

MEASUREMENT REPORT

LTE / NR SUB6

Applicant Name:

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

Date of Testing:

07/27 - 08/14/2020

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2006110090-03.ZNF

FCC ID:

ZNFG900TM

APPLICANT:

LG Electronics USA, Inc.

Application Type:

Class II Permissive Change

Model:

LM-G900TM

Additional Model(s):

LMG900TM, G900TM

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

22, 24, & 27

Test Procedure(s):

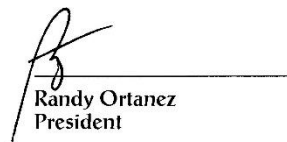
ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

Class II Permissive Change:

Please see FCC change document

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



Randy Ortanez
President

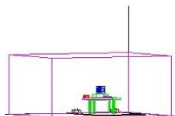


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T A B L E O F C O N T E N T S

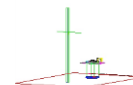
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FCC Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	
LTE Band 71	27	665.5 - 695.5	0.090	19.55			QPSK
LTE Band 12	27	699.7 - 715.3	0.038	15.82	0.063	17.97	QPSK
LTE Band 13	27	779.5 - 784.5	0.044	16.46	0.073	18.61	QPSK
LTE Band 26/5	22H	824.7 - 848.3	0.052	17.17	0.086	19.32	QPSK

EUT Overview (<1 GHz)

Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
LTE Band 66/4	27	1710.7 - 1779.3	0.158	21.98	QPSK
LTE Band 25/2	24E	1850.7 - 1914.3	0.165	22.17	QPSK

EUT Overview (Mid Bands)

Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.190	22.79	QPSK

EUT Overview (High Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		ERP	
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]
NR Band n71	20 MHz	$\pi/2$ BPSK	673.0 - 688.0	0.094	19.71	0.057	17.56
		QPSK	673.0 - 688.0	0.095	19.80	0.058	17.65
		16QAM	673.0 - 688.0	0.070	18.44	0.043	16.29
		64QAM	673.0 - 688.0	0.051	17.06	0.031	14.91
		256QAM	673.0 - 688.0	0.035	15.42	0.021	13.27

EUT Overview (n71)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
NR Band n66	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.251	23.99
		QPSK	834.0 - 839.0	0.257	24.10
		16QAM	834.0 - 839.0	0.193	22.85
		64QAM	834.0 - 839.0	0.141	21.48
		256QAM	834.0 - 839.0	0.100	20.00

EUT Overview (n66)

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
NR Band n25/2	20 MHz	$\pi/2$ BPSK	1860 - 1905	0.299	24.75
		QPSK	1860 - 1905	0.294	24.68
		16QAM	1860 - 1905	0.204	23.09
		64QAM	1860 - 1905	0.158	21.97
		256QAM	1860 - 1905	0.108	20.34

EUT Overview (n25/2)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
NR Band n41	100 MHz	$\pi/2$ BPSK	2546.0 - 2640.0	0.210	23.22
		QPSK	2546.0 - 2640.0	0.233	23.67
		16QAM	2546.0 - 2640.0	0.244	23.87
		64QAM	2546.0 - 2640.0	0.357	25.52
		256QAM	2546.0 - 2640.0	0.367	25.65

EUT Overview (n41)

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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 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 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: ZNFG900TM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 01605, 01613

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, BC0, BC1, BC10, 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-Band 5G NR, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC

LTE Band 12 (698 - 716 MHz) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz). Therefore, test data provided in this report covers Band 17 as well as Band 12.

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.

LTE Band 66 (1710 - 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 - 1755 MHz). Therefore, test data provided in this report covers Band 4 as well as Band 66.

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

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports dual display capability. Additional radiated emission measurements were performed having the dual display cover (Model: LM-G906N) installed with the EUT while operating under normal conditions in a simulated call or data transmission configuration. The worst-case radiated emissions data is shown in this report.

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration band set to the emissions’ occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01. In accordance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10 \log_{10}(\text{Power}_{\text{[Watts]}})$. For Band 41, the calculated P_d levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of $55 + 10 \log_{10}(\text{Power}_{\text{[Watts]}})$.

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.

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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
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
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	PWR-SEN-4RMS	USB Power Sensor	8/18/2019	Annual	8/18/2020	11210140001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100040
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	8/11/2019	Annual	8/11/2020	102134
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

Emission Designator

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 – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics USA, Inc.
FCC ID: ZNFG900TM
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
Mode(s): LTE / NR SUB6

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 5/26)	< 7 Watts max. ERP	RADIATED	PASS	Section 0
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 71, 12/13)	< 3 Watts max. ERP			Section 0
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2/25, 7, 41)	< 2 Watts max. EIRP			Section 0
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	< 1 Watts max. EIRP			Section 0
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12, 13, 26/5, 66/4, 25/2)	> 43 + 10 log ₁₀ (P[Watts]) for all out-of-band emissions			Section 7.3
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz			Section 7.3
27.53(m)	Undesirable Emissions (Band 41)	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3
22.917(a) 24.238 (a) 27.53 (m) 27.53(h)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3

Table 7-1. Summary of Radiated Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

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7.2 Radiated Power (ERP/EIRP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

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

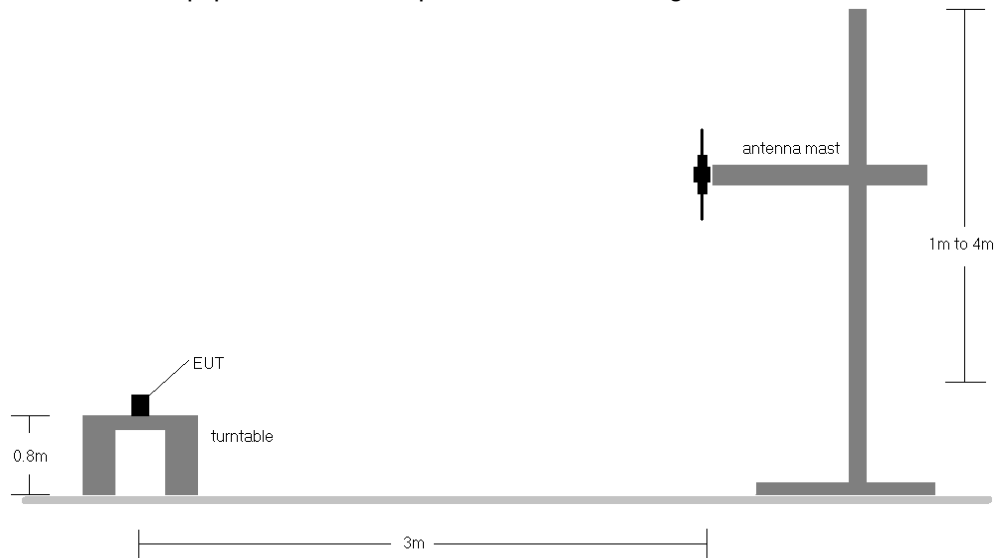


Figure 7-1. Radiated Test Setup <1GHz

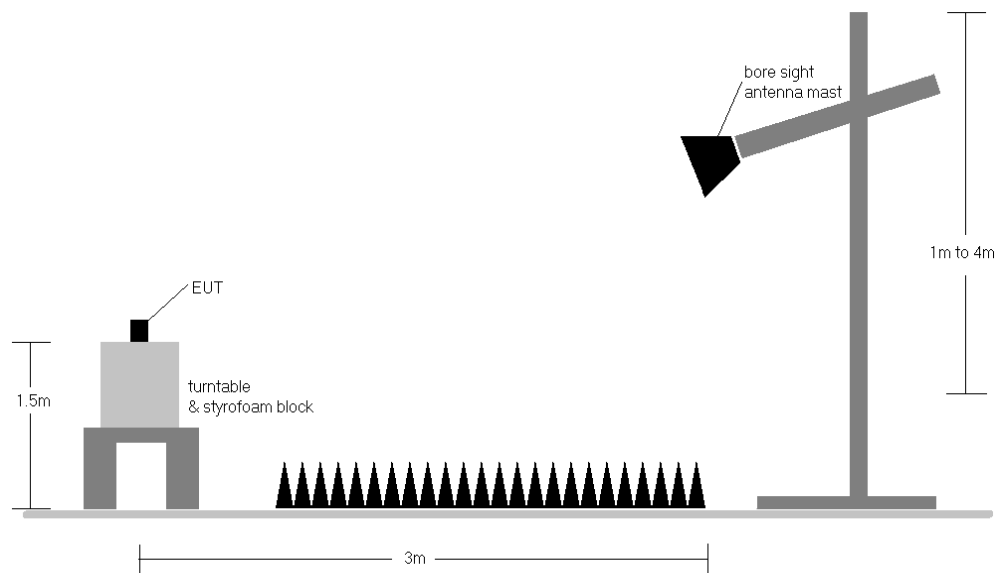


Figure 7-2. Radiated Test Setup >1GHz

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
673.00	20	QPSK	V	133	102	50 / 25	17.18	4.09	19.12	0.082	34.77	-15.65
680.50	20	QPSK	V	138	99	50 / 25	17.25	4.24	19.34	0.086	34.77	-15.44
688.00	20	QPSK	V	141	101	1 / 0	17.22	4.48	19.55	0.090	34.77	-15.22
688.00	20	QPSK	H	170	348	1 / 0	13.06	4.24	15.15	0.033	34.77	-19.63
688.00	20 (Dual Dis)	QPSK	V	261	73	1 / 0	8.53	4.48	10.86	0.012	34.77	-23.91

Table 7-2. ERP Data (Band 71)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
704.00	10	QPSK	H	123	108	1 / 49	13.74	3.58	15.17	0.033	34.77	-19.60
707.50	10	QPSK	H	125	82	1 / 0	13.35	3.72	14.92	0.031	34.77	-19.85
711.00	10	QPSK	H	131	106	1 / 49	14.30	3.67	15.82	0.038	34.77	-18.95
711.00	10	QPSK	V	100	81	1 / 49	11.61	3.67	13.13	0.021	34.77	-21.64

Table 7-3. ERP Data (Band 12)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
782.00	10	QPSK	V	155	119	1 / 49	12.82	5.79	16.46	0.044	34.77	-18.31	18.61	0.073	36.99	-18.38
782.00	10	QPSK	H	269	85	1 / 49	11.84	5.79	15.48	0.035	34.77	-19.29	17.63	0.058	36.99	-19.36

Table 7-4. ERP Data (Band 13)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	V	137	83	1 / 74	12.84	6.43	17.12	0.051	38.45	-21.33	19.27	0.084	40.61	-21.34
836.50	15	QPSK	V	157	96	1 / 74	12.94	6.38	17.17	0.052	38.45	-21.28	19.32	0.085	40.61	-21.29
841.50	15	QPSK	V	141	137	1 / 0	12.08	6.43	16.36	0.043	38.45	-22.09	18.51	0.071	40.61	-22.10
836.50	15	QPSK	H	104	62	1 / 74	10.90	6.43	15.18	0.033	38.45	-23.27	17.33	0.054	40.61	-23.28

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

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1720.00	20	QPSK	V	157	149	1 / 0	12.44	9.31	21.75	0.150	30.00	-8.25
1745.00	20	QPSK	V	139	53	1 / 0	12.84	9.14	21.98	0.158	30.00	-8.02
1770.00	20	QPSK	V	101	32	1 / 99	11.89	9.17	21.06	0.128	30.00	-8.94
1745.00	20	QPSK	H	115	64	1 / 0	11.23	9.14	20.37	0.109	30.00	-9.63
1745.00	20 (Dual Dis)	QPSK	V	206	242	1 / 0	9.71	9.14	18.85	0.077	30.00	-11.15

Table 7-6. EIRP Data (Band 66/4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1860.00	20	QPSK	V	143	58	1 / 0	12.19	9.98	22.17	0.165	33.01	-10.84
1882.50	20	QPSK	V	170	352	1 / 0	11.67	10.15	21.82	0.152	33.01	-11.19
1905.00	20	QPSK	V	126	32	1 / 99	11.56	10.31	21.87	0.154	33.01	-11.14
1860.00	20	QPSK	H	102	355	1 / 0	12.04	9.96	22.00	0.158	33.01	-11.01

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

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2510.00	20	QPSK	H	121	187	1 / 0	13.34	9.45	22.79	0.190	33.01	-10.22
2593.00	20	QPSK	H	107	226	1 / 0	12.72	9.58	22.30	0.170	33.01	-10.71
2680.00	20	QPSK	H	188	195	1 / 99	11.76	9.86	21.62	0.145	33.01	-11.39
2510.00	20	QPSK	V	104	332	1 / 0	10.89	9.58	20.47	0.111	33.01	-12.54

Table 7-8. EIRP Data (Band 41 – PC2)

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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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	TT/2 BPSK	673.0	V	181.0	55.0	4.09	1 / 0	15.62	19.71	0.094	36.99	-17.28	17.56	0.057	34.77	-17.21
		680.5	V	170.0	23.0	4.24	1 / 50	15.38	19.62	0.092	36.99	-17.37	17.47	0.056	34.77	-17.31
		688.0	V	157.0	162.0	4.48	1 / 99	14.73	19.21	0.083	36.99	-17.78	17.06	0.051	34.77	-17.71
	QPSK	673.0	V	181.0	55.0	4.09	1 / 0	15.71	19.80	0.095	36.99	-17.19	17.65	0.058	34.77	-17.12
		680.5	V	170.0	23.0	4.24	1 / 50	15.34	19.58	0.091	36.99	-17.41	17.43	0.055	34.77	-17.35
		688.0	V	157.0	162.0	4.48	1 / 99	14.31	18.79	0.076	36.99	-18.20	16.64	0.046	34.77	-18.13
	16-QAM	673.0	V	181.0	55.0	4.09	1 / 0	14.35	18.44	0.070	36.99	-18.55	16.29	0.043	34.77	-18.48
	64-QAM	680.5	V	170.0	23.0	4.24	1 / 50	12.82	17.06	0.051	36.99	-19.93	14.91	0.031	34.77	-19.87
	256-QAM	680.5	V	170.0	23.0	4.24	1 / 50	11.18	15.42	0.035	36.99	-21.57	13.27	0.021	34.77	-21.51
	QPSK (Opposite Pol.)	673.0	H	148.0	309.0	4.09	1 / 0	15.22	19.31	0.085	36.99	-17.68	17.16	0.052	34.77	-17.61

Table 7-9. ERP Data (5G sub6 n71)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	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	TT/2 BPSK	1720.0	H	137.0	325.0	9.41	1 / 0	13.22	22.63	0.183	30.00	-7.37
		1745.0	H	138.0	359.0	9.26	1 / 50	14.49	23.75	0.237	30.00	-6.25
		1770.0	H	173.0	342.0	9.27	1 / 0	14.72	23.99	0.251	30.00	-6.01
	QPSK	1720.0	H	137.0	325.0	9.41	1 / 0	13.28	22.69	0.186	30.00	-7.31
		1745.0	H	138.0	359.0	9.26	1 / 50	14.33	23.59	0.229	30.00	-6.41
		1770.0	H	173.0	342.0	9.27	1 / 0	14.83	24.10	0.257	30.00	-5.90
	16-QAM	1770.0	H	173.0	342.0	9.27	1 / 0	13.58	22.85	0.193	30.00	-7.15
	64-QAM	1770.0	H	173.0	342.0	9.27	1 / 0	12.21	21.48	0.141	30.00	-8.52
	256-QAM	1770.0	H	173.0	342.0	9.27	1 / 0	10.73	20.00	0.100	30.00	-10.00
	QPSK (Opposite Pol.)	1770.0	V	127.0	233.0	9.17	1 / 0	9.69	18.86	0.077	30.00	-11.14

Table 7-10. EIRP Data (5G sub6 n66)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	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	TT/2 BPSK	1860.0	H	151.0	4.0	9.64	1 / 50	13.77	23.41	0.220	33.01	-9.60
		1880.0	H	165.0	189.0	9.96	1 / 99	14.30	24.26	0.267	33.01	-8.75
		1900.0	H	148.0	162.0	10.24	1 / 0	14.51	24.75	0.299	33.01	-8.26
	QPSK	1860.0	H	151.0	4.0	9.64	1 / 50	13.79	23.43	0.221	33.01	-9.58
		1880.0	H	165.0	189.0	9.96	1 / 99	14.26	24.22	0.264	33.01	-8.79
		1900.0	H	148.0	162.0	10.24	1 / 0	14.44	24.68	0.294	33.01	-8.33
	16-QAM	1900.0	H	148.0	162.0	10.24	1 / 0	12.85	23.09	0.204	33.01	-9.92
	64-QAM	1900.0	H	148.0	162.0	10.24	1 / 0	11.73	21.97	0.158	33.01	-11.04
	256-QAM	1900.0	H	148.0	162.0	10.24	1 / 0	10.10	20.34	0.108	33.01	-12.67
	QPSK (Opposite Pol.)	1905.0	V	195.0	35.0	10.24	1 / 0	9.81	20.05	0.101	33.01	-12.96

Table 7-11. EIRP Data (5G sub6 n25/2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
100 MHz	TT/2 BPSK	2546.0	H	108.0	312.0	9.41	1 / 273	12.79	22.20	0.166	33.01	-10.81
		2593.0	H	100.0	313.0	9.58	1 / 137	13.64	23.22	0.210	33.01	-9.79
		2640.0	H	350.0	313.0	9.87	1 / 137	12.74	22.61	0.182	33.01	-10.40
	QPSK	2546.0	H	108.0	312.0	9.41	1 / 273	13.35	22.76	0.189	33.01	-10.25
		2593.0	H	100.0	313.0	9.58	1 / 137	14.09	23.67	0.233	33.01	-9.34
		2640.0	H	350.0	313.0	9.87	1 / 137	13.42	23.29	0.213	33.01	-9.72
	16-QAM	2640.0	H	350.0	313.0	9.87	1 / 137	14.00	23.87	0.244	33.01	-9.14
	64-QAM	2593.0	H	100.0	313.0	9.58	1 / 137	15.94	25.52	0.357	33.01	-7.49
	256-QAM	2593.0	H	100.0	313.0	9.58	1 / 137	16.07	25.65	0.367	33.01	-7.36
	QPSK (Opposite Pol.)	2593.0	V	243.0	13.0	9.58	1 / 137	12.08	21.66	0.147	33.01	-11.35

Table 7-12. EIRP Data (5G sub6 n41 – PC2)

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7.3 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

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

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Test Setup

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

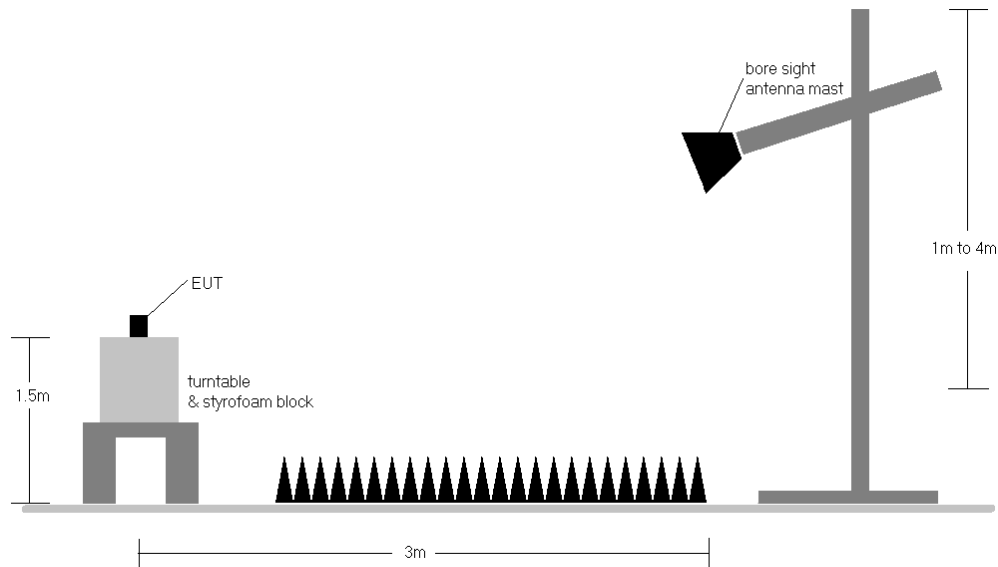


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 6) LTE NR bands n25 and n66 were investigated on two antennas (Ant2 and Ant3) and that the data shown in the report is the worst case.

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Band 71

OPERATING FREQUENCY: 688.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1376.00	H	138	347	-58.36	2.64	-55.71	-42.7
2064.00	H	-	-	-54.84	2.82	-52.02	-39.0
2752.00	H	-	-	-55.77	4.60	-51.17	-38.2
3440.00	H	-	-	-58.10	6.28	-51.82	-38.8

Table 7-13. Radiated Spurious Data (Band 71 – High Channel)

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Band n71

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]
3540.0	H	138	182	-80.25	7.66	34.41	-60.85	-13.00	-47.85
5310.0	H	400	214	-80.47	10.09	36.62	-58.64	-13.00	-45.64
7080.0	H	-	-	-82.12	14.13	39.01	-56.25	-13.00	-43.25
8850.0	H	-	-	-82.71	16.87	41.16	-54.10	-13.00	-41.10
10620.0	H	-	-	-83.63	19.63	43.00	-52.26	-13.00	-39.26

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3540.00	H	138	182	-67.27	6.45	-60.82	-47.8
5310.00	H	400	214	-67.70	9.09	-58.61	-45.6
7080.00	H	-	-	-65.39	9.17	-56.22	-43.2
8850.00	H	-	-	-63.64	9.57	-54.07	-41.1
10620.00	H	-	-	-61.78	9.55	-52.23	-39.2

Table 7-14. Radiated Spurious Data (Band n71 + B66 – Mid Channel)

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Band 12

OPERATING FREQUENCY: 707.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	-	-	-57.72	2.39	-55.33	-42.3
2122.50	H	-	-	-55.31	3.14	-52.17	-39.2
2830.00	H	-	-	-56.38	4.87	-51.52	-38.5

Table 7-15. Radiated Spurious Data (Band 12 – Mid Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
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Band 13

OPERATING FREQUENCY: 782.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	V	-	-	-57.80	2.93	-54.87	-41.9
2346.00	V	-	-	-56.21	3.64	-52.57	-39.6
3128.00	V	-	-	-57.39	5.73	-51.65	-38.7

Table 7-16. Radiated Spurious Data (Band 13 – Mid Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
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Band 26/5

OPERATING FREQUENCY: 841.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1683.00	H	-	-	-58.23	3.15	-55.08	-42.1
2524.50	H	-	-	-56.37	4.07	-52.30	-39.3
3366.00	H	-	-	-56.64	6.10	-50.53	-37.5

Table 7-17. Radiated Spurious Data (Band 26 – Hgih Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
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Band 66/4

OPERATING FREQUENCY: 1770.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3540.00	V	-	-	-58.45	6.45	-52.00	-39.0
5310.00	V	-	-	-59.55	9.09	-50.46	-37.5
7080.00	V	-	-	-56.19	9.17	-47.02	-34.0

Table 7-18. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
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Band n66

OPERATING FREQUENCY: 1730.00 MHz
 MODULATION SIGNAL: DFT-s-OFDM
 BANDWIDTH: 40.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3460.00	V	101	356	-41.23	6.33	-34.89	-21.9
5190.00	V	129	10	-55.69	9.03	-46.66	-33.7
6920.00	V	223	29	-49.14	9.39	-39.74	-26.7
8650.00	V	107	340	-59.94	9.57	-50.37	-37.4
10380.00	V	297	333	-53.50	9.49	-44.01	-31.0
12110.00	V	224	363	-52.02	9.17	-42.85	-29.9
13840.00	V	218	326	-52.98	8.77	-44.21	-31.2
15570.00	V	-	-	-54.35	8.48	-45.88	-32.9
17300.00	V	-	-	-51.45	7.99	-43.46	-30.5

Table 7-19. Radiated Spurious Data (Band n66 – Low Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band 25/2

OPERATING FREQUENCY: 1860.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	H	-	-	-58.99	6.90	-52.09	-39.1
5580.00	H	-	-	-58.55	9.06	-49.49	-36.5
7440.00	H	-	-	-56.52	9.26	-47.26	-34.3

Table 7-20. Radiated Spurious Data (Band 25/2 – Low Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
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Band n25

OPERATING FREQUENCY: 1870.00 MHz
 MODULATION SIGNAL: DFT-s-OFDM
 BANDWIDTH: 40.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3740.00	V	107	342	-47.29	6.91	-40.38	-27.4
5610.00	V	111	354	-53.19	9.11	-44.08	-31.1
7480.00	V	296	330	-45.54	9.31	-36.23	-23.2
9350.00	V	101	251	-56.28	9.45	-46.84	-33.8
11220.00	V	239	20	-54.55	9.43	-45.12	-32.1
13090.00	V	226	315	-51.78	8.69	-43.09	-30.1
14960.00	V	-	-	-55.57	8.81	-46.76	-33.8
16830.00	V	-	-	-52.11	8.45	-43.66	-30.7

Table 7-21. Radiated Spurious Data (Band n25 – Low Channel)

Band 41 PC2

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 2506.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5012.00	H	-	-	-68.28	8.75	-59.52	-34.5
7518.00	H	-	-	-65.70	9.32	-56.39	-31.4
10024.00	H	-	-	-62.83	9.80	-53.03	-28.0

Table 7-22. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	-	-	-68.66	9.03	-59.63	-34.6
7779.00	H	109	347	-64.69	9.29	-55.40	-30.4
10372.00	H	-	-	-62.02	9.50	-52.52	-27.5
12965.00	H	-	-	-57.16	8.75	-48.41	-23.4
15558.00	H	-	-	-53.35	8.47	-44.88	-19.9

Table 7-23. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 2680.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	H	-	-	-68.46	8.99	-59.47	-34.5
8040.00	H	107	328	-63.52	9.35	-54.17	-29.2
10720.00	H	-	-	-61.15	9.39	-51.75	-26.8
13400.00	H	-	-	-55.74	8.67	-47.07	-22.1
16080.00	H	-	-	-53.16	8.46	-44.70	-19.7

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

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band n41 PC2

OPERATING FREQUENCY: 2546.00 MHz
 MODULATION SIGNAL: DFT-s-OFDM
 BANDWIDTH: 100.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5092.00	V	292	32	-62.23	8.88	-53.34	-28.3
7638.00	V	236	352	-62.56	9.29	-53.27	-28.3
10184.00	V	229	9	-61.98	9.72	-52.26	-27.3
12730.00	V	-	-	-58.48	8.93	-49.55	-24.6
15276.00	V	-	-	-55.79	8.56	-47.23	-22.2
17822.00	V	-	-	-50.40	7.70	-42.69	-17.7

Table 7-25. Radiated Spurious Data (Band n25 – Low Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
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Band n25

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	-	-	-80.20	7.77	34.57	-60.69	-13.00	-47.69
5647.5	V	387	180	-72.35	10.56	45.21	-50.05	-13.00	-37.05
7530.0	V	-	-	-82.42	14.68	39.26	-56.00	-13.00	-43.00
9412.5	V	-	-	-84.12	18.07	40.95	-54.31	-13.00	-41.31
11295.0	V	-	-	-83.66	20.74	44.08	-51.18	-13.00	-38.18
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]
1415.0	V	-	-	-78.22	1.98	30.76	-64.50	-13.00	-51.50
2122.5	V	-	-	-78.93	6.08	34.15	-61.11	-13.00	-48.11
2830.0	V	-	-	-78.89	7.06	35.17	-60.09	-13.00	-47.09

Table 7-26. Radiated Spurious Data (Band n25 (Ant 3 NSA) + B12 EN-DC – Mid Channel)

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]
3765.00	H	-	-	-80.24	7.77	34.53	-60.73	-13.00	-47.73
5647.50	H	-	-	-81.46	10.56	36.10	-59.16	-13.00	-46.16
7530.00	H	-	-	-82.23	14.68	39.45	-55.81	-13.00	-42.81
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]
3490.00	H	111	307	-58.20	7.19	55.99	-39.27	-13.00	-26.27
5235.00	H	151	29	-70.52	9.60	46.08	-49.18	-13.00	-36.18
6980.00	H	132	57	-67.76	13.50	52.74	-42.51	-13.00	-29.51
8725.00	H	100	71	-80.71	16.69	42.98	-52.28	-13.00	-39.28
10470.00	H	102	337	-78.11	19.96	48.85	-46.41	-13.00	-33.41
12215.00	H	106	353	-80.19	22.21	49.02	-46.24	-13.00	-33.24
13960.00	H	-	-	-84.64	24.87	47.23	-48.02	-13.00	-35.02
15705.00	H	-	-	-84.84	27.45	49.61	-45.65	-13.00	-32.65

Table 7-27. Radiated Spurious Data (Band n25 (Ant 3 NSA) + B66 EN-DC – Mid Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band n41

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.0	V	145	42	-77.12	10.09	39.97	-64.83	-25.00	-39.83
7779.0	V	111	22	-81.56	15.35	40.79	-64.01	-25.00	-39.01
10372.0	V	103	322	-81.87	18.96	44.09	-60.71	-25.00	-35.71
12965.0	V	-	-	-84.38	23.97	46.59	-58.21	-25.00	-33.21
15558.0	V	-	-	-84.67	27.54	49.87	-54.93	-25.00	-29.93
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]
3490.0	V	-	-	-79.98	7.05	34.07	-70.73	-25.00	-45.73
5235.0	V	277	319	-76.94	9.97	40.03	-64.77	-25.00	-39.77
6980.0	V	-	-	-81.72	13.83	39.11	-65.69	-25.00	-40.69
8725.0	V	-	-	-82.75	16.32	40.57	-64.23	-25.00	-39.23
10470.0	V	-	-	-83.48	19.59	43.11	-61.69	-25.00	-36.69

Table 7-28. Radiated Spurious Data (Band n41 + B66 – Mid Channel)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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7.4 Uplink Carrier Aggregation Radiated Measurements

§2.1053

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. No. of sweep points $\geq 2 \times$ span / RBW
4. Detector = RMS
5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

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Test Setup

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

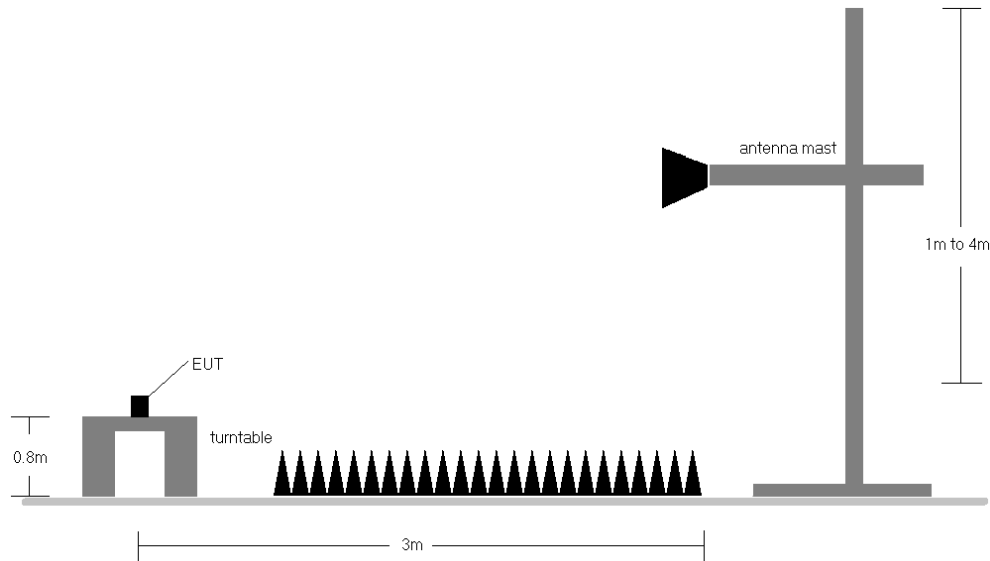


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) «Batteries»
- 3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.

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OPERATING FREQUENCY (PCC):	2680.00	MHz
OPERATING FREQUENCY (SCC):	2660.20	MHz
CHANNEL (PCC):	41490	
CHANNEL (SCC):	41292	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	H	180	355	-67.67	8.99	-58.68	-33.7
8040.00	H	100	28	-60.06	9.35	-50.71	-25.7
10720.00	H	100	15	-61.29	9.39	-51.89	-26.9
13400.00	H	-	-	-55.78	8.67	-47.11	-22.1
16080.00	H	-	-	-53.41	8.46	-44.95	-20.0

Plot 7-29. Radiated Spurious Data (ULCA B41 Left Carrier: RB 1 Offset 0, Right Carrier: RB 1 Offset 99)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY (PCC): 1880.00 MHz
 OPERATING FREQUENCY (SCC): 707.50 MHz
 CHANNEL (PCC): 18900
 CHANNEL (SCC): 23095
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20 MHz / 10 MHz MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2122.50	H	-	-	-62.24	3.14	-59.10	-46.1
3295.00	H	-	-	-63.61	6.00	-57.61	-44.6
5175.00	H	-	-	-61.72	9.01	-52.71	-39.7

Plot 7-30. Radiated Spurious Data – Mid (ULCA 2A-12A PCC: RB 100 Offset 0, SCC: RB 50 Offset 0)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY (PCC): 711.00 MHz
 OPERATING FREQUENCY (SCC): 1770.00 MHz
 CHANNEL (PCC): 23130
 CHANNEL (SCC): 132572
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz / 20MHz MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3525.00	H	-	-	-65.49	6.45	-59.04	-46.0
4251.00	H	-	-	-65.05	9.09	-55.96	-43.0
5658.00	H	-	-	-62.34	9.17	-53.17	-40.2

Plot 7-31. Radiated Spurious Data – High (ULCA 12A-66A PCC: RB 50 Offset 0, SCC: RB 100 Offset 0)

FCC ID: ZNFG900TM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	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: ZNFG900TM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE and NR operations only.

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