PCTEST ENGINEERING LABORATORY, INC.
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctestlab.com

MEASUREMENT REPORT
FCC Part 15.407 UNII 802.11a/n/ac

Applicant Name:
LG Electronics MobileComm U.S.A
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
10/5/2017
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
1M1710060269-02.ZNF

FCC ID:	**ZNFH932**
APPLICANT:	**LG Electronics MobileComm U.S.A**

Application Type:	Class II Permissive Change
Model:	LG-H932
Additional Model(s):	LGH932, H932, LG-H932PR, LGH932PR, H932PR
EUT Type:	Portable Handset
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15.407
Test Procedure(s):	KDB 789033 D02 v01r04, KDB 662911 D01 v02r01
Class II Permissive Change:	Enabling TDWR Channels

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 KDB 789033 D02 v01r04. 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

ACCREDITED
TESTING CERT#2041.01

V 7
06/23/2017

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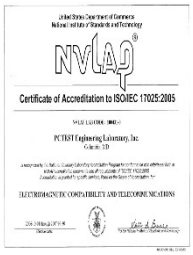
§ 2.1033 General Information

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 15.407
BASE MODEL:	LG-H932
FCC ID:	ZNFH932
FCC CLASSIFICATION:	Unlicensed National Information Infrastructure (UNII)
Test Device Serial No.:	05514, 05498, 05456 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	10/5/2017
TEST REPORT S/N:	1M1710060269-02.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.

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 Internt'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 39º 10'23" N latitude and 76º 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 C63.4-2014 on January 22, 2015.

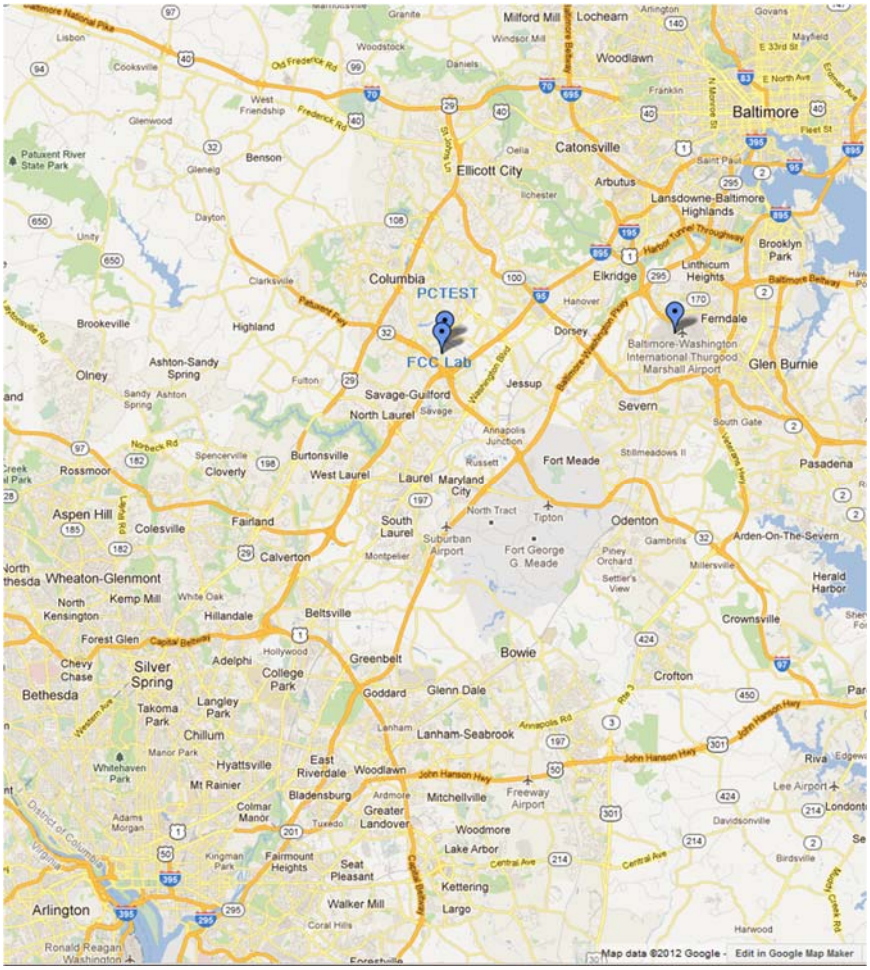


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFH932**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

2.2 Device Capabilities

This device contains the following capabilities:

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

Band 1		Band 2A		Band 2C		Band 3	
Ch.	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**
36	5180	52	5260	100	5500	149	5745
:	:	:	:	:	:	:	:
42	5210	56	5280	120	5600	157	5785
:	:	:	:	:	:	:	:
48	5240	64	5320	144	5720	165	5825

Table 2-1. 802.11a / 802.11n / 802.11ac (20MHz) Frequency / Channel Operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**
38	5190	54	5270	102	5510	151	5755
:	:	:	:	:	:	:	:
46	5230	62	5310	118	5590	159	5795
				:	:		
				142	5710		

Table 2-2. 802.11n / 802.11ac (40MHz BW) Frequency / Channel Operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**
42	5210	58	5290	106	5530	155	5775
				:	:		
				138	5690		

Table 2-3. 802.11ac (80MHz BW) Frequency / Channel Operations

Notes:

1. 5GHz NII operation is possible in 20MHz, and 40MHz, and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of KDB 789033 D02 v01r04. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Maximum Achievable Duty Cycles				
802.11 Mode/Band		Duty Cycle [%]		
		ANT1	ANT2	MIMO
5GHz	a	95.2	95.0	95.4
	n (HT20)	94.5	94.9	94.7
	ac (HT20)	95.0	94.9	94.2
	n (HT40)	92.6	93.3	92.0
	ac (HT40)	93.2	93.3	92.1
	ac (HT80)	91.8	91.7	92.4

Table 2-4. Measured Duty Cycles

2. The device employs MIMO technology. Below are the possible configurations.

WiFi Configurations		SISO		SDM		CDD	
		ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
5GHz	11a	✓	✓	×	×	✓	✓
	11n (20MHz)	✓	✓	✓	✓	✓	✓
	11n (40MHz)	✓	✓	✓	✓	✓	✓
	11ac (80MHz)	✓	✓	✓	✓	✓	✓

Table 2-5. Frequency / Channel Operations

✓= Support ; × = NOT Support
SISO = Single Input Single Output
SDM = Spatial Diversity Multiplexing – MIMO function
CDD = Cyclic Delay Diversity - 2Tx Function

Data Rate(s) Tested:

6, 9, 12, 18, 24, 36, 48, 54Mbps (802.11a)

6.5/7.2, 13/14.4, 19.5/21.7, 26/28.9, 39/43.3, 52/57.8, 58.5/65, 65/72.2 (n/ac – 20MHz)

13.5/15, 27/30, 40.5/45, 54/60, 81/90, 108/120, 121.5/135, 135/150 (n/ac – 40MHz BW)

29.3/32.5, 58.5/65, 87.8/97.5, 117/130, 175.5/195, 234/260, 263.3/292.5, 292.5/325, 351/390, 390/433.3 (ac – 80MHz BW)
13/14.4, 26.28.9, 39/43.3, 52/57.8, 78/86.7, 104/115.6, 117/130, 130/144.4MBps (MIMO n/ac – 20MHz)
156/173Mbps (MIMO ac – 20MHz)
27/30, 54/60, 81/90, 108/120, 162/180, 216/240, 243,270, 270/300Mbps (MIMO n/ac – 40MHz) 324/360, 360/400Mbps (MIMO ac – 40MHz)
58.5/65, 117/130, 175.5/195, 234/260, 351/390, 468/520, 526.5/585, 585/650, 702/780, 780/866.7Mbps (MIMO ac – 80MHz)

3. This device supports simultaneous transmission operation, which allows for two SISO channels to operate independent of one another in the 2.4GHz and 5GHz bands simultaneously on Antenna 1 and Antenna 2 respectively. Table 2-6 shows the worst case configuration determined during testing. The data for these configurations is contained in this test report.

Configuration 1: ANT1 transmitting in 2.4GHz mode and ANT2 in 5GHz mode

Description	2.4 GHz Emission	5 GHz Emission
Antenna	1	2
Channel	2	48
Operating Frequency (MHz)	2417	5240
Data Rate (Mbps)	1	6
Mode	b	a

Table 2-6. Config-1 (ANT1 2.4GHz & ANT2 5GHz)

2.3 Test Configuration

The EUT was tested per the guidance of KDB 789033 D02 v01r04.See Sections 7.2, 7.3, and 7.4 for antenna port conducted emissions test setups.

2.4 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 v01r04 were used in the measurement of the EUT.

Deviation from measurement procedure……..…….....None

3.2 Environmental Conditions

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

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 EUT are **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. 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

6.0 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 C63.5-2006.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9020A	MXA Signal Analyzer	10/28/2016	Annual	10/28/2017	US46470561
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
-	WL25-1	Conducted Cable Set (25GHz)	6/14/2017	Annual	6/14/2018	WL25-1
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/27/2017	Annual	3/27/2018	MY52350166
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	1328004
Anritsu	ML2496A	Power Meter	6/8/2017	Annual	6/8/2018	1405003

Table 6-1. Annual Test Equipment Calibration Schedule for Conducted Measurements

Note: 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.

7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics MobileComm U.S.A
FCC ID: ZNFH932
Method/System: Unlicensed National Information Infrastructure (UNII)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
N/A	26dB Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
15.407 (a.1.iv), (a.2), (a.3)	Maximum Conducted Output Power	Maximum conducted powers must meet the limits detailed in 15.407 (a)		PASS	Section 7.3
15.407 (a.1.iv), (a.2), (a.3)	Maximum Power Spectral Density	Maximum power spectral density must meet the limits detailed in 15.407 (a)		PASS	Section 7.4

Table 7-1. Summary of Test Results

Notes:

1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer 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 and attenuators.

7.2 26dB Bandwidth Measurement – 802.11a/n/ac

Test Overview and Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01r04, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

The 26dB bandwidth is used to determine the conducted power limits.

Test Procedure Used

KDB 789033 D02 v01r04 – Section C

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth
3. VBW $\geq$ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold

Test Setup

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

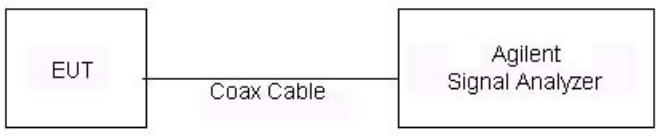


Figure 7-1. Test Instrument & Measurement Setup

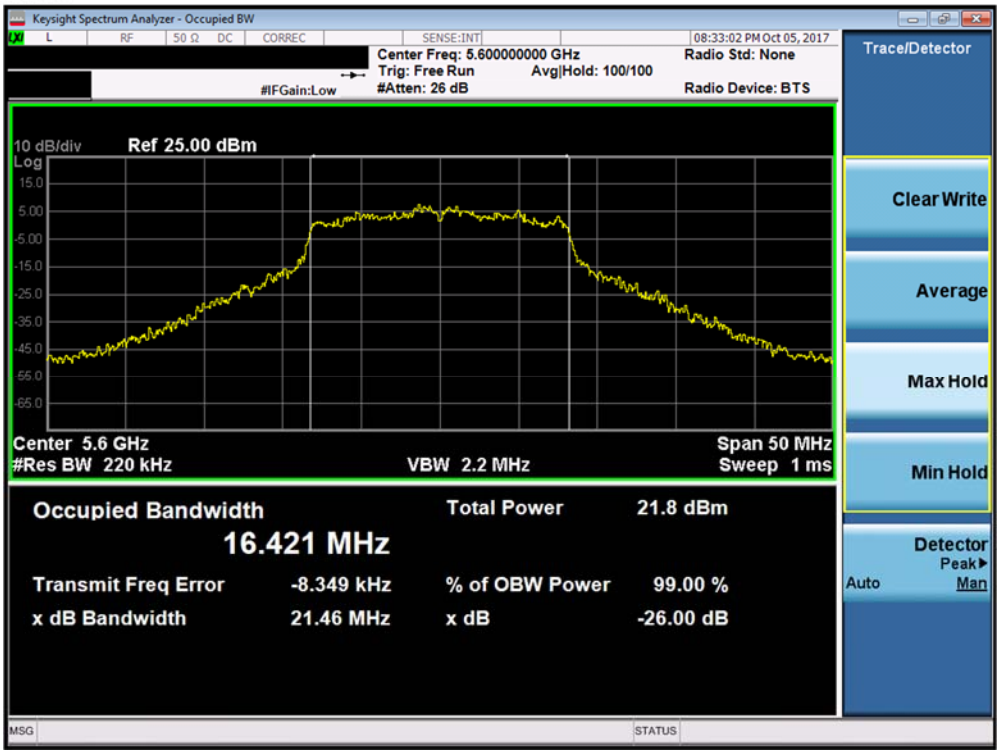
Test Notes

None.

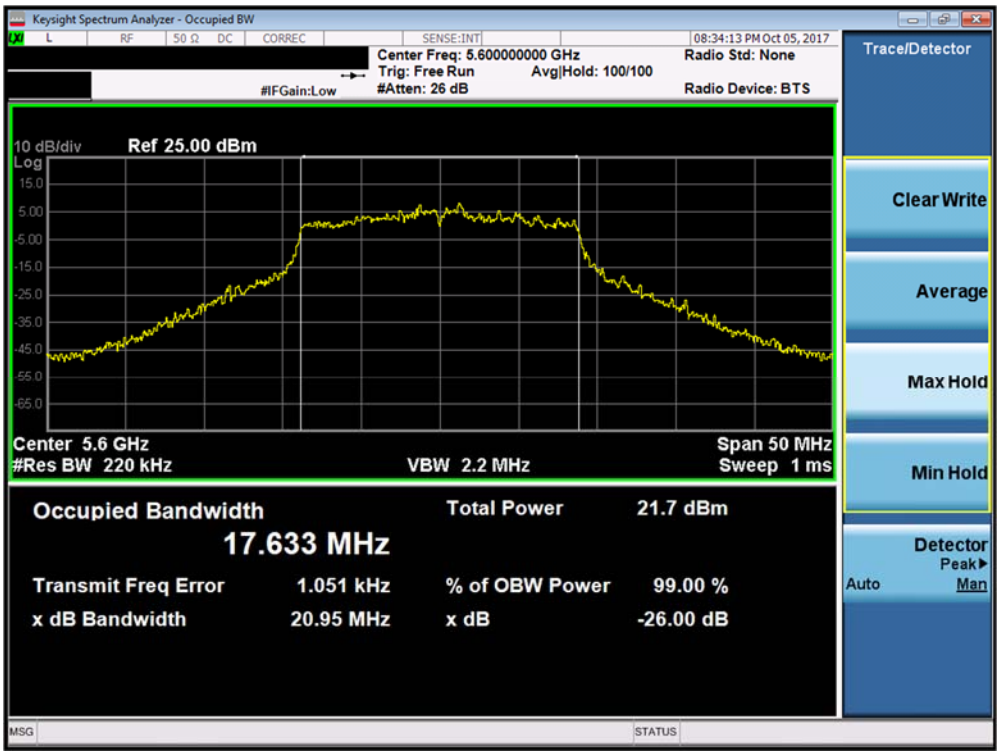
Antenna-1 26 dB Bandwidth Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
Band 2C	5600	120	a	6	21.46
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	20.95
	5590	118	n (40MHz)	13.5/15 (MCS0)	40.04
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	81.74

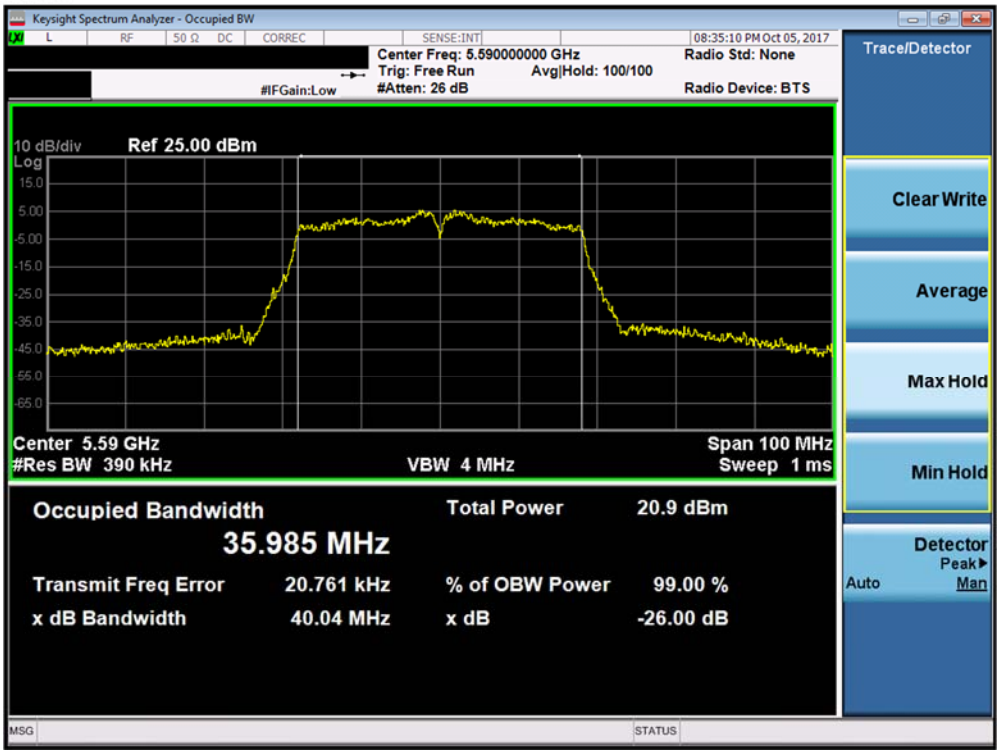
Table 7-2. Conducted Bandwidth Measurements



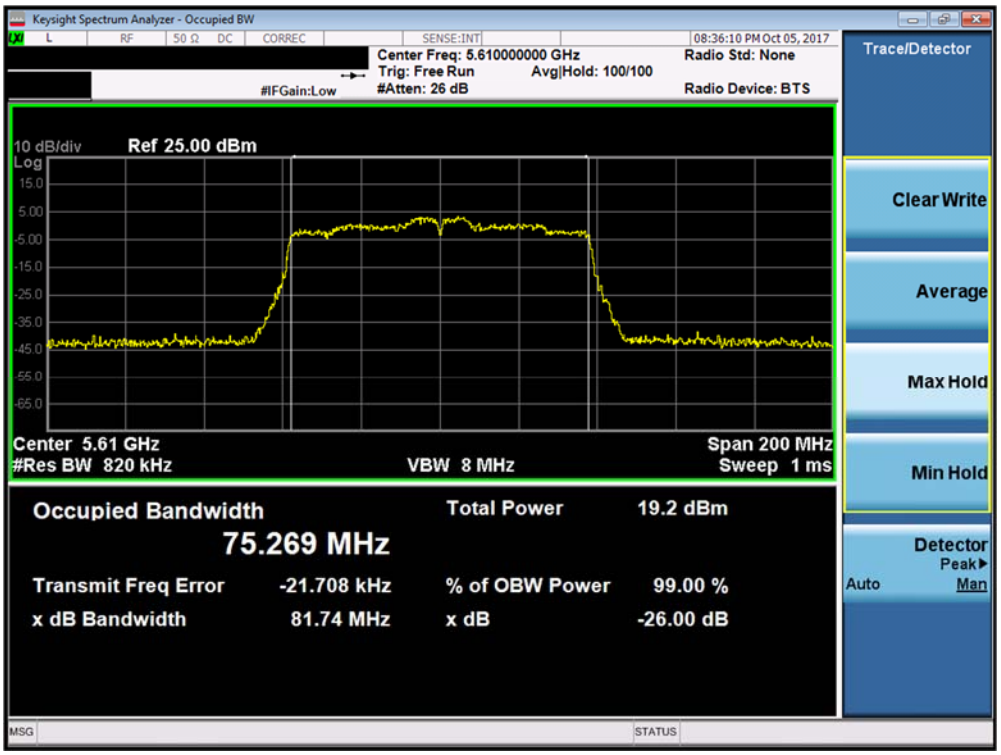
Plot 7-1. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 120)



Plot 7-2. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)



Plot 7-3. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

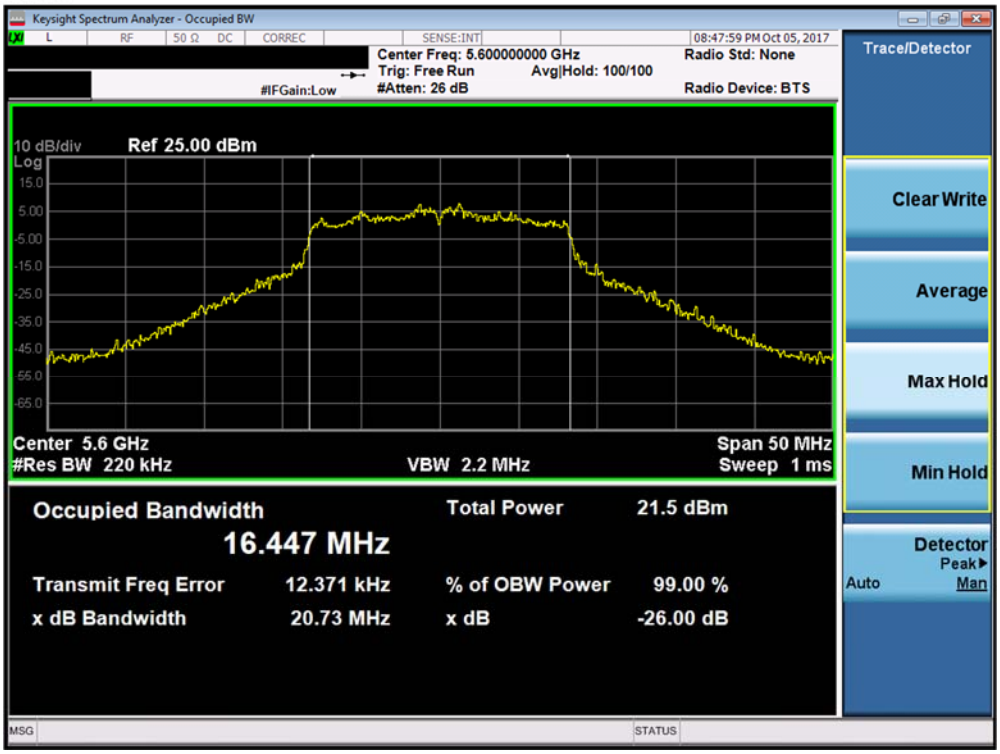


Plot 7-4. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)

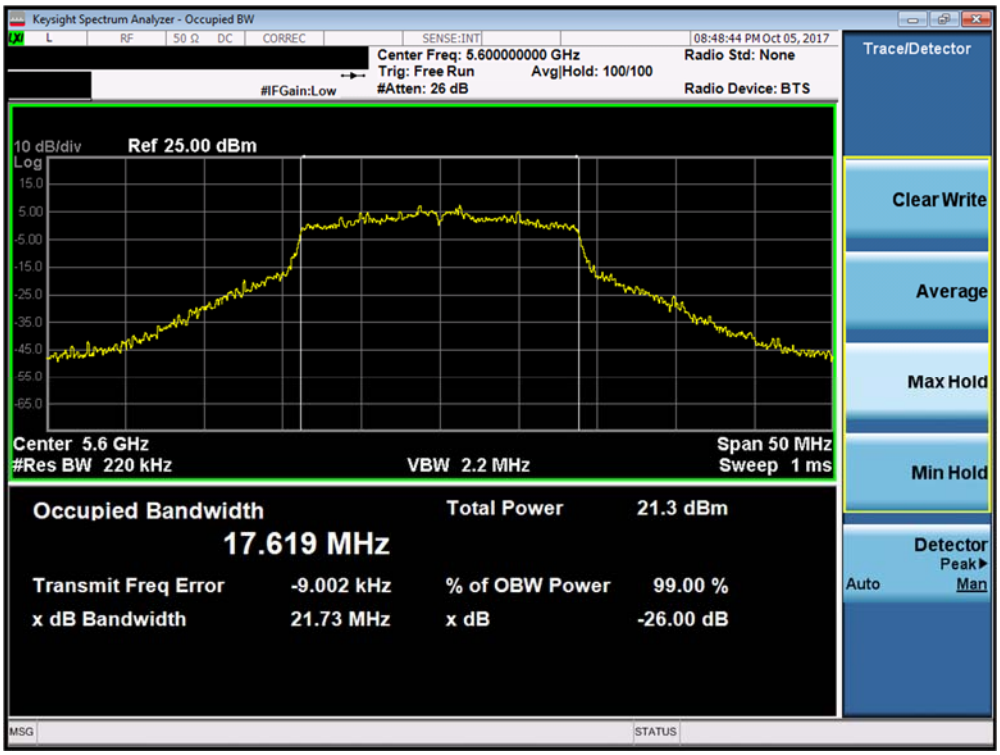
Antenna-2 26dB Bandwidth Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
Band 2C	5600	120	a	6	20.73
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	21.73
	5590	118	n (40MHz)	13.5/15 (MCS0)	40.11
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	80.72

Table 7-3. Conducted Bandwidth Measurements

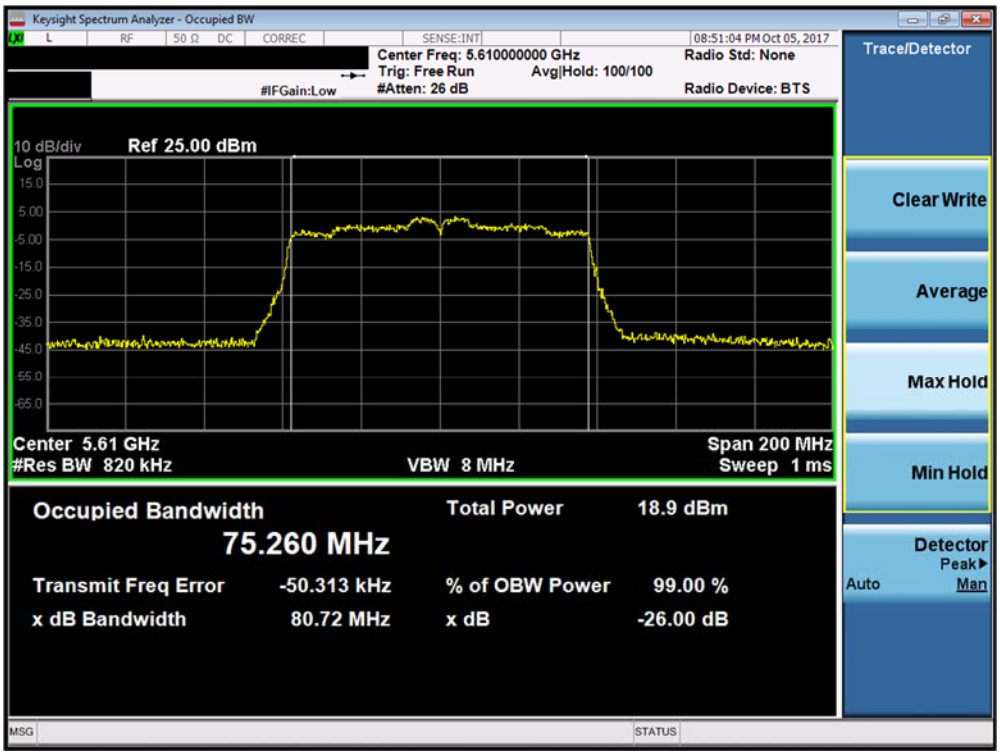


Plot 7-5. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 120)



Plot 7-6. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)

Plot 7-7. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)



Plot 7-8. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)

7.3 UNII Output Power Measurement – 802.11a/n/ac

§15.407(a.1.iv) §15.407(a.2) §15.407(a.3)

Test Overview and Limits

A transmitter antenna terminal of the EUT is connected to the input of an RF pulse power sensor. Measurement is made using a broadband average power meter while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01r04, and at the appropriate frequencies.

In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log$_{10}$(26dB BW) = 11 dBm + 10log$_{10}$(20.75) = 24.17dBm.

Test Procedure Used

KDB 789033 D02 v01r04 – Section E)3)b) Method PM-G
KDB 662911 v02r01 – Section E)1) Measure-and-Sum Technique

Test Settings

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

Test Setup

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

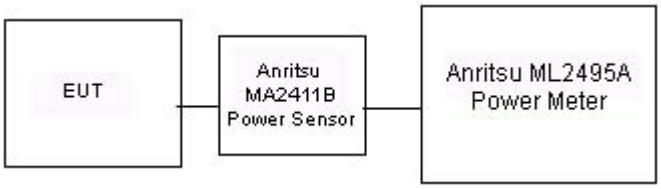


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None

Antenna-1 Conducted Output Power Measurements

Freq [MHz]	Channel	Detector	5GHz (20MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			802.11a	802.11n	802.11ac
5600	120	AVG	16.49	16.33	16.33
5620	124	AVG	16.57	16.35	16.36
5640	128	AVG	16.44	16.33	16.31

Table 7-4. 20MHz BW (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (40MHz) Conducted Power [dBm]	
			IEEE Transmission Mode	
			802.11n	802.11ac
5590	118	AVG	15.15	15.11
5630	126	AVG	15.19	15.17

Table 7-5. 40MHz BW (UNII) Maximum Conducted Output Power

5GHz (80MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	Detector	IEEE Transmission Mode
			802.11ac
5610	122	AVG	12.25

Table 7-6. 80MHz BW (UNII) Maximum Conducted Output Power

Antenna-2 Conducted Output Power Measurements

Freq [MHz]	Channel	Detector	5GHz (20MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			802.11a	802.11n	802.11ac
5600	120	AVG	16.01	15.83	15.81
5620	124	AVG	15.97	15.68	15.67
5640	128	AVG	15.75	15.57	15.55

Table 7-7. 20MHz BW (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (40MHz) Conducted Power [dBm]	
			IEEE Transmission Mode	
			802.11n	802.11ac
5590	118	AVG	14.89	14.89
5630	126	AVG	14.54	14.47

Table 7-8. 40MHz BW (UNII) Maximum Conducted Output Power

5GHz (80MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	Detector	IEEE Transmission Mode
			802.11ac
5610	122	AVG	11.81

Table 7-9. 80MHz BW (UNII) Maximum Conducted Output Power

MIMO Maximum Conducted Output Power Measurements

Freq [MHz]	Channel	Detector	5GHz (20MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5600	120	AVG	16.49	16.01	19.27
5620	124	AVG	16.57	15.97	19.29
5640	128	AVG	16.44	15.75	19.12

Table 7-10. CDD 20MHz BW 802.11a (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (20MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5600	120	AVG	16.33	15.83	19.10
5620	124	AVG	16.35	15.68	19.04
5640	128	AVG	16.33	15.57	18.98

Table 7-11. MIMO 20MHz BW 802.11n (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (20MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5600	120	AVG	16.33	15.81	19.09
5620	124	AVG	16.36	15.67	19.04
5640	128	AVG	16.31	15.55	18.96

Table 7-12. MIMO 20MHz BW 802.11ac (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (40MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5590	118	AVG	15.15	14.89	18.03
5630	126	AVG	15.19	14.54	17.89

Table 7-13. MIMO 40MHz BW 802.11n (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (40MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5590	118	AVG	15.11	14.89	18.01
5630	126	AVG	15.17	14.47	17.84

Table 7-14. MIMO 40MHz BW 802.11ac (UNII) Maximum Conducted Output Power

5GHz (80MHz) Conducted Power [dBm]					
Freq [MHz]	Channel	Detector	IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5610	122	AVG	12.25	11.81	15.05

Table 7-15. MIMO 80MHz BW 802.11ac (UNII) Maximum Conducted Output Power

Note:

Per KDB 662911 v02r01 Section E)1), the conducted powers at Antenna 1 and Antenna 2 were first measured separately during MIMO transmission as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

Sample MIMO/CDD Calculation:

At 5600MHz n mode, the average conducted output power was measured to be 16.33 dBm for Antenna-1 and 15.83 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(16.33 dBm + 15.83 dBm) = (42.95 mW + 38.28 mW) = 81.23 mW = 19.10 dBm

7.4 Maximum Power Spectral Density – 802.11a/n/ac

§15.407(a.1.iv) §15.407(a.2) §15.407(a.3)

Test Overview and Limit

The spectrum analyzer was connected to the antenna terminal while the EUT was operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01r04, and at the appropriate frequencies. Method SA-1, as defined in KDB 789033 D02 v01r04, was used to measure the power spectral density.

In the 5.15 – 5.25GHz, 5.25 – 5.35GHz, 5.47 – 5.725GHz bands, the maximum permissible power spectral density is 11dBm/MHz.

In the 5.725 – 5.850GHz band, the maximum permissible power spectral density is 30dBm/500kHz.

Test Procedure Used

KDB 789033 D02 v01r04 – Section F
KDB 662911 v02r01 – Section E)2) Measure-and-Sum Technique

Test Settings

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire emission bandwidth of the signal
3. RBW = 1MHz
4. VBW = 3MHz
5. Number of sweep points $\geq$ 2 x (span/RBW)
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes
9. Trace was averaged over 100 sweeps
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

Test Setup

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

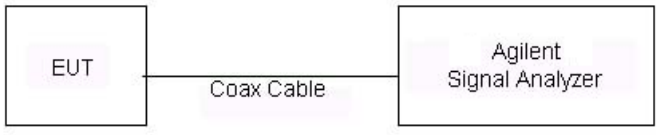


Figure 7-3. Test Instrument & Measurement Setup

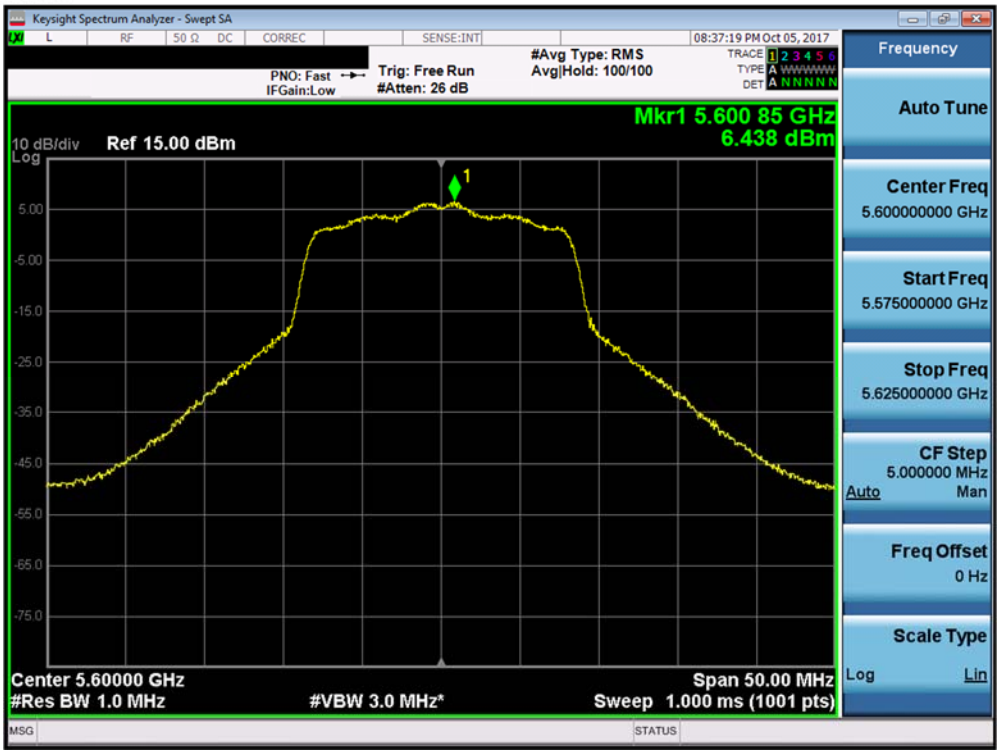
Test Notes

None

Antenna-1 Power Spectral Density Measurements

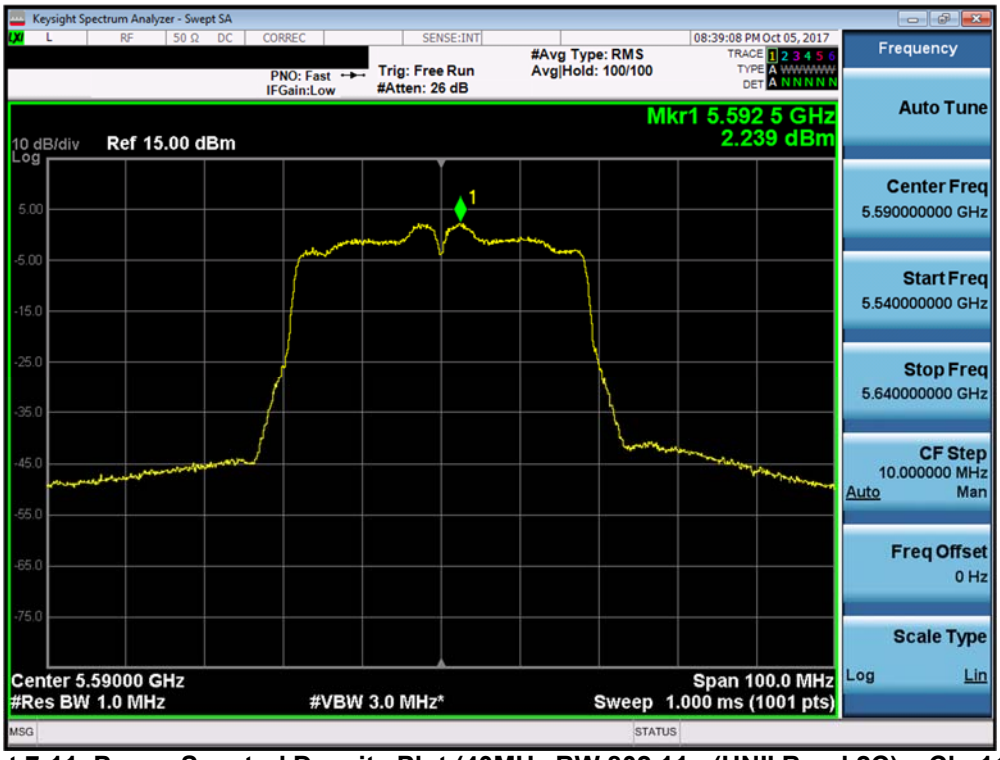
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]
Band 2C	5600	120	a	6	6.44	11.0	-4.56
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	5.88	11.0	-5.12
	5590	118	n (40MHz)	13.5/15 (MCS0)	2.24	11.0	-8.76
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-3.63	11.0	-14.63

Table 7-16. Bands 2C Conducted Power Spectral Density Measurements

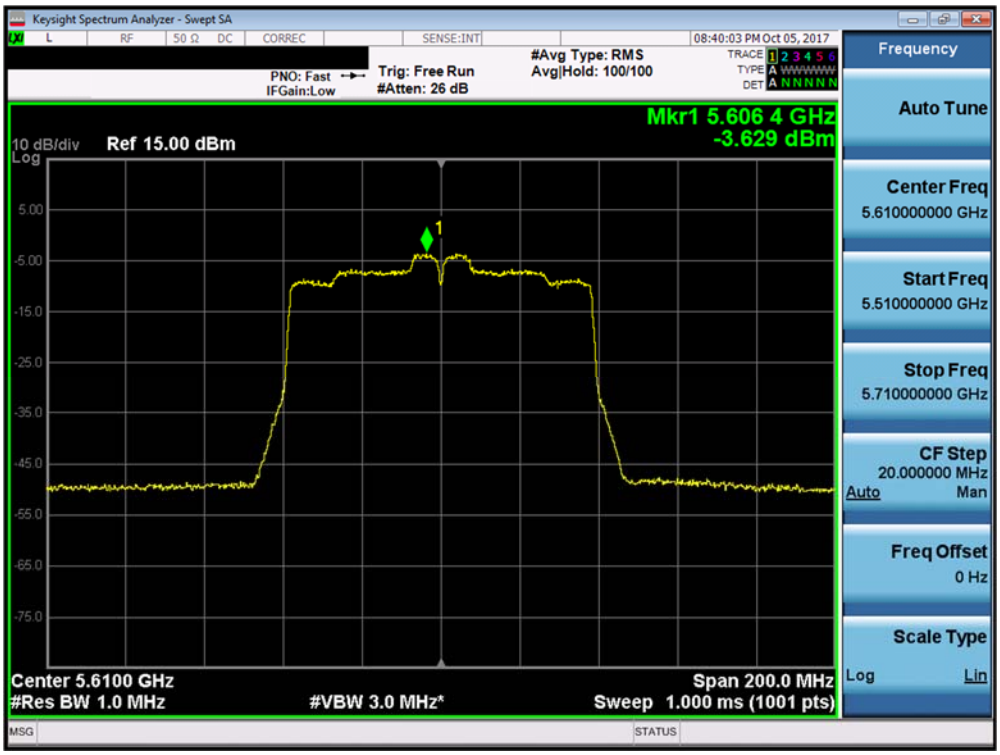


Plot 7-9. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 120)

Plot 7-10. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)



Plot 7-11. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

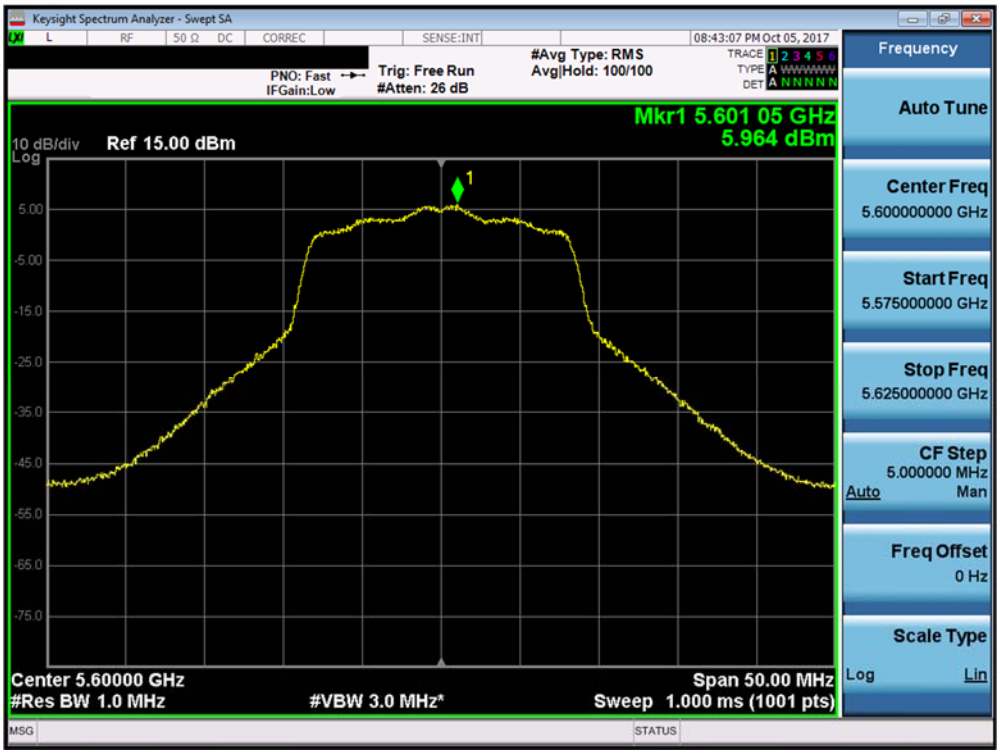


Plot 7-12. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)

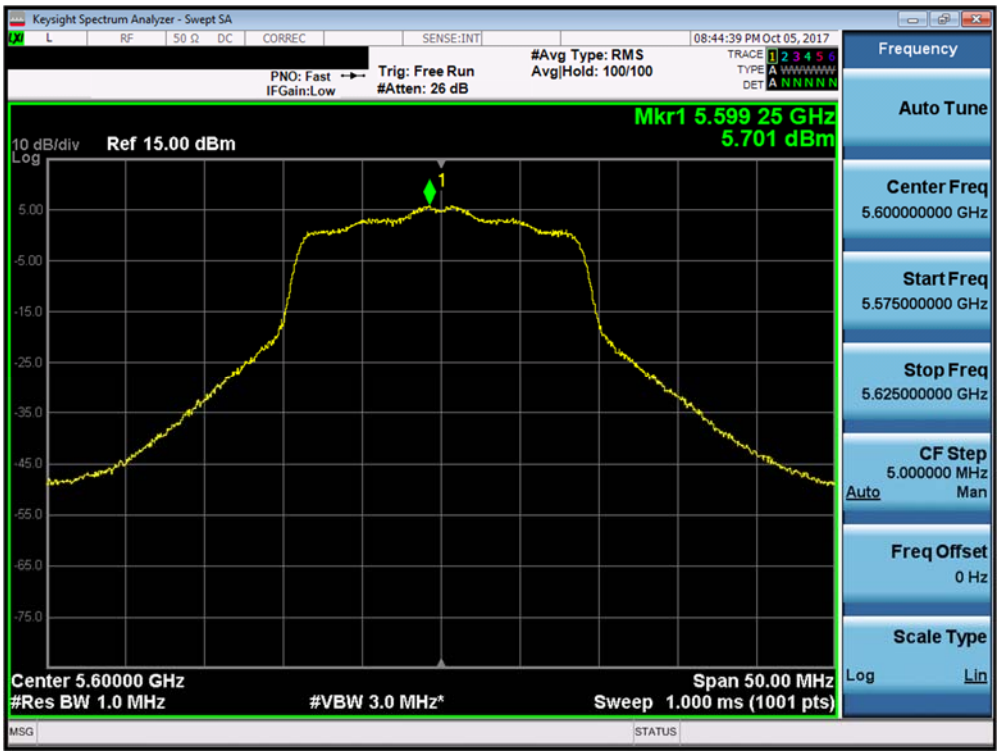
Antenna-2 Power Spectral Density Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]
Band 2C	5600	120	a	6	5.96	11.0	-5.04
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	5.70	11.0	-5.30
	5590	118	n (40MHz)	13.5/15 (MCS0)	2.48	11.0	-8.52
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-3.81	11.0	-14.81

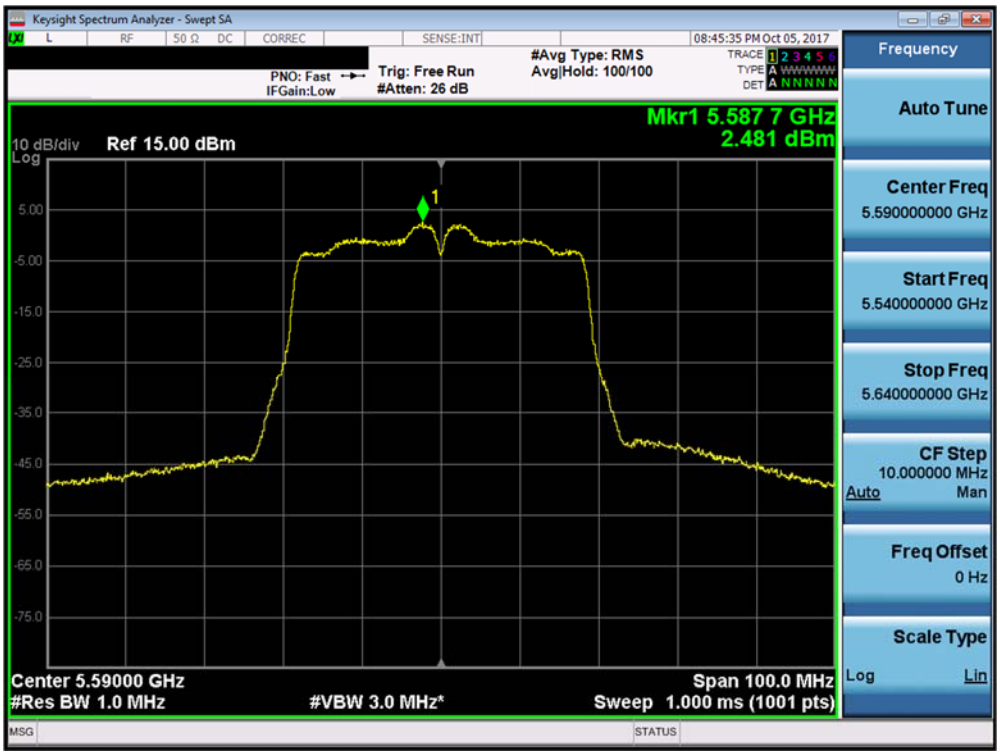
Table 7-17. Bands 2C Conducted Power Spectral Density Measurements



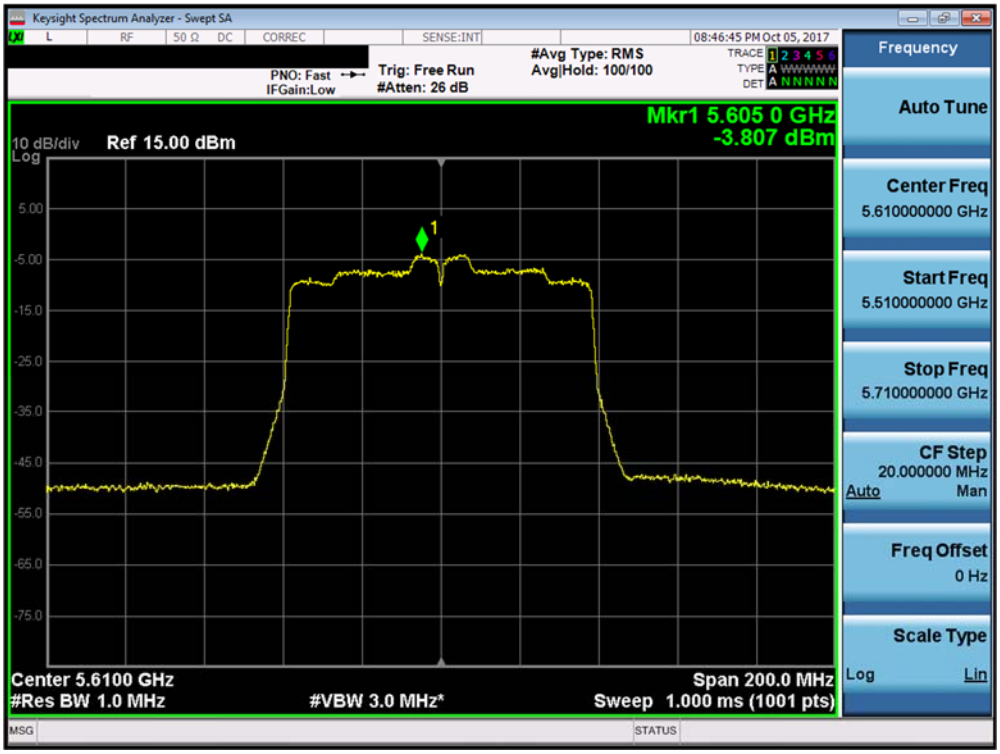
Plot 7-13. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 120)



Plot 7-14. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)



Plot 7-15. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)



Plot 7-16. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)

Summed MIMO/CDD Power Spectral Density Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Antenn-1 Power Density [dBm]	Antenn-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]
Band 2C	5600	120	a	6.5/7.2 (MCS0)	6.44	5.96	9.22	11.0	-1.78
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	5.88	5.70	8.80	11.0	-2.20
	5590	118	n (40MHz)	13.5/15 (MCS0)	2.24	2.48	5.37	11.0	-5.63
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-3.63	-3.81	-0.71	11.0	-11.71

Table 7-18. Bands 2C MIMO/CDD Conducted Power Spectral Density Measurements

Note:

Per KDB 662911 v02r01 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

Sample MIMO/CDD Calculation:

At 5600MHz n mode, the average conducted power spectral density was measured to be 6.44 dBm for Antenna-1 and 5.96 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(6.44 dBm + 5.96 dBm) = (4.41 mW + 3.94 mW) = 8.35 mW = 9.22 dBm

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFH932** is in compliance with Part 15E of the FCC Rules.