



TEST REPORT

EMI Test for FCC Certification of LCWB-002 Model

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-EM-2107-FC005

DATE OF ISSUE
July 30, 2021

Tested by
Hyun-Jin Lim


(signature)

Technical Manager
Jeong-Hyun Choi



Accredited by KOLAS, Republic of KOREA

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TEST REPORT

EMI Test for
FCC Certification

REPORT NO.
HCT-EM-2107-FC005

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FCC ID.
BEJ-LCWB002

Applicant

LG Electronics Inc.
170, Seongsanpaechong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do,
51533, Republic of Korea

Product Name
Model Name

RF Module
LCWB-002

Date of Test

July 15, 2021 to July 20, 2021

Test Standard Used

FCC CFR 47 PART 15 Subpart B Class B
ANSI C63.4-2014

Test Results

Refer to the present document

Manufacturer

LG Electronics Inc.

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.

The contents marked ** is information provided by the customer.



REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	July 30, 2021	Initial Release

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (KOLAS Accreditation No. KT197)

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr



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1. GENERAL INFORMATION

1.1 Description of EUT

The EUT is RF Module.

FCC ID	BEJ-LCWB002
Model Name	LCWB-002
Product Name	RF Module
Frequency Range	Bluetooth: 2 402 MHz to 2 480 MHz WiFi: 2 412 MHz to 2 462 MHz
Power Supply	DC 5 V, DC 12 V
Manufacturer	LG Electronics Inc.

1.2 Tested System Details

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

Device Type	Model Name	Serial Number	Manufacturer
RF Module	LCWB-002	-	LG Electronics
Jig Board	-	-	LG Electronics
AC/DC Adapter	F12L2-120100SPAK	12WE9021393A	SHENZHEN FRECOM ELECTRONICS
Notebook PC	HP ProBook 650 G1	5CG5520P9J	HP
Notebook PC Adapter	PPP014H-S	F1-09040230370D	Hipro Electronics (Suzhou)
Gateway	DIR-806M	-	D-Link
Gateway Adapter	AMS1-0501200FK	-	D-Link
Serial Mouse	Serial 2 Button mouse	02031069	Radio Shack
RJ45 cable	-	-	-

1.3 Cable Description

[Operating Voltage: 5 V]

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	5 PIN	N/A	N/A	(P,D) 0.3
Jig Board	USB	N/A	N/A	(P,D) -
Notebook PC	USB	N/A	N/A	(P,D) -
	RJ 45	N	N	(D) 1.6
	Serial Mouse	N	N	(D) 1.8
	DC IN	N	N	(P) 1.8
Gateway	DC IN	N	N	(P) 1.8
	RJ 45	N	N	(D) 1.6

[Operating Voltage: 12 V]

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	2 PIN	N/A	N/A	(D) 0.3
	2 PIN	N/A	N/A	(P) 1.7
Jig Board	USB	N/A	N/A	(P,D) -
AC/DC Adapter	2 PIN	N/A	N/A	(P) 1.7
Notebook PC	USB	N/A	N/A	(P,D) -
	RJ 45	N	N	(D) 1.6
	Serial Mouse	N	N	(D) 1.8
	DC IN	N	N	(P) 1.8
Gateway	DC IN	N	N	(P) 1.8
	RJ 45	N	N	(D) 1.6

“(D)” Data Cable, “(P)” Power Cable.

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

[Operating Voltage: 5 V]

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	5 PIN	N	N/A	N	N/A
Jig Board	USB	N	N/A	Y	Both end
Notebook PC	USB	N	N/A	Y	Both end
	RJ 45	N	N/A	N	N/A
	Serial Mouse	N	N/A	Y	Notebook PC end
	DC IN	Y	Notebook PC end	Y	Notebook PC end
Gateway	DC IN	N	N/A	Y	Gateway end
	RJ 45	N	N/A	N	N/A

[Operating Voltage: 12 V]

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	2 PIN	N	N/A	N	N/A
Jig Board	USB	N	N/A	Y	Both end
AC/DC Adapter	2 PIN	N	N/A	Y	AD/DC Adapter end
Notebook PC	USB	N	N/A	Y	Both end
	RJ 45	N	N/A	N	N/A
	Serial Mouse	N	N/A	Y	Notebook PC end
	DC IN	Y	Notebook PC end	Y	Notebook PC end
Gateway	DC IN	N	N/A	Y	Gateway end
	RJ 45	N	N/A	N	N/A

1.5 Test Facility

Test site is located at 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Rep. of Korea.
Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014.
The Normalized site attenuations (30 MHz to 1 GHz) and Site validation (1 GHz to 18 GHz) were performed in accordance with the standard in ANSI C63.4-2014
This testing laboratories are accredited and accordance with the recognized international Standard ISO/IEC 17025:2017.

1.6 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

1.7 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 U_{CISPR} 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
Conducted Emission (150 kHz to 30 MHz)	EMI Shield Room	2.0 dB
Radiated Emissions (30 MHz to 1 GHz)	3 m Semi Anechoic Chamber #1	4.9 dB
	3 m Semi Anechoic Chamber #1	5.8 dB
Radiated Emissions (1 GHz to 18 GHz)	3 m Semi Anechoic Chamber #1	4.8 dB



2. DESCRIPTION OF TEST

2.1 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 $50\ \Omega$ / $50\ \mu\text{H}$ 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 range from 150 kHz to 30 MHz was searched.

[Conducted Emission Limits]

Frequency (MHz)	Class A		Class B	
	Quasi-Peak (dB μV)	Average (dB μV)	Quasi-Peak (dB μV)	Average (dB μV)
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

[*] Decreases with the logarithm of the frequency.

2.2 Measurement of Radiated Emission

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

- 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.
- The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- 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.
- 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.
- 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 ($\mu\text{V}/\text{m}$)	Quasi-Peak (dB $\mu\text{V}/\text{m}$)	Antenna Distance (m)	Field Strength ($\mu\text{V}/\text{m}$)	Quasi-Peak (dB $\mu\text{V}/\text{m}$)
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 (dB $\mu\text{V}/\text{m}$)	Average (dB $\mu\text{V}/\text{m}$)	Peak (dB $\mu\text{V}/\text{m}$)	Average (dB $\mu\text{V}/\text{m}$)	
Above 1 000	3	80	60	74	54	

2.2.1 Frequency Range of Radiated Measurements

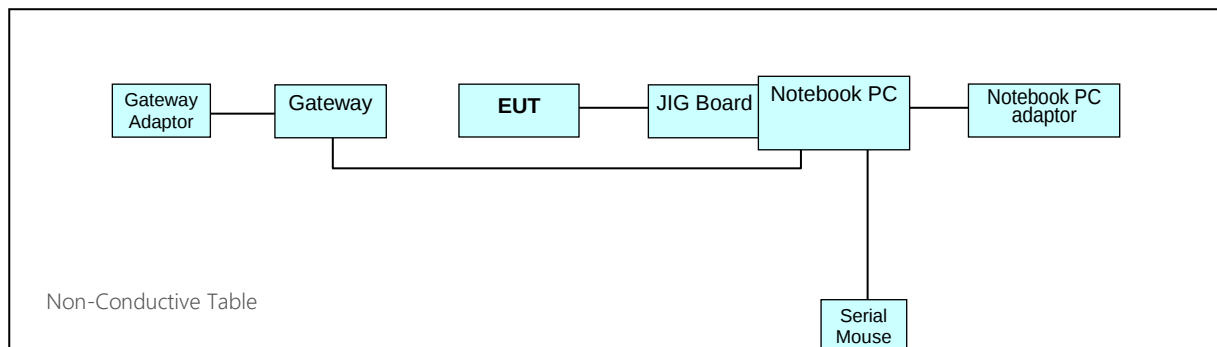
An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

FCC Part15 Subpart B

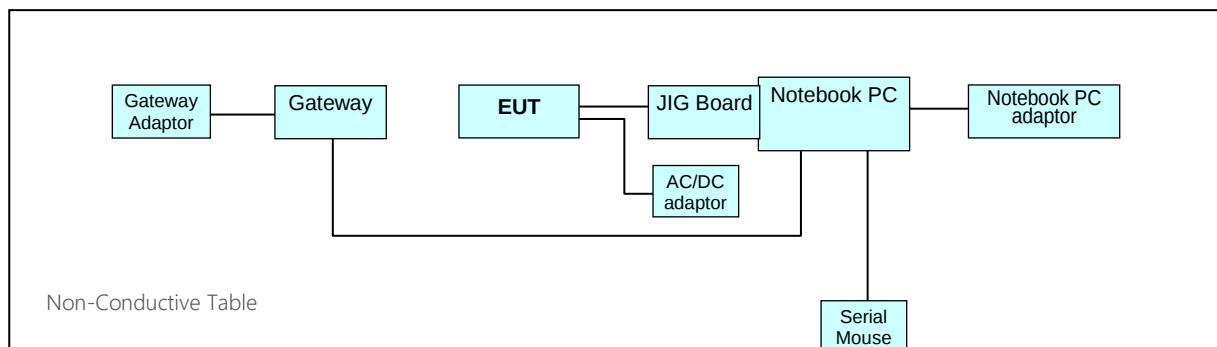
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

2.3 Configuration of Tested System

[Operating Voltage: 5 V]



[Operating Voltage: 12 V]





3. PRELIMINARY TEST

3.1 Conducted Emission

It was tested the following operating mode, after connecting all peripheral devices.

Operating Modes: IDLE mode (5 V / 12 V)

3.2 Radiated Emission

It was tested the following operating mode, after connecting all peripheral devices.

Operating Modes: IDLE mode (5 V / 12 V)



4. CONDUCTED EMISSION AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission

4.1.1 Measuring instruments

Type	Model Name	Manufacturer	Serial Number	Calibration Cycle	Calibration Date
☒ EMI test receiver	ESR7	Rohde & Schwarz	101910	1 year	06.17.2021
☒ LISN	ENV216	Rohde & Schwarz	102245	1 year	09.04.2020
☒ LISN	ENV216	Rohde & Schwarz	100073	1 year	04.07.2021
☒ Software	EMC32	Rohde & Schwarz	-	-	-

4.1.2 Operating Condition

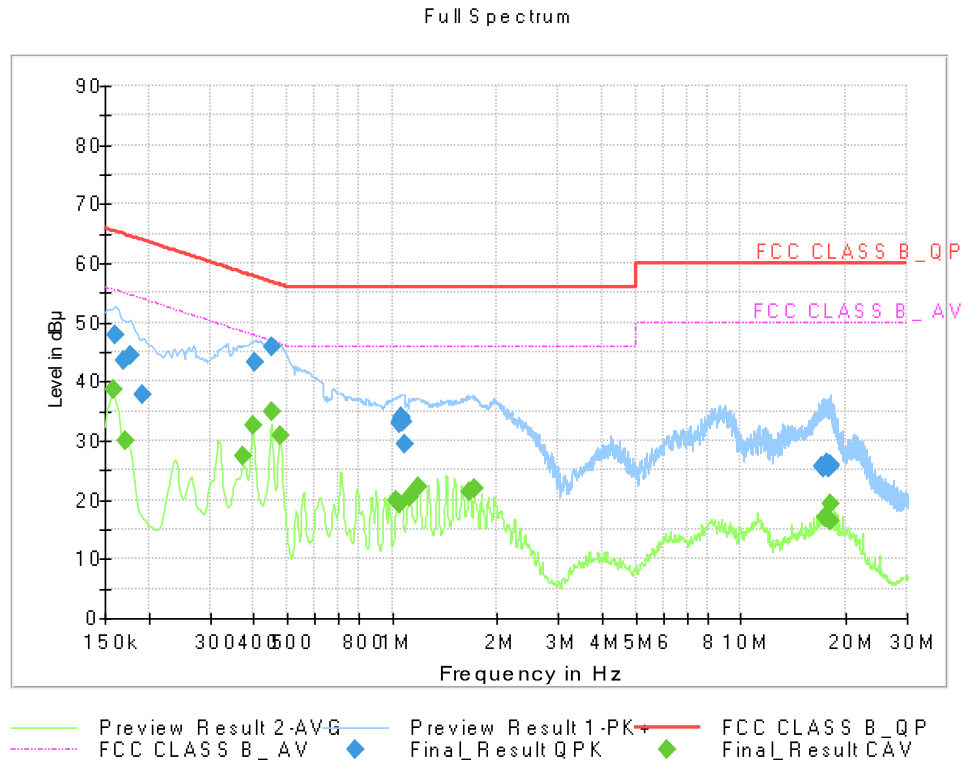
The test results of conducted emission at mains ports provide the following information:

Test Standard Used	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
Frequency Range	0.15 MHz to 30 MHz
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Test Site	EMI Shield Room
Temperature	24.4 °C
Relative Humidity	47.2 %
Test Date	July 19, 2021

- Calculation Formula:
1. Conductor L1 = Hot, Conductor N = Neutral
 2. Corr. = LISN Factor + Cable Loss
 3. QuasiPeak or CAverage= Receiver Reading + Corr.
 4. Margin = Limit – QuasiPeak or CAverage

4.1.3 Measuring Data

Figure 1: Conducted Emission (0.15 to 30) MHz, IDLE mode (5 V), Line (L1)





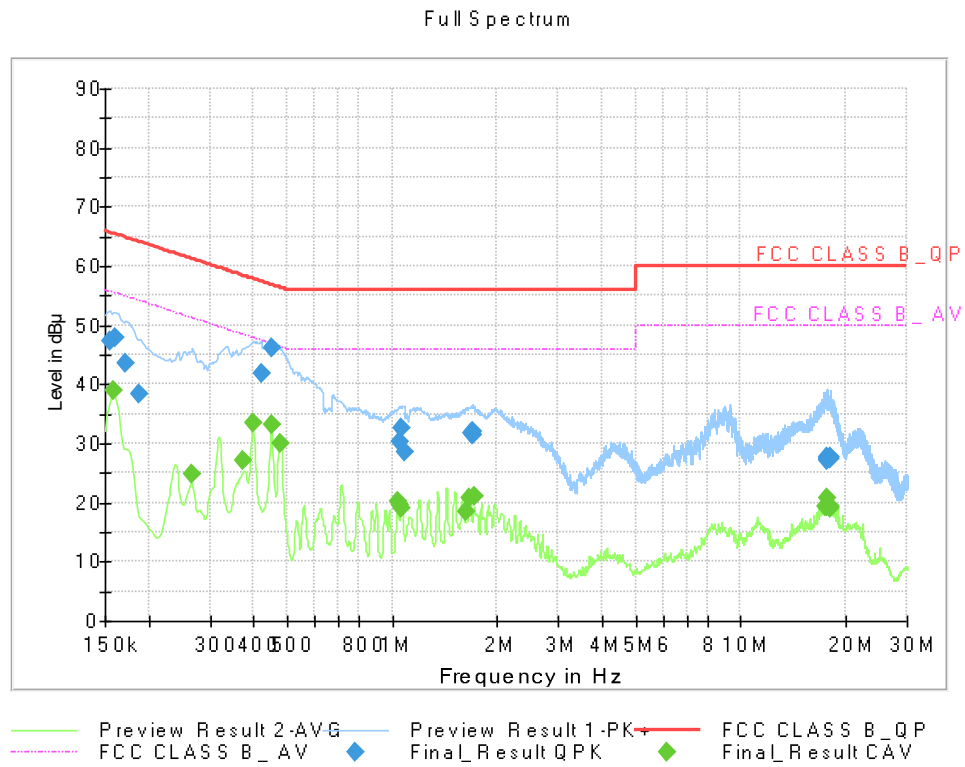
QuasiPeak Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1613	47.83	65.40	17.56	9.000	L1	9.6
0.1703	43.48	64.95	21.47	9.000	L1	9.6
0.1770	44.43	64.63	20.20	9.000	L1	9.6
0.1928	37.90	63.92	26.02	9.000	L1	9.6
0.4043	43.37	57.77	14.39	9.000	L1	9.6
0.4515	45.80	56.85	11.05	9.000	L1	9.6
1.0490	32.93	56.00	23.07	9.000	L1	9.6
1.0558	33.25	56.00	22.75	9.000	L1	9.6
1.0625	33.75	56.00	22.25	9.000	L1	9.6
1.0670	34.04	56.00	21.96	9.000	L1	9.6
1.0738	33.18	56.00	22.82	9.000	L1	9.6
1.0805	29.48	56.00	26.52	9.000	L1	9.6
17.1095	25.55	60.00	34.45	9.000	L1	9.9
17.3773	25.44	60.00	34.56	9.000	L1	9.9
17.6450	26.20	60.00	33.80	9.000	L1	9.9
17.9713	25.47	60.00	34.53	9.000	L1	9.9
18.0028	25.98	60.00	34.02	9.000	L1	9.9
18.0523	25.76	60.00	34.24	9.000	L1	9.9

CAverage Final Result

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1590	38.71	55.52	16.80	9.000	L1	9.6
0.1725	29.89	54.84	24.95	9.000	L1	9.6
0.3750	27.41	48.39	20.98	9.000	L1	9.6
0.3975	32.66	47.91	15.25	9.000	L1	9.6
0.4493	34.81	46.89	12.08	9.000	L1	9.6
0.4763	30.83	46.40	15.58	9.000	L1	9.6
1.0310	20.04	46.00	25.96	9.000	L1	9.6
1.0558	19.43	46.00	26.57	9.000	L1	9.6
1.1278	20.58	46.00	25.42	9.000	L1	9.6
1.1885	22.28	46.00	23.72	9.000	L1	9.6
1.6610	21.24	46.00	24.76	9.000	L1	9.6
1.7195	21.95	46.00	24.05	9.000	L1	9.6
17.4065	17.07	50.00	32.93	9.000	L1	9.9
17.4358	16.97	50.00	33.03	9.000	L1	9.9
17.5415	17.04	50.00	32.96	9.000	L1	9.9
17.9263	16.85	50.00	33.15	9.000	L1	9.9
18.0005	16.50	50.00	33.50	9.000	L1	9.9
18.0478	19.26	50.00	30.74	9.000	L1	9.9

Figure 2: Conducted Emission (0.15 to 30) MHz, IDLE mode (5 V), Line (N)





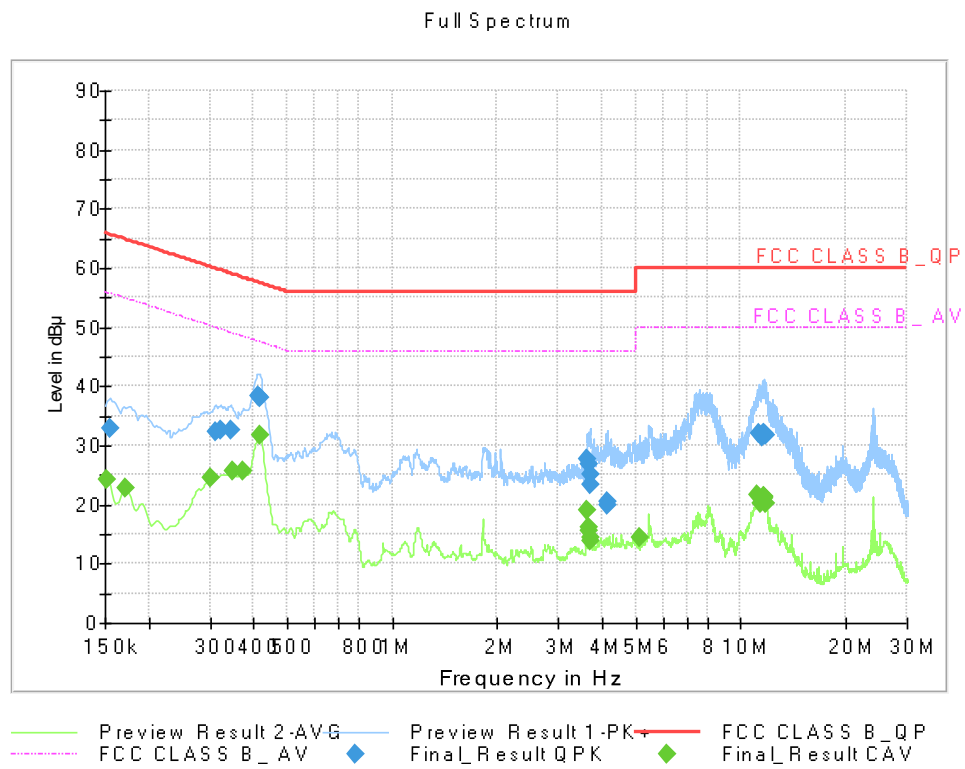
QuasiPeak Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	47.18	65.75	18.57	9.000	N	9.6
0.1613	47.98	65.40	17.42	9.000	N	9.6
0.1725	43.52	64.84	21.32	9.000	N	9.6
0.1883	38.32	64.11	25.80	9.000	N	9.6
0.4200	41.72	57.45	15.73	9.000	N	9.6
0.4493	46.28	56.89	10.61	9.000	N	9.6
1.0445	30.32	56.00	25.68	9.000	N	9.6
1.0625	32.56	56.00	23.44	9.000	N	9.6
1.0805	28.48	56.00	27.52	9.000	N	9.6
1.6813	31.72	56.00	24.28	9.000	N	9.6
1.6970	31.53	56.00	24.47	9.000	N	9.6
1.7060	31.98	56.00	24.02	9.000	N	9.6
17.6495	27.44	60.00	32.56	9.000	N	9.9
17.6585	27.67	60.00	32.33	9.000	N	9.9
17.7238	27.44	60.00	32.56	9.000	N	9.9
17.7643	27.11	60.00	32.89	9.000	N	9.9
18.0185	27.76	60.00	32.24	9.000	N	9.9
18.0298	27.50	60.00	32.50	9.000	N	9.9

CAverage Final Result

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1590	39.04	55.52	16.48	9.000	N	9.6
0.2648	24.82	51.28	26.46	9.000	N	9.6
0.3750	27.02	48.39	21.36	9.000	N	9.6
0.3975	33.57	47.91	14.33	9.000	N	9.6
0.4493	33.25	46.89	13.64	9.000	N	9.6
0.4763	30.09	46.40	16.32	9.000	N	9.6
1.0355	20.16	46.00	25.84	9.000	N	9.6
1.0558	19.73	46.00	26.27	9.000	N	9.6
1.0670	19.06	46.00	26.94	9.000	N	9.6
1.6318	18.33	46.00	27.67	9.000	N	9.6
1.6723	20.74	46.00	25.26	9.000	N	9.6
1.7173	20.97	46.00	25.03	9.000	N	9.6
17.4245	19.40	50.00	30.60	9.000	N	9.9
17.6495	19.20	50.00	30.80	9.000	N	9.9
17.6630	20.77	50.00	29.23	9.000	N	9.9
17.7260	19.19	50.00	30.81	9.000	N	9.9
18.0095	18.98	50.00	31.02	9.000	N	9.9
18.0253	19.35	50.00	30.65	9.000	N	9.9

Figure 3: Conducted Emission (0.15 to 30) MHz, IDLE mode (12 V), Line (L1)





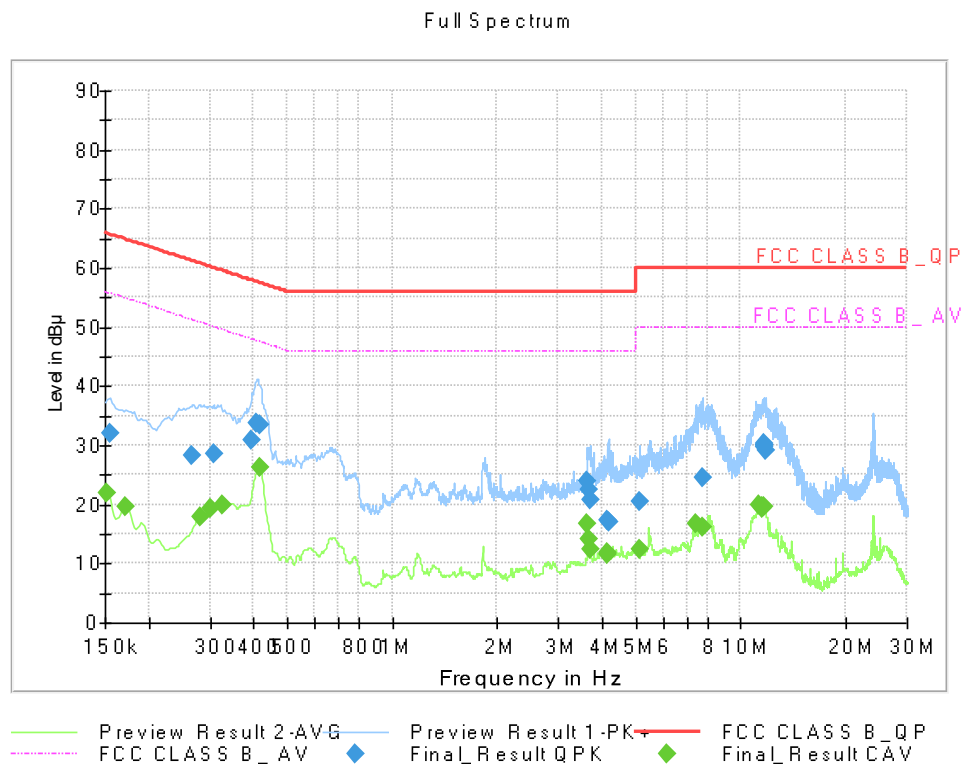
QuasiPeak Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	32.92	65.75	32.83	9.000	L1	9.6
0.3120	32.29	59.92	27.62	9.000	L1	9.6
0.3210	32.64	59.68	27.04	9.000	L1	9.6
0.3435	32.51	59.12	26.61	9.000	L1	9.6
0.4110	38.25	57.63	19.38	9.000	L1	9.6
0.4155	38.14	57.54	19.40	9.000	L1	9.6
3.6320	27.61	56.00	28.39	9.000	L1	9.7
3.6478	26.89	56.00	29.11	9.000	L1	9.7
3.6838	23.32	56.00	32.68	9.000	L1	9.7
3.6928	25.16	56.00	30.84	9.000	L1	9.7
4.1405	19.78	56.00	36.22	9.000	L1	9.7
4.1495	20.61	56.00	35.39	9.000	L1	9.7
11.3158	31.92	60.00	28.08	9.000	L1	9.9
11.4845	31.65	60.00	28.35	9.000	L1	9.9
11.4890	31.52	60.00	28.48	9.000	L1	9.9
11.6600	31.98	60.00	28.02	9.000	L1	9.9
11.6893	31.90	60.00	28.10	9.000	L1	9.9
11.7343	31.68	60.00	28.32	9.000	L1	9.9

CAverage Final Result

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1523	24.13	55.88	31.75	9.000	L1	9.6
0.1725	22.76	54.84	32.08	9.000	L1	9.6
0.3008	24.40	50.22	25.82	9.000	L1	9.6
0.3480	25.74	49.01	23.27	9.000	L1	9.6
0.3728	25.55	48.44	22.89	9.000	L1	9.6
0.4178	31.83	47.49	15.66	9.000	L1	9.6
3.6320	19.11	46.00	26.89	9.000	L1	9.7
3.6478	16.12	46.00	29.88	9.000	L1	9.7
3.6590	15.54	46.00	30.46	9.000	L1	9.7
3.6905	14.54	46.00	31.46	9.000	L1	9.7
3.7063	13.99	46.00	32.01	9.000	L1	9.7
5.1440	14.40	50.00	35.60	9.000	L1	9.8
11.1673	21.63	50.00	28.37	9.000	L1	9.9
11.4238	20.05	50.00	29.95	9.000	L1	9.9
11.6578	21.42	50.00	28.58	9.000	L1	9.9
11.6780	21.31	50.00	28.70	9.000	L1	9.9
11.6848	21.00	50.00	29.00	9.000	L1	9.9
11.7815	20.17	50.00	29.83	9.000	L1	9.9

Figure 4: Conducted Emission (0.15 to 30) MHz, IDLE mode (12 V), Line (N)





QuasiPeak Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	32.14	65.75	33.62	9.000	N	9.6
0.2670	28.32	61.21	32.89	9.000	N	9.6
0.3075	28.44	60.04	31.60	9.000	N	9.6
0.3953	30.73	57.95	27.22	9.000	N	9.6
0.4088	33.85	57.67	23.82	9.000	N	9.6
0.4178	33.57	57.49	23.92	9.000	N	9.6
3.6320	24.07	56.00	31.93	9.000	N	9.7
3.6455	22.58	56.00	33.42	9.000	N	9.7
3.6928	20.68	56.00	35.32	9.000	N	9.7
4.1450	17.16	56.00	38.84	9.000	N	9.7
4.1675	16.99	56.00	39.01	9.000	N	9.7
5.1440	20.62	60.00	39.38	9.000	N	9.7
7.7653	24.58	60.00	35.42	9.000	N	9.8
11.6285	30.16	60.00	29.84	9.000	N	9.8
11.6330	30.09	60.00	29.91	9.000	N	9.8
11.6848	30.06	60.00	29.94	9.000	N	9.8
11.6915	29.81	60.00	30.19	9.000	N	9.8
11.8423	29.01	60.00	30.99	9.000	N	9.8

CAverage Final Result

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1523	21.78	55.88	34.09	9.000	N	9.6
0.1725	19.72	54.84	35.11	9.000	N	9.6
0.2805	17.74	50.80	33.06	9.000	N	9.6
0.3008	19.35	50.22	30.88	9.000	N	9.6
0.3255	20.02	49.57	29.55	9.000	N	9.6
0.4178	26.36	47.49	21.14	9.000	N	9.6
3.6320	16.79	46.00	29.21	9.000	N	9.7
3.6478	14.05	46.00	31.95	9.000	N	9.7
3.6905	12.38	46.00	33.62	9.000	N	9.7
4.1473	11.76	46.00	34.24	9.000	N	9.7
4.1653	11.63	46.00	34.37	9.000	N	9.7
5.1463	12.36	50.00	37.64	9.000	N	9.7
7.4570	16.76	50.00	33.24	9.000	N	9.7
7.7630	16.01	50.00	33.99	9.000	N	9.8
11.3225	19.96	50.00	30.04	9.000	N	9.8
11.4800	19.61	50.00	30.39	9.000	N	9.8
11.5070	19.36	50.00	30.64	9.000	N	9.8
11.6848	19.73	50.00	30.27	9.000	N	9.8

4.2 Radiated Emission Below 1 GHz

4.2.1 Measuring instruments

Type	Model Name	Manufacturer	Serial Number	Calibration Cycle	Calibration Date
☒ EMI test receiver	ESU40	Rohde & Schwarz	100524	1 year	05.10.2021
☒ Bilog antenna	VULB9168	Schwarzbeck	255	2 year	03.15.2021
☒ Antenna master	MA4640-XP-ET	INNCO SYSTEM	-	-	-
☒ Antenna master controller	CO3000	INNCO SYSTEM	CO3000/870 /35990515/L	-	-
☒ Turn Table	1060	INNCO SYSTEM	-	-	-
☒ Turn Table controller	CO2000	INNCO SYSTEM	CO2000/095 /7590304/L	-	-
☒ Software	EMC32	Rohde & Schwarz	-	-	-

4.2.2 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)
Test Site	3 m Semi Anechoic Chamber #1
Temperature	23.0 / 24.4 °C
Relative Humidity	49.2 / 47.3 %
Test Date	July 16 / July 20, 2021

-Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak

4.2.3 Measuring Data

IDLE mode (5 V)

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
96.1585	24.1	274.8	H	354.0	14.7	19.4	43.5
131.8712	26.8	374.7	H	17.0	18.3	16.7	43.5
144.0972	29.4	125.2	H	238.0	19.3	14.1	43.5
219.2751	28.3	100.0	H	176.0	17.5	17.7	46.0
255.3358	39.8	125.3	H	134.0	18.9	6.2	46.0
275.8036	39.3	100.0	H	45.0	19.6	6.7	46.0

IDLE mode (12 V)

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
96.104040	26.3	192.8	H	17.0	14.7	17.2	43.5
120.017240	27.9	225.0	V	224.0	17.1	15.6	43.5
132.069720	33.6	100.0	V	276.0	18.4	9.9	43.5
143.845760	34.2	100.0	V	261.0	19.3	9.3	43.5
156.066480	31.0	174.8	V	308.0	19.6	12.5	43.5
815.439440	35.4	100.0	H	0.0	30.6	10.6	46.0

4.3 Radiated Emission Above 1 GHz

4.3.1 Measuring instruments

Type	Model Name	Manufacturer	Serial Number	Calibration Cycle	Calibration Date
☒ EMI test receiver	ESU40	Rohde & Schwarz	100524	1 year	05.10.2021
☒ Antenna master	MA4640-XP-ET	INNCO SYSTEM	-	-	-
☒ Antenna master controller	CO3000	INNCO SYSTEM	CO3000/870/ 35990515/L	-	-
☒ Turn table	1060	INNCO SYSTEM	-	-	-
☒ Turn table controller	CO2000	INNCO SYSTEM	CO2000/095/ 7590304/L	-	-
☒ Horn antenna	BBHA 9120D	Schwarzbeck	01836	1 year	07.20.2021
☒ Low noise amplifier	TK-PA18H	TESTEK	170034-L	1 year	03.02.2021
☐ Horn Antenna	BBHA 9170	Schwarzbeck	BBHA 9170 #786	1 year	11.18.2020
☐ Power Amplifier	TK-PA1840H	TESTEK	170030-L	1 year	03.09.2021
☒ Software	EMC32	Rohde & Schwarz	-	-	-

4.3.2 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 mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Frequency	2 480 MHz
Tested Frequency Range	1 GHz to 18 GHz
Test Site	3 m Semi Anechoic Chamber #1
Temperature	24.3 / 24.1 °C
Relative Humidity	48.6 / 48.6 %
Test Date	July 15 / July 19, 2021

-Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. Peak or CAverage = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
4. Margin = Limit - Peak or CAverage

4.3.3 Measuring Data

IDLE mode (5 V)

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1658.0500	41.4	113.4	V	144.0	-26.1	32.6	74.0
1795.4300	45.7	305.4	V	308.0	-25.8	28.3	74.0
1932.5750	43.6	100.0	V	107.0	-25.5	30.4	74.0
1999.3950	44.8	100.0	V	43.0	-25.4	29.2	74.0
14185.8450	47.9	150.0	V	45.0	-0.3	26.1	74.0
17986.7301	55.1	150.0	V	261.0	9.6	18.9	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1658.0500	25.5	113.4	V	144.0	-26.1	28.5	54.0
1795.4300	29.6	305.4	V	308.0	-25.8	24.4	54.0
1932.5750	31.7	100.0	V	107.0	-25.5	22.3	54.0
1999.3950	27.0	100.0	V	43.0	-25.4	27.0	54.0
14185.8450	35.3	150.0	V	45.0	-0.3	18.7	54.0
17986.7301	42.4	150.0	V	261.0	9.6	11.6	54.0

IDLE mode (12 V)

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1794.8750	42.6	305.6	V	313.0	-25.8	31.4	74.0
1996.1950	39.8	160.7	V	192.0	-25.4	34.2	74.0
2706.0400	38.5	350.0	V	262.0	-22.4	35.5	74.0
7703.1800	42.7	291.4	V	143.0	-10.4	31.3	74.0
14153.1500	47.8	149.6	V	227.0	-0.4	26.2	74.0
17972.5650	54.8	100.0	V	94.0	9.4	19.2	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1794.8750	22.3	305.6	V	313.0	-25.8	31.7	54.0
1996.1950	21.4	160.7	V	192.0	-25.4	32.6	54.0
2706.0400	28.6	350.0	V	262.0	-22.4	25.4	54.0
7703.1800	29.9	291.4	V	143.0	-10.4	24.1	54.0
14153.1500	35.3	149.6	V	227.0	-0.4	18.7	54.0
17972.5650	42.5	100.0	V	94.0	9.4	11.5	54.0



5. CONCLUSION

The data collected shows that the **Product Name: RF Module, Model Name: LCWB-002** complies with §15.107 and §15.109 of the FCC rules



6. 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-2107-FC005-P	July 30, 2021	Initial Release

End of report