



PART 27 MEASUREMENT REPORT

Applicant Name:

LG Electronics USA, Inc.
111 Sylvan Avenue, North Building
Englewood Cliffs, NJ 07632
United States

Date of Testing:

1/19/2021 – 1/28/2021

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2012230208-13.ZNF

FCC ID:

ZNFK420TM

Applicant Name:

LG Electronics USA, Inc.

Application Type:

Class II Permissive Change

Model:

LM-K420TM

Additional Model(s):

LMK420TM, K420TM, LM-K420MM, LMK420MM, K420MM, LM-K420PM, LMK420PM, K420PM, LG L560DL, LGL560DL, L560DL, LM-K420QM, LMK420QM, K420QM, LM-K420QM5, LMK420QM5, K420QM5, LM-K420QM6, LMK420QM6, K420QM6, LM-K420QA, LMK420QA, K420QA
Portable Handset

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

27

Test Procedure(s):

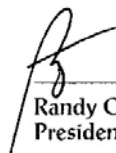
ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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







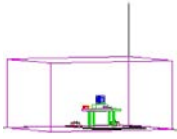
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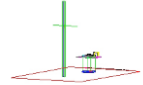
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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
LTE Band 41(PC2)	20 MHz	QPSK	2506.0 - 2680.0	0.172	22.35
		16QAM	2506.0 - 2680.0	0.164	22.15
		64QAM	2506.0 - 2680.0	0.128	21.06
	15 MHz	QPSK	2503.5 - 2682.5	0.198	22.96
		16QAM	2503.5 - 2682.5	0.137	21.36
		64QAM	2503.5 - 2682.5	0.105	20.21
	10 MHz	QPSK	2501.0 - 2685.0	0.193	22.86
		16QAM	2501.0 - 2685.0	0.156	21.94
		64QAM	2501.0 - 2685.0	0.105	20.20
	5 MHz	QPSK	2498.5 - 2687.5	0.180	22.56
		16QAM	2498.5 - 2687.5	0.170	22.30
		64QAM	2498.5 - 2687.5	0.129	21.10
LTE Band 41(PC3)	20 MHz	QPSK	2506.0 - 2680.0	0.103	20.13
		16QAM	2506.0 - 2680.0	0.089	19.49
		64QAM	2506.0 - 2680.0	0.058	17.63

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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 17025-2017 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: ZNFK420TM**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

Test Device Serial No.: 23806, 22774

2.2 Device Capabilities

This device contains the following capabilities:



850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, CDMA/EvDO Rev. 0/A 800/850/1900 (BC10/BC0/BC1), Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE)

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 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

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3.2 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.

For radiated power measurements, substitution method is used per the guidance of ANSI/TIA-603-E-2016. A half-wave dipole is 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:

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

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

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. Field Strength (EIRP) is calculated using the following formulas:



$$E_{[\text{dB}\mu\text{V/m}]} = \text{Measured amplitude level}_{[\text{dBm}]} + 107 + \text{Cable Loss}_{[\text{dB}]} + \text{Antenna Factor}_{[\text{dB/m}]}$$

And

$$\text{EIRP}_{[\text{dBm}]} = E_{[\text{dB}\mu\text{V/m}]} + 20\log D - 104.8; \text{ where } D \text{ is the measurement distance in meters.}$$

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.



Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

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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
Anritsu	MT8820C	Radio Communication Analyzer	N/A			6201300731
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6200901190
Emco	3115	Hom Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Keysight Technologies	N9020A	MXA Signal Analyzer	4/29/2019	Annual	8/14/2021	MY54500644
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134

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.

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6.0 SAMPLE CALCULATIONS

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated



7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive 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 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm $- (-24.80) = 50.3$ dBc.

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7.0 TEST RESULTS

7.1 Summary



Company Name: LG Electronics USA, Inc.
 FCC ID: ZNFK420TM
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
Equivalent Isotropic Radiated Power (LTE Band 41)	27.50(h)(2)	RSS-199 (4.4)	< 2 Watts max. EIRP	PASS	Section 7.2
Radiated Spurious Emissions (LTE Band 41)	2.1053, 27.53(m)	RSS-199 (4.5)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.3
Radiated Spurious Emissions (Uplink Carrier Aggregation - LTE Band 41)				PASS	Section 7.4

Table 7-1. Summary of Test Results

Notes:

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 (EIRP)

Test Overview

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 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.

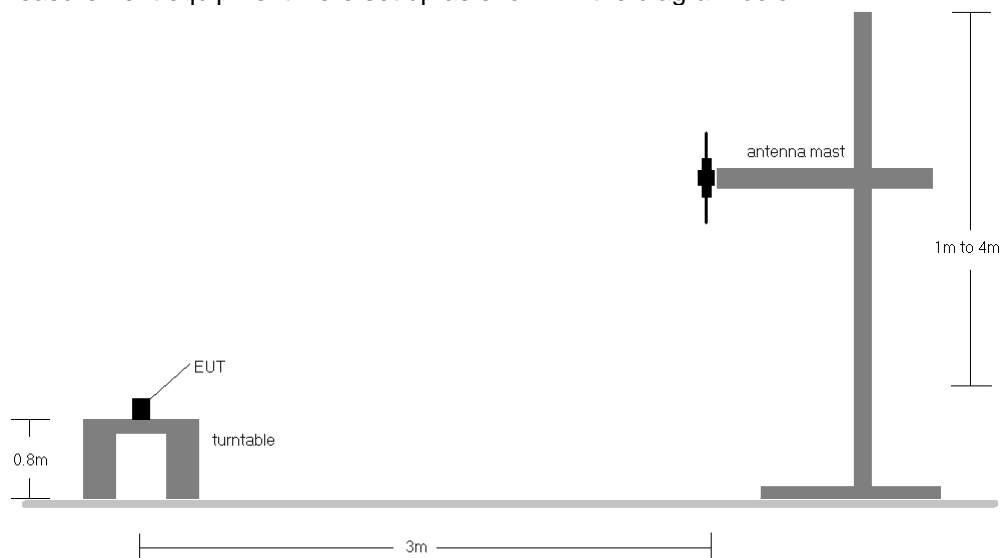


Figure 7-1. Radiated Test Setup <1GHz

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 EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.



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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	2506.0	H	Z	194	3	9.45	1 / 50	12.22	21.67	0.147	33.01	-11.34
		2593.0	H	Z	215	5	9.58	1 / 50	12.69	22.27	0.169	33.01	-10.74
		2680.0	H	Z	118	6	9.86	1 / 50	12.49	22.35	0.172	33.01	-10.66
	16-QAM	2593.0	H	Z	215	5	9.58	1 / 50	12.57	22.15	0.164	33.01	-10.86
	64-QAM	2593.0	H	Z	215	5	9.58	1 / 50	11.48	21.06	0.128	33.01	-11.95
15 MHz	QPSK	2503.5	H	Z	194	3	8.74	1 / 0	14.22	22.96	0.198	33.01	-10.05
		2593.0	H	Z	215	5	8.99	1 / 0	11.96	20.95	0.124	33.01	-12.06
		2682.5	H	Z	118	6	9.23	1 / 0	12.45	21.68	0.147	33.01	-11.33
	16-QAM	2503.5	H	Z	194	3	8.74	1 / 0	12.62	21.36	0.137	33.01	-11.65
	64-QAM	2503.5	H	Z	194	3	8.74	1 / 0	11.47	20.21	0.105	33.01	-12.80
10 MHz	QPSK	2501.0	H	Z	194	3	8.73	1 / 0	13.99	22.72	0.187	33.01	-10.29
		2593.0	H	Z	215	5	8.99	1 / 0	13.87	22.86	0.193	33.01	-10.15
		2685.0	H	Z	118	6	9.23	1 / 0	13.52	22.75	0.189	33.01	-10.26
	16-QAM	2685.0	H	Z	118	6	9.23	1 / 0	12.71	21.94	0.156	33.01	-11.07
	64-QAM	2593.0	H	Z	215	5	8.99	1 / 0	11.21	20.20	0.105	33.01	-12.81
5 MHz	QPSK	2498.5	H	Z	194	3	8.73	1 / 0	13.67	22.40	0.174	33.01	-10.61
		2593.0	H	Z	215	5	8.99	1 / 0	13.57	22.56	0.180	33.01	-10.45
		2687.5	H	Z	118	6	9.24	1 / 0	13.27	22.51	0.178	33.01	-10.50
	16-QAM	2498.5	H	Z	194	3	8.73	1 / 0	13.57	22.30	0.170	33.01	-10.71
	64-QAM	2498.5	H	Z	194	3	8.73	1 / 0	12.37	21.10	0.129	33.01	-11.91
20 MHz	Opposite Pol.	2503.5	V	Y	118	123	8.74	1 / 0	13.66	22.40	0.174	33.01	-10.61

Table 7-2. EIRP Data (LTE Band 41(PC2))

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	2506.0	H	Z	104	12	9.45	1 / 50	10.68	20.13	0.103	33.01	-12.88
		2593.0	H	Z	112	16	9.58	1 / 50	9.89	19.47	0.089	33.01	-13.54
		2680.0	H	Z	104	24	9.86	1 / 50	10.25	20.11	0.103	33.01	-12.90
	16-QAM	2506.0	H	Z	104	12	9.45	1 / 50	10.04	19.49	0.089	33.01	-13.52
	64-QAM	2506.0	H	Z	104	12	9.45	1 / 50	8.18	17.63	0.058	33.01	-15.38

Table 7-3. EIRP Data (LTE Band 41(PC3))

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7.3 Radiated Spurious Emissions Measurements

Test Overview




Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically 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 peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

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

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Test Setup

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

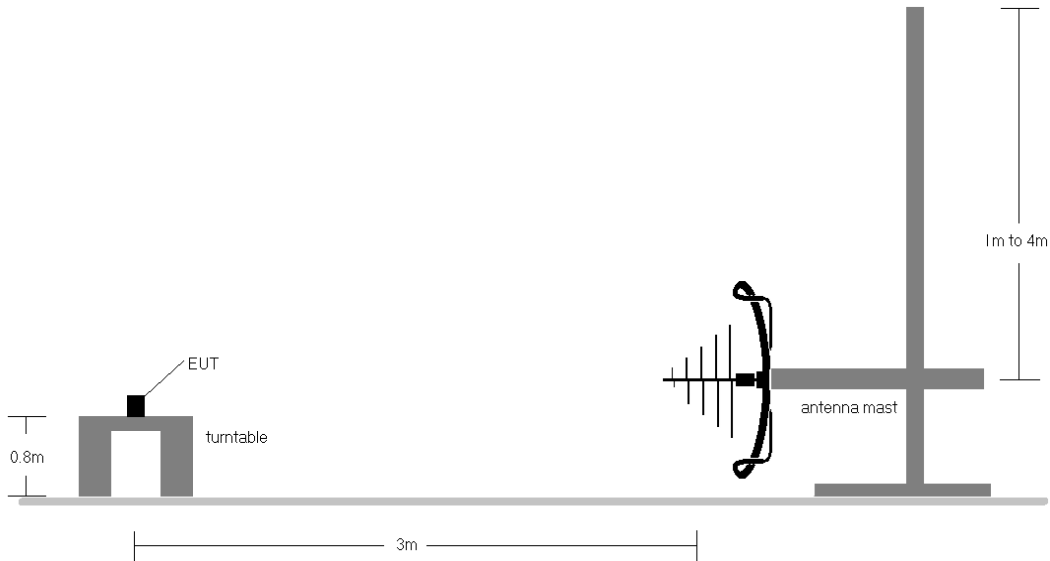


Figure 7-2. Test Instrument & Measurement Setup < 1GHz

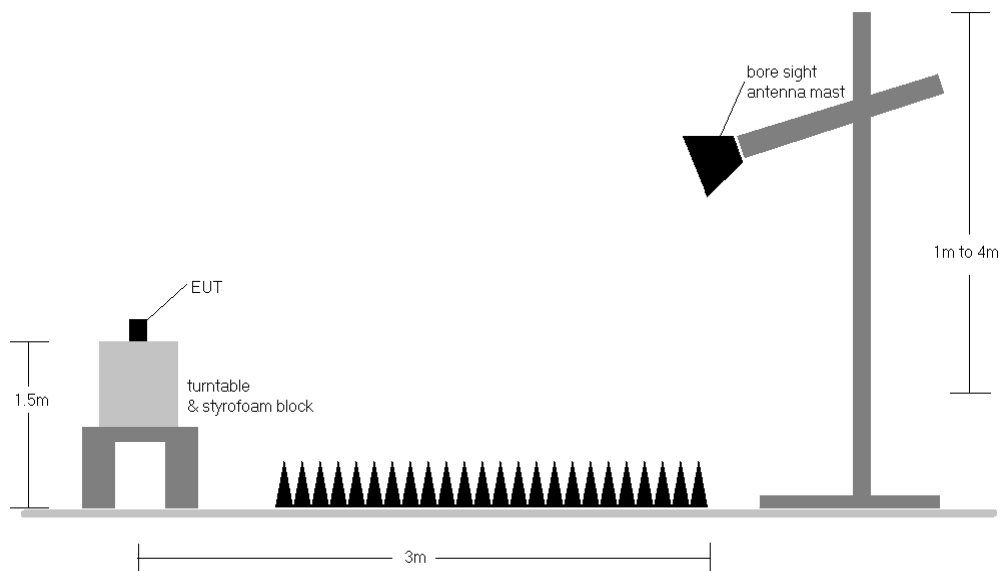




Figure 7-3. Test Instrument & Measurement Setup >1 GHz

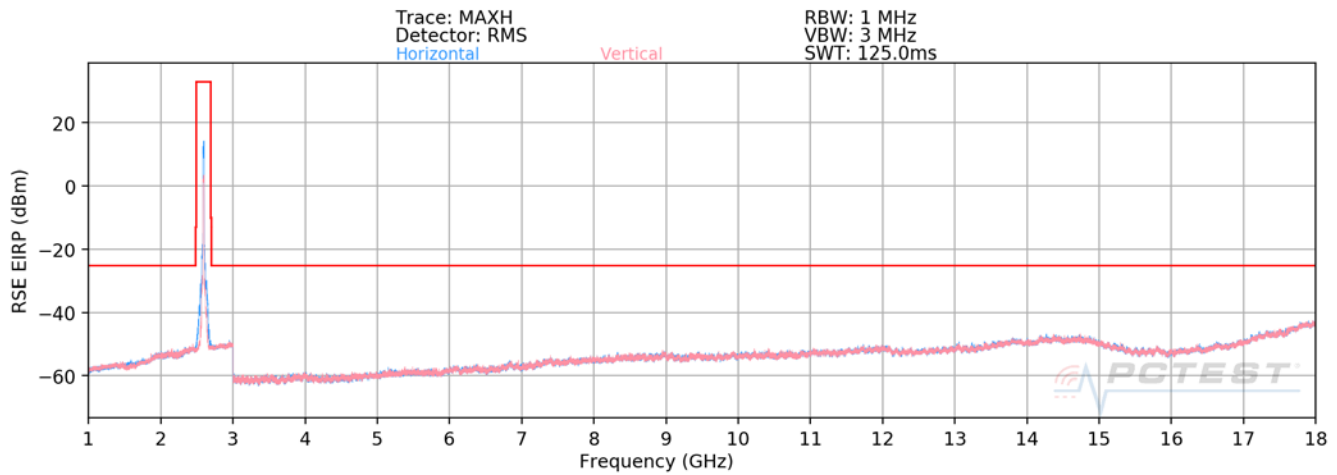
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Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
 - a) $E(\text{dB}\mu\text{V}/\text{m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - b) $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V}/\text{m}) + 20\log D - 104.8$; where D is the measurement distance in meters.
- 2) 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.
- 3) This unit was tested with its standard battery.
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 6) 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.
- 7) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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LTE Band 41(PC2)



Plot 7-1. Radiated Spurious Plot (LTE Band 41(PC2))

Bandwidth (MHz):	15
Frequency (MHz):	2503.5
RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5007.0	V	388	361	-68.23	1.98	40.75	-54.50	-25.00	-29.50
7510.5	V	116	95	-60.44	8.69	55.25	-40.00	-25.00	-15.00
10014.0	V	-	-	-76.48	12.63	43.15	-52.10	-25.00	-27.10
12517.5	V	-	-	-77.72	15.92	45.20	-50.06	-25.00	-25.06
15021.0	V	-	-	-76.88	18.82	48.94	-46.31	-25.00	-21.31

Table 7-4. Radiated Spurious Data (LTE Band 41(PC2) – Low Channel)

Bandwidth (MHz):	15
Frequency (MHz):	2593.0
RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.0	V	400	331	-66.41	2.54	43.13	-52.13	-25.00	-27.13
7779.0	V	132	85	-58.76	9.64	57.88	-37.37	-25.00	-12.37
10372.0	V	-	-	-77.29	13.35	43.06	-52.20	-25.00	-27.20
12965.0	V	-	-	-77.78	17.96	47.18	-48.08	-25.00	-23.08
15558.0	V	-	-	-77.34	15.22	44.88	-50.38	-25.00	-25.38



Table 7-5. Radiated Spurious Data (LTE Band 41(PC2) – Mid Channel)

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Bandwidth (MHz):	15
Frequency (MHz):	2682.5
RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5365.0	V	400	10	-63.03	3.59	47.56	-47.70	-25.00	-22.70
8047.5	V	146	89	-62.56	9.24	53.68	-41.58	-25.00	-16.58
10730.0	V	-	-	-75.95	13.67	44.72	-50.54	-25.00	-25.54
13412.5	V	-	-	-76.94	17.22	47.28	-47.98	-25.00	-22.98
16095.0	V	-	-	-77.13	15.32	45.19	-50.07	-25.00	-25.07



Table 7-6. Radiated Spurious Data (LTE Band 41(PC2) – High Channel)

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LTE Band 41(PC3)

Bandwidth (MHz):	15								
Frequency (MHz):	2593.0								
RB / Offset:	1 / 0								
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.0	V	100	331	-68.88	2.92	41.04	-54.22	-25.00	-29.22
7779.0	V	101	96	-66.73	9.97	50.24	-45.02	-25.00	-20.02
10372.0	V	-	-	-77.98	13.49	42.51	-52.75	-25.00	-27.75
12965.0	V	-	-	-78.07	18.03	46.96	-48.30	-25.00	-23.30
15558.0	V	-	-	-78.55	15.84	44.29	-50.97	-25.00	-25.97

Table 7-7. Radiated Spurious Data (LTE Band 41(PC3) – Mid Channel)

FCC ID: ZNFK420TM	 PCTEST <small>Proud to be part of Element</small>	PART 27 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Technical Manager
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7.4 Uplink Carrier Aggregation Radiated Measurements

§2.1053.

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 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 peak 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 5.8

ANSI/TIA-603-D-2010 – 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. No. of sweep points $\geq 2 \times$ span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. 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.

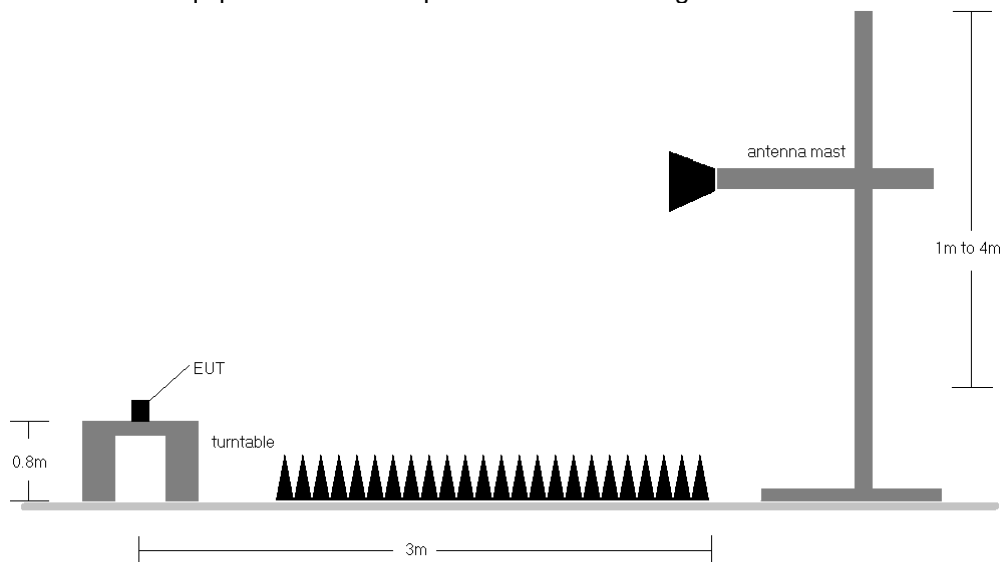


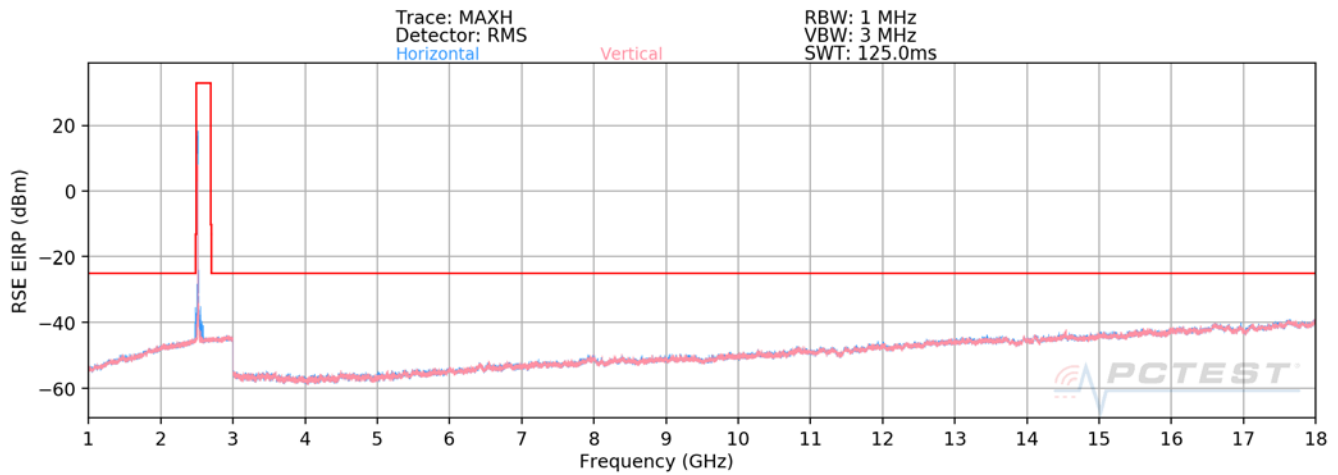
Figure 7-4. Test Instrument & Measurement Setup

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) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 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) No significant emissions were found as a result of two uplink carriers operating contiguously.

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ULCA Band 41



Plot 7-2. Radiated Spurious Plot (ULCA B41 Left Carrier: RB 1 Offset 99, Right Carrier: RB 1 Offset 0)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	2506.0
PCC RB / Offset:	1 / 99
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	2525.8
SCC RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5012.0	H	-	-	-75.50	7.58	39.08	-56.18	-25.00	-31.18
7518.0	H	-	-	-74.77	12.47	44.70	-50.55	-25.00	-25.55
10024.0	H	-	-	-75.58	14.66	46.08	-49.17	-25.00	-24.17

Plot 7-8. Radiated Spurious Plot (ULCA B41 Left Carrier: RB 1 Offset 99, Right Carrier: RB 1 Offset 0)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	2593.0
PCC RB / Offset:	1 / 99
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	2612.8
SCC RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.0	H	-	-	-75.68	7.33	38.65	-56.61	-25.00	-31.61
7779.0	H	-	-	-75.24	12.27	44.03	-51.22	-25.00	-26.22
10372.0	H	-	-	-75.32	15.37	47.05	-48.20	-25.00	-23.20



Plot 7-9. Radiated Spurious Plot (ULCA B41 Left Carrier: RB 100 Offset 0, Right Carrier: RB 100 Offset 0)

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PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	2680.0
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	2660.2
SCC RB / Offset:	1 / 99



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5360.0	H	-	-	-75.88	8.08	39.20	-56.06	-25.00	-31.06
8040.0	H	-	-	-73.44	12.75	46.31	-48.95	-25.00	-23.95
10720.0	H	-	-	-73.58	15.97	49.39	-45.87	-25.00	-20.87

Plot 7-10. Radiated Spurious Data (ULCA B41 Left Carrier: RB 1 Offset 0, Right Carrier: RB 1 Offset 99)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LG **Portable Handset** **FCC ID: ZNFK420TM** complies with all the requirements of Part 27 of the FCC rules.

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