



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AY0051453(7) Date : Sep 16, 2019

Application No. : LY021855(0)

Applicant : Bell Sports Inc.  
5550 SCOTTS VALLEY DRIVE,  
SCOTTS VALLEY, CA 95066

Sample Description : One(1) item of submitted sample stated to be Turn signal light  
Radio Frequency : 2403 – 2478MHz  
Rating : 3.7V rechargeable battery  
No. of submitted sample : One (1) set  
Sample registration No. : RY047193-001

Date Received : 09 Jul 2019

Test Period : 09 Jul 2019 to 09 Aug 2019

Test Requested : FCC 47CFR Part 15 Certification

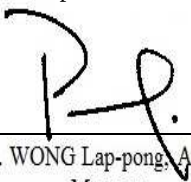
Test Method : 47 CFR Part 15 (10-1-18 Edition)  
ANSI C63.10 – 2013  
ANSI C63.4 – 2014

Test Result : See attached sheet(s) from page 2 to 21.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C, section 15.249.

For and on behalf of  
CMA Industrial Development Foundation Limited

Authorized Signature : \_\_\_\_\_

  
Mr. WONG Lap-pong, Andrew  
Manager

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FCC ID: QH67115952L

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### 1 General Information

#### 1.1 General Description

The 4.897MHz crystal oscillator drives the base of IC final amplifier. The modulation provided by IC u1. The output of U1 has the matching network consisting C2, L1, L2 that limit the harmonic content and affect the proper coupling of the antenna to the output stage.

Antenna, Ground and Power Source:

The antenna consists of PCB antenna with 0.0dBi gain. The ground is only that of the printed circuit board. Electric current is supplied by 3.7V rechargeable battery.

Operation Descriptions:

The Equipment Under Test (EUT) is a portable 2.4GHz transmitter, The transmitter is light control system. The transmission signal is frequency hopping with channel frequency range 2403.0.-2478.0MHz during normal use. The EUT was set to fixed frequency test mode by application. The EUT is powered by 3.7V rechargeable. After switching on the EUT, the light can be controlled by remote.

The EUT is need to pair with a transmitter and received the transmitted signal for corresponding response.



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### 1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2014. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,  
9 – 13 Wong Chuk Yeung Street,  
Fo Tan, Shatin,  
New Territories,  
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2014. A shielded room is located at :

Ground Floor, Yan Hing Centre,  
9 – 13 Wong Chuk Yeung Street,  
Fo Tan, Shatin,  
New Territories,  
Hong Kong.

FCC Accredited Lab (Designation Number: HK0004)  
Conformity Assessment Body Identifier (CABID: HK0002)



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### 1.3 List of measuring equipment

| Equipment               | Manufacturer     | Model No.    | Serial No.  | Calibration Due Date | Calibration Period |
|-------------------------|------------------|--------------|-------------|----------------------|--------------------|
| EMI Test Receiver       | Rohde & Schwarz  | ESCI         | 100152      | 31 Mar 2020          | 1Year              |
| Spectrum Analyzer       | R&S              | FSV40        | 100964      | 10 Sep 2020          | 1Year              |
| Broadband Antenna       | Schaffner        | CBL6112B     | 2692        | 27 Mar 2021          | 2Years             |
| Loop Antenna            | EMCO             | 6502         | 00056620    | 25 Jan 2020          | 2Years             |
| Horn Antenna            | Schwarzbeck      | BBHA 9120D   | 9120D-531   | 21 Dec 2020          | 2Years             |
| Broadband Pre-Amplifier | Schwarzbeck      | BBV 9718     | 9718-119    | 21 Dec 2020          | 2Years             |
| Horn Antenna            | Schwarzbeck      | BBHA 9170    | BBHA9170442 | 01 Aug 2020          | 2Years             |
| Broadband Pre-Amplifier | Schwarzbeck      | BBV 9719     | 9719-010    | 01 Aug 2020          | 2Years             |
| Coaxial Cable           | Schaffner        | RG 213/U     | N/A         | 16 May 2020          | 1Year              |
| Coaxial Cable           | Suhner           | RG 214/U     | N/A         | 16 May 2020          | 1Year              |
| Coaxial Cable           | Suhner           | Sucoflex_104 | N/A         | 21 Dec 2019          | 1Year              |
| LISN                    | Rohde & Schwarz  | ENV216       | 101323      | 22 Jan 2020          | 1Year              |
| Coaxial Cable           | Tyco Electronics | RG 58C/U     | N/A         | 23 Oct 2019          | 1Year              |



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### 1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%.

#### Radiated emissions

| Frequency                     | Uncertainty ( $U_{lab}$ ) |
|-------------------------------|---------------------------|
| 30MHz ~ 200MHz (Horizontal)   | 4.59dB                    |
| 30MHz ~ 200MHz (Vertical)     | 4.49dB                    |
| 200MHz ~ 1000MHz (Horizontal) | 4.94dB                    |
| 200MHz ~ 1000MHz (Vertical)   | 4.97dB                    |
| 1GHz ~ 6GHz                   | 4.52dB                    |
| 6GHz – 18GHz                  | 4.58dB                    |
| 18GHz – 40GHz                 | 4.80dB                    |

### 1.5 Test Summary

| TEST ITEM                         | FCC REFERENCE | RESULT |
|-----------------------------------|---------------|--------|
| Fundamental and harmonic emission | 15.249(a)     | Comply |
| Out-band emission                 | 15.249(d)     | Comply |
| Peak Limit                        | 15.249(e)     | Comply |
| Bandwidth                         | 15.215(c)     | Comply |



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### 2 Description of the radiated emission test

#### 2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

A non-conductive turntable with dimensions of 1.5m x 0.4m x 0.8m (L x W x H) placed above the reference ground plane. The equipment under test (EUT) was placed at 0.8m height for below 1GHz measurement and 1.5m height for above 1GHz measurement. The test distance is 3m between EUT and receiving antenna. A broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated. Additional absorbing material will be placed between the EUT and receiving antenna for above 1GHz measurement.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.



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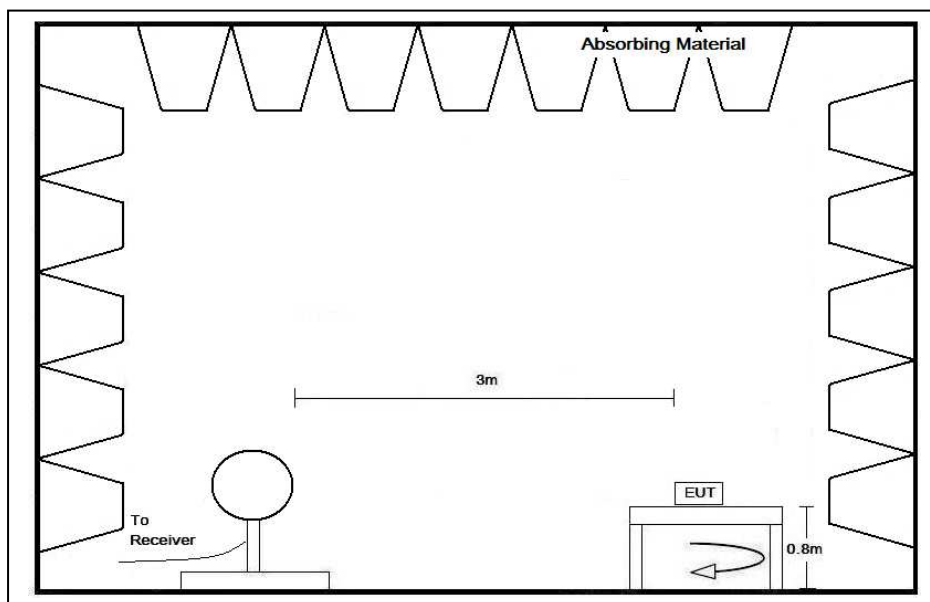
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## TEST REPORT

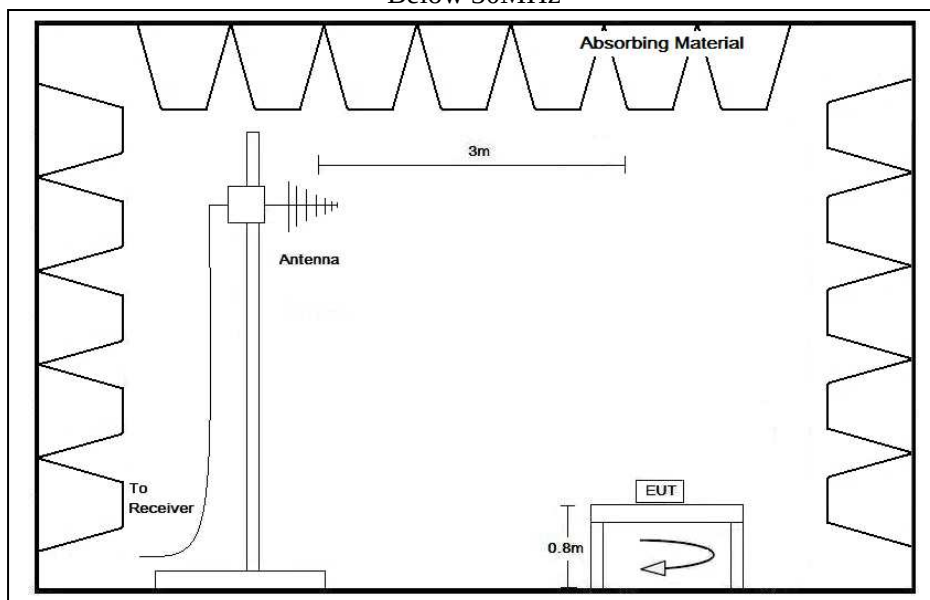
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### 2.2 Test Setup



Below 30MHz



30MHz – 1GHz

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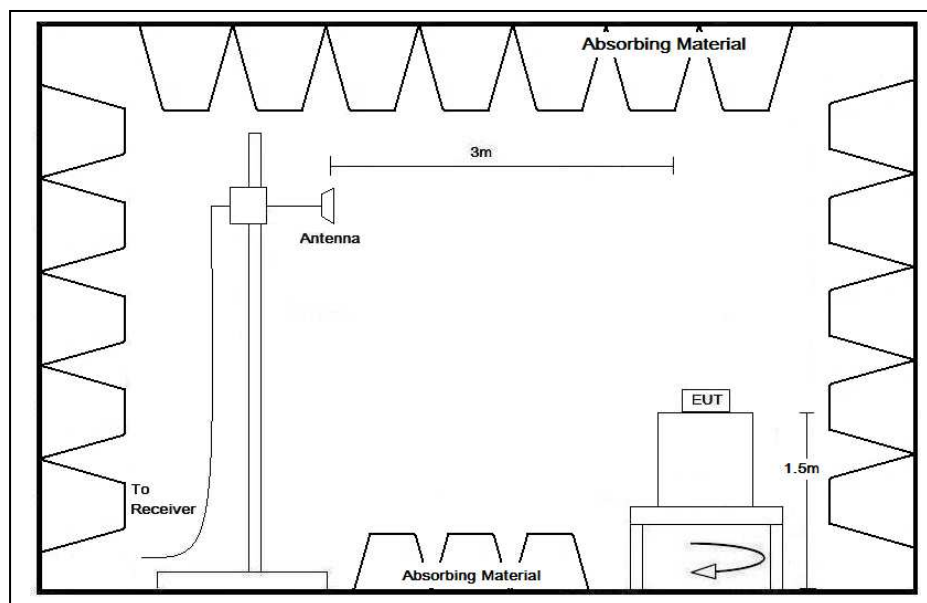
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### 2.2 Test Setup



Above 1GHz

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### 2.3 Test Result

Peak Detector data was measured unless otherwise stated.

The radiated emissions are measured from 9kHz to 26GHz (the tenth harmonics)

The worst case configuration is shown on the worst case configuration of test setup photo.

The frequencies from fundamental up to tenth harmonics were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next pages.

The EUT has been tested in Transmission mode.

It was found that the EUT meet the FCC requirement.



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### 2.4 Radiated Emission Measurement Data

#### Radiated emission

##### Environmental conditions:

| Parameter            | Recorded value |
|----------------------|----------------|
| Ambient temperature: | 27.8 °C        |
| Relative humidity:   | 49.5 %         |

Channel: 2403 MHz

| Polarization | Frequency (MHz)       | Reading at 3m (dBμV) | Antenna Factor and Cable Loss (dB/m) | Field Strength at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) | Detector Type |
|--------------|-----------------------|----------------------|--------------------------------------|-------------------------------|----------------------|-------------|---------------|
| H            | 2402.848 <sup>1</sup> | 85.3                 | -4.6                                 | 80.7                          | 94.0                 | -13.3       | Peak          |
| V            | 2402.874 <sup>1</sup> | 85.0                 | -4.6                                 | 80.4                          | 94.0                 | -13.6       | Peak          |
| H            | 2400.000              | 60.4                 | -4.6                                 | 55.8                          | 74.0                 | -18.2       | Peak          |
| H            | 2400.000              | 27.4                 | -4.6                                 | 22.8                          | 54.0                 | -31.2       | Average       |
| V            | 2400.000              | 60.0                 | -4.6                                 | 55.4                          | 74.0                 | -18.6       | Peak          |
| V            | 2400.000              | 26.7                 | -4.6                                 | 22.1                          | 54.0                 | -31.9       | Average       |
| H            | 4806.389              | 57.4                 | 2.9                                  | 60.3                          | 74.0                 | -13.7       | Peak          |
| H            | 4806.289              | 33.1                 | 2.9                                  | 36.0                          | 54.0                 | -18.0       | Average       |
| V            | 4806.272              | 52.4                 | 2.9                                  | 55.3                          | 74.0                 | -18.7       | Peak          |
| V            | 4806.288              | 28.7                 | 2.9                                  | 31.6                          | 54.0                 | -22.4       | Average       |
| H            | 7209.086 <sup>1</sup> | 33.7                 | 9.7                                  | 43.4                          | 54.0                 | -10.6       | Peak          |
| V            | 7208.452 <sup>1</sup> | 33.8                 | 9.7                                  | 43.5                          | 54.0                 | -10.5       | Peak          |

Remark: 1) The peak value of emissions at fundamental and above 7GHz are below the average limit, so no average measurement is performed.



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Channel: 2440 MHz

| Polarization | Frequency (MHz) | Reading at 3m (dBμV) | Antenna Factor and Cable Loss (dB/m) | Field Strength at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) | Detector Type |
|--------------|-----------------|----------------------|--------------------------------------|-------------------------------|----------------------|-------------|---------------|
| H            | 2440.127        | 86.4                 | -4.6                                 | 81.8                          | 94.0                 | -12.2       | Peak          |
| V            | 2440.113        | 85.2                 | -4.6                                 | 80.6                          | 94.0                 | -13.4       | Peak          |
| H            | 4880.162        | 56.6                 | 2.5                                  | 59.1                          | 74.0                 | -14.9       | Peak          |
| H            | 4880.297        | 32.4                 | 2.5                                  | 34.9                          | 54.0                 | -19.1       | Average       |
| V            | 4880.391        | 54.0                 | 2.5                                  | 56.5                          | 74.0                 | -17.5       | Peak          |
| V            | 4880.309        | 30.2                 | 2.5                                  | 32.7                          | 54.0                 | -21.3       | Average       |
| H            | 7320.059        | 34.6                 | 9.7                                  | 44.3                          | 54.0                 | -9.7        | Peak          |
| V            | 7320.341        | 35.6                 | 9.7                                  | 45.3                          | 54.0                 | -8.7        | Peak          |

Remark: 1) The peak value of emissions at fundamental and above 7GHz are below the average limit, so no average measurement is performed.



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Channel: 2478 MHz

| Polarization | Frequency (MHz) | Reading at 3m (dBμV) | Antenna Factor and Cable Loss (dB/m) | Field Strength at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) | Detector Type |
|--------------|-----------------|----------------------|--------------------------------------|-------------------------------|----------------------|-------------|---------------|
| H            | 2478.107        | 85.3                 | -4.6                                 | 80.7                          | 94.0                 | -13.3       | Peak          |
| V            | 2478.139        | 83.3                 | -4.6                                 | 78.7                          | 94.0                 | -15.3       | Peak          |
| H            | 2483.500        | 54.3                 | -4.6                                 | 49.7                          | 74.0                 | -24.3       | Peak          |
| V            | 2483.500        | 53.3                 | -4.6                                 | 48.7                          | 74.0                 | -25.3       | Peak          |
| H            | 4956.408        | 53.4                 | 2.9                                  | 56.3                          | 74.0                 | -17.7       | Peak          |
| H            | 4956.355        | 29.9                 | 2.9                                  | 32.8                          | 54.0                 | -21.2       | Average       |
| V            | 4956.319        | 54.6                 | 2.9                                  | 57.5                          | 74.0                 | -16.5       | Peak          |
| V            | 4956.342        | 30.3                 | 2.9                                  | 33.2                          | 54.0                 | -20.8       | Average       |
| H            | 7434.147        | 35.1                 | 9.7                                  | 44.8                          | 54.0                 | -9.2        | Peak          |
| V            | 7434.505        | 35.0                 | 9.7                                  | 44.7                          | 54.0                 | -9.3        | Peak          |

Remark: 1) The peak value of emissions at fundamental and above 7GHz are below the average limit, so no average measurement is performed.



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Mode: Light on with charging

| Polarization | Frequency (MHz) | Reading at 3m (dBμV) | Antenna Factor and Cable Loss (dB/m) | Field Strength at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) | Detector Type |
|--------------|-----------------|----------------------|--------------------------------------|-------------------------------|----------------------|-------------|---------------|
| H            | 54.949          | 7.3                  | 10.8                                 | 18.1                          | 40.0                 | -21.9       | QP            |
| V            | 89.216          | 10.4                 | 10.0                                 | 20.4                          | 43.5                 | -23.1       | QP            |
| H            | 125.785         | 11.1                 | 12.9                                 | 24.0                          | 43.5                 | -19.5       | QP            |
| V            | 174.325         | 7.4                  | 14.7                                 | 22.1                          | 43.5                 | -21.4       | QP            |
| H            | 217.524         | 7.7                  | 14.5                                 | 22.2                          | 46.0                 | -23.8       | QP            |
| H            | 248.699         | 11.4                 | 14.5                                 | 25.9                          | 46.0                 | -20.1       | QP            |
| V            | 289.579         | 12.7                 | 14.5                                 | 27.2                          | 46.0                 | -18.8       | QP            |



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### 3 Description of the Line-conducted Test

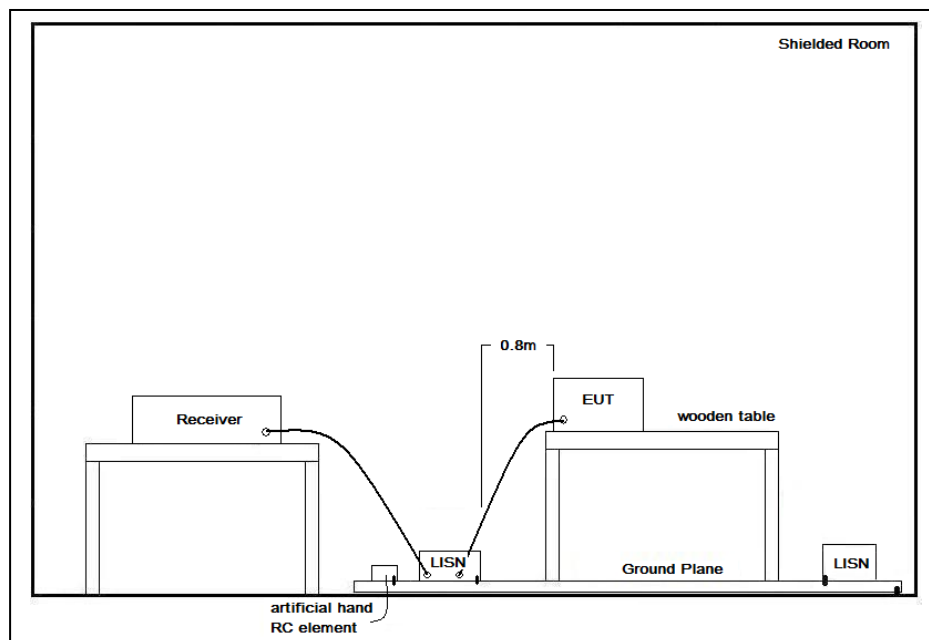
#### 3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

#### 3.2 Test Result

The result showed that the EUT meet the FCC requirement.

#### 3.3 Test Setup



#### 3.4 Graph and Table of Conducted Emission Measurement Data



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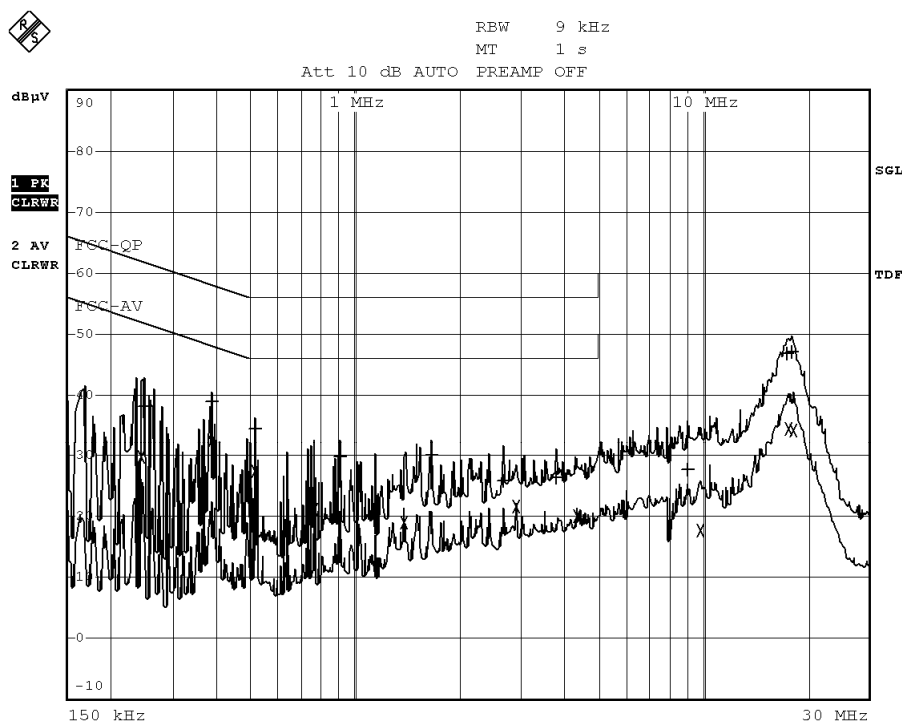
### Measurement Data (Graph)

Conducted emission

pursuant to

the requirement of FCC Part 15

Mode: Bluetooth connection with Charging





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### Measurement Data (Data)

#### Conducted emission

pursuant to

the requirement of FCC Part 15

Mode: Bluetooth connection with Charging

| EDIT PEAK LIST (Final Measurement Results) |             |            |        |                |
|--------------------------------------------|-------------|------------|--------|----------------|
| Trace1:                                    | FCC-QP      |            |        |                |
| Trace2:                                    | FCC-AV      |            |        |                |
| Trace3:                                    | ---         |            |        |                |
| TRACE                                      | FREQUENCY   | LEVEL dBμV |        | DELTA LIMIT dB |
| 2 Average                                  | 244.5 kHz   | 29.84      | N gnd  | -22.09         |
| 1 Quasi Peak                               | 249 kHz     | 38.18      | N gnd  | -23.60         |
| 1 Quasi Peak                               | 388.5 kHz   | 38.92      | N gnd  | -19.17         |
| 2 Average                                  | 388.5 kHz   | 32.46      | N gnd  | -15.63         |
| 1 Quasi Peak                               | 513.5 kHz   | 34.48      | L1 gnd | -21.51         |
| 2 Average                                  | 513.5 kHz   | 27.27      | N gnd  | -18.72         |
| 2 Average                                  | 761 kHz     | 20.98      | N gnd  | -25.02         |
| 1 Quasi Peak                               | 905 kHz     | 29.78      | N gnd  | -26.21         |
| 2 Average                                  | 1.3865 MHz  | 18.97      | N gnd  | -27.03         |
| 1 Quasi Peak                               | 1.6655 MHz  | 30.14      | N gnd  | -25.85         |
| 1 Quasi Peak                               | 2.6645 MHz  | 25.80      | N gnd  | -30.19         |
| 2 Average                                  | 2.9255 MHz  | 21.51      | N gnd  | -24.48         |
| 1 Quasi Peak                               | 3.7895 MHz  | 26.22      | N gnd  | -29.77         |
| 2 Average                                  | 4.334 MHz   | 20.06      | N gnd  | -25.93         |
| 1 Quasi Peak                               | 9.0635 MHz  | 27.56      | N gnd  | -32.43         |
| 2 Average                                  | 9.8195 MHz  | 17.67      | L1 gnd | -32.32         |
| 1 Quasi Peak                               | 17.456 MHz  | 46.91      | N gnd  | -13.08         |
| 2 Average                                  | 17.645 MHz  | 34.55      | N gnd  | -15.44         |
| 1 Quasi Peak                               | 18.0005 MHz | 47.06      | N gnd  | -12.93         |
| 2 Average                                  | 18.212 MHz  | 34.17      | N gnd  | -15.82         |



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### 4 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

| Document                | Filename                       |
|-------------------------|--------------------------------|
| ID Label/Location       | Label Artwork and Location.pdf |
| Block Diagram           | Block Diagram.pdf              |
| Schematic Diagram       | Schematic.pdf                  |
| Users Manual            | User Manual.pdf                |
| Operational Description | Operation Description.pdf      |

#### 4.1 Bandwidth

Appendix A1 show the fundamental emission is confined in the specified band. 20dB bandwidth is 1.208MHz. 20dB bandwidth falls in the band of 2400 – 2483.5MHz. It also shows that the EUT met the requirement of FCC Part 15.215(c).



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### 5 Appendices

A1. 20dB Bandwidth Plot 2 page(s)



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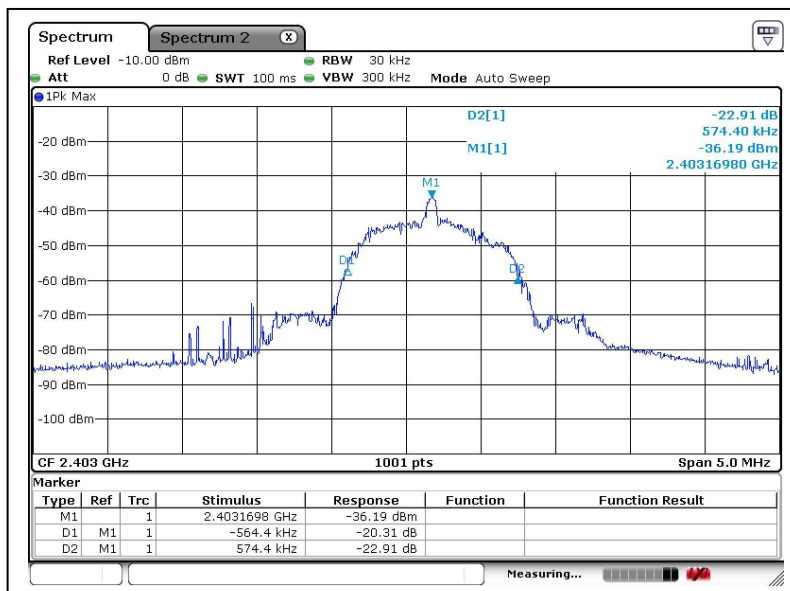
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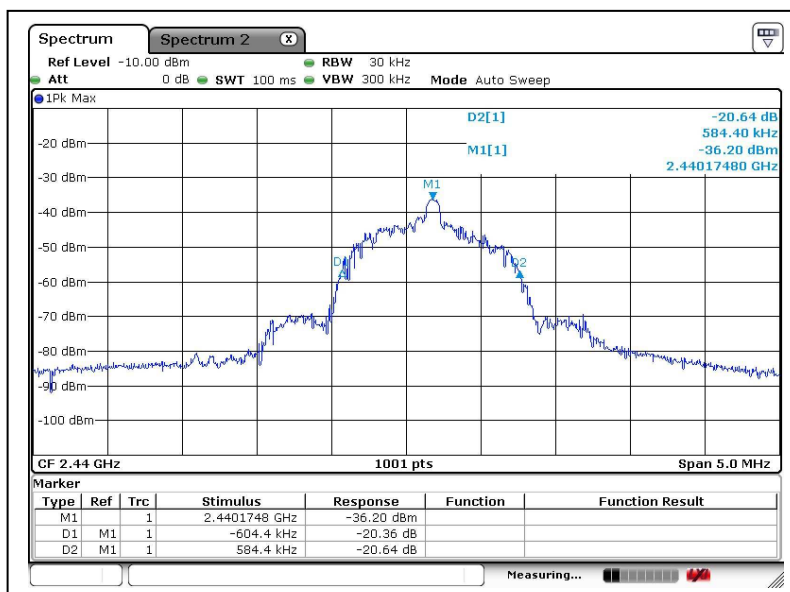
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### A1. 20dB Bandwidth Plot



Channel: 2403MHz



Channel: 2440MHz

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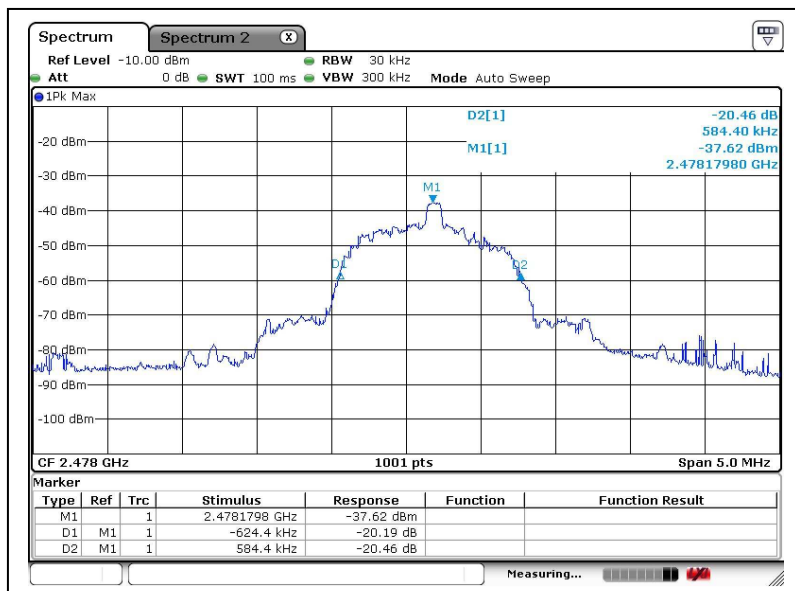
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Channel: 2478MHz

\*\*\*\*\* End of Report \*\*\*\*\*