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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-FC023

DATE OF ISSUE

August 26, 2020

Tested by
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(signature)

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TEST REPORT

EMI Test for
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DATE OF ISSUE

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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-P02WH

Manufacturer: PHIHONG

Date of Test

August 06, 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
LED monitor	34UC98	-	LG
Monitor adapter	ADS-110CL-19-3	-	SHENZHEN HONOR ELECTRONIC
DP cable	CDP2DPMM1MW	-	STARTECH
Wireless charger	F7U082	-	belkin
Micro USB cable	-	-	belkin
Wireless charger TA	DSA-18QFB	-	belkin
DATA cable	EAD65830102	-	NINGBO
Earphone	EAB63728251	-	CRESYN
Audio gender	EBX64331001	-	CRESYN
TA	MCS-P02WH	-	PHIHONG
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
	USB Type C (Display Cable)	N/A	Y	(D) 1.0
	USB Type C (Audio Gender)	N/A	N	(D) 0.1
Audio Gender	Earphone	N/A	N	(D) 1.2
LED Monitor	DC IN	N	N/A	(P) 1.8
	DP port	N/A	Y	(D) 1.2
Wireless Charger	Micro USB	Y	N/A	(P) 1.3

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
	USB Type C (Display Cable)	N	N/A	Y	Both End
	USB Type C (Audio Gender)	N	N/A	Y	EUT End
Audio Gender	Earphone	N	N/A	Y	Audio Gender End
LED Monitor	DP port	N	N/A	Y	Both End
Wireless Charger	Micro USB	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

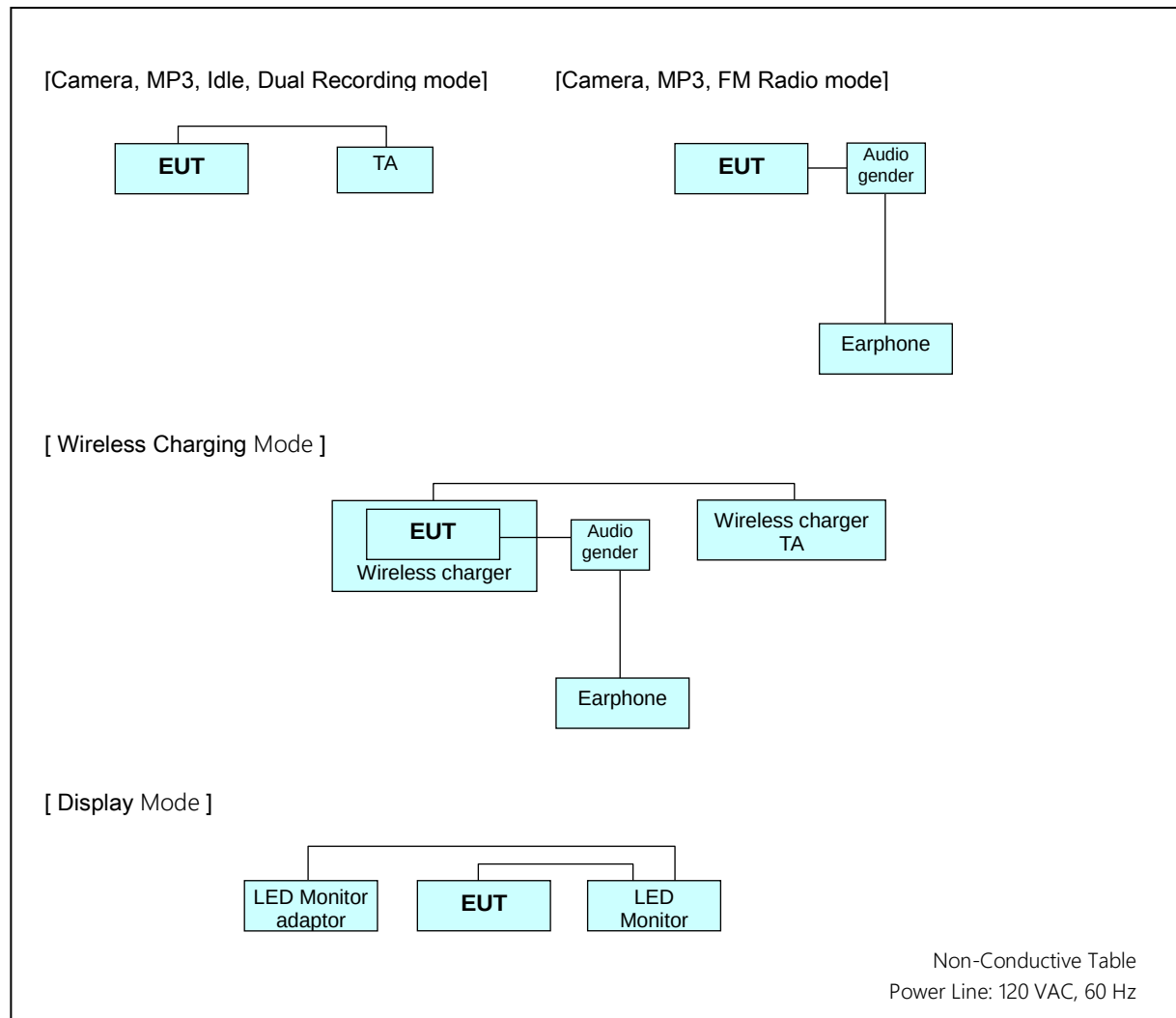
Frequency (MHz)	Class A			Class B		
	Antenna Distance (m)	Field Strength ($\mu\text{V/m}$)	Quasi-Peak (dB $\mu\text{V/m}$)	Antenna Distance (m)	Field Strength ($\mu\text{V/m}$)	Quasi-Peak (dB $\mu\text{V/m}$)
30 to 88	10	90	39.0	3	100	40.0
88 to 216	10	150	43.5	3	150	43.5
216 to 960	10	210	46.4	3	200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

[EUT +TA]

FRONT CAMERA & MP3 mode

REAR CAMERA mode

IDLE mode

Dual Recording 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:

[EUT +TA]

FRONT CAMERA & MP3 mode

REAR CAMERA mode

IDLE mode

Dual Recording mode

Display mode

[EUT +Earphone]

FRONT CAMERA & MP3 mode

REAR CAMERA & FM RADIO mode

WIRELESS CHARGING 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
☒	EMI test receiver	Rohde & Schwarz	ESCI	100584	1 year	06.10.2020
☒	LISN	Rohde & Schwarz	ENV216	102245	1 year	09.11.2019
☒	Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.20.2019
☒	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
☒	UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY58300756	1 year	01.07.2020
☒	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-201	-	-
☒	Software	Rohde & Schwarz	EMC32	-	-	-

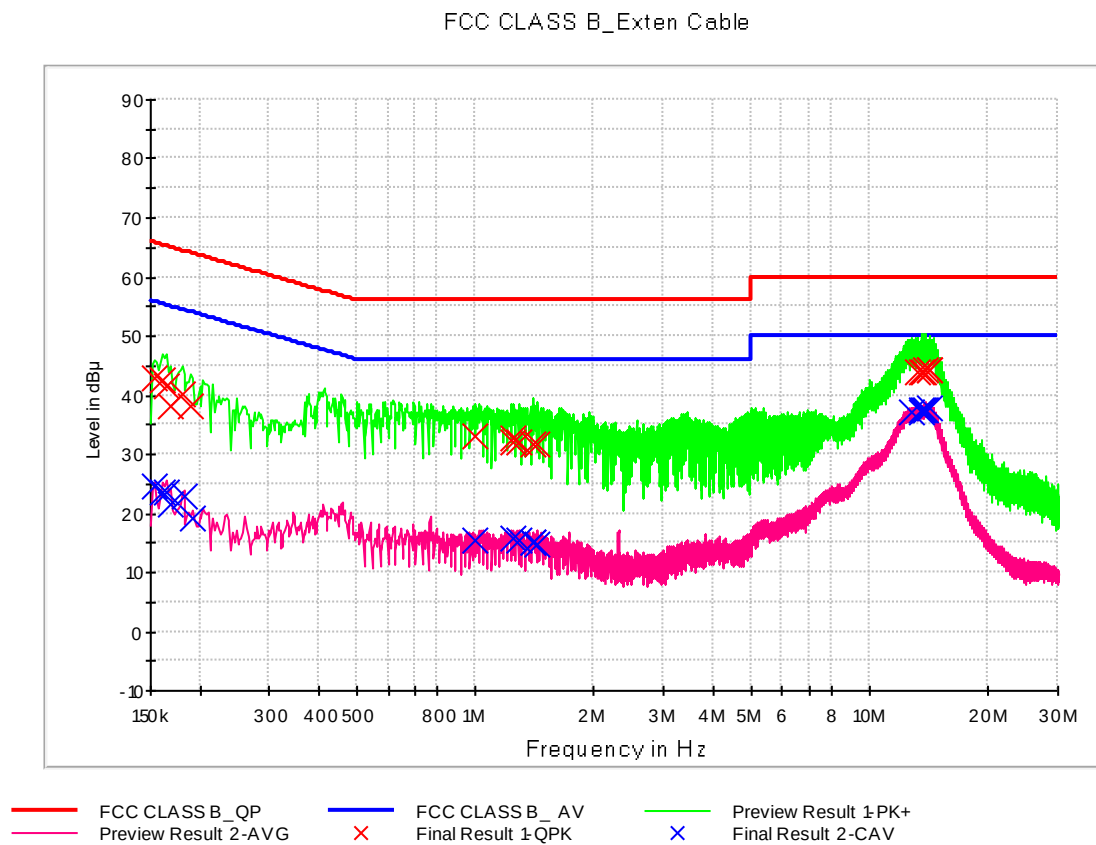
4.1.2 Operating Condition

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 Dual Recording 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)
0.154000	43.0	9.000	L1	9.8	22.8	65.8
0.160000	42.6	9.000	L1	9.8	22.9	65.5
0.164000	41.4	9.000	L1	9.8	23.9	65.3
0.168000	38.1	9.000	L1	9.8	27.0	65.1
0.180000	40.1	9.000	L1	9.8	24.4	64.5
0.190000	38.2	9.000	L1	9.8	25.9	64.0
0.998000	33.1	9.000	L1	9.8	22.9	56.0
1.240000	32.8	9.000	L1	9.8	23.2	56.0
1.252000	32.0	9.000	L1	9.9	24.0	56.0
1.288000	32.0	9.000	L1	9.9	24.0	56.0
1.404000	31.7	9.000	L1	9.9	24.3	56.0
1.434000	31.8	9.000	L1	9.9	24.2	56.0
13.264000	43.8	9.000	L1	10.3	16.2	60.0
13.602000	43.8	9.000	L1	10.3	16.2	60.0
13.704000	44.1	9.000	L1	10.3	15.9	60.0
13.800000	44.4	9.000	L1	10.3	15.6	60.0
14.114000	44.2	9.000	L1	10.3	15.8	60.0
14.256000	44.1	9.000	L1	10.3	15.9	60.0

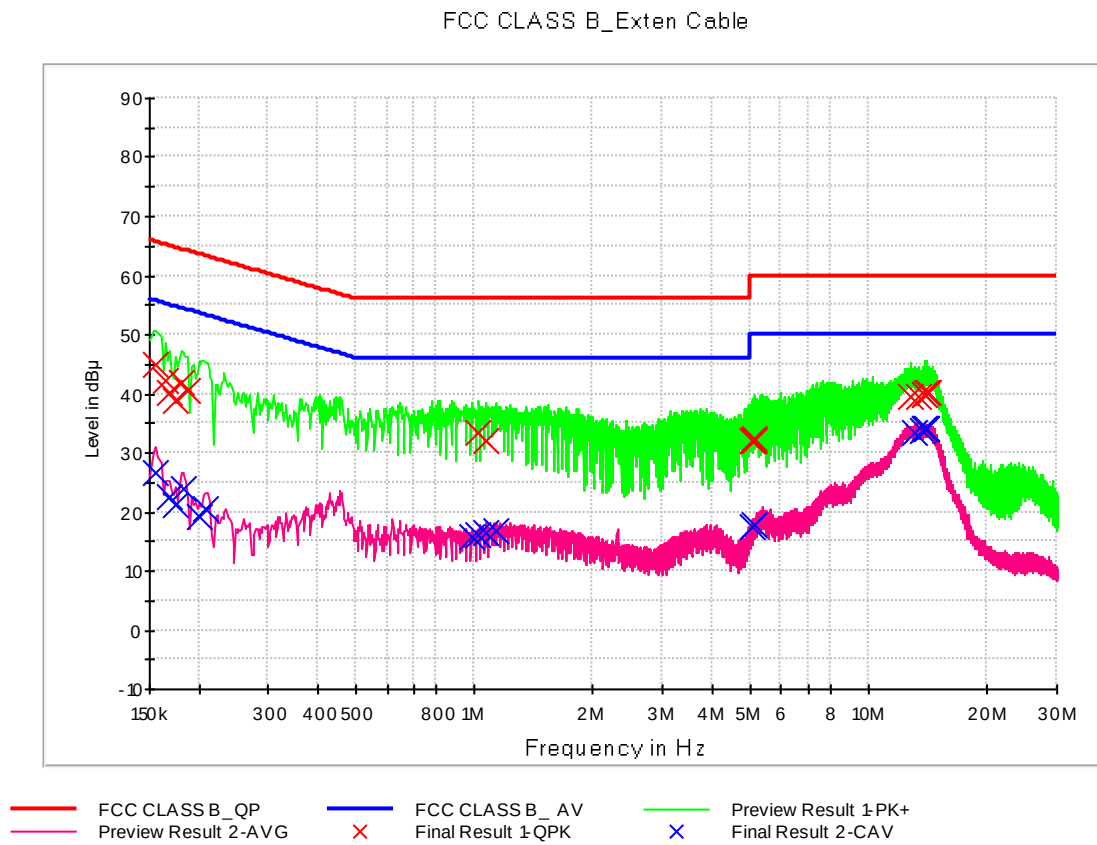
Calculation Formula:

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

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	24.5	9.000	L1	9.8	31.3	55.8
0.160000	23.7	9.000	L1	9.8	31.7	55.5
0.164000	23.6	9.000	L1	9.8	31.6	55.3
0.168000	21.5	9.000	L1	9.8	33.5	55.1
0.182000	22.8	9.000	L1	9.8	31.6	54.4
0.192000	19.2	9.000	L1	9.8	34.7	53.9
0.998000	15.4	9.000	L1	9.8	30.6	46.0
1.240000	15.9	9.000	L1	9.8	30.1	46.0
1.288000	15.6	9.000	L1	9.9	30.4	46.0
1.404000	15.0	9.000	L1	9.9	31.0	46.0
1.408000	15.2	9.000	L1	9.9	30.8	46.0
1.434000	14.8	9.000	L1	9.9	31.2	46.0
12.706000	37.1	9.000	L1	10.3	12.9	50.0
13.580000	37.3	9.000	L1	10.3	12.7	50.0
13.602000	37.3	9.000	L1	10.3	12.7	50.0
13.704000	37.4	9.000	L1	10.3	12.6	50.0
13.800000	37.5	9.000	L1	10.3	12.5	50.0
14.114000	37.7	9.000	L1	10.3	12.3	50.0

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



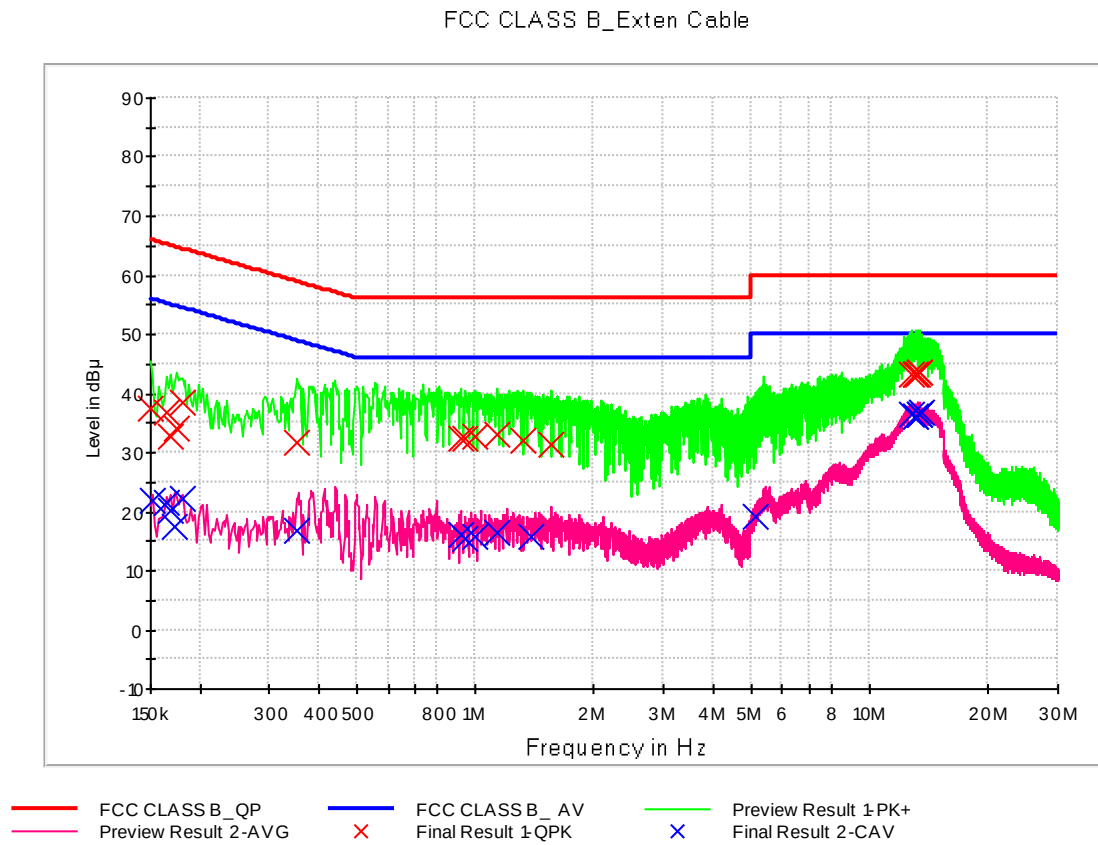
QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.156000	45.0	9.000	N	9.8	20.7	65.7
0.164000	42.2	9.000	N	9.8	23.1	65.3
0.168000	40.1	9.000	N	9.8	24.9	65.1
0.174000	38.7	9.000	N	9.8	26.1	64.8
0.180000	41.7	9.000	N	9.8	22.7	64.5
0.188000	40.7	9.000	N	9.8	23.5	64.1
1.026000	33.4	9.000	N	9.8	22.6	56.0
1.066000	32.0	9.000	N	9.8	24.0	56.0
5.060000	31.9	9.000	N	10.0	28.1	60.0
5.100000	32.1	9.000	N	10.0	27.9	60.0
5.112000	32.5	9.000	N	10.0	27.5	60.0
5.160000	32.2	9.000	N	10.0	27.8	60.0
12.710000	39.5	9.000	N	10.4	20.5	60.0
13.414000	39.5	9.000	N	10.4	20.5	60.0
13.904000	39.9	9.000	N	10.4	20.1	60.0
13.922000	40.0	9.000	N	10.4	20.0	60.0
13.984000	40.2	9.000	N	10.4	19.8	60.0
14.240000	40.0	9.000	N	10.4	20.0	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.156000	26.7	9.000	N	9.8	29.0	55.7
0.168000	22.6	9.000	N	9.8	32.5	55.1
0.174000	21.1	9.000	N	9.8	33.6	54.8
0.182000	23.8	9.000	N	9.8	30.5	54.4
0.200000	19.0	9.000	N	9.8	34.6	53.6
0.208000	20.5	9.000	N	9.8	32.8	53.3
0.988000	15.6	9.000	N	9.8	30.4	46.0
1.026000	16.3	9.000	N	9.8	29.7	46.0
1.066000	16.4	9.000	N	9.8	29.6	46.0
1.140000	16.7	9.000	N	9.8	29.3	46.0
5.060000	17.5	9.000	N	10.0	32.5	50.0
5.112000	18.0	9.000	N	10.0	32.0	50.0
13.142000	33.5	9.000	N	10.4	16.5	50.0
13.746000	33.8	9.000	N	10.4	16.2	50.0
13.904000	34.0	9.000	N	10.4	16.0	50.0
13.922000	34.1	9.000	N	10.4	15.9	50.0
13.984000	34.2	9.000	N	10.4	15.8	50.0
14.048000	34.0	9.000	N	10.4	16.0	50.0

Figure 3: Conducted Emission (150 kHz to 30 MHz), Dual Recording mode, Line (L1)



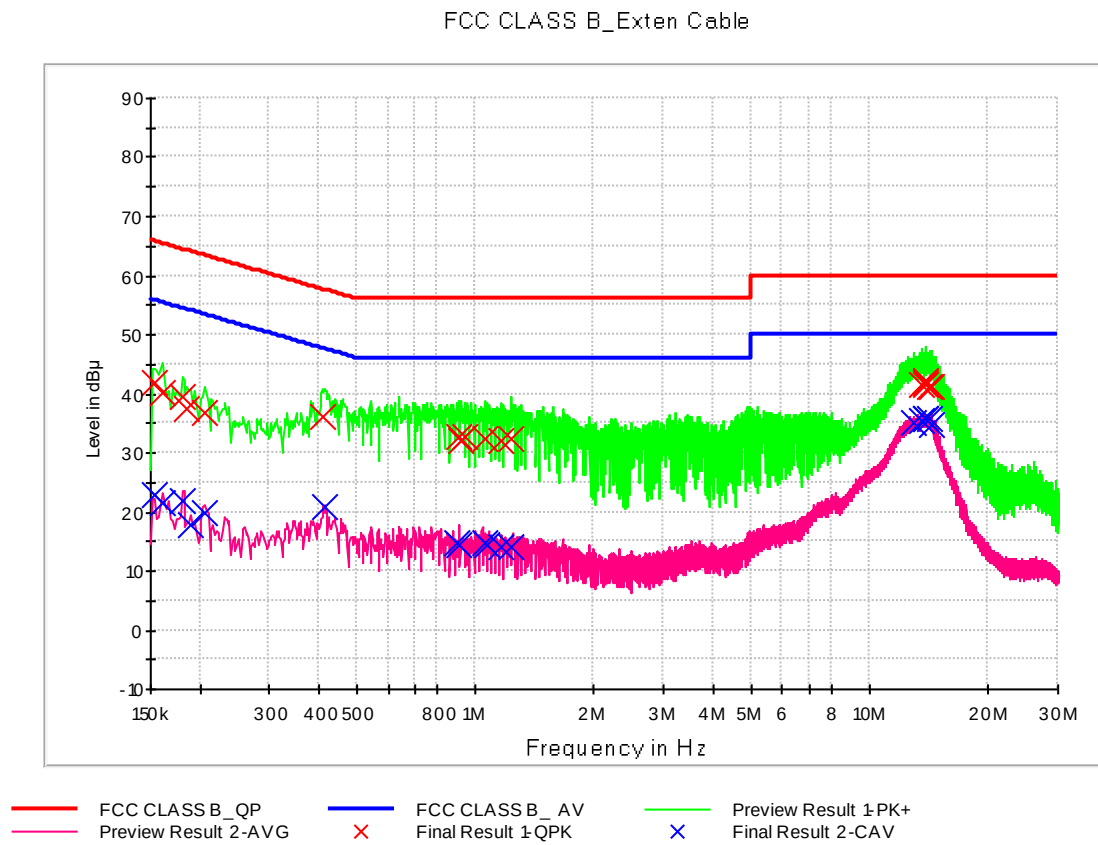
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	37.6	9.000	L1	9.8	28.4	66.0
0.164000	36.8	9.000	L1	9.8	28.4	65.3
0.168000	32.8	9.000	L1	9.8	32.2	65.1
0.174000	34.1	9.000	L1	9.8	30.7	64.8
0.180000	38.6	9.000	L1	9.8	25.9	64.5
0.354000	31.5	9.000	L1	9.8	27.3	58.9
0.914000	32.4	9.000	L1	9.8	23.6	56.0
0.936000	32.3	9.000	L1	9.8	23.7	56.0
1.000000	32.8	9.000	L1	9.8	23.2	56.0
1.134000	32.9	9.000	L1	9.8	23.1	56.0
1.320000	32.0	9.000	L1	9.9	24.0	56.0
1.560000	31.3	9.000	L1	9.9	24.7	56.0
12.834000	43.3	9.000	L1	10.3	16.7	60.0
13.024000	43.1	9.000	L1	10.3	16.9	60.0
13.028000	43.2	9.000	L1	10.3	16.8	60.0
13.156000	43.2	9.000	L1	10.3	16.8	60.0
13.378000	43.6	9.000	L1	10.3	16.4	60.0
13.434000	43.5	9.000	L1	10.3	16.5	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	21.8	9.000	L1	9.8	34.1	55.9
0.164000	21.7	9.000	L1	9.8	33.6	55.3
0.168000	20.2	9.000	L1	9.8	34.8	55.1
0.172000	17.4	9.000	L1	9.8	37.5	54.9
0.180000	22.3	9.000	L1	9.8	32.2	54.5
0.352000	16.8	9.000	L1	9.8	32.1	48.9
0.914000	16.3	9.000	L1	9.8	29.7	46.0
0.936000	15.6	9.000	L1	9.8	30.4	46.0
1.000000	15.9	9.000	L1	9.8	30.1	46.0
1.134000	16.4	9.000	L1	9.8	29.6	46.0
1.378000	15.9	9.000	L1	9.9	30.1	46.0
5.118000	19.3	9.000	L1	10.0	30.7	50.0
12.802000	36.5	9.000	L1	10.3	13.5	50.0
13.024000	36.1	9.000	L1	10.3	13.9	50.0
13.028000	36.1	9.000	L1	10.3	13.9	50.0
13.350000	36.3	9.000	L1	10.3	13.7	50.0
13.434000	36.6	9.000	L1	10.3	13.5	50.0
13.546000	36.6	9.000	L1	10.3	13.4	50.0

Figure 4: Conducted Emission (150 kHz to 30 MHz), Dual Recording mode, Line (N)



QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	41.8	9.000	N	9.8	24.0	65.8
0.160000	40.1	9.000	N	9.8	25.4	65.5
0.180000	39.6	9.000	N	9.8	24.9	64.5
0.186000	37.3	9.000	N	9.8	26.9	64.2
0.206000	36.9	9.000	N	9.8	26.4	63.4
0.408000	36.0	9.000	N	9.8	21.7	57.7
0.908000	32.6	9.000	N	9.8	23.4	56.0
0.914000	32.0	9.000	N	9.8	24.0	56.0
0.944000	32.6	9.000	N	9.8	23.4	56.0
1.052000	32.2	9.000	N	9.8	23.8	56.0
1.156000	32.0	9.000	N	9.8	24.0	56.0
1.234000	32.3	9.000	N	9.8	23.7	56.0
13.524000	41.5	9.000	N	10.4	18.5	60.0
13.858000	41.7	9.000	N	10.4	18.3	60.0
13.890000	41.9	9.000	N	10.4	18.1	60.0
13.942000	42.4	9.000	N	10.4	17.6	60.0
14.248000	41.1	9.000	N	10.4	18.9	60.0
14.334000	41.2	9.000	N	10.4	18.8	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	23.0	9.000	N	9.8	32.8	55.8
0.160000	21.6	9.000	N	9.8	33.9	55.5
0.180000	21.8	9.000	N	9.8	32.7	54.5
0.190000	17.9	9.000	N	9.8	36.2	54.0
0.206000	19.9	9.000	N	9.8	33.4	53.4
0.414000	20.7	9.000	N	9.8	26.9	47.6
0.896000	14.7	9.000	N	9.8	31.3	46.0
0.908000	14.4	9.000	N	9.8	31.6	46.0
1.052000	14.9	9.000	N	9.8	31.1	46.0
1.064000	14.4	9.000	N	9.8	31.6	46.0
1.156000	14.0	9.000	N	9.8	32.0	46.0
1.234000	14.0	9.000	N	9.8	32.0	46.0
12.988000	35.1	9.000	N	10.4	14.9	50.0
13.524000	35.6	9.000	N	10.4	14.4	50.0
13.890000	35.8	9.000	N	10.4	14.2	50.0
13.942000	35.9	9.000	N	10.4	14.1	50.0
14.248000	35.7	9.000	N	10.4	14.3	50.0
14.334000	34.8	9.000	N	10.4	15.2	50.0

4.2 Radiated Emission Below 1 GHz

4.2.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
☒	EMI test receiver	Rohde & Schwarz	ESU40	100524	1 year	05.12.2020
☒	Bi-Log antenna	Schwarzbeck	VULB 9168	255	2 year	03.26.2019
☒	Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
☒	Antenna master controller	INNCO Systems	CO3000	CO3000/870/ 35990515/L	N/A	-
☒	Turn table	INNCO Systems	1060	-	N/A	-
☒	Turn table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
☒	Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.19.2020
☒	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
☐	Radio communication test station	ANRITSU	MT8000A	6262036812	1 year	01.06.2020
☐	Radio communication analyzer	ANRITSU	MT8821C	6262044720	1 year	01.06.2020
☒	UXM 5G wireless test platform	KEYSIGHT	E7515B	MY58300756	1 year	01.07.2020
☒	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-201	-	-
☒	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	[EUT +TA] FRONT CAMERA & MP3 mode Display mode Dual Recording mode [EUT +Earphone] FRONT CAMERA & MP3 mode REAR CAMERA & FM RADIO mode WIRELESS CHARGING mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	21.6 / 24.1 / 23.7 / 22.9 °C
Relative Humidity	48.4 / 47.3 / 48.2 / 46.1 %
Test Date	August 06 / August 20 / August 21 / August 24, 2020

- 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

[EUT +TA] 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)
56.333040	20.5	100.0	V	303.0	19.5	19.5	40.0
166.432840	28.5	100.0	V	97.0	19.4	15.0	43.5
189.592000	26.4	100.0	V	192.0	17.5	17.1	43.5
273.000000	24.0	100.0	V	96.0	19.6	22.0	46.0
403.140640	26.7	100.0	H	285.0	22.9	19.3	46.0
900.670000	33.0	125.2	H	277.0	31.5	13.0	46.0

[EUT +TA] DISPLAY mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.092840	26.7	100.0	V	128.0	18.4	13.3	40.0
54.168680	27.6	100.0	V	262.0	19.6	12.4	40.0
125.370960	29.7	100.0	V	54.0	17.8	13.8	43.5
181.304440	27.5	174.8	H	168.0	18.2	16.0	43.5
334.317600	36.6	100.0	V	147.0	21.3	9.4	46.0
453.715200	34.0	100.0	V	40.0	24.1	12.0	46.0

[EUT +TA] Dual Recording mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
34.353000	21.0	100.0	V	140.0	18.6	19.0	40.0
83.891040	22.4	100.0	V	216.0	15.2	17.6	40.0
166.071440	27.1	100.0	V	178.0	19.4	16.4	43.5
189.845480	26.1	100.0	V	205.0	17.5	17.4	43.5
272.799840	24.2	100.0	V	157.0	19.5	21.8	46.0
943.134960	32.8	100.0	V	149.0	31.8	13.2	46.0

[EUT +Earphone] 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)
30.363640	18.7	225.0	V	82.0	18.3	21.3	40.0
73.975000	27.6	274.8	H	107.0	17.1	12.4	40.0
83.962680	23.4	225.2	H	96.0	15.2	16.6	40.0
114.488600	16.6	225.2	V	133.0	16.8	26.9	43.5
310.752000	20.0	274.7	H	333.0	20.7	26.0	46.0
931.477680	32.5	174.8	H	50.0	31.7	13.5	46.0

[EUT +Earphone] REAR CAMERA & FM RADIO mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
43.099800	19.8	208.9	H	133.0	19.2	20.2	40.0
75.952800	24.4	274.7	H	99.0	16.7	15.6	40.0
114.525960	19.2	174.9	V	97.0	16.8	24.3	43.5
159.678800	19.8	274.8	H	126.0	19.8	23.7	43.5
477.123960	24.5	275.0	H	72.0	24.6	21.5	46.0
782.472160	30.9	325.2	V	229.0	30.0	15.9	46.0

[EUT +Earphone] WIRELESS CHARGING mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
53.311720	24.8	174.8	V	230.0	19.7	15.2	40.0
87.900480	19.3	274.7	H	118.0	14.5	20.7	40.0
160.002760	29.6	100.0	V	121.0	19.8	13.9	43.5
213.334920	26.7	100.0	V	48.0	17.2	16.8	43.5
272.583280	22.1	100.0	H	142.0	19.5	23.9	46.0
864.221200	31.6	274.8	V	59.0	31.0	14.4	46.0

4.3 Radiated Emission Above 1 GHz

4.3.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
☒	EMI test receiver	Rohde & Schwarz	ESU40	100524	1 year	05.12.2020
☒	Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
☒	Antenna master controller	INNCO Systems	CO3000	CO3000/870/ 35990515/L	N/A	-
☒	Turn table	INNCO Systems	1060	-	N/A	-
☒	Turn table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
☒	Low noise amplifier	TESTEK	TK-PA18H	170034-L	1 year	03.03.2020
☒	Low noise amplifier	TESTEK	TK-PA1840H	170030-L	1 year	02.13.2020
☒	Radio communication analyzer	ANRITSU	MT8820C	6201138643	1 year	08.19.2020
☒	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-200	-	-
☐	Radio communication test station	ANRITSU	MT8000A	6262036812	1 year	01.06.2020
☐	Radio communication analyzer	ANRITSU	MT8821C	6262044720	1 year	01.06.2020
☒	UXM 5G wireless test platform	KEYSIGHT	E7515B	MY58300756	1 year	01.07.2020
☒	Antenna (for Communication)	Schwarzbeck	USLP9142	VSLP 9142-201	-	-
☒	Horn antenna	Schwarzbeck	BBHA 9120D	01836	1 year	07.23.2020
☒	Horn antenna	Schwarzbeck	BBHA 9170	BBHA9170#786	1 year	12.03.2019
☒	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	[EUT +TA] FRONT CAMERA & MP3 mode Display mode Dual Recording mode [EUT +Earphone] FRONT CAMERA & MP3 mode REAR CAMERA & FM RADIO mode WIRELESS CHARGING mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	21.6 / 23.3 / 23.7 / 22.9 °C
Relative Humidity	48.4 / 46.8 / 48.2 / 46.1 %
Test Date	August 06 / August 19 / August 21 / August 24, 2020

- 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

[EUT +TA] FRONT CAMERA & MP3 mode

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1700.850000	30.7	150.0	V	28.0	-27.1	43.3	74.0
2520.655000	32.1	149.5	V	150.0	-24.0	41.9	74.0
5541.315000	36.1	217.4	V	215.0	-17.1	37.9	74.0
9204.995000	42.7	140.7	V	341.0	-10.1	31.3	74.0
13770.360000	45.4	149.6	V	191.0	-2.3	28.6	74.0
17943.370000	54.9	136.6	H	0.0	8.8	19.1	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1700.850000	18.3	150.0	V	28.0	-27.1	35.7	54.0
2520.655000	19.4	149.5	V	150.0	-24.0	34.6	54.0
5541.315000	23.5	217.4	V	215.0	-17.1	30.5	54.0
9204.995000	30.1	140.7	V	341.0	-10.1	23.9	54.0
13770.360000	32.8	149.6	V	191.0	-2.3	21.2	54.0
17943.370000	42.5	136.6	H	0.0	8.8	11.5	54.0

[EUT +TA] DISPLAY mode

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1039.620000	34.9	138.6	V	236.0	-29.1	39.1	74.0
1631.310000	36.3	291.5	V	183.0	-27.3	37.7	74.0
2485.140000	43.2	190.4	V	205.0	-24.1	30.8	74.0
5399.950000	47.4	299.6	V	164.0	-17.3	26.6	74.0
14239.710000	46.8	150.0	V	95.0	-1.2	27.2	74.0
17988.597090	55.8	292.5	V	0.0	9.5	18.2	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1039.620000	21.9	138.6	V	236.0	-29.1	32.1	54.0
1631.310000	24.0	291.5	V	183.0	-27.3	30.0	54.0
2485.140000	36.9	190.4	V	205.0	-24.1	17.1	54.0
5399.950000	44.1	299.6	V	164.0	-17.3	9.9	54.0
14239.710000	34.0	150.0	V	95.0	-1.2	20.0	54.0
17988.597090	42.9	292.5	V	0.0	9.5	11.1	54.0

[EUT +TA] Dual Recording mode

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1386.585000	32.1	249.9	V	242.0	-28.0	41.9	74.0
2698.120000	33.0	150.0	V	307.0	-23.4	41.0	74.0
5226.805000	36.3	177.5	V	275.0	-17.5	37.7	74.0
7552.880000	41.0	187.5	H	111.0	-11.9	33.0	74.0
13234.455000	45.4	149.5	V	194.0	-3.2	28.6	74.0
17955.650000	55.4	139.8	V	176.0	9.0	18.6	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1386.585000	18.8	249.9	V	242.0	-28.0	35.2	54.0
2698.120000	20.4	150.0	V	307.0	-23.4	33.6	54.0
5226.805000	23.6	177.5	V	275.0	-17.5	30.4	54.0
7552.880000	28.1	187.5	H	111.0	-11.9	25.9	54.0
13234.455000	32.1	149.5	V	194.0	-3.2	21.9	54.0
17955.650000	42.7	139.8	V	176.0	9.0	11.3	54.0

[EUT +Earphone] FRONT CAMERA & MP3 mode

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1374.095000	31.7	126.6	V	68.0	-28.0	42.3	74.0
2448.730000	32.3	110.4	V	309.0	-24.3	41.7	74.0
5359.000000	36.0	139.8	V	197.0	-17.3	38.0	74.0
8959.710000	42.1	249.8	V	12.0	-10.6	31.9	74.0
14475.775000	48.0	249.9	V	216.0	-0.4	26.0	74.0
17940.790000	55.5	100.0	V	226.0	8.8	18.5	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1374.095000	18.8	126.6	V	68.0	-28.0	35.2	54.0
2448.730000	19.8	110.4	V	309.0	-24.3	34.2	54.0
5359.000000	23.6	139.8	V	197.0	-17.3	30.4	54.0
8959.710000	29.4	249.8	V	12.0	-10.6	24.6	54.0
14475.775000	35.3	249.9	V	216.0	-0.4	18.7	54.0
17940.790000	42.6	100.0	V	226.0	8.8	11.4	54.0

[EUT +Earphone] REAR CAMERA & FM RADIO mode

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1371.750000	30.8	139.8	H	352.0	-28.0	43.2	74.0
4991.625000	35.9	150.0	H	240.0	-17.7	38.1	74.0
7367.415000	40.5	150.1	V	0.0	-12.3	33.5	74.0
9885.635000	43.0	199.5	H	103.0	-8.7	31.0	74.0
13311.650000	43.9	150.0	V	109.0	-3.0	30.1	74.0
17983.579500	55.7	201.6	H	249.0	9.4	18.3	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1371.750000	18.6	139.8	H	352.0	-28.0	35.4	54.0
4991.625000	23.2	150.0	H	240.0	-17.7	30.8	54.0
7367.415000	27.9	150.1	V	0.0	-12.3	26.1	54.0
9885.635000	30.4	199.5	H	103.0	-8.7	23.6	54.0
13311.650000	31.2	150.0	V	109.0	-3.0	22.8	54.0
17983.579500	42.6	201.6	H	249.0	9.4	11.4	54.0

[EUT +Earphone] WIRELESS CHARGING mode

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
2027.840000	31.5	277.6	H	320.0	-26.3	42.6	74.0
5632.055000	36.8	220.4	V	237.0	-16.9	37.2	74.0
7301.565000	40.6	249.8	V	0.0	-12.5	33.4	74.0
11332.940000	45.7	350.0	V	240.0	-4.5	28.3	74.0
14512.095000	48.2	137.5	V	53.0	-0.4	25.8	74.0
17972.620000	55.3	277.4	V	55.0	9.2	18.7	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
2027.840000	18.8	277.6	H	320.0	-26.3	35.2	54.0
5632.055000	23.8	220.4	V	237.0	-16.9	30.2	54.0
7301.565000	27.5	249.8	V	0.0	-12.5	26.5	54.0
11332.940000	32.3	350.0	V	240.0	-4.5	21.7	54.0
14512.095000	35.0	137.5	V	53.0	-0.4	19.0	54.0
17972.620000	42.6	277.4	V	55.0	9.2	11.4	54.0

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-FC023-P	August 26, 2020	Initial Release

End of report