FCC TEST REPORT

No. 180601531SHA-001

Applicant	: IKEA of Sweden AB P.O. Box 702, S-343 81 Älmhult, SWEDEN
Manufacturer	: Zhe Jiang Hao Ting Lighting Co. Ltd Feng Ming Industrial Zone, Tongxiang City, Zhejiang Province, 314505, P.R.China
Product Name	: Ceiling mounted luminaire
Type/Model	: T1705 BÄVE

TEST RESULT : Pass

SUMMARY

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

47CFR Part 15 (2017): 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

Date of issue: December 10, 2018

Prepared by:

Star Guo (*Project Engineer*)

Reviewed by:

Andy Chen (*Reviewer*)

Content

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product Name	:	Ceiling mounted luminaire
Description of EUT	:	LED driver: EHP018C0140LERD1. We tested one model, and listed the worst data as the representative.
Model number	:	T1705 BÄVE
I/O Port	:	--
Category of EUT	:	Class B
Rating	:	120V; 60Hz; 5x 3.4W
EUT type	:	☒ Table top ☐ Floor standing
Highest operating frequency	:	<108MHz
Sample received date	:	June 19, 2018
Date of test	:	June 19-25, 2018

1.2 Description of Client

Applicant&Manufacturer :		IKEA of Sweden AB P.O. Box 702, S-343 81 Älmhult, SWEDEN
Person of contact	:	Vivian Xu
Telephone	:	+46 728865243
Telefax	:	-
Email address	:	vivian.xu@ikea.com
Factory	:	Zhe Jiang Hao Ting Lighting Co. Ltd Feng Ming Industrial Zone, Tongxiang City, Zhejiang Province, 314505, P.R.China

1.3 Description of Test Facility

☒ Name : Intertek Testing Service Shanghai

Address : Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China

Telephone : 86 21 61278200

Telefax : 86 21 54262353

A2LA Certificate Number: 3309.02

Subcontractor:

☐ Name : Shanghai Institute of Measurement Technology

Address : 716 Yishan Road, Shanghai 200233, P.R. China

Telephone : 86 21 64700066

Telefax :

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 with modulation and tested under its rating voltage and frequency.

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 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	2019-09-12
☑	A.M.N.	R&S	ESH2-Z5	EC 3119	2019-12-01
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	2019-05-30
Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Shielded room	Zhongyu	-	EC 2838	2019-01-08
☑	Semi-anechoic chamber	Albatross project	-	EC 3048	2019-03-09
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 2323	2019-06-14
☑	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3326	2019-03-29

2.6 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	RESULT
Conducted emission	15.107	Pass
Radiated emission	15.109	Pass

Notes: 1: NA =Not Applicable

2: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

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

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

3 Conducted emission

Test result: Pass

3.1 Limits

3.1.1 Limits for conducted emission of class A device

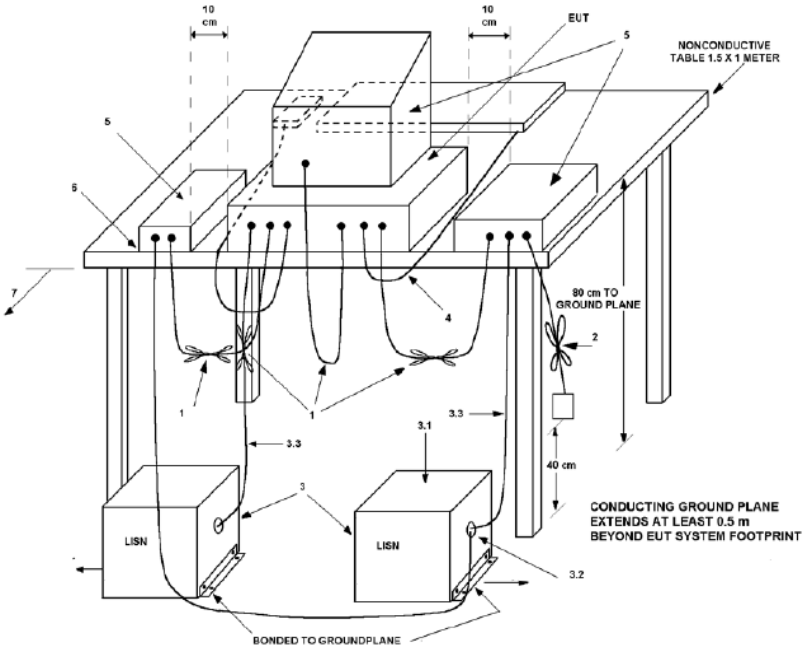
Frequency range (MHz)	Limits dB(μV) Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver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

3.1.2 Limits for conducted emission of class B device

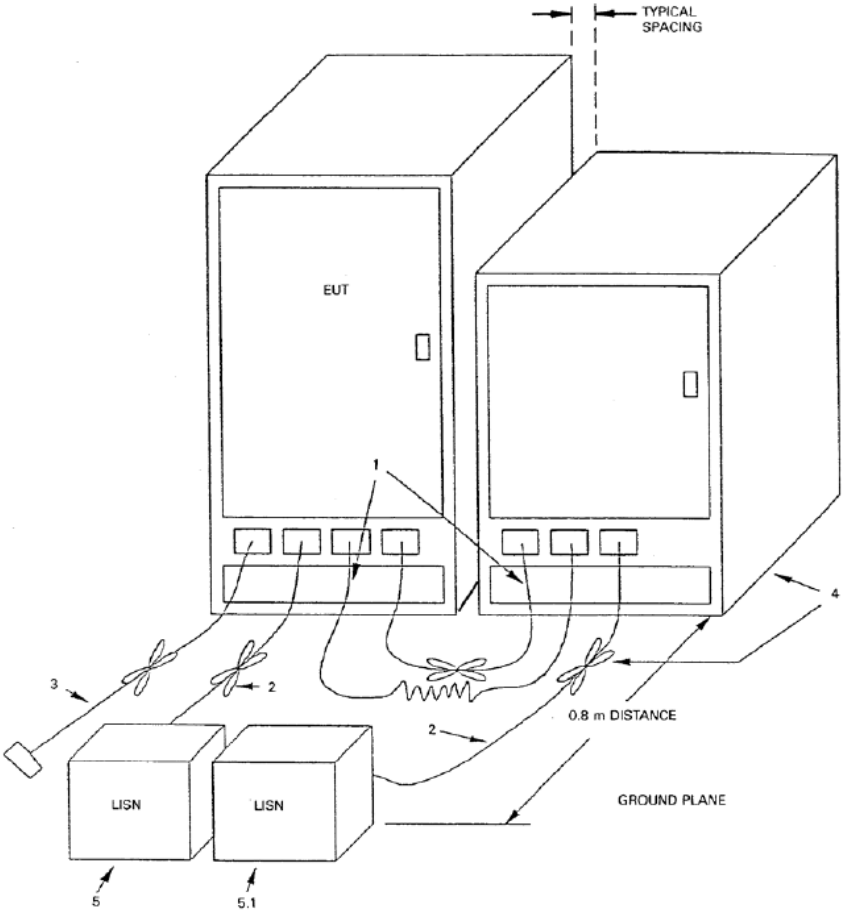
Frequency range (MHz)	Limits dB(μV) Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz 2. If the limit for the measurement with the average detector is met when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

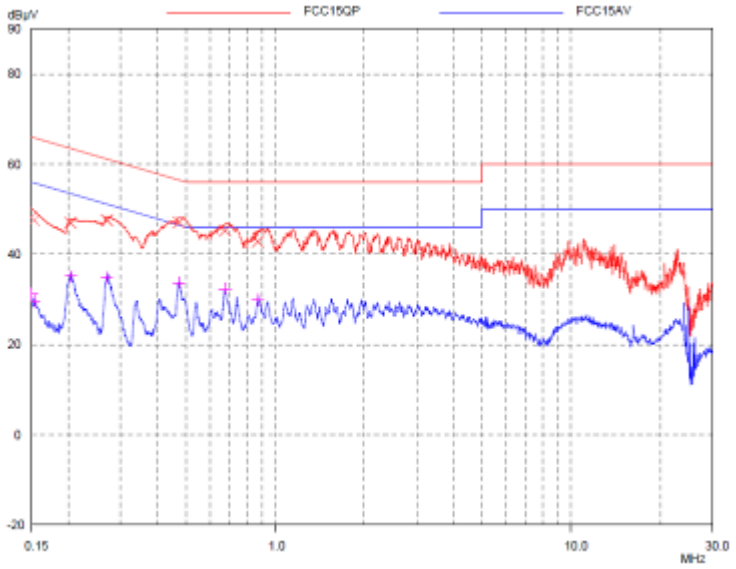


3.3 Test Setup and Test Procedure

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

Temperature : 25°C
Relative Humidity : 45%
L line

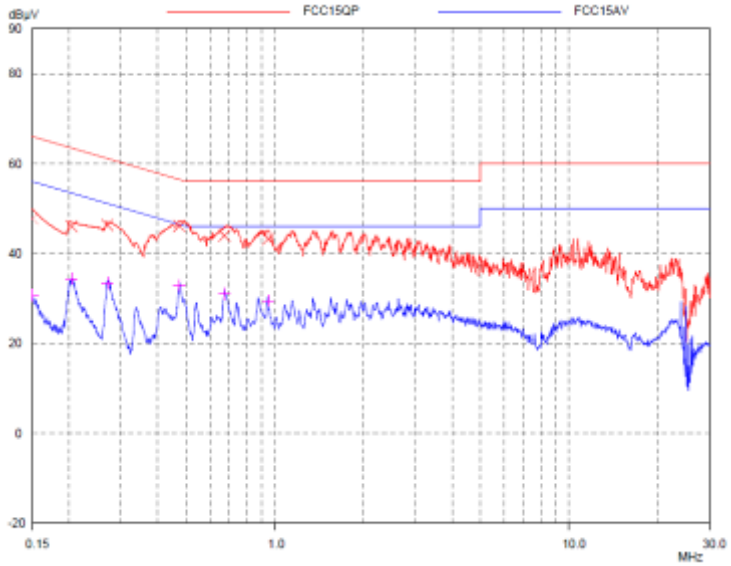


Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.15	48.27	66.00	17.73
0.15302	47.55	65.83	18.28
0.20316	46.98	63.48	16.50
0.26974	47.58	61.13	13.55
0.4717	47.12	56.48	9.36
0.67561	45.26	56.00	10.74
0.87228	42.82	56.00	13.18

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.15	31.19	56.00	24.81
0.15302	29.68	55.83	26.15
0.20316	35.15	53.48	18.33
0.26974	34.91	51.13	16.22
0.4717	33.77	46.48	12.71
0.67561	32.41	46.00	13.59
0.87228	29.89	46.00	16.11

N line:



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.15	47.79	66.00	18.21
0.20397	46.04	63.45	17.41
0.26974	46.32	61.13	14.81
0.47358	46.12	56.45	10.33
0.67292	43.96	56.00	12.04
0.94856	43.22	56.00	12.78

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.15	30.74	56.00	25.26
0.20397	34.40	53.45	19.05
0.26974	33.49	51.13	17.64
0.47358	32.94	46.45	13.51
0.67292	31.05	46.00	14.95
0.94856	29.52	46.00	16.48

Notes: All possible modes of operation were investigated. Only the worst case emissions was measured.

3.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty at mains terminal: ± 3.52dB (9kHz-150kHz), ±3.19dB (150kHz-30MHz).
The measurement uncertainty is given with a confidence of 95%, k=2.

4 Radiated emission

Test result: Pass

4.1 Radiated emission limits

4.1.1 Limits for radiated emission of class A device

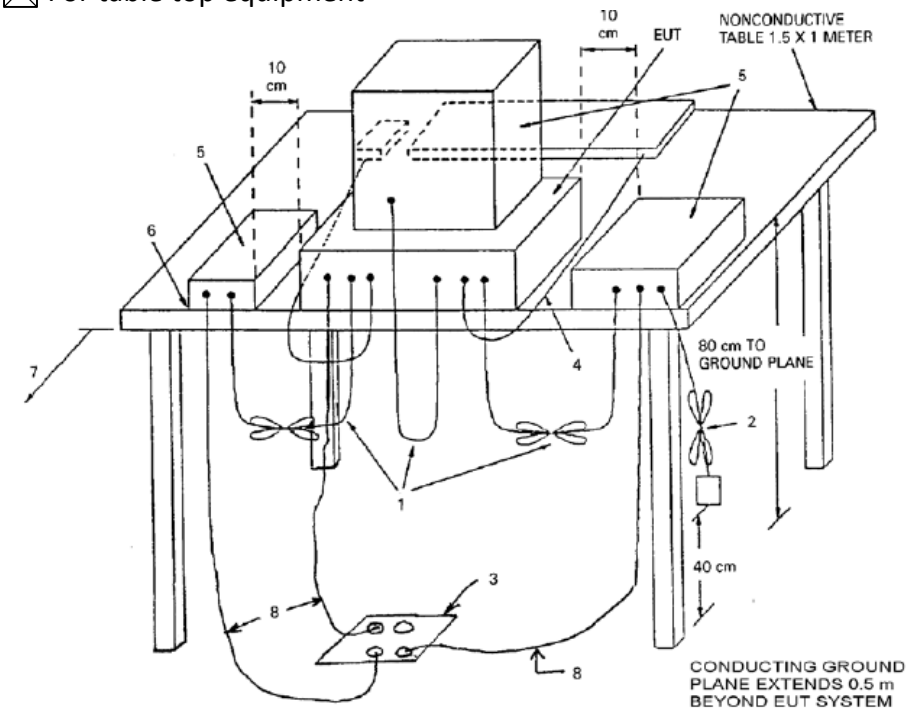
Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 10m
30 – 88	39
88 – 216	43.5
216 – 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.1.2 Limits for radiated emission of class B device

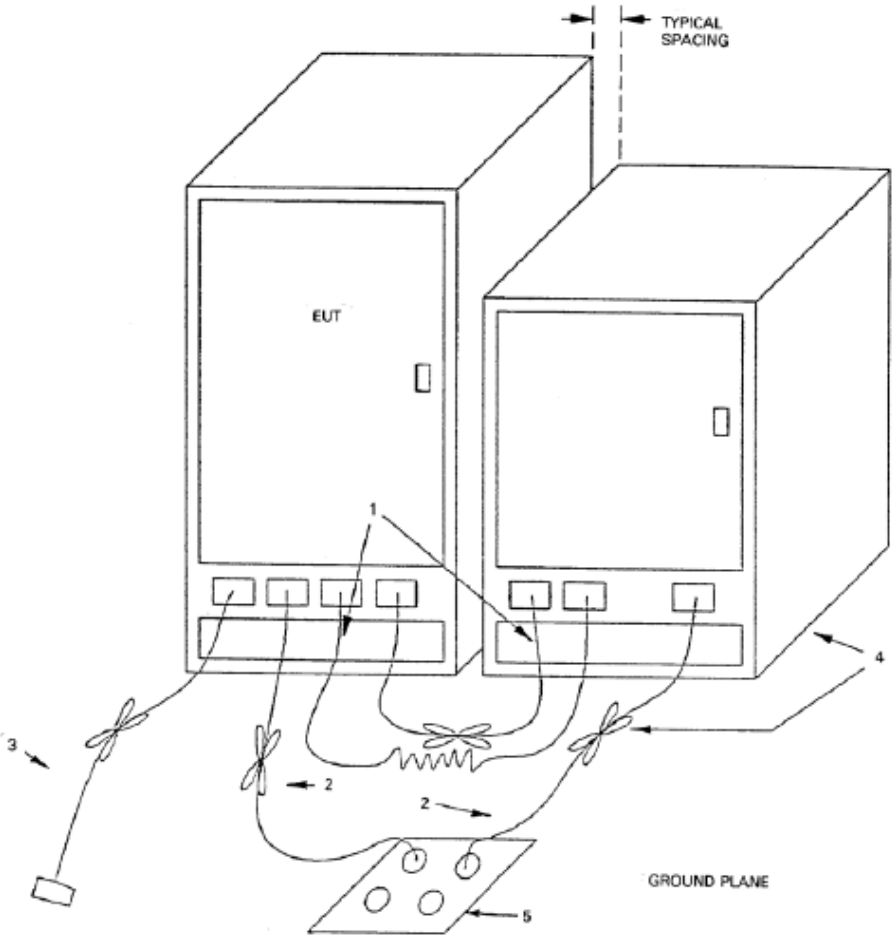
Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 3m
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

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 ESIB26 was 120 kHz.

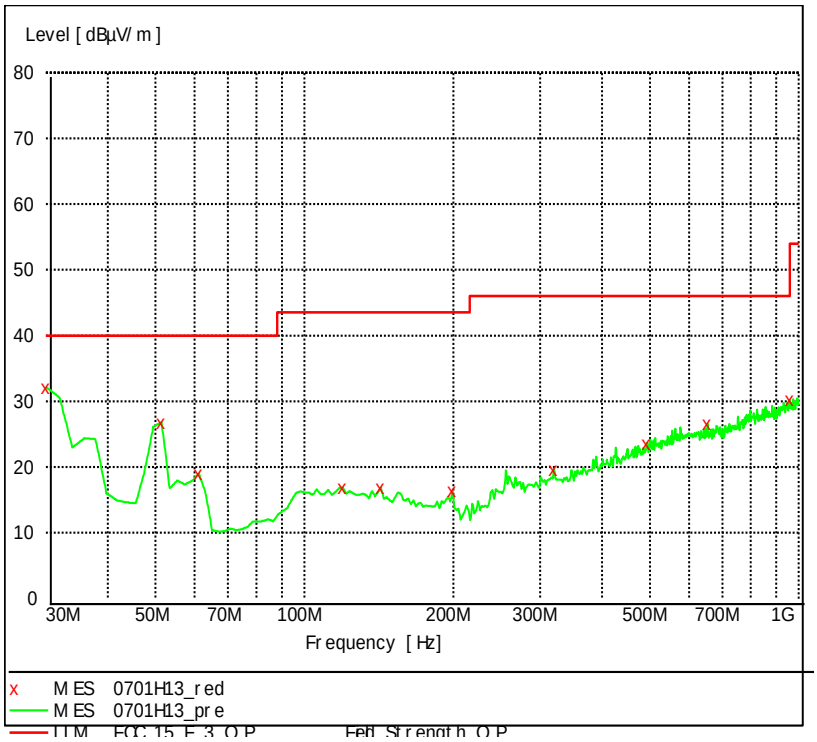
The required measurement frequency range was checked.

4.4 Test Protocol

Temperature : 25 °C Relative Humidity : 45 %

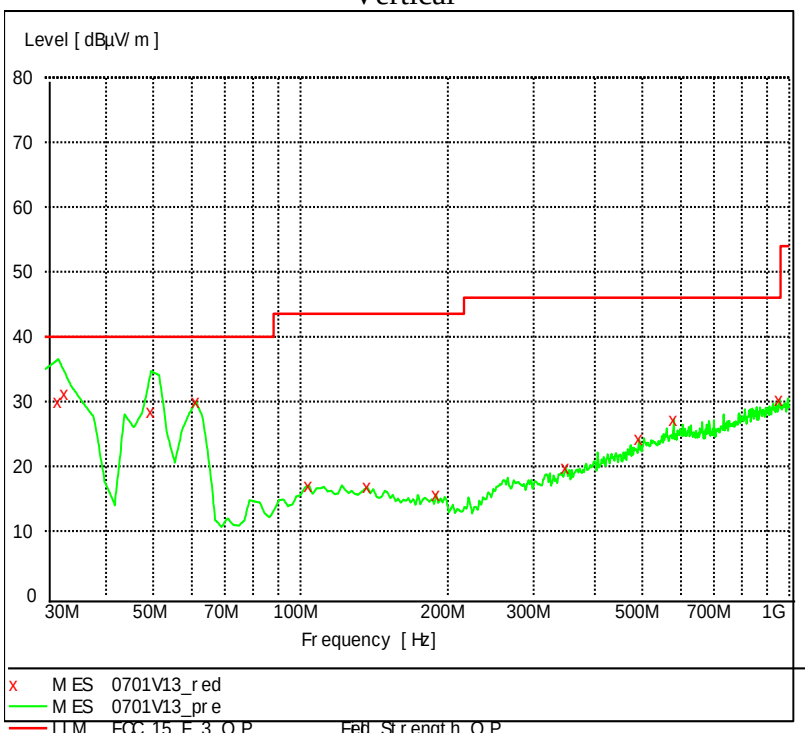
Test Curve:

Horizontal



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
30.000000	32.20	19.2	40.0	7.8
51.382766	26.80	8.5	40.0	13.2
61.102204	19.00	7.0	40.0	21.0
119.418838	16.90	13.3	43.5	26.6
142.745491	16.90	12.1	43.5	26.6
199.118236	16.50	10.7	43.5	27.0
319.639279	19.70	15.2	46.0	26.3
492.645291	23.70	19.2	46.0	22.3
653.987976	26.70	20.7	46.0	19.3
959.178357	30.30	23.6	46.0	15.7

Vertical



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB
32.945892	31.20	17.9	40.0	8.8
31.943888	30.00	17.9	40.0	10.0
49.438878	28.40	9.0	40.0	11.6
61.102204	30.00	7.0	40.0	10.0
103.867735	17.10	12.2	43.5	26.4
136.913828	16.80	12.5	43.5	26.7
189.398798	15.70	10.6	43.5	27.8
348.797595	19.80	16.0	46.0	26.2
492.645291	24.20	19.2	46.0	21.8
580.120240	27.30	20.3	46.0	18.7
953.346693	30.30	23.5	46.0	15.7

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.

4.5 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of radiated emission is: ± 4.90dB (30M-1000M), ± 5.02dB(1000M-6000M), ± 5.28dB(6000M-18000M)
The measurement uncertainty is given with a confidence of 95%, k=2.

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