

|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                               |                                                                                     |                                          |                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                                                                                | <b>CN21JML7 001</b>                                                                                                                                                           | <b>Auftrags-Nr.:</b><br>Order no.:                                                  | <b>244312940</b>                         | <b>Seite 1 von 123</b><br>Page 1 of 123                 |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                                                                       | <b>1288983</b>                                                                                                                                                                | <b>Auftragsdatum:</b><br>Order date:                                                | <b>2021-02-08</b>                        |                                                         |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>IKEA of Sweden AB</b><br>Box 702, SE-343 81, Älmhult, Sweden                                                                                                               |                                                                                     |                                          |                                                         |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>VAPPEBY Lamp BT speaker outdoor</b>                                                                                                                                        |                                                                                     |                                          |                                                         |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                                                                                | <b>E2004</b><br><b>FCC ID: FHO-E2004</b><br><b>IC: 10912A-E2004</b>                                                                                                           |                                                                                     |                                          |                                                         |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Complete test</b>                                                                                                                                                          |                                                                                     |                                          |                                                         |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                                                                               | <b>FCC CFR47 Part 15, Subpart C Section 15.247</b><br><b>RSS-Gen Issue 5, Amendment 2, February 2021</b><br><b>RSS-247 Issue 2, February 2017</b><br><b>ANSI C63.10: 2013</b> |                                                                                     |                                          |                                                         |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                                                                      | <b>2021-06-09</b>                                                                                                                                                             |  |                                          |                                                         |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>A003069443-001-002</b>                                                                                                                                                     |                                                                                     |                                          |                                                         |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Refer to test report</b>                                                                                                                                                   |                                                                                     |                                          |                                                         |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                                                                               | <b>TÜV Rheinland (Shanghai) Co., Ltd.</b>                                                                                                                                     |                                                                                     |                                          |                                                         |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                                                                            | <b>TÜV Rheinland (Shanghai) Co., Ltd.</b>                                                                                                                                     |                                                                                     |                                          |                                                         |
| <b>Prüfergebnis*:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Pass</b>                                                                                                                                                                   |                                                                                     |                                          |                                                         |
| <b>geprüft von:</b><br>tested by:                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>X</b> <i>Hongfei Wu</i><br>Signed by: Hongfei Wu                                                                                                                           |                                                                                     | <b>genehmigt von:</b><br>authorized by:  | <b>X</b> <i>Elliot Zhang</i><br>Signed by: Elliot Zhang |
| <b>Datum:</b><br>Date:                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>2021-08-20</b>                                                                                                                                                             |                                                                                     | <b>Ausstellungsdatum:</b><br>Issue date: | <b>2021-08-20</b>                                       |
| <b>Stellung / Position:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>PE</b>                                                                                                                                                                     |                                                                                     | <b>Stellung / Position:</b>              | <b>Reviewer</b>                                         |
| <b>Sonstiges /</b><br>Other:                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>HVIN: E2004</b>                                                                                                                                                            |                                                                                     |                                          |                                                         |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                                                                            | <b>Prüfmuster vollständig und unbeschädigt</b><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><i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i> |                                                                                                                                                                               |                                                                                     |                                          |                                                         |

## 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: Pass

### **5.3.1 RADIATED BAND-EDGE**

RESULT: Pass

### **5.3.2 RADIATED SPURIOUS EMISSION**

RESULT: Pass

## Contents

|            |                                                            |            |
|------------|------------------------------------------------------------|------------|
| <b>1.</b>  | <b>GENERAL REMARKS .....</b>                               | <b>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>20dB &amp; 99% Bandwidth.....</i>                       | <i>12</i>  |
| 5.1.3      | <i>Peak Output Power .....</i>                             | <i>15</i>  |
| 5.1.4      | <i>Frequency Separation .....</i>                          | <i>18</i>  |
| 5.1.5      | <i>Number of Hopping Frequency.....</i>                    | <i>21</i>  |
| 5.1.6      | <i>Time of Occupancy .....</i>                             | <i>24</i>  |
| 5.1.7      | <i>Conducted Band Edge and out-of Band Emissions .....</i> | <i>27</i>  |
| <b>5.2</b> | <b>EMISSION IN THE FREQUENCY RANGE UP TO 30MHZ .....</b>   | <b>32</b>  |
| 5.2.1      | <i>Conducted Emission.....</i>                             | <i>32</i>  |
| <b>5.3</b> | <b>EMISSION IN THE FREQUENCY RANGE ABOVE 30MHZ.....</b>    | <b>35</b>  |
| 5.3.1      | <i>Radiated Band-Edge .....</i>                            | <i>35</i>  |
| 5.3.2      | <i>Radiated Spurious Emission.....</i>                     | <i>48</i>  |
| <b>6.</b>  | <b>LIST OF TABLES .....</b>                                | <b>121</b> |
| <b>7.</b>  | <b>LIST OF FIGURES .....</b>                               | <b>121</b> |

## 1. General Remarks

### 1.1 Complementary Materials

Null.

## 2. Test Sites

### 2.1 Test Facilities

TÜV Rheinland (Shanghai) Co., Ltd.

Shanghai TUV 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

| Instrument                        | Manufacturer    | Type No.             | Asset No.  | Cali. Due Date |
|-----------------------------------|-----------------|----------------------|------------|----------------|
| 3m modified semi-anechoic chamber | Frankonia       | SAC3                 | G1811378   | 2022-06-27     |
| Bilog antenna                     | Teseq           | CBL 6112D            | G1811425   | 2023-03-10     |
| EMI test receiver                 | Rohde & Schwarz | ESCI                 | G1811402   | 2021-09-18     |
| Spectrum analyser                 | Rohde & Schwarz | FSV40                | G1822702   | 2021-11-01     |
| Preamplifier                      | Taiwan EMCI     | EMC184045SE          | G1825372   | 2023-03-06     |
| Log periodic antenna              | Rohde & Schwarz | HL050                | G1811417   | 2023-03-10     |
| Broadband Horn Antenna            | Schwarzbeck     | BBHA 9170            | 9170-305   | 2023-07-09     |
| Preamplifier                      | Taiwan EMCI     | EMC051845SE          | G1825371   | 2023-03-06     |
| Spectrum Analyzer                 | Keysight        | N9020A               | MY54500180 | 2021-09-08     |
| Thermohygrometer                  | Testo           | 608-H1               | 1241320614 | 2021-10-13     |
| EMI test receiver                 | R&S             | ESIB26               | G1811380   | 2023-03-06     |
| Artificial main network           | R&S             | ENV432               | G1830003   | 2022-11-01     |
| EMC measurement software          | R&S             | EMC32 (Ver 10.20.01) | G1824845   | N/A            |

## 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 a Bluetooth speaker.

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:                                | VAPPEBY Lamp BT speaker outdoor                  |
| Model No.:                                   | E2004                                            |
| Operating Voltage:                           | DC 7.2V (Li-ion Battery)                         |
| Technical Specification of Bluetooth Classic |                                                  |
| Frequency Range:                             | 2402 to 2480MHz                                  |
| Modulation Type:                             | GFSK, $\pi/4$ DQPSK, 8DPSK                       |
| Data Rate:                                   | 1Mbps(GFSK), 2Mbps( $\pi/4$ DQPSK), 3Mbps(8DPSK) |
| Antenna Type:                                | PCB Antenna                                      |
| Antenna Gain:                                | -3.07 dBi (Provided by the Client)               |

### 3.3 Independent Operation Modes

**Table 4: Independent Operation Modes**

| Test Mode | Data Rate             | Channel |
|-----------|-----------------------|---------|
| TM1       | 1-DH5                 | 00      |
| TM2       | 1-DH5                 | 39      |
| TM3       | 1-DH5                 | 78      |
| TM4       | 2-DH5                 | 00      |
| TM5       | 2-DH5                 | 39      |
| TM6       | 2-DH5                 | 78      |
| TM7       | 3-DH5                 | 00      |
| TM8       | 3-DH5                 | 39      |
| TM9       | 3-DH5                 | 78      |
| TM10      | 1-DH1                 | Hopping |
| TM11      | 1-DH3                 | Hopping |
| TM12      | 1-DH5                 | Hopping |
| TM13      | 2-DH1                 | Hopping |
| TM14      | 2-DH3                 | Hopping |
| TM15      | 2-DH5                 | Hopping |
| TM16      | 3-DH1                 | Hopping |
| TM17      | 3-DH3                 | Hopping |
| TM18      | 3-DH5                 | Hopping |
| TM19      | Normal Operating Mode |         |

### 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: BT FCC tool, V2.21

**Table 5: Power parameter value**

| Channel Frequency<br>[MHz] | Power Parameter Value |
|----------------------------|-----------------------|
| 2402                       | 3                     |
| 2441                       | 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 -3.07 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.: CN21JML7 001**  
Test Report No.**Seite 11 von 123**  
Page 11 of 123**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: | -3.07 dBi   |

**Verdict:** PASS

### 5.1.2 20dB & 99% Bandwidth

**RESULT:**

## Pass

|                      |                                                                          |
|----------------------|--------------------------------------------------------------------------|
| Date of testing      | : 2021-06-24                                                             |
| Ambient temperature  | : 21.6°C                                                                 |
| Relative humidity    | : 58.4%                                                                  |
| Atmospheric pressure | : 101kPa                                                                 |
| Test requirement     | : FCC Part 15.247(a)(1)<br>RSS-247 Issue 2, February 2017, Clause 5.1(a) |
| Test procedure       | : ANSI C63.10: 2013                                                      |
| Test voltage         | : DC 7.2V                                                                |
| Test modes applied   | : TM1 to TM9                                                             |

### Table 7: 20dB & 99% Bandwidth

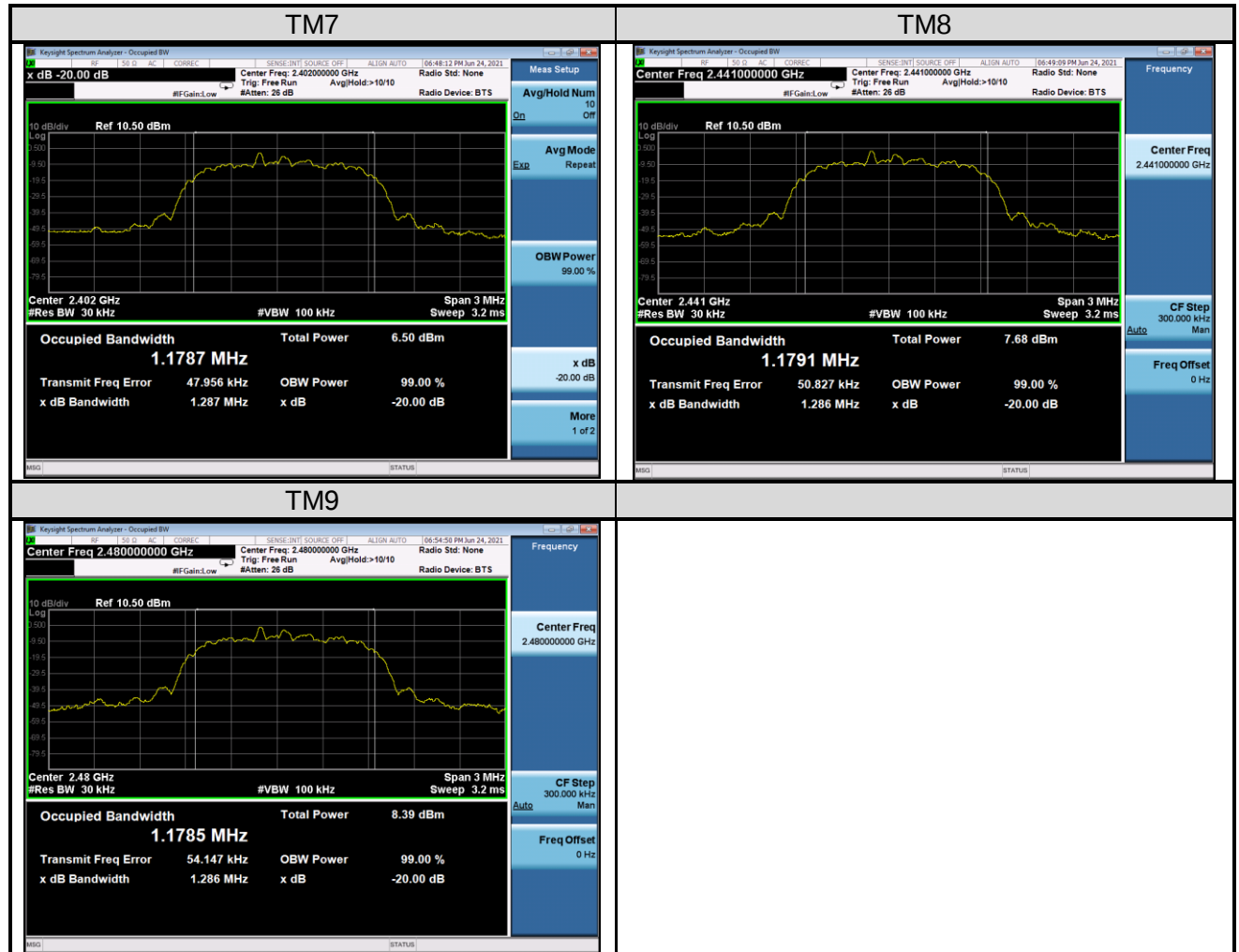
| Test Mode | Mode  | CH. | Freq.<br>[MHz] | 20dB Bandwidht<br>[kHz] | 99% Bandwidth<br>[kHz] |
|-----------|-------|-----|----------------|-------------------------|------------------------|
| TM1       | 1-DH5 | 00  | 2402           | 935.0                   | 861.11                 |
| TM2       | 1-DH5 | 39  | 2441           | 934.2                   | 861.00                 |
| TM3       | 1-DH5 | 78  | 2480           | 935.0                   | 862.19                 |
| TM4       | 2-DH5 | 00  | 2402           | 1329                    | 1187.1                 |
| TM5       | 2-DH5 | 39  | 2441           | 1330                    | 1188.0                 |
| TM6       | 2-DH5 | 78  | 2480           | 1329                    | 1187.7                 |
| TM7       | 3-DH5 | 00  | 2402           | 1287                    | 1178.7                 |
| TM8       | 3-DH5 | 39  | 2441           | 1286                    | 1179.1                 |
| TM9       | 3-DH5 | 78  | 2480           | 1286                    | 1178.5                 |

Note:

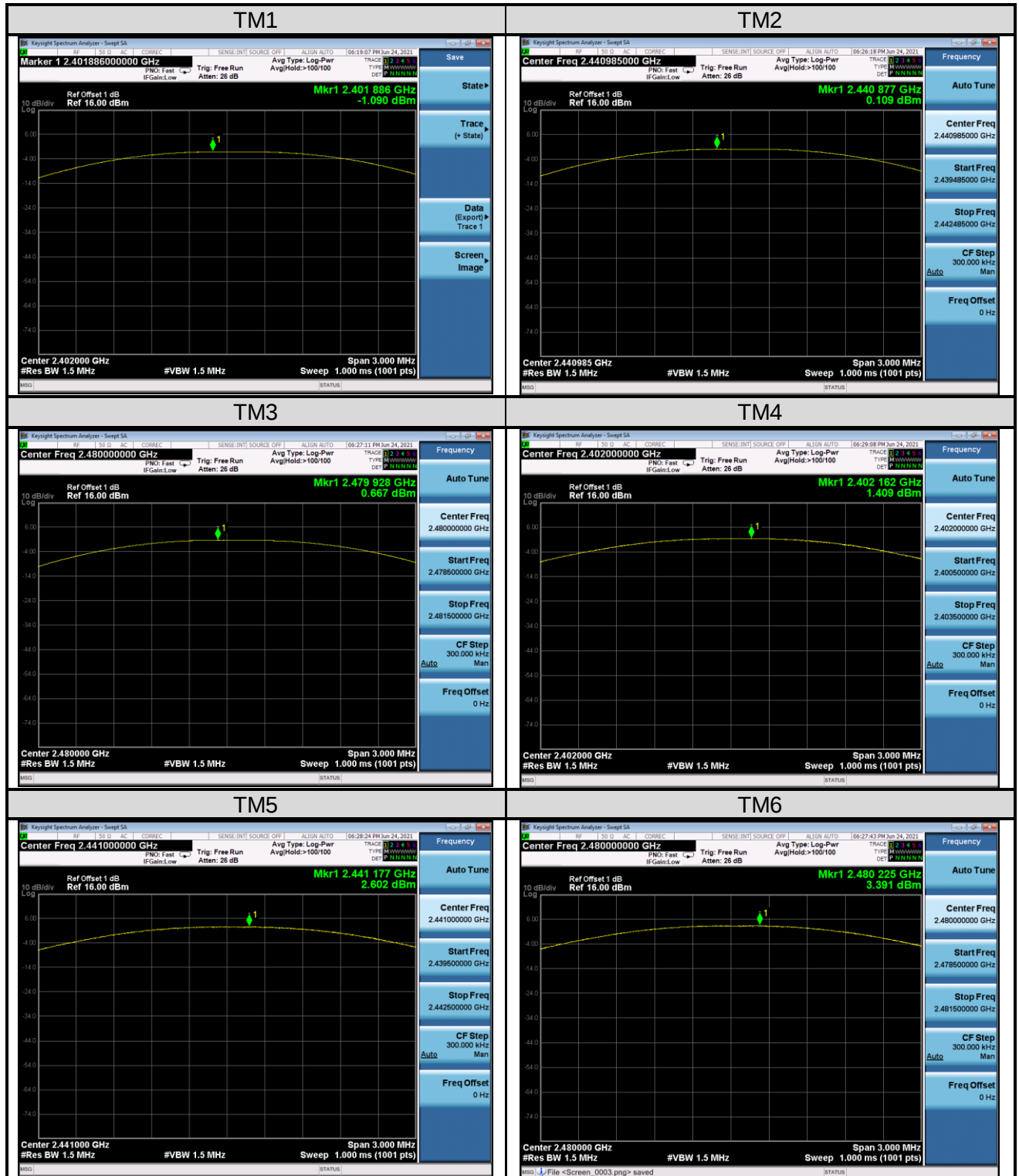
For frequency hopping systems operating in the 2400 – 2483.5MHz band, no bandwidth limit is specified. The test data is provide for reference.

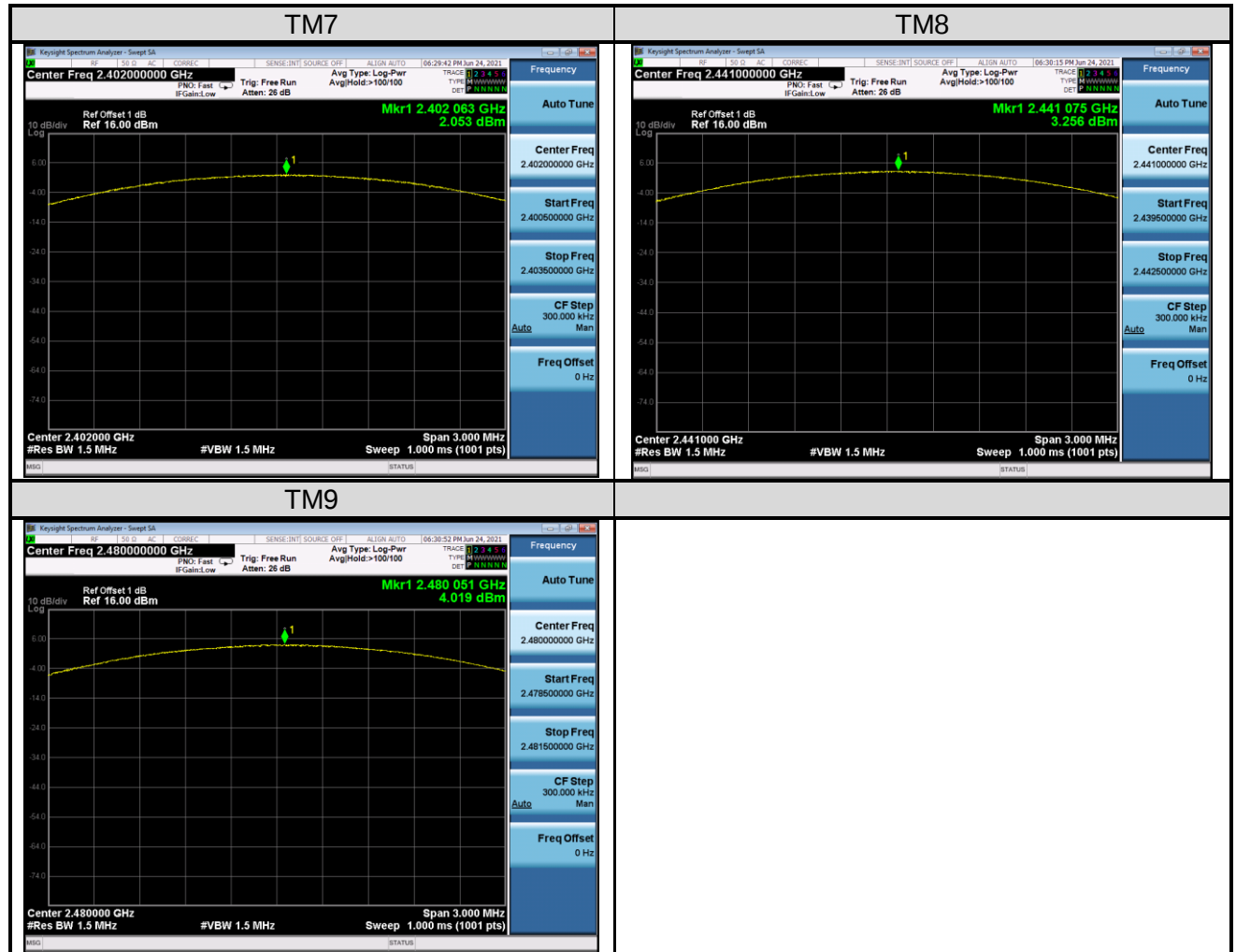
And according to FCC, when the occupied bandwidth limit is not stated in the applicable FCC or reference measurement method, the transmitted signal band width shall be reported as the 99% emission bandwidth.

**Figure 1: 20dB & 99% Bandwidth**

The cable loss=1dB was provided by the client, and was factored in the result Peak Conducted Output Power

**Figure 2: Peak Output Power, TM1 to TM9**




### 5.1.4 Frequency Separation

**RESULT:**

## Pass

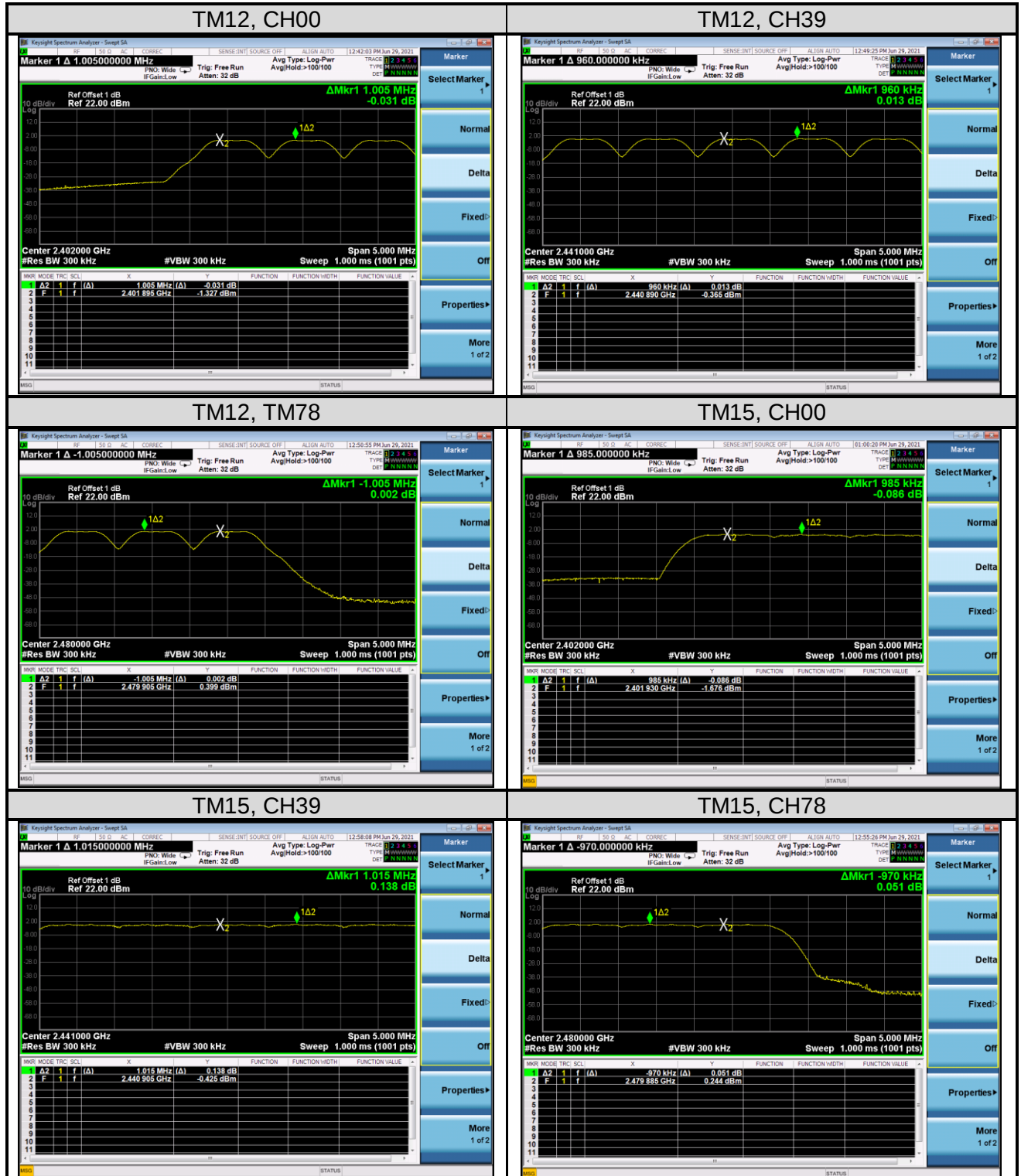
|                      |                                                                          |
|----------------------|--------------------------------------------------------------------------|
| Date of testing      | : 2021-06-29                                                             |
| Ambient temperature  | : 21.5°C                                                                 |
| Relative humidity    | : 57.4%                                                                  |
| Atmospheric pressure | : 101kPa                                                                 |
| Test requirement     | : FCC Part 15.247(a)(1)<br>RSS-247 Issue 2, February 2017, Clause 5.1(b) |
| Test procedure       | : ANSI C63.10: 2013                                                      |
| Test voltage         | : DC 7.2V                                                                |
| Test modes applied   | : TM12 , TM15, TM18                                                      |

### Table 9: Frequency Separation

| Test Mode | CH. | Frequency<br>[MHz] | Frequency Separation<br>[kHz] | Limit<br>[kHz] |
|-----------|-----|--------------------|-------------------------------|----------------|
| TM12      | 00  | 2402               | 1005                          | ≥637.733       |
|           | 39  | 2441               | 960                           | ≥640.667       |
|           | 78  | 2480               | 1005                          | ≥640.333       |
| TM15      | 00  | 2402               | 970                           | ≥897.333       |
|           | 39  | 2441               | 1015                          | ≥895.333       |
|           | 78  | 2480               | 985                           | ≥897.333       |
| TM18      | 00  | 2402               | 1000                          | ≥870.000       |
|           | 39  | 2441               | 990                           | ≥870.000       |
|           | 78  | 2480               | 1015                          | ≥867.333       |

Note:

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

**Figure 3: Frequency Separation**




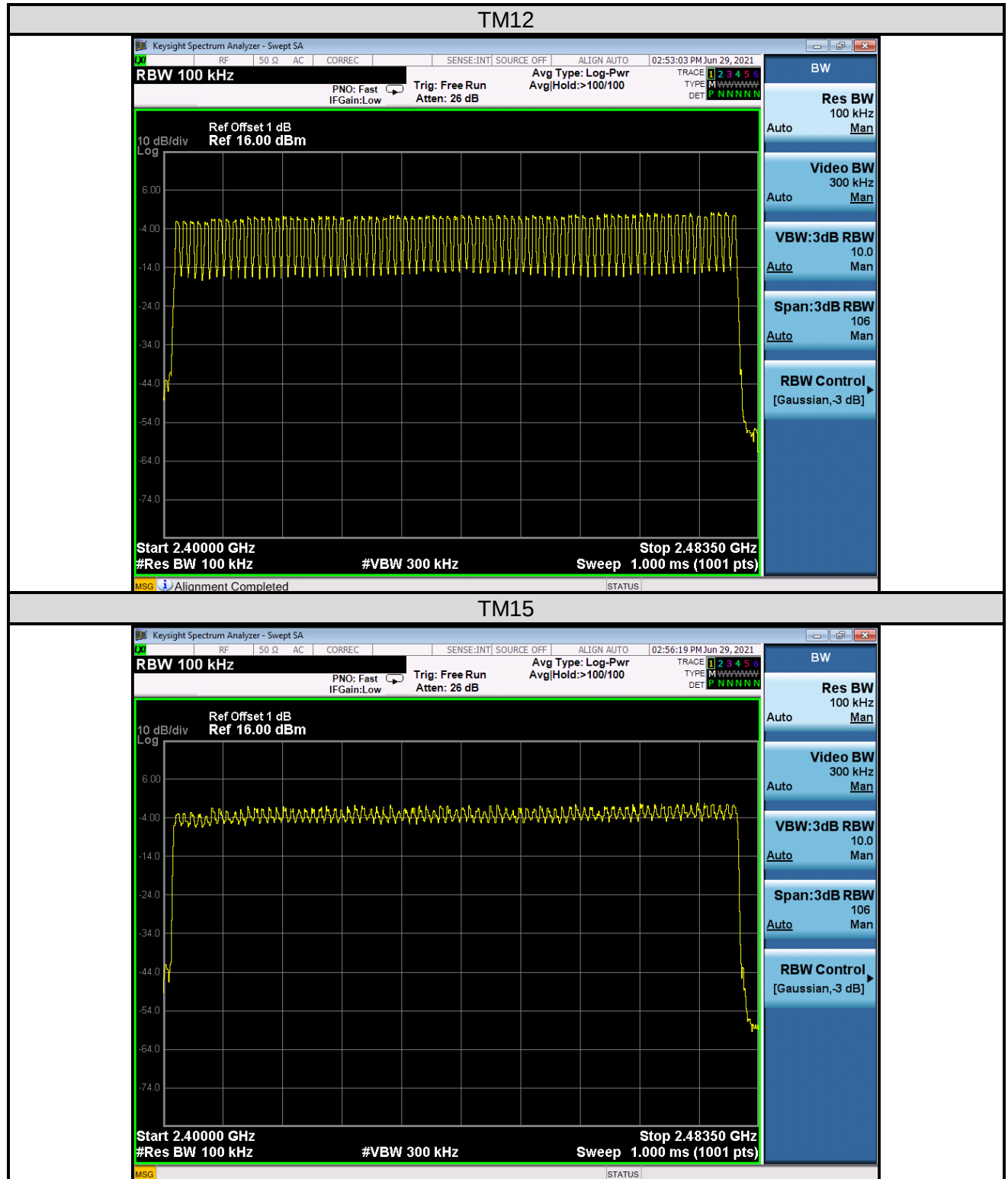
### 5.1.5 Number of Hopping Frequency

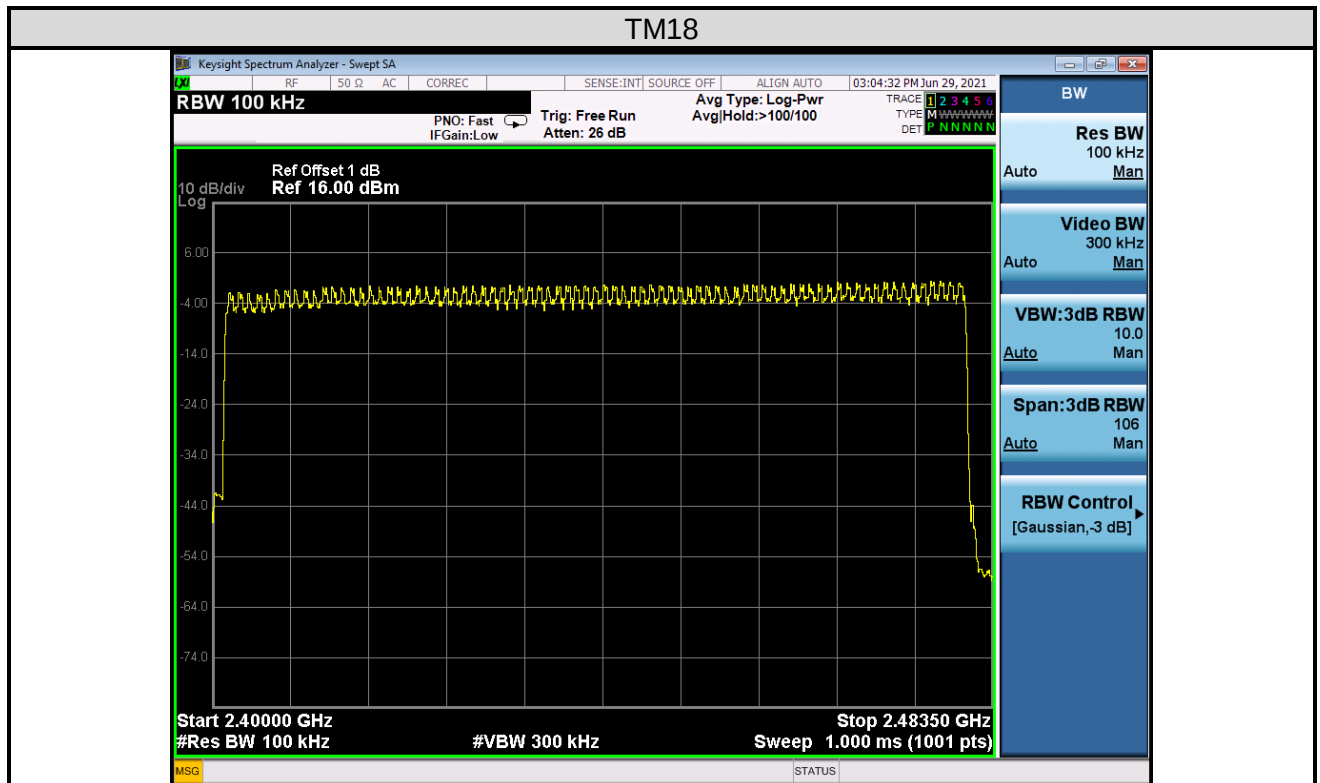
**RESULT:****Pass**

Date of testing : 2021-06-29  
Ambient temperature : 21.5°C  
Relative humidity : 57.4%  
Atmospheric pressure : 101kPa  
Test requirement : FCC 15.247(a)(1)(iii)  
RSS-247 Issue 2, February 2017, Clause 5.1(d)  
Test procedure : ANSI C63.10: 2013  
Test voltage : DC 7.2V  
Test modes applied : TM12, TM15, TM18

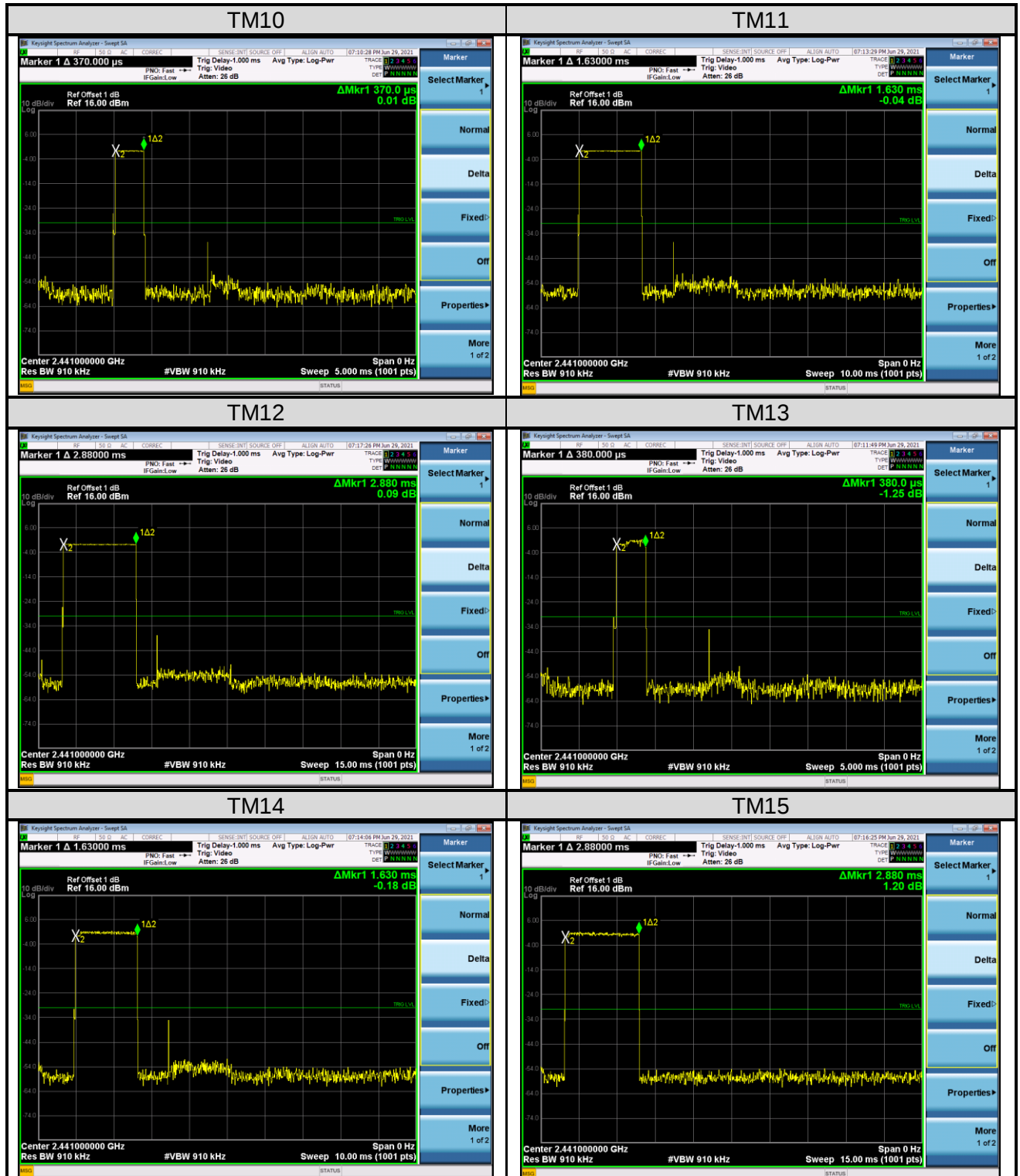
**Table 10: Number of Hopping Frequency**

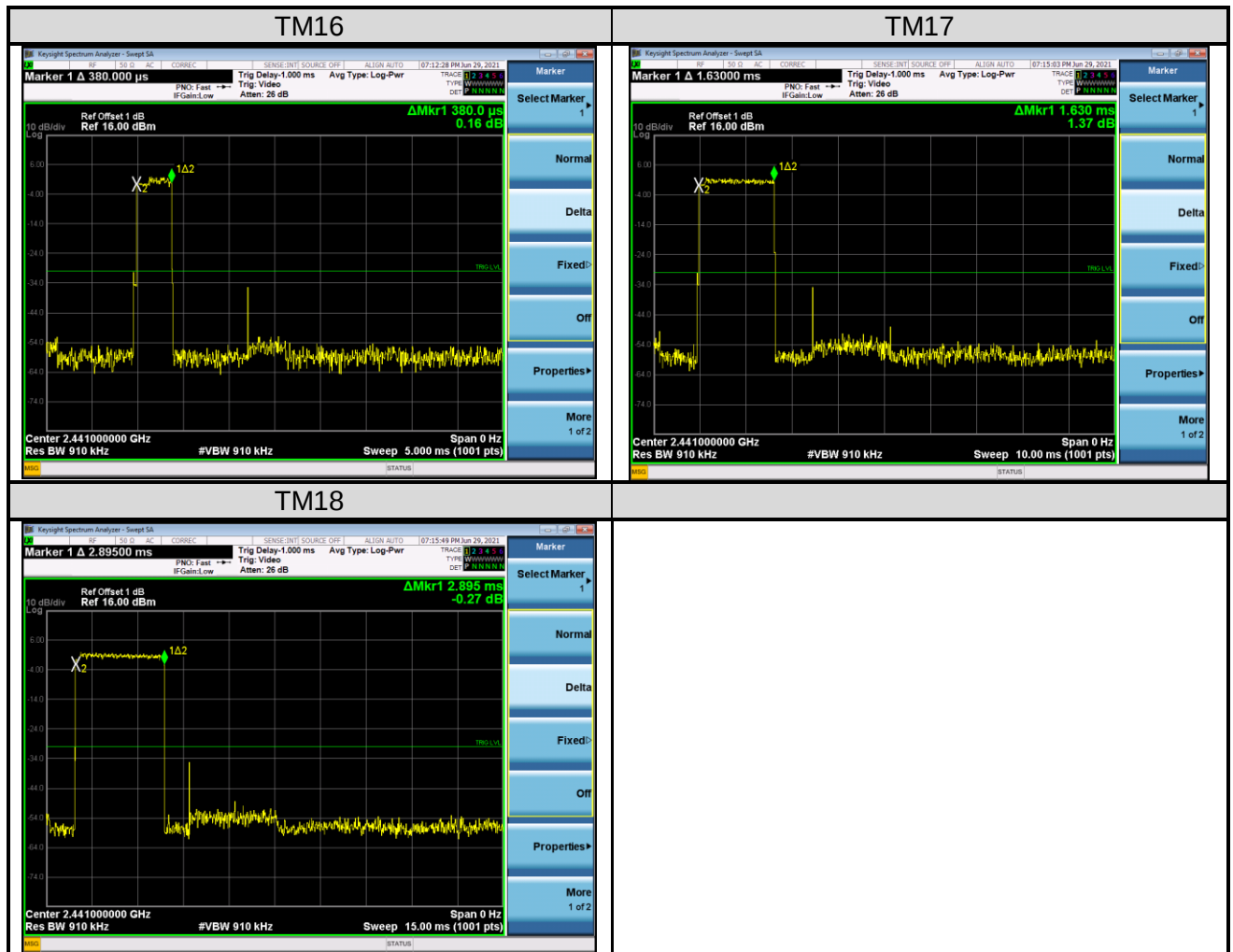
| Frequency Range | Measured Quantity of Hopping Channel | Limit |
|-----------------|--------------------------------------|-------|
| 2402 to 2480    | 79                                   | ≥15   |

**Figure 4: Number of Hopping Frequency**




Hops Over Occupancy Time in 31.6s for DH5 =  $1600 / 6 / 79 * 31.6 = 107$ .

**Figure 5: Time of Occupancy, TM10 to TM18**




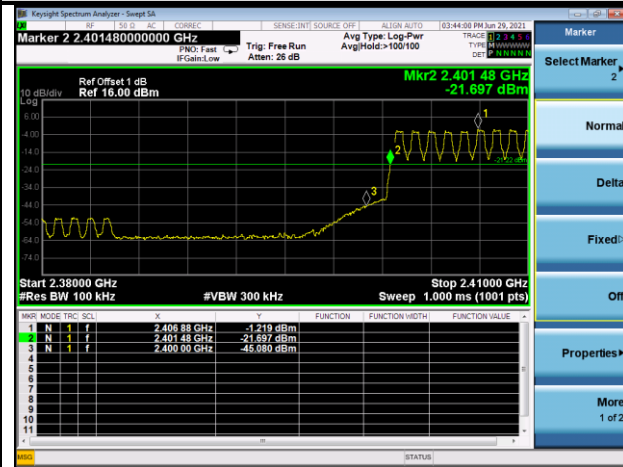
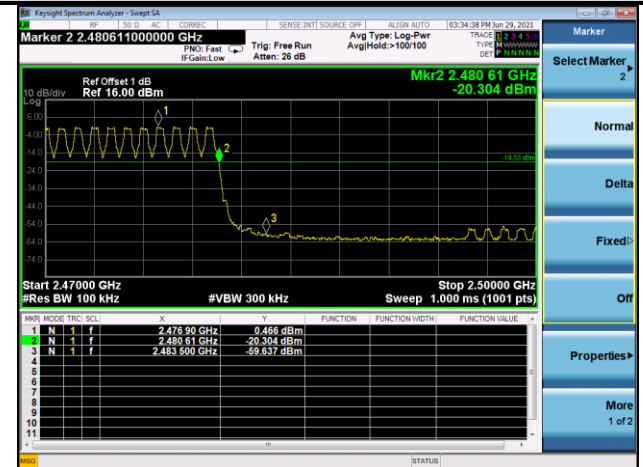
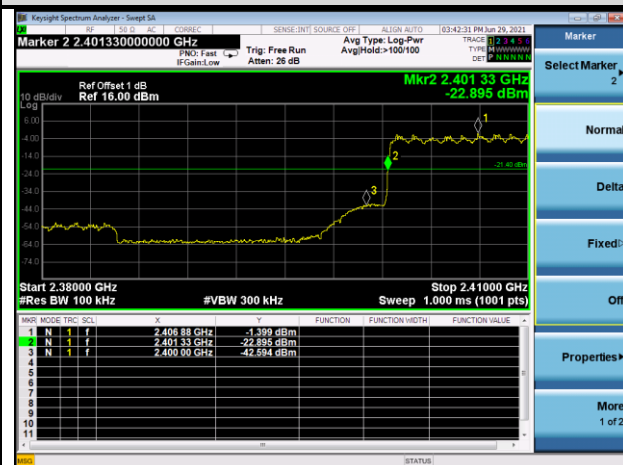
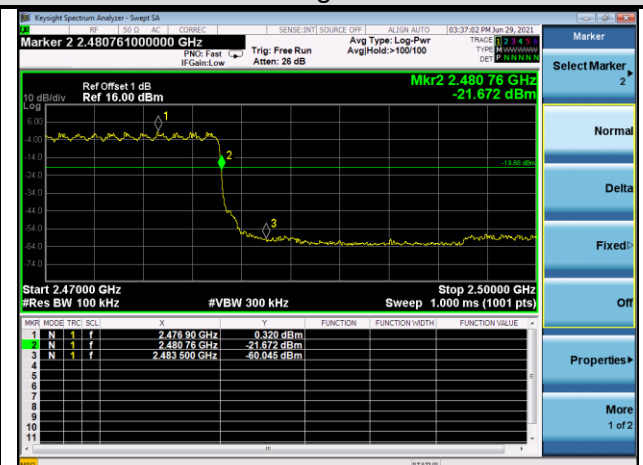
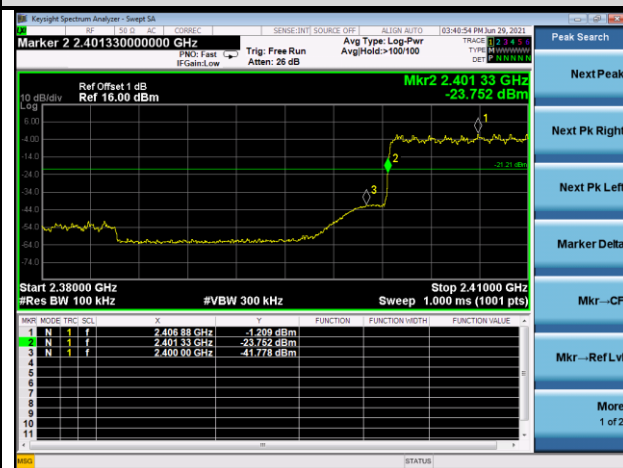
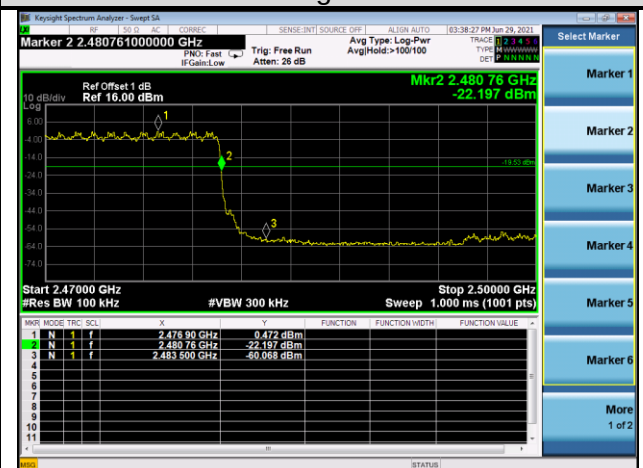
**Prüfbericht - Nr.: CN21JML7 001**  
Test Report No.**Seite 27 von 123**  
Page 27 of 123

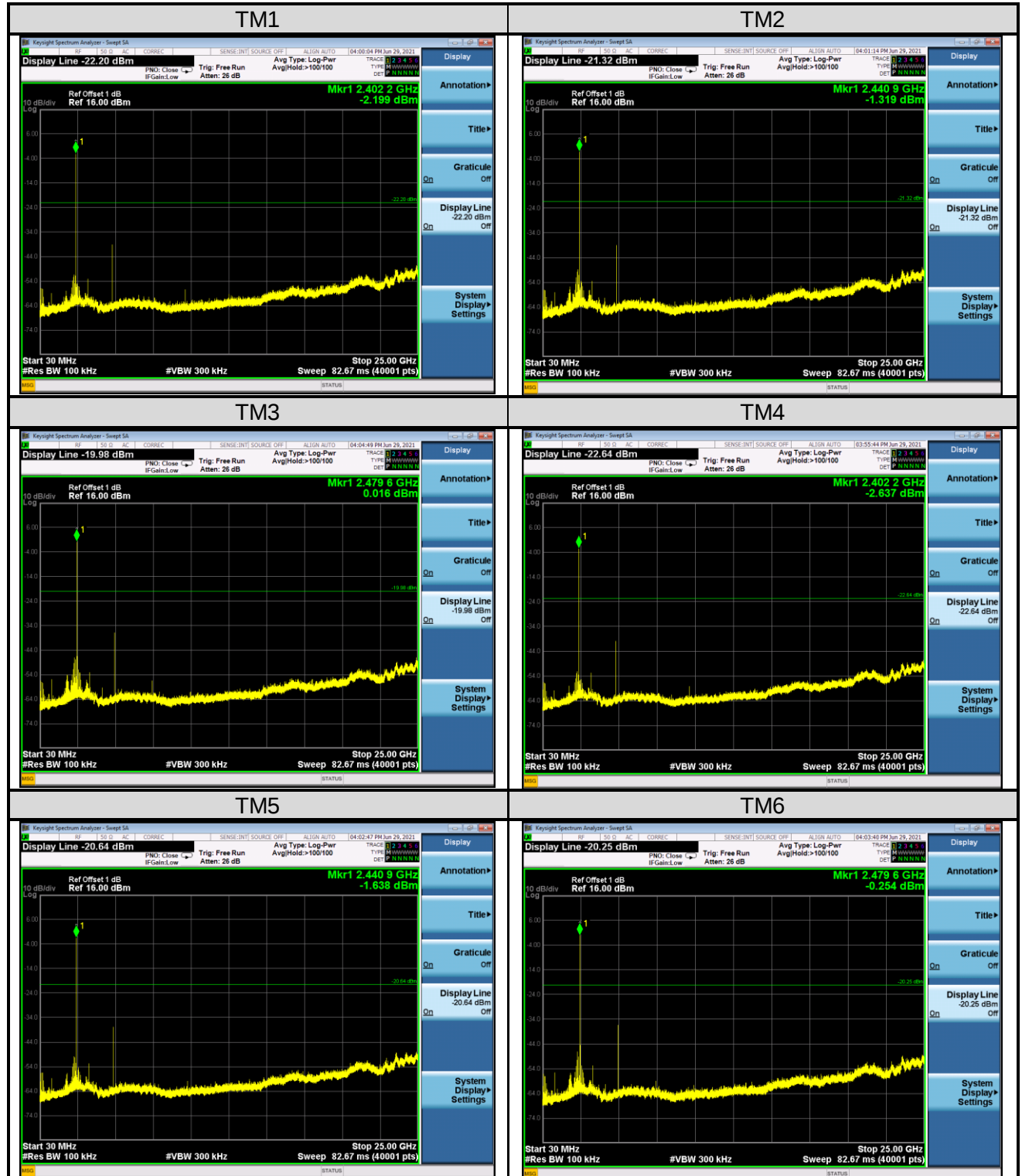
### 5.1.7 Conducted Band Edge and out-of Band Emissions

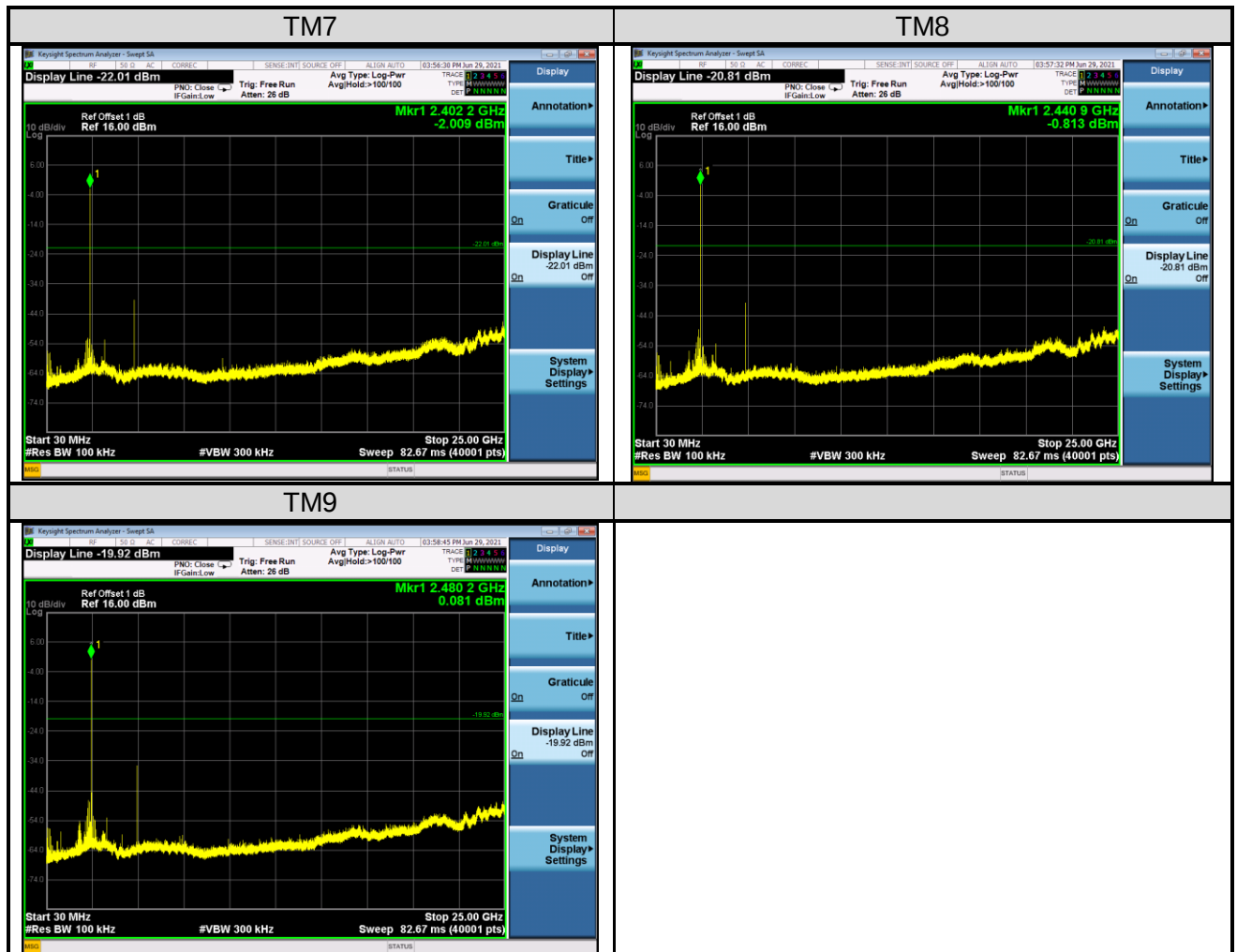
**RESULT:****Pass**

|                      |   |                                                                  |
|----------------------|---|------------------------------------------------------------------|
| Date of testing      | : | 2021-06-29                                                       |
| Ambient temperature  | : | 21.5°C                                                           |
| Relative humidity    | : | 57.4%                                                            |
| 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 7.2V                                                          |
| Test modes applied   | : | TM1 to TM9, TM12, TM15, TM18                                     |

**Figure 6: Conducted Band Edge**


**TM12 lower band**

**TM12 higher band**

**TM15 lower band**

**TM15 higher band**

**TM18 lower band**

**TM18 higher band**


**Figure 7: Conducted Spurious Emission**


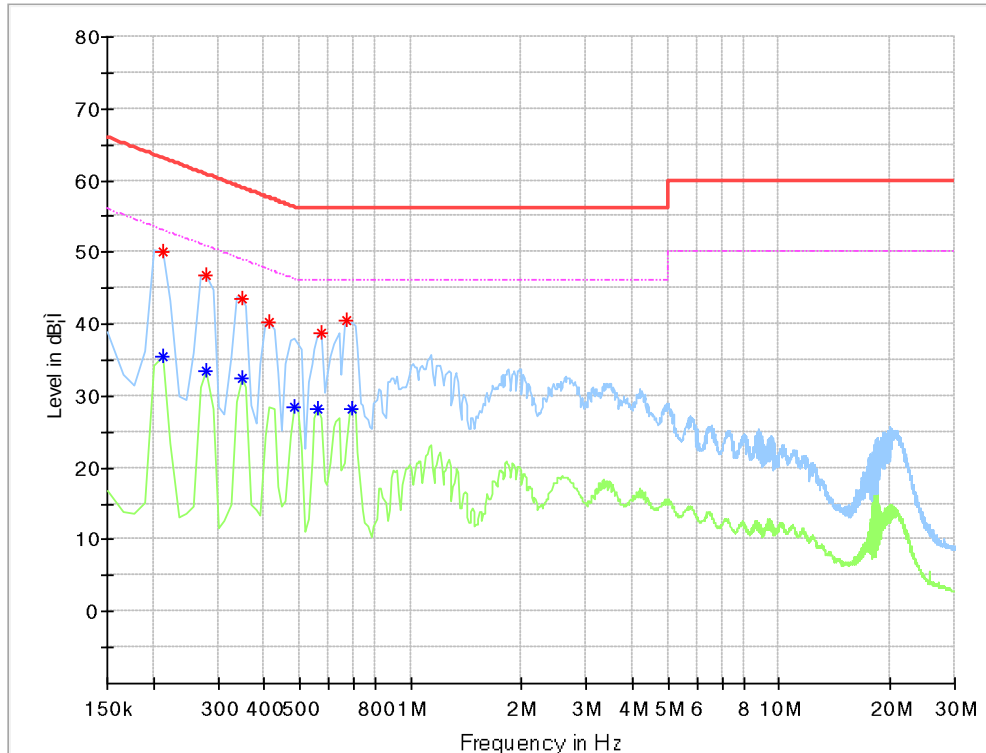


## 5.2 Emission in the Frequency Range up to 30MHz

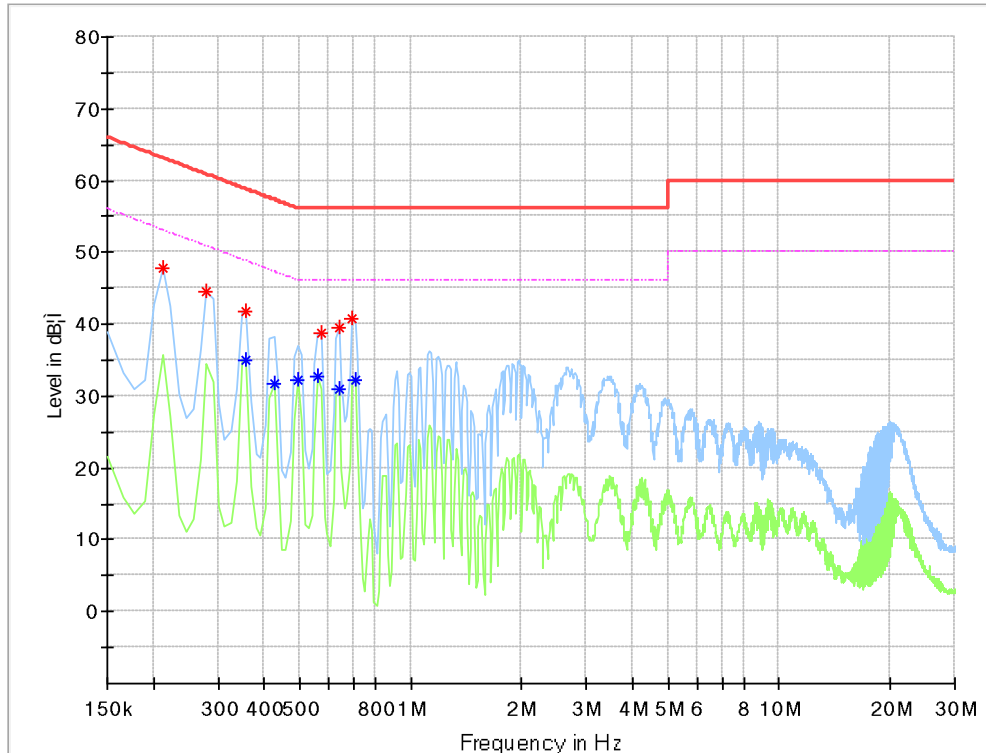
### 5.2.1 Conducted Emission

**RESULT:****Pass**

|                      |   |                                                                                |
|----------------------|---|--------------------------------------------------------------------------------|
| Date of testing      | : | 2021-07-01                                                                     |
| Ambient temperature  | : | 23.3°C                                                                         |
| Relative humidity    | : | 52.4%                                                                          |
| Atmospheric pressure | : | 101kPa                                                                         |
| Test requirement     | : | FCC Part 15.207 (a)<br>RSS-Gen Issue 5, Amendment 2, February 2021, Clause 8.8 |
| Test procedure       | : | ANSI C63.10: 2013                                                              |
| Test voltage         | : | AC 120V/60Hz                                                                   |
| Test modes applied   | : | TM19                                                                           |

**Figure 8: Conducted Emission, L**

**Critical\_Freqs**

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Filter |
|-----------------|------------------|----------------|--------------|-------------|------|--------|
| 0.560625        | ---              | 28.15          | 46.00        | 17.85       | L1   | ON     |
| 0.695625        | ---              | 28.33          | 46.00        | 17.67       | L1   | ON     |
| 0.481875        | ---              | 28.56          | 46.31        | 17.75       | L1   | ON     |
| 0.346875        | ---              | 32.50          | 49.04        | 16.54       | L1   | ON     |
| 0.279375        | ---              | 33.57          | 50.83        | 17.27       | L1   | ON     |
| 0.211875        | ---              | 35.63          | 53.13        | 17.51       | L1   | ON     |
| 0.211875        | 50.00            | ---            | 63.13        | 13.13       | L1   | ON     |
| 0.279375        | 46.77            | ---            | 60.83        | 14.06       | L1   | ON     |
| 0.346875        | 43.62            | ---            | 59.04        | 15.42       | L1   | ON     |
| 0.414375        | 40.23            | ---            | 57.56        | 17.33       | L1   | ON     |
| 0.571875        | 38.74            | ---            | 56.00        | 17.26       | L1   | ON     |
| 0.673125        | 40.58            | ---            | 56.00        | 15.42       | L1   | ON     |

**Figure 9: Conducted Emission, N**

**Critical\_Freqs**

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line |
|-----------------|------------------|----------------|--------------|-------------|------|
| 0.639375        | ---              | 31.08          | 46.00        | 14.92       | N    |
| 0.425625        | ---              | 31.79          | 47.34        | 15.55       | N    |
| 0.493125        | ---              | 32.16          | 46.12        | 13.96       | N    |
| 0.706875        | ---              | 32.28          | 46.00        | 13.72       | N    |
| 0.560625        | ---              | 32.75          | 46.00        | 13.25       | N    |
| 0.358125        | ---              | 34.88          | 48.77        | 13.89       | N    |
| 0.211875        | 47.90            | ---            | 63.13        | 15.23       | N    |
| 0.279375        | 44.56            | ---            | 60.83        | 16.27       | N    |
| 0.358125        | 41.76            | ---            | 58.77        | 17.01       | N    |
| 0.571875        | 38.84            | ---            | 56.00        | 17.16       | N    |
| 0.639375        | 39.54            | ---            | 56.00        | 16.46       | N    |
| 0.695625        | 40.68            | ---            | 56.00        | 15.32       | N    |

## 5.3 Emission in the Frequency Range above 30MHz

### 5.3.1 Radiated Band-Edge

**RESULT:****Pass**

|                      |   |                                                                                                                                                                                                                                     |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date of testing      | : | 2021-07-27                                                                                                                                                                                                                          |
| Ambient temperature  | : | 23.1°C                                                                                                                                                                                                                              |
| Relative humidity    | : | 46.2%                                                                                                                                                                                                                               |
| 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 7.2V                                                                                                                                                                                                                             |
| Test modes applied   | : | TM1, TM3, TM4, TM6, TM7, TM9                                                                                                                                                                                                        |