



MEASUREMENT REPORT LTE

Applicant Name:

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

Date of Testing:

6/28 - 7/13/2018

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M1806270133-03.ZNF

FCC ID:

ZNFX410PM

APPLICANT:

LG Electronics MobileComm U.S.A

Application Type:

Class II Permissive Change

Model:

LM-X410PM

Additional Model(s):

LMX410PM, X410PM

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

22, 24, & 27

Test Procedure(s):

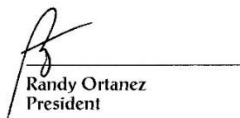
ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

Class II Permissive Change:

Please see FCC change document

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

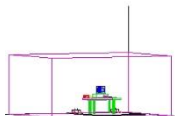


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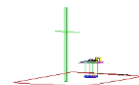
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MEASUREMENT REPORT

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	0.050	17.01	0.082	19.16	QPSK
LTE Band 12	27	699.7 - 715.3	0.041	16.14	0.067	18.29	16QAM
LTE Band 12	27	700.5 - 714.5	0.058	17.61	0.095	19.76	QPSK
LTE Band 12	27	700.5 - 714.5	0.047	16.75	0.078	18.90	16QAM
LTE Band 12	27	701.5 - 713.5	0.050	16.99	0.082	19.14	QPSK
LTE Band 12	27	701.5 - 713.5	0.046	16.66	0.076	18.81	16QAM
LTE Band 12	27	704 - 711	0.058	17.65	0.096	19.80	QPSK
LTE Band 12	27	704 - 711	0.049	16.92	0.081	19.07	16QAM
LTE Band 13	27	779.5 - 784.5	0.143	21.57	0.235	23.72	QPSK
LTE Band 13	27	779.5 - 784.5	0.118	20.71	0.193	22.86	16QAM
LTE Band 13	27	782	0.147	21.68	0.241	23.83	QPSK
LTE Band 13	27	782	0.121	20.83	0.199	22.98	16QAM
LTE Band 26/5	22H	824.7 - 848.3	0.187	22.73	0.308	24.88	QPSK
LTE Band 26/5	22H	824.7 - 848.3	0.144	21.58	0.236	23.73	16QAM
LTE Band 26/5	22H	825.5 - 847.5	0.192	22.83	0.315	24.98	QPSK
LTE Band 26/5	22H	825.5 - 847.5	0.144	21.58	0.236	23.73	16QAM
LTE Band 26/5	22H	826.5 - 846.5	0.204	23.09	0.334	25.24	QPSK
LTE Band 26/5	22H	826.5 - 846.5	0.166	22.20	0.272	24.35	16QAM
LTE Band 26/5	22H	829 - 844	0.189	22.76	0.310	24.91	QPSK
LTE Band 26/5	22H	829 - 844	0.150	21.75	0.245	23.90	16QAM
LTE Band 26	22H	831.5 - 841.5	0.237	23.74	0.388	25.89	QPSK
LTE Band 26	22H	831.5 - 841.5	0.182	22.60	0.299	24.75	16QAM

EUT Overview (<1GHz)

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Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
LTE Band 4	27	1710.7 - 1754.3	0.309	24.90	QPSK
LTE Band 4	27	1710.7 - 1754.3	0.240	23.81	16QAM
LTE Band 4	27	1711.5 - 1753.5	0.368	25.66	QPSK
LTE Band 4	27	1711.5 - 1753.5	0.316	25.00	16QAM
LTE Band 4	27	1712.5 - 1752.5	0.310	24.91	QPSK
LTE Band 4	27	1712.5 - 1752.5	0.279	24.46	16QAM
LTE Band 4	27	1715 - 1750	0.351	25.46	QPSK
LTE Band 4	27	1715 - 1750	0.307	24.88	16QAM
LTE Band 4	27	1717.5 - 1747.5	0.312	24.95	QPSK
LTE Band 4	27	1717.5 - 1747.5	0.247	23.93	16QAM
LTE Band 4	27	1720 - 1745	0.347	25.40	QPSK
LTE Band 4	27	1720 - 1745	0.274	24.38	16QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.400	26.02	QPSK
LTE Band 25/2	24E	1850.7 - 1914.3	0.326	25.14	16QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.405	26.08	QPSK
LTE Band 25/2	24E	1851.5 - 1913.5	0.353	25.48	16QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.385	25.85	QPSK
LTE Band 25/2	24E	1852.5 - 1912.5	0.341	25.33	16QAM
LTE Band 25/2	24E	1855 - 1910	0.406	26.09	QPSK
LTE Band 25/2	24E	1855 - 1910	0.337	25.28	16QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.391	25.92	QPSK
LTE Band 25/2	24E	1857.5 - 1907.5	0.313	24.96	16QAM
LTE Band 25/2	24E	1860 - 1905	0.428	26.31	QPSK
LTE Band 25/2	24E	1860 - 1905	0.364	25.61	16QAM
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.491	26.91	QPSK
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.343	25.35	16QAM
LTE Band 41 (PC2)	27	2501 - 2685	0.475	26.76	QPSK
LTE Band 41 (PC2)	27	2501 - 2685	0.380	25.80	16QAM
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.445	26.48	QPSK
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.359	25.55	16QAM
LTE Band 41 (PC2)	27	2506 - 2680	0.497	26.96	QPSK
LTE Band 41 (PC2)	27	2506 - 2680	0.349	25.42	16QAM

EUT Overview (>1GHz)

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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 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 ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFX410PM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 01091, 01092

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 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 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.



LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. 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 v03r01) were used in the measurement of the EUT.

3.2 Block C Frequency Range

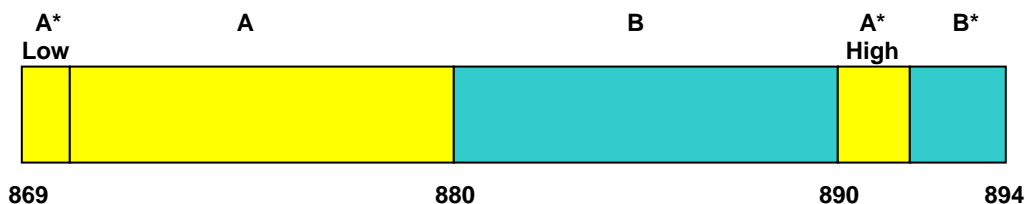
Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

3.3 Block A Frequency Range

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.

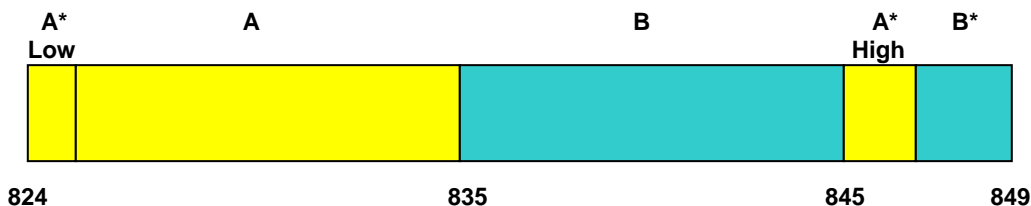
3.4 Cellular - Base Frequency Blocks



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*)

3.5 Cellular - Mobile Frequency Blocks

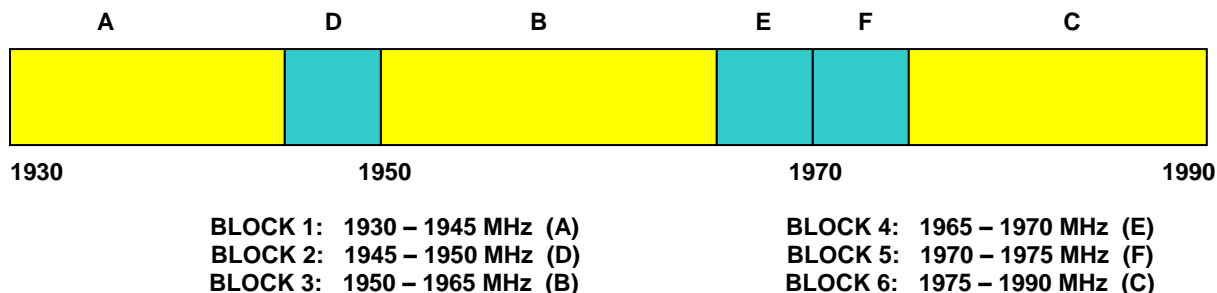


BLOCK 1: 824 – 835 MHz (A* Low + A)
BLOCK 2: 835 – 845 MHz (B)

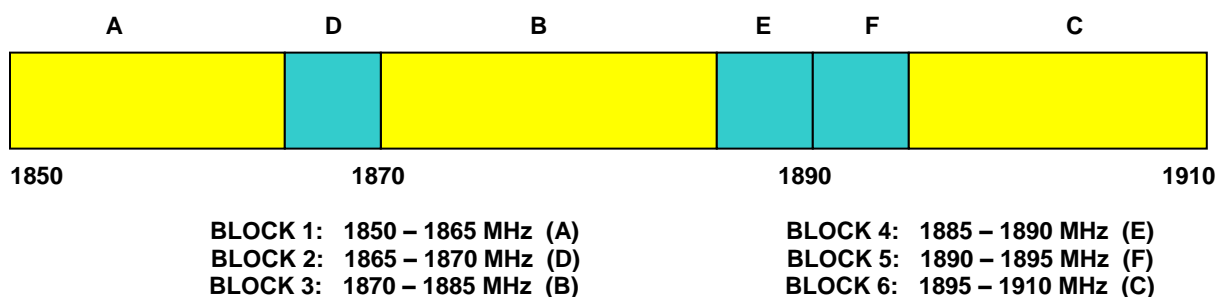
BLOCK 3: 845 – 846.5 MHz (A* High)
BLOCK 4: 846.5 – 849 MHz (B*)

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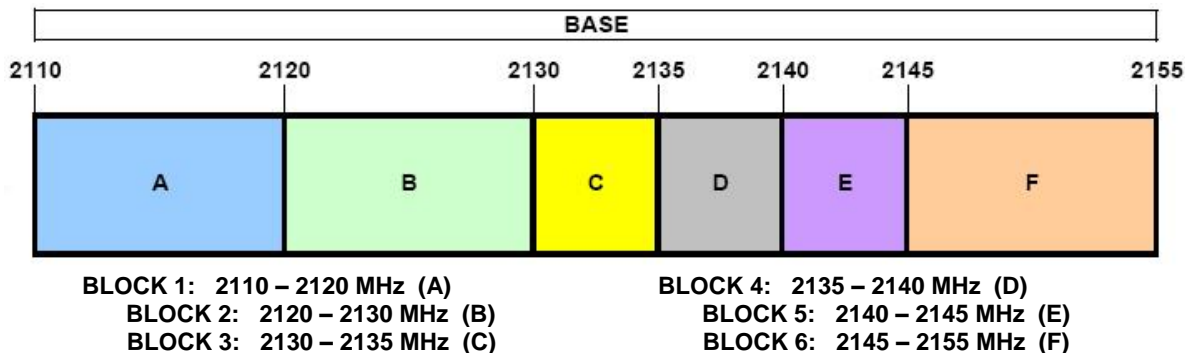
3.6 PCS - Base Frequency Blocks



3.7 PCS - Mobile Frequency Blocks

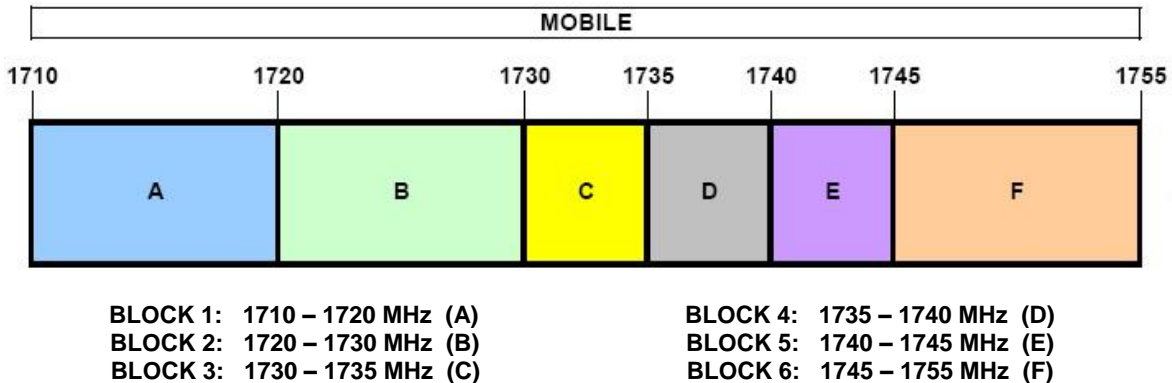


3.8 AWS - Base Frequency Blocks

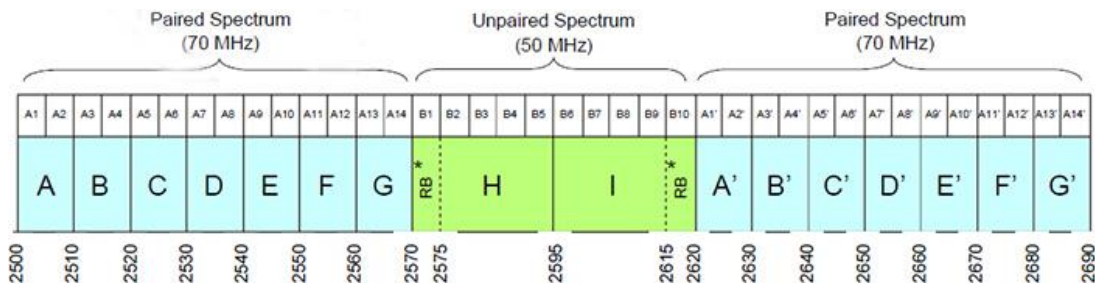


FCC ID: ZNFX410PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
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3.9 AWS - Mobile Frequency Blocks



3.10 BRS/EBS Frequency Block



3.11 Radiated Power and Radiated Spurious Emissions

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. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

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 v03r01.

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

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previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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 $P_g \text{ [dBm]} - \text{cable loss [dB]}$.



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 $43 + 10\log_{10}(\text{Power [Watts]})$. For Band 41, the calculated P_d levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of $55 + 10\log_{10}(\text{Power [Watts]})$.

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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
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Anritsu	MT8820C	Radio Communication Analyzer	1/30/2018	Annual	1/30/2019	6201300731
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
Espec	ESX-2CA	Environmental Chamber	3/28/2018	Annual	3/28/2019	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102135
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102133
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/24/2018	Annual	1/24/2019	100040
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	CMW500	Radio Communication Tester	11/3/2017	Annual	11/3/2018	100976
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102134
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB6	Bi-Log Antenna (30M - 6GHz)	9/27/2016	Biennial	9/27/2018	A082816

Table 5-1. Test Equipment

Notes:

- For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.



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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: ZNFX410PM
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 26/5)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.2
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 12/13)	< 3 Watts max. ERP		PASS	Section 7.2
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25/2, 41)	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d)(4)	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(c) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + 10log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 7.3
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz		PASS	Section 7.3
27.53(m)	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)		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)

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 v03r01 – 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. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
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.

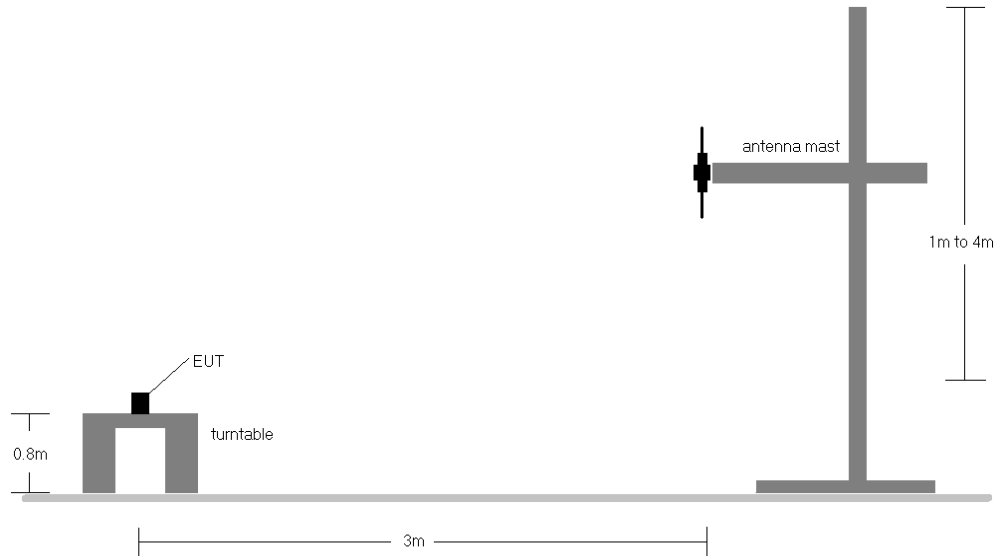


Figure 7-1. Radiated Test Setup <1GHz

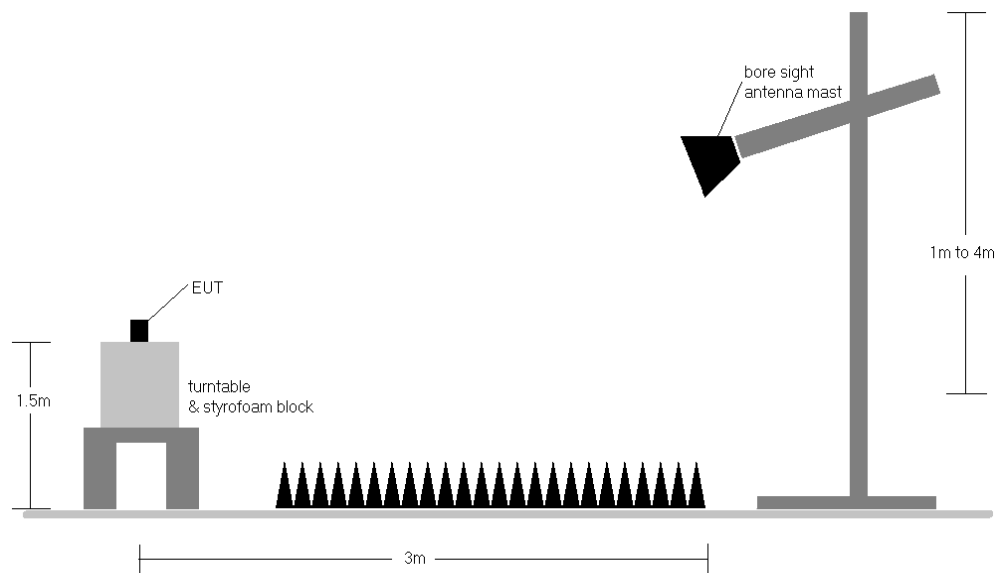


Figure 7-2. Radiated Test Setup >1GHz



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]
699.70	1.4	QPSK	H	150	293	1 / 5	17.97	1.10	16.92	0.049	34.77	-17.85
707.50	1.4	QPSK	H	150	297	1 / 5	18.03	1.13	17.01	0.050	34.77	-17.76
715.30	1.4	QPSK	H	150	308	1 / 5	17.88	1.16	16.89	0.049	34.77	-17.88
707.50	1.4	16-QAM	H	150	297	1 / 5	17.16	1.13	16.14	0.041	34.77	-18.63
700.50	3	QPSK	H	150	303	1 / 14	18.41	1.10	17.36	0.054	34.77	-17.41
707.50	3	QPSK	H	150	288	1 / 14	18.30	1.13	17.28	0.053	34.77	-17.49
714.50	3	QPSK	H	150	292	1 / 14	18.60	1.16	17.61	0.058	34.77	-17.16
714.50	3	16-QAM	H	150	292	1 / 14	17.74	1.16	16.75	0.047	34.77	-18.02
701.50	5	QPSK	H	150	296	1 / 0	18.03	1.11	16.99	0.050	34.77	-17.79
707.50	5	QPSK	H	150	297	1 / 0	17.98	1.13	16.96	0.050	34.77	-17.81
713.50	5	QPSK	H	150	310	1 / 0	17.85	1.15	16.85	0.048	34.77	-17.92
701.50	5	16-QAM	H	150	296	1 / 0	17.70	1.11	16.66	0.046	34.77	-18.12
704.00	10	QPSK	H	150	262	1 / 49	18.35	1.12	17.32	0.054	34.77	-17.45
707.50	10	QPSK	H	150	259	1 / 49	18.67	1.13	17.65	0.058	34.77	-17.12
711.00	10	QPSK	H	150	255	1 / 49	18.37	1.14	17.36	0.055	34.77	-17.41
707.50	10	16-QAM	H	150	259	1 / 49	17.94	1.13	16.92	0.049	34.77	-17.85
707.50	10	QPSK	V	150	276	1 / 49	14.39	1.13	13.37	0.022	34.77	-21.40

Table 7-2. ERP Data (Band 12)

FCC ID: ZNFX410PM	 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]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	150	280	1 / 0	22.40	1.32	21.57	0.143	34.77	-13.20	23.72	0.235	36.99	-13.27
782.00	5	QPSK	H	150	273	1 / 0	22.33	1.33	21.51	0.142	34.77	-13.26	23.66	0.232	36.99	-13.33
784.50	5	QPSK	H	150	276	1 / 24	22.35	1.34	21.54	0.143	34.77	-13.23	23.69	0.234	36.99	-13.30
779.50	5	16-QAM	H	150	280	1 / 0	21.54	1.32	20.71	0.118	34.77	-14.06	22.86	0.193	36.99	-14.13
782.00	10	QPSK	H	150	281	1 / 0	22.50	1.33	21.68	0.147	34.77	-13.09	23.83	0.241	36.99	-13.16
782.00	10	16-QAM	H	150	281	1 / 0	21.65	1.33	20.83	0.121	34.77	-13.94	22.98	0.199	36.99	-14.01
782.00	10	QPSK	V	150	75	1 / 0	22.11	1.33	21.29	0.135	34.77	-13.48	23.44	0.221	36.99	-13.55

Table 7-3. ERP Data (Band 13)

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]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	60	6 / 0	23.24	1.50	22.59	0.182	38.45	-15.86	24.74	0.298	40.61	-15.87
836.50	1.4	QPSK	H	150	288	1 / 0	23.19	1.50	22.54	0.179	38.45	-15.91	24.69	0.294	40.61	-15.92
848.30	1.4	QPSK	H	150	297	1 / 5	23.38	1.50	22.73	0.187	38.45	-15.72	24.88	0.308	40.61	-15.73
848.30	1.4	16-QAM	H	150	297	1 / 5	22.23	1.50	21.58	0.144	38.45	-16.87	23.73	0.236	40.61	-16.88
825.50	3	QPSK	H	150	76	1 / 14	23.48	1.50	22.83	0.192	38.45	-15.62	24.98	0.315	40.61	-15.63
836.50	3	QPSK	H	150	90	1 / 7	23.43	1.50	22.78	0.190	38.45	-15.67	24.93	0.311	40.61	-15.68
847.50	3	QPSK	H	150	290	1 / 14	23.19	1.50	22.54	0.179	38.45	-15.91	24.69	0.294	40.61	-15.92
825.50	3	16-QAM	H	150	76	1 / 14	22.23	1.50	21.58	0.144	38.45	-16.87	23.73	0.236	40.61	-16.88
826.50	5	QPSK	H	150	283	1 / 12	23.31	1.50	22.66	0.185	38.45	-15.79	24.81	0.303	40.61	-15.80
836.50	5	QPSK	H	150	69	1 / 0	23.74	1.50	23.09	0.204	38.45	-15.36	25.24	0.334	40.61	-15.37
846.50	5	QPSK	H	150	294	1 / 24	23.30	1.50	22.65	0.184	38.45	-15.80	24.80	0.302	40.61	-15.81
836.50	5	16-QAM	H	150	69	1 / 0	22.85	1.50	22.20	0.166	38.45	-16.25	24.35	0.272	40.61	-16.26
829.00	10	QPSK	H	150	291	1 / 49	23.08	1.50	22.43	0.175	38.45	-16.02	24.58	0.287	40.61	-16.03
836.50	10	QPSK	H	150	292	1 / 25	22.75	1.50	22.10	0.162	38.45	-16.35	24.25	0.266	40.61	-16.36
844.00	10	QPSK	H	150	294	1 / 49	23.41	1.50	22.76	0.189	38.45	-15.69	24.91	0.310	40.61	-15.70
844.00	10	16-QAM	H	150	294	1 / 49	22.40	1.50	21.75	0.150	38.45	-16.70	23.90	0.245	40.61	-16.71

Table 7-4. ERP Data (Band 26/5)



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]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	150	283	1 / 0	23.39	1.50	22.74	0.188	38.45	-15.71	24.89	0.308	40.61	-15.72
836.50	15	QPSK	H	150	81	1 / 74	23.92	1.50	23.27	0.212	38.45	-15.18	25.42	0.348	40.61	-15.19
841.50	15	QPSK	H	150	66	1 / 74	24.39	1.50	23.74	0.237	38.45	-14.71	25.89	0.388	40.61	-14.72
841.50	15	16-QAM	H	150	66	1 / 74	23.25	1.50	22.60	0.182	38.45	-15.85	24.75	0.299	40.61	-15.86
841.50	15	QPSK	V	150	93	1 / 74	23.40	1.50	22.75	0.188	38.45	-15.70	24.90	0.309	40.61	-15.71

Table 7-5. ERP Data (Band 26)

FCC ID: ZNFX410PM	 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	H	150	5	1 / 0	19.34	5.56	24.90	0.309	30.00	-5.10
1732.50	1.4	QPSK	H	150	1	1 / 0	19.00	5.41	24.41	0.276	30.00	-5.59
1754.30	1.4	QPSK	H	150	6	1 / 0	18.67	5.26	23.93	0.247	30.00	-6.07
1710.70	1.4	16-QAM	H	150	5	1 / 0	18.25	5.56	23.81	0.240	30.00	-6.19
1711.50	3	QPSK	H	150	356	1 / 0	20.11	5.55	25.66	0.368	30.00	-4.34
1732.50	3	QPSK	H	150	356	1 / 0	19.75	5.41	25.16	0.328	30.00	-4.84
1753.50	3	QPSK	H	150	352	1 / 0	19.36	5.26	24.62	0.290	30.00	-5.38
1711.50	3	16-QAM	H	150	356	1 / 0	19.45	5.55	25.00	0.316	30.00	-5.00
1712.50	5	QPSK	H	150	5	1 / 0	18.64	5.55	24.19	0.262	30.00	-5.81
1732.50	5	QPSK	H	150	355	1 / 0	19.50	5.41	24.91	0.310	30.00	-5.09
1752.50	5	QPSK	H	150	0	1 / 0	16.64	5.27	21.91	0.155	30.00	-8.09
1732.50	5	16-QAM	H	150	355	1 / 0	19.05	5.41	24.46	0.279	30.00	-5.54
1715.00	10	QPSK	H	150	355	1 / 0	19.93	5.53	25.46	0.351	30.00	-4.54
1732.50	10	QPSK	H	150	355	1 / 0	19.04	5.41	24.45	0.278	30.00	-5.55
1750.00	10	QPSK	H	150	358	1 / 0	19.01	5.29	24.30	0.269	30.00	-5.70
1715.00	10	16-QAM	H	150	355	1 / 0	19.35	5.53	24.88	0.307	30.00	-5.12
1717.50	15	QPSK	H	150	4	1 / 0	18.79	5.51	24.30	0.269	30.00	-5.70
1732.50	15	QPSK	H	150	354	1 / 0	19.54	5.41	24.95	0.312	30.00	-5.05
1747.50	15	QPSK	H	150	0	1 / 0	18.61	5.31	23.92	0.246	30.00	-6.08
1732.50	15	16-QAM	H	150	354	1 / 0	18.52	5.41	23.93	0.247	30.00	-6.07
1720.00	20	QPSK	H	150	345	1 / 0	19.30	5.49	24.79	0.302	30.00	-5.21
1732.50	20	QPSK	H	150	3	1 / 0	19.99	5.41	25.40	0.347	30.00	-4.60
1745.00	20	QPSK	H	150	358	1 / 0	19.65	5.32	24.97	0.314	30.00	-5.03
1732.50	20	16-QAM	H	150	3	1 / 0	18.97	5.41	24.38	0.274	30.00	-5.62
1711.50	3	QPSK	V	150	300	1 / 0	19.09	5.41	24.50	0.282	30.00	-5.50

Table 7-6. EIRP Data (Band 4)

FCC ID: ZNFX410PM	 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	H	150	360	1 / 0	21.20	4.82	26.02	0.400	33.01	-6.99
1882.50	1.4	QPSK	H	150	355	1 / 0	20.43	4.73	25.16	0.328	33.01	-7.85
1914.30	1.4	QPSK	H	150	359	1 / 0	20.04	4.68	24.72	0.296	33.01	-8.29
1850.70	1.4	16-QAM	H	150	360	1 / 0	20.32	4.82	25.14	0.326	33.01	-7.87
1851.50	3	QPSK	H	150	351	1 / 0	21.26	4.82	26.08	0.405	33.01	-6.93
1882.50	3	QPSK	H	150	359	1 / 0	20.64	4.73	25.37	0.345	33.01	-7.64
1913.50	3	QPSK	H	150	342	1 / 0	18.83	4.68	23.51	0.224	33.01	-9.50
1851.50	3	16-QAM	H	150	351	1 / 0	20.66	4.82	25.48	0.353	33.01	-7.53
1852.50	5	QPSK	H	150	358	1 / 0	21.04	4.81	25.85	0.385	33.01	-7.16
1882.50	5	QPSK	H	150	358	1 / 0	20.27	4.73	25.00	0.316	33.01	-8.01
1912.50	5	QPSK	H	150	13	1 / 0	16.04	4.68	20.72	0.118	33.01	-12.29
1852.50	5	16-QAM	H	150	358	1 / 0	20.52	4.81	25.33	0.341	33.01	-7.68
1855.00	10	QPSK	H	150	359	1 / 0	21.28	4.81	26.09	0.406	33.01	-6.92
1882.50	10	QPSK	H	150	359	1 / 0	20.32	4.73	25.05	0.320	33.01	-7.96
1910.00	10	QPSK	H	150	359	1 / 0	20.02	4.68	24.70	0.295	33.01	-8.31
1855.00	10	16-QAM	H	150	359	1 / 0	20.47	4.81	25.28	0.337	33.01	-7.73
1857.50	15	QPSK	H	150	356	1 / 0	21.12	4.80	25.92	0.391	33.01	-7.09
1882.50	15	QPSK	H	150	179	1 / 0	20.38	4.73	25.11	0.325	33.01	-7.90
1907.50	15	QPSK	H	150	356	1 / 0	19.72	4.68	24.40	0.276	33.01	-8.61
1857.50	15	16-QAM	H	150	356	1 / 0	20.16	4.80	24.96	0.313	33.01	-8.05
1860.00	20	QPSK	H	150	358	1 / 0	21.52	4.79	26.31	0.428	33.01	-6.70
1882.50	20	QPSK	H	150	358	1 / 0	20.90	4.73	25.63	0.366	33.01	-7.38
1905.00	20	QPSK	H	150	358	1 / 0	20.57	4.68	25.25	0.335	33.01	-7.76
1860.00	20	16-QAM	H	150	358	1 / 0	20.82	4.79	25.61	0.364	33.01	-7.40
1860.00	20	QPSK	V	150	318	1 / 0	20.36	4.79	25.15	0.328	33.01	-7.86

Table 7-7. EIRP Data (Band 25/2)

FCC ID: ZNFX410PM	 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]
2498.50	5	QPSK	H	1	352	1 / 0	20.99	5.73	26.72	0.470	33.01	-6.29
2593.00	5	QPSK	H	7	0	1 / 0	20.84	6.07	26.91	0.491	33.01	-6.10
2687.50	5	QPSK	H	3	357	1 / 0	19.82	6.48	26.30	0.427	33.01	-6.71
2498.50	5	16-QAM	H	1	352	1 / 0	19.62	5.73	25.35	0.343	33.01	-7.66
2501.00	10	QPSK	H	4	351	1 / 0	20.74	5.73	26.47	0.444	33.01	-6.54
2593.00	10	QPSK	H	0	349	1 / 0	20.69	6.07	26.76	0.475	33.01	-6.25
2685.00	10	QPSK	H	3	358	1 / 49	19.95	6.47	26.42	0.439	33.01	-6.59
2593.00	10	16-QAM	H	0	349	1 / 0	19.73	6.07	25.80	0.380	33.01	-7.21
2503.50	15	QPSK	H	5	357	1 / 74	20.74	5.74	26.48	0.445	33.01	-6.53
2593.00	15	QPSK	H	1	352	1 / 0	19.94	6.07	26.01	0.399	33.01	-7.00
2682.50	15	QPSK	H	2	355	1 / 0	19.88	6.46	26.34	0.431	33.01	-6.67
2593.00	15	16-QAM	H	1	352	1 / 74	19.48	6.07	25.55	0.359	33.01	-7.46
2506.00	20	QPSK	H	3	349	1 / 99	20.38	5.75	26.13	0.410	33.01	-6.88
2593.00	20	QPSK	H	1	356	1 / 99	20.89	6.07	26.96	0.497	33.01	-6.05
2680.00	20	QPSK	H	0	351	1 / 0	20.13	6.45	26.58	0.455	33.01	-6.43
2593.00	20	16-QAM	H	1	356	1 / 99	19.35	6.07	25.42	0.349	33.01	-7.59
2593.00	20	QPSK	V	271	329	1 / 99	20.79	6.07	26.86	0.486	33.01	-6.15

Table 7-8. EIRP Data (Band 41, PC2)

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]
2593.00	15	QPSK	H	4	351	1 / 0	18.09	6.07	24.16	0.261	33.01	-8.85
2593.00	15	16-QAM	H	4	351	1 / 0	17.00	6.07	23.07	0.203	33.01	-9.94

Table 7-9. EIRP Data (Band 41, PC3)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE) 				Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset			Page 21 of 41

7.3 Radiated Spurious Emissions Measurements

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 v03r01 – 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 $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 22 of 41

Test Setup

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

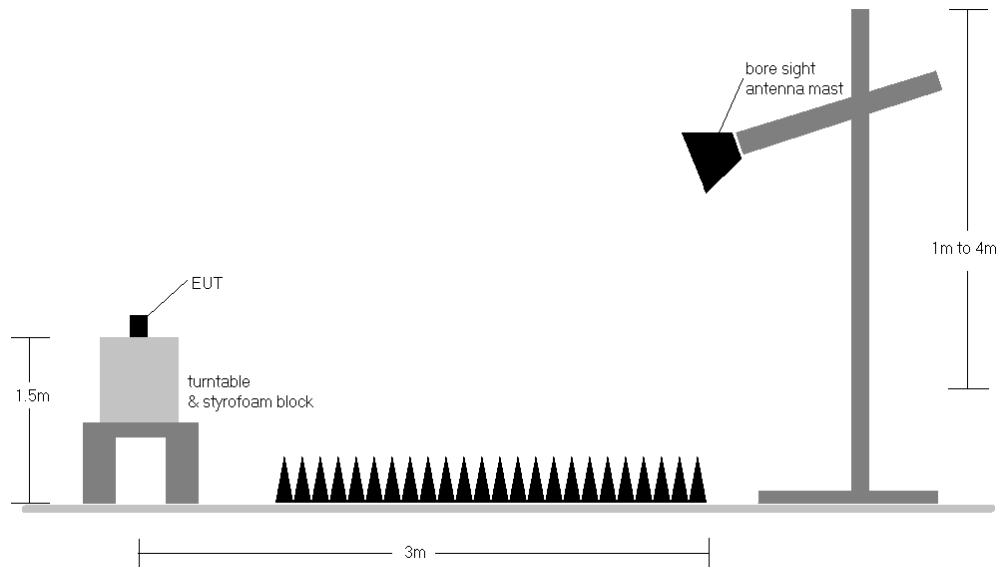


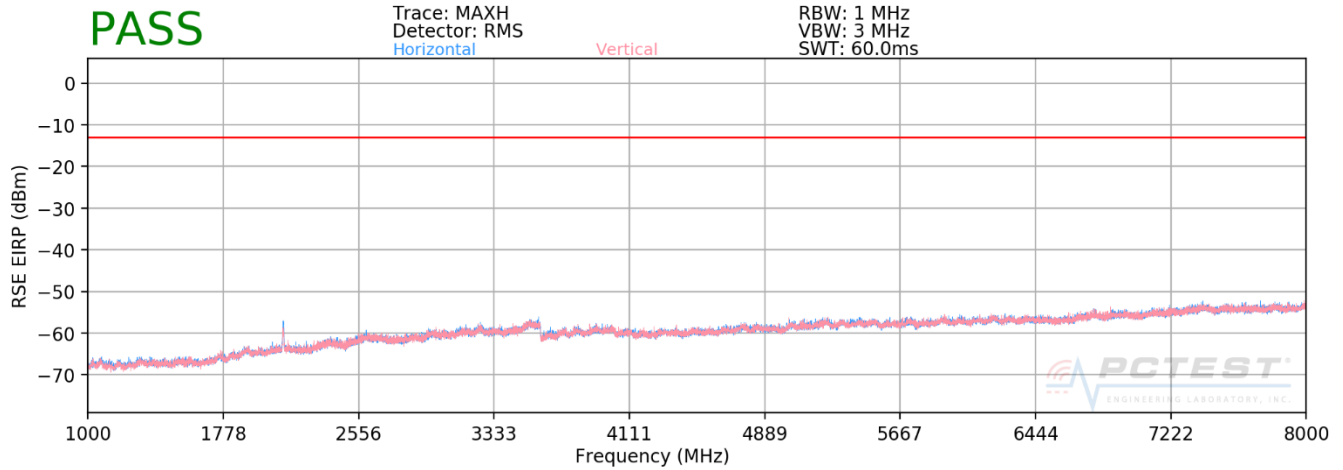
Figure 7-3. Test Instrument & Measurement Setup

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: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 23 of 41

Band 12



Plot 7-1. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY: 704.00 MHz
CHANNEL: 23060
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]
1408.00	H	169	216	-73.04	7.54	-65.50	-52.5
2112.00	H	111	28	-54.31	8.85	-45.46	-32.5
2816.00	H	-	-	-78.07	10.12	-67.95	-55.0
3520.00	H	335	319	-73.28	9.91	-63.36	-50.4
4224.00	H	-	-	-74.59	10.50	-64.09	-51.1
4928.00	H	-	-	-73.07	10.87	-62.20	-49.2

Table 7-10. Radiated Spurious Data (Band 12 – Low Channel)

FCC ID: ZNFX410PM	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		LG	Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 24 of 41

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 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]
1415.00	H	122	210	-73.90	7.63	-66.27	-53.3
2122.50	H	160	316	-51.35	8.86	-42.49	-29.5
2830.00	H	-	-	-78.14	10.10	-68.04	-55.0
3537.50	H	102	338	-73.30	9.90	-63.40	-50.4
4245.00	H	-	-	-74.57	10.58	-63.99	-51.0
4952.50	H	-	-	-73.42	10.92	-62.51	-49.5

Table 7-11. Radiated Spurious Data (Band 12 – Mid Channel)

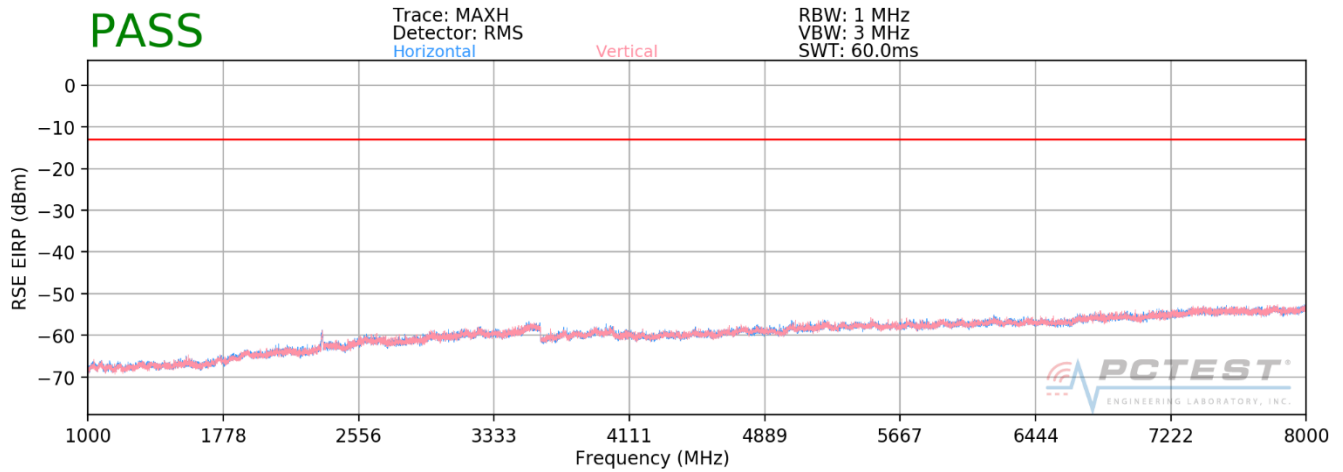
OPERATING FREQUENCY: 711.00 MHz
 CHANNEL: 23130
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1422.00	H	150	120	-76.50	7.72	-68.78	-55.8
2133.00	H	141	327	-52.28	8.87	-43.41	-30.4
2844.00	H	-	-	-77.47	10.07	-67.40	-54.4
3555.00	H	160	161	-73.98	9.89	-64.08	-51.1
4266.00	H	-	-	-74.18	10.65	-63.53	-50.5
4977.00	H	-	-	-73.64	10.93	-62.71	-49.7

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

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)				Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset			Page 25 of 41

Band 13



Plot 7-2. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY: 782.00 MHz

CHANNEL: 23230

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]
2346.00	H	127	61	-54.09	9.43	-44.65	-31.7
3128.00	H	111	355	-74.08	9.34	-64.74	-51.7
3910.00	H	178	59	-72.34	9.37	-62.97	-50.0
4692.00	H	-	-	-74.42	10.93	-63.49	-50.5
5474.00	H	-	-	-72.60	10.80	-61.80	-48.8



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

FCC ID: ZNFX410PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 26 of 41

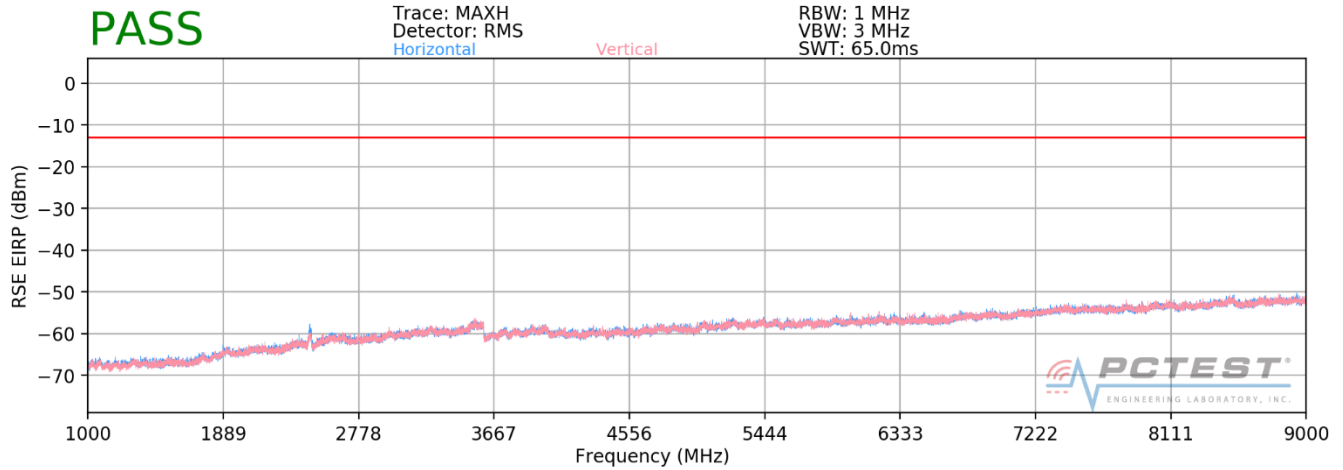
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

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]
1564.00	H	132	136	-74.18	8.53	-65.65	-25.6

Table 7-14. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 27 of 41

Band 26/5



Plot 7-3. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY: 825.50 MHz
CHANNEL: 26805
MODULATION SIGNAL: QPSK
BANDWIDTH: 3.0 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]
1651.00	H	102	3	-73.98	8.95	-65.03	-52.0
2476.50	H	106	214	-58.22	9.66	-48.56	-35.6
3302.00	H	146	344	-73.41	9.58	-63.83	-50.8
4127.50	H	181	208	-73.51	10.18	-63.33	-50.3
4953.00	H	-	-	-73.60	10.92	-62.69	-49.7

Table 7-15. Radiated Spurious Data (Band 26/5 – Low Channel)

FCC ID: ZNFX410PM	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 28 of 41

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 26915
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 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	111	356	-74.94	8.95	-65.99	-53.0
2509.50	H	141	216	-59.83	9.75	-50.08	-37.1
3346.00	H	158	355	-73.56	9.60	-63.95	-51.0
4182.50	H	132	304	-71.92	10.34	-61.57	-48.6
5019.00	H	-	-	-73.83	10.88	-62.95	-49.9

Table 7-16. Radiated Spurious Data (Band 26/5 – Mid Channel)

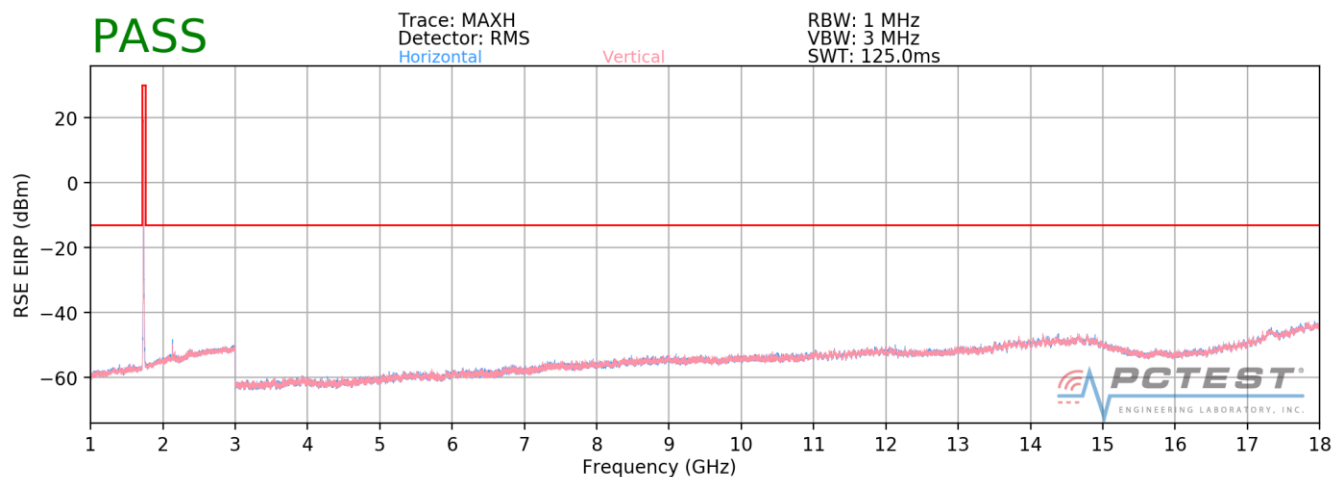
OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 27025
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1695.00	H	141	6	-75.67	8.95	-66.72	-53.7
2542.50	H	164	222	-58.89	9.74	-49.15	-36.2
3390.00	H	363	173	-71.98	9.76	-62.22	-49.2
4237.50	H	127	42	-71.91	10.55	-61.35	-48.4
5085.00	H	-	-	-72.37	10.71	-61.66	-48.7

Table 7-17. Radiated Spurious Data (Band 26/5 – High Channel)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 29 of 41

Band 4



Plot 7-4. Radiated Spurious Plot above 1GHz (Band 4)

OPERATING FREQUENCY: 1711.50 MHz
CHANNEL: 19965
MODULATION SIGNAL: QPSK
BANDWIDTH: 3.0 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]
3423.00	V	-	-	-73.73	9.82	-63.90	-50.9
5134.50	V	113	267	-70.39	10.69	-59.70	-46.7
6846.00	V	-	-	-70.78	11.64	-59.14	-46.1
8557.50	V	114	42	-65.25	11.15	-54.10	-41.1
10269.00	V	-	-	-67.59	12.21	-55.38	-42.4
11980.50	V	-	-	-65.30	12.54	-52.76	-39.8

Table 7-18. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: ZNFX410PM	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset	Page 30 of 41

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 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]
3465.00	V	384	182	-72.38	9.88	-62.50	-49.5
5197.50	V	117	264	-70.72	10.76	-59.97	-47.0
6930.00	V	209	195	-70.13	11.74	-58.39	-45.4
8662.50	V	121	41	-65.63	11.02	-54.61	-41.6
10395.00	V	-	-	-67.66	12.44	-55.22	-42.2
12127.50	V	-	-	-65.46	12.96	-52.49	-39.5

Table 7-19. Radiated Spurious Data (Band 4 – Mid Channel)

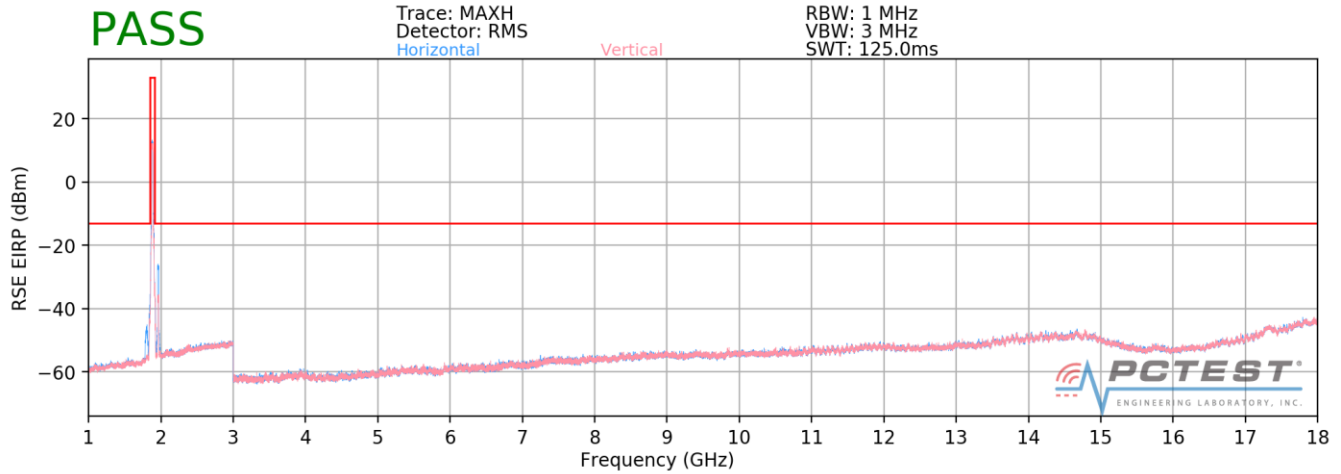
OPERATING FREQUENCY: 1753.50 MHz
 CHANNEL: 20385
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
3507.00	V	130	51	-73.01	9.92	-63.09	-50.1
5260.50	V	150	167	-69.48	10.71	-58.77	-45.8
7014.00	V	228	195	-69.71	11.86	-57.85	-44.9
8767.50	V	118	42	-64.96	10.98	-53.98	-41.0
10521.00	V	-	-	-67.82	12.60	-55.22	-42.2
12274.50	V	-	-	-65.89	13.17	-52.72	-39.7

Table 7-20. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 31 of 41

Band 25/2



Plot 7-5. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY: 1860.00 MHz
CHANNEL: 26140
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 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]
3720.00	V	106	49	-67.95	9.51	-58.45	-45.4
5580.00	V	140	111	-68.71	10.99	-57.72	-44.7
7440.00	V	116	177	-66.42	10.99	-55.44	-42.4
9300.00	V	102	132	-63.29	11.61	-51.69	-38.7
11160.00	V	-	-	-68.87	12.73	-56.14	-43.1

Table 7-21. Radiated Spurious Data (Band 25/2 – Low Channel)

FCC ID: ZNFX410PM	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 32 of 41

OPERATING FREQUENCY: 1882.50 MHz
 CHANNEL: 26365
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 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]
3765.00	V	321	33	-65.04	9.36	-55.68	-42.7
5647.50	V	111	88	-65.59	11.19	-54.39	-41.4
7530.00	V	120	177	-68.75	11.13	-57.62	-44.6
9412.50	V	106	52	-65.44	11.57	-53.87	-40.9
11295.00	V	-	-	-69.26	12.71	-56.55	-43.5

Table 7-22. Radiated Spurious Data (Band 25/2 – Mid Channel)

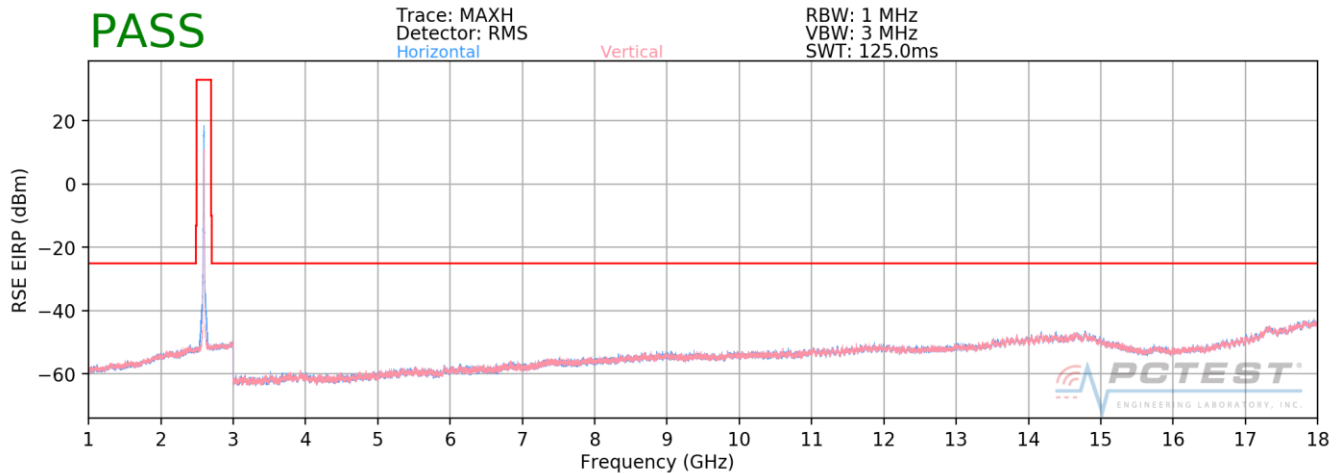
OPERATING FREQUENCY: 1905.00 MHz
 CHANNEL: 26590
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	V	288	22	-67.49	9.29	-58.20	-45.2
5715.00	V	107	120	-65.15	11.35	-53.80	-40.8
7620.00	V	386	92	-67.41	11.29	-56.13	-43.1
9525.00	V	102	313	-63.37	11.73	-51.64	-38.6
11430.00	V	-	-	-69.24	12.83	-56.41	-43.4

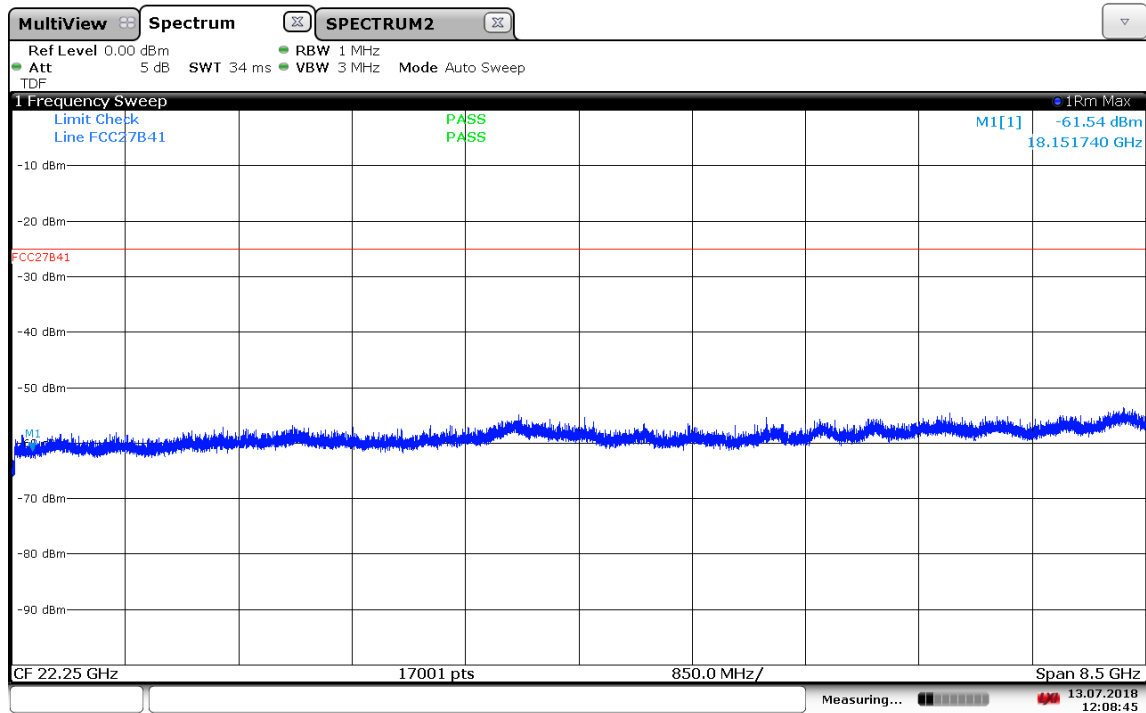
Table 7-23. Radiated Spurious Data (Band 25/2 – High Channel)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 33 of 41

Band 41 (PC2)



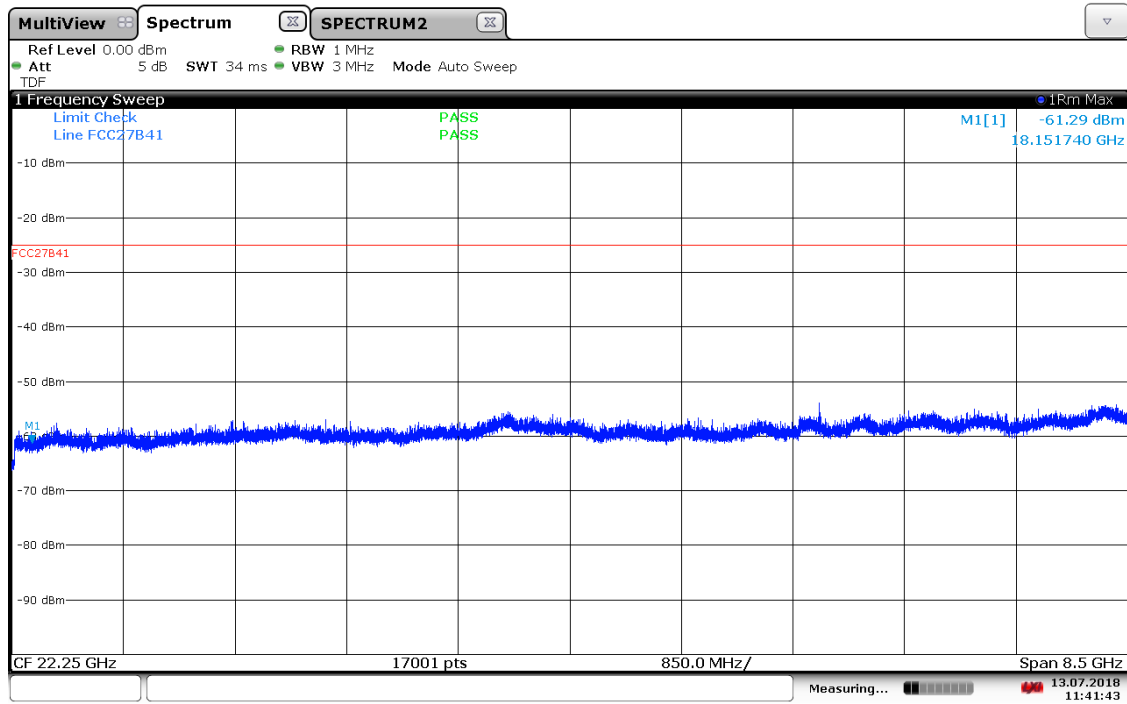
Plot 7-6. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



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Plot 7-7. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41), H Pol

FCC ID: ZNFX410PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 34 of 41



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Plot 7-8. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41), V Pol

OPERATING FREQUENCY: 2501.00 MHz

CHANNEL: 39740

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.0 MHz

DISTANCE: 3 meters

LIMIT: -25 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]
5002.00	V	351	163	-62.63	10.93	-51.70	-26.7
7503.00	V	118	311	-57.89	11.08	-46.81	-21.8
10004.00	V	115	243	-60.72	12.00	-48.72	-23.7
12505.00	V	360	282	-61.38	13.56	-47.82	-22.8
15006.00	V	117	355	-60.86	13.42	-47.45	-22.4
17507.00	V	-	-	-56.52	11.81	-44.71	-19.7

Table 7-24. Radiated Spurious Data (Band 41 – Low Channel)

FCC ID: ZNFX410PM	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		LG	Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 35 of 41

OPERATING FREQUENCY: 2593.00 MHz
 CHANNEL: 40620
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 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]
5186.00	V	129	137	-58.30	10.74	-47.56	-22.6
7779.00	V	117	144	-56.39	11.44	-44.95	-20.0
10372.00	V	316	316	-63.80	12.42	-51.38	-26.4
12965.00	V	-	-	-64.09	13.29	-50.80	-25.8
15558.00	V	-	-	-68.75	16.33	-52.42	-27.4

Table 7-25. Radiated Spurious Data (Band 41 – Mid Channel)

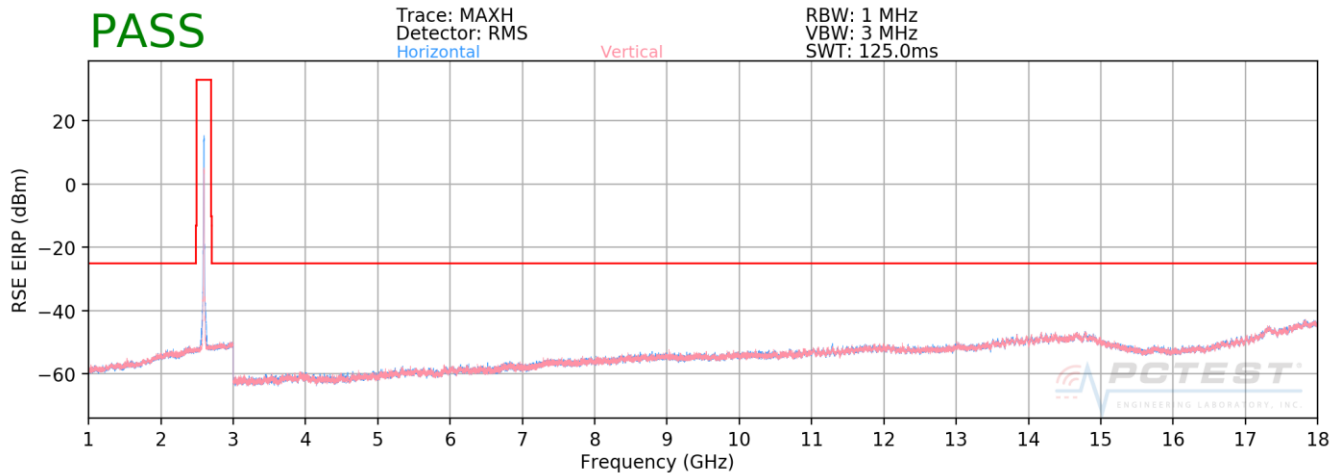
OPERATING FREQUENCY: 2685.00 MHz
 CHANNEL: 41540
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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]
5370.00	V	117	126	-57.12	10.69	-46.43	-21.4
8055.00	V	369	126	-52.17	11.17	-41.00	-16.0
10740.00	V	122	155	-62.28	12.61	-49.67	-24.7
13425.00	V	335	334	-58.25	12.59	-45.66	-20.7
16110.00	V	-	-	-68.61	16.59	-52.02	-27.0

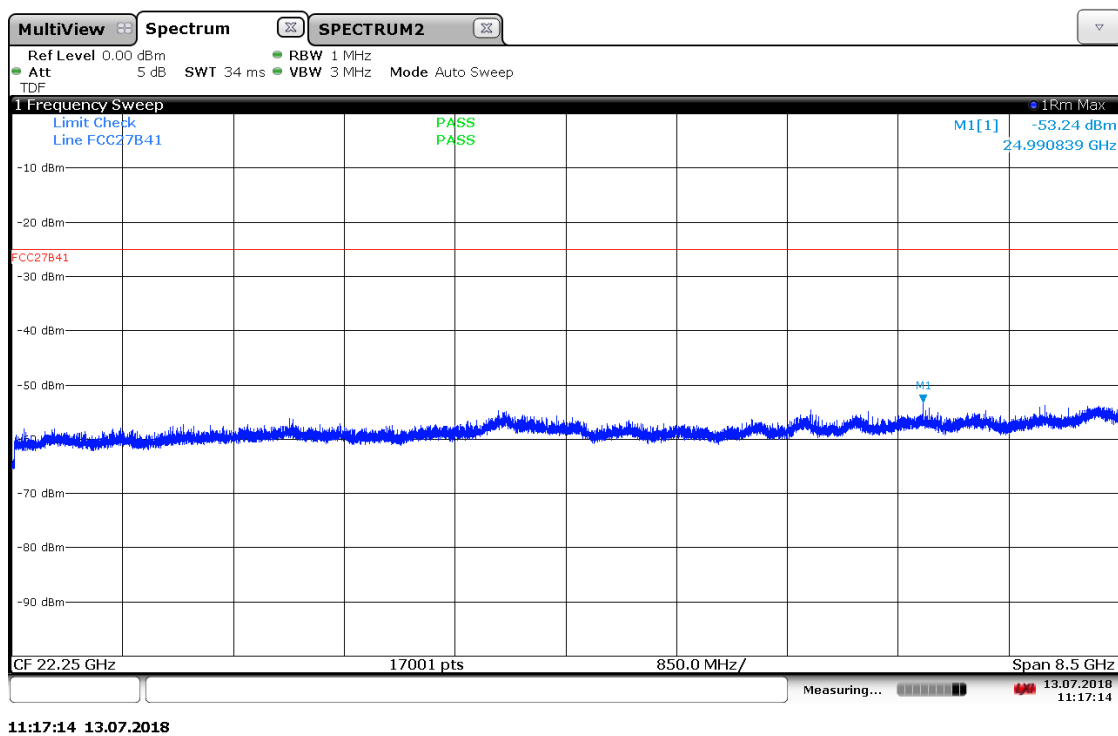
Table 7-26. Radiated Spurious Data (Band 41 – High Channel)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 36 of 41

Band 41 (PC3)

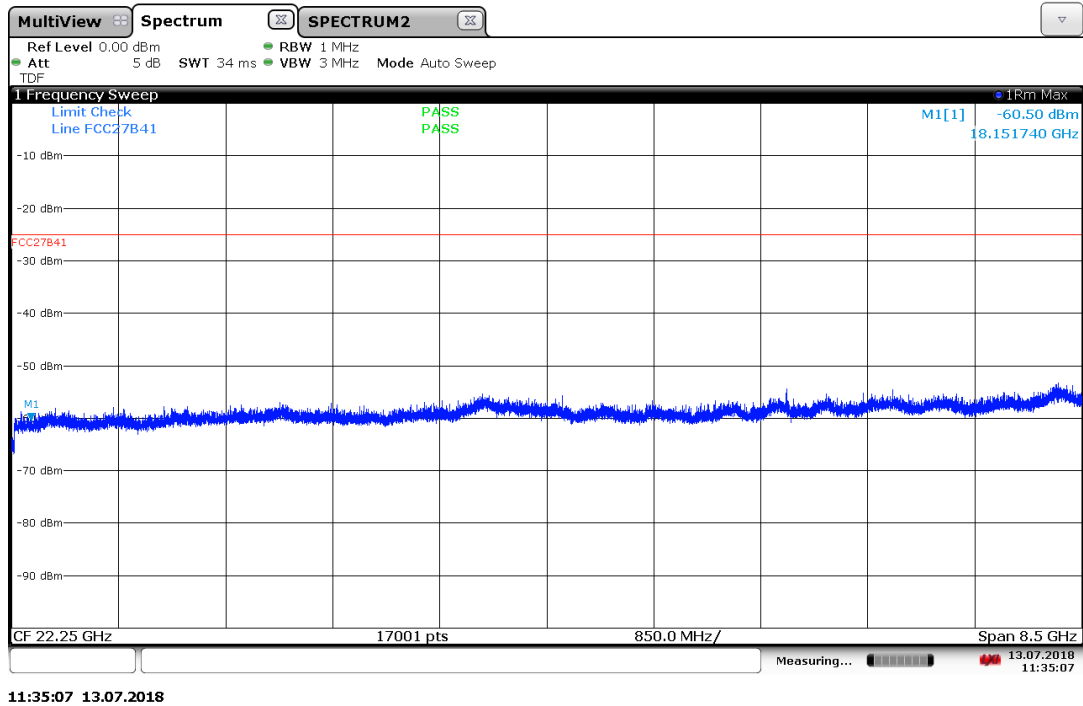


Plot 7-9. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



Plot 7-10. Radiated Spurious Plot 18GHz - 26.5GHz (Band 41), H Pol

FCC ID: ZNFX410PM	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset	Page 37 of 41



Plot 7-11. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41), V Pol

FCC ID: ZNFX410PM	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset	Page 38 of 41

OPERATING FREQUENCY: 2501.00 MHz
CHANNEL: 39740
MODULATION SIGNAL: QPSK
BANDWIDTH: 10.0 MHz
DISTANCE: 3 meters
LIMIT: -25 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]
5002.00	V	360	43	-64.11	10.93	-53.18	-28.2
7503.00	V	354	103	-60.44	11.08	-49.36	-24.4
10004.00	V	112	239	-61.83	12.00	-49.83	-24.8
12505.00	V	345	279	-62.62	13.56	-49.06	-24.1
15006.00	V	-	-	-62.08	13.42	-48.67	-23.7

Table 7-27. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
CHANNEL: 40620
MODULATION SIGNAL: QPSK
BANDWIDTH: 10.0 MHz
DISTANCE: 3 meters
LIMIT: -25 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]
5186.00	V	111	135	-60.86	10.74	-50.12	-25.1
7779.00	V	122	324	-61.38	11.44	-49.94	-24.9
10372.00	V	-	-	-66.24	12.42	-53.82	-28.8
12965.00	V	358	352	-61.75	13.29	-48.46	-23.5
15558.00	V	-	-	-66.98	16.33	-50.65	-25.7



Table 7-28. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 39 of 41

OPERATING FREQUENCY: 2685.00 MHz
 CHANNEL: 41540
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 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]
5370.00	V	120	225	-59.18	10.69	-48.49	-23.5
8055.00	V	332	128	-54.64	11.17	-43.47	-18.5
10740.00	V	124	152	-62.93	12.61	-50.32	-25.3
13425.00	V	395	328	-60.42	12.59	-47.83	-22.8
16110.00	V	-	-	-67.66	16.59	-51.07	-26.1

Table 7-29. Radiated Spurious Data (Band 41 – High Channel)

FCC ID: ZNFX410PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 40 of 41

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFX410PM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFX410PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1806270133-03.ZNF	Test Dates: 6/28 - 7/13/2018	EUT Type: Portable Handset		Page 41 of 41