

## TEST REPORT

**Report No.: 23100158HKG-002**

VTech Telecommunications Ltd.

Application For Original Grant of 47 CFR Part 15 Certification

Single New of RSS-210 Issue 10 Amendment 1 Certification

Video Baby Monitor

**FCC ID: EW780-2529-00A**

**IC: 1135B-80252900A**

This report contains the data of BLE portion only

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Signed on File

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Date: November 28, 2023

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## TEST REPORT

### GENERAL INFORMATION

|                                    |                                                                                                                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Grantee:</b>                    | VTech Telecommunications Ltd.                                                                                                                                                                                                 |
| <b>Grantee Address:</b>            | 23/F., Tai Ping Industrial Centre, Block 1,<br>57 Ting Kok Road, Tai Po,<br>Hong Kong.                                                                                                                                        |
| <b>Manufacturer:</b>               | VTech (Dongguan) Telecommunications Limited                                                                                                                                                                                   |
| <b>Manufacturer Address:</b>       | VTech Science Park, Xia Ling Bei Management Zone,<br>Liaobu, Dongguan, Guangdong, China.                                                                                                                                      |
| <b>FCC Specification Standard:</b> | FCC Part 15, October 1, 2022 Edition                                                                                                                                                                                          |
| <b>FCC ID:</b>                     | EW780-2529-00A                                                                                                                                                                                                                |
| <b>FCC Model(s):</b>               | RM5766HD BU, RM5766-2HD BU, RM5866HD BU, RM5866-2HD BU,<br>RM7766HD BU, RM7766-2HD BU, RM7866HD BU, RM7866-2HD BU                                                                                                             |
| <b>IC Specification Standard:</b>  | RSS-210 Issue 10 Amendment 1, April 2020<br>RSS-Gen Issue 5 Amendment 2, February 2021                                                                                                                                        |
| <b>IC:</b>                         | 1135B-80252900A                                                                                                                                                                                                               |
| <b>HVIN:</b>                       | 35-400515BU                                                                                                                                                                                                                   |
| <b>PMN:</b>                        | RM5766HD BU, RM5766-2HD BU, RM5866HD BU, RM5866-2HD BU,<br>RM7766HD BU, RM7766-2HD BU, RM7866HD BU, RM7866-2HD BU                                                                                                             |
| <b>Type of EUT:</b>                | Spread Spectrum Transmitter                                                                                                                                                                                                   |
| <b>Description of EUT:</b>         | Video Baby Monitor                                                                                                                                                                                                            |
| <b>Brand Name:</b>                 | VTech                                                                                                                                                                                                                         |
| <b>Sample Receipt Date:</b>        | October 24, 2023                                                                                                                                                                                                              |
| <b>Date of Test:</b>               | October 24, 2023 to November 23, 2023                                                                                                                                                                                         |
| <b>Report Date:</b>                | November 28, 2023                                                                                                                                                                                                             |
| <b>Environmental Conditions:</b>   | Temperature: +10 to 40°C<br>Relative Humidity: 10 to 90%                                                                                                                                                                      |
| <b>Conclusion:</b>                 | Test was conducted by client submitted sample.<br>The submitted sample as received complied with the<br>47 CFR Part 15 / RSS-210 Issue 10 Amendment 1 Certification.<br><br>This report contains the data of BLE portion only |

## TEST REPORT

### SUMMARY OF TEST RESULT

| Test Items                                 | FCC Part 15<br>Section | RSS-210 /<br>RSS-Gen <sup>#</sup> | Results  |
|--------------------------------------------|------------------------|-----------------------------------|----------|
| Transmitter Power Line Conducted Emissions | 15.207                 | 8.8 <sup>#</sup>                  | Complied |
| Radiated Emission                          | 15.249, 15.209         | B.10 / 8.9 <sup>#</sup>           | Complied |
| Radiated Emission on the Bandedge          |                        |                                   | Complied |
| Radiated Emission in Restricted Bands      | 15.205                 | 8.10 <sup>#</sup>                 | Complied |

For all technical data can be referred to Annex B – Report cover sheet.

For electronic filing, the Annex B – Report cover sheet is saved with filename: Annex B.pdf.

The equipment under test is found to be complying with the following standards:

FCC Part 15, October 1, 2022 Edition

RSS-210 Issue 10 Amendment 1, April 2020

RSS-Gen Issue 5 Amendment 2, February 2021

- Note:
1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
  2. Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

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## TEST REPORT

### 1.0 GENERAL DESCRIPTION

#### 1.1 Product Description

The RM5766HD BU (HVIN: 35-400515BU) is a Video Baby Monitor - Baby Unit.

The Equipment Under Test (EUT) contains 2.4GHz FHSS, Wi-Fi and Bluetooth BLE features. The EUT wifi portion operates at frequency range of 2412 MHz to 2462 MHz with 11 channels, Bluetooth portion frequency at range of 2402 MHz to 2480 MHz with 40 channels and 2.4GHz FHSS portion at 2406MHz to 2475MHz.

For BLE Mode, it operates at frequency range of 2402.000 MHz to 2480.000 MHz with 40 channels, the channels are separated with 2MHz spacing.

The EUT is powered by 100-240VAC 50/60Hz 0.5A adaptor.

The antenna(s) used in the EUT is integral, and the test sample is a prototype.  
Peak Antenna Gain: 0 dBi

For FCC, the Model(s): RM5766-2HD BU, RM5866HD BU, RM5866-2HD BU, RM7766HD BU, RM7766-2HD BU, RM7866HD BU, RM7866-2HD BU are the same as the Model: RM5766HD BU in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure. The only differences between these models are color and model number to be sold for marketing purpose as declared by client.

For electronic filing, the brief circuit description is saved with filename: Descri.pdf.

#### 1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver (BLE Portion).

#### 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber. Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application.

#### 1.4 Test Facility

The 3m Chamber and conducted measurement facility used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been placed on file with the FCC and IC No. 2042H, CABID is “HKAP01”.

## TEST REPORT

### 2.0 SYSTEM TEST CONFIGURATION

#### 2.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by 120VAC during test.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable at 0.8m height from the ground plane for emission testing at or below 1GHz and 1.5m for emission measurements above 1GHz. If the baby unit attached to peripherals, they were connected and operational (as typical as possible). The parent unit was remotely located as far from the antenna and the baby as possible to ensure full power transmission from the parent unit. Else, the base was wired to transmit full power with modulation.

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Radiated emission measurement for transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.209 / RSS-247 2.5. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109 / RSS-247 Section 5.5 Limits.

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### 2.1 Justification (Cont'd)

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 4.8.3.

Determination of pulse desensitization was made according to Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF. The effective period (Teff) was referred to Exhibit 4.8.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC power line-conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst-case data is included in this report.

All data rates were tested under normal mode of WiFi. Only the worst-case data is shown in the report for DSSS and OFDM.

For simultaneous transmission, both Wi-Fi, BLE and FHSS portions are also switched on when taking radiated emission for determining worst-case spurious emission.

### 2.2 EUT Exercising Software

The EUT exercise program (Tera Terms Version 4.106) used during radiated testing was designed to exercise the various system components in a manner similar to a typical use.

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### 2.3 Details of EUT and Description of Accessories

#### Details of EUT:

An AC/DC Adaptor (provided with the unit) was used to power the device.  
Their descriptions are listed below.

- (1) An AC adaptor (Model: VT07EUS05150; Brand Name: VTPL; Input: 100-240VAC 50/60Hz 0.5A; Output: 5.0VDC 1.5A 7.5W) (Provided by Applicant)

#### Description of Accessories:

- (1) Parent Unit (FCC ID: EW780-2529-01A) (Provided by Applicant)

### 2.4 Measurement Uncertainty

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.



## TEST REPORT

### 3.0 EMISSION RESULTS

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

#### 3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG - AV$$

where

|    |   |                                                     |
|----|---|-----------------------------------------------------|
| FS | = | Field Strength in dBμV/m                            |
| RA | = | Receiver Amplitude (including preamplifier) in dBμV |
| AF | = | Antenna Factor in dB                                |
| CF | = | Cable Attenuation Factor in dB                      |
| AG | = | Amplifier Gain in dB                                |
| AV | = | Average Factor in dB                                |

In the following table(s), the reading shown on the data table reflects the preamplifier gain.

An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where

|    |   |                          |
|----|---|--------------------------|
| FS | = | Field Strength in dBμV/m |
| RR | = | RA - AG - AV in dBμV     |
| LF | = | CF + AF in dB            |

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29.0 dB and average factor of 5.0 dB are subtracted, giving a field strength of 27.0 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

|    |   |                          |                |
|----|---|--------------------------|----------------|
| RA | = | 52.0 dBμV/m              |                |
| AF | = | 7.4 dB                   | RR = 18.0 dBμV |
| CF | = | 1.6 dB                   | LF = 9.0 dB    |
| AG | = | 29.0 dB                  |                |
| AV | = | 5.0 dB                   |                |
| FS | = | RR + LF                  |                |
| FS | = | 18.0 + 9.0 = 27.0 dBμV/m |                |

Level in μV/m = Common Antilogarithm [(27.0 dBμV/m)/20] = 22.4 μV/m

## TEST REPORT

### 3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 723.550 MHz

For electronic filing, the worst-case radiated emission configuration photographs are saved with filename: Setup Photos.pdf.

### 3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 6.6 dB (1.7 dB at 2400 MHz bandedge)

### 3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.4335 MHz

For electronic filing, the worst-case line-conducted configuration photographs are saved with filename: Setup Photos.pdf.

### 3.5 Conducted Emission Data

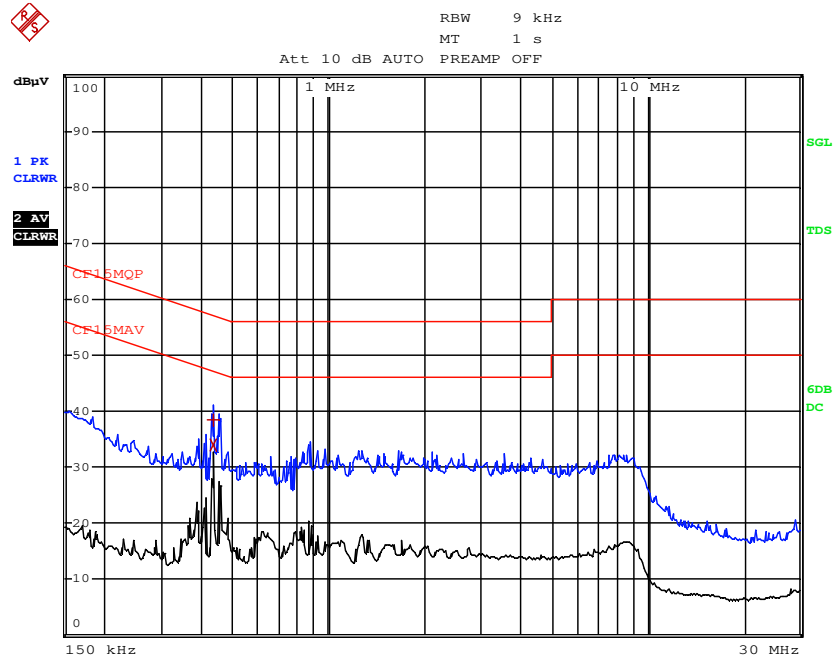
The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Pass by 13.3 dB

## TEST REPORT

### CONDUCTED EMISSION

Model: RM5766HD BU  
Date of Test: November 22, 2023  
Worst-Case Operating Mode: BU Operating



| EDIT PEAK LIST (Final Measurement Results) |                         |            |        |          |
|--------------------------------------------|-------------------------|------------|--------|----------|
| Trace1:                                    | CF15MQP                 |            |        |          |
| Trace2:                                    | CF15MAV                 |            |        |          |
| Trace3:                                    | ---                     |            |        |          |
| TRACE                                      | FREQUENCY               | LEVEL dBμV | DELTA  | LIMIT dB |
| 1                                          | Quasi Peak 433.5 kHz    | 38.54 N    | -18.64 |          |
| 2                                          | CISPR Average 433.5 kHz | 33.87 N    | -13.31 |          |

Note: Measurement Uncertainty is  $\pm 4.2$ dB at a level of confidence of 95%.

## TEST REPORT

### RADIATED EMISSIONS

Model: RM5766HD BU  
Date of Test: October 26, 2023  
Worst-Case Operating Mode: Transmitting

Table 1

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 Requirement

Lowest Channel

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 2402.000        | 84.7           | 33                | 29.4                | 81.1                         | 94.0                         | -12.9       |
| V            | 4804.000        | 44.4           | 33                | 34.9                | 46.3                         | 54.0                         | -7.7        |
| H            | 7206.000        | 27.2           | 33                | 37.9                | 32.1                         | 54.0                         | -21.9       |
| V            | 9608.000        | 27.4           | 33                | 40.4                | 34.8                         | 54.0                         | -19.2       |
| H            | 12010.000       | 29.7           | 33                | 40.5                | 37.2                         | 54.0                         | -16.8       |
| V            | 14412.000       | 34.5           | 33                | 40.0                | 41.5                         | 54.0                         | -12.5       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 2402.000        | 102.2          | 33                | 29.4                | 98.6                      | 114.0                     | -15.4       |
| V            | 4804.000        | 55.4           | 33                | 34.9                | 57.3                      | 74.0                      | -16.7       |
| H            | 7206.000        | 40.6           | 33                | 37.9                | 45.5                      | 74.0                      | -28.5       |
| V            | 9608.000        | 40.5           | 33                | 40.4                | 47.9                      | 74.0                      | -26.1       |
| H            | 12010.000       | 43.2           | 33                | 40.5                | 50.7                      | 74.0                      | -23.3       |
| V            | 14412.000       | 47.8           | 33                | 40.0                | 54.8                      | 74.0                      | -19.2       |

- Notes:
1. Peak Detector Data unless otherwise stated.
  2. Average detector is applied according to ANSI C63.10.
  3. All measurements were made at 3 meters.
  4. Negative value in the margin column shows emission below limit.
  5. Horn antenna is used for the emission over 1000MHz.
  6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
  7. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.

## TEST REPORT

### RADIATED EMISSIONS

Model: RM5766HD BU  
Date of Test: October 26, 2023  
Worst-Case Operating Mode: Transmitting

Table 2

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 Requirement

Middle Channel

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 2440.000        | 86.8           | 33                | 29.4                | 83.2                         | 94.0                         | -10.8       |
| V            | 4880.000        | 44.1           | 33                | 34.9                | 46.0                         | 54.0                         | -8.0        |
| H            | 7320.000        | 27.3           | 33                | 37.9                | 32.2                         | 54.0                         | -21.8       |
| H            | 9760.000        | 27.0           | 33                | 40.4                | 34.4                         | 54.0                         | -19.6       |
| H            | 12200.000       | 28.6           | 33                | 40.5                | 36.1                         | 54.0                         | -17.9       |
| H            | 14640.000       | 35.6           | 33                | 38.4                | 41.0                         | 54.0                         | -13.0       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 2440.000        | 105.5          | 33                | 29.4                | 101.9                     | 114.0                     | -12.1       |
| V            | 4880.000        | 55.1           | 33                | 34.9                | 57.0                      | 74.0                      | -17.0       |
| H            | 7320.000        | 41.2           | 33                | 37.9                | 46.1                      | 74.0                      | -27.9       |
| H            | 9760.000        | 39.8           | 33                | 40.4                | 47.2                      | 74.0                      | -26.8       |
| H            | 12200.000       | 42.3           | 33                | 40.5                | 49.8                      | 74.0                      | -24.2       |
| H            | 14640.000       | 48.8           | 33                | 38.4                | 54.2                      | 74.0                      | -19.8       |

- Notes:
1. Peak Detector Data unless otherwise stated.
  2. Average detector is applied according to ANSI C63.10.
  3. All measurements were made at 3 meters.
  4. Negative value in the margin column shows emission below limit.
  5. Horn antenna is used for the emission over 1000MHz.
  6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
  7. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.

## TEST REPORT

### RADIATED EMISSIONS

Model: RM5766HD BU  
Date of Test: October 26, 2023  
Worst-Case Operating Mode: Transmitting

Table 3

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 Requirement

Highest Channel

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 2480.000        | 87.2           | 33                | 29.4                | 83.6                         | 94.0                         | -10.4       |
| V            | 4960.000        | 45.2           | 33                | 34.9                | 47.1                         | 54.0                         | -6.9        |
| H            | 7440.000        | 26.9           | 33                | 37.9                | 31.8                         | 54.0                         | -22.2       |
| H            | 9920.000        | 27.7           | 33                | 40.4                | 35.1                         | 54.0                         | -18.9       |
| H            | 12400.000       | 30.3           | 33                | 40.5                | 37.8                         | 54.0                         | -16.2       |
| V            | 14880.000       | 36.8           | 33                | 38.4                | 42.2                         | 54.0                         | -11.8       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 2480.000        | 106.4          | 33                | 29.4                | 102.8                     | 114.0                     | -11.2       |
| V            | 4960.000        | 56.3           | 33                | 34.9                | 58.2                      | 74.0                      | -15.8       |
| H            | 7440.000        | 40.3           | 33                | 37.9                | 45.2                      | 74.0                      | -28.8       |
| H            | 9920.000        | 40.7           | 33                | 40.4                | 48.1                      | 74.0                      | -25.9       |
| H            | 12400.000       | 43.7           | 33                | 40.5                | 51.2                      | 74.0                      | -22.8       |
| V            | 14880.000       | 49.6           | 33                | 38.4                | 55.0                      | 74.0                      | -19.0       |

- Notes:
1. Peak Detector Data unless otherwise stated.
  2. Average detector is applied according to ANSI C63.10.
  3. All measurements were made at 3 meters.
  4. Negative value in the margin column shows emission below limit.
  5. Horn antenna is used for the emission over 1000MHz.
  6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
  7. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.

## TEST REPORT

### RADIATED EMISSIONS

Model: RM5766HD BU  
Date of Test: November 23, 2023  
Worst-Case Operating Mode: BU Operating

Table 4

Pursuant to FCC Part 15 Section 15.209 / RSS-GEN 8.9 Requirement

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|--------------|---------------------|--------------------|----------------------|-------------|
| V            | 103.235         | 39.4           | 16           | 13.0                | 36.4               | 43.5                 | -7.1        |
| V            | 106.630         | 37.9           | 16           | 13.0                | 34.9               | 43.5                 | -8.6        |
| V            | 199.993         | 35.8           | 16           | 16.0                | 35.8               | 43.5                 | -7.7        |
| V            | 210.541         | 33.7           | 16           | 17.0                | 34.7               | 43.5                 | -8.8        |
| V            | 421.153         | 30.1           | 16           | 25.0                | 39.1               | 46.0                 | -6.9        |
| H            | 723.550         | 25.4           | 16           | 30.0                | 39.4               | 46.0                 | -6.6        |

- Notes:
1. Quasi-Peak Detector Data unless otherwise stated.
  2. All measurements were made at 3 meters.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
  6. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.

## **TEST REPORT**

### **4.0 EQUIPMENT PHOTOGRAPHS**

For electronic filing, the photographs are saved with filename: External Photos.pdf and Internal Photos.pdf.

### **5.0 PRODUCT LABELLING**

For electronics filing, the FCC ID label artwork and the label location are saved with filename: Label.pdf.

### **6.0 TECHNICAL SPECIFICATIONS**

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: Block.pdf and Circuit.pdf respectively.

### **7.0 INSTRUCTION MANUAL**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: Manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States and Canada.



## TEST REPORT

### 8.0 MISCELLANEOUS INFORMATION

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

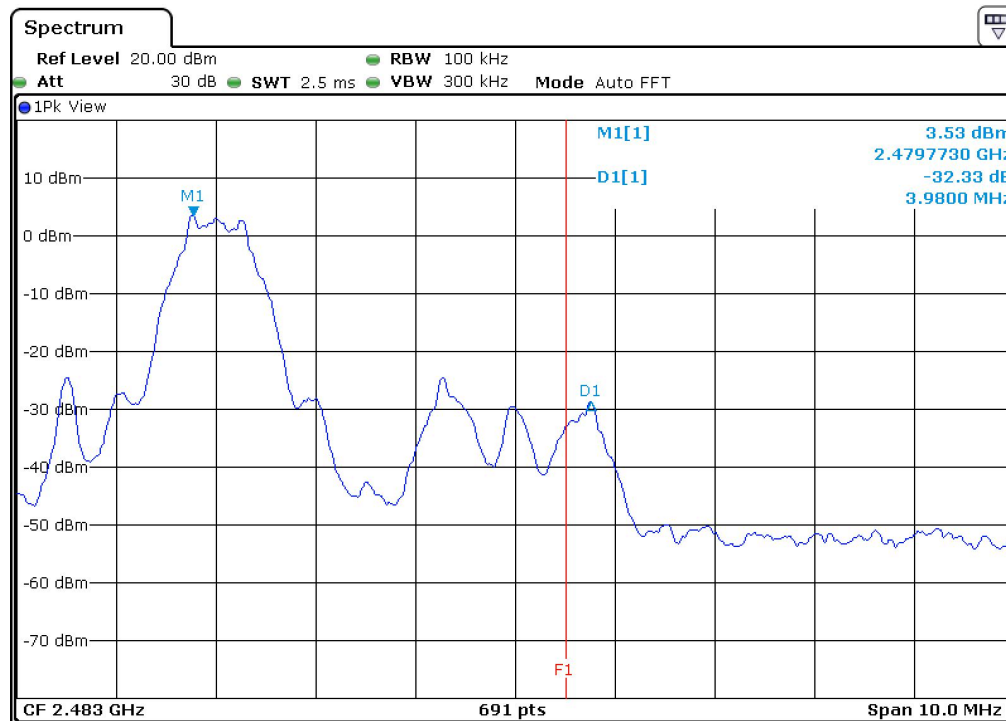
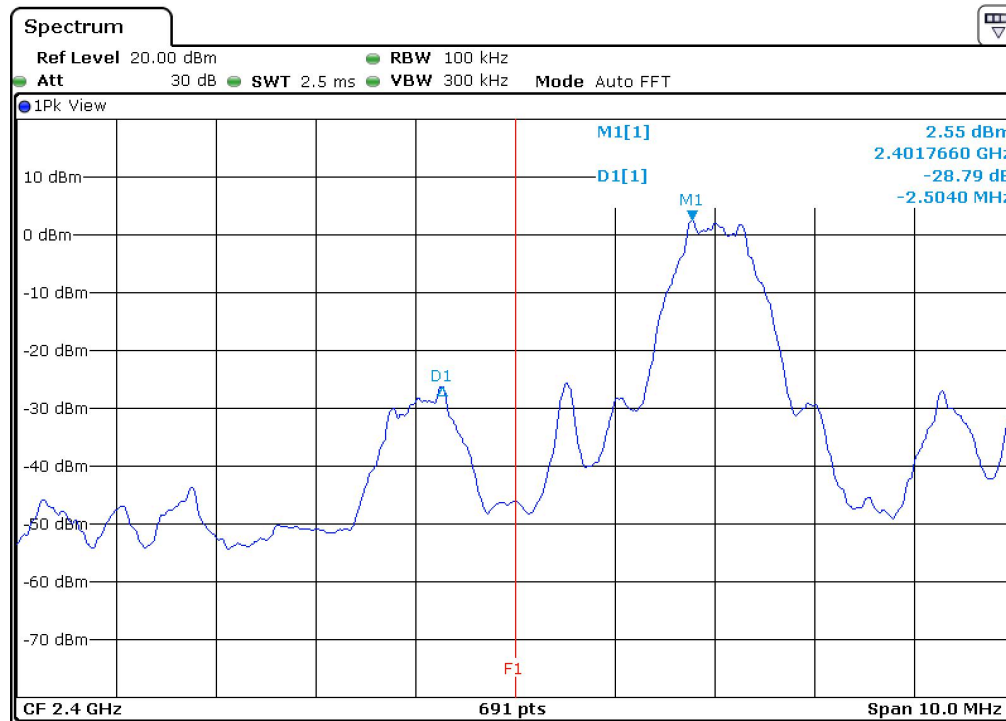
#### 8.1 Radiated Emission on the Bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz to 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.10 (2013) for frequency being measured.

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits in Section 15.209 / RSS-Gen 8.9, whichever is the lesser attenuation, which meet the requirement of Part 15.249(d) / RSS-210 B.10.

## TEST REPORT

### PEAK MEASUREMENT (BLE)



## TEST REPORT

### PEAK MEASUREMENT (BLE)

Bandedge compliance is determined by applying marker-delta method, i.e. (Bandedge Plot).

Lower Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

$$= 98.6 \text{ dB}\mu\text{V/m} - 28.8 \text{ dB}$$

$$= 69.8 \text{ dB}\mu\text{V/m}$$

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

$$= 81.1 \text{ dB}\mu\text{V/m} - 28.8 \text{ dB}$$

$$= 52.3 \text{ dB}\mu\text{V/m}$$

Upper Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

$$= 102.8 \text{ dB}\mu\text{V/m} - 32.3 \text{ dB}$$

$$= 70.5 \text{ dB}\mu\text{V/m}$$

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

$$= 83.6 \text{ dB}\mu\text{V/m} - 32.3 \text{ dB}$$

$$= 51.3 \text{ dB}\mu\text{V/m}$$

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74 dBμV/m (Peak Limit) and 54 dBμV/m (Average Limit).

## TEST REPORT

### 8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period ( $T_{eff}$ ) is approximately  $625\mu s$  for a digital "1" bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 3MHz, so the pulse desensitivity factor is 0dB.

### 8.3 Calculation of Average Factor

Not Applicable

## TEST REPORT

### 8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

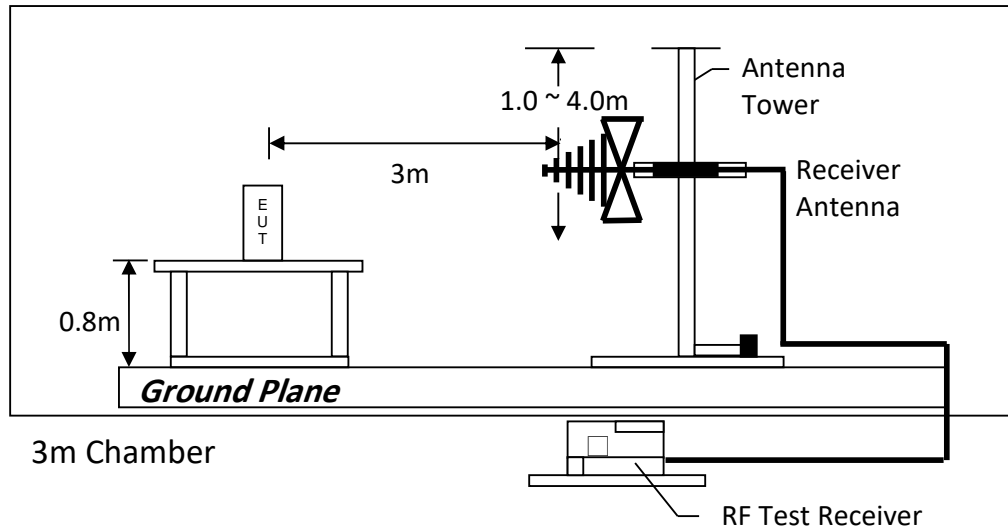
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 3 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

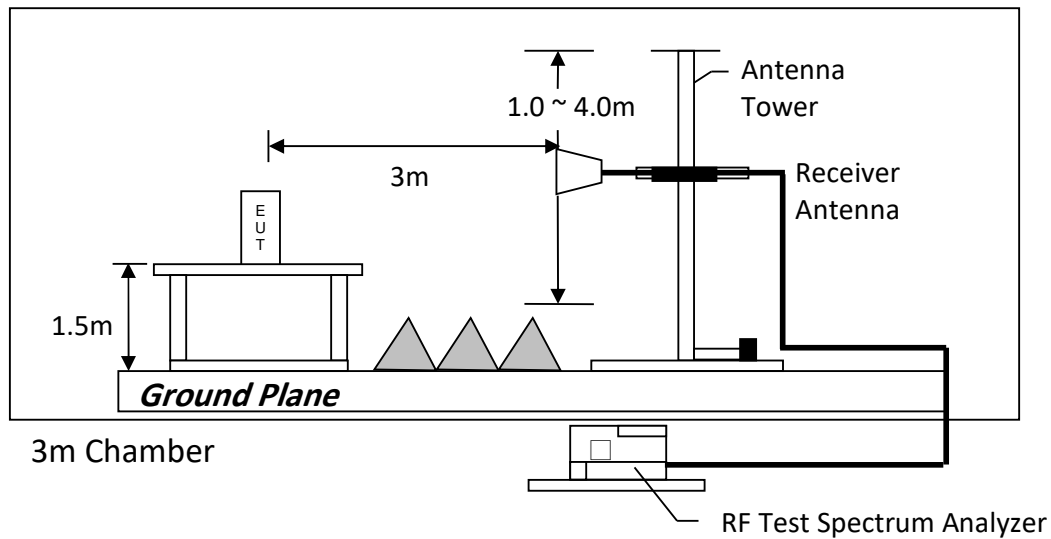
## TEST REPORT

### 8.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

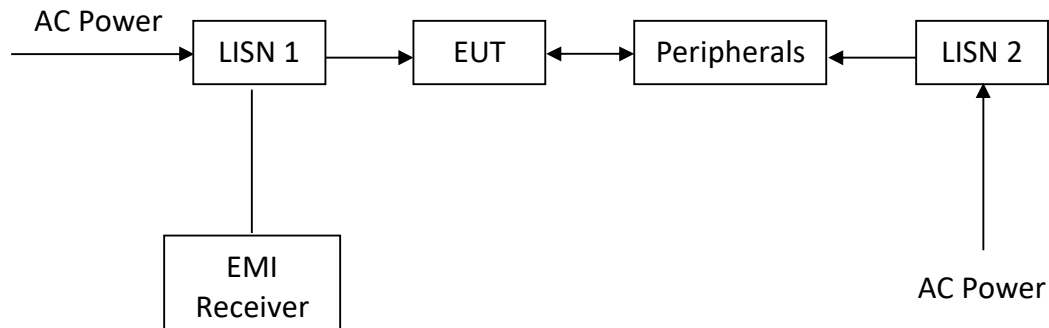
## TEST REPORT

### 8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. The EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

### 8.4.3 Conducted Emission Test Setup



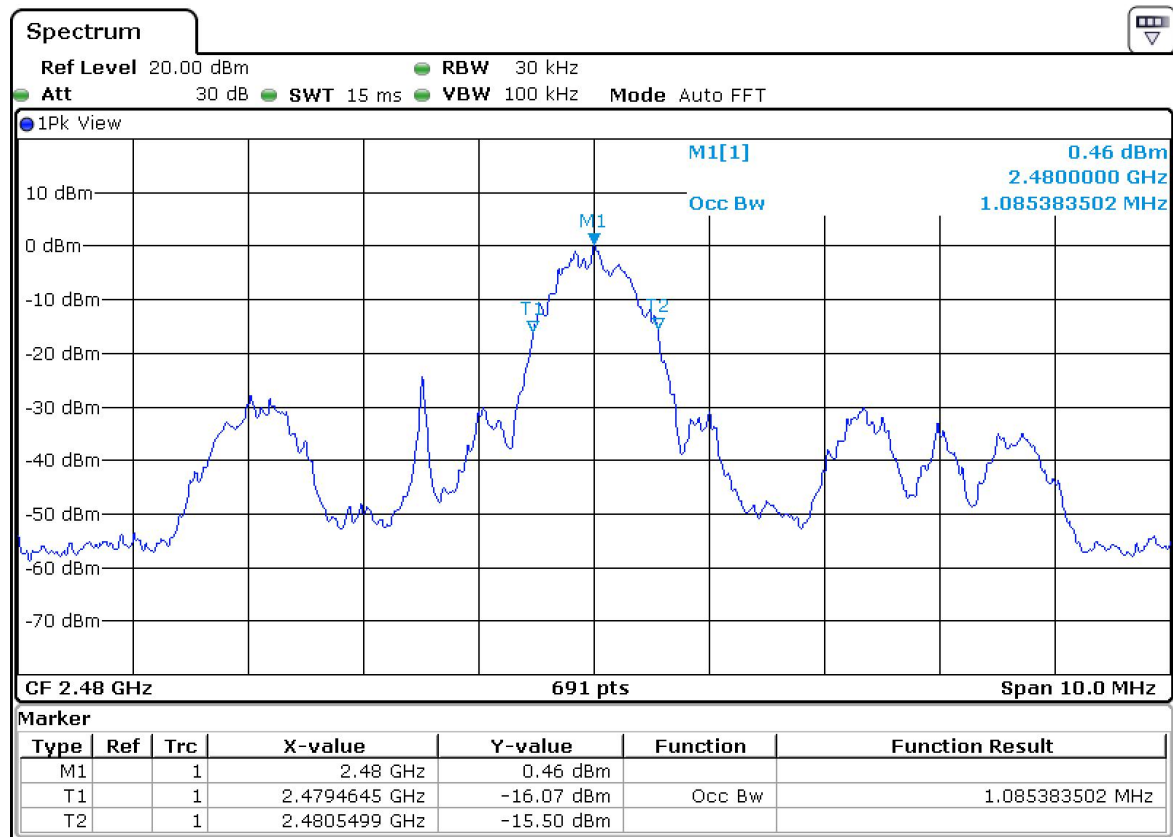
## TEST REPORT

### 8.5 Occupied Bandwidth

Occupied Bandwidth Results: (BLE)

| Bluetooth (MHz)      | Occupied Bandwidth (kHz) |
|----------------------|--------------------------|
| Low Channel: 2402    | 1056                     |
| Middle Channel: 2440 | 1085                     |
| High Channel: 2480   | 1085                     |

The worst case is shown as below:





## TEST REPORT

### 9.0 CONFIDENTIALITY REQUEST

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: Request.pdf.

### 10.0 EQUIPMENT LIST

#### 1) Radiated Emissions Test

| Equipment            | Signal and Spectrum Analyzer (10Hz to 40GHz) | Biconical Antenna (30MHz to 300MHz) | EMI Test Receiver 7GHz |
|----------------------|----------------------------------------------|-------------------------------------|------------------------|
| Registration No.     | EW-3016                                      | EW-3242                             | EW-3603                |
| Manufacturer         | ROHDESCHWARZ                                 | EMCO                                | ROHDESCHWARZ           |
| Model No.            | FSV40                                        | 3110C                               | ESR7                   |
| Calibration Date     | December 13, 2022                            | May 26, 2021                        | December 06, 2022      |
| Calibration Due Date | December 13, 2023                            | November 26, 2023                   | December 06, 2023      |

| Equipment            | Log Periodic Antenna | Double Ridged Guide Antenna (1GHz - 18GHz) | Active Loop H-field (9kHz to 30MHz) |
|----------------------|----------------------|--------------------------------------------|-------------------------------------|
| Registration No.     | EW-3243              | EW-0194                                    | EW-3302                             |
| Manufacturer         | EMCO                 | EMCO                                       | EMCO                                |
| Model No.            | 3148B                | 3115                                       | 6502                                |
| Calibration Date     | June 03, 2021        | May 10, 2023                               | September 08, 2022                  |
| Calibration Due Date | December 30, 2023    | November 10, 2024                          | December 08, 2023                   |

| Equipment            | RF Preamplifier (9kHz to 6000MHz) | 2.4GHz Notch Filter | 14m Double Shield RF Cable (9kHz - 6GHz) |
|----------------------|-----------------------------------|---------------------|------------------------------------------|
| Registration No.     | EW-3006b                          | EW-3435             | EW-2376                                  |
| Manufacturer         | SCHWARZBECK                       | MICROWAVE           | RADIALL                                  |
| Model No.            | BBV9718                           | N0324413            | n m/br56/bnc m 14m                       |
| Calibration Date     | February 15, 2022                 | June 16, 2022       | January 26, 2022                         |
| Calibration Due Date | February 15, 2024                 | December 16, 2023   | January 26, 2024                         |

| Equipment            | RF Cable 14m (1GHz to 26.5GHz)    | 14m Double Shield RF Cable (20MHz to 6GHz) | Pyramidal Horn Antenna |
|----------------------|-----------------------------------|--------------------------------------------|------------------------|
| Registration No.     | EW-2781                           | EW-2074                                    | EW-0905                |
| Manufacturer         | GREATBILLION                      | RADIALL                                    | EMCO                   |
| Model No.            | SMA m/SHF5MPU /SMA m<br>ra14m,26G | N(m)-RG142-BNC(m)<br>L=14M                 | 3160-09                |
| Calibration Date     | December 12, 2022                 | December 10, 2021                          | July 20, 2021          |
| Calibration Due Date | December 12, 2023                 | December 10, 2023                          | February 20, 2024      |

## TEST REPORT

### 2) Conducted Emissions Test

| Equipment            | RF Cable 240cm (RG142)<br>(9kHz to 30MHz) | Artificial Mains<br>Network | EMI Test Receiver<br>7GHz |
|----------------------|-------------------------------------------|-----------------------------|---------------------------|
| Registration No.     | EW-2454                                   | EW-2501                     | EW-3481                   |
| Manufacturer         | RADIAL                                    | ROHDESCHWARZ                | ROHDESCHWARZ              |
| Model No.            | Bnc m st / 142 / bnc mra<br>240cm         | ENV-216                     | ESR7                      |
| Calibration Date     | June 13, 2023                             | September 11, 2021          | December 21, 2021         |
| Calibration Due Date | June 13, 2024                             | December 11, 2023           | December 21, 2023         |

### 3) Bandedge Measurement

| Equipment            | EMI Test Receiver 7GHz | 5m RF Cable<br>(40GHz) |
|----------------------|------------------------|------------------------|
| Registration No.     | EW-3481                | EW-2701                |
| Manufacturer         | ROHDESCHWARZ           | RADIAL                 |
| Model No.            | ESR7                   | Sma m-m 5m 40G         |
| Calibration Date     | December 21, 2021      | November 24, 2020      |
| Calibration Due Date | December 21, 2023      | February 24, 2024      |

### 4) OBW Measurement

| Equipment            | EMI Test Receiver 7GHz | 5m RF Cable<br>(40GHz) |
|----------------------|------------------------|------------------------|
| Registration No.     | EW-3481                | EW-2701                |
| Manufacturer         | ROHDESCHWARZ           | RADIAL                 |
| Model No.            | ESR7                   | Sma m-m 5m 40G         |
| Calibration Date     | December 21, 2021      | November 24, 2020      |
| Calibration Due Date | December 21, 2023      | February 24, 2024      |

### 5) Control Software for Radiated Emission

| Software Information |              |
|----------------------|--------------|
| Software Name        | EMC32        |
| Manufacturer         | ROHDESCHWARZ |
| Software version     | 10.50.40     |

**END OF TEST REPORT**