



MEASUREMENT REPORT
LTE

Applicant Name:
 LG Electronics MobileComm U.S.A
 1000 Sylvan Avenue
 Englewood Cliffs, NJ 07632
 United States

Date of Testing:
 10/02-10/16/2017
Test Site/Location:
 PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
 1M1710020259-03.ZNF

FCC ID:	ZNFX210MA
APPLICANT:	LG Electronics MobileComm U.S.A

Application Type: Class II Permissive Change
Model: LM-X210MA
Additional Model(s): LMX210MA, X210MA, LM-X210TA, LMX210TA, X210TA, LM-X210TAT, LMX210TAT, X210TAT
EUT Type: Portable Handset
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): 22, 24, & 27
Test Procedure(s): ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v02r02
Class II Permissive Change: Please see FCC change document
Original Grant Date: 10/12/2017

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

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.


 Randy Ortanez
 President







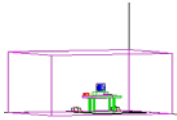
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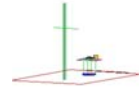
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FCC Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	
LTE Band 12	27	699.7 - 715.3	0.103	20.12	0.169	22.27	QPSK
LTE Band 12	27	699.7 - 715.3	0.084	19.24	0.138	21.39	16QAM
LTE Band 12	27	700.5 - 714.5	0.097	19.87	0.159	22.02	QPSK
LTE Band 12	27	700.5 - 714.5	0.078	18.90	0.127	21.05	16QAM
LTE Band 12	27	701.5 - 713.5	0.093	19.71	0.153	21.86	QPSK
LTE Band 12	27	701.5 - 713.5	0.069	18.38	0.113	20.53	16QAM
LTE Band 12	27	704 - 711	0.094	19.75	0.155	21.90	QPSK
LTE Band 12	27	704 - 711	0.085	19.32	0.140	21.47	16QAM
LTE Band 5	22H	824.7 - 848.3	0.247	23.92	0.404	26.07	QPSK
LTE Band 5	22H	824.7 - 848.3	0.181	22.57	0.296	24.72	16QAM
LTE Band 5	22H	825.5 - 847.5	0.247	23.93	0.406	26.08	QPSK
LTE Band 5	22H	825.5 - 847.5	0.171	22.34	0.281	24.49	16QAM
LTE Band 5	22H	826.5 - 846.5	0.236	23.72	0.386	25.87	QPSK
LTE Band 5	22H	826.5 - 846.5	0.171	22.34	0.281	24.49	16QAM
LTE Band 5	22H	829 - 844	0.249	23.97	0.409	26.12	QPSK
LTE Band 5	22H	829 - 844	0.170	22.30	0.279	24.45	16QAM
LTE Band 66/4	27	1710.7 - 1779.3			0.307	24.87	QPSK
LTE Band 66/4	27	1710.7 - 1779.3			0.259	24.13	16QAM
LTE Band 66/4	27	1711.5 - 1778.5			0.314	24.97	QPSK
LTE Band 66/4	27	1711.5 - 1778.5			0.202	23.05	16QAM
LTE Band 66/4	27	1712.5 - 1777.5			0.322	25.08	QPSK
LTE Band 66/4	27	1712.5 - 1777.5			0.208	23.17	16QAM
LTE Band 66/4	27	1715 - 1775			0.333	25.23	QPSK
LTE Band 66/4	27	1715 - 1775			0.292	24.65	16QAM
LTE Band 66/4	27	1717.5 - 1772.5			0.309	24.90	QPSK
LTE Band 66/4	27	1717.5 - 1772.5			0.250	23.98	16QAM
LTE Band 66/4	27	1720 - 1770			0.326	25.13	QPSK
LTE Band 66/4	27	1720 - 1770			0.221	23.44	16QAM
LTE Band 2	24E	1850.7 - 1909.3			0.361	25.57	QPSK
LTE Band 2	24E	1850.7 - 1909.3			0.265	24.24	16QAM
LTE Band 2	24E	1851.5 - 1908.5			0.329	25.17	QPSK
LTE Band 2	24E	1851.5 - 1908.5			0.241	23.82	16QAM
LTE Band 2	24E	1852.5 - 1907.5			0.325	25.12	QPSK
LTE Band 2	24E	1852.5 - 1907.5			0.247	23.92	16QAM
LTE Band 2	24E	1855 - 1905			0.366	25.63	QPSK
LTE Band 2	24E	1855 - 1905			0.258	24.11	16QAM
LTE Band 2	24E	1857.5 - 1902.5			0.365	25.63	QPSK
LTE Band 2	24E	1857.5 - 1902.5			0.275	24.39	16QAM
LTE Band 2	24E	1860 - 1900			0.340	25.32	QPSK
LTE Band 2	24E	1860 - 1900			0.277	24.43	16QAM

EUT Overview

FCC ID: ZNFX210MA		 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.



1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS)."
- PCTEST facility is a registered (22831) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFX210MA**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 61979

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE)



LTE Band 66/4 (1710 - 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 - 1755 MHz). Therefore, test data provided in this report covers Band 4 as well as Band 66/4.

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v02r02. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168 D01 v02r02) were used in the measurement of the EUT.

3.2 Block A Frequency Range

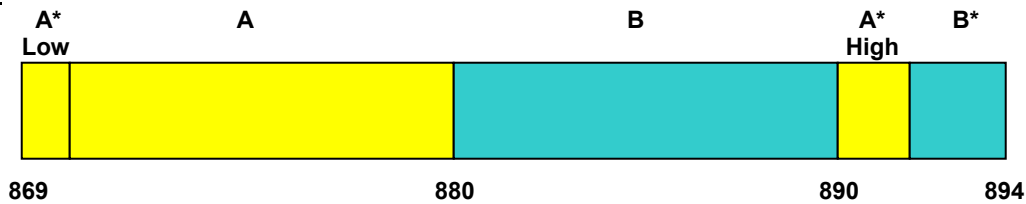
§27.5(c)

698-746 MHz band. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

Block A: 698-704 MHz and 728-734 MHz;
 Block B: 704-710 MHz and 734-740 MHz; and
 Block C: 710-716 MHz and 740-746 MHz.

3.3 Cellular - Base Frequency Blocks

§22.905

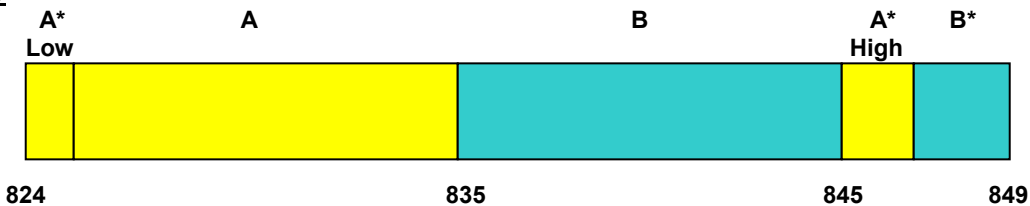


BLOCK 1: 869 – 880 MHz (A* Low + A)
BLOCK 2: 880 – 890 MHz (B)

BLOCK 3: 890 – 891.5 MHz (A* High)
BLOCK 4: 891.5 – 894 MHz (B*)



3.4 Cellular - Mobile Frequency Blocks

§22.905



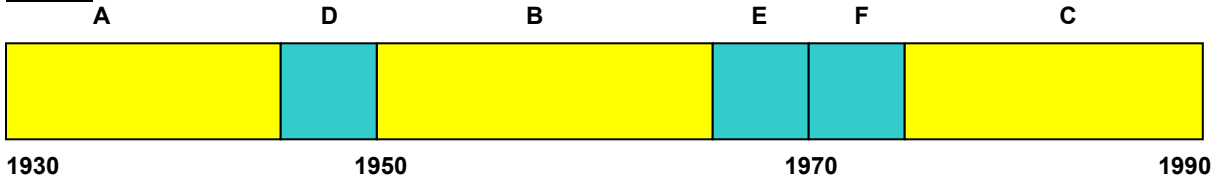
BLOCK 1: 824 – 835 MHz (A* Low + A)
BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A* High)
BLOCK 4: 846.5 – 849 MHz (B*)

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3.5 PCS - Base Frequency Blocks

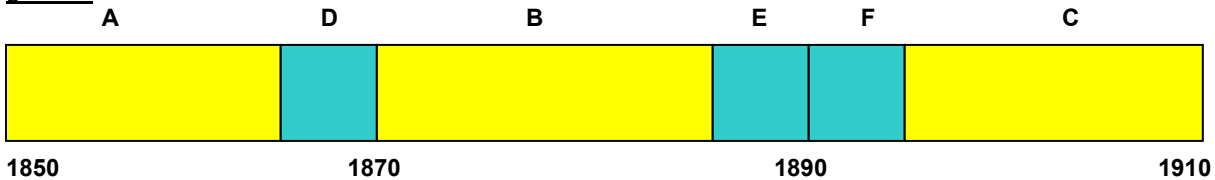
§24.229



- BLOCK 1: 1930 – 1945 MHz (A)
- BLOCK 2: 1945 – 1950 MHz (D)
- BLOCK 3: 1950 – 1965 MHz (B)
- BLOCK 4: 1965 – 1970 MHz (E)
- BLOCK 5: 1970 – 1975 MHz (F)
- BLOCK 6: 1975 – 1990 MHz (C)

3.6 PCS - Mobile Frequency Blocks

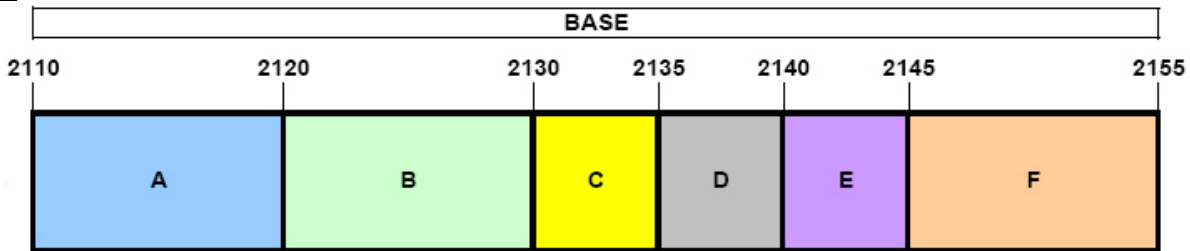
§24.229



- BLOCK 1: 1850 – 1865 MHz (A)
- BLOCK 2: 1865 – 1870 MHz (D)
- BLOCK 3: 1870 – 1885 MHz (B)
- BLOCK 4: 1885 – 1890 MHz (E)
- BLOCK 5: 1890 – 1895 MHz (F)
- BLOCK 6: 1895 – 1910 MHz (C)

3.7 AWS - Base Frequency Blocks

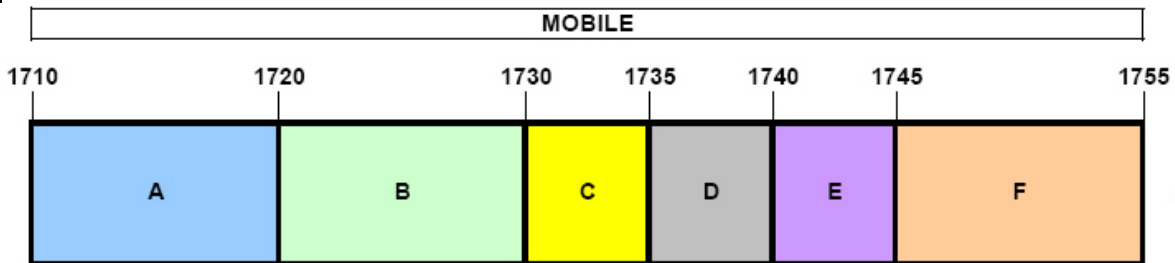
§27.5(h)





- BLOCK 1: 2110 – 2120 MHz (A)
- BLOCK 2: 2120 – 2130 MHz (B)
- BLOCK 3: 2130 – 2135 MHz (C)
- BLOCK 4: 2135 – 2140 MHz (D)
- BLOCK 5: 2140 – 2145 MHz (E)
- BLOCK 6: 2145 – 2155 MHz (F)

3.8 AWS - Mobile Frequency Blocks

§27.5(h)



- BLOCK 1: 1710 – 1720 MHz (A)
- BLOCK 2: 1720 – 1730 MHz (B)
- BLOCK 3: 1730 – 1735 MHz (C)
- BLOCK 4: 1735 – 1740 MHz (D)
- BLOCK 5: 1740 – 1745 MHz (E)
- BLOCK 6: 1745 – 1755 MHz (F)

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3.9 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a)(2) §22.917(a) §24.232(c) §24.238(a) §27.50(c)(10) §27.50(d)(4) §27.53(g) §27.53(h) RSS-130(4.4) RSS-132(5.4) RSS-132(5.5) RSS-133(6.4) RSS-133(6.5) RSS-139(6.5) RSS-139(6.6) RSS-199(4.5)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.



The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v02r02.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_d [dBm] = P_g [dBm] - \text{cable loss} [dB] + \text{antenna gain} [dBd/dBi]$$

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_g [dBm] - \text{cable loss} [dB]$.



The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10\log_{10}(\text{Power}_{[Watts]})$.

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4.0 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 uncertainty shown below 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.

Contribution	Expanded Uncertainty (\pm dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09



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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/21/2017	Annual	6/21/2018	RE1
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	6/21/2017	Annual	6/21/2018	441119
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Emco	6502	Active Loop Antenna (10k - 30 MHz)	8/9/2016	Biennial	8/9/2018	2936
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
PCTEST	-	EMC Switch System	6/21/2017	Annual	6/21/2018	NM1
PCTEST	-	EMC Switch System	6/21/2017	Annual	6/21/2018	NM2
Rohde & Schwarz	CMU200	Base Station Simulator	4/11/2017	Annual	4/11/2018	836371/0079
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/7/2017	Annual	3/7/2018	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/11/2017	Annual	8/11/2018	103200
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment



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6.0 SAMPLE CALCULATIONS

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm $- (-24.80)$.

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7.0 TEST RESULTS

7.1 Summary



Company Name: LG Electronics MobileComm U.S.A
 FCC ID: ZNFX210MA
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(2)	RSS-132(5.4)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 5)	< 7 Watts max. ERP < 11.5 Watts max. EIRP	RADIATED	PASS	Section 7.2
27.50(c)(10)	RSS-130(4.4)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 12)	< 3 Watts max. ERP < 5 Watts max. EIRP		PASS	Section 7.2
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power (Band 2)	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d)(4)	RSS-139(6.5)	Equivalent Isotropic Radiated Power (Band 66/4)	< 1 Watts max. EIRP		PASS	Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	RSS-130(4.6) RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	Undesirable Emissions	> 43 + 10log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 7.3

Table 7-1. Summary of Radiated Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

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7.2 Radiated Power (ERP/EIRP)

§22.913(a)(2) §24.232(c.2) §27.50(c)(10) §27.50(d)(4) RSS-130(4.4) RSS-132(5.4) RSS-133(6.4) RSS-139(6.5)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.



Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer’s “channel power” measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW \geq 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points \geq 2 x span / RBW
6. Detector = RMS
7. Trigger is set to “free run” for signals with continuous operation with the sweep times set to “auto”.
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

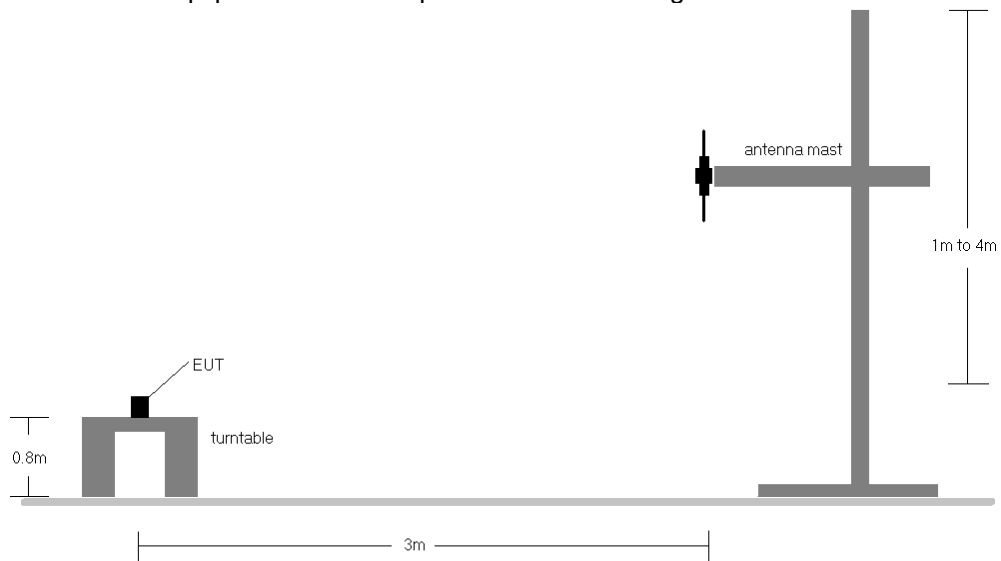


Figure 7-1. Radiated Test Setup <1GHz

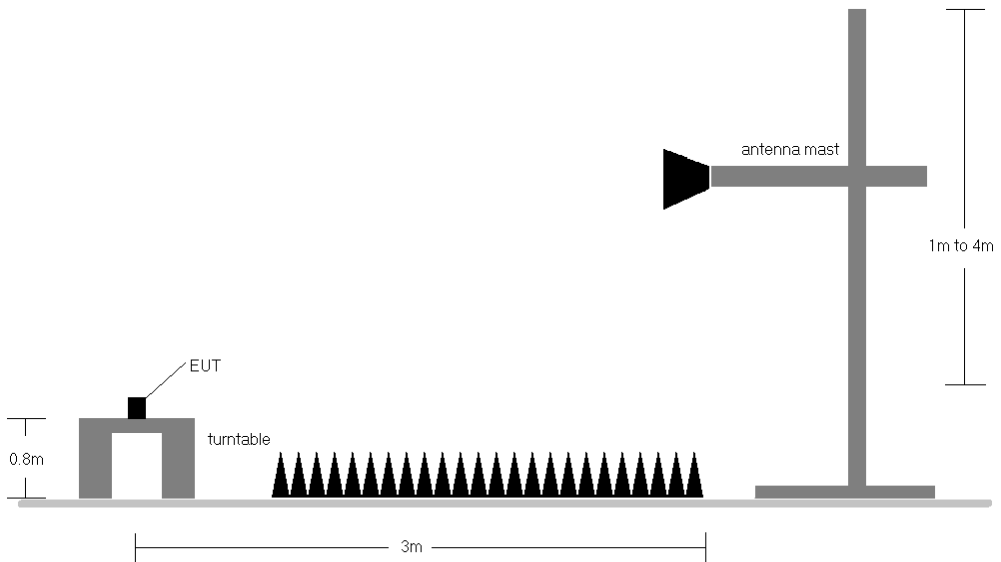




Figure 7-2. Radiated Test Setup >1GHz

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.



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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
699.70	1.4	QPSK	V	157	246	3 / 2	17.08	5.14	20.07	0.102	34.77	-14.70	22.22	0.167	-18.39
707.50	1.4	QPSK	V	157	246	3 / 2	17.13	5.14	20.12	0.103	34.77	-14.65	22.27	0.169	-18.34
715.30	1.4	QPSK	V	157	246	3 / 2	16.36	5.21	19.42	0.087	34.77	-15.35	21.57	0.144	-19.04
699.70	1.4	16-QAM	V	157	246	3 / 2	16.25	5.14	19.24	0.084	34.77	-15.53	21.39	0.138	-19.22
700.50	3	QPSK	V	171	243	1 / 0	17.02	5.00	19.87	0.097	34.77	-14.90	22.02	0.159	-18.58
707.50	3	QPSK	V	171	243	1 / 0	16.71	5.14	19.70	0.093	34.77	-15.07	21.85	0.153	-18.76
714.50	3	QPSK	V	171	243	1 / 0	15.98	5.20	19.03	0.080	34.77	-15.74	21.18	0.131	-19.43
707.50	3	16-QAM	V	171	243	1 / 0	15.91	5.14	18.90	0.078	34.77	-15.87	21.05	0.127	-19.56
701.50	5	QPSK	V	164	193	1 / 0	16.83	5.03	19.71	0.093	34.77	-15.07	21.86	0.153	-18.75
707.50	5	QPSK	V	164	193	1 / 0	16.30	5.14	19.29	0.085	34.77	-15.48	21.44	0.139	-19.17
713.50	5	QPSK	V	164	193	1 / 0	15.79	5.19	18.83	0.076	34.77	-15.94	20.98	0.125	-19.62
701.50	5	16-QAM	V	164	193	1 / 0	15.50	5.03	18.38	0.069	34.77	-16.40	20.53	0.113	-20.08
704.00	10	QPSK	V	173	231	1 / 0	16.81	5.09	19.75	0.094	34.77	-15.03	21.90	0.155	-18.71
707.50	10	QPSK	V	173	231	1 / 0	16.30	5.14	19.29	0.085	34.77	-15.48	21.44	0.139	-19.17
711.00	10	QPSK	V	173	231	1 / 0	15.79	5.17	18.81	0.076	34.77	-15.96	20.96	0.125	-19.64
704.00	10	16-QAM	V	173	231	1 / 0	16.38	5.09	19.32	0.085	34.77	-15.46	21.47	0.140	-19.14

Table 7-2. ERP/EIRP Data (Band 12)



Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
824.70	1.4	QPSK	H	150	359	1 / 0	24.57	1.50	23.92	0.247	38.45	-14.53	26.07	0.404	-10.92
836.50	1.4	QPSK	H	150	354	1 / 5	24.07	1.50	23.42	0.220	38.45	-15.03	25.57	0.361	-11.42
848.30	1.4	QPSK	H	150	345	1 / 0	23.08	1.50	22.43	0.175	38.45	-16.02	24.58	0.287	-12.41
824.70	1.4	16-QAM	H	150	359	1 / 0	23.22	1.50	22.57	0.181	38.45	-15.88	24.72	0.296	-12.27
825.50	3	QPSK	H	150	360	1 / 0	24.58	1.50	23.93	0.247	38.45	-14.52	26.08	0.406	-10.91
836.50	3	QPSK	H	150	355	1 / 0	24.14	1.50	23.49	0.223	38.45	-14.96	25.64	0.366	-11.35
847.50	3	QPSK	H	150	363	1 / 0	23.23	1.50	22.58	0.181	38.45	-15.87	24.73	0.297	-12.26
825.50	3	16-QAM	H	150	360	1 / 0	22.99	1.50	22.34	0.171	38.45	-16.11	24.49	0.281	-12.50
826.50	5	QPSK	H	150	345	1 / 0	24.37	1.50	23.72	0.236	38.45	-14.73	25.87	0.386	-11.12
836.50	5	QPSK	H	150	357	1 / 0	24.03	1.50	23.38	0.218	38.45	-15.07	25.53	0.357	-11.46
846.50	5	QPSK	H	150	353	1 / 0	23.40	1.50	22.75	0.188	38.45	-15.70	24.90	0.309	-12.09
836.50	5	16-QAM	H	150	357	1 / 0	22.99	1.50	22.34	0.171	38.45	-16.11	24.49	0.281	-12.50
829.00	10	QPSK	H	150	351	1 / 0	24.62	1.50	23.97	0.249	38.45	-14.48	26.12	0.409	-10.87
836.50	10	QPSK	H	150	359	1 / 0	24.15	1.50	23.50	0.224	38.45	-14.95	25.65	0.367	-11.34
844.00	10	QPSK	H	150	357	1 / 0	23.86	1.50	23.21	0.209	38.45	-15.24	25.36	0.344	-11.63
829.00	10	16-QAM	H	150	351	1 / 0	22.95	1.50	22.30	0.170	38.45	-16.15	24.45	0.279	-12.54
829.00	10	QPSK	V	150	347	1 / 0	23.42	1.50	22.77	0.189	38.45	-15.68	24.92	0.310	-12.07

Table 7-3. ERP/EIRP Data (Band 5)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	150	280	1 / 5	19.22	5.65	24.87	0.307	30.00	-5.13
1745.00	1.4	QPSK	V	150	282	1 / 5	19.43	5.27	24.70	0.295	30.00	-5.30
1779.30	1.4	QPSK	V	150	283	1 / 5	18.17	4.90	23.07	0.203	30.00	-6.93
1710.70	1.4	16-QAM	V	150	280	1 / 5	18.48	5.65	24.13	0.259	30.00	-5.87
1711.50	3	QPSK	V	150	281	1 / 14	19.33	5.64	24.97	0.314	30.00	-5.03
1745.00	3	QPSK	V	150	278	1 / 0	19.45	5.27	24.72	0.297	30.00	-5.28
1778.50	3	QPSK	V	150	283	1 / 0	18.60	4.91	23.51	0.224	30.00	-6.49
1745.00	3	16-QAM	V	150	278	1 / 0	17.78	5.27	23.05	0.202	30.00	-6.95
1712.50	5	QPSK	V	150	280	1 / 24	19.45	5.63	25.08	0.322	30.00	-4.92
1745.00	5	QPSK	V	150	282	1 / 0	19.48	5.27	24.75	0.299	30.00	-5.25
1777.50	5	QPSK	V	150	278	1 / 0	18.28	4.92	23.20	0.209	30.00	-6.80
1745.00	5	16-QAM	V	150	282	1 / 0	17.90	5.27	23.17	0.208	30.00	-6.83
1715.00	10	QPSK	V	150	279	1 / 49	19.63	5.60	25.23	0.333	30.00	-4.77
1745.00	10	QPSK	V	150	280	1 / 0	19.86	5.27	25.13	0.326	30.00	-4.87
1775.00	10	QPSK	V	150	285	1 / 0	18.83	4.95	23.78	0.239	30.00	-6.22
1715.00	10	16-QAM	V	150	279	1 / 49	19.05	5.60	24.65	0.292	30.00	-5.35
1717.50	15	QPSK	V	150	286	1 / 74	19.15	5.57	24.72	0.297	30.00	-5.28
1745.00	15	QPSK	V	150	284	1 / 0	19.63	5.27	24.90	0.309	30.00	-5.10
1772.50	15	QPSK	V	150	285	1 / 0	18.91	4.97	23.88	0.245	30.00	-6.12
1717.50	15	16-QAM	V	150	286	1 / 74	18.41	5.57	23.98	0.250	30.00	-6.02
1720.00	20	QPSK	V	150	283	1 / 99	19.59	5.54	25.13	0.326	30.00	-4.87
1745.00	20	QPSK	V	150	281	1 / 0	19.32	5.27	24.59	0.288	30.00	-5.41
1770.00	20	QPSK	V	150	286	1 / 0	19.16	5.00	24.16	0.261	30.00	-5.84
1745.00	20	16-QAM	V	150	281	1 / 0	18.17	5.27	23.44	0.221	30.00	-6.56
1715.00	10	QPSK	H	150	339	1 / 99	18.93	5.32	24.25	0.266	30.00	-5.75

Table 7-4. EIRP Data (Band 66/4)

FCC ID: ZNFX210MA			LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	150	260	1 / 5	20.26	4.82	25.08	0.322	33.01	-7.93
1880.00	1.4	QPSK	V	150	261	1 / 0	20.41	4.74	25.15	0.327	33.01	-7.86
1909.30	1.4	QPSK	V	150	262	1 / 0	20.89	4.68	25.57	0.361	33.01	-7.44
1850.70	1.4	16-QAM	V	150	260	1 / 5	19.42	4.82	24.24	0.265	33.01	-8.77
1851.50	3	QPSK	V	150	260	1 / 0	20.26	4.82	25.08	0.322	33.01	-7.93
1880.00	3	QPSK	V	150	265	1 / 0	20.26	4.74	25.00	0.316	33.01	-8.01
1908.50	3	QPSK	V	150	259	1 / 0	20.49	4.68	25.17	0.329	33.01	-7.84
1908.50	3	16-QAM	V	150	259	1 / 14	19.14	4.68	23.82	0.241	33.01	-9.19
1852.50	5	QPSK	V	150	260	1 / 0	19.93	4.81	24.74	0.298	33.01	-8.27
1880.00	5	QPSK	V	150	265	1 / 24	20.23	4.74	24.97	0.314	33.01	-8.04
1907.50	5	QPSK	V	150	263	1 / 24	20.44	4.68	25.12	0.325	33.01	-7.89
1880.00	5	16-QAM	V	150	265	1 / 0	19.18	4.74	23.92	0.247	33.01	-9.09
1855.00	10	QPSK	V	150	261	1 / 49	20.30	4.81	25.11	0.324	33.01	-7.90
1880.00	10	QPSK	V	150	266	1 / 49	20.47	4.74	25.21	0.332	33.01	-7.80
1905.00	10	QPSK	V	150	265	1 / 49	20.95	4.68	25.63	0.366	33.01	-7.38
1905.00	10	16-QAM	V	150	265	1 / 49	19.43	4.68	24.11	0.258	33.01	-8.90
1857.50	15	QPSK	V	150	259	1 / 74	20.41	4.80	25.21	0.332	33.01	-7.80
1880.00	15	QPSK	V	150	264	1 / 74	20.51	4.74	25.25	0.335	33.01	-7.76
1902.50	15	QPSK	V	150	262	1 / 74	20.94	4.69	25.63	0.365	33.01	-7.38
1902.50	15	16-QAM	V	150	262	1 / 0	19.70	4.69	24.39	0.275	33.01	-8.62
1860.00	20	QPSK	V	150	263	1 / 99	20.48	4.79	25.27	0.337	33.01	-7.74
1880.00	20	QPSK	V	150	268	1 / 99	20.29	4.74	25.03	0.318	33.01	-7.98
1900.00	20	QPSK	V	150	266	1 / 99	20.63	4.69	25.32	0.340	33.01	-7.69
1900.00	20	16-QAM	V	150	266	1 / 99	19.74	4.69	24.43	0.277	33.01	-8.58
1905.00	10	QPSK	H	150	95	1 / 99	20.63	4.74	25.37	0.344	33.01	-7.64

Table 7-5. EIRP Data (Band 2)

FCC ID: ZNFX210MA			LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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7.3 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h) RSS-130(4.6) RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.



Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW \geq 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points \geq 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: ZNFX210MA		<p style="text-align: center;">LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</p>		<p>Approved by: Quality Manager</p>
<p>Test Report S/N: 1M1710020259-03.ZNF</p>	<p>Test Dates: 10/02-10/16/2017</p>	<p>EUT Type: Portable Handset</p>	<p>Page 18 of 27</p>	

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

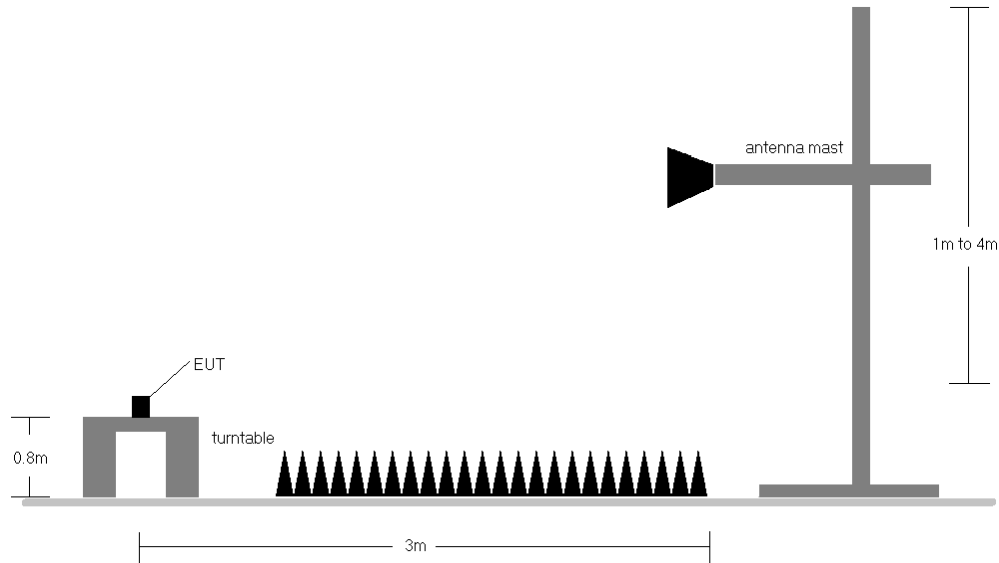




Figure 7-3. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band 12

OPERATING FREQUENCY: 699.70 MHz
 CHANNEL: 23017
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1399.40	V	128	254	-63.10	7.88	-55.23	-42.2
2099.10	V	146	248	-53.18	8.74	-44.44	-31.4

Table 7-6. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	V	142	267	-60.60	7.95	-52.65	-39.6
2122.50	V	153	274	-52.77	8.86	-43.91	-30.9



Table 7-7. Radiated Spurious Data (Band 12 – Mid Channel)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 715.30 MHz
 CHANNEL: 23173
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1430.60	V	197	226	-62.12	8.03	-54.09	-41.1
2145.90	V	100	267	-50.38	8.99	-41.40	-28.4

Table 7-8. Radiated Spurious Data (Band 12 – High Channel)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band 5

OPERATING FREQUENCY: 829.00 MHz
 CHANNEL: 20450
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1658.00	H	128	64	-56.44	8.85	-47.59	-34.6
2487.00	H	100	58	-52.64	9.73	-42.91	-29.9

Table 7-9. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	125	58	-55.50	8.85	-46.65	-33.7
2509.50	H	100	42	-51.91	9.78	-42.14	-29.1

Table 7-10. Radiated Spurious Data (Band 5 – Mid Channel)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-03.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset	Page 22 of 27	

OPERATING FREQUENCY: 844.00 MHz
 CHANNEL: 20600
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1688.00	H	-	-	-71.99	8.85	-63.14	-50.1
2532.00	H	-	-	-70.09	9.76	-60.34	-47.3



Table 7-11. Radiated Spurious Data (Band 5 – High Channel)

Band 66/4

OPERATING FREQUENCY: 1715.00 MHz
 CHANNEL: 132022
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3430.00	H	190	236	-58.37	9.87	-48.50	-35.5
5145.00	H	-	-	-61.61	10.75	-50.86	-37.9

Table 7-12. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-03.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 23 of 27

OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 132322
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	100	210	-54.27	9.94	-44.33	-31.3
5235.00	H	-	-	-60.85	10.72	-50.13	-37.1

Table 7-13. Radiated Spurious Data (Band 66/4 – Mid Channel)

OPERATING FREQUENCY: 1775.00 MHz
 CHANNEL: 132622
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3550.00	H	100	27	-49.58	9.96	-39.62	-26.6
5325.00	H	-	-	-61.08	10.71	-50.37	-37.4

Table 7-14. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-03.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 24 of 27

Band 2

OPERATING FREQUENCY: 1855.00 MHz
 CHANNEL: 18650
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3710.00	H	-	-	-62.54	9.51	-53.03	-40.0
5565.00	H	-	-	-61.16	11.06	-50.10	-37.1

Table 7-15. Radiated Spurious Data (Band 2 – Low Channel)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	H	-	-	-61.32	9.39	-51.93	-38.9
5640.00	H	-	-	-63.18	11.22	-51.96	-39.0



Table 7-16. Radiated Spurious Data (Band 2 – Mid Channel)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-03.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 25 of 27

OPERATING FREQUENCY: 1905.00 MHz
 CHANNEL: 19150
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	H	-	-	-60.88	9.31	-51.57	-38.6
5715.00	H	110	15	-61.21	11.33	-49.89	-36.9

Table 7-17. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-03.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 26 of 27

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFX210MA** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFX210MA		LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-03.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 27 of 27