

MEASUREMENT REPORT LTE

Applicant Name:

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

Date of Testing:

9/8/2020 - 9/15/2020

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2008130119-03.ZNF

FCC ID:

ZNFK920AM

APPLICANT:

LG Electronics USA, Inc.

Application Type:

Class II Permissive Change

Model:

LM-K920AM

Additional Model(s):

LM-K920TM, LM-K920QM, LMK920AM, LMK920TM,
LMK920QM, K920AM, K920TM, K920QM

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

22, 24, & 27

Test Procedure(s):

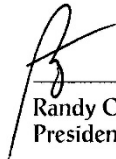
ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

Class II Permissive Change:

Please see FCC change document

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

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



Randy Ortanez
President

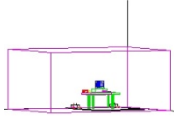


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T A B L E O F C O N T E N T S

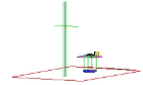
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FCC Part 22, 24, & 27



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		ERP
				Max. Power [W]	Max. Power [dBm]	Max. Power [dBm]
LTE Band 12/17	10 MHz	QPSK	704.0 - 711.0	0.098	19.90	17.75
		16QAM	704.0 - 711.0	0.081	19.06	16.91
		64QAM	704.0 - 711.0	0.068	18.33	16.18
LTE Band 13	10 MHz	QPSK	782.0	0.152	21.83	19.68
		16QAM	782.0	0.125	20.96	18.81
		64QAM	782.0	0.100	20.00	17.85
LTE Band 71	20 MHz	QPSK	673.0 - 688.0	0.055	17.44	15.29
		16QAM	673.0 - 688.0	0.051	17.07	14.92
		64QAM	673.0 - 688.0	0.046	16.64	14.49
NR Band n71	20 MHz	$\pi/2$ BPSK	673.0 - 688.0	0.109	20.39	18.24
		QPSK	673.0 - 688.0	0.106	20.27	18.12
		16QAM	673.0 - 688.0	0.048	16.78	14.63
		64QAM	673.0 - 688.0	0.042	16.19	14.04
		256QAM	673.0 - 688.0	0.027	14.24	12.09

EUT Overview (<1 GHz)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP	
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]
LTE Band 26/5	10 MHz	QPSK	829.0 - 844.0	0.098	19.93	0.161	22.08
		16QAM	829.0 - 844.0	0.082	19.15	0.135	21.30
		64QAM	829.0 - 844.0	0.070	18.48	0.116	20.63
NR Band n5	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.060	17.81	0.099	19.96
		QPSK	834.0 - 839.0	0.059	17.71	0.097	19.86
		16QAM	834.0 - 839.0	0.035	15.40	0.057	17.55
		64QAM	834.0 - 839.0	0.027	14.28	0.044	16.43
		256QAM	834.0 - 839.0	0.017	12.27	0.028	14.42

EUT Overview (<1 GHz)

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
LTE Band 66	20 MHz	QPSK	1720.0 - 1770.0	0.107	20.28
		16QAM	1720.0 - 1770.0	0.090	19.55
		64QAM	1720.0 - 1770.0	0.054	17.33
NR Band n66	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.113	20.52
		QPSK	834.0 - 839.0	0.110	20.42
		16QAM	834.0 - 839.0	0.079	18.95
		64QAM	834.0 - 839.0	0.053	17.25
		256QAM	834.0 - 839.0	0.041	16.15

EUT Overview (Mid Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
LTE Band 25/2	20 MHz	QPSK	1860 - 1905	0.384	25.84
		16QAM	1860 - 1905	0.339	25.30
		64QAM	1860 - 1905	0.296	24.72
NR Band n2	20 MHz	$\pi/2$ BPSK	1860 - 1905	0.232	23.65
		QPSK	1860 - 1905	0.230	23.63
		16QAM	1860 - 1905	0.176	22.47
		64QAM	1860 - 1905	0.122	20.88
		256QAM	1860 - 1905	0.071	18.51

EUT Overview (Mid Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP	
				Max. Power [W]	Max. Power [dBm]
LTE Band 30	10 MHz	QPSK	2310.0	0.178	22.50
		16QAM	2310.0	0.162	22.10
		64QAM	2310.0	0.147	21.66
LTE Band 41(PC3)	20 MHz	QPSK	2506.0 - 2680.0	0.181	22.99
		16QAM	2506.0 - 2680.0	0.169	22.28
		64QAM	2506.0 - 2680.0	0.129	21.12

EUT Overview (High Bands)

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

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

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFK920AM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 15878, 15886, 15936

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-Band 5G NR, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC

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

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

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

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

This device uses a tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance for certain bands and modes of operation. The tuner for this device was set to simulate a "free space" condition where the transmit antenna is matched to the medium into which it is transmitting and, thus, the power is at its maximum level.

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.

The emissions below 1GHz and above 18GHz were tested with the highest transmitting power channel and the worst case configuration.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report. The worst orientation was found to be Y-orientation (landscape).

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

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

3.2 Radiated Power and Radiated Spurious Emissions

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration band set to the emissions’ occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10 \log_{10}(\text{Power [Watts]})$. 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
-	LTx2	Licensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx2
-	LTx3	Licensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx3
Agilent	N9038A	MXE EMI Receiver	8/11/2020	Annual	8/11/2021	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini Circuits	PWR-4GHS	USB Power Sensor	6/18/2020	Annual	6/18/2021	12001070013
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			102060
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	102133
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol Science	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Spurious Radiated Emission – LTE Band

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

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

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7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics USA, Inc.
FCC ID: ZNFK920AM
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 5/26)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.2
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 71, 12, 17, 13)	< 3 Watts max. ERP		PASS	Section 7.2
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2/25, 41)	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	< 1 Watts max. EIRP		PASS	Section 7.2
27.50(a)(3)	Equivalent Isotropic Radiated Power (Band 30)	< 0.25 Watts max. EIRP		PASS	Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12, 13, 26/5, 66/4, 25/2)	> 43 + 10 log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	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		PASS	Section 7.3
27.53(a)	Undesirable Emissions (Band 30)	> 70 + 10 log ₁₀ (P[Watts])		PASS	Section 7.3
27.53(m)	Undesirable Emissions (Band 41)	Undesirable emissions must meet the limits detailed in 27.53(m)		PASS	Section 7.3
27.53(m)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 27.53(m) & 22.913(a)(5)		PASS	Section 7.4

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.
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".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

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

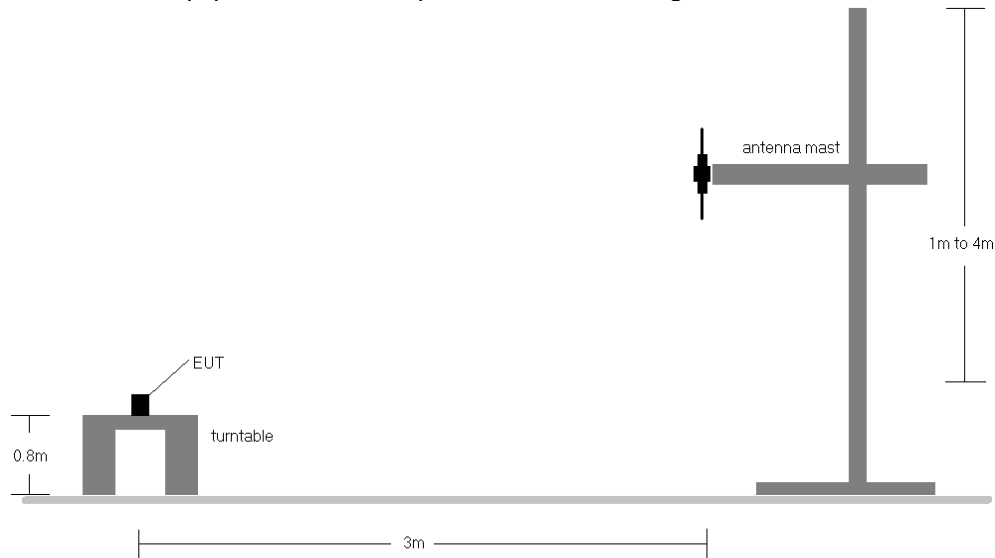


Figure 7-1. Radiated Test Setup <1GHz

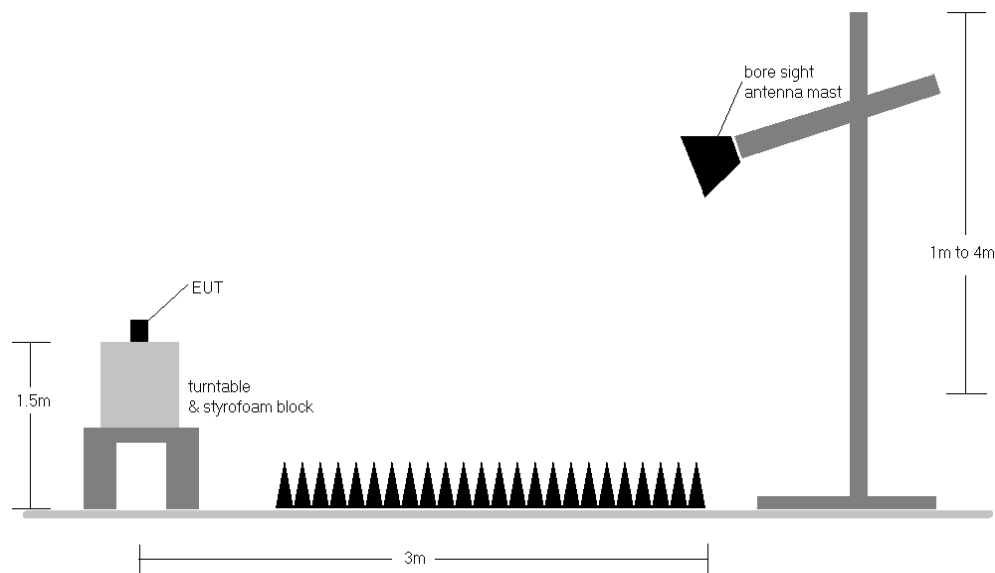


Figure 7-2. Radiated Test Setup >1GHz

Test Notes

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

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	QPSK	673.0	V	101	293	1.33	1 / 50	15.73	17.06	0.051	36.99	-19.93	14.91	0.031	34.77	-19.86
		680.5	V	101	289	1.33	1 / 50	15.88	17.21	0.053	36.99	-19.77	15.06	0.032	34.77	-19.71
		688.0	V	101	292	1.34	1 / 50	16.10	17.44	0.055	36.99	-19.55	15.29	0.034	34.77	-19.48
	16-QAM	688.0	V	101	292	1.34	1 / 50	15.73	17.07	0.051	36.99	-19.92	14.92	0.031	34.77	-19.85
	64-QAM	688.0	V	101	292	1.34	1 / 50	15.90	16.64	0.046	36.99	-20.35	14.49	0.028	34.77	-20.28
	Opposite Pol.	680.5	H	102	277	1.32	1 / 12	13.79	15.11	0.032	36.99	-21.88	12.96	0.020	34.77	-21.81

Table 7-2. ERP Data (Band 71)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	TT/2 BPSK	673.0	H	180.0	331.0	3.70	1 / 0	16.47	20.17	0.104	36.99	-16.82	18.02	0.063	34.77	-16.75
		680.5	H	180.0	331.0	3.70	1 / 0	16.69	20.39	0.109	36.99	-16.60	18.24	0.067	34.77	-16.53
		688.0	H	180.0	331.0	3.70	1 / 0	16.61	20.31	0.107	36.99	-16.68	18.16	0.065	34.77	-16.61
	QPSK	680.5	H	180.0	331.0	3.70	1 / 0	16.57	20.27	0.106	36.99	-16.72	18.12	0.065	34.77	-16.65
		680.5	H	180.0	331.0	3.70	1 / 0	13.08	16.78	0.048	36.99	-20.21	14.63	0.029	34.77	-20.14
		680.5	H	180.0	331.0	3.70	1 / 0	12.49	16.19	0.042	36.99	-20.80	14.04	0.025	34.77	-20.73
	16-QAM	680.5	H	180.0	331.0	3.70	1 / 0	10.54	14.24	0.027	36.99	-22.75	12.09	0.016	34.77	-22.68
	64-QAM	680.5	H	180.0	331.0	3.70	1 / 0	10.54	14.24	0.027	36.99	-22.75	12.09	0.016	34.77	-22.68
	QPSK (Opposite Pol.)	680.5	V	100.0	257.0	3.70	1 / 0	16.65	20.35	0.108	36.99	-16.64	18.20	0.066	34.77	-16.57

Table 7-3. ERP Data (Band n71)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
10 MHz	QPSK	704.0	H	280	124	1.34	1 / 0	18.49	19.83	0.096	36.99	-17.16	17.68	0.059	34.77	-17.09
		707.5	H	150	51	1.33	1 / 0	18.57	19.90	0.098	36.99	-17.09	17.75	0.060	34.77	-17.02
		711.0	H	264	58	1.33	1 / 0	17.99	19.32	0.085	36.99	-17.67	17.17	0.052	34.77	-17.61
	16-QAM	707.5	H	148	26	1.33	1 / 0	17.73	19.06	0.081	36.99	-17.93	16.91	0.049	34.77	-17.86
	64-QAM	707.5	H	156	26	1.33	1 / 0	17.00	18.33	0.068	36.99	-18.66	16.18	0.042	34.77	-18.59
		700.5	V	164	230	1.35	1 / 0	17.82	19.17	0.083	36.99	-17.82	17.02	0.050	34.77	-17.75

Table 7-4. ERP Data (Band 12/17)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
10 MHz	QPSK	782.0	V	154	260	1.04	1 / 0	20.79	21.83	0.152	36.99	-15.16	19.68	0.093	34.77	-15.09
	16-QAM	782.0	V	154	260	1.04	1 / 0	19.92	20.96	0.125	36.99	-16.03	18.81	0.076	34.77	-15.96
	64-QAM	782.0	V	154	260	1.04	1 / 0	18.96	20.00	0.100	36.99	-16.99	17.85	0.061	34.77	-16.92
	Opposite Pol.	782.0	H	134	167	1.04	1 / 0	17.23	18.27	0.067	36.99	-18.72	16.12	0.041	34.77	-18.65

Table 7-5. ERP Data (Band 13)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	V	140	251	1.27	1 / 0	19.94	19.06	0.081	38.45	-19.39	21.21	0.132	40.61	-19.39
		836.5	V	135	304	1.31	1 / 0	20.77	19.93	0.098	38.45	-18.52	22.08	0.161	40.61	-18.53
		844.0	V	127	251	1.35	1 / 0	19.86	19.06	0.080	38.45	-19.39	21.21	0.132	40.61	-19.40
	16-QAM	836.5	V	135	304	1.31	1 / 0	19.99	19.15	0.082	38.45	-19.30	21.30	0.135	40.61	-19.31
	64-QAM	836.5	V	135	304	1.31	1 / 0	19.32	18.48	0.070	38.45	-19.97	20.63	0.116	40.61	-19.98
		836.5	H	216	289	1.26	1 / 0	16.01	17.27	0.053	38.45	-21.18	19.42	0.087	40.61	-21.19

Table 7-6. ERP Data (Band 26/5)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	TT/2 BPSK	834.0	V	164.0	234.0	6.40	1 / 0	13.53	17.78	0.060	38.45	-20.67	19.93	0.098	40.61	-20.68
		836.5	V	160.0	255.0	6.40	1 / 0	13.56	17.81	0.060	38.45	-20.64	19.96	0.099	40.61	-20.65
		839.0	V	162.0	251.0	6.40	1 / 0	13.43	17.68	0.059	38.45	-20.77	19.83	0.096	40.61	-20.78
	QPSK	836.5	V	154.0	241.0	6.40	1 / 0	13.46	17.71	0.059	38.45	-20.74	19.86	0.097	40.61	-20.75
	16-QAM	836.5	V	160.0	255.0	6.40	1 / 0	11.15	15.40	0.035	38.45	-23.05	17.55	0.057	40.61	-23.06
	64-QAM	836.5	V	160.0	255.0	6.40	1 / 0	10.03	14.28	0.027	38.45	-24.17	16.43	0.044	40.61	-24.18
	256-QAM	836.5	V	160.0	255.0	6.40	1 / 0	8.02	12.27	0.017	38.45	-26.18	14.42	0.028	40.61	-26.19
	QPSK (Opposite Pol.)	836.5	H	221.0	327.0	6.40	1 / 0	9.94	16.34	0.043	38.45	-22.11	18.49	0.071	40.61	-22.12

Table 7-7. EIRP Data (Band n5)

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	1720.0	H	134	27	8.66	1 / 0	11.62	20.28	0.107	30.00	-9.72
		1745.0	H	100	164	8.18	1/99	10.85	19.03	0.080	30.00	-10.97
		1770.0	H	138	27	8.19	1 / 0	10.76	18.95	0.079	30.00	-11.05
	16-QAM	1720.0	H	134	27	8.66	1 / 0	10.89	19.55	0.090	30.00	-10.45
	64-QAM	1770.0	H	138	27	8.19	1 / 0	9.14	17.33	0.054	30.00	-12.67
	Opposite Pol.	1717.5	V	104	57	8.82	1 / 0	8.52	17.34	0.054	30.00	-12.66

Table 7-8. EIRP Data (Band 66/4)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	TT/2 BPSK	1720.0	V	231.0	261.0	9.20	1 / 0	11.17	20.37	0.109	30.00	-9.63
		1745.0	V	244.0	277.0	9.20	1 / 0	11.32	20.52	0.113	30.00	-9.48
		1770.0	V	228.0	251.0	9.20	1 / 0	11.15	20.35	0.108	30.00	-9.65
	QPSK	1745.0	V	244.0	277.0	9.20	1 / 0	11.22	20.42	0.110	30.00	-9.58
	16-QAM	1745.0	V	244.0	277.0	9.20	1 / 0	9.75	18.95	0.079	30.00	-11.05
	64-QAM	1745.0	V	244.0	277.0	9.20	1 / 0	8.05	17.25	0.053	30.00	-12.75
	256-QAM	1745.0	V	244.0	277.0	9.20	1 / 0	6.95	16.15	0.041	30.00	-13.85
	QPSK (Opposite Pol.)	1745.0	H	186.0	235.0	9.20	1 / 0	11.33	20.53	0.113	30.00	-9.47

Table 7-9. EIRP Data (Band n66)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	1860.0	V	134	124	8.62	1 / 0	17.22	25.84	0.384	33.01	-7.17
		1882.5	V	164	127	8.50	1 / 0	16.29	24.79	0.301	33.01	-8.22
		1905.0	V	151	134	8.42	1 / 0	15.66	24.08	0.256	33.01	-8.93
	16-QAM	1860.0	V	134	124	8.62	1 / 0	16.68	25.30	0.339	33.01	-7.71
	64-QAM	1860.0	V	134	124	8.62	1 / 0	16.10	24.72	0.296	33.01	-8.29
	Opposite Pol.	1860.0	H	340	38	8.62	1 / 0	15.42	24.04	0.253	33.01	-8.97

Table 7-10. EIRP Data (Band 25/2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	TT/2 BPSK	1880.0	H-Swivel	164.0	297.0	9.93	1 / 50	13.72	23.65	0.232	33.01	-9.36
	QPSK	1880.0	H-Swivel	164.0	297.0	9.93	1 / 50	13.70	23.63	0.230	33.01	-9.38
	16-QAM	1880.0	H-Swivel	164.0	297.0	9.93	1 / 50	12.54	22.47	0.176	33.01	-10.54
	64-QAM	1880.0	H-Swivel	164.0	297.0	9.93	1 / 50	10.95	20.88	0.122	33.01	-12.13
	256-QAM	1880.0	H-Swivel	164.0	297.0	9.93	1 / 50	8.58	18.51	0.071	33.01	-14.50
	QPSK (Opposite Pol.)	1880.0	V-Swivel	271.0	80.0	9.93	1 / 50	12.12	22.05	0.160	33.01	-10.96

Table 7-11. EIRP Data (Band n2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	2310.0	H	154.0	304.0	9.62	1 / 25	12.88	22.50	0.178	23.98	-1.48
	16-QAM	2310.0	H	154.0	304.0	9.62	1 / 25	12.48	22.10	0.162	23.98	-1.88
	64-QAM	2310.0	H	154.0	304.0	9.62	1 / 25	12.04	21.66	0.147	23.98	-2.32
	Opposite Pol.	2310.0	V	341.0	58.0	9.62	1 / 25	8.55	18.17	0.066	23.98	-5.81

Table 7-12. EIRP Data (Band 30)

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	QPSK	2506.0	H	102	142	9.50	100 / 0	13.07	22.57	0.181	33.01	-10.44
		2593.0	H	100	131	9.62	100 / 0	13.14	22.76	0.189	33.01	-10.25
		2680.0	H	104	152	9.95	100 / 0	13.04	22.99	0.199	33.01	-10.02
	16-QAM	2593.0	H	100	131	9.62	100 / 0	12.66	22.28	0.169	33.01	-10.73
	64-QAM	2593.0	H	100	131	9.62	100 / 0	11.50	21.12	0.129	33.01	-11.89
	Opposite Pol.	2680.0	V	134	52	9.95	100 / 0	12.21	22.16	0.165	33.01	-10.85

Table 7-13. EIRP Data (Band 41 PC3)

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7.3 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

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

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Test Setup

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

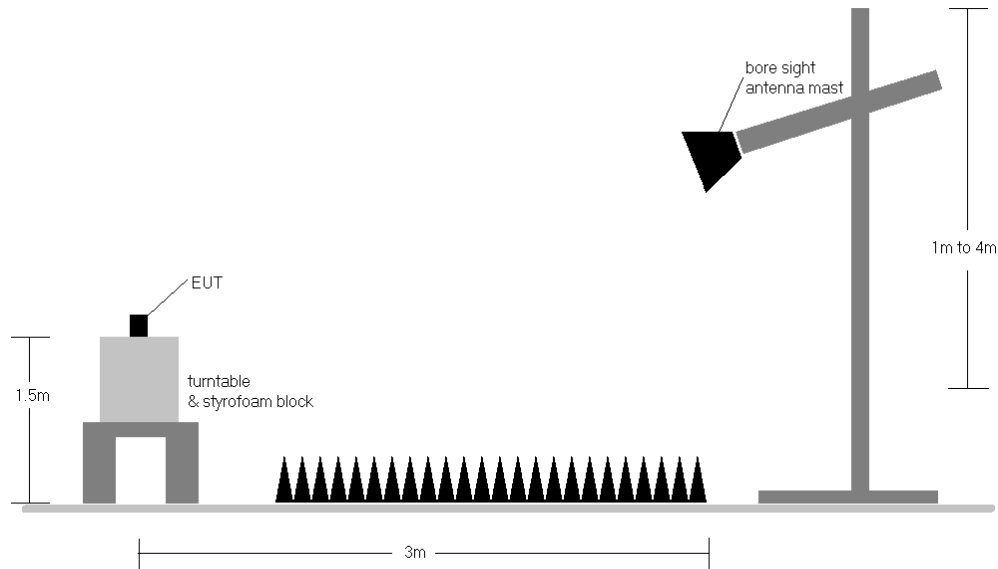


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

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

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Band 71

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	V	155	47	-67.44	3.37	-64.07	-51.1
2041.50	V	150	60	-69.64	3.62	-66.02	-53.0
2722.00	V	-	-	-71.93	5.18	-66.75	-53.7
3402.50	V	-	-	-70.90	6.28	-64.62	-51.6
4083.00	V	-	-	-70.45	7.72	-62.73	-49.7

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

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Band 12/17

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	V	133	52	-64.32	3.10	-61.22	-48.2
2122.50	V	130	48	-59.74	3.71	-56.03	-43.0
2830.00	V	-	-	-71.24	5.22	-66.01	-53.0
3537.50	V	-	-	-71.15	6.41	-64.74	-51.7
4245.00	V	-	-	-71.27	8.02	-63.25	-50.2

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

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band 13

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	V	131	323	-59.37	4.23	-55.14	-42.1
3128.00	V	123	335	-55.38	5.71	-49.67	-36.7
3910.00	V	-	-	-70.78	7.35	-63.43	-50.4
4692.00	V	-	-	-71.52	8.58	-62.94	-49.9
5474.00	V	-	-	-72.22	8.71	-63.52	-50.5

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

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	V	124	301	-62.77	3.92	-58.85	-18.9

Table 7-17. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFK920AM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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Band 26/5

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	241	140	-67.38	3.88	-63.50	-50.5
2509.50	H	257	125	-55.80	4.48	-51.32	-38.3
3346.00	H	-	-	-70.98	6.03	-64.94	-51.9
4182.50	H	-	-	-71.39	7.90	-63.49	-50.5
5019.00	H	-	-	-71.51	8.83	-62.68	-49.7

Table 7-18. Radiated Spurious Data (Band 26/5 – Mid Channel)

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 22 of 44

Band 66/4

OPERATING FREQUENCY: 1745.00 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]
3490.00	H	100	53	-62.94	6.40	-56.54	-43.5
5235.00	H	105	55	-50.59	8.73	-41.85	-28.9
6980.00	H	-	-	-66.67	8.72	-57.96	-45.0
8725.00	H	-	-	-65.18	9.37	-55.81	-42.8
10470.00	H	-	-	-62.75	9.45	-53.30	-40.3

Table 7-19. Radiated Spurious Data (Band 66/4 – Mid Channel)

FCC ID: ZNFK920AM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 23 of 44

Band 25/2

OPERATING FREQUENCY: 1882.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	103	8	-68.96	6.93	-62.03	-49.0
5647.50	H	109	22	-48.20	8.94	-39.26	-26.3
7530.00	H	-	-	-65.78	8.44	-57.34	-44.3
9412.50	H	-	-	-63.58	9.29	-54.29	-41.3
11295.00	H	-	-	-63.62	9.38	-54.24	-41.2

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

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 24 of 44

Band 30

OPERATING FREQUENCY: 2310.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -40 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]
4620.00	H	121	84	-71.43	8.37	-63.06	-23.1
6930.00	H	114	91	-68.68	8.85	-59.83	-19.8
9240.00	H	-	-	-67.01	9.32	-57.69	-17.7
11550.00	H	-	-	-65.28	9.41	-55.87	-15.9
13860.00	H	-	-	-61.67	9.14	-52.53	-12.5

Table 7-21. Radiated Spurious Data (Band 30 – Mid Channel)

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 25 of 44

Band 41 (PC3)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	115	310	-52.27	10.77	-41.50	-16.5
7779.00	H	385	37	-60.76	11.47	-49.29	-24.3
10372.00	H	291	54	-65.17	12.48	-52.69	-27.7
12965.00	H	-	-	-66.91	13.34	-53.57	-28.6
15558.00	H	124	336	-68.53	16.37	-52.16	-27.2

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

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 26 of 44

Sub6 n71

Bandwidth (MHz):	20
Frequency (MHz):	680.5

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1361.0	H	142	238	-72.42	-0.47	34.11	-61.14	-13.00	-48.14
2041.5	H	-	-	-77.42	3.43	33.01	-62.24	-13.00	-49.24
2722.0	H	-	-	-77.60	5.93	35.33	-59.93	-13.00	-46.93

Table 7-23. Radiated Spurious Data (n71 – Mid Channel)

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 27 of 44

Sub6 n5

Bandwidth (MHz):	20
Frequency (MHz):	836.5

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	V	100	248	-74.96	0.67	32.71	-62.55	-13.00	-49.55
2509.5	V	196	262	-66.54	5.01	45.47	-49.79	-13.00	-36.79
3346.0	V	-	-	-79.61	6.53	33.92	-61.33	-13.00	-48.33
4182.5	V	-	-	-80.49	8.35	34.86	-60.39	-13.00	-47.39

Table 7-24. Radiated Spurious Data (n5 – Mid Channel)

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 28 of 44

Sub6 n66

Bandwidth (MHz):	20
Frequency (MHz):	1745.0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3490.0	H	101	218	-79.31	7.19	34.88	-60.37	-13.00	-47.37
5235.0	H	135	128	-74.60	10.02	42.42	-52.84	-13.00	-39.84
6980.0	H	-	-	-82.07	14.36	39.29	-55.96	-13.00	-42.96
8725.0	H	111	65	-81.25	16.59	42.34	-52.91	-13.00	-39.91
10470.0	H	-	-	-83.70	19.77	43.07	-52.19	-13.00	-39.19

Table 7-25. Radiated Spurious Data (n66 – Mid Channel)

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 29 of 44

Sub6 n2

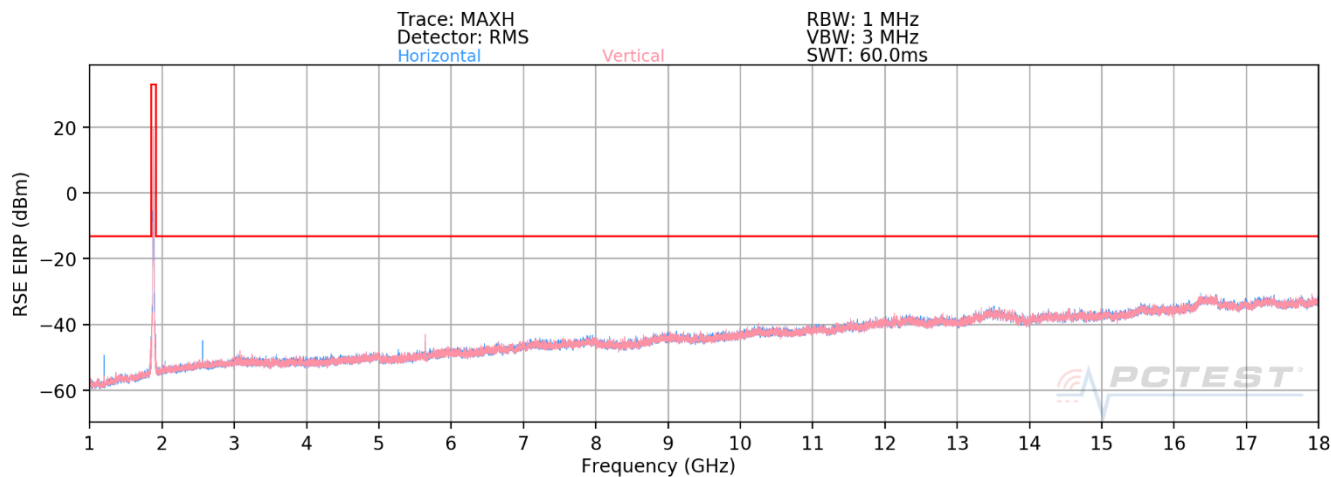
Bandwidth (MHz):	20
Frequency (MHz):	1880.0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3760.0	H	162	315	-79.03	7.91	35.88	-59.38	-13.00	-46.38
5640.0	H	289	45	-79.78	10.76	37.98	-57.28	-13.00	-44.28
7520.0	H	141	21	-81.94	15.34	40.40	-54.86	-13.00	-41.86
9400.0	H	-	-	-83.70	18.64	41.94	-53.32	-13.00	-40.32
11280.0	H	-	-	-83.92	21.22	44.30	-50.95	-13.00	-37.95

Table 7-26. Radiated Spurious Data (n2 – Mid Channel)

FCC ID: ZNFK920AM	 PCTEST Proud to be part of 	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 30 of 44

EN-DC Band n71 + B2



Plot 7-1. Radiated Spurious Plot above 1GHz (EN-DC Band n71 + B2)

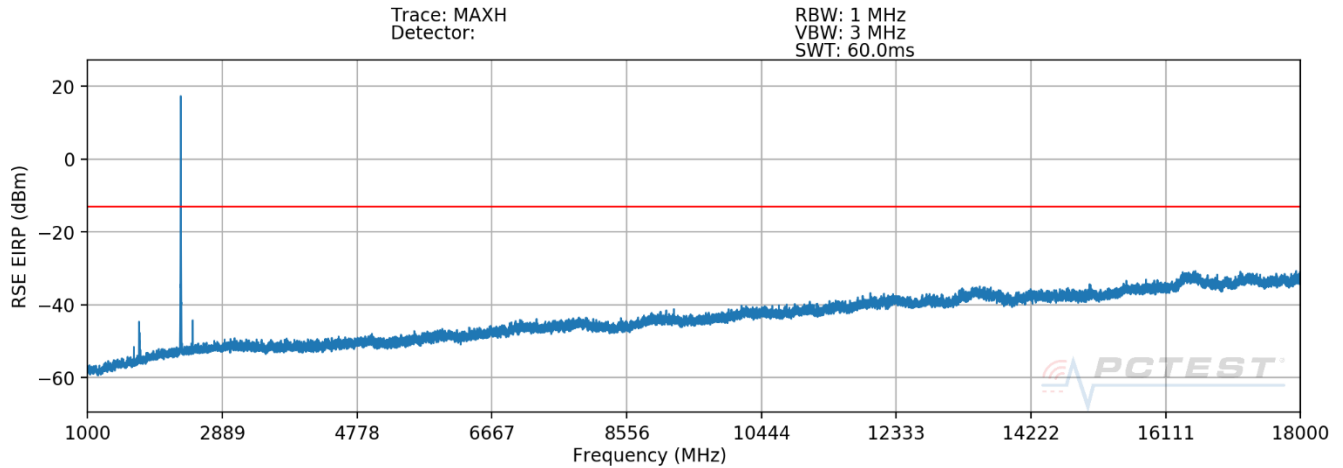
Bandwidth (MHz):	20
Frequency (MHz):	680.5
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1361.0	H	111	38	-75.58	-0.47	30.95	-64.30	-13.00	-51.30
2041.5	H	385	29	-74.45	3.43	35.98	-59.27	-13.00	-46.27
2560.6	H	182	307	-65.48	5.51	47.03	-48.23	-13.00	-35.23
3079.5	H	367	190	-74.85	7.56	39.71	-55.55	-13.00	-42.55
5640.0	H	102	335	-64.87	10.76	52.89	-42.37	-13.00	-29.37
7520.0	H	-	-	-82.61	15.34	39.73	-55.53	-13.00	-42.53

Table 7-27. Radiated Spurious Data (EN-DC Band n71 + B2 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 31 of 44

EN-DC Band n5 + B30



Plot 7-2. Radiated Spurious Plot above 1GHz (EN-DC Band n5 + B30)

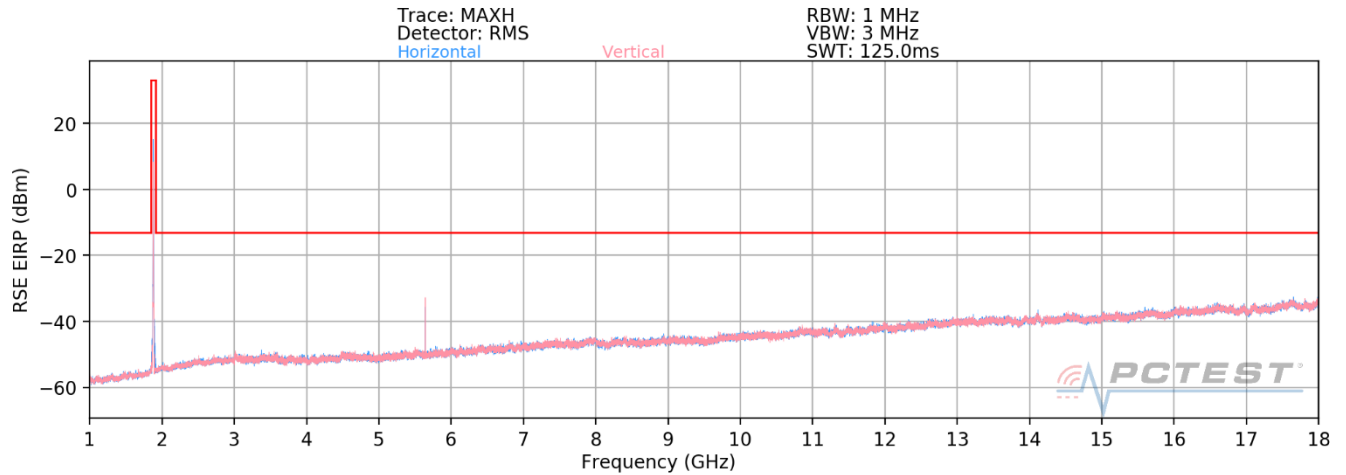
Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1649.6	H	149	343	-68.37	-5.18	33.45	-61.81	-13.00	-48.81
2474.4	H	144	14	-61.88	-1.74	43.38	-51.87	-13.00	-38.87
3299.2	H	-	-	-72.58	0.78	35.20	-60.06	-13.00	-47.06
4611.6	H	210	35	-73.80	2.92	36.12	-59.14	-13.00	-46.14
6917.4	H	134	28	-72.72	8.28	42.56	-52.70	-13.00	-39.70

Table 7-28. Radiated Spurious Data (EN-DC Band n5 + B30 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 32 of 44

EN-DC Band n5 + B2



Plot 7-3. Radiated Spurious Plot above 1GHz (EN-DC Band n5 + B2)

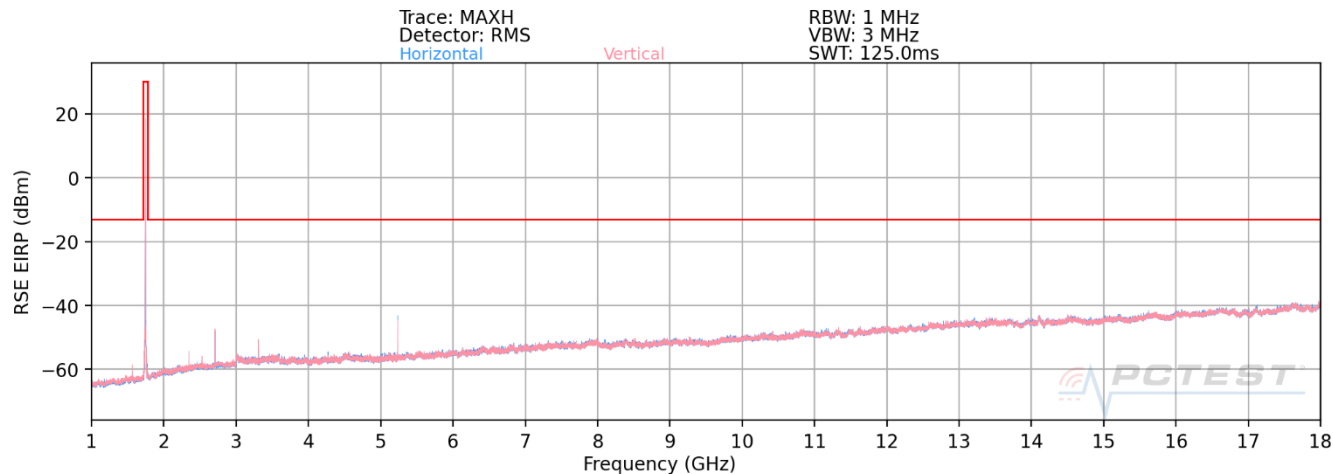
Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
2923.5	V	256	330	-72.47	3.59	38.12	-57.14	-13.00	-44.14
3760.0	V	-	-	-79.63	6.37	33.74	-61.52	-13.00	-48.52
5640.0	V	100	97	-60.64	8.38	54.74	-40.52	-13.00	-27.52
7520.0	V	-	-	-80.98	12.20	38.22	-57.04	-13.00	-44.04

Table 7-29. Radiated Spurious Data (EN-DC Band n5 + B2 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 33 of 44

EN-DC Band n66 + B13



Plot 7-4. Radiated Spurious Plot above 1GHz (EN-DC Band n66 + B13)

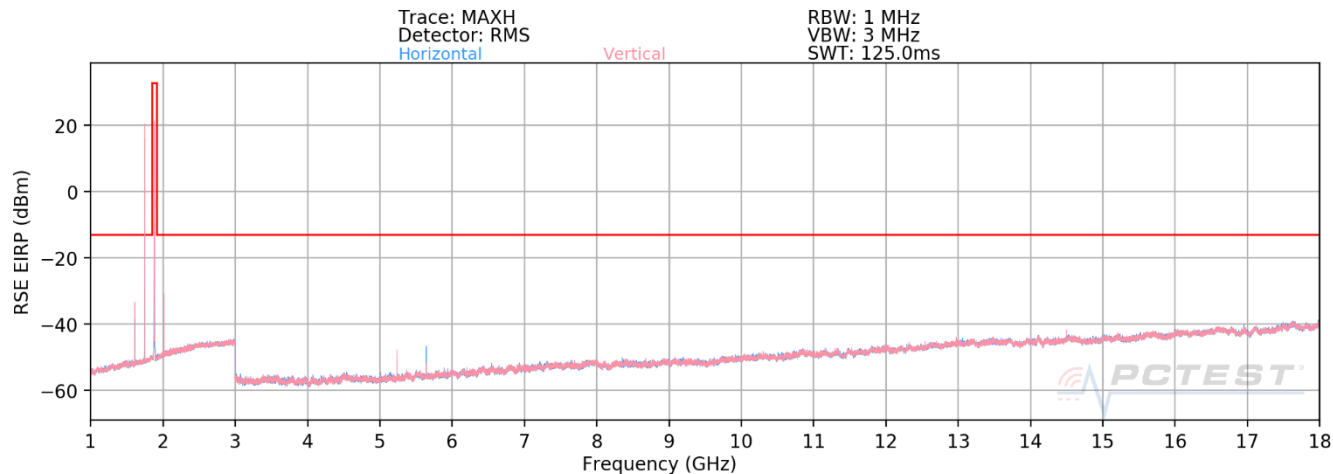
Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B13

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1564.0	H	156	21	-75.27	-0.89	30.84	-64.41	-40.00	-24.41
2346.0	H	102	22	-72.79	2.25	36.46	-58.80	-13.00	-45.80
2708.0	H	147	133	-66.89	3.46	43.57	-51.69	-13.00	-38.69
3310.0	H	130	217	-74.22	4.90	37.68	-57.57	-13.00	-44.57
3490.0	H	101	220	-75.56	5.35	36.79	-58.47	-13.00	-45.47
5235.0	H	101	310	-70.86	7.37	43.51	-51.75	-13.00	-38.75
6980.0	H	-	-	-80.14	10.84	37.70	-57.56	-13.00	-44.56

Table 7-30. Radiated Spurious Data (EN-DC Band n66 + B13 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 34 of 44

EN-DC Band n66 + B2



Plot 7-5. Radiated Spurious Plot above 1GHz (EN-DC Band n66 + B2)

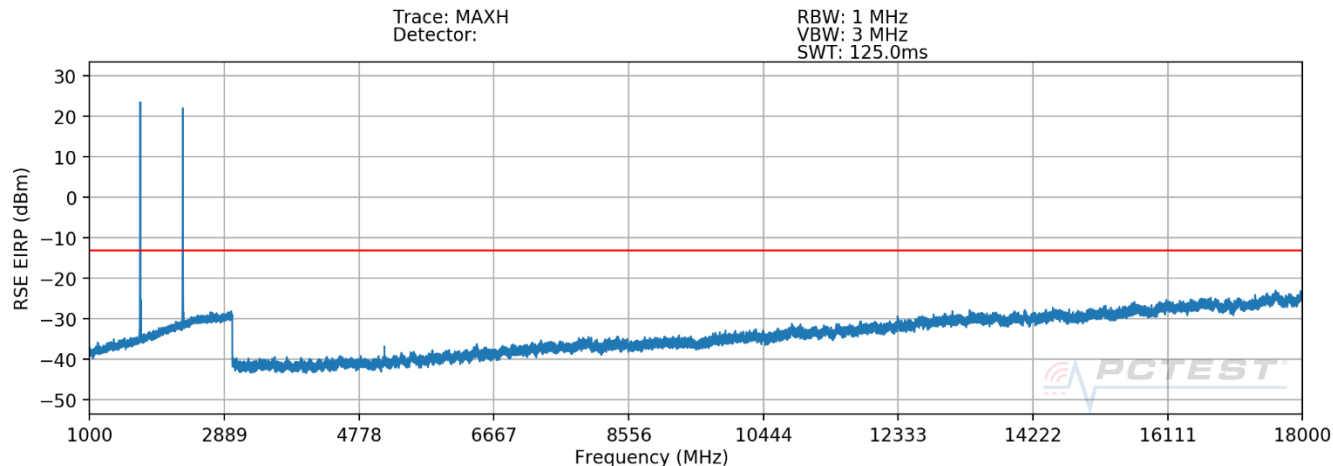
Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1610.0	V	188	245	-65.19	17.27	59.08	-36.18	-13.00	-23.18
2015.0	V	155	329	-68.76	19.98	58.22	-37.03	-13.00	-24.03
5235.0	V	109	21	-72.53	7.37	41.84	-53.41	-13.00	-40.41
5640.0	V	113	83	-66.79	8.38	48.59	-46.67	-13.00	-33.67
6980.0	V	-	-	-80.26	10.84	37.58	-57.68	-13.00	-44.68

Table 7-31. Radiated Spurious Data (EN-DC Band n66 + B2 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 35 of 44

EN-DC Band n66 + B30



Plot 7-6. Radiated Spurious Plot above 1GHz (EN-DC Band n66 + B30)

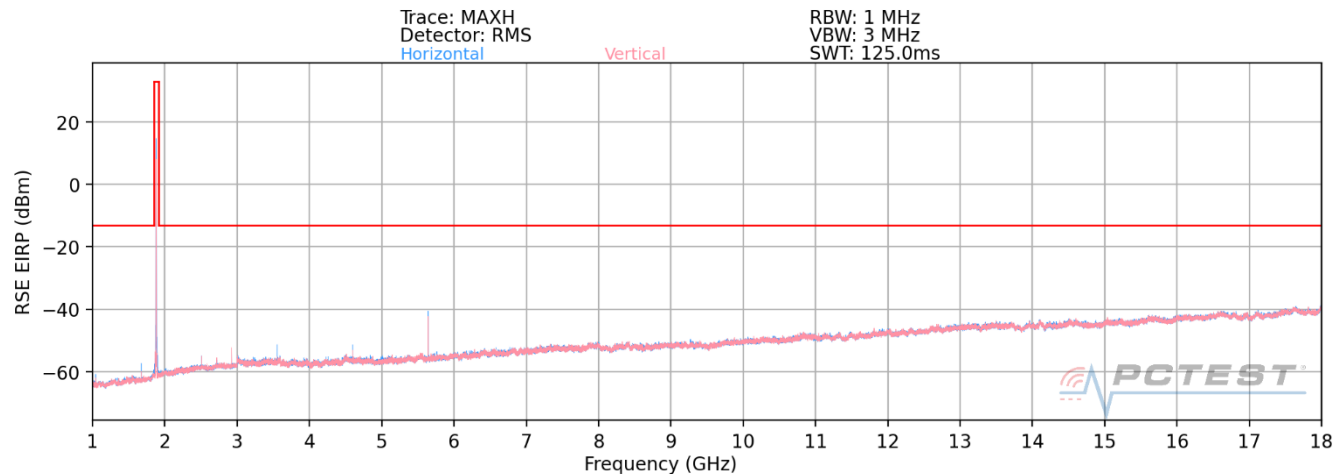
Bandwidth (MHz):	20
Frequency (MHz):	1745.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	30

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3421.8	V	120	363	-74.28	2.17	34.89	-60.37	-40.00	-20.37
4611.6	V	121	346	-75.46	2.92	34.46	-60.80	-40.00	-20.80
5132.7	V	119	0	-76.36	3.95	34.59	-60.67	-40.00	-20.67
6843.3	V	-	-	-78.20	9.24	38.04	-57.22	-13.00	-44.22
6917.4	V	141	280	-76.75	8.28	38.53	-56.73	-13.00	-43.73
9223.2	V	-	-	-75.83	9.98	41.15	-54.10	-13.00	-41.10

Table 7-32. Radiated Spurious Data (EN-DC Band n66 + B30 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 36 of 44

EN-DC Band n2 + B5



Plot 7-7. Radiated Spurious Plot above 1GHz (EN-DC Band n2 + B5)

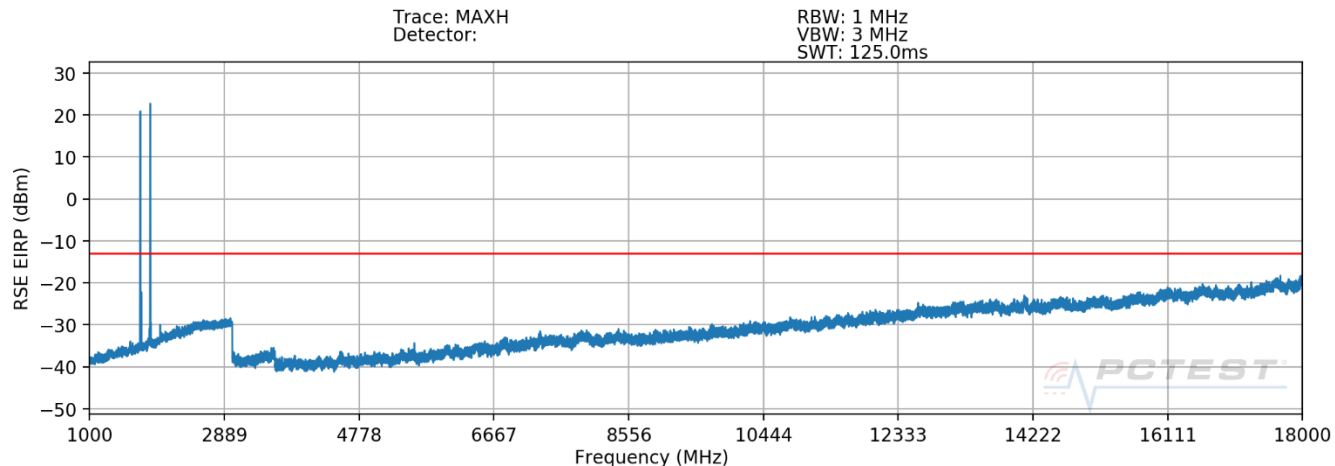
Bandwidth (MHz):	20
Frequency (MHz):	1880.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B5

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	258	171	-68.55	-1.15	37.30	-57.96	-13.00	-44.96
2509.5	H	101	7	-71.86	3.29	38.43	-56.82	-13.00	-43.82
2923.5	H	104	46	-72.02	3.59	38.57	-56.69	-13.00	-43.69
3553.3	H	125	202	-65.49	5.45	46.96	-48.30	-13.00	-35.30
4596.6	H	109	323	-71.22	6.95	42.73	-52.52	-13.00	-39.52
5640.0	H	180	42	-62.53	8.37	52.84	-42.42	-13.00	-29.42
7520.0	H	-	-	-80.91	12.20	38.29	-56.97	-13.00	-43.97

Table 7-33. Radiated Spurious Data (EN-DC Band n2 + B5 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 37 of 44

EN-DC Band n2 + B66



Plot 7-8. Radiated Spurious Plot above 1GHz (EN-DC Band n2 + B66)

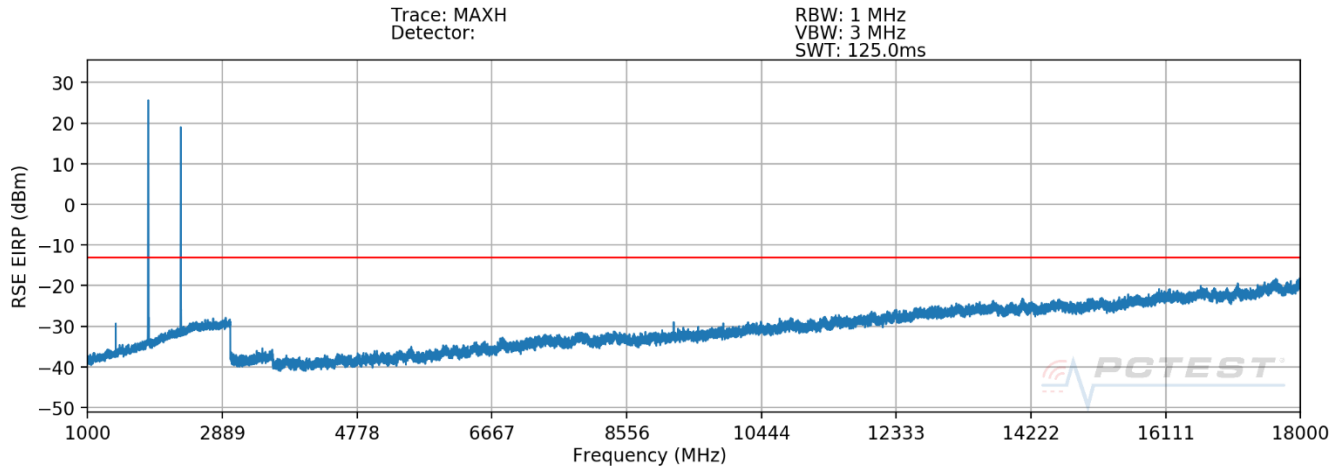
Bandwidth (MHz):	20
Frequency (MHz):	1880.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B5

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3701.7	V	100	322	-76.67	7.61	37.94	-57.32	-13.00	-44.32
5134.0	V	100	10	-61.11	9.80	55.69	-39.56	-13.00	-26.56
5552.4	V	100	328	-64.23	11.26	54.03	-41.23	-13.00	-28.23
7363.4	V	-	-	-79.77	15.05	42.28	-52.98	-13.00	-39.98

Table 7-34. Radiated Spurious Data (EN-DC Band n2 + B66 – Mid Channel)

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EN-DC Band n2 + B30



Plot 7-9. Radiated Spurious Plot above 1GHz (EN-DC Band n2 + B30)

Bandwidth (MHz):	20
Frequency (MHz):	1880.0
RB / Offset:	1 / 53
Mode:	EN-DC
Anchor Band:	B5

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3701.6	H	174	321	-72.21	2.28	37.07	-58.19	-13.00	-45.19
4611.6	H	-	-	-73.93	2.92	35.99	-59.27	-13.00	-46.27
6917.4	H	-	-	-74.37	8.28	40.91	-54.35	-13.00	-41.35
5552.4	H	314	90	-63.81	4.54	47.73	-47.53	-13.00	-34.53
7403.2	H	-	-	-74.40	8.72	41.32	-53.94	-13.00	-40.94
9254.0	H	-	-	-74.55	10.13	42.58	-52.68	-13.00	-39.68

Table 7-35. Radiated Spurious Data (EN-DC Band n2 + B30 – Mid Channel)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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7.4 Uplink Carrier Aggregation Radiated Measurements

§2.1053,

Test Overview

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

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

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

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Test Setup

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

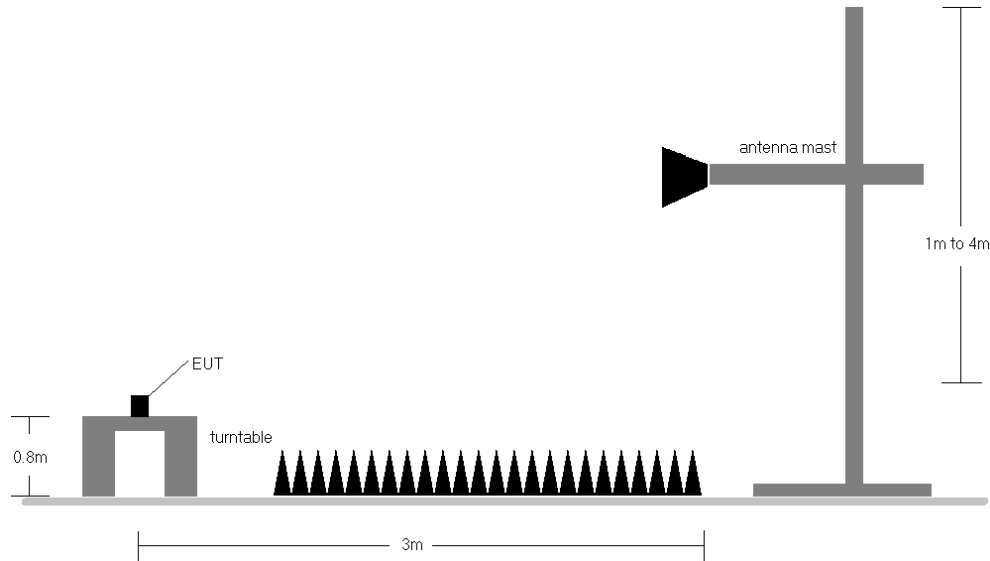


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 6) No significant emissions were found as a result of two uplink carriers operating contiguously.

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ULCA Band 5

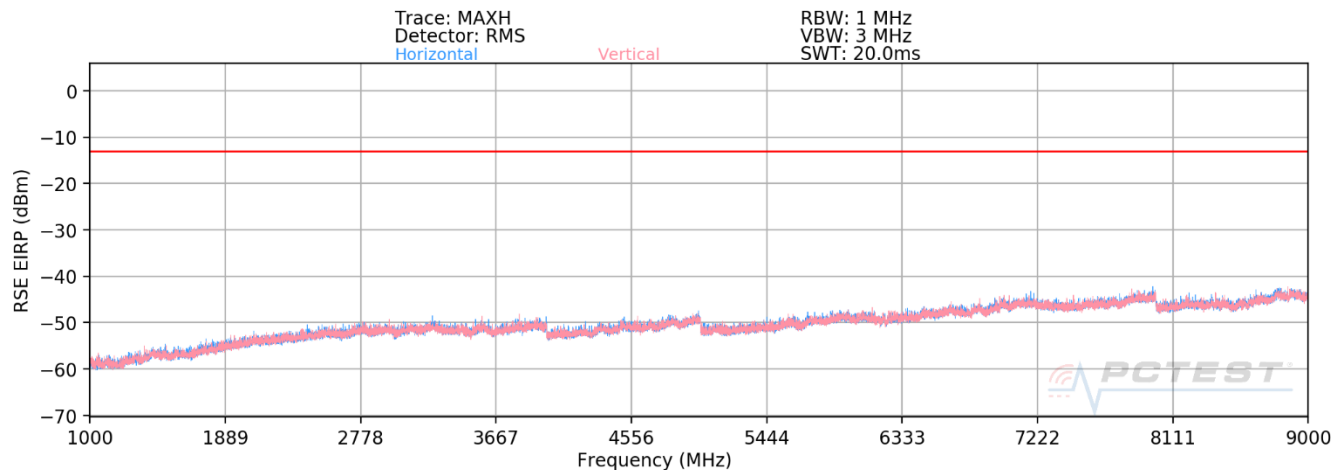


Table 7-36. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 Mid Channel – PCC/SCC: 1RB)

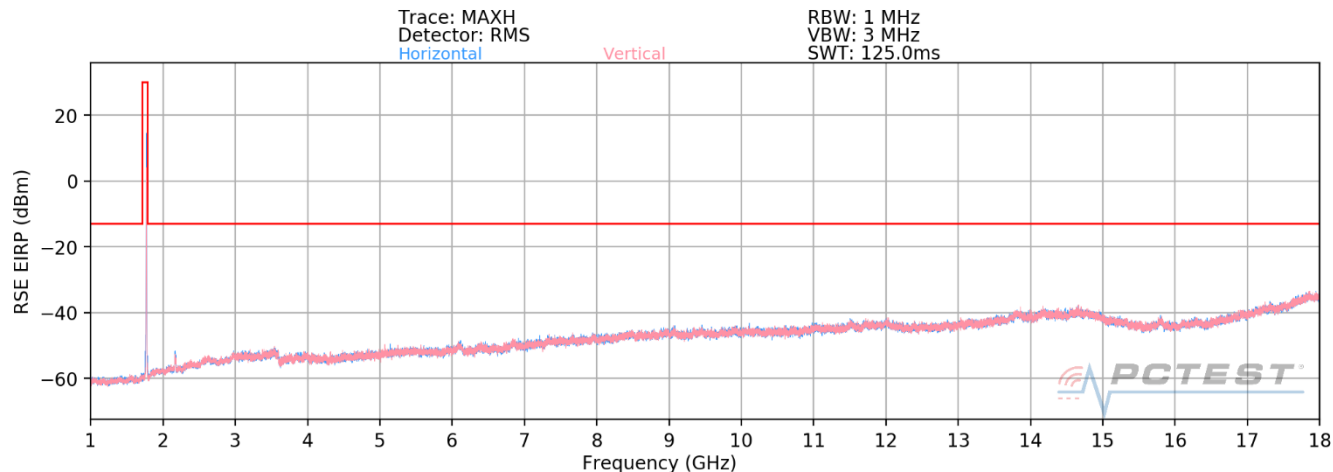
PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	831.5
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	841.4
SCC RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	V	109	161	-76.65	0.67	31.02	-64.24	-13.00	-51.24
2509.5	V	130	332	-71.09	5.01	40.92	-54.34	-13.00	-41.34
3346.0	V	-	-	-80.60	6.53	32.93	-62.32	-13.00	-49.32

Table 7-37. Radiated Spurious Data (ULCA B5 PCC: RB 1 Offset 49, SCC: RB 1 Offset 0 – Mid Channel)

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ULCA Band 41 PC3



Plot 7-10. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 PC3 Mid Channel – PCC/SCC: 1RB)

PCC Bandwidth (MHz):	20
PCC Frequency (MHz):	2593.0
PCC RB / Offset:	1 / 99
SCC Bandwidth (MHz):	20
SCC Frequency (MHz):	2612.8
SCC RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5206.0	H	272	44	-70.87	9.93	46.06	-58.74	-25.00	-33.74
7809.0	H	209	298	-69.59	16.09	53.50	-51.30	-25.00	-26.30
10412.0	H	-	-	-74.68	19.87	52.19	-52.61	-25.00	-27.61

Table 7-38. Radiated Spurious Data (ULCA B41 Left Carrier: RB 1 Offset 99, Right Carrier: RB 1 Offset 0)

FCC ID: ZNFK920AM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFK920AM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFK920AM		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M2008130119-03.ZNF	Test Dates: 9/8/2020 - 9/15/2020	EUT Type: Portable Handset		Page 44 of 44