

**MEASUREMENT REPORT**
FCC PART 15.247 Bluetooth**Applicant Name:**LG Electronics MobileComm U.S.A
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States**Date of Testing:**

7/20-7/26/2015

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

0Y1507241434.ZNF

FCC ID:**ZNFV930****APPLICANT:****LG Electronics MobileComm U.S.A****Application Type:**

Class II Permissive Change

Model(s):

LG-V930, LGV930, V930

EUT Type:

Portable Tablet

Frequency Range:

2402 – 2480MHz (Bluetooth for US)

Type of Modulation:GFSK, $\pi/4$ -DQPSK, 8DPSK**FCC Classification:**

FCC Part 15 Spread Spectrum Transmitter (DSS)

FCC Rule Part(s):

Part 15 Subpart C (15.247)

Test Procedure(s):

ANSI C63.10-2009

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 ANSI C63.10-2009. 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.

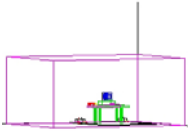

Randy Ortanez
President

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 1 of 24

TABLE OF CONTENTS

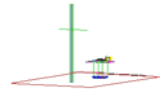
FCC PART 15.247 MEASUREMENT REPORT	3
1.0 INTRODUCTION.....	4
1.1 SCOPE.....	4
1.2 PCTEST TEST LOCATION.....	4
2.0 PRODUCT INFORMATION	5
2.1 EQUIPMENT DESCRIPTION.....	5
2.2 DEVICE CAPABILITIES	5
2.3 TEST CONFIGURATION	5
2.4 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS.....	5
3.0 DESCRIPTION OF TEST	6
3.1 EVALUATION PROCEDURE.....	6
3.2 RADIATED EMISSIONS	7
3.3 ENVIRONMENTAL CONDITIONS	7
4.0 ANTENNA REQUIREMENTS	8
5.0 TEST EQUIPMENT CALIBRATION DATA.....	9
6.0 TEST RESULTS	10
6.1 SUMMARY	10
6.2 RADIATED SPURIOUS EMISSION MEASUREMENTS – ABOVE 1GHZ	11
6.3 RADIATED RESTRICTED BAND EDGE MEASUREMENTS	19
6.4 RADIATED SPURIOUS EMISSIONS MEASUREMENTS – BELOW 1GHZ	21
7.0 CONCLUSION	24

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 2 of 24	



MEASUREMENT REPORT

FCC Part 15.247

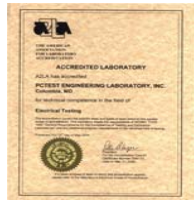


§ 2.1033 General Information

APPLICANT: LG Electronics MobileComm U.S.A
APPLICANT ADDRESS: 1000 Sylvan Avenue
 Englewood Cliffs, NJ 07632, United States
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S): Part 15 Subpart C (15.247)
BASE MODEL: LG-V930
FCC ID: ZNFV930
FCC CLASSIFICATION: FCC Part 15 Spread Spectrum Transmitter (DSS)
Test Device Serial No.: 351895070010598 ☐ Production ☒ Pre-Production ☐ Engineering
Method/System: Frequency Hopping Spread Spectrum (FHSS)
DATE(S) OF TEST: 7/20-7/26/2015
TEST REPORT S/N: 0Y1507241434.ZNF

Test Facility / Accreditations

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



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 3 of 24

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 Industry Canada Certification and Engineering Bureau.

1.2 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.



Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFV930	 FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 4 of 24

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Tablet FCC ID: ZNFV930**. The test data contained in this report pertains only to the emissions due to the EUT's Bluetooth transmitter.

- This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:
 - A) The hopping sequence is pseudorandom
 - B) All channels are used equally on average
 - C) The receiver input bandwidth equals the transmit bandwidth
 - D) The receiver hops in sequence with the transmit signal
- 15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.
- 15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate its channels selection/ hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.
- 15.247(h): The EUT employs Adaptive Frequency Hopping (AFH) which identifies sources of interference namely devices operating in 802.11 WLAN and excludes them from the list of available channels. The process of re-mapping reduces the number of test channels from 79 channels to a minimum number of 20 channels.

2.2 Device Capabilities

This device contains the following capabilities:

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

2.3 Test Configuration

The LG Portable Tablet FCC ID: ZNFV930 was tested per the guidance of ANSI C63.10-2009. ANSI C63.10-2009 was also used to reference the appropriate EUT setup for radiated spurious emissions testing. See Section 3.2 for radiated emissions test setups.

2.4 EMI Suppression Device(s)/Modifications

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

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 5 of 24

3.0 DESCRIPTION OF TEST

3.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009) was used in the measurement of the **LG Portable Tablet** **FCC ID: ZNFV930**.

Deviation from measurement procedure.....None

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 6 of 24

3.2 Radiated 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 Clause 5, Figure 5.7 of ANSI C63.4-2009. For measurements above 1GHz 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 below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It 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. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

3.3 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 7 of 24

4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antennas of the LG Portable Tablet are **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The **LG Portable Tablet FCC ID: ZNFV930** unit complies with the requirement of §15.203.

Ch.	Frequency (MHz)
00	2402
:	:
39	2441
:	:
78	2480

Table 4-1. Frequency/ Channel Operations

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 8 of 24

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE3	Radiated Emissions Cable Set	10/17/2014	Annual	10/17/2015	N/A
Agilent	8447D	Broadband Amplifier	6/12/2015	Annual	6/12/2016	2443A01900
Agilent	N4010A	Wireless Connectivity Test Set	N/A			GB46170464
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	135427
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	2
Rhode & Schwarz	TS-PR18	Pre-Amplifier	3/5/2015	Annual	3/5/2016	101622
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			836536/0005
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/17/2015	Annual	7/17/2016	100348
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100040
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140336

Table 5-1. Annual Test Equipment Calibration Schedule

Note:

Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 9 of 24

6.0 TEST RESULTS

6.1 Summary

Company Name: LG Electronics MobileComm U.S.A
 FCC ID: ZNFV930
 Method/System: Frequency Hopping Spread Spectrum (FHSS)
 Number of Channels: 79

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)					
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	RADIATED	PASS	Section 6.2, Section 6.3, Section 6.4

Table 6-1. 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) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "Chamber Automation," Version 1.1.2.

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 10 of 24	

6.2 Radiated Spurious Emission Measurements – Above 1GHz

§15.205 §15.209 §15.247 (d)

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 6-2 per Section 15.209.

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 6-2. Radiated Limits

Test Procedure Used

ANSI C63.10-2009 – Section 6.6.4.2

Test Settings

Average Field Strength Measurements per Section 4.2.3.2.3 of ANSI C63.10-2009

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 1kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds
4. Averaging type was set to RMS to ensure that video filtering was applied in the power domain
5. Detector = peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to stabilize

Peak Field Strength Measurements per Section 4.2.3.2.2 of ANSI C63.10-2009

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW is set depending on measurement frequency, as specified in Table 6-3 below
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 11 of 24

Frequency	RBW
9 – 150kHz	200 – 300Hz
0.15 – 30MHz	9 – 10kHz
30 – 1000MHz	100 – 120kHz
> 1000MHz	1MHz

Table 6-3. RBW as a Function of Frequency

Test Setup

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

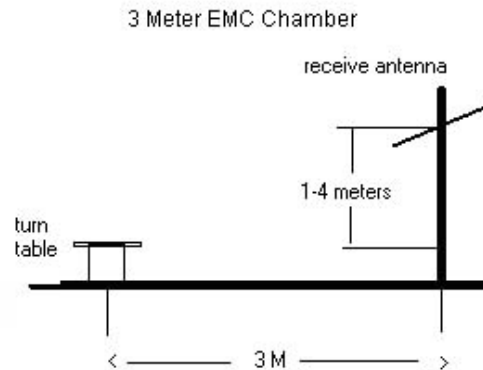


Figure 6-1. Test Instrument & Measurement Setup

Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-2.
2. No significant radiated emissions were found in the 2310 - 2390MHz restricted band.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested with its standard battery.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
6. The duty cycle correction factor was not applied to noise floor measurements.
7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.

FCC ID: ZNFV930	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 12 of 24	

Sample Calculation

- o Field Strength Level $_{[dB\mu V/m]} = \text{Analyzer Level }_{[dBm]} + 107 + \text{AFCL }_{[dB/m]} + \text{Duty Cycle Correction }_{[dB]}$
- o $\text{AFCL }_{[dB/m]} = \text{Antenna Factor }_{[dB/m]} + \text{Cable Loss }_{[dB]}$
- o $\text{Margin }_{[dB]} = \text{Field Strength Level }_{[dB\mu V/m]} - \text{Limit }_{[dB\mu V/m]}$

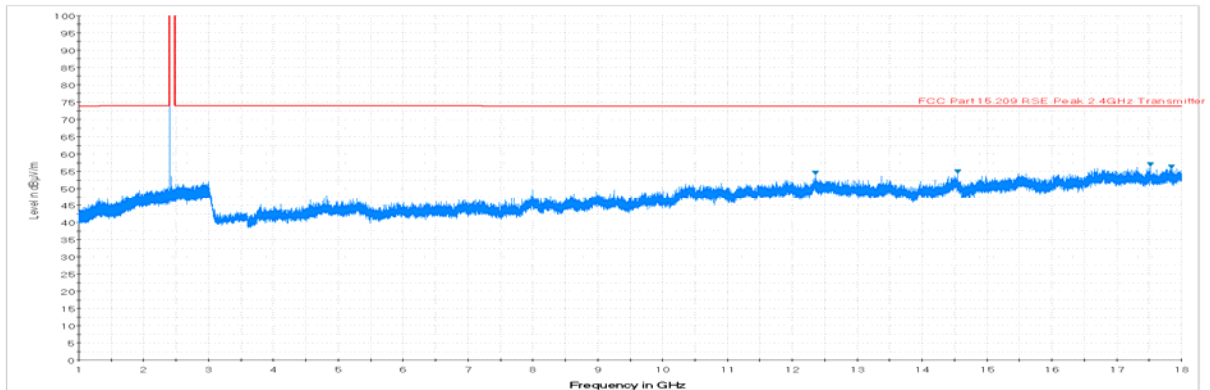
Duty Cycle Correction Factor Calculation

- o Channel hop rate = 800 hops/second (AFH Mode)
- o Adjusted channel hop rate for DH5 mode = 133.33 hops/second
- o Time per channel hop = $1 / 133.33 \text{ hops/second} = 7.50 \text{ ms}$
- o Time to cycle through all channels = $7.50 \times 20 \text{ channels} = 150 \text{ ms}$
- o Number of times transmitter hits on one channel = $100 \text{ ms} / 150 \text{ ms} = 1 \text{ time(s)}$
- o Worst case dwell time = 7.5 ms
- o Duty cycle correction factor = $20\log_{10}(7.5\text{ms}/100\text{ms}) = -22.5 \text{ dB}$

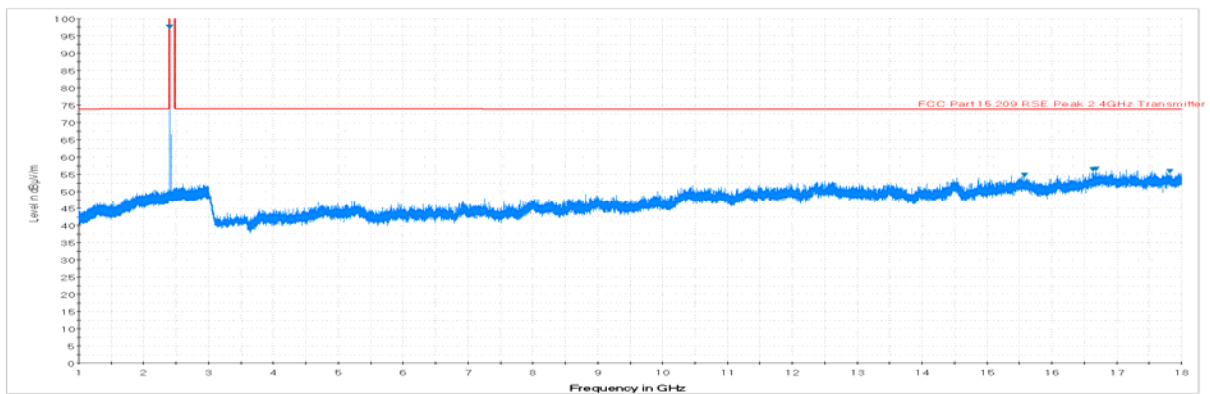
FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 13 of 24

Radiated Spurious Emission Measurements

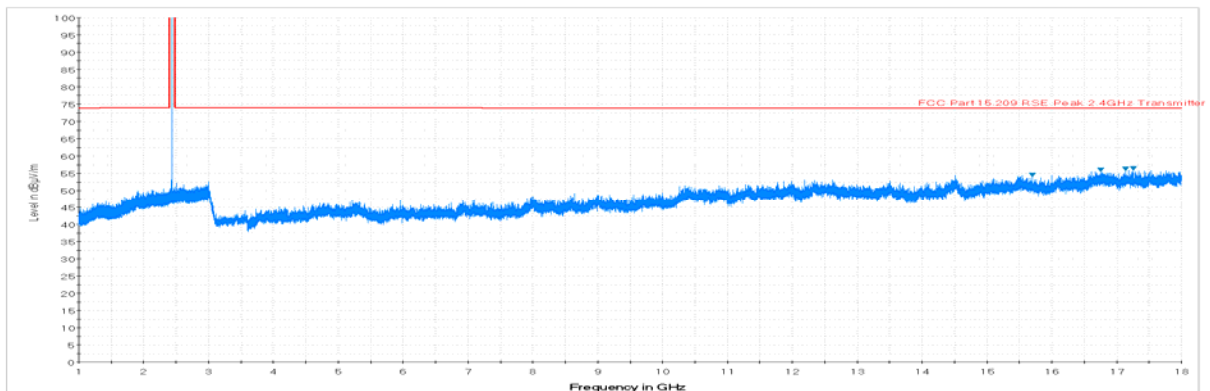
§15.205 §15.209 §15.247 (d)



Plot 6-1. Radiated Spurious Plot above 1GHz (BT – Ch. 0, Ant. Pol. H)

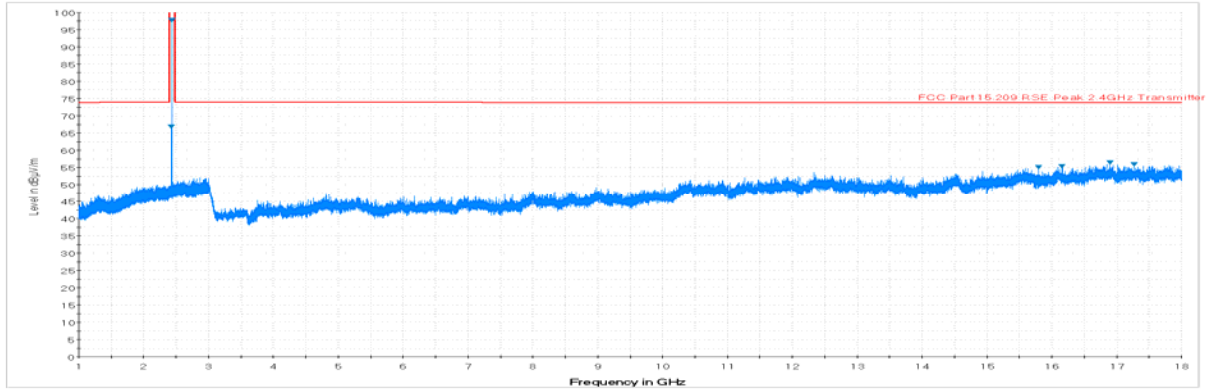


Plot 6-2. Radiated Spurious Plot above 1GHz (BT – Ch. 0, Ant. Pol. V)

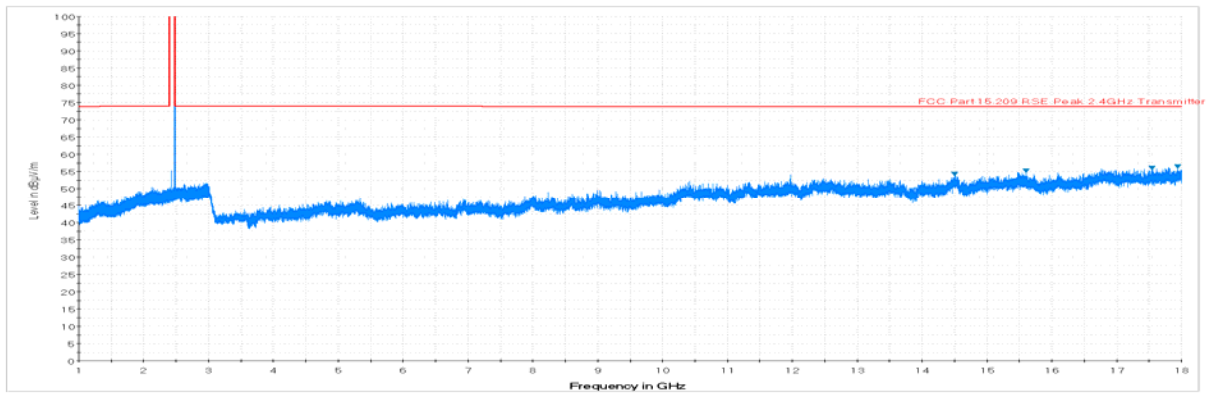


Plot 6-3. Radiated Spurious Plot above 1GHz (BT – Ch. 39, Ant. Pol. H)

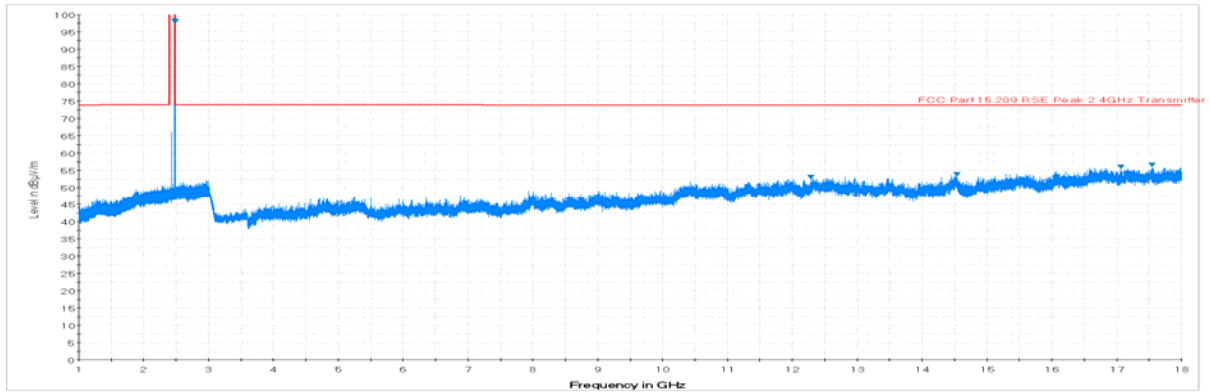
FCC ID: ZNFV930	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 14 of 24



Plot 6-4. Radiated Spurious Plot above 1GHz (BT – Ch. 39, Ant. Pol. V)



Plot 6-5. Radiated Spurious Plot above 1GHz (BT – Ch. 78, Ant. Pol. H)

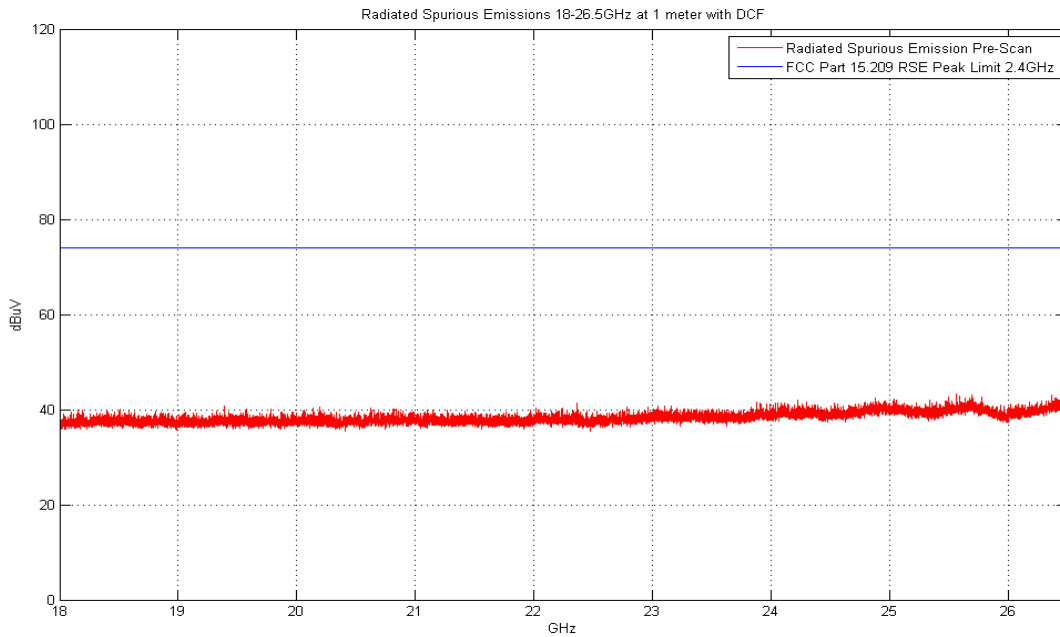


Plot 6-6. Radiated Spurious Plot above 1GHz (BT – Ch. 78, Ant. Pol. V)

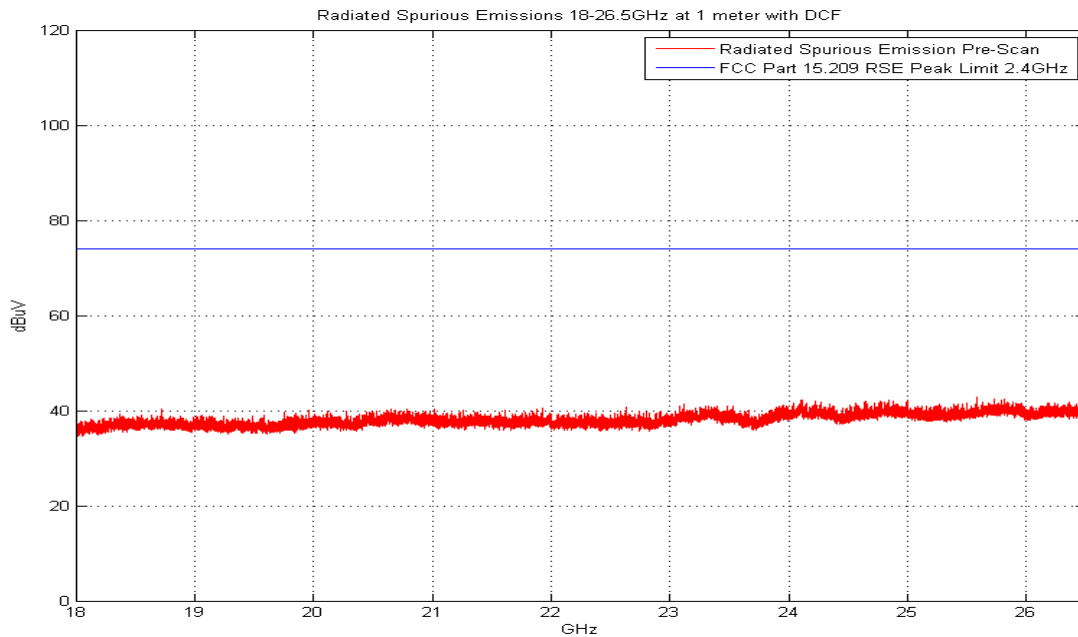
FCC ID: ZNFV930	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)	Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 15 of 24

Radiated Spurious Emissions Measurements (Above 18GHz)

§15.209



Plot 6-7. Radiated Spurious Plot above 18GHz (Pol. H)



Plot 6-8. Radiated Spurious Plot above 18GHz (Pol. V)

FCC ID: ZNFV930	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)	Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 16 of 24

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Worst Case Mode: Bluetooth
Worst Case Data Rate: 1 Mbps
Measurement Distance: 3 Meters
Operating Frequency: 2402MHz
Channel: 0

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4804.00	-104.91	Avg	H	41.25	-22.50	20.84	53.98	-33.14
4804.00	-98.29	Peak	H	41.25	0.00	49.96	73.98	-24.02
12010.00	-112.27	Avg	H	49.12	0.00	43.85	53.98	-10.13
12010.00	-98.41	Peak	H	49.12	0.00	57.71	73.98	-16.27

Table 6-4. Radiated Measurements

Worst Case Mode: Bluetooth
Worst Case Data Rate: 1 Mbps
Measurement Distance: 3 Meters
Operating Frequency: 2441MHz
Channel: 39

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4882.00	-106.40	Avg	H	40.91	-22.50	19.02	53.98	-34.96
4882.00	-99.37	Peak	H	40.91	0.00	48.54	73.98	-25.44
7323.00	-112.71	Avg	H	43.38	0.00	37.67	53.98	-16.31
7323.00	-100.51	Peak	H	43.38	0.00	49.87	73.98	-24.11
12205.00	-111.93	Avg	H	49.16	0.00	44.23	53.98	-9.74
12205.00	-99.81	Peak	H	49.16	0.00	56.35	73.98	-17.62

Table 6-5. Radiated Measurements

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 17 of 24

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4960.00	-109.41	Avg	H	40.84	-22.50	15.93	53.98	-38.05
4960.00	-99.91	Peak	H	40.84	0.00	47.93	73.98	-26.05
7440.00	-113.30	Avg	H	44.11	0.00	37.81	53.98	-16.17
7440.00	-100.80	Peak	H	44.11	0.00	50.31	73.98	-23.67
12400.00	-111.56	Avg	H	49.65	0.00	45.09	53.98	-8.89
12400.00	-99.06	Peak	H	49.65	0.00	57.59	73.98	-16.39

Table 6-6. Radiated Measurements

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 18 of 24

6.3 Radiated Restricted Band Edge Measurements

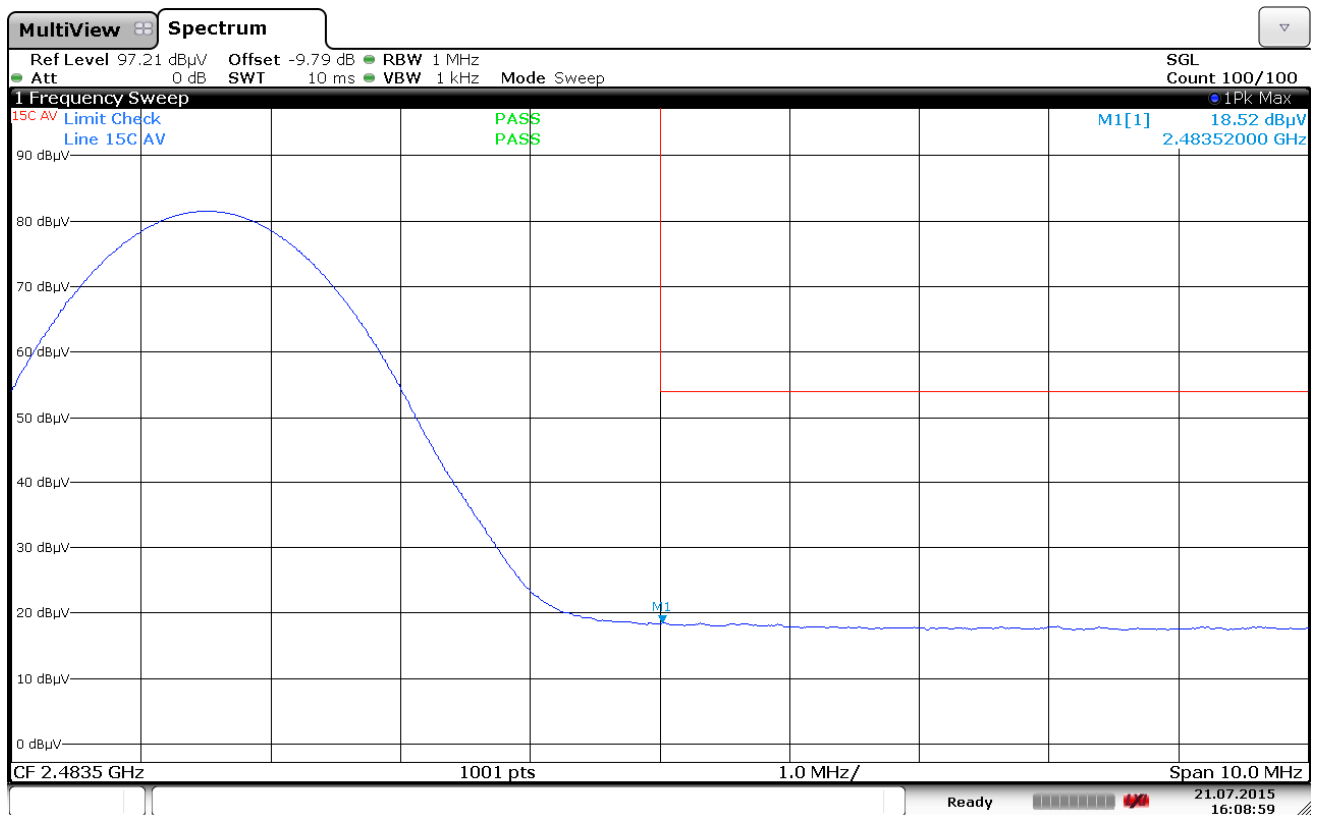
~~\$15.205~~ ~~\$15.209~~ ~~\$15.247 (d)~~

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting. Two different amplitude offsets were used depending on whether peak or average measurements were measured. The average measurements use a duty cycle correction factor (DCCF).

The amplitude offset shown in the following plots for average measurements was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + 10 \text{ dB Attenuator}) - \text{Preamplifier Gain} + \text{DCCF}$$

Worst Case Mode:	Bluetooth
Worst Case Data Rate:	1 Mbps
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78



Date: 21.JUL.2015 16:08:59

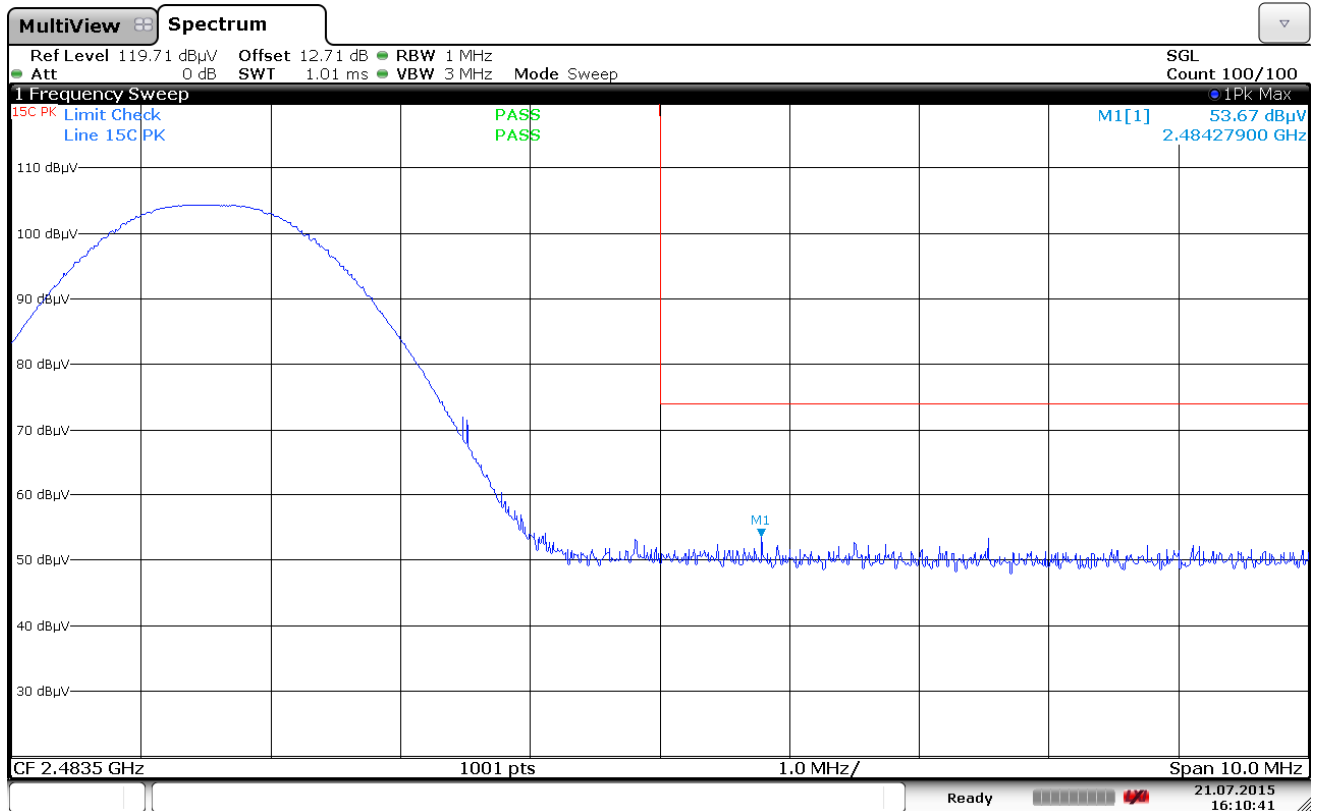
Plot 6-9. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: ZNFV930	PCTEST ENGINEERING LABORATORY, INC.		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)	Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 19 of 24	

Radiated Restricted Band Edge Measurements \$15.205 \$15.209 \$15.247 (d)

The amplitude offset shown in the following plots for peak measurements was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + 10 \text{ dB Attenuator}) - \text{Preamplifier Gain}$$



Date: 21.JUL.2015 16:10:41

Plot 6-10. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: ZNFV930	FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)			Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 20 of 24	

6.4 Radiated Spurious Emissions Measurements – Below 1GHz

§15.209

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 6-7 per Section 15.209.

Frequency	Field Strength [μ V/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 6-7. Radiated Limits

Test Procedures Used

ANSI C63.4-2009

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 21 of 24

Test Setup

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

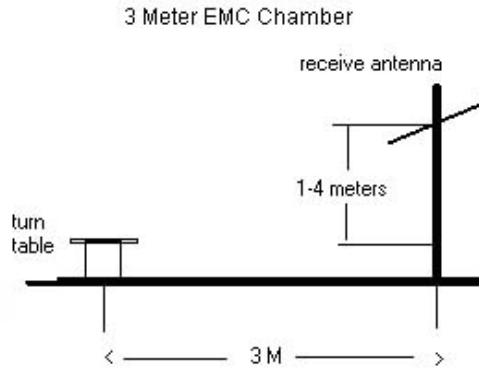


Figure 6-2. Test Instrument & Measurement Setup

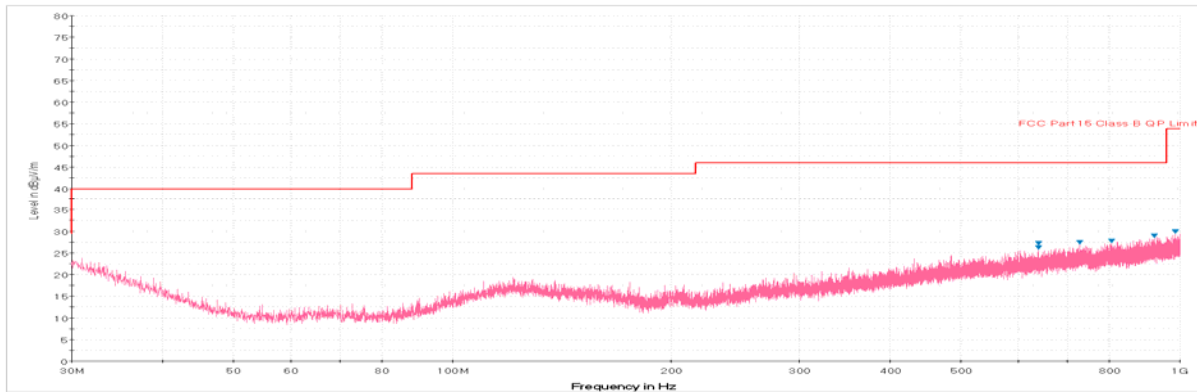
Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-7.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

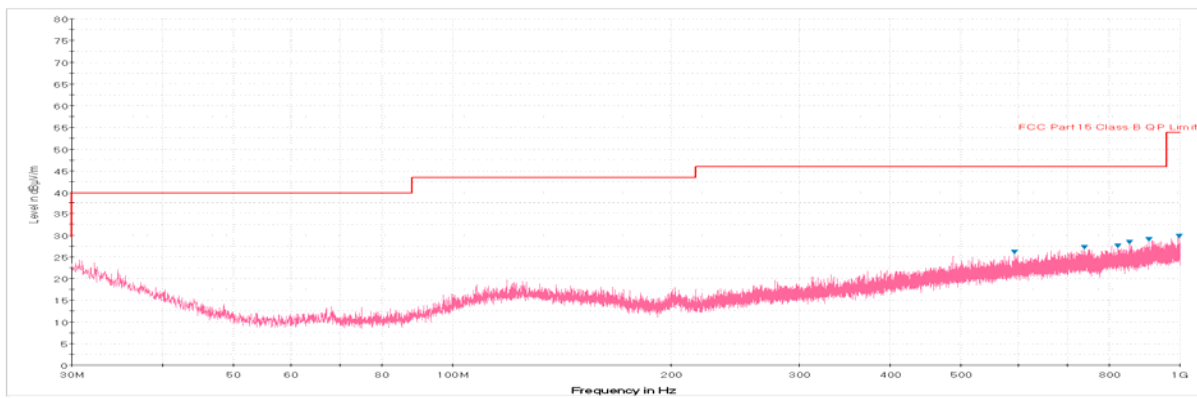
FCC ID: ZNFV930	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)	Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet	Page 22 of 24

Radiated Spurious Emissions Measurements (Below 1GHz)

\$15.209



Plot 6-11. Radiated Spurious Plot below 1GHz (Pol. H)



Plot 6-12. Radiated Spurious Plot below 1GHz (Pol. V)

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 23 of 24

7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Tablet FCC ID: ZNFV930** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules.

FCC ID: ZNFV930		FCC Pt. 15.247 BLUETOOTH TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1507241434.ZNF	Test Dates: 7/20-7/26/2015	EUT Type: Portable Tablet		Page 24 of 24