

## Variant FCC Test Report

**Report No.:** RF190610C02

**FCC ID:** 2ALO3MOCONNECT2

**Test Model:** MOVADO CONNECT 2.0/42

**Received Date:** Jun. 10, 2019

**Test Date:** Jul. 01, 2019 ~ Jul. 03, 2019

**Issued Date:** Jul. 11, 2019

**Applicant:** MOVADO GROUP INC.

**Address:** 29th floor, Citicorp Center; 18 Whitfield Road, North Point, Hong Kong.

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan  
( R.O.C )

**Test Location:** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan, R.O.C.

**FCC Registration /  
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

|                                                                 |           |
|-----------------------------------------------------------------|-----------|
| <b>Release Control Record .....</b>                             | <b>3</b>  |
| <b>1 Certificate of Conformity .....</b>                        | <b>4</b>  |
| <b>2 Summary of Test Results .....</b>                          | <b>5</b>  |
| 2.1 Measurement Uncertainty .....                               | 5         |
| 2.2 Modification Record.....                                    | 5         |
| <b>3 General Information .....</b>                              | <b>6</b>  |
| 3.1 General Description of EUT .....                            | 6         |
| 3.2 Description of Test Modes .....                             | 7         |
| 3.2.1 Test Mode Applicability and Tested Channel Detail .....   | 8         |
| 3.3 Description of Support Units.....                           | 9         |
| 3.3.1 Configuration of System under Test.....                   | 9         |
| 3.4 General Description of Applied Standards .....              | 9         |
| <b>4 Test Types and Results .....</b>                           | <b>10</b> |
| <Bluetooth EDR> .....                                           | 10        |
| 4.1 Radiated Emission and Bandedge Measurement .....            | 10        |
| 4.1.1 Limits of Radiated Emission and Bandedge Measurement..... | 10        |
| 4.1.2 Test Instruments .....                                    | 11        |
| 4.1.3 Test Procedures.....                                      | 12        |
| 4.1.4 Deviation from Test Standard.....                         | 12        |
| 4.1.5 Test Set Up .....                                         | 13        |
| 4.1.6 EUT Operating Conditions .....                            | 14        |
| 4.1.7 Test Results .....                                        | 15        |
| 4.2 Maximum Output Power .....                                  | 19        |
| 4.2.1 Limits of Maximum Output Power Measurement .....          | 19        |
| 4.2.2 Test Setup.....                                           | 19        |
| 4.2.3 Test Instruments .....                                    | 19        |
| 4.2.4 Test Procedure .....                                      | 19        |
| 4.2.5 Deviation from Test Standard.....                         | 19        |
| 4.2.6 EUT Operating Condition .....                             | 19        |
| 4.2.7 Test Results .....                                        | 19        |
| <b>5 Pictures of Test Arrangements .....</b>                    | <b>20</b> |
| <b>Appendix – Information of the Testing Laboratories .....</b> | <b>21</b> |

### Release Control Record

| Issue No.   | Description      | Date Issued   |
|-------------|------------------|---------------|
| RF190610C02 | Original Release | Jul. 11, 2019 |

## 1 Certificate of Conformity

**Product:** Movado Connect

**Brand:** MOVADO

**Test Model:** MOVADO CONNECT 2.0/42

**Sample Status:** Engineering Sample

**Applicant:** MOVADO GROUP INC.

**Test Date:** Jul. 01, 2019 ~ Jul. 03, 2019

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Rona Chen, **Date:** Jul. 11, 2019  
Rona Chen / Specialist

**Approved by :** Dylan Chiou, **Date:** Jul. 11, 2019  
Dylan Chiou / Project Engineer

## 2 Summary of Test Results

### <Bluetooth EDR>

| 47 CFR FCC Part 15, Subpart C (Section 15.247) |                                                                                                               |        |                                                                                    |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                                                                                     | Result | Remarks                                                                            |
| 15.207                                         | AC Power Conducted Emission                                                                                   | N/A    | Refer to Note                                                                      |
| 15.247(a)(1)(iii)                              | Number of Hopping Frequency Used                                                                              | N/A    | Refer to Note                                                                      |
| 15.247(a)(1)(iii)                              | Dwell Time on Each Channel                                                                                    | N/A    | Refer to Note                                                                      |
| 15.247(a)(1)                                   | 1. Hopping Channel Separation<br>2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System | N/A    | Refer to Note                                                                      |
| 15.247(b)(1)                                   | Maximum Peak Output Power                                                                                     | Pass   | Meet the requirement of limit.                                                     |
| ---                                            | Occupied Bandwidth Measurement                                                                                | N/A    | Refer to Note                                                                      |
| 15.205 & 209                                   | Radiated Emissions                                                                                            | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -8.74 dB at 41.64 MHz. |
| 15.247(d)                                      | Band Edge Measurement                                                                                         | N/A    | Refer to Note                                                                      |
| 15.247(d)                                      | Antenna Port Emission                                                                                         | N/A    | Refer to Note                                                                      |
| 15.203                                         | Antenna Requirement                                                                                           | N/A    | Refer to Note                                                                      |

#### Note:

- Only Conducted Power and Radiated Emissions tests had been performed for this addendum. Refer to original report for other test data.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                        | Frequency          | Expanded Uncertainty (k=2) (±) |
|------------------------------------|--------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz   | 2.44 dB                        |
| Radiated Emissions up to 1 GHz     | 9 kHz ~ 30 MHz     | 3.04 dB                        |
|                                    | 30 MHz ~ 200 MHz   | 2.0153 dB                      |
|                                    | 200 MHz ~ 1000 MHz | 2.0224 dB                      |
| Radiated Emissions above 1 GHz     | 1 GHz ~ 18 GHz     | 1.0121 dB                      |
|                                    | 18 GHz ~ 40 GHz    | 1.1508 dB                      |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                                          |                             |
|----------------------------|----------------------------------------------------------|-----------------------------|
| <b>Product</b>             | Movado Connect                                           |                             |
| <b>Brand</b>               | MOVADO                                                   |                             |
| <b>Test Model</b>          | MOVADO CONNECT 2.0/42                                    |                             |
| <b>Status of EUT</b>       | Engineering Sample                                       |                             |
| <b>Power Supply Rating</b> | 5.0 Vdc (Host equipment or Adapter)<br>3.8 Vdc (Battery) |                             |
| <b>Modulation Type</b>     | Bluetooth EDR                                            | GFSK, $\pi/4$ -DQPSK, 8DPSK |
| <b>Transfer Rate</b>       | Bluetooth EDR                                            | 1/2/3 Mbps                  |
| <b>Operating Frequency</b> | Bluetooth EDR                                            | 2402 ~ 2480 MHz             |
| <b>Number of Channel</b>   | Bluetooth EDR                                            | 79                          |
| <b>Output Power</b>        | Bluetooth EDR                                            | 16.749 mW                   |
| <b>Antenna Type</b>        | Loop antenna with -10.44 dBi gain                        |                             |
| <b>Antenna Connector</b>   | N/A                                                      |                             |
| <b>Accessory Device</b>    | Refer to Note as below                                   |                             |
| <b>Data Cable Supplied</b> | Refer to Note as below                                   |                             |

Note:

1. This report is issued as a supplementary report to BV CPS report no.: RF190218C04. The difference compared with original report is adding new model. This new model whose size is larger and antenna gain is lower than original model. Therefore, only Output Power and Radiated Emissions were verified and recorded in this report. Radiated Emission tests according to original report radiated emission worst channel.
2. The EUT contains following accessory devices.

| Product            | Brand    | Model                 | Description                              |
|--------------------|----------|-----------------------|------------------------------------------|
| Battery            | APACK    | APP00302              | 3.8 Vdc, 300 mAh                         |
| USB Cable (Cradle) | Movado   | L4QU2016-CS-H         | 1 m shielded cable w/o core              |
| LCD Panel          | N/A      | T09AFFC01212A         | --                                       |
| CPU                | Qualcomm | APQ8009W              | ARM CORTEX-A7, Quad cores up to 1.094GHz |
| eMMC               | KINGSTON | 08EPOP08-NL3DT227-A01 | 8GB eMMC + 1GB LPDDR3                    |
| BT/WLAN chipset    | Qualcomm | WCN3620               | --                                       |
| NFC chipset        | NXP      | NQ310A1EV/C101Y       | --                                       |

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

### 3.2 Description of Test Modes

#### <Bluetooth EDR>

79 channels are provided to this EUT:

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
| 0       | 2402        | 20      | 2422        | 40      | 2442        | 60      | 2462        |
| 1       | 2403        | 21      | 2423        | 41      | 2443        | 61      | 2463        |
| 2       | 2404        | 22      | 2424        | 42      | 2444        | 62      | 2464        |
| 3       | 2405        | 23      | 2425        | 43      | 2445        | 63      | 2465        |
| 4       | 2406        | 24      | 2426        | 44      | 2446        | 64      | 2466        |
| 5       | 2407        | 25      | 2427        | 45      | 2447        | 65      | 2467        |
| 6       | 2408        | 26      | 2428        | 46      | 2448        | 66      | 2468        |
| 7       | 2409        | 27      | 2429        | 47      | 2449        | 67      | 2469        |
| 8       | 2410        | 28      | 2430        | 48      | 2450        | 68      | 2470        |
| 9       | 2411        | 29      | 2431        | 49      | 2451        | 69      | 2471        |
| 10      | 2412        | 30      | 2432        | 50      | 2452        | 70      | 2472        |
| 11      | 2413        | 31      | 2433        | 51      | 2453        | 71      | 2473        |
| 12      | 2414        | 32      | 2434        | 52      | 2454        | 72      | 2474        |
| 13      | 2415        | 33      | 2435        | 53      | 2455        | 73      | 2475        |
| 14      | 2416        | 34      | 2436        | 54      | 2456        | 74      | 2476        |
| 15      | 2417        | 35      | 2437        | 55      | 2457        | 75      | 2477        |
| 16      | 2418        | 36      | 2438        | 56      | 2458        | 76      | 2478        |
| 17      | 2419        | 37      | 2439        | 57      | 2459        | 77      | 2479        |
| 18      | 2420        | 38      | 2440        | 58      | 2460        | 78      | 2480        |
| 19      | 2421        | 39      | 2441        | 59      | 2461        |         |             |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

#### <Bluetooth EDR>

| EUT Configure Mode | Applicable To |              |       | Description |
|--------------------|---------------|--------------|-------|-------------|
|                    | ROP           | RE $\geq$ 1G | RE<1G |             |
| -                  | √             | √            | √     | -           |

Where **ROP**: RF Output Power **RE $\geq$ 1G**: Radiated Emission above 1 GHz  
**RE<1G**: Radiated Emission below 1 GHz

#### Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-" means no effect

#### RF Output Power:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Packet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| -                  | 0 to 78           | 0, 39, 78      | FHSS                  | GFSK            | DH5         |
| -                  | 0 to 78           | 0, 39, 78      | FHSS                  | 8DPSK           | DH5         |

#### Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Packet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| -                  | 0 to 78           | 78             | FHSS                  | GFSK            | DH5         |

#### Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Packet Type |
|--------------------|-------------------|----------------|-----------------------|-----------------|-------------|
| -                  | 0 to 78           | 78             | FHSS                  | GFSK            | DH5         |

#### Test Condition:

| Applicable To | Environmental Conditions | Input Power    | Tested by     |
|---------------|--------------------------|----------------|---------------|
| ROP           | 25 deg. C, 60 % RH       | 3.8 Vdc        | Vincent Huang |
| RE $\geq$ 1G  | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Tim-Chen      |
| RE<1G         | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Tim-Chen      |

### 3.3 Description of Support Units

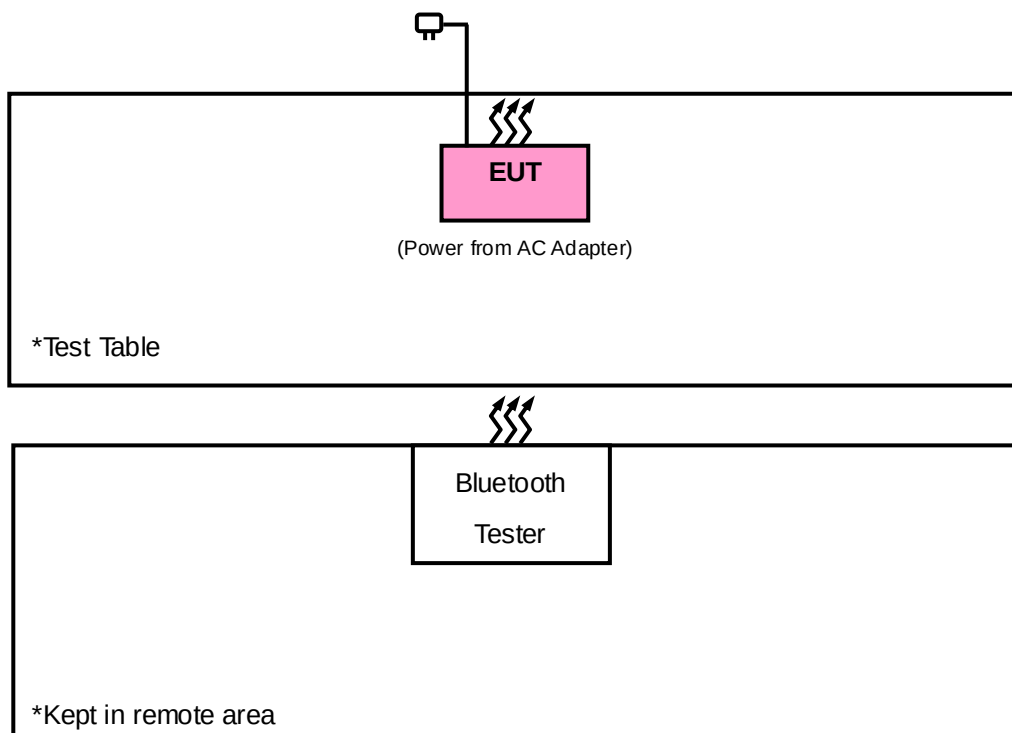
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Product            | Brand   | Model No.     | Serial No. | FCC ID |
|-----|--------------------|---------|---------------|------------|--------|
| 1.  | Adapter            | SALCOMP | TC U250       | N/A        | N/A    |
| 2.  | USB Cable (Cradle) | Movado  | L4QU2016-CS-H | N/A        | N/A    |

| No. | Signal Cable Description Of The Above Support Units |
|-----|-----------------------------------------------------|
| 1.  | 1m shielded cable                                   |

#### 3.3.1 Configuration of System under Test

<Bluetooth EDR>



### 3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.247)**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

## 4 Test Types and Results

### <BLUETOOTH EDR>

#### 4.1 Radiated Emission and Bandedge Measurement

##### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009 ~ 0.490     | 2400/F (kHz)                      | 300                           |
| 0.490 ~ 1.705     | 24000/F (kHz)                     | 30                            |
| 1.705 ~ 30.0      | 30                                | 30                            |
| 30 ~ 88           | 100                               | 3                             |
| 88 ~ 216          | 150                               | 3                             |
| 216 ~ 960         | 200                               | 3                             |
| Above 960         | 500                               | 3                             |

#### Note:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

#### 4.1.2 Test Instruments

| Description & Manufacturer                     | Model No.                  | Serial No.                    | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|----------------------------|-------------------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent                       | N9038A                     | MY51210203                    | Mar. 18, 2019       | Mar. 17, 2020           |
| Spectrum Analyzer<br>Agilent                   | N9010A                     | MY52220314                    | Dec. 13, 2018       | Dec. 12, 2019           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43                      | 101261                        | Apr. 15, 2019       | Apr. 14, 2020           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170                  | 148                           | Nov. 25, 2018       | Nov. 24, 2019           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120D                 | 9120D-969                     | Nov. 25, 2018       | Nov. 24, 2019           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168                  | 9168-472                      | Nov. 23, 2018       | Nov. 22, 2019           |
| Fixed Attenuator<br>WORKEN                     | MDCS18N-10                 | MDCS18N-10-01                 | Apr. 15, 2019       | Apr. 14, 2020           |
| Loop Antenna                                   | EM-6879                    | 269                           | Sep. 07, 2018       | Sep. 06, 2019           |
| Preamplifier<br>EMCI                           | EMC001340                  | 980201                        | Oct. 12, 2018       | Oct. 11, 2019           |
| Bluetooth Tester                               | CBT                        | 100946                        | Aug. 09, 2018       | Aug. 08, 2020           |
| Preamplifier<br>EMCI                           | EMC 012645                 | 980115                        | Oct. 12, 2018       | Oct. 11, 2019           |
| Preamplifier<br>EMCI                           | EMC 184045                 | 980116                        | Oct. 12, 2018       | Oct. 11, 2019           |
| Preamplifier<br>EMCI                           | EMC 330H                   | 980112                        | Oct. 12, 2018       | Oct. 11, 2019           |
| Power Meter<br>Anritsu                         | ML2495A                    | 1012010                       | Sep. 05, 2018       | Sep. 04, 2019           |
| Power Sensor<br>Anritsu                        | MA2411B                    | 1315050                       | Sep. 04, 2018       | Sep. 03, 2019           |
| RF Coaxial Cable<br>HUBER+SUHNNER              | EMC104-SM-SM-8<br>000&3000 | 140811+170717                 | Oct. 12, 2018       | Oct. 11, 2019           |
| RF Coaxial Cable<br>HUBER+SUHNNER              | SUCOFLEX 104               | EMC104-SM-SM-1<br>000(140807) | Oct. 12, 2018       | Oct. 11, 2019           |
| RF Coaxial Cable<br>WOKEN                      | 8D-FB                      | Cable-Ch10-01                 | Oct. 12, 2018       | Oct. 11, 2019           |
| Boresight Antenna Fixture                      | FBA-01                     | FBA-SIP01                     | NA                  | NA                      |
| Software<br>BV ADT                             | E3<br>6.120103             | NA                            | NA                  | NA                      |
| Antenna Tower<br>MF                            | MFA-440H                   | NA                            | NA                  | NA                      |
| Turn Table<br>MF                               | MFT-201SS                  | NA                            | NA                  | NA                      |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802                    | NA                            | NA                  | NA                      |

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.

3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.

#### 4.1.3 Test Procedures

##### **For Radiated Emission below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### **Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

##### **For Radiated Emission above 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### **Note:**

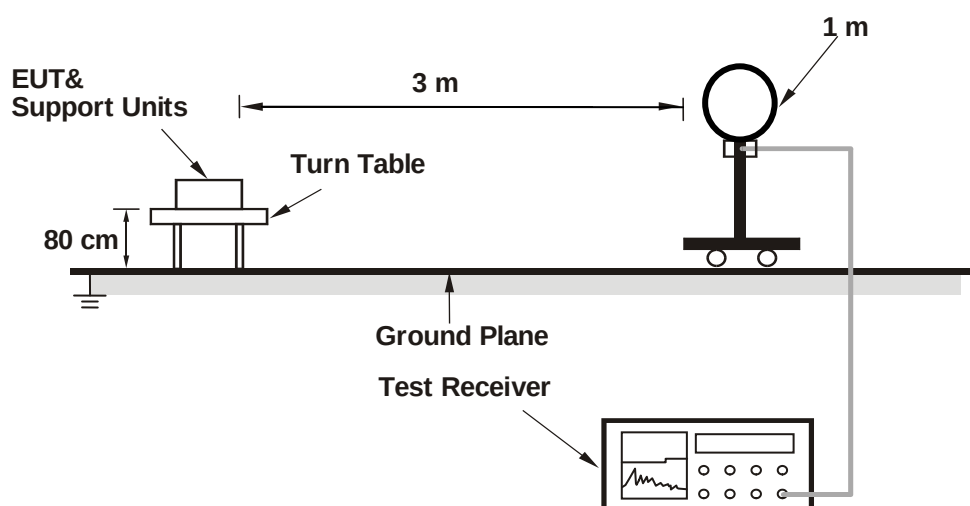
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98 %) or 10 Hz (Duty cycle  $\geq 98$  %) for Average detection (AV) at frequency above 1 GHz. (RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

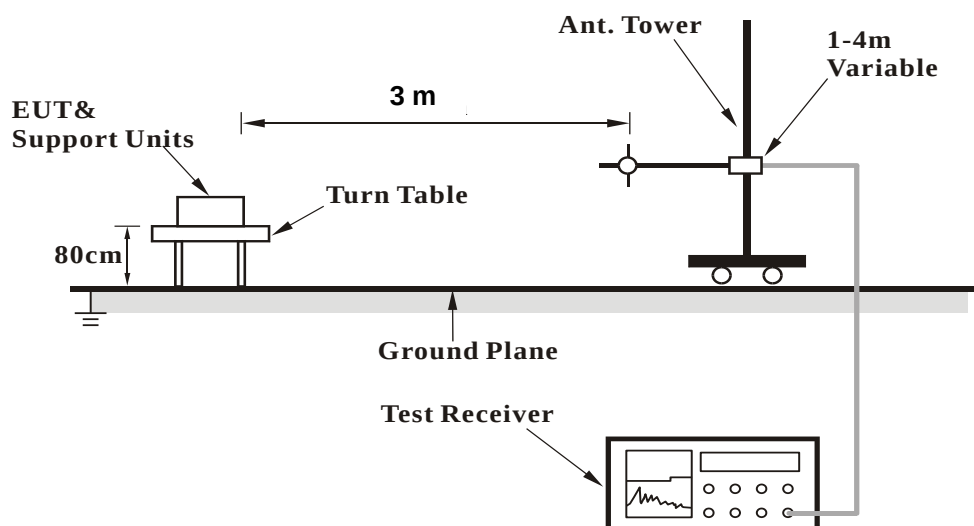
No deviation.

#### 4.1.5 Test Set Up

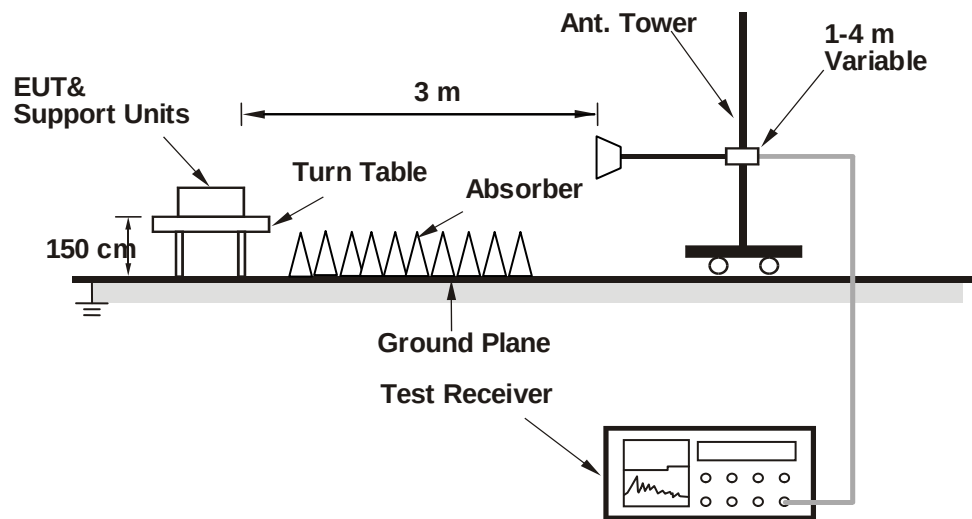
##### <Radiated Emission below 30 MHz>



##### <Radiated Emission 30 MHz to 1 GHz>



# <Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

## 4.1.6 EUT Operating Conditions

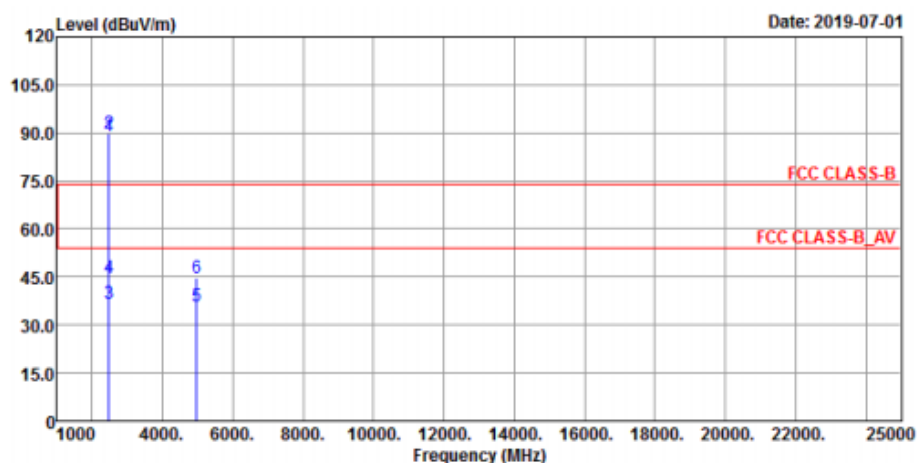
Set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

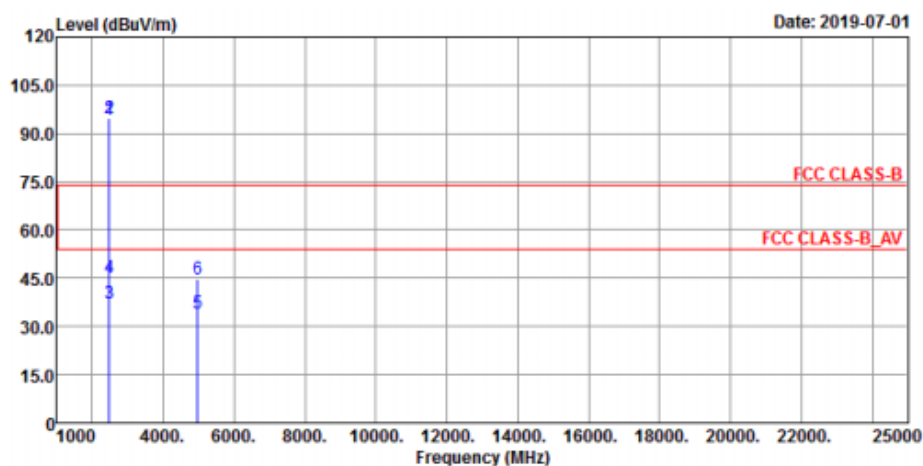
Above 1 GHz Data:  
GFSK

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 78         | Frequency Range    | 1 GHz ~ 25 GHz            |
| Input Power              | 120 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Tim-Chen                  |

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |               |                |             |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|---------------|----------------|-------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2480                                                | 89.01                   | 93.86             | -4.85         |                |             | 112                 | 247                  | Average |
| 2480                                                | 89.74                   | 94.59             | -4.85         |                |             | 112                 | 247                  | Peak    |
| 2483.5                                              | 36.69                   | 41.54             | -4.85         | 54             | -17.31      | 112                 | 247                  | Average |
| 2483.5                                              | 44.88                   | 49.73             | -4.85         | 74             | -29.12      | 112                 | 247                  | Peak    |
| 4960                                                | 35.74                   | 49.63             | -13.89        | 54             | -18.26      | 208                 | 192                  | Average |
| 4960                                                | 44.86                   | 58.75             | -13.89        | 74             | -29.14      | 208                 | 192                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |               |                |             |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2480                                                | 94.28                   | 99.13             | -4.85         |                |             | 143                 | 22                   | Average |
| 2480                                                | 94.91                   | 99.76             | -4.85         |                |             | 143                 | 22                   | Peak    |
| 2483.5                                              | 37.04                   | 41.89             | -4.85         | 54             | -16.96      | 143                 | 22                   | Average |
| 2483.5                                              | 45.07                   | 49.92             | -4.85         | 74             | -28.93      | 143                 | 22                   | Peak    |
| 4960                                                | 33.95                   | 47.84             | -13.89        | 54             | -20.05      | 109                 | 33                   | Average |
| 4960                                                | 44.54                   | 58.43             | -13.89        | 74             | -29.46      | 109                 | 33                   | Peak    |

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 2480 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

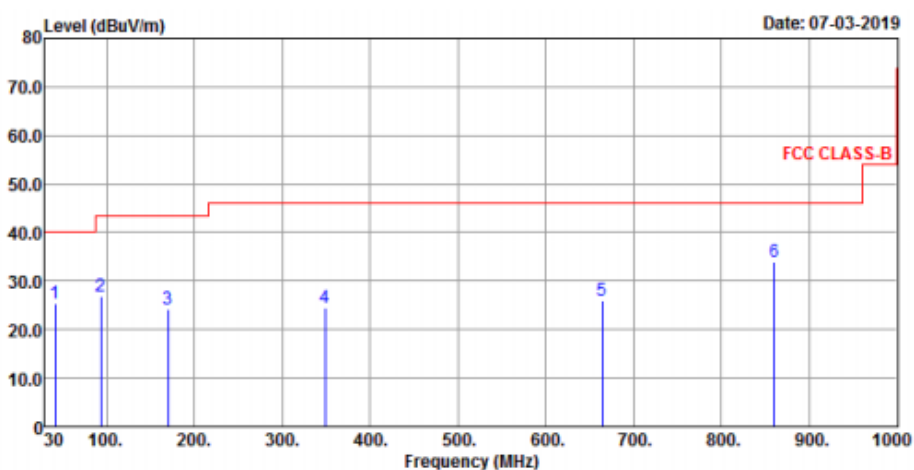
### 9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

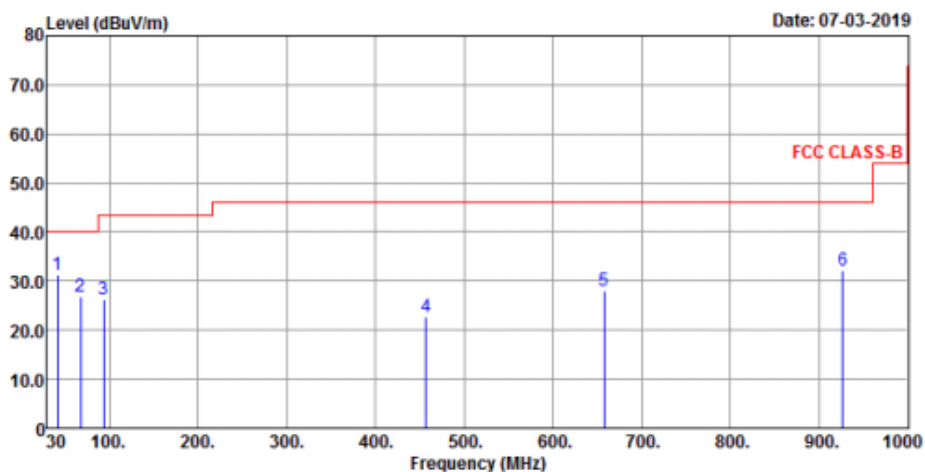
### 30 MHz ~ 1 GHz Worst-Case Data:

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 78         | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 120 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quasi-peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Tim-Chen                     |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |               |                |              |                     |                      |             |
|-----------------------------------------------------|-------------------------|-------------------|---------------|----------------|--------------|---------------------|----------------------|-------------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB)  | Antenna Height (cm) | Table Angle (Degree) | Remark      |
| 41.64                                               | 25.34                   | 42.27             | -16.93        | 40             | -14.66       | 126                 | 144                  | Peak        |
| 94.02                                               | 26.98                   | 48.92             | -21.94        | 43.5           | -16.52       | 153                 | 167                  | Peak        |
| 169.68                                              | 24.3                    | 41.92             | -17.62        | 43.5           | -19.2        | 189                 | 205                  | Peak        |
| 349.13                                              | 24.48                   | 39.31             | -14.83        | 46             | -21.52       | 241                 | 255                  | Peak        |
| 664.38                                              | 26.09                   | 33.57             | -7.48         | 46             | -19.91       | 279                 | 283                  | Peak        |
| 860.32                                              | 33.91                   | 38.08             | -4.17         | 46             | -12.09       | 299                 | 317                  | Peak        |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |               |                |              |                     |                      |             |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Factor (dB/m) | Limit (dBuV/m) | Margin (dB)  | Antenna Height (cm) | Table Angle (Degree) | Remark      |
| <b>41.64</b>                                        | <b>31.26</b>            | <b>48.19</b>      | <b>-16.93</b> | <b>40</b>      | <b>-8.74</b> | <b>136</b>          | <b>148</b>           | <b>Peak</b> |
| 67.83                                               | 26.86                   | 46.03             | -19.17        | 40             | -13.14       | 157                 | 174                  | Peak        |
| 94.02                                               | 26.24                   | 48.18             | -21.94        | 43.5           | -17.26       | 189                 | 203                  | Peak        |
| 456.8                                               | 22.84                   | 35.18             | -12.34        | 46             | -23.16       | 235                 | 249                  | Peak        |
| 657.59                                              | 28                      | 35.78             | -7.78         | 46             | -18          | 268                 | 279                  | Peak        |
| 926.28                                              | 32.1                    | 35.13             | -3.03         | 46             | -13.9        | 296                 | 322                  | Peak        |

Remarks:

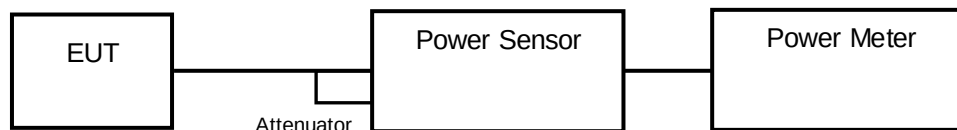
- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- The emission levels of other frequencies were very low against the limit.

## 4.2 Maximum Output Power

### 4.2.1 Limits of Maximum Output Power Measurement

Refer to Regulation 15.247 (b)(1), the Maximum Output Power Measurement is 125 mW.

### 4.2.2 Test Setup



### 4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.2.4 Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

### 4.2.5 Deviation from Test Standard

No deviation.

### 4.2.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

### 4.2.7 Test Results

#### <GFSK>

| Channel | Freq. (MHz) | Peak Power (mW) | Peak Power (dBm) | Power Limit (mW) | Pass / Fail |
|---------|-------------|-----------------|------------------|------------------|-------------|
| 0       | 2402        | 15.136          | 11.80            | 125              | Pass        |
| 39      | 2441        | 15.346          | 11.86            | 125              | Pass        |
| 78      | 2480        | 14.962          | 11.75            | 125              | Pass        |

#### <8DPSK>

| Channel | Freq. (MHz) | Peak Power (mW) | Peak Power (dBm) | Power Limit (mW) | Pass / Fail |
|---------|-------------|-----------------|------------------|------------------|-------------|
| 0       | 2402        | 16.293          | 12.12            | 125              | Pass        |
| 39      | 2441        | 16.749          | 12.24            | 125              | Pass        |
| 78      | 2480        | 16.106          | 12.07            | 125              | Pass        |

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---