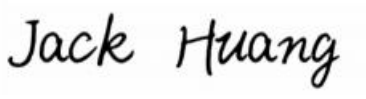
TEST REPORT

Reference No......	:	WTX23X03058256W001
FCC ID.....	:	2BBNW-JM05
Applicant.....	:	ShenZhen XinTu Century Technology Co., Ltd.
Address.....	:	No. 5/FA, Building A1, Anle Industrial Zone, 172 Hangcheng Avenue, Hangcheng Street, Baoan District, Shenzhen
Product Name.....	:	Bluetooth headset
Test Model.....	:	JM05
Standards.....	:	FCC Part 15.247
Date of Receipt sample.....	:	June 2, 2023
Date of Test.....	:	June 2~June 10, 2023
Date of Issue.....	:	June 10, 2023
Test Result.....	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

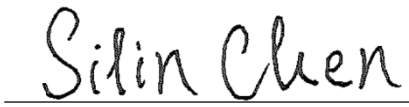
Prepared By:
Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,
Block 70 Bao'an District, Shenzhen, Guangdong, China

Tested by:



Jack Huang

Approved & Authorized By:



Silin Chen

TABLE OF CONTENTS

1. GENERAL INFORMATION 4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
1.2 TEST STANDARDS 5
1.3 TEST METHODOLOGY 5
1.4 TEST FACILITY 5
1.5 EUT SETUP AND TEST MODE 6
1.6 MEASUREMENT UNCERTAINTY 6
1.7 TEST EQUIPMENT LIST AND DETAILS 7
2. SUMMARY OF TEST RESULTS 9
3. ANTENNA REQUIREMENT 10
3.1 STANDARD APPLICABLE 10
3.2 EVALUATION INFORMATION 10
4. POWER SPECTRAL DENSITY 11
4.1 STANDARD APPLICABLE 11
4.2 TEST SETUP BLOCK DIAGRAM 11
4.3 TEST PROCEDURE 11
4.4 SUMMARY OF TEST RESULTS/PLOTS 11
5. DTS BANDWIDTH 12
5.1 STANDARD APPLICABLE 12
5.2 TEST SETUP BLOCK DIAGRAM 12
5.3 TEST PROCEDURE 12
5.3 SUMMARY OF TEST RESULTS/PLOTS 12
6. RF OUTPUT POWER 13
6.1 STANDARD APPLICABLE 13
6.2 TEST SETUP BLOCK DIAGRAM 13
6.3 TEST PROCEDURE 13
6.4 SUMMARY OF TEST RESULTS/PLOTS 13
7. FIELD STRENGTH OF SPURIOUS EMISSIONS 14
7.1 STANDARD APPLICABLE 14
7.2 TEST PROCEDURE 14
7.3 CORRECTED AMPLITUDE & MARGIN CALCULATION 16
7.4 SUMMARY OF TEST RESULTS/PLOTS 16
8. OUT OF BAND EMISSIONS 20
8.1 STANDARD APPLICABLE 20
8.2 TEST PROCEDURE 20
8.3 SUMMARY OF TEST RESULTS/PLOTS 21
9. CONDUCTED EMISSIONS 25
9.1 TEST PROCEDURE 25
9.2 BASIC TEST SETUP BLOCK DIAGRAM 25
9.3 TEST RECEIVER SETUP 25
9.4 SUMMARY OF TEST RESULTS/PLOTS 25
APPENDIX SUMMARY 28
APPENDIX A 29
APPENDIX B 31
APPENDIX C 33
APPENDIX D 34
APPENDIX E 35
APPENDIX PHOTOGRAPHS 38

Report version

Version No.	Date of issue	Description
Rev.00	June 10, 2023	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	ShenZhen XinTu Century Technology Co., Ltd.
Address of applicant:	5/FA, Building A1, Anle Industrial Zone, 172 Hangcheng Avenue, Hangcheng Street, Baoan District, Shenzhen
Manufacturer:	ShenZhen XinTu Century Technology Co., Ltd.
Address of manufacturer:	5/FA, Building A1, Anle Industrial Zone, 172 Hangcheng Avenue, Hangcheng Street, Baoan District, Shenzhen

General Description of EUT	
Product Name:	Bluetooth headset
Brand Name:	/
Model No.:	JM05
Adding Model(s):	/
Rated Voltage:	DC 3.7V from Battery
Power Adapter:	/
Software Version:	/
Hardware Version:	/
Serial Number:	105SS52
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Bluetooth Version:	V5.3 BLE
Frequency Range:	2402-2480MHz
RF Output Power:	dBm
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB
Antenna Gain:	2.71dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
558074 D01 15.247 Meas Guidance v05r02: Guidance For Compliance Measurements On Digital Transmission System, Frequency Hopping Spread Spectrum System, And Hybrid System Devices Operating Under Section 15.247 Of The Fcc Rules
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

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, KDB 558074 D01 15.247 Meas Guidance v05r02.
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory
Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990
Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintain ed in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

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, with a duty cycle equal to 100%, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low	2402MHz
TM2	Middle	2440MHz
TM3	High	2480MHz

Test software(Fix the Tx frequency)	**Power level(Testing)**
Name	level
FCC Assist V1.0.2.2	Index

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

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

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB

Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2023-03-27	2024-03-26
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2023-03-27	2024-03-26
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2023-03-27	2024-03-26
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2023-03-27	2024-03-26
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2023-03-27	2024-03-26
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2023-03-27	2024-03-26
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2023-03-27	2024-03-26
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2023-03-27	2024-03-26
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-03-27	2024-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-03-27	2024-03-26
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2023-04-12	2024-04-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2023-04-12	2024-04-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2023-03-19	2025-03-18
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-19	2025-03-18
SEMT-1042	Horn Antenna	ETS	3117	00086197	2023-03-19	2025-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2023-03-27	2024-03-26
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2023-03-27	2024-03-26
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2023-03-27	2024-03-26
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2023-03-27	2024-03-26
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2023-03-19	2025-03-18
SEMT-1096	Power Sensor	Agilent	U2021XA	MY54250019	2023-03-27	2024-03-26
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/

SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/

Software List			
Description	**Manufacturer**	**Model**	**Version**
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing

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)	DTS 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. Antenna Requirement

3.1 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.

3.2 Evaluation Information

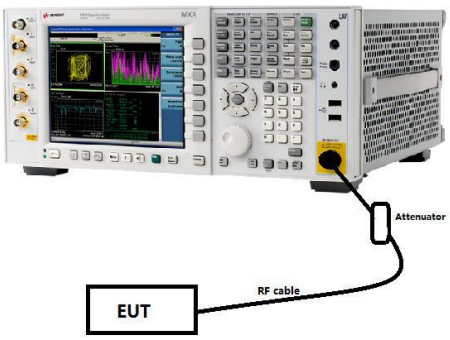
This product has a chip antenna, fulfill the requirement of this section.

4. Power Spectral Density

4.1 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.

4.2 Test Setup Block Diagram



4.3 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.4 and ANSI C63.10-2013 Subclause 11.10.2, 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 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 × 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.

4.4 Summary of Test Results/Plots

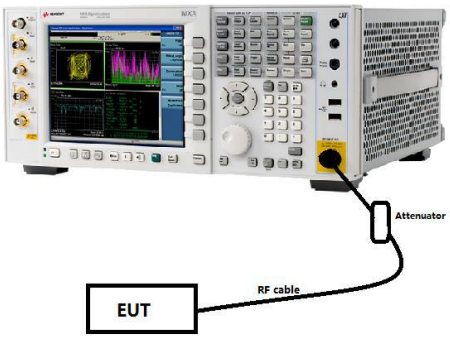
Please refer to Appendix A

5. DTS Bandwidth

5.1 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.

5.2 Test Setup Block Diagram



5.3 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.2 and ANSI C63.10-2013 Subclause 11.8.1, the test method of DTS Bandwidth as below:

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × 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.

5.3 Summary of Test Results/Plots

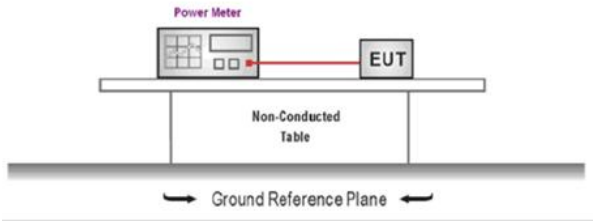
Please refer to Appendix B

6. RF Output Power

6.1 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.

6.2 Test Setup Block Diagram



6.3 Test Procedure

According to the KDB-558074 D01 v05r02 Subclause 8.3.1.1 and ANSI C63.10-2013 Subclause 11.9.1.1, this procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

a)The maximum peak conducted output power may be measured using a broadband peak RF power meter.
b)The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
c)Record the measurement data.

6.4 Summary of Test Results/Plots

Please refer to Appendix C

7. Field Strength of Spurious Emissions

7.1 Standard Applicable

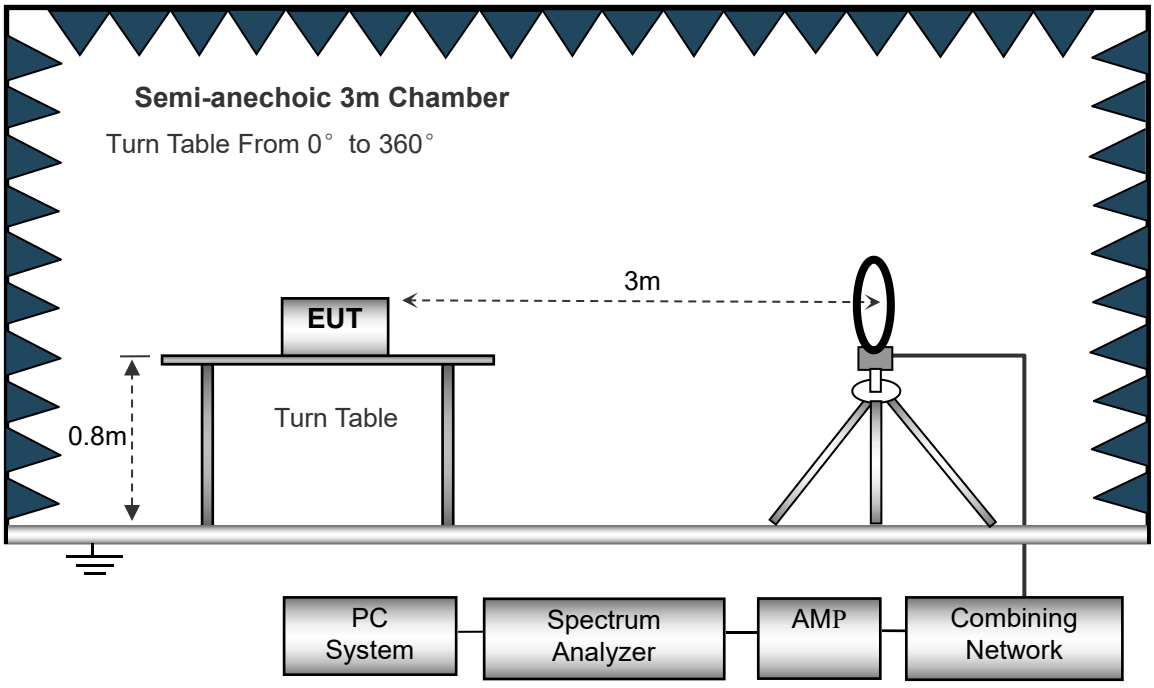
According to §15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the 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 30dB instead of 20dB. 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.

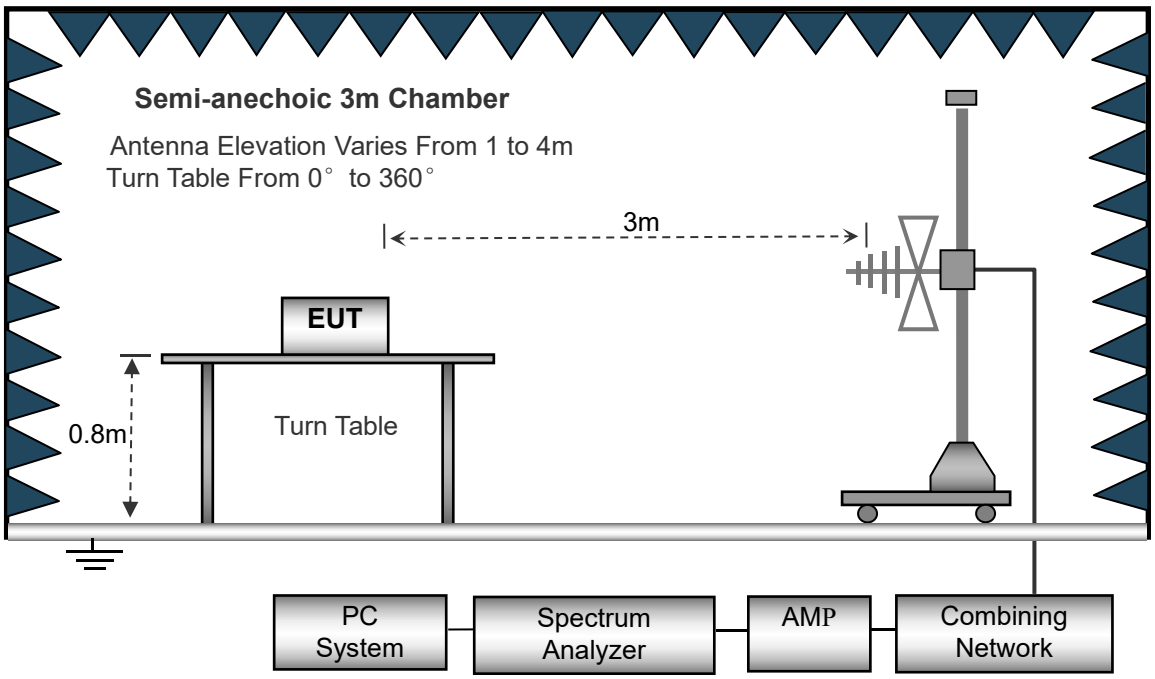
7.2 Test Procedure

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 40cm long in the middle.
The spacing between the peripherals was 10cm.

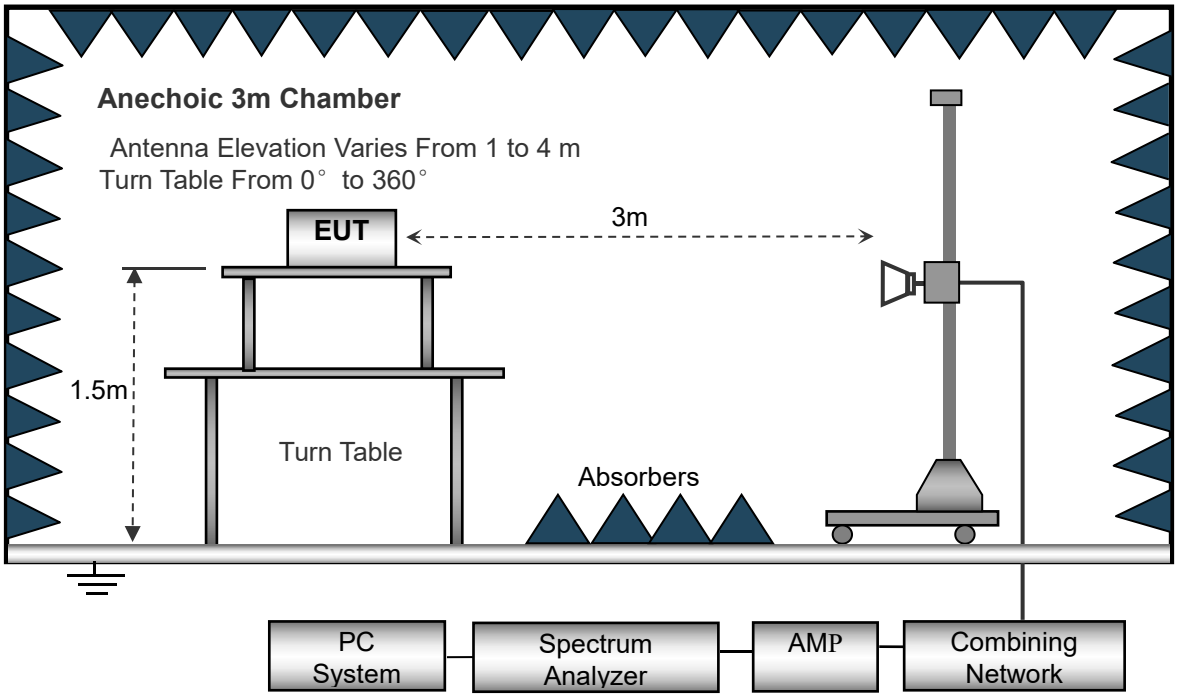
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1GHz.



Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

7.3 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:

Result = Indicated Reading + Correct

Correct =Ant. Factor + Cable Loss – Ampl. Gain

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

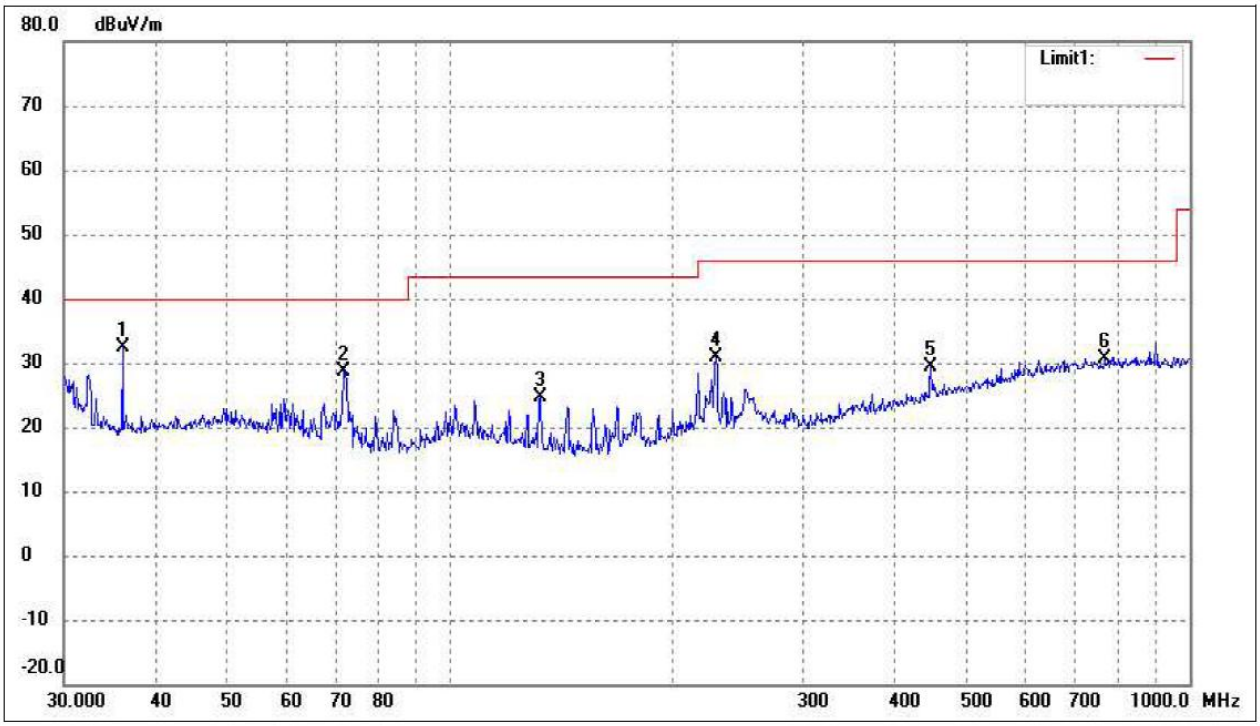
Margin = Result – FCC Part 15 Limit

7.4 Summary of Test Results/Plots

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

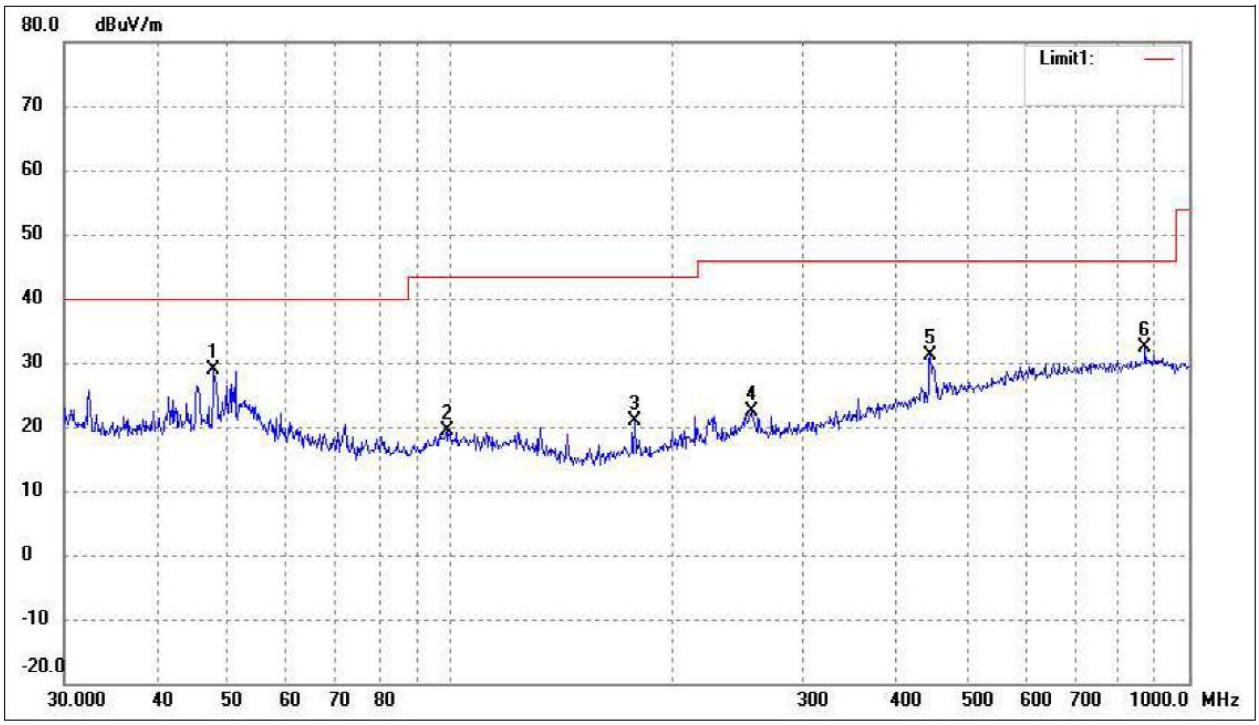
➢ Spurious Emissions Below 1GHz

Test Channel	Low(worst case)	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	36.0007	39.70	-7.31	32.39	40.00	-7.61	-	-	peak
2	71.8320	38.29	-9.65	28.64	40.00	-11.36	-	-	peak
3	132.2206	35.64	-11.12	24.52	43.50	-18.98	-	-	peak
4	228.4904	39.37	-8.51	30.86	46.00	-15.14	-	-	peak
5	446.4141	31.85	-2.43	29.42	46.00	-16.58	-	-	peak
6	768.7481	28.48	2.04	30.52	46.00	-15.48	-	-	peak

Test Channel	Low(worst case)	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	47.8260	35.12	-6.32	28.80	40.00	-11.20	-	-	peak
2	98.8326	27.84	-8.37	19.47	43.50	-24.03	-	-	peak
3	177.5092	31.83	-10.94	20.89	43.50	-22.61	-	-	peak
4	255.6231	30.20	-7.79	22.41	46.00	-23.59	-	-	peak
5	446.4141	33.63	-2.43	31.20	46.00	-14.80	-	-	peak
6	872.1832	29.61	2.72	32.33	46.00	-13.67	-	-	peak

➢ Spurious Emissions Above 1GHz

Frequency (MHz)	Reading (dBuV)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2402MHz							
4804	59.58	-3.59	55.99	74	-18.01	H	PK
4804	40.08	-3.59	36.49	54	-17.51	H	AV
7206	60.74	-0.52	60.22	74	-13.78	H	PK
7206	38.14	-0.52	37.62	54	-16.38	H	AV
4804	60.3	-3.59	56.71	74	-17.29	V	PK
4804	38.3	-3.59	34.71	54	-19.29	V	AV
7206	58.45	-0.52	57.93	74	-16.07	V	PK
7206	40.41	-0.52	39.89	54	-14.11	V	AV
Middle Channel-2440MHz							
4880	60.04	-3.49	56.55	74	-17.45	H	PK
4880	39.72	-3.49	36.23	54	-17.77	H	AV
7320	59.85	-0.47	59.38	74	-14.62	H	PK
7320	39.13	-0.47	38.66	54	-15.34	H	AV
4880	60.59	-3.49	57.1	74	-16.9	V	PK
4880	39.04	-3.49	35.55	54	-18.45	V	AV
7320	61.03	-0.47	60.56	74	-13.44	V	PK
7320	41.19	-0.47	40.72	54	-13.28	V	AV
High Channel-2480MHz							
4960	60.26	-3.41	56.85	74	-17.15	H	PK
4960	39.33	-3.41	35.92	54	-18.08	H	AV
7440	57.84	-0.42	57.42	74	-16.58	H	PK
7440	38.11	-0.42	37.69	54	-16.31	H	AV
4960	61	-3.41	57.59	74	-16.41	V	PK
4960	39.67	-3.41	36.26	54	-17.74	V	AV
7440	59.82	-0.42	59.4	74	-14.6	V	PK
7440	37.75	-0.42	37.33	54	-16.67	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. Out of Band 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).

8.2 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.4 and ANSI C63.10-2013 Subclause 11.11, the Emissions in nonrestricted frequency bands test method as follows:

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ [3 × RBW].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

According to the KDB 558074 D01 v05r02 Subclause 8.5 and ANSI C63.10-2013 Subclause 11.12, the Emissions in restricted frequency bands test method as follows:

A. Radiated emission measurements:
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.

B. Antenna-port conducted measurements

Peak emission levels are measured by setting the instrument as follows:

a) RBW = as specified in Table 9/

b) VBW ≥ [3 × RBW].

c) Detector = peak.

d) Sweep time = auto.

e) Trace mode = max hold.

f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be lengthened for low-duty-cycle applications.)

Table 9—RBW as a function of frequency

Frequency	RBW
9 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1000 MHz	100 kHz to 120 kHz
>1000 MHz	1 MHz

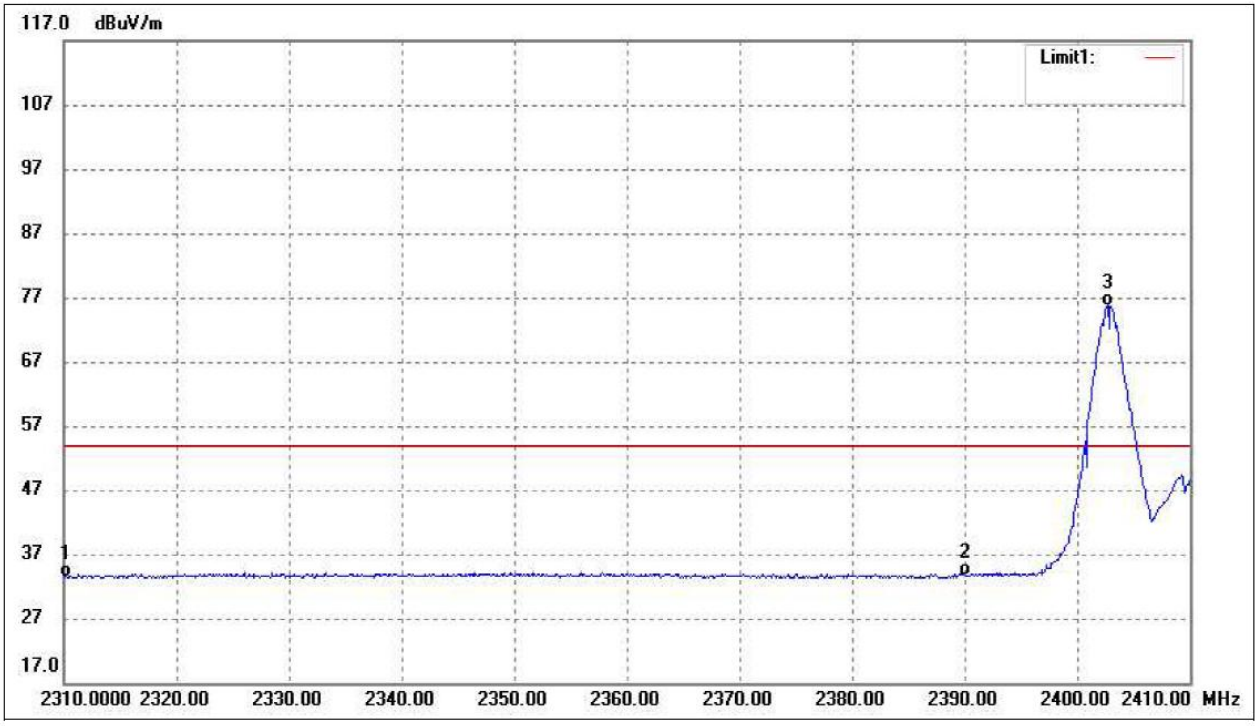
If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

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.

8.3 Summary of Test Results/Plots

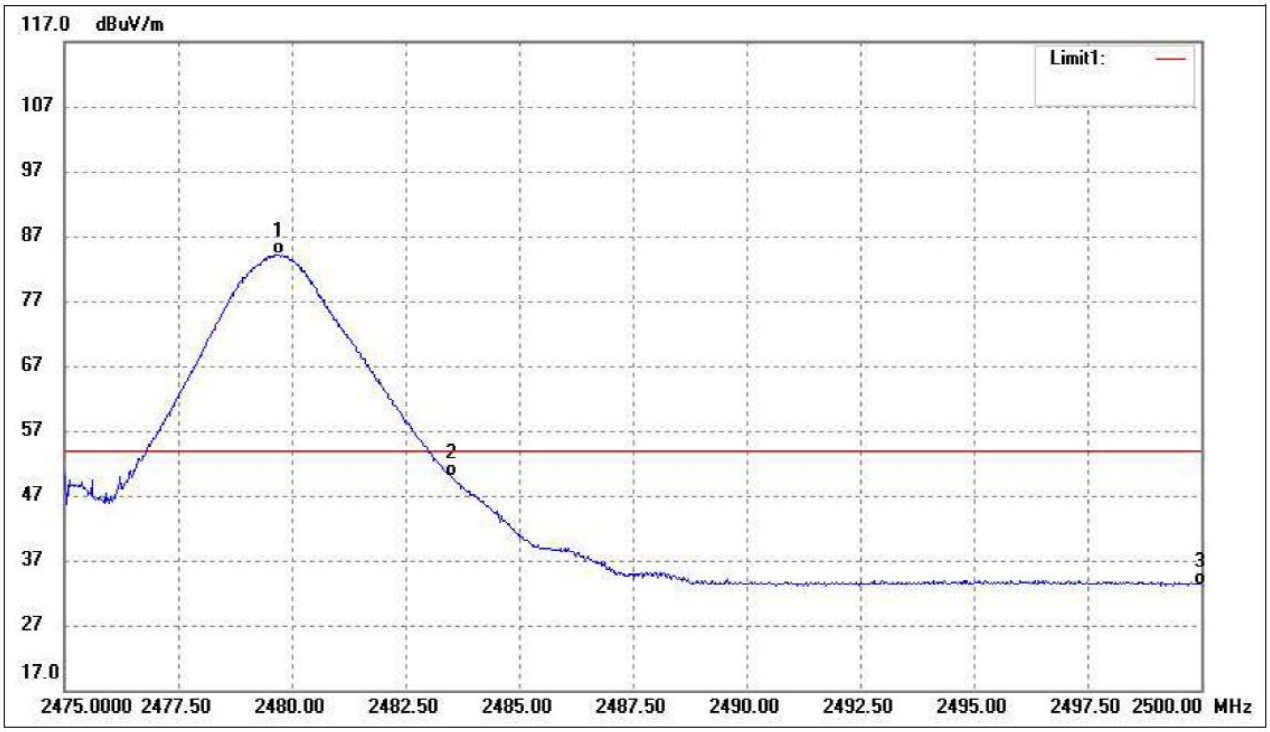
➢ Radiated test

Test Channel	Low	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	42.17	-8.78	33.39	54.00	-20.61	Ave Detector
	2310.000	55.40	-8.78	46.62	74.00	-27.38	Peak Detector
2	2390.000	42.02	-8.48	33.54	54.00	-20.46	Ave Detector
	2390.000	71.21	-8.48	62.73	74.00	-11.27	Peak Detector
3	2402.700	84.19	-8.44	75.75	/	/	Ave Detector
	2403.400	107.55	-8.44	99.11	/	/	Peak Detector

Test Channel	High	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2479.725	92.34	-8.15	84.19	/	/	Ave Detector
	2479.375	100.35	-8.15	92.20	/	/	Peak Detector
2	2483.500	57.92	-8.14	49.78	54.00	-4.22	Ave Detector
	2483.500	77.68	-8.14	69.54	74.00	-4.46	Peak Detector
3	2500.000	41.23	-8.08	33.15	54.00	-20.85	Ave Detector
	2500.000	61.56	-8.08	53.48	74.00	-20.52	Peak Detector

- Conducted test

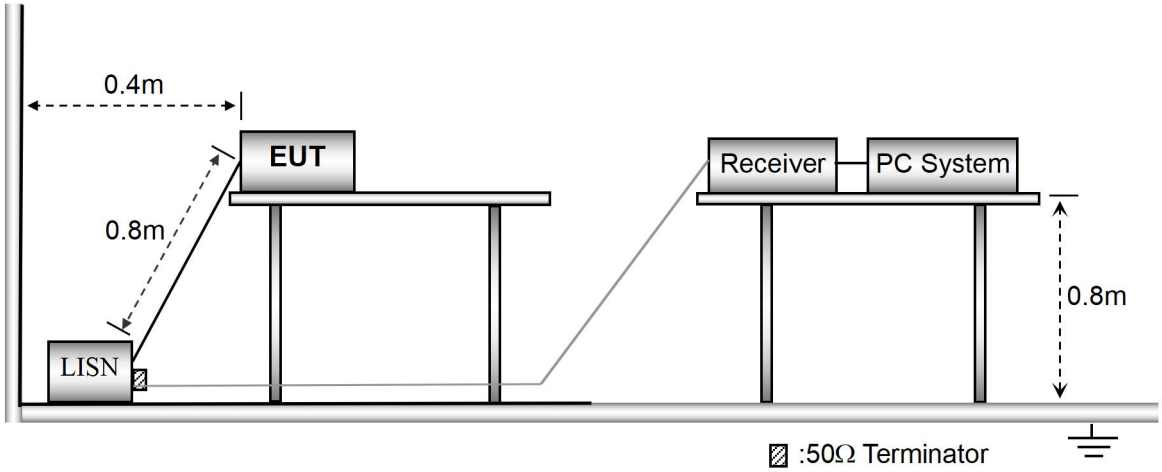
Please refer to Appendix D and E

9. Conducted Emissions

9.1 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.

9.2 Basic Test Setup Block Diagram



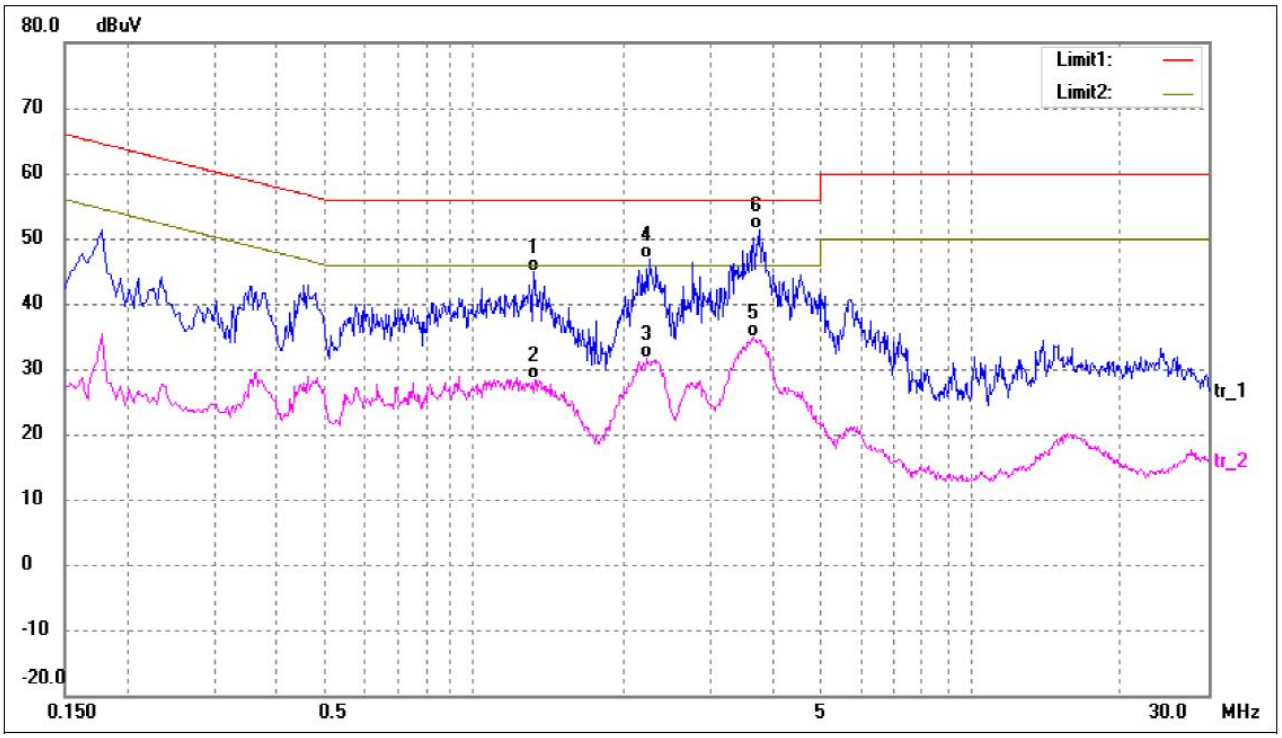
9.3 Test Receiver Setup

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

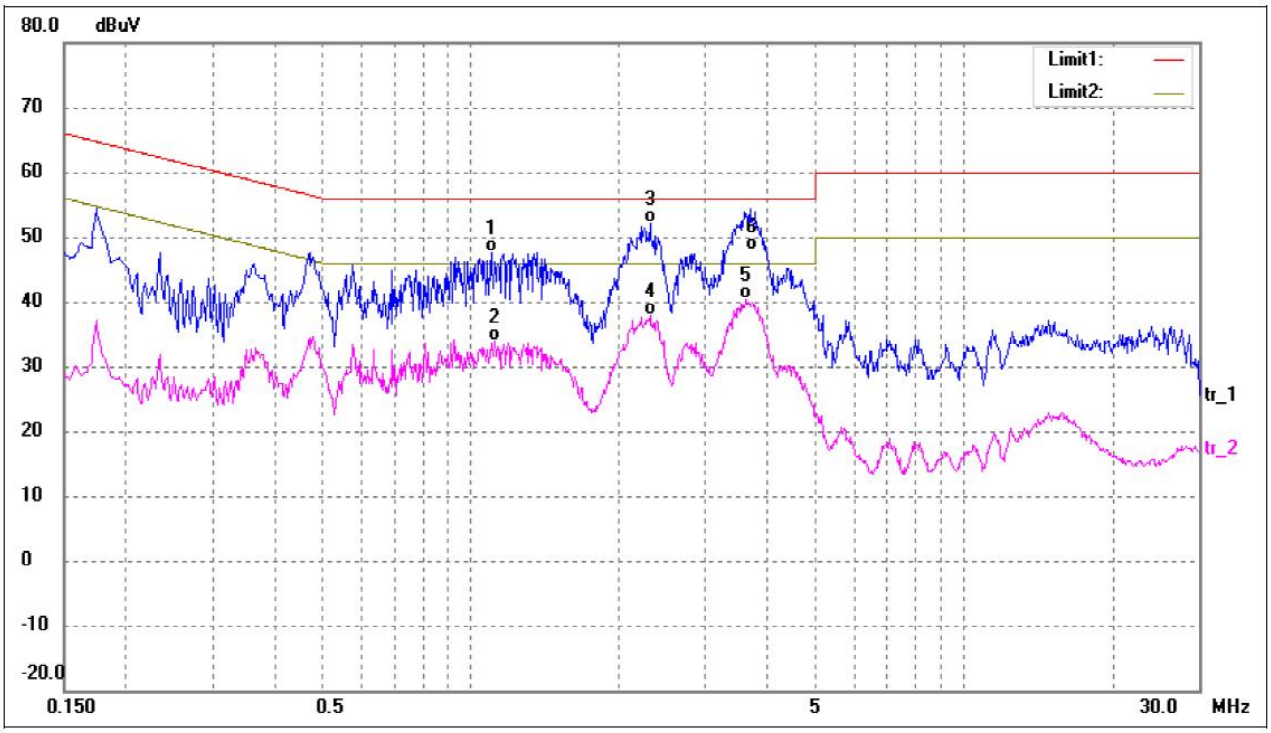
9.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.3220	34.61	10.22	44.83	56.00	-11.17	QP
2	1.3300	18.18	10.22	28.40	46.00	-17.60	AVG
3	2.2300	21.35	10.29	31.64	46.00	-14.36	AVG
4	2.2540	36.48	10.30	46.78	56.00	-9.22	QP
5	3.6420	24.53	10.25	34.78	46.00	-11.22	AVG
6*	3.7420	41.11	10.25	51.36	56.00	-4.64	QP

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.1019	37.40	10.21	47.61	56.00	-8.39	QP
2	1.1180	23.62	10.21	33.83	46.00	-12.17	AVG
3*	2.3100	41.73	10.29	52.02	56.00	-3.98	QP
4	2.3100	27.59	10.29	37.88	46.00	-8.12	AVG
5	3.6300	30.12	10.25	40.37	46.00	-5.63	AVG
6	3.6820	37.67	10.25	47.92	56.00	-8.08	QP

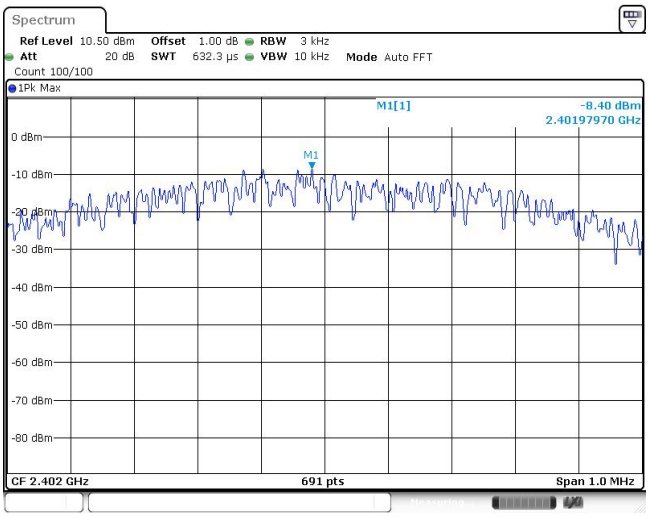
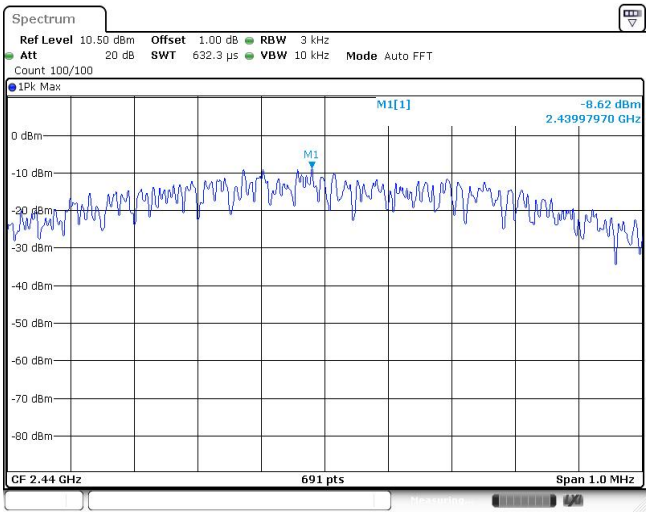
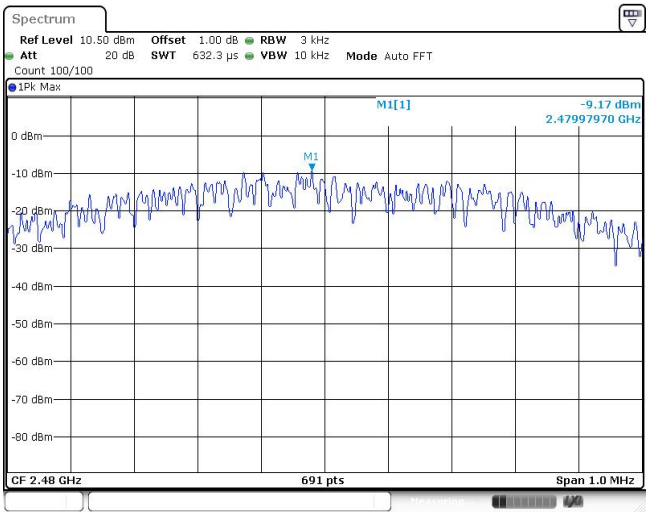
APPENDIX SUMMARY

Project No.	WTX23X03058241W001	Test Engineer	Tom Wang
Start date	2023/06/02	Finish date	2023/06/10
Temperature	24.3℃	Humidity	45%
RF specifications	BT-BLE		

APPENDIX	Description of Test Item	Result
A	Power Spectral Density	Compliant
B	DTS Bandwidth	Compliant
C	RF Output Power	Compliant
D	Conducted Out of Band Emissions and	Compliant
E	Conducted Sprious Emissions	Compliant

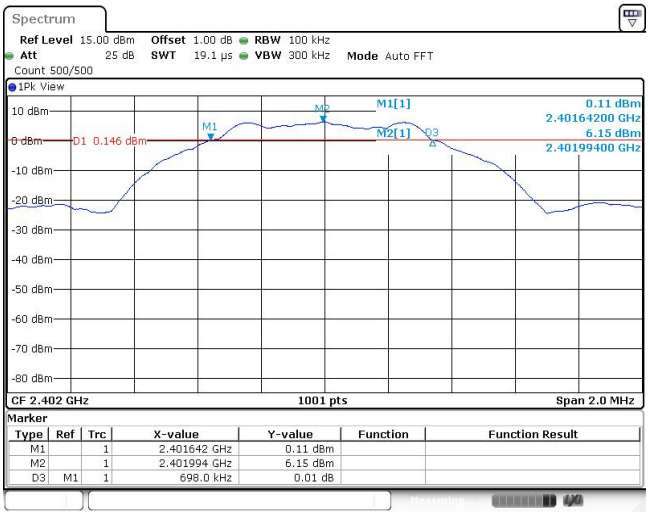
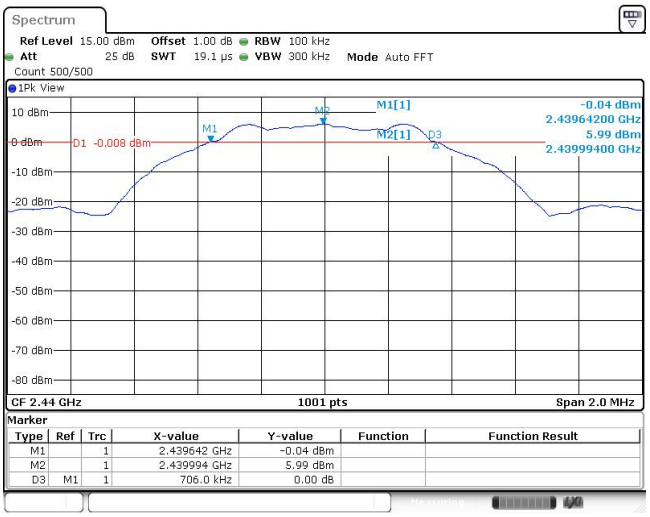
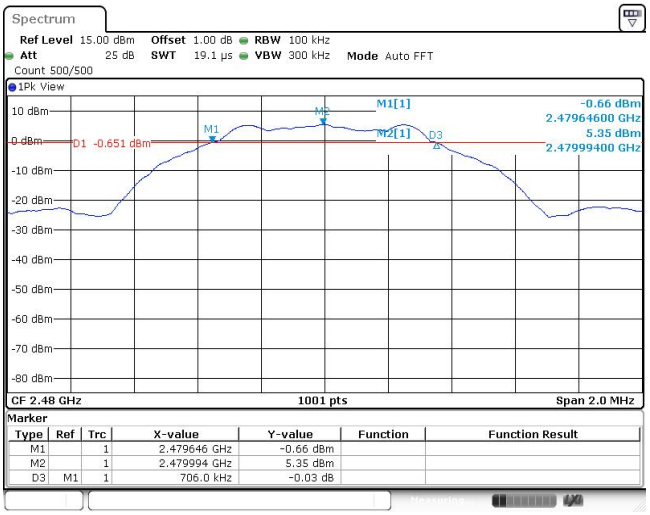
APPENDIX A

Power Spectral Density			
Test Mode	Test Channel	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
GFSK(BLE)	Low	-8.40	8
	Middle	-8.62	8
	High	-9.17	8

Low	
Middle	
High	

APPENDIX B

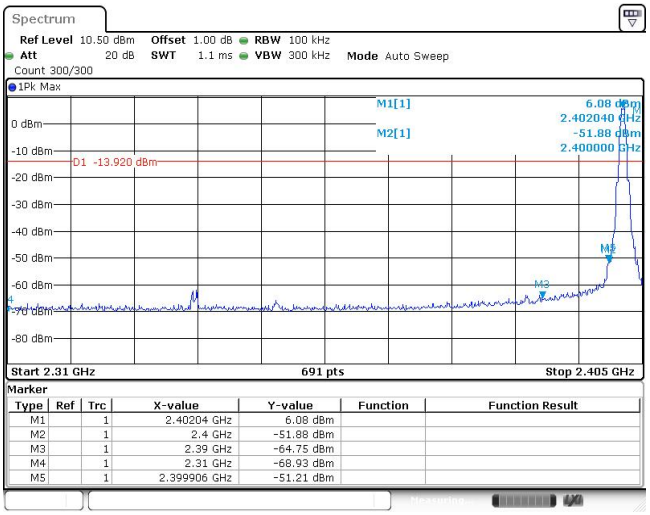
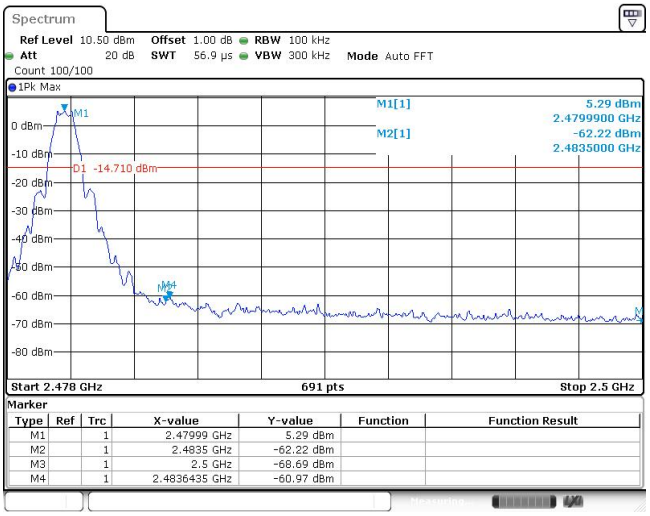
DTS Bandwidth			
Test Mode	Test Channel	6 dB Bandwidth kHz	Limit kHz
GFSK(BLE)	Low	0.70	≥500
	Middle	0.71	≥500
	High	0.71	≥500

Low	
Middle	
High	

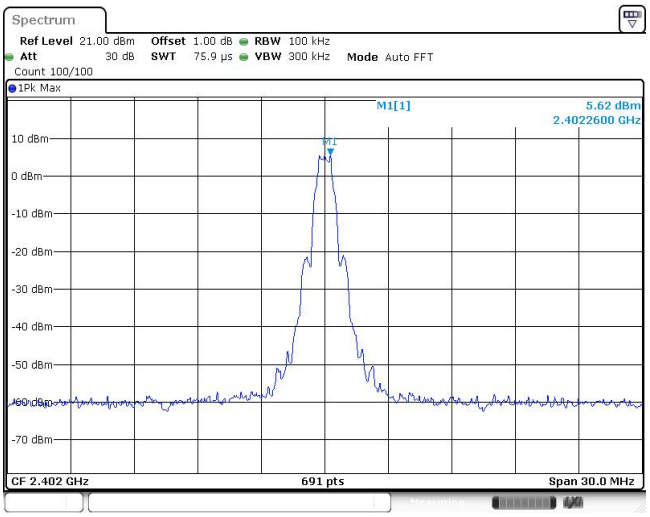
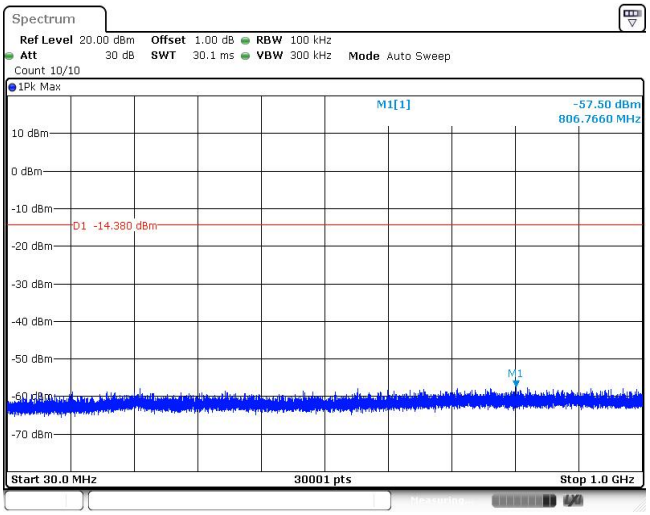
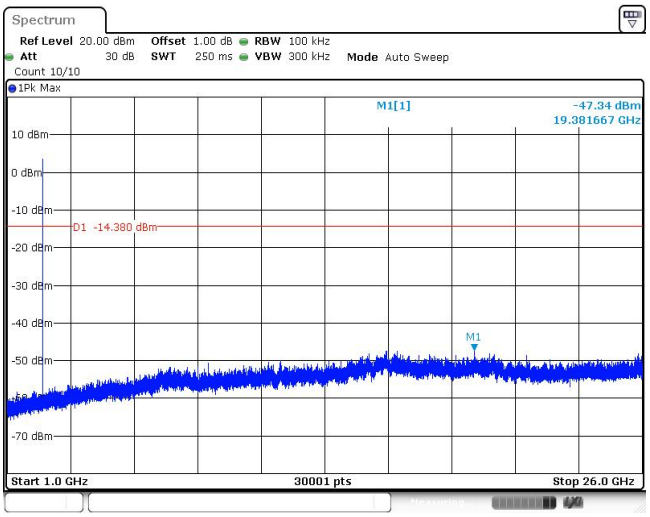
APPENDIX C

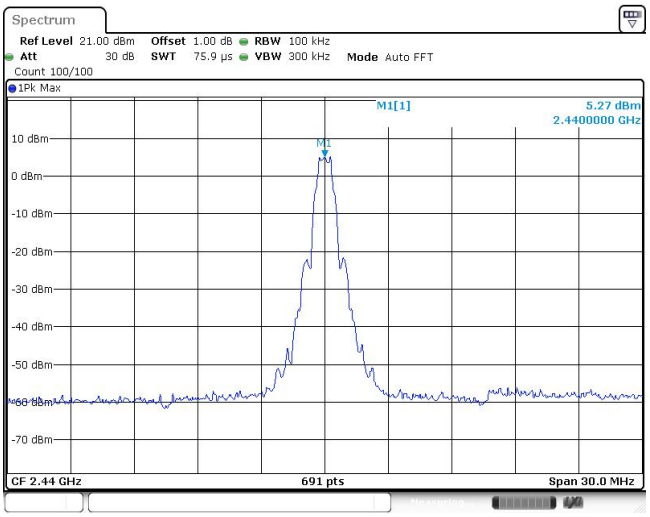
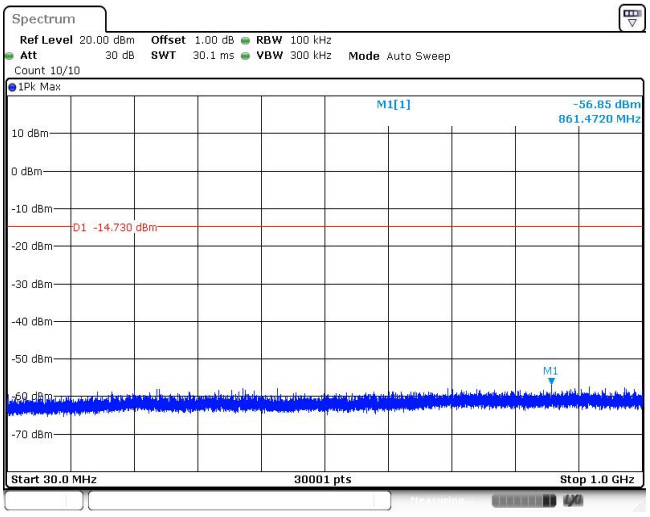
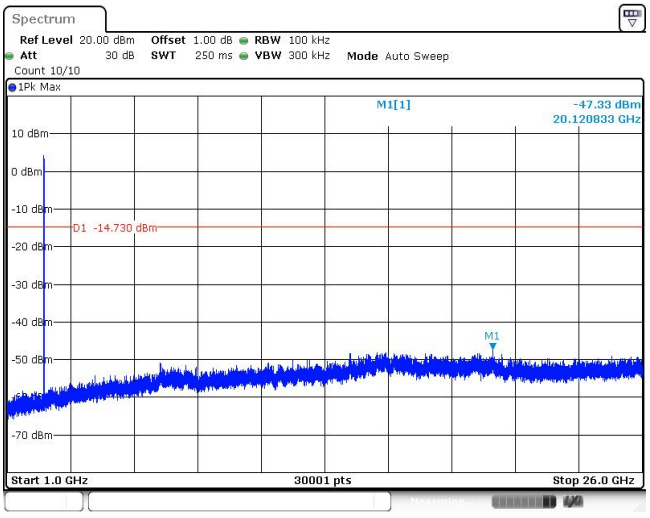
RF Output Power			
Test Mode	Test Channel	Reading dBm	Limit dBm
GFSK(BLE)	Low	6.86	30
	Middle	6.67	30
	High	6.03	30

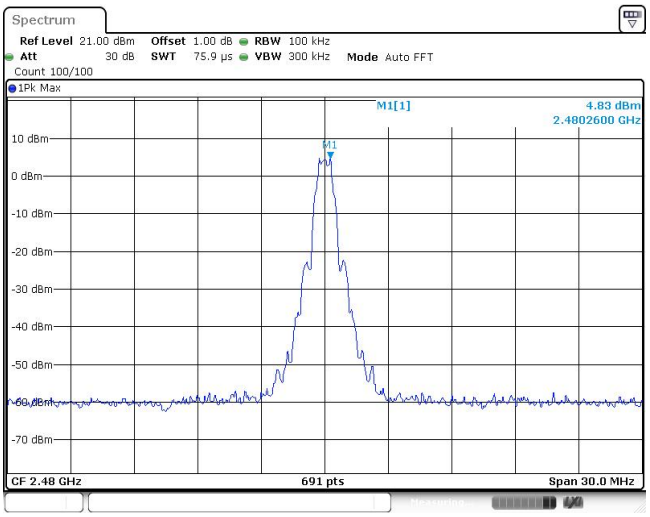
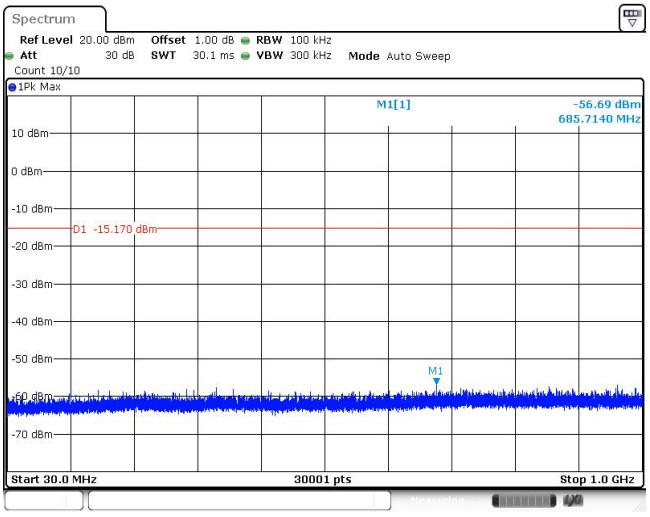
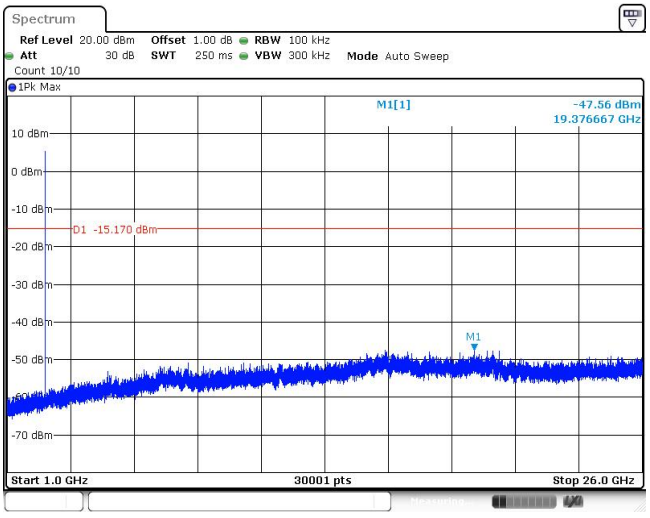
APPENDIX D

Low	
High	

APPENDIX E

Low	
	
	

Middle	 Spectrum Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] 5.27 dBm 2.4400000 GHz CF 2.44 GHz 691 pts Span 30.0 MHz
	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -56.85 dBm 861.4720 MHz D1 -14.730 dBm Start 30.0 MHz 30001 pts Stop 1.0 GHz
	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -47.33 dBm 20.120833 GHz D1 -14.730 dBm Start 1.0 GHz 30001 pts Stop 26.0 GHz

High	 Spectrum Ref Level 21.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 75.9 µs VBW 300 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] 4.83 dBm 2.4802600 GHz 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -70 dBm CF 2.48 GHz 691 pts Span 30.0 MHz
	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -56.69 dBm 685.7140 MHz 10 dBm 0 dBm -10 dBm D1 -15.170 dBm -20 dBm -30 dBm -40 dBm -50 dBm -70 dBm Start 30.0 MHz 30001 pts Stop 1.0 GHz
	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 1Pk Max M1[1] -47.56 dBm 19.376667 GHz 10 dBm 0 dBm -10 dBm D1 -15.170 dBm -20 dBm -30 dBm -40 dBm -50 dBm -70 dBm Start 1.0 GHz 30001 pts Stop 26.0 GHz

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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