TEST REPORT

EMC Test for LCWB-009

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-EM-2411-FC004

DATE OF ISSUE
November 25, 2024

Tested by
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Technical Manager
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Accredited by KOLAS, Republic of KOREA

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TEST REPORT

FCC SDoC

REPORT NO.
HCT-EM-2411-FC004

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FCC ID.
BEJ-LCWB009

Applicant	**LG Electronics Inc.** 170, Seongsan Pachong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do 51533, Republic of Korea
Product Name Model Name	RF Module LCWB-009
Date of Test	11.12.2024 – 11.15.2024
Location of Test	☒ Permanent Testing Lab ☐ On Site Testing Lab (Address: See clause 1.2)
Test Standard Used	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
Test Results	Refer to the present document
Manufacturer Brand Name	LG Electronics Inc. LG

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	November 25, 2024	Initial Release

Notice

Content
The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s). The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***. When confirmation of authenticity of this test report is required, please contact www.hct.co.kr This test report provides test result(s) under the scope accredited by the Korea Laboratory Accreditation Scheme (KOLAS), which signed the ILAC-MRA. (KOLAS (KS Q ISO/IEC 17025) Accreditation No. KT197)

CONTENTS

1. TESTING LABORATORY

1.1 General Information

Organization Name	HCT Co., Ltd.
Address	2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383. Rep. of Korea
Telephone	+82 31 645 6300
FAX	+82 31 645 6401

1.2 Location of the Test Site

The test site is located at the following address.;

Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383. Rep. of Korea
Telephone	+82 31 645 6300
FAX	+82 31 645 6401

2. GENERAL INFORMATION

2.1 Description of EUT

FCC ID.	BEJ-LCWB009
Model Name	LCWB-009
Product Name	RF Module
Frequency Range	Bluetooth LE: 2 402 ㎒ to 2 480 ㎒ WiFi 2.4 ㎓: 2 412 ㎒ to 2 462 ㎒
Power Rating	DC 3.3 V, DC 5 V
Manufacturer	LG Electronics Inc.

2.2 Power Source

During the test, the following power supply levels are utilized/provided.;

Power supply: AC 120 V, 60 Hz

2.3 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Serial Number	Manufacturer
RF Module (EUT)	LCWB-009	-	LG Electronics Inc.
Jigboard	-	-	-
DC Power Supply	PWS-3003D	04050810	Protek

2.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	2 pin	N/A	N	0.15(D)
	2 pin	N	N/A	0.4(P)

"(D)" data cable and "(P)" power cable.

2.5 Noise Suppression Parts on Cable (I/O Cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	2pin	N	-	N	-
	2pin	N	-	N	

2.6 Test Facility

Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014. The Normalized site attenuations (30 ㎒ to 1 ㎓) and Site validation (1 ㎓ to 18 ㎓) were performed in accordance with the standard in ANSI C63.4-2014 and ANSI C63.4a-2017
Our laboratories are accredited and designated in accordance with the provisions of Radio Waves ACT and International Standard ISO/IEC 17025:2017. (National Radio Research Agency, CABID No. KR0032)

2.7 Calibration of Measuring Instrument

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturers recommendations for utilizing calibration equipment, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5:2017.

2.8 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. 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 UCISPR measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Test Item	Test Site (Chamber)	Expanded Uncertainty
Radiated Emission (30 ㎒ to 1 ㎓)	3 m Semi Anechoic Chamber #1	5.8 dB
Radiated Emission (1 ㎓ to 18 ㎓)	3 m Semi Anechoic Chamber #1	4.9 dB

3. DESCRIPTION OF TEST

3.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 7.3

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).
Other support units were connected to the power mains through another LISN.
The two LISNs provide 50 Ω / 50 μH of coupling impedance for the measuring instrument.

b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.

c. The frequency ranges from 150 ㎑ to 30 ㎒ was searched.

Conducted Emission Limits

Frequency (㎒)	Class A Quasi-Peak (dBμV)	Class A Average (dBμV)	Class B Quasi-Peak (dBμV)	Class B Average (dBμV)
0.15 to 0.5	79	66	66 to 56*	56 to 46*
0.5 to 5	73	60	56	46
5 to 30	73	60	60	50

NOTE. The more stringent limit applies at transition frequencies.

[*] The limit level in dBμV decreases linearly with the logarithm of frequency.

3.2 Antenna Conducted Power Measurements

The test procedure was in accordance with ANSI C63.4-2014, Clause 12.2.6 and BETS-7 Issue 3.

Antenna-conducted power measurements shall be performed on each broadcast reception tuner input in accordance with the requirements of the applicable regulatory authority. For example, see 47 CFR paragraph 15.111 and ANSI C63.4 paragraph 12.1.5 and Appendix H5 (test method) with the following clarifications:

a. With the TV tuned to each channel [e.g., channel 2 to channel 69], the level of the local oscillator frequency and the second harmonic shall be measured and recorded for each tuner.
b. Antenna-conducted power measurements shall be performed with the EUT antenna terminals connected directly to either a spectrum analyzer or another measurement instrument conforming to ANSI C63.2 or CISPR 16-1 or the latest revision thereof, if the antenna impedance matches the impedance of the measuring instrument.
Otherwise, use a balun or impedance-matching network to connect the measuring instrument to the antenna terminals of the EUT. Manufacturer-supplied interconnect cabling or wiring shall be used, or if none is supplied, the cable shall be commercially available and a maximum of 2 m in length. Losses in decibels in any balun or impedance-matching network used shall be added to the measured value in dBµV.

Antenna Conducted Power Emission Limits

Frequency (MHz)	Limits (dBµV)	
	Quasi-Peak	Peak
30 to 1 000	51.7	-
1 000 to 2 150	-	51.7

3.3 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 8.3

a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from 1 m to 4 m 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 m to 4 m and the turn 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.

g. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. (1 GHz to 40 GHz)

Radiated Emission Limits

Frequency (MHz)	Class A			Class B		
	Antenna Distance (m)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)	Antenna Distance (m)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)
30 to 88	10	90	39.0	3	100	40.0
88 to 216	10	150	43.5	3	150	43.5
216 to 960	10	210	46.4	3	200	46.0
Above 960	10	300	49.5	3	500	54.0

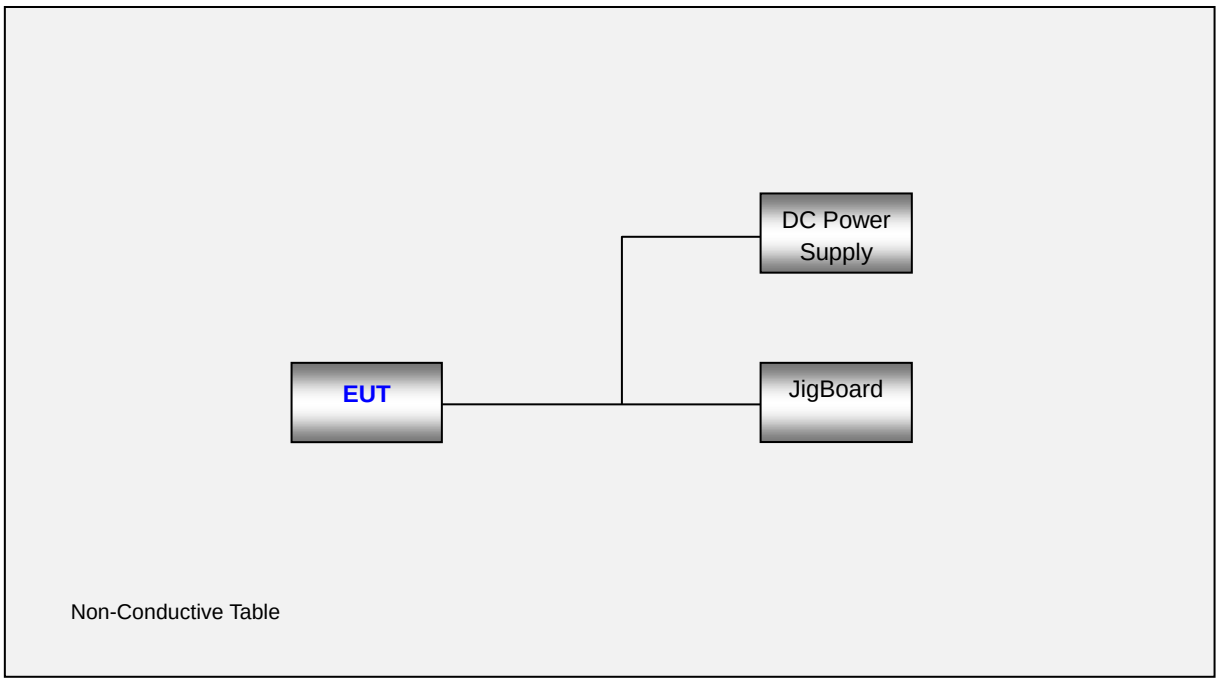
Frequency (MHz)	Antenna Distance (m)	Class A		Class B	
		Peak (dBμV/m)	Average (dBμV/m)	Peak (dBμV/m)	Average (dBμV/m)
Above 1 000	3	80	60	74	54

Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

3.4 Configuration of Tested System



4. OPERATION OF THE EUT

During preliminary test and final tests, the following operating mode was investigated.
It was tested the following operating mode, after connecting all peripheral devices.

Operating Mode: Idle mode (3.3 V)
Idle mode (5 V)

5. MEASURING INSTRUMENTS

	Type	Model Name	Manufacturer	Serial Number	Cal. Cycle	Next Cal. Date (yy.mm.dd)
Conducted emission						
☐	EMI Test Receiver	ESR7	Rohde&Schwarz	101910	1 year	2025.07.02
☐	LISN	ENV4200	Rohde & Schwarz	100054	1 year	2025.01.09
☐	LISN	ENV216	Rohde & Schwarz	102246	1 year	2025.11.19
☐	LISN	ENV216	Rohde & Schwarz	100073	1 year	2025.05.07
☐	Software	EMC32	Rohde & Schwarz	-	-	-
Antenna Conducted Power Emission						
☐	EMI Test Receiver	ESCI	Rohde & Schwarz	100584	1 year	2025.05.08
☐	Impedance Matching Pad	PE7070	PASTERNACK	5	1 year	2025.01.12.
Radiated emission below 1 ㎓						
☒	EMI Test Receiver	ESU26	Rohde&Schwarz	100241	1 year	2025.07.25
☒	Bilog Antenna	VULB 9168	SCHWARZBECK	847	2 year	2026.04.23
☒	Antenna master	MA4640-XP-ET	INNCO SYSTEM	-	N/A	-
☒	Turn Table	DT3000-3t	INNCO Systems	DT3000/69	N/A	-
☒	Low Noise Amplifier	TK-PA01S	TESTEK	200112-L	1 year	2025.05.31
☒	Software	EMC32	Rohde & Schwarz	-	-	-
Radiated emission above 1 ㎓						
☒	EMI test receiver	ESU40	Rohde & Schwarz	100524	1 year	2025.05.07
☒	Horn Antenna	HF907	Rohde & Schwarz	103160	1 year	2025.10.15
☒	Power Amplifier	TK-PA18H	TESTEK	170034-L	1 year	2025.10.14
☐	Horn Antenna	BBHA 9170	Schwarzbeck	BBHA 9170 #786	1 year	2025.10.30
☐	Power Amplifier	TK-PA1840H	TESTEK	170030-L	1 year	2025.02.20
☒	Antenna master	MA4640-XP-ET	INNCO SYSTEM	-	N/A	-
☒	Software	EMC32	Rohde & Schwarz	-	-	-

6. EMISSION TEST SUMMARY

6.1 Conducted Emission (Not Applicable)

6.1.1 Operating Condition

The test results of conducted emission at mains ports provide the following information:

Test Standard Used	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014		
Frequency Range	0.15 ㎒ to 30 ㎒		
Detector	Quasi-Peak, CISPR-Average		
Bandwidth	9 ㎑ (6 ㏈)		
Operating Mode	---		
Test Site	EMI Shield Room		
Temperature	min. °C max. °C	**Relative Humidity**	min. % max. %
Date of Test (yy.mm.dd)	---		

A Conducted emission is calculated by the following equation:

Calculation Formula: QuasiPeak or CAverage= Receiver Reading + Corr.
Corr. = LISN Factor + Cable Loss
Margin = Limit – QuasiPeak or CAverage

The measurements from both Live (L1) and Neutral (N) of the LISN are combined into a single graph.

6.1.2 Measurement Data

Not applicable

REMARK.
Since this product uses DC power source, this test does not apply.

6.2 Antenna Conducted Power Emission (Not Applicable)

6.2.1 Operating Condition

The test results of antenna conducted power emission provide the following information.;

Test Method Used	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014		
Frequency Range	30 MHz to 2150 MHz		
Detector / Bandwidth	For frequencies ≤1 GHz: Quasi-peak / 120 kHz For frequencies ≥1 GHz: Peak / 1 MHz		
Operating Mode	---		
Test Site	EMI Shield Room		
Temperature	min. °C max. °C	**Relative Humidity**	min. % max. %
Date of Test (yy.mm.dd)	---		

6.2.2 Measurement Data

Not applicable

6.3 Radiated Emission Below 1 GHz

6.3.1 Operating Condition

The test results of radiated emission provide the following information:

Used Test Standard	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014		
Frequency Range	30 MHz to 1 000 MHz		
Detector	Quasi-Peak		
Bandwidth	120 kHz (6 dB)		
Antenna Height	1 m to 4 m		
Measurement Distance	3 m		
Antenna Polarity	Horizontal, Vertical		
Operating Mode	Idle mode (3.3 V) Idle mode (5 V)		
Test Site	3 m Semi Anechoic Chamber #1		
Temperature	min. 21.4 °C max. 24.2 °C	**Relative Humidity**	min. 38.4 % max. 43.6 %
Date of Test (yy.mm.dd)	2024.11.15		

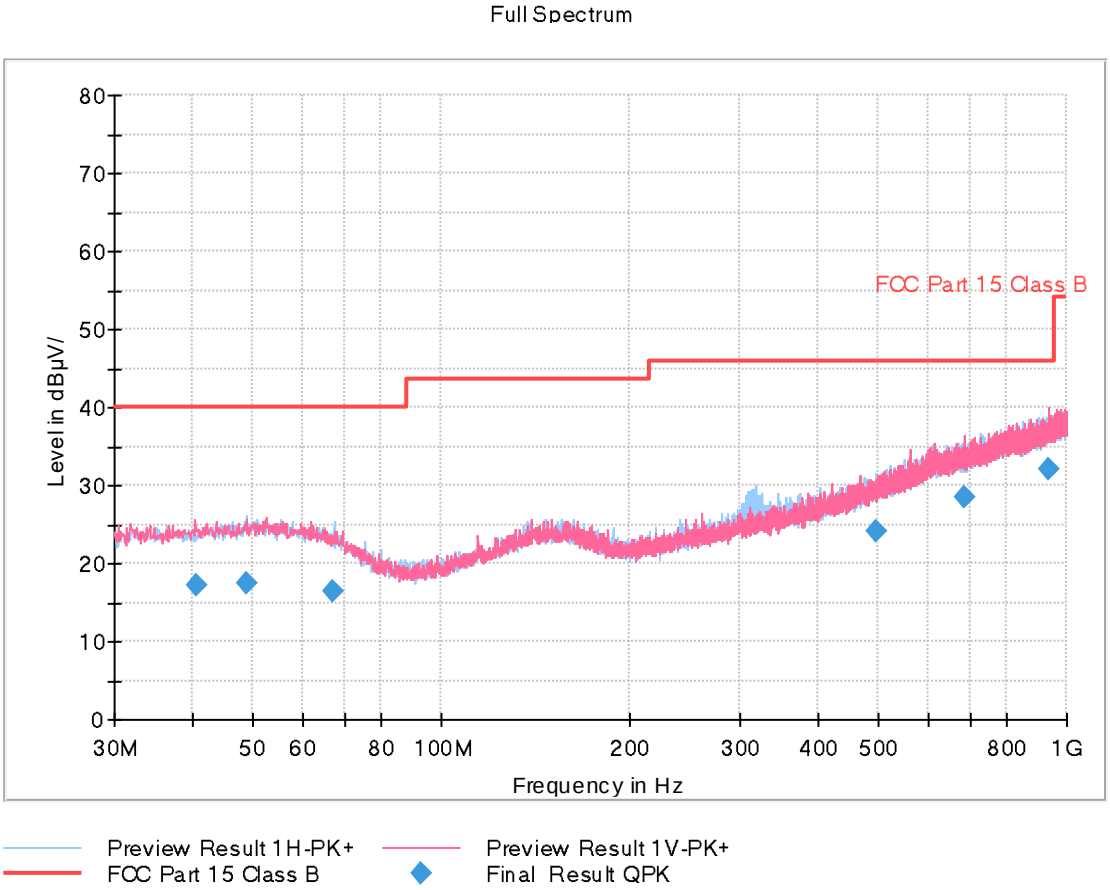
A field strength is calculated by the following equation.

Calculation Formula: QuasiPeak = Reading (Receiver Reading) + Corr.
Corr. (Correction Factor) = Antenna Factor + Cable Loss
Margin = Limit - QuasiPeak

The measurements' polarities are H and V, where H means horizontal and V means vertical.

6.3.2 Measurement Data

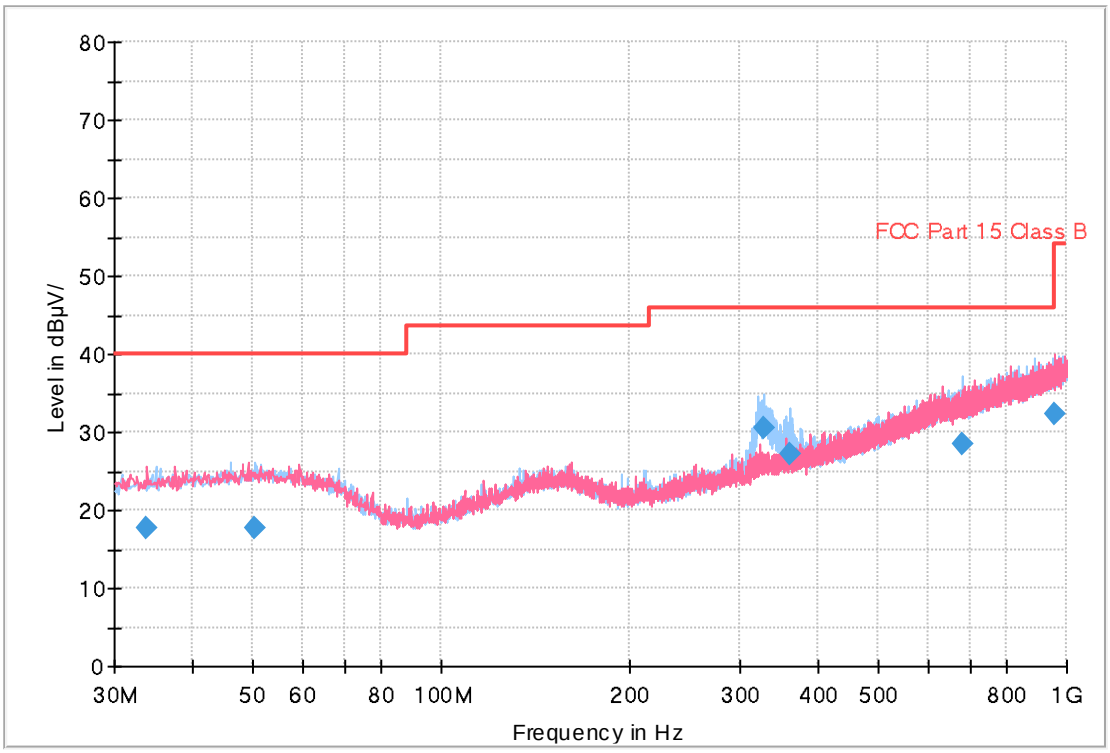
[3.3 V] Idle Mode



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.4758	17.14	40.00	22.86	196.0	V	57.0	19.6
48.7212	17.53	40.00	22.47	100.0	H	93.0	20.3
67.3121	16.31	40.00	23.69	225.1	H	300.0	18.7
494.2814	24.09	46.00	21.91	400.0	H	206.0	25.2
687.8613	28.42	46.00	17.58	212.2	V	230.0	28.7
937.5086	32.02	46.00	13.98	325.3	V	291.0	32.0

[5 V] Idle Mode

Full Spectrum



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.8640	17.62	40.00	22.38	197.7	V	246.0	19.0
50.4082	17.68	40.00	22.32	106.9	H	47.0	20.4
326.9211	30.64	46.00	15.36	100.0	H	140.0	21.2
361.5273	27.22	46.00	18.78	100.0	H	350.0	22.1
679.6212	28.39	46.00	17.61	274.6	H	0.0	28.6
956.3363	32.25	46.00	13.75	299.0	V	15.0	32.2

6.4 Radiated Emission Above 1 GHz

6.4.1 Operating Condition

The test results of radiated emission provide the following information:

Used Test Standard	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014		
Detector	Peak, CISPR-Average		
Bandwidth	1 MHz		
Highest Frequency	2.480 GHz		
Tested Frequency Range	1 GHz to 18 GHz		
Antenna Height	1 m to 4 m		
Measurement Distance	3 m		
Antenna Polarity	Horizontal, Vertical		
Operating Mode	Idle mode (3.3 V) Idle mode (5 V)		
Test Site	3 m Semi Anechoic Chamber #1		
Temperature	min. 21.3 °C max. 23.7 °C	**Relative Humidity**	min. 41.5 % max. 44.8 %
Date of Test (yy.mm.dd)	2024.11.12		

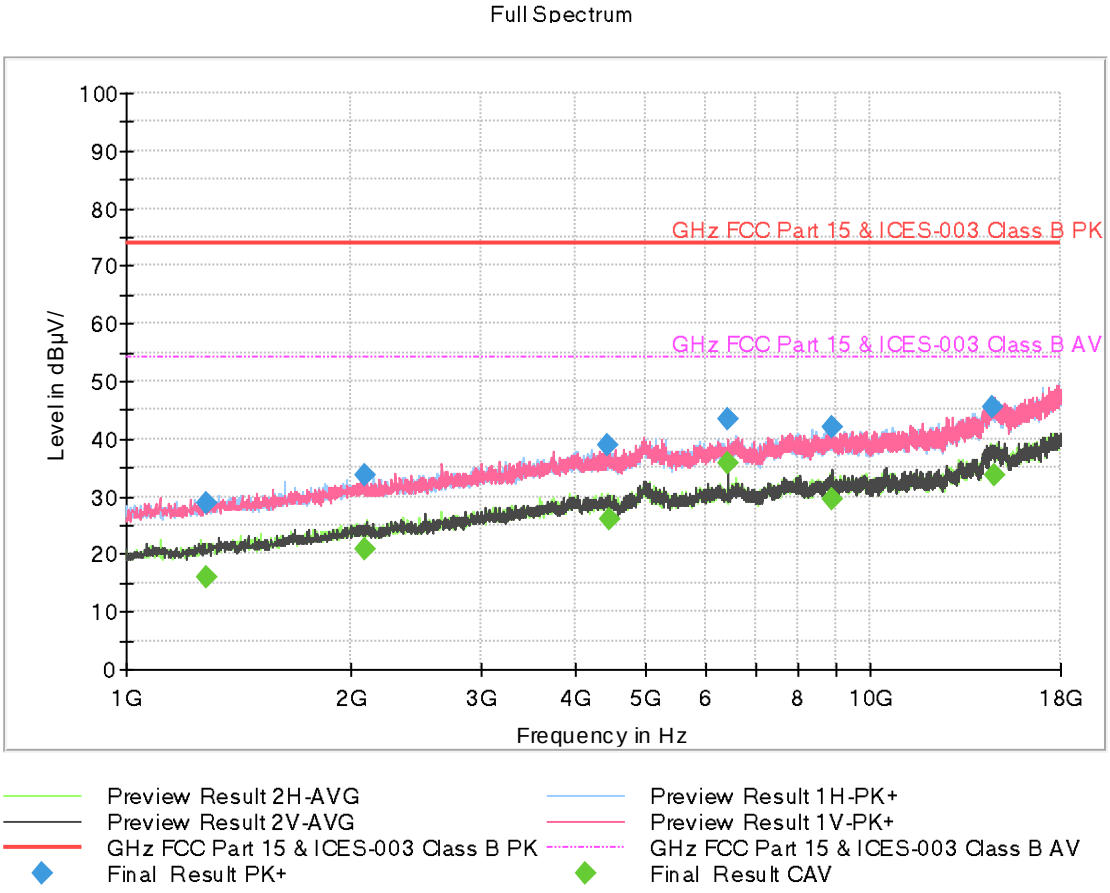
A field strength is calculated by the following equation.

Calculation Formula: Peak or CAverage = Reading (Receiver Reading) + Corr.
Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
Margin = Limit - Peak or CAverage

The measurements' polarities are H and V, where H means horizontal and V means vertical.

6.4.2 Measurement Data

[3.3 V] Idle Mode

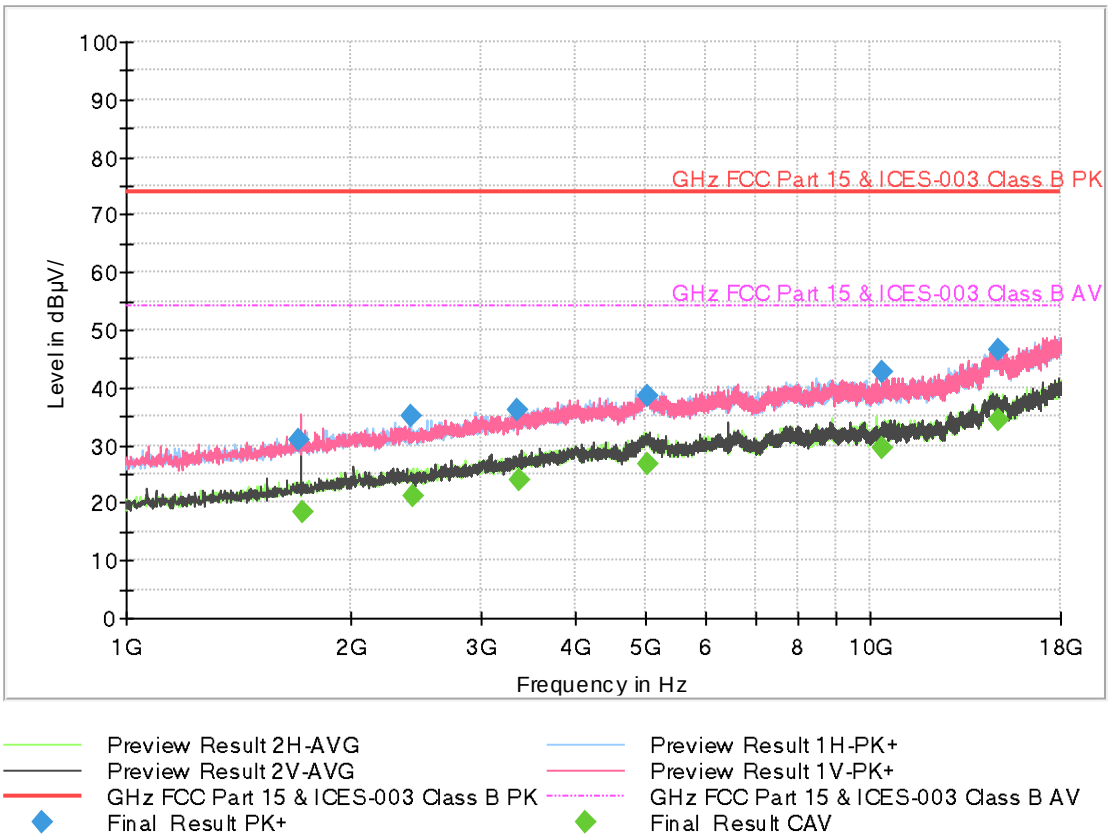


Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1285.5050	28.91	74.00	45.09	174.3	V	300.0	-29.9
2091.3250	33.63	74.00	40.37	100.0	V	25.0	-25.2
4433.7600	38.74	74.00	35.26	100.0	V	15.0	-16.3
6431.9000	43.24	74.00	30.76	102.8	H	3.0	-12.0
8864.8250	41.89	74.00	32.11	174.2	V	25.0	-9.3
14622.1100	45.56	74.00	28.44	202.1	V	26.0	0.1

Frequency (MHz)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1284.3300	15.97	54.00	38.03	174.4	V	310.0	-29.9
2086.3300	20.81	54.00	33.19	274.0	V	356.0	-25.2
4456.8350	26.14	54.00	27.86	174.4	V	25.0	-16.3
6432.0050	35.92	54.00	18.08	101.9	H	2.0	-12.0
8873.8300	29.39	54.00	24.61	177.2	V	0.0	-9.3
14624.1800	33.79	54.00	20.21	225.0	V	52.0	0.1

[5 V] Idle Mode

Full Spectrum



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1709.8750	30.80	74.00	43.20	119.8	V	80.0	-27.4
2420.0450	34.93	74.00	39.07	182.5	H	20.0	-24.0
3345.1800	36.28	74.00	37.72	124.9	V	0.0	-20.0
5028.7850	38.61	74.00	35.39	109.8	V	39.0	-14.5
10359.1500	42.75	74.00	31.25	125.2	V	152.0	-7.4
14808.8350	46.57	74.00	27.43	225.0	H	0.0	0.2

Frequency (MHz)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1722.2800	18.43	54.00	35.57	100.0	V	66.0	-27.3
2427.5500	21.24	54.00	32.76	274.5	H	261.0	-24.0
3380.3750	23.85	54.00	30.15	277.5	V	257.0	-19.8
5023.7850	26.62	54.00	27.38	108.9	V	279.0	-14.5
10368.6200	29.55	54.00	24.45	178.4	V	0.0	-7.4
14824.8200	34.42	54.00	19.58	125.2	H	0.0	0.2

APPENDIX A. TEST SETUP PHOTO

Please refer to Appendix. A and test setup photo file no. as follows;

File No.	Date of Issue	Description
HCT-EM-2411-FC004-P	November 25, 2024	Initial Release

End of report