

IKEA of Sweden AB

TEST REPORT

SCOPE OF WORK:

FCC Part 15 subpart B – EMC report

Model:

LED1918G4

REPORT NUMBER

190600605SHA-003

ISSUE DATE

August 5, 2019

DOCUMENT CONTROL NUMBER

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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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County Modern Industrial Park, Lu'an City, Anhui 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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Contents

REVISION HISTORY	4
MEASUREMENT RESULT SUMMARY	5
1 GENERAL INFORMATION	6
1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	6
1.2 DESCRIPTION OF TEST FACILITY	7
2 TEST SPECIFICATIONS	8
2.1 STANDARDS OR SPECIFICATION	8
2.2 MODE OF OPERATION DURING THE TEST	8
2.3 TEST SOFTWARE LIST	8
2.4 TEST PERIPHERALS LIST	8
2.5 RECORD OF CLIMATIC CONDITIONS	8
2.6 INSTRUMENT LIST	9
2.7 MEASUREMENT UNCERTAINTY	10
3 CONDUCTED EMISSION	11
3.1 LIMITS	11
3.1.1 <i>Limits for conducted emission of class A device</i>	11
3.1.2 <i>Limits for conducted emission of class B device</i>	11
3.2 TEST SETUP	12
3.3 TEST SETUP AND TEST PROCEDURE	13
3.4 TEST PROTOCOL	14
4 RADIATED EMISSION	17
4.1 RADIATED EMISSION LIMITS	17
4.1.1 <i>Limits for radiated emission of class A device</i>	17
4.1.2 <i>Limits for radiated emission of class B device</i>	17
4.2 BLOCK DIAGRAM AND TEST SET UP	18
4.3 TEST SETUP AND TEST PROCEDURE	19
4.4 TEST PROTOCOL	20

Revision History

Report No.	Version	Description	Issued Date
190600605SHA-003	Rev. 01	Initial issue of report	August 5, 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 : LED1918G4
Description of EUT : We tested it, and listed the worst data.
Rating : AC120V, 60Hz, 4.3W, 45mA, with E26 lamp cap
Brand name : IKEA
Category of EUT : Class B
EUT type : ☒ Table top
 ☐ Floor standing
Sample received date : June 10, 2019
Sample identification No. : 0190610-11
Date of test : June 20, 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 (2017): 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	2019-09-12
☒	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

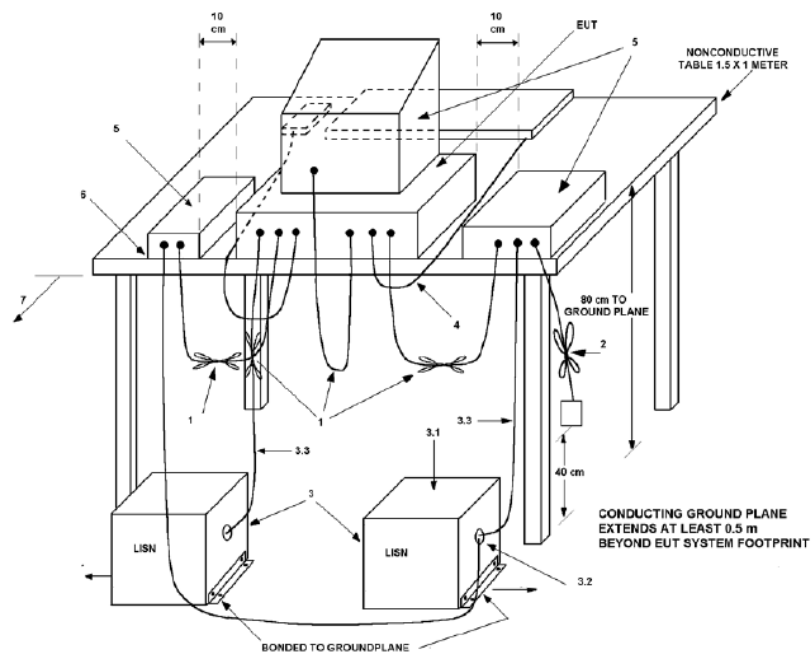
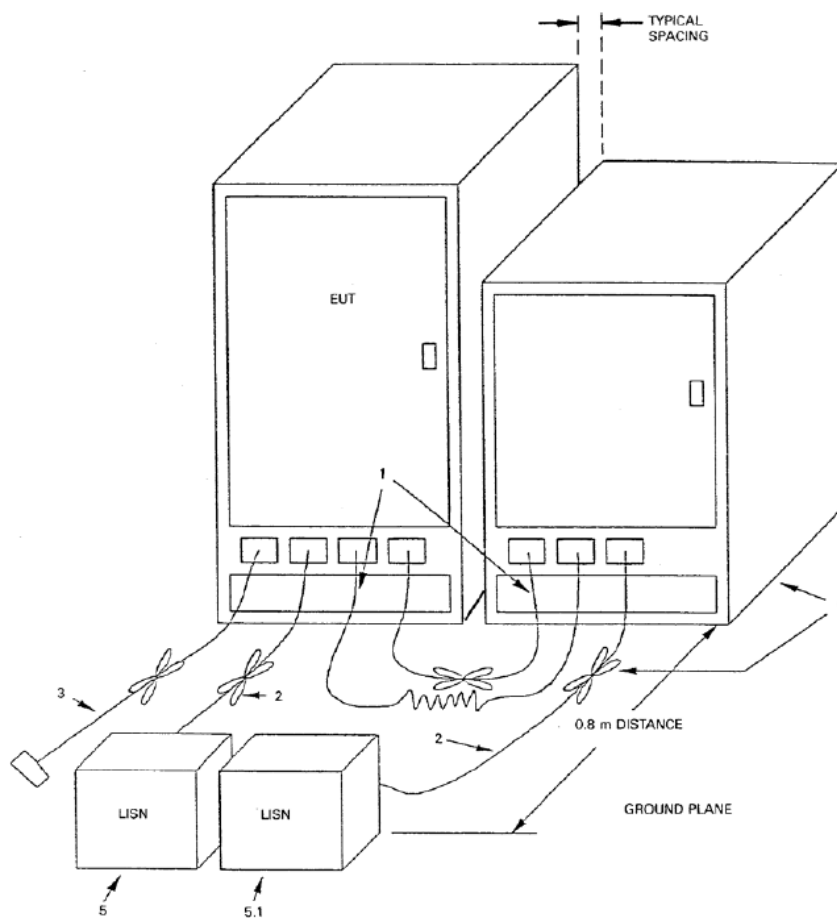
Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the 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.

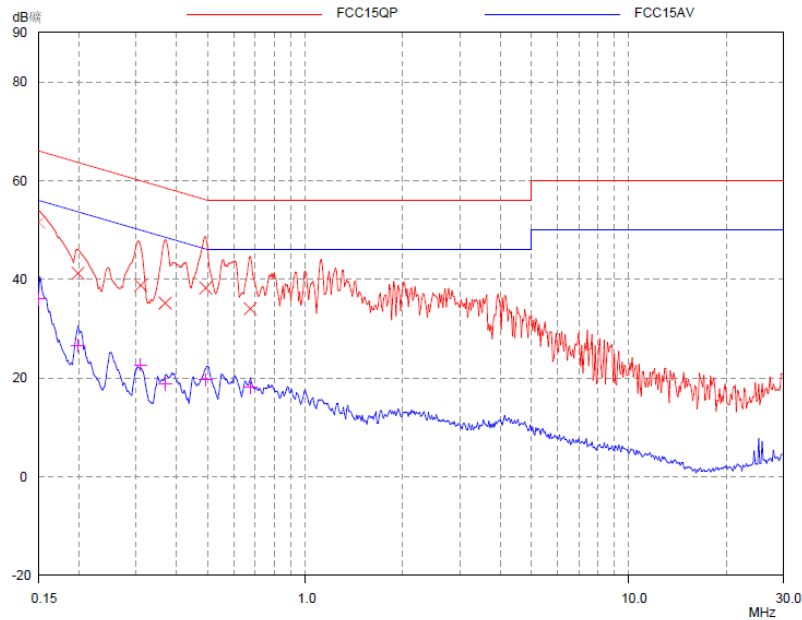
Detailed test procedure was following clause 7.3 of ANSI 63.4.

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:

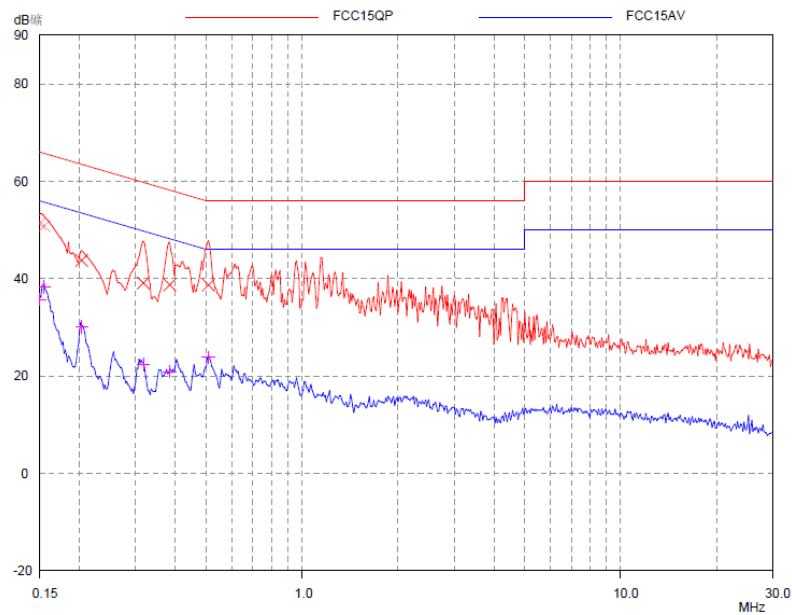


Final Measurement Results

Frequency MHz	QP Level dB μ V	QP Limit dB μ V	QP Delta dB
0.15	51.58	66.00	14.42
0.19824	41.24	63.68	22.44
0.30974	38.77	59.98	21.21
0.36908	35.18	58.52	23.34
0.49171	38.24	56.14	17.90
0.67628	34.05	56.00	21.95

Frequency MHz	AV Level dB μ V	AV Limit dB μ V	AV Delta dB
0.15	35.99	56.00	20.01
0.19824	26.57	53.68	27.11
0.30974	22.66	49.98	27.32
0.36908	18.88	48.52	29.64
0.49171	19.65	46.14	26.49
0.67628	18.07	46.00	27.93

N line:



Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.15	51.30	66.00	14.70
0.15485	50.84	65.74	14.90
0.20304	43.75	63.49	19.74
0.31723	39.13	59.78	20.65
0.38409	38.73	58.19	19.46
0.50763	38.68	56.00	17.32

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.15	35.70	56.00	20.30
0.15485	38.27	55.74	17.47
0.20304	30.15	53.49	23.34
0.31723	22.37	49.78	27.41
0.38409	20.92	48.19	27.27
0.50763	23.83	46.00	22.17

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

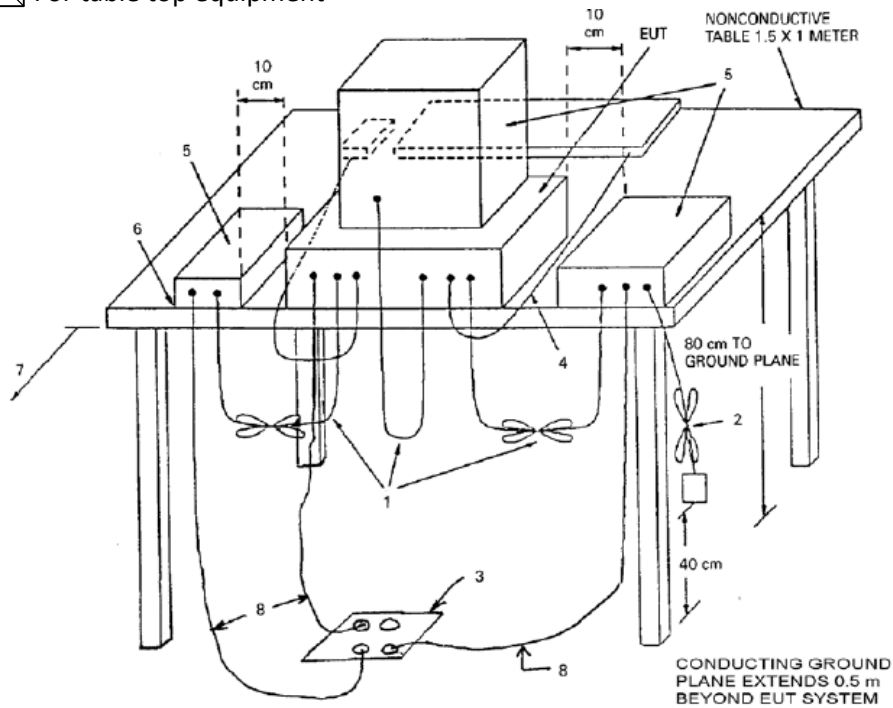
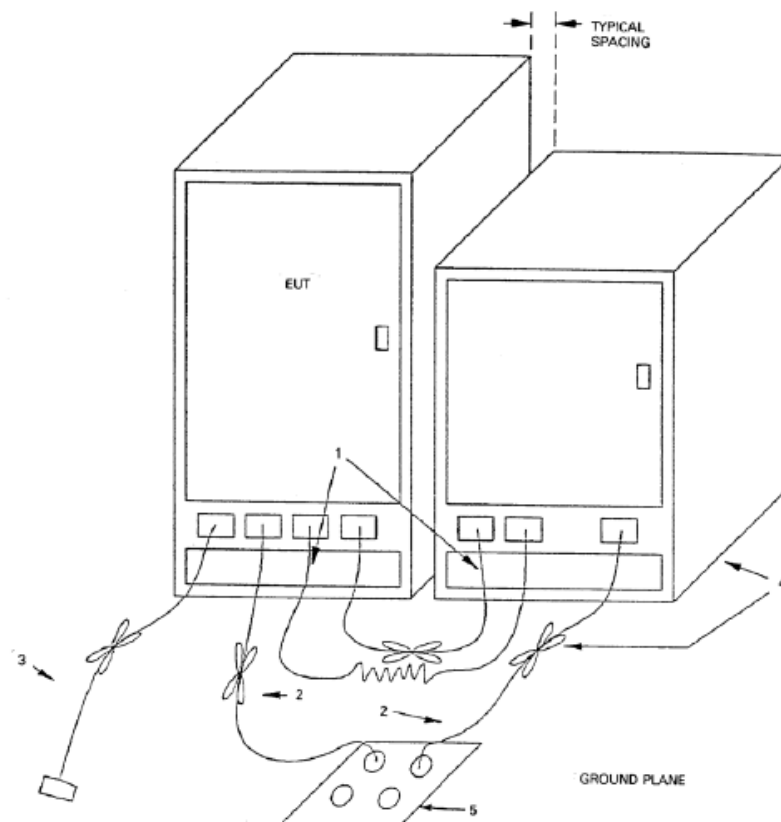
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10m
30 ~ 88	39
88 ~ 216	43.5
216 ~ 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

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.

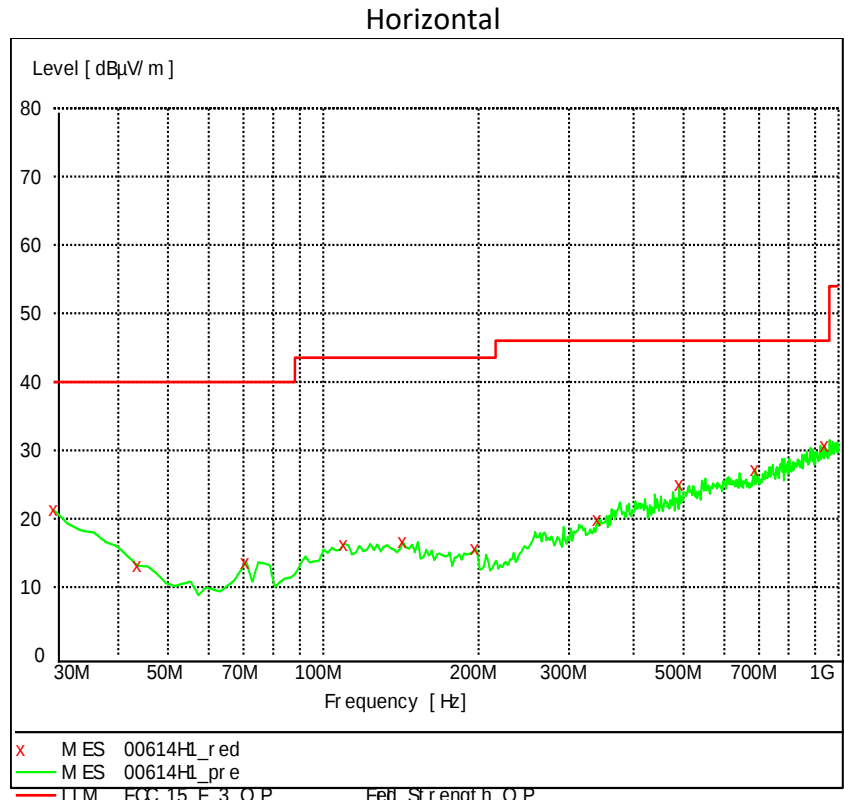
EUT arrangement and operate condition were according to clause 6 and clause 8 of ANSI 63.4.

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

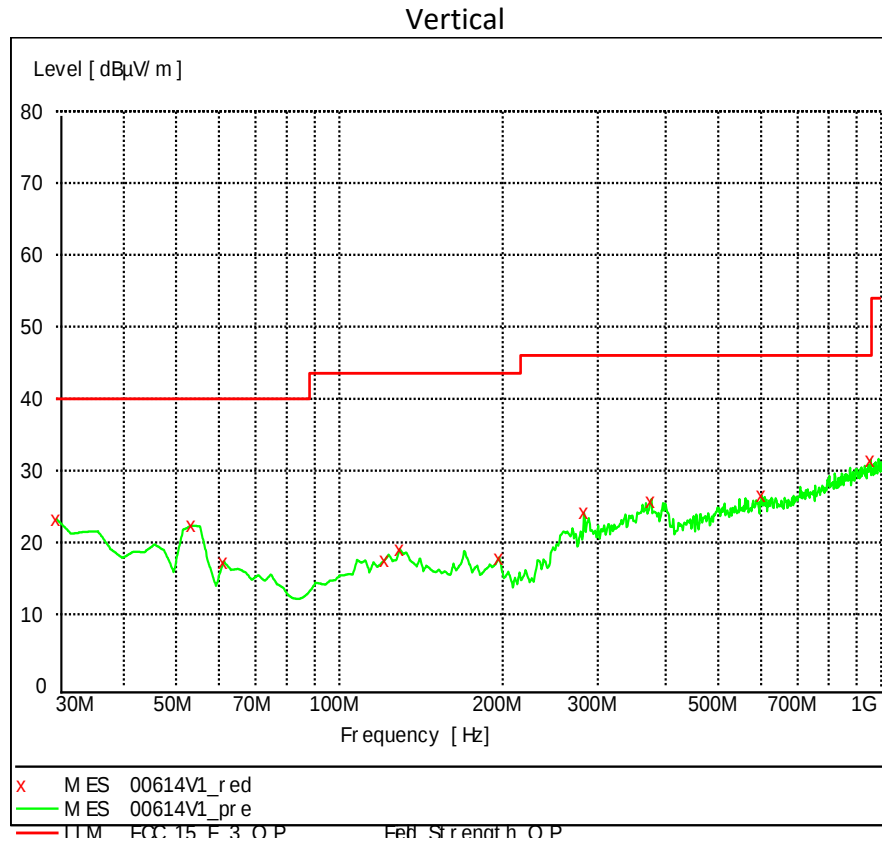
The required measurement frequency range was checked.

4.4 Test Protocol

Test Curve:



Frequency	Level	Transd	Limit	Margin
MHz	<u>dBμV/m</u>	<u>dB</u>	<u>dBμV/m</u>	<u>dB</u>
30.000000	21.30	18.9	40.0	18.7
43.607214	13.20	11.8	40.0	26.8
70.821643	13.70	7.3	40.0	26.3
109.699399	16.30	13.0	43.5	27.2
142.745491	16.70	12.7	43.5	26.8
197.174349	15.70	11.3	43.5	27.8
341.022044	19.90	16.6	46.0	26.1
490.701403	25.00	20.0	46.0	21.0
688.977956	27.30	22.1	46.0	18.7
939.739479	30.70	24.8	46.0	15.3



Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
30.000000	23.30	18.9	40.0	16.7
53.326653	22.40	8.2	40.0	17.6
61.102204	17.40	6.9	40.0	22.6
121.362725	17.60	13.6	43.5	25.9
129.138277	19.10	13.2	43.5	24.4
197.174349	17.90	11.3	43.5	25.6
282.705411	24.20	15.0	46.0	21.8
376.012024	25.90	17.5	46.0	20.1
601.503006	26.60	21.4	46.0	19.4
955.290581	31.50	25.0	46.0	14.5

- 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*****