

MEASUREMENT REPORT LTE

Applicant Name:

LG Electronics USA, Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:

11/26/2019 - 1/8/2020

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M1911260200-03-R1.ZNF

FCC ID:

ZNFL555DL

APPLICANT:

LG Electronics USA, Inc.

Application Type:

Class II Permissive Change

Model:

LG L555DL

Additional Model(s):

LG-L555DL, LM-K500UM, LM-K500QM, LM-K500QM5,
LM-K500QM6, LM-K500MM, LM-K500UL, LM-K500VPP,
LGL555DL, LMK500UM, LMK500QM, LMK500QM5, LMK500QM6,
LMK500MM, LMK500UL, LMK500VPP, L555DL, K500UM, K500QM,
K500QM5, K500QM6, K500MM, K500UL, K500VPP

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

Original Grant Date:

12/13/2019

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.

This revised Test Report (S/N: 1M1911260200-03-R1.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

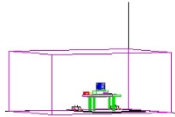


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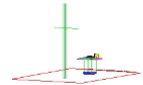
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FCC Part 22, 24, & 27



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	0.042	16.28			QPSK
LTE Band 71	27	665.5 - 695.5	0.034	15.29			16QAM
LTE Band 71	27	665.5 - 695.5	0.027	14.30			64QAM
LTE Band 71	27	668 - 693	0.041	16.09			QPSK
LTE Band 71	27	668 - 693	0.034	15.29			16QAM
LTE Band 71	27	668 - 693	0.027	14.25			64QAM
LTE Band 71	27	670.5 - 690.5	0.039	15.95			QPSK
LTE Band 71	27	670.5 - 690.5	0.033	15.16			16QAM
LTE Band 71	27	670.5 - 690.5	0.026	14.12			64QAM
LTE Band 71	27	673 - 688	0.041	16.17			QPSK
LTE Band 71	27	673 - 688	0.032	15.06			16QAM
LTE Band 71	27	673 - 688	0.026	14.16			64QAM
LTE Band 12	27	699.7 - 715.3	0.046	16.66	0.076	18.81	QPSK
LTE Band 12	27	699.7 - 715.3	0.037	15.74	0.062	17.89	16QAM
LTE Band 12	27	699.7 - 715.3	0.030	14.74	0.049	16.89	64QAM
LTE Band 12	27	700.5 - 714.5	0.046	16.66	0.076	18.81	QPSK
LTE Band 12	27	700.5 - 714.5	0.038	15.83	0.063	17.98	16QAM
LTE Band 12	27	700.5 - 714.5	0.030	14.83	0.050	16.98	64QAM
LTE Band 12	27	701.5 - 713.5	0.047	16.70	0.077	18.85	QPSK
LTE Band 12	27	701.5 - 713.5	0.038	15.76	0.062	17.91	16QAM
LTE Band 12	27	701.5 - 713.5	0.031	14.87	0.050	17.02	64QAM
LTE Band 12	27	704 - 711	0.058	17.62	0.095	19.77	QPSK
LTE Band 12	27	704 - 711	0.044	16.39	0.071	18.54	16QAM
LTE Band 12	27	704 - 711	0.036	15.59	0.059	17.74	64QAM
LTE Band 13	27	779.5 - 784.5	0.111	20.46	0.182	22.61	QPSK
LTE Band 13	27	779.5 - 784.5	0.088	19.45	0.145	21.60	16QAM
LTE Band 13	27	779.5 - 784.5	0.071	18.50	0.116	20.65	64QAM
LTE Band 13	27	782	0.112	20.50	0.184	22.65	QPSK
LTE Band 13	27	782	0.089	19.51	0.147	21.66	16QAM
LTE Band 13	27	782	0.072	18.59	0.119	20.74	64QAM
LTE Band 26/5	22H	824.7 - 848.3	0.060	17.76	0.098	19.91	QPSK
LTE Band 26/5	22H	824.7 - 848.3	0.050	17.01	0.082	19.16	16QAM
LTE Band 26/5	22H	824.7 - 848.3	0.040	16.03	0.066	18.18	64QAM
LTE Band 26/5	22H	825.5 - 847.5	0.060	17.81	0.099	19.96	QPSK
LTE Band 26/5	22H	825.5 - 847.5	0.050	16.97	0.082	19.12	16QAM
LTE Band 26/5	22H	825.5 - 847.5	0.041	16.08	0.067	18.23	64QAM
LTE Band 26/5	22H	826.5 - 846.5	0.061	17.87	0.100	20.02	QPSK
LTE Band 26/5	22H	826.5 - 846.5	0.051	17.05	0.083	19.20	16QAM
LTE Band 26/5	22H	826.5 - 846.5	0.040	16.05	0.066	18.20	64QAM
LTE Band 26/5	22H	829 - 844	0.061	17.82	0.099	19.97	QPSK
LTE Band 26/5	22H	829 - 844	0.049	16.92	0.081	19.07	16QAM
LTE Band 26/5	22H	829 - 844	0.039	15.95	0.065	18.10	64QAM
LTE Band 26	22H	831.5 - 841.5	0.062	17.89	0.101	20.04	QPSK
LTE Band 26	22H	831.5 - 841.5	0.052	17.15	0.085	19.30	16QAM
LTE Band 26	22H	831.5 - 841.5	0.041	16.16	0.068	18.31	64QAM

EUT Overview (<1 GHz)

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Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
LTE Band 66/4	27	1710.7 - 1779.3	0.279	24.45	QPSK
LTE Band 66/4	27	1710.7 - 1779.3	0.211	23.25	16QAM
LTE Band 66/4	27	1710.7 - 1779.3	0.175	22.44	64QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.279	24.45	QPSK
LTE Band 66/4	27	1711.5 - 1778.5	0.218	23.38	16QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.178	22.51	64QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.283	24.52	QPSK
LTE Band 66/4	27	1712.5 - 1777.5	0.223	23.48	16QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.183	22.63	64QAM
LTE Band 66/4	27	1715 - 1775	0.282	24.50	QPSK
LTE Band 66/4	27	1715 - 1775	0.217	23.37	16QAM
LTE Band 66/4	27	1715 - 1775	0.180	22.54	64QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.274	24.37	QPSK
LTE Band 66/4	27	1717.5 - 1772.5	0.213	23.29	16QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.177	22.49	64QAM
LTE Band 66/4	27	1720 - 1770	0.276	24.41	QPSK
LTE Band 66/4	27	1720 - 1770	0.221	23.44	16QAM
LTE Band 66/4	27	1720 - 1770	0.180	22.56	64QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.410	26.13	QPSK
LTE Band 25/2	24E	1850.7 - 1914.3	0.309	24.90	16QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.287	24.58	64QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.399	26.01	QPSK
LTE Band 25/2	24E	1851.5 - 1913.5	0.338	25.30	16QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.287	24.58	64QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.394	25.96	QPSK
LTE Band 25/2	24E	1852.5 - 1912.5	0.320	25.05	16QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.265	24.24	64QAM
LTE Band 25/2	24E	1855 - 1910	0.409	26.12	QPSK
LTE Band 25/2	24E	1855 - 1910	0.338	25.30	16QAM
LTE Band 25/2	24E	1855 - 1910	0.287	24.58	64QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.394	25.96	QPSK
LTE Band 25/2	24E	1857.5 - 1907.5	0.338	25.30	16QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.280	24.47	64QAM
LTE Band 25/2	24E	1860 - 1905	0.414	26.17	QPSK
LTE Band 25/2	24E	1860 - 1905	0.338	25.29	16QAM
LTE Band 25/2	24E	1860 - 1905	0.285	24.56	64QAM

EUT Overview (Mid Bands)

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Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.169	22.27	QPSK
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.108	20.32	16QAM
LTE Band 41 (PC2)	27	2498.5 - 2687.5	0.086	19.33	64QAM
LTE Band 41 (PC2)	27	2501 - 2685	0.165	22.17	QPSK
LTE Band 41 (PC2)	27	2501 - 2685	0.105	20.20	16QAM
LTE Band 41 (PC2)	27	2501 - 2685	0.084	19.25	64QAM
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.166	22.20	QPSK
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.108	20.32	16QAM
LTE Band 41 (PC2)	27	2503.5 - 2682.5	0.087	19.39	64QAM
LTE Band 41 (PC2)	27	2506 - 2680	0.151	21.80	QPSK
LTE Band 41 (PC2)	27	2506 - 2680	0.107	20.31	16QAM
LTE Band 41 (PC2)	27	2506 - 2680	0.087	19.38	64QAM
LTE Band 41 (PC3)	27	2498.5 - 2687.5	0.086	19.37	QPSK
LTE Band 41 (PC3)	27	2498.5 - 2687.5	0.067	18.27	16QAM
LTE Band 41 (PC3)	27	2498.5 - 2687.5	0.055	17.38	64QAM
LTE Band 41 (PC3)	27	2501 - 2685	0.087	19.42	QPSK
LTE Band 41 (PC3)	27	2501 - 2685	0.065	18.12	16QAM
LTE Band 41 (PC3)	27	2501 - 2685	0.055	17.39	64QAM
LTE Band 41 (PC3)	27	2503.5 - 2682.5	0.087	19.38	QPSK
LTE Band 41 (PC3)	27	2503.5 - 2682.5	0.064	18.06	16QAM
LTE Band 41 (PC3)	27	2503.5 - 2682.5	0.051	17.05	64QAM
LTE Band 41 (PC3)	27	2506 - 2680	0.083	19.19	QPSK
LTE Band 41 (PC3)	27	2506 - 2680	0.064	18.08	16QAM
LTE Band 41 (PC3)	27	2506 - 2680	0.048	16.79	64QAM

EUT Overview (High Bands)

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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: ZNFL555DL**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 14677

2.2 Device Capabilities

This device contains the following capabilities:

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

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.

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 Block C Frequency Range

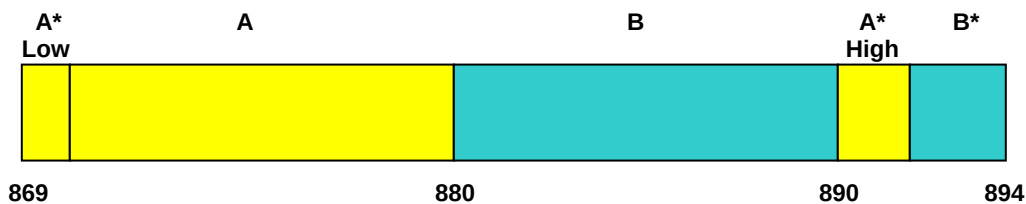
Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

3.3 Block A Frequency Range

698-746 MHz band. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

Block A: 698-704 MHz and 728-734 MHz;
Block B: 704-710 MHz and 734-740 MHz; and
Block C: 710-716 MHz and 740-746 MHz.

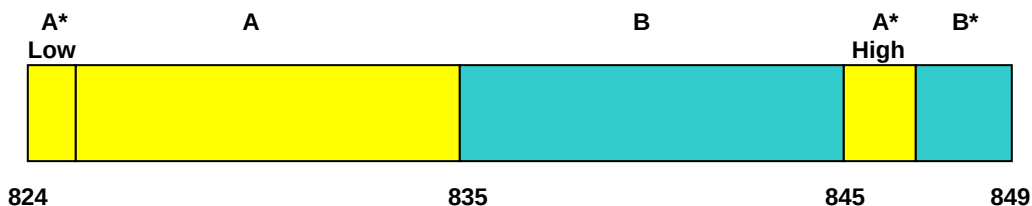
3.4 Cellular - Base Frequency Blocks



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*)

3.5 Cellular - Mobile Frequency Blocks

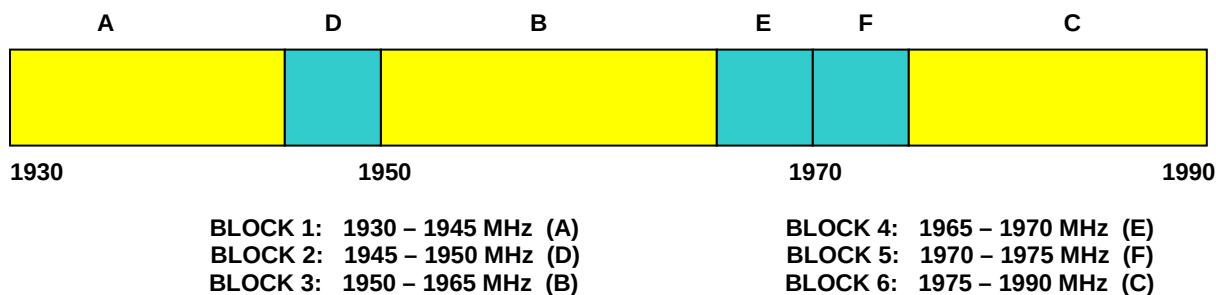


BLOCK 1: 824 – 835 MHz (A* Low + A)
BLOCK 2: 835 – 845 MHz (B)

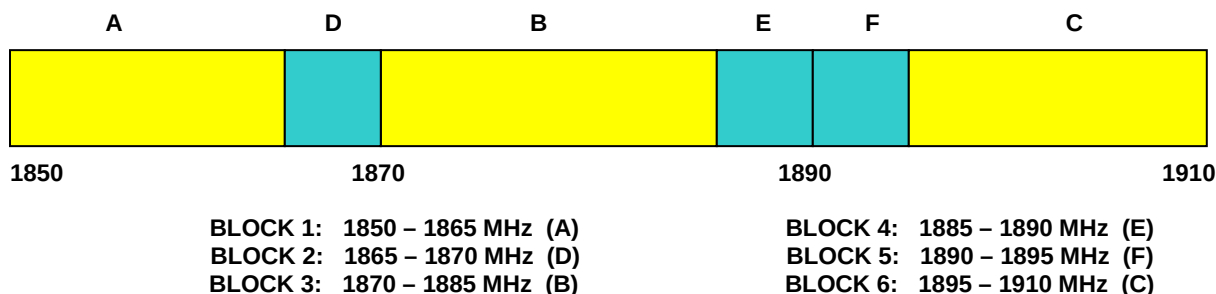
BLOCK 3: 845 – 846.5 MHz (A* High)
BLOCK 4: 846.5 – 849 MHz (B*)

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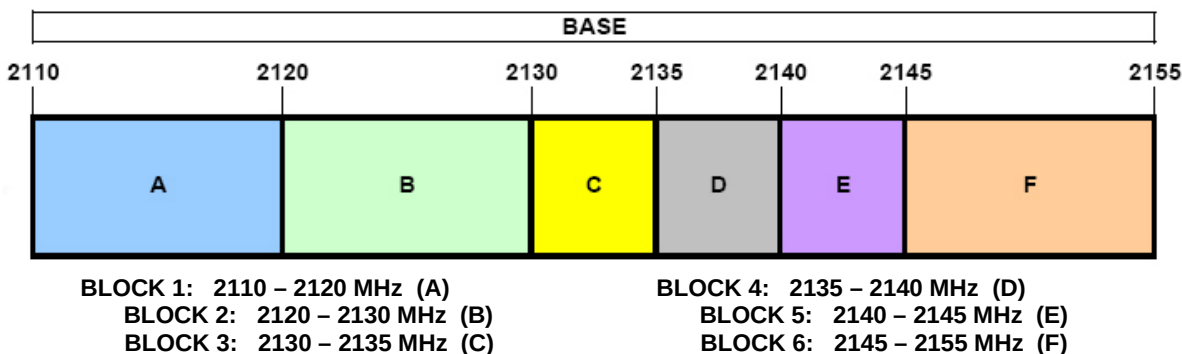
3.6 PCS - Base Frequency Blocks



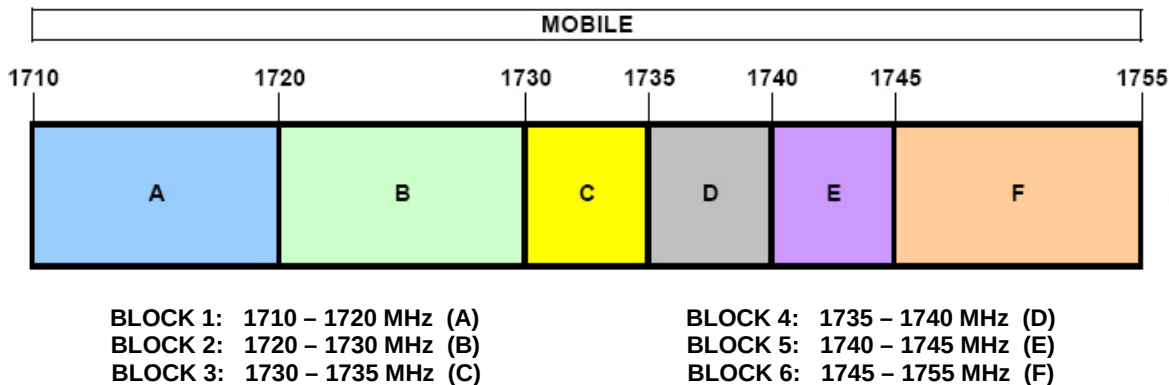
3.7 PCS - Mobile Frequency Blocks



3.8 AWS - Base Frequency Blocks

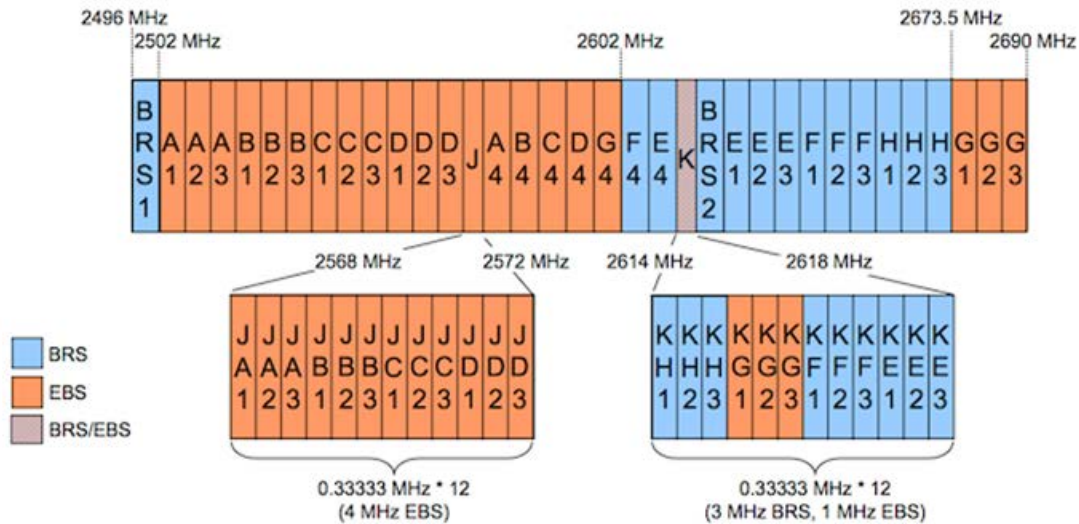


3.9 AWS - Mobile Frequency Blocks



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3.10 BRS/EBS Frequency Block



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3.11 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.

Per the guidance 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	6/13/2019	Annual	6/13/2020	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	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	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/31/2019	Annual	1/31/2020	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511

Table 5-1. Test Equipment

Notes:

- For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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6.0 SAMPLE CALCULATIONS

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: ZNFL555DL
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

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 7.2
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 12, 13)	< 3 Watts max. ERP			Section 7.2
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2/25, 41/38)	< 2 Watts max. EIRP			Section 7.2
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	< 1 Watts max. EIRP			Section 7.2
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 41/38)	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3
27.53(m)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.4

Table 7-1. Summary of Radiated Test Results

Note:

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.

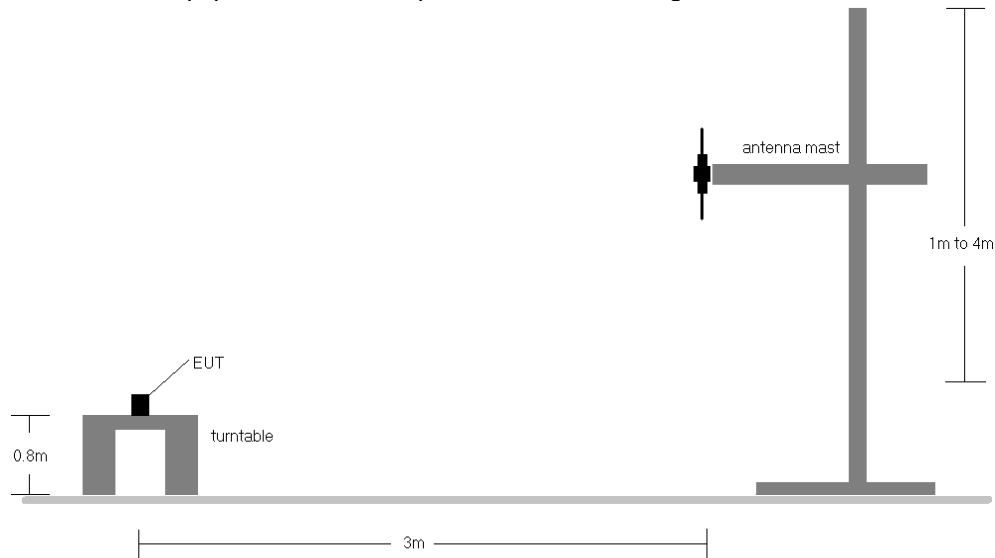


Figure 7-1. Radiated Test Setup <1GHz

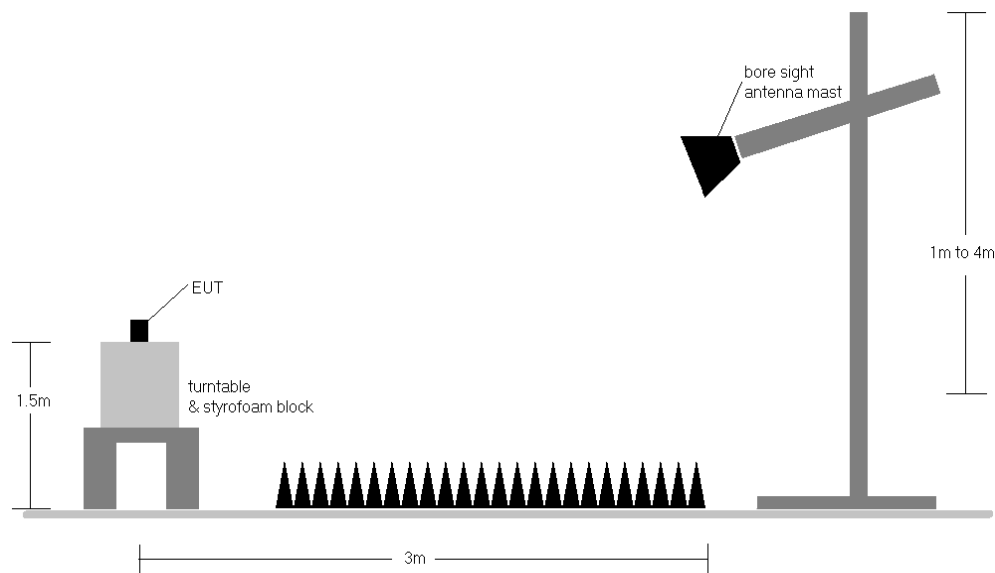


Figure 7-2. Radiated Test Setup >1GHz

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]
665.50	5	QPSK	H	131	291	1 / 12	15.39	2.90	16.14	0.041	34.77	-18.63
680.50	5	QPSK	H	141	295	1 / 12	14.97	3.20	16.02	0.040	34.77	-18.75
695.50	5	QPSK	H	145	301	1 / 12	15.13	3.30	16.28	0.042	34.77	-18.49
680.50	5	16-QAM	H	141	295	1 / 12	14.24	3.20	15.29	0.034	34.77	-19.48
695.50	5	64-QAM	H	145	301	1 / 12	13.15	3.30	14.30	0.027	34.77	-20.47
668.00	10	QPSK	H	131	291	1 / 25	15.33	2.90	16.08	0.041	34.77	-18.69
680.50	10	QPSK	H	141	295	1 / 25	15.04	3.20	16.09	0.041	34.77	-18.68
693.00	10	QPSK	H	145	301	1 / 25	14.85	3.30	16.00	0.040	34.77	-18.77
693.00	10	16-QAM	H	145	301	1 / 25	14.14	3.30	15.29	0.034	34.77	-19.48
668.00	10	64-QAM	H	131	291	1 / 25	13.50	2.90	14.25	0.027	34.77	-20.52
670.50	15	QPSK	H	131	291	1 / 37	14.74	3.00	15.59	0.036	34.77	-19.18
680.50	15	QPSK	H	141	295	1 / 37	14.90	3.20	15.95	0.039	34.77	-18.82
690.50	15	QPSK	H	145	301	1 / 37	14.58	3.30	15.73	0.037	34.77	-19.04
680.50	15	16-QAM	H	141	295	1 / 37	14.11	3.20	15.16	0.033	34.77	-19.61
680.50	15	64-QAM	H	141	295	1 / 37	13.07	3.20	14.12	0.026	34.77	-20.65
673.00	20	QPSK	H	131	291	1 / 99	14.73	3.10	15.68	0.037	34.77	-19.09
680.50	20	QPSK	H	141	295	1 / 99	15.12	3.20	16.17	0.041	34.77	-18.60
688.00	20	QPSK	H	145	301	1 / 50	14.93	3.30	16.08	0.041	34.77	-18.69
680.50	20	16-QAM	H	141	295	1 / 99	14.01	3.20	15.06	0.032	34.77	-19.71
680.50	20	64-QAM	H	141	295	1 / 99	13.11	3.20	14.16	0.026	34.77	-20.61
695.50	5	QPSK	V	163	320	1 / 12	13.35	3.20	14.40	0.028	34.77	-20.37

Table 7-2. ERP Data (Band 71)

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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]
699.70	1.4	QPSK	H	155	299	1 / 2	15.39	3.40	16.64	0.046	34.77	-18.13
707.50	1.4	QPSK	H	143	291	1 / 2	15.11	3.65	16.61	0.046	34.77	-18.16
715.30	1.4	QPSK	H	131	292	1 / 2	15.11	3.70	16.66	0.046	34.77	-18.11
707.50	1.4	16-QAM	H	143	291	1 / 2	14.24	3.65	15.74	0.037	34.77	-19.03
707.50	1.4	64-QAM	H	143	291	1 / 2	13.24	3.65	14.74	0.030	34.77	-20.03
700.50	3	QPSK	H	155	299	1 / 7	15.41	3.40	16.66	0.046	34.77	-18.11
707.50	3	QPSK	H	143	291	1 / 0	14.98	3.65	16.48	0.044	34.77	-18.29
714.50	3	QPSK	H	131	292	1 / 7	15.08	3.70	16.63	0.046	34.77	-18.14
700.50	3	16-QAM	H	155	299	1 / 7	14.58	3.40	15.83	0.038	34.77	-18.94
700.50	3	64-QAM	H	155	299	1 / 7	13.58	3.40	14.83	0.030	34.77	-19.94
701.50	5	QPSK	H	155	299	1 / 12	15.45	3.40	16.70	0.047	34.77	-18.07
707.50	5	QPSK	H	143	291	1 / 12	15.13	3.65	16.63	0.046	34.77	-18.14
713.50	5	QPSK	H	131	292	1 / 12	15.04	3.70	16.59	0.046	34.77	-18.18
707.50	5	16-QAM	H	143	291	1 / 12	14.26	3.65	15.76	0.038	34.77	-19.01
701.50	5	64-QAM	H	155	299	1 / 12	13.62	3.40	14.87	0.031	34.77	-19.90
704.00	10	QPSK	H	155	299	1 / 49	14.99	3.50	16.34	0.043	34.77	-18.43
707.50	10	QPSK	H	143	291	1 / 49	15.13	3.65	16.63	0.046	34.77	-18.14
711.00	10	QPSK	H	131	292	1 / 49	16.07	3.70	17.62	0.058	34.77	-17.15
711.00	10	16-QAM	H	131	292	1 / 49	14.84	3.70	16.39	0.044	34.77	-18.38
711.00	10	64-QAM	H	131	292	1 / 49	14.04	3.70	15.59	0.036	34.77	-19.18
711.00	10	QPSK	V	168	320	1 / 49	14.52	3.70	16.07	0.040	34.77	-18.70

Table 7-3. ERP Data (Band 12)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
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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]
779.50	5	QPSK	H	100	290	1 / 12	16.52	5.80	20.17	0.104	34.77	-14.60
782.00	5	QPSK	H	100	290	1 / 12	16.81	5.80	20.46	0.111	34.77	-14.31
784.50	5	QPSK	H	100	290	1 / 12	16.35	5.90	20.10	0.102	34.77	-14.67
782.00	5	16-QAM	H	100	290	1 / 12	15.80	5.80	19.45	0.088	34.77	-15.32
782.00	5	64-QAM	H	100	290	1 / 12	14.85	5.80	18.50	0.071	34.77	-16.27
782.00	10	QPSK	H	100	290	1 / 0	16.85	5.80	20.50	0.112	34.77	-14.27
782.00	10	16-QAM	H	100	290	1 / 0	15.86	5.80	19.51	0.089	34.77	-15.26
782.00	10	64-QAM	H	100	290	1 / 0	14.94	5.80	18.59	0.072	34.77	-16.18
782.00	10	QPSK	V	152	257	1 / 0	15.36	5.80	19.01	0.080	34.77	-15.76

Table 7-4. ERP Data (Band 13)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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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]
824.70	1.4	QPSK	H	104	296	1 / 2	12.97	6.70	17.52	0.056	38.45	-20.93
836.50	1.4	QPSK	H	102	299	1 / 2	13.21	6.70	17.76	0.060	38.45	-20.69
848.30	1.4	QPSK	H	106	294	1 / 2	12.72	6.70	17.27	0.053	38.45	-21.18
836.50	1.4	16-QAM	H	102	299	1 / 2	12.46	6.70	17.01	0.050	38.45	-21.44
836.50	1.4	64-QAM	H	102	299	1 / 2	11.48	6.70	16.03	0.040	38.45	-22.42
825.50	3	QPSK	H	104	296	1 / 7	13.03	6.70	17.58	0.057	38.45	-20.87
836.50	3	QPSK	H	102	299	1 / 7	13.26	6.70	17.81	0.060	38.45	-20.64
847.50	3	QPSK	H	106	294	1 / 7	12.82	6.65	17.32	0.054	38.45	-21.13
836.50	3	16-QAM	H	102	299	1 / 7	12.42	6.70	16.97	0.050	38.45	-21.48
836.50	3	64-QAM	H	102	299	1 / 7	11.53	6.70	16.08	0.041	38.45	-22.37
826.50	5	QPSK	H	104	296	1 / 12	13.03	6.70	17.58	0.057	38.45	-20.87
836.50	5	QPSK	H	102	299	1 / 12	13.32	6.70	17.87	0.061	38.45	-20.58
846.50	5	QPSK	H	106	294	1 / 12	12.91	6.60	17.36	0.054	38.45	-21.09
836.50	5	16-QAM	H	102	299	1 / 12	12.50	6.70	17.05	0.051	38.45	-21.40
836.50	5	64-QAM	H	102	299	1 / 12	11.50	6.70	16.05	0.040	38.45	-22.40
829.00	10	QPSK	H	104	296	1 / 49	12.91	6.70	17.46	0.056	38.45	-20.99
836.50	10	QPSK	H	102	299	1 / 0	13.27	6.70	17.82	0.061	38.45	-20.63
844.00	10	QPSK	H	106	294	1 / 0	12.85	6.60	17.30	0.054	38.45	-21.15
836.50	10	16-QAM	H	102	299	1 / 0	12.37	6.70	16.92	0.049	38.45	-21.53
836.50	10	64-QAM	H	102	299	1 / 0	11.40	6.70	15.95	0.039	38.45	-22.50

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

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]
831.50	15	QPSK	H	104	296	1 / 37	12.97	6.70	17.52	0.056	38.45	-20.93
836.50	15	QPSK	H	102	299	1 / 37	13.34	6.70	17.89	0.062	38.45	-20.56
841.50	15	QPSK	H	106	294	1 / 37	12.83	6.60	17.28	0.053	38.45	-21.17
836.50	15	16-QAM	H	102	299	1 / 37	12.60	6.70	17.15	0.052	38.45	-21.30
836.50	15	64-QAM	H	102	299	1 / 37	11.61	6.70	16.16	0.041	38.45	-22.29
836.50	15	QPSK	V	145	254	1 / 37	13.22	6.70	17.77	0.060	38.45	-20.68

Table 7-6. ERP Data (Band 26)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1-ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 21 of 46

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]
1710.70	1.4	QPSK	H	101	15	3 / 2	14.63	9.44	24.07	0.256	30.00	-5.93
1745.00	1.4	QPSK	H	101	24	1 / 2	14.89	9.23	24.12	0.258	30.00	-5.88
1779.30	1.4	QPSK	H	143	22	1 / 2	15.19	9.26	24.45	0.279	30.00	-5.55
1779.30	1.4	16-QAM	H	143	22	1 / 2	13.99	9.26	23.25	0.211	30.00	-6.75
1779.30	1.4	64-QAM	H	143	22	1 / 2	13.18	9.26	22.44	0.175	30.00	-7.56
1711.50	3	QPSK	H	101	15	1 / 7	14.64	9.44	24.07	0.256	30.00	-5.93
1745.00	3	QPSK	H	101	24	1 / 7	14.91	9.23	24.14	0.259	30.00	-5.86
1778.50	3	QPSK	H	143	22	1 / 7	15.19	9.26	24.45	0.279	30.00	-5.55
1778.50	3	16-QAM	H	143	22	1 / 7	14.12	9.26	23.38	0.218	30.00	-6.62
1778.50	3	64-QAM	H	143	22	1 / 7	13.25	9.26	22.51	0.178	30.00	-7.49
1712.50	5	QPSK	H	101	15	1 / 12	14.72	9.43	24.15	0.260	30.00	-5.85
1745.00	5	QPSK	H	101	24	1 / 12	14.85	9.23	24.08	0.256	30.00	-5.92
1777.50	5	QPSK	H	143	22	1 / 12	15.26	9.26	24.52	0.283	30.00	-5.48
1777.50	5	16-QAM	H	143	22	1 / 12	14.22	9.26	23.48	0.223	30.00	-6.52
1777.50	5	64-QAM	H	143	22	1 / 12	13.37	9.26	22.63	0.183	30.00	-7.37
1715.00	10	QPSK	H	101	15	1 / 25	14.66	9.42	24.07	0.256	30.00	-5.93
1745.00	10	QPSK	H	101	24	1 / 25	14.96	9.23	24.19	0.262	30.00	-5.81
1775.00	10	QPSK	H	143	22	1 / 25	15.25	9.25	24.50	0.282	30.00	-5.50
1775.00	10	16-QAM	H	143	22	1 / 25	14.12	9.25	23.37	0.217	30.00	-6.63
1775.00	10	64-QAM	H	143	22	1 / 25	13.29	9.25	22.54	0.180	30.00	-7.46
1717.50	15	QPSK	H	101	15	1 / 74	14.68	9.40	24.08	0.256	30.00	-5.92
1745.00	15	QPSK	H	101	24	1 / 37	14.78	9.23	24.01	0.252	30.00	-5.99
1772.50	15	QPSK	H	143	22	1 / 0	15.12	9.25	24.37	0.274	30.00	-5.63
1772.50	15	16-QAM	H	143	22	1 / 0	14.04	9.25	23.29	0.213	30.00	-6.71
1772.50	15	64-QAM	H	143	22	1 / 0	13.24	9.25	22.49	0.177	30.00	-7.51
1720.00	20	QPSK	H	101	15	1 / 99	14.71	9.38	24.09	0.257	30.00	-5.91
1745.00	20	QPSK	H	101	24	1 / 0	14.73	9.23	23.96	0.249	30.00	-6.04
1770.00	20	QPSK	H	143	22	1 / 0	15.17	9.24	24.41	0.276	30.00	-5.59
1770.00	20	16-QAM	H	143	22	1 / 0	14.20	9.24	23.44	0.221	30.00	-6.56
1770.00	20	64-QAM	H	143	22	1 / 0	13.32	9.24	22.56	0.180	30.00	-7.44
1777.50	5	QPSK	V	101	59	1 / 12	14.58	9.24	23.82	0.241	30.00	-6.18

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

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 22 of 46

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]
1850.70	1.4	QPSK	H	122	19	1 / 2	16.49	9.48	25.98	0.396	33.01	-7.03
1882.50	1.4	QPSK	H	123	14	1 / 2	16.19	9.94	26.13	0.410	33.01	-6.89
1914.30	1.4	QPSK	H	113	31	1 / 2	15.55	10.29	25.84	0.384	33.01	-7.17
1882.50	1.4	16-QAM	H	123	14	1 / 2	14.96	9.94	24.90	0.309	33.01	-8.12
1882.50	1.4	64-QAM	H	123	14	1 / 2	14.64	9.94	24.58	0.287	33.01	-8.44
1851.50	3	QPSK	H	122	19	1 / 7	16.51	9.50	26.01	0.399	33.01	-7.00
1882.50	3	QPSK	H	123	14	1 / 14	16.07	9.94	26.01	0.399	33.01	-7.01
1913.50	3	QPSK	H	113	31	1 / 7	15.55	10.29	25.84	0.384	33.01	-7.17
1882.50	3	16-QAM	H	123	14	1 / 14	15.36	9.94	25.30	0.338	33.01	-7.72
1882.50	3	64-QAM	H	123	14	1 / 14	14.64	9.94	24.58	0.287	33.01	-8.44
1852.50	5	QPSK	H	122	19	1 / 12	16.45	9.51	25.96	0.394	33.01	-7.05
1882.50	5	QPSK	H	123	14	1 / 24	15.81	9.94	25.75	0.375	33.01	-7.27
1912.50	5	QPSK	H	113	31	1 / 12	15.56	10.28	25.84	0.384	33.01	-7.17
1882.50	5	16-QAM	H	123	14	1 / 24	15.11	9.94	25.05	0.320	33.01	-7.97
1882.50	5	64-QAM	H	123	14	1 / 24	14.30	9.94	24.24	0.265	33.01	-8.78
1855.00	10	QPSK	H	122	19	1 / 25	16.35	9.55	25.90	0.389	33.01	-7.11
1882.50	10	QPSK	H	123	14	1 / 25	16.18	9.94	26.12	0.409	33.01	-6.90
1910.00	10	QPSK	H	113	31	1 / 25	15.48	10.26	25.74	0.375	33.01	-7.27
1882.50	10	16-QAM	H	123	14	1 / 25	15.36	9.94	25.30	0.338	33.01	-7.72
1882.50	10	64-QAM	H	123	14	1 / 25	14.64	9.94	24.58	0.287	33.01	-8.44
1857.50	15	QPSK	H	122	19	1 / 0	16.33	9.58	25.91	0.390	33.01	-7.10
1882.50	15	QPSK	H	123	14	1 / 37	16.02	9.94	25.96	0.394	33.01	-7.06
1907.50	15	QPSK	H	113	31	1 / 74	15.44	10.24	25.68	0.370	33.01	-7.33
1882.50	15	16-QAM	H	123	14	1 / 37	15.36	9.94	25.30	0.338	33.01	-7.72
1882.50	15	64-QAM	H	123	14	1 / 37	14.53	9.94	24.47	0.280	33.01	-8.55
1860.00	20	QPSK	H	122	19	1 / 0	16.44	9.62	26.06	0.403	33.01	-6.95
1882.50	20	QPSK	H	123	14	1 / 0	16.23	9.94	26.17	0.414	33.01	-6.85
1905.00	20	QPSK	H	113	31	1 / 0	15.41	10.22	25.63	0.366	33.01	-7.38
1882.50	20	16-QAM	H	123	14	1 / 0	15.35	9.94	25.29	0.338	33.01	-7.73
1882.50	20	64-QAM	H	123	14	1 / 0	14.62	9.94	24.56	0.285	33.01	-8.46
1882.50	20	QPSK	V	187	143	1 / 0	8.02	9.94	17.96	0.063	33.01	-15.05

Table 7-8. EIRP Data (Band 25/2)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 23 of 46

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]
2498.50	5	QPSK	V	109	265	1 / 12	10.32	9.40	19.72	0.094	33.01	-13.29
2593.00	5	QPSK	V	379	319	1 / 12	12.71	9.56	22.27	0.169	33.01	-10.74
2687.50	5	QPSK	V	334	304	1 / 12	11.12	9.69	20.80	0.120	33.01	-12.21
2687.50	5	16-QAM	V	334	304	1 / 12	10.64	9.69	20.32	0.108	33.01	-12.69
2687.50	5	64-QAM	V	334	304	1 / 12	9.65	9.69	19.33	0.086	33.01	-13.68
2501.00	10	QPSK	V	109	265	1 / 0	10.12	9.40	19.51	0.089	33.01	-13.50
2593.00	10	QPSK	V	379	319	1 / 25	12.61	9.56	22.17	0.165	33.01	-10.84
2685.00	10	QPSK	V	334	304	1 / 25	11.12	9.68	20.80	0.120	33.01	-12.21
2685.00	10	16-QAM	V	334	304	1 / 25	10.52	9.68	20.20	0.105	33.01	-12.81
2685.00	10	64-QAM	V	334	304	1 / 25	9.57	9.68	19.25	0.084	33.01	-13.76
2503.50	15	QPSK	V	109	265	1 / 37	10.32	9.39	19.71	0.094	33.01	-13.30
2593.00	15	QPSK	V	379	319	1 / 37	12.64	9.56	22.20	0.166	33.01	-10.81
2682.50	15	QPSK	V	334	304	1 / 37	11.07	9.68	20.75	0.119	33.01	-12.26
2682.50	15	16-QAM	V	334	304	1 / 37	10.64	9.68	20.32	0.108	33.01	-12.69
2682.50	15	64-QAM	V	334	304	1 / 37	9.71	9.68	19.39	0.087	33.01	-13.62
2506.00	20	QPSK	V	109	265	1 / 50	10.32	9.39	19.71	0.094	33.01	-13.30
2593.00	20	QPSK	V	379	319	1 / 50	12.24	9.56	21.80	0.151	33.01	-11.21
2680.00	20	QPSK	V	334	304	1 / 99	11.27	9.68	20.95	0.124	33.01	-12.06
2680.00	20	16-QAM	V	334	304	1 / 99	10.63	9.68	20.31	0.107	33.01	-12.70
2680.00	20	64-QAM	V	334	304	1 / 99	9.70	9.68	19.38	0.087	33.01	-13.63
2593.00	5	QPSK	H	118	337	1 / 12	11.84	9.56	21.40	0.138	33.01	-11.61

Table 7-9. EIRP Data (Band 41 – PC2)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset	Page 24 of 46	

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]
2498.50	5	QPSK	V	376	326	1 / 12	9.94	9.40	19.34	0.086	33.01	-13.67
2593.00	5	QPSK	V	376	326	1 / 12	9.81	9.56	19.37	0.086	33.01	-13.64
2687.50	5	QPSK	V	376	326	1 / 12	9.65	9.69	19.34	0.086	33.01	-13.67
2687.50	5	16-QAM	V	376	326	1 / 12	8.58	9.69	18.27	0.067	33.01	-14.74
2593.00	5	64-QAM	V	376	326	1 / 12	7.82	9.56	17.38	0.055	33.01	-15.63
2501.00	10	QPSK	V	376	326	1 / 49	9.96	9.40	19.36	0.086	33.01	-13.65
2593.00	10	QPSK	V	376	326	1 / 25	9.86	9.56	19.42	0.087	33.01	-13.59
2685.00	10	QPSK	V	376	326	1 / 25	9.73	9.68	19.41	0.087	33.01	-13.60
2501.00	10	16-QAM	V	376	326	1 / 49	8.72	9.40	18.12	0.065	33.01	-14.89
2501.00	10	64-QAM	V	376	326	1 / 49	7.99	9.40	17.39	0.055	33.01	-15.62
2503.50	15	QPSK	V	376	326	1 / 37	9.99	9.39	19.38	0.087	33.01	-13.63
2593.00	15	QPSK	V	376	326	1 / 37	9.64	9.56	19.20	0.083	33.01	-13.81
2682.50	15	QPSK	V	376	326	1 / 37	9.67	9.68	19.35	0.086	33.01	-13.66
2682.50	15	16-QAM	V	376	326	1 / 37	8.38	9.68	18.06	0.064	33.01	-14.95
2503.50	15	64-QAM	V	376	326	1 / 37	7.66	9.39	17.05	0.051	33.01	-15.96
2506.00	20	QPSK	V	376	326	1 / 50	9.65	9.39	19.04	0.080	33.01	-13.97
2593.00	20	QPSK	V	376	326	1 / 50	9.55	9.56	19.11	0.081	33.01	-13.90
2680.00	20	QPSK	V	376	326	1 / 50	9.51	9.68	19.19	0.083	33.01	-13.82
2680.00	20	16-QAM	V	376	326	1 / 50	8.40	9.68	18.08	0.064	33.01	-14.93
2680.00	20	64-QAM	V	376	326	1 / 50	7.11	9.68	16.79	0.048	33.01	-16.22
2593.00	10	QPSK	H	107	333	1 / 50	9.48	9.56	19.04	0.080	33.01	-13.97

Table 7-10. EIRP Data (Band 41 – PC3)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 25 of 46

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

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 26 of 46

Test Setup

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

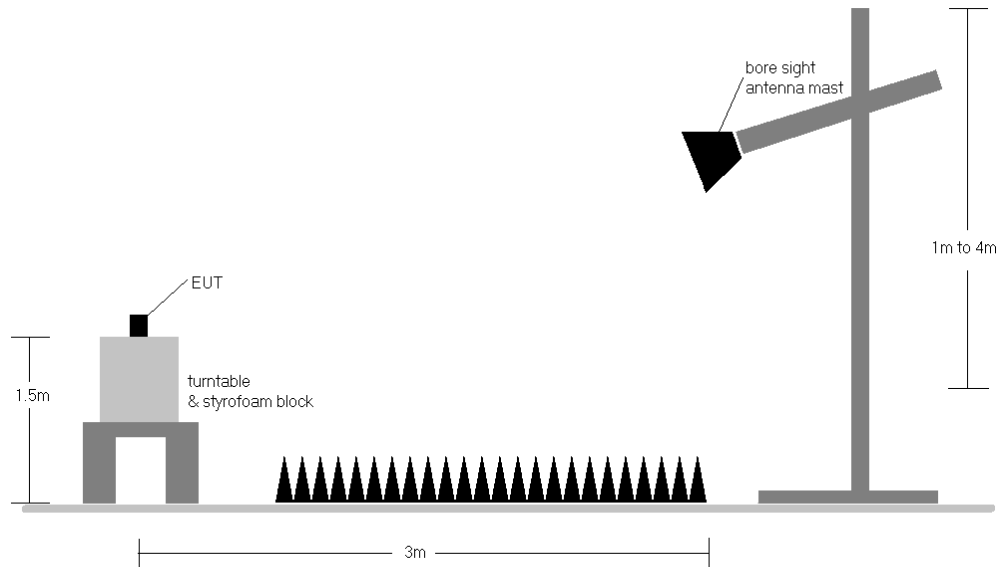


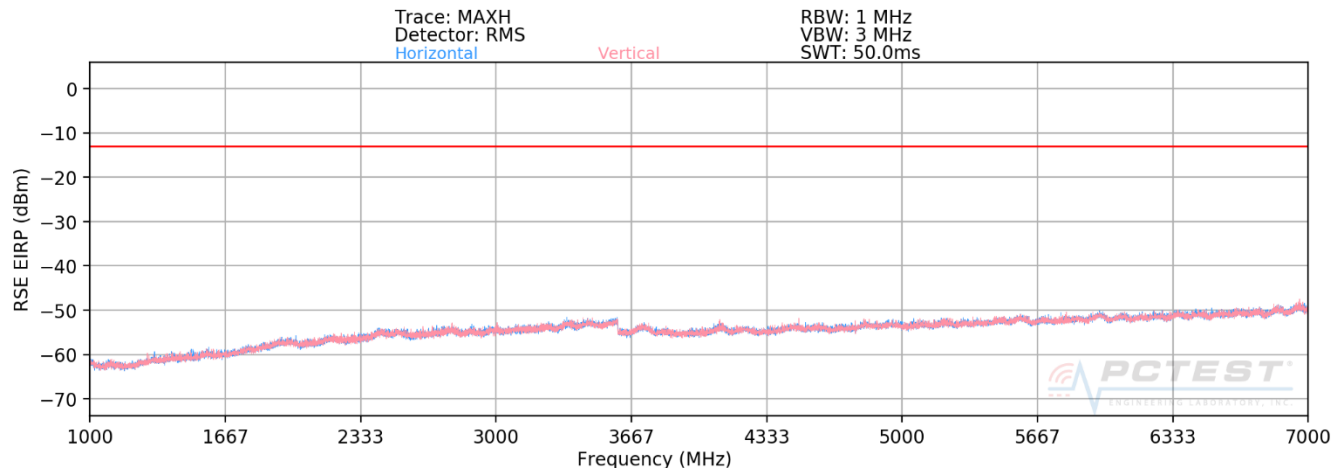
Figure 7-3. Test Instrument & Measurement Setup

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.

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 27 of 46

Band 71



Plot 7-1. Radiated Spurious Plot above 1GHz (Band 71)

OPERATING FREQUENCY: 673.00 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]
1346.00	H	322	352	-74.21	8.99	-65.22	-52.2
2019.00	H	-	-	-71.29	9.42	-61.87	-48.9

Table 7-11. Radiated Spurious Data (Band 71 – Low Channel)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 28 of 46

OPERATING FREQUENCY: 680.50 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]
1361.00	H	280	346	-74.02	8.79	-65.22	-52.2
2041.50	H	-	-	-71.51	9.35	-62.16	-49.2

Table 7-12. Radiated Spurious Data (Band 71 – Mid Channel)

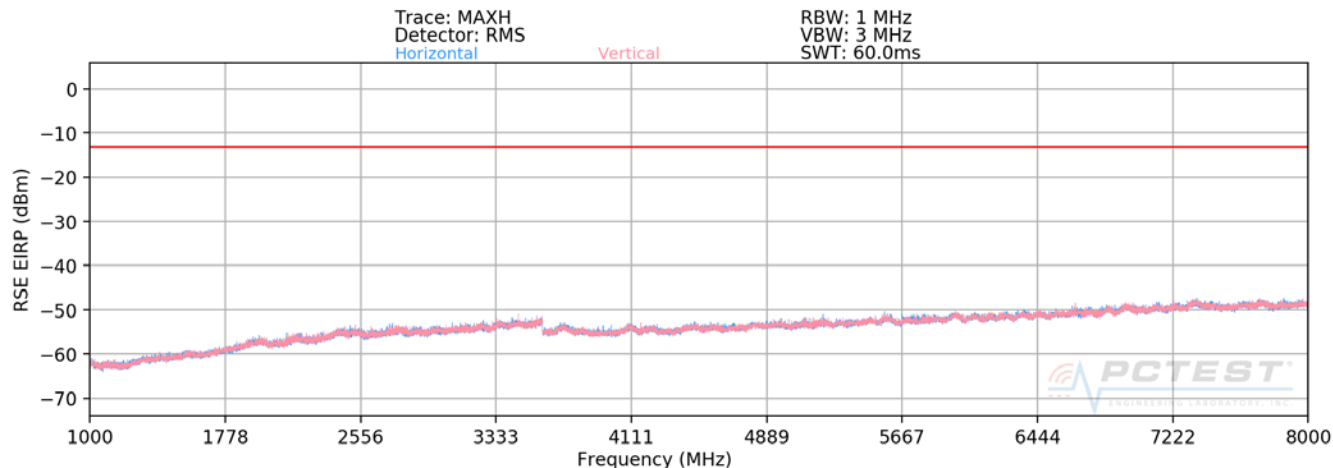
OPERATING FREQUENCY: 688.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	-	-	-73.60	8.56	-65.04	-52.0
2064.00	H	-	-	-71.12	9.24	-61.88	-48.9

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

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset	Page 29 of 46

Band 12



Plot 7-2. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY: 704.00 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]
1408.00	H	112	358	-73.03	8.23	-64.81	-51.8
2112.00	H	-	-	-70.87	8.98	-61.88	-48.9

Table 7-14. Radiated Spurious Data (Band 12 – Low Channel)

FCC ID: ZNFL555DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 30 of 46

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	-	-	-73.12	8.25	-64.88	-51.9
2122.50	H	-	-	-70.77	8.95	-61.82	-48.8

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

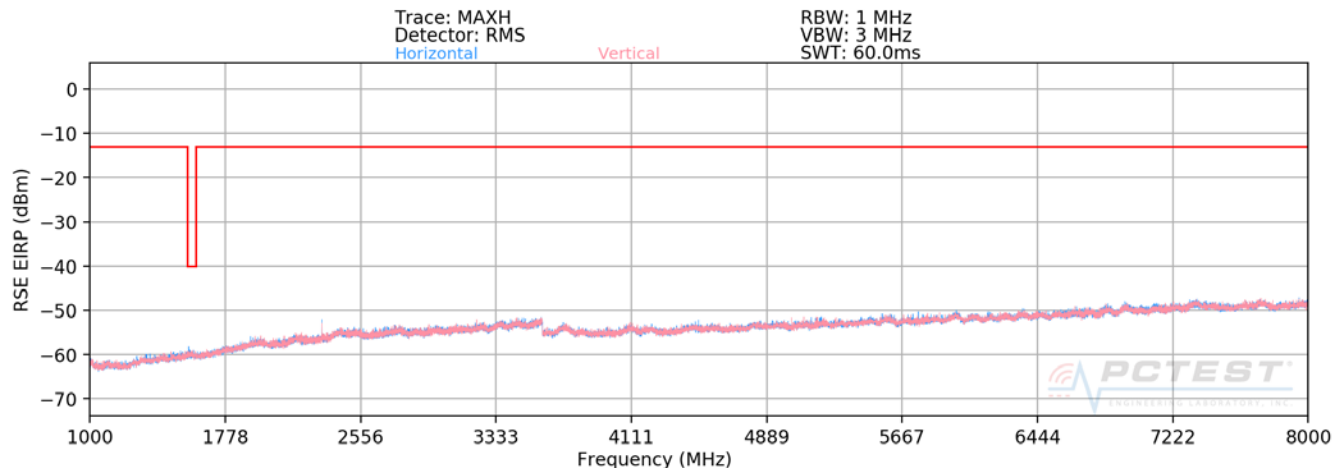
OPERATING FREQUENCY: 711.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1422.00	H	-	-	-73.16	8.26	-64.89	-51.9
2133.00	H	-	-	-70.61	8.92	-61.68	-48.7

Table 7-16. Radiated Spurious Data (Band 12 – High Channel)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset	Page 31 of 46

Band 13



Plot 7-3. Radiated Spurious Plot above 1GHz (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]
2346.00	H	-	-	-69.79	8.70	-61.09	-48.1

Table 7-17. Radiated Spurious Data (Band 13 – Mid Channel)

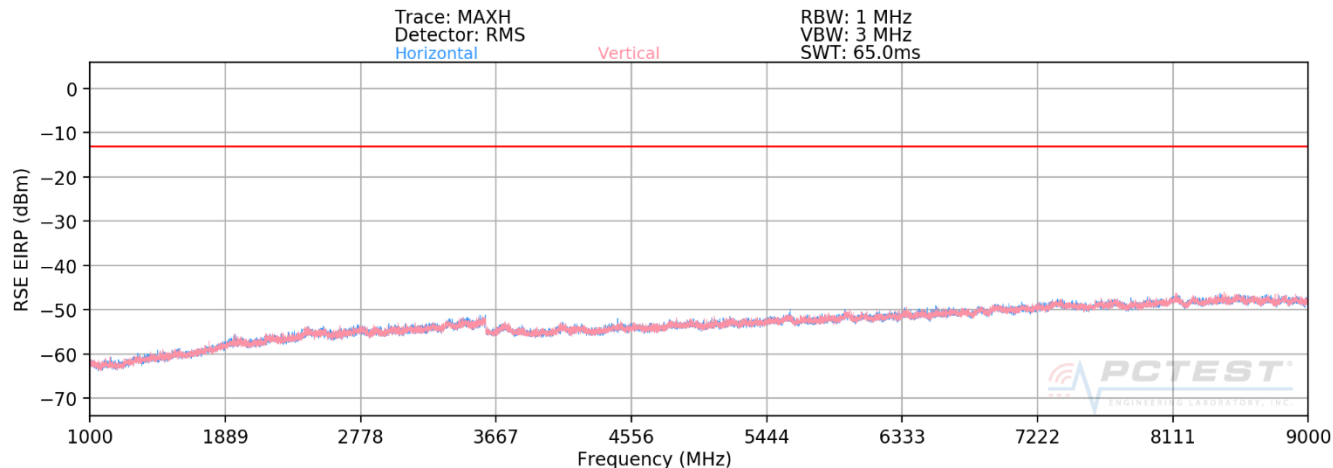
MODULATION SIGNAL: QPSK
BANDWIDTH: 10.00 MHz
DISTANCE: 3 meters
NARROWBAND EMISSION LIMIT: -50 dBm
WIDEBAND EMISSION LIMIT: -40 dBm/MHz

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	H	-	-	-72.89	8.85	-64.03	-24.0

Table 7-18. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1-ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 32 of 46

Band 26/5



Plot 7-4. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY: 831.50 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]
1663.00	H	-	-	-74.77	9.49	-65.28	-52.3
2494.50	H	-	-	-70.55	8.35	-62.19	-49.2

Table 7-19. Radiated Spurious Data (Band 26 – Low Channel)

OPERATING FREQUENCY: 836.50 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]
1673.00	H	-	-	-74.59	9.54	-65.05	-52.1
2509.50	H	-	-	-70.34	8.37	-61.97	-49.0

Table 7-20. Radiated Spurious Data (Band 26 – Mid Channel)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 33 of 46

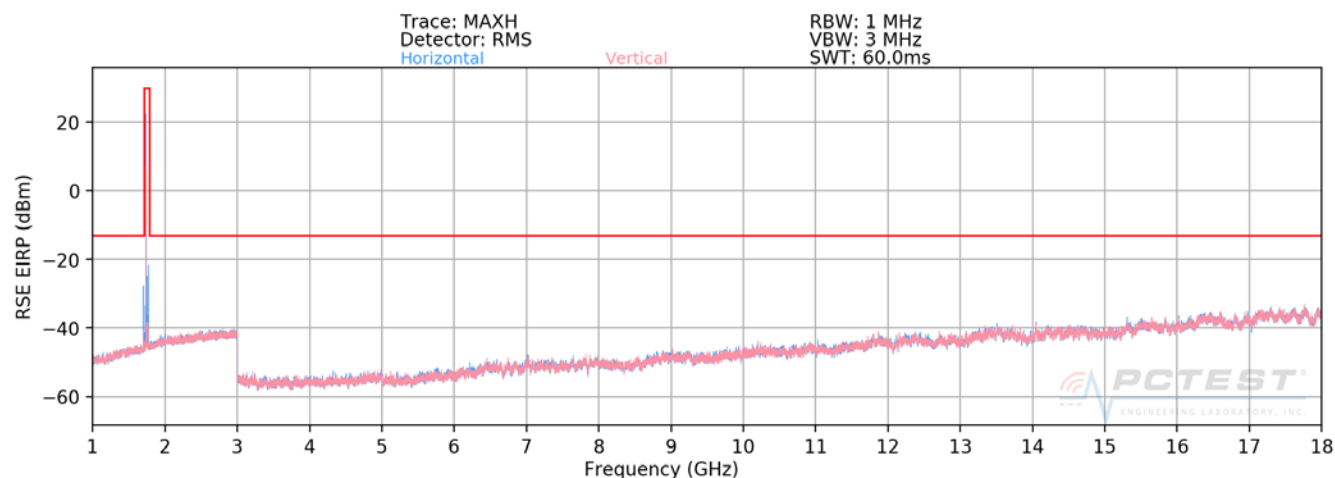
OPERATING FREQUENCY: 841.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	-	-	-73.41	9.60	-63.82	-50.8
2524.50	H	-	-	-68.50	8.36	-60.14	-47.1

Table 7-21. Radiated Spurious Data (Band 26 – High Channel)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 34 of 46

Band 66/4



Plot 7-5. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY: 1712.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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]
3425.00	V	104	164	-67.52	9.31	-58.21	-45.2
5137.50	V	-	-	-69.35	12.23	-57.12	-44.1

Table 7-22. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFL555DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 35 of 46

OPERATING FREQUENCY: 1745.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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]
3490.00	V	-	-	-67.25	9.22	-58.03	-45.0
5235.00	V	-	-	-70.21	12.71	-57.50	-44.5

Table 7-23. Radiated Spurious Data (Band 66/4 – Mid Channel)

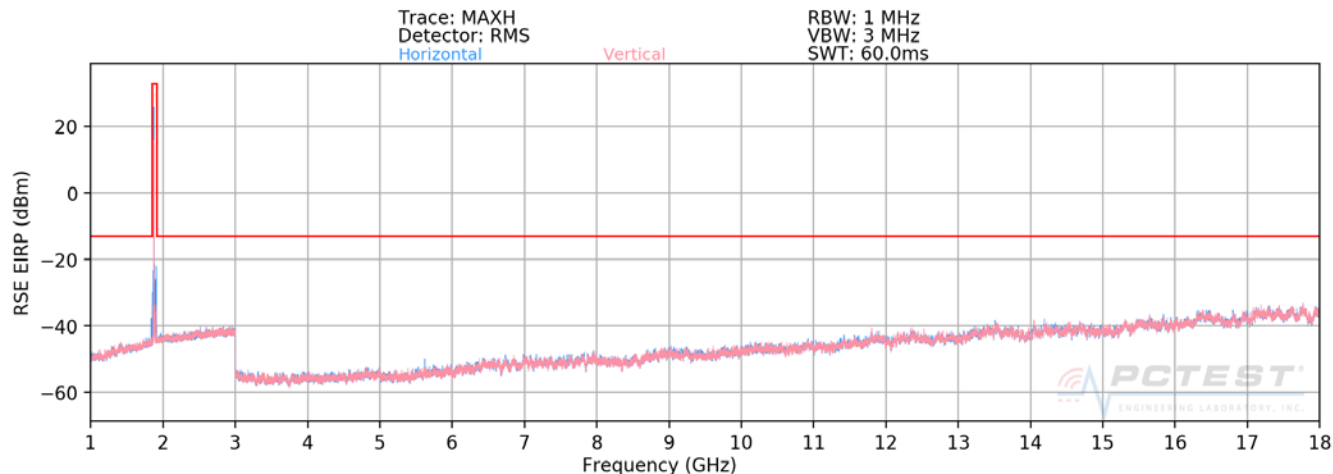
OPERATING FREQUENCY: 1777.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
3555.00	V	235	228	-66.92	8.86	-58.06	-45.1
5332.50	V	-	-	-70.56	13.04	-57.51	-44.5

Table 7-24. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset	Page 36 of 46

Band 25/2



Plot 7-6. Radiated Spurious Plot above 1GHz (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	V	-	-	-72.43	9.24	-63.20	-50.2
5580.00	V	-	-	-74.41	13.37	-61.04	-48.0

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

FCC ID: ZNFL555DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 37 of 46

OPERATING FREQUENCY: 1882.50 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]
3765.00	V	-	-	-73.17	9.62	-63.55	-50.5
5647.50	V	-	-	-73.77	13.50	-60.27	-47.3

Table 7-26. Radiated Spurious Data (Band 25/2 – Mid Channel)

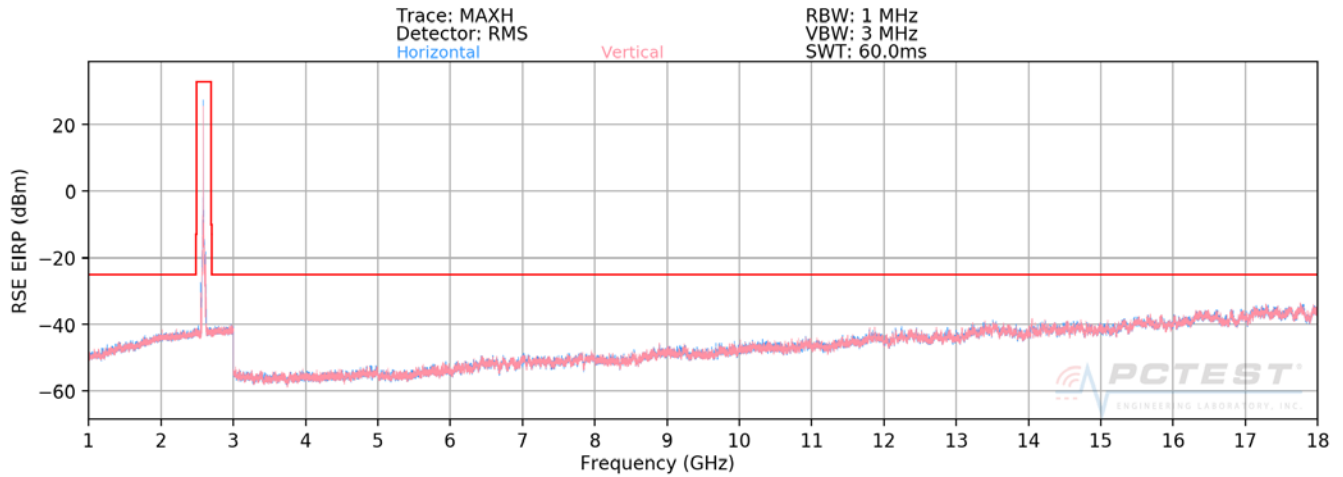
OPERATING FREQUENCY: 1905.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
3810.00	V	-	-	-73.00	9.67	-63.32	-50.3
5715.00	V	-	-	-74.54	13.55	-60.99	-48.0

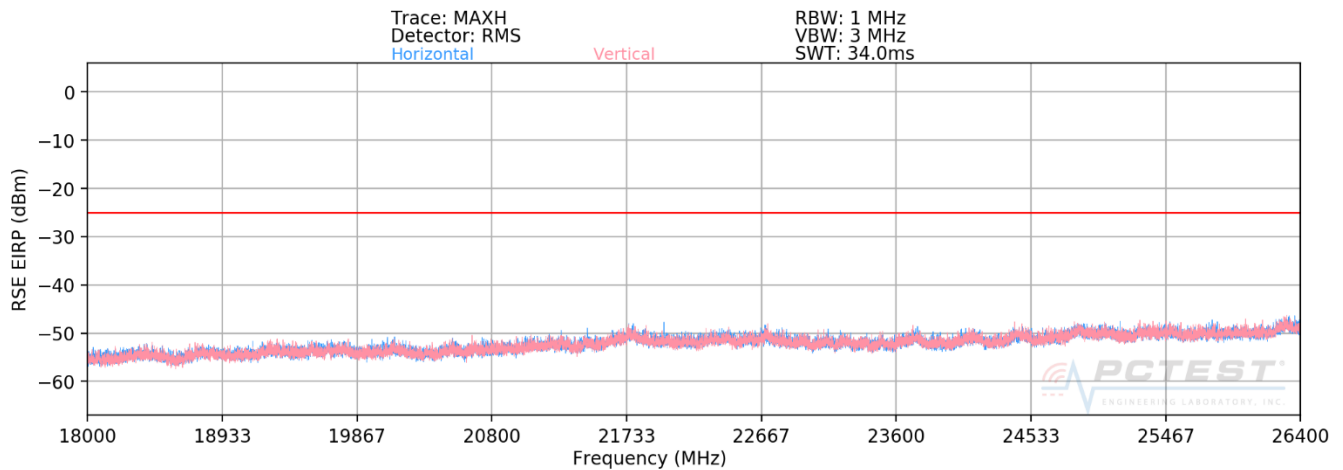
Table 7-27. Radiated Spurious Data (Band 25/2 – High Channel)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band 41



Plot 7-7. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



Plot 7-8. Radiated Spurious Plot 18GHz - 26.5GHz (Band 41)

FCC ID: ZNFL555DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 39 of 46

OPERATING FREQUENCY: 2496.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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]
4992.00	V	121	13	-69.78	11.53	-58.24	-33.2
7488.00	V	100	352	-66.35	11.21	-55.15	-30.1
9984.00	V	-	-	-61.54	9.11	-52.43	-27.4

Table 7-28. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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	V	102	316	-71.18	12.38	-58.80	-33.8
7779.00	V	223	351	-65.26	11.44	-53.83	-28.8
10372.00	V	-	-	-64.80	12.42	-52.38	-27.4

Table 7-29. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 40 of 46

OPERATING FREQUENCY: 2687.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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]
5375.00	V	100	265	-71.08	13.00	-58.08	-33.1
8062.50	V	106	349	-66.37	11.61	-54.77	-29.8
10750.00	V	-	-	-64.13	12.59	-51.54	-26.5

Table 7-30. Radiated Spurious Data (Band 41 – High Channel)

FCC ID: ZNFL555DL	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
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7.4 Uplink Carrier Aggregation Radiated Measurements

§2.1053, §27.53(m)

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

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Test Setup

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

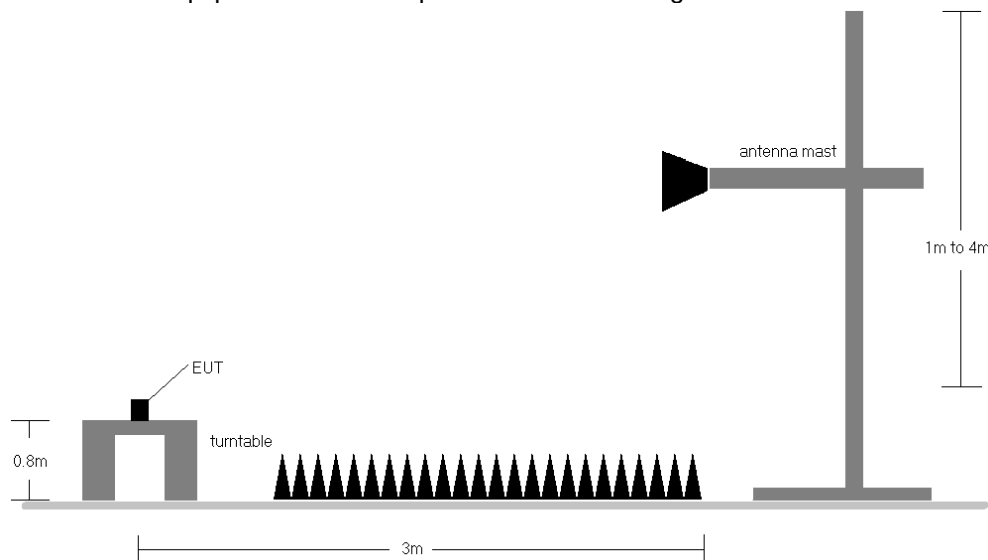
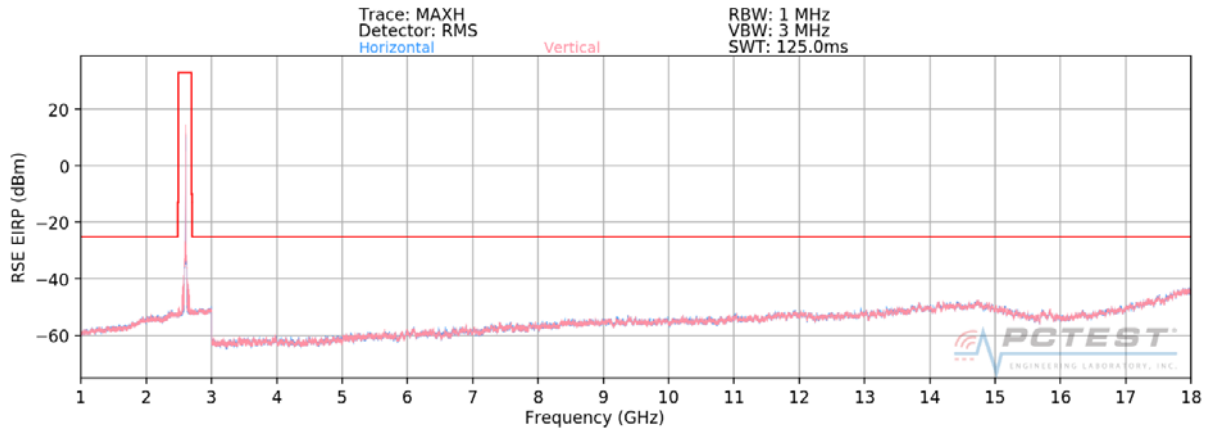


Figure 7-4. Test Instrument & Measurement Setup

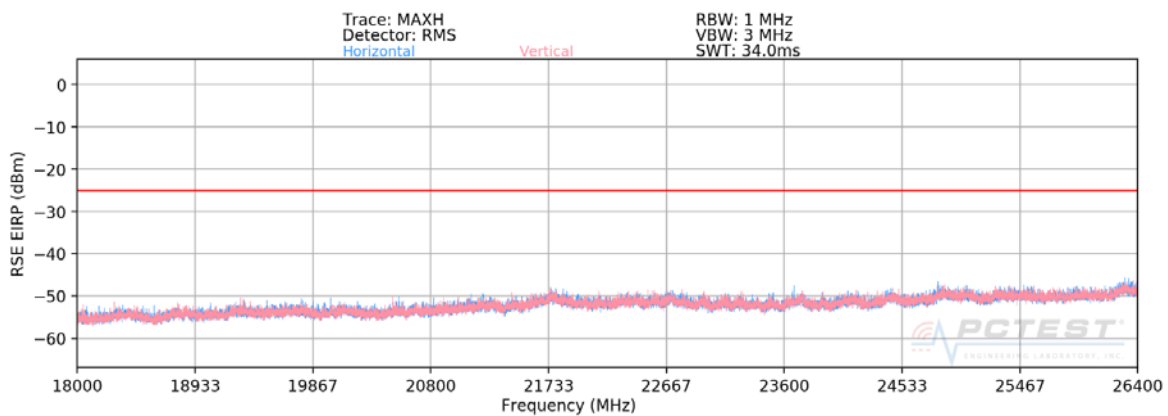
Test Notes

- 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) This unit was tested with its standard battery.
- 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.
- 6) No significant emissions were found as a result of two uplink carriers operating contiguously.

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Plot 7-9. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 PC3)



Plot 7-10. Radiated Spurious Plot 18GHz - 26.5GHz (ULCA Band 41 PC3)

OPERATING FREQUENCY (PCC):	2506.00	MHz
OPERATING FREQUENCY (SCC):	2525.80	MHz
CHANNEL (PCC):	39750	
CHANNEL (SCC):	39948	
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	V	186	5	-72.51	10.90	-61.61	-36.6
7518.00	V	325	289	-68.57	11.11	-57.46	-32.5
10024.00	V	-	-	-68.76	11.99	-56.76	-31.8

Table 7-31. Radiated Spurious Data (ULCA Band 41 PC3 - Low Channel)

FCC ID: ZNFL555DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 44 of 46

OPERATING FREQUENCY (PCC): 2593.00 MHz
 OPERATING FREQUENCY (SCC): 2612.80 MHz
 CHANNEL (PCC): 40620
 CHANNEL (SCC): 40818
 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	V	400	356	-70.74	10.74	-60.00	-35.0
7779.00	V	178	98	-68.70	11.44	-57.26	-32.3
10372.00	V	-	-	-67.39	12.42	-54.97	-30.0

Table 7-32. Radiated Spurious Data (ULCA Band 41 PC3 – Mid Channel)

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	V	131	271	-72.35	10.70	-61.65	-36.7
8040.00	V	147	343	-69.53	11.16	-58.37	-33.4
10720.00	V	-	-	-69.98	12.59	-57.39	-32.4

Table 7-33. Radiated Spurious Data (ULCA Band 41 PC3 – High Channel)

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 45 of 46

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFL555DL** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFL555DL		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1911260200-03-R1.ZNF	Test Dates: 11/26/2019 - 1/8/2020	EUT Type: Portable Handset		Page 46 of 46