



FCC TEST REPORT

FCC PART 15 SUBPART C 15.249

Test report
On Behalf of
The Gem Group, Inc.
For
Pace Bluetooth® Earbuds
Model No.: 100158-001B

FCC ID: 2AGR4-100158

Prepared for : **The Gem Group, Inc.**
9 International Way, Lawrence MA 01843, USA

Prepared By : **Shenzhen HUAKE Testing Technology Co., Ltd.**
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Date of Test: **Dec. 07, 2018 ~ Dec. 18, 2018**

Date of Report: **Dec. 24, 2018**

Report Number: **HK1812171893E**



TEST RESULT CERTIFICATION

Applicant's name..... The Gem Group, Inc.

Address..... 9 International Way, Lawrence MA 01843, USA

Manufacture's Name Dongguan Harmony Electronic Technology Co., Ltd

Address..... Shuibei Industrial Zone, Hongyun Road, Shuibei Industrial Park, Shipai Town, Dongguan

Factory's Name..... Dongguan Harmony Electronic Technology Co., Ltd

Address..... Shuibei Industrial Zone, Hongyun Road, Shuibei Industrial Park, Shipai Town, Dongguan

Product description

Trade Mark..... Gemline

Product name..... Pace Bluetooth® Earbuds

Model and/or type reference.... 100158-001B

Standards..... FCC Rules and Regulations Part 15 Subpart C Section 15.249
ANSI C63.10: 2013

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Date of Test

Date (s) of performance of tests..... Dec. 07, 2018 ~ Dec. 18, 2018

Date of Issue Dec. 24, 2018

Test Result **Pass**

Testing Engineer :

(Gary Qian)

Technical Manager :

(Eden Hu)

Authorized Signatory :

(Jason Zhou)



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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|----------------|---------------------|-----------|
| §15.249&15.209 | Radiated Emission | Compliant |
| §15.249&15.209 | Band Edges Emission | Compliant |
| §15.215 | 20dB bandwidth | Compliant |
| §15.207 | Conducted Emission | N/A |

Note: N/A means it's not applicable to this item.

1.2 TEST FACILITY

Test Firm : Shenzhen HUAKE Testing Technology Co., Ltd.

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,
Fuhai Street, Bao'an District, Shenzhen City, China

Designation Number: : CN1229

Test Firm Registration Number : 616276

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty(9kHz-30MHz) = 3.08dB, k=2

Radiated emission expanded uncertainty(30MHz-1000MHz) = 4.42dB, k=2

Radiated emission expanded uncertainty(Above 1GHz) = 4.06dB, k=2



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

| | |
|--|--|
| Operation Frequency | 2.402 GHz to 2.480GHz |
| Maximum field strength | 98.53dBuV/m(Peak)@3m |
| Bluetooth Version | V4.2 |
| Modulation | GFSK, $\pi/4$ -DQPSK, 8DPSK for BR/EDR |
| Number of channels | 79 for BR/EDR |
| Antenna Gain | 2dBi |
| Antenna Designation | Ceramic Antenna |
| Hardware Version | V1.0 |
| Software Version | V1.0 |
| Power Supply | DC 3.7V by battery |
| Note: 1. The USB port only used for charging and can't be used to transfer data with PC. 2. The BT function of EUT doesn't work when charging. 3. The EUT doesn't support BLE. | |

BR/EDR channel List

| Frequency Band | Channel Number | Frequency |
|----------------|----------------|-----------|
| 2400~2483.5MHZ | 0 | 2402MHZ |
| | 1 | 2403MHZ |
| | : | : |
| | 38 | 2440 MHZ |
| | 39 | 2441 MHZ |
| | 40 | 2442 MHZ |
| | : | : |
| | 77 | 2479 MHZ |
| | 78 | 2480 MHZ |



2.2 OPERATION OF EUT DURING TESTING

| NO. | TEST MODE DESCRIPTION |
|-----|-------------------------------|
| 1 | Low channel GFSK |
| 2 | Middle channel GFSK |
| 3 | High channel GFSK |
| 4 | Low channel $\pi/4$ -DQPSK |
| 5 | Middle channel $\pi/4$ -DQPSK |
| 6 | High channel $\pi/4$ -DQPSK |
| | Low channel 8DPSK |
| | Middle channel 8DPSK |
| | High channel 8DPSK |

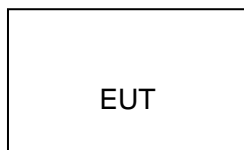
Note: 1. Only the data of the worst case recorded in the test report.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

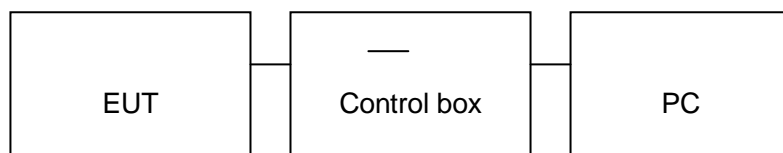


2.3 DESCRIPTION OF TEST SETUP

Configure 1: (Normal hopping)



Configure 2: (Control continuous TX)



| Item | Equipment | Mfr/Brand | Model/Type No. | Remark |
|------|-------------------------|------------------|-----------------|-----------|
| 1 | Pace Bluetooth® Earbuds | Gemline | 100158-001B | EUT |
| 2 | Battery | HUAHUI NEW ENEGY | 1010 | Accessory |
| 3 | PC | APPLE | A1465 | A.E |
| 4 | IPOD | APPLE | A1367 | A.E |
| 5 | Control box | SERIAL | N/A | A.E |
| 6 | USB Cable | N/A | 1.0m unshielded | Accessory |



2.4 MEASUREMENT INSTRUMENTS LIST

TEST EQUIPMENT OF RADIATED EMISSION TEST

| Item | Equipment | Manufacturer | Model No. | Lab Equipment No. | Last Cal. | Cal. Interval |
|------|--------------------------|-----------------|--------------|-------------------|---------------|---------------|
| 1. | Spectrum analyzer | Agilent | N9020A | HKE-048 | Dec. 28, 2017 | 1 Year |
| 2. | Preamplifier | Schwarzbeck | BBV 9743 | HKE-006 | Dec. 28, 2017 | 1 Year |
| 3. | EMI Test Receiver | Rohde & Schwarz | ESCI 7 | HKE-010 | Dec. 28, 2017 | 1 Year |
| 4. | Bilog Broadband Antenna | Schwarzbeck | VULB9163 | HKE-012 | Dec. 28, 2017 | 1 Year |
| 5. | Loop Antenna | Schwarzbeck | FMZB 1519 B | HKE-014 | Dec. 28, 2017 | 1 Year |
| 6. | Horn Antenna | Schwarzbeck | 9120D | HKE-013 | Dec. 28, 2017 | 1 Year |
| 7. | Broad-band Horn Antenna | A-INFOMW | LB-180400-KF | HKE-031 | Dec. 28, 2017 | 1 Year |
| 8. | Pre-amplifier | EMCI | EMC051845SE | HKE-015 | Dec. 28, 2017 | 1 Year |
| 9. | Pre-amplifier | Agilent | 83051A | HKE-016 | Dec. 28, 2017 | 1 Year |
| 10. | Filter (2.4-2.483GHz) | Micro-tronics | 087 | -- | N/A | N/A |
| 11. | Radiation Cable 1 | MXT | HK1 | R05 | N/A | N/A |
| 12. | Radiation Cable 2 | MXT | HK1 | R06 | N/A | N/A |



3. RADIATED EMISSION

3.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.



The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|-----------------------|---|
| Start ~Stop Frequency | 9KHz~150KHz/RBW 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RBW 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RBW 120KHz for QP |
| Start ~Stop Frequency | 1GHz~26.5GHz 1.5MHz/5MHz for Peak, 1.5MHz/10Hz for Average |

| Receiver Parameter | Setting |
|-----------------------|---------------------------------|
| Start ~Stop Frequency | 9KHz~150KHz/RBW 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RBW 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RBW 120KHz for QP |

Test limit for Standard FCC15.249

| Fundamental Frequency | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|-----------------------|---|---|
| 900-928MHz | 50 | 500 |
| 2400-2483.5MHz | 50 | 500 |
| 5725-5875MHz | 50 | 500 |
| 24.0-24.25GHz | 250 | 2500 |

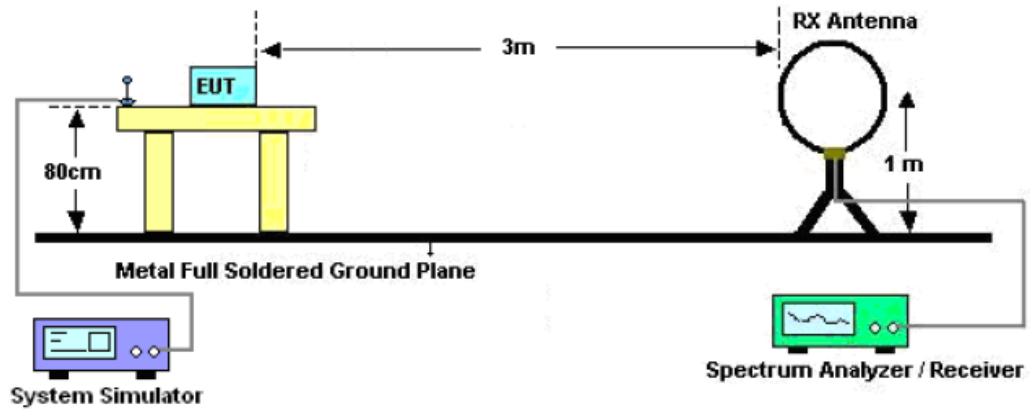
Test limit for Standard FCC 15.209

| Frequency (MHz) | Distance Meters | Field Strengths Limit | |
|--------------------|--------------------|---|----------------|
| | | μ V/m | dB(μ V)/m |
| 0.009 ~ 0.490 | 300 | 2400/F(kHz) | --- |
| 0.490 ~ 1.705 | 30 | 24000/F(kHz) | --- |
| 1.705 ~ 30 | 30 | 30 | --- |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | Other: 74.0 dB(μ V)/m (Peak) 54.0 dB(μ V)/m (Average) | |

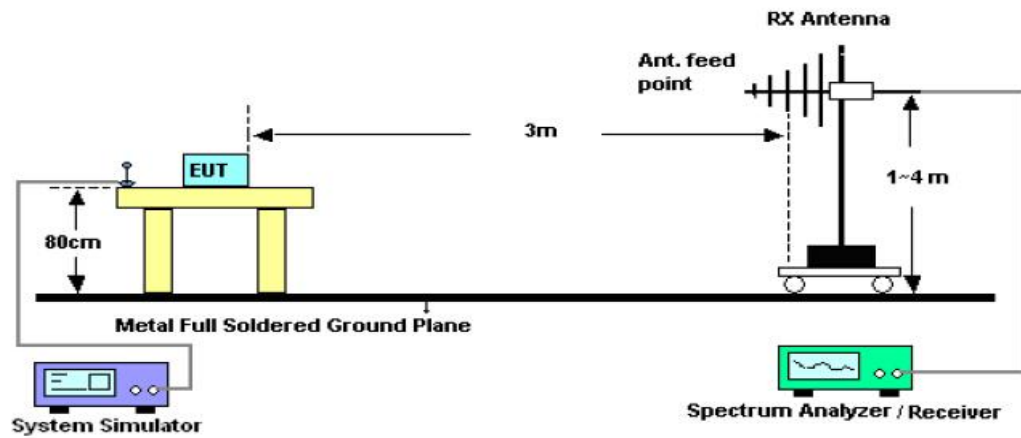
Remark: (1) Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$.
 (2) The smaller limit shall apply at the cross point between two frequency bands.
 (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2. TEST SETUP

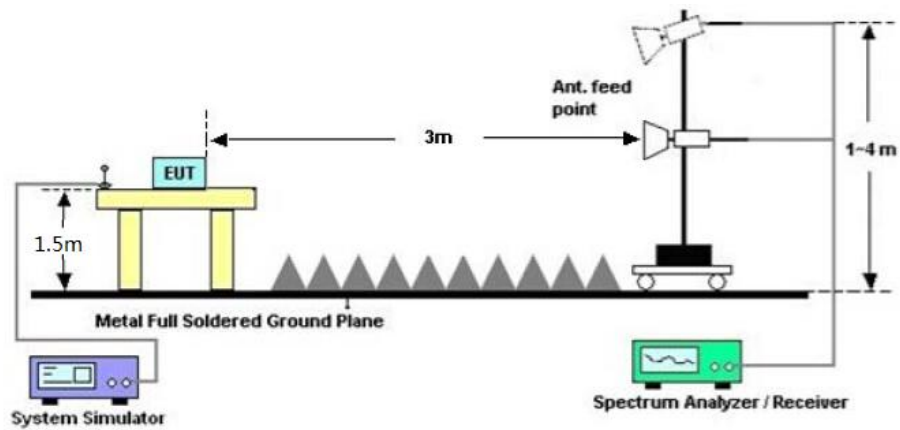
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz





3.3. TEST RESULT

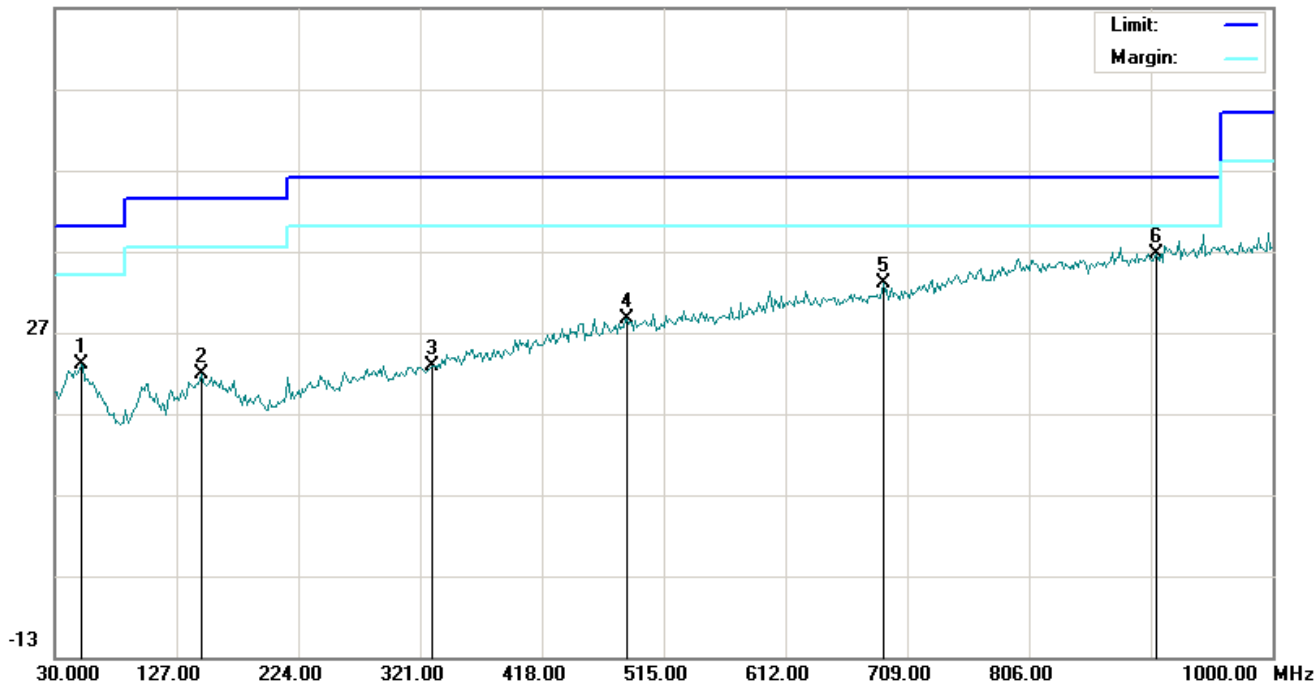
RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION 30MHz- 1GHz FOR BR/EDR

| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 1 | Polarization : | Horizontal |

66.9 dBuV/m

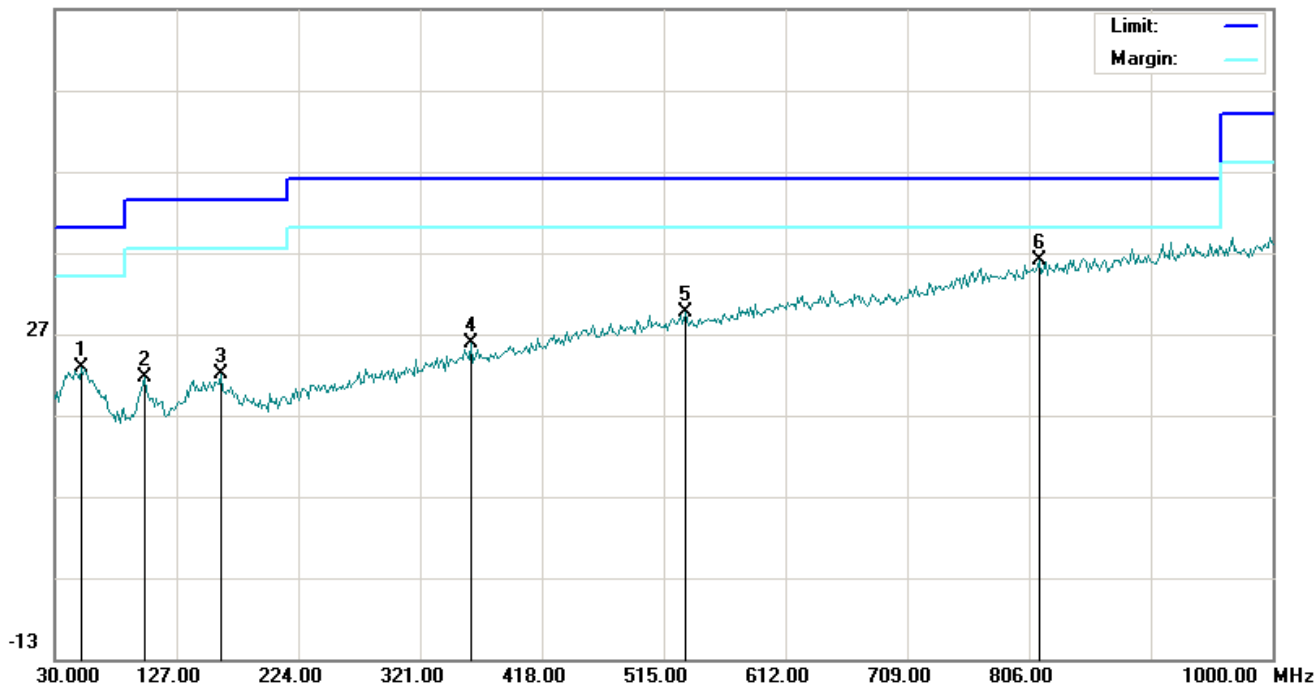


| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 51.0167 | 1.72 | 21.27 | 22.99 | 40.00 | -17.01 | peak | | | |
| 2 | | 146.4000 | 1.58 | 20.25 | 21.83 | 43.50 | -21.67 | peak | | | |
| 3 | | 330.7000 | 0.60 | 22.26 | 22.86 | 46.00 | -23.14 | peak | | | |
| 4 | | 485.9000 | 1.79 | 26.82 | 28.61 | 46.00 | -17.39 | peak | | | |
| 5 | | 689.6000 | 2.43 | 30.59 | 33.02 | 46.00 | -12.98 | peak | | | |
| 6 | * | 907.8500 | 1.86 | 34.75 | 36.61 | 46.00 | -9.39 | peak | | | |



| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 1 | Polarization : | Vertical |

66.9 dBuV/m



| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 51.0167 | 1.54 | 21.27 | 22.81 | 40.00 | -17.19 | peak | | | |
| 2 | | 101.1333 | 1.87 | 19.74 | 21.61 | 43.50 | -21.89 | peak | | | |
| 3 | | 162.5667 | 1.86 | 20.06 | 21.92 | 43.50 | -21.58 | peak | | | |
| 4 | | 361.4166 | 2.39 | 23.40 | 25.79 | 46.00 | -20.21 | peak | | | |
| 5 | | 532.7833 | 1.88 | 27.82 | 29.70 | 46.00 | -16.30 | peak | | | |
| 6 | * | 814.0833 | 2.67 | 33.38 | 36.05 | 46.00 | -9.95 | peak | | | |

RESULT: PASS**Note:**

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

FIELD STRENGTH OF FUNDAMENTAL FOR BR/EDR

| | | | |
|-------------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Modulation : | GFSK | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402.021 | 85.07 | 13.46 | 98.53 | 114.00 | -15.47 | peak |
| 2402.021 | 77.13 | 13.46 | 90.59 | 94.00 | -3.41 | AVG |
| 2441.021 | 83.36 | 13.88 | 97.24 | 114.00 | -16.76 | peak |
| 2441.021 | 75.38 | 13.88 | 89.26 | 94.00 | -4.74 | AVG |
| 2480.021 | 82.54 | 14.11 | 96.65 | 114.00 | -17.35 | peak |
| 2480.021 | 74.63 | 14.11 | 88.74 | 94.00 | -5.26 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|-------------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Modulation : | GFSK | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402.021 | 84.64 | 13.46 | 98.10 | 114.00 | -15.90 | peak |
| 2402.021 | 76.58 | 13.46 | 90.04 | 94.00 | -3.96 | AVG |
| 2441.021 | 82.92 | 13.88 | 96.80 | 114.00 | -17.20 | peak |
| 2441.021 | 74.89 | 13.88 | 88.77 | 94.00 | -5.23 | AVG |
| 2480.021 | 82.07 | 14.11 | 96.18 | 114.00 | -17.82 | peak |
| 2480.021 | 74.12 | 14.11 | 88.23 | 94.00 | -5.77 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|-------------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Modulation : | $\pi/4$ -DQPSK | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402.021 | 84.11 | 13.46 | 97.57 | 114.00 | -16.43 | peak |
| 2402.021 | 76.09 | 13.46 | 89.55 | 94.00 | -4.45 | AVG |
| 2441.021 | 82.37 | 13.88 | 96.25 | 114.00 | -17.75 | peak |
| 2441.021 | 74.44 | 13.88 | 88.32 | 94.00 | -5.68 | AVG |
| 2480.021 | 81.58 | 14.11 | 95.69 | 114.00 | -18.31 | peak |
| 2480.021 | 73.63 | 14.11 | 87.74 | 94.00 | -6.26 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|-------------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Modulation : | $\pi/4$ -DQPSK | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402.021 | 83.59 | 13.46 | 97.05 | 114.00 | -16.95 | peak |
| 2402.021 | 75.59 | 13.46 | 89.05 | 94.00 | -4.95 | AVG |
| 2441.021 | 81.87 | 13.88 | 95.75 | 114.00 | -18.25 | peak |
| 2441.021 | 73.87 | 13.88 | 87.75 | 94.00 | -6.25 | AVG |
| 2480.021 | 81.11 | 14.11 | 95.22 | 114.00 | -18.78 | peak |
| 2480.021 | 73.12 | 14.11 | 87.23 | 94.00 | -6.77 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|-------------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Modulation : | 8DPSK | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402.021 | 83.14 | 13.46 | 96.60 | 114.00 | -17.40 | peak |
| 2402.021 | 75.12 | 13.46 | 88.58 | 94.00 | -5.42 | AVG |
| 2441.021 | 81.41 | 13.88 | 95.29 | 114.00 | -18.71 | peak |
| 2441.021 | 73.37 | 13.88 | 87.25 | 94.00 | -6.75 | AVG |
| 2480.021 | 80.63 | 14.11 | 94.74 | 114.00 | -19.26 | peak |
| 2480.021 | 72.63 | 14.11 | 86.74 | 94.00 | -7.26 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|-------------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Modulation : | 8DPSK | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402.021 | 82.58 | 13.46 | 96.04 | 114.00 | -17.96 | peak |
| 2402.021 | 74.61 | 13.46 | 88.07 | 94.00 | -5.93 | AVG |
| 2441.021 | 80.92 | 13.88 | 94.80 | 114.00 | -19.20 | peak |
| 2441.021 | 72.95 | 13.88 | 86.83 | 94.00 | -7.17 | AVG |
| 2480.021 | 80.07 | 14.11 | 94.18 | 114.00 | -19.82 | peak |
| 2480.021 | 72.12 | 14.11 | 86.23 | 94.00 | -7.77 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

**RADIATED EMISSION ABOVE 1GHZ FOR BR/EDR**

| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 1 | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|-----------|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4804.026 | 43.86 | 7.12 | 50.98 | 74 | -23.02 | peak |
| 4804.026 | 39.55 | 7.12 | 46.67 | 54 | -7.33 | AVG |
| 7206.039 | 36.79 | 9.84 | 46.63 | 74 | -27.37 | peak |
| 7206.039 | 35.24 | 9.84 | 45.08 | 54 | -8.92 | AVG |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 1 | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|-----------|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4804.026 | 42.98 | 7.12 | 50.1 | 74 | -23.9 | peak |
| 4804.026 | 39.87 | 7.12 | 46.99 | 54 | -7.01 | AVG |
| 7206.039 | 36.58 | 9.84 | 46.42 | 74 | -27.58 | peak |
| 7206.039 | 34.26 | 9.84 | 44.1 | 54 | -9.9 | AVG |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 2 | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4882.032 | 42.66 | 7.12 | 49.78 | 74 | -24.22 | peak |
| 4882.032 | 39.25 | 7.12 | 46.37 | 54 | -7.63 | AVG |
| 7323.048 | 37.17 | 9.84 | 47.01 | 74 | -26.99 | peak |
| 7323.048 | 35.87 | 9.84 | 45.71 | 54 | -8.29 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 2 | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4882.032 | 41.81 | 7.12 | 48.93 | 74 | -25.07 | peak |
| 4882.032 | 38.52 | 7.12 | 45.64 | 54 | -8.36 | AVG |
| 7323.048 | 38.39 | 9.84 | 48.23 | 74 | -25.77 | peak |
| 7323.048 | 35.79 | 9.84 | 45.63 | 54 | -8.37 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |



| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 3 | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4960.042 | 41.84 | 7.12 | 48.96 | 74 | -25.04 | peak |
| 4960.042 | 39.57 | 7.12 | 46.69 | 54 | -7.31 | AVG |
| 7440.063 | 37.18 | 9.84 | 47.02 | 74 | -26.98 | peak |
| 7440.063 | 35.03 | 9.84 | 44.87 | 54 | -9.13 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---------------|-------------------------|---------------------|-------------|
| EUT : | Pace Bluetooth® Earbuds | Model Name. : | 100158-001B |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Mode 3 | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Value Type |
|---|---------------|--------|----------------|----------|--------|------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 4960.042 | 41.17 | 7.12 | 48.29 | 74 | -25.71 | peak |
| 4960.042 | 38.75 | 7.12 | 45.87 | 54 | -8.13 | AVG |
| 7440.063 | 36.24 | 9.84 | 46.08 | 74 | -27.92 | peak |
| 7440.063 | 34.53 | 9.84 | 44.37 | 54 | -9.63 | AVG |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

Note: Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report.
Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
The “Factor” value can be calculated automatically by software of measurement system.
The GFSK modulation was the worst case and only the data of worst recorded in this report.



4. BAND EDGE EMISSION

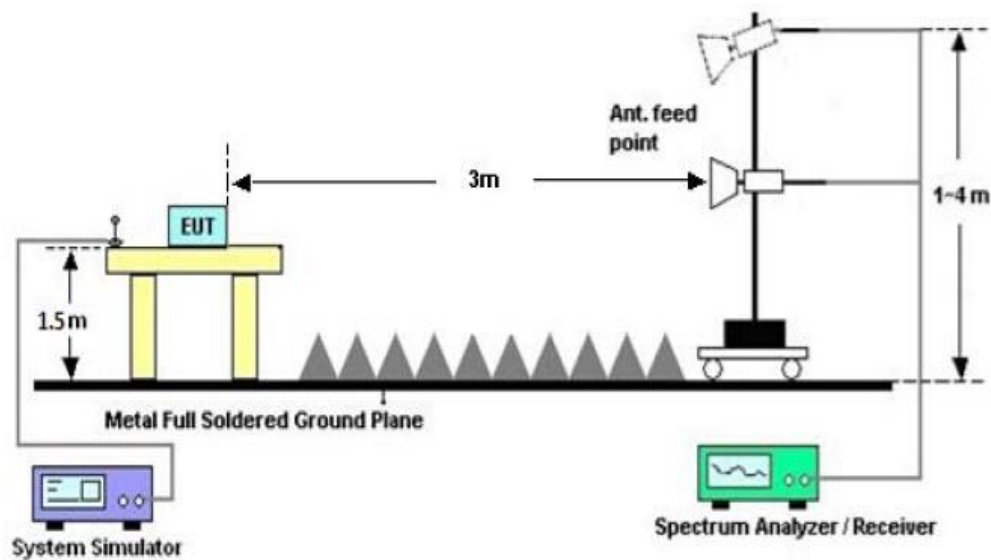
4.1. MEASUREMENT PROCEDURE

1. The EUT operates at hopping-off test mode. The lowest or highest channels are tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
2. Max hold the trace of the setup 1, and the EUT operates at hopping-on test mode to verify the largest spurious emissions power.
3. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission.

| Start frequency(MHz) | Stop frequency(MHz) |
|----------------------|---------------------|
| 2200 | 2405 |
| 2478 | 2500 |

4.2 TEST SETUP

RADIATED EMISSION TEST SETUP



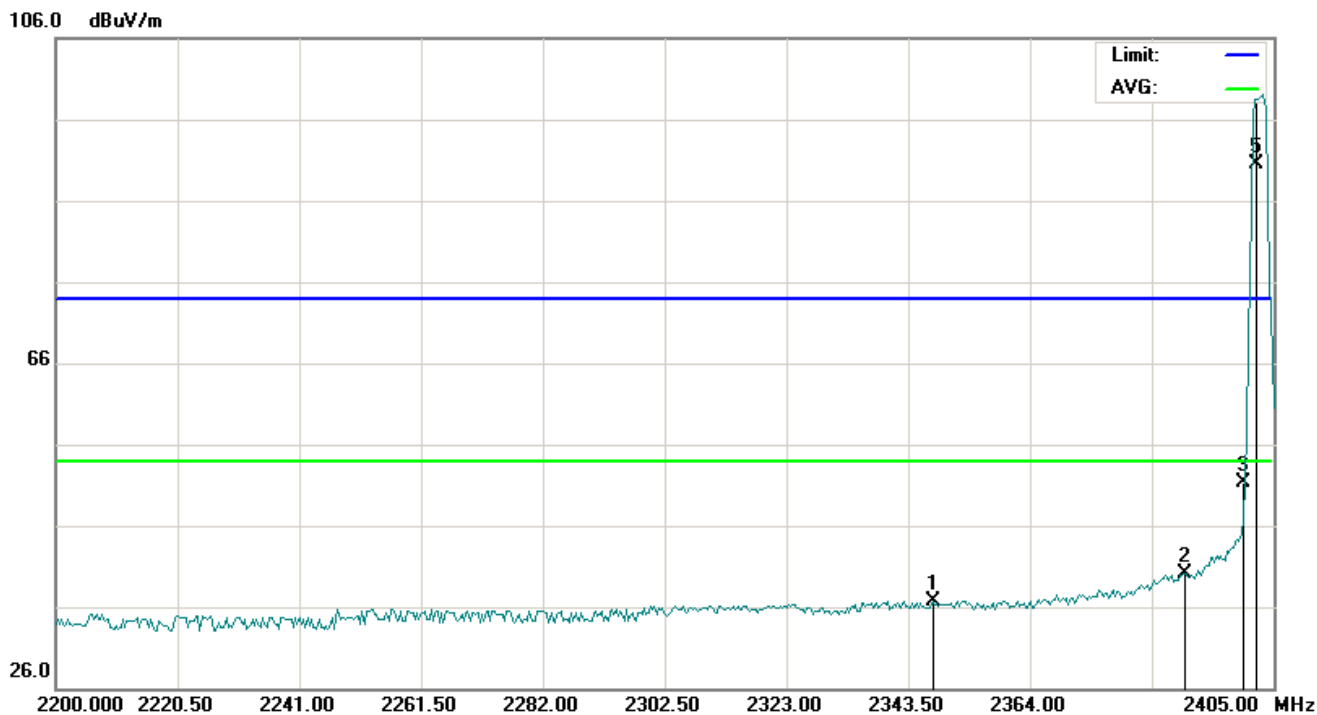


4.3 RADIATED TEST RESULT

FOR BR/EDR

(Worst modulation: GFSK)

TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal

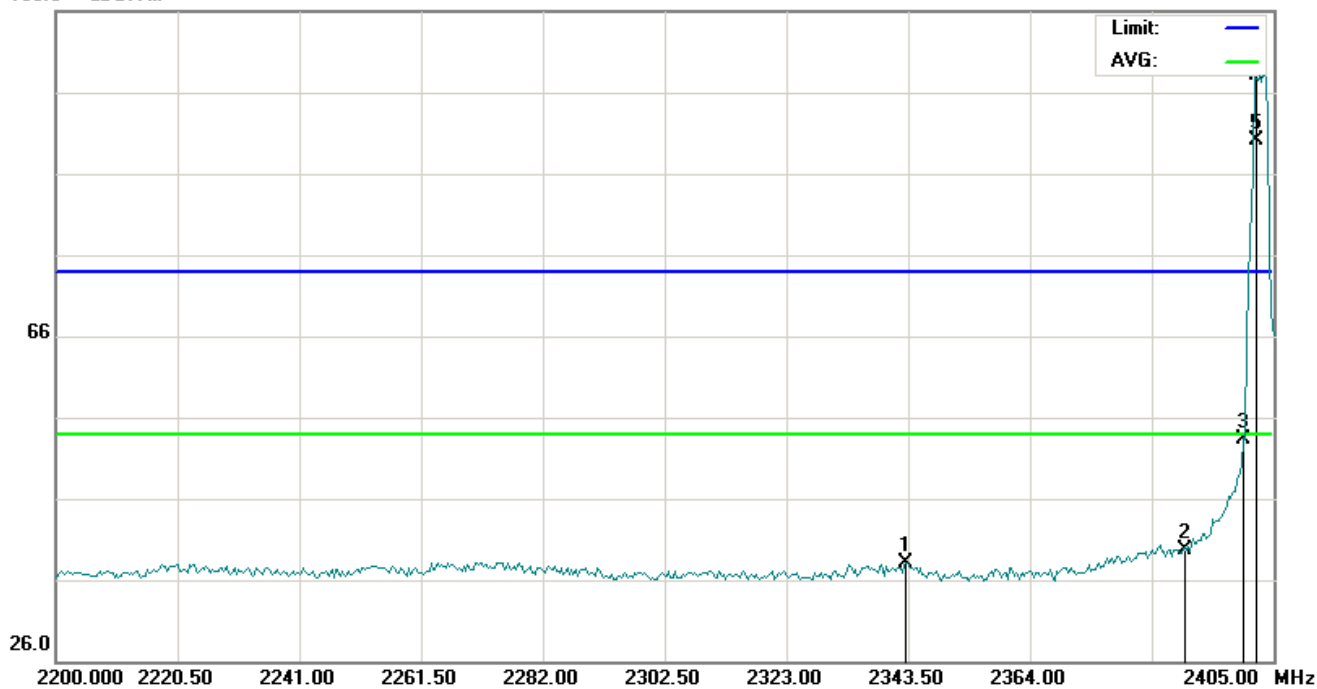


| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 2347.600 | 23.29 | 13.46 | 36.75 | 74.00 | -37.25 | peak | | | |
| 2 | | 2390.000 | 26.67 | 13.46 | 40.13 | 74.00 | -33.87 | peak | | | |
| 3 | | 2400.000 | 37.94 | 13.46 | 51.40 | 74.00 | -22.60 | peak | | | |
| 4 | X | 2402.000 | 84.95 | 13.46 | 98.41 | 74.00 | 24.41 | peak | | | |
| 5 | * | 2402.000 | 76.97 | 13.46 | 90.43 | 54.00 | 36.43 | AVG | 100 | 145 | |



TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

106.0 dBuV/m

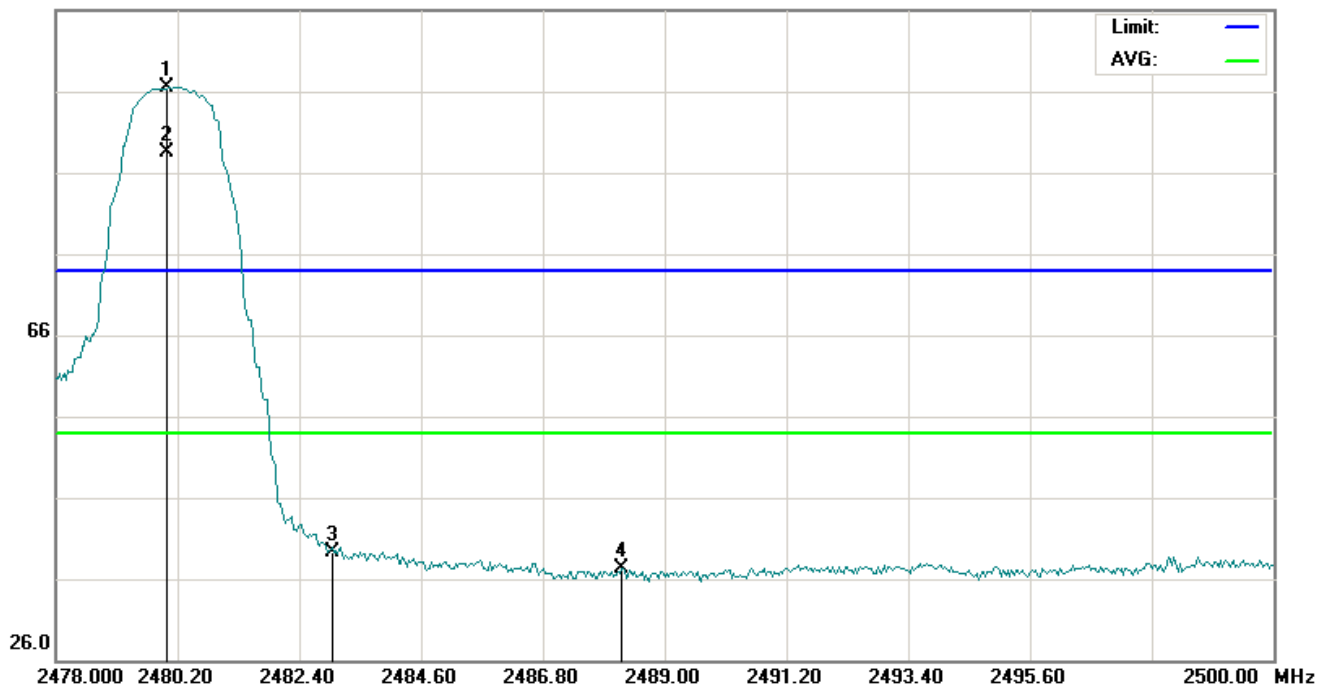


| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 2343.158 | 24.61 | 13.46 | 38.07 | 74.00 | -35.93 | peak | | | |
| 2 | | 2390.000 | 26.17 | 13.46 | 39.63 | 74.00 | -34.37 | peak | | | |
| 3 | | 2400.000 | 39.94 | 13.46 | 53.40 | 74.00 | -20.60 | peak | | | |
| 4 | X | 2402.000 | 84.55 | 13.46 | 98.01 | 74.00 | 24.01 | peak | | | |
| 5 | * | 2402.000 | 76.55 | 13.46 | 90.01 | 54.00 | 36.01 | AVG | 100 | 280 | |



TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal

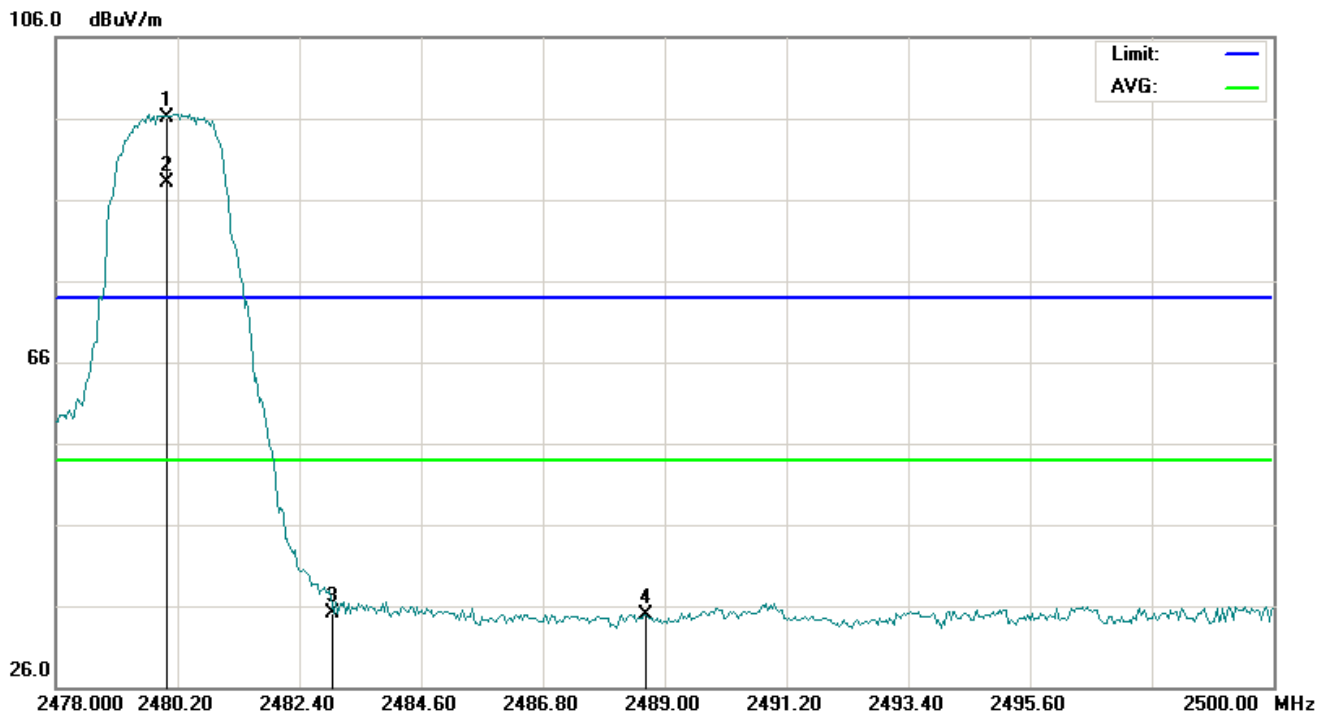
106.0 dBuV/m



| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | X | 2480.000 | 82.33 | 14.11 | 96.44 | 74.00 | 22.44 | peak | | | |
| 2 | * | 2480.000 | 74.37 | 14.11 | 88.48 | 54.00 | 34.48 | AVG | 100 | 130 | |
| 3 | | 2483.000 | 25.22 | 14.13 | 39.35 | 74.00 | -34.65 | peak | | | |
| 4 | | 2488.230 | 23.07 | 14.16 | 37.23 | 74.00 | -36.77 | peak | | | |



TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical



| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | X | 2480.000 | 81.91 | 14.11 | 96.02 | 74.00 | 22.02 | peak | | | |
| 2 | * | 2480.000 | 73.93 | 14.11 | 88.04 | 54.00 | 34.04 | AVG | 100 | 260 | |
| 3 | | 2483.000 | 20.92 | 14.13 | 35.05 | 74.00 | -38.95 | peak | | | |
| 4 | | 2488.670 | 20.76 | 14.16 | 34.92 | 74.00 | -39.08 | peak | | | |

RESULT: PASS

Note: Factor=Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

Hopping on mode and Hopping off mode have been tested, but only worst case reported.

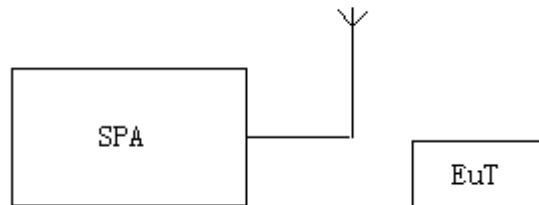


5. BANDWIDTH

5.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Set the EUT Work on the operation frequency individually.
3. Set Span = approximately 2 to 5 times the OBW, centered on a hopping channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately 3* RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

5.2. TEST SETUP





5.3. TEST RESULT

| | |
|-----------------|-----------------|
| TEST ITEM | 20DB BANDWIDTH |
| TEST MODULATION | GFSK for BR/EDR |

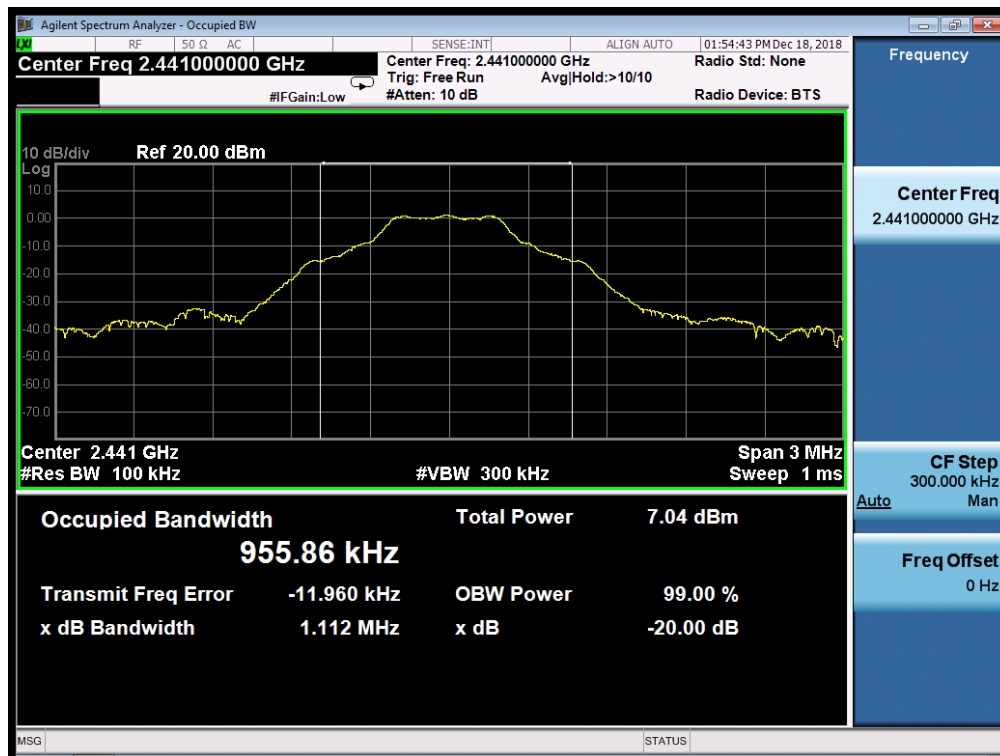
| Test Data (MHz) | | Criteria |
|-----------------|-------|----------|
| Low Channel | 1.112 | PASS |
| Middle Channel | 1.112 | PASS |
| High Channel | 1.110 | PASS |

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

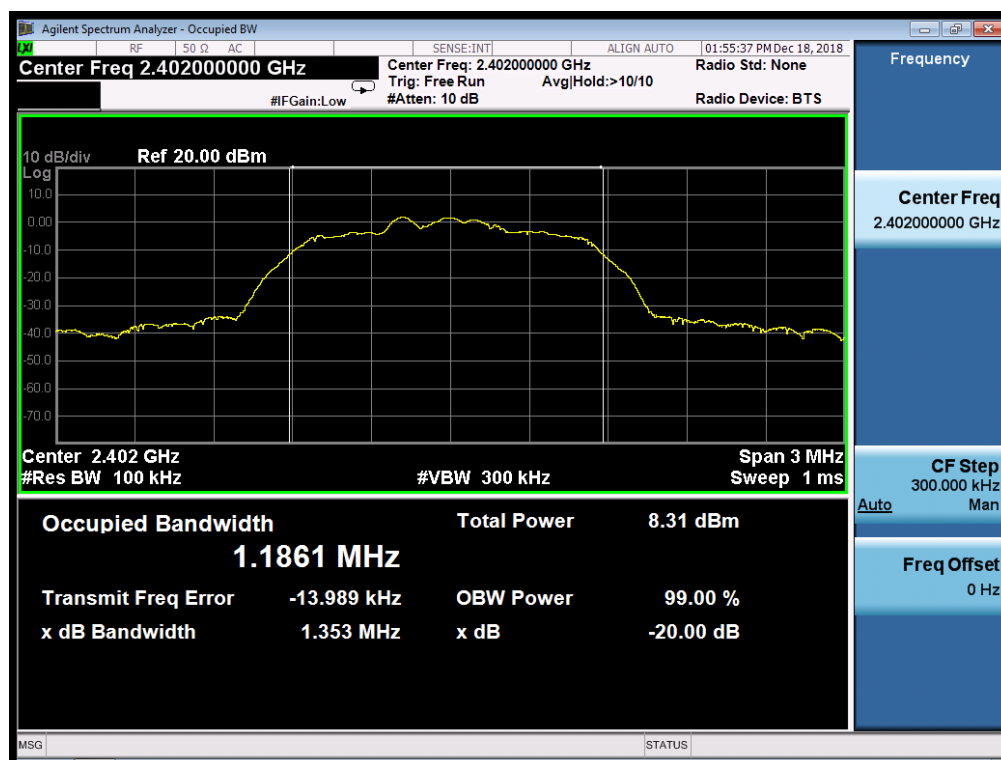




| | |
|-----------------|---------------------------|
| TEST ITEM | 20DB BANDWIDTH |
| TEST MODULATION | π /4-DQPSK for BR/EDR |

| Test Data (MHz) | | Criteria |
|-----------------|-------|----------|
| Low Channel | 1.353 | PASS |
| Middle Channel | 1.350 | PASS |
| High Channel | 1.346 | PASS |

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

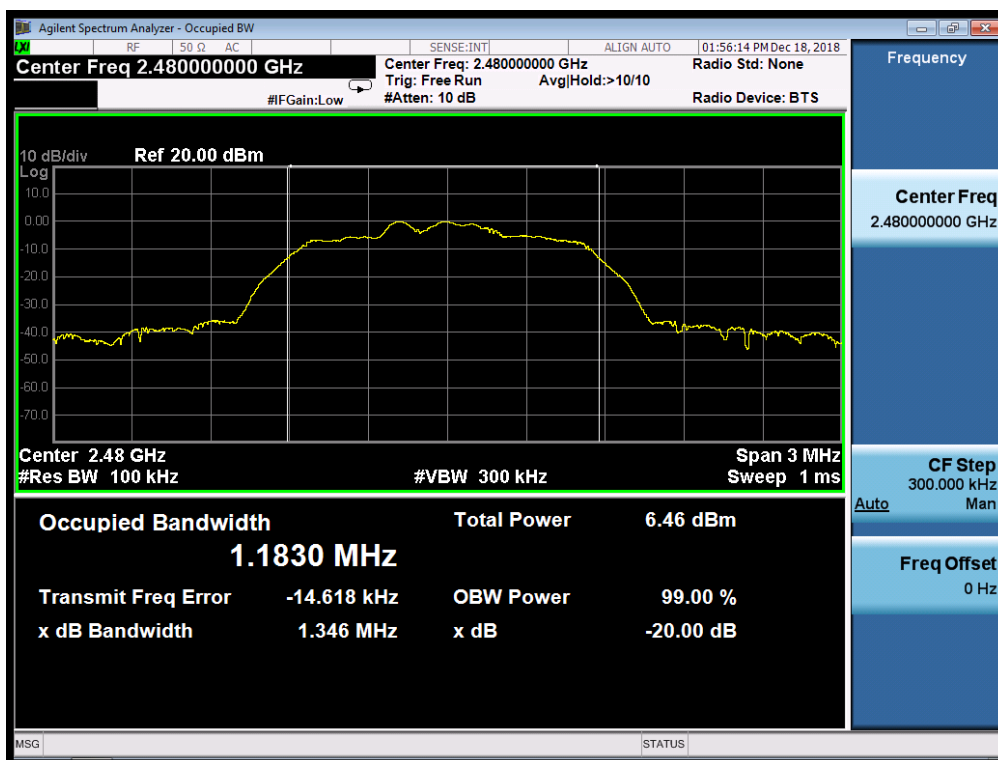




TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

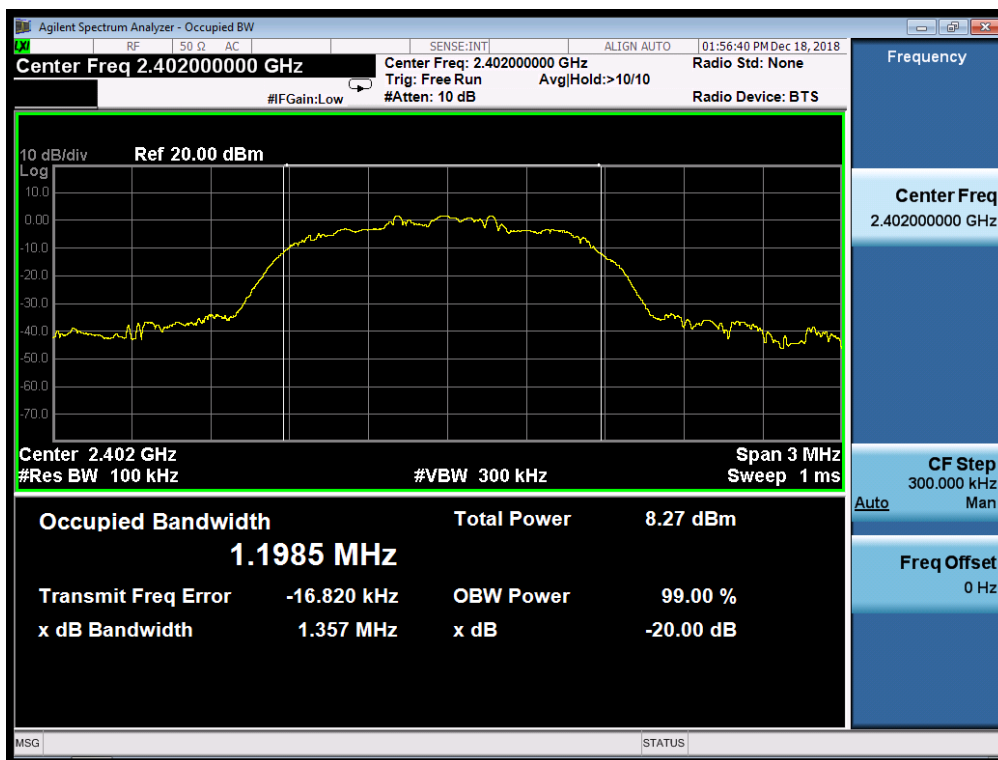




| | |
|-----------------|------------------|
| TEST ITEM | 20DB BANDWIDTH |
| TEST MODULATION | 8DPSK for BR/EDR |

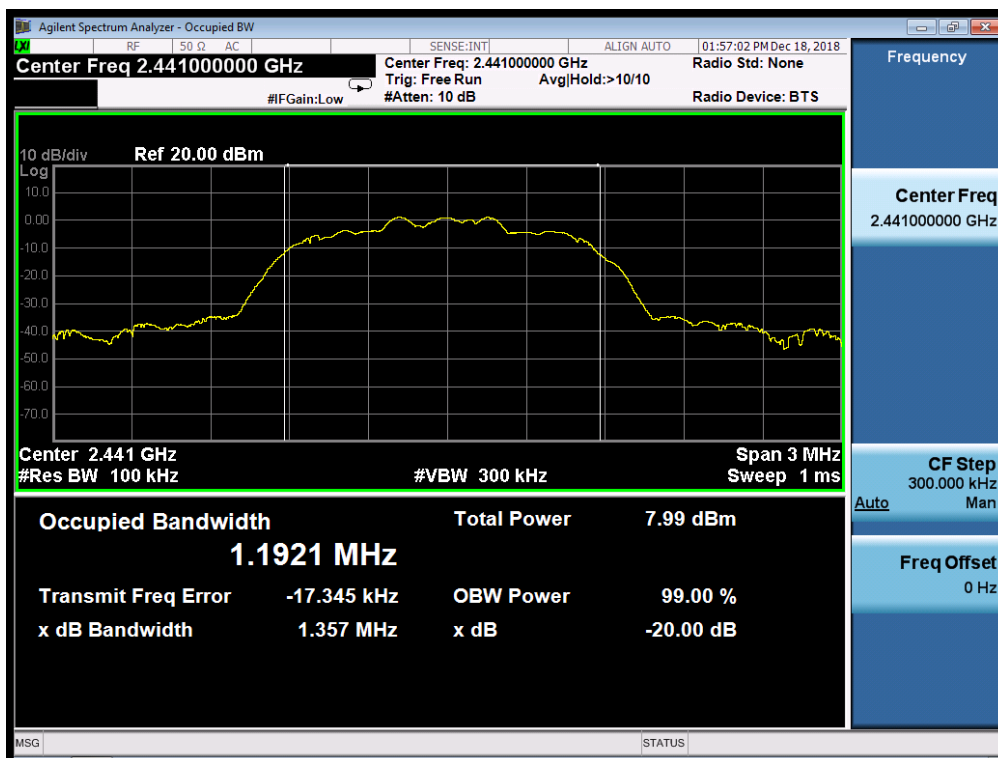
| Test Data (MHz) | | Criteria |
|-----------------|-------|----------|
| Low Channel | 1.357 | PASS |
| Middle Channel | 1.357 | PASS |
| High Channel | 1.356 | PASS |

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

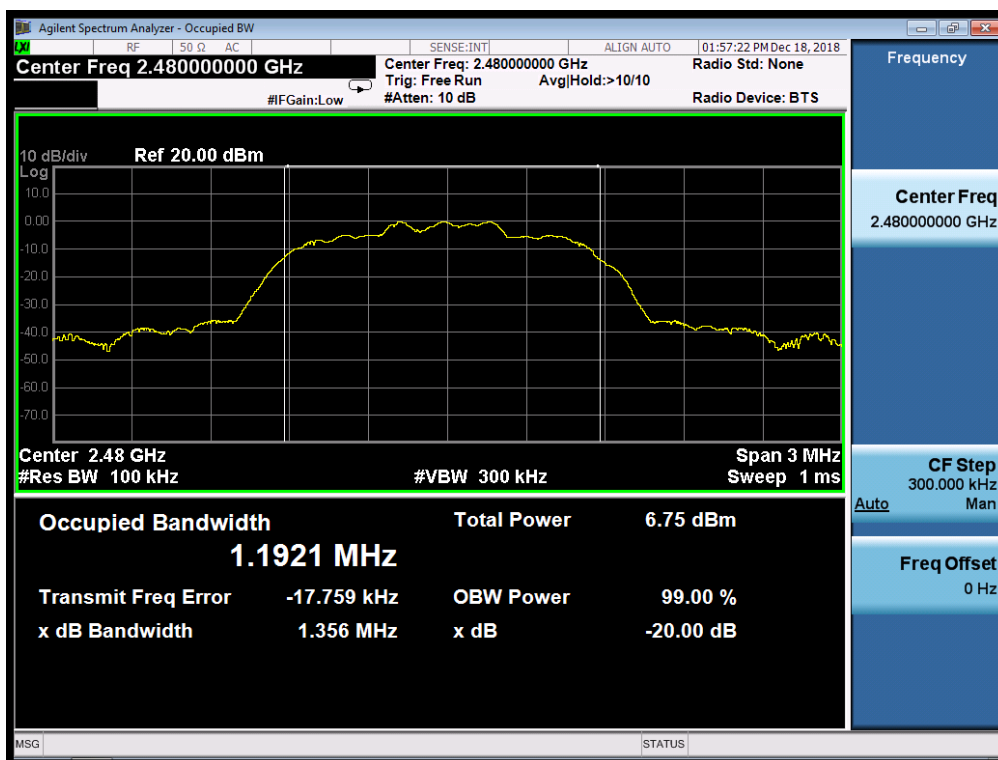




TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





6. FCC LINE CONDUCTED EMISSION TEST

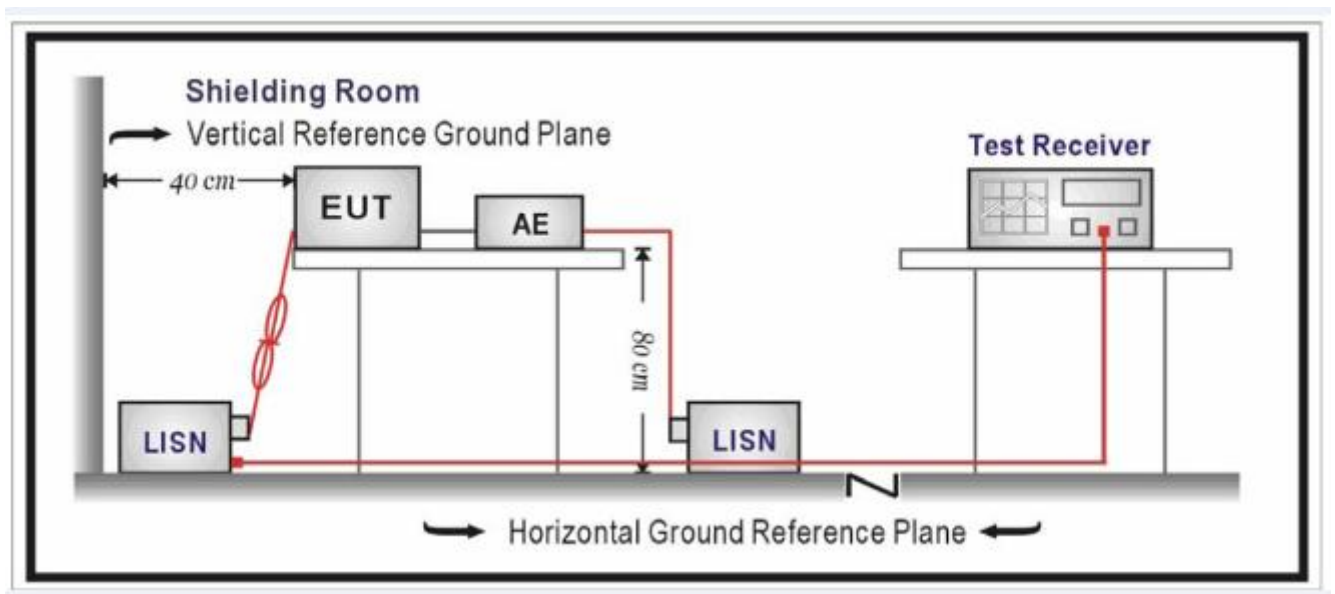
6.1. LIMITS OF LINE CONDUCTED EMISSION TEST

| Frequency | Maximum RF Line Voltage | |
|---------------|-------------------------|----------------|
| | Q.P.(dBuV) | Average(dBuV) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

6.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





6.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by adapter or PC which received 120V/60Hz power by a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

6.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

6.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

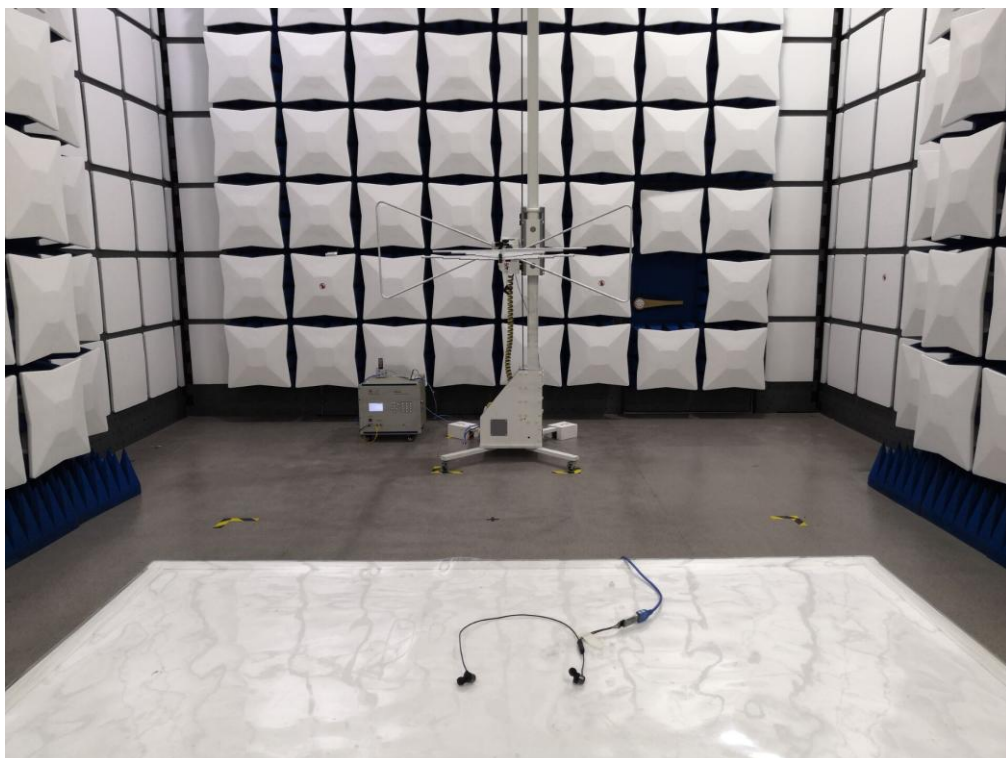
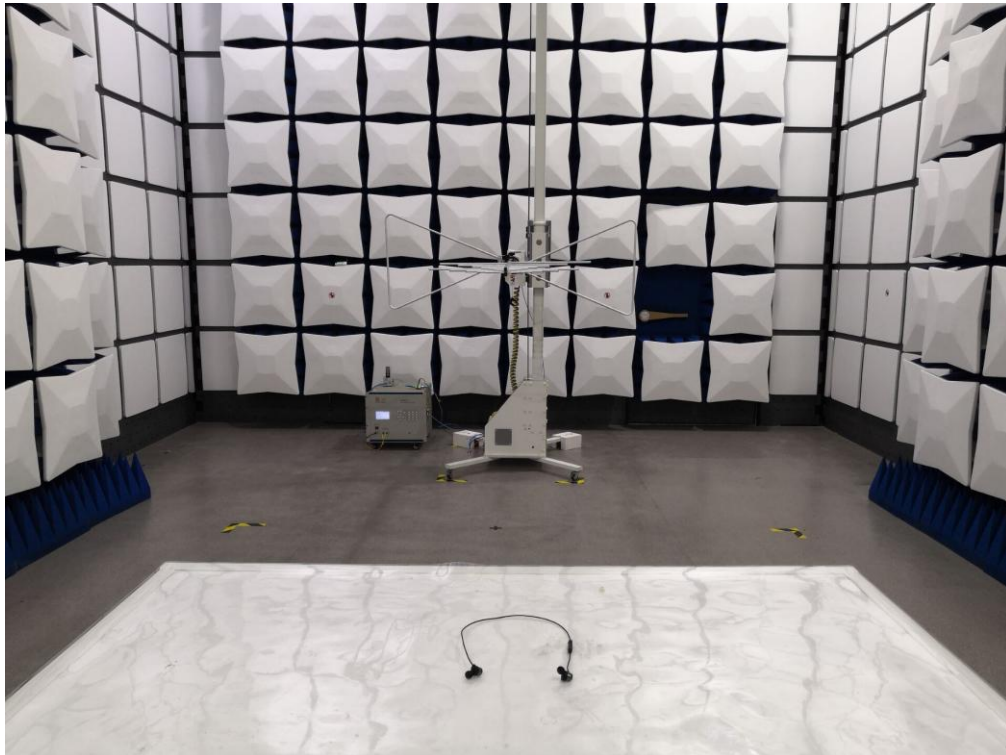
N/A

Note: The BT function of EUT doesn't work when charging.



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP







APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT



BOTTOM VIEW OF EUT





FRONT VIEW OF EUT



BACK VIEW OF EUT





LEFT VIEW OF EUT



RIGHT VIEW OF EUT





VIEW OF EUT (PORT)





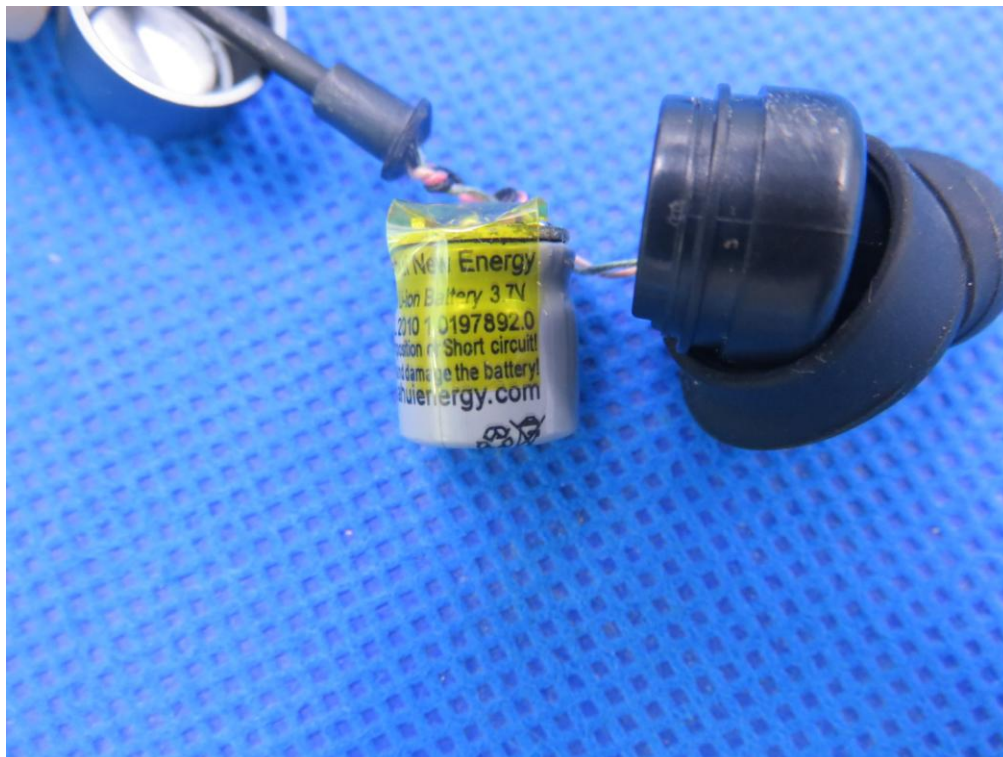
OPEN VIEW OF EUT



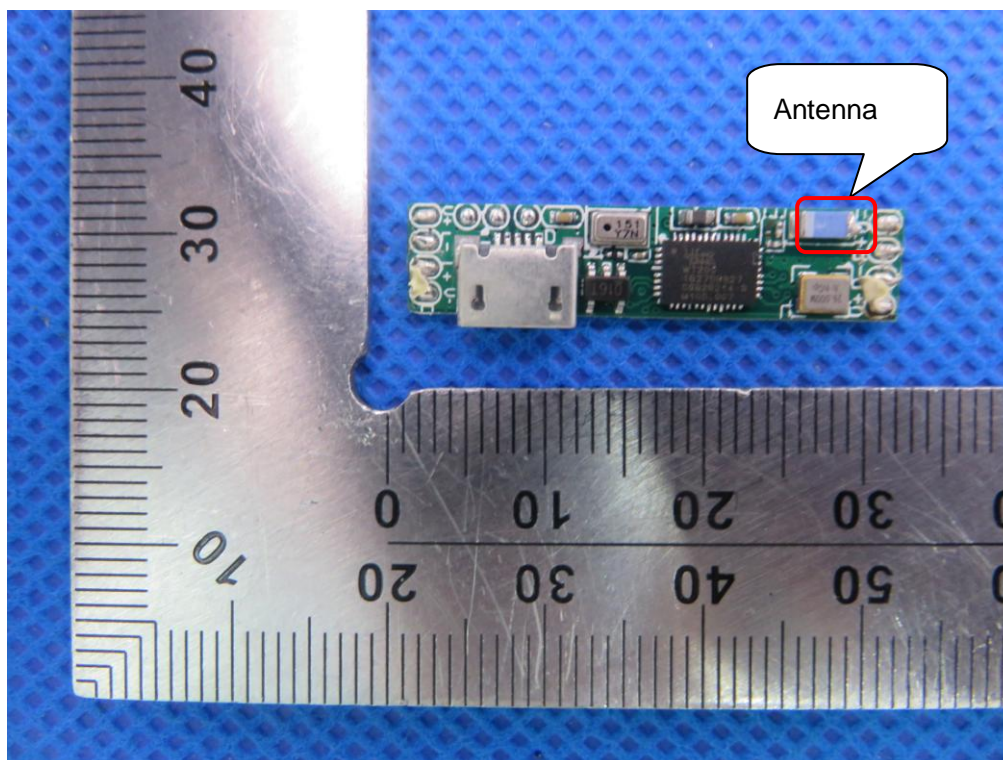
VIEW OF BATTERY-1



VIEW OF BATTERY-2

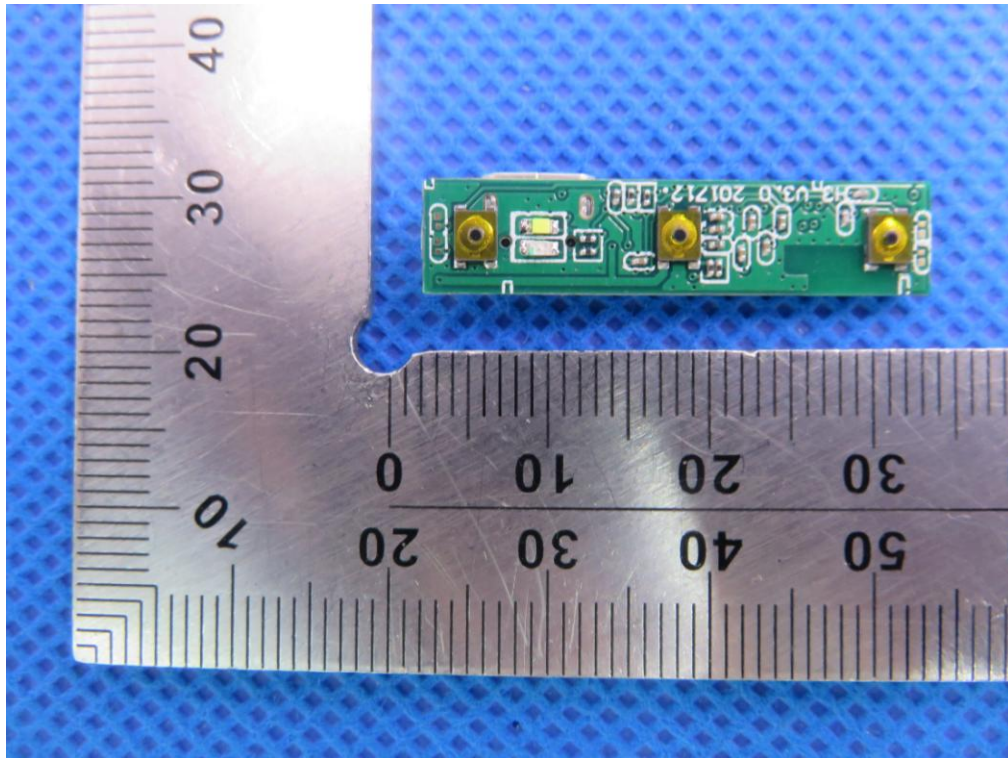


INTERNAL VIEW OF EUT-1

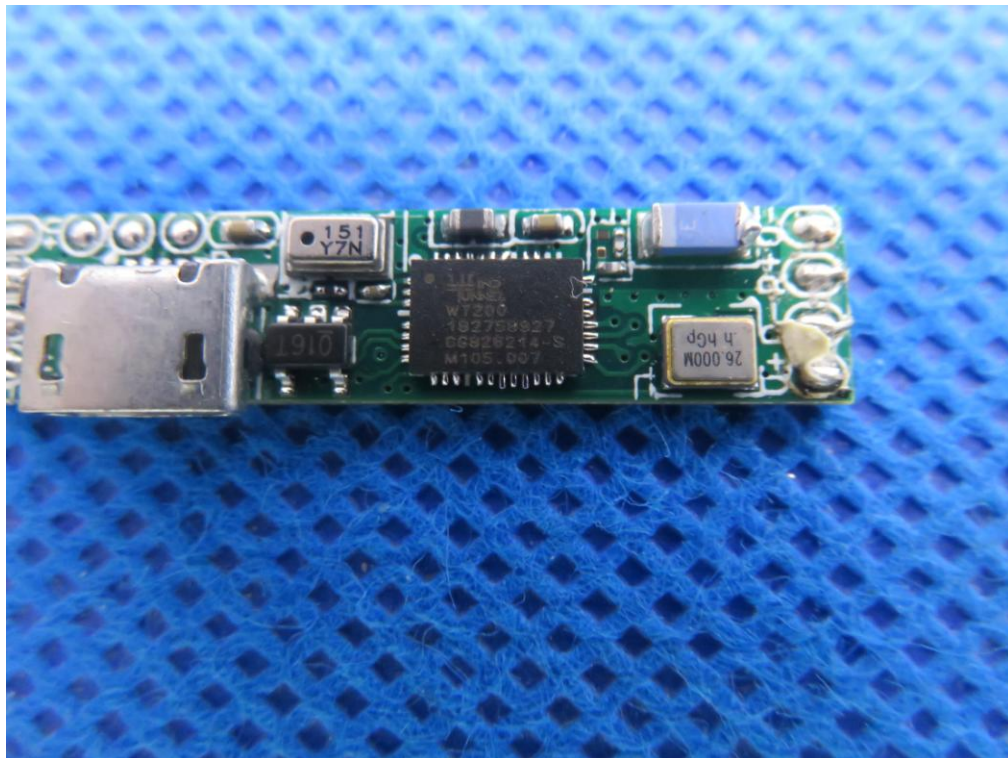




INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



----END OF REPORT----