

|                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                   |                                      |                                          |                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------|--------------------------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CN23CF7A 001</b>                                                                                                                               | <b>Auftrags-Nr.:</b><br>Order no.:   | <b>244490783</b>                         | <b>Seite 1 von 49</b><br>Page 1 of 49            |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                                                                | <b>1288983</b>                                                                                                                                    | <b>Auftragsdatum:</b><br>Order date: | <b>2023-01-08</b>                        |                                                  |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>IKEA of Sweden AB</b><br>Box 702, Almhult, Sweden                                                                                              |                                      |                                          |                                                  |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                                                                | <b>PARASOLL Open/Close Sensor</b>                                                                                                                 |                                      |                                          |                                                  |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                                                                         | <b>E2013</b><br><b>FCC ID: FHO-E2013</b><br><b>IC: 10912A-E2013</b>                                                                               |                                      |                                          |                                                  |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                                                           | Complete test                                                                                                                                     |                                      |                                          |                                                  |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                                                                        | FCC CFR47 Part 15, Subpart C Section 15.247<br>RSS-Gen Issue 5, Amendment 2, February 2021<br>RSS-247 Issue 2, February 2017<br>ANSI C63.10: 2013 |                                      |                                          |                                                  |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                                                               | 2023-02-02                                                                                                                                        | Refer to photo document              |                                          |                                                  |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                                                          | A003408704-003                                                                                                                                    |                                      |                                          |                                                  |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                                                             | Refer to test report                                                                                                                              |                                      |                                          |                                                  |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                                                                        | TÜV Rheinland (Shanghai)<br>Co., Ltd.                                                                                                             |                                      |                                          |                                                  |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                                                                     | TÜV Rheinland (Shanghai)<br>Co., Ltd.                                                                                                             |                                      |                                          |                                                  |
| <b>Prüfergebnis*:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                                                              | Pass                                                                                                                                              |                                      |                                          |                                                  |
| <b>geprüft von:</b><br>tested by:                                                                                                                                                                                                                                                                                                                                                                                                                   | X <u>Hongfei Wu</u><br>Signed by: Hongfei Wu                                                                                                      |                                      | <b>genehmigt von:</b><br>authorized by:  | X <u>Elliot Zhang</u><br>Signed by: Elliot Zhang |
| <b>Datum:</b><br>Date:                                                                                                                                                                                                                                                                                                                                                                                                                              | 2023-05-10                                                                                                                                        |                                      | <b>Ausstellungsdatum:</b><br>Issue date: | 2023-05-10                                       |
| <b>Stellung / Position:</b>                                                                                                                                                                                                                                                                                                                                                                                                                         | PE                                                                                                                                                |                                      | <b>Stellung / Position:</b>              | Reviewer                                         |
| <b>Sonstiges /</b><br>Other:                                                                                                                                                                                                                                                                                                                                                                                                                        | HVIN: E2013                                                                                                                                       |                                      |                                          |                                                  |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                                                                     | Prüfmuster vollständig und unbeschädigt<br>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<br>* 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                                                                                                                                                            |                                                                                                                                                   |                                      |                                          |                                                  |
| <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><br>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. |                                                                                                                                                   |                                      |                                          |                                                  |

## TEST SUMMARY

### 5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

### 5.1.2 6dB & 99% BANDWIDTH

RESULT: Pass

### 5.1.3 PEAK 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

## Contents

|            |                                                           |           |
|------------|-----------------------------------------------------------|-----------|
| <b>1.</b>  | <b>GENERAL REMARKS .....</b>                              | <b>4</b>  |
| <b>1.1</b> | <b>COMPLEMENTARY MATERIALS.....</b>                       | <b>4</b>  |
| <b>2.</b>  | <b>TEST SITES .....</b>                                   | <b>4</b>  |
| <b>2.1</b> | <b>TEST FACILITIES .....</b>                              | <b>4</b>  |
| <b>2.2</b> | <b>LIST OF TEST AND MEASUREMENT INSTRUMENTS.....</b>      | <b>5</b>  |
| <b>2.3</b> | <b>TRACEABILITY .....</b>                                 | <b>5</b>  |
| <b>2.4</b> | <b>CALIBRATION .....</b>                                  | <b>5</b>  |
| <b>2.5</b> | <b>MEASUREMENT UNCERTAINTY .....</b>                      | <b>6</b>  |
| <b>3.</b>  | <b>GENERAL PRODUCT INFORMATION.....</b>                   | <b>7</b>  |
| <b>3.1</b> | <b>PRODUCT FUNCTION AND INTENDED USE .....</b>            | <b>7</b>  |
| <b>3.2</b> | <b>RATINGS AND SYSTEM DETAILS.....</b>                    | <b>7</b>  |
| <b>3.3</b> | <b>INDEPENDENT OPERATION MODES.....</b>                   | <b>8</b>  |
| <b>3.4</b> | <b>NOISE GENERATING AND NOISE SUPPRESSING PARTS .....</b> | <b>8</b>  |
| <b>3.5</b> | <b>SUBMITTED DOCUMENTS.....</b>                           | <b>8</b>  |
| <b>4.</b>  | <b>TEST SET-UP AND OPERATION MODES.....</b>               | <b>9</b>  |
| <b>4.1</b> | <b>PRINCIPLE OF CONFIGURATION SELECTION .....</b>         | <b>9</b>  |
| <b>4.2</b> | <b>TEST OPERATION AND TEST SOFTWARE.....</b>              | <b>9</b>  |
| <b>4.3</b> | <b>SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT .....</b>  | <b>9</b>  |
| <b>4.4</b> | <b>COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....</b>     | <b>9</b>  |
| <b>5.</b>  | <b>TEST RESULTS .....</b>                                 | <b>10</b> |
| <b>5.1</b> | <b>CONDUCTED TESTING AT ANTENNA PORT .....</b>            | <b>10</b> |
| 5.1.1      | <i>Antenna Requirement.....</i>                           | <i>10</i> |
| 5.1.2      | <i>6dB &amp; 99% Bandwidth.....</i>                       | <i>12</i> |
| 5.1.3      | <i>Output Power .....</i>                                 | <i>19</i> |
| 5.1.4      | <i>Power Spectral Density .....</i>                       | <i>20</i> |
| 5.1.5      | <i>Conducted Band Edge and out-of Band Emissions.....</i> | <i>24</i> |
| <b>5.2</b> | <b>EMISSION IN THE FREQUENCY RANGE UP TO 30MHZ.....</b>   | <b>26</b> |
| 5.2.1      | <i>Conducted Emission.....</i>                            | <i>26</i> |
| <b>5.3</b> | <b>EMISSION IN THE FREQUENCY RANGE ABOVE 30MHZ .....</b>  | <b>27</b> |
| 5.3.1      | <i>Radiated Band-Edge .....</i>                           | <i>27</i> |
| 5.3.2      | <i>Radiated Spurious Emission.....</i>                    | <i>36</i> |
| <b>6.</b>  | <b>LIST OF TABLES .....</b>                               | <b>49</b> |
| <b>7.</b>  | <b>LIST OF FIGURES .....</b>                              | <b>49</b> |

## **1. General Remarks**

### **1.1 Complementary Materials**

Null.

## **2. Test Sites**

### **2.1 Test Facilities**

TÜV Rheinland (Shanghai) Co., Ltd.

Shanghai TÜV Rheinland Building No. 177, 178 Lane 777, West Guangzhong Rd, Jing'an District, Shanghai, 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 958801.

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 2932F.

## 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

| Equip.    | Description                       | Model                   | Manufacturer    | Last Date<br>DD.MM.YYYY | Due Date<br>DD.MM.YYYY |
|-----------|-----------------------------------|-------------------------|-----------------|-------------------------|------------------------|
| G1811378  | 3m modified semi-anechoic chamber | SAC3                    | Frankonia       | 10.06.2021              | 10.06.2024             |
| 9023229   | EMI test receiver                 | ESR3                    | Rohde&Schwarz   | 11.08.2022              | 11.08.2023             |
| G1811425  | Bilog antenna                     | CBL 6112D               | Teseq           | 10.03.2020              | 10.03.2023             |
| G1811417  | Log periodic antenna              | HL050                   | Rohde&Schwarz   | 10.03.2020              | 10.03.2023             |
| G1825371  | Preamplifier                      | EMC051845SE             | Taiwan EMCI     | 14.05.2021              | 14.05.2023             |
| G1825372  | Preamplifier                      | EMC184045SE             | Taiwan EMCI     | 14.05.2021              | 14.05.2023             |
| G1822702  | Spectrum analyser                 | FSV40                   | Rohde&Schwarz   | 04.11.2021              | 04.11.2023             |
| EMC-C-304 | OSP                               | OSP-B157W8              | Rohde & Schwarz | 14.10.2022              | 14.10.2023             |
| software  |                                   |                         |                 |                         |                        |
| G1824845  | EMC measurement software          | EMC32<br>(Ver 10.20.01) | Rohde&Schwarz   | NA                      | NA                     |
|           | EMC measurement software          | EMC32<br>(Ver 11.40.00) | Rohde&Schwarz   | NA                      | 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     |
| 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 an open/close sensor which supports Zigbee.

For details refer to the User Manual and Circuit Diagram.

#### 3.2 Ratings and System Details

**Table 3: Technical Specification of EUT**

| General Description of EUT        |                            |
|-----------------------------------|----------------------------|
| Product Name:                     | PARASOLL Open/Close Sensor |
| Model No.:                        | E2013                      |
| Operating Voltage:                | DC 1.5V (AAA battery*1)    |
| Technical Specification of Zigbee |                            |
| Frequency Range:                  | 2405 ~ 2480 MHz            |
| Modulation Type:                  | OQPSK                      |
| Antenna Type:                     | PCB Antenna                |
| Antenna Gain:                     | 4.04 dBi                   |

Note:

The EUT have two configurations, and only the power supply chip is different. In this report, full test EUT 1# and partial test EUT 2# (radiated test).

| Configuration | Power supply chip |
|---------------|-------------------|
| EUT 1#        | OC6811            |
| EUT 2#        | MAX17224          |

### 3.3 Independent Operation Modes

**Table 4: Independent Operation Modes**

| Test Mode | Channel Number | Channel Frequency<br>[MHz] |
|-----------|----------------|----------------------------|
| TM1       | 11             | 2405                       |
| TM2       | 19             | 2445                       |
| TM3       | 26             | 2480                       |

### 3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

### 3.5 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Circuit Diagram
- Instruction Manual
- Rating Label



## 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 used: UartAssist.exe

**Table 5: Power parameter value**

| Channel Frequency<br>[MHz] | Power Parameter Value |
|----------------------------|-----------------------|
| 2405                       | 3                     |
| 2445                       | 3                     |
| 2480                       | 3                     |

### 4.3 Special Accessories and Auxiliary Equipment

Null.

### 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 4.04 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 6: 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.: CN23CF7A 001**

Test Report No.

**Seite 11 von 49**

Page 11 of 49

**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: | 4.04 dBi    |

**Verdict:** PASS

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

|                      |   |                                                                        |
|----------------------|---|------------------------------------------------------------------------|
| Date of testing      | : | 2023-02-09                                                             |
| Ambient temperature  | : | 22.1°C                                                                 |
| Relative humidity    | : | 47.2%                                                                  |
| Atmospheric pressure | : | 101kPa                                                                 |
| Test requirement     | : | FCC Part 15.247(a)(2)<br>RSS-247 Issue 2, February 2017, Clause 5.2(a) |
| Test procedure       | : | ANSI C63.10: 2013                                                      |
| Test voltage         | : | DC 1.5V                                                                |
| Test modes applied   | : | TM1 to TM3                                                             |

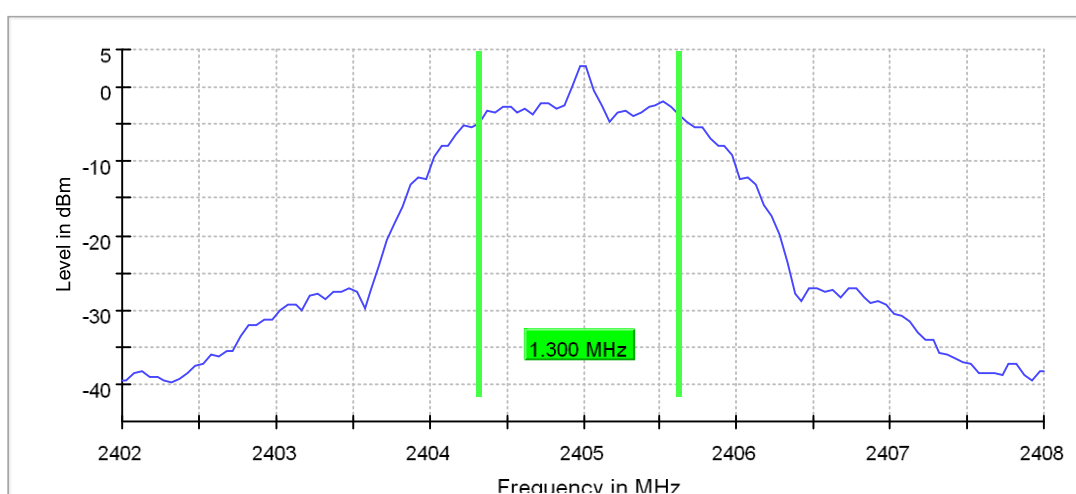
**6dB Bandwidth, TM1, 2405MHz**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 2405.000000         | 1.300000        | 0.500000        | ---             | 2404.325000          | 2405.625000           |

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

| DUT Frequency (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|--------|
| 2405.000000         | 2.8             | 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           | 35.000 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                   | 12 / max. 150    | max. 150      |
| Stable                | 5 / 5            | 5             |
| Max Stable Difference | 0.15 dB          | 0.50 dB       |

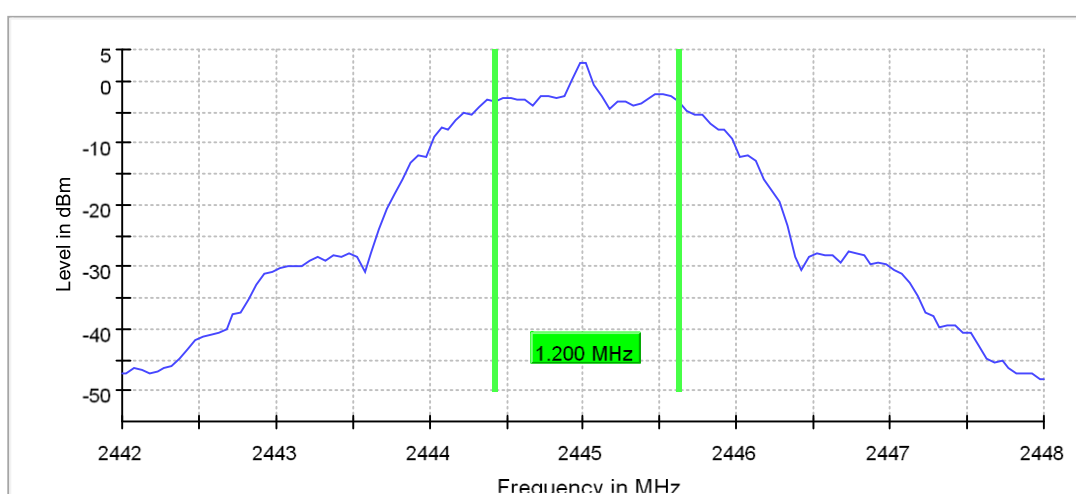
**6dB Bandwidth, TM2, 2445MHz**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 2445.000000         | 1.200000        | 0.500000        | ---             | 2444.425000          | 2445.625000           |

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

| DUT Frequency (MHz) | Max Level (dBm) | Result |
|---------------------|-----------------|--------|
| 2445.000000         | 3.0             | 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                   | 10 / max. 150    | max. 150      |
| Stable                | 5 / 5            | 5             |
| Max Stable Difference | 0.19 dB          | 0.50 dB       |

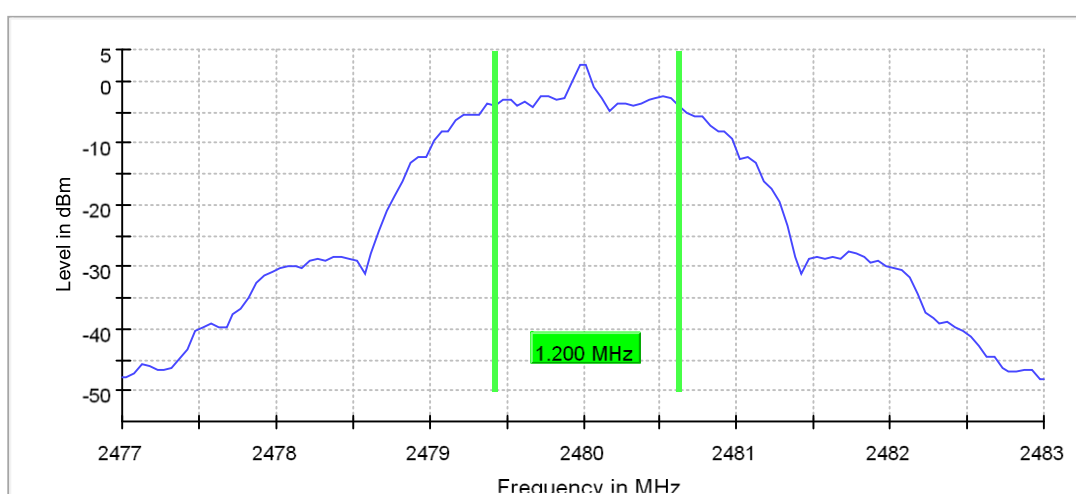
**6dB Bandwidth, TM3, 2480MHz**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 2480.000000         | 1.200000        | 0.500000        | ---             | 2479.425000          | 2480.625000           |

(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       | 2.47700 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 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 | 0.11 dB          | 0.50 dB       |

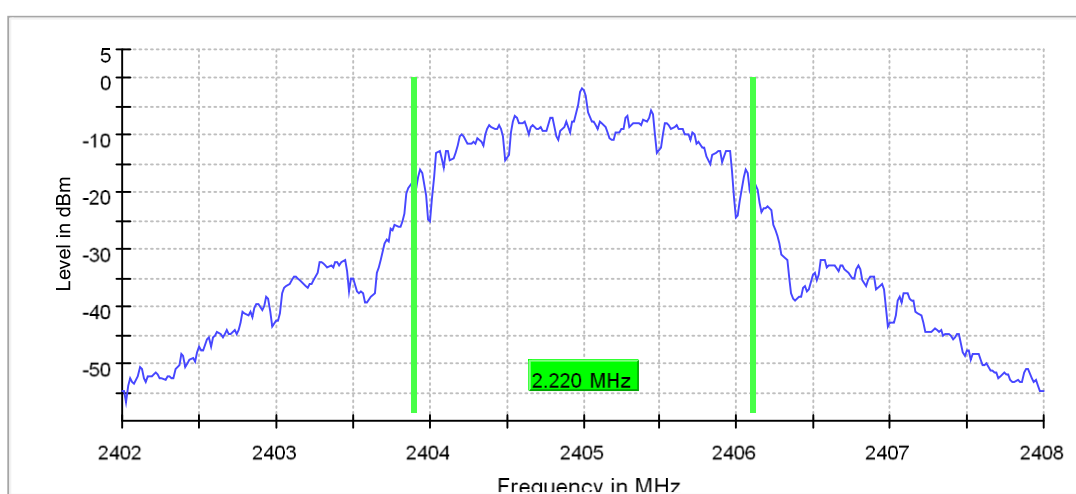
**99% Occupied Channel Bandwidth, TM1, 2405MHz**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 2405.000000         | 2.220000        | ---             | ---             | 2403.897500          | 2406.117500           |

(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                   | 8 / max. 150     | max. 150      |
| Stable                | 3 / 3            | 3             |
| Max Stable Difference | 0.18 dB          | 0.30 dB       |



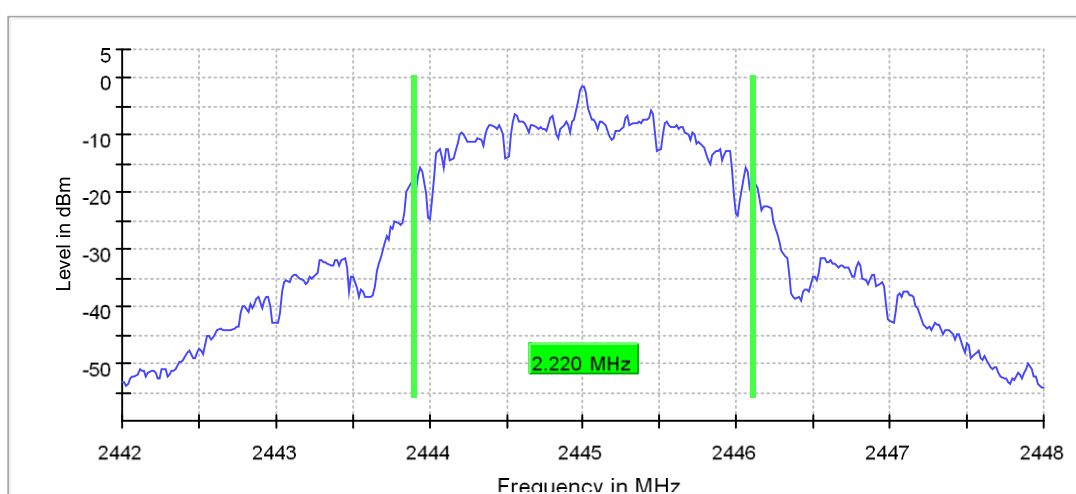
**99% Occupied Channel Bandwidth, TM2, 2445MHz**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 2445.000000         | 2.220000        | ---             | ---             | 2443.897500          | 2446.117500           |

(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                   | 10 / max. 150    | max. 150      |
| Stable                | 3 / 3            | 3             |
| Max Stable Difference | 0.07 dB          | 0.30 dB       |

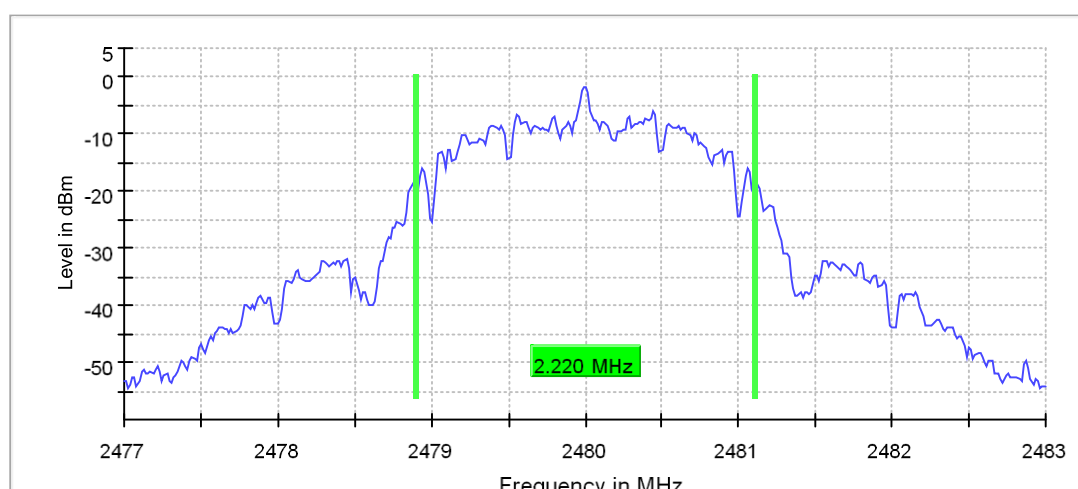
**Prüfbericht - Nr.: CN23CF7A 001**
*Test Report No.*
**Seite 18 von 49**
*Page 18 of 49*
**99% Occupied Channel Bandwidth, TM3, 2480MHz**

| DUT Frequency (MHz) | Bandwidth (MHz) | Limit Min (MHz) | Limit Max (MHz) | Band Edge Left (MHz) | Band Edge Right (MHz) |
|---------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|
| 2480.000000         | 2.220000        | ---             | ---             | 2478.897500          | 2481.117500           |

(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         |
| Sweptime              | 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                   | 7 / max. 150     | max. 150      |
| Stable                | 3 / 3            | 3             |
| Max Stable Difference | 0.20 dB          | 0.30 dB       |

### 5.1.3 Output Power

**RESULT:**

## Pass

|                      |   |                                                                        |
|----------------------|---|------------------------------------------------------------------------|
| Date of testing      | : | 2023-03-09                                                             |
| Ambient temperature  | : | 21.9°C                                                                 |
| Relative humidity    | : | 48.5%                                                                  |
| Atmospheric pressure | : | 101kPa                                                                 |
| Test requirement     | : | FCC Part 15.247(b)(3)<br>RSS-247 Issue 2, February 2017, Clause 5.4(d) |
| Test procedure       | : | ANSI C63.10: 2013                                                      |
| Test voltage         | : | DC 1.5V                                                                |
| Test modes applied   | : | TM1 to TM3                                                             |

### Table 7: Peak Output Power

| Mode | Antenna Gain [dBi] | CH. | Freq. [MHz] | Maximum Peak Conducted Output Power [dBm] | Peak Conducted Output Power Limit [dBm] | Maximum EIRP [dBm] | EIRP Limit [dBm] |
|------|--------------------|-----|-------------|-------------------------------------------|-----------------------------------------|--------------------|------------------|
| TM1  | 4.04               | 11  | 2405        | 2.8                                       | 30                                      | 6.84               | 36               |
| TM2  |                    | 19  | 2445        | 3.1                                       | 30                                      | 7.14               | 36               |
| TM3  |                    | 26  | 2480        | 2.6                                       | 30                                      | 6.64               | 36               |

**Table 8: Average Output Power**

| Mode | Antenna Gain [dBi] | CH. | Freq. [MHz] | Average Conducted Output Power [dBm] | Average EIRP [dBm] |
|------|--------------------|-----|-------------|--------------------------------------|--------------------|
| TM1  | 4.04               | 11  | 2405        | 1.4                                  | 5.44               |
| TM2  |                    | 19  | 2445        | 1.7                                  | 5.74               |
| TM3  |                    | 26  | 2480        | 1.2                                  | 5.24               |

Note:

EIRP=Conducted Output Power + Antenna Gain

The cable loss=0.5dB was provided by the client, and was factored in the result Conducted Output Power

### 5.1.4 Power Spectral Density

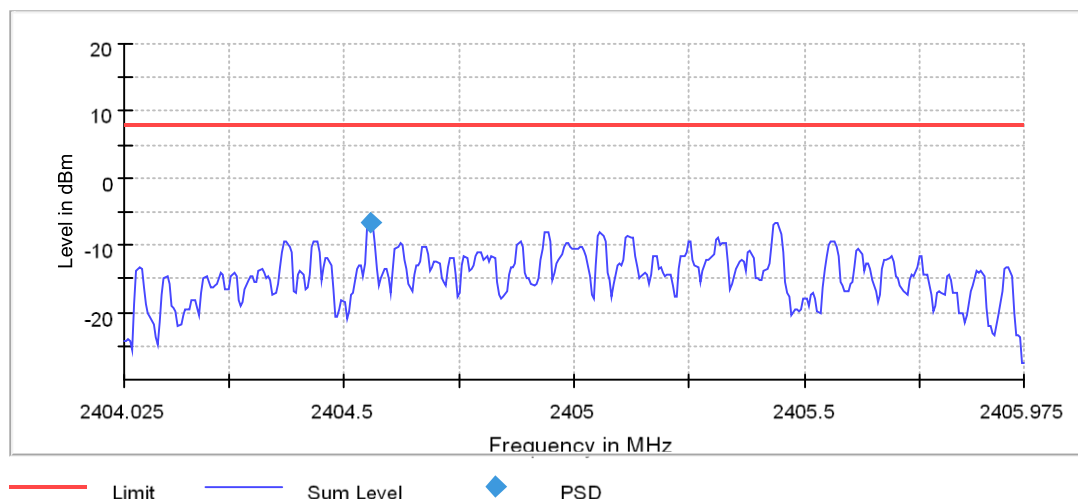
**RESULT:****Pass**

|                      |   |                                                                     |
|----------------------|---|---------------------------------------------------------------------|
| Date of testing      | : | 2023-02-09                                                          |
| Ambient temperature  | : | 22.1°C                                                              |
| Relative humidity    | : | 47.2%                                                               |
| Atmospheric pressure | : | 101kPa                                                              |
| Test requirement     | : | FCC Part 15.247(e)<br>RSS-247 Issue 2, February 2017, Clause 5.2(b) |
| Test procedure       | : | ANSI C63.10: 2013                                                   |
| Test voltage         | : | DC 1.5V                                                             |
| Test modes applied   | : | TM1 to TM3                                                          |

**Prüfbericht - Nr.: CN23CF7A 001**
*Test Report No.*
**Seite 21 von 49**
*Page 21 of 49*
**Power Spectral Density, TM1, 2405MHz**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2405.000000         | 2404.557500     | -6.739    | 8.0             | PASS   |

Peak Power Spectral Density

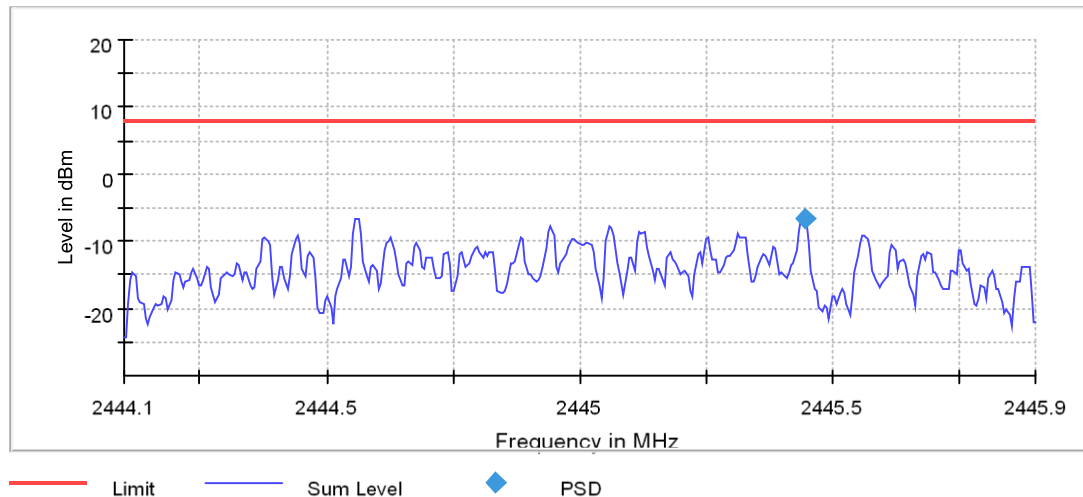

**Measurement**

| Setting               | Instrument Value | Target Value  |
|-----------------------|------------------|---------------|
| Start Frequency       | 2.40403 GHz      | 2.40403 GHz   |
| Stop Frequency        | 2.40598 GHz      | 2.40598 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                   | 5 / max. 150     | max. 150      |
| Stable                | 2 / 2            | 2             |
| Max Stable Difference | 0.13 dB          | 0.50 dB       |

**Power Spectral Density, TM2, 2445MHz**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2445.000000         | 2445.442500     | -6.624    | 8.0             | PASS   |

Peak Power Spectral Density

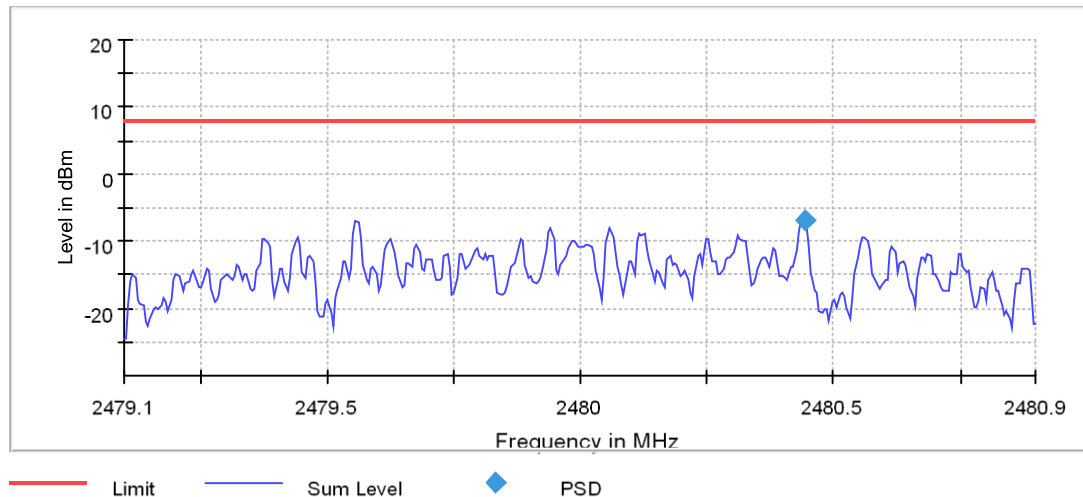

**Measurement**

| Setting               | Instrument Value | Target Value  |
|-----------------------|------------------|---------------|
| Start Frequency       | 2.44410 GHz      | 2.44410 GHz   |
| Stop Frequency        | 2.44590 GHz      | 2.44590 GHz   |
| Span                  | 1.800 MHz        | 1.800 MHz     |
| RBW                   | 10.000 kHz       | <= 10.000 kHz |
| VBW                   | 30.000 kHz       | >= 30.000 kHz |
| SweepPoints           | 360              | ~ 360         |
| Sweeptime             | 1.800 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 | 0.09 dB          | 0.50 dB       |

**Power Spectral Density, TM3, 2480MHz**

| DUT Frequency (MHz) | Frequency (MHz) | PSD (dBm) | Limit Max (dBm) | Result |
|---------------------|-----------------|-----------|-----------------|--------|
| 2480.000000         | 2480.442500     | -6.986    | 8.0             | PASS   |

Peak Power Spectral Density


**Measurement**

| Setting               | Instrument Value | Target Value  |
|-----------------------|------------------|---------------|
| Start Frequency       | 2.47910 GHz      | 2.47910 GHz   |
| Stop Frequency        | 2.48090 GHz      | 2.48090 GHz   |
| Span                  | 1.800 MHz        | 1.800 MHz     |
| RBW                   | 10.000 kHz       | <= 10.000 kHz |
| VBW                   | 30.000 kHz       | >= 30.000 kHz |
| SweepPoints           | 360              | ~ 360         |
| Sweeptime             | 1.800 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 | 0.21 dB          | 0.50 dB       |

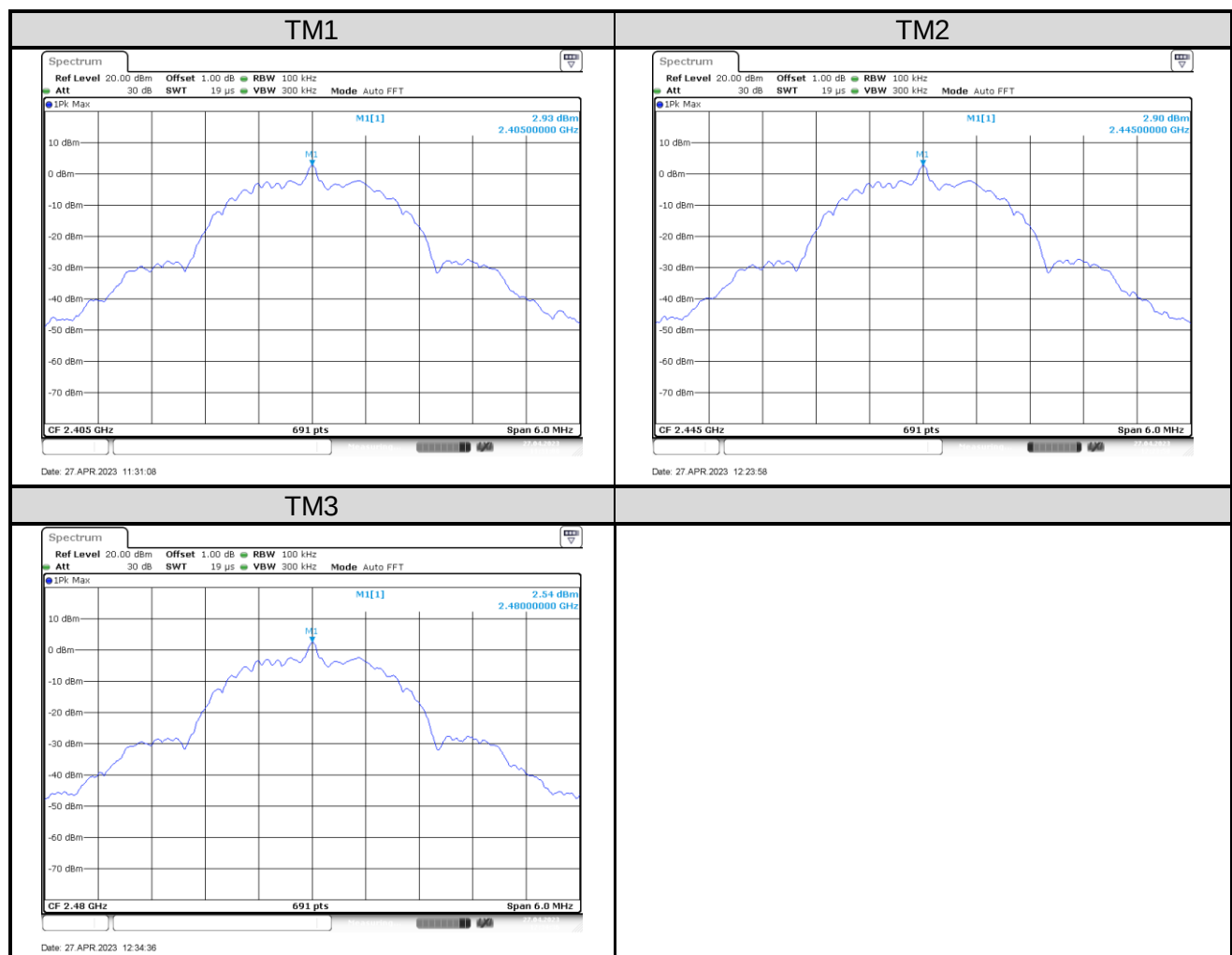
### 5.1.5 Conducted Band Edge and out-of Band Emissions

**RESULT:**

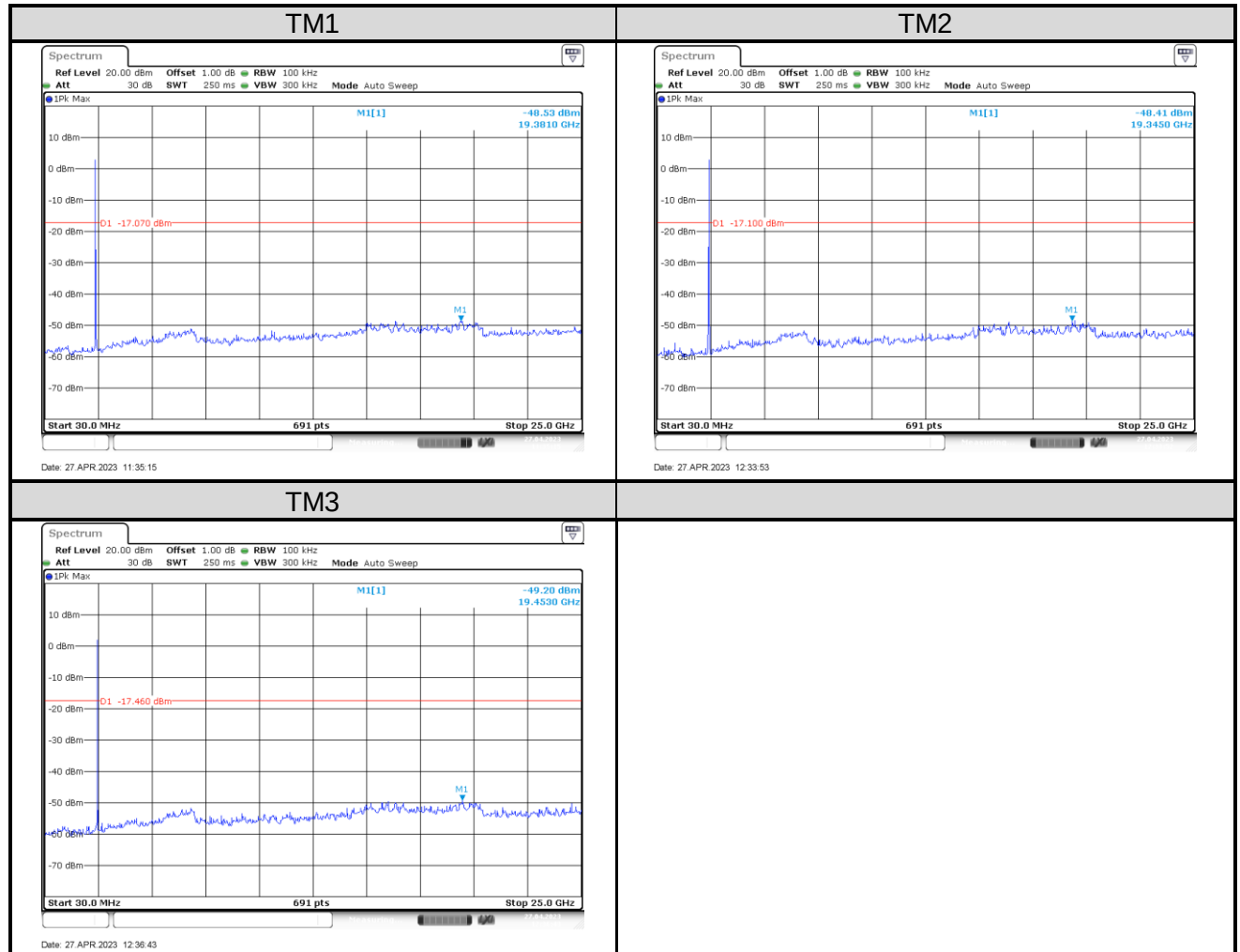
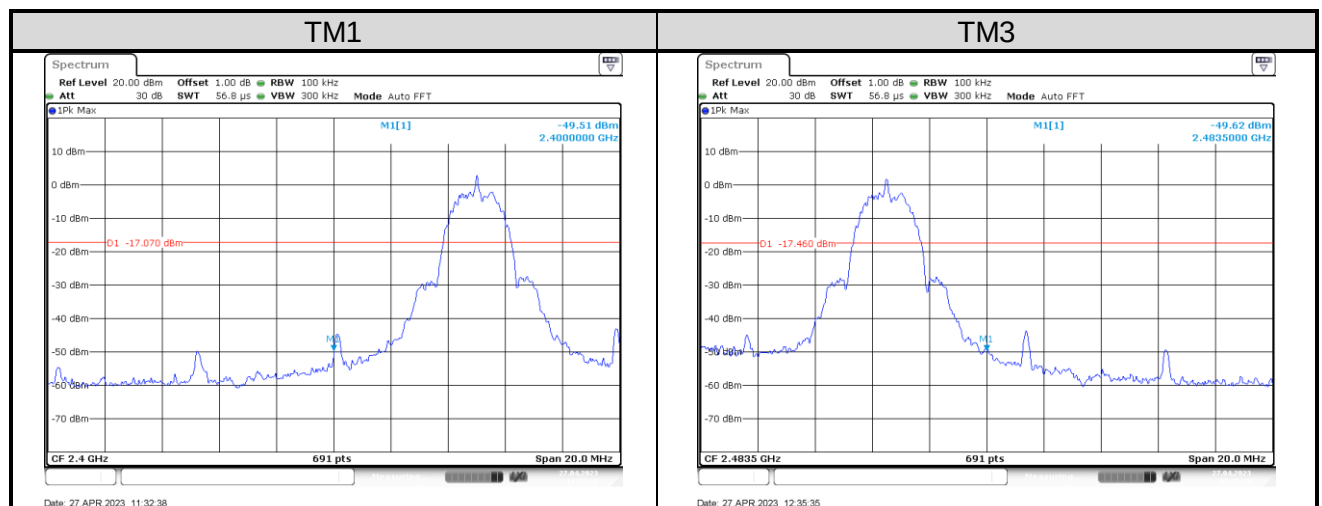
## Pass

|                      |                                                                    |
|----------------------|--------------------------------------------------------------------|
| Date of testing      | : 2023-04-27                                                       |
| Ambient temperature  | : 21.8°C                                                           |
| Relative humidity    | : 52.0%                                                            |
| Atmospheric pressure | : 101kPa                                                           |
| Test requirement     | : FCC Part 15.247(d)<br>RSS-247 Issue 2, February 2017, Clause 5.5 |
| Test procedure       | : ANSI C63.10: 2013                                                |
| Test voltage         | : DC 1.5V                                                          |
| Test modes applied   | : TM1 to TM3                                                       |

### 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**

Test requirement : FCC Part 15.207 (a)  
RSS-Gen Issue 5, Amendment 2, February 2021, Clause  
8.8

Test procedure : ANSI C63.10: 2013

Note: This product is powered by battery, so this test is not applicable

## 5.3 Emission in the Frequency Range above 30MHz

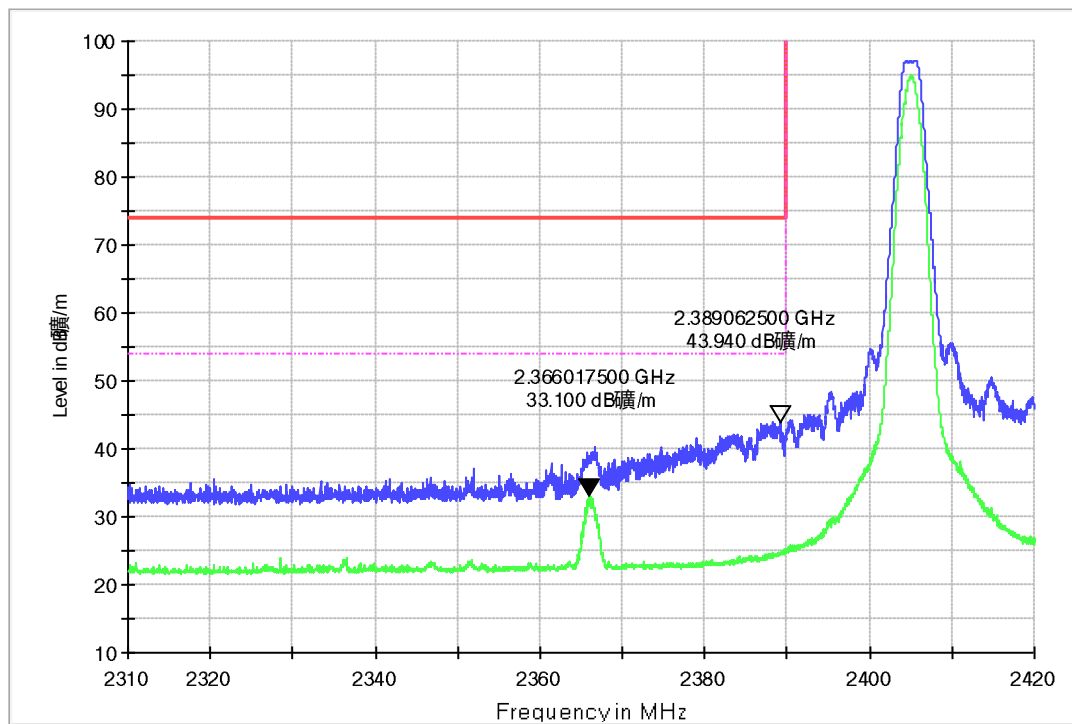
### 5.3.1 Radiated Band-Edge

**RESULT:****Pass**

|                      |   |                                                                                                                                                                                                                                     |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date of testing      | : | 2023-02-13                                                                                                                                                                                                                          |
| Ambient temperature  | : | 21.3°C                                                                                                                                                                                                                              |
| Relative humidity    | : | 42.9%                                                                                                                                                                                                                               |
| Atmospheric pressure | : | 101kPa                                                                                                                                                                                                                              |
| Test requirement     | : | FCC Part 15.247(d)<br>FCC Part 15.205(a)<br>FCC Part 15.209(a)<br>RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.9<br>RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.10<br>RSS-247 Issue 2, February 2017, Clause 5.5 |
| Test procedure       | : | ANSI C63.10: 2013                                                                                                                                                                                                                   |
| Test voltage         | : | DC 1.5V                                                                                                                                                                                                                             |
| Test modes applied   | : | TM1, TM3                                                                                                                                                                                                                            |

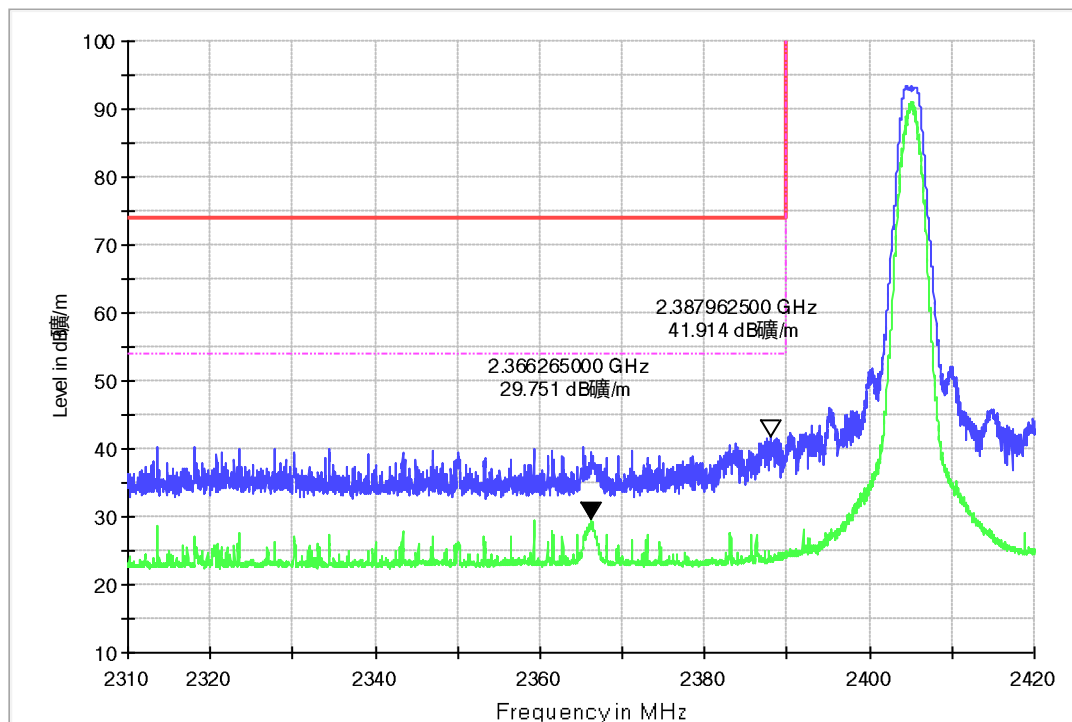
**Figure 4: Radiated Band-Edge, TM1, H, MAX17224**

2310~2410 BE 1-18GHz HL050 FSV40 Pre



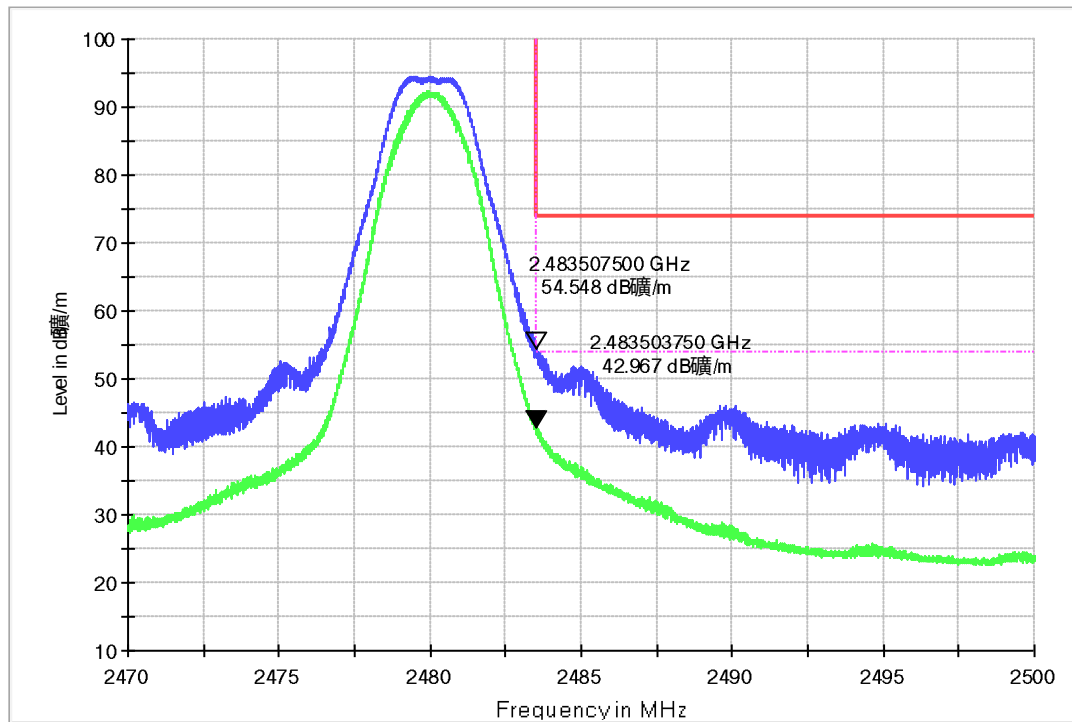
**Figure 5: Radiated Band-Edge, TM1, V. MAX17224**

2310~2410 BE 1-18GHz HL050 FSV40 Pre



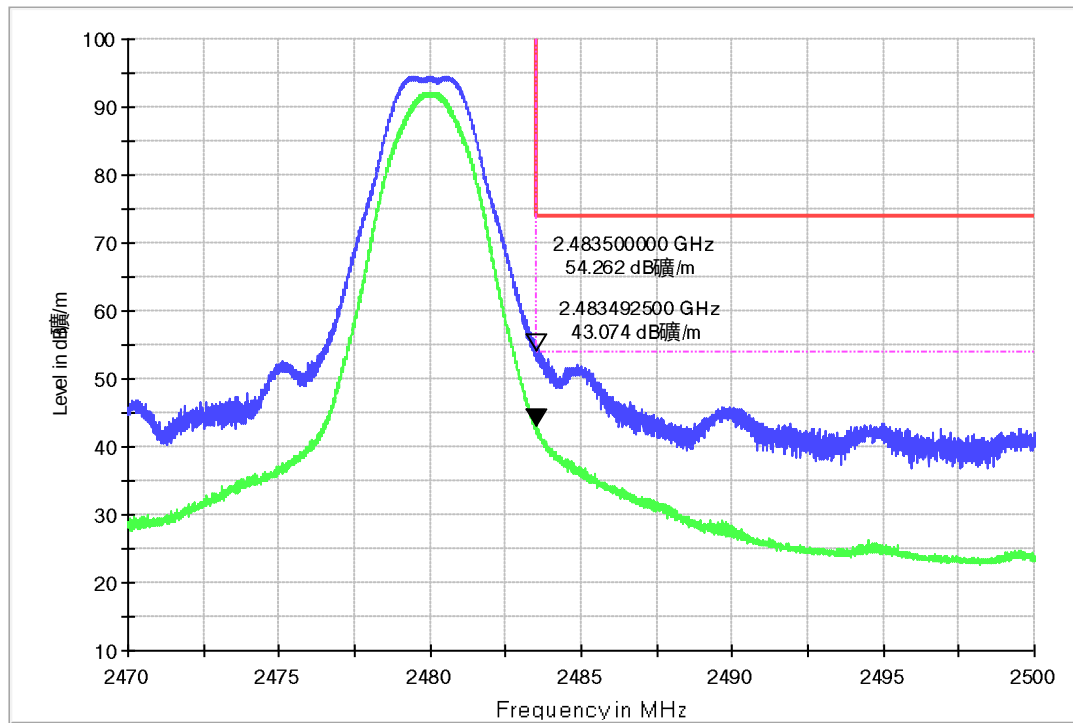
**Figure 6: Radiated Band-Edge, TM3, H, MAX17224**

2470° 2500 BE 1-18GHz HL050 FSV40 Pre



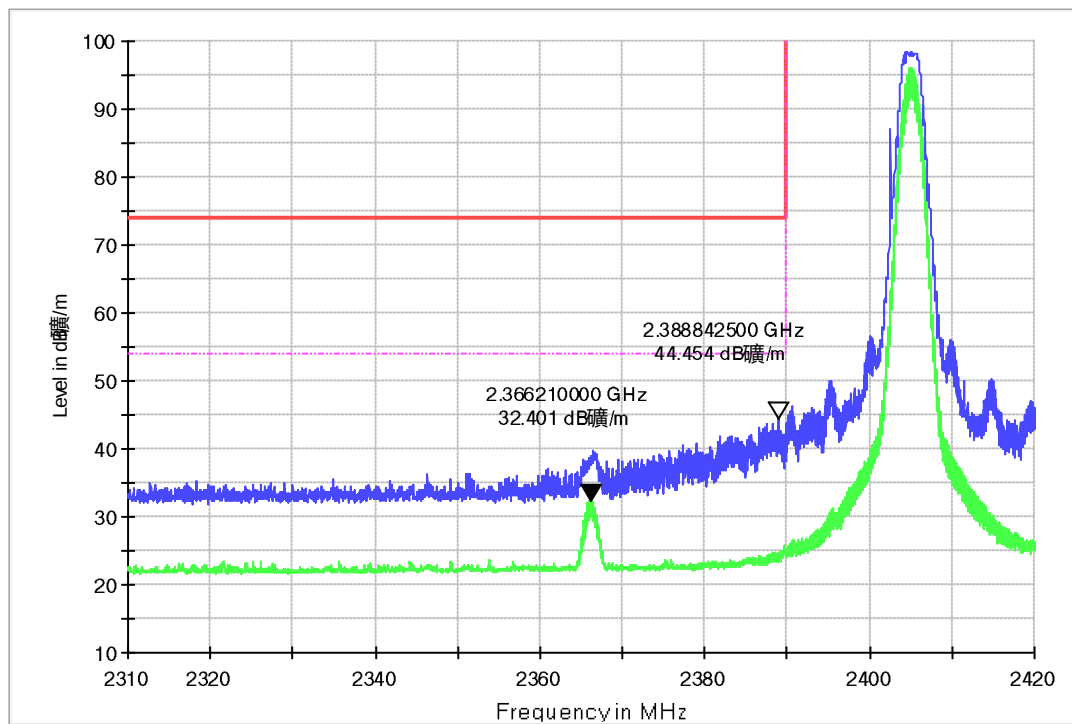
**Figure 7: Radiated Band-Edge, TM3, V, MAX17224**

2470° 2500 BE 1-18GHz HL050 FSV40 Pre



**Figure 8: Radiated Band-Edge, TM1, H, OC6811**

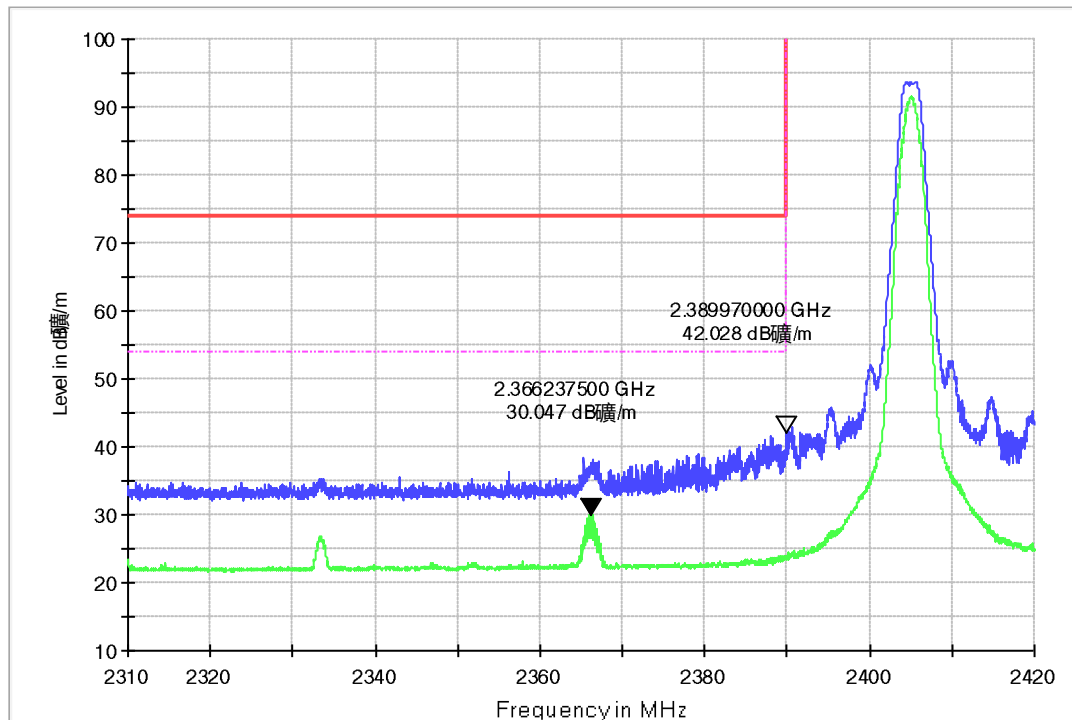
2310~2410 BE 1-18GHz HL050 FSV40 Pre





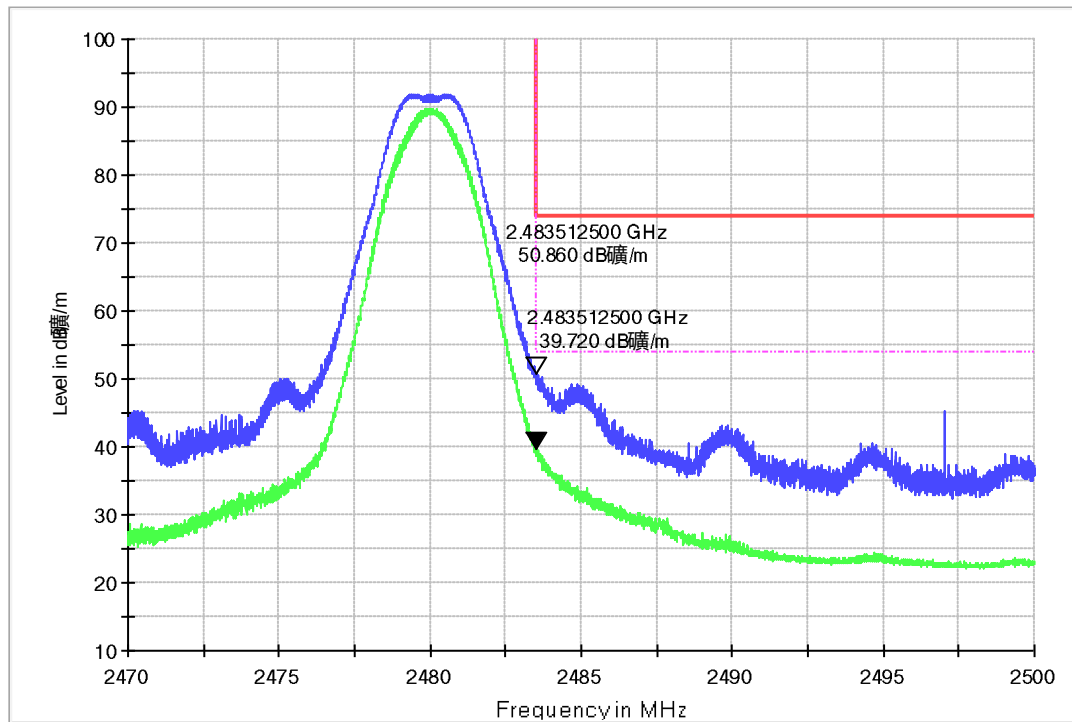
**Figure 9: Radiated Band-Edge, TM1, V. OC6811**

2310~2410 BE 1-18GHz HL050 FSV40 Pre



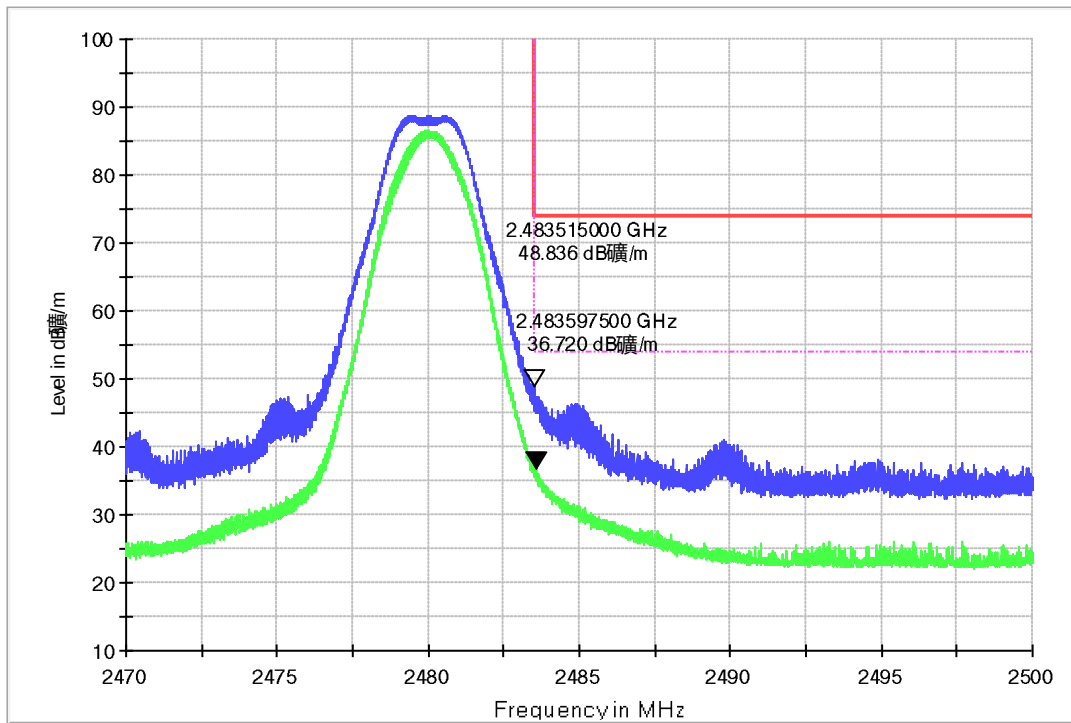
**Figure 10: Radiated Band-Edge, TM3, H, OC6811**

2470° 2500 BE 1-18GHz HL050 FSV40 Pre



**Figure 11: Radiated Band-Edge, TM3, V, OC6811**

2470° 2500 BE 1-18GHz HL050 FSV40 Pre

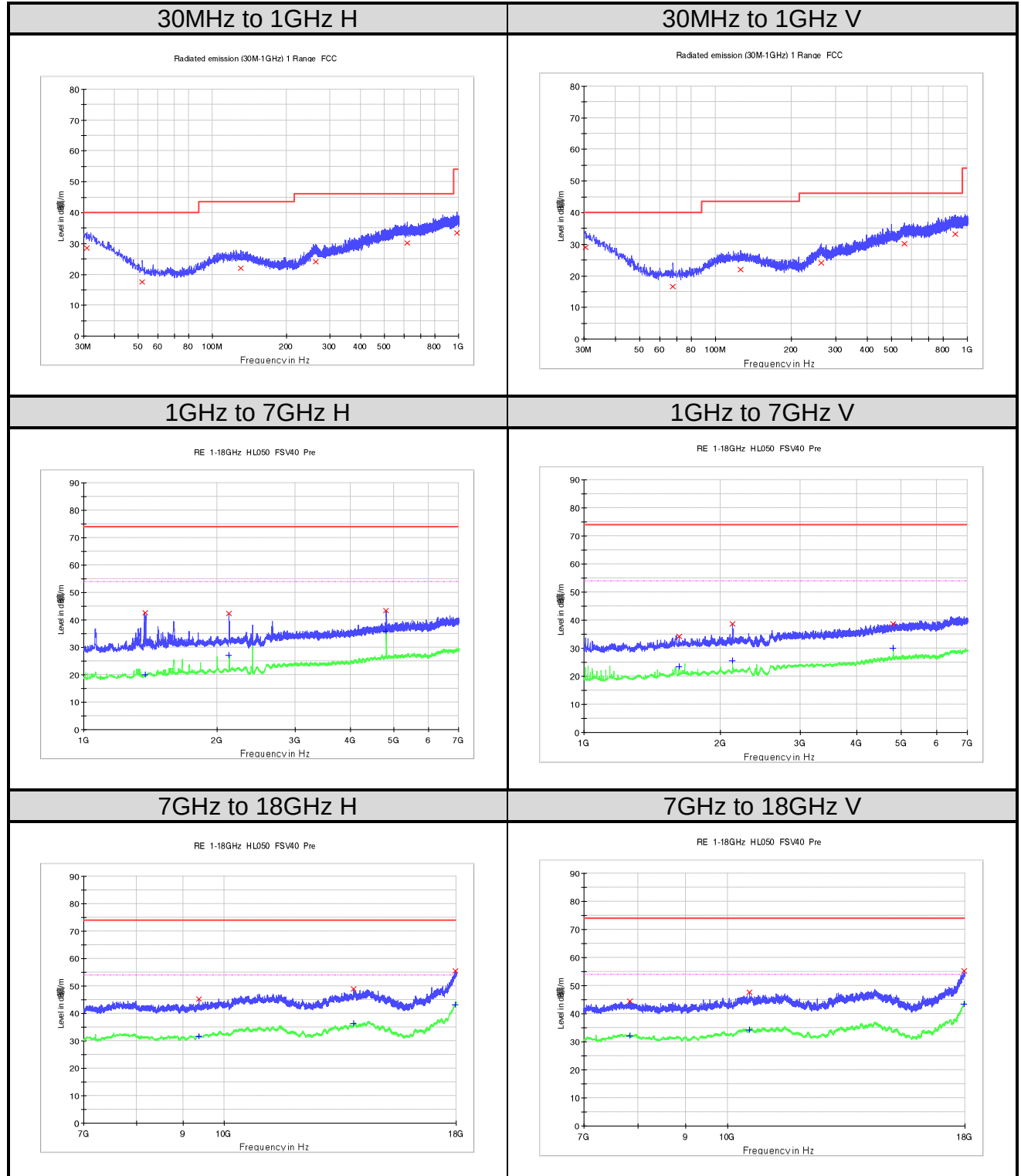


**Prüfbericht - Nr.: CN23CF7A 001**  
Test Report No.**Seite 36 von 49**  
Page 36 of 49**5.3.2 Radiated Spurious Emission****RESULT:****Pass**

|                      |   |                                                                                                                                                   |
|----------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Date of testing      | : | 2023-02-20~2022-03-06                                                                                                                             |
| Ambient temperature  | : | 20.2~20.5°C                                                                                                                                       |
| Relative humidity    | : | 55.4~55.9%                                                                                                                                        |
| Atmospheric pressure | : | 101kPa                                                                                                                                            |
| Test requirement     | : | FCC Part 15.247(d)<br>FCC Part 15.209(a)<br>RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.9<br>RSS-247 Issue 2, February 2017, Clause 5.5 |
| Test procedure       | : | ANSI C63.10: 2013                                                                                                                                 |
| Test voltage         | : | DC 1.5V                                                                                                                                           |
| Test modes applied   | : | TM1 to TM3                                                                                                                                        |

**Note:**

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

**Figure 12: Radiated Spurious Emission, TM1, MAX17224**


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

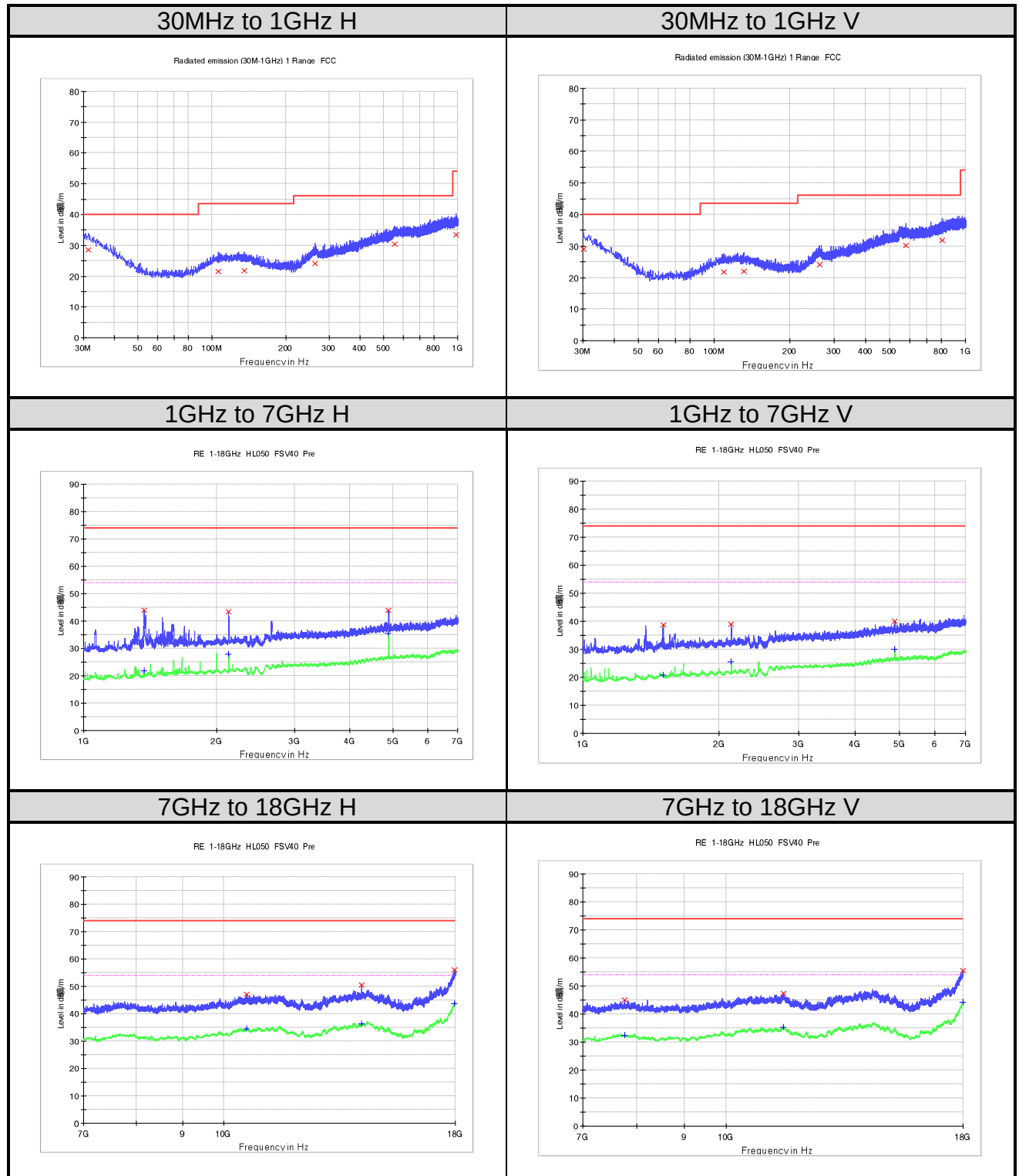
| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|-----------------|--------------------|-----|--------------|-------------------|----------------------|
| 30.970000       | 28.6               | H   | 24.9         | 11.4              | 40.0                 |
| 51.946250       | 17.6               | H   | 13.9         | 22.4              | 40.0                 |
| 130.273750      | 22.1               | H   | 18.7         | 21.4              | 43.5                 |
| 263.406250      | 24.1               | H   | 20.7         | 21.9              | 46.0                 |
| 616.728750      | 30.2               | H   | 26.3         | 15.8              | 46.0                 |
| 982.055000      | 33.5               | H   | 28.8         | 20.5              | 54.0                 |
| 30.363750       | 28.9               | V   | 25.2         | 11.1              | 40.0                 |
| 67.708750       | 16.7               | V   | 13.0         | 23.3              | 40.0                 |
| 126.030000      | 22.0               | V   | 18.8         | 21.5              | 43.5                 |
| 263.285000      | 24.1               | V   | 20.7         | 21.9              | 46.0                 |
| 562.045000      | 30.3               | V   | 26.2         | 15.7              | 46.0                 |
| 892.087500      | 33.3               | V   | 28.2         | 12.7              | 46.0                 |

**PK**

| Frequency (MHz) | MaxPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1375.000000     | 42.6             | H   | -19.8        | 31.4              | 74.0                 |
| 2125.000000     | 42.3             | H   | -17.2        | 31.7              | 74.0                 |
| 4809.250000     | 43.4             | H   | -10.6        | 30.6              | 74.0                 |
| 9380.125000     | 45.3             | H   | -4.4         | 28.7              | 74.0                 |
| 13879.125000    | 49.0             | H   | 1.5          | 25.0              | 74.0                 |
| 17949.125000    | 55.5             | H   | 11.7         | 18.5              | 74.0                 |
| 1621.000000     | 34.3             | V   | -18.7        | 39.7              | 74.0                 |
| 2125.750000     | 38.8             | V   | -17.2        | 35.2              | 74.0                 |
| 4810.750000     | 38.8             | V   | -10.6        | 35.2              | 74.0                 |
| 7848.375000     | 44.4             | V   | -5.3         | 29.6              | 74.0                 |
| 10543.375000    | 47.5             | V   | -1.4         | 26.5              | 74.0                 |
| 17964.250000    | 55.2             | V   | 12.0         | 18.8              | 74.0                 |

**AV**

| Frequency (MHz) | Average (dBµV/m) | Pol | Corr. (dB/m) | Margin - AVG (dB) | Limit - AVG (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1375.000000     | 20.0             | H   | -19.8        | 34.0              | 54.0                 |
| 2125.000000     | 27.0             | H   | -17.2        | 27.0              | 54.0                 |
| 4809.250000     | 35.7             | H   | -10.6        | 18.3              | 54.0                 |
| 9380.125000     | 31.5             | H   | -4.4         | 22.5              | 54.0                 |
| 13879.125000    | 36.2             | H   | 1.5          | 17.8              | 54.0                 |
| 17949.125000    | 43.1             | H   | 11.7         | 10.9              | 54.0                 |
| 1621.000000     | 23.4             | V   | -18.7        | 19.7              | 54.0                 |
| 2125.750000     | 25.4             | V   | -17.2        | 15.2              | 54.0                 |
| 4810.750000     | 29.9             | V   | -10.6        | 15.2              | 54.0                 |
| 7848.375000     | 32.2             | V   | -5.3         | 21.8              | 54.0                 |
| 10543.375000    | 34.3             | V   | -1.4         | 19.7              | 54.0                 |
| 17964.250000    | 43.3             | V   | 12.0         | 10.7              | 54.0                 |

**Figure 13: Radiated Spurious Emission, TM2, MAX17224**


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

| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|-----------------|--------------------|-----|--------------|-------------------|----------------------|
| 31.455000       | 28.4               | H   | 24.7         | 11.6              | 40.0                 |
| 105.781250      | 21.6               | H   | 18.3         | 21.9              | 43.5                 |
| 134.881250      | 21.8               | H   | 18.4         | 21.7              | 43.5                 |
| 263.406250      | 24.0               | H   | 20.7         | 22.0              | 46.0                 |
| 555.012500      | 30.5               | H   | 26.5         | 15.5              | 46.0                 |
| 985.813750      | 33.5               | H   | 28.9         | 20.5              | 54.0                 |
| 30.121250       | 29.0               | V   | 25.3         | 11.0              | 40.0                 |
| 109.418750      | 21.8               | V   | 18.5         | 21.7              | 43.5                 |
| 130.880000      | 22.0               | V   | 18.7         | 21.5              | 43.5                 |
| 263.163750      | 24.0               | V   | 20.7         | 22.0              | 46.0                 |
| 578.171250      | 30.2               | V   | 26.1         | 15.8              | 46.0                 |
| 809.031250      | 31.8               | V   | 27.5         | 14.2              | 46.0                 |

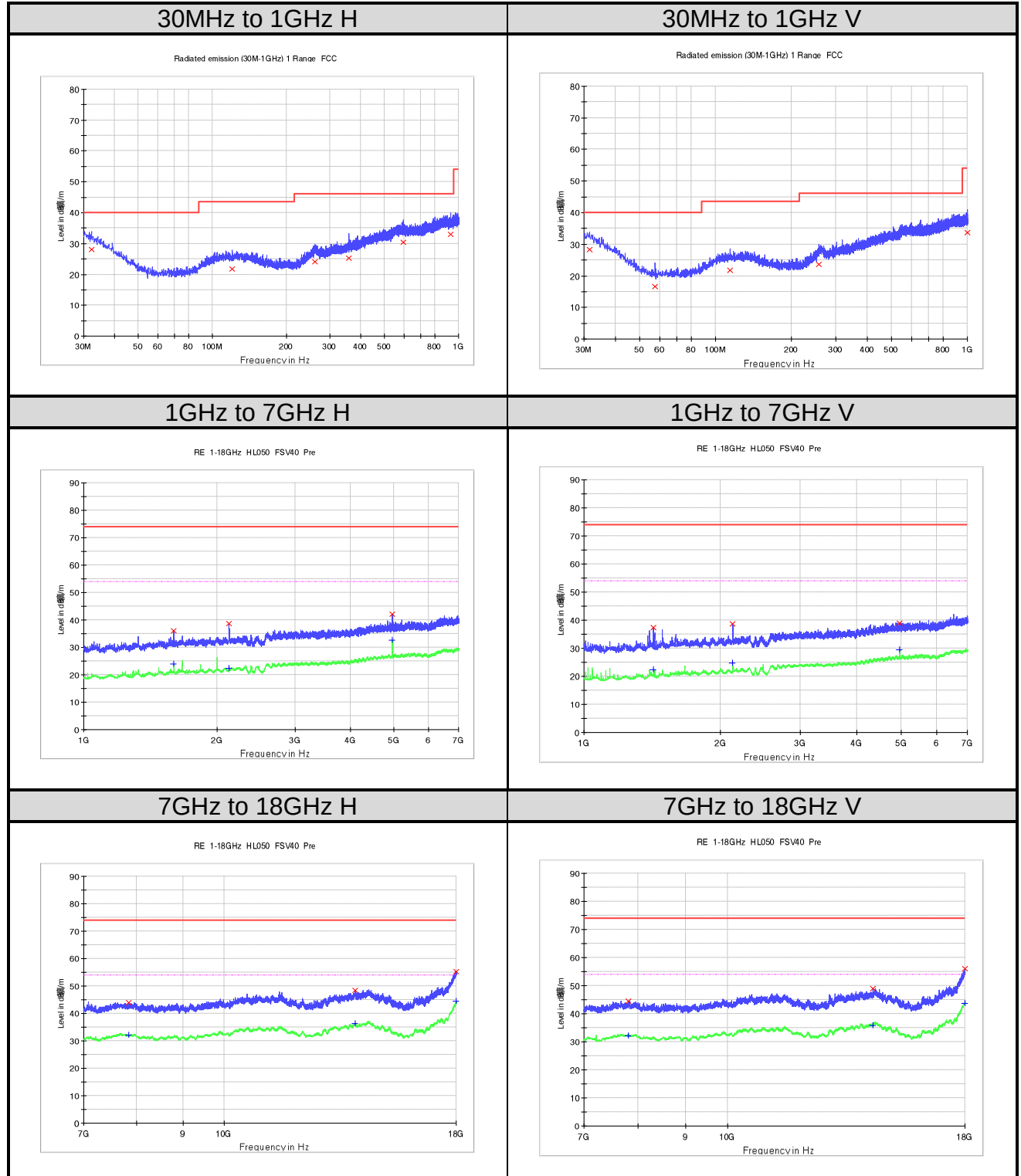
**PK**

| Frequency (MHz) | MaxPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1370.500000     | 43.9             | H   | -19.8        | 30.1              | 74.0                 |
| 2122.750000     | 43.4             | H   | -17.2        | 30.6              | 74.0                 |
| 4891.000000     | 43.9             | H   | -10.5        | 30.1              | 74.0                 |
| 10588.750000    | 47.0             | H   | -0.9         | 27.0              | 74.0                 |
| 14185.750000    | 50.4             | H   | 2.0          | 23.6              | 74.0                 |
| 17975.250000    | 56.1             | H   | 12.3         | 17.9              | 74.0                 |
| 1506.250000     | 38.6             | V   | -19.1        | 35.4              | 74.0                 |
| 2128.000000     | 38.9             | V   | -17.2        | 35.1              | 74.0                 |
| 4891.000000     | 40.1             | V   | -10.5        | 34.0              | 74.0                 |
| 7763.125000     | 45.0             | V   | -5.4         | 29.0              | 74.0                 |
| 11516.875000    | 47.4             | V   | -0.4         | 26.6              | 74.0                 |
| 17990.375000    | 55.5             | V   | 12.6         | 18.5              | 74.0                 |

**AV**

| Frequency (MHz) | Average (dBµV/m) | Pol | Corr. (dB/m) | Margin - AVG (dB) | Limit - AVG (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1370.500000     | 21.9             | H   | -19.8        | 32.1              | 54.0                 |
| 2122.750000     | 28.0             | H   | -17.2        | 16.0              | 54.0                 |
| 4891.000000     | 35.5             | H   | -10.5        | 18.5              | 54.0                 |
| 10588.750000    | 34.5             | H   | -0.9         | 19.5              | 54.0                 |
| 14185.750000    | 36.2             | H   | 2.0          | 17.8              | 54.0                 |
| 17975.250000    | 43.6             | H   | 12.3         | 10.4              | 54.0                 |
| 1506.250000     | 20.7             | V   | -19.1        | 33.3              | 54.0                 |
| 2128.000000     | 25.5             | V   | -17.2        | 28.5              | 54.0                 |
| 4891.000000     | 30.0             | V   | -10.5        | 24.0              | 54.0                 |
| 7763.125000     | 32.4             | V   | -5.4         | 21.6              | 54.0                 |
| 11516.875000    | 35.1             | V   | -0.4         | 18.9              | 54.0                 |
| 17990.375000    | 44.1             | V   | 12.6         | 9.9               | 54.0                 |



**Figure 14: Radiated Spurious Emission, TM3, MAX17224**


**Prüfbericht - Nr.: CN23CF7A 001**
*Test Report No.*
**Seite 42 von 49**
*Page 42 of 49*
**Limit and Margin**
**QP**

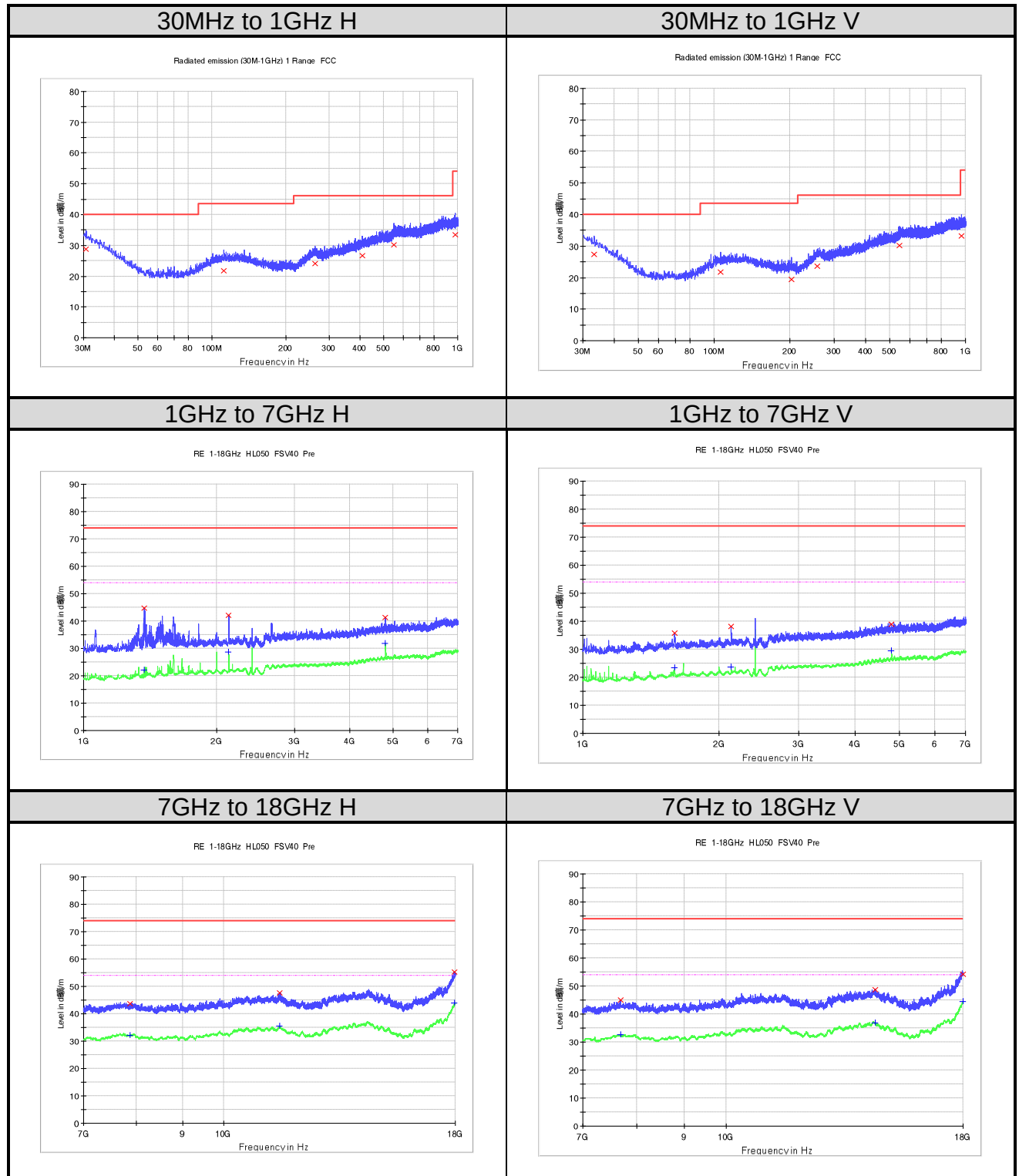
| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|-----------------|--------------------|-----|--------------|-------------------|----------------------|
| 32.182500       | 28.1               | H   | 24.4         | 11.9              | 40.0                 |
| 120.573750      | 21.9               | H   | 18.5         | 21.6              | 43.5                 |
| 260.375000      | 24.0               | H   | 20.7         | 22.0              | 46.0                 |
| 359.436250      | 25.2               | H   | 21.7         | 20.8              | 46.0                 |
| 596.116250      | 30.4               | H   | 26.2         | 15.6              | 46.0                 |
| 930.402500      | 32.9               | H   | 28.1         | 13.1              | 46.0                 |
| 31.576250       | 28.4               | V   | 24.7         | 11.6              | 40.0                 |
| 57.402500       | 16.5               | V   | 12.8         | 23.5              | 40.0                 |
| 114.147500      | 21.8               | V   | 18.5         | 21.7              | 43.5                 |
| 257.828750      | 23.7               | V   | 20.4         | 22.3              | 46.0                 |
| 997.090000      | 33.6               | V   | 28.9         | 20.4              | 54.0                 |

**PK**

| Frequency (MHz) | MaxPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1598.500000     | 35.9             | H   | -18.8        | 38.1              | 74.0                 |
| 2123.500000     | 38.7             | H   | -17.2        | 35.3              | 74.0                 |
| 4961.500000     | 42.0             | H   | -10.4        | 32.0              | 74.0                 |
| 7838.750000     | 44.0             | H   | -5.4         | 30.0              | 74.0                 |
| 13928.625000    | 48.5             | H   | 1.8          | 25.5              | 74.0                 |
| 17989.000000    | 55.2             | H   | 12.5         | 18.8              | 74.0                 |
| 1423.000000     | 37.3             | V   | -19.6        | 36.7              | 74.0                 |
| 2128.000000     | 38.7             | V   | -17.2        | 35.3              | 74.0                 |
| 4959.250000     | 38.9             | V   | -10.4        | 35.1              | 74.0                 |
| 7820.875000     | 44.5             | V   | -5.4         | 29.5              | 74.0                 |
| 14332.875000    | 48.8             | V   | 2.4          | 25.2              | 74.0                 |
| 17995.875000    | 56.1             | V   | 12.7         | 17.9              | 74.0                 |

**AV**

| Frequency (MHz) | Average (dBµV/m) | Pol | Corr. (dB/m) | Margin - AVG (dB) | Limit - AVG (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1598.500000     | 24.0             | H   | -18.8        | 30.0              | 54.0                 |
| 2123.500000     | 22.5             | H   | -17.2        | 31.5              | 54.0                 |
| 4961.500000     | 32.6             | H   | -10.4        | 21.5              | 54.0                 |
| 7838.750000     | 32.0             | V   | -5.4         | 22.0              | 54.0                 |
| 13928.625000    | 36.2             | V   | 1.8          | 17.8              | 54.0                 |
| 17989.000000    | 44.4             | V   | 12.5         | 9.7               | 54.0                 |
| 1423.000000     | 22.3             | V   | -19.6        | 31.7              | 54.0                 |
| 2128.000000     | 24.7             | V   | -17.2        | 29.3              | 54.0                 |
| 4959.250000     | 29.4             | V   | -10.4        | 24.6              | 54.0                 |
| 7820.875000     | 32.1             | V   | -5.4         | 21.9              | 54.0                 |
| 14332.875000    | 35.9             | V   | 2.4          | 18.1              | 54.0                 |
| 17995.875000    | 43.7             | V   | 12.7         | 10.3              | 54.0                 |

**Figure 15: Radiated Spurious Emission, TM1, OC6811**


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

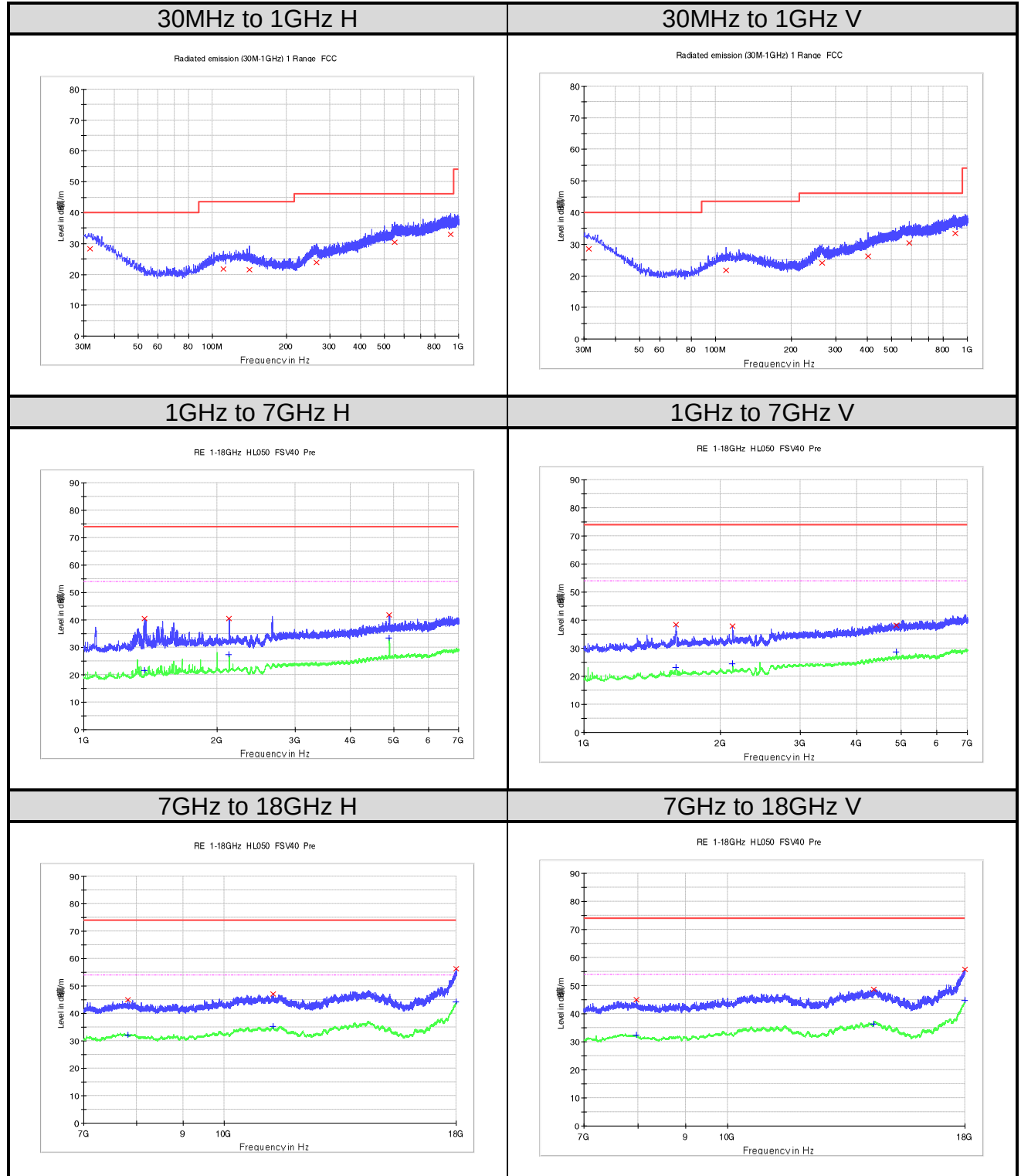
| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|-----------------|--------------------|-----|--------------|-------------------|----------------------|
| 30.606250       | 28.8               | H   | 25.1         | 11.2              | 40.0                 |
| 111.722500      | 21.8               | H   | 18.5         | 21.7              | 43.5                 |
| 262.072500      | 24.1               | H   | 20.7         | 21.9              | 46.0                 |
| 409.997500      | 26.6               | H   | 23.1         | 19.4              | 46.0                 |
| 549.677500      | 30.2               | H   | 26.3         | 15.8              | 46.0                 |
| 974.537500      | 33.5               | H   | 28.8         | 20.5              | 54.0                 |
| 33.273750       | 27.3               | V   | 23.7         | 12.7              | 40.0                 |
| 106.145000      | 21.6               | V   | 18.3         | 21.9              | 43.5                 |
| 202.538750      | 19.4               | V   | 16.2         | 24.1              | 43.5                 |
| 257.101250      | 23.6               | V   | 20.3         | 22.4              | 46.0                 |
| 547.495000      | 30.1               | V   | 26.1         | 15.9              | 46.0                 |
| 961.321250      | 33.3               | V   | 28.5         | 20.7              | 54.0                 |

**PK**

| Frequency (MHz) | MaxPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1371.250000     | 44.8             | H   | -19.8        | 29.2              | 74.0                 |
| 2122.750000     | 42.2             | H   | -17.2        | 31.8              | 74.0                 |
| 4811.500000     | 41.4             | H   | -10.6        | 32.6              | 74.0                 |
| 7875.875000     | 43.6             | H   | -5.2         | 30.4              | 74.0                 |
| 11522.375000    | 47.6             | H   | -0.5         | 26.4              | 74.0                 |
| 17976.625000    | 55.4             | H   | 12.3         | 18.6              | 74.0                 |
| 1593.250000     | 35.7             | V   | -18.8        | 38.3              | 74.0                 |
| 2123.500000     | 38.1             | V   | -17.2        | 35.9              | 74.0                 |
| 4810.750000     | 38.9             | V   | -10.6        | 35.1              | 74.0                 |
| 7691.625000     | 44.9             | V   | -5.3         | 29.1              | 74.0                 |
| 14471.750000    | 48.8             | V   | 2.6          | 25.2              | 74.0                 |
| 17998.625000    | 54.2             | V   | 12.7         | 19.8              | 74.0                 |

**AV**

| Frequency (MHz) | Average (dBµV/m) | Pol | Corr. (dB/m) | Margin - AVG (dB) | Limit - AVG (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1371.250000     | 22.0             | H   | -19.8        | 32.0              | 54.0                 |
| 2122.750000     | 28.8             | H   | -17.2        | 25.2              | 54.0                 |
| 4811.500000     | 31.9             | H   | -10.6        | 22.1              | 54.0                 |
| 7875.875000     | 32.2             | H   | -5.2         | 21.8              | 54.0                 |
| 11522.375000    | 35.4             | H   | -0.5         | 18.6              | 54.0                 |
| 17976.625000    | 43.8             | H   | 12.3         | 10.2              | 54.0                 |
| 1593.250000     | 23.3             | V   | -18.8        | 30.7              | 54.0                 |
| 2123.500000     | 23.8             | V   | -17.2        | 30.2              | 54.0                 |
| 4810.750000     | 29.6             | V   | -10.6        | 24.4              | 54.0                 |
| 7691.625000     | 32.6             | V   | -5.3         | 21.4              | 54.0                 |
| 14471.750000    | 36.9             | V   | 2.6          | 17.1              | 54.0                 |
| 17998.625000    | 44.5             | V   | 12.7         | 9.5               | 54.0                 |

**Figure 16: Radiated Spurious Emission, TM2, OC6811**


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

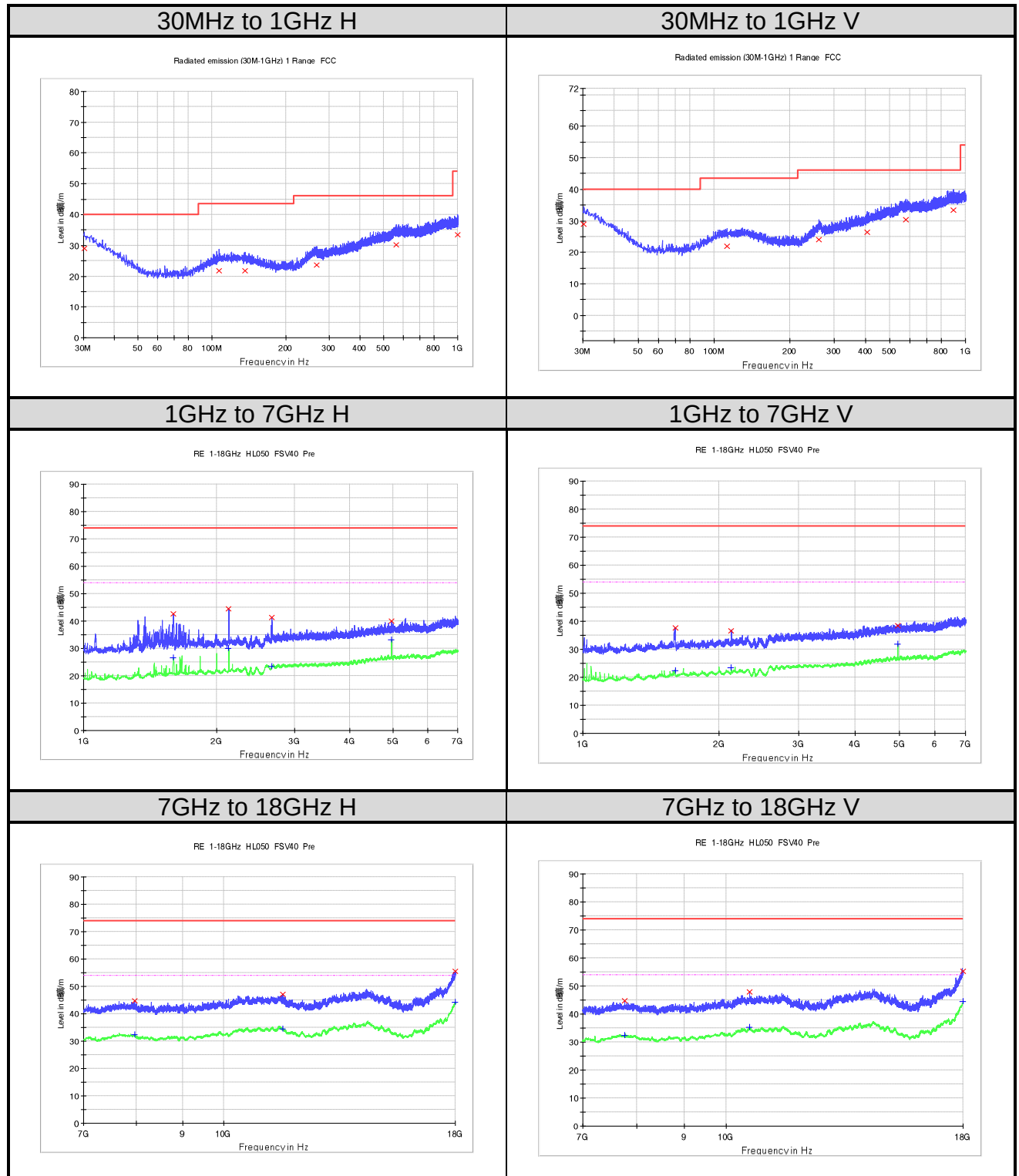
| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|-----------------|--------------------|-----|--------------|-------------------|----------------------|
| 31.818750       | 28.3               | H   | 24.6         | 11.8              | 40.0                 |
| 110.510000      | 21.8               | H   | 18.5         | 21.7              | 43.5                 |
| 141.550000      | 21.4               | H   | 18.0         | 22.1              | 43.5                 |
| 265.588750      | 24.0               | H   | 20.6         | 22.0              | 46.0                 |
| 551.738750      | 30.4               | H   | 26.3         | 15.6              | 46.0                 |
| 927.371250      | 33.0               | H   | 28.1         | 13.1              | 46.0                 |
| 31.333750       | 28.5               | V   | 24.8         | 11.5              | 40.0                 |
| 110.146250      | 21.8               | V   | 18.5         | 21.7              | 43.5                 |
| 264.376250      | 24.1               | V   | 20.7         | 22.0              | 46.0                 |
| 402.965000      | 26.3               | V   | 22.7         | 19.7              | 46.0                 |
| 585.810000      | 30.4               | V   | 26.1         | 15.6              | 46.0                 |
| 894.755000      | 33.5               | V   | 28.4         | 12.5              | 46.0                 |

**PK**

| Frequency (MHz) | MaxPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1372.750000     | 40.4             | H   | -19.8        | 33.6              | 74.0                 |
| 2123.500000     | 40.6             | H   | -17.2        | 33.4              | 74.0                 |
| 4889.500000     | 41.8             | H   | -10.5        | 32.2              | 74.0                 |
| 7833.250000     | 45.0             | H   | -5.4         | 29.0              | 74.0                 |
| 11317.500000    | 47.1             | H   | -0.9         | 26.9              | 74.0                 |
| 17998.625000    | 56.3             | H   | 12.7         | 17.7              | 74.0                 |
| 1597.750000     | 38.5             | V   | -18.8        | 35.5              | 74.0                 |
| 2123.500000     | 37.8             | V   | -17.2        | 36.2              | 74.0                 |
| 4891.000000     | 38.1             | V   | -10.5        | 35.9              | 74.0                 |
| 7968.000000     | 45.0             | V   | -5.1         | 29.0              | 74.0                 |
| 14365.875000    | 48.8             | V   | 2.5          | 25.2              | 74.0                 |
| 17995.875000    | 55.7             | V   | 12.7         | 18.3              | 74.0                 |

**AV**

| Frequency (MHz) | Average (dBµV/m) | Pol | Corr. (dB/m) | Margin - AVG (dB) | Limit - AVG (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1372.750000     | 21.7             | H   | -19.8        | 32.3              | 54.0                 |
| 2123.500000     | 27.4             | H   | -17.2        | 26.6              | 54.0                 |
| 4889.500000     | 33.3             | H   | -10.5        | 20.7              | 54.0                 |
| 7833.250000     | 32.0             | H   | -5.4         | 22.0              | 54.0                 |
| 11317.500000    | 35.2             | H   | -0.9         | 18.8              | 54.0                 |
| 17998.625000    | 44.2             | H   | 12.7         | 9.8               | 54.0                 |
| 1597.750000     | 23.2             | V   | -18.8        | 30.8              | 54.0                 |
| 2123.500000     | 24.6             | V   | -17.2        | 29.4              | 54.0                 |
| 4891.000000     | 28.6             | V   | -10.5        | 25.4              | 54.0                 |
| 7968.000000     | 32.4             | V   | -5.1         | 21.6              | 54.0                 |
| 14365.875000    | 36.4             | V   | 2.5          | 17.6              | 54.0                 |
| 17995.875000    | 44.7             | V   | 12.7         | 9.3               | 54.0                 |

**Figure 17: Radiated Spurious Emission, TM3, OC6811**


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

| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|-----------------|--------------------|-----|--------------|-------------------|----------------------|
| 30.121250       | 29.0               | H   | 25.3         | 11.0              | 40.0                 |
| 106.993750      | 21.8               | H   | 18.4         | 21.8              | 43.5                 |
| 136.700000      | 21.8               | H   | 18.3         | 21.8              | 43.5                 |
| 267.650000      | 23.5               | H   | 20.2         | 22.5              | 46.0                 |
| 563.136250      | 30.3               | H   | 26.2         | 15.7              | 46.0                 |
| 998.787500      | 33.5               | H   | 28.9         | 20.5              | 54.0                 |
| 30.242500       | 29.0               | V   | 25.3         | 11.0              | 40.0                 |
| 112.328750      | 21.9               | V   | 18.5         | 21.6              | 43.5                 |
| 260.738750      | 24.1               | V   | 20.7         | 22.0              | 46.0                 |
| 406.481250      | 26.5               | V   | 22.9         | 19.5              | 46.0                 |
| 577.080000      | 30.3               | V   | 26.1         | 15.8              | 46.0                 |
| 896.695000      | 33.4               | V   | 28.4         | 12.6              | 46.0                 |

**PK**

| Frequency (MHz) | MaxPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - PK+ (dB) | Limit - PK+ (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1597.750000     | 42.6             | H   | -18.8        | 31.4              | 74.0                 |
| 2123.500000     | 44.4             | H   | -17.2        | 29.7              | 74.0                 |
| 2662.750000     | 41.2             | H   | -15.4        | 32.8              | 74.0                 |
| 4963.000000     | 40.0             | H   | -10.4        | 34.0              | 74.0                 |
| 7965.250000     | 44.7             | H   | -5.2         | 30.4              | 74.0                 |
| 11621.375000    | 47.0             | H   | -0.5         | 26.4              | 74.0                 |
| 17995.875000    | 55.5             | H   | 12.3         | 18.6              | 74.0                 |
| 1599.250000     | 37.6             | V   | -18.8        | 36.4              | 74.0                 |
| 2125.750000     | 36.7             | V   | -17.2        | 37.3              | 74.0                 |
| 4963.000000     | 38.3             | V   | -10.4        | 35.7              | 74.0                 |
| 7763.125000     | 44.7             | V   | -5.4         | 29.3              | 74.0                 |
| 10590.125000    | 48.0             | V   | -0.9         | 26.0              | 74.0                 |
| 18000.000000    | 55.3             | V   | 12.8         | 18.7              | 74.0                 |

**AV**

| Frequency (MHz) | Average (dBµV/m) | Pol | Corr. (dB/m) | Margin - AVG (dB) | Limit - AVG (dBµV/m) |
|-----------------|------------------|-----|--------------|-------------------|----------------------|
| 1597.750000     | 26.6             | H   | -18.8        | 27.4              | 54.0                 |
| 2123.500000     | 30.1             | H   | -17.2        | 23.9              | 54.0                 |
| 2662.750000     | 23.5             | H   | -15.4        | 30.5              | 54.0                 |
| 4963.000000     | 33.3             | H   | -10.4        | 20.7              | 54.0                 |
| 7965.250000     | 32.4             | H   | -5.1         | 21.6              | 54.0                 |
| 11621.375000    | 34.5             | H   | -1.1         | 19.5              | 54.0                 |
| 17995.875000    | 44.1             | H   | 12.7         | 9.9               | 54.0                 |
| 1599.250000     | 22.5             | V   | -18.8        | 31.5              | 54.0                 |
| 2125.750000     | 23.5             | V   | -17.2        | 30.5              | 54.0                 |
| 4963.000000     | 31.9             | V   | -10.4        | 22.1              | 54.0                 |
| 7763.125000     | 32.4             | V   | -5.4         | 21.6              | 54.0                 |
| 10590.125000    | 35.3             | V   | -0.9         | 18.7              | 54.0                 |
| 18000.000000    | 44.4             | V   | 12.8         | 9.6               | 54.0                 |



## 6. List of Tables

|                                                       |    |
|-------------------------------------------------------|----|
| Table 1: List of Test and Measurement Equipment ..... | 5  |
| Table 2: Measurement Uncertainty .....                | 6  |
| Table 3: Technical Specification of EUT .....         | 7  |
| Table 4: Independent Operation Modes .....            | 8  |
| Table 5: Power parameter value .....                  | 9  |
| Table 6: Antenna Requirement .....                    | 10 |
| Table 7: Peak Output Power .....                      | 19 |
| Table 8: Average Output Power .....                   | 19 |

## 7. List of Figures

|                                                            |    |
|------------------------------------------------------------|----|
| Figure 1: Reference level .....                            | 24 |
| Figure 2: Conducted Spurious Emission .....                | 25 |
| Figure 3: Conducted Band Edge .....                        | 25 |
| Figure 4: Radiated Band-Edge, TM1, H, MAX17224 .....       | 28 |
| Figure 5: Radiated Band-Edge, TM1, V, MAX17224 .....       | 29 |
| Figure 6: Radiated Band-Edge, TM3, H, MAX17224 .....       | 30 |
| Figure 7: Radiated Band-Edge, TM3, V, MAX17224 .....       | 31 |
| Figure 8: Radiated Band-Edge, TM1, H, OC6811 .....         | 32 |
| Figure 9: Radiated Band-Edge, TM1, V, OC6811 .....         | 33 |
| Figure 10: Radiated Band-Edge, TM3, H, OC6811 .....        | 34 |
| Figure 11: Radiated Band-Edge, TM3, V, OC6811 .....        | 35 |
| Figure 12: Radiated Spurious Emission, TM1, MAX17224 ..... | 37 |
| Figure 13: Radiated Spurious Emission, TM2, MAX17224 ..... | 39 |
| Figure 14: Radiated Spurious Emission, TM3, MAX17224 ..... | 41 |
| Figure 15: Radiated Spurious Emission, TM1, OC6811 .....   | 43 |
| Figure 16: Radiated Spurious Emission, TM2, OC6811 .....   | 45 |
| Figure 17: Radiated Spurious Emission, TM3, OC6811 .....   | 47 |