EMC TEST REPORT

For

Wireless light up logo earbud

Test Model: XO-9613

Additional Model No.: /

Prepared for	:	
Address	:	
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Tel	:	(+86)755-82591330
Fax	:	(+86)755-82591332
Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	September 18, 2018
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	September 18, 2018~ September 21, 2018
Date of Report	:	September 27, 2018

EMC TEST REPORT

ETSI EN 301 489-1 V2.1.1 (2017-02)&ETSI EN 301 489-17 V3.1.1 (2017-02)

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

Report Reference No.	:	**LCS180913082AEA**
Date Of Issue.....	:	September 27, 2018
Testing Laboratory Name	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name	:	
Address.....	:	
Test Specification		
Standard.....	:	ETSI EN 301 489-1 V2.1.1 (2017-02) ETSI EN 301 489-17 V3.1.1 (2017-02)
Test Report Form No.	:	LCSEMC-1.0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2017-06

Test Item Description.....	:	**Wireless light up logo earbud**
Trade Mark.....	:	N/A
Test Model	:	XO-9613
Ratings	:	DC 3.7V by Rechargeable Li-ion Battery(55mAh) Recharge Voltage: DC5V/0.04A
Result	:	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Ryan Hu	Calvin Weng	Gavin Liang
Ryan Hu/ Administrators	Calvin Weng/ Technique principal	Gavin Liang/ Manager

EMC -- TEST REPORT

Test Report No. : LCS180913082AEA	September 27, 2018 Date of issue

Test Model.....	: XO-9613
EUT.....	: Wireless light up logo earbud
Applicant.....	**:**
Address.....	:
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**:**
Address.....	:
Telephone.....	: /
Fax.....	: /
Factory.....	**:**
Address.....	:
Telephone.....	: /
Fax.....	: /

Test Result	Positive

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Report Version	Issue Date	Revisions	Revised By
000	September 27, 2018	Initial Issue	Gavin Liang

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Test Report Description Page

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	:	Wireless light up logo earbud
Model No.	:	XO-9613
Model Declaration	:	/
Test Model	:	XO-9613
Power Supply	:	DC 3.7V by Rechargeable Li-ion Battery(55mAh) Recharge Voltage: DC5V/0.04A
Hardware Version	:	BK3266A
Software Version	:	BK3266_01_00
Bluetooth		
Frequency Range	:	2.402-2.480GHz
Channel Number	:	79 channels for Bluetooth (BDR/EDR) 40 channels for Bluetooth (BT LE)
Channel Spacing	:	1MHz for Bluetooth (BDR/EDR) 2MHz for Bluetooth (BT LE)
Modulation Type	:	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth (BDR/EDR) GFSK for Bluetooth (BT LE)
Bluetooth Version	:	V5.0
Antenna Description	:	Internal Antenna, 0.58dBi (Max.)

1.2. Objective

ETSI EN 301 489-1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
ETSI EN 301 489-17	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

The objective is to determine compliance with ETSI EN 301 489-1 V2.1.1 (2017-02) and ETSI EN 301 489-17 V3.1.1 (2017-02).

1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.1.1 (2017-02) and ETSI EN 301 489-17 V3.1.1 (2017-02).

1.5. Description of Test Facility

FCC Registration Number. is 254912.
Industry Canada Registration Number. is 9642A-1.
ESMD Registration Number. is ARCB0108.
UL Registration Number. is 100571-492.
TUV SUD Registration Number. is SCN1081.
TUV RH Registration Number. is UA 50296516-001

NVLAP Registration Code is 600167-0.

1.6. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
--	--	--	--	--

1.7. External I/O

I/O Port Description	Quantity	Cable
Micro USB	1	0.2m, unshielded

1.8. List Of Measuring Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	X-series USB Peak and Average Power Sensor Aglient	Agilent	U2021XA	MY54080022	2017-10-26	2018-10-25
2	4 CH. Simultaneous Sampling 14 Bits 2MS/s	Agilent	U2531A	MY54080016	2017-10-26	2018-10-25
3	Test Software	Ascentest	AXO-961390-SW	20160630	N/A	N/A
4	RF Control Unit	Ascentest	AXO-961390-RFB	N/A	2018-06-16	2019-06-15
5	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2018-06-16	2019-06-15
6	SPECTRUM ANALYZER	R&S	FSP	100503	2018-06-16	2019-06-15
7	MXG Vector Signal Generator	Agilent	N5182A	MY47071151	2017-11-17	2018-11-16
8	ESG VECTOR SIGNAL GENERATOR	Agilent	E4438C	MY42081396	2017-11-17	2018-11-16
9	PSG Analog Signal Generator	Agilent	E8257D	MY4520521	2017-11-17	2018-11-16
10	Universal Radio Communication Tester	R&S	CMU 200	105788	2018-06-16	2019-06-15
11	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2018-06-16	2019-06-15
12	RF Control Unit	Tonscend	JS0806-1	N/A	2018-06-16	2019-06-15
13	DC Power Supply	Agilent	E3642A	N/A	2017-11-17	2018-11-16
14	LTE Test Software	Tonscend	JS1120-1	N/A	N/A	N/A
15	Temperature & Humidity Chamber	GUANGZHOU GOGNWEN	GDS-100	70932	2017-10-11	2018-10-10
16	DC Source	CHROMA	62012P-80-60	34782951	2017-10-11	2018-10-10
17	RF Filter	Micro-Tronics	BRC50718	S/N-017	2018-06-16	2019-06-15
18	RF Filter	Micro-Tronics	BRC50719	S/N-011	2018-06-16	2019-06-15
19	RF Filter	Micro-Tronics	BRC50720	S/N-011	2018-06-16	2019-06-15
20	RF Filter	Micro-Tronics	BRC50721	S/N-013	2018-06-16	2019-06-15
21	RF Filter	Micro-Tronics	BRM50702	S/N-195	2018-06-16	2019-06-15
22	Splitter/Combiner	Micro-Tronics	PS2-15	CB11-20	2018-06-16	2019-06-15
23	Splitter/Combiner	Micro-Tronics	CB11-20	N/A	2018-06-16	2019-06-15
24	Attenuator	Micro-Tronics	PAS-8-10	S/N23466	2018-06-16	2019-06-15
25	Exposure Level Tester	Narda	ELT-400	N-0713	2018-04-02	2019-04-01
26	B-Field Probe	Narda	ELT-400	M-1154	2018-04-10	2019-04-09
27	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2018-06-16	2019-06-15
28	Positioning Controller	MF	MF-7082	/	2018-06-16	2019-06-15
29	EMI Test Software	AUDIX	E3	N/A	2018-06-16	2019-06-15
30	EMI Test Receiver	R&S	ESR 7	101181	2018-06-16	2019-06-15
31	AMPLIFIER	QuieTek	QTK-A2525G	CHM10809065	2017-11-17	2018-11-16
32	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2018-06-22	2019-06-21
33	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-05-01	2019-04-30

34	Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1925	2018-07-02	2019-07-01
35	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2017-09-21	2018-09-20
36	Broadband Preamplifier	SCHWARZBECK	BBV 9719	9719-025	2017-09-21	2018-09-20
37	RF Cable-R03m	Jye Bao	RG142	CB021	2018-06-16	2019-06-15
38	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2018-06-16	2019-06-15
39	TEST RECEIVER	R&S	ESCI	101142	2018-06-16	2019-06-15
40	RF Cable-CON	UTIFLEX	3102-26886-4	CB049	2018-06-16	2019-06-15
41	10dB Attenuator	SCHWARZBECK	MTS-IMP136	261115-001-0032	2018-06-16	2019-06-15
42	Artificial Mains	R&S	ENV216	101288	2018-06-16	2019-06-15
43	Power Analyzer Test System	Voltech	PM6000	20000670053	2018-06-16	2019-06-15
44	ESD Simulator	SCHLODER	SESD 230	604035	2018-06-16	2019-06-15
45	RF POWER AMPLIFIER	OPHIR	5225R	1052	NCR	NCR
46	RF POWER AMPLIFIER	OPHIR	5273F	1019	NCR	NCR
47	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	NCR	NCR
48	Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	NCR	NCR
49	Electric field probe	Narda S.TS./PMM	EP601	611WX80208	2018-03-26	2019-03-25
50	Power Meter	Agilent	E4419B	MY45104493	2018-06-16	2019-06-15
51	Power Sensor	Agilent	E9301H	MY41495234	2018-06-16	2019-06-15
52	Power Sensor	Agilent	E4412A	MY41500229	2018-06-16	2019-06-15
53	Sound Level meter	BK Precision	735	73500873100 10020	2018-06-16	2019-06-15
54	Audio Analyzer	R&S	UPV	1146.2003K0 2-101782-XR	2018-06-16	2019-06-15
55	Mouse Simulation	Bruel & Kjaer	4227	A0304216	2018-06-16	2019-06-15
56	Ear Simulation and supply	Bruel & Kjaer	2669.4182.5935	A0305284	2018-06-16	2019-06-15
57	Acoustical Calibrators	Bruel & Kjaer	4231	A0304215	2018-06-16	2019-06-15
58	Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2017-11-17	2018-11-16
59	Simulator	FRANKONIA	CIT-10	A126A1195	2018-06-16	2019-06-15
60	CDN	FRANKONIA	CDN-M2	5100100100	2018-06-16	2019-06-15
61	CDN	FRANKONIA	CDN-M3	0900-11	2018-06-16	2019-06-15
62	Attenuator	FRANKONIA	ATT6	0010222A	2018-06-16	2019-06-15
63	Infuse tongs	EM TEST	EM-Clamp	0513A031201	2018-06-16	2019-06-15
64	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2018-06-16	2019-06-15
Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.						

1.9. Measurement Uncertainty

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	0.01ppm	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2℃	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

1.10. Description Of Test Modes

There was 3 test Modes. TM1 to TM3 were shown below:

TM1 **:** Operate in Bluetooth mode;
TM2 Recharge mode
TM3 **:** Idle mode

***Note:

1. All test modes were tested, but we only recorded the worst case in this report.

2. SUMMARY OF TEST RESULTS

Rule	Description of Test Items	Result
§7.1	Reference to clause 8.4 of ETSI EN 301 489-1 Conducted Emission (AC mains input/output port)	Compliant
§7.1	Reference to clause 8.3 of ETSI EN 301 489-1 Conducted Emission (DC power input/output port)	N/A*
§7.1	Reference to clause 8.7 of ETSI EN 301 489-1 Conducted Emission (Wired network port)	N/A*
§7.1	Reference to clause 8.2 of ETSI EN 301 489-1 Radiated Emission (Enclosure of ancillary equipment)	Compliant
§7.1	Reference to clause 8.5 of ETSI EN 301 489-1 Harmonic current emissions (AC mains input port)	N/A*
§7.1	Reference to clause 8.6 of ETSI EN 301 489-1 Voltage fluctuations and flicker (AC mains input port)	N/A*
§7.2	Reference to clause 9.3 of ETSI EN 301 489-1 Electrostatic discharge (Enclosure port) (EN 61000-4-2)	Compliant
§7.2	Reference to clause 9.2 of ETSI EN 301 489-1 RF electromagnetic field (80MHz to 6000MHz) (Enclosure port) (EN 61000-4-3)	Compliant
§7.2	Reference to clause 9.4 of ETSI EN 301 489-1 Fast transients common mode (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-4)	N/A*
§7.2	Reference to clause 9.8 of ETSI EN 301 489-1 Surges, line to line and line to ground (AC mains power input ports, wired network ports) (EN 61000-4-5)	N/A*
§7.2	Reference to clause 9.5 of ETSI EN 301 489-1 RF common mode 0.15MHz to 80MHz (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-6)	N/A*
§7.2	Reference to clause 9.6 of ETSI EN 301 489-1 Transients and surges in the vehicular environment (ISO 7637-2)	N/A*
§7.2	Reference to clause 9.7 of ETSI EN 301 489-1 Voltage dips and interruptions (AC mains power input ports) (EN 61000-4-11)	N/A*

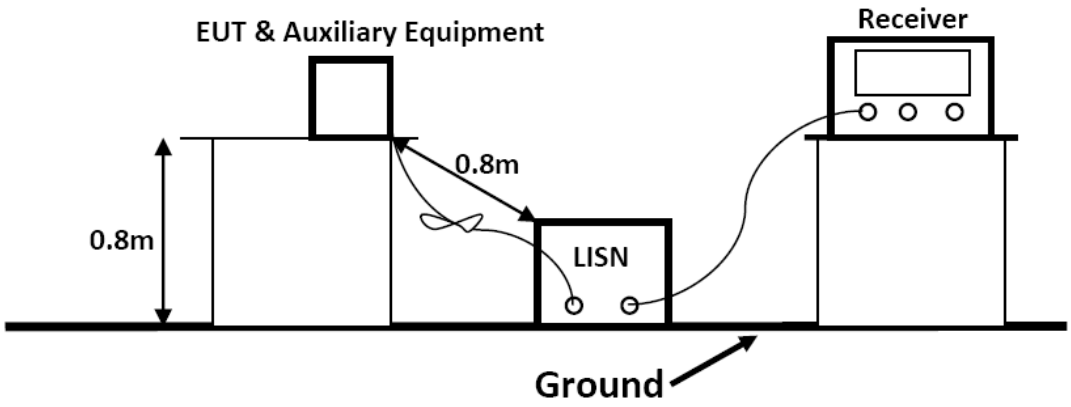
3. LINE CONDUCTED EMISSION

3.1. Conducted Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 55032: 2015 Class B

Limits for Line Conducted Emission		
Frequency (MHz)	Limit (dBμV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

3.2. Test Configuration



The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

The EUT received DC 12V charging power from the adapter which received power through a LISN supplying power of AC 230V/50Hz.

3.3. EMI Test Receiver Setup

During the conducted emission test, the EMI test receiver was set with the following configurations:

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	150KHz ~ 30MHz
(IF)RBW	9kHz

All data was recorded in the Quasi-peak and average detection mode.

3.4. Test Procedure

Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

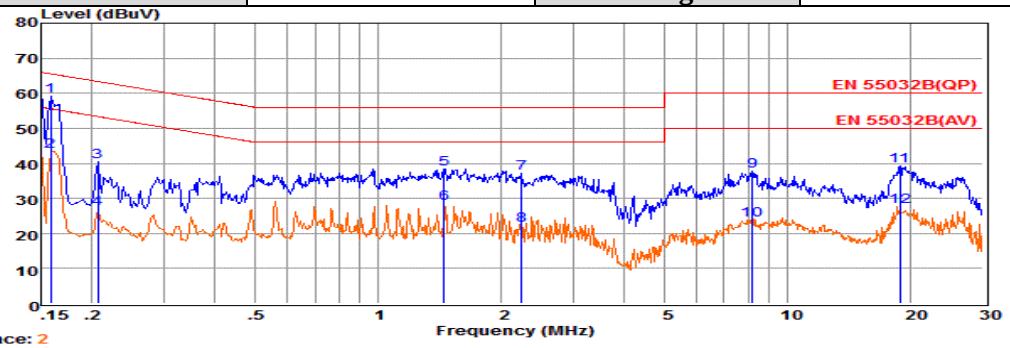
Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

3.5. Test Data

***Note: For pre-scan, the worst case is TM1, and the test data was shown as follow:

Model No.	XO-9613	**Test Mode**	TM1
Environmental Conditions	24.2℃, 53.5% RH	**Test Engineer**	Diamond Lu
Pol.	Line	**Test Voltage**	AC 230V/50Hz

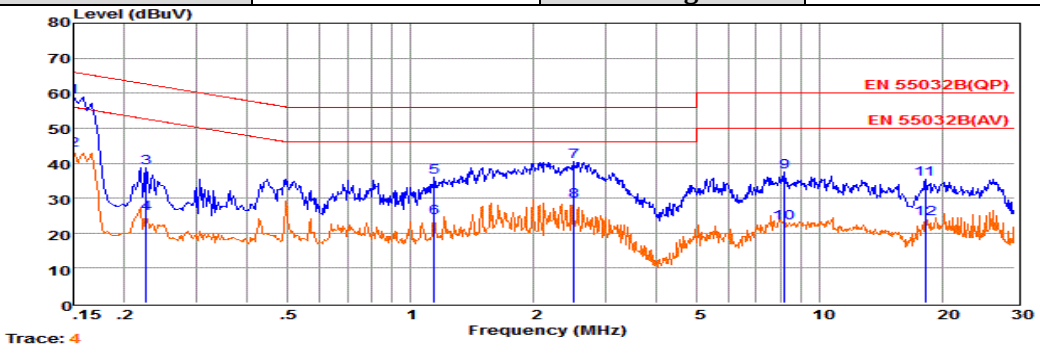


Trace: 2
Env. Ins: 24.2*/53.5%
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.16	39.51	9.58	0.02	10.00	59.11	65.56	-6.45	QP
2	0.16	23.92	9.58	0.02	10.00	43.52	55.55	-12.03	Average
3	0.21	20.70	9.63	0.03	10.00	40.36	63.36	-23.00	QP
4	0.21	7.54	9.63	0.03	10.00	27.20	53.36	-26.16	Average
5	1.45	18.79	9.64	0.05	10.00	38.48	56.00	-17.52	QP
6	1.45	8.71	9.64	0.05	10.00	28.40	46.00	-17.60	Average
7	2.24	17.53	9.64	0.05	10.00	37.22	56.00	-18.78	QP
8	2.24	2.47	9.64	0.05	10.00	22.16	46.00	-23.84	Average
9	8.19	18.01	9.68	0.07	10.00	37.76	60.00	-22.24	QP
10	8.19	4.09	9.68	0.07	10.00	23.84	50.00	-26.16	Average
11	18.82	19.28	9.75	0.11	10.00	39.14	60.00	-20.86	QP
12	18.82	7.69	9.75	0.11	10.00	27.55	50.00	-22.45	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Model No.	XO-9613	**Test Mode**	TM1
Environmental Conditions	24.2℃, 53.5% RH	**Test Engineer**	Diamond Lu
Pol.	Neutral	**Test Voltage**	AC 230V/50Hz



Trace: 4
Env. Ins: 24.2*/53.5%
Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.15	39.16	9.70	0.02	10.00	58.88	66.00	-7.12	QP
2	0.15	24.04	9.70	0.02	10.00	43.76	55.99	-12.23	Average
3	0.23	18.93	9.59	0.03	10.00	38.55	62.61	-24.06	QP
4	0.23	6.01	9.59	0.03	10.00	25.63	52.61	-26.98	Average
5	1.14	16.43	9.63	0.05	10.00	36.11	56.00	-19.89	QP
6	1.14	4.63	9.63	0.05	10.00	24.31	46.00	-21.69	Average
7	2.51	20.61	9.64	0.05	10.00	40.30	56.00	-15.70	QP
8	2.51	9.32	9.64	0.05	10.00	29.01	46.00	-16.99	Average
9	8.19	17.64	9.70	0.07	10.00	37.41	60.00	-22.59	QP
10	8.19	3.05	9.70	0.07	10.00	22.82	50.00	-27.18	Average
11	18.14	15.57	9.81	0.11	10.00	35.49	60.00	-24.51	QP
12	18.14	4.21	9.81	0.11	10.00	24.13	50.00	-25.87	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

Note: For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.

4. RADIATED DISTURBANCE

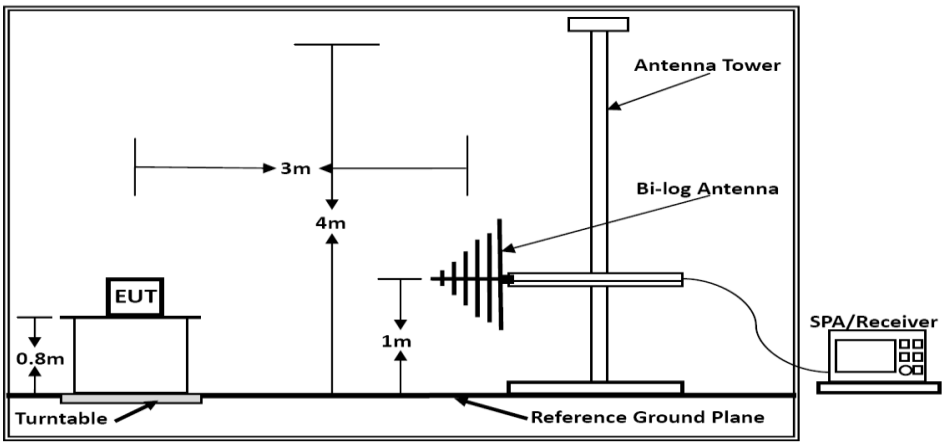
4.1. Radiated Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 55032: 2015 Class B

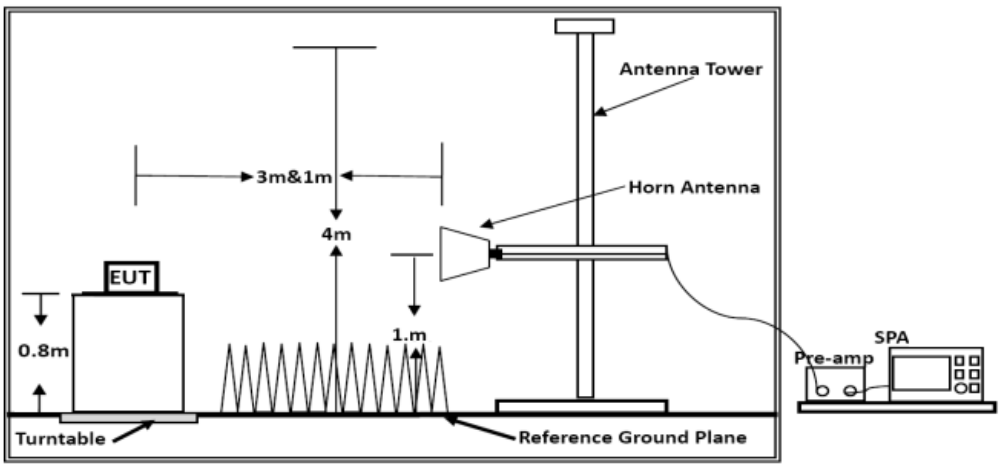
Limits for Radiated Disturbance Below 1GHz		
Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47
***Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.		

Limits for Radiated Disturbance Above 1GHz			
Frequency (MHz)	Distance (Meters)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54
***Note: The lower limit applies at the transition frequency.			

4.2. Test Configuration



Below 1GHz



Above 1GHz

4.3. Test Procedure

1) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

Pre-measurement:

--- The turntable rotates from 0 °to 315 °using 45 °steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height changes from 1 to 4 meter.
--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (±45 °) and antenna movement between 1 and 4 meter.
--- The final measurement will be done with QP detector with an EMI receiver.
--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

2) Sequence of testing 1 GHz to 6 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
--- Auxiliary equipment and cables were positioned to simulate normal operation conditions
--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
--- The measurement distance is 3 meter.
--- The EUT was set into operation.

Pre-measurement:

--- The turntable rotates from 0 °to 315 °using 45 °steps.
--- The antenna is polarized vertical and horizontal.
--- The antenna height scan range is 1 meter to 4 meter.
--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.
--- According to the maximum antenna and turntable positions of pre-measurement the software maximize the peaks by changing turntable position (±45 °) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

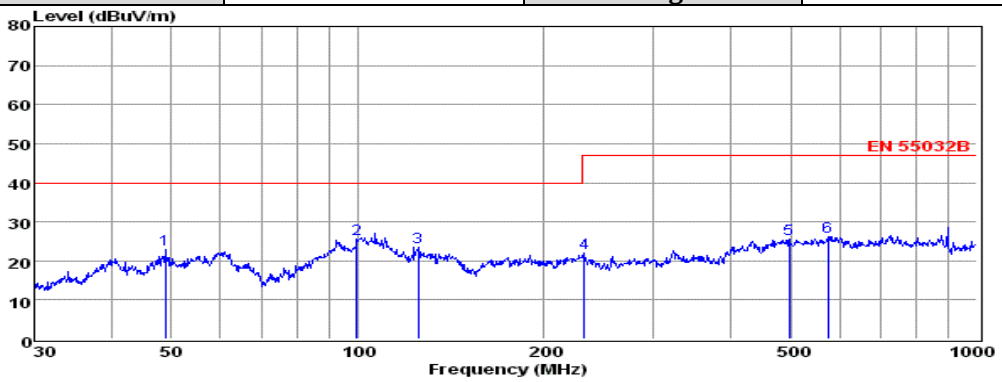
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	30MHz~1000MHz / RBW 100kHz for QP

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	6000 MHz
RBW / VBW	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

4.4. Test Data

The worst test mode of the EUT was TM1, and its test data was showed as the follow:

Model No.	XO-9613	Test Mode	TM1
Environmental Conditions	24.3℃, 53.2% RH	Test Engineer	Diamond Lu
Pol.	Vertical	Detector Function	Quasi-peak
Distance	3m	Test Voltage	AC 230V/50Hz

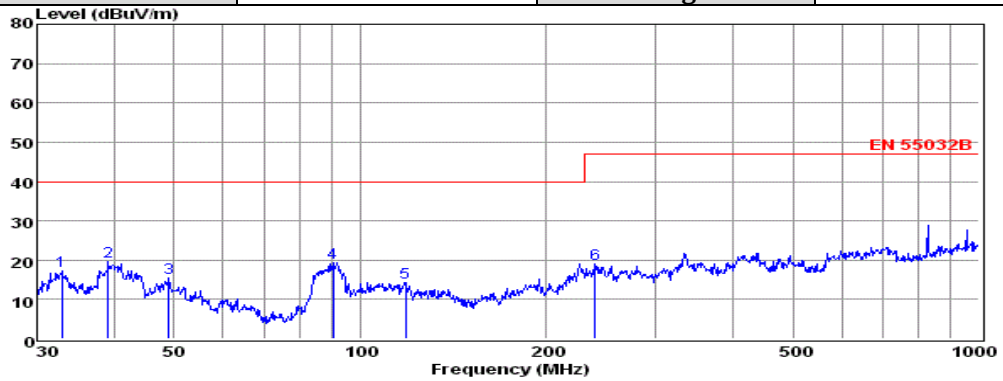


Env./Ins: 24.3℃/53.2%
pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	48.84	9.18	0.35	13.32	22.85	40.00	-17.15	QP
2	99.53	11.96	0.61	13.13	25.70	40.00	-14.30	QP
3	125.01	13.10	0.71	9.70	23.51	40.00	-16.49	QP
4	232.53	9.24	0.98	11.76	21.98	47.00	-25.02	QP
5	497.68	7.74	1.34	16.52	25.60	47.00	-21.40	QP
6	574.63	6.72	1.49	17.98	26.19	47.00	-20.81	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Model No.	XO-9613	Test Mode	TM1
Environmental Conditions	24.3℃, 53.2% RH	Test Engineer	Diamond Lu
Pol.	Horizontal	Detector Function	Quasi-peak
Distance	3m	Test Voltage	AC 230V/50Hz



Env./Ins: 24.3℃/53.2%
pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	32.86	4.63	0.37	12.31	17.31	40.00	-22.69	QP
2	39.16	6.02	0.38	13.37	19.77	40.00	-20.23	QP
3	49.01	1.77	0.35	13.31	15.43	40.00	-24.57	QP
4	90.22	6.61	0.68	11.94	19.23	40.00	-20.77	QP
5	118.19	2.82	0.64	10.80	14.26	40.00	-25.74	QP
6	239.99	5.94	1.01	12.09	19.04	47.00	-27.96	QP

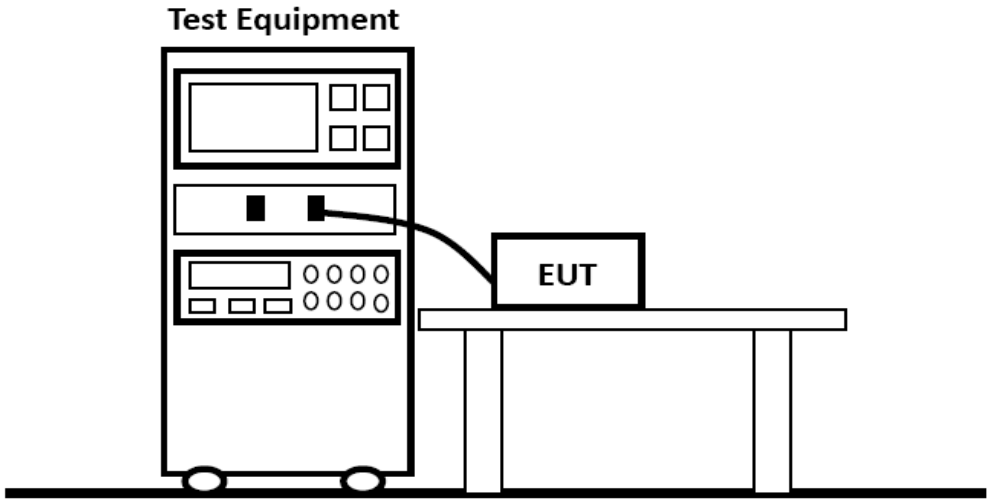
Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that ate 20db blow the offficial limit are not reported

Test Mode: TM1 (Worst Case for Above 1GHz)				**Tested by:** Diamond Lu			
Test Voltage: AC 230V/50Hz				**Test Distance:** 3m			
Detector Function: Peak + AV				**Test Results:** Passed			
Polarization	Frequency (MHz)	Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
Horizontal	1262.39	57.40	32.84	70.00	50.00	-12.60	-17.16
	1858.77	57.43	36.49	70.00	50.00	-12.57	-13.51
	2155.46	51.79	32.72	70.00	50.00	-18.21	-17.28
	3273.02	49.99	32.32	74.00	54.00	-24.01	-21.68
	4395.59	55.49	37.14	74.00	54.00	-18.51	-16.86
	5730.16	55.46	31.74	74.00	54.00	-18.54	-22.26
Vertical	1264.53	56.32	33.37	70.00	50.00	-13.68	-16.63
	1858.74	57.88	36.99	70.00	50.00	-12.12	-13.01
	2153.51	52.22	33.10	70.00	50.00	-17.78	-16.90
	3274.17	49.10	30.32	74.00	54.00	-24.90	-23.68
	4397.34	55.51	35.61	74.00	54.00	-18.49	-18.39
	5730.57	56.16	31.21	74.00	54.00	-17.84	-22.79

1. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
2. Measurements above show only up to 6 maximum emissions noted.
3. Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5. HARMONIC CURRENT EMISSIONS

5.1. Test Configuration



5.2. Test Standard

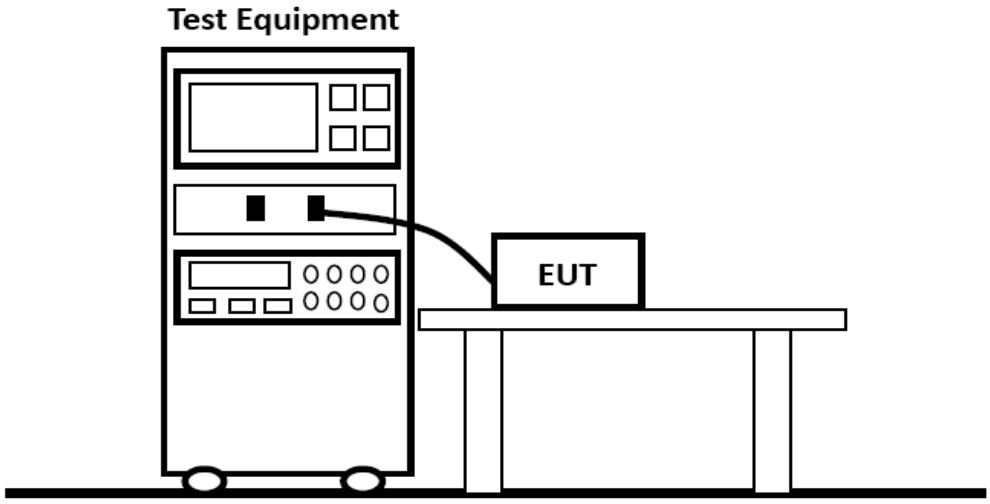
According to ETSI EN 301 489-1 V2.1.1 (2017-02) & EN 61000-3-2: 2014

5.3. Test Data

Because power of EUT less than 75W, According standard EN 61000-3-2, Harmonic current unnecessary to test.

6. VOLTAGE FLUCTUATION AND FLICKER

6.1. Test Configuration



6.2. Test Standard

According to ETSI EN 301 489-1 V2.1.1 (2017-02) & EN 61000-3-3: 2013

6.3. Test Data

Not applicable to this device.

7. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

7.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.
Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

7.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

7.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

7.4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Performance criteria for ETSI EN 301 489-17 V3.1.1 (2017-02)

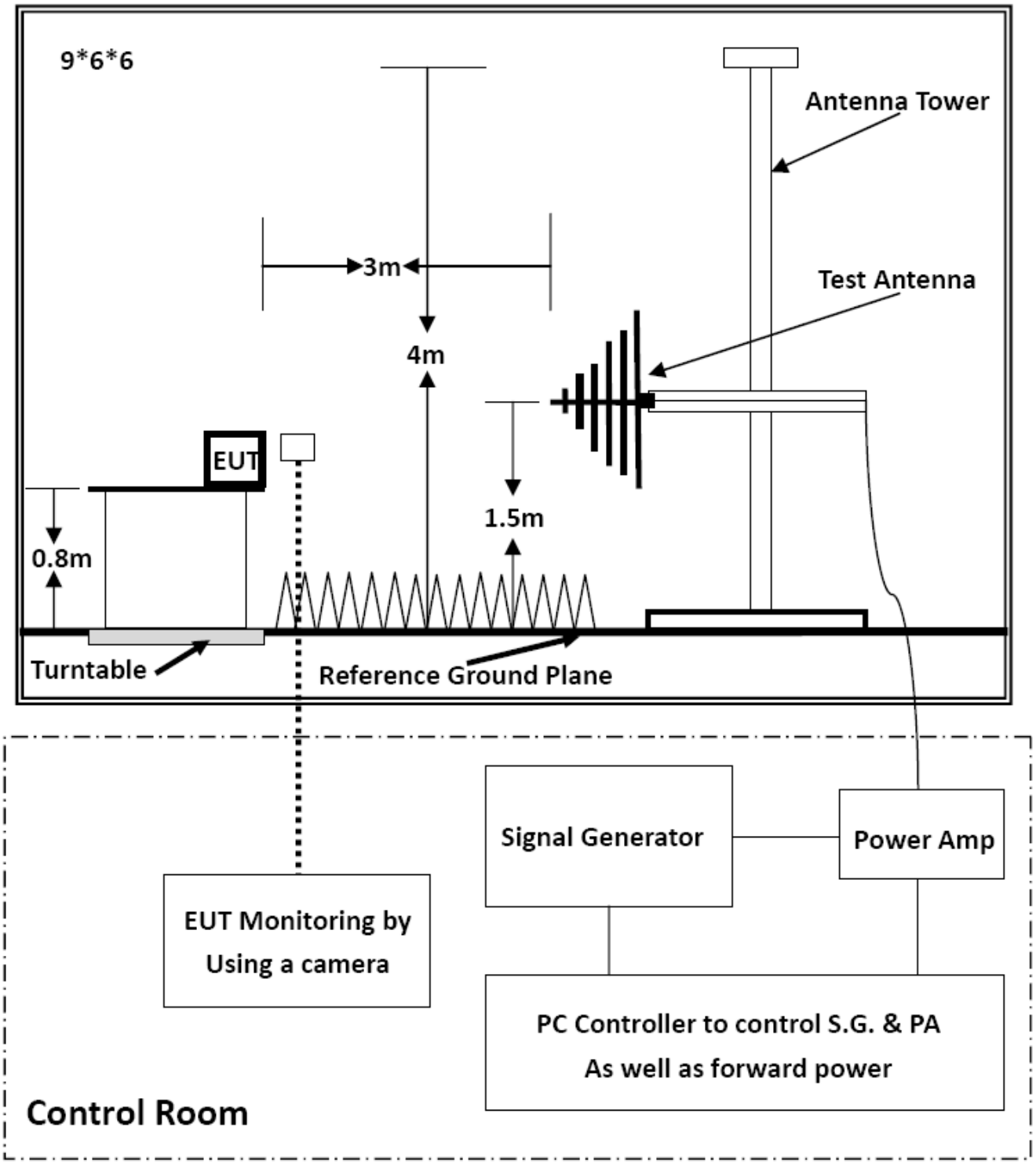
Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).
NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of		

performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

8. RF ELECTROMAGNETIC FIELD (80 MHz - 6000 MHz)

8.1. Test Configuration



8.2. Test Standard

ETSI EN 301 489-1, ETSI EN 301 489-3, ETSI EN 301 489-17 / (EN 61000-4-3: 2006+A2: 2010)

Test level 2 at 3V/m.

8.3. Severity Level

Level	Field Strength (V/m)
1	1
2	3
3	10
X	Special
Performance Criterion: **A**	

8.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

Condition of Test	Remark
Fielded Strength	3 V/m (Severity Level 2)
Radiated Signal	Unmodulated
Scanning Frequency	80-6000MHz
Dwell time of radiated	0.0015 decade/s
Waiting Time	3 Sec.

8.5. Test Result

PASS.

Please refer to the following page.

RF ELECTROMAGNETIC FIELD

Standard	☐ IEC 61000-4-3 ☑ EN 61000-4-3		
Applicant	Dongguan Xing Yue Electronic co., Ltd		
EUT	Wireless light up logo earbud	**Temperature**	24.3℃
M/N	XO-9613	**Humidity**	53.2%
Test Mode	TM1	**Criterion**	B
Test Engineer	Diamond Lu	**Test Date**	September 20, 2018

Bluetooth Test Result:

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Fielded Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-6000	3	CT, CR	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	CT, CR	Front, Right, Left, Back	Pass
Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass

TM2-TM3 Test Result:

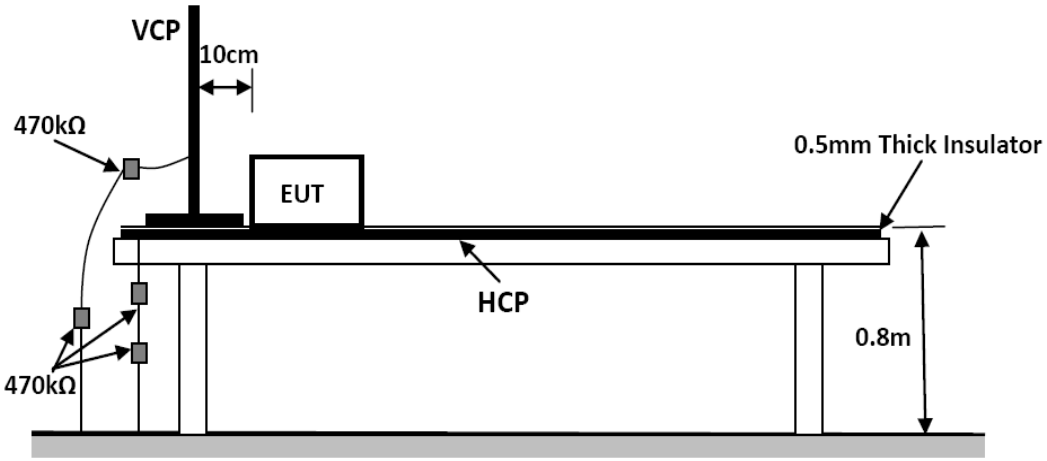
EUT Working Mode	Antenna Polarity	Frequency (MHz)	Fielded Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass
Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass

Note: There is no any degradation of performance and function.

9. ELECTROSTATIC DISCHARGE

Please refer to ETSI EN 301 489-1 and EN 61000-4-2.

9.1. Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

9.2. Test Procedure

ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 61000-4-2: 2009
Test level 3 for Air Discharge at ±8 kV
Test level 2 for Contact Discharge at ±4 kV

9.2.1. Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

9.2.2. Contact Discharge

All the procedure shall be same as Section 9.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

9.2.3. Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

9.2.4. Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

9.3. Test Data

PASS.

Please refer to the following page.

Electrostatic Discharge Test Results

Standard	☐ IEC 61000-4-2 ☑ EN 61000-4-2		
Applicant	Dongguan Xing Yue Electronic co., Ltd		
EUT	Wireless light up logo earbud	**Temperature**	24.5℃
M/N	XO-9613	**Humidity**	52.4%
Criterion	B	**Pressure**	1021mbar
Test Mode	TM1-TM3	**Test Date**	September 20, 2018
Test Engineer	Diamond Lu		

TEST RESULT OF BLUETOOTH

Test Voltage	Coupling	Observation	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	CT, CR	Pass
±2KV, ±4kV, ±8kV	Air Discharge	CT, CR	Pass
±2KV, ±4kV	Indirect Discharge HCP	CT, CR	Pass
±2KV, ±4kV	Indirect Discharge VCP	CT, CR	Pass

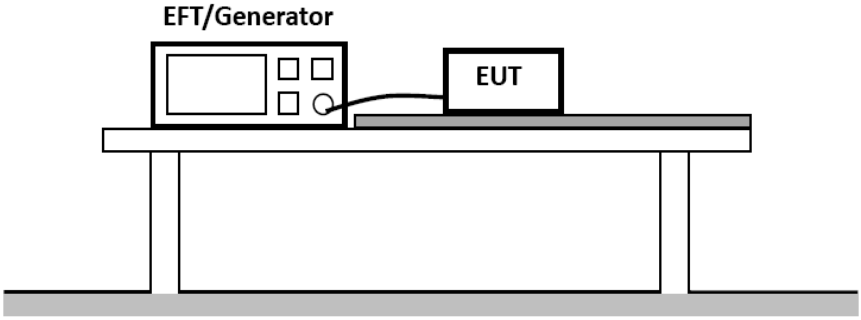
TEST RESULT OF TM2-TM3

Test Voltage	Coupling	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	Pass
±2KV, ±4kV, ±8kV	Air Discharge	Pass
±2KV, ±4kV	Indirect Discharge HCP	Pass
±2KV, ±4kV	Indirect Discharge VCP	Pass

Note: There is no any degradation of performance and function.

10. ELECTRICAL FAST TRANSIENT IMMUNITY

10.1. Test Configuration



10.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN61000-4-4: 2012
Test level 2 at 1 kV

Test Level		
Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special
Performance Criterion: B		

10.3. Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

10.3.1.For input and output AC power ports:
The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

10.3.2.For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

10.3.3.For DC output line ports: It's unnecessary to test.

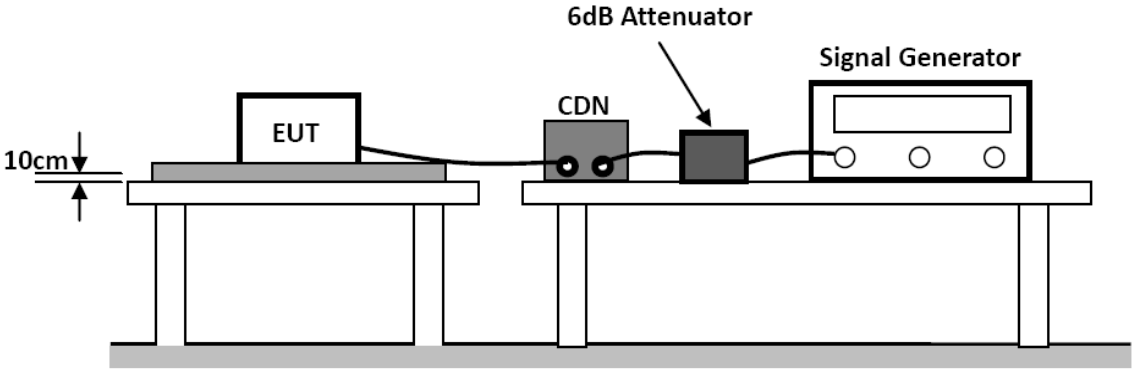
10.4. Test Data

PASS.

Not applicable to this device.

11. RF COMMON MODE

11.1. Test Configuration



11.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-6: 2014
Test level 2 at 3 V (r.m.s.), 0.15 MHz ~ 80 MHz,
Modulation type: AM
Modulation depth: 80%
Modulation signal: 1 kHz

Test Level	
Level	Voltage Level (r.m.s..) (V)
1	1
2	3
3	10
X	Special
Performance Criterion: A	

11.3. Test Procedure

11.3.1. Let the EUT work in test mode and test it.

11.3.2. The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible).

11.3.3. The disturbance signal described below is injected to EUT through CDN.

11.3.4. The EUT operates within its operational mode(s) under intended climatic conditions after power on.

11.3.5. The frequency range is swept from 150kHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

11.3.6. The rate of sweep shall not exceed 1.5*10-3 decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

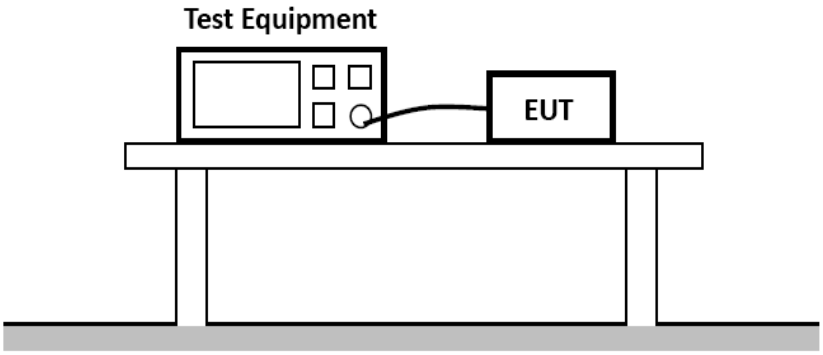
11.3.7. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

11.4. Test Data

Not applicable to this device.

12. SURGES, LINE TO LINE AND LINE TO GROUND

12.1. Test Configuration



12.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 61000-4-5: 2014+A1: 2017
L-N: Test level 2 at 1 kV
L-PE, N-PE Test Level 3 at 2kV

Test Level		
Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special
Performance Criterion: B		

12.3. Test Procedure

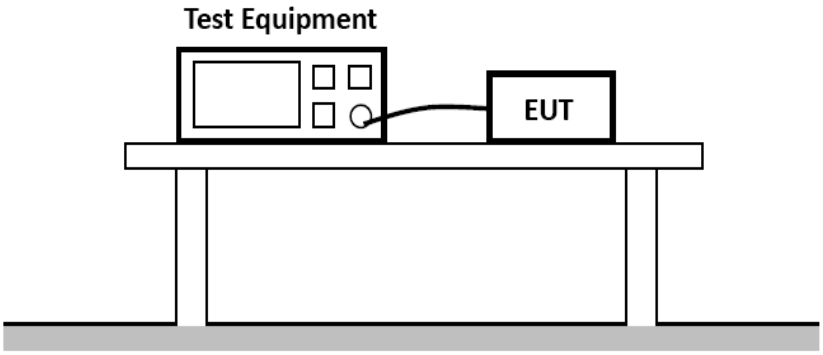
12.3.1. For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).
12.3.2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
12.3.3. Different phase angles are done individually.
12.3.4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

12.4. Test Data

Not applicable to this device.

13. VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

13.1. Test Configuration



13.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-11: 2004
Test levels and Performance Criterion

Test Level		
Voltage Reduction $\%U_T$	Voltage Dips $\%U_T$	Duration (in Period)
100	0	0.5
100	0	1
30	70	5
Voltage Reduction $\%U_T$	Voltage Dips $\%U_T$	Duration (in Period)
100	0	250
Performance Criterion: B&C		

13.3. Test Procedure

13.3.1. The interruption is introduced at selected phase angles with specified duration.

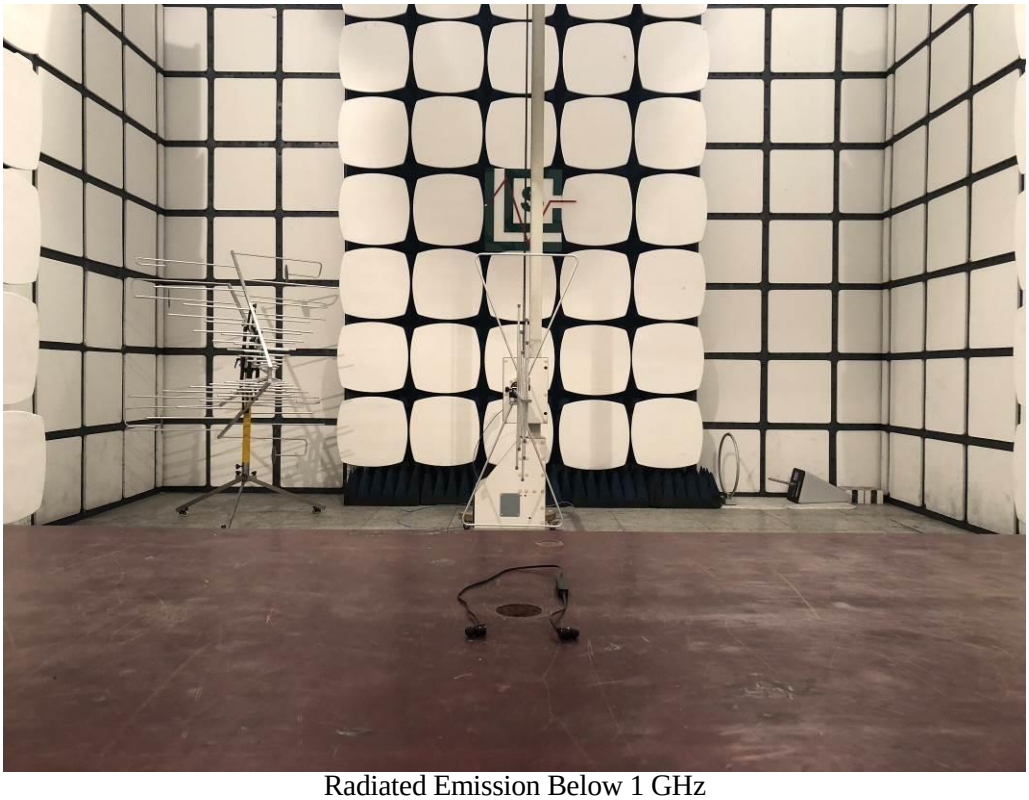
13.3.2. Record any degradation of performance.

13.4. Test Data

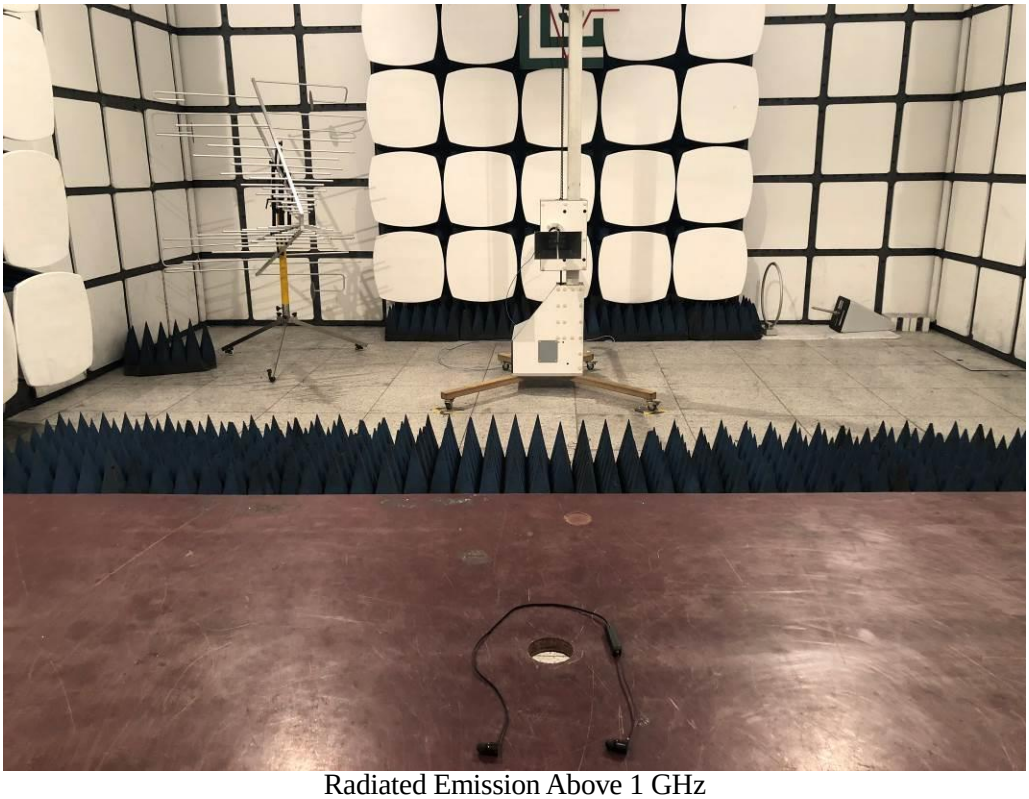
Not applicable to this device.

14. PHOTOGRAPHS OF TEST SETUP

Power Line Conducted Emission

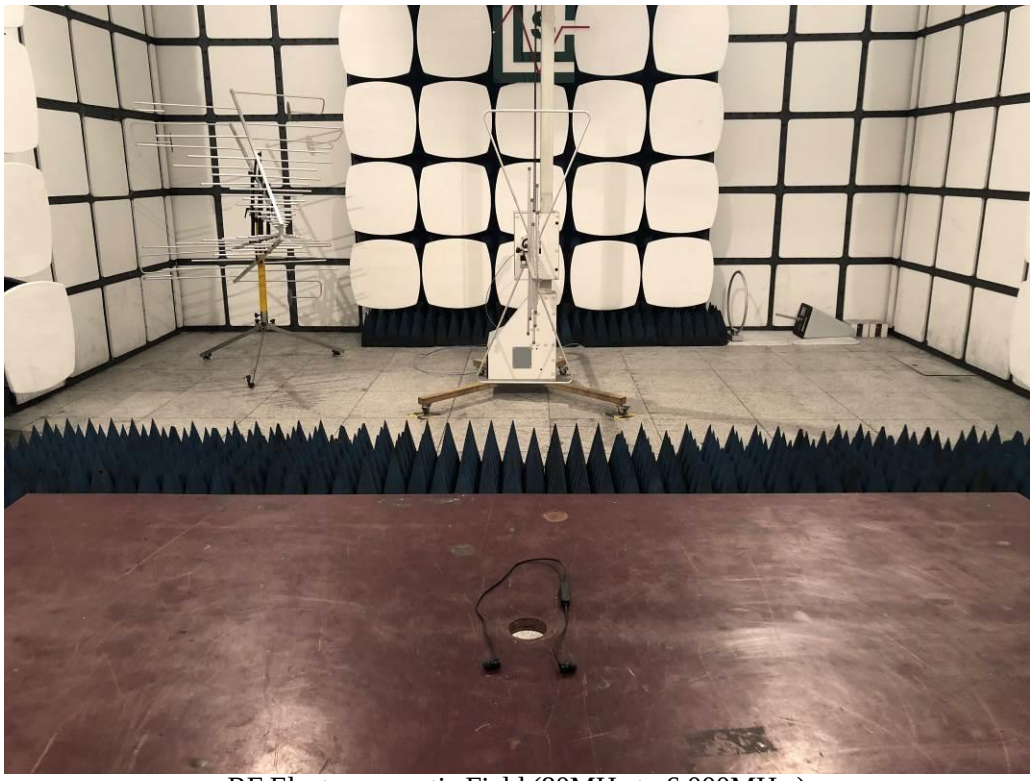


Radiated Emission Below 1 GHz



Radiated Emission Above 1 GHz

Electrostatic Discharge



RF Electromagnetic Field (80MHz to 6 000MHz)

15. PHOTOGRAPHS OF THE EUT

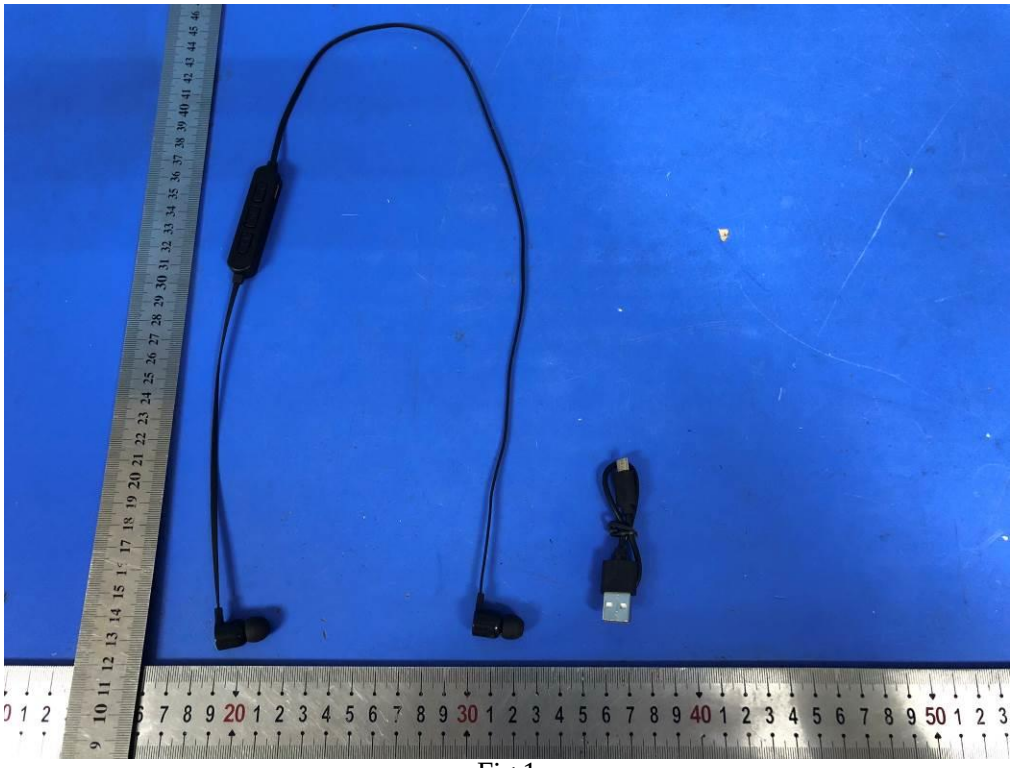


Fig.1

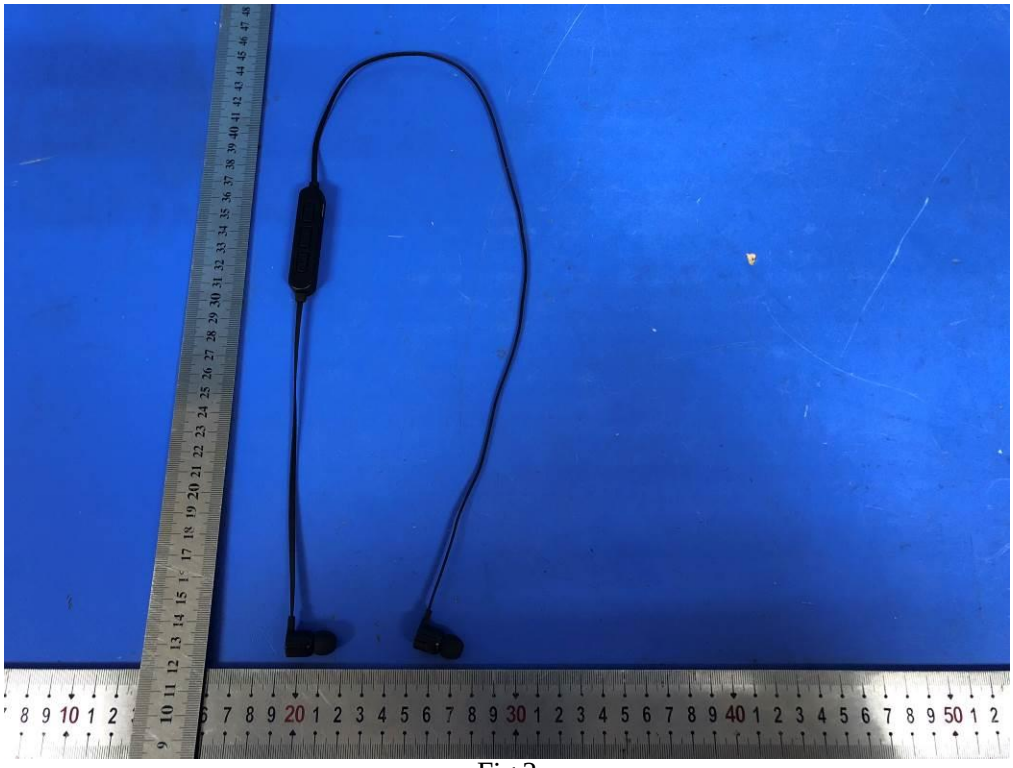


Fig.2

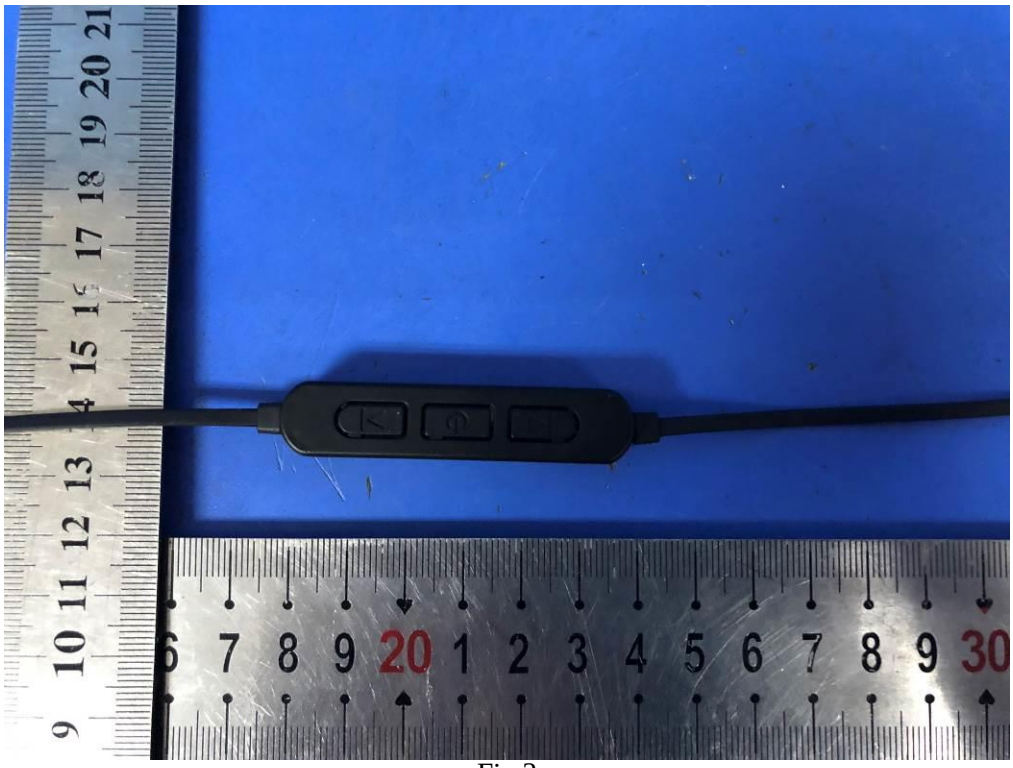


Fig.3

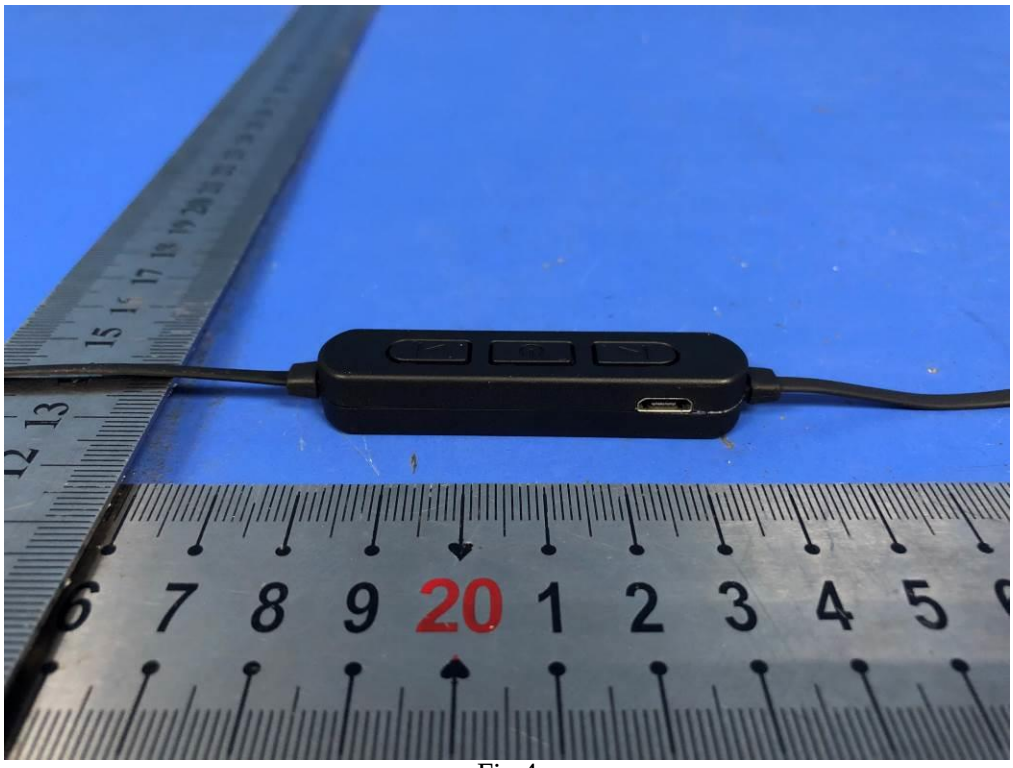


Fig.4

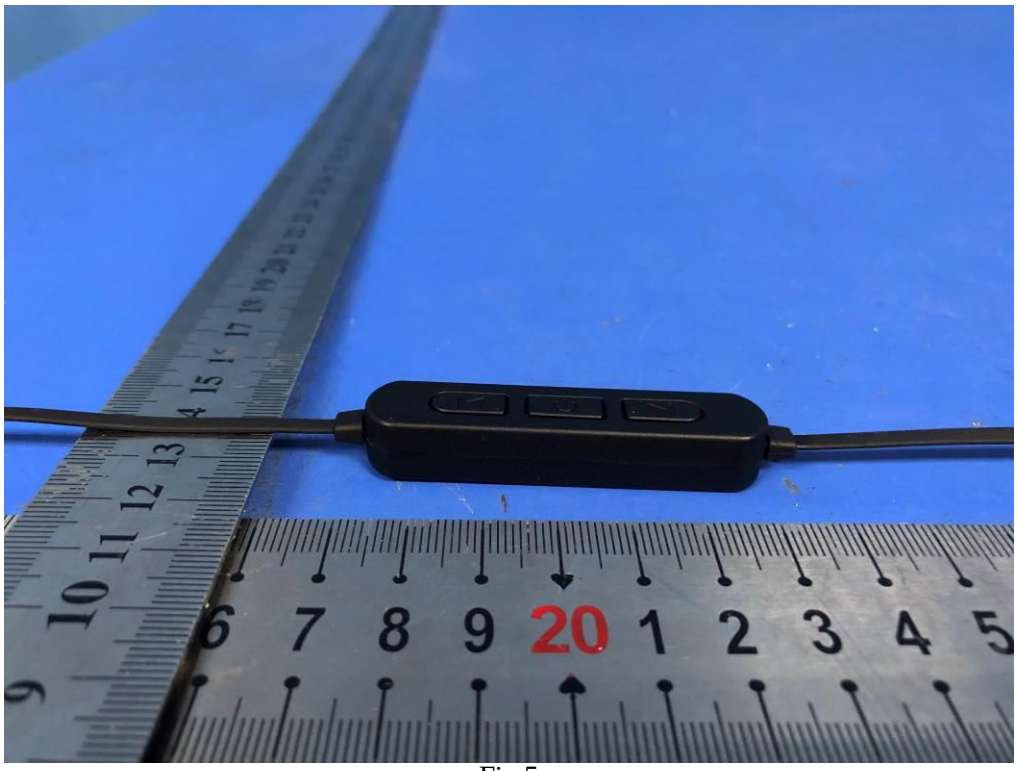


Fig.5

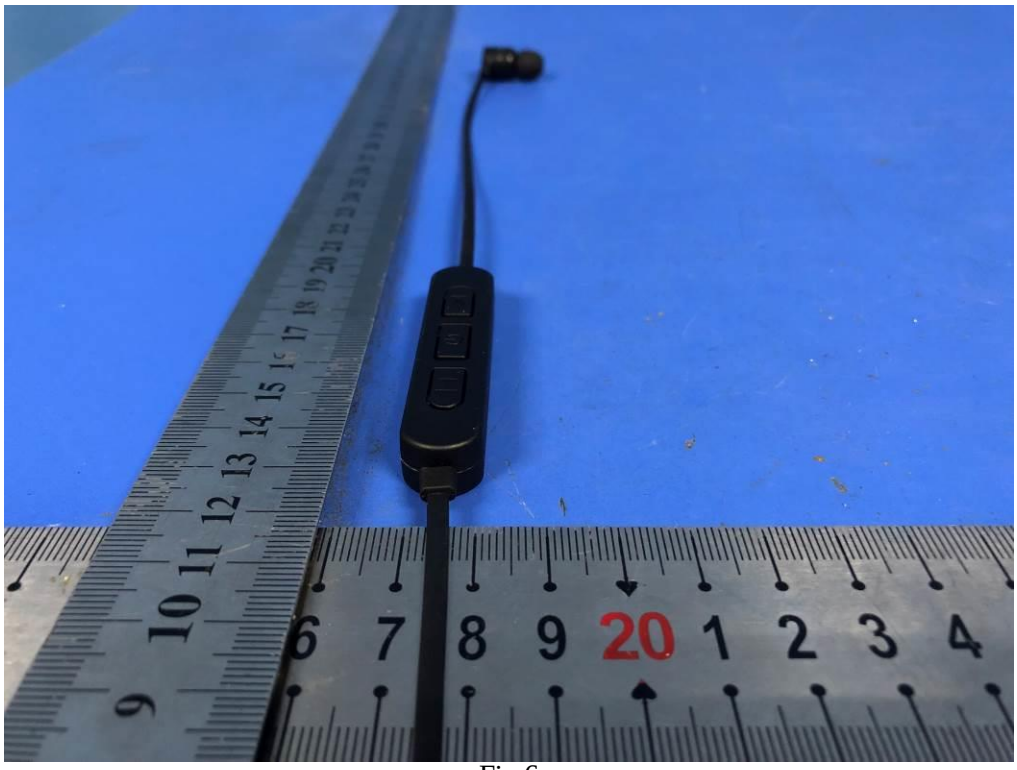


Fig.6

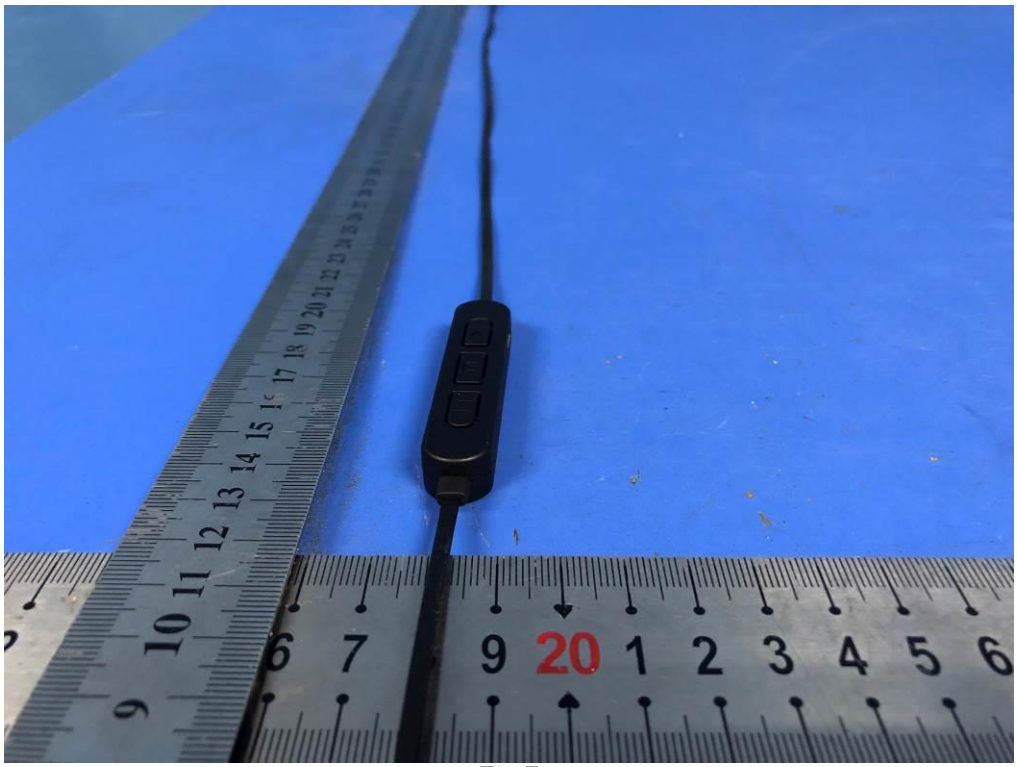


Fig.7

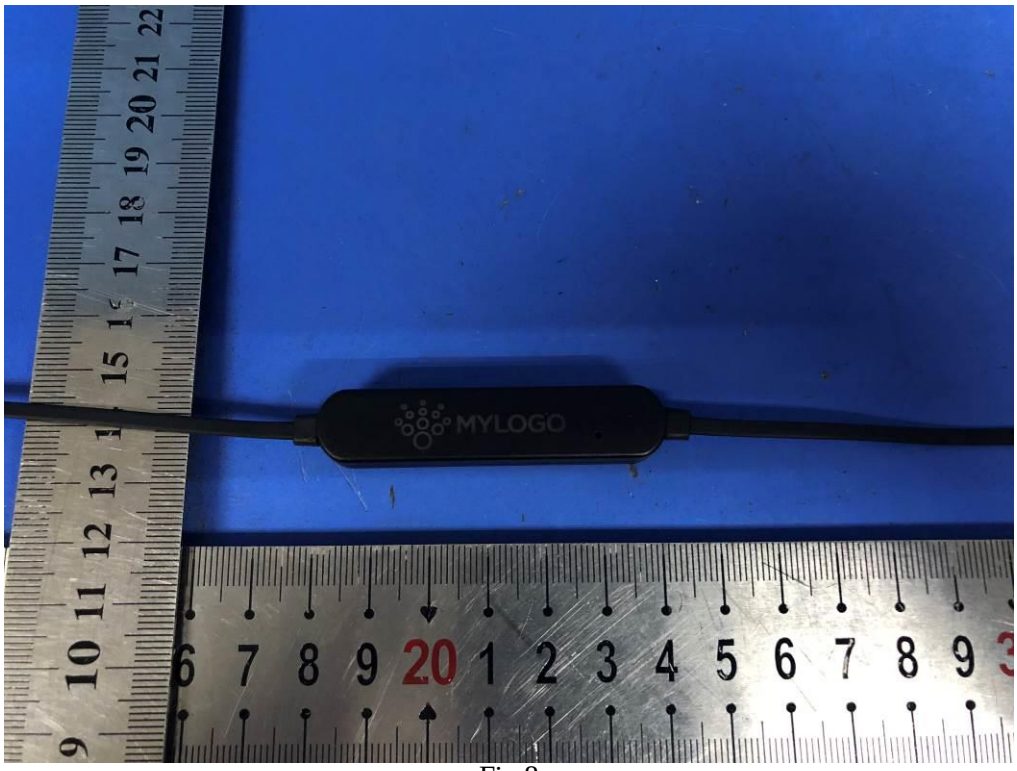


Fig.8

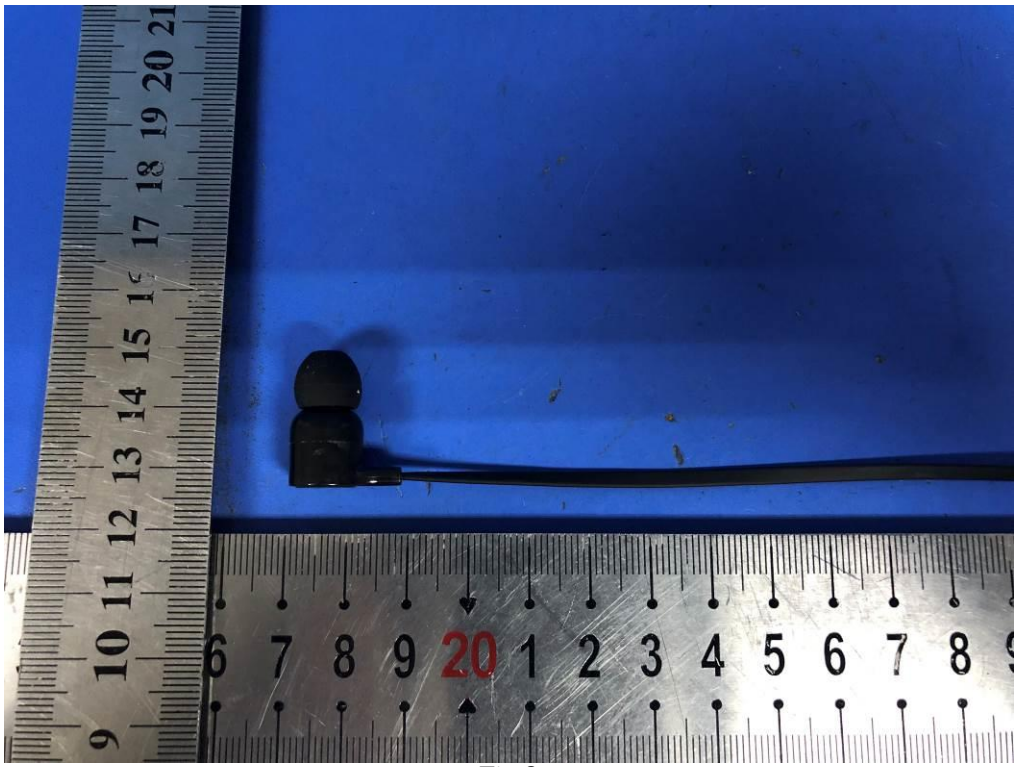


Fig.9

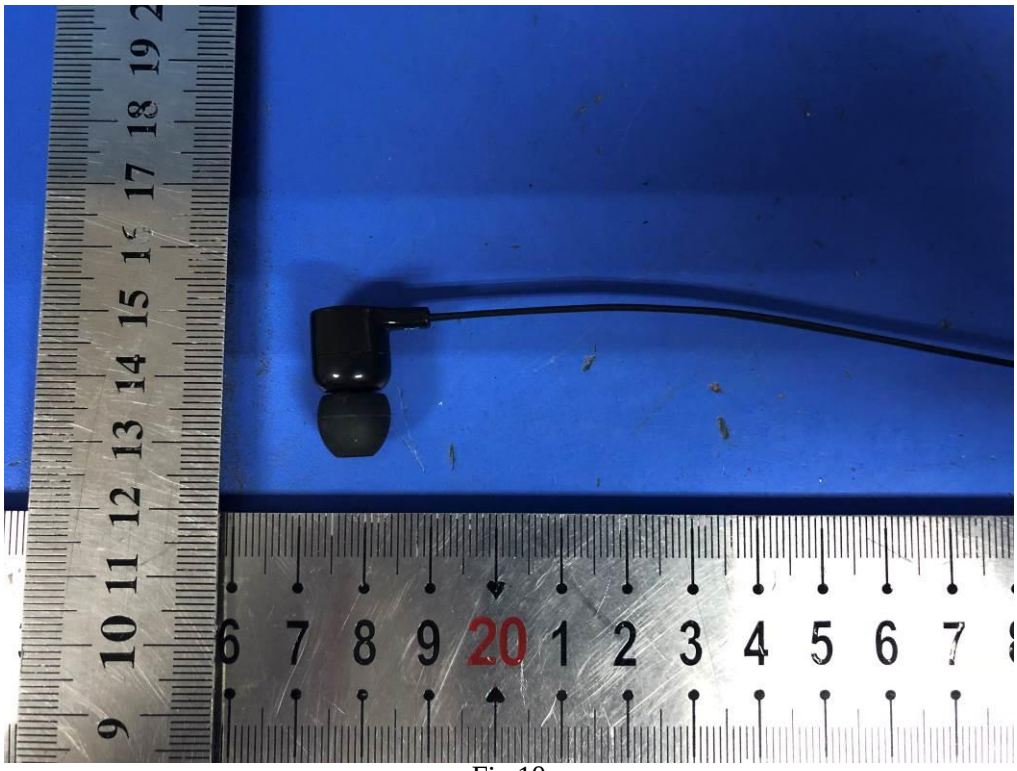


Fig.10

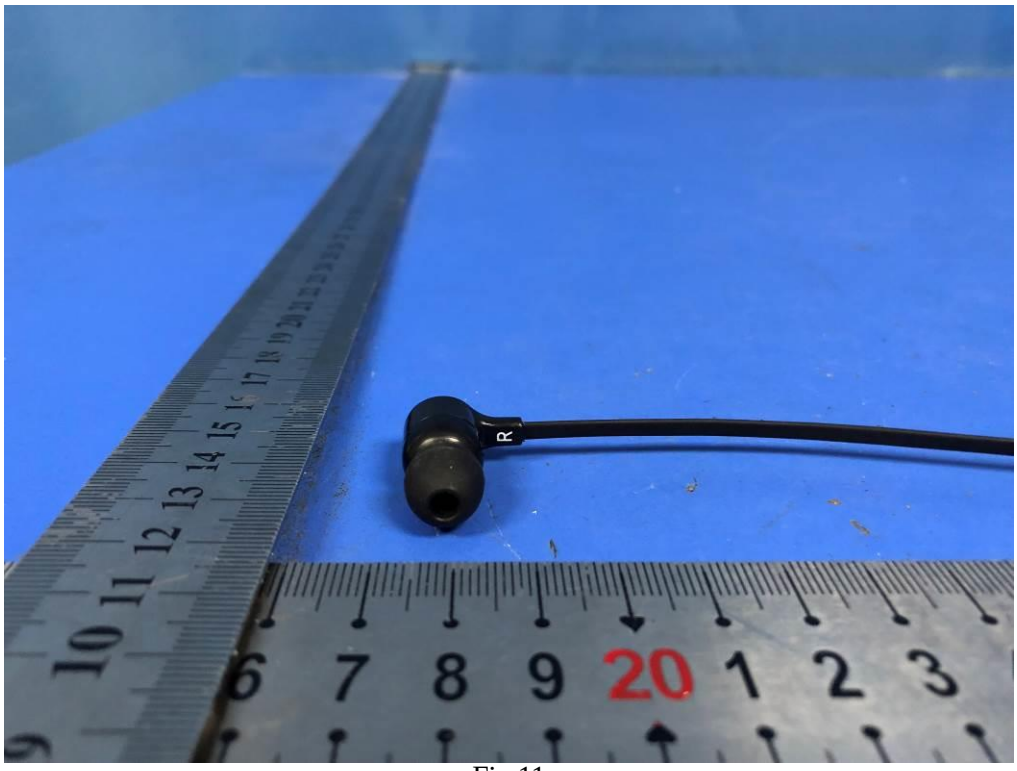


Fig.11

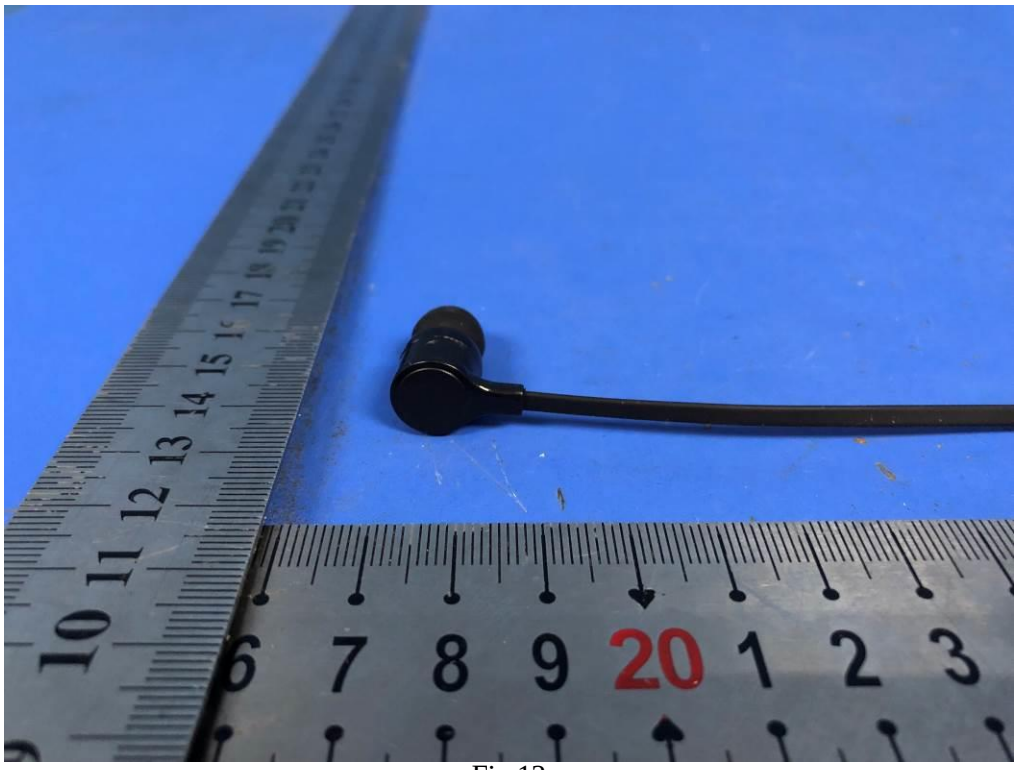


Fig.12

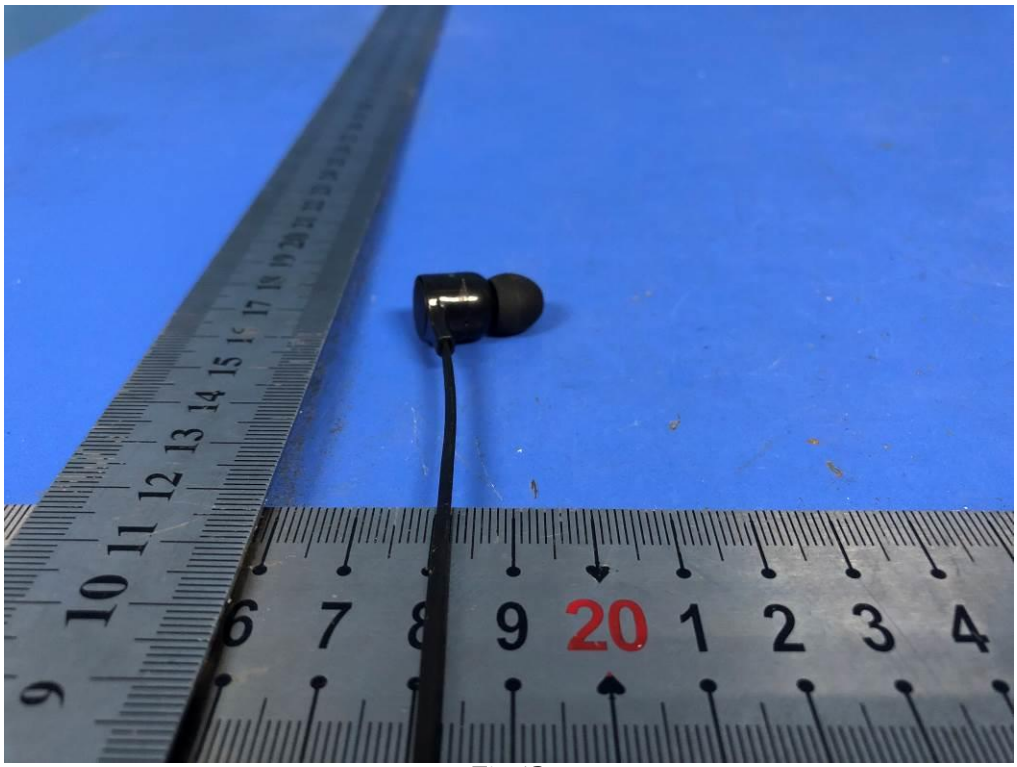


Fig.13

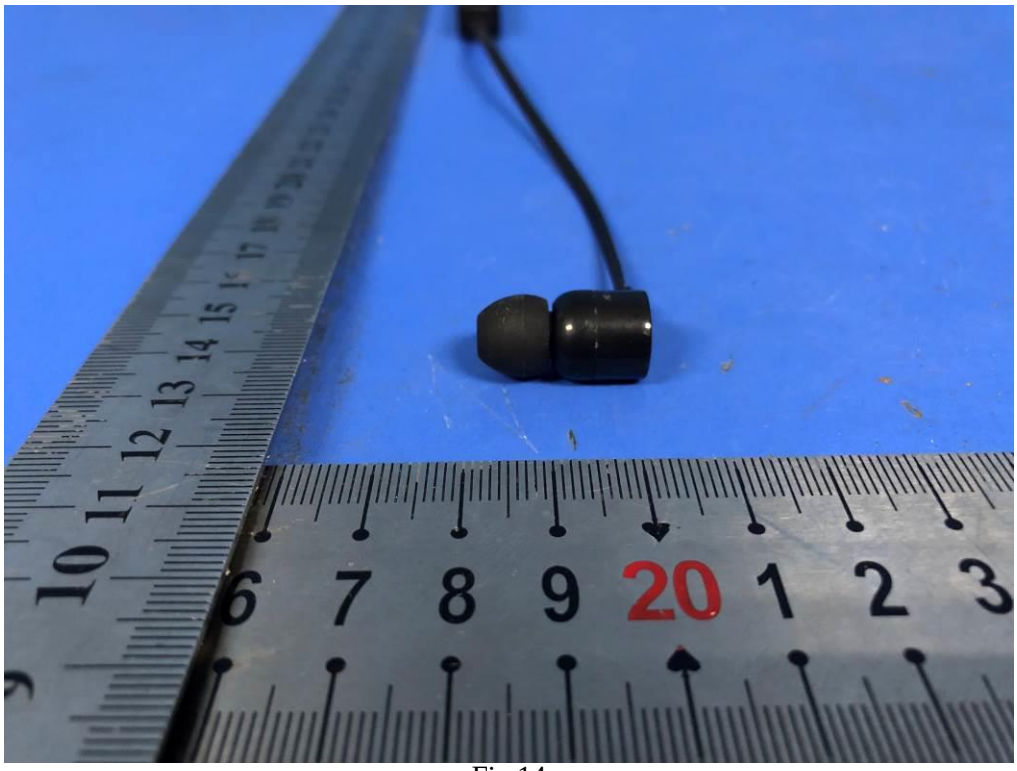


Fig.14

Fig.15

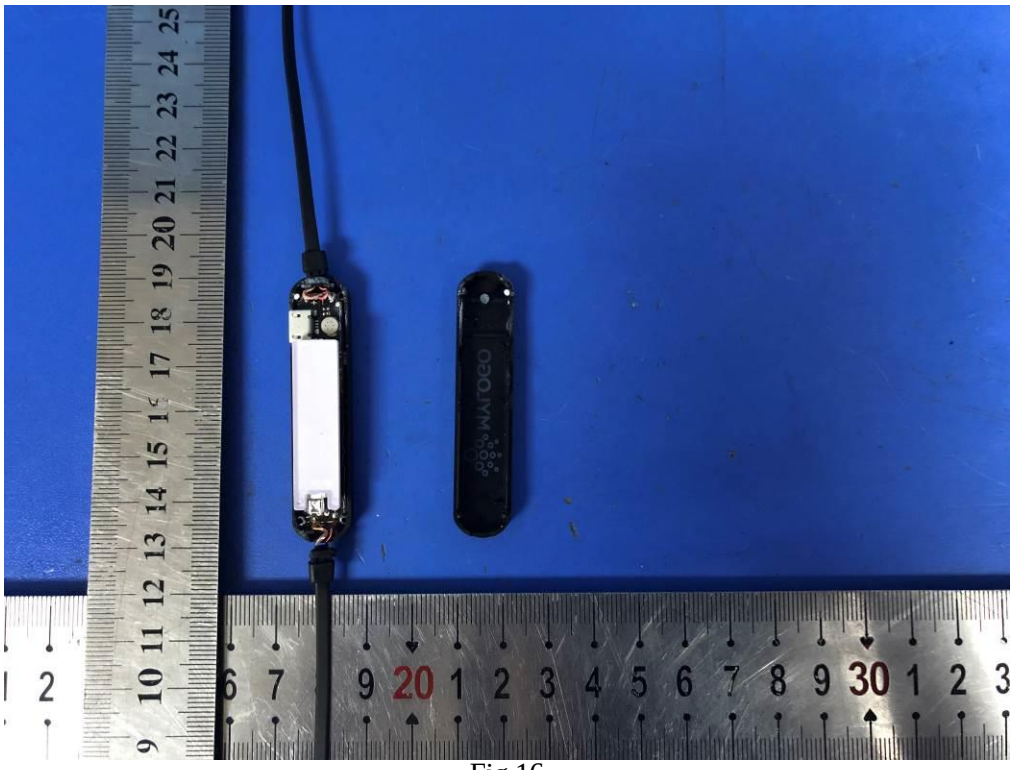


Fig.16

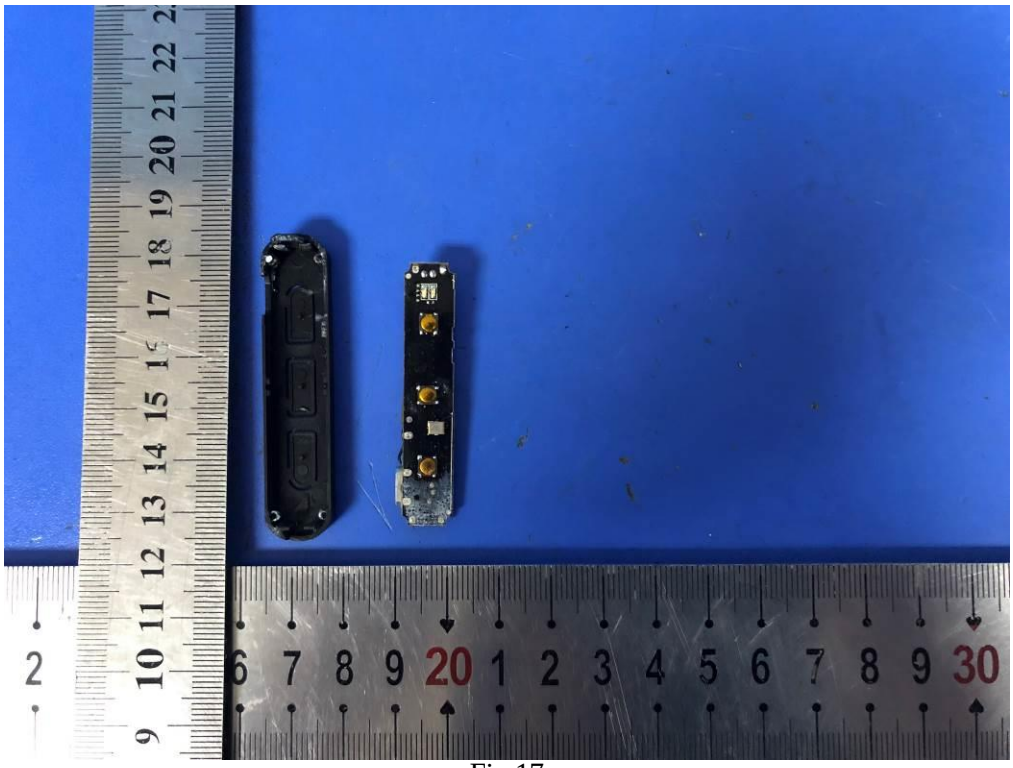


Fig.17

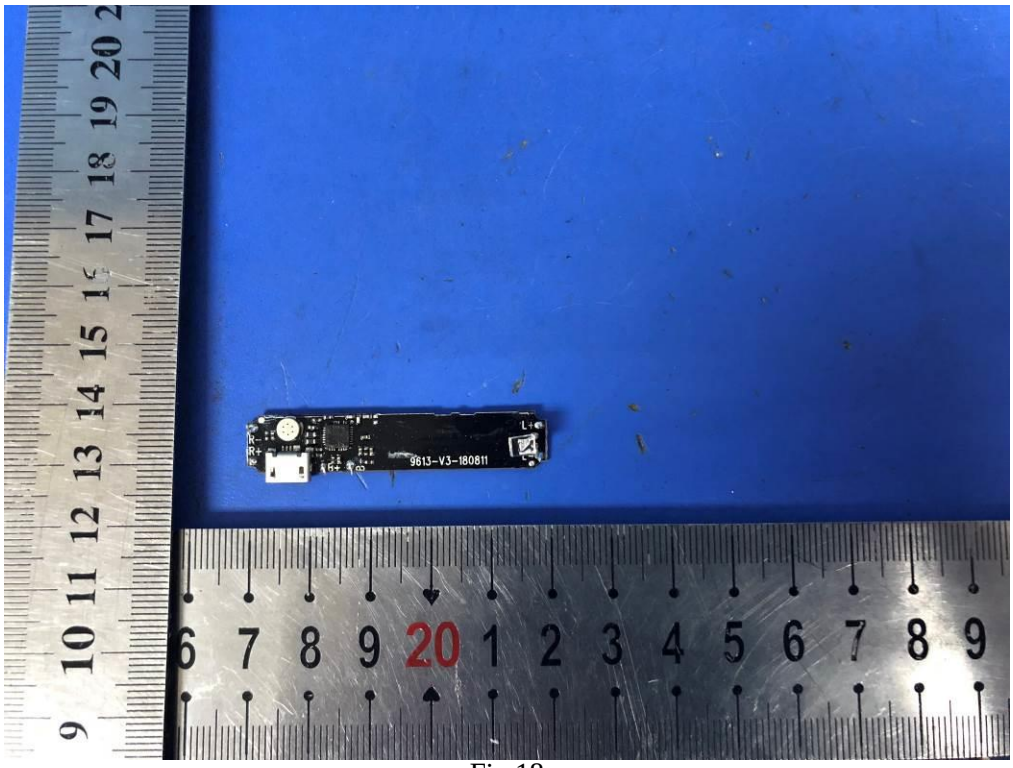


Fig.18

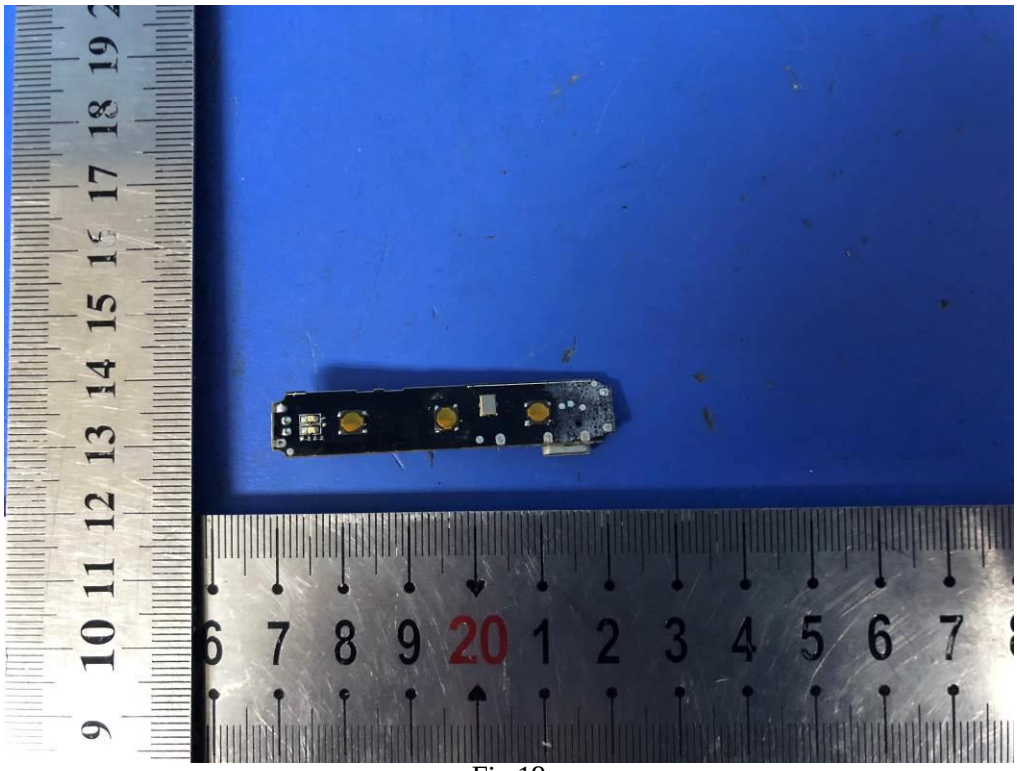


Fig.19

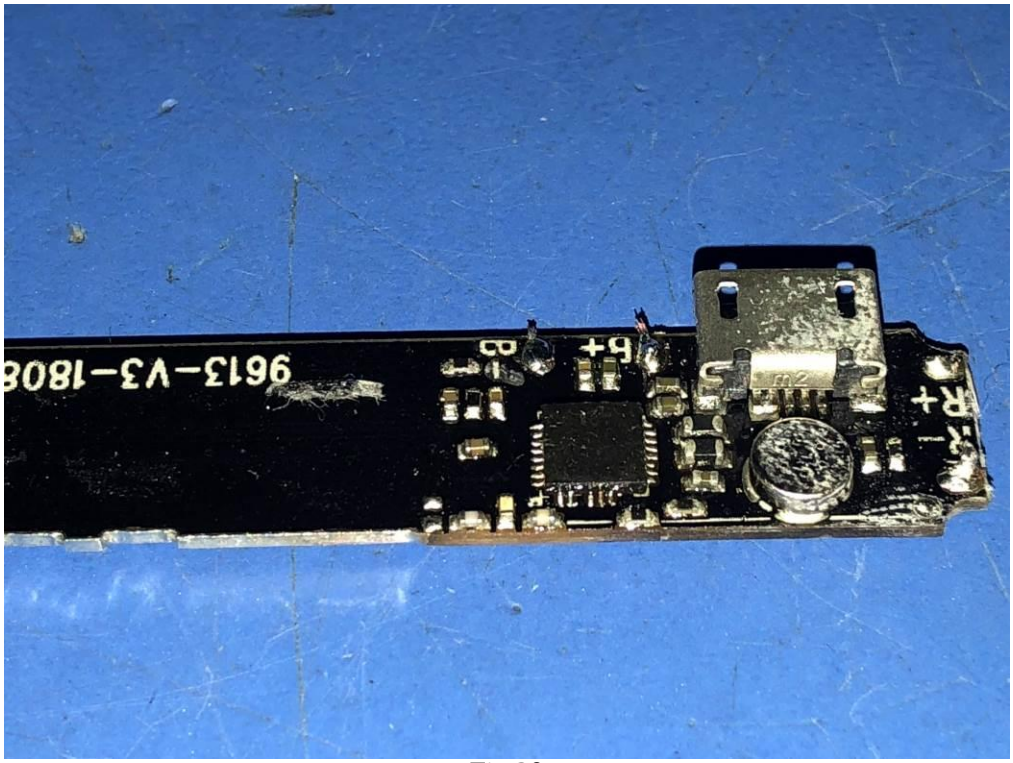


Fig.20

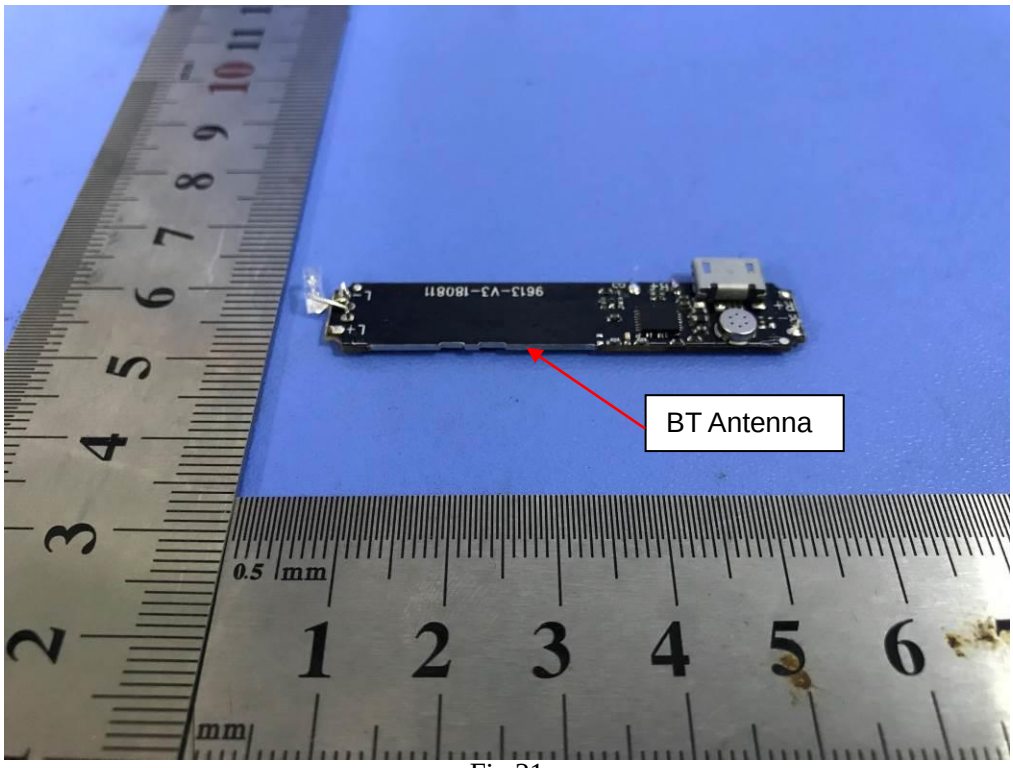


Fig.21

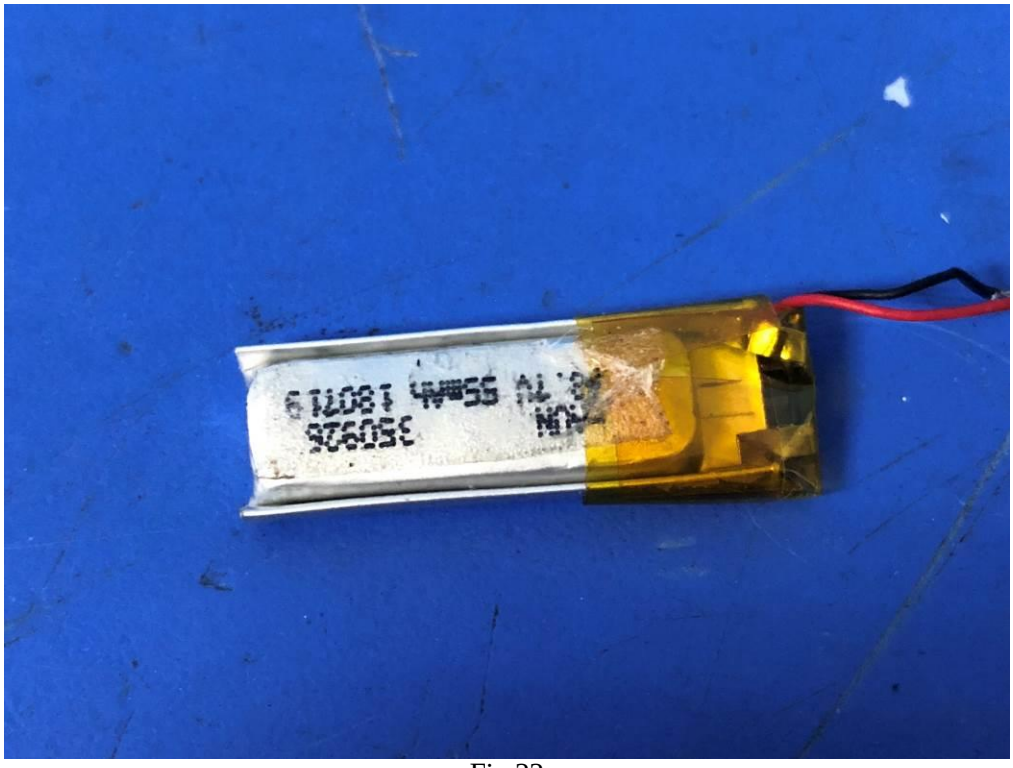


Fig.22

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