

## 11. NUMBER OF HOPPING FREQUENCY

### 11.1. MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=RBW.

### 11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

### 11.3. MEASUREMENT EQUIPMENT USED

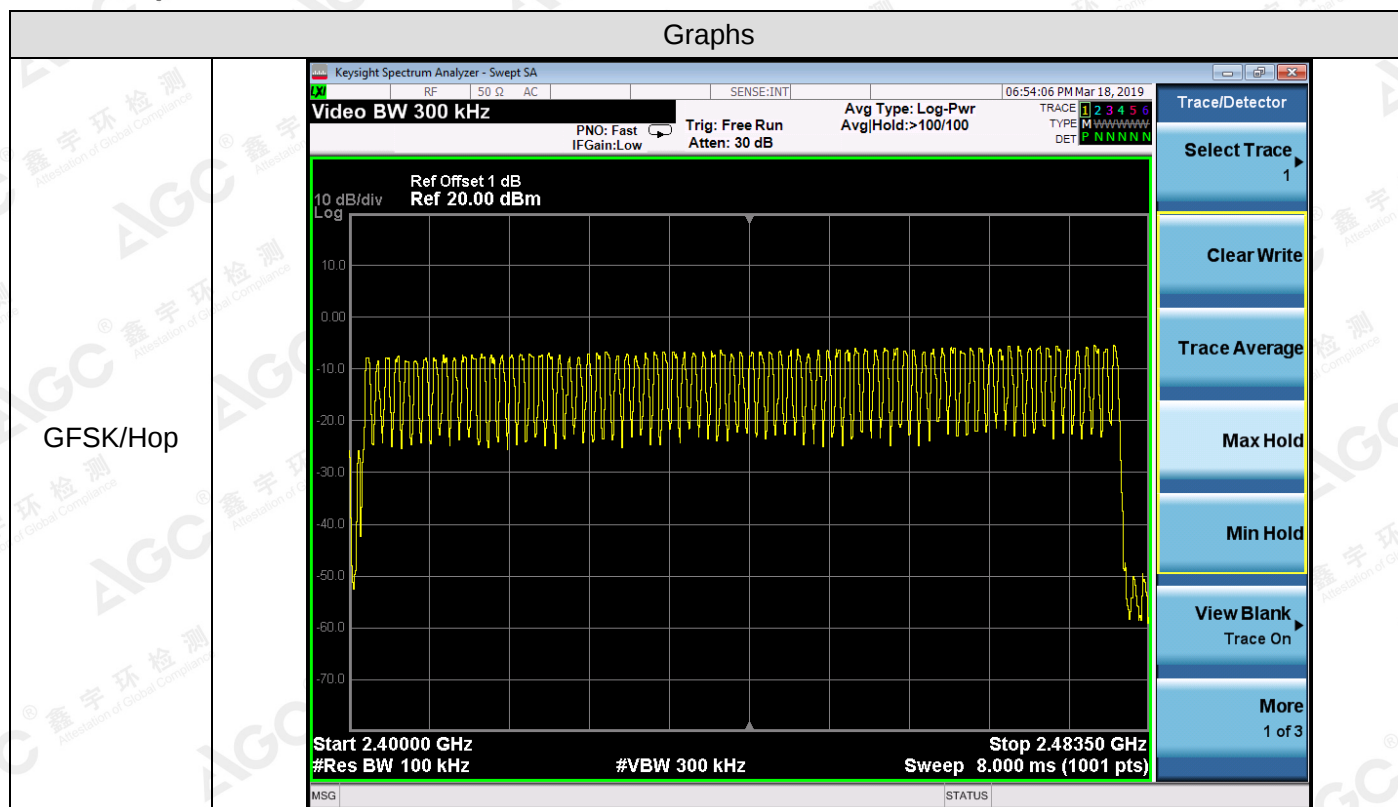
The same as described in section 6

### 11.4. LIMITS AND MEASUREMENT RESULT

| Mode | Channel. | Number of Hopping Channel | Verdict |
|------|----------|---------------------------|---------|
| GFSK | Hop      | 79                        | PASS    |

Note: All modes were tested, only the worst case record in the report.

### Test Graph



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## 12. TIME OF OCCUPANCY (DWELL TIME)

### 12.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.
2. RBW shall be  $\leq$  channel spacing and where possible RBW should be set  $\gg 1/T$ , where T is the expected dwell time per channel.
3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel.
4. Detector function: Peak. Trace: Max hold.
5. Use the marker-delta function to determine the transmit time per hop.
6. Using the following equation:

The dwell time is calculated with the following formula:

$$\text{Dwell time} = t_{\text{pulse}} \times n_{\text{hops}} / \text{number of channels} \times 31.6 \text{ s}$$

Where:

$t_{\text{pulse}}$  is the measured pulse time (pls. refer the plots of the spectrum analyser above) [s],

$n_{\text{hops}}$  is the number of hops per second in the actual operating mode of the transmitter [1/s].

The hopping rate of the system is 1600 hops per second and the system uses 79 channels. For this reason one time slot has a length of 625  $\mu$ s.

With the used hopping mode (DH5) a packet need 5 timeslots for transmitting and the next timeslot for receiving. So the system makes in worst case 266,67 hops per second in transmit mode ( $n_{\text{hops}} = 266.667$  1/s)

### 12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

### 12.3. MEASUREMENT EQUIPMENT USED

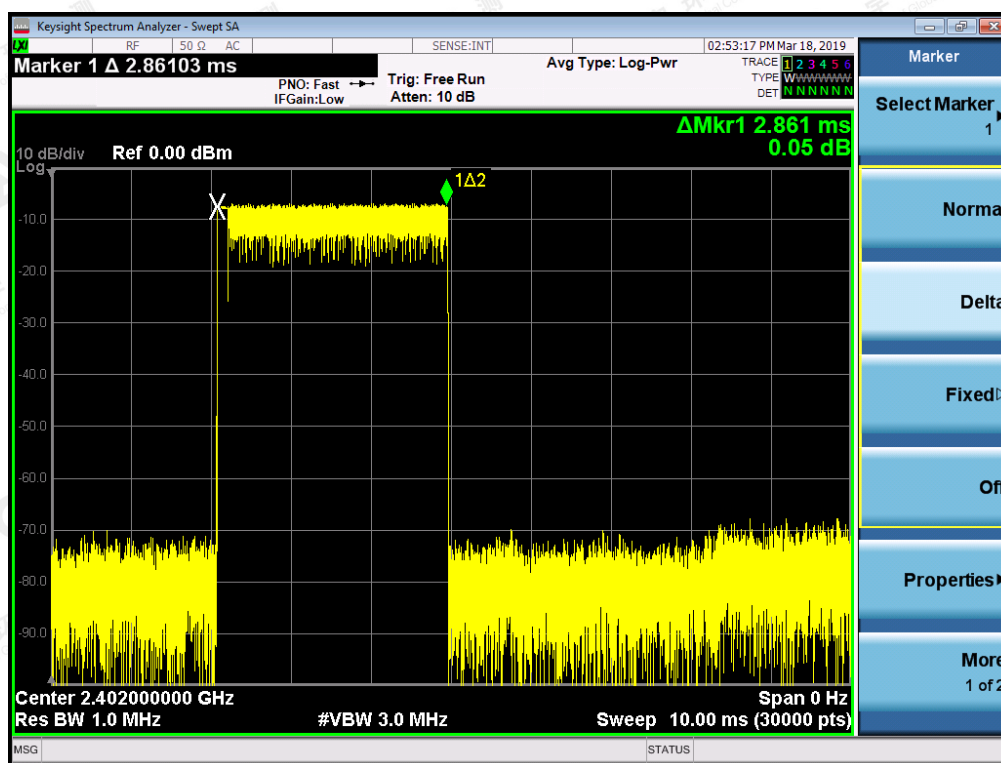
The same as described in section 6

#### 12.4. LIMITS AND MEASUREMENT RESULT

| Channel. | Burst Width [ms/hop/ch] | Dwell Time[ms] | Verdict | Limit (ms) |
|----------|-------------------------|----------------|---------|------------|
| LCH      | 2.861                   | 305.1737       | PASS    | 400        |
| MCH      | 2.848                   | 303.7870       | PASS    | 400        |
| HCH      | 2.861                   | 305.1737       | PASS    | 400        |

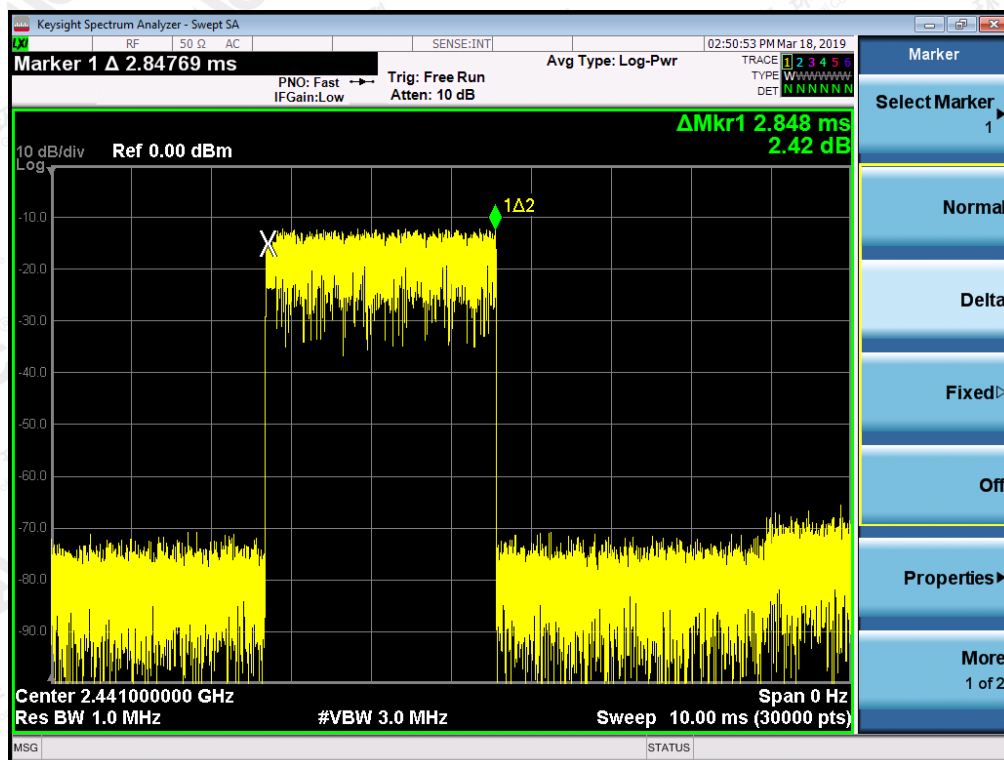
Note: The GFSK modulation is the worst case and recorded in the report.

#### TEST PLOT OF LOW CHANNEL

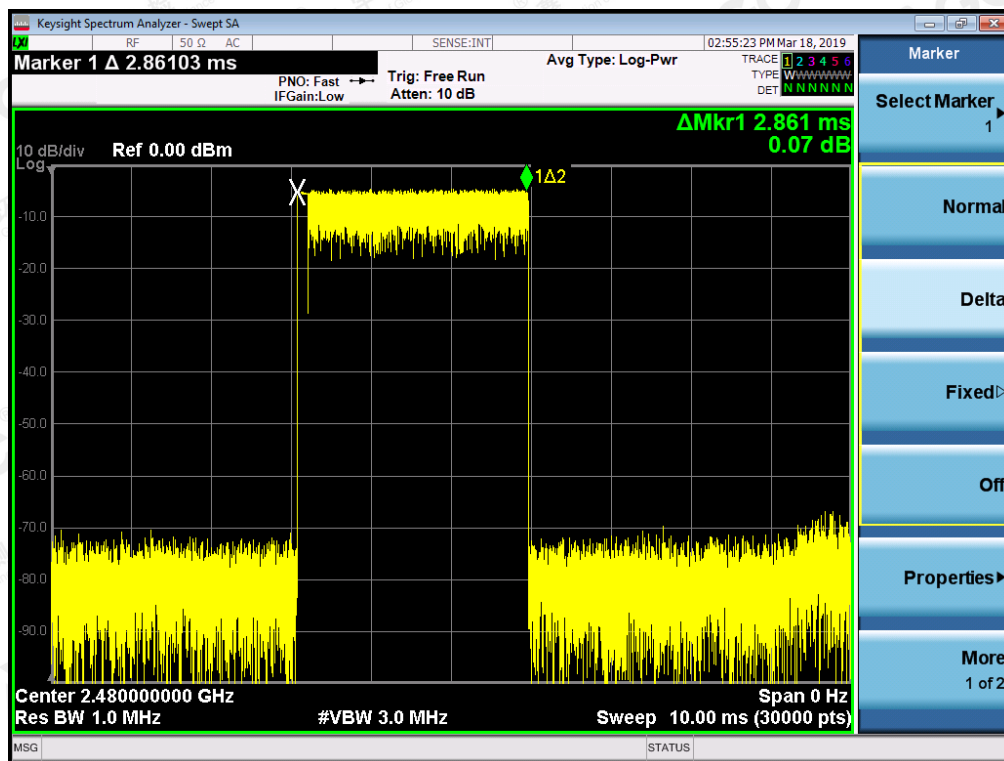


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### TEST PLOT OF MIDDLE CHANNEL



### TEST PLOT OF HIGH CHANNEL



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### 13. FREQUENCY SEPARATION

#### 13.1. MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW)  $\geq 1\%$  of the span Video (or Average) Bandwidth (VBW)  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold

#### 13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2

#### 13.3. MEASUREMENT EQUIPMENT USED

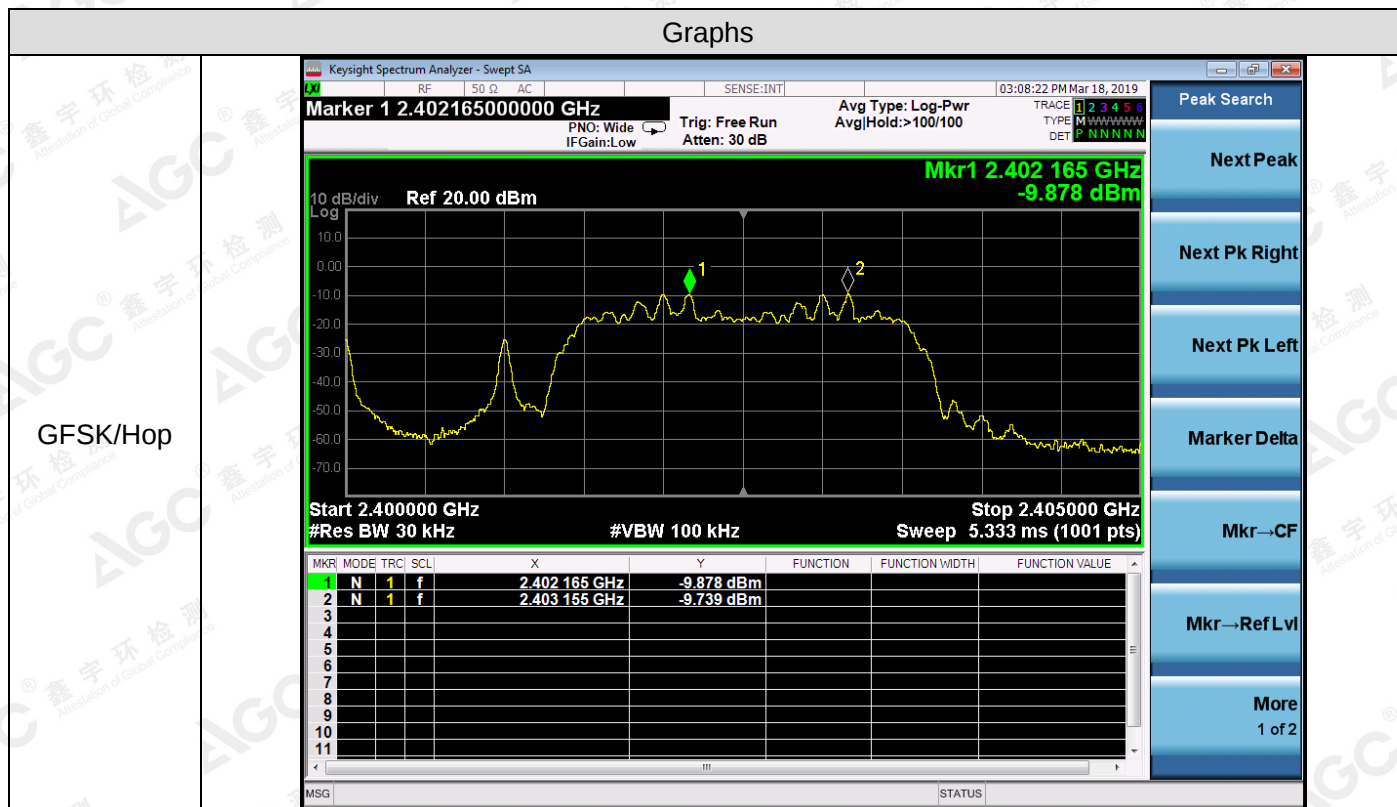
The same as described in section 6.3

#### 13.4. LIMITS AND MEASUREMENT RESULT

| Mode | Channel. | Carrier Frequency Separation [MHz] | Verdict |
|------|----------|------------------------------------|---------|
| GFSK | Hop      | 1000                               | PASS    |

Note: All modes were tested, only the worst case record in the report.

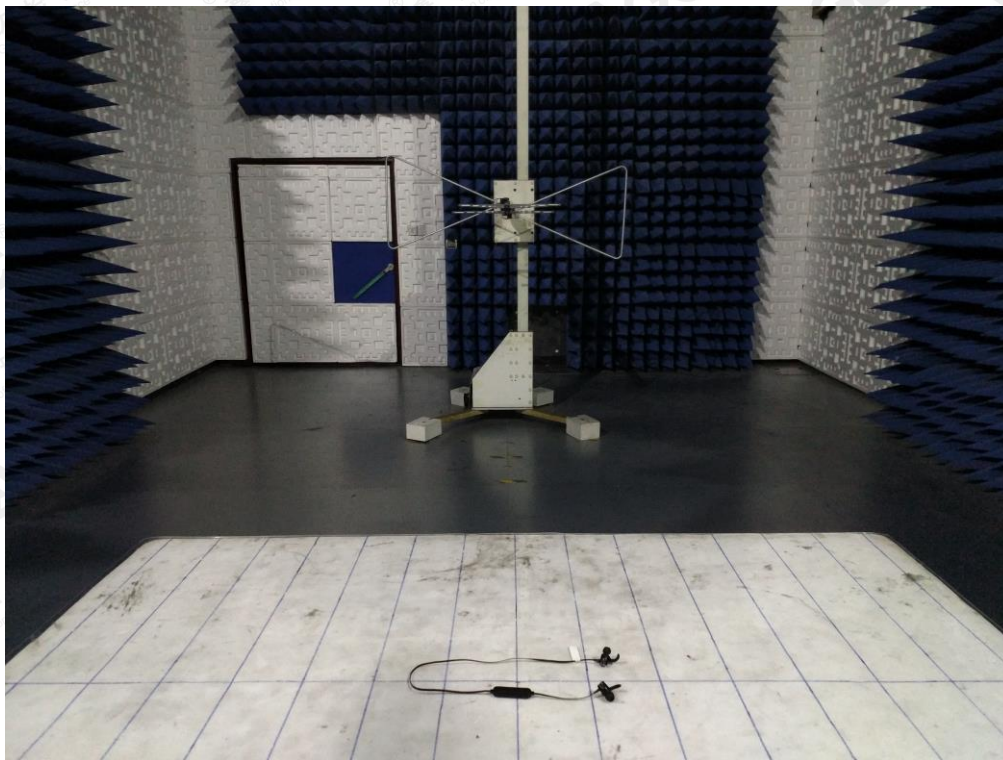
#### Test Graph



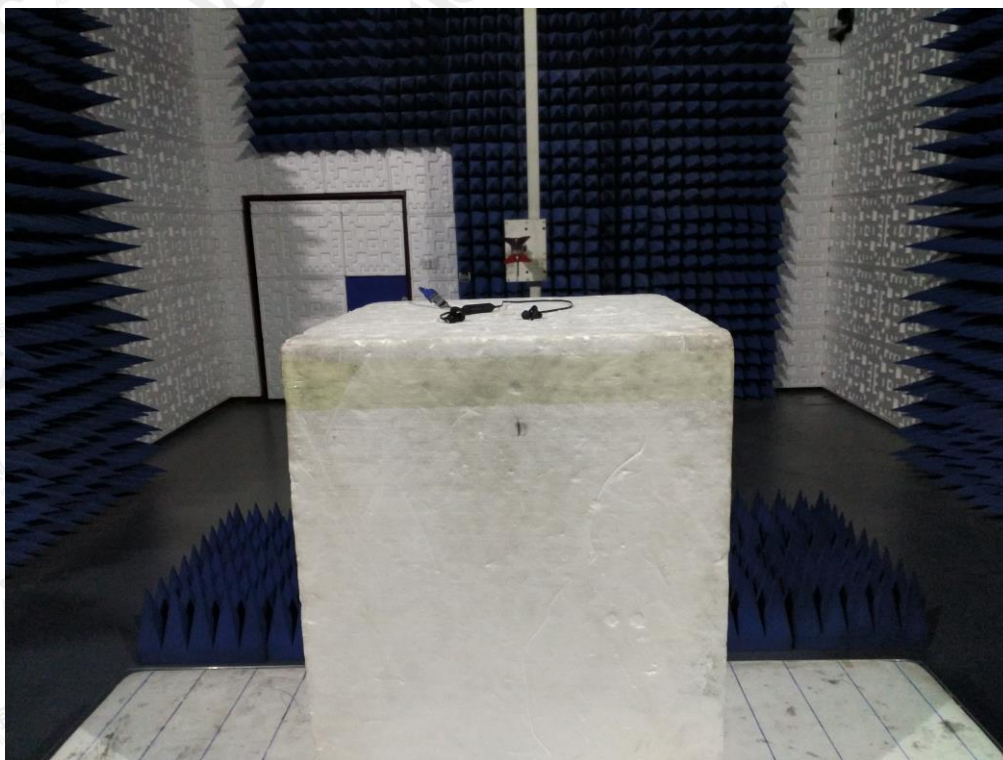
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## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

The mode name of MI-E005B  
RADIATED EMISSION TEST SETUP

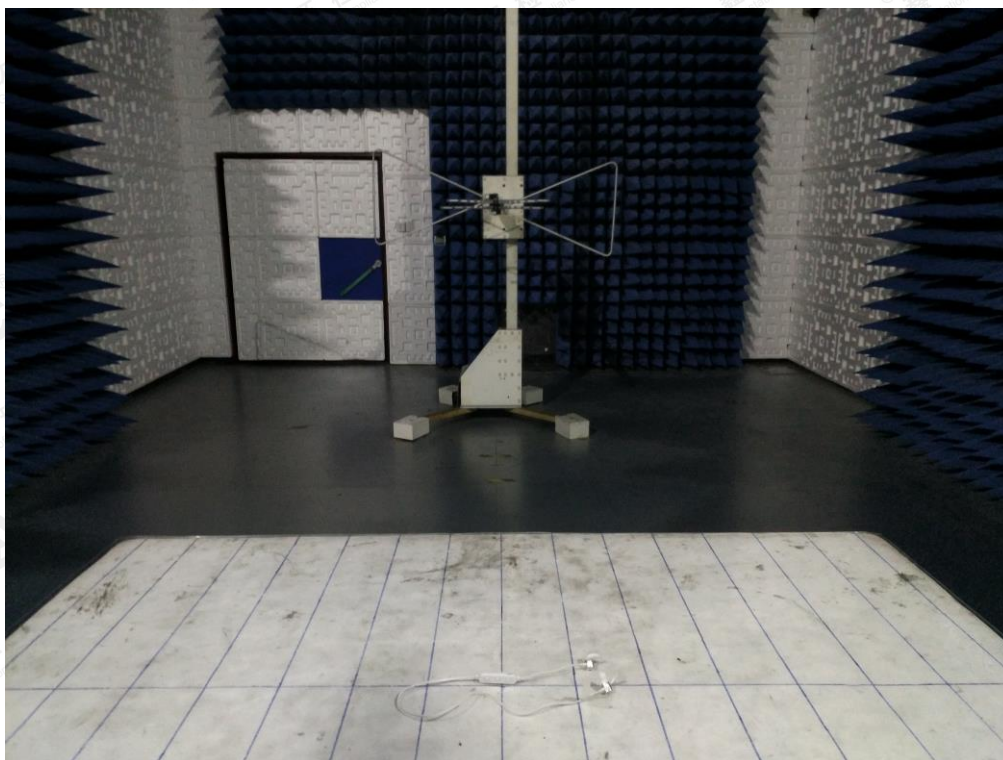


RADIATED EMISSION ABOVE 1G TEST SETUP



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The mode name of UZ-E005B  
**RADIATED EMISSION TEST SETUP**



**RADIATED EMISSION ABOVE 1G TEST SETUP**



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## APPENDIX B: PHOTOGRAPHS OF TEST SETUP

The mode name of MI-E005B

ALL VIEW OF EUT



TOP VIEW OF EUT



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BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



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BACK VIEW OF EUT



LEFT VIEW OF EUT



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RIGHT VIEW OF EUT



OPEN VIEW OF EUT(FIGURE 1)

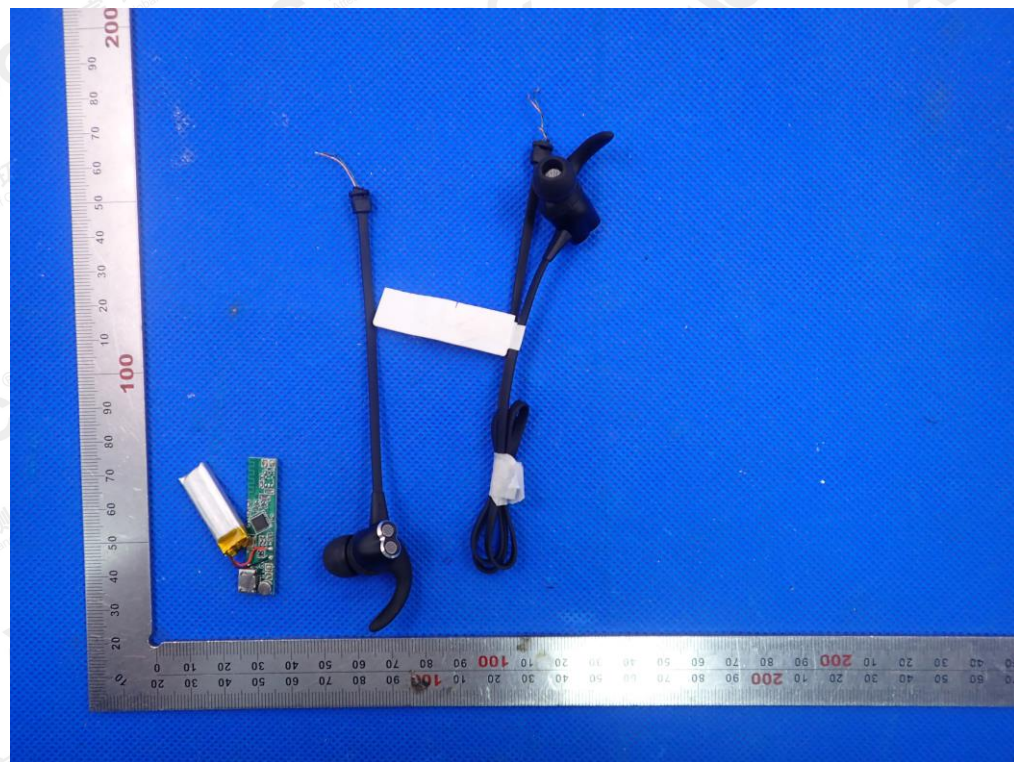


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OPEN VIEW OF EUT(FIGURE 2)

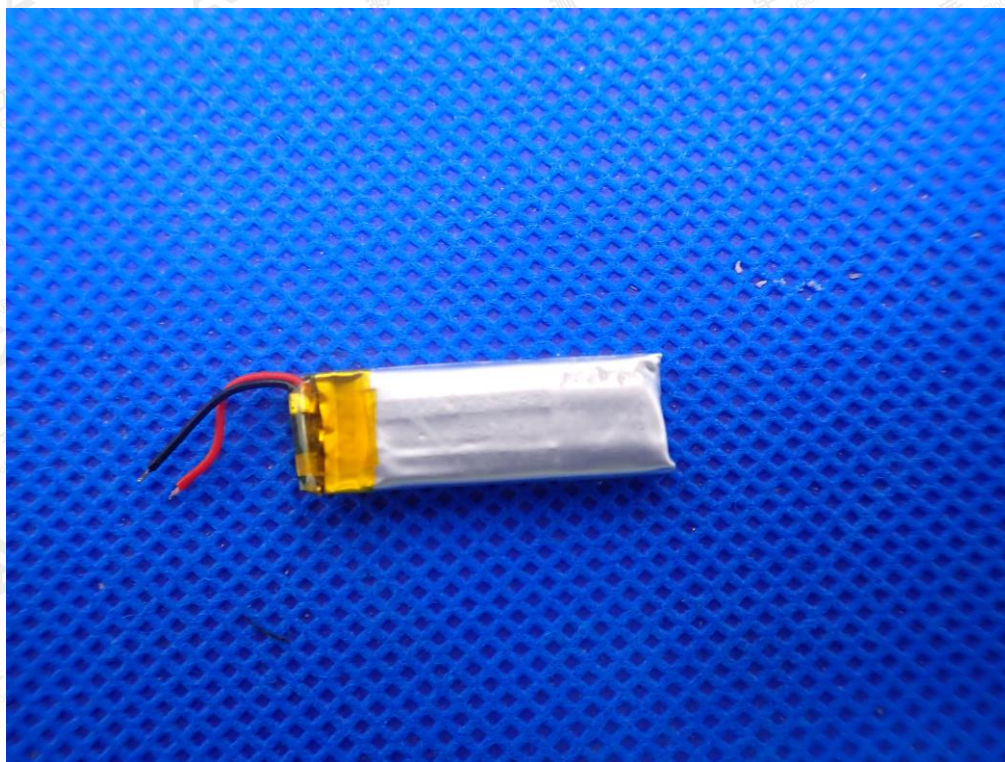


OPEN VIEW OF EUT(FIGURE 3)

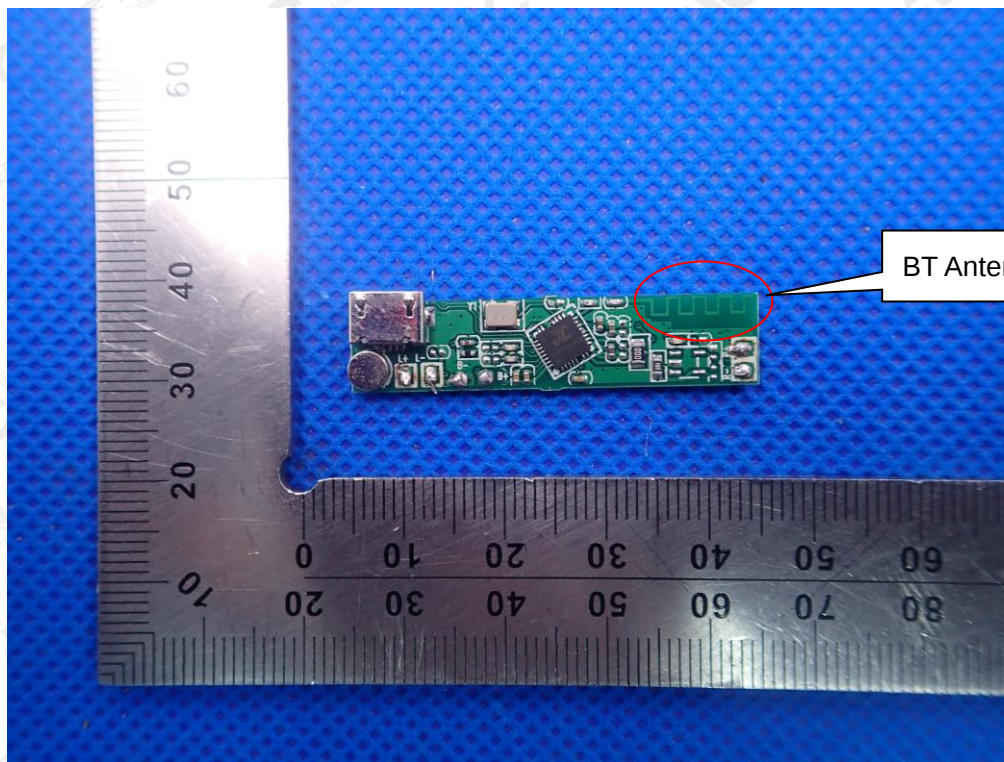


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VIEW OF BATTERY

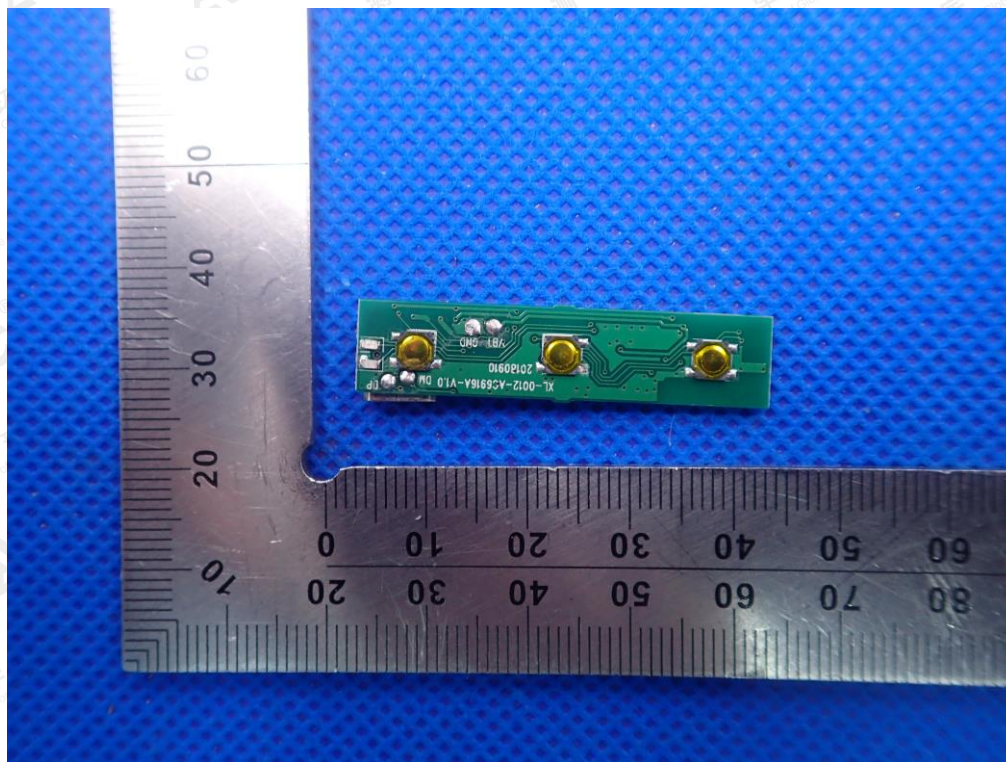


INTERNAL VIEW OF EUT(FIGURE 1)

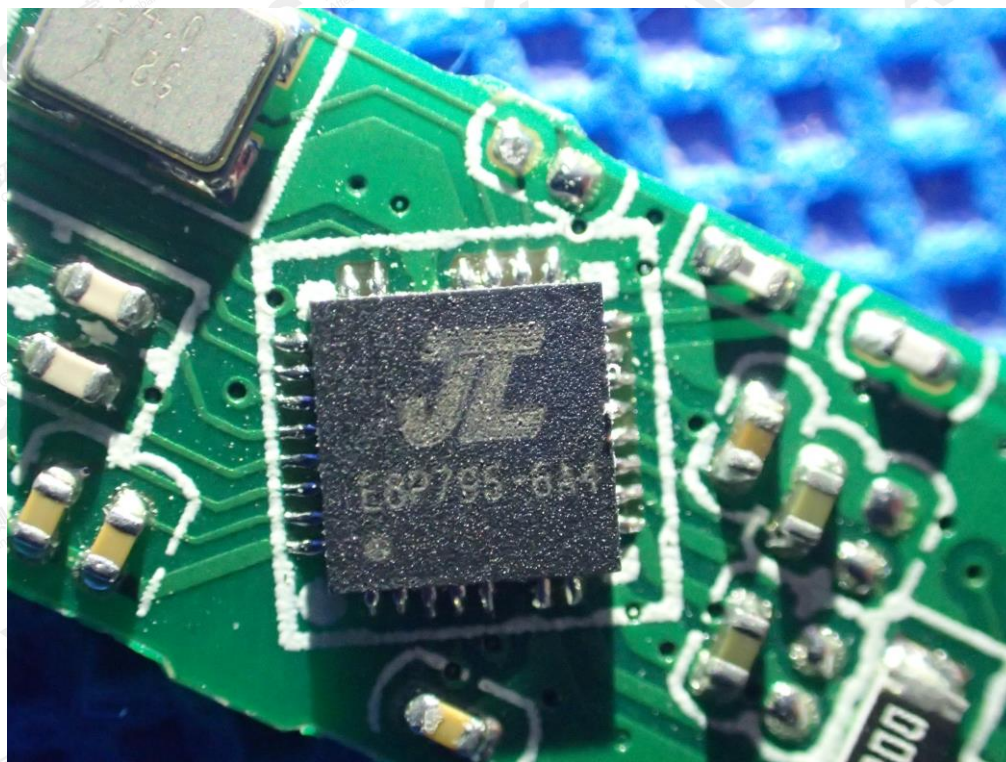


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INTERNAL VIEW OF EUT(FIGURE 2)



INTERNAL VIEW OF EUT(FIGURE 3)

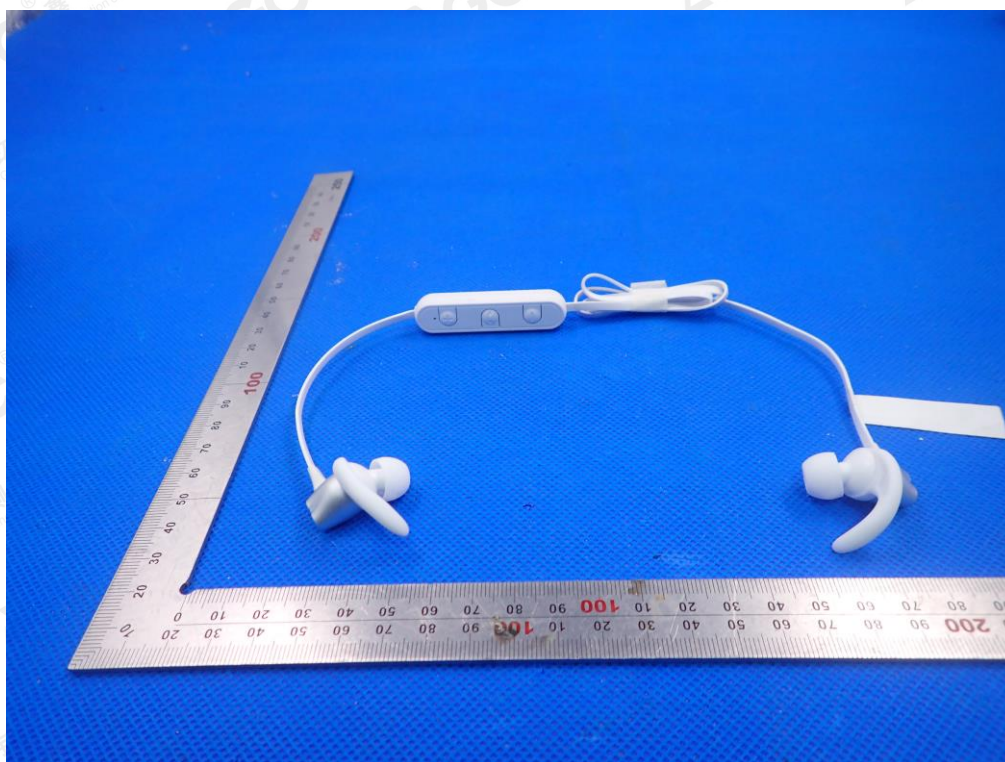


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The mode name of UZ-E005B  
ALL VIEW OF EUT

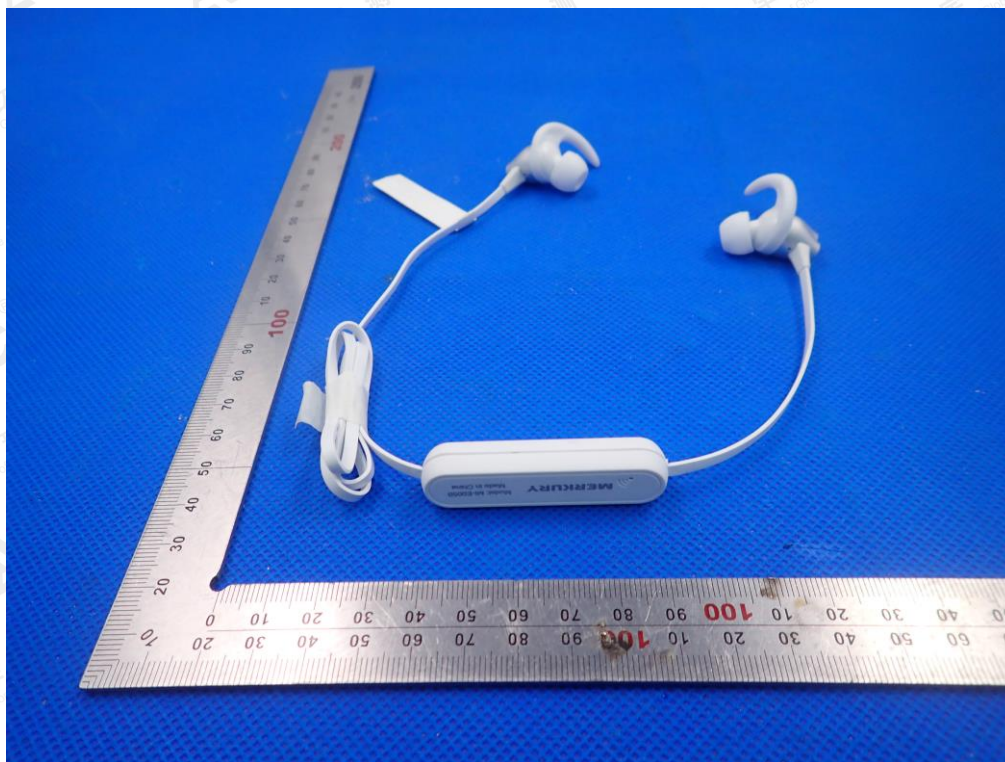


TOP VIEW OF EUT

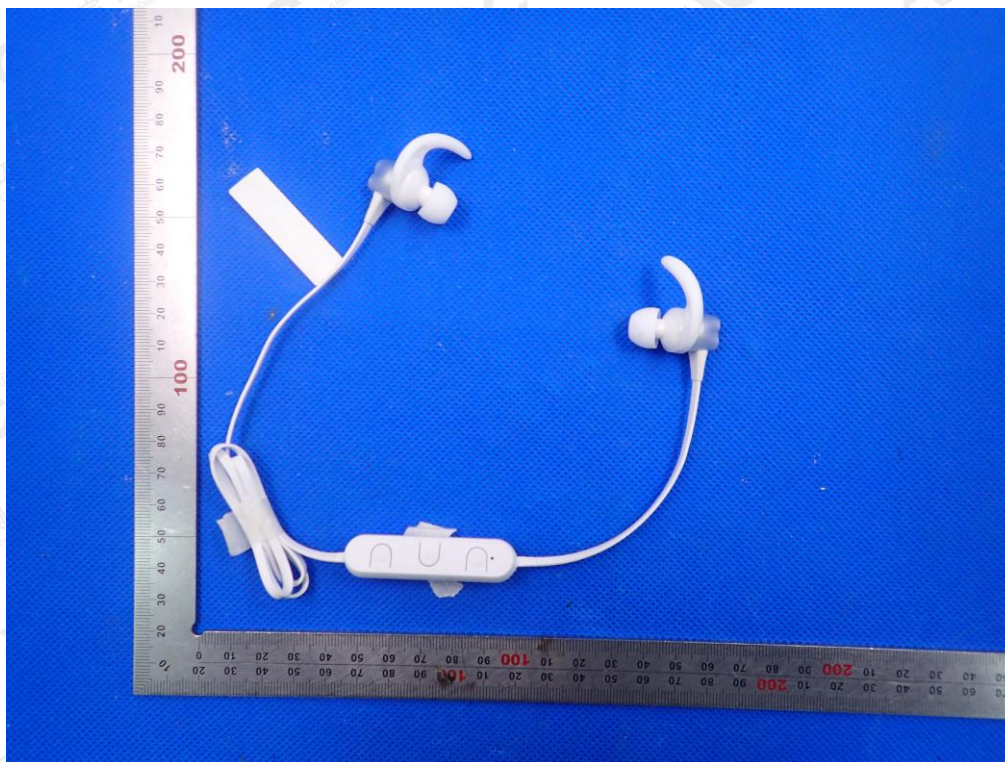


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BOTTOM VIEW OF EUT



FRONT VIEW OF EUT

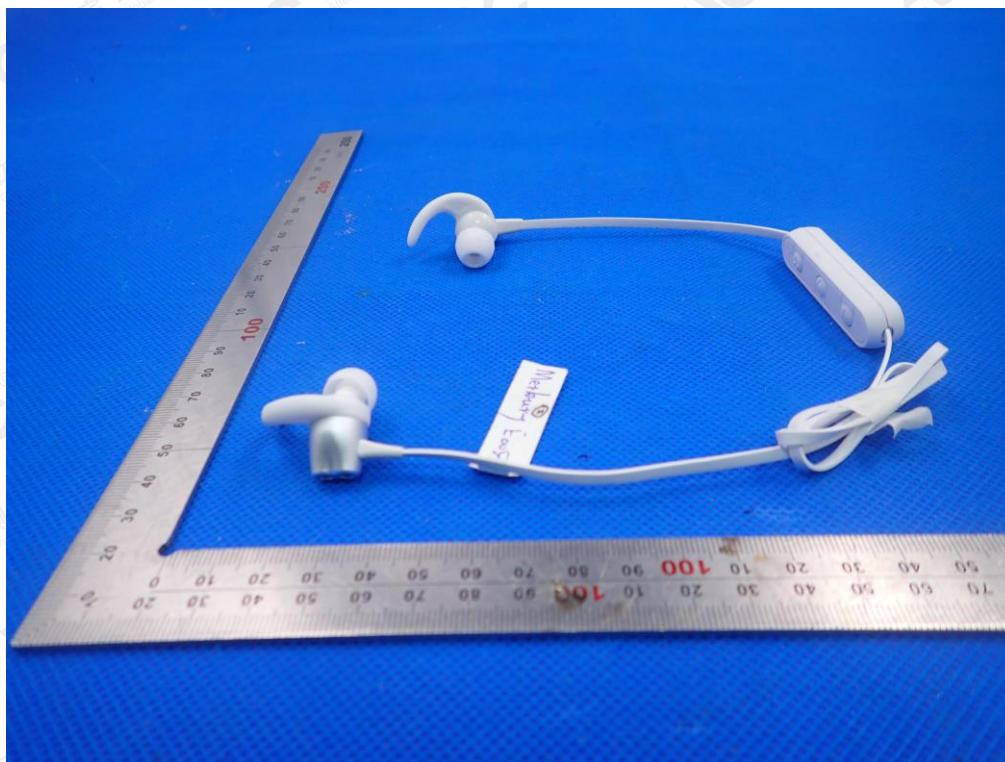


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BACK VIEW OF EUT



LEFT VIEW OF EUT

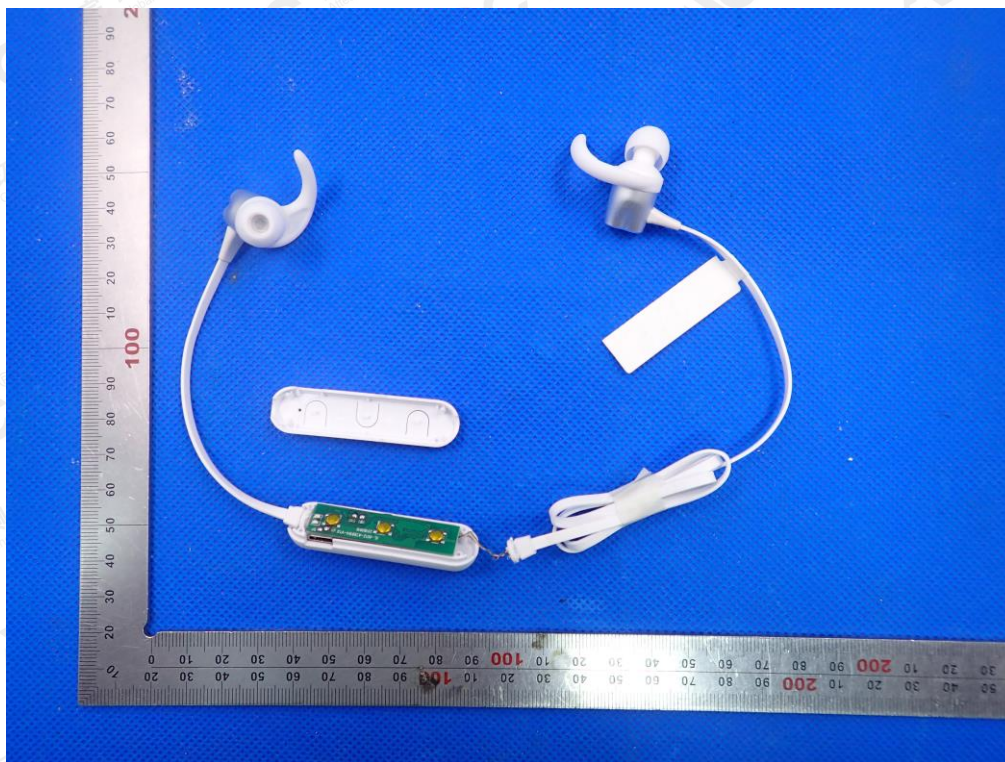


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RIGHT VIEW OF EUT

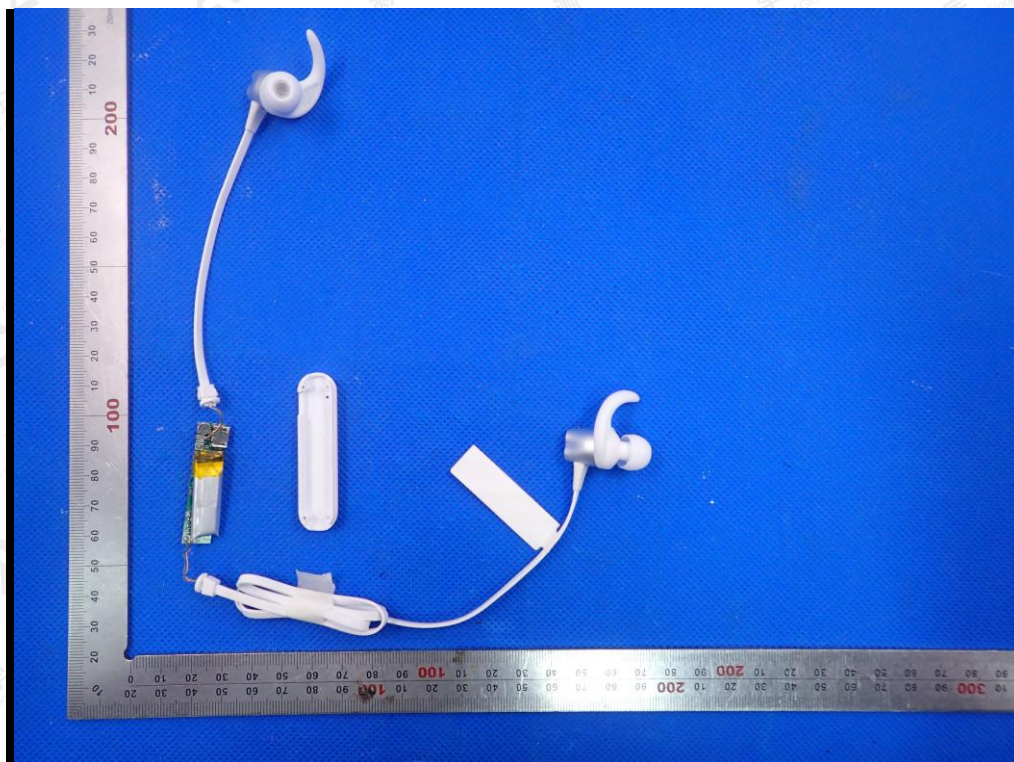


OPEN VIEW OF EUT(FIGURE 1)



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OPEN VIEW OF EUT(FIGURE 2)

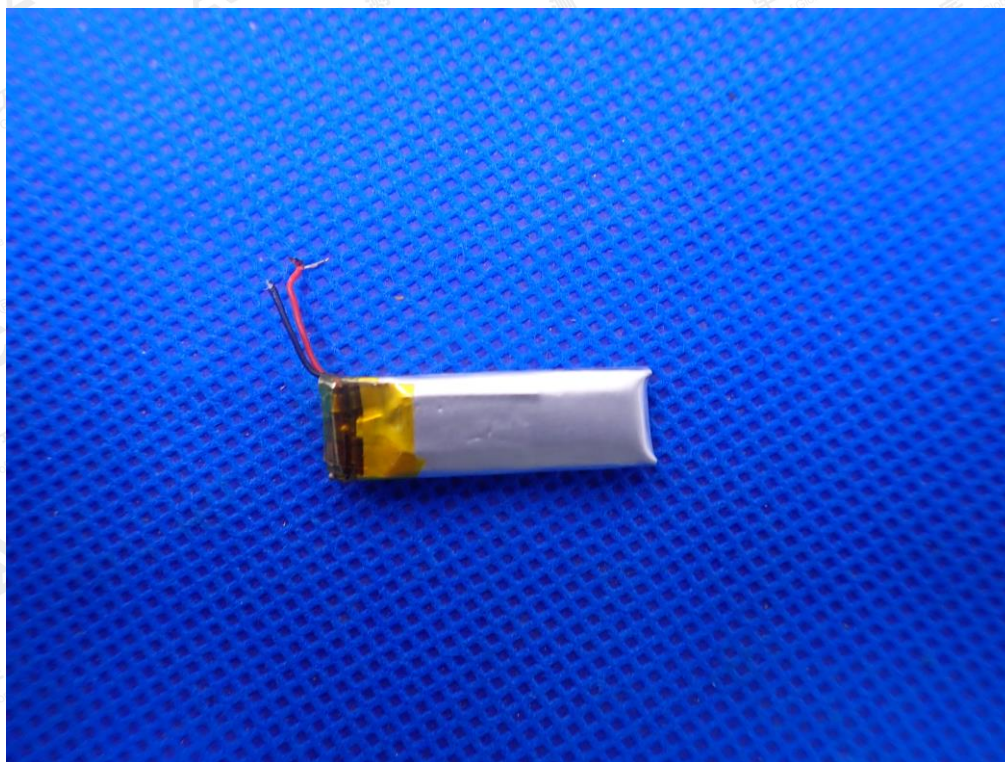


OPEN VIEW OF EUT(FIGURE 3)

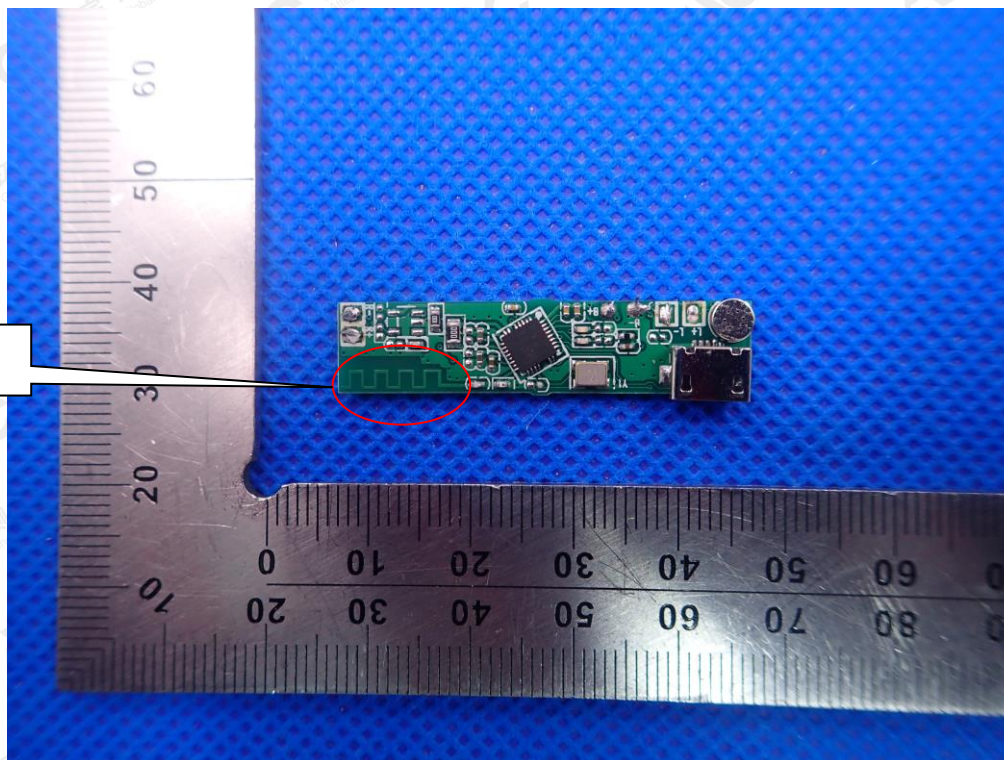


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VIEW OF BATTERY



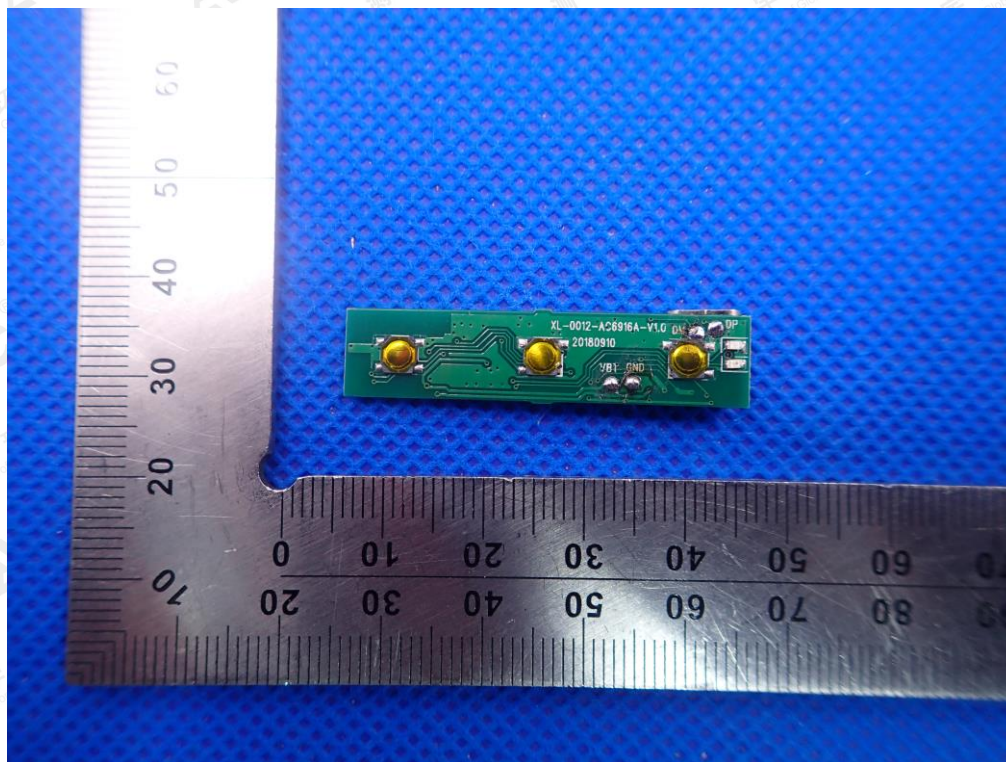
INTERNAL VIEW OF EUT(Figure 1)



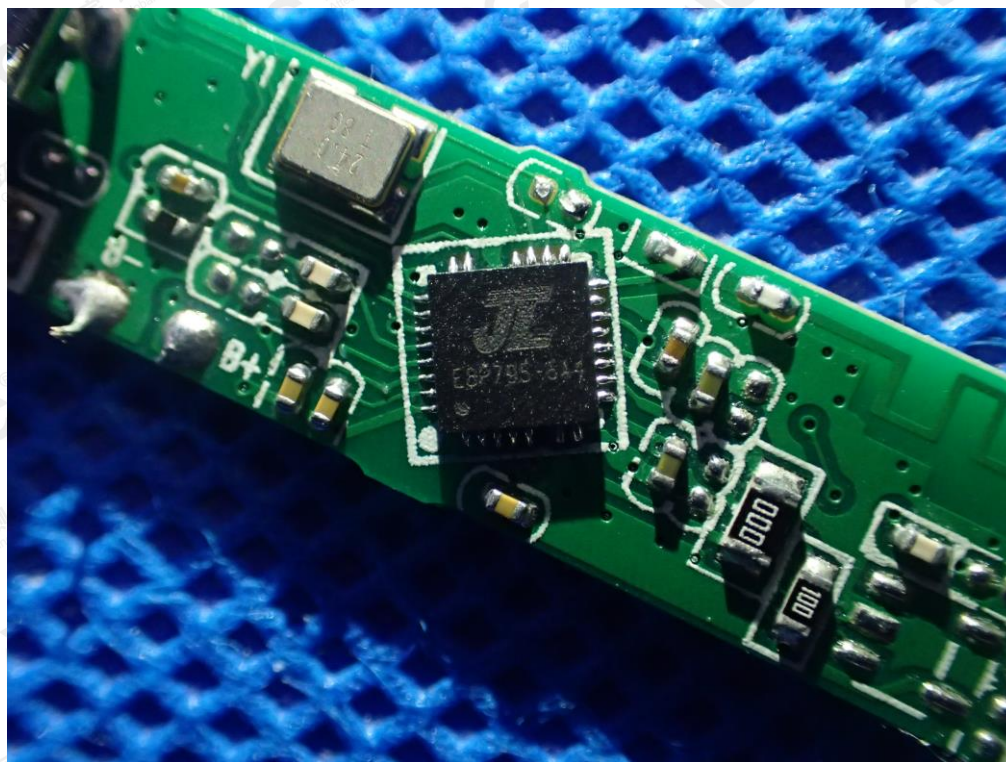
BT Antenna

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INTERNAL VIEW OF EUT(FIGURE 2)



INTERNAL VIEW OF EUT(FIGURE 3)



----END OF REPORT----

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