

## PART 22 MEASUREMENT REPORT

**Applicant Name:**

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

**Date of Testing:**

44207 - 44215

**Test Site/Location:**

PCTEST Lab. Columbia, MD, USA

**Test Report Serial No.:**

1M2012230208-02.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

**EUT Type:**

Portable Handset

**FCC Classification:**

PCS Licensed Transmitter Held to Ear (PCE)

**FCC Rule Part:**

22

**Test Procedure(s):**

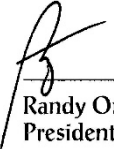
ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168  
 D01 v03r01

**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

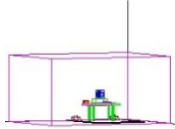


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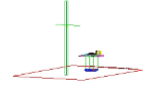
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Mode	Modulation	Tx Frequency Range [MHz]	ERP		EIRP	
			Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]
GSM/GPRS	GMSK	824.2 - 848.8	0.497	26.96	0.815	29.11
EDGE	8-PSK	824.2 - 848.8	0.108	20.34	0.177	22.49
WCDMA	Spread Spectrum	826.4 - 846.6	0.061	17.83	0.100	19.98
CDMA	Spread Spectrum	824.70 - 848.31	0.063	17.97	0.103	20.12

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP	
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]
LTE Band 26/5	15MHz (Band 26 only)	QPSK	831.5 - 841.5	0.073	18.64	0.120	20.79
		16QAM	831.5 - 841.5	0.060	17.79	0.099	19.94
		64QAM	831.5 - 841.5	0.050	16.96	0.081	19.11
	10 MHz	QPSK	829.0 - 844.0	0.073	18.62	0.119	20.77
		16QAM	829.0 - 844.0	0.063	18.01	0.104	20.16
		64QAM	829.0 - 844.0	0.054	17.29	0.088	19.44
	5 MHz	QPSK	826.5 - 846.5	0.074	18.68	0.121	20.83
		16QAM	826.5 - 846.5	0.065	18.11	0.106	20.26
		64QAM	826.5 - 846.5	0.055	17.38	0.090	19.53
	3 MHz	QPSK	825.5 - 847.5	0.074	18.71	0.122	20.86
		16QAM	825.5 - 847.5	0.065	18.11	0.106	20.26
		64QAM	825.5 - 847.5	0.055	17.37	0.090	19.52
	1.4 MHz	QPSK	824.7 - 848.3	0.073	18.63	0.120	20.78
		16QAM	824.7 - 848.3	0.063	18.00	0.104	20.15
		64QAM	824.7 - 848.3	0.054	17.29	0.088	19.44

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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 ISED Standards (RSS).
- PCTEST facility is a registered (2451B) 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: 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 22.

**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 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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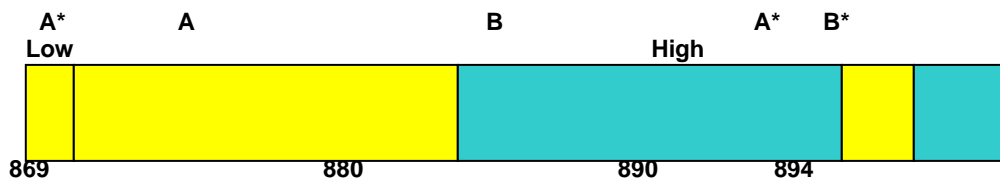
## 3.0 DESCRIPTION OF TESTS

### 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

### 3.2 Cellular - Base Frequency Blocks



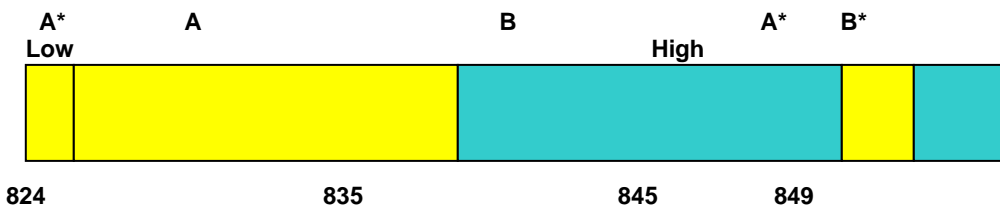
BLOCK 1: 869 – 880 MHz (A\* Low + A)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 3: 890 – 891.5 MHz (A\* High)

BLOCK 4: 891.5 – 894 MHz (B\*)

### 3.3 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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### 3.4 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:

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

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

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  $U_{\text{CISPR}}$  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	Horn 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	SFUTIT-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.
- 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

### GSM Emission Designator

#### **Emission Designator = 250KGXW**

GSM BW = 250 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

### EDGE Emission Designator

#### **Emission Designator = 250KG7W**

EDGE BW = 250 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

### CDMA Emission Designator

#### **Emission Designator = 1M25F9W**

CDMA BW = 1.25 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

### WCDMA Emission Designator

#### **Emission Designator = 4M16F9W**

WCDMA BW = 4.16 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

### 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

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## 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): WCDMA/CDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
<b>RADIATED</b>	Effective Radiated Power	22.913(a)(5)	RSS-132(5.4)	< 7 Watts max. ERP	<b>PASS</b>	Section 7.2
	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-132(5.5)	> 43 + 10 log <sub>10</sub> (P[Watts]) for all out-of-band emissions	<b>PASS</b>	Section 7.3

**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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## 7.3 Radiated Power (ERP)

### Test Overview

Effective Radiated Power (ERP) 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

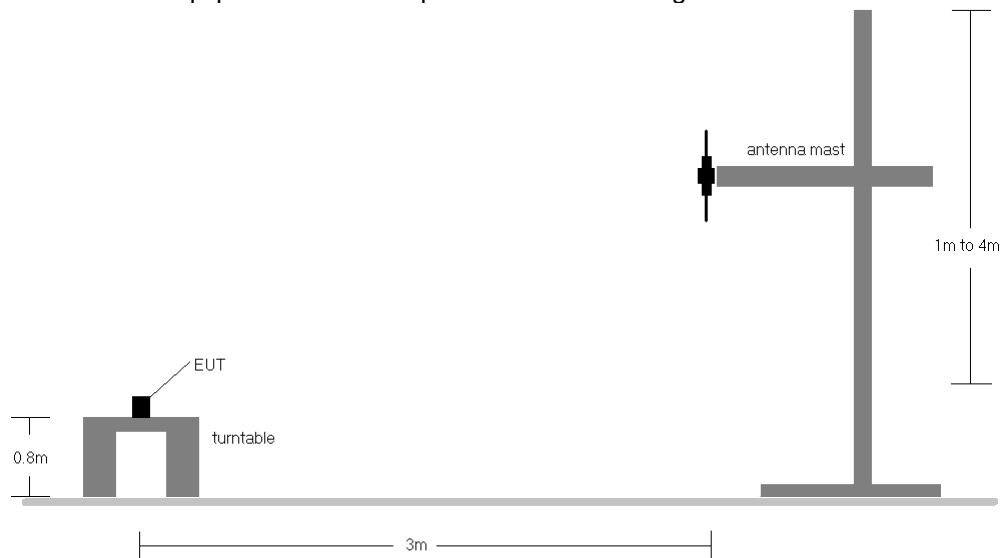
### Test Settings

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) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 3) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) 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.
- 5) This unit was tested with its standard battery.
- 6) 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]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
15MHz (Band 26 only)	QPSK	831.5	V	142.0	42.0	6.43	1 / 74	13.51	17.79	0.060	38.45	-20.66	19.94	0.099	40.61	-20.67
		836.5	V	156.0	55.0	6.38	1 / 74	13.72	17.95	0.062	38.45	-20.50	20.10	0.102	40.61	-20.51
		841.5	V	155.0	47.0	6.43	1 / 74	14.36	<b>18.64</b>	0.073	38.45	-19.81	<b>20.79</b>	0.120	40.61	-19.82
		841.5	V	155.0	47.0	6.43	1 / 74	13.51	17.79	0.060	38.45	-20.66	19.94	0.099	40.61	-20.67
10 MHz	QPSK	829.0	V	142.0	42.0	6.40	1 / 49	13.45	17.70	0.059	38.45	-20.75	19.85	0.097	40.61	-20.76
		836.5	V	156.0	55.0	6.38	1 / 49	13.59	17.82	0.061	38.45	-20.63	19.97	0.099	40.61	-20.64
		844.0	V	155.0	47.0	6.46	1 / 25	14.31	<b>18.62</b>	0.073	38.45	-19.83	<b>20.77</b>	0.119	40.61	-19.84
		844.0	V	155.0	47.0	6.46	1 / 25	13.70	18.01	0.063	38.45	-20.44	20.16	0.104	40.61	-20.45
5 MHz	QPSK	826.5	V	142.0	42.0	6.37	1 / 49	13.61	17.84	0.061	38.45	-20.61	19.99	0.100	40.61	-20.62
		836.5	V	156.0	55.0	6.38	1 / 25	13.69	17.92	0.062	38.45	-20.53	20.07	0.102	40.61	-20.54
		846.5	V	155.0	47.0	6.48	1 / 49	14.35	<b>18.68</b>	0.074	38.45	-19.77	<b>20.83</b>	0.121	40.61	-19.78
		846.5	V	155.0	47.0	6.48	1 / 49	13.78	18.11	0.065	38.45	-20.34	20.26	0.106	40.61	-20.35
3 MHz	QPSK	824.7	V	142.0	42.0	6.36	1 / 49	13.03	17.37	0.055	38.45	-21.07	19.53	0.090	40.61	-21.08
		824.7	V	142.0	42.0	6.36	1 / 49	13.61	17.83	0.061	38.45	-20.62	19.98	0.099	40.61	-20.63
		836.5	V	156.0	55.0	6.38	1 / 49	13.71	17.94	0.062	38.45	-20.51	20.09	0.102	40.61	-20.52
		847.5	V	155.0	47.0	6.49	1 / 25	14.37	<b>18.71</b>	0.074	38.45	-19.74	<b>20.86</b>	0.122	40.61	-19.75
1.4 MHz	QPSK	824.7	V	142.0	42.0	6.36	1 / 49	13.55	17.76	0.060	38.45	-20.69	19.91	0.098	40.61	-20.70
		824.7	V	142.0	42.0	6.36	1 / 49	13.63	17.86	0.061	38.45	-20.59	20.01	0.100	40.61	-20.60
		848.3	V	155.0	47.0	6.50	1 / 25	14.28	<b>18.63</b>	0.073	38.45	-19.82	<b>20.78</b>	0.120	40.61	-19.83
		848.3	V	155.0	47.0	6.50	1 / 25	13.65	18.00	0.063	38.45	-20.45	20.15	0.104	40.61	-20.46
10 MHz	Opposite Pol.	824.7	V	142.0	42.0	6.36	1 / 49	13.55	17.76	0.060	38.45	-20.69	19.91	0.098	40.61	-20.70
		824.7	V	142.0	42.0	6.36	1 / 49	13.63	17.86	0.061	38.45	-20.59	20.01	0.100	40.61	-20.60

Table 7-2. ERP Data (LTE Band 26/5)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	V	343	184	21.63	6.35	25.83	0.383	38.45	-12.62
836.60	GSM850	V	141	123	22.73	6.38	<b>26.96</b>	<b>0.497</b>	38.45	-11.49
848.80	GSM850	V	153	15	21.38	6.51	25.74	0.375	38.45	-12.72
836.60	GSM850	H	234	177	21.61	6.38	25.84	0.384	38.45	-12.61
836.60	EDGE850	V	141	123	16.11	6.38	<b>20.34</b>	0.108	38.45	-18.11



Table 7-3. ERP Data (GPRS Cell)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	256	291	13.05	6.77	17.67	0.059	38.45	-20.78
836.60	WCDMA850	H	237	293	13.30	6.68	<b>17.83</b>	<b>0.061</b>	38.45	-20.62
846.60	WCDMA850	H	100	316	11.16	6.68	15.69	0.037	38.45	-22.76
836.60	WCDMA850	V	254	366	10.63	6.68	15.16	0.033	38.45	-23.29

Table 7-4. ERP Data (WCDMA Cell)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	H	204	293	13.27	6.76	17.88	0.061	38.45	-20.58
836.52	CDMA850	H	205	304	13.22	6.68	17.75	0.060	38.45	-20.70
848.31	CDMA850	H	192	302	13.42	6.70	<b>17.97</b>	<b>0.063</b>	38.45	-20.48
848.31	CDMA850	V	197	354	13.16	6.50	17.51	0.056	38.45	-20.94

Table 7-5. ERP Data (CDMA Cell)

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## 7.4 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

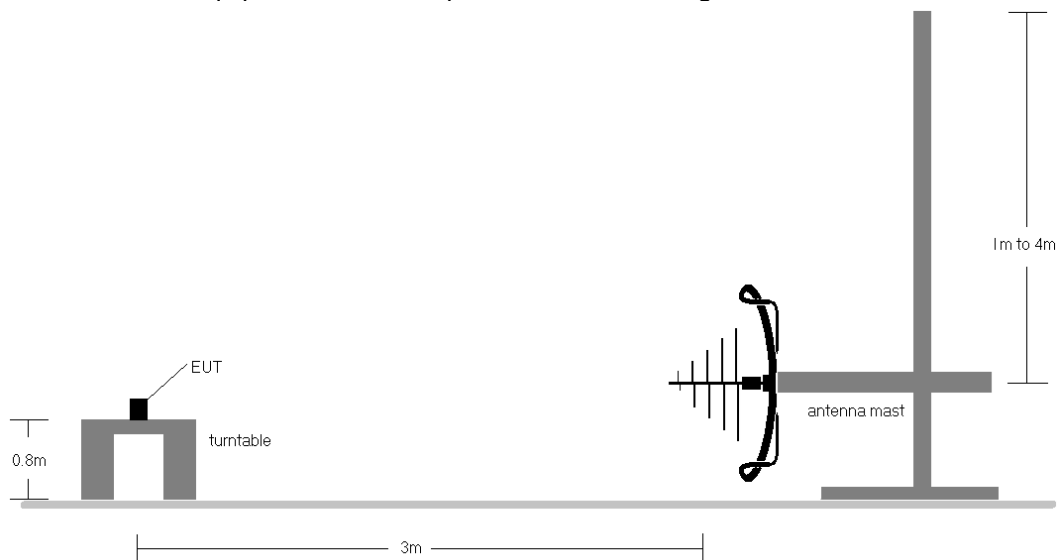
1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq 3 \times$  RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $\geq 2 \times$  span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

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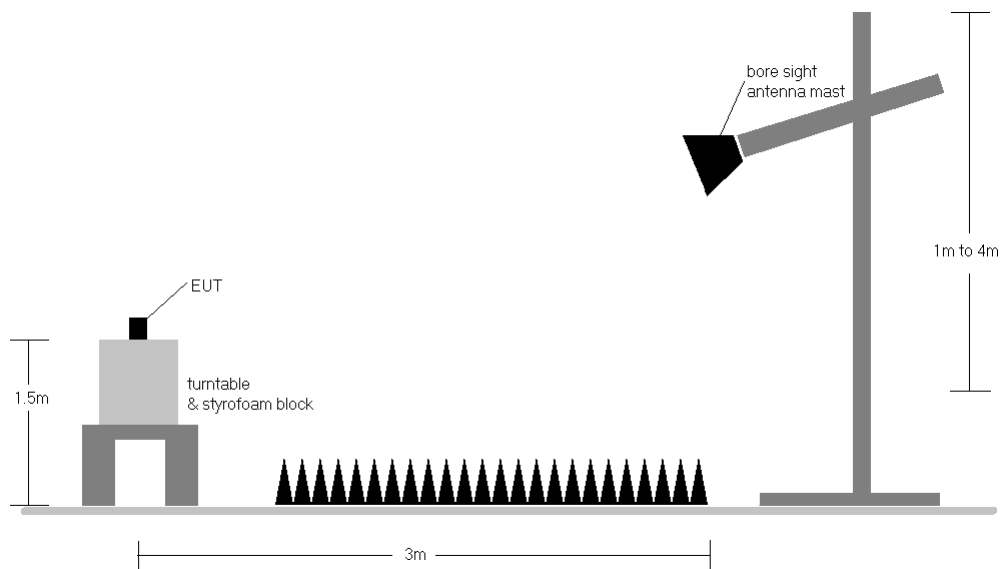


## Test Setup

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**

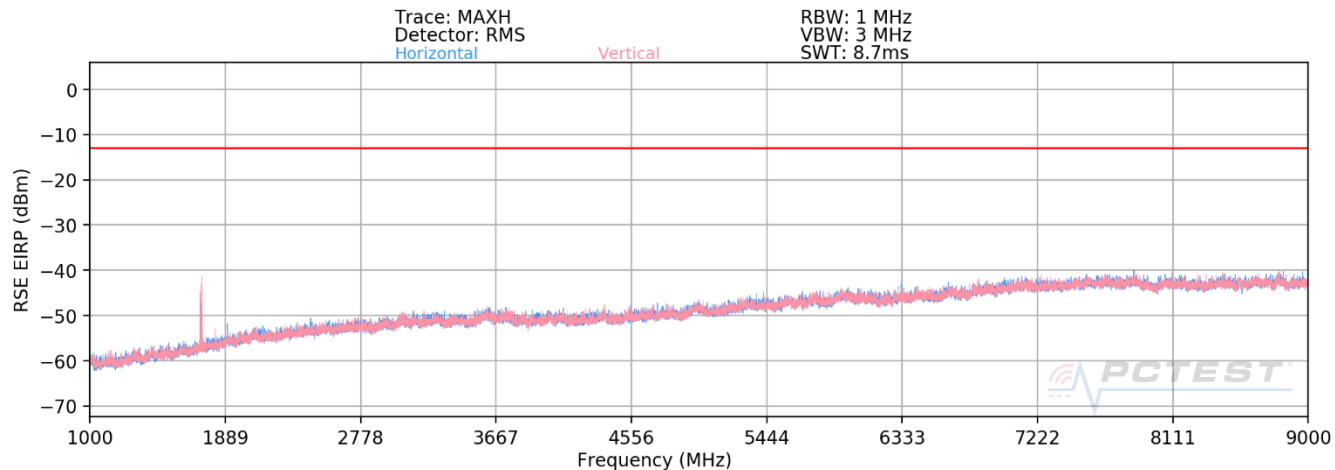
FCC ID: ZNFK420TM	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>	<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2012230208-02.ZNF	<b>Test Dates:</b> 44207 - 44215	<b>EUT Type:</b> Portable Handset	Page 17 of 27

## 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) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- 3) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 4) For CDMA, this device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 5) 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.
- 6) This unit was tested with its standard battery.
- 7) 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.
- 8) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 9) 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.
- 10) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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## LTE Band 26/5



**Plot 7-1 Radiated Spurious Plot (LTE Band 26/5)**

Bandwidth (MHz):	15
Frequency (MHz):	831.5
RB / Offset:	1 / 74

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]
1663.0	H	117	120	-72.05	-6.94	28.01	-67.25	-13.00	-54.25
2494.5	H	116	124	-54.88	-3.39	48.73	-46.53	-13.00	-33.53
3326.0	H	-	-	-76.11	-1.14	29.75	-65.51	-13.00	-52.51
4157.5	H	-	-	-77.11	1.21	31.10	-64.16	-13.00	-51.16
4989.0	H	-	-	-78.41	1.82	30.41	-64.85	-13.00	-51.85

**Table 7-6. Radiated Spurious Data (LTE Band 26/5 – Low Channel)**

Bandwidth (MHz):	15
Frequency (MHz):	836.5
RB / Offset:	1 / 74

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]
1673.0	H	115	106	-71.67	-6.97	28.36	-66.90	-13.00	-53.90
2509.5	H	113	120	-56.39	-3.38	47.23	-48.03	-13.00	-35.03
3346.0	H	-	-	-76.98	-1.24	28.78	-66.48	-13.00	-53.48
4182.5	H	-	-	-77.23	0.81	30.58	-64.68	-13.00	-51.68
5019.0	H	-	-	-78.08	1.64	30.56	-64.70	-13.00	-51.70



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

FCC ID: ZNFK420TM	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		Approved by: Technical Manager
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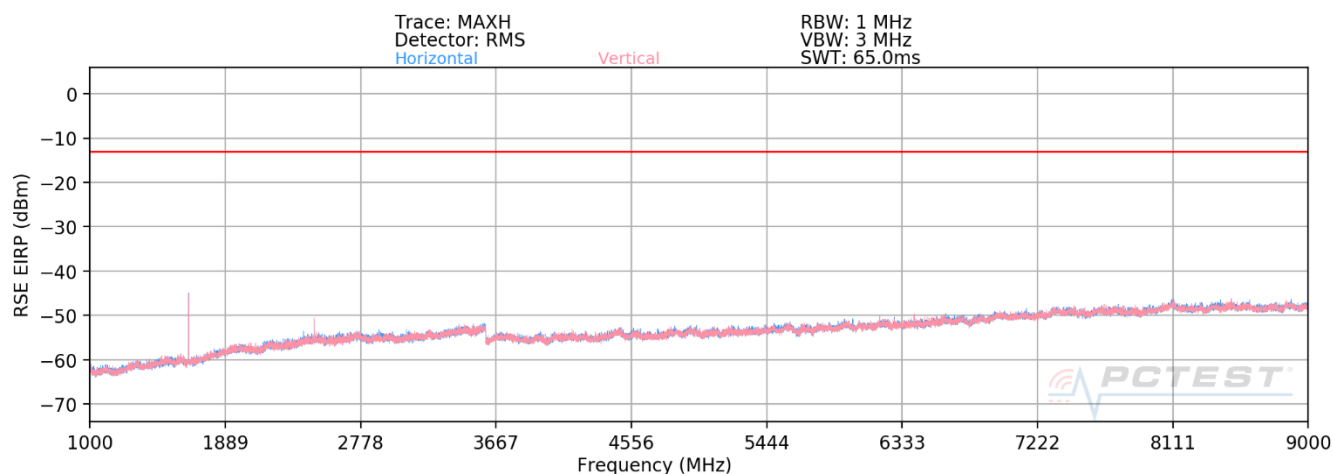
Bandwidth (MHz):	15
Frequency (MHz):	841.5
RB / Offset:	1 / 74

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]
1683.00	H	149	94	-71.19	-6.97	28.84	-66.42	-13.00	-53.42
2524.50	H	134	119	-57.91	-3.44	45.65	-49.61	-13.00	-36.61
3366.00	H	-	-	-78.04	-1.24	27.72	-67.54	-13.00	-54.54
4207.50	H	-	-	-77.58	0.80	30.22	-65.03	-13.00	-52.03
5049.00	H	-	-	-78.53	1.98	30.45	-64.81	-13.00	-51.81

**Table 7-8. Radiated Spurious Data (LTE Band 26/5 – High Channel)**

FCC ID: ZNFK420TM	 <b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b> 		Approved by: Technical Manager
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## GPRS Cell



**Plot 7-2 Radiated Spurious Plot (GPRS Cell)**

Mode:	GPRS 1 Tx Slot
Channel:	128
Frequency (MHz):	824.2

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]
1648.4	V	100	310	-59.46	-0.71	46.83	-48.43	-13.00	-35.43
2472.6	V	117	356	-62.14	3.39	48.25	-47.01	-13.00	-34.01
3296.8	V	-	-	-67.24	4.46	44.22	-51.04	-13.00	-38.04
4121.0	V	-	-	-68.56	5.78	44.22	-51.03	-13.00	-38.03
4945.2	V	-	-	-69.12	7.29	45.17	-50.08	-13.00	-37.08

**Table 7-9. Radiated Spurious Data (GPRS Cell – Low Channel)**

Mode:	GPRS 1 Tx Slot
Channel:	190
Frequency (MHz):	836.6



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]
1673.2	V	112	318	-56.51	-0.57	49.92	-45.33	-13.00	-32.33
2509.8	V	142	227	-63.01	3.53	47.52	-47.73	-13.00	-34.73
3346.4	V	-	-	-67.68	5.20	44.52	-50.73	-13.00	-37.73
4183.0	V	-	-	-69.11	6.13	44.02	-51.24	-13.00	-38.24
5019.6	V	-	-	-69.37	6.51	44.14	-51.12	-13.00	-38.12

**Table 7-10. Radiated Spurious Data (GPRS Cell – Mid Channel)**

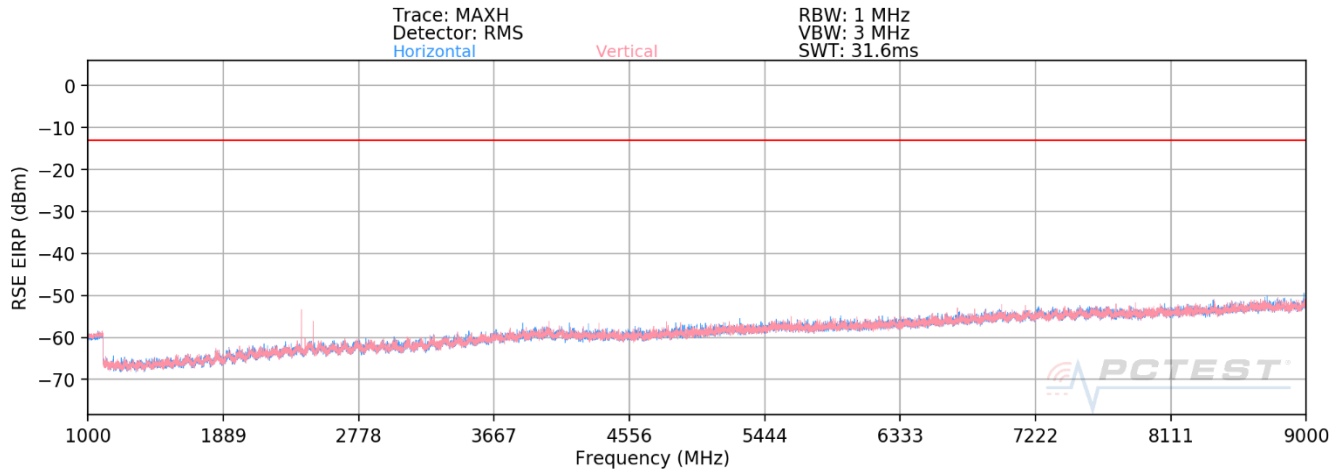
FCC ID: ZNFK420TM	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>	<b>LG</b>	Approved by: Technical Manager
Test Report S/N: 1M2012230208-02.ZNF	Test Dates: 44207 - 44215	EUT Type: Portable Handset		Page 21 of 27

Mode:	GPRS 1 Tx Slot								
Channel:	251								
Frequency (MHz):	848.8								
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]
1697.6	V	144	290	-50.33	-0.55	56.12	-39.14	-13.00	-26.14
2546.4	V	393	32	-65.29	3.33	45.04	-50.22	-13.00	-37.22
3395.2	V	-	-	-67.36	4.98	44.62	-50.64	-13.00	-37.64
4244.0	V	-	-	-70.07	5.65	42.58	-52.68	-13.00	-39.68
5092.8	V	-	-	-70.15	7.26	44.11	-51.15	-13.00	-38.15

**Table 7-11. Radiated Spurious Data (GPRS Cell – High Channel)**

FCC ID: ZNFK420TM			<b>PART 22 MEASUREMENT REPORT</b> <b>(CLASS II PERMISSIVE CHANGE)</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2012230208-02.ZNF	<b>Test Dates:</b> 44207 - 44215	<b>EUT Type:</b> Portable Handset			Page 22 of 27

## WCDMA Cell



**Plot 7-3 Radiated Spurious Plot (WCDMA Cell)**

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4

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]
1652.8	H	-	-	-75.68	-6.93	24.39	-70.87	-13.00	-57.87
2479.2	H	111	122	-72.78	-3.48	30.74	-64.52	-13.00	-51.52
3305.6	H	-	-	-77.18	-1.29	28.53	-66.73	-13.00	-53.73
4132.0	H	-	-	-77.80	1.02	30.22	-65.04	-13.00	-52.04
4958.4	H	-	-	-77.94	1.95	31.01	-64.25	-13.00	-51.25

**Table 7-12. Radiated Spurious Data (WCDMA Cell – Low Channel)**

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6



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]
1673.2	H	-	-	-75.83	-6.97	24.20	-71.06	-13.00	-58.06
2509.8	H	141	117	-71.93	-3.39	31.68	-63.57	-13.00	-50.57
3346.4	H	-	-	-76.46	-1.25	29.29	-65.97	-13.00	-52.97
4183.0	H	-	-	-76.84	0.80	30.96	-64.30	-13.00	-51.30
5019.6	H	-	-	-77.41	1.64	31.23	-64.03	-13.00	-51.03

**Table 7-13. Radiated Spurious Data (WCDMA Cell – Mid Channel)**

FCC ID: ZNFK420TM	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>	<b>LG</b>	Approved by: Technical Manager
Test Report S/N: 1M2012230208-02.ZNF	Test Dates: 44207 - 44215	EUT Type: Portable Handset		Page 23 of 27

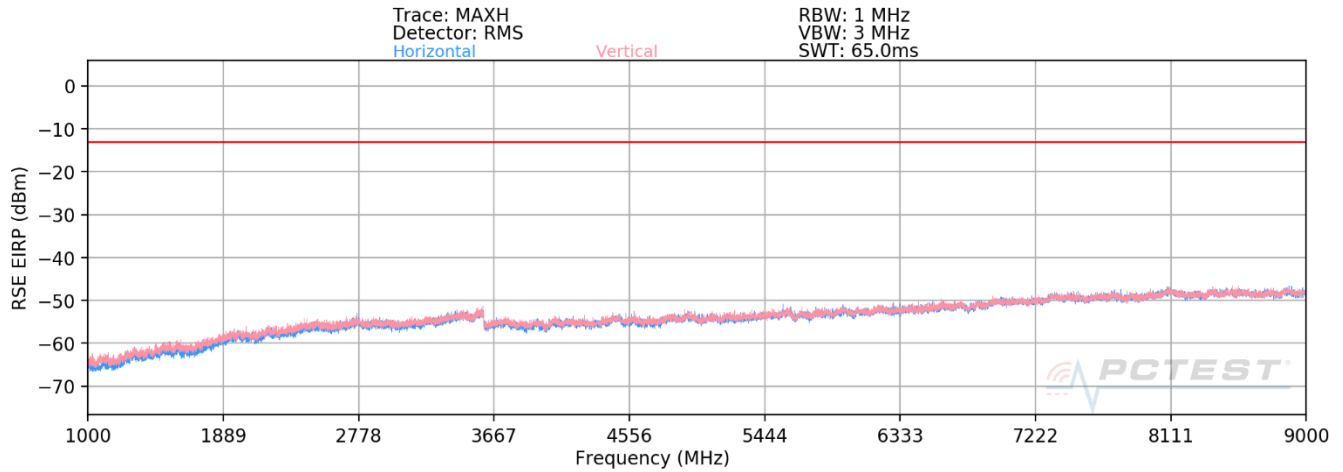
Mode:	WCDMA RMC								
Channel:	4233								
Frequency (MHz):	846.6								
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.2	H	-	-	-75.70	-6.97	24.33	-70.92	-13.00	-57.92
2539.8	H	125	113	-71.44	-3.42	32.14	-63.12	-13.00	-50.12
3386.4	H	-	-	-76.96	-0.91	29.13	-66.13	-13.00	-53.13
4233.0	H	-	-	-77.58	0.55	29.97	-65.28	-13.00	-52.28
5079.6	H	-	-	-78.43	2.27	30.84	-64.42	-13.00	-51.42

**Table 7-14. Radiated Spurious Data (WCDMA Cell – High Channel)**

FCC ID: ZNFK420TM	 <b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b> 		Approved by: Technical Manager
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## CDMA Cell



**Plot 7-4 Radiated Spurious Plot (CDMA Cell)**

Mode:	CDMA
Channel:	1013
Frequency (MHz):	824.7

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]
1649.40	V	-	-	-76.70	-0.70	29.60	-65.65	-13.00	-52.65
2474.10	V	-	-	-77.41	3.39	32.98	-62.27	-13.00	-49.27
3298.80	V	-	-	-77.54	4.47	33.93	-61.33	-13.00	-48.33
4123.50	V	-	-	-78.64	5.80	34.16	-61.10	-13.00	-48.10
4948.20	V	-	-	-79.19	7.23	35.04	-60.21	-13.00	-47.21

**Table 7-15. Radiated Spurious Data (CDMA Cell – Low Channel)**

Mode:	CDMA
Channel:	384
Frequency (MHz):	836.52



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]
1673.04	V	-	-	-78.03	-0.56	28.41	-66.85	-13.00	-53.85
2509.56	V	192	249	-74.53	3.53	36.00	-59.25	-13.00	-46.25
3346.08	V	-	-	-78.14	5.20	34.06	-61.20	-13.00	-48.20
4182.60	V	-	-	-78.71	6.14	34.43	-60.82	-13.00	-47.82
5019.12	V	-	-	-78.88	6.52	34.64	-60.62	-13.00	-47.62

**Table 7-16. Radiated Spurious Data (CDMA Cell – Mid Channel)**

FCC ID: ZNFK420TM	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>	<b>LG</b>	Approved by: Technical Manager
Test Report S/N: 1M2012230208-02.ZNF	Test Dates: 44207 - 44215	EUT Type: Portable Handset		Page 25 of 27



<b>Mode:</b>	CDMA								
<b>Channel:</b>	777								
<b>Frequency (MHz):</b>	848.31								
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]
1696.62	V	-	-	-76.89	-0.57	29.54	-65.71	-13.00	-52.71
2544.93	V	-	-	-76.67	3.35	33.68	-61.58	-13.00	-48.58
3393.24	V	-	-	-77.48	5.00	34.52	-60.74	-13.00	-47.74
4241.55	V	-	-	-78.13	5.65	34.52	-60.74	-13.00	-47.74
5089.86	V	-	-	-79.17	7.27	35.10	-60.16	-13.00	-47.16

**Table 7-17. Radiated Spurious Data (CDMA Cell – High Channel)**

<b>FCC ID:</b> ZNFK420TM	 <b>PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b> 		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2012230208-02.ZNF	<b>Test Dates:</b> 44207 - 44215	<b>EUT Type:</b> 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: ZNFK420TM** complies with all the requirements of Part 22 of the FCC rules.

FCC ID: ZNFK420TM	 PCTEST <sup>®</sup> Proud to be part of element	PART 22 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Technical Manager
Test Report S/N: 1M2012230208-02.ZNF	Test Dates: 44207 - 44215	EUT Type: Portable Handset		Page 27 of 27