

IKEA of Sweden AB
TEST REPORT

SCOPE OF WORK:

FCC Part 15 subpart B – EMC report

Model:

LED1933R11

REPORT NUMBER

190902479SHA-001

ISSUE DATE

October 22, 2019

DOCUMENT CONTROL NUMBER

TTRFFCCPART15b_V1

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

Manufacturer : **Same as applicant**

Manufacturing site : **LEEDARSON LIGHTING CO., LTD.**
Xingtai Industrial Park, Economic Development Zone of Changtai
County, Zhangzhou City, Fujian 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:

REVIEWED BY:

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Project Engineer

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Reviewer

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Revision History

Report No.	Version	Description	Issued Date
190902479SHA-001	Rev. 01	Initial issue of report	October 22, 2019

Measurement result summary

TEST ITEM	FCC REFERANCE	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 : LED1933R11
Description of EUT : We tested it, and listed the worst data.
Rating : AC 120V, 60Hz, 10W, 122mA, 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. : 0190821-13
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 recognized, certified, or accredited by these organizations :

- CNAS Accreditation Lab
Registration No. CNAS L0139
- FCC Accredited Lab
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
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESCS 30	EC 2107	2020-07-15
<input checked="" type="checkbox"/>	A.M.N.	R&S	ESH2-Z5	EC 3119	2019-11-29
<input checked="" type="checkbox"/>	Shielded room	Zhongyu	-	EC 2838	2020-01-13
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2020-09-12
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2020-06-10
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2020-07-31
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3326	2020-03-28
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2020-02-28
<input checked="" type="checkbox"/>	Pressure meter	YM3	Shanghai Mengde	EC 3320	2020-07-01

2.7 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
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.

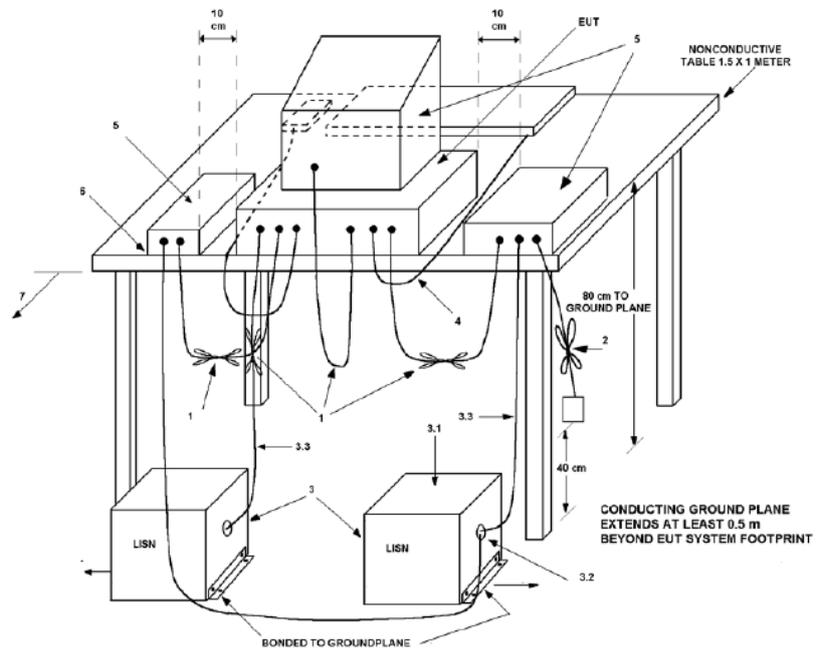
3.1.2 Limits for conducted emission of class B device

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

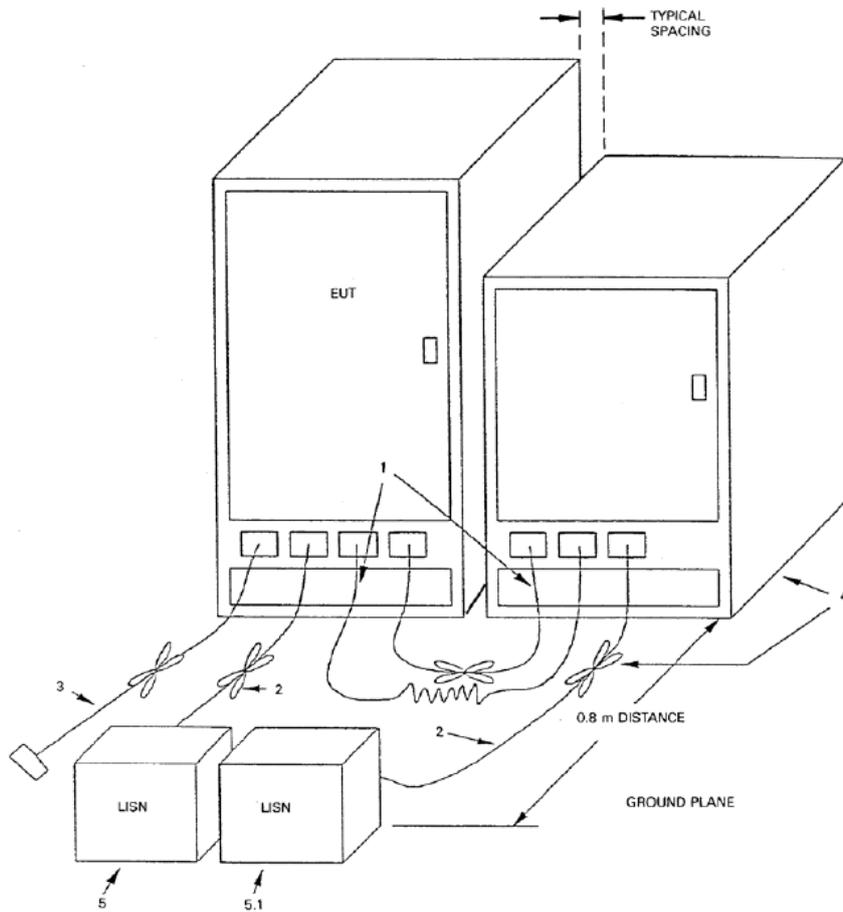
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the 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.

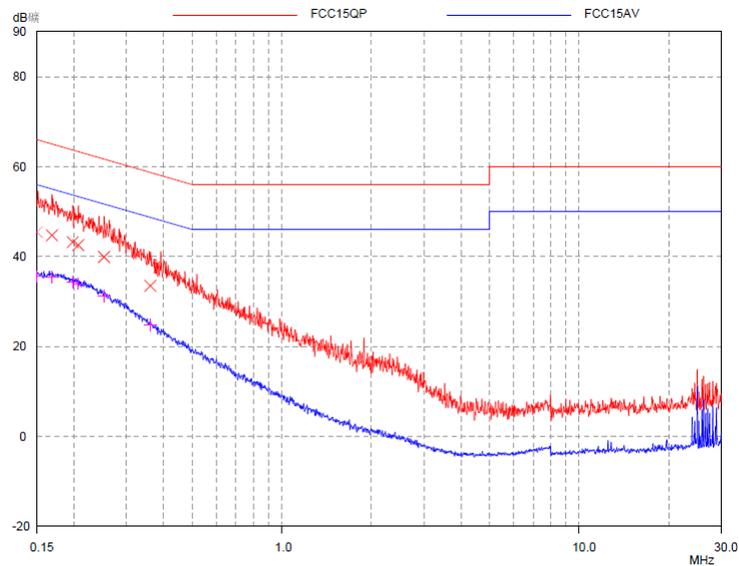
EUT arrangement and operation conditions were according to clause 6 and clause 7 of ANSI 63.4.

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

3.4 Test Protocol

BP5178FLD

L line:

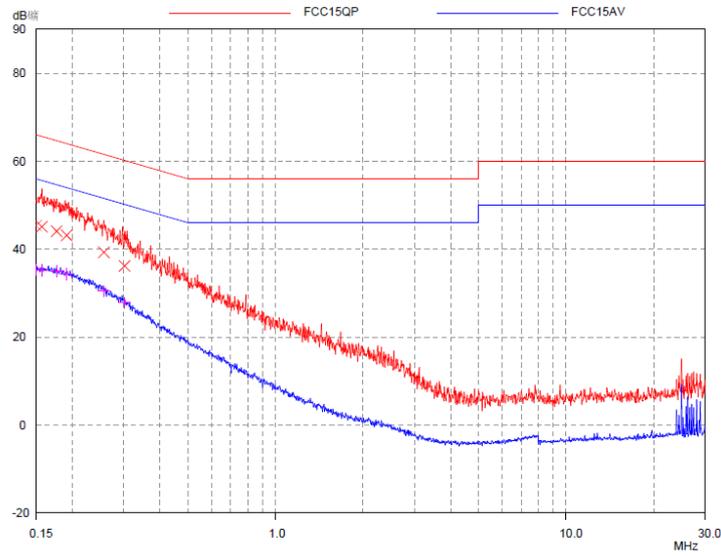


Final Measurement Results

Frequency MHz	QP Level dBm	QP Limit dBm	QP Delta dB
0.15	45.47	66.00	20.53
0.16841	44.73	65.04	20.31
0.19756	43.22	63.71	20.49
0.20643	42.54	63.35	20.81
0.25204	39.90	61.69	21.79
0.361	33.49	58.71	25.22

Frequency MHz	AV Level dBm	AV Limit dBm	AV Delta dB
0.15	35.58	56.00	20.42
0.16841	35.49	55.04	19.55
0.19756	34.36	53.71	19.35
0.20643	33.91	53.35	19.44
0.25204	31.24	51.69	20.45
0.361	24.77	48.71	23.94

N line:



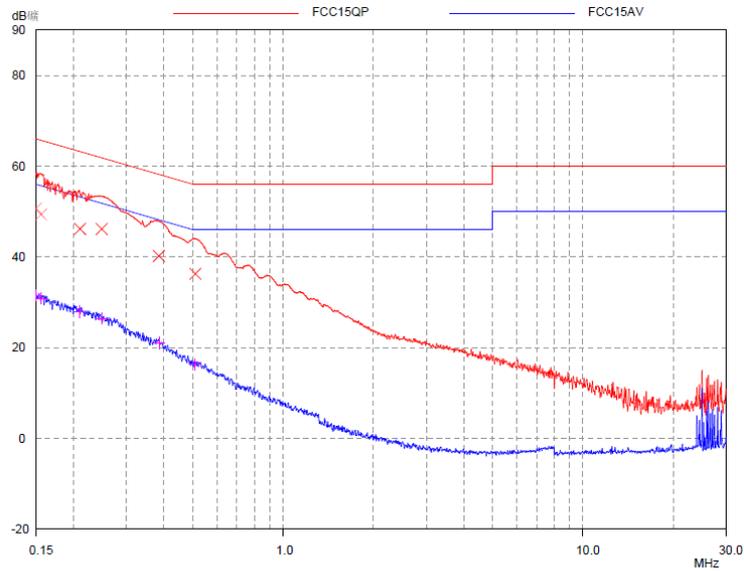
Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.15	45.39	66.00	20.61
0.15673	45.13	65.64	20.51
0.17597	44.09	64.67	20.58
0.19059	43.14	64.01	20.87
0.25608	39.31	61.56	22.25
0.30164	36.20	60.20	24.00

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.15	35.27	56.00	20.73
0.15673	35.19	55.64	20.45
0.17597	35.00	54.67	19.67
0.19059	34.32	54.01	19.69
0.25608	30.46	51.56	21.10
0.30164	27.78	50.20	22.42

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L line:

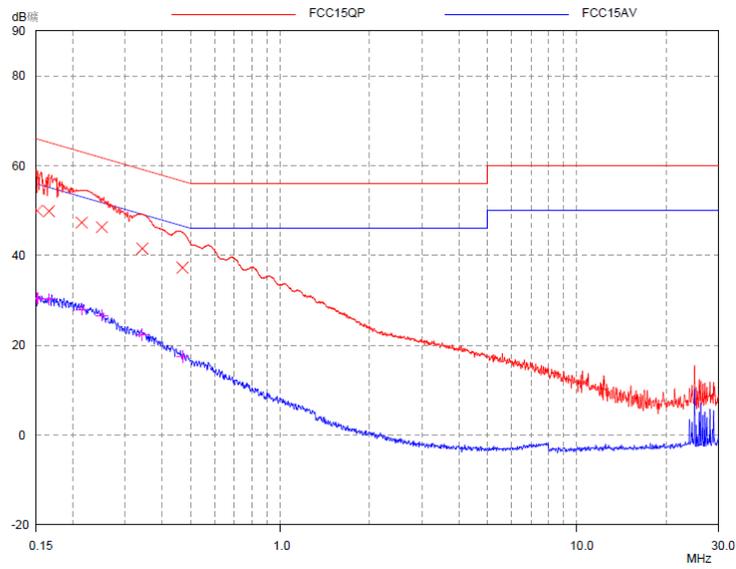


Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.15	50.73	66.00	15.27
0.15548	49.37	65.70	16.33
0.20976	46.20	63.21	17.01
0.24804	46.15	61.82	15.67
0.38481	40.24	58.17	17.93
0.50887	36.30	56.00	19.70

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.15	31.52	56.00	24.48
0.15548	30.84	55.70	24.86
0.20976	27.91	53.21	25.30
0.24804	26.46	51.82	25.36
0.38481	21.04	48.17	27.13
0.50887	16.32	46.00	29.68

N line:



Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.1506	50.03	65.97	15.94
0.1518	49.89	65.90	16.01
0.16574	49.86	65.17	15.31
0.21398	47.32	63.05	15.73
0.25002	46.31	61.76	15.45
0.34274	41.53	59.14	17.61
0.46794	37.27	56.55	19.28

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.1506	30.45	55.97	25.52
0.1518	30.52	55.90	25.38
0.16574	30.23	55.17	24.94
0.21398	27.99	53.05	25.06
0.25002	26.63	51.76	25.13
0.34274	22.38	49.14	26.76
0.46794	17.54	46.55	29.01

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.

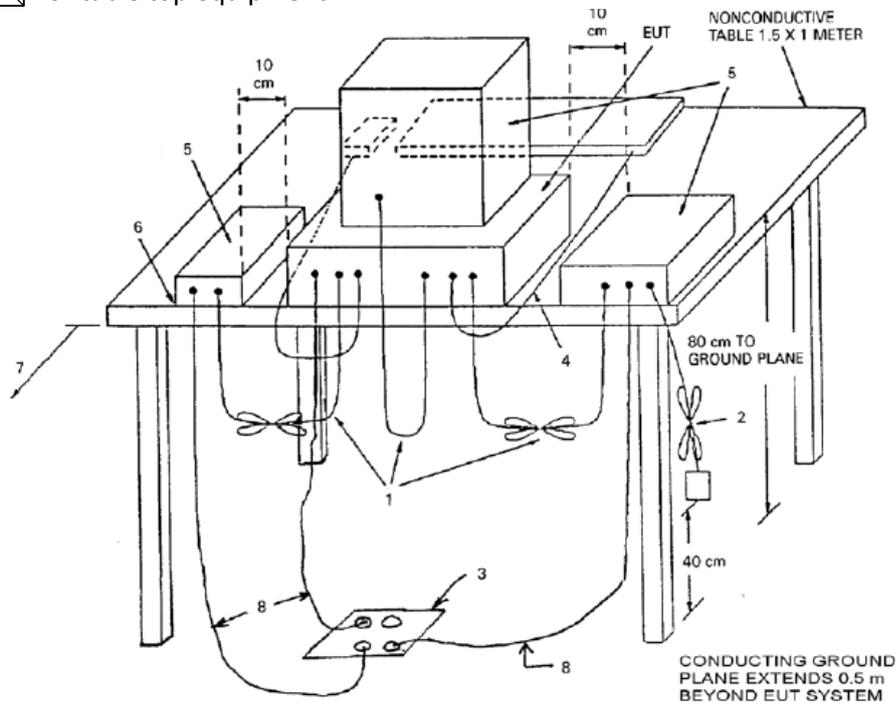
4.1.2 Limits for radiated emission of class B device

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

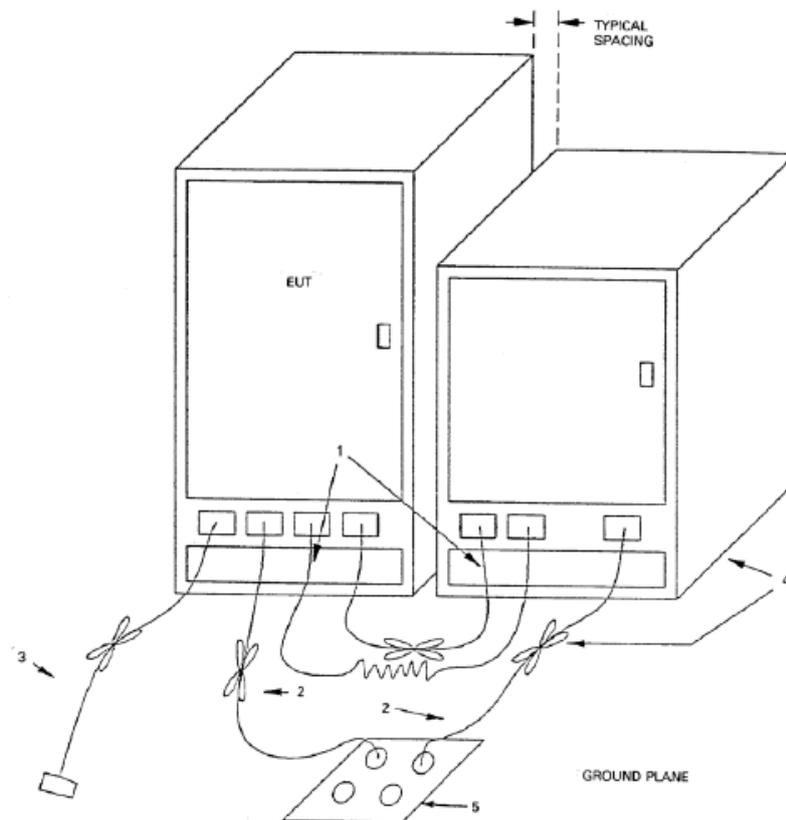
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.

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.

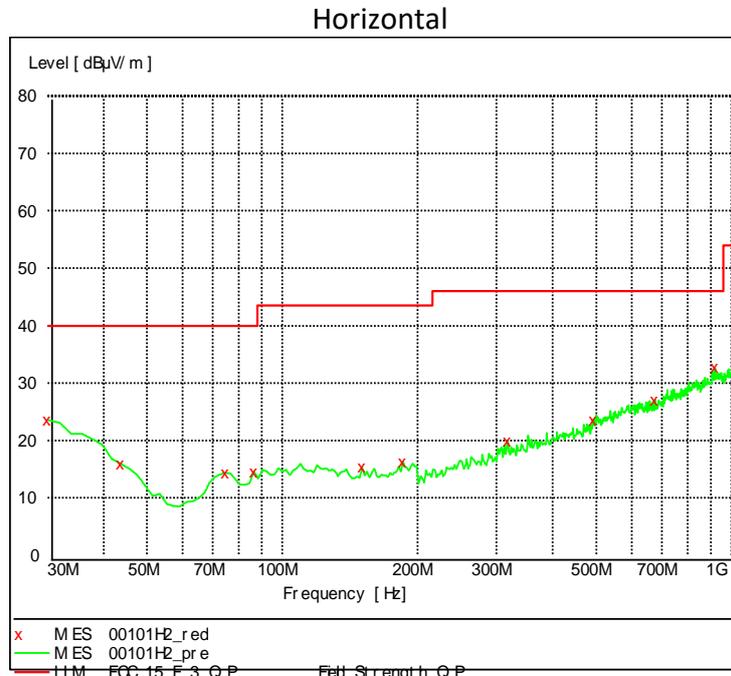
EUT arrangement and operate condition were according to clause 6 and clause 8 of ANSI 63.4.

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

The required measurement frequency range was checked.

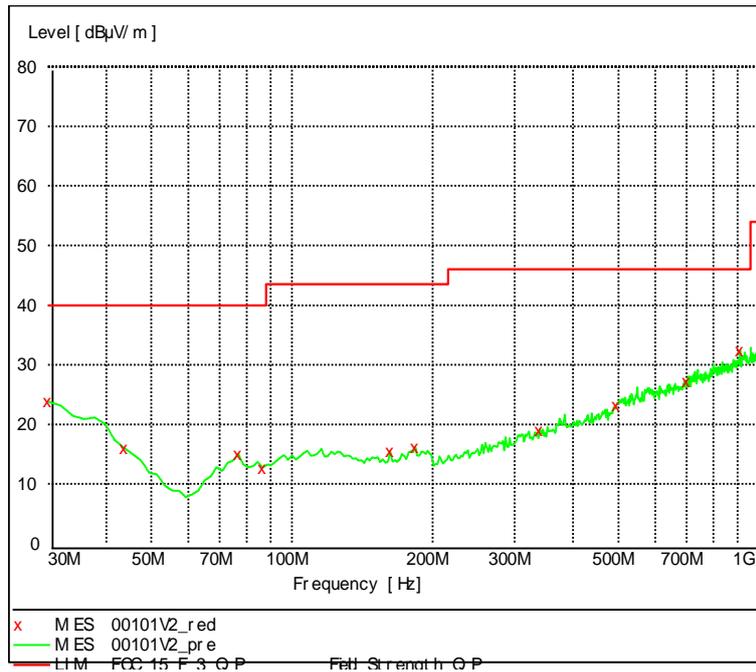
4.4 Test Protocol

Test Curve:
BP5178FLD



Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
30.000000	23.60	21.3	40.0	16.4
43.607214	15.90	13.9	40.0	24.1
74.709419	14.30	9.5	40.0	25.7
86.372745	14.60	10.1	40.0	25.4
150.521042	15.40	10.2	43.5	28.1
185.511022	16.30	11.0	43.5	27.2
317.695391	20.00	15.2	46.0	26.0
492.645291	23.60	19.4	46.0	22.4
675.370741	27.00	22.0	46.0	19.0
918.356713	32.70	25.4	46.0	13.3

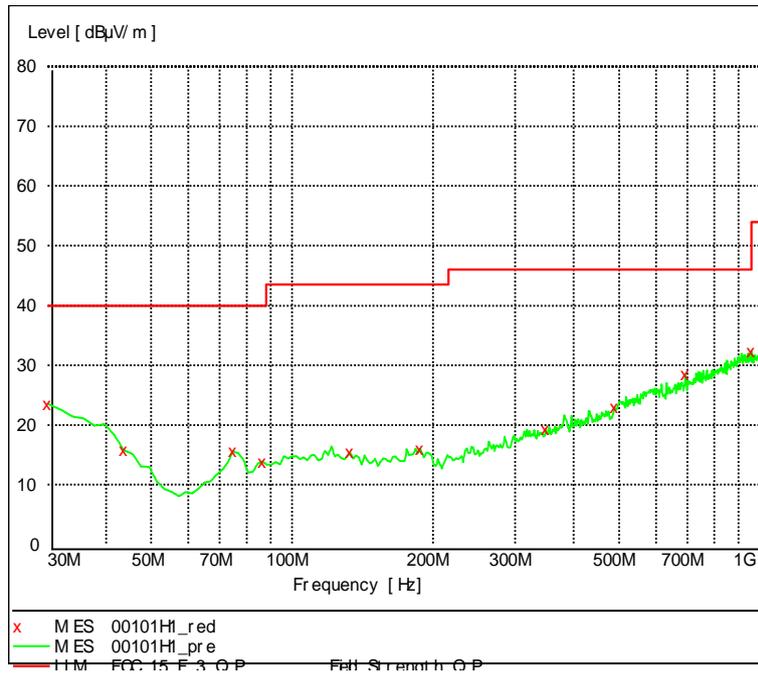
Vertical



Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
30.000000	23.80	21.3	40.0	16.2
43.607214	16.10	13.9	40.0	23.9
76.653307	15.10	9.7	40.0	24.9
86.372745	12.70	10.1	40.0	27.3
162.184369	15.50	10.1	43.5	28.0
183.567134	16.20	10.9	43.5	27.3
339.078156	19.10	15.7	46.0	26.9
494.589178	23.20	19.5	46.0	22.8
700.641283	27.30	22.3	46.0	18.7
912.525050	32.40	25.3	46.0	13.6

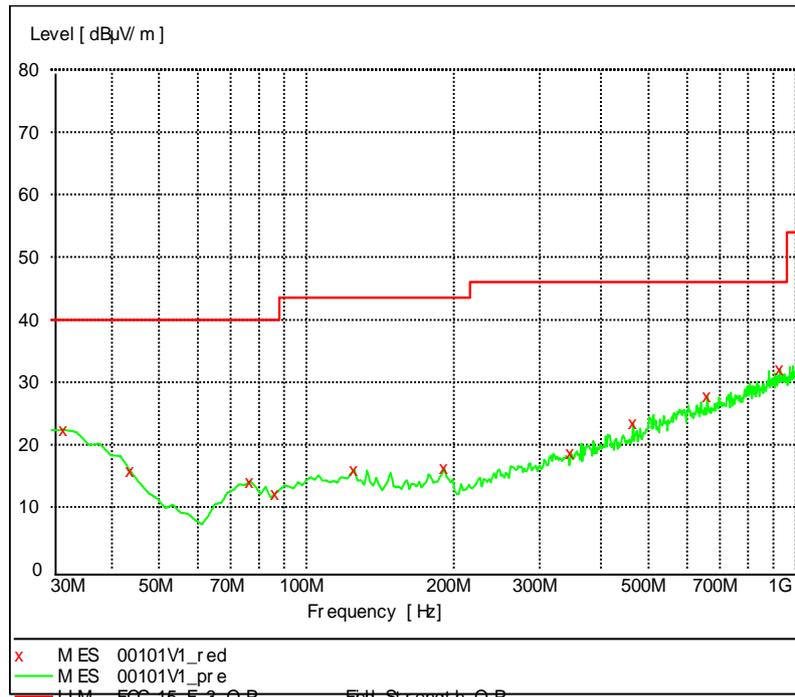
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Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	23.50	21.3	40.0	16.5
43.607214	15.80	13.9	40.0	24.2
74.709419	15.60	9.5	40.0	24.4
86.372745	13.80	10.1	40.0	26.2
133.026052	15.40	11.2	43.5	28.1
187.454910	16.00	11.1	43.5	27.5
348.797595	19.30	15.9	46.0	26.7
488.757515	23.00	19.1	46.0	23.0
692.865731	28.40	22.2	46.0	17.6
959.178357	32.40	25.3	46.0	13.6

Vertical



Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
31.943888	22.40	20.4	40.0	17.6
43.607214	15.80	13.9	40.0	24.2
76.653307	14.10	9.7	40.0	25.9
86.372745	12.20	10.1	40.0	27.8
125.250501	15.90	11.7	43.5	27.6
191.342685	16.30	11.2	43.5	27.2
346.853707	18.70	15.9	46.0	27.3
465.430862	23.40	18.3	46.0	22.6
659.819639	27.80	21.8	46.0	18.2
930.020040	32.10	25.4	46.0	13.9

- 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*****