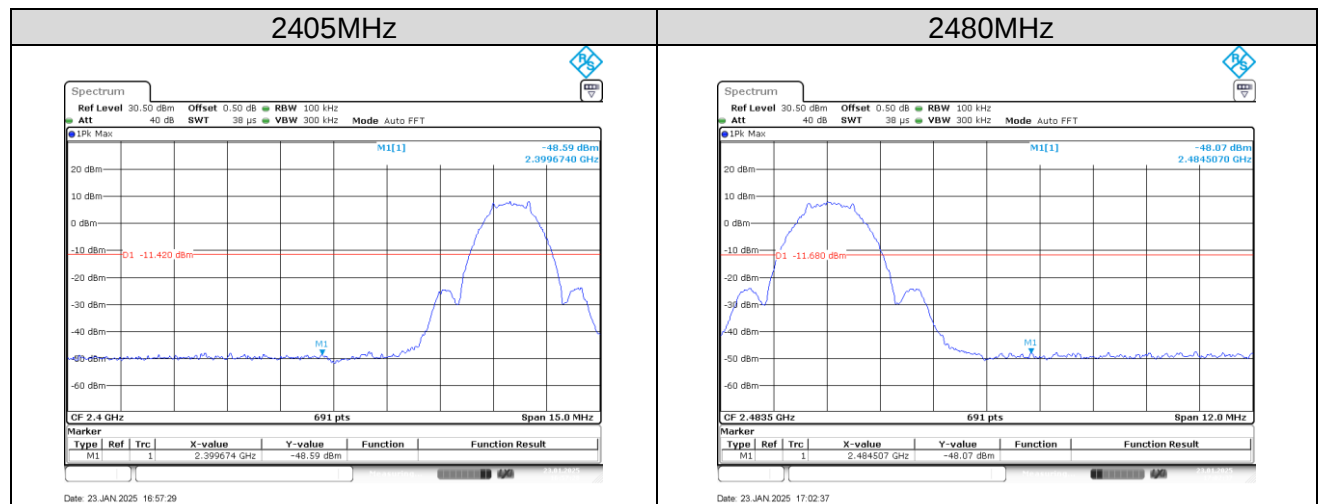


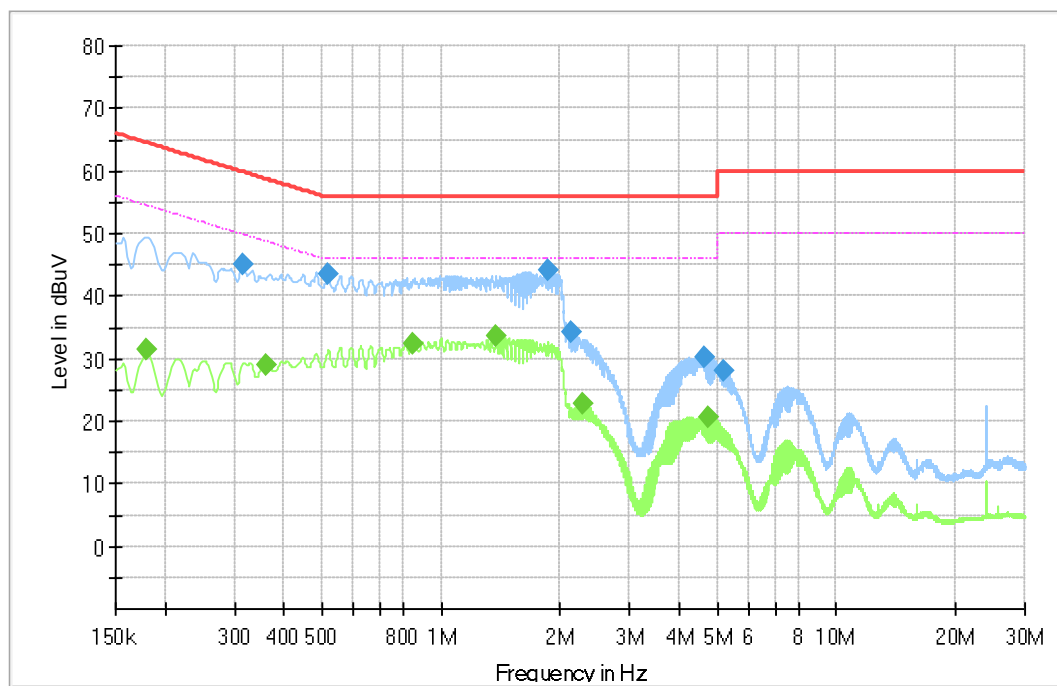
Figure 2: Conducted Spurious Emission

Figure 3: Conducted Band Edge


5.2 Emission in the Frequency Range up to 30MHz

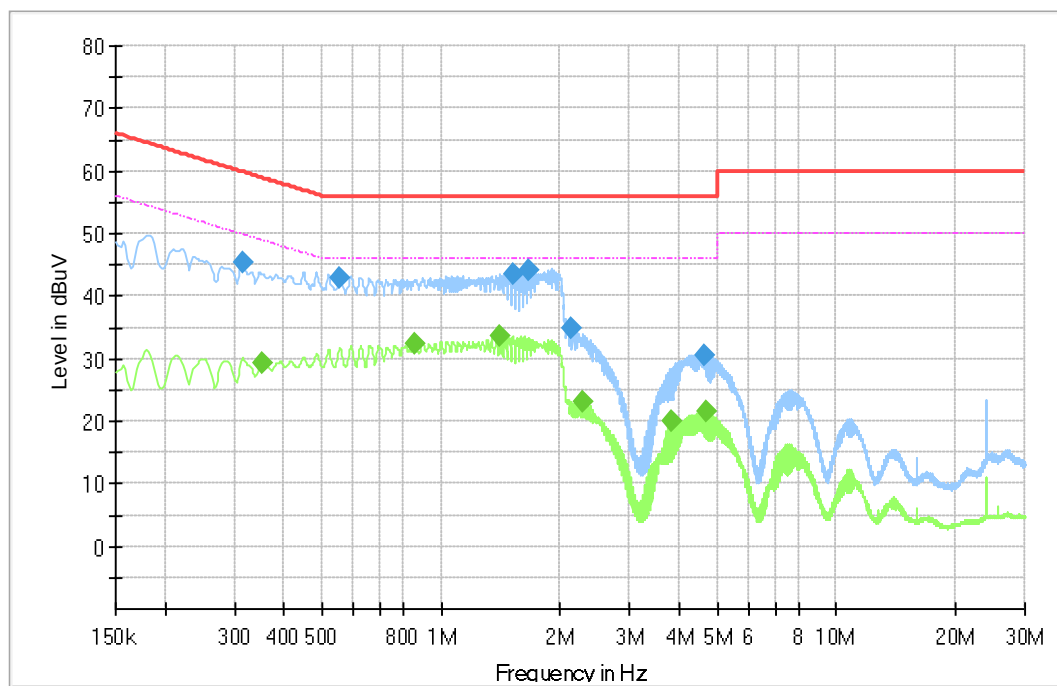
5.2.1 Conducted Emission

RESULT:**N/A**

Date of testing	:	2025-01-20
Ambient temperature	:	22.0°C
Relative humidity	:	55.0%
Atmospheric pressure	:	101kPa
Test requirement	:	FCC Part 15.207 (a) RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.8
Test procedure	:	KDB 558074 D01v05r02 ANSI C63.10: 2013
Test voltage	:	AC 120V, 60Hz
Test modes applied	:	B

Figure 4: Conducted Emission, L

Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.179250	---	31.51	54.52	23.01	1000.0	9.000	L1	10.3
0.314250	45.16	---	59.86	14.70	1000.0	9.000	L1	10.3
0.361500	---	29.08	48.69	19.61	1000.0	9.000	L1	10.3
0.519000	43.54	---	56.00	12.46	1000.0	9.000	L1	10.3
0.852000	---	32.48	46.00	13.52	1000.0	9.000	L1	10.5
1.378500	---	33.47	46.00	12.53	1000.0	9.000	L1	10.4
1.860000	44.05	---	56.00	11.95	1000.0	9.000	L1	10.1
2.136750	34.31	---	56.00	21.69	1000.0	9.000	L1	10.1
2.274000	---	22.74	46.00	23.26	1000.0	9.000	L1	10.1
4.652250	30.13	---	56.00	25.87	1000.0	9.000	L1	10.3
4.726500	---	20.77	46.00	25.23	1000.0	9.000	L1	10.3
5.160750	28.04	---	60.00	31.96	1000.0	9.000	L1	10.4

Figure 5: Conducted Emission, N

Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.314250	45.35	---	59.86	14.51	1000.0	9.000	N	10.5
0.352500	---	29.28	48.90	19.62	1000.0	9.000	N	10.4
0.552750	42.90	---	56.00	13.10	1000.0	9.000	N	10.3
0.858750	---	32.28	46.00	13.72	1000.0	9.000	N	10.4
1.412250	---	33.57	46.00	12.43	1000.0	9.000	N	10.4
1.515750	43.61	---	56.00	12.39	1000.0	9.000	N	10.4
1.673250	44.19	---	56.00	11.81	1000.0	9.000	N	10.5
2.136750	34.80	---	56.00	21.20	1000.0	9.000	N	10.5
2.274000	---	23.06	46.00	22.94	1000.0	9.000	N	10.5
3.828750	---	20.03	46.00	25.97	1000.0	9.000	N	10.7
4.616250	30.39	---	56.00	25.61	1000.0	9.000	N	10.7
4.688250	---	21.50	46.00	24.50	1000.0	9.000	N	10.7

5.3 Emission in the Frequency Range above 30MHz

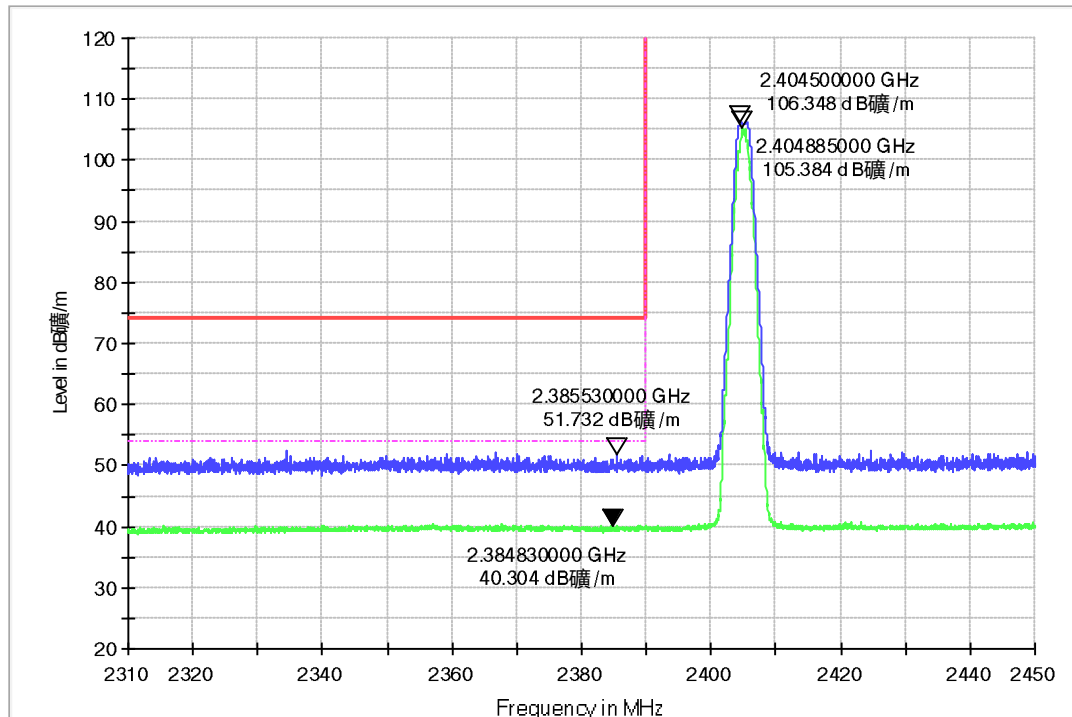
5.3.1 Radiated Band-Edge

RESULT:**Pass**

Date of testing	:	2025-01-15
Ambient temperature	:	22.8°C
Relative humidity	:	53.0%
Atmospheric pressure	:	101kPa
Test requirement	:	FCC Part 15.247(d) FCC Part 15.205(a) FCC Part 15.209(a) RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.9 RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.10 RSS-247 Issue 3, August 2023, Clause 5.5
Test procedure	:	ANSI C63.10: 2013
Test voltage	:	DC 3.3V
Test modes applied	:	A

Figure 6: Radiated Band-Edge, 2405MHz, H

2310~ 2410 BE 1-18GHz_HL050_FSV40_Pre


Figure 7: Radiated Band-Edge, 2405MHz, V

2310~ 2410 BE 1-18GHz_HL050_FSV40_Pre

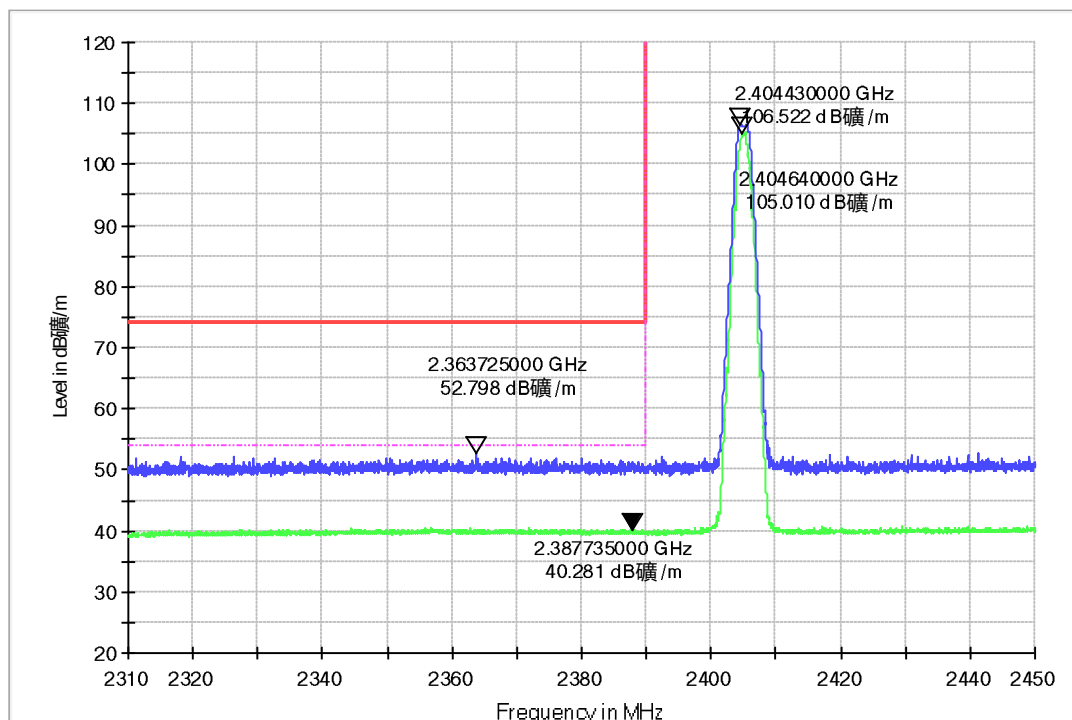
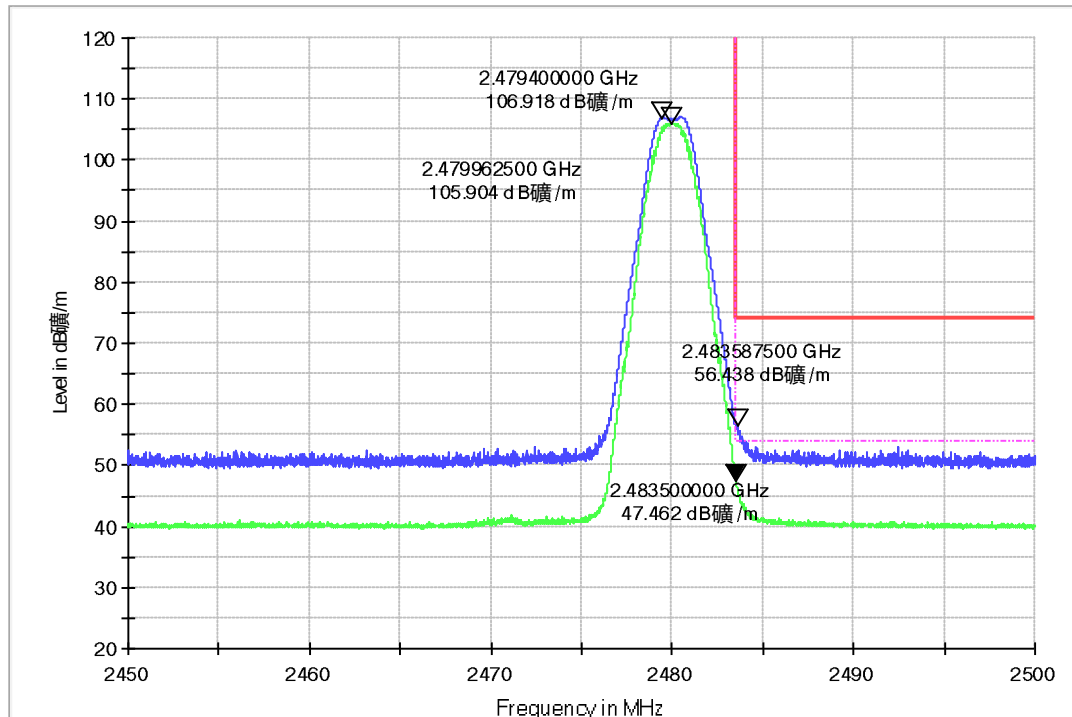
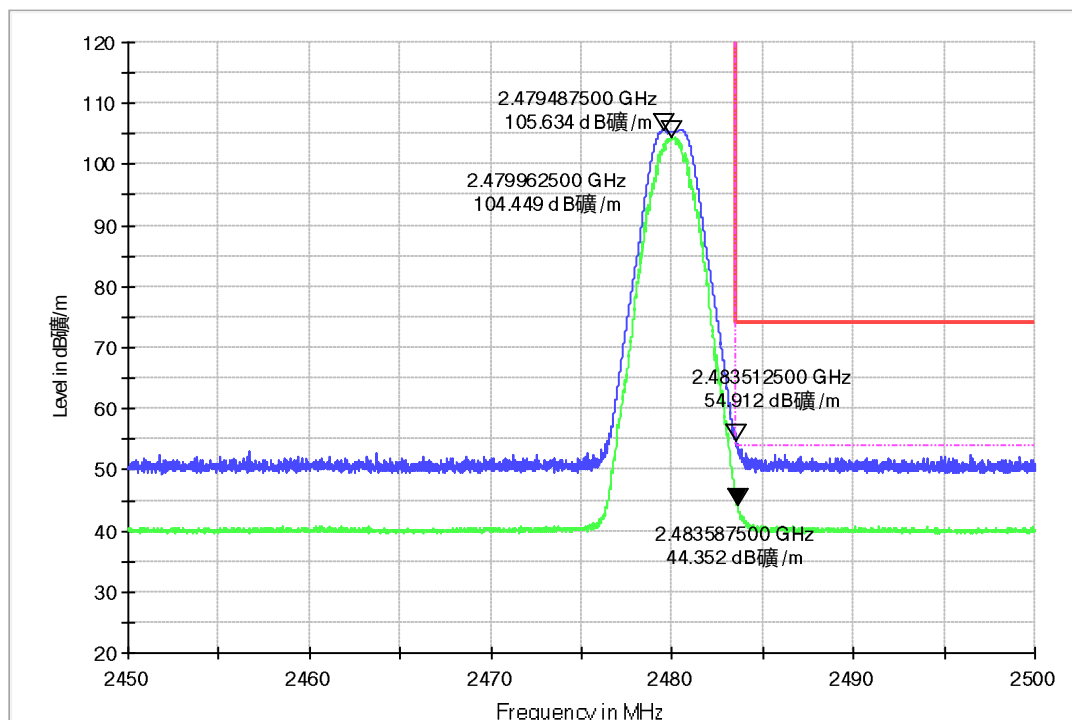


Figure 8: Radiated Band-Edge, 2480MHz, H

2470° 2500 BE_1-18GHz_HL050_FSV40_Pre


Figure 9: Radiated Band-Edge, 2480MHz, V

2470° 2500 BE_1-18GHz_HL050_FSV40_Pre

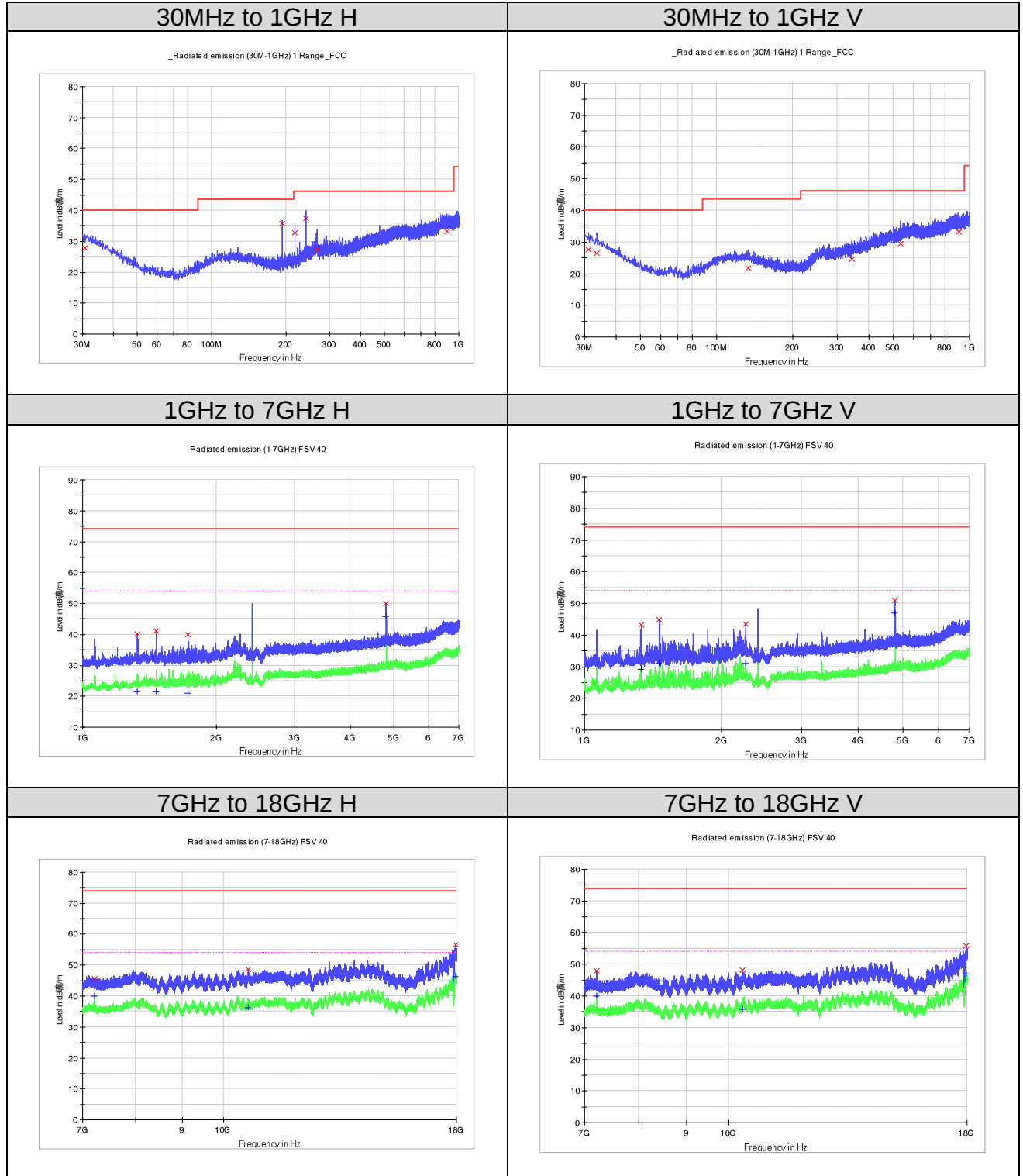


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Test Report No.**Seite 34 von 41**
Page 34 of 41**5.3.2 Radiated Spurious Emission****RESULT:****Pass**

Date of testing	:	2025-02-13
Ambient temperature	:	22.9°C
Relative humidity	:	56.8%
Atmospheric pressure	:	101kPa
Test requirement	:	FCC Part 15.247(d) FCC Part 15.209(a) RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.9 RSS-247 Issue 3, August 2023, Clause 5.5
Test procedure	:	ANSI C63.10: 2013
Test voltage	:	DC 3.3V
Test modes applied	:	A

Note:

For the frequency range from 18GHz to 25GHz, no emission was found.

Figure 10: Radiated Spurious Emission, 2405MHz


Limit and Margin
QP

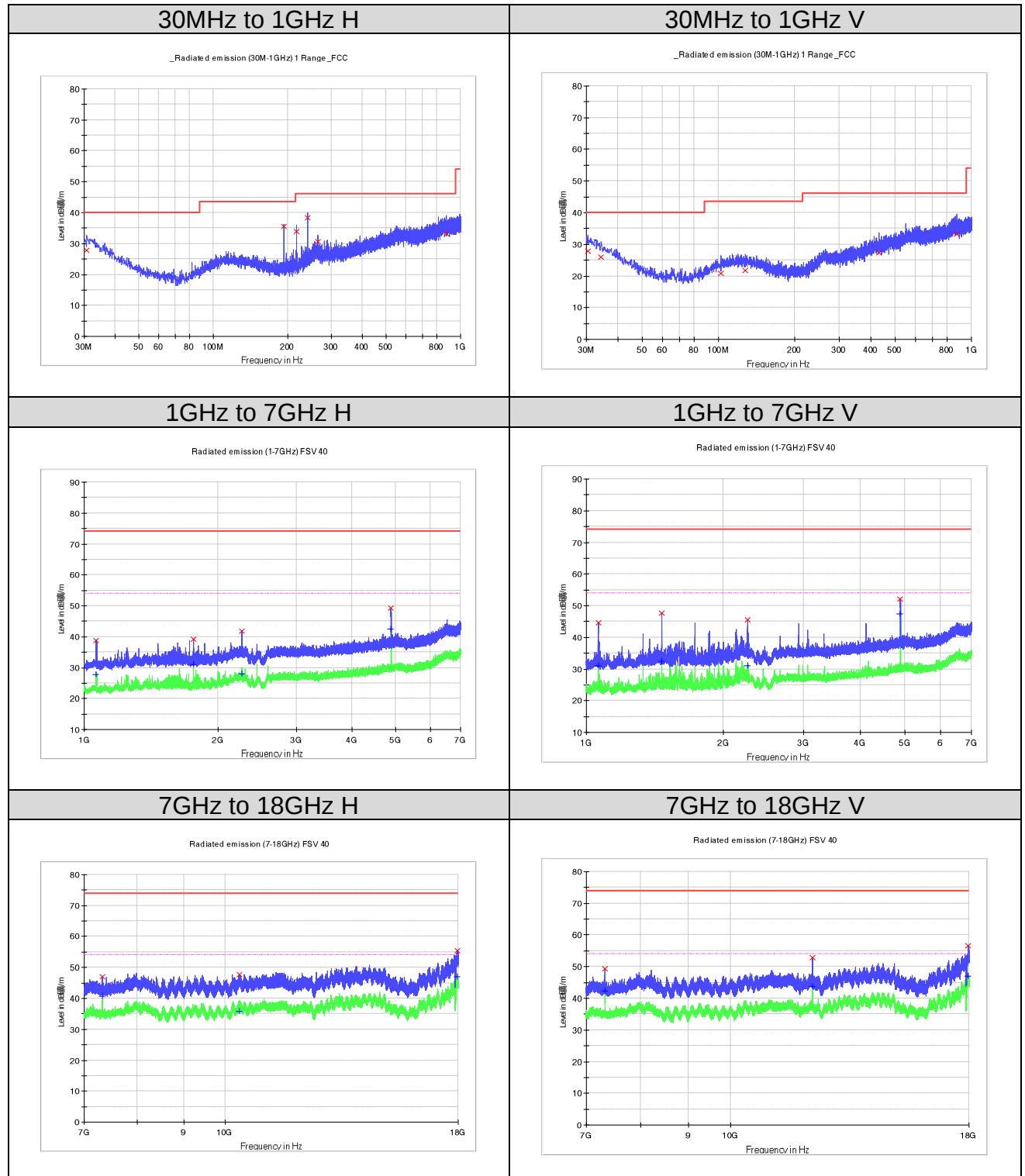
Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.606250	27.8	H	24.5	12.2	40.0
192.717500	35.7	H	15.9	7.8	43.5
216.846250	32.9	H	16.0	13.1	46.0
240.853750	37.5	H	18.5	8.6	46.0
266.437500	27.5	H	20.5	18.5	46.0
895.361250	33.3	H	28.8	12.7	46.0
31.212500	27.6	V	24.3	12.4	40.0
33.516250	26.4	V	23.2	13.6	40.0
132.820000	21.8	V	18.5	21.7	43.5
341.612500	24.5	V	21.3	21.5	46.0
532.096250	29.4	V	25.8	16.6	46.0
910.153750	33.2	V	28.9	12.8	46.0

PK

Frequency (MHz)	MaxPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1328.200000	40.1	H	-18.9	33.9	74.0
1464.400000	41.0	H	-18.7	33.0	74.0
1726.600000	40.0	H	-18.9	34.0	74.0
4809.100000	50.0	H	-11.4	24.0	74.0
7213.468750	45.7	H	-6.2	28.3	74.0
10638.593750	48.7	H	-1.9	25.3	74.0
17960.125000	56.6	H	11.7	17.4	74.0
1330.000000	43.3	V	-18.8	30.7	74.0
1459.600000	45.0	V	-18.7	29.0	74.0
2263.600000	43.4	V	-15.7	30.6	74.0
4809.100000	50.9	V	-11.4	23.1	74.0
7216.218750	48.0	V	-6.2	26.0	74.0
10347.437500	48.2	V	-2.7	25.8	74.0
17974.562500	56.0	V	11.9	18.0	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1328.200000	21.4	H	-18.9	32.6	54.0
1464.400000	21.5	H	-18.7	32.5	54.0
1726.600000	21.0	H	-18.9	33.0	54.0
4809.100000	45.8	H	-11.4	8.2	54.0
7213.468750	40.0	H	-6.2	14.0	54.0
10638.593750	36.3	H	-1.9	17.7	54.0
17960.125000	46.3	H	11.7	7.7	54.0
1330.000000	29.3	V	-18.8	24.7	54.0
1459.600000	31.0	V	-18.7	23.0	54.0
2263.600000	31.1	V	-15.7	22.9	54.0
4809.100000	47.0	V	-11.4	7.0	54.0
7216.218750	39.9	V	-6.2	14.1	54.0
10347.437500	35.8	V	-2.7	18.2	54.0
17974.562500	47.0	V	11.9	7.0	54.0

Figure 11: Radiated Spurious Emission, 2445MHz


Limit and Margin
QP

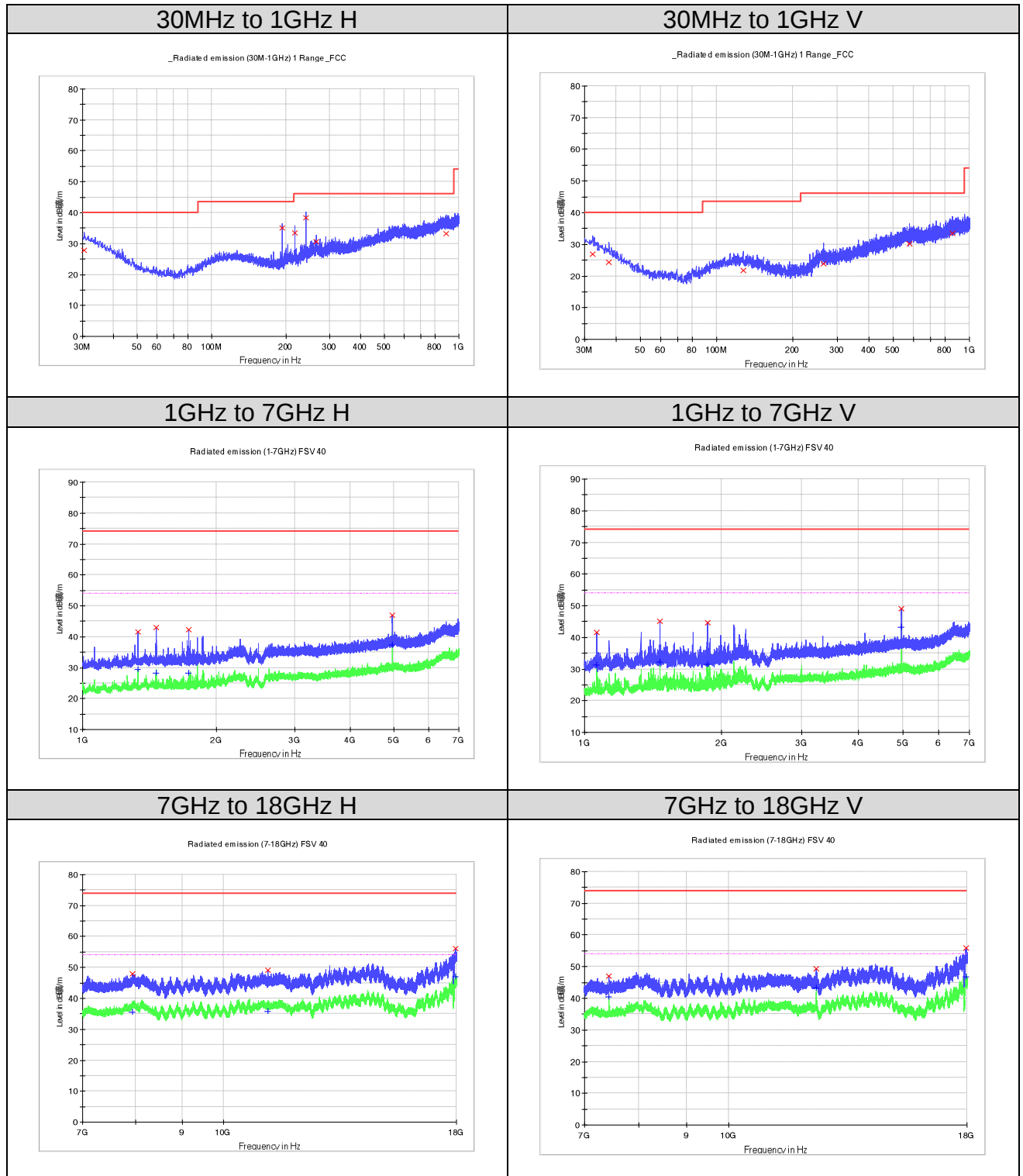
Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.727500	27.7	H	24.5	12.3	40.0
192.717500	35.6	H	15.9	7.9	43.5
216.846250	34.0	H	16.0	12.0	46.0
240.853750	38.3	H	18.5	7.7	46.0
264.861250	30.6	H	20.7	15.4	46.0
878.022500	33.3	H	28.7	12.7	46.0
30.363750	27.9	V	24.6	12.1	40.0
34.365000	26.0	V	22.8	14.0	40.0
102.143750	20.9	V	17.9	22.6	43.5
127.970000	21.7	V	18.7	21.8	43.5
431.701250	27.3	V	24.0	18.7	46.0
875.597500	33.3	V	28.6	12.8	46.0

PK

Frequency (MHz)	MaxPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1063.300000	38.9	H	-20.1	35.2	74.0
1758.400000	39.3	H	-18.8	34.8	74.0
2264.000000	41.8	H	-15.7	32.2	74.0
4891.000000	49.3	H	-11.3	24.7	74.0
7333.437500	47.1	H	-6.5	26.9	74.0
10367.031250	47.8	H	-2.7	26.2	74.0
17964.593750	55.4	H	11.8	18.6	74.0
1061.500000	44.5	V	-20.1	29.5	74.0
1465.600000	47.6	V	-18.7	26.4	74.0
2263.000000	45.5	V	-15.7	28.5	74.0
4891.000000	52.1	V	-11.3	21.9	74.0
7333.093750	49.3	V	-6.5	24.7	74.0
12227.406250	52.9	V	-1.9	21.1	74.0
17970.437500	56.5	V	11.9	17.5	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1063.300000	27.7	H	-20.1	26.3	54.0
1758.400000	31.1	H	-18.8	22.9	54.0
2264.000000	28.0	H	-15.7	26.1	54.0
4891.000000	42.5	H	-11.3	11.5	54.0
7333.437500	40.8	H	-6.5	13.2	54.0
10367.031250	35.8	H	-2.7	18.3	54.0
17964.593750	47.1	H	11.8	6.9	54.0
1061.500000	31.1	V	-20.1	22.9	54.0
1465.600000	32.5	V	-18.7	21.5	54.0
2263.000000	31.0	V	-15.7	23.0	54.0
4891.000000	47.4	V	-11.3	6.6	54.0
7333.093750	42.4	V	-6.5	11.6	54.0
12227.406250	43.8	V	-1.9	10.2	54.0
17970.437500	47.0	V	11.9	7.0	54.0

Figure 12: Radiated Spurious Emission, 2480MHz


Limit and Margin
QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.485000	27.9	H	24.6	12.1	40.0
192.475000	35.2	H	15.9	8.4	43.5
216.725000	33.4	H	16.0	12.6	46.0
240.732500	38.4	H	18.5	7.6	46.0
264.740000	30.7	H	20.7	15.3	46.0
885.903750	33.3	H	28.7	12.8	46.0
32.303750	27.0	V	23.7	13.0	40.0
37.517500	24.4	V	21.1	15.6	40.0
127.121250	21.9	V	18.7	21.6	43.5
264.012500	23.9	V	20.8	22.1	46.0
580.717500	30.2	V	26.5	15.8	46.0
857.167500	33.4	V	28.9	12.6	46.0

PK

Frequency (MHz)	MaxPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1331.200000	41.7	H	-18.8	32.3	74.0
1463.800000	42.9	H	-18.7	31.1	74.0
1728.700000	42.2	H	-18.9	31.8	74.0
4960.900000	46.9	H	-11.1	27.1	74.0
7943.937500	47.9	H	-3.7	26.1	74.0
11172.437500	49.1	H	-2.8	24.9	74.0
17970.781250	56.2	H	11.9	17.8	74.0
1063.900000	41.6	V	-20.1	32.4	74.0
1464.100000	45.2	V	-18.7	28.8	74.0
1860.500000	44.7	V	-18.4	29.3	74.0
4959.100000	49.2	V	-11.2	24.8	74.0
7438.281250	47.1	V	-6.1	26.9	74.0
12397.562500	49.2	V	-2.4	24.8	74.0
17952.562500	55.9	V	11.5	18.1	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1331.200000	29.5	H	-18.8	24.5	54.0
1463.800000	28.3	H	-18.7	25.7	54.0
1728.700000	28.3	H	-18.9	25.7	54.0
4960.900000	37.4	H	-11.1	16.6	54.0
7943.937500	35.6	H	-3.7	18.4	54.0
11172.437500	35.7	H	-2.8	18.3	54.0
17970.781250	47.0	H	11.9	7.1	54.0
1063.900000	31.2	V	-20.1	22.8	54.0
1464.100000	32.1	V	-18.7	21.9	54.0
1860.500000	31.6	V	-18.4	22.5	54.0
4959.100000	43.3	V	-11.2	10.7	54.0
7438.281250	40.5	V	-6.1	13.5	54.0
12397.562500	43.3	V	-2.4	10.7	54.0
17952.562500	46.8	V	11.5	7.3	54.0

6. List of Tables

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