

## FCC CFR47 PART 15 SUBPART C

## **CERTIFICATION TEST REPORT**

FOR

## TRI-BAND PHONE WITH WLAN, BLUETOOTH, BLE, AND NFC

MODEL NUMBER: LG870, LG-LG870, LGLG870

FCC ID: ZNFLG870

REPORT NUMBER: 13U14917-2

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Prepared for LG ELECTRONICS MOBILECOMM U.S.A., INC. 1000 SYLVAN AVENUE ENGLEWOOD CLIFFS, NJ 07632

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NVLAP LAB CODE 200065-0

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## 1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	LG ELECTRONICS MOBLILECOMM US 1000 SYLVAN AVENUE ENGLEWOOD, NJ 07632, USA	SA,INC.		
EUT DESCRIPTION:	LTE PHONE BLUETOOTH AND WLAN			
MODEL:	LG870, LG-LG870, LGLG870			
SERIAL NUMBER:	99000250000211 (CONDUCTED) AND 256691464000002160 (RADIATED)			
DATE TESTED:	JANUARY 7 TO 25 AND MARCH 14 TO	25, 2013		
APPLICABLE STANDARDS				
ST	ANDARD	TEST RESULTS		
CFR 47 P	art 15 Subpart C	Pass		

UL CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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Tested By:

TIM LEE WISE PROGRAM MANAGER **UL CCS** 

TONY WANG **EMC ENGINEER UL CCS** 

UL CCS

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://www.ccsemc.com</u>.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

# 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

# 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a Dual Band phone that also supports BLUETOOTH, WLAN and NFC.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	18.76	75.16
2412 - 2462	802.11g	22.16	164.44
2412 - 2462	802.11n HT20	20.92	123.59
5745 - 5825	802.11a	19.38	86.70
5745 - 5825	802.11n HT20	18.26	66.99
5755 - 5795	802.11n HT40	17.55	56.89

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of -1.64 dBi for 2.4GHz and -2.1 dBl for 5GHz.

# 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Kernel, Version 3.4.0

The EUT driver software installed during testing was Android Version 4.1.2

The test utility software used during testing was LG870\_LAP8960JR121210A

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## 5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

For the fundamental investigation, since the EUT is a portable device that has three orientations; X, Y and Z orientations have been investigated, also with AC adapter, and earphone, and the worst case was found to be at X orientation with AC adapter and earphone for both 2.4GHz and 5GHz band.

For Radiated Emissions below 1 GHz and Power line Conducted Emissions, the channel with the highest conducted output power was selected as a worst-case scenario:

802.11b mode: 1 Mbps 802.11g mode: 6 Mbps 802.11a mode: 6 Mbps 802.11n HT20mode: MCS0 802.11n HT40mode: MCS0

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## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-01WR	EAY62768913	N/A
Earphone	I-SOUND CO. LTD	HC-MYD-LG113	N/A	N/A

### I/O CABLES

	I/O Cable List						
Cable	Port	# of identical	Connector	Cable Type	<b>Cable Length</b>	Remarks	
No		ports	Туре		(m)		
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A	
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A	

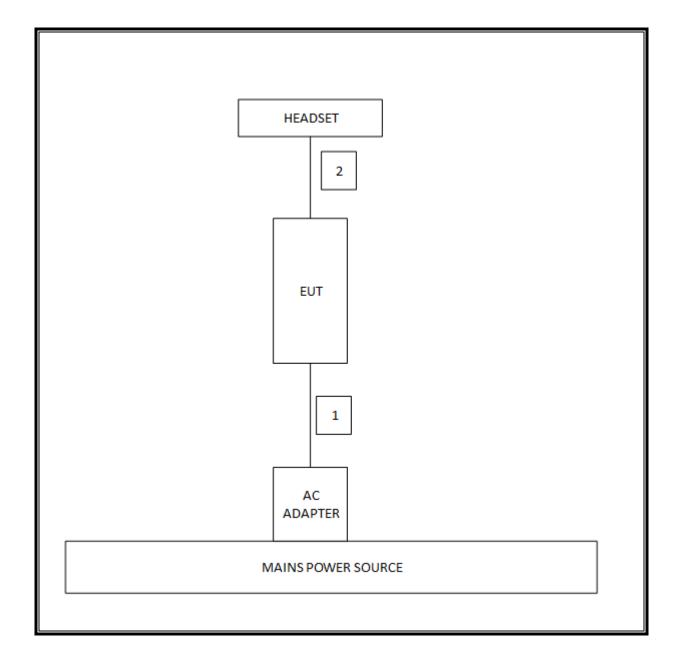
### TEST SETUP

The EUT is setup to transmit continuously.

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## SETUP DIAGRAM FOR TESTS



# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List						
Description	Manufacturer	Model	Asset	Cal Due		
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	4/22/2013		
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	2/26/2014		
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	8/8/2013		
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	1/28/2014		
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/2013		
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	8/2/2013		
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	N/A	3/6/2014		
Antenna, Horn, 18 GHz	ETS	3117	C01022	2/21/2014		
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/2013		
Peak Power Meter	Agilent / HP	E4416A	C00963	5/13/2013		
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	5/13/2013		
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/14		
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRC13192	N02683	CNR		
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02676	CNR		

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# 7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

## **LIMITS**

None; for reporting purposes only.

## PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

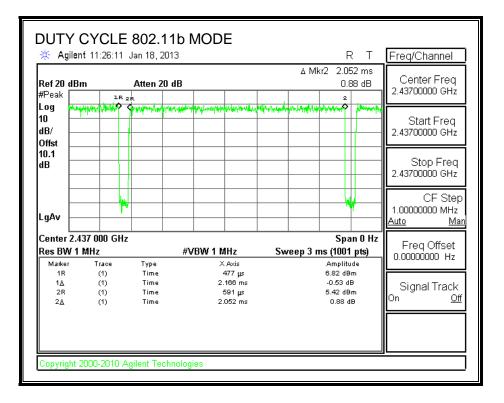
## 7.1. ON TIME AND DUTY CYCLE RESULTS

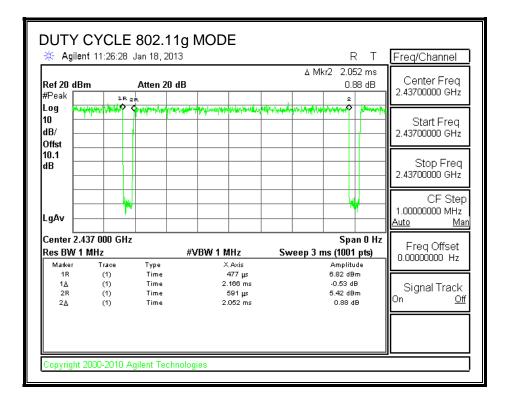
Mode	<b>ON</b> Time	Period	Duty Cycle	Duty	Duty Cycle	1/B
	В		x	Cycle	<b>Correction Factor</b>	Minimum VBW
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)
802.11b	2.05	2	0.977	97.7%	0.10	0.487
802.11g	2.05	2	0.947	94.7%	0.23	0.487
802.11n 20 MHz	1.91	2	0.947	94.7%	0.24	0.522
802.11a 20 MHz	2.07	2	0.954	95.4%	0.21	0.484
802.11n HT20	1.92	2	0.950	95.0%	0.22	0.521
802.11n HT40	0.99	1	0.956	95.6%	0.20	1.005

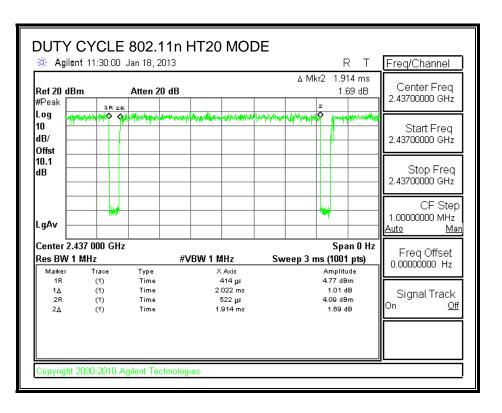
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# 7.2. 2.4 GHz DUTY CYCLE PLOTS

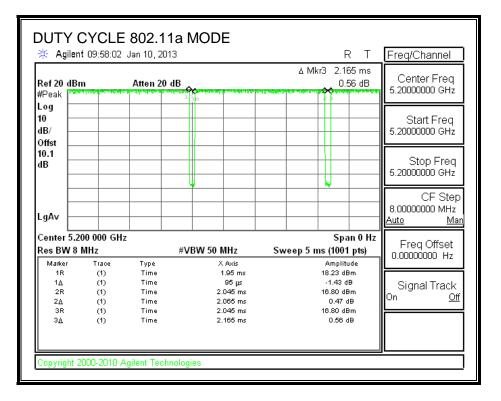


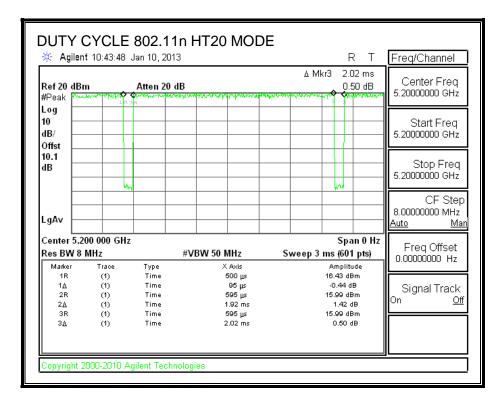




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# 7.3. 5.8 GHz DUTY CYCLE PLOTS





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🔆 Ayılen	t 10:27:37	Jan 10, 2013		R T	Freq/Channel
				∆ Mkr3 1.04 ms	Center Freq
Ref 20 dBi		Atten 20 dB		-0.89 dB	<b>_  </b> 5 1900000 сн÷
	whenter	map anothing	have all and make the	promotion of the production of	~
Log		IN 3R			
10 -					Start Freq
dB/ ├─					- 5.19000000 GHz
Offst 🔔					
10.1					
dB					Stop Freq
					5.19000000 GHz
		L.J.My		here and a second se	
					CF Step
LgAv –					8.0000000 MHz
					<u>Auto Man</u>
Center 5.1	90 000 GH	z		Span 0 H:	
Res BW 8	MHz	;	¥VBW 50 MHz	Sweep 2 ms (601 pts)	⊢req Offset
Marker	Trace	Туре	X Axis	Amplitude	0.0000000 Hz
1R	(1)	Time	450 μs	12.88 dBm	
1∆	(1)	Time	100 µs	-2.09 dB	Signal Track
2R	(1)	Time	550 μs	10.79 dBm	On Off
2 <u>∆</u> 3R	(1) (1)	Time Time	940 μs 550 μs	2.64 dB 10.79 dBm	
3A	(1)	Time	1.04 ms	10.79 dBm 8b 98.0-	
° <u>"</u>	(.)			0.00 00	

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# 8. MEASUREMENT METHOD

The Duty Cycle is less than 98% and consistent therefore KDB 789033 Method SA-2 is used for power add PPSD.

The Duty Cycle is less than 98% and consistent, KDB 789033 Method VB with Power RMS Averaging is used for spurious emissions above 1GHz

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# 9. ANTENNA PORT TEST RESULTS

## 9.1. 802.11b MODE IN THE 2.4 GHz BAND

## 9.1.1.6 dB BANDWIDTH

## <u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

## TEST PROCEDURE

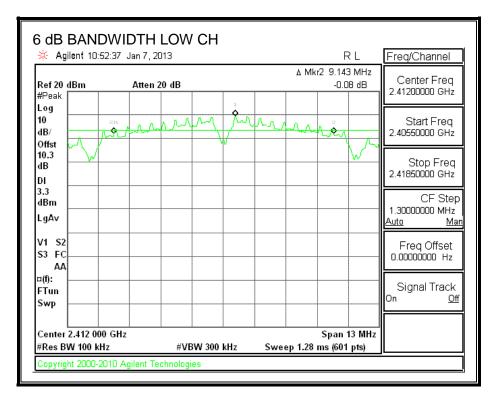
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $>= 3 \times RBW$ , peak detector and max hold.

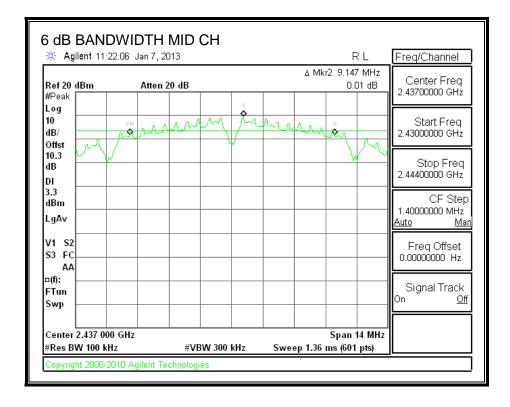
## **RESULTS**

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	9.143	0.5
Mid	2437	9.147	0.5
High	2462	9.143	0.5

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#### 6 dB BANDWIDTH





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🔆 Agilent 12:0	12:22 Jan 7,	2013						۲.	Freq/Channel
Ref 20 dBm	Atter	20 dB				∆ Mk	r2 9.143 -0.2	3 dB	Center Freq 2.46200000 GHz
.og 0 IB/ Dffst	2R Martin	mm		M	rr,	ara.	L.E.J		Start Freq 2.45550000 GHz
0.3 V IB )I								~	Stop Freq 2.46850000 GHz
IBm									CF Ster 1.30000000 MHz
.gAv /1 S2									Auto Ma Freq Offset
53 FC									0.00000000 Hz
i(f): Tun Swp									Signal Track On <u>O</u> f
Center 2.462 00		#\/E	W 300	LU-		ep 1.28	•	13 MHz	

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## 9.1.2. 99% BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

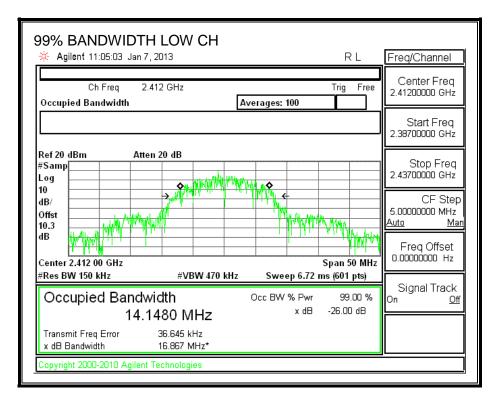
## **RESULTS**

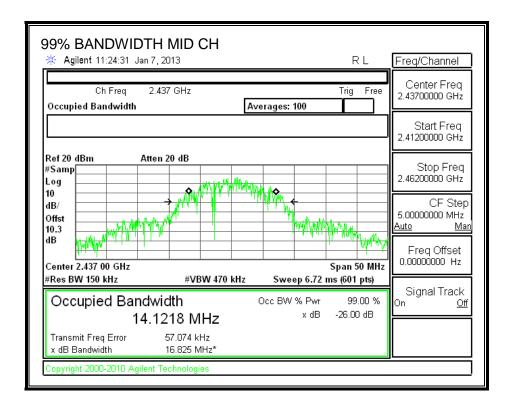
Channel Frequency		99% Bandwidth
	(MHz)	(MHz)
Low	2412	14.1480
Mid	2437	14.1218
High	2462	14.0981

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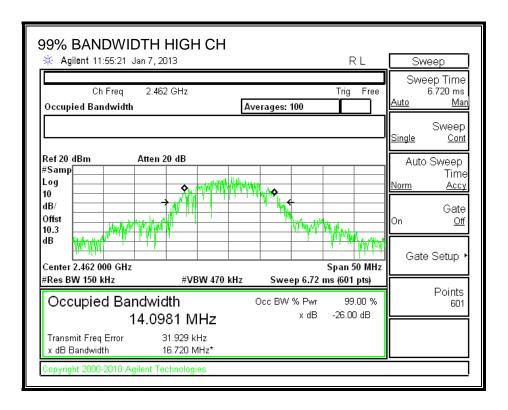
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#### 99% BANDWIDTH





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## 9.1.3. OUTPUT POWER

## <u>LIMITS</u>

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

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## **RESULTS**

#### Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	-5.90	30.00	30	36	30.00
Mid	2437	-5.90	30.00	30	36	30.00
High	2462	-5.90	30.00	30	36	30.00

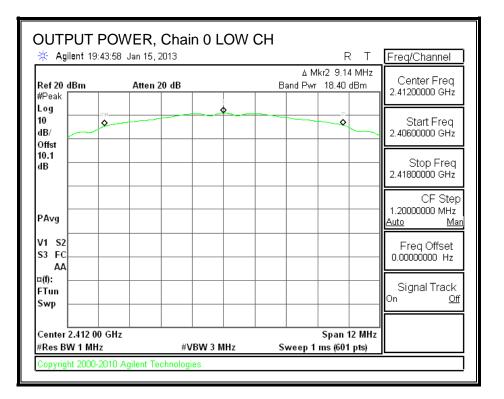
#### Results

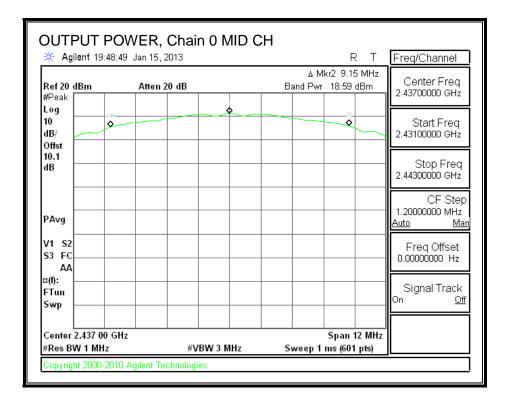
Channel	Frequency	Chain 0	Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	18.40	18.40	30.00	-11.60
Mid	2437	18.59	18.59	30.00	-11.41
High	2462	18.76	18.76	30.00	-11.24

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### **OUTPUT POWER, Chain 0**





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🔆 Agilent 19:5	5:56 Jan 15, 2013		R T Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB	∆ Mkr2 9 Band Pwr 18.7	Contor Frog
Log		2	Start Freq 2.45600000 GHz
Offst 10.1 dB			Stop Freq 2.46800000 GHz
PAvg			CF Step 1.2000000 MHz <u>Auto Man</u>
V1 S2 S3 FC AA			Freq Offset 0.00000000 Hz
¤(f): FTun Swp			Signal Track On <u>Off</u>
Center 2.462 00 #Res BW 1 MHz	GHz #VBW 3 M	•	n 12 MHz 01 pts)

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## 9.1.4. AVERAGE POWER

### <u>LIMITS</u>

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### **RESULTS**

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	15.70
Mid	2437	15.80
High	2462	15.80

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## 9.1.5. PSD

### **LIMITS**

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

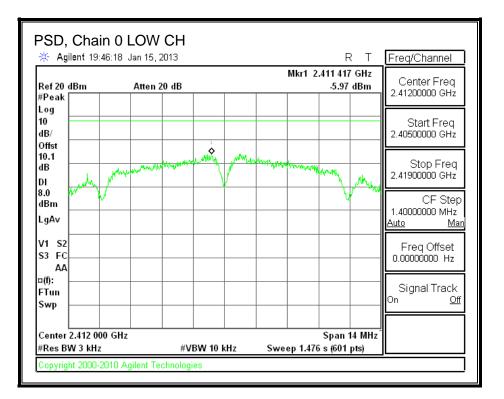
#### **RESULTS**

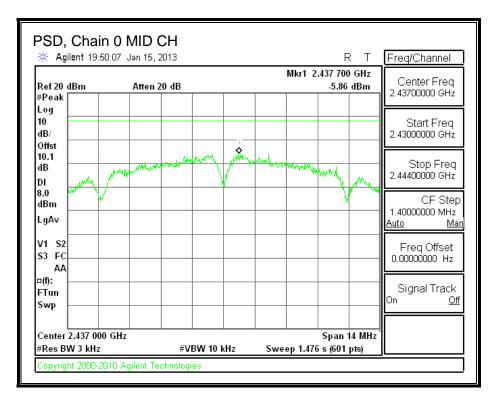
#### **PSD Results**

Channel	Frequency	Chain 0	Limit	Margin
		Meas		
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-5.97	8.0	-14.0
Mid	2437	-5.86	8.0	-13.9
High	2462	-5.68	8.0	-13.7

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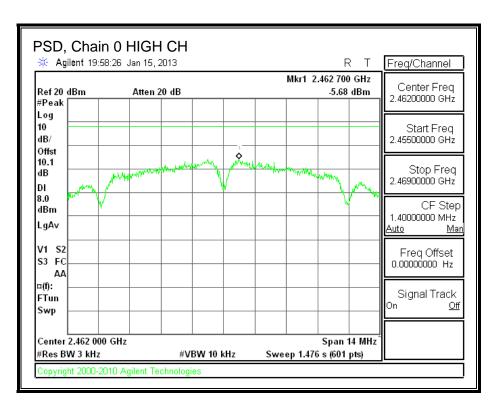
## PSD, Chain 0





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## 9.1.6. OUT-OF-BAND EMISSIONS

## LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

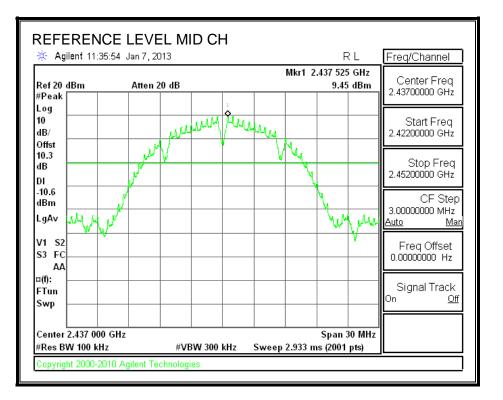
### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

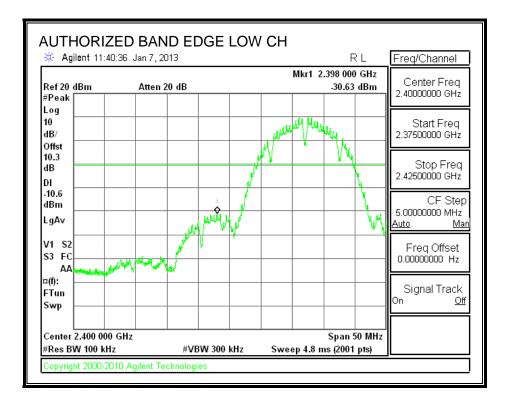
#### **RESULTS**

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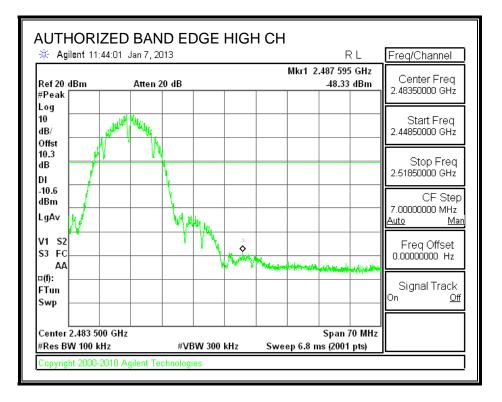
#### **IN-BAND REFERENCE LEVEL**



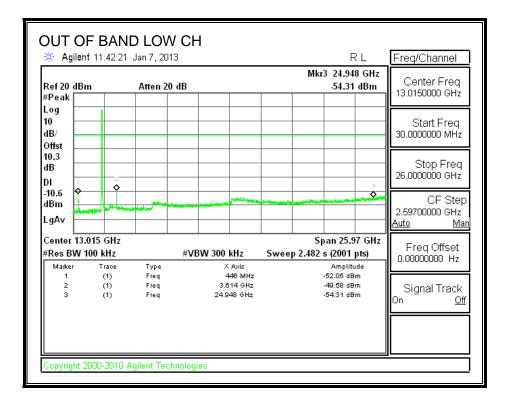
#### LOW CHANNEL BANDEDGE

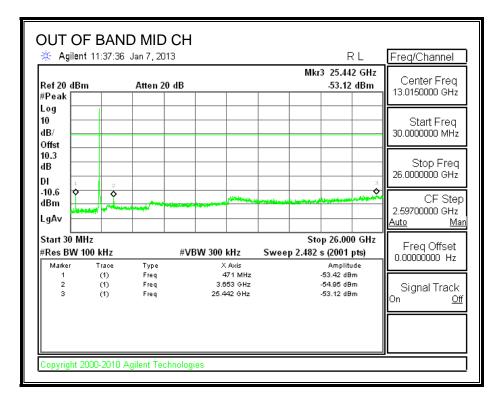


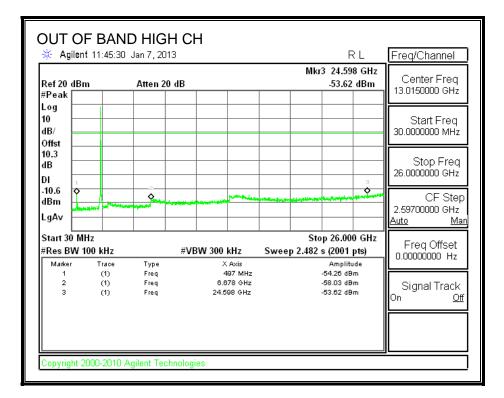
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## **OUT-OF-BAND EMISSIONS**







## 9.2. 802.11g MODE IN THE 2.4 GHz BAND

## 9.2.1. 6 dB BANDWIDTH

## <u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST PROCEDURE

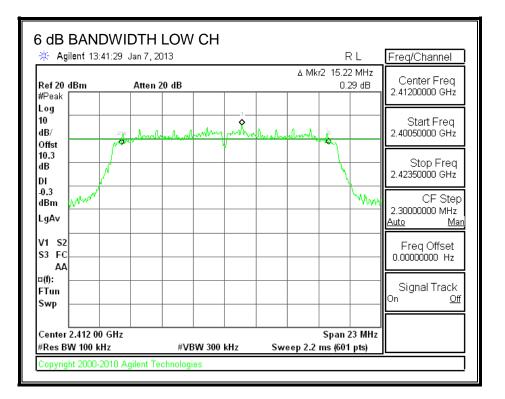
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $>= 3 \times RBW$ , peak detector and max hold.

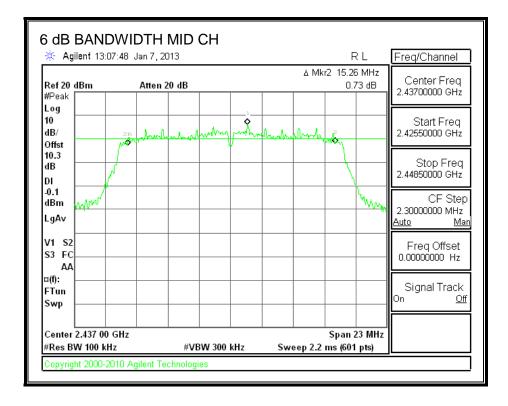
#### **RESULTS**

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	15.220	0.5
Mid	2437	15.260	0.5
High	2462	15.220	0.5

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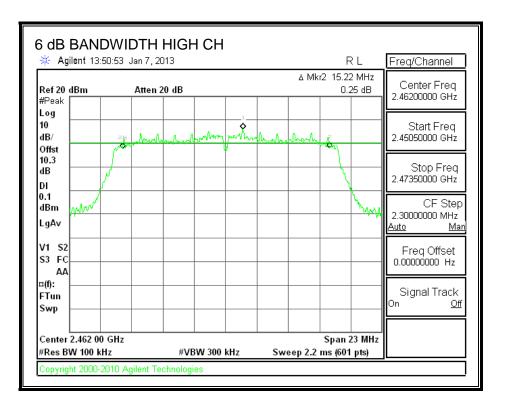
#### 6 dB BANDWIDTH





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# 9.2.2. 99% BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

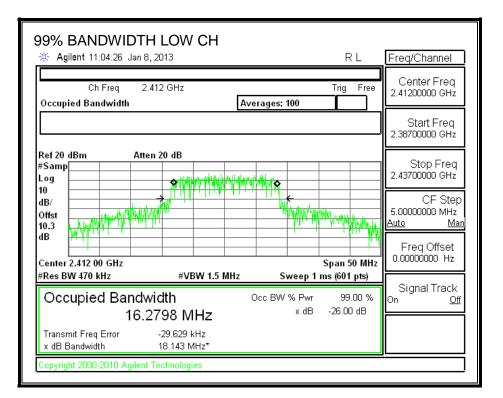
# **RESULTS**

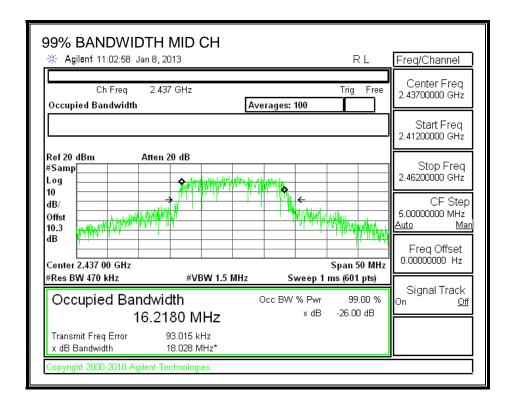
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	16.2798
Mid	2437	16.2180
High	2462	16.1410

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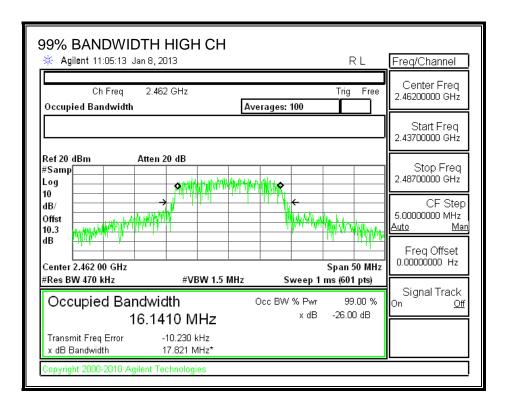
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#### 99% BANDWIDTH





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# 9.2.3. OUTPUT POWER

# <u>LIMITS</u>

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

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## **RESULTS**

#### Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	-5.90	30.00	30	36	30.00
Mid	2437	-5.90	30.00	30	36	30.00
High	2462	-5.90	30.00	30	36	30.00

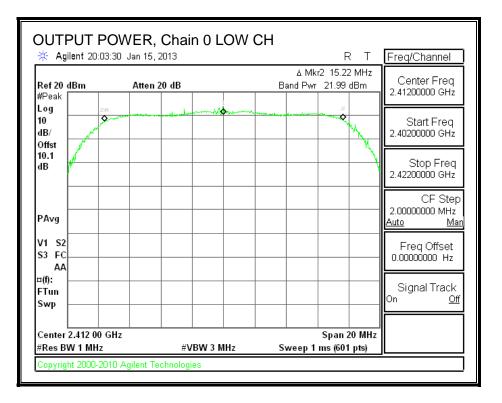
#### Results

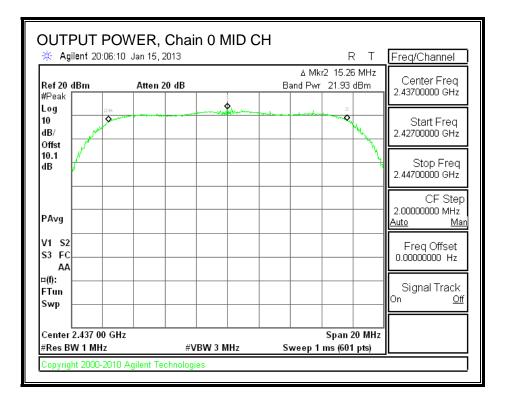
Channel	Frequency	Chain 0	Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	21.99	21.99	30.00	-8.01
Mid	2437	21.93	21.93	30.00	-8.07
High	2462	22.16	22.16	30.00	-7.84

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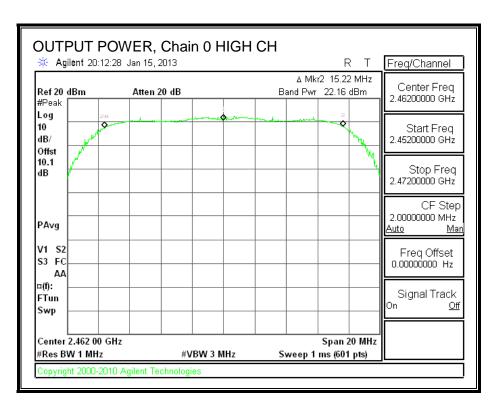
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#### **OUTPUT POWER, Chain 0**





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# 9.2.4. AVERAGE POWER

### <u>LIMITS</u>

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	13.90
Mid	2437	13.90
High	2462	13.80

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# 9.2.5. PSD

#### **LIMITS**

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

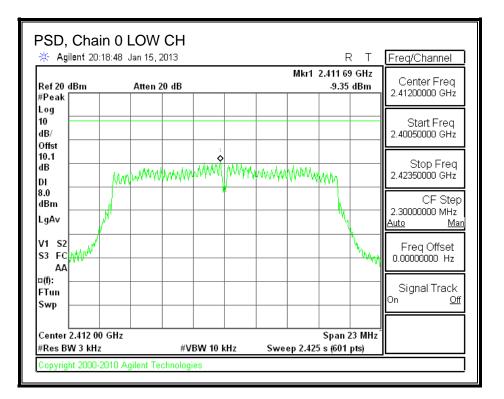
#### **RESULTS**

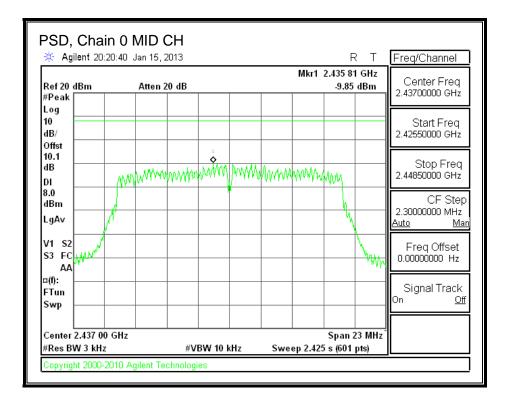
#### **PSD** Results

Channel	Frequency	Chain 0	Limit	Margin
		Meas		
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-9.35	8.0	-17.4
Mid	2437	-9.85	8.0	-17.9
High	2462	-9.57	8.0	-17.6

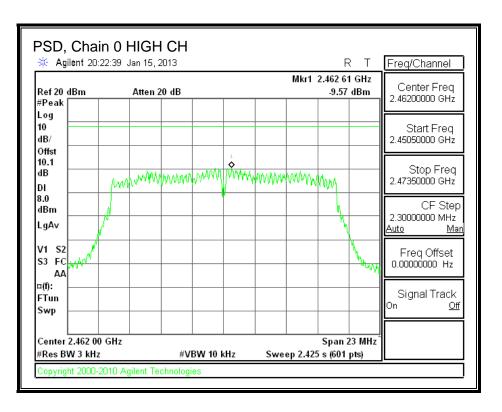
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# PSD, Chain 0





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# 9.2.6. OUT-OF-BAND EMISSIONS

# LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

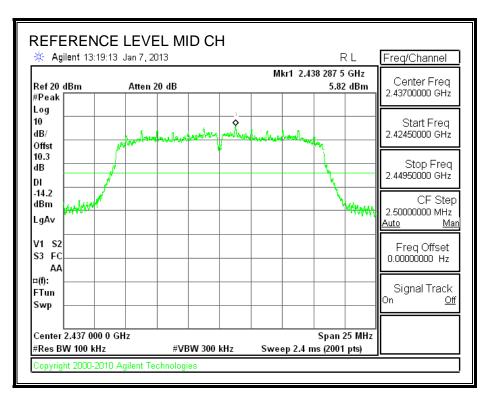
### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

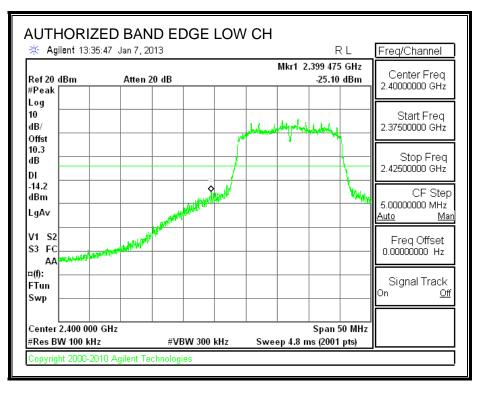
RESULTS

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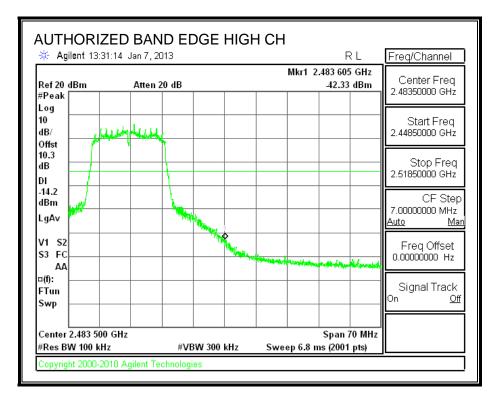
#### **IN-BAND REFERENCE LEVEL**



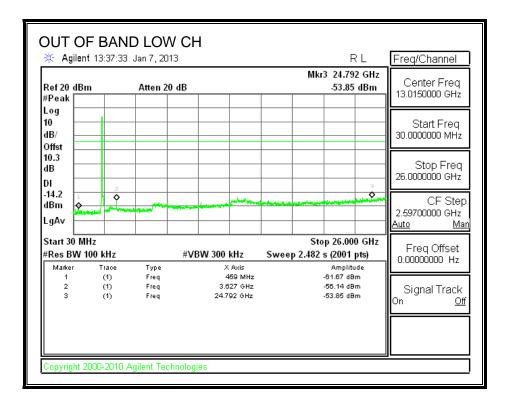
#### LOW CHANNEL BANDEDGE

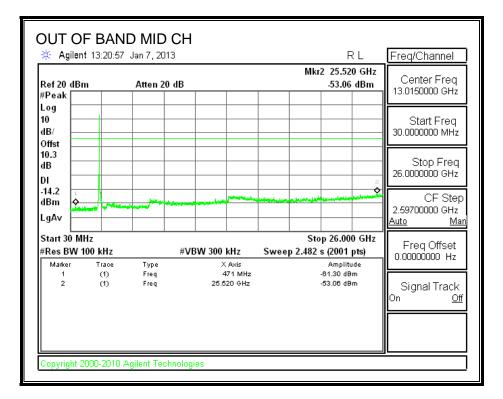


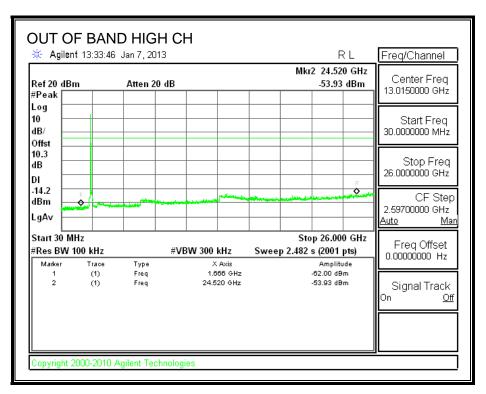
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# OUT-OF-BAND EMISSIONS







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# 9.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

# 9.3.1. 6 dB BANDWIDTH

# <u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST PROCEDURE

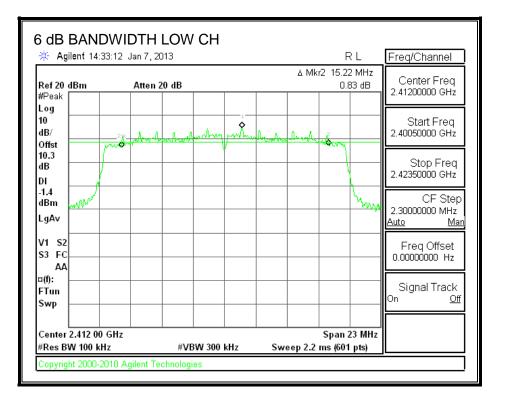
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $>= 3 \times RBW$ , peak detector and max hold.

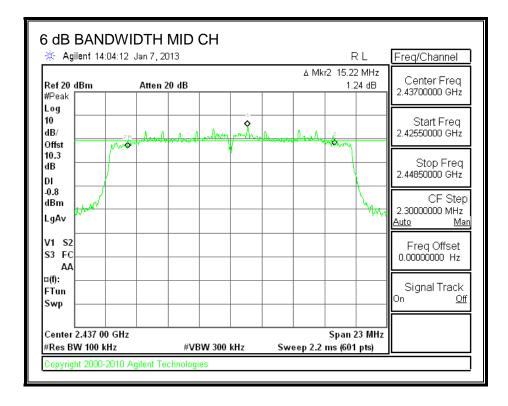
#### **RESULTS**

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	15.220	0.5
Mid	2437	15.220	0.5
High	2462	15.220	0.5

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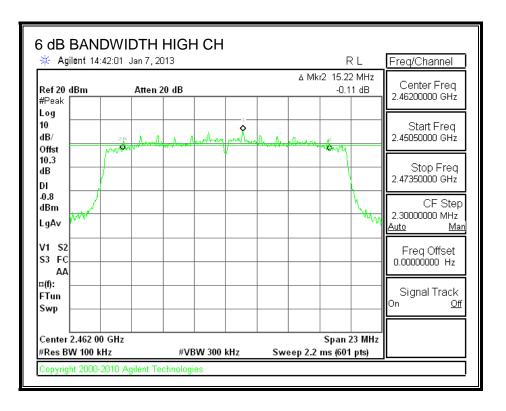
#### 6 dB BANDWIDTH





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# 9.3.2. 99% BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

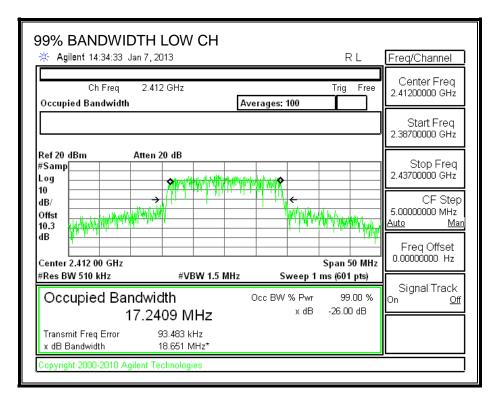
# **RESULTS**

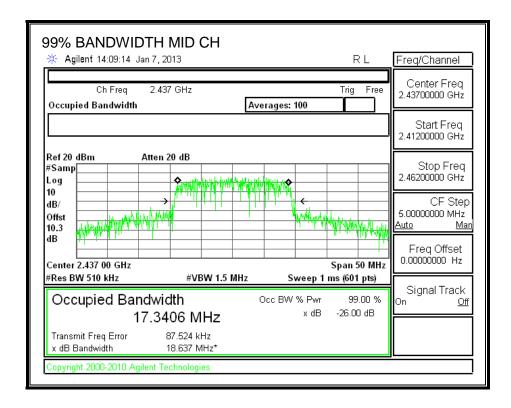
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	17.2409
Mid	2437	17.3406
High	2462	17.3043

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#### 99% BANDWIDTH





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99% BANDWIDTH HIGH CH # Agilent 14:43:15 Jan 7, 2013	RL	Freq/Channel
Ch Freq 2.462 GHz Occupied Bandwidth	Trig Free Averages: 100	Center Freq 2.46200000 GHz
		Start Freq 2.43700000 GHz
Ref 20 dBm Atten 20 dB #Samp Log Control Contr	#d##uk#**	Stop Freq 2.48700000 GHz
00 dB/ Offst 10.3 ↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓		CF Step 5.0000000 MHz <u>Auto Man</u>
Center 2.462 00 GHz	Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 510 kHz #VBW 1.5 MHz	Sweep 1 ms (601 pts) Occ BW % Pwr 99.00 %	Signal Track
Occupied Bandwidth 17.3043 MHz	x dB -26.00 dB	On <u>Off</u>
Transmit Freq Error -12.382 kHz x dB Bandwidth 18.510 MHz*		
Copyright 2000-2010 Agilent Technologies		

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# 9.3.3. OUTPUT POWER

# <u>LIMITS</u>

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

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## **RESULTS**

#### Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	-5.90	30.00	30	36	30.00
Mid	2437	-5.90	30.00	30	36	30.00
High	2462	-5.90	30.00	30	36	30.00

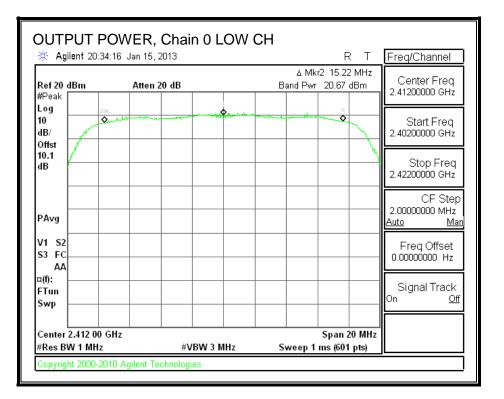
#### Results

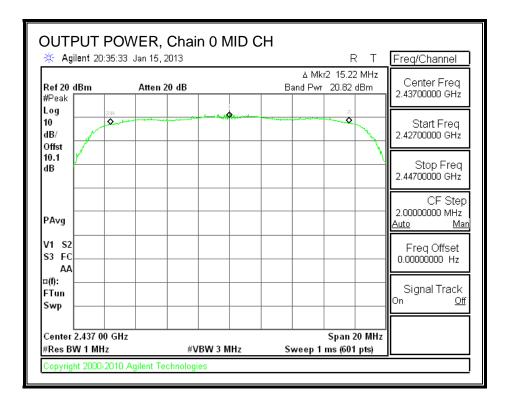
Channel	Frequency	Chain 0	Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	20.67	20.67	30.00	-9.33
Mid	2437	20.82	20.82	30.00	-9.18
High	2462	20.92	20.92	30.00	-9.08

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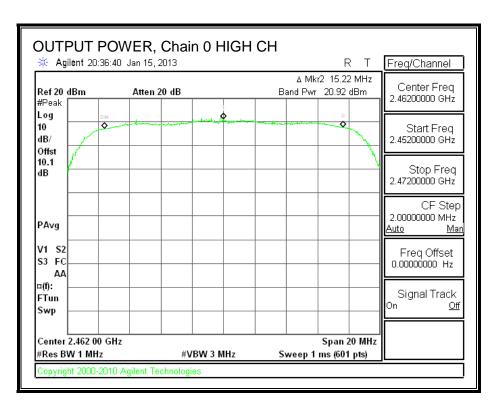
#### **OUTPUT POWER, Chain 0**





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# 9.3.4. AVERAGE POWER

### <u>LIMITS</u>

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	12.80
Mid	2437	12.90
High	2462	13.00

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# 9.3.5. PSD

### **LIMITS**

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

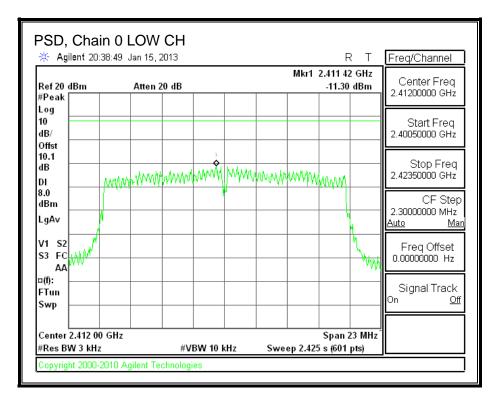
#### <u>RESULTS</u>

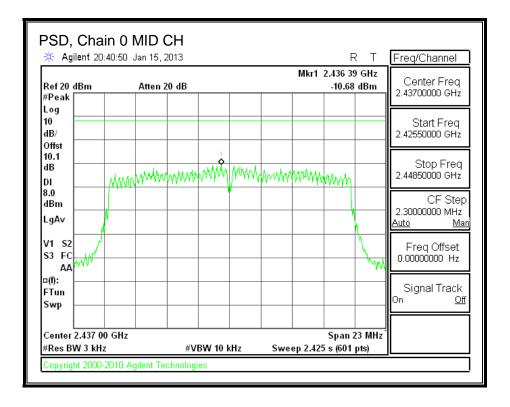
Channel	Frequency	Chain 0	Limit	Margin
		Meas		
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-11.30	8.0	-19.3
Mid	2437	-10.68	8.0	-18.7
High	2462	-10.59	8.0	-18.6

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# PSD, Chain 0





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🗧 Agilent 2	0:42:49	Jan 15, 2	2013						<u> </u>	Freq/Channel
ef 20 dBm Peak		Atten 2	20 dB				MKr1 /	2.462 9; -10.59		Center Freq 2.46200000 GHz
og 0 B/										Start Freq 2.45050000 GHz
0.1 B	MM	y www.	NMMA	NWW	₩₩₩	nayya	www	MirWi		Stop Freq 2.47350000 GHz
.0  Bm _gA∨								,		CF Step 2.30000000 MHz <u>Auto Ma</u>
1 S2 3 FC AA									T WW	Freq Offset 0.00000000 Hz
(f): Tun Swp										Signal Track On <u>Of</u>
Center 2.462 00 GHz Res BW 3 kHz			#V	BW 10 I	(H7	Swa	ep 2.425		23 MHz <sup>°</sup>	

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# 9.3.6. OUT-OF-BAND EMISSIONS

## LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

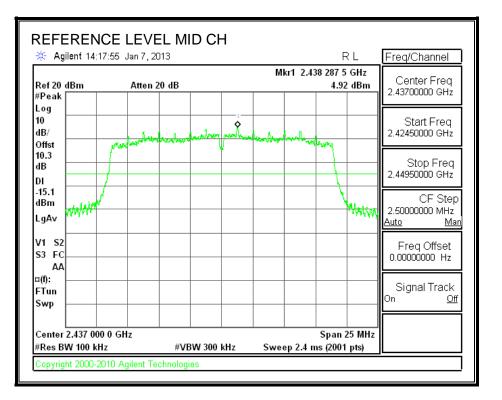
### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

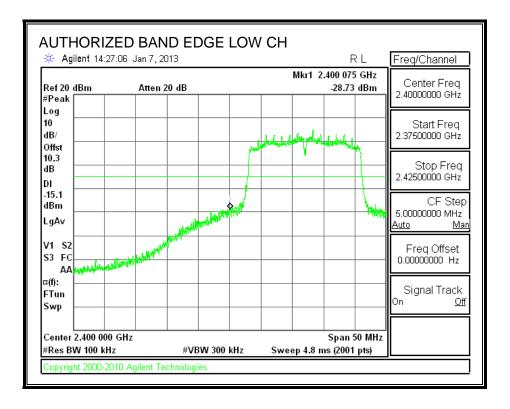
**RESULTS** 

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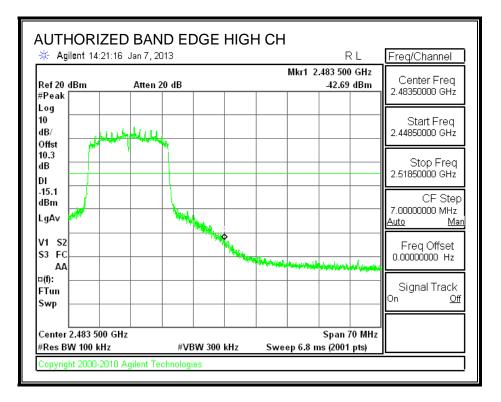
#### **IN-BAND REFERENCE LEVEL**



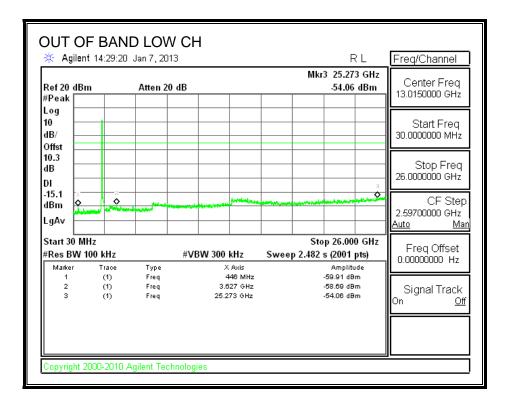
#### LOW CHANNEL BANDEDGE

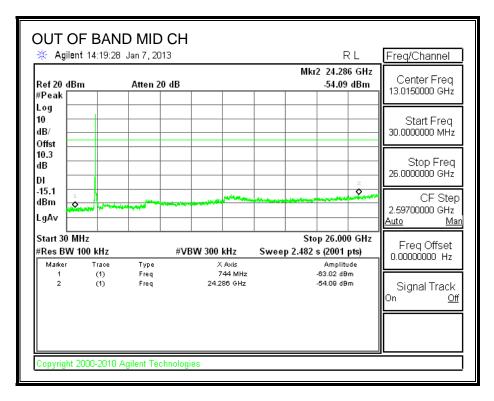


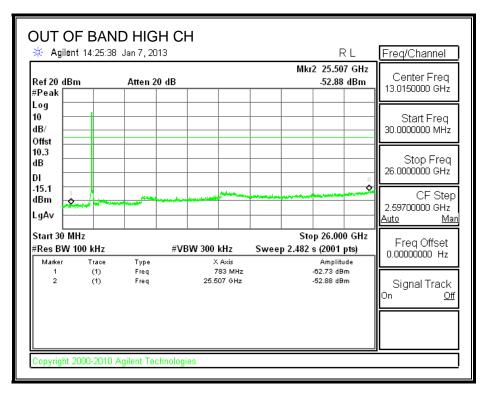
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# **OUT-OF-BAND EMISSIONS**







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# 9.4. 802.11a MODE IN THE 5.8 GHz BAND

# 9.4.1.6 dB BANDWIDTH

# <u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST PROCEDURE

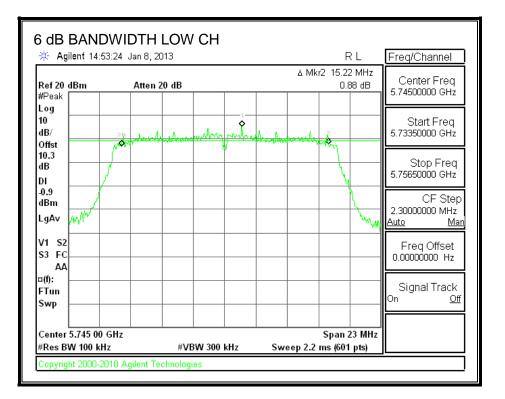
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $>= 3 \times RBW$ , peak detector and max hold.

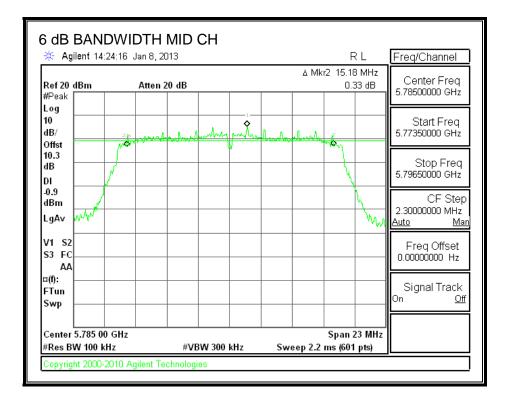
### **RESULTS**

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	5745	15.220	0.5
Mid	5785	15.180	0.5
High	5825	15.180	0.5

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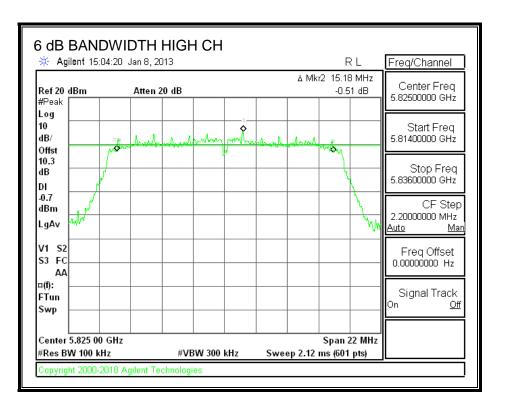
#### 6 dB BANDWIDTH





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## 9.4.2. 99% BANDWIDTH

## **LIMITS**

None; for reporting purposes only.

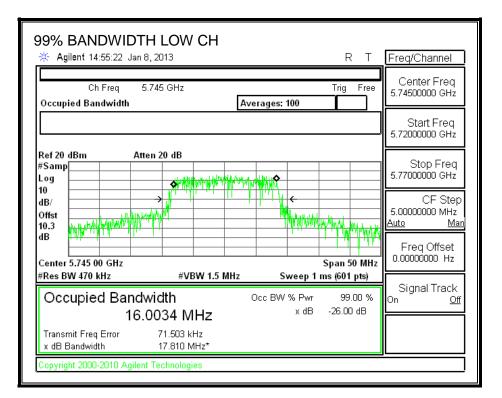
## **RESULTS**

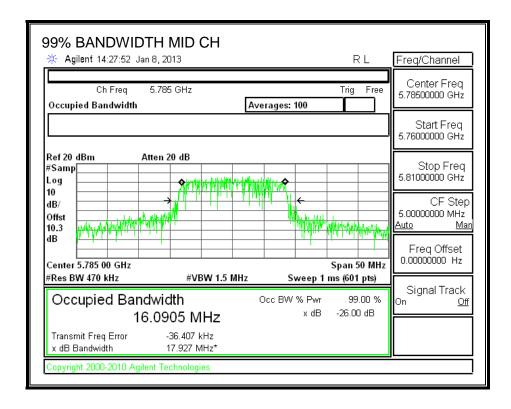
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5745	16.0034
Mid	5785	16.0905
High	5825	16.2614

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#### 99% BANDWIDTH





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99% BANDWIDTH HIGH CH	Freq/Channel
Ch Freq 5.825 GHz Trig Free Occupied Bandwidth Averages: 100	Center Freq 5.82500000 GHz
	Start Freq 5.80000000 GHz
Ref 20 dBm Atten 20 dB #Samp	Stop Freq 5.85000000 GHz
ID     IT     IT	CF Step 5.00000000 MHz <u>Auto Man</u>
Center 5.825 00 GHz Span 50 MHz	Freq Offset 0.00000000 Hz
	Signal Track On <u>Off</u>
Transmit Freq Error 13.564 kHz x dB Bandwidth 18.123 MHz*	
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## 9.4.3. OUTPUT POWER

## <u>LIMITS</u>

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

## **DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

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## **RESULTS**

#### Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5745	-6.40	30.00	30	36	30.00
Mid	5785	-6.40	30.00	30	36	30.00
High	5825	-6.40	30.00	30	36	30.00

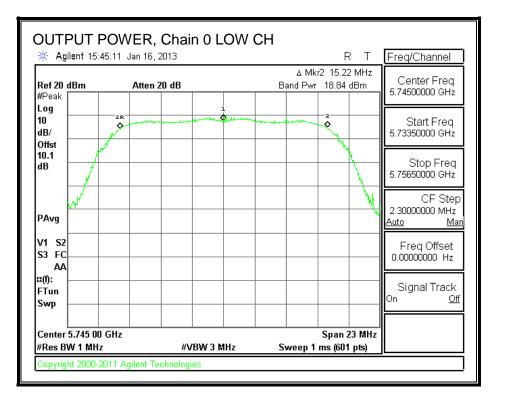
#### Results

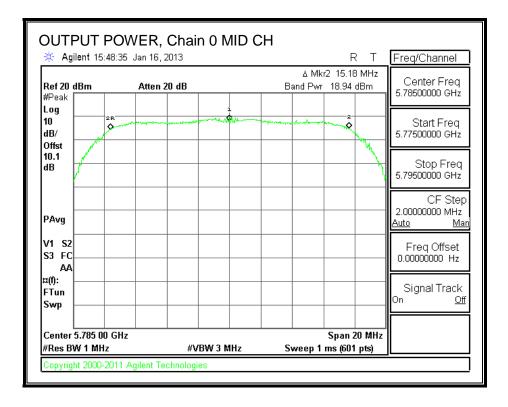
Channel	Frequency	Chain 0	Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	18.84	18.84	30.00	-11.16
Mid	5785	18.94	18.94	30.00	-11.06
High	5825	19.38	19.38	30.00	-10.62

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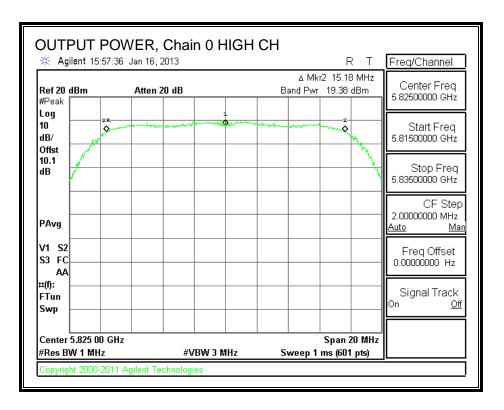
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### **OUTPUT POWER, Chain 0**





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## 9.4.4. AVERAGE POWER

## LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5745	11.80
Mid	5785	11.90
High	5825	11.90

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## 9.4.5. PSD

### **LIMITS**

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

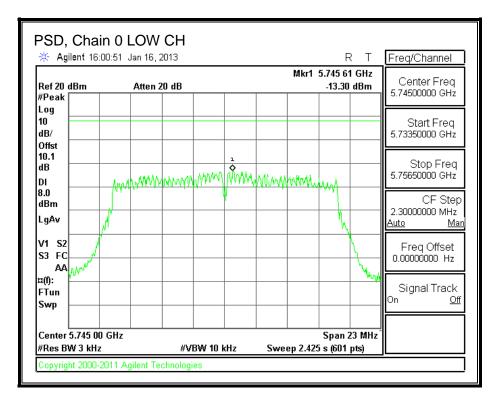
#### **RESULTS**

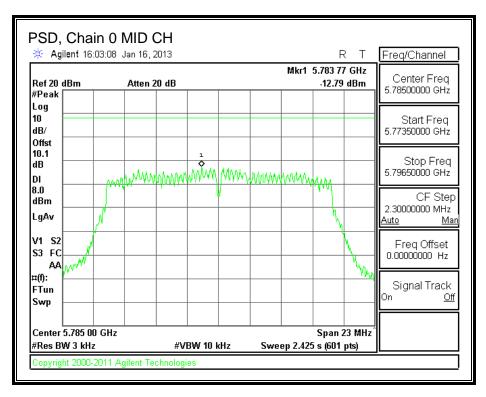
#### **PSD Results**

Channel	Frequency	Chain 0	Limit	Margin
		Meas		
	(MHz)	(dBm)	(dBm)	(dB)
Low	5745	-13.30	8.0	-21.3
Mid	5785	-12.79	8.0	-20.8
High	5825	-11.25	8.0	-19.3

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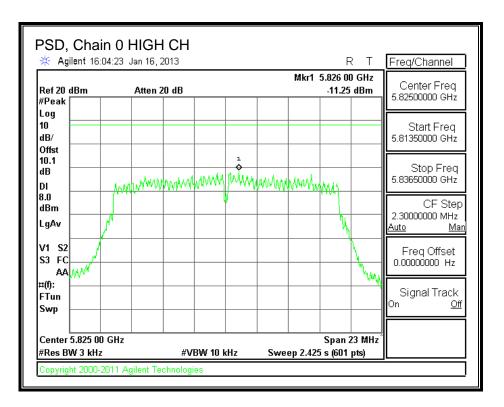
## PSD, Chain 0





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## 9.4.6. OUT-OF-BAND EMISSIONS

## LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

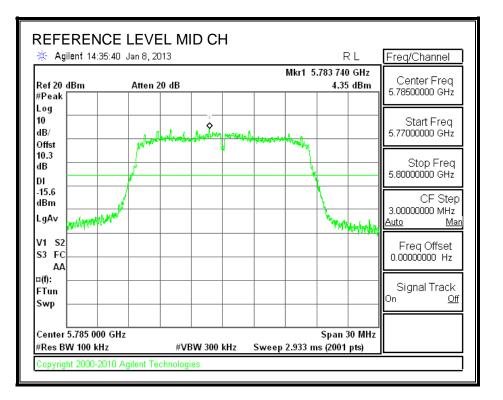
## TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

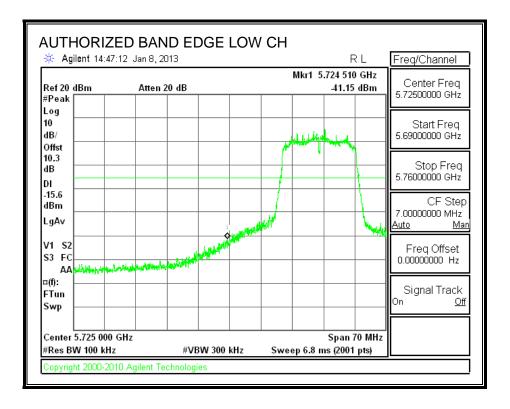
**RESULTS** 

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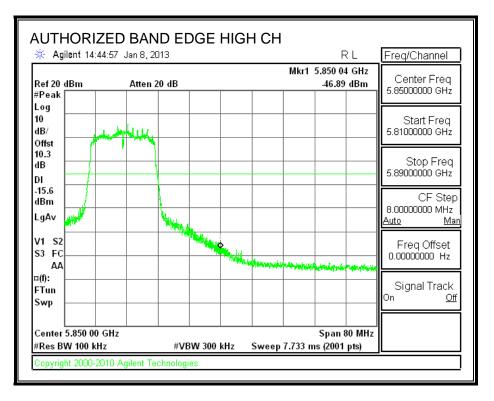
#### **IN-BAND REFERENCE LEVEL**



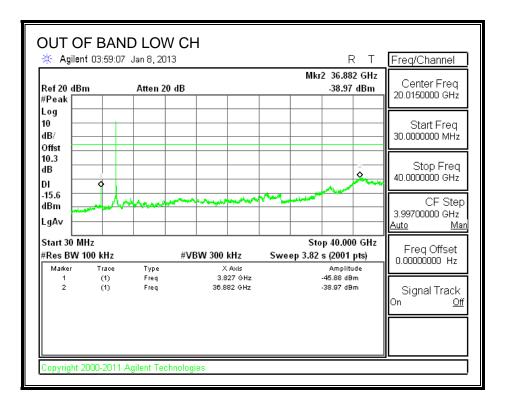
#### LOW CHANNEL BANDEDGE

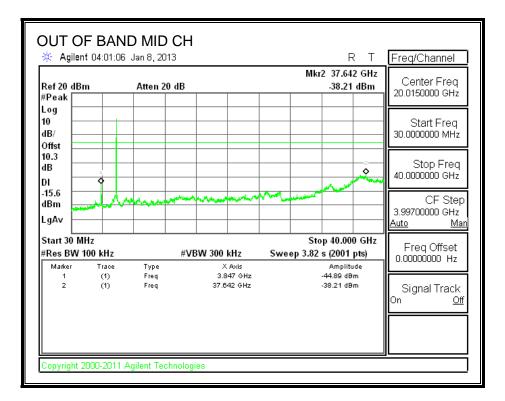


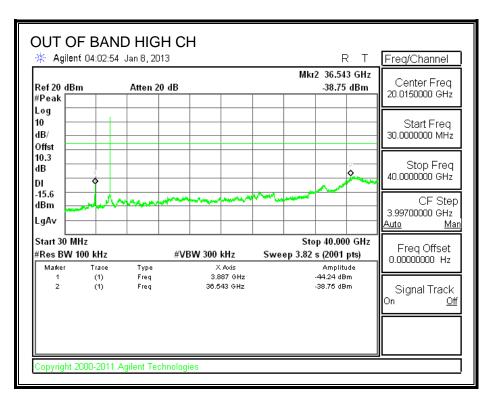
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## **OUT-OF-BAND EMISSIONS**







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# 9.5. 802.11n HT20 MODE IN THE 5.8 GHz BAND

## 9.5.1. 6 dB BANDWIDTH

## <u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

## TEST PROCEDURE

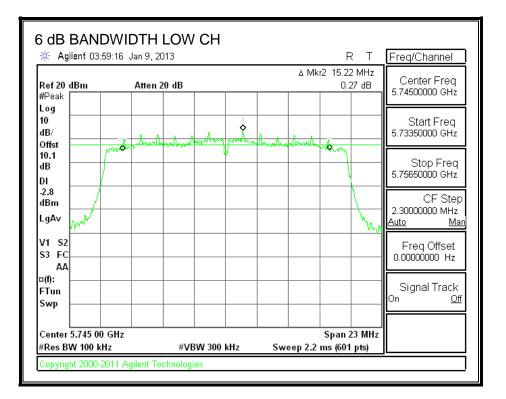
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $>= 3 \times RBW$ , peak detector and max hold.

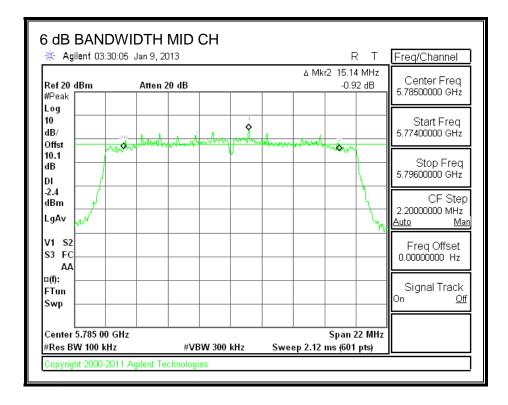
## **RESULTS**

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	5745	15.220	0.5
Mid	5785	15.140	0.5
High	5825	15.220	0.5

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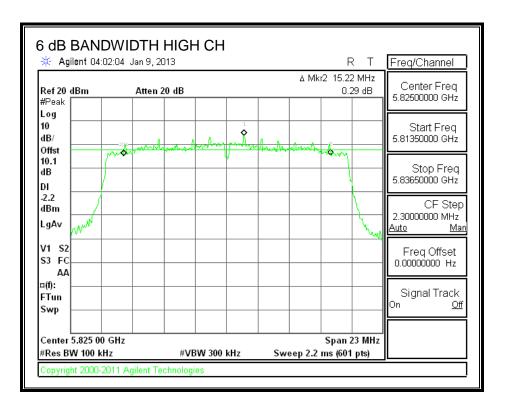
#### 6 dB BANDWIDTH





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## 9.5.2. 99% BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

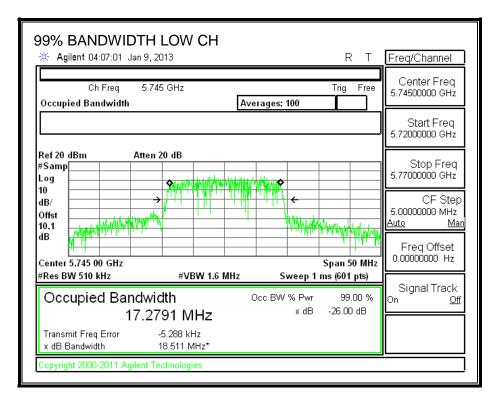
## **RESULTS**

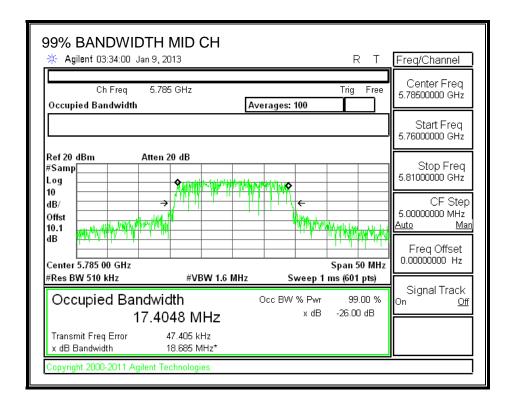
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5745	17.2791
Mid	5785	17.4048
High	5825	17.3031

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#### 99% BANDWIDTH





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99% BANDWIDTH			RТ	Freq/Channel
Ch Freq 5.82 Occupied Bandwidth	5 GHz	Averages: 100	Trig Free	Center Freq 5.82500000 GHz
				Start Freq 5.8000000 GHz
Ref 20 dBm Atten #Samp Log 10 dB/ Offst 10.1 dB			A HANNA A A ANA	Stop Freq           5.85000000 GHz           CF Step           5.00000000 MHz           Auto         Man           Freq Offset
Center 5.825 00 GHz #Res BW 510 kHz	#VBW 1.6 MH		Span 50 MHz ns (601 pts)	0.00000000 Hz
Occupied Bandwi 17.30	dth )31 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Signal Track On <u>Off</u>
x dB Bandwidth	65.240 kHz 18.540 MHz*			
Copyright 2000-2011 Agilent Te	chnologies			

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## 9.5.3. OUTPUT POWER

## LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

## **DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

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## **RESULTS**

#### Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5745	-6.40	30.00	30	36	30.00
Mid	5785	-6.40	30.00	30	36	30.00
High	5825	-6.40	30.00	30	36	30.00

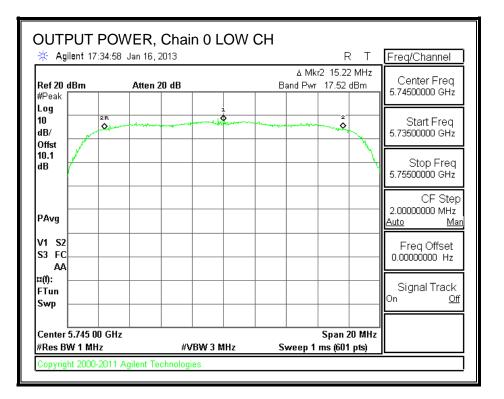
#### Results

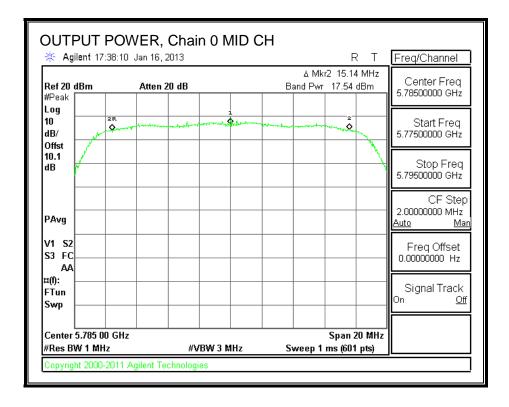
Channel	Frequency	Chain 0	Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	17.52	17.52	30.00	-12.48
Mid	5785	17.54	17.54	30.00	-12.46
High	5825	18.26	18.26	30.00	-11.74

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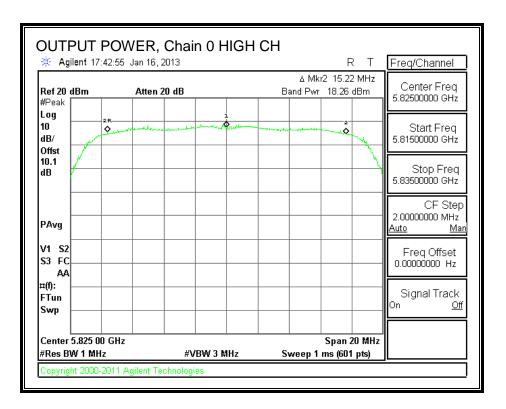
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### **OUTPUT POWER, Chain 0**





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## 9.5.4. AVERAGE POWER

## LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5745	10.60
Mid	5785	10.60
High	5825	10.70

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## 9.5.5. PSD

### **LIMITS**

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

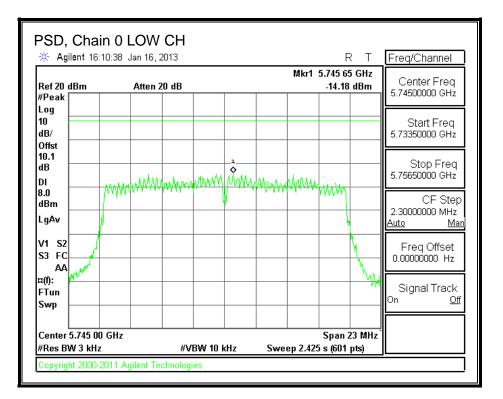
#### **RESULTS**

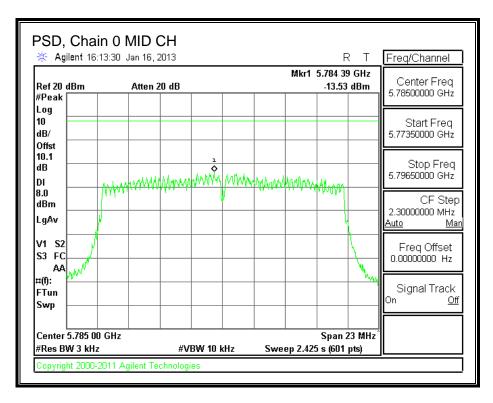
#### **PSD Results**

Channel	Frequency	Chain 0	Limit	Margin
		Meas		
	(MHz)	(dBm)	(dBm)	(dB)
Low	5745	-14.18	8.0	-22.2
Mid	5785	-13.53	8.0	-21.5
High	5825	-12.56	8.0	-20.6

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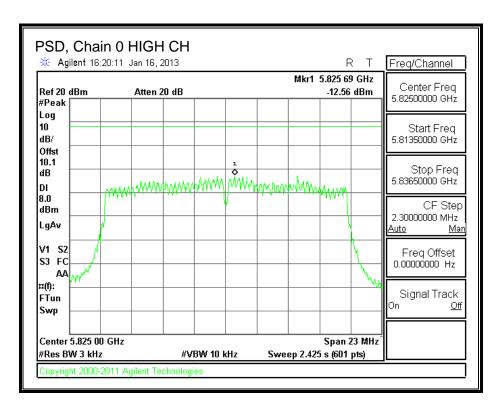
## PSD, Chain 0





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## 9.5.6. OUT-OF-BAND EMISSIONS

## LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

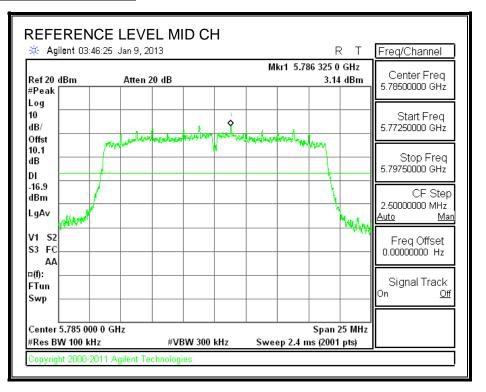
## TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

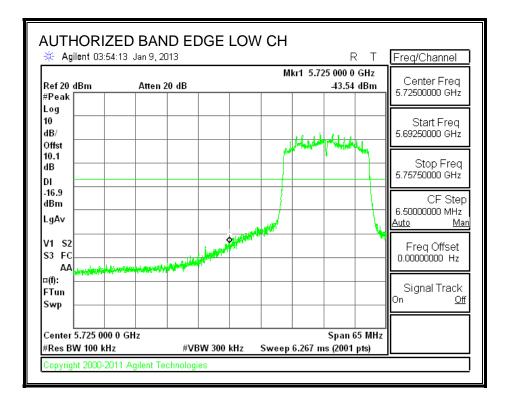
**RESULTS** 

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### **IN-BAND REFERENCE LEVEL**

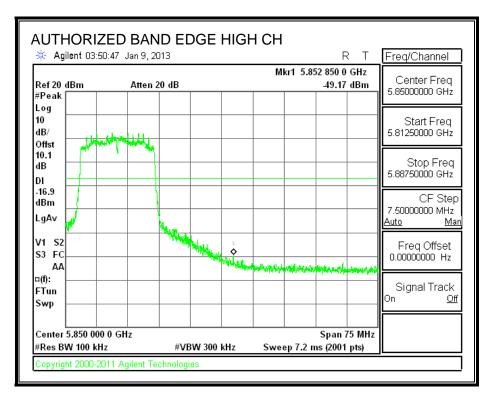


## LOW CHANNEL BANDEDGE

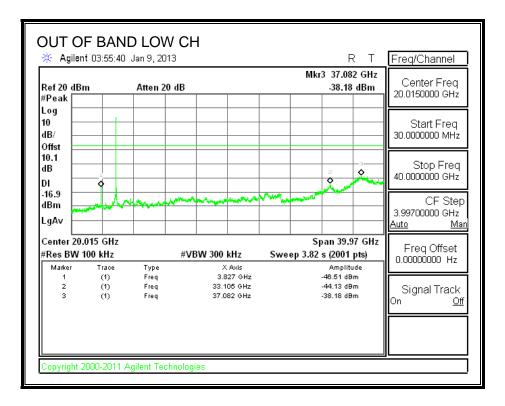


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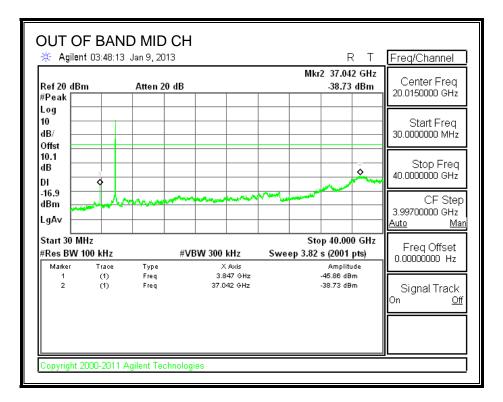
### HIGH CHANNEL BANDEDGE

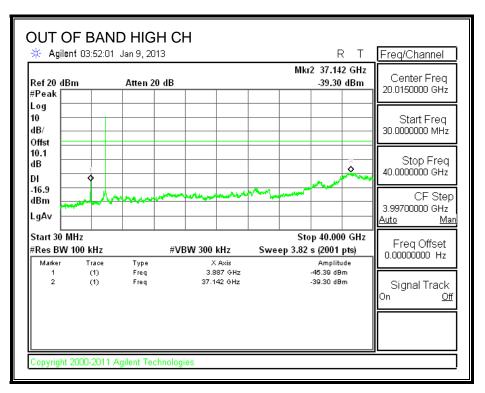


#### **OUT-OF-BAND EMISSIONS**



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# 9.6. 802.11n HT40 MODE IN THE 5.8 GHz BAND

## 9.6.1. 6 dB BANDWIDTH

## <u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

## TEST PROCEDURE

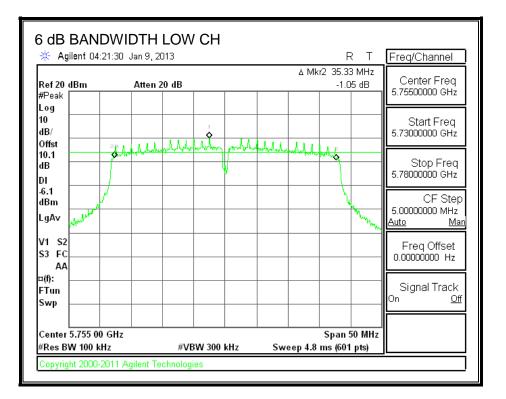
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $>= 3 \times RBW$ , peak detector and max hold.

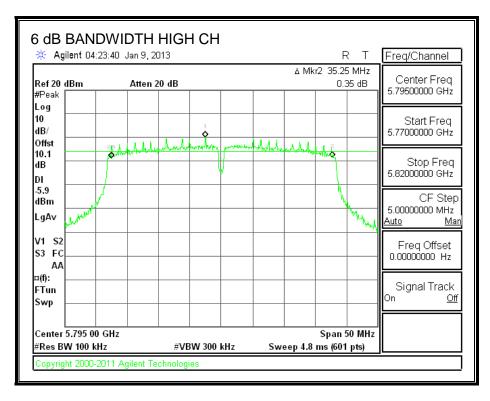
#### **RESULTS**

Channel	Frequency	6 dB Bandwidth Minimum Limi	
	(MHz)	(MHz)	(MHz)
Low	5755	35.330	0.5
High	5795	35.250	0.5

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### 6 dB BANDWIDTH





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# 9.6.2. 99% BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

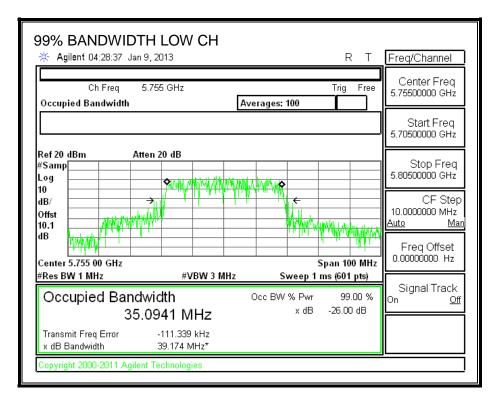
# **RESULTS**

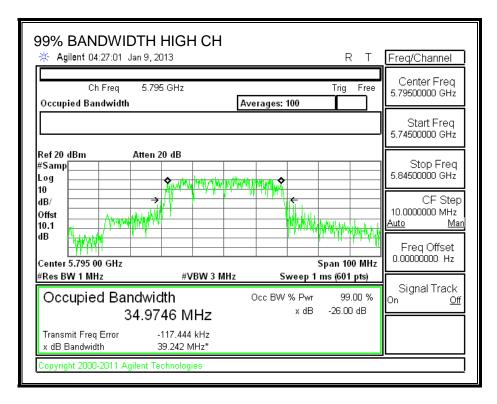
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5755	35.0941
High	5795	34.9746

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### 99% BANDWIDTH





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# 9.6.3. OUTPUT POWER

# LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

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### **RESULTS**

#### Limits

Channel	Frequency	Directional	FCC	IC	IC	Max
		Gain	Power	Power	EIRP	Power
			Limit	Limit	Limit	
	(MHz)	(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5755	-6.40	30.00	30	36	30.00
High	5795	-6.40	30.00	30	36	30.00

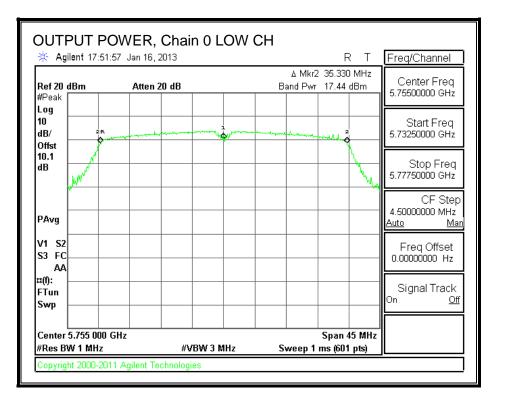
#### Results

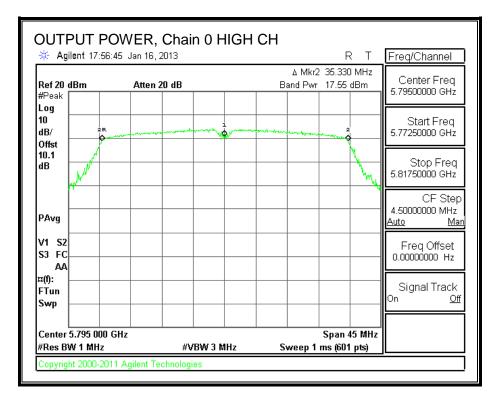
Channel	Frequency	Chain 0	Total	Power	Margin
		Meas	Corr'd	Limit	
		Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	<b>(MHz)</b> 5755	<b>(dBm)</b> 17.44	<b>(dBm)</b> 17.44	(dBm) 30.00	(dB) -12.56

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### **OUTPUT POWER, Chain 0**





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# 9.6.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5755	10.30
High	5795	10.30

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# 9.6.5. PSD

### **LIMITS**

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

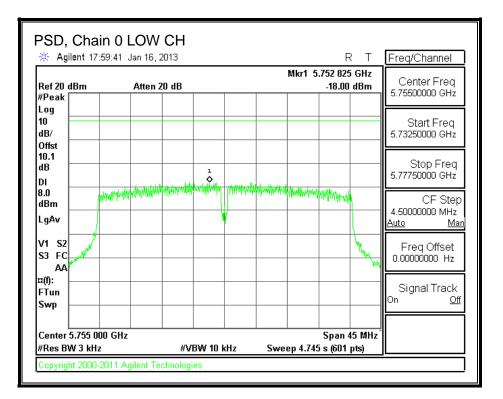
### **RESULTS**

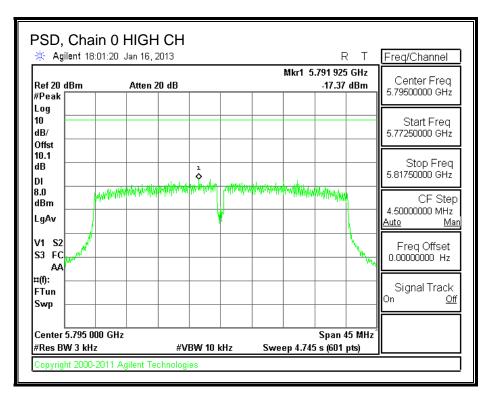
#### **PSD** Results

Channel	Frequency	Chain 0	Limit	Margin
		Meas		
	(MHz)	(dBm)	(dBm)	(dB)
Low	5755	-18.00	8.0	-26.0
High	5795	-17.37	8.0	-25.4

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### PSD, Chain 0





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# 9.6.6. OUT-OF-BAND EMISSIONS

### LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

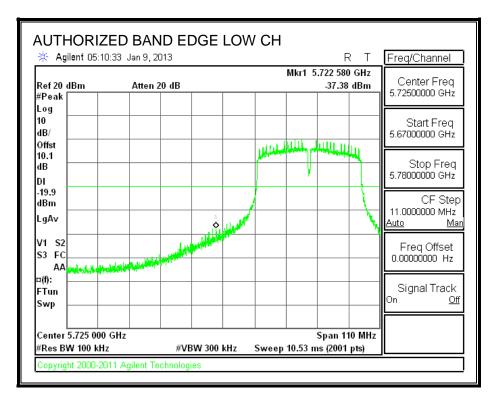
### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the inband reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

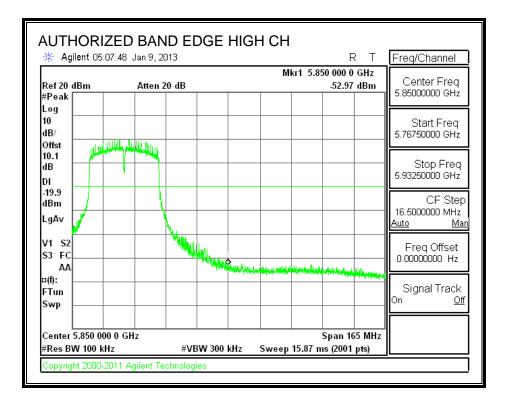
**RESULTS** 

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### LOW CHANNEL BANDEDGE

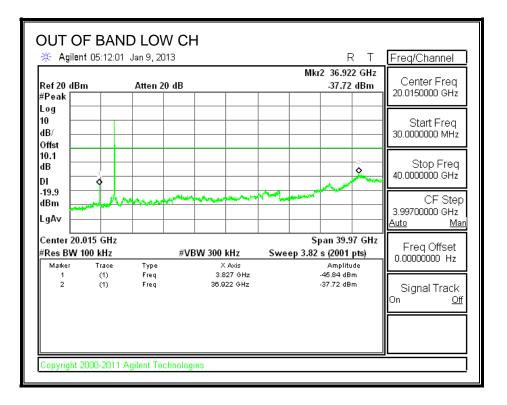


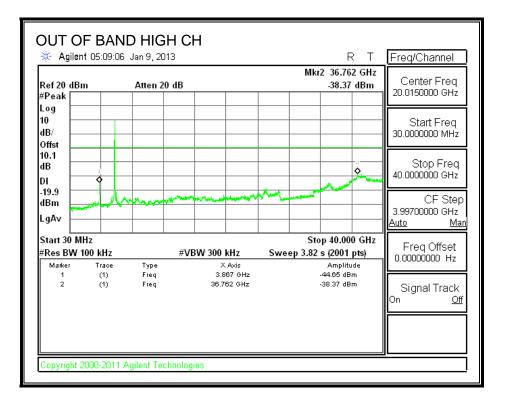
#### HIGH CHANNEL BANDEDGE



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### **OUT-OF-BAND EMISSIONS**





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# **10. RADIATED TEST RESULTS**

# 10.1. LIMITS AND PROCEDURE

# <u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

# TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Duty Cycle correction factor is included in the offset.

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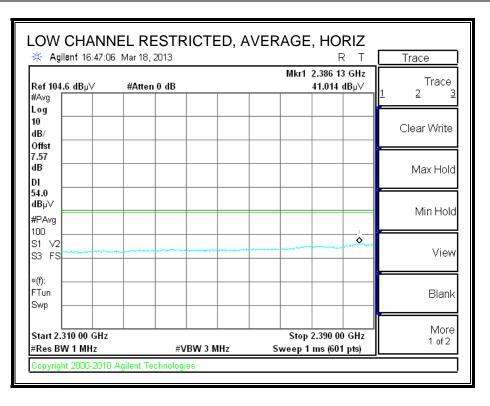
# 10.2. TRANSMITTER ABOVE 1 GHz

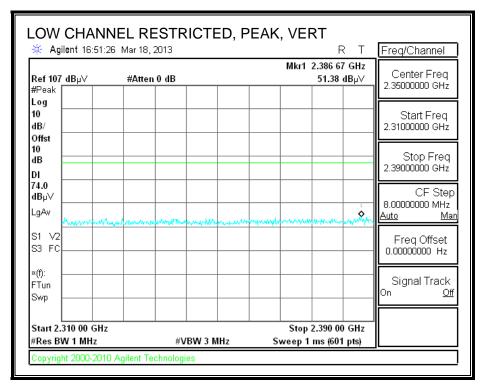
# 10.2.1. TX ABOVE 1 GHz FOR 802.11b 1TX MODE IN THE 2.4 GHz BAND

# **RESTRICTED BANDEDGE (LOW CHANNEL)**

•	:08 Mar 18, 2013		Mkr1 2.386	00 CH-	Freq/Channel
f 104.6 dBµ∀	#Atten 0 dB			00 Gnz 7 dBµ∨	Center Freq 2.3500000 GHz
'eak					2.35000000 GH2
g					Start Freq
v					2.31000000 GHz
fst					
57					Stop Fred
					2.39000000 GH;
.0					CF Ste
μV				1	8.0000000 MH;
Av	normania	and more thank the second	man and a start	white phalestrong a	<u>Auto M</u>
V2					Freq Offset
FC					0.00000000 Hz
):					Signal Tracl
					On <u> </u>
art 2.310 00 GH	z		Stop 2.390	00 GHz	
		3W 3 MHz	Sweep 1 ms (6		

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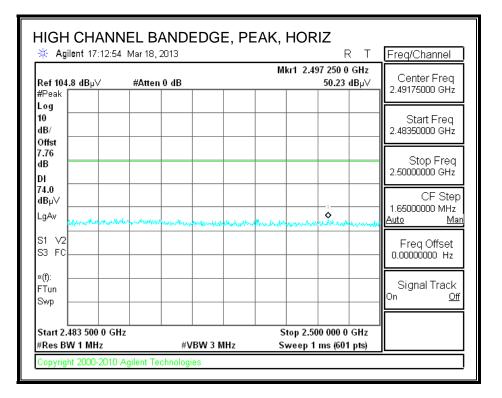
### REPORT NO: 13U14917-2 FCC ID: TRI-BAND PHONE WITH WLAN, BLUETOOTH, BLE, AND NFC

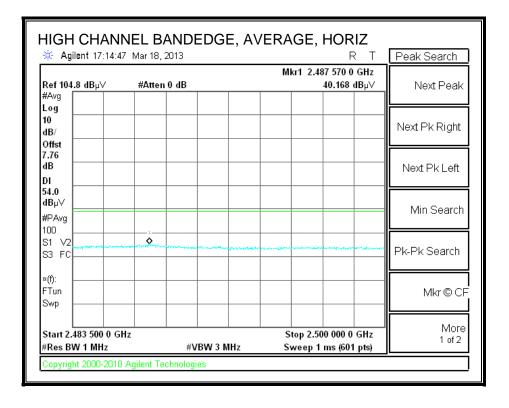
🔆 Agilent 16:53:	37 Mar 18, 2013	RT	Trace
Ref 107 dBµ∨ #Avq	#Atten 0 dB	Mkr1 2.386 93 GHz 38.538 dBµ∀	Trace
Log 10 dB/ Offst		*	Clear Write
dB			Max Hold
54.0 dBµ∨			Min Hold
#PAvg 100 S1 V2 S3 FS			View
*(f): =Tun Swp			Blank
Start 2.310 00 GHz #Res BW 1 MHz	: #VBW 3 MI	Stop 2.390 00 GHz Hz Sweep 1 ms (601 pts)	More 1 of 2

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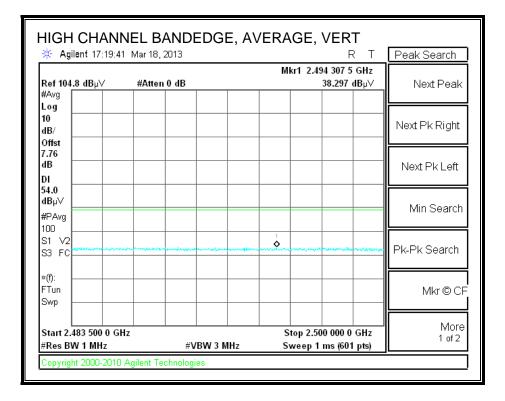
### **AUTHORIZED BANDEDGE (HIGH CHANNEL)**





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							м	kr1 2 49	34 132 5	GHz	Freq/Channel
Ref 104. #Peak ⊺	.8 dBµ∖	/	#Atten	0 dB					48.66		Center Freq 2.49175000 GHz
#Peak   Loq											
10											Start Freq
dB/											2.48350000 GHz
Offst											
7.76 dB											Stop Freq
DI											2.5000000 GHz
74.0											CF Step
dBµ∀	1										1.6500000 MHz
LgAv		weath who	delaw - Au				halferman	and the set of the set		al alle a	<u>Auto Man</u>
S1 √2		and the second	2011 - 11 - 2 <b>1</b> - 14	Contraction and	(-************************************	and and a state of the state of		of all all and all all all all all all all all all al		a hindu bad	En a Official
S3 FC											Freq Offset 0.00000000 Hz
											0.00000000 112
×(f):											Signal Track
FTun Swp											On <u>Off</u>
owh .											
] Start 2.4	183 200	0.68-					e	ton 2 54	0 000 0	CH7	ᅫ
#Res BV				443	/BW 3 I	1U~		•	ms (60°		



Page 126 of 157 UL CCS FORM NO: CCSUP4701G 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

# LOW CH

Client Nar	me:LG												
Model / D	evice:US87	0											
Config / O	ther:EUT w	ith AC Ada	pter, Low (	Ch									
Test By:Ch	nin Pang												
Range 1 1	000 - 18000N	ИНz											
	Test	Meter	Detector	T119	Loop	T166 BRF	(dBuVolt	FCC Part	Margin	Fcc Part	Margin	Height	Polarity
No.	Frequency	Reading			w/T34	2.4-2.5	s)	15C Peak		15C		[cm]	
						GHz				15.209			
										Avg 3m			
1	2409.943	42.97	PK	32.1	-29.7						-8.13	100	Horz
2				32.6	-29								Horz
3	7081.439	34.79	РК	35.6	-23.1	0.5	47.79	74	-26.21	54	-6.21	100	Horz
	000 - 18000	I											
Marker	Test	Meter	Detector	T119	Loop		•	FCC Part	Margin	Fcc Part	Margin	Height	Polarity
No.	Frequency	Reading			w/T34	2.4-2.5	s)	15C Peak		15C		[cm]	
						GHz				15.209			
										Avg 3m			
4				32.1	-29.7								Vert
5				32.6	-29								Vert
6	6988.009	35.3	PK	35.6	-23.2	0.5	48.2	74	-25.8	54	-5.8	201	Vert
Dangar2 1	 0000 - 18000												
Marker	Test	Meter	Detector	T119	Loop	T166 BRF	(dBu)/olt	FCC Part	Margin	Fcc Part	Margin	Height	Polarit
No.	Frequency		Detettor	1115	w/T34	2.4-2.5	s)	15C Peak	Margin	15C	Margin	[cm]	Folding
	requency	ncuung			w/134	GHz	31	15CT Cur		15.209		temi	
										Avg 3m			
7	17784.108	20.35	РК	41.5	-14.1	0.5	48.25	74	-25.75		-5.75	99	Horz
Range:41	0000 - 18000	MHz											
	17580.21	20.38	PK	41.4	-14.3	0.5	47.98	74	-26.02	54	-6.02	99	Vert

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### MID CH

Project N	o:13U14917												
Client Na	me:LG												
Model / D	Device:US870												
Config / C	Other:EUT/ A	C Adapter,	b mode m	id Ch									
Test By:C	hin Pang												
Range 11	000 - 18000M	Hz											
Marker No.	Test Frequency	Meter Reading	Detector	T119	Loop w/T34	T166 BRF 2.4-2.5 GHz	(dBuVolt s)	FCC Part 15C Peak	Margin	Fcc Part 15C 15.209 Avg 3m	Margin	Height [cm]	Polarity
1	2435.423	43.18	РК	32.2	-29.6	0.5	46.28	74	-27.72	54	-7.72	201	Horz
2	2715.713	40.88	РК	32.6	-29	0.5	44.98	74	-29.02	54	-9.02	201	Horz
3	7743.942	34.43	РК	35.8	-22.7	0.5	48.03	74	-25.97	54	-5.97	100	Horz
Range:21	.000 - 18000M	IHz											
Marker No.	Test Frequency	Meter Reading	Detector	T119	Loop w/T34	T166 BRF 2.4-2.5 GHz	(dBuVolt s)	FCC Part 15C Peak	Margin	Fcc Part 15C 15.209	Margin	Height [cm]	Polarity
										Avg 3m			
4	2435.423	42.3	РК	32.2	-29.6	0.5	45.4	74	-28.6	54	-8.6	201	Vert
5	2732.7	39.88	РК	32.7	-28.9	0.5	44.18	74	-29.82	54	-9.82	100	Vert
6	7837.372	34.54	РК	35.8	-22.7	0.5	48.14	74	-25.86	54	-5.86	201	Vert
Range:31	0000 - 18000	MHz											
Marker No.	Test Frequency	Meter Reading		T119	Loop w/T34	T166 BRF 2.4-2.5 GHz	(dBuVolt s)	FCC Part 15C Peak	Margin	Fcc Part 15C 15.209 Avg 3m	Margin	Height [cm]	Polarity
7	17784.108	20.54	РК	41.5	-14.1	0.5	48.44	74	-25.56	54	-5.56	99	Horz
Range:41	0000 - 18000	MHz											
Marker No.	Test Frequency	Meter Reading	Detector		Loop w/T34	T166 BRF 2.4-2.5 GHz	(dBuVolt s)	FCC Part 15C Peak	Margin	Fcc Part 15C 15.209 Avg 3m	Margin	Height [cm]	Polarity
8	17924.038	20.68	РК	41.6	-13.9	0.5	48.88	74	-25.12	-	-5.12	101	Vert

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### **HIGH CH**

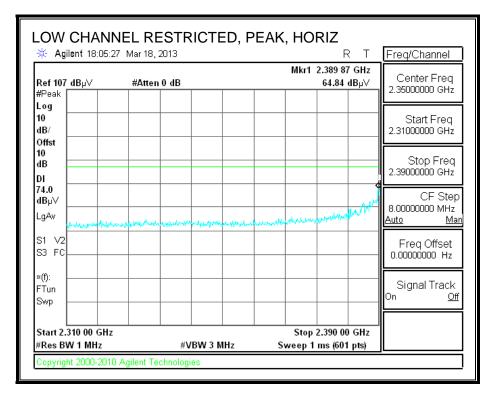
Project No	o:13U14917												
Client Nar	ne:LG												
Model / D	evice:US870	)											
Config / O	ther:EUT/ A	C Adapter,	b mode hi	igh Ch									
Test By:Ch	nin Pang												
Range 1 1(	000 - <b>1</b> 8000N	1H7											
Marker	Test	Meter	Detector	T119	Loop	<b>T166 BRF</b>	(dBuVolt	FCC Part	Margin	Fcc Part	Margin	Height	Polarity
	Frequency				w/T34		s)	15C Peak		15C 15.209 Avg 3m		[cm]	. order of
1	2380.215	42.2	РК	32.1	-29.7	0.5	45.1	74	-28.9	54	-8.9	101	Horz
2	5268.049	37.04	PK	34.3	-24.6	0.5	47.24	74	-26.76	54	-6.76	101	Horz
3	6321.259	36.2	РК	35.4	-23.7	0.5	48.4	74	-25.6	54	-5.6	200	Horz
Range:210	 000 - 18000N	/Hz											
Marker No.	Test Frequency	Meter Reading	Detector	T119	Loop w/T34		(dBuVolt s)	FCC Part 15C Peak	Margin	Fcc Part 15C 15.209 Avg 3m	Margin	Height [cm]	Polarity
4	2465.151	42.67	РК	32.2	-29.6	0.5	45.77	74	-28.23	54	-8.23	201	Vert
5	2711.466	41.01	РК	32.6	-29	0.5	45.11	74	-28.89	54	-8.89	201	Vert
6	7013.49	33.86	РК	35.6	-23.2	0.5	46.76	74	-27.24	54	-7.24	100	Vert
Range:3 10	 0000 - 18000	MHz											
Marker	Test Frequency	Meter	Detector	T119	Loop w/T34	T166 BRF 2.4-2.5 GHz	(dBuVolt s)	FCC Part 15C Peak	Margin	Fcc Part 15C 15.209 Avg 3m	Margin	Height [cm]	Polarity
7	17992.004	20.03	РК	41.6	-13.9	0.5	48.23	74	-25.77	54	-5.77	201	Horz
Range:410	0000 - 18000	MHz											
Marker No.	Test Frequency	Meter Reading	Detector	T119	Loop w/T34		(dBuVolt s)	FCC Part 15C Peak	Margin	Fcc Part 15C 15.209 Avg 3m	Margin	Height [cm]	Polarity
8	17830.085	20.38	РК	41.5	-14	0.5	48.38	74	-25.62	- <u>-</u>	-5.62	201	Vert

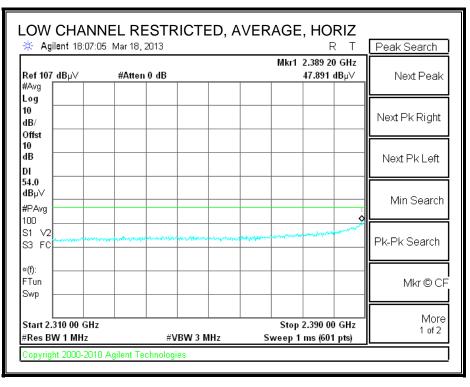
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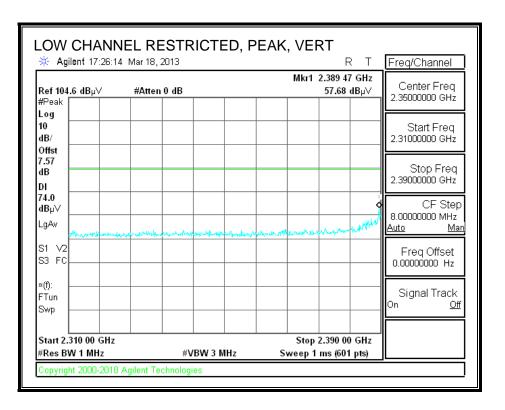
# 10.2.2. TX ABOVE 1 GHz FOR 802.11g 1TX MODE IN THE 2.4 GHz BAND

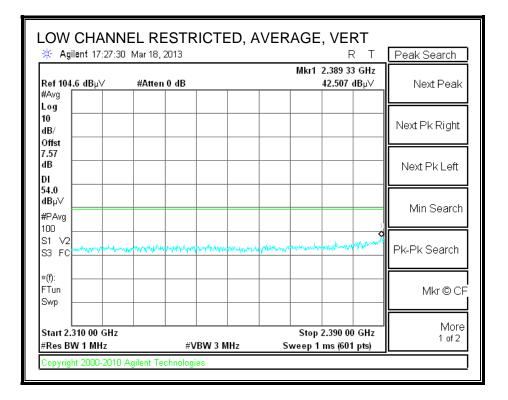
## **RESTRICTED BANDEDGE (LOW CHANNEL)**





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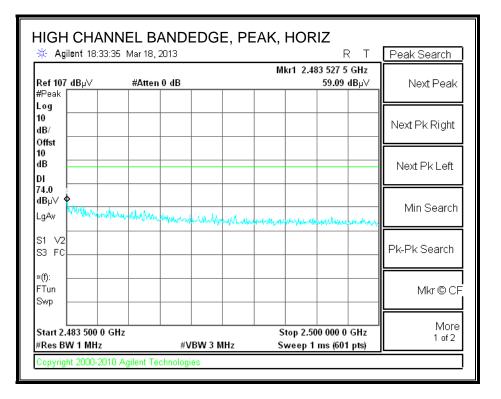


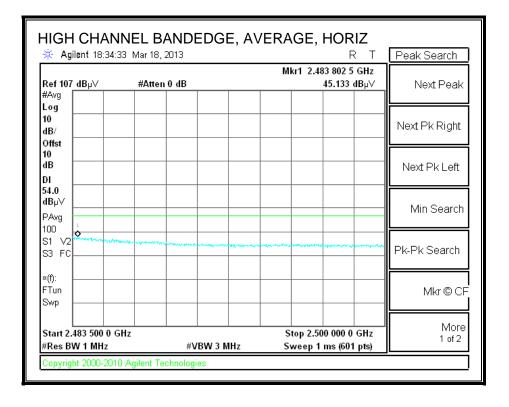


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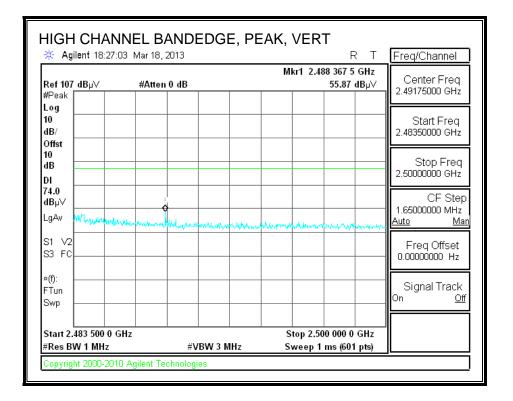
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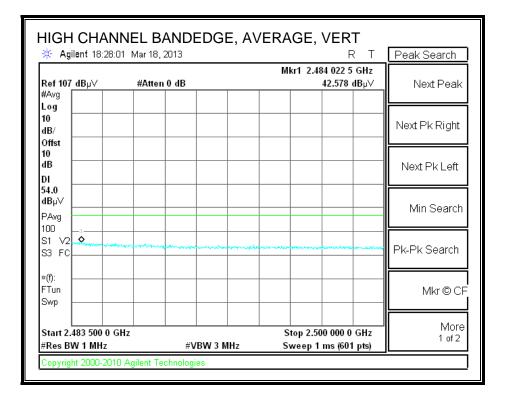
### **AUTHORIZED BANDEDGE (HIGH CHANNEL)**





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### LOW CH

Project :1	13u14917													
Company	y Name:LG													
Model / (	Config:LG870	(C2PC)												
Mode:TX	g mode Low	/CH												
Test By:Te	lony Wang													
Horizonta	al 1000 - 1800	OMHz												
Marker No.	Test Frequency	1.000.000	Detector	100323	1223 1		100 100 100	s/meter)	FCC Part 15C 15.209 Avg		FCC Part 15C Peak	1.0.0	Height [cm]	Polarity
1	1 2410.295	46.31	PK	32,4	-35	4.6	0.5	48.81	1 54	-5.19	74	-25.19	114	Horz
2	2 2784.108	41.35	PK	32.8	-35.1	5	0.5	44.55	54	-9.45	74	-29.45	200	Horz
3	3 4415.292	40.42	PK	34.4	-34.9	6.6	0.5	47.02	2 54	-6.98	74	-26.98	114	Horz
Vertical 1	1000 - 18000M	MHz.		$\vdash$					$\vdash$					
Marker No.	Test Frequency	1550855 S	Detector	1.1555.0	1998	Factor	CONTRACT:	s/meter)	FCC Part 15C 15.209 Avg	0.00	FCC Part 1SC Peak	0.00200	Height [cm]	Polarity
. 4	4 2410.295	46.69	PK	32.4	-35	4,6	0.5	49.19	54	-4.81	74	-24.81	200	Vert
5	5 2758.621	43.19	PK	32.8	-35.1	5	0.5	46.39	54	-7.61	74	-27.61	100	Vert
6	6 3574.213	40.94	PK	33.4	-35	5.8	0.5	45.64	\$ 54	-8.36	74	-28.36	100	Vert
7	7 4500.25	39.09	PK	34.5	-34.9	6.7	0.5	45.89	54	-8.11	74	-28.11	200	Vert

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#### MID CH

Company	Name:LG													
Model /	Config:LG87	(C2PC)												
Mode:TX	g mode Mid	I CH												
	ony Wang													
Horizonta	al 1000 - 180	00MHz												
Marker No.	Test Frequency	Meter Reading	Detector	T345 Antenna Factor	T145 Preamp	Cable Factor	T186 BRF 2.4- 2.5GHz	dB(uVolt s/meter)	City monore	Margin	FCC Part 15C Peak	Margin	Height [cm]	Polarity
1	2435.782			32.4	-35	4.7	0.5	48.67	54	-5.33	74	-25.33	100	Horz
2	5706.647	39.1	PK	35.1	-34.9	7.7	0.5	47.5	54	-6.5	74	-26.5	200	Horz
3	6887.556	37.95	PK	35.9	-35	8.6	0.5	47.95	54	-6.05	74	-26.05	100	Horz
4	9368.316	37.32	PK	37	-35.1	10.1	0.5	49.82	54	-4.18	74	-24.18	100	Horz
Vertical 1	000 - 18000	ИНz												
Marker No.	Test Frequency	Meter Reading	Detector	T345 Antenna Factor	T145 Preamp	Cable Factor	T186 BRF 2.4- 2.5GHz	dB{uVolt s/meter)			FCC Part 15C Peak	Margin	Height [cm]	Polarity
5	2435.782	46.52	PK	32.4	-35	4.7	0.5	49.12		-4.88	74	-24.88	200	Vert
	4211.394	39.23	PK	34.1	-34.8	6.4	0.5	45.43	54	-8.57	74	-28.57	200	Vert
	4942.029	39.2	PK	34.6	-34.9	7.2	0.5	46.6	54	-7.4	74	-27.4	200	Vert
8	7550.225	38.14	РК	36	-35	9	0.5	48.64	54	-5.36	74	-25.36	200	Vert
5	3 7550.225	38.14	PK	36	-35	9	0.5	48.64	54	-5.36	74	-25.36	200	Vert

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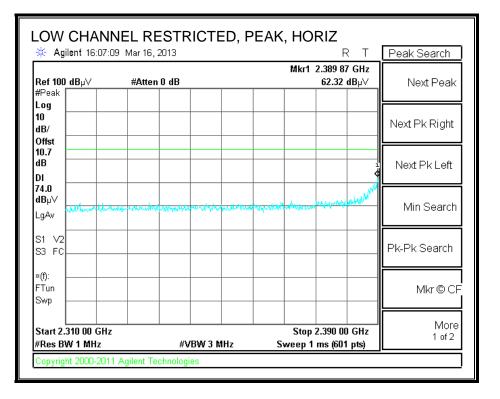
### **HIGH CH**

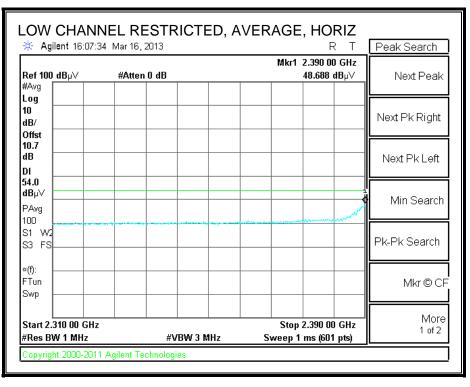
u14917													
Name:LG	(canc)												
and the second second second													
the second s	n CH												
ny Wang													
1000 - 1800	OMHz						-						
Test Frequency	Meter Reading	Detector	T345 Antenna Factor	T145 Preamp	Cable Factor	T186 BRF 2.4- 2.5GHz	10000000000	Carlo Carlo and Carlo	Margin	FCC Part 15C Peak	Margin	Height [cm]	Polarity
2452.774	43.94	PK	32.4	-35	4.7	0.5	46.54	54	-7.46	74	-27.46	100	Horz
2767.116	41.93	PK	32.8	-35.1	5	0.5	45.13	54	-8.87	74	-28.87	200	Horz
5188.406	39.06	PK	34.8	-34.9	7.4	0.5	46.86	54	-7.14	74	-27.14	200	Horz
7609.695	37.2	PK	36.1	-35.1	9.1	0.5	47.8	54	-6.2	74	-26.2	100	Horz
3149.425	39.01	PK	33.2	-35.2	5.4	0.5	42.91	54	-11.09	74	-31.09	100	Horz
00 - 18000M	ЛНz				-								
Test Frequency	Meter Reading	Detector	A Statements	T145 Preamp	Cable Factor	T186 BRF 2.4- 2.5GHz	dB(uVolt s/meter)	FCC Part 15C 15.209 Avg	Margin	FCC Part 15C Peak	Margin	Height [cm]	Polarity
2452.774	43.13	PK	32.4	-35	4.7	0.5	45.73	54	-8.27	74	-28.27	100	Vert
3106.947	38.63	PK	33.2	-35.2	5.4	0.5	42.53	54	-11.47	74	-31.47	200	Vert
3565.717	39.79	PK	33.4	-35	5.8	0.5	44.49	54	-9.51	74	-29.51	200	Vert
9189.905	36.01	PK	36.9	-35.2	10	0.5	48.21	54	-5.79	74	-25.79	100	Vert
T	nfig:LG870 mode High ny Wang 1000 - 1800 fest requency 2452.774 2767.116 5188.406 7609.695 3149.425 3149.425 00 - 18000M fest requency 2452.774 3106.947 3565.717	nfig:LG870(C2PC) mode High CH ny Wang 1000 - 1800UMHz Test Meter requency Reading 2452.774 43.94 2767.116 41.93 5188.406 39.06 7609.695 37.2 3149.425 39.01 00 - 18000MHz Fest Meter requency Reading 2452.774 43.13 3106.947 38.63 3565.717 39.79	nfig:LG870(C2PC) mode High CH ny Wang 1000 - 1800UMHz Test Meter Detector requency Reading 2452.774 43.94 PK 2767.116 41.93 PK 2767.116 41.93 PK 3149.425 39.01 PK 3149.425 39.01 PK 00 - 18000MHz F Fest Meter Reading 2452.774 43.13 PK 3106.947 38.63 PK 33565.717 39.79 PK	nfig:LG870(C2PC) mode High CH mode High CH 1000 - 18000MHz T345 Frequency Reading Detector T345 Antenna Factor 2452.774 43.94 PK 32.4 2767.116 41.93 PK 32.8 5188.406 39.06 PK 34.8 7609.695 37.2 PK 36.1 3149.425 39.01 PK 33.2 00 - 18000MHz Frequency Reading Detector T345 Antenna Factor 745 Antenna Factor 745 Antenna Factor 745 Antenna Factor 745 Antenna Factor 7345 Antenna Factor 7345	nfig:LG870(C2PC) mode High CH mode High CH iy Wang 1000 - 18000MHz Test Meter Reading Detector T345 Preamp Factor 7345 Preamp Factor 32.4 -35 2767.116 41.93 PK 32.4 -35 2767.116 41.93 PK 32.8 -35.1 5188.406 39.06 PK 34.8 -34.9 7609.695 37.2 PK 36.1 -35.2 3149.425 39.01 PK 33.2 -35.2 00 - 18000MHz Factor 7345 Preamp Factor 735.2 -35.2 3106.947 38.63 PK 33.2 -35.2 3106.947 39.79 PK 33.4 -35	nfig:LG870(C2PC) mode High CH my Wang 1000 - 18000MHz Test Reading Detector T345 Antenna Factor Preamp Factor 2452.774 43.94 PK 32.4 -35 4.7 2767.116 41.93 PK 32.8 -35.1 55 5188.406 39.06 PK 34.8 -34.9 7.4 7609.695 37.2 PK 36.1 -35.1 9.1 3149.425 39.01 PK 33.2 -35.2 5.4 0 100 - 18000MHz 100 100 100 100 100 100 100 100 100 10	Infig:LG870(C2PC)       Image:LG870(C2PC)         mode High CH       Image:LG870(C2PC)         mode High CH       Image:LG870(C2PC)         iny Wang       Image:LG870(C2PC)         1000 - 18000MHz       Image:LG870(C2PC)         Test       Meter         Reading       Detector       T345         Antenna       Preamp         Factor       Factor         2452.774       43.94         41.93       PK         3245       -35.1         5188.406       39.06         39.01       PK         3149.425       39.01         P       Image:LG870         Image:LG870       Ima	Infig:LG870(C2PC)       Image:LG870(C2PC)       Image:LG870(C2PC)       Image:LG870(C2PC)         mode:High CH       H       Image:LG870(C2PC)       Image:LG870(C2PC)       Image:LG870(C2PC)         1000 - 18000MHz       Image:LG870(C2PC)       Image:LG870(C2PC)       Image:LG870(C2PC)       Image:LG870(C2PC)         Test       Meter       Detector       T345       T145       Cable       T186 BRF       dB(uVolt         2452.774       43.94       PK       32.4      35       4.7       0.5       46.54         2767.116       41.93       PK       32.8      35.1       5       0.5       45.13         5188.406       39.06       PK       34.8      34.9       7.4       0.5       46.86         7609.695       37.2       PK       36.1      35.1       9.1       0.5       47.8         3149.425       39.01       PK       33.2       -35.2       5.4       0.5       42.91         00 - 18000MHz       Image: Preserver       Factor       T145       Fable       T186 BRF       dB(uVolt         requency       Meter       Detector       T345       T145       Cable       T186 BRF       2.4-       2.5GHz       3/meter)       2.5GHz	Infig:LG870(C2PC)         Image High CH         Imag	Infig:LG870(C2PC)         Image High CH         Ima	Infig:LG870(C2PC)       Image:LG870(C2PC)       Im	nrlig:LGS70(C2PC) <td><math display="block"> \begin{array}{c c c c c c c c c c c c c c c c c c c </math></td>	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $

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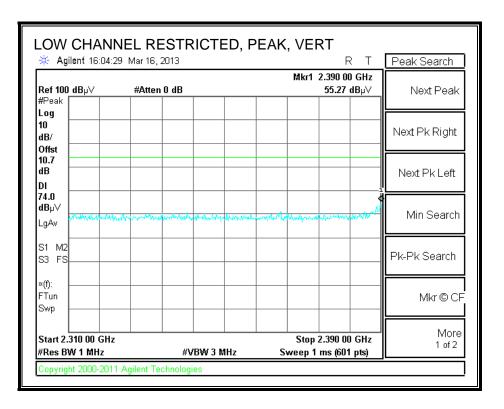
# 10.2.3. TX ABOVE 1 GHz FOR 802.11n HT20 1TX MODE IN THE 2.4 GHz BAND

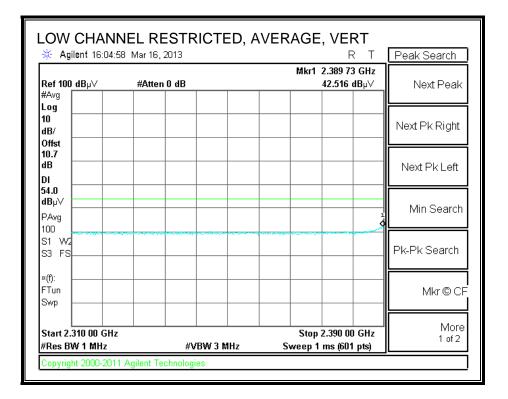
# **RESTRICTED BANDEDGE (LOW CHANNEL)**





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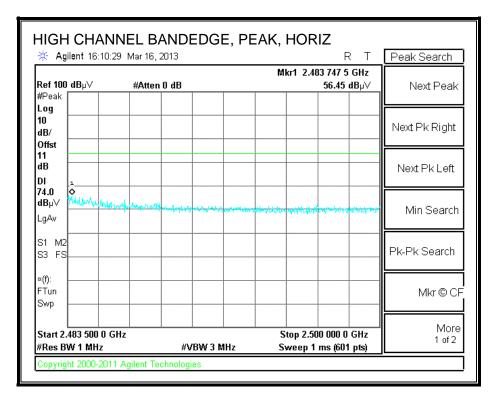


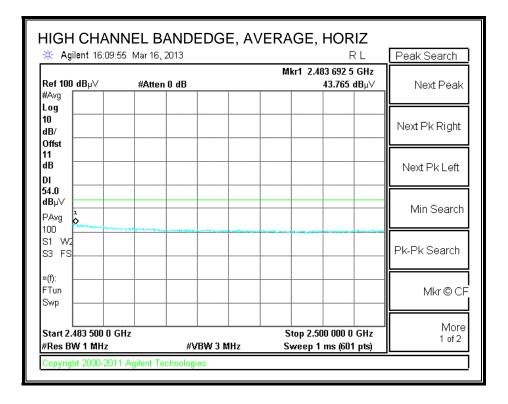


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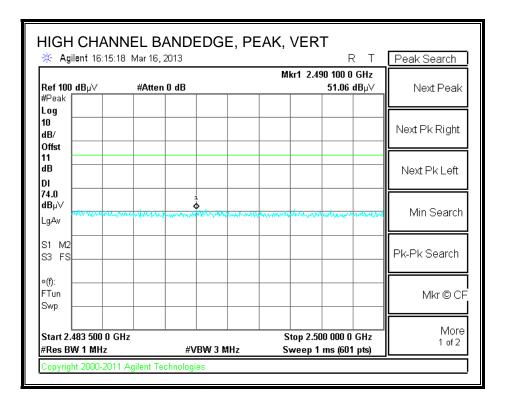
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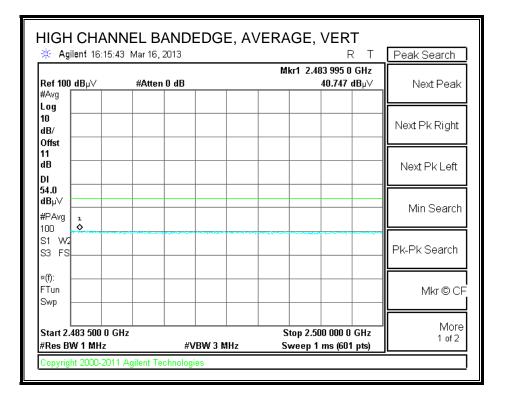
### AUTHORIZED BANDEDGE (HIGH CHANNEL)





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### LOW CH

Project :1	3u14917													
Company	Name:LG													
Model / C	Onfig:LG870	(C2PC)												
Mode:Tx :	11n mode Lo	ow <mark>c</mark> h												
Test By:To	ony Wang													
Horizonta	il 1000 - 1800	OMHz												
	Test Frequency		Detector	T345 Antenna Factor	T145 Preamp	Factor	Second Second	s/meter)	Color Second	0.000	FCC Part 15C Peak	Margin	Height [cm]	Polarity
1	2410.295	46.09	PK	32.4	-35	4.6	0.5			-5.41	74	-25.41	100	Horz
2	6564.718	38.52	PK	35.9	-35	8.4	0.5	48.32	2 54	-5.68	74	-25.68	200	Horz
3	7618.191	38.23	PK	36.1	-35.1	9.1	0.5	48.83	54	-5.17	74	-25.17	100	Horz
4	8331.834	38.23	PK	36.1	-35.2	9.5	0.5	i 49.13	54	-4.87	74	-24.87	100	Horz
Vertical 1	000 - 18000M	ЛНz	1			с								
Marker No.	Test Frequency		Detector	T345 Antenna Factor	T145 Preamp		2.4- 2.5GHz	s/meter)	1000000000		FCC Part 15C Peak	Margin	Height [cm]	Polarity
5		0.2023	1001	32.4			1.000		-	-	1 25	UT UT TAGE	2.5	Vert
6	5987.006			35.9										Vert
7	6887.556	1 1 1 1 1 1 1	A	35.9		-		10.000				1.000.000	10.00	Vert
8	9104.948	36.34	PK	36.8	-35.2	10	0.5	48.44	54	-5.56	74	-25.56	100	Vert
								<u> </u>						

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#### MID CH

	3u14917 Name:LG													
		(conc)												
	onfig:LG870 11n mode M													
	ny Wang	lia ch												
Test By:To	my wang													
Horizonta	l 1000 - 1800	OMHz												
Marker	Test	Meter	Detector	T345	T145	Cable	T186 BRF	dB(uVolt	FCC Part	Margin	FCC Part	Margin	Height	Polarity
No.	Frequency	Reading			Preamp	Factor	2.4-	s/meter)			15C Peak		[cm]	· · · · ·
				Factor			2.5GHz	-,,	15.209					
									Avg					
1	2435.782	45.56	РК	32.4	-35	4.7	0.5			-5.84	74	-25.84	100	Horz
2	3659.17	40.44	РК	33.6	-35	5.9	0.5	45.44	54	-8.56	74	-28.56	200	Horz
3	6190.905	37.77	PK	36	-34.9	8.1	0.5	47.47	54	-6.53	74	-26.53	200	Horz
	7541.729	38.33	DK	36	-35	9	0.5	48.83	54	-5.17	74	-25.17	200	Horz
4	1542.725	36.33	PK	50	-30	, ,	0.5	48.83	- 34	-5.17	/4	-23.17	200	HUIZ
Vertical 1	000 - 18000N	1Hz												
Vertical 1 Marker	000 - 18000N Test	NHz Meter	Detector	T345	T145	Cable	T186 BRF	dB(uVolt	FCC Part		FCC Part		Height	
Vertical 1 Marker	000 - 18000N	NHz Meter		T345 Antenna			T186 BRF 2.4-		FCC Part 15C					
Vertical 1 Marker	000 - 18000N Test	NHz Meter		T345	T145	Cable	T186 BRF	dB(uVolt	FCC Part 15C 15.209		FCC Part		Height	
Vertical 1 Marker No.	000 - 18000M Test Frequency	1Hz Meter Reading	Detector	T345 Antenna Factor	T145 Preamp	Cable Factor	T186 BRF 2.4- 2.5GHz	dB(uVolt s/meter)	FCC Part 15C 15.209 Avg	Margin	FCC Part 15C Peak	Margin	Height [cm]	Polarity
Vertical 1 Marker No. 5	000 - 18000M Test Frequency 2435.782	1Hz Meter Reading 45.8	Detector	T345 Antenna Factor 32.4	T145 Preamp -35	Cable Factor 4.7	T186 BRF 2.4- 2.5GHz 0.5	dB(uVolt s/meter) 48.4	FCC Part 15C 15.209 Avg 54	Margin -5.6	FCC Part 15C Peak 74	Margin -25.6	Height [cm] 100	Polarity Vert
Vertical 10 Marker No. 5 6	000 - 18000M Test Frequency 2435.782 5834.083	NHz Meter Reading 45.8 38.32	Detector PK PK	T345 Antenna Factor 32.4 35.4	T145 Preamp -35 -34.9	Cable Factor 4.7 7.8	T186 BRF 2.4- 2.5GHz 0.5 0.5	dB(uVolt s/meter) 48.4 47.12	FCC Part 15C 15.209 Avg 54 54	Margin -5.6 -6.88	FCC Part 15C Peak 74 74	Margin -25.6 -26.88	Height [cm] 100 200	Polarity Vert Vert
Vertical 10 Marker No. 5	000 - 18000M Test Frequency 2435.782 5834.083 6921.539	Hz Meter Reading 45.8 38.32 37.53	Detector PK PK PK	T345 Antenna Factor 32.4	T145 Preamp -35 -34.9 -35	Cable Factor 4.7 7.8 8.6	T186 BRF 2.4- 2.5GHz 0.5 0.5 0.5	dB(uVolt s/meter) 48.4 47.12 47.53	FCC Part 15C 15.209 Avg 54 54 54	Margin -5.6 -6.88 -6.47	FCC Part 15C Peak 74 74 74	Margin -25.6 -26.88 -26.47	Height [cm] 100 200 100	Polarity Vert

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### **HIGH CH**

Name:LG													
Config:LG870	(C2PC)												
	0												
,													
1000 - 1800	OMHz												
Test Frequency	Meter Reading	Detector	Concerns.	creater of	Ca <mark>b</mark> le Factor			15C 15.209	-	200	Margin	Height [cm]	Polarity
2461.269	44.32	PK	32.4	-35	4.7	0.5	46.92		-7.08	74	-27.08	100	Horz
3344.828	40.71	PK	33.3	-35.1	5.6	0.5	45.01	54	-8.99	74	-28.99	200	Horz
5902.049	38.39	РК	35.6	-34.9	7.9	0.5	47.49	54	-6.51	74	-26.51	200	Horz
7592.704	38.47	PK	36.1	-35.1	9	0.5	48.97	54	-5.03	74	-25.03	200	Horz
		Detector			Factor				-		Margin	Height [cm]	Polarity
			32.4	-35	4.7	0.5	46	54	-8	74	-28	200	Vert
2461.269	43.4	PK	32.4	-30									
2461.269 5290.355		1.000	32.4		7.4	0.5	46.54	54	-7.46	74	-27.46	200	Vert
100000.000	38,64	PK		-34.9						9 93		760	10000
	ny Wang 1000 - 1800 Test Frequency 2461.269 3344.828 5902.049 7592.704 000 - 18000W Test	I 1000 - 18000MHz           Test         Meter           Frequency         Reading           2461.269         44.32           3344.828         40.71           5902.049         38.39           7592.704         38.47           000 - 18000MHz	Amp Wang         Meter         Detector           Test         Meter         Detector           Frequency         Reading         Detector           2461.269         44.32         PK           3344.828         40.71         PK           5902.049         38.39         PK           7592.704         38.47         PK           000 - 18000MHz         Detector         Detector	Antenna         Antenna           Frequency         Reading         Detector         T345           Antenna         Factor         Antenna           2461.269         44.32         PK         32.4           3344.828         40.71         PK         33.3           5902.049         38.39         PK         35.6           7592.704         38.47         PK         36.1           000 - 18000MHz         1000         1345         145           Frequency         Reading         Detector         T345           Antenna         Factor         145         145	Automa         Automa         Tube           II 1000 - 18000MHz         II 1000 - 18000MHz         Tube         Tube           Test         Meter         Detector         T345         T145           Frequency         Reading         Detector         T345         Preamp           2461.269         44.32         PK         32.4         -35           3344.828         40.71         PK         33.3         -35.1           5902.049         38.39         PK         35.6         -34.9           7592.704         38.47         PK         36.1         -35.1           000 - 18000MHz         Image: Constant State St	Amp Wang         Amp Mag         <	Main         Meter         Detector         T345         T145         Cable         T186 BRF           Frequency         Reading         Detector         T345         T145         Freamp         Factor         2.4-           2461.269         44.32         PK         32.4         -35         4.7         0.5           3344.828         40.71         PK         33.3         -35.1         5.6         0.5           5902.049         38.39         PK         35.6         -34.9         7.9         0.5           7592.704         38.47         PK         36.1         -35.1         9         0.5           000 - 18000MHz         Image: Cable in the i	Amply Wang         Tuse         Tuse         Tuse         Amply Wang         Amply Wang         Tuse         Tuse         Tuse         Amply Wang         Amply Wang         Tuse         Tuse         Amply Wang         Tuse         Tuse         Amply Wang         Tuse         Amply Wang         Tuse         Tuse         Tuse         Amply Wang         Tuse         Tuse         Tuse         Tuse         Tuse         Tuse         Tuse         Tuse	Amp Wang         Interview         Detector         T345         T145         Cable         T186 BRF         dB(uVolt         FCC Part           Frequency         Reading         Detector         T345         T145         Cable         T186 BRF         dB(uVolt         FCC Part           Frequency         Reading         Detector         T345         T145         Cable         T186 BRF         dB(uVolt         FCC Part           2461.269         44.32         PK         32.4         -35         4.7         0.5         46.92         54           3344.828         40.71         PK         33.3         -35.1         5.6         0.5         45.01         54           5902.049         38.39         PK         35.6         -34.9         7.9         0.5         47.49         54           7592.704         38.47         PK         36.1         -35.1         9         0.5         48.97         54           7592.704         38.47         PK         36.1         -35.1         9         0.5         48.97         54           7592.704         38.47         PK         36.1         -35.1         9         0.5         48.97         54	Amply Wang         T145         Cable         T186 BRF         dB(uVolt)         FCC Part         Margin           Test         Meter         Detector         T345         T145         Cable         Factor         2.4-         .5/GHz         S/meter)         15C         15.209         Avg           2461.269         44.32         PK         32.4         -35         4.7         0.5         46.92         54         -7.08           3344.828         40.71         PK         33.3         -35.1         5.6         0.5         45.01         54         -8.99           5902.049         38.39         PK         35.6         -34.9         7.9         0.5         47.49         54         -6.51           7592.704         38.47         PK         36.1         -35.1         9         0.5         48.97         54         -5.03           000 - 18000MHz         Image: Provide Hamping         Image: Provide Hamping         Image: Provide Hamping         Image: Provide Hamping	Margin         Meter         Detector         T345         T145         Cable         T186 BRF         dB(uVolt         FCC Part         Margin         FCC Part           Test         Meter         Detector         T345         T145         Cable         T186 BRF         dB(uVolt         FCC Part         Margin         FCC Part           Frequency         Reading         Detector         T345         Antenna         Preamp         Factor         2.4         s/meter)         15C         Nargin         FCC Part         15C Peak           2461.269         44.32         PK         32.4         -35         4.7         0.5         46.92         54         -7.08         74           3344.828         40.71         PK         33.3         -35.1         5.6         0.5         47.49         54         -6.51         74           5902.049         38.39         PK         35.6         -34.9         7.9         0.5         47.49         54         -6.51         74           7592.704         38.47         PK         36.1         -35.1         9         0.5         48.97         54         -5.03         74           7592.704         38.47         PK         36.1 </td <td>Anny Wang         Image: Margin Factor         Taks Factor         Taks Factor         Cable Factor         Taks Factor         Barlow Factor         FCC Part Factor         Margin Factor           2461.269         44.32         PK         32.4         -35         4.7         0.5         46.92         54         -7.08         74         -27.08           3344.828         40.71         PK         33.3         -35.1         5.6         0.5         45.01         54         -6.51         74         -28.99           5902.049         38.39         PK         35.6         -34.9         7.9         0.5         48.97         54         -6.51         74         -25.03           7592.704         38.47         PK         36.1         -35.1         9         0.5         48.97         54         -6.51         74         -25.03           000 - 18000MHz         Image: PK         36.1         -35.1         9         0.5         48.97         54         -6.51         74         -25.03           000 - 18000MHz         Image: PK         36.1         -35.1         9         0.5         48.97         54         -5.03         74         -25.03           000 - 18000MHz         Image: PK<td>Anny Wang         Image: Constraint of the symptotic sympt wang         Image: Constraint of the symptotic sympt wang         Image: Constraint of the sympt wang         Image: Constraint of the sympt wang         Image: Constraint wang         Image: Constrait wang         Image</td></td>	Anny Wang         Image: Margin Factor         Taks Factor         Taks Factor         Cable Factor         Taks Factor         Barlow Factor         FCC Part Factor         Margin Factor           2461.269         44.32         PK         32.4         -35         4.7         0.5         46.92         54         -7.08         74         -27.08           3344.828         40.71         PK         33.3         -35.1         5.6         0.5         45.01         54         -6.51         74         -28.99           5902.049         38.39         PK         35.6         -34.9         7.9         0.5         48.97         54         -6.51         74         -25.03           7592.704         38.47         PK         36.1         -35.1         9         0.5         48.97         54         -6.51         74         -25.03           000 - 18000MHz         Image: PK         36.1         -35.1         9         0.5         48.97         54         -6.51         74         -25.03           000 - 18000MHz         Image: PK         36.1         -35.1         9         0.5         48.97         54         -5.03         74         -25.03           000 - 18000MHz         Image: PK <td>Anny Wang         Image: Constraint of the symptotic sympt wang         Image: Constraint of the symptotic sympt wang         Image: Constraint of the sympt wang         Image: Constraint of the sympt wang         Image: Constraint wang         Image: Constrait wang         Image</td>	Anny Wang         Image: Constraint of the symptotic sympt wang         Image: Constraint of the symptotic sympt wang         Image: Constraint of the sympt wang         Image: Constraint of the sympt wang         Image: Constraint wang         Image: Constrait wang         Image

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# 10.2.4. TX ABOVE 1 GHz FOR 802.11a MODE IN THE 5.8 GHz BAND

### HARMONICS AND SPURIOUS EMISSIONS

	High	Frequency	Measurem	ent											
Complia	ance Ce	rtification	Services, Fr	emont	5m Ch	amber-	в								
ompar	IV:		LG												
roject	#:		13014917												
)ate:			3/29/2015												
	gineer:		Tony wang												
Configu	ration:		LOS70 with He		AC Ada	oter									
Iode:			Ts 11a HT20 5	SGhr											
est Eq	uipmen	t:													
н	orn 1-	18GHz	Pre-ar	nplifer	1-260	Hz	Pre-am	plifer	26-40GH	z	Но	vrn > 180	Hz		Limit
T136;	M/N: 31	17 @3m	• T145.4	gilent 3	00840	05E .	T88 Min	eq 26-	40GHz	• T39;	ARA 18-260	GHz; S/N:10	13	-	FCC 15.205
r H Red	quency Cab	les				- 70				7				_	
1.02		2807700	12' c	able 2	28076	00	20' cal	ble 22	2807500		HPF	Re	ject Filte		Measurements V=VBW=1MHz
3' c	able 228	107700	• 12' ca	ible 228	07600	•	20' cab	le 228	07500	HP	F_7.6GHz	•			e Measurements MHz ; VBW=10Hz
ſ.	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
	745MHz	contraction in the second second	1 1000		and the	i.	Conne	1	1100			1	1000	- market 12	
1.490	3.0	36.2	23.3	38.1	11.3	-33.7	0.0	0.7	52.5	39.6	74	54	-21.5	-14.4	H V
1.490	3.0	35.3	23.4	38.1	11.3	-33.7	0.0	0.7	51.6	39.7	74	34	-44-4	-14.3	N
did ch. 5	785MHz		-												
1.570	3.0	36.0	23.4	38.1	11.3	-33.7	0.0	0.7	52.5	39.9	74	54	-21.5	-14.1	н
1.570	3.0	35.1	24.1	38,1	11.3	-33.7	0.0	0.7	51.6	40.6	74	54	-22.4	-13.4	v
	5825MH:		-												
ligh ch. t	the second s	35.9	23.7	38.2	11.4	-33.6	0.0	0.7	52.6	40.4	74	54	-21.4	-13.6	н
ligh ch. 5 1.650	3.0														

# 10.2.5. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND

### HARMONICS AND SPURIOUS EMISSIONS

	High	Frequency	Measuren	nent											
Complia	ance Ce	rtification	Services, F	remont	5m Ch	amber-	В								
Compar	IV:		LG												
Project			13U14917												
Date:			3/20/2013												
Test Er	gineer:		Tony wang												
Configu	ration:		LG870 with H	eadset &	AC Ad	oter									
Mode:			Tx 11n HT20	5.80hz											
Fest Eq	uipmen	t:													
н	orn 1-	18GHz	Pre-a	mplifer	1-260	GHZ	Pre-am	plifer	26-40GH	z	Ho	vrn > 180	iHz		Limit
T136;	M/N: 31	17 @Jm	• T145	Agilent :	OOBAO	056 🗸	T88 Mit	oq 26-	40GHz	• 139	; ARA 18-260	GHz; S/N:10	13		FCC 15.205
T H Pres	quency Cal	oles				2012	-			-					
		2807700	12	cable 2	28076	00	20' cal	ble 22	2807500		HPF	Re	ject Filte	The second	Measurements W=VBW=1MHz
3. c	able 221	807700	• 17 c	able 228	07600	•	20' cab	le 228	07500	HP	F_7.6GHz	•		Averas	ge Measurements MHz ; VBW=10Hz
f	1.777.07		Read Avg		CL	Amp	D Corr		Peak	Avg	Pk Lim		N 1 1 1 1	Avg Mar	Notes
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBeV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
	745MHz	and have been as											and in		
11.490	3.0	35.6	23.5	38.1	11.3	-33.7	0.0	0.7	51.9 51.8	39.8 39.9	74	54 54	-22.1	-14.2	H V
	3.0	30.0	65.0	30,1	11.5	-33,1	0.0	0,7	21/0	393	74	-24	-6.6.6	-14.1	
11.490	785MHz	1							2.00			1			
	3.0	35.3	23.6	38.1	11.3	-33.7	0.0	0.7	51.8	40.1	74	54	-22.2	-13.9	н
Mid ch. 5	3.0	35.7	23.6	38.1	11.3	-33.7	0.0	0.7	52.2	40.1	74	54	-21.8	-13.9	v
Mid ek. 5 11.570	3.0			-			-	-							
Mid ek. 5 11.570 11.570	3.0		-												
11.490 Mid ch. 5 11.570 11.570 High ch. 11.650	3.0	35.9	23.7	38.2	11.4	-33.6	0.0	0,7	52.6	40.4	74	54	-21.4	-13.6	н

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# 10.2.6. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.8 GHz BAND

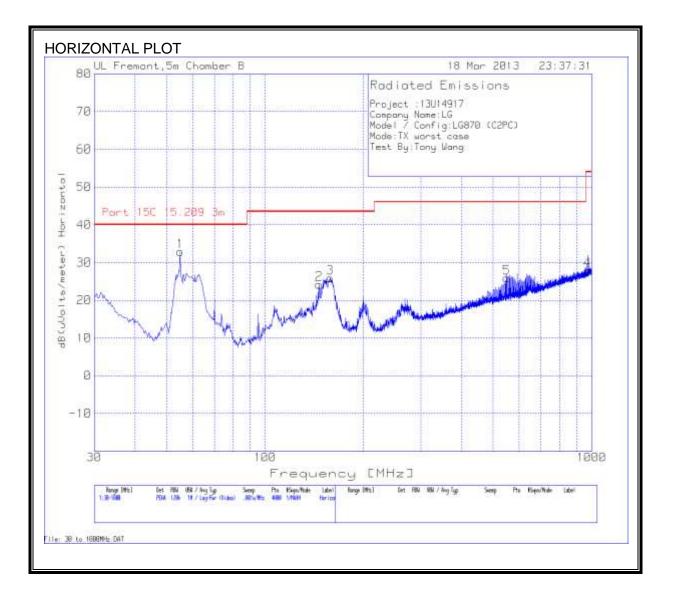
### HARMONICS AND SPURIOUS EMISSIONS

11.590	3.0	34.5	24.8	38.2	11.3	-33.7	0.0	0.7	\$1.0	41.3	74	54	.23.0	-12.7	V.
11.590	3.0	35.5	24.1	38.2	11.3	-33.7	0.0	0.7	52.0	40.6	74	54	-22.0	-13.4	H
ligh ch. 5	795MH			5											
1.510	3.0	35.1	24.8	38.1	11.3	-33.7	0.0	0.7	51,4	41.1	74	54	-22.6	-12.9	v
1.510	3.0	34.4	24.5	38.1	11.3	-33.7	0.0	0.7	50.8	40.8	.74	54	-23,2	-13.2	H
on ch. 57	SSMHz											1			house a
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
3' CE	able 228	807700	• 12 ca	ble 228	07600	•	20' cab	le 228		HPF	_7.6GHz	•			<u>re Measurements</u> MHz ; VBW=10Hz
- Hi Freq 3' c	all be	es 2807700	12' c	able 2	28076	00	20' cal	ble 22	2807500		HPF	Re	ject Filte	· · · · · · · · · · · · · · · · · · ·	Measurements W=VBW=1MHz
7136;	M/N: 31	17 @3m	• T145 A	gilent 3	008.000	05E .	T88 Mite	eq 26-	40GHz	<ul> <li>T39;</li> </ul>	ARA 18-260	GHz; S/N:10	13	-	FCC 15.205 +
He	orn 1-	18GHz	Pre-ar	nplifer	1-260	Hz	Pre-am	plifer	26-40GH	z	Но	vrn > 18G	Hz		Limit
est Equ	uipmen	<u>t:</u>													
Iode:			Ts 11n HT40 5	3Ghz											
Configur	ration:		LO870 with He		AC Ada	oter									
lest Eng	1		Tony wang												
ate:			3/20/2013												
Compan Project #	*		LG 191/14917												
		- decartesu	1075	C. Brout :											
ompia		1	Services, Fr		5m Ch	amber-l	в								
	High	Francis	Measurem	ant											

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# 10.3. WORST-CASE BELOW 1 GHz

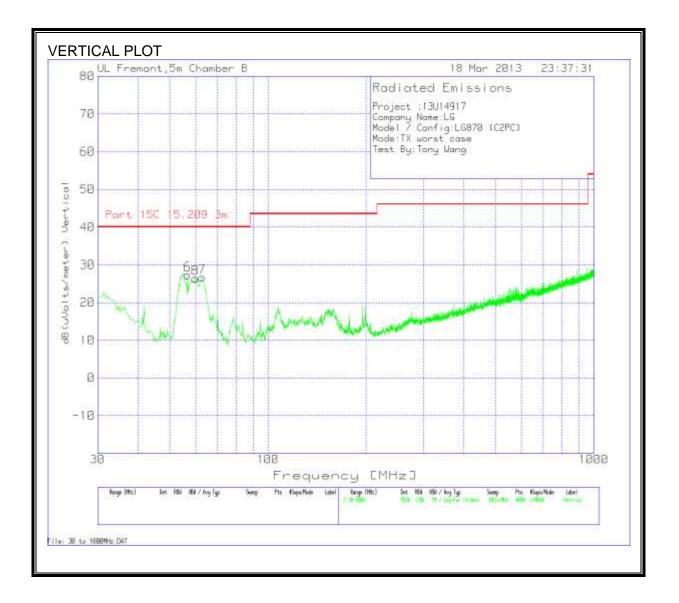
### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



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•	SU14917									
Company										
-	onfig:LG870	) (C2PC)								
	worst case									
Test By:To	ny Wang									
Horizonta	30 - 1000M	Hz								
Marker No.	Test Frequency	Meter Reading	Detector	T243 Hybrid	T10 preamp/ Cable loss loop	dB(uVolt s/meter)		Margin	Height [cm]	Polarity
1	54.9588	54.9	РК	6.8		32.9	40	-7.1	400	Horz
2	146.3128	39.54	РК	12.5	-27.8	24.24	43.5	-19.26	100	Horz
3	158.4287	41.41	РК	12.1	-27.6	25.91	43.5	-17.59	200	Horz
4	973.8296	28.39	РК	22.9	-23.4	27.89	54	-26.11	300	Horz
5	550.4996	33.9	РК	18.3	-26.3	25.9	46	-20.1	200	Horz
Vertical 30	) - 1000MHz									
Marker No.	Test Frequency	Meter Reading	Detector	T243 Hybrid	T10 preamp/ Cable	dB(uVolt s/meter)		Margin	Height [cm]	Polarity
					loss loop					
6	56.655			6.9						Vert
7	62.713			7.4			40			Vert
8	59.8051	48.17	PK	7.1	-28.8	26.47	40	-13.53	300	Vert

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# 11. AC POWER LINE CONDUCTED EMISSIONS

# LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted I	.imit (dBuV)
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

### TEST PROCEDURE

# ANSI C63.4

# **RESULTS**

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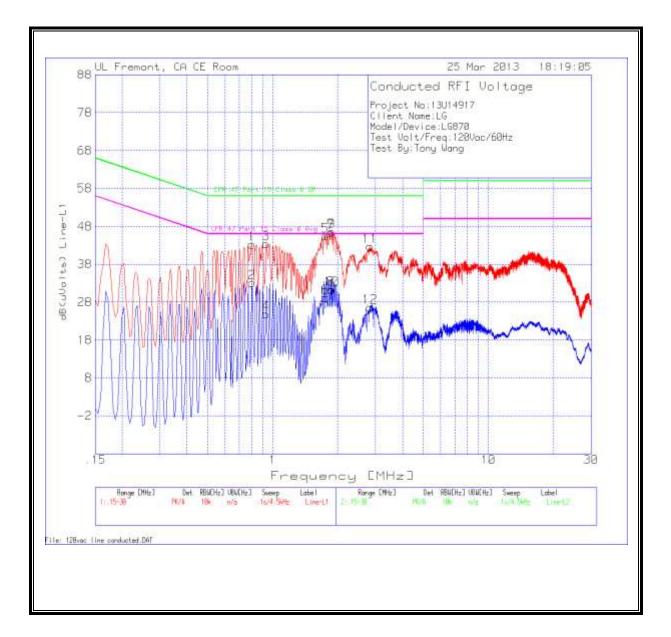
#### **<u>6 WORST EMISSIONS</u>**

Project No:	13U14917								
<b>Client Nam</b>	e:LG								
Model/Dev	vice:LG870								
Test Volt/F	req:120Vad	c/60Hz							
Test By:Ton	y Wang								
Line-L1.15									
Test	Meter	Detector	T24 IL		dB(uVolt	CFR 47	Margin	CFR 47	Margin
Frequency	Reading		L1.TXT	1&3.TXT	s)	Part 15		Part 15	
			(dB)	(dB)		Class B		Class B	
						QP		Avg	
0.8025	43.2	PK	0.1	0	43.3	56	-12.7	-	-
0.8025	32.95	Av	0.1	0	33.05	-	-	46	-12.95
1.8555	46.17	PK	0.1	0.1	46.37	56	-9.63	-	-
1.8555	31.2	Av	0.1	0.1	31.4	-	-	46	-14.6
1.8735	46.47	PK	0.1	0.1	46.67	56	-9.33	-	-
1.8735	31.08	Av	0.1	0.1	31.28	-	-	46	-14.72
Line-L2.15	- 30MHz								
Test	Meter	Detector	T24 IL	LC Cables	dB(uVolt	CFR 47	Margin	CFR 47	Margin
Frequency	Reading		L1.TXT	1&3.TXT	s)	Part 15		Part 15	
			(dB)	(dB)		Class B		Class B	
						QP		Avg	
0.4785	41.23	РК	0.1	0	41.33	56.4	-15.07	-	-
0.4785	35.75	Av	0.1	0	35.85	-	-	46.4	-10.55
1.7835	43.76	РК	0.1	0.1	43.96	56	-12.04	-	-
1.7835	23.78	Av	0.1	0.1	23.98	-	-	46	-22.02
0.807	41.4	PK	0.1	0	41.5	56	-14.5	-	-
0.807	31.24	Av	0.1	0	31.34	-	-	46	-14.66

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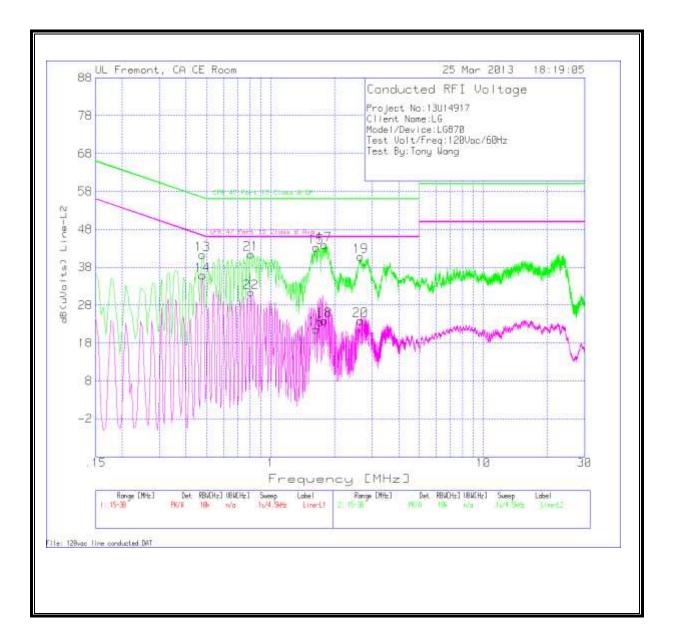
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### LINE 1 RESULTS



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# LINE 2 RESULTS



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