

TEST REPORT

Reference No..... : WTD20X07050639W-5
FCC ID : 2AA3H-S6064
Applicant : Shenzhen 3Nod Digital Technology Co., Ltd.
Address : WORKSHOP 15,ZHONGFU ROAD,TANGXIAYONG
COMMUNITY,ONGGANG NEIGHBOURHOOD,BAOAN
DISTRICT,SHENZHEN CITY Guangdong 518105
Product Name : onn 5.1.2 Atmos Soundbar, Onn 5.1.2 Atmos Soundbar
Test Model. : 100002634
Standards : FCC Part 15.247
Date of Receipt sample : Jul.30, 2020
Date of Test..... : Jul.30, 2020 to Aug.17, 2020
Date of Issue : Aug.17, 2020
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

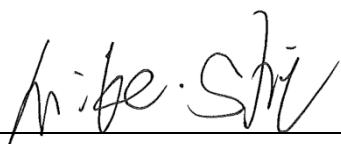
Tel.: +86-755-33663308

Fax.: +86-755-33663309

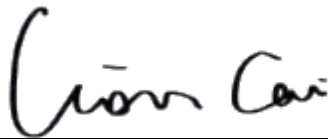
Tested by:

Reviewed By:

Approved & Authorized By:



Mike Shi / Project Engineer



Lion Cai / RF Manager



Silin Chen / Manager

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. RF EXPOSURE	10
3.1 STANDARD APPLICABLE	10
3.2 TEST RESULT	10
4. ANTENNA REQUIREMENT	11
4.1 STANDARD APPLICABLE	11
4.2 EVALUATION INFORMATION	11
5. FIELD STRENGTH OF SPURIOUS EMISSIONS	12
5.1 STANDARD APPLICABLE	12
5.2 TEST PROCEDURE	12
5.3 CORRECTED AMPLITUDE & MARGIN CALCULATION	14
5.4 SUMMARY OF TEST RESULTS/PLOTS	14
6. CONDUCTED EMISSIONS	21
6.1 TEST PROCEDURE	21
6.2 BASIC TEST SETUP BLOCK DIAGRAM	21
6.3 TEST RECEIVER SETUP	21
6.4 SUMMARY OF TEST RESULTS/PLOTS	21

Report version

Version No.	Date of issue	Description
Rev.00	Aug.17, 2020	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shenzhen 3Nod Digital Technology Co., Ltd.
 Address of applicant: WORKSHOP 15,ZHONGFU ROAD,TANGXIAYONG
 COMMUNITY,SONGGANG NEIGHBOURHOOD,BAOAN
 DISTRICT,SHENZHEN CITY Guangdong 518105

Manufacturer: Shenzhen 3Nod Digital Technology Co., Ltd.
 Address of manufacturer: WORKSHOP 15,ZHONGFU ROAD,TANGXIAYONG
 COMMUNITY,SONGGANG NEIGHBOURHOOD,BAOAN
 DISTRICT,SHENZHEN CITY Guangdong 518105

General Description of EUT	
Product Name:	onn 5.1.2 Atmos Soundbar, Onn 5.1.2 Atmos Soundbar
Trade Name:	/
Model No.:	100002634
Adding Model(s):	/
Rated Voltage:	AC120V/60Hz
Battery Capacity	/
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:	2403.35MHz-2477.35MHz
Max. Field Strength:	0.93dBm
Modulation:	GFSK
Antenna Type:	Integral Antenna
Antenna Gain:	0dBi

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 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.

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	2403.35MHz
TM2	Middle	2439.35MHz
TM3	High	2477.35MHz

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	$\pm 0.42\text{dB}$
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	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 $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2020-04-28	2021-04-27
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2020-04-28	2021-04-27
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2020-04-28	2021-04-27
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2020-04-28	2021-04-27
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2020-04-28	2021-04-27
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-05-05	2021-05-04
SEMT-1042	Horn Antenna	ETS	3117	00086197	2019-05-05	2021-05-04
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2019-05-05	2021-05-04
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2019-05-05	2021-05-04
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2020-04-28	2021-04-27
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2020-04-28	2021-04-27
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2020-04-28	2021-04-27
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2020-04-28	2021-04-27
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2020-04-28	2021-04-27
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2020-04-28	2021-04-27
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2019-05-05	2021-05-04
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2020-04-28	2021-04-27
SEMT-1048	RF Limiter	ATTEN	AT-BSF-2400~2500	/	2020-04-28	2021-04-27
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2020-04-28	2021-04-27
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	2020-03-17	2021-03-16
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	2020-03-17	2021-03-16
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	2020-03-17	2021-03-16
SEMT-C004	Cable	Zheng DI	2M0RFC	/	2020-03-17	2021-03-16
SEMT-C005	Cable	Zheng DI	1M0RFC	/	2020-03-17	2021-03-16
SEMT-C006	Cable	Zheng DI	1M0RFC	/	2020-03-17	2021-03-16

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
§2.1091	RF Exposure	Compliant
§15.203; §15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	N/A
§15.207(a)	Conducted Emission	Compliant
§15.247(e)	Power Spectral Density	N/A
§15.247(a)(2)	DTS Bandwidth	N/A
§15.247(b)(3)	RF Output Power	N/A
§15.209(a)	Radiated Emission	Compliant
§15.247(d)	Band Edge (Out of Band Emissions)	N/A

Note: 1. N/A: Not applicable

2. This report is apply C2PC, Only do partial test(RF Exposure, Antenna Requirement, Conducted Emission and Radiated Spurious Emissions below 1GHz)

3. RF Exposure

3.1 Standard Applicable

According to §1.1307 and §2.1091, the fixed 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 an Integral antenna, fulfill the requirement of this section.

5. Field Strength of Spurious Emissions

5.1 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.

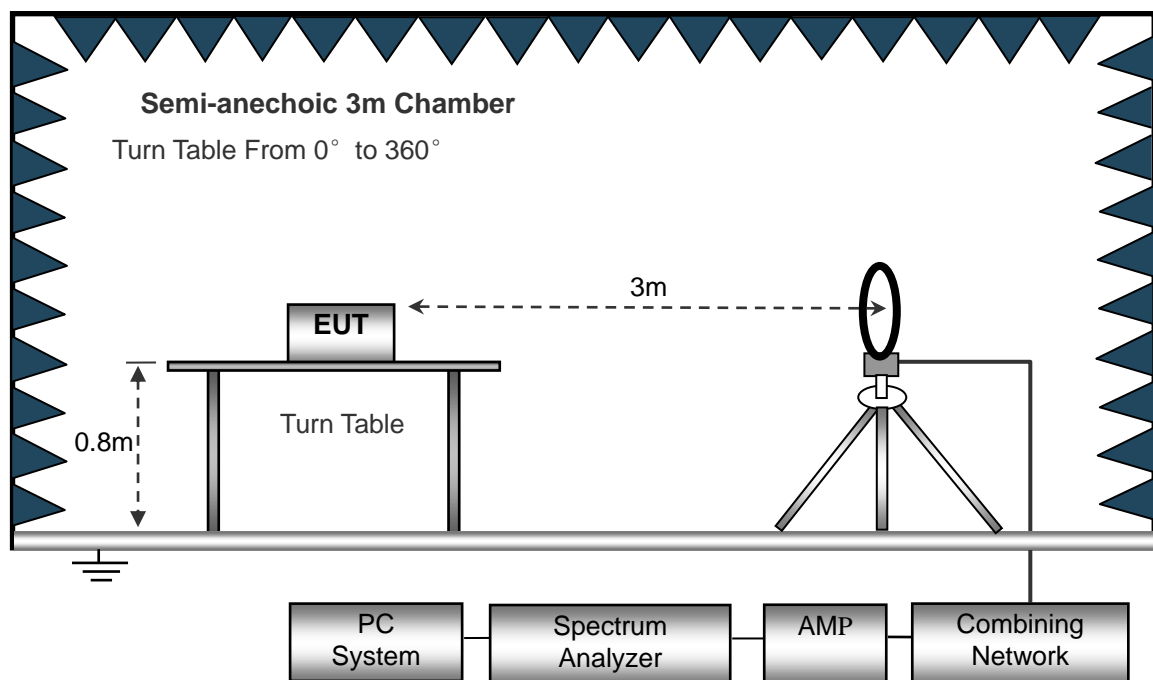
5.2 Test Procedure

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.

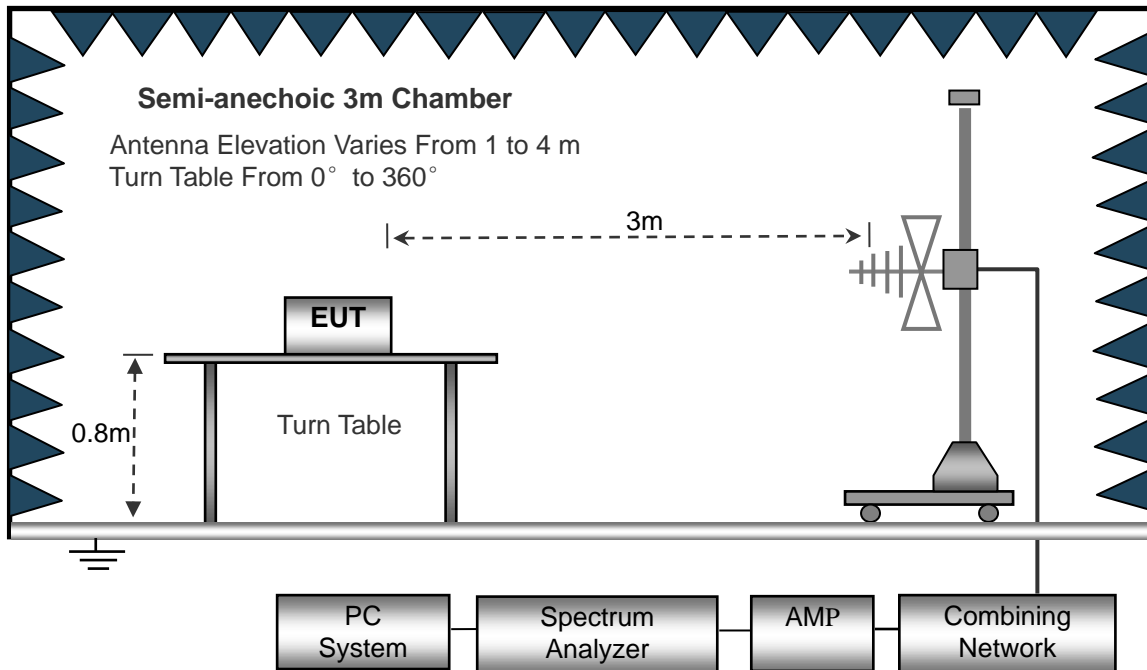
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

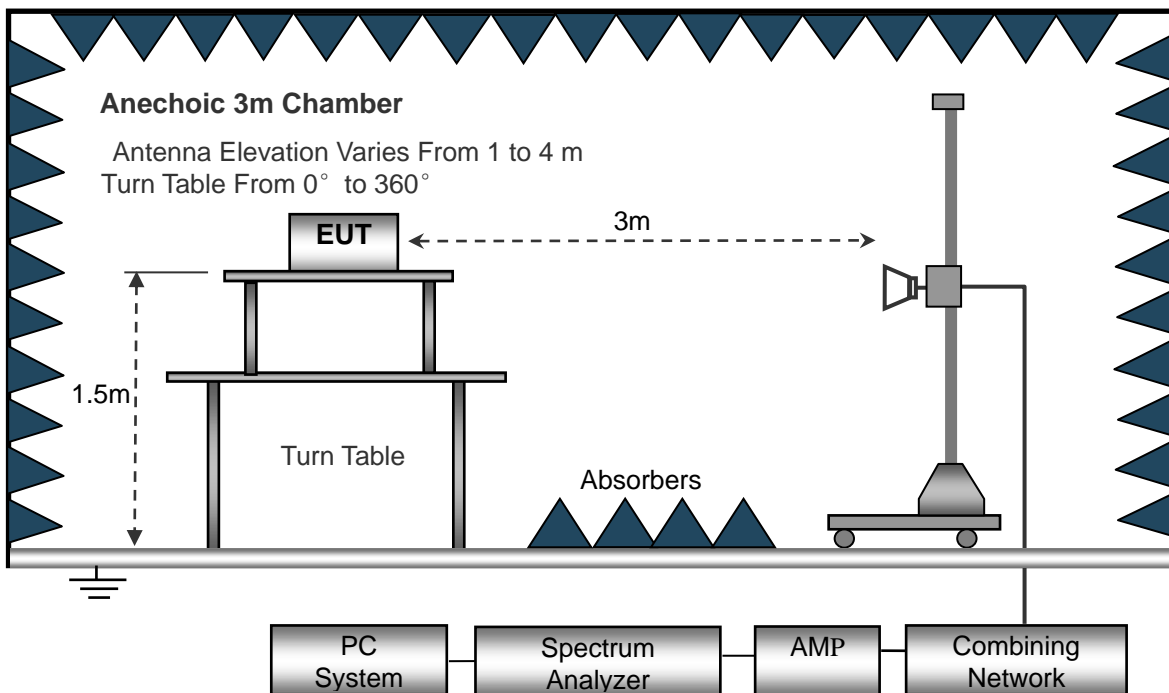
The test setup for emission measurement below 30MHz..



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



The test setup for emission measurement above 1 GHz..



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

5.3 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:

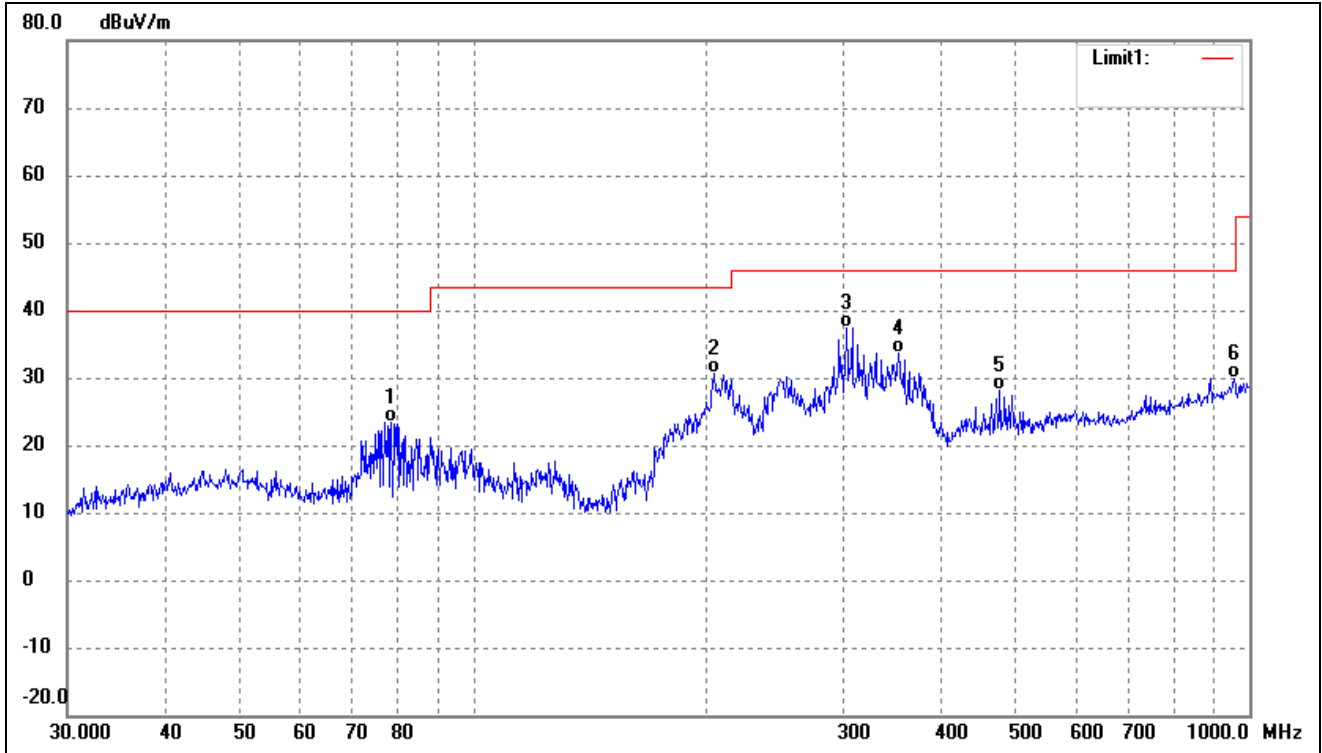
$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

5.4 Summary of Test Results/Plots

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

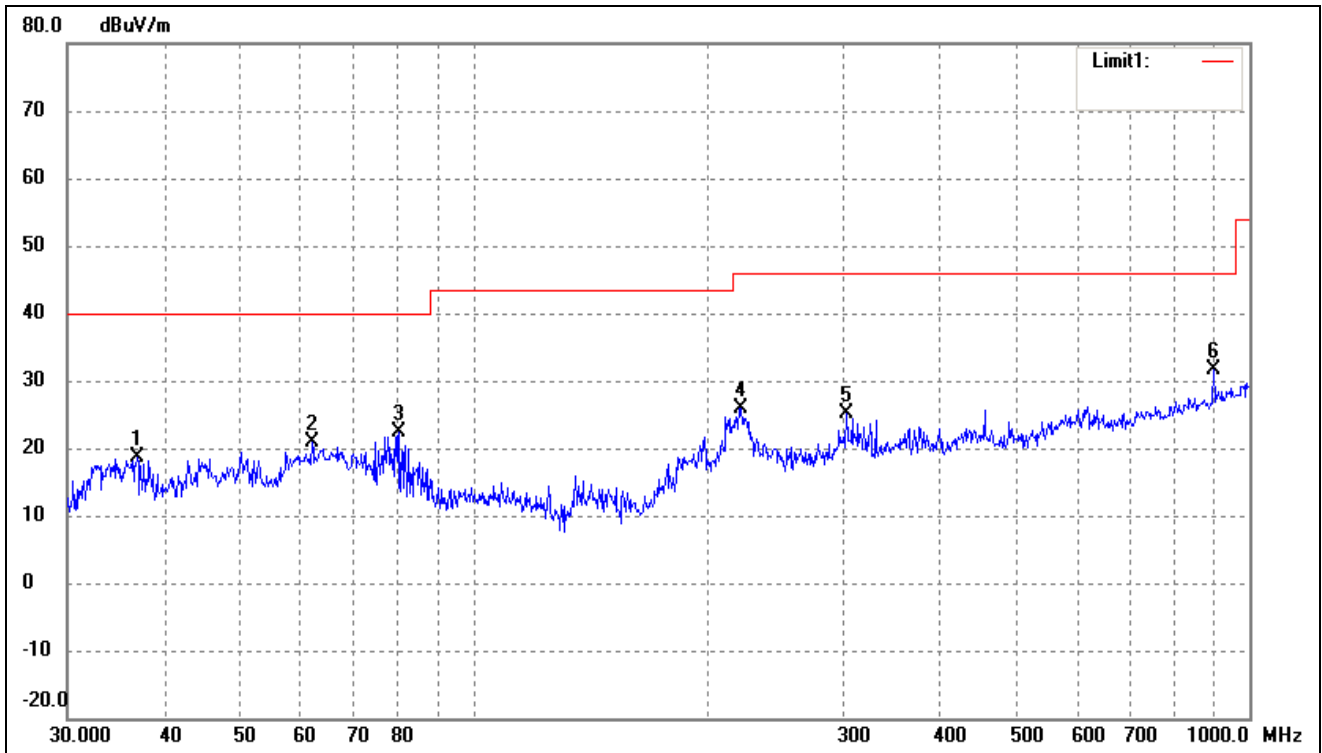
➤ Spurious Emissions Below 1GHz

➤ Test Channel	Low	Polarity:	Horizontal
----------------	-----	-----------	------------



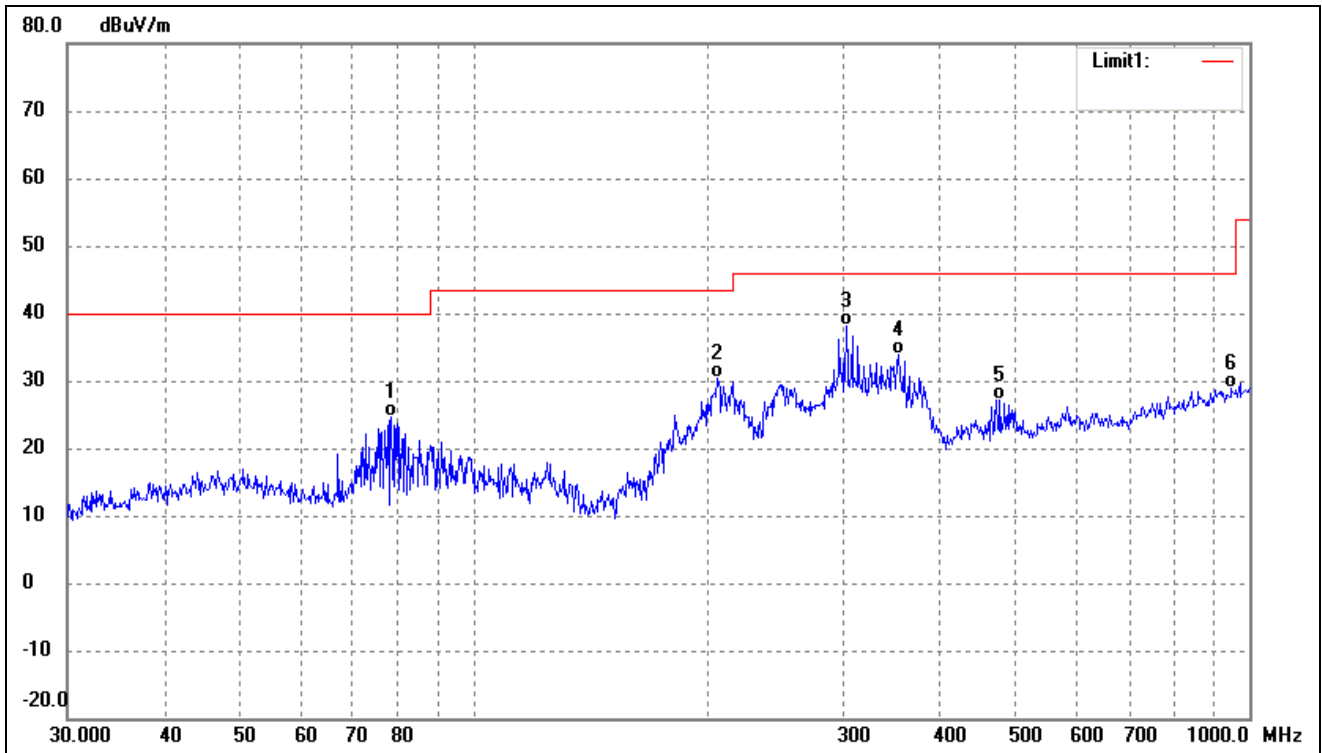
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	78.4134	37.50	-14.09	23.41	40.00	-16.59	-	-	QP
2	204.2377	41.91	-11.21	30.70	43.50	-12.80	-	-	QP
3	302.4812	44.57	-7.25	37.32	46.00	-8.68	-	-	QP
4	352.9434	39.66	-6.08	33.58	46.00	-12.42	-	-	QP
5	477.1694	32.93	-4.81	28.12	46.00	-17.88	-	-	QP
6	955.4381	27.50	2.48	29.98	46.00	-16.02	-	-	QP

Test Channel	Low	Polarity:	Vertical
--------------	-----	-----------	----------



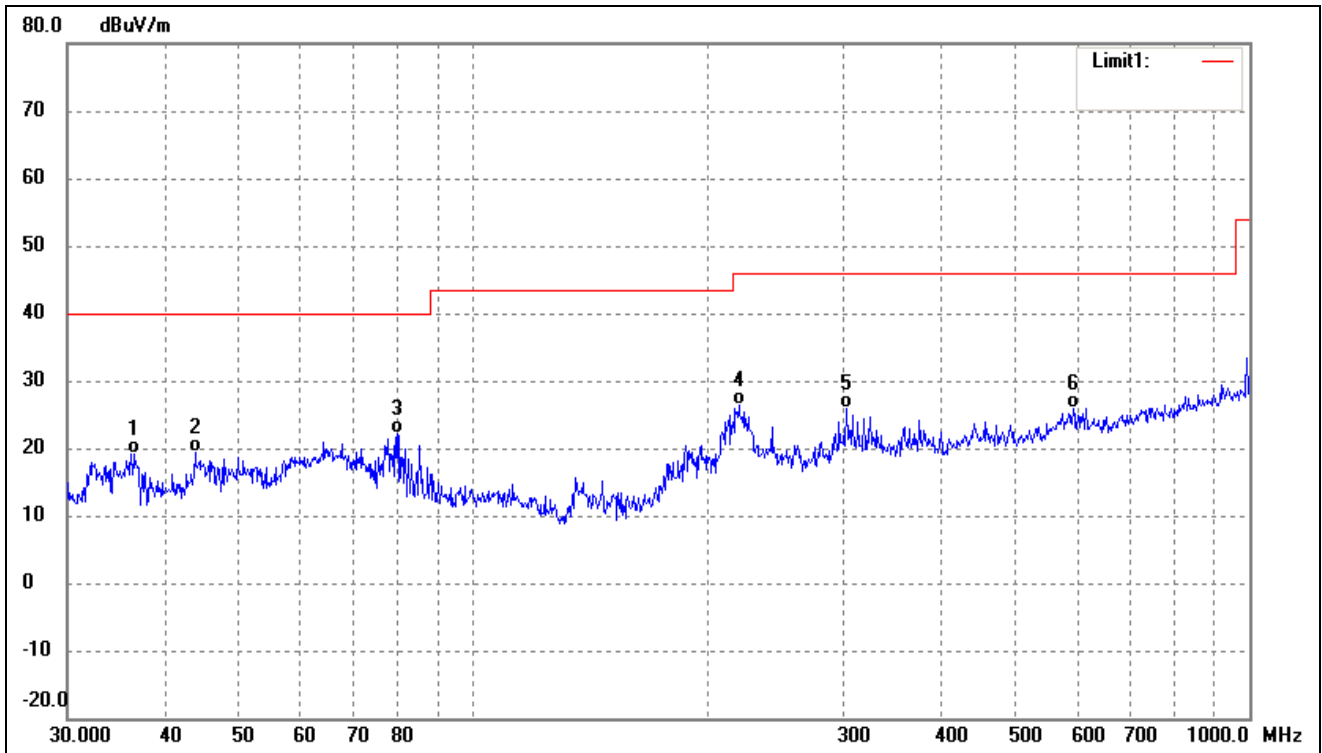
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	36.8953	30.86	-12.30	18.56	40.00	-21.44	-	-	peak
2	61.9951	33.45	-12.63	20.82	40.00	-19.18	-	-	peak
3	80.3619	36.47	-14.19	22.28	40.00	-17.72	-	-	peak
4	221.3921	36.70	-10.84	25.86	46.00	-20.14	-	-	peak
5	302.4812	32.29	-7.25	25.04	46.00	-20.96	-	-	peak
6	900.1474	29.94	1.58	31.52	46.00	-14.48	-	-	peak

Test Channel	Middle	Polarity:	Horizontal
--------------	--------	-----------	------------



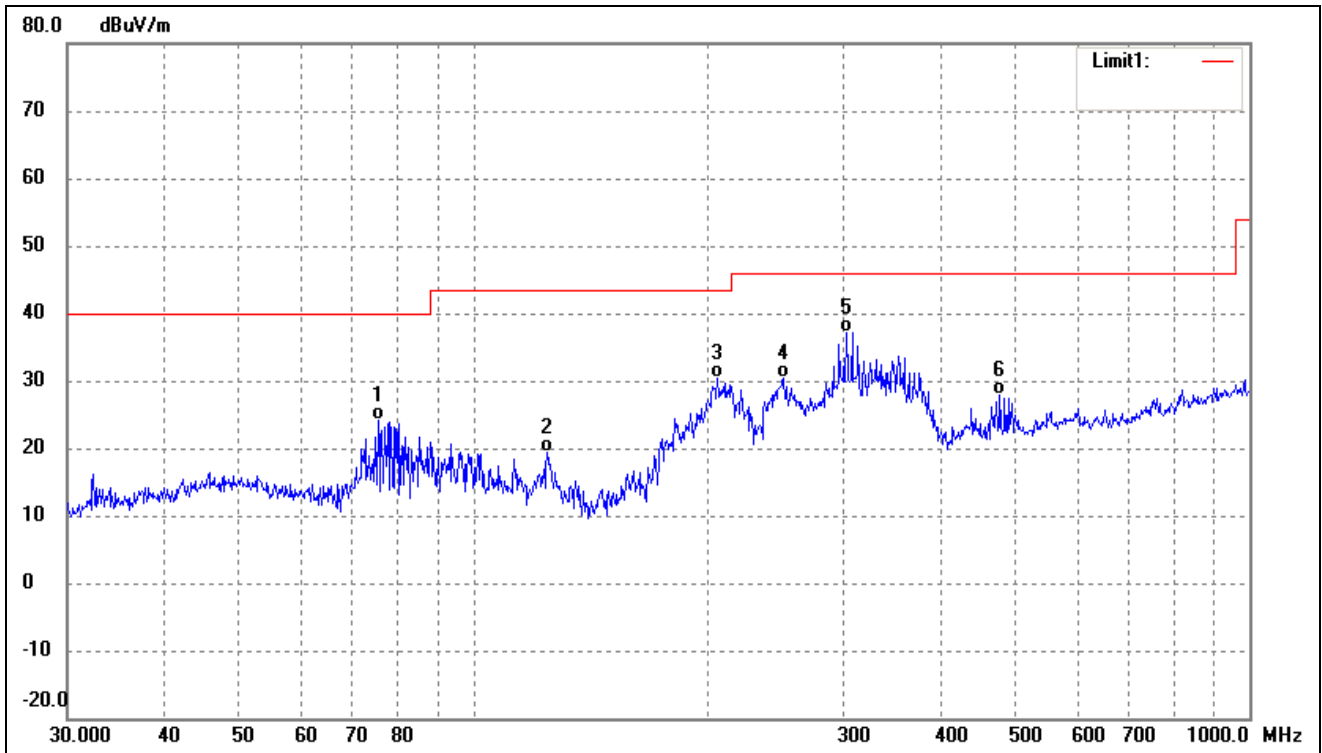
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	78.4134	38.79	-14.09	24.70	40.00	-15.30	-	-	QP
2	206.3976	41.47	-11.16	30.31	43.50	-13.19	-	-	QP
3	302.4812	45.38	-7.25	38.13	46.00	-7.87	-	-	QP
4	352.9434	40.03	-6.08	33.95	46.00	-12.05	-	-	QP
5	477.1694	32.04	-4.81	27.23	46.00	-18.77	-	-	QP
6	948.7610	26.43	2.40	28.83	46.00	-17.17	-	-	QP

Test Channel	Middle	Polarity:	Vertical
--------------	--------	-----------	----------



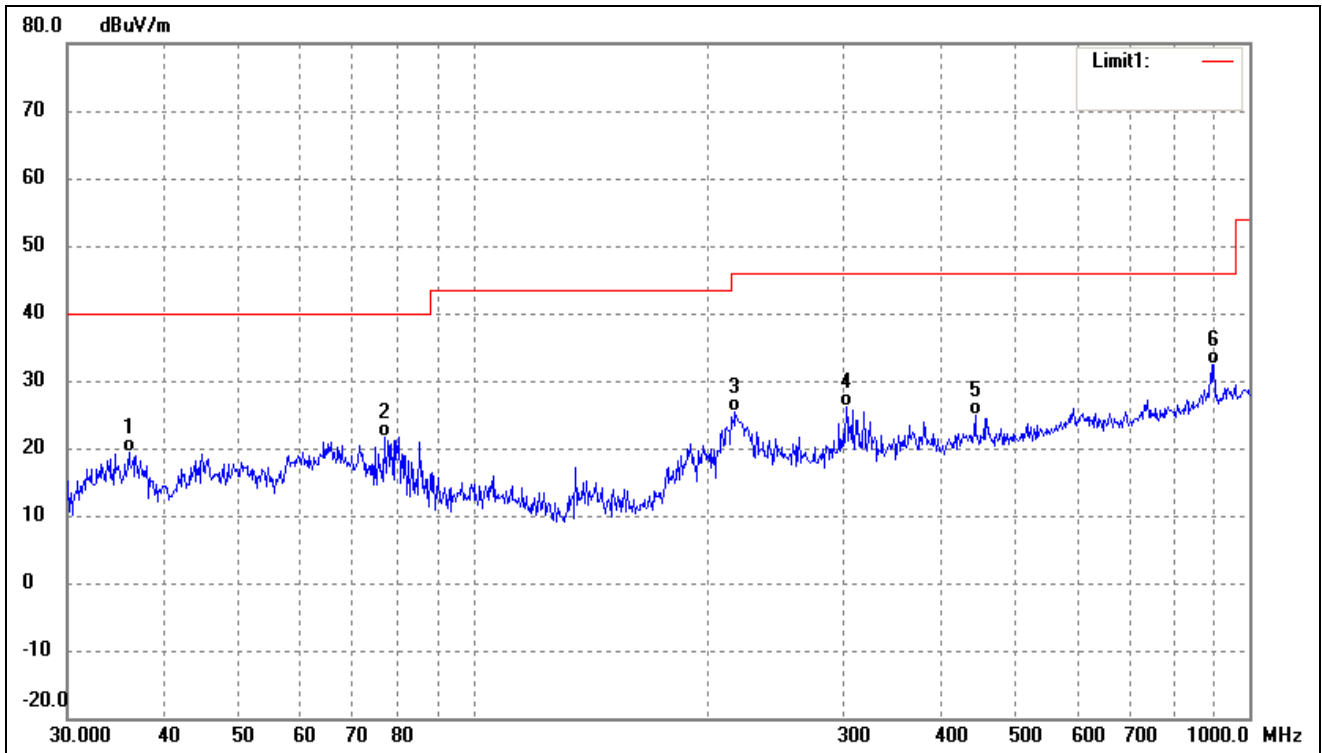
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	36.5092	31.51	-12.36	19.15	40.00	-20.85	-	-	QP
2	43.8119	30.13	-10.84	19.29	40.00	-20.71	-	-	QP
3	79.8003	36.23	-14.15	22.08	40.00	-17.92	-	-	QP
4	219.8449	37.18	-10.87	26.31	46.00	-19.69	-	-	QP
5	302.4812	33.04	-7.25	25.79	46.00	-20.21	-	-	QP
6	593.0497	28.24	-2.35	25.89	46.00	-20.11	-	-	QP

Test Channel	High	Polarity:	Horizontal
--------------	------	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	75.4464	37.97	-13.94	24.03	40.00	-15.97	-	-	QP
2	124.5690	33.76	-14.43	19.33	43.50	-24.17	-	-	QP
3	206.3976	41.61	-11.16	30.45	43.50	-13.05	-	-	QP
4	251.1804	39.60	-9.27	30.33	46.00	-15.67	-	-	QP
5	302.4812	44.41	-7.25	37.16	46.00	-8.84	-	-	QP
6	477.1694	32.78	-4.81	27.97	46.00	-18.03	-	-	QP

Test Channel	High	Polarity:	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	31.70	-12.44	19.26	40.00	-20.74	-	-	QP
2	76.7808	35.71	-14.01	21.70	40.00	-18.30	-	-	QP
3	217.5443	36.25	-10.92	25.33	46.00	-20.67	-	-	QP
4	302.4812	33.38	-7.25	26.13	46.00	-19.87	-	-	QP
5	443.2943	29.28	-4.46	24.82	46.00	-21.18	-	-	QP
6	900.1474	30.78	1.58	32.36	46.00	-13.64	-	-	QP

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

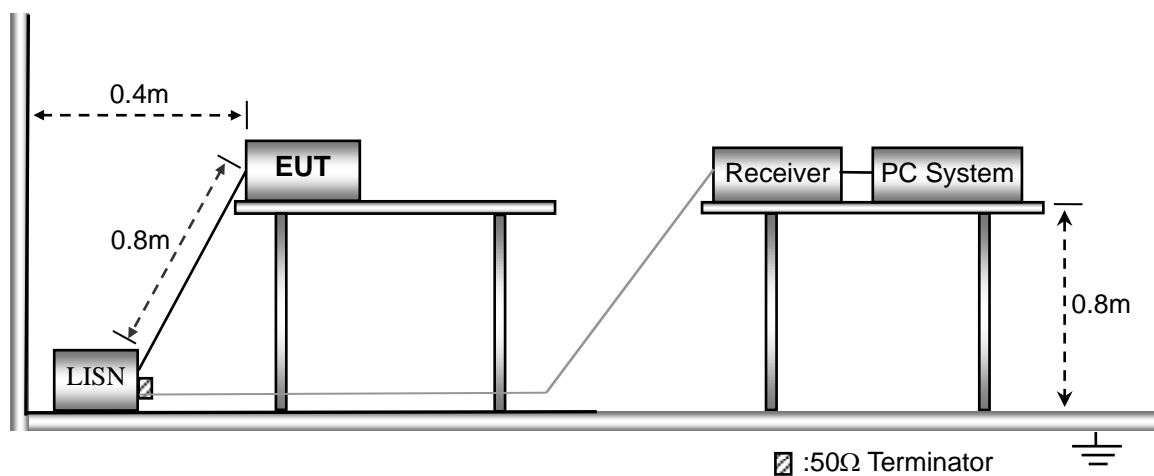
6. Conducted Emissions

6.1 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.

6.2 Basic Test Setup Block Diagram



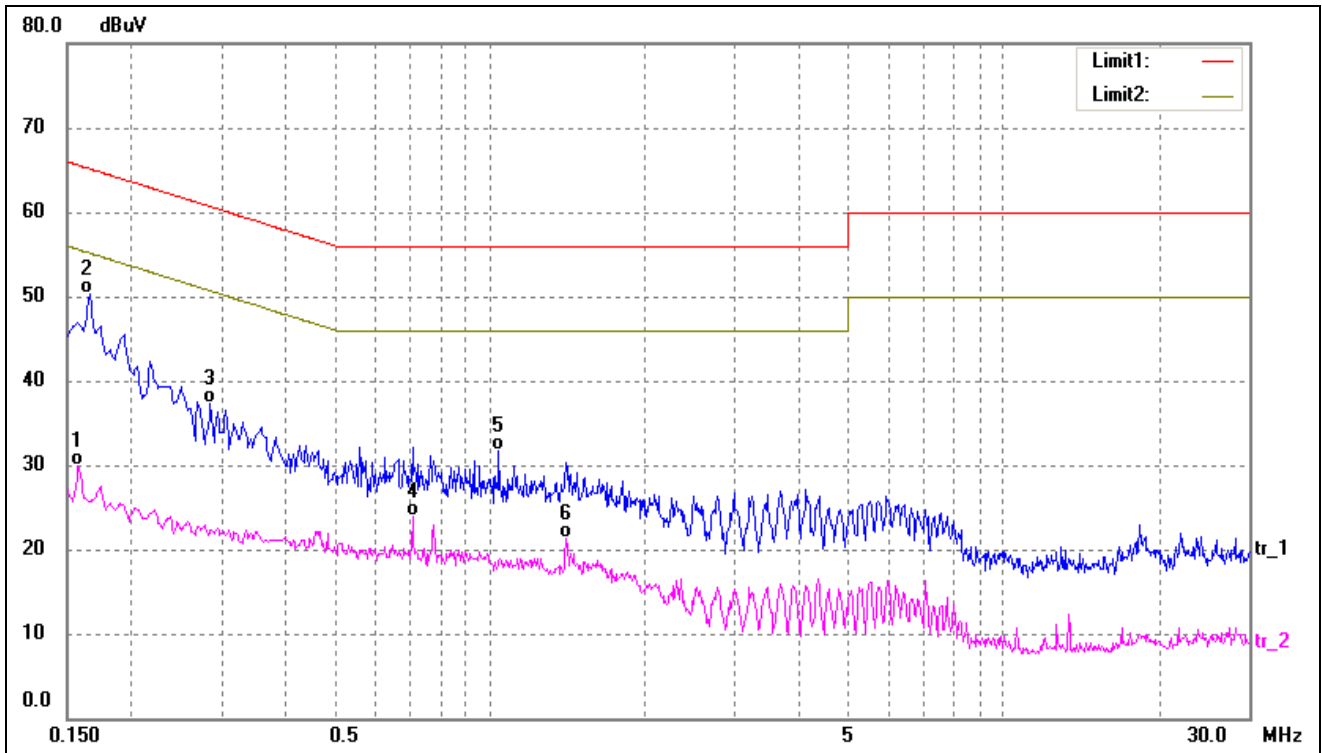
6.3 Test Receiver Setup

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

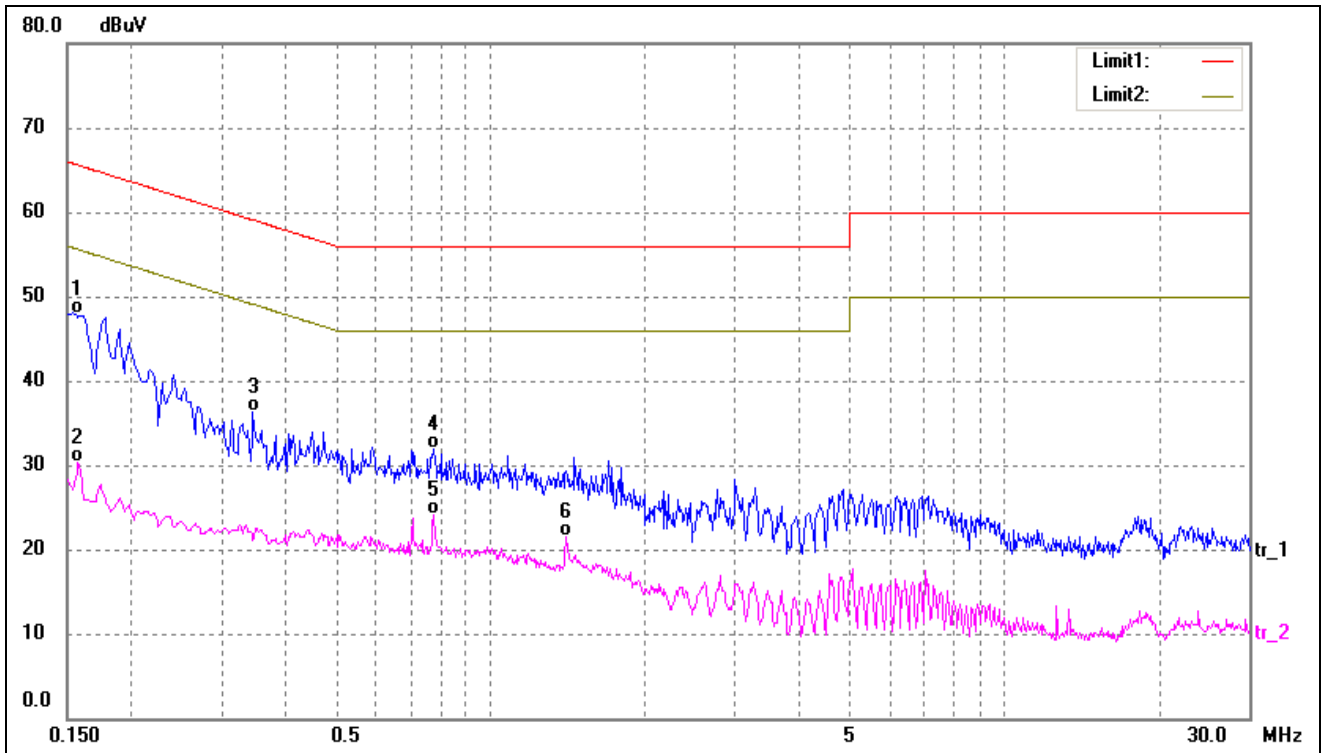
6.4 Summary of Test Results/Plots

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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	19.59	10.25	29.84	55.57	-25.73	AVG
2*	0.1660	40.12	10.26	50.38	65.16	-14.78	QP
3	0.2860	27.09	10.25	37.34	60.64	-23.30	QP
4	0.7060	13.70	10.17	23.87	46.00	-22.13	AVG
5	1.0420	21.52	10.20	31.72	56.00	-24.28	QP
6	1.4100	11.12	10.22	21.34	46.00	-24.66	AVG

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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1548	37.72	10.25	47.97	65.74	-17.77	QP
2	0.1580	20.00	10.25	30.25	55.57	-25.32	AVG
3	0.3460	25.98	10.26	36.24	59.06	-22.82	QP
4	0.7780	21.63	10.18	31.81	56.00	-24.19	QP
5	0.7780	13.94	10.18	24.12	46.00	-21.88	AVG
6	1.4100	11.27	10.22	21.49	46.00	-24.51	AVG

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