

Prüfbericht-Nr.: Test report no.:	CN2413YJ 001	Auftrags-Nr.: Order no.:	326050137	Seite 1 von 39 Page 1 of 39
Kunden-Referenz-Nr.: Client reference no.:	1288983	Auftragsdatum: Order date:	2024-09-03	
Auftraggeber: Client:	IKEA of Sweden AB Box 702, SE-343 81 Älmhult, Sweden			
Prüfgegenstand: Test item:	Remote Control (Scroll Wheel)			
Bezeichnung / Typ-Nr.: Identification / Type no.:	E2490			
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:	2024-09-09	Refer to photo document.		
Prüfmuster-Nr.: Test sample no.:	A003812960-006~007			
Prüfzeitraum: Testing period:	2024-11-02 ~ 2024-11-13			
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:	<input checked="" type="checkbox"/> <u>Hongfei Wu</u>	genehmigt von: authorized by:	<input checked="" type="checkbox"/> <u>Elliot Zhang</u>	
Datum: Date:	2025-07-17 <small>Signed by: Hongfei Wu</small>	Datum: Date:	2025-07-17 <small>Signed by: Elliot Zhang</small>	
Stellung / Position:	Sachverständige(r)/Expert	Stellung / Position:	Sachverständige(r)/Expert	
Sonstiges / Other:	FCC ID: FHO-E2490 IC: 10912A-E2490 HVIN: E2490 PMN: BILRESA			
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
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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Test report no.:

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Anmerkungen
Remarks

<p>1</p>	<p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>
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<p>3</p>	<p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>
<p>4</p>	<p>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 115:2023, 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.</p> <p><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 115:2023, 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></p>

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.
No.14 building and north half of No.10 workshop building, No.525, Yuewang Lingang South Road, Pingqian (Taicang) Modern Industrial Park, Shaxi Town, Taicang City, Jiangsu Province, P.R. 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	16.10.2024
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	15.12.2024
9053474	Signal generator	SMB100B (6 GHz)	Rohde & Schwarz	15.12.2024
9053476	Vector Signal generator	SMW200A	Rohde & Schwarz	15.12.2024
9047770	Wireless connectivity tester	CMW270	Rohde & Schwarz	23.08.2025
software				
EMC-S-036	RF measurement software	WMS32-WB (11.40.00)	Rohde & Schwarz	NA
9062745	EMI measurement software	EMC32-MEB (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	±3.39dB
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 remote control and which support Bluetooth, Zigbee and Thread function.

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

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Description of EUT	
Product Name:	Remote Control (Scroll Wheel)
Model No.:	E2490
Operation Voltage:	DC 3V (2*AAA battery)
RF Technical:	1) BLE 2) Zigbee 3) Thread
Technical Specification of Zigbee	
Frequency Range:	2405~2480MHz
Modulation Type:	OQPSK
Antenna Type:	Stamping Antenna
Antenna Gain:	2.45 dBi (declared by client)

Table 4: Operation Channel List

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. On, Zigbee transmitting mode
- B. Off

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: sscm 5.13.1

Table 5: Power parameter value

Mode	Power Parameter Setting Value
Zigbee	3 dBm

4.3 Special Accessories and Auxiliary Equipment

Table 6: Auxiliary Equipment

Equipment	Manufacturer	Model
Laptop	Lenovo	21AJ-S57N0J

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 stamping antenna, the directional gain of antenna is 2.45 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: Stamping 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 stamping 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 39**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:	Stamping Antenna
b) Manufacture:	N/A
c) Model No.:	N/A
d) Gain with reference to an isotropic radiator:	2.45 dBi

Verdict: **PASS**

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

Date of testing : 2024-11-05
Ambient temperature : 22.4°C
Relative humidity : 50.2%
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 3V
Test modes applied : A

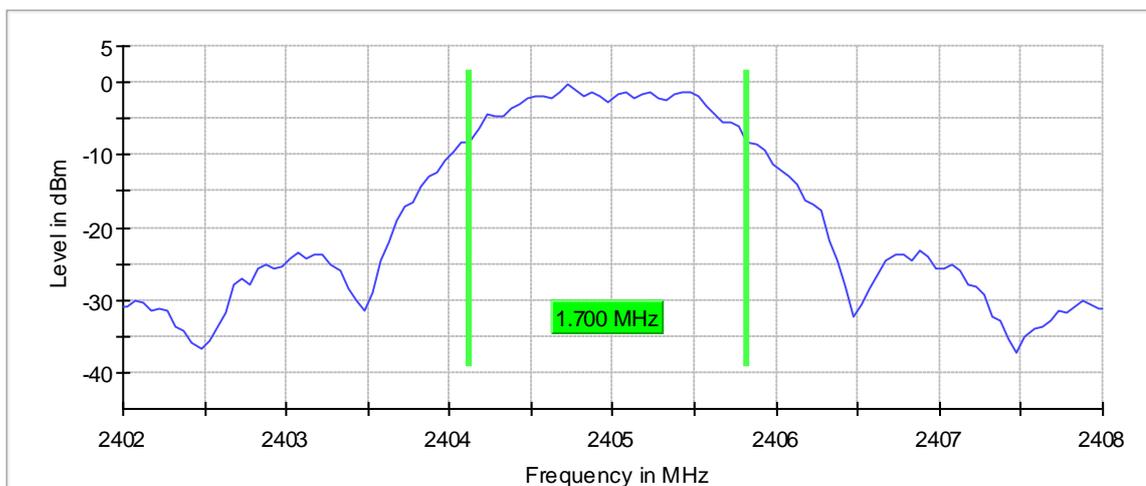
6dB Bandwidth, 2405MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2405.000000	1.700000	0.500000	---	2404.125000	2405.825000

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2405.000000	-0.4	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 1/4 s	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	21 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.06 dB	0.50 dB

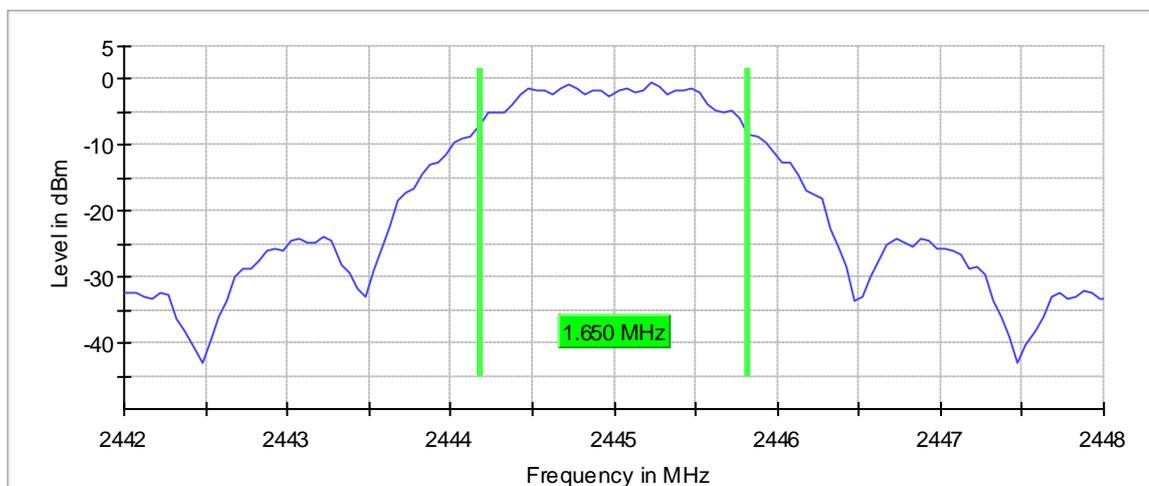
6dB Bandwidth, 2445MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2445.000000	1.650000	0.500000	---	2444.175000	2445.825000

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2445.000000	-0.4	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 1/4 s	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	17 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.47 dB	0.50 dB

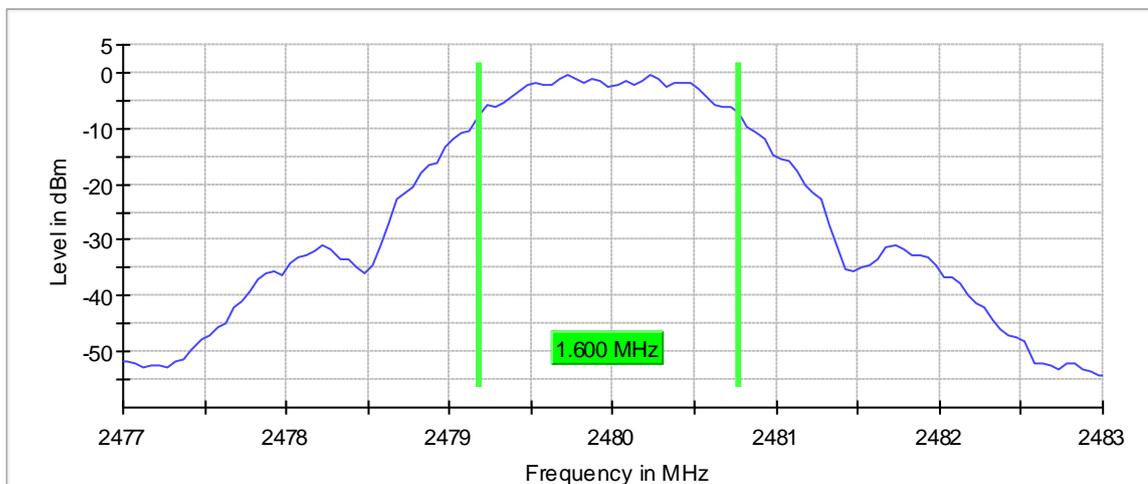
6dB Bandwidth, 2480MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	1.600000	0.500000	---	2479.175000	2480.775000

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	-0.2	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
Sweeptime	18.984 $\frac{1}{4}$ s	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	11 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.38 dB	0.50 dB

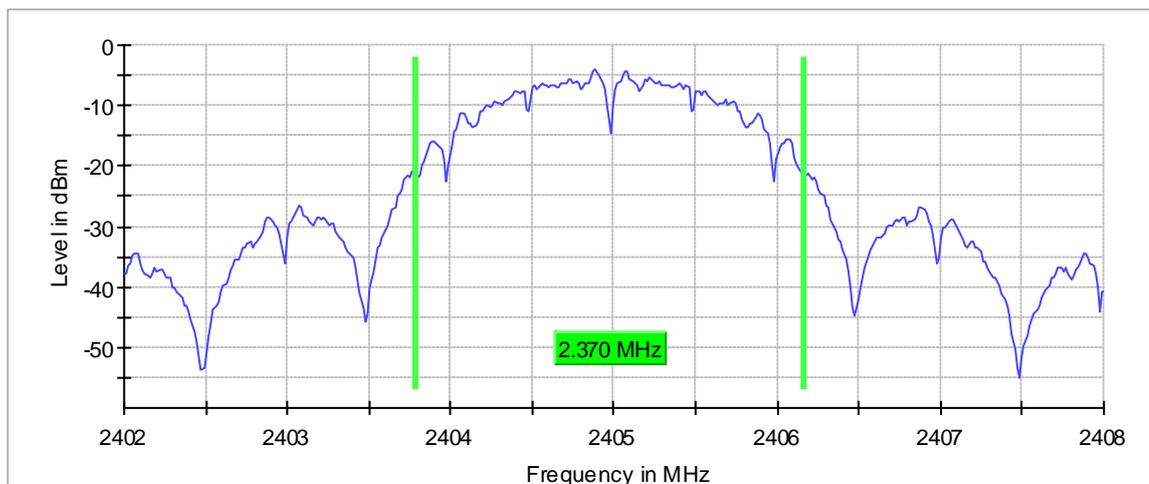
99% Occupied Channel Bandwidth, 2405MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2405.000000	2.370000	---	---	2403.792500	2406.162500

(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 1/4 s	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	38 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.15 dB	0.30 dB

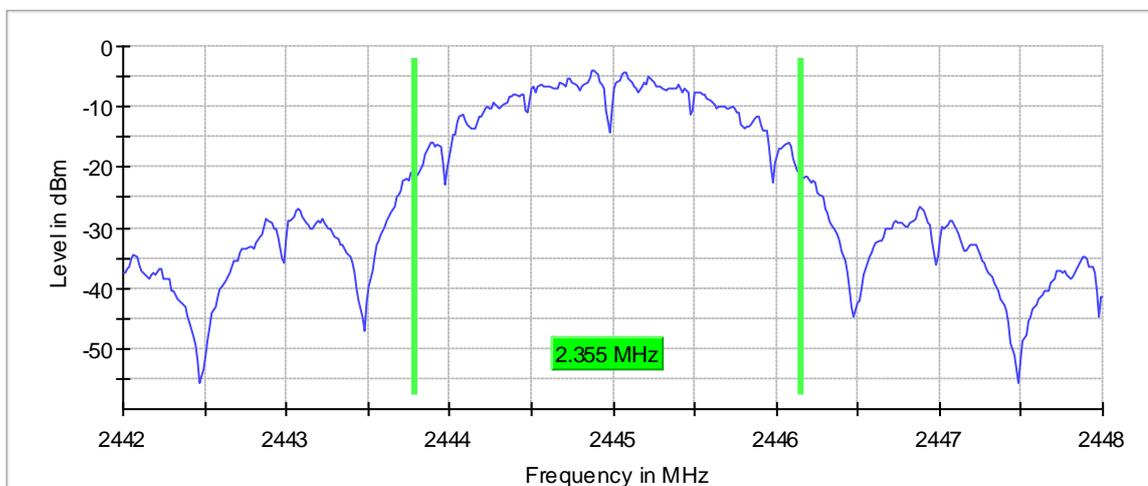
99% Occupied Channel Bandwidth, 2445MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2445.000000	2.355000	---	---	2443.792500	2446.147500

(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 1/4 s	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	0.00 dB	0.30 dB

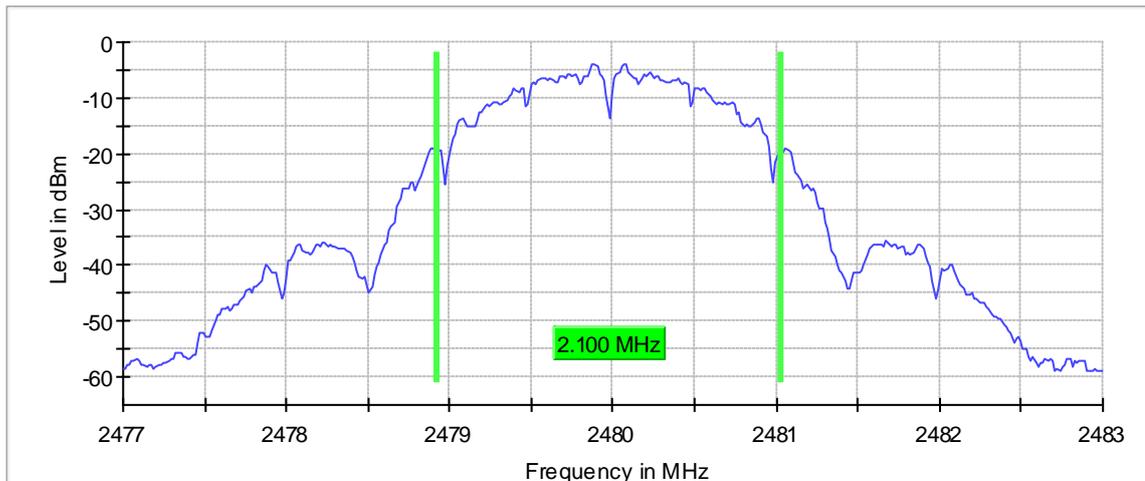
99% Occupied Channel Bandwidth, 2480MHz

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	2.100000	---	---	2478.927500	2481.027500

(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 $\frac{1}{4}$ s	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	28 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.29 dB	0.30 dB

5.1.3 Output Power

RESULT:**Pass**

Date of testing : 2024-11-05
Ambient temperature : 22.4°C
Relative humidity : 50.2%
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 3V
Test modes applied : A

Table 8: Peak Output Power

Frequency [MHz]	Peak Conducted Output Power [dBm]	Limit [dBm]
2405	4.6	30
2445	4.4	30
2480	4.2	30

Note:

1. The cable loss is taken into account in results.
2. EIRP=Conducted Output Power + Antenna Gain (2.45dBi), which is far below the 4 W (36dBm).

5.1.4 Power Spectral Density

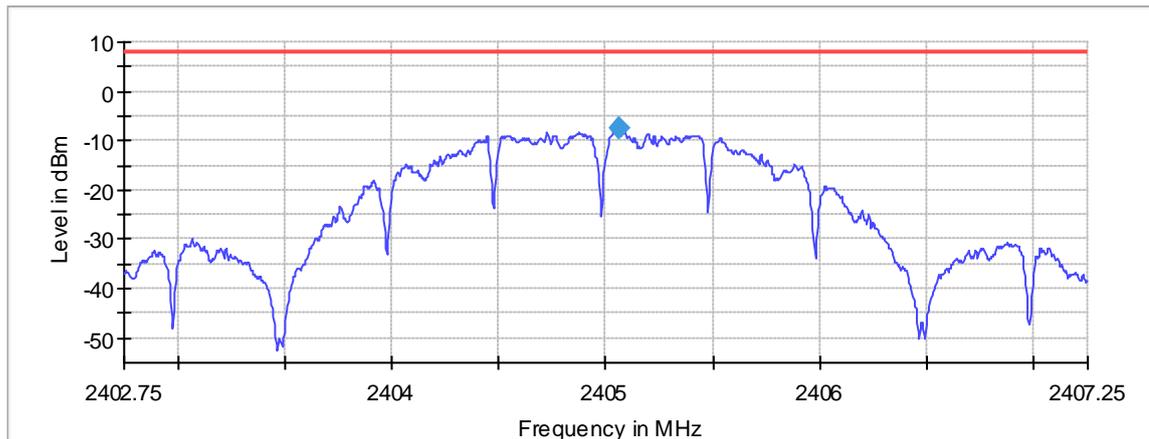
RESULT:**Pass**

Date of testing : 2024-11-05
Ambient temperature : 22.4°C
Relative humidity : 50.2%
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 3V
Test modes applied : A

Power Spectral Density, 2405MHz

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2405.000000	2405.062500	-7.547	8.0	PASS

Peak Power Spectral Density



— Limit
 — Sum Level
 ◆ PSD

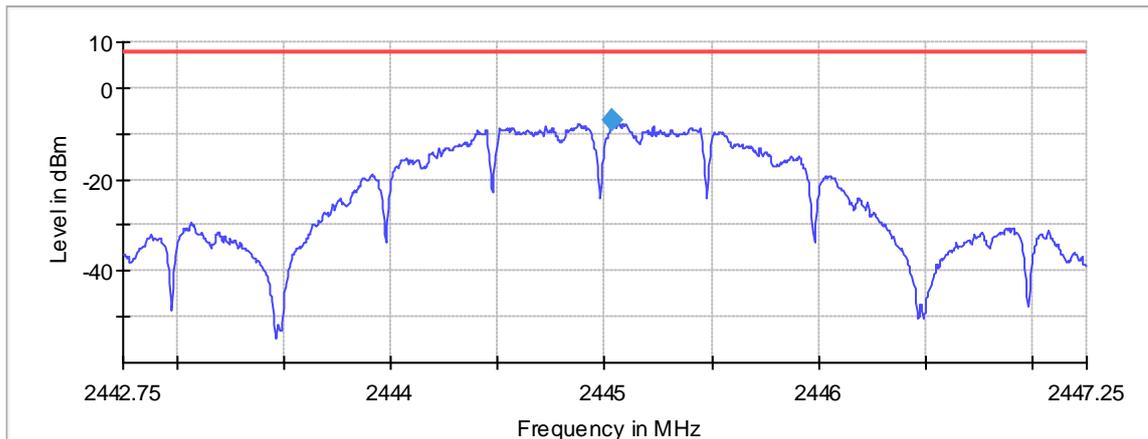
Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40275 GHz	2.40275 GHz
Stop Frequency	2.40725 GHz	2.40725 GHz
Span	4.500 MHz	4.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	900	~ 900
SweepTime	4.500 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	37 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.32 dB	0.50 dB

Power Spectral Density, 2445MHz

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2445.000000	2445.032500	-7.203	8.0	PASS

Peak Power Spectral Density



— Limit
 — Sum Level
 ◆ PSD

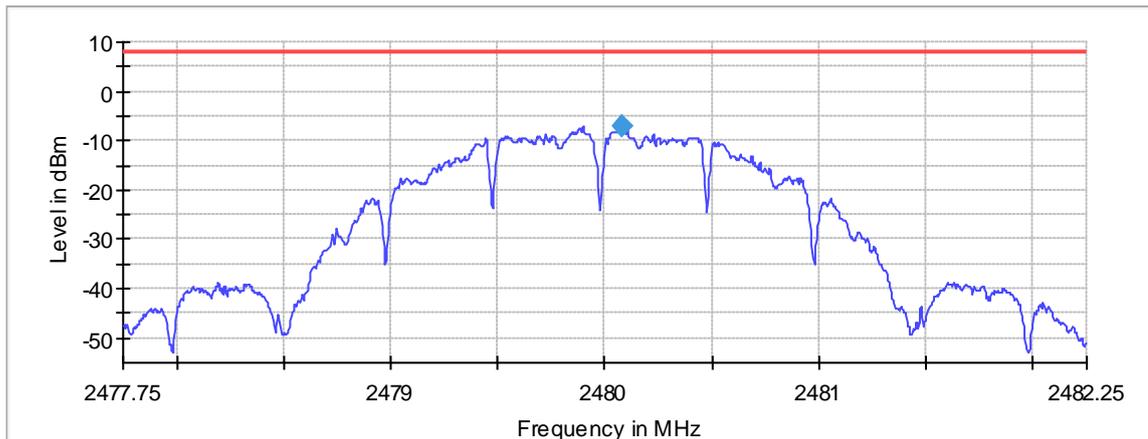
Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.44275 GHz	2.44275 GHz
Stop Frequency	2.44725 GHz	2.44725 GHz
Span	4.500 MHz	4.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	900	~ 900
SweepTime	4.500 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	71 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.50 dB	0.50 dB

Power Spectral Density, 2480MHz

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2480.082500	-7.083	8.0	PASS

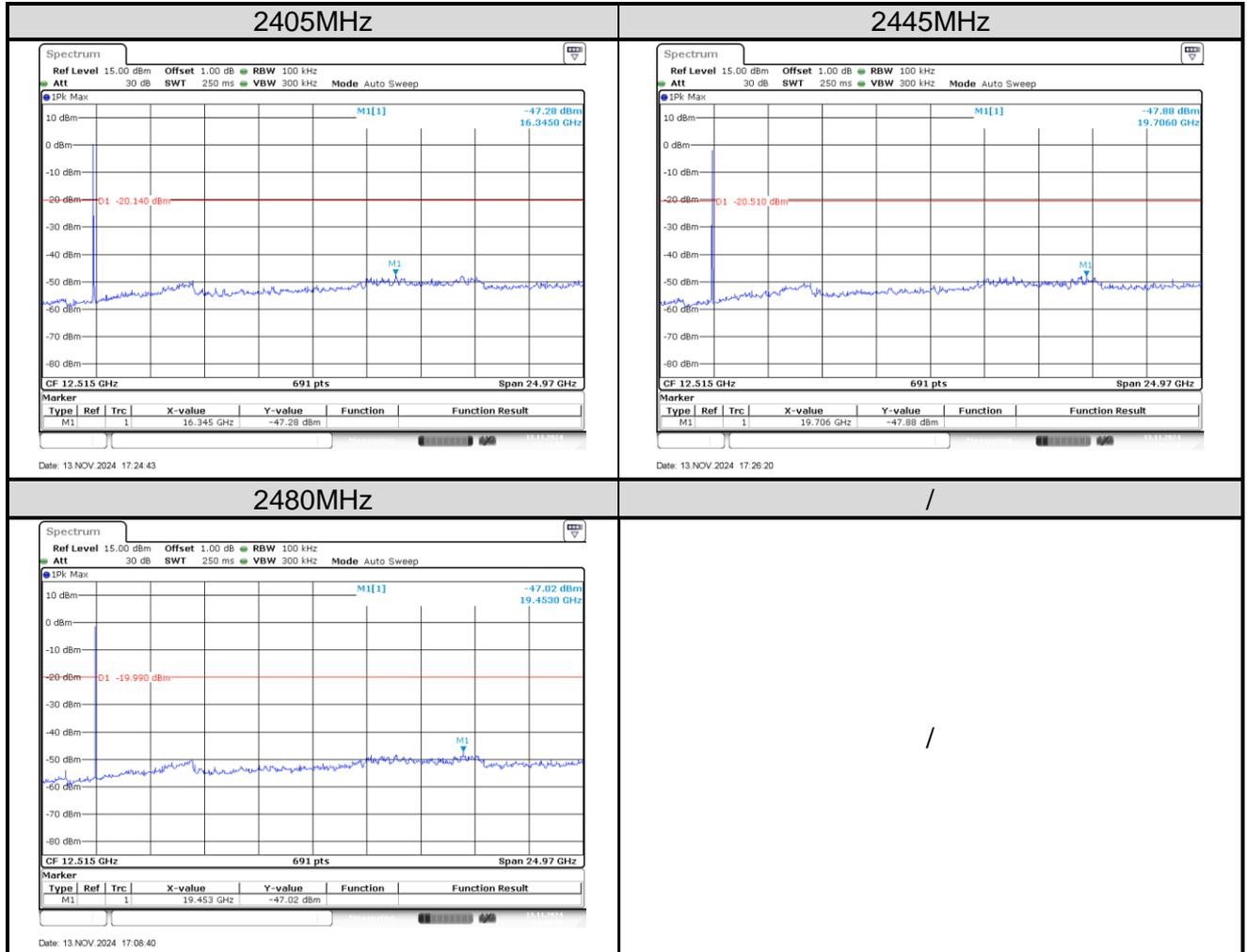
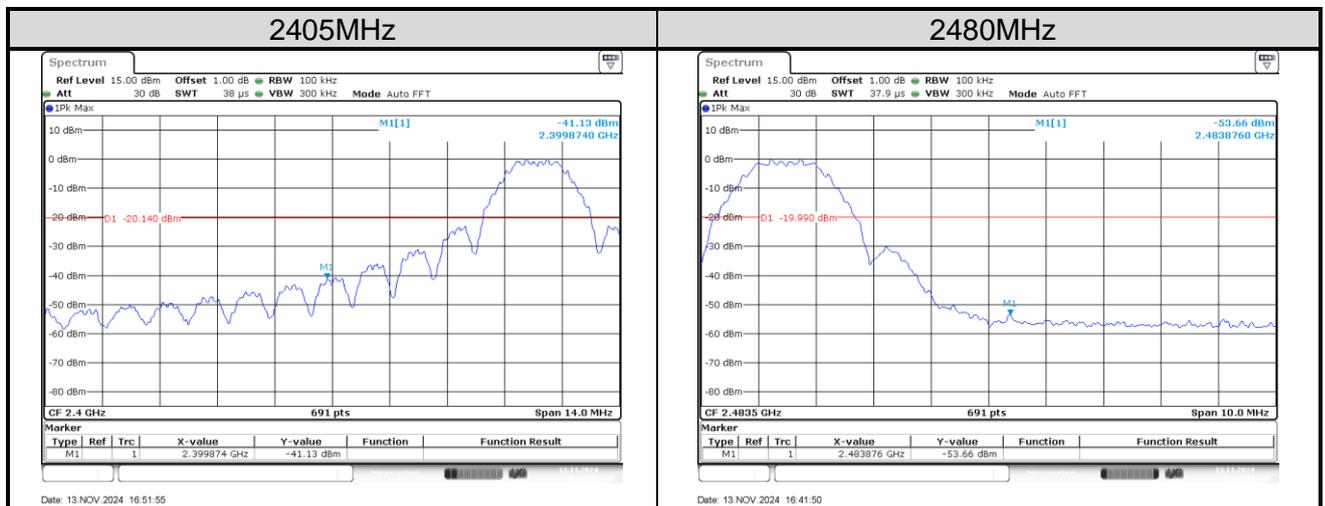
Peak Power Spectral Density



— Limit
 — Sum Level
 ◆ PSD

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47775 GHz	2.47775 GHz
Stop Frequency	2.48225 GHz	2.48225 GHz
Span	4.500 MHz	4.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	900	~ 900
SweepTime	4.500 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	41 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.00 dB	0.50 dB

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 : /
Ambient temperature : /
Relative humidity : /
Atmospheric pressure : /
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 : /
Test modes applied : /

Note: This product is power by battery, so it is not applicable for this test.

5.3 Emission in the Frequency Range above 30MHz

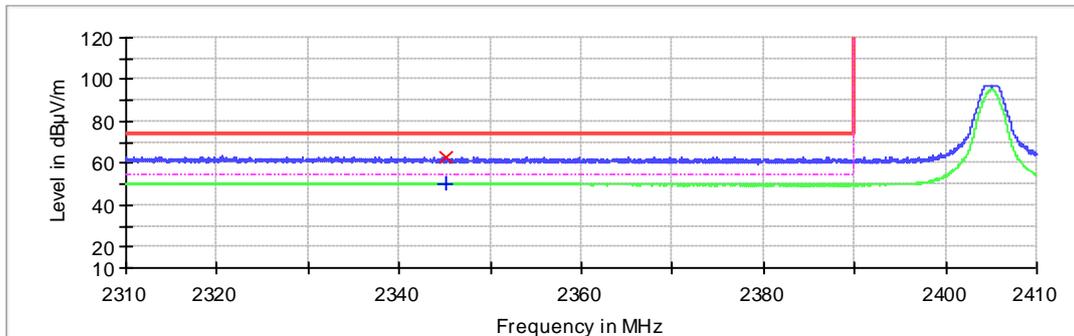
5.3.1 Radiated Band-Edge

RESULT:**Pass**

Date of testing	:	2024-11-05
Ambient temperature	:	22.4°C
Relative humidity	:	50.2%
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 3V
Test modes applied	:	A

Figure 4: Radiated Band-Edge, 2405MHz, H

Copy of 2310~ 2410 BE 1-18GHz_HL050_FSV40_Pre


PK

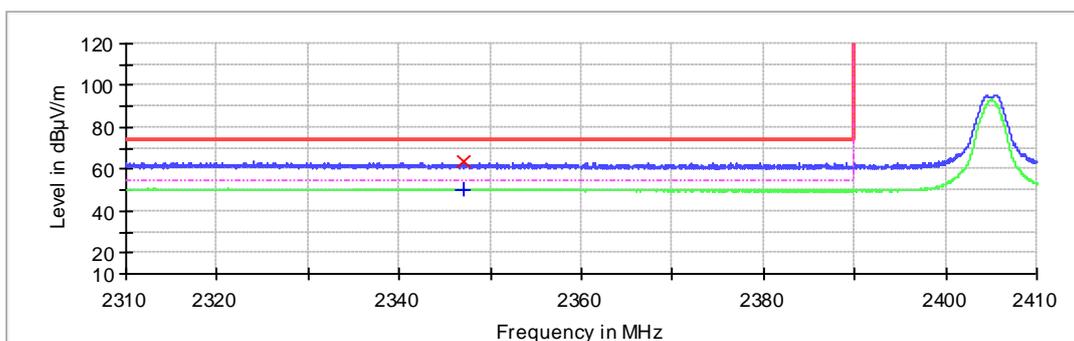
Frequency (MHz)	MaxPeak (dBµV/m)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2345.100000	63.1	32.7	10.9	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
2345.100000	50.1	32.7	3.9	54.0

Figure 5: Radiated Band-Edge, 2405MHz, V

Copy of 2310~ 2410 BE 1-18GHz_HL050_FSV40_Pre


PK

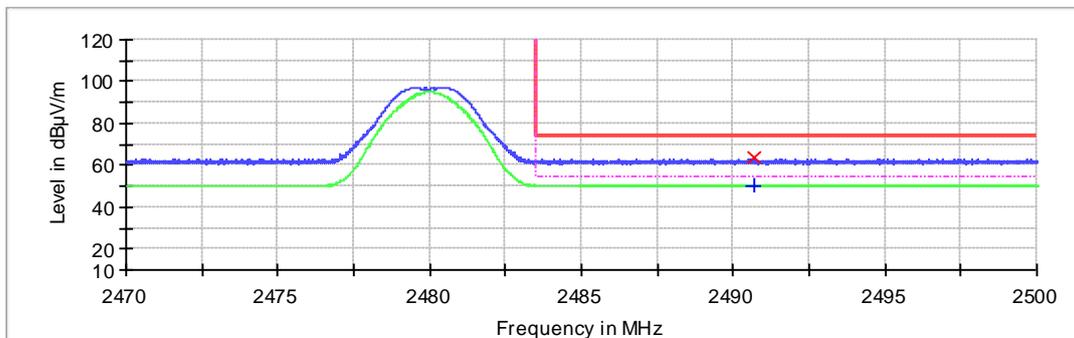
Frequency (MHz)	MaxPeak (dBµV/m)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2346.975000	63.4	32.7	10.6	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
2346.975000	49.9	32.7	4.1	54.0

Figure 6: Radiated Band-Edge, 2480MHz, H

Copy of 2470~ 2500 BE_1-18GHz_HL050_FSV40_Pre


PK

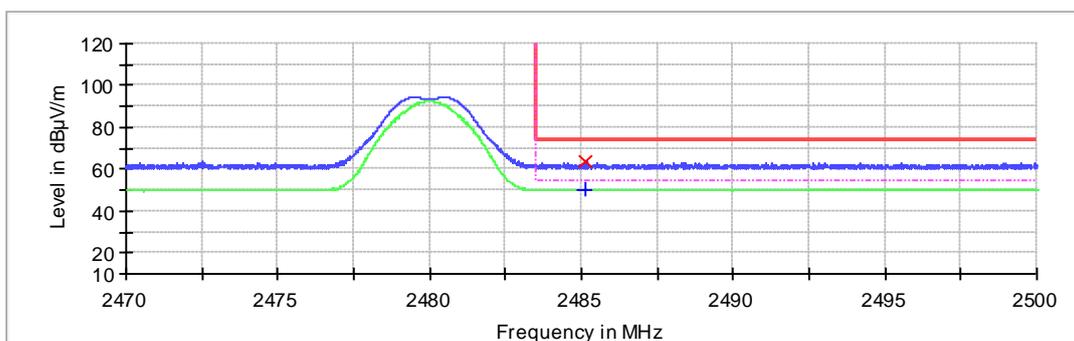
Frequency (MHz)	MaxPeak (dBµV/m)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2490.715000	63.4	32.5	10.6	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
2490.715000	50.0	32.5	4.0	54.0

Figure 7: Radiated Band-Edge, 2480MHz, V

Copy of 2470~ 2500 BE_1-18GHz_HL050_FSV40_Pre


PK

Frequency (MHz)	MaxPeak (dBµV/m)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2485.112500	63.7	32.5	10.3	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
2485.112500	49.8	32.5	4.2	54.0

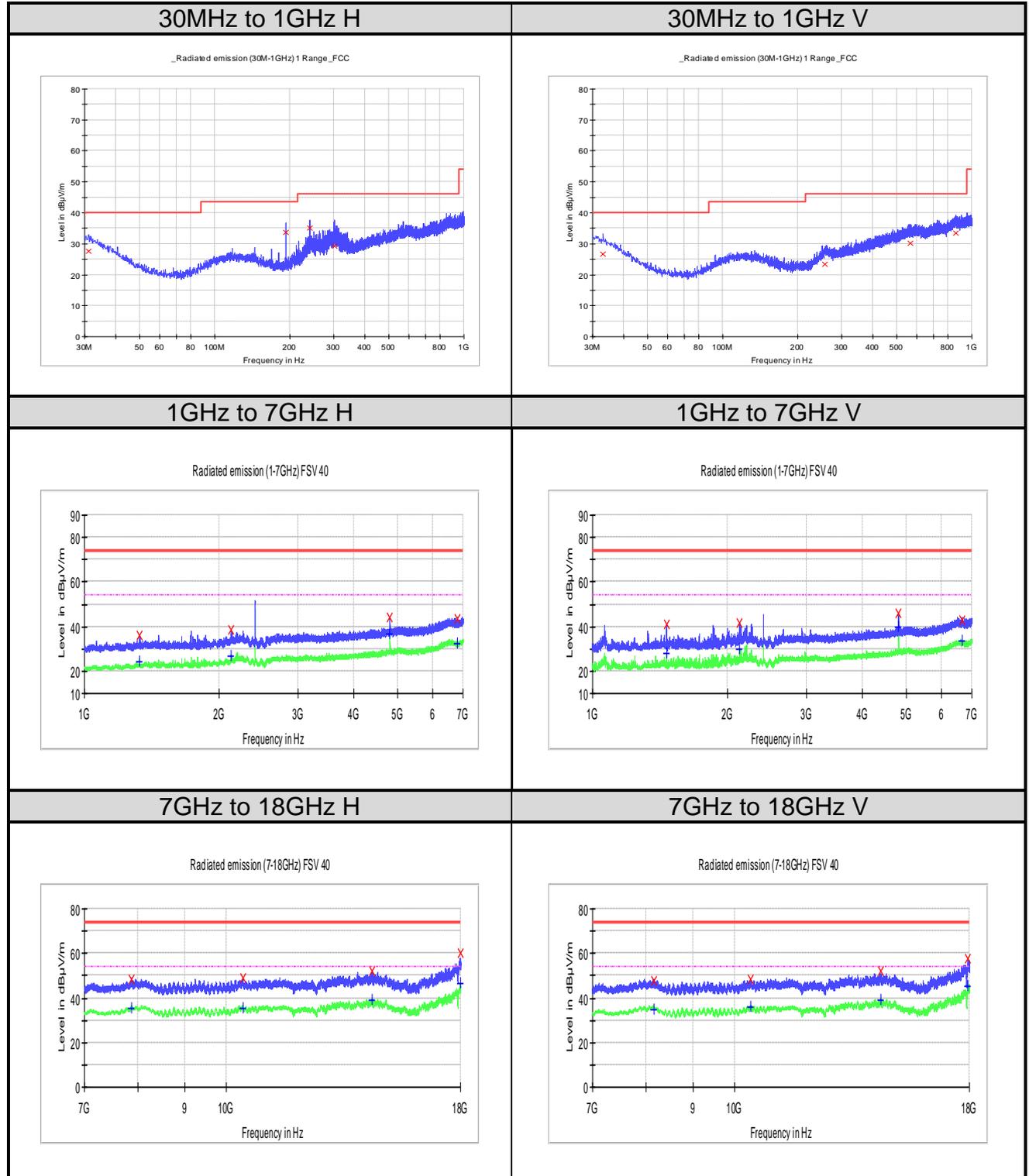
5.3.2 Radiated Spurious Emission

RESULT:**Pass**

Date of testing : 2024-11-02
Ambient temperature : 21.3°C
Relative humidity : 59.2%
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 3V
Test modes applied : A

Note:

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

Figure 8: Radiated Spurious Emission, 2405MHz


Limit and Margin
QP

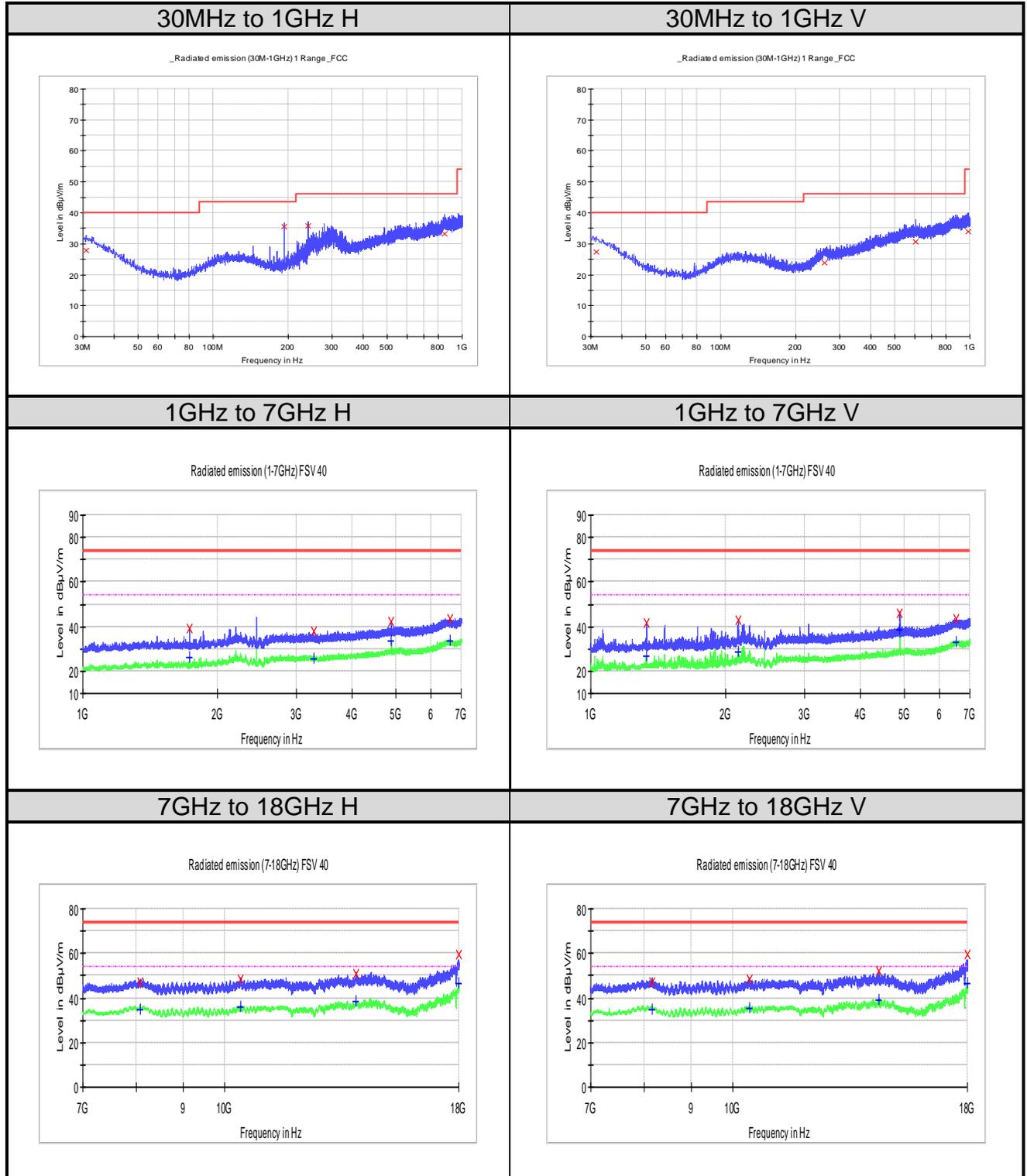
Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
31.091250	27.6	H	24.3	12.4	40.0
192.838750	33.6	H	15.9	9.9	43.5
240.975000	35.0	H	18.5	11.0	46.0
303.297500	29.2	H	20.3	16.8	46.0
33.031250	26.7	V	23.4	13.3	40.0
257.465000	23.5	V	20.5	22.5	46.0
565.197500	30.1	V	26.5	15.9	46.0
859.835000	33.3	V	28.9	12.7	46.0

PK

Frequency (MHz)	MaxPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1329.100000	35.9	H	-18.6	38.1	74.0
2129.200000	38.7	H	-16.2	35.3	74.0
4811.200000	44.3	H	-10.8	29.7	74.0
6809.200000	43.5	H	-7.3	30.5	74.0
7883.300000	48.6	H	-3.5	25.4	74.0
10414.400000	48.8	H	-1.8	25.2	74.0
14412.350000	51.8	H	3.4	22.2	74.0
17982.950000	60.2	H	13.1	13.8	74.0
1460.800000	40.7	V	-18.4	33.3	74.0
2126.800000	41.6	V	-16.3	32.4	74.0
4809.100000	46.2	V	-10.8	27.8	74.0
6656.200000	43.1	V	-7.2	30.9	74.0
8159.950000	47.8	V	-3.7	26.2	74.0
10409.450000	48.7	V	-1.8	25.3	74.0
14415.100000	52.3	V	3.4	21.7	74.0
17945.550000	57.6	V	12.4	16.4	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1329.100000	24.3	H	-18.6	29.7	54.0
2129.200000	26.7	H	-16.2	27.3	54.0
4811.200000	36.8	H	-10.8	17.2	54.0
6809.200000	32.6	H	-7.3	21.4	54.0
7883.300000	35.2	H	-3.5	18.8	54.0
10414.400000	35.6	H	-1.8	18.4	54.0
14412.350000	39.3	H	3.4	14.7	54.0
17982.950000	46.7	H	13.1	7.3	54.0
1460.800000	28.2	V	-18.4	25.8	54.0
2126.800000	30.1	V	-16.3	23.9	54.0
4809.100000	39.7	V	-10.8	14.3	54.0
6656.200000	33.5	V	-7.2	20.5	54.0
8159.950000	34.9	V	-3.7	19.1	54.0
10409.450000	35.7	V	-1.8	18.3	54.0
14415.100000	39.3	V	3.4	14.7	54.0
17945.550000	45.1	V	12.4	8.9	54.0

Figure 9: Radiated Spurious Emission, 2445MHz


Limit and Margin
QP

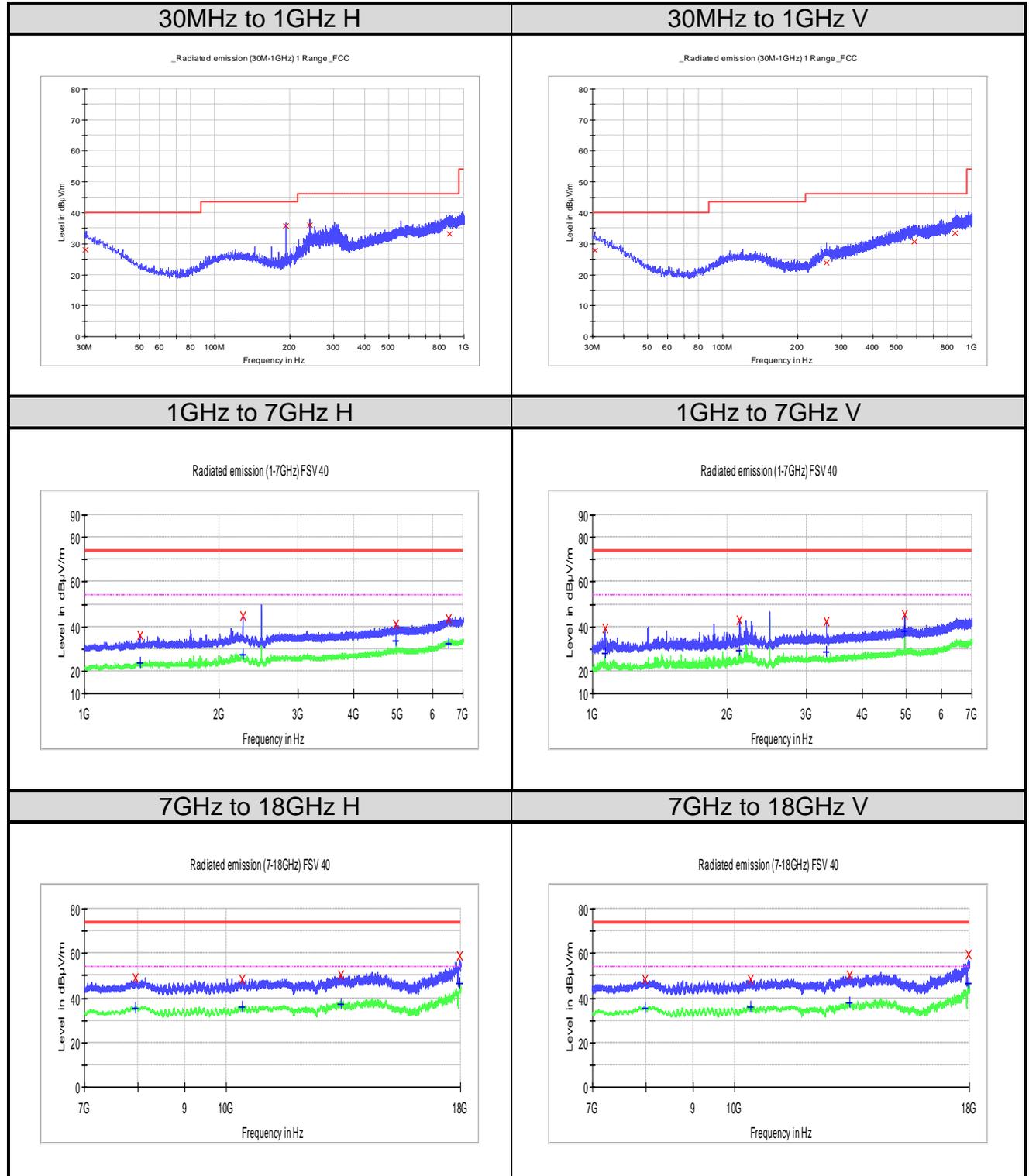
Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.848750	27.7	H	24.4	12.3	40.0
192.838750	35.6	H	15.9	7.9	43.5
240.853750	35.9	H	18.5	10.1	46.0
847.346250	33.2	H	28.9	12.8	46.0
31.697500	27.3	V	24.0	12.7	40.0
261.345000	23.8	V	20.9	22.2	46.0
607.513750	30.6	V	27.0	15.4	46.0
983.388750	34.0	V	29.8	20.0	54.0

PK

Frequency (MHz)	MaxPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1729.600000	39.0	H	-18.5	35.0	74.0
3274.300000	37.6	H	-14.4	36.4	74.0
4890.700000	42.3	H	-10.7	31.7	74.0
6618.100000	43.3	H	-7.1	30.7	74.0
8090.100000	47.2	H	-3.2	26.8	74.0
10407.800000	48.4	H	-1.8	25.6	74.0
13899.200000	50.9	H	1.5	23.1	74.0
17983.500000	59.4	H	13.1	14.6	74.0
1332.100000	41.9	V	-18.5	32.1	74.0
2130.400000	43.1	V	-16.2	30.9	74.0
4891.000000	46.1	V	-10.7	27.9	74.0
6532.900000	43.7	V	-7.0	30.3	74.0
8168.750000	47.2	V	-3.8	26.8	74.0
10415.500000	48.3	V	-1.8	25.7	74.0
14408.500000	52.1	V	3.4	21.9	74.0
17982.950000	59.6	V	13.1	14.4	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1729.600000	26.3	H	-18.5	27.7	54.0
3274.300000	25.6	H	-14.4	28.4	54.0
4890.700000	33.6	H	-10.7	20.4	54.0
6618.100000	33.7	H	-7.1	20.3	54.0
8090.100000	34.5	H	-3.2	19.5	54.0
10407.800000	35.7	H	-1.8	18.3	54.0
13899.200000	38.2	H	1.5	15.8	54.0
17983.500000	46.6	H	13.1	7.4	54.0
1332.100000	26.7	V	-18.5	27.3	54.0
2130.400000	28.4	V	-16.2	25.6	54.0
4891.000000	38.7	V	-10.7	15.3	54.0
6532.900000	32.9	V	-7.0	21.1	54.0
8168.750000	34.7	V	-3.8	19.3	54.0
10415.500000	35.5	V	-1.8	18.5	54.0
14408.500000	39.3	V	3.4	14.7	54.0
17982.950000	46.6	V	13.1	7.4	54.0

Figure 10: Radiated Spurious Emission, 2480MHz


Limit and Margin
QP

Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.121250	28.0	H	24.7	12.0	40.0
192.717500	35.8	H	15.9	7.7	43.5
240.853750	35.9	H	18.5	10.1	46.0
873.051250	33.3	H	28.7	12.7	46.0
30.606250	27.8	V	24.5	12.2	40.0
261.223750	23.8	V	20.8	22.2	46.0
587.386250	30.6	V	26.7	15.4	46.0
858.258750	33.3	V	28.9	12.7	46.0

PK

Frequency (MHz)	MaxPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1330.600000	36.2	H	-18.5	37.8	74.0
2259.400000	44.9	H	-15.3	29.1	74.0
4960.000000	40.9	H	-10.6	33.1	74.0
6508.900000	43.6	H	-7.0	30.4	74.0
7956.450000	48.7	H	-3.0	25.3	74.0
10403.950000	48.3	H	-1.8	25.7	74.0
13336.550000	50.1	H	0.9	23.9	74.0
17966.450000	59.0	H	12.8	15.0	74.0
1065.700000	39.1	V	-19.9	34.9	74.0
2129.200000	42.7	V	-16.2	31.3	74.0
3320.500000	42.0	V	-14.5	32.0	74.0
4958.800000	45.5	V	-10.6	28.5	74.0
7986.150000	48.4	V	-2.9	25.6	74.0
10408.900000	48.6	V	-1.8	25.4	74.0
13320.050000	50.2	V	1.0	23.8	74.0
17968.650000	59.3	V	12.8	14.7	74.0

AV

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1330.600000	23.7	H	-18.5	30.3	54.0
2259.400000	27.5	H	-15.3	26.5	54.0
4960.000000	33.5	H	-10.6	20.5	54.0
6508.900000	32.6	H	-7.0	21.4	54.0
7956.450000	35.4	H	-3.0	18.6	54.0
10403.950000	35.7	H	-1.8	18.3	54.0
13336.550000	37.0	H	0.9	17.0	54.0
17966.450000	46.4	H	12.8	7.6	54.0
1065.700000	27.7	V	-19.9	26.3	54.0
2129.200000	29.3	V	-16.2	24.7	54.0
3320.500000	28.6	V	-14.5	25.4	54.0
4958.800000	38.2	V	-10.6	15.8	54.0
7986.150000	35.4	V	-2.9	18.6	54.0
10408.900000	35.7	V	-1.8	18.3	54.0
13320.050000	37.6	V	1.0	16.4	54.0
17968.650000	46.6	V	12.8	7.4	54.0

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