

TEST REPORT

Reference No..... : WTX23X08175513W
FCC ID : 2A3ZZ-IMHU100
Applicant : O-JIN CORPORATION
Address..... : 61-1, Seosomun-ro Seodaemun-gu, Seoul, South Korea
Manufacturer : The same as Applicant
Address..... : The same as Applicant
Product Name : 3in1 USB-C MULTIPOINT HUB
Model No..... : IMHU100
Standards : **FCC PART15 SUBPART B**
Date of Receipt sample ... : 2023-07-26
Date of Test..... : 2023-07-26 to 2023-08-03
Date of Issue : 2023-08-17
Test Report Form No. : WTX_FCC PART15B_001
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.

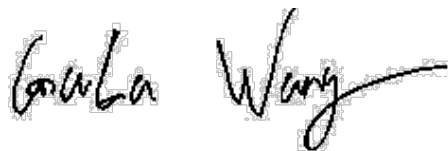
Prepared By:

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Tested by:



Gala Wang

Approved by:



Silin Chen

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Report version

Version No.	Date of issue	Description
Rev.00	2023-08-03	Original report WTX23X07161638E
Rev.01	2023-08-17	Refer the old report WTX23X07161638E, So the test data from the original report.
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	3in1 USB-C MULTIPORT HUB
Trade Name:	/
Model No.:	IMHU100
Adding Model(s):	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	DC 5V
Rated Current:	/
Rated Power:	/
Power Adapter Model:	/
Lowest Internal Frequency:	/
Highest Internal Frequency:	Above 108MHz
Classification of ITE:	Class B

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15 Subpart B:Unintentional Radiators.

ANSI C63.4-2014:American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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 C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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 Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark	Power Supply Mode
TM1	Working mode	Type-C port is connected to the Notebook Power supply port is connected to the Adapter HDMI port is connected to the Display USB-A Port is connected to the USB flash disk	DC 5V(Adapter input 230V50Hz)
TM2	Working mode	Type-C port is connected to the Notebook HDMI port is connected to the Display USB-A Port is connected to the USB flash disk USB-C port is connected to the Portable hard disk	DC 5V(Notebook input)

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
TYPE-C	0.13	Shielded	Without
TYPE-C	0.3	Shielded	Without

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	XiaoXinPro 14IHU 2021	PF2V9FG1
Display	Titan army	MF2EV	NBQW15014086G0091
USB disk	SanDisk	64GB	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
HDMI Cable	1.2	Shielded	Without Core

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	9-150kHz ± 3.74 dB
		0.15-30MHz ± 3.34 dB
Radiated Emissions	Radiated	30-200MHz ± 4.52 dB
		0.2-1GHz ± 5.56 dB
		1-6GHz ± 3.84 dB
		6-18GHz ± 3.92 dB

1.7 Test Equipment List and Details

Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
☒ Chamber A: Below 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2023-02-25	2024-02-24
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
Amplifier	HP	8447F	2805A03475	2023-02-25	2024-02-24
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☐ Chamber A: Above 1GHz					
Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
☐ Chamber B: Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
Amplifier	Agilent	8447D	2944A10179	2023-02-25	2024-02-24
☐ Chamber C: Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
Amplifier	HP	8447F	2944A03869	2023-02-25	2024-02-24
☐ Chamber C: Above 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24

Horn Antenna	POAM	RTF-11A	LP228060221	2023-03-10	2026-03-09
Amplifier	Tonscend	TAP01018050	AP22E806235	2023-02-25	2024-02-24
DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
☒ Conducted Room 1#					
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2023-02-25	2024-02-24
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2023-02-25	2024-02-24
AC LISN	Schwarz beck	NSLK8126	8126-224	2023-02-25	2024-02-24
☐ Conducted Room 2#					
EMI Test Receiver	Rohde & Schwarz	ESPI	10129	2023-02-25	2024-02-24
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

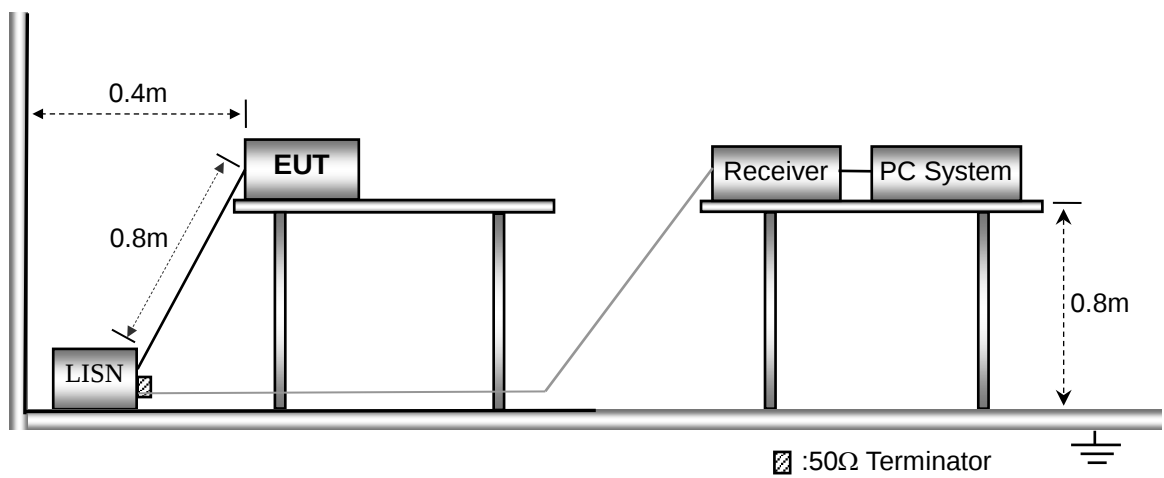
Description of Test	Result
§15.107(a) Conducted Emission	Compliant
§15.109(a) Radiated Emission	Compliant

3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

3.2 Basic Test Setup Block Diagram



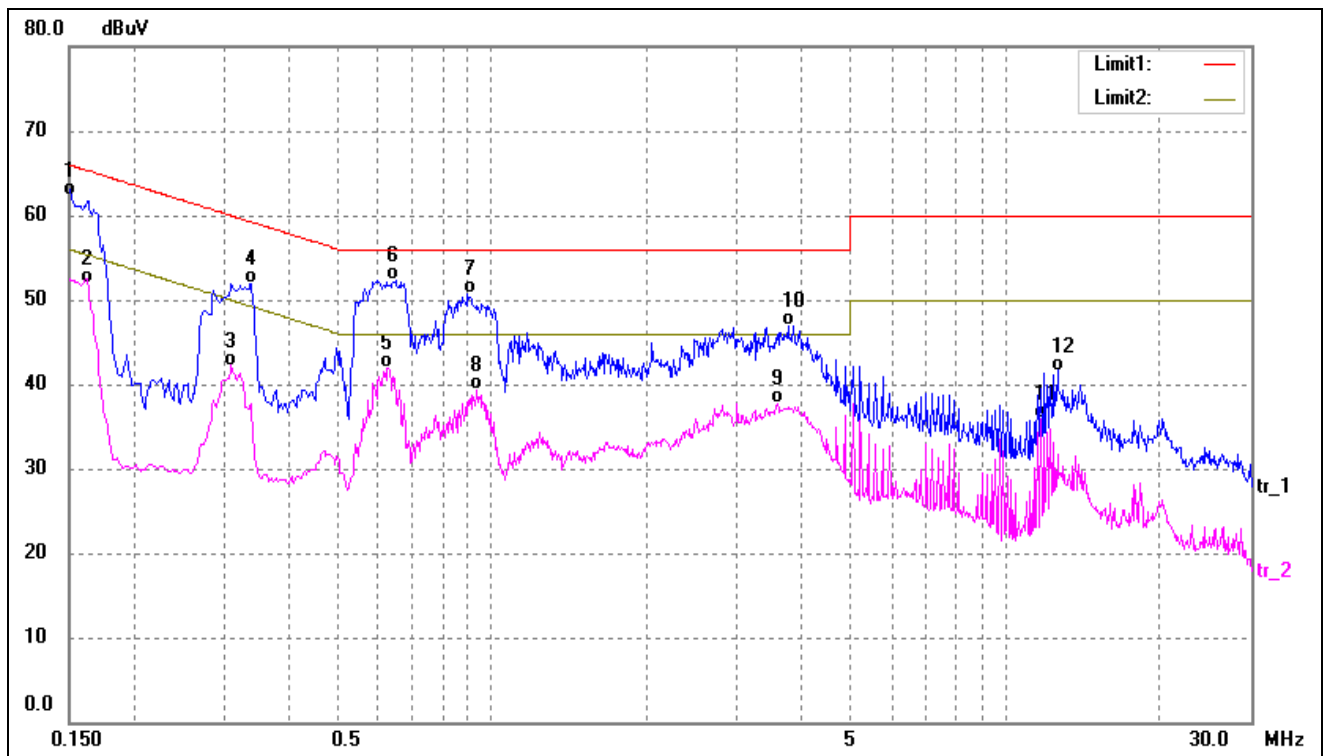
3.3 Environmental Conditions

Temperature:	23.5 °C
Relative Humidity:	54%
ATM Pressure:	998 mbar

3.4 Summary of Test Results

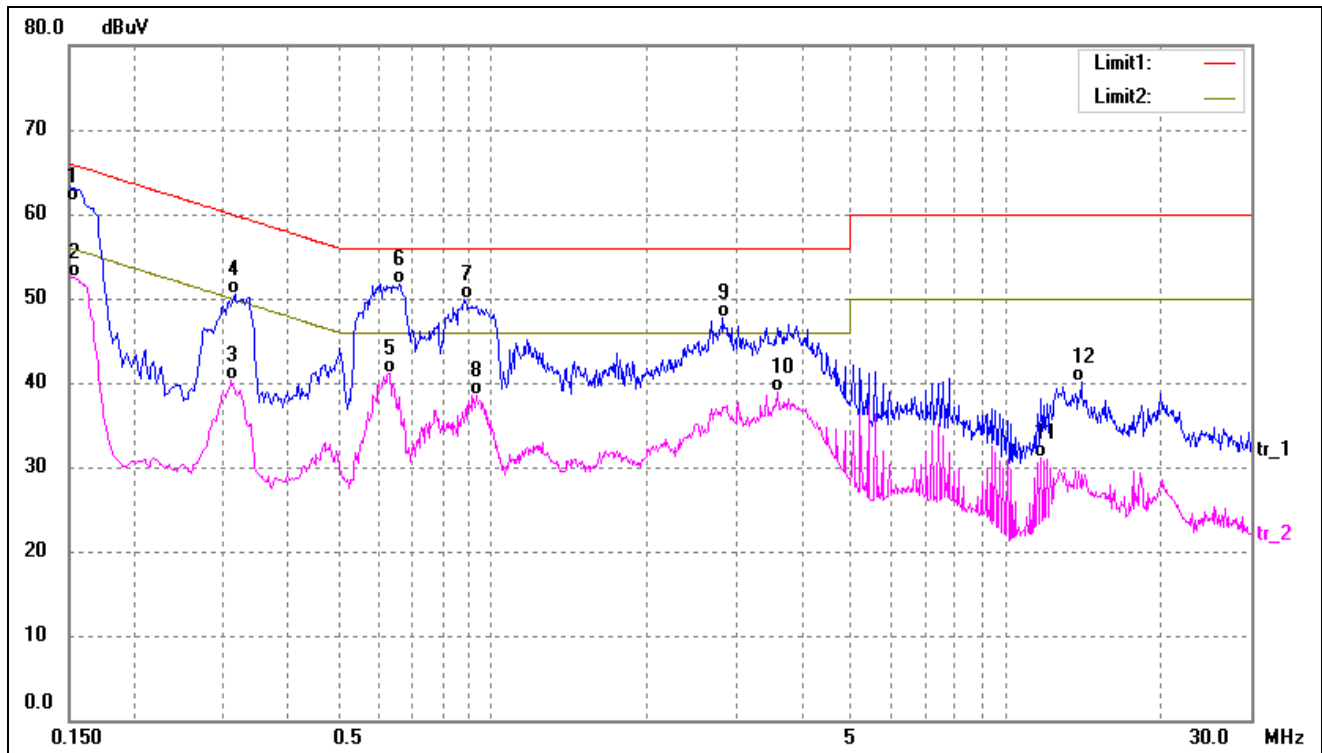
Look at the graphs and data below:

Test mode:	TM1	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1499	51.90	10.40	62.30	66.00	-3.70	QP
2*	0.1620	41.60	10.40	52.00	55.36	-3.36	AVG
3	0.3100	31.90	10.30	42.20	49.97	-7.77	AVG
4	0.3379	41.69	10.28	51.97	59.25	-7.28	QP
5	0.6260	31.62	10.20	41.82	46.00	-4.18	AVG
6	0.6500	42.03	10.20	52.23	56.00	-3.77	QP
7	0.8980	40.65	10.15	50.80	56.00	-5.20	QP
8	0.9340	29.11	10.15	39.26	46.00	-6.74	AVG
9	3.6020	27.38	10.36	37.74	46.00	-8.26	AVG
10	3.7780	36.55	10.36	46.91	56.00	-9.09	QP
11	11.6980	25.58	10.33	35.91	50.00	-14.09	AVG
12	12.5980	31.30	10.30	41.60	60.00	-18.40	QP

Test mode:	TM1	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	51.20	10.40	61.60	66.00	-4.40	QP
2*	0.1539	42.08	10.41	52.49	55.79	-3.30	AVG
3	0.3100	29.98	10.30	40.28	49.97	-9.69	AVG
4	0.3140	40.14	10.30	50.44	59.86	-9.42	QP
5	0.6300	30.96	10.20	41.16	46.00	-4.84	AVG
6	0.6580	41.45	10.20	51.65	56.00	-4.35	QP
7	0.8820	39.67	10.16	49.83	56.00	-6.17	QP
8	0.9300	28.42	10.15	38.57	46.00	-7.43	AVG
9	2.8179	37.38	10.34	47.72	56.00	-8.28	QP
10	3.5980	28.63	10.36	38.99	46.00	-7.01	AVG
11	11.6940	20.83	10.33	31.16	50.00	-18.84	AVG
12	14.0340	29.80	10.25	40.05	60.00	-19.95	QP

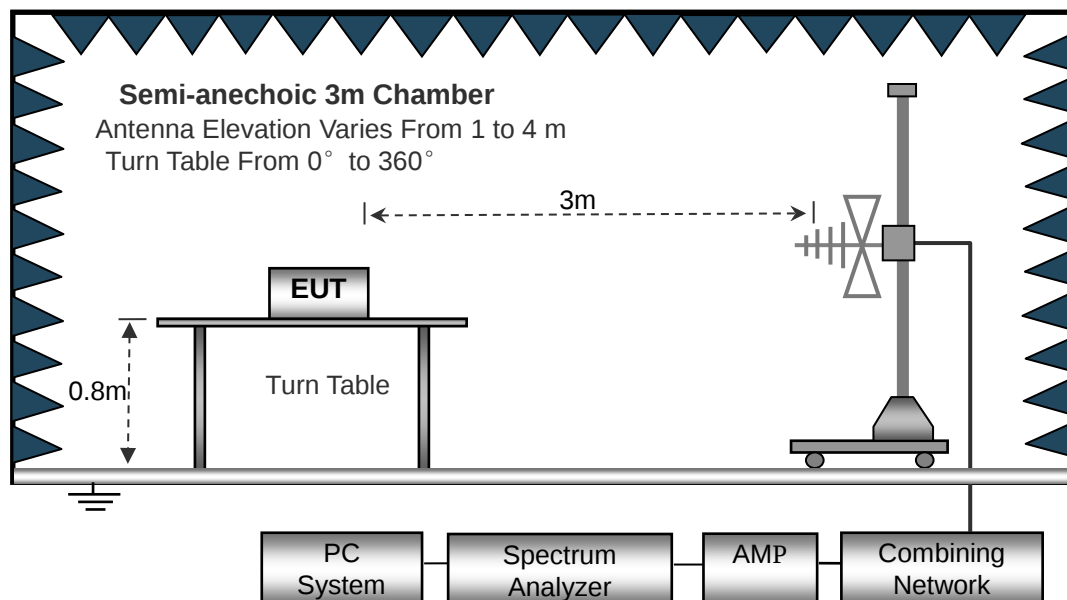
4. RADIATED EMISSION

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.109 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.

4.2 Block Diagram of Test Setup



4.3 Test Receiver Setup

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

4.4 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:

$$\begin{aligned}\text{Corr. Ampl.} &= \text{Indicated Reading} + \text{Correct} \\ \text{Correct} &= \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}\end{aligned}$$

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 for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

4.5 Environmental Conditions

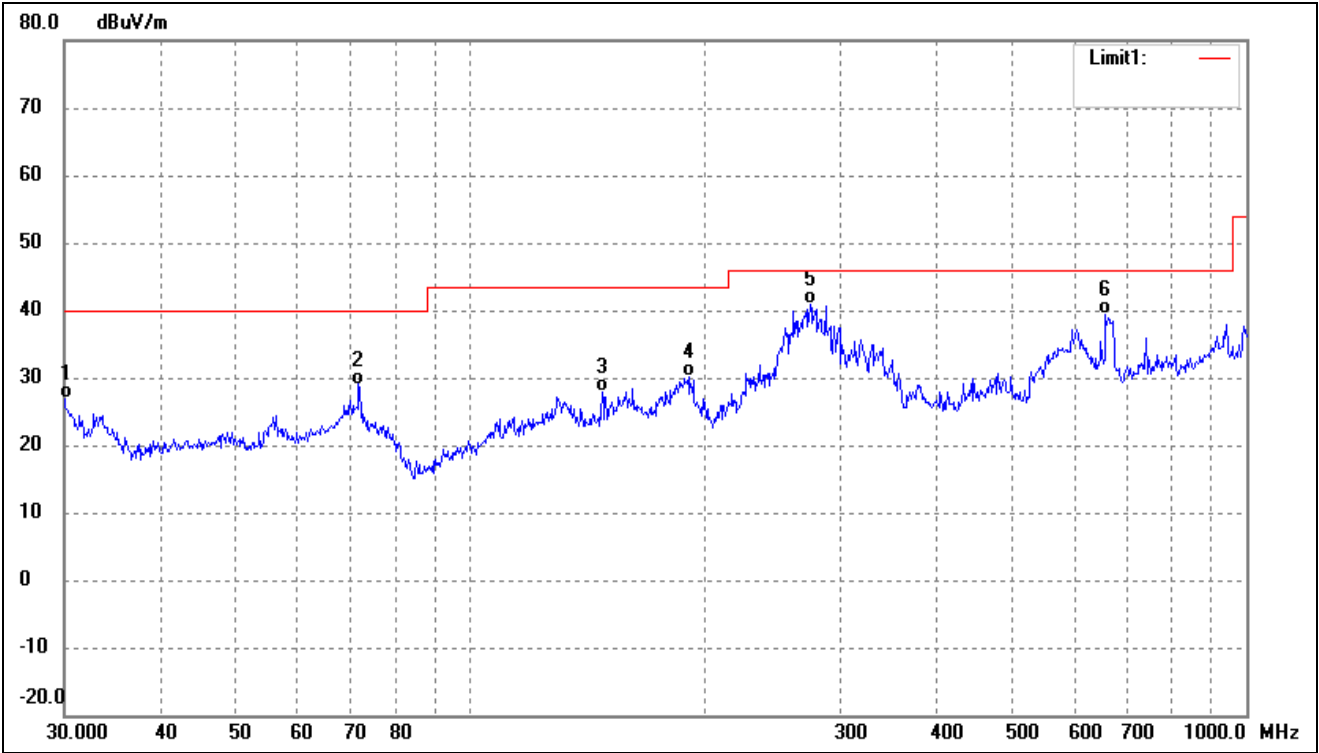
Temperature:	22.5 °C
Relative Humidity:	54 %
ATM Pressure:	998 mbar

4.6 Summary of Test Results

Look at the graphs and data below:

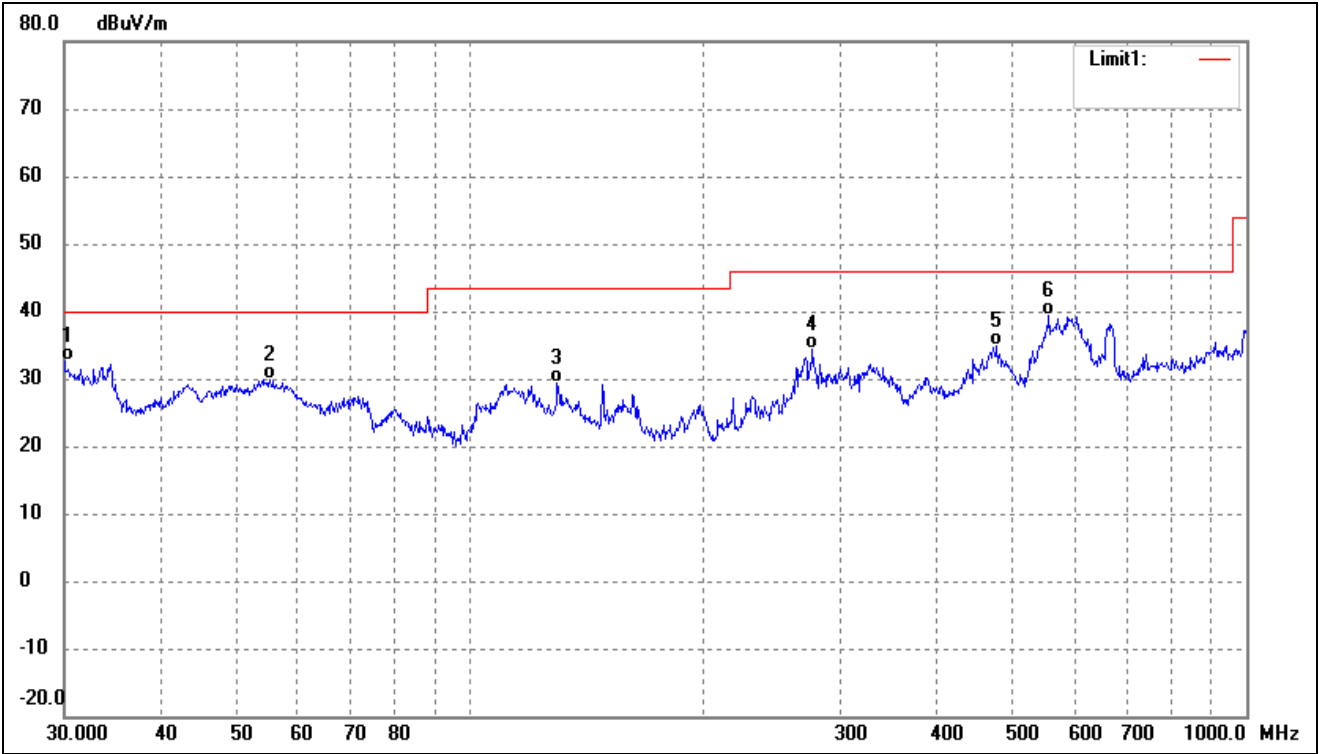
➤ Below 1GHz

Test mode:	TM1	Polarity:	Horizontal
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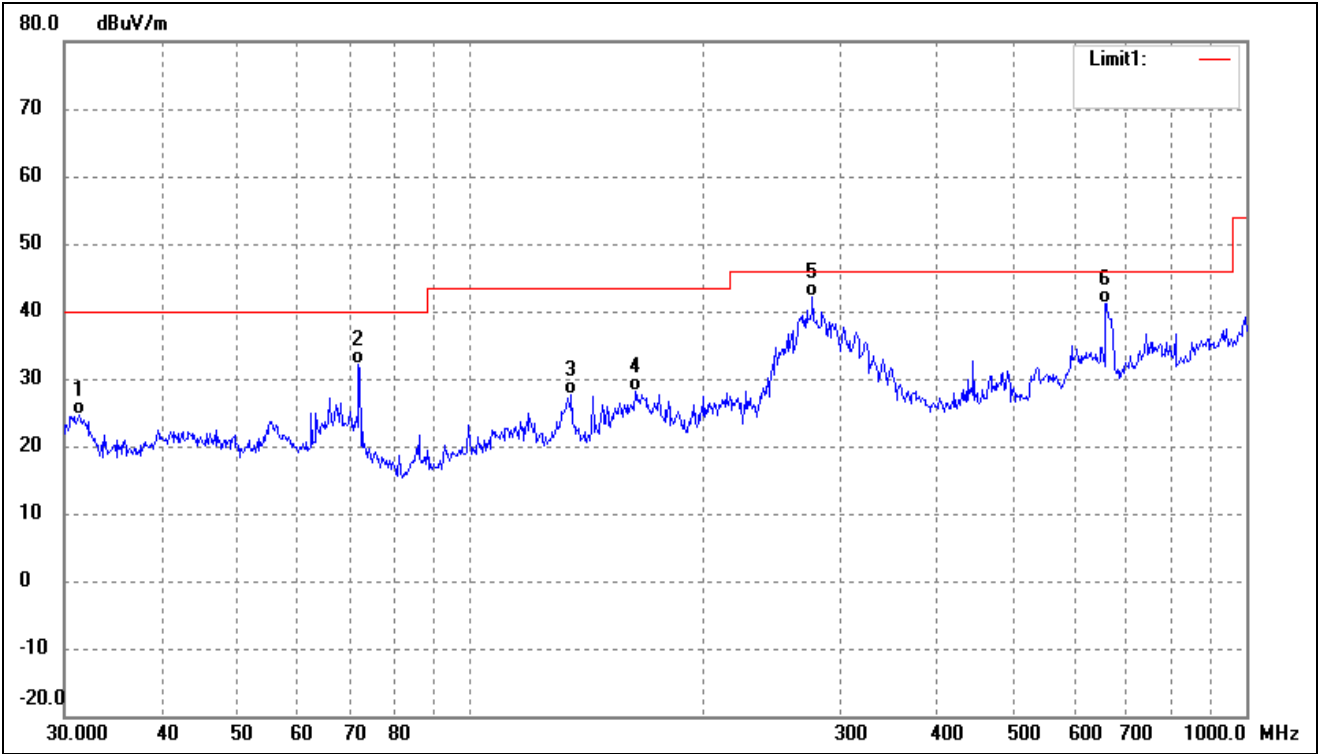
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.0000	37.65	-10.76	26.89	40.00	-13.11	QP
2	71.8320	40.92	-11.92	29.00	40.00	-11.00	QP
3	147.9214	39.56	-11.76	27.80	43.50	-15.70	QP
4	191.0738	38.58	-8.53	30.05	43.50	-13.45	QP
5	274.1939	46.45	-5.69	40.76	46.00	-5.24	QP
6	658.8362	37.20	2.07	39.27	46.00	-6.73	QP

Test mode:	TM1	Polarity:	Vertical
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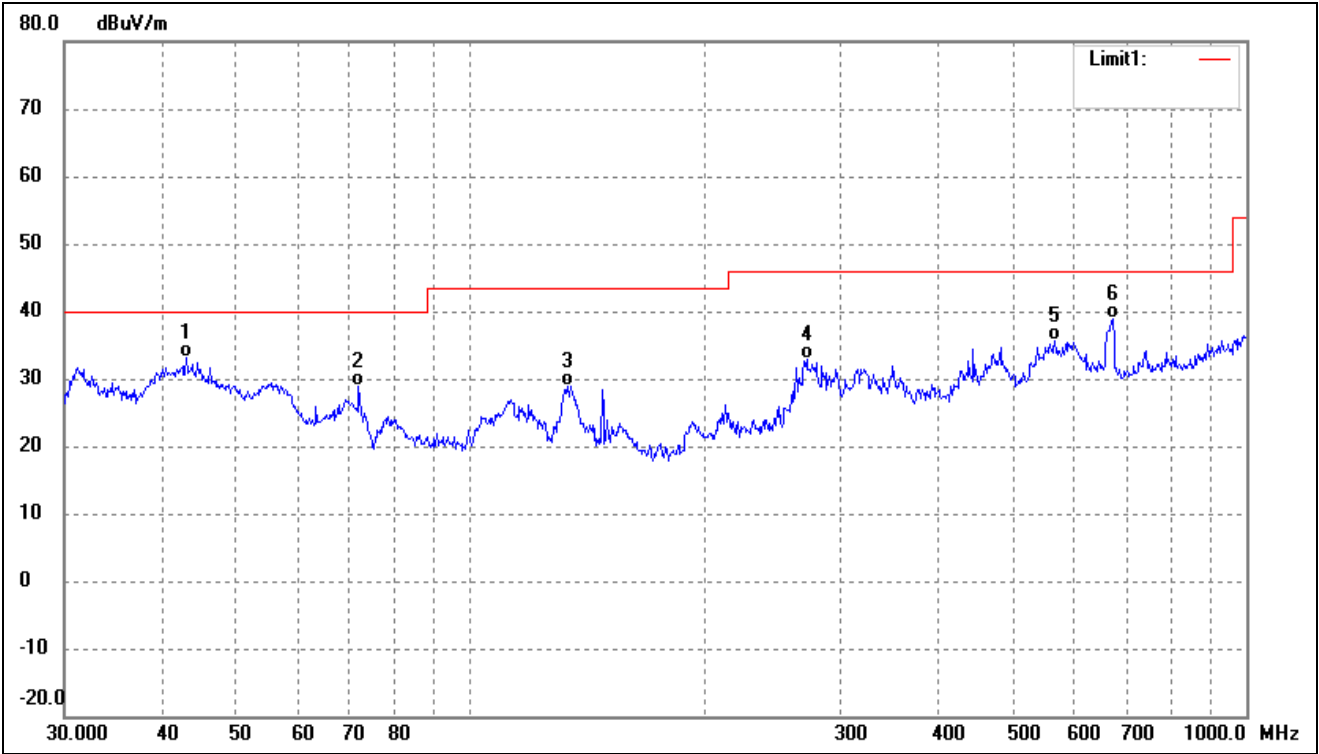
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.0000	43.37	-10.76	32.61	40.00	-7.39	QP
2	55.2207	37.43	-7.65	29.78	40.00	-10.22	QP
3	129.4677	40.60	-11.29	29.31	43.50	-14.19	QP
4	276.1235	39.93	-5.58	34.35	46.00	-11.65	QP
5	477.1694	36.55	-1.67	34.88	46.00	-11.12	QP
6	556.7744	39.39	-0.03	39.36	46.00	-6.64	QP

Test mode:	TM2	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	31.3992	35.29	-10.63	24.66	40.00	-15.34	QP
2	71.8320	44.10	-11.92	32.18	40.00	-7.82	QP
3	135.0319	39.20	-11.61	27.59	43.50	-15.91	QP
4	163.1818	39.07	-11.01	28.06	43.50	-15.44	QP
5	276.1235	47.59	-5.58	42.01	46.00	-3.99	QP
6	658.8362	39.10	2.07	41.17	46.00	-4.83	QP

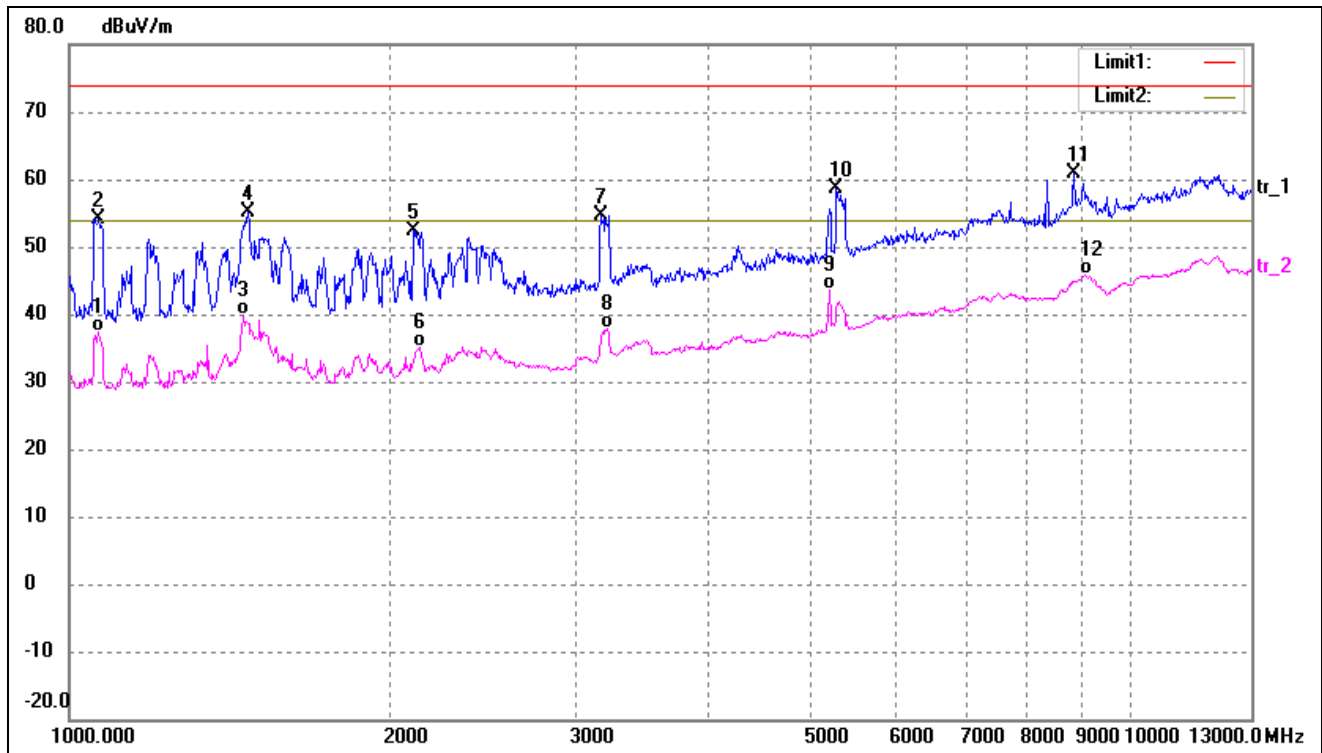
Test mode:	TM2	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	43.0505	41.22	-8.01	33.21	40.00	-6.79	QP
2	71.8320	40.78	-11.92	28.86	40.00	-11.14	QP
3	133.6188	40.51	-11.55	28.96	43.50	-14.54	QP
4	271.3246	38.67	-5.87	32.80	46.00	-13.20	QP
5	566.6223	35.55	0.16	35.71	46.00	-10.29	QP
6	672.8444	60.20	-21.43	38.77	46.00	-7.23	QP

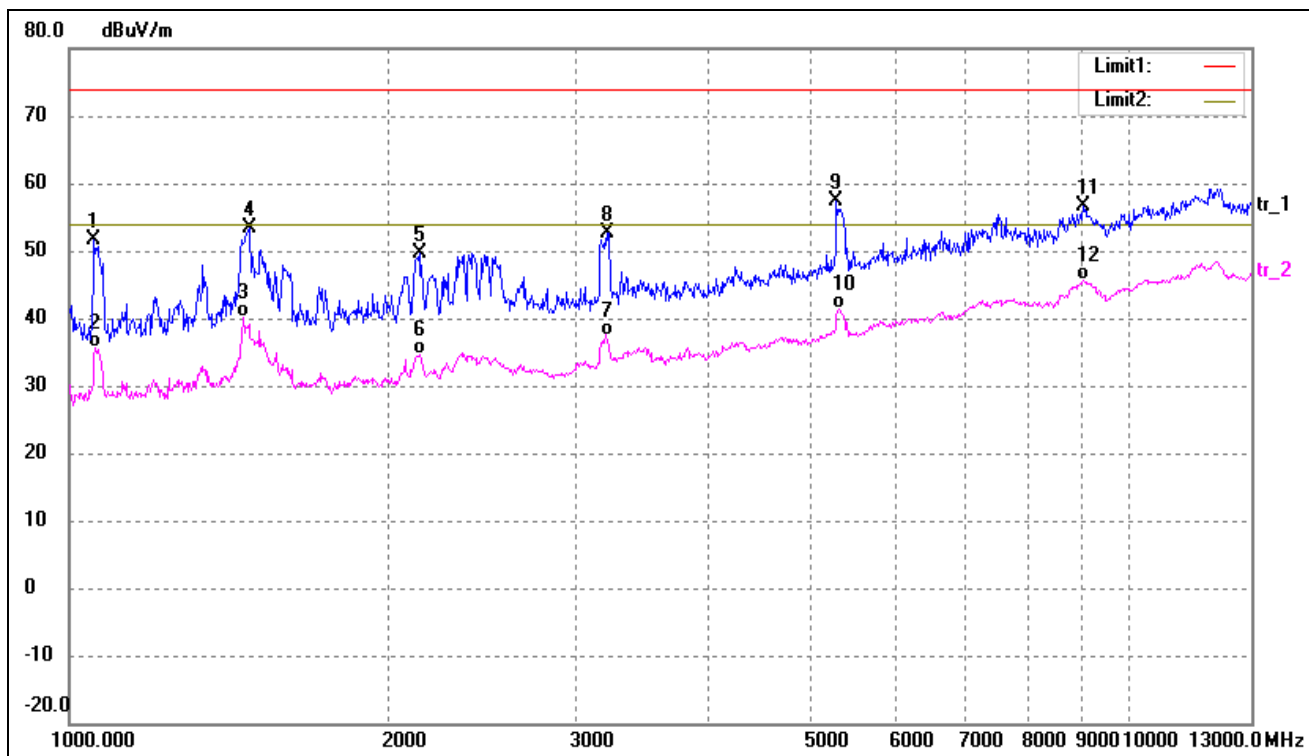
➤ Above 1GHz

Test mode:	TM1	Polarity:	Horizontal
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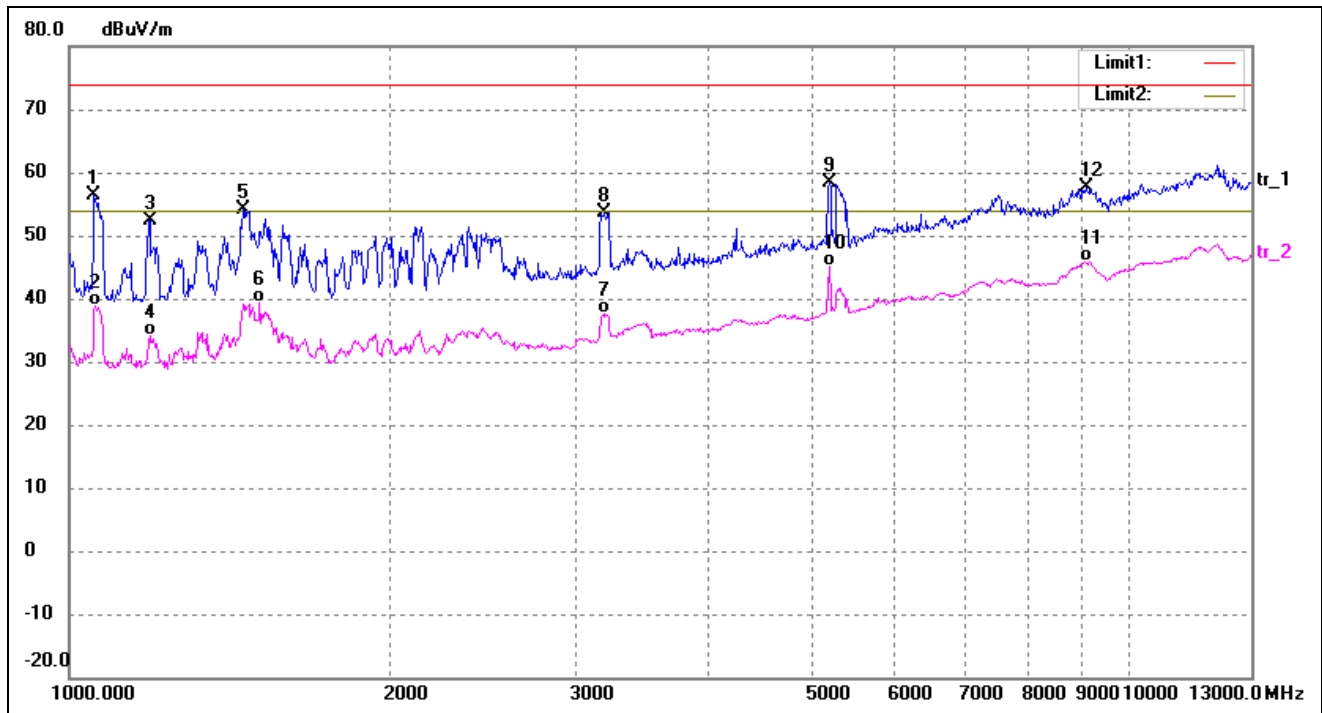
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1063.493	50.88	-13.51	37.37	54.00	-16.63	AVG
2	1066.224	67.50	-13.49	54.01	74.00	-19.99	peak
3	1457.974	51.55	-11.76	39.79	54.00	-14.21	AVG
4	1473.009	66.77	-11.70	55.07	74.00	-18.93	peak
5	2109.393	62.01	-9.51	52.50	74.00	-21.50	peak
6	2136.620	44.52	-9.41	35.11	54.00	-18.89	AVG
7	3171.572	61.48	-6.85	54.63	74.00	-19.37	peak
8	3212.508	44.49	-6.70	37.79	54.00	-16.21	AVG
9	5203.141	45.67	-2.14	43.53	54.00	-10.47	AVG
10	5283.835	60.52	-2.00	58.52	74.00	-15.48	peak
11	8848.137	55.42	5.46	60.88	74.00	-13.12	peak
12	9054.768	39.60	6.25	45.85	54.00	-8.15	AVG

Test mode:	TM1	Polarity:	Vertical
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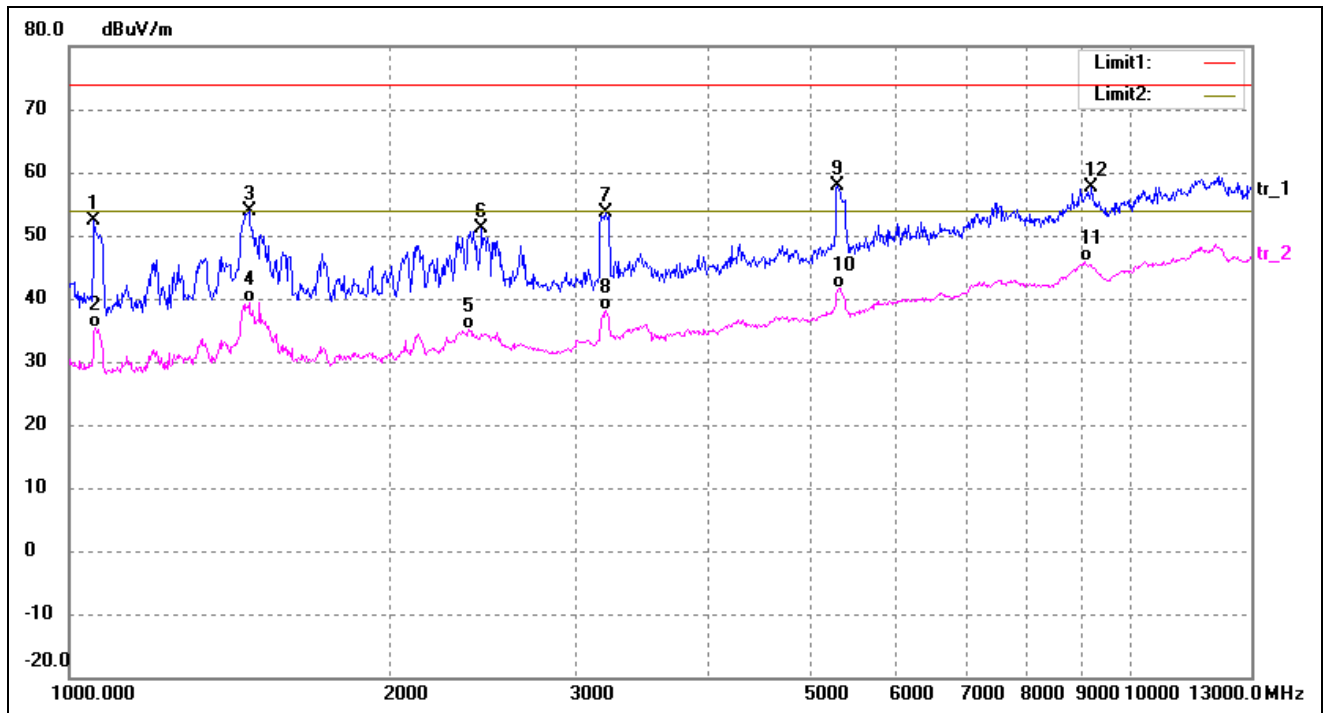
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1055.341	65.10	-13.53	51.57	74.00	-22.43	peak
2	1058.051	49.23	-13.52	35.71	54.00	-18.29	AVG
3	1457.974	51.82	-11.76	40.06	54.00	-13.94	AVG
4	1476.792	64.96	-11.68	53.28	74.00	-20.72	peak
5	2136.620	59.13	-9.41	49.72	74.00	-24.28	peak
6	2142.107	44.02	-9.39	34.63	54.00	-19.37	AVG
7	3204.279	44.22	-6.72	37.50	54.00	-16.50	AVG
8	3212.508	59.28	-6.70	52.58	74.00	-21.42	peak
9	5283.835	59.29	-2.00	57.29	74.00	-16.71	peak
10	5311.010	43.36	-1.96	41.40	54.00	-12.60	AVG
11	9031.573	50.27	6.36	56.63	74.00	-17.37	peak
12	9031.573	39.29	6.36	45.65	54.00	-8.35	AVG

Test mode:	TM2	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1055.341	69.88	-13.53	56.35	74.00	-17.65	peak
2	1058.051	52.37	-13.52	38.85	54.00	-15.15	AVG
3	1190.551	65.22	-12.95	52.27	74.00	-21.73	peak
4	1190.551	47.14	-12.95	34.19	54.00	-19.81	AVG
5	1457.974	65.95	-11.76	54.19	74.00	-19.81	peak
6	1511.280	50.85	-11.54	39.31	54.00	-14.69	AVG
7	3187.883	44.39	-6.79	37.60	54.00	-16.40	AVG
8	3196.070	60.47	-6.76	53.71	74.00	-20.29	peak
9	5203.141	60.41	-2.14	58.27	74.00	-15.73	peak
10	5203.141	47.26	-2.14	45.12	54.00	-8.88	AVG
11	9054.768	39.58	6.25	45.83	54.00	-8.17	AVG
12	9078.023	51.45	6.17	57.62	74.00	-16.38	peak

Test mode:	TM2	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1055.341	65.80	-13.53	52.27	74.00	-21.73	peak
2	1058.051	48.82	-13.52	35.30	54.00	-18.70	AVG
3	1476.792	65.65	-11.68	53.97	74.00	-20.03	peak
4	1476.792	51.12	-11.68	39.44	54.00	-14.56	AVG
5	2379.649	43.59	-8.52	35.07	54.00	-18.93	AVG
6	2447.745	59.30	-8.27	51.03	74.00	-22.97	peak
7	3204.279	60.24	-6.72	53.52	74.00	-20.48	peak
8	3204.279	44.78	-6.72	38.06	54.00	-15.94	AVG
9	5297.405	59.85	-1.98	57.87	74.00	-16.13	peak
10	5311.010	43.60	-1.96	41.64	54.00	-12.36	AVG
11	9054.768	39.52	6.25	45.77	54.00	-8.23	AVG
12	9195.196	51.80	5.73	57.53	74.00	-16.47	peak

APPENDIX PHOTOGRAPHS

Please refer to “ANNEX”

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