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EMC TEST REPORT

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

Model:
LED2003G10

REPORT NUMBER
201100278SHA-001

ISSUE DATE
June 4, 2021

DOCUMENT CONTROL NUMBER
TTRFFCCPART15b_V1

Intertek Testing Services Shanghai,
Building No.86, 1198 Qinzhou Road (North),
Caohejing Development Zone,
Shanghai 200233, China

Telephone: 86 21 6127 8200
www.intertek.com

Report No. 201100278SHA-001

Applicant	:	**IKEA of Sweden AB** **Box 702 SE-343 81 Älmhult, SWEDEN**
Manufacturer	:	**IKEA of Sweden AB** **Box 702 SE-343 81 Älmhult, SWEDEN**
Manufacturing site	:	**Haysonic IoT Technology 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 (2019): 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:**
Erick Liu	Wakeyou Wang
Project Engineer	Reviewer

Contents

Revision History

Report No.	Version	Description	Issued Date
201100278SHA-001	Rev. 01	Initial issue of report	January 25, 2021
201100278SHA-001	Rev. 02	Remove the EUT photos from the report	June 04, 2021

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 lamp
Type/Model	:	LED2003G10
Description of EUT	:	The product covered by this report is self-ballasted LED lamp, which be provided with an E26 lamp base for connection to a 120V~, 60Hz source of supply through suitable lampholders. It's only controllable by IKEA smart lighting product. It has only one model.
Rating	:	120V~, 60Hz, 10.0W, 95mA, E26
Brand name	:	IKEA
Category of EUT	:	Class B
EUT type	:	☒ Table top ☐ Floor standing
Sample received date	:	November 17, 2020
Date of test	:	November 17, 2020 ~ January 5, 2021

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 (2019): 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	49	/
Radiated Emission	24	49	/

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	2021-07-08
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2021-11-28
☒	Shielded room	Zhongyu	-	EC 2838	2021-01-12
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2021-09-15
☒	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2021-10-25
☒	Pre-amplifier	R&S	AFS42-00101800-25-S-42	EC5262	2021-06-11
☒	Horn antenna	R&S	HF 906	EC 3049	2021-01-17
☒	Horn antenna	ETS	3117	EC 4792-1	2021-03-15
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2021-07-14
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3442	2021-01-05
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 5844	2021-03-10
☒	Pressure meter	YM3	Shanghai Mengde	EC 3320	2021-07-20

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

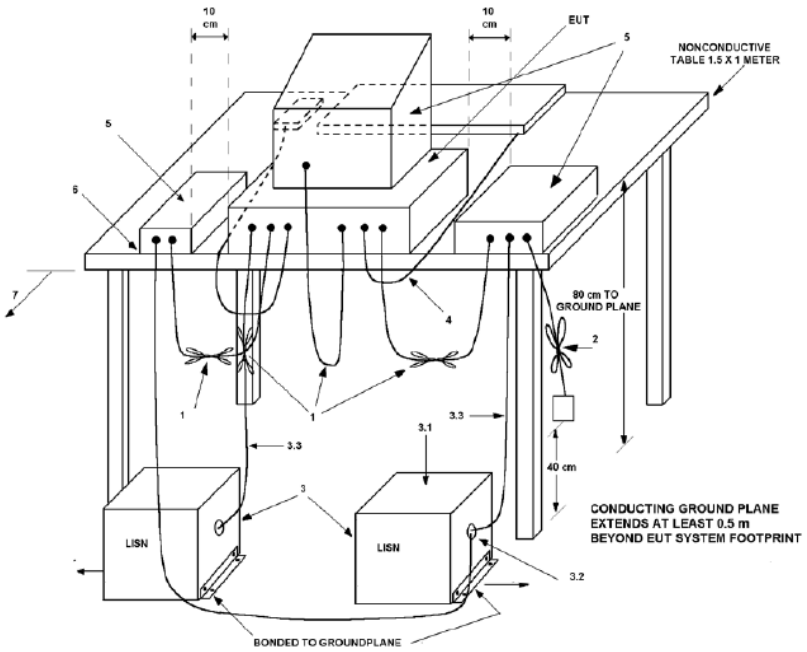
Frequency range (MHz)	Limits dB(μV) Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver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

3.1.2 Limits for conducted emission of class B device

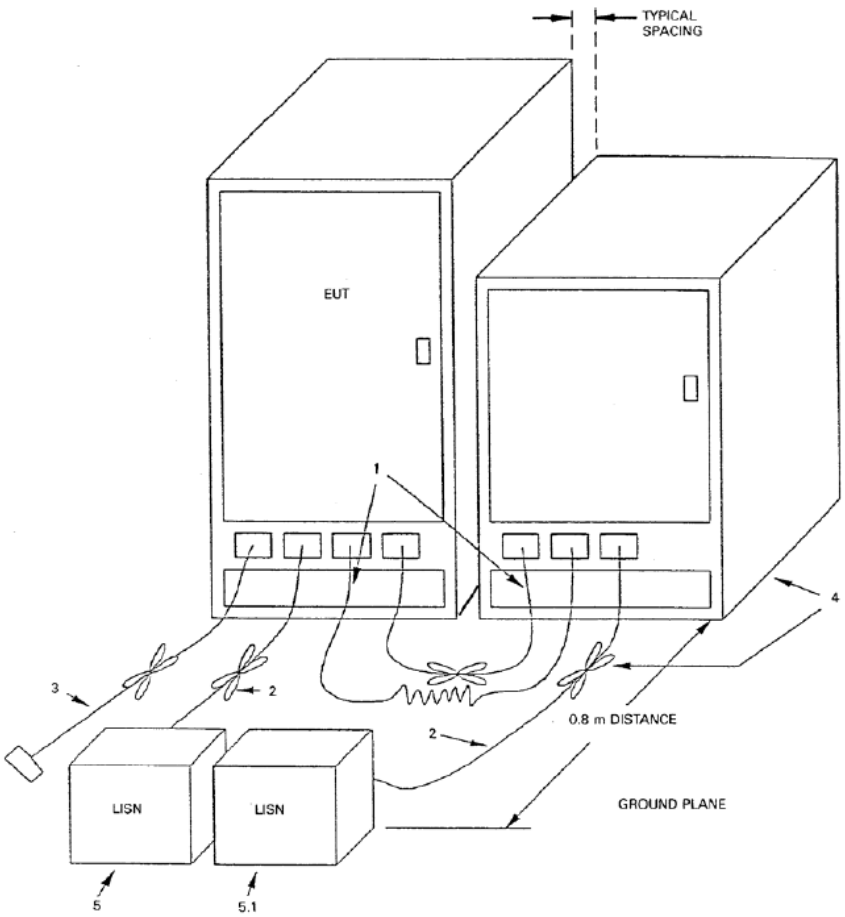
Frequency range (MHz)	Limits dB(μV) Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz 2. If the limit for the measurement with the average detector is met when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

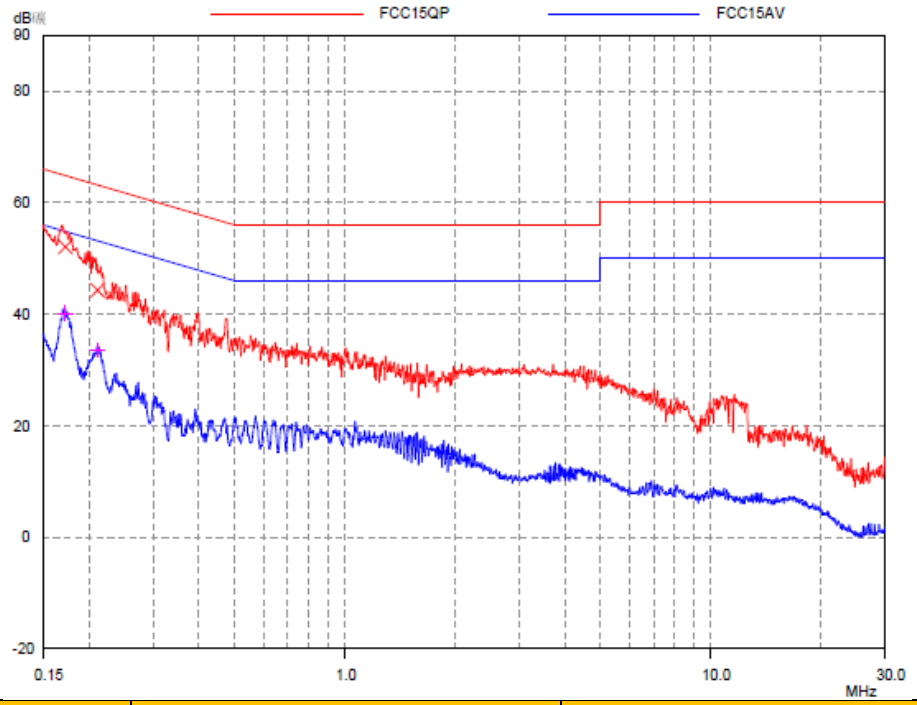


3.3 Test Setup and Test Procedure

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.

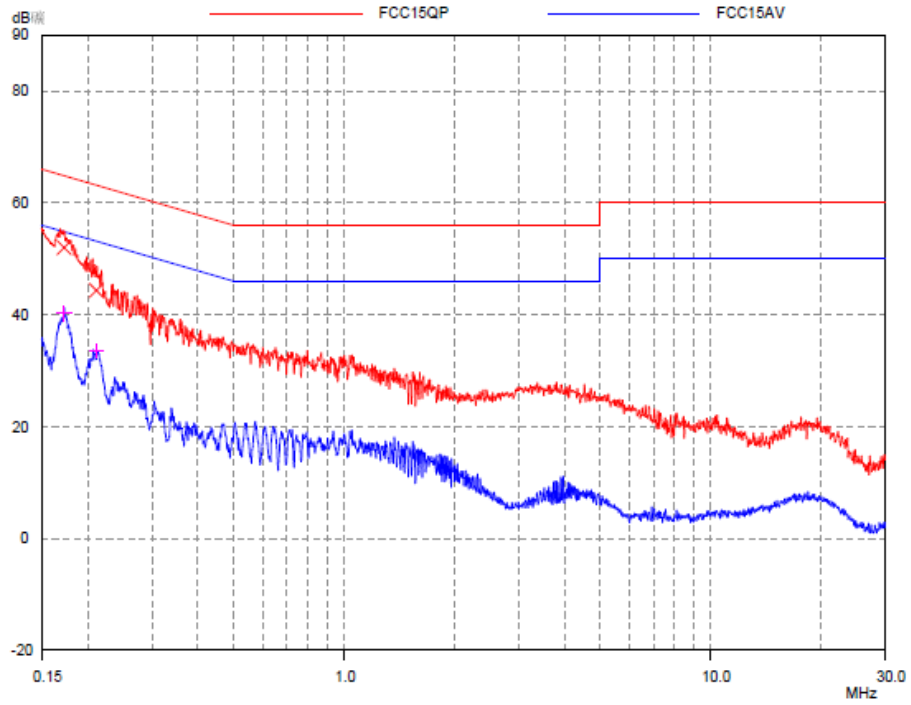
3.4 Test Protocol

L line:



Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
0.17	52.06	64.84	12.78	40.17	54.84	14.67
0.21	44.30	63.15	18.85	33.51	53.15	19.64
0.24	*	61.95	*	*	51.95	*
0.71	*	56.00	*	*	46.00	*
Note: * means the emission level 20dB below the relevant limit.						

N line:



Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
0.17	52.01	64.84	12.83	40.28	54.84	14.56
0.21	44.35	63.15	18.80	33.60	53.15	19.55
0.23	*	62.29	*	*	52.29	*
0.28	*	60.70	*	*	50.70	*
17.14	*	60.00	*	*	50.00	*
Note: * means the emission level 20dB below the relevant limit.						

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

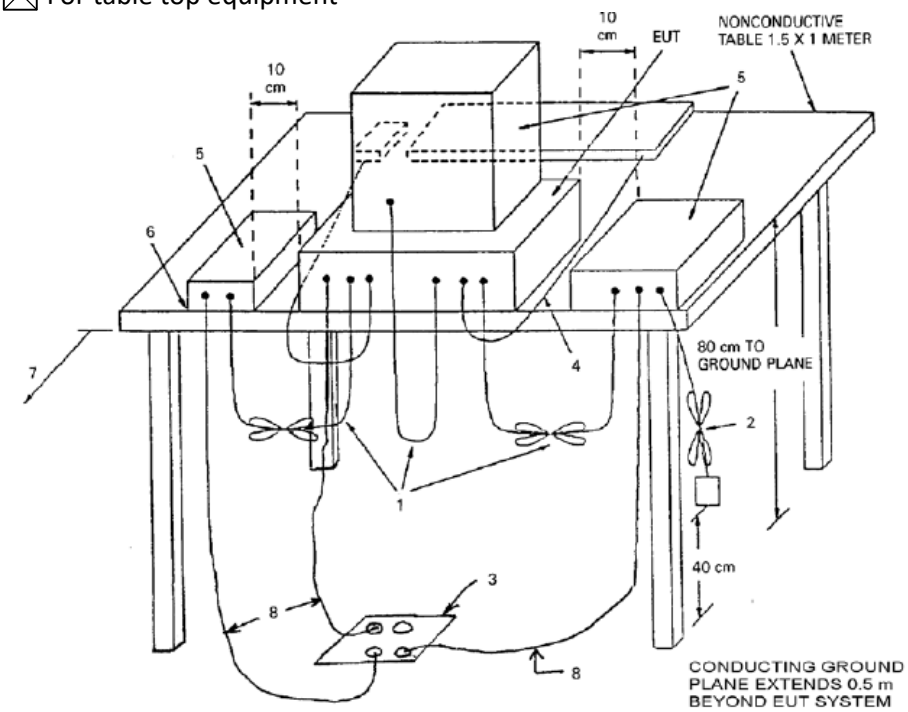
Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 10m
30 ~ 88	39
88 ~ 216	43.5
216 ~ 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.1.2 Limits for radiated emission of class B device

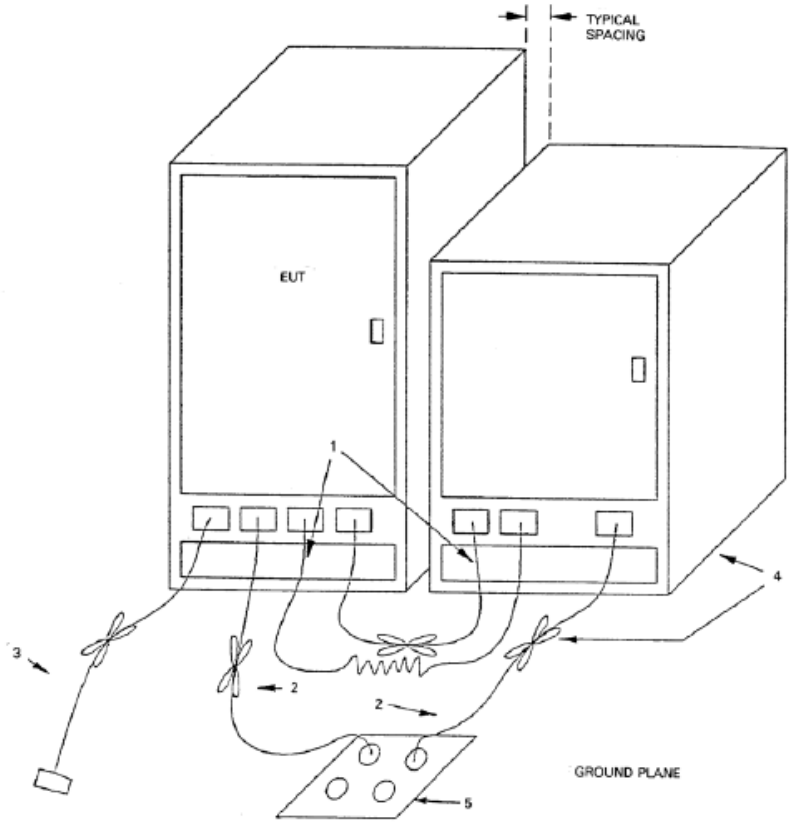
Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 3m
30 ~ 88	40.0
88 ~ 216	43.5
216 ~ 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

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.

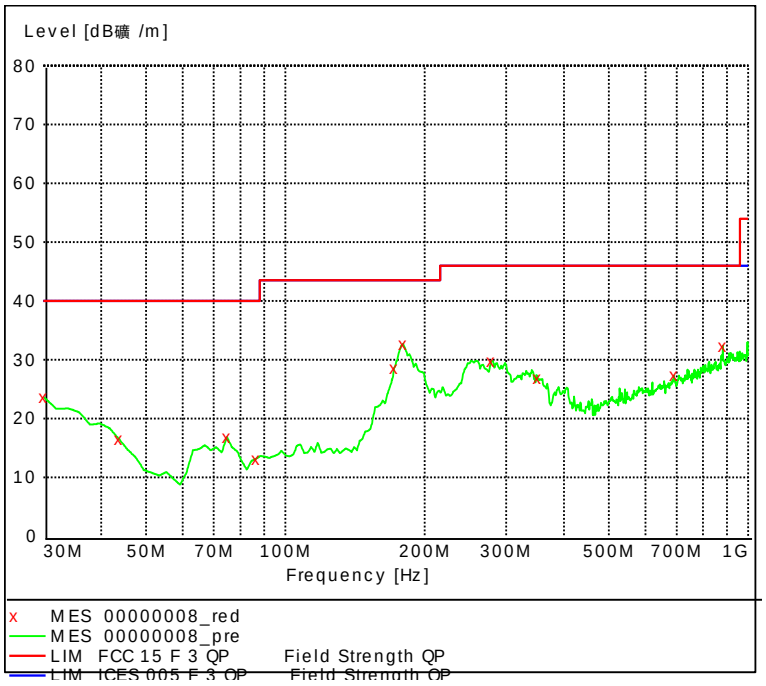
The bandwidth setting on R&S Test Receiver was 120 kHz.

The required measurement frequency range was checked.

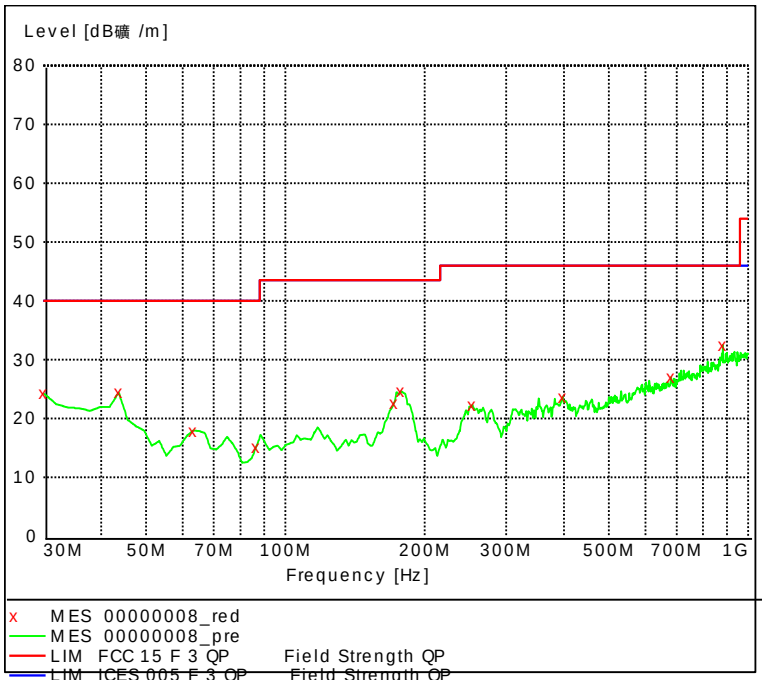
4.4 Test Protocol

Test Curve:

Horizontal



Vertical



Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	30.00	23.60	21.30	40.00	16.40	PK
H	179.68	32.70	10.70	43.50	10.80	PK
H	278.82	29.80	13.90	46.00	16.20	PK
H	350.74	26.80	15.90	46.00	19.20	PK
H	690.92	27.30	22.20	46.00	18.70	PK
H	881.42	32.40	24.70	46.00	13.60	PK
V	30.00	24.20	21.30	40.00	15.80	PK
V	43.61	24.40	13.90	40.00	15.60	PK
V	177.74	24.60	10.60	43.50	18.90	PK
V	681.20	27.00	22.10	46.00	19.00	PK
V	881.42	32.50	24.70	46.00	13.50	PK

Above 1GHz

Polarization	Frequency (MHz)	Emission level (dBuV/m)	Limits (dBuV/m)	Margin (dBuV/m)	Detector
Horizontal	1000.00	*	74.0	*	PK
	5000.00	*	74.0	*	PK
	10000.00	*	74.0	*	PK
	15000.00	*	74.0	*	PK
	18000.00	*	74.0	*	PK
Vertical	1000.00	*	74.0	*	PK
	5000.00	*	74.0	*	PK
	10000.00	*	74.0	*	PK
	15000.00	*	74.0	*	PK
	18000.00	*	74.0	*	PK
Note: * means the emission level is 10dB or more lower than the relevant limit.					

Remark:

1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. If the PK measured level is lower than AV limit, the AV test can be elided.

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