

LG Electronics USA

EMC TEST REPORT

Report Type:

FCC Part 18 EMC report

Model:

PVM9225SR1SS

REPORT NUMBER:

210703036SHA-001

ISSUE DATE:

August 12, 2021

DOCUMENT CONTROL NUMBER:

TTRF18_V1 © 2018 Intertek



Applicant: LG Electronics USA
111 Sylvan Avenue, Englewood Cliffs, New Jersey, United States

Manufacturing Site: LG Electronics Tianjin Appliances Co., Ltd.
No.9 Jinwei Road, Bei Chen Dist., Tianjin 300402, People's Republic of China

Product Name: Microwave oven

Type/Model: PVM9225#####
(# represents "A to Z" or "0 to 9" or blank, according to exterior design, color, cooking utensil or market)

FCC ID: BEJV2272TAB


SUMMARY:

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

47CFR Part 18 (2018): Industrial, Scientific, and Medical Equipment

FCC/OET MP-5 (1986): FCC methods of Measurements of Radio Noise Emissions From Industrial, Scientific, and Medical Equipment

PREPARED BY: **REVIEWED BY:**


Project Engineer
Dylan Tang


Reviewer
Daniel Zhao

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TEST REPORT

Content

REVISION HISTORY	4
MEASUREMENT RESULT SUMMARY	5
1 GENERAL INFORMATION	6
1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	6
1.2 DESCRIPTION OF TEST FACILITY	6
2 TEST SPECIFICATIONS	7
2.1 STANDARDS OR SPECIFICATION	7
2.2 MODE OF OPERATION DURING THE TEST	7
2.3 TEST SOFTWARE LIST	7
2.4 TEST PERIPHERALS LIST	7
2.5 TEST LOAD DESCRIPTION	7
2.6 TEST ENVIRONMENT CONDITION:.....	8
2.7 INSTRUMENT LIST	8
2.8 MEASUREMENT UNCERTAINTY	9
3 RADIATED EMISSIONS	10
3.1 LIMIT	10
3.2 MEASUREMENT PROCEDURE	10
3.3 TEST CONFIGURATION	12
3.4 TEST RESULTS OF RADIATED EMISSIONS	14
APPENDIX I: PHOTOGRAPH OF TEST SETUP	19
APPENDIX II: PHOTOGRAPH OF EQUIPMENT UNDER TEST	19

Revision History

Report No.	Version	Description	Issued Date
210703036SHA-001	Rev. 01	Initial issue of report	August 12, 2021

Measurement result summary

TEST ITEM	FCC REFERANCE	RESULT
Conducted Emission (150 kHz to 30 MHz)	18.307(b)	NA
Radiated Emission (9 kHz to 30 MHz)	18.305(b)	Pass
Radiated Emission (30 MHz to1 GHz)	18.305(b)	Pass
Radiated Emission (1 GHz to 25 GHz)	18.305(b)	Pass
Operating Frequency	Clause 4.5	NA
RF Output Power Measurement	Clause 4.3	NA

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.

TEST REPORT

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Microwave oven
Type/Model:	PVM9225##### (# represents "A to Z" or "0 to 9" or blank, according to exterior design, color, cooking utensil or market)
Brand Name:	GE
Description of EUT:	The EUT is a Microwave oven have series models, and they are electric identical. The model PVM9225SR1SS were chosen to testing.
Rating:	AC 120V/60Hz Input: 170W
Frequency:	2450MHz (Class B/Group 2)
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	August 8, 2021
Date of test:	August 8, 2021 ~ August 12, 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

TEST REPORT

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 18 (2018)
FCC/OET MP-5 (1986)

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 are specified if used.

Worst test mode: Working mode with full power. (Model: QVM7167RN8SS)

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	Beaker	NA	1000/700/300mL

2.5 Test Load Description

Load for power output measurement, frequency measurement, radiation hazard test: 1000 milliliters of water in the beaker located in the center of the oven;
Load for measurement of radiation on second and third harmonic: Two loads, one of 700 and the other of 300 milliliters, of water are used. Each load is tested both with the beaker located in the center of the oven and with it in the right front corner.
Load for all other measurements: 700 milliliters of water, with the beaker located in the center of the oven.

TEST REPORT

2.6 Test environment condition:

Test items	Temperature	Humidity
Radiated Emissions	22°C	55% RH
Conducted Emission	21°C	52% RH

2.7 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	Test Receiver	R&S	ESCS 30	EC 2107	2022-07-14
<input type="checkbox"/>	A.M.N.	R&S	ENV 216	EC 3393	2022-07-14
<input type="checkbox"/>	A.M.N.	R&S	ENV4200	EC 3558	2022-06-11
<input type="checkbox"/>	Shielded room	Zhongyu	-	EC 2838	2022-01-13
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2022-09-12
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESCI 7	EC 4501	2022-09-12
<input checked="" type="checkbox"/>	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2022-03-14
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2021-12-09
<input checked="" type="checkbox"/>	Horn antenna	R&S	HF 906	EC 3049	2021-11-15
<input checked="" type="checkbox"/>	Horn antenna	ETS	3117	EC 4792-1	2022-02-24
<input checked="" type="checkbox"/>	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2022-07-07
<input checked="" type="checkbox"/>	Pre-amplifier	R&S	Pre-amp 18	EC5881	2022-06-10
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2022-07-29
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2022-03-09
<input checked="" type="checkbox"/>	Pressure meter	YM3	Shanghai Mengde	EC 3320	2022-06-30

TEST REPORT**2.8 Measurement uncertainty**

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

Test item	Measurement uncertainty
Radiated Emissions in restricted frequency bands below 1GHz	$\pm 4.90\text{dB}$
Radiated Emissions in restricted frequency bands above 1GHz	$\pm 5.02\text{dB}$
Power line conducted emission	$\pm 3.19\text{dB}$

3 Radiated Emissions

Test result: Pass

3.1 Limit

- (a) ISM equipment operation on a frequency specified in §18.301 is permitted unlimited radiated energy in the band specified for that frequency.
- (b) The field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500	25	300
		500 or more	$25 \times \text{SQRT}(\text{power}/500)$	300

RF Power = 820.0W

Limit = $20\lg(25 \times \text{SQRT}(\text{power}/500)) + 20\lg(300/3) = 30.1 + 40 = 70.1\text{dBuV/m @ 3m distance.}$

3.2 Measurement Procedure

For Radiated emission below 30MHz:

- a) The EUT was placed on the top of a rotating table 1 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.

TEST REPORT**For Radiated emission above 30MHz:**

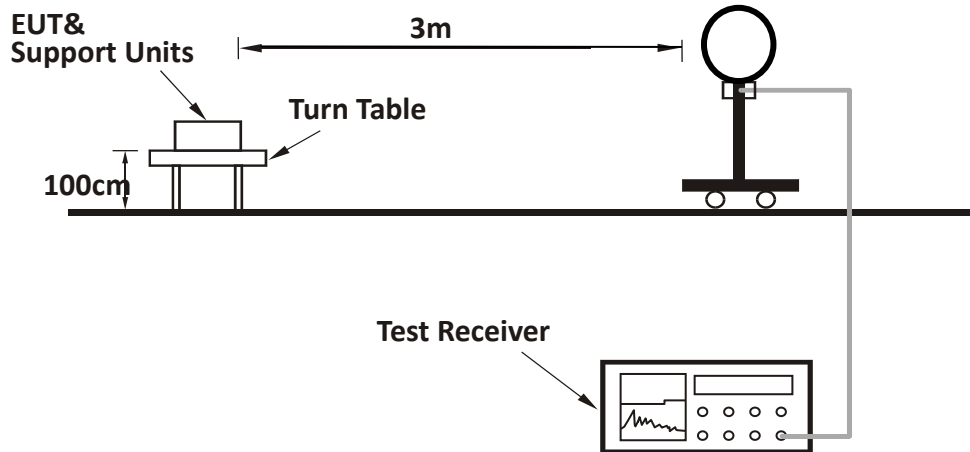
- a) The EUT was placed on the top of a rotating table 1 meters above the ground at 3-meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the 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:

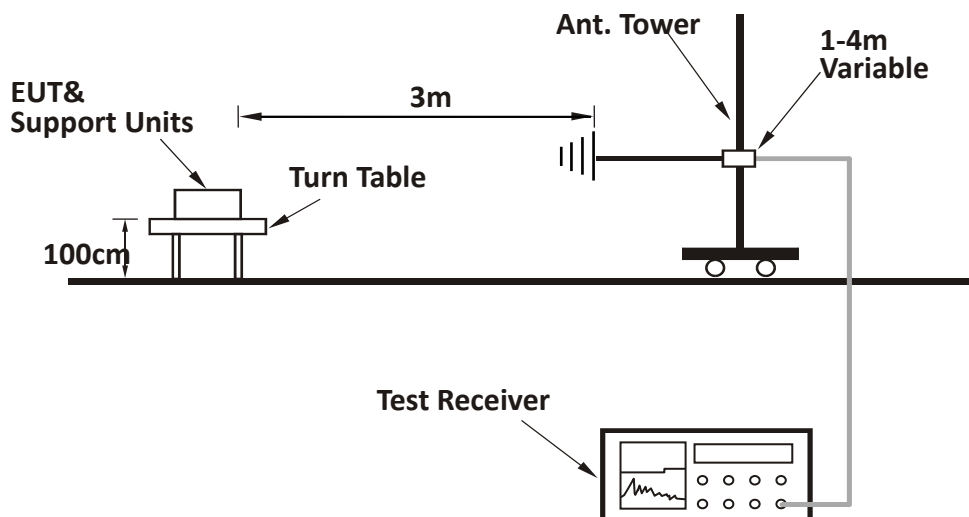
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or $3 \times \text{RBW}$ (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported

3.3 Test Configuration

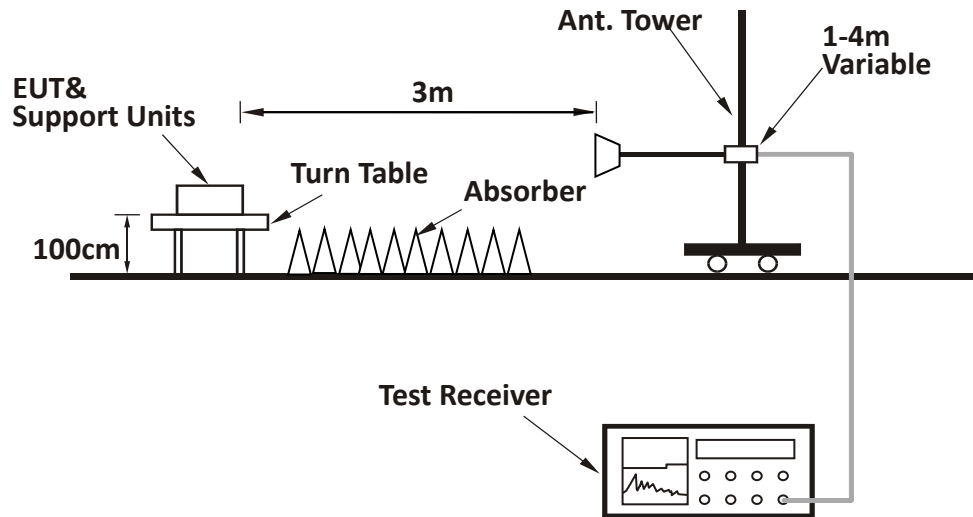
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



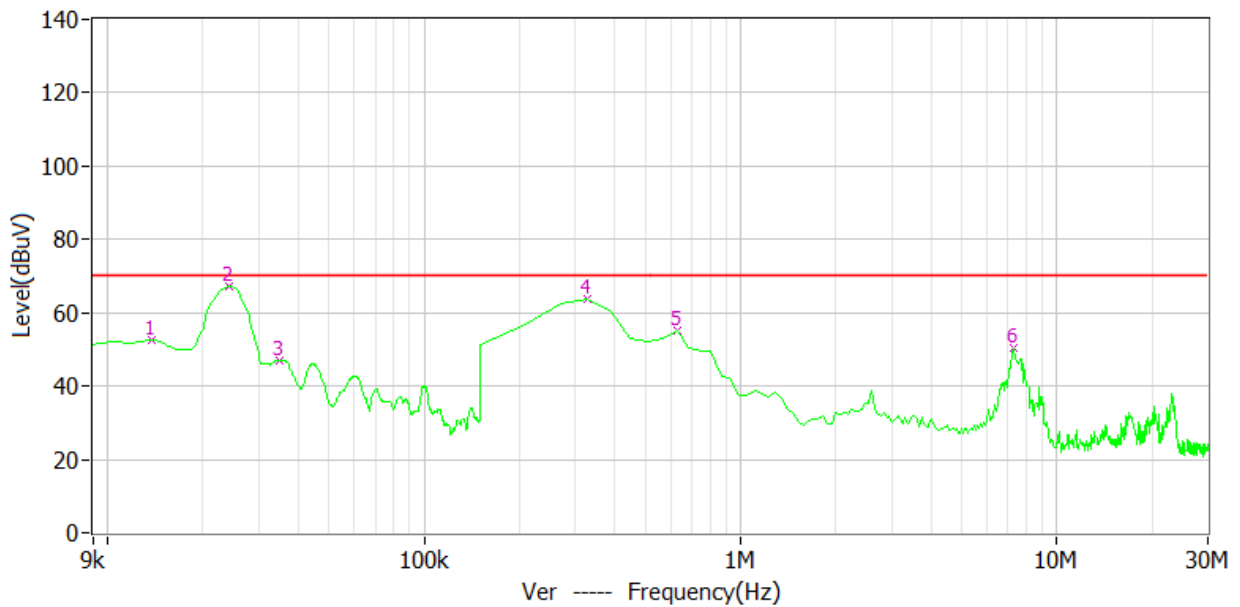
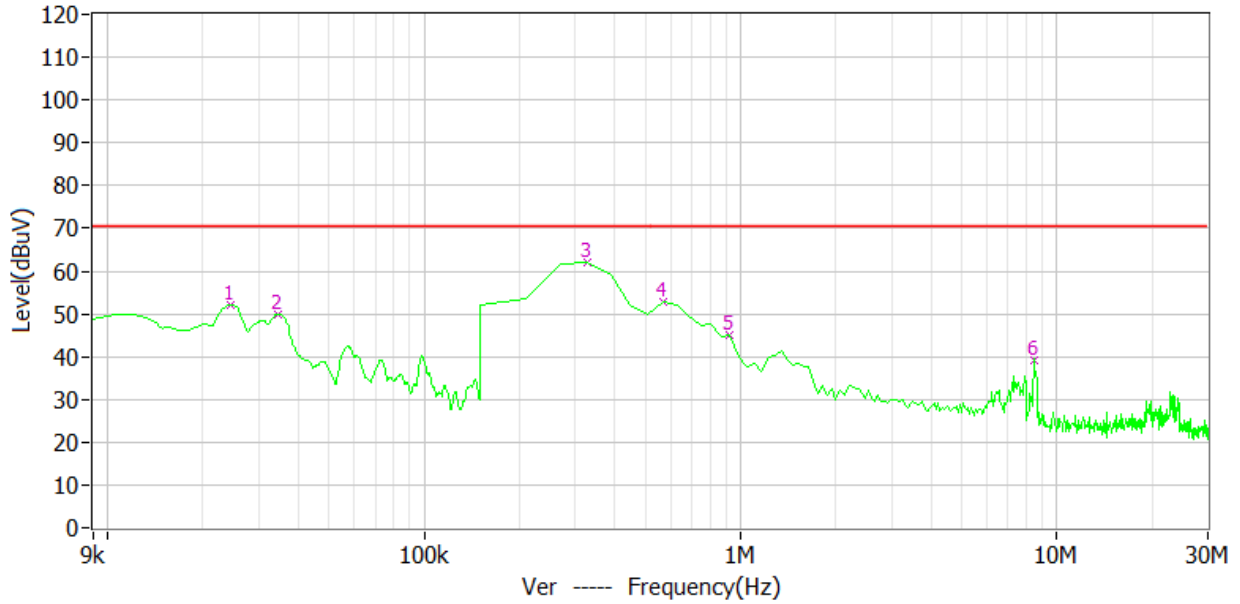
For Radiated emission above 1GHz:



TEST REPORT

3.4 Test Results of Radiated Emissions

Test plots of 9KHz ~ 30MHz:



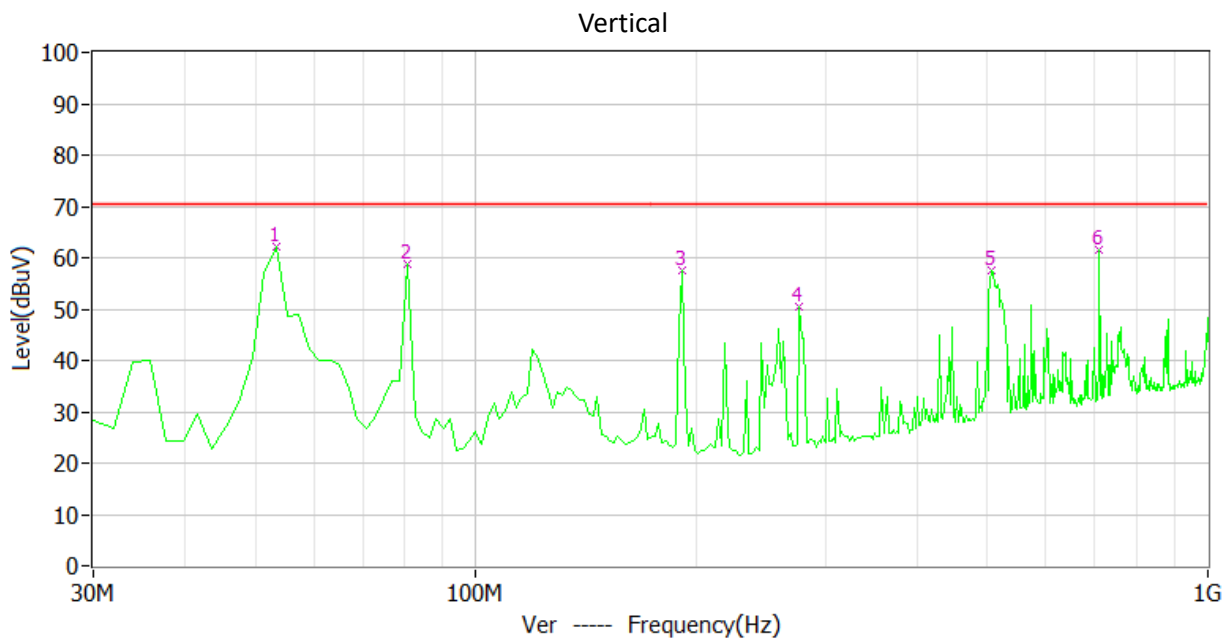
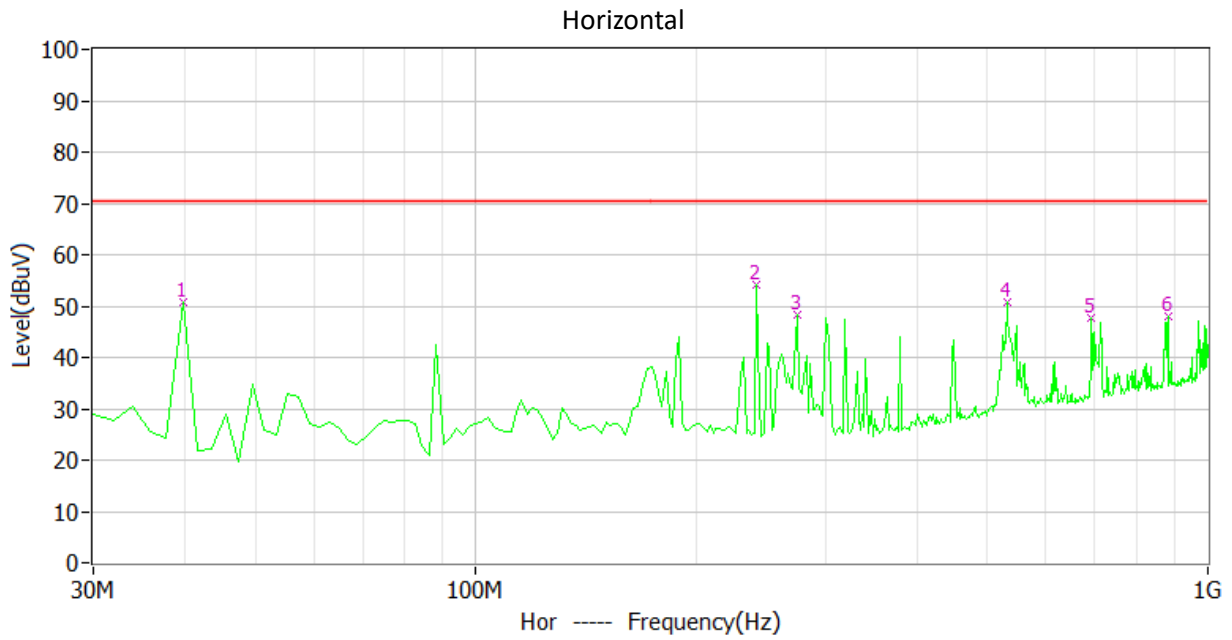
TEST REPORT

Test data of 9KHz ~ 30MHz:

Antenna	Frequency (KHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
X	24.541	52.10	70.10	18.0	PK
X	34.713	49.90	70.10	20.2	PK
X	329.459	62.00	70.10	8.1	PK
X	568.738	52.70	70.10	17.4	PK
X	927.655	44.90	70.10	25.2	PK
X	8465.00	39.30	70.10	30.8	PK
Y	13.804	52.40	70.10	17.7	PK
Y	24.258	67.10	70.10	3.0	PK
Y	34.996	47.10	70.10	23.0	PK
Y	329.459	63.70	70.10	6.4	PK
Y	628.557	55.30	70.10	14.8	PK
Y	7328.00	50.50	70.10	19.6	PK

TEST REPORT

Test plots of 30MHz ~ 1GHz:



TEST REPORT

Test data of 30MHz ~ 1GHz:

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	39.719	50.90	70.10	19.2	PK
H	241.884	54.10	70.10	16.0	PK
H	274.930	48.30	70.10	21.8	PK
H	531.523	50.70	70.10	19.4	PK
H	692.866	47.80	70.10	22.3	PK
H	881.423	48.00	70.10	22.1	PK
V	53.327	62.20	70.10	7.9	PK
V	80.541	58.80	70.10	11.3	PK
V	191.343	57.40	70.10	12.7	PK
V	276.874	50.40	70.10	19.7	PK
V	506.253	57.60	70.10	12.5	PK
V	710.361	61.50	70.10	8.6	PK

TEST REPORT

Test data of 1GHz ~ 25GHz:

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	2295	52.8	70.10	17.3	AV
H	4920	46.4	70.10	23.7	AV
H	7393	42.9	70.10	27.2	AV
H	9824	58.0	70.10	12.1	AV
H	11323	53.9	70.10	16.2	AV
H	14866	51.8	70.10	18.3	AV
H	17285	57.8	70.10	12.3	AV
H	20050	45.5	70.10	24.6	AV
V	2192	56.5	70.10	13.6	AV
V	4905	48.2	70.10	21.9	AV
V	7399	45.3	70.10	24.8	AV
V	9790	53.7	70.10	16.4	AV
V	12277	51.7	70.10	18.4	AV
V	14798	51.3	70.10	18.8	AV
V	17285	55.1	70.10	15.0	AV
V	20658	47.2	70.10	22.9	AV

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.

Appendix I: Photograph of test setup

Refer to Test set up photos.

Appendix II: Photograph of equipment under test

Refer to EUT External photos.

***** END *****