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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-FC003-R1

DATE OF ISSUE
September 07, 2020

Tested by
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TEST REPORT

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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 Model Name Series Model Name	Multi-band CDMA/GSM/EDGE/WCDMA/LTE/5G NR Phone with WLAN, BT and RFID LM-F100TM Refer to the clause 1.1 Description of EUT
Travel Adaptor Information	Model name: MCS-P02WR Manufacturer: SUNLIN
Date of Test	July 23, 2020 to August 06, 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 07, 2020	Initial Release
1	September 07, 2020	Revised the frequency band

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 denial 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.

CONTENTS

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)

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-P02WR	-	SUNLIN
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 ac cordance with the manufacturers recommendations for utilizing calibration equipment, which is traceable to recognized national standards. Espectially, 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

a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
g. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.
(1 GHz to 40 GHz)

Radiated Emission Limits

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

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

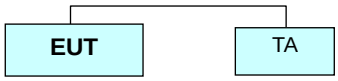
2.2.1 Frequency Range of Radiated Measurements

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

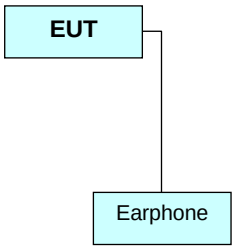
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 ㎓, whichever is lower

2.3 Configuration of Tested System

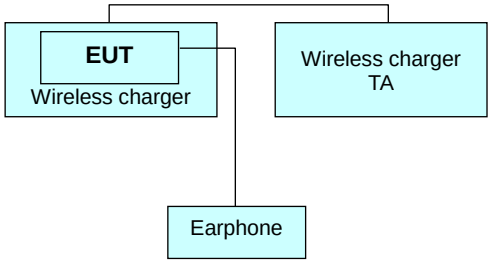
[Camera, MP3, Idle, Dual Recording mode]



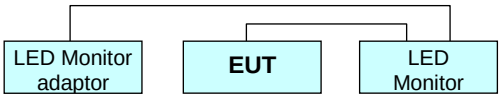
[Camera, MP3, FM Radio mode]



[Wireless Charging Mode]



[Display Mode]



Non-Conductive Table
Power Line: 120 VAC, 60 Hz

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	-	-
☒	Software	Rohde & Schwarz	EMC32	-	-	-

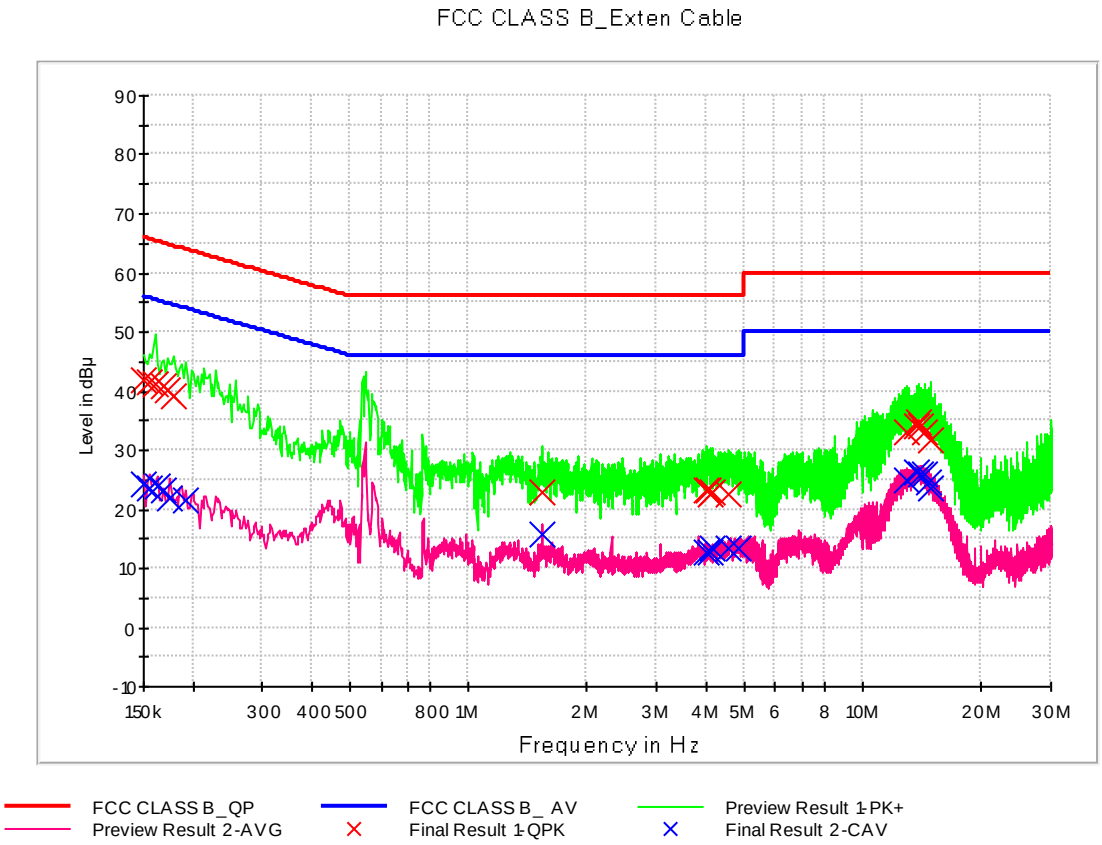
4.1.2 Operating Condition

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	24.2 / 24.4 / 21.9 °C
Relative Humidity	48.1 / 45.1 / 48.3 %
Test Date	July 23 / July 29 / August 06, 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	41.9	9.000	L1	9.8	24.1	66.0
0.156000	41.4	9.000	L1	9.8	24.2	65.7
0.160000	41.3	9.000	L1	9.8	24.2	65.5
0.168000	40.8	9.000	L1	9.8	24.3	65.1
0.172000	40.2	9.000	L1	9.8	24.7	64.9
0.178000	39.2	9.000	L1	9.8	25.4	64.6
1.534000	23.0	9.000	L1	9.9	33.0	56.0
4.028000	23.3	9.000	L1	10.0	32.7	56.0
4.068000	23.3	9.000	L1	10.0	32.7	56.0
4.096000	22.7	9.000	L1	10.0	33.3	56.0
4.154000	22.8	9.000	L1	10.0	33.2	56.0
4.558000	22.7	9.000	L1	10.0	33.3	56.0
12.904000	33.1	9.000	L1	10.3	26.9	60.0
13.682000	34.0	9.000	L1	10.3	26.0	60.0
13.828000	34.7	9.000	L1	10.3	25.3	60.0
14.004000	33.9	9.000	L1	10.3	26.1	60.0
14.424000	33.0	9.000	L1	10.4	27.0	60.0
14.938000	31.7	9.000	L1	10.4	28.3	60.0

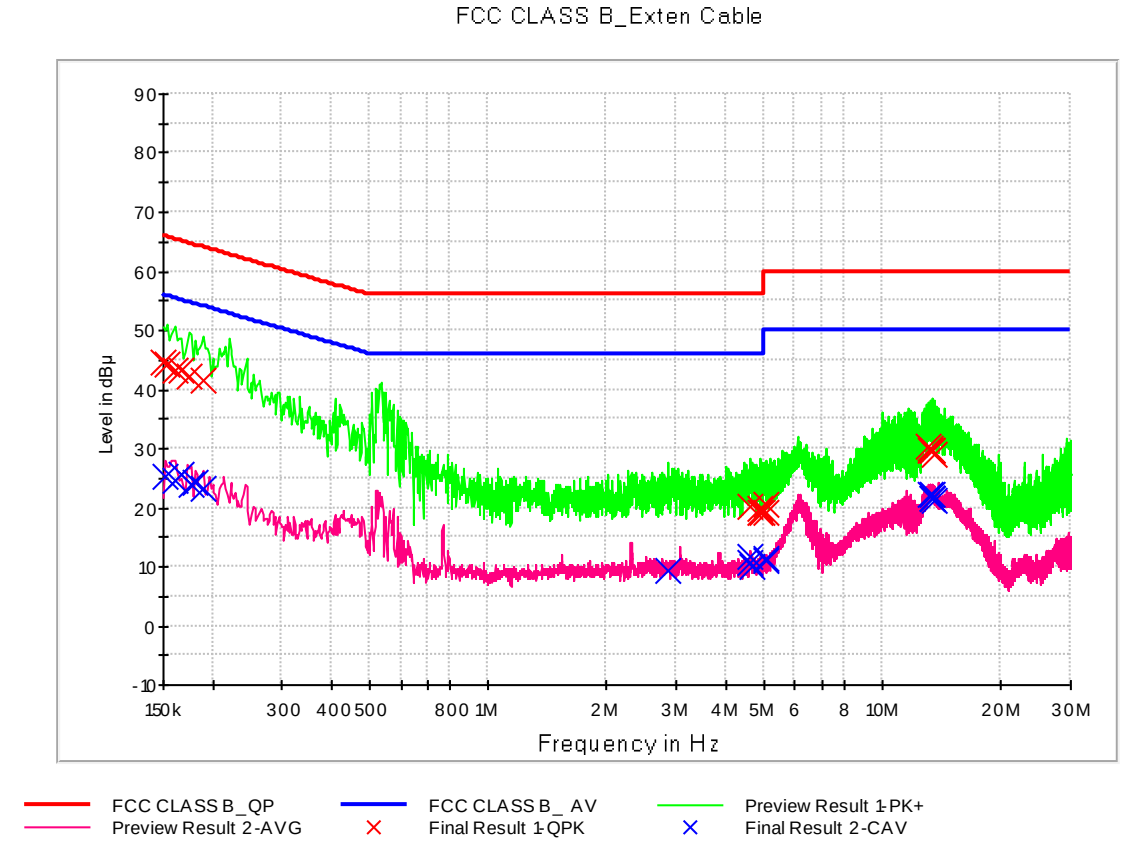
Calculation Formula:

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)
0.150000	24.2	9.000	L1	9.8	31.8	56.0
0.156000	23.6	9.000	L1	9.8	32.1	55.7
0.162000	24.0	9.000	L1	9.8	31.4	55.4
0.168000	23.3	9.000	L1	9.8	31.8	55.1
0.174000	21.9	9.000	L1	9.8	32.9	54.8
0.192000	21.6	9.000	L1	9.8	32.3	53.9
1.536000	15.9	9.000	L1	9.9	30.1	46.0
4.028000	12.8	9.000	L1	10.0	33.2	46.0
4.096000	12.8	9.000	L1	10.0	33.2	46.0
4.154000	13.2	9.000	L1	10.0	32.8	46.0
4.558000	13.4	9.000	L1	10.0	32.6	46.0
4.816000	13.3	9.000	L1	10.0	32.7	46.0
12.904000	24.8	9.000	L1	10.3	25.2	50.0
13.682000	26.2	9.000	L1	10.3	23.8	50.0
14.004000	25.9	9.000	L1	10.3	24.1	50.0
14.424000	25.9	9.000	L1	10.4	24.1	50.0
14.658000	24.5	9.000	L1	10.4	25.5	50.0
14.938000	23.7	9.000	L1	10.4	26.3	50.0

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



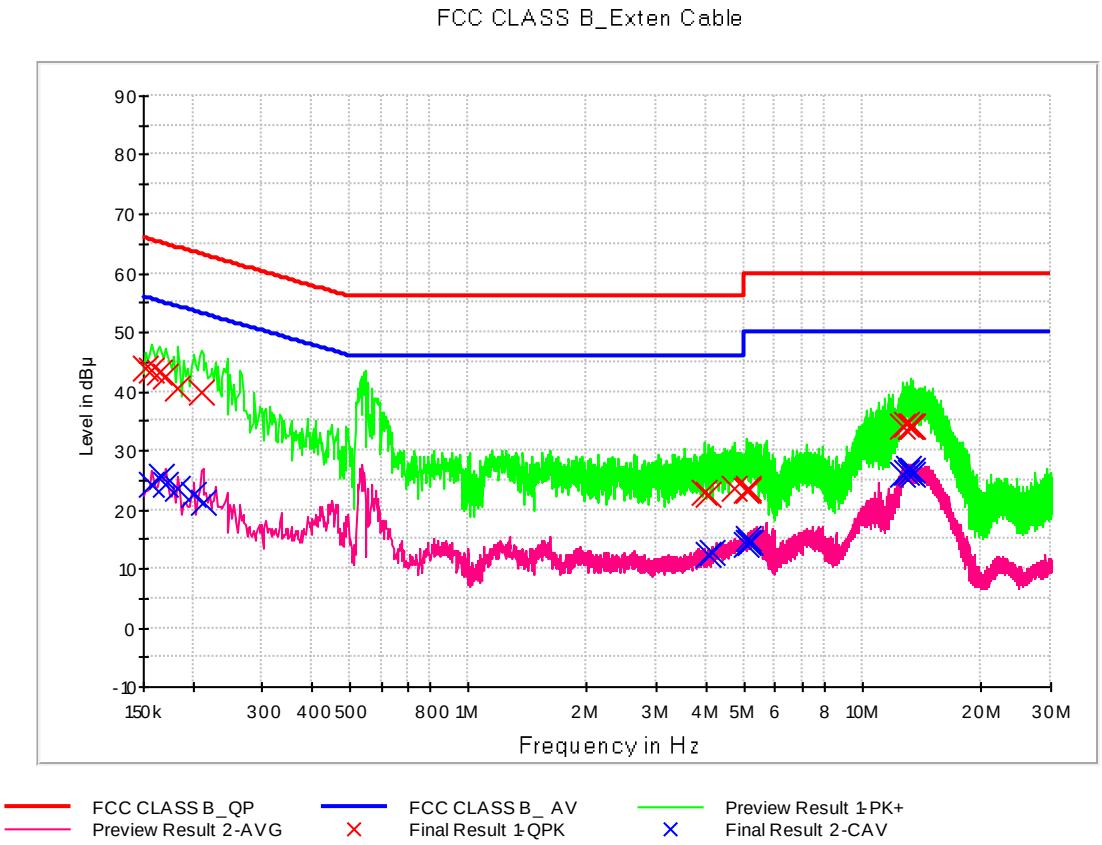
QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	44.5	9.000	N	9.8	21.5	66.0
0.154000	44.2	9.000	N	9.8	21.6	65.8
0.160000	43.1	9.000	N	9.8	22.4	65.5
0.166000	43.1	9.000	N	9.8	22.1	65.2
0.174000	42.2	9.000	N	9.8	22.6	64.8
0.190000	41.6	9.000	N	9.8	22.4	64.0
4.628000	20.1	9.000	N	10.0	35.9	56.0
4.886000	19.9	9.000	N	10.0	36.1	56.0
4.890000	19.3	9.000	N	10.0	36.7	56.0
4.936000	19.3	9.000	N	10.0	36.7	56.0
5.074000	19.1	9.000	N	10.0	40.9	60.0
5.092000	20.6	9.000	N	10.0	39.4	60.0
13.102000	30.5	9.000	N	10.4	29.5	60.0
13.242000	29.7	9.000	N	10.4	30.3	60.0
13.256000	30.0	9.000	N	10.4	30.0	60.0
13.310000	29.8	9.000	N	10.4	30.2	60.0
13.410000	29.8	9.000	N	10.4	30.2	60.0
13.580000	29.1	9.000	N	10.4	30.9	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152000	25.3	9.000	N	9.8	30.6	55.9
0.160000	24.7	9.000	N	9.8	30.8	55.5
0.166000	25.7	9.000	N	9.8	29.4	55.2
0.176000	23.8	9.000	N	9.8	30.9	54.7
0.180000	24.1	9.000	N	9.8	30.4	54.5
0.190000	23.2	9.000	N	9.8	30.8	54.0
2.862000	9.5	9.000	N	9.9	36.5	46.0
4.608000	11.7	9.000	N	10.0	34.3	46.0
4.628000	10.6	9.000	N	10.0	35.4	46.0
4.650000	10.0	9.000	N	10.0	36.0	46.0
5.074000	11.2	9.000	N	10.0	38.8	50.0
5.092000	11.2	9.000	N	10.0	38.8	50.0
13.242000	22.2	9.000	N	10.4	27.8	50.0
13.310000	22.2	9.000	N	10.4	27.8	50.0
13.364000	21.6	9.000	N	10.4	28.4	50.0
13.410000	21.6	9.000	N	10.4	28.4	50.0
13.458000	21.4	9.000	N	10.4	28.6	50.0
13.582000	21.2	9.000	N	10.4	28.8	50.0

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



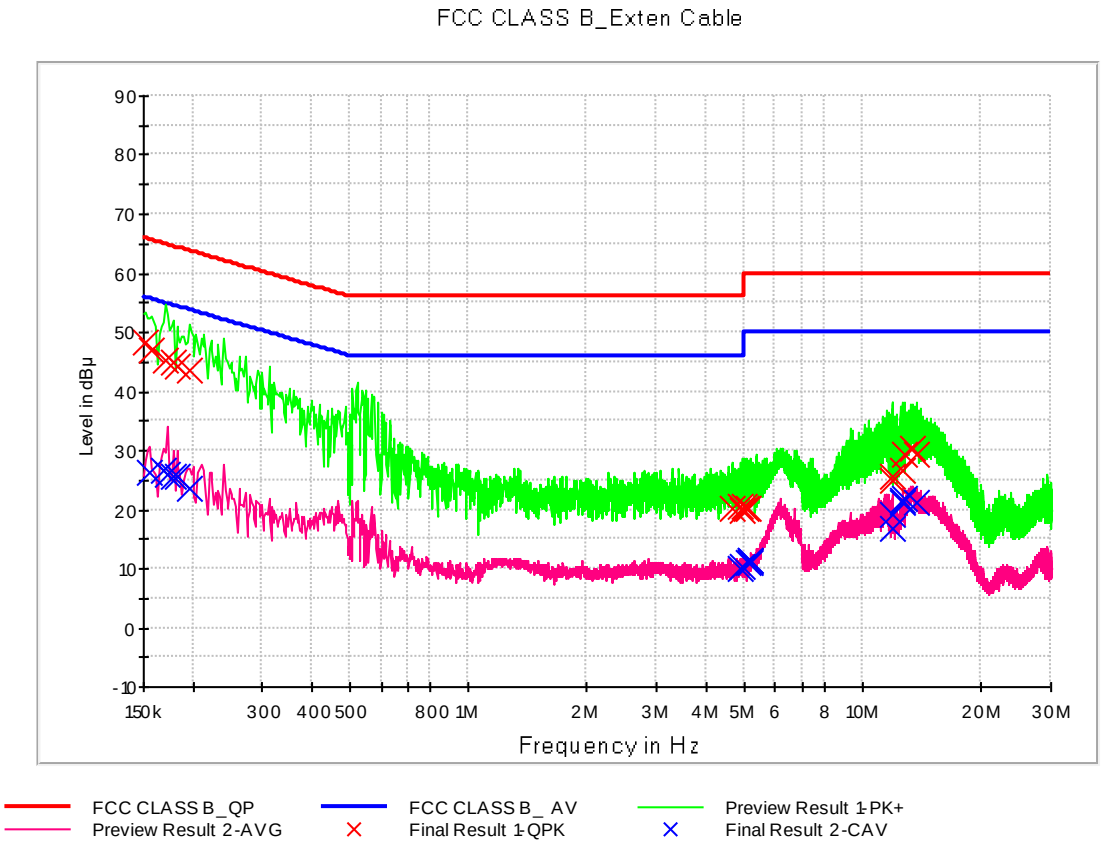
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152000	43.9	9.000	L1	9.8	22.0	65.9
0.158000	43.6	9.000	L1	9.8	22.0	65.6
0.164000	43.4	9.000	L1	9.8	21.9	65.3
0.170000	42.5	9.000	L1	9.8	22.5	65.0
0.184000	40.7	9.000	L1	9.8	23.6	64.3
0.210000	39.9	9.000	L1	9.8	23.3	63.2
3.946000	22.8	9.000	L1	10.0	33.2	56.0
4.072000	22.7	9.000	L1	10.0	33.3	56.0
4.730000	23.5	9.000	L1	10.0	32.5	56.0
5.062000	23.3	9.000	L1	10.0	36.7	60.0
5.112000	23.3	9.000	L1	10.0	36.7	60.0
5.130000	23.6	9.000	L1	10.0	36.4	60.0
12.682000	34.1	9.000	L1	10.3	25.9	60.0
12.898000	34.4	9.000	L1	10.3	25.6	60.0
13.220000	34.1	9.000	L1	10.3	25.9	60.0
13.276000	34.1	9.000	L1	10.3	25.9	60.0
13.312000	34.0	9.000	L1	10.3	26.0	60.0
13.316000	33.9	9.000	L1	10.3	26.1	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	24.1	9.000	L1	9.8	31.5	55.6
0.166000	25.6	9.000	L1	9.8	29.5	55.2
0.170000	24.2	9.000	L1	9.8	30.7	55.0
0.184000	23.6	9.000	L1	9.8	30.7	54.3
0.202000	22.5	9.000	L1	9.8	31.0	53.5
0.212000	21.2	9.000	L1	9.8	32.0	53.1
4.072000	12.3	9.000	L1	10.0	33.7	46.0
4.172000	12.7	9.000	L1	10.0	33.3	46.0
5.062000	14.2	9.000	L1	10.0	35.8	50.0
5.112000	14.4	9.000	L1	10.0	35.6	50.0
5.130000	15.2	9.000	L1	10.0	34.8	50.0
5.168000	14.4	9.000	L1	10.0	35.6	50.0
12.682000	25.8	9.000	L1	10.3	24.2	50.0
12.898000	26.4	9.000	L1	10.3	23.6	50.0
13.096000	27.1	9.000	L1	10.3	22.9	50.0
13.220000	26.3	9.000	L1	10.3	23.7	50.0
13.312000	26.8	9.000	L1	10.3	23.2	50.0
13.316000	26.0	9.000	L1	10.3	24.0	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)
0.152000	48.2	9.000	N	9.8	17.7	65.9
0.158000	47.0	9.000	N	9.8	18.5	65.6
0.170000	45.2	9.000	N	9.8	19.8	65.0
0.178000	44.8	9.000	N	9.8	19.8	64.6
0.182000	44.4	9.000	N	9.8	20.0	64.4
0.196000	43.7	9.000	N	9.8	20.1	63.8
4.674000	20.0	9.000	N	10.0	36.0	56.0
4.894000	20.4	9.000	N	10.0	35.6	56.0
4.932000	19.7	9.000	N	10.0	36.3	56.0
5.020000	20.5	9.000	N	10.0	39.5	60.0
5.072000	20.2	9.000	N	10.0	39.8	60.0
5.144000	20.2	9.000	N	10.0	39.8	60.0
11.862000	25.0	9.000	N	10.3	35.0	60.0
11.970000	25.6	9.000	N	10.3	34.4	60.0
12.674000	26.7	9.000	N	10.4	33.3	60.0
12.730000	29.2	9.000	N	10.4	30.8	60.0
13.368000	30.2	9.000	N	10.4	29.8	60.0
13.776000	29.3	9.000	N	10.4	30.7	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.156000	26.4	9.000	N	9.8	29.3	55.7
0.168000	26.7	9.000	N	9.8	28.3	55.1
0.172000	25.8	9.000	N	9.8	29.1	54.9
0.178000	25.6	9.000	N	9.8	29.0	54.6
0.182000	25.5	9.000	N	9.8	28.9	54.4
0.196000	23.6	9.000	N	9.8	30.2	53.8
4.894000	10.0	9.000	N	10.0	36.0	46.0
4.932000	10.2	9.000	N	10.0	35.8	46.0
5.144000	11.0	9.000	N	10.0	39.0	50.0
5.166000	11.0	9.000	N	10.0	39.0	50.0
5.182000	11.3	9.000	N	10.0	38.7	50.0
5.194000	11.5	9.000	N	10.0	38.5	50.0
11.862000	16.9	9.000	N	10.3	33.1	50.0
11.914000	19.1	9.000	N	10.3	30.9	50.0
12.622000	21.1	9.000	N	10.4	28.9	50.0
12.674000	21.5	9.000	N	10.4	28.5	50.0
12.730000	21.8	9.000	N	10.4	28.2	50.0
13.776000	21.2	9.000	N	10.4	28.8	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	08.20.2019
☒	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	24.1 / 22.9 / 22.1 / 21.6 °C
Relative Humidity	47.2 / 47.4 / 49.2 / 48.4 %
Test Date	July 24 / August 04 / August 05 / August 06, 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)
43.256360	23.6	174.8	V	126.0	19.3	16.4	40.0
67.890400	26.5	100.0	V	278.0	18.3	13.5	40.0
104.462880	22.3	100.0	V	318.0	15.7	21.3	43.5
166.201040	25.3	100.0	V	152.0	19.4	18.2	43.5
294.796840	22.0	117.7	H	94.0	20.3	24.0	46.0
634.895480	27.7	125.1	H	359.0	27.8	18.3	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)
33.867800	25.5	100.0	V	167.0	18.6	14.5	40.0
48.715680	23.8	100.0	V	59.0	19.7	16.2	40.0
133.477520	28.3	100.0	V	167.0	18.5	15.2	43.5
334.295200	33.6	100.0	V	142.0	21.3	12.4	46.0
477.620000	31.2	100.0	V	53.0	24.1	14.8	46.0
671.379760	31.2	191.8	V	214.0	28.3	14.8	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)
34.450000	20.7	100.0	V	131.0	18.6	19.3	40.0
44.337400	21.8	100.0	V	16.0	19.3	18.2	40.0
66.492920	23.9	100.0	V	17.0	18.5	16.1	40.0
102.993840	23.2	100.0	V	299.0	15.5	20.3	43.5
137.694560	24.5	100.0	V	185.0	18.8	19.0	43.5
346.396400	23.8	100.0	H	71.0	21.6	22.2	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)
63.991960	19.0	274.9	V	175.0	18.8	21.0	40.0
78.255320	21.6	325.1	H	292.0	16.2	18.4	40.0
114.570000	20.5	274.8	V	0.0	16.8	23.0	43.5
165.841880	21.8	174.9	H	103.0	19.4	21.7	43.5
276.697840	19.2	125.3	H	256.0	19.7	26.8	46.0
393.290160	21.4	100.0	H	356.0	22.7	24.6	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)
76.936680	25.3	274.7	H	115.0	16.5	14.7	40.0
83.982720	22.8	225.0	H	107.0	15.1	17.2	40.0
114.496920	17.3	206.8	V	160.0	16.8	26.2	43.5
166.029040	21.5	125.3	H	108.0	19.4	22.0	43.5
324.672880	20.1	274.8	V	0.0	21.1	25.9	46.0
904.676080	31.4	325.0	V	138.0	31.5	14.6	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)
57.208600	21.3	100.0	V	307.0	19.5	18.7	40.0
89.457720	20.8	274.8	H	91.0	14.3	22.7	43.5
152.258560	23.2	100.0	V	202.0	19.5	20.3	43.5
213.373560	24.1	100.0	V	102.0	17.2	19.4	43.5
266.726880	23.7	125.2	H	0.0	19.3	22.3	46.0
653.566760	27.9	117.8	V	120.0	28.1	18.1	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	08.20.2019
☒	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	E7515B	KEYSIGHT	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	23.5 / 21.9 / 22.6 / 22.1 / 21.6 °C
Relative Humidity	45.1 / 44.6 / 46.1 / 49.2 / 48.4 %
Test Date	July 29 / July 30 / July 31 / August 05 / August 06, 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)
2005.835000	31.7	100.0	V	0.0	-26.4	42.3	74.0
3137.720000	34.4	149.6	V	214.0	-22.3	39.6	74.0
4972.545000	36.4	100.0	V	181.0	-17.8	37.6	74.0
7353.250000	40.9	249.9	V	44.0	-12.3	33.1	74.0
11021.930000	46.1	150.0	V	0.0	-5.0	27.9	74.0
17995.885000	55.8	202.4	H	116.0	9.6	18.2	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2005.835000	18.5	100.0	V	0.0	-26.4	35.5	54.0
3137.720000	20.5	149.6	V	214.0	-22.3	33.5	54.0
4972.545000	23.4	100.0	V	181.0	-17.8	30.6	54.0
7353.250000	28.0	249.9	V	44.0	-12.3	26.0	54.0
11021.930000	32.4	150.0	V	0.0	-5.0	21.6	54.0
17995.885000	42.8	202.4	H	116.0	9.6	11.2	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)
1407.085000	36.3	125.7	H	263.0	-27.9	37.7	74.0
2485.230000	42.2	189.5	V	207.0	-24.1	31.8	74.0
5399.940000	46.8	336.5	V	164.0	-17.3	27.2	74.0
11010.900000	46.1	150.0	V	328.0	-5.0	27.9	74.0
14478.090000	47.8	125.8	H	215.0	-0.4	26.2	74.0
17987.398920	55.4	139.6	V	106.0	9.5	18.6	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1407.085000	23.2	125.7	H	263.0	-27.9	30.8	54.0
2485.230000	36.0	189.5	V	207.0	-24.1	18.0	54.0
5399.940000	43.0	336.5	V	164.0	-17.3	11.0	54.0
11010.900000	32.6	150.0	V	328.0	-5.0	21.4	54.0
14478.090000	35.5	125.8	H	215.0	-0.4	18.5	54.0
17987.398920	42.8	139.6	V	106.0	9.5	11.2	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)
2020.310000	31.4	100.0	V	58.0	-26.3	42.6	74.0
3283.675000	33.4	149.5	V	98.0	-22.2	40.6	74.0
5273.920000	36.5	100.0	H	62.0	-17.4	37.5	74.0
9862.385000	43.3	233.5	V	291.0	-8.8	30.7	74.0
14456.580000	48.2	100.0	H	269.0	-0.5	25.8	74.0
17981.605890	55.0	137.6	V	11.0	9.4	19.0	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2020.310000	18.8	100.0	V	58.0	-26.3	35.2	54.0
3283.675000	20.4	149.5	V	98.0	-22.2	33.6	54.0
5273.920000	23.7	100.0	H	62.0	-17.4	30.3	54.0
9862.385000	30.4	233.5	V	291.0	-8.8	23.6	54.0
14456.580000	35.4	100.0	H	269.0	-0.5	18.6	54.0
17981.605890	42.8	137.6	V	11.0	9.4	11.2	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)
1835.335000	31.4	100.0	V	63.0	-26.8	42.6	74.0
3023.150000	32.9	215.4	V	245.0	-22.5	41.1	74.0
7307.090000	40.5	149.6	V	176.0	-12.4	33.5	74.0
9457.165000	43.5	159.5	H	213.0	-9.6	30.5	74.0
14540.445000	48.0	188.4	V	232.0	-0.4	26.0	74.0
17970.225660	55.8	159.5	H	11.0	9.2	18.2	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1835.335000	17.7	100.0	V	63.0	-26.8	36.3	54.0
3023.150000	20.3	215.4	V	245.0	-22.5	33.7	54.0
7307.090000	27.5	149.6	V	176.0	-12.4	26.5	54.0
9457.165000	30.3	159.5	H	213.0	-9.6	23.7	54.0
14540.445000	34.8	188.4	V	232.0	-0.4	19.2	54.0
17970.225660	42.7	159.5	H	11.0	9.2	11.3	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)
1488.070000	30.2	100.0	V	0.0	-27.6	43.8	74.0
2473.270000	32.8	100.0	H	37.0	-24.2	41.2	74.0
4890.020000	36.3	125.6	H	289.0	-18.0	37.7	74.0
10055.330000	43.3	350.0	V	78.0	-8.3	30.7	74.0
14500.135000	47.7	100.0	H	171.0	-0.4	26.3	74.0
17977.779450	55.3	150.0	V	224.0	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)
1488.070000	17.3	100.0	V	0.0	-27.6	36.7	54.0
2473.270000	19.7	100.0	H	37.0	-24.2	34.3	54.0
4890.020000	23.4	125.6	H	289.0	-18.0	30.6	54.0
10055.330000	30.6	350.0	V	78.0	-8.3	23.4	54.0
14500.135000	35.2	100.0	H	171.0	-0.4	18.8	54.0
17977.779450	42.7	150.0	V	224.0	9.3	11.3	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)
1764.935000	31.8	150.0	V	37.0	-27.0	42.2	74.0
3119.225000	33.5	173.5	V	61.0	-22.4	40.5	74.0
4926.160000	36.5	111.4	V	141.0	-17.9	37.5	74.0
7395.760000	41.3	205.4	V	237.0	-12.2	32.7	74.0
13195.185000	45.6	249.5	V	116.0	-3.3	28.4	74.0
17930.555000	55.8	274.5	V	0.0	8.6	18.2	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1764.935000	18.4	150.0	V	37.0	-27.0	35.6	54.0
3119.225000	20.7	173.5	V	61.0	-22.4	33.3	54.0
4926.160000	23.6	111.4	V	141.0	-17.9	30.4	54.0
7395.760000	28.2	205.4	V	237.0	-12.2	25.8	54.0
13195.185000	32.5	249.5	V	116.0	-3.3	21.5	54.0
17930.555000	42.5	274.5	V	0.0	8.6	11.5	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-FC003-P	August 07, 2020	Initial Release

End of report