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HCT

TEST REPORT

EMI Test for FCC Certification of LM-F100TM Model

APPLICANT

LG Electronics USA, Inc.

REPORT NO.

HCT-EM-2008-FC022

DATE OF ISSUE

August 26, 2020

Tested by

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TEST REPORT

EMI Test for
FCC Certification

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DATE OF ISSUE

August 26, 2020

FCC ID.

ZNFF100TM

Applicant

LG Electronics USA, Inc.

111 Sylvan Avenue, North Building , Englewood Cliffs NJ 07632 United States

Product Name

Multi-band CDMA/GSM/EDGE/WCDMA/LTE/5G NR Phone with WLAN, BT and RFID

Model Name

LM-F100TM

Series Model Name

Refer to the clause 1.1 Description of EUT

Travel Adaptor Information

Model name: MCS-P02WA

Manufacturer: AOHA1

Date of Test

August 10, 2020 to August 24, 2020

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

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	August 26, 2020	Initial Release

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2014. (See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme) / A2LA(American Association for Laboratory Accreditation), which signed the ILAC-MRA.

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

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1. GENERAL INFORMATION

1.1 Description of EUT

FCC ID	ZNFF100TM
Model Name	LM-F100TM
Series Model Name	LMF100TM, F100TM
Product Name	Multi-band CDMA/GSM/EDGE/WCDMA/LTE/5G NR Phone with WLAN, BT and RFID
TX Frequency	824.70 MHz to 848.31 MHz (CDMA BC0) 1 851.25 MHz to 1 908.75 MHz (CDMA BC1) 817.90 MHz to 823.10 MHz (CDMA BC10) 824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 1 852.4 MHz to 1 907.6 MHz (WCDMA B2) 1712.4 MHz to 1752.6 MHz (WCDMA B4) 826.40 MHz to 846.60 MHz (WCDMA B5) 1 850 MHz to 1 910 MHz (LTE B2) 1 710 MHz to 1 755 MHz (LTE B4) 824 MHz to 849 MHz (LTE B5) 699 MHz to 716 MHz (LTE B12) 777 MHz to 787 MHz (LTE B13) 704 MHz to 716 MHz (LTE B17) 1 850 MHz to 1 915 MHz (LTE B25) 814 MHz to 849 MHz (LTE B26) 2 496 MHz to 2 690 MHz (LTE B41) 3 550 MHz to 3 700 MHz (LTE B48) 1 710 MHz to 1 780 MHz (LTE B66) 663 MHz to 698 MHz (LTE B71) 2 402 MHz to 2 480 MHz (Bluetooth) 2 412 MHz to 2 462 MHz (WiFi 2.4 GHz) 5 180 MHz to 5 240 MHz (WiFi 5 GHz_UNII 1) 5 260 MHz to 5 320 MHz (WiFi 5 GHz_UNII 2A) 5 500 MHz to 5 720 MHz (WiFi 5 GHz_UNII 2C) 5 745 MHz to 5 825 MHz (WiFi 5 GHz_UNII 3) 13.56 MHz (NFC) 1 850 MHz to 1 910 MHz (5G NR n2) 824 MHz to 849 MHz (5G NR n5) 1 850 MHz to 1 915 MHz (5G NR n25) 2 496 MHz to 2 690 MHz (5G NR n41) 1 710 MHz to 1 780 MHz (5G NR n66) 663 MHz to 698 MHz (5G NR n71)

RX Frequency	869.70 MHz to 893.31 MHz (CDMA BC0) 1 931.25 MHz to 1 988.75 MHz (CDMA BC1) 862.00 MHz to 894.00 MHz (CDMA BC10) 869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 1 932.4 MHz to 1 987.6 MHz (WCDMA B2) 2 112.4 MHz to 2 152.6 MHz (WCDMA B4) 871.40 MHz to 891.60 MHz (WCDMA B5) 1 930 MHz to 1 990 MHz (LTE B2) 2 110 MHz to 2 155 MHz (LTE B4) 869 MHz to 894 MHz (LTE B5) 729 MHz to 746 MHz (LTE B12) 746 MHz to 756 MHz (LTE B13) 734 MHz to 746 MHz (LTE B17) 1 925 MHz to 1 990 MHz (LTE B25) 859 MHz to 894 MHz (LTE B26) 717 MHz to 728 MHz (LTE B29) 2 496 MHz to 2 690 MHz (LTE B41) 5 150 MHz to 5 925 MHz (LTE B46) 3 550 MHz to 3 700 MHz (LTE B48) 2 110 MHz to 2 200 MHz (LTE B66) 617 MHz to 652 MHz (LTE B71) 2 402 MHz to 2 480 MHz (Bluetooth) 2 412 MHz to 2 462 MHz (WiFi 2.4 GHz) 5 180 MHz to 5 240 MHz (WiFi 5 GHz_UNII 1) 5 260 MHz to 5 320 MHz (WiFi 5 GHz_UNII 2A) 5 500 MHz to 5 720 MHz (WiFi 5 GHz_UNII 2C) 5 745 MHz to 5 825 MHz (WiFi 5 GHz_UNII 3) 13.56 MHz (NFC) 1 930 MHz to 1 990 MHz (5G NR n2) 869 MHz to 894 MHz (5G NR n5) 1 930 MHz to 1 995 MHz (5G NR n25) 2 496 MHz to 2 690 MHz (5G NR n41) 2 110 MHz to 2 200 MHz (5G NR n66) 617 MHz to 652 MHz (5G NR n71)
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1.2 Tested System Details

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

Device Type	Model Name	Serial Number	Manufacturer
EUT	LM-F100TM	-	LG
DATA cable	EAD65830102	-	NINGBO
TA	MCS-P02WA	-	AOHAI
Micro SD card	SAMSUNG EVO+ microSDXC CLASS10 UHS-I (256 GB)	-	SAMSUNG

1.3 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	USB Type C (Data Cable)	Y	N/A	(P) 1.0

NOTE. The marked "(D)" means the data cable and "(P)" means the power cable.

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

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	USB Type C (Data Cable)	N	N/A	Y	Both End

1.5 Test Facility

Test site is located at 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, South 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

Measurement Facilities	Designation No.
Radiated Field strength measurement facility 3 m Semi Anechoic chamber	KR0032
Radiated Field strength measurement facility 10 m Semi Anechoic chamber #1	
Radiated Field strength measurement facility 10 m Semi Anechoic chamber #2	

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.

Parameter	Expanded Uncertainty
Conducted Emission (0.15 MHz to 30 MHz)	1.58 dB
3 m Radiated Emissions (30 MHz to 1 GHz)	4.86 dB
3 m Radiated Emissions (1 GHz to 18 GHz)	4.58 dB
3 m Radiated Emissions (18 GHz to 40 GHz)	5.54 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 Ohm/ 50uH 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)	Resolution Bandwidth (kHz)	Class A		Class B	
		Quasi-Peak (dBμV)	Average (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)
0.15 to 0.5	9	79	66	66 to 56*	56 to 46*
0.5 to 5	9	73	60	56	46
5 to 30	9	73	60	60	50

NOTE. 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

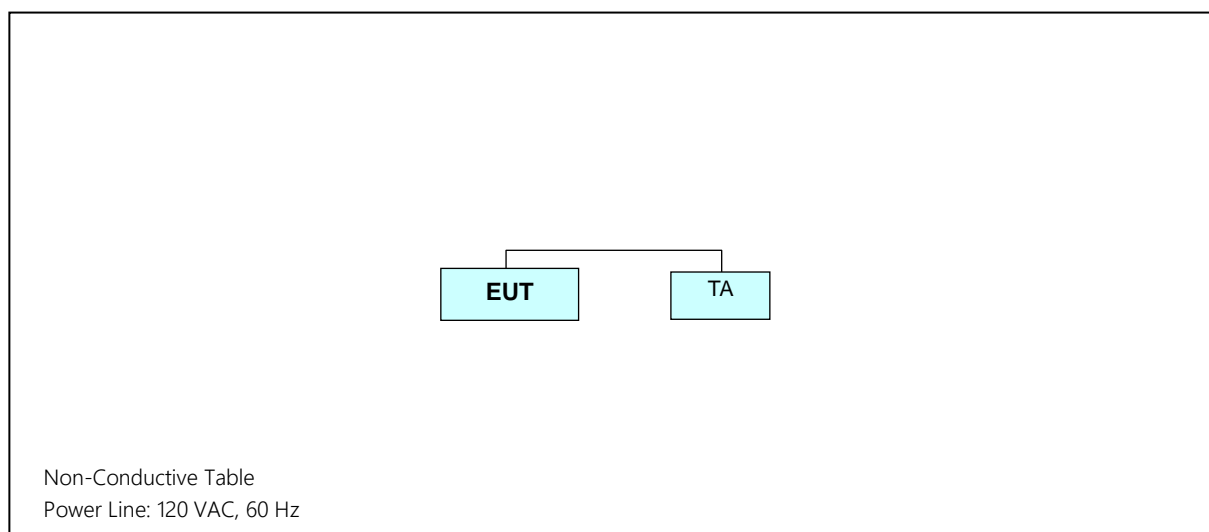
Frequency (MHz)	Class A			Class B		
	Antenna Distance (m)	Field Strength ($\mu\text{V/m}$)	Quasi-Peak (dB $\mu\text{V/m}$)	Antenna Distance (m)	Field Strength ($\mu\text{V/m}$)	Quasi-Peak (dB $\mu\text{V/m}$)
30 to 88	10	90	39.0	3	100	40.0
88 to 216	10	150	43.5	3	150	43.5
216 to 960	10	210	46.4	3	200	46.0
Above 960	10	300	49.5	3	500	54.0
Frequency (MHz)	Antenna Distance (m)	Class A		Class B		
		Peak (dB $\mu\text{V/m}$)	Average (dB $\mu\text{V/m}$)	Peak (dB $\mu\text{V/m}$)	Average (dB $\mu\text{V/m}$)	
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

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



3. PRELIMINARY TEST

3.1 Conducted Emission

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

Operating Modes:

FRONT CAMERA & MP3 mode

REAR CAMERA mode

IDLE mode

NOTE. The worst-case emissions are reported.

3.2 Radiated Emission

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

Operating Modes:

FRONT CAMERA & MP3 mode

REAR CAMERA mode

IDLE mode

NOTE. The worst-case emissions are reported.

4. CONDUCTED EMISSION AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission

4.1.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
<input checked="" type="checkbox"/>	EMI test receiver	Rohde & Schwarz	ESCI	100584	1 year	06.10.2020
<input checked="" type="checkbox"/>	LISN	Rohde & Schwarz	ENV216	102245	1 year	09.11.2019
<input checked="" type="checkbox"/>	Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.20.2019
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
<input checked="" type="checkbox"/>	UXM 5G wireless test platform	KEYSIGHT	E7515B	MY58300756	1 year	01.07.2020
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-201	-	-
<input checked="" type="checkbox"/>	Software	Rohde & Schwarz	EMC32	-	-	-

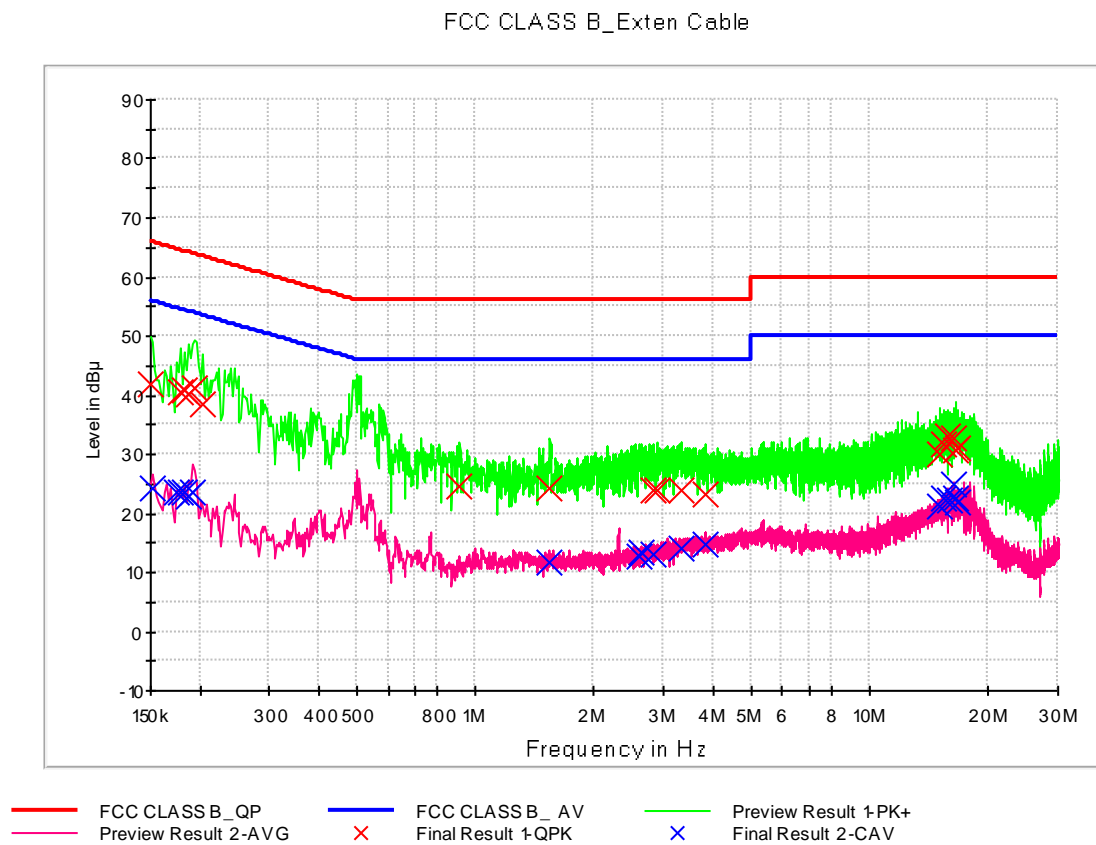
4.1.2 Operating Condition

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	150 kHz to 30 MHz
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Worst Case of Operating Mode	FRONT CAMERA & MP3 mode
Kind of Test Site	EMI Shielded Room
Temperature	23.6 / 23.9 °C
Relative Humidity	47.2 / 48.3 %
Test Date	August 10 / August 13, 2020

4.1.3 Measuring Data

Figure 1: Conducted Emission (150 kHz to 30 MHz), FRONT CAMERA & MP3 mode, Line (L1)



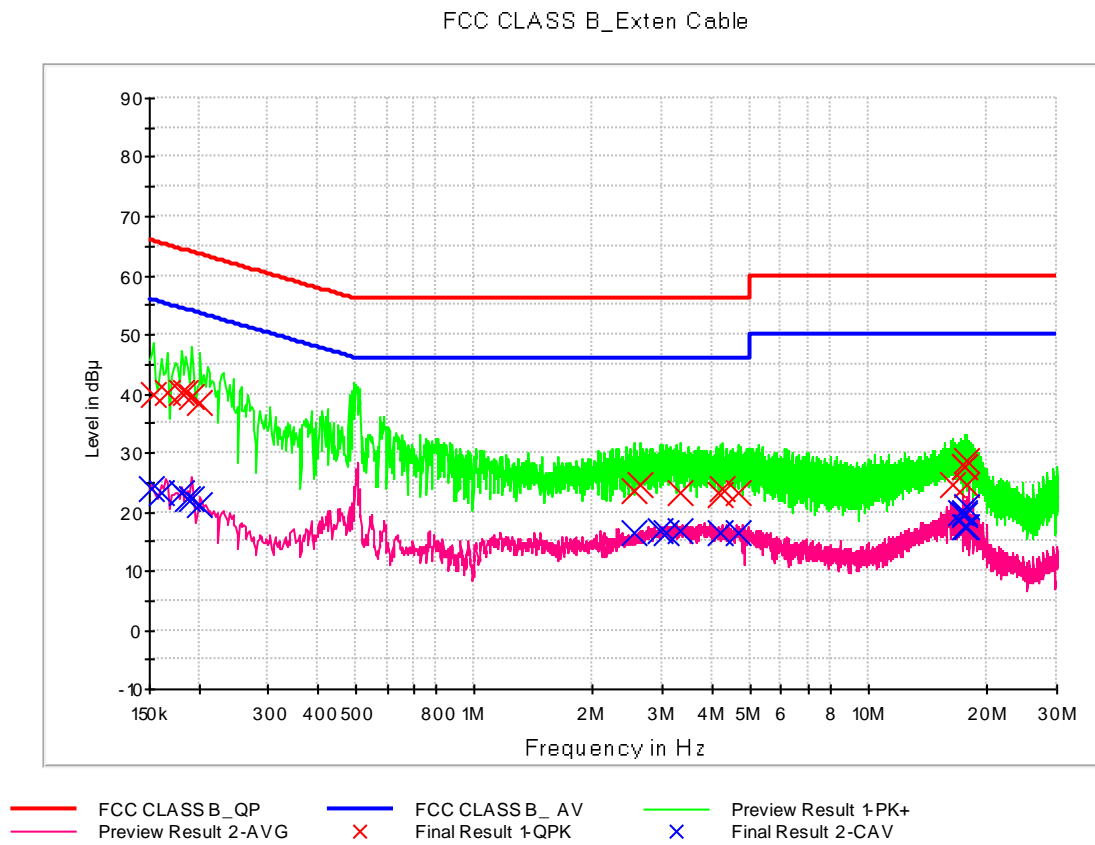
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	42.0	9.000	L1	9.8	24.0	66.0
0.178000	40.6	9.000	L1	9.8	24.0	64.6
0.182000	40.7	9.000	L1	9.8	23.7	64.4
0.188000	40.0	9.000	L1	9.8	24.1	64.1
0.194000	41.1	9.000	L1	9.8	22.7	63.9
0.204000	38.6	9.000	L1	9.8	24.8	63.4
0.912000	24.7	9.000	L1	9.8	31.3	56.0
1.546000	24.2	9.000	L1	9.9	31.8	56.0
2.816000	24.0	9.000	L1	9.9	32.0	56.0
2.876000	23.9	9.000	L1	9.9	32.1	56.0
3.340000	24.0	9.000	L1	9.9	32.0	56.0
3.826000	23.3	9.000	L1	10.0	32.7	56.0
14.974000	29.8	9.000	L1	10.4	30.2	60.0
15.328000	31.7	9.000	L1	10.4	28.3	60.0
15.836000	33.0	9.000	L1	10.4	27.0	60.0
16.248000	32.8	9.000	L1	10.4	27.2	60.0
16.498000	30.7	9.000	L1	10.4	29.3	60.0
16.650000	30.9	9.000	L1	10.4	29.1	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	24.3	9.000	L1	9.8	31.5	55.9
0.174000	23.7	9.000	L1	9.8	31.1	54.8
0.178000	23.4	9.000	L1	9.8	31.2	54.6
0.182000	23.6	9.000	L1	9.8	30.8	54.4
0.188000	22.8	9.000	L1	9.8	31.3	54.1
0.192000	23.6	9.000	L1	9.8	30.4	53.9
1.546000	11.6	9.000	L1	9.9	34.4	46.0
2.600000	12.7	9.000	L1	9.9	33.3	46.0
2.642000	13.5	9.000	L1	9.9	32.5	46.0
2.816000	13.2	9.000	L1	9.9	32.8	46.0
3.340000	14.1	9.000	L1	9.9	31.9	46.0
3.826000	14.7	9.000	L1	10.0	31.3	46.0
14.974000	21.1	9.000	L1	10.4	28.9	50.0
15.328000	22.6	9.000	L1	10.4	27.4	50.0
15.888000	22.1	9.000	L1	10.4	27.9	50.0
16.248000	24.8	9.000	L1	10.4	25.2	50.0
16.498000	22.4	9.000	L1	10.4	27.6	50.0
16.650000	21.9	9.000	L1	10.4	28.1	50.0

Figure 2: Conducted Emission (150 kHz to 30 MHz), FRONT CAMERA & MP3 mode, Line (N)



QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	40.0	9.000	N	9.8	25.8	65.8
0.166000	40.3	9.000	N	9.8	24.9	65.2
0.180000	40.2	9.000	N	9.8	24.3	64.5
0.186000	40.2	9.000	N	9.8	24.0	64.2
0.192000	39.6	9.000	N	9.8	24.3	63.9
0.202000	38.4	9.000	N	9.8	25.1	63.5
2.548000	23.4	9.000	N	9.9	32.6	56.0
2.632000	24.4	9.000	N	9.9	31.6	56.0
3.314000	23.4	9.000	N	9.9	32.6	56.0
4.218000	22.8	9.000	N	10.0	33.2	56.0
4.278000	23.8	9.000	N	10.0	32.2	56.0
4.680000	23.2	9.000	N	10.0	32.8	56.0
16.252000	24.5	9.000	N	10.5	35.5	60.0
17.442000	27.7	9.000	N	10.5	32.3	60.0
17.492000	27.6	9.000	N	10.5	32.4	60.0
17.534000	27.7	9.000	N	10.5	32.3	60.0
17.750000	24.7	9.000	N	10.6	35.3	60.0
17.824000	28.6	9.000	N	10.6	31.4	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	23.8	9.000	N	9.8	32.1	55.9
0.160000	23.4	9.000	N	9.8	32.1	55.5
0.180000	23.3	9.000	N	9.8	31.2	54.5
0.188000	22.1	9.000	N	9.8	32.1	54.1
0.192000	22.1	9.000	N	9.8	31.8	53.9
0.202000	21.3	9.000	N	9.8	32.3	53.5
2.548000	16.3	9.000	N	9.9	29.7	46.0
2.958000	16.6	9.000	N	9.9	29.4	46.0
3.052000	16.5	9.000	N	9.9	29.5	46.0
3.314000	16.8	9.000	N	9.9	29.2	46.0
4.218000	16.3	9.000	N	10.0	29.7	46.0
4.680000	16.5	9.000	N	10.0	29.5	46.0
17.116000	19.8	9.000	N	10.5	30.2	50.0
17.434000	17.4	9.000	N	10.5	32.6	50.0
17.492000	19.8	9.000	N	10.5	30.2	50.0
17.534000	19.6	9.000	N	10.5	30.4	50.0
17.750000	17.5	9.000	N	10.6	32.5	50.0
17.824000	21.0	9.000	N	10.6	29.0	50.0

4.2 Radiated Emission Below 1 GHz

4.2.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
<input checked="" type="checkbox"/>	EMI test receiver	Rohde & Schwarz	ESU40	100524	1 year	05.12.2020
<input checked="" type="checkbox"/>	Bi-Log antenna	Schwarzbeck	VULB 9168	255	2 year	03.26.2019
<input checked="" type="checkbox"/>	Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
<input checked="" type="checkbox"/>	Antenna master controller	INNCO Systems	CO3000	CO3000/870/ 35990515/L	N/A	-
<input checked="" type="checkbox"/>	Turn table	INNCO Systems	1060	-	N/A	-
<input checked="" type="checkbox"/>	Turn table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
<input checked="" type="checkbox"/>	Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.19.2020
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
<input type="checkbox"/>	Radio communication test station	ANRITSU	MT8000A	6262036812	1 year	01.06.2020
<input type="checkbox"/>	Radio communication analyzer	ANRITSU	MT8821C	6262044720	1 year	01.06.2020
<input checked="" type="checkbox"/>	UXM 5G wireless test platform	KEYSIGHT	E7515B	MY58300756	1 year	01.07.2020
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-201	-	-
<input checked="" type="checkbox"/>	Software	Rohde & Schwarz	EMC32	-	-	-

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)
Worst Case of Operating Mode	FRONT CAMERA & MP3 mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	24.1 / 23.7 °C
Relative Humidity	47.3 / 48.2 %
Test Date	August 20 / August 21, 2020

4.2.3 Measuring Data

FRONT CAMERA & MP3 mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
35.349040	21.0	100.0	V	311.0	18.7	19.0	40.0
55.000000	23.7	117.0	V	117.0	19.5	16.3	40.0
145.533000	21.4	125.1	V	132.0	19.2	22.1	43.5
167.302280	23.1	100.0	V	153.0	19.3	20.4	43.5
310.192240	20.6	207.9	V	141.0	20.7	25.4	46.0
801.287120	30.9	174.8	V	1.0	30.2	15.1	46.0

- 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

4.3 Radiated Emission Above 1 GHz

4.3.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
<input checked="" type="checkbox"/>	EMI test receiver	Rohde & Schwarz	ESU40	100524	1 year	05.12.2020
<input checked="" type="checkbox"/>	Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
<input checked="" type="checkbox"/>	Antenna master controller	INNCO Systems	CO3000	CO3000/870/ 35990515/L	N/A	-
<input checked="" type="checkbox"/>	Turn table	INNCO Systems	1060	-	N/A	-
<input checked="" type="checkbox"/>	Turn table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
<input checked="" type="checkbox"/>	Low noise amplifier	TESTEK	TK-PA18H	170034-L	1 year	03.03.2020
<input checked="" type="checkbox"/>	Low noise amplifier	TESTEK	TK-PA1840H	170030-L	1 year	02.13.2020
<input checked="" type="checkbox"/>	Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.19.2020
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
<input type="checkbox"/>	Radio communication test station	ANRITSU	MT8000A	6262036812	1 year	01.06.2020
<input type="checkbox"/>	Radio communication analyzer	ANRITSU	MT8821C	6262044720	1 year	01.06.2020
<input checked="" type="checkbox"/>	UXM 5G wireless test platform	KEYSIGHT	E7515B	MY58300756	1 year	01.07.2020
<input checked="" type="checkbox"/>	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-201	-	-
<input checked="" type="checkbox"/>	Horn antenna	Schwarzbeck	BBHA 9120D	01836	1 year	07.23.2020
<input checked="" type="checkbox"/>	Horn antenna	Schwarzbeck	BBHA 9170	BBHA9170#786	1 year	12.03.2019
<input checked="" type="checkbox"/>	Software	Rohde & Schwarz	EMC32	-	-	-

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	5 925 MHz
Tested Frequency Range	1 GHz to 30 GHz
Worst Case of Operating Mode	FRONT CAMERA & MP3 mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	21.8 / 23.3 / 23.7 / 22.9 °C
Relative Humidity	45.7 / 46.8 / 48.2 / 46.1 %
Test Date	August 18 / August 19 / August 21 / August 24, 2020

4.3.3 Measuring Data

FRONT CAMERA & MP3 mode

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1421.930000	31.1	149.7	H	79.0	-27.8	42.9	74.0
2554.650000	32.3	188.6	V	0.0	-23.9	41.7	74.0
4958.150000	37.0	124.6	V	135.0	-17.8	37.0	74.0
8537.985000	41.4	100.0	V	314.0	-11.7	32.6	74.0
10586.025000	45.6	138.7	V	58.0	-6.6	28.4	74.0
17977.504800	55.3	149.5	V	126.0	9.3	18.7	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1421.930000	18.5	149.7	H	79.0	-27.8	35.5	54.0
2554.650000	19.4	188.6	V	0.0	-23.9	34.6	54.0
4958.150000	23.8	124.6	V	135.0	-17.8	30.2	54.0
8537.985000	28.9	100.0	V	314.0	-11.7	25.1	54.0
10586.025000	32.1	138.7	V	58.0	-6.6	21.9	54.0
17977.504800	42.7	149.5	V	126.0	9.3	11.3	54.0

- 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

5. CONCLUSION

The data collected shows that the **Product Name: Multi-band CDMA/GSM/EDGE/WCDMA/LTE/5G NR Phone with WLAN, BT and RFID / Model Name: LM-F100TM** 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-2008-FC022-P	August 26, 2020	Initial Release

End of report