

<b>Prüfbericht-Nr.:</b> Test report no.:	<b>CN25EF9D 001</b>	<b>Auftrags-Nr.:</b> Order no.:	326066359	Seite 1 von 41 Page 1 of 41
<b>Kunden-Referenz-Nr.:</b> Client reference no.:	1288983	<b>Auftragsdatum:</b> Order date:	2024-12-02	
<b>Auftraggeber:</b> Client:	<b>IKEA of Sweden AB</b> Box 702, SE-343 81 Älmhult, Sweden			
<b>Prüfgegenstand:</b> Test item:	Matter Air Quality Sensor			
<b>Bezeichnung / Typ-Nr.:</b> Identification / Type no.:	E2495			
<b>Auftrags-Inhalt:</b> Order content:	Test Report			
<b>Prüfgrundlage:</b> 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			
<b>Wareneingangsdatum:</b> Date of sample receipt:	2024-12-13	Refer to photo document.		
<b>Prüfmuster-Nr.:</b> Test sample no.:	A003864150-011~012			
<b>Prüfzeitraum:</b> Testing period:	2025-01-16 ~ 2025-02-13			
<b>Ort der Prüfung:</b> Place of testing:	TÜV Rheinland (Shanghai) Co., Ltd.			
<b>Prüflaboratorium:</b> Testing laboratory:	TÜV Rheinland (Shanghai) Co., Ltd.			
<b>Prüfergebnis*:</b> Test result*:	Pass			
<b>geprüft von:</b> tested by:	<input checked="" type="checkbox"/> <u>Hongfei Wu</u>	<b>genehmigt von:</b> authorized by:	<input checked="" type="checkbox"/> <u>Yanli Fan</u>	
<b>Datum:</b> Date:	2025-07-15 <small>Signed by: Hongfei Wu</small>	<b>Datum:</b> Date:	2025-07-15 <small>Signed by: Yanli Fan</small>	
<b>Stellung / Position:</b>	Sachverständige(r)/Expert	<b>Stellung / Position:</b>	Sachverständige(r)/Expert	
<b>Sonstiges / Other:</b>	FCC ID: FHO-E2495 IC: 10912A-E2495 HVIN: E2495 PMN: ALPSTUGA			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> 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
<p><b>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.</b> This test report only relates to the above mentioned 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.</p>				

Prüfbericht-Nr.: CN25EF9D 001  
Test report no.:

Seite 2 von 41  
Page 2 of 41

**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>
<p>2</p>	<p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: <a href="http://go.tuv.com/digital-signature">go.tuv.com/digital-signature</a></p> <p><i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: <a href="http://go.tuv.com/digital-signature">go.tuv.com/digital-signature</a></i></p>
<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.</i> <i>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: Pass***5.3.1 RADIATED BAND-EDGE***RESULT: Pass***5.3.2 RADIATED SPURIOUS EMISSION***RESULT: Pass*

## Contents

<b>1.</b>	<b>GENERAL REMARKS .....</b>	<b>5</b>
<b>1.1</b>	<b>COMPLEMENTARY MATERIALS.....</b>	<b>5</b>
<b>2.</b>	<b>TEST SITES .....</b>	<b>6</b>
<b>2.1</b>	<b>TEST FACILITIES.....</b>	<b>6</b>
<b>2.2</b>	<b>LIST OF TEST AND MEASUREMENT INSTRUMENTS.....</b>	<b>7</b>
<b>2.3</b>	<b>TRACEABILITY .....</b>	<b>7</b>
<b>2.4</b>	<b>CALIBRATION .....</b>	<b>7</b>
<b>2.5</b>	<b>MEASUREMENT UNCERTAINTY .....</b>	<b>8</b>
<b>3.</b>	<b>GENERAL PRODUCT INFORMATION.....</b>	<b>9</b>
<b>3.1</b>	<b>PRODUCT FUNCTION AND INTENDED USE .....</b>	<b>9</b>
<b>3.2</b>	<b>RATINGS AND SYSTEM DETAILS.....</b>	<b>9</b>
<b>3.3</b>	<b>INDEPENDENT OPERATION MODES.....</b>	<b>10</b>
<b>3.4</b>	<b>NOISE GENERATING AND NOISE SUPPRESSING PARTS .....</b>	<b>10</b>
<b>4.</b>	<b>TEST SET-UP AND OPERATION MODES.....</b>	<b>11</b>
<b>4.1</b>	<b>PRINCIPLE OF CONFIGURATION SELECTION .....</b>	<b>11</b>
<b>4.2</b>	<b>TEST OPERATION AND TEST SOFTWARE.....</b>	<b>11</b>
<b>4.3</b>	<b>SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT .....</b>	<b>11</b>
<b>4.4</b>	<b>COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....</b>	<b>11</b>
<b>5.</b>	<b>TEST RESULTS .....</b>	<b>12</b>
<b>5.1</b>	<b>CONDUCTED TESTING AT ANTENNA PORT .....</b>	<b>12</b>
5.1.1	<i>Antenna Requirement.....</i>	<i>12</i>
5.1.2	<i>6dB &amp; 99% Bandwidth.....</i>	<i>14</i>
5.1.3	<i>Output Power .....</i>	<i>21</i>
5.1.4	<i>Power Spectral Density .....</i>	<i>22</i>
5.1.5	<i>Conducted Band Edge and out-of Band Emissions.....</i>	<i>26</i>
<b>5.2</b>	<b>EMISSION IN THE FREQUENCY RANGE UP TO 30MHZ.....</b>	<b>28</b>
5.2.1	<i>Conducted Emission.....</i>	<i>28</i>
<b>5.3</b>	<b>EMISSION IN THE FREQUENCY RANGE ABOVE 30MHZ .....</b>	<b>31</b>
5.3.1	<i>Radiated Band-Edge .....</i>	<i>31</i>
5.3.2	<i>Radiated Spurious Emission.....</i>	<i>34</i>
<b>6.</b>	<b>LIST OF TABLES .....</b>	<b>41</b>
<b>7.</b>	<b>LIST OF FIGURES .....</b>	<b>41</b>

## 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	03.12.2028
G1811425	Bilog antenna	CBL 6112D	Teseq	20.04.2026
G1825371	Preamplifier	EMC051845SE	Taiwan EMCI	24.07.2025
G1825372	Preamplifier	EMC184045SE	Taiwan EMCI	24.07.2025
9059157	Double ridged broadband horn antenna	BBHA 9120 D	Schwarzbeck	16.03.2025
G1831065	Broadband horn antenna	BBHA 9170	Schwarzbeck	18.06.2028
G1822702	Spectrum analyser	FSV40	Rohde&Schwarz	15.07.2025
9053474	Signal generator	SMB100B (6 GHz)	Rohde & Schwarz	10.12.2025
9053476	Vector Signal generator	SMW200A	Rohde & Schwarz	10.12.2025
9053477	OSP	OSP-B157W8	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	10.055x3.605x3.00	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				
	EMC measurement software	EMC32 (Ver 10.60.20)	Rohde&Schwarz	NA
	EMC measurement software	EMC32 (Ver 11.40.00)	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	±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 Matter Air Quality Sensor which supports Bluetooth and Thread.

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

#### 3.2 Ratings and System Details

**Table 3: Technical Specification of EUT**

General Description of EUT	
Product Name:	Matter Air Quality Sensor
Model No.:	E2495
Operation Voltage:	DC 5V (powered by USB)
Test Voltage:	DC 3.3V for RF conducted and radiated test AC 120V, 60Hz (by adapter) for conducted emission test
RF Technical:	1) BLE 2) Thread
Technical Specification of BLE	
Frequency Range:	2402~2480MHz
Modulation Type:	GFSK
Data Rate:	1Mbps
Antenna Type:	PCB Antenna
Antenna Gain:	-1.19 dBi (provided by client)

**Table 4: Operation Channel List**

RF Channel	Frequency [MHz]						
<b>00</b>	<b>2402</b>	10	2422	20	2442	30	2462
01	2404	11	2424	21	2444	31	2464
02	2406	12	2426	22	2446	32	2466
03	2408	13	2428	23	2448	33	2468
04	2410	14	2430	24	2450	34	2470
05	2412	15	2432	25	2452	35	2472
06	2414	16	2434	26	2454	36	2474
07	2416	17	2436	27	2456	37	2476
08	2418	18	2438	28	2458	38	2478
09	2420	<b>19</b>	<b>2440</b>	29	2460	<b>39</b>	<b>2480</b>

### 3.3 Independent Operation Modes

Test frequencies are lowest channel: 2402 MHz, middle channel: 2440 MHz and highest channel: 2480 MHz

The basic operation modes are:

A. BLE transmitting 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: sscm 5.13.1

**Table 5: Power parameter value**

Mode	Power Parameter Setting Value
BLE	3 dBm

### 4.3 Special Accessories and Auxiliary Equipment

**Table 6: Auxiliary Equipment**

Equipment	Manufacturer	Model
Laptop	Lenovo	21AJ-S57N0J
Adapter	Huawei	HW-050450C00

### 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 PCB antenna, the directional gain of antenna is -1.19 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

**Prüfbericht - Nr.: CN25EF9D 001**  
Test Report No.**Seite 13 von 41**  
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:	-1.19 dBi

Verdict: Pass

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

Date of testing : 2025-02-05  
Ambient temperature : 20.2°C  
Relative humidity : 45.3%  
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

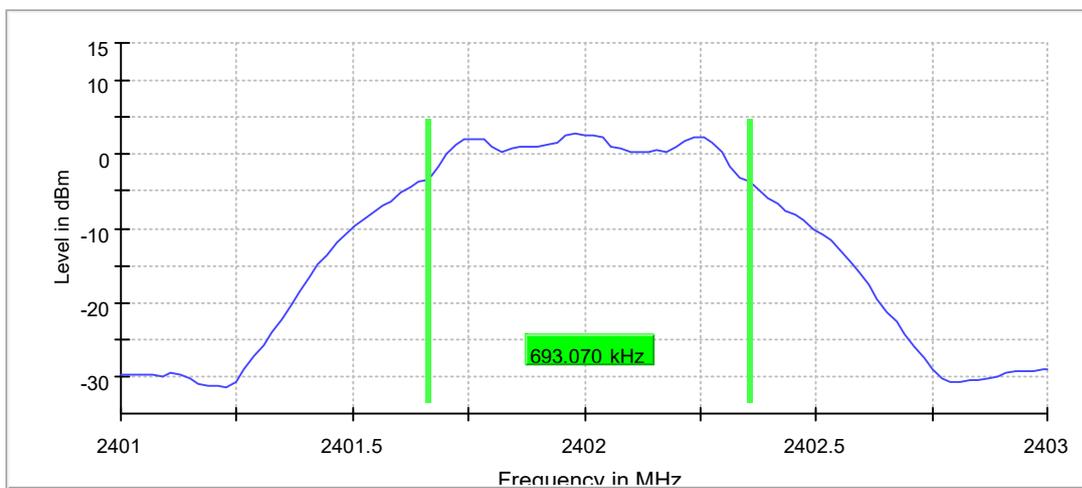
**6dB Bandwidth, 2402MHz**

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	0.693070	0.500000	---	2401.663366	2402.356436

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2402.000000	2.8	PASS

6 dB Bandwidth


**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
Sweeptime	18.938 $\mu$ 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	7 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.12 dB	0.50 dB

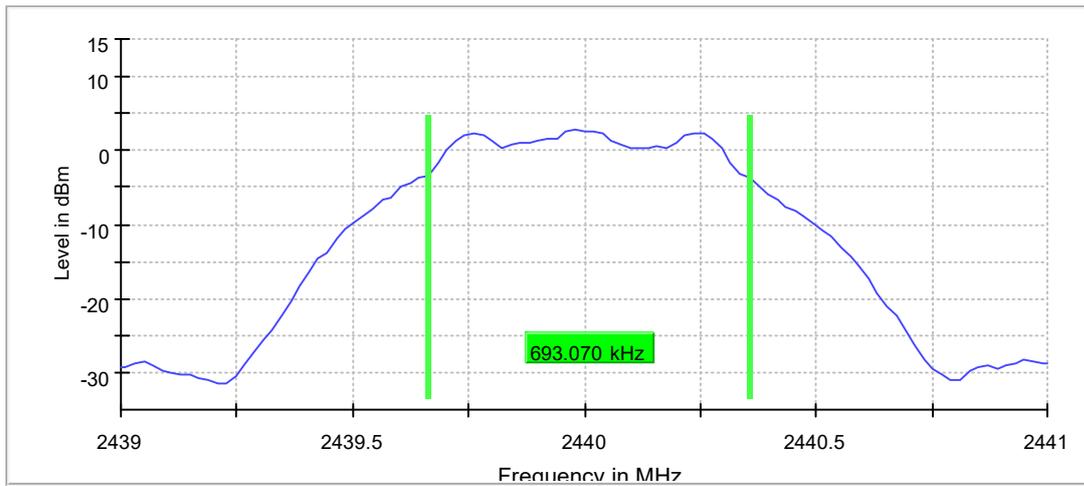
**6dB Bandwidth, 2440MHz**

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	0.693070	0.500000	---	2439.663366	2440.356436

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	2.8	PASS

6 dB Bandwidth


**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
Sweptime	18.938 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	10 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.02 dB	0.50 dB

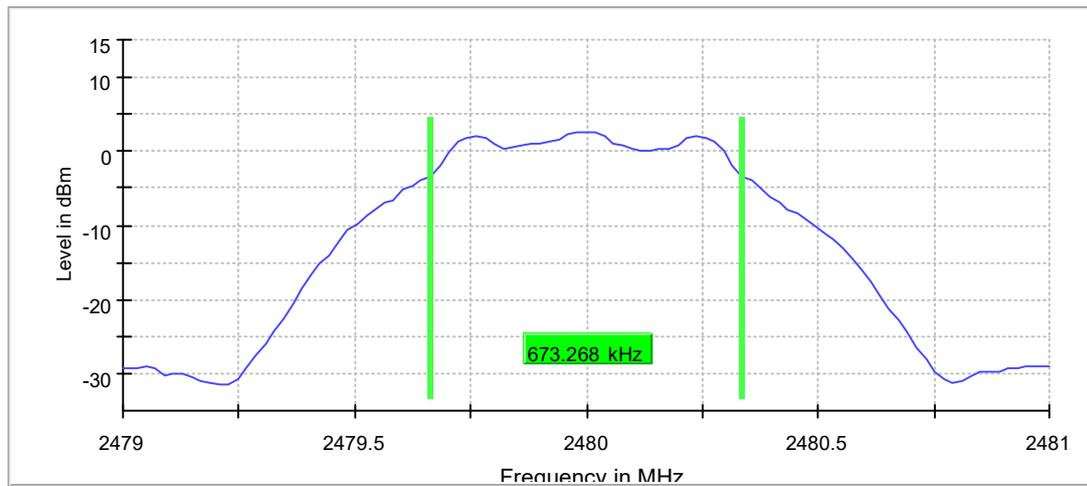
**6dB Bandwidth, 2480MHz**

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	0.673268	0.500000	---	2479.663366	2480.336634

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

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	2.6	PASS

6 dB Bandwidth


**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 40
Sweptime	18.938 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	8 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.02 dB	0.50 dB

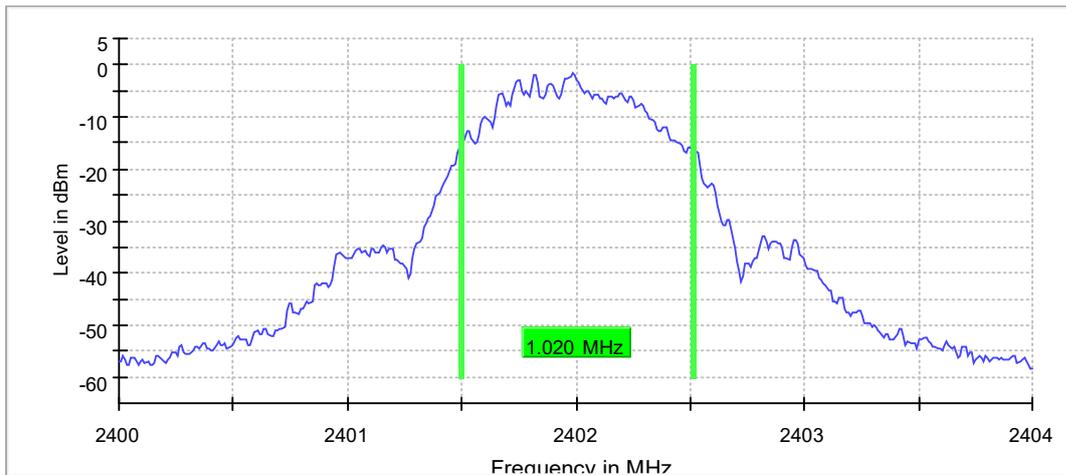
**99% Occupied Channel Bandwidth, 2402MHz**

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2402.000000	1.020000	---	---	2401.495000	2402.515000

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

DUT Frequency (MHz)	Result
2402.000000	PASS

99 % Bandwidth


**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.40400 GHz	2.40400 GHz
Span	4.000 MHz	4.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	400	~ 400
Sweeptime	94.824 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	5 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.08 dB	0.30 dB

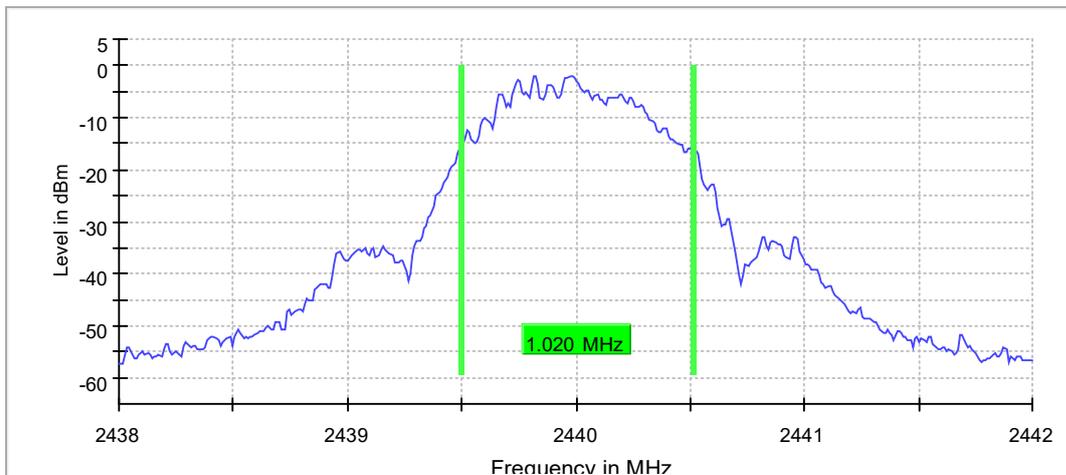
**99% Occupied Channel Bandwidth, 2440MHz**

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	1.020000	---	---	2439.495000	2440.515000

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

DUT Frequency (MHz)	Result
2440.000000	PASS

99 % Bandwidth


**Measurement**

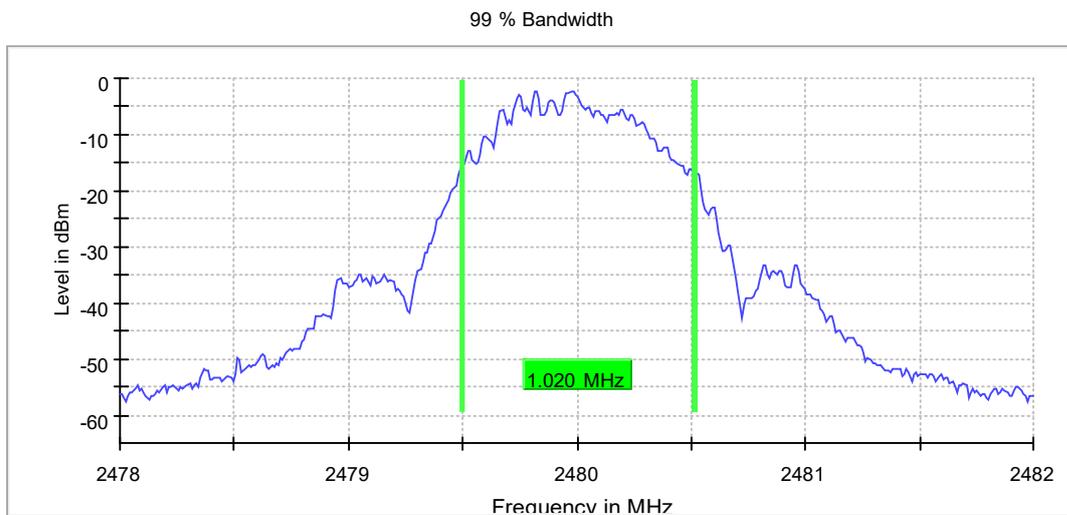
Setting	Instrument Value	Target Value
Start Frequency	2.43800 GHz	2.43800 GHz
Stop Frequency	2.44200 GHz	2.44200 GHz
Span	4.000 MHz	4.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	400	~ 400
Sweptime	94.824 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 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	6 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.05 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	1.020000	---	---	2479.495000	2480.515000

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

DUT Frequency (MHz)	Result
2480.000000	PASS


**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.47800 GHz	2.47800 GHz
Stop Frequency	2.48200 GHz	2.48200 GHz
Span	4.000 MHz	4.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	400	~ 400
Sweptime	94.824 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	6 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.03 dB	0.30 dB



## 5.1.4 Power Spectral Density

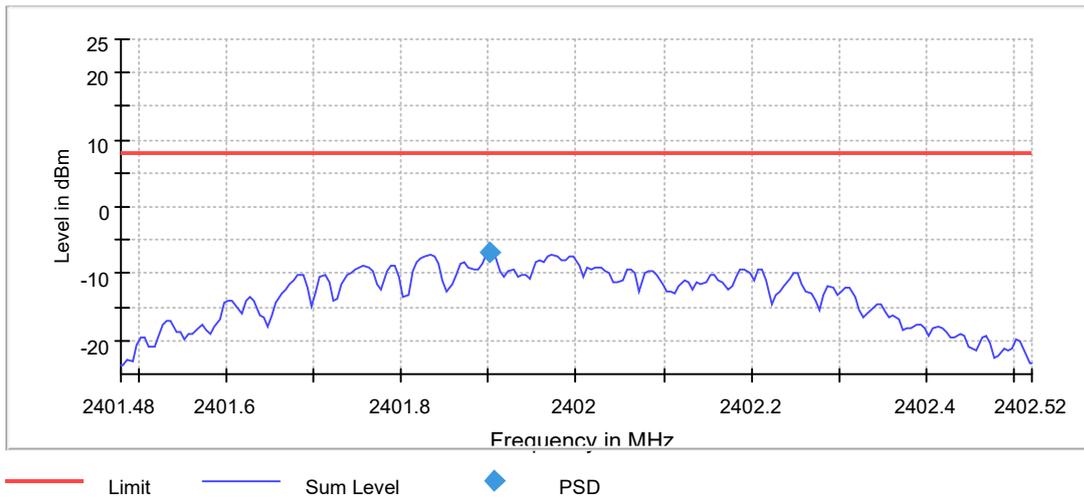
**RESULT:****Pass**

Date of testing : 2025-02-05  
Ambient temperature : 20.2°C  
Relative humidity : 45.3%  
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, 2402MHz**

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2401.902537	-6.943	8.0	PASS

Peak Power Spectral Density

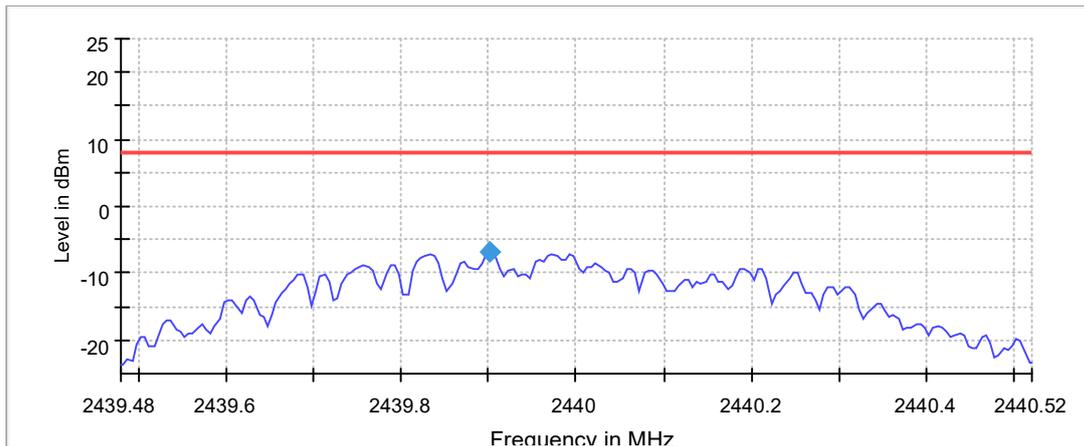

**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.40148 GHz	2.40148 GHz
Stop Frequency	2.40252 GHz	2.40252 GHz
Span	1.040 MHz	1.040 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	208	~ 208
Sweptime	1.040 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	6 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.05 dB	0.50 dB

**Power Spectral Density, 2440MHz**

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2439.902537	-6.920	8.0	<b>PASS</b>

Peak Power Spectral Density



— Limit   
 — Sum Level   
 ◆ PSD

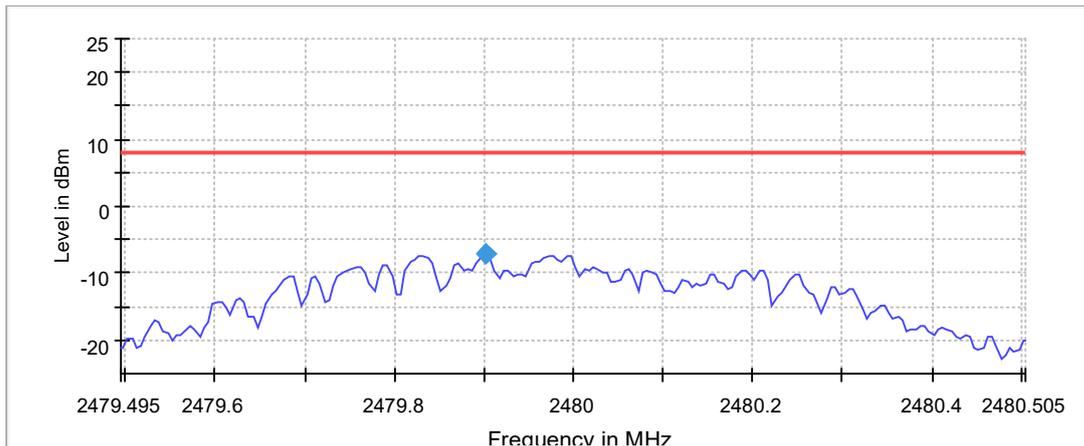
**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.43948 GHz	2.43948 GHz
Stop Frequency	2.44052 GHz	2.44052 GHz
Span	1.040 MHz	1.040 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	208	~ 208
Sweeptime	1.040 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	5 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.03 dB	0.50 dB

**Power Spectral Density, 2480MHz**

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2479.902509	-7.077	8.0	<b>PASS</b>

Peak Power Spectral Density

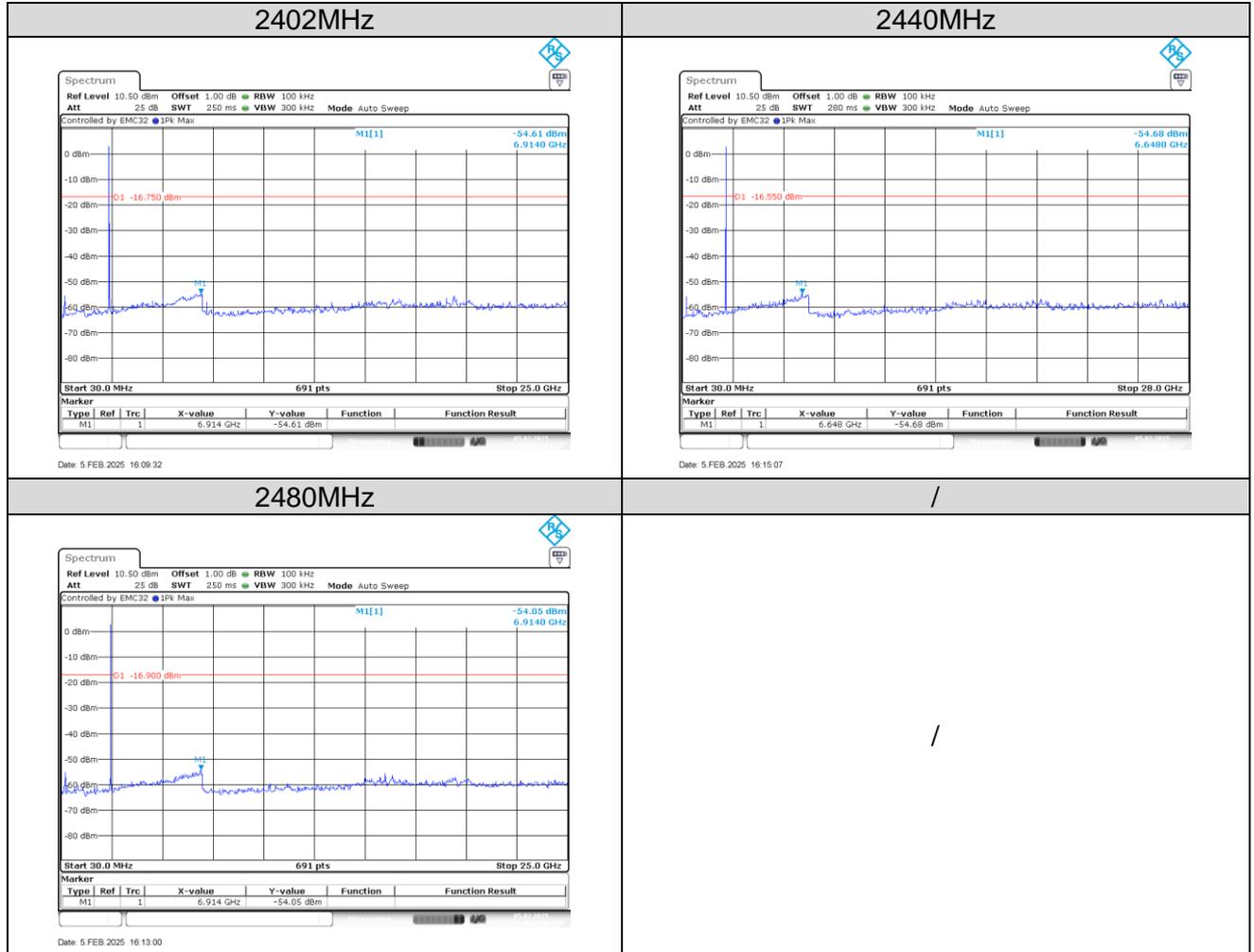
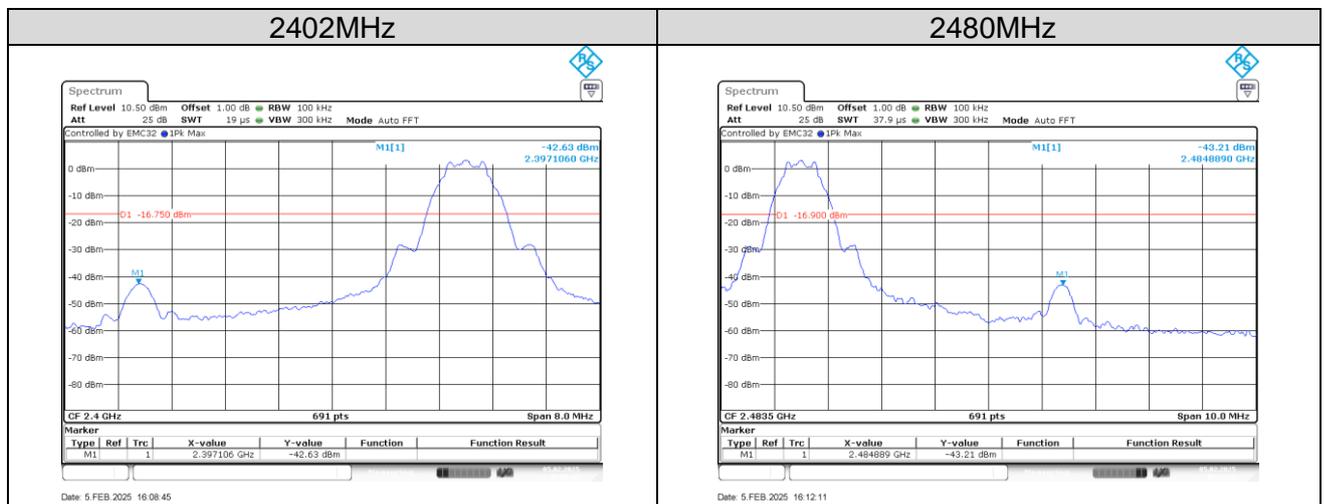


— Limit      — Sum Level      ◆ PSD

**Measurement**

Setting	Instrument Value	Target Value
Start Frequency	2.47950 GHz	2.47950 GHz
Stop Frequency	2.48050 GHz	2.48050 GHz
Span	1.010 MHz	1.010 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	202	~ 202
Sweeptime	1.010 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	4 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.04 dB	0.50 dB



**Figure 2: Conducted Spurious Emission**

**Figure 3: Conducted Band Edge**


## 5.2 Emission in the Frequency Range up to 30MHz

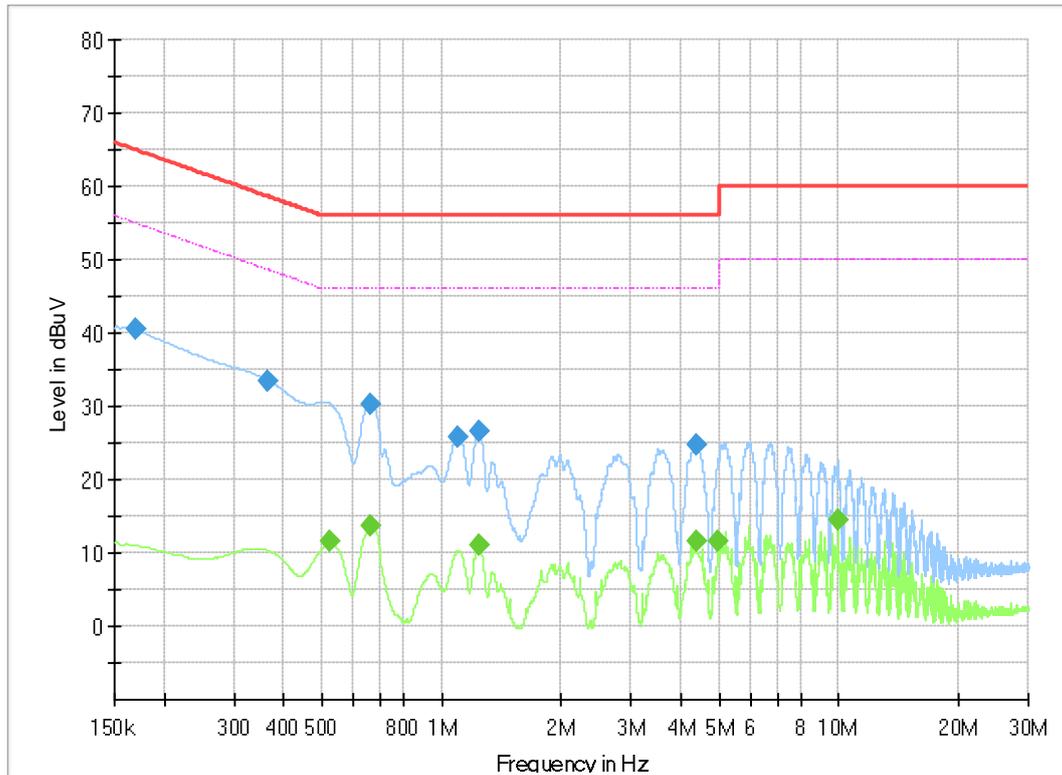
### 5.2.1 Conducted Emission

**RESULT:****Pass**

Date of testing : 2025-02-13  
Ambient temperature : 22.4°C  
Relative humidity : 54.2%  
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 (powered by adapter)  
Test modes applied : A

**Figure 4: Conducted Emission, L**

Full Spectrum


**Final\_Result\_QPK**

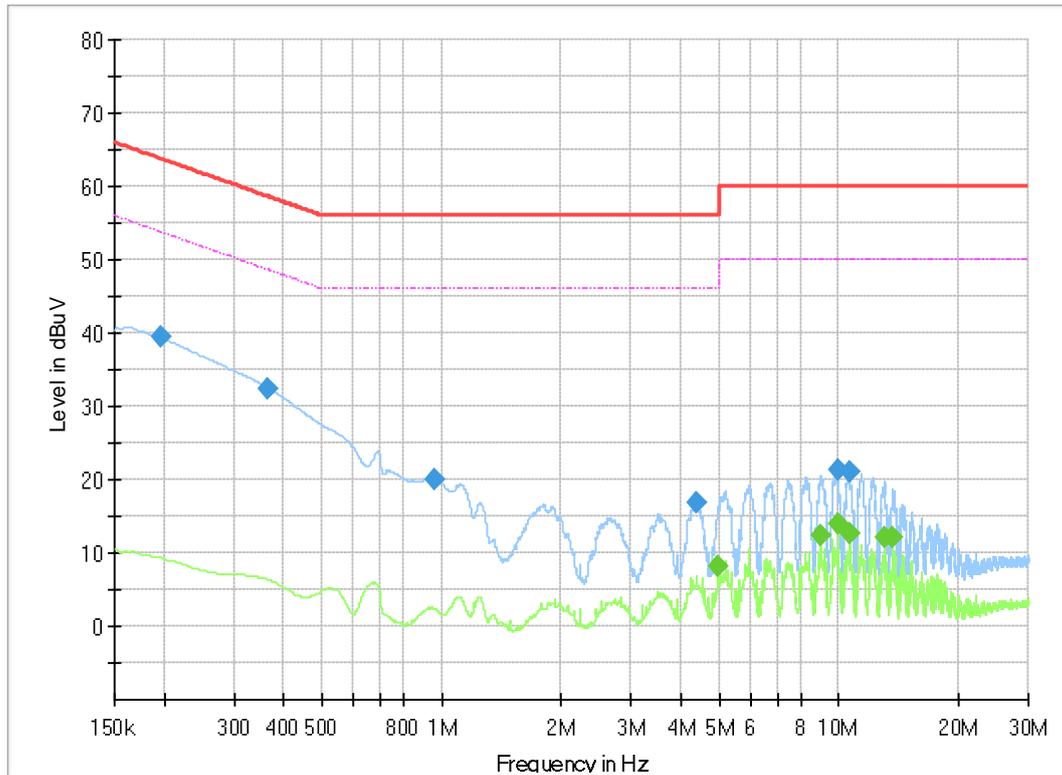
Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170250	40.42	64.95	24.53	1000.0	9.000	L1	10.3
0.363750	33.32	58.64	25.32	1000.0	9.000	L1	10.3
0.663000	30.39	56.00	25.61	1000.0	9.000	L1	10.3
1.099500	25.87	56.00	30.13	1000.0	9.000	L1	10.6
1.236750	26.48	56.00	29.52	1000.0	9.000	L1	10.5
4.375500	24.71	56.00	31.29	1000.0	9.000	L1	10.3

**Final\_Result\_CAV**

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.521250	11.51	46.00	34.49	1000.0	9.000	L1	10.3
0.663000	13.75	46.00	32.25	1000.0	9.000	L1	10.3
1.239000	11.14	46.00	34.86	1000.0	9.000	L1	10.5
4.377750	11.58	46.00	34.42	1000.0	9.000	L1	10.3
4.971750	11.51	46.00	34.49	1000.0	9.000	L1	10.3
9.942000	14.42	50.00	35.58	1000.0	9.000	L1	10.8

**Figure 5: Conducted Emission, N**

Full Spectrum


**Final\_Result\_QPK**

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.197250	39.42	63.73	24.30	1000.0	9.000	N	10.8
0.363750	32.43	58.64	26.21	1000.0	9.000	N	10.4
0.957750	19.89	56.00	36.11	1000.0	9.000	N	10.4
4.377750	16.82	56.00	39.18	1000.0	9.000	N	10.7
9.939750	21.43	60.00	38.57	1000.0	9.000	N	11.1
10.608000	21.18	60.00	38.82	1000.0	9.000	N	11.1

**Final\_Result\_CAV**

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
4.969500	8.25	46.00	37.75	1000.0	9.000	N	10.7
8.976750	12.33	50.00	37.67	1000.0	9.000	N	10.9
9.939750	13.98	50.00	36.02	1000.0	9.000	N	11.1
10.608000	12.52	50.00	37.48	1000.0	9.000	N	11.1
13.056000	12.10	50.00	37.90	1000.0	9.000	N	11.1
13.650000	12.03	50.00	37.97	1000.0	9.000	N	11.1

## 5.3 Emission in the Frequency Range above 30MHz

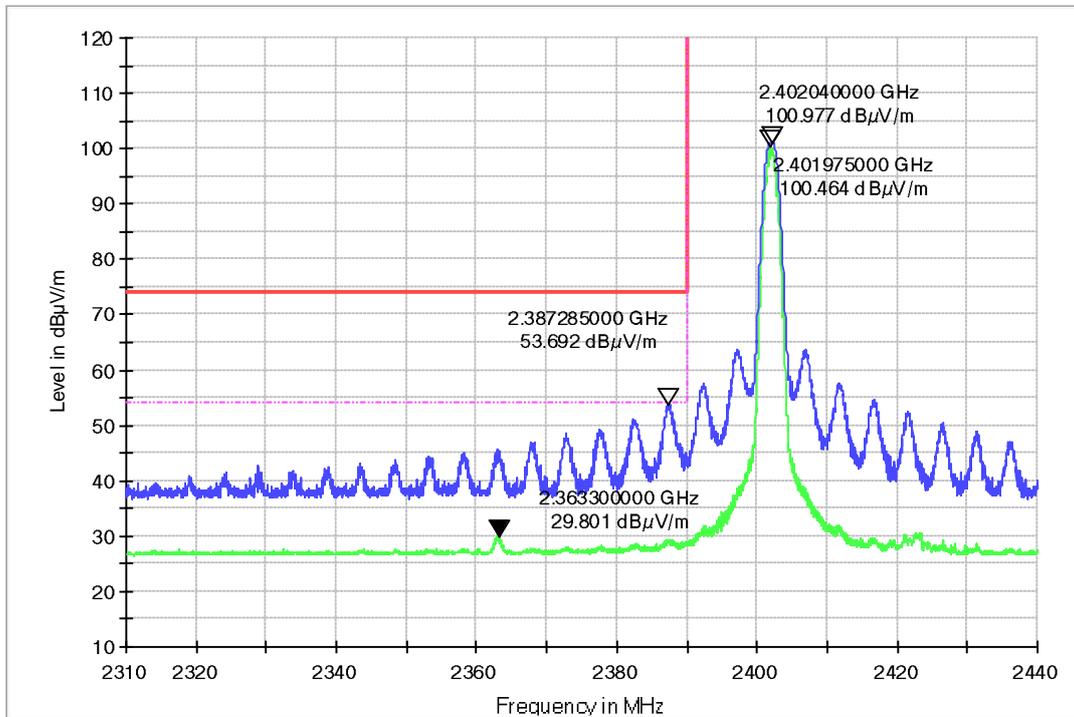
### 5.3.1 Radiated Band-Edge

**RESULT:****Pass**

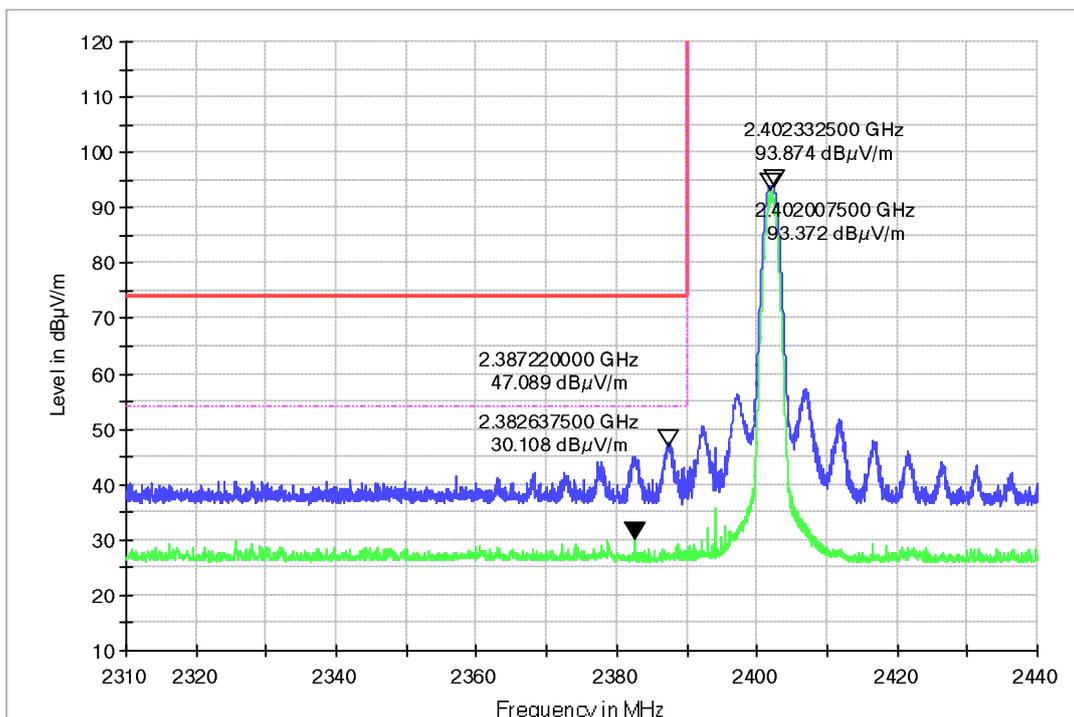
Date of testing	:	2025-01-16
Ambient temperature	:	20.1°C
Relative humidity	:	47.2%
Atmospheric pressure	:	101kPa
Test requirement	:	FCC Part 15.247(d) FCC Part 15.205(a) FCC Part 15.209(a) RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.9 RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.10 RSS-247 Issue 3, August 2023, Clause 5.5
Test procedure	:	ANSI C63.10: 2013
Test voltage	:	DC 3.3V
Test modes applied	:	A

**Figure 6: Radiated Band-Edge, 2402MHz, H**

Copy of 2310` 2410 BE 1-18GHz\_HL050\_FSV40\_Pre

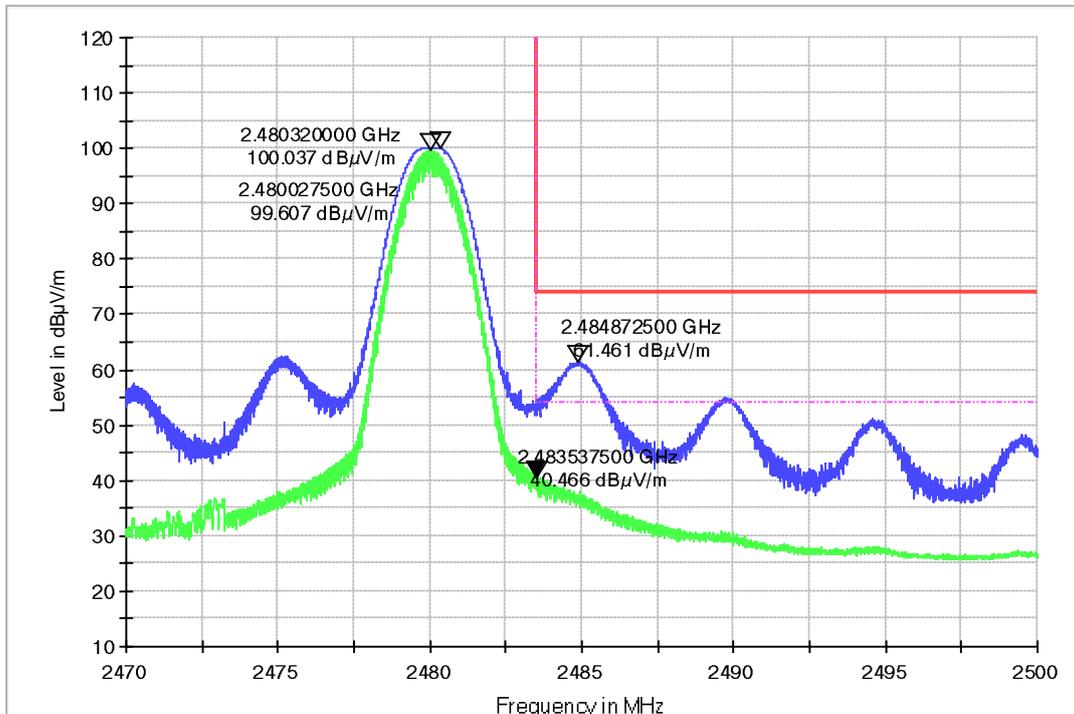

**Figure 7: Radiated Band-Edge, 2402MHz, V**

Copy of 2310` 2410 BE 1-18GHz\_HL050\_FSV40\_Pre

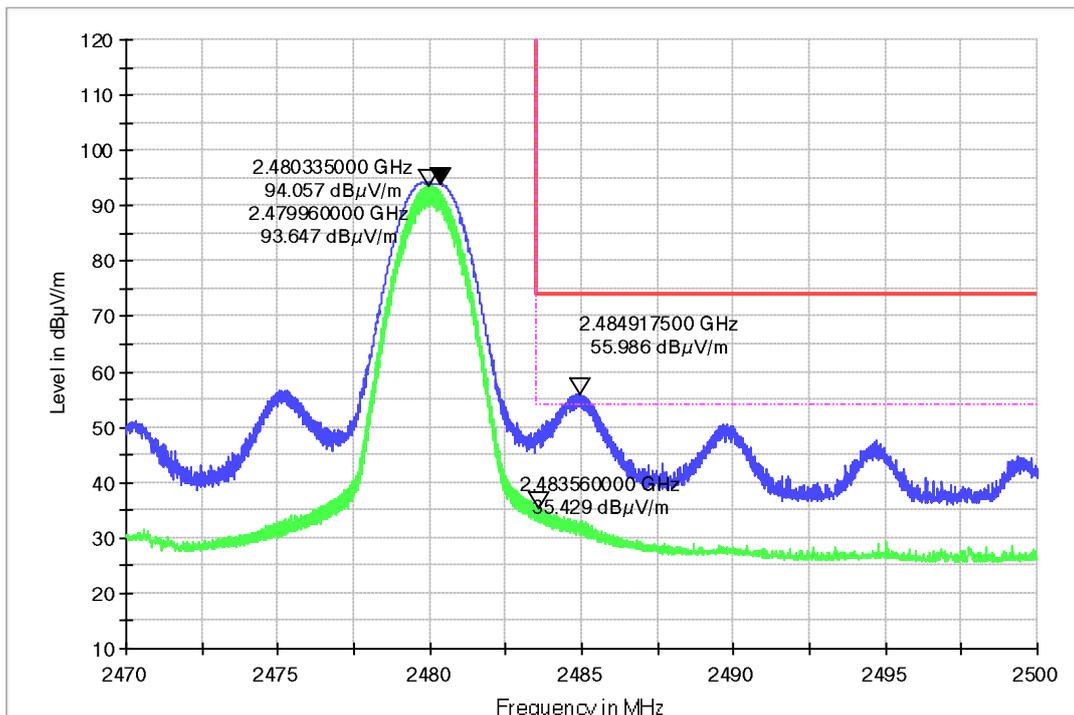


**Figure 8: Radiated Band-Edge, 2480MHz, H**

Copy of 2470~ 2500 BE\_1-18GHz\_HL050\_FSV40\_Pre


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

Copy of 2470~ 2500 BE\_1-18GHz\_HL050\_FSV40\_Pre



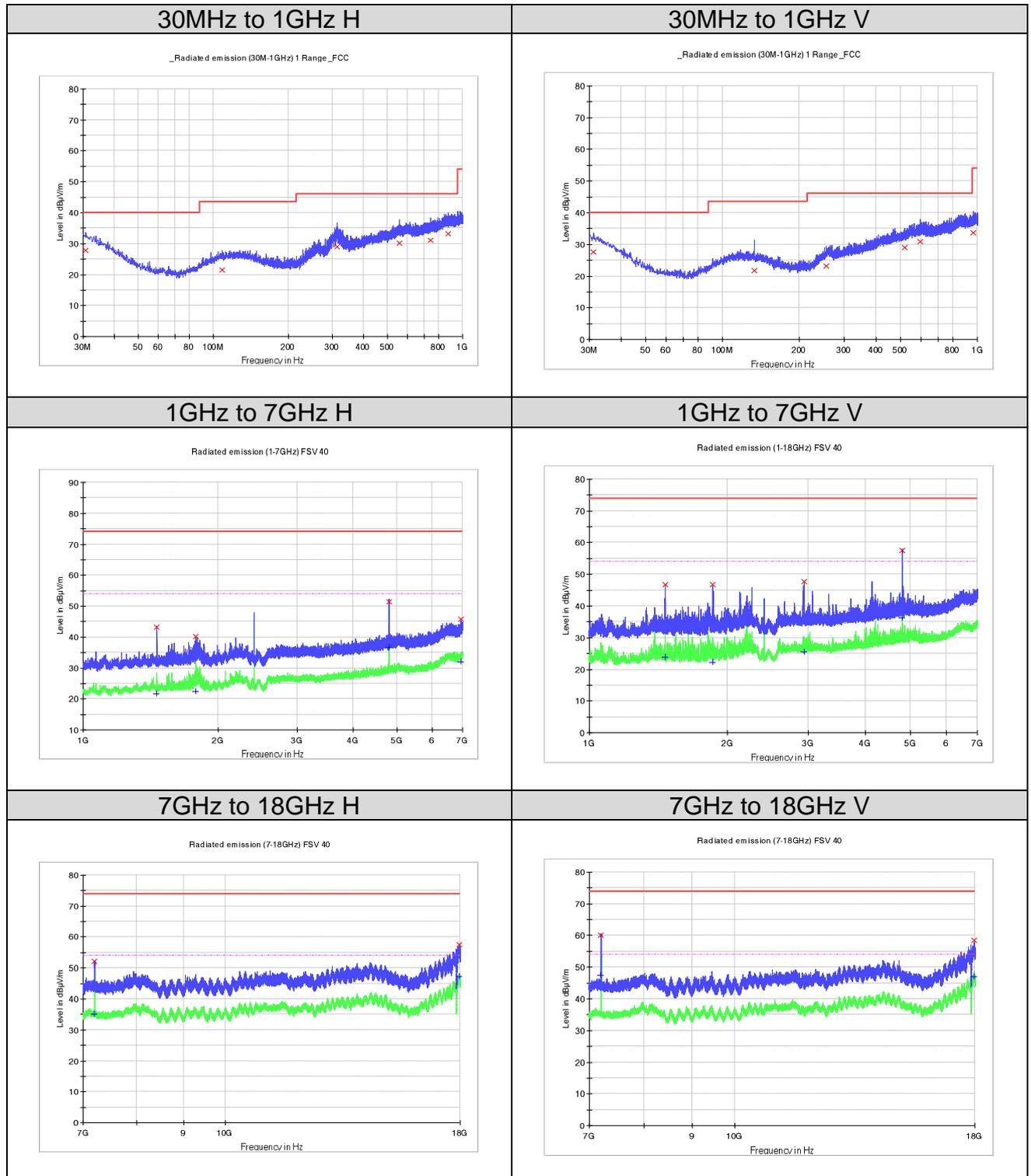
### 5.3.2 Radiated Spurious Emission

**RESULT:****Pass**

Date of testing : 2025-01-16  
Ambient temperature : 20.2°C  
Relative humidity : 47.3%  
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, 2402MHz**


**Limit and Margin**  
**QP**

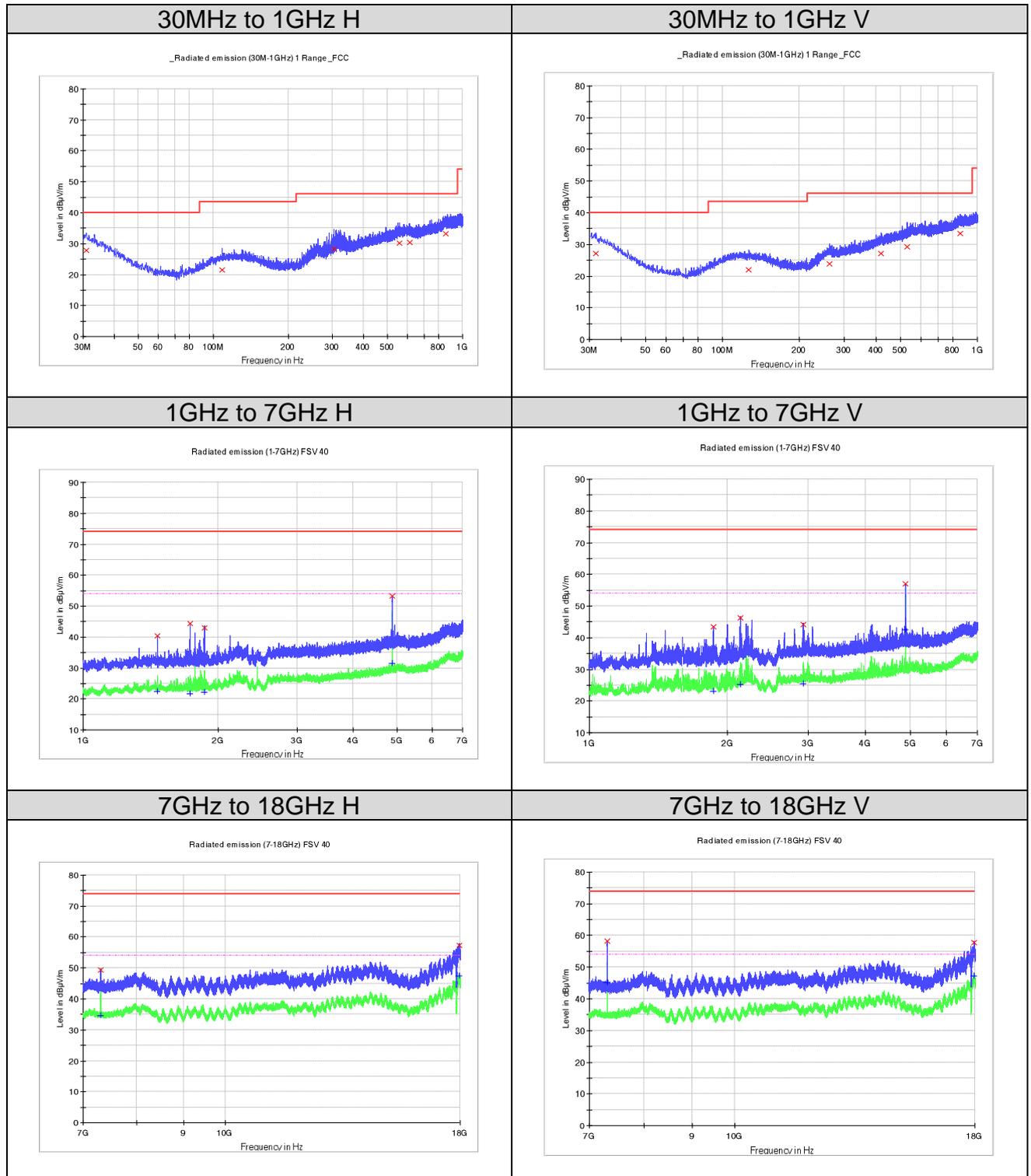
Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.727500	27.8	H	24.5	12.2	40.0
108.570000	21.6	H	18.5	22.0	43.5
313.482500	28.9	H	20.7	17.1	46.0
556.346250	30.3	H	26.7	15.8	46.0
744.283750	31.2	H	27.7	14.8	46.0
875.112500	33.3	H	28.6	12.7	46.0
31.212500	27.6	V	24.3	12.4	40.0
133.305000	21.8	V	18.5	21.7	43.5
254.797500	23.1	V	20.1	22.9	46.0
517.667500	29.0	V	25.6	17.0	46.0
597.086250	30.9	V	26.9	15.1	46.0
963.018750	33.7	V	29.5	20.3	54.0

**PK**

Frequency (MHz)	MaxPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1460.500000	43.3	H	-18.7	30.8	74.0
1785.400000	40.2	H	-18.8	33.8	74.0
4804.600000	51.5	H	-11.4	22.5	74.0
6952.300000	45.7	H	-7.1	28.3	74.0
7205.218750	52.2	H	-6.1	21.8	74.0
17968.718750	57.5	H	11.8	16.5	74.0
1464.812500	46.7	V	-18.7	27.3	74.0
1859.875000	46.7	V	-18.4	27.3	74.0
2932.375000	47.7	V	-15.1	26.3	74.0
4803.437500	57.6	V	-11.4	16.4	74.0
7205.218750	60.0	V	-6.1	14.0	74.0
17952.562500	58.6	V	11.5	15.4	74.0

**AV**

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1460.500000	21.7	H	-18.7	32.3	54.0
1785.400000	22.4	H	-18.8	31.6	54.0
4804.600000	36.6	H	-11.4	17.5	54.0
6952.300000	32.1	H	-7.1	21.9	54.0
7205.218750	35.1	H	-6.1	18.9	54.0
17968.718750	47.2	H	11.8	6.8	54.0
1464.812500	23.9	V	-18.7	30.1	54.0
1859.875000	22.1	V	-18.4	31.9	54.0
2932.375000	25.5	V	-15.1	28.5	54.0
4803.437500	36.2	V	-11.4	17.8	54.0
7205.218750	47.6	V	-6.1	6.4	54.0
17952.562500	47.0	V	11.5	7.1	54.0

**Figure 11: Radiated Spurious Emission, 2440MHz**


**Limit and Margin**  
**QP**

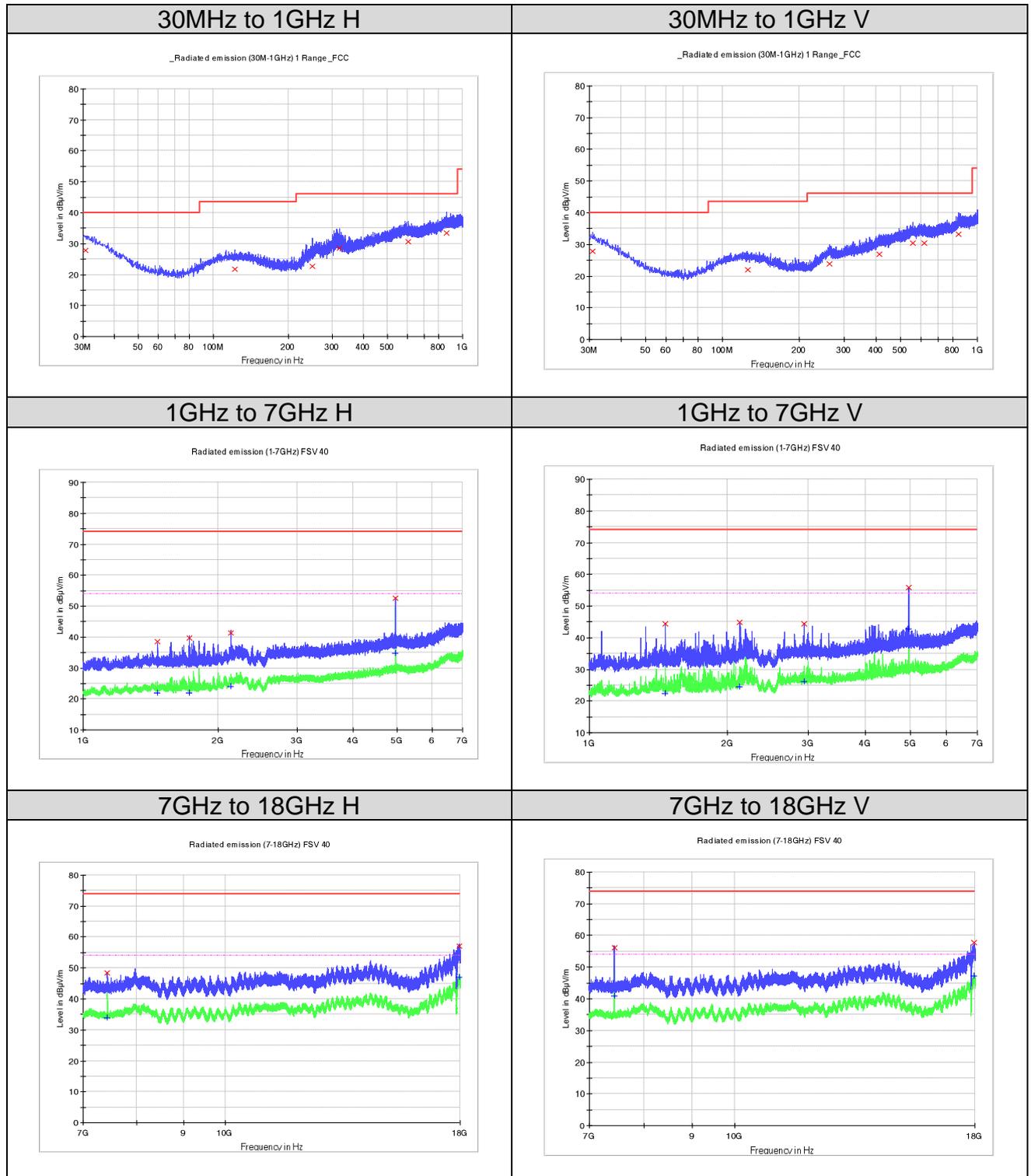
Frequency (MHz)	QuasiPeak (dBµV/m)	Pol	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.970000	27.8	H	24.4	12.3	40.0
108.327500	21.5	H	18.5	22.0	43.5
305.237500	28.2	H	20.4	17.8	46.0
556.831250	30.2	H	26.7	15.8	46.0
615.031250	30.5	H	27.0	15.5	46.0
854.621250	33.3	H	29.0	12.7	46.0
31.940000	27.2	V	23.9	12.8	40.0
127.000000	21.9	V	18.7	21.6	43.5
263.042500	23.9	V	20.8	22.1	46.0
418.727500	27.3	V	23.9	18.8	46.0
530.762500	29.3	V	25.8	16.7	46.0
859.228750	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)
1464.400000	40.4	H	-18.7	33.6	74.0
1732.900000	44.3	H	-18.9	29.7	74.0
1862.500000	43.0	H	-18.4	31.0	74.0
4879.300000	53.4	H	-11.3	20.6	74.0
7320.031250	49.2	H	-6.6	24.8	74.0
17963.906250	57.3	H	11.7	16.7	74.0
1861.900000	43.5	V	-18.4	30.5	74.0
2133.100000	46.3	V	-16.5	27.7	74.0
2920.900000	44.2	V	-15.1	29.8	74.0
4880.500000	57.0	V	-11.3	17.0	74.0
7319.343750	58.3	V	-6.6	15.8	74.0
17960.125000	57.9	V	11.7	16.1	74.0

**AV**

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1464.400000	22.3	H	-18.7	31.7	54.0
1732.900000	21.6	H	-18.9	32.4	54.0
1862.500000	22.1	H	-18.4	31.9	54.0
4879.300000	31.4	H	-11.3	22.6	54.0
7320.031250	34.7	H	-6.6	19.3	54.0
17963.906250	47.4	H	11.7	6.6	54.0
1861.900000	23.2	V	-18.4	30.8	54.0
2133.100000	25.2	V	-16.5	28.8	54.0
2920.900000	25.4	V	-15.1	28.6	54.0
4880.500000	42.4	V	-11.3	11.6	54.0
7319.343750	45.1	V	-6.6	8.9	54.0
17960.125000	47.3	V	11.7	6.7	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)
30.727500	27.9	H	24.5	12.2	40.0
121.543750	21.9	H	18.8	21.7	43.5
250.068750	22.7	H	19.5	23.3	46.0
320.030000	28.6	H	20.9	17.4	46.0
606.665000	30.5	H	27.0	15.5	46.0
859.713750	33.4	H	28.9	12.6	46.0
30.970000	27.7	V	24.4	12.3	40.0
126.030000	21.9	V	18.7	21.6	43.5
263.527500	23.9	V	20.8	22.1	46.0
411.331250	26.9	V	23.6	19.1	46.0
558.407500	30.4	V	26.6	15.6	46.0
620.245000	30.5	V	26.9	15.6	46.0
844.557500	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)
1462.600000	38.5	H	-18.7	35.5	74.0
1726.600000	39.8	H	-18.9	34.3	74.0
2130.100000	41.3	H	-16.6	32.7	74.0
4960.300000	52.5	H	-11.1	21.5	74.0
7439.312500	48.3	H	-6.1	25.7	74.0
17953.250000	57.0	H	11.5	17.0	74.0
1461.700000	44.5	V	-18.7	29.5	74.0
2126.500000	44.9	V	-16.6	29.1	74.0
2932.300000	44.5	V	-15.1	29.5	74.0
4959.700000	55.9	V	-11.2	18.1	74.0
7440.687500	56.1	V	-6.0	17.9	74.0
17955.656250	57.9	V	11.6	16.1	74.0

**AV**

Frequency (MHz)	Average (dBµV/m)	Pol	Corr. (dB/m)	Margin - AVG (dB)	Limit - AVG (dBµV/m)
1462.600000	22.0	H	-18.7	32.0	54.0
1726.600000	21.8	H	-18.9	32.2	54.0
2130.100000	24.0	H	-16.6	30.0	54.0
4960.300000	34.7	H	-11.1	19.3	54.0
7439.312500	34.0	H	-6.1	20.1	54.0
17953.250000	47.0	H	11.5	7.1	54.0
1461.700000	22.5	V	-18.7	31.5	54.0
2126.500000	24.6	V	-16.6	29.4	54.0
2932.300000	26.1	V	-15.1	28.0	54.0
4959.700000	42.8	V	-11.2	11.2	54.0
7440.687500	40.9	V	-6.0	13.2	54.0
17955.656250	47.2	V	11.6	6.8	54.0

## 6. List of Tables

Table 1: List of Test and Measurement Equipment .....	7
Table 2: Measurement Uncertainty .....	8
Table 3: Technical Specification of EUT .....	9
Table 4: Operation Channel List .....	10
Table 5: Power parameter value.....	11
Table 6: Auxiliary Equipment.....	11
Table 7: Antenna Requirement.....	12
Table 8: Peak Output Power .....	21

## 7. List of Figures

Figure 1: Reference level .....	26
Figure 2: Conducted Spurious Emission.....	27
Figure 3: Conducted Band Edge .....	27
Figure 4: Conducted Emission, L.....	29
Figure 5: Conducted Emission, N.....	30
Figure 6: Radiated Band-Edge, 2402MHz, H.....	32
Figure 7: Radiated Band-Edge, 2402MHz, V .....	32
Figure 8: Radiated Band-Edge, 2480MHz, H.....	33
Figure 9: Radiated Band-Edge, 2480MHz, V .....	33
Figure 10: Radiated Spurious Emission, 2402MHz .....	35
Figure 11: Radiated Spurious Emission, 2440MHz .....	37
Figure 12: Radiated Spurious Emission, 2480MHz .....	39