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HCT

TEST REPORT

EMI Test for FCC Certification of LM-F100VM Model

APPLICANT
LG Electronics USA, Inc.

REPORT NO.
HCT-EM-2008-FC013-R1

DATE OF ISSUE
September 07, 2020

Tested by
Ki-Min Lee (signature)

Technical Manager
Jeong-Hyun Choi (signature)

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FCC ID.
ZNFF100VM

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-F100VM Refer to the clause 1.1 Description of EUT
Travel Adaptor Information	Model name: MCS-P02WH Manufacturer: PHIHONG
Date of Test	July 30, 2020 to August 18, 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 19, 2020	Initial Release
1	September 07, 2020	Revised the frequency range

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	ZNFF100VM
Model Name	LM-F100VM
Series Model Name	LMF100VM, F100VM, LM-F101V, LMF101V, F101V
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) 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) 788 MHz to 798 MHz (LTE B14) 2 305 MHz to 2 315 MHz (LTE B30) 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) 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) 1 710 MHz to 1 780 MHz (5G NR n66) 37 000 MHz to 40 000 MHz (5G NR n260) 27 500 MHz to 28 350 MHz (5G NR n261)

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) 758 MHz to 768 MHz (LTE B14) 717 MHz to 728 MHz (LTE B29) 2 350 MHz to 2 360 MHz (LTE B30) 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) 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) 2 110 MHz to 2 200 MHz (5G NR n66) 37 000 MHz to 40 000 MHz (5G NR n260) 27 500 MHz to 28 350 MHz (5G NR n261)

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-F100VM	-	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	EAD65830101	-	LUXSHARE
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 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

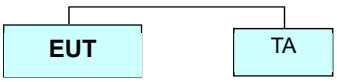
2.2.1 Frequency Range of Radiated Measurements

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

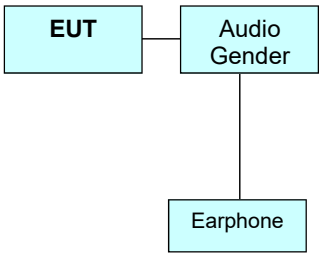
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 ㎓, whichever is lower

2.3 Configuration of Tested System

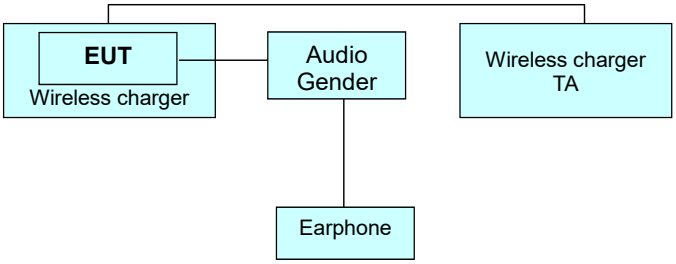
[Camera, MP3, Idle, Dual Recording mode]



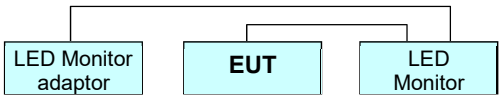
[Camera, MP3, FM Radio mode]



[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	-	-
☒	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	-	-	-

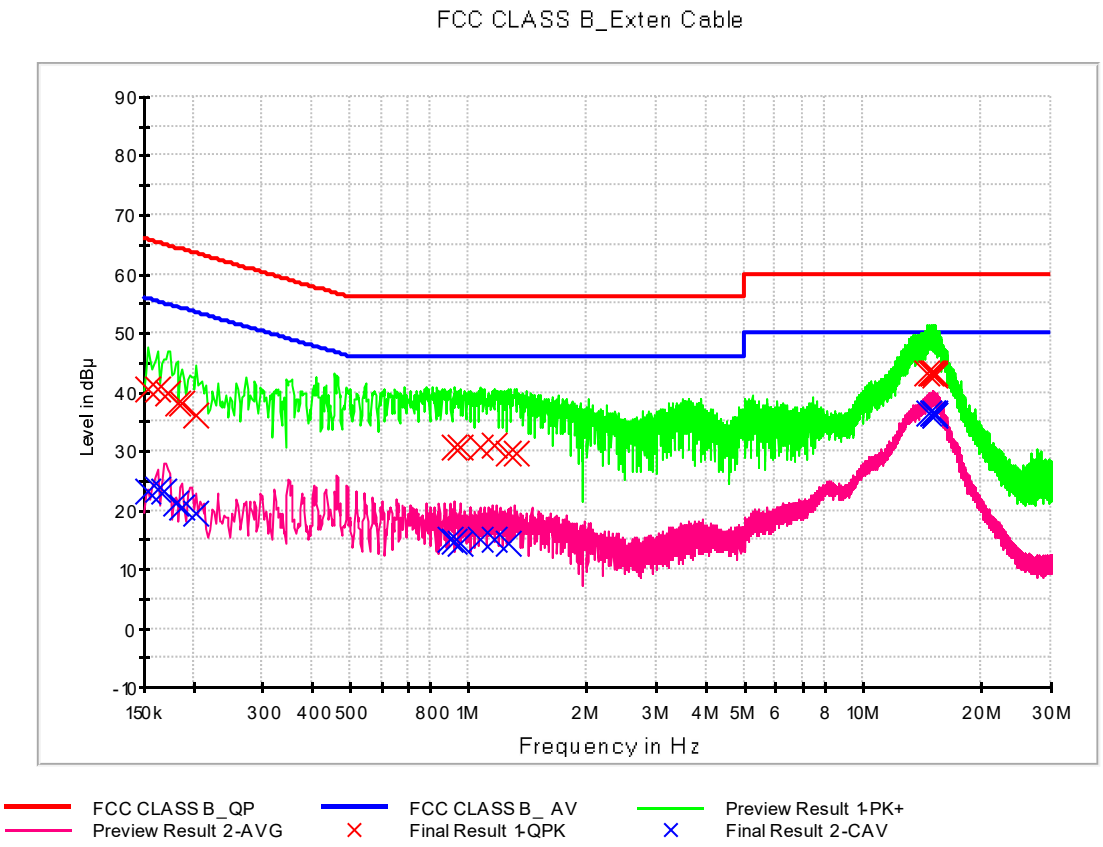
4.1.2 Operating Condition

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	REAR CAMERA mode Dual Recording mode
Kind of Test Site	EMI Shielded Room
Temperature	24.2 °C
Relative Humidity	48.5 %
Test Date	August 11, 2020

4.1.3 Measuring Data

Figure 1: Conducted Emission (150 kHz to 30 MHz), REAR CAMERA mode, **Line (L1)**



QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154000	40.4	9.000	L1	9.8	25.4	65.8
0.162000	40.4	9.000	L1	9.8	25.0	65.4
0.172000	39.7	9.000	L1	9.8	25.2	64.9
0.182000	38.0	9.000	L1	9.8	26.4	64.4
0.188000	38.1	9.000	L1	9.8	26.0	64.1
0.204000	36.2	9.000	L1	9.8	27.2	63.4
0.922000	30.8	9.000	L1	9.8	25.2	56.0
0.952000	30.8	9.000	L1	9.8	25.2	56.0
1.064000	30.6	9.000	L1	9.8	25.4	56.0
1.168000	30.9	9.000	L1	9.8	25.1	56.0
1.260000	29.7	9.000	L1	9.9	26.3	56.0
1.326000	29.8	9.000	L1	9.9	26.2	56.0
14.604000	43.2	9.000	L1	10.4	16.8	60.0
14.876000	43.2	9.000	L1	10.4	16.8	60.0
15.010000	43.1	9.000	L1	10.4	16.9	60.0
15.102000	43.1	9.000	L1	10.4	16.9	60.0
15.184000	43.1	9.000	L1	10.4	16.9	60.0
15.288000	42.7	9.000	L1	10.4	17.3	60.0

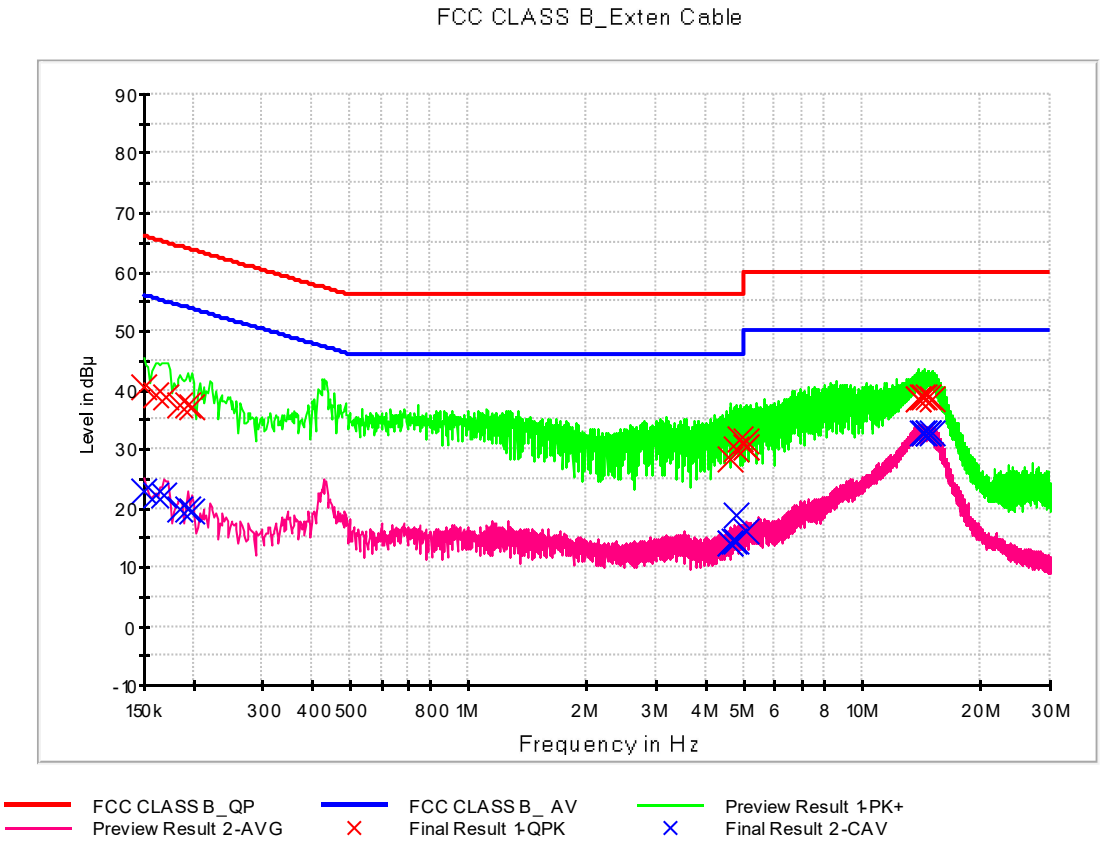
Calculation Formula:

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)
0.154000	23.3	9.000	L1	9.8	32.5	55.8
0.162000	23.5	9.000	L1	9.8	31.8	55.4
0.168000	23.1	9.000	L1	9.8	32.0	55.1
0.180000	21.3	9.000	L1	9.8	33.2	54.5
0.188000	20.3	9.000	L1	9.8	33.8	54.1
0.204000	19.4	9.000	L1	9.8	34.1	53.4
0.900000	15.0	9.000	L1	9.8	31.0	46.0
0.922000	14.9	9.000	L1	9.8	31.1	46.0
0.952000	14.5	9.000	L1	9.8	31.5	46.0
1.064000	15.2	9.000	L1	9.8	30.8	46.0
1.160000	15.2	9.000	L1	9.8	30.8	46.0
1.260000	14.3	9.000	L1	9.9	31.7	46.0
14.690000	36.5	9.000	L1	10.4	13.5	50.0
15.010000	36.5	9.000	L1	10.4	13.5	50.0
15.102000	36.4	9.000	L1	10.4	13.6	50.0
15.158000	36.3	9.000	L1	10.4	13.7	50.0
15.184000	36.3	9.000	L1	10.4	13.7	50.0
15.288000	36.1	9.000	L1	10.4	13.9	50.0

Figure 2: Conducted Emission (150 kHz to 30 MHz), REAR CAMERA mode, **Line (N)**



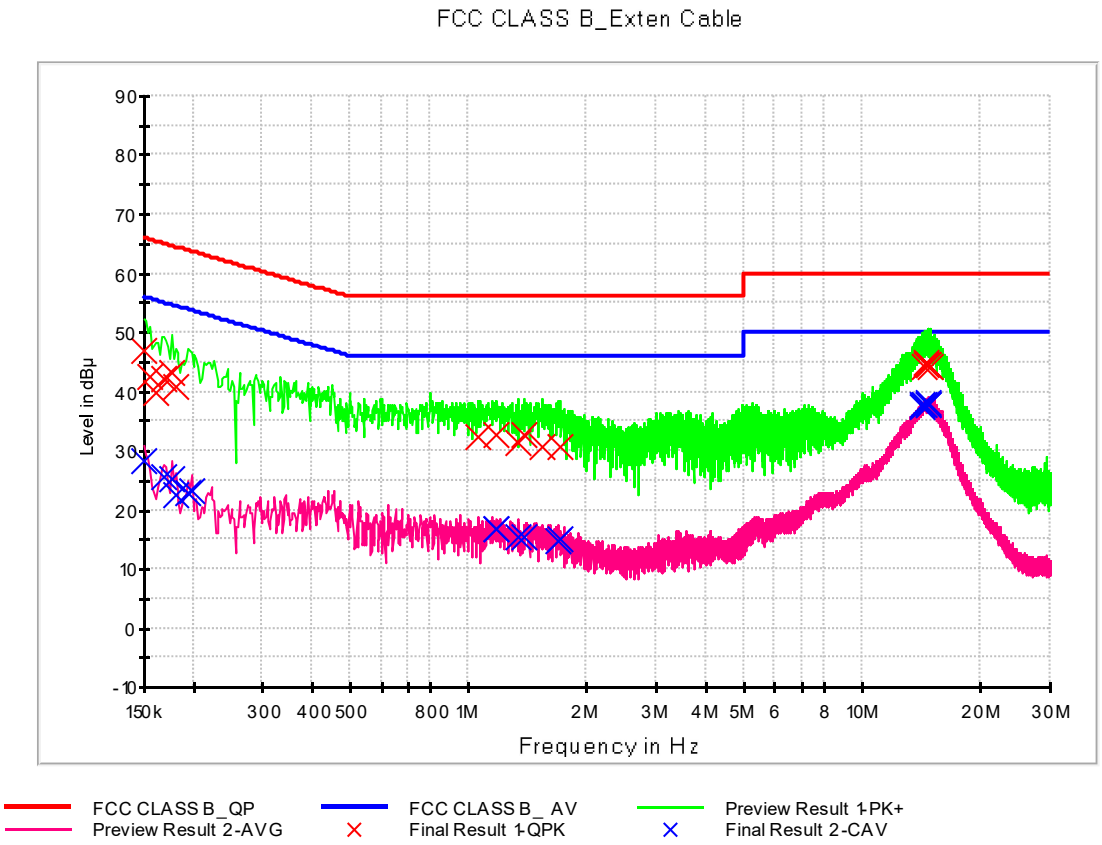
QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	40.5	9.000	N	9.8	25.5	66.0
0.160000	39.3	9.000	N	9.8	26.2	65.5
0.170000	38.9	9.000	N	9.8	26.1	65.0
0.186000	37.4	9.000	N	9.8	26.8	64.2
0.194000	37.3	9.000	N	9.8	26.5	63.9
0.198000	37.3	9.000	N	9.8	26.4	63.7
4.644000	28.3	9.000	N	10.0	27.7	56.0
4.764000	29.9	9.000	N	10.0	26.1	56.0
4.882000	31.6	9.000	N	10.0	24.4	56.0
5.066000	31.3	9.000	N	10.0	28.7	60.0
5.074000	30.4	9.000	N	10.0	29.6	60.0
5.100000	30.2	9.000	N	10.0	29.8	60.0
13.846000	38.6	9.000	N	10.4	21.4	60.0
13.906000	38.6	9.000	N	10.4	21.4	60.0
14.170000	38.8	9.000	N	10.4	21.2	60.0
14.366000	38.7	9.000	N	10.4	21.3	60.0
14.664000	38.7	9.000	N	10.4	21.3	60.0
15.008000	38.6	9.000	N	10.5	21.4	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	22.8	9.000	N	9.8	33.2	56.0
0.160000	22.1	9.000	N	9.8	33.4	55.5
0.168000	22.2	9.000	N	9.8	32.8	55.1
0.186000	19.8	9.000	N	9.8	34.4	54.2
0.194000	19.7	9.000	N	9.8	34.2	53.9
0.198000	19.4	9.000	N	9.8	34.3	53.7
4.624000	14.1	9.000	N	10.0	31.9	46.0
4.644000	14.1	9.000	N	10.0	31.9	46.0
4.738000	14.3	9.000	N	10.0	31.7	46.0
4.764000	14.4	9.000	N	10.0	31.6	46.0
4.806000	18.9	9.000	N	10.0	27.1	46.0
5.074000	16.2	9.000	N	10.0	33.8	50.0
14.170000	32.8	9.000	N	10.4	17.2	50.0
14.366000	32.8	9.000	N	10.4	17.2	50.0
14.664000	32.6	9.000	N	10.4	17.4	50.0
14.678000	32.8	9.000	N	10.4	17.2	50.0
14.728000	32.6	9.000	N	10.4	17.4	50.0
14.970000	32.6	9.000	N	10.4	17.4	50.0

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



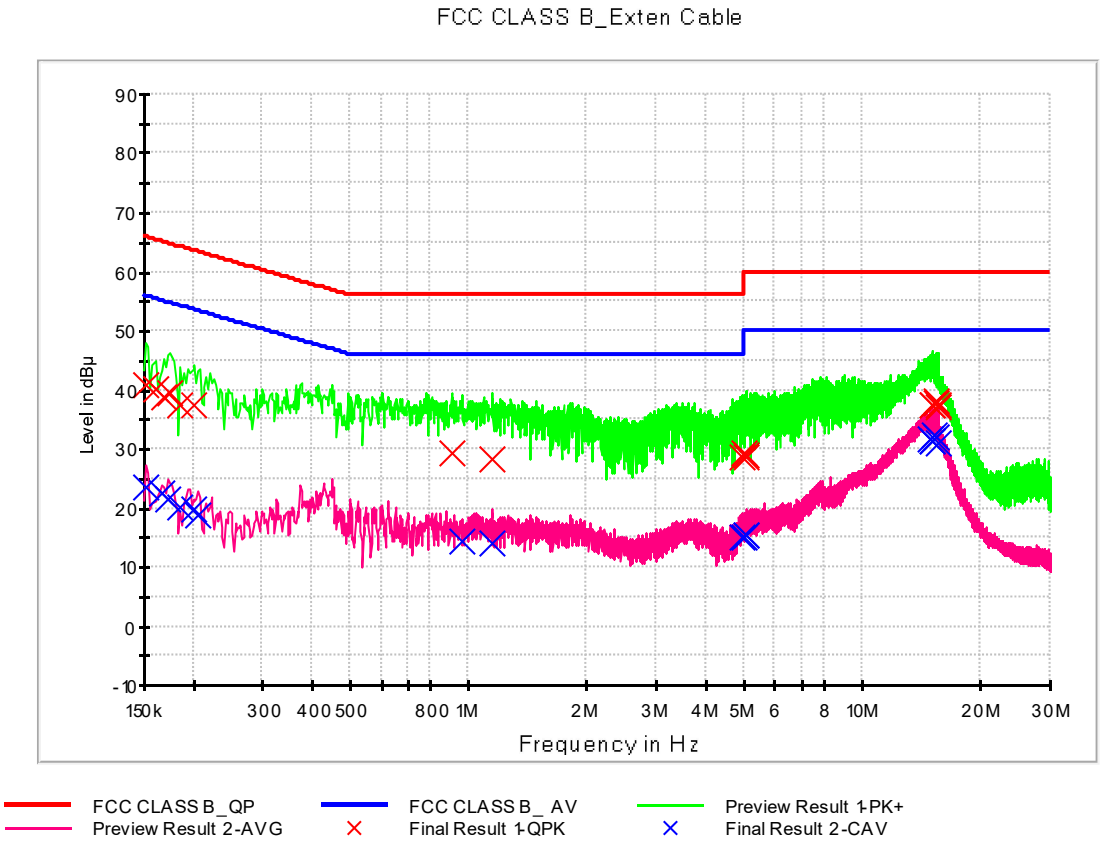
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	46.9	9.000	L1	9.8	19.1	66.0
0.156000	42.5	9.000	L1	9.8	23.2	65.7
0.160000	39.8	9.000	L1	9.8	25.7	65.5
0.168000	42.3	9.000	L1	9.8	22.7	65.1
0.176000	43.4	9.000	L1	9.8	21.3	64.7
0.180000	40.8	9.000	L1	9.8	23.7	64.5
1.062000	32.5	9.000	L1	9.8	23.5	56.0
1.178000	32.6	9.000	L1	9.8	23.4	56.0
1.334000	31.4	9.000	L1	9.9	24.6	56.0
1.386000	32.7	9.000	L1	9.9	23.3	56.0
1.534000	30.6	9.000	L1	9.9	25.4	56.0
1.704000	30.8	9.000	L1	9.9	25.2	56.0
14.278000	44.2	9.000	L1	10.3	15.8	60.0
14.562000	44.5	9.000	L1	10.4	15.5	60.0
14.608000	44.8	9.000	L1	10.4	15.2	60.0
14.732000	44.5	9.000	L1	10.4	15.5	60.0
14.738000	44.6	9.000	L1	10.4	15.4	60.0
14.806000	44.4	9.000	L1	10.4	15.6	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	28.4	9.000	L1	9.8	27.6	56.0
0.168000	25.6	9.000	L1	9.8	29.5	55.1
0.176000	25.3	9.000	L1	9.8	29.4	54.7
0.180000	22.6	9.000	L1	9.8	31.8	54.5
0.194000	22.9	9.000	L1	9.8	31.0	53.9
0.198000	23.1	9.000	L1	9.8	30.6	53.7
1.178000	16.7	9.000	L1	9.8	29.3	46.0
1.182000	16.6	9.000	L1	9.8	29.4	46.0
1.334000	15.4	9.000	L1	9.9	30.6	46.0
1.386000	15.5	9.000	L1	9.9	30.5	46.0
1.682000	14.9	9.000	L1	9.9	31.1	46.0
1.704000	15.0	9.000	L1	9.9	31.0	46.0
14.206000	37.6	9.000	L1	10.3	12.4	50.0
14.250000	37.8	9.000	L1	10.3	12.2	50.0
14.278000	37.7	9.000	L1	10.3	12.3	50.0
14.618000	37.8	9.000	L1	10.4	12.2	50.0
14.668000	37.7	9.000	L1	10.4	12.3	50.0
14.732000	38.1	9.000	L1	10.4	11.9	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	40.7	9.000	N	9.8	25.2	65.9
0.160000	40.3	9.000	N	9.8	25.2	65.5
0.168000	38.7	9.000	N	9.8	26.3	65.1
0.174000	39.4	9.000	N	9.8	25.3	64.8
0.186000	37.6	9.000	N	9.8	26.6	64.2
0.202000	37.5	9.000	N	9.8	26.1	63.5
0.904000	29.2	9.000	N	9.8	26.8	56.0
1.146000	28.2	9.000	N	9.8	27.8	56.0
4.928000	28.8	9.000	N	10.0	27.2	56.0
5.006000	29.3	9.000	N	10.0	30.7	60.0
5.068000	28.7	9.000	N	10.0	31.3	60.0
5.082000	29.0	9.000	N	10.0	31.0	60.0
14.994000	37.4	9.000	N	10.4	22.6	60.0
15.000000	37.5	9.000	N	10.5	22.5	60.0
15.398000	38.1	9.000	N	10.5	21.9	60.0
15.432000	37.9	9.000	N	10.5	22.1	60.0
15.542000	37.3	9.000	N	10.5	22.7	60.0
15.592000	37.0	9.000	N	10.5	23.0	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152000	23.6	9.000	N	9.8	32.3	55.9
0.166000	22.6	9.000	N	9.8	32.5	55.2
0.172000	21.6	9.000	N	9.8	33.3	54.9
0.186000	20.2	9.000	N	9.8	34.0	54.2
0.200000	19.9	9.000	N	9.8	33.7	53.6
0.206000	18.8	9.000	N	9.8	34.6	53.4
0.964000	14.3	9.000	N	9.8	31.7	46.0
1.146000	14.0	9.000	N	9.8	32.0	46.0
4.928000	15.2	9.000	N	10.0	30.8	46.0
5.006000	15.2	9.000	N	10.0	34.8	50.0
5.068000	15.3	9.000	N	10.0	34.7	50.0
5.082000	15.3	9.000	N	10.0	34.7	50.0
14.860000	31.7	9.000	N	10.4	18.3	50.0
14.996000	31.4	9.000	N	10.4	18.6	50.0
15.000000	31.3	9.000	N	10.5	18.7	50.0
15.240000	32.4	9.000	N	10.5	17.6	50.0
15.398000	31.9	9.000	N	10.5	18.1	50.0
15.592000	31.0	9.000	N	10.5	19.0	50.0

4.2 Radiated Emission Below 1 GHz

4.2.1 Measuring instruments

	Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Calibration Date
☒	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]** REAR CAMERA 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 – 24.2 °C
Relative Humidity	46.9 – 49.3 %
Test Date	August 06, 2020 to August 13, 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] REAR CAMERA mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
30.434040	19.4	174.8	V	52.0	18.3	20.6	40.0
47.756680	21.3	174.7	V	212.0	19.6	18.7	40.0
166.762760	30.2	100.0	V	139.0	19.3	13.3	43.5
191.968840	24.1	100.0	V	163.0	17.3	19.4	43.5
250.146440	24.6	100.0	V	129.0	18.7	21.4	46.0
681.363680	28.3	174.8	V	141.0	28.4	17.7	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)
33.549640	26.5	100.0	V	105.0	18.5	13.5	40.0
55.775640	29.0	100.0	V	227.0	19.6	11.0	40.0
125.196400	29.0	100.0	V	76.0	17.8	14.5	43.5
333.180920	36.0	100.0	V	147.0	21.3	10.0	46.0
661.772560	30.2	191.8	V	220.0	28.2	15.8	46.0
978.922240	32.5	100.0	V	216.0	32.0	21.5	54.0

[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)
49.027240	23.5	174.8	V	91.0	19.7	16.5	40.0
100.860440	16.0	125.2	V	0.0	15.2	27.5	43.5
166.484320	26.8	100.0	V	150.0	19.3	16.7	43.5
274.103480	31.6	100.0	H	69.0	19.6	14.4	46.0
381.609720	30.4	100.0	H	102.0	22.4	15.6	46.0
920.612480	32.5	117.7	V	176.0	31.6	13.5	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)
36.594720	19.0	274.8	V	16.0	18.7	21.0	40.0
75.788000	25.9	300.0	H	100.0	16.6	14.1	40.0
114.471320	20.1	274.8	V	30.0	16.8	23.4	43.5
159.828480	21.6	174.8	H	110.0	19.8	21.9	43.5
570.226280	27.0	225.0	H	296.0	26.7	19.0	46.0
777.388640	30.8	325.0	V	30.0	29.9	15.2	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)
30.351960	16.6	191.7	V	0.0	18.3	23.4	40.0
82.000560	22.3	208.8	H	299.0	15.5	17.7	40.0
114.483960	16.3	225.2	V	68.0	16.8	27.2	43.5
167.798800	20.1	174.8	H	96.0	19.2	23.4	43.5
567.661120	25.9	116.7	V	148.0	26.7	20.1	46.0
860.406400	30.7	274.8	H	336.0	31.0	15.3	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)
56.348760	22.1	100.0	V	0.0	19.5	17.9	40.0
88.290120	19.4	192.8	H	306.0	14.5	24.1	43.5
159.961840	28.4	100.0	V	137.0	19.8	15.1	43.5
213.375160	22.5	100.0	V	15.0	17.2	21.0	43.5
256.054360	22.7	100.0	V	156.0	18.9	23.3	46.0
771.642200	30.0	225.1	V	185.0	29.8	16.0	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	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	40 000 MHz
Tested Frequency Range	1 GHz to 40 GHz
Worst Case of Operating Mode	**[EUT +TA]** REAR CAMERA 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 – 22.9 °C
Relative Humidity	44.6 – 48.4 %
Test Date	July 30, 2020 to August 18, 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] REAR CAMERA mode

Frequency (MHz)	Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1371.805000	31.4	100.0	H	150.0	-28.0	42.6	74.0
3066.835000	32.8	199.5	H	308.0	-22.4	41.2	74.0
5621.380000	36.3	150.0	H	264.0	-16.9	37.7	74.0
7395.765000	41.0	249.9	V	313.0	-12.2	33.0	74.0
11223.130000	45.0	150.1	H	111.0	-4.7	29.0	74.0
17954.915000	55.0	126.6	H	50.0	9.0	19.0	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1371.805000	18.5	100.0	H	150.0	-28.0	35.5	54.0
3066.835000	20.2	199.5	H	308.0	-22.4	33.8	54.0
5621.380000	23.5	150.0	H	264.0	-16.9	30.5	54.0
7395.765000	27.9	249.9	V	313.0	-12.2	26.1	54.0
11223.130000	32.2	150.1	H	111.0	-4.7	21.8	54.0
17954.915000	42.5	126.6	H	50.0	9.0	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)
1641.990000	37.6	199.5	V	183.0	-27.2	36.4	74.0
2484.910000	41.3	161.6	V	214.0	-24.1	32.7	74.0
5399.790000	47.2	299.4	V	164.0	-17.3	26.8	74.0
9824.515000	43.3	199.4	V	315.0	-8.9	30.7	74.0
14586.780000	47.3	176.4	V	114.0	-0.5	26.7	74.0
17970.590760	56.0	274.5	V	350.0	9.2	18.0	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1641.990000	24.9	199.5	V	183.0	-27.2	29.1	54.0
2484.910000	32.8	161.6	V	214.0	-24.1	21.2	54.0
5399.790000	43.0	299.4	V	164.0	-17.3	11.0	54.0
9824.515000	30.2	199.4	V	315.0	-8.9	23.8	54.0
14586.780000	34.5	176.4	V	114.0	-0.5	19.5	54.0
17970.590760	42.8	274.5	V	350.0	9.2	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)
1361.160000	32.2	218.4	V	38.0	-28.0	41.8	74.0
2013.920000	32.3	100.0	H	161.0	-26.4	41.7	74.0
4927.715000	36.2	176.5	V	160.0	-17.9	37.8	74.0
9827.720000	43.7	100.0	H	242.0	-8.9	30.3	74.0
13165.680000	45.7	249.9	H	0.0	-3.3	28.3	74.0
17970.145000	55.9	100.0	H	207.0	9.2	18.1	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1361.160000	18.6	218.4	V	38.0	-28.0	35.4	54.0
2013.920000	18.7	100.0	H	161.0	-26.4	35.3	54.0
4927.715000	23.4	176.5	V	160.0	-17.9	30.6	54.0
9827.720000	30.5	100.0	H	242.0	-8.9	23.5	54.0
13165.680000	32.5	249.9	H	0.0	-3.3	21.5	54.0
17970.145000	42.8	100.0	H	207.0	9.2	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)
2354.700000	32.2	150.0	V	320.0	-24.7	41.8	74.0
4986.835000	35.9	176.4	H	120.0	-17.8	38.1	74.0
7308.500000	40.3	233.3	V	274.0	-12.4	33.7	74.0
10952.300000	45.1	249.9	V	29.0	-5.2	28.9	74.0
14503.295000	47.9	100.0	V	289.0	-0.4	26.1	74.0
17983.553560	55.0	249.9	V	226.0	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)
2354.700000	19.2	150.0	V	320.0	-24.7	34.8	54.0
4986.835000	23.2	176.4	H	120.0	-17.8	30.8	54.0
7308.500000	27.5	233.3	V	274.0	-12.4	26.5	54.0
10952.300000	32.5	249.9	V	29.0	-5.2	21.5	54.0
14503.295000	35.1	100.0	V	289.0	-0.4	18.9	54.0
17983.553560	42.6	249.9	V	226.0	9.4	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)
1546.175000	29.3	198.5	H	175.0	-27.5	44.7	74.0
3353.855000	33.5	124.6	V	119.0	-22.1	40.5	74.0
5256.690000	36.5	249.9	V	4.0	-17.4	37.5	74.0
10063.990000	43.4	249.9	H	183.0	-8.3	30.6	74.0
13225.645000	44.7	249.9	H	289.0	-3.2	29.3	74.0
17983.244580	55.3	199.4	H	29.0	9.4	18.7	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1546.175000	17.1	198.5	H	175.0	-27.5	36.9	54.0
3353.855000	20.3	124.6	V	119.0	-22.1	33.7	54.0
5256.690000	23.5	249.9	V	4.0	-17.4	30.5	54.0
10063.990000	30.5	249.9	H	183.0	-8.3	23.5	54.0
13225.645000	32.1	249.9	H	289.0	-3.2	21.9	54.0
17983.244580	42.6	199.4	H	29.0	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)
2184.365000	30.8	190.4	V	4.0	-25.6	43.2	74.0
3042.085000	34.4	113.5	V	252.0	-22.4	39.6	74.0
5279.390000	36.8	125.6	V	295.0	-17.4	37.2	74.0
9637.095000	43.0	199.5	V	222.0	-9.3	31.0	74.0
14754.335000	47.0	249.6	H	0.0	-0.8	27.0	74.0
17944.555000	55.1	100.0	H	118.0	8.8	18.9	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2184.365000	18.3	190.4	V	4.0	-25.6	35.7	54.0
3042.085000	20.3	113.5	V	252.0	-22.4	33.7	54.0
5279.390000	23.5	125.6	V	295.0	-17.4	30.5	54.0
9637.095000	30.6	199.5	V	222.0	-9.3	23.4	54.0
14754.335000	34.5	249.6	H	0.0	-0.8	19.5	54.0
17944.555000	42.5	100.0	H	118.0	8.8	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-F100VM** 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-FC013-P	August 19, 2020	Initial Release

End of report