



MEASUREMENT REPORT
LTE and NR Band n41 (ENDC)

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

Date of Testing:
 1/16 - 2/11/2019
Test Site/Location:
 PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
 1M1901150004-03-R2.ZNF

FCC ID:	ZNFV450PM
APPLICANT:	LG Electronics USA, Inc.

Application Type: Class II Permissive Change
Model: LM-V450PM
Additional Model(s): LMV450PM, V450PM, LM-V500XM, LMV500XM, V500XM
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, KDB 648474 D03 v01r04
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.

This revised Test Report (S/N: 1M1901150004-03-R2.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1901150004-03-R1.ZNF) 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

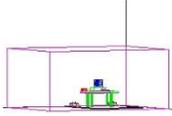


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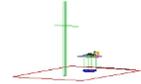
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FCC Part 22, 24, & 27



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	0.047	16.76			QPSK
LTE Band 71	27	665.5 - 695.5	0.038	15.80			16QAM
LTE Band 71	27	665.5 - 695.5	0.030	14.82			64QAM
LTE Band 71	27	668 - 693	0.044	16.43			QPSK
LTE Band 71	27	668 - 693	0.034	15.37			16QAM
LTE Band 71	27	668 - 693	0.000	0.00			64QAM
LTE Band 71	27	670.5 - 690.5	0.053	17.22			QPSK
LTE Band 71	27	670.5 - 690.5	0.042	16.20			16QAM
LTE Band 71	27	670.5 - 690.5	0.034	15.30			64QAM
LTE Band 71	27	673 - 688	0.055	17.39			QPSK
LTE Band 71	27	673 - 688	0.044	16.40			16QAM
LTE Band 71	27	673 - 688	0.035	15.48			64QAM
LTE Band 12	27	699.7 - 715.3	0.064	18.06	0.105	20.21	QPSK
LTE Band 12	27	699.7 - 715.3	0.050	17.03	0.083	19.18	16QAM
LTE Band 12	27	699.7 - 715.3	0.040	16.00	0.065	18.15	64QAM
LTE Band 12	27	700.5 - 714.5	0.061	17.84	0.100	19.99	QPSK
LTE Band 12	27	700.5 - 714.5	0.048	16.82	0.079	18.97	16QAM
LTE Band 12	27	700.5 - 714.5	0.038	15.80	0.062	17.95	64QAM
LTE Band 12/17	27	701.5 - 713.5	0.061	17.89	0.101	20.04	QPSK
LTE Band 12/17	27	701.5 - 713.5	0.049	16.93	0.081	19.08	16QAM
LTE Band 12/17	27	701.5 - 713.5	0.039	15.95	0.065	18.10	64QAM
LTE Band 12/17	27	704 - 711	0.065	18.13	0.107	20.28	QPSK
LTE Band 12/17	27	704 - 711	0.050	17.03	0.083	19.18	16QAM
LTE Band 12/17	27	704 - 711	0.040	16.01	0.065	18.16	64QAM
LTE Band 13	27	779.5 - 784.5	0.051	17.07	0.084	19.22	QPSK
LTE Band 13	27	779.5 - 784.5	0.040	16.07	0.066	18.22	16QAM
LTE Band 13	27	779.5 - 784.5	0.032	15.06	0.053	17.21	64QAM
LTE Band 13	27	782	0.069	18.37	0.113	20.52	QPSK
LTE Band 13	27	782	0.052	17.12	0.085	19.27	16QAM
LTE Band 13	27	782	0.041	16.13	0.067	18.28	64QAM
LTE Band 26/5	22H	824.7 - 848.3	0.091	19.61	0.150	21.76	QPSK
LTE Band 26/5	22H	824.7 - 848.3	0.071	18.53	0.117	20.68	16QAM
LTE Band 26/5	22H	824.7 - 848.3	0.058	17.61	0.095	19.76	64QAM
LTE Band 26/5	22H	825.5 - 847.5	0.113	20.54	0.186	22.69	QPSK
LTE Band 26/5	22H	825.5 - 847.5	0.085	19.31	0.140	21.46	16QAM
LTE Band 26/5	22H	825.5 - 847.5	0.067	18.26	0.110	20.41	64QAM
LTE Band 26/5	22H	826.5 - 846.5	0.118	20.73	0.194	22.88	QPSK
LTE Band 26/5	22H	826.5 - 846.5	0.090	19.57	0.148	21.72	16QAM
LTE Band 26/5	22H	826.5 - 846.5	0.069	18.42	0.114	20.57	64QAM
LTE Band 26/5	22H	829 - 844	0.116	20.66	0.191	22.81	QPSK
LTE Band 26/5	22H	829 - 844	0.087	19.40	0.143	21.55	16QAM
LTE Band 26/5	22H	829 - 844	0.069	18.40	0.114	20.55	64QAM
LTE Band 26	22H	831.5 - 841.5	0.133	21.23	0.218	23.38	QPSK
LTE Band 26	22H	831.5 - 841.5	0.110	20.43	0.181	22.58	16QAM
LTE Band 26	22H	831.5 - 841.5	0.110	20.43	0.181	22.58	64QAM

EUT Overview (<1GHz)

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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	0.090	19.53	QPSK
LTE Band 66/4	27	1710.7 - 1779.3	0.074	18.68	16QAM
LTE Band 66/4	27	1710.7 - 1779.3	0.063	18.00	64QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.126	21.00	QPSK
LTE Band 66/4	27	1711.5 - 1778.5	0.096	19.83	16QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.078	18.90	64QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.129	21.10	QPSK
LTE Band 66/4	27	1712.5 - 1777.5	0.102	20.07	16QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.080	19.05	64QAM
LTE Band 66/4	27	1715 - 1775	0.114	20.58	QPSK
LTE Band 66/4	27	1715 - 1775	0.088	19.44	16QAM
LTE Band 66/4	27	1715 - 1775	0.071	18.49	64QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.117	20.67	QPSK
LTE Band 66/4	27	1717.5 - 1772.5	0.088	19.44	16QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.071	18.49	64QAM
LTE Band 66/4	27	1720 - 1770	0.116	20.65	QPSK
LTE Band 66/4	27	1720 - 1770	0.091	19.59	16QAM
LTE Band 66/4	27	1720 - 1770	0.070	18.47	64QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.119	20.74	QPSK
LTE Band 25/2	24E	1850.7 - 1914.3	0.102	20.08	16QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.083	19.18	64QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.153	21.86	QPSK
LTE Band 25/2	24E	1851.5 - 1913.5	0.124	20.92	16QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.102	20.08	64QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.172	22.36	QPSK
LTE Band 25/2	24E	1852.5 - 1912.5	0.140	21.45	16QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.114	20.58	64QAM
LTE Band 25/2	24E	1855 - 1910	0.167	22.23	QPSK
LTE Band 25/2	24E	1855 - 1910	0.128	21.07	16QAM
LTE Band 25/2	24E	1855 - 1910	0.103	20.13	64QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.191	22.82	QPSK
LTE Band 25/2	24E	1857.5 - 1907.5	0.145	21.61	16QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.116	20.64	64QAM
LTE Band 25/2	24E	1860 - 1905	0.168	22.25	QPSK
LTE Band 25/2	24E	1860 - 1905	0.135	21.29	16QAM
LTE Band 25/2	24E	1860 - 1905	0.103	20.12	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	27	2498.5 - 2687.5	0.622	27.94	QPSK
LTE Band 41	27	2498.5 - 2687.5	0.567	27.54	16QAM
LTE Band 41	27	2498.5 - 2687.5	0.494	26.94	64QAM
LTE Band 41	27	2501 - 2685	0.608	27.84	QPSK
LTE Band 41	27	2501 - 2685	0.574	27.59	16QAM
LTE Band 41	27	2501 - 2685	0.494	26.94	64QAM
LTE Band 41	27	2503.5 - 2682.5	0.616	27.90	QPSK
LTE Band 41	27	2503.5 - 2682.5	0.548	27.39	16QAM
LTE Band 41	27	2503.5 - 2682.5	0.466	26.69	64QAM
LTE Band 41	27	2506 - 2680	0.525	27.20	QPSK
LTE Band 41	27	2506 - 2680	0.439	26.43	16QAM
LTE Band 41	27	2506 - 2680	0.371	25.69	64QAM

EUT Overview (High Bands)

Mode	FCC Rule Part	Channel Bandwidth (MHz)	EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
NR Band n41	27	60	0.109	20.37	QPSK
NR Band n41	27	60	0.044	16.40	16QAM
NR Band n41	27	60	0.055	17.39	64QAM
NR Band n41	27	40	0.117	20.68	QPSK
NR Band n41	27	40	0.078	18.94	16QAM
NR Band n41	27	40	0.053	17.22	64QAM

EUT Overview (NR Band 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 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 ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFV450PM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 01956, 01857, 01849

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ac 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 wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) FCC ID: PWMA-W815A 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 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.

3.4 600 MHz Frequency Range

§27.5(l)

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:

600 MHz band. The following frequencies are available for licensing pursuant to this part in the 600 MHz band: (1) Seven paired channel blocks of 5 megahertz each are available for assignment as follows:

- Block A: 617-622 MHz and 663-668 MHz;
- Block B: 622-627 MHz and 668-673 MHz;
- Block C: 627-632 MHz and 673-678 MHz;
- Block D: 632-637 MHz and 678-683 MHz;
- Block E: 637-642 MHz and 683-688 MHz;
- Block F: 642-647 MHz and 688-693 MHz; and
- Block G: 647-652 MHz and 693-698 MHz;

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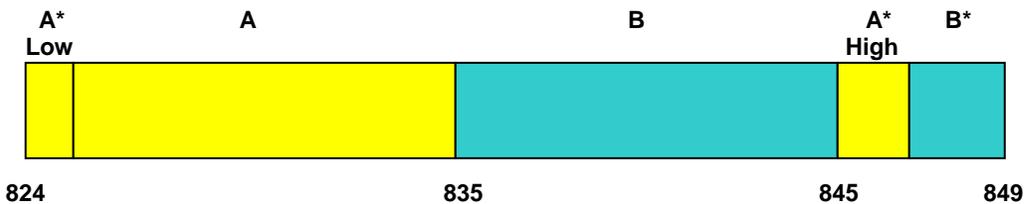
3.5 Cellular - Base Frequency Blocks



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*)

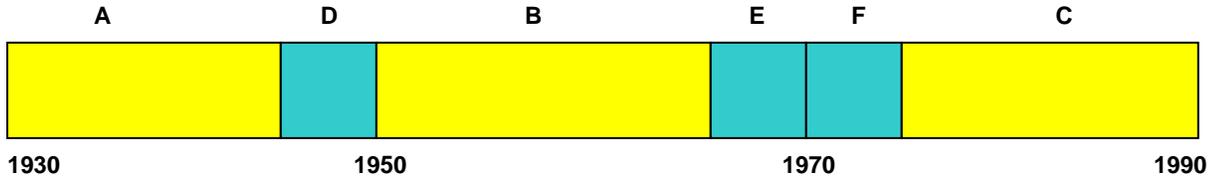
3.6 Cellular - Mobile Frequency Blocks



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*)

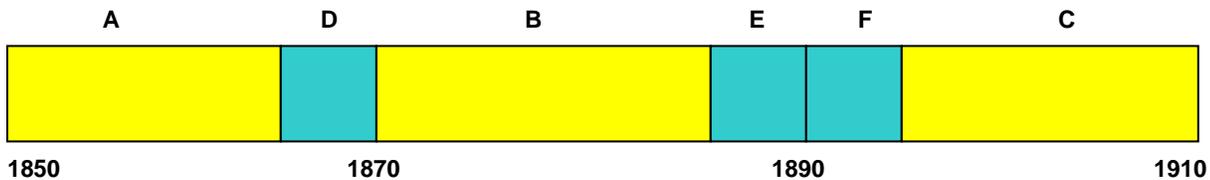
3.7 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)
 BLOCK 2: 1945 – 1950 MHz (D)
 BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 4: 1965 – 1970 MHz (E)
 BLOCK 5: 1970 – 1975 MHz (F)
 BLOCK 6: 1975 – 1990 MHz (C)

3.8 PCS - Mobile Frequency Blocks



BLOCK 1: 1850 – 1865 MHz (A)
 BLOCK 2: 1865 – 1870 MHz (D)
 BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 4: 1885 – 1890 MHz (E)
 BLOCK 5: 1890 – 1895 MHz (F)
 BLOCK 6: 1895 – 1910 MHz (C)

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3.12 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:

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

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

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 $43 + 10\log_{10}(\text{Power} [Watts])$. For Band 7 and 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 $55 + 10\log_{10}(\text{Power} [Watts])$.

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
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Anritsu	MT8820C	Radio Communication Analyzer	1/30/2018	Annual	1/30/2019	6201300731
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	1/23/2018	Annual	1/23/2019	251425001
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	8/17/2018	Biennial	8/17/2020	101072
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/24/2018	Annual	1/24/2019	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/21/2018	Annual	5/21/2019	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	CMW500	Radio Communication Tester	11/14/2018	Annual	11/14/2019	100976
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Spurious Radiated Emission – 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: ZNFV450PM
 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 26/5)	< 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 71, 12/17, 13)	< 3 Watts max. ERP			Section 7.2
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25/2, 41)	< 2 Watts max. EIRP			Section 7.2
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 66/4)	< 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	> 43 + 10log 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	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.

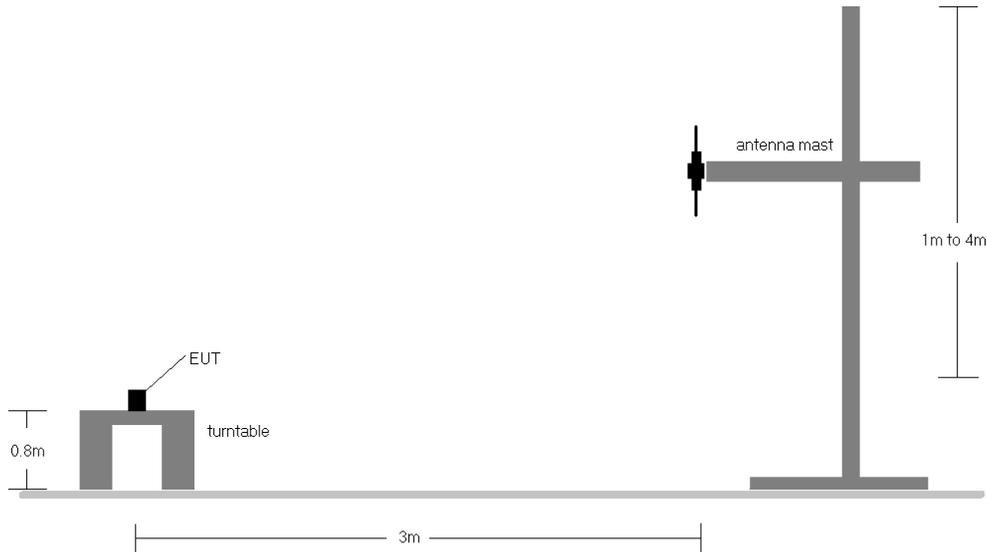


Figure 7-1. Radiated Test Setup <1GHz

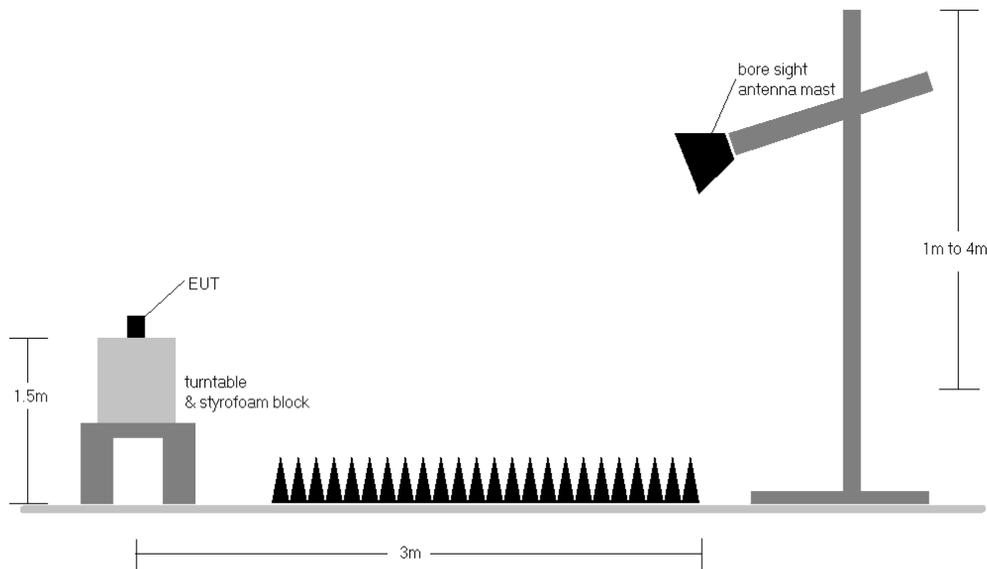


Figure 7-2. Radiated Test Setup >1GHz

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.

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	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]
665.50	5	QPSK	H	194	332	1 / 24	13.53	3.84	15.22	0.033	34.77	-19.56
680.50	5	QPSK	H	194	332	1 / 24	15.00	3.91	16.76	0.047	34.77	-18.01
695.50	5	QPSK	H	100	313	1 / 24	13.84	3.98	15.67	0.037	34.77	-19.10
680.50	5	16-QAM	H	194	332	1 / 24	14.04	3.91	15.80	0.038	34.77	-18.97
680.50	5	64-QAM	H	194	332	1 / 24	13.06	3.91	14.82	0.030	34.77	-19.95
668.00	10	QPSK	H	100	317	1 / 49	14.07	3.85	15.77	0.038	34.77	-19.00
680.50	10	QPSK	H	100	317	1 / 49	14.53	3.91	16.29	0.043	34.77	-18.48
693.00	10	QPSK	H	100	317	1 / 49	14.61	3.97	16.43	0.044	34.77	-18.34
693.00	10	16-QAM	H	100	317	1 / 49	13.55	3.97	15.37	0.034	34.77	-19.40
693.00	10	64-QAM	H	100	317	1 / 49	12.56	3.97	14.38	0.027	34.77	-20.39
670.50	15	QPSK	H	202	337	1 / 74	15.04	3.86	16.75	0.047	34.77	-18.02
680.50	15	QPSK	H	202	337	1 / 74	14.97	3.91	16.73	0.047	34.77	-18.04
690.50	15	QPSK	H	202	337	1 / 74	15.41	3.96	17.22	0.053	34.77	-17.56
690.50	15	16-QAM	H	202	337	1 / 74	14.39	3.96	16.20	0.042	34.77	-18.58
690.50	15	64-QAM	H	202	337	1 / 74	13.49	3.96	15.30	0.034	34.77	-19.48
673.00	20	QPSK	H	184	138	1 / 99	14.68	3.87	16.40	0.044	34.77	-18.37
680.50	20	QPSK	H	184	138	1 / 99	15.63	3.91	17.39	0.055	34.77	-17.38
688.00	20	QPSK	H	184	138	1 / 99	15.52	3.94	17.31	0.054	34.77	-17.46
680.50	20	16-QAM	H	184	138	1 / 99	14.64	3.91	16.40	0.044	34.77	-18.37
680.50	20	64-QAM	H	184	138	1 / 99	13.72	3.91	15.48	0.035	34.77	-19.29
680.50	20	QPSK	V	204	357	1 / 99	13.58	3.91	15.34	0.034	34.77	-19.43
680.50	20 (WCP)	QPSK	H	146	111	1 / 99	14.34	3.91	16.10	0.041	34.77	-18.67

Table 7-2. ERP Data (Band 71)

FCC ID: ZNFV450PM		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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	188	321	1 / 5	14.67	4.00	16.52	0.045	34.77	-18.25	18.67	0.074	36.99	-18.32
707.50	1.4	QPSK	H	188	321	1 / 5	15.74	4.22	17.81	0.060	34.77	-16.97	19.96	0.099	36.99	-17.03
715.30	1.4	QPSK	H	101	318	1 / 5	15.77	4.44	18.06	0.064	34.77	-16.71	20.21	0.105	36.99	-16.78
715.30	1.4	16-QAM	H	101	318	1 / 5	14.74	4.44	17.03	0.050	34.77	-17.74	19.18	0.083	36.99	-17.81
715.30	1.4	64-QAM	H	101	318	1 / 5	13.71	4.44	16.00	0.040	34.77	-18.77	18.15	0.065	36.99	-18.84
700.50	3	QPSK	H	195	311	1 / 0	15.65	4.01	17.51	0.056	34.77	-17.26	19.66	0.093	36.99	-17.33
707.50	3	QPSK	H	195	311	1 / 14	15.53	4.22	17.60	0.057	34.77	-17.18	19.75	0.094	36.99	-17.24
714.50	3	QPSK	H	195	311	1 / 0	15.58	4.41	17.84	0.061	34.77	-16.93	19.99	0.100	36.99	-17.00
714.50	3	16-QAM	H	195	311	1 / 0	14.56	4.41	16.82	0.048	34.77	-17.95	18.97	0.079	36.99	-18.02
714.50	3	64-QAM	H	195	311	1 / 0	13.54	4.41	15.80	0.038	34.77	-18.97	17.95	0.062	36.99	-19.04
701.50	5	QPSK	H	180	322	1 / 24	15.70	4.04	17.59	0.057	34.77	-17.18	19.74	0.094	36.99	-17.25
707.50	5	QPSK	H	180	322	1 / 0	15.71	4.22	17.78	0.060	34.77	-17.00	19.93	0.098	36.99	-17.06
713.50	5	QPSK	H	180	322	1 / 0	15.65	4.39	17.89	0.061	34.77	-16.88	20.04	0.101	36.99	-16.95
713.50	5	16-QAM	H	180	322	1 / 0	14.69	4.39	16.93	0.049	34.77	-17.84	19.08	0.081	36.99	-17.91
713.50	5	64-QAM	H	180	322	1 / 0	13.71	4.39	15.95	0.039	34.77	-18.82	18.10	0.065	36.99	-18.89
704.00	10	QPSK	H	189	317	1 / 0	15.93	4.12	17.90	0.062	34.77	-16.88	20.05	0.101	36.99	-16.94
707.50	10	QPSK	H	189	317	1 / 0	15.86	4.22	17.93	0.062	34.77	-16.85	20.08	0.102	36.99	-16.91
711.00	10	QPSK	H	189	317	1 / 0	15.96	4.32	18.13	0.065	34.77	-16.65	20.28	0.107	36.99	-16.71
711.00	10	16-QAM	H	189	317	1 / 0	14.86	4.32	17.03	0.050	34.77	-17.75	19.18	0.083	36.99	-17.81
711.00	10	64-QAM	H	189	317	1 / 0	13.84	4.32	16.01	0.040	34.77	-18.77	18.16	0.065	36.99	-18.83
711.00	10	QPSK	V	195	347	1 / 0	12.88	4.32	15.05	0.032	34.77	-19.73	17.20	0.052	36.99	-19.79
711.00	10 (WCP)	QPSK	H	111	111	1 / 0	15.44	4.32	17.61	0.058	34.77	-17.17	19.76	0.095	36.99	-17.23

Table 7-3. ERP Data (Band 12/17)

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]
779.50	5	QPSK	H	101	370	1 / 24	12.98	6.18	17.01	0.050	34.77	-17.77	19.16	0.082	36.99	-17.83
782.00	5	QPSK	H	101	370	1 / 0	12.98	6.24	17.07	0.051	34.77	-17.70	19.22	0.084	36.99	-17.77
784.50	5	QPSK	H	101	6	1 / 24	12.68	6.30	16.83	0.048	34.77	-17.94	18.98	0.079	36.99	-18.01
782.00	5	16-QAM	H	101	370	1 / 0	11.98	6.24	16.07	0.040	34.77	-18.70	18.22	0.066	36.99	-18.77
782.00	5	64-QAM	H	101	370	1 / 0	10.97	6.24	15.06	0.032	34.77	-19.71	17.21	0.053	36.99	-19.78
782.00	10	QPSK	H	271	347	1 / 0	14.28	6.24	18.37	0.069	34.77	-16.40	20.52	0.113	36.99	-16.47
782.00	10	16-QAM	H	271	347	1 / 0	13.03	6.24	17.12	0.052	34.77	-17.65	19.27	0.085	36.99	-17.72
782.00	10	64-QAM	H	271	347	1 / 0	12.04	6.24	16.13	0.041	34.77	-18.64	18.28	0.067	36.99	-18.71
782.00	10	QPSK	V	101	6	1 / 0	13.48	6.24	17.57	0.057	34.77	-17.20	19.72	0.094	36.99	-17.27
782.00	10 (WCP)	QPSK	H	392	92	1 / 0	13.75	6.24	17.84	0.061	34.77	-16.93	19.99	0.100	36.99	-17.00

Table 7-4. ERP Data (Band 13)

FCC ID: ZNFV450PM		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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	202	137	1 / 0	15.01	6.75	19.61	0.091	38.45	-18.84	21.76	0.150	40.61	-18.85
836.50	1.4	QPSK	H	209	135	1 / 0	14.11	6.78	18.74	0.075	38.45	-19.72	20.89	0.123	40.61	-19.72
848.30	1.4	QPSK	H	193	109	1 / 0	13.09	6.80	17.74	0.059	38.45	-20.71	19.89	0.097	40.61	-20.72
824.70	1.4	16-QAM	H	202	137	1 / 0	13.93	6.75	18.53	0.071	38.45	-19.92	20.68	0.117	40.61	-19.93
824.70	1.4	64-QAM	H	202	137	1 / 0	13.01	6.75	17.61	0.058	38.45	-20.84	19.76	0.095	40.61	-20.85
825.50	3	QPSK	H	202	128	1 / 0	15.94	6.75	20.54	0.113	38.45	-17.91	22.69	0.186	40.61	-17.91
836.50	3	QPSK	H	206	131	1 / 0	15.11	6.78	19.74	0.094	38.45	-18.72	21.89	0.154	40.61	-18.72
847.50	3	QPSK	H	110	193	1 / 0	13.67	6.80	18.32	0.068	38.45	-20.13	20.47	0.111	40.61	-20.14
825.50	3	16-QAM	H	202	128	1 / 0	14.71	6.75	19.31	0.085	38.45	-19.14	21.46	0.140	40.61	-19.14
825.50	3	64-QAM	H	202	128	1 / 0	13.66	6.75	18.26	0.067	38.45	-20.19	20.41	0.110	40.61	-20.19
826.50	5	QPSK	H	207	126	1 / 0	16.10	6.76	20.71	0.118	38.45	-17.75	22.86	0.193	40.61	-17.75
836.50	5	QPSK	H	207	133	1 / 0	16.10	6.78	20.73	0.118	38.45	-17.73	22.88	0.194	40.61	-17.73
846.50	5	QPSK	H	212	110	1 / 0	14.32	6.80	18.97	0.079	38.45	-19.49	21.12	0.129	40.61	-19.49
826.50	5	16-QAM	H	207	126	1 / 0	14.96	6.76	19.57	0.090	38.45	-18.89	21.72	0.148	40.61	-18.89
826.50	5	64-QAM	H	207	126	1 / 0	13.81	6.76	18.42	0.069	38.45	-20.04	20.57	0.114	40.61	-20.04
829.00	10	QPSK	H	201	110	1 / 0	16.05	6.76	20.66	0.116	38.45	-17.79	22.81	0.191	40.61	-17.80
836.50	10	QPSK	H	209	119	1 / 0	15.46	6.78	20.09	0.102	38.45	-18.37	22.24	0.167	40.61	-18.37
844.00	10	QPSK	H	209	102	1 / 0	14.78	6.79	19.42	0.088	38.45	-19.03	21.57	0.144	40.61	-19.04
829.00	10	16-QAM	H	201	110	1 / 0	14.79	6.76	19.40	0.087	38.45	-19.05	21.55	0.143	40.61	-19.06
829.00	10	64-QAM	H	201	110	1 / 0	13.79	6.76	18.40	0.069	38.45	-20.05	20.55	0.114	40.61	-20.06

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	205	107	1 / 0	16.61	6.77	21.23	0.133	38.45	-17.23	23.38	0.218	40.61	-17.23
836.50	15	QPSK	H	204	98	1 / 0	15.90	6.78	20.53	0.113	38.45	-17.93	22.68	0.185	40.61	-17.93
841.50	15	QPSK	H	209	122	1 / 0	15.76	6.79	20.40	0.110	38.45	-18.06	22.55	0.180	40.61	-18.06
831.50	15	16-QAM	H	205	107	1 / 0	15.81	6.77	20.43	0.110	38.45	-18.03	22.58	0.181	40.61	-18.03
831.50	15	64-QAM	H	205	107	1 / 0	15.81	6.77	20.43	0.110	38.45	-18.03	22.58	0.181	40.61	-18.03

Table 7-6. ERP Data (Band 26)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 20 of 74	

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	168	220	1 / 0	10.75	8.16	18.91	0.078	30.00	-11.09
1745.00	1.4	QPSK	H	165	221	1 / 0	10.62	8.19	18.81	0.076	30.00	-11.19
1779.30	1.4	QPSK	H	220	155	1 / 0	11.28	8.25	19.53	0.090	30.00	-10.47
1779.30	1.4	16-QAM	H	220	155	1 / 0	10.43	8.25	18.68	0.074	30.00	-11.32
1779.30	1.4	64-QAM	H	220	155	1 / 0	9.75	8.25	18.00	0.063	30.00	-12.00
1711.50	3	QPSK	H	166	217	1 / 0	11.23	8.16	19.39	0.087	30.00	-10.61
1745.00	3	QPSK	H	163	226	1 / 0	11.58	8.19	19.77	0.095	30.00	-10.23
1778.50	3	QPSK	H	119	216	1 / 0	12.75	8.25	21.00	0.126	30.00	-9.00
1778.50	3	16-QAM	H	119	216	1 / 0	11.58	8.25	19.83	0.096	30.00	-10.17
1778.50	3	64-QAM	H	119	216	1 / 0	10.65	8.25	18.90	0.078	30.00	-11.10
1712.50	5	QPSK	H	115	218	1 / 0	12.44	8.16	20.60	0.115	30.00	-9.40
1745.00	5	QPSK	H	122	216	1 / 0	12.08	8.19	20.27	0.107	30.00	-9.73
1777.50	5	QPSK	H	118	223	1 / 0	12.85	8.25	21.10	0.129	30.00	-8.90
1777.50	5	16-QAM	H	118	223	1 / 0	11.82	8.25	20.07	0.102	30.00	-9.93
1777.50	5	64-QAM	H	118	223	1 / 0	10.80	8.25	19.05	0.080	30.00	-10.95
1715.00	10	QPSK	H	117	217	1 / 0	12.14	8.16	20.30	0.107	30.00	-9.70
1745.00	10	QPSK	H	122	221	1 / 0	12.20	8.19	20.39	0.110	30.00	-9.61
1775.00	10	QPSK	H	224	115	1 / 0	12.34	8.24	20.58	0.114	30.00	-9.42
1775.00	10	16-QAM	H	224	115	1 / 0	11.20	8.24	19.44	0.088	30.00	-10.56
1775.00	10	64-QAM	H	224	115	1 / 0	10.25	8.24	18.49	0.071	30.00	-11.51
1717.50	15	QPSK	H	122	218	1 / 0	12.18	8.16	20.34	0.108	30.00	-9.66
1745.00	15	QPSK	H	124	221	1 / 0	12.42	8.19	20.61	0.115	30.00	-9.39
1772.50	15	QPSK	H	117	220	1 / 0	12.43	8.24	20.67	0.117	30.00	-9.33
1772.50	15	16-QAM	H	117	220	1 / 0	11.20	8.24	19.44	0.088	30.00	-10.56
1772.50	15	64-QAM	H	117	220	1 / 0	10.25	8.24	18.49	0.071	30.00	-11.51
1720.00	20	QPSK	H	126	215	1 / 0	11.63	8.17	19.80	0.095	30.00	-10.20
1745.00	20	QPSK	H	123	219	1 / 0	12.20	8.19	20.39	0.110	30.00	-9.61
1770.00	20	QPSK	H	119	230	1 / 0	12.42	8.23	20.65	0.116	30.00	-9.35
1770.00	20	16-QAM	H	119	230	1 / 0	11.36	8.23	19.59	0.091	30.00	-10.41
1770.00	20	64-QAM	H	119	230	1 / 0	10.24	8.23	18.47	0.070	30.00	-11.53
1777.50	5	QPSK	V	120	232	1 / 0	10.69	8.25	18.94	0.078	30.00	-11.06
1777.50	5 (WCP)	QPSK	H	229	117	1 / 0	11.90	8.25	20.15	0.103	30.00	-9.85

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

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 21 of 74	

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	145	227	1 / 5	12.37	8.37	20.74	0.119	33.01	-12.27
1882.50	1.4	QPSK	H	144	238	1 / 5	12.16	8.42	20.58	0.114	33.01	-12.43
1914.30	1.4	QPSK	H	138	236	1 / 5	11.81	8.47	20.28	0.107	33.01	-12.73
1850.70	1.4	16-QAM	H	145	227	1 / 5	11.71	8.37	20.08	0.102	33.01	-12.93
1850.70	1.4	64-QAM	H	145	227	1 / 5	10.81	8.37	19.18	0.083	33.01	-13.83
1851.50	3	QPSK	H	102	225	1 / 14	13.49	8.37	21.86	0.153	33.01	-11.15
1882.50	3	QPSK	H	100	229	1 / 14	13.23	8.42	21.65	0.146	33.01	-11.36
1913.50	3	QPSK	H	138	232	1 / 14	12.43	8.47	20.90	0.123	33.01	-12.11
1851.50	3	16-QAM	H	102	225	1 / 14	12.55	8.37	20.92	0.124	33.01	-12.09
1851.50	3	64-QAM	H	102	225	1 / 14	11.71	8.37	20.08	0.102	33.01	-12.93
1852.50	5	QPSK	H	100	226	1 / 24	13.99	8.37	22.36	0.172	33.01	-10.65
1882.50	5	QPSK	H	100	229	1 / 24	13.87	8.42	22.29	0.169	33.01	-10.72
1912.50	5	QPSK	H	135	233	1 / 24	12.77	8.47	21.24	0.133	33.01	-11.77
1852.50	5	16-QAM	H	100	226	1 / 24	13.08	8.37	21.45	0.140	33.01	-11.56
1852.50	5	64-QAM	H	100	226	1 / 24	12.21	8.37	20.58	0.114	33.01	-12.43
1855.00	10	QPSK	H	100	227	1 / 49	13.33	8.37	21.70	0.148	33.01	-11.31
1882.50	10	QPSK	H	102	230	1 / 49	13.81	8.42	22.23	0.167	33.01	-10.78
1910.00	10	QPSK	H	100	234	1 / 49	12.28	8.46	20.74	0.119	33.01	-12.27
1882.50	10	16-QAM	H	102	230	1 / 49	12.65	8.42	21.07	0.128	33.01	-11.94
1882.50	10	64-QAM	H	102	230	1 / 49	11.71	8.42	20.13	0.103	33.01	-12.88
1857.50	15	QPSK	H	100	227	1 / 74	13.76	8.38	22.14	0.164	33.01	-10.87
1882.50	15	QPSK	H	100	231	1 / 74	14.40	8.42	22.82	0.191	33.01	-10.19
1907.50	15	QPSK	H	100	238	1 / 74	12.32	8.46	20.78	0.120	33.01	-12.23
1882.50	15	16-QAM	H	100	231	1 / 74	13.19	8.42	21.61	0.145	33.01	-11.40
1882.50	15	64-QAM	H	100	231	1 / 74	12.22	8.42	20.64	0.116	33.01	-12.37
1860.00	20	QPSK	H	108	229	1 / 99	13.59	8.38	21.97	0.157	33.01	-11.04
1882.50	20	QPSK	H	100	234	1 / 99	13.83	8.42	22.25	0.168	33.01	-10.76
1905.00	20	QPSK	H	100	236	1 / 99	12.38	8.45	20.83	0.121	33.01	-12.18
1882.50	20	16-QAM	H	100	234	1 / 99	12.87	8.42	21.29	0.135	33.01	-11.72
1882.50	20	64-QAM	H	100	234	1 / 99	11.70	8.42	20.12	0.103	33.01	-12.89
1882.50	15	QPSK	V	149	339	1 / 74	12.04	8.42	20.46	0.111	33.01	-12.55
1882.50	15 (WCP)	QPSK	H	140	232	1 / 74	12.11	8.42	20.53	0.113	33.01	-12.48

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

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 22 of 74	

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	H	146	301	1 / 24	20.04	7.90	27.94	0.622	33.01	-5.07
2593.00	5	QPSK	H	115	307	1 / 24	19.95	7.71	27.66	0.583	33.01	-5.35
2687.50	5	QPSK	H	115	262	1 / 24	18.61	7.52	26.13	0.410	33.01	-6.88
2593.00	5	16-QAM	H	115	307	1 / 24	19.83	7.71	27.54	0.567	33.01	-5.47
2593.00	5	64-QAM	H	115	307	1 / 24	19.23	7.71	26.94	0.494	33.01	-6.07
2501.00	10	QPSK	H	149	315	1 / 49	19.85	7.90	27.75	0.595	33.01	-5.26
2593.00	10	QPSK	H	119	314	1 / 49	20.13	7.71	27.84	0.608	33.01	-5.17
2685.00	10	QPSK	H	147	260	1 / 49	18.96	7.53	26.49	0.445	33.01	-6.52
2593.00	10	16-QAM	H	119	314	1 / 49	19.88	7.71	27.59	0.574	33.01	-5.42
2593.00	10	64-QAM	H	119	314	1 / 49	19.23	7.71	26.94	0.494	33.01	-6.07
2503.50	15	QPSK	H	155	312	1 / 74	19.97	7.89	27.86	0.611	33.01	-5.15
2593.00	15	QPSK	H	141	322	1 / 74	20.19	7.71	27.90	0.616	33.01	-5.11
2682.50	15	QPSK	H	146	249	1 / 74	19.03	7.53	26.56	0.453	33.01	-6.45
2593.00	15	16-QAM	H	141	322	1 / 74	19.68	7.71	27.39	0.548	33.01	-5.62
2593.00	15	64-QAM	H	141	322	1 / 74	18.98	7.71	26.69	0.466	33.01	-6.32
2506.00	20	QPSK	H	117	306	1 / 99	19.01	7.89	26.90	0.489	33.01	-6.11
2593.00	20	QPSK	H	141	326	1 / 99	19.49	7.71	27.20	0.525	33.01	-5.81
2680.00	20	QPSK	H	100	261	1 / 99	19.23	7.54	26.77	0.475	33.01	-6.25
2593.00	20	16-QAM	H	141	326	1 / 99	18.72	7.71	26.43	0.439	33.01	-6.58
2593.00	20	64-QAM	H	141	326	1 / 99	17.98	7.71	25.69	0.371	33.01	-7.32
2498.50	5	QPSK	V	152	206	1 / 24	18.29	7.90	26.19	0.416	33.01	-6.82
2593.00	15	QPSK	H	119	316	1 / 24	17.03	7.90	24.93	0.311	33.01	-8.08

Table 7-9. EIRP Data (Band 41), PC2

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 23 of 74	

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]
2593.00	15	QPSK	H	115	303	1 / 74	17.39	7.71	25.10	0.323	33.01	-7.91
2593.00	15	16-QAM	H	115	303	1 / 74	16.39	7.71	24.10	0.257	33.01	-8.91
2593.00	15	64-QAM	H	115	303	1 / 74	15.37	7.71	23.08	0.203	33.01	-9.93
2593.00	15	QPSK	V	400	303	1 / 74	15.78	7.71	23.49	0.223	33.01	-9.52

Table 7-10. EIRP Data (Band 41), PC3

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 24 of 74

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: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 25 of 74	

Test Setup

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

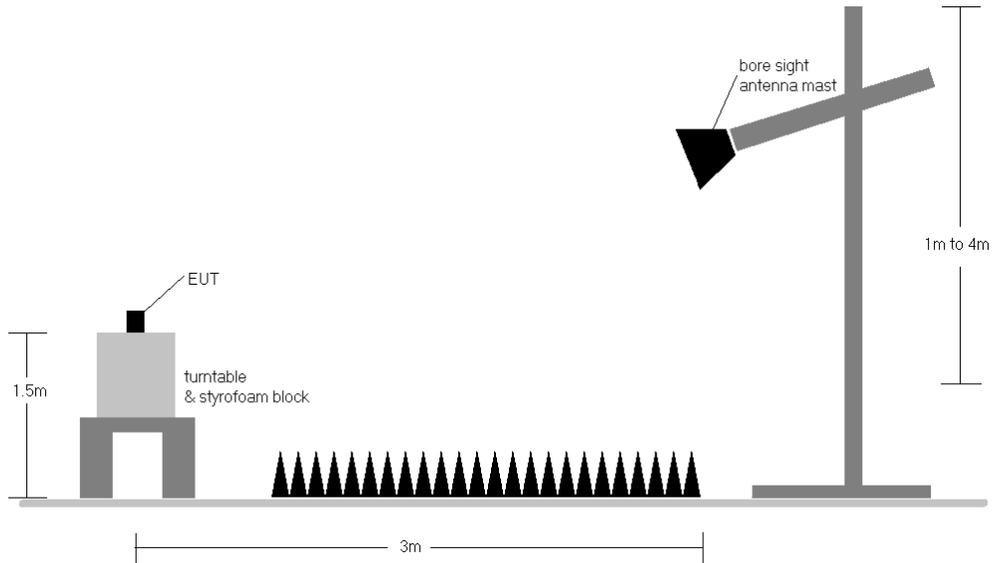


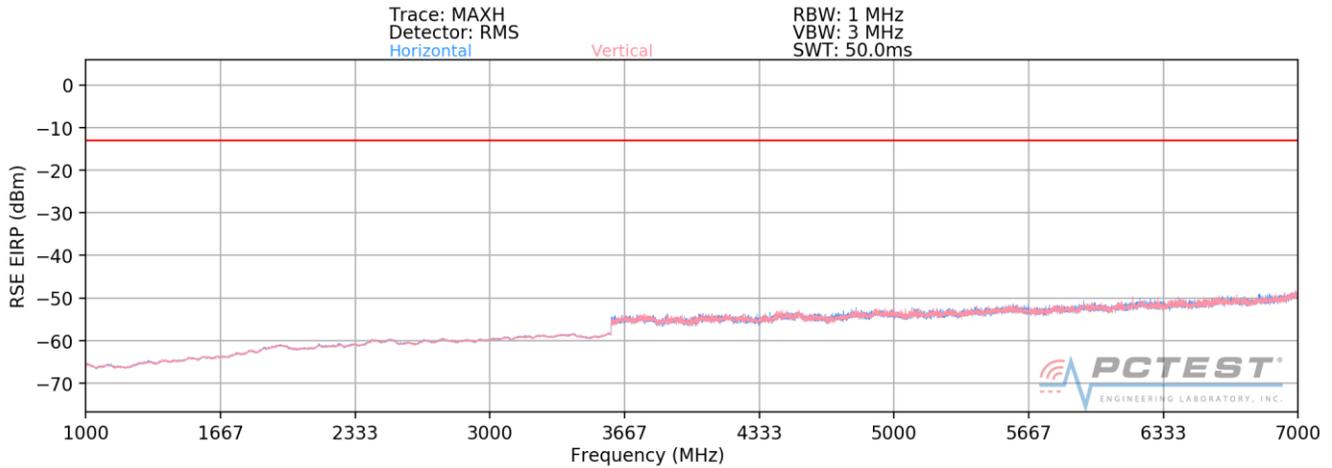
Figure 7-3. Test Instrument & Measurement Setup

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: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 26 of 74

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	-	-	-78.46	8.20	-70.26	-57.3
2019.00	H	132	239	-71.89	8.54	-63.34	-50.3
2692.00	H	-	-	-73.30	7.51	-65.79	-52.8

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

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 27 of 74	

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	116	227	-77.40	8.17	-69.24	-56.2
2041.50	H	125	54	-69.75	8.48	-61.28	-48.3
2722.00	H	-	-	-73.33	7.45	-65.88	-52.9

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	161	236	-78.00	8.14	-69.87	-56.9
2064.00	H	114	164	-70.38	8.41	-61.97	-49.0
2752.00	H	-	-	-72.97	7.40	-65.58	-52.6

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

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 28 of 74	

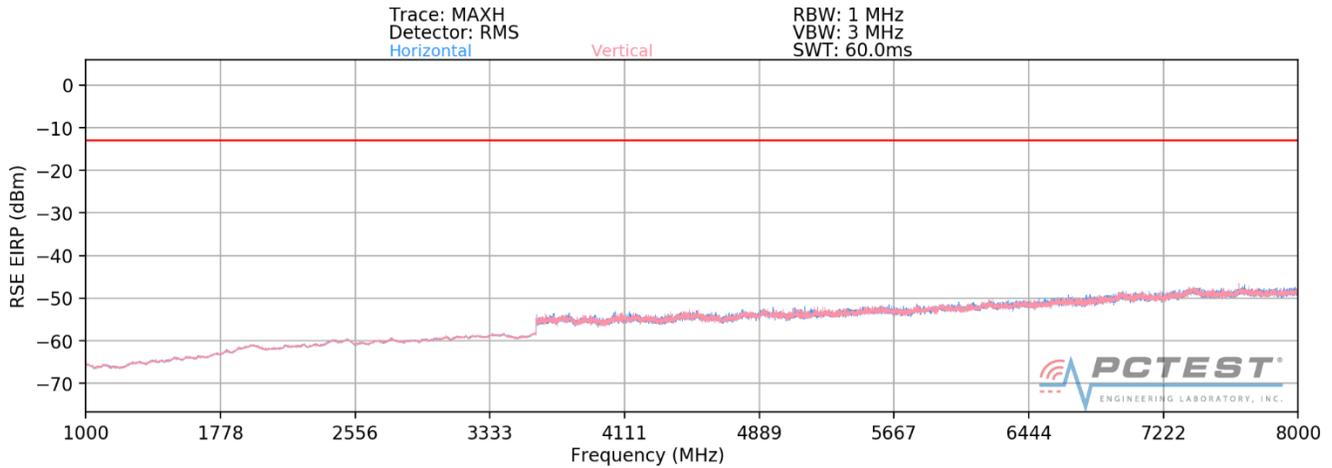
OPERATING FREQUENCY: 680.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	195	196	-66.62	8.17	-58.46	-45.5
2041.50	H	280	41	-68.91	8.48	-60.44	-47.4
2722.00	H	-	-	-73.34	7.45	-65.89	-52.9

Table 7-14. Radiated Spurious Data with WCP (Band 71 – Mid Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 29 of 74	

Band 12/17



Plot 7-2. Radiated Spurious Plot above 1GHz (Band 12/17)

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	-	-	-79.08	8.07	-71.00	-58.0
2112.00	H	-	-	-76.75	8.28	-68.48	-55.5

Table 7-15. Radiated Spurious Data (Band 12/17 – Low Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 30 of 74	

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	-	-	-79.37	8.06	-71.31	-58.3
2122.50	H	-	-	-76.92	8.25	-68.67	-55.7

Table 7-16. Radiated Spurious Data (Band 12/17 – 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	-	-	-79.03	8.05	-70.98	-58.0
2133.00	H	-	-	-76.81	8.22	-68.60	-55.6

Table 7-17. Radiated Spurious Data (Band 12/17 – High Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 31 of 74	

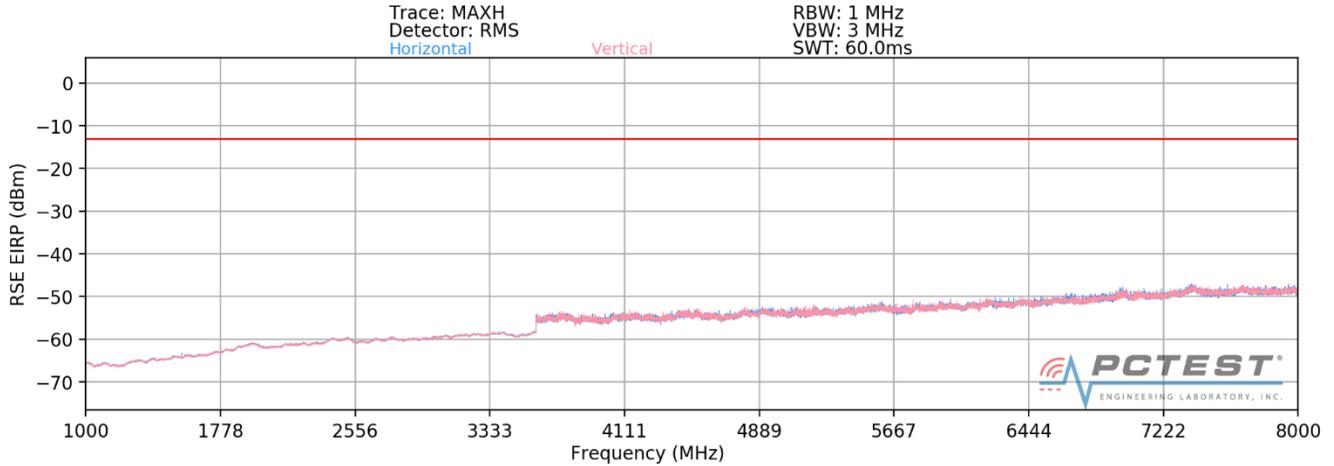
OPERATING FREQUENCY: 711.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	101	258	-76.09	8.05	-68.04	-55.0
2133.00	H	102	155	-73.86	8.22	-65.65	-52.6
2844.00	H	-	-	-76.66	7.25	-69.41	-56.4

Table 7-18. Radiated Spurious Data with WCP (Band 12/17 – High Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 32 of 74	

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	-	-	-75.89	7.90	-67.99	-55.0
3128.00	H	-	-	-71.79	7.00	-64.79	-51.8

Table 7-19. Radiated Spurious Data (Band 13 – Mid Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 33 of 74	

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	-	-	-78.64	7.98	-70.66	-30.7

Table 7-20. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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	113	140	-74.63	7.90	-66.73	-53.7
3128.00	H	-	-	-75.99	7.00	-68.99	-56.0

Table 7-21. Radiated Spurious Data with WCP (Band 13 – Mid Channel)

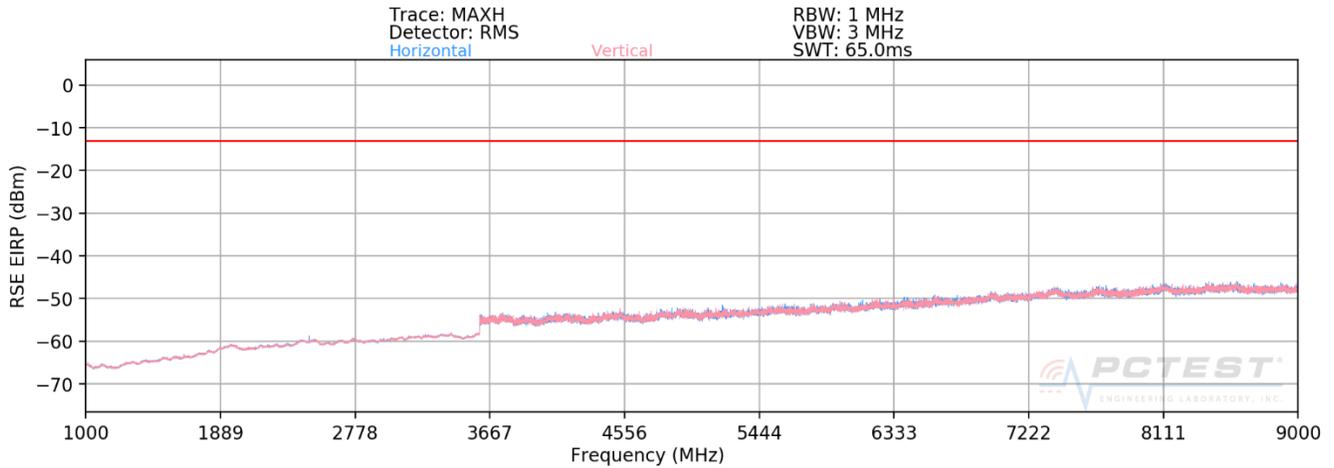
MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.00 MHz
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

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	153	327	-77.33	7.98	-69.35	-29.3

Table 7-22. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 34 of 74	

Band 26



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

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	143	286	-78.38	8.09	-70.29	-57.3
2494.50	H	236	247	-73.66	7.90	-65.76	-52.8
3326.00	H	-	-	-71.15	7.00	-64.15	-51.2

Table 7-23. Radiated Spurious Data (Band 26 – Low Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 35 of 74	

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	204	291	-76.77	8.11	-68.65	-55.7
2509.50	H	188	239	-72.30	7.88	-64.42	-51.4
3346.00	H	-	-	-70.91	7.00	-63.91	-50.9

Table 7-24. Radiated Spurious Data (Band 26 – Mid Channel)

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	287	121	-76.79	8.13	-68.66	-55.7
2524.50	H	124	49	-72.64	7.83	-64.81	-51.8
3366.00	H	-	-	-70.95	7.00	-63.95	-51.0

Table 7-25. Radiated Spurious Data (Band 26 – High Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 36 of 74	

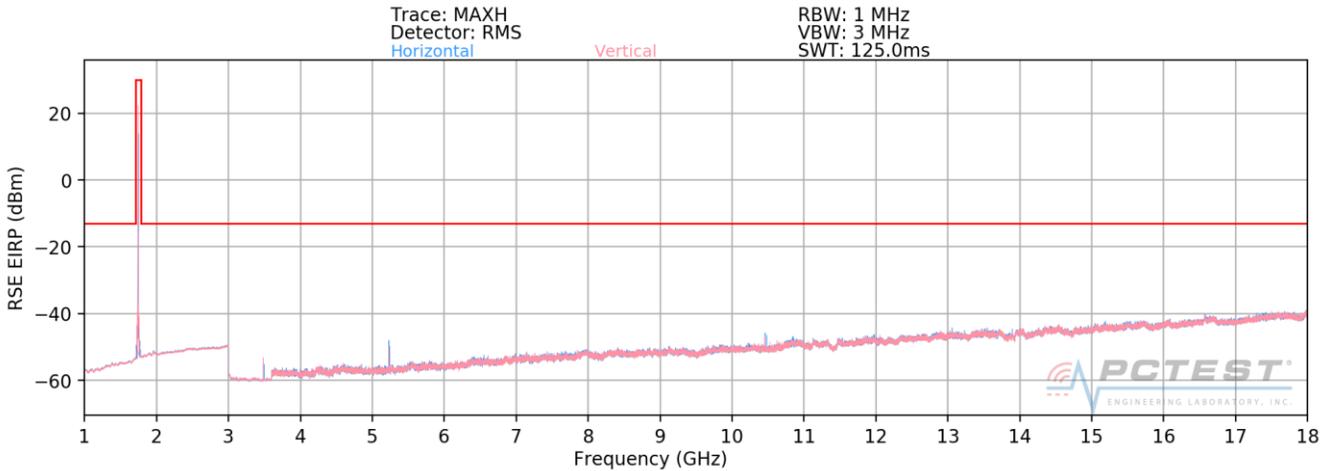
OPERATING FREQUENCY: 831.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	169	7	-81.77	8.11	-73.65	-60.7
2494.50	H	104	137	-77.44	7.88	-69.56	-56.6
3326.00	H	-	-	-75.74	7.00	-68.74	-55.7

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

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 37 of 74	

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	H	116	190	-61.88	7.00	-54.88	-41.9
5137.50	H	112	27	-67.23	8.65	-58.58	-45.6
6850.00	H	-	-	-68.59	9.84	-58.75	-45.7

Table 7-27. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 38 of 74	

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	H	135	212	-67.44	7.00	-60.44	-47.4
5235.00	H	114	248	-68.77	8.44	-60.34	-47.3
6980.00	H	-	-	-68.93	9.89	-59.04	-46.0

Table 7-28. 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	H	116	19	-69.46	6.61	-62.85	-49.9
5332.50	H	-	-	-69.71	8.67	-61.04	-48.0

Table 7-29. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 39 of 74	

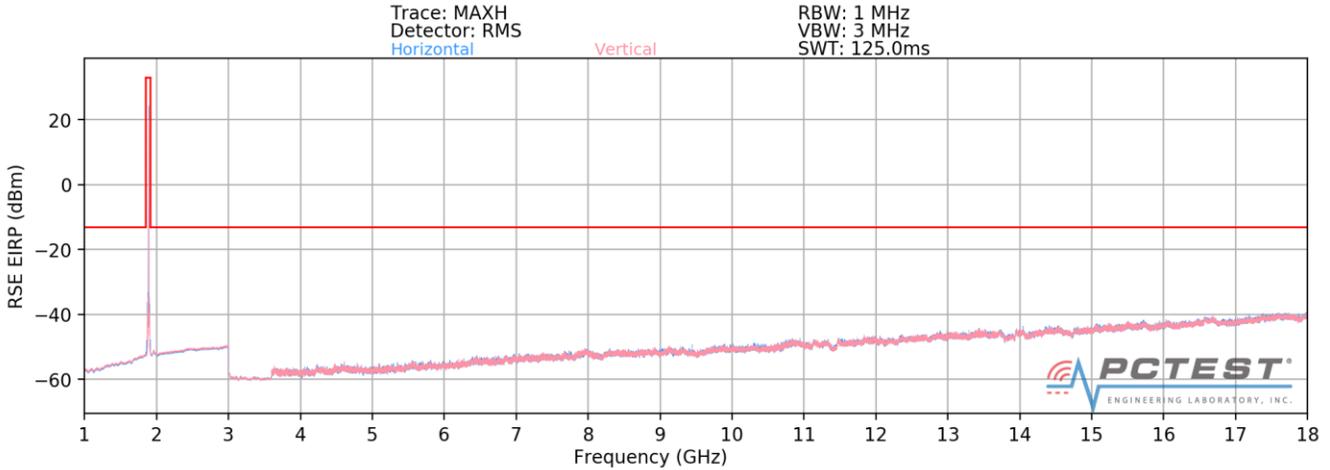
OPERATING FREQUENCY: 1777.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	H	-	-	-75.28	7.00	-68.28	-55.3
5332.50	H	-	-	-74.86	8.44	-66.43	-53.4

Table 7-30. Radiated Spurious Data with WCP (Band 66/4 – High Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 40 of 74	

Band 25/2



Plot 7-6. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY: 1857.50 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]
3715.00	H	-	-	-68.55	5.36	-63.19	-50.2
5572.50	H	-	-	-69.48	9.51	-59.98	-47.0

Table 7-31. Radiated Spurious Data (Band 25/2 – Low Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 41 of 74	

OPERATING FREQUENCY: 1882.50 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]
3765.00	H	-	-	-67.30	5.11	-62.19	-49.2
5647.50	H	-	-	-69.40	9.72	-59.69	-46.7

Table 7-32. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY: 1907.50 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]
3815.00	H	-	-	-67.06	5.13	-61.94	-48.9
5722.50	H	-	-	-70.08	9.92	-60.15	-47.2

Table 7-33. Radiated Spurious Data (Band 25/2 – High Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 42 of 74	

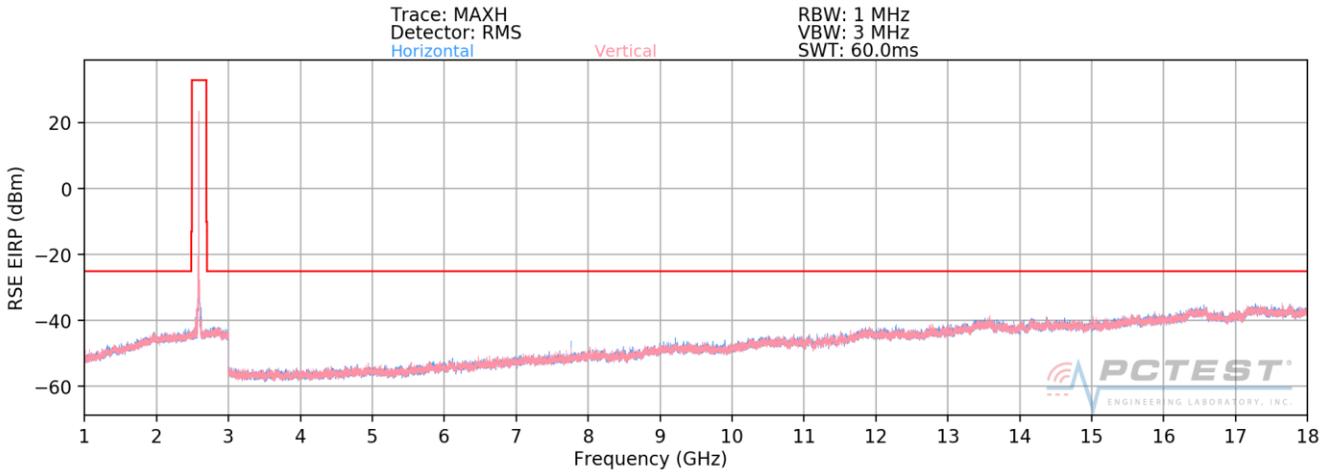
OPERATING FREQUENCY: 1882.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
3765.00	H	395	254	-66.85	5.11	-61.74	-48.7
5647.50	H	-	-	-69.38	9.72	-59.67	-46.7

Table 7-34. Radiated Spurious Data with WCP (Band 25/2 – Mid Channel)

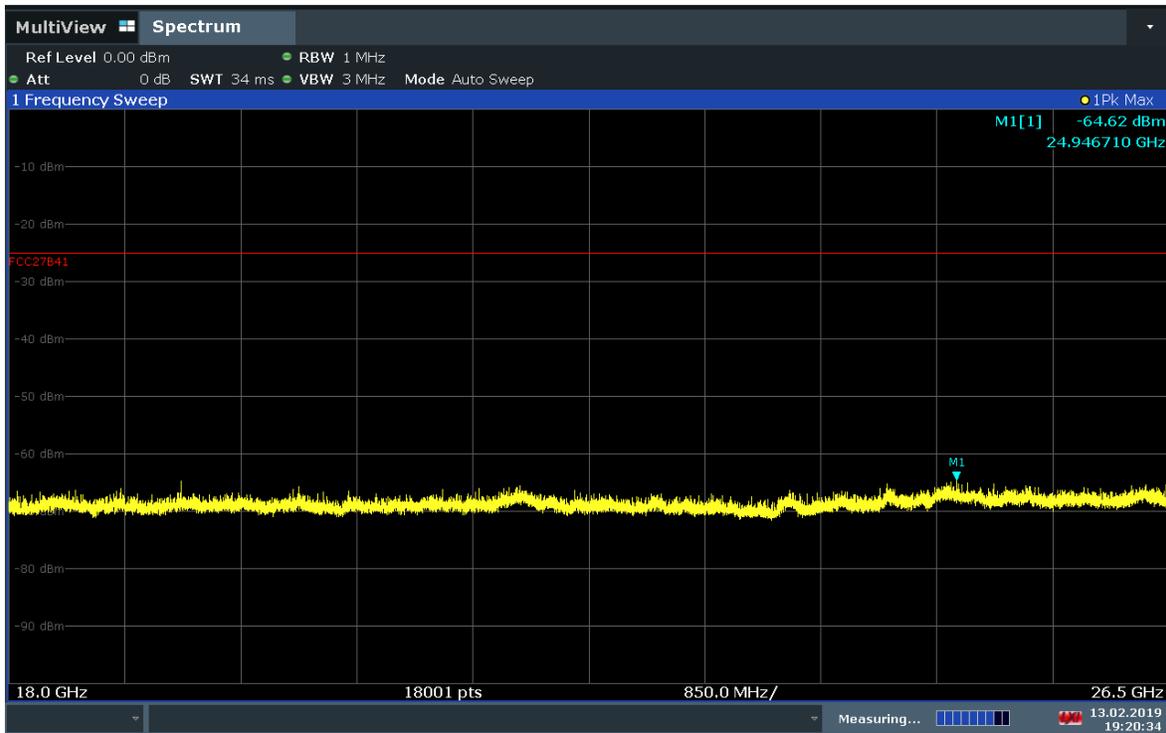
FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 43 of 74	

Band 41 (PC2)



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

ACLRR results

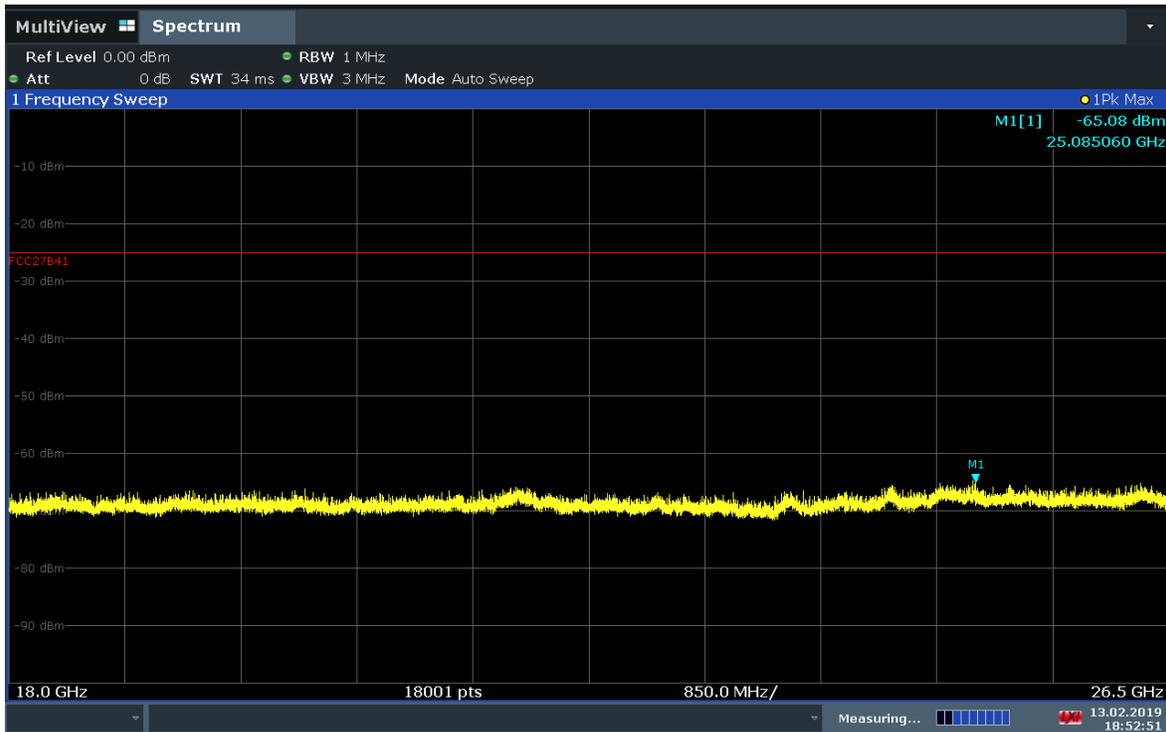


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Plot 7-8. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41), H Pol.

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 44 of 74

ACLRR results



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Plot 7-9. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41), V Pol.

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 45 of 74

OPERATING FREQUENCY: 2507.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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]
5015.00	H	164	353	-63.18	10.90	-52.28	-27.3
7522.50	H	115	67	-57.45	11.12	-46.33	-21.3
10030.00	H	-	-	-62.63	11.99	-50.64	-25.6

Table 7-35. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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	212	49	-61.79	10.74	-51.05	-26.0
7779.00	H	338	55	-56.52	11.44	-45.08	-20.1
10372.00	H	-	-	-61.40	12.42	-48.97	-24.0

Table 7-36. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 46 of 74	

OPERATING FREQUENCY: 2682.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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]
5365.00	H	174	106	-64.69	10.69	-53.99	-29.0
8047.50	H	163	316	-55.02	11.16	-43.86	-18.9
10730.00	H	-	-	-62.25	12.60	-49.65	-24.6

Table 7-37. Radiated Spurious Data (Band 41 – High Channel)

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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	-	-	-70.63	10.74	-59.89	-34.9
7779.00	H	128	193	-64.04	11.44	-52.60	-27.6
10372.00	H	-	-	-65.91	12.42	-53.49	-28.5

Table 7-38. Radiated Spurious Data with WCP (Band 41 – Mid Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 47 of 74	

Band 41 (PC3)

OPERATING FREQUENCY: 2507.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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]
5015.00	H	-	-	-66.69	10.90	-55.79	-30.8
7522.50	H	133	3	-56.83	11.12	-45.71	-20.7
10030.00	H	-	-	-62.59	11.99	-50.60	-25.6

Table 7-39. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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	-	-	-65.28	10.74	-54.54	-29.5
7779.00	H	258	146	-60.28	11.44	-48.84	-23.8
10372.00	H	-	-	-61.32	12.42	-48.89	-23.9

Table 7-40. Radiated Spurious Data (Band 41 – Mid Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 48 of 74	

OPERATING FREQUENCY: 2682.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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]
5365.00	H	-	-	-65.02	10.69	-54.32	-29.3
8047.50	H	352	100	-61.42	11.16	-50.26	-25.3
10730.00	H	-	-	-61.70	12.60	-49.10	-24.1

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

OPERATING FREQUENCY: 2593.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 15.0 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	-	-	-71.82	10.74	-61.08	-36.1
7779.00	H	297	15	-64.77	11.44	-53.33	-28.3
10372.00	H	-	-	-67.52	12.42	-55.10	-30.1

Table 7-42. Radiated Spurious Data with WCP (Band 41 – Mid Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 49 of 74	

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: ZNFV450PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 50 of 74

Test Setup

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

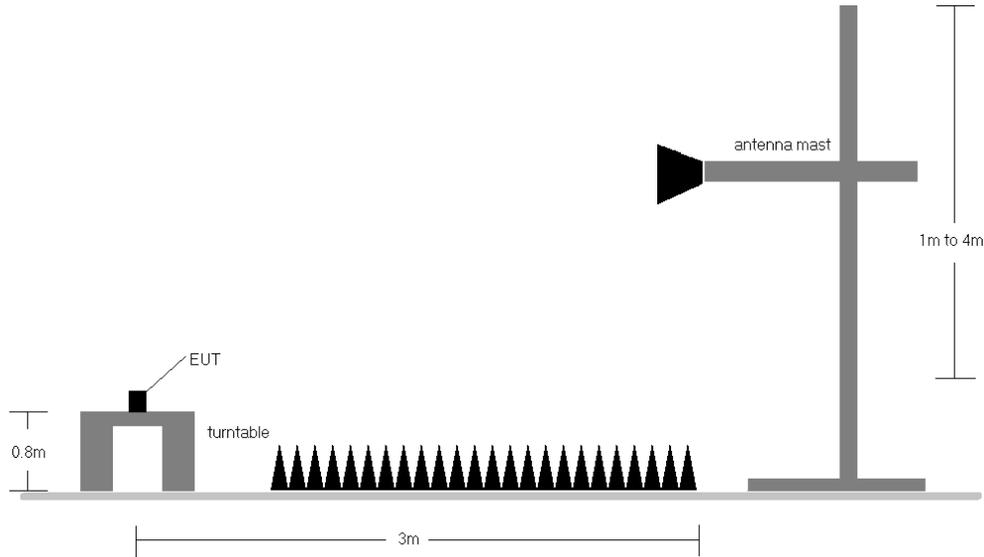
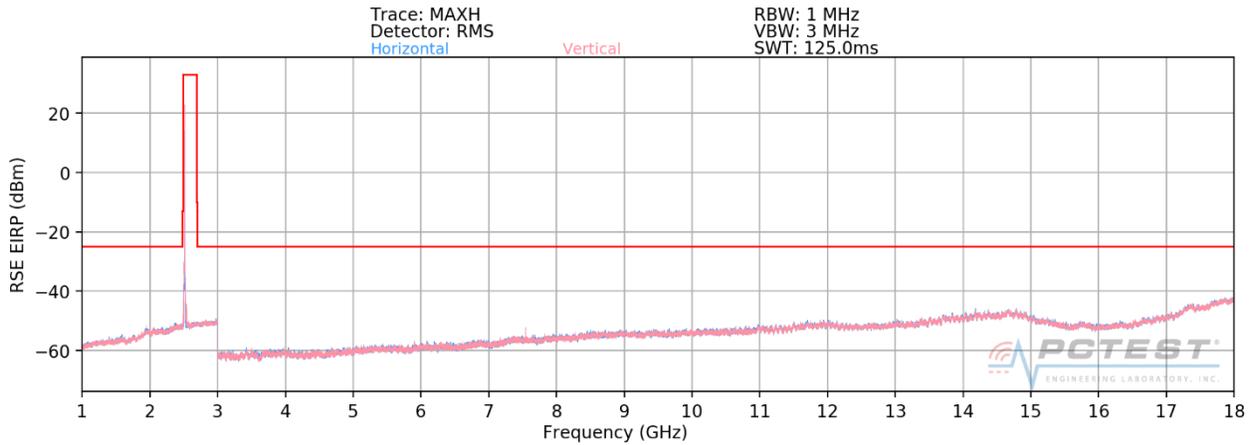


Figure 7-4. Test Instrument & Measurement Setup

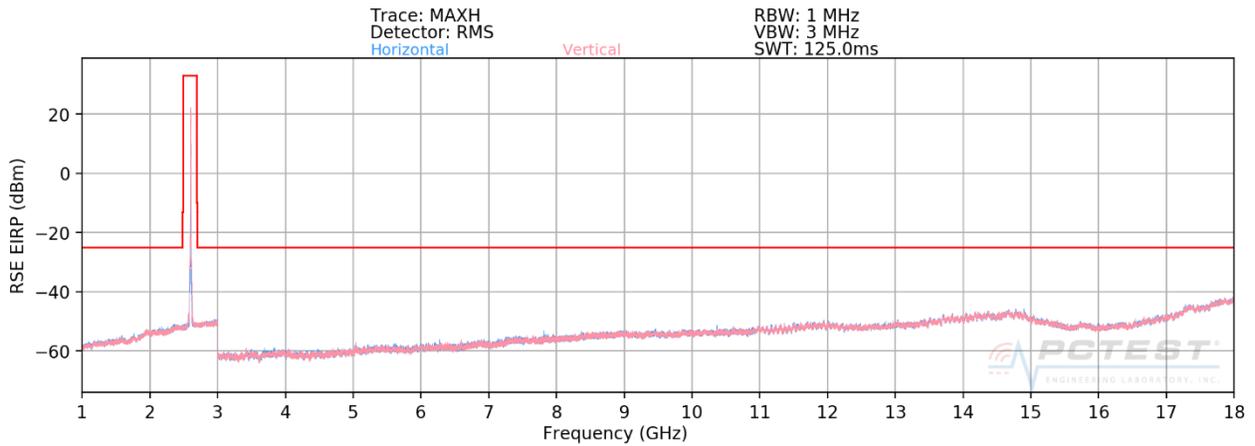
Test Notes

- 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.

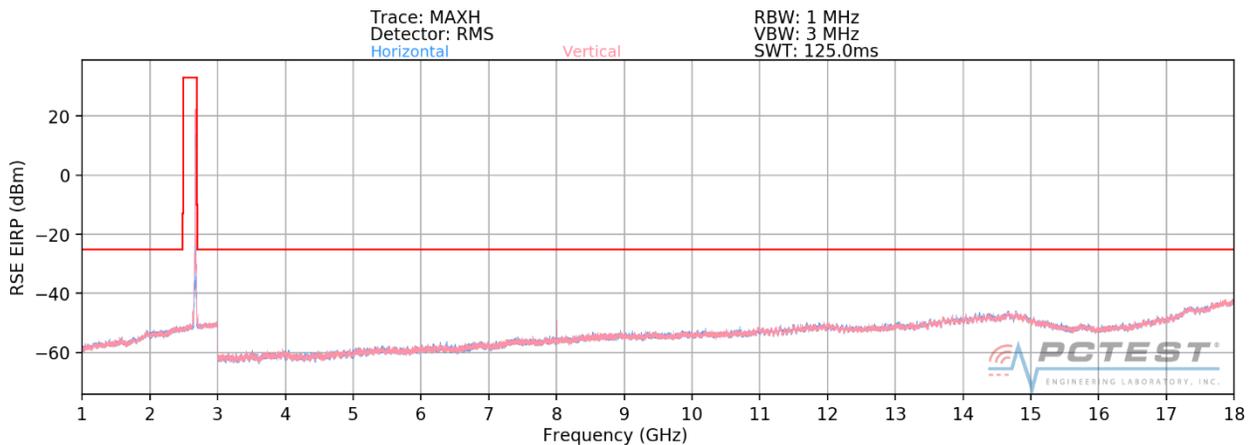
FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 51 of 74



Plot 7-43. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0-Low Channel)

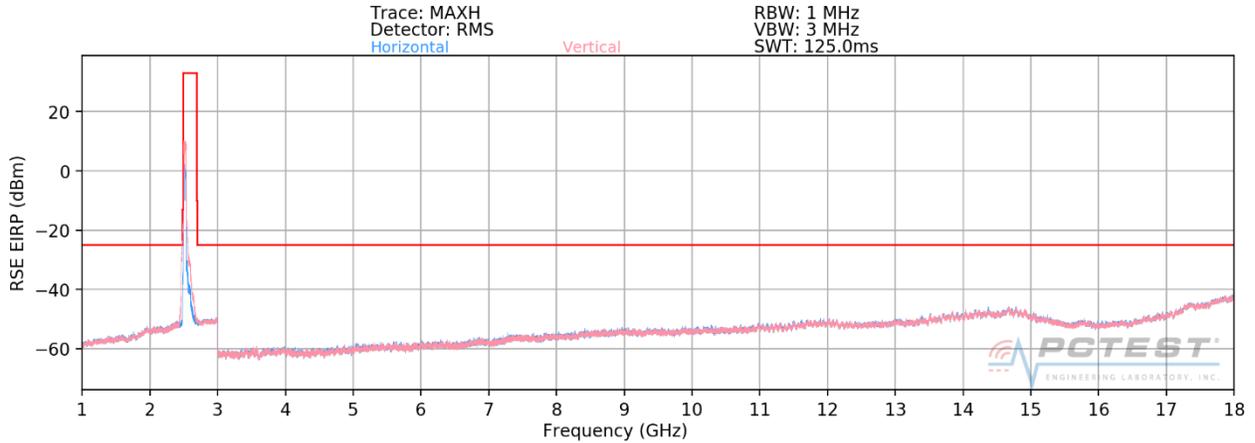


Plot 7-44. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0-Mid Channel)

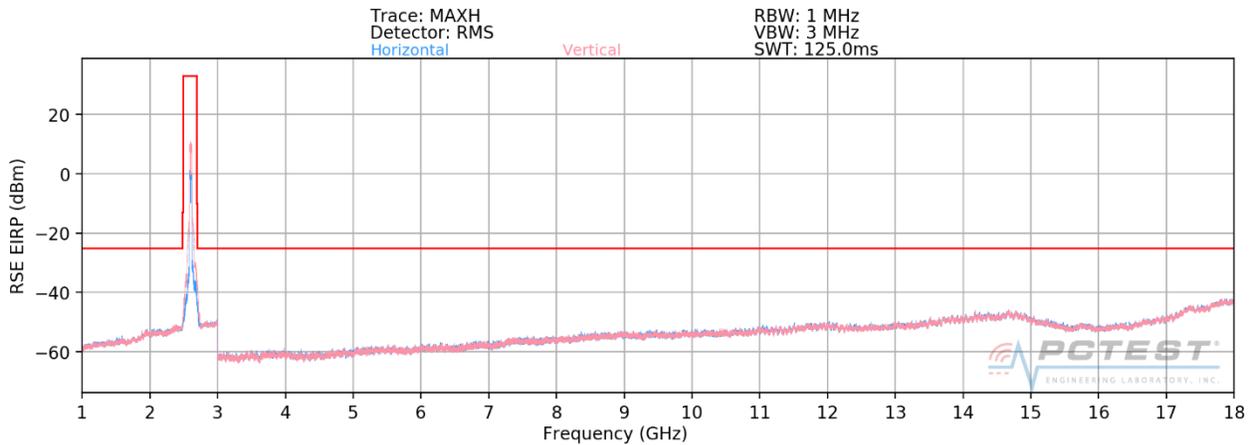


Plot 7-45. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99-High Channel)

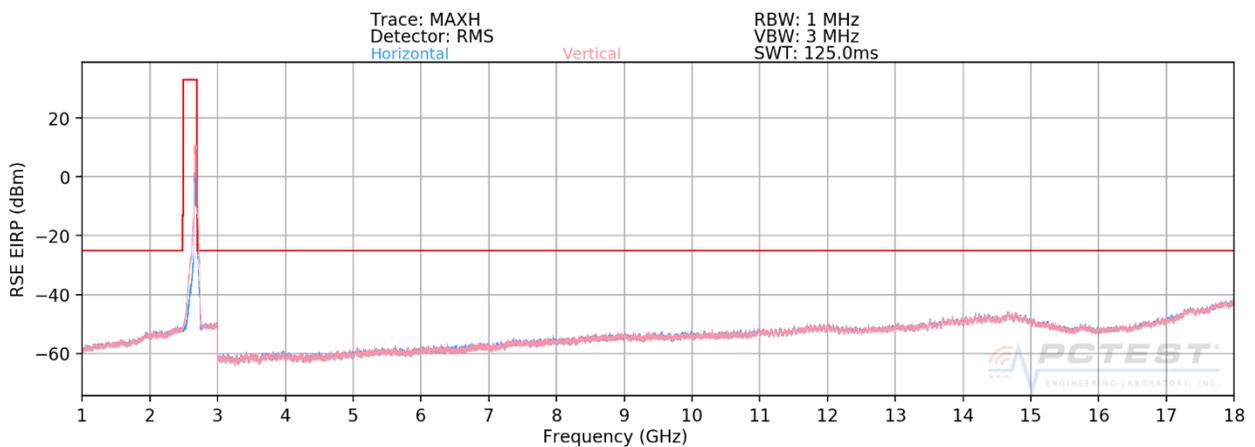
FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 52 of 74



Plot 7-46. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0-Low Channel)



Plot 7-47. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0-Mid Channel)



Plot 7-48. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0-High Channel)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2-ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 53 of 74

OPERATING FREQUENCY(PCC): 2506.00 MHz
 OPERATING FREQUENCY(SCC): 2525.80 MHz
 CHANNEL: 39750
 CHANNEL: 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	H	-	-	-71.19	10.90	-60.29	-35.3
7513.00	H	-	-	-67.48	11.10	-56.38	-31.4

Plot 7-49. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0)

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	H	-	-	-70.12	10.74	-59.38	-34.4
7779.00	H	-	-	-67.80	11.44	-56.36	-31.4

Plot 7-50. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 54 of 74	

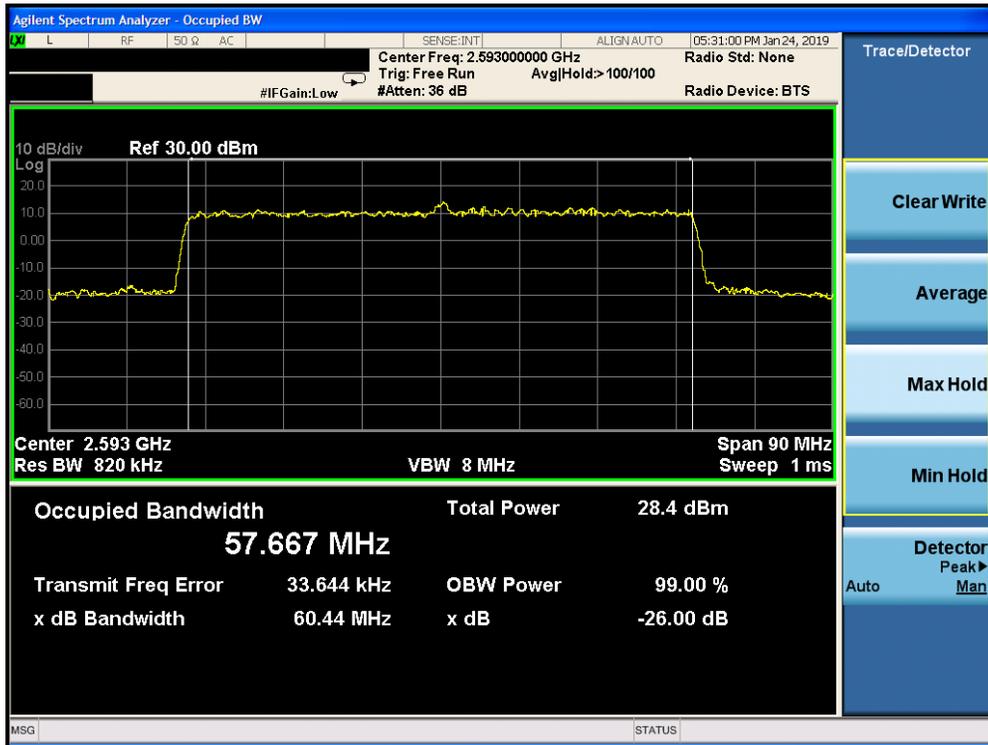
OPERATING FREQUENCY (PCC): 2680.00 MHz
 OPERATING FREQUENCY(SCC): 2660.20 MHz
 CHANNEL(PCC): 41490
 CHANNEL(SCC): 41292
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -25 dBm

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	-	-	-70.80	10.70	-60.10	-35.1
8045.00	H	-	-	-66.75	11.16	-55.59	-30.6

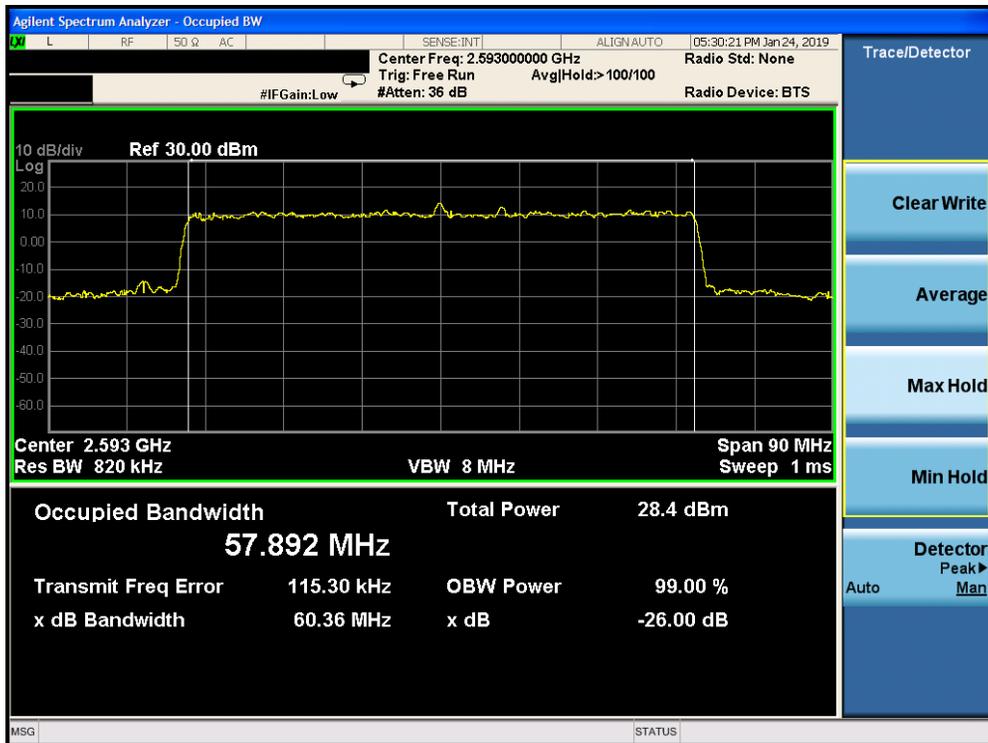
Plot 7-51. Radiated Spruious Data (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 55 of 74	

7.5 NR Band n41 (ENDC) Test Results

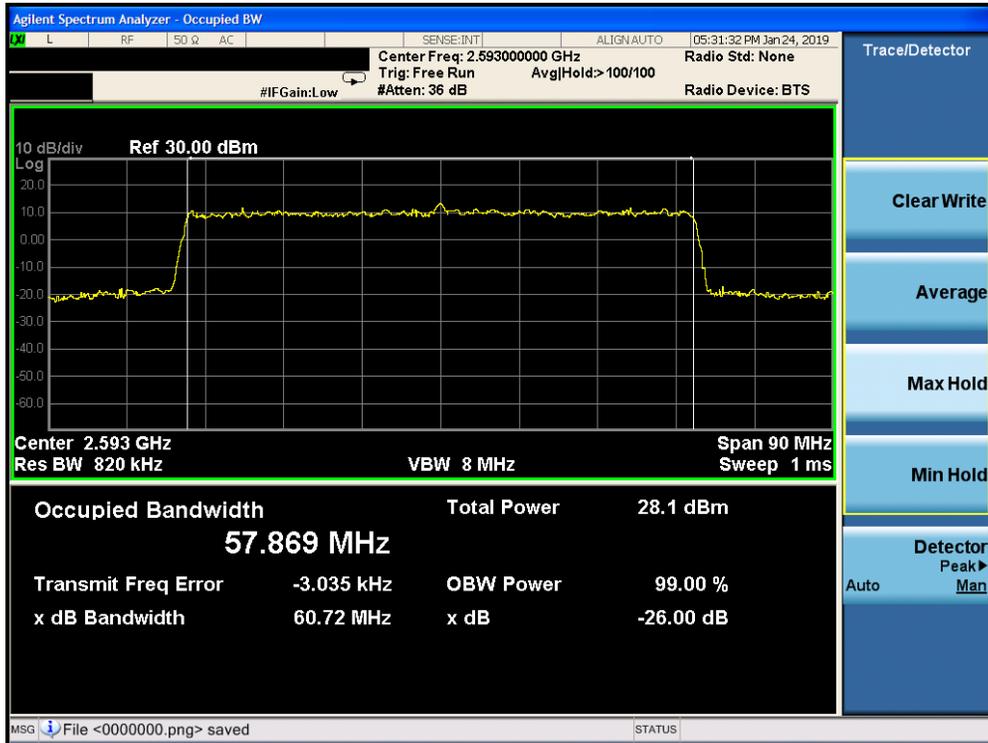


Plot 10. Occupied Bandwidth Plot (n41 60MHz CP-QPSK - Full RB Configuration)

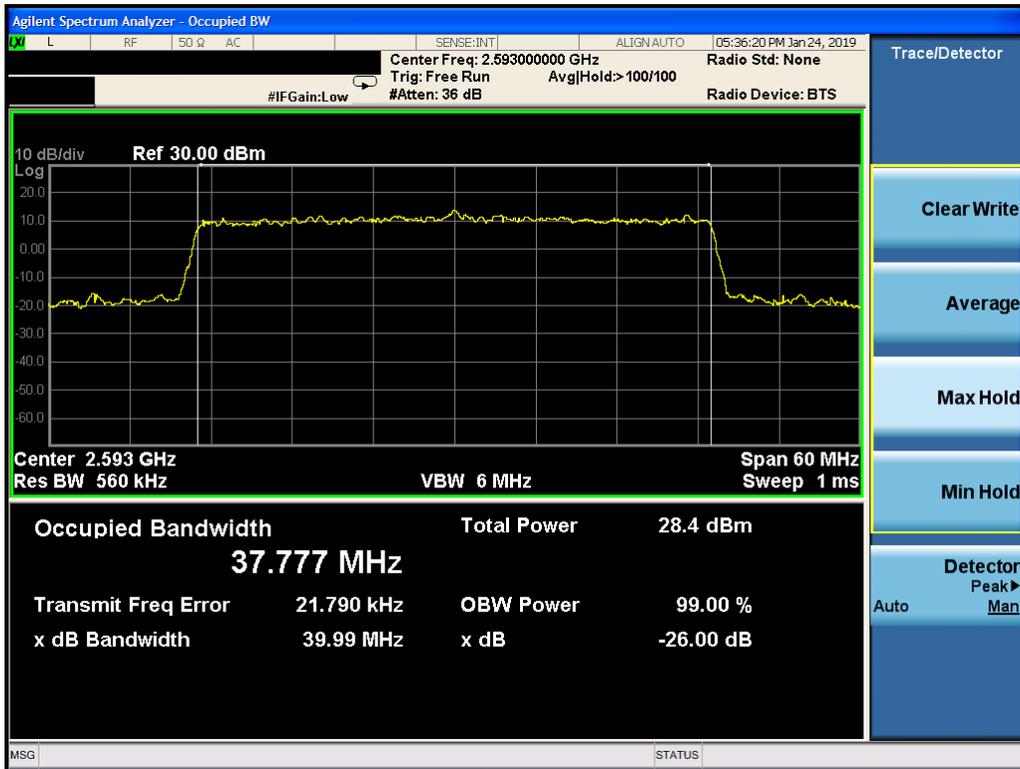


Plot 11. Occupied Bandwidth Plot (n41 60MHz CP-16QAM - Full RB Configuration)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 56 of 74

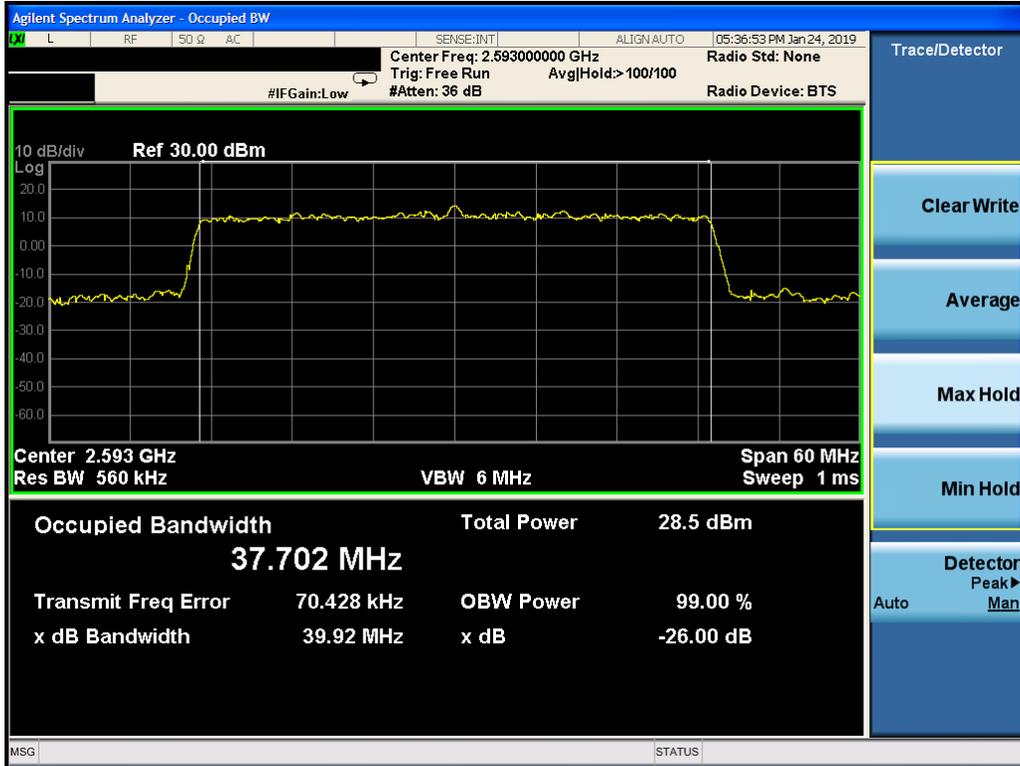


Plot 12. Occupied Bandwidth Plot (n41 60MHz CP-64QAM - Full RB Configuration)

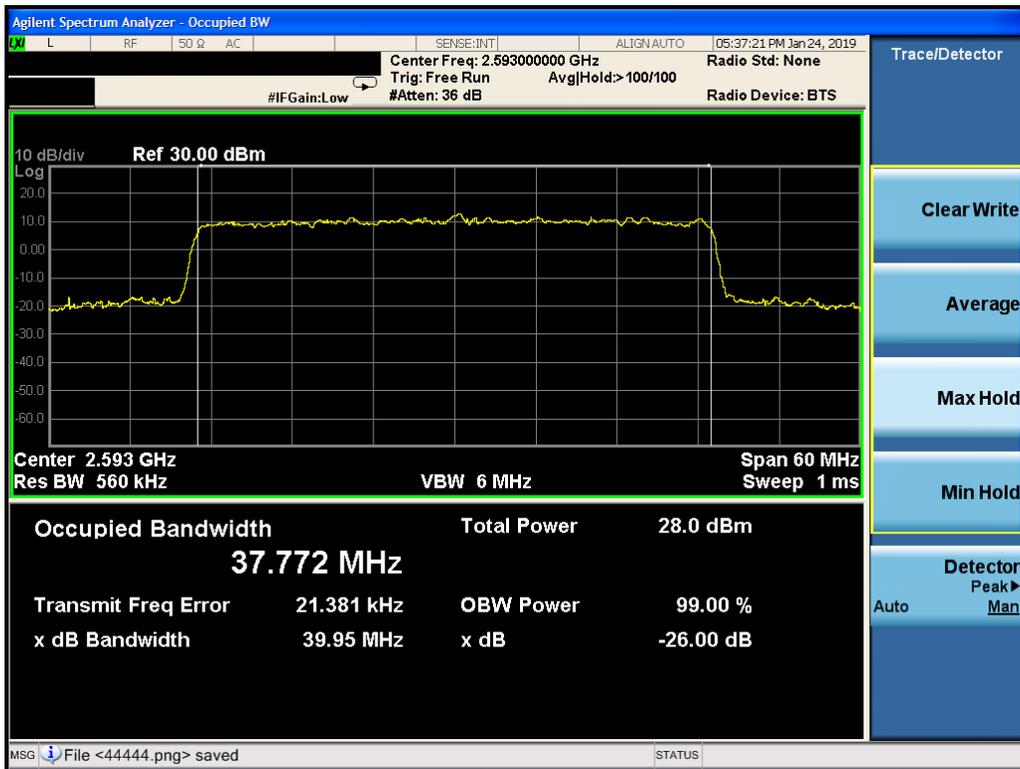


Plot 13. Occupied Bandwidth Plot (n41 40MHz CP-QPSK - Full RB Configuration)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 57 of 74

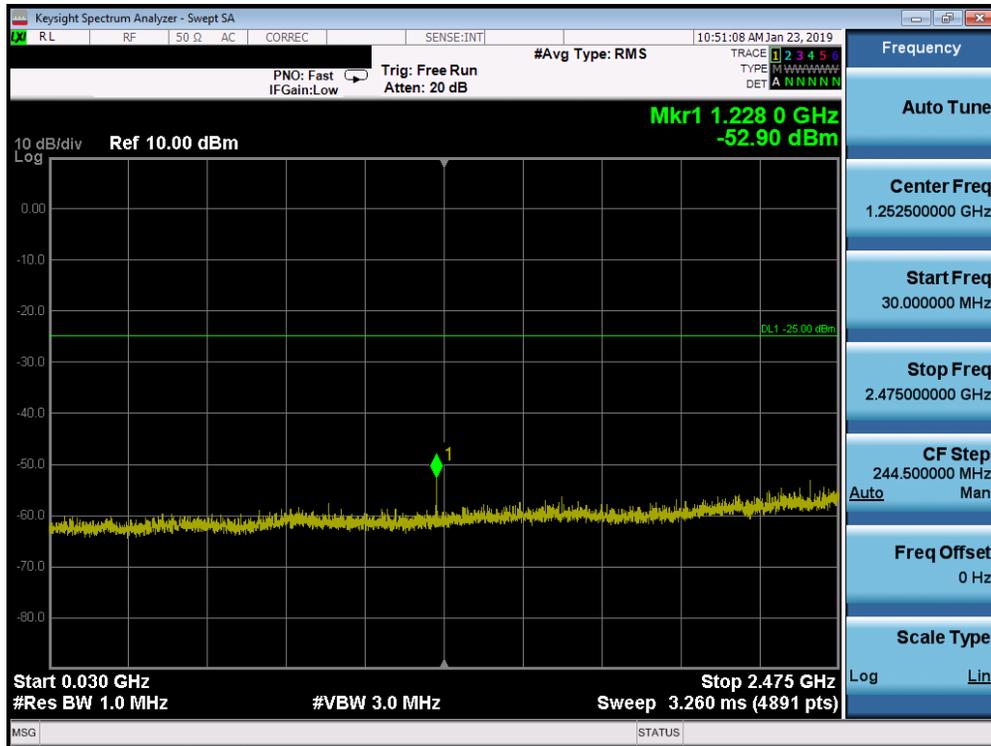


Plot 14. Occupied Bandwidth Plot (n41 40MHz CP-16QAM - Full RB Configuration)

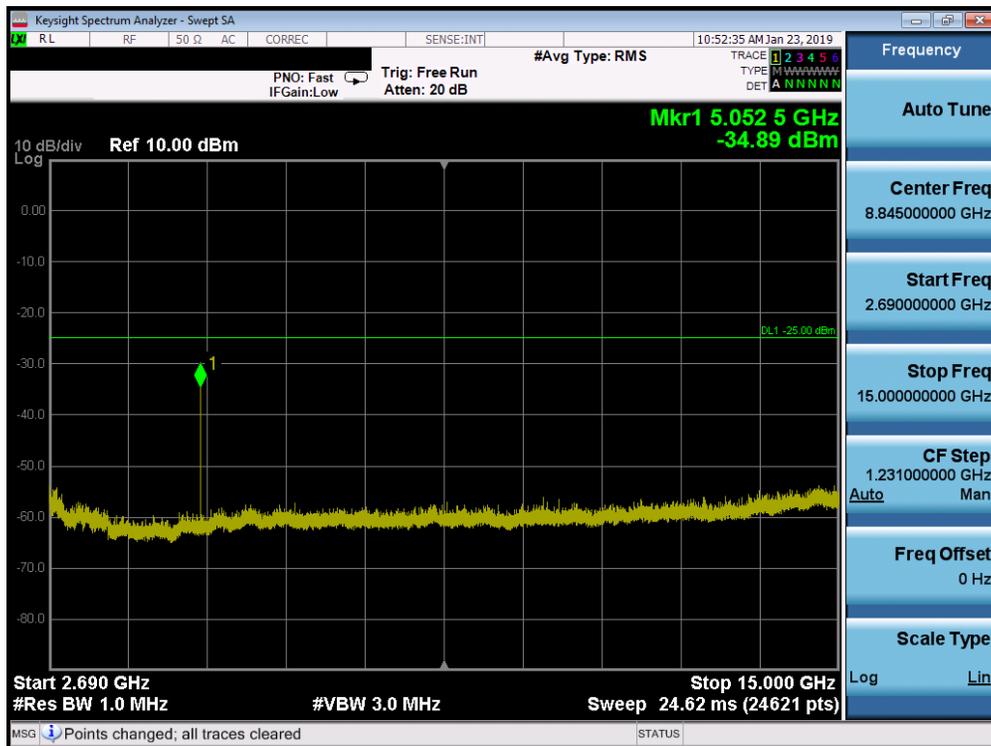


Plot 15. Occupied Bandwidth Plot (n41 40MHz CP-64QAM- Full RB Configuration)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 58 of 74

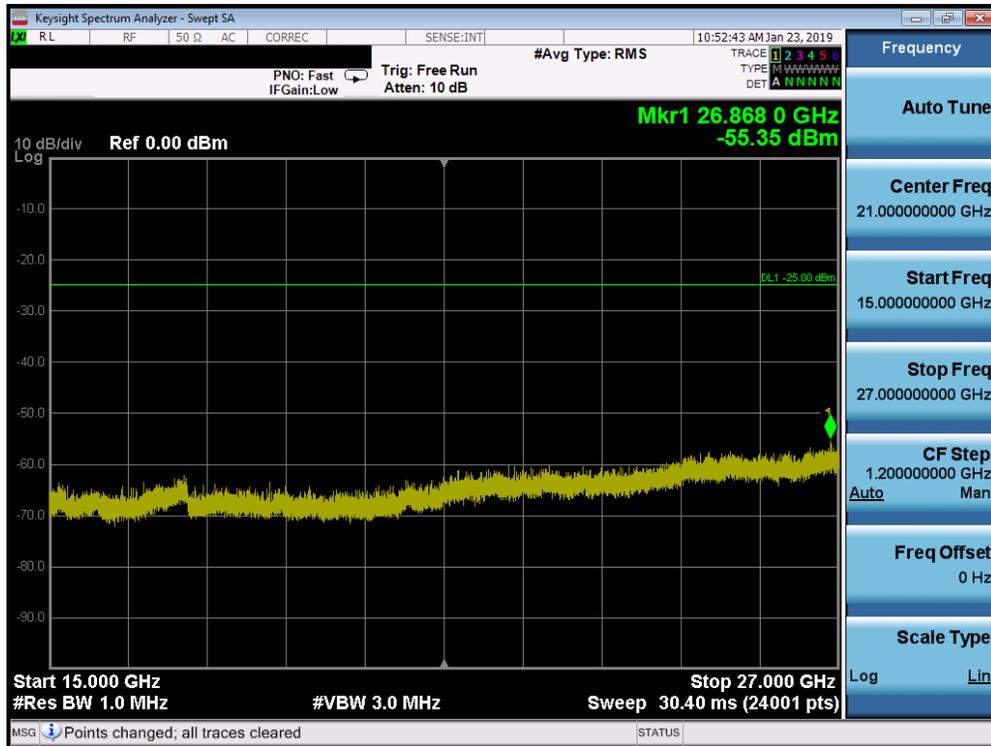


Plot 16. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 - Low Channel)

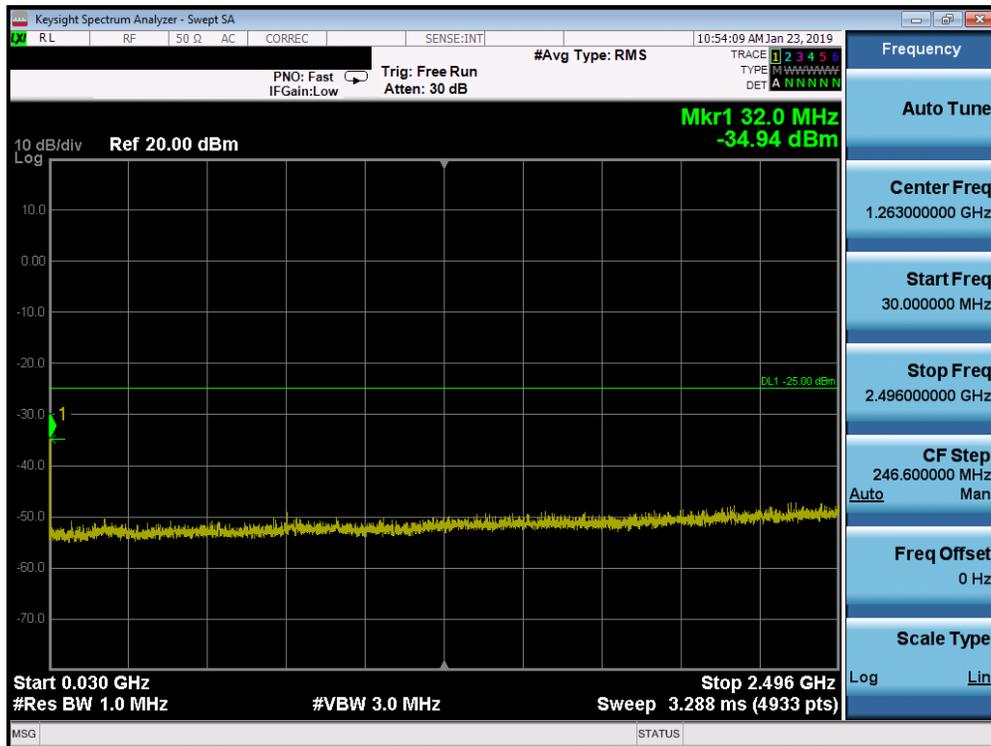


Plot 17. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 - Low Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 59 of 74

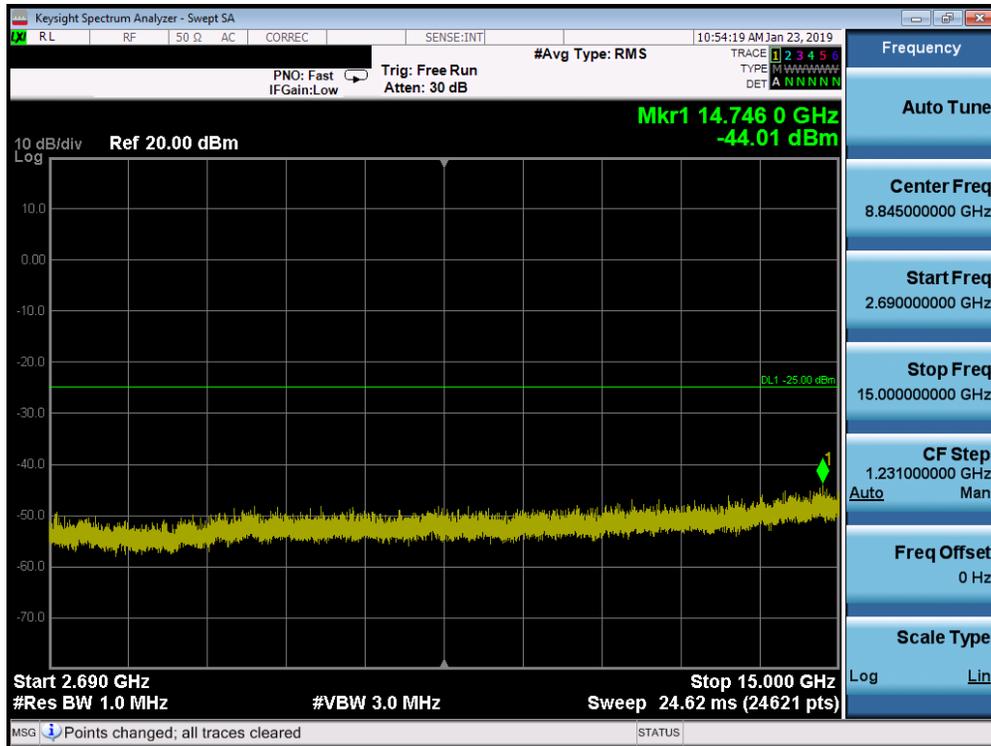


Plot 18. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 - Low Channel)

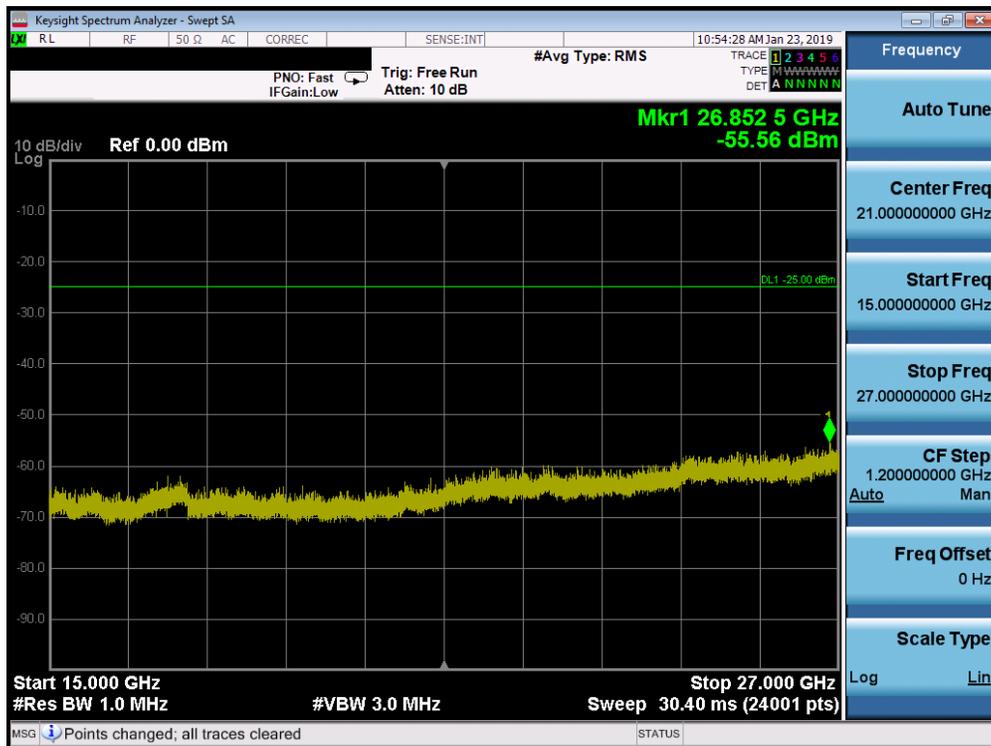


Plot 19. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 - Mid Channel)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 60 of 74

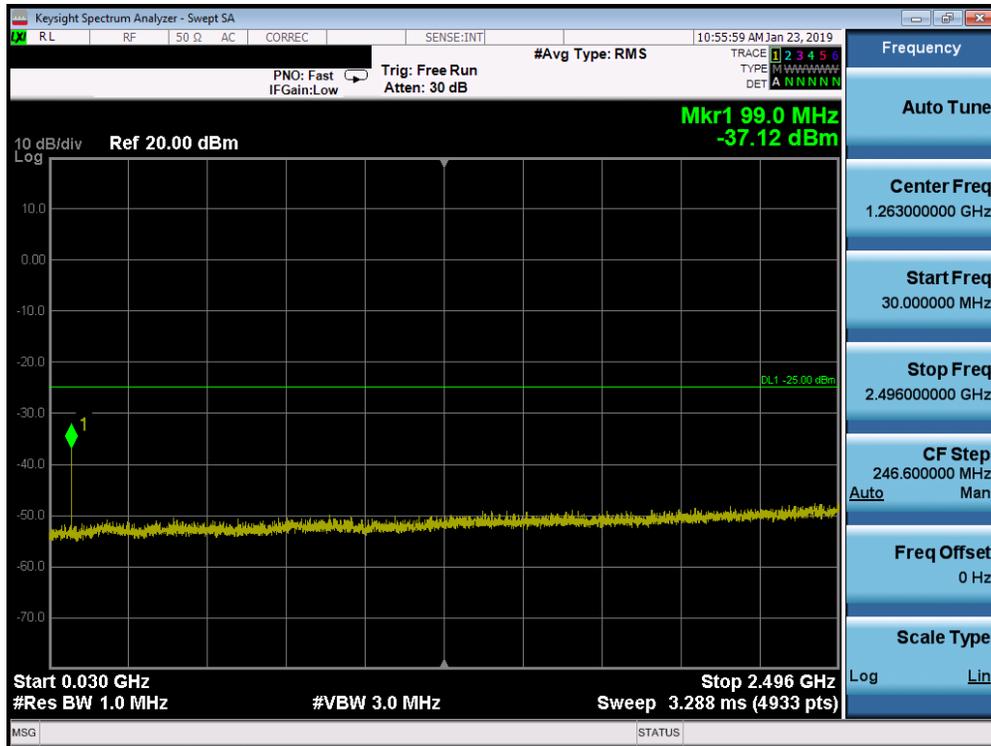


Plot 20. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 – Mid Channel)

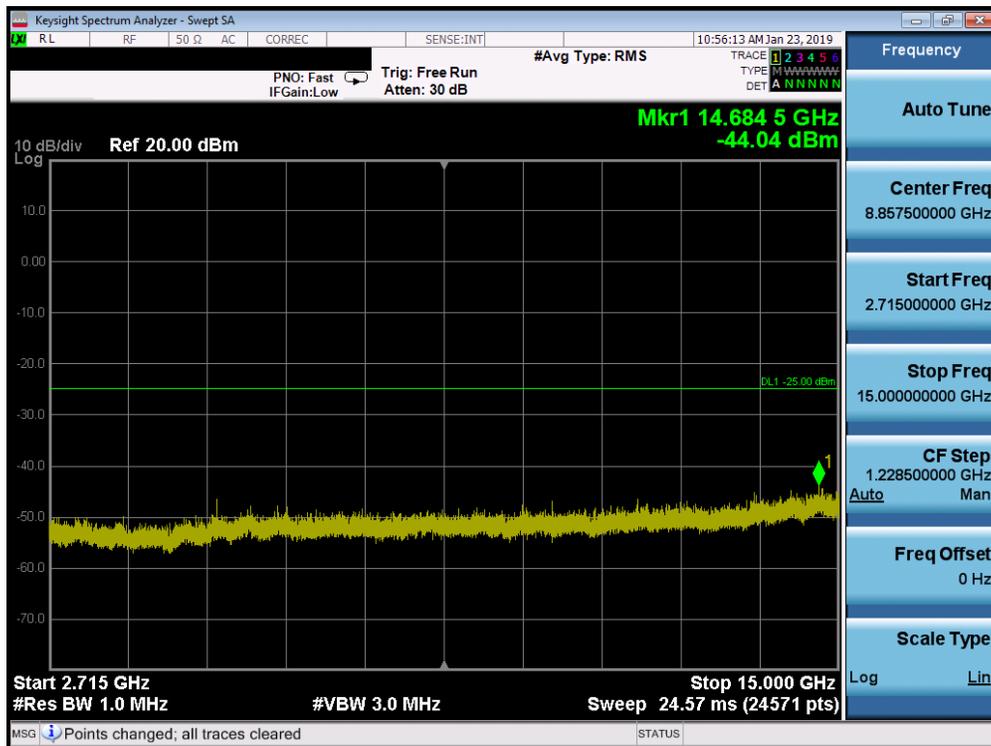


Plot 21. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 – Mid Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 61 of 74

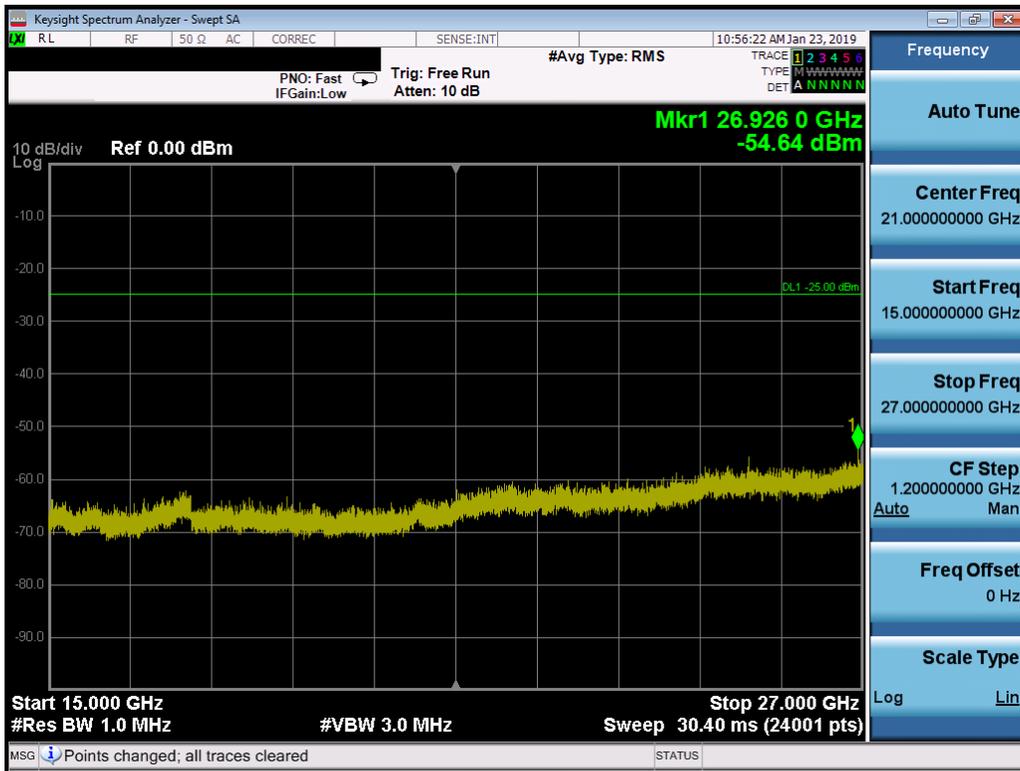


Plot 22. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 - High Channel)



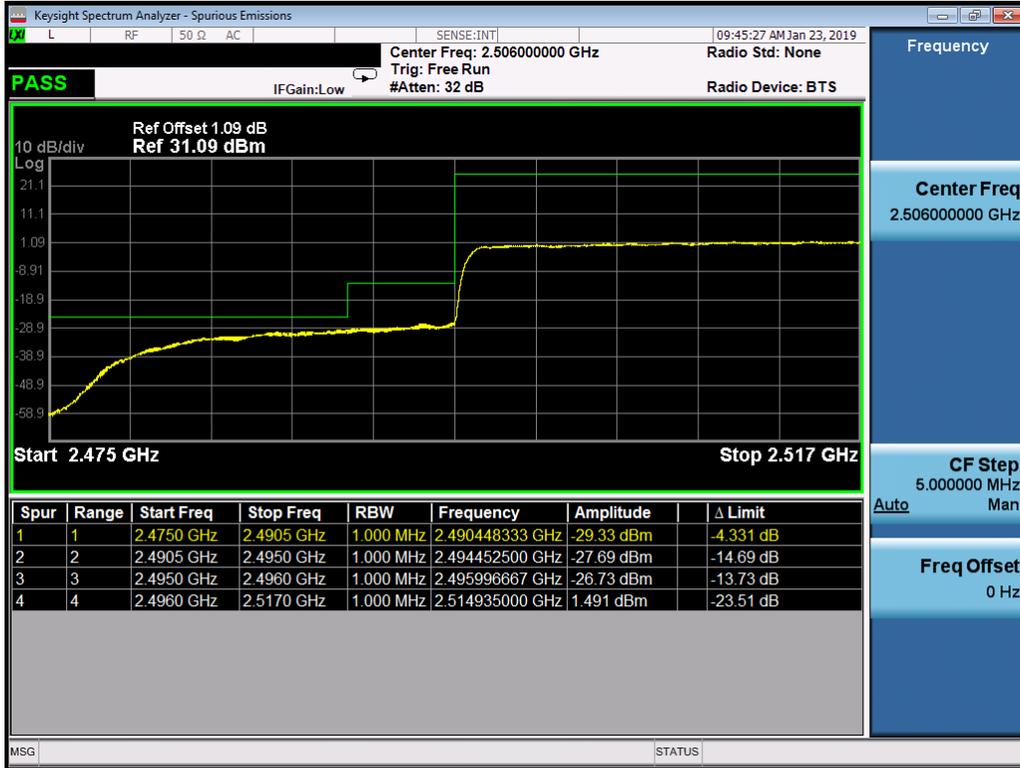
Plot 23. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 - High Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 62 of 74

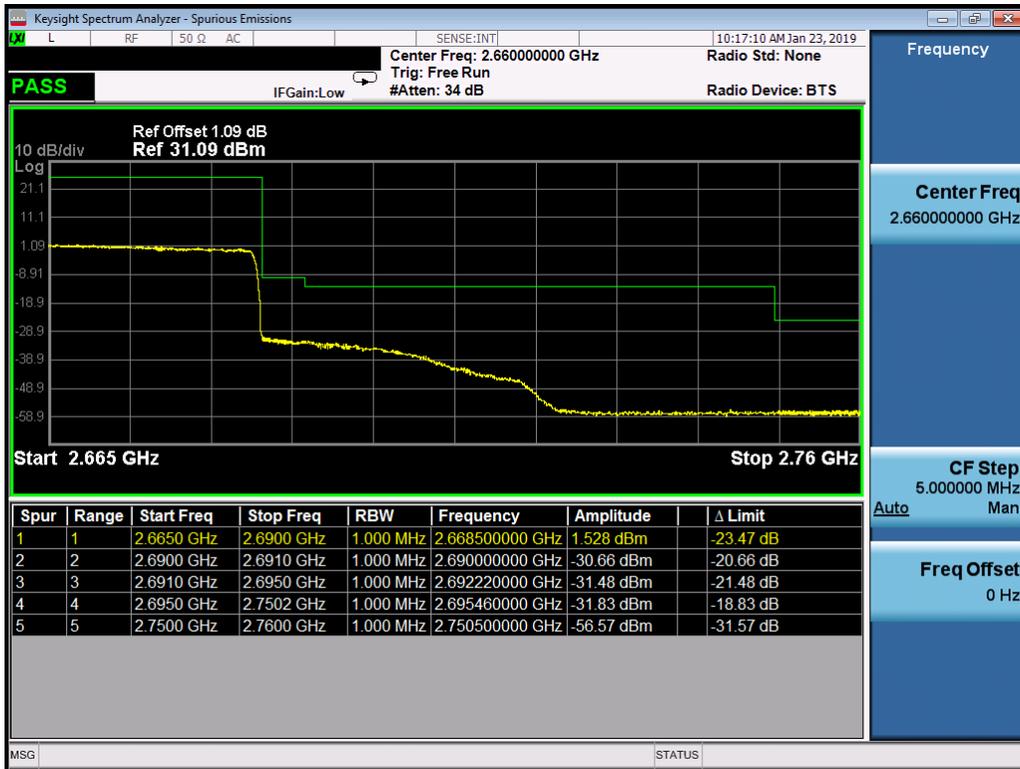


Plot 24. Conducted Spurious Plot (NR Band n41 (ENDC mode) 60MHz CP-QPSK - RB Size 1, RB Offset 81 – High Channel)

FCC ID: ZNFV450PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 63 of 74	

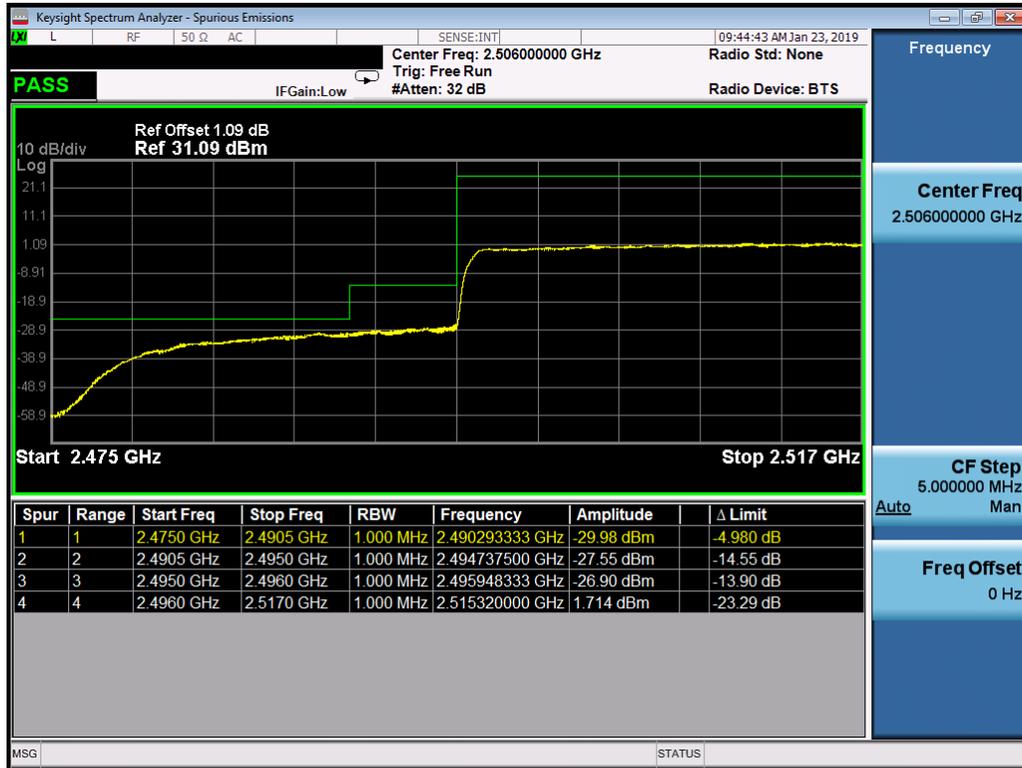


Plot 25. Lower Band Edge Plot (n41 - 60MHz CP-QPSK - Full RB Configuration)

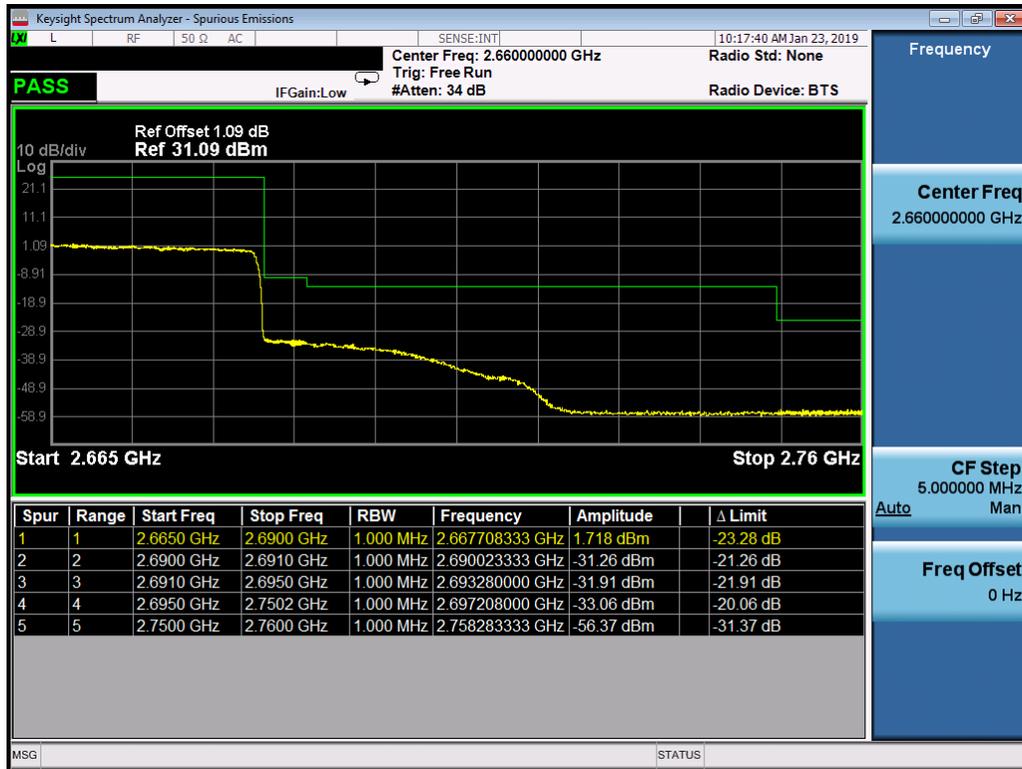


Plot 26. Upper Band Edge Plot (n41 - 60MHz CP-QPSK - Full RB Configuration)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 64 of 74

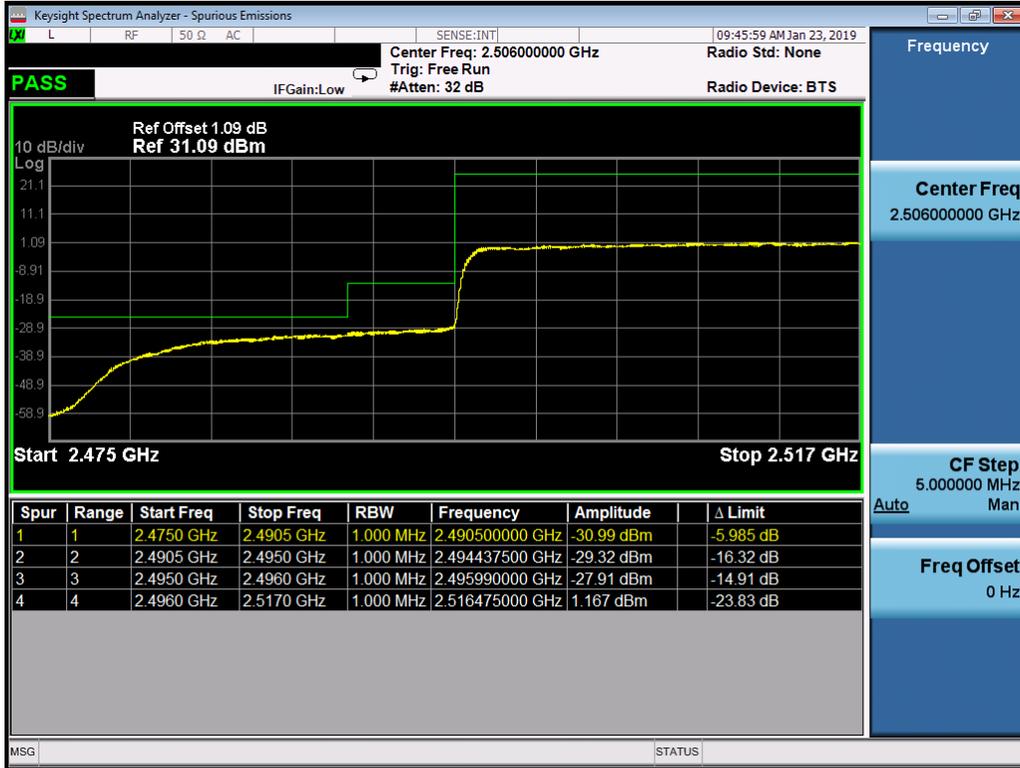


Plot 27. Lower Band Edge Plot (n41 - 60MHz CP-16QAM - Full RB Configuration)

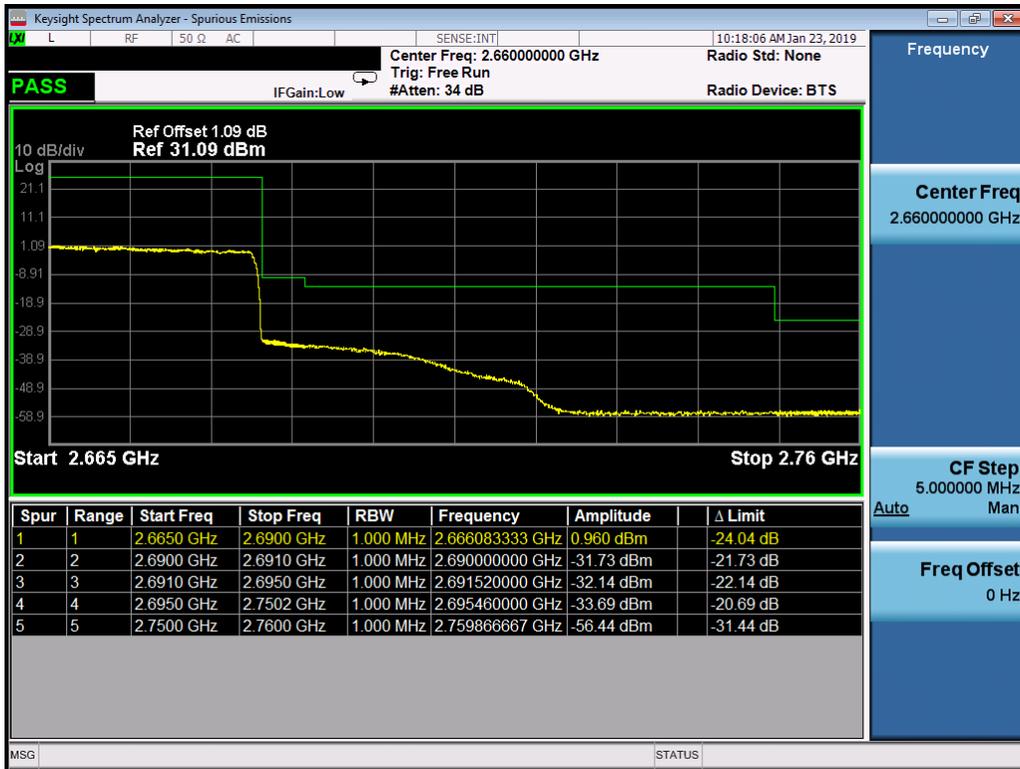


Plot 28. Upper Band Edge Plot (n41 - 60MHz CP-16QAM - Full RB Configuration)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 65 of 74

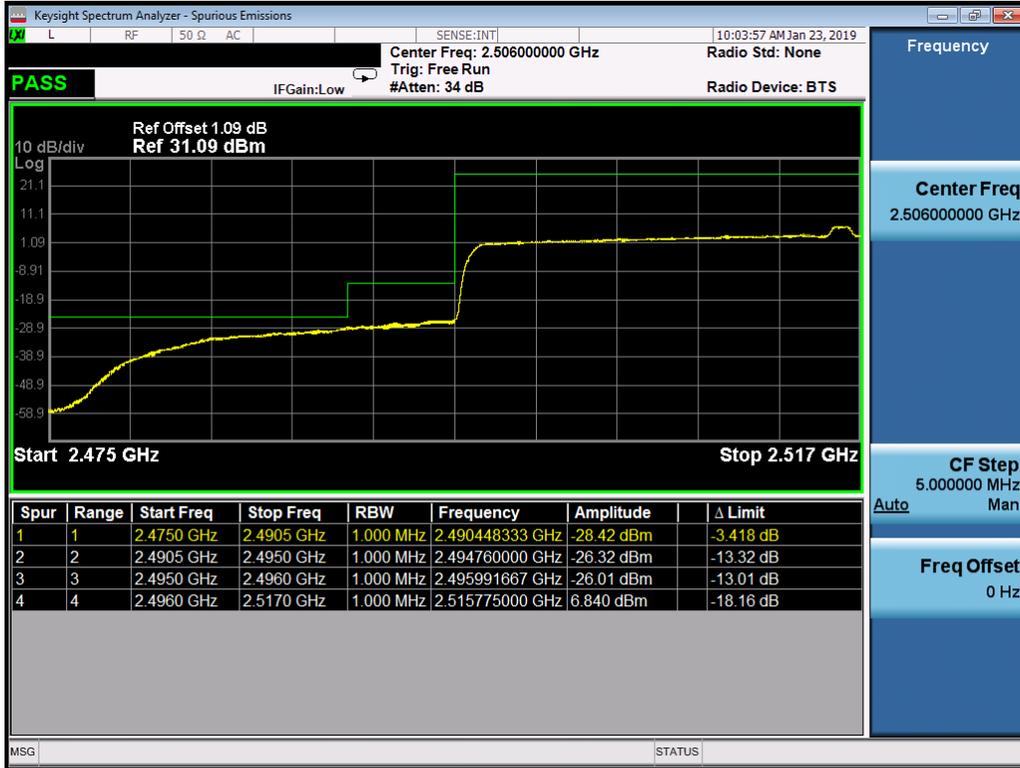


Plot 29. Lower Band Edge Plot (n41 - 60MHz CP-64QAM - Full RB Configuration)

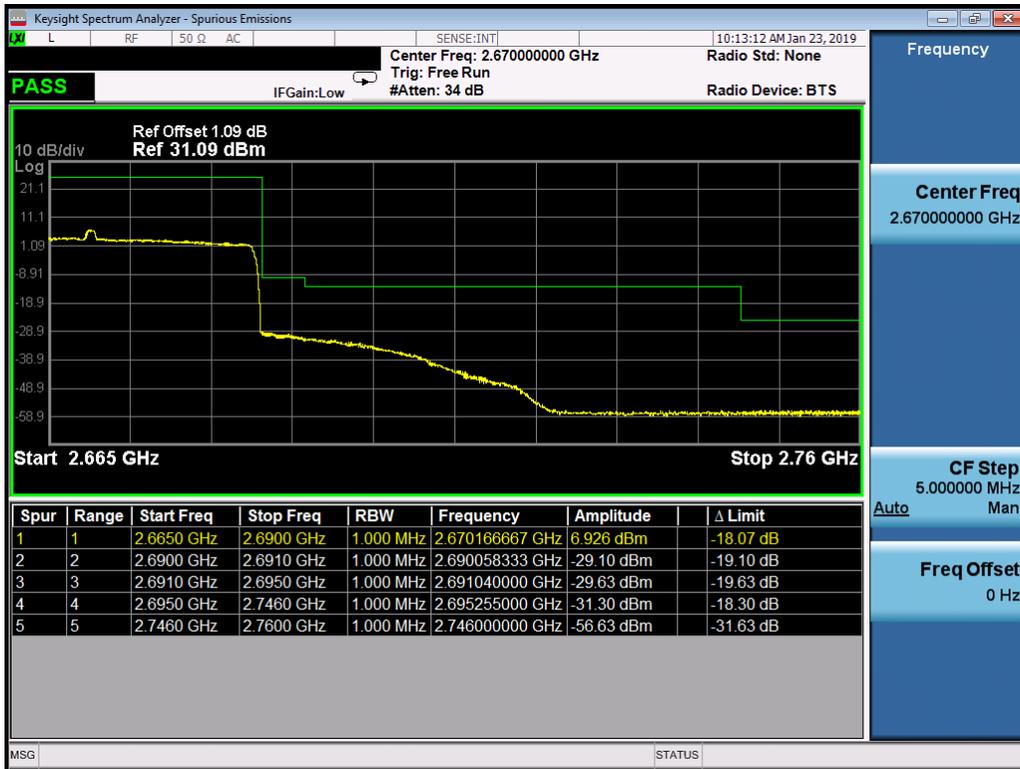


Plot 30. Upper Band Edge Plot (n41 - 60MHz CP-64QAM - Full RB Configuration)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 66 of 74



Plot 31. Lower Band Edge Plot (n41 - 40MHz CP-QPSK - Full RB Configuration)



Plot 32. Upper Band Edge Plot (n41 - 40MHz CP-QPSK - Full RB Configuration)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 67 of 74



Plot 33. Lower Band Edge Plot (n41 - 40MHz CP-16QAM - Full RB Configuration)

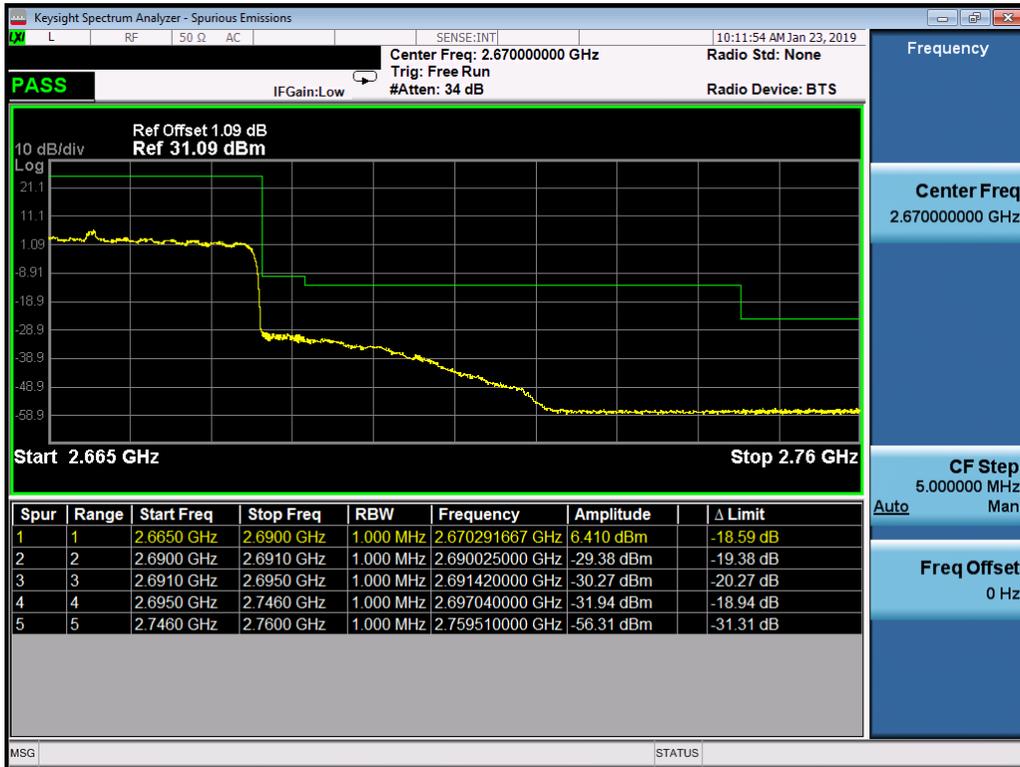


Plot 34. Upper Band Edge Plot (n41 - 40MHz CP-16QAM - Full RB Configuration)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 68 of 74



Plot 35. Lower Band Edge Plot (n41 - 40MHz CP-64QAM - Full RB Configuration)



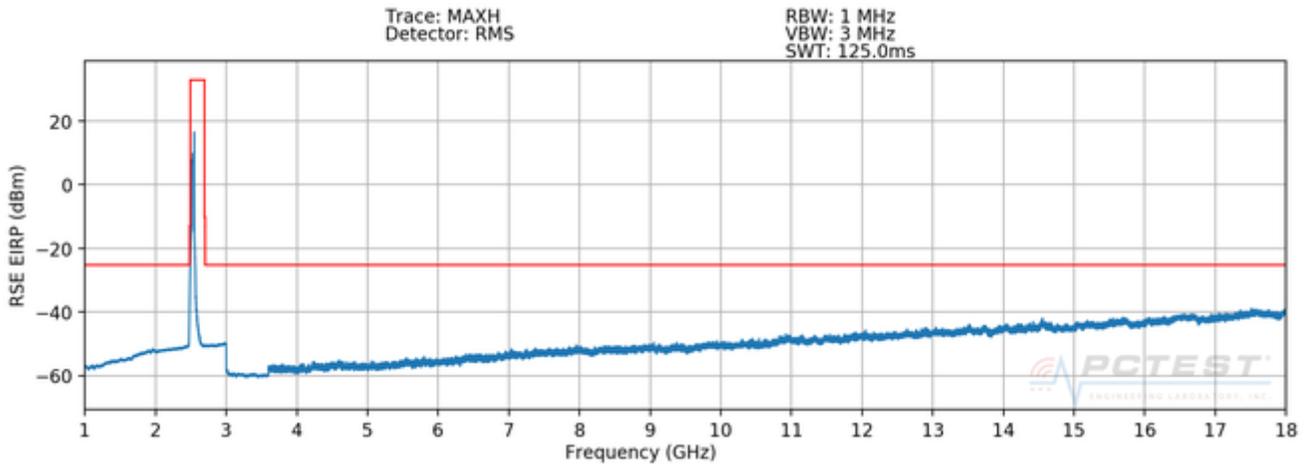
Plot 36. Upper Band Edge Plot (n41 - 40MHz CP-64QAM - Full RB Configuration)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 69 of 74

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]
2526.00	60	QPSK	H	121	83	81/40	11.43	7.85	19.28	0.085	33.01	-13.73
2592.99	60	QPSK	H	142	103	81/40	10.42	7.71	18.13	0.065	33.01	-14.88
2659.98	60	QPSK	H	123	87	81/40	10.02	7.57	17.59	0.057	33.01	-15.42
2592.99	60	QPSK	H	115	97	1/1	11.98	7.71	19.69	0.093	33.01	-13.32
2550.00	60	QPSK	H	121	116	1/81	12.66	7.71	20.37	0.109	33.01	-12.64
2592.99	60	16-QAM	H	113	287	1/0	8.83	7.57	16.40	0.044	33.01	-16.61
2592.99	60	64-QAM	H	101	230	81/0	9.82	7.57	17.39	0.055	33.01	-15.62
2516.01	40	QPSK	H	159	91	53/26	12.81	7.87	20.68	0.117	33.01	-12.33
2592.99	40	QPSK	H	117	116	53/26	10.87	7.71	18.58	0.072	33.01	-14.43
2670.00	40	QPSK	H	113	57	53/26	10.34	7.55	17.89	0.062	33.01	-15.12
2592.99	40	QPSK	H	125	78	1/1	11.21	7.71	18.92	0.078	33.01	-14.09
2550.00	40	QPSK	H	127	86	1/52	12.59	7.71	20.30	0.107	33.01	-12.71
2592.99	40	16-QAM	H	119	263	1/52	11.23	7.71	18.94	0.078	33.01	-14.07
2592.99	40	64-QAM	H	115	269	106/0	9.51	7.71	17.22	0.053	33.01	-15.79

Table 52. EIRP Data (n41)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 70 of 74	



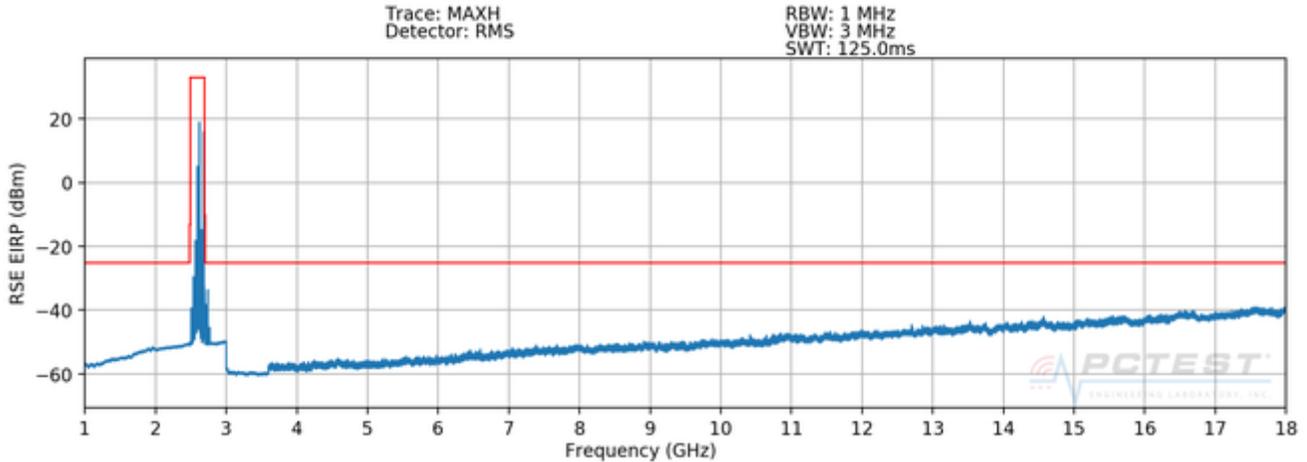
Plot 37. Radiated Spurious Plot above 1GHz (NR Band n41 (ENDC mode) – Low Channel)

n41 OPERATING FREQUENCY: 2526.00 MHz
 n41 MODULATION SIGNAL: QPSK
 n41 BANDWIDTH: 60.0 MHz
 n41 RB OFFSET: 81/40
 LTE OPERATING FREQUENCY: 2566.00 MHz
 LTE CHANNEL: 40350
 LTE MODULATION SIGNAL: QPSK
 LTE BANDWIDTH: 20.0 MHz
 LTE RB OFFSET: 1/0
 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]
5052.00	H	-	-	-67.63	8.57	-59.07	-34.1
7578.00	H	-	-	-63.12	8.44	-54.67	-29.7
10104.00	H	-	-	-59.88	9.81	-50.07	-25.1

Table 53. Radiated Spurious Data (NR Band n41 (ENDC mode) – Low Channel)

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 71 of 74



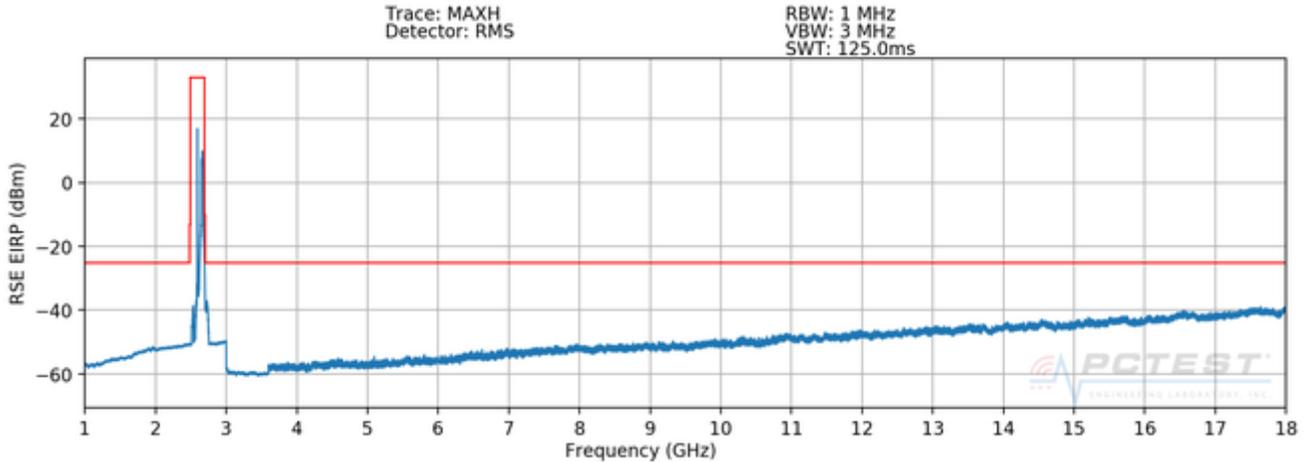
Plot 38. Radiated Spurious Plot above 1GHz (NR Band n41 (ENDC mode) – Mid Channel)

n41 OPERATING FREQUENCY: 2592.99 MHz
n41 CHANNEL: 518598
n41 MODULATION SIGNAL: QPSK
n41 BANDWIDTH: 60.0 MHz
n41 RB OFFSET: 81/40
LTE OPERATING FREQUENCY: 2680.00 MHz
LTE CHANNEL: 41490
LTE MODULATION SIGNAL: QPSK
LTE BANDWIDTH: 20.0 MHz
LTE RB OFFSET: 1/50
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]
5185.98	H	-	-	-67.89	8.70	-59.19	-34.2
7778.97	H	-	-	-63.34	8.69	-54.65	-29.7
10371.96	H	-	-	-59.04	9.62	-49.42	-24.4

Table 54. Radiated Spurious Data (NR Band n41 (ENDC mode – Mid Channel)

FCC ID: ZNFV450PM	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 72 of 74



Plot 39. Radiated Spurious Plot above 1GHz (NR Band n41 (ENDC mode – High Channel))

n41 OPERATING FREQUENCY: 2659.98 MHz
n41 CHANNEL: 531996
n41 MODULATION SIGNAL: QPSK
n41 BANDWIDTH: 60.0 MHz
n41 RB OFFSET: 81/40
LTE OPERATING FREQUENCY: 2593.00 MHz
LTE CHANNEL: 40620
LTE MODULATION SIGNAL: QPSK
LTE BANDWIDTH: 20.0 MHz
LTE RB OFFSET: 1/50
DISTANCE: -25 dBm
LIMIT:

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]
5319.96	H	-	-	-67.45	8.73	-58.72	-33.7
7979.94	H	-	-	-63.23	8.85	-54.38	-29.4
10639.92	H	-	-	-57.87	9.50	-48.37	-23.4

Table 55. Radiated Spurious Data (NR Band n41 (ENDC mode – High Channel))

FCC ID: ZNFV450PM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset		Page 73 of 74

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFV450PM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFV450PM	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 Approved by: Quality Manager
Test Report S/N: 1M1901150004-03-R2.ZNF	Test Dates: 1/16 - 2/11/2019	EUT Type: Portable Handset	Page 74 of 74