

TEST REPORT

**CTK Co., Ltd.**

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, 17142, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:

CTK-2025-01441

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1. Applicant

- Name : ENPLUG CO.,LTD
- Address : A-704. 705, 46, Dallaenae-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do
Republic of Korea
- Date of Receipt : 2025-04-18

2. Manufacturer

- Name : ENPLUG CO.,LTD
- Address : A-704. 705, 46, Dallaenae-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do
Republic of Korea

3. Use of Report : For FCC Certification**4. Test Sample / Model :** Health Hub / EUM-200**5. Date of Test :** 2025-05-13 to 2025-05-30**6. Test Standard(method) used :** FCC 47 CFR part 24 subpart E**7. Testing Environment :** refer to 6 page**8. Test Results :** Compliance

9. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing
(Address : 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

Approval	Tested by	Technical Manager
	Nam-hyoung Kwon: (Signature)	Gwan-yong Kim: (Signature)

2025-06-04

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REPORT REVISION HISTORY

Date	Revision	Page No
2025-06-04	Issued (CTK-2025-01441)	all

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1. General Description

1.1 Applicant Information

Company	ENPLUG CO.,LTD
Contact Point	A-704. 705, 46, Dallaenae-ro, Sujeong-gu, Seongnam-si Gyeonggi-do, Republic of Korea
Contact Person	Name : Jongsung Lee E-mail : js.lee@enplug.co.kr

1.2 Product Information

FCC ID	2BEJA-EUM-200		
Product Description	Health Hub		
Basic Model	EUM-200		
LTE Module	Manufacturer : Quectel Wireless Solutions Co., Ltd.		
	FCC ID : XMR2023EG912UGL		
LTE Band	Band 2 (Cat.1)		
Operating Frequency Range	TX : 1 850 MHz - 1 910 MHz / RX : 1 930 MHz - 1 990 MHz		
Supported Channel Bandwidth	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
Type of Modulation	QPSK, 16QAM		
Output Power (Module test report reference)	LTE Mode	Conducted Output Power (dBm)	Antenna Gain (dBi)
	Band 2_1.4 MHz_QPSK	23.24	2.4
	Band 2_1.4 MHz_16QAM	22.51	2.4
	Band 2_3 MHz_QPSK	23.21	2.4
	Band 2_3 MHz_16QAM	22.34	2.4
	Band 2_5 MHz_QPSK	23.36	2.4
	Band 2_5 MHz_16QAM	22.64	2.4
	Band 2_10 MHz_QPSK	23.45	2.4
	Band 2_10 MHz_16QAM	22.54	2.4
	Band 2_15 MHz_QPSK	23.51	2.4
	Band 2_15 MHz_16QAM	22.46	2.4
	Band 2_20 MHz_QPSK	23.54	2.4
	Band 2_20 MHz_16QAM	22.67	2.4
Antenna Specification	Antenna type : Integral chip antenna Peak Gain : 2.4 dBi (Band 2)		
Power Source	DC 5 V		
Hardware Version	REV 1.0		
Software Version	1.40		
RF Power Setting in test SW	-		

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW500	167018

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2. Accreditations

2.1 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

2.2 Calibration Details of Equipment used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

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3. Test Specifications

3.1 Standards

FCC Part Section(s)	Requirement(s)	Status (Note 1)	Test Condition
24.238(a)	Radiated Spurious Emissions	C	Radiated
Other test requirements		NT(Note 3)	-
<u>Note 1</u> : C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable			
<u>Note 2</u> : The data in this test report are traceable to the national or international standards.			
<u>Note 3</u> : The conformity assessment of except for this item was confirmed by the RF module installed in the device. Please refer to test reports "FG2D1203B". (FCC ID: XMR2023EG912UGL)			
<u>Note 4</u> : The sample was tested according to the following specification: ANSI C63.26-2015.			

3.2 Testing Environment

Test Item		Test Date	Temperature (℃)	Relative Humidity (%)
Transmitter Emission (Radiated)	1) 9 kHz to 30 MHz	2025-05-13	22 - 24	34 - 41
	2) 30 MHz to 1 GHz	2025-05-22	21 - 24	31 - 38
	3) 1 GHz to 18 GHz	2025-05-30	23 - 25	36 - 42
	4) 18 GHz to 20 GHz	2025-05-19	23 - 25	35 - 40

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3.3 Mode of Operation during the Test

The test was performed only in the worst case, referring to the test report of the equipped single module.

Worst Mode

Bandwidth	Channel / Frequency	Index	RB#RBstart	Modulation
20 MHz	18900 Ch / 1 880 MHz	0	1#0	QPSK

3.4 Device Modifications

The following modifications were necessary for compliance:

Not applicable

3.5 Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.

Coverage factor $k = 2$, Confidence levels of 95 %

Description	Uncertainty
Radiated Emissions ($f \leq 1$ GHz)	3.82 dB (C.L.: Approx. 95 %, $k = 2$)
Radiated Emissions ($f > 1$ GHz)	4.48 dB (C.L.: Approx. 95 %, $k = 2$)

3.6 Test Software

Radiated Test	EP5RE Ver. 6.0.1.0, ES10 Ver. 10.001
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4. Technical Characteristic Test

4.1 Radiated Emissions

Requirement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

$$\ast P [\text{dBW}] - (43 + 10 \log(P)) = P [\text{dBm}] + 30 [\text{dB}] - (43 + P[\text{dBm}]) = -13 \text{ dBm}$$

Test Location

- ☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

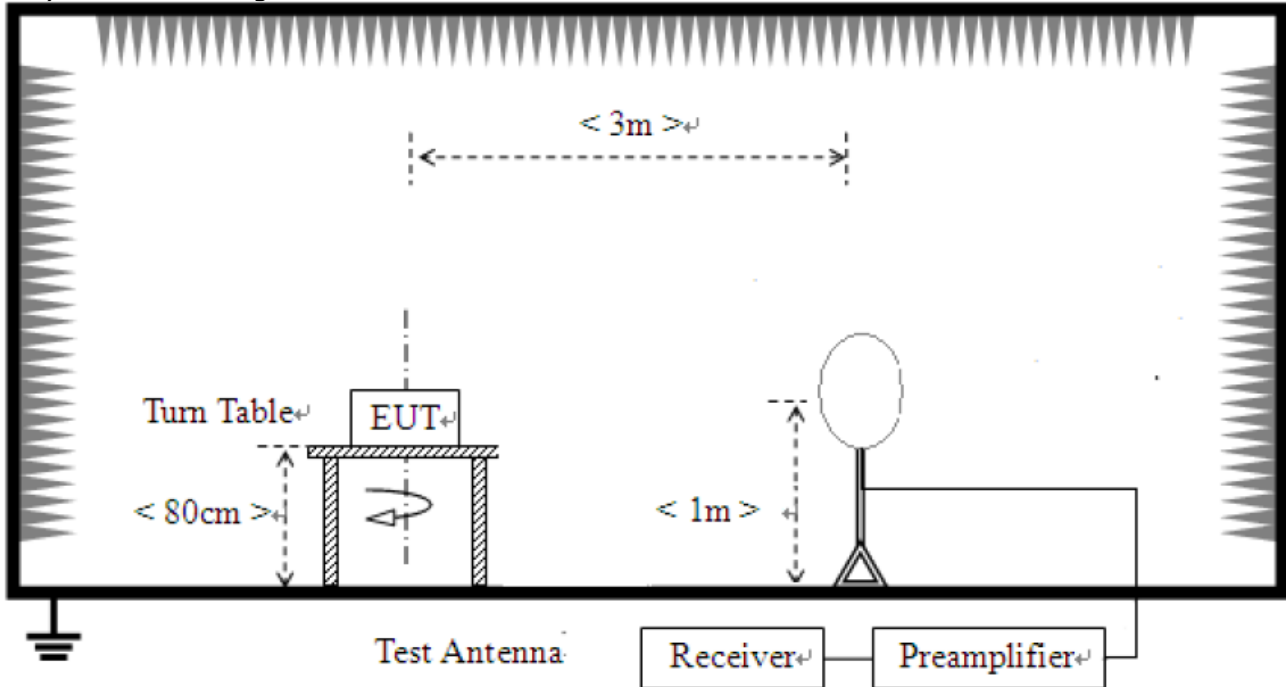
Test Procedures

Test Method	
☒	Refer as ANSI C63.26-2015, clause 5.5.4 (Radiated measurement using the field strength method).
☒	Radiated emission tests shall be performed in the frequency range of 9 kHz to 30 MHz, using a calibrated loop antenna. When perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1 m above the ground and shall be positioned at the specified distance from the EUT. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
☒	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
☒	In the frequency range above 30 MHz, Bi-Log antenna (30 MHz to 1 GHz) is used. Test Antenna height is carried from 1 m to 4 m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.
☒	In the frequency range above 1 GHz, Horn antenna is used. Test Antenna height is carried from 1 m to 4 m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.
☒	The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
☒	$E [\text{dBuV/m}] = \text{EIRP} [\text{dBm}] - 20\log(D) + 104.8$; where D is measurement distance (in the far field region) in m. If the measurement distance is 3 m, the formula is as follows : $E [\text{dBuV/m}] = \text{EIRP} [\text{dBm}] - 95.2$
☒	Relationship between ERP and EIRP : $\text{ERP} = \text{EIRP} - 2.15 \text{ dB}$

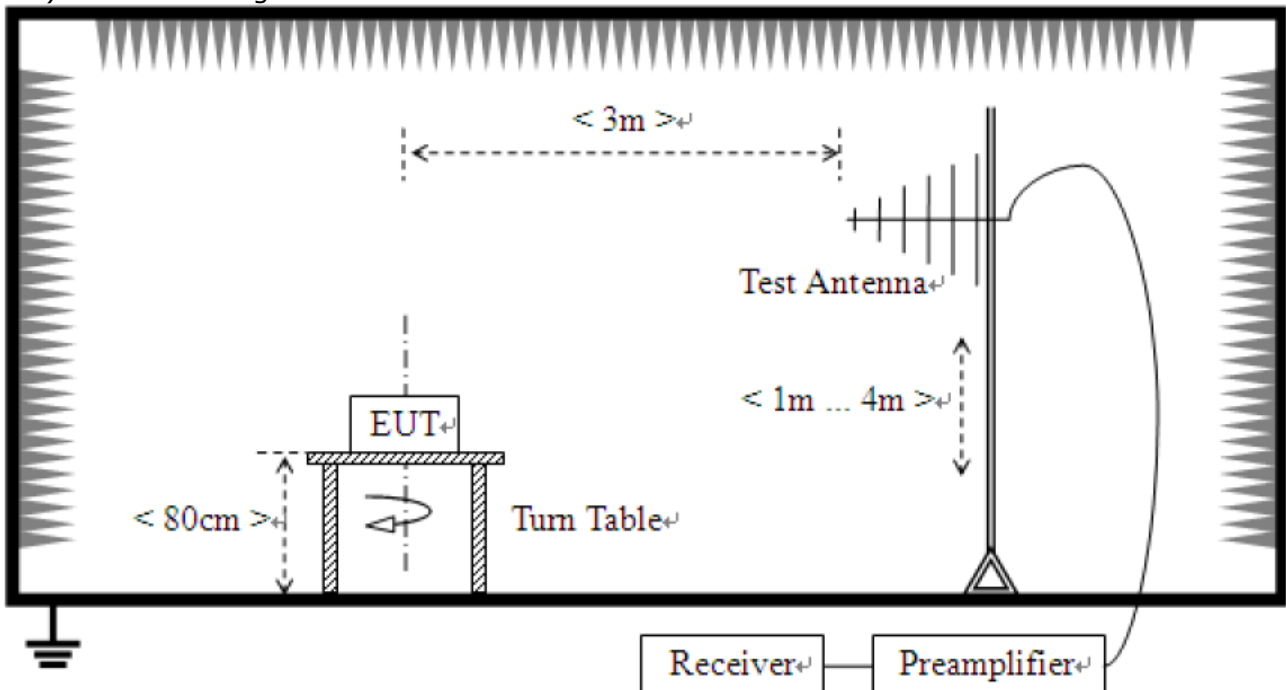
Measuring Instrument Settings	
Frequency Range	9 kHz - 20 GHz (tenth harmonic)
RBW	200 Hz (9 kHz - 150 kHz), 9 kHz (150 kHz - 30 MHz) 120 kHz (30 MHz - 1 000 MHz), 1 MHz (above 1 GHz)
VBW	$\geq$ RBW
Sweep time	auto

Test Setup:

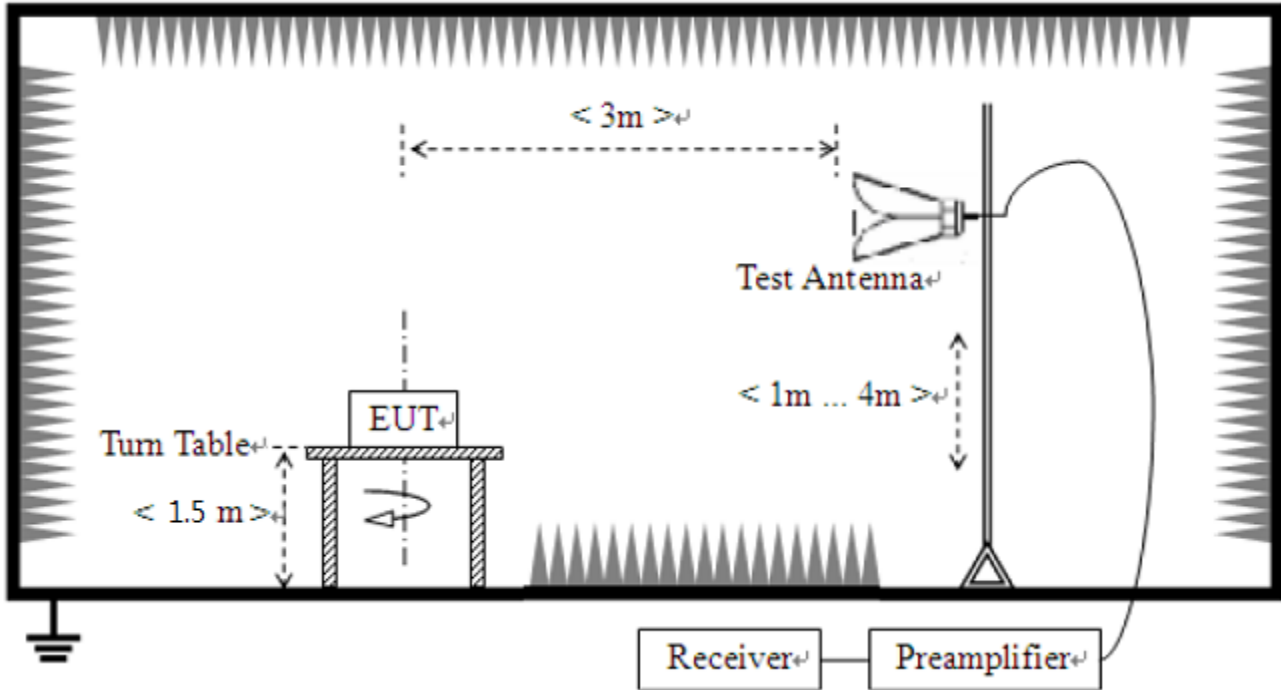
1) For field strength of emissions from 9 kHz to 30 MHz



2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz





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Test Results :

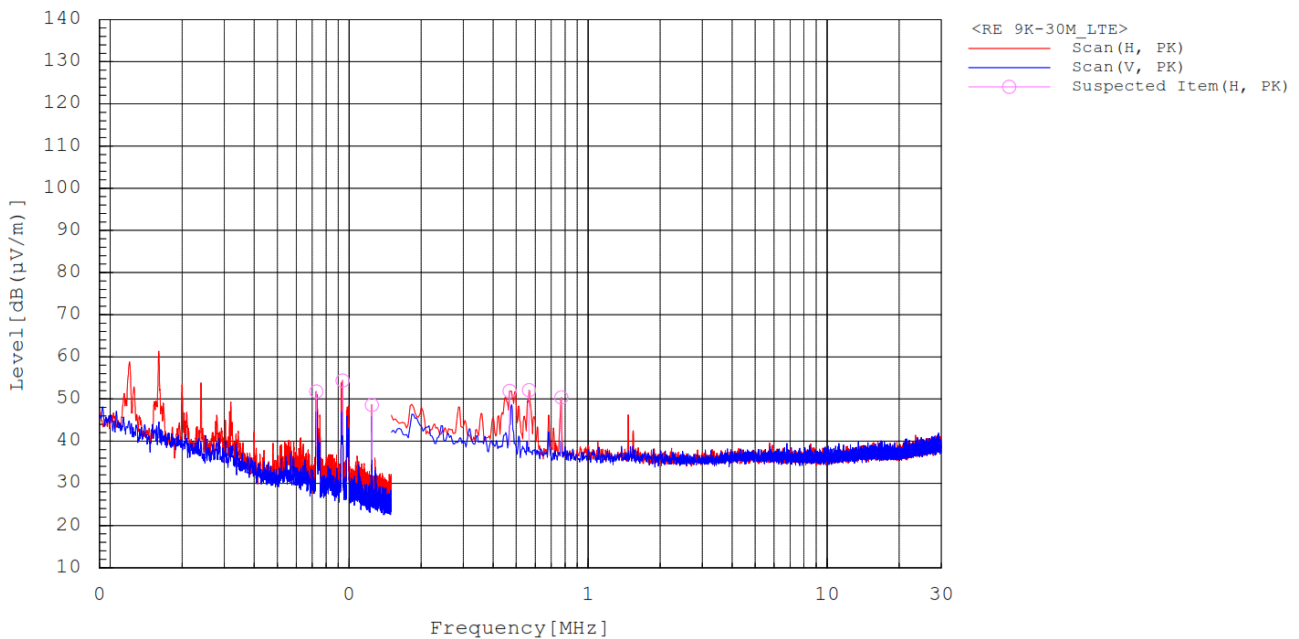
1) 9 kHz to 30 MHz

Test Mode : Transmitter (Worst Case)

The requirements are:

☒ Complies

Test Data



Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Result E [dBuV/m]	Result ERP [dBm]	Limit [dBm]	Margin [dB]	Note
0.073	H	26.9	24.9	51.8	-45.6	-13.0	32.6	
0.094	H	29.5	24.9	54.4	-43.0	-13.0	30.0	
0.124	H	23.8	24.8	48.6	-48.8	-13.0	35.8	
0.469	H	27.0	24.9	51.9	-45.5	-13.0	32.5	
0.565	H	27.2	24.9	52.1	-45.3	-13.0	32.3	
0.771	H	25.4	24.9	50.3	-47.1	-13.0	34.1	

Remark :

- Measuring position : The unwanted emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X,Y axis). The worst emission was found in lie-down position (Z axis) and the worst case was recorded.
- Result = Reading + c.f (Correction factor)
- Correction factor = Antenna factor + Cable loss + 6 dB attenuator
- Result ERP [dBm] = Result E [dBuV/m] - 95.2 - 2.15
- This data is the Peak (PK) value.



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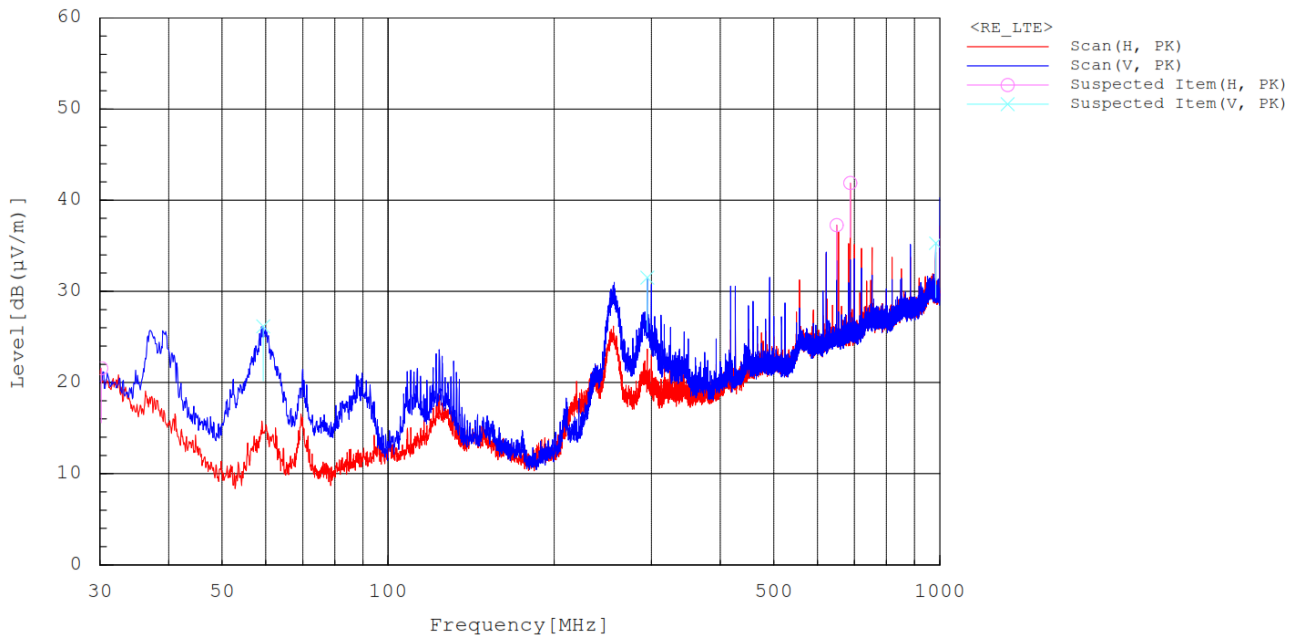
2) 30 MHz to 1 GHz

Test Mode : Transmitter (Worst Case)

The requirements are:

☒ Complies

Test Data



Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Result E [dBuV/m]	Result ERP [dBm]	Limit [dBm]	Margin [dB]	Note
30.194	H	27.9	-6.3	21.6	-75.8	-13.0	62.8	
59.391	V	45.4	-19.3	26.1	-71.3	-13.0	58.3	
294.907	V	41.3	-9.8	31.5	-65.9	-13.0	52.9	
650.024	H	38.2	-0.9	37.3	-60.1	-13.0	47.1	
688.145	H	42.4	-0.5	41.9	-55.5	-13.0	42.5	
983.122	V	29.1	6.2	35.3	-62.1	-13.0	49.1	

Remark :

1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X,Y axis). The worst emission was found in lie-down position (Z axis) and the worst case was recorded.
2. Result = Reading + c.f (Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp gain
4. Result ERP [dBm] = Result E [dBuV/m] - 95.2 - 2.15
5. This data is the Peak (PK) value.



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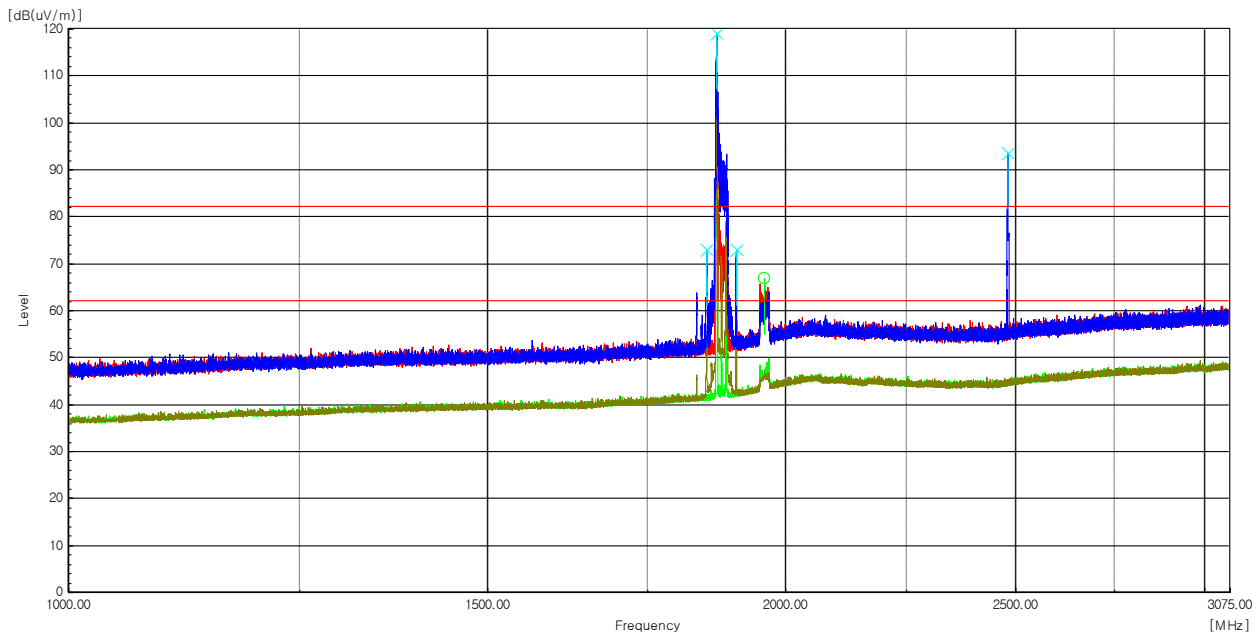
3) 1 GHz to 3.075 GHz

Test Mode : Transmitter (Worst Case)

The requirements are:

☒ Complies

Test Data



Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Result E [dBuV/m]	Result EIRP [dBm]	Limit [dBm]	Margin [dB]	Note
1 853.108	V	80.3	-7.3	73.0	-22.2	----	----	LTE Fundamental
1 871.037	V	126.1	-7.1	119.0	23.8	----	----	
1 907.060	V	79.4	-6.4	73.0	-22.2	----	----	
1 959.850	H	72.0	-5.2	66.8	-28.4	----	----	Emission of Peripheral device
2 480.281	V	97.7	-4.3	93.4	-1.8	----	----	BLE Fundamental

Result : Emissions from EUT were found to have a margin of more than 20 dB above the EIRP limit.

Remarks

- Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X,Y axis). The worst emission was found in lie-down position (Z axis) and the worst case was recorded.
- Result E [dBuV/m] = Reading + c.f (Correction factor)
- Correction factor = Antenna factor + Cable loss - Amp gain
- Result EIRP [dBm] = Result E [dBuV/m] - 95.2



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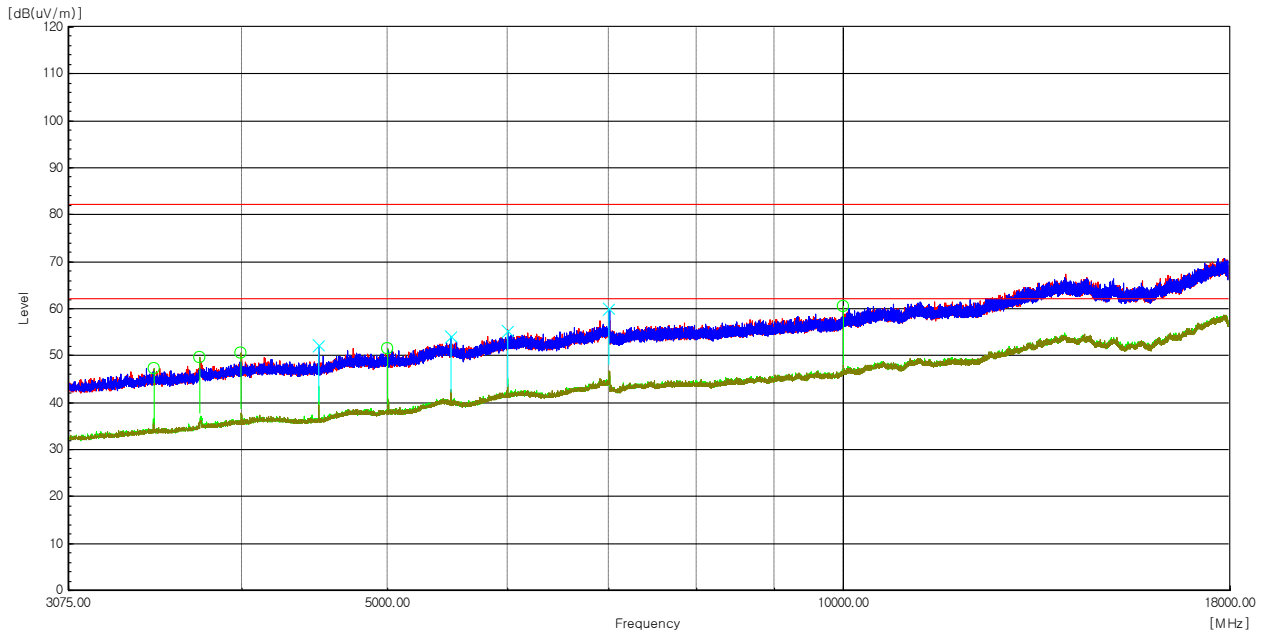
4) 3.075 GHz to 18 GHz

Test Mode : Transmitter (Worst Case)

The requirements are:

☒ Complies

Test Data



Frequency [MHz]	(P)	Reading [dBuV]	c.f [dB(1/m)]	Result E [dB(uV/m)]	Result EIRP [dBm]	Limit [dBm]	Margin [dB]	Note
3 500.081	H	47.4	-0.3	47.1	-48.1	-----	-----	Emission of Peripheral device
3 755.010	H	48.9	0.7	49.6	-45.6	-----	-----	
3 999.790	H	49.1	1.5	50.6	-44.6	-----	-----	
4 500.096	V	50.1	2.2	52.3	-42.9	-----	-----	
4 999.208	H	47.7	3.8	51.5	-43.7	-----	-----	
5 500.110	V	49.1	4.9	54.0	-41.2	-----	-----	
6 000.417	V	48.5	6.7	55.2	-40.0	-----	-----	
6 999.834	V	51.5	8.5	60.0	-35.2	-----	-----	
9 999.879	H	48.6	11.9	60.5	-34.7	-----	-----	

Result : Emissions from EUT were found to have a margin of more than 20 dB above the EIRP limit.

Remarks

1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X,Y axis). The worst emission was found in lie-down position (Z axis) and the worst case was recorded.
2. Result E [dBuV/m] = Reading + c.f (Correction factor)
3. Correction factor = Antenna factor + Cable loss - Amp gain
4. Result EIRP [dBm] = Result E [dBuV/m] - 95.2
5. High pass filter was used from 3.075 GHz to 18 GHz

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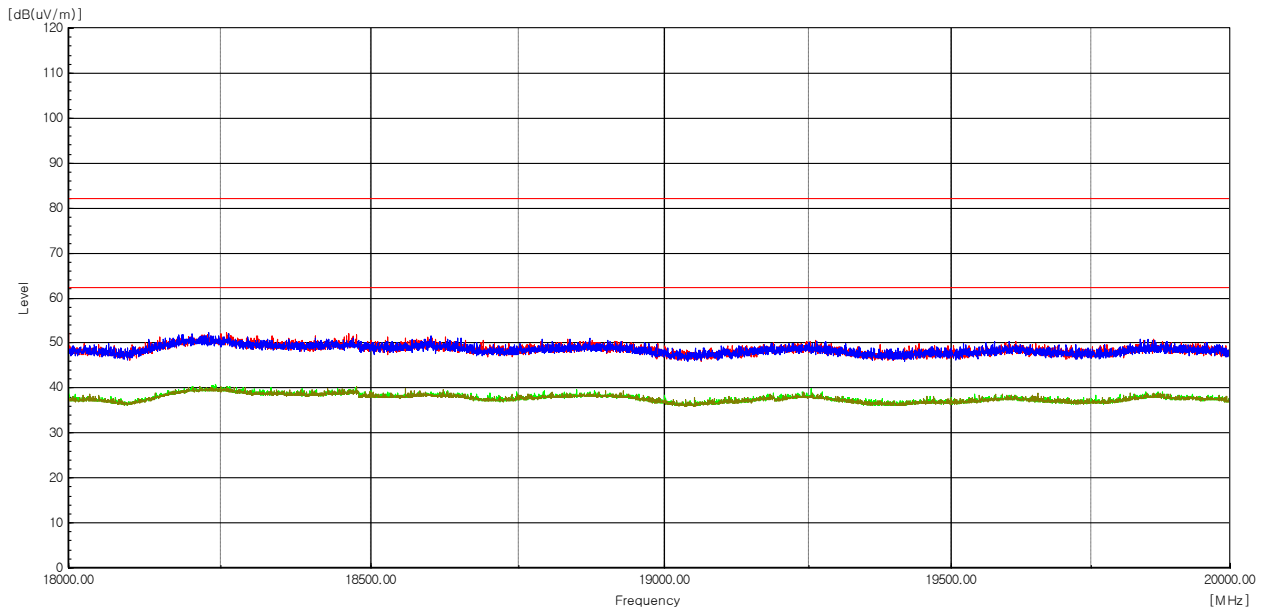
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5) 18 GHz to 20 GHz**Test Mode : Transmitter (Worst Case)**

The requirements are:

☒ Complies

Test Data

Result : No peak found

Remarks

1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X,Y axis). The worst emission was found in lie-down position (Z axis) and the worst case was recorded.
2. Result E [dBuV/m] = Reading + c.f (Correction factor)
3. Correction factor = Antenna factor + Cable loss - Amp gain
4. Result EIRP [dBm] = Result E [dBuV/m] - 95.2

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APPENDIX A – Test Equipment Used For Tests

No.	Name of Equipment	Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date
1	EMI TEST RECEIVER	Rohde & Schwarz	ESW44	102039	2025-04-28	2026-04-28
2	BILOG ANTENNA	TESEQ	CBL6111D	60654	2023-08-21	2025-08-21
3	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2024-04-15	2026-04-15
4	6dB Attenuator	PASTERNAK	PE7AP006-06	L20210504000023	2024-07-31	2025-07-31
5	6dB Attenuator	NONE	6dB	190557	2024-09-19	2025-09-19
6	AMPLIFIER	SONOMA INSTRUMENT	310N	411011	2024-07-31	2025-07-31
7	Spectrum Analyzer	R&S	FSV40	101574	2025-01-10	2026-01-10
8	PRE AMPLIFIER	HP	8449B	3008A00620	2025-03-11	2026-03-11
9	Double Ridged Guide Antenna	ETS-Lindgren	3115	00078895	2025-03-13	2026-03-13
10	HORN ANTENNA	SCHWARZBECK	BBHA9170	1153	2024-10-18	2025-10-18
11	LOW NOISE AMPLIFIER	TESTEK	TK-PA1840H	210124-L	2024-10-18	2025-10-18
12	High Pass Filter	K&L MICROWAVE	11SH10-3075 /U18000-O/O	4	2024-07-10	2025-07-10

-END-