

PART 22 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

6/4 - 8/7/2020

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2006040088-02.ZNF

FCC ID:

ZNFG900VM

Applicant Name:

LG Electronics USA, Inc.

Application Type:

Class II Permissive Change

Model:

LM-G900VM

Additional Models:

LMG900VM, G900VM, LM-G900QM6, LMG900QM6,
G900QM6, LM-G902V, LMG902V, G902V

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

22

Test Procedure(s):

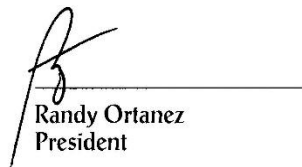
ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168
D01 v03r01

Class II Permissive Change(s):

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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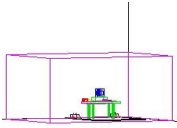
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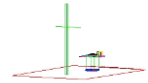
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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP	
				Max. Power [W]	Max. Power [dBm]
GSM/GPRS	N/A	GMSK	824.2 - 848.8	0.731	28.64
EDGE		8-PSK	824.2 - 848.8	0.167	22.22
WCDMA	N/A	Spread Spectrum	826.4 - 846.6	0.112	20.48
CDMA	N/A	Spread Spectrum	824.70 - 848.31	0.039	15.96
LTE Band 5	10 MHz	QPSK	829.0 - 844.0	0.053	17.21
		16QAM	829.0 - 844.0	0.044	16.41
		64QAM	829.0 - 844.0	0.035	15.45
NR Band n5	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.058	17.62
		QPSK	834.0 - 839.0	0.058	17.66
		16QAM	834.0 - 839.0	0.038	15.81
		64QAM	834.0 - 839.0	0.027	14.38
		256QAM	834.0 - 839.0	0.018	12.56

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

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

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID:ZNFG900VM**. 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.: 04963, 04971

2.2 Device Capabilities

This device contains the following capabilities:

CDMA, GSM/GPRS/EDGE, WCDMA/HSPA, LTE, 5G NR, WLAN, UNII, Bluetooth (1x, EDR, LE), NFC

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 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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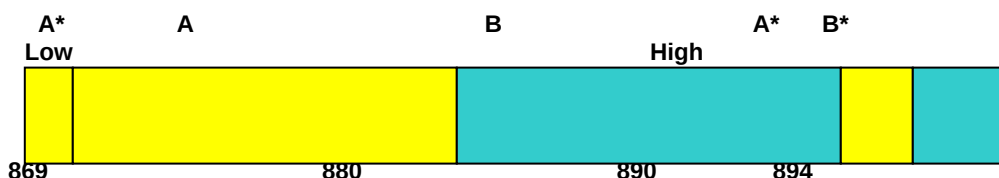
3.0 DESCRIPTION OF TESTS

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

3.2 Cellular - Base Frequency Blocks



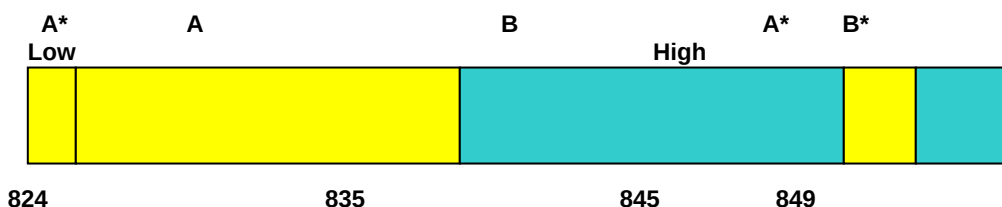
BLOCK 1: 869 – 880 MHz (A* Low + A)

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_{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
Agilent	E5515C	Wireless Communications Test Set	N/A			GB46310798
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Espec	ESX-2CA	Environmental Chamber	8/13/2019	Annual	8/13/2020	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			836371/0079
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	102133
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307

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.

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6.0 SAMPLE CALCULATIONS

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: ZNFG900VM
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): NR/GSM/GPRS/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	22.913(a)(5)	RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.2
	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-132(5.5)	> 43 + 10 log ₁₀ (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.

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7.2 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.

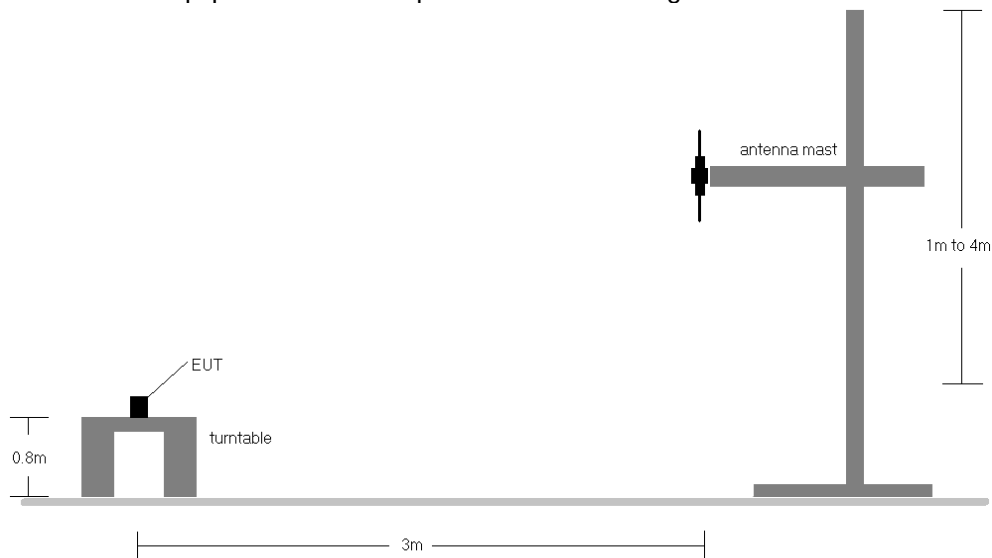


Figure 7-1. Radiated Test Setup <1GHz

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.
- 7) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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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]
10 MHz	QPSK	829.0	H	144	87	6.80	1 / 25	12.56	17.21	0.053	38.45	-21.24
		836.5	H	130	89	6.68	1 / 0	11.65	16.18	0.041	38.45	-22.27
		844.0	H	218	87	6.66	1 / 0	12.49	17.00	0.050	38.45	-21.45
	16-QAM	829.0	H	144	87	6.80	1 / 25	11.76	16.41	0.044	38.45	-22.04
		836.5	H	130	89	6.68	1 / 0	10.81	15.34	0.034	38.45	-23.11
		844.0	H	218	87	6.66	1 / 0	11.78	16.29	0.043	38.45	-22.16
	64-QAM	829.0	H	144	87	6.80	1 / 25	10.80	15.45	0.035	38.45	-23.00
		836.5	H	130	89	6.68	1 / 0	9.76	14.29	0.027	38.45	-24.16
		844.0	H	218	87	6.66	1 / 0	10.91	15.42	0.035	38.45	-23.03
10 MHz	QPSK (Opposite Pol.)	829.0	V	316	295	6.80	1 / 25	10.29	17.09	0.051	38.45	-21.36

Table 7-1. ERP Data (LTE Band 5)

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]
20 MHz	TT/2 BPSK	834.0	H	100.0	75.0	6.75	1 / 50	13.02	17.62	0.058	38.45	-20.83
		836.5	H	107.0	88.0	6.68	1 / 0	6.11	10.64	0.012	38.45	-27.81
		839.0	H	200.0	80.0	6.70	1 / 0	5.80	10.35	0.011	38.45	-28.10
	QPSK	834.0	H	100.0	75.0	6.75	1 / 50	13.06	17.66	0.058	38.45	-20.79
		836.5	H	107.0	88.0	6.68	1 / 0	6.32	10.85	0.012	38.45	-27.60
		839.0	H	200.0	80.0	6.70	1 / 0	6.27	10.82	0.012	38.45	-27.63
	16-QAM	834.0	H	100.0	75.0	6.75	1 / 50	11.21	15.81	0.038	38.45	-22.64
		836.5	H	107.0	88.0	6.68	1 / 0	5.63	10.16	0.010	38.45	-28.29
		839.0	H	200.0	80.0	6.70	1 / 0	5.06	9.61	0.009	38.45	-28.84
	64-QAM	834.0	H	100.0	75.0	6.75	1 / 50	9.78	14.38	0.027	38.45	-24.07
		836.5	H	107.0	88.0	6.68	1 / 0	3.92	8.45	0.007	38.45	-30.00
		839.0	H	200.0	80.0	6.70	1 / 0	3.78	8.33	0.007	38.45	-30.12
	256-QAM	834.0	H	100.0	75.0	6.75	1 / 50	7.96	12.56	0.018	38.45	-25.89
		836.5	H	107.0	88.0	6.68	1 / 0	1.42	5.95	0.004	38.45	-32.50
		839.0	H	200.0	80.0	6.70	1 / 0	1.18	5.73	0.004	38.45	-32.72
20 MHz	QPSK (CP-OFDM)	834.0	H	203.0	81.0	6.70	1 / 50	1.57	8.27	0.007	38.45	-30.18
	QPSK (Opposite Pol.)	834.0	V	147.0	99.0	6.70	1 / 50	2.96	9.66	0.009	38.45	-28.79
	QPSK (Dual Display)	834.0	H	194.0	89.0	6.70	1 / 50	10.68	17.38	0.055	38.45	-21.07

Table 7-2. ERP Data (NR Band n5)

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	139	113	24.44	6.35	28.64	0.731	38.45	-9.81
836.60	GSM850	V	143	113	24.26	6.38	28.49	0.706	38.45	-9.96
848.80	GSM850	V	151	114	23.37	6.51	27.73	0.592	38.45	-10.73
824.20	GSM850	H	220	92	21.60	6.38	25.83	0.383	38.45	-12.62
824.20	EDGE850	V	139	113	17.99	6.38	22.22	0.167	38.45	-16.23
824.20	GSM850 (Dual Display)	V	13	113	22.84	6.38	27.07	0.509	38.45	-11.38

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	V	137	119	16.15	6.37	20.37	0.109	38.45	-18.08
836.60	WCDMA850	V	147	77	16.25	6.38	20.48	0.112	38.45	-17.97
846.60	WCDMA850	V	155	60	16.08	6.48	20.41	0.110	38.45	-18.04
836.60	WCDMA850	H	197	76	12.81	6.38	17.04	0.051	38.45	-21.41

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	V	353	3	11.75	6.36	15.96	0.039	38.45	-22.50
836.52	CDMA850	V	183	16	11.22	6.38	15.45	0.035	38.45	-23.00
848.31	CDMA850	V	313	13	10.74	6.50	15.09	0.032	38.45	-23.36
824.70	CDMA850	H	100	80	8.29	6.36	12.50	0.018	38.45	-25.96

Table 7-5. ERP Data (CDMA Cell)

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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.

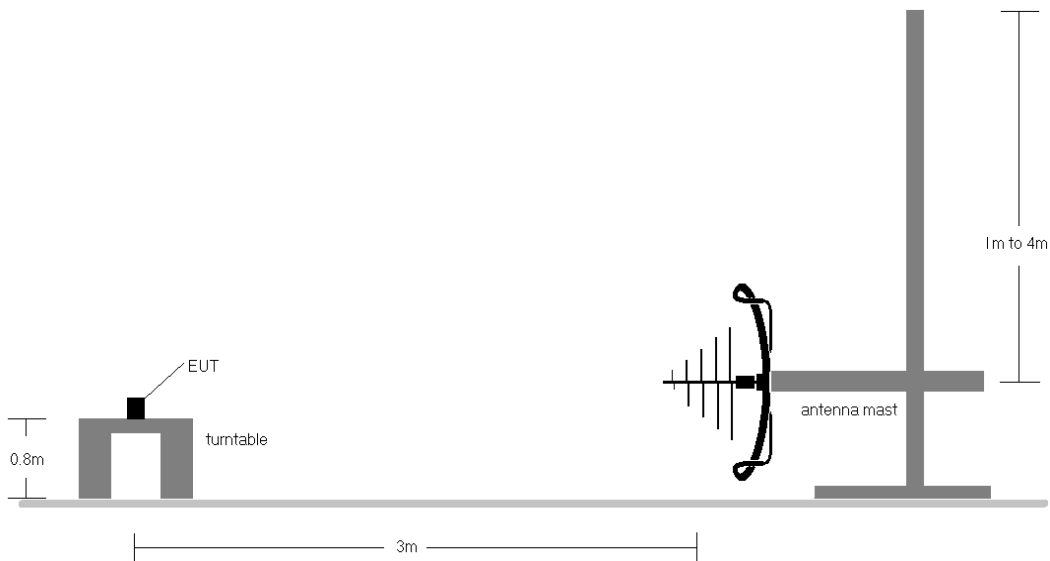


Figure 7-2. Test Instrument & Measurement Setup < 1GHz

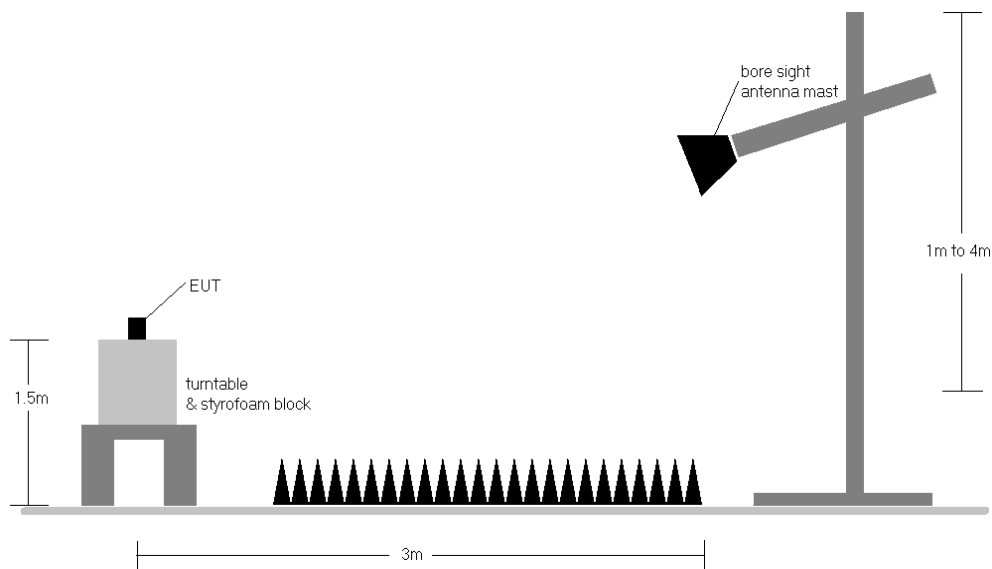


Figure 7-3. Test Instrument & Measurement Setup >1 GHz

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Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
 - b) $E(\text{dB}\mu\text{V/m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - d) $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V/m}) + 20\log D - 104.8$; 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.
- 11) ULCA spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
- 12) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.
- 13) Spurious emissions shown in this section are measured while operating in EN-DC mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor). Spurious emissions from the NR carrier device, is subject to the rules under which the NR carrier operates. Spurious emission caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.

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LTE Band 5

Bandwidth (MHz):	10
Frequency (MHz):	829.0
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]
1658.0	V	-	-	-78.27	2.93	31.66	-63.59	-13.00	-50.59
2487.0	V	-	-	-79.06	6.27	34.21	-61.05	-13.00	-48.05
3316.0	V	-	-	-79.93	7.77	34.84	-60.42	-13.00	-47.42
4145.0	V	-	-	-80.33	9.63	36.30	-58.96	-13.00	-45.96

Table 7-2. Radiated Spurious Data (LTE Band 5 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
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]
1673.0	V	171	255	-78.19	2.84	31.65	-63.61	-13.00	-50.61
2509.5	V	-	-	-78.98	6.13	34.15	-61.11	-13.00	-48.11
3346.0	V	-	-	-79.50	7.91	35.41	-59.85	-13.00	-46.85
4182.5	V	-	-	-80.74	9.74	36.00	-59.26	-13.00	-46.26

Table 7-3. Radiated Spurious Data (LTE Band 5 – Mid Channel)

Bandwidth (MHz):	10
Frequency (MHz):	844.0
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]
1688.00	V	-	-	-78.29	2.73	31.44	-63.82	-13.00	-50.82
2532.00	V	-	-	-79.32	6.09	33.77	-61.48	-13.00	-48.48
3376.00	V	-	-	-79.86	8.01	35.15	-60.11	-13.00	-47.11
4220.00	V	-	-	-80.35	9.41	36.06	-59.20	-13.00	-46.20

Table 7-4. Radiated Spurious Data (LTE Band 5 – High Channel)

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ULCA LTE Band 5

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	829.0
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	838.9
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]
1668.0	V	-	-	-78.31	2.93	31.62	-63.63	-13.00	-50.63
2502.0	V	-	-	-79.06	6.27	34.21	-61.05	-13.00	-48.05
3336.0	V	-	-	-79.57	7.77	35.20	-60.06	-13.00	-47.06
4170.0	V	-	-	-80.59	9.63	36.04	-59.22	-13.00	-46.22

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

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	831.5
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	5
SCC Frequency (MHz):	829.3
SCC RB / Offset:	1 / 24

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	V	140	260	-77.93	2.84	31.91	-63.35	-13.00	-50.35
2509.5	V	379	53	-79.16	6.13	33.97	-61.29	-13.00	-48.29
3346.0	V	-	-	-79.63	7.91	35.28	-59.98	-13.00	-46.98
4182.5	V	-	-	-80.66	9.74	36.08	-59.18	-13.00	-46.18

Table 7-6. Radiated Spurious Data (ULCA LTE Band 5 – Mid Channel)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	844.0
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	834.1
SCC RB / Offset:	1 / 49

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]
1678.0	V	-	-	-78.05	2.73	31.68	-63.58	-13.00	-50.58
2517.0	V	-	-	-79.06	6.09	34.03	-61.22	-13.00	-48.22
3356.0	V	-	-	-79.79	8.01	35.22	-60.04	-13.00	-47.04
4195.0	V	-	-	-80.65	9.41	35.76	-59.50	-13.00	-46.50

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

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NR Band n5

Bandwidth (MHz):	20
Frequency (MHz):	834.0
RB / Offset:	1 / 50
Mode:	Stand Alone

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]
1668.0	H	267	110	-57.23	-3.89	45.88	-49.38	-13.00	-36.38
2502.0	H	148	66	-63.49	-1.83	41.68	-53.58	-13.00	-40.58
3336.0	H	-	-	-70.29	1.97	38.68	-56.58	-13.00	-43.58

Table 7-8. Radiated Spurious Data (NR Band n5 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 50
Mode:	Stand Alone

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	288	97	-56.74	-3.56	46.70	-48.55	-13.00	-35.55
2509.5	H	122	89	-61.36	-1.74	43.90	-51.35	-13.00	-38.35
3346.0	H	-	-	-71.06	1.99	37.93	-57.33	-13.00	-44.33

Table 7-9. Radiated Spurious Data (NR Band n5 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	839.0
RB / Offset:	1 / 50
Mode:	Stand Alone

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]
1678.0	H	295	63	-56.38	-3.22	47.40	-47.86	-13.00	-34.86
2517.0	H	130	91	-64.88	-1.59	40.53	-54.73	-13.00	-41.73
3356.0	H	-	-	-71.42	2.13	37.71	-57.55	-13.00	-44.55

Table 7-10. Radiated Spurious Data (NR Band n5 – High Channel)

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Bandwidth (MHz):	20
Frequency (MHz):	839.0
RB / Offset:	1 / 50
Mode:	EN-DC
Anchor Band:	LTE Band 66

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]
2607.0	H	277	143	-71.22	8.05	43.83	-51.42	-13.00	-38.42
2660.0	H	263	120	-72.93	8.29	42.36	-52.90	-13.00	-39.90

Table 7-11. Radiated Spurious Data (ENDC n5-LB66)

Case:	w/ Dual Display
Bandwidth (MHz):	20
Frequency (MHz):	839.0
RB / Offset:	1 / 50
Mode:	Stand Alone

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]
1678.0	H	325	142	-58.91	-3.22	44.87	-50.39	-13.00	-37.39
2517.0	H	178	80	-63.44	-1.59	41.97	-53.29	-13.00	-40.29
3356.0	H	-	-	-70.87	2.13	38.26	-57.00	-13.00	-44.00

Table 7-12. Radiated Spurious Data (NR Band n5 – w/ Dual Display)

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GSM/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	H	211	56	-68.94	-3.22	34.84	-60.41	-13.00	-47.41
2472.6	H	141	120	-48.17	-1.81	57.02	-38.23	-13.00	-25.23
3296.8	H	-	-	-69.29	2.16	39.87	-55.39	-13.00	-42.39

Table 7-13. 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	H	186	82	-67.49	-3.54	35.97	-59.29	-13.00	-46.29
2509.8	H	127	149	-47.88	-1.73	57.39	-37.87	-13.00	-24.87
3346.4	H	-	-	-70.13	2.00	38.87	-56.39	-13.00	-43.39

Table 7-14. Radiated Spurious Data (GPRS Cell – Mid Channel)

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	H	195	71	-67.59	-2.91	36.50	-58.76	-13.00	-45.76
2546.4	H	149	134	-47.67	-0.99	58.34	-36.92	-13.00	-23.92
3395.2	H	-	-	-70.21	2.02	38.81	-56.45	-13.00	-43.45

Table 7-15. Radiated Spurious Data (GPRS Cell – High Channel)

FCC ID: ZNFG900VM	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1M2006040088-02.ZNF	Test Dates: 6/4 - 8/7/2020	EUT Type: Portable Handset	Page 22 of 25

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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	227	52	-70.39	-3.37	33.24	-62.02	-13.00	-49.02
2479.2	H	167	241	-62.75	-1.85	42.40	-52.85	-13.00	-39.85
3305.6	H	-	-	-70.18	1.93	38.75	-56.51	-13.00	-43.51

Table 7-16. 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	230	63	-69.84	-3.54	33.62	-61.64	-13.00	-48.64
2509.8	H	158	218	-63.28	-1.73	41.99	-53.27	-13.00	-40.27
3346.4	H	-	-	-70.44	2.00	38.56	-56.70	-13.00	-43.70

Table 7-17. Radiated Spurious Data (WCDMA Cell – Mid Channel)

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	202	75	-68.97	-2.86	35.17	-60.08	-13.00	-47.08
2539.8	H	140	162	-63.79	-1.10	42.11	-53.15	-13.00	-40.15
3386.4	H	-	-	-70.54	1.87	38.33	-56.93	-13.00	-43.93

Table 7-18. Radiated Spurious Data (WCDMA Cell – High Channel)

FCC ID: ZNFG900VM	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
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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	H	164	51	-70.48	-3.22	33.30	-61.96	-13.00	-48.96
2474.10	H	132	127	-66.37	-1.82	38.81	-56.45	-13.00	-43.45
3298.80	H	-	-	-70.22	2.08	38.86	-56.40	-13.00	-43.40

Table 7-19. 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	H	161	89	-70.58	-3.55	32.87	-62.39	-13.00	-49.39
2509.56	H	144	122	-67.46	-1.74	37.80	-57.45	-13.00	-44.45
3346.08	H	-	-	-69.87	1.99	39.12	-56.14	-13.00	-43.14

Table 7-20. Radiated Spurious Data (CDMA Cell – Mid Channel)

Mode:	CDMA
Channel:	777
Frequency (MHz):	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	H	154	64	-69.89	-2.90	34.21	-61.04	-13.00	-48.04
2544.93	H	132	125	-66.87	-1.01	39.12	-56.14	-13.00	-43.14
3393.24	H	-	-	-70.37	2.03	38.66	-56.59	-13.00	-43.59

Table 7-21. Radiated Spurious Data (CDMA Cell – High Channel)

FCC ID: ZNFG900VM	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
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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: ZNFG900VM** complies with all the requirements of Part 22 of the FCC rules.

FCC ID: ZNFG900VM	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	 LG	Approved by: Quality Manager
Test Report S/N: 1M2006040088-02.ZNF	Test Dates: 6/4 - 8/7/2020	EUT Type: Portable Handset		Page 25 of 25

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