

PCTEST

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MEASUREMENT REPORT

WCDMA

Applicant Name:

FCC ID:

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

Date of Testing: 1/13 - 2/14/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2001100004-02.ZNF

ZNFT600TS

APPLICANT:LG Electronics USA, Inc.Application Type:CertificationModel:LM-T600TSAdditional Model(s):LMT600TS, T600TSEUT Type:Portable TabletFCC Classification:PCS Licensed Transmitter (PCB)FCC Rule Part(s):22, 24, & 27

 Test Procedure(s):
 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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



FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		David of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 1 of 59
© 2020 PCTEST	•	•		V 9.0 02/01/2019



TABLE OF CONTENTS

1.0	INTF	RODUCTION	4
	1.1	Scope	4
	1.2	PCTEST Test Location	4
	1.3	Test Facility / Accreditations	4
2.0	PRO	DUCT INFORMATION	5
	2.1	Equipment Description	5
	2.2	Device Capabilities	5
	2.3	Test Configuration	5
	2.4	EMI Suppression Device(s)/Modifications	5
3.0	DES	CRIPTION OF TESTS	6
	3.1	Evaluation Procedure	6
	3.2	Cellular - Base Frequency Blocks	6
	3.3	Cellular - Mobile Frequency Blocks	6
	3.4	PCS - Base Frequency Blocks	6
	3.5	PCS - Mobile Frequency Blocks	7
	3.6	AWS - Base Frequency Blocks	7
	3.7	AWS - Mobile Frequency Blocks	7
	3.8	Radiated Measurements	8
4.0	MEA	ASUREMENT UNCERTAINTY	9
5.0	TES	T EQUIPMENT CALIBRATION DATA	10
6.0	SAM	IPLE CALCULATIONS	11
7.0	TES	T RESULTS	12
	7.1	Summary	
	7.2	Occupied Bandwidth	13
	7.3	Spurious and Harmonic Emissions at Antenna Terminal	16
	7.4	Band Edge Emissions at Antenna Terminal	
	7.5	Peak-Average Ratio	
	7.6	Radiated Power (ERP/EIRP)	40
	7.7	Radiated Spurious Emissions Measurements	43
	7.8	Frequency Stability / Temperature Variation	
8.0	CON	NCLUSION	59

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dere 2 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 2 of 59
© 2020 PCTEST		•		V 9 0 02/01/2019





MEASUREMENT REPORT WCDMA



			ERP		EIRP			
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	Emission Designator	
WCDMA850	22H	826.4 - 846.6	0.119	20.74	0.195	22.89	4M16F9W	
WCDMA1700	27	1712.4 - 1752.6			0.235	23.70	4M15F9W	
WCDMA1900	24E	1852.4 - 1907.6			0.276	24.41	4M16F9W	

EUT Overview

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of EQ
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 3 of 59
© 2020 PCTEST		•		V 9.0 02/01/2019



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

FCC ID: ZNFT600TS	<u><i>CPCTEST</i></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dere 4 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 4 of 59
© 2020 PCTEST				V 0 0 02/01/2010



2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Tablet FCC ID: ZNFT600TS**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

Test Device Serial No.: 02180, 02495

2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE)

2.3 Test Configuration

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

2.4 EMI Suppression Device(s)/Modifications

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

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage E of EQ
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 5 of 59
@ 2020 DOTEST				V 0 0 02/01/2010



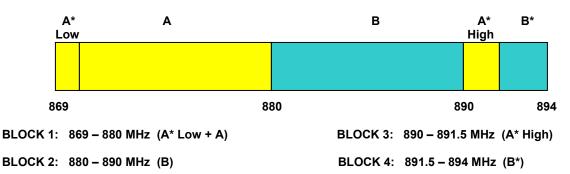
3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

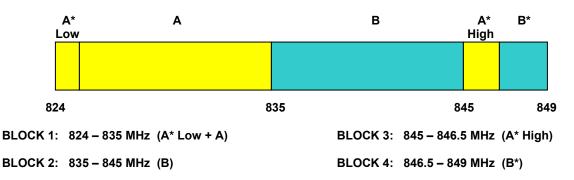
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

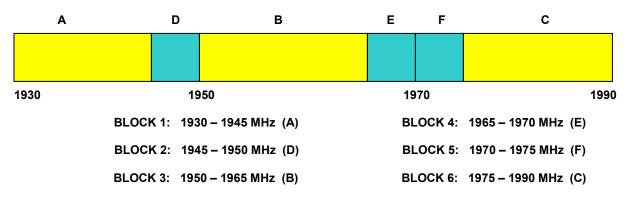
3.2 Cellular - Base Frequency Blocks



3.3 Cellular - Mobile Frequency Blocks

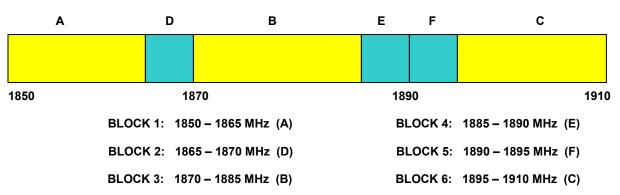


3.4 PCS - Base Frequency Blocks



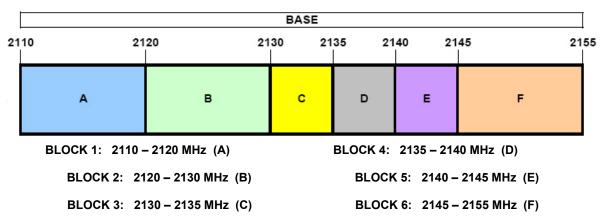
FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dere 6 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 6 of 59	
© 2020 PCTEST	•	*		V 9.0 02/01/2019	





3.5 PCS - Mobile Frequency Blocks





3.7 AWS - Mobile Frequency Blocks

				MQ	OBILE				
17	10		1720	1730	17	'35 17 	40 17	45	1755
		A	в		с	D	E	F	
		BLOCK 2: 1	710 – 1720 MHz (A) 1720 – 1730 MHz (B) 1730 – 1735 MHz (C)			BLOCK	5: 1740 –	1740 MHz (D) 1745 MHz (E) 1755 MHz (F)	

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 7 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 7 of 59
© 2020 PCTEST	•	•		V 9.0 02/01/2019



3.8 Radiated Measurements

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.

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:

 $P_{d [dBm]} = P_{g [dBm]} - cable loss [dB] + antenna gain [dBd/dBi]$

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 $P_{g [dBm]}$ – cable loss [dB].

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 9 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 8 of 59
© 2020 PCTEST	•	•		V 9 0 02/01/2019



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 (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 0 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 9 of 59
© 2020 PCTEST				V 9 0 02/01/2019



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
-	LTx1	Licensed Transmitter Cable Set	6/4/2019	Annual	6/4/2020	LTx1
Agilent	8648D	(9kHz-4GHz) Signal Generator	4/29/2019	Annual	4/29/2020	3613A00315
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	5/10/2019	Annual	5/10/2020	441112
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	2/14/2019	Biennial	2/14/2021	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp	N/A		QA1317001	
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	PWR-SEN-4RMS	USB Power Sensor	4/20/2019	Annual	4/20/2020	11210140001
Rohde & Schwarz	CMW500	Radio Communication Tester	8/26/2019	Annual	8/26/2020	100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Seekonk	NC-100	Torque Wrench (8" lb)	5/10/2018	Biennial	5/10/2020	N/A
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.

FCC ID: ZNFT600TS	<u><u><u></u><u>PCTEST</u></u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 10 of 59
© 2020 PCTEST				V 9 0 02/01/2019



6.0 SAMPLE CALCULATIONS

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data)

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm -(-24.80) = 50.3 dBc.

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 11 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 11 of 59
© 2020 PCTEST		•		V 9.0 02/01/2019



7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics USA, Inc.
FCC ID:	ZNFT600TS
FCC Classification:	PCS Licensed Transmitter (PCB)
Mode(s):	WCDMA

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	RSS-Gen (4.6.1) RSS-133(2.3) RSS-139(2.3)	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	Conducted Band Edge / Spurious Emissions	> 43 + 10 log ₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions		PASS	Sections 7.3, 7.4
24.232(d)	RSS-132(5.4) RSS-133(6.4) RSS-139(6.5)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.5
2.1046	RSS-132(5.4) RSS-133(4.1) RSS-139(4.1)	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	RSS-132(5.3) RSS-133(6.3) RSS-139(6.4)	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 7.8
22.913(a)(5)	RSS-132(5.4)	Effective Radiated Power	< 7 Watts max. ERP		PASS	Section 7.6
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d)(4)	RSS-139(6.5)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	Radiated Spurious Emissions	> 43 + 10 log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 7.7

Table 7-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "2G/3G Automation," Version 4.3.

FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 12 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 12 of 59
© 2020 PCTEST		•		V 9 0 02/01/2019



7.2 Occupied Bandwidth

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 4.2

Test Settings

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW \geq 3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within
 - 1-5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

FCC ID: ZNFT600TS	<u><u><u>PCTEST</u></u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 12 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 13 of 59
© 2020 PCTEST	•	•		V 9.0 02/01/2019





Plot 7-1. Occupied Bandwidth Plot (Cellular WCDMA Mode)



Plot 7-2. Occupied Bandwidth Plot (AWS WCDMA Mode)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 44 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 14 of 59
© 2020 PCTEST				V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW				
NFE	Center Trig: F	SENSE:INT ALI r Freq: 1.88000000 GHz Free Run Free Run Avg Hold:>1 1: 28 dB Free Run	GN AUTO 11:19:20 AM Feb 04, 20 Radio Std: None 00/100 Radio Device: BTS	Trace/Detector
0 dB/div Ref 40.00 dBm				Clear Writ
20.0		mummen ny		Averag
0.0			and the second	Max Ho
enter 1.880000 GHz es BW 150 kHz		VBW 470 kHz Total Power	Span 15.00 Mł Sweep 1 n 33.0 dBm	
Occupied Bandwidth 4.1 Transmit Freq Error	648 MHz	% of OBW Power		Detecto Peak Auto <u>Ma</u>
x dB Bandwidth	4.752 MHz	x dB	-26.00 dB	
G			STATUS	

Plot 7-3. Occupied Bandwidth Plot (PCS WCDMA Mode)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 15 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 15 of 59
© 2020 PCTEST				V 9 0 02/01/2019



7.3 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + 10\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz for Cell, 20GHz for AWS, 20GHz for PCS (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Per 24.238(b), 27.53(h)(3), and RSS-133(6.5), RSS-139(6.5), compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz, and 100 kHz or greater for Part 22 and RSS-132 measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

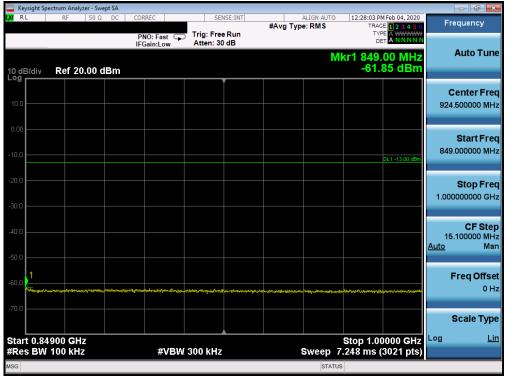
FCC ID: ZNFT600TS	<u><i>CPCTEST</i></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 16 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 16 of 59
© 2020 PCTEST				V 9 0 02/01/2019



Cellular WCDMA Mode

	ectrum Analyzer -								
I <mark>XV</mark> RL	RF 50	ΩDC	CORREC	SENSE:INT	#Avg Type	ALIGN AUTO e: RMS	12:27:56 PM Feb (TRACE 1 2 TYPE A DET A	3456	Frequency
10 dB/div Log	Ref 20.00) dBm	IFGain:Low	Atten: 30 dB		Μ	kr1 822.80 -33.43	MHz	Auto Tune
10.0									Center Fred 426.500000 MH:
-10.0							DL1 -1	3.00 dBm	Start Free 30.000000 MH
-20.0								1	Stop Fre 823.000000 MH
-40.0									CF Ste 79.300000 MH <u>Auto</u> Ma
-60.0	an a								Freq Offse 0 H
-70.0									Scale Typ
Start 30.0 #Res BW			#VBV	V 300 kHz	S	weep 38	Stop 823.0 8.06 ms (1586		Log <u>Lir</u>
MSG						STATUS	5		

Plot 7-4. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)



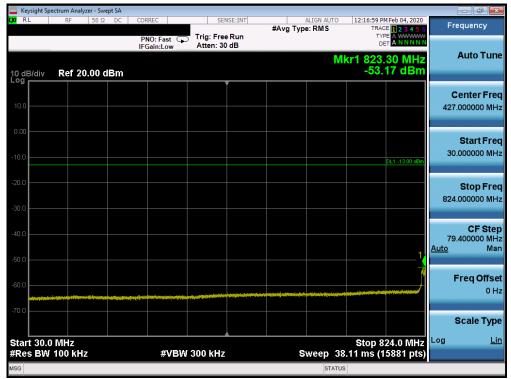
Plot 7-5. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 17 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 17 of 59
© 2020 PCTEST	*	÷		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Swept SA					
XIRL RF 50ΩDC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGN AUTO #Avg Type: RMS	12:28:29 PM Feb 04, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Ref 10.00 dBm	I Guilleow		MI	(r1 9.769 0 GHz -41.06 dBm	Auto Tune
0.00					Center Fred 5.500000000 GHz
-10.0				DL1 -13.00 dBm	Start Fred 1.000000000 GH:
-30.0				▲ ¹	Stop Fred 10.000000000 GH
-50.0	~~~~~				CF Step 900.000000 MH <u>Auto</u> Ma
-70.0					Freq Offse 0 H
-80.0					Scale Type
Start 1.000 GHz #Res BW 1.0 MHz ^{MSG}	#VBW 3	.0 MHz	Sweep 15	60 ms (18001 pts)	Log <u>Lir</u>

Plot 7-6. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)



Plot 7-7. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 18 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 18 of 59
© 2020 PCTEST	•			V 9 0 02/01/2019



	ectrum Analyz												
XI RL	RF	50 Ω	DC	CORREC		SEN	ISE:INT	#Avg Typ	ALIGN AUTO		M Feb 04, 2020	Frequ	ency
				PNO: Fa	ast 😱 .ow	Trig: Free Atten: 30				TYP			_
10 dB/div Log	Ref 20	.00 dl	Bm						Μ	lkr1 849. -52.	.85 MHz 99 dBm	Au	to Tune
10.0													ter Freq 1000 MHz
-10.0											DL1 -13.00 dBm		art Freq 1000 MHz
-20.0												St 1.000000	op Freq 0000 GHz
-40.0													CF Step 1000 MHz Mar
-60.0	ware and the second	and a second of the second	antan pitang	Pylant, provident	and the state of the	and a state of the s	un yalan ya	of the same start way as	te fordere del profession pri	الالمان المراجع	angeng bern the laterary by	Fre	q Offset 0 Hz
-70.0													ale Type
Start 0.84 #Res BW				;	≠vBW :	300 kHz			Sweep	Stop 1.00 7.248 ms (0000 GHz 3021 pts)	Log	<u>Lin</u>
ISG									STATU	IS			

Plot 7-8. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)



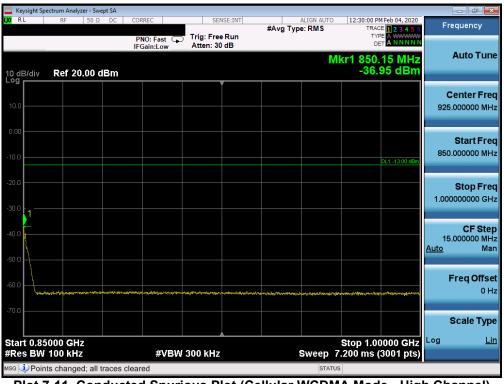
Plot 7-9. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFT600TS	<u><u><u></u><u>PCTEST</u></u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 19 of 59
© 2020 PCTEST				V 9 0 02/01/2019



	ectrum Analyzer - S									- 0	
XI RL	RF 50	Ω DC	CORREC PNO: Fast	Trig: Fre		#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Feb 04, 2020 E 1 2 3 4 5 6 E A WWWWW A N N N N N	Freq	uency
10 dB/div Log	Ref 20.00	dBm	IFGain:Low	Atten: 3	0 dB		MI	(r1 823.	90 MHz 22 dBm	A	uto Tune
10.0											nter Freq 00000 MHz
-10.0									DL1 -13.00 dBm		Start Fred
-20.0											Stop Fred
-40.0										79.40 <u>Auto</u>	CF Step 00000 MH: Mar
-60.0							of details		1	Fr	e q Offse 0 H:
-70.0											ale Type
Start 30.0 #Res BW			#VE	SW 300 kHz		s	weep 38		24.0 MHz 5881 pts)	Log	<u>Lin</u>
MSG							STATUS				

Plot 7-10. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)



Plot 7-11. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 20 of 59
© 2020 PCTEST	•	•		V 9.0 02/01/2019



NINT 19.702 U GHZ Center Fr 00 dB/div Ref 10.00 dBm -41.03 dBm 00 dB/div Ref 10.00 dBm -41.03 dBm 00 dB/div Ref 10.00 dBm -41.03 dBm 00 dB/div Ref 10.00 dBm -50.000000 GHZ 00 dB/div Ref 10.00 dBm -50.000000 GHZ 00 dB/div Ref 10.00 dBm -50.000000 GHZ 00 dB/div Genter Fr 5.50000000 GHZ 00 dB/div Genter Fr -5.50000000 GHZ 00 dB/div Genter Fr -5.500000000 GHZ 00 dB/div Genter Fr -5.500000000 GHZ 00 dB/div Genter Fr -5.50000000 GHZ	🔤 Keysight Spe	ectrum Analyze	er - Swept S	A								
Mkr1 9.732 0 GHz Auto Tu 0 dB/div Ref 10.00 dBm 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	X/RL	RF	50 Ω D						TRAC	E 1 2 3 4 5 6	Free	quency
Cog Center Fr 000 011-1300 dem 100 011-1300 dem 200 011-1300 dem 300 011-1300 dem 300 011-1300 dem 400 011-1300 dem	10 dB/div	Pef 10	00 dBr	IFG	IO: Fast ⊆ _⊫ . Sain:Low			MI	(r1 9.73	2 0 GHz	A	uto Tune
200 XIII 12000 dtm Start Fr 200 XIIII 12000 dtm Start Fr 200 XIIIII 12000 dtm Start Fr 200 XIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII												
40.0 50.0	-10.0									DL1 -13.00 dBm		Start Freq 00000 GHz
3000 900.00000 M 4uto M 700 Freq Offs 800 Start 1.000 GHz	-30.0									1		Stop Freq 00000 GHz
-70.0 Freq Offs 80.0 Start 1.000 GHz			مىيىنىيەلى <i>پ</i>	[*]	~~~							CF Step 00000 MHz Man
Start 1.000 GHz Stop 10.000 GHz											Fi	r eq Offset 0 Hz
	-80.0								Stop 10	000 GHz		cale Type <u>Lin</u>
#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 15.60 ms (18001 pts)					#VBW	/ 3.0 MHz	s		5.60 ms (1	8001 pts)		

Plot 7-12. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 01 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 21 of 59
© 2020 PCTEST				V 9 0 02/01/2019



AWS WCDMA Mode

	ectrum Analyzer - Swe	pt SA						
K RL	RF 50 Ω		ORREC PNO: Fast G	Trig: Free Ru Atten: 30 dB	#Avg	ALIGN AUTO J Type: RMS	12:07:48 PM Feb 04, 2020 TRACE 1 2 3 4 5 TYPE A WWWW DET A NNNN	6 Frequency
0 dB/div	Ref 20.00 d	Bm				M	r1 1.705 0 GHz -34.12 dBm	2 Auto Tun
10.0								Center Fre 867.500000 MH
10.0							DL1 -13.00 dBr	Start Fre 30.000000 MH
30.0							1	Stop Fre 1.705000000 G⊢
40.0								CF Ste 167.500000 MH <u>Auto</u> Ma
60.0 	nqqresq ₄ unquesturinissificipiti		ente de la constante de la cons		144)	de and Manhood State of State of Control of State		Freq Offs 0 H
							Otop 4 7050 Oll-	Scale Typ
Start 0.03 Res BW			#VBV	/ 3.0 MHz		Sweep 2	Stop 1.7050 GHz .233 ms (3351 pts	
SG						STATUS	3	

Plot 7-13. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)



Plot 7-14. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 22 of 59
© 2020 PCTEST	*	•		V 9.0 02/01/2019



	ectrum Analyze									_	
<mark>0</mark> RL	RF	50 Ω DC	PNO: Fast C			A #Avg Type	LIGN AUTO RMS	TRACI	Feb 04, 2020 E 1 2 3 4 5 6 E A WWWWW T A NNNNN	Frequ	iency
0 dB/div	Ref 10.	00 dBm	IFGain:Low	Atten: 20	ub		Mkr	1 19.622		Αι	ito Tun
0.00										Cer 15.00000	i ter Fre 0000 GH
20.0									DL1 -13.00 dBm	S1 10.00000	t art Fre 0000 GH
40.0									1-	Si 20.00000	t op Fre 0000 GH
50.0	~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							1.00000 <u>Auto</u>	CF Ste 0000 G⊦ Ma
°0.0										Fre	e q Offs o 0 ⊦
80.0 Start 10.0	00 GHz							Stop 20	000 GHz	Sc: Log	ale Typ <u>Li</u>
Res BW	1.0 MHz		#VB	W 3.0 MHz		Sv	veep 17	.33 ms (2)	0001 pts)		
SG							STATUS				

Plot 7-15. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)



Plot 7-16. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 23 of 59
© 2020 PCTEST				V 9 0 02/01/2019



	ectrum Analyz												- 6 ×
X/RL	RF	50 Ω	DC	CORREC	ast 😱	SEI		#Avg Typ	ALIGN AUTO	TRA	AM Feb 04, 2020 ACE 1 2 3 4 5 6 (PE A 4 4 4 4 5 6 A N N N N N N	Fre	quency
10 dB/div	Ref 20	.00 dB	3m	IFGain:L	.ow	Atten: 30			M	(r1 9.75	6 5 GHz 02 dBm		Auto Tune
10.0													enter Free 500000 GH
10.0											DL1 -13.00 dBm		Start Fre
30.0													Stop Fre 000000 GH
40.0			\sim	\sim		~~~	~~~				¹	824.6 <u>Auto</u>	CF Ste 500000 MH Ma
60.0												F	reqOffso 0⊦
70.0	5 CH2									Stop	0.000 GHz	S Log	cale Typ _{Li}
Res BW		4		į	≠VBW	3.0 MHz			weep 14	.29 ms (16491 pts)	_	
SG									STATUS	S			

Plot 7-17. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)



Plot 7-18. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 24 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 24 of 59
© 2020 PCTEST	•	•		V 9.0 02/01/2019



	ectrum Analyzer - S									_	- 6 ×
XI RL	RF 50	ΩDC	CORREC	SEN	SE:INT	#Avg Type: F	SN AUTO	TRAC	E 1 2 3 4 5 6 A WWWWWW A NNNN	Freq	luency
			IFGain:Low	Atten: 30							
10 dB/div	Ref 20.00	dBm					Mk	r1 1.616 -49.9	60 GHz 94 dBm	A	uto Tun
				Ĭ						Ce	nter Free
10.0										870.0	00000 MH
0.00										ę	Start Free
-10.0									DL1 -13.00 dBm	30.0	00000 MH:
20.0										c	Stop Fre
30.0											00000 GH
30.0											0.5.04
40.0									. 1		CF Stej 00000 MH Ma
-50.0					ويتوجعونه والمحارب		toga Player & a sub-Prop	a and the first of the second seco		<u>Auto</u>	IVIA
60.0 	uivanalist <u>an</u> sessan <mark>sessa</mark>	Nego alimatic da alima								Fr	eq Offse
70.0											0 H
70.0										S	cale Typ
Start 0.03								Stop 1.7	00 0112	Log	Li
	1.0 MHz		#VBW	3.0 MHz		Sw	_		3361 pts)		
ISG							STATUS				

Plot 7-19. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)



Plot 7-20. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 25 of 59
© 2020 PCTEST				V 9 0 02/01/2019



🔤 Keysight Sp	ectrum An	alyzer - Swe	ept SA										- # - X
I <mark>X/</mark> RL	RF	50 Ω	DC	CORREC	ast 🖵	Trig: Free		#Avg Ty	ALIGN AUTO	TRA	M Feb 04, 2020 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Fre	quency
10 dB/div Log	Ref	10.00 c	iBm	IFGain:L	.ow	Atten: 20	dB		Mkr	1 19.53	8 5 GHz 62 dBm		Auto Tune
0.00													e nter Freq 000000 GHz
-10.0											DL1 -13.00 dBm		Start Freq 000000 GHz
-30.0											1_		Stop Freq 000000 GHz
-50.0	~					an a						1.0000 <u>Auto</u>	CF Step 000000 GHz Man
-70.0												F	r eq Offset 0 Hz
-80.0												S	cale Type
Start 10.0 #Res BW				\$	VBW	3.0 MHz			Sweep 17	Stop 20 33 ms (2	0.000 GHz 20001 pts)	LOg	Lin
MSG									STATUS	3			

Plot 7-21. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFT600TS	<u> PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 26 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 26 of 59
© 2020 PCTEST				V 9 0 02/01/2019



PCS WCDMA Mode

	ectrum Analyzer - S						
X/RL	RF 50	ΩDC	CORREC	Trig: Free Run	#Avg Type: RMS	11:23:19 AM Feb 04, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
10 dB/div Log	Ref 20.00	dBm	IFGain:Low	Atten: 30 dB	М	kr1 1.845 0 GHz -34.16 dBm	Auto Tune
10.0							Center Fred 937.500000 MH:
-10.0						DL1 -13.00 dBm	Start Free 30.000000 MH
-20.0						1	Stop Fred 1.845000000 GH
-40.0							CF Step 181.50000 MH <u>Auto</u> Ma
60.0	1999 - Januar II. (1990) 		en das en de la constante de la				Freq Offse 0 H
-70.0	300 GHz					Stop 1.8450 GHz	Scale Typ
#Res BW			#VBW	/ 3.0 MHz	Sweep 2	2.420 ms (3631 pts)	
ISG					STATU	IS	

Plot 7-22. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-23. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 07 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 27 of 59
© 2020 PCTEST	-	•		V 9.0 02/01/2019



Keysight Spe			ot SA										- 6 ×
XI RL	RF	50 Ω	DC	CORREC PNO: F	ast 🖵	Trig: Free Atten: 20		#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Feb 04, 2020 CE 1 2 3 4 5 6 PE A WWWWW A N N N N N	Fre	equency
10 dB/div	Ref 1	0.00 d	Bm	IFGain:	Low	Atten: 20	dB		Mkr	1 19.61	1 0 GHz 47 dBm		Auto Tune
0.00													enter Fre 000000 GH
20.0											DL1 -13.00 dBm	10.000	Start Fre
40.0											1-	20.000	Stop Fre 000000 GH
50.0	~~		-									1.000 <u>Auto</u>	CF Ste 000000 G⊢ Ma
70.0												F	F req Offs 0 H
80.0 Start 10.0										Stop <u>20</u>	.000 0112	Log	Scale Typ <u>Li</u>
Res BW	1.0 MH	IZ			#VBW	3.0 MHz		S	weep 17	.33 ms (2	0001 pts)		
SG									STATUS	5			

Plot 7-24. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-25. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFT600TS	<u><u><u>P</u>CTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 29 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 28 of 59
© 2020 PCTEST		•		V 9 0 02/01/2019



	ectrum Analyze	r - Swept SA									
XI RL	RF	50 Ω DC	CORREC	Trig: Free		#Avg Typ	ALIGN AUTO e: RMS	TRA	AM Feb 04, 2020 CE 1 2 3 4 5 6 (PE A WWWWW DET A NNNNN	Freque	ncy
10 dB/div	Ref 20.0	00 dBm	IFGain:Low _	Atten: 30) dB		MI	(r1 9.70	9 0 GHz 14 dBm	Aut	o Tune
10.0										Cent 5.955000	er Fred 000 GH:
10.00									DL1 -13.00 dBm	Sta 1.910000	nt Fre 000 GH
30.0										Sto 10.0000000	o p Fre 000 GH
40.0		~~	~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				1	0 809.000 <u>Auto</u>	F Stej 000 MH Ma
60.0										Frec	l Offse 0 H
-70.0										Sca Log	le Typ
Start 1.91 ≇Res BW			#VB	N 3.0 MHz		s	weep 14	Stop 10 .02 ms (1	0.000 GHz 16181 pts)	-	
ISG							STATU	S			

Plot 7-26. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)



Plot 7-27. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 29 of 59
© 2020 PCTEST				V 9 0 02/01/2019



	ectrum Analyzer - S	wept SA							
I <mark>XI</mark> RL	RF 50	Ω DC	CORREC PNO: Fast	SENSE:IN Trig: Free Run Atten: 30 dB	#Avg Typ	ALIGN AUTO e: RMS	11:27:48 AM Feb 04, 2 TRACE 1 2 3 4 TYPE A WWW DET A NN N	56 www	Frequency
10 dB/div	Ref 20.00	dBm	I Guilleon			Mł	r1 1.849 5 G -49.77 dB	-Iz im	Auto Tune
10.0								g	Center Fred 40.000000 MH:
-10.00							DL1 -13.00		Start Free 30.000000 MH
-20.0								1.	Stop Fre 850000000 GH
40.0								1 Auto	CF Ste 82.000000 MH 2 Ma
60.0	99999-2929 					g lager digest for a trianger we			Freq Offse 0 H
-70.0								H7 Log	Scale Typ Li
Start 0.03 #Res BW			#VBW	3.0 MHz		Sweep 2	Stop 1.8500 G .427 ms (3641 p	- 12	
MSG						STATUS	\$		

Plot 7-28. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)



Plot 7-29. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 30 of 59
© 2020 PCTEST		•		V 9 0 02/01/2019



Keysight Sp	ectrum Ana	lyzer - Swe	ept SA										- • • •
IXI RL	RF	50 Ω	DC	CORREC	ast 🖵	Trig: Free		#Avg Ty	ALIGN AUTO pe: RMS	TRA	M Feb 04, 2020 CE 123456 PE A WWWWW ET A N N N N N	Fre	quency
10 dB/div Log	Ref 1	0.00 d	Bm	IFGain:L	.ow	Atten: 20) dB		Mkr	1 19.58	3 0 GHz 76 dBm		Auto Tune
0.00													e nter Freq 000000 GHz
-10.0											DL1 -13.00 dBm		Start Freq 000000 GHz
-30.0											1-		Stop Freq 000000 GHz
-50.0	~~~								ater and the second			1.0000 <u>Auto</u>	CF Step 000000 GHz Man
-70.0												F	r eq Offset 0 Hz
-80.0													cale Type
Start 10.0 #Res BW				\$	≠vbw	3.0 MHz			Sweep 17	Stop 20 .33 ms (2	0.000 GHz 20001 pts)	Log	Lin
MSG									STATUS	5			

Plot 7-30. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFT600TS	<u><u><u>P</u>CTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 31 of 59	
© 2020 PCTEST		•		V 9 0 02/01/2019	



7.4 Band Edge Emissions at Antenna Terminal

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW \geq 1% of the emission bandwidth
- 4. VBW \geq 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

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

Per 22.917(b), 24.238(b), 27.53(h)(3), and RSS-132(5.5), RSS-133(6.5), RSS-139(6.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕚 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 32 of 59
© 2020 PCTEST				V 9 0 02/01/2019



Cellular WCDMA Mode



Plot 7-31. Band Edge Plot (Cellular WCDMA Mode - Low Channel)



Plot 7-32. Band Edge Plot (Cellular WCDMA Mode - High Channel)

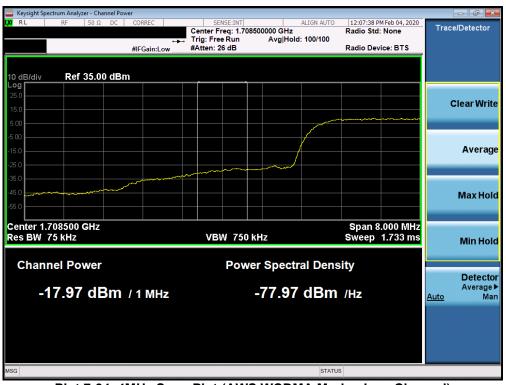
FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 33 of 59	
© 2020 PCTEST	*	•		V 9.0 02/01/2019	



AWS WCDMA Mode



Plot 7-33. Band Edge Plot (AWS WCDMA Mode - Low Channel)



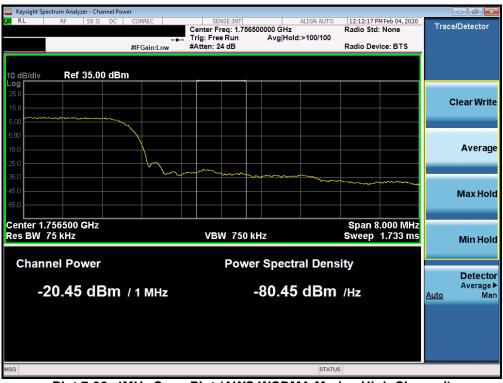
Plot 7-34. 4MHz Span Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 24 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 34 of 59
© 2020 PCTEST	-	•		V 9.0 02/01/2019



	ectrum Analyzer - S	wept SA									- # ×
X/RL	RF 50 9	Ω DC	CORREC		SE:INT Run	#Avg Typ	ALIGN AUTO De: RMS	TRA	M Feb 04, 2020 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Fre	quency
10 dB/div Log	Ref 30.00	dBm	IFGain:Low	Atten: 40	dB		Mkr1	1.755 (000 GHz 17 dBm		Auto Tune
20.0											e nter Fre d 000000 GH
0.00		\int									Start Free 500000 GH
-10.0					1				DL1 -13.00 dBm		Stop Free 500000 GH
30.0 ~~~					h	~~~	~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		1.9 <u>Auto</u>	CF Stej 500000 MH Ma
50.0										F	req Offse 0 H
-60.0	755000 011-									S	cale Type
	755000 GHz 100 kHz		#VB	N 300 kHz			Sweep 1	Span 1 .000 ms (5.00 MHz (1001 pts)	209	
MSG							STATUS	5			

Plot 7-35. Band Edge Plot (AWS WCDMA Mode - High Channel)



Plot 7-36. 4MHz Span Plot (AWS WCDMA Mode - High Channel)

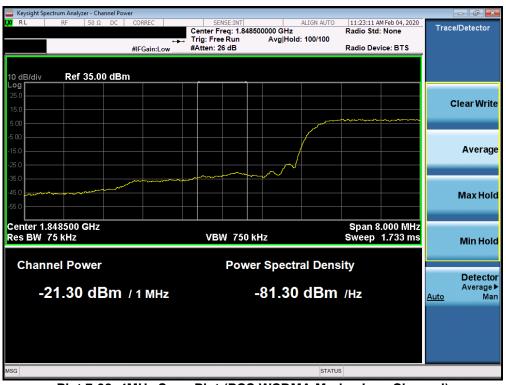
FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 25 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 35 of 59	
© 2020 PCTEST	•	*		V 9.0 02/01/2019	



PCS WCDMA Mode







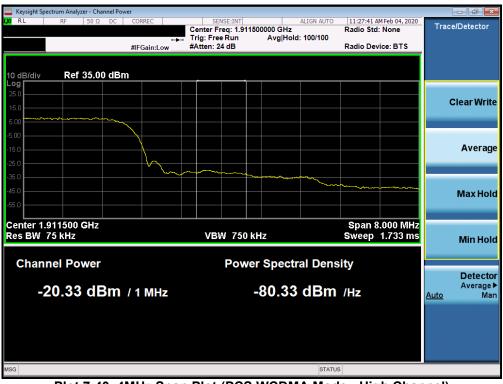
Plot 7-38. 4MHz Span Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 26 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 36 of 59
© 2020 PCTEST	-	•		V 9.0 02/01/2019



	ectrum Analyzer											
(<mark>RL</mark>	RF	50Ω DC	CORREC	Te	SENSE		#Avg Typ	ALIGN AUTO	TRA	M Feb 04, 2020 CE 1 2 3 4 5 6	Fr	equency
			PNO: Wie IFGain:Lo		tten: 40 d				D	PE A WWWW ET A N N N N N		
I0 dB/div	Ref 30.0	10 dBm						Mkr1	1.910 (-20.	000 GHz 39 dBm		Auto Tun
					Ĭ							enter Fre
20.0											1.91	000000 GH
10.0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	^	~							Start Fre
0.00											1.90	2500000 GH
10.0										DL1 -13.00 dBm		Stop Fre
20.0											1.91	7500000 GH
30.0	m				V \	har						CF Ste
40.0							- Com	- Congregation			1 <u>Auto</u>	.500000 MH Ma
+0.0									hand	m		Freq Offse
50.0												0
60.0												Scale Typ
	910000 G	Hz							Span 1	5.00 MHz	Log	Li
Res BW	100 kHz		#	VBW 300	0 kHz			Sweep 1	.000 ms	(1001 pts)		
SG								STATUS	6			

Plot 7-39. Band Edge Plot (PCS WCDMA Mode - High Channel)



Plot 7-40. 4MHz Span Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 27 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 37 of 59
© 2020 PCTEST	•	-		V 9.0 02/01/2019



7.5 Peak-Average Ratio

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 5.7.1

Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

Test Setup

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

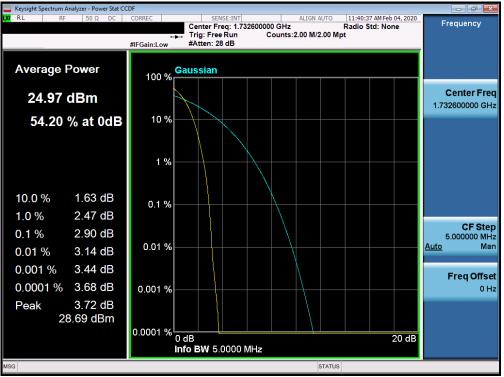


Figure 7-4. Test Instrument & Measurement Setup

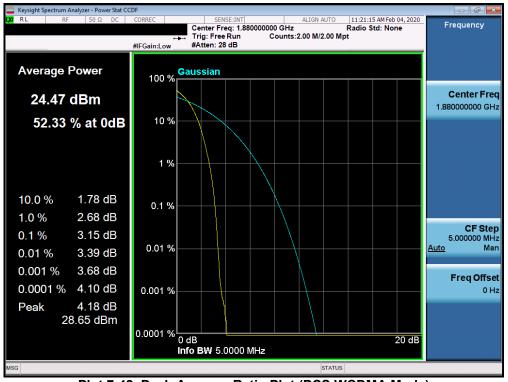
Test Notes

None

FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 38 of 59	
© 2020 PCTEST	•	•		V 9 0 02/01/2019	







Plot 7-42. Peak-Average Ratio Plot (PCS WCDMA Mode)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 20 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 39 of 59	
© 2020 PCTEST		•		V 9.0 02/01/2019	



7.6 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 and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW \ge 3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points \geq 2 x 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

FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 40 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 40 of 59
© 2020 PCTEST	•			V 9 0 02/01/2019



Test Setup

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

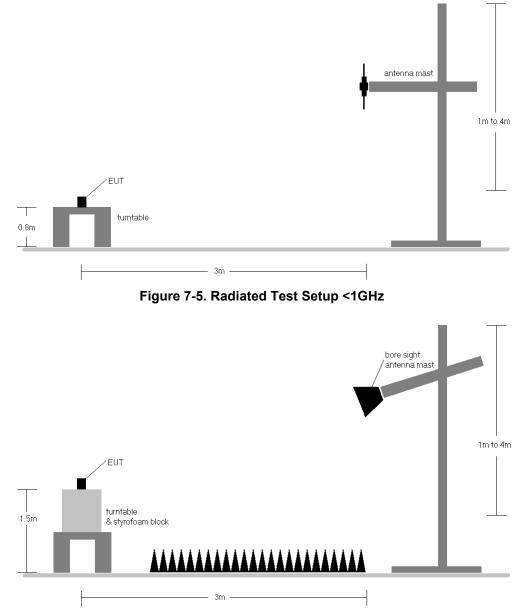


Figure 7-6. Radiated Test Setup >1GHz

FCC ID: ZNFT600TS	<u><u><u>P</u>CTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 41 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 41 of 59	
© 2020 PCTEST		•		V 9 0 02/01/2019	



Test Notes

- This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	н	129	1	16.15	6.70	20.70	0.117	38.45	-17.75	22.85	0.193	40.61	-17.76
836.60	WCDMA850	н	124	4	16.19	6.70	20.74	0.119	38.45	-17.71	22.89	0.195	40.61	-17.72
846.60	WCDMA850	Н	119	2	15.83	6.60	20.28	0.107	38.45	-18.17	22.43	0.175	40.61	-18.18
836.60	WCDMA850	V	111	100	15.71	6.40	19.96	0.099	38.45	-18.49	22.11	0.163	40.61	-18.50

Table 7-2. ERP/EIRP (Cellular WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	Н	100	218	14.27	9.43	23.70	30.00	-6.30
1732.60	WCDMA1700	н	109	322	13.93	9.31	23.24	30.00	-6.76
1752.60	WCDMA1700	н	151	216	14.12	9.21	23.33	30.00	-6.67
1712.40	WCDMA1700	V	386	252	12.33	9.34	21.67	30.00	-8.33

Table 7-3. EIRP (AWS WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	V	100	80	14.16	9.89	24.05	33.01	-8.96
1880.00	WCDMA1900	V	135	62	13.73	10.10	23.83	33.01	-9.18
1907.60	WCDMA1900	V	214	92	14.11	10.30	24.41	33.01	-8.60
1907.60	WCDMA1900	Н	119	322	13.94	10.24	24.18	33.01	-8.83

Table 7-4. EIRP (PCS WCDMA)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 42 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 42 of 59	
© 2020 PCTEST	•	·		V 9.0 02/01/2019	



7.7 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 horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.8

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 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 43 of 59	
© 2020 PCTEST	•	•		V 9.0 02/01/2019	



Test Setup

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

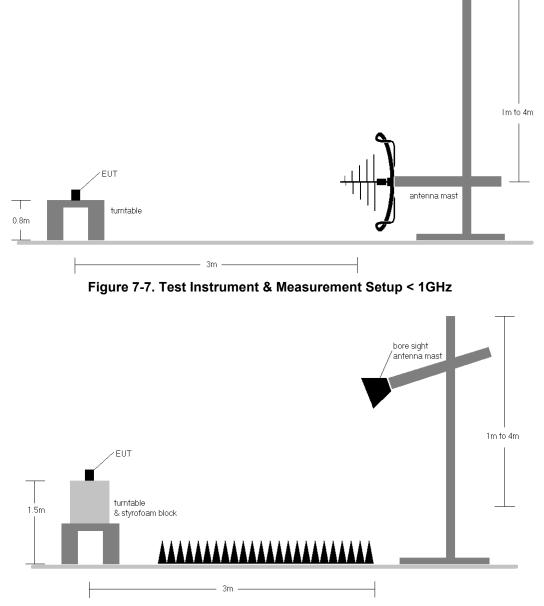


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

FCC ID: ZNFT600TS	<u><u><u></u><u>PCTEST</u></u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 44 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 44 of 59	
© 2020 PCTEST				V 9 0 02/01/2019	



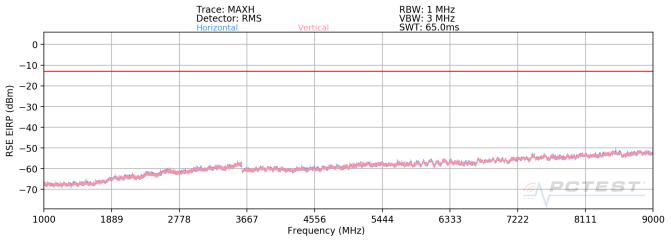
Test Notes

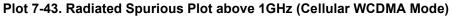
- This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 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) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

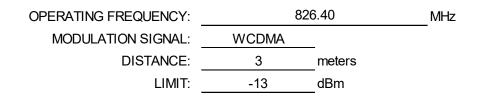
FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 45 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	20 Portable Tablet		Page 45 of 59
© 2020 PCTEST				V 9 0 02/01/2019



Cellular WCDMA Mode





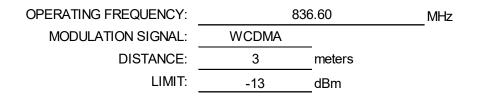


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1652.80	Н	200	43	-75.66	8.95	-66.71	-53.7
2479.20	Н	331	10	-77.50	9.67	-67.83	-54.8
3305.60	Н	-	-	-74.24	9.58	-64.65	-51.7
4132.00	Н	-	-	-74.08	10.19	-63.89	-50.9

Table 7-5. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 46 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	- 2/14/2020 Portable Tablet		Page 46 of 59
© 2020 PCTEST	-	•		V 9 0 02/01/2019





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]
1673.20	Н	199	30	-76.78	8.95	-67.83	-54.8
2509.80	Н	324	4	-76.99	9.75	-67.24	-54.2
3346.40	Н	-	-	-75.23	9.60	-65.62	-52.6
4183.00	Н	-	-	-75.42	10.35	-65.08	-52.1

Table 7-6. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

846.60

MHz

OPERATING FREQUENCY:

MODULATION SIGNA

ON SIGNAL:	WCDMA	
DISTANCE:	3	meters
LIMIT:	-13	dBm

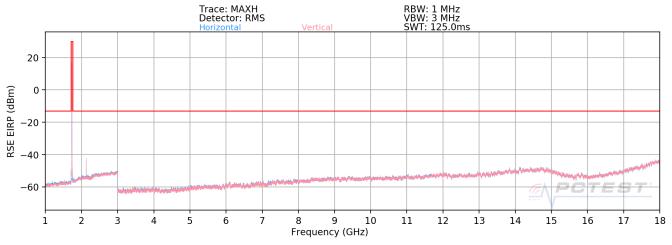
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1693.20	Н	197	46	-77.88	8.95	-68.92	-55.9
2539.80	Н	209	4	-77.33	9.74	-67.59	-54.6
3386.40	Н	-	-	-75.18	9.75	-65.43	-52.4
4233.00	Н	-	-	-74.77	10.53	-64.24	-51.2

Table 7-7. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 47 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020 Portable Tablet			Page 47 of 59
© 2020 PCTEST				V 9.0 02/01/2019



AWS WCDMA Mode



Plot 7-44. Radiated Spurious Plot above 1GHz (AWS WCDMA Mode)

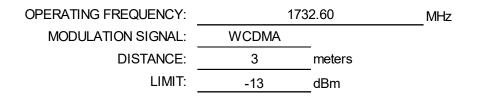
OPERATING FREQUENCY:	171	12.40	MHz
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
3424.80	Н	186	35	-73.66	9.83	-63.83	-50.8
5137.20	Н	148	209	-71.51	10.69	-60.82	-47.8
6849.60	Н	-	-	-71.10	11.64	-59.46	-46.5
8562.00	Н	-	-	-68.17	11.14	-57.02	-44.0

Table 7-8. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 49 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 48 of 59	
© 2020 PCTEST				V 9 0 02/01/2019	





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]
3465.20	Н	329	209	-71.19	9.88	-61.31	-48.3
5197.80	Н	123	212	-71.42	10.76	-60.67	-47.7
6930.40	Н	-	-	-72.31	11.74	-60.56	-47.6
8663.00	Н	-	-	-68.01	11.02	-57.00	-44.0

Table 7-9. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1413)

OPERATING FREQUENCY

MODULATION SIGNAL

REQUENCY:	175	2.60
ON SIGNAL:	WCDMA	
DISTANCE:	3	meters
LIMIT:	-13	dBm

MHz

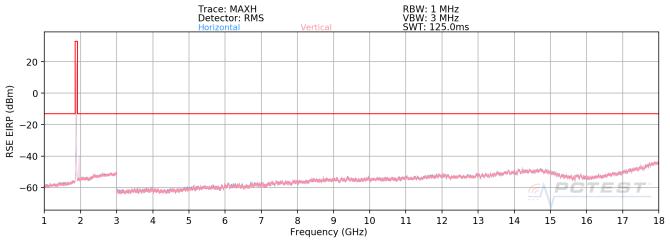
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3505.20	Н	328	213	-70.98	9.92	-61.06	-48.1
5257.80	Н	165	183	-71.91	10.72	-61.20	-48.2
7010.40	Н	-	-	-71.70	11.86	-59.84	-46.8
8763.00	Н	-	-	-67.95	10.98	-56.97	-44.0

Table 7-10. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 40 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 49 of 59
© 2020 PCTEST		•		V 9.0 02/01/2019



PCS WCDMA Mode



Plot 7-45. Radiated Spurious Plot above 1GHz (PCS WCDMA Mode)

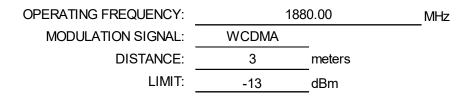
OPERATING FREQUENCY:	185	52.40	MHz
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
3704.80	Н	385	350	-69.71	9.57	-60.15	-47.1
5557.20	Н	-	-	-73.15	10.95	-62.20	-49.2
7409.60	Н	-	-	-69.24	10.96	-58.28	-45.3

Table 7-11. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dere E0 of E0	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 50 of 59	
© 2020 PCTEST	•			V 9.0 02/01/2019	





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]
3760.00	Н	208	353	-71.00	9.37	-61.64	-48.6
5640.00	Н	-	-	-72.88	11.17	-61.71	-48.7
7520.00	Н	-	-	-69.78	11.11	-58.66	-45.7

Table 7-12. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

OPERATING FREQUENCY:	190	7.60	MHz
MODULATION SIGNAL:	WCDMA		_
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]
3815.20	Н	173	357	-71.10	9.30	-61.80	-48.8
5722.80	Н	-	-	-73.35	11.37	-61.98	-49.0
7630.40	Н	-	-	-70.69	11.31	-59.38	-46.4

Table 7-13. Radiated Spurious Data (PCS WCDMA Mode - Ch. 9538)

FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage E1 of E0
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet	Page 51 of 59
© 2020 PCTEST			V 9.0 02/01/2019



Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, RSS-132, and RSS-133, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, Part 27, and RSS-139, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 52 of 50	
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 52 of 59	
© 2020 PCTEST				V 9 0 02/01/2019	



OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	
REFERENCE VOLTAGE:	4.27	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	836,600,141	141	0.0000169
100 %		- 20	836,599,991	-9	-0.0000011
100 %		- 10	836,599,993	-7	-0.0000008
100 %		0	836,600,111	111	0.0000133
100 %		+ 10	836,600,123	123	0.0000147
100 %		+ 20	836,599,887	-113	-0.0000135
100 %		+ 30	836,600,117	117	0.0000140
100 %		+ 40	836,600,460	460	0.0000550
100 %		+ 50	836,600,310	310	0.0000371
BATT. ENDPOINT	3.51	+ 20	836,599,966	-34	-0.0000041

Table 7-14. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFT600TS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 52 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 53 of 59
© 2020 PCTEST	•			V 9.0 02/01/2019



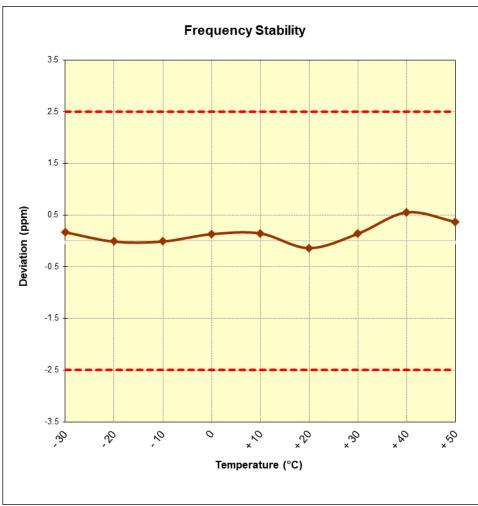


Figure 7-9. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 54 of 59
© 2020 PCTEST	•			V 9.0 02/01/2019



OPERATING FREQUENCY:	1,732,600,000	Hz
CHANNEL:	1413	
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	1,732,599,745	-255	-0.0000147
100 %		- 20	1,732,599,854	-146	-0.0000084
100 %		- 10	1,732,600,374	374	0.0000216
100 %		0	1,732,600,363	363	0.0000210
100 %		+ 10	1,732,600,010	10	0.0000006
100 %		+ 20	1,732,599,963	-37	-0.0000021
100 %		+ 30	1,732,599,967	-33	-0.0000019
100 %		+ 40	1,732,600,086	86	0.0000050
100 %		+ 50	1,732,600,090	90	0.0000052
BATT. ENDPOINT	3.51	+ 20	1,732,600,044	44	0.0000025

Table 7-15. Frequency Stability Data (AWS WCDMA Mode – Ch. 1413)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFT600TS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 55 of 59
© 2020 PCTEST	•	•		V 9.0 02/01/2019



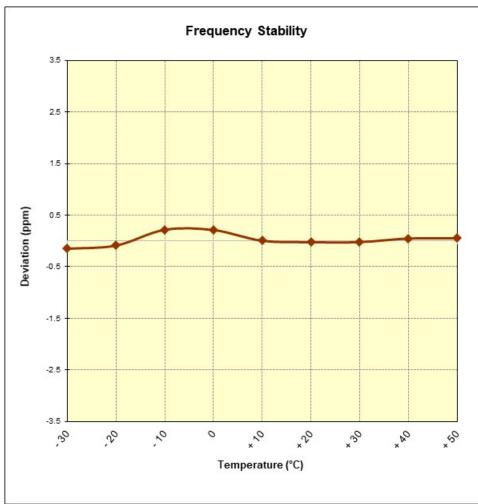


Figure 7-10. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage FC of FO
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 56 of 59
© 2020 PCTEST				V 9.0 02/01/2019



OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	_
REFERENCE VOLTAGE:	4.27	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.27	- 30	1,880,000,278	278	0.0000148
100 %		- 20	1,879,999,987	-13	-0.0000007
100 %		- 10	1,880,000,090	90	0.0000048
100 %		0	1,879,999,908	-92	-0.0000049
100 %		+ 10	1,879,999,747	-253	-0.0000135
100 %		+ 20	1,879,999,990	-10	-0.0000005
100 %		+ 30	1,879,999,961	-39	-0.0000021
100 %		+ 40	1,879,999,745	-255	-0.0000136
100 %		+ 50	1,879,999,765	-235	-0.0000125
BATT. ENDPOINT	3.51	+ 20	1,879,999,998	-2	-0.0000001

Table 7-16. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 57 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 57 of 59
© 2020 PCTEST				V 9.0 02/01/2019



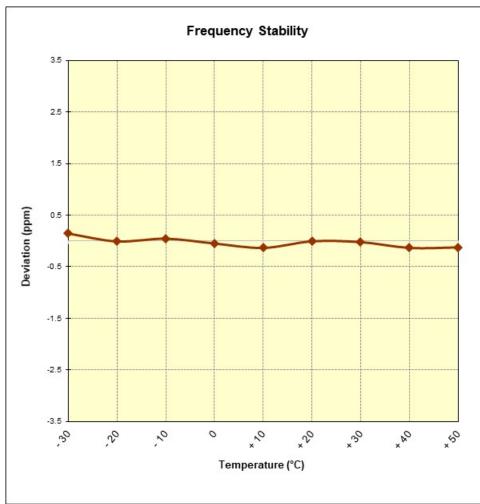


Figure 7-11. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFT600TS	<u><u>PCTEST</u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 59 of 50
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 58 of 59
© 2020 PCTEST				V 9.0 02/01/2019



8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LG Portable Tablet FCC ID: ZNFT600TS complies with all the requirements of Part 22, 24, & 27 of the FCC Rules.

FCC ID: ZNFT600TS	<u><u><u></u><u>PCTEST</u></u></u>	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 59 of 59
1M2001100004-02.ZNF	1/13 - 2/14/2020	Portable Tablet		Page 59 01 59
© 2020 PCTEST				V 9.0 02/01/2019