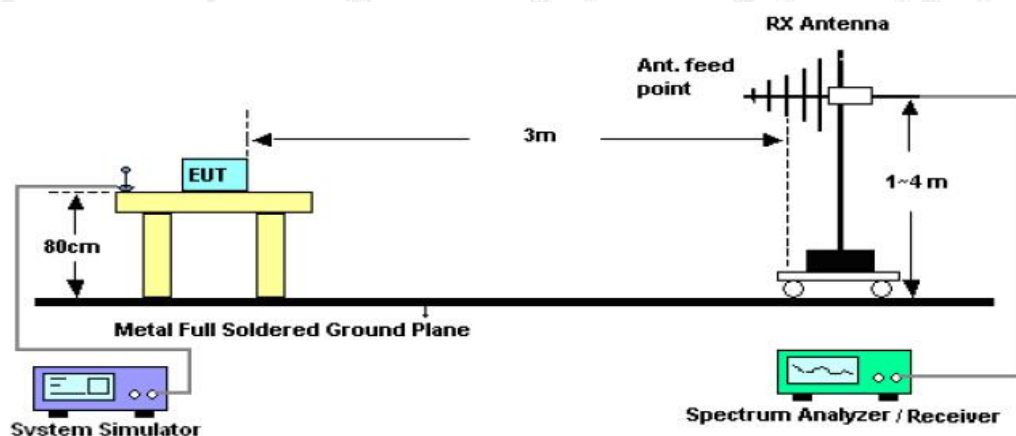


10.2. TEST SETUP

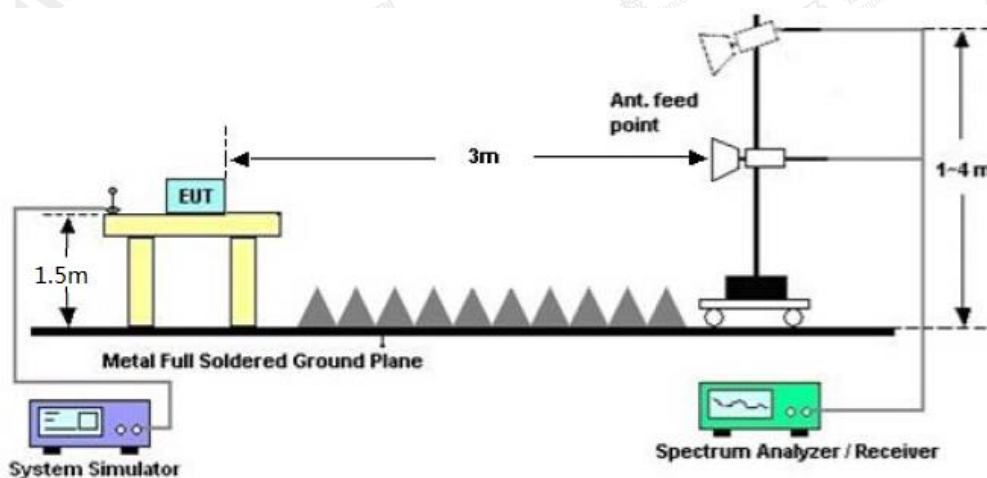
RADIATED EMISSION TEST-SETUP FREQUENCY BELOW 30MHZ



RADIATED EMISSION TEST SETUP 30MHZ-1000MHZ



RADIATED EMISSION TEST SETUP ABOVE 1000MHZ



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10.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/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: All modes were tested For restricted band radiated emission,
 the test records reported below are the worst result compared to other modes.

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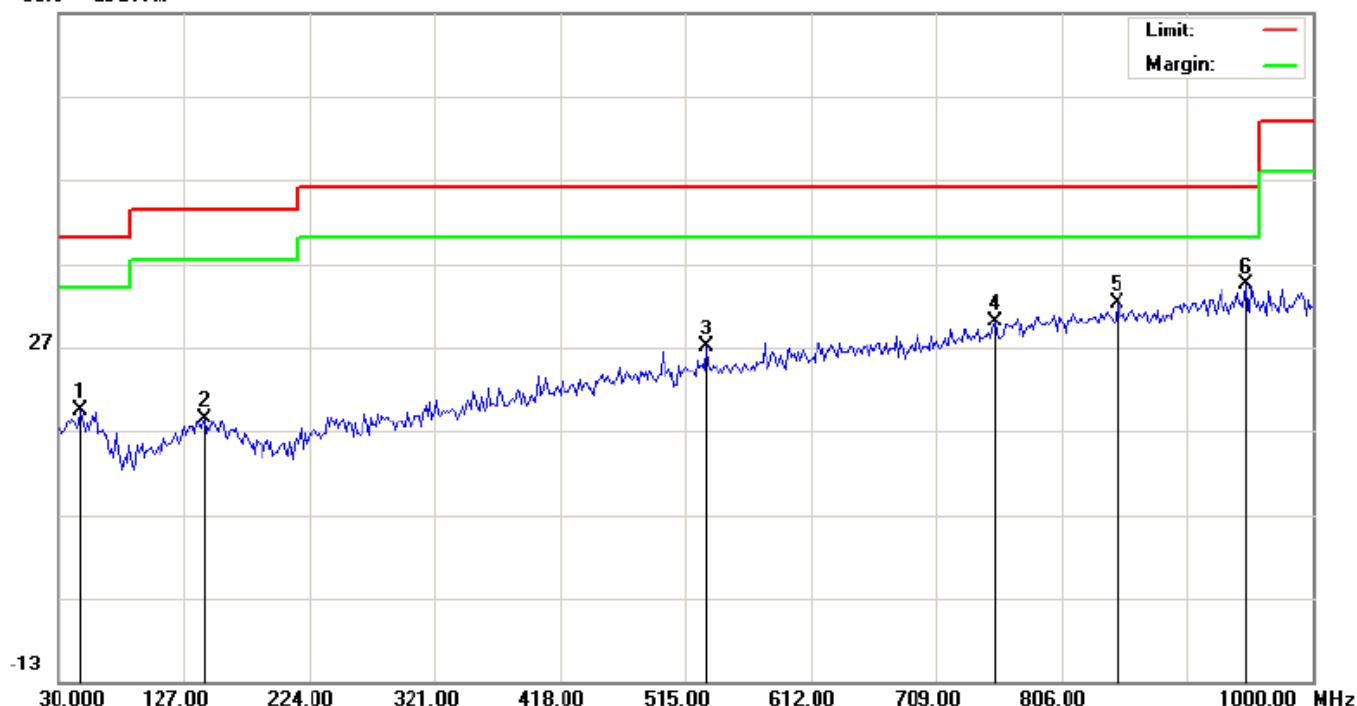
RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION BELOW 1GHZ

EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna	Horizontal

66.9 dBuV/m



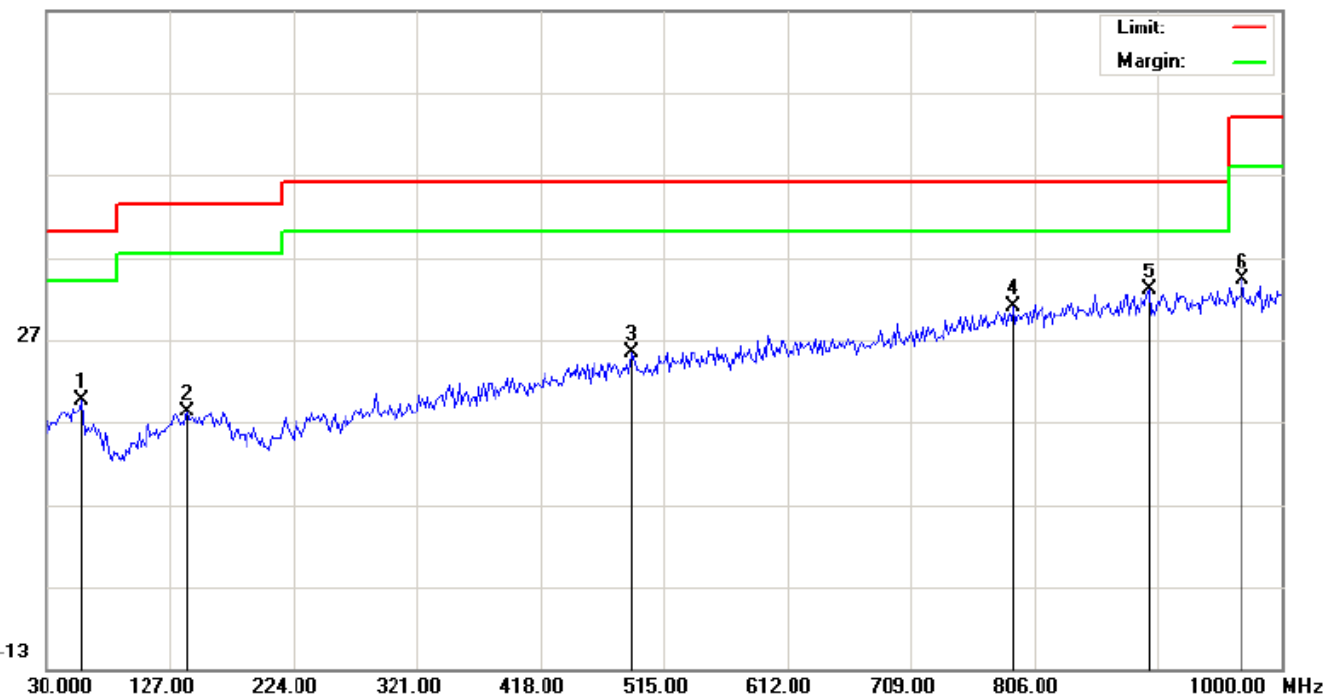
No.	Mk	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		47.7833	-0.44	19.81	19.37	40.00	-20.63	peak			
2		143.1667	-0.82	19.22	18.40	43.50	-25.10	peak			
3		531.1667	1.37	25.60	26.97	46.00	-19.03	peak			
4		754.2667	0.66	29.38	30.04	46.00	-15.96	peak			
5		849.6500	1.18	31.05	32.23	46.00	-13.77	peak			
6	*	948.2667	2.26	32.12	34.38	46.00	-11.62	peak			

RESULT: PASS

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EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna	Vertical

66.9 dBuV/m



No.	Mk	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		57.4833	0.59	19.09	19.68	40.00	-20.32	peak			
2		139.9333	-0.97	19.23	18.26	43.50	-25.24	peak			
3		489.1333	0.69	24.77	25.46	46.00	-20.54	peak			
4		789.8333	0.87	30.18	31.05	46.00	-14.95	peak			
5	*	896.5333	1.25	31.66	32.91	46.00	-13.09	peak			
6		969.2833	1.88	32.30	34.18	54.00	-19.82	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2 All test modes had been pre-tested. The mode 4 is the worst case and recorded in the report.

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RADIATED EMISSION ABOVE 1GHZ

EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.062	47.95	3.74	51.69	74.00	-22.31	peak
4804.062	35.8	3.74	39.54	54.00	-14.46	AVG
7206.093	45.72	8.15	53.87	74.00	-20.13	peak
7206.093	32.73	8.15	40.88	54.00	-13.12	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804.062	47.83	3.74	51.57	74.00	-22.43	peak
4804.062	33.98	3.74	37.72	54.00	-16.28	AVG
7206.093	44.6	8.15	52.75	74.00	-21.25	peak
7206.093	31.86	8.15	40.01	54.00	-13.99	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4882.062	48.13	3.79	51.92	74.00	-22.08	peak
4882.062	35.98	3.79	39.77	54.00	-14.23	AVG
7323.093	45.92	8.21	54.13	74.00	-19.87	peak
7323.093	32.9	8.21	41.11	54.00	-12.89	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4882.062	48.02	3.79	51.81	74.00	-22.19	peak
4882.062	34.16	3.79	37.95	54.00	-16.05	AVG
7323.093	44.77	8.21	52.98	74.00	-21.02	peak
7323.093	32.03	8.21	40.24	54.00	-13.76	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.062	48.46	3.83	52.29	74.00	-21.71	peak
4960.062	36.31	3.83	40.14	54.00	-13.86	AVG
7440.093	46.26	8.26	54.52	74.00	-19.48	peak
7440.093	33.22	8.26	41.48	54.00	-12.52	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960.062	48.35	3.83	52.18	74.00	-21.82	peak
4960.062	34.49	3.83	38.32	54.00	-15.68	AVG
7440.093	45.09	8.26	53.35	74.00	-20.65	peak
7440.093	32.35	8.26	40.61	54.00	-13.39	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RESULT: PASS

Note: Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

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

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

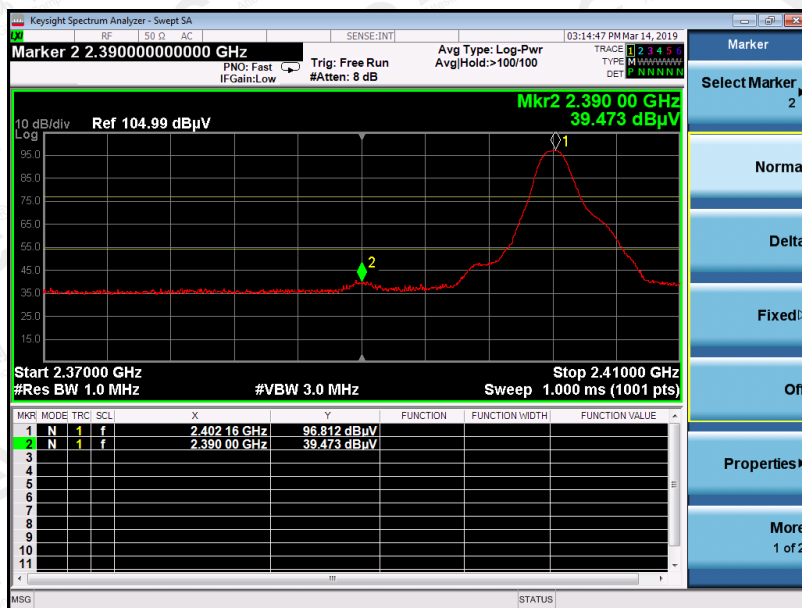
All test modes had been tested. The GFSK modulation is the worst case and recorded in the report.

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TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

PK



AV

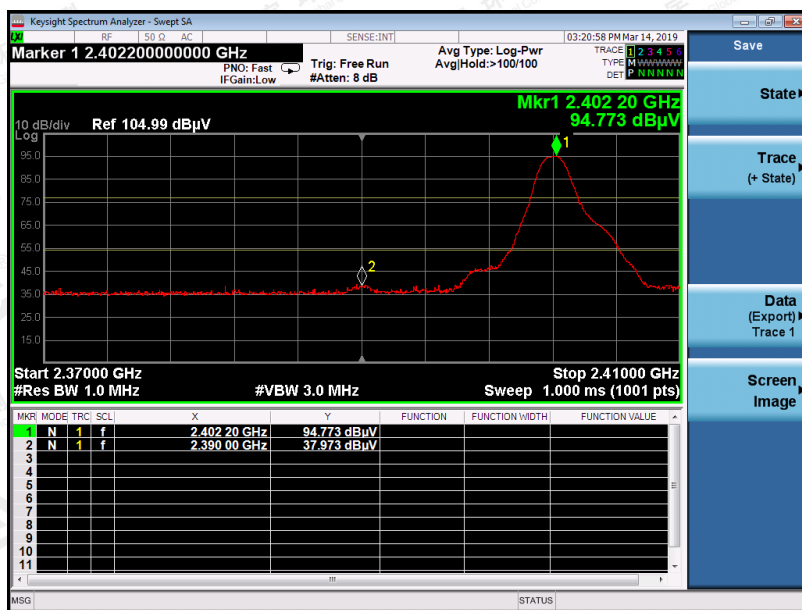


RESULT: PASS

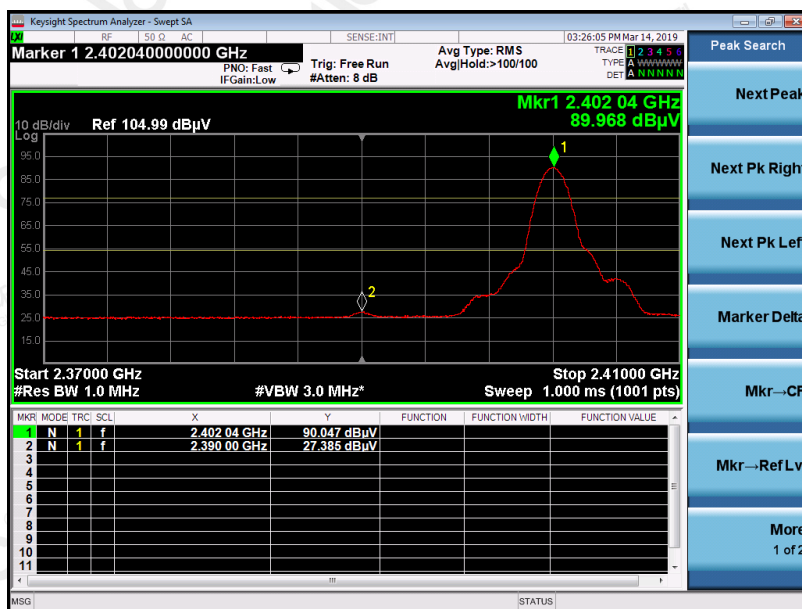
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EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

PK



AV

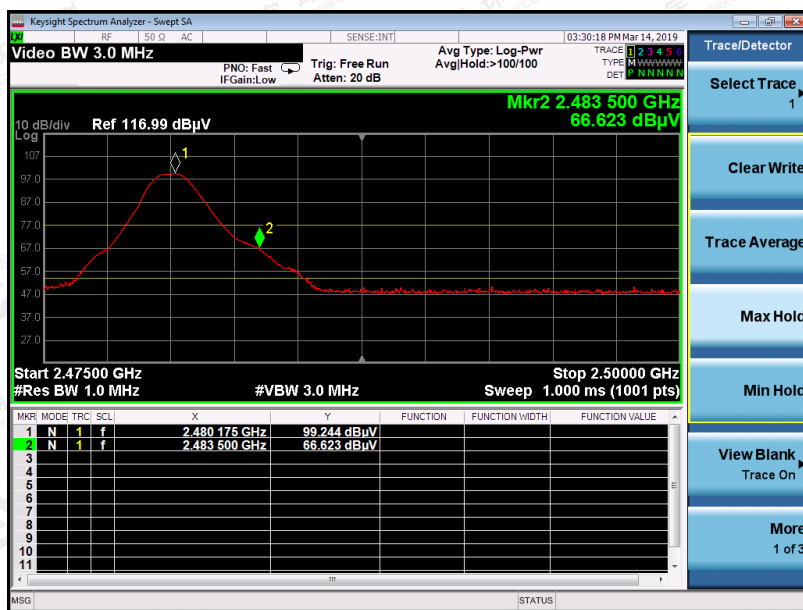


RESULT: PASS

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EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

PK



AV



RESULT: PASS

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EUT	Bluetooth Headphones	Model Name	D08
Temperature	25.2°C	Relative Humidity	55.7%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

PK



AV



RESULT: PASS

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F. All test modes had been pre-tested. The GFSK modulation is the worst case and recorded in the report.

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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

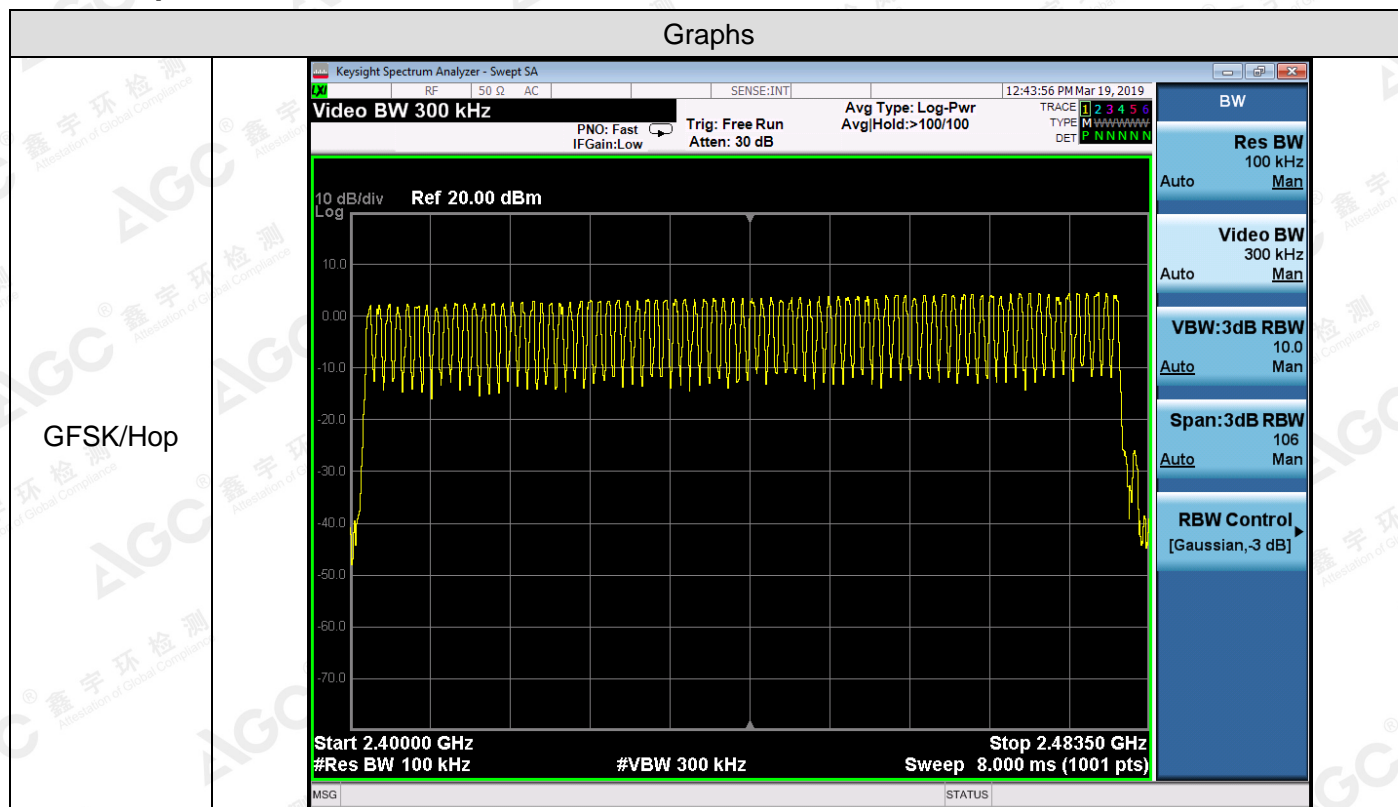
The same as described in section 6

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_{pulse} is the measured pulse time (pls. refer the plots of the spectrum analyser above) [s],
 n_{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 μ 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

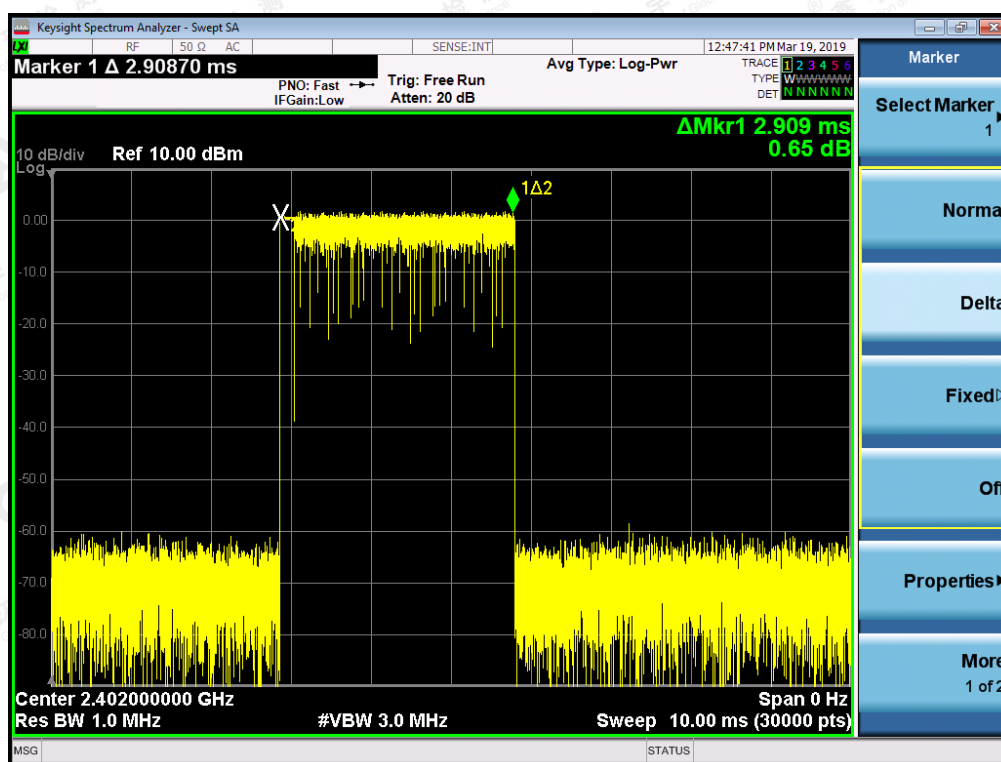
The same as described in section 6

12.4. LIMITS AND MEASUREMENT RESULT

Channel.	Burst Width [ms/hop/ch]	Dwell Time[ms]	Verdict	Limit (ms)
LCH	2.909	310.294	PASS	400
MCH	2.909	310.294	PASS	400
HCH	2.902	309.547	PASS	400

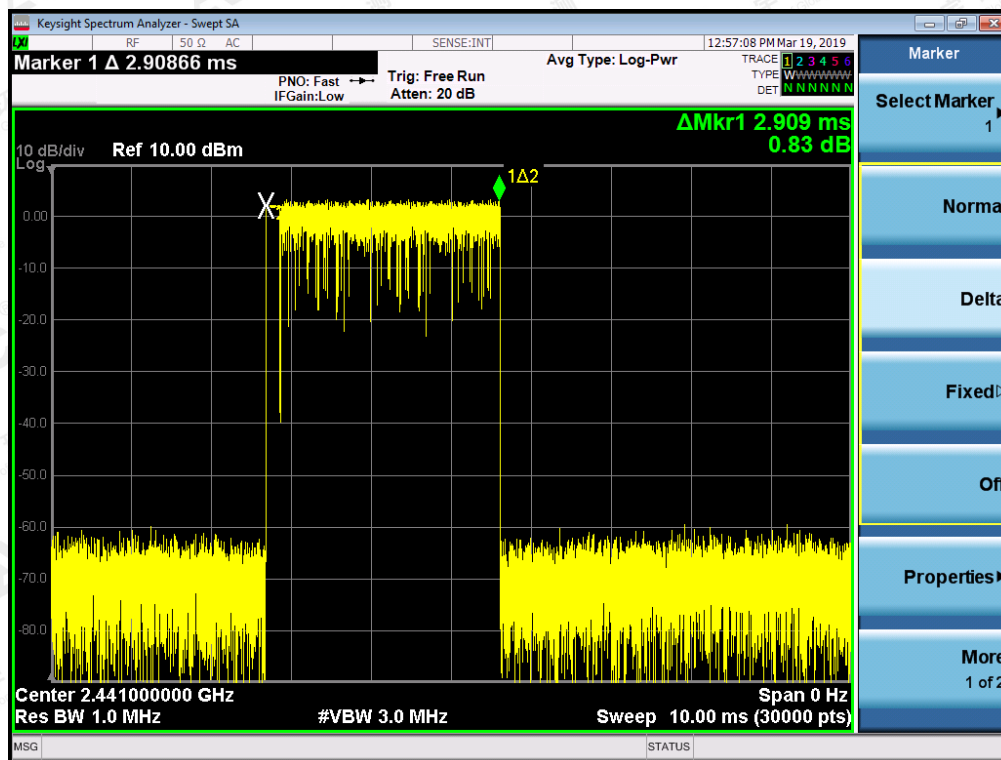
Note: The GFSK modulation is the worst case and recorded in the report.

TEST PLOT OF LOW CHANNEL

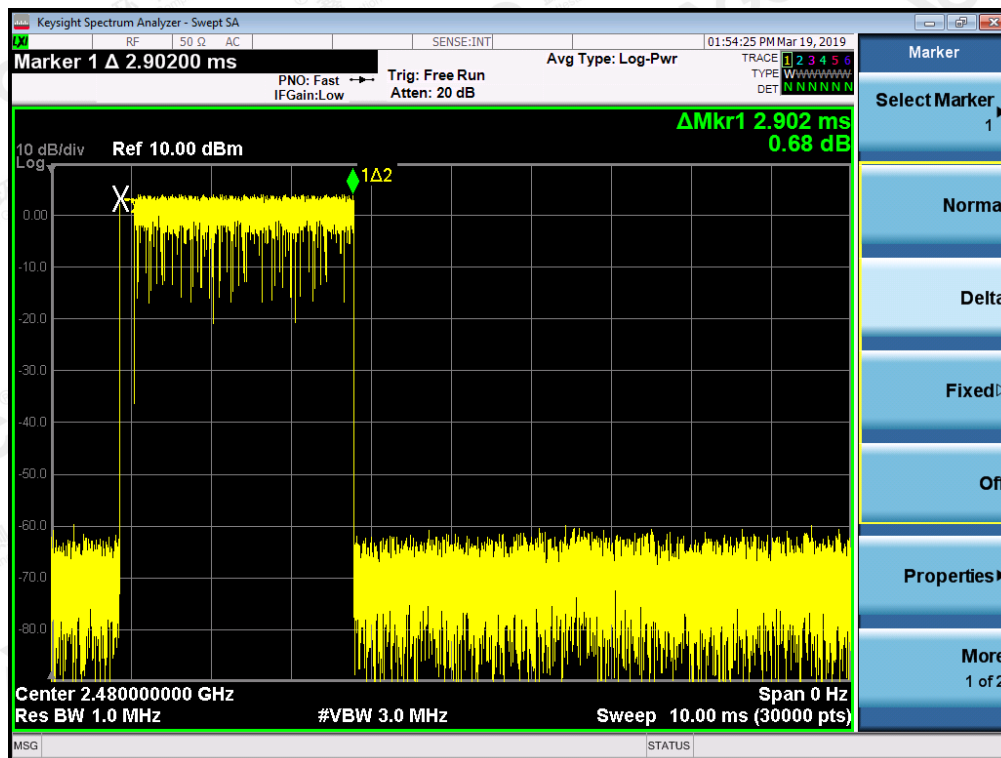


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TEST PLOT OF MIDDLE CHANNEL



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

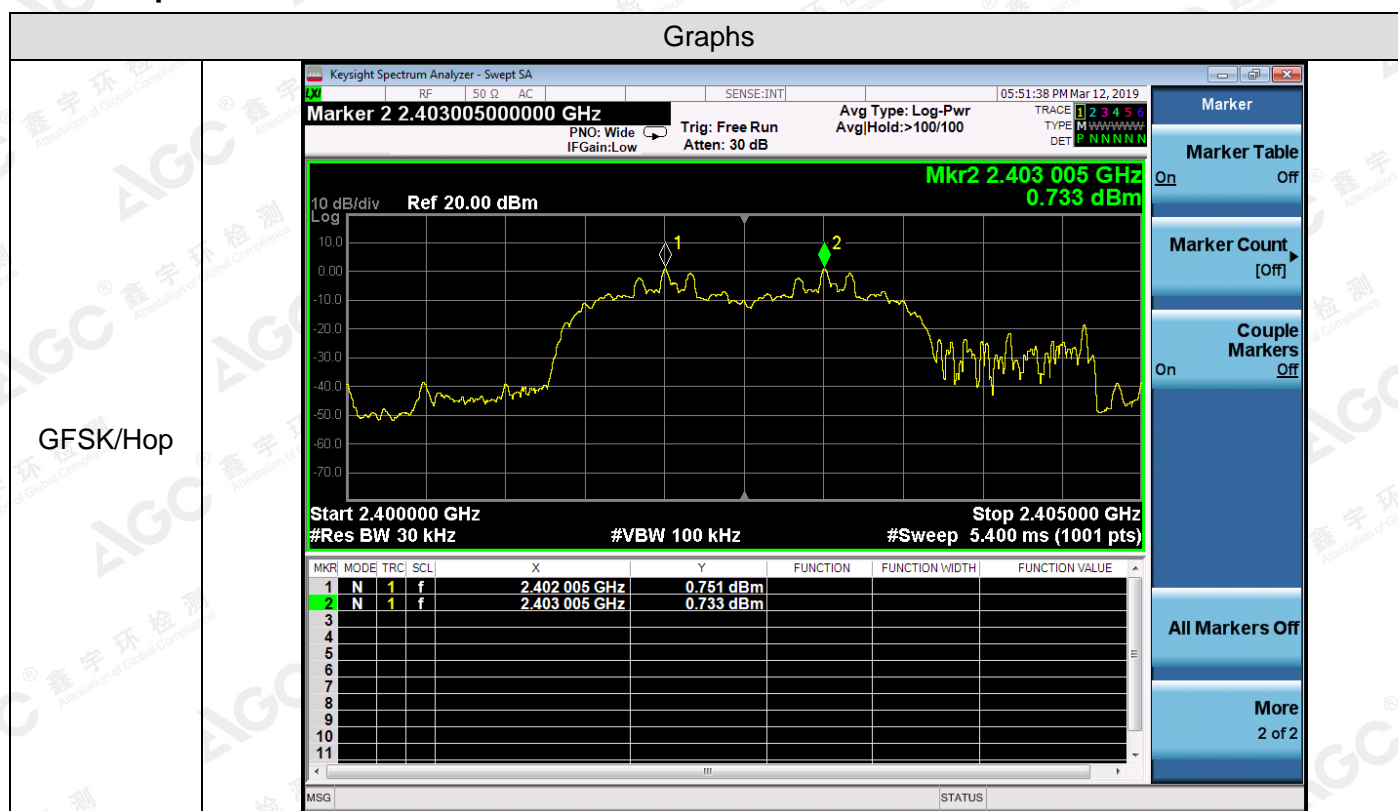
The same as described in section 6.3

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.

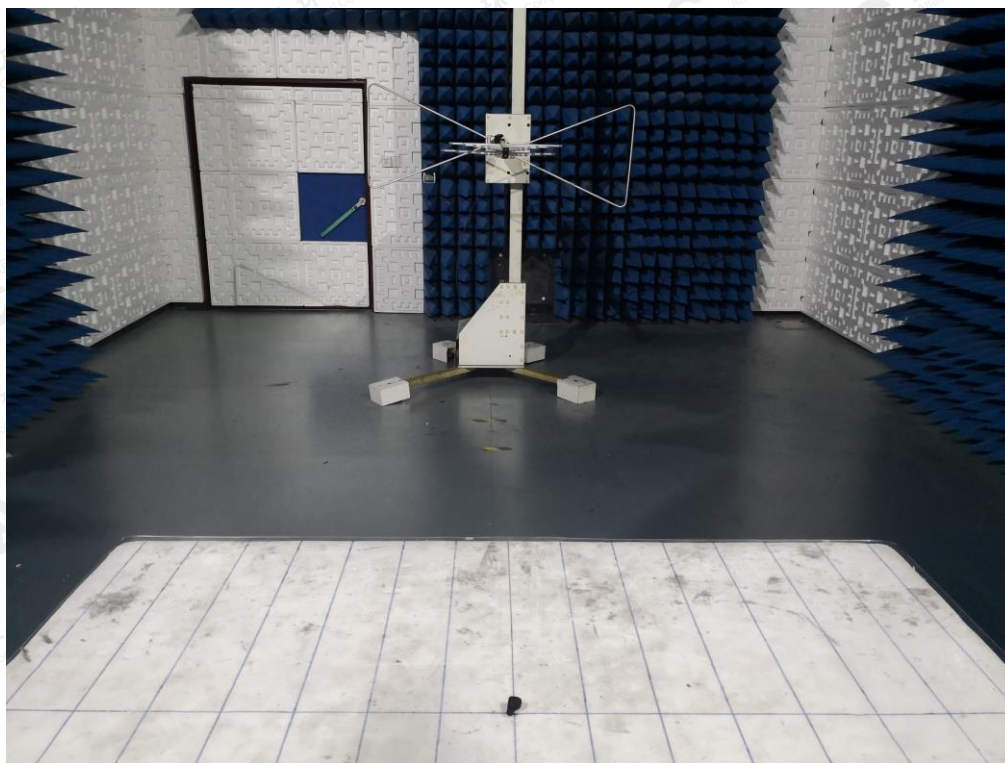
Test Graph



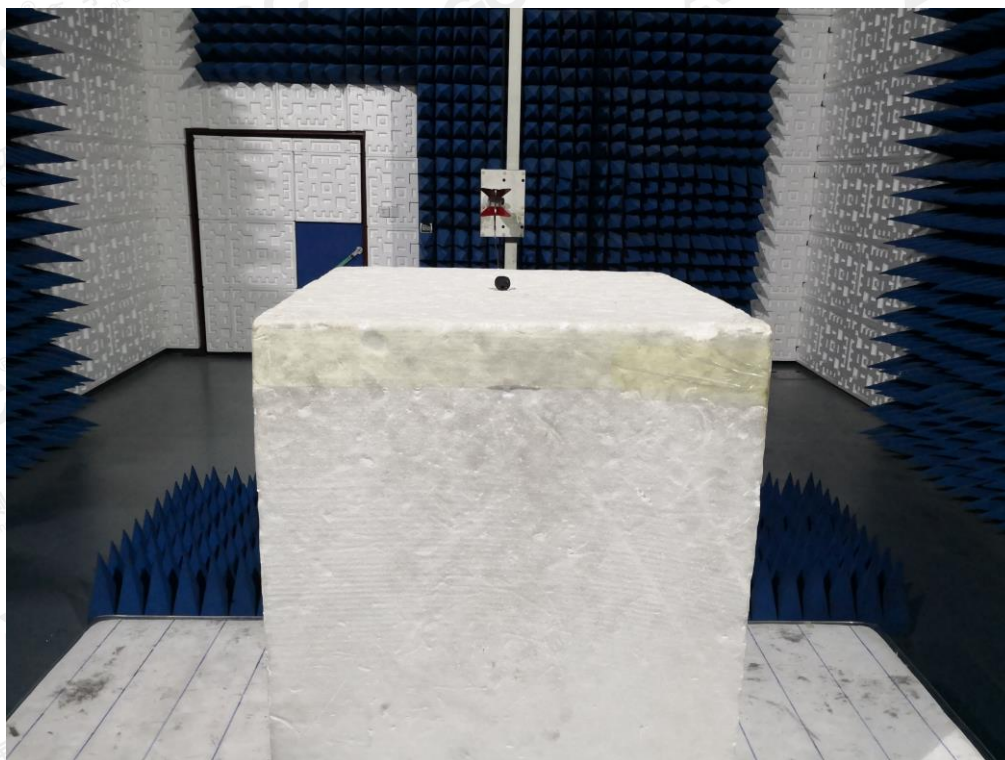
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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP



RADIATED EMISSION ABOVE 1G TEST SETUP



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APPENDIX B: PHOTOGRAPHS OF TEST SETUP

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

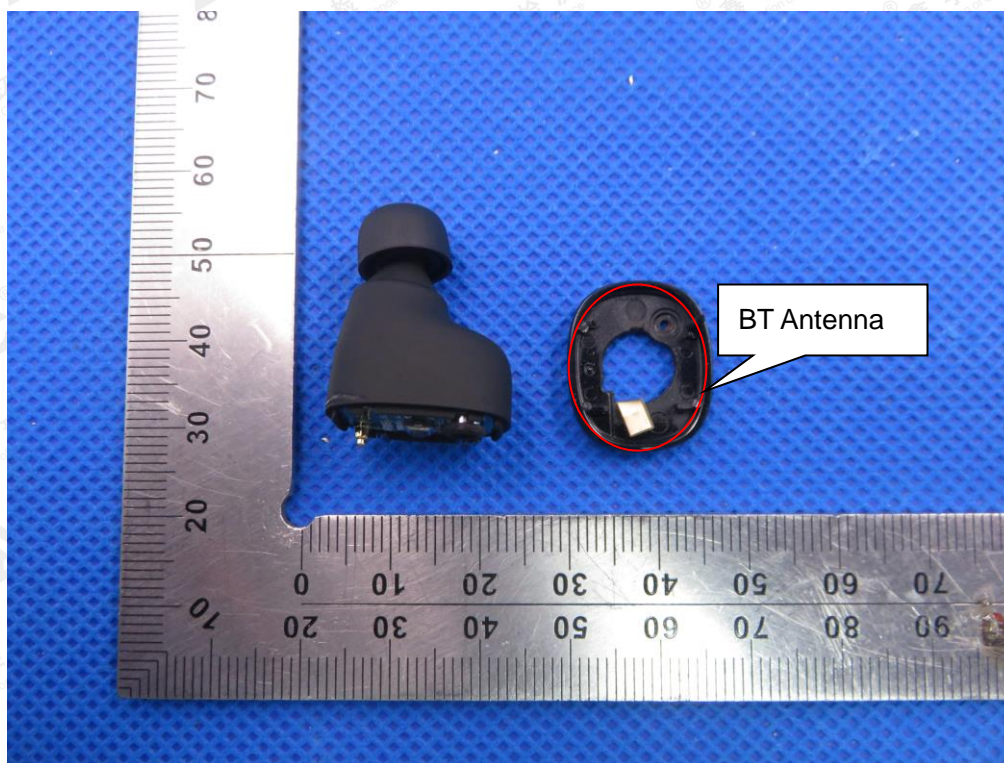


OPEN VIEW OF EUT(Figure 1)(Left)

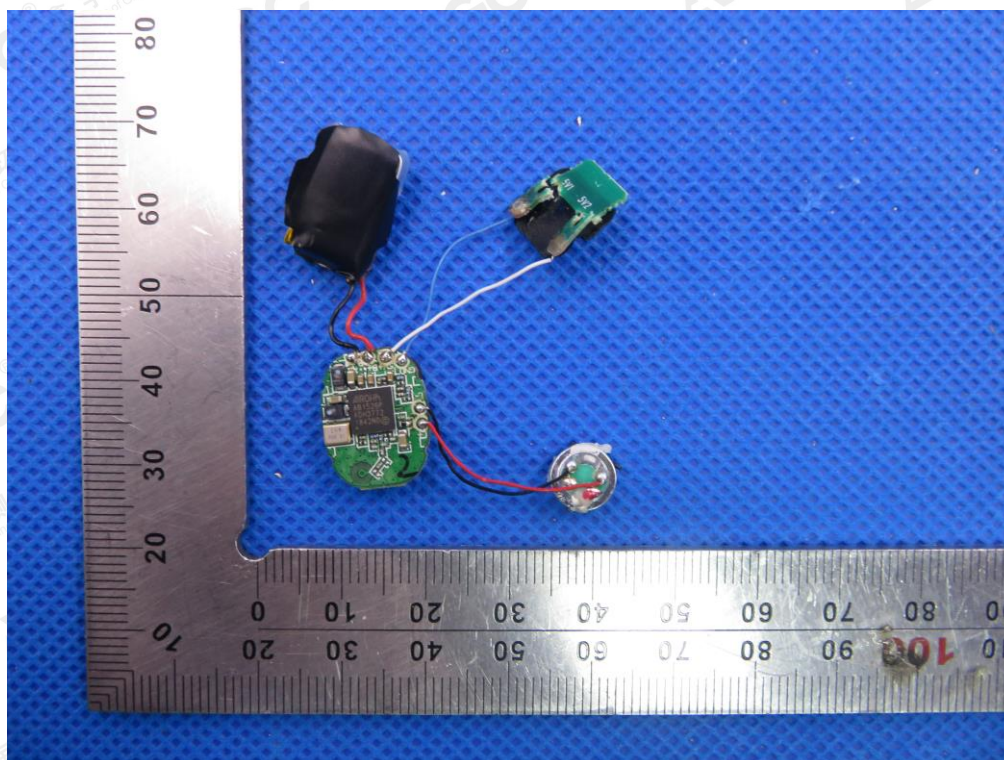


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OPEN VIEW OF EUT(FIGURE 2)

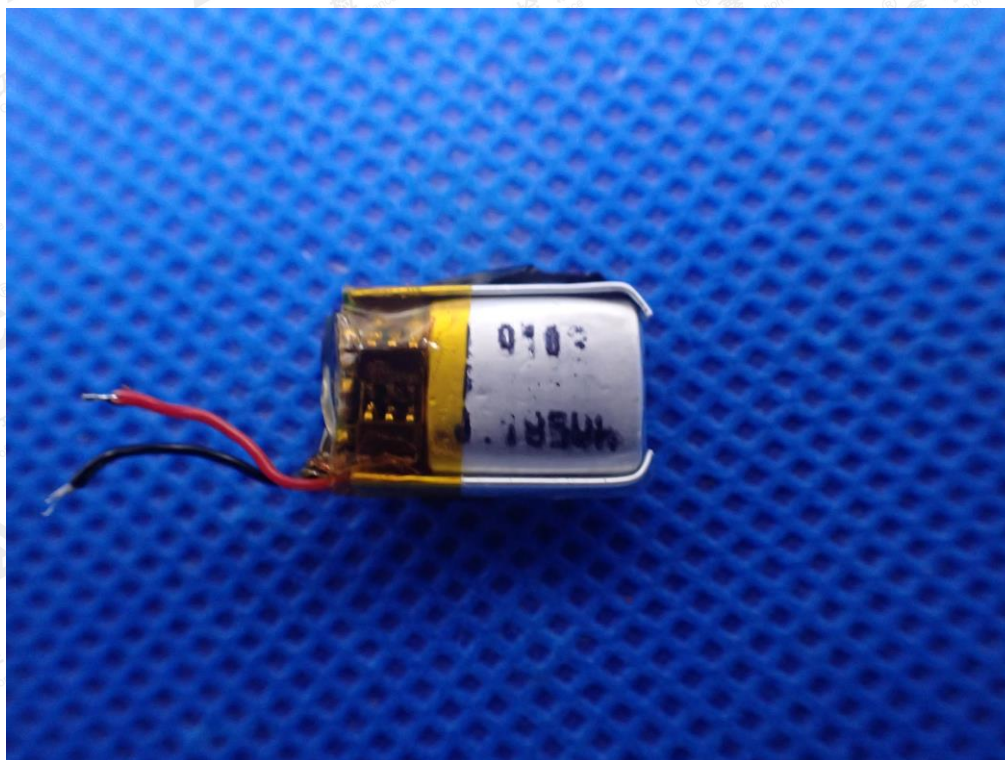


OPEN VIEW OF EUT(FIGURE 3)

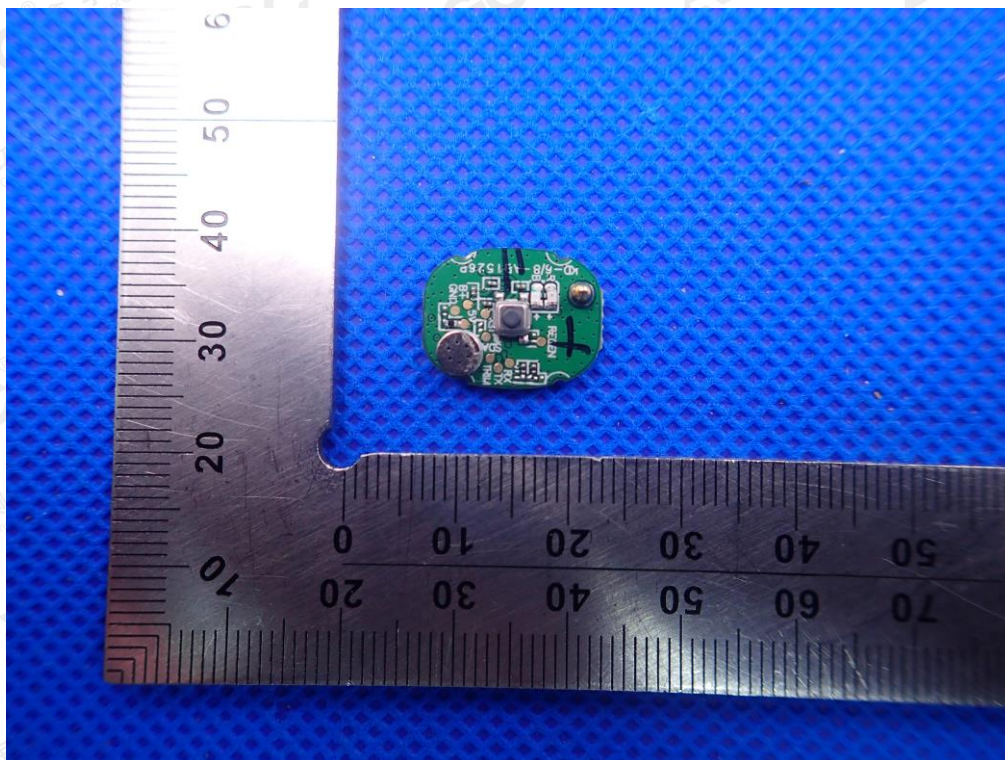


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VIEW OF BATTERY

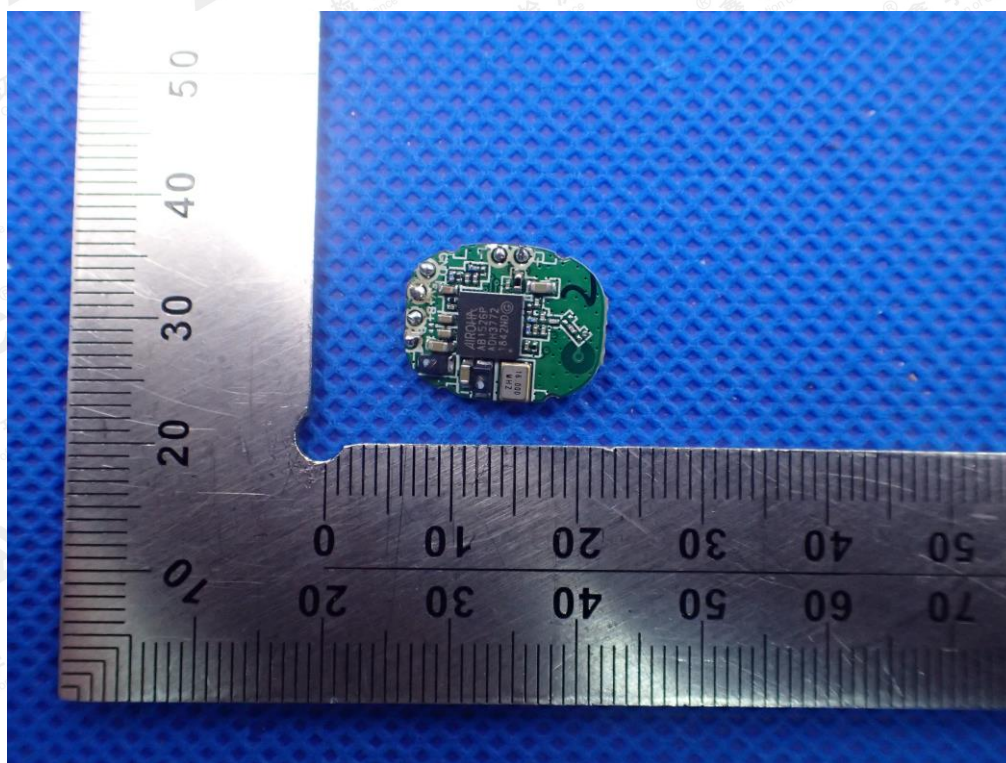


INTERNAL VIEW OF EUT(Figure 1)

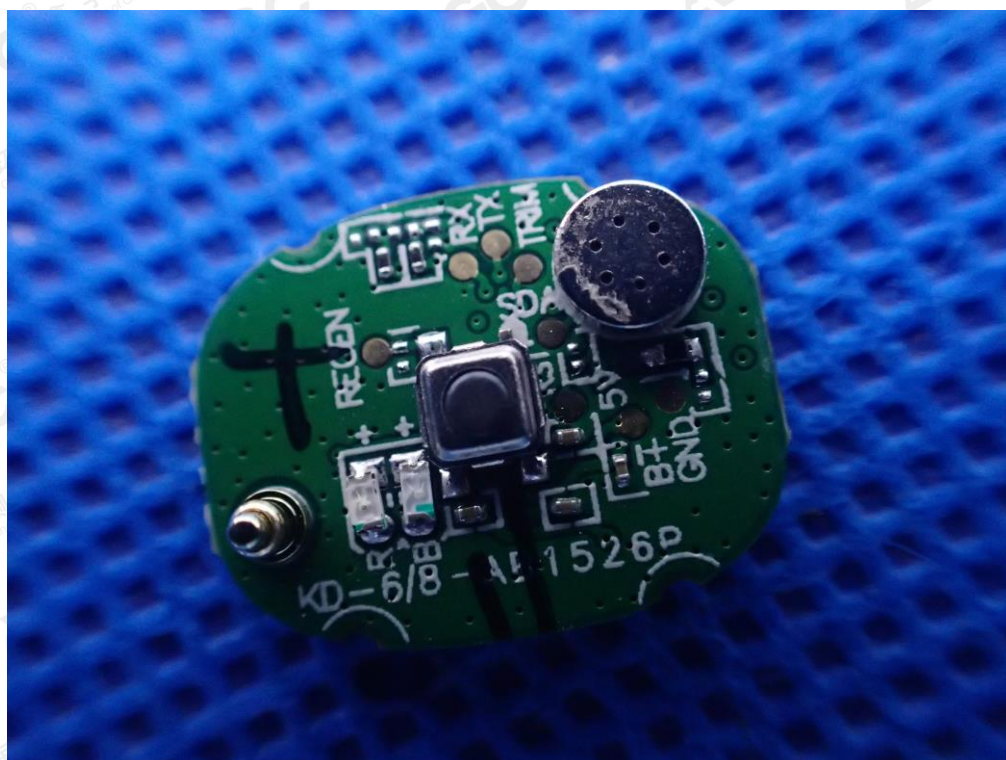


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INTERNAL VIEW OF EUT(FIGURE 2)

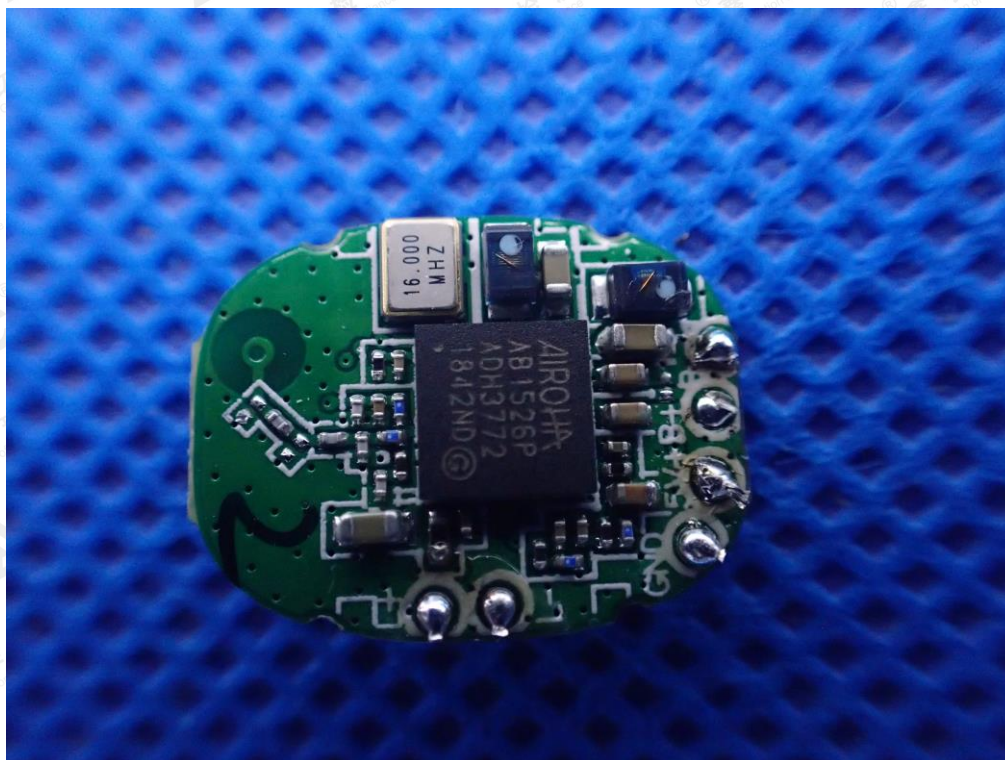


INTERNAL VIEW OF EUT(FIGURE 3)



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INTERNAL VIEW OF EUT(Figure 4)

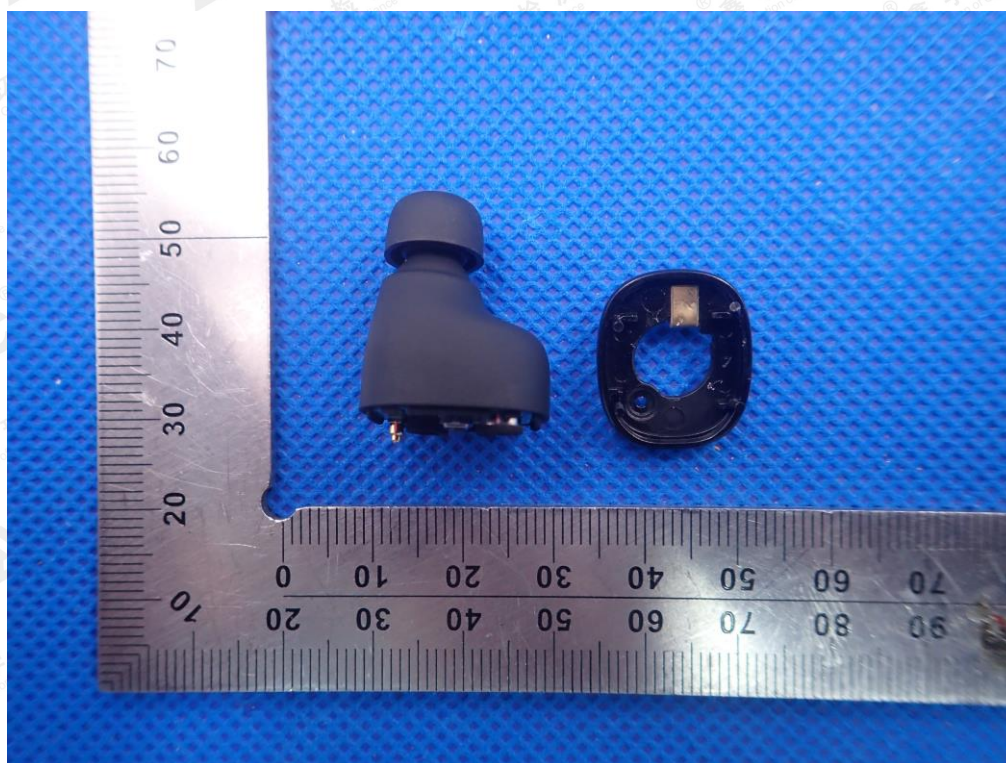


OPEN VIEW OF EUT(Figure 1) (Right)

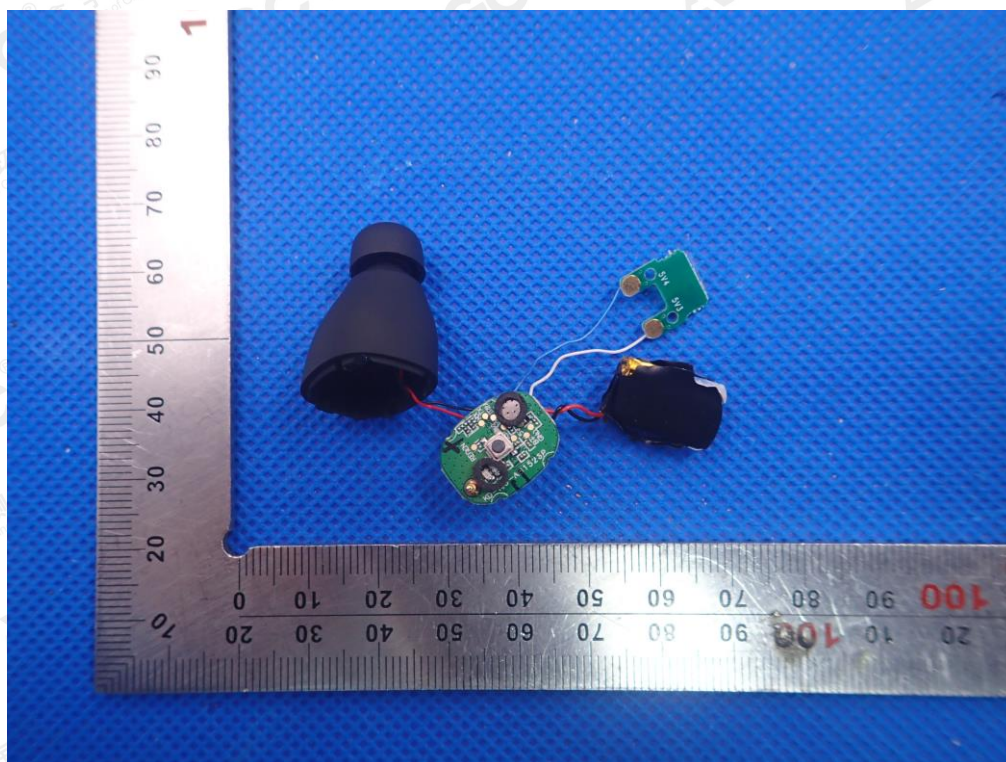


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OPEN VIEW OF EUT(FIGURE 2)

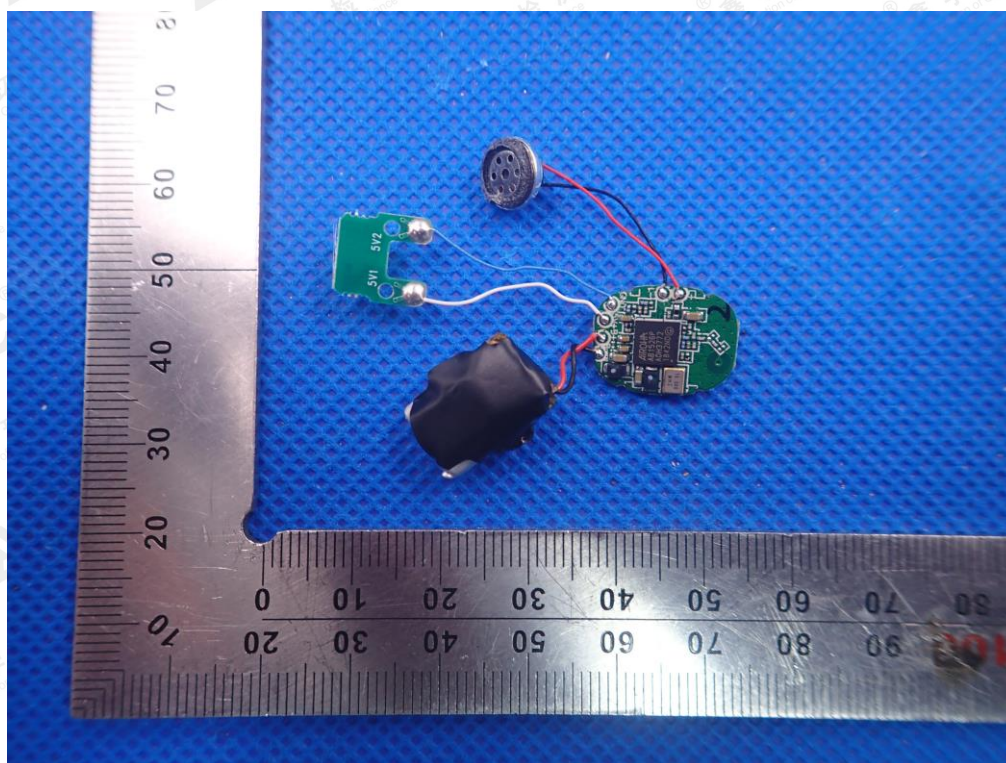


OPEN VIEW OF EUT(FIGURE 3)

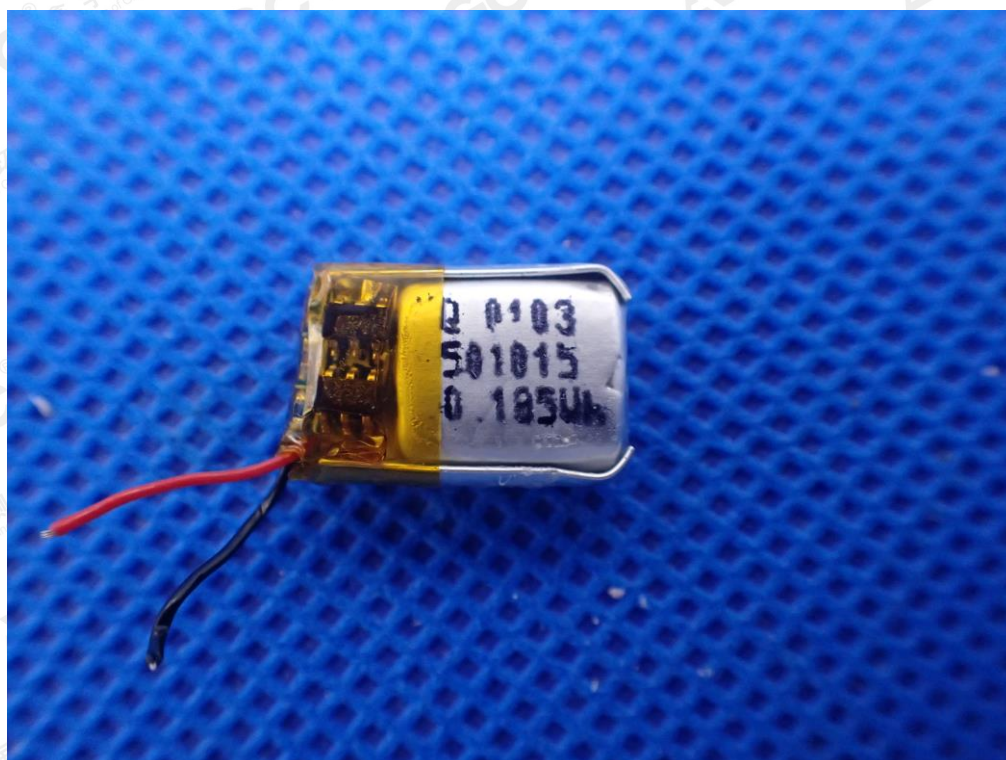


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OPEN VIEW OF EUT(Figure 4)

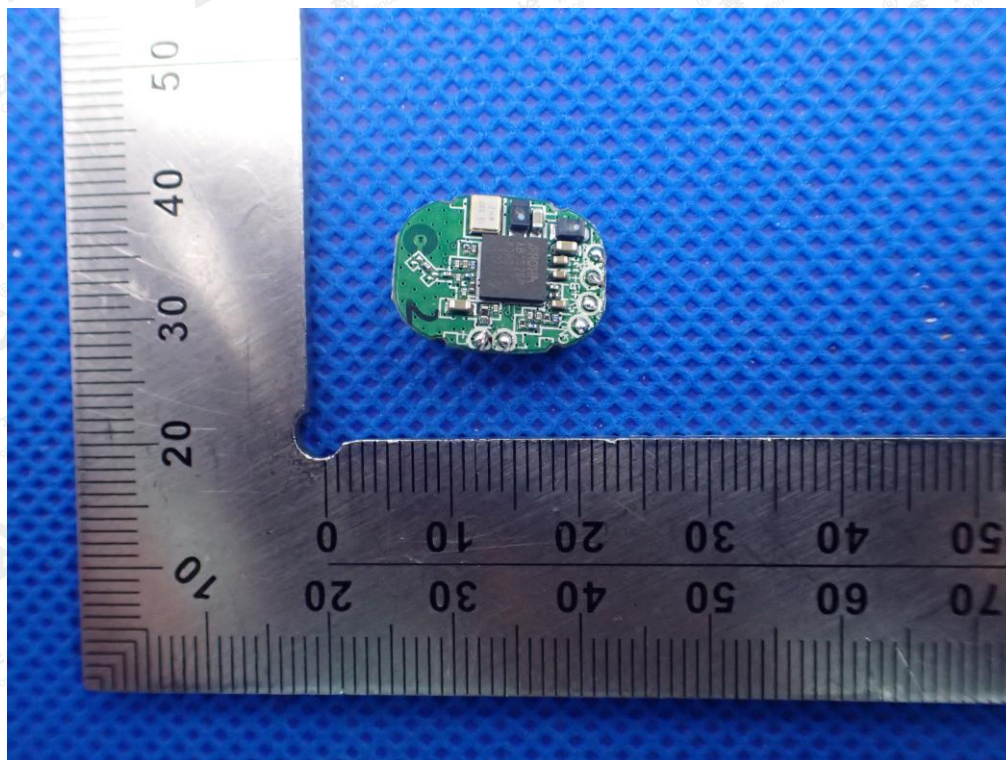


VIEW OF BATTERY

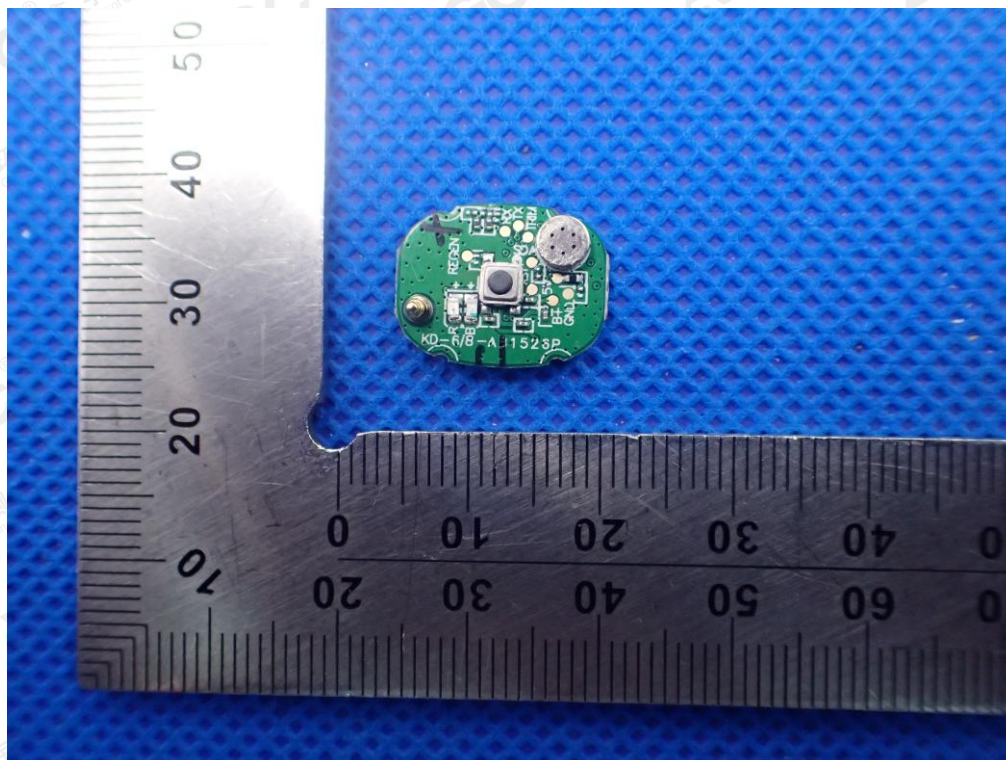


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INTERNAL VIEW OF EUT(FIGURE 1)

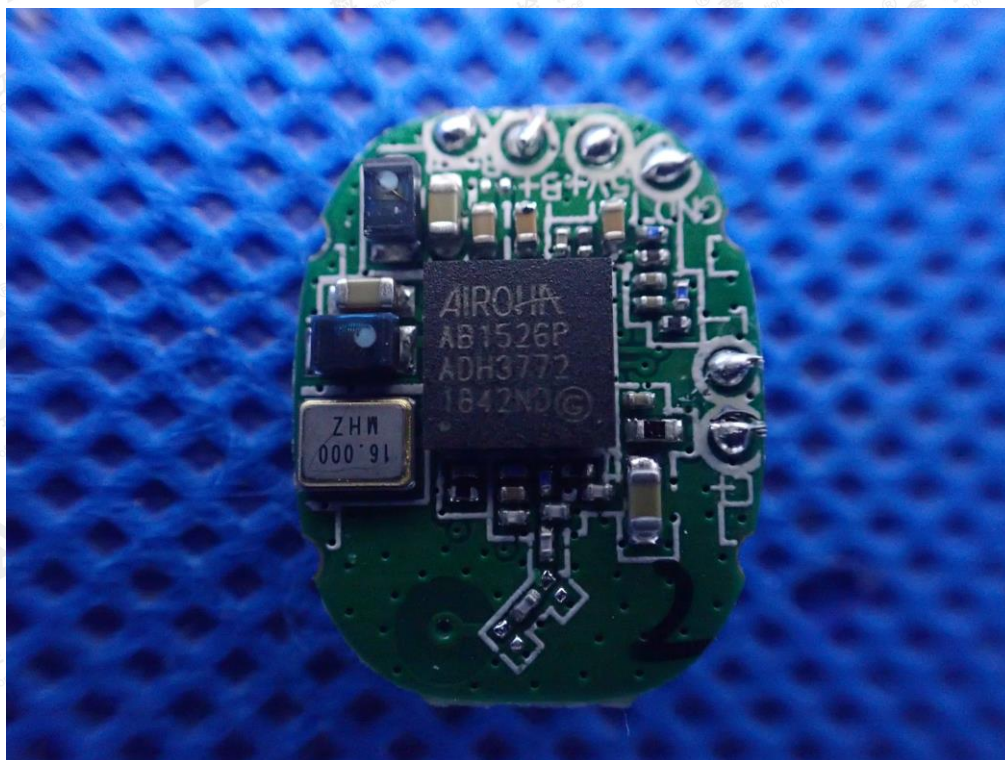


INTERNAL VIEW OF EUT(FIGURE 2)

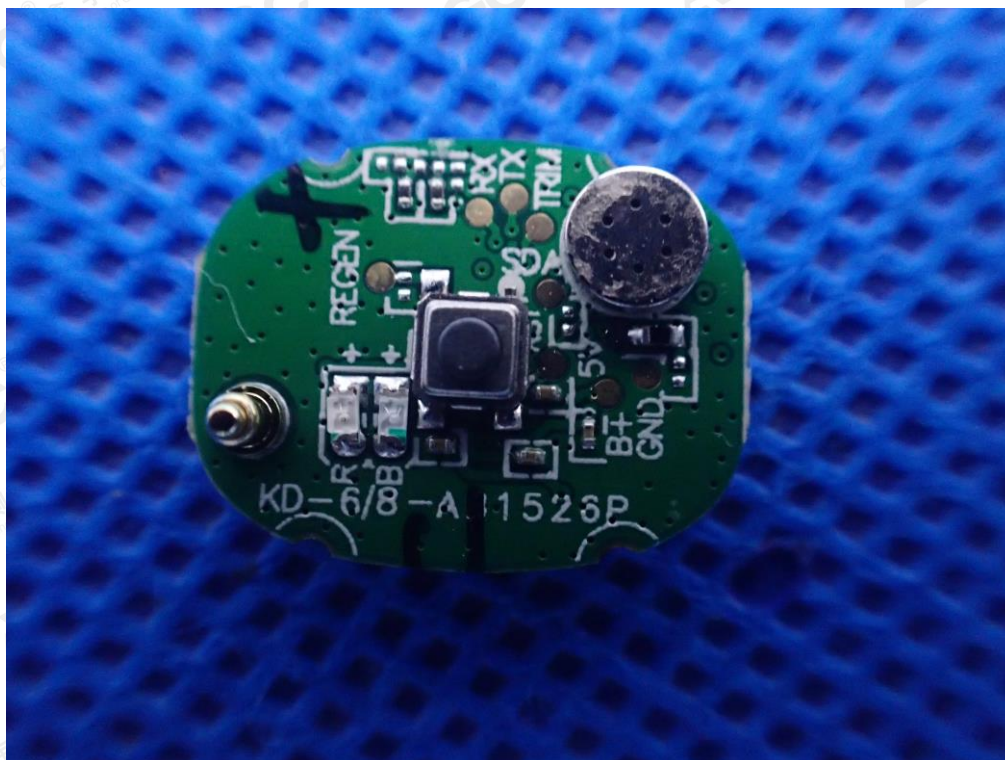


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INTERNAL VIEW OF EUT(FIGURE 3)



INTERNAL VIEW OF EUT(FIGURE 4)



----END OF REPORT----

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