
FCC Test Report

Report No.: AGC00797160503FE03

FCC ID : Z7RTUWEB
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : Premium Wireless Earbuds
BRAND NAME : TUMI
MODEL NAME : TUWEB, 0114300DGM
CLIENT : BRAVEN LC
DATE OF ISSUE : May 12, 2016
STANDARD(S) : FCC Part 15 Rules
TEST PROCEDURE(S)
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 12, 2016	Valid	Original Report

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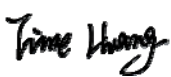
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1. VERIFICATION OF CONFORMITY

Applicant	BRAVEN LC
Address	6001 Oak Canyon, Irvine California, United States, 92618
Manufacturer	Zhongshan K-mate General Electronics Co., Ltd
Address	NO.2, 5th Xincheng Street, Gangkou Town, Zhongshan City, Guangdong, China
Product Designation	Premium Wireless Earbuds
Brand Name	TUMI
Test Model	TUWEB
Series Model	0114300DGM
Difference Declaration	All the same except for the model name.
Date of test	May 03, 2016 to May 05, 2016
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 
Time Huang(Huang Nanhui) May 12, 2016

Reviewed By 
Forrest Lei(Lei Yonggang) May 12, 2016

Approved By 
Solger Zhang(Zhang Hongyi)
Authorized Officer May 12, 2016

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	3.62dBm(Max)
Bluetooth Version	V4.1
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK
Number of channels	79 for BR/EDR, 40 for BLE
Hardware Version	BTH115MB-V03
Software Version	BTH116-V01
Antenna Designation	Fixed Antenna
Antenna Gain	0dBi
Power Supply	DC 3.7V by Battery
Note: The USB port only used for charging and can't be used to transfer data with PC. The EUT supports Bluetooth Low Energy Mode.	

2.2. TABLE OF CARRIER FREQUENCIES

BR/EDR channel List

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

BLE Channel List

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2404MHZ
	:	:
	38	2478 MHZ
	39	2480 MHZ

3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	$\pm 3.18\text{dB}$
2	All emissions, radiated	$\pm 3.91\text{dB}$
3	Temperature	$\pm 0.5^\circ\text{C}$
4	Humidity	$\pm 2\%$

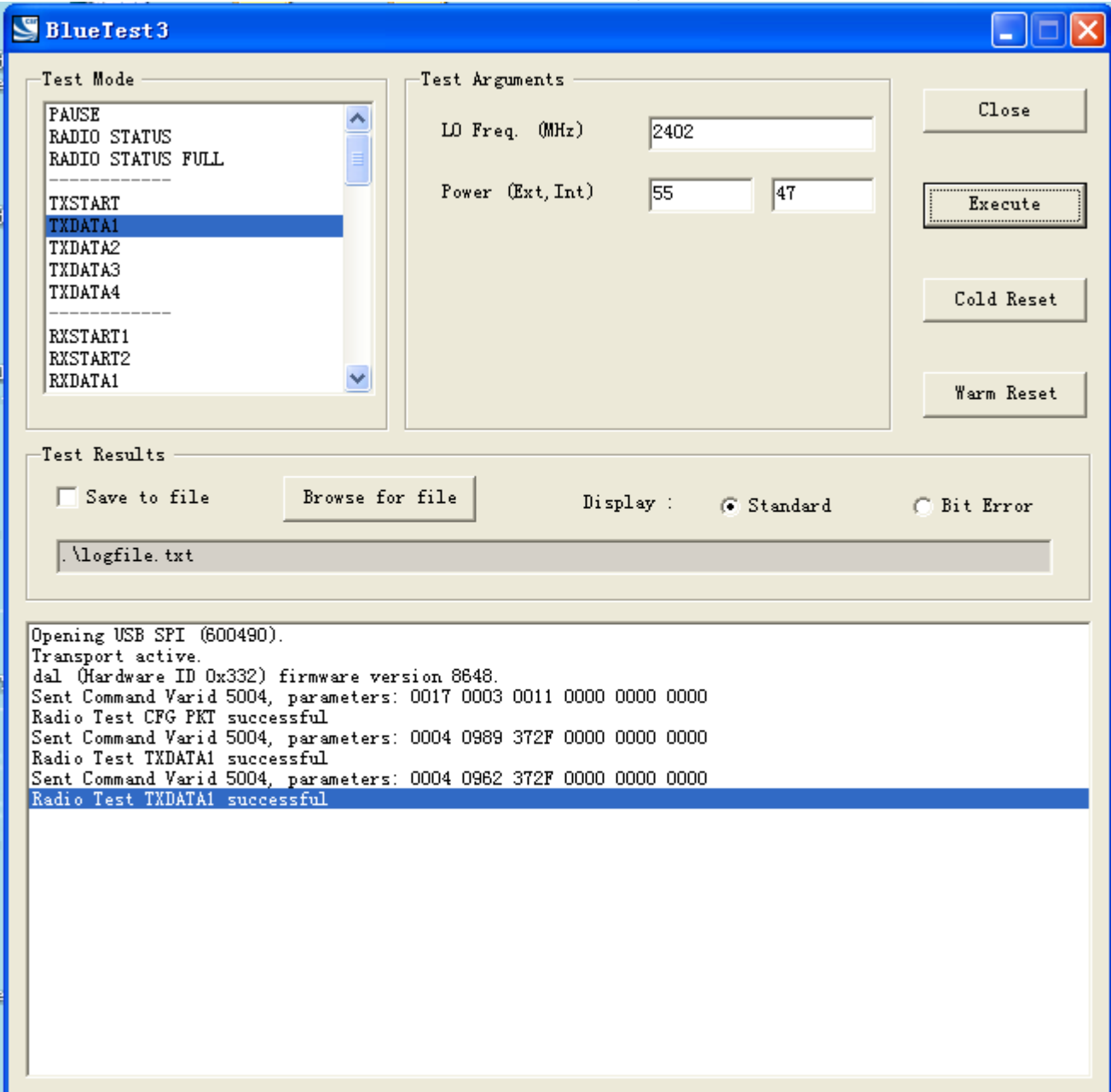
4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	BT Link with charging
5	Standby with charging
6	Audio in

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



The image shows a screenshot of the BlueTest3 software interface. The window has a blue title bar with the text 'BlueTest3' and standard Windows window controls. The main area is divided into several sections:

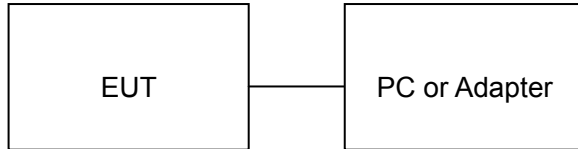
- Test Mode:** A list box containing the following items: PAUSE, RADIO STATUS, RADIO STATUS FULL, TXSTART, TXDATA1 (highlighted), TXDATA2, TXDATA3, TXDATA4, RXSTART1, RXSTART2, and RXDATA1.
- Test Arguments:** Two input fields. The first is 'LD Freq. (MHz)' with the value '2402'. The second is 'Power (Ext, Int)' with values '55' and '47'.
- Buttons:** On the right side, there are four buttons: 'Close', 'Execute', 'Cold Reset', and 'Warm Reset'.
- Test Results:** A section with a 'Save to file' checkbox (unchecked), a 'Browse for file' button, and a 'Display' section with two radio buttons: 'Standard' (selected) and 'Bit Error'.
- Log File:** A text box containing the path '.\logfile.txt'.
- Output Log:** A large text area at the bottom showing the following text:

```
Opening USB SPI (600490).
Transport active.
dal (Hardware ID 0x332) firmware version 8648.
Sent Command Varid 5004, parameters: 0017 0003 0011 0000 0000 0000
Radio Test CFG PKT successful
Sent Command Varid 5004, parameters: 0004 0989 372F 0000 0000 0000
Radio Test TXDATA1 successful
Sent Command Varid 5004, parameters: 0004 0962 372F 0000 0000 0000
Radio Test TXDATA1 successful
```


5. SYSTEM TEST CONFIGURATION

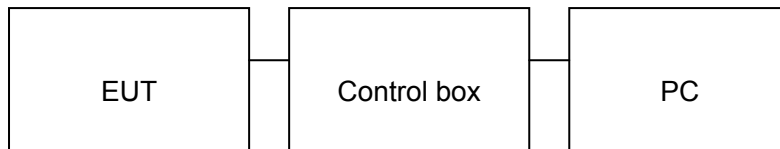
5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)



Note: Owing to the EUT has own battery, Testing will be performed while PC or adapter remove.

Configure 2: (Control continuous TX)



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Premium Wireless Earbuds	TUWEB	FCC ID: Z7RTUWEB	EUT
2	PC	E1412AYCW	Sony	A.E
3	Control box	N/A	N/A	A.E
4	Adapter	P4015	N/A	A.E
5	temporary antenna connector	T10	N/A	A.E.

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249	Radiated Emission	Compliant
§15.249	Band Edges	Compliant
§15.207	Conduction Emission	Compliant
§15.215	BANDWIDTH	Compliant

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 C63.10:2013.

TEST METHODOLOGY

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

7. ALL 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, 2015	July 3, 2016
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2015	July 3, 2016
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2015	July 3, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 6, 2015	June 5, 2016
Spectrum analyzer	Agilent	E4407B	MY46185649	June 6, 2015	June 5, 2016
Radiation Cable 1	MXT	RS1	R005	June 6, 2015	June 5, 2016
Radiation Cable 2	MXT	RS1	R006	June 6, 2015	June 5, 2016

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, 2015	July 3, 2016
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	July 11, 2015	July 10, 2016
Spectrum Analyzer	Agilent	E4411B	MY4511453	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9718	9718-269	July 7, 2015	July 6, 2016
RF Cable	SCHWARZBECK	AK9515H	96220	July 8, 2015	July 7, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 6, 2015	June 5, 2016
Radiation Cable 1	MXT	RS1	R005	June 6, 2015	June 5, 2016
Radiation Cable 2	MXT	RS1	R006	June 6, 2015	June 5, 2016

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	- Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Artificial Mains Network	Narda	L2-16B	000WX31025	July 8, 2015	July 7, 2016
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 8, 2015	July 7, 2016
RF Cable	SCHWARZBECK	AK9515E	96222	July 4, 2015	July 3, 2016
Shielded Room	CHENGYU	843	PTS-002	June 6,2015	June 5,2016
Conduction Cable	MXT	SE1	S003	June 6,2015	June 5,2016

8. RADIATED EMISSION

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

Remark: (1) Emission level dB μ 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.

8.2. MEASUREMENT PROCEDURE

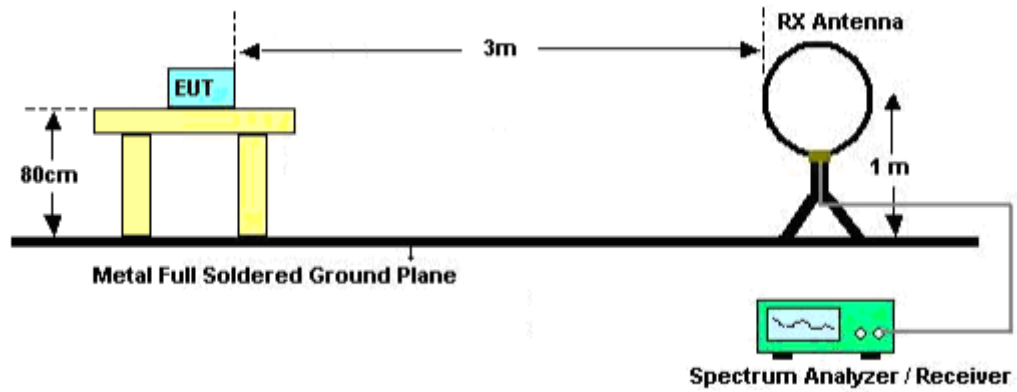
1. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(below 1GHz)
2. The measuring distance of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

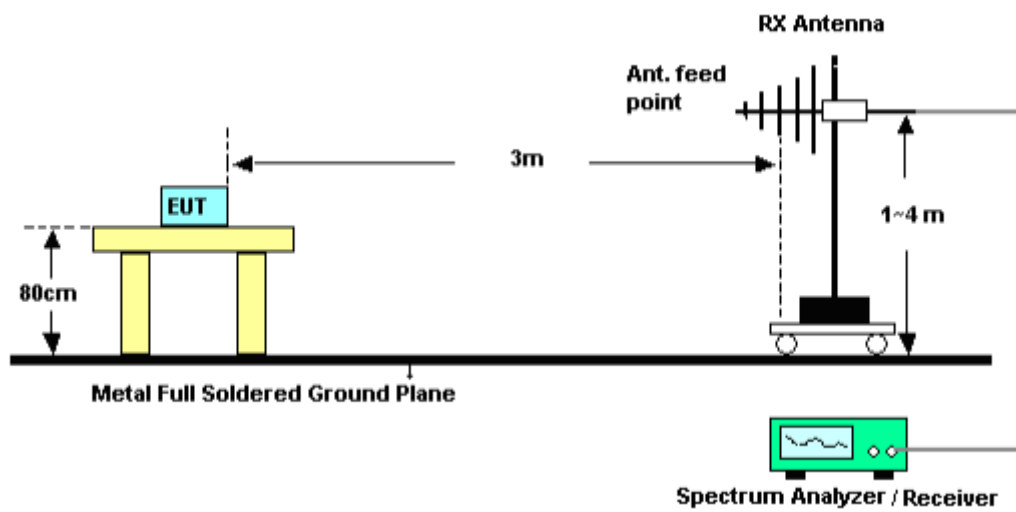
Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/10Hz for Average
Receiver Parameter	Setting
Start ~Stop Frequency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

8.3. TEST SETUP

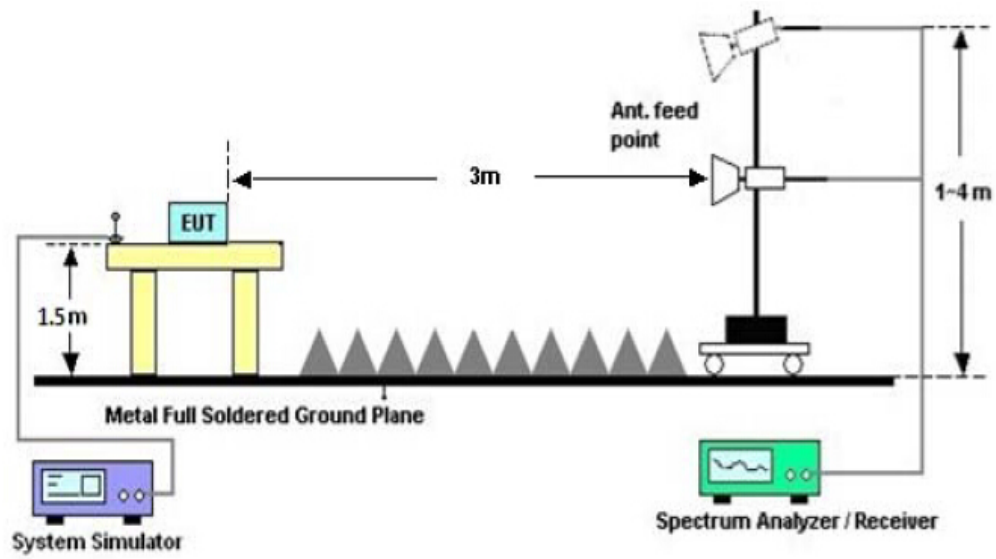
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



8.4. TEST RESULT

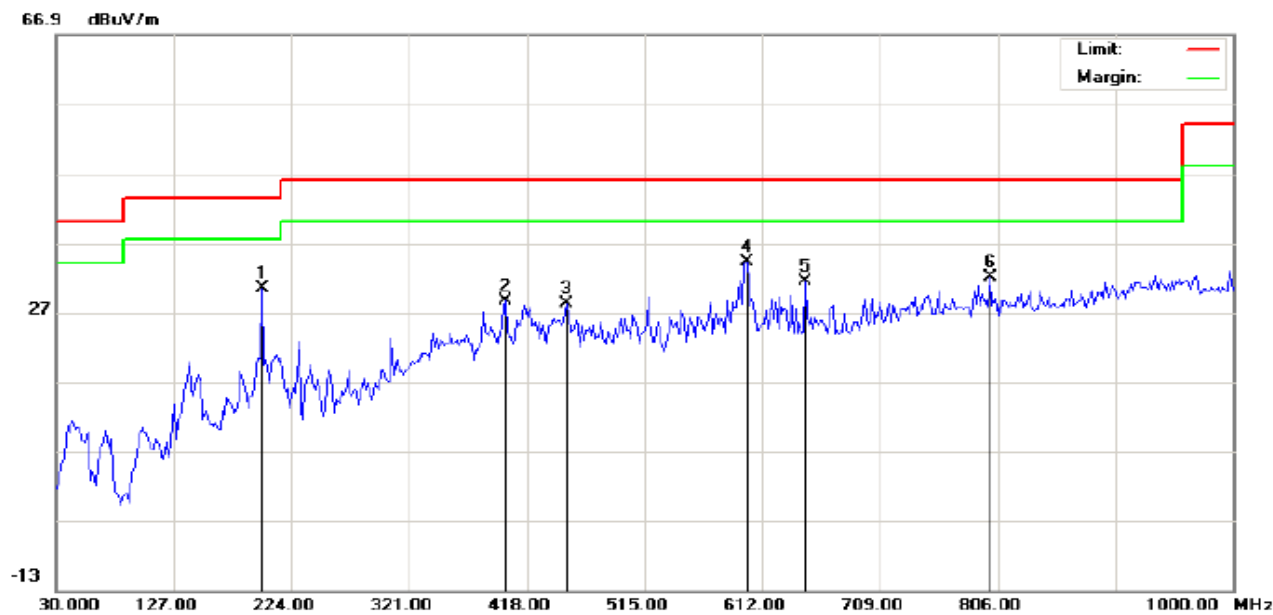
(Worst modulation:GFSK)
FOR BR/EDR

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

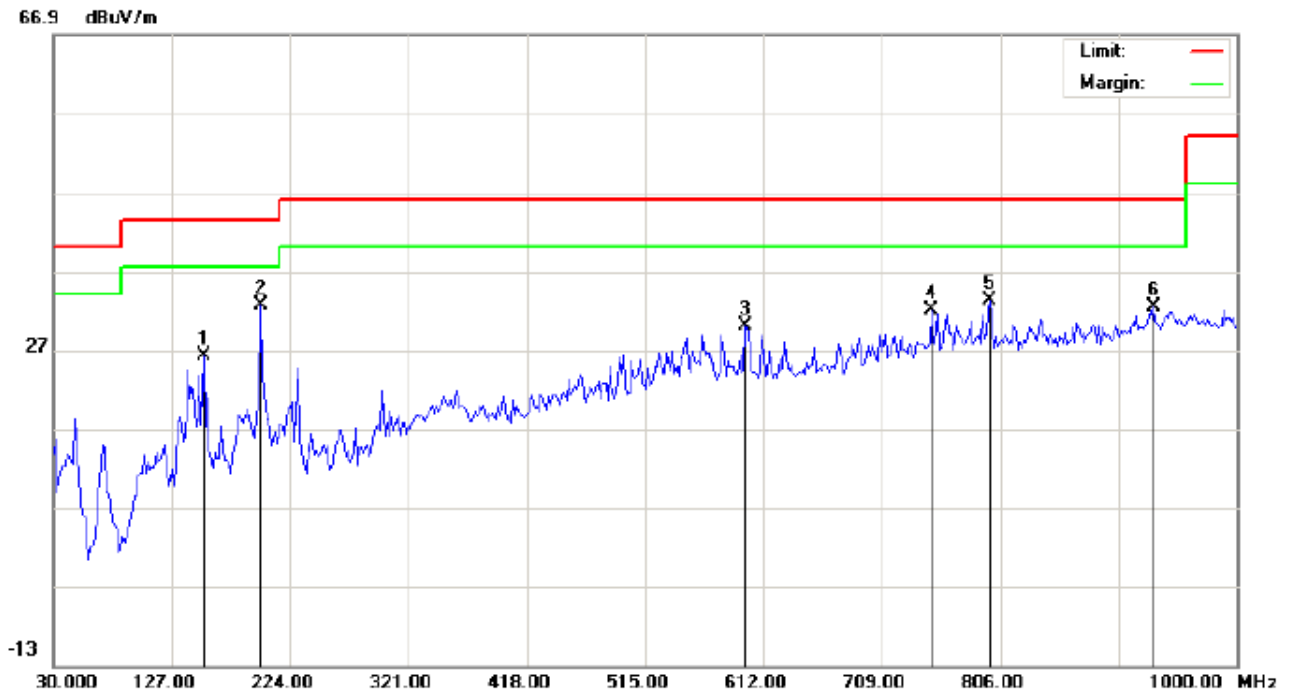


Site: site #1	Polarization: Horizontal	Temperature: 23.1
Limit: FCC Class B 3M Radiation	Power:	Humidity: 52.4 %
EUT: Premium Wireless Earbuds	Distance:	
M/N: TUWEB		
Mode: Low Channel TX		
Note:		

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		199.7500	18.35	11.99	30.34	43.50	-13.16	peak			
2		400.2167	9.48	19.08	28.56	46.00	-17.44	peak			
3		450.3333	7.66	20.59	28.25	46.00	-17.75	peak			
4	*	599.0667	10.42	23.71	34.13	46.00	-11.87	peak			
5		647.5667	7.54	23.84	31.38	46.00	-14.62	peak			
6		799.5333	4.78	27.31	32.09	46.00	-13.91	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: site #1

Limit: FCC Class B 3M Radiation

EUT: Premium Wireless Earbuds

M/N: TUWEB

Mode: Low Channel TX

Note:

Polarization: *Vertical*

Power:

Distance:

Temperature: 23.1

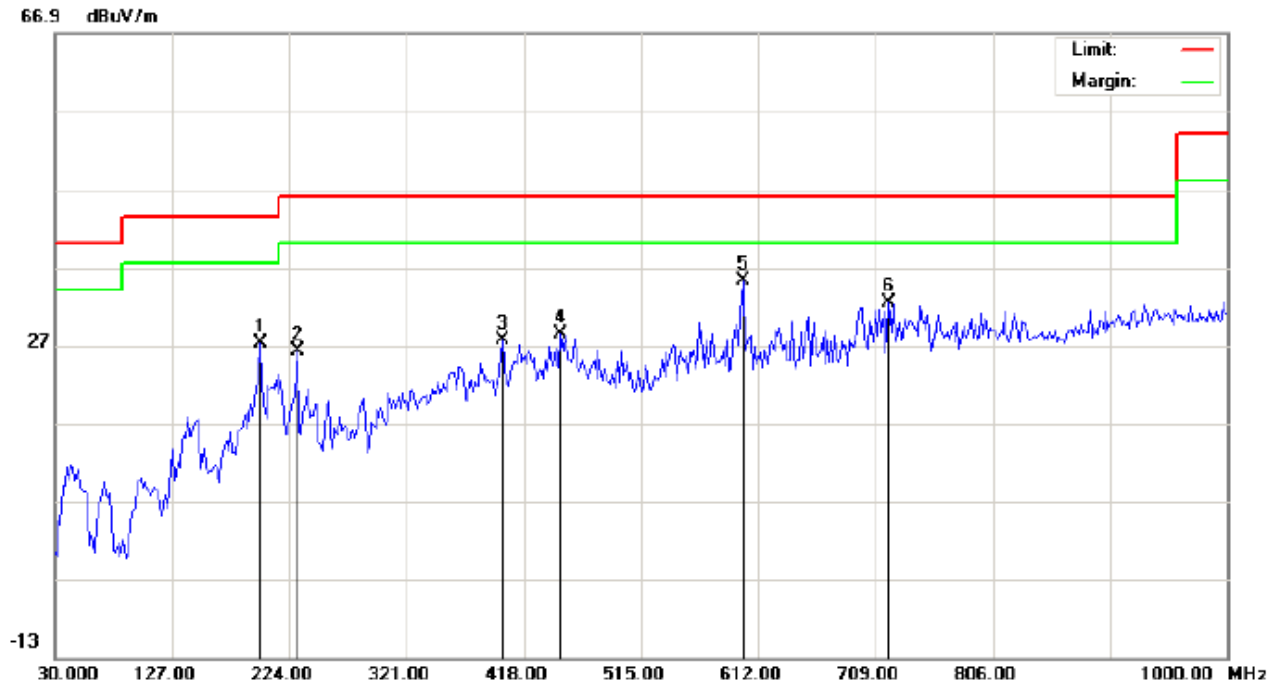
Humidity: 52.4 %

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		152.8667	14.07	12.07	26.14	43.50	-17.36	peak			
2	*	199.7500	20.58	11.99	32.57	43.50	-10.93	peak			
3		597.4500	6.24	23.67	29.91	46.00	-16.09	peak			
4		749.4167	5.30	26.61	31.91	46.00	-14.09	peak			
5		797.9167	5.83	27.29	33.12	46.00	-12.88	peak			
6		932.1000	2.87	29.50	32.37	46.00	-13.63	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

Polarization: *Horizontal*

Temperature: 23.1

Limit: FCC Class B 3M Radiation

Power:

Humidity: 52.4 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

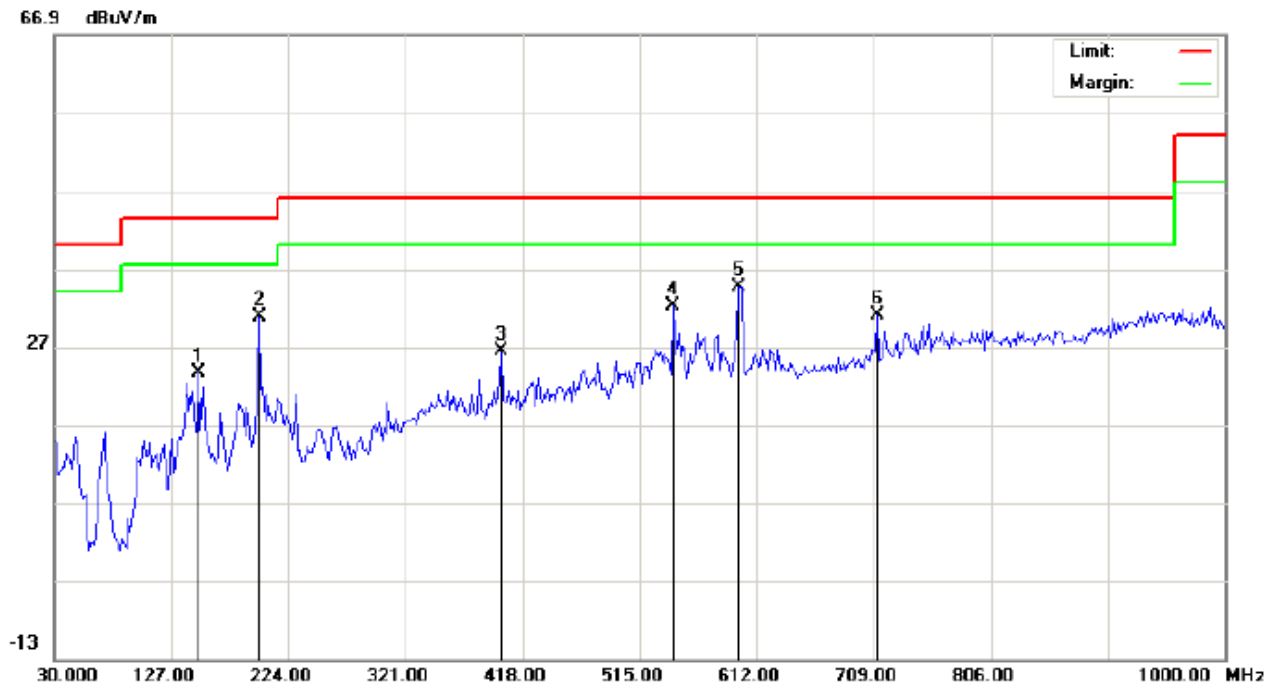
Mode: Middle Channel TX

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		199.7500	15.16	11.99	27.15	43.50	-16.35	peak			
2		230.4667	17.32	8.89	26.21	46.00	-19.79	peak			
3		400.2167	8.56	19.08	27.64	46.00	-18.36	peak			
4		448.7167	7.86	20.55	28.41	46.00	-17.59	peak			
5	*	599.0667	11.56	23.71	35.27	46.00	-10.73	peak			
6		720.3167	6.61	25.78	32.39	46.00	-13.61	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: site #1

Limit: FCC Class B 3M Radiation

EUT: Premium Wireless Earbuds

M/N: TUWEB

Mode: Middle Channel TX

Note:

Polarization: **Vertical**

Power:

Distance:

Temperature: 23.1

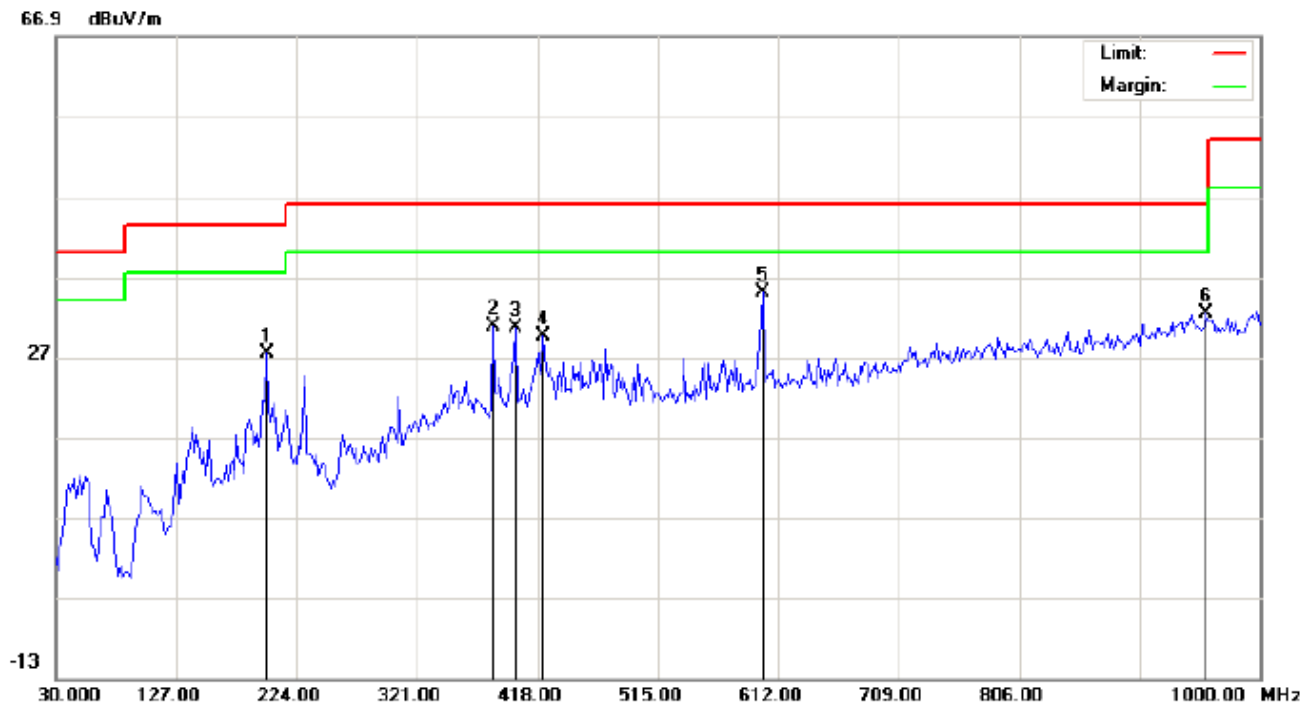
Humidity: 52.4 %

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		149.6333	10.75	12.85	23.60	43.50	-19.90	peak			
2		199.7500	18.86	11.99	30.85	43.50	-12.65	peak			
3		400.2167	7.35	19.08	26.43	46.00	-19.57	peak			
4		542.4833	9.86	22.28	32.14	46.00	-13.86	peak			
5	*	597.4500	11.01	23.67	34.68	46.00	-11.32	peak			
6		712.2333	5.38	25.54	30.92	46.00	-15.08	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

Polarization: *Horizontal*

Temperature: 23.1

Limit: FCC Class B 3M Radiation

Power:

Humidity: 52.4 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

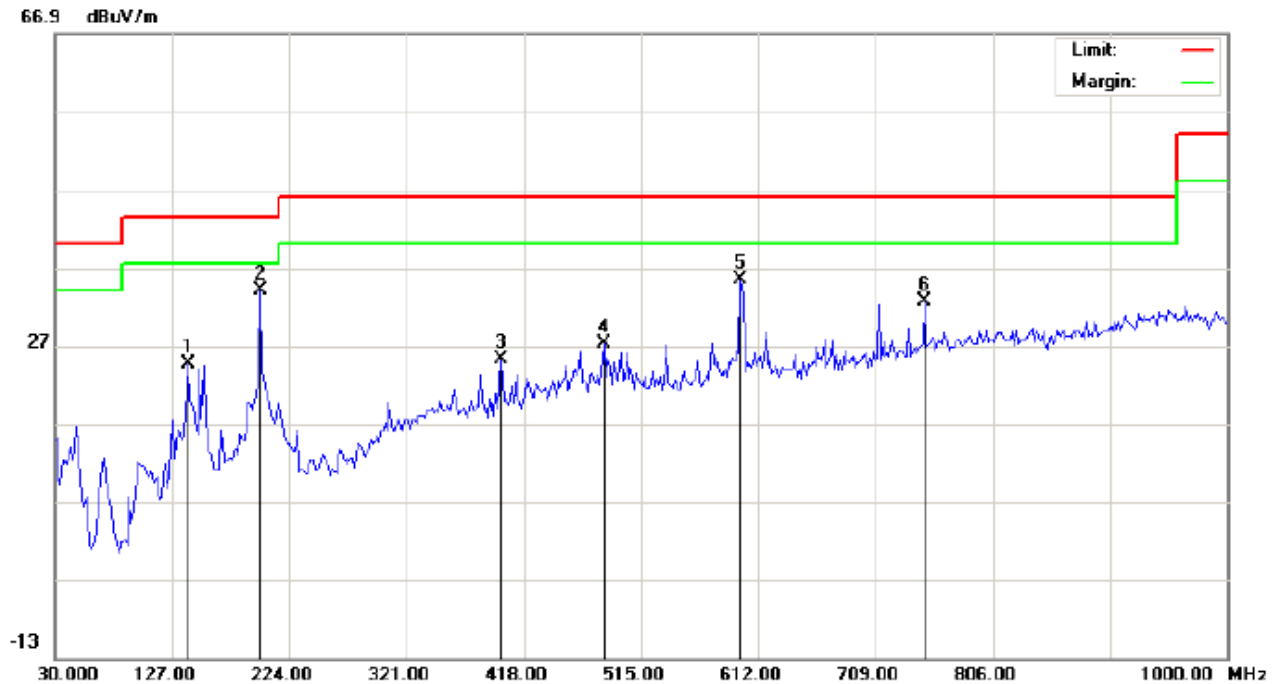
Mode: High Channel TX

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		199.7500	15.51	11.99	27.50	43.50	-16.00	peak			
2		382.4333	11.79	18.95	30.74	46.00	-15.26	peak			
3		400.2167	11.50	19.08	30.58	46.00	-15.42	peak			
4		422.8500	9.81	19.76	29.57	46.00	-16.43	peak			
5	*	599.0667	11.25	23.71	34.96	46.00	-11.04	peak			
6		956.3500	2.41	29.94	32.35	46.00	-13.65	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: site #1

Polarization: *Vertical*

Temperature: 23.1

Limit: FCC Class B 3M Radiation

Power:

Humidity: 52.4 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

Mode: High 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		139.9333	9.39	15.17	24.56	43.50	-18.94	peak			
2	*	199.7500	22.08	11.99	34.07	43.50	-9.43	peak			
3		398.6000	6.18	19.06	25.24	46.00	-20.76	peak			
4		484.2833	6.29	20.96	27.25	46.00	-18.75	peak			
5		597.4500	11.65	23.67	35.32	46.00	-10.68	peak			
6		749.4167	5.90	26.61	32.51	46.00	-13.49	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.

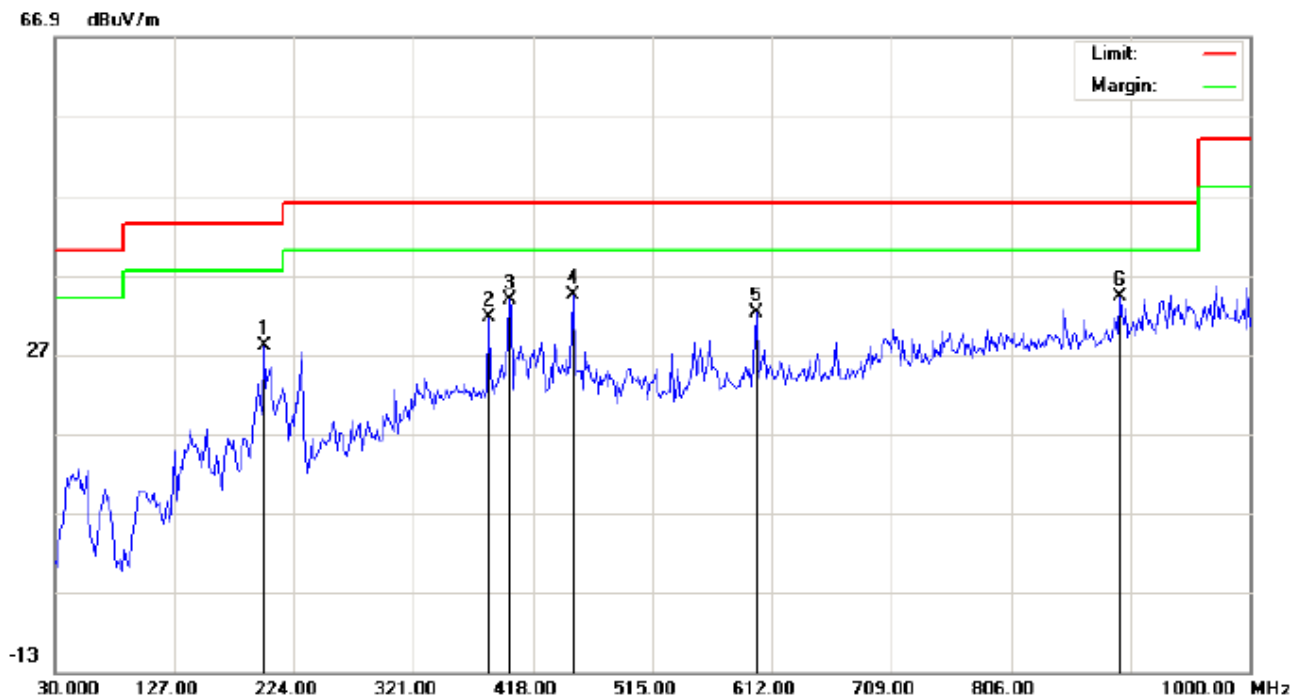
FOR BLE

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: Premium Wireless Earbuds

M/N: TUWEB

Mode: Low Channel TX

Note:

Polarization: *Horizontal*

Power:

Distance:

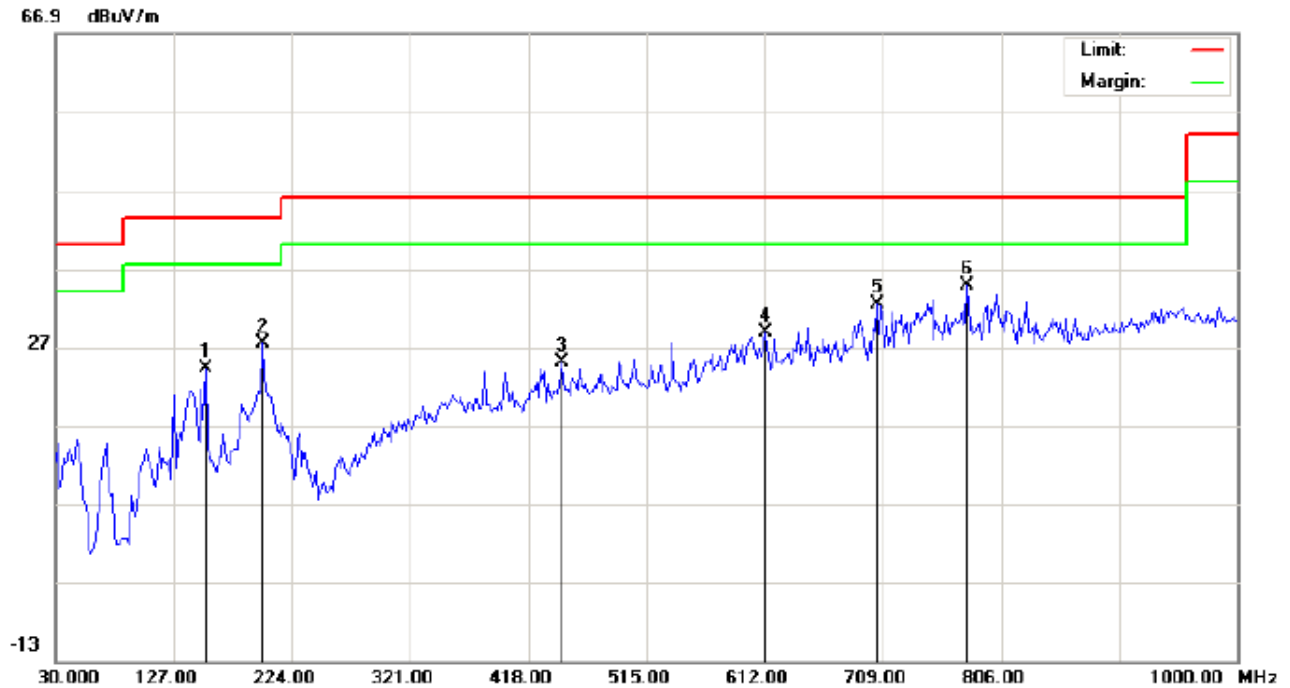
Temperature: 23.1

Humidity: 52.4 %

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		199.7500	16.07	11.99	28.06	43.50	-15.44	peak			
2		382.4333	12.58	18.95	31.53	46.00	-14.47	peak			
3		398.6000	14.66	19.06	33.72	46.00	-12.28	peak			
4	*	450.3333	13.87	20.59	34.46	46.00	-11.54	peak			
5		599.0667	8.59	23.71	32.30	46.00	-13.70	peak			
6		894.9167	5.73	28.48	34.21	46.00	-11.79	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: site #1

Polarization: **Vertical**

Temperature: 23.1

Limit: FCC Class B 3M Radiation

Power:

Humidity: 52.4 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

Mode: Low Channel TX

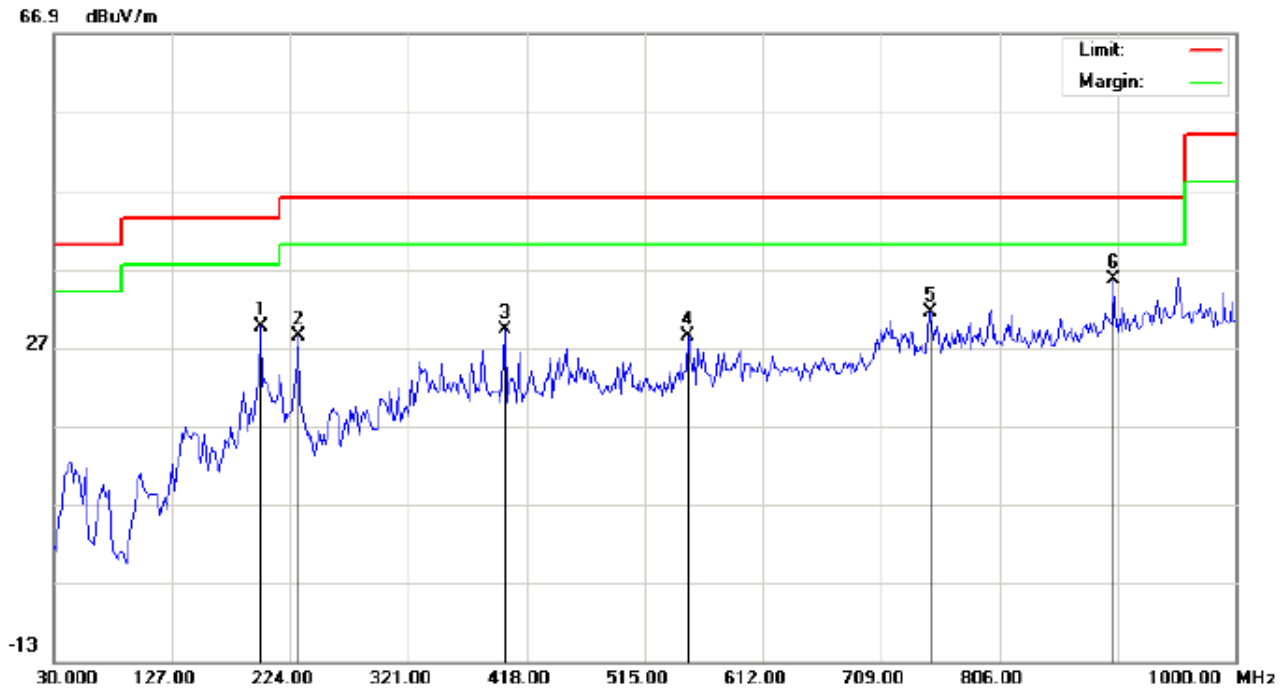
Note:

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		152.8667	12.04	12.07	24.11	43.50	-19.39	peak			
2		199.7500	15.49	11.99	27.48	43.50	-16.02	peak			
3		445.4833	4.51	20.45	24.96	46.00	-21.04	peak			
4		612.0000	5.04	23.76	28.80	46.00	-17.20	peak			
5		704.1500	7.06	25.31	32.37	46.00	-13.63	peak			
6	*	778.5167	7.85	27.02	34.87	46.00	-11.13	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

Polarization: *Horizontal*

Temperature: 23.1

Limit: FCC Class B 3M Radiation

Power:

Humidity: 52.4 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

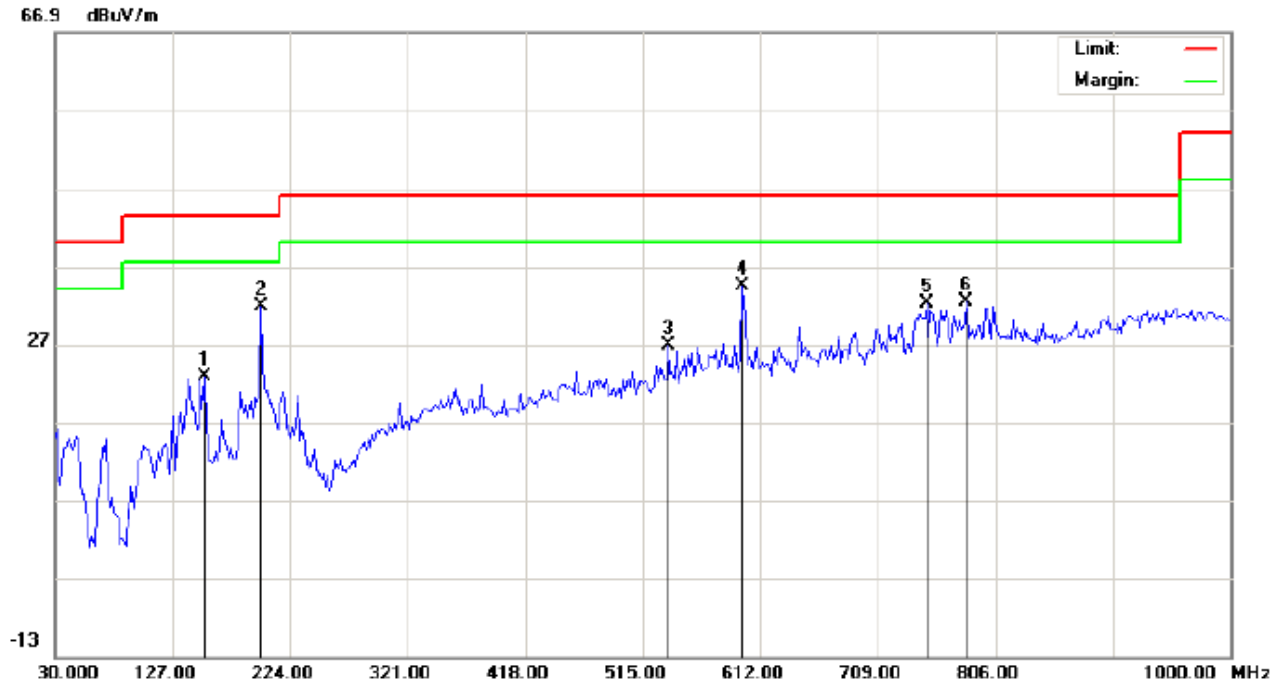
Mode: Middle Channel TX

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		199.7500	17.64	11.99	29.63	43.50	-13.87	peak			
2		230.4667	19.51	8.89	28.40	46.00	-17.60	peak			
3		400.2167	10.17	19.08	29.25	46.00	-16.75	peak			
4		550.5667	5.99	22.49	28.48	46.00	-17.52	peak			
5		749.4167	4.84	26.61	31.45	46.00	-14.55	peak			
6	*	899.7667	7.02	28.60	35.62	46.00	-10.38	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: site #1
 Limit: FCC Class B 3M Radiation
 EUT: Premium Wireless Earbuds
 M/N: TUWEB
 Mode: Middle Channel TX
 Note:

Polarization: **Vertical**
 Power:
 Distance:

Temperature: 23.1
 Humidity: 52.4 %

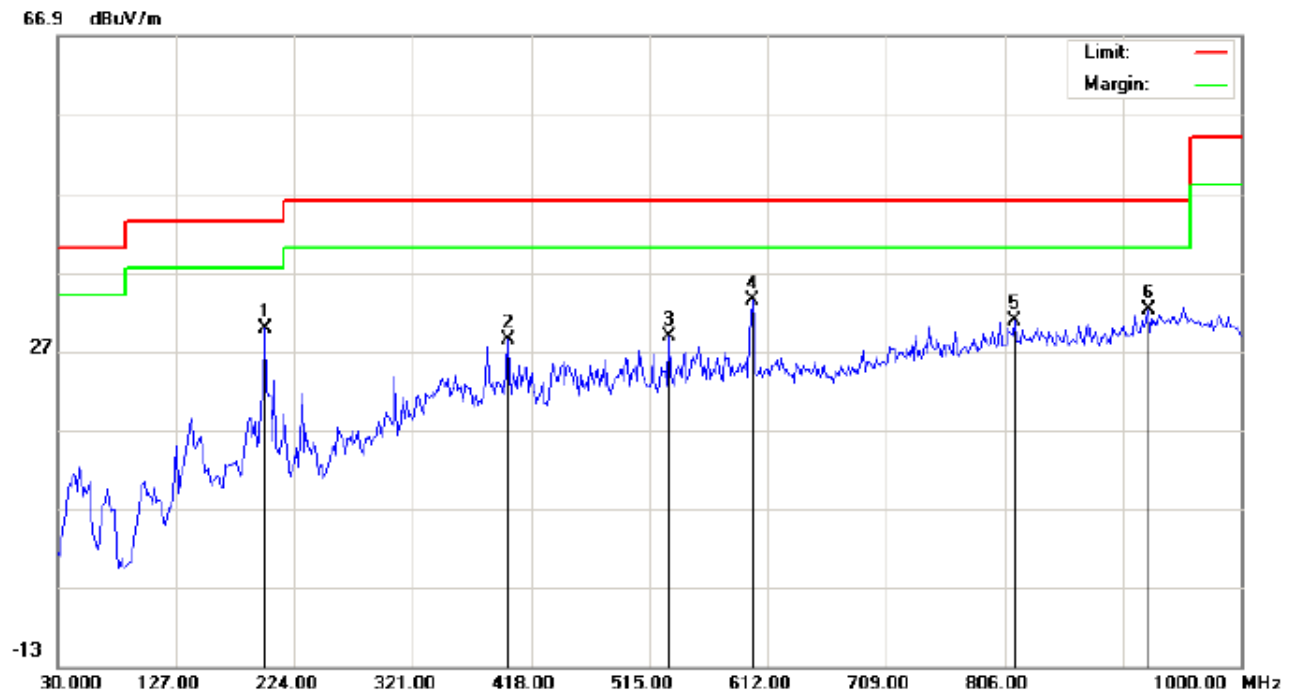
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		152.8667	10.72	12.07	22.79	43.50	-20.71	peak			
2		199.7500	19.79	11.99	31.78	43.50	-11.72	peak			
3		536.0167	4.69	22.10	26.79	46.00	-19.21	peak			
4	*	597.4500	10.78	23.67	34.45	46.00	-11.55	peak			
5		749.4167	5.65	26.61	32.26	46.00	-13.74	peak			
6		781.7500	5.24	27.07	32.31	46.00	-13.69	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

Polarization: *Horizontal*

Temperature: 23.1

Limit: FCC Class B 3M Radiation

Power:

Humidity: 52.4 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

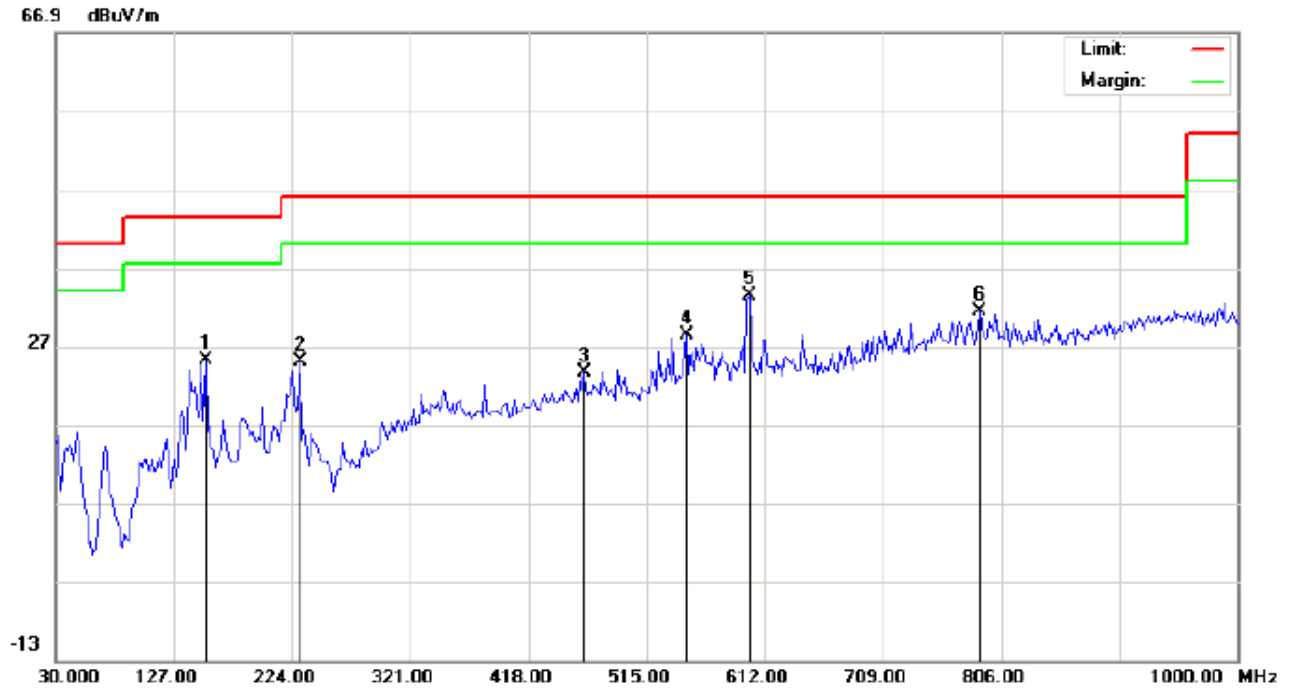
Mode: High Channel TX

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		199.7500	17.90	11.99	29.89	43.50	-13.61	peak			
2		398.6000	9.31	19.06	28.37	46.00	-17.63	peak			
3		531.1667	6.74	21.97	28.71	46.00	-17.29	peak			
4	*	599.0667	9.65	23.71	33.36	46.00	-12.64	peak			
5		814.0833	3.49	27.32	30.81	46.00	-15.19	peak			
6		924.0167	2.84	29.28	32.12	46.00	-13.88	peak			

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: site #1

Polarization: **Vertical**

Temperature: 23.1

Limit: FCC Class B 3M Radiation

Power:

Humidity: 52.4 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

Mode: High Channel TX

Note:

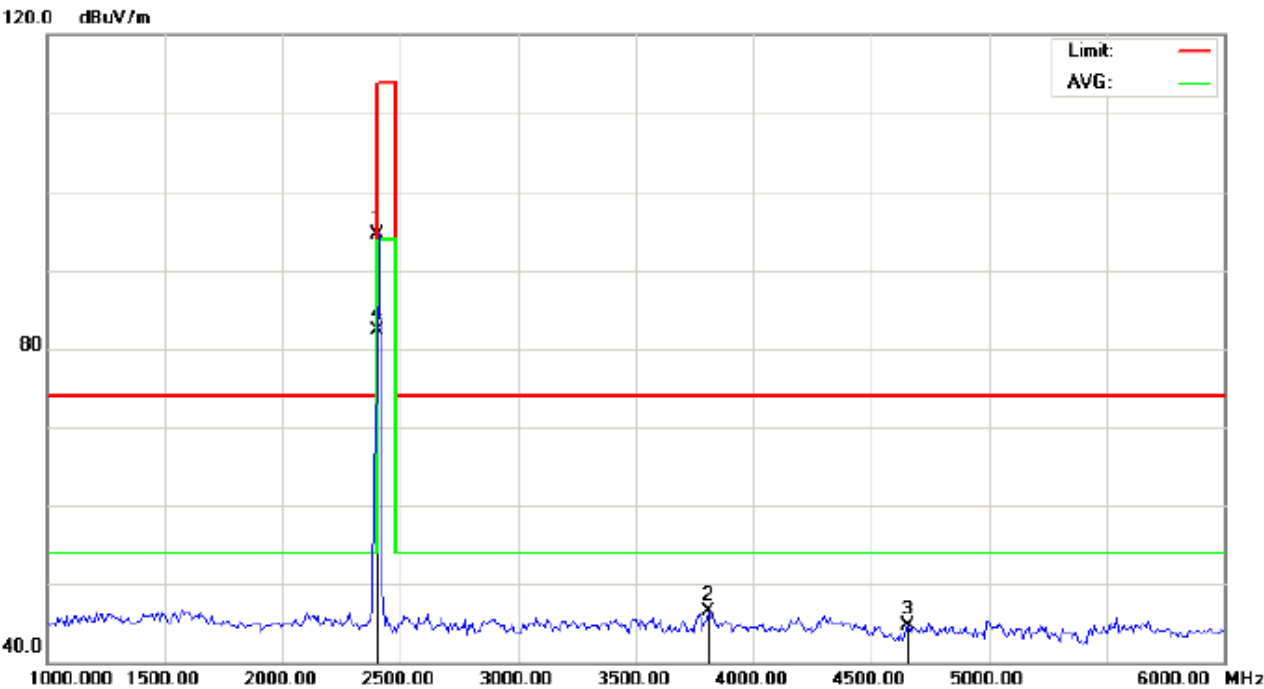
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		152.8667	13.20	12.07	25.27	43.50	-18.23	peak			
2		230.4667	16.17	8.89	25.06	46.00	-20.94	peak			
3		463.2667	2.97	20.73	23.70	46.00	-22.30	peak			
4		547.3333	5.93	22.41	28.34	46.00	-17.66	peak			
5	*	599.0667	9.67	23.71	33.38	46.00	-12.62	peak			
6		788.2167	4.28	27.16	31.44	46.00	-14.56	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

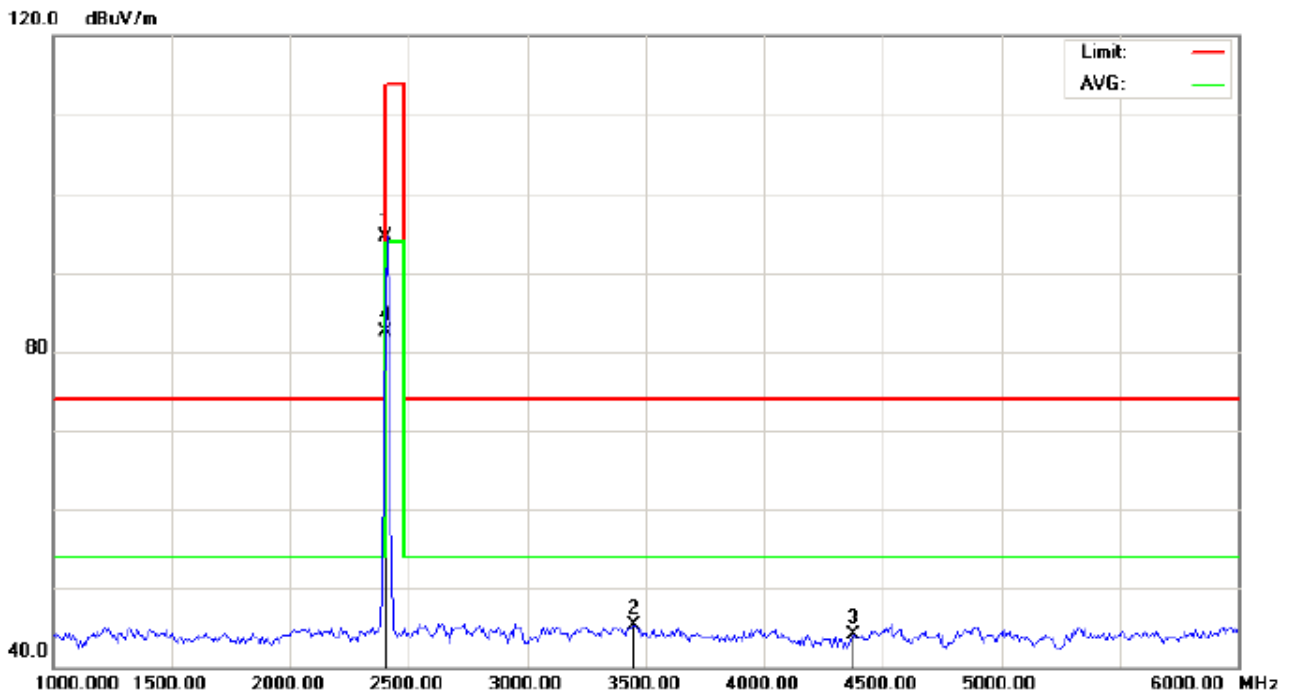


Site: site #1 Polarization: *Horizontal* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %
EUT: Premium Wireless Earbuds Distance: 3m
M/N: TUWEB
Mode: Low Channel TX
Note:

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		2402.000	104.21	-9.68	94.53	114.00	-19.47	peak			
2		3808.333	52.50	-5.99	46.51	74.00	-27.49	peak			
3		4658.333	47.49	-2.70	44.79	74.00	-29.21	peak			
4	*	2402.000	91.97	-9.68	82.29	94.00	-11.71	AVG	100	321	

RESULT: PASS

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



Site: site #1

Polarization: *Vertical*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

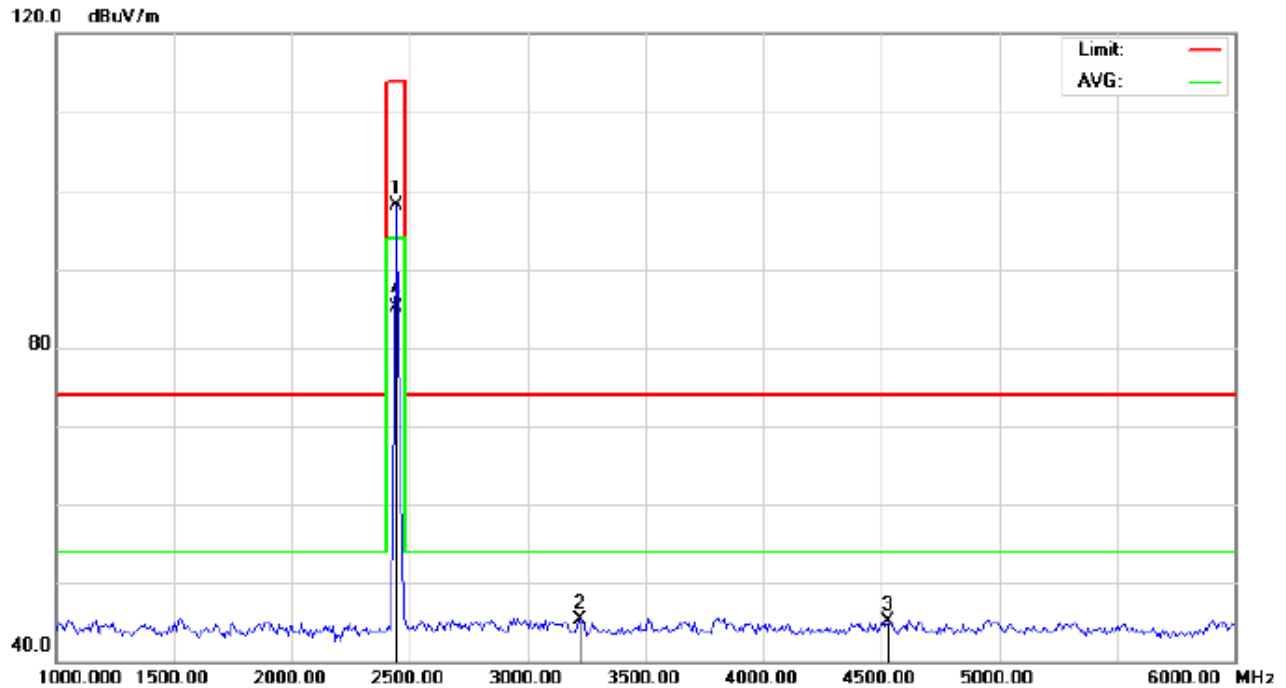
Mode: Low Channel TX

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		2402.000	104.25	-9.68	94.57	114.00	-19.43	peak			
2		3450.000	53.32	-7.94	45.38	74.00	-28.62	peak			
3		4375.000	47.70	-3.53	44.17	74.00	-29.83	peak			
4	*	2402.000	92.11	-9.68	82.43	94.00	-11.57	AVG	100	52	

RESULT: PASS

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



Site: site #1

Polarization: *Horizontal*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

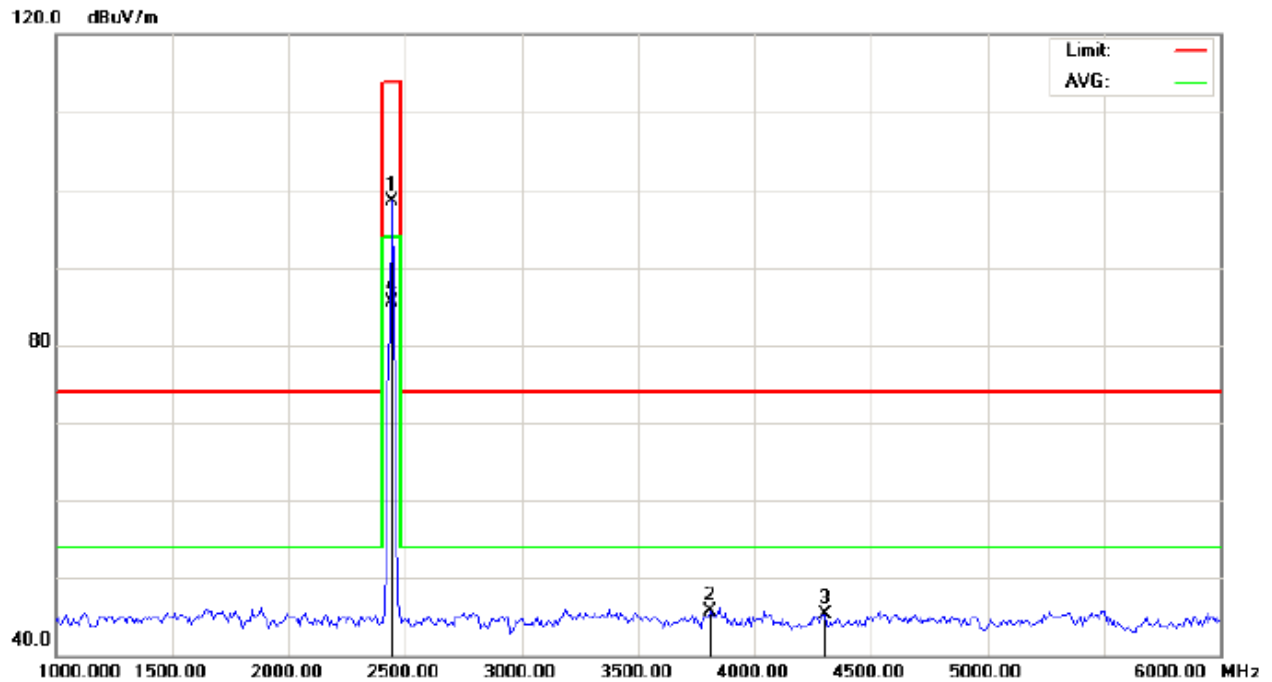
Mode: Middle Channel TX

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	107.82	-9.63	98.19	114.00	-15.81	peak			
2		3225.000	53.55	-8.15	45.40	74.00	-28.60	peak			
3		4533.333	48.11	-3.02	45.09	74.00	-28.91	peak			
4	*	2441.000	94.78	-9.63	85.15	94.00	-8.85	AVG	100	324	

RESULT: PASS

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



Site: site #1

Polarization: **Vertical**

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

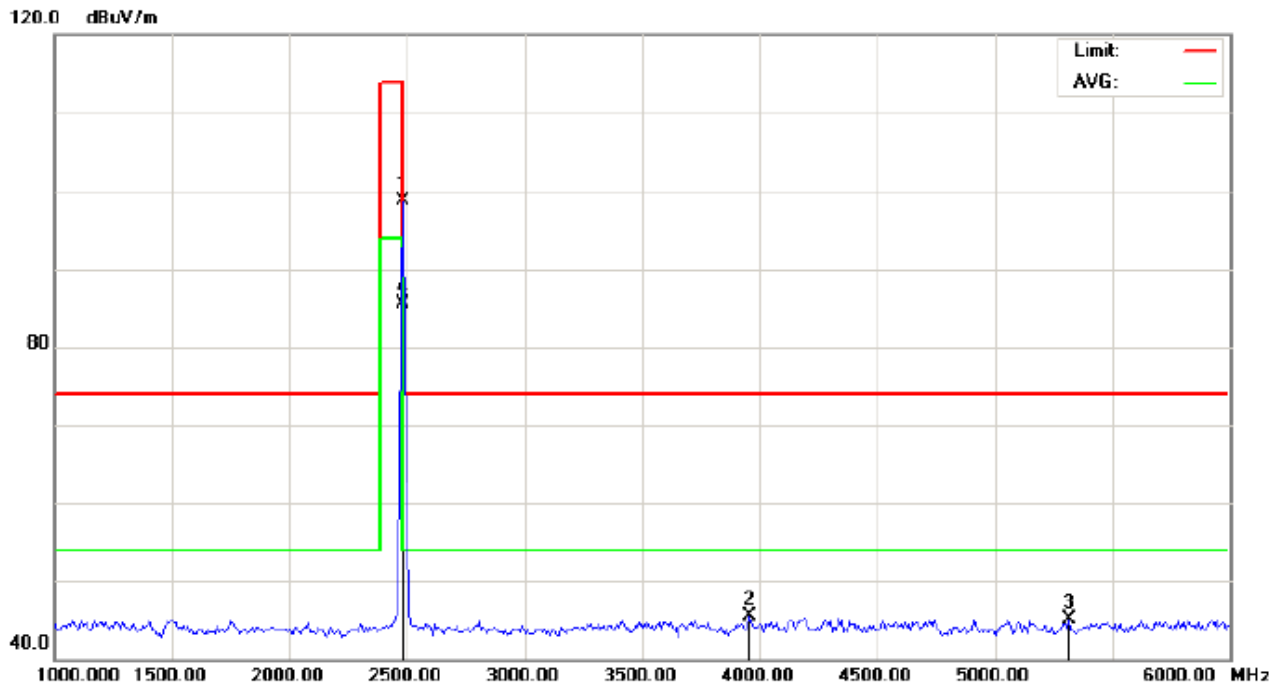
Mode: Middle Channel TX

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	108.19	-9.63	98.56	114.00	-15.44	peak			
2		3808.333	51.64	-5.99	45.65	74.00	-28.35	peak			
3		4300.000	49.13	-3.79	45.34	74.00	-28.66	peak			
4	*	2441.000	95.21	-9.63	85.58	94.00	-8.42	AVG	100	54	

RESULT: PASS

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



Site: site #1

Polarization: *Horizontal*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

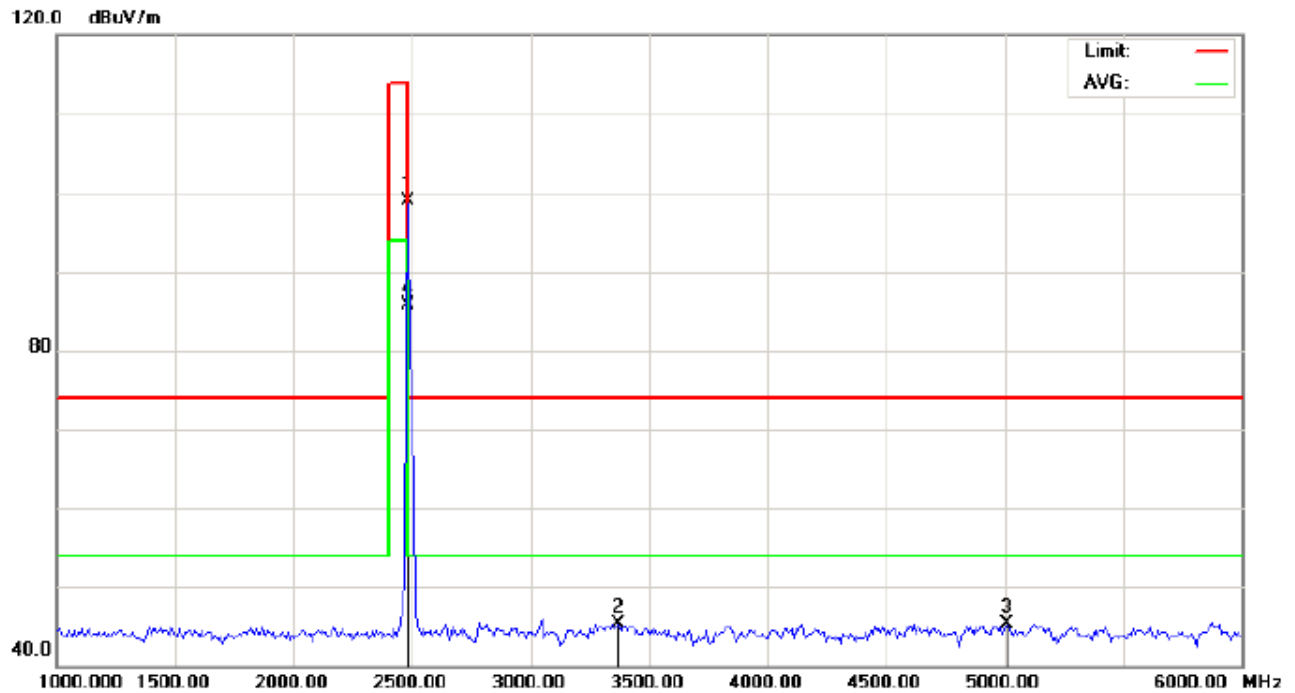
Mode: High Channel TX

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		2480.000	108.34	-9.59	98.75	114.00	-15.25	peak			
2		3958.333	50.49	-5.07	45.42	74.00	-28.58	peak			
3		5316.667	46.91	-1.81	45.10	74.00	-28.90	peak			
4	*	2480.000	95.06	-9.59	85.47	94.00	-8.53	AVG	100	319	

RESULT: PASS

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



Site: site #1

Polarization: **Vertical**

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

Mode: High 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		2480.000	108.41	-9.59	98.82	114.00	-15.18	peak			
2		3366.667	53.42	-8.02	45.40	74.00	-28.60	peak			
3		5008.333	47.14	-1.80	45.34	74.00	-28.66	peak			
4	*	2480.000	95.33	-9.59	85.74	94.00	-8.26	AVG	100	58	

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	104.21	-9.68	94.53	114.00	-19.47	Horizontal
2402	104.25	-9.68	94.57	114.00	-19.43	Vertical
2441	107.82	-9.63	98.19	114.00	-15.81	Horizontal
2441	108.19	-9.63	98.56	114.00	-15.44	Vertical
2480	108.34	-9.59	98.75	114.00	-15.25	Horizontal
2480	108.41	-9.59	98.82	114.00	-15.18	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	91.97	-9.68	82.29	94.00	-11.71	Horizontal
2402	92.11	-9.68	82.43	94.00	-11.57	Vertical
2441	94.78	-9.63	85.15	94.00	-8.85	Horizontal
2441	95.21	-9.63	85.58	94.00	-8.42	Vertical
2480	95.06	-9.59	85.47	94.00	-8.53	Horizontal
2480	95.33	-9.59	85.74	94.00	-8.26	Vertical

2Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	100.89	-9.68	91.21	114.00	-22.79	Horizontal
2402	100.72	-9.68	91.04	114.00	-22.96	Vertical
2441	105.06	-9.68	95.38	114.00	-18.62	Horizontal
2441	104.95	-9.68	95.27	114.00	-18.73	Vertical
2480	105.2	-9.63	95.57	114.00	-18.43	Horizontal
2480	104.99	-9.63	95.36	114.00	-18.64	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	89.05	-9.63	79.42	94.00	-14.58	Horizontal
2402	88.88	-9.63	79.25	94.00	-14.75	Vertical
2441	-92.12	-9.59	82.53	94.00	-11.47	Horizontal
2441	-91.96	-9.59	82.37	94.00	-11.63	Vertical
2480	-92.34	-9.59	82.75	94.00	-11.25	Horizontal
2480	-92.28	-9.59	82.69	94.00	-11.31	Vertical

3Mbps Result:

Peak value

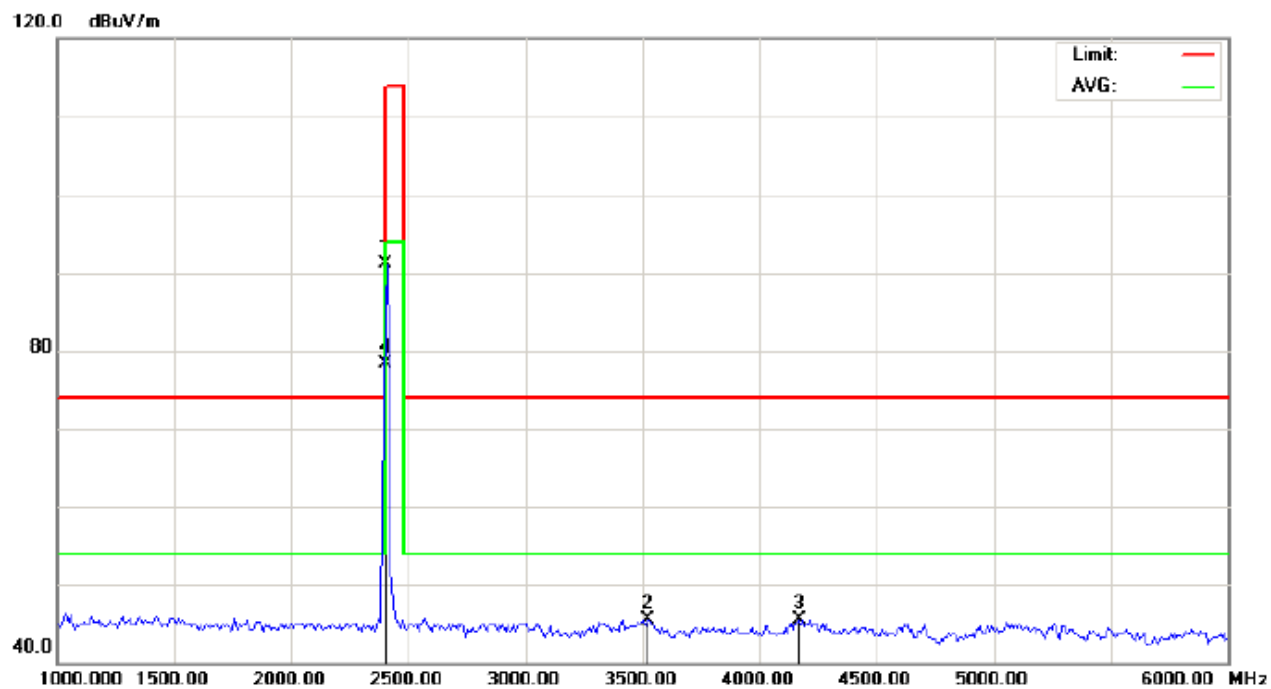
Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	100.85	-9.68	91.17	114.00	-22.83	Horizontal
2402	100.66	-9.68	90.98	114.00	-23.02	Vertical
2441	104.94	-9.68	95.26	114.00	-18.74	Horizontal
2441	104.82	-9.68	95.14	114.00	-18.86	Vertical
2480	105.11	-9.63	95.48	114.00	-18.52	Horizontal
2480	104.91	-9.63	95.28	114.00	-18.72	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	88.98	-9.63	79.35	94.00	-14.65	Horizontal
2402	88.82	-9.63	79.19	94.00	-14.81	Vertical
2441	-92.08	-9.59	82.49	94.00	-11.51	Horizontal
2441	-91.86	-9.59	82.27	94.00	-11.73	Vertical
2480	-92.23	-9.59	82.64	94.00	-11.36	Horizontal
2480	-91.94	-9.59	82.35	94.00	-11.65	Vertical

FOR BLE

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

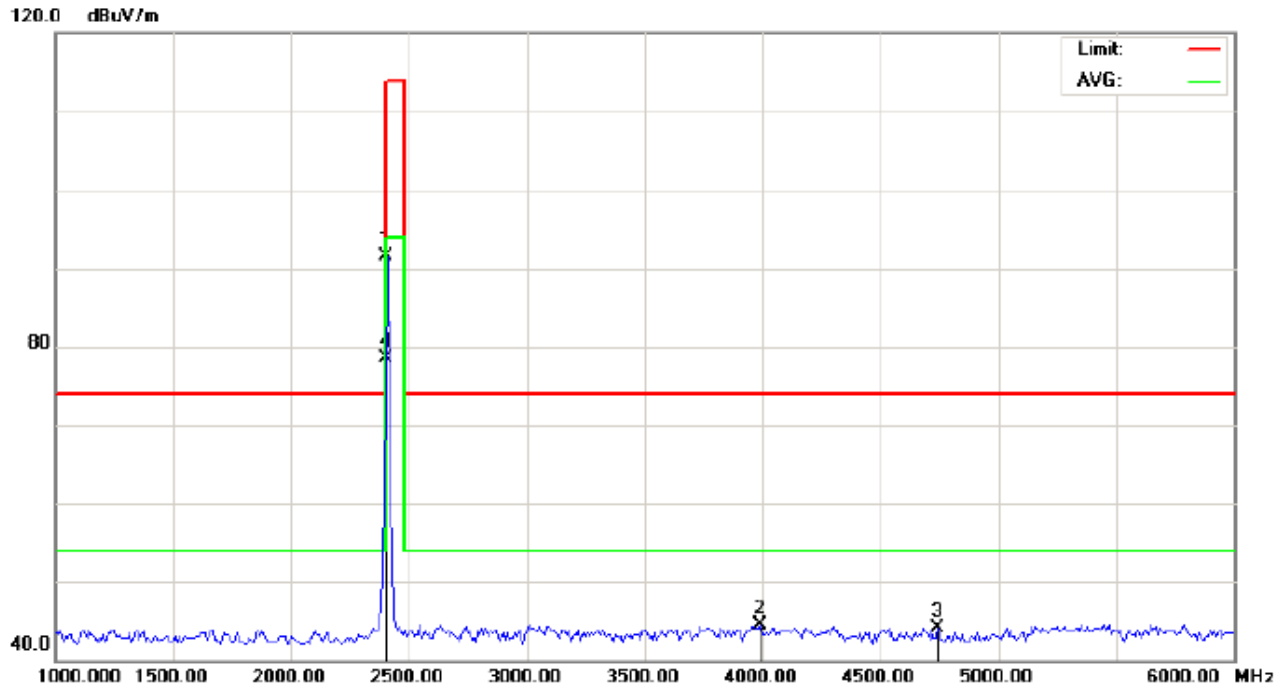


Site: site #1	Polarization: <i>Horizontal</i>	Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)-	Power:	Humidity: 60 %
EUT: Premium Wireless Earbuds	Distance: 3m	
M/N: TUWEB		
Mode: Low Channel TX		
Note:		

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		2402.000	100.77	-9.68	91.09	114.00	-22.91	peak			
2		3525.000	53.29	-7.74	45.55	74.00	-28.45	peak			
3		4166.667	49.78	-4.24	45.54	74.00	-28.46	peak			
4	*	2402.000	87.93	-9.68	78.25	94.00	-15.75	AVG	100	289	

RESULT: PASS

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

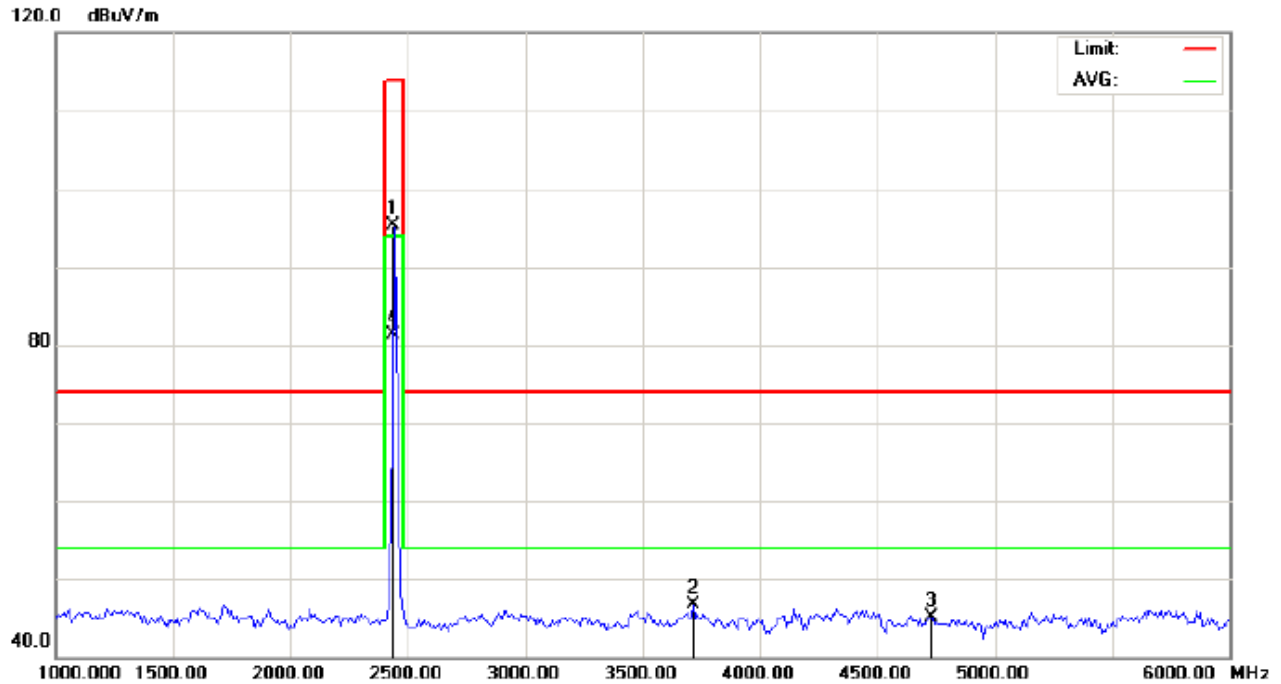


Site: site #1 Polarization: **Vertical** Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK)- Power: Humidity: 60 %
 EUT: Premium Wireless Earbuds Distance: 3m
 M/N: TUWEB
 Mode: Low Channel TX
 Note:

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		2402.000	101.20	-9.68	91.52	114.00	-22.48	peak			
2		3991.667	49.29	-4.86	44.43	74.00	-29.57	peak			
3		4741.667	46.60	-2.48	44.12	74.00	-29.88	peak			
4	*	2402.000	88.11	-9.68	78.43	94.00	-15.57	AVG	100	37	

RESULT: PASS

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



Site: site #1

Polarization: *Horizontal*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

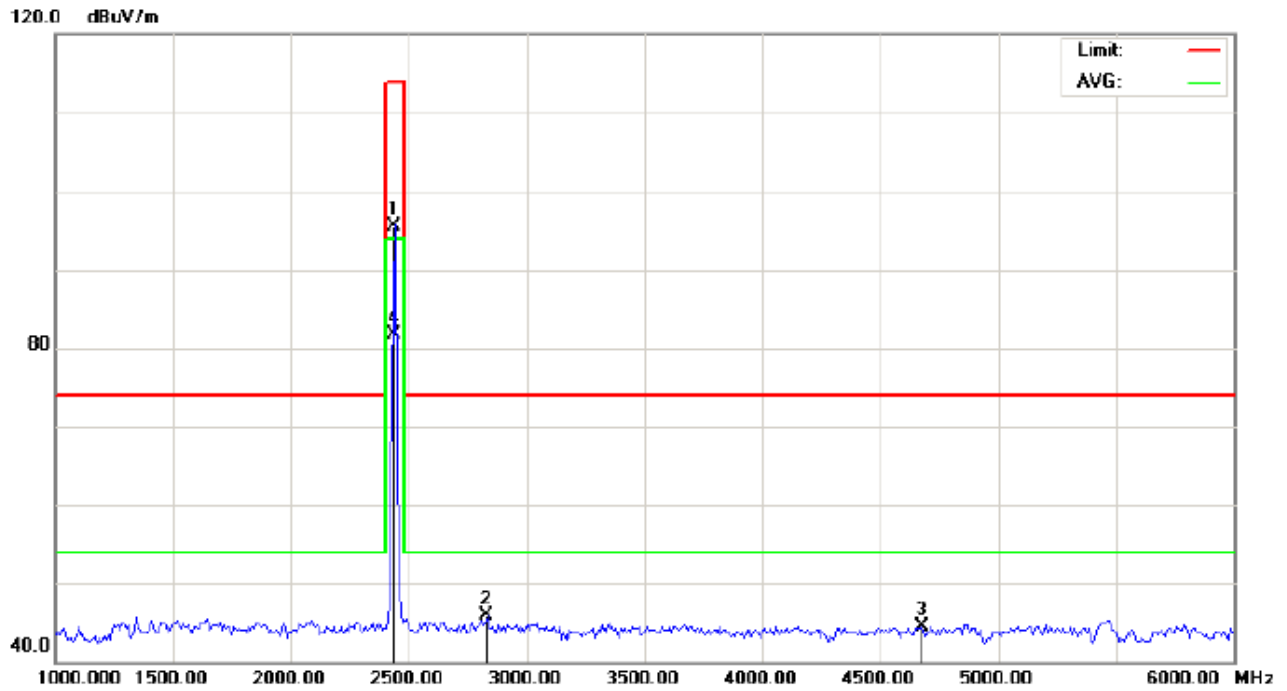
Mode: Middle Channel TX

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		2440.000	104.85	-9.64	95.21	114.00	-18.79	peak			
2		3716.667	53.22	-6.56	46.66	74.00	-27.34	peak			
3		4733.333	47.56	-2.50	45.06	74.00	-28.94	peak			
4	*	2440.000	90.93	-9.64	81.29	94.00	-12.71	AVG	100	293	

RESULT: PASS

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



Site: site #1

Polarization: **Vertical**

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

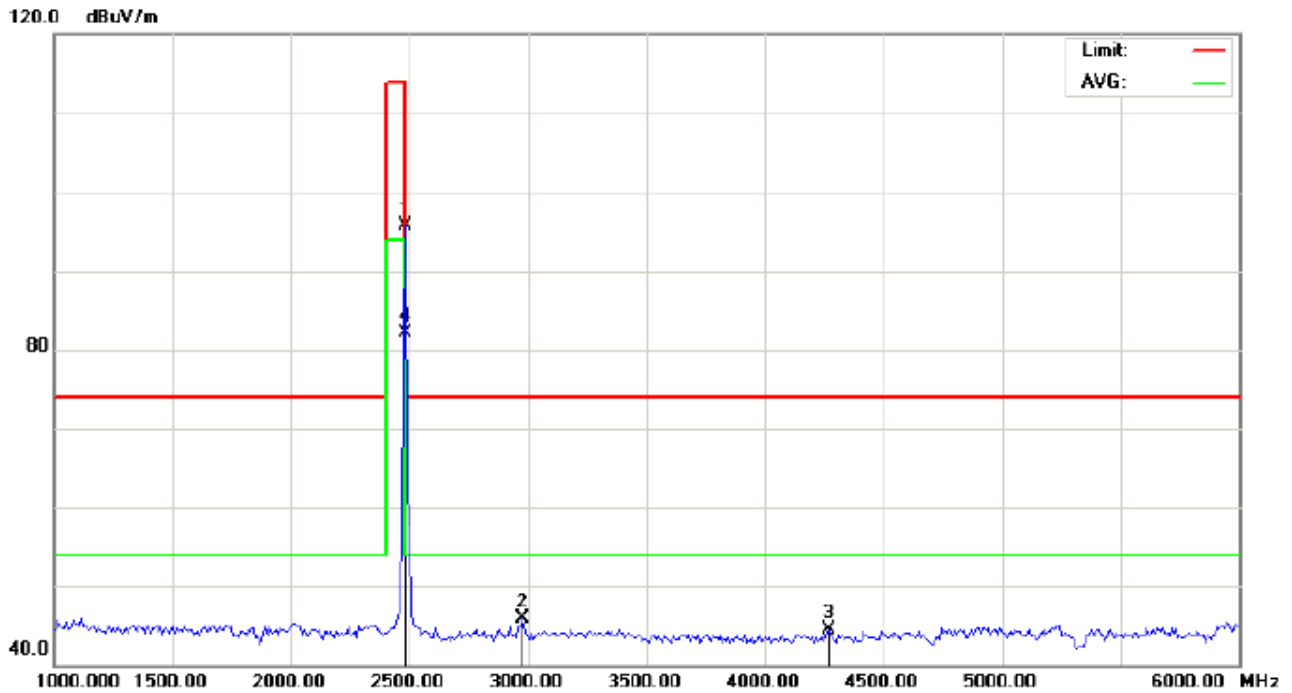
Mode: Middle Channel TX

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		2440.000	105.20	-9.64	95.56	114.00	-18.44	peak			
2		2833.333	54.64	-8.76	45.88	74.00	-28.12	peak			
3		4675.000	47.12	-2.65	44.47	74.00	-29.53	peak			
4	*	2440.000	91.26	-9.64	81.62	94.00	-12.38	AVG	100	42	

RESULT: PASS

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



Site: site #1

Polarization: *Horizontal*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

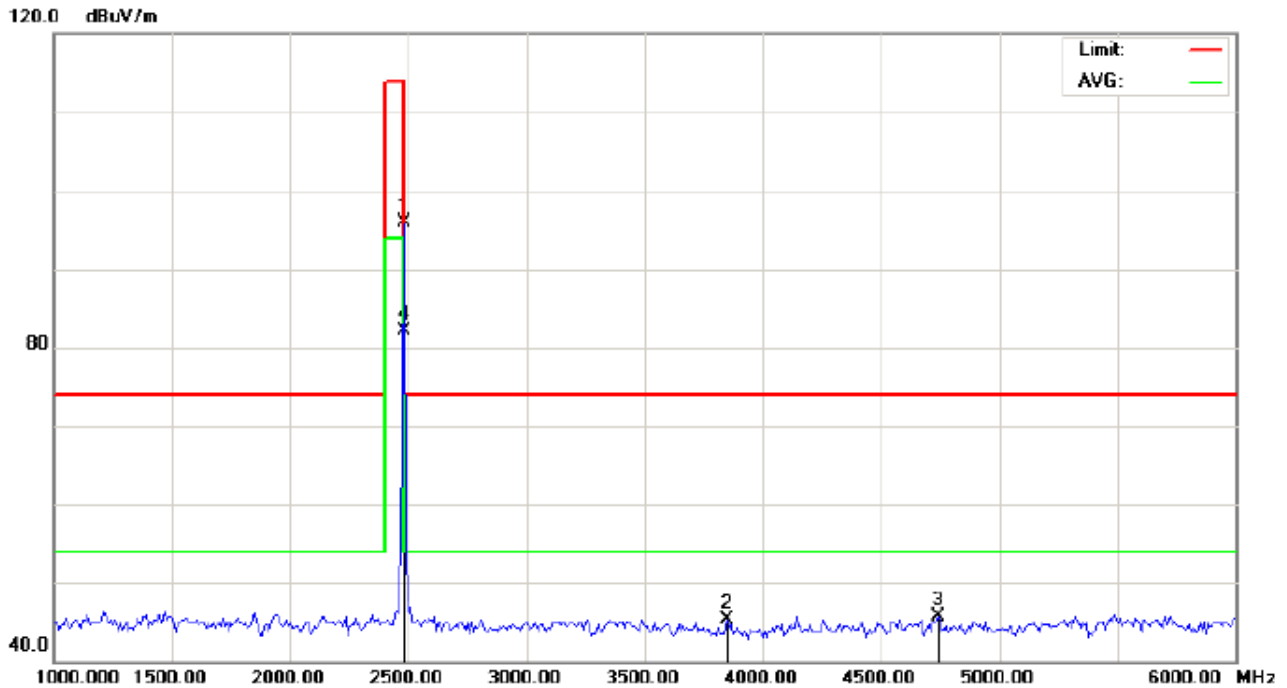
Mode: High Channel TX

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		2480.000	105.33	-9.59	95.74	114.00	-18.26	peak			
2		2975.000	54.37	-8.42	45.95	74.00	-28.05	peak			
3		4266.667	48.42	-3.90	44.52	74.00	-29.48	peak			
4	*	2480.000	91.65	-9.59	82.06	94.00	-11.94	AVG	100	286	

RESULT: PASS

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



Site: site #1

Polarization: **Vertical**

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance: 3m

M/N: TUWEB

Mode: High 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		2480.000	105.41	-9.59	95.82	114.00	-18.18	peak			
2		3850.000	51.04	-5.73	45.31	74.00	-28.69	peak			
3		4741.667	48.10	-2.48	45.62	74.00	-28.38	peak			
4	*	2480.000	91.77	-9.59	82.18	94.00	-11.82	AVG	100	34	

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

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	100.77	-9.68	91.09	114.00	-22.91	Horizontal
2402	101.20	-9.68	91.52	114.00	-22.48	Vertical
2440	104.85	-9.64	95.21	114.00	-18.79	Horizontal
2440	105.20	-9.64	95.56	114.00	-18.44	Vertical
2480	105.33	-9.59	95.74	114.00	-18.26	Horizontal
2480	105.41	-9.59	95.82	114.00	-18.18	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	87.93	-9.68	78.25	94.00	-15.75	Horizontal
2402	88.11	-9.68	78.43	94.00	-15.57	Vertical
2440	90.93	-9.64	81.29	94.00	-12.71	Horizontal
2440	91.26	-9.64	81.62	94.00	-12.38	Vertical
2480	91.65	-9.59	82.06	94.00	-11.94	Horizontal
2480	91.77	-9.59	82.18	94.00	-11.82	Vertical

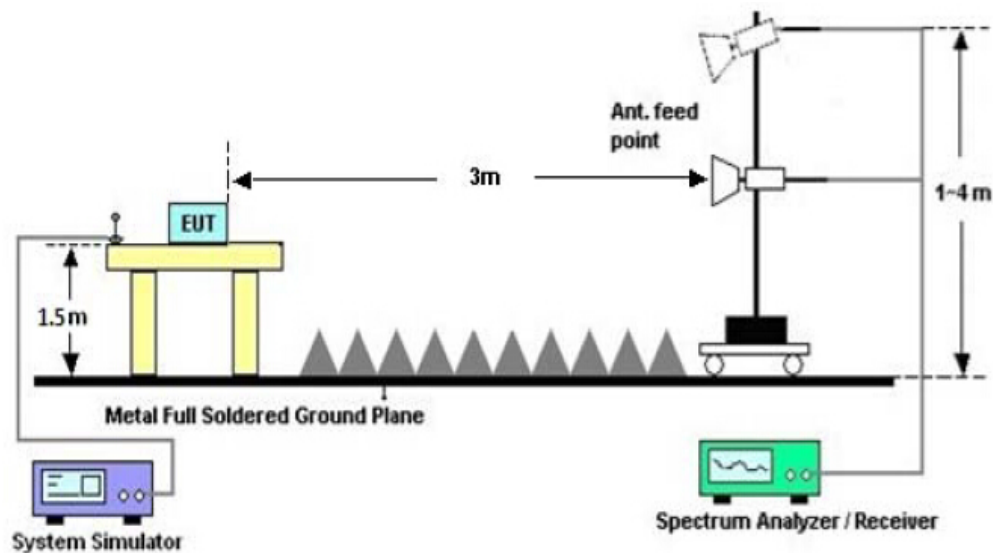
9. BAND EDGE EMISSION

9.1. MEASUREMENT PROCEDURE

- 1The 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.
- 2Max hold the trace of the setp 1,and the EUT operates at hopping-on test mode to verify the largest spurious emissions power.
- 3Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission

9.2 TEST SETUP

RADIATED EMISSION TEST SETUP

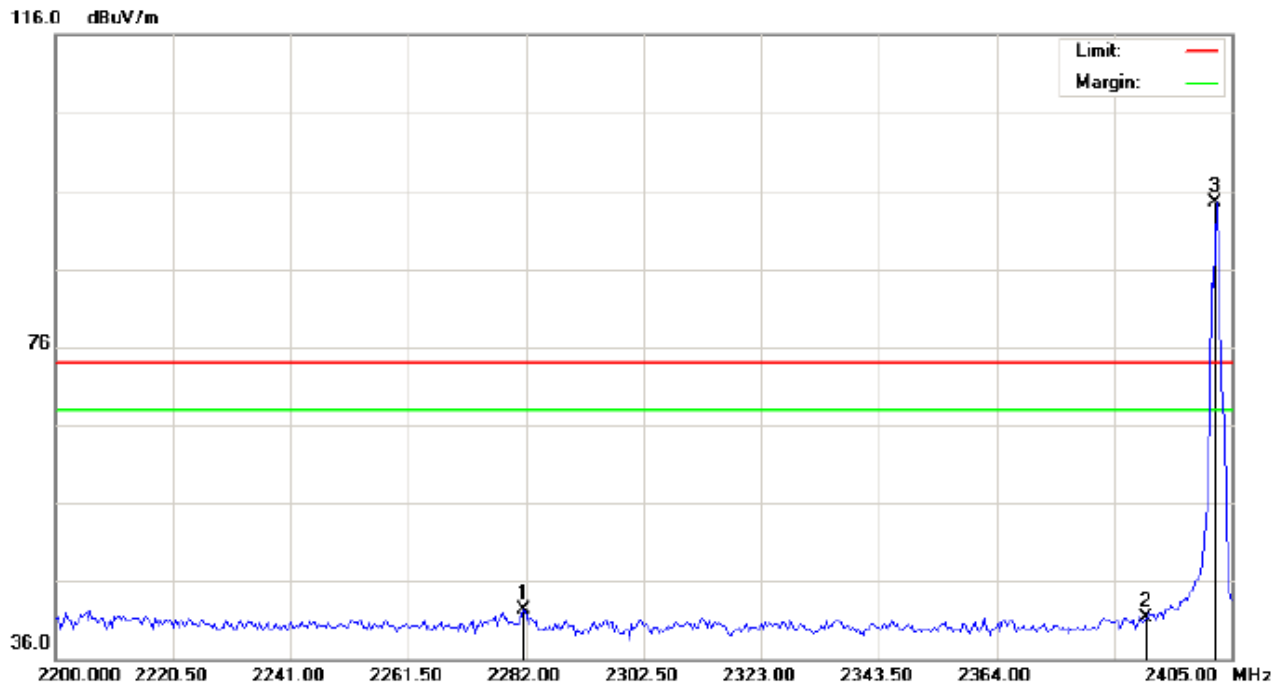


9.3 RADIATED TEST RESULT

(Worst modulation: GFSK)

FOR BR/EDR

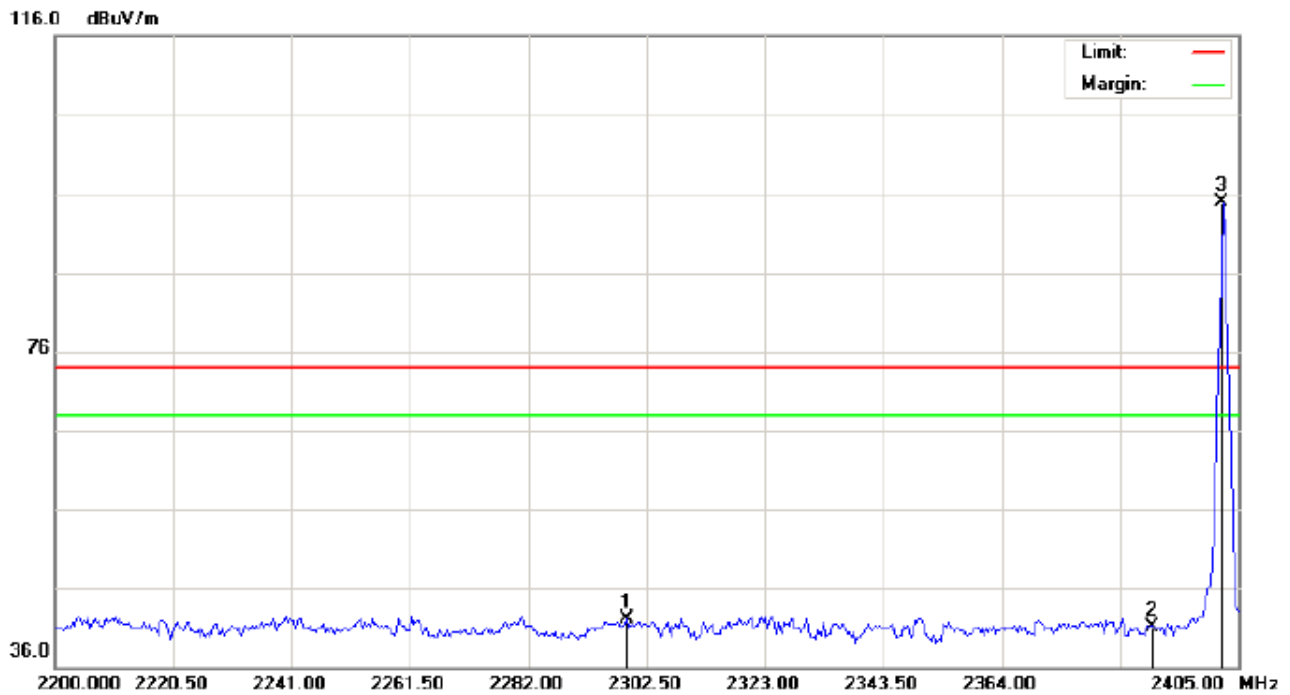
TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal



Site: site #1	Polarization: <i>Horizontal</i>	Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)	Power:	Humidity: 60 %
EUT: Premium Wireless Earbuds	Distance:	
M/N: TUWEB		
Mode: Low 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		2281.658	32.20	10.19	42.39	74.00	-31.61	peak			
2		2390.000	31.00	10.31	41.31	74.00	-32.69	peak			
3	*	2402.000	84.22	10.32	94.54	74.00	20.54	peak			

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical



Site: site #1

Polarization: *Vertical*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance:

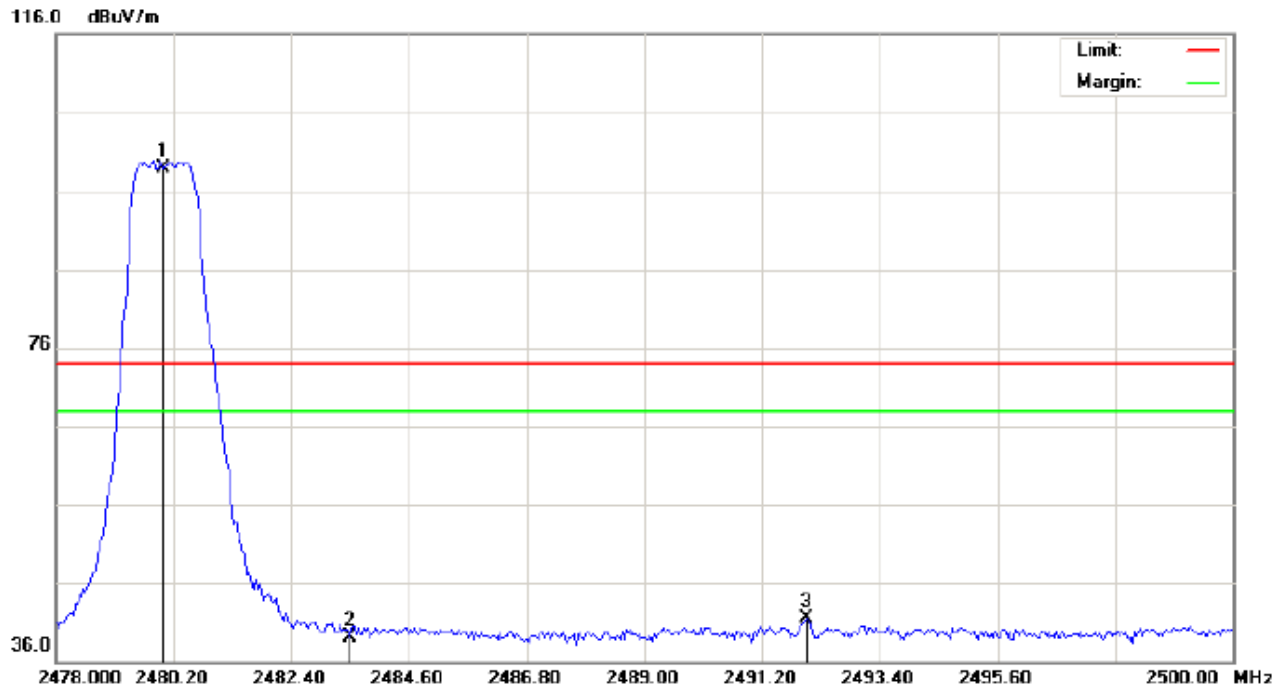
M/N: TUWEB

Mode: Low 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		2299.083	31.91	10.21	42.12	74.00	-31.88	peak			
2		2390.000	30.71	10.31	41.02	74.00	-32.98	peak			
3	*	2402.000	84.55	10.32	94.87	74.00	20.87	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal



Site: site #1

Polarization: *Horizontal*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance:

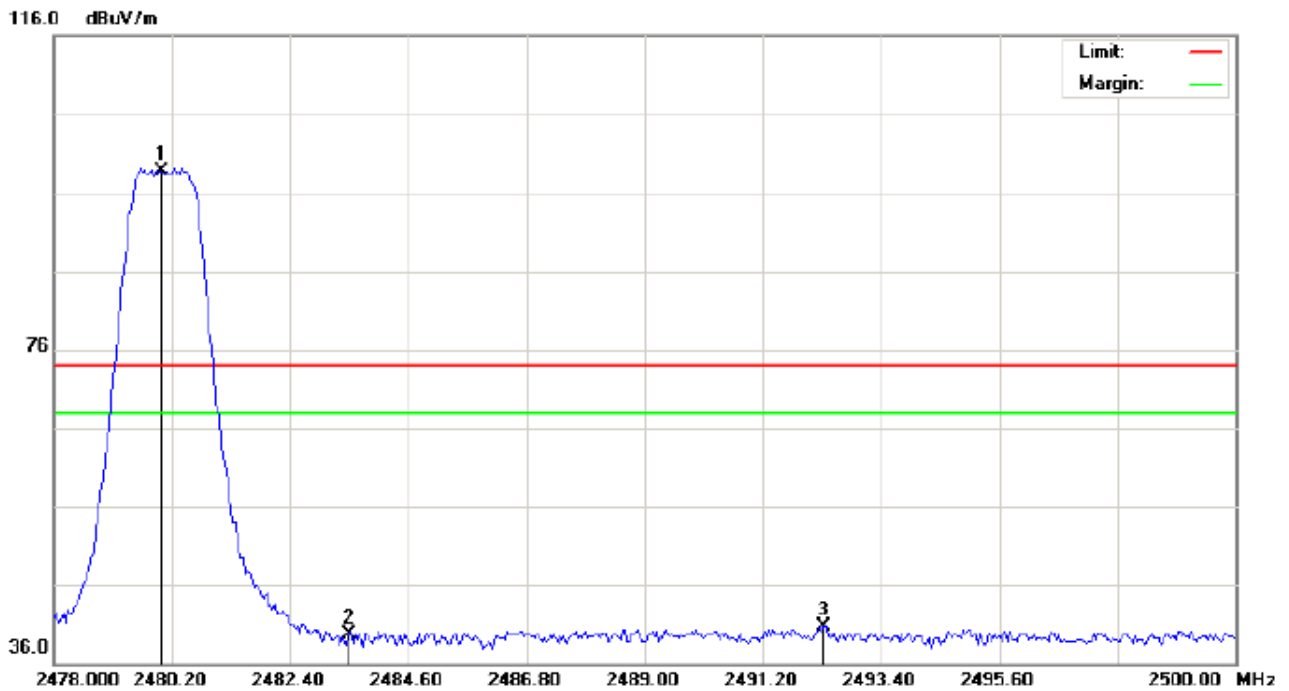
M/N: TUWEB

Mode: High 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	*	2480.000	88.55	10.41	98.96	74.00	24.96	peak			
2		2483.500	28.69	10.41	39.10	74.00	-34.90	peak			
3		2492.043	31.14	10.42	41.56	74.00	-32.44	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical



Site: site #1

Polarization: **Vertical**

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

Mode: High 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	*	2480.000	88.35	10.41	98.76	74.00	24.76	peak			
2		2483.500	29.26	10.41	39.67	74.00	-34.33	peak			
3		2492.337	30.28	10.42	40.70	74.00	-33.30	peak			

RESULT: PASS**Note:** The other modes radiation emission have enough 20dB margin.

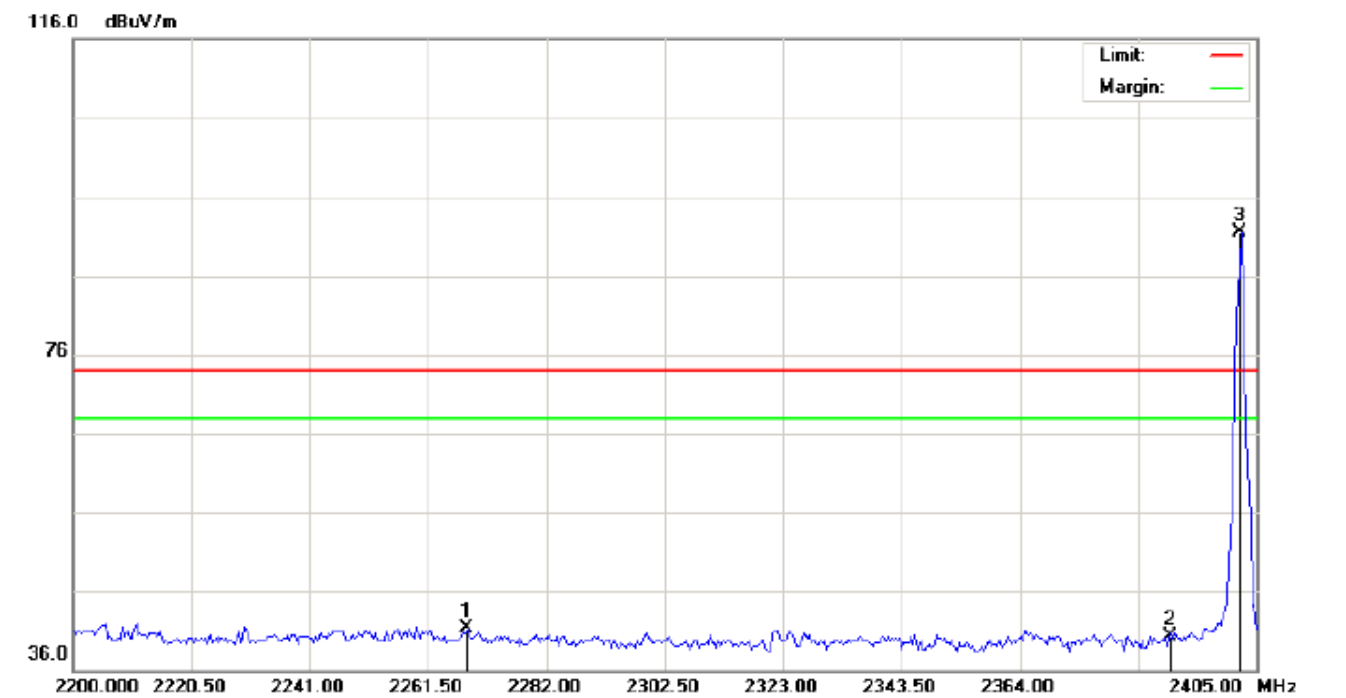
Factor=Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

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.

FOR BLE

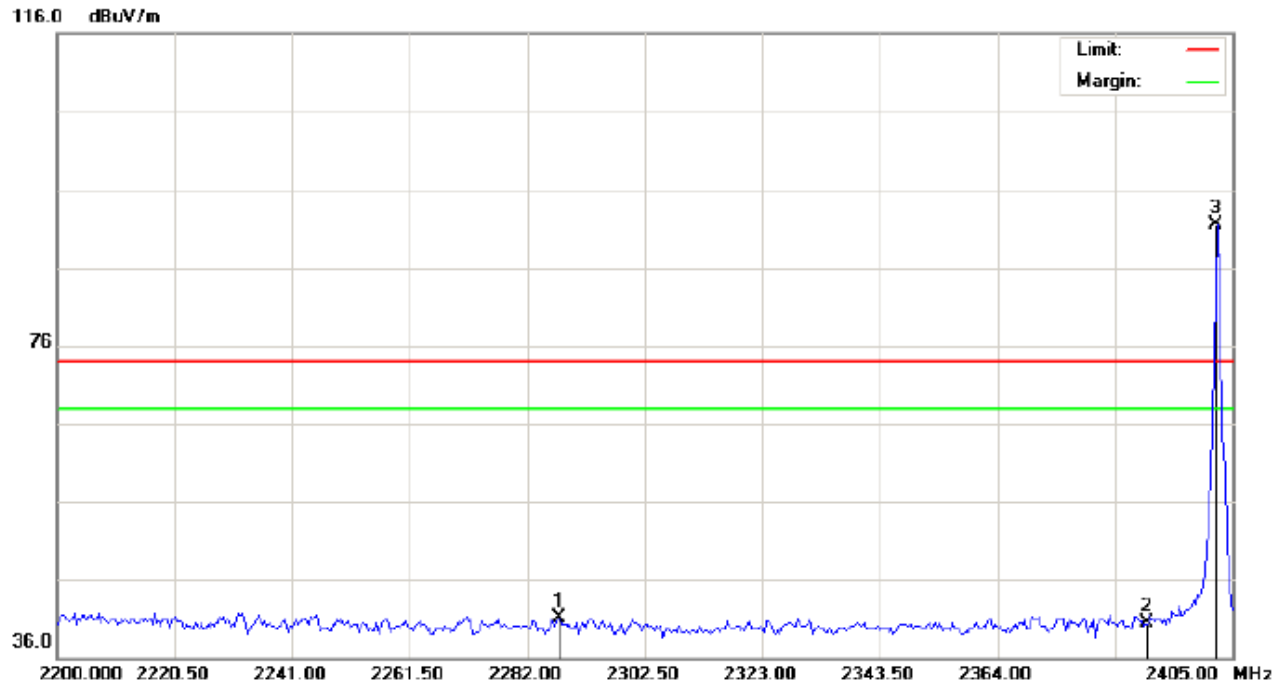
TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal



Site: site #1	Polarization: <i>Horizontal</i>	Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK)	Power:	Humidity: 60 %
EUT: Premium Wireless Earbuds	Distance:	
M/N: TUWEB		
Mode: Low 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		2268.333	31.16	10.18	41.34	74.00	-32.66	peak			
2		2390.000	30.00	10.31	40.31	74.00	-33.69	peak			
3	*	2402.000	81.22	10.32	91.54	74.00	17.54	peak			

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical



Site: site #1

Polarization: *Vertical*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance:

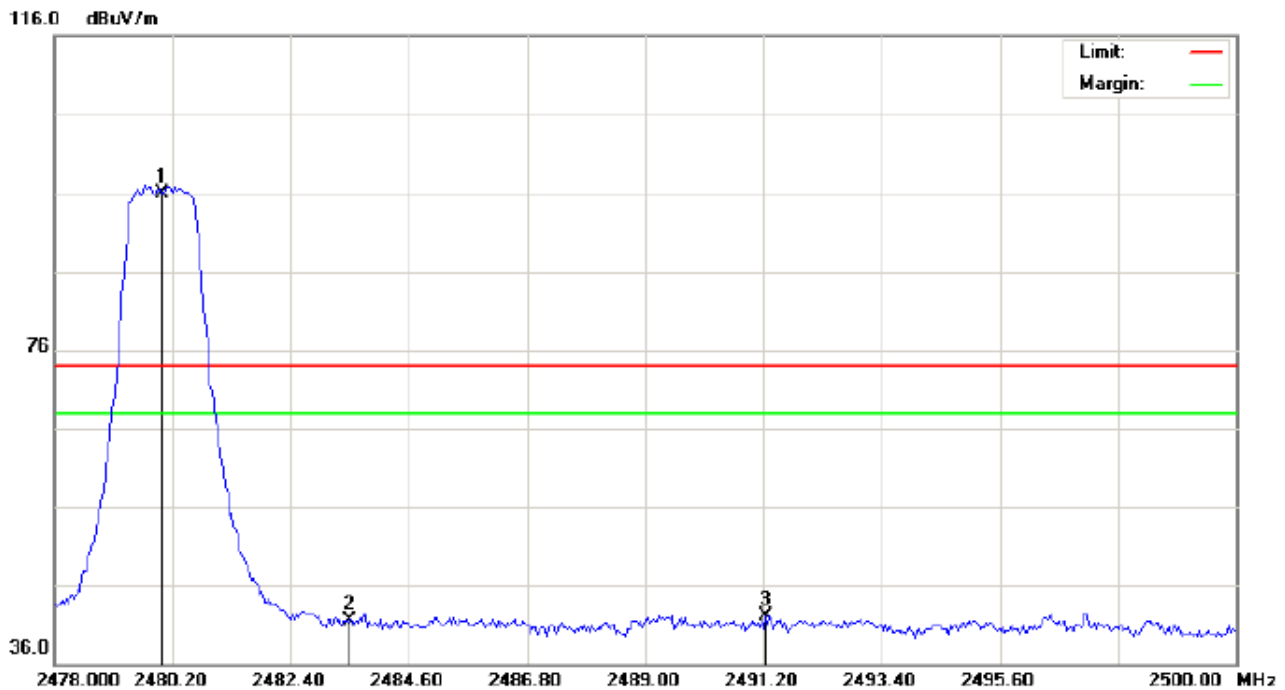
M/N: TUWEB

Mode: Low 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		2287.467	30.89	10.20	41.09	74.00	-32.91	peak			
2		2390.000	30.21	10.31	40.52	74.00	-33.48	peak			
3	*	2402.000	81.09	10.32	91.41	74.00	17.41	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal



Site: site #1

Polarization: *Horizontal*

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance:

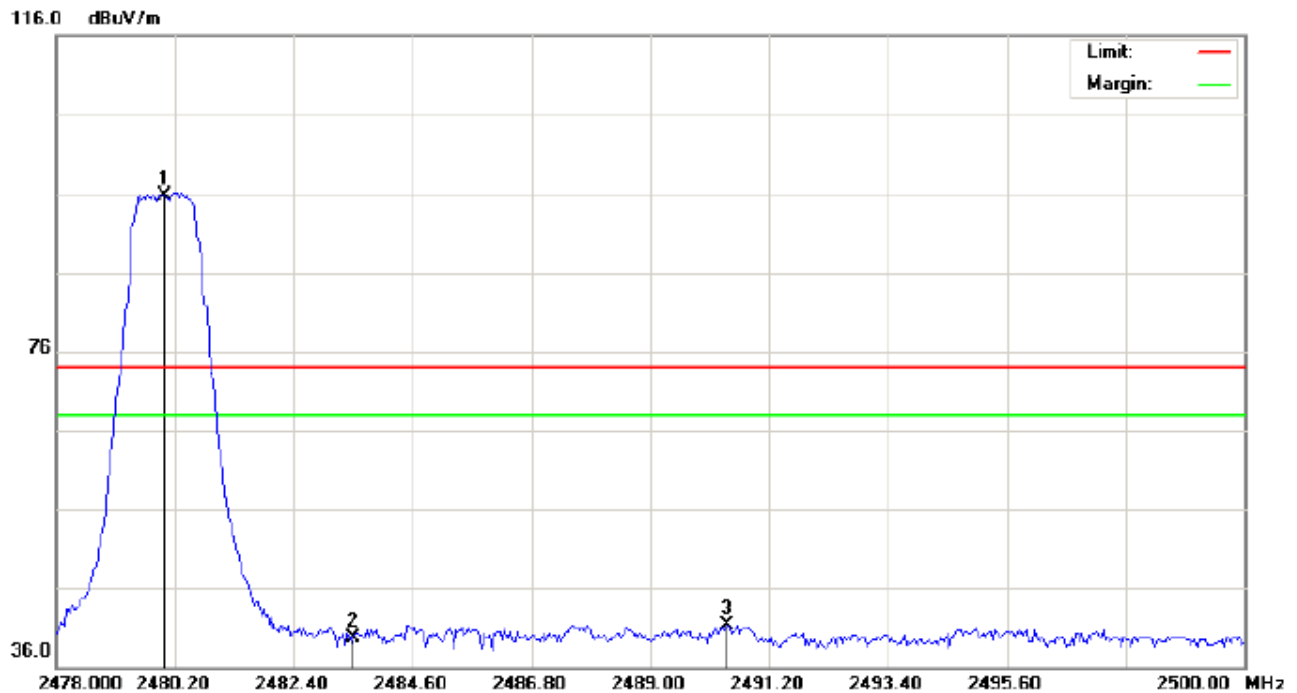
M/N: TUWEB

Mode: High 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	*	2480.000	85.55	10.41	95.96	74.00	21.96	peak			
2		2483.500	31.19	10.41	41.60	74.00	-32.40	peak			
3		2491.237	31.60	10.42	42.02	74.00	-31.98	peak			

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical



Site: site #1

Polarization: **Vertical**

Temperature: 26

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

Power:

Humidity: 60 %

EUT: Premium Wireless Earbuds

Distance:

M/N: TUWEB

Mode: High 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	*	2480.000	85.32	10.41	95.73	74.00	21.73	peak			
2		2483.500	29.26	10.41	39.67	74.00	-34.33	peak			
3		2490.430	30.84	10.42	41.26	74.00	-32.74	peak			

RESULT: PASS**Note:** The other modes radiation emission have enough 20dB margin.

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

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

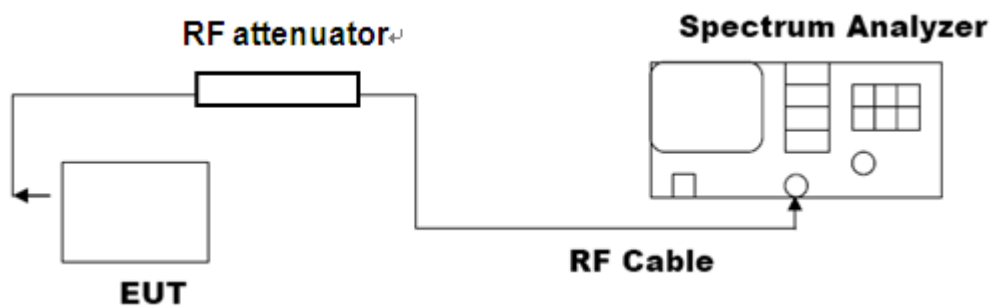
10. 20DB BANDWIDTH

10.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW $\geq$ 1% of the 20 dB bandwidth, VBW $\geq$ RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

10.2. TEST SET-UP

(BLOCK DIAGRAM OF CONFIGURATION)



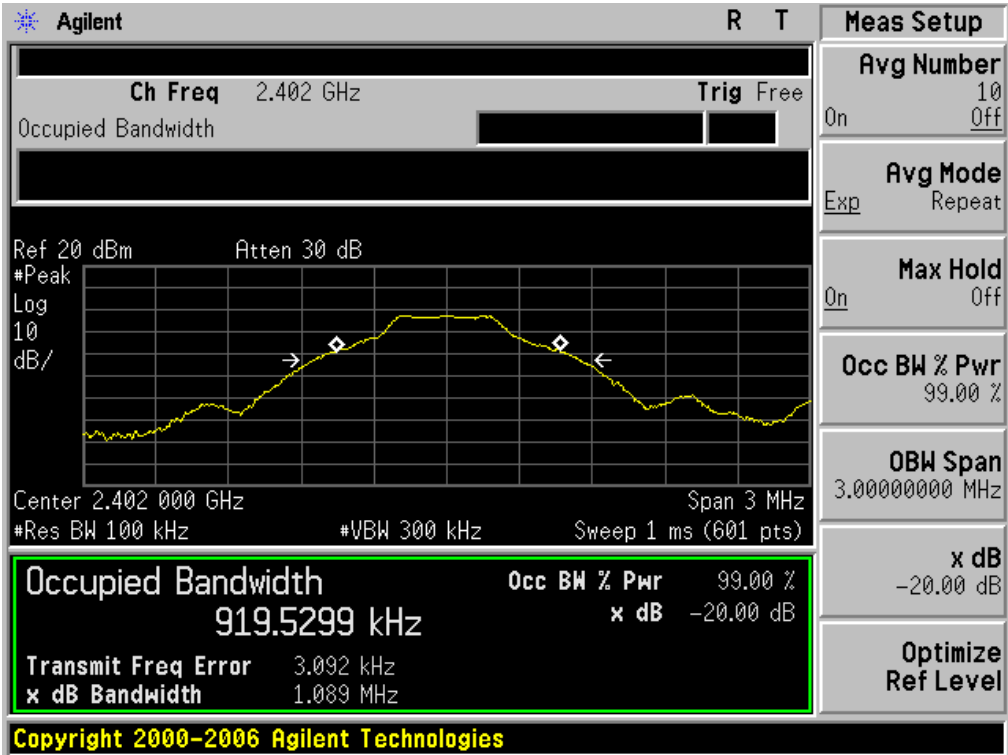
Note: The EUT has been used temporary antenna connector for testing.

10.3. LIMITS AND MEASUREMENT RESULTS

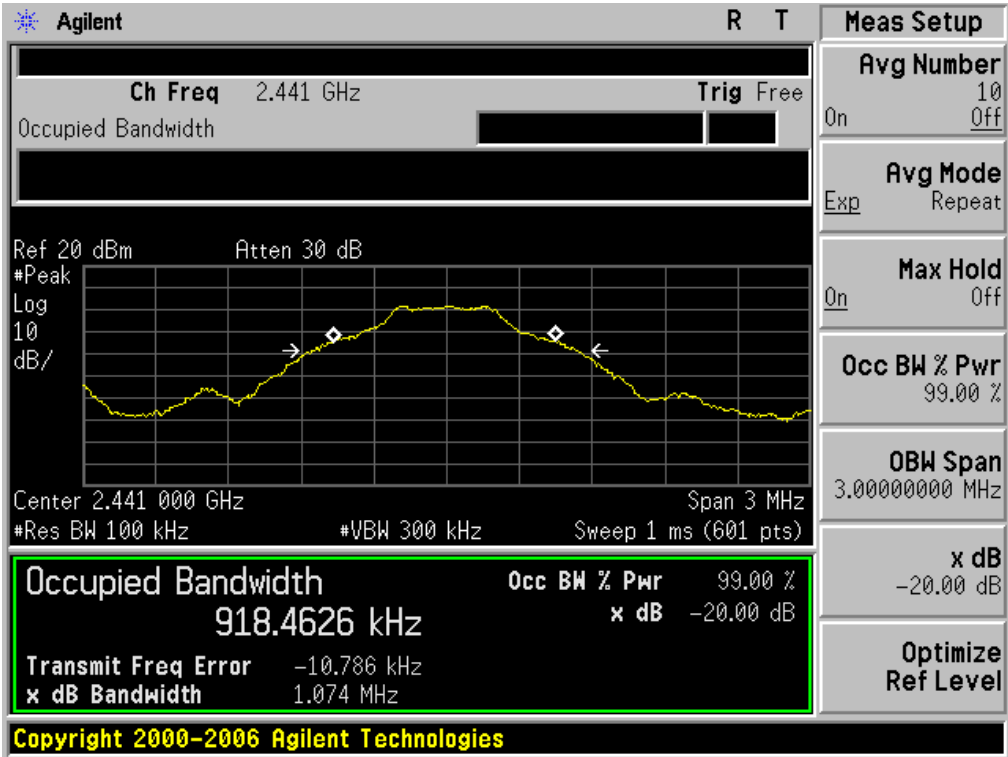
FOR BR/EDR

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Measurement Result			
	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHZ)	
N/A	Low Channel	0.920	1.089	PASS
	Middle Channel	0.918	1.074	PASS
	High Channel	0.924	1.090	PASS

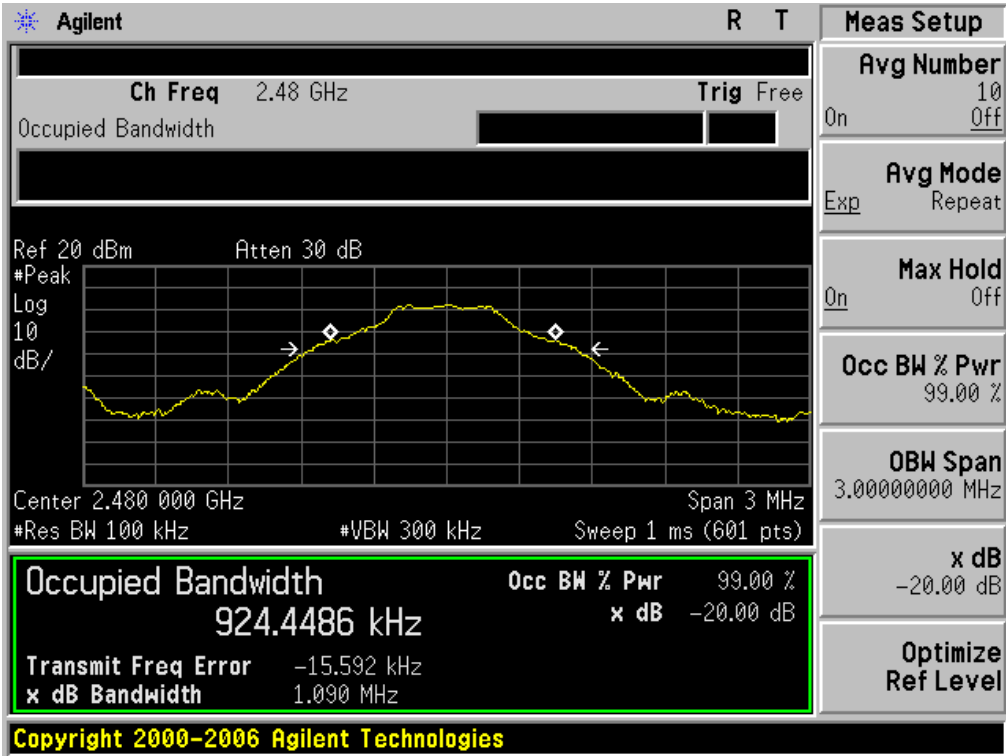
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

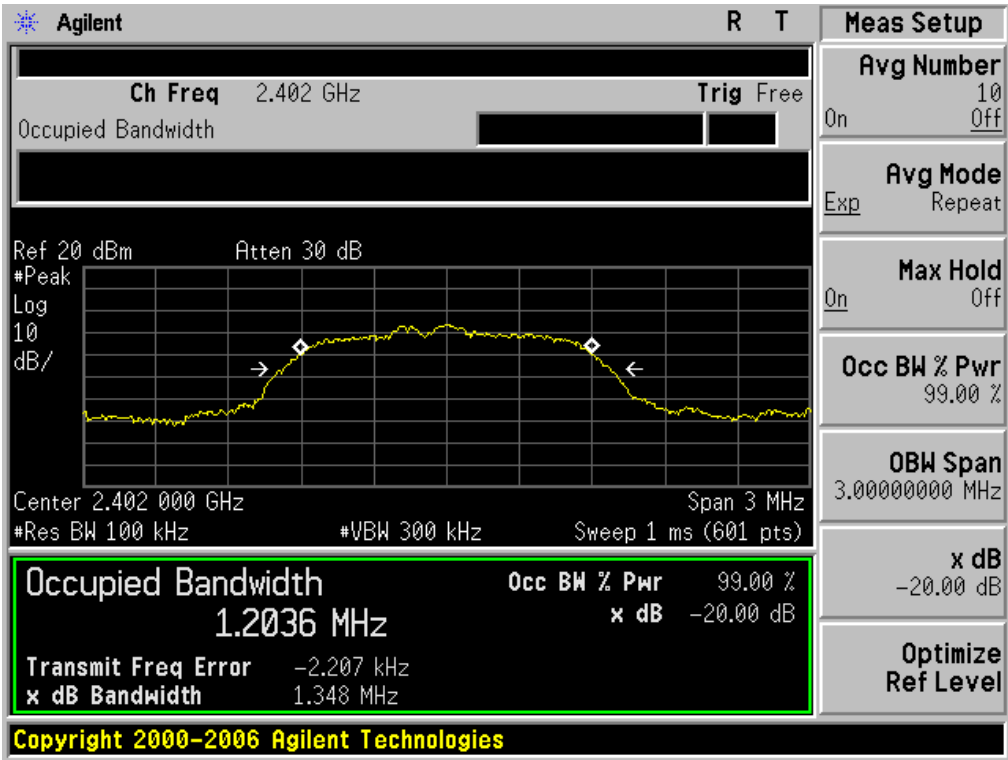


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

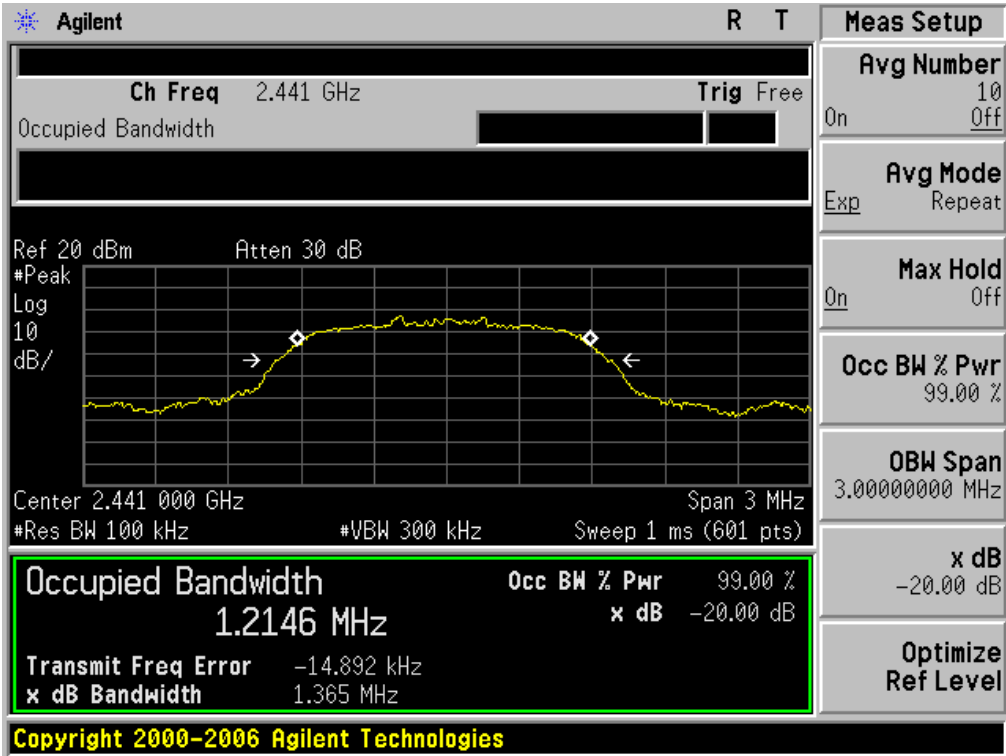


BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Measurement Result			
	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHZ)	
N/A	Low Channel	1.204	1.348	PASS
	Middle Channel	1.215	1.365	PASS
	High Channel	1.203	1.354	PASS

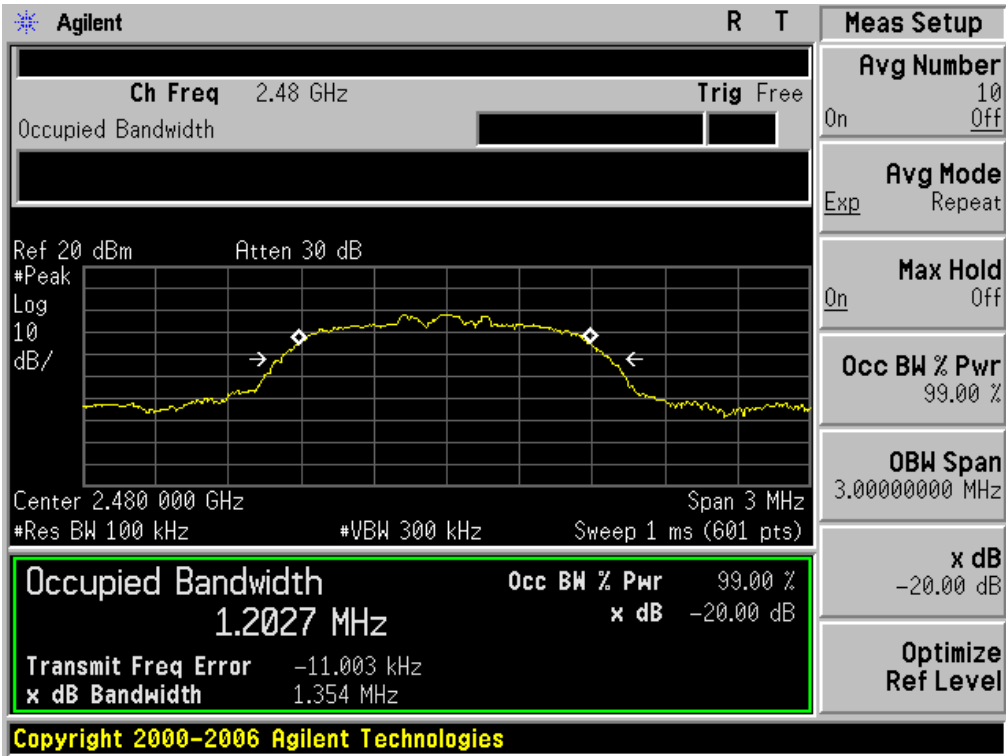
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

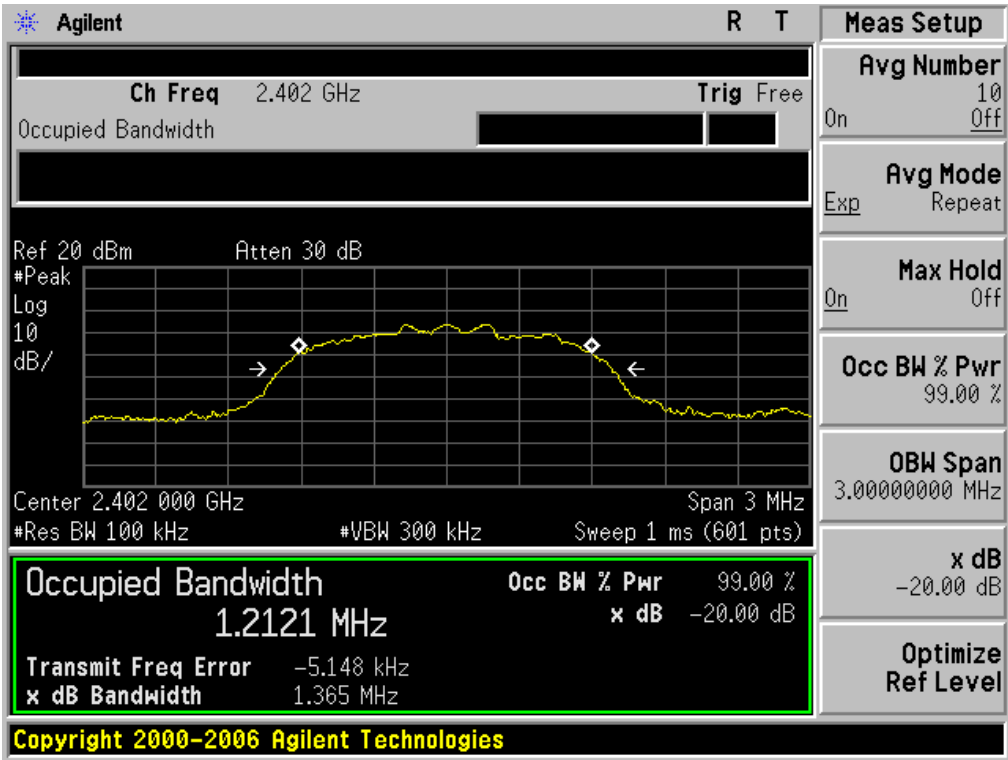


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

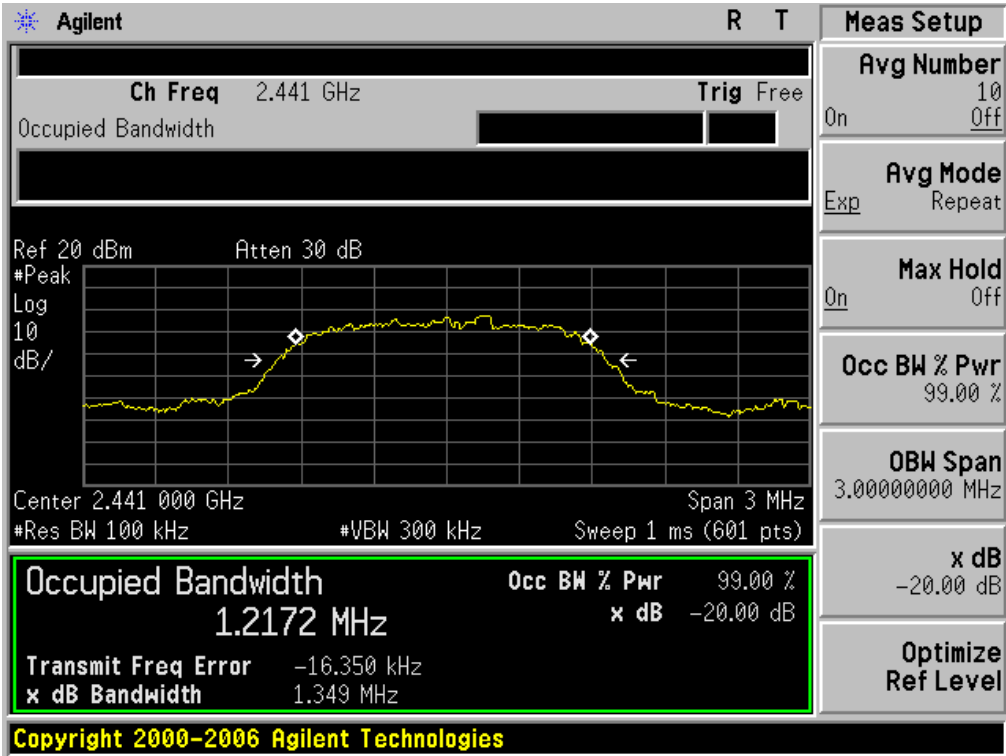


BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Measurement Result			
	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHZ)	
N/A	Low Channel	1.212	1.365	PASS
	Middle Channel	1.217	1.349	PASS
	High Channel	1.225	1.357	PASS

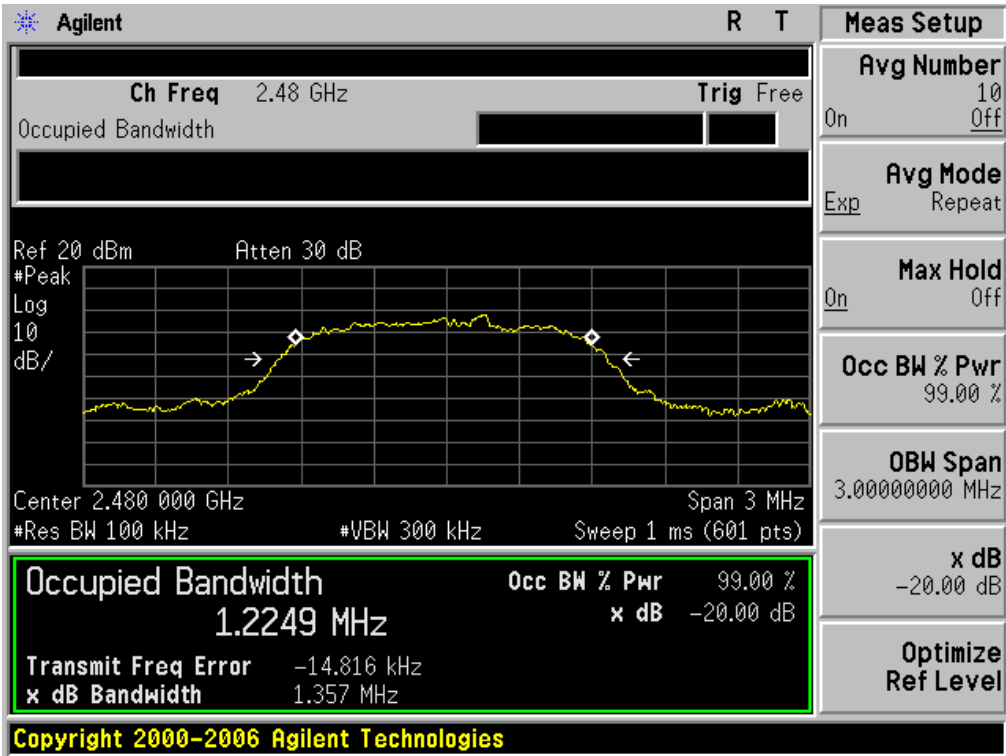
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



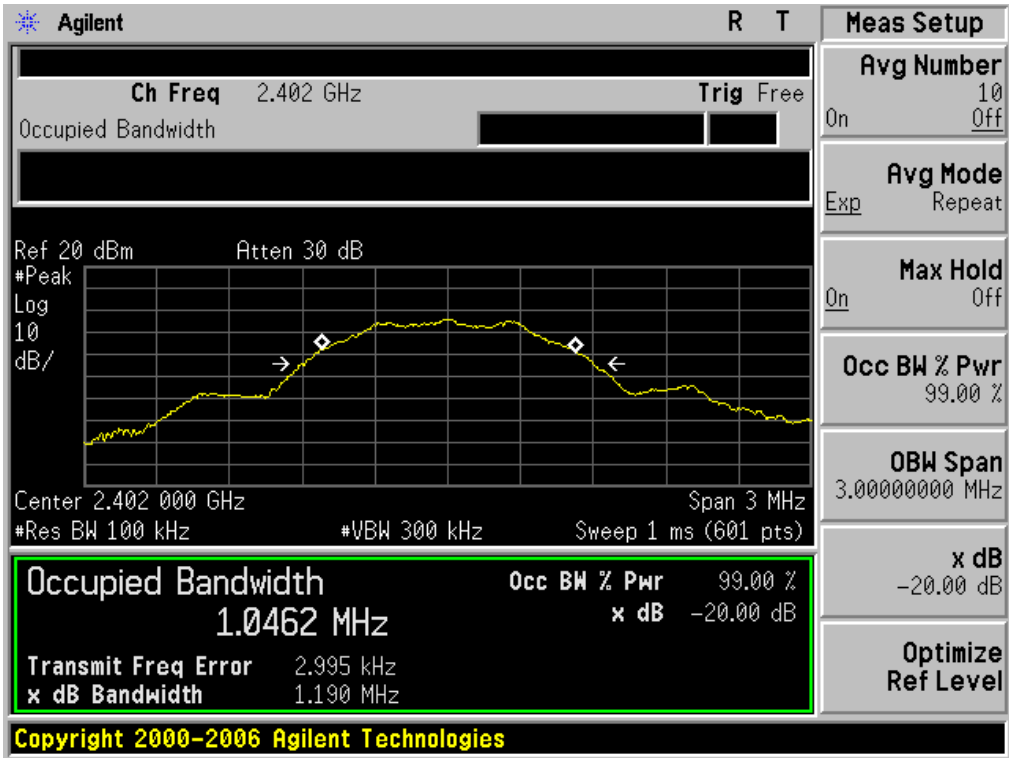
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



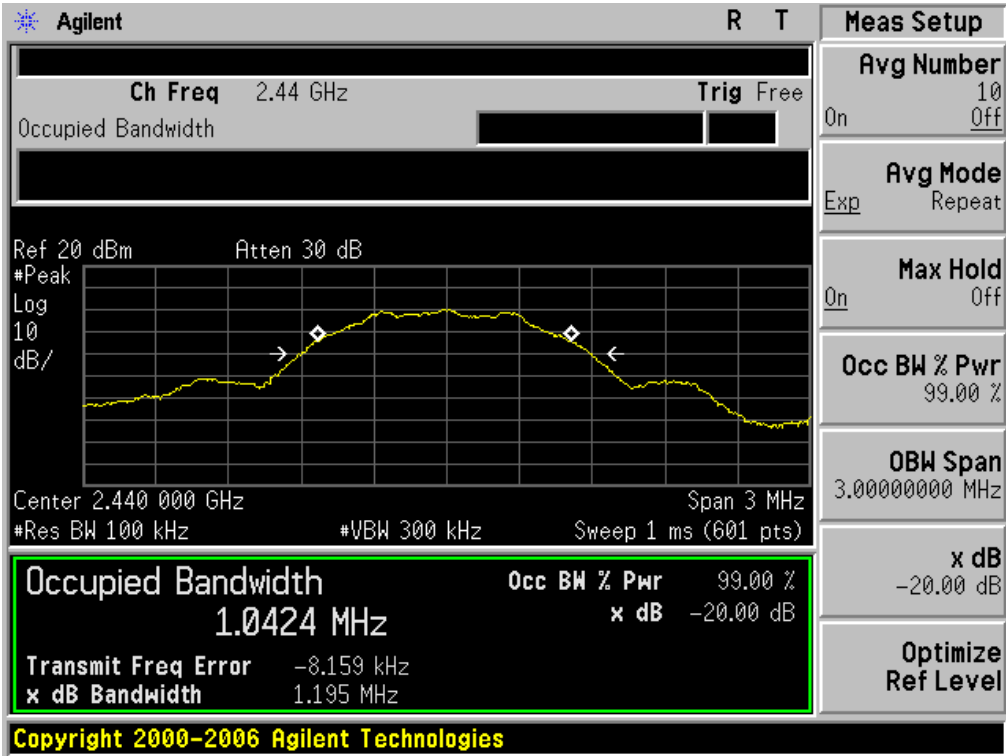
FOR BLE

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT				
Applicable Limits	Measurement Result			
	Test Data (MHz)			Result
		99%OBW (MHz)	-20dB BW(MHZ	
N/A	Low Channel	1.046	1.190	PASS
	Middle Channel	1.042	1.195	PASS
	High Channel	1.044	1.207	PASS

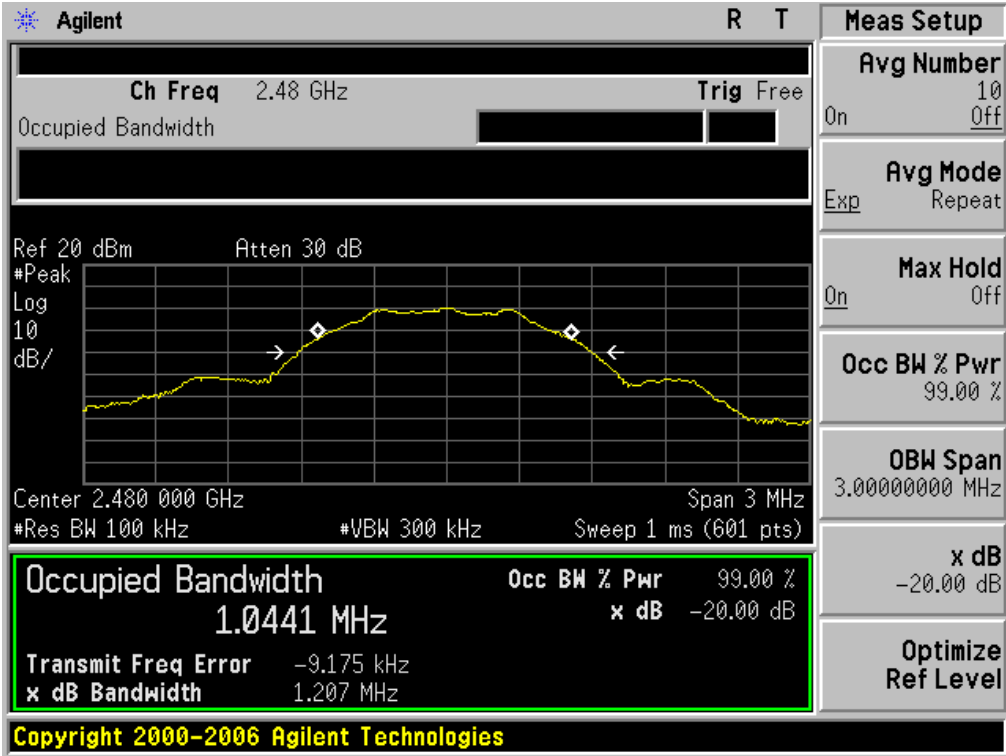
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



11. FCC LINE CONDUCTED EMISSION TEST

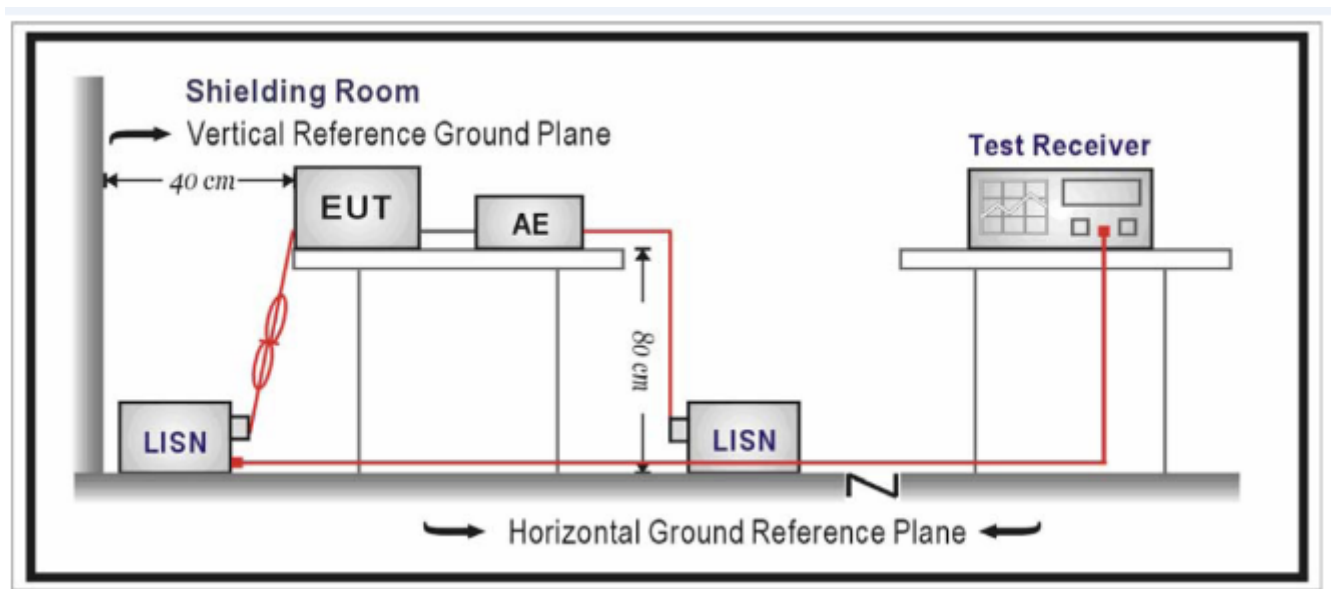
11.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.

11.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



11.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

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

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

11.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

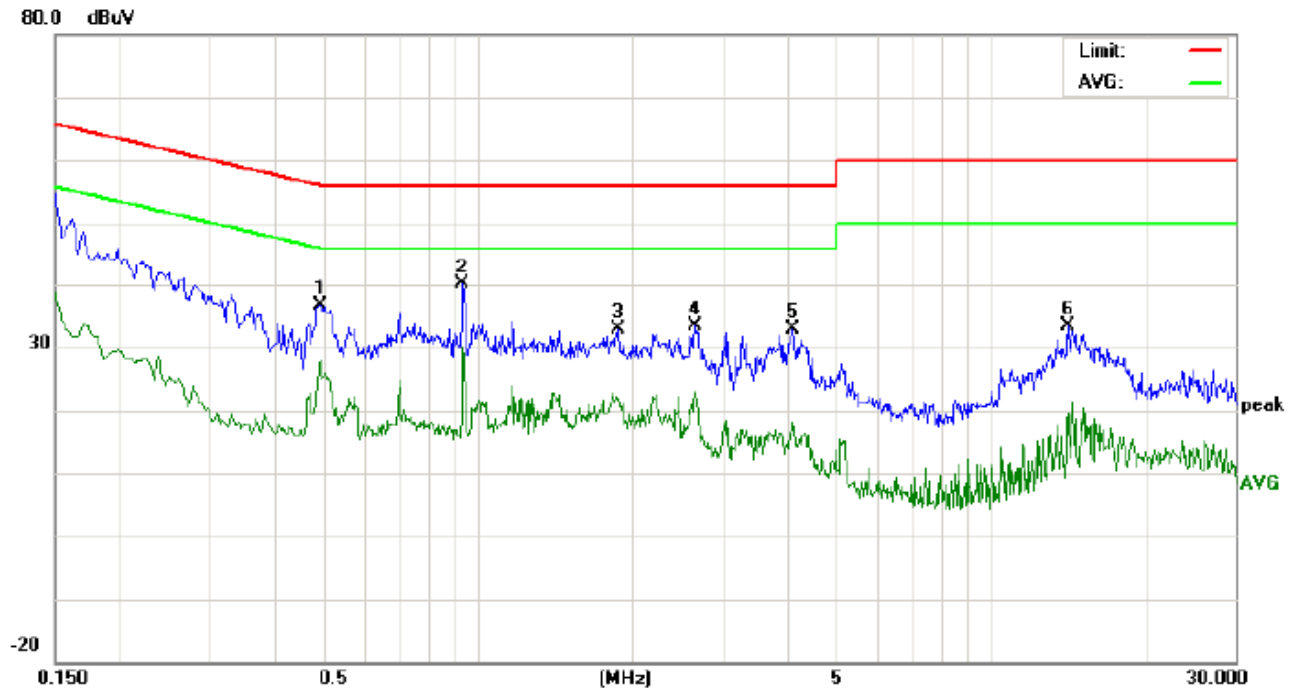
1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used 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.

11.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

By adapter(worst case)

FOR BR/EDR

Line Conducted Emission Test Line 1-L



Site: Conduction

Phase: L1

Temperature: 23.5

Limit: FCC Class B Conduction(QP)

Power:

Humidity: 55.1 %

EUT: Premium Wireless Earbuds

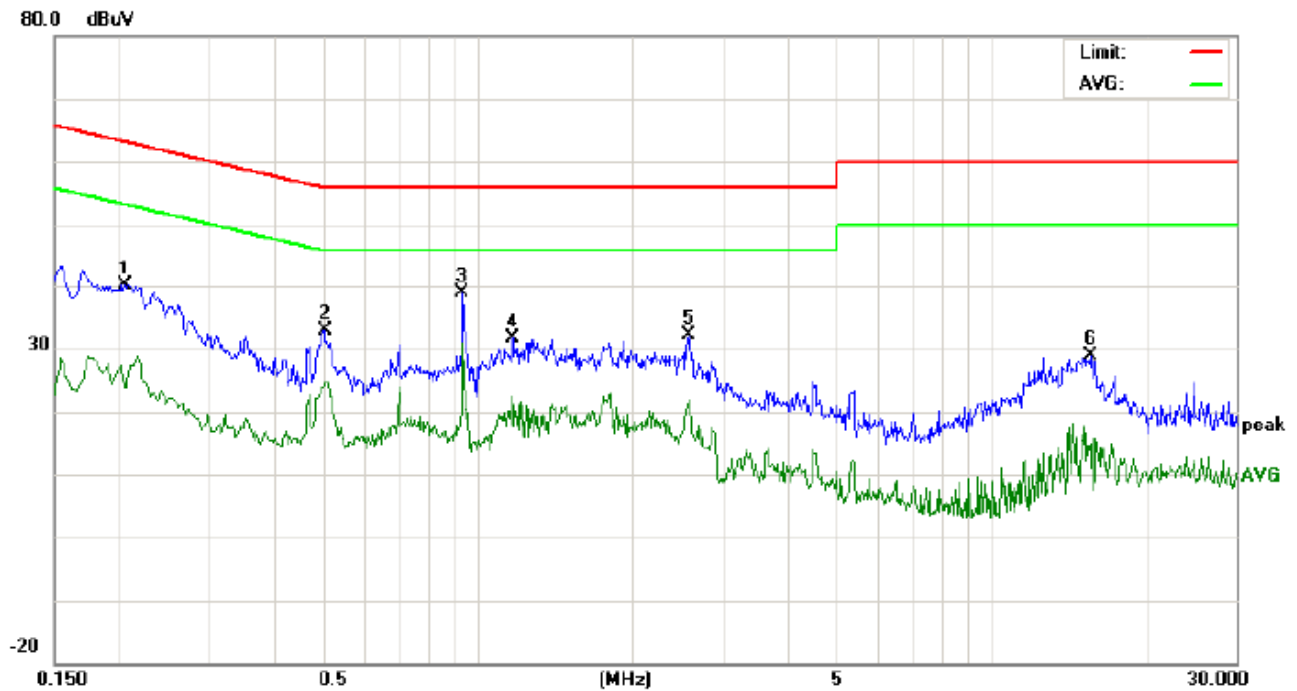
M/N: TUWEB

Mode: BT Link with charging

Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.4940	26.22		17.32	10.40	36.62		27.72	56.10	46.10	-19.48	-18.38	P	
2	0.9380	29.79		19.76	10.39	40.18		30.15	56.00	46.00	-15.82	-15.85	P	
3	1.8780	22.58		11.66	10.26	32.84		21.92	56.00	46.00	-23.16	-24.08	P	
4	2.6540	22.98		12.34	10.47	33.45		22.81	56.00	46.00	-22.55	-23.19	P	
5	4.1179	22.44		7.00	10.38	32.82		17.38	56.00	46.00	-23.18	-28.62	P	
6	14.2099	23.13		9.63	10.12	33.25		19.75	60.00	50.00	-26.75	-30.25	P	

Line Conducted Emission Test Line 2-N

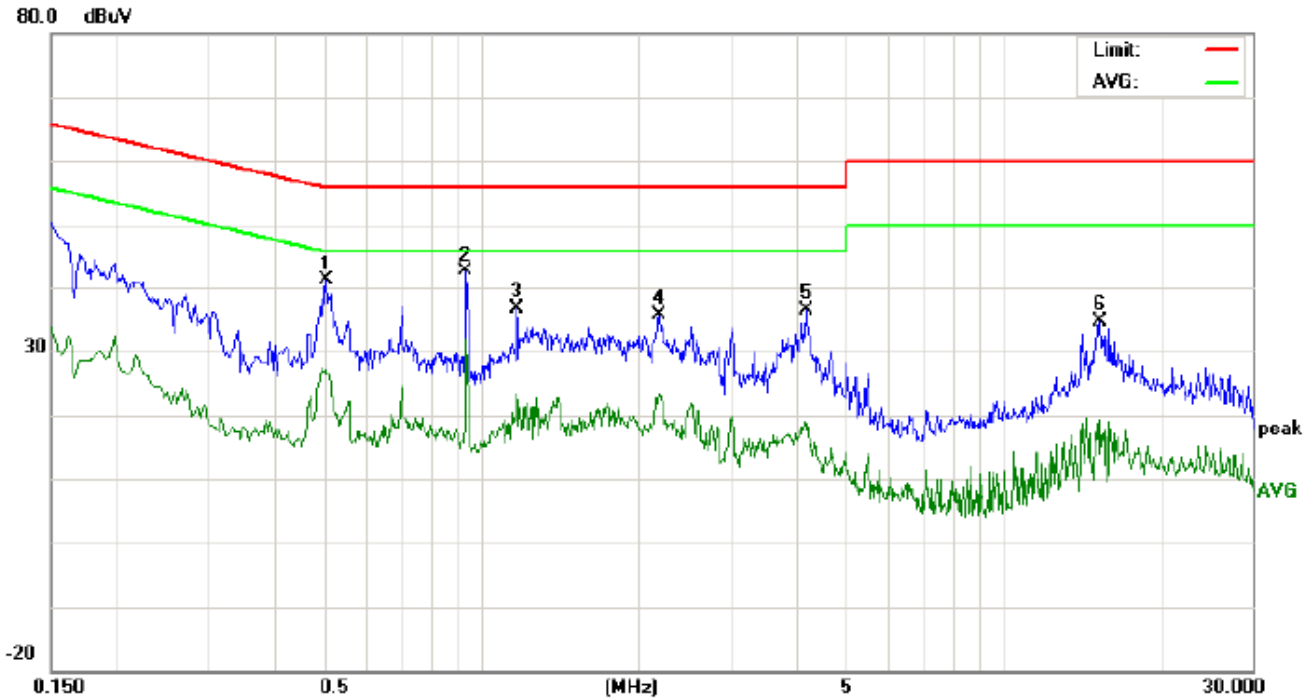


Site: Conduction Phase: **N** Temperature: 23.5
Limit: FCC Class B Conduction(QP) Power: Humidity: 55.1 %
EUT: Premium Wireless Earbuds
M/N: TUWEB
Mode: BT Link with charging
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2060	30.01		13.54	10.22	40.23		23.76	63.36	53.36	-23.13	-29.60	P	
2	0.5020	22.51		13.65	10.40	32.91		24.05	56.00	46.00	-23.09	-21.95	P	
3	0.9380	28.53		20.47	10.39	38.92		30.86	56.00	46.00	-17.08	-15.14	P	
4	1.1700	21.32		11.99	10.37	31.69		22.36	56.00	46.00	-24.31	-23.64	P	
5	2.5860	21.78		11.35	10.45	32.23		21.80	56.00	46.00	-23.77	-24.20	P	
6	15.6099	18.84		4.76	10.11	28.95		14.87	60.00	50.00	-31.05	-35.13	P	

FOR BLE

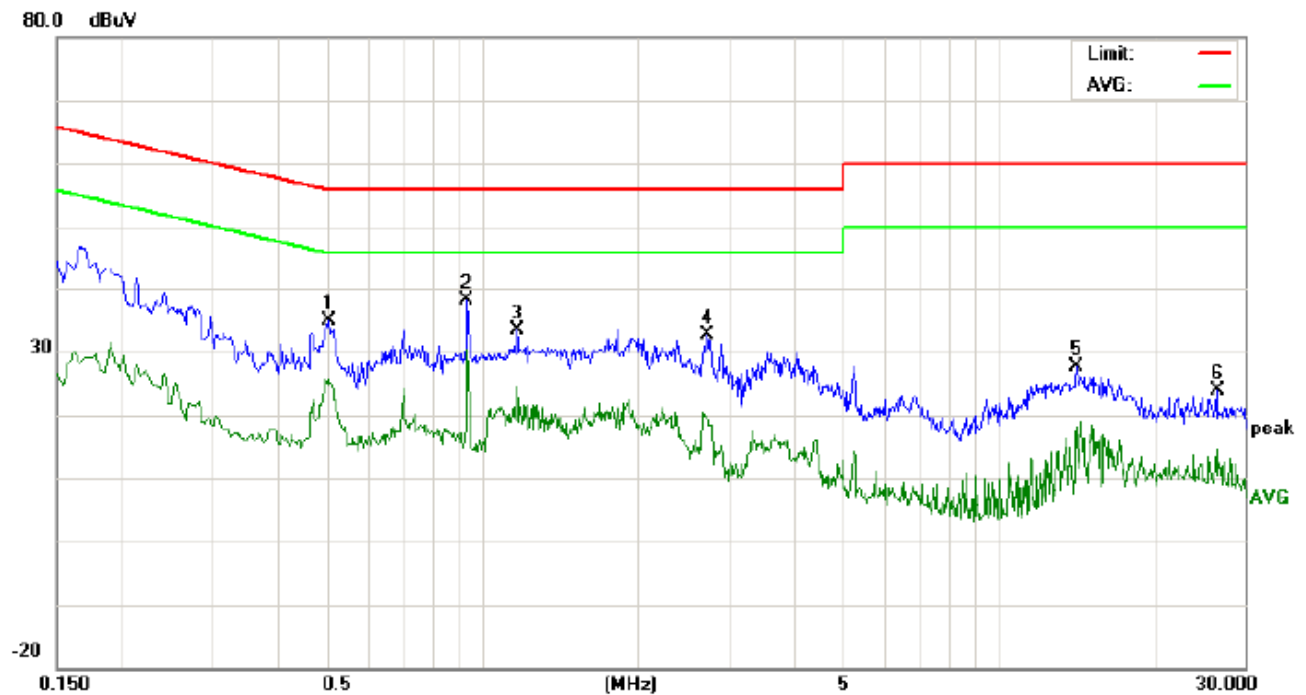
Line Conducted Emission Test Line 1-L



Site: Conduction Phase: **L1** Temperature: 23.5
Limit: FCC Class B Conduction(QP) Power: Humidity: 55.1 %
EUT: Premium Wireless Earbuds
M/N: TUWEB
Mode: BT Link with charging
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.5020	30.62		16.72	10.40	41.02		27.12	56.00	46.00	-14.98	-18.88	P	
2	0.9380	32.31		21.53	10.39	42.70		31.92	56.00	46.00	-13.30	-14.08	P	
3	1.1700	26.22		13.09	10.37	36.59		23.46	56.00	46.00	-19.41	-22.54	P	
4	2.1900	25.21		13.03	10.30	35.51		23.33	56.00	46.00	-20.49	-22.67	P	
5	4.1859	25.91		8.39	10.35	36.26		18.74	56.00	46.00	-19.74	-27.26	P	
6	15.3099	24.54		9.09	10.12	34.66		19.21	60.00	50.00	-25.34	-30.79	P	

Line Conducted Emission Test Line 2-N

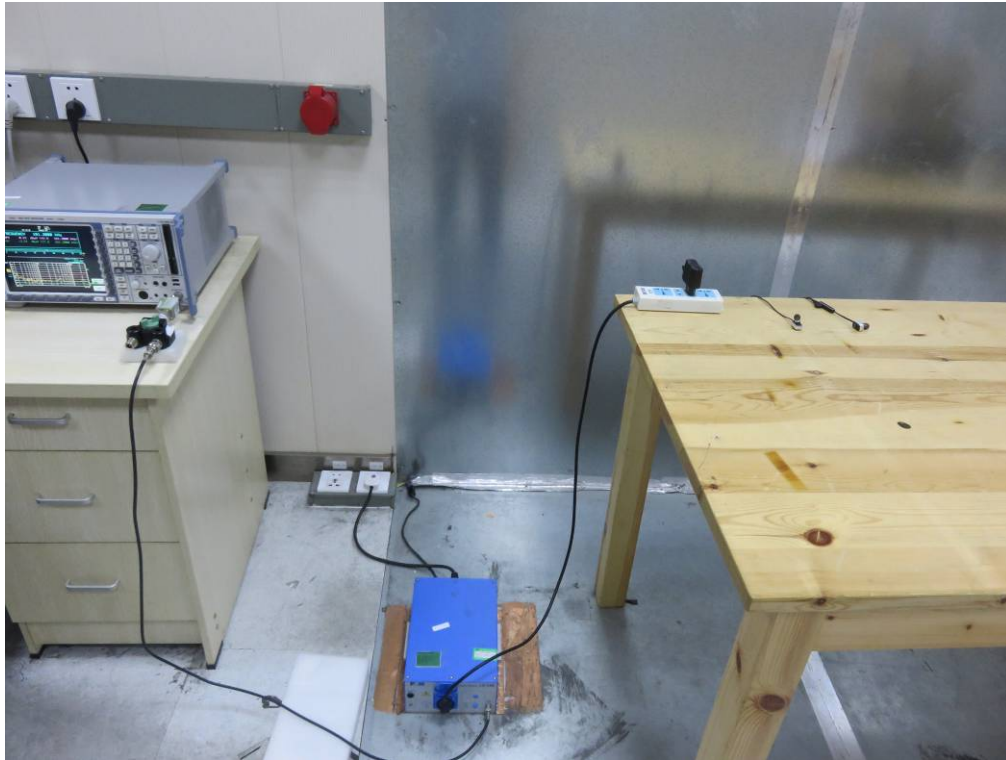


Site: Conduction Phase: **N** Temperature: 23.5
Limit: FCC Class B Conduction(QP) Power: Humidity: 55.1 %
EUT: Premium Wireless Earbuds
M/N: TUWEB
Mode: BT Link with charging
Note:

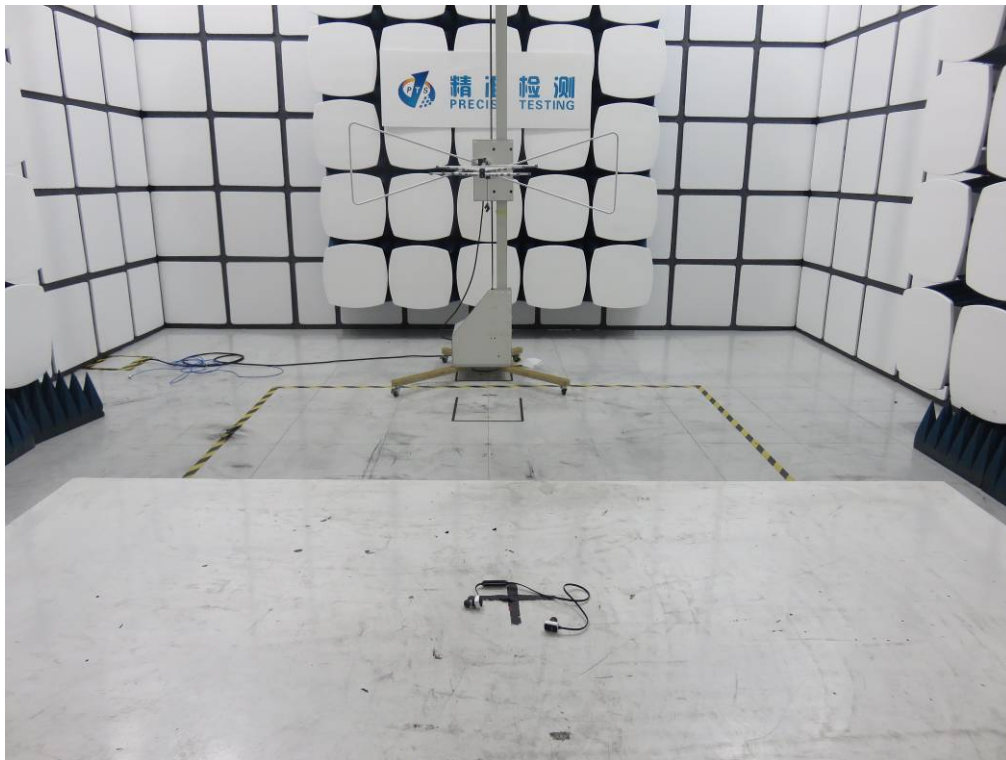
No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.5020	24.43		14.53	10.40	34.83		24.93	56.00	46.00	-21.17	-21.07	P	
2	0.9380	27.81		19.93	10.39	38.20		30.32	56.00	46.00	-17.80	-15.68	P	
3	1.1700	23.08		14.10	10.37	33.45		24.47	56.00	46.00	-22.55	-21.53	P	
4	2.7340	22.25		9.19	10.49	32.74		19.68	56.00	46.00	-23.26	-26.32	P	
5	14.2099	17.55		8.01	10.12	27.67		18.13	60.00	50.00	-32.33	-31.87	P	
6	26.4580	13.75		4.61	10.11	23.86		14.72	60.00	50.00	-36.14	-35.28	P	

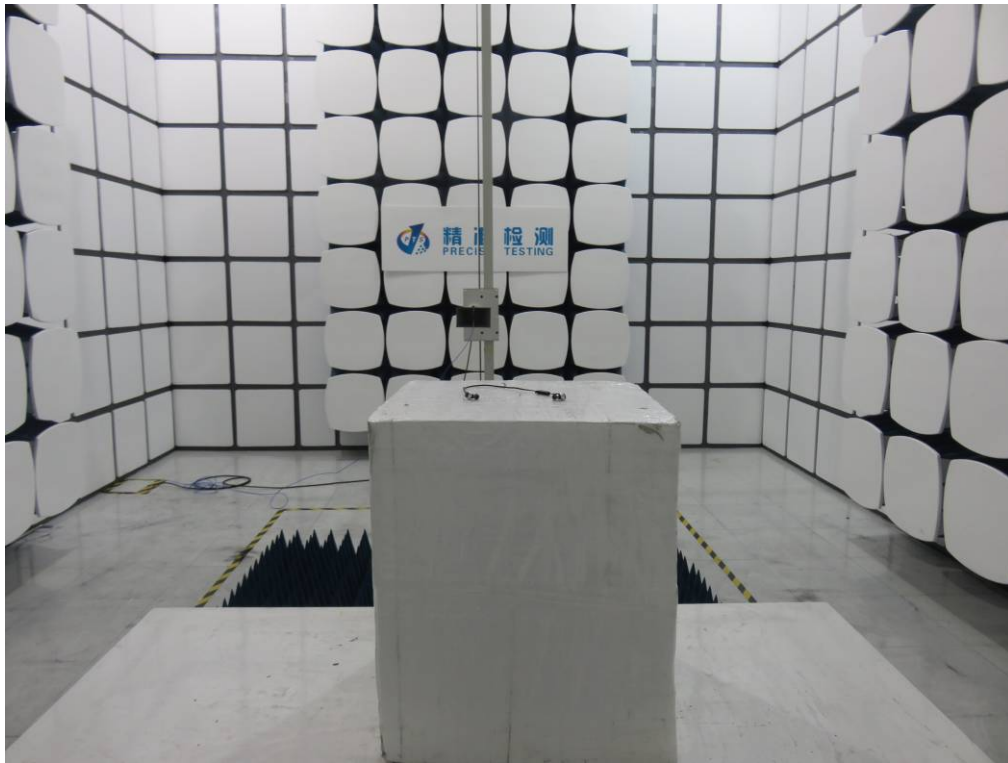
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP





APPENDIX B: PHOTOGRAPHS OF EUT

WHOLE VIEW OF EUT



TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



LEFT VIEW OF EUT



RIGHT VIEW OF EUT



VIEW OF EUT (LOCAL)-1



VIEW OF EUT (LOCAL)-2



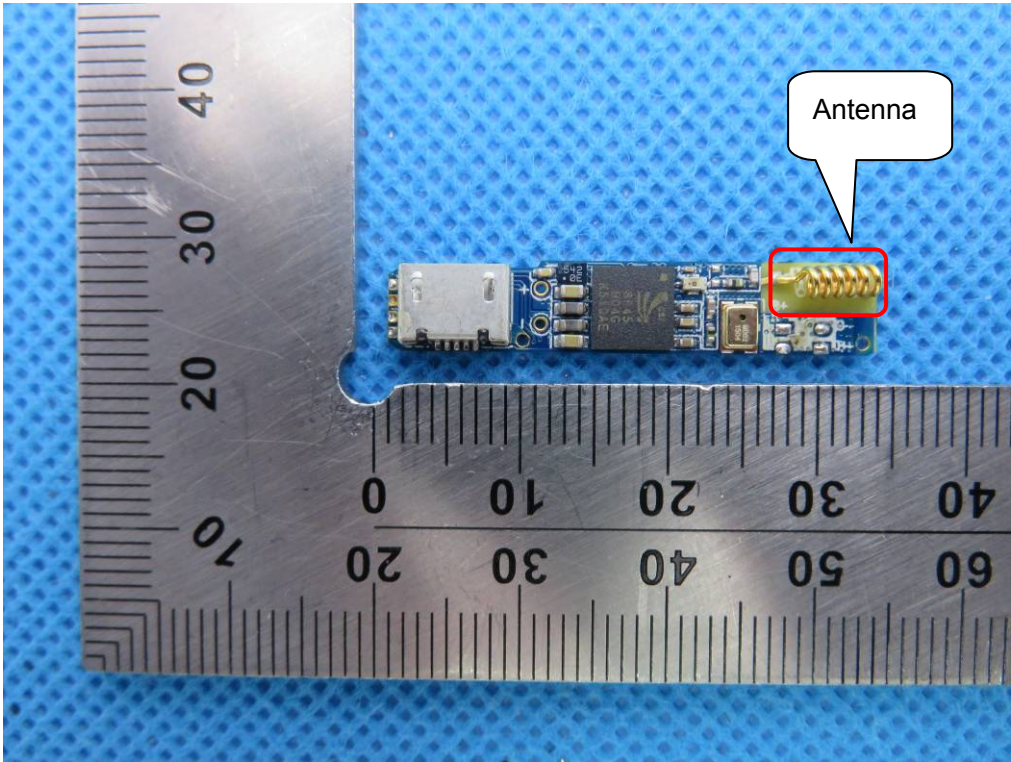
VIEW OF EUT (PORT)



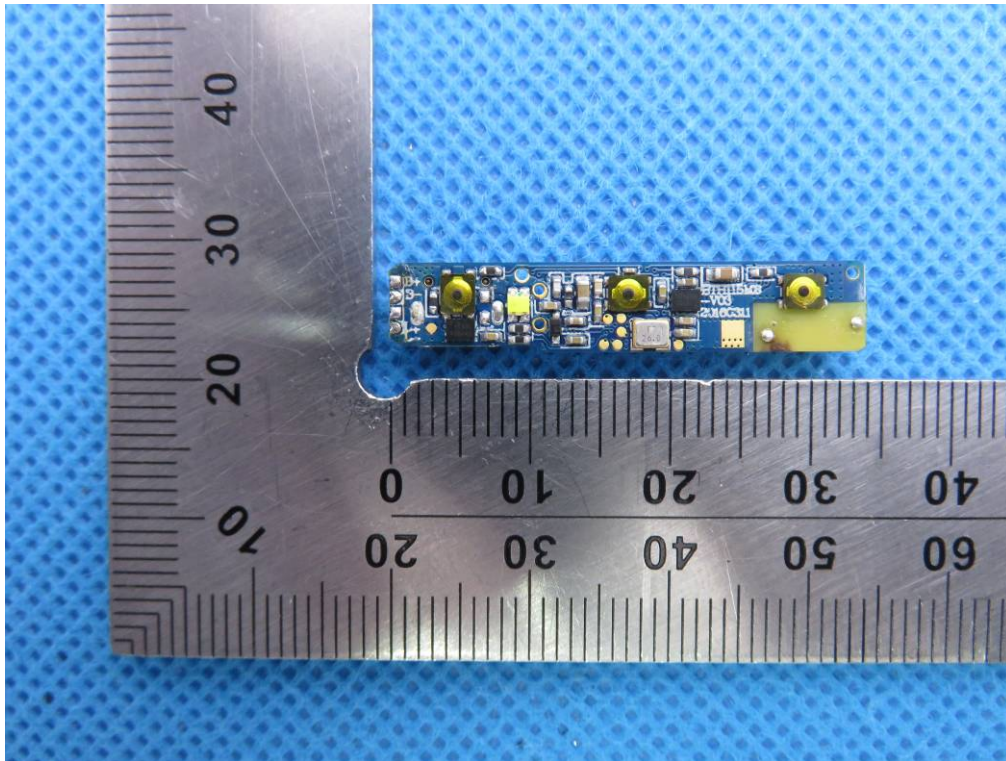
OPEN VIEW OF EUT



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



VIEW OF ADAPTER(AE)



Note: The adapter was provided by AGC test lab and used for testing only.

----END OF REPORT----