

FCC Part 15C Measurement and Test Report

For

Shenzhen Na Yin Technology Co., Ltd.

6F, Building A, De Bao Li Industrial Park, Ji Hua Road No.312,

Bantian, Longguang District, Shenzhen City, China

FCC ID: 2AF8QZ20

FCC Rule(s):	<u>FCC Part 15.247</u>
Product Description:	<u>Bluetooth headset</u>
Tested Model:	<u>Z20</u>
Report No.:	<u>STR17109014I-2</u>
Tested Date:	<u>2017-10-09 to 2017-10-17</u>
Issued Date:	<u>2017-10-18</u>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shenzhen Na Yin Technology Co., Ltd.
Address of applicant: 6F, Building A, De Bao Li Industrial Park, Ji Hua Road
No.312, Bantian, Longguang District, Shenzhen City, China

Manufacturer: Shenzhen Na Yin Technology Co., Ltd.
Address of manufacturer: 6F, Building A, De Bao Li Industrial Park, Ji Hua Road
No.312, Bantian, Longguang District, Shenzhen City, China

General Description of EUT	
Product Name:	Bluetooth headset
Brand Name:	/
Model No.:	Z20
Rated Voltage:	Battery:3.7V ; USB:DC 5V
Rated Current:	/
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Bluetooth Version:	Bluetooth V4.1 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	0.422dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	Integral
Antenna Gain:	3.4dBi
Lowest Internal Frequency:	/

1.2 Test Standards

The following report is prepared on behalf of the Shenzhen Na Yin Technology Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 558074 D01 v04 for digital transmission systems shall be performed also.

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

FCC – Registration No.: 226174

Shenzhen Morlab Communications Technology Co. Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN1164, and Test Firm Registration Number is 226174.

Note: The Radiation Emission Above 18GHz is test by Shenzhen Morlab Communications Technology Co. Ltd. And the other test is by Shenzhen SEM Test Technology Co., Ltd.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GFSK(BLE)	2402MHz, 2440MHz, 2480MHz

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Adapter	Dell Inc.	PSAI10R-050Q	/
USB CABLE	UGREEN	10836	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Power Spectral Density	Conducted	$\pm 1.8\text{dB}$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	$\pm 2.88\text{dB}$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.7 Test Equipment List and Details

Shenzhen SEM.Test Technology Co., Ltd.

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2018-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2018-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2018-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2018-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11

Shenzhen Morlab Communications Technology Co. Ltd.

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
MXE EMI Receiver	Agilent	N9038A	MY54130016	2017.05.17	2018.05.16
Semi-Anechoic Chamber	Changning	9m*6m*6m	N/A	2017.01.11	2018.01.10
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2016.12.09	2017.12.08
Test Antenna - Horn	Schwarzbeck	BBHA9120C	9120C-384	2017.03.30	2018.03.29
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde&Schwarz	2017.05.17	2018.05.16
26.5-40GHz pre-Amplifier	C00990	NSP4000-SP2	Miteq	2017.05.17	2018.05.16

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 15.203, 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.

4.2 Evaluation Information

This product has a PCB antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Procedure

According to the KDB 558074 D01 v04, the test method of power spectral density as below:

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 \times \text{RBW}$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 Environmental Conditions

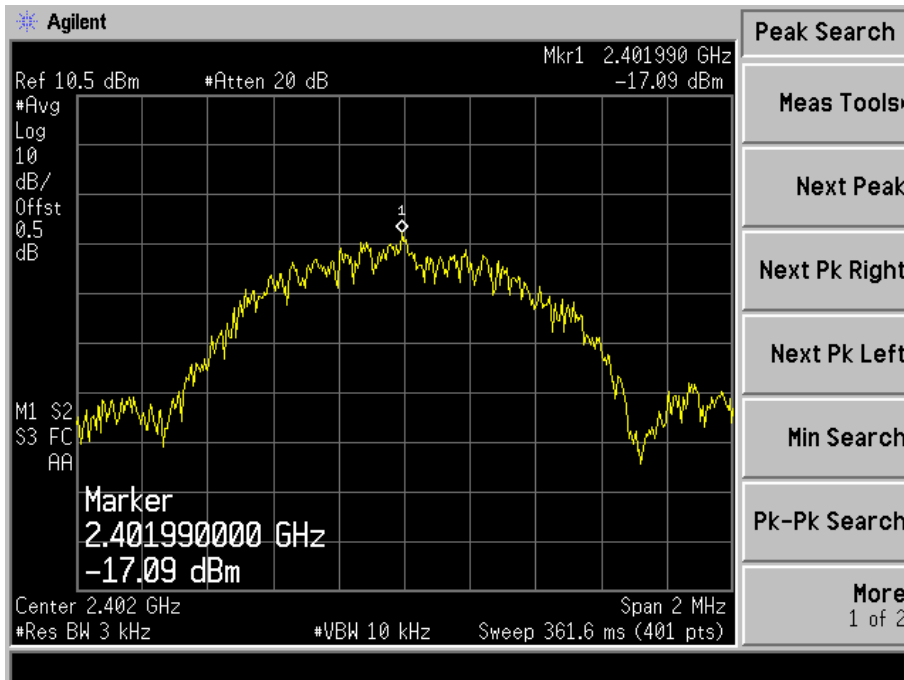
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results/Plots

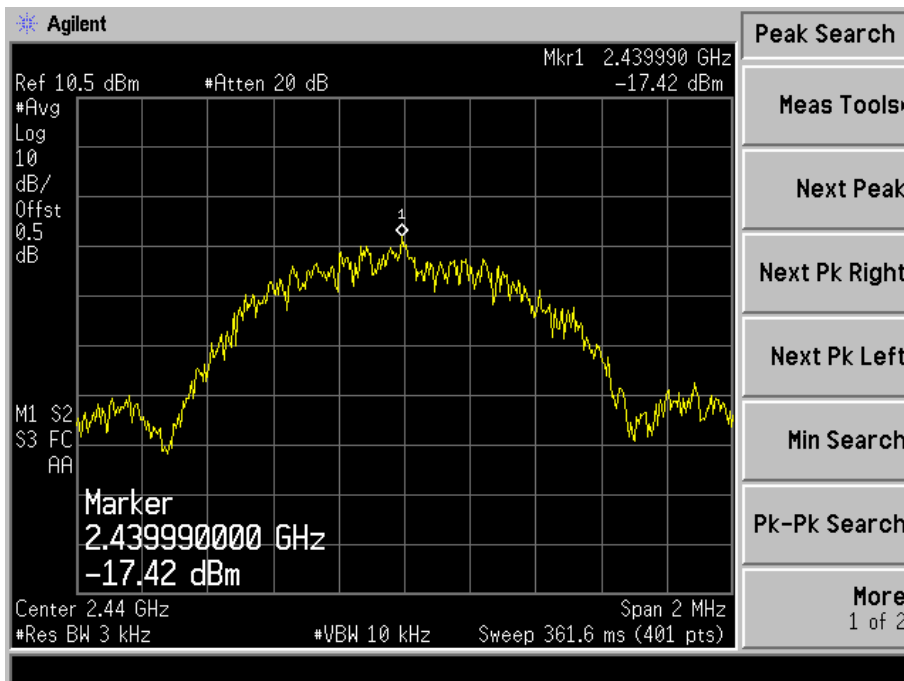
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
GFSK(BLE)	2402	-17.09	8
	2440	-17.42	8
	2480	-16.31	8

Please refer to the following test plots:

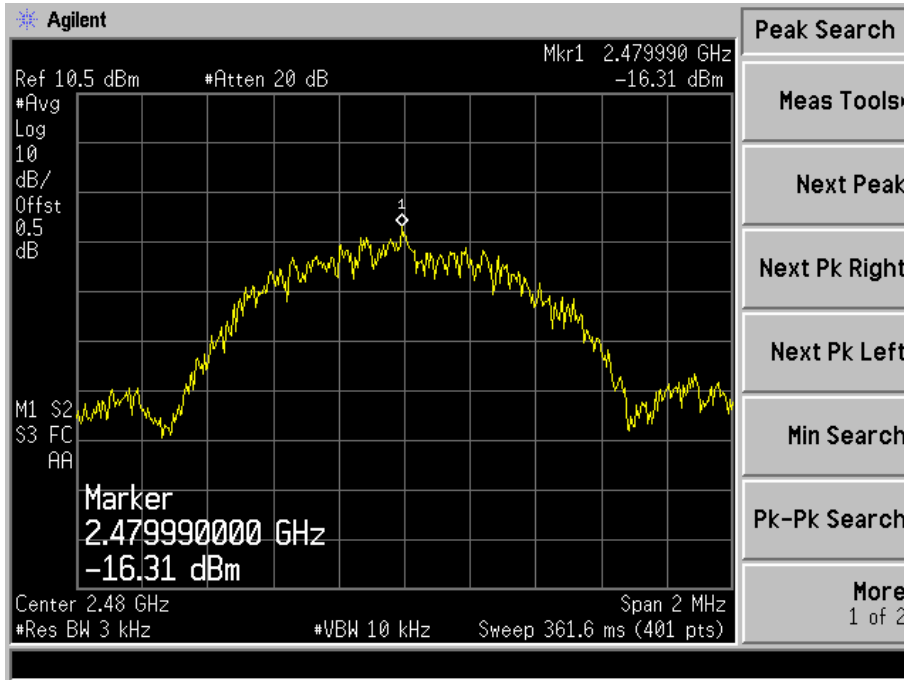
Low Channel



Middle Channel



High Channel



6. 6dB Bandwidth

6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test Procedure

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 Environmental Conditions

Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
GFSK(BLE)	2402	700.234	1058.6	≥ 500
	2440	708.114	1053.4	≥ 500
	2480	706.375	1058.7	≥ 500

Please refer to the following test plots:

For BLE
Low Channel:



Middle Channel:



High Channel:



7. RF Output Power

7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 Test Procedure

According to section KDB-558074 D01 v04 section 9.1.1, this procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW $\geq 3 \times$ RBW.
- c) Set span $\geq 3 \times$ RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

7.3 Environmental Conditions

Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

7.4 Summary of Test Results/Plots

Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
GFSK(BLE)	2402	0.144	1.516	1000
	2440	0.422	1.366	1000
	2480	-0.874	1.329	1000

8. Field Strength of Spurious Emissions

8.1 Standard Applicable

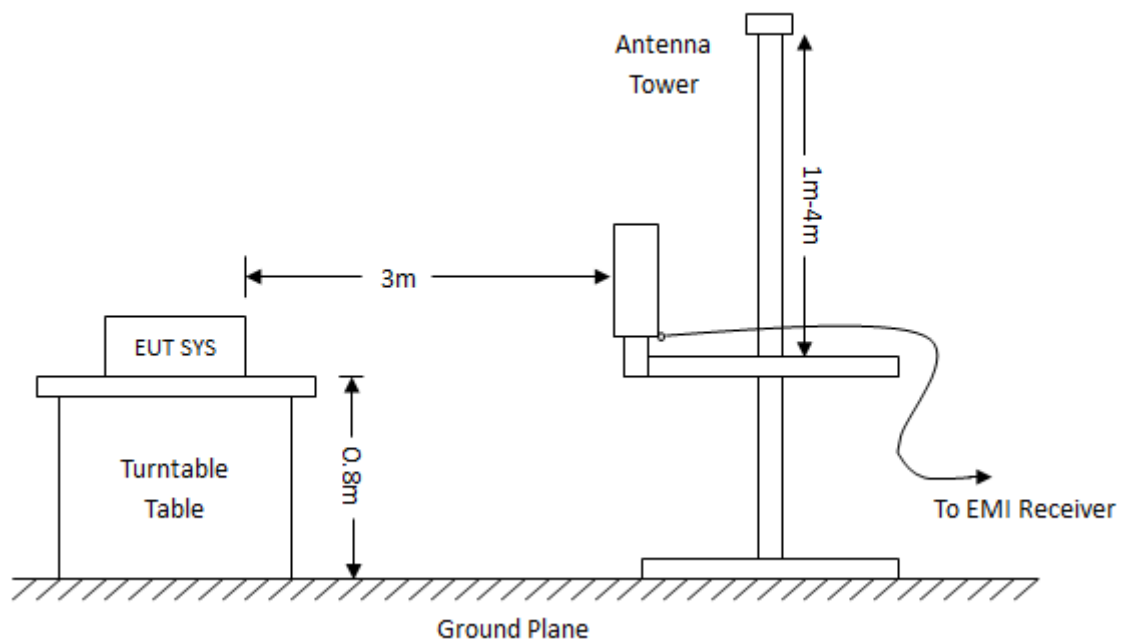
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

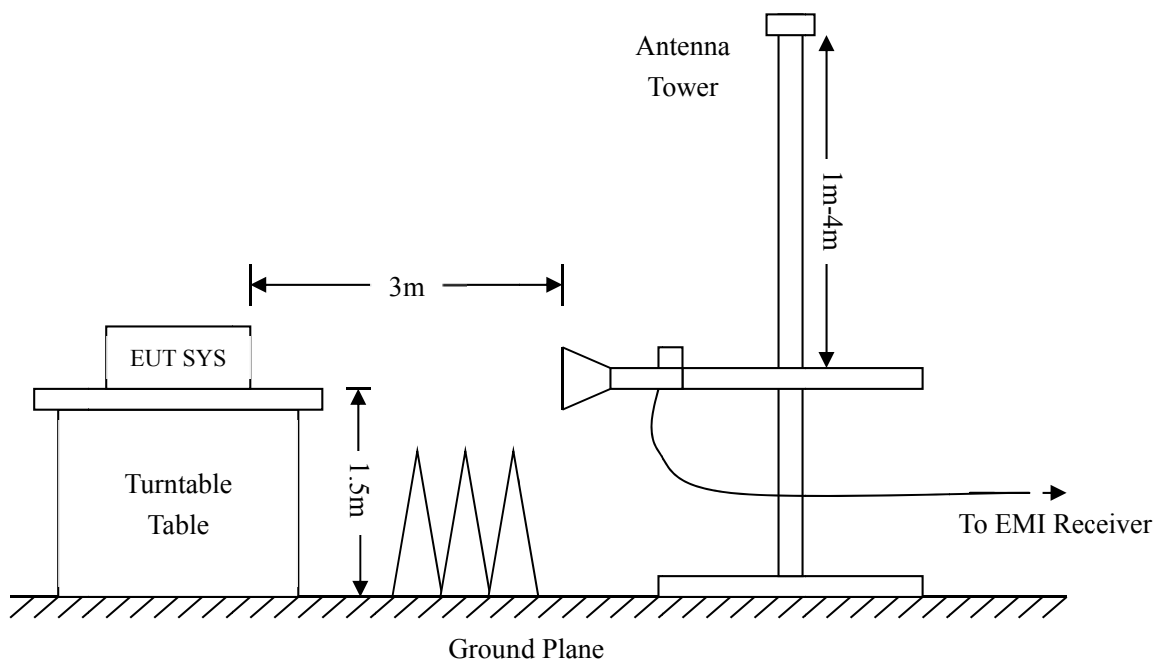
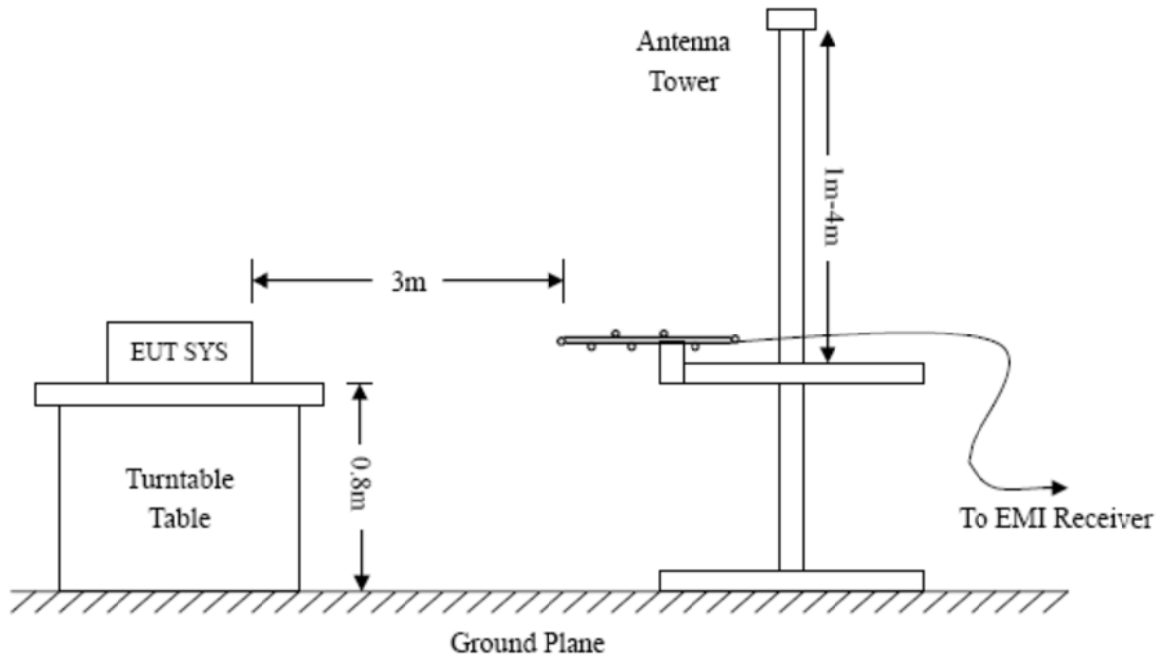
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

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





Frequency :9kHz-30MHz
 RBW=10KHz,
 VBW =30KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak

Frequency :30MHz-1GHz
 RBW=120KHz,
 VBW=300KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, QP

Frequency :Above 1GHz
 RBW=1MHz,
 VBW=3MHz(Peak), 10Hz(AV)
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, AV

8.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

8.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

8.5 Summary of Test Results/Plots

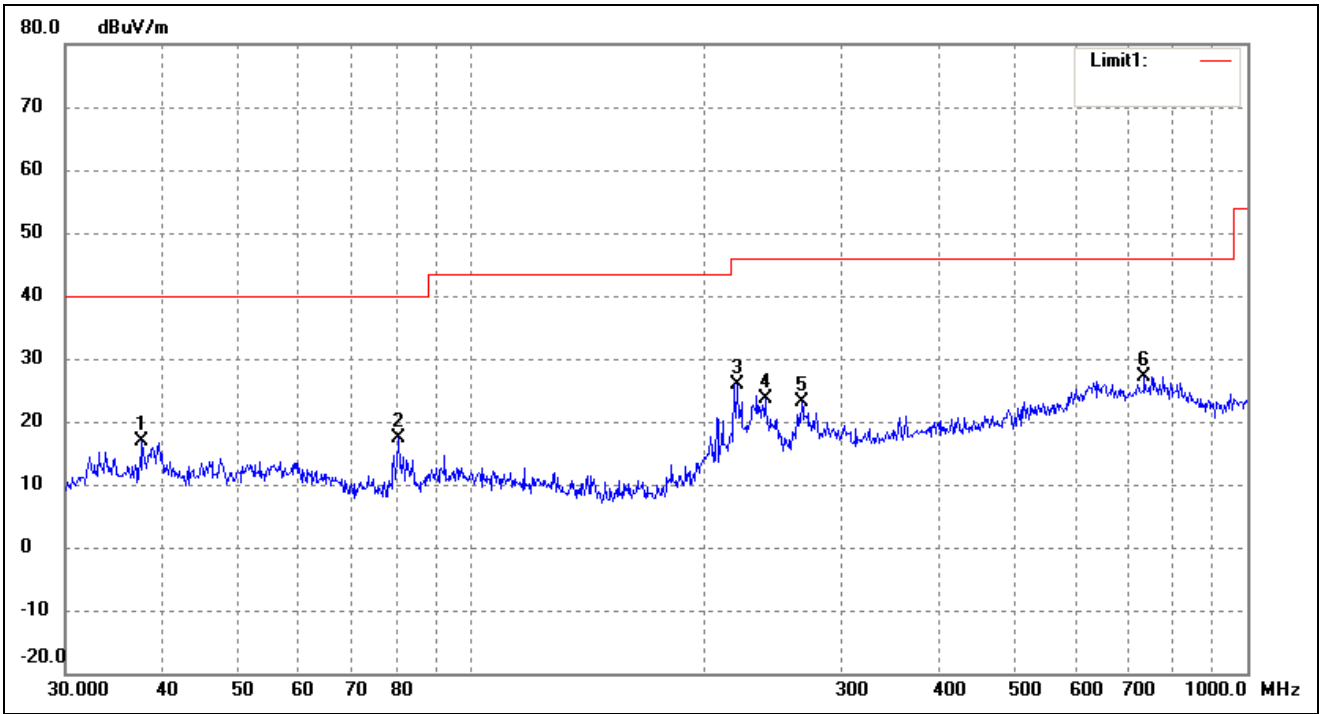
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiated Emissions Test Data

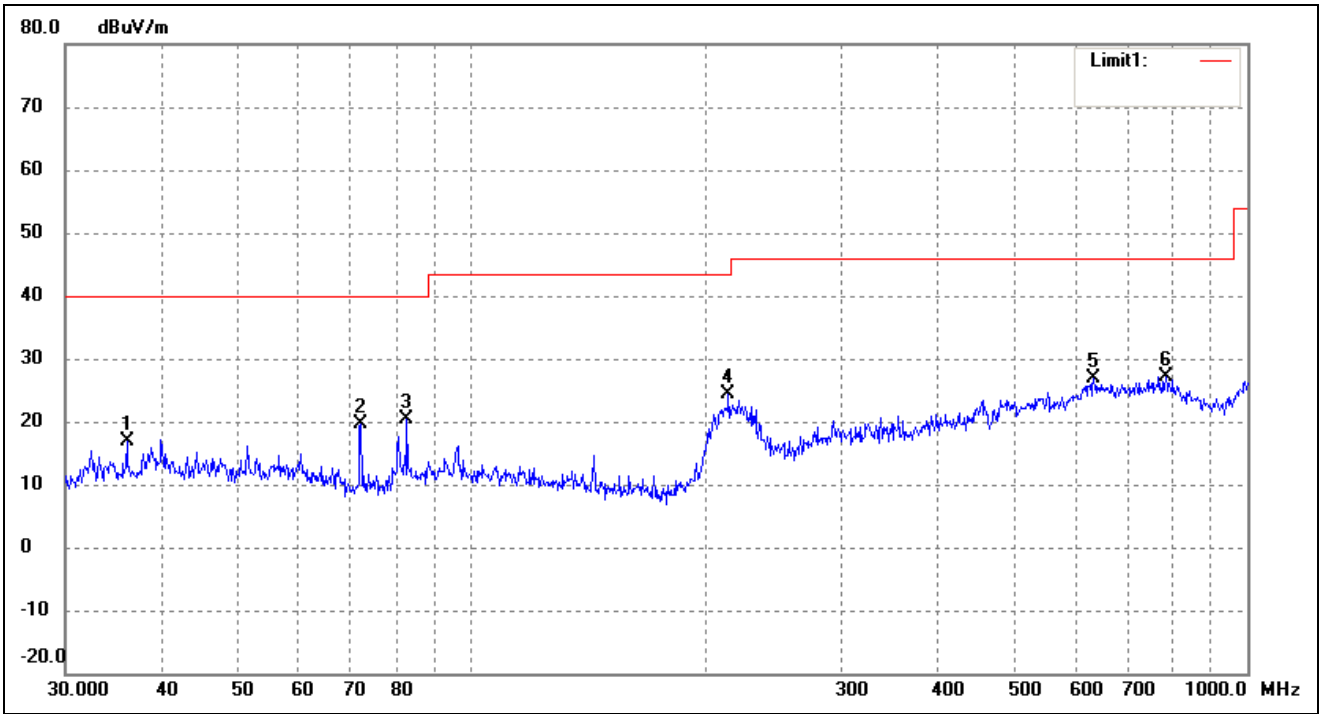
EUT: Bluetooth headset
Tested Model: Z20
Operating Condition: Transmitting-Low channel (2402MHz)
Comment: Battery:3.7V; USB:DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	37.6798	33.80	-16.89	16.91	40.00	-23.09	326	100	QP
2	80.6442	37.17	-19.71	17.46	40.00	-22.54	90	100	QP
3	219.8449	39.75	-13.87	25.88	46.00	-20.12	145	100	QP
4	239.1473	36.23	-12.60	23.63	46.00	-22.37	107	100	QP
5	266.6089	34.37	-11.31	23.06	46.00	-22.94	254	100	QP
6	737.0714	27.13	-0.02	27.11	46.00	-18.89	106	100	QP

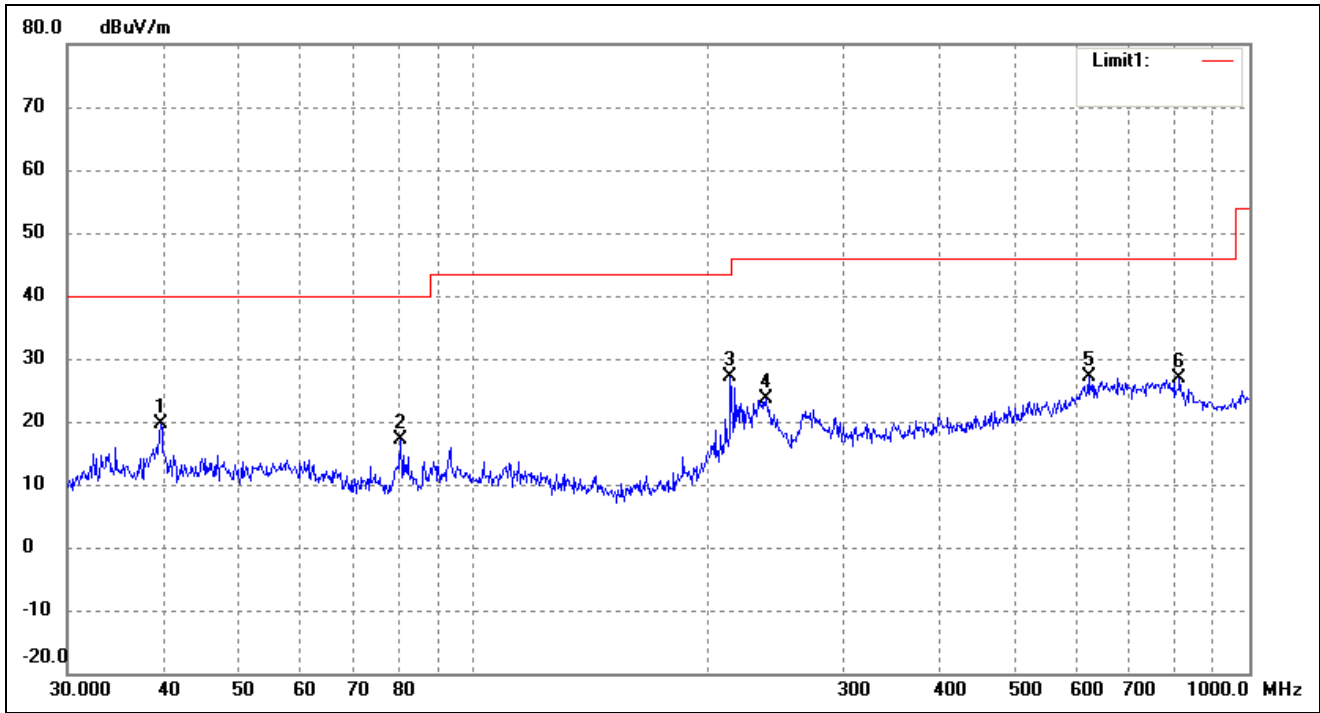
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	36.0007	33.99	-17.16	16.83	40.00	-23.17	326	100	QP
2	72.0842	38.67	-18.97	19.70	40.00	-20.30	90	100	QP
3	82.6482	39.63	-19.36	20.27	40.00	-19.73	145	100	QP
4	214.5142	39.40	-15.04	24.36	43.50	-19.14	107	100	QP
5	633.9072	28.18	-1.21	26.97	46.00	-19.03	254	100	QP
6	785.0934	29.06	-1.95	27.11	46.00	-18.89	106	100	QP

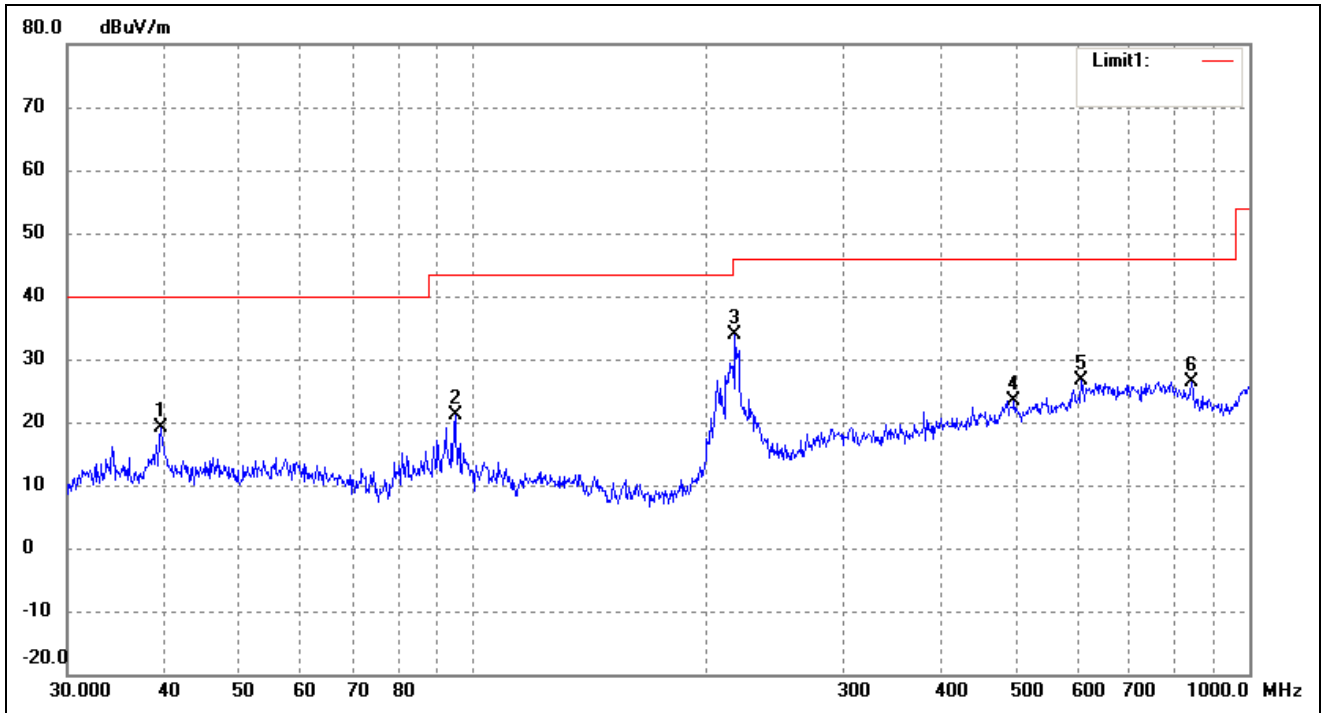
Plot of Radiated Emissions Test Data

EUT: Bluetooth headset
 Tested Model: Z20
 Operating Condition: Transmitting-Middle channel (2440MHz)
 Comment: Battery:3.7V;
 Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.5757	36.21	-16.59	19.62	40.00	-20.38	163	100	QP
2	80.6442	36.84	-19.71	17.13	40.00	-22.87	146	100	QP
3	214.5143	42.21	-15.04	27.17	43.50	-16.33	82	100	QP
4	238.3102	36.23	-12.65	23.58	46.00	-22.42	274	100	QP
5	620.7096	28.72	-1.67	27.05	46.00	-18.95	274	100	QP
6	813.1116	29.58	-2.60	26.98	46.00	-19.02	212	100	QP

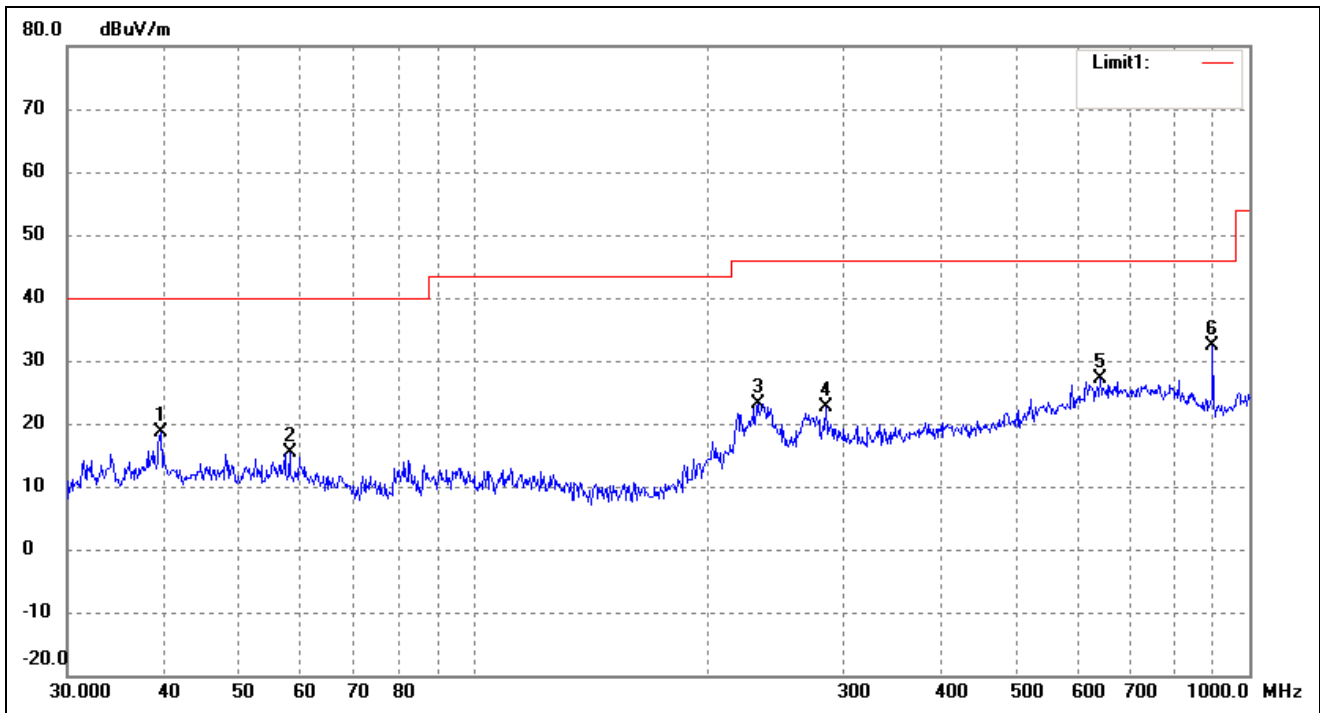
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.5757	35.80	-16.59	19.21	40.00	-20.79	QP	QP	QP
2	94.7601	38.37	-17.34	21.03	43.50	-22.47	QP	QP	QP
3	217.5443	48.15	-14.38	33.77	46.00	-12.23	QP	QP	QP
4	497.6765	29.27	-5.94	23.33	46.00	-22.67	QP	QP	QP
5	607.7867	27.37	-0.83	26.54	46.00	-19.46	QP	QP	QP
6	842.1296	28.88	-2.48	26.40	46.00	-19.60	QP	QP	QP

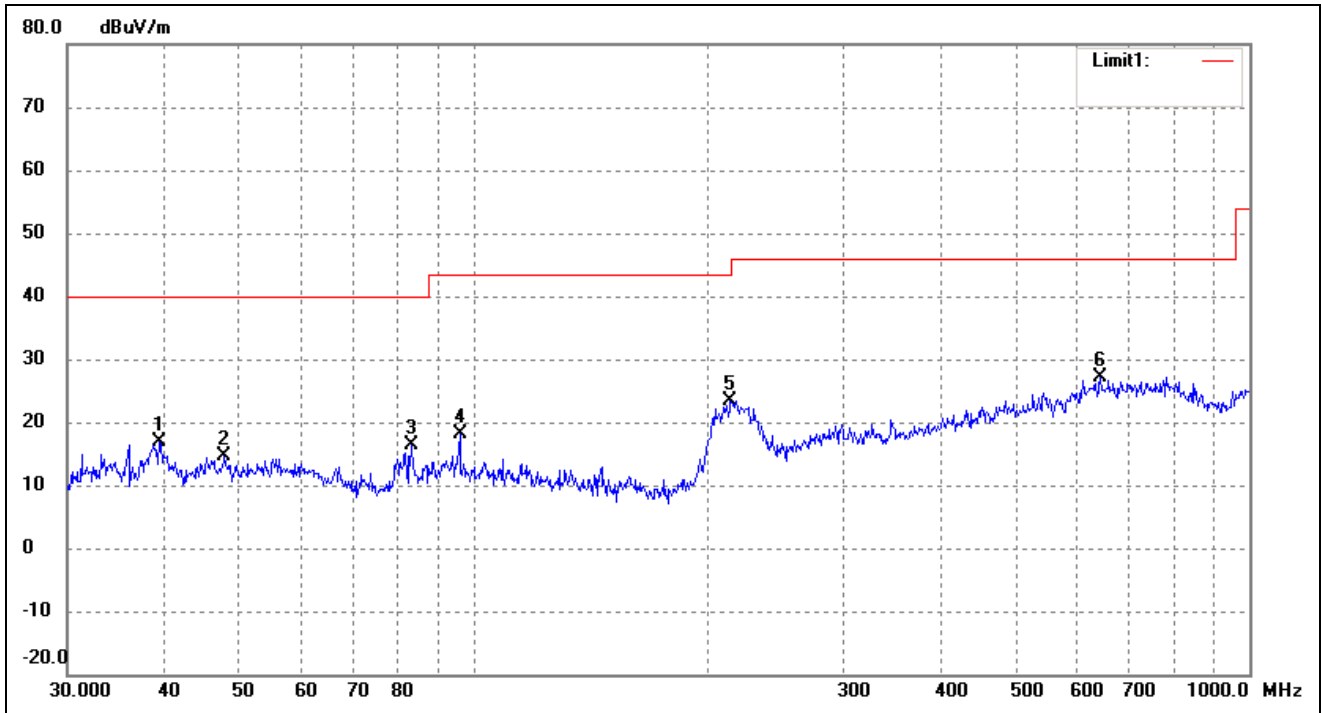
Plot of Radiated Emissions Test Data

EUT: Bluetooth headset
 Tested Model: Z20
 Operating Condition: Transmitting-High channel (2480MHz)
 Comment: Battery:3.7V;
 Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.5757	35.34	-16.59	18.75	40.00	-21.25	99	100	QP
2	57.9993	32.02	-16.55	15.47	40.00	-24.53	189	100	QP
3	232.5318	36.24	-13.03	23.21	46.00	-22.79	80	100	QP
4	284.9767	32.87	-10.17	22.70	46.00	-23.30	130	100	QP
5	642.8613	28.10	-1.08	27.02	46.00	-18.98	198	100	QP
6	896.9965	35.32	-2.86	32.46	46.00	-13.54	117	100	QP

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.4372	33.40	-16.62	16.78	40.00	-23.22	99	100	QP
2	47.8260	31.22	-16.53	14.69	40.00	-25.31	189	100	QP
3	83.2298	35.62	-19.25	16.37	40.00	-23.63	80	100	QP
4	96.0986	35.18	-17.14	18.04	43.50	-25.46	130	100	QP
5	214.5143	38.43	-15.04	23.39	43.50	-20.11	198	100	QP
6	642.8613	28.09	-1.08	27.01	46.00	-18.99	117	100	QP

Spurious Emissions 1GHz to 18GHz

Transmitting: BLE mode:

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2402MHz							
4804	59.09	-3.59	55.50	74	-18.50	H	PK
4804	42.73	-3.59	39.14	54	-14.86	H	AV
7206	56.36	-0.52	55.84	74	-18.16	H	PK
7206	40.00	-0.52	39.48	54	-14.52	H	AV
4804	58.18	-3.59	54.59	74	-19.41	V	PK
4804	47.27	-3.59	43.68	54	-10.32	V	AV
7206	52.73	-0.52	52.21	74	-21.79	V	PK
7206	40.00	-0.52	39.48	54	-14.52	V	AV
Middle Channel-2440MHz							
4880	59.09	-3.49	55.60	74	-18.40	H	PK
4880	46.36	-3.49	42.87	54	-11.13	H	AV
7320	58.18	-0.47	57.71	74	-16.29	H	PK
7320	47.27	-0.47	46.80	54	-7.20	H	AV
4880	54.55	-3.49	51.06	74	-22.94	V	PK
4880	43.64	-3.49	40.15	54	-13.85	V	AV
7320	55.45	-0.47	54.98	74	-19.02	V	PK
7320	40.91	-0.47	40.44	54	-13.56	V	AV
High Channel-2480MHz							
4960	54.55	-3.41	51.14	74	-22.86	H	PK
4960	40.00	-3.41	36.59	54	-17.41	H	AV
7440	54.55	-0.42	54.13	74	-19.87	H	PK
7440	50.00	-0.42	49.58	54	-4.42	H	AV
4960	53.64	-3.41	50.23	74	-23.77	V	PK
4960	46.36	-3.41	42.95	54	-11.05	V	AV
7440	56.36	-0.42	55.94	74	-18.06	V	PK
7440	42.73	-0.42	42.31	54	-11.69	V	AV

Operating Condition: Transmitting-High channel (2480MHz)_worst case

Spurious Emissions above 18GHz(Test by Morlab)

Num	Freq(MHz)	PK	limit AV	Degree	Antenna	Verdict
1	18462.084	48.81	54.00	147.6	H	PASS
2	19879.651	42.84	54.00	281.7	H	PASS
3	21851.209	47.54	54.00	78.2	H	PASS
4	22999.927	48.02	54.00	29.5	H	PASS
5	23920.531	49.90	54.00	137.9	H	PASS
6	24185.306	49.15	54.00	39.1	H	PASS
7	18625.023	47.26	54.00	194.1	V	PASS
8	20502.891	46.67	54.00	58.3	V	PASS
9	22103.764	46.78	54.00	328.9	V	PASS
10	22767.740	47.48	54.00	357.2	V	PASS
11	23529.478	47.73	54.00	204.0	V	PASS
12	24160.866	49.59	54.00	165.2	V	PASS
Remark: The peak reading is below the AV Limit, so the AV test is not reading.						

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics. The measurements greater than 20dB below the limit from 9kHz to 30MHz is not show.

9. Out of Band Emissions

9.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

9.2 Test Procedure

According to the KDB 558074 D01 v04, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the KDB 558074 D01 v04, the conducted spurious emissions test method as follows:

1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW \geq 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

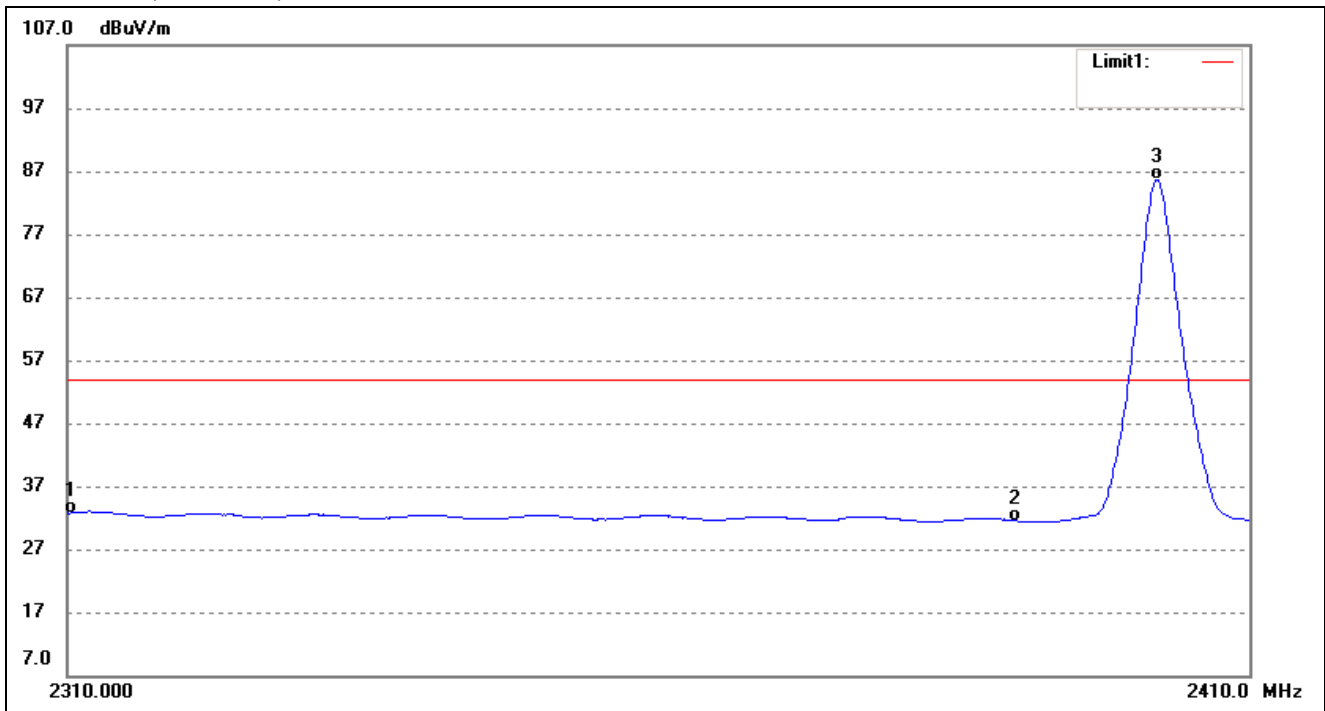
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

9.3 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

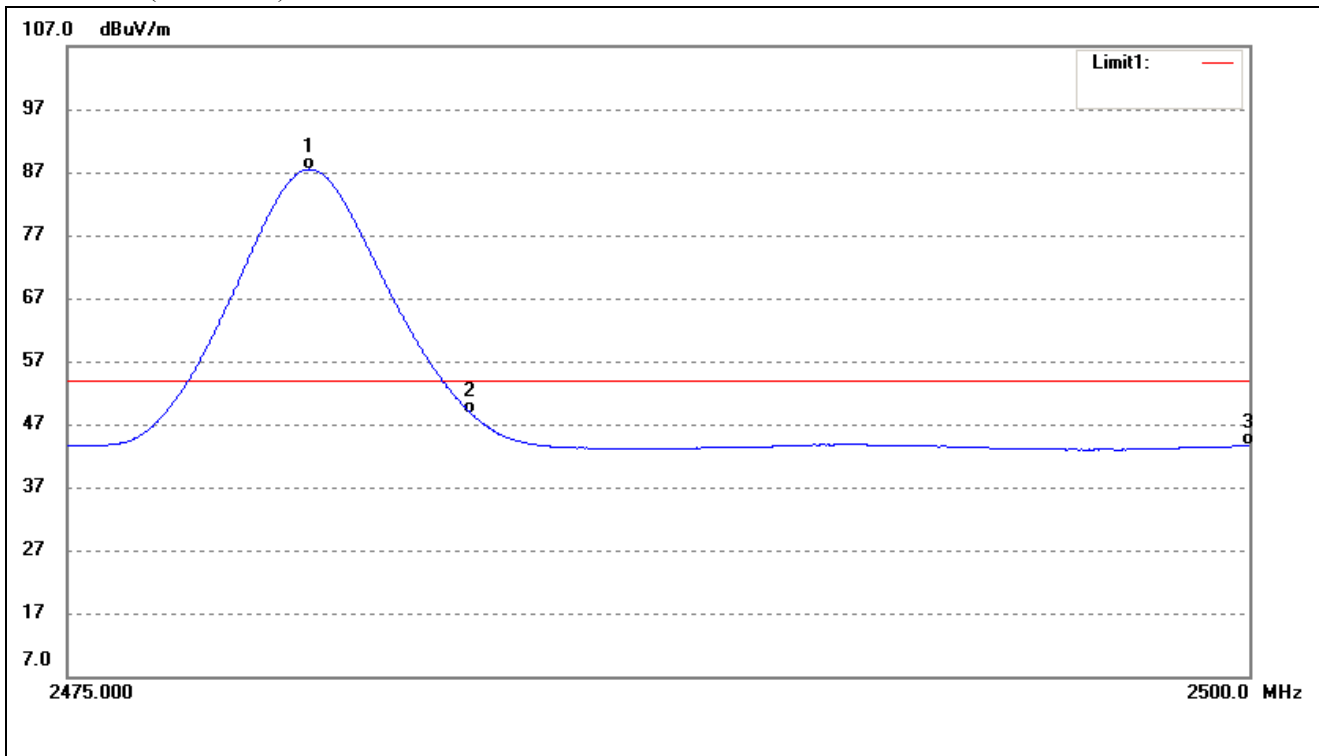
9.4 Summary of Test Results/Plots

Bandedge (Radiated)
 Lowest Bandedge-BLE
 Horizontal (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	39.09	-6.38	32.71	54.00	-21.29	Average Detector
	2310.000	51.22	-6.38	44.84	74.00	-29.16	Peak Detector
2	2390.000	38.73	-7.26	31.47	54.00	-22.53	Average Detector
	2390.000	51.25	-7.26	43.99	74.00	-30.01	Peak Detector
3	2402.047	93.11	-7.39	85.72	/	/	Average Detector
	2402.352	99.31	-7.40	91.91	/	/	Peak Detector

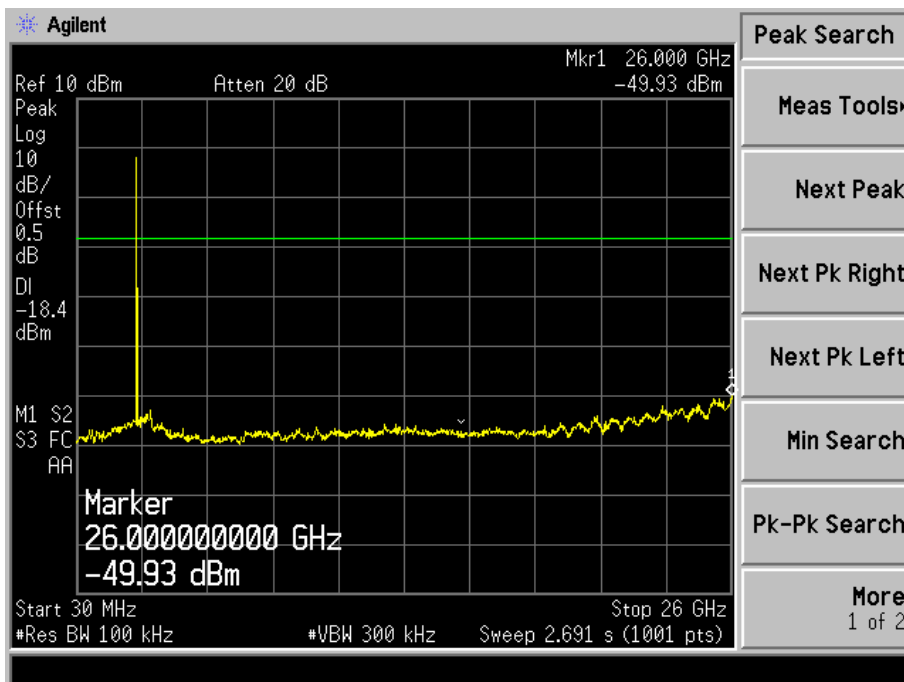
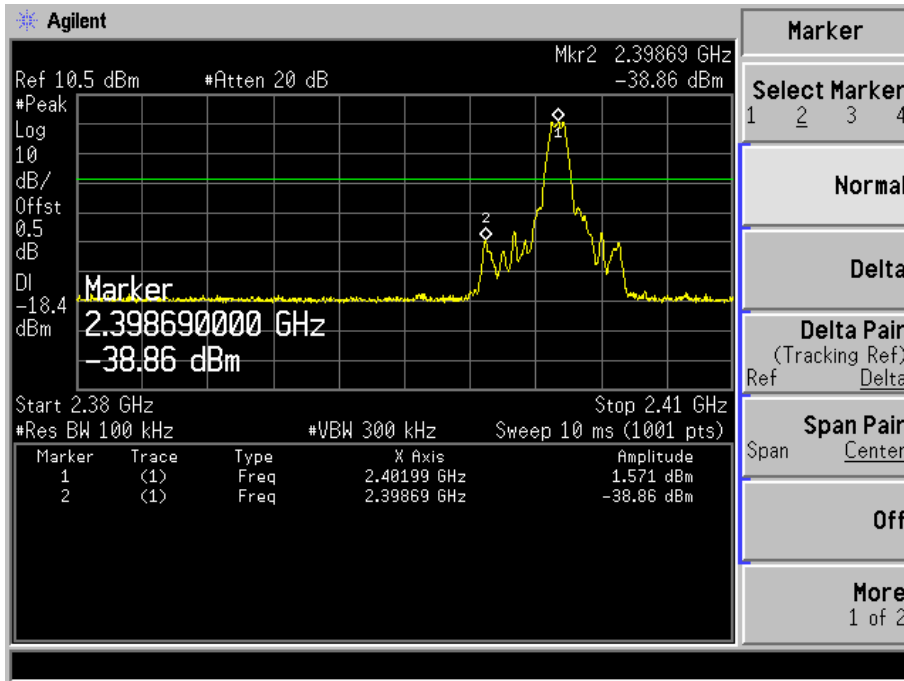
Highest Bandedge-BLE
Horizontal (Worst case)



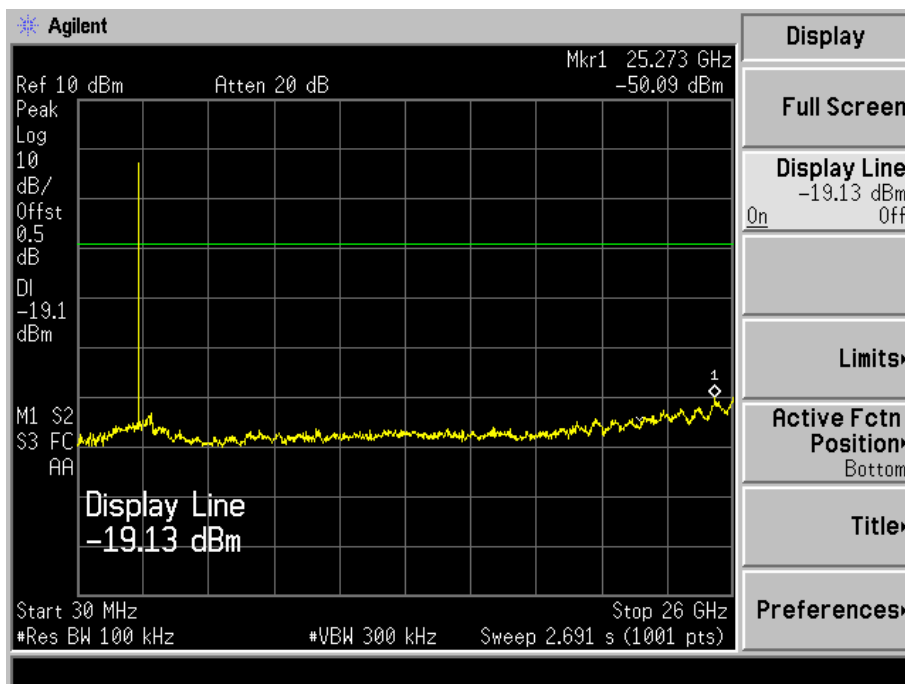
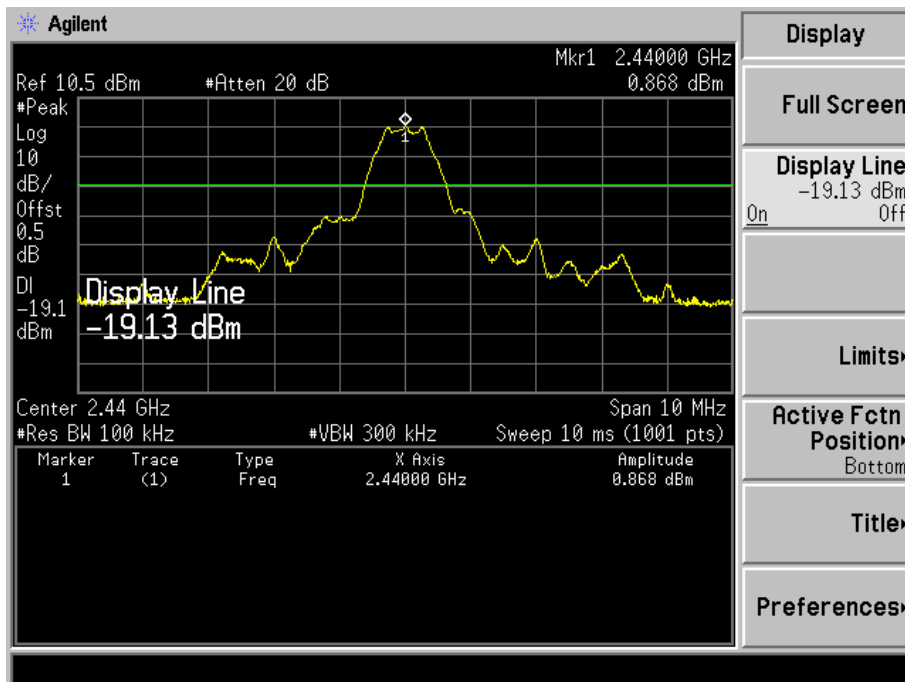
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.080	94.78	-7.28	87.50	/	/	Average Detector
	2480.379	87.36	4.52	91.88	/	/	Peak Detector
2	2483.500	55.94	-7.28	48.66	54.00	-5.34	Average Detector
	2483.500	50.41	4.52	54.93	74.00	-19.07	Peak Detector
3	2500.000	50.88	-7.25	43.63	54.00	-10.37	Average Detector
	2500.000	40.54	4.55	45.09	74.00	-28.91	Peak Detector

Bandedge (Conducted)

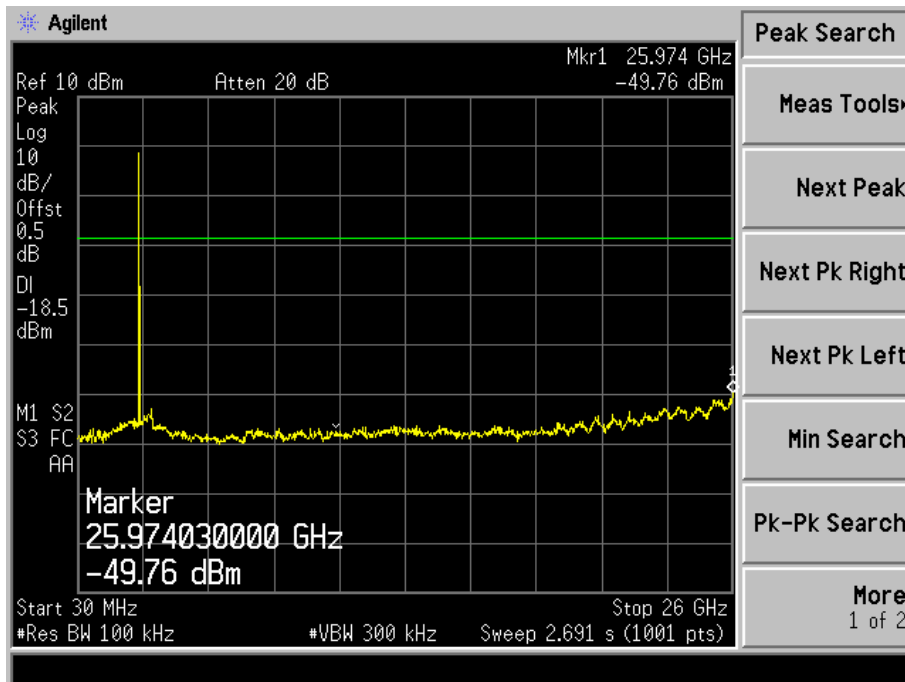
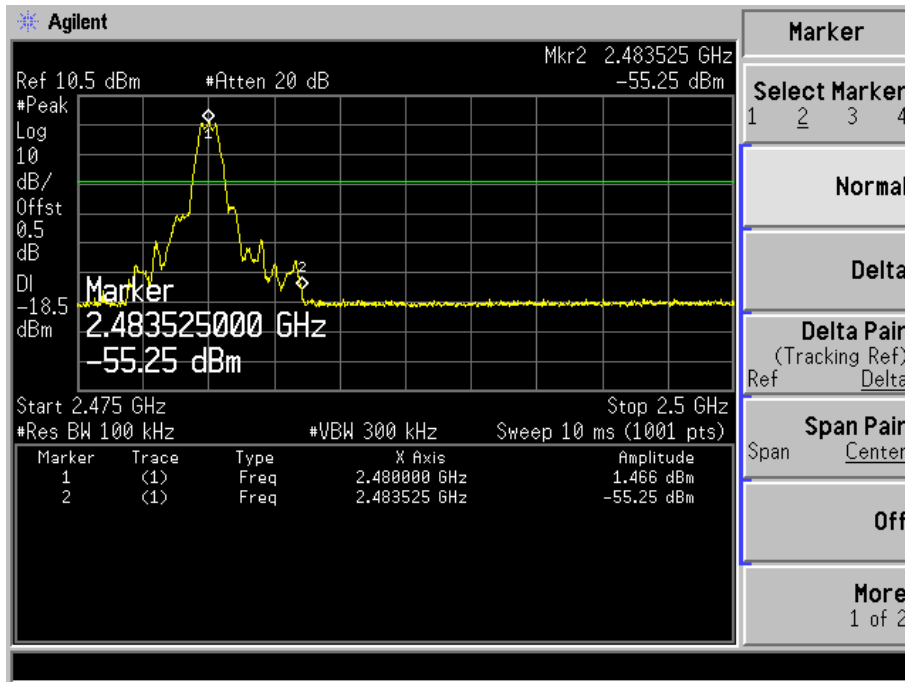
Lowest



Middle Channel



High Channel:



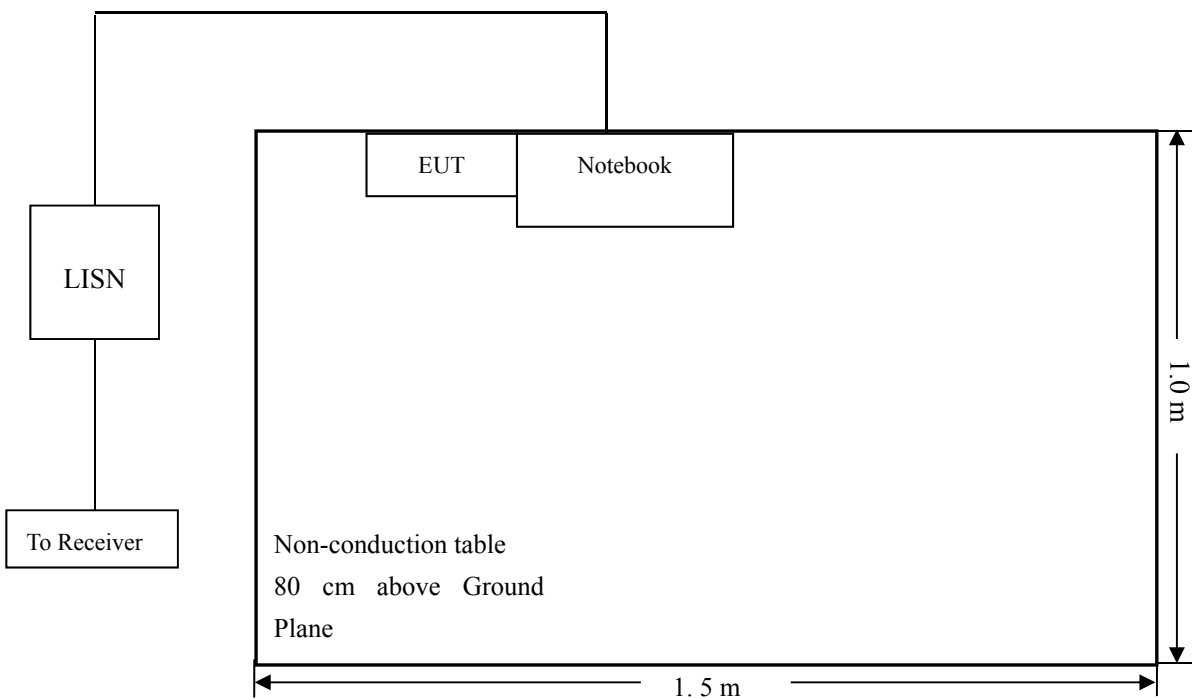
10. Conducted Emissions

10.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

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

10.2 Basic Test Setup Block Diagram



10.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

10.4 Test Receiver Setup

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

Start Frequency	150 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth.....	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

10.5 Summary of Test Results/Plots

According to the data in section 10.6, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin reading of:

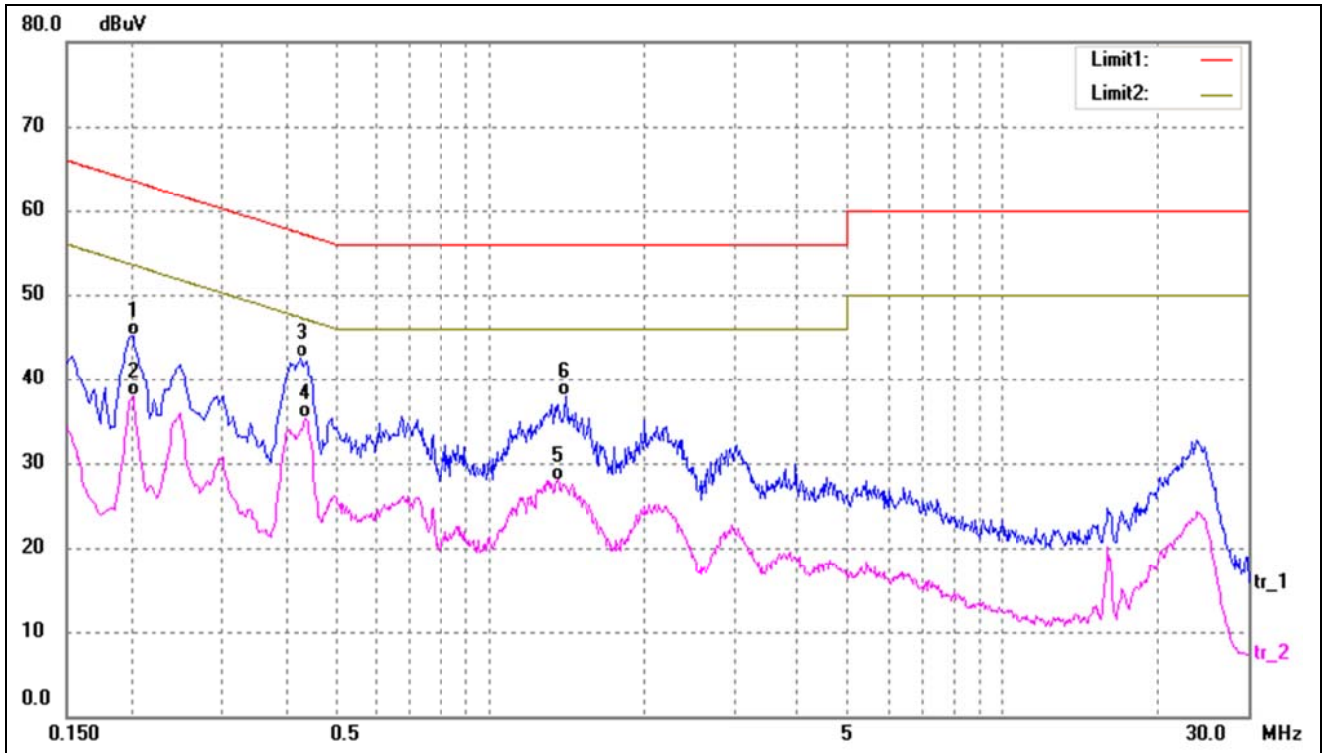
-10.55 dB at 0.4380 MHz in the **Line, AVG** detector, 0.15-30MHz

10.6 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

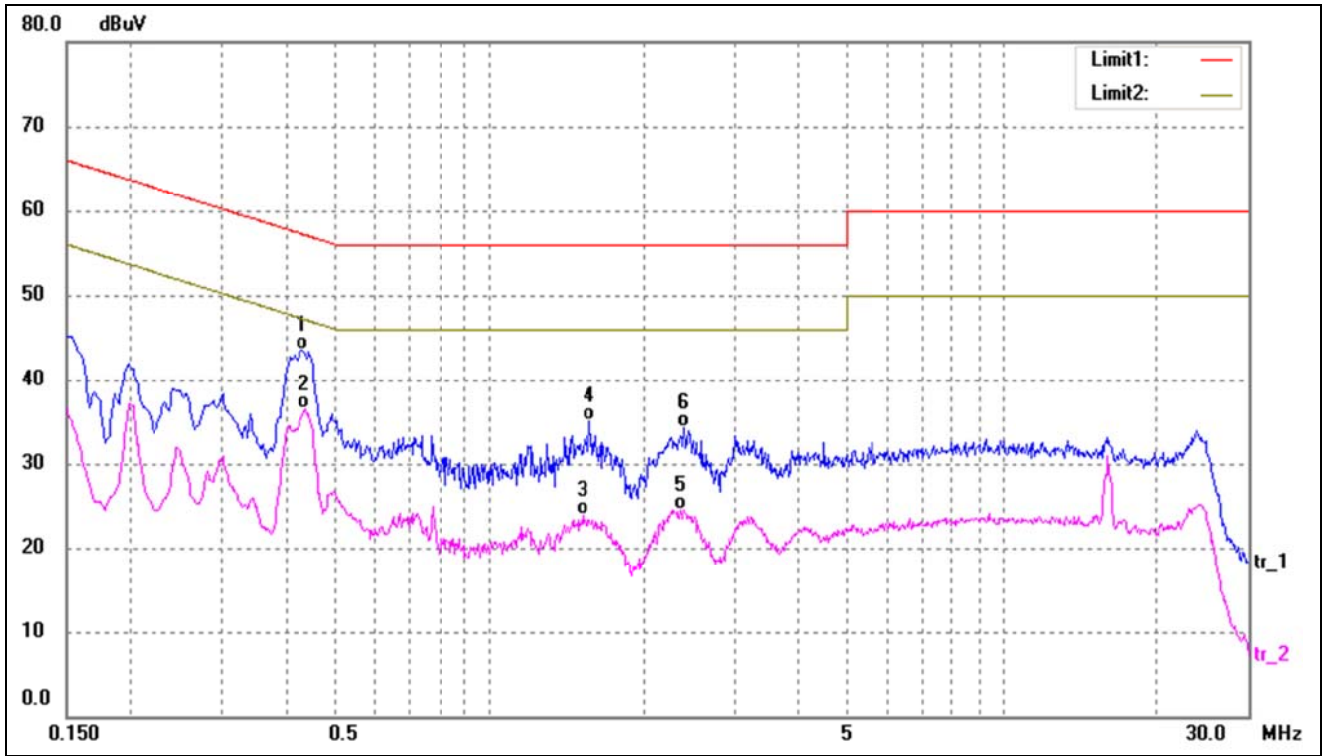
EUT: Bluetooth headset
 Tested Model: Z20
 Operating Condition: Transmitting
 Comment: Adapter 120V/60Hz

 Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2020	35.38	9.80	45.18	63.53	-18.35	QP
2	0.2020	28.08	9.80	37.88	53.53	-15.65	AVG
3	0.4300	32.64	9.80	42.44	57.25	-14.81	QP
4*	0.4380	25.53	9.80	35.33	47.10	-11.77	AVG
5	1.3540	18.25	9.75	28.00	46.00	-18.00	AVG
6	1.4100	28.20	9.75	37.95	56.00	-18.05	QP

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4300	33.70	9.80	43.50	57.25	-13.75	QP
2*	0.4380	26.75	9.80	36.55	47.10	-10.55	AVG
3	1.5180	14.10	9.75	23.85	46.00	-22.15	AVG
4	1.5620	25.33	9.75	35.08	56.00	-20.92	QP
5	2.3580	14.84	9.73	24.57	46.00	-21.43	AVG
6	2.3900	24.55	9.73	34.28	56.00	-21.72	QP

Note: Test for 120V/240V, the worst case is 120V, and the 240V data is not show.

***** END OF REPORT *****