IKEA of Sweden AB

RF TEST REPORT

Report Type:
FCC Part 15C RF report

Model:
E1905 Nordmärke

REPORT NUMBER:
191000408SHA-001

ISSUE DATE:
Dec 10, 2019

DOCUMENT CONTROL NUMBER:
TTRFFCCPART15C_V1 © 2018 Intertek

Intertek Testing Services Shanghai
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TEST REPORT

Report no.: 191000408SHA-001

Applicant	:	IKEA of Sweden AB P.O. Box 702, S-343 81 Älmhult, SWEDEN
Manufacturer	:	IKEA of Sweden AB P.O. Box 702, S-343 81 Älmhult, SWEDEN
FCC ID	:	FHO-E1905

SUMMARY:

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

47CFR Part 15 (2019): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY:	**REVIEWED BY:**
Project Engineer Stephanie Zhang	Reviewer Wakeyou Wang

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Content

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TEST REPORT

Revision History

Report No.	Version	Description	Issued Date
191000408SHA-001	Rev. 01	Initial issue of report	Dec 10, 2019

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
Radiated emissions	15.209	Pass
Conducted emissions	15.207	Pass

Notes: 1: NA =Not Applicable

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

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Wireless Charger
Type/Model:	E1905 Nordmärke
Description of EUT:	The product is a charging pad with wireless charging function.
Rating:	Input: 5V DC, 2A, 10W Wireless output: 5W Adapter input: AC 100-240V, 50/60Hz, Mx. 0.3A, 14W
Category of EUT:	Class B
EUT type:	☒ Table top ☐ Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	Oct 10, 2019
Date of test:	Oct 10, 2019 – Oct 29, 2019

1.2 Technical Specification

Frequency Range:	110kHz – 205kHz

1.3 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 Registration code No.: 2042B-1
	VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252
	NVLAP Accreditation Lab NVLAP LAB CODE: 200849-0
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2019)
ANSI C63.10 (2013)

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
1	wireless load	Provided by client	100% power level
2	wireless load	Provided by client	50% power level
3	wireless load	Provided by client	0% power level

2.5 Test environment condition:

Test items	Temperature	Humidity
Radiated emission	21°C	51% RH
Power line conducted emission	20°C	51% RH

2.6 Instrument list

Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2020-09-16
☒	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2019-12-10
☒	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2020-03-14
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2020-03-04
Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Shielded room	Zhongyu	-	EC 2838	2020-01-13
☐	Shielded room	Zhongyu	-	EC 2839	2020-01-13
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2020-06-31
☐	Fully-anechoic chamber	Albatross project	-	EC 3047	2020-06-31
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2020-04-07
☒	Pressure meter	YM3	Shanghai Mengde	EC 3320	2020-07-14
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	2020-07-14
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2019-11-29

2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Frequency	Expanded Uncertainty (k=2)
Conducted emission at mains ports	9kHz ~ 150kHz	3.52 dB
	150kHz ~ 30MHz	3.19 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.90 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.02 dB
	6GHz ~ 18GHz	5.28 dB

3 Radiated emissions

Test result: **Pass**

3.1 Limit

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

3.2 Measurement Procedure

For Radiated emission below 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c) Both X and Y axes of the antenna are set to make the measurement.
d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are

set to make the measurement.

d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

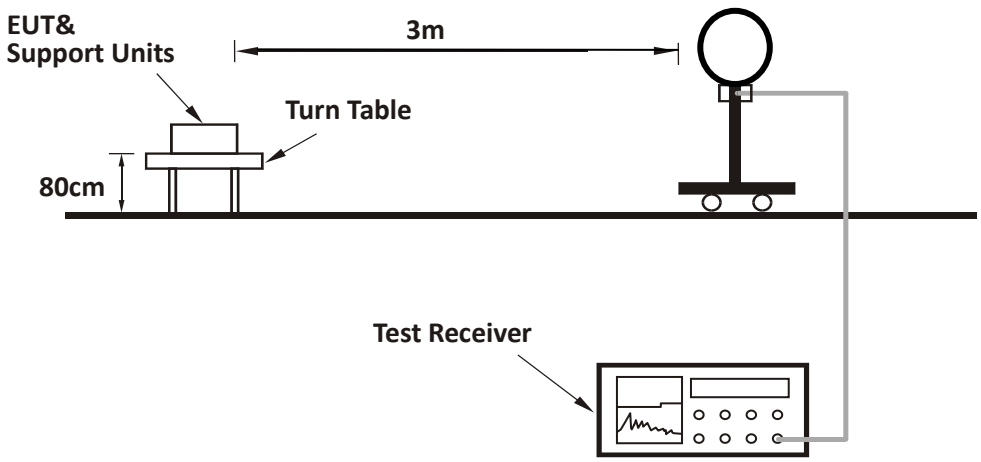
f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. All modes of operation were evaluated and the worst-case emissions were reported

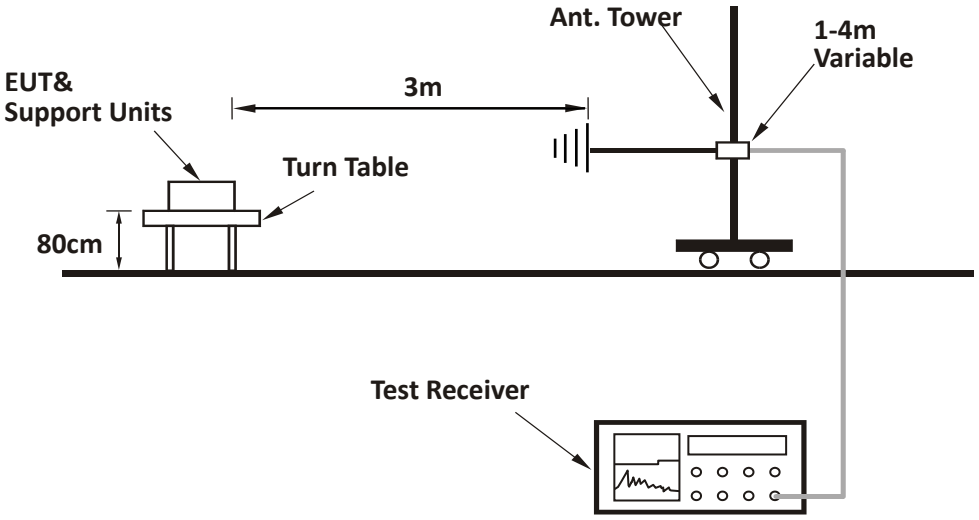
3.3 Test Configuration

For Radiated emission below 30MHz:

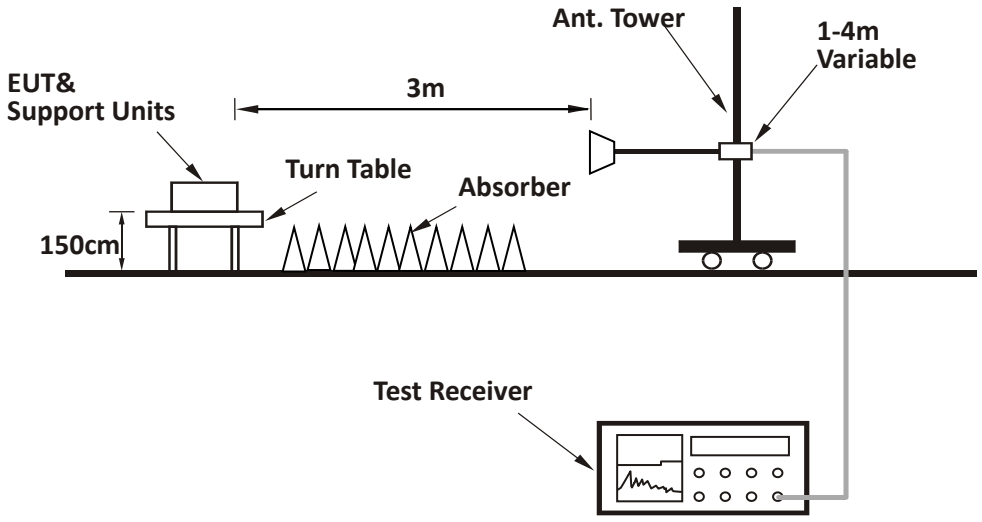


TEST REPORT

For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:



3.4 Test Results of Radiated Emissions

EUT was tested with empty load, half load and full load, the full load is the worst case and we listed the results in the report.

Test data below 30MHz:

Antenna Polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin	Detector	Remark
X	0.125	88.5	20.1	105.7	17.2	PK	Fundamental
X	0.145	74.1	20.2	104.4	30.3	PK	Fundamental
X	0.329	61.9	20.1	97.3	35.4	PK	Spurious
Y	0.118	79.9	20.1	106.2	26.3	PK	Fundamental
Y	0.329	55.2	20.1	97.3	42.1	PK	Spurious
Y	0.449	52.3	20.0	94.6	42.3	PK	Spurious
Z	0.118	88.3	20.1	106.2	17.9	PK	Fundamental
Z	0.329	62.1	20.1	97.3	35.2	PK	Spurious

Test data from 30MHz to 1000MHz:

Antenna Polarization	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin	Detector
H	183.56	39.10	10.9	43.5	4.4	PK
H	199.11	34.70	11.2	43.5	8.8	PK
H	265.21	29.30	13.5	46.0	16.7	PK
H	344.90	34.90	15.8	46.0	11.1	PK
H	576.23	27.40	21.0	46.0	18.6	PK
H	776.45	29.60	23.1	46.0	16.4	PK
V	35.83	33.20	18.7	40.0	6.8	PK
V	47.49	35.70	11.1	40.0	4.3	PK
V	49.43	32.30	9.7	40.0	7.7	PK
V	162.18	33.60	10.1	43.5	9.9	PK
V	272.98	25.00	13.7	46.0	21.0	PK
V	494.58	23.80	19.5	46.0	22.2	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), 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 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.

TEST REPORT

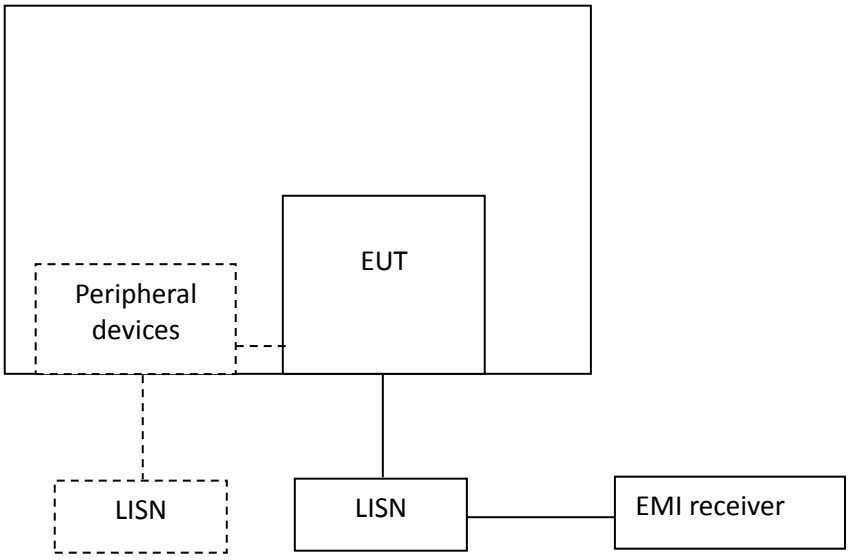
4 Conducted emissions

Test result: **Pass**

4.1 Limit

Frequency of Emission (MHz)	Conducted Emissions Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

4.2 Test Configuration



4.3 Measurement Procedure

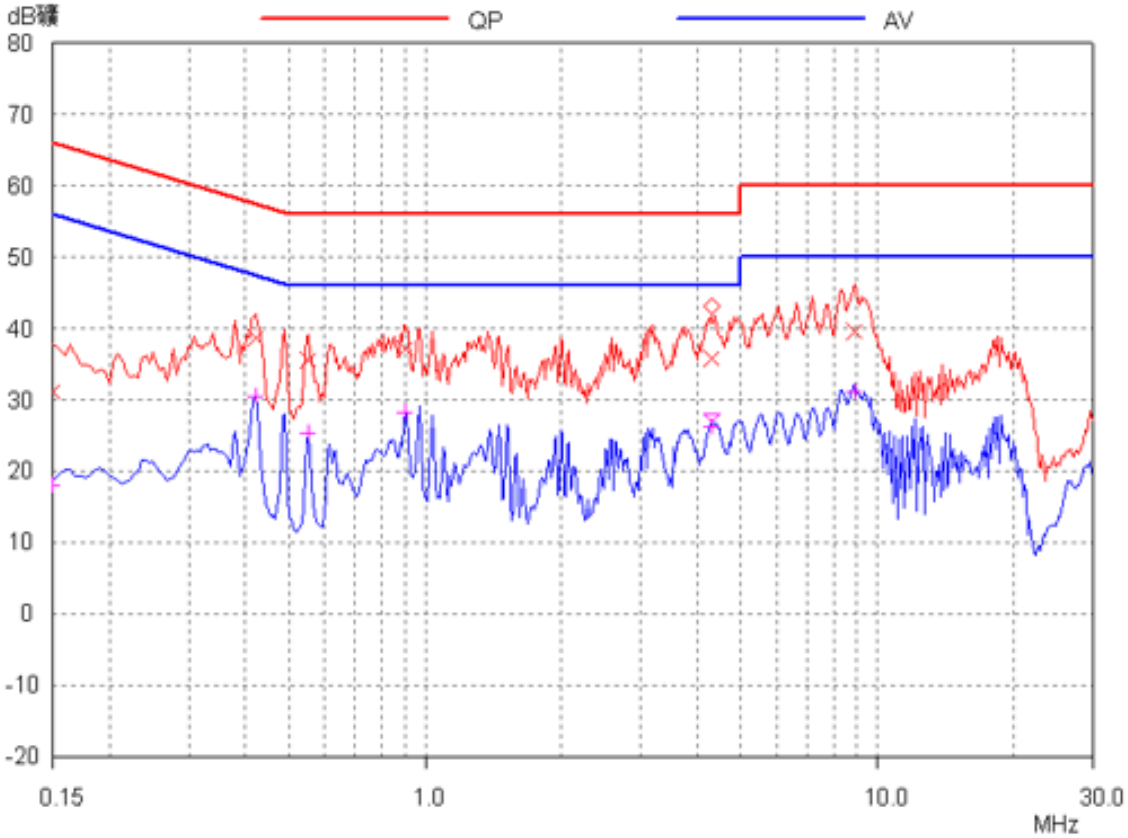
Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

4.4 Test Results of Conducted Emissions

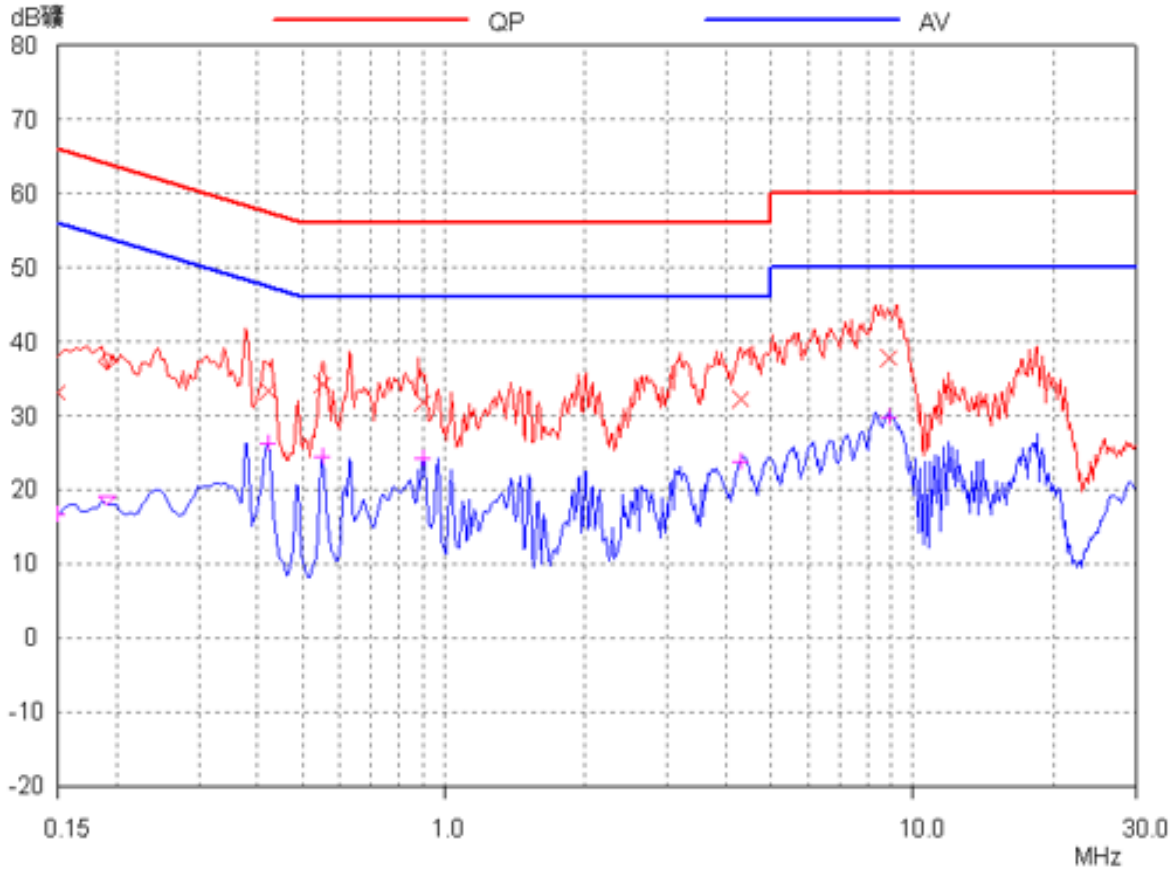
L-Line



Frequency MHz	Quasi Pk dBµV	Limit dBµV	Delta dB	Average dBµV	Limit dBµV	Delta dB
0.15	31.09	66.00	34.91	17.98	56.00	38.02
0.42	38.57	57.45	18.88	30.54	47.45	16.91
0.5505	35.47	56.00	20.53	25.26	46.00	20.74
0.9015	37.07	56.00	18.93	28.21	46.00	17.79
4.2765	35.83	56.00	20.17	26.18	46.00	19.82
8.889	39.56	60.00	20.44	31.01	50.00	18.99

TEST REPORT

N-Line



Frequency MHz	Quasi Pk dBµV	Limit dBµV	Delta dB	Average dBµV	Limit dBµV	Delta dB
0.15	33.01	66.00	32.99	16.71	56.00	39.29
0.42	33.43	57.45	24.02	26.22	47.45	21.23
0.5505	34.21	56.00	21.79	24.35	46.00	21.65
0.9015	31.79	56.00	24.21	24.26	46.00	21.74
4.2765	32.25	56.00	23.75	23.77	46.00	22.23
8.889	37.82	60.00	22.18	29.73	50.00	20.27

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.

2. Quasi PK / Average = Original Receiver Reading + Correct Factor

3. Delta = Limit - Quasi PK / Average

********** END **********