

IKEA of Sweden AB

TEST REPORT

SCOPE OF WORK:

FCC Part 15 subpart B – EMC report

Model:

LED1906G12

REPORT NUMBER

190701049SHA-003

ISSUE DATE

October 31, 2019

DOCUMENT CONTROL NUMBER

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Report no. 190701049SHA-003

Applicant : **IKEA of Sweden AB**
Box 702, SE-343 81 Älmhult, SWEDEN

Manufacturer : **Same as applicant**

Manufacturing site : **Jinzhai Yankon Lufei Lighting Co., Ltd.**
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Province, CHINA

Summary

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2018): Radio Frequency Devices (Subpart B)

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

PREPARED BY:

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Project Engineer

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Reviewer

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Revision History

Report No.	Version	Description	Issued Date
190701049SHA-003	Rev. 01	Initial issue of report	October 31, 2019

Measurement result summary

TEST ITEM	FCC REFERENCE	TEST RESULT	NOTE
Conducted emission	15.107	Pass	
Radiation emission	15.109	Pass	

Notes: 1: NA =Not Applicable

2. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product Name : Self-ballasted LED lamps
Type/Model : LED1906G12
Description of EUT : We tested it, and listed the worst data.
Rating : AC120V, 60Hz, 12.2W, 120mA, with E26 lamp cap
Brand name : IKEA
Category of EUT : Class B
EUT type : ☒ Table top
 ☐ Floor standing
Sample received date : August 21, 2019
Sample identification No. : 0190725-15
Date of test : August 25, 2019

1.2 Description of Test Facility

Name : Intertek Testing Services Shanghai
Address : Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R.
China
Telephone : 86 21 61278200
Telefax : 86 21 54262353

The test facility is : CNAS Accreditation Lab
recognized, certified, Registration No. CNAS L0139
or accredited by these FCC Accredited Lab
organizations Designation Number: CN1175
IC Registration Lab
CAB identifier.: CN0051
VCCI Registration Lab
Registration No.: R-14243, G-10845, C-14723, T-12252
A2LA Accreditation Lab
Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2018): Radio Frequency Device: Subpart B

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

2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency is specified if used.

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description

2.5 Record of climatic conditions

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)
Conducted emission	24	42	101
Radiated Emission	24	42	101

Notes: NA =Not Applicable

2.6 Instrument list

Conducted Emission / Disturbance Power / Tri-loop Test / CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESCS 30	EC 2107	2020-07-15
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2019-11-29
☒	Shielded room	Zhongyu	-	EC 2838	2020-01-13
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2020-09-12
☒	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2020-06-10
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2020-07-31
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3326	2020-03-28
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2020-02-28
☒	Pressure meter	YM3	Shanghai Mengde	EC 3320	2020-07-01

2.7 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted emission at mains ports	9kHz ~ 150kHz	3.71 dB
	150kHz ~ 30MHz	3.31 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.04 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.97 dB
	6GHz ~ 18GHz	5.29 dB

3 Conducted emission

Test result: **PASS**

3.1 Limits

3.1.1 Limits for conducted emission of class A device

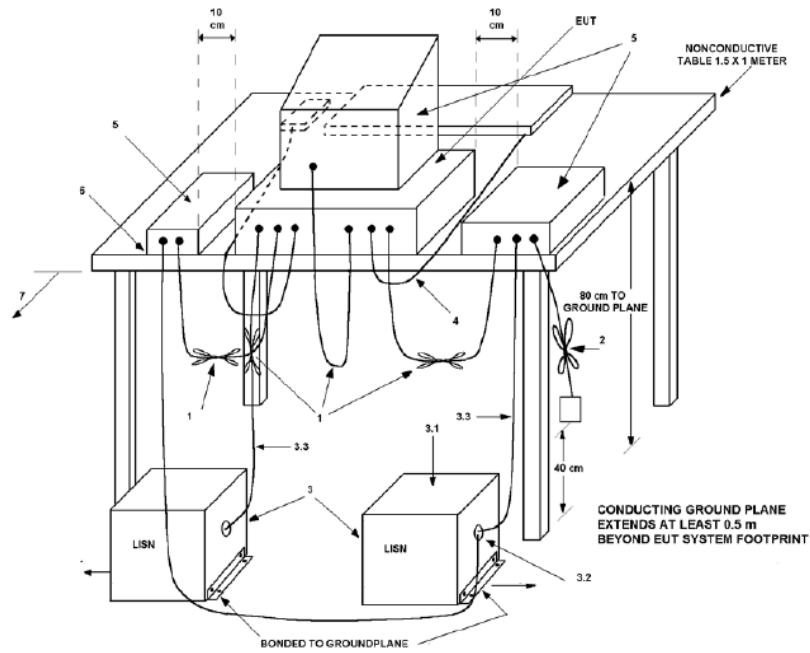
Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

3.1.2 Limits for conducted emission of class B device

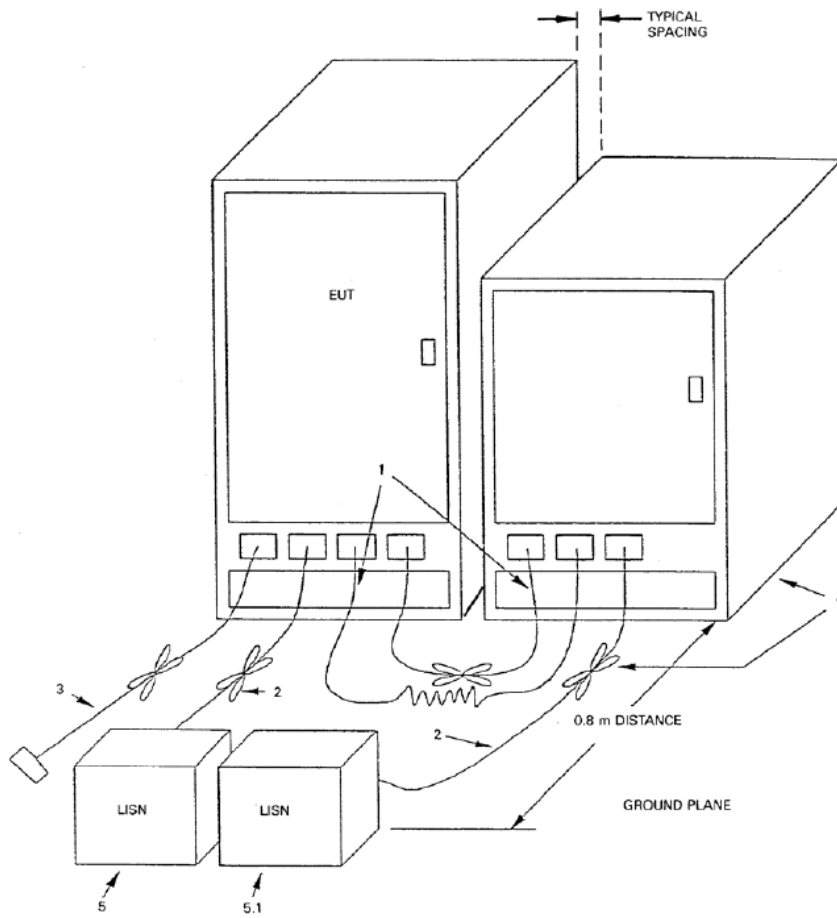
Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz 2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

3.2 Test setup

 For table top equipment



☐ For floor standing equipment



3.3 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were following clause 4 and clause 5 of ANSI 63.4.

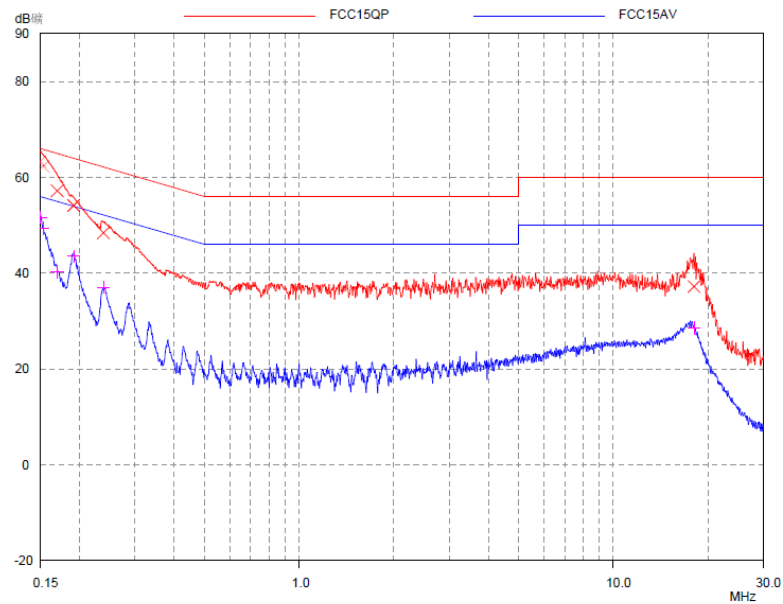
Detailed test procedure was following clause 7.3 of ANSI 63.4.

EUT arrangement and operation conditions were according to clause 6 and clause 7 of ANSI 63.4.

Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

3.4 Test Protocol

L line:

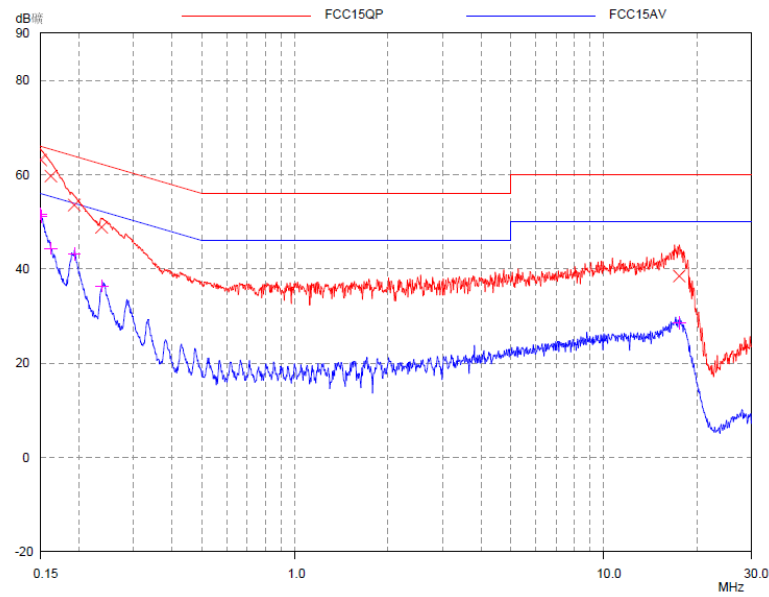


Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.15	63.36	66.00	2.64
0.15302	62.34	65.83	3.49
0.16976	57.22	64.97	7.75
0.19135	54.13	63.98	9.85
0.23834	48.42	62.15	13.73
18.05288	37.21	60.00	22.79

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.15	51.65	56.00	4.35
0.15302	49.41	55.83	6.42
0.16976	40.31	54.97	14.66
0.19135	43.54	53.98	10.44
0.23834	37.06	52.15	15.09
18.05288	28.62	50.00	21.38

N line:



Final Measurement Results

Frequency MHz	QP Level dB μ V	QP Limit dB μ V	QP Delta dB
0.15	63.26	66.00	2.74
0.1506	63.04	65.97	2.93
0.16181	59.69	65.37	5.68
0.19289	53.55	63.91	10.36
0.23644	48.85	62.22	13.37
17.55539	38.49	60.00	21.51

Frequency MHz	AV Level dB μ V	AV Limit dB μ V	AV Delta dB
0.15	51.65	56.00	4.35
0.1506	51.18	55.97	4.79
0.16181	44.38	55.37	10.99
0.19289	43.22	53.91	10.69
0.23644	36.35	52.22	15.87
17.55539	28.55	50.00	21.45

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.

2. Corrected Reading = Original Receiver Reading + Correct Factor

3. Margin = Limit - Corrected Reading

4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
Original Receiver Reading = 10.00dBuV, Limit = 66.00dBuV.
Then Correct Factor = 10.00 + 2.00 = 12.00dB;
Corrected Reading = 10dBuV + 12.00dB = 22.00dBuV;
Margin = 66.00dBuV – 22.00dBuV = 44.00dB.

4 Radiated emission

Test result: **PASS**

4.1 Radiated emission limits

4.1.1 Limits for radiated emission of class A device

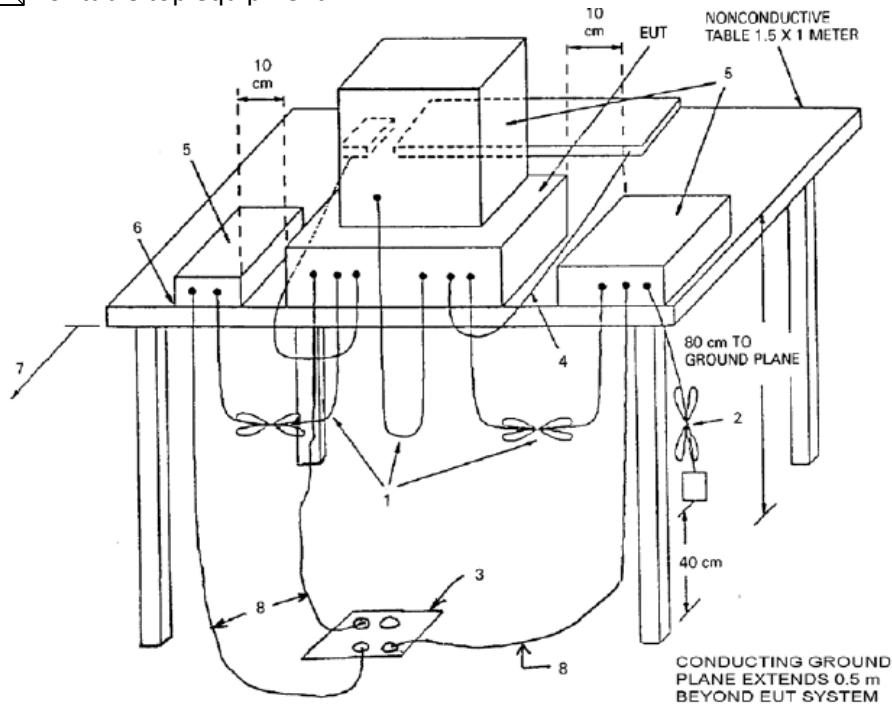
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10m
30 ~ 88	39
88 ~ 216	43.5
216 ~ 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.1.2 Limits for radiated emission of class B device

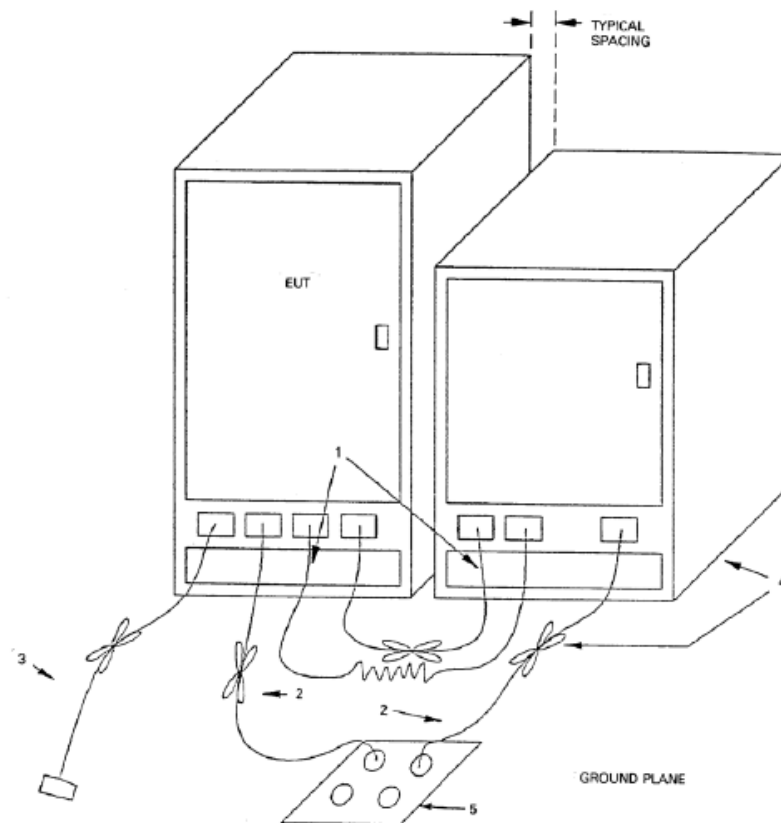
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m
30 ~ 88	40.0
88 ~ 216	43.5
216 ~ 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.2 Block diagram and test set up

☒ For table top equipment



☐ For floor standing equipment



4.3 Test Setup and Test Procedure

The measurement was performed in a semi-anechoic chamber.

The distance from EUT to receiving antenna is 3 meter.

Measurement was performed according to clause 4 and clause 5 of ANSI 63.4.

Test procedure was according to clause 8.3 of ANSI 63.4.

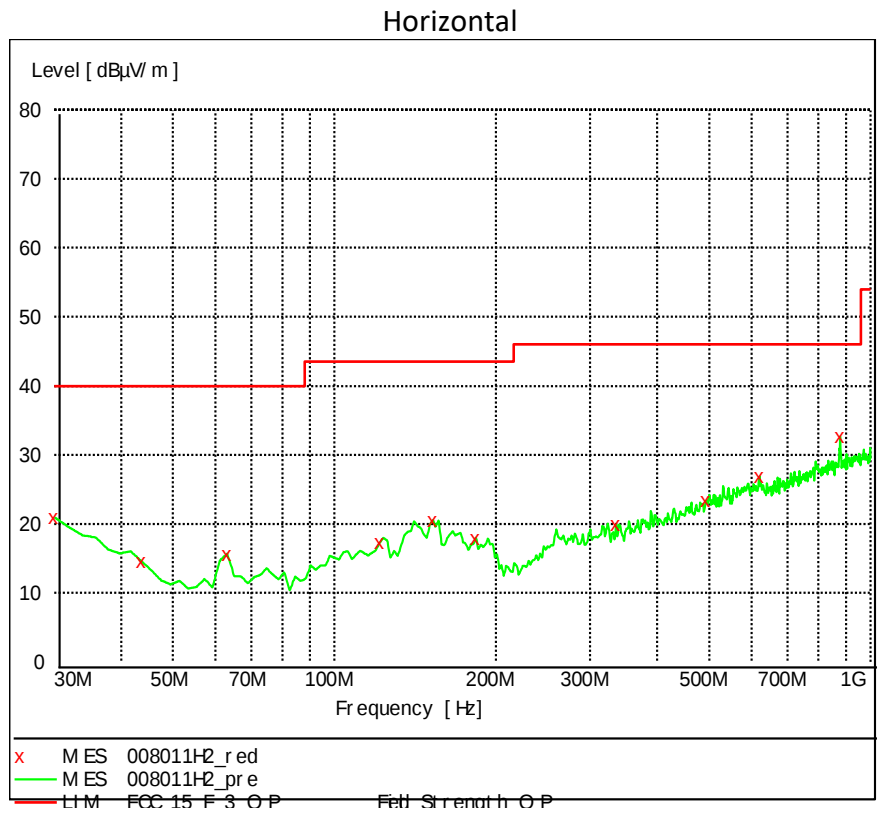
EUT arrangement and operate condition were according to clause 6 and clause 8 of ANSI 63.4.

The bandwidth setting on R&S Test Receiver was 120 kHz.

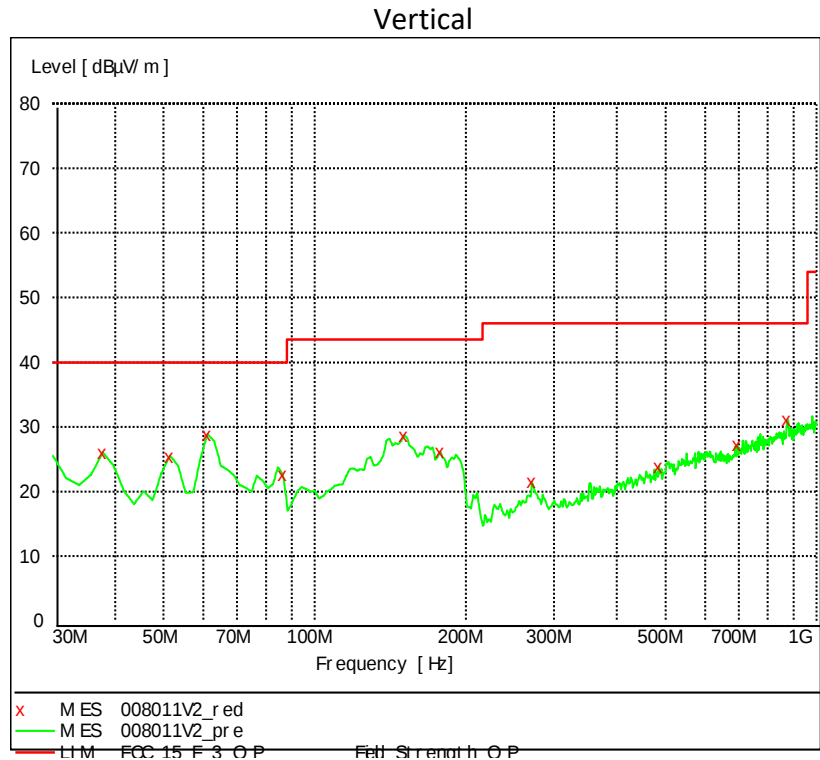
The required measurement frequency range was checked.

4.4 Test Protocol

Test Curve:



Frequency	Level	Transd	Limit	Margin
MHz	<u>dBμV/m</u>	<u>dB</u>	<u>dBμV/m</u>	dB
30.000000	21.00	18.8	40.0	19.0
43.607214	14.60	11.7	40.0	25.4
63.046092	15.70	7.1	40.0	24.3
121.362725	17.30	13.3	43.5	26.2
152.464930	20.50	11.7	43.5	23.0
183.567134	17.90	10.7	43.5	25.6
335.190381	19.90	16.0	46.0	26.1
492.645291	23.40	19.5	46.0	22.6
620.941884	26.90	21.1	46.0	19.1
877.535070	32.70	23.5	46.0	13.3



Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
37.775551	26.10	14.5	40.0	13.9
51.382766	25.50	8.5	40.0	14.5
61.102204	28.90	7.1	40.0	11.1
86.372745	22.60	9.3	40.0	17.4
150.521042	28.70	11.9	43.5	14.8
177.735471	26.20	10.7	43.5	17.3
271.042084	21.50	15.0	46.0	24.5
484.869739	23.90	19.4	46.0	22.1
694.809619	27.20	21.6	46.0	18.8
873.647295	31.10	23.5	46.0	14.9

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV, limit = 40.00dBuV/m.
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV +
 0.20dB/m = 10.20dBuV/m; Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

*****END of the report*****