RF TEST REPORT

Report No.	:	SSP26050142-1R
Applicant	:	Lumen Labs (HK) Limited
Product Name	:	Lumos Firefly Mini
Model Name	:	LBLFFMN
Test Standard	:	Article 2 Paragraph 1 of Item 19
Date of Issue	:	2026-05-22

Shenzhen CCUT Quality Technology Co., Ltd.
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This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.

Test Report Basic Information

Applicant.....:	Lumen Labs (HK) Limited
Address of Applicant.....:	21st Floor, CMA Building 64 Connaught Road, Central Hong Kong
Manufacturer.....:	Lumen Labs (HK) Limited
Address of Manufacturer.....:	21st Floor, CMA Building 64 Connaught Road, Central Hong Kong
Product Name.....:	Lumos Firefly Mini
Brand Name.....:	-
Main Model.....:	LBLFFMN
Series Models.....:	-
Test Standard.....:	Article 2 Paragraph 1 of Item 19 MIC notification No.88 of 2004, Annex 43
Date of Test .....:	2026-05-16 to 2026-05-22
Test Result.....:	PASS
Tested By .....:	Walker Wu (Walker Wu)
Reviewed By.....:	Lorzix Luo (Lorzix Luo)
Authorized Signatory.....:	Lahm Peng (Lahm Peng)

Shenzhen CCUT Quality Technology Co., Ltd. APPROVED

Note : This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.. All test data presented in this test report is only applicable to presented test sample.

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複製禁止

Revision History

Revision	Issue Date	Description	Revised By
V1.0	2026-05-22	Initial Release	Lahm Peng

複製禁止

1. General Information

1.1 Product Information

Product Name:	Lumos Firefly Mini
Trade Name:	-
Test Model:	LBLFFMN
Series Models:	-
Rated Voltage:	DC 3.7V by battery, USB 5V Charging
Battery:	DC 3.7V, 240mAh
Hardware Version:	V0.5
Software Version:	V1.10
Note 1: The test data is gathered from a production sample, provided by the manufacturer.	

Wireless Specification	
Wireless Standard:	BLE
Operating Frequency:	2402MHz ~ 2480MHz
RF Output Power:	0.8dBm (EIRP)
Number of Channel:	40
Channel Separation:	2MHz
Modulation:	GFSK
Antenna Gain:	2dBi
Type of Antenna:	PCB Antenna

List of Channels

No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)
01	2402	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
~	~	~	~	~	~	~	~
~	~	~	~	~	~	~	~
09	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

1.2 Test Setup Information

List of Test Modes		
Test Mode	Description	Remark
TM1	BLE Transmitting	2402MHz/2442MHz/2480MHz
TM2	BLE Receiving	2402MHz/2442MHz/2480MHz

List and Details of Auxiliary Cable			
Description	Length (cm)	Shielded/Unshielded	With/Without Ferrite
-	-	-	-
-	-	-	-

List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
-	-	-	-
-	-	-	-

1.3 Test Conditions

Supply Voltage			
	DC Input Voltage V	DC Voltage V	Percent
Normal(NV)	3.7	3.3	
+10%(HV)	4.07	3.3	0%
-10%(LV)	3.33	3.3	0%

Note 1: When the input voltage is reduced or increased by 10%, the regulator voltage changes of less than 1%. So the following test items are conducted in the normal voltage.
Note 2: The regulator voltage is integral within U5 (NRF52810).
Note 3: 3.3VDC from the RF IC, for extreme voltage test, we have tested the relationship between the external power supply and RF IC power supply. Base on the test results, only the normal voltage was selected to perform all items.

Test Environment					
Temperature	21°C	Humidity	52%	Atmospheric Pressure	1011.0mbar

1.4 Compliance Standards

Compliance Standards	
Article 2 Paragraph 1 of Item 19	Low Power Data Communication System in the 2.4GHz band (2400-2483.5MHz)
All measurements contained in this report were conducted with all above standards	
According to standards for test methodology	
MIC notification No.88 of 2004, Annex 43 (2023-11-08)	Low Power Data Communication System in the 2.4GHz band (2400-2483.5MHz)
Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained.	

1.5 Test Facilities

Laboratory Name:	**Shenzhen CCUT Quality Technology Co., Ltd.** 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China
CNAS Laboratory No.:	L18863
A2LA Certificate No.:	6983.01
FCC Registration No:	583813
ISED Registration No.:	CN0164

1.6 List of Measurement Instruments

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Conducted RF Testing					
RF Test System	MWRFTest	MW100-RFCB	220418SQS-37	2025-07-16	2026-07-15
Spectrum Analyzer	KEYSIGHT	N9020A	ATO-90521	2025-07-16	2026-07-15
Signal Generator	Agilent	N5182A	MY47071192	2025-07-15	2026-07-14
Power Meter	MRT	MW100-RFCB	MW220418SQS-37	2025-07-15	2026-07-14

Calibration agency: Guangzhou LiSai Metrology & Test Co., Ltd.

Address: No.8 South Street, Shiji Institute, Guangzhou, Guangdong, China

Calibration method: Through the standard signal source calibration, the results meet the requirements.

Calibration agency comply with designated calibration agency under Article 102-18 paragraph (1).

1.7 Measurement Uncertainty

Test Item	Conditions	Uncertainty
Frequency Tolerance	9kHz ~ 6GHz	±1 E-7
Conducted Output Power	9kHz ~ 6GHz	±0.50 dB
Occupied Bandwidth	9kHz ~ 6GHz	±4.0 %
Conducted Spurious Emission	9kHz ~ 26GHz	±1.32 dB

2. Summary of Test Results

MIC Rule	Description of Test Item	Result
Article 2 Paragraph 1 of Item 19	Frequency Tolerance	Passed
	Antenna and EIRP Power	Passed
	Occupied Bandwidth	Passed
	Transmitter Spurious Emissions	Passed
	Receiver Spurious Emissions	Passed
	Interference Prevention Function	Passed
	Carrier Sensing Function (1)	N/A
	Carrier Sensing Function (2)	N/A
Passed: The EUT complies with the essential requirements in the standard Failed: The EUT does not comply with the essential requirements in the standard N/A: Not applicable		
The Appendix A is a part of the test report, including EUT external photos, internal photos, test photos and label information; The Appendix B is a part of the test report, including test data and test plots for RF testing.		

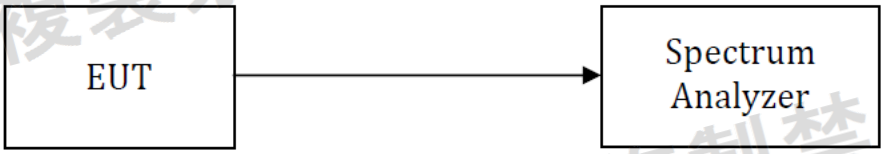
3. Frequency Tolerance

3.1 Standard and Limit

According to Article 2 Paragraph 1 of Item 19, the maximum permit tolerance of frequency is 50ppm.

3.2 Test Procedure

(1)Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
(2) Set center frequency of spectrum analyzer = operating frequency.
(3) Set the spectrum analyzer as RBW, VBW=10KHz, Span = 1MHz.
(4) 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided emission is repetitive in nature.
(5)Repeat above procedures until all frequency measured was complete.



Test Setup Block Diagram

3.3 Test Data and Results

Please refer to the section 1 of the Appendix B.

4. Antenna and EIRP Power

4.1 Standard and Limit

According to Article 2 Paragraph 1 of Item 19.

(1) The maximum permit antenna power is 3mW/MHz, EIRP is 6.91dBm/MHz for FHSS.

(2) The maximum permit antenna power is 10mW/MHz, EIRP is 12.14 dBm/MHz for DSSS and OFDM with 20MHz bandwidth.

(3) The maximum permit antenna power is 5mW/MHz, EIRP is 9.13dBm/MHz for OFDM with 40MHz bandwidth.

(4) The maximum permit antenna power is 10mW or less, EIRP is 12.14 dBm for Other method(except FHSS, DSSS and OFDM).

(5) The maximum permit tolerance is +20%.

4.2 Test Procedure

(1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.

(2) Set the spectrum analyzer to any one measured frequency within its operating range.

(3) Set RBW = 2MHz, VBW = 2MHz, Sweep = Auto, Detector = Peak.

(4) Measure the highest amplitude appearing on spectral display and mark the frequency.

(5) Set the spectrum analyzer to the mark frequency as center of frequency and set SPAN = 0Hz.

(6) Measure the highest amplitude appearing on spectral display and mark the value.

(7) Repeat the above procedures until all frequencies measured were complete.

Test Setup Block Diagram

4.3 Test Data and Results

Please refer to the section 2 and section 3 of the Appendix B.

5. Occupied Bandwidth

5.1 Standard and Limit

According to Article 2 Paragraph 1 of Item 19.
(1) The occupied bandwidth shall not exceed 83.5MHz for FHSS.
(2) The occupied bandwidth shall not exceed 26MHz for DSSS and OFDM with 20MHz bandwidth.
(3) The occupied bandwidth shall not exceed 40MHz for OFDM with 40MHz bandwidth.

5.2 Test Procedure

(1) Set up the spectrum analyzer as the follows:
Center frequency: Test frequency
Sweep bandwidth: 2 to 3.5 times of allowance
Resoluble bandwidth: less than 3% of allowance
Video bandwidth: Equivalent to resoluble bandwidth
Sweep time: Minimum time by which measuring accuracy is assured (In case of burst wave, 1 burst shall be contained per 1 sample)
Sampling points: More than 400 points
Sweep mode : Continuous sweeping
Detection mode: Positive peak
Display mode: Maximum holding
(2) Repeat the sweeping till no change was observed on the display and enter all values of data point to the computer as array variable.
(3) About all data, convert dB value to antilogarithm of electric power dimension.
(4) Add up the electric power of all data and record it as “Sum total of electric power”.
(5) Adding up data in order from the lowest frequency to upper frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of “Sum total of electric power”. Convert the limit point to frequency and record as “Lowest limit frequency”.
(6) Adding up data in order from the highest frequency to lower frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of “Sum total of electric power”. Convert the limit point to frequency and record as “Highest limit frequency”.
(7) Repeat above procedures until all frequency measured was complete.

Test Setup Block Diagram

5.3 Test Data and Results

Please refer to the section 4 of the Appendix B.

6. Transmitter Spurious Emissions

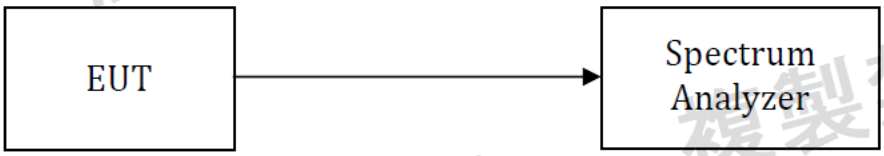
6.1 Standard and Limit

According to Article 2 Paragraph 1 of Item 19, the transmitter spurious emissions shall not exceeded the following limit:

(1) Below 2387MHz : 2.5μW/MHz
(2) 2387 to 2400MHz : 25μW/MHz
(3) 2483.5 through 2496.5MHz : 25μW/MHz
(4) Over 2496.5MHz : 2.5μW/MHz

6.2 Test Procedure

(1) A spectrum in case of conducted measurements, the radio device shall be connected to the measuring equipment via a suitable attenuator.
(2) The measurement equipment shall be set for peak hold mode of operation.
(3) the transmitter shall be operated at the highest output power, or, in the case of equipment able to operate at more than one power level, at the lowest and highest output powers;
(4) The resolution bandwidth shall be set to 100kHz from 10MHz to 1GHz, the resolution bandwidth shall be set to 1MHz above 1GHz , and the sweep time shall be set to auto mode, to ensure all major modulation products are captured.
(5) When the searched result is less than the specified limit, the maximum one shall be recorded, when the result is more than the specified limit, all measured values shall be recorded.
(6) This measurement shall be repeated with the transmitter in standby mode where applicable.
(7) Repeat above procedures until all frequency measured was complete.



Test Setup Block Diagram

6.3 Test Data and Results

Please refer to the section 5 of the Appendix B.

7. Receiver Spurious Emissions

7.1 Standard and Limit

According to Article 2 Paragraph 1 of Item 19, the receiver spurious emissions shall not exceeded the following limit:

(1) Below 1GHz : 4nW

(2) 1GHz or higher : 20nW

7.2 Test Procedure

(1) A spectrum in case of conducted measurements, the radio device shall be connected to the measuring equipment via a suitable attenuator.

(2) The measurement equipment shall be set for peak hold mode of operation.

(3) the transmitter shall be operated at the highest output power, or, in the case of equipment able to operate at more than one power level, at the lowest and highest output powers;

(4) The resolution bandwidth shall be set to 100kHz from 10MHz to 1GHz, the resolution bandwidth shall be set to 1MHz above 1GHz , and the sweep time shall be set to auto mode, to ensure all major modulation products are captured.

(5) When the searched result is less than the specified limit, the maximum one shall be recorded, when the result is more than the specified limit, all measured values shall be recorded.

(6) This measurement shall be repeated with the transmitter in standby mode where applicable.

(7) Repeat above procedures until all frequency measured was complete.

Test Setup Block Diagram

7.3 Test Data and Results

Please refer to the section 6 of the Appendix B.

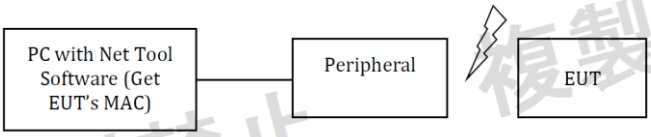
8. Interference Prevention Function

8.1 Standard and Limit

According to Article 2 Paragraph 1 of Item 19, the device shall have the function of automatic transmission or reception of identification code.

8.2 Test Procedure

(1) Set the EUT in the usual operation condition.
(2) The radio equipment with automatic transmitting function of identification code.
a. Transmit the assigned identification code from the radio equipment.
b. Confirm the identification code received by the demodulator.
(3) The radio equipment with automatic receiving function of identification code.
a. Transmit the assigned identification code from the opposite equipment.
b. Confirm that the usual communication is available.
c. Transmit the identification code distinct from the assigned one from the opposite equipment.
d. Confirm that the radio equipment is stopped or an indication is displayed as the identification code is different.
(4) The identification function shall be recorded.



Test Setup Block Diagram

8.3 Test Data and Results

Test Condition	Test Items	Test Result
NV	Transmitting Function of Identification Code	Good
	Receiving Function of Identification Code	Good
LV	Transmitting Function of Identification Code	Good
	Receiving Function of Identification Code	Good
HV	Transmitting Function of Identification Code	Good
	Receiving Function of Identification Code	Good

MAC address ID: 44:85:76:59:86:70

******* END OF REPORT *******