

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-24N-RWD-032

Reception No. : 2411003922

Applicant : LG Electronics USA

Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States

Manufacturer : LG Electronics Inc.

Address : 222, LG-ro, Jinwi-myeon, Pyeontaek-si, Gyeonggi-do 17709, Republic of Korea

Type of Equipment : Electric Vehicle Charger

FCC ID : BEJ-EVD350DL

Model Name : EVD350DL-PN

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 22 pages (including this page)

Date of Incoming : November 01, 2024

Date of Issuing : November 19, 2024

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART C Section 15.225**

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.

한동연



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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-24N-RWD-032	November 19, 2024	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : LG Electronics USA

Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States

Contact Person : David, Kim / Team leader, LGEUS NA Policy & Regulatory Affairs

Telephone No. : +201-470-2696

FCC ID : BEJ-EVD350DL

Model Name : EVD350DL-PN

Brand Name : -

Serial Number : N/A

Date : November 19, 2024

DEVICE TYPE	DXX – Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	Electric Vehicle Charger
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC CFR47 Part 15 Subpart C Section 15.225
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	3 m Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.225 (a) (b) (c)	Field Strength of Fundamental Emissions	Met the Limit / PASS
15.225 (d) & 15.209	Radiated Emission Limits	Met the Limit / PASS
2.1049	20dB Bandwidth	Met the Limit / PASS
15.225(e)	FREQUENCY STABILITY WITH TEMPERATURE VARIATION / FREQUENCY STABILITY WITH VOLTAGE VARIATION	Met the Limit / PASS
15.207	Conducted Limits	N/A (See Note)
15.203	Antenna Requirement	Met requirement / PASS

Note: AC conducted emissions testing has been replaced by the FCC Part 15 Subpart B report (Report No.: EMC24017).

2.2 Product Description

The LG Electronics USA, Model EVD350DL-PN (referred to as the EUT in this report) is a Electric Vehicle Charger. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Electric Vehicle Charger
TRANSMITTING FREQUENCY	13.560 MHz
MODULATION	ASK
ANTENNA TYPE	PCB Antenna
LIST OF EACH OSC. or CRY. FREQ.(FREQ. \geq 1 MHz)	8 MHz

2.3 Model Differences

-. None

2.4 Related Submittal(s) / Grant(s)

Original submittal only

2.5 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.225.

2.6 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013.

Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.7 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
HMI Board	LG Electronics Inc.	N/A	-
Bridge Board	LG Electronics Inc.	N/A	-
LED Board	LG Electronics Inc.	N/A	-
PLC Board	N/A	N/A	-
RFID Reader Modules	Advanced Card Systems Ltd.	ACM1281S-C7	-
Wireless Modules	Sierra Wireless Inc.	MC7455	N7NMC7455
VPOS Touch	NAYAX LTD	Nayax VPOS Touch, VPOS	2AK6L-VPOST

3.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

Model	Manufacturer	Description	Connected to
EVD350DL-PN	LG Electronics USA	Electric Vehicle Charger (EUT)	-
EVP175NK-NN	LG ELECTRONICS INC.	Electric Vehicle Charger	EUT
EVP175NK-NN	LG ELECTRONICS INC.	Electric Vehicle Charger	EUT

3.3 Mode of operation during the test

The EUT has 13.560 MHz RF boards for reading Card and program was used for making continuous transmission mode during the test.

3.4 Equipment Modifications

-. None

3.5 Configuration of Test System

Radiated Emission Test : Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. The radiated emissions measurements were performed on the 10 m Semi Anechoic Chamber.

For frequencies from 150 kHz to 30 MHz measurements were made of the magnetic H field. The measuring antenna is an electrically screened loop antenna.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and maximum emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

3.6 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The transmitter antenna of the EUT is a PCB Antenna so there is no consideration of replacement by the user.

4. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Output Power	0.90
Conducted Spurious Emission < 26.5 GHz	1.26
Power Spectral Density	1.20
Line Conducted Disturbance (150 kHz ~ 30 MHz)	2.00
Radiated Disturbance (9 kHz ~ 30 MHz)	3.30
Radiated Disturbance (30 MHz ~ 1 GHz)	4.42
Radiated Disturbance (1 GHz ~ 18 GHz)	5.10
Radiated Disturbance (18 GHz ~ 40 GHz)	5.65

5. PRELIMINARY TEST

5.1 AC Power line Conducted Emissions Tests

As this product is only using DC power, AC conducted emission test has not been performed.

5.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

6. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

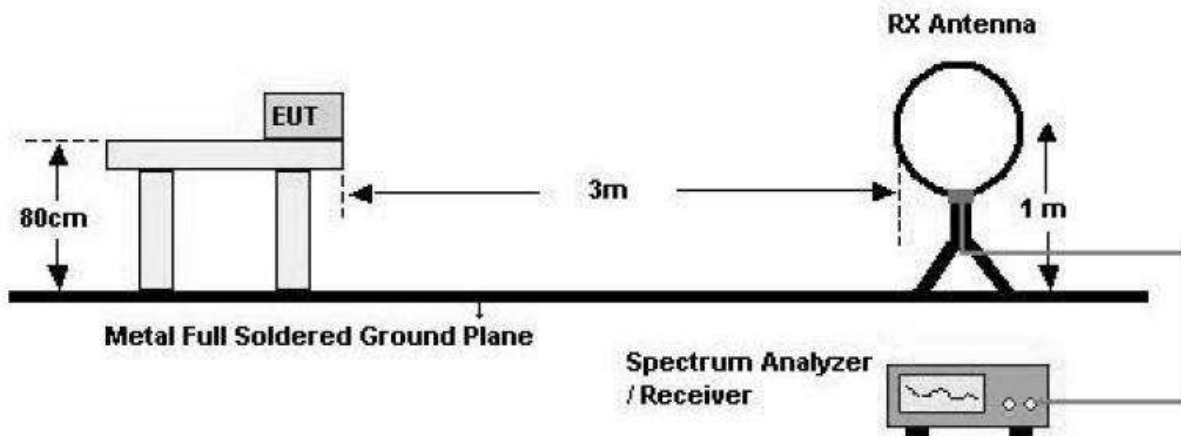
6.1 ADIATED EMISSION TEST

6.1.1 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

- Test Configuration

Below 30 MHz



6.1.2 Operation frequency band: (13.553 ~ 13.567) MHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 46.4 % R.H. Temperature: 22.5 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.225
 Type of Test : Low Power Communication Device Transmitter
 Result : PASSED

EUT : Electric Vehicle Charger Date: November 01, 2024 ~ November 05, 2024
 Operating Condition : Transmitting Mode
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)
 Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
13.56	38.92	H	1	19.6	1	59.52	124	64.48
13.56	34.57	V	1	19.6	1	55.17	124	68.83

Remark. The EUT was tested at 3 m, so conversation factor was included at above limit.

6.1.3 Operation frequency band: Below 13.553 MHz and above 13.567 MHz

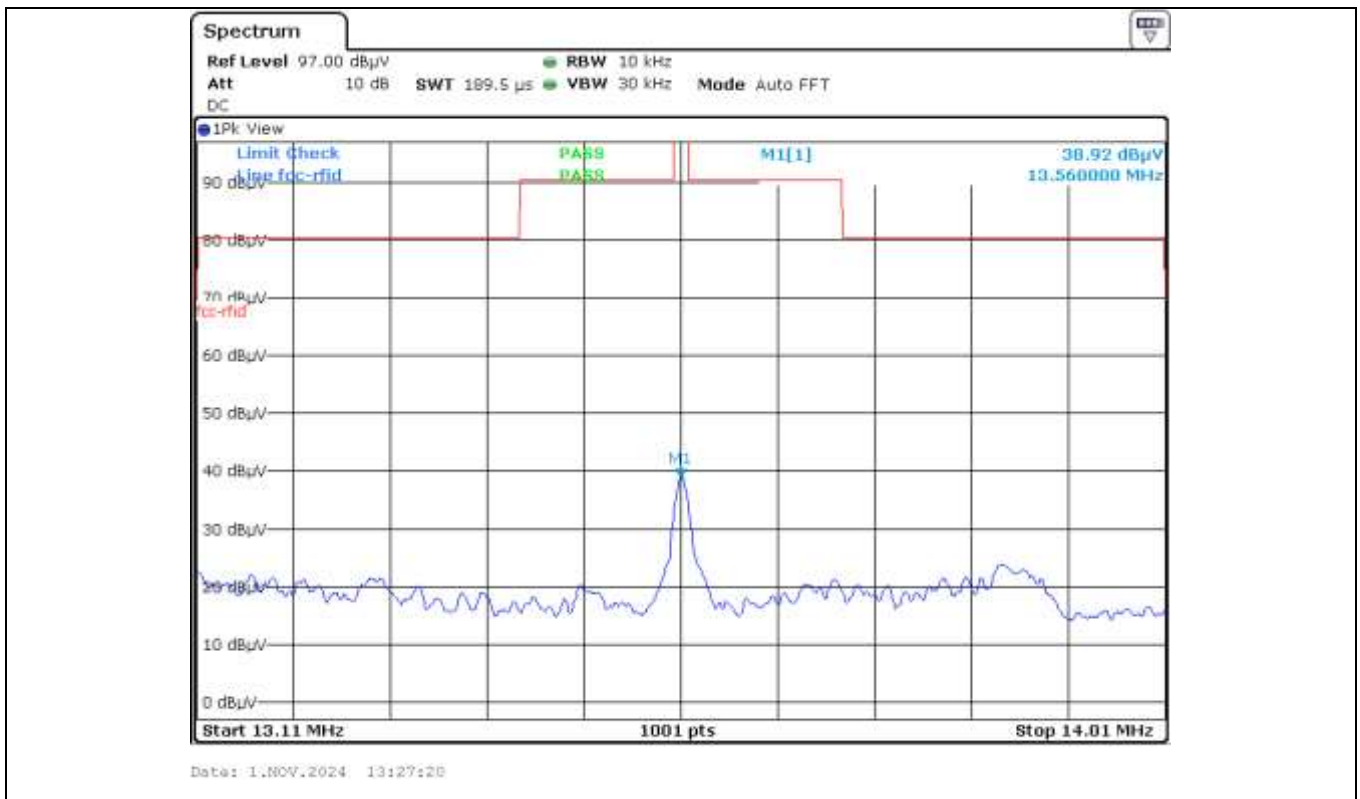
The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level	: <u>46.4 % R.H.</u>	Temperature: <u>22.5 °C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.225</u>	
Type of Test	: <u>Low Power Communication Device Transmitter</u>	
Result	: <u>PASSED</u>	

EUT : Electric Vehicle Charger

Date: November 01, 2024 ~ November 05, 2024

Operating Condition : Transmitting Mode



cc. to above test data, the field strength level of 13.56 MHz is 32.30 dBuV/m and the worst limit subject to 15.225 (b) and (c) is 80.5 dBuV/m, so the EUT meets the requirement.

6.2 SPURIOUS EMISSION TEST

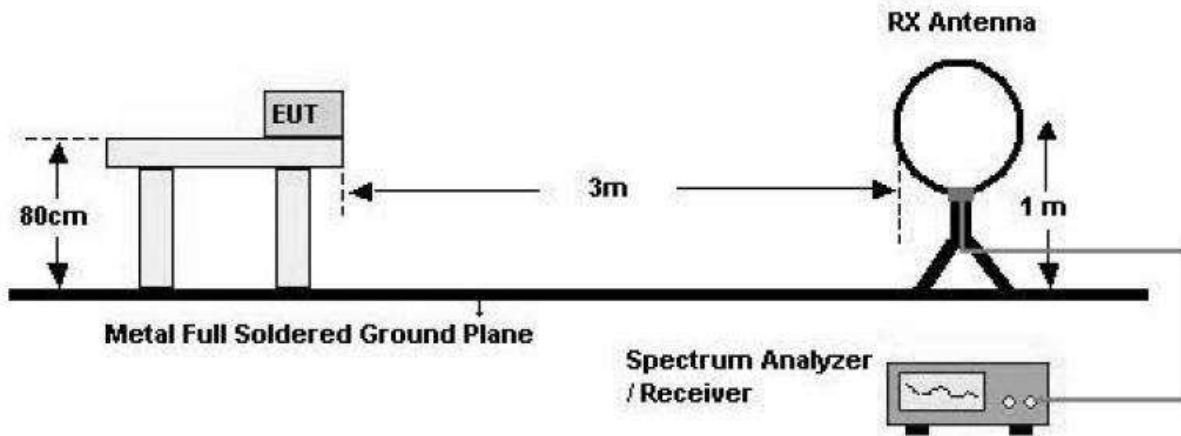
6.2.1 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

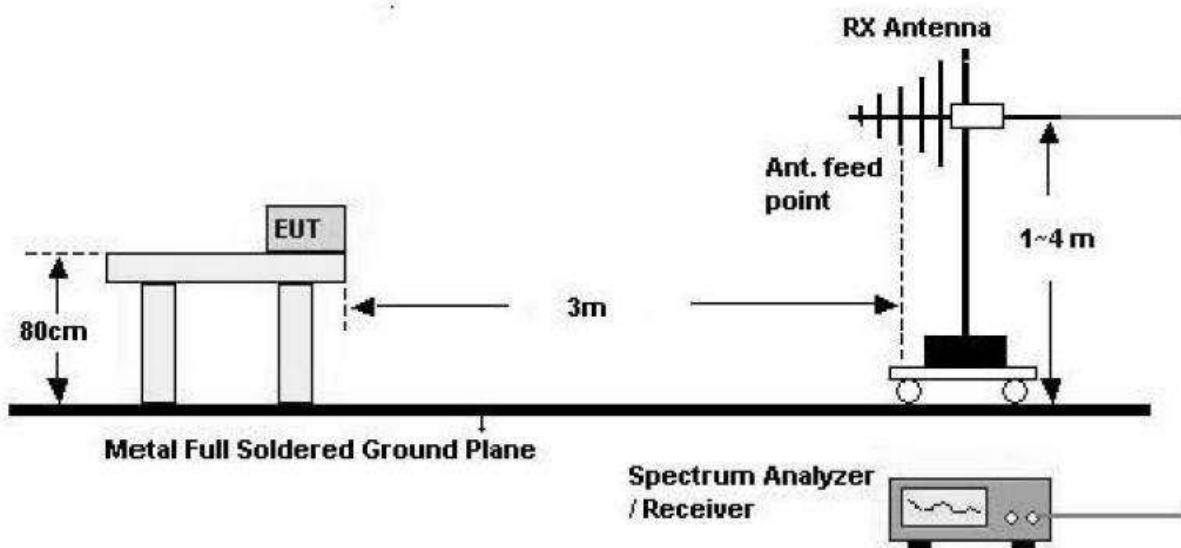
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

- Test Configuration

1. Below 30 MHz



2. 30 MHz - 1 GHz



6.2.2 Spurious Radiated Emission Below 30 MHz

Humidity Level : 46.4 % R.H. Temperature: 22.5 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
Type of Test : Low Power Communication Device Transmitter
Frequency Range : 9 kHz ~ 30 MHz
Result : PASSED

EUT : Electric Vehicle Charger Date: November 01, 2024 ~ November 05, 2024
Operating Condition : Transmitting Mode
Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
It was not observed any emissions from the EUT.									

6.2.3 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 46.4 % R.H.

Temperature: 22.5 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Type of Test : Low Power Communication Device Transmitter

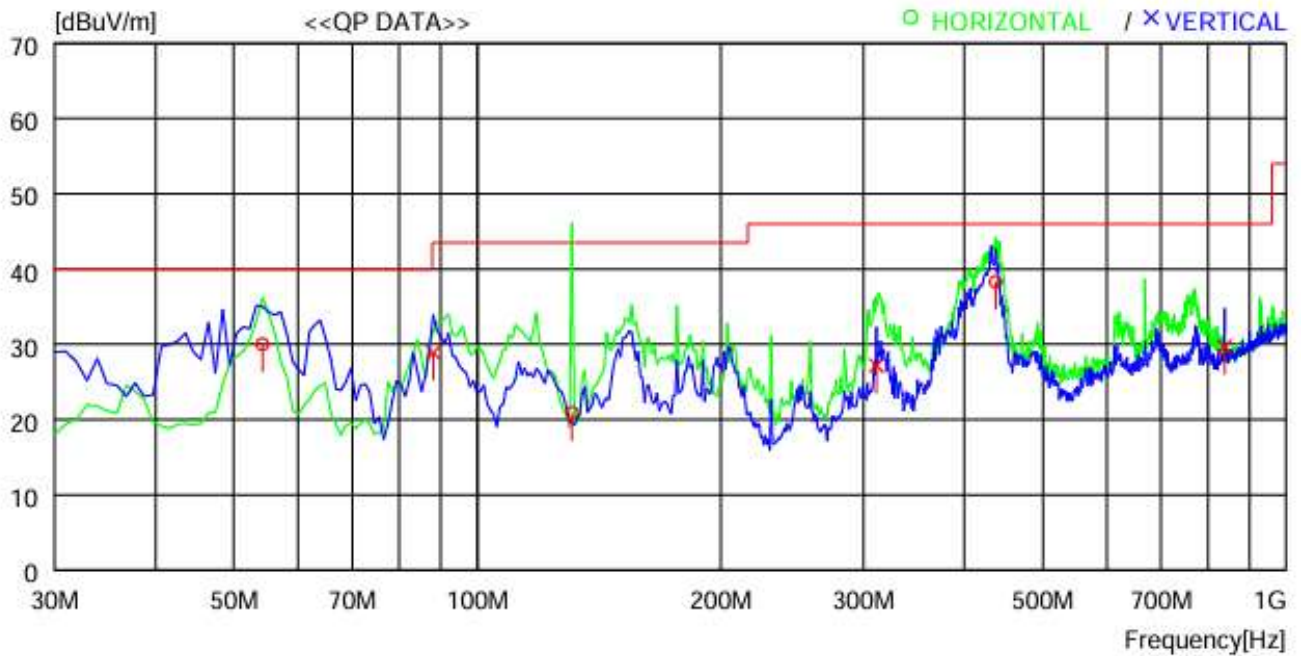
Result : PASSED

EUT : Electric Vehicle Charger

Date: November 01, 2024 ~ November 05, 2024

Operating Condition : Transmitting Mode

Distance : 3 m



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	54.250	41.4	13.5	3.3	28.2	30.0	40.0	10.0	400	182
2	130.880	35.6	8.4	4.8	27.9	20.9	43.5	22.6	400	0
3	437.401	40.7	16.4	9.4	28.2	38.3	46.0	7.7	300	359
----- Vertical -----										
4	88.200	43.2	9.7	4.1	28.1	28.9	43.5	14.6	100	0
5	311.300	33.5	13.5	7.6	27.4	27.2	46.0	18.8	100	0
6	838.971	23.6	21.0	12.8	27.7	29.7	46.0	16.3	300	348

6.3 20 dB BANDWIDTH

6.3.1 Operating environment

Temperature : 25 °C
Relative humidity : 56 % R.H.

6.3.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 % to 5 % of the OBW and video bandwidth (VBW) shall be approximately three times RBW. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



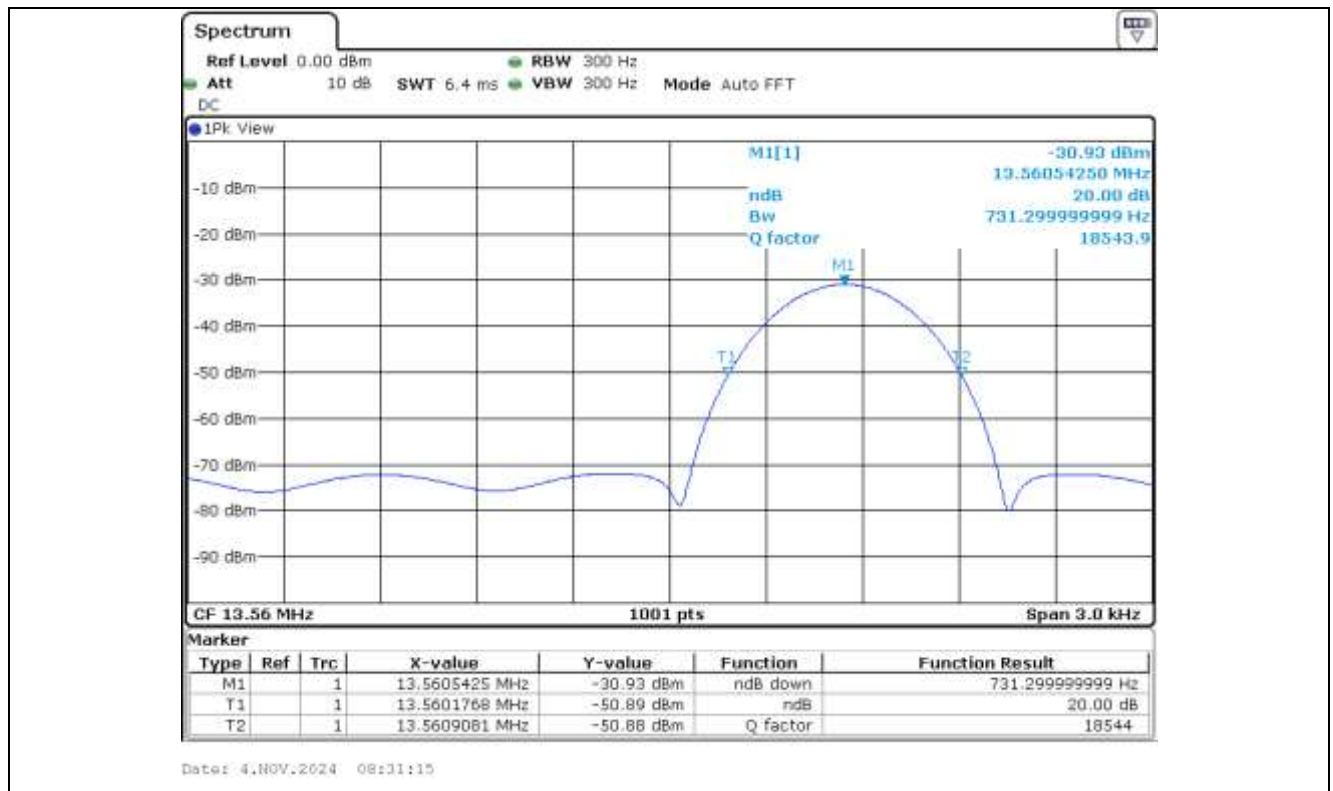
6.3.3 Test date

November 01, 2024 ~ November 05, 2024

6.3.4 Test data

-. Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.215

FREQUENCY (MHz)	MEASURED VALUE (kHz)	Result
13.560	0.731 3	PASS



6.4 FREQUENCY STABILITY WITH TEMPERATURE VARIATION

6.4.1 Operating environment

Temperature : 25 °C
Relative humidity : 56 % R.H.

6.4.2 Test set-up

Turn EUT off and set chamber temperature to -20 °C and then allow sufficient time (approximately 20 to 30 minutes after chamber reach the assigned temperature) for EUT to stabilize. Turn ON EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10 °C step from -20 °C to +50°C. Repeat above method for frequency measurements every 10 °C step and then record all measured frequencies on each temperature step.

6.4.3 Test date

November 01, 2024 ~ November 05, 2024

6.4.4 Test data

-. Result : PASSED

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
-20	13,560,000	13,560,621	621	± 1 356.00
-10		13,560,636	636	
0		13,560,680	680	
10		13,560,650	650	
20		13,560,597	597	
30		13,560,558	558	
40		13,560,502	502	
50		13,560,487	487	

6.5 FREQUENCY STABILITY WITH VOLTAGE VARIATION

6.5.1 Operating environment

Temperature : 25 °C
Relative humidity : 56 % R.H.

6.5.2 Test set-up

An external AC power supply was connected to the input of the EUT. The voltage of EUT set to 115 % of the nominal value and then was reduced to 85 % of nominal voltage. The output frequency was recorded at each step.

6.5.3 Test date

November 01, 2024 ~ November 05, 2024

6.5.4 Test data

-. Result : PASSED

Voltage (Vac)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
460.0(115 %)	13,560,000	13,560,544	544	± 1 356.00
400.0(100 %)		13,560,701	701	
340.0(85 %)		13,560,638	638	

7. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses.

+	Meter reading	(dB μ V)
+	Cable Loss	(dB)
+	Antenna Factor	(dB/m)
		<hr/>
=	Corrected Result	(dB μ V/m)
Margin (dB)		
	Specification Limit	(dB μ V/m)
-	Corrected Result	(dB μ V/m)
		<hr/>
=	dB Relative to Spec	(\pm dB)

8. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
FSV30	Rohde & Schwarz	SIGNAL ANALYZER	101372	Jul. 04, 2024 (1Y)
ESCI	Rohde & Schwarz	Test Receiver	101013	Mar. 12, 2024 (1Y)
310N	Sonoma Instrument	AMPLIFIER	312544	Mar. 11, 2024 (1Y)
VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-225	Aug. 19, 2024(1Y)
DT5000-3t- Tragplatten	Innco System	Turn Table	930611	N/A
CO3000	Innco Systems GmbH	Controller	N/A	N/A
MA4000-EP	Innco Systems GmbH	Antenna Master	MA4000/332	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Apr. 15, 2024 (2Y)
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Apr. 15, 2024 (2Y)
SH-242	ESPEC	Environmental Test chamber	0093011138	Jan. 16, 2024 (1Y)
ZUP36-6	TDK-Lambda	DC Power Supply	6MJ-850Z16-0014	Jan. 16, 2024 (1Y)