TEST REPORT

Job No.	:	**GPWE2403000029EC**
Test Report No.	:	**F690501-RF-EMC002267**
Applicant	:	**LG Electronics USA, Inc.**
Product Name	:	**RF Module**
Model Name	:	**MTMB01**
Standards	:	**FCC Part 15 Subpart B, Class B**
FCC ID	:	**BEJ-MTMB01**
Date of Receipt	:	**March 6, 2024**
Date of Test	:	**March 28, 2024 ~ April 3, 2024**
Date of Issue	:	**March 4, 2024**
Test Result	:	**Complied**

1) This test report does not assure KOLAS accreditation.
2) The results of this test report are effective only to the items tested.
3) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

	Tested by (Name, signature)	Approved by (Name, signature)
Affirmation	*Dojun Lee*	*Julia Choi*

SGS Korea Co., Ltd. Gunpo Laboratory
4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, KOREA

Contents

Revision History

Revision	Report Number	Description
0	F690501-RF-EMC002267	Initial

1. Test Laboratory

1.1 General information

Name	SGS Korea Co., Ltd.
- Branch Site	4, LS-ro 182beon-gil, Gunposi, Gyeonggi-do, Republic of Korea Tel. 82 31 428 5700 Fax. 82 31 427 5370
- Branch Site-3	35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea Tel. 82 31 548 0710 Fax. 82 31 548 0719
- Branch Site-4	12, Dongtansandan 10-gil, Hwaseong-si, Gyeonggi-do, 18487, Republic of Korea Tel. 82 31 8007 5302 Fax. 82 31 427 2370
Website	http://www.sgsgruop.kr/ee

SGS Korea Co., Ltd. has been accredited by the agencies listed in the following table;

Accreditation	Accreditation bodies	Accreditation No.
KC	MSIT- RRA	KR0150
FCC	FCC (MRA)	
IC	IC (MRA)	
Vietnam-MIC	Vietnam-MIC	
Japan EMI	VCCI	C-14102, T-11153, R-13662, G-20037
KOLAS	KATS - KOLAS	Testing No.123
CBTL	IECEE	TL 146
SDPPI	SDPPI	-

2. General Information of E.U.T.

2.1 Applicant Information

Applicant	LG Electronics USA, Inc.
Applicant Address	111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United states, 07632
Manufacturer	LG Electronics Inc.
Manufacturer Address	170, Seongsanpaechong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, 51533, Republic of Korea

2.2 General Information of E.U.T.

Classification	Description
Product Name	RF Module
Model Name	MTMB01
Alt. Model Name	-
Model Differences	-
Serial No.	-
EMI Classification	Class B
Internal Clock Frequency	38.4 ㎒(Wireless Frequency: 2 480 ㎒)
Rated Power	5 Vd.c.
Tested Power	5 Vd.c.
H/W Version	V 1.0
S/W Version	V 1.0
Port	-
Components	-
Function	RF Module(ZigBee)

2.3 Configurations of E.U.T

Description	Model	Serial No.	Manufacturer	Note
-	-	-	-	-

3. E.U.T. Operation and Test Configuration

3.1 Peripheral Equipments

Description	Model	Serial No.	Manufacturer	Note.
RF Module	MTMB01	-	LG Electronics Inc.	Korea
DC Power Supply	IT6720	-	ITECH	-
Test Jig 1	-	-	-	-
Test Jig 2	-	-	-	-
Laptop 1	NT740U5L	0MMN91BH800265L	Samsung Electronics Co., Ltd.	-
Laptop 2	NT740U5L	0MMN91BH800200Y	Samsung Electronics Co., Ltd.	-

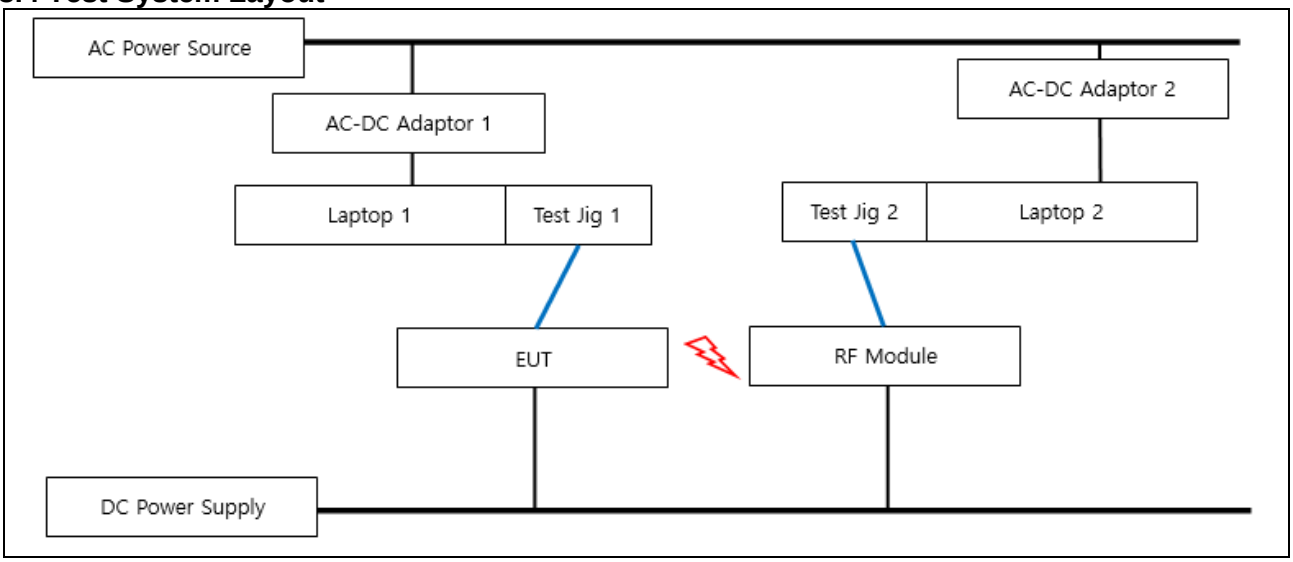
3.2 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length (m)	Shield	
EUT	-	DC Power Supply	DC OUT	0.5	Unshield	-
		Test Jig 1	4 Pin Connector	0.5	Unshield	-
	-	RF Module	-	-	-	-

3.3 Operating Modes and Conditions

Operating mode	Operating condition
01 ZigBee(Rx + Tx)	EUT is communicating with each other in ZigBee(Rx + Tx).

3.4 Test System Layout



3.5 Modifications to the test items during testing

■	No modifications done during testing
□	Modification done during testing (see details below)

No.	Description of modification (if any)
1	
2	

4. Test Results

4.1 Summary

Test Items	Standards	Test Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107 ANSI C63.4a:2017	N/A
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ANSI C63.4a:2017	Complied

4.2 Note

1

2

Emission Test

5.1 Test Method and Limits

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 ㎒ - 30 ㎒	9 ㎑	-
Radiated Emission	30 ㎒ - 1 ㎓	120 ㎑	10 m or 3 m
	Above 1 ㎓	1 ㎒	3 m

5.2 Test Limits

Frequency Range	Limits(dBµV)		Class
	Quasi-peak	CISPR-Average	
0.15 ㎒ - 0.5 ㎒	79	66	Class A
0.5 ㎒ - 30 ㎒	73	60	
0.15 ㎒ - 0.5 ㎒	66 to 56 Note1	56 to 46 Note1	Class B
0.5 ㎒ - 5 ㎒	56	46	
5 ㎒ - 30 ㎒	60	50	

[Table 2.1 Conducted Emission Limits]

Frequency Range	Limits(dBµV/m)	Class
	Quasi-peak	
30 ㎒ - 88 ㎒	39.0	Class A (10 m method)
88 ㎒ - 216 ㎒	43.5	
216 ㎒ - 960 ㎒	46.4	
960 ㎒ - 1 ㎓	49.5	
30 ㎒ - 88 ㎒	40.0	Class B (3 m method)
88 ㎒ - 216 ㎒	43.5	
216 ㎒ - 960 ㎒	46.0	
960 ㎒ - 1 ㎓	54.0	

[Table 2.2 Radiated Emission Limits below 1 ㎓]

Frequency Range	Limits(dBµV)		Class
	Quasi-peak	CISPR-Average	
Above 1 ㎓	79.5	59.5	Class A
	74.0	54.0	Class B

[Table 2.4 Radiated Emission Limits Above 1 ㎓ Note2]

Note 1. The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of that frequency.
Note 2. The limits of class A equipment is extrapolated using an extrapolation factor of 20 ㏈/decade because it was measured at 3 m distance not 10 m distance.

5.3 Radiated Emission

5.3.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU40	R&S	100075	2025-01-17
TRILOG BROADBAND ANTENNA	VULB 9163	SCHWARZBECK	01126	2025-02-26
Double Ridged Horn Antenna	HF907	R&S	100208	2025-03-04
PREAMPLIFIER	AM-1431	MITEQ	1336160	2024-05-23
AMPLIFIER	SCU 18	R&S	10070	2024-08-23
RF Cable	EMH-1Lab-RE-01	-	-	-
RF Cable	EMH-1Lab-RE-02	-	-	-
RF Cable	EMH-1Lab-RE-03	-	-	-
RF Cable	EMH-1Lab-RE-04	-	-	-
RF Cable	EMH-1Lab-RE-05	-	-	-
RF Cable	EMH-1Lab-RE-06	-	-	-

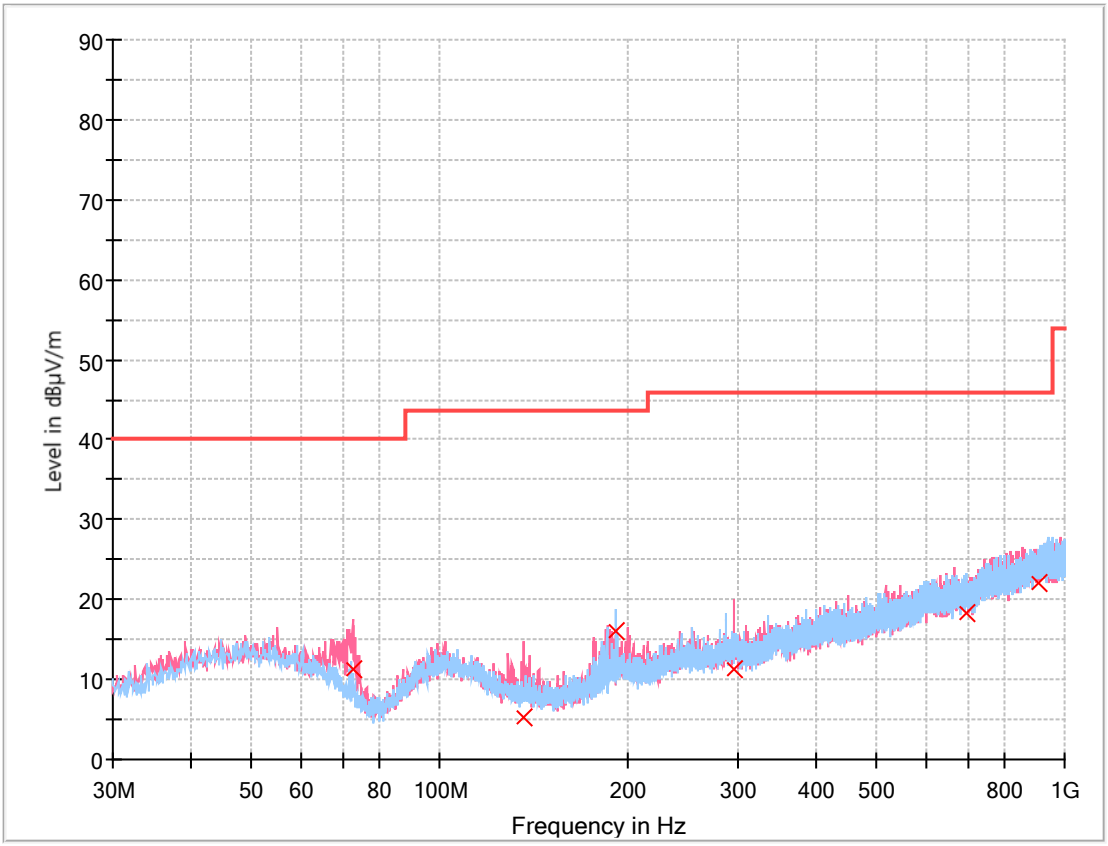
Note. Measuring software is below
- Branch Site : ELECTRA(V5.01.0) from R&S
- Branch Site-3 : EMC32(V10.40.10) from R&S
- Branch Site-4 : EMC32(V10.40.10) from R&S

5.3.2 Environment Conditions

Test SIte	10 m SEMI-ANECHOIC CHAMBER in Branch site-3
Temperature	(Minimum 20.3, Maximum 21.3) ℃
Humidity	(Minimum 30.0, Maximum 34.0) % R.H.
Atmospheric Pressure	(Minimum 101.0, Maximum 101.0) kPa
Test Date	2024-03-28, 2024-04-03

5.3.3 Test Result

01 Mode



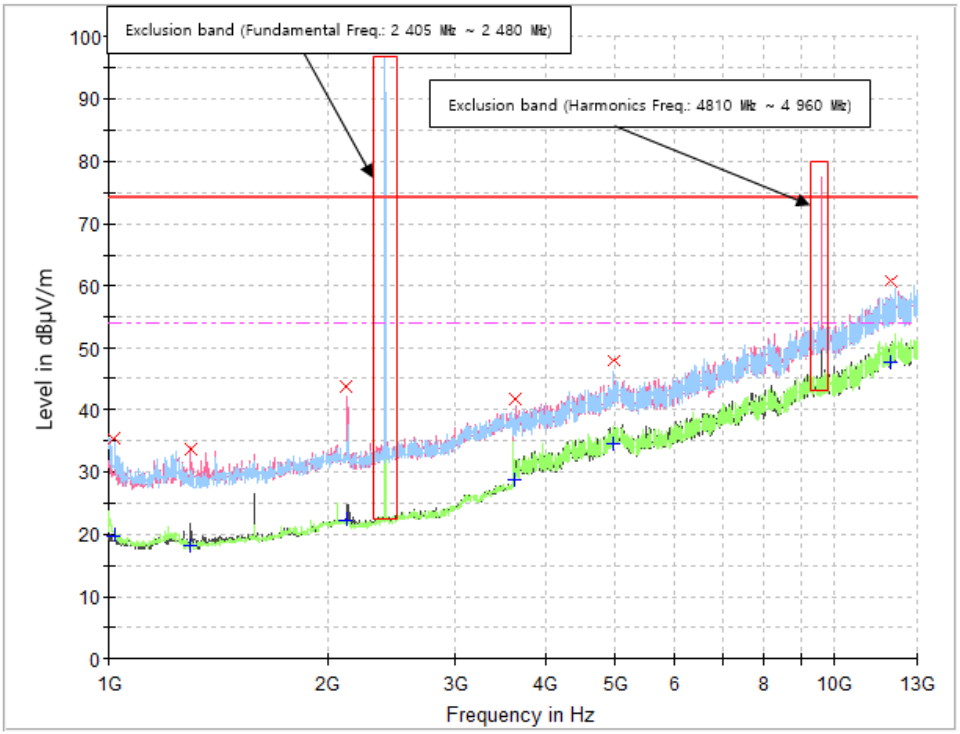
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
72.486	11.40	40.00	28.60	15 000.0	120.000	320.0	V	262.0	-23.0
136.603	5.27	43.50	38.23	15 000.0	120.000	217.0	V	285.0	-23.1
191.893	16.12	43.50	27.38	15 000.0	120.000	203.0	H	0.0	-20.1
295.683	11.17	46.00	34.83	15 000.0	120.000	340.0	V	253.0	-17.3
697.457	18.37	46.00	27.63	15 000.0	120.000	296.0	H	309.0	-9.8
905.328	22.18	46.00	23.82	15 000.0	120.000	123.0	V	0.0	-6.7

Note. Measurement Uncertainty: See Appendix A

- POL H = Horizontal
- POL V = Vertical
- Margin = Limit – Quasi Peak
- Corr. = Antenna Factor + Cable loss – Amplifier Gain

01 Mode



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time(ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1 016.800	35.27	---	74.00	38.73	15 000.0	1 000.000	100.0	H	232.0	-14.4
1 016.800	---	19.84	54.00	34.16	15 000.0	1 000.000	100.0	H	232.0	-14.4
1 296.400	33.61	---	74.00	40.39	15 000.0	1 000.000	100.0	V	251.0	-14.2
1 296.400	---	18.24	54.00	35.76	15 000.0	1 000.000	100.0	V	251.0	-14.2
2 125.600	43.84	---	74.00	30.16	15 000.0	1 000.000	100.0	V	292.0	-8.4
2 125.600	---	22.19	54.00	31.81	15 000.0	1 000.000	100.0	V	292.0	-8.4
3 617.200	41.73	---	74.00	32.27	15 000.0	1 000.000	100.0	V	355.0	-0.5
3 617.200	---	28.66	54.00	25.34	15 000.0	1 000.000	100.0	V	355.0	-0.5
4 967.200	---	34.56	54.00	19.44	15 000.0	1 000.000	100.0	H	72.0	5.7
4 967.200	47.88	---	74.00	26.12	15 000.0	1 000.000	100.0	H	72.0	5.7
11 974.000	---	47.75	54.00	6.25	15 000.0	1 000.000	100.0	H	219.0	19.2
11 974.000	60.77	---	74.00	13.23	15 000.0	1 000.000	100.0	H	219.0	19.2

Note. Measurement Uncertainty: See Appendix A

- AF = Antenna Factor
- CL = Cable Loss
- AMP = Amplifier Gain
- POL H = Horizontal
- POL V = Vertical
- A = Angle
- H = Height
- Margin = Limit – Result
- Corr. = AF + CL – AMP

** The value of 'Level' includes 'Corr.'.

Ex) In case

Freq ; 100 MHz, level ; 30 dB(µV/m), AF ; 10 dB/m, CL ; 4 dB, Amp ; 25 dB

Result = Level + AF + CL – Amp
= 30 + 10 + 4 - 25
= 19

Margin = Limit – Result
= 43.5 – 19
= 24.5

Appendix A: Measurement Uncertainty

Test Method			Measurement Uncertainty
Conducted Emission		ENV216	3.1 dB (The confidential level is 95 %, *k*=2)
		ESH2-Z5	2.8 dB (The confidential level is 95 %, *k*=2)
		ESH3-Z6	3.0 dB (The confidential level is 95 %, *k*=2)
Conducted Emission - Signal		ISN T800	5.3 dB (The confidential level is 95 %, *k*=2)
		ISNT8-Cat6	5.4 dB (The confidential level is 95 %, *k*=2)
		ISN S751	7.1 dB (The confidential level is 95 %, *k*=2)
Disturbance Voltage at Antenna Terminal		2.2 dB (The confidential level is 95 %, *k*=2)	
Radiated Emission	9 kHz - 30 MHz	Horizontal	3.6 dB (The confidential level is 95 %, *k*=2)
		Vertical	3.6 dB (The confidential level is 95 %, *k*=2)
	30 MHz - 1 000 MHz	Horizontal	4.6 dB (The confidential level is 95 %, *k*=2)
		Vertical	4.9 dB (The confidential level is 95 %, *k*=2)
	1 GHz - 18 GHz	Horizontal	3.9 dB (The confidential level is 95 %, *k*=2)
		Vertical	3.8 dB (The confidential level is 95 %, *k*=2)

Table A.1 Measurement Uncertainty of Branch Site

Test Method			Measurement Uncertainty
Conducted Emission		ENV216	3.2 dB (The confidential level is 95 %, *k*=2)
		ESH3-Z6	3.2 dB (The confidential level is 95 %, *k*=2)
		ESH2-Z5	3.0 dB (The confidential level is 95 %, *k*=2)
		NNLK8129	3.0 dB (The confidential level is 95 %, *k*=2)
Conducted Emission - Signal		ISN T800	5.5 dB (The confidential level is 95 %, *k*=2)
		ISN ST08	6.6 dB (The confidential level is 95 %, *k*=2)
Radiated Emission	9 kHz - 30 MHz	Horizontal	3.3 dB (The confidential level is 95 %, *k*=2)
		Vertical	3.3 dB (The confidential level is 95 %, *k*=2)
	30 MHz - 1 000 MHz	Horizontal	4.3 dB (The confidential level is 95 %, *k*=2)
		Vertical	4.6 dB (The confidential level is 95 %, *k*=2)
	1 GHz - 18 GHz	Horizontal	3.9 dB (The confidential level is 95 %, *k*=2)
		Vertical	4.0 dB (The confidential level is 95 %, *k*=2)

Table A.2 Measurement Uncertainty of Branch Site-3

Test Method			Measurement Uncertainty
Conducted Emission		ENV216	3.5 dB (The confidential level is 95 %, *k*=2)
		ESH2-Z5	3.3 dB (The confidential level is 95 %, *k*=2)
		ESH3-Z6	3.3 dB (The confidential level is 95 %, *k*=2)
		NNLK8129	3.4 dB (The confidential level is 95 %, *k*=2)
Conducted Emission - Signal		ISN T800	5.7 dB (The confidential level is 95 %, *k*=2)
		ISN ST08	5.5 dB (The confidential level is 95 %, *k*=2)
Radiated Emission	9 kHz - 30 MHz (Triple Loop Ant.)	3.4 dB (The confidential level is 95 %, *k*=2)	
	9 kHz - 30 MHz (Loop Ant.)	Horizontal	3.8 dB (The confidential level is 95 %, *k*=2)
		Vertical	3.8 dB (The confidential level is 95 %, *k*=2)
	30 MHz - 1 000 MHz	Horizontal	4.8 dB (The confidential level is 95 %, *k*=2)
		Vertical	5.4 dB (The confidential level is 95 %, *k*=2)
	1 GHz - 18 GHz	Horizontal	4.1 dB (The confidential level is 95 %, *k*=2)
		Vertical	4.2 dB (The confidential level is 95 %, *k*=2)

Table A.3 Measurement Uncertainty of Branch Site-4

- End of Test Report -