FCC Test Report

Report No.: AGC02039170203FE03

FCC ID	:	WTDG22A-TWS
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	TWS Bluetooth Headset
BRAND NAME	:	Dacom
MODEL NAME	:	See Page 4
CLIENT	:	Shenzhen Sande Dacom Electronics Co., Ltd.
DATE OF ISSUE	:	Mar.29, 2017
STANDARD(S) TEST PROCEDURE(S)	:	FCC Part 15 Subpart C Section 15.249
REPORT VERSION	:	V1.0

*A*ttestation of *G*lobal *C*ompliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar.29, 2017	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	Shenzhen Sande Dacom Electronics Co., Ltd.
Address	Building E, East District No.8, Shangxue Technology, Shenzhen, China
Manufacturer	Shenzhen Sande Dacom Electronics Co., Ltd.
Address	Building I, NO.10, East of Shangxue Science & Technology Industrial Park, Bantian, Longgang, Shenzhen, China
Product Designation	TWS Bluetooth Headset
Brand Name	Dacom
Test Model	G22A+
Series Model	G22A, IT-G23A, D88, Grapes 'G7', Connecting Pods Air, YCC-7TWS, S12, BIAZE D18, FG-T001, GF7tws
Difference Description	All the same except for the appearance color.
Date of test	Feb.25, 2017 to Mar.02, 2017
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.249.

Tested By _Henry Zhang_

Henry Zhang(Zhang Zhuorui)   Mar.02, 2017

Reviewed By _Forrest Lei_

Forrest Lei(Lei Yonggang)   Mar.29, 2017

Approved By _Solger Zhang_

Solger Zhang(Zhang Hongyi)
Authorized Officer   Mar.29, 2017

2. GENERAL INFORMATION
2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	-1.85dBm(Max EIRP Power=Max radiation field-95.2)
Bluetooth Version	V 4.2
Modulation	GFSK ,π /4-DQPSK, 8DPSK
Number of channels	79 for BR/EDR
Hardware Version	V2.0
Software Version	V1.0
Antenna Designation	Ceramic Antenna
Antenna Gain	0dBi
Power Supply	DC 3.7V by battery

Note: 1. The EUT didn't Support BLE.
        2. The BT function of EUT didn't work when charging.
        3. The EUT comprises left and right channel earphone, both are the same.Only the test data of left earphone recorded in this report.	

2.2. TABLE OF CARRIER FREQUENCYS
BR/EDR channel List

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

3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	±3.18dB
2	All emissions,radiated	±3.91dB
3	Temperature	±0.5°C
4	Humidity	±2%

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel π /4-DQPSK
5	Middle channel π /4-DQPSK
6	High channel π /4-DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	BT Link

Note:
1. All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3.The EUT used fully-charged battery when tested.

Software Setting
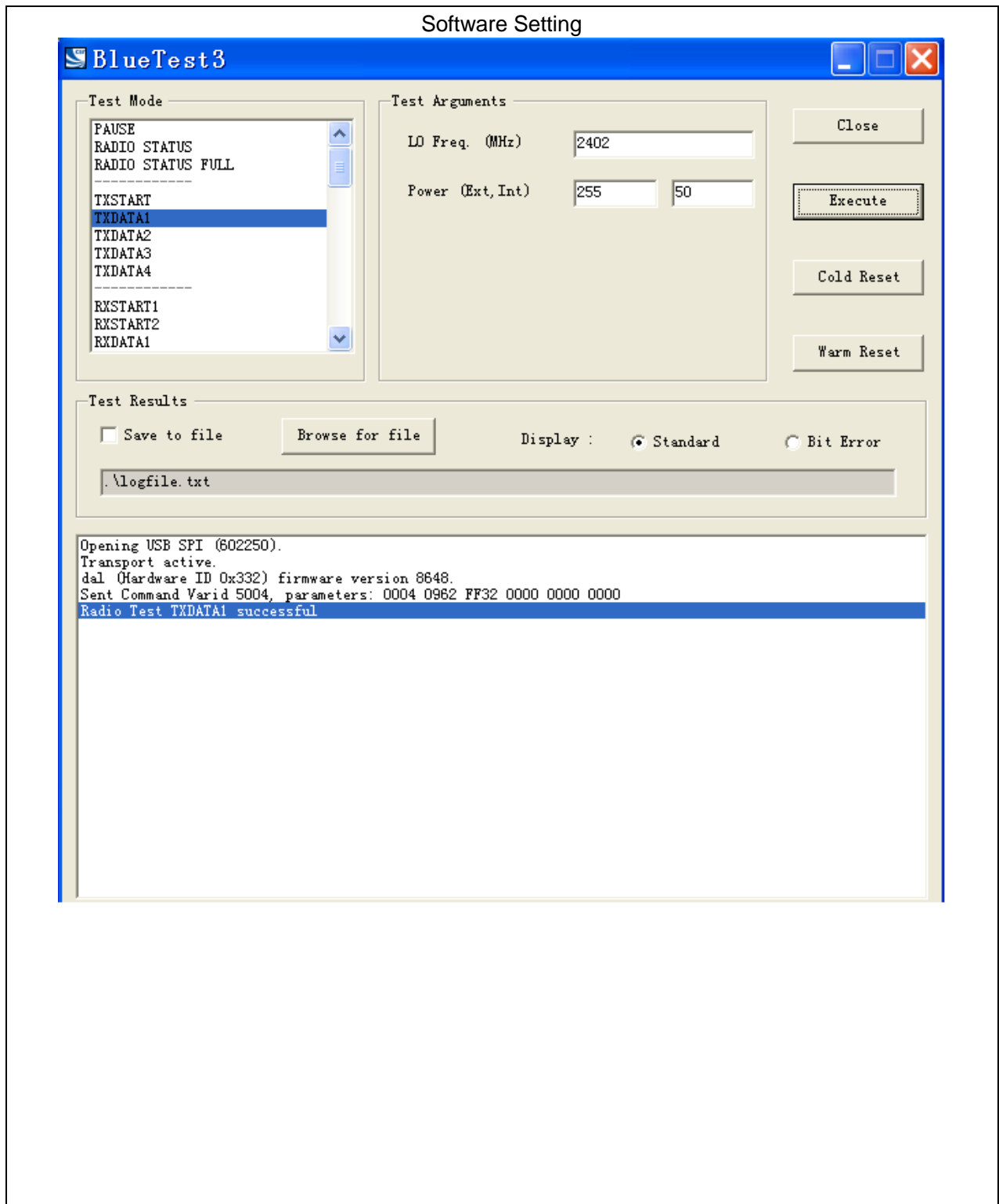
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)

```
┌─────────────┐
│             │
│     EUT     │
│             │
└─────────────┘
```
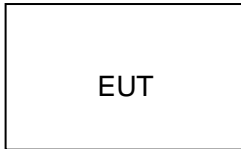
Configure 2: (Control continuous TX)

```
┌─────────┐   ┌─────────────┐   ┌─────────┐
│         │   │             │   │         │
│   EUT   │───│ Control box │───│   PC    │
│         │   │             │   │         │
└─────────┘   └─────────────┘   └─────────┘
```
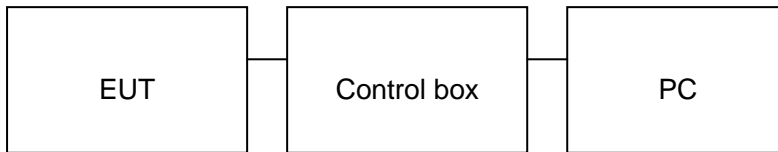
5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	TWS Bluetooth Headset	Dacom	G22A+	EUT
2	Battery	VDL	10100	Accessory
3	PC	Sony	E1412AYCW	A.E
4	PC Adapter	Sony	AC-L100	A.E
5	Control box	CSR	USB_SPI_TOOLS	A.E

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249(a) §15.209	Radiated Emission	Compliant
§15.249(d)	Band Edges	Compliant
§15.207	Conduction Emission	N/A
§15.215	Bandwidth	Compliant

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

6. TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D,Baoding Technology Park,Guangming Road2,Dongcheng District, Dongguan, Guangdong, China,
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014.

7.TEST METHOD

All measurements contained in this report were conducted with ANSI C63.10-2013

8. TEST EQUIPMENT LIST

FOR RADIATED EMISSION TEST (BELOW 1GHz)

Radiated Emission Test Site					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101417	July 4, 2016	July 3, 2017
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2016	July 3, 2017
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2016	July 3, 2017
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2016	July 3, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2016	June 5, 2017
MULTI-DEVICE Positioning Controller	MAX-FULL	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	SCHWARZBECK	FMZB1519	1519-038	June 6, 2016	June 5, 2017
Spectrum analyzer	AGILENT	E4407B	MY46185649	June 6, 2016	June 5, 2017
Radiation Cable 1	MXT	RS1	R005	June 6, 2016	June 5, 2017
Radiation Cable 2	MXT	RS1	R006	June 6, 2016	June 5, 2017

FOR RADIATED EMISSION TEST (1GHz ABOVE)

Radiated Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101417	July 4, 2016	July 3, 2017
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 11, 2016	July 10, 2017
Spectrum Analyzer	AGILENT	E4411B	MY4511453	July 4, 2016	July 3, 2017
Signal Amplifier	SCHWARZBECK	BBV 9718	9718-269	July 7, 2016	July 6, 2017
RF Cable	SCHWARZBECK	AK9515H	96220	July 8, 2016	July 7, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2016	June 5, 2017
MULTI-DEVICE Positioning Controller	MAX-FULL	MF-7802	MF780208339	N/A	N/A
Horn Ant (18G-40GHz)	SCHWARZBECK	BBHA 9170	9170-181	June 6, 2016	June 5, 2017
Radiation Cable 1	MXT	RS1	R005	June 6, 2016	June 5, 2017
Radiation Cable 2	MXT	RS1	R006	June 6, 2016	June 5, 2017

9. RADIATED EMISSION

9.1 TEST LIMIT

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

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(µV)/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(µV)/m (Peak) 54.0 dB(µV)/m (Average)	
Remark: (1) Emission level dBµ V = 20 log Emission level μ 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.			

9.2. MEASUREMENT PROCEDURE

1. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)

2. The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)

3. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.

4. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

5. All readings   are peak unless otherwise stated QP in column of Note.   Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform(Below 1GHz)

6. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak & AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

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

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/10Hz for Average
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

9.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz

RADIATED EMISSION TEST SETUP 30MHz-1000MHz

RADIATED EMISSION TEST SETUP ABOVE 1000MHz

9.4. TEST RESULT

(Worst modulation:GFSK)

FOR BR/EDR

RADIATED EMISSION BELOW 30MHz

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

RADIATED EMISSION BELOW 1GHz

RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL-HORIZONTAL
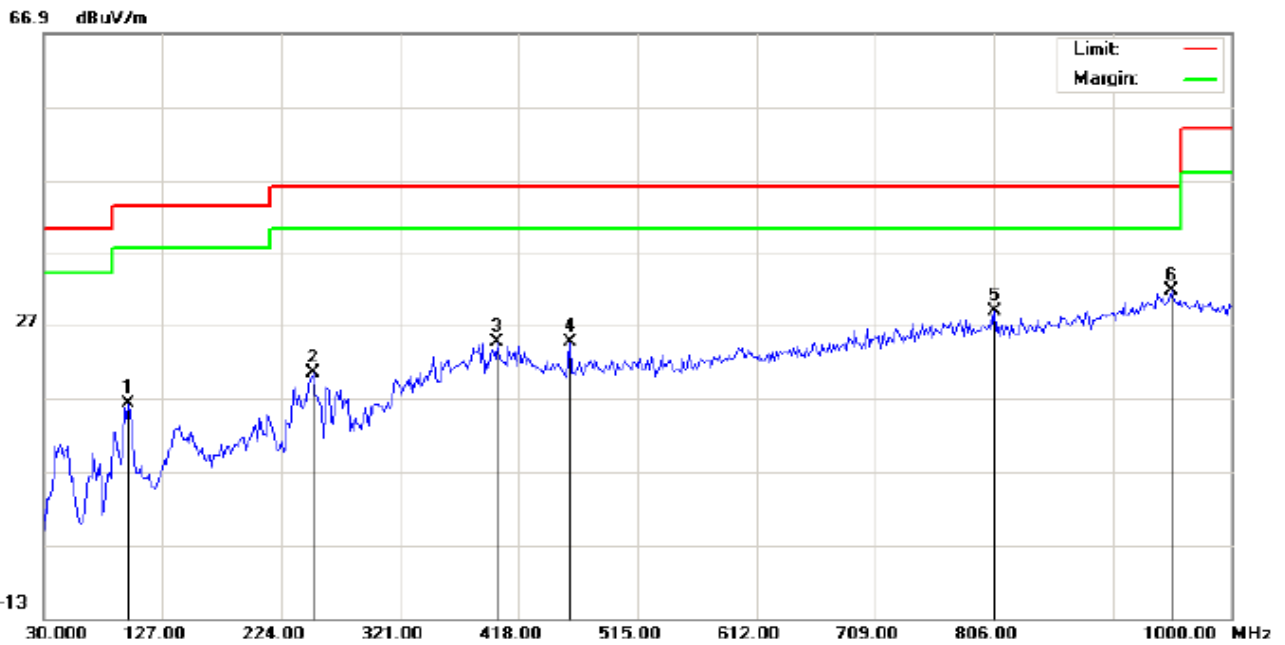
Site: site #1

Limit: FCC Class B 3M Radiation

EUT: TWS Bluetooth Headset

M/N: G22A+

Mode:Low Channel TX

Note:

Polarization: *Horizontal*

Power:

Distance:

Temperature: 23.4

Humidity: 53.1 %

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		99.5167	6.14	10.00	16.14	43.50	-27.36	peak			
2		249.8667	13.55	6.91	20.46	46.00	-25.54	peak			
3		400.2167	5.49	19.08	24.57	46.00	-21.43	peak			
4		460.0333	3.82	20.70	24.52	46.00	-21.48	peak			
5		806.0000	1.56	27.32	28.88	46.00	-17.12	peak			
6	*	951.5000	1.60	29.99	31.59	46.00	-14.41	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL -VERTICAL

Site: site #1
Limit: FCC Class B 3M Radiation
EUT: TWS Bluetooth Headset
M/N: G22A+
Mode:Low Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 23.4
Humidity: 53.1 %

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		47.7833	7.17	8.39	15.56	40.00	-24.44	peak			
2		143.1667	2.27	15.22	17.49	43.50	-26.01	peak			
3		251.4833	12.20	13.94	26.14	46.00	-19.86	peak			
4		460.0333	2.69	20.70	23.39	46.00	-22.61	peak			
5		749.4167	1.58	26.61	28.19	46.00	-17.81	peak			
6	*	948.2667	0.85	29.95	30.80	46.00	-15.20	peak			

RESULT: PASS

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

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

RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL-HORIZONTAL

Site: site #1
Limit: FCC Class B 3M Radiation
EUT: TWS Bluetooth Headset
M/N: G22A+
Mode:Middle Channel TX
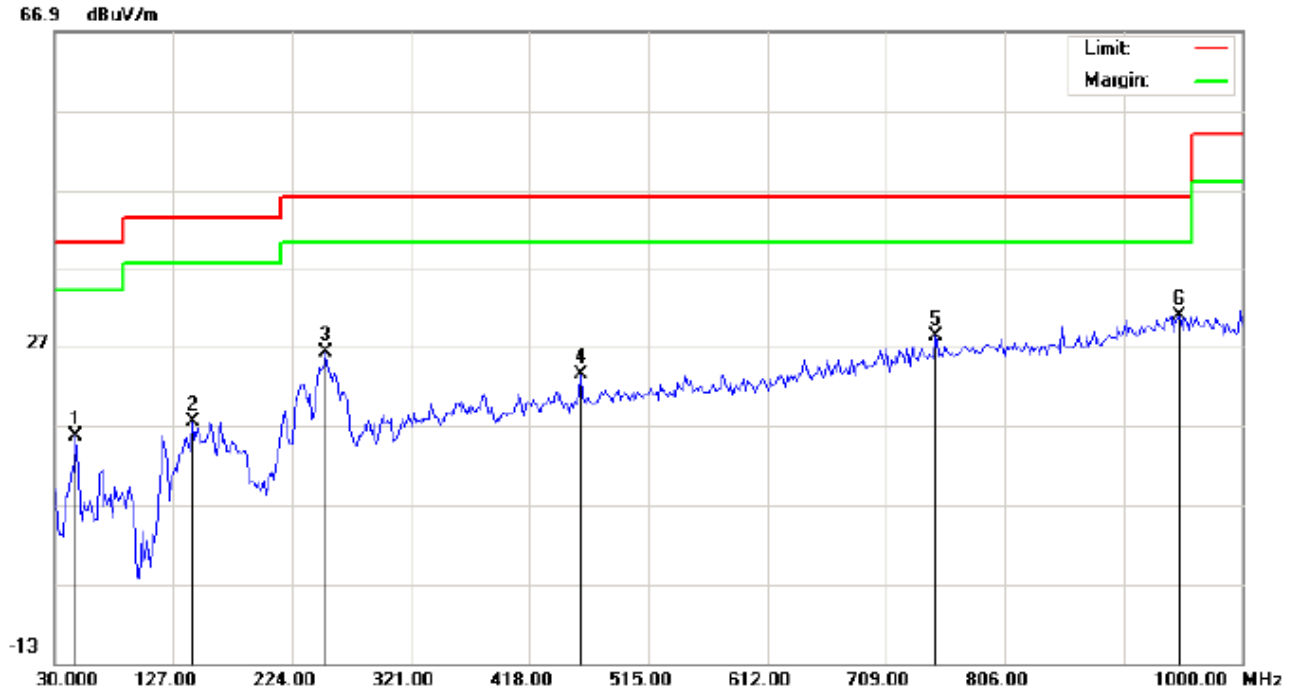Note:

Polarization: *Horizontal*
Power:
Distance:

Temperature: 23.4
Humidity: 53.1 %

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		115.6833	6.25	6.86	13.11	43.50	-30.39	peak			
2		141.5500	-0.99	14.82	13.83	43.50	-29.67	peak			
3		256.3333	12.64	7.98	20.62	46.00	-25.38	peak			
4		390.5167	7.72	19.01	26.73	46.00	-19.27	peak			
5	*	806.0000	0.88	27.32	28.20	46.00	-17.80	peak			
6		964.4333	1.33	29.86	31.19	54.00	-22.81	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHz-1GHz)- MIDDLE CHANNEL -VERTICAL

Site: site #1
Limit: FCC Class B 3M Radiation
EUT: TWS Bluetooth Headset
M/N: G22A+
Mode:Middle Channel TX
Note:

Polarization: *Vertical*
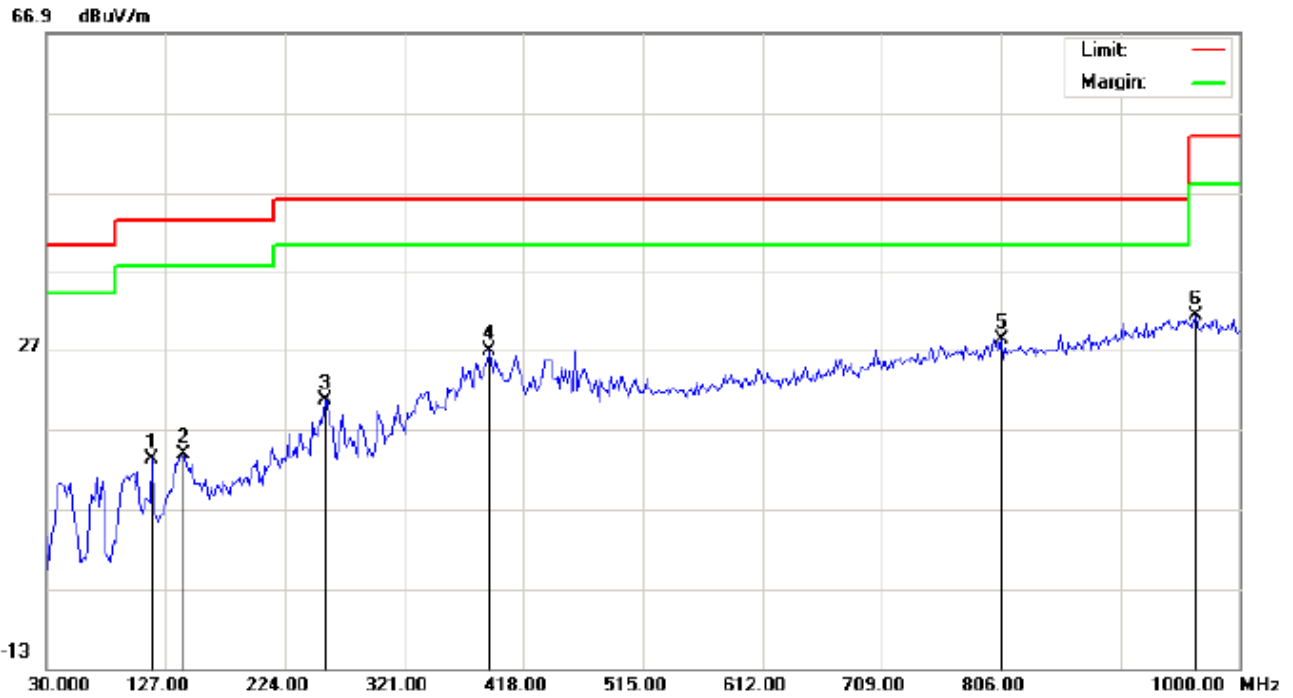Power:
Distance:

Temperature: 23.4
Humidity: 53.1 %

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		47.7833	5.39	8.39	13.78	40.00	-26.22	peak			
2		143.1667	2.62	15.22	17.84	43.50	-25.66	peak			
3		254.7167	8.51	14.04	22.55	46.00	-23.45	peak			
4		500.4500	1.20	21.14	22.34	46.00	-23.66	peak			
5		801.1500	1.02	27.32	28.34	46.00	-17.66	peak			
6	*	941.8000	1.81	29.77	31.58	46.00	-14.42	peak			

RESULT: PASS

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

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

RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL-HORIZONTAL

Site: site #1

Limit: FCC Class B 3M Radiation

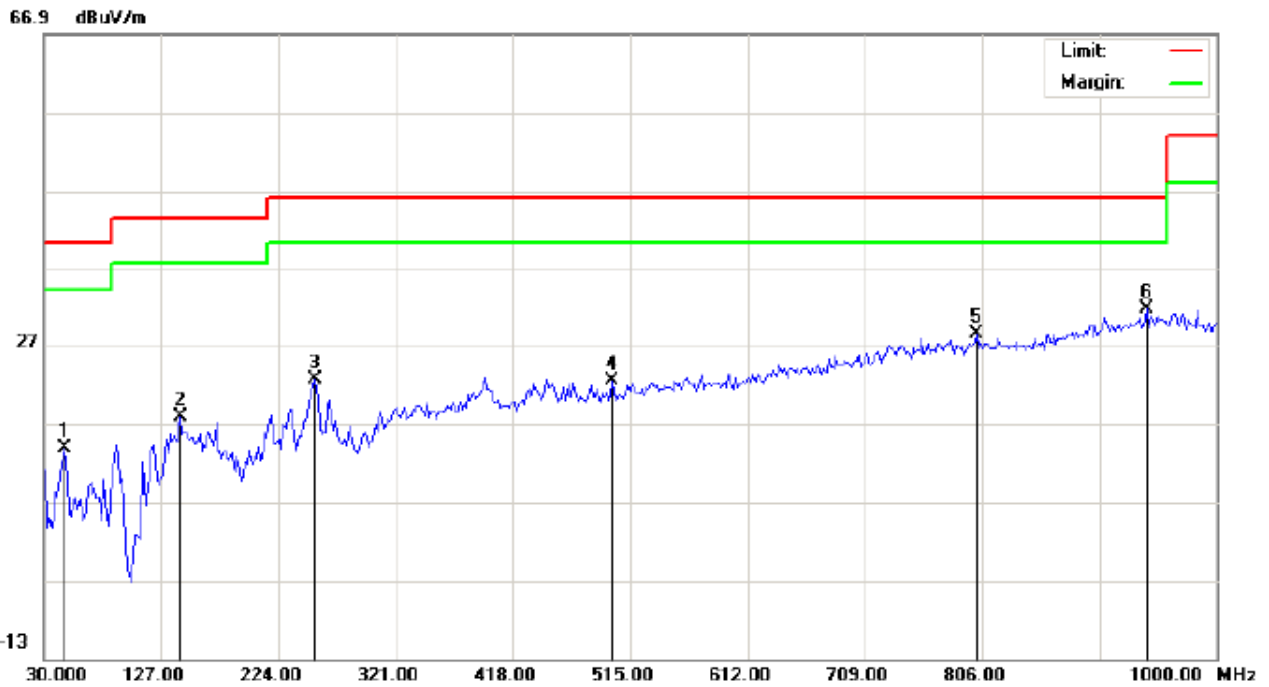EUT: TWS Bluetooth Headset

M/N: G22A+

Mode:High Channel TX

Note:

Polarization: *Horizontal*

Power:

Distance:

Temperature: 23.4

Humidity: 53.1 %

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		99.5167	5.89	10.00	15.89	43.50	-27.61	peak			
2		141.5500	-0.35	14.82	14.47	43.50	-29.03	peak			
3		262.8000	17.39	9.08	26.47	46.00	-19.53	peak			
4		426.0833	7.70	19.86	27.56	46.00	-18.44	peak			
5	*	838.3333	0.80	27.31	28.11	46.00	-17.89	peak			
6		961.2000	1.32	29.89	31.21	54.00	-22.79	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL -VERTICAL

Site: site #1
Limit: FCC Class B 3M Radiation
EUT: TWS Bluetooth Headset
M/N: G22A+
Mode:High Channel TX
Note:

Polarization: **Vertical**
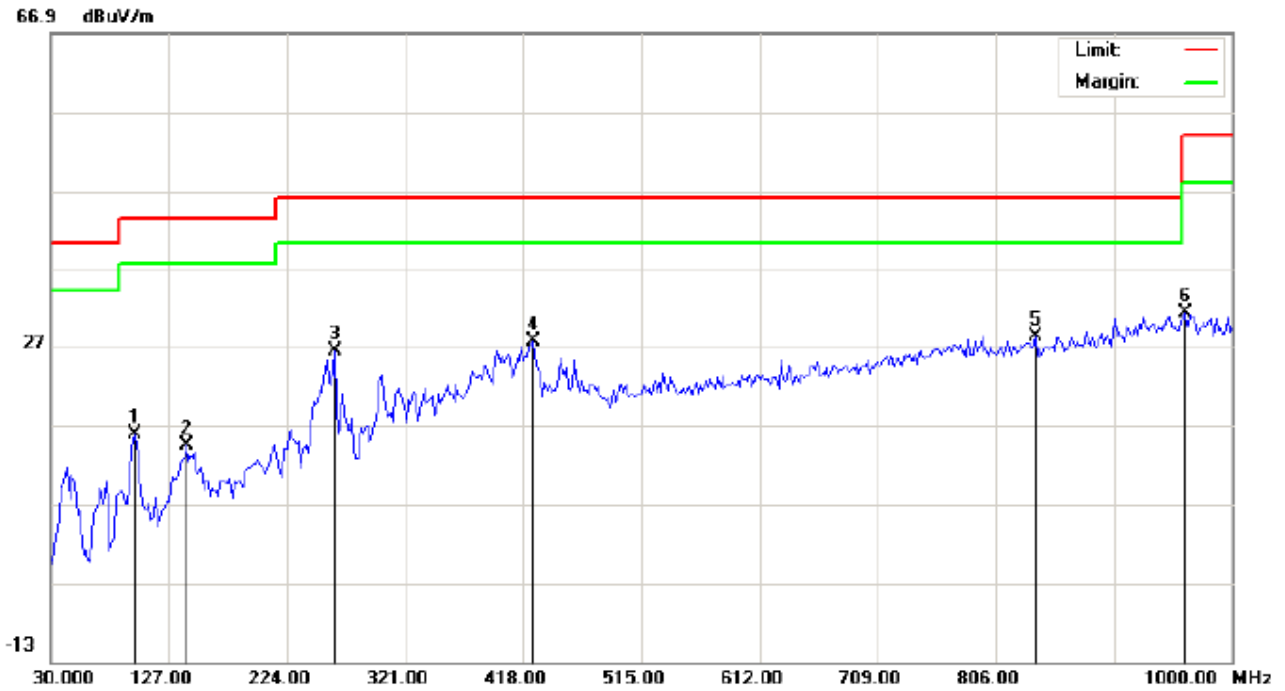Power:
Distance:

Temperature: 23.4
Humidity: 53.1 %

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		91.4333	8.98	4.16	13.14	43.50	-30.36	peak			
2		256.3333	6.88	14.09	20.97	46.00	-25.03	peak			
3		435.7833	2.27	20.16	22.43	46.00	-23.57	peak			
4		799.5333	0.46	27.31	27.77	46.00	-18.23	peak			
5		907.8500	1.65	28.83	30.48	46.00	-15.52	peak			
6	*	953.1167	0.82	29.97	30.79	46.00	-15.21	peak			

RESULT: PASS

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

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

RADIATED EMISSION ABOVE 1GHz

(Worst modulation: GFSK)

FOR BR/EDR

RADIATED EMISSION TEST- (ABOVE 1GHz)-LOW CHANNEL-HORIZONTAL

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHz(PK)-

EUT: TWS Bluetooth Headset
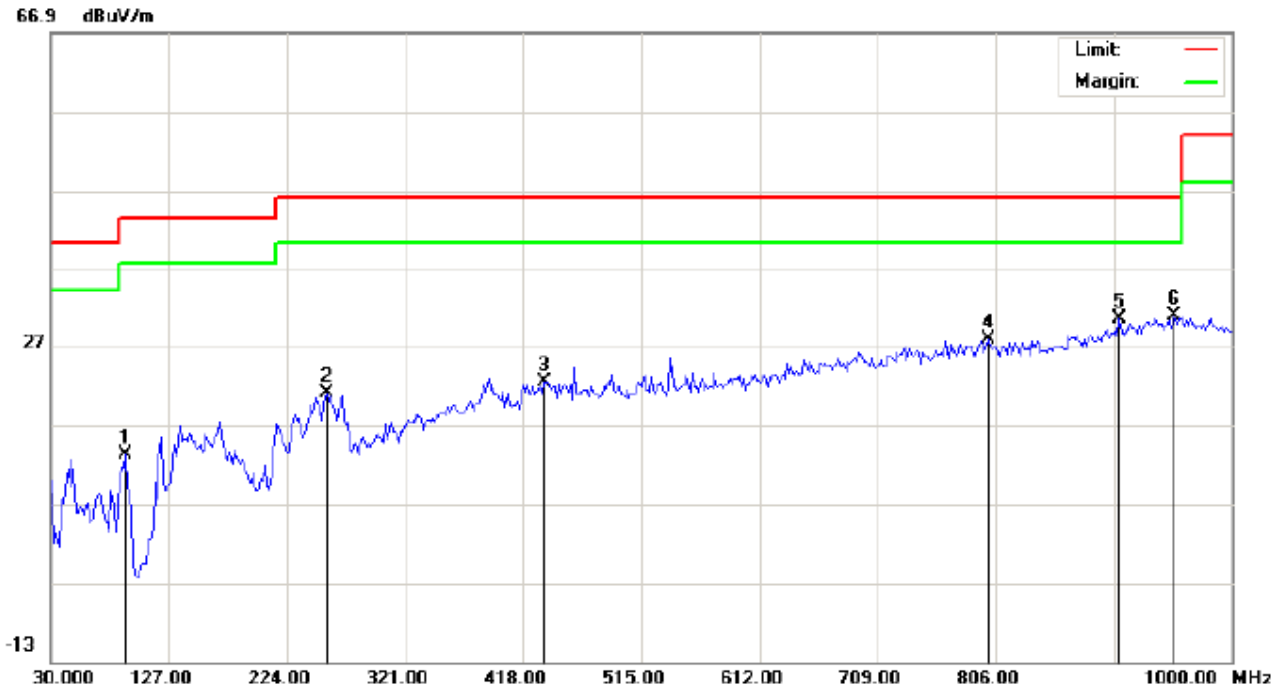
M/N: G22A+

Mode: Low Channel TX

Note:

Polarization: *Horizontal*

Power:

Distance:

Temperature: 22.7

Humidity: 53.6 %

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		2402.000	80.77	10.32	91.09	114.00	-22.91	peak			
2	*	2402.000	72.36	10.32	82.68	94.00	-11.32	AVG	100	24	
3		3269.000	29.69	11.89	41.58	74.00	-32.42	peak			
4		4804.000	38.24	7.69	45.93	74.00	-28.07	peak			

RESULT: PASS

RADIATED EMISSION TEST- (ABOVE 1GHz)-LOW CHANNEL- VERTICAL

Site: site #1

Polarization: *Vertical*

Temperature: 22.7

Limit: FCC Class B 3M Radiation above 1GHz(PK)-

Power:

Humidity: 53.6 %

EUT: TWS Bluetooth Headset

Distance:

M/N: G22A+

Mode: Low Channel TX

Note:

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		2402.000	80.71	10.32	91.03	114.00	-22.97	peak			
2	*	2402.000	72.29	10.32	82.61	94.00	-11.39	AVG	100	63	
3		3197.000	30.24	11.83	42.07	74.00	-31.93	peak			
4		4804.000	37.88	7.69	45.57	74.00	-28.43	peak			

RESULT: PASS

RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL-HORIZONTAL

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHz(PK)-

EUT: TWS Bluetooth Headset

M/N: G22A+

Mode: Middle Channel TX

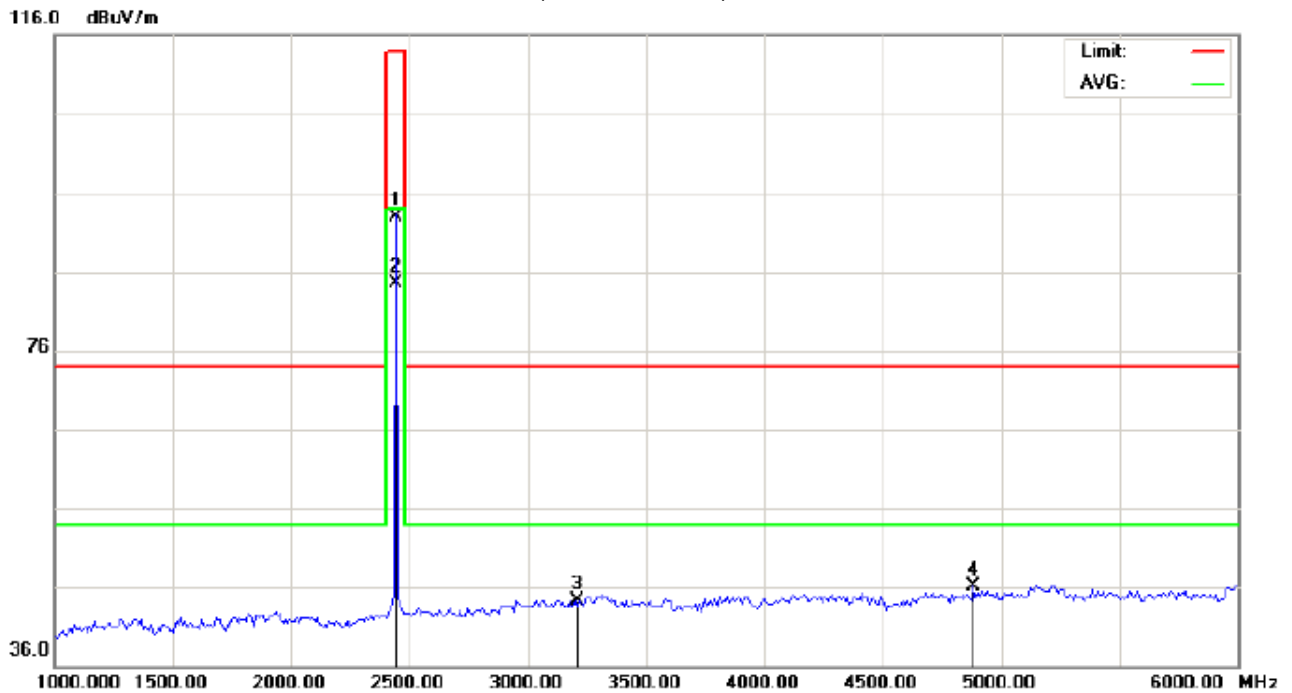Note:

Polarization: *Horizontal*

Power:

Distance:

Temperature: 22.7

Humidity: 53.6 %

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		2441.000	82.77	10.36	93.13	114.00	-20.87	peak			
2	*	2441.000	74.30	10.36	84.66	94.00	-9.34	AVG	100	25	
3		3274.000	30.75	11.90	42.65	74.00	-31.35	peak			
4		4882.000	38.88	7.89	46.77	74.00	-27.23	peak			

RESULT: PASS

RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL- VERTICAL

Site: site #1	Polarization: **Vertical**	Temperature: 22.7
Limit: FCC Class B 3M Radiation above 1GHz(PK)-	Power:	Humidity: 53.6 %
EUT: TWS Bluetooth Headset	Distance:	
M/N: G22A+		
Mode: Middle Channel TX		
Note:		

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		2441.000	82.62	10.36	92.98	114.00	-21.02	peak			
2	*	2441.000	74.21	10.36	84.57	94.00	-9.43	AVG	100	62	
3		3209.000	32.43	11.84	44.27	74.00	-29.73	peak			
4		4882.000	38.31	7.89	46.20	74.00	-27.80	peak			

RESULT: PASS

RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL-HORIZONTAL

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHz(PK)-

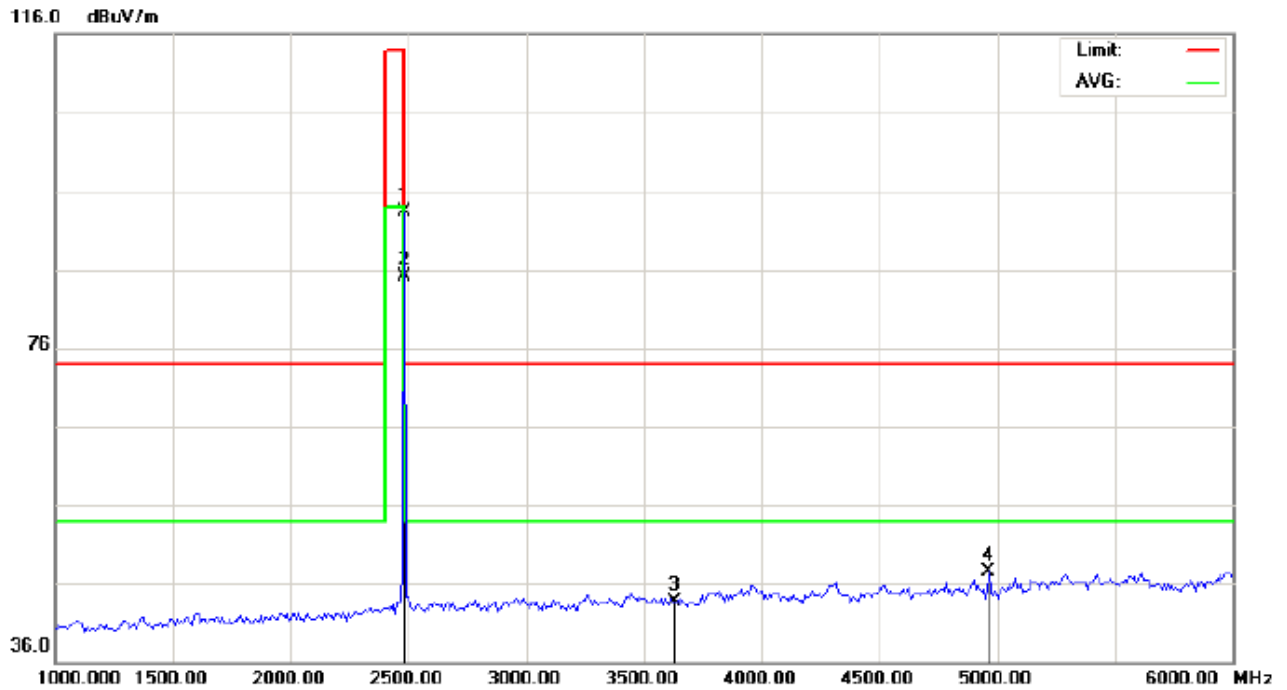EUT: TWS Bluetooth Headset

M/N: G22A+
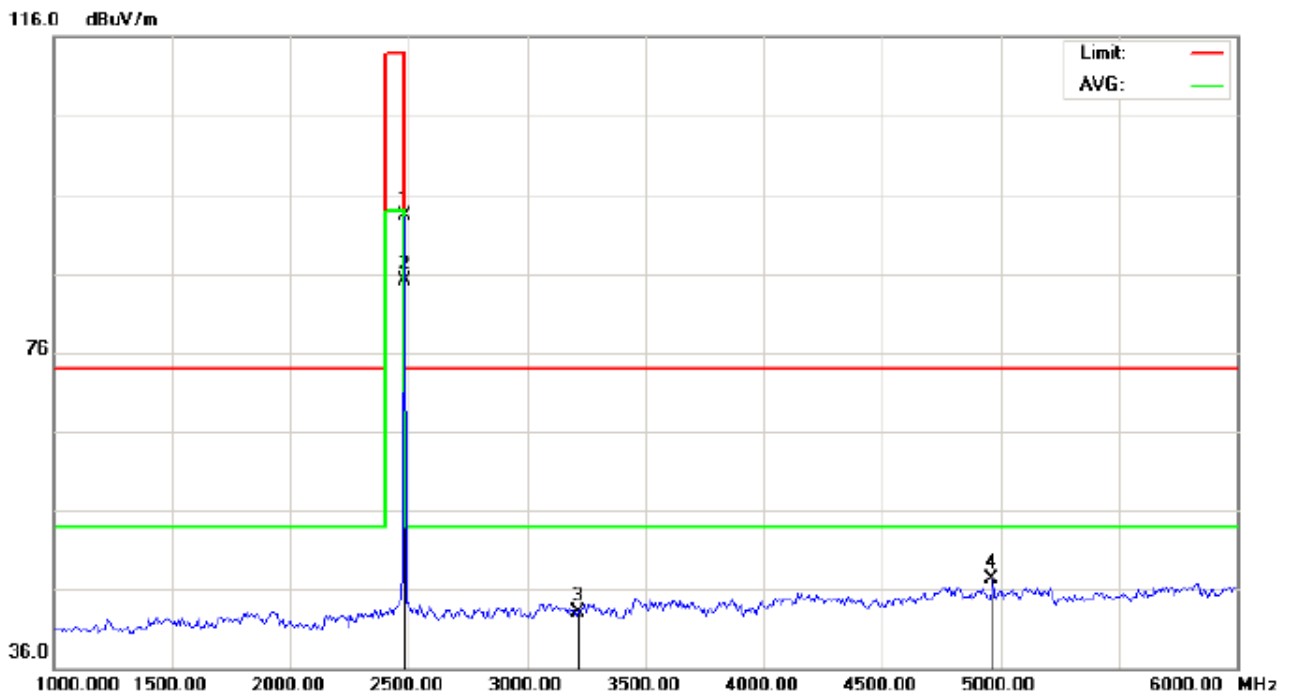
Mode: High Channel TX

Note:

Polarization: *Horizontal*

Power:

Distance:

Temperature: 22.7

Humidity: 53.6 %

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		2480.000	82.94	10.41	93.35	114.00	-20.65	peak			
2	*	2480.000	74.72	10.41	85.13	94.00	-8.87	AVG	100	22	
3		3629.000	30.74	12.90	43.64	74.00	-30.36	peak			
4		4960.000	39.51	8.09	47.60	74.00	-26.40	peak			

RESULT: PASS

RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL- VERTICAL

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHz(PK)-

EUT: TWS Bluetooth Headset

M/N: G22A+

Mode: High Channel TX

Note:

Polarization: *Vertical*

Power:

Distance:

Temperature: 22.7

Humidity: 53.6 %

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		2480.000	82.83	10.41	93.24	114.00	-20.76	peak			
2	*	2480.000	74.68	10.41	85.09	94.00	-8.91	AVG	100	64	
3		3217.000	31.22	11.84	43.06	74.00	-30.94	peak			
4		4960.000	39.16	8.09	47.25	74.00	-26.75	peak			

RESULT: PASS

Note: 6~25GHz at least have 20dB margin. 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.

Field strength of the fundamental signal

1Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	80.77	10.32	91.09	114	-22.91	Horizontal
2402	80.71	10.32	91.03	114	-22.97	Vertical
2441	82.77	10.36	93.13	114	-20.87	Horizontal
2441	82.62	10.36	92.98	114	-21.02	Vertical
2480	82.94	10.41	93.35	114	-20.65	Horizontal
2480	82.83	10.41	93.24	114	-20.76	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	72.36	10.32	82.68	94	-11.32	Horizontal
2402	72.29	10.32	82.61	94	-11.39	Vertical
2441	74.30	10.36	84.66	94	-9.34	Horizontal
2441	74.21	10.36	84.57	94	-9.43	Vertical
2480	74.72	10.41	85.13	94	-8.87	Horizontal
2480	74.68	10.41	85.09	94	-8.91	Vertical

2Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	80.70	10.32	91.02	114	-22.98	Horizontal
2402	80.66	10.32	90.98	114	-23.02	Vertical
2441	82.71	10.36	93.07	114	-20.93	Horizontal
2441	82.55	10.36	92.91	114	-21.09	Vertical
2480	82.90	10.41	93.31	114	-20.69	Horizontal
2480	82.77	10.41	93.18	114	-20.82	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	72.31	10.32	82.63	94	-11.37	Horizontal
2402	72.22	10.32	82.54	94	-11.46	Vertical
2441	74.25	10.36	84.61	94	-9.39	Horizontal
2441	74.16	10.36	84.52	94	-9.48	Vertical
2480	74.68	10.41	85.09	94	-8.91	Horizontal
2480	74.57	10.41	84.98	94	-9.02	Vertical

3Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	80.64	10.32	90.96	114	-23.04	Horizontal
2402	80.59	10.32	90.91	114	-23.09	Vertical
2441	82.66	10.36	93.02	114	-20.98	Horizontal
2441	82.49	10.36	92.85	114	-21.15	Vertical
2480	82.87	10.41	93.28	114	-20.72	Horizontal
2480	82.72	10.41	93.13	114	-20.87	Vertical

Average value

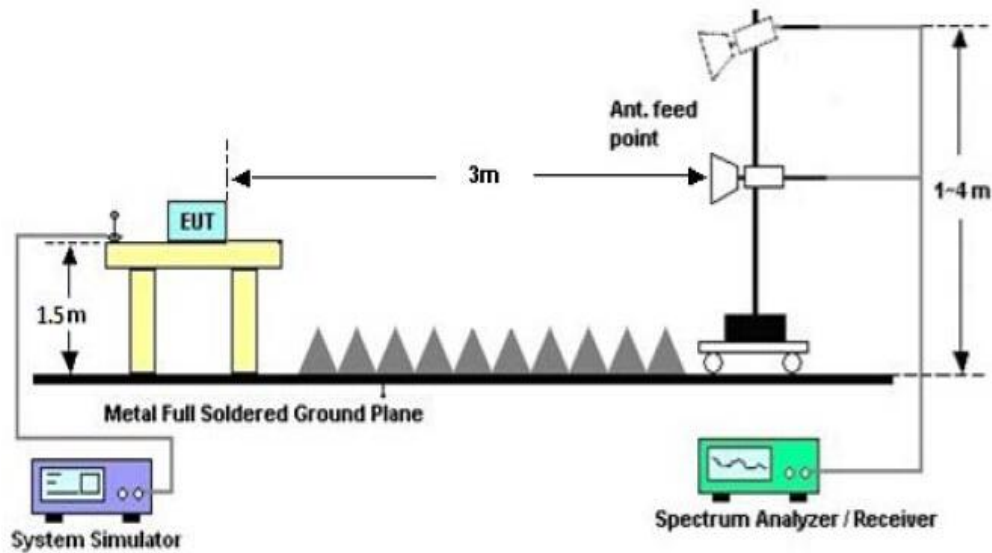| Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	72.26	10.32	82.58	94	-11.42	Horizontal
2402	72.19	10.32	82.51	94	-11.49	Vertical
2441	74.20	10.36	84.56	94	-9.44	Horizontal
2441	74.11	10.36	84.47	94	-9.53	Vertical
2480	74.60	10.41	85.01	94	-8.99	Horizontal
2480	74.51	10.41	84.92	94	-9.08	Vertical

10. BAND EDGE EMISSION

10.1. 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

10.2 TEST SETUP

RADIATED EMISSION TEST SETUP

10.3 RADIATED TEST RESULT

(Worst modulation: GFSK)

FOR BR/EDR

TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal

Site: site #1
Limit: FCC Class B 3M Radiation above 1GHz(PK)
EUT: TWS Bluetooth Headset
M/N: G22A+
Mode: Low Channel TX
Note:

Polarization: *Horizontal*
Power:
Distance:

Temperature: 26
Humidity: 60 %

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		2275.508	30.66	10.18	40.84	74.00	-33.16	peak			
2		2390.000	30.00	10.31	40.31	74.00	-33.69	peak			
3	*	2402.000	80.85	10.32	91.17	74.00	17.17	peak			

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHz(PK)

EUT: TWS Bluetooth Headset

M/N: G22A+

Mode: Low Channel TX

Note:

Polarization: *Vertical*

Power:

Distance:

Temperature: 26

Humidity: 60 %

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		2291.225	30.33	10.20	40.53	74.00	-33.47	peak			
2		2390.000	30.21	10.31	40.52	74.00	-33.48	peak			
3	*	2402.000	80.73	10.32	91.05	74.00	17.05	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal

Site: site #1
Limit: FCC Class B 3M Radiation above 1GHz(PK)
EUT: TWS Bluetooth Headset
M/N: G22A+
Mode: High Channel TX
Note:

Polarization: *Horizontal*
Power:
Distance:

Temperature: 26
Humidity: 60 %

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	*	2480.000	82.98	10.41	93.39	74.00	19.39	peak			
2		2483.500	30.69	10.41	41.10	74.00	-32.90	peak			
3		2493.767	31.53	10.42	41.95	74.00	-32.05	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHz(PK)

EUT: TWS Bluetooth Headset

M/N: G22A+

Mode: High Channel TX

Note:

Polarization: *Vertical*

Power:

Distance:

Temperature: 26

Humidity: 60 %

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	*	2480.000	82.90	10.41	93.31	74.00	19.31	peak			
2		2483.500	32.26	10.41	42.67	74.00	-31.33	peak			
3		2492.997	32.79	10.42	43.21	74.00	-30.79	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.

11. 20DB BANDWIDTH

11.1. MEASUREMENT PROCEDURE

1. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
2. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel
   RBW $\geq$ 1% of the 20 dB bandwidth, VBW $\geq$ RBW; Sweep = auto; Detector function = peak
3. Set SPA Trace 1 Max hold, then View.

11.2. TEST SET-UP
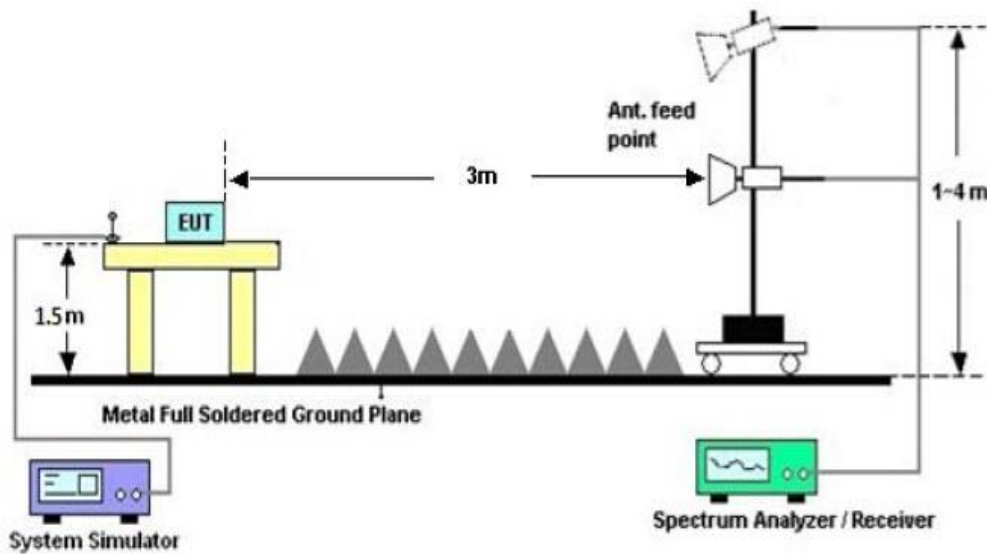
11.3. LIMITS AND MEASUREMENT RESULTS

FOR BR/EDR

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT			
Applicable Limits	**Measurement Result**		
	Test Data (MHz)		**Result**
	99%OBW (MHz)	**-20dB BW(MHz)**	
N/A	Low Channel	0.927	1.082	PASS
	Middle Channel	0.935	1.085	PASS
	High Channel	0.941	1.108	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

Agilent		R T	Meas Setup

Ch Freq   2.402 GHz   Trig Free

Occupied Bandwidth

Ref 20 dBm   Atten 30 dB
#Peak
Log
10
dB/

Center 2.402 000 GHz   Span 3 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 1 ms (601 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
          926.6088 kHz   x dB   −20.00 dB

Transmit Freq Error   23.823 kHz
x dB Bandwidth   1.082 MHz

Copyright 2000–2002 Agilent Technologies

Meas Setup menu:
- Avg Number 10 — On / Off
- Avg Mode — Exp / Repeat
- Max Hold — On / Off
- Occ BW % Pwr 99.00 %
- OBW Span 3.00000000 MHz
- x dB −20.00 dB
- Optimize Ref Level

TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

Agilent		R T	Meas Setup

Ch Freq   2.441 GHz   Trig Free

Occupied Bandwidth

Ref 20 dBm   Atten 30 dB
#Peak
Log
10
dB/

Center 2.441 000 GHz   Span 3 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 1 ms (601 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
          935.0063 kHz   x dB   −20.00 dB

Transmit Freq Error   4.353 kHz
x dB Bandwidth   1.085 MHz

Copyright 2000–2002 Agilent Technologies

Meas Setup menu:
- Avg Number 10 — On / Off
- Avg Mode — Exp / Repeat
- Max Hold — On / Off
- Occ BW % Pwr 99.00 %
- OBW Span 3.00000000 MHz
- x dB −20.00 dB
- Optimize Ref Level

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT				
	Measurement Result			
Applicable Limits	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHz)	
N/A	Low Channel	1.194	1.367	PASS
	Middle Channel	1.223	1.394	PASS
	High Channel	1.207	1.344	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL
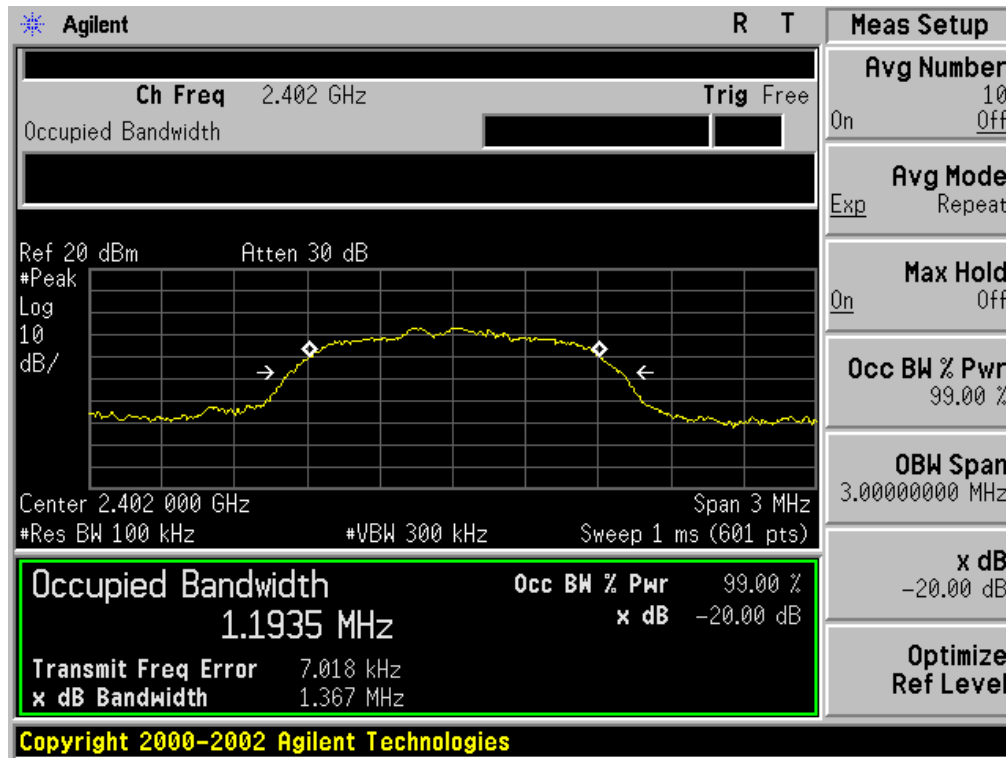
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL
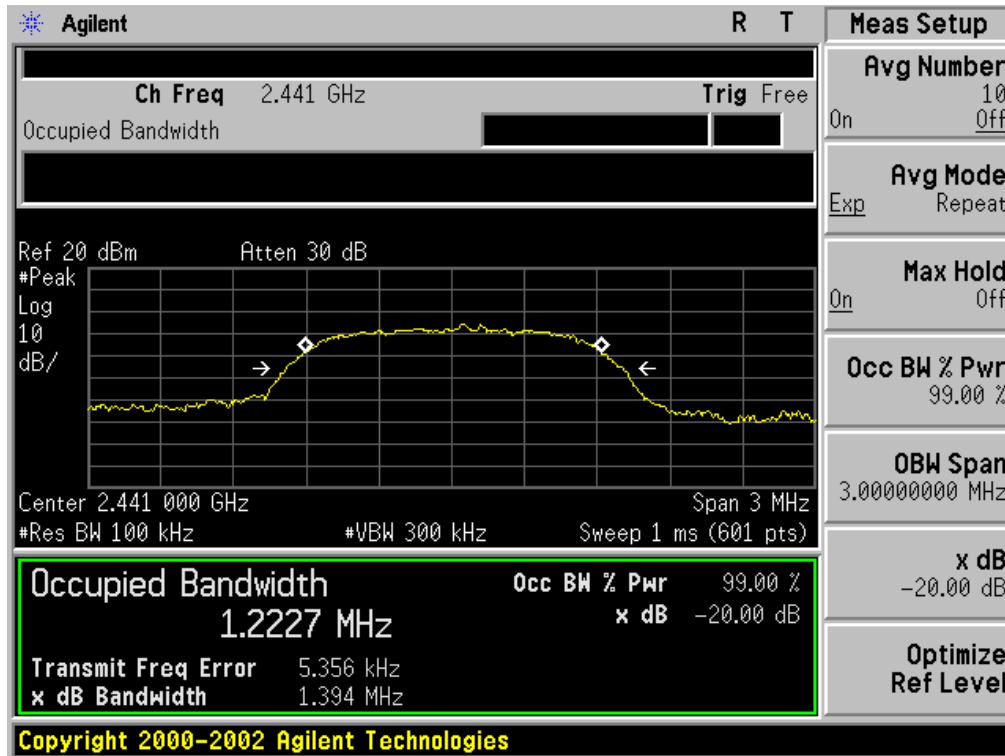
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL
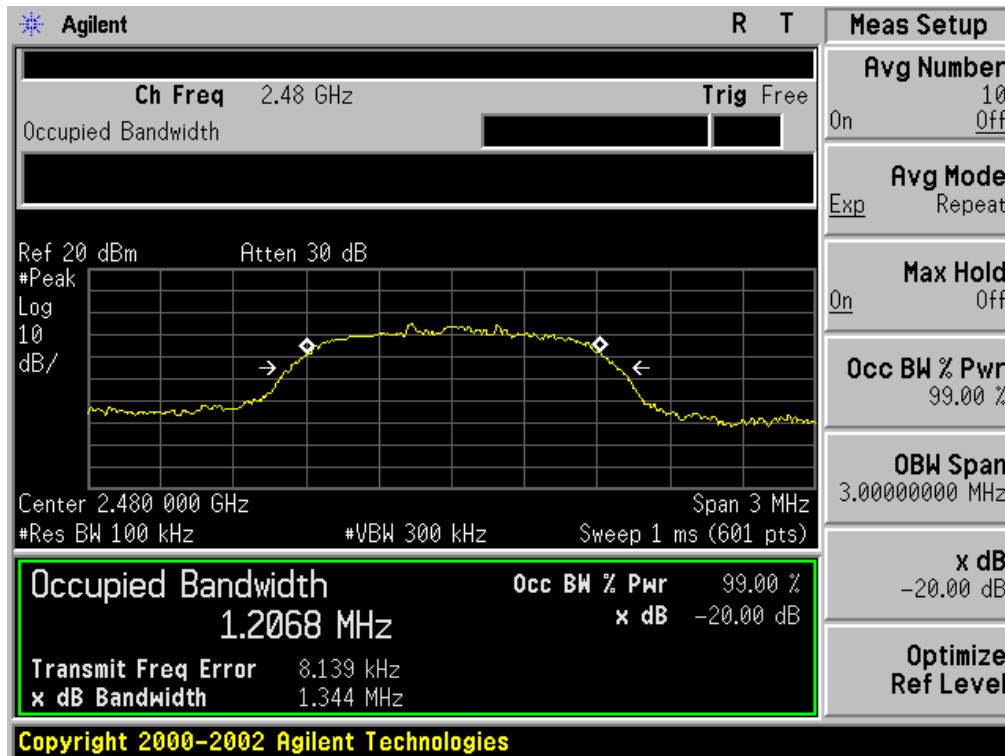
BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT				
	Measurement Result			
Applicable Limits	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHz)	
N/A	Low Channel	1.210	1.366	PASS
	Middle Channel	1.204	1.368	PASS
	High Channel	1.210	1.353	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL
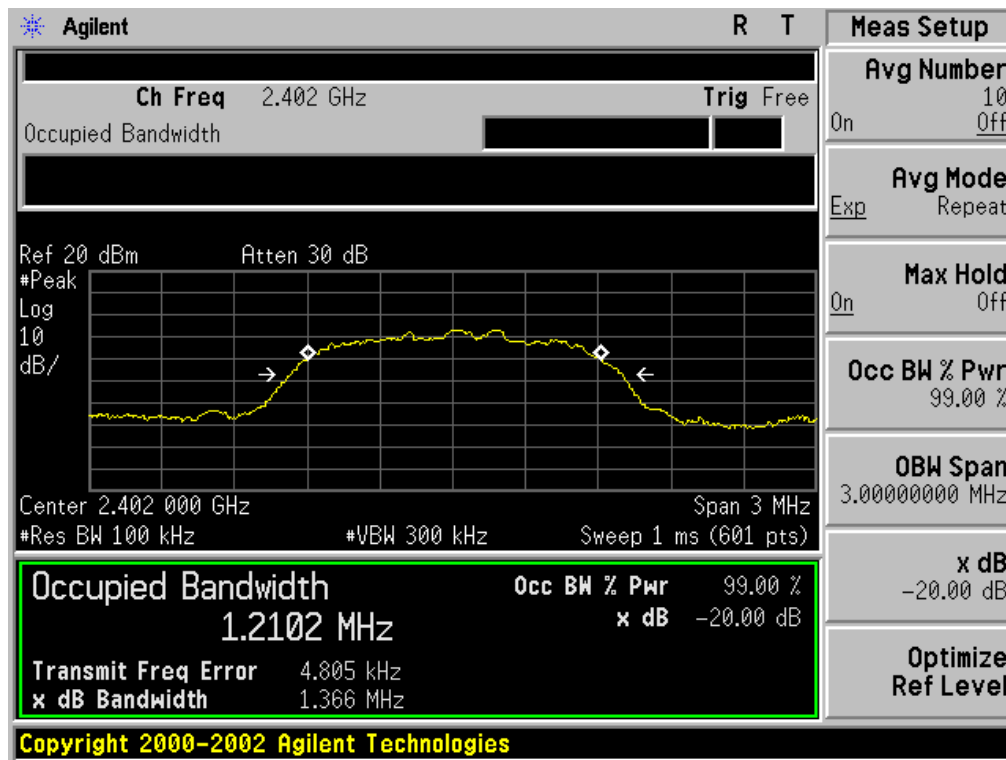
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL
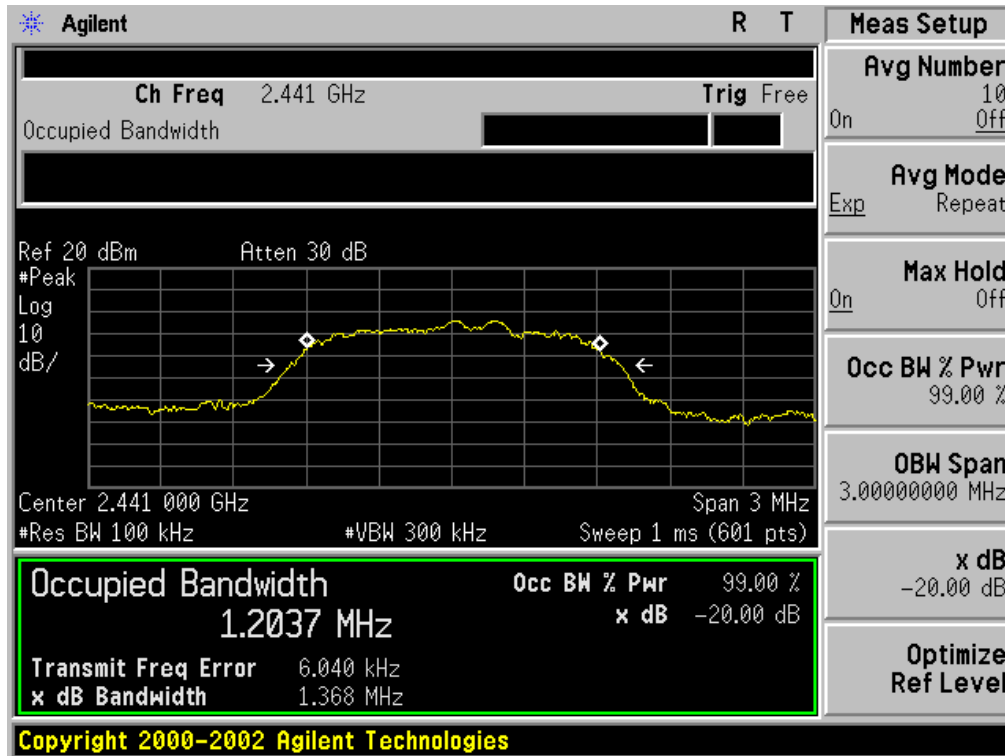
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL
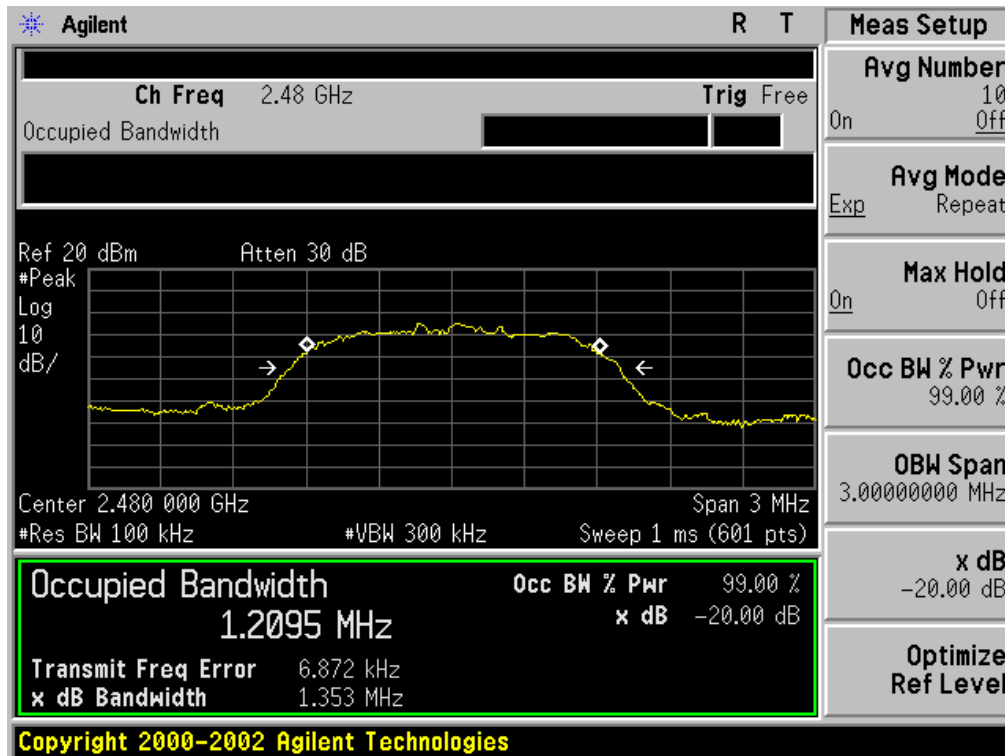
12. FCC LINE CONDUCTED EMISSION TEST

12.1. 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.

12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST
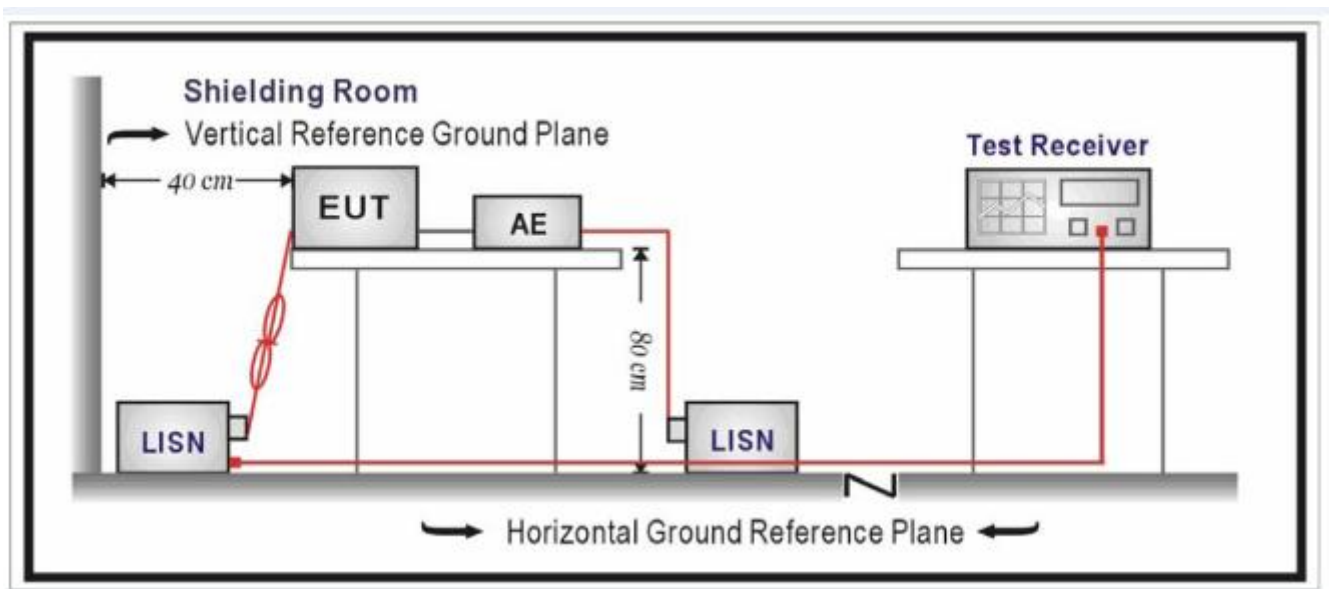
12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

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/60Hzpower 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.

12.4. 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.

12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

N/A

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

APPENDIX A: PHOTOGRAPHS OF TEST SETUP
FCC RADIATED EMISSION TEST SETUP

FCC RADIATED EMISSION TEST SETUP
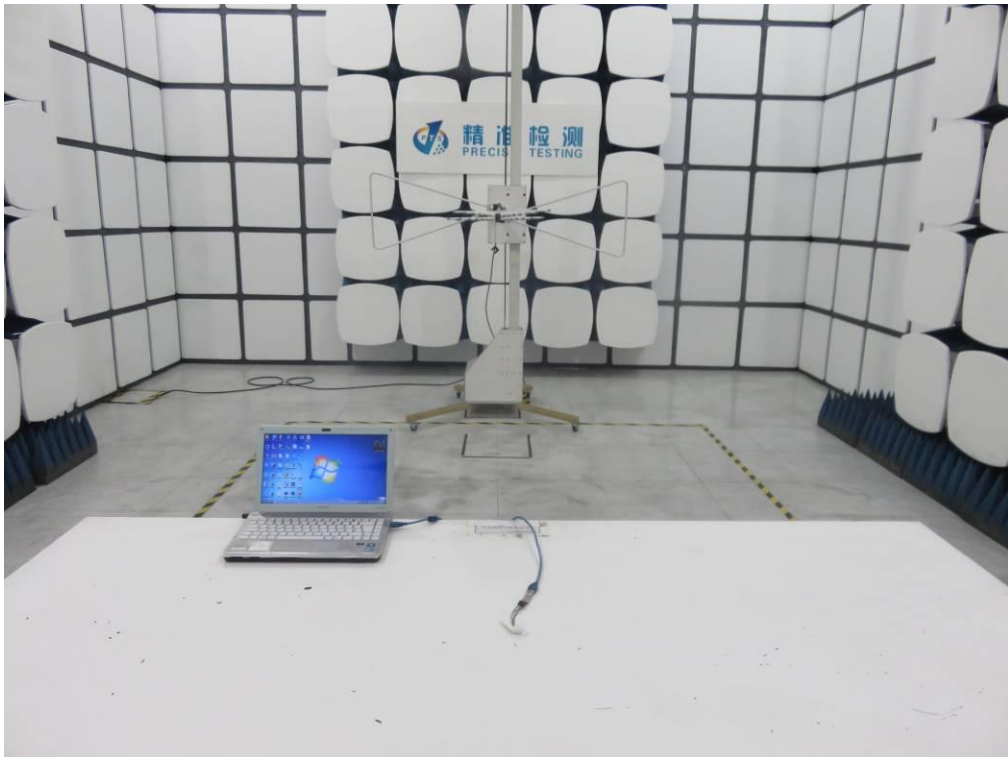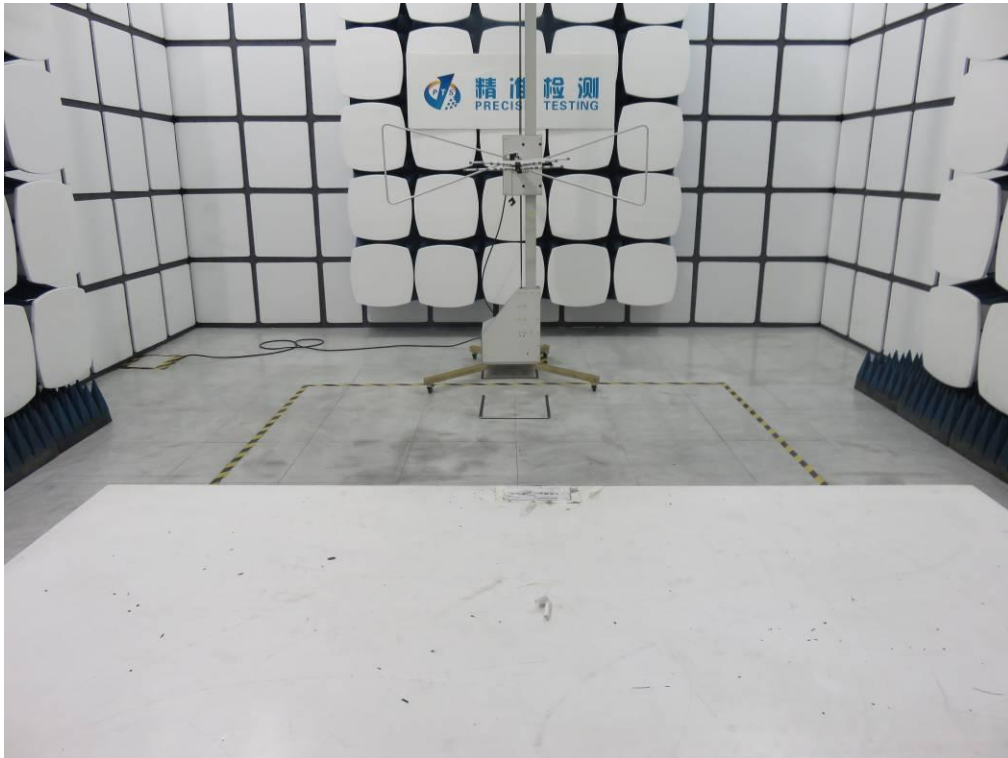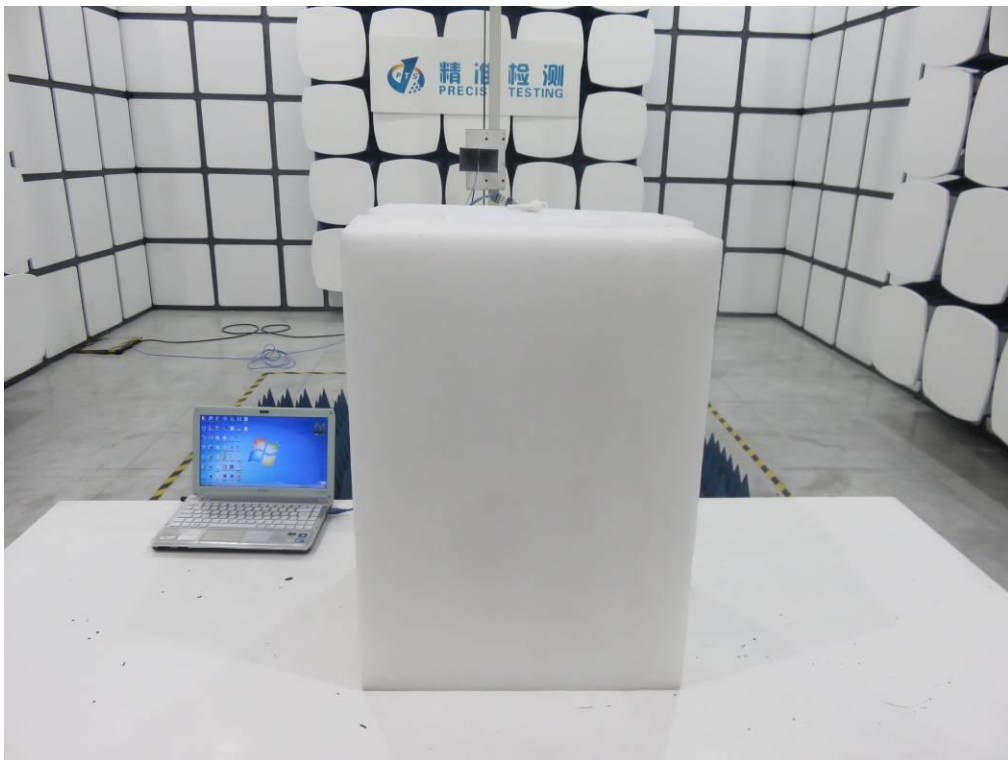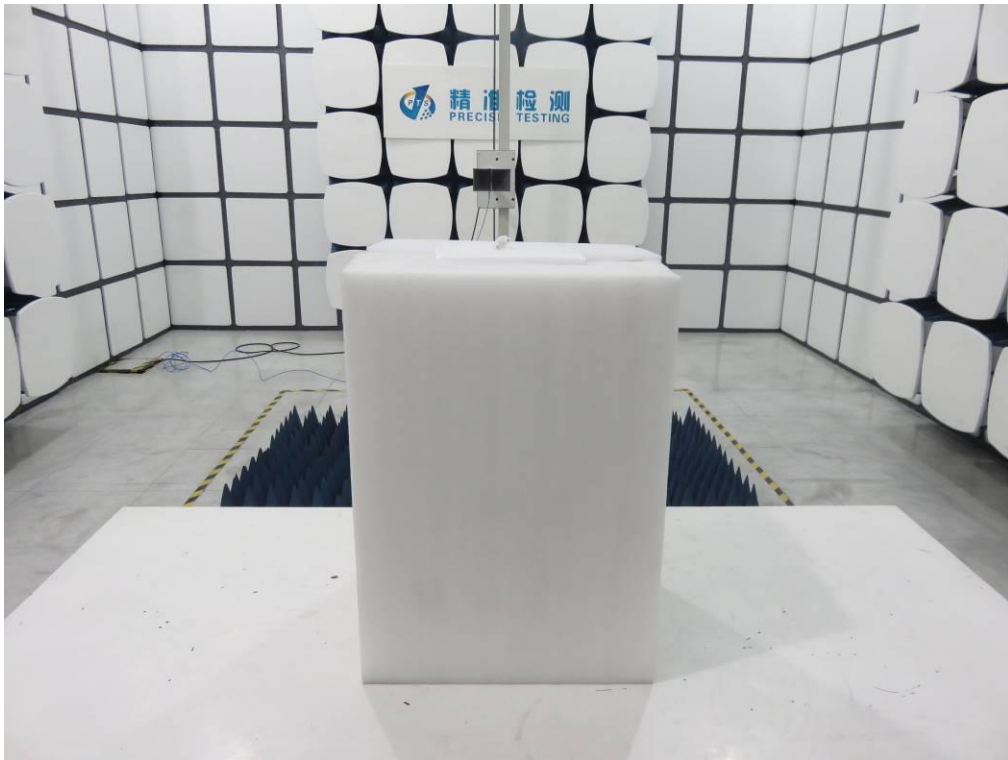
APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT-1

ALL VIEW OF EUT-2
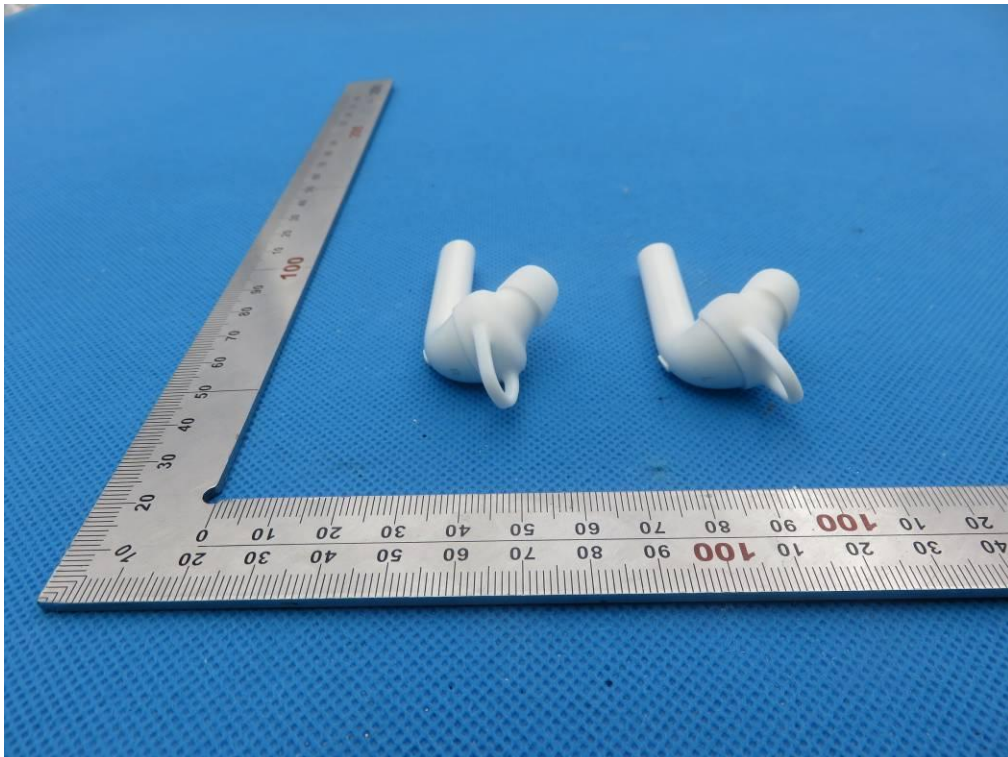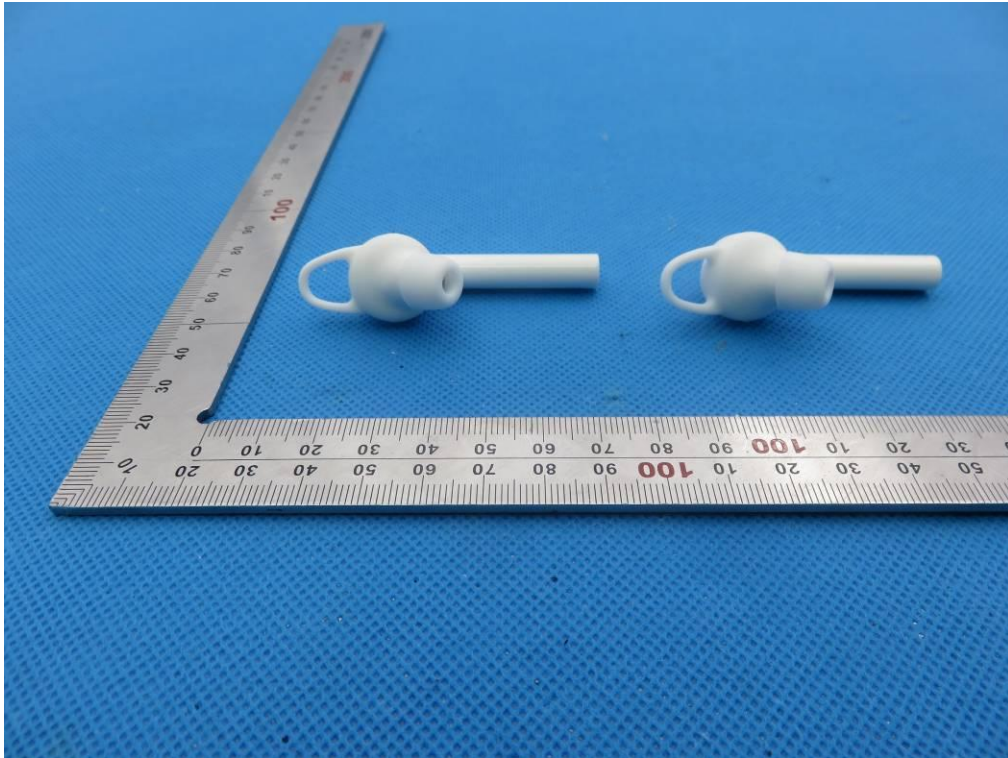
TOP VIEW OF EUT

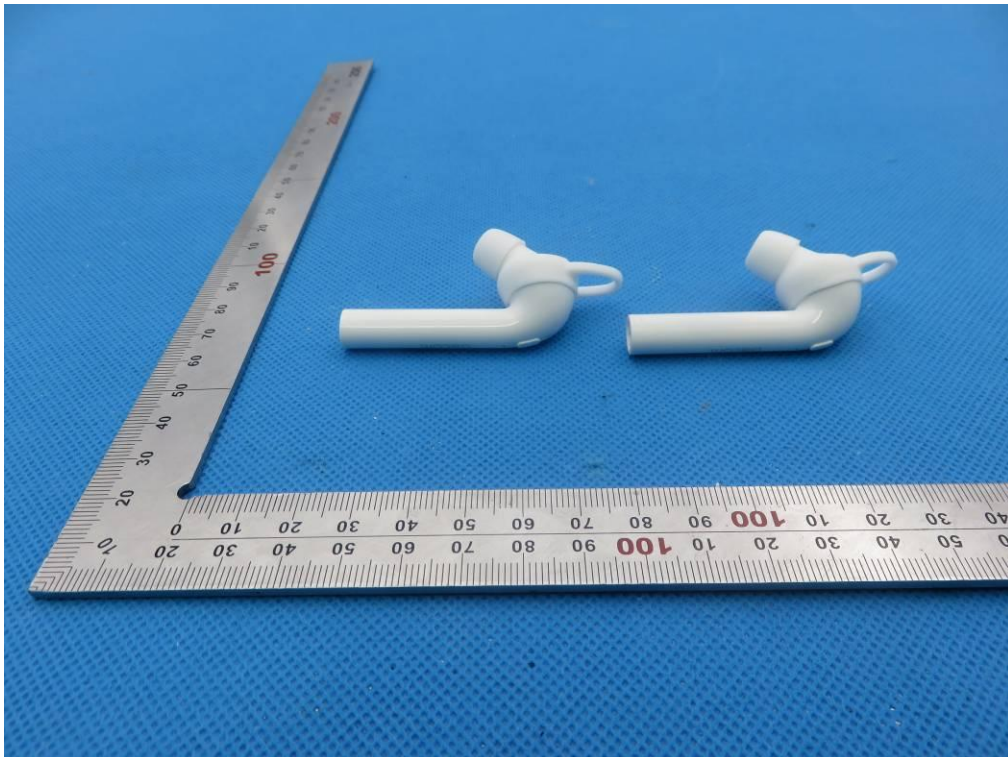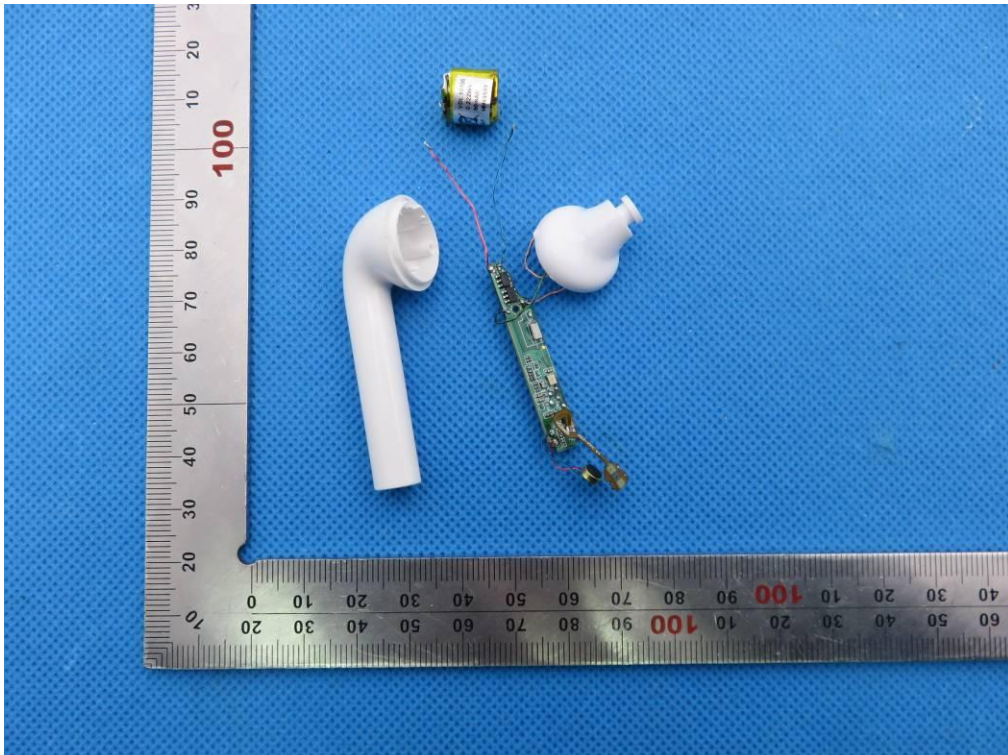BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

BACK VIEW OF EUT

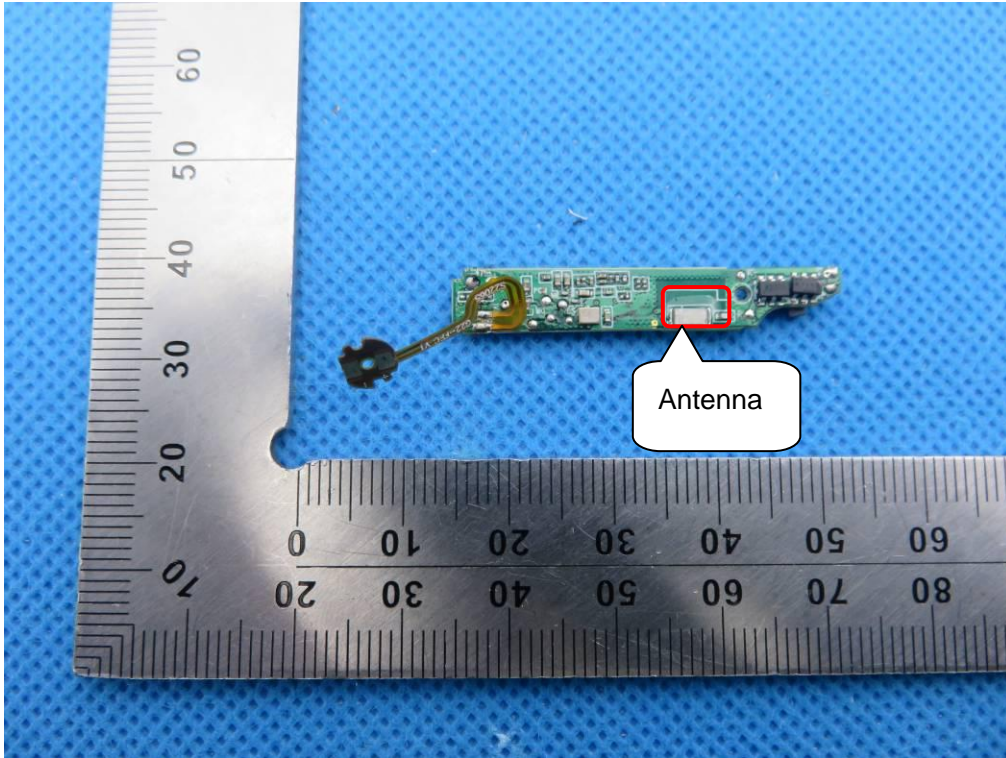LEFT VIEW OF EUT
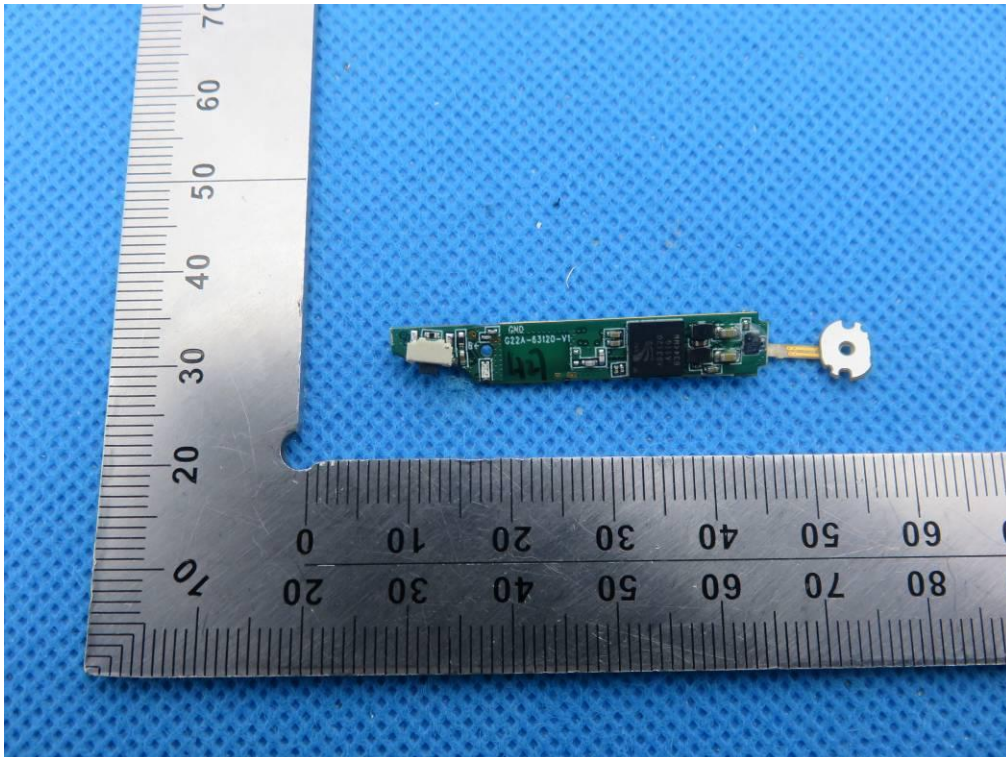

RIGHT VIEW OF EUT
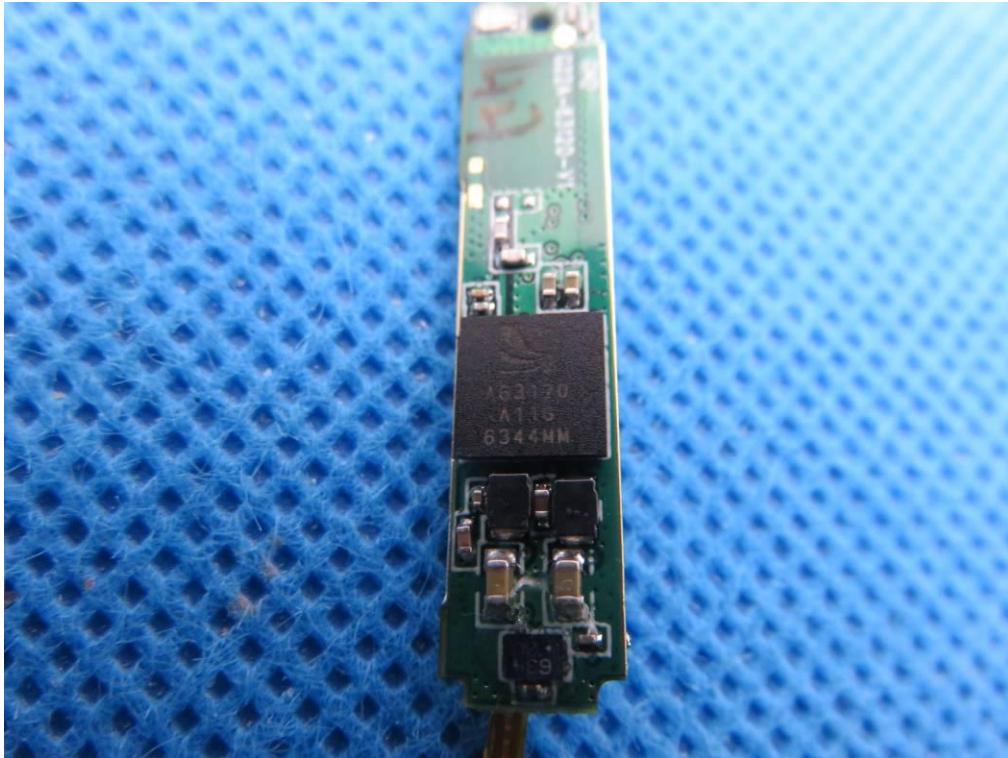
VIEW OF EUT(Left)(Port)

OPEN VIEW OF EUT(Left)

INTERNAL VIEW OF EUT(Left)-1

INTERNAL VIEW OF EUT(Left)-2
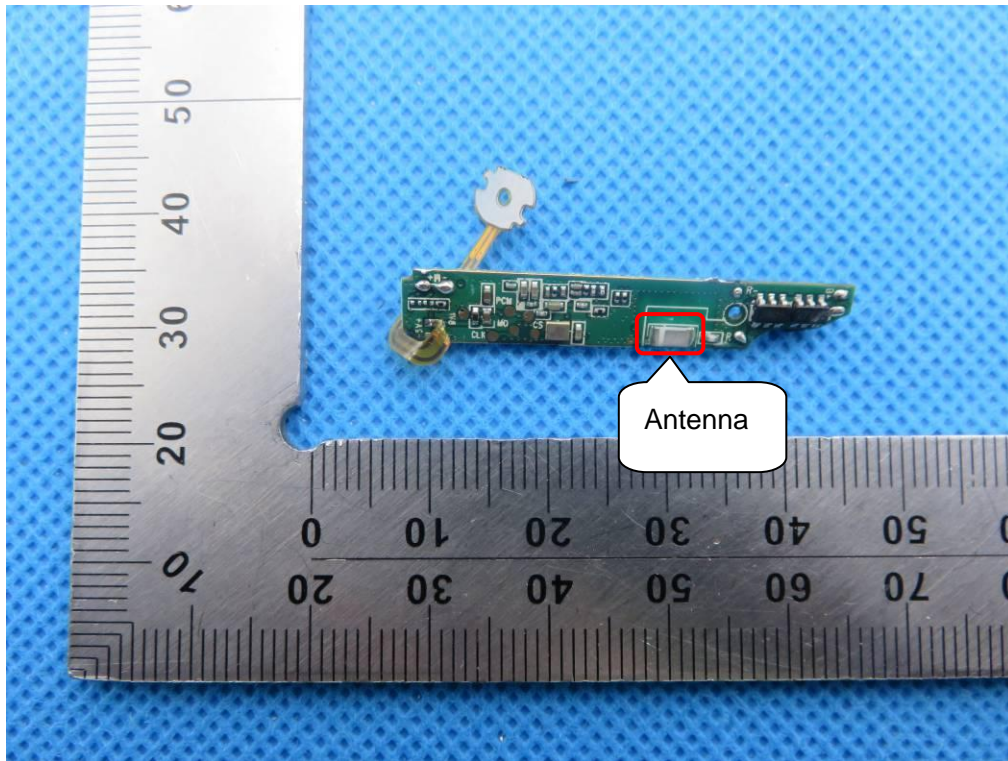
INTERNAL VIEW OF EUT(Left)-3

VIEW OF EUT(Right)(Port)
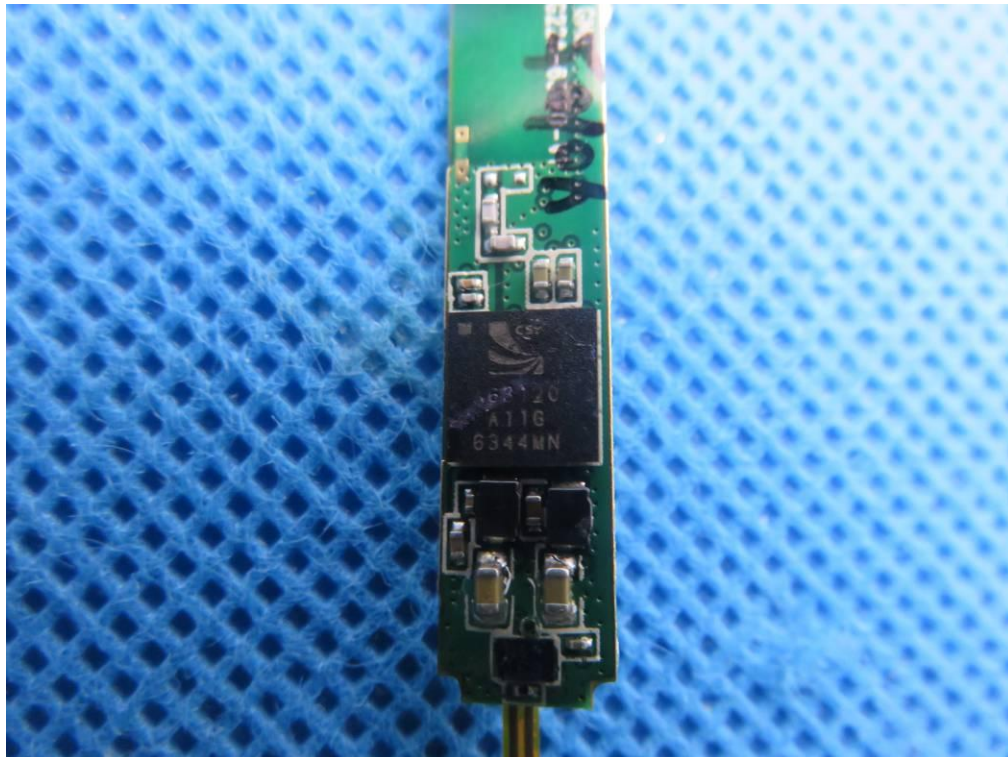
OPEN VIEW OF EUT(Right)
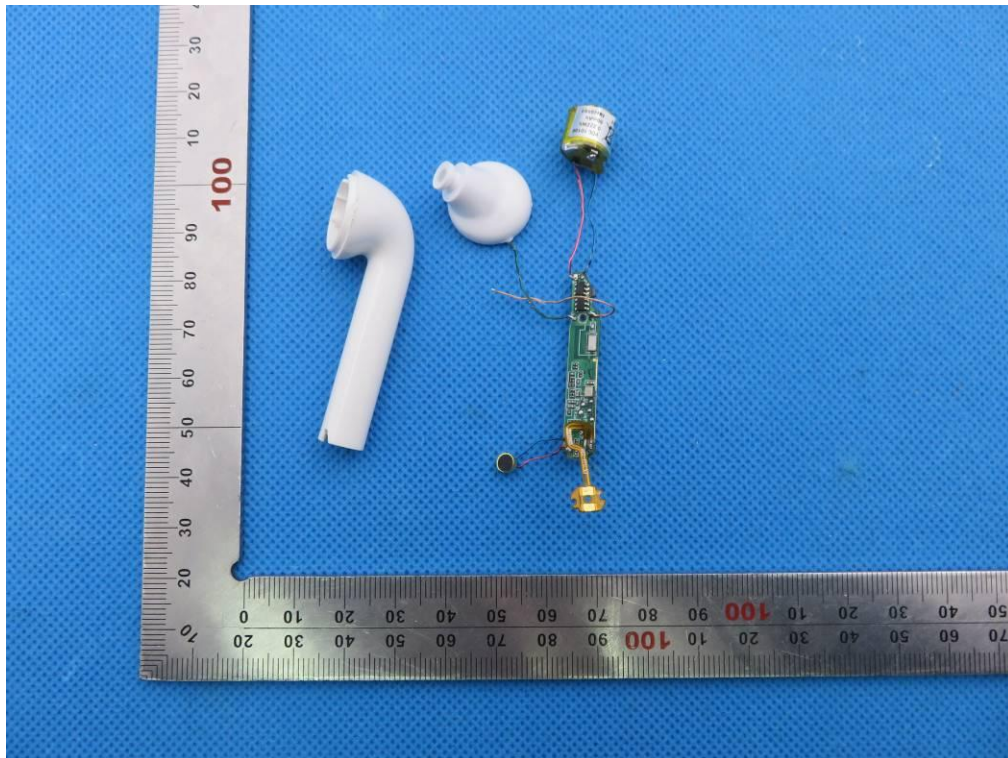
INTERNAL VIEW OF EUT(Right)-1
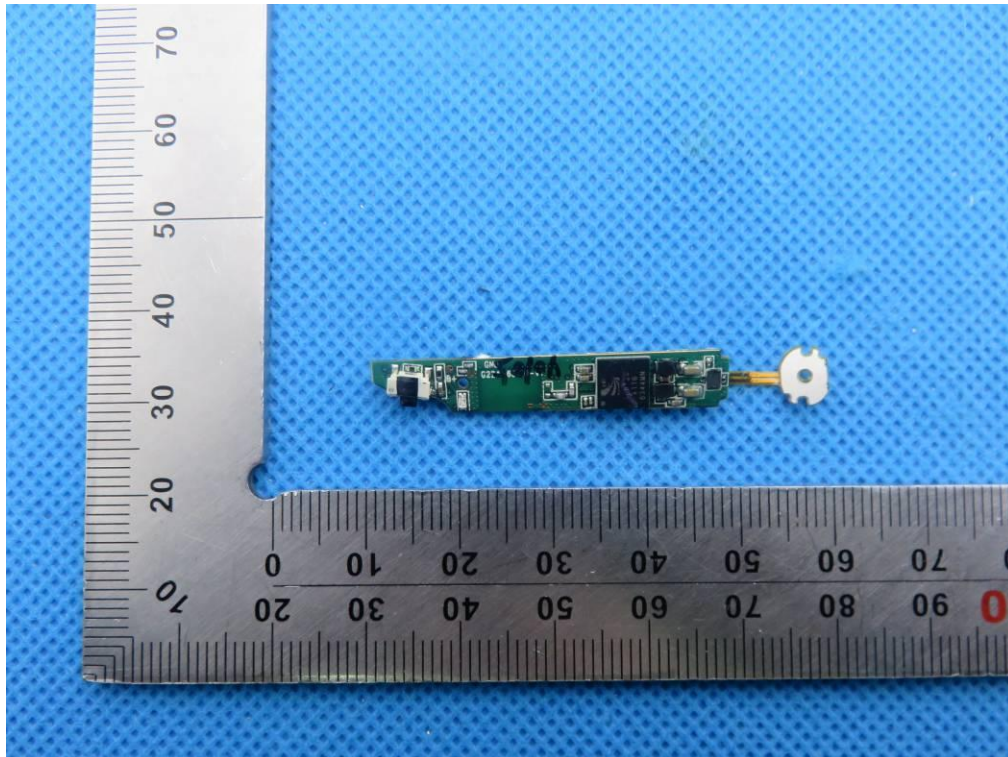
INTERNAL VIEW OF EUT(Right)-2

Antenna

INTERNAL VIEW OF EUT(Right)-3

----END OF REPORT----