IKEA of Sweden AB

TEST REPORT

SCOPE OF WORK:
FCC Part 15 subpart B – EMC report

Model:
LED1926C3

REPORT NUMBER
190802534SHA-001

ISSUE DATE
October 22, 2019

DOCUMENT CONTROL NUMBER
TTRFFCCPART15b_V1

Intertek Testing Services Shanghai,
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Report no. 190802534SHA-001

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:**
Star Guo	Andy Chen
Project Engineer	Reviewer

Contents

Revision History

Report No.	Version	Description	Issued Date
190802534SHA-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	:	LED1926C3
Description of EUT	:	We tested it, and listed the worst data.
Rating	:	AC 120V, 60Hz, 2.4W, 39mA, with E12 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
☒	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) (±)
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

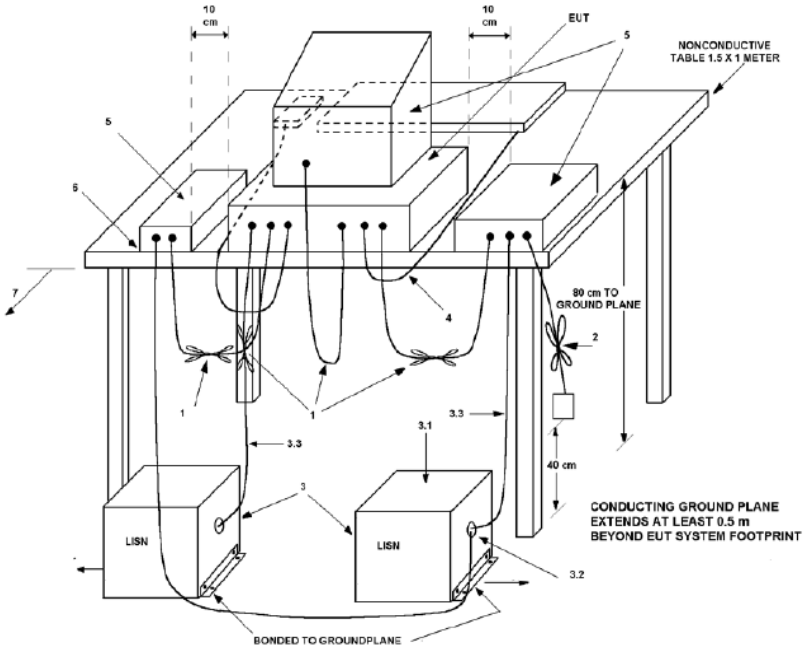
Frequency range (MHz)	Limits dB(μV) Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver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

3.1.2 Limits for conducted emission of class B device

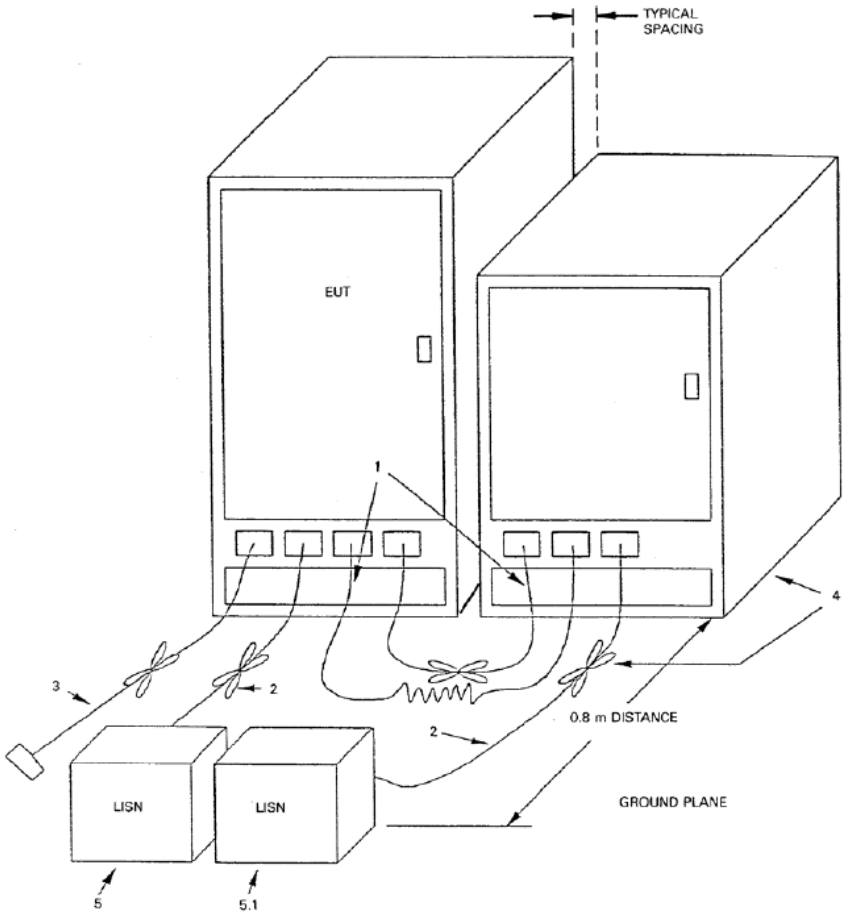
Frequency range (MHz)	Limits dB(μV) Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz 2. If the limit for the measurement with the average detector is met when 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



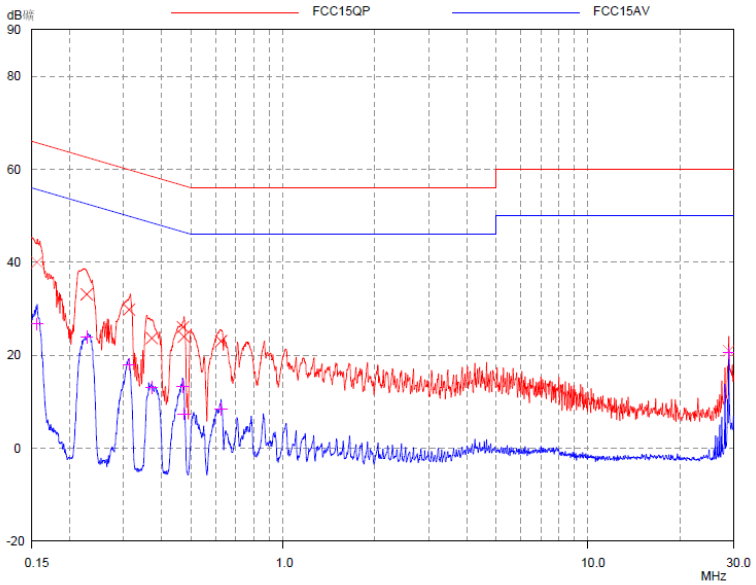
3.3 Test Setup and Test Procedure

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

BP9938D

L line:

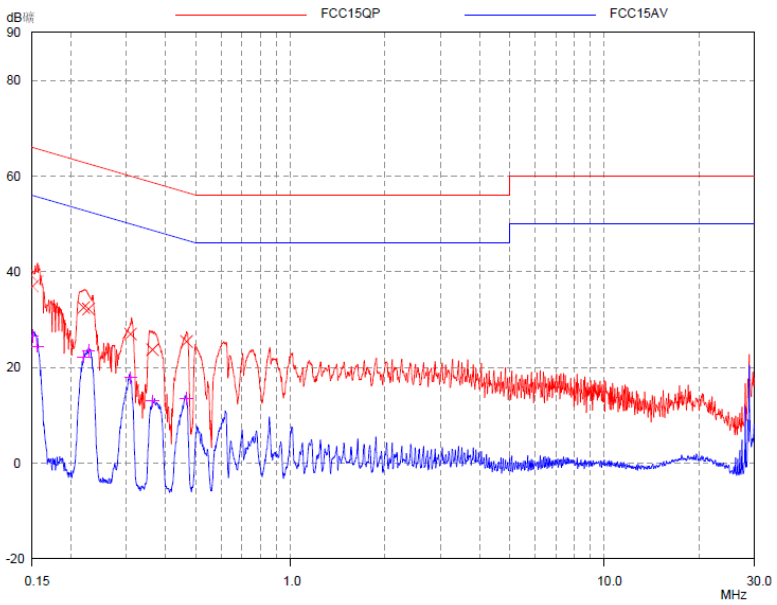


Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.1561	40.01	65.67	25.66
0.22719	33.11	62.55	29.44
0.31267	29.82	59.90	30.08
0.37123	23.68	58.47	34.79
0.46982	26.05	56.52	30.47
0.47358	24.01	56.45	32.44
0.62626	23.03	56.00	32.97
28.9151	20.98	60.00	39.02

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.1561	26.73	55.67	28.94
0.22719	23.89	52.55	28.66
0.31267	18.02	49.90	31.88
0.37123	13.13	48.47	35.34
0.46982	13.34	46.52	33.18
0.47358	7.43	46.45	39.02
0.62626	8.41	46.00	37.59
28.9151	20.47	50.00	29.53

N line:



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.1506	37.00	65.97	28.97
0.1561	37.93	65.67	27.74
0.21917	32.53	62.85	30.32
0.22719	32.22	62.55	30.33
0.30895	26.99	60.00	33.01
0.36389	23.72	58.64	34.92
0.46608	25.42	56.58	31.16

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.1506	26.57	55.97	29.40
0.1561	24.44	55.67	31.23
0.21917	22.21	52.85	30.64
0.22719	23.44	52.55	29.11
0.30895	17.84	50.00	32.16
0.36389	12.97	48.64	35.67
0.46608	13.57	46.58	33.01

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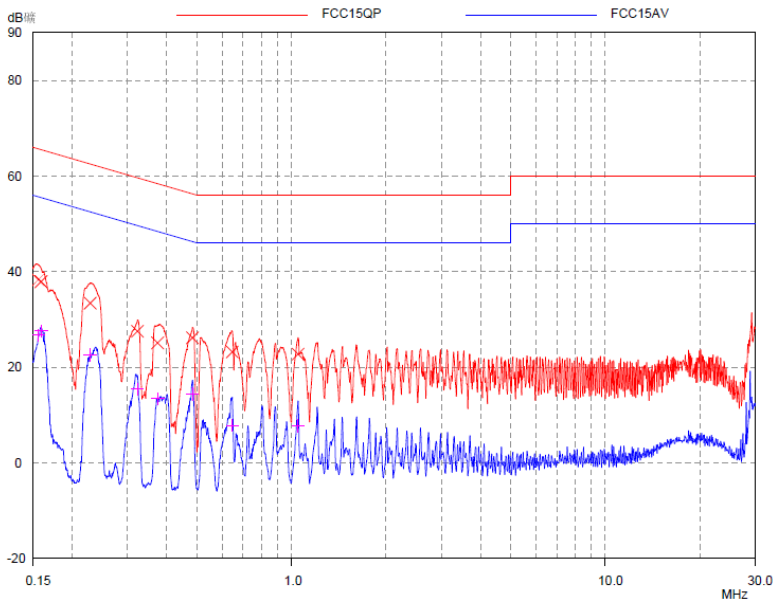
L line:

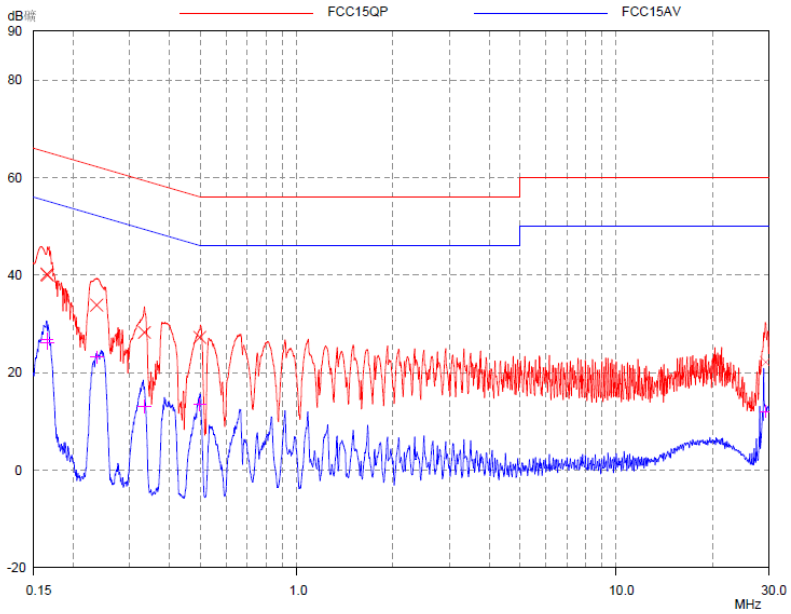


Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.15548	38.30	65.70	27.40
0.15925	37.92	65.50	27.58
0.2281	33.40	62.52	29.12
0.32282	27.56	59.63	32.07
0.3742	25.11	58.41	33.30
0.48313	26.17	56.29	30.12
0.64659	23.22	56.00	32.78
1.04811	22.76	56.00	33.24

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.15548	26.73	55.70	28.97
0.15925	27.59	55.50	27.91
0.2281	22.62	52.52	29.90
0.32282	15.42	49.63	34.21
0.3742	13.44	48.41	34.97
0.48313	14.35	46.29	31.94
0.64659	7.82	46.00	38.18
1.04811	7.77	46.00	38.23

N line:



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.16508	40.18	65.20	25.02
0.16574	39.98	65.17	25.19
0.23644	33.87	62.22	28.35
0.33329	28.23	59.37	31.14
0.49682	27.24	56.05	28.81
29.38052	22.15	60.00	37.85

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.16508	26.88	55.20	28.32
0.16574	26.07	55.17	29.10
0.23644	23.19	52.22	29.03
0.33329	13.11	49.37	36.26
0.49682	13.45	46.05	32.60
29.38052	12.00	50.00	38.00

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

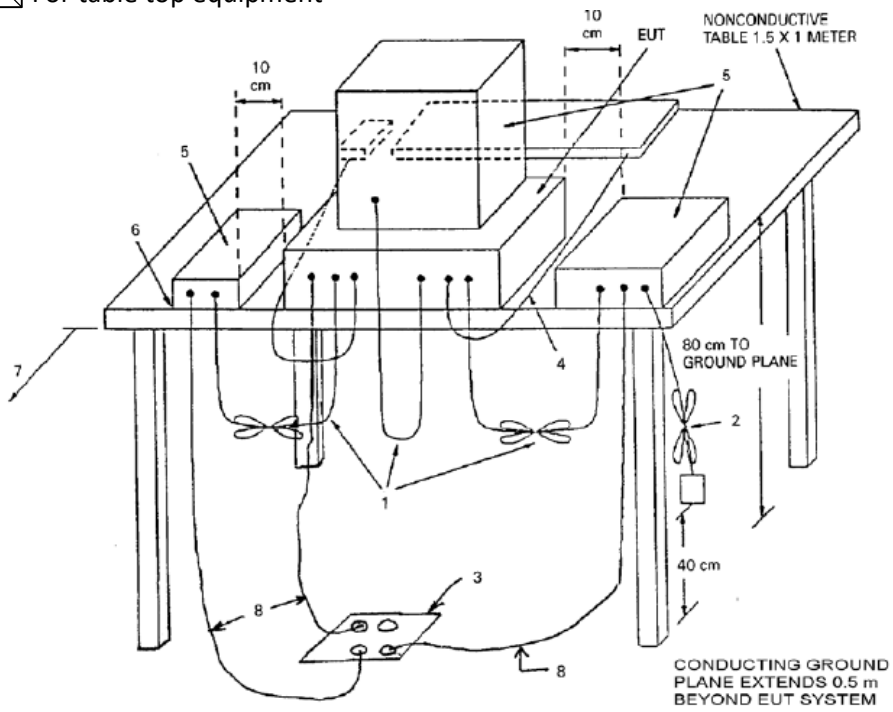
Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 10m
30 ~ 88	39
88 ~ 216	43.5
216 ~ 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.1.2 Limits for radiated emission of class B device

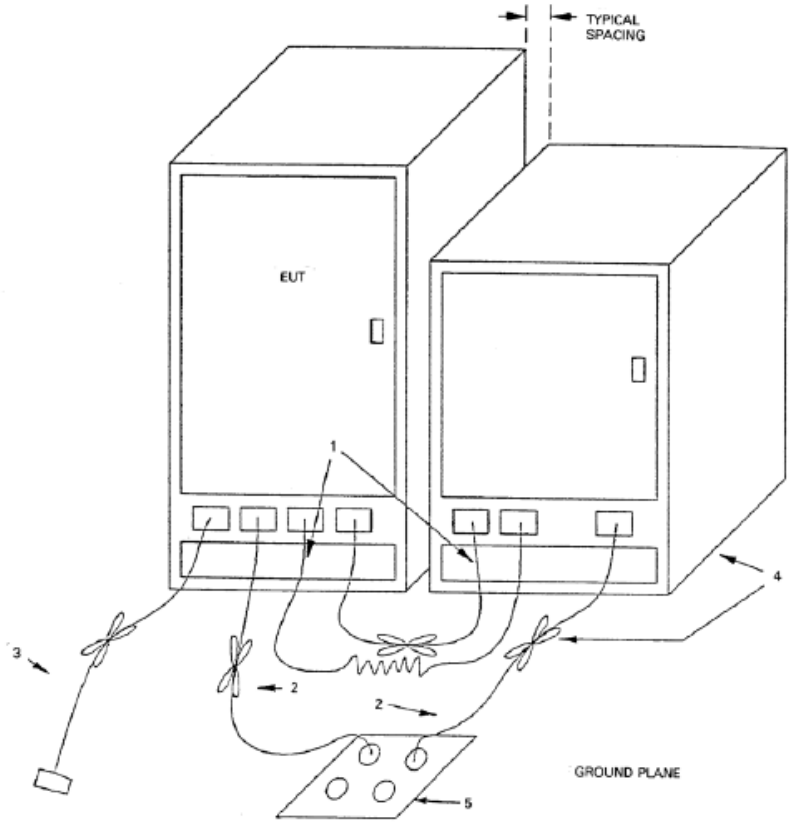
Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 3m
30 ~ 88	40.0
88 ~ 216	43.5
216 ~ 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

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.

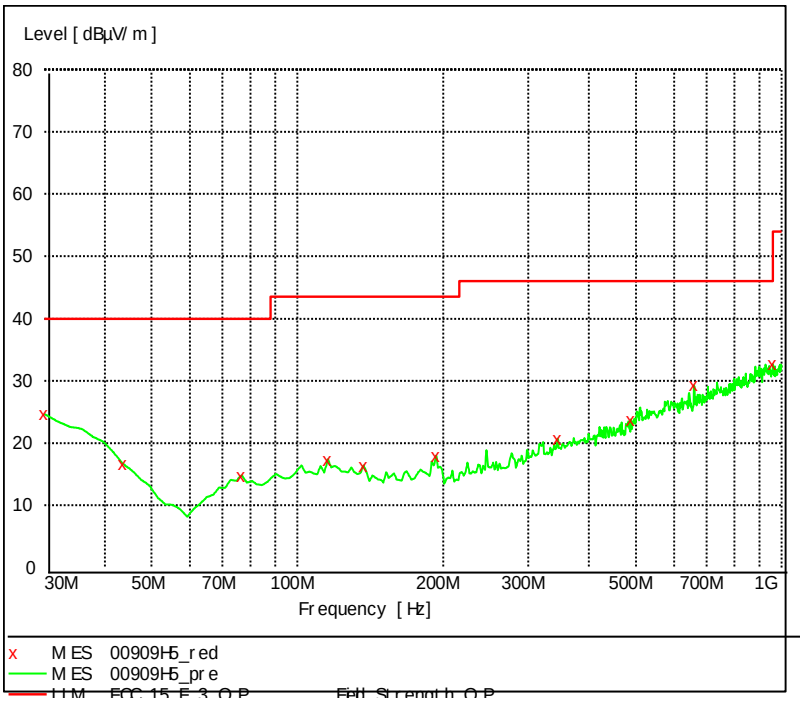
The distance from EUT to receiving antenna is 3 meter.
Measurement was performed according to clause 4 and clause 5 of ANSI 63.4.
Test procedure was according to clause 8.3 of ANSI 63.4.
EUT arrangement and operate condition were according to clause 6 and clause 8 of ANSI 63.4.
The bandwidth setting on R&S Test Receiver was 120 kHz.
The required measurement frequency range was checked.

4.4 Test Protocol

Test Curve:

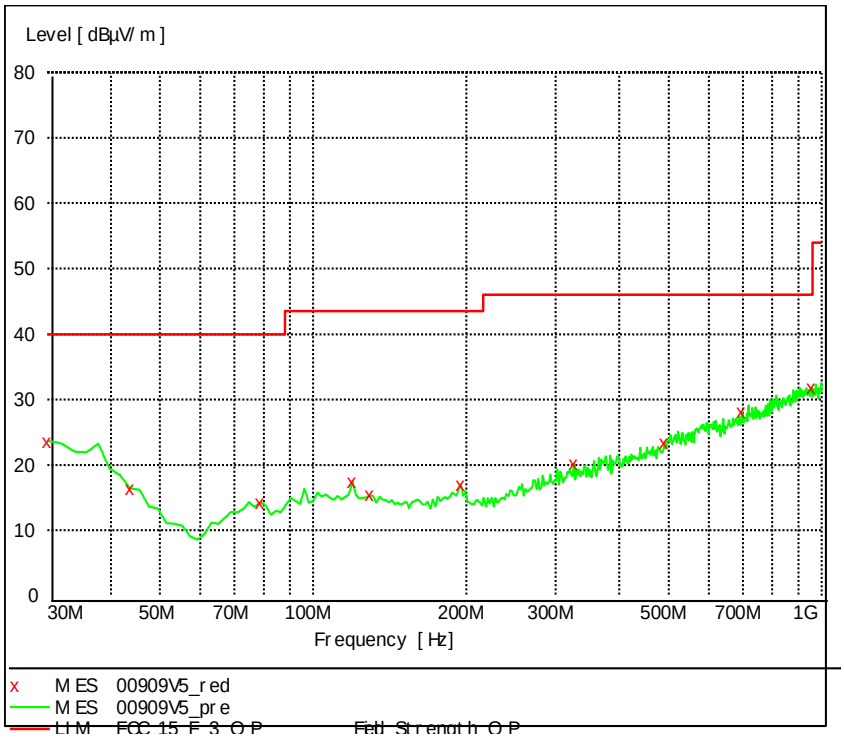
BP9938D

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	24.70	21.3	40.0	15.3
43.607214	16.60	13.9	40.0	23.4
76.653307	14.80	9.7	40.0	25.2
115.531062	17.40	11.7	43.5	26.1
136.913828	16.40	10.9	43.5	27.1
193.286573	18.00	11.2	43.5	25.5
344.909820	20.70	15.8	46.0	25.3
488.757515	23.80	19.1	46.0	22.2
659.819639	29.30	21.8	46.0	16.7
959.178357	32.70	25.3	46.0	13.3

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	23.70	21.3	40.0	16.3
43.607214	16.40	13.9	40.0	23.6
78.597194	14.30	9.6	40.0	25.7
119.418838	17.50	11.9	43.5	26.0
129.138277	15.40	11.6	43.5	28.1
195.230461	17.00	11.2	43.5	26.5
325.470942	20.20	15.4	46.0	25.8
490.701403	23.50	19.3	46.0	22.5
696.753507	28.20	22.3	46.0	17.8
955.290581	31.80	25.3	46.0	14.2

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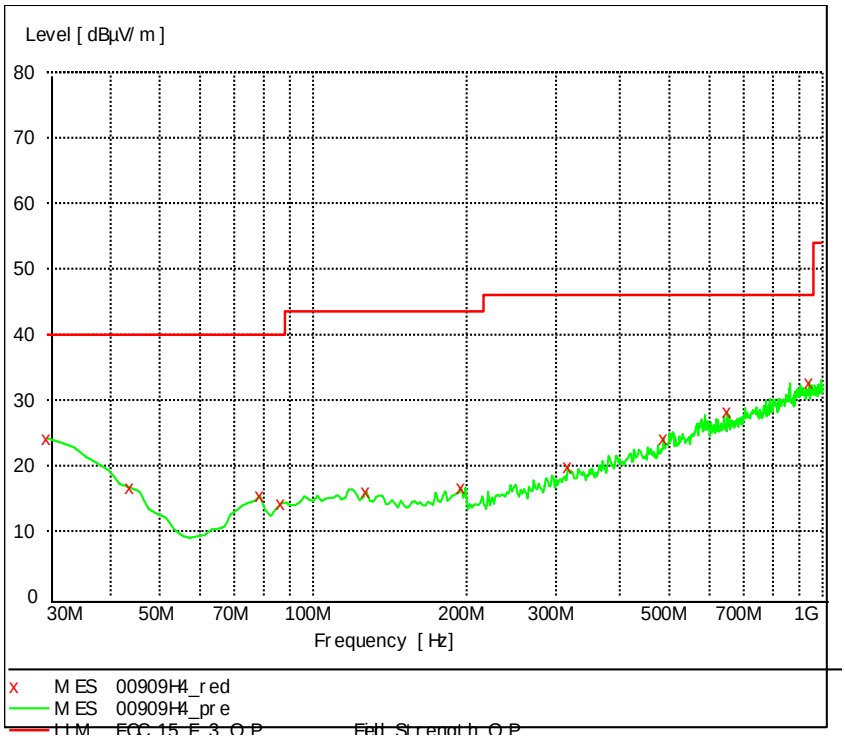
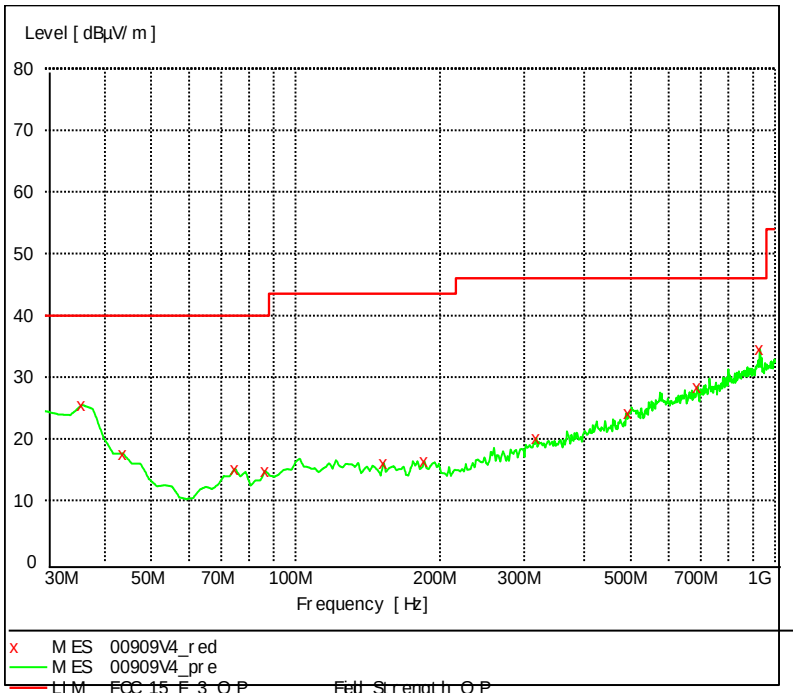
Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	24.20	21.3	40.0	15.8
43.607214	16.60	13.9	40.0	23.4
78.597194	15.40	9.6	40.0	24.6
86.372745	14.20	10.1	40.0	25.8
127.194389	16.00	11.6	43.5	27.5
195.230461	16.70	11.2	43.5	26.8
315.751503	19.80	15.1	46.0	26.2
486.813627	24.20	19.0	46.0	21.8
650.100200	28.20	21.7	46.0	17.8
941.683367	32.70	25.4	46.0	13.3

Vertical



Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
35.831663	25.50	18.7	40.0	14.5
43.607214	17.60	13.9	40.0	22.4
74.709419	15.10	9.5	40.0	24.9
86.372745	14.80	10.1	40.0	25.2
152.464930	16.10	10.2	43.5	27.4
185.511022	16.40	11.0	43.5	27.1
317.695391	20.10	15.2	46.0	25.9
494.589178	24.20	19.5	46.0	21.8
688.977956	28.50	22.2	46.0	17.5
930.020040	34.60	25.4	46.0	11.4

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*****