

TEST REPORT

Reference No..... : WTX20X11083905W
FCC ID : PRDHS03
Applicant : Acrox Technologies Co., Ltd.
Address..... : 4F., No.89, Minshan St., Neihu Dist.,Taipei City 114, Taiwan
Product Name : Wireless gaming headset
Test Model. : 100025012/NHT
Standards : FCC Part 15.249
Date of Receipt sample : Nov.10. 2020
Date of Test..... : Nov.10. 2020 to Dec.09, 2020
Date of Issue : Dec.09, 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.

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Report version

Version No.	Date of issue	Description
Rev.00	Dec.09, 2020	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Acrox Technologies Co., Ltd.
 Address of applicant: 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan

Manufacturer: Acrox Technologies Co., Ltd
 Address of manufacturer: Hsinmin Industria, Changan Town, Dongguan City, Guangdong, China

General Description of EUT	
Product Name:	Wireless gaming headset
Trade Name:	onn./ACROX
Model No.:	100025012/NHT
Adding Model(s):	/
Rated Voltage:	DC 3.7V
Battery Capacity	600mAh
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:	2406MHz-2478MHz
Max. Field Strength:	104.57dBuV/m
Modulation:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi

1.2 Test Standards

The tests were performed according to following standards:

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

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.

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	2406MHz
TM2	Middle Channel	2439MHz
TM3	High Channel	2478MHz

Test Conditions	
Temperature:	24 °C
Relative Humidity:	50.5 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
AUX Cable	1.86	Unshielded	Without Ferrite
USB Cable	1.86	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
Receiver	Acrox	NRK	/
Adapter	/	KA1517-0502000CNU	/
Mobile phone	HUAWEI	VOG-AL00	/
Notebook	Lenovo	E445	EB12648265

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

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
§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

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 PCB 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)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB 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.

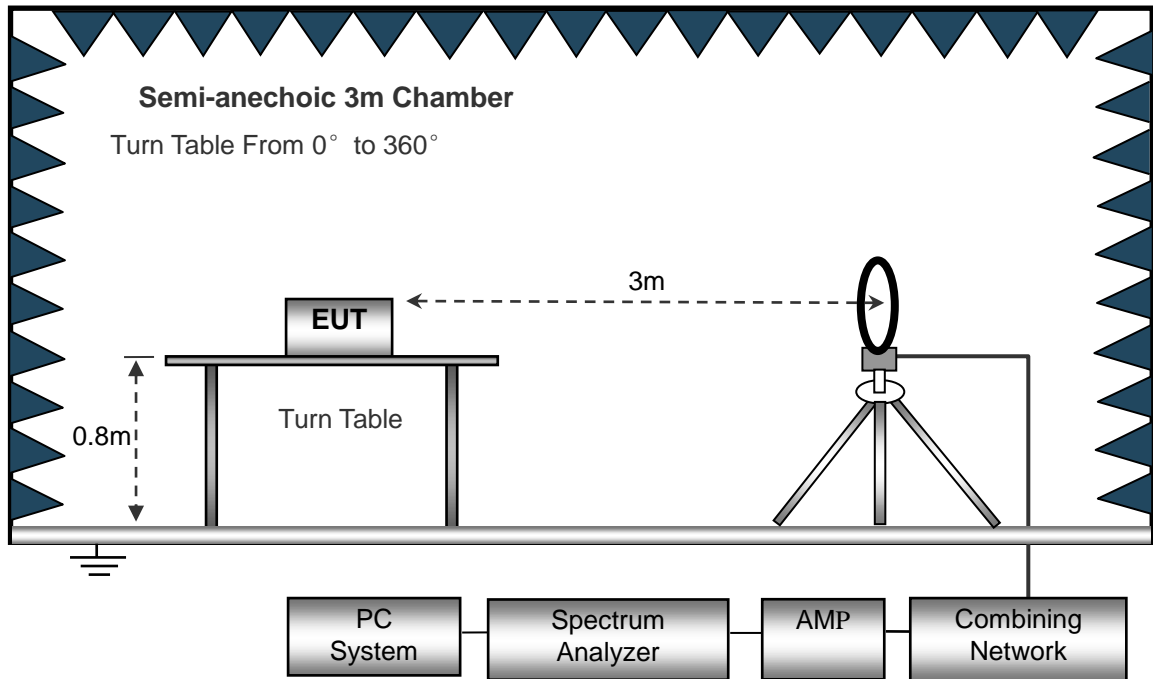
4.2 Test Procedure

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.

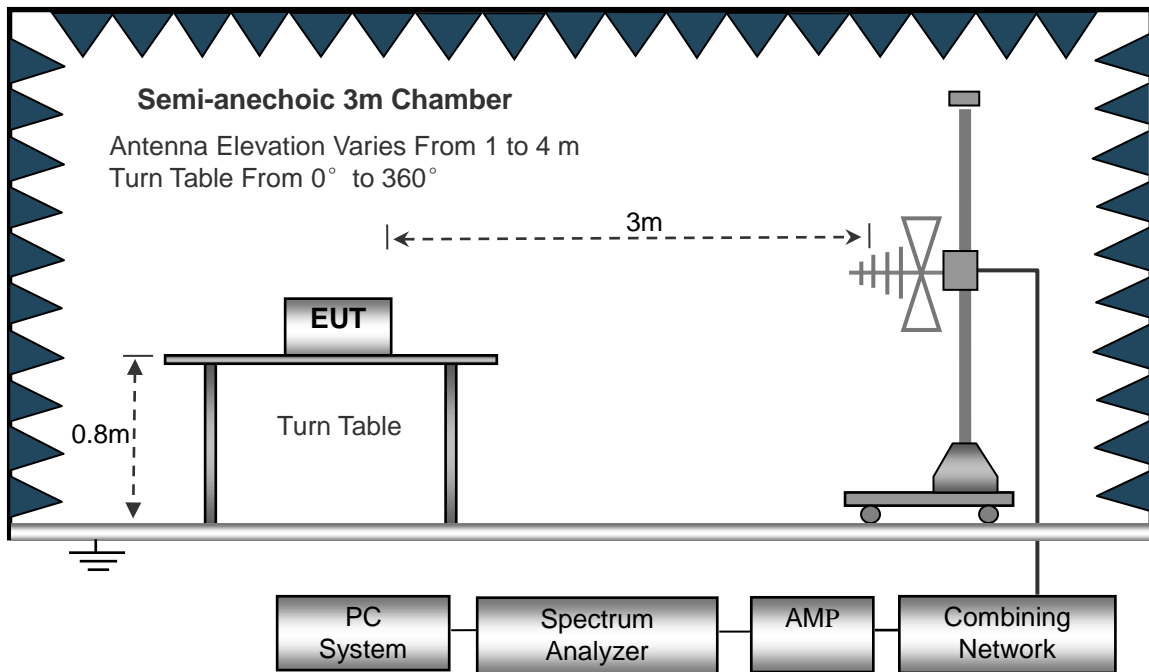
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

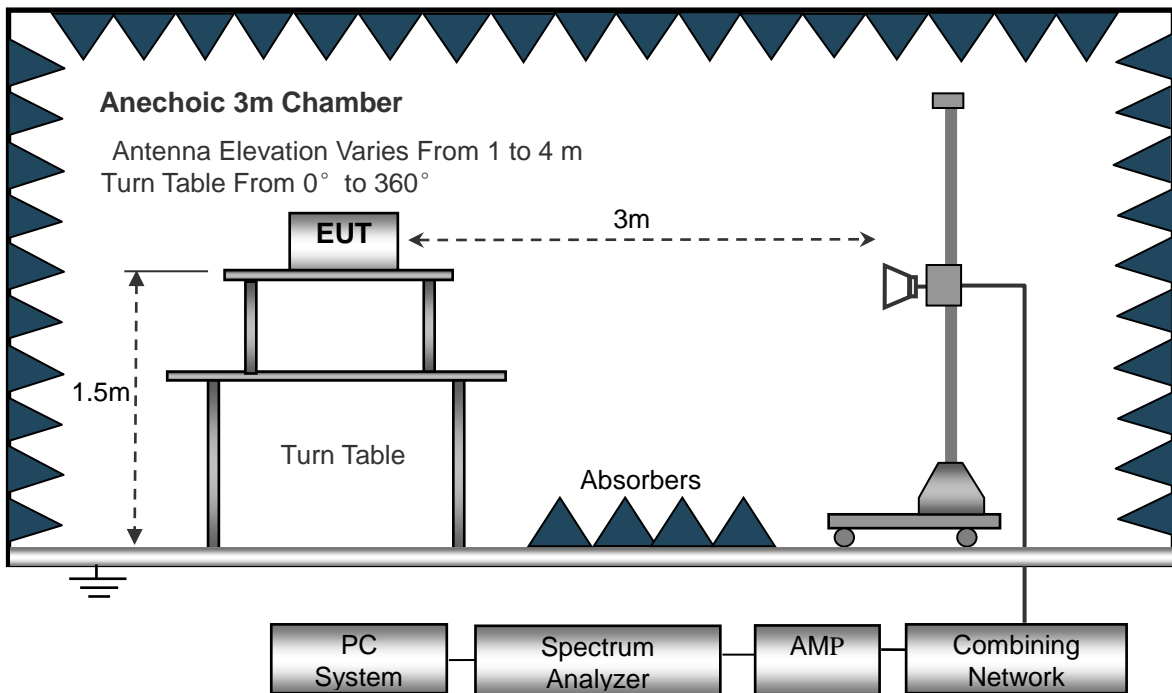
The test setup for emission measurement below 30MHz..



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

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:

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

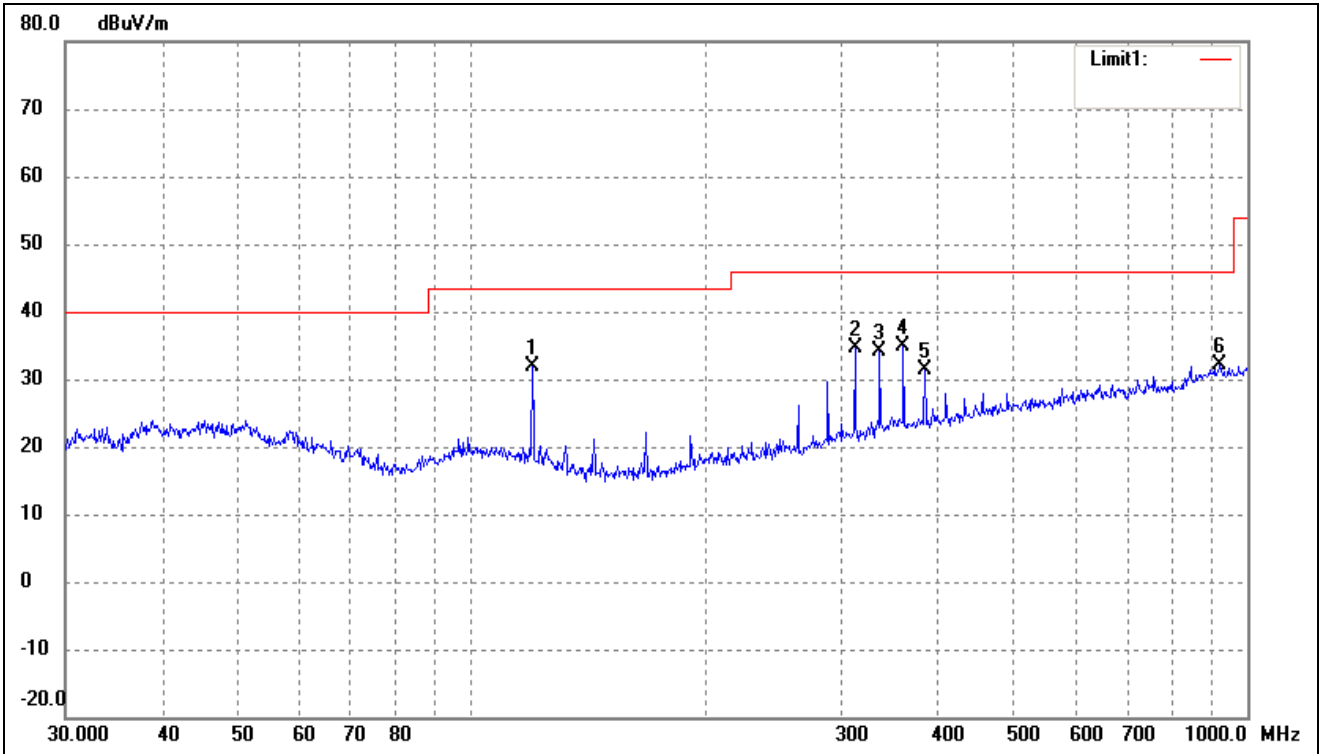
4.4 Summary of Test Results/Plots

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

➤ Spurious Emissions Below 1GHz

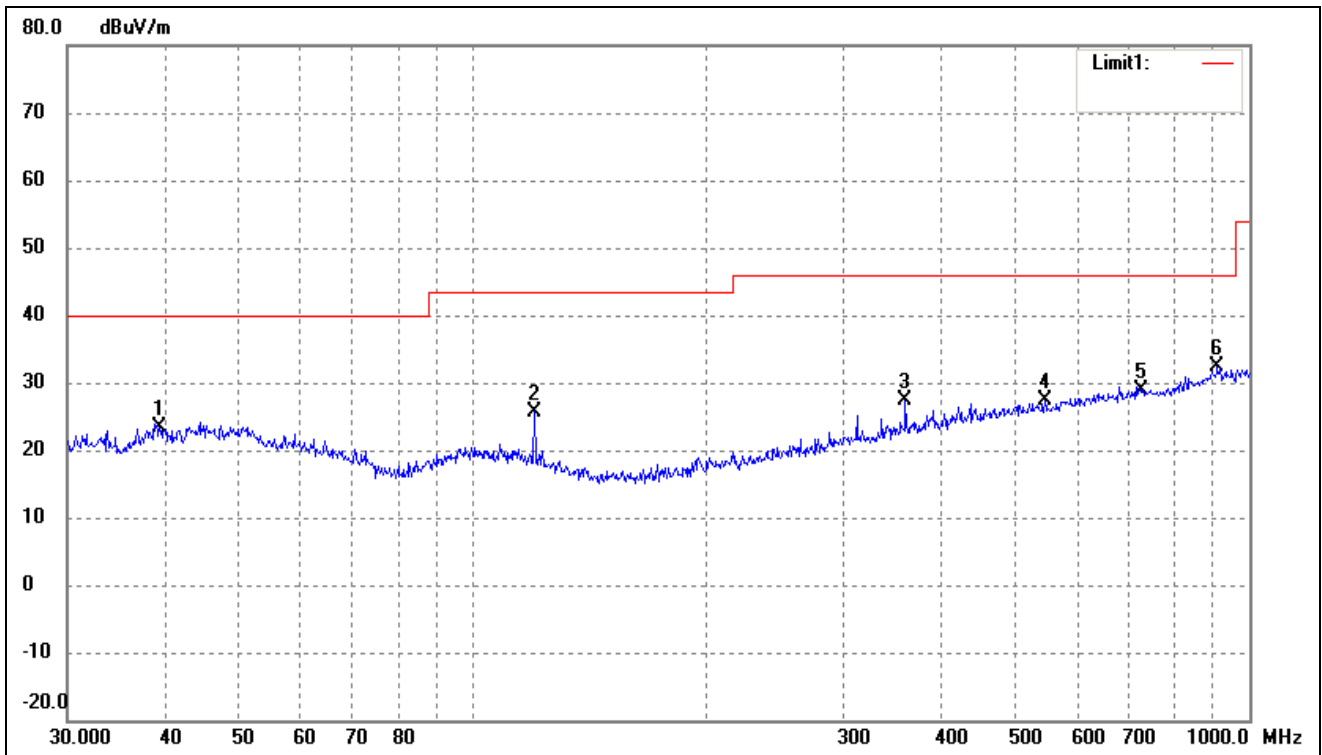
ANT1:

Test Channel	Low	Polarity:	Horizontal
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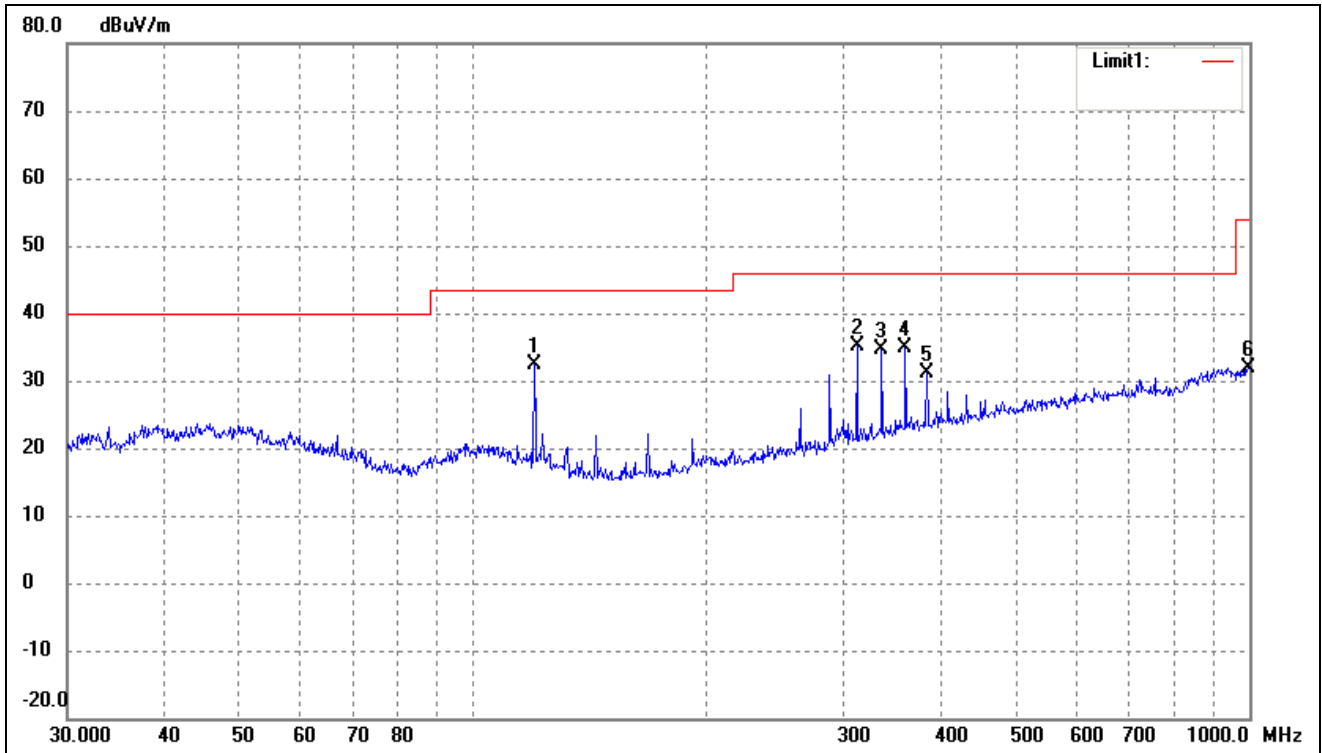
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	119.8556	46.23	-14.28	31.95	43.50	-11.55	-	-	peak
2	312.1794	43.70	-8.95	34.75	46.00	-11.25	-	-	peak
3	336.0352	42.52	-8.28	34.24	46.00	-11.76	-	-	peak
4	360.4476	42.20	-7.34	34.86	46.00	-11.14	-	-	peak
5	383.9318	38.42	-6.93	31.49	46.00	-14.51	-	-	peak
6	922.5157	30.31	1.83	32.14	46.00	-13.86	-	-	peak

Test Channel	Low	Polarity:	Vertical
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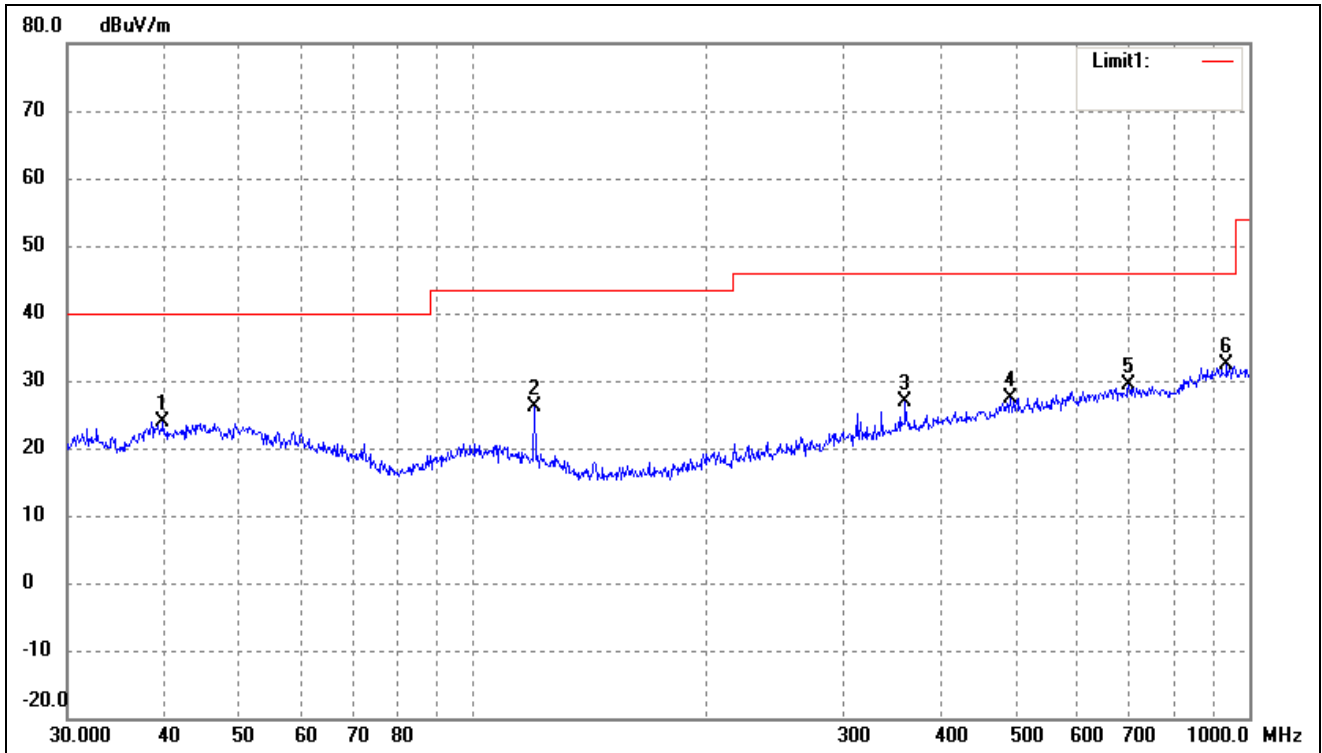
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.4371	35.51	-12.19	23.32	40.00	-16.68	-	-	peak
2	119.8555	40.03	-14.28	25.75	43.50	-17.75	-	-	peak
3	360.4476	34.76	-7.34	27.42	46.00	-18.58	-	-	peak
4	545.1825	31.25	-3.87	27.38	46.00	-18.62	-	-	peak
5	726.8052	29.99	-1.00	28.99	46.00	-17.01	-	-	peak
6	909.6666	30.63	1.67	32.30	46.00	-13.70	-	-	peak

Test Channel	Middle	Polarity:	Horizontal
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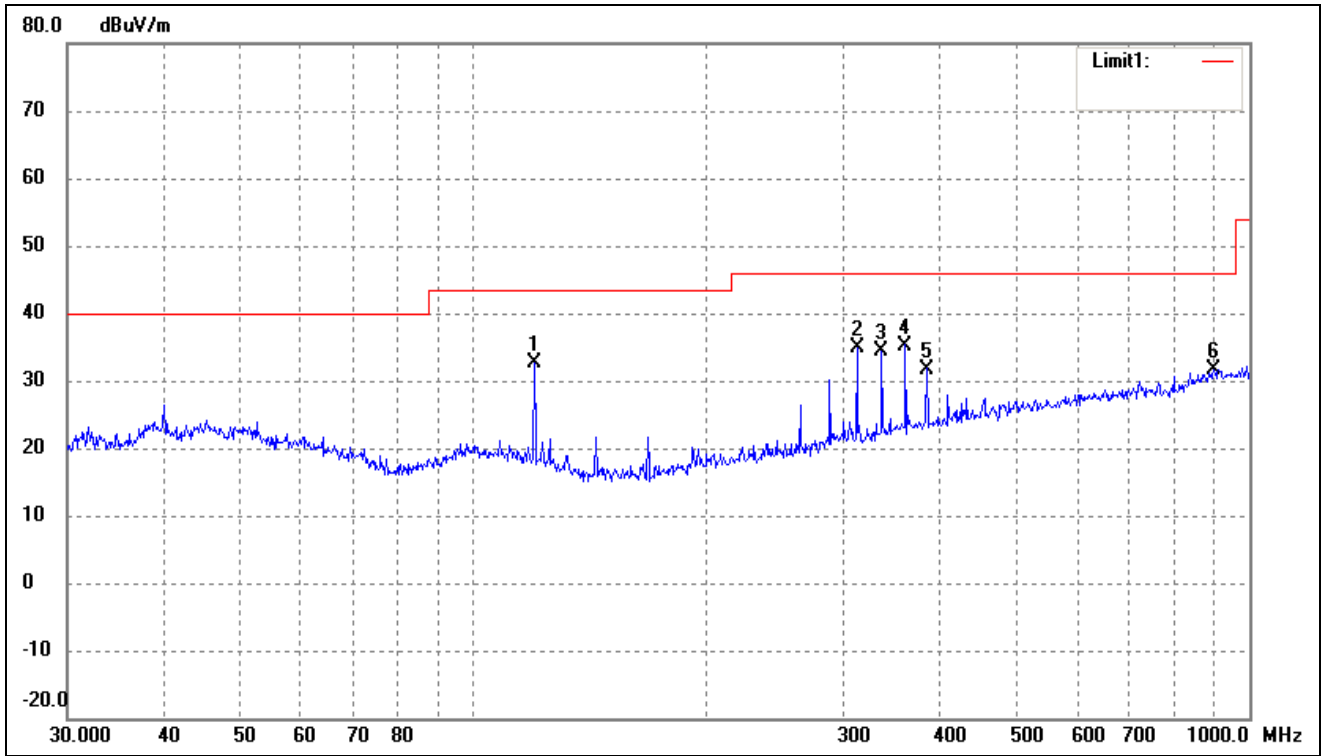
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	119.8556	46.70	-14.28	32.42	43.50	-11.08	-	-	peak
2	312.1794	44.09	-8.95	35.14	46.00	-10.86	-	-	peak
3	336.0352	42.93	-8.28	34.65	46.00	-11.35	-	-	peak
4	360.4476	42.16	-7.34	34.82	46.00	-11.18	-	-	peak
5	383.9318	38.02	-6.93	31.09	46.00	-14.91	-	-	peak
6	996.4996	30.15	1.83	31.98	54.00	-22.02	-	-	peak

Test Channel	Middle	Polarity:	Vertical
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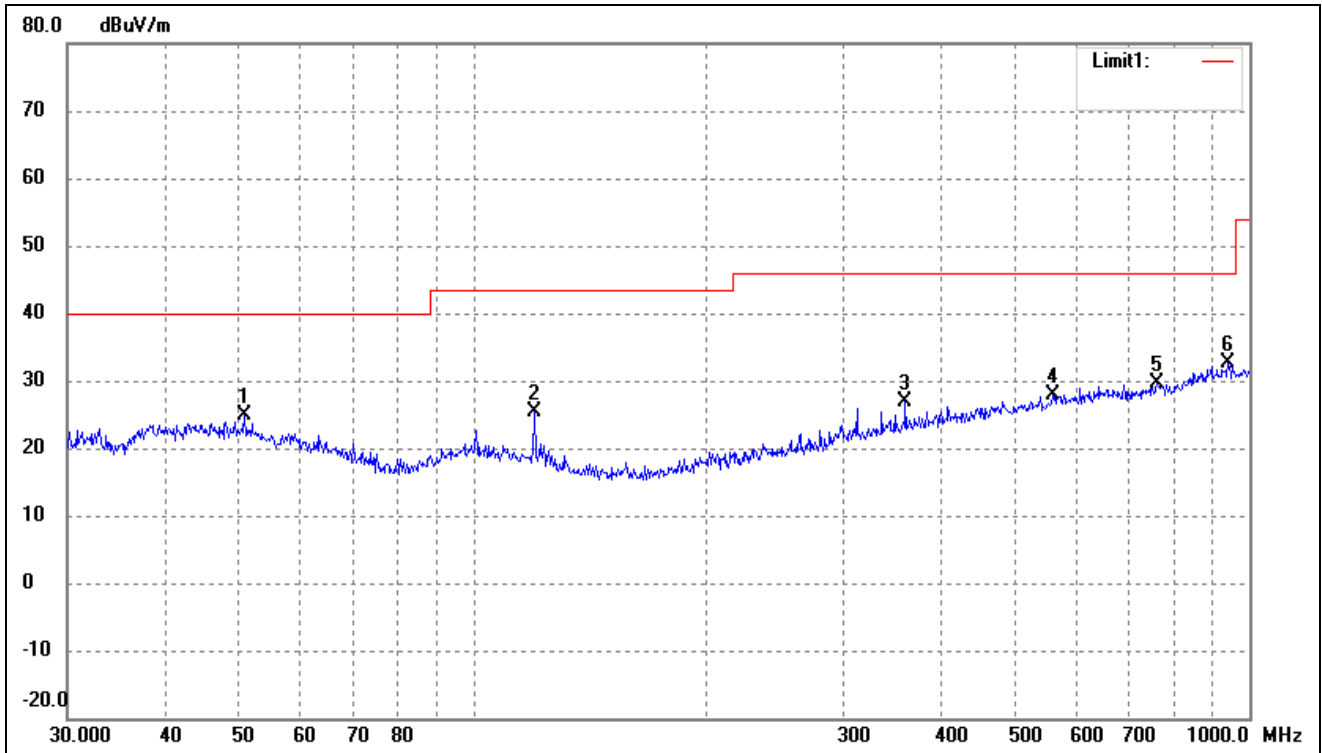
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.8542	35.84	-12.03	23.81	40.00	-16.19	-	-	peak
2	119.8556	40.31	-14.28	26.03	43.50	-17.47	-	-	peak
3	360.4476	34.11	-7.34	26.77	46.00	-19.23	-	-	peak
4	492.4685	31.72	-4.29	27.43	46.00	-18.57	-	-	peak
5	699.3046	31.28	-1.86	29.42	46.00	-16.58	-	-	peak
6	935.5463	30.81	1.65	32.46	46.00	-13.54	-	-	peak

Test Channel	High	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	119.8556	46.84	-14.28	32.56	43.50	-10.94	-	-	peak
2	312.1794	43.84	-8.95	34.89	46.00	-11.11	-	-	peak
3	336.0352	42.56	-8.28	34.28	46.00	-11.72	-	-	peak
4	360.4476	42.59	-7.34	35.25	46.00	-10.75	-	-	peak
5	383.9318	38.68	-6.93	31.75	46.00	-14.25	-	-	peak
6	900.1474	30.15	1.55	31.70	46.00	-14.30	-	-	peak

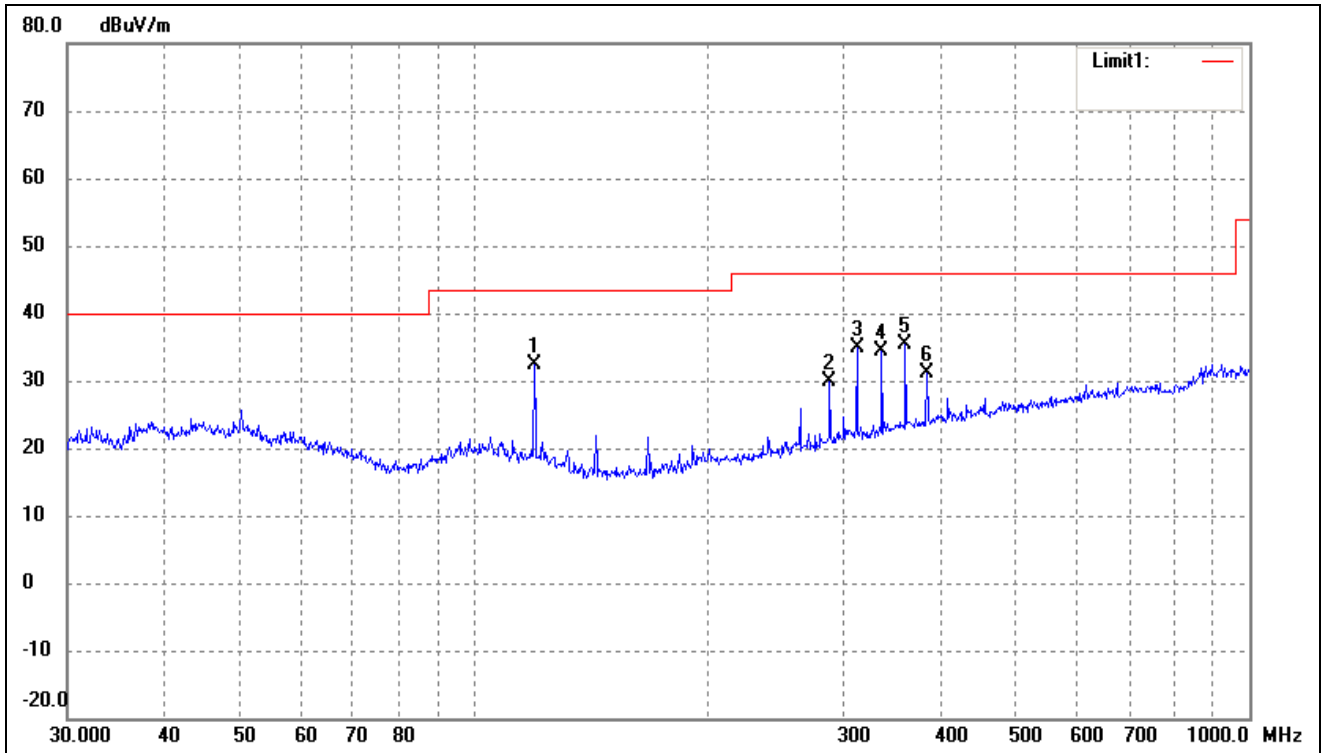
Test Channel	High	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.7637	36.58	-11.75	24.83	40.00	-15.17	-	-	peak
2	119.8556	39.60	-14.28	25.32	43.50	-18.18	-	-	peak
3	360.4476	34.14	-7.34	26.80	46.00	-19.20	-	-	peak
4	558.7302	31.25	-3.37	27.88	46.00	-18.12	-	-	peak
5	760.7036	30.72	-1.21	29.51	46.00	-16.49	-	-	peak
6	938.8326	30.96	1.59	32.55	46.00	-13.45	-	-	peak

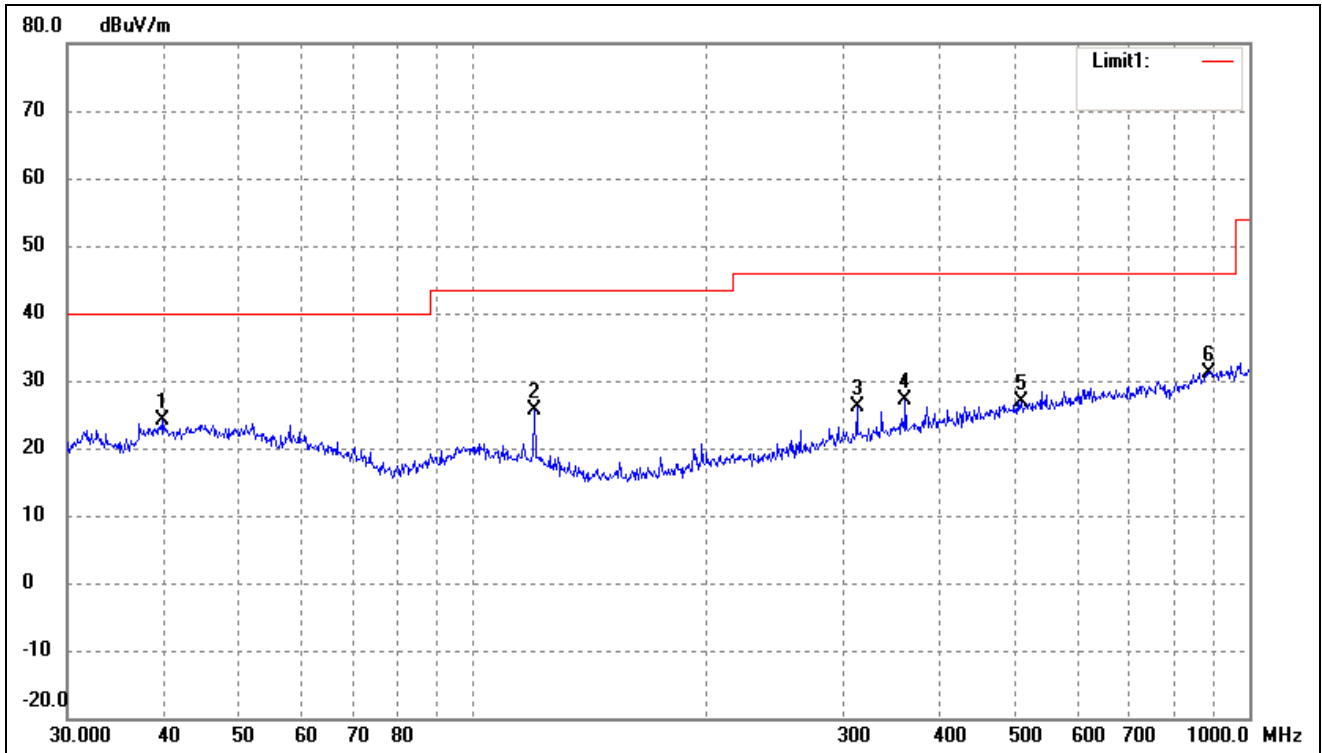
ANT2:

Test Channel	Low	Polarity:	Horizontal
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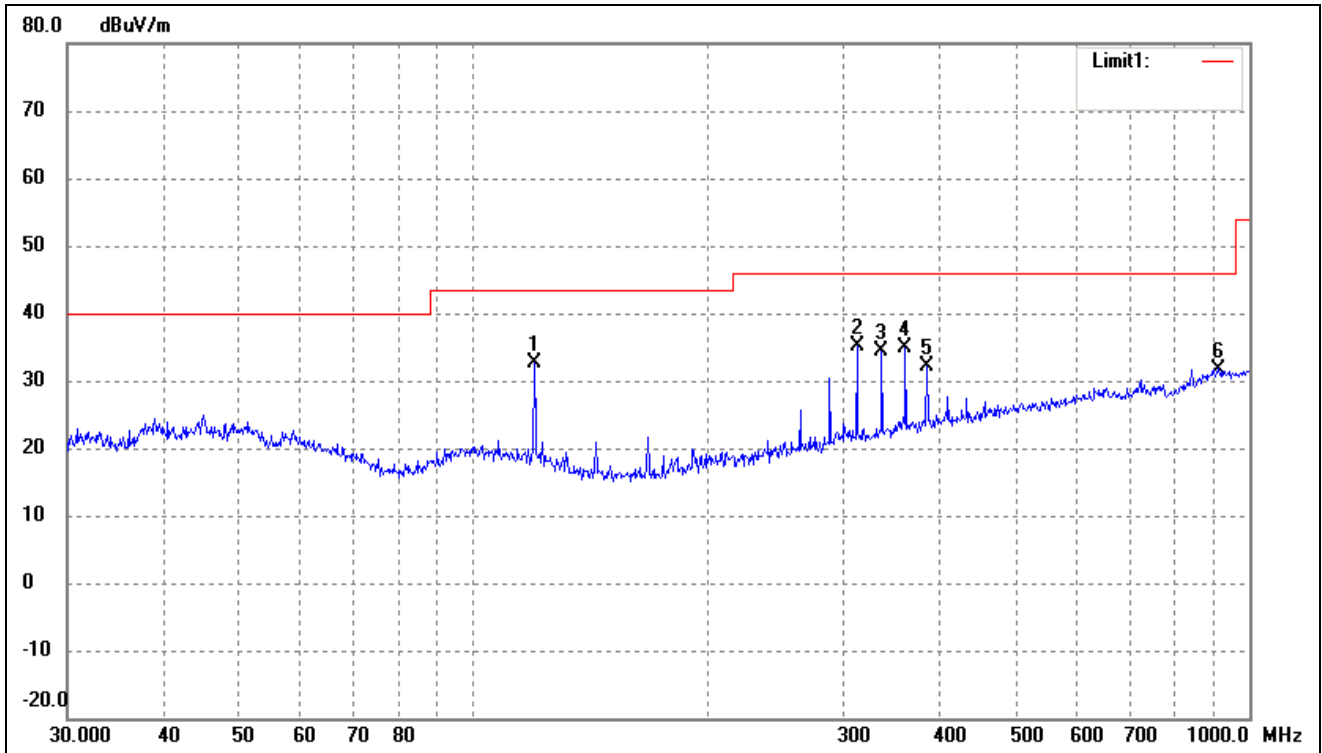
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	119.8556	46.77	-14.28	32.49	43.50	-11.01	-	-	peak
2	287.9904	39.74	-9.81	29.93	46.00	-16.07	-	-	peak
3	312.1794	43.85	-8.95	34.90	46.00	-11.10	-	-	peak
4	336.0352	42.65	-8.28	34.37	46.00	-11.63	-	-	peak
5	360.4477	42.76	-7.34	35.42	46.00	-10.58	-	-	peak
6	383.9318	38.09	-6.93	31.16	46.00	-14.84	-	-	peak

Test Channel	Low	Polarity:	Vertical
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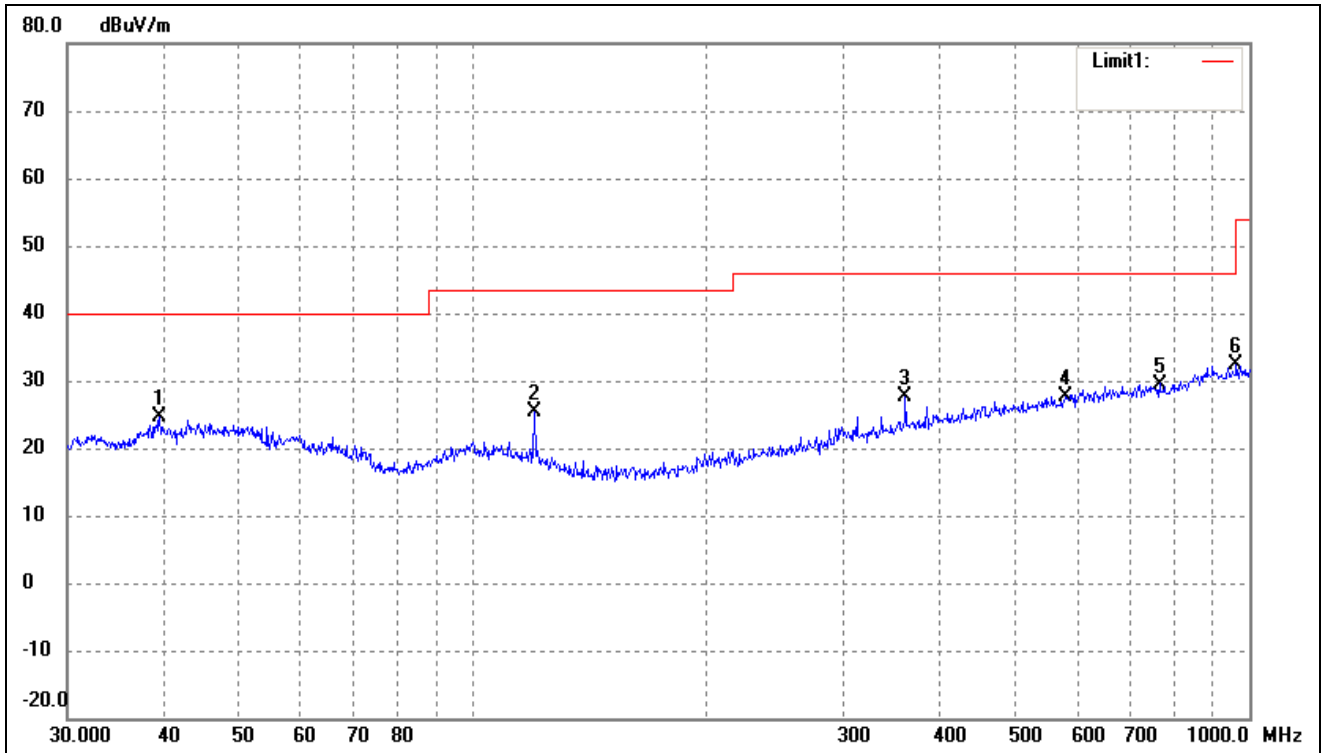
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.7146	36.28	-12.09	24.19	40.00	-15.81	-	-	peak
2	119.8556	39.92	-14.28	25.64	43.50	-17.86	-	-	peak
3	312.1794	35.11	-8.95	26.16	46.00	-19.84	-	-	peak
4	360.4476	34.57	-7.34	27.23	46.00	-18.77	-	-	peak
5	508.2582	31.04	-4.09	26.95	46.00	-19.05	-	-	peak
6	887.6099	30.10	1.05	31.15	46.00	-14.85	-	-	peak

Test Channel	Middle	Polarity:	Horizontal
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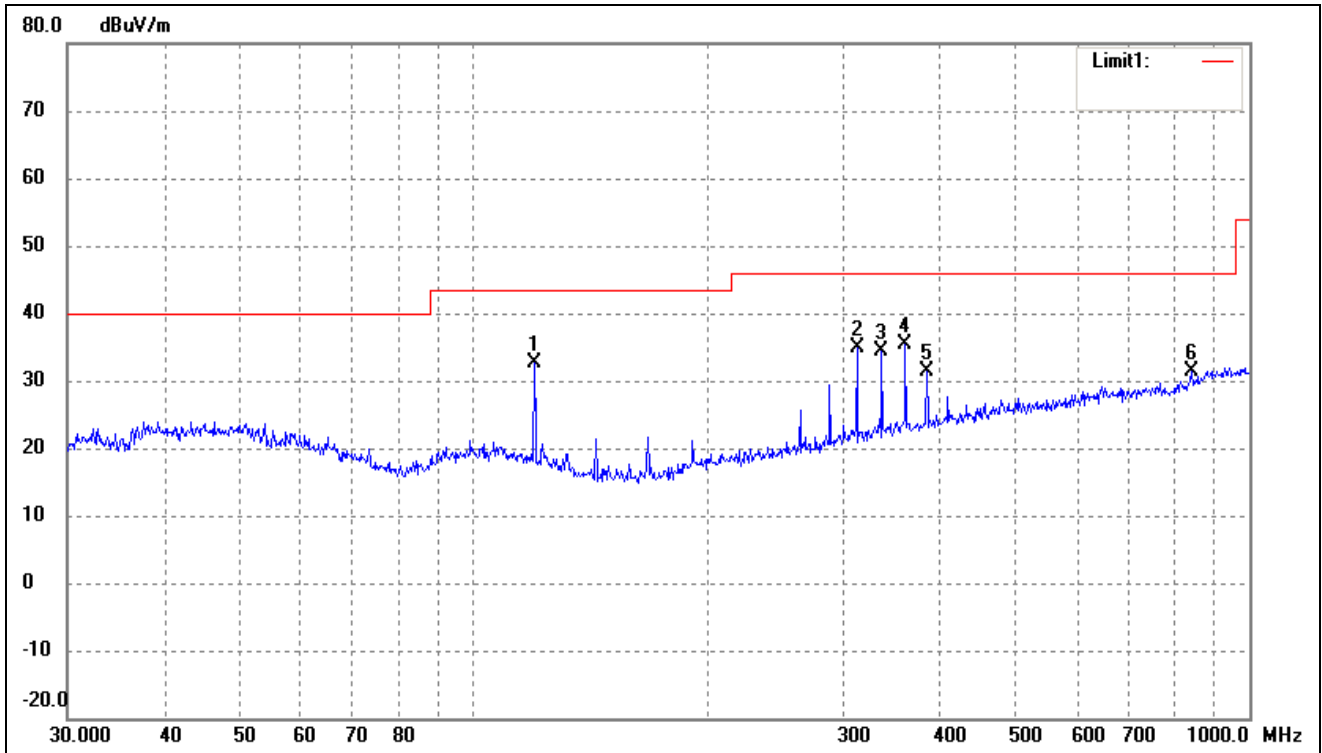
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	119.8556	46.91	-14.28	32.63	43.50	-10.87	-	-	peak
2	312.1794	44.05	-8.95	35.10	46.00	-10.90	-	-	peak
3	336.0352	42.76	-8.28	34.48	46.00	-11.52	-	-	peak
4	360.4476	42.26	-7.34	34.92	46.00	-11.08	-	-	peak
5	383.9318	38.99	-6.93	32.06	46.00	-13.94	-	-	peak
6	912.8620	30.04	1.71	31.75	46.00	-14.25	-	-	peak

Test Channel	Middle	Polarity:	Vertical
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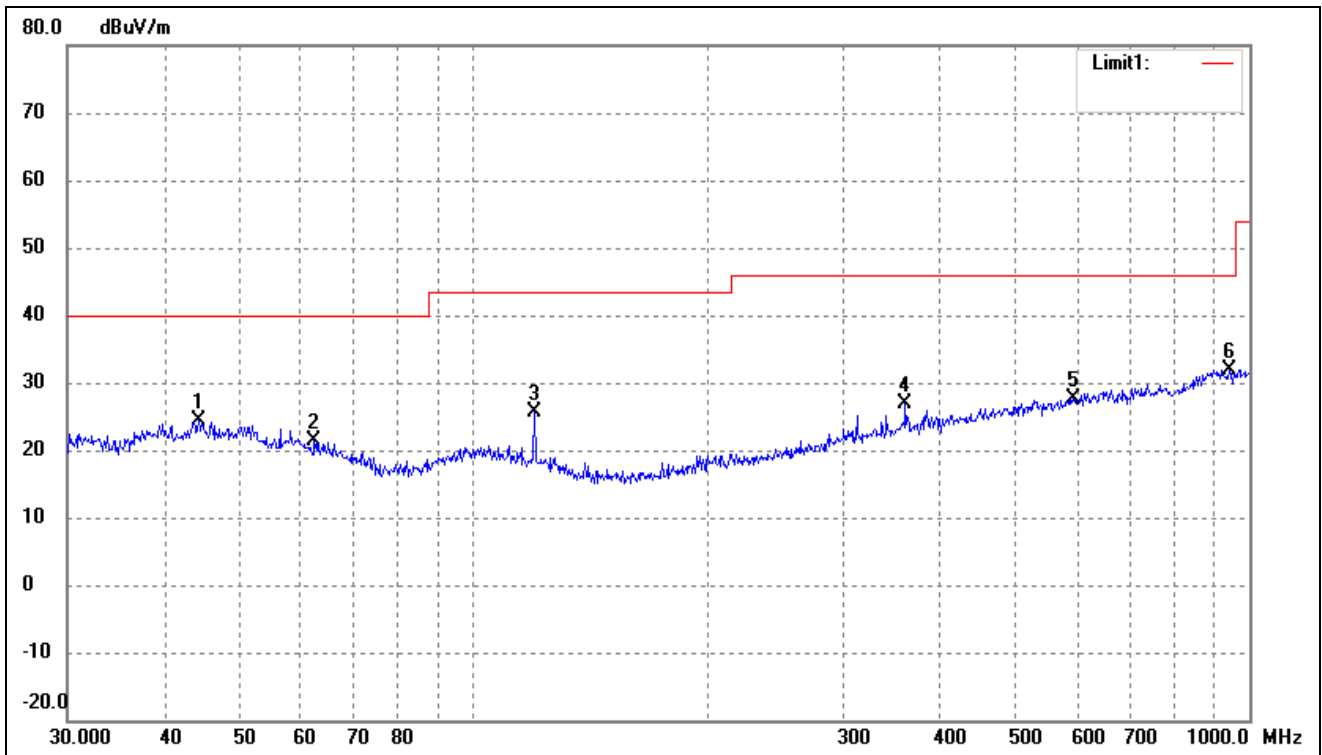
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.4371	36.71	-12.19	24.52	40.00	-15.48	-	-	peak
2	119.8556	39.78	-14.28	25.50	43.50	-18.00	-	-	peak
3	360.4476	34.88	-7.34	27.54	46.00	-18.46	-	-	peak
4	580.7026	30.15	-2.42	27.73	46.00	-18.27	-	-	peak
5	766.0571	30.66	-1.16	29.50	46.00	-16.50	-	-	peak
6	962.1623	30.99	1.41	32.40	54.00	-21.60	-	-	peak

Test Channel	High	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	119.8556	46.99	-14.28	32.71	43.50	-10.79	-	-	peak
2	312.1794	43.83	-8.95	34.88	46.00	-11.12	-	-	peak
3	336.0352	42.68	-8.28	34.40	46.00	-11.60	-	-	peak
4	360.4476	42.66	-7.34	35.32	46.00	-10.68	-	-	peak
5	383.9318	38.29	-6.93	31.36	46.00	-14.64	-	-	peak
6	842.1296	31.28	0.22	31.50	46.00	-14.50	-	-	peak

Test Channel	High	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	44.2752	36.12	-11.83	24.29	40.00	-15.71	-	-	peak
2	62.4314	34.92	-13.45	21.47	40.00	-18.53	-	-	peak
3	119.8556	39.90	-14.28	25.62	43.50	-17.88	-	-	peak
4	360.4476	34.22	-7.34	26.88	46.00	-19.12	-	-	peak
5	593.0497	29.64	-2.11	27.53	46.00	-18.47	-	-	peak
6	942.1305	30.41	1.51	31.92	46.00	-14.08	-	-	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***ANT1:**

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2406MHz							
2404	114.05	-9.48	104.57	114	-9.43	H	PK
2406	101.35	-9.47	91.88	94	-2.12	H	AV
4809	61.77	-4.51	57.26	74.00	-16.74	H	PK
4809	40.01	-4.51	35.50	54.00	-18.50	H	AV
7218	49.39	-2.20	47.19	74.00	-26.81	H	PK
2405	90.14	-9.47	80.67	114	-33.33	V	PK
2405	89.95	-9.47	80.48	94	-13.52	V	AV
4809	61.84	-4.51	57.33	74.00	-16.67	V	PK
4809	40.08	-4.51	35.57	54.00	-18.43	V	AV
7218	51.32	-2.20	49.12	74.00	-24.88	V	PK
Middle Channel-2439MHz							
2437	99.18	-9.4	89.78	114	-24.22	H	PK
2437	99.01	-9.4	89.61	94	-4.39	H	AV
4883	63.17	-4.47	58.70	74.00	-15.30	H	PK
4883	39.05	-4.47	34.58	54.00	-19.42	H	AV
7317	49.08	-2.17	46.91	74.00	-27.09	H	PK
2437	92.35	-9.4	82.95	114	-31.05	V	PK
2437	92.15	-9.4	82.75	94	-11.25	V	AV
4883	62.63	-4.47	58.16	74.00	-15.84	V	PK
4884	39.07	-4.47	34.60	54.00	-19.40	V	AV
7317	49.70	-2.17	47.53	74.00	-26.47	V	PK
High Channel-2478MHz							
2476	108.73	-9.33	99.4	114	-14.6	H	PK
2477	100.71	-9.33	91.38	94	-2.62	H	AV
4958	39.59	-4.42	35.17	54.00	-18.83	H	AV
4958	62.79	-4.41	58.38	74.00	-15.62	H	PK
7434	49.84	-2.14	47.70	74.00	-26.30	H	PK
2477	94.1	-9.33	84.77	114	-29.23	V	PK
2477	93.85	-9.33	84.52	94	-9.48	V	AV
4958	39.54	-4.42	35.12	54.00	-18.88	V	AV
4958	62.36	-4.41	57.95	74.00	-16.05	V	PK
7434	50.09	-2.14	47.95	74.00	-26.05	V	PK

ANT2:

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2406MHz							
2404	107	-9.48	97.52	114	-16.48	H	PK
2406	100.35	-9.47	90.88	94	-3.12	H	AV
4809	61.86	-4.51	57.35	74.00	-16.65	H	PK
4809	40.09	-4.51	35.58	54.00	-18.42	H	AV
7218	49.91	-2.20	47.71	74.00	-26.29	H	PK
2405	90.85	-9.47	81.38	114	-32.62	V	PK
2405	90.56	-9.47	81.09	94	-12.91	V	AV
4809	62.27	-4.51	57.76	74.00	-16.24	V	PK
4809	40.09	-4.51	35.58	54.00	-18.42	V	AV
7218	49.51	-2.20	47.31	74.00	-26.69	V	PK
Middle Channel-2439MHz							
2437	99.84	-9.4	90.44	114	-23.56	H	PK
2437	99.66	-9.4	90.26	94	-3.74	H	AV
4883	64.69	-4.47	60.22	74.00	-13.78	H	PK
4883	38.89	-4.47	34.42	54.00	-19.58	H	AV
7317	49.46	-2.17	47.29	74.00	-26.71	H	PK
2437	92.93	-9.4	83.53	114	-30.47	V	PK
2437	92.73	-9.4	83.33	94	-10.67	V	AV
4883	62.92	-4.47	58.45	74.00	-15.55	V	PK
4884	38.97	-4.47	34.50	54.00	-19.50	V	AV
7317	48.39	-2.17	46.22	74.00	-27.78	V	PK
High Channel-2478MHz							
2476	102.97	-9.33	93.64	114	-20.36	H	PK
2477	98.3	-9.33	88.97	94	-5.03	H	AV
4958	39.74	-4.42	35.32	54.00	-18.68	H	AV
4958	63.89	-4.41	59.48	74.00	-14.52	H	PK
7434	49.61	-2.14	47.47	74.00	-26.53	H	PK
2477	94.2	-9.33	84.87	114	-29.13	V	PK
2477	94	-9.33	84.67	94	-9.33	V	AV
4958	39.36	-4.42	34.94	54.00	-19.06	V	AV
4958	62.36	-4.41	57.95	74.00	-16.05	V	PK
7434	50.18	-2.14	48.04	74.00	-25.96	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 50 dB 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

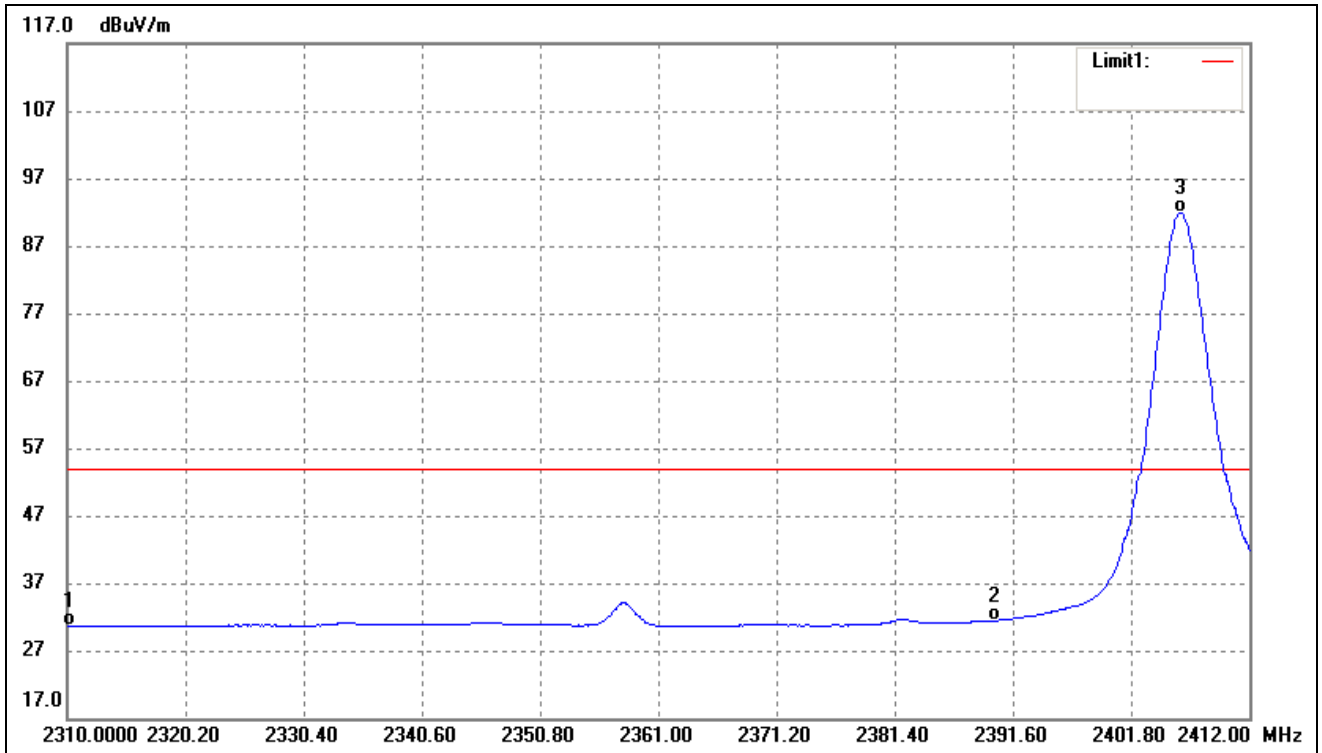
Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	<54 dBuV	Pass
Highest	2483.50	<54 dBuV	Pass
	2500.00	<54 dBuV	Pass

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.

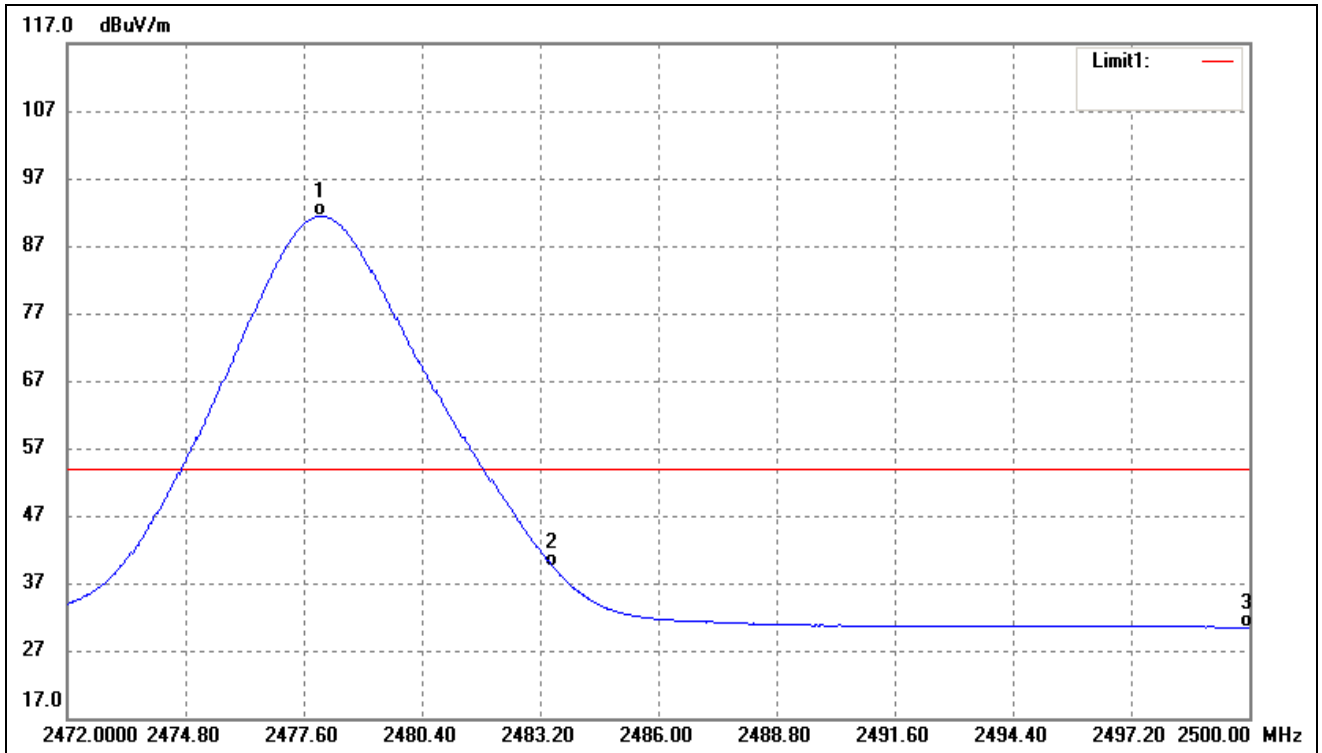
ANT1:

Test Channel	Low	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	40.24	-9.66	30.58	54.00	-23.42	Ave Detector
	2310.000	52.49	-9.66	42.83	74.00	-31.17	Peak Detector
2	2390.000	40.95	-9.50	31.45	54.00	-22.55	Ave Detector
	2390.000	53.69	-9.50	44.19	74.00	-29.81	Peak Detector
3	2406.084	101.35	-9.47	91.88	/	/	Ave Detector
	2404.554	114.05	-9.48	104.57	/	/	Peak Detector

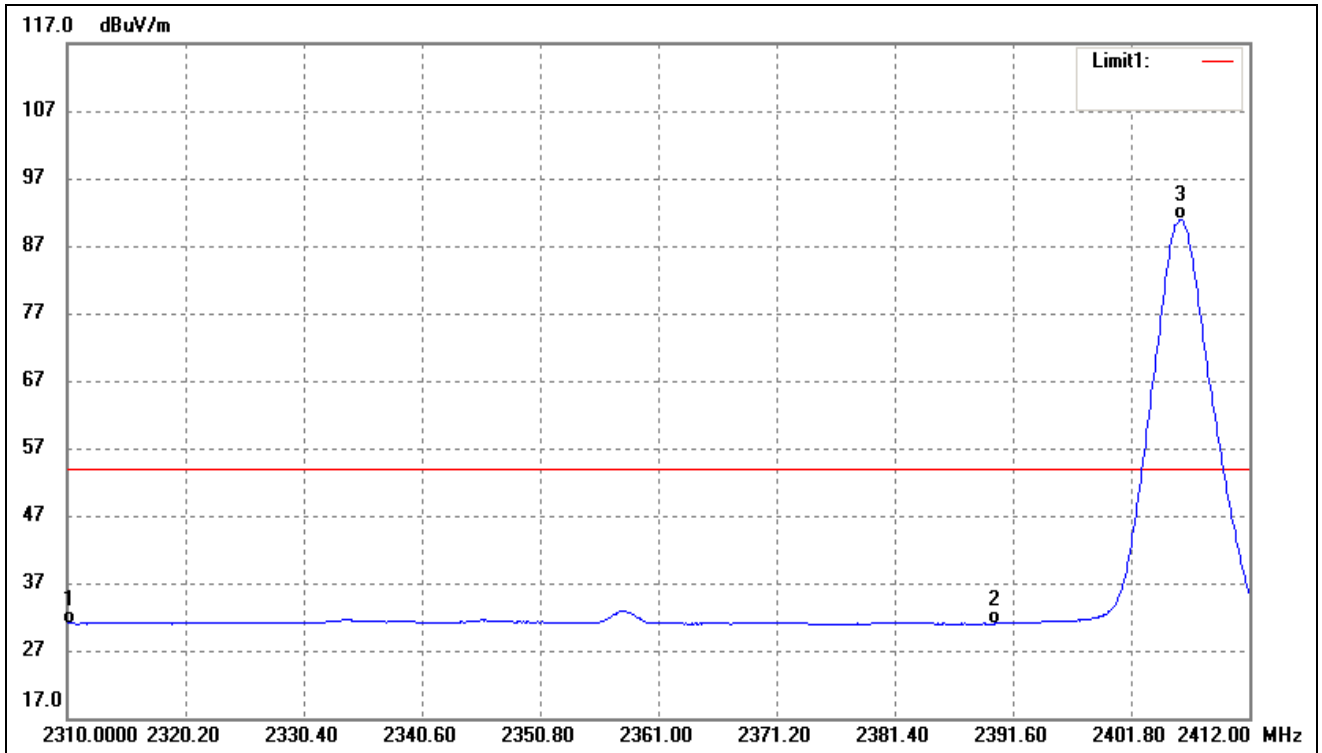
Test Channel	High	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2477.992	100.71	-9.33	91.38	/	/	Ave Detector
	2476.536	108.73	-9.33	99.40	/	/	Peak Detector
2	2483.500	48.68	-9.31	39.37	54.00	-14.63	Ave Detector
	2483.500	65.36	-9.31	56.05	74.00	-17.95	Peak Detector
3	2500.000	39.72	-9.28	30.44	54.00	-23.56	Ave Detector
	2500.000	51.00	-9.28	41.72	74.00	-32.28	Peak Detector

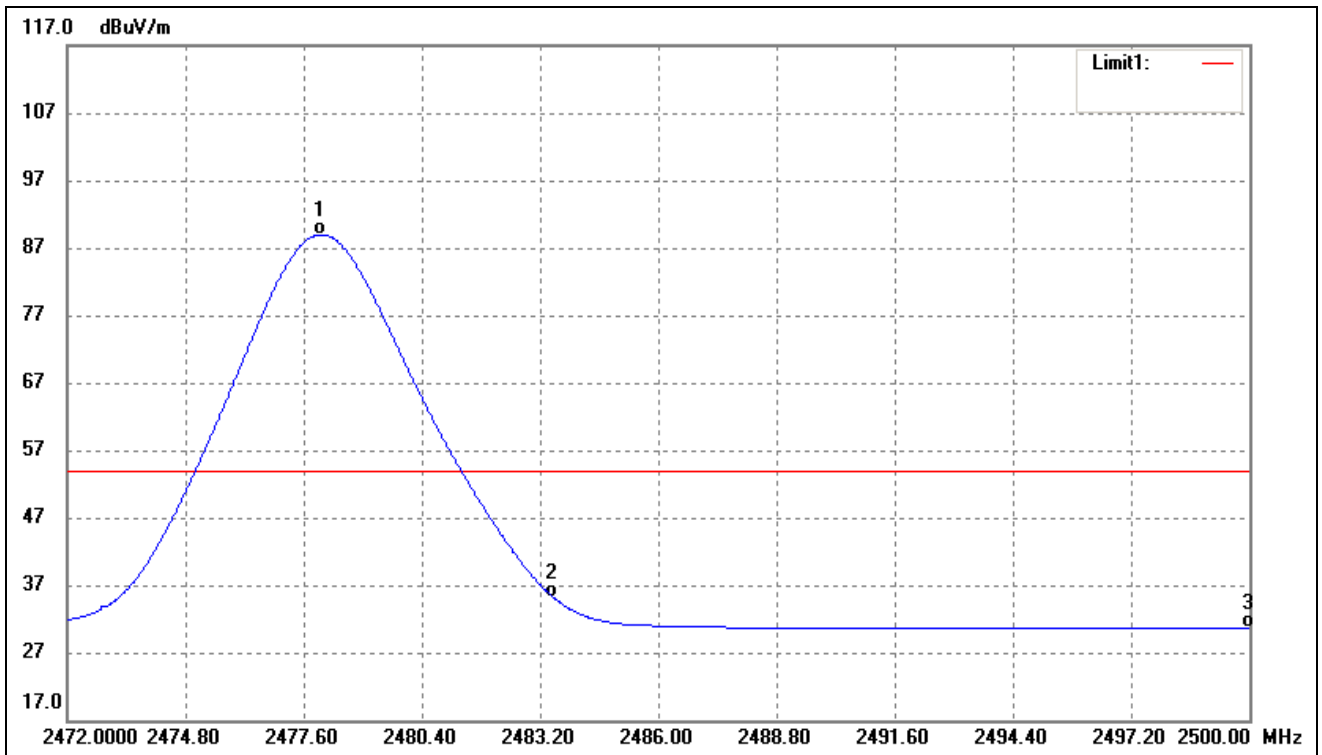
ANT2:

Test Channel	Low	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	40.66	-9.66	31.00	54.00	-23.00	Ave Detector
	2310.000	52.42	-9.66	42.76	74.00	-31.24	Peak Detector
2	2390.000	40.50	-9.50	31.00	54.00	-23.00	Ave Detector
	2390.000	52.98	-9.50	43.48	74.00	-30.52	Peak Detector
3	2406.084	100.35	-9.47	90.88	/	/	Ave Detector
	2404.656	107.00	-9.48	97.52	/	/	Peak Detector

Test Channel	High	Polarity:	Horizontal (worst case)
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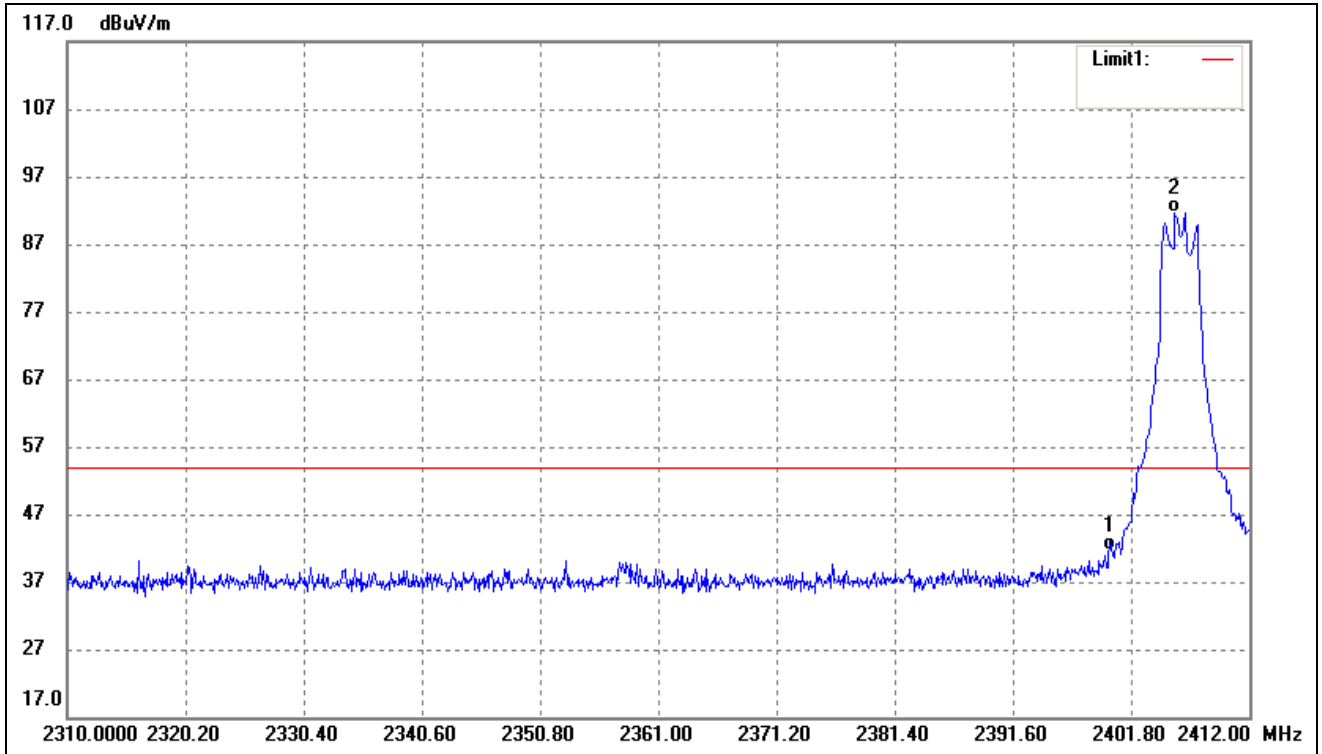


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2477.992	98.30	-9.33	88.97	/	/	Ave Detector
	2476.648	102.97	-9.33	93.64	/	/	Peak Detector
2	2483.500	44.52	-9.31	35.21	54.00	-18.79	Ave Detector
	2483.500	59.21	-9.31	49.90	74.00	-24.10	Peak Detector
3	2500.000	39.81	-9.28	30.53	54.00	-23.47	Ave Detector
	2500.000	51.47	-9.28	42.19	74.00	-31.81	Peak Detector

Band edge

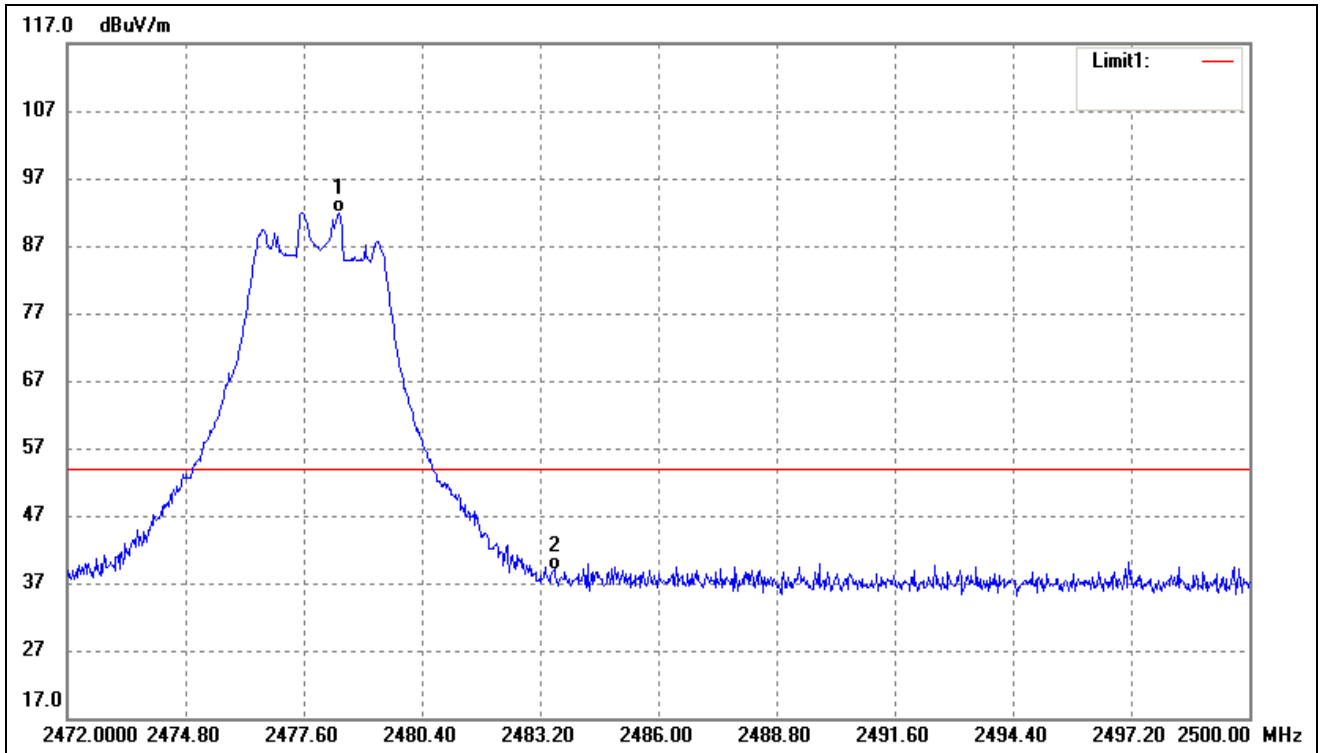
ANT1:

Test Channel	Low	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	51.11	-9.48	41.63	54.00	-12.37	Ave Detector
	2400.000	54.06	-9.48	44.58	74.00	-29.42	Peak Detector
2	2405.574	101.23	-9.48	91.75	/	/	Ave Detector
	2405.676	113.39	-9.48	103.91	/	/	Peak Detector

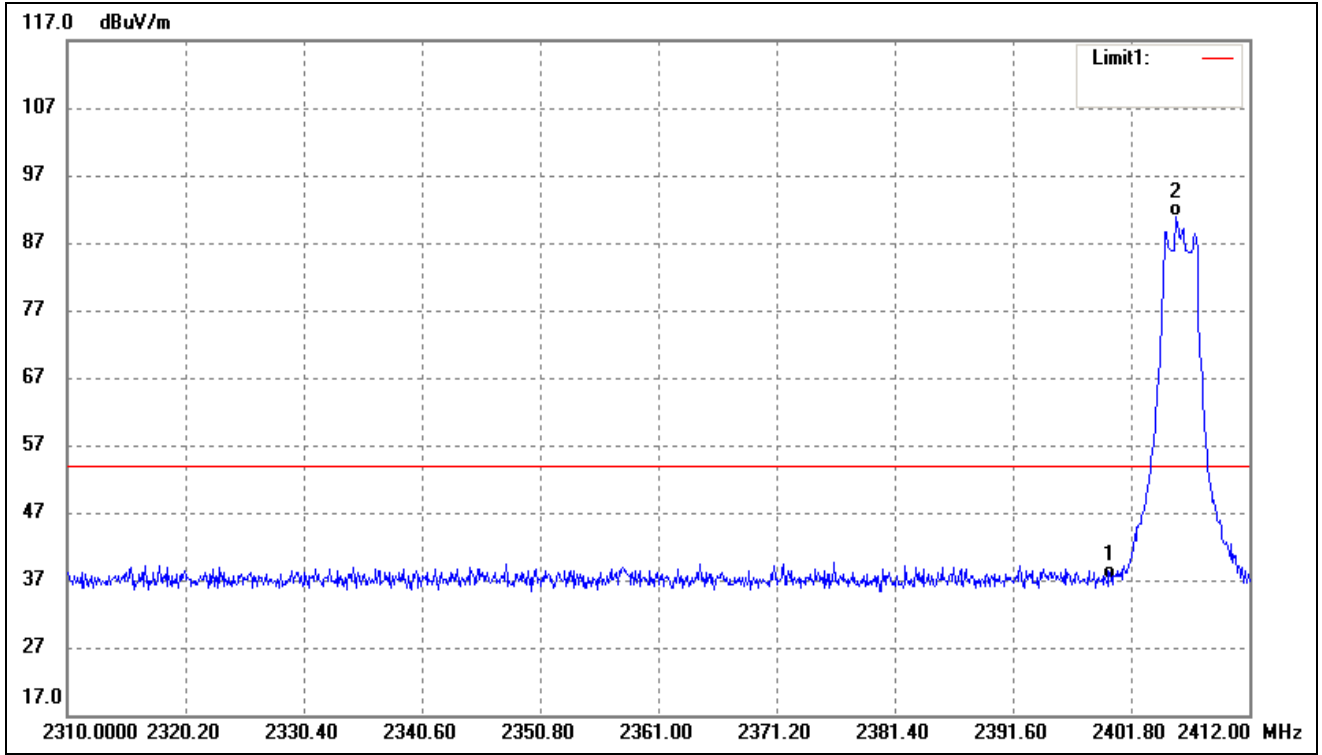
Test Channel	High	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2478.440	101.24	-9.33	91.91	/	/	Ave Detector
	2478.412	108.03	-9.33	98.70	/	/	Peak Detector
2	2483.500	48.28	-9.31	38.97	54.00	-15.03	Ave Detector
	2483.500	48.64	-9.31	39.33	74.00	-34.67	Peak Detector

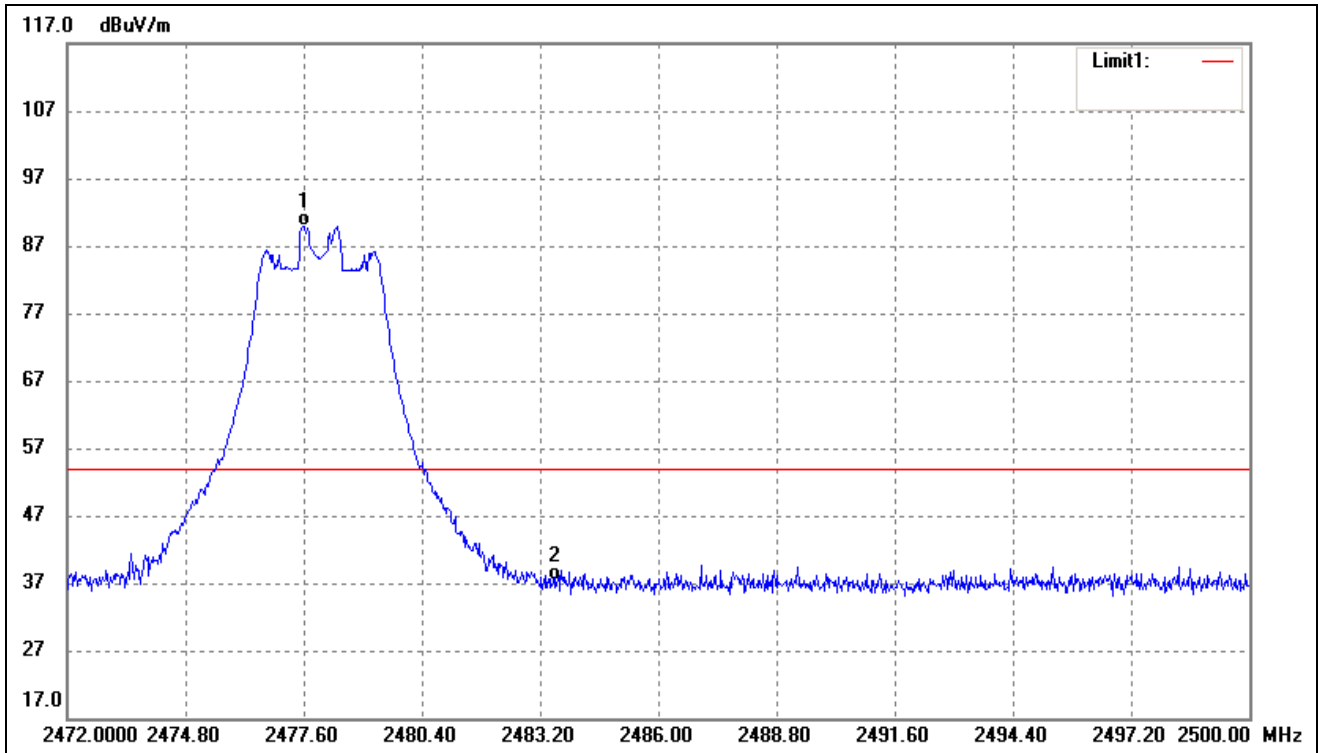
ANT2:

Test Channel	Low	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	46.54	-9.48	37.06	54.00	-16.94	Ave Detector
	2400.000	47.86	-9.48	38.38	74.00	-35.62	Peak Detector
2	2405.676	100.38	-9.48	90.90	/	/	Ave Detector
	2405.676	106.51	-9.48	97.03	/	/	Peak Detector

Test Channel	High	Polarity:	Horizontal (worst case)
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2477.600	99.31	-9.33	89.98	/	/	Ave Detector
	2478.412	101.87	-9.33	92.54	/	/	Peak Detector
2	2483.500	46.64	-9.31	37.33	54.00	-16.67	Ave Detector
	2483.500	46.43	-9.31	37.12	74.00	-36.88	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 20 dB 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

ANT1:

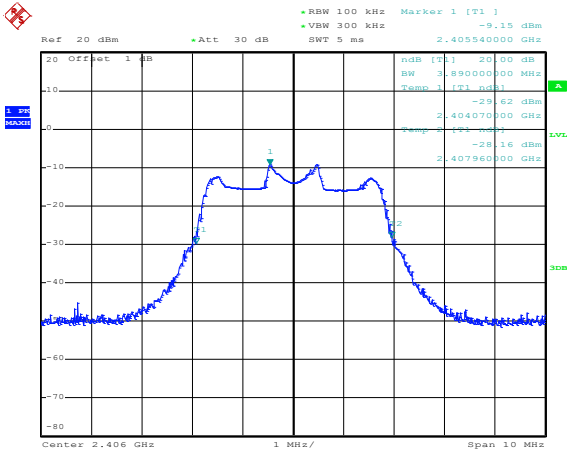
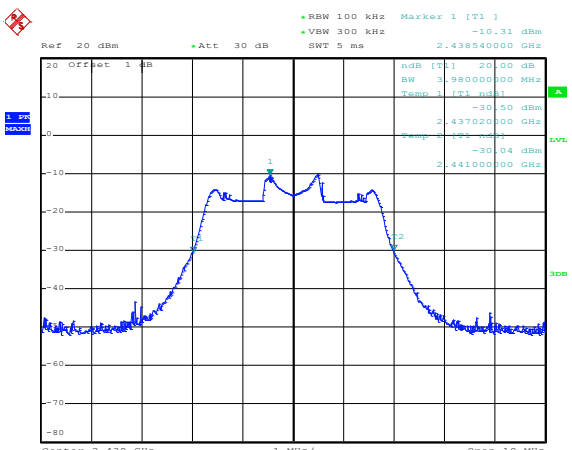
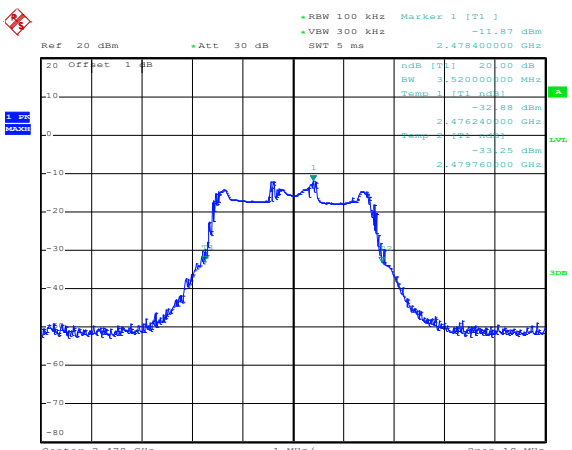
Test Channel	20dB Bandwidth(kHz)
Low Channel	3890
Middle Channel	3980
High Channel	3520

ANT2:

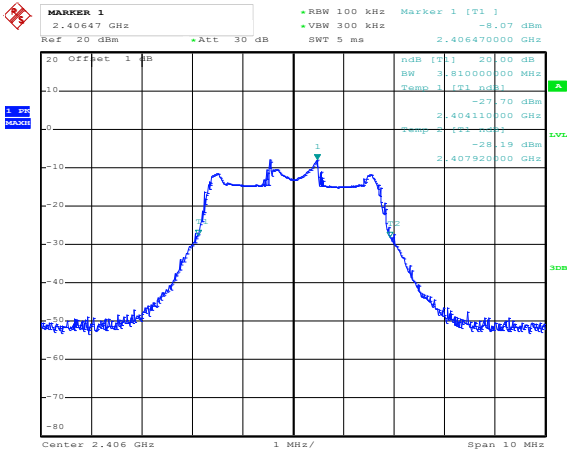
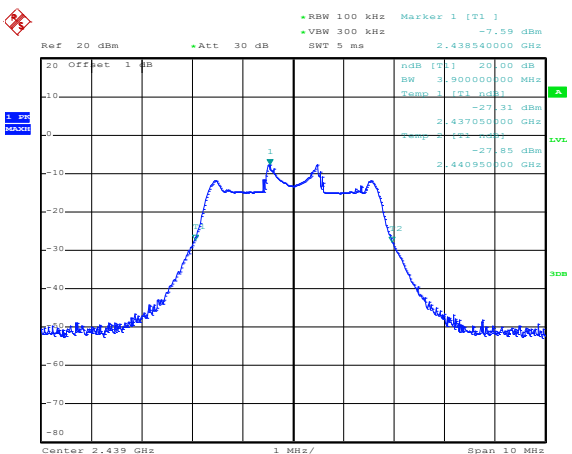
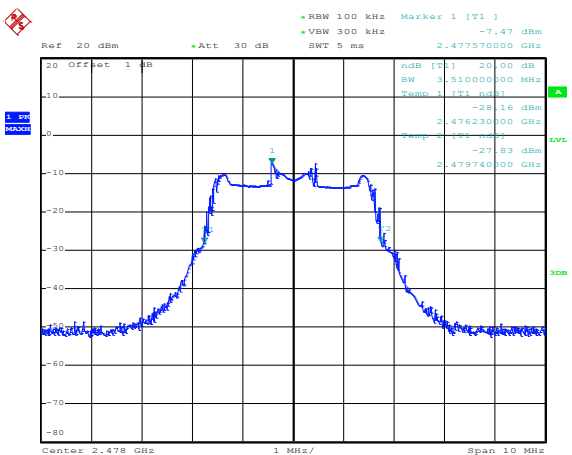
Test Channel	20dB Bandwidth(kHz)
Low Channel	3810
Middle Channel	3900
High Channel	3510

Please refer to the following test plots

ANT1:

<p>Low Channel</p>	 <p>Date: 4.DEC.2020 17:15:29</p>
<p>Middle Channel</p>	 <p>Date: 4.DEC.2020 17:16:05</p>
<p>High Channel</p>	 <p>Date: 4.DEC.2020 17:19:23</p>

ANT2:

<p>Low Channel</p>	 <p>MARKER 1 2.40647 GHz Ref: 20 dBm Att: 30 dB SWT 5 ms</p> <p>RBW 100 kHz VBW 300 kHz Marker 1 [T1] -8.07 dBm 2.406470000 GHz</p> <p>ndB [T1] 20.00 dB BW 3.810000000 MHz Temp 1 [T1] ndB</p> <p>-27.70 dBm 2.404110000 GHz -28.19 dBm 2.407920000 GHz</p> <p>Center 2.406 GHz 1 MHz/ Span 10 MHz</p> <p>Date: 4.DEC.2020 17:25:48</p>
<p>Middle Channel</p>	 <p>MARKER 1 [T1] Ref: 20 dBm Att: 30 dB SWT 5 ms</p> <p>RBW 100 kHz VBW 300 kHz Marker 1 [T1] -7.59 dBm 2.438540000 GHz</p> <p>ndB [T1] 20.00 dB BW 3.900000000 MHz Temp 1 [T1] ndB</p> <p>-27.31 dBm 2.437050000 GHz -27.85 dBm 2.440950000 GHz</p> <p>Center 2.439 GHz 1 MHz/ Span 10 MHz</p> <p>Date: 4.DEC.2020 17:26:09</p>
<p>High Channel</p>	 <p>MARKER 1 [T1] Ref: 20 dBm Att: 30 dB SWT 5 ms</p> <p>RBW 100 kHz VBW 300 kHz Marker 1 [T1] -7.47 dBm 2.477930000 GHz</p> <p>ndB [T1] 20.00 dB BW 3.810000000 MHz Temp 1 [T1] ndB</p> <p>-28.16 dBm 2.476230000 GHz -27.83 dBm 2.479740000 GHz</p> <p>Center 2.478 GHz 1 MHz/ Span 10 MHz</p> <p>Date: 4.DEC.2020 17:26:32</p>

7. Conducted Emissions

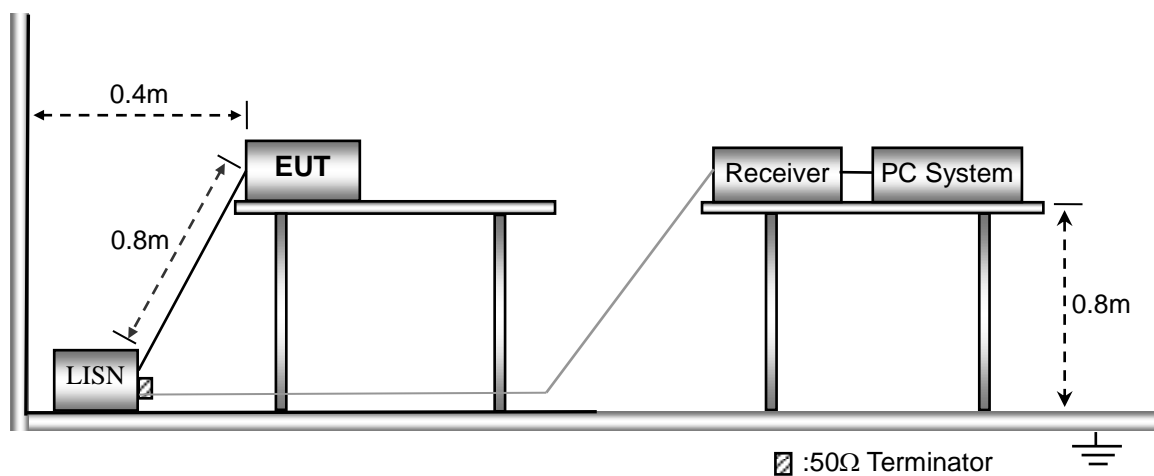
7.1 Test Procedure

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 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

7.2 Basic Test Setup Block Diagram



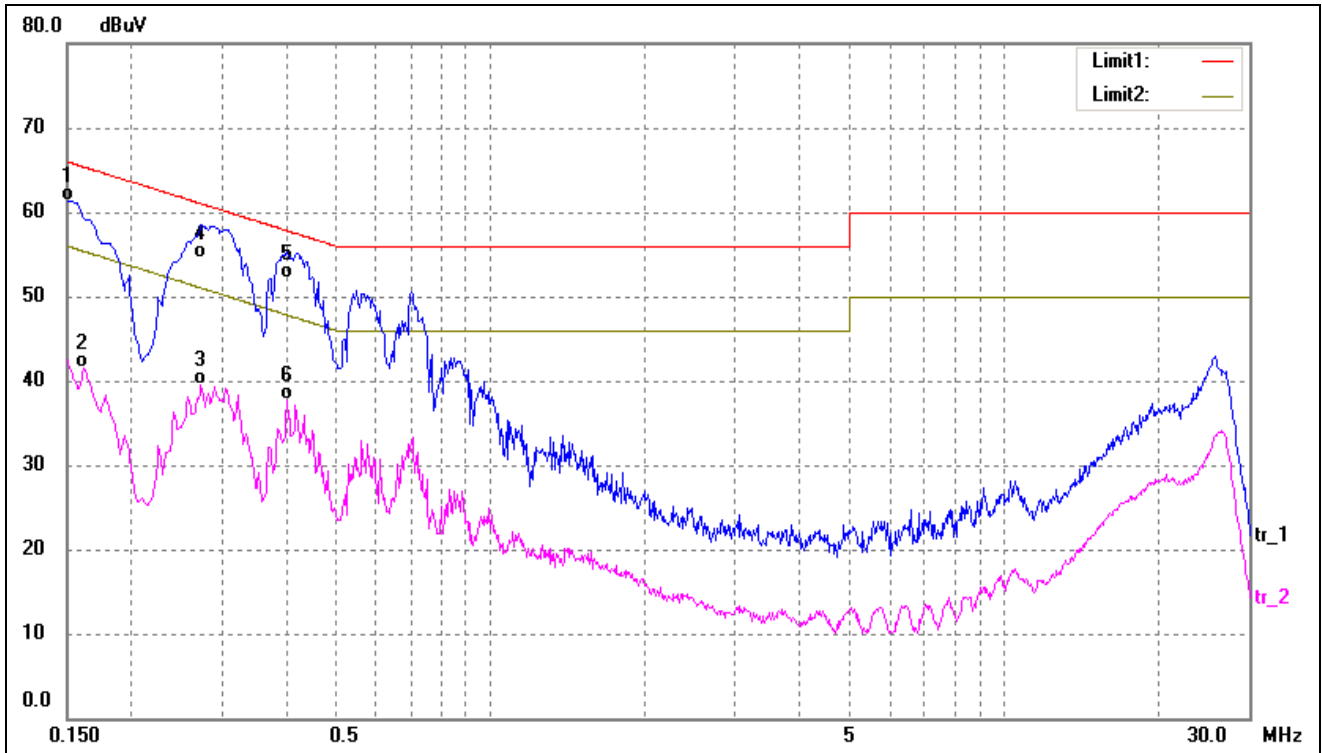
7.3 Test Receiver Setup

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

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

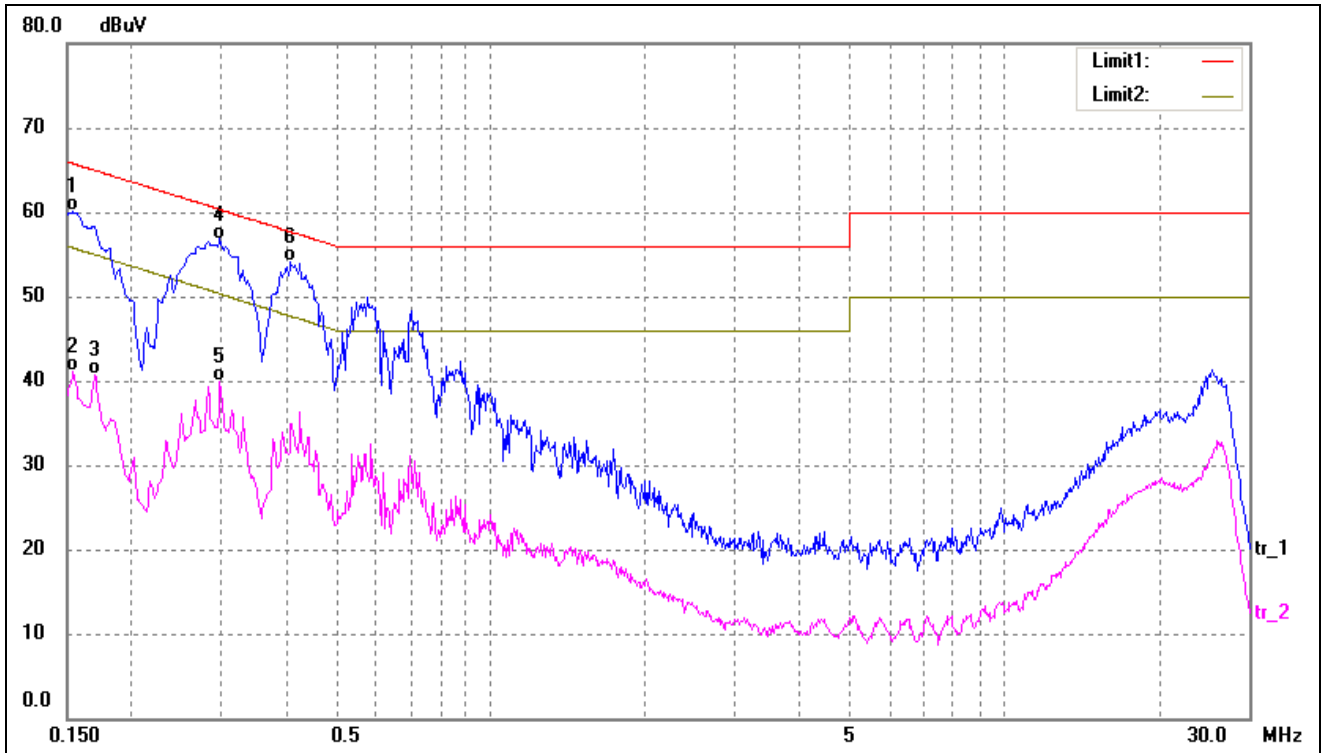
7.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	51.05	10.25	61.30	65.99	-4.69	QP
2	0.1620	31.32	10.26	41.58	55.36	-13.78	AVG
3	0.2740	29.19	10.25	39.44	50.99	-11.55	AVG
4	0.2759	44.20	10.25	54.45	60.94	-6.49	QP
5	0.4020	41.93	10.23	52.16	57.81	-5.65	QP
6	0.4020	27.56	10.23	37.79	47.81	-10.02	AVG

Test Mode	Communication	AC120V 60Hz	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1539	49.81	10.25	60.06	65.78	-5.72	QP
2	0.1539	30.87	10.25	41.12	55.78	-14.66	AVG
3	0.1700	30.54	10.25	40.79	54.96	-14.17	AVG
4	0.2980	46.56	10.24	56.80	60.30	-3.50	QP
5	0.2980	29.63	10.24	39.87	50.30	-10.43	AVG
6	0.4100	43.90	10.23	54.13	57.65	-3.52	QP

8. Duty Cycle

8.1 Standard Applicable

According to RSS-210 Issue 10 A1.2, for pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

8.2 Test Procedure

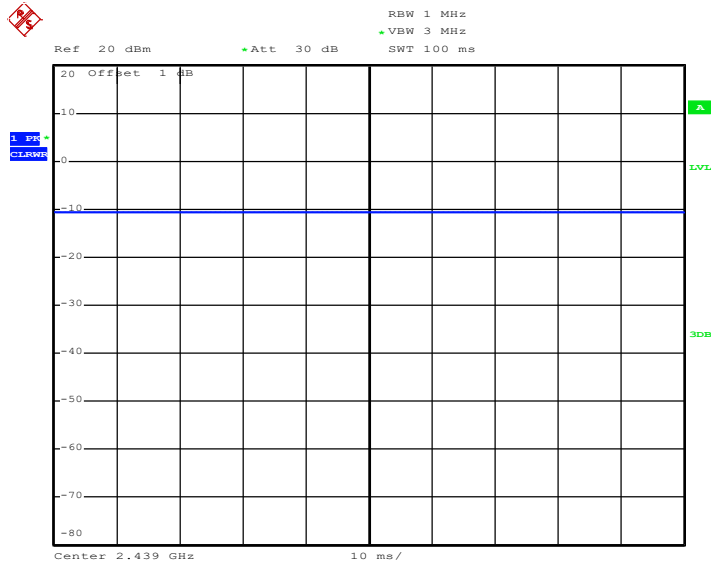
With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

8.3 Summary of Test Results/Plots

Test Frequency (MHz)	T _{on} time for single burst (ms)	T _{period} (ms)	Duty cycle %
2439	> 100	> 100	100

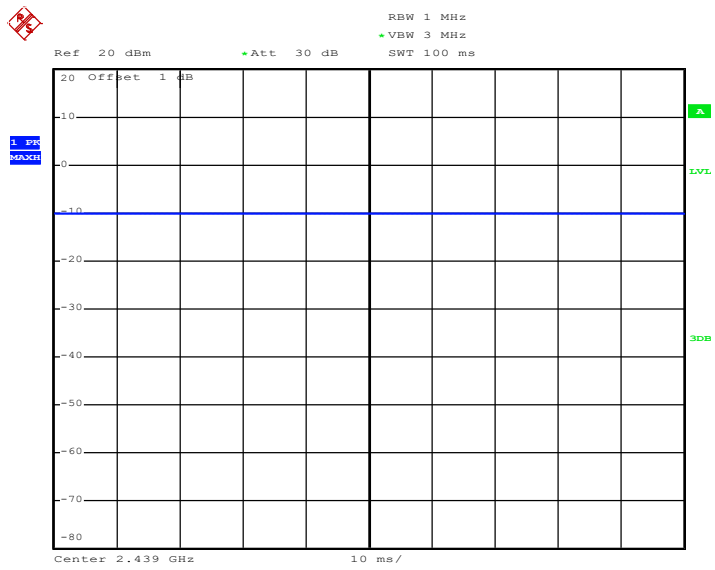
Please refer to the attached test plots

ANT1



Date: 4.DEC.2020 17:23:42

ANT2



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APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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