

TEST REPORT

Reference No..... : WTX22X12263848W001
FCC ID : 2BBHA-SLEEPER
Applicant : Projects Gaming PTE LTD
Address..... : Unit B, 14/F, Magnet Place Tower 2, No. 38-42 Kwai Fung Crescent, Kwai
Chung, HongKong, China
Manufacturer : Dongguan Dianxuntong Electronic Technology Co., Ltd.
Address..... : Third floor, building A, no. 1, wendestreet, xianbian village, chang 'an town,
dongguan city
Product Name : SLEEPER
Model No..... : SLEEPER
Standards : FCC Part 15.249
Date of Receipt sample : 2022-12-29
Date of Test..... : 2022-12-29 to 2023-04-23
Date of Issue : 2023-04-23
Test Report Form No. : WTX_Part 15_249W
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 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

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Email: sem@waltek.com.cn

Tested by:



Gala Wang

Approved 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	7
1.7 TEST EQUIPMENT LIST AND DETAILS	8
2. SUMMARY OF TEST RESULTS.....	13
3. ANTENNA REQUIREMENTS	14
3.1 STANDARD APPLICABLE	14
3.2 TEST RESULT.....	14
4. RADIATED EMISSIONS	15
4.1 STANDARD APPLICABLE	15
4.2 TEST PROCEDURE	15
4.3 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	18
4.4 SUMMARY OF TEST RESULTS/PLOTS.....	18
5. OUT OF BAND EMISSIONS	22
5.1 STANDARD APPLICABLE	22
5.2 TEST PROCEDURE	22
5.3 SUMMARY OF TEST RESULTS/PLOTS.....	22
6. EMISSION BANDWIDTH.....	27
6.1 STANDARD APPLICABLE	27
6.2 TEST PROCEDURE	27
6.3 SUMMARY OF TEST RESULTS/PLOTS.....	27
7. CONDUCTED EMISSIONS	29
7.1 TEST PROCEDURE	29
7.2 BASIC TEST SETUP BLOCK DIAGRAM	29
7.3 TEST RECEIVER SETUP	29
7.4 SUMMARY OF TEST RESULTS/PLOTS.....	29
APPENDIX PHOTOGRAPHS.....	32

Report version

Version No.	Date of issue	Description
Rev.00	2023-04-23	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	SLEEPER
Trade Name:	Projects Gaming
Model No.:	SLEEPER
Adding Model(s):	
Rated Voltage:	DC 3.7V
Battery Capacity	300mAh
Power Adapter Model:	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	2405-2475MHz
Max. Field Strength:	80.94dBuV/m
Modulation:	GFSK
Quantity of Channels:	16
Channel Separation:	/
Antenna Type:	Ceramic Antenna
Antenna Gain:	2.06dBi
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i>	

➤ **Channel List:**

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	9	2414
2	2463	10	2471
3	2441	11	2459
4	2426	12	2436
5	2408	13	2419
6	2466	14	2475
7	2445	15	2453
8	2422	16	2439

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902-928MHz, 2400-2483.5MHz, 5725-5875MHz, and 24.0-24.25GHz.

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 results 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, 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 maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

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	Low Channel	2405MHz
TM2	Middle Channel	2441MHz
TM3	High Channel	2475MHz

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
USB Cable	0.5	Unshielded	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
Notebook	Lenovo	TianYi 100-14IBD	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	9-150kHz $\pm 3.74\text{dB}$
		0.15-30MHz $\pm 3.34\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-26GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

2022

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-22	2023-03-21
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2022-03-22	2023-03-21
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2022-03-25	2023-03-24
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2022-03-22	2023-03-21
SMET-1313	Spectrum Analyzer	Agilent	N9020A	MY54320548	2022-03-22	2023-03-21
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2022-03-22	2023-03-21
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2022-03-22	2023-03-21
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2022-03-22	2023-03-21
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2022-03-22	2023-03-21
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	/	/	/
☒ Chamber A: Below 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
SEMT-1008	Amplifier	HP	8447F	2805A03475	2022-01-07	2023-01-06
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19
☒ Chamber A: Above 1GHz						
SEMT-1031	Spectrum	Rohde &	FSP30	836079/03	2022-03-22	2023-03-21

	Analyzer	Schwarz		5		
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2022-03-22	2023-03-21
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26
SEMT-1216	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2022-03-25	2023-03-24
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-22	2023-03-21
☐ Chamber B:Below 1GHz						
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2022-03-22	2023-03-21
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-22	2023-03-21
☐ Chamber C:Below 1GHz						
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-12-30	2023-12-29
SEMT-1343	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
SEMT-1333	Amplifier	HP	8447F	2944A03869	2022-03-22	2023-03-21
☒ Conducted Room 1#						
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2022-03-21	2023-03-20
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2022-03-25	2023-03-24
SEMT-1003	AC LISN	Schwarz beck	NSLK8126	8126-224	2022-03-22	2023-03-21
☐ Conducted Room 2#						
SEMT-1334	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2022-03-22	2023-03-21
SEMT-1336	LISN	Rohde & Schwarz	ENV 216	100097	2022-03-22	2023-03-21

2023

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041 A1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2023-02-25	2024-02-24
WTXE1022 A1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2023-02-25	2024-02-24
WTXE1005 A1005	Spectrum Analyzer	Agilent	N9020A	US471401 02	2023-02-25	2024-02-24
WTXE1084 A1001	Spectrum Analyzer	Agilent	N9020A	MY543205 48	2023-02-25	2024-02-24
WTXE1044 A1001	Signal Generator	Agilent	83752A	3610A014 53	2023-02-25	2024-02-24
WTXE1045 A1001	Vector Signal Generator	Agilent	N5182A	MY470702 02	2023-02-25	2024-02-24
WTXE1018 A1001	Power Divider	Weinschel	1506A	PM204	2023-02-25	2024-02-24
WTXE1045 A1001	Power Divider	RF-Lambda	RFLT4W5M18 G	14110400 027	2023-02-25	2024-02-24
WTXE1051 A1001	Power Sensor	Agilent	U2021XA	MY551600 07	2023-02-25	2024-02-24
WTXE1051 A1002	Power Sensor	Agilent	U2021XA	MY552100 26	2023-02-25	2024-02-24
☒ Chamber A: Below 1GHz						
WTXE1005 A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2023-02-25	2024-02-24
WTXE1007 A1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/00 5	2023-02-25	2024-02-24
WTXE1007 A1001	Amplifier	HP	8447F	2805A034 75	2023-02-25	2024-02-24
WTXE1010 A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1010 A1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☒ Chamber A: Above 1GHz						
WTXE1005 A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/03 5	2023-02-25	2024-02-24
WTXE1007 A1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/00 5	2023-02-25	2024-02-24
WTXE1065 A1001	Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
WTXE1010	Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18

A1005						
WTXE1010 A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
WTXE1003 A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
WTXE1004 A1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2023-02-25	2024-02-24
☐ Chamber B:Below 1GHz						
WTXE1010 A1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
WTXE1038 A1001	Amplifier	Agilent	8447D	2944A101 79	2023-02-25	2024-02-24
WTXE1001 A1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
☐ Chamber C:Below 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1010 A1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
WTXE1007 A1002	Amplifier	HP	8447F	2944A038 69	2023-02-25	2024-02-24
☐ Chamber C: Above 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1103 A1005	Horn Antenna	POAM	RTF-11A	LP228060 221	2023-03-10	2026-03-09
WTXE1103 A1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2023-02-25	2024-02-24
☒ Conducted Room 1#						
WTXE1001 A1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2023-02-25	2024-02-24
WTXE1002 A1001	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2023-02-25	2024-02-24
WTXE1003 A1001	AC LISN	Schwarz beck	NSLK8126	8126-224	2023-02-25	2024-02-24
☐ Conducted Room 2#						
WTXE1001 A1004	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2023-02-25	2024-02-24
WTXE1003 A1003	LISN	Rohde & Schwarz	ENV 216	100097	2023-02-25	2024-02-24

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
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.207(a)	Conducted Emission	Compliant
§15.209(a)(f)	Radiated Spurious Emissions	Compliant
§15.249(a)	Field Strength of Emissions	Compliant
§15.249(d)	Out of Band Emission	Compliant
§15.215(c)	Emission Bandwidth	Compliant

N/A: Not applicable.

3. Antenna Requirements

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 Test Result

This product has a Ceramic Antenna, fulfill the requirement of this section.

4. Radiated Emissions

4.1 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

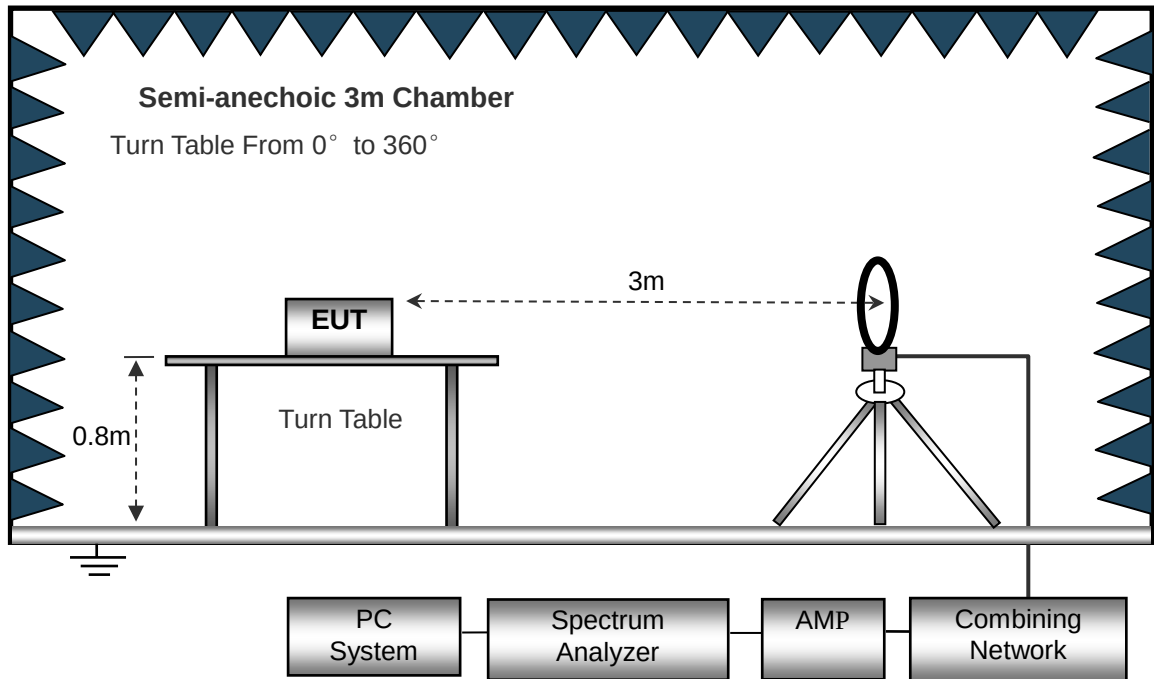
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

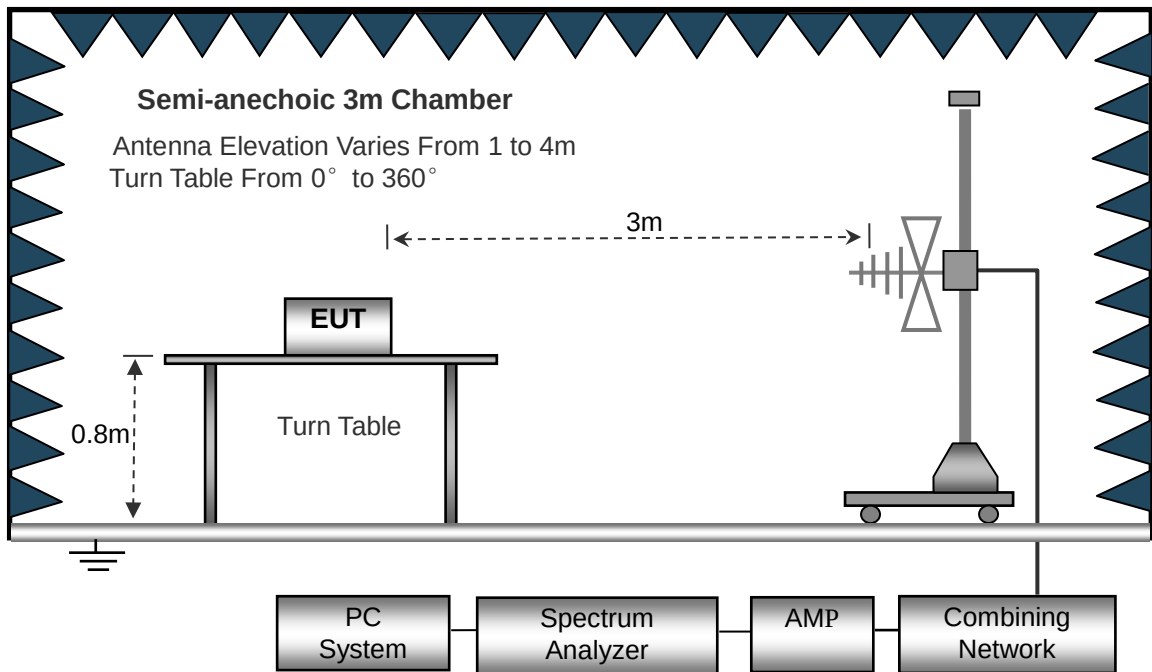
The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 Limit.

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.

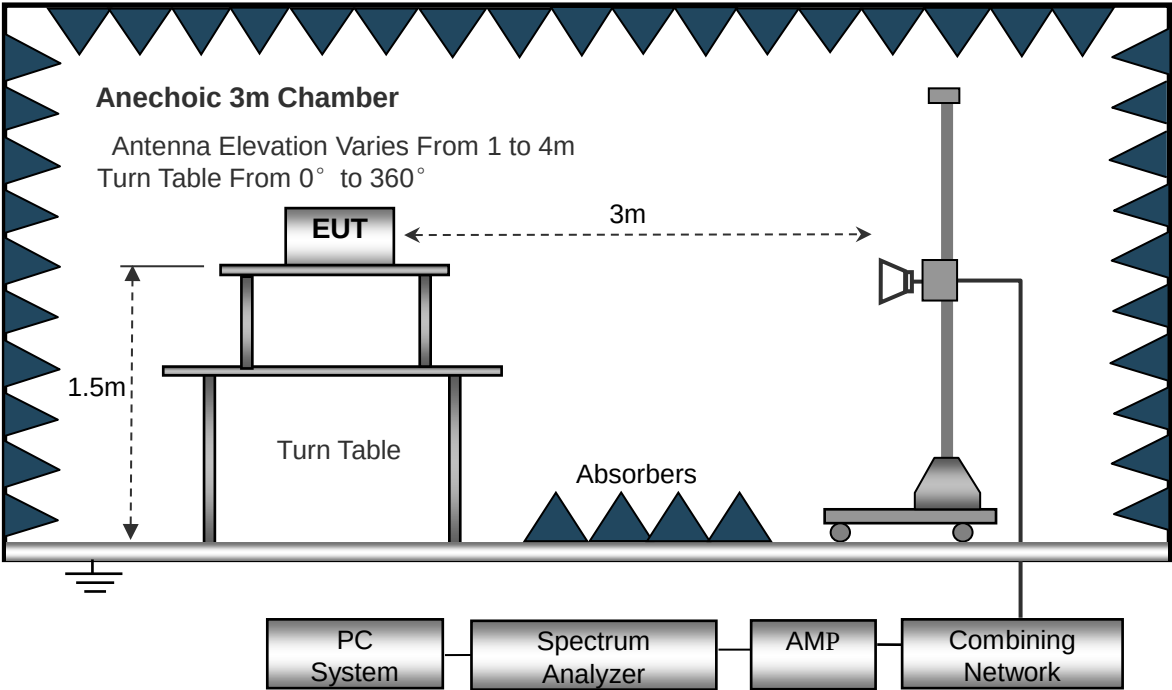
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1GHz.



Frequency :9kHz-30MHz
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

4.3 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:

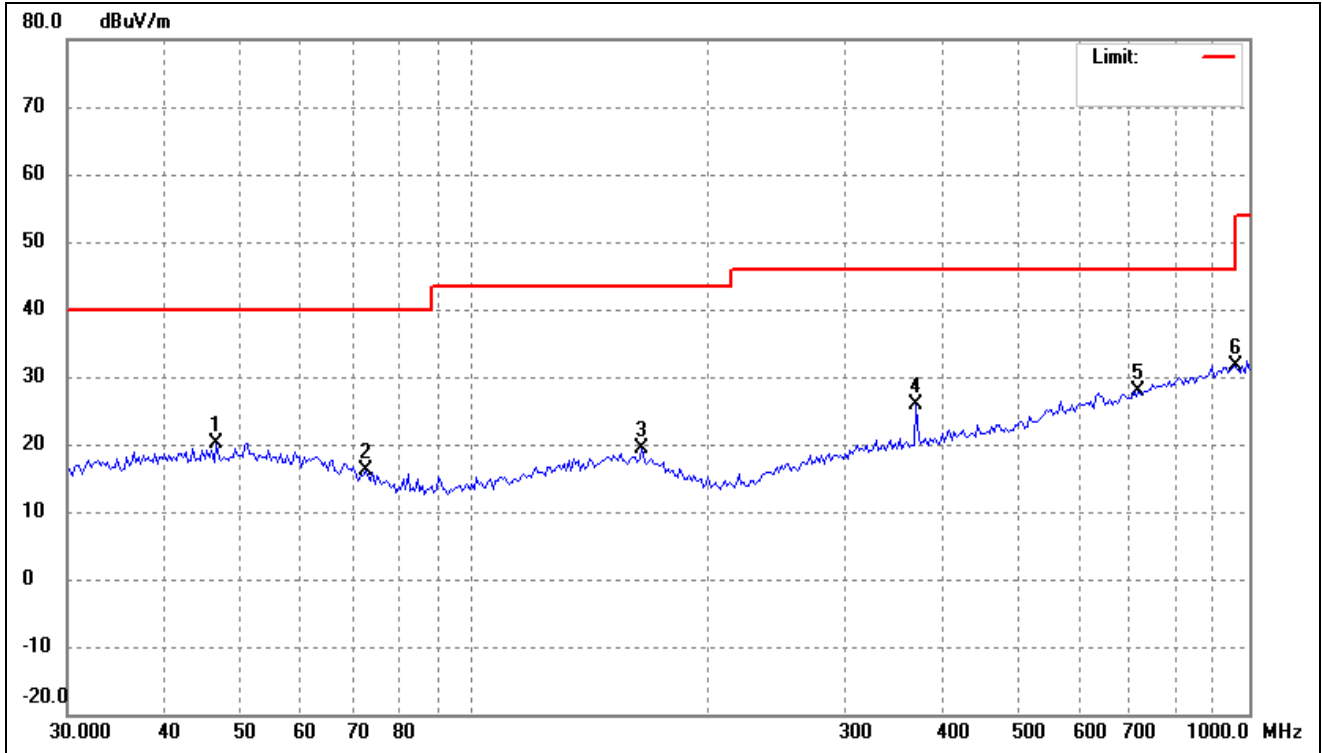
$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15C Limit}$$

4.4 Summary of Test Results/Plots

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

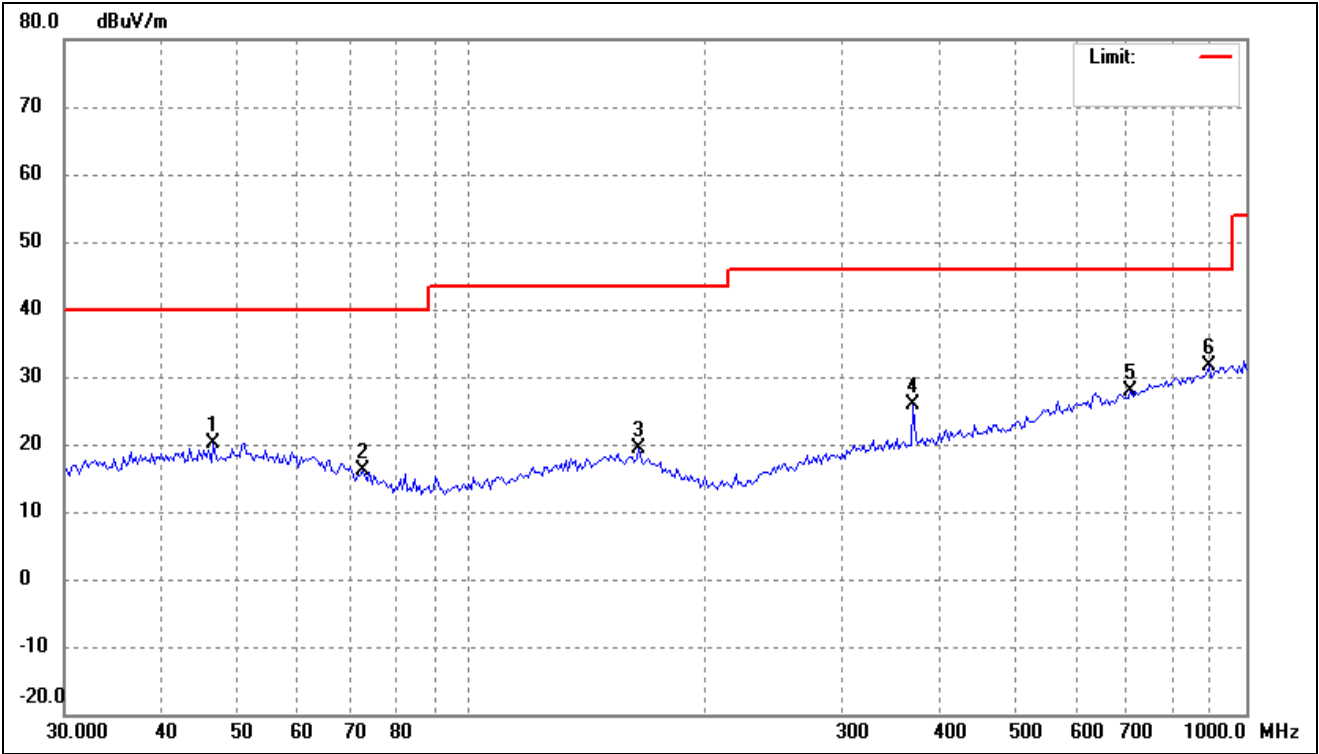
➤ Spurious Emissions Below 1GHz

Test Channel	Low(worst case)	Polarity:	Horizontal
--------------	-----------------	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	46.6664	28.50	-8.25	20.25	40.00	-19.75	-	-	peak
2	72.5916	27.69	-11.46	16.23	40.00	-23.77	-	-	peak
3	164.9075	28.43	-9.08	19.35	43.50	-24.15	-	-	peak
4	372.0045	33.17	-7.18	25.99	46.00	-20.01	-	-	peak
5	719.1995	28.61	-0.67	27.94	46.00	-18.06	-	-	peak
6	958.7943	28.49	3.18	31.67	46.00	-14.33	-	-	peak

Test Channel	Low(worst case)	Polarity:	Vertical
--------------	-----------------	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	46.6664	28.50	-8.25	20.25	40.00	-19.75	-	-	peak
2	72.5916	27.69	-11.46	16.23	40.00	-23.77	-	-	peak
3	164.9075	28.43	-9.08	19.35	43.50	-24.15	-	-	peak
4	372.0045	33.17	-7.18	25.99	46.00	-20.01	-	-	peak
5	709.1823	28.72	-0.94	27.78	46.00	-18.22	-	-	peak
6	893.8567	29.70	1.93	31.63	46.00	-14.37	-	-	peak

Remark: '-'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

Spurious Emissions Above 1GHz

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2405MHz							
2405.00	90.67	1.77	78.72	114	-25.10	H	PK
2405.00	90.20	1.77	72.88	94	-5.57	H	AV
4810.000	50.84	-2.85	47.99	74.00	-26.01	H	PK
7215.000	51.68	2.76	54.44	74.00	-19.56	H	PK
2405.00	86.03	-8.44	77.59	114	-36.41	V	PK
2405.00	85.56	-8.44	77.12	94	-16.88	V	AV
4810.498	53.70	-2.85	50.85	74.00	-23.15	V	PK
7215.000	51.32	2.76	54.08	74.00	-19.92	V	PK
Middle Channel-2441MHz							
2441.00	87.03	-8.30	78.73	114	-35.27	H	PK
2441.00	86.59	-8.30	78.29	94	-15.71	H	AV
4882.720	54.40	-2.75	51.65	74.00	-22.35	H	PK
7323.000	49.64	3.02	52.66	74.00	-21.34	H	PK
2441.00	83.72	-8.30	75.42	114	-38.58	V	PK
2441.00	82.88	-8.30	74.58	94	-19.42	V	AV
4882.720	51.60	-2.75	48.85	74.00	-25.15	V	PK
7323.000	49.57	3.02	52.59	74.00	-21.41	V	PK
High Channel-2475MHz							
2475.00	88.83	1.95	80.94	114	-27.12	H	PK
2475.00	88.80	1.95	77.39	94	-7.15	H	AV
4950.072	55.33	-2.58	52.75	74.00	-21.25	H	PK
7425.000	48.94	3.44	52.38	74.00	-21.62	H	PK
2475.00	82.80	-8.15	74.65	114	-39.35	V	PK
2475.00	78.40	-8.15	70.25	94	-23.75	V	AV
4950.072	55.06	-2.58	52.48	74.00	-21.52	V	PK
7425.000	49.12	3.44	52.56	74.00	-21.44	V	PK

*Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz..*

5. Out of Band Emissions

5.1 Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2483.5MHz, than mark the higher-level emission for comparing with the FCC rules.

5.3 Summary of Test Results/Plots

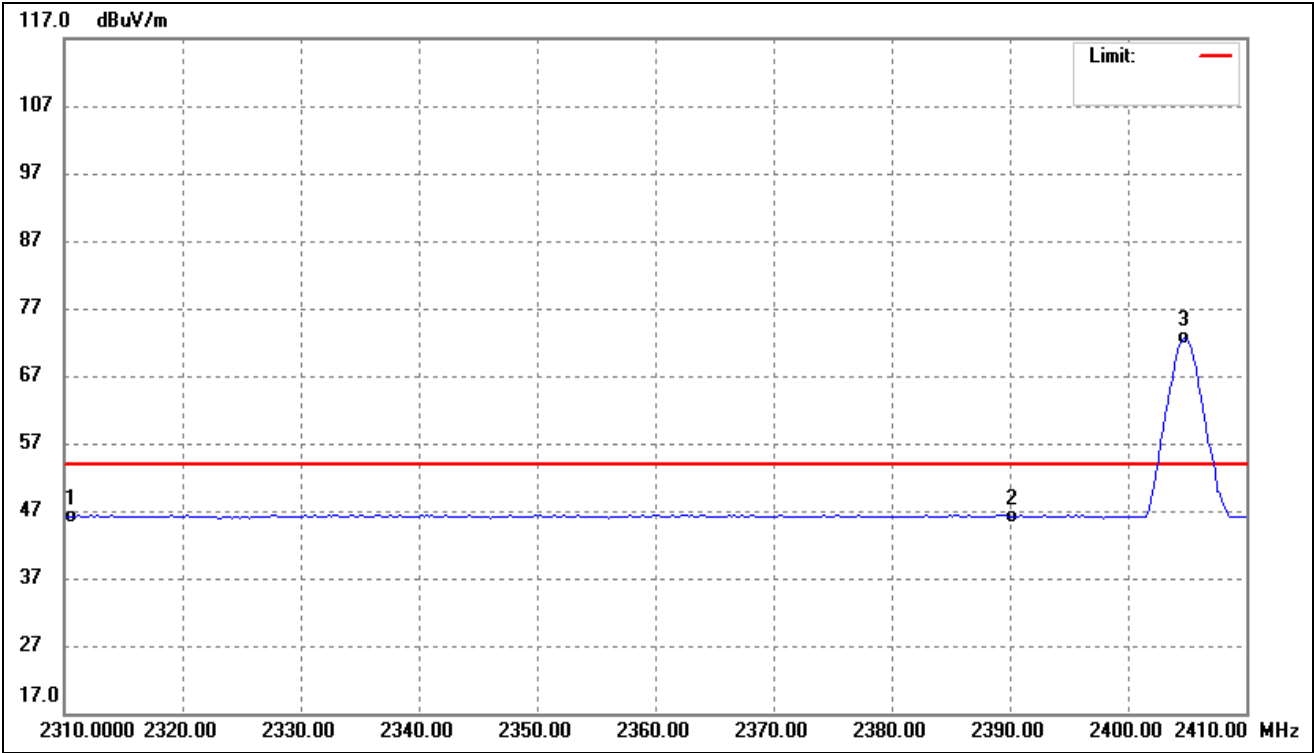
Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	2310.00	<54dBuV	Pass
	2390.00	<54dBuV	Pass
	2400.00	<54dBuV	Pass
Highest	2483.50	<54dBuV	Pass
	2500.00	<54dBuV	Pass

The edge emissions are below the FCC 15.209 Limits or complies with the 15.249 requirements.

Please refer to the test plots as below.

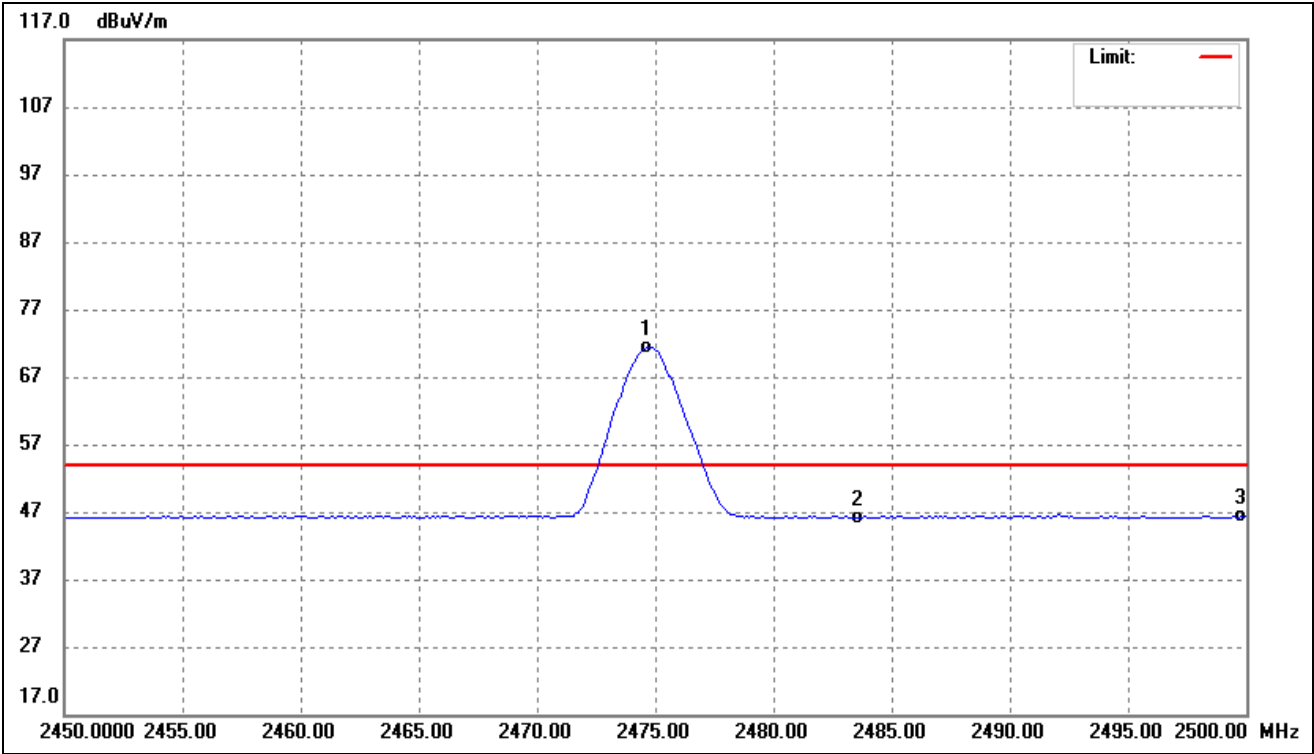
RBW: 1MHz; VBW: 3MHz

Test Channel	Low	Polarity:	Horizontal (worst case)
--------------	-----	-----------	-------------------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	44.34	1.81	46.15	54.00	-7.85	Ave Detector
	2310.000	58.02	1.81	59.83	74.00	-14.17	Peak Detector
2	2390.000	44.46	1.77	46.23	54.00	-7.77	Ave Detector
	2390.000	57.08	1.77	58.85	74.00	-15.15	Peak Detector
3	2404.790	70.77	1.77	72.54	/	/	Ave Detector
	2405.190	93.17	1.77	94.94	/	/	Peak Detector

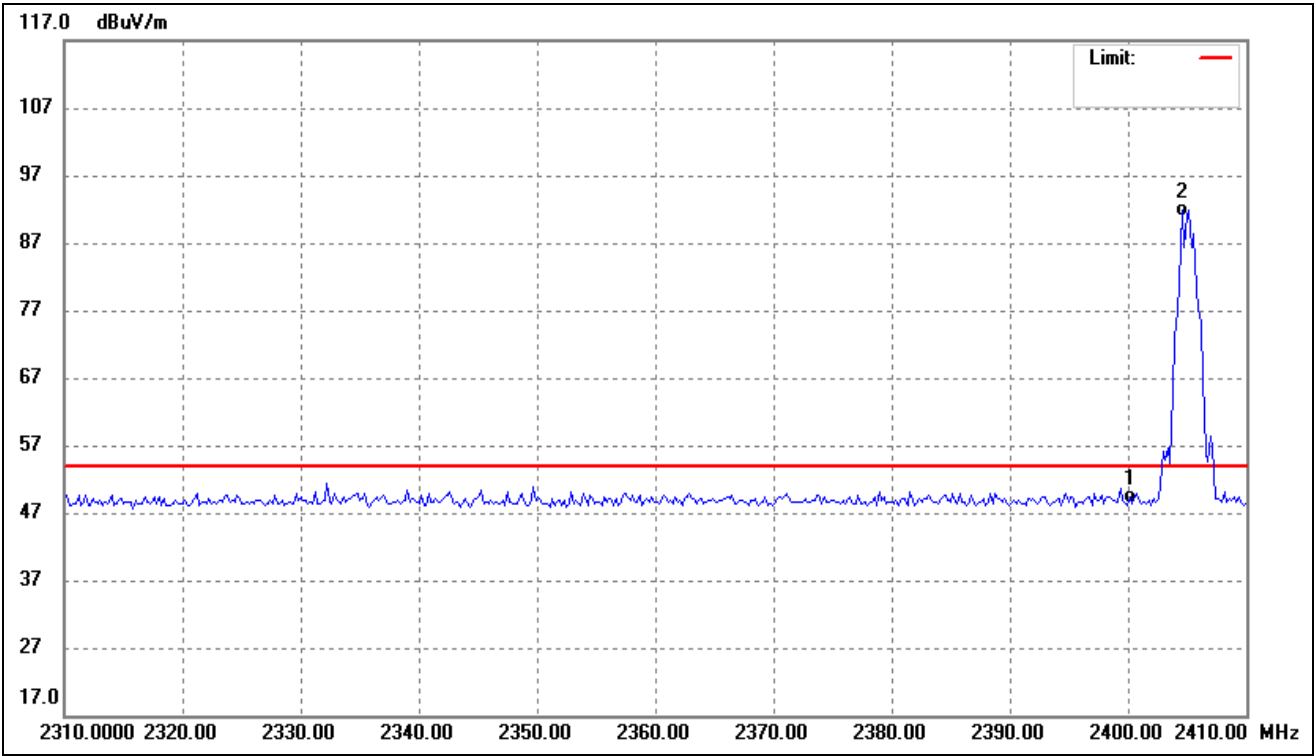
Test Channel	High	Polarity:	Horizontal (worst case)
--------------	------	-----------	-------------------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2474.649	69.45	1.95	71.40	/	/	Ave Detector
	2474.549	89.02	1.95	90.97	/	/	Peak Detector
2	2483.500	44.22	1.97	46.19	54.00	-7.81	Ave Detector
	2483.500	56.76	1.97	58.73	74.00	-15.27	Peak Detector
3	2500.000	44.34	2.01	46.35	54.00	-7.65	Ave Detector
	2500.000	56.86	2.01	58.87	74.00	-15.13	Peak Detector

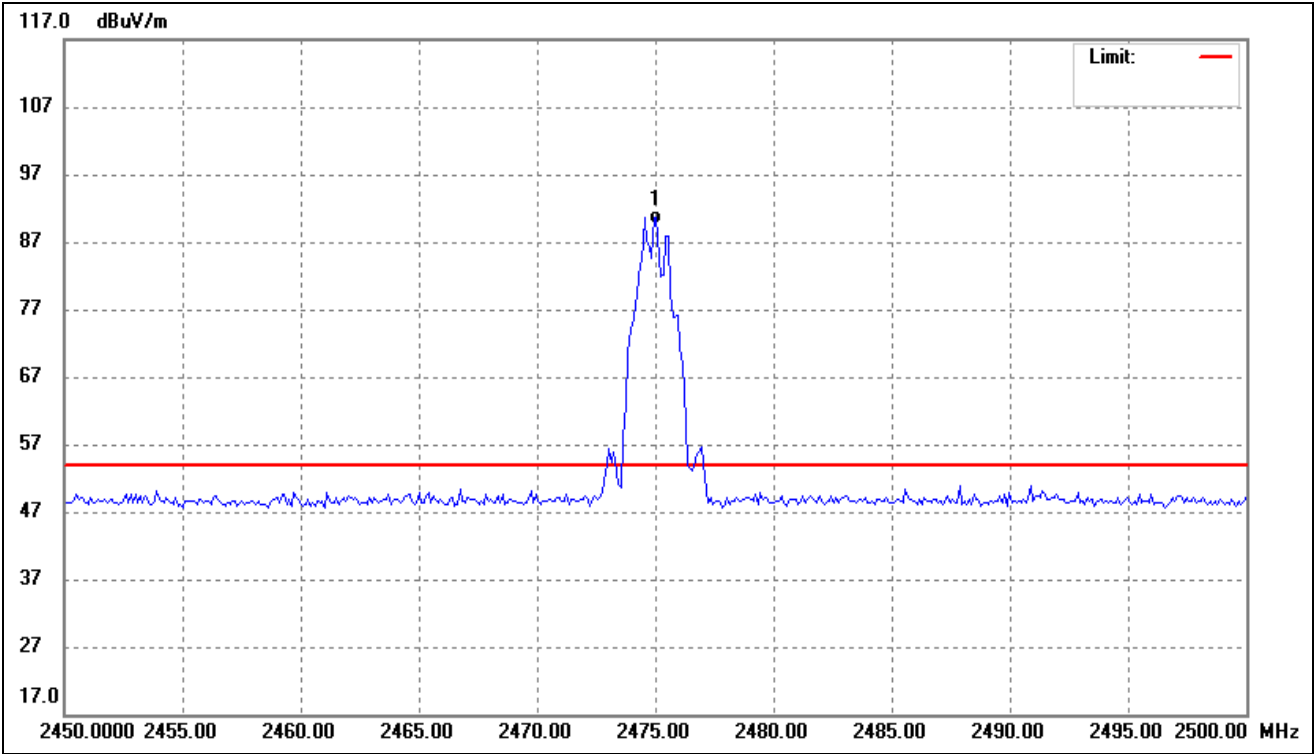
Band edge
RBW: 100kHz; VBW: 300kHz

Test Channel	Low	Polarity:	Horizontal(worst case)
--------------	-----	-----------	------------------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	47.66	1.76	49.42	54.00	-4.58	Ave Detector
	2400.000	47.44	1.76	49.20	74.00	-24.80	Peak Detector
2	2404.589	90.20	1.77	91.97	/	/	Ave Detector
	2404.589	90.67	1.77	92.44	/	/	Peak Detector

Test Channel	High	Polarity:	Horizontal(worst case)
--------------	------	-----------	------------------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2475.050	88.80	1.95	90.75	/	/	Ave Detector
	2474.549	88.83	1.95	90.78	/	/	Peak Detector

6. Emission Bandwidth

6.1 Standard Applicable

According to 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

6.2 Test Procedure

According to the ANSI 63.10-2013, the emission bandwidth test method as follows.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Set span = 1MHz, centered on a transmitting channel

RBW $\geq$ 1% 20dB Bandwidth, VBW $\geq$ RBW

Sweep = auto

Detector function = peak

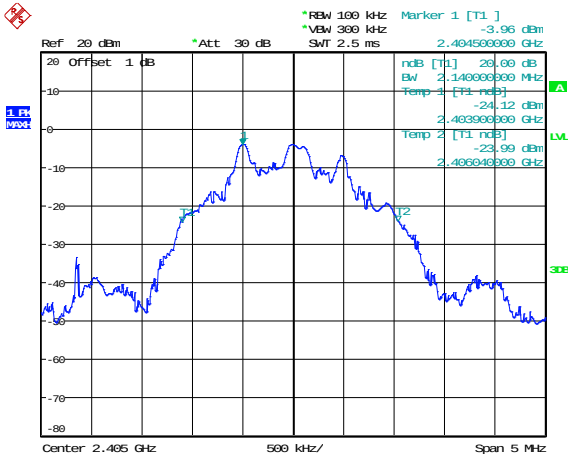
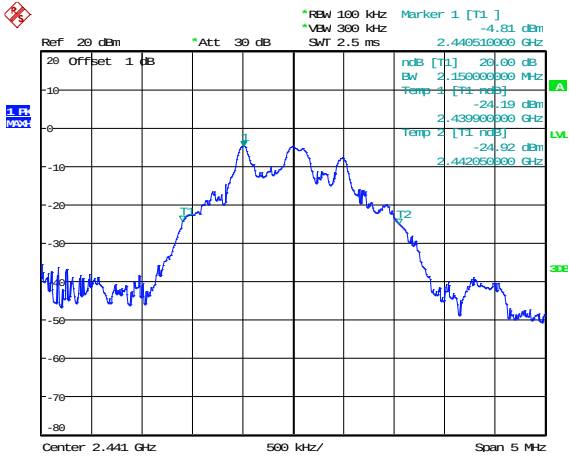
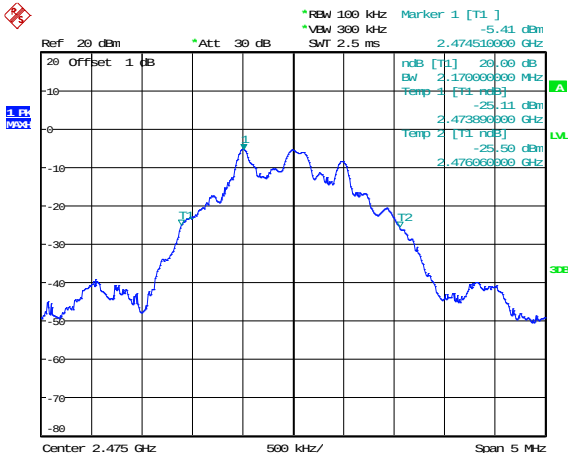
Trace = max hold

All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

6.3 Summary of Test Results/Plots

Test Channel	20dB Bandwidth(kHz)
Low Channel	2140
Middle Channel	2150
High Channel	2170

Please refer to the following test plots:

Low Channel	 The spectrum plot for the Low Channel shows a signal centered at 2.405 GHz with a 5 MHz span. The y-axis represents power in dBm, ranging from -80 to 20. The signal has a peak around -10 dBm. The plot includes various parameters: Ref 20 dBm, Att 30 dB, RBW 100 kHz, VBW 300 kHz, SWT 2.5 ms, Marker 1 [T1] -3.96 dBm, and several other markers and data points. Date: 12.APR.2023 15:12:58
Middle Channel	 The spectrum plot for the Middle Channel shows a signal centered at 2.441 GHz with a 5 MHz span. The y-axis represents power in dBm, ranging from -80 to 20. The signal has a peak around -10 dBm. The plot includes various parameters: Ref 20 dBm, Att 30 dB, RBW 100 kHz, VBW 300 kHz, SWT 2.5 ms, Marker 1 [T1] -4.81 dBm, and several other markers and data points. Date: 12.APR.2023 15:14:24
High Channel	 The spectrum plot for the High Channel shows a signal centered at 2.475 GHz with a 5 MHz span. The y-axis represents power in dBm, ranging from -80 to 20. The signal has a peak around -10 dBm. The plot includes various parameters: Ref 20 dBm, Att 30 dB, RBW 100 kHz, VBW 300 kHz, SWT 2.5 ms, Marker 1 [T1] -5.41 dBm, and several other markers and data points. Date: 12.APR.2023 15:17:47

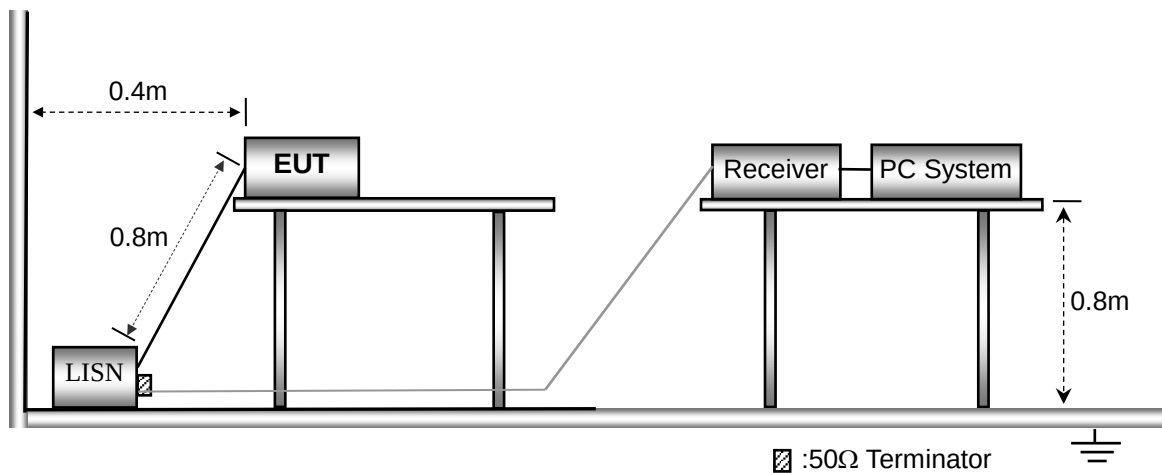
7. Conducted Emissions

7.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 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.

7.2 Basic Test Setup Block Diagram



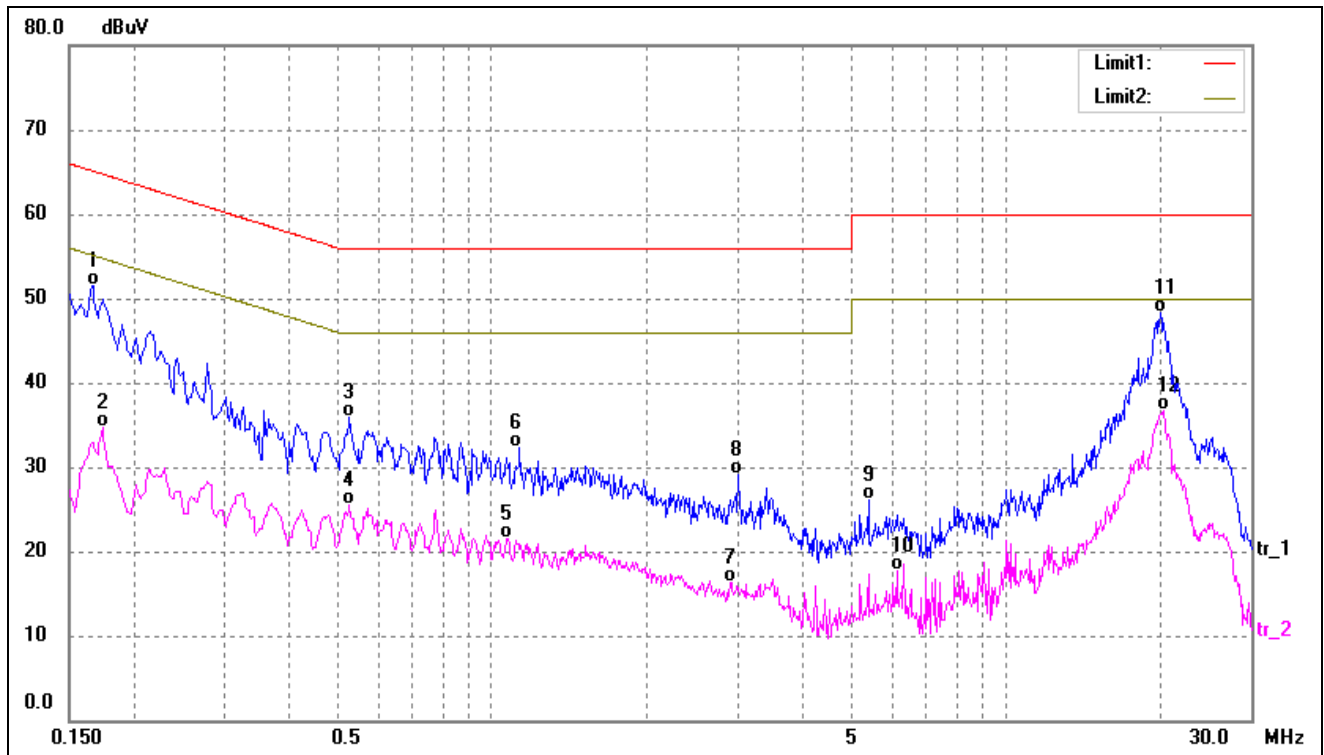
7.3 Test Receiver Setup

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

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

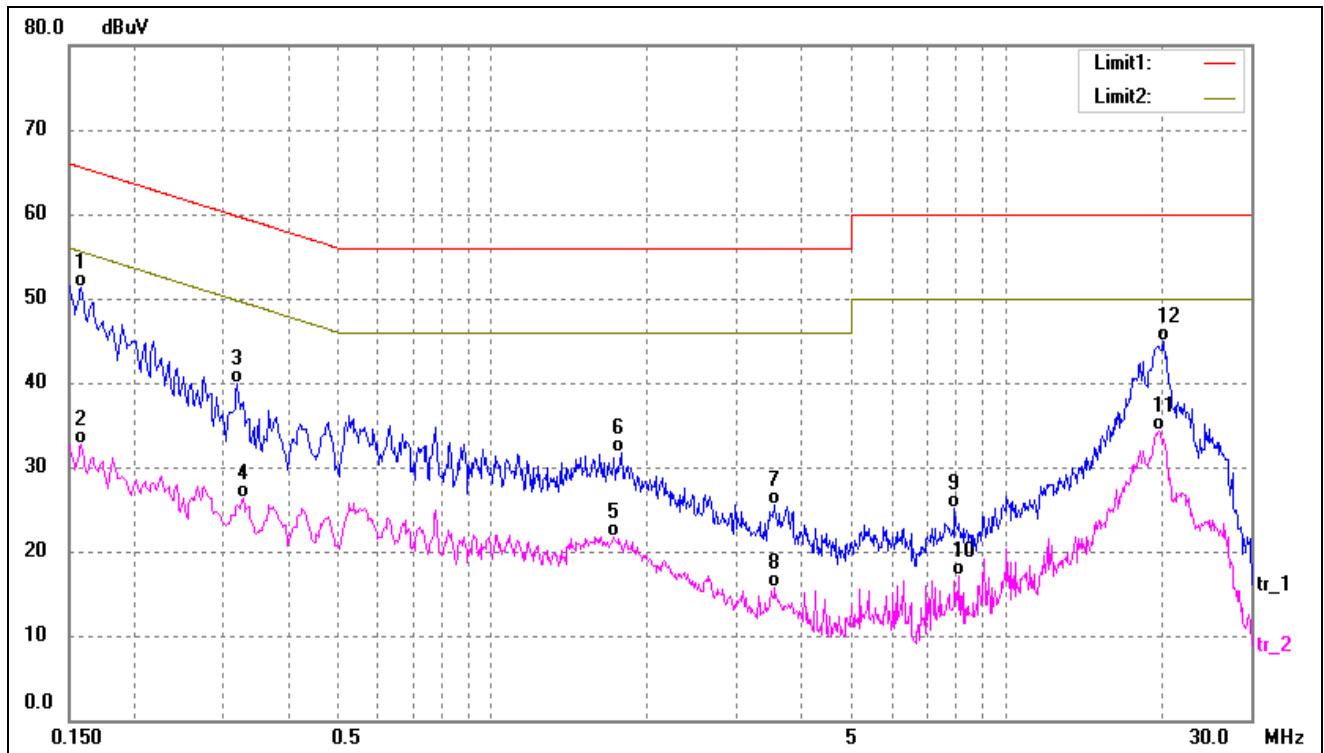
7.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral
-----------	---------------	-------------	-----------	---------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	41.15	10.40	51.55	65.16	-13.61	QP
2	0.1740	24.28	10.39	34.67	54.77	-20.10	AVG
3	0.5260	25.71	10.23	35.94	56.00	-20.06	QP
4	0.5260	15.30	10.23	25.53	46.00	-20.47	AVG
5	1.0740	11.32	10.16	21.48	46.00	-24.52	AVG
6	1.1300	22.06	10.16	32.22	56.00	-23.78	QP
7	2.9180	6.01	10.35	16.36	46.00	-29.64	AVG
8	3.0140	18.80	10.35	29.15	56.00	-26.85	QP
9	5.3900	15.71	10.38	26.09	60.00	-33.91	QP
10	6.1460	7.33	10.38	17.71	50.00	-32.29	AVG
11*	19.9820	37.85	10.38	48.23	60.00	-11.77	QP
12	20.3260	26.35	10.37	36.72	50.00	-13.28	AVG

Test Mode	Communication	AC120V 60Hz	Polarity:	Line
-----------	---------------	-------------	-----------	------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1580	40.98	10.40	51.38	65.57	-14.19	QP
2	0.1580	22.35	10.40	32.75	55.57	-22.82	AVG
3	0.3180	29.53	10.30	39.83	59.76	-19.93	QP
4	0.3260	16.10	10.29	26.39	49.55	-23.16	AVG
5	1.7300	11.39	10.28	21.67	46.00	-24.33	AVG
6	1.7860	21.50	10.29	31.79	56.00	-24.21	QP
7	3.5420	15.24	10.36	25.60	56.00	-30.40	QP
8	3.5580	5.43	10.36	15.79	46.00	-30.21	AVG
9	7.9420	14.78	10.38	25.16	60.00	-34.84	QP
10	8.1300	6.76	10.38	17.14	50.00	-32.86	AVG
11	19.8620	24.00	10.38	34.38	50.00	-15.62	AVG
12	20.2740	34.46	10.38	44.84	60.00	-15.16	QP

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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