

EMI TEST REPORT FCC CERTIFICATION

Applicant:

LG Electronics USA, Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632
United States

Date of Issue: January 14, 2019

Test Report No. HCT-EM-1901-FC002-R1

Test Site: HCT CO., LTD.

FCC ID :

ZNFX220QM

Rule Part(s) / Standard(s) : FCC CFR 47 PART 15 Subpart B Class B
ANSI C63.4-2014

EUT Type : Multi-band CDMA/GSM/WCMDA/LTE Phone with BT and WiFi

Model Name : LM-X220QM

Series Model Name : LMX220QM, X220QM

Date of Test : December 19, 2018 to January 02, 2019

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

Tested By



Na-Eun Song
Test Engineer
EMC Team
Certification Division

Reviewed



Jin-Pyo Hong
Technical Manager
EMC Team
Certification Division

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.



REVISION HISTORY

The revision history for this document is shown in table.

Report No.	Issue Date	Information About Changes
HCT-EM-1901-FC002	January 04, 2019	Initial Release
HCT-EM-1901-FC002-R1	January 14, 2019	Added LTE B5 TX Frequency



TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION	4
1.1 Description of EUT	4
1.2 Tested System Details	5
1.3 Cable Description.....	6
1.4 Noise Suppression Parts on Cable. (I/O Cable)	6
1.5 Test Facility	7
1.6 Calibration of Measuring Instrument	7
1.7 Measurement Uncertainty	7
2. LIST OF TEST EQUIPMENT.....	8
3. DESCRIPTION OF TEST	9
3.1 Measurement of Conducted Emission.....	9
3.2 Measurement of Radiated Emission.....	10
4. OPERATING MODES	12
4.1 Conducted Emission.....	12
4.2 Radiated Emission.....	12
5. CONDUCTED AND RADIATED EMISSION TEST SUMMARY	13
5.1 Conducted Emission.....	13
5.2 Radiated Emission.....	20
6. CONCLUSION.....	22
7. APPENDIX A. TEST SETUP PHOTOGRAPHS	23



1. GENERAL INFORMATION

1.1 Description of EUT

Its basic purpose is used for communications.

FCC ID	ZNFX220QM
Model	LM-X220QM
Series Model Name	LMX220QM, X220QM
EUT Type	Multi-band CDMA/GSM/WCDMA/LTE Phone with BT and WiFi
TX Frequency	824.70 MHz to 848.31 MHz (CDMA BC0) 1 851.25 MHz to 1 908.75 MHz (CDMA BC1) 824.2 MHz to 848.8 MHz (GSM 850) 1 850.2 MHz to 1 909.8 MHz (GSM 1 900) 1 852.4 MHz to 1 907.6 MHz (WCDMA B2) 1712.4 MHz to 1752.6 MHz (WCDMA B4) 826.4 MHz to 846.6 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) 1 850 MHz to 1 915 MHz (LTE B25) 2 402 MHz to 2 480 MHz (Bluetooth) 2 412 MHz to 2 462 MHz (WiFi 2.4 GHz)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA BC0) 1 931.25 MHz to 1 988.75 MHz (CDMA BC1) 869.2 MHz to 893.8 MHz (GSM 850) 1 930.2 MHz to 1 989.8 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) 871.4 MHz to 891.6 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) 1 925 MHz to 1 990 MHz (LTE B25) 2 402 MHz to 2 480 MHz (Bluetooth) 2 412 MHz to 2 462 MHz (WiFi 2.4 GHz)



1.2 Tested System Details

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

Device Type	Model Name	Serial Number	Manufacturer	FCC ID / DoC
EUT	LM-X220QM	-	LG	ZNFX220QM
Data Cable*	EAD62377927	-	Ningbo Broad	-
Data Cable*	EAD62377922	-	KSD	-
Earphone	EAB64168701	-	FOXLINK	-
Micro SD Card	Extreme MicroSDHC UHS-I CLASS 10 (32 GB)	-	SanDisk	-
Notebook PC	ProBook6560b	5CB2053MXF	HP	DoC
Notebook PC adaptor	Series PPP009L-E	-	LITE-On Technology	-
RJ45 cable	-	-	-	-
Gateway	TL-WR747N	-	TP-LINK	-
Gateway adaptor	T090060-2H1	-	TP-LINK	-
Serial mouse	Serial 2 button mouse	02031069	Radio shack	FSUGMZE3

*NOTE. The worst case of operating mode is reported.



1.3 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Micro USB	Y	Y	(P,D) 1.0
	Earphone	N/A	N	(D) 1.2
Notebook PC	RJ 45	N/A	N	(D) 1.6
	Serial(Mouse)	N/A	Y	(D) 1.8
	DC IN	N	N/A	(P) 1.8
Gateway	DC IN	N	N/A	(P) 1.8

* 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	Micro USB	N	N/A	Y	Both End
	Earphone	N	N/A	Y	EUT End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial(Mouse)	N	N/A	Y	Notebook PC 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	Registration Number
Radiated Field strength measurement facility 3 m Semi Anechoic chamber	90661
Radiated Field strength measurement facility 10 m Semi Anechoic chamber	

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 equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

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 (dB)
Conducted Emission (0.15 MHz to 30 MHz)	1.82 dB
Radiated Emissions (30 MHz to 1 GHz)	5.20 dB
Radiated Emissions (1 GHz to 18 GHz)	5.24 dB
Radiated Emissions (18 GHz to 40 GHz)	5.40 dB



2. LIST OF TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>CAL Date</u>
<u>Conducted Emission</u>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	06.25.2018
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	102245	1 year	12.12.2018
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	05.03.2018
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32 VER8.54.0	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU40	100524	1 year	07.27.2018
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB 9168	760	2 year	04.06.2017
<input checked="" type="checkbox"/> Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
<input checked="" type="checkbox"/> Antenna master controller	INNCO Systems	CO 3000	CO3000/870/ 35990515/L	N/A	-
<input checked="" type="checkbox"/> Turn Table	INNCO Systems	1060	-	N/A	-
<input checked="" type="checkbox"/> Turn Table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	08.14.2018
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32 VER8.40.0	-	-	-
-For measurement above 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU40	100524	1 year	07.27.2018
<input checked="" type="checkbox"/> Antenna master	INNCO Systems	MA4640-XP-ET	-	N/A	-
<input checked="" type="checkbox"/> Antenna master controller	INNCO Systems	CO3000	CO3000/870/ 35990515/L	N/A	-
<input checked="" type="checkbox"/> Turn Table	INNCO Systems	1060	-	N/A	-
<input checked="" type="checkbox"/> Turn Table controller	INNCO Systems	CO2000	CO2000/095/ 7590304/L	N/A	-
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	01836	2 year	05.14.2018
<input checked="" type="checkbox"/> Low Noise Amplifier	TESTEK	TK-PA18H	170034-L	1 year	03.06.2018
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170#786	2 year	12.05.2017
<input type="checkbox"/> Power Amplifier	TESTEK	TK-PA1840H	170030-L	1 year	12.17.2018
<input type="checkbox"/> Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
<input type="checkbox"/> Power Amplifier	CERNEX	CBLU1183540	21691	1 year	06.25.2018
<input type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	08.14.2018
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32 VER8.40.0	-	-	-



3. DESCRIPTION OF TEST

3.1 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)	Quasi-Peak (dB(μV))	Average (dB(μV))
0.15 to 0.5	9	66 to 56*	56 to 46*
0.5 to 5	9	56	46
5 to 30	9	60	50

**Decreases with the logarithm of the frequency.*



3.2 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)	Antenna Distance (m)	Field Strength ($\mu\text{V}/\text{m}$)	Quasi-Peak ($\text{dB}(\mu\text{V}/\text{m})$)
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0
Frequency (MHz)	Antenna Distance (m)	Peak ($\text{dB}(\mu\text{V}/\text{m})$)	Average ($\text{dB}(\mu\text{V}/\text{m})$)
Above 1 000	3	74	54

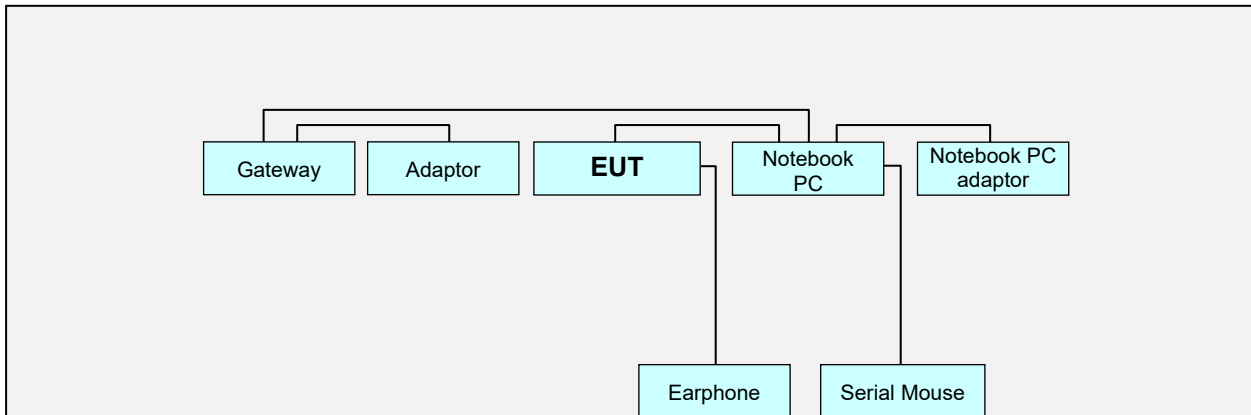


3.2.1 Frequency Range of Radiated Measurements

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	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

3.3 Configuration of Tested System



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



4. PRELIMINARY TEST

4.1 Conducted Emission

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

Operating Modes:

Data Communication mode

4.2 Radiated Emission

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

Operating Modes:

Data Communication mode



5. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

5.1 Conducted Emission

The test results of conducted emission at mains ports provide the following information:

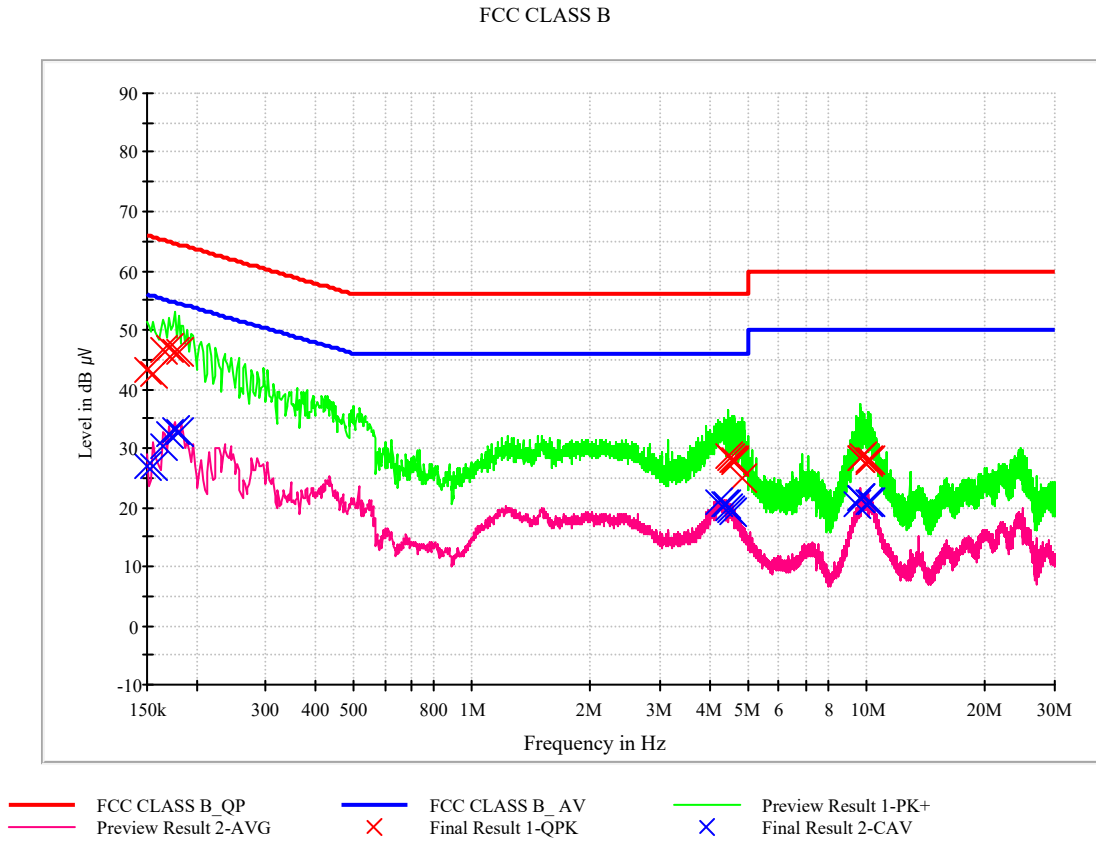
Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Operating Mode	Data Communication mode
Worst case of Data Cable	Ningbo Broad (EAD62377927)
Kind of Test Site	Shielded Room
Temperature	22.5 °C
Relative Humidity	40.8 %
Test Date	December 19, 2018

- 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



Figure 1: Conducted Emission, AC Main Port, Line (L1)





QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	43.4	9.000	L1	9.6	22.6	66.0
0.156000	42.6	9.000	L1	9.6	23.1	65.7
0.164000	46.4	9.000	L1	9.6	18.8	65.3
0.170000	46.8	9.000	L1	9.6	18.1	65.0
0.176000	46.1	9.000	L1	9.6	18.6	64.7
0.180000	46.3	9.000	L1	9.6	18.2	64.5
4.440000	28.6	9.000	L1	9.8	27.4	56.0
4.504000	28.3	9.000	L1	9.8	27.7	56.0
4.568000	28.1	9.000	L1	9.8	27.9	56.0
4.614000	28.0	9.000	L1	9.8	28.0	56.0
4.638000	27.6	9.000	L1	9.8	28.4	56.0
4.842000	25.0	9.000	L1	9.8	31.0	56.0
9.672000	28.4	9.000	L1	10.0	31.6	60.0
9.678000	28.4	9.000	L1	10.0	31.6	60.0
9.728000	28.6	9.000	L1	10.0	31.4	60.0
10.160000	27.9	9.000	L1	10.0	32.1	60.0
10.164000	27.7	9.000	L1	10.0	32.3	60.0
10.174000	27.9	9.000	L1	10.0	32.1	60.0

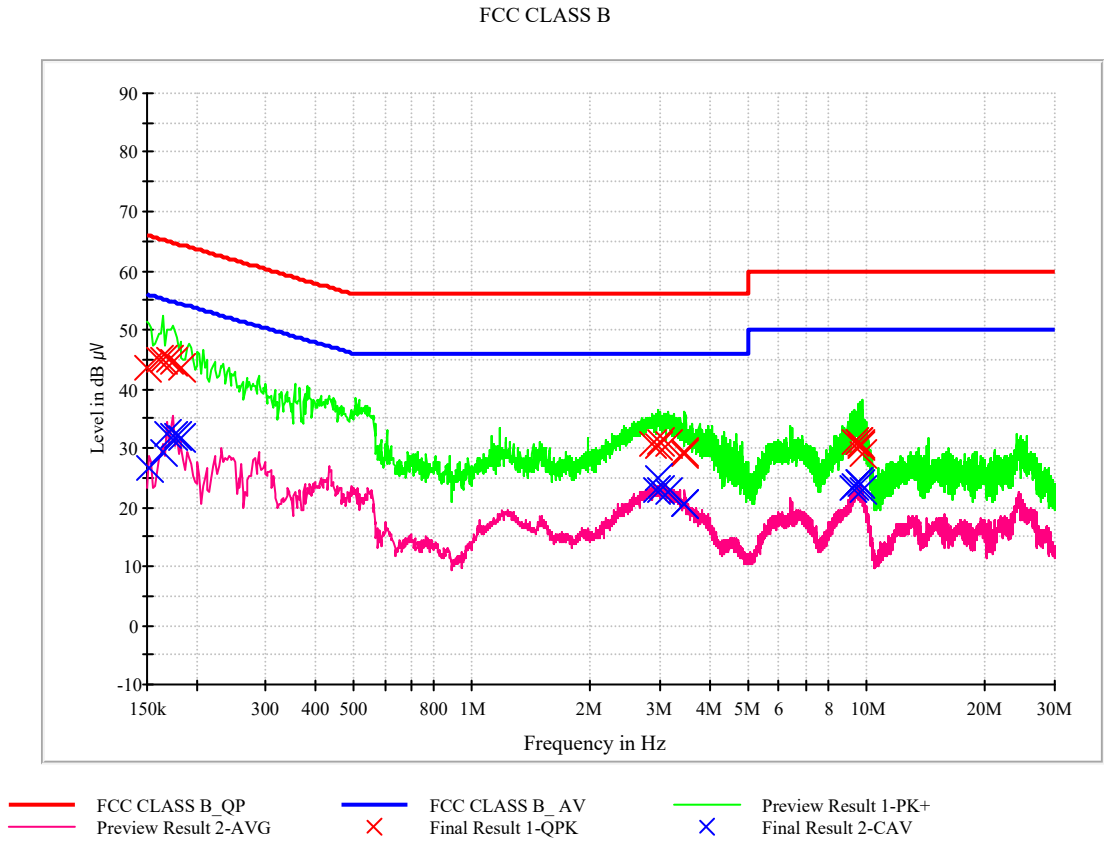


CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	27.1	9.000	L1	9.6	28.9	56.0
0.156000	26.8	9.000	L1	9.6	28.8	55.7
0.164000	30.3	9.000	L1	9.6	24.9	55.3
0.170000	32.2	9.000	L1	9.6	22.7	55.0
0.176000	33.0	9.000	L1	9.6	21.7	54.7
0.180000	32.8	9.000	L1	9.6	21.7	54.5
4.208000	20.7	9.000	L1	9.8	25.3	46.0
4.354000	20.6	9.000	L1	9.8	25.4	46.0
4.402000	20.4	9.000	L1	9.8	25.6	46.0
4.440000	19.9	9.000	L1	9.8	26.1	46.0
4.504000	19.4	9.000	L1	9.8	26.6	46.0
4.568000	19.1	9.000	L1	9.8	26.9	46.0
9.470000	20.5	9.000	L1	10.0	29.5	50.0
9.672000	21.6	9.000	L1	10.0	28.4	50.0
9.678000	21.4	9.000	L1	10.0	28.6	50.0
9.684000	21.5	9.000	L1	10.0	28.5	50.0
10.164000	20.7	9.000	L1	10.0	29.3	50.0
10.174000	20.8	9.000	L1	10.0	29.2	50.0



Figure 2: Conducted Emission, AC Main Port, Line (N)





QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	43.4	9.000	N	9.6	22.6	66.0
0.160000	44.8	9.000	N	9.6	20.7	65.5
0.164000	45.0	9.000	N	9.6	20.2	65.3
0.170000	45.0	9.000	N	9.6	20.0	65.0
0.174000	44.7	9.000	N	9.6	20.1	64.8
0.182000	43.6	9.000	N	9.6	20.8	64.4
2.872000	30.8	9.000	N	9.8	25.2	56.0
2.962000	30.4	9.000	N	9.8	25.6	56.0
3.002000	30.9	9.000	N	9.8	25.1	56.0
3.142000	30.6	9.000	N	9.8	25.4	56.0
3.452000	29.1	9.000	N	9.8	26.9	56.0
3.466000	29.2	9.000	N	9.8	26.8	56.0
9.318000	30.9	9.000	N	9.9	29.1	60.0
9.484000	31.2	9.000	N	9.9	28.8	60.0
9.584000	31.1	9.000	N	9.9	28.9	60.0
9.598000	30.8	9.000	N	9.9	29.2	60.0
9.684000	30.3	9.000	N	9.9	29.7	60.0
9.788000	28.9	9.000	N	9.9	31.1	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	26.5	9.000	N	9.6	29.4	55.9
0.164000	29.2	9.000	N	9.6	26.0	55.3
0.168000	32.3	9.000	N	9.6	22.7	55.1
0.174000	32.1	9.000	N	9.6	22.7	54.8
0.178000	32.2	9.000	N	9.6	22.4	54.6
0.182000	31.8	9.000	N	9.6	22.6	54.4
2.924000	22.8	9.000	N	9.8	23.2	46.0
2.962000	24.8	9.000	N	9.8	21.2	46.0
3.002000	22.9	9.000	N	9.8	23.1	46.0
3.142000	22.5	9.000	N	9.8	23.5	46.0
3.452000	20.5	9.000	N	9.8	25.5	46.0
3.466000	20.6	9.000	N	9.8	25.4	46.0
9.258000	23.2	9.000	N	9.9	26.8	50.0
9.318000	23.7	9.000	N	9.9	26.3	50.0
9.482000	24.1	9.000	N	9.9	25.9	50.0
9.486000	24.2	9.000	N	9.9	25.8	50.0
9.598000	23.8	9.000	N	9.9	26.2	50.0
9.754000	22.9	9.000	N	9.9	27.1	50.0



5.2 Radiated Emission

The test results of radiated emission provide the following information:

For Measurement Below 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Operating Mode	Data Communication mode
Worst case of Data Cable	Ningbo Broad (EAD62377927)
Kind of Test Site	3 m semi anechoic chamber
Temperature	21.4 °C
Relative Humidity	42.0 %
Test Date	December 27, 2018

Frequency (MHz)	Quasi Peak (dB μ V/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
85.674400	21.3	374.8	H	301.0	14.9	18.7	40.0
265.585600	32.7	100.0	H	151.0	19.4	13.3	46.0
276.397600	29.0	100.0	H	321.0	19.7	17.0	46.0
600.039200	38.1	100.0	V	354.0	27.5	7.9	46.0
800.005600	40.4	100.0	H	90.0	30.2	5.6	46.0
999.534400	47.3	100.0	H	1.0	32.1	6.7	54.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak



For Measurement Above 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Frequency	2 480 MHz
Tested Frequency Range	1 GHz to 18 GHz
Operation Mode	Data Communication mode
Worst case of Data Cable	Ningbo Broad (EAD62377927)
Kind of Test Site	3 m semi anechoic chamber
Temperature	20.7 °C
Relative Humidity	40.2 %
Test Date	January 02, 2019

Frequency (MHz)	Peak (dB μ V/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1399.920000	51.1	335.5	V	214.0	-28.2	22.9	74.0
1994.265000	45.1	111.4	V	55.0	-26.7	28.9	74.0
2655.070000	46.8	199.6	V	29.0	-24.3	27.2	74.0
4498.985000	44.5	176.5	V	0.0	-19.5	29.5	74.0
5990.410000	46.3	299.5	V	98.0	-17.1	27.7	74.0
9546.100000	44.6	150.1	V	202.0	-10.0	29.4	74.0

Frequency (MHz)	CAverage (dB μ V/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1399.920000	49.9	335.5	V	214.0	-28.2	4.1	54.0
1994.265000	20.1	111.4	V	55.0	-26.7	33.9	54.0
2655.070000	20.3	199.6	V	29.0	-24.3	33.7	54.0
4498.985000	27.4	176.5	V	0.0	-19.5	26.6	54.0
5990.410000	29.0	299.5	V	98.0	-17.1	25.0	54.0
9546.100000	31.8	150.1	V	202.0	-10.0	22.2	54.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. Peak or CAverage = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
4. Margin = Limit - Peak or CAverage



6. CONCLUSION

The data collected shows that the **EUT Type: Multi-band CDMA/GSM/WCMDA/LTE Phone with BT and WiFi, FCC ID: ZNFX220QM, Model: LM-X220QM** complies with §15.107 and §15.109 of the FCC rules.



7. APPENDIX A. TEST SETUP PHOTOGRAPHS

Please refer to Appendix A