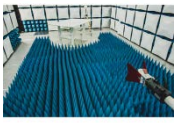
PCTEST
13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954 South Korea
Tel. 031.660.7319 / Fax 031.660.7318
http://www.pctest.com



PART 24 MEASUREMENT REPORT

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

Date of Testing:
1/7/2021 - 1/20/2021
Test Site/Location:
PCTEST Lab. Yongin-Si, Gyeonggi-do, South Korea
Test Report Serial No.:
1M2012230208-03.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, LMK420QM6, LM-K420QA, LMK420QA, K420QA, LM-K420QM5, LM-K420QM6, LM-K420QA
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Class II Permissive Change:	Please see FCC change document
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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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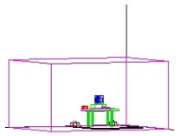
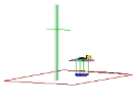


PART 24 MEASUREMENT REPORT



Mode	Modulation	Tx Frequency Range [MHz]	EIRP	
			Max. Power [W]	Max. Power [dBm]
GSM/GPRS	GMSK	1850.2 - 1909.8	0.696	28.43
EDGE	8-PSK	1850.2 - 1909.8	0.267	24.27
WCDMA	Spread Spectrum	1852.4 - 1907.6	0.245	23.90
CDMA	Spread Spectrum	1851.25 - 1908.75	0.307	24.86

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
LTE Band 25/2	20 MHz	QPSK	1860 - 1905	0.194	22.87
		16QAM	1860 - 1905	0.166	22.19
		64QAM	1860 - 1905	0.126	21.01
	15 MHz	QPSK	1857.5 - 1907.5	0.126	21.01
		16QAM	1857.5 - 1907.5	0.190	22.78
		64QAM	1857.5 - 1907.5	0.192	22.83
	10 MHz	QPSK	1855 - 1910	0.192	22.83
		16QAM	1855 - 1910	0.163	22.13
		64QAM	1855 - 1910	0.125	20.98
	5 MHz	QPSK	1852.5 - 1912.5	0.192	22.84
		16QAM	1852.5 - 1912.5	0.163	22.13
		64QAM	1852.5 - 1912.5	0.125	20.98
	3 MHz	QPSK	1851.5 - 1913.5	0.187	22.72
		16QAM	1851.5 - 1913.5	0.163	22.13
		64QAM	1851.5 - 1913.5	0.125	20.98
	1.4 MHz	QPSK	1850.7 - 1914.3	0.182	22.61
		16QAM	1850.7 - 1914.3	0.163	22.11
		64QAM	1850.7 - 1914.3	0.125	20.98

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 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954 South Korea.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 Seoul, South Korea.

- 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.

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 24.

Test Device Serial No.: 23806, 22774, 24986

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 tests.

2.4 EMI Suppression Device(s)/Modifications

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

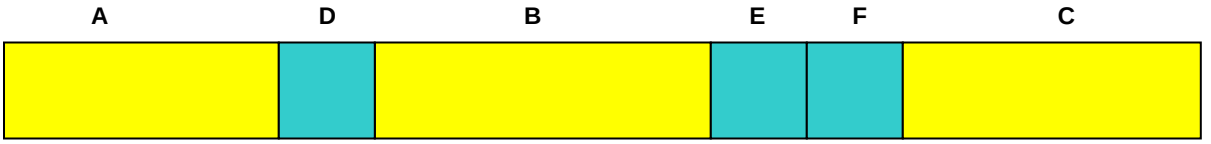
3.0 DESCRIPTION OF TESTS

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.

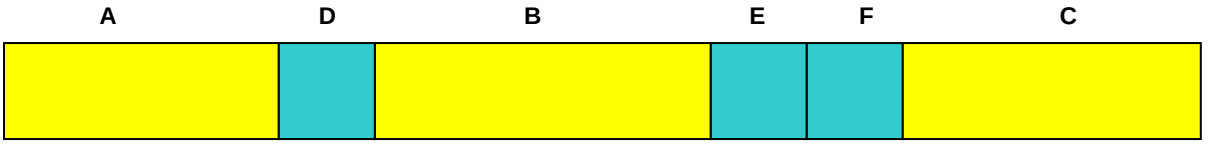
Deviation from Measurement Procedure……..None

3.2 PCS - Base Frequency Blocks



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

3.3 PCS - Mobile Frequency Blocks



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

3.4 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:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]};$$

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

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

And

$$EIRP_{[dBm]} = E_{[dB\mu V/m]} + 20\log D - 104.8;$$ where D 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.

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 (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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
Agilent	N9030A	PXA Signal Analyzer	6/29/2020	Annual	6/28/2021	MY49432391
Agilent	E5515C	Wireless Communications Test Set	N/A			MY50262130
Anritsu	S820E	Cable and Antenna Analyzer	6/29/2020	Annual	6/28/2021	1839097
Anritsu	MA24106A	USB Power Sensor	6/29/2020	Annual	6/28/2021	1244512
Anritsu	MA24106A	USB Power Sensor	3/5/2020	Annual	3/4/2021	1344557
Espec	SH-242	Environmental Chamber	9/17/2020	Annual	9/16/2021	93011064
ETS Lindgren	3110C	Biconical Antenna	7/9/2020	Biennial	7/8/2022	00211248
ETS Lindgren	3110C	Biconical Antenna	7/9/2020	Biennial	7/8/2022	00211250
ETS Lindgren	3148B	Log-periodic Antenna	7/9/2020	Biennial	7/8/2022	00211278
ETS Lindgren	3148B	Log-periodic Antenna	7/9/2020	Biennial	7/8/2022	00211263
Keysight Technologies	N9020B	MXA Signal Analyzer	11/13/2020	Annual	11/12/2021	MY55470135
Mini Circuits	ZHDC-16-63-S+	Coupler	6/29/2020	Annual	6/28/2021	F709401716
Mini Circuits	ZADC-10-63-S+	Coupler	3/5/2020	Annual	3/4/2021	C922601645
Mini-Circuits	ZNDC-18-2G-S+	Coupler	6/29/2020	Annual	6/28/2021	F280401542
Rohde & Schwarz	TS-PR18	Preamplifier	6/29/2020	Annual	6/28/2021	102141
Rohde & Schwarz	TS-PR1840	Preamplifier	6/29/2020	Annual	6/28/2021	100049
Rohde & Schwarz	SMF100A	Signal Generator	9/17/2020	Annual	9/16/2021	104154
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	6/29/2020	Annual	6/28/2021	116851
Rohde & Schwarz	ENV216	Two-Line V-Network	5/22/2020	Annual	5/21/2021	101319
Rohde & Schwarz	ESW	EMI Test Receiver	6/29/2020	Annual	6/28/2021	101761
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/20/2021	102131
Rohde & Schwarz	Signal Generator	SMBV100B	11/5/2020	Annual	11/4/2021	101568
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	102133
Sunol Sciences	DRH-118	Horn Antenna	8/9/2019	Biennial	8/8/2021	A102416-1
Sunol Sciences	DRH-118	Horn Antenna	1/12/2021	Biennial	1/11/2023	A060215
Schwarzbeck	UHA9105	Dipole Antenna	7/9/2020	Biennial	7/8/2022	91052522
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	7/9/2019	Biennial	7/8/2021	9162-217

Table 5-1. Test Equipment

Notes:

1. 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.

2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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

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.

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): GSM/GPRS/EDGE/WCDMA/CDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	24.232(c)	RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.2
	Radiated Spurious Emissions	2.1053, 24.238(a)	RSS-133(6.5)	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.3

Table 7-1. Summary of 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.
2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.

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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". 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

Test Setup

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

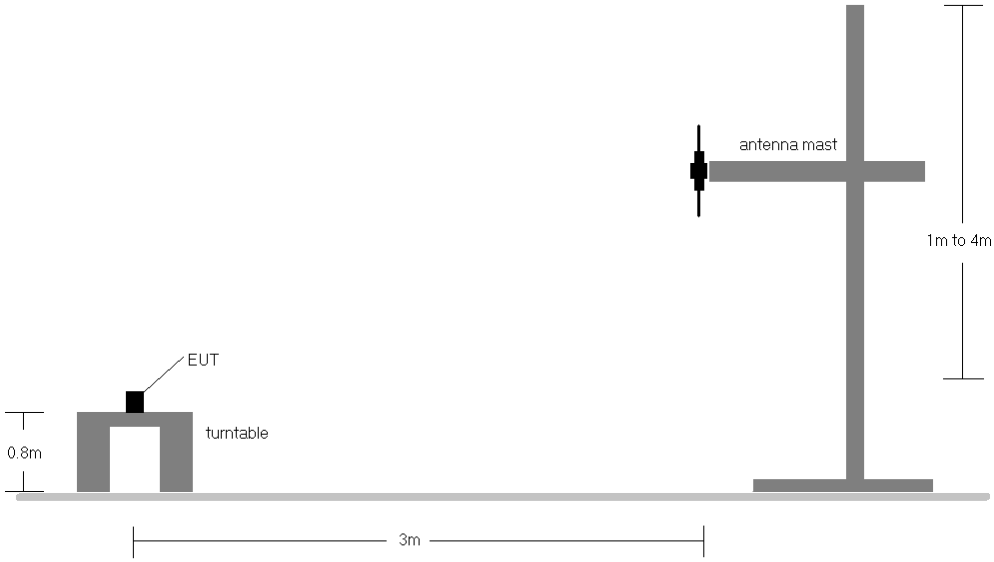


Figure 7-1. Radiated Test Setup <1GHz

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.

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	1860.0	H	X	156	298	9.64	1 / 50	12.49	22.13	0.163	33.01	-10.88
		1882.5	H	X	153	293	9.96	1 / 50	12.88	22.84	0.192	33.01	-10.17
		1905.0	H	X	141	295	10.24	1 / 50	12.63	**22.87**	0.194	33.01	-10.14
	16-QAM	1905.0	H	X	141	295	10.24	1 / 50	11.95	22.19	0.166	33.01	-10.82
	64-QAM	1905.0	H	X	141	295	10.24	1 / 50	10.77	21.01	0.126	33.01	-12.00
15 MHz	QPSK	1857.5	H	X	156	298	9.61	1 / 74	12.55	22.15	0.164	33.01	-10.86
		1882.5	H	X	153	293	9.96	1 / 74	12.71	22.67	0.185	33.01	-10.34
		1907.5	H	X	141	295	10.26	1 / 74	12.52	**22.78**	0.190	33.01	-10.23
	16-QAM	1882.5	H	X	153	293	9.96	1 / 74	12.17	22.13	0.163	33.01	-10.88
	64-QAM	1882.5	H	X	153	293	9.96	1 / 74	11.02	20.98	0.125	33.01	-12.03
10 MHz	QPSK	1855.0	H	X	156	298	9.57	1 / 49	12.61	22.18	0.165	33.01	-10.83
		1882.5	H	X	153	293	9.96	1 / 49	12.77	22.73	0.188	33.01	-10.28
		1910.0	H	X	141	295	10.28	1 / 49	12.55	**22.83**	0.192	33.01	-10.18
	16-QAM	1882.5	H	X	153	293	9.96	1 / 49	12.17	22.13	0.163	33.01	-10.88
	64-QAM	1882.5	H	X	153	293	9.96	1 / 49	11.02	20.98	0.125	33.01	-12.03
5 MHz	QPSK	1852.5	H	X	156	298	9.54	1 / 0	12.73	22.26	0.168	33.01	-10.75
		1882.5	H	X	153	293	9.96	1 / 0	12.61	22.57	0.181	33.01	-10.44
		1912.5	H	X	141	295	10.30	1 / 0	12.54	**22.84**	0.192	33.01	-10.17
	16-QAM	1882.5	H	X	153	293	9.96	1 / 0	12.17	22.13	0.163	33.01	-10.88
	64-QAM	1882.5	H	X	153	293	9.96	1 / 0	11.02	20.98	0.125	33.01	-12.03
3 MHz	QPSK	1851.5	H	X	156	298	9.52	1 / 0	12.68	22.20	0.166	33.01	-10.81
		1882.5	H	X	153	293	9.96	1 / 0	12.65	22.61	0.182	33.01	-10.40
		1913.5	H	X	141	295	10.31	1 / 0	12.41	**22.72**	0.187	33.01	-10.29
	16-QAM	1882.5	H	X	153	293	9.96	1 / 0	12.17	22.13	0.163	33.01	-10.88
	64-QAM	1882.5	H	X	153	293	9.96	1 / 0	11.02	20.98	0.125	33.01	-12.03
1.4 MHz	QPSK	1850.7	H	X	156	298	9.51	1 / 0	12.63	22.14	0.164	33.01	-10.87
		1882.5	H	X	153	293	9.96	1 / 0	12.65	**22.61**	0.182	33.01	-10.40
		1914.3	H	X	141	295	10.32	1 / 0	12.29	22.60	0.182	33.01	-10.41
	16-QAM	1882.5	H	X	153	293	9.96	1 / 0	12.15	22.11	0.163	33.01	-10.90
	64-QAM	1882.5	H	X	153	293	9.96	1 / 0	11.02	20.98	0.125	33.01	-12.03

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

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS	H	273	351	18.92	9.51	**28.43**	**0.696**	33.01	-4.58
1880.00	GPRS	H	112	284	17.43	9.93	27.36	0.544	33.01	-5.65
1909.80	GPRS	H	127	12	15.52	10.28	25.80	0.380	33.01	-7.21
1850.20	GPRS	V	251	228	13.54	9.51	23.05	0.202	33.01	-9.96
1850.20	EDGE1900	H	273	351	14.76	9.51	**24.27**	0.267	33.01	-8.74

Table 7-3. EIRP Data (GPRS PCS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	H	158	298	14.36	9.54	**23.90**	**0.245**	33.01	-9.11
1880.00	WCDMA1900	H	100	302	13.76	9.93	23.69	0.234	33.01	-9.32
1907.60	WCDMA1900	H	100	297	12.69	10.26	22.95	0.197	33.01	-10.06
1852.40	WCDMA1900	V	144	121	14.34	9.54	23.88	0.244	33.01	-9.13

Table 7-4. EIRP Data (WCDMA PCS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	V	147	235	14.05	9.91	23.96	0.249	33.01	-9.05
1880.00	CDMA1900	V	183	266	14.56	10.13	24.69	0.295	33.01	-8.32
1908.75	CDMA1900	V	174	257	14.53	10.33	**24.86**	**0.307**	33.01	-8.15
1908.75	CDMA1900	H	112	8	13.99	10.27	24.26	0.267	33.01	-8.75

Table 7-5. EIRP Data (CDMA PCS)

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 RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

Test Settings

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

Test Setup

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

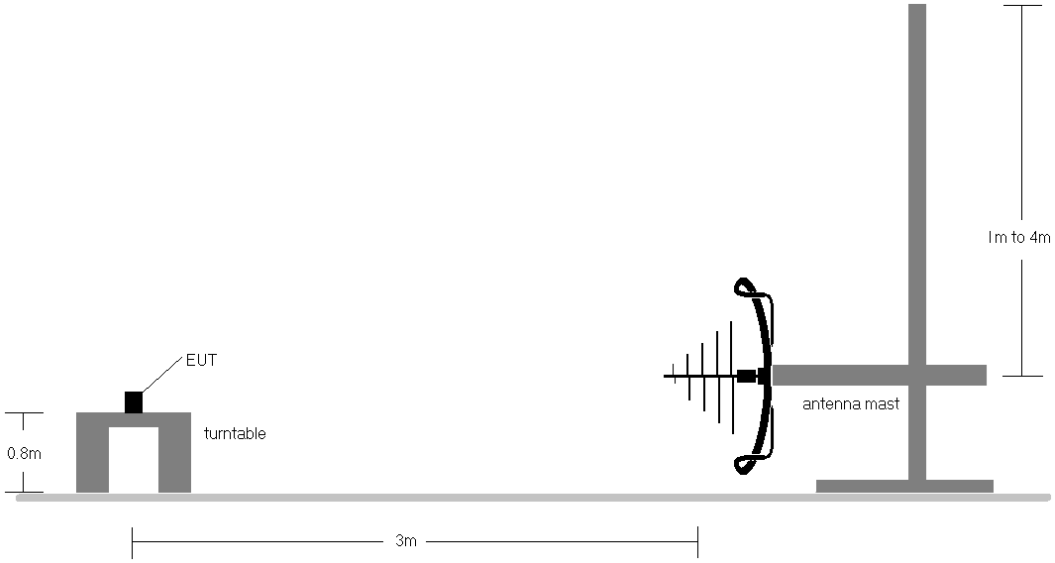


Figure 7-2. Test Instrument & Measurement Setup < 1GHz

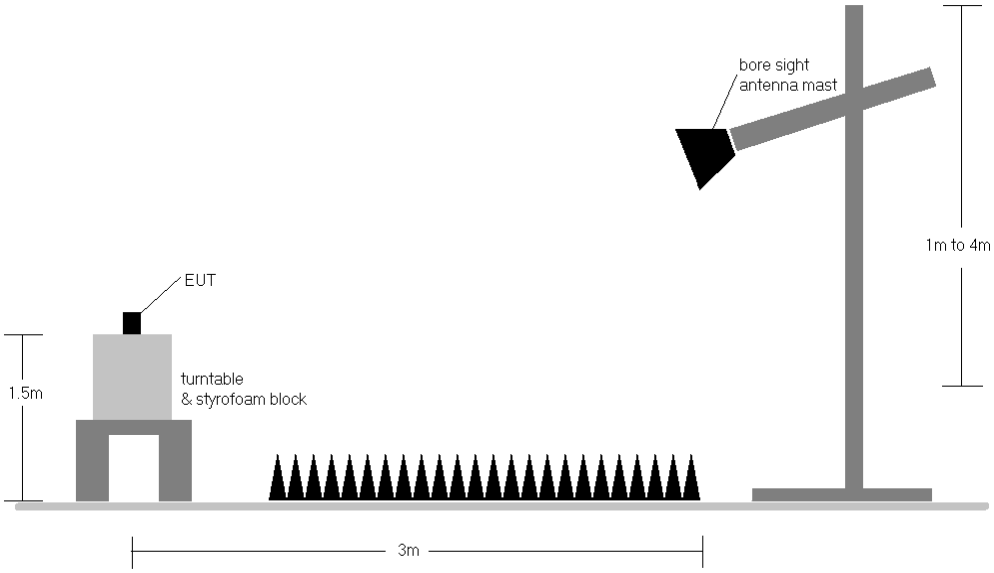


Figure 7-3. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBµV/m) + 20logD – 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.

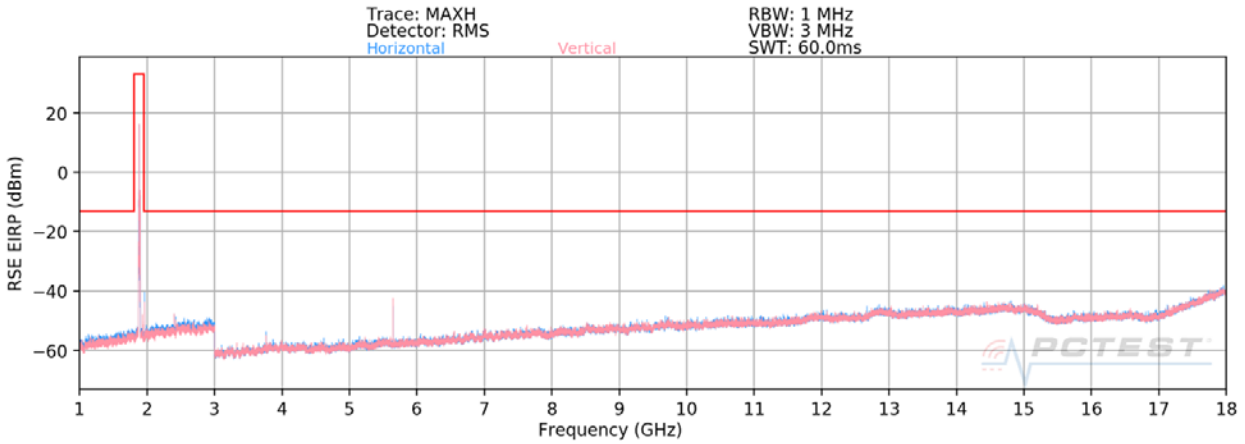
7) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

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.

LTE Band 25/2



Plot 7-1. Radiated Spurious Plot (LTE Band 25/2)

Bandwidth (MHz):	1.4
Frequency (MHz):	1850.7
RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3701.4	V	131	60	-69.16	-0.19	37.65	-57.61	-13.00	-44.61
5552.1	V	104	171	-62.78	3.64	47.86	-47.39	-13.00	-34.39
7402.8	V	-	-	-80.88	8.59	34.71	-60.55	-13.00	-47.55
9253.5	V	-	-	-81.28	11.09	36.81	-58.45	-13.00	-45.45
11104.2	V	-	-	-82.57	13.49	37.92	-57.34	-13.00	-44.34

Table 7-6. Radiated Spurious Data (LTE Band 25/2 – Low Channel)

Bandwidth (MHz):	1.4
Frequency (MHz):	1882.5
RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3765.0	V	136	60	-71.71	-0.18	35.11	-60.15	-13.00	-47.15
5647.5	V	134	161	-66.95	4.31	44.36	-50.90	-13.00	-37.90
7530.0	V	-	-	-80.22	8.83	35.61	-59.65	-13.00	-46.65
9412.5	V	-	-	-81.62	11.61	36.99	-58.27	-13.00	-45.27
11295.0	V	-	-	-82.15	13.68	38.53	-56.72	-13.00	-43.72

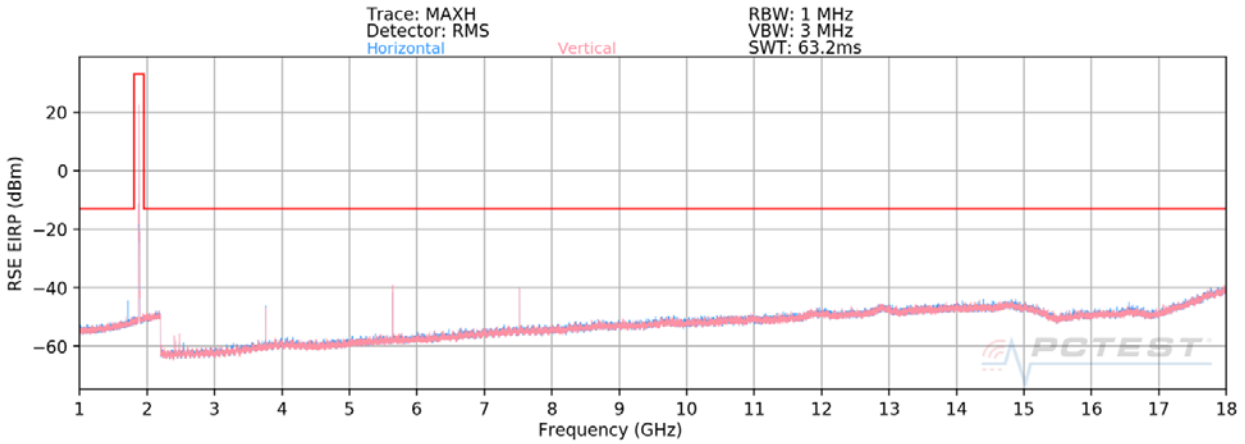
Table 7-7. Radiated Spurious Data (LTE Band 25/2 – Mid Channel)

Bandwidth (MHz):	1.4
Frequency (MHz):	1914.3
RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3828.60	V	156	61	-73.31	0.30	33.99	-61.27	-13.00	-48.27
5742.90	V	110	164	-63.15	4.54	48.39	-46.87	-13.00	-33.87
7657.20	V	-	-	-80.28	8.62	35.34	-59.92	-13.00	-46.92
9571.50	V	-	-	-81.32	11.62	37.30	-57.96	-13.00	-44.96
11485.80	V	-	-	-82.30	13.96	38.66	-56.60	-13.00	-43.60

Table 7-8. Radiated Spurious Data (LTE Band 25/2 – High Channel)

GSM/GPRS PCS



Plot 7-2. Radiated Spurious Plot (GPRS PCS)

Mode:	GPRS 1 Tx Slot
Channel:	512
Frequency (MHz):	1850.2
Detector / Trace Mode:	RMS / Max Hold
RBW / VBW:	1MHz / 3MHz

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]
3700.4	V	126	62	-57.55	-0.18	49.27	-45.99	-13.00	-32.99
5550.6	V	232	41	-54.36	3.64	56.28	-38.97	-13.00	-25.97
7400.8	V	120	276	-55.48	8.58	60.10	-35.16	-13.00	-22.16
9251.0	V	-	-	-75.89	11.08	42.19	-53.07	-13.00	-40.07
11101.2	V	-	-	-76.42	13.63	44.21	-51.05	-13.00	-38.05
12951.4	V	-	-	-78.60	18.28	46.68	-48.58	-13.00	-35.58

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

Mode:	GPRS 1 Tx Slot
Channel:	661
Frequency (MHz):	1880
Detector / Trace Mode:	RMS / Max Hold
RBW / VBW:	1MHz / 3MHz

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]
3760.0	V	103	51	-55.99	-0.17	50.84	-44.42	-13.00	-31.42
5640.0	V	236	38	-57.35	4.12	53.77	-41.49	-13.00	-28.49
7520.0	V	113	285	-60.85	8.84	54.99	-40.27	-13.00	-27.27
9400.0	V	-	-	-75.01	11.56	43.55	-51.70	-13.00	-38.70
11280.0	V	-	-	-76.21	13.93	44.72	-50.54	-13.00	-37.54
13160.0	V	-	-	-78.82	17.02	45.20	-50.06	-13.00	-37.06

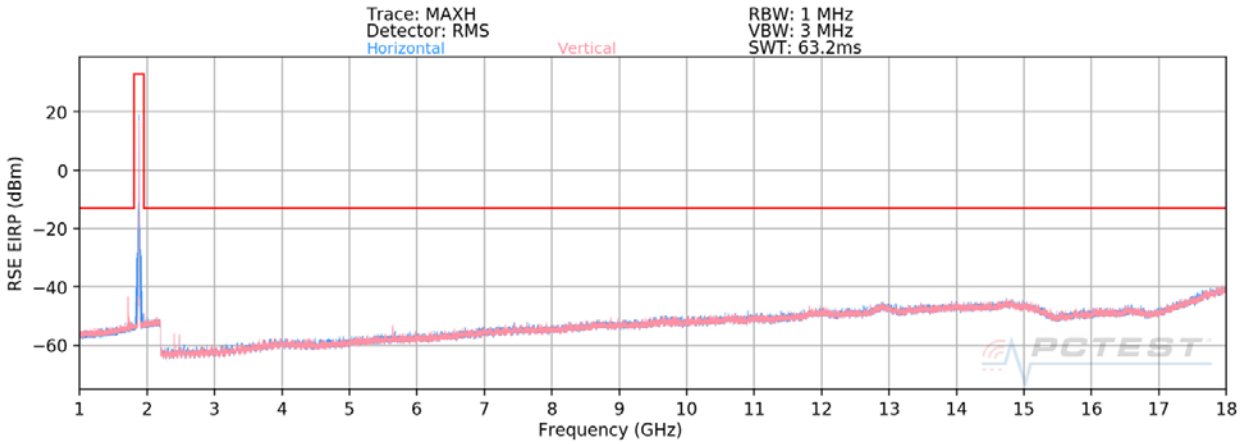
Table 7-10. Radiated Spurious Data (GPRS PCS – Mid Channel)

Mode:	GPRS 1 Tx Slot
Channel:	810
Frequency (MHz):	1909.8
Detector / Trace Mode:	RMS / Max Hold
RBW / VBW:	1MHz / 3MHz

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]
3819.6	V	111	41	-58.42	0.24	48.82	-46.44	-13.00	-33.44
5729.4	V	229	46	-61.20	4.47	50.27	-44.99	-13.00	-31.99
7639.2	V	101	278	-62.31	8.71	53.40	-41.85	-13.00	-28.85
9549.0	V	-	-	-74.97	11.61	43.64	-51.62	-13.00	-38.62
11458.8	V	-	-	-77.15	14.03	43.88	-51.38	-13.00	-38.38
13368.6	V	-	-	-78.15	17.13	45.98	-49.28	-13.00	-36.28

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

WCDMA PCS



Plot 7-3. Radiated Spurious Plot (WCDMA PCS)

Mode:	WCDMA RMC
Channel:	9262
Frequency (MHz):	1852.4
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3704.8	V	-	-	-77.39	-0.23	29.38	-65.88	-13.00	-52.88
5557.2	V	117	167	-75.65	3.64	34.99	-60.26	-13.00	-47.26
7409.6	V	-	-	-80.83	8.63	34.80	-60.46	-13.00	-47.46
9262.0	V	-	-	-81.48	11.05	36.57	-58.69	-13.00	-45.69
11114.4	V	-	-	-82.25	13.44	38.19	-57.07	-13.00	-44.07

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

Mode:	WCDMA RMC
Channel:	9400
Frequency (MHz):	1880
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3760.0	V	-	-	-76.99	-0.17	29.84	-65.42	-13.00	-52.42
5640.0	V	143	187	-73.86	4.12	37.26	-58.00	-13.00	-45.00
7520.0	V	-	-	-80.21	8.84	35.63	-59.63	-13.00	-46.63
9400.0	V	-	-	-81.67	11.56	36.89	-58.36	-13.00	-45.36
11280.0	V	-	-	-82.76	13.93	38.17	-57.09	-13.00	-44.09

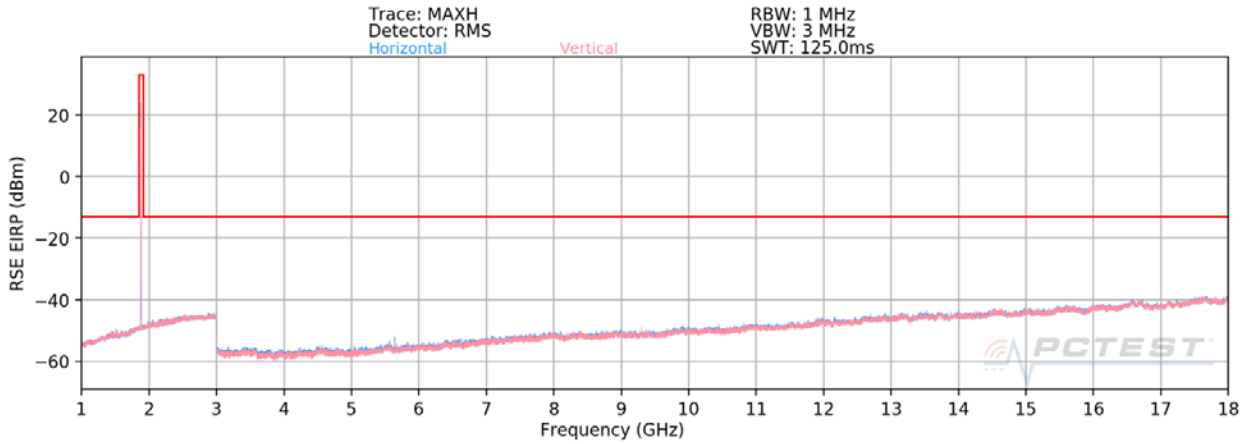
Table 7-13. Radiated Spurious Data (WCDMA PCS – Mid Channel)

Mode:	WCDMA RMC
Channel:	9538
Frequency (MHz):	1907.6
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3815.2	V	-	-	-77.00	0.24	30.24	-65.02	-13.00	-52.02
5722.8	V	112	186	-72.99	4.45	38.46	-56.80	-13.00	-43.80
7630.4	V	-	-	-80.31	8.76	35.45	-59.81	-13.00	-46.81
9538.0	V	-	-	-81.16	11.69	37.53	-57.72	-13.00	-44.72
11445.6	V	-	-	-82.24	14.54	39.30	-55.96	-13.00	-42.96

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

CDMA PCS



Plot 7-3. Radiated Spurious Plot (CDMA PCS)

Mode:	CDMA
Channel:	25
Frequency (MHz):	1851.25
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3702.50	V	-	-	-78.26	5.38	34.12	-61.14	-13.00	-48.14
5553.75	V	174	182	-77.73	8.78	38.05	-57.21	-13.00	-44.21
7405.00	V	-	-	-79.65	12.08	39.43	-55.83	-13.00	-42.83
9256.25	V	-	-	-80.47	13.91	40.44	-54.81	-13.00	-41.81
11107.50	V	-	-	-80.84	16.44	42.60	-52.66	-13.00	-39.66

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

Mode:	CDMA
Channel:	600
Frequency (MHz):	1880
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3760.00	V	-	-	-78.69	6.14	34.45	-60.81	-13.00	-47.81
5640.00	V	109	4	-76.96	8.08	38.12	-57.14	-13.00	-44.14
7520.00	V	-	-	-80.27	12.45	39.18	-56.07	-13.00	-43.07
9400.00	V	-	-	-80.92	14.66	40.74	-54.52	-13.00	-41.52
11280.00	V	-	-	-81.08	16.55	42.47	-52.79	-13.00	-39.79

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

Mode:	CDMA
Channel:	1175
Frequency (MHz):	1908.75
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
3817.50	V	-	-	-78.53	5.74	34.21	-61.05	-13.00	-48.05
5726.25	V	104	3	-77.03	8.45	38.42	-56.84	-13.00	-43.84
7635.00	V	-	-	-79.93	12.49	39.56	-55.70	-13.00	-42.70
9543.75	V	-	-	-80.91	14.45	40.54	-54.71	-13.00	-41.71
11452.50	V	-	-	-81.34	16.90	42.56	-52.70	-13.00	-39.70

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

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 24 of the FCC rules.