

# RADIO PERFORMANCE TEST REPORT

**Test Report No.** : OT-239-RWD-033

**Reception No.** : 2307002349

**Applicant** : LG Electronics USA, Inc.

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

**Manufacturer** : LG Electronics Inc.

**Address** : 84, Wanam-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Republic of Korea

**Type of Equipment** : Wired Remote Controller

**FCC ID.** : BEJ-PREMTA201

**Model Name** : PREMTA201

**Serial number** : N/A

**Total page of Report** : 30 pages (including this page)

**Date of Incoming** : August 09, 2023

**Date of issue** : September 25, 2023

## SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*

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

It is not a generally 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.**





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※ Please refer to the Annex section for All test plots

**Revision History**

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-239-RWD-033	September 25, 2023	Initial Release	All

## 1. VERIFICATION OF COMPLIANCE

Applicant : LG Electronics USA, Inc.  
 Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, 07632, United States  
 Contact Person : Eunk yung Lee  
 Telephone No. : +82-10-8353-2260  
 FCC ID : BEJ-PREMTA201  
 Model Name : PREMTA201  
 Brand Name : -  
 Serial Number : N/A  
 Date : September 25, 2023

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Wired Remote Controller
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 PART 15 SUBPART C Section 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02
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. TEST SUMMARY

### 2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Conducted(average) Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	N/A (See Note)
15.203	Antenna Requirement	Met requirement / PASS

Note: This test is not performed because the EUT is operated by DC Power.

### 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

### 2.3 Related Submittal(s) / Grant(s)

Original submittal only

### 2.4 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 15.247.

### 2.5 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.

### 2.6 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. GENERAL INFORMATION

#### 3.1 Product Description

The LG Electronics USA, Inc., Model PREMTA201 (referred to as the EUT in this report) is a Wired Remote Controller. The product specification described herein was obtained from product data sheet or user’s manual.

DEVICE TYPE	Wired Remote Controller
Temperature Range	0 °C ~ 40 °C
OPERATING FREQUENCY	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))
MODULATION TYPE	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11g/n(HT20): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
RF OUTPUT POWER	14.71 dBm(802.11b) 13.98 dBm(802.11g) 12.78 dBm(802.11n_HT20)
ANTENNA TYPE	Chip Antenna
ANTENNA GAIN	3.0 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	24 MHz, 32 MHz

#### 3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

### 4. EUT MODIFICATIONS

-. None

## 5. SYSTEM TEST CONFIGURATION

### 5.1 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
Main Board	LG Electronics Inc.	EAX69389601	N/A
LCD	N/A	BL-B0430099AV0 20-52	N/A

### 5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
PREMTA201	LG Electronics Inc.	Wired Remote Controller (EUT)	
HP Probook	HP	Notebook PC	EUT
GP-4303D	LG Precision Co.,Ltd	DC Power Supply	EUT

### 5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting mode is programmed.

-. Frequency

Channel	Frequency
1	2 412
2	2 417
3	2 422
4	2 427
5	2 432
6	2 437
7	2 442
8	2 447
9	2 452
10	2 457
11	2 462



-. Channel Operations

Modulation	DATA RATE	OUTPUT POWER[dBm]
802.11 b (Low Channel)	1 Mbps	14.58
	2 Mbps	14.53
	5.5 Mbps	14.49
	11 Mbps	14.46
802.11 g (Low Channel)	6 Mbps	13.84
	9 Mbps	13.82
	12 Mbps	13.78
	18 Mbps	13.74
	24 Mbps	13.72
	36 Mbps	13.68
	48 Mbps	13.62
	54 Mbps	13.59
802.11 HT 20 (Low Channel)	6.5 Mbps	12.66
	13 Mbps	12.64
	19.5 Mbps	12.60
	26 Mbps	12.56
	39 Mbps	12.51
	52 Mbps	12.49
	58.5 Mbps	12.45
	65 Mbps	12.41

-. The worse case data rate for each modulation is determined 1 Mbps for IEEE 802.11b, 6 Mbps for IEEE 802.11g, 6.5 Mbps for HT20.

-. To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

- Duty Cycle

Band	TEST Mode	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
WLAN 2.4 GHz	802.11 b	1	8.6094	8.7063	98.89	0.05
		2	4.3056	4.4019	97.81	0.10
		5.5	1.6275	1.7250	94.35	0.25
		11	0.8625	0.9588	89.96	0.46
	802.11 g	6	1.4281	1.5284	93.44	0.29
		9	0.9600	1.0616	90.43	0.44
		12	0.7241	0.8253	87.74	0.57
		18	0.4919	0.5928	82.98	0.81
		24	0.3722	0.4722	78.82	1.03
		36	0.2559	0.3566	71.76	1.44
		48	0.1959	0.2972	65.92	1.81
		54	0.1800	0.2809	64.08	1.93
	802.11 n(HT20)	MCS0	1.3359	1.4366	92.99	0.32
		MCS1	0.6878	0.7894	87.13	0.60
		MCS2	0.4722	0.5731	82.39	0.84
		MCS3	0.3638	0.4650	78.24	1.07
		MCS4	0.2559	0.3569	71.70	1.44
		MCS5	0.2000	0.3009	66.47	1.77
		MCS6	0.1841	0.2847	64.66	1.89
		MCS7	0.1841	0.2850	64.60	1.90

Note – Duty Cycle : (Tx On Time / (Tx On Time + Tx Off Time)) \* 100

Correction Factor : 10 \* Log(1 / (Duty Cycle / 100))

### 5.4 Configuration of Test System

**Line Conducted Test:** It is not need to test this requirement, because the EUT shall be operated by DC Power.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

### 5.5 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 antenna of the EUT is Chip Antenna on the main board in the EUT, so no consideration of replacement by the user.

## 6. PRELIMINARY TEST

### 6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
It is not need to test this requirement, because the power of the EUT is supplied by DC Power.	

### 6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

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

## 7. MINIMUM 6 dB BANDWIDTH

### 7.1 Operating environment

Temperature : 24 °C  
 Relative humidity : 52 % R.H.

### 7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



### 7.3 Test Date

August 09, 2023 ~ September 13, 2023

**7.4 Test data for 802.11b WLAN Mode**

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	9.04	0.50	8.54
Middle	2 437.00	9.04	0.50	8.54
High	2 462.00	9.04	0.50	8.54

Remark. Margin = Measured Value - Limit

**7.5 Test data for 802.11g WLAN Mode**

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.14	0.50	14.64
Middle	2 437.00	15.14	0.50	14.64
High	2 462.00	15.73	0.50	15.23

Remark. Margin = Measured Value - Limit

**7.6 Test data for 802.11n\_HT20 WLAN Mode**

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.14	0.50	14.64
Middle	2 437.00	15.14	0.50	14.64
High	2 462.00	15.18	0.50	14.68

Remark. Margin = Measured Value - Limit

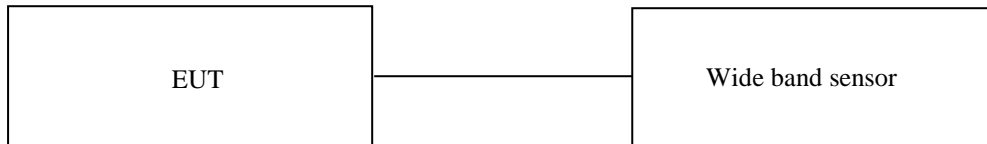
## 8. MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

### 8.1 Operating environment

Temperature : 24 °C  
 Relative humidity : 52 % R.H.

### 8.2 Test set-up

The maximum peak output power was measured with the wide band sensor connected to the antenna output of the EUT. The Wide Band Sensor is measured when the EUT is transmitting at the appropriate center frequency its maximum power control level as described in Section 8.3(558074 D01 15.247 Meas Guidance v05r02). Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.



### 8.3 Test Date

August 09, 2023 ~ August 18, 2023

**8.4 Test data for 802.11b WLAN Mode**

-. Test Result : Pass

-. Duty Cycle : 98.89 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	14.53	0.05	14.58	30.00	15.42
Middle	2 437.00	14.66	0.05	14.71	30.00	15.29
High	2 462.00	14.63	0.05	14.68	30.00	15.32

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

**8.5 Test data for 802.11g WLAN Mode**

-. Test Result : Pass

-. Duty Cycle : 93.50 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	13.55	0.29	13.84	30.00	16.16
Middle	2 437.00	13.64	0.29	13.93	30.00	16.07
High	2 462.00	13.69	0.29	13.98	30.00	16.02

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

**8.6 Test data for 802.11n HT20 WLAN Mode**

-. Test Result : Pass

-. Duty Cycle : 93.13 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	12.35	0.32	12.67	30.00	17.33
Middle	2 437.00	12.38	0.32	12.70	30.00	17.30
High	2 462.00	12.46	0.32	12.78	30.00	17.22

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

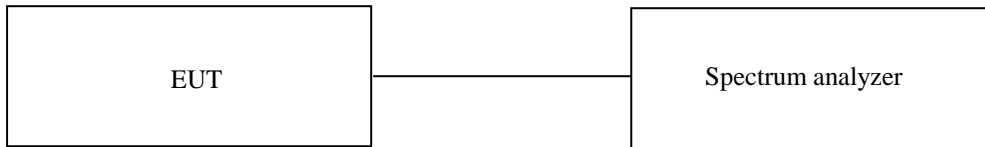
**9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND**

**9.1 Operating environment**

Temperature : 24 °C  
 Relative humidity : 52 % R.H.

**9.2 Test set-up for conducted measurement**

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



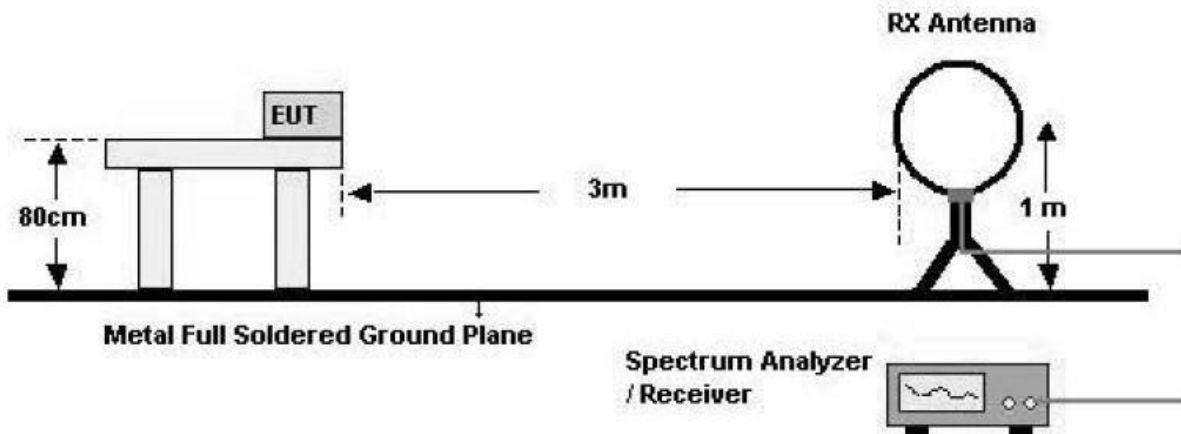
**9.3 Test set-up for radiated measurement**

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels 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 horizontal and vertical polarization of the receiving antenna.

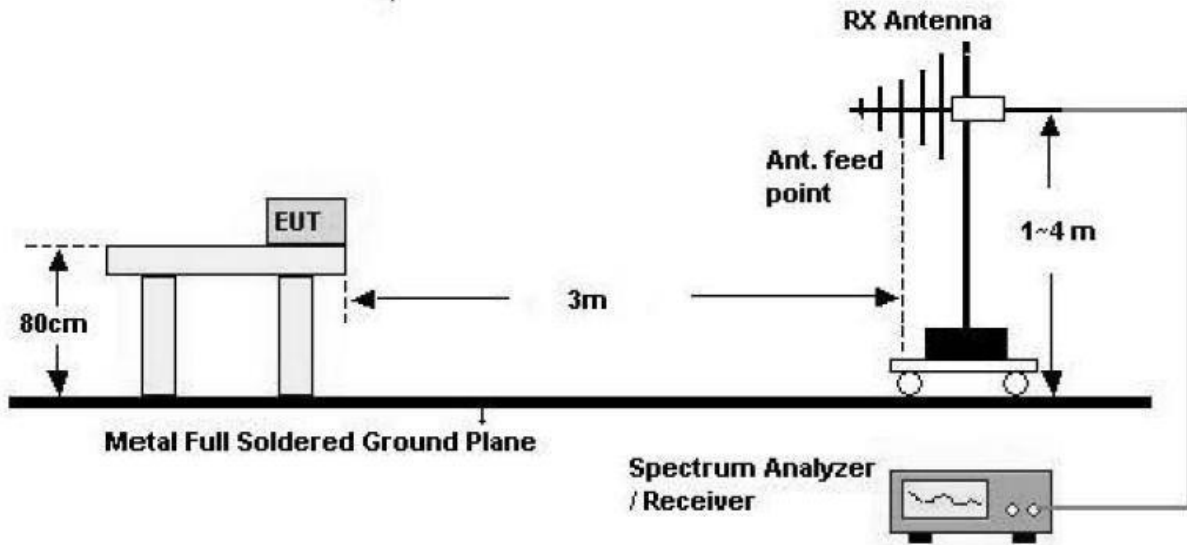
**- Test Configuration**

1. Below 30 MHz

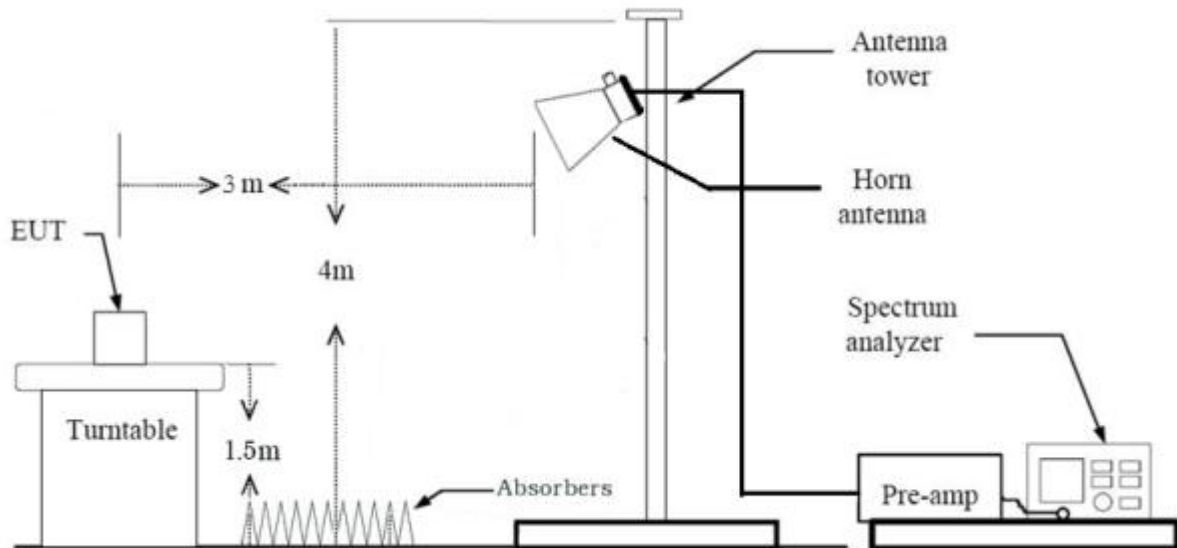




2. 30 MHz - 1 GHz



3. Above 1 GHz



**9.4 Test Date**

August 09, 2023 ~ August 18, 2023

**9.5 Test data for conducted emission**

For Test data for conducted emission, Please refer to the Annex

**9.6 Test data for radiated emission**

**9.6.1 Radiated Emission which fall in the Restricted Band**

**9.6.1.1 Test data for 802.11b WLAN Mode**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 98.89 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 386.47	55.61	Peak	H	27.52	6.92	44.95	6.04	-	51.14	74.00	22.86
2 386.07	47.15	Average	H	27.52	6.92	44.95	6.04	0.05	42.73	54.00	11.27
2 386.27	56.58	Peak	V	27.52	6.92	44.95	6.04	-	52.11	74.00	21.89
2 367.52	45.72	Average	V	27.41	6.77	44.95	6.04	0.05	41.04	54.00	12.96
<b>Test Data for High Channel</b>											
2 485.18	54.08	Peak	H	27.56	6.94	44.91	6.04	-	49.71	74.00	24.29
2 484.00	43.34	Average	H	27.56	6.94	44.91	6.04	0.05	39.02	54.00	14.98
2 493.30	54.72	Peak	V	27.53	6.97	44.90	6.04	-	50.36	74.00	23.64
2 499.64	42.80	Average	V	27.50	6.91	44.90	6.04	0.05	38.40	54.00	15.60

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amp Gain} + \text{ATT} + \text{Duty Factor}$$

**9.6.1.2 Test data for 802.11g WLAN Mode**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 93.50 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 389.94	59.45	Peak	H	27.54	6.92	44.94	6.04	-	55.01	74.00	18.99
2 389.63	47.66	Average	H	27.54	6.92	44.94	6.04	0.29	43.51	54.00	10.49
2 387.39	65.65	Peak	V	27.52	6.92	44.95	6.04	-	61.18	74.00	12.82
2 389.94	47.70	Average	V	27.54	6.92	44.94	6.04	0.29	43.55	54.00	10.45
<b>Test Data for High Channel</b>											
2 483.77	59.40	Peak	H	27.56	6.94	44.91	6.04	-	55.03	74.00	18.97
2 483.51	43.02	Average	H	27.57	6.94	44.91	6.04	0.29	38.95	54.00	15.05
2 483.62	59.35	Peak	V	27.57	6.94	44.91	6.04	-	54.99	74.00	19.01
2 483.58	43.62	Average	V	27.57	6.94	44.91	6.04	0.29	39.55	54.00	14.45

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amp Gain} + \text{ATT} + \text{Duty Factor}$$

**9.6.1.3 Test data for 802.11n\_HT20 WLAN Mode**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 93.13 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain (dB)	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>											
2 389.02	57.09	Peak	H	27.53	6.92	44.94	6.04	-	52.64	74.00	21.36
2 389.84	47.21	Average	H	27.54	6.92	44.94	6.04	0.31	43.08	54.00	10.92
2 389.84	61.61	Peak	V	27.54	6.92	44.94	6.04	-	57.17	74.00	16.83
2 390.04	47.70	Average	V	27.54	6.92	44.94	6.04	0.31	43.57	54.00	10.43
<b>Test Data for High Channel</b>											
2 484.11	57.63	Peak	H	27.56	6.94	44.91	6.04	-	53.26	74.00	20.74
2 483.73	44.54	Average	H	27.57	6.94	44.91	6.04	0.31	40.49	54.00	13.51
2 483.58	57.64	Peak	V	27.57	6.94	44.91	6.04	-	53.28	74.00	20.72
2 483.51	44.01	Average	V	27.57	6.94	44.91	6.04	0.31	39.96	54.00	14.04

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amp Gain} + \text{ATT} + \text{Duty Factor}$$

### 9.6.2 Spurious & Harmonic Radiated Emission

#### 9.6.2.1 Test data for 802.11b WLAN Mode

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,  
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band  
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 98.89 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
4 844.95	49.77	Peak	H	31.30	11.27	44.67	-	47.67	74.00	26.33
4 812.13	37.83	Average	H	31.30	11.15	44.66	0.05	35.67	54.00	18.33
4 810.20	49.28	Peak	V	31.30	11.15	44.66	-	47.07	74.00	26.93
4 824.05	37.81	Average	V	31.30	11.15	44.66	0.05	35.65	54.00	18.35
<b>Test Data for Middle Channel</b>										
4 865.91	49.24	Peak	H	31.30	11.27	44.67	-	47.14	74.00	26.86
4 890.36	37.66	Average	H	31.30	11.15	44.68	0.05	35.48	54.00	18.52
4 887.35	49.73	Peak	V	31.30	11.15	44.68	-	47.50	74.00	26.50
4 883.35	37.65	Average	V	31.30	11.15	44.68	0.05	35.47	54.00	18.53
<b>Test Data for High Channel</b>										
4 942.52	49.39	Peak	H	31.30	11.35	44.69	-	47.35	74.00	26.65
4 930.88	37.46	Average	H	31.30	11.35	44.69	0.05	35.47	54.00	18.53
4 935.69	48.88	Peak	V	31.30	11.35	44.69	-	46.84	74.00	27.16
4 928.09	37.17	Average	V	31.30	11.35	44.69	0.05	35.18	54.00	18.82

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amp Gain} + \text{Duty Factor}$$

**9.6.2.2 Test data for 802.11g WLAN Mode**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,  
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band  
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 93.50 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
4 819.82	49.46	Peak	H	31.30	11.15	44.66	-	47.25	74.00	26.75
4 819.95	37.77	Average	H	31.30	11.15	44.66	0.29	35.85	54.00	18.15
4 818.88	49.18	Peak	V	31.30	11.15	44.66	-	46.97	74.00	27.03
4 819.82	37.75	Average	V	31.30	11.15	44.66	0.29	35.83	54.00	18.17
<b>Test Data for Middle Channel</b>										
4 878.77	49.72	Peak	H	31.30	11.15	44.68	-	47.49	74.00	26.51
4 888.07	37.35	Average	H	31.30	11.15	44.68	0.29	35.41	54.00	18.59
4 894.46	49.50	Peak	V	31.30	11.15	44.68	-	47.27	74.00	26.73
4 862.22	37.32	Average	V	31.30	11.27	44.67	0.29	35.51	54.00	18.49
<b>Test Data for High Channel</b>										
4 904.13	49.18	Peak	H	31.30	11.15	44.68	-	46.95	74.00	27.05
4 930.25	37.10	Average	H	31.30	11.35	44.69	0.29	35.35	54.00	18.65
4 904.13	48.75	Peak	V	31.30	11.15	44.68	-	46.52	74.00	27.48
4 924.76	37.08	Average	V	31.30	11.15	44.68	0.29	35.14	54.00	18.86

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amp Gain} + \text{Duty Factor}$$

**9.6.2.3 Test data for 802.11n\_HT20 WLAN Mode**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,  
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band  
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 93.13 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
<b>Test Data for Low Channel</b>										
4 819.64	49.75	Peak	H	31.30	11.15	44.66	-	47.54	74.00	26.46
4 818.56	37.75	Average	H	31.30	11.15	44.66	0.31	35.85	54.00	18.15
4 816.31	49.24	Peak	V	31.30	11.15	44.66	-	47.03	74.00	26.97
4 821.44	37.86	Average	V	31.30	11.15	44.66	0.31	35.96	54.00	18.04
<b>Test Data for Middle Channel</b>										
4 894.46	49.15	Peak	H	31.30	11.15	44.68	-	46.92	74.00	27.08
4 888.97	37.54	Average	H	31.30	11.15	44.68	0.31	35.62	54.00	18.38
4 861.68	49.40	Peak	V	31.30	11.27	44.67	-	47.30	74.00	26.70
4 894.46	37.51	Average	V	31.30	11.15	44.68	0.31	35.59	54.00	18.41
<b>Test Data for High Channel</b>										
4 929.44	49.20	Peak	H	31.30	11.35	44.69	-	47.16	74.00	26.84
4 904.31	37.14	Average	H	31.30	11.15	44.68	0.31	35.22	54.00	18.78
4 933.40	49.11	Peak	V	31.30	11.35	44.69	-	47.07	74.00	26.93
4 933.67	37.30	Average	V	31.30	11.35	44.69	0.31	35.57	54.00	18.43

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amp Gain} + \text{Duty Factor}$$

## 10. AVERAGE POWER SPECTRAL DENSITY

### 10.1 Operating environment

Temperature : 24 °C  
 Relative humidity : 52 % R.H.

### 10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$  , the video bandwidth is set to 3 times the resolution bandwidth.



### 10.3 Test Date

August 09, 2023 ~ August 18, 2023



**10.4 Test data for 802.11b WLAN Mode**

-. Test Result : Pass

-. Duty Cycle : 98.89 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
Low	2 412.00	-17.47	0.05	-17.42	8.00	25.42
Middle	2 437.00	-17.38	0.05	-17.33	8.00	25.33
High	2 462.00	-17.42	0.05	-17.37	8.00	25.37

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

**10.5 Test data for 802.11g WLAN Mode**

-. Test Result : Pass

-. Duty Cycle : 93.50 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
Low	2 412.00	-20.73	0.29	-20.44	8.00	28.44
Middle	2 437.00	-20.62	0.29	-20.33	8.00	28.33
High	2 462.00	-20.52	0.29	-20.23	8.00	28.23

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

**10.6 Test data for 802.11n HT20 WLAN Mode**

-. Test Result : Pass

-. Duty Cycle : 93.13 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
Low	2 412.00	-21.93	0.31	-21.62	8.00	29.62
Middle	2 437.00	-21.87	0.31	-21.56	8.00	29.56
High	2 462.00	-21.92	0.31	-21.61	8.00	29.61

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

## 11. RADIATED EMISSION TEST

### 11.1 Operating environment

Temperature : 24 °C  
 Relative humidity : 52 % R.H.

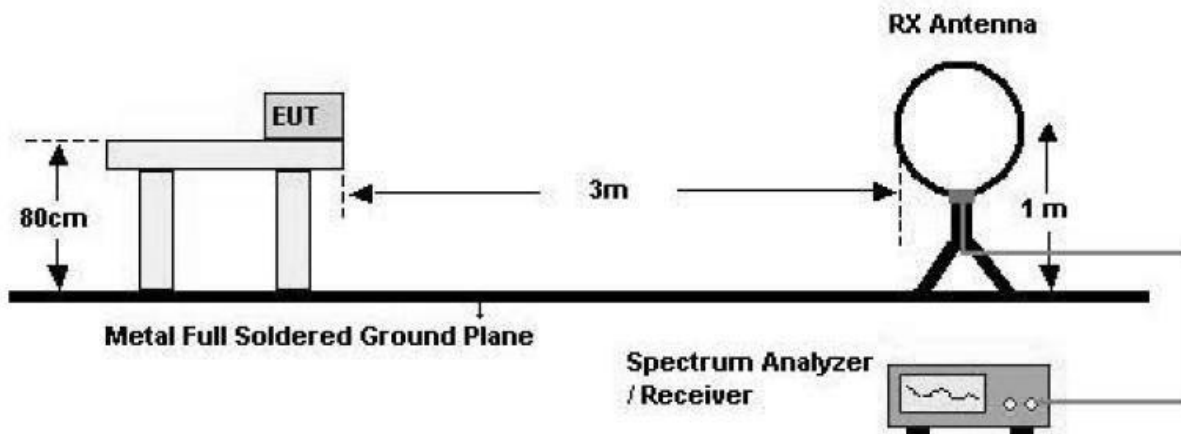
### 11.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on 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.

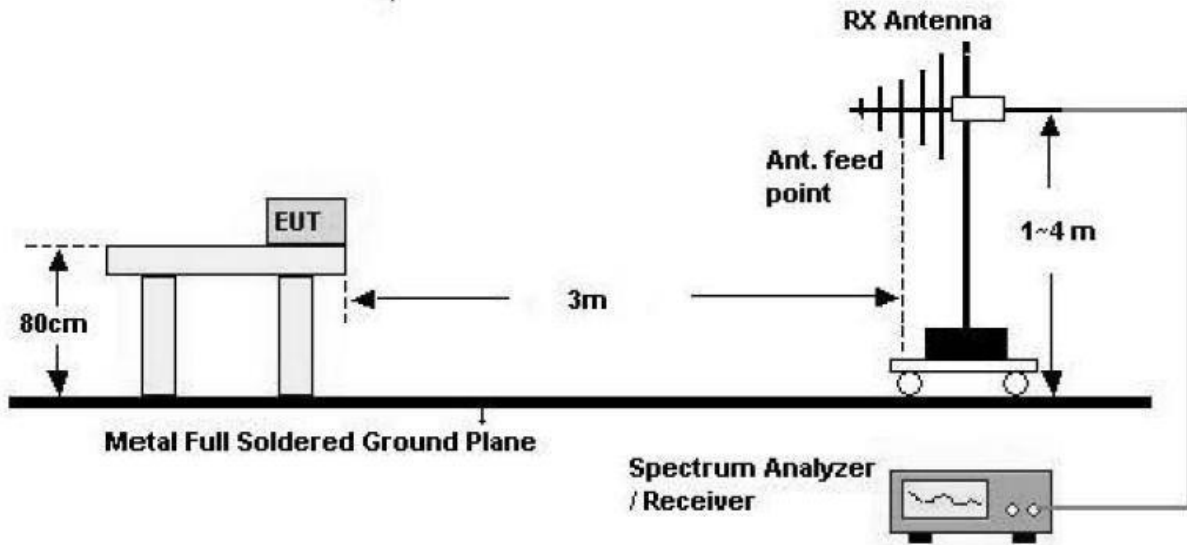
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal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

#### - Test Configuration

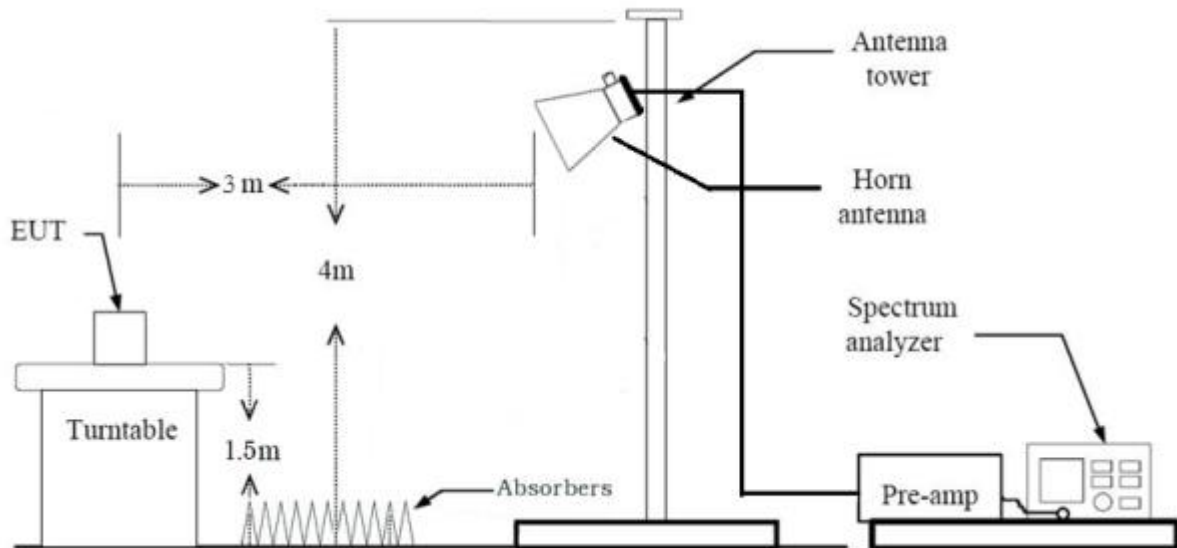
1. Below 30 MHz



2. 30 MHz - 1 GHz



3. Above 1 GHz



**11.3 Test Date**

August 09, 2023 ~ August 18, 2023

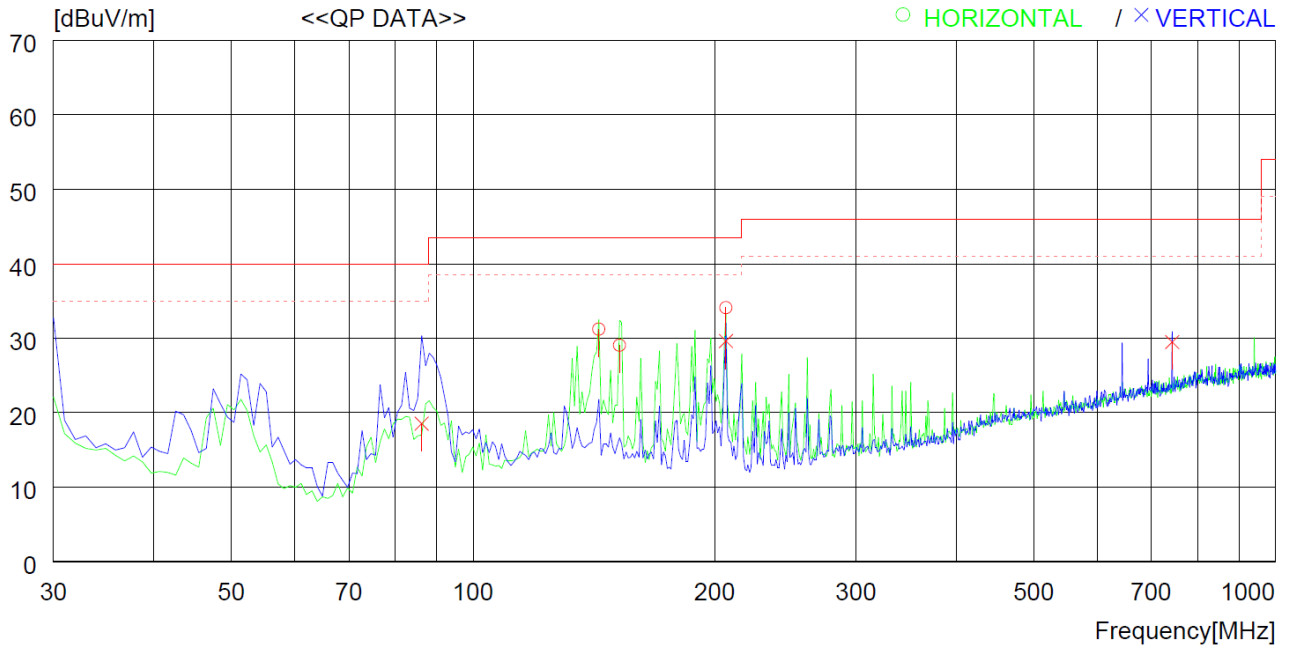
**11.4 Test data for 30 MHz ~ 1 000 MHz**

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wired Remote Controller

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	143.490	42.9	19.1	2.3	33.1	31.2	43.5	12.3	200	230
2	152.220	41.1	18.6	2.4	33.1	29.0	43.5	14.5	300	209
3	206.540	48.6	15.8	2.8	33.1	34.1	43.5	9.4	200	359
----- Vertical -----										
4	86.260	36.4	13.4	1.8	33.1	18.5	40.0	21.5	100	359
5	206.540	44.1	15.8	2.8	33.1	29.6	43.5	13.9	200	0
6	742.944	31.4	25.9	5.5	33.3	29.5	46.0	16.5	100	341

**11.5 Test data for Below 30 MHz**

- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dB $\mu$ V)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

**11.6 Test data for above 1 GHz**

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode  
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dB $\mu$ V)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

## 12. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV30	Rohde & Schwarz	Signal Analyzer	101372	Jul. 10, 2023 (1Y)
SMB100A	Rohde & Schwarz	Signal Generator	177648	Jan. 18, 2023 (1Y)
ESR	Rohde & Schwarz	EMI Test Receiver	101470	Jun. 16, 2023 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	312544	Mar. 14, 2023 (1Y)
SCU18	Rohde & Schwarz	Signal Conditioning unit	102266	Jul. 11, 2023 (1Y)
SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Jan. 18, 2023 (1Y)
GP-4303D	LG Precision Co.,Ltd	DC Power Supply	5071069	Jan. 04, 2023 (1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter ( 1-3 GHz )	N/A	Jan. 17, 2023 (1Y)
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 24, 2022 (2Y)
HLP-2008	TDK	Hybrid Antenna	131316	Mar. 07, 2022 (2Y)
BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1349	Jul. 04, 2023 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170179	Jan. 25, 2023 (1Y)
ESCI	Rohde & Schwarz	EMI Test Receiver	101420	Mar. 06, 2023 (1Y)
11947A	Rohde & Schwarz	Pulse Limiter	3107A02762	Mar. 07, 2023 (1Y)
LT32C/10	Afj Instruments	LISN	32032039322	Mar. 07, 2023 (1Y)
DT2000-2t	Innco System	Turn Table	N/A	N/A
MA-4640-XPET	Innco System	Antenna Master	MA4640/652/43100318/P	N/A
CO3000	Innco System	Controller	1026/40960617/P	N/A