Test Report

FCC Part15 Subpart C

Product Name	:	BLUETOOTH EARPHONE
Model No.	:	LTI700
FCC ID	:	Y2SLTI700

Applicant	:	Libratone A/S
Address	:	Sundkaj 9, 2150 Nordhavn, Denmark

Date of Receipt	:	Mar. 12, 2019
Test Date	:	Mar. 12, 2019 ~ Apr. 02, 2019
Issued Date	:	Apr. 09, 2019
Report No.	:	1932105R-RF-US-P06V03
Report Version	:	V1.0

Test Report Certification

Issued Date : Apr. 09, 2019
Report No. : 1932105R-RF-US-P06V03

Product Name	:	BLUETOOTH EARPHONE
Applicant	:	Libratone A/S
Address	:	Sundkaj 9, 2150 Nordhavn, Denmark
Manufacturer	:	Libratone A/S
Address	:	Sundkaj 9, 2150 Nordhavn, Denmark
Factory	:	Goertek Inc.
Address	:	West of Weian Road, North of Yingqian Street, High-tech Industrial Development Zone, Weifang, Shandong Province, China 261031
Model No.	:	LTI700
FCC ID	:	Y2SLTI700
EUT Voltage	:	DC 3.7V
Test Voltage	:	AC120V/60Hz
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C KDB 558074 D01v05r01 ANSI C63.10: 2013
Test Result	:	Complied
Performed Location	:	DEKRA Testing & Certification (Suzhou) Co., Ltd. No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Designation Number: CN1199

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Approved By : Jack zhang

(Engineering Supervisor: Jack Zhang)

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1932105R-RF-US-P06V03	V1.0	Initial Issued Report	Apr. 09, 2019

1. General Information

1.1. EUT Description

Product Name	BLUETOOTH EARPHONE
Model No.	LTI700
EUT Voltage	DC 3.7V
Test Voltage	AC120V/60Hz
Bluetooth Specification	V3.0
Frequency Range	2402- 2480 MHz
Channel Number	V3.0: 79
Channel Separation	V3.0: 1MHz
Type of Modulation	V3.0: GFSK, Pi/4 DQPSK, 8DPSK
Data Rate	V3.0: 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps(8DPSK)
Antenna Type	Reference to Antenna List
Peak Antenna Gain	Reference to Antenna List

Bluetooth Working Frequency of Each Channel: (For V3.0)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz	03	2405 MHz
04	2406 MHz	05	2407 MHz	06	2408 MHz	07	2409 MHz
08	2410 MHz	09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz	15	2417 MHz
16	2418 MHz	17	2419 MHz	18	2420 MHz	19	2421 MHz
20	2422 MHz	21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz	27	2429 MHz
28	2430 MHz	29	2431 MHz	30	2432 MHz	31	2433 MHz
32	2434 MHz	33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz	39	2441 MHz
40	2442 MHz	41	2443 MHz	42	2444 MHz	43	2445 MHz
44	2446 MHz	45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz	51	2453 MHz
52	2454 MHz	53	2455 MHz	54	2456 MHz	55	2457 MHz
56	2458 MHz	57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz	63	2465 MHz
64	2466 MHz	65	2467 MHz	66	2468 MHz	67	2469 MHz
68	2470 MHz	69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz	75	2477 MHz
76	2478 MHz	77	2479 MHz	78	2480 MHz	N/A	N/A

1.2 Antenna information

Antenna manufacturer	N/A					
Antenna Delivery	☒	1*TX+1*RX	☐	2*TX+2*RX	☐	3*TX+3*RX
Antenna technology	☒	SISO				
	☐	MIMO	☐	Basic		
			☐	CDD		
			☐	Beam-forming		
Antenna Type	☐	External	☐	Dipole		
	☒	Internal	☐	PIFA		
			☐	PCB		
			☐	Ceramic Chip Antenna		
			☐	Stamping Antenna		
			☐	Metal plate type F antenna		
			☒	Monopole antenna		
Antenna Gain	2.7dBi					

1.3 Mode of Operation

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmitter-1Mbps(GFSK_DH5)
Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)
Mode 3: Transmitter-3Mbps(8DPSK_DH5)
Mode 4: Transmitter-Hopping

Note:

1. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.
2. Regards to the frequency band operation for systems using FHSS modulation: normal operation (hopping) was selected to test for conducted spurious test.
3. The extreme test condition for voltage and temperature were declared by the manufacturer.
4. The reading values of all the test items contain cable loss.

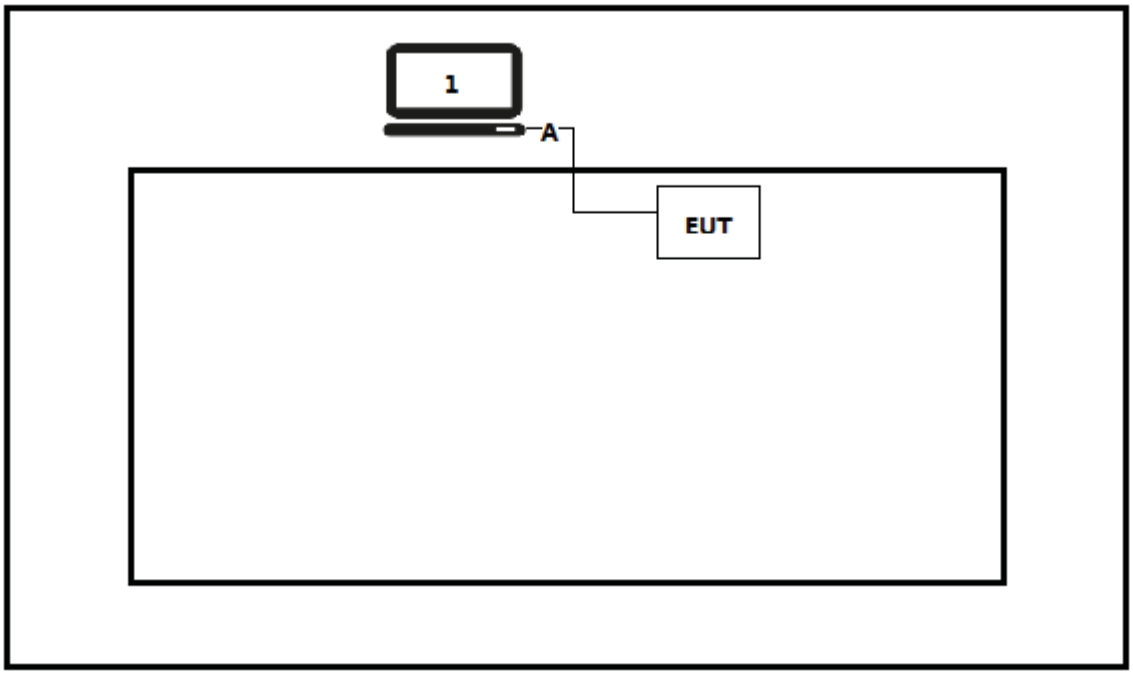
1.4 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

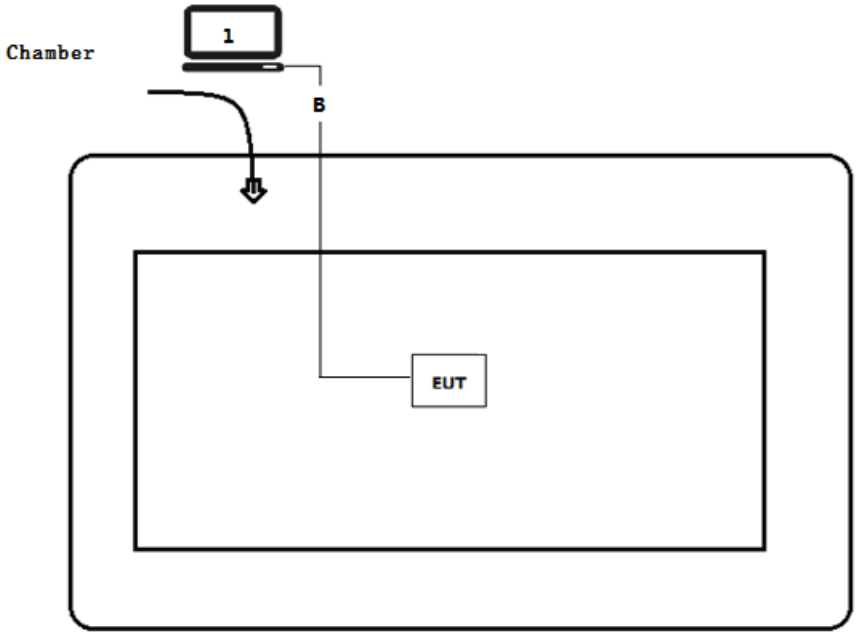
Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Think Pad	2526	LV-A3285	Power by adapter
A	USB Cable	N/A	N/A	N/A	Shield, 0.5m
B	USB Cable	N/A	N/A	N/A	Shield, 10m

1.5 Configuration of Tested System

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



1.6 EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Run RF software [Bluetest 3], and set the test mode and channel, then press OK to start to continue transmit.

2. Technical Test

2.1. Summary of Test Result

☒ No deviations from the test standards

☐ Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.207	Yes	No
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.209	Yes	No
20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)	Yes	No
Carrier Frequency Separation	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)	Yes	No
Number of Hopping Frequencies	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)(iii)	Yes	No
Time of Occupancy (Dwell Time)	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(a)(1)(iii)	Yes	No
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.247(b)(1)	Yes	No
Emissions in non-restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.215(c), 15.247(d)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2015 15.247(d)	Yes	No
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart C: 2015 Section 15.203	Yes	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

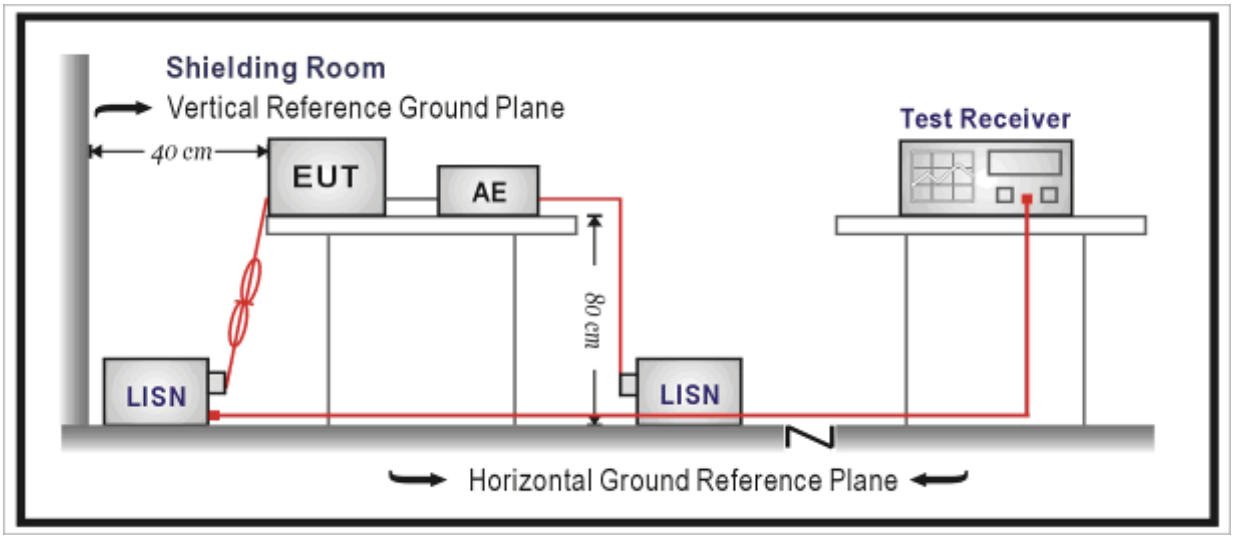
3. Conducted Emission

3.1. Test Equipment

AC Power Line Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100906	2019.03.05	2020.03.04
Two-Line V-Network	R&S	ENV 216	101189	2018.07.16	2019.07.15
Two-Line V-Network	R&S	ENV 216	101044	2018.09.15	2019.09.15
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
50ohm Termination	SHX	TF2	07081402	2018.09.15	2019.09.15
Temperature/Humidity Meter	Zhichen	ZC1-2	TR1-TH	2019.01.05	2020.01.04
Quietek EMI V3(test software)	Quietek	N/A	N/A	N/A	N/A
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

3.2. Test Setup

AC Power Line Conducted Emission test setup



3.3. Limit

Frequency of Emission (MHz)	Conducted Limit	
	Quasi-peak (dB μ V)	Average(dB μ V)
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

3.4. Test Procedure

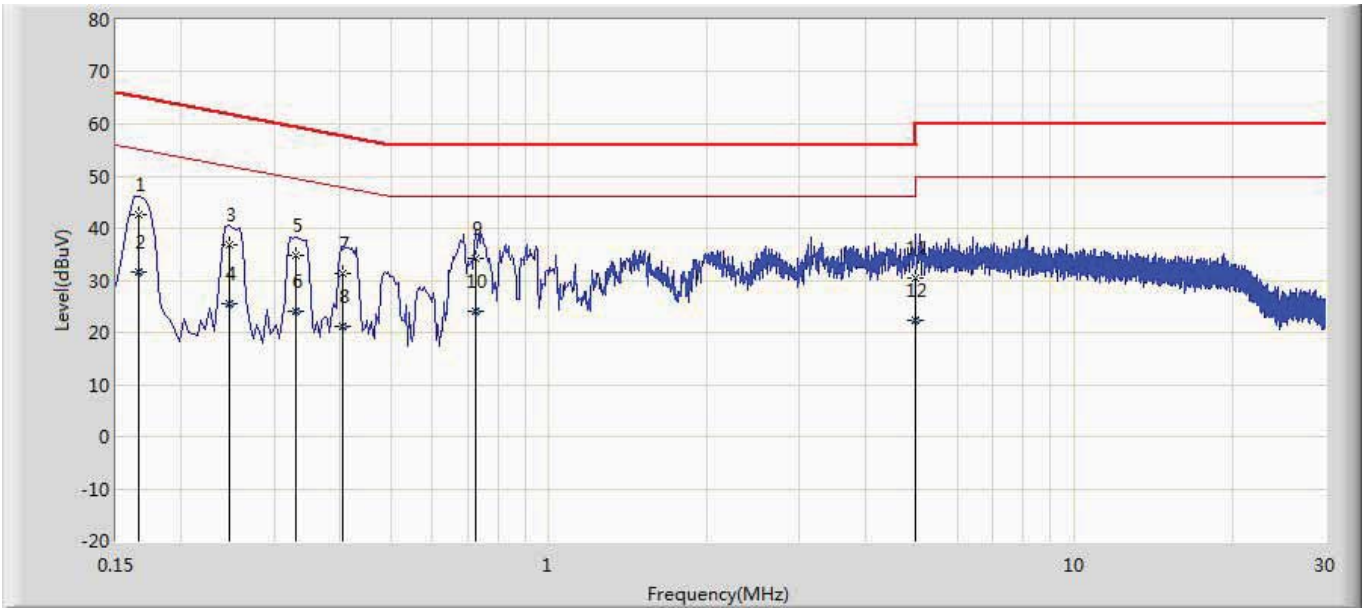
Test Method			
	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

3.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

3.6. Test Result

Site: TR1	Time: 2019/03/18
Limit: FCC_Part15.207_CE_AC Power	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Line
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1	



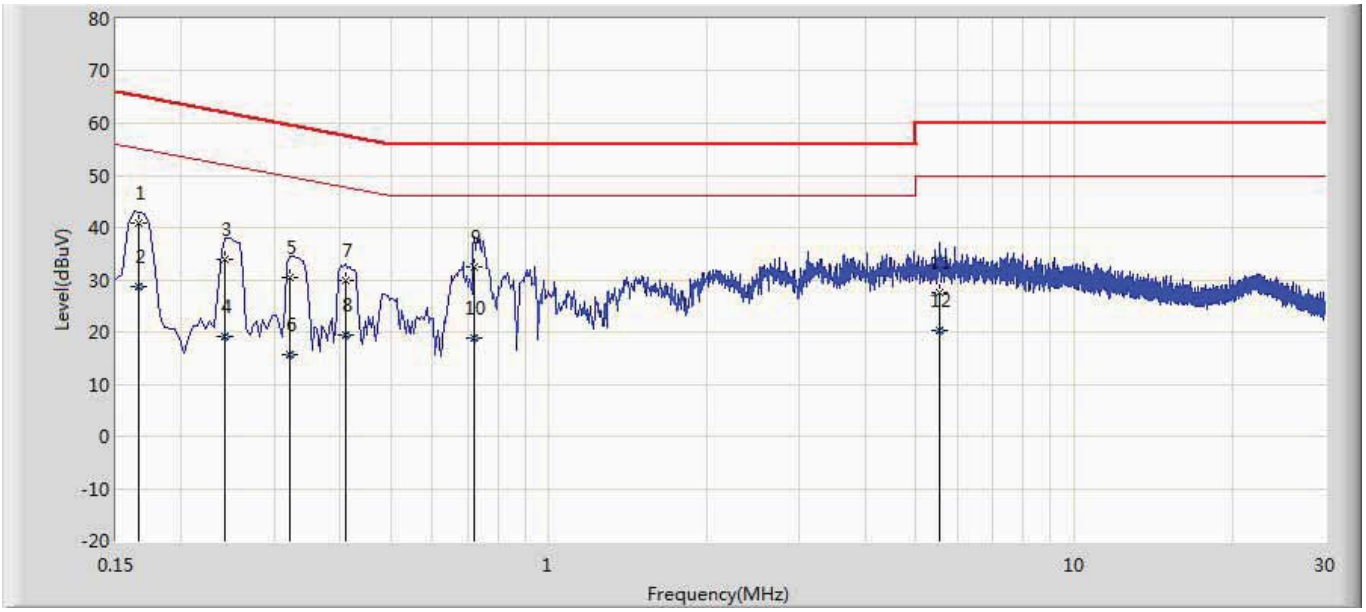
No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1		0.166	42.584	32.984	-22.574	65.158	9.571	0.028	0.000	QP
2		0.166	31.610	22.010	-23.548	55.158	9.571	0.028	0.000	AV
3		0.246	36.804	27.254	-25.087	61.891	9.519	0.031	0.000	QP
4		0.246	25.545	15.995	-26.346	51.891	9.519	0.031	0.000	AV
5		0.330	34.642	25.071	-24.809	59.451	9.536	0.035	0.000	QP
6		0.330	23.996	14.425	-25.455	49.451	9.536	0.035	0.000	AV
7		0.406	31.333	21.743	-26.397	57.730	9.551	0.039	0.000	QP
8		0.406	21.015	11.425	-26.715	47.730	9.551	0.039	0.000	AV
9	*	0.726	34.223	24.545	-21.777	56.000	9.628	0.050	0.000	QP
10		0.726	24.128	14.449	-21.872	46.000	9.628	0.050	0.000	AV
11		4.986	30.515	20.663	-25.485	56.000	9.710	0.142	0.000	QP
12		4.986	22.235	12.383	-23.765	46.000	9.710	0.142	0.000	AV

Note:

1. " * ", means this data is the worst emission level.

2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Site: TR1	Time: 2019/03/18
Limit: FCC_Part15.207_CE_AC Power	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Neutral
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1		0.166	40.890	31.321	-24.269	65.158	9.541	0.028	0.000	QP
2		0.166	28.611	19.042	-26.547	55.158	9.541	0.028	0.000	AV
3		0.242	34.034	24.483	-27.993	62.027	9.521	0.030	0.000	QP
4		0.242	19.172	9.622	-32.855	52.027	9.521	0.030	0.000	AV
5		0.322	30.567	20.972	-29.088	59.655	9.561	0.035	0.000	QP
6		0.322	15.703	6.108	-33.952	49.655	9.561	0.035	0.000	AV
7		0.410	29.754	20.110	-27.895	57.648	9.605	0.039	0.000	QP
8		0.410	19.448	9.805	-28.200	47.648	9.605	0.039	0.000	AV
9	*	0.722	32.396	22.738	-23.604	56.000	9.608	0.050	0.000	QP
10		0.722	18.970	9.313	-27.030	46.000	9.608	0.050	0.000	AV
11		5.538	27.656	17.723	-32.344	60.000	9.783	0.150	0.000	QP
12		5.538	20.286	10.353	-29.714	50.000	9.783	0.150	0.000	AV

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

4. Emissions in restricted frequency bands

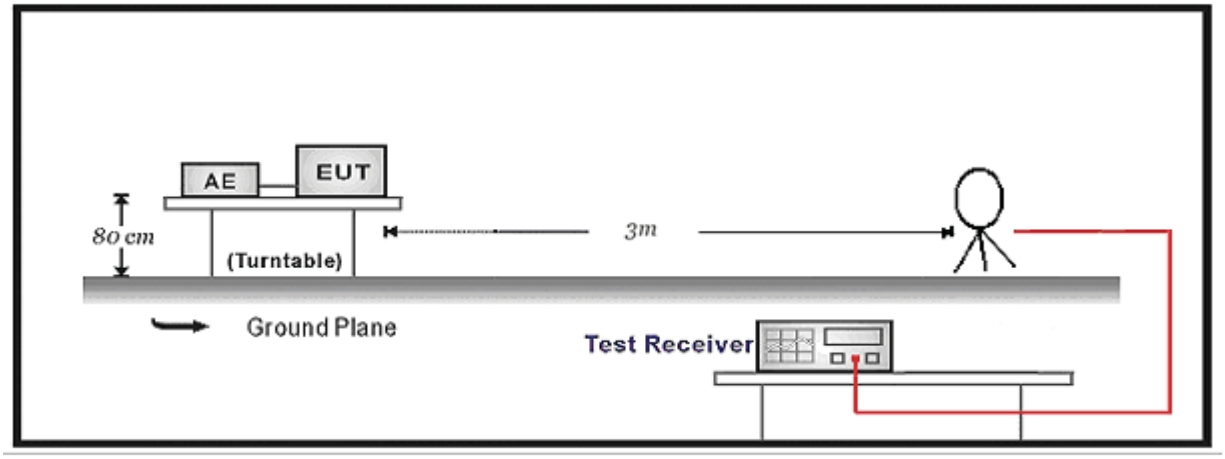
4.1. Test Equipment

Radiated Emission(Below 1GHz) / AC-2					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2019.03.29	2020.03.28
Loop Antenna	R&S	HFH2-Z2	833799/003	2018.11.16	2019.11.15
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2018.10.16	2019.10.15
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2019.03.02	2020.03.01
Temperature/Humidity Meter	Zhichen	ZC1-2	AC2-TH	2019.01.04	2020.01.03
Quietek EMI V3(test software)	Quietek	N/A	N/A	N/A	N/A
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

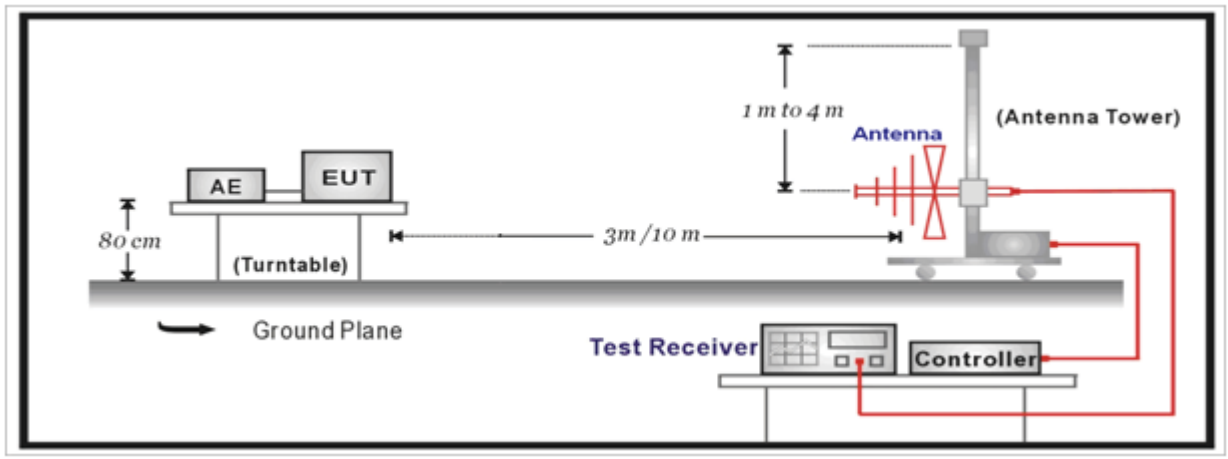
Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2019.01.04	2020.01.03
Preamplifier	Miteq	NSP1800-25	1364185	2018.05.06	2019.05.05
Preamplifier	QuieTek	AP-040G	CHM-0906001	2018.05.06	2019.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2019.01.22	2020.01.21
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2018.11.25	2019.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.03.02	2020.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.03.02	2020.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.03.02	2020.03.01
EMI Receiver	Agilent	N9038A	MY51210196	2018.06.10	2019.06.09
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2019.01.04	2020.01.03
Quietek EMI V3(test software)	Quietek	N/A	N/A	N/A	N/A
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

4.2. Test Setup

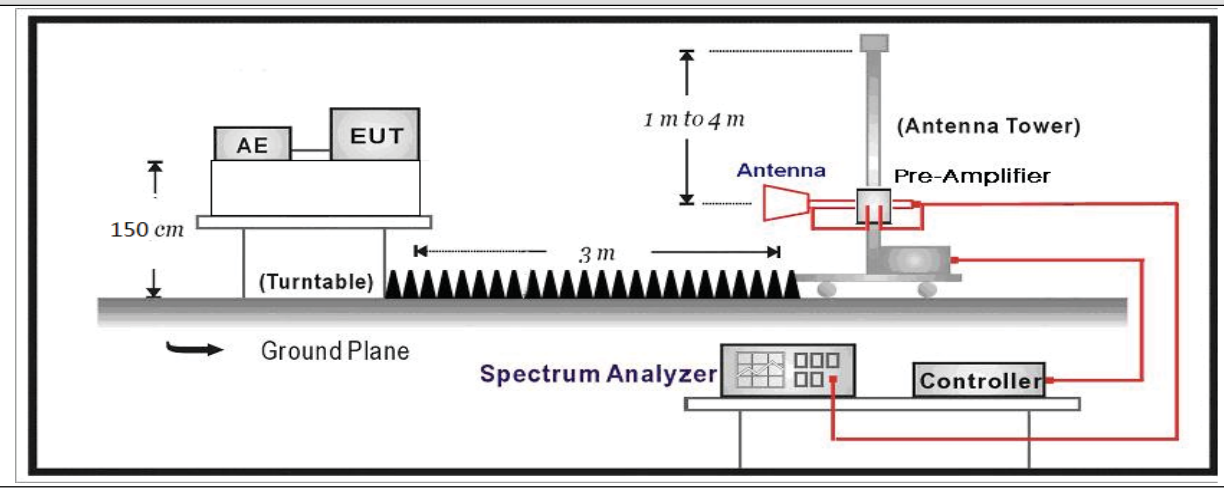
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 –16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975–12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675–12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			

Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☒	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

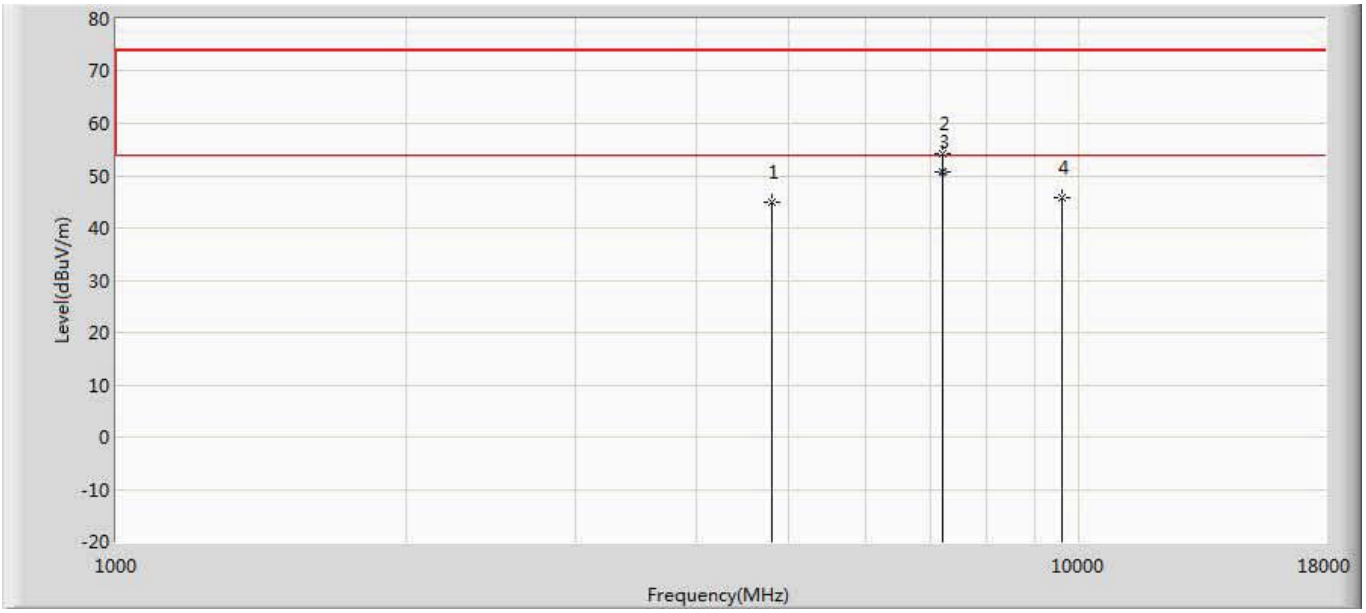
4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB

below 1G is defined as ± 3.8 dB

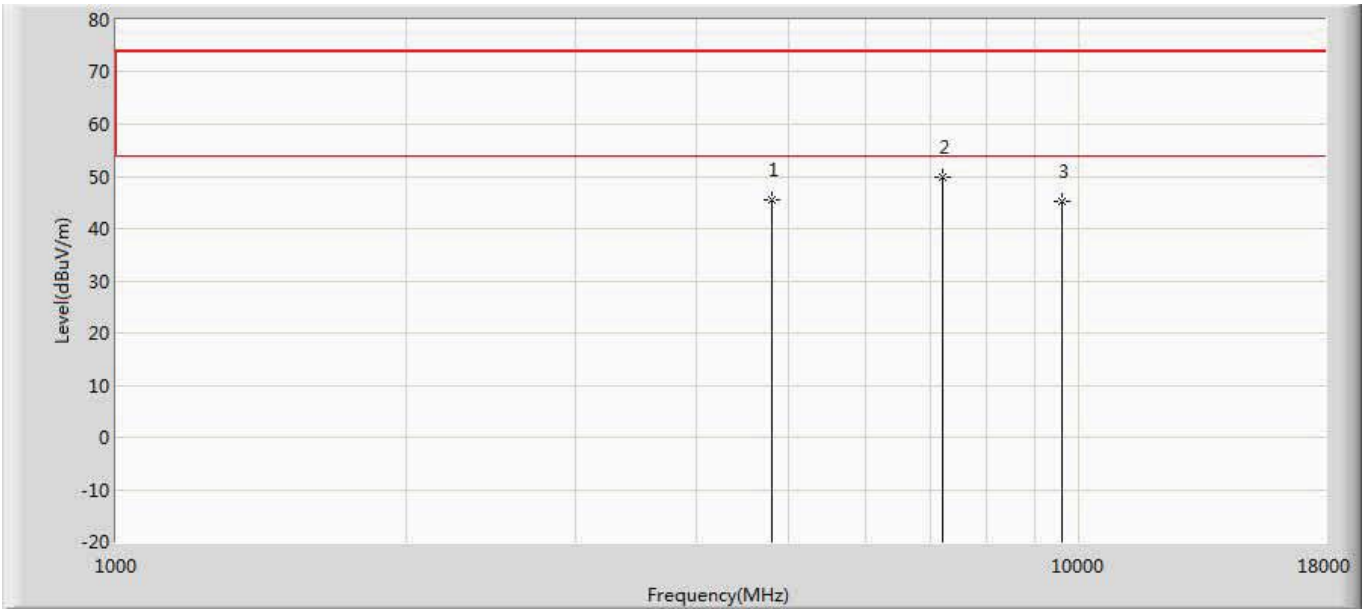
4.6. Test Result

Profile: 1932105R	Page No.: 33
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2402MHz by DH5	



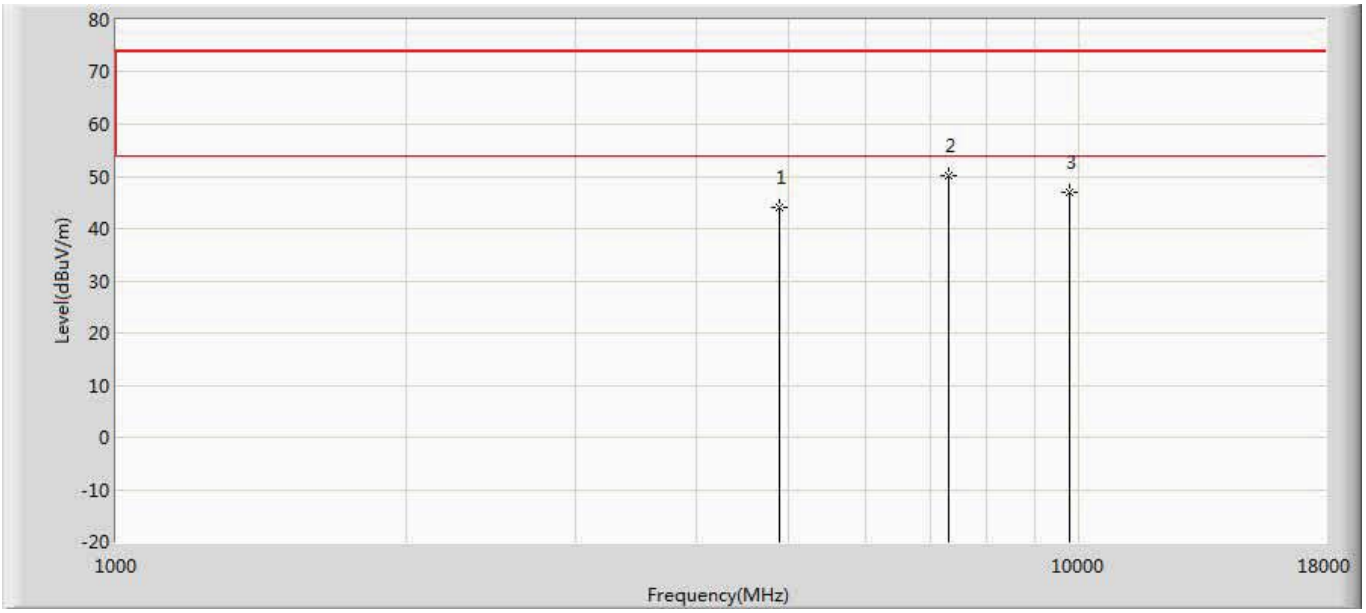
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	45.038	44.809	-28.962	74.000	0.229	PK
2		7205.000	54.085	50.664	-19.915	74.000	3.421	PK
3	*	7206.095	50.821	47.394	-3.179	54.000	3.426	AV
4		9608.000	45.880	37.360	-28.120	74.000	8.519	PK

Profile: 1932105R	Page No.: 34
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2402MHz by DH5	



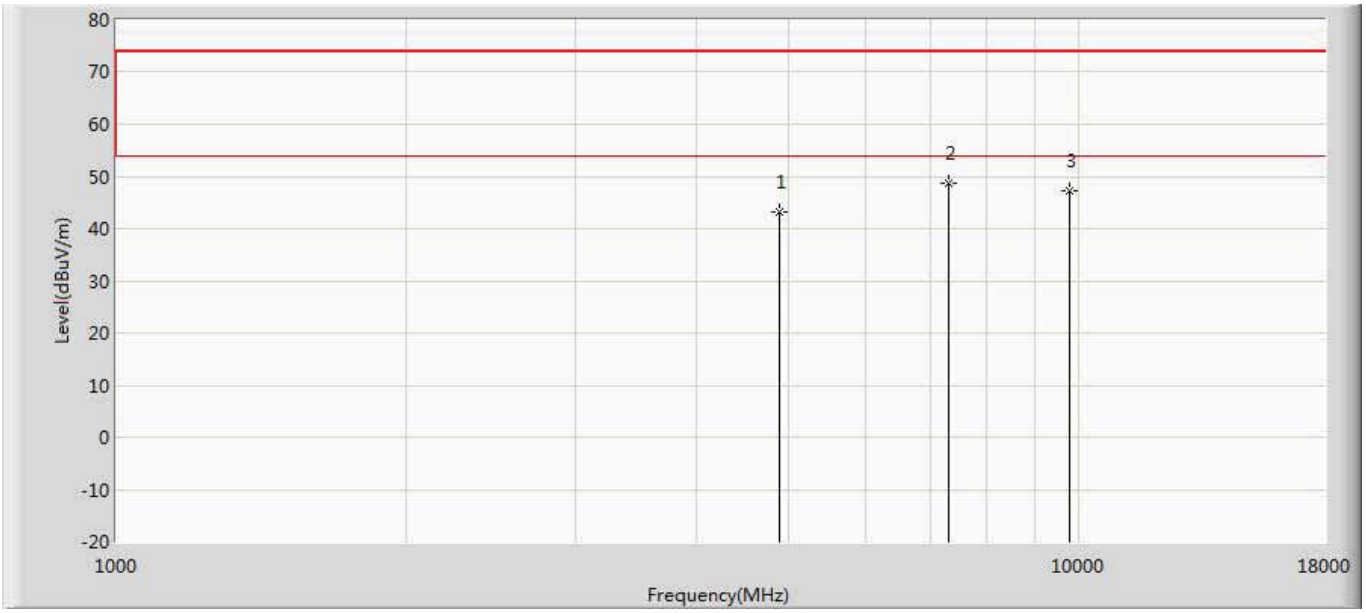
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	45.466	45.237	-28.534	74.000	0.229	PK
2	*	7205.000	49.791	46.370	-24.209	74.000	3.421	PK
3		9608.000	45.117	36.597	-28.883	74.000	8.519	PK

Profile: 1932105R	Page No.: 35
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2441MHz by DH5	



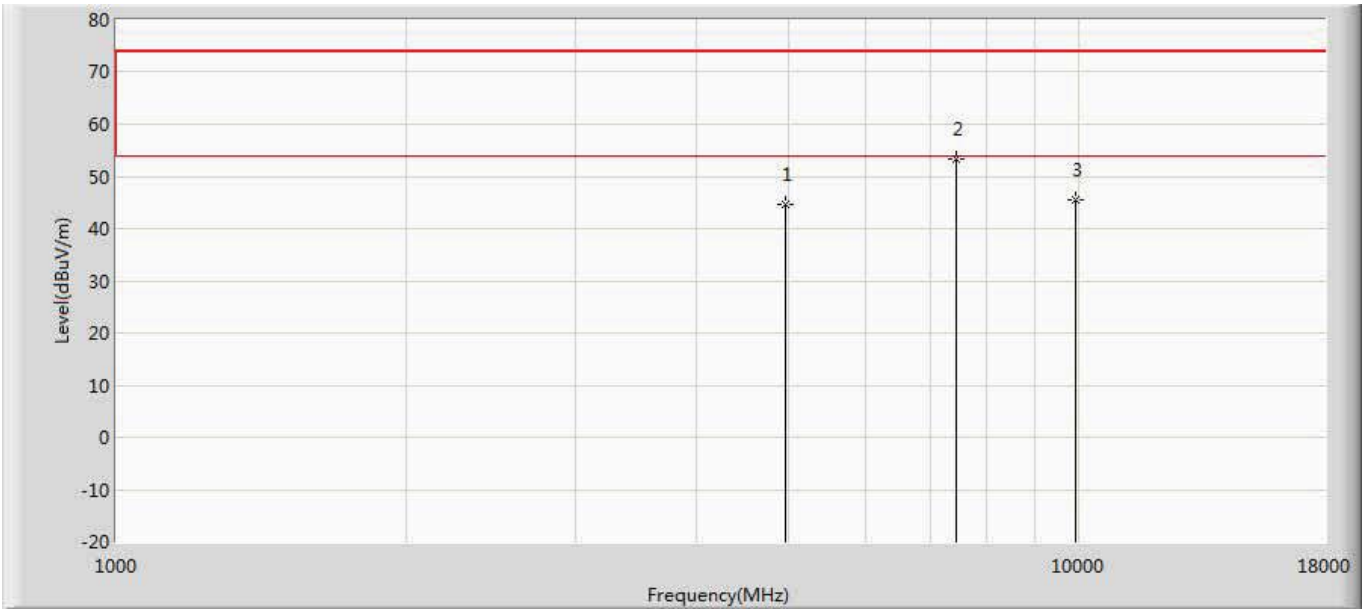
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	43.918	43.458	-30.082	74.000	0.460	PK
2	*	7323.000	50.183	46.594	-23.817	74.000	3.590	PK
3		9764.000	46.933	37.569	-27.067	74.000	9.365	PK

Profile: 1932105R	Page No.: 36
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2441MHz by DH5	



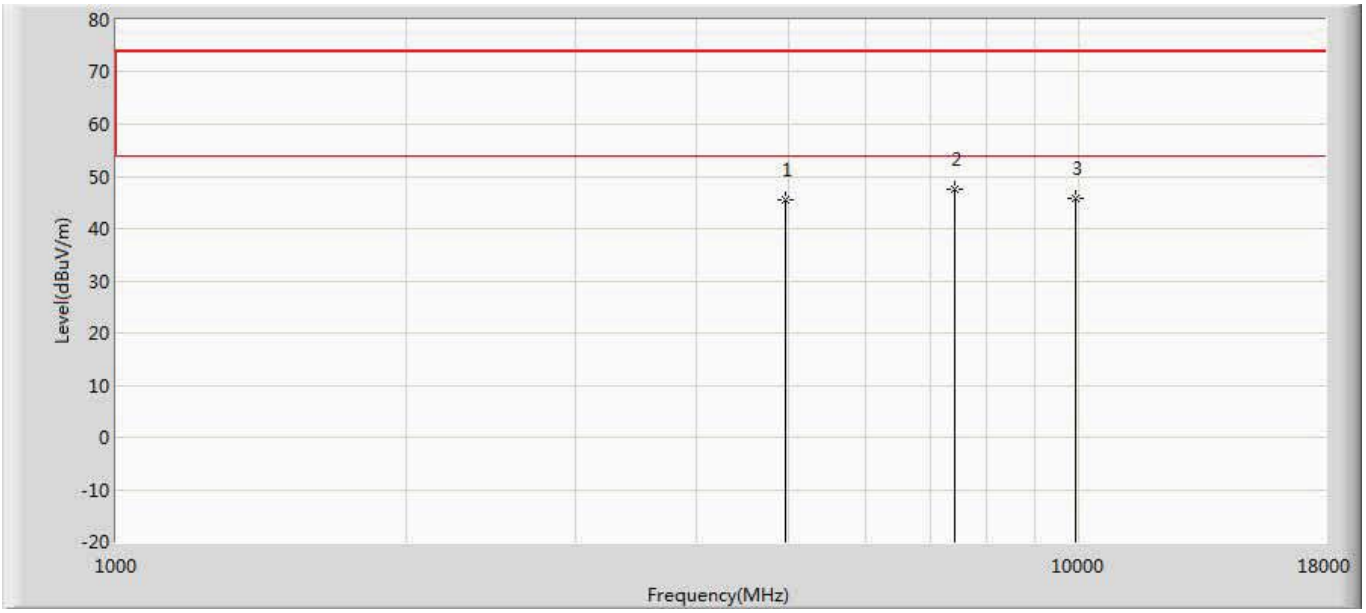
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	43.196	42.736	-30.804	74.000	0.460	PK
2	*	7323.000	48.746	45.157	-25.254	74.000	3.590	PK
3		9764.000	47.325	37.961	-26.675	74.000	9.365	PK

Profile: 1932105R	Page No.: 37
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2480MHz by DH5	



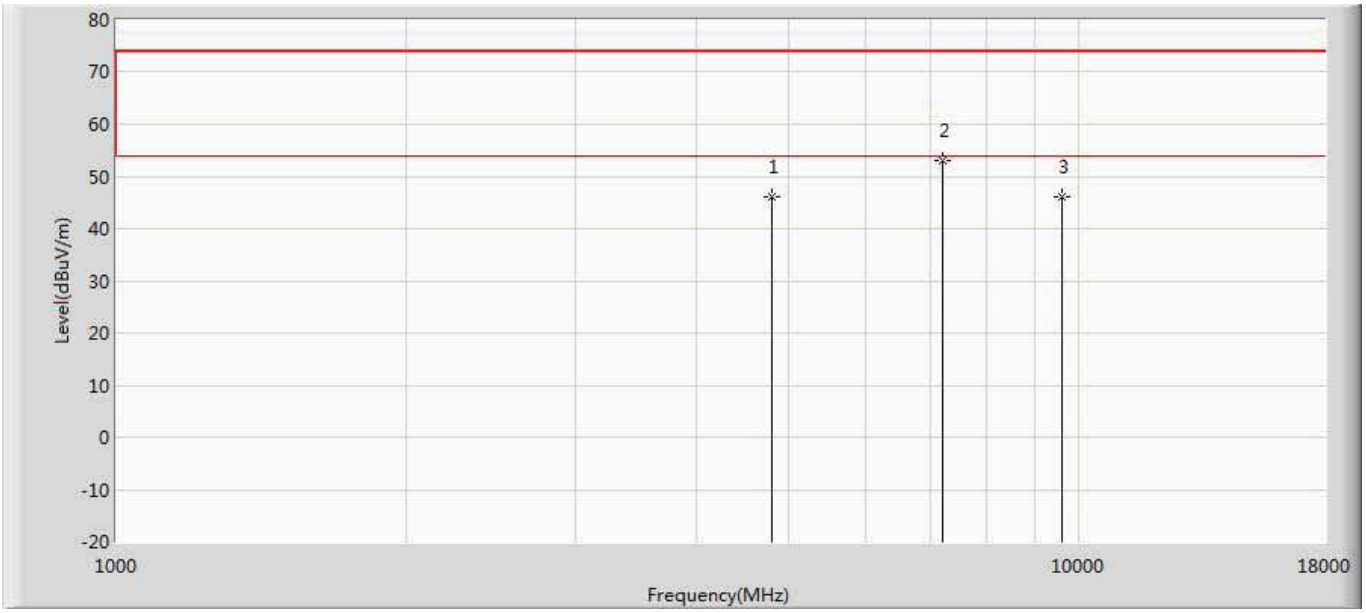
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	44.501	43.830	-29.499	74.000	0.671	PK
2	*	7443.000	53.304	48.475	-20.696	74.000	4.829	PK
3		9920.000	45.586	37.185	-28.414	74.000	8.401	PK

Profile: 1932105R	Page No.: 38
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2480MHz by DH5	



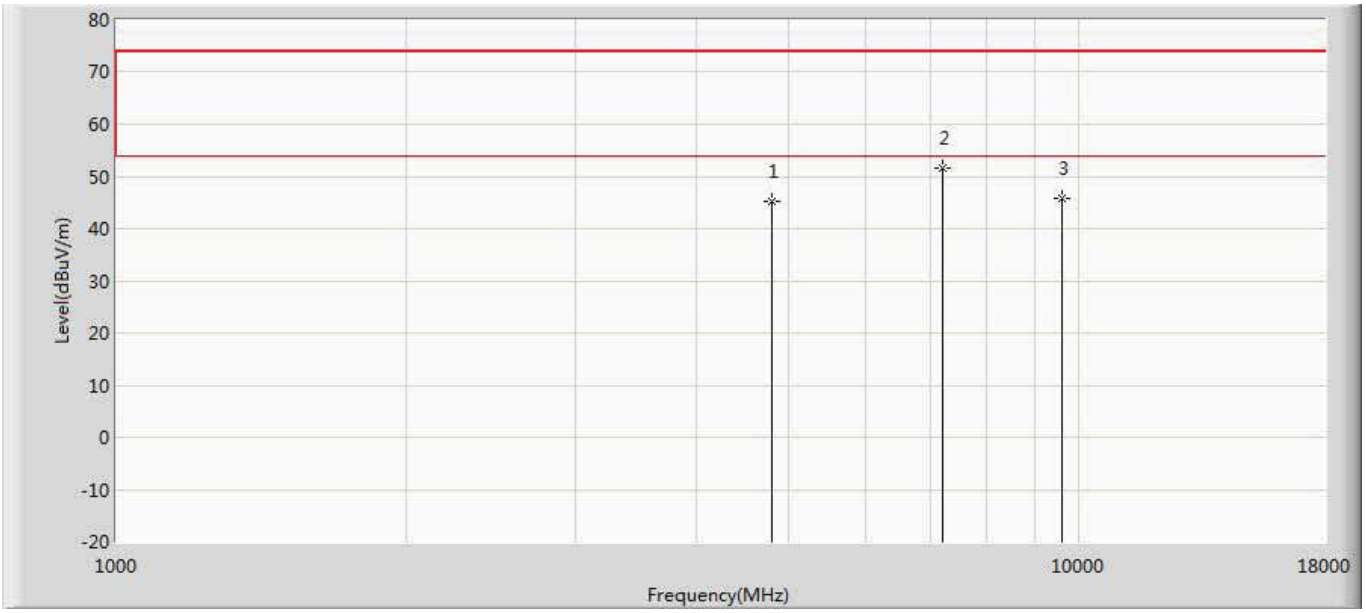
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	45.622	44.951	-28.378	74.000	0.671	PK
2	*	7440.000	47.524	42.797	-26.476	74.000	4.727	PK
3		9920.000	45.736	37.335	-28.264	74.000	8.401	PK

Profile: 1932105R	Page No.: 39
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 2: Transmit at 2402MHz by 2DH5	



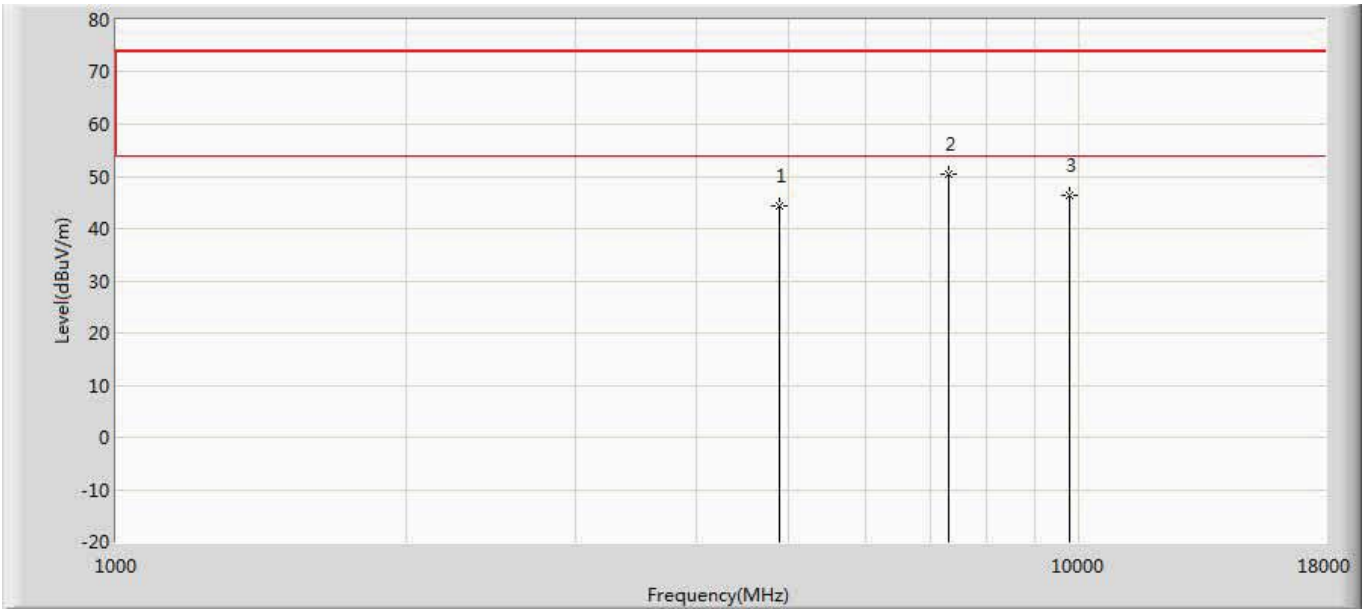
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	46.014	45.785	-27.986	74.000	0.229	PK
2	*	7205.000	53.014	49.593	-20.986	74.000	3.421	PK
3		9608.000	45.985	37.465	-28.015	74.000	8.519	PK

Profile: 1932105R	Page No.: 40
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 2: Transmit at 2402MHz by 2DH5	



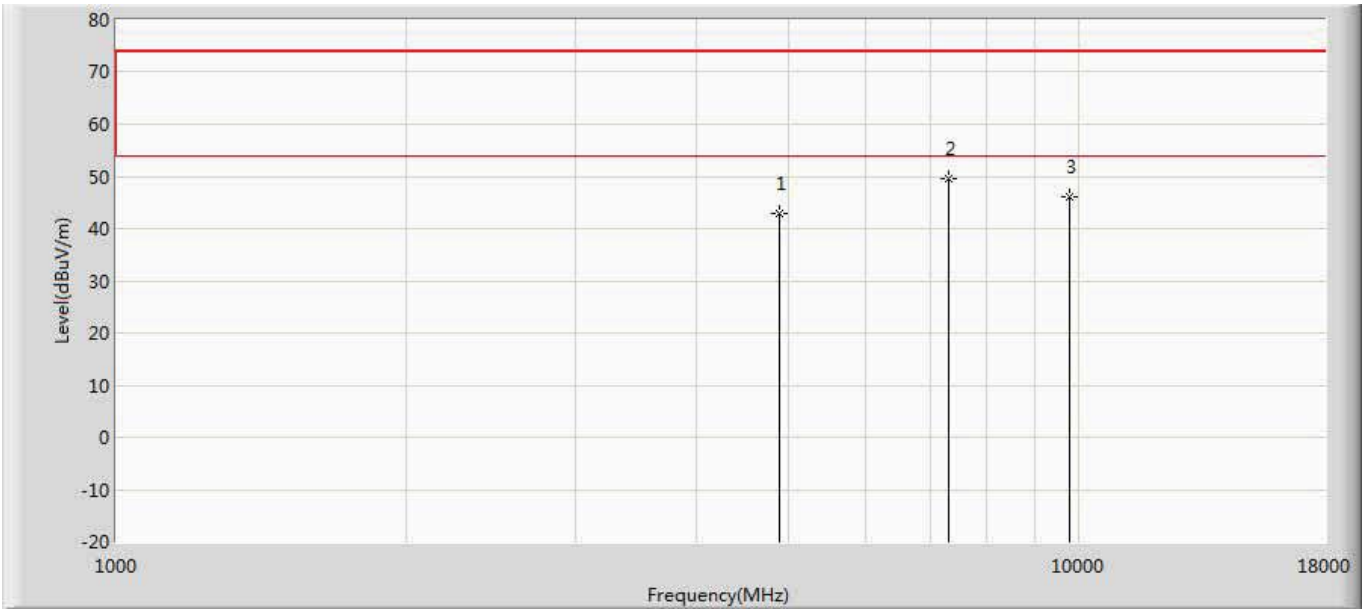
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	45.319	45.090	-28.681	74.000	0.229	PK
2	*	7205.000	51.737	48.316	-22.263	74.000	3.421	PK
3		9608.000	45.749	37.229	-28.251	74.000	8.519	PK

Profile: 1932105R	Page No.: 41
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 2: Transmit at 2441MHz by 2DH5	



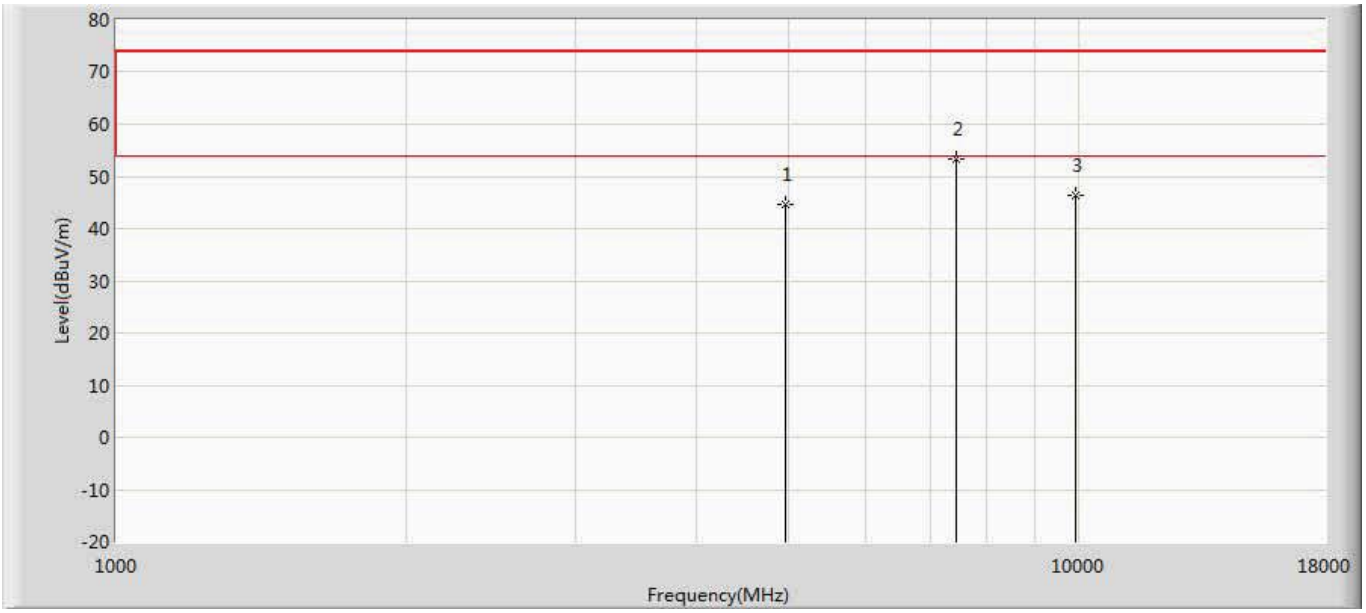
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	44.343	43.883	-29.657	74.000	0.460	PK
2	*	7324.000	50.420	46.818	-23.580	74.000	3.602	PK
3		9764.000	46.346	36.982	-27.654	74.000	9.365	PK

Profile: 1932105R	Page No.: 42
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 2: Transmit at 2441MHz by 2DH5	



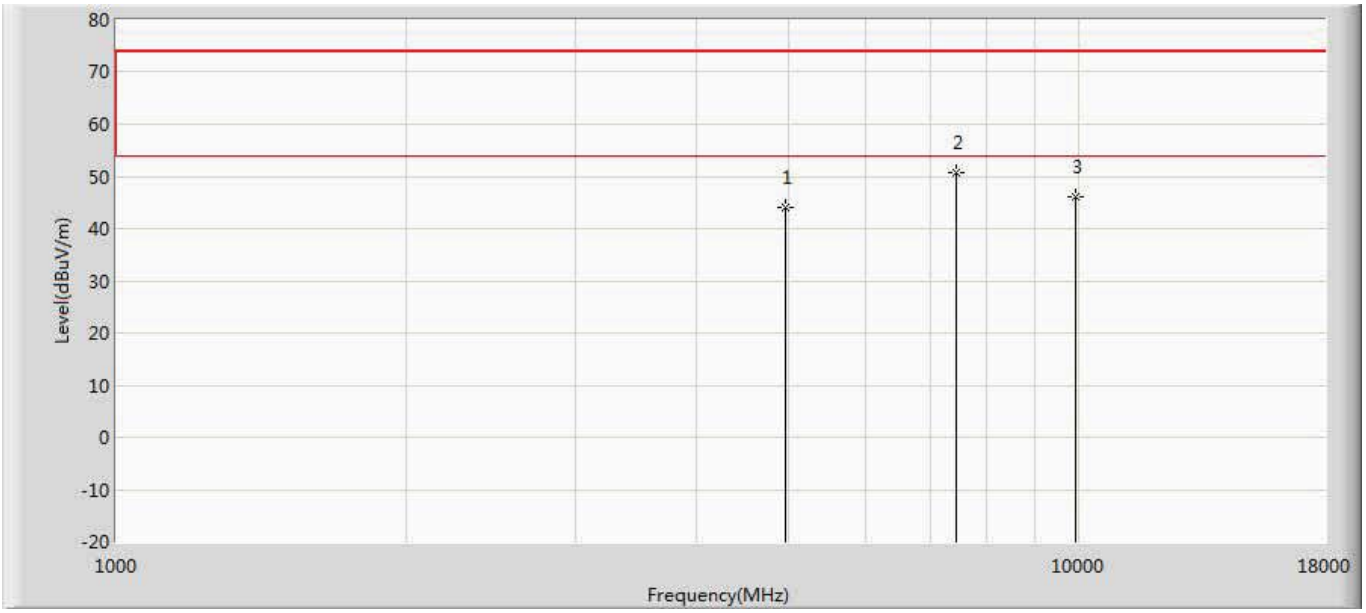
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	42.836	42.376	-31.164	74.000	0.460	PK
2	*	7324.000	49.653	46.051	-24.347	74.000	3.602	PK
3		9764.000	46.063	36.699	-27.937	74.000	9.365	PK

Profile: 1932105R	Page No.: 43
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 2: Transmit at 2480MHz by 2DH5	



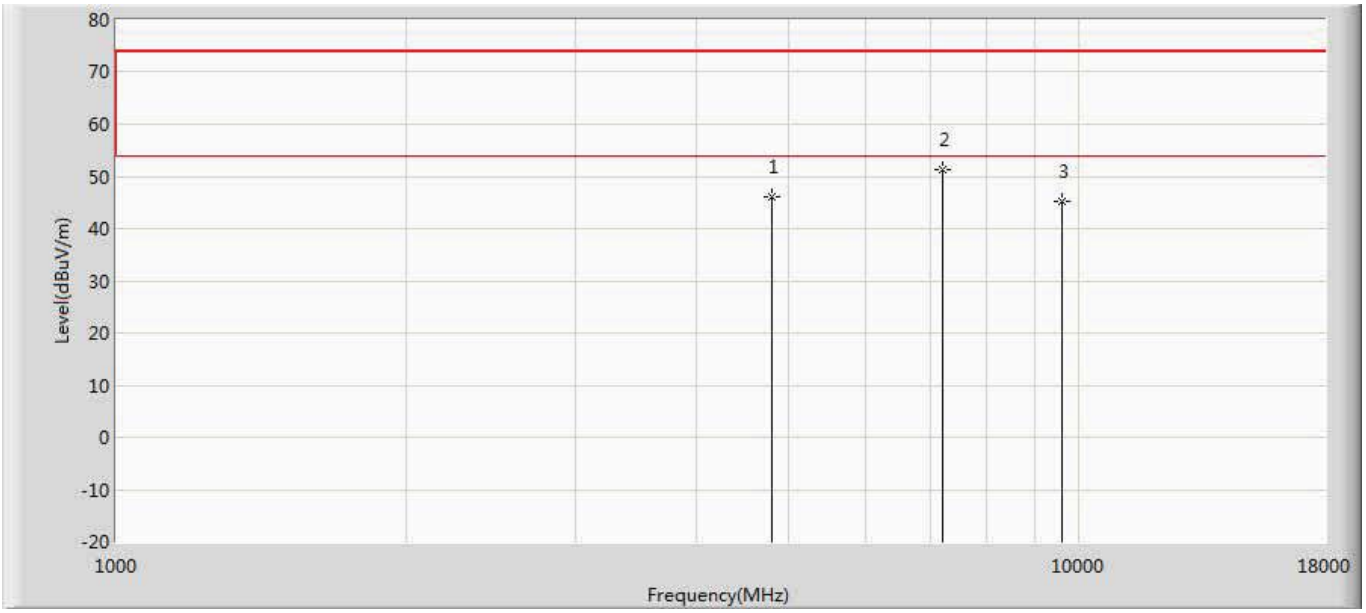
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	44.716	44.045	-29.284	74.000	0.671	PK
2	*	7443.000	53.410	48.581	-20.590	74.000	4.829	PK
3		9920.000	46.247	37.846	-27.753	74.000	8.401	PK

Profile: 1932105R	Page No.: 44
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 2: Transmit at 2480MHz by 2DH5	



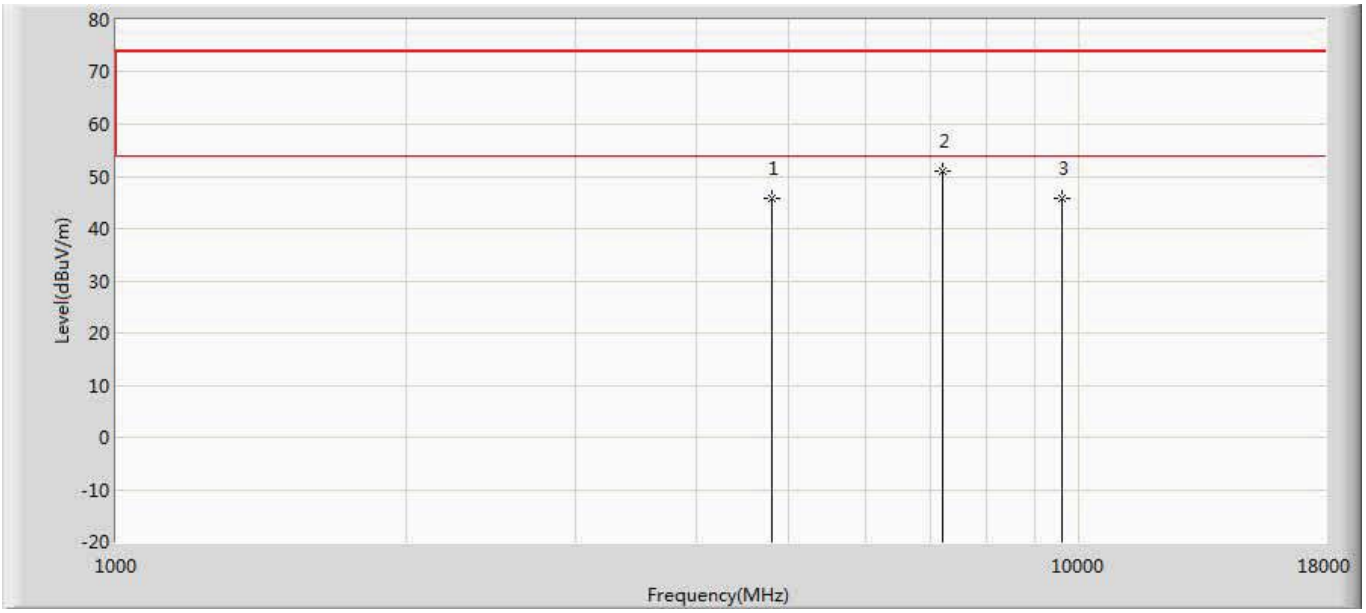
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	44.131	43.460	-29.869	74.000	0.671	PK
2	*	7443.000	50.801	45.972	-23.199	74.000	4.829	PK
3		9920.000	46.090	37.689	-27.910	74.000	8.401	PK

Profile: 1932105R	Page No.: 45
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 3: Transmit at 2402MHz by 3DH5	



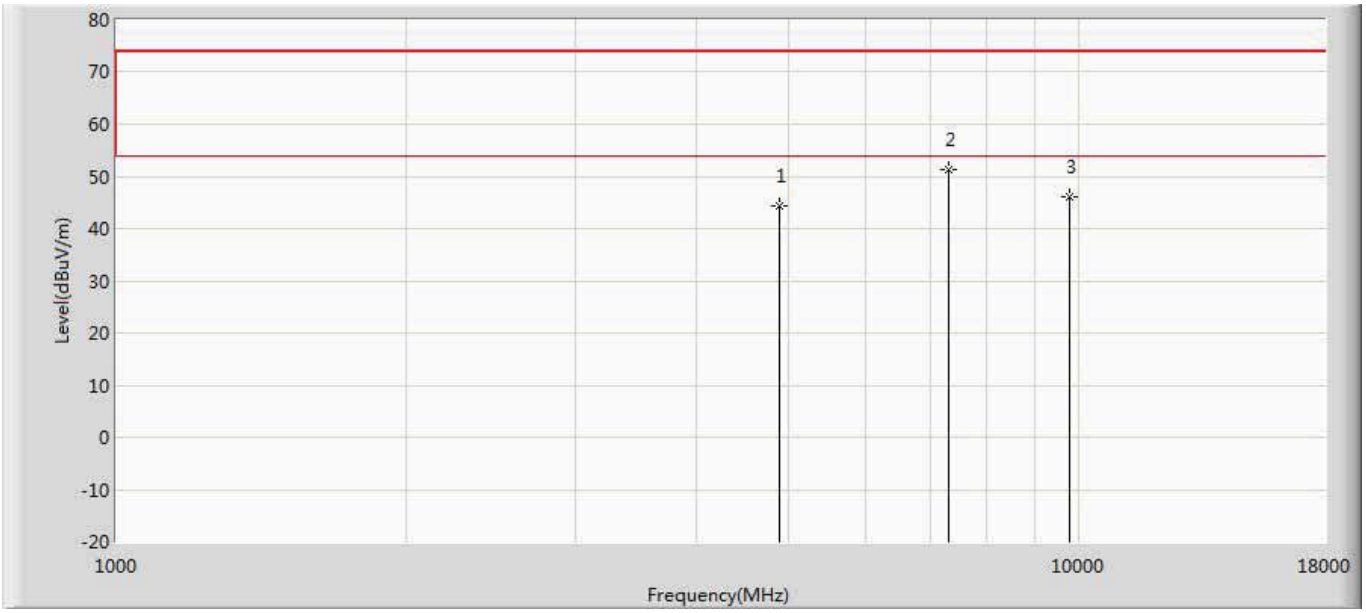
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	46.052	45.823	-27.948	74.000	0.229	PK
2	*	7205.000	51.336	47.915	-22.664	74.000	3.421	PK
3		9608.000	45.241	36.721	-28.759	74.000	8.519	PK

Profile: 1932105R	Page No.: 46
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 3: Transmit at 2402MHz by 3DH5	



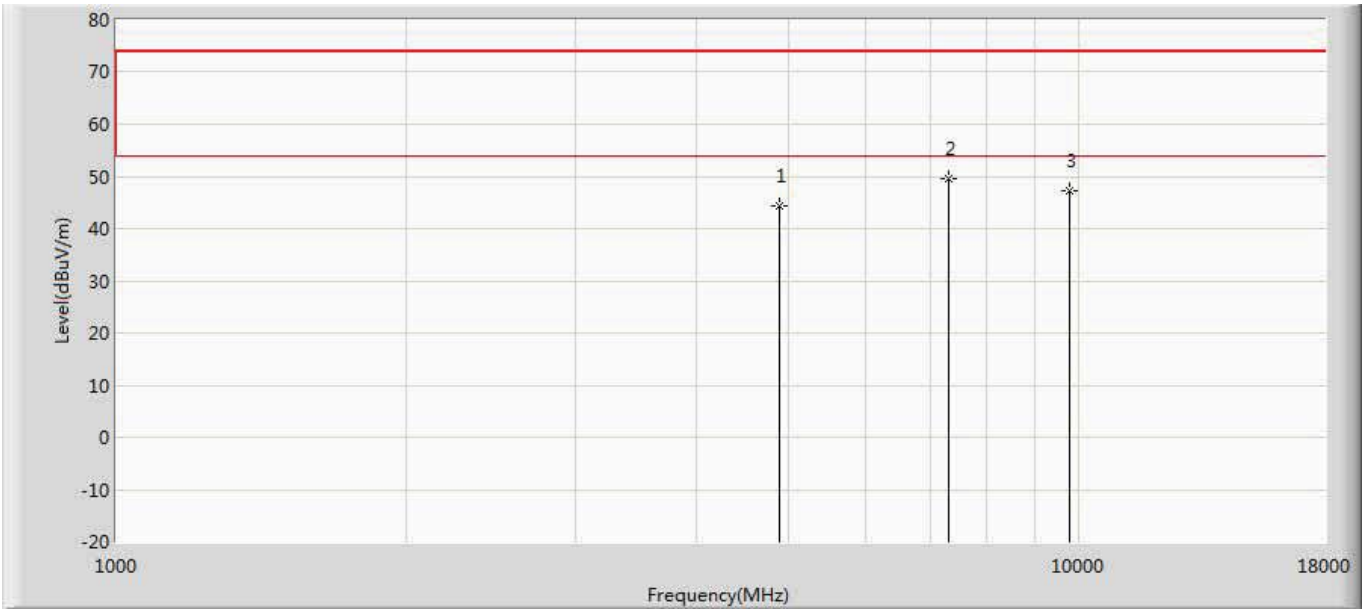
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	45.843	45.614	-28.157	74.000	0.229	PK
2	*	7205.000	50.998	47.577	-23.002	74.000	3.421	PK
3		9608.000	45.693	37.173	-28.307	74.000	8.519	PK

Profile: 1932105R	Page No.: 47
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 3: Transmit at 2441MHz by 3DH5	



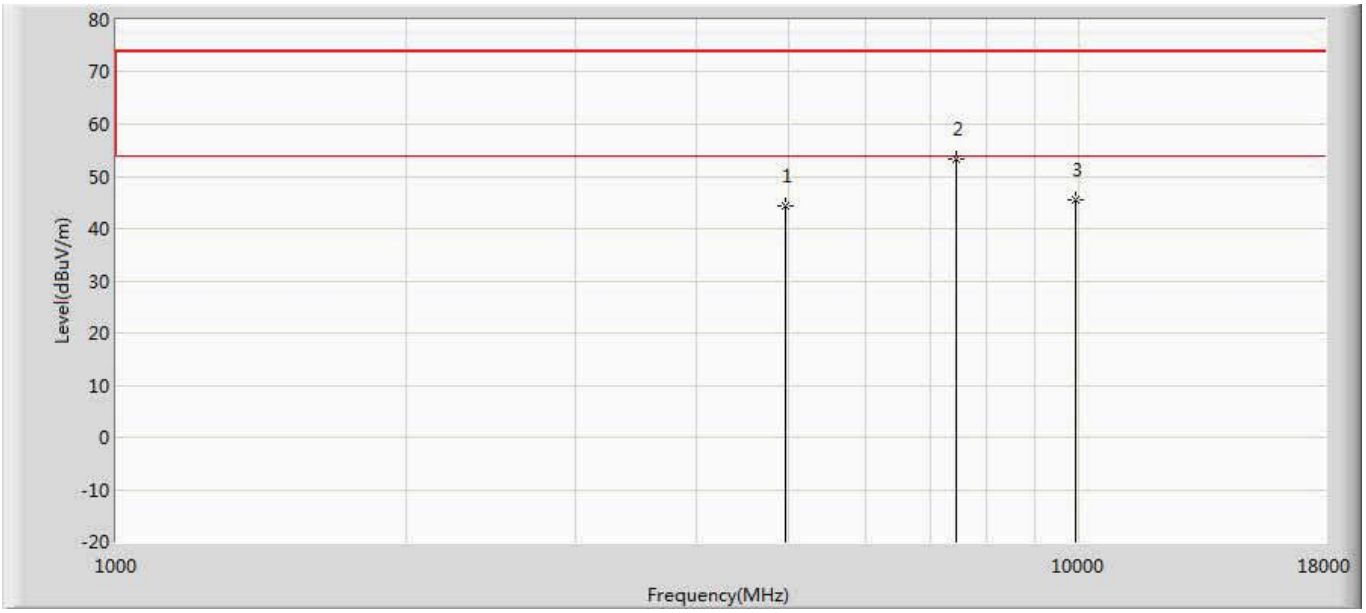
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	44.365	43.905	-29.635	74.000	0.460	PK
2	*	7324.000	51.315	47.713	-22.685	74.000	3.602	PK
3		9764.000	45.946	36.582	-28.054	74.000	9.365	PK

Profile: 1932105R	Page No.: 48
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 3: Transmit at 2441MHz by 3DH5	



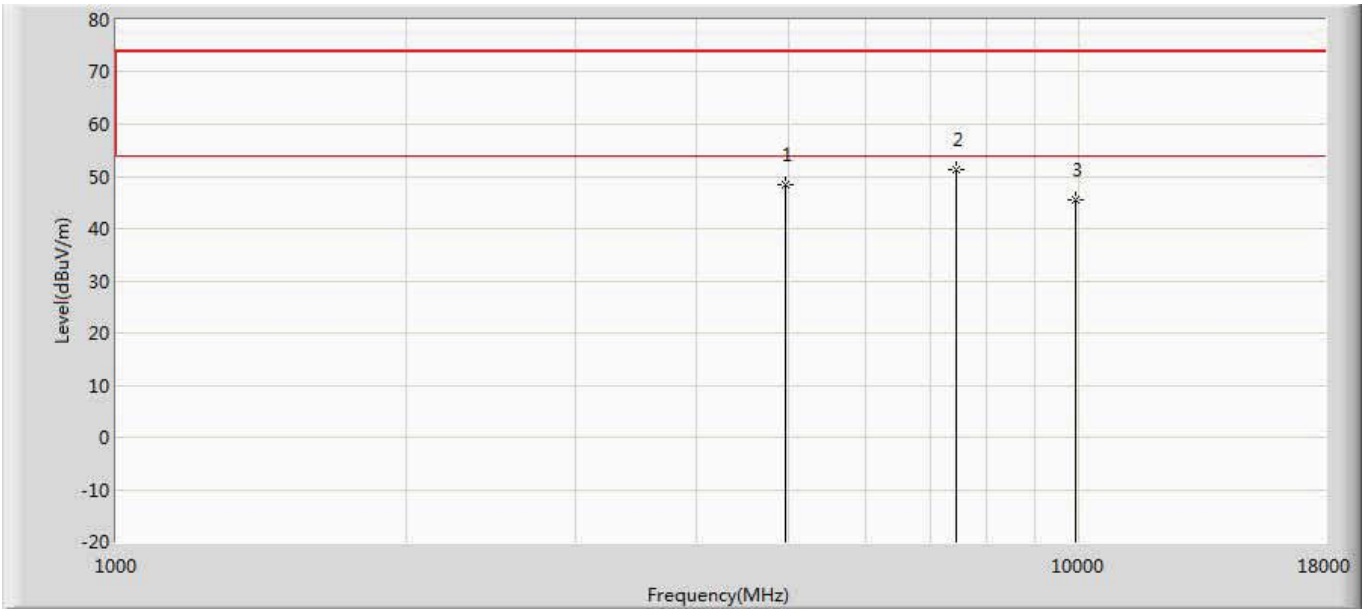
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4882.000	44.360	43.900	-29.640	74.000	0.460	PK
2	*	7324.000	49.568	45.966	-24.432	74.000	3.602	PK
3		9764.000	47.204	37.840	-26.796	74.000	9.365	PK

Profile: 1932105R	Page No.: 49
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:20
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 3: Transmit at 2480MHz by 3DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	44.218	43.547	-29.782	74.000	0.671	PK
2	*	7443.000	53.332	48.503	-20.668	74.000	4.829	PK
3		9920.000	45.641	37.240	-28.359	74.000	8.401	PK

Profile: 1932105R	Page No.: 50
Engineer: Simon	
Site: AC5	Time: 2019/04/01 - 13:21
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 3: Transmit at 2480MHz by 3DH5	



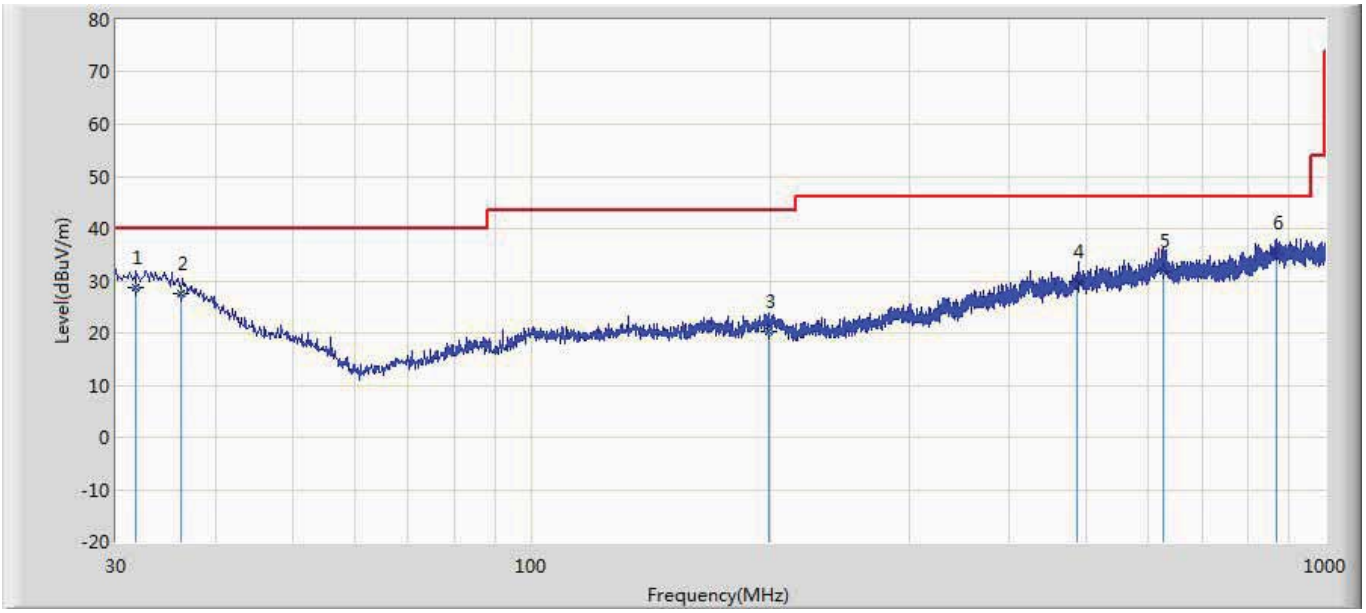
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	48.507	47.836	-25.493	74.000	0.671	PK
2	*	7443.000	51.307	46.478	-22.693	74.000	4.829	PK
3		9920.000	45.527	37.126	-28.473	74.000	8.401	PK

Note:

1. Measured Level = Reading Level + Factor.
2. The test frequency range, 9kHz~30MHz, 18GHz~26GHz, both of the worst case are at least 20dB below the limits, therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
4. As the radiated emission was performed, so conducted emission was not tested.

The worst case of Radiated Emission below 1GHz:

Site: AC2	Time: 2019/03/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1	

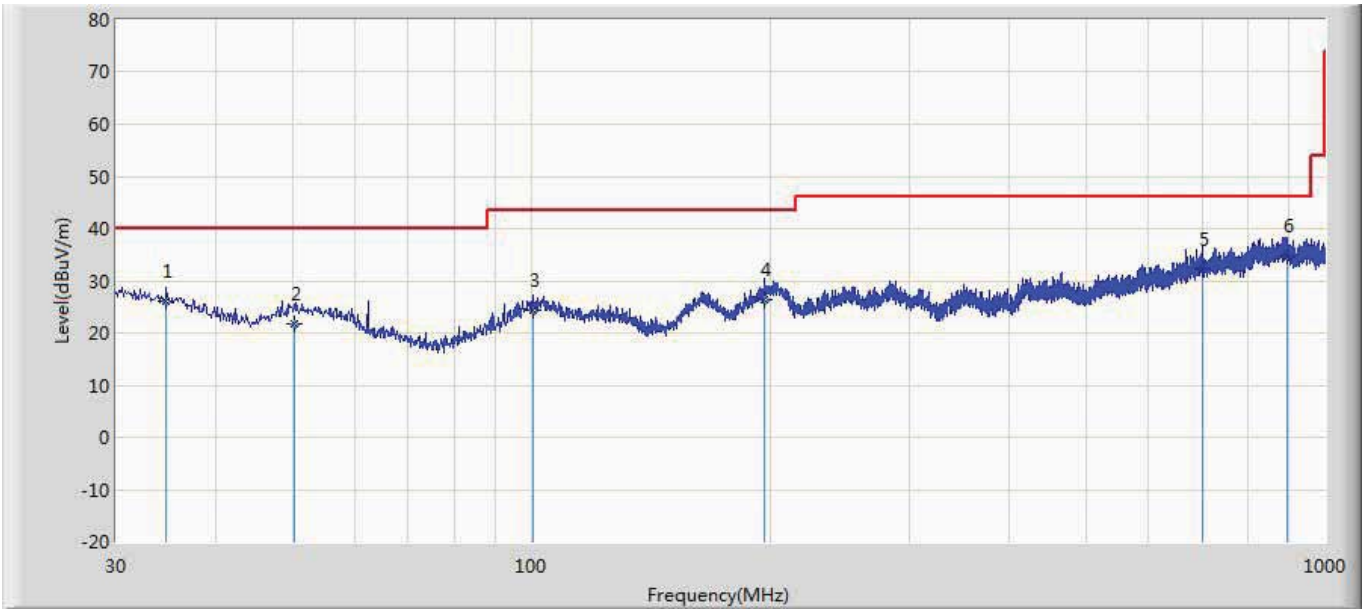


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		31.820	28.726	1.320	-11.274	40.000	20.767	6.639	0.000	100	36	QP
2		36.210	27.461	1.320	-12.539	40.000	19.499	6.642	0.000	100	238	QP
3		199.200	20.203	2.320	-23.297	43.500	10.544	7.339	0.000	100	66	QP
4		488.320	29.918	1.920	-16.082	46.000	19.969	8.029	0.000	200	128	QP
5		625.250	32.006	1.320	-13.994	46.000	22.116	8.570	0.000	100	236	QP
6	*	867.635	35.334	2.320	-10.666	46.000	23.841	9.172	0.000	200	214	QP

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Site: AC2	Time: 2019/03/14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: BLUETOOTH EARPHONE	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		34.650	25.957	2.950	-14.043	40.000	16.339	6.668	0.000	100	140	QP
2		50.320	21.838	2.320	-18.162	40.000	12.968	6.550	0.000	200	336	QP
3		100.420	24.375	2.331	-19.125	43.500	15.169	6.875	0.000	100	221	QP
4		196.950	26.443	3.620	-17.057	43.500	15.488	7.334	0.000	100	78	QP
5		699.650	32.135	1.250	-13.865	46.000	22.136	8.749	0.000	100	12	QP
6	*	897.620	34.750	1.320	-11.250	46.000	24.186	9.244	0.000	200	265	QP

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

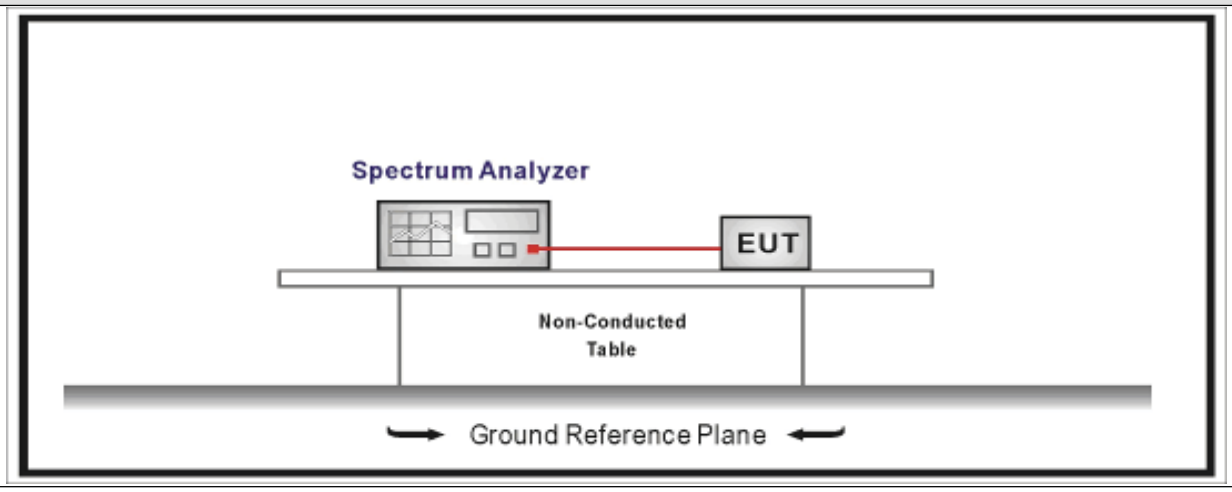
5. 20dB Bandwidth

5.1 Test Equipment

20dB Occupied Bandwidth / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2018.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2018.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2018.04.10	2019.04.09
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

5.2 Test Setup

20dB Occupied Bandwidth test setup:



5.3 Limit

Carrier Frequency Separation	
☒	For frequency hopping systems operating in 2400-2483.5 MHz band, within frequency range.
☐	For frequency hopping systems operating in 902-928 MHz band, the maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
☐	For frequency hopping systems operating in 5725-5850 MHz band, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.

5.4 Test Procedure

Test Method			
	References Rule	Chapter	Description
☒	ANSI C63.10	6.9.2	Occupied bandwidth tests

5.5 Uncertainty

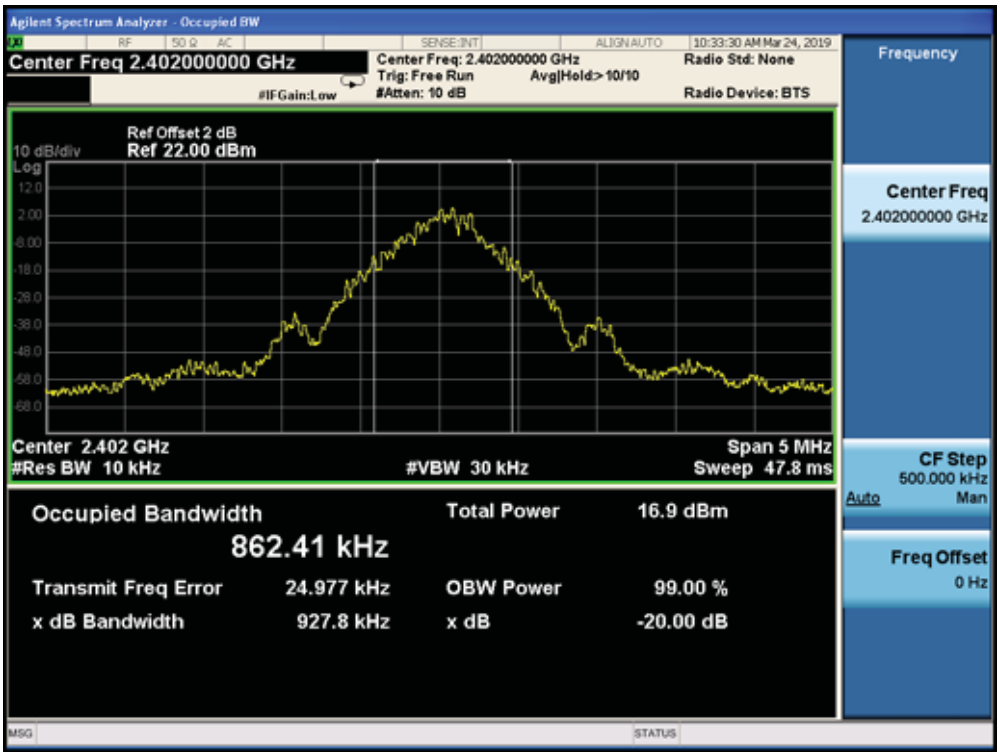
The measurement uncertainty is defined as ± 1 kHz

5.6 Test Result

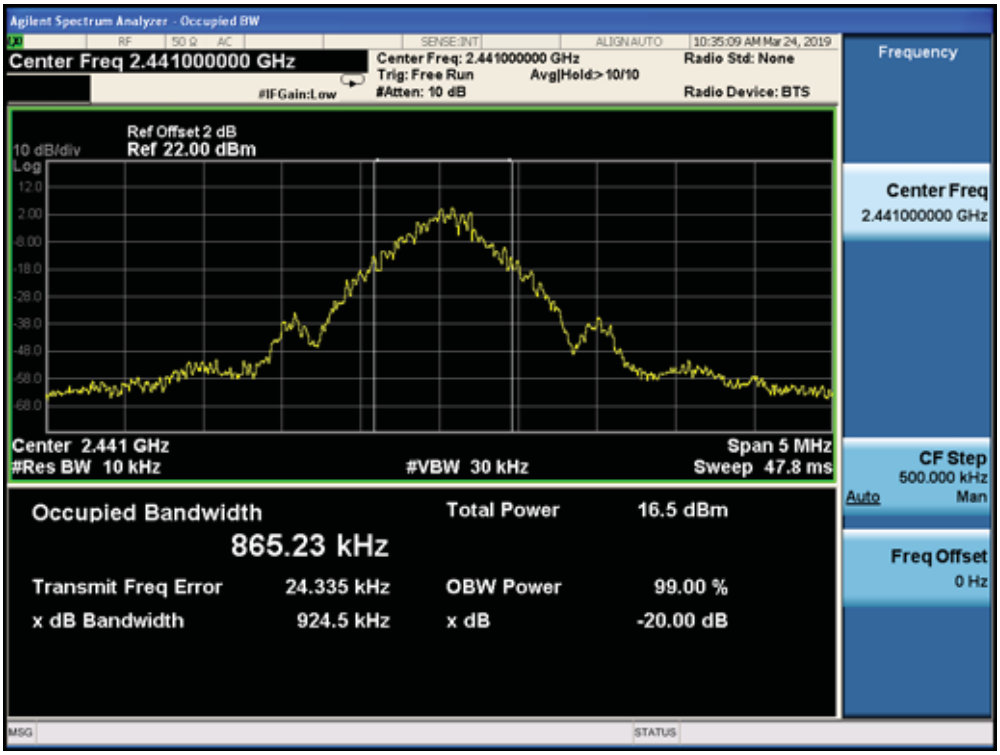
Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1	Test Site	:	TR-8
Test Date	:	2019.03.24	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	927.8	862.41
39	2441	924.5	865.23
78	2480	925.2	861.36

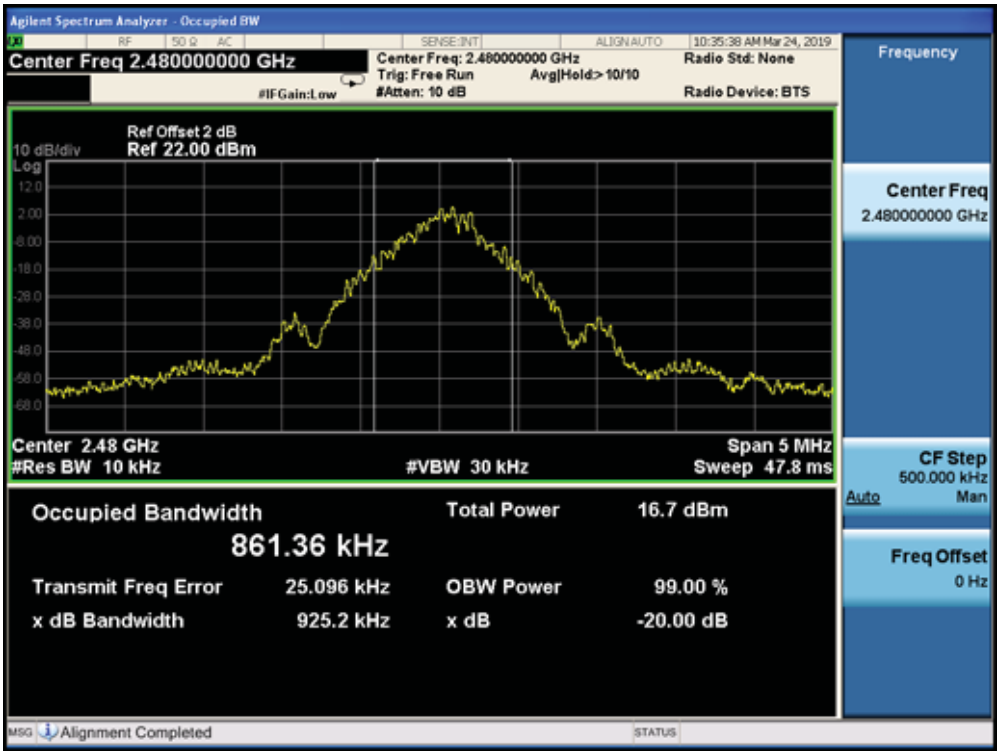
Channel 00 (2402MHz)



Channel 39 (2441MHz)



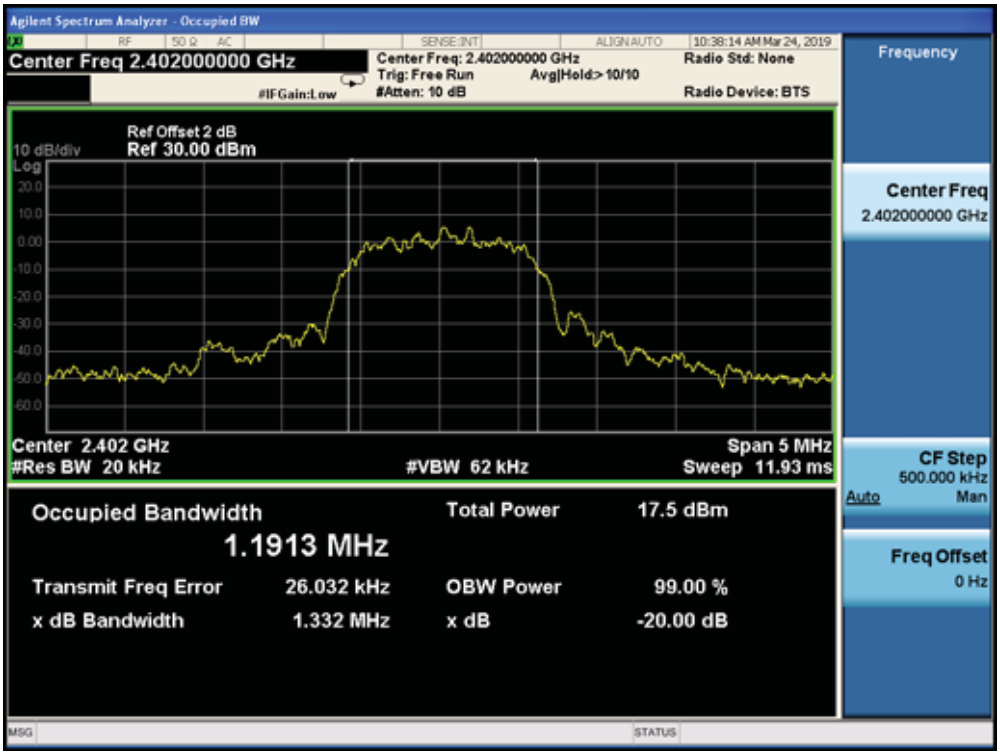
Channel 78 (2480MHz)



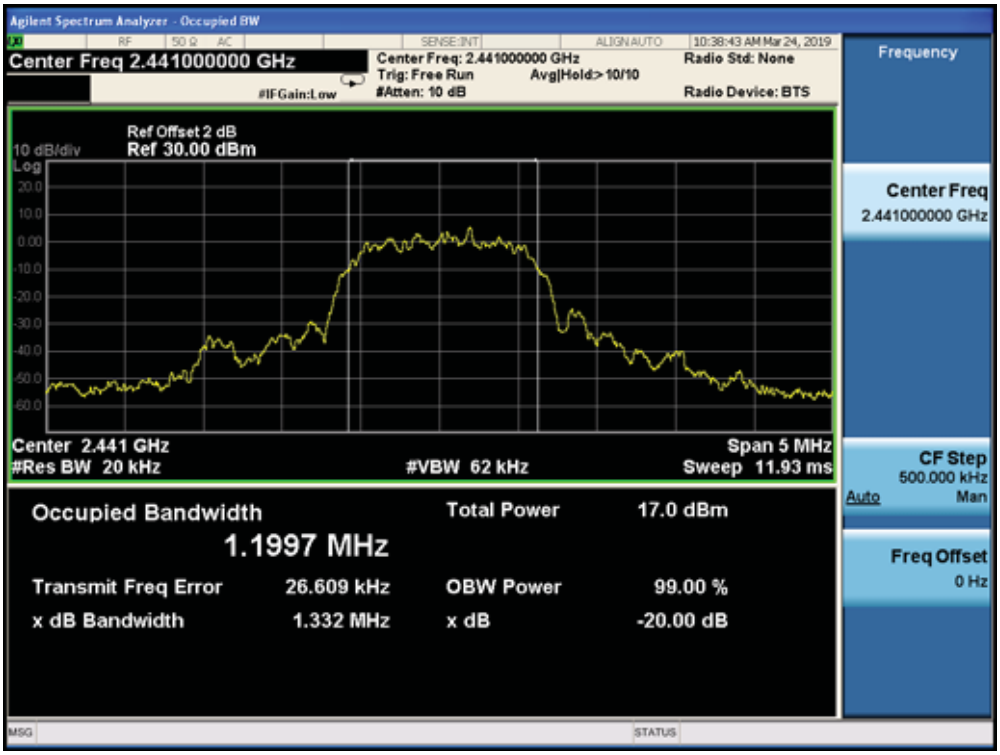
Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 2	Test Site	:	TR-8
Test Date	:	2019.03.24	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1332	1191.3
39	2441	1332	1199.7
78	2480	1332	1196.3

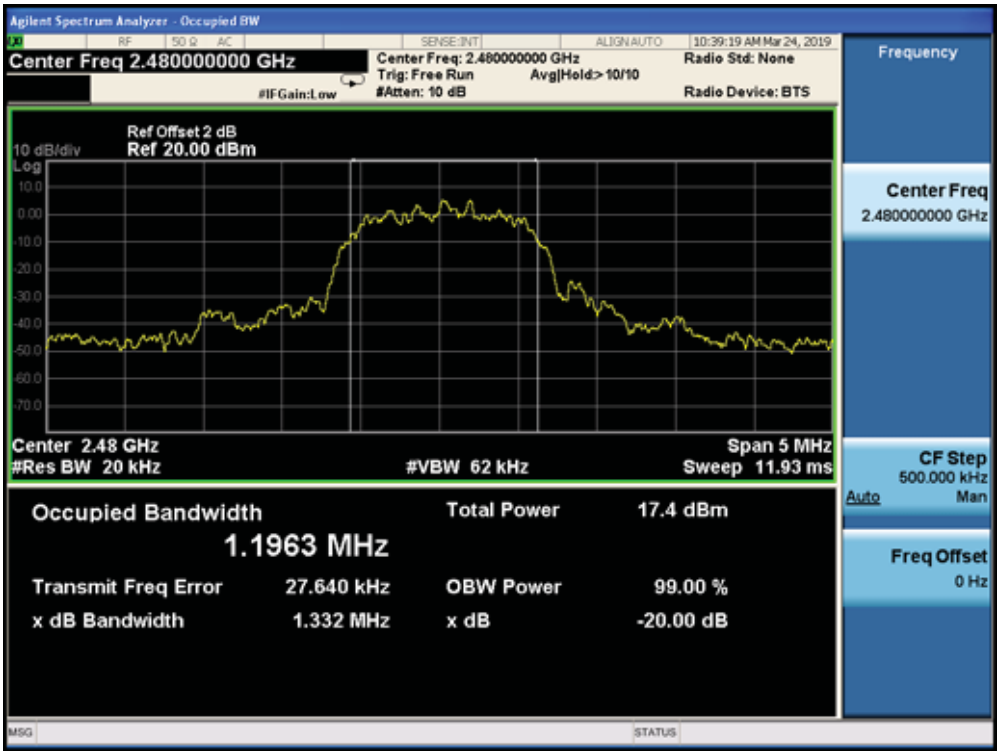
Channel 00 (2402MHz)



Channel 39 (2441MHz)



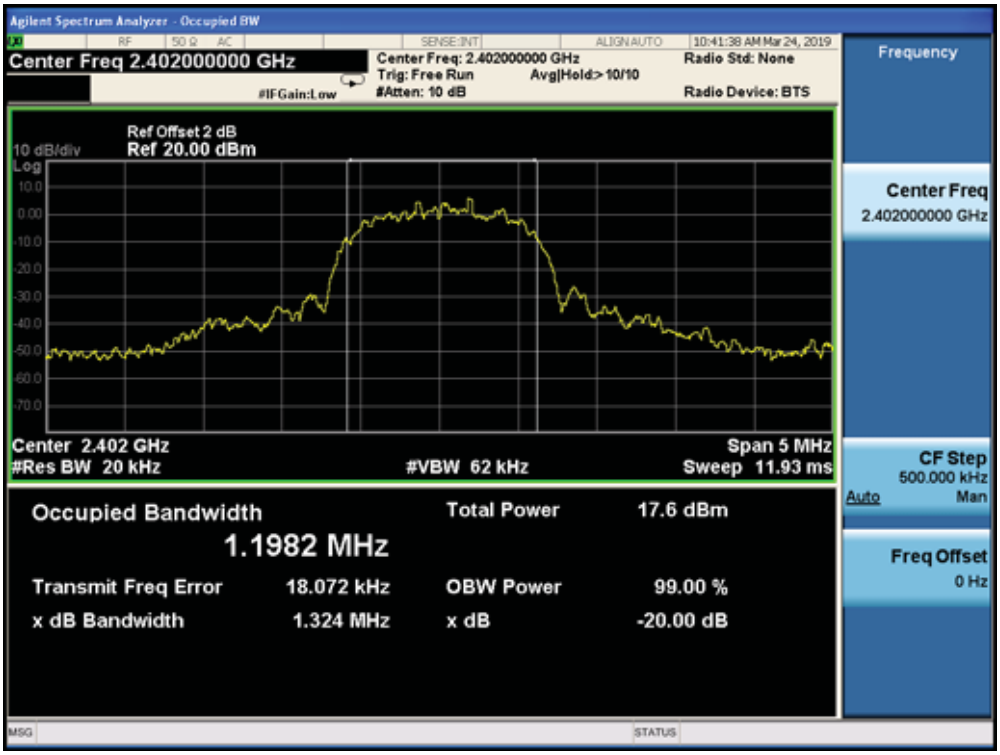
Channel 78 (2480MHz)



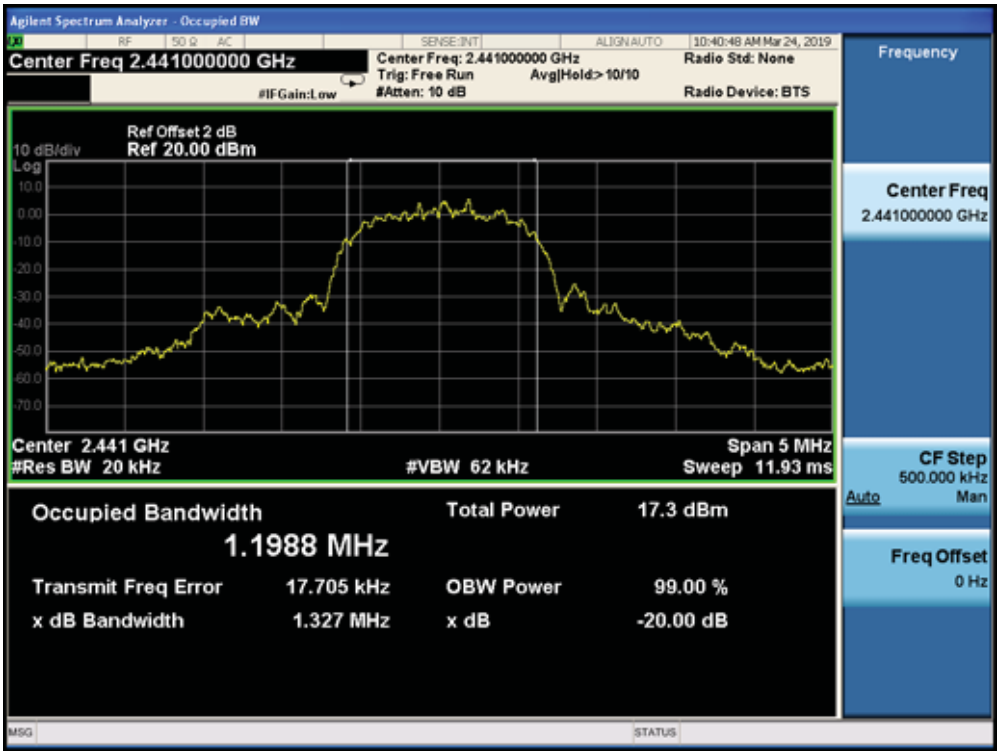
Product Name	:	BLUETOOTH EARPHONE	Power	:	AC 120V/60Hz
Test Mode	:	Mode 3	Test Site	:	TR-8
Test Date	:	2019.03.24	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1324	1198.2
39	2441	1327	1198.8
78	2480	1322	1195.5

Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)

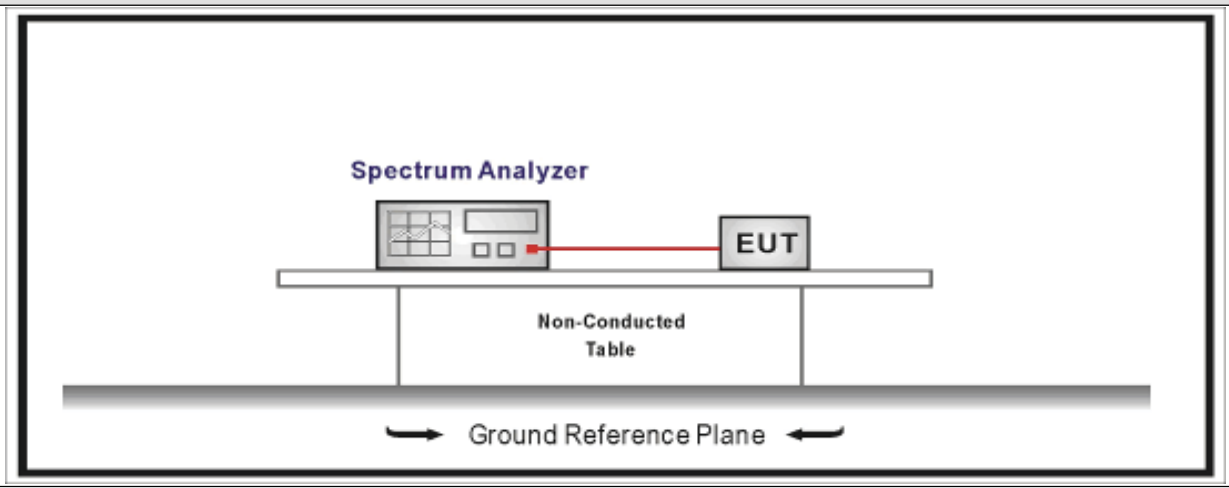
6. Carrier Frequency Separation

6.1. Test Equipment

Carrier Frequency Separation / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2018.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2018.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2018.04.10	2019.04.09
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

6.2. Test Setup

Carrier Frequency Separation test setup:



6.3. Limit

Carrier Frequency Separation	
☒	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
☒	Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.
☐	The 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;
☐	The 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
☐	Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz.

6.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
☒	ANSI C63.10	7.8.2	Carrier frequency separation

6.5. Uncertainty

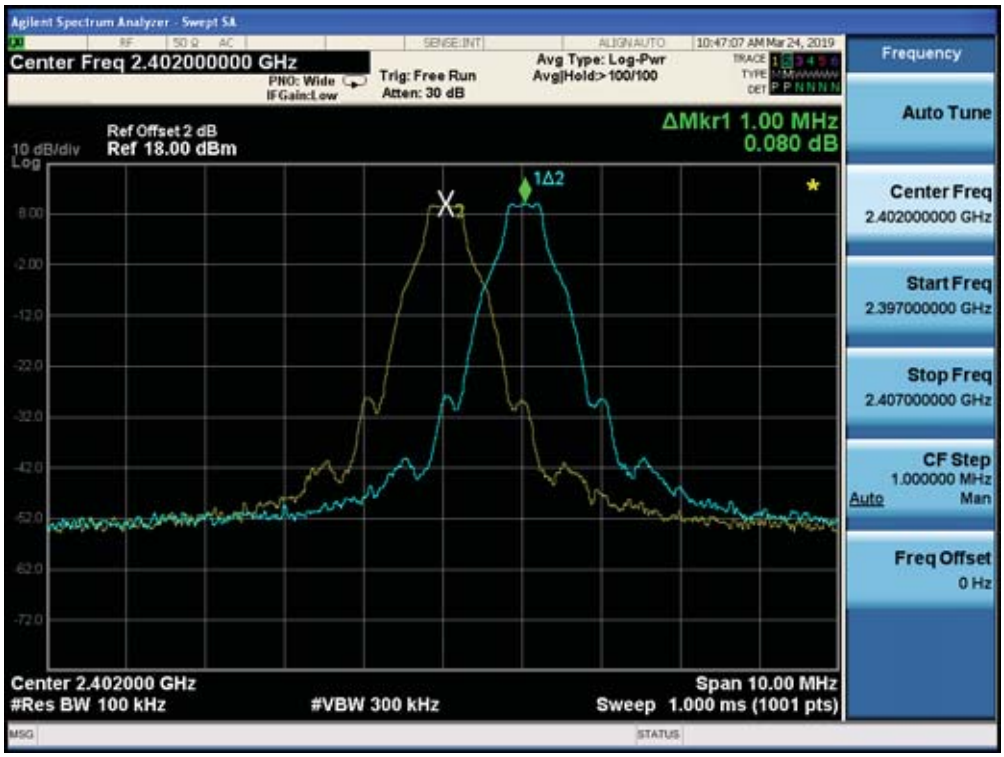
The measurement uncertainty is defined as ± 1 kHz

6.6. Test Result

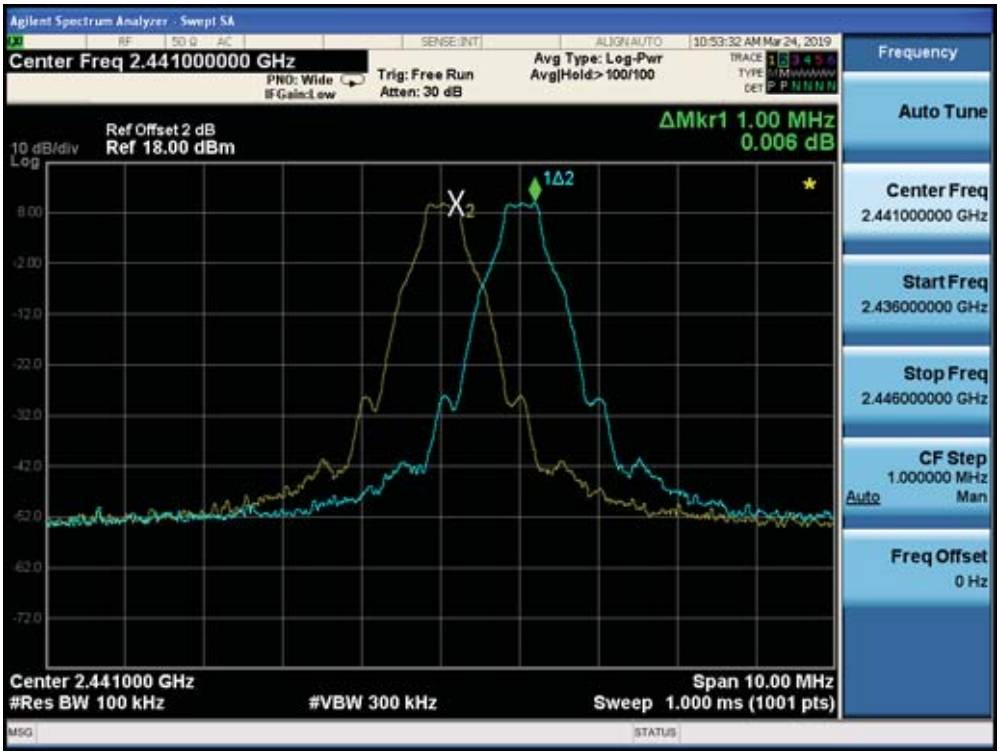
Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1	Test Site	:	TR-8
Test Date	:	2019.03.24	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	927.8	Pass
39	2441	1000	924.5	Pass
78	2480	1000	925.2	Pass

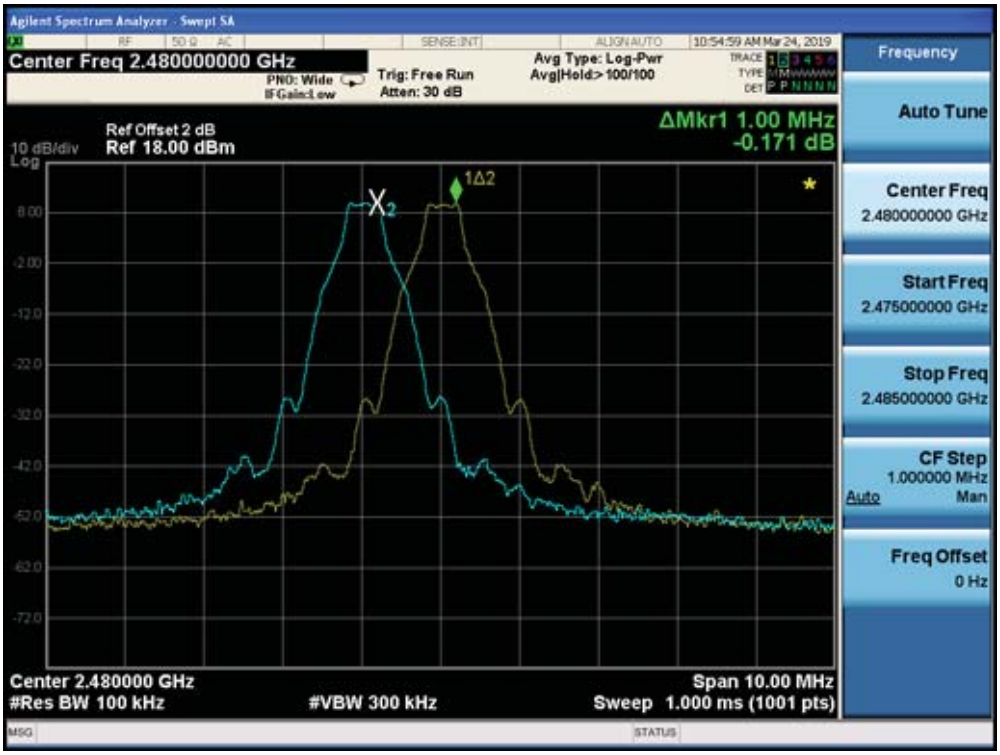
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)

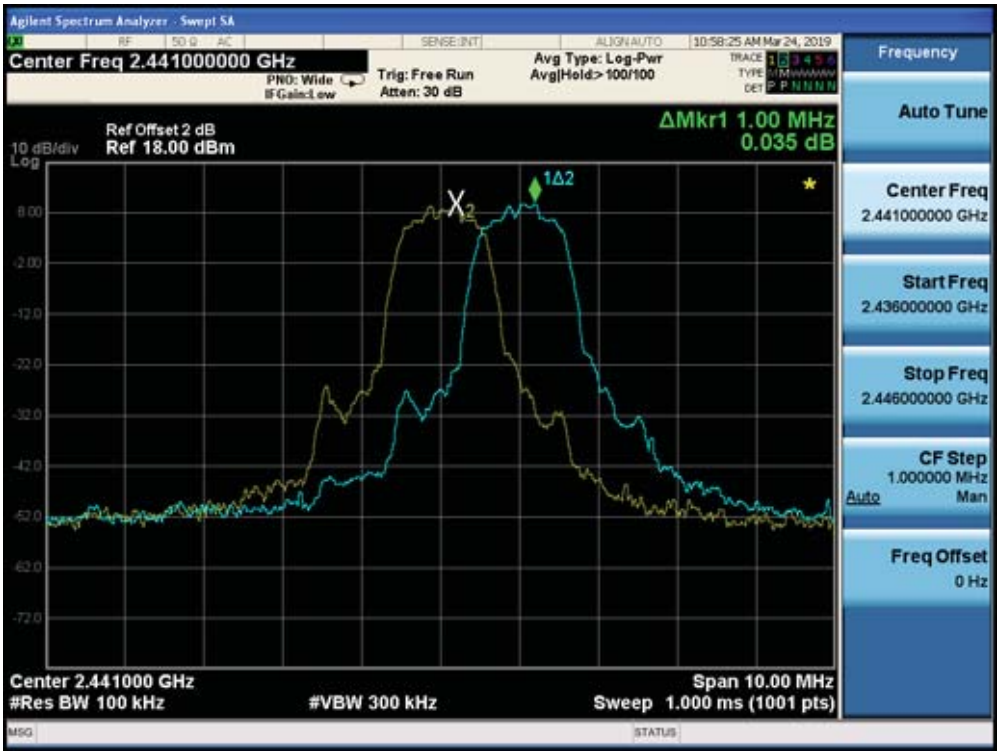


Product Name	:	BLUETOOTH EARPHONE	Power	:	AC 120V/60Hz
Test Mode	:	Mode 2	Test Site	:	TR-8
Test Date	:	2019.03.24	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	888.0	Pass
39	2441	1000	888.0	Pass
78	2480	1000	888.0	Pass

Channel 00 (2402MHz)

Channel 39 (2441MHz)

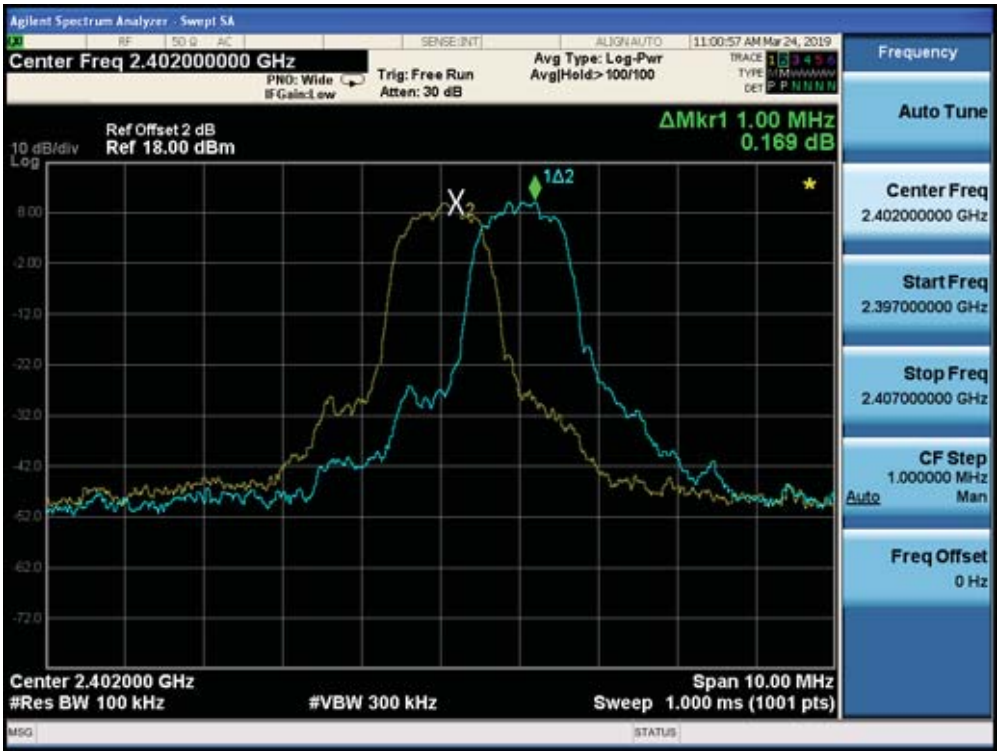


Channel 78 (2480MHz)

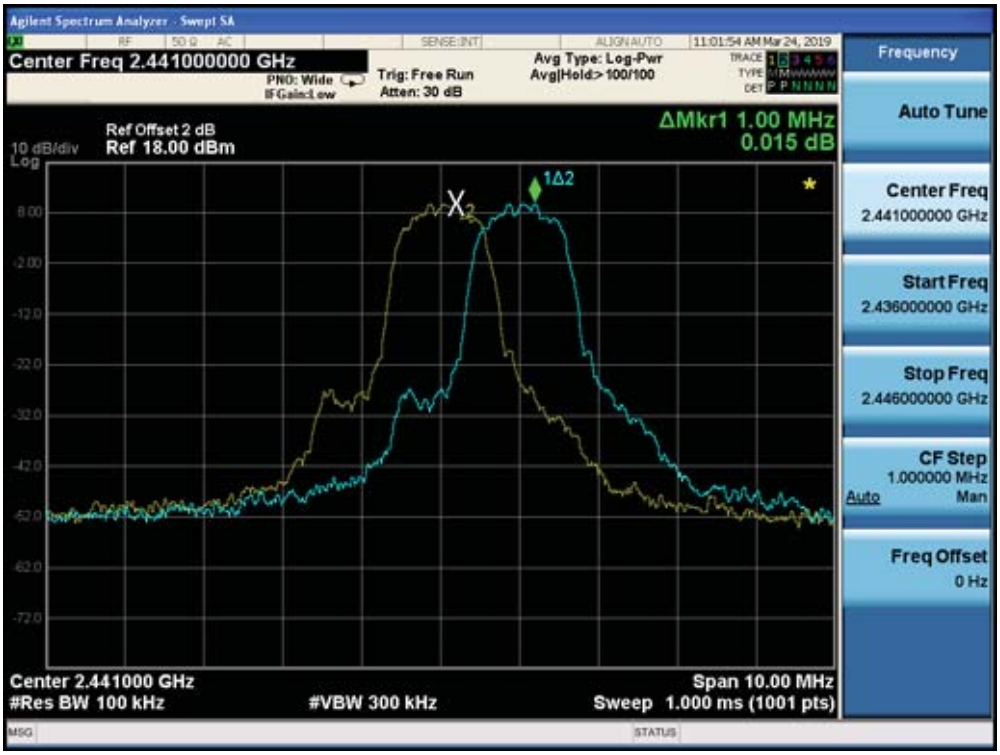
Product Name	:	BLUETOOTH EARPHONE	Power	:	AC 120V/60Hz
Test Mode	:	Mode 3	Test Site	:	TR-8
Test Date	:	2019.03.24	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	882.7	Pass
39	2441	1000	884.7	Pass
78	2480	1000	881.3	Pass

Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)

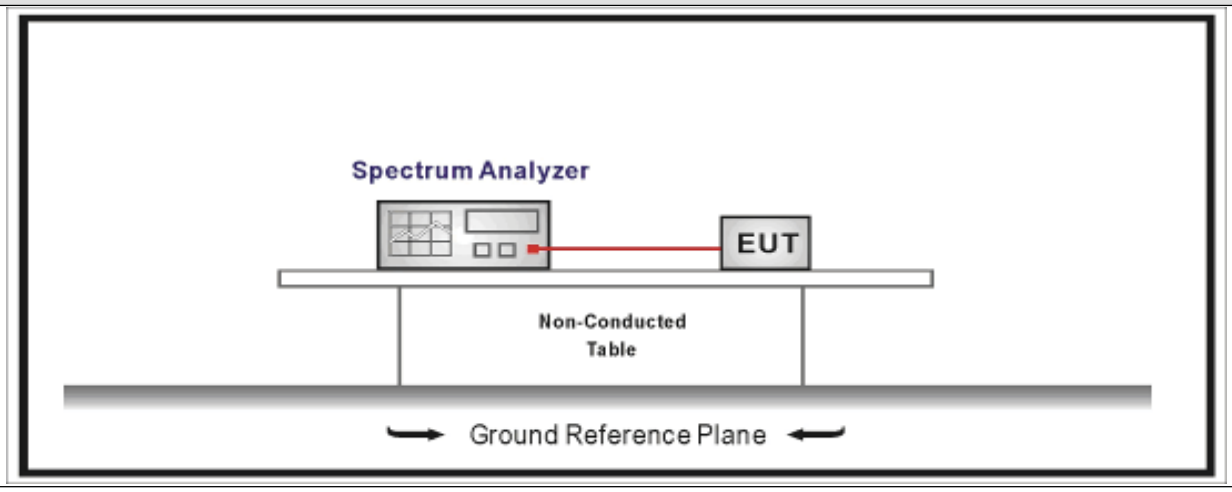
7. Number of Hopping Frequencies

7.1. Test Equipment

Number of Hopping Frequencies / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2018.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2018.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2018.04.10	2019.04.09
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

7.2. Test Setup

Number of Hopping Frequencies test setup:



7.3. Limit

Carrier Frequency Separation	
☒	For frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.
☐	For frequency hopping systems operating in 902-928 MHz band, if the 20 dB bandwidth of the hopping channel is less than 250 kHz, shall use at least 50 hopping frequencies.
☐	For frequency hopping systems operating in 902-928 MHz band, if the 20 dB bandwidth of the hopping channel is higher than 250 kHz, shall use at least 25 hopping frequencies.
☐	For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

7.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
☒	ANSI C63.10	7.8.3	Number of Hopping Frequencies

7.5. Uncertainty

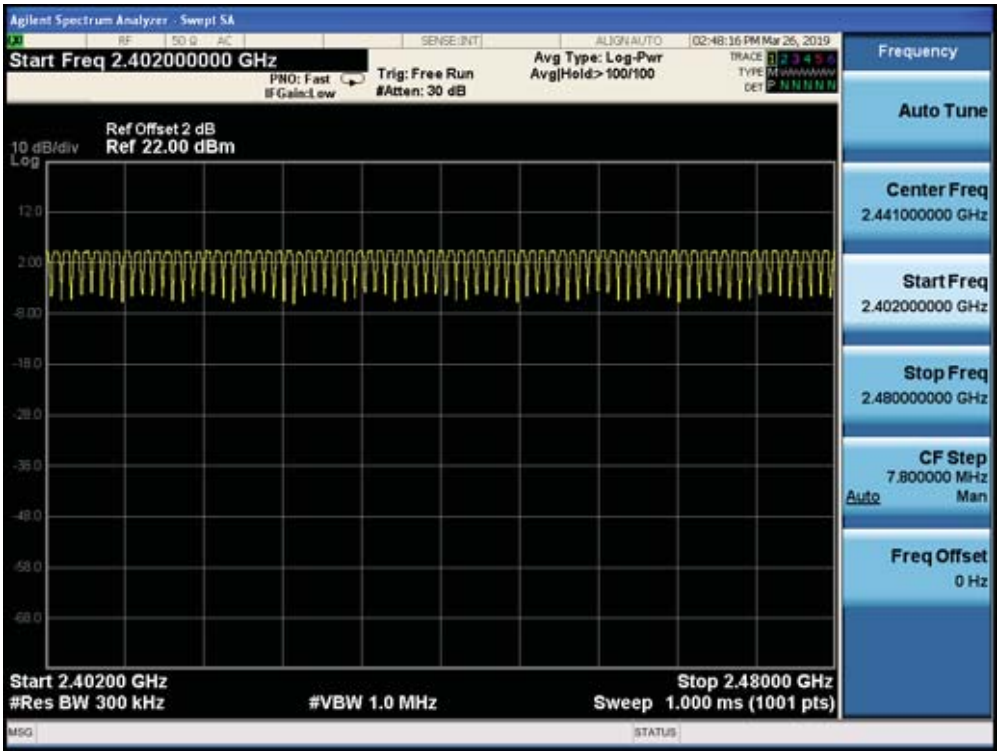
The measurement uncertainty is defined as ± 1 kHz

7.6. Test Result

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1	Test Site	:	TR-8
Test Date	:	2019.03.26	Test Engineer	:	Simon

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

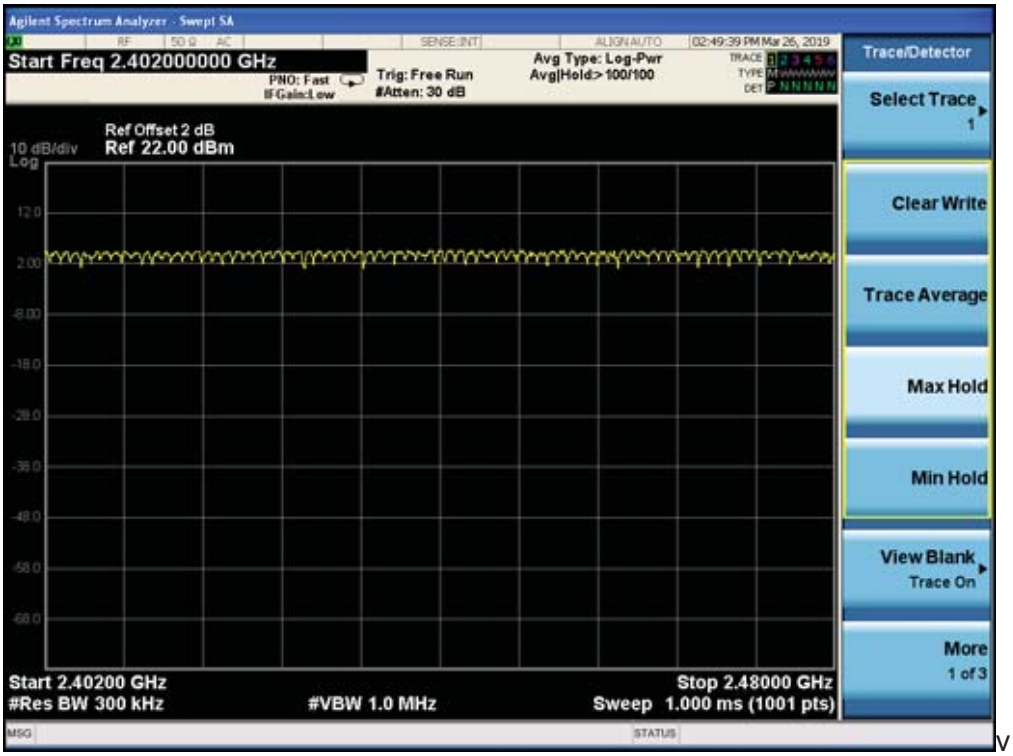
2402 - 2480MHz



Product Name	:	BLUETOOTH EARPHONE	Power	:	AC 120V/60Hz
Test Mode	:	Mode 2	Test Site	:	TR-8
Test Date	:	2019.03.26	Test Engineer	:	Simon

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

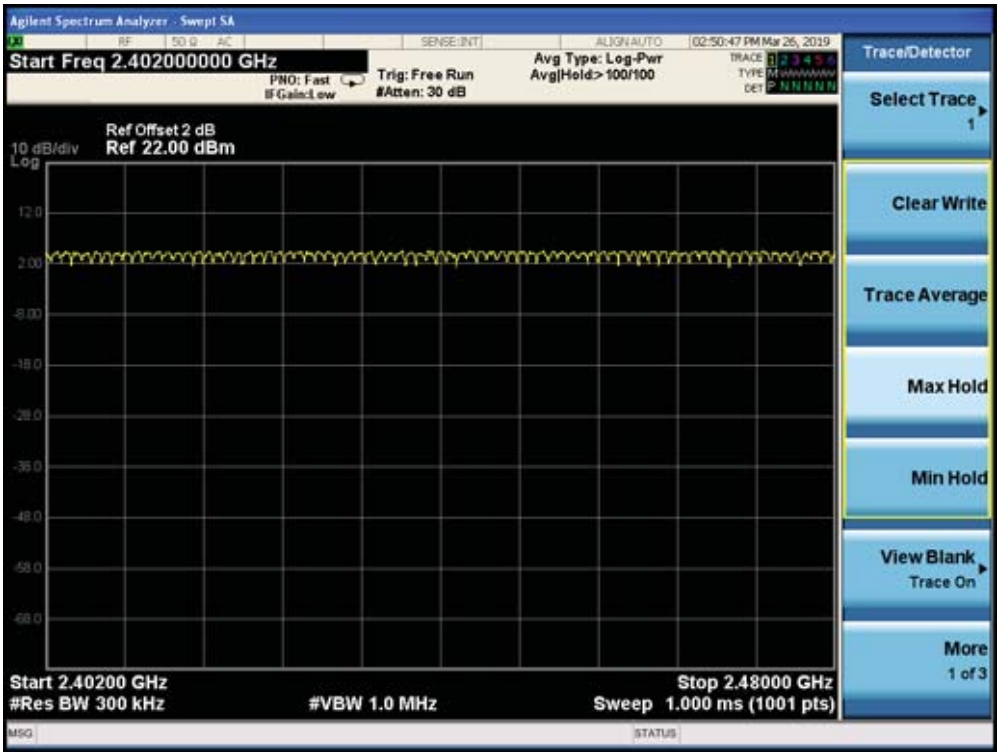
2402 - 2480 MHz



Product Name	:	BLUETOOTH EARPHONE	Power	:	AC 120V/60Hz
Test Mode	:	Mode 3	Test Site	:	TR-8
Test Date	:	2019.03.26	Test Engineer	:	Simon

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

2402 - 2480 MHz



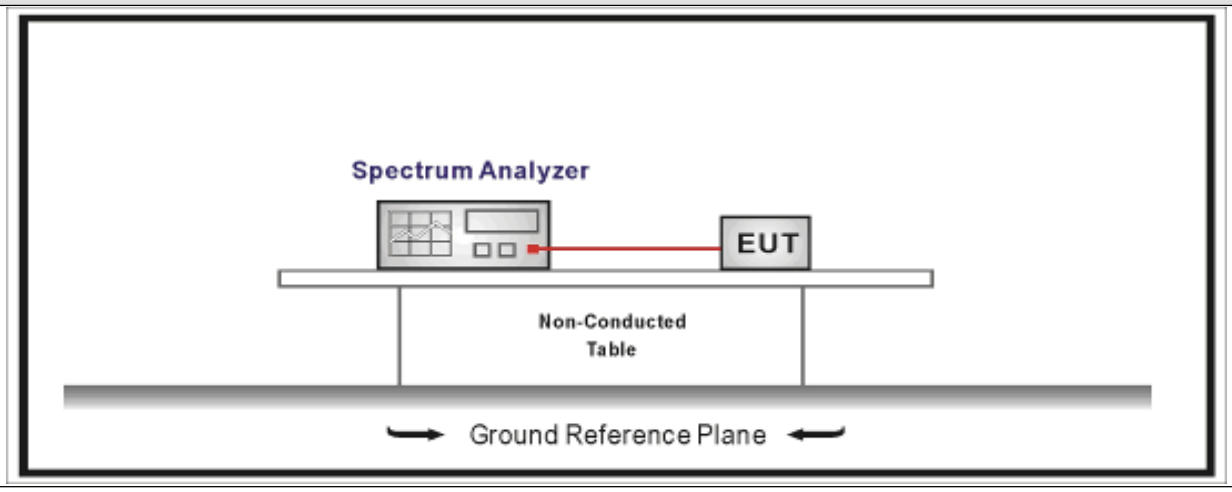
8. Time of Occupancy (Dwell Time)

8.1. Test Equipment

Time of Occupancy (Dwell Time) / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2018.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2018.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2018.04.10	2019.04.09
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

8.2. Test Setup

Time of Occupancy (Dwell Time) test setup:



8.3. Limit

Time of Occupancy (Dwell Time)	
☒	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
☐	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period
☐	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping

	frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.
☐	Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

8.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
☒	ANSI C63.10	7.8.4	Time of Occupancy (Dwell Time)

8.5. Uncertainty

The measurement uncertainty is defined as ± 0.1 us

8.6. Test Result

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1(GFSK_DH1)	Test Site	:	TR-8
Test Date	:	2019.03.26	Test Engineer	:	Simon

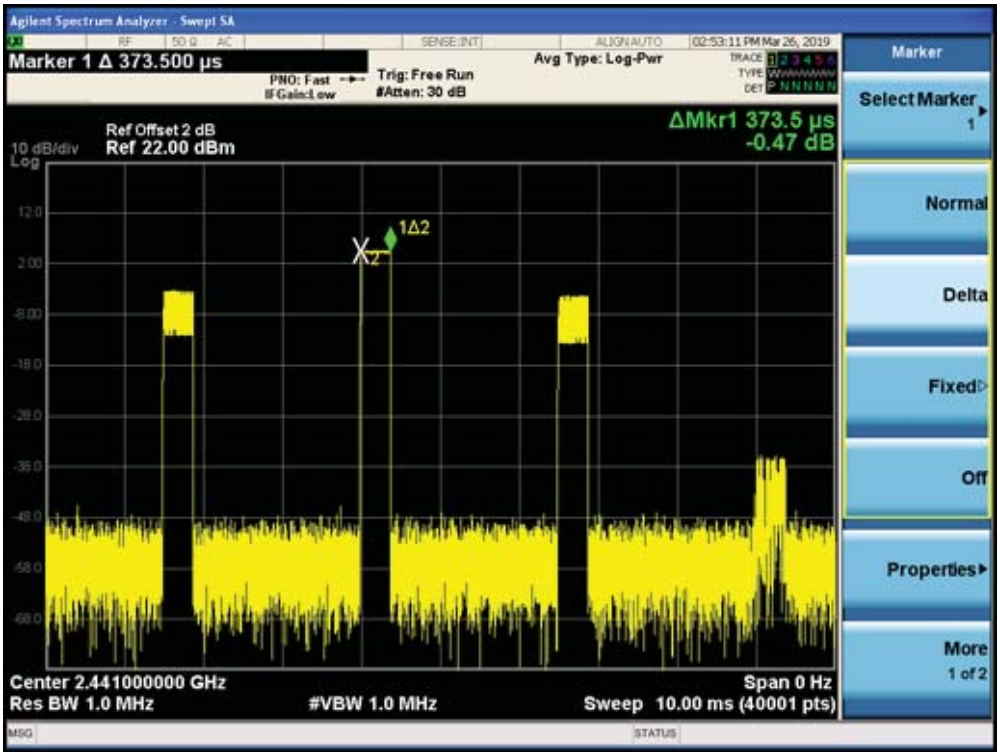
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	119.52	< 400	Pass

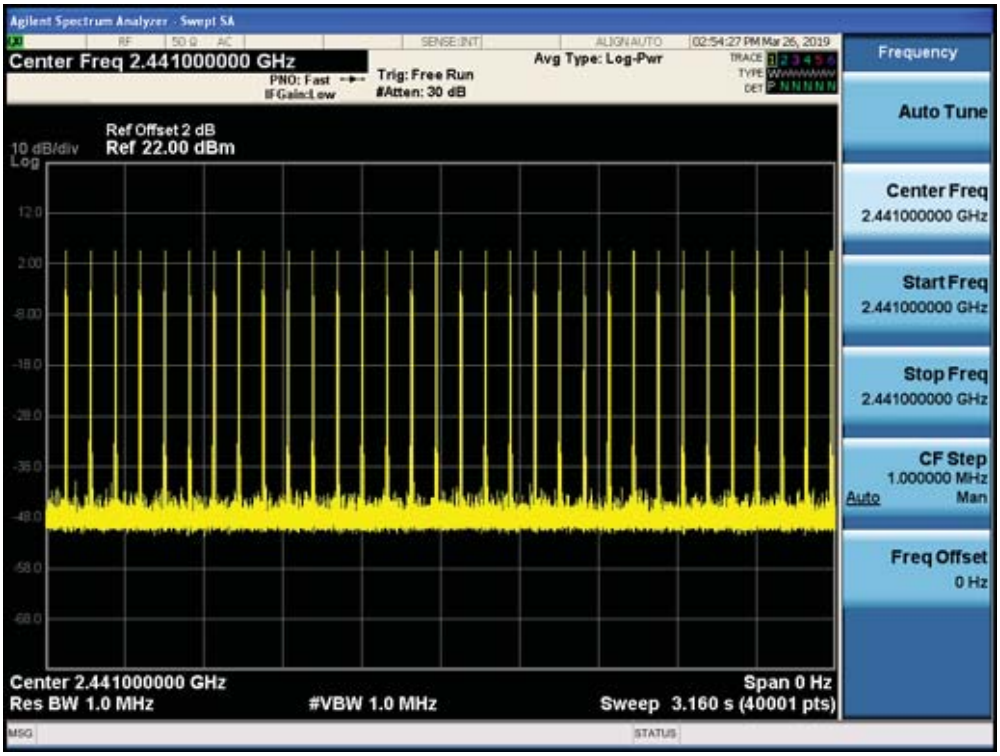
Note1: Test Time Period: 0.4*79=31.6sec

Note2: Time of Occupancy=0.3735*32*31.6/3.16=119.52ms

Note3: We have evaluated different packet type, shown in the report is the worst data.

Channel 39 (2441MHz) - (DH1)




Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
02:54:27 PM Mar 26, 2019
Ref Offset 2 dB
10 dB/div
Log
Ref 22.00 dBm
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.160 s (40001 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1(GFSK_DH3)	Test Site	:	TR-8
Test Date	:	2019.03.26	Test Engineer	:	Simon

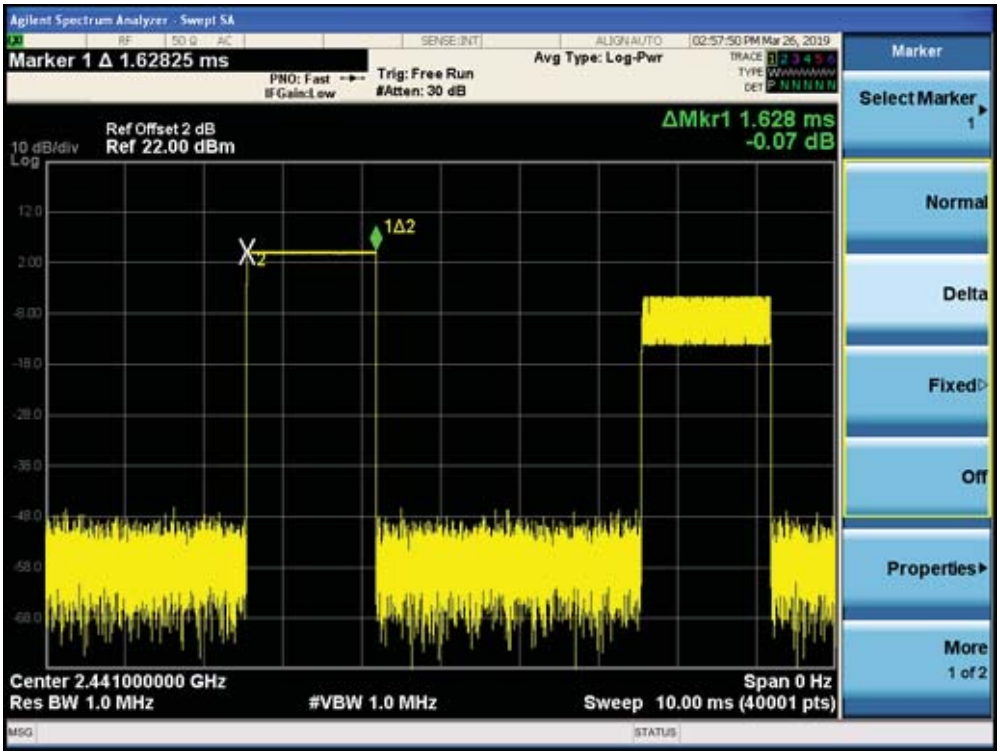
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	260.48	< 400	Pass

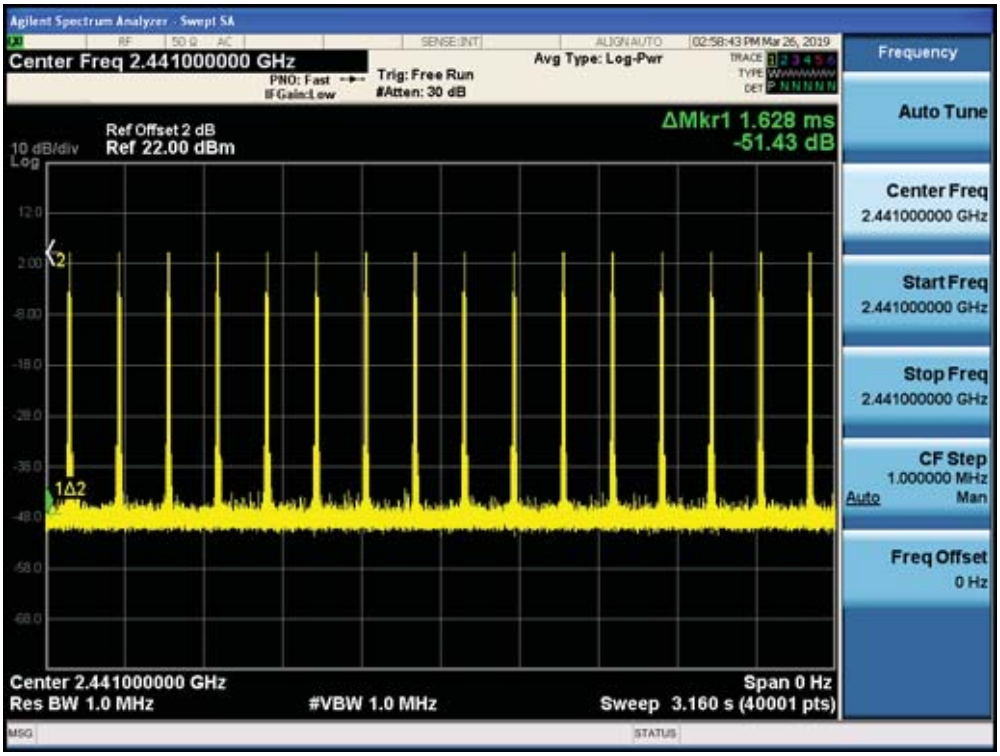
Note1: Test Time Period: 0.4*79=31.6sec

Note2: Time of Occupancy=1.628*16*31.6/3.16=260.48ms

Note3: We have evaluated different packet type, shown in the report is the worst data.

Channel 39 (2441MHz) - (DH3)




Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
02:58:43 PM Mar 26, 2019
Ref Offset 2 dB
10 dB/div
Log
Ref 22.00 dBm
ΔMkr1 1.628 ms
-51.43 dB
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.160 s (40001 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1(GFSK_DH5)	Test Site	:	TR-8
Test Date	:	2019.03.26	Test Engineer	:	Simon

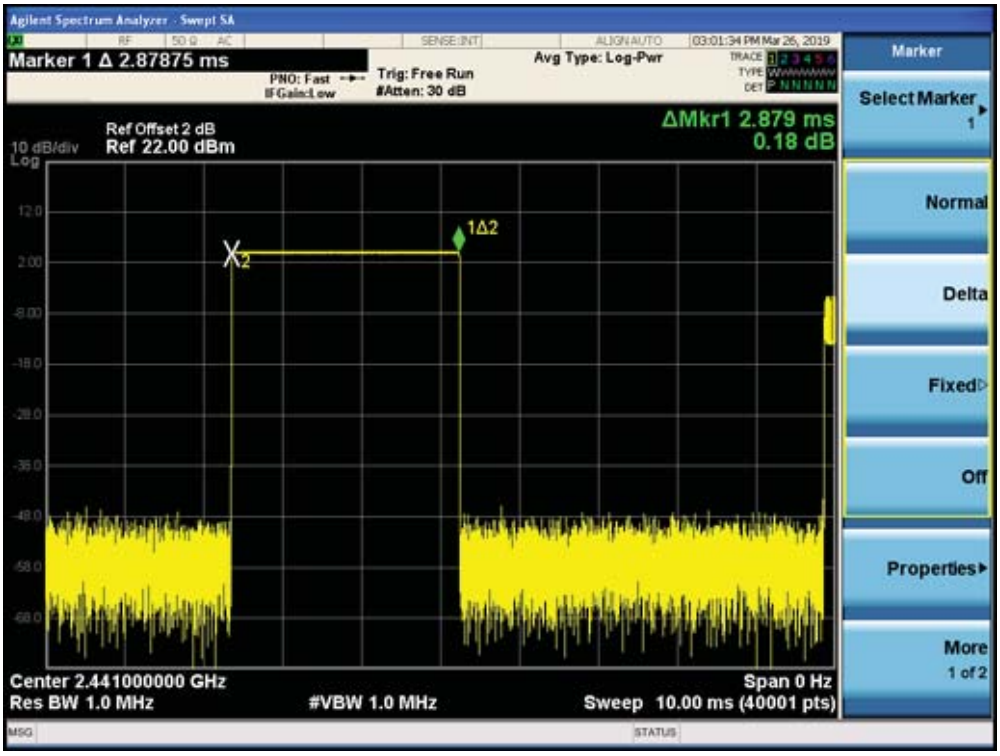
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	316.69	< 400	Pass

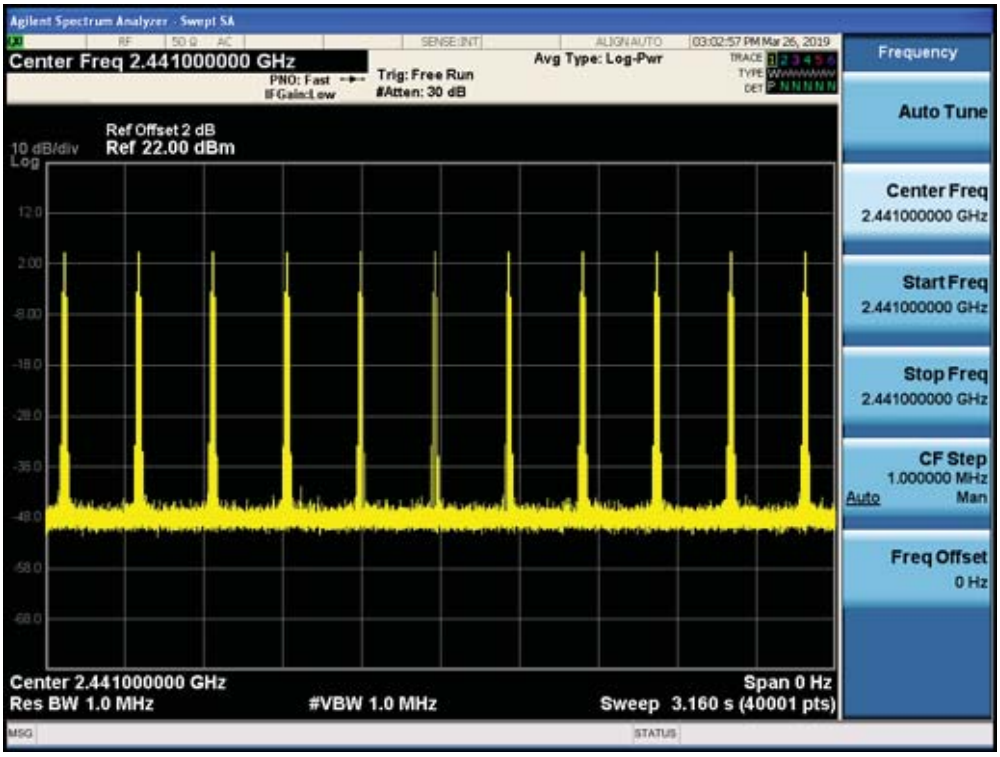
Note1: Test Time Period: 0.4*79=31.6sec

Note2: Time of Occupancy=2.879*11*31.6/3.16=316.69ms

Note3: We have evaluated different packet type, shown in the report is the worst data.

Channel 39 (2441MHz) - (DH5)





Note: The packet time of AFH mode is same as normal mode, due to the packet time of AFH mode multiply with lesser factor is dwell time of 0.4X20=8S, the dwell time of AFH mode comply with the limit.

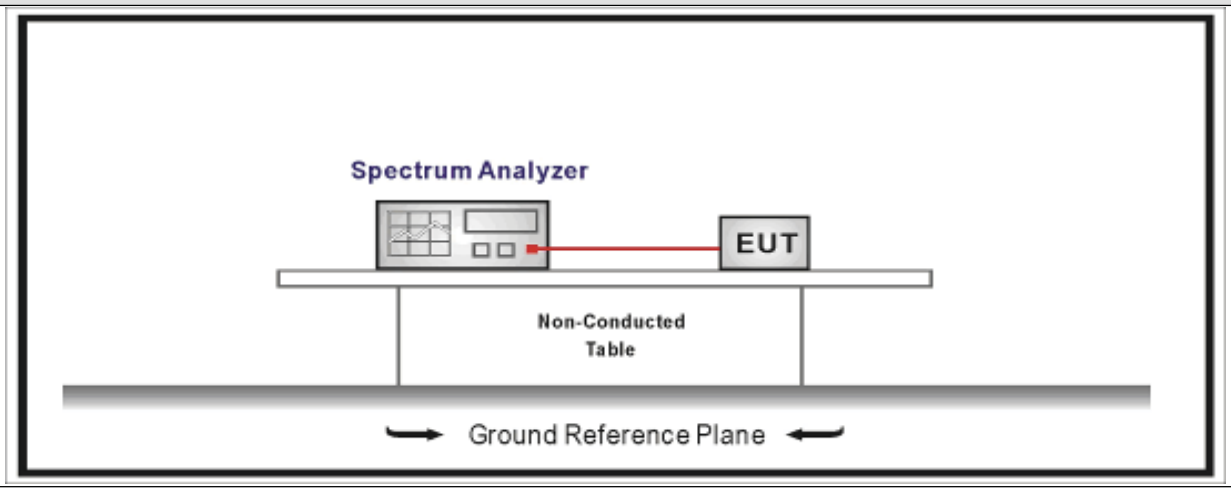
9. Peak Output Power

9.1. Test Equipment

Peak Output Power / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2018.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2018.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2018.04.10	2019.04.09
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

9.2. Test Setup

Peak Output Power test setup:



9.3. Limit

Peak Output Power	
☒	Frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
☒	Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
☐	For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels

9.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
☒	ANSI C63.10	7.8.5	Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices

9.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

9.6. Test Result

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1	Test Site	:	TR-8
Test Date	:	2019.03.25	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
00	2402	4.31	30.00	Pass
39	2441	4.06	30.00	Pass
78	2480	3.94	30.00	Pass

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 2	Test Site	:	TR-8
Test Date	:	2019.03.25	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
00	2402	5.22	21.00	Pass
39	2441	4.91	21.00	Pass
78	2480	4.78	21.00	Pass

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 3	Test Site	:	TR-8
Test Date	:	2019.03.25	Test Engineer	:	Simon

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
00	2402	4.40	21.00	Pass
39	2441	3.47	21.00	Pass
78	2480	3.78	21.00	Pass

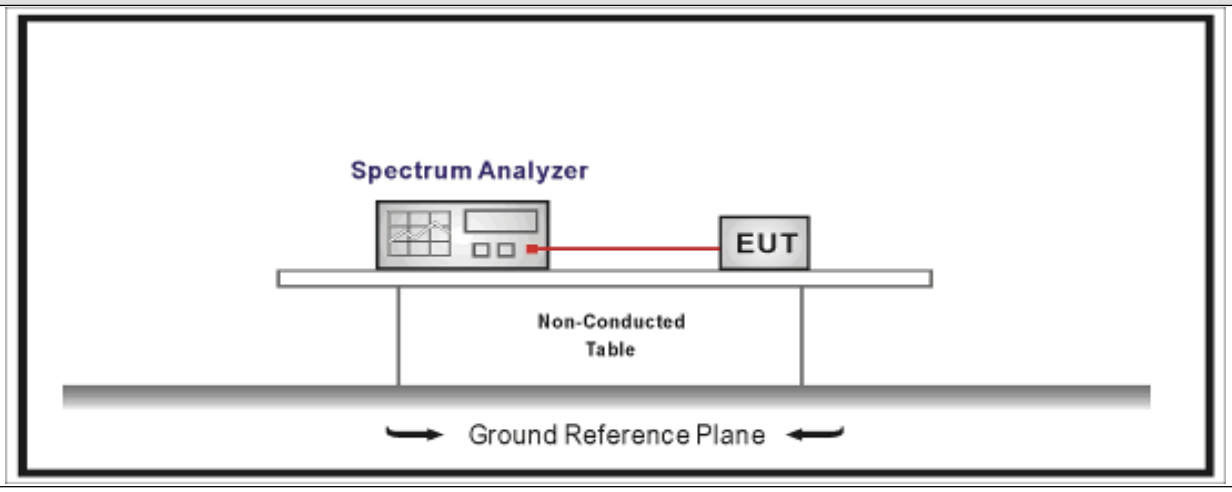
10. Emissions in non-restricted frequency bands

10.1. Test Equipment

Emissions in non-restricted frequency bands / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2018.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2018.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2018.04.10	2019.04.09
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

10.2. Test Setup

Emissions in non-restricted frequency bands test setup:



10.3. Limit

Un-Restricted Band Emissions Limit	
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30c(Note1)
RF Output power(PK detector)	20c(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

10.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
☒	ANSI C63.10	7.8.6	Band-edge Compliance of RF Conducted Emissions

10.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

10.6. Test Result

Product Name	:	BLUETOOTH EARPHONE	Test Voltage	:	AC 120V/60Hz
Test Mode	:	Mode 1~4	Test Site	:	TR-8
Test Date	:	2019.03.26	Test Engineer	:	Simon

Mode	Channel	Test Frequency (MHz)	In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
1	00	2402	4.553	2400.00	-62.535	67.088	>20	Pass
1	78	2480	4.292	2500.00	-64.875	69.167	>20	Pass
2	00	2402	4.473	2400.00	-60.786	65.259	>20	Pass
2	78	2480	4.085	2500.00	-64.629	68.714	>20	Pass
3	00	2402	4.207	2400.00	-61.421	65.628	>20	Pass
3	78	2480	4.156	2500.00	-61.847	66.003	>20	Pass
4	00~78	00~78	4.369	2400.00	-61.625	65.994	>20	Pass

Note1: The worst case of Emissions in non-restricted frequency bands as below:

2: Mode 1-3, The In-Band PSD is the highest PSD of All channels.

Mode2 CH00(2402MHz)

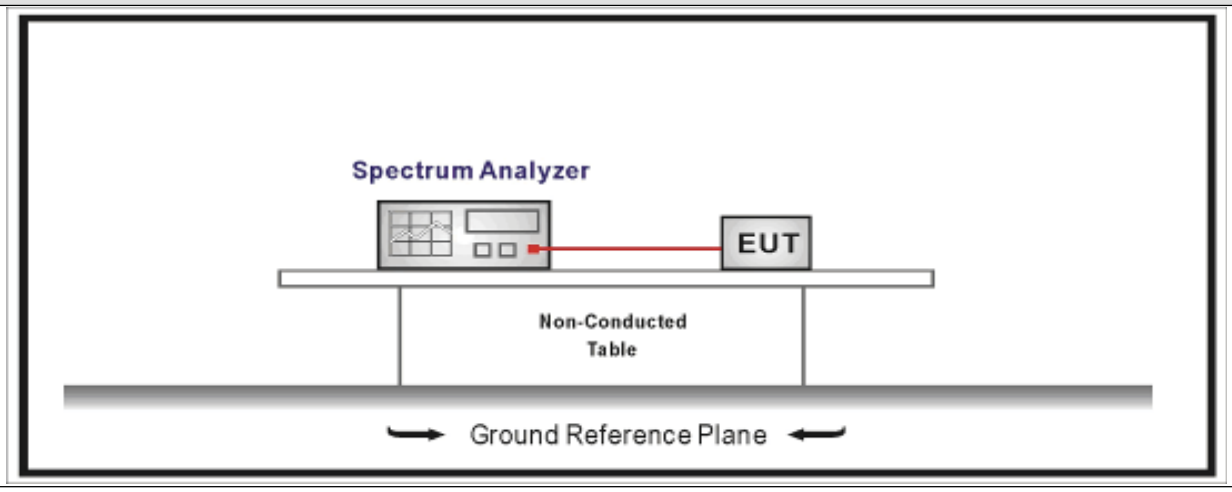
11. Conducted Band Edge

11.1. Test Equipment

Conducted Band Edge / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2018.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2018.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2018.04.10	2019.04.09
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

11.2. Test Setup

Conducted Band Edge



11.3. Limit

Band edge Limit				
Frequency bands (MHz)	Detector	Limit (dB μ V/m)	RBW (MHz)	Distance (m)
2310-2390 2483.5-2500	PK	74	1	3
	AV	54	1	3
Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.				

11.4. Test Procedure

Test Method			
	References Rule	Chapter	Description
☐	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
☐	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
☐	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
☒	ANSI C63.10	6.7	Antenna-port conducted emission measurements

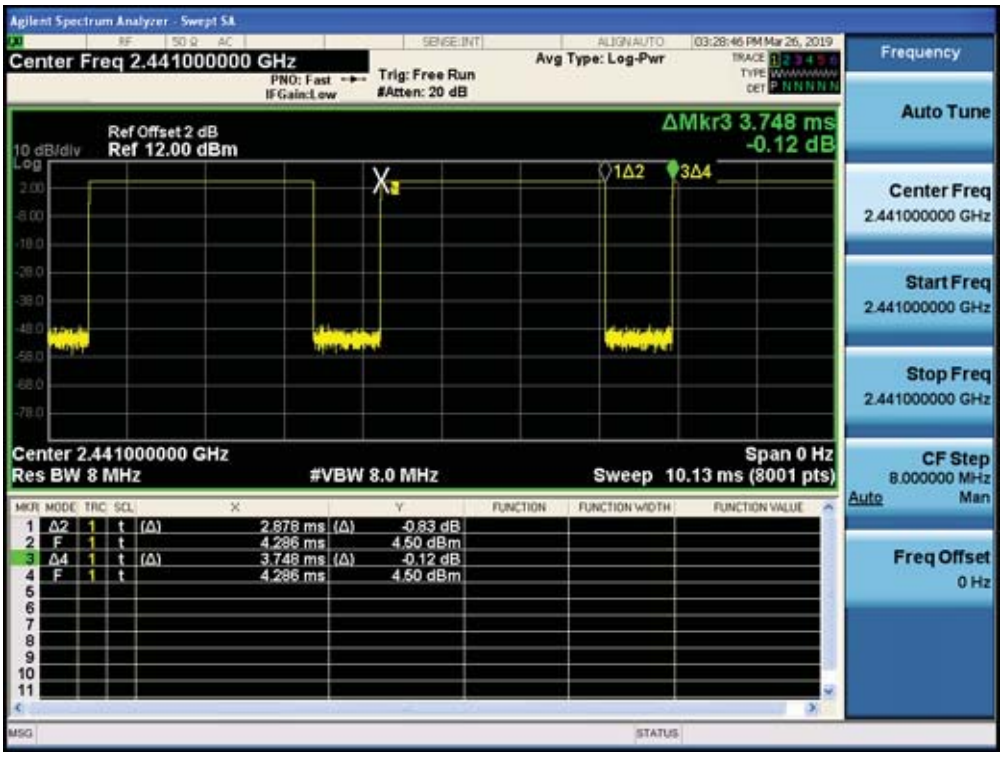
11.5. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB

11.6. Duty Cycle

Test Mode	Tx On (ms)	Tx Off (ms)	Reduced VBW (Hz)	Tx On + Tx Off (ms)	Duty Cycle
DH5	2.878	0.870	360	3.748	76.79%

DH5

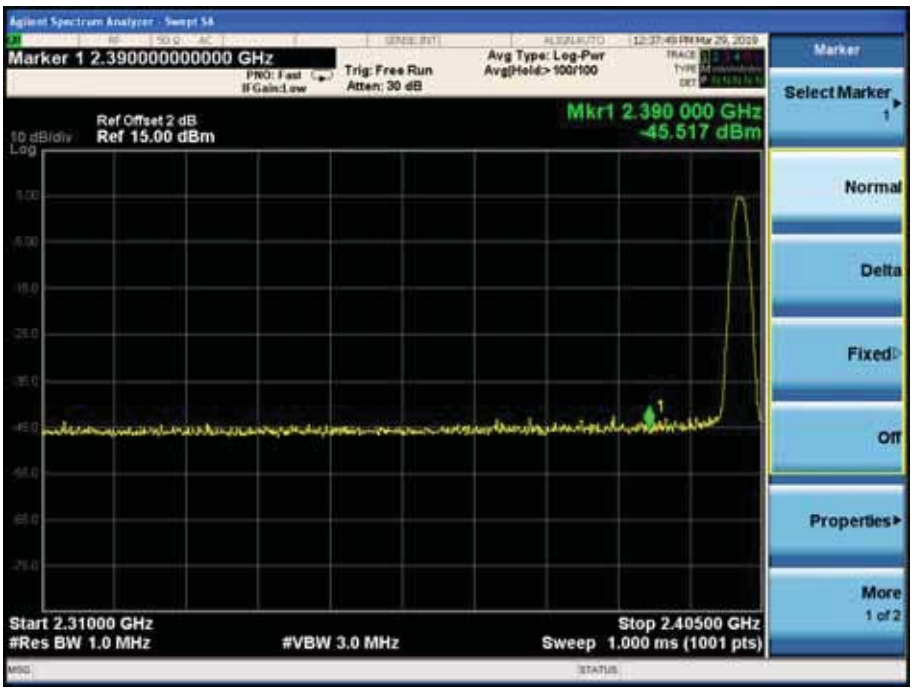


11.7. Test Result

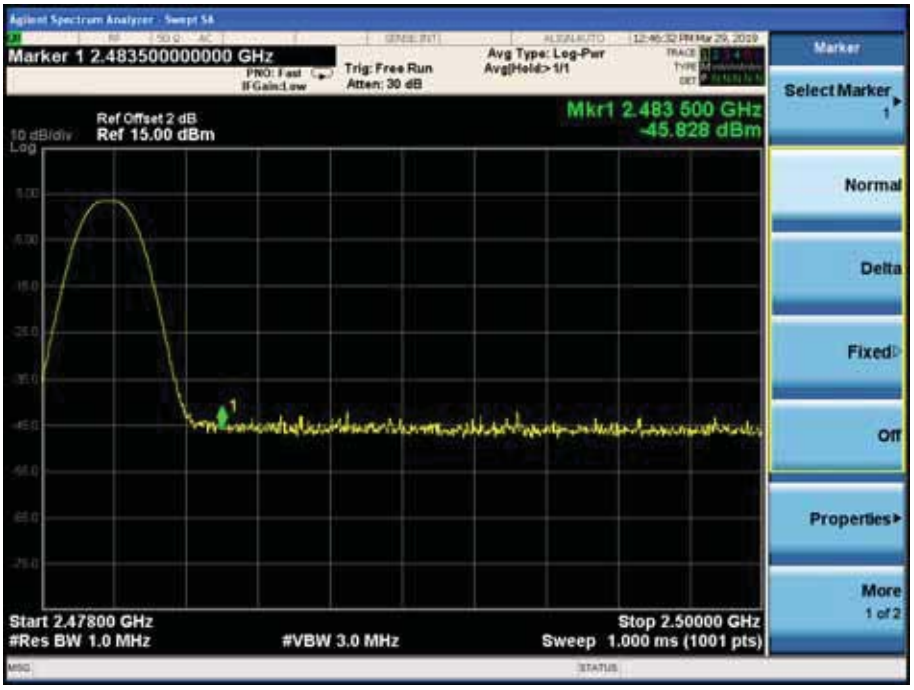
PK Limit=74dBuV/m-95.2-2.7(Antenna Gain) = -23.9dBm

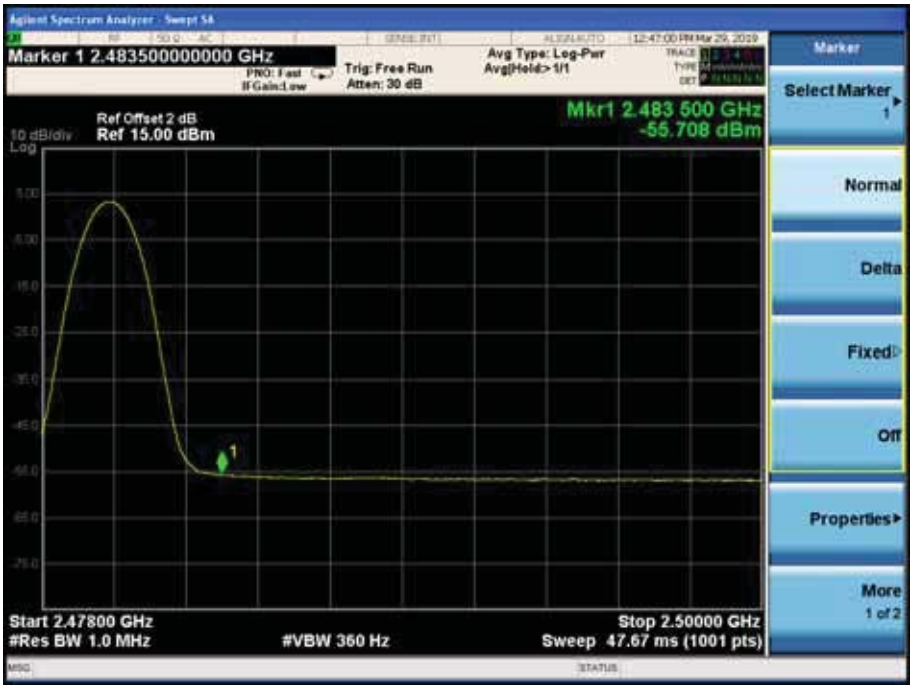
AV Limit=54dBuV/m-95.2-2.7(Antenna Gain) = -43.9dBm

DH5-2402MHz:



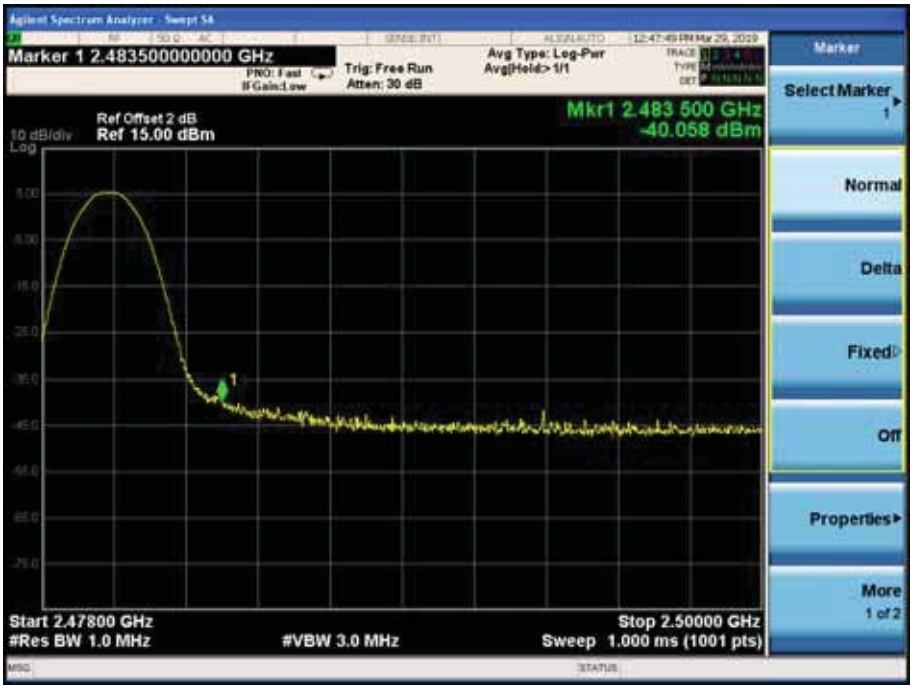
DH5-2480MHz:

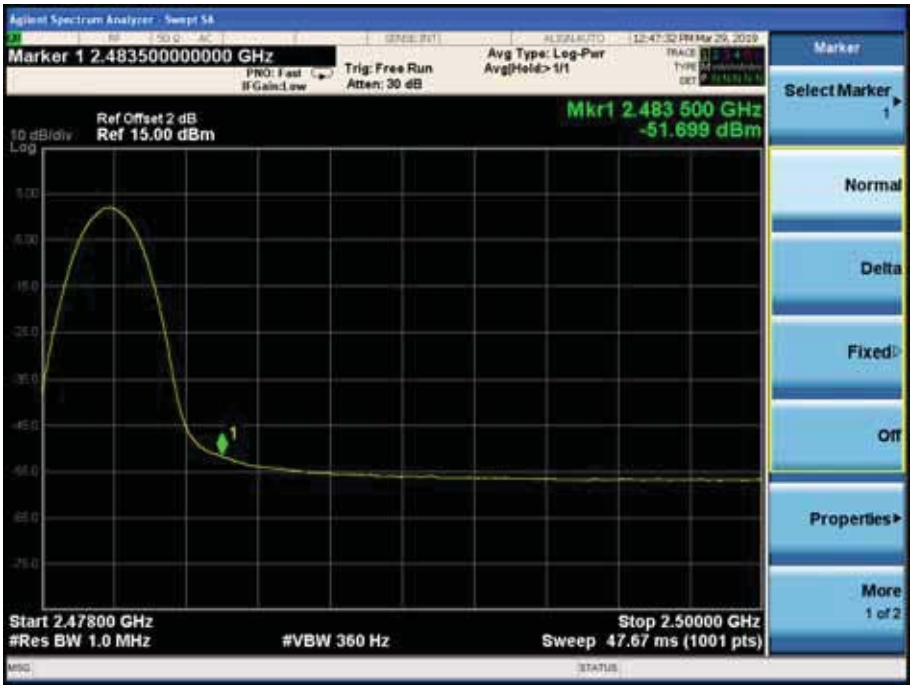

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.483500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
Ref Offset 2 dB
10 dB/div
Log
Ref 15.00 dBm
Mkr1 2.483 500 GHz
-45.828 dBm
Start 2.47800 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 2.50000 GHz
Sweep 1.000 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.483500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
Ref Offset 2 dB
10 dB/div
Log
Ref 15.00 dBm
Mkr1 2.483 500 GHz
-55.708 dBm
Start 2.47800 GHz
#Res BW 1.0 MHz
#VBW 360 Hz
Stop 2.50000 GHz
Sweep 47.67 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2

2DH5-2402MHz:

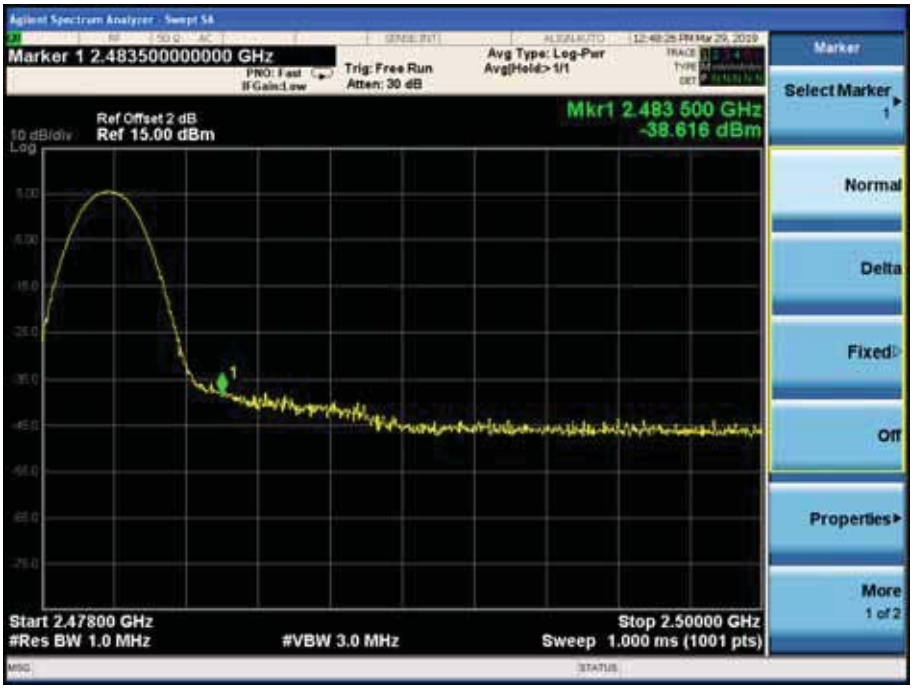
2DH5-2480MHz:

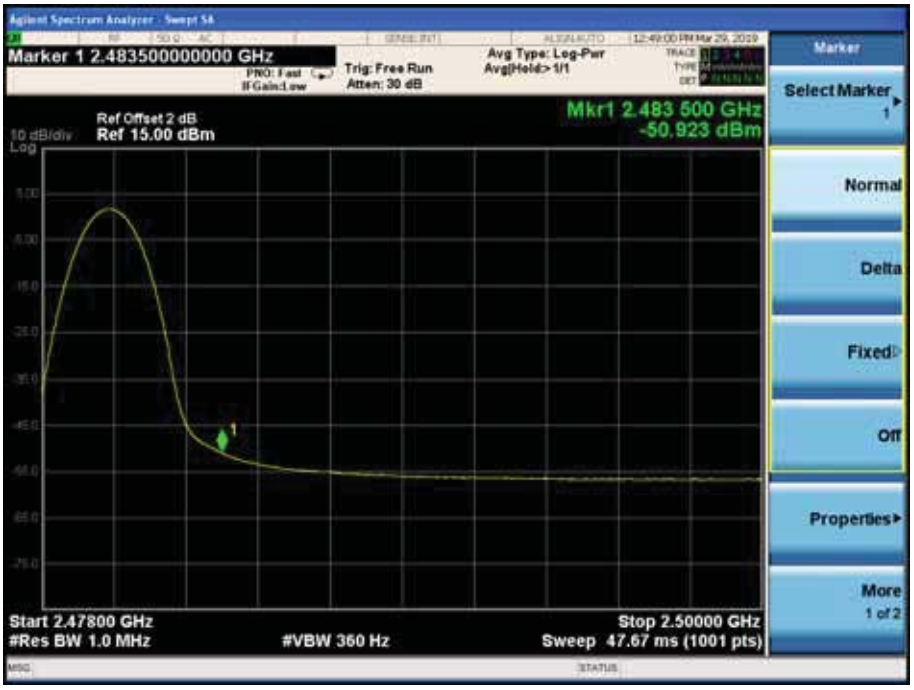




3DH5-2402MHz:

3DH5-2480MHz:





12. Antenna Requirement

12.1. Limit

Antenna Requirement Limit
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

12.2. Antenna Connector Construction

Antenna Connector Construction	
☒	The use of a permanently attached antenna
☐	The antenna use of a unique coupling to the intentional radiator
☐	The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document “Internal Photograph” to show the antenna connector.	

The End