

### FCC CFR47 PART 15 SUBPART E INDUSTRY CANADA RSS-210 ISSUE 8

### **CERTIFICATION TEST REPORT**

### FOR

The Apple iPad is a tablet device with iPod functions (music, application support, and video), 802.11a/b/g/n radio, and Bluetooth radio functions

MODEL NUMBER: A1458, A1459, A1460\*

FCC ID: BCGA1458

IC: 579C-A1458

REPORT NUMBER: 12U14507-2

**ISSUE DATE: AUGUST 15, 2012** 

Prepared for APPLE, INC. 1 INFINITE LOOP CUPERTINO, CA 95014, U.S.A.

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\*Models differences are detailed within the body of this report

NVLAP LAB CODE 200065-0

### **Revision History**

Rev.	lssue Date	Revisions	Revised By
	08/15/12	Initial Issue	F. Ibrahim

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## **1. ATTESTATION OF TEST RESULTS**

COMPANY NAME:	APPLE, INC. 1 INFINITE LOOP CUPERTINO, CA, 95014, U.S.A.				
EUT DESCRIPTION:	The Apple iPad is a tablet device with application support, and video), 802.17 Bluetooth radio functions				
MODEL:	A1458, A1459, & A1460				
SERIAL NUMBER:	20558				
DATE TESTED:	AUGUST 3-13, 2012				
	APPLICABLE STANDARDS				
S <sup>-</sup>	STANDARD TEST RESULTS				

STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 9	Pass
INDUSTRY CANADA RSS-GEN Issue 3	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.

Approved & Released For UL CCS By:

Tested By:

FRANK IBRAHIM EMC SUPERVISOR UL CCS

The

TOM CHEN EMC ENGINEER UL CCS

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.10-2003, 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 iPad tablet device with iPod functions (music, application support, and video), 802.11a/b/g/n radio, and Bluetooth radio functions.

## 5.2. DESCRIPTION OF MODELS DIFFERENCES

FCC ID: BCGA1458 IC ID: 579C-A1458 Model #: A1458

Model A1458, is a tablet with multimedia functions (music, application support, and video) IEEE 802.11a/b/g/n radio and Bluetooth radio. The rechargeable battery is not user accessible.

FCC ID: BCGA1459 IC ID: 579C-A1459 Model #: A1459

Model A1459, is a tablet with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n and Bluetooth radio. The rechargeable battery is not user accessible.

FCC ID: BCGA1460 IC ID: 579C-A1460 Model #: A1460

Model A1460, is a tablet with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/CDMA1xRTT/ EV-DO Rev 0, A, B / LTE radio, IEEE 802.11a/b/g/n radio and Bluetooth radio. The rechargeable battery is not user accessible.

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## 5.3. MAXIMUM OUTPUT POWER

Frequency Range	Mode	Output Power	Output Power
(MHz)		(dBm)	(mW)
5180 - 5240	802.11a	14.295	26.884
5180 - 5240	802.11n HT20	14.322	27.052
5190 - 5230	802.11n HT40	15.428	34.898
5260 - 5320	802.11a	17.983	62.849
5260 - 5320	802.11n HT20	17.941	62.244
5270 - 5310	802.11n HT40	18.070	64.121
5500 - 5700	802.11a	19.021	79.818
5500 - 5700	802.11n HT20	18.879	77.250
5510 - 5670	802.11n HT40	18.531	71.302

The transmitter has a maximum conducted output power as follows:

## 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain as shown below:

Frequency Band (GHz)	Antenna Gain (dBi)
2.4-2.4835	-0.26
5.15-5.25	4.63
5.25-5.35	4.25
5.5-5.7	4.51
5.725-5.85	4.9

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### 5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 10A378

The EUT driver software installed during testing was Broadcom\_Rel\_6\_10\_56\_172

The test utility software used during testing was WL\_tool.

## 5.6. WORST-CASE CONFIGURATION AND MODE

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/DC adapter, and earphone, and the worst case was found to be at Y orientation without AC adapter and earphone.

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.

Worst-case data rates as provided by the manufacturer are:

For 11a mode: 6Mbps For 11n HT20 MCS0 For 11n HT40 MCS0

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## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description Manufacturer Model Serial Number FCC							
AC Adapter	Apple	A1401	D060812	DoC			
Power Splitter	Krytar	158010	99250	N/A			
Dc Power Supply	Agilent	E3610A	KR24104150	N/A			
Laptop PC	Apple	MacBook Pro	AOU269116	N/A			

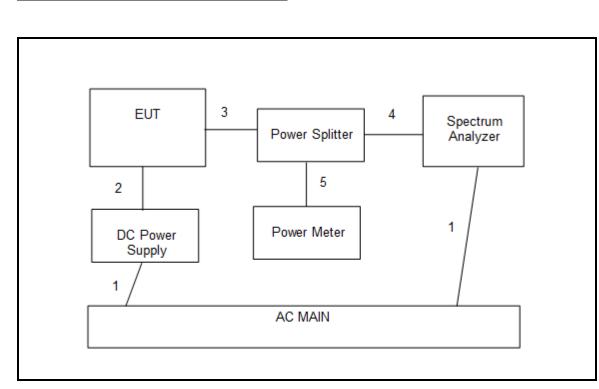
### I/O CABLES (CONDUCTED SETUP)

I/O CABLE LIST							
Cable No.	Port	#of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks	
1	AC	2	AC	Un-shielded	2.0m	N/A	
2	DC	1	DC	Un-shielded	1.0m	N/A	
3	Antenna Port	1	Splitter	Un-shielded	0.1m	N/A	
4	RF out	1	Spectrum Analyzer	Un-Shielded	None	N/A	
5	RF out	1	Power Meter	Shielded	None	NA	

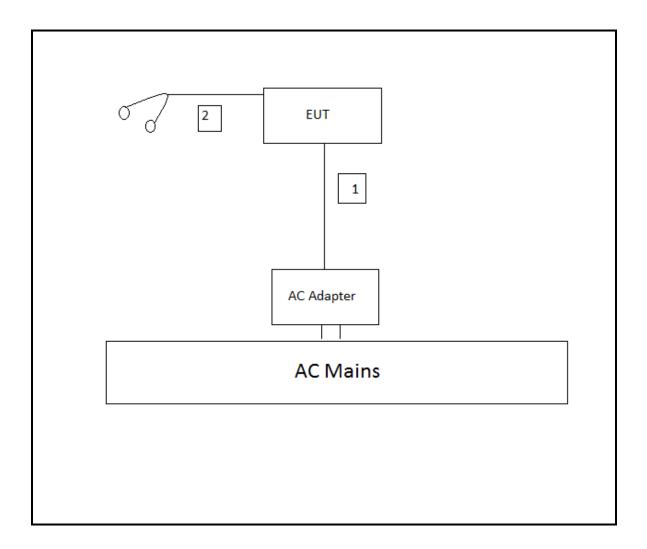
### I/O CABLES (RADIATED SETUP)

	I/O Cable List							
Cable No	Port	# of identical ports	Connector Type		Cable Length (m)	Remarks		
1	DC	1	MINI USB	UN-SHELDED	1.0m	N/A		
2	AUDIO	1	MINI JACK	UN-SHELDED	1.0m	N/A		

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# 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						
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	11/11/12						
Antenna, Horn, 18 GHz	EMCO	3115	C00945	10/06/12						
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	11/11/12						
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1		02/07/13						
Horn Antenna, 26.5 GHz	ARA	MWH-1826/B	C00589	04/23/13						
Horn Antenna, 40 GHz	ARA	MWH-2640/B	C00981	06/14/13						
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	03/14/13						
Reject Filter, 2.0-2.9 GHz	Micro-Tronics	BRM50702	N02684	CNR						
High Pass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR						
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/15/12						
E-Series Power Sensor 9 kHg~18 GHz	Agilent	E9304A	1260847C	05/23/13						
P-Series single channel Power Meter	Agilent / HP	N1911A		07/27/13						
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02676	CNR						
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRM50702	N02685	CNR						
Highpass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR						
EMI Test Receiver, 30MHz	R & S	ESHS 20	N02396	08/19/13						
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	12/13/12						

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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	<b>Duty Cycle</b>	Duty	Duty Cycle	1/B	
	В		x	Cycle	<b>Correction Factor</b>	Minimum VBW	
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)	
802.11a 20 MHz	2.050	2.079	0.986	98.6%	0.06	0.488	
802.11n HT20	1.903	1.930	0.986	98.6%	0.06	0.525	
802.11n HT40	0.943	0.960	0.983	98.3%	0.08	1.060	

## 7.2. MEASUREMENT METHOD FOR POWER AND PPSD

For 802.11a and 802.11n HT20 modes, the Duty Cycle is greater than or equal to 98% therefore KDB 789033 Method SA-1 is used.

For 802.11n HT40 mode, the Duty Cycle is greater than or equal to 98% therefore KDB 789033 Method SA-1 is used.

### 7.3. MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz

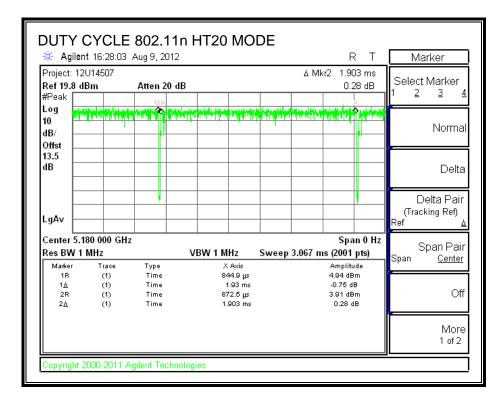
For 802.11a and 802.11n HT20 modes, the Duty Cycle is greater than or equal to 98%, KDB 789033 Method VB with Power RMS Averaging is used.

For 802.11n HT40 mode, the Duty Cycle is greater than or equal to 98%, KDB 789033 Method VB with Power RMS Averaging is used.

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## 7.4. DUTY CYCLE PLOTS

		Aug 9, 2012				ΔM		RT 05 ms	Freq/Channel
Project: 13 Ref 19.8 (		Atten 20 d	D			ΔIVI		Joms 83 dB	Center Freq
#Peak	127R	Atten 20 d	D				1		5.18000000 GHz
Log 🗖			ALL OF BUILDING	والتنفين وأباعا				And the second second	
10	a da la da			A BANK AND A	<b>A A A A</b> MIN		1.1.1	<u>a dunan</u>	Start Freq
dB/ —						<b>    </b>	· ·		5.18000000 GHz
Offst ⊨									
13.5									Stop Freq
dB									5.18000000 GHz
									CF Step
									1.00000000 MHz
LgAv –									<u>Auto Ma</u>
Center 5.	180 000 GH	z					Spa	an 0 Hz	<b>E</b>
Res BW 1	MHz		VBW 1	MHz	Sweep	3.067 n	ns (2001	pts)	Freq Offset 0.00000000 Hz
Marker	Trace	Type		X Axis			Amplit	ude	0.0000000 112
1R	(1)	Time		153.3 μs			6.21 dE		
1∆ 28	(1) (1)	Time Time		2.079 ms 182.5 цs			-0.46 d 4.91 dB	-	Signal Track
2Δ	(1)	Time		2.05 ms			0.83 (		On <u>Of</u>



🔆 Agi	lent 14:21:4	3 Aug 17, 20	12			F	<u> </u>	Marker
<b>Ref 18.7</b> #Peak	′ dBm	Atten 30	dB		۵ M		0 µs 34 dB	Select Marker 1 <u>2 3</u> 4
Log 10 dB/	need survey with	ZR	vertreenste Andrea Strangeraute	an a	יז איזעראין אייראיין אייראיי 2 לי	Millipma	helentpuren	Normal
								Delta
#PAvg								Delta Pair (Tracking Ref) Ref <u>∆</u>
Center	5.310 000 G	Hz	I		I	Spa	n 0 Hz	Spop Doir
Res BW	8 MHz		VBW 8 M	Hz	Sweep 2	2 ms (601	pts)	Span Pair Span <u>Center</u>
Marker 1R	Trace (1)	Type Time		. Axis 36.7 цs		Amplitu -16.31 dB		
1 <u>∆</u> 2R 2 <u>∆</u>	(1) (1) (1)	Time Time Time	94 44	43.3 µ́s 36.7 µs 960 µs		18.19 d -16.31 dB 0.34 d	m	Off
								More 1 of 2

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## 8. ANTENNA PORT TEST RESULTS 8.1. 802.11a MODE IN THE 5.2 GHz BAND

### 8.1.1. 26 dB BANDWIDTH

### LIMITS

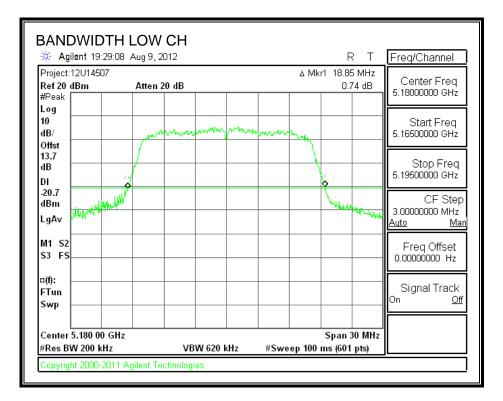
None; for reporting purposes only.

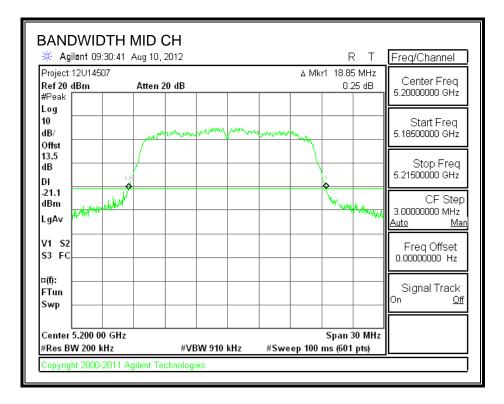
#### **RESULTS**

Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5180	18.85
Mid	5200	18.85
High	5240	18.95

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BANDWIDTH					
🔆 Agilent 10:11:25 .	Aug 10, 2012			RT	Freq/Channel
Project:12U14507 Ref 20 dBm #Peak	Atten 20 dB		∆ Mki	r1 18.95 MHz 0.05 dB	Center Freq 5.24000000 GHz
Log 10 dB/ Offst	monum	mmymm	monormany		Start Freq 5.22500000 GHz
13.5 dB DI				1	Stop Freq 5.25500000 GHz
-20.8 dBm LgAv				www.manapup	CF Step 3.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 5.240 00 GHz #Res BW 200 kHz	VBV	V 620 kHz	#Sweep 100	Span 30 MHz ms (601 pts)	
Copyright 2000-2011 A	gilent Technologie	s			

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### 8.1.2. 99% BANDWIDTH

#### DATE: AUGUST 15, 2012 IC: 579C-A1458

### LIMITS

None; for reporting purposes only.

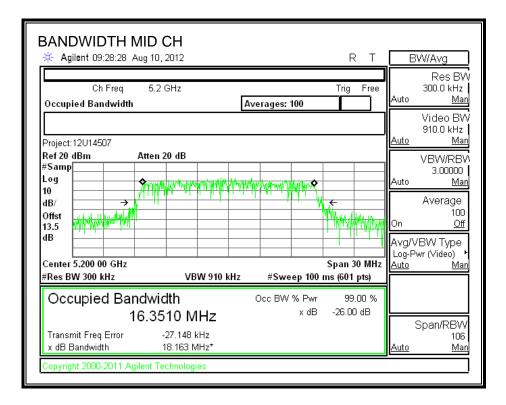
### **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5180	16.3450
Mid	5200	16.3510
High	5240	16.3412

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BANDWIDTH LO	-		RТ	Measure
Ch Freq 5. Occupied Bandwidth	18 GHz	Averages: 100	Trig Free	Meas Off
Project:12U14507				Channel Power
#Samp	n 20 dB			Occupied BW
10 dB/ Offst 13.7				ACP
dB			Span 30 MHz	Multi Carrier Power
#Res BW 300 kHz	VBW 910	kHz #Sweep100	ms (601 pts)	
Occupied Bandw 16.3	/idth 3450 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Power Stat CCDF
Transmit Freq Error x dB Bandwidth	-28.154 kHz 18.186 MHz*			More 1 of 2
Copyright 2000-2011 Agilent	Technologies			



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BANDWIDTH HIGH C Agilent 10:08:55 Aug 10, 2012		RТ	Measure
Ch Freq 5.24 GHz Occupied Bandwidth	Averages:	Trig Free	Meas Off
Project:12U14507			Channel Power
Ref 20 dBm Atten 20 dl #Samp Log		ahd.	Occupied BW
dB/ Offst 13.5			ACP
dB		Span 30 MHz	Multi Carrier Power
#Res BW 300 kHz	VBW 910 kHz #Swe	ep 100 ms (601 pts)	Davuar Otat
Occupied Bandwidth 16.3412		% Pwr 99.00 % xdB -26.00 dB	Power Stat CCDF
	16 kHz )3 MHz*		More 1 of 2
Copyright 2000-2011 Agilent Techno	logies		

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### 8.1.3. 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 13.5 dB (including 12 dB pad and 1.5 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	5180	13.98
Mid	5200	13.98
High	5240	13.98

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### 8.1.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

### FCC §15.407 (a) (1):

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### IC RSS-210 A9.2 (1):

For the 5.15 – 5.25 GHz band, The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

#### DIRECTIONAL ANTENNA GAIN

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

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#### Limits FCC 15.407

Channel	Frequency	Fixed	В	4 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5180	17	18.85	22.75	4.63	17.00	4.00
Mid	5200	17	18.85	22.75	4.63	17.00	4.00
High	5240	17	18.95	22.78	4.63	17.00	4.00

#### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	14.295	14.295	17.00	-2.705
Mid	5200	14.279	14.279	17.00	-2.721
High	5240	14.227	14.227	17.00	-2.773

### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	3.84	3.84	4.00	-0.16
Mid	5200	3.83	3.83	4.00	-0.17
High	5240	3.84	3.84	4.00	-0.16

### REPORT NO: 12U14507-2 FCC ID: BCGA1458

#### IC RSS-210 A9.2 (1)

Channel	Frequency	Fixed	В	10 + 10 Log B	Directional	Power	PPSD
		EIRP Limit	99%	EIRP Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5180	23	16.3450	22.1338	4.63	22.1338	10.0000
Mid	5200	23	16.3510	22.1354	4.63	22.1354	10.0000
High	5240	23	16.3412	22.1328	4.63	22.1328	10.0000

### **Output Power Results**

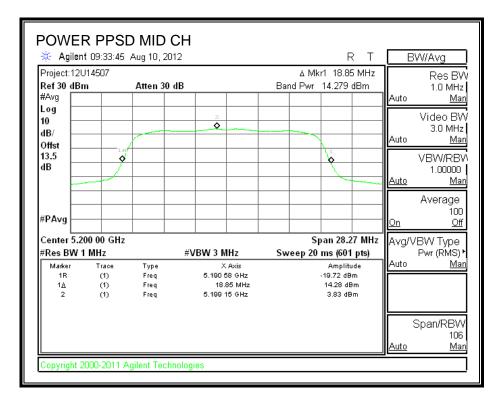
Channel	Frequency	Meas	Corr'd	Directional	Power	Power
		Power	Power	Gain	EIRP Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(dB)
Low	5180	14.295	14.295	2.09	22.1338	-5.7488
Mid	5200	14.279	14.279	2.09	22.1354	-5.7664
High	5240	14.227	14.227	2.09	22.1328	-5.8158

#### **PPSD** Results

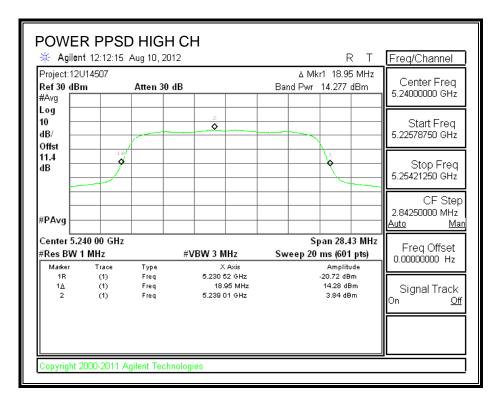
Channel	Frequency	Meas	Corr'd	Directional	PPSD	PPSD
		PPSD	PPSD	Gain	EIRP Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(dB)
Low	5180	3.84	3.84	2.09	10.0000	-4.0700
Mid	5200	3.83	3.83	2.09	10.0000	-4.0800
High	5240	3.84	3.84	2.09	10.0000	-4.0700

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POWE	R PPSI	D LOW	СН							_
🔆 Agilen	t 11:19:51	Aug 10, 20	12			F	RТ	B	W/Avg	
Project:12U Ref 30 dBr #Avg		Atten 30	dB		Ban	 r1 18.85 14.295		Auto	Res BV 1.0 MHz <u>Mar</u>	
Log 10 dB/ Offst			2					Auto	Video BV 3.0 MHz <u>Mar</u>	
11.4 dB						2		<u>Auto</u>	VBW/RB\ 1.00000 <u>Mar</u>	I
#PAvg								<u>On</u>	Average 100 <u>Off</u>	
Center 5.1						 an 28.2		Avg/V	/BW Type	1
# <b>Res BW</b> 1 Marker 1R 1 <u>Δ</u> 2	1 MHz Trace (1) (1) (1)	Type Freq Freq Freq	5.170 5	Axis i8 GHz 35 MHz	Sw	ms (601 Amplitu 19.87 dB 14.30 dE 3.84 dB	ude m 9m	Auto	Pwr (RMS) <sup>(</sup> <u>Mar</u>	- 1 -
								Auto	Span/RBW 106 <u>Mar</u>	
Copyright 2	2000-2011 A	gilent Techi	nologies							]



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### 8.1.5. PEAK EXCURSION

### **LIMITS**

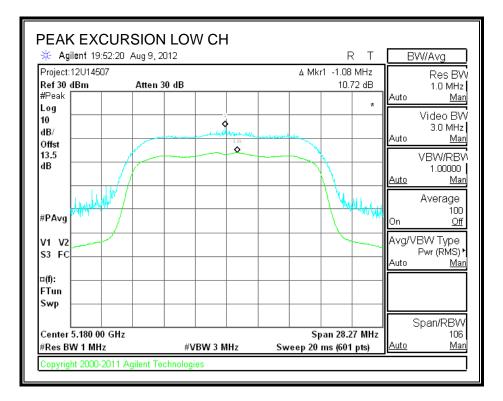
FCC §15.407 (a) (6)

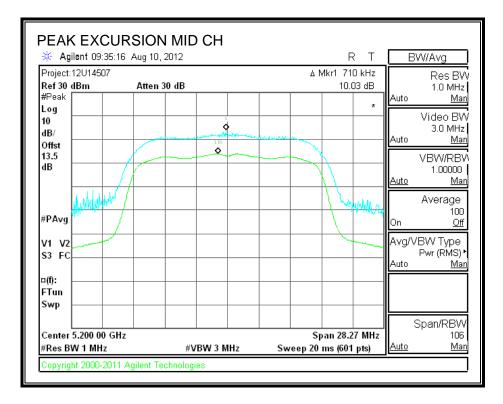
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	10.72	13	-2.28
Mid	5200	10.03	13	-2.97
High	5240	9.75	13	-3.25

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PEAK EXCUR				RT	E	W/Avg
Project:12U14507 Ref 30 dBm #Peak	Atten 30 dB		۵ N	/lkr1 -948 kHz 9.75 dB	Auto	Res BW 1.0 MHz <u>Man</u>
Log 10 dB/ Offst			ma na anna	*	Auto	Video BW 3.0 MHz <u>Man</u>
13.5 dB		◆ ◆			Auto	VBW/RBV 1.00000 <u>Man</u>
#PAvg				- Children and Aller	M On	Average 100 <u>Off</u>
V1 V2 S3 FC					Avg/\ Auto	/BW Type Pwr (RMS)≛ <u>Man</u>
¤(f): FTun Swp						
Center 5.240 00 GHz #Res BW 1 MHz	#\	/BW 3 MHz		Span 28.43 MH 0 ms (601 pts)	z <u>Auto</u>	Span/RBW 106 <u>Man</u>

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## 8.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

### 8.2.1. 26 dB BANDWIDTH

### **LIMITS**

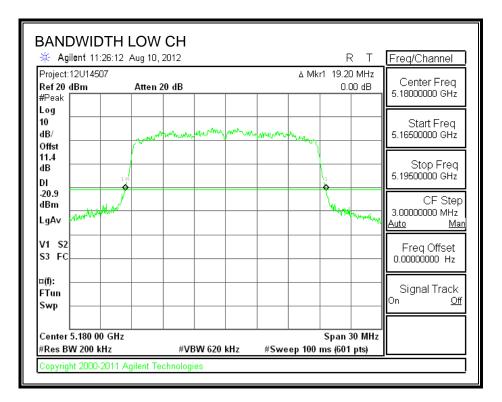
None; for reporting purposes only.

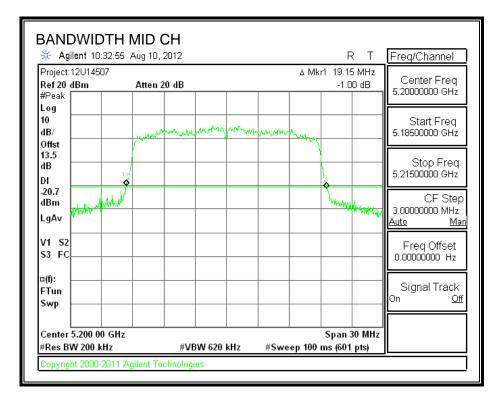
### **RESULTS**

Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5180	19.20
Mid	5200	19.15
High	5240	19.25

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	BANDWIDTH HIGH CH Agilent 10:48:44 Aug 10, 2012 R T Freq/Channel						
Project:12U14507	t:12U14507 ∆ Mkr1 19.25 MHz 1 dBm Atten 20 dB 0.67 dB				Center Freq 5.24000000 GHz		
Log 10 dB/ Offst	manufumantum	mynmannen	mmy		Start Freq 5.22500000 GHz		
13.5 dB DI					Stop Freq 5.25500000 GHz		
-20.7 dBm LgAv			- Innyka	the states	CF Step 3.0000000 MHz <u>Auto Man</u>		
V1 S2 S3 FC					Freq Offset 0.00000000 Hz		
¤(f): FTun Swp					Signal Track <sup>On <u>Off</u></sup>		
Center 5.240 00 GHz #Res BW 200 kHz							
Copyright 2000-2011 Ag	Copyright 2000-2011 Agilent Technologies						

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### 8.2.2. 99% BANDWIDTH

#### DATE: AUGUST 15, 2012 IC: 579C-A1458

### **LIMITS**

None; for reporting purposes only.

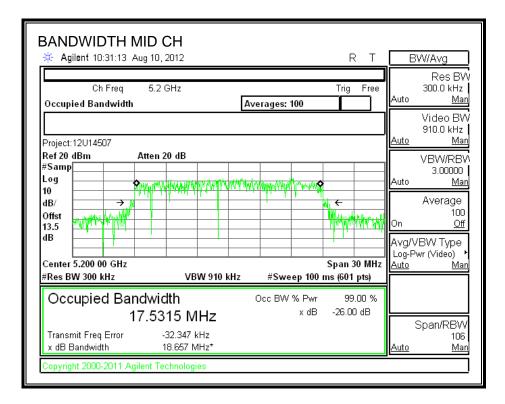
### **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5180	17.5332
Mid	5200	17.5315
High	5240	17.5264

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Ch Freq         5.18 GHz         Trig         Free           Occupied Bandwidth         Averages: 100	Res BW 300.0 kHz Auto Man Video BW 910.0 kHz <u>Auto Man</u> Auto Man
Atten 20 dB         Atten 20 dB           .og	910.0 kHz <u>Auto Man</u> VBW/RBW 3.00000
Samp og 00 IB/ → 1	3.00000
	Average
	-III - Tool
Center 5.180 00 GHz Span 30 MHz Res BW 300 kHz VBW 910 kHz #Sweep 100 ms (601 pts)	Log-Pwr (Video) 🔸
Occupied Bandwidth         Occ BW % Pwr         99.00 %           17.5332 MHz         x dB         -26.00 dB	Span/RBW
Transmit Freq Error     -25.447 kHz       x dB Bandwidth     18.670 MHz*       Copyright 2000-2011 Agilent Technologies	106 Auto Man



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BANDWIDTH HIGH CH		RТ	Measure
Ch Freq 5.24 GHz Occupied Bandwidth	Averages: 100	Trig Free	Meas Off
Project:12U14507		]	Channel Power
Ref 20 dBm Atten 20 dB #Samp Log	Alexania and the second and the second		Occupied BW
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			ACP
dB		Span 30 MHz	Multi Carrier Power
	BW 910 kHz #Sweep 100	ms (601 pts)	Power Stat
Occupied Bandwidth 17.5264 N	Occ BW % Pwr X dB	99.00 % -26.00 dB	CCDF
Transmit Freq Error-21.190x dB Bandwidth18.663			More 1 of 2
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## 8.2.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5180	13.99
Mid	5200	14.00
High	5240	13.99

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## 8.2.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

### FCC §15.407 (a) (1):

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### IC RSS-210 A9.2 (1):

For the 5.15 - 5.25 GHz band, The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### DIRECTIONAL ANTENNA GAIN

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

#### Limits FCC 15.407

Channel	Frequency	Fixed	В	4 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5180	17	19.20	16.83	4.63	16.83	4.00
Mid	5200	17	19.15	16.82	4.63	16.82	4.00
High	5240	17	19.25	16.84	4.63	16.84	4.00

### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	14.174	14.174	16.83	-2.659
Mid	5200	14.281	14.281	16.82	-2.541
High	5240	14.322	14.322	16.84	-2.522

### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	3.56	3.56	4.00	-0.44
Mid	5200	3.65	3.65	4.00	-0.35
High	5240	3.72	3.72	4.00	-0.28

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### REPORT NO: 12U14507-2 FCC ID: BCGA1458

#### IC RSS-210 A9.2(1)

Channel	Frequency	Fixed	В	4 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5180	23	17.5332	16.4386	4.63	16.4386	4.0000
Mid	5200	23	17.5315	16.4382	4.63	16.4382	4.0000
High	5240	23	17.5264	16.4369	4.63	16.4369	4.0000

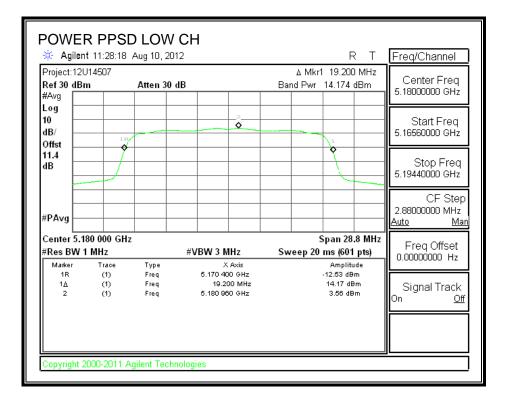
#### **Output Power Results**

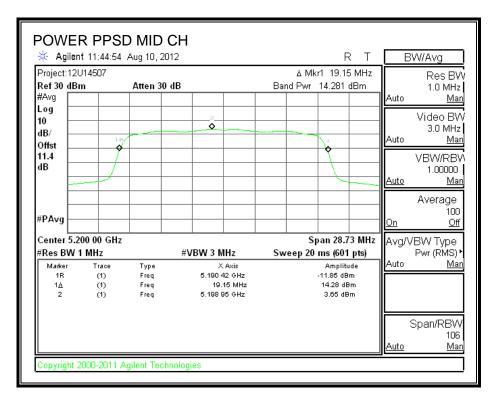
Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	14.174	14.174	16.44	-2.265
Mid	5200	14.281	14.281	16.44	-2.157
High	5240	14.322	14.322	16.44	-2.115

#### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	3.56	3.56	4.00	-0.44
Mid	5200	3.65	3.65	4.00	-0.35
High	5240	3.72	3.72	4.00	-0.28

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-	f 11:53:17	Aug 10, 20 <sup>.</sup>	12				F		B	W/Avg
Project:12U <b>Ref 30 dBr</b> #Avg		Atten 30	dB		Bar		r1 19.25 14.322		Auto	Res BV 1.0 MHz <u>Mar</u>
Log 10 dB/ Offst	18			2			1		Auto	Video BV 3.0 MHz <u>Mar</u>
dB							8		<u>Auto</u>	VBW/RBV 1.00000 <u>Mar</u>
#PAvg									<u>On</u>	Average 100 <u>Off</u>
Center 5.2							an 28.8		Avg/V	'BW Type
# <b>Res BW</b> 1 Marker 1R 1∆ 2	Trace (1) (1) (1) (1)	Type Freq Freq Freq	#VBW 3 MHz X Axis 5.230 38 GHz 19.25 MHz 5.240 98 GHz		Sw	Sweep 20 ms (601 Amplitud -13.06 dBm 14.32 dBm 3.72 dBm			Auto	Pwr (RMS) <sup>(</sup> <u>Mar</u>
									< Auto	Span/RBW 106 <u>Mar</u>

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## 8.2.5. PEAK EXCURSION

### **LIMITS**

FCC §15.407 (a) (6)

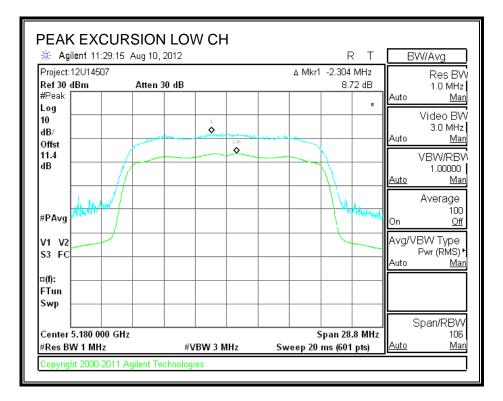
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

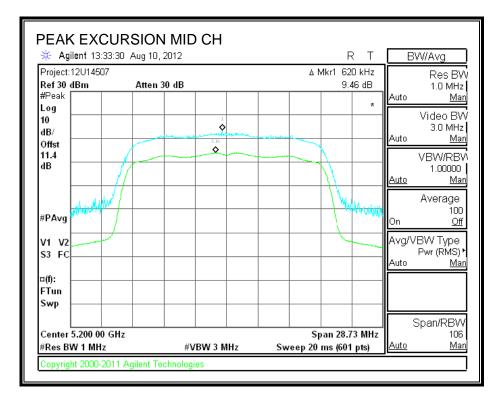
### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	8.72	13	-4.28
Mid	5200	9.46	13	-3.54
High	5240	9.19	13	-3.81

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PEAK EXCURSION HIGH CH	
※ Agilent 13:42:53         Aug 10, 2012           Project:12U14507         Ref 30 dBm         Atten 30 dB	R T BW/Avg ▲ Mkr1 -1.25 MHz Res BW 9.19 dB 1.0 MHz
#Peak Log	* Auto Man
10 dB/ offst	Video BW 3.0 MHz Auto <u>Man</u>
0151 11.4 dB	
#PAvg	Average 100 On <u>Off</u>
V1 V2 S3 FC	Avg/VBW Type Pwr (RMS) * Auto <u>Man</u>
¤(f):	
Center 5.240 00 GHz #Res BW 1 MHz #VBW 3 MHz	Span 28.88 MHz         Span/RBW           Sweep 20 ms (601 pts)         Auto

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# 8.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

## 8.3.1. 26 dB BANDWIDTH

### **LIMITS**

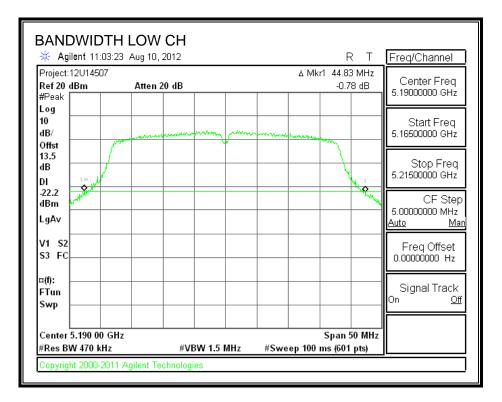
None; for reporting purposes only.

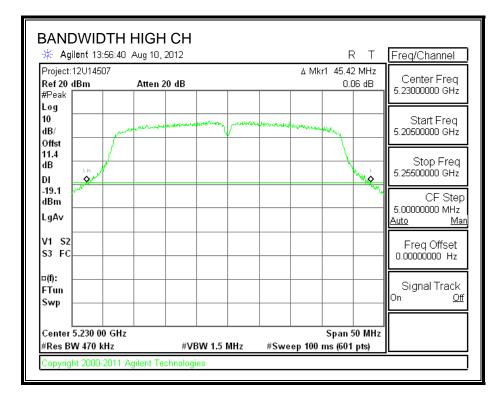
### **RESULTS**

Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5190	44.83
High	5230	45.42

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## 8.3.2. 99% BANDWIDTH

### DATE: AUGUST 15, 2012 IC: 579C-A1458

### **LIMITS**

None; for reporting purposes only.

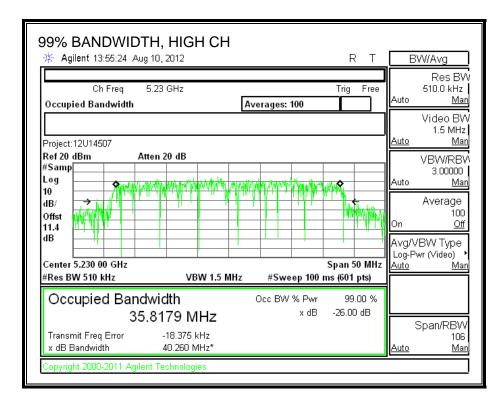
### **RESULTS**

Channel	Frequency	99% Bandwidth		
	(MHz)	(MHz)		
Low	5190	35.8147		
High	5230	35.8179		

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99% BANDWIDTH, LOW C	Н	RТ	Measure
Ch Freq 5.19 GHz Occupied Bandwidth	Averages: 100	Trig Free	Meas Off
Project:12U14507			Channel Power
Ref 20 dBm Atten 20 dB #Samp Log	tura - Miseladd U dataan dwr can Dr. Hamedrawda yn	•	Occupied BW
10 dB/ → ///////////////////////////////////			ACP
Center 5.190 00 GHz #Res BW 510 kHz VBW 1.		pan 50 MHz s (601 pts)	Multi Carrier Power
Occupied Bandwidth 35.8147 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Power Stat CCDF
Transmit Freq Error -22.732 kHz x dB Bandwidth 39.956 MHz*			More 1 of 2
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## 8.3.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5190	12.0
High	5230	15.5

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## 8.3.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

### FCC §15.407 (a) (1):

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### IC RSS-210 A9.2 (1):

For the 5.15 – 5.25 GHz band, The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### DIRECTIONAL ANTENNA GAIN

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

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#### Limits FCC 15.407

Channel	Frequency	Fixed	В	4 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5190	17	44.83	20.52	4.63	17.00	4.00
High	5230	17	45.42	20.57	4.63	17.00	4.00

#### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	12.224	12.224	17.00	-4.776
High	5230	15.428	15.428	17.00	-1.572

### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	-1.84	-1.84	4.00	-5.84
High	5230	1.38	1.38	4.00	-2.62

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### IC RSS-210 A9.2(1)

Channel	Frequency	Fixed	В	4 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5190	23	35.8147	19.5406	4.63	19.5406	4.0000
High	5230	23	35.8179	19.5410	4.63	19.5410	4.0000

### **Output Power Results**

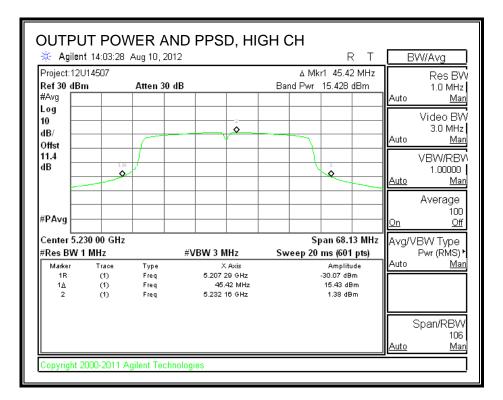
Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	12.224	12.224	19.5406	-7.3166
High	5230	15.428	15.428	19.5410	-4.1130

### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	-1.84	-1.84	4.0000	-5.84
High	5230	1.38	1.38	4.0000	-2.62

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	UT POV		ND PPSD, LC	W CH	RТ		AllAura
Project:12 Ref 30 df #Avg	2U14507	Aug 10, 20			rr1 44.83 MHz 12.224 dBm	Auto	W/Avg Res BVV 1.0 MHz Man
Log – 10 – dB/ – Offst			2			Auto	Video BW 3.0 MHz <u>Man</u>
13.5 dB						Auto	VBW/RBW 1.00000 <u>Man</u>
#PAvg –						<u>On</u>	Average 100 <u>Off</u>
Center 5. #Res BW	.190 00 GHz / 1 MHz		#VBW 3 MHz		pan 67.25 MHz ms (601 pts)	Avg/V	BW Type Pwr (RMS) •
Marker 1R 1 <u>∆</u> 2	Trace (1) (1) (1)	Type Freq Freq Freq	X Axis 5.167 58 GHz 44.83 MHz 5.192 47 GHz	<u>.</u>	Amplitude -33.87 dBm 12.22 dBm -1.84 dBm	Auto	<u>Mán</u>
						Auto	Span/RBW 106 <u>Man</u>
Copyright	: 2000-2011 A	gilent Techr	nologies				



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## 8.3.5. PEAK EXCURSION

### LIMITS

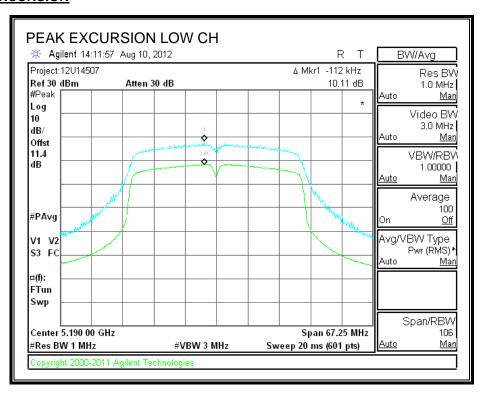
FCC §15.407 (a) (6)

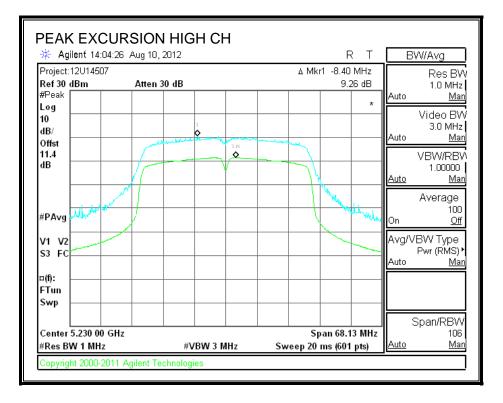
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5190	10.11	13	-2.89
High	5230	9.26	13	-3.74

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# 8.4. 802.11a MODE IN THE 5.3 GHz BAND

## 8.4.1. 26 dB BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

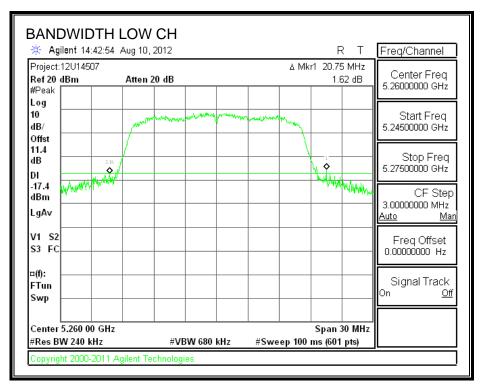
### **RESULTS**

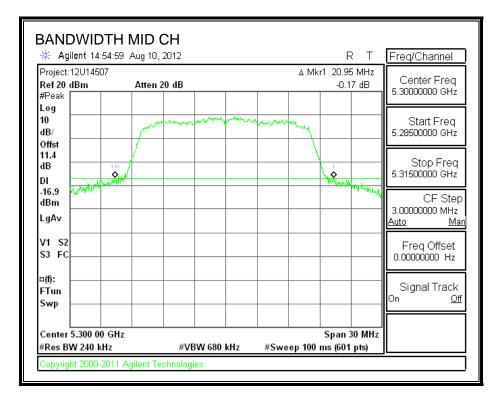
Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5260	20.75
Mid	5300	20.95
High	5320	19.25

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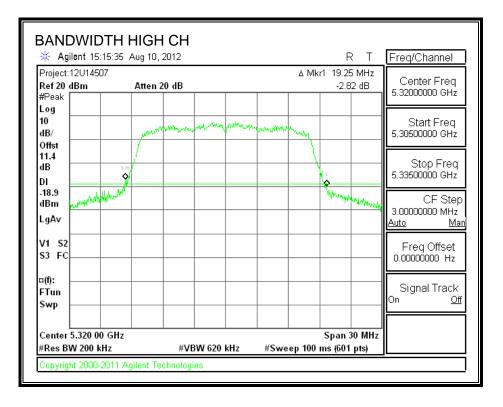
### 26 dB BANDWIDTH





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## 8.4.2. 99% BANDWIDTH

### DATE: AUGUST 15, 2012 IC: 579C-A1458

### LIMITS

None; for reporting purposes only.

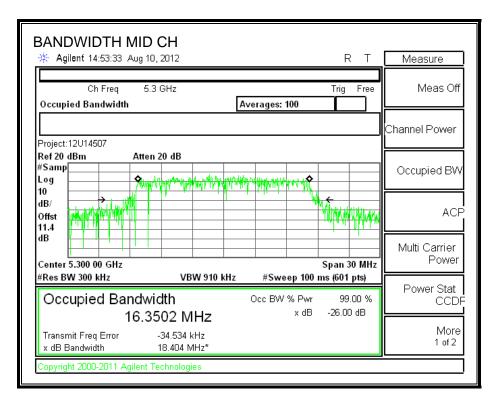
### **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5260	16.3495
Mid	5300	16.3502
High	5320	16.3483

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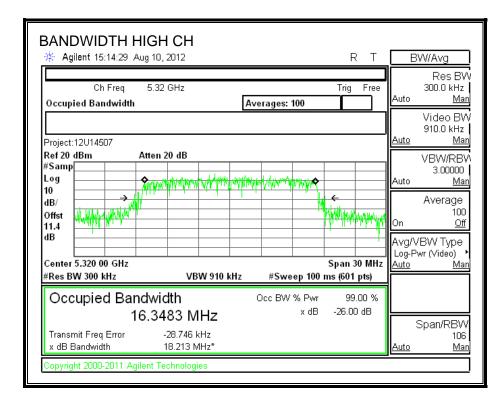
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BANDWIDTH LO	-		RT	Measure
Ch Freq 5 Occupied Bandwidth	.26 GHz	Averages: 100	Trig Free	Meas Off
Project:12U14507				Channel Power
#Samp Log	en 20 dB	hyhyyyy		Occupied BW
10 dB/ Offst				ACF
dB			Span 30 MHz	Multi Carrier Power
#Res BW 300 kHz	VBW 910 k	Hz #Sweep 100	ms (601 pts)	
Occupied Bandv 16.3	vidth 3495 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Power Stat CCD
Transmit Freq Error x dB Bandwidth	-34.509 kHz 18.409 MHz*			More 1 of 2
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## 8.4.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5260	17.5
Mid	5300	17.5
High	5320	16.0

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## 8.4.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density 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.

#### Limits FCC 15.407

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5260	24	20.75	24.17	4.25	24.00	11.00
Mid	5300	24	20.95	24.21	4.25	24.00	11.00
High	5320	24	19.25	23.84	4.25	23.84	11.00

#### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	17.538	17.538	24.00	-6.462
Mid	5300	17.733	17.733	24.00	-6.267
High	5320	17.983	17.983	23.84	-5.861

### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	7.10	7.10	11.00	-3.90
Mid	5300	7.30	7.30	11.00	-3.70
High	5320	7.54	7.54	11.00	-3.46

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### IC RSS-210 A9.2 (1)

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5260	24	16.3495	23.1350	4.25	23.1350	11.0000
Mid	5300	24	16.3502	23.1352	4.25	23.1352	11.0000
High	5320	24	16.3483	23.1347	4.25	23.1347	11.0000

### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	17.538	17.538	23.1350	-5.5970
Mid	5300	17.733	17.733	23.1352	-5.4022
High	5320	17.983	17.983	23.1347	-5.1517

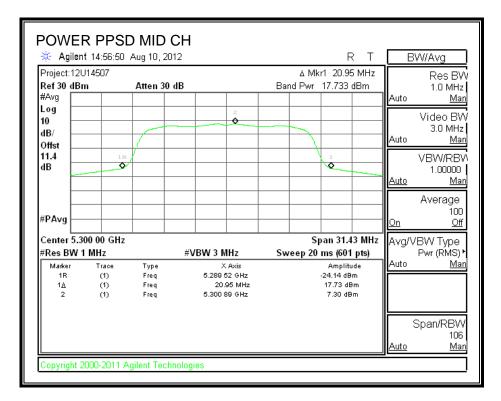
### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	7.10	7.10	11.0000	-3.9000
Mid	5300	7.30	7.30	11.0000	-3.7000
High	5320	7.54	7.54	11.0000	-3.4600

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	PPSD LOV		RТ		V/Avg
Project:12U145 Ref 30 dBm #Avg			 r1 20.75 MHz 17.538 dBm	Auto	Res BW 1.0 MHz <u>Man</u>
Log 10 dB/ Offst		2		Auto	Video BW 3.0 MHz <u>Man</u>
11.4 dB	18			<u>Auto</u>	VBW/RBV 1.00000 <u>Man</u>
#PAvg				<u>On</u>	Average 100 <u>Off</u>
Center 5.260 0 #Res BW 1 MH		#VBW 3 MHz	pan 31.12 MHz ms (601 pts)		3W Type Pwr (RMS)►
1R 1∆	Trace Type (1) Freq (1) Freq (1) Freq	X Axis 5.249 62 GHz 20.75 MHz 5.260 99 GHz	Amplitude -24.49 dBm 17.54 dBm 7.10 dBm	Auto	<u>Man</u>
				S <u>Auto</u>	ipan/RBW 106 <u>Man</u>
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🔆 Agilen	f 16:16:15	Aug 10, 20	12				F	₹Т	B	W/Avg
Project:12U Ref 30 dBr #Avg		Atten 20	dB		Bar	∆Mk nd Pwr	r1 20.79 17.983		Auto	Res BV 1.0 MHz <u>Mar</u>
Log 10 dB/ Offst				2					Auto	Video BV 3.0 MHz <u>Mar</u>
22.2 dB	1R						1		<u>Auto</u>	VBW/RBV 1.00000 <u>Mar</u>
#PAvg									<u>On</u>	Average 100 <u>Off</u>
Center 5.2							an 31.1		Avg/V	'BW Type
#Res BW 1	MHz		#VBW 3	MHz	Sw	eep 20	```	• •	∥	Pwr (RMS)*
1R (1) Fre 1∆ (1) Fre		Type Freq Freq Freq	q 5.249.62 GHz q 20.75 MHz			Amplitude -23.49 dBm 17.98 dBm 7.54 dBm			Auto	<u>Mar</u>
									< Auto	Span/RBW 106 <u>Mar</u>

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## 8.4.5. PEAK EXCURSION

### **LIMITS**

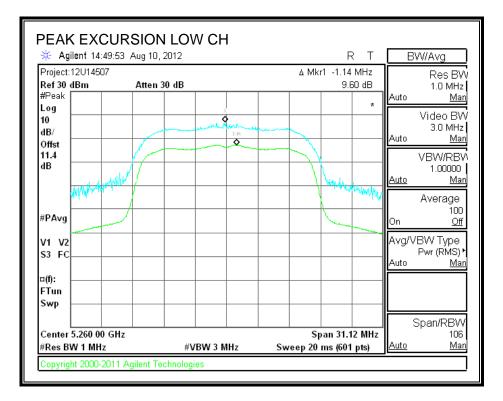
FCC §15.407 (a) (6)

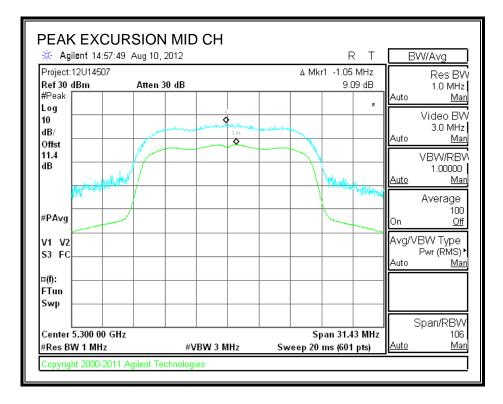
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	9.60	13	-3.40
Mid	5300	9.09	13	-3.91
High	5320	9.82	13	-3.18

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🔆 Agilent 16:07	URSION HI 52 Aug 10, 2012			RТ	В	W/Avg
Project:12U14507 Ref 30 dBm #Peak	Atten 20 dB		∆ Mkr	1 -770 kHz 9.82 dB	Auto	Res BW 1.0 MHz <u>Man</u>
Log 10 dB/ Offst					Auto	Video BW 3.0 MHz <u>Man</u>
22.2 dB					<u>Auto</u>	VBW/RBV 1.00000 <u>Man</u>
#PAvg	- 			WAN WWWWWWW	On	Average 100 <u>Off</u>
V1 V2 S3 FC					A∨g/∖ Auto	/BW Type Pwr (RMS) ► <u>Man</u>
¤(f): FTun Swp						
Center 5.320 00 0 #Res BW 1 MHz		VBW 3 MHz	Spa Sweep 20 m	ın 28.88 MHz ıs (601 pts)	Auto	Span/RBW 106 <u>Man</u>

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## 8.4.6. TPC POWER

### <u>LIMITS</u>

FCC §15.407 (h) (1)

IC RSS-210 A9.2 (2)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

### DIRECTIONAL ANTENNA GAIN

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

### **RESULTS**

EIRP = 18.043 dBm + 4.25 dBi = **22.293 dBm**, which is less than the threshold of 500 mW (27 dBm); therefore, TPC is not required.

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# 8.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

## 8.5.1. 26 dB BANDWIDTH

## **LIMITS**

None; for reporting purposes only.

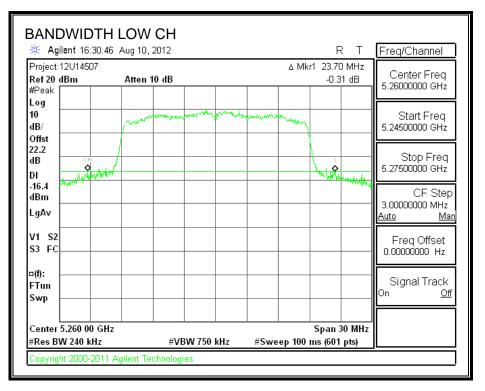
### **RESULTS**

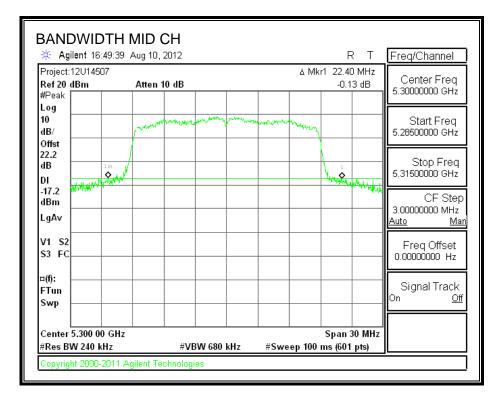
Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5260	23.70
Mid	5300	22.40
High	5320	19.95

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### 26 dB BANDWIDTH





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BANDWIDTH HIGH CH Agilent 16:59:24 Aug 10, 2012 R T Free/Channel							
	Aug 10, 2012				Freq/Channel		
Project:12U14507 Ref 20 dBm #Peak	Atten 10 dB		∆ Mk	r1 19.95 MHz -0.71 dB	Center Freq 5.32000000 GHz		
Log 10 dB/ Offst	mannaman	man man	manan		Start Freq 5.30500000 GHz		
22.2 dB DI					- Stop Freq 5.33500000 GHz		
DI -18.5 dBm LgAv				Mar and the second strategy of	CF Step 3.0000000 MHz <u>Auto Man</u>		
V1 S2 S3 FC					Freq Offset 0.00000000 Hz		
¤(f): FTun Swp					Signal Track On <u>Off</u>		
Center 5.320 00 GHz         Span 30 MHz           #Res BW 200 kHz         #VBW 620 kHz         #Sweep 100 ms (601 pts)							
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## 8.5.2. 99% BANDWIDTH

### DATE: AUGUST 15, 2012 IC: 579C-A1458

## LIMITS

None; for reporting purposes only.

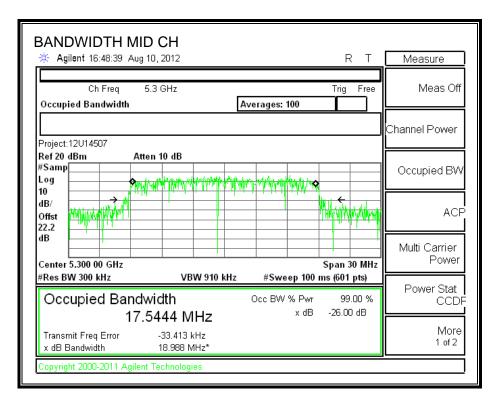
## **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5260	17.5359
Mid	5300	17.5444
High	5320	17.5384

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BANDWIDTH LOV	-		RT	Measure
Ch Freq 5.3 Occupied Bandwidth	26 GHz	Averages: 100	Trig Free	Meas Off
Project:12U14507				Channel Power
Ref 20 dBm Atte #Samp	n 10 dB	<u>,</u>		Occupied BW
dB/ Offst				ACF
Center 5.260 00 GHz #Res BW 300 kHz	VBW 910	kHz #Sweep 100	Span 30 MHz ms (601 pts)	Multi Carrier Power
Occupied Bandw 17.5	ridth 359 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Power Stat CCD
Transmit Freq Error x dB Bandwidth	-25.890 kHz 18.976 MHz*			More 1 of 2
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BANDWIDTH HIGH CH * Agilent 16:57:33 Aug 10, 2012 R T	Measure
Ch Freq 5.32 GHz Trig Free Occupied Bandwidth Averages: 100	Meas Off
 Project: 12U14507	Channel Power
Ref 20 dBm Atten 10 dB #Samp	Occupied BW
Log 10 dB/ Offst 22.2	ACF
dB	Multi Carrier Power
Occupied Bandwidth Occ BW % Pwr 99.00 %	Power Stat CCDF
<b>17.5384 MHz</b> x dB -26.00 dB Transmit Freq Error -30.384 kHz x dB Bandwidth 18.723 MHz*	More 1 of 2
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## 8.5.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5260	17.5
Mid	5300	17.5
High	5320	16.0

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## 8.5.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density 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.

#### Limits FCC 15.407

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5260	24	23.70	24.75	4.25	24.00	11.00
Mid	5300	24	22.40	24.50	4.25	24.00	11.00
High	5320	24	19.95	24.00	4.25	24.00	11.00

### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	17.941	17.941	24.00	-6.059
Mid	5300	17.751	17.751	24.00	-6.249
High	5320	16.702	16.702	24.00	-7.297

### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	7.30	7.30	11.00	-3.70
Mid	5300	7.11	7.11	11.00	-3.89
High	5320	6.08	6.08	11.00	-4.92

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### IC RSS-210 A9.2(1)

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5260	24	17.5359	23.4393	4.25	23.4393	11.0000
Mid	5300	24	17.5444	23.4414	4.25	23.4414	11.0000
High	5320	24	17.5384	23.4399	4.25	23.4399	11.0000

### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	17.941	17.941	23.4393	-5.4983
Mid	5300	17.751	17.751	23.4414	-5.6904
High	5320	16.702	16.702	23.4399	-6.7379

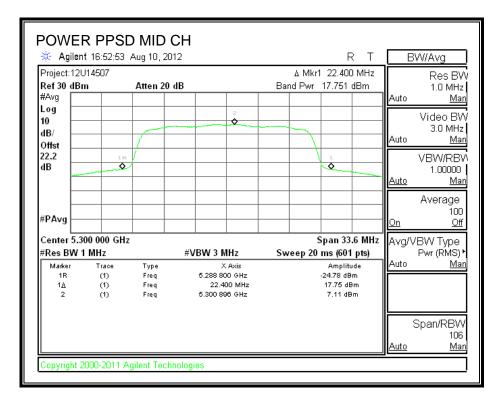
### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	7.30	7.30	11.0000	-3.7000
Mid	5300	7.11	7.11	11.0000	-3.8900
High	5320	6.08	6.08	11.0000	-4.9200

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POWER							F	RТ	В	W/Avg
Project:12U14 Ref 30 dBm #Avg		Atten 20			Ban		r1 23.70 17.941		Auto	Res BV 1.0 MHz <u>Mar</u>
Log 10 dB/ Offst			2			$\overline{}$			Auto	Video BV 3.0 MHz <u>Mar</u>
22.2 dB							1		<u>Auto</u>	VBW/RBV 1.00000 <u>Mar</u>
#PAvg									<u>On</u>	Average 100 <u>Off</u>
Center 5.260 #Res BW 1 M		· · · · ·	#VBW 3 M	IHz	Sw		oan 35.5 ms (601			/BW Type Pwr (RMS) •
Marker 1R 1 <u>∆</u> 2	Trace (1) (1) (1)	Type Freq Freq Freq	5.248 1	70 MHz			Amplitu -25.21 dB 17.94 dE 7.30 dB	m 9m	Auto	<u>Mar</u>
									Auto	Span/RBW 106 <u>Mar</u>
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-	R PPSI 1f 17:01:44	-	-				F	₹ T	В	W/Avg
Project:12 Ref 30 dB #Avg		Atten 20	dB		Bar		r1 19.95 16.702 (		Auto	Res BV 1.0 MHz <u>Man</u>
Log 10 dB/ Offst				2					Auto	Video BW 3.0 MHz <u>Man</u>
22.2 dB	4						P C		<u>Auto</u>	VBW/RBV 1.00000 <u>Man</u>
#PAvg —									<u>On</u>	Average 100 <u>Off</u>
Center 5.3 #Res BW	320 00 GHz 1 MHz		#VBW 3 N	ЛНz	Sw		oan 29.9 ms (601			′BW Type Pwr (RMS)♪
Marker 1R 1∆ 2	Trace (1) (1) (1)	Type Freq Freq Freq	5.310 19.	(Axis D2 GHz 95 MHz 85 GHz		-	Amplitu -18.52 dB 16.70 dB 6.08 dB	m Im	Auto	Man
									Auto	Span/RBW 106 <u>Man</u>
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## 8.5.5. PEAK EXCURSION

### **LIMITS**

FCC §15.407 (a) (6)

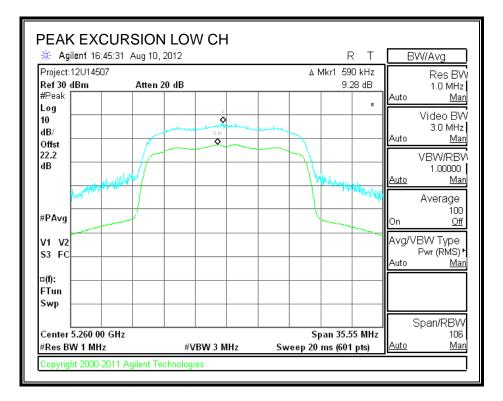
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

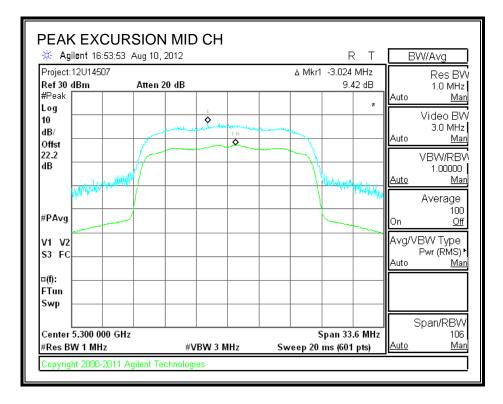
### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	9.28	13	-3.72
Mid	5300	9.42	13	-3.58
High	5320	9.09	13	-3.91

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🔆 Agilent 17:02		GH CH		RТ	В	W/Avg
Project:12U14507 Ref 30 dBm #Peak	Atten 20 dB		A Mł	(r1 -798 kHz 9.09 dB	Auto	Res BV 1.0 MHz <u>Man</u>
Log 10 dB/ Offst	and and and and			*	Auto	Video BW 3.0 MHz <u>Man</u>
22.2 dB					Auto	VBW/RBV 1.00000 <u>Mar</u>
#PAvg				Lapadingalyting	On	Average 100 <u>Off</u>
V1 V2 S3 FC					Avg/\ Auto	/BW Type Pwr (RMS)⊁ <u>Mar</u>
¤(f): FTun Swp						
Center 5.320 00 0 #Res BW 1 MHz		VBW 3 MHz	•	an 29.93 MHz ms (601 pts)	Auto	Span/RBW 106 <u>Mar</u>

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## 8.5.6. TPC POWER

### **LIMITS**

FCC §15.407 (h) (1)

IC RSS-210 A9.2 (2)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

### DIRECTIONAL ANTENNA GAIN

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

### **RESULTS**

EIRP = 18.001 dBm + 4.25 dBi = **22.251 dBm**, which is less than the threshold of 500 mW (27 dBm); therefore, TPC is not required

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# 8.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

## 8.6.1. 26 dB BANDWIDTH

## **LIMITS**

None; for reporting purposes only.

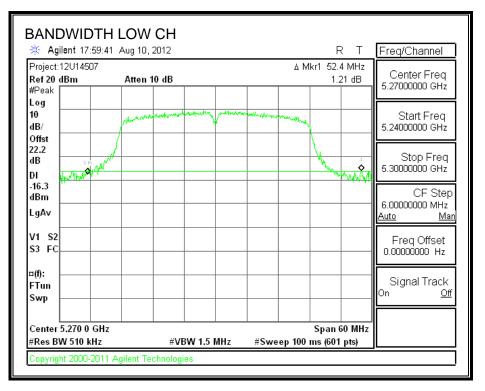
### **RESULTS**

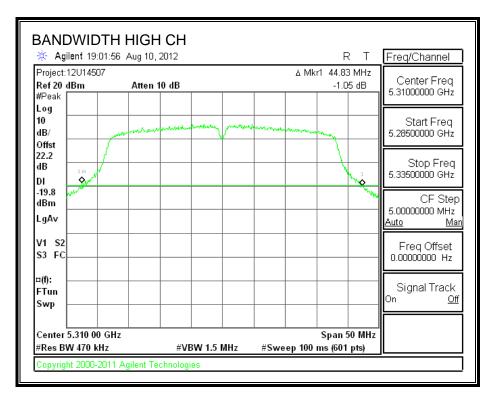
Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5270	52.40
High	5310	44.83

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### 26 dB BANDWIDTH





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## 8.6.2. 99% BANDWIDTH

### DATE: AUGUST 15, 2012 IC: 579C-A1458

## **LIMITS**

None; for reporting purposes only.

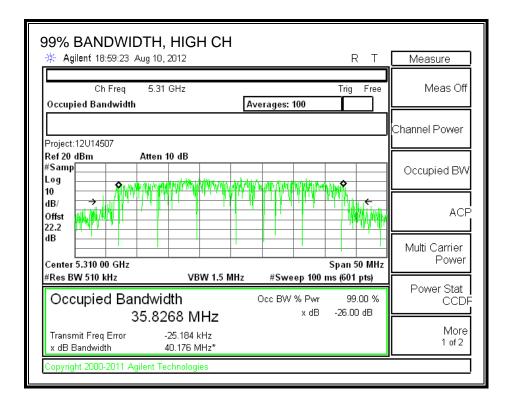
## **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5270	35.8536
High	5310	35.8268

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99% BANDWIDTH, LOW CH	Measure
Ch Freq 5.27 GHz Trig Free Occupied Bandwidth Averages: 100	Meas Off
Project:12U14507	Channel Power
Ref 20 dBm Atten 10 dB #Samp Log 10 Atten 10 dB	Occupied BW
dB/ Offst 22.2 dB	ACP Multi Carrier
Center 5.270 00 GHz Span 50 MHz #Res BW 510 kHz VBW 1.5 MHz #Sweep 100 ms (601 pts)	Power
Occupied Bandwidth         Occ BW % Pwr         99.00 %           35.8536 MHz         x dB         -26.00 dB	Power Stat CCDF
Transmit Freq Error -43.456 kHz x dB Bandwidth 41.445 MHz*	More 1 of 2
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## 8.6.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5270	17.5
High	5310	14.0

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## 8.6.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density 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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#### Limits FCC 15.407

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5270	24	52.40	28.19	4.25	24.00	11.00
High	5310	24	44.83	27.52	4.25	24.00	11.00

### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	18.070	18.070	24.00	-5.930
High	5310	14.738	14.738	24.00	-9.262

### **PPSD Results**

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	4.04	4.04	11.00	-6.96
High	5310	0.69	0.69	11.00	-10.31

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### IC RSS-210 A9.2(1)

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5270	24	35.8536	26.5453	4.25	24.0000	11.0000
High	5310	24	35.8268	26.5421	4.25	24.0000	11.0000

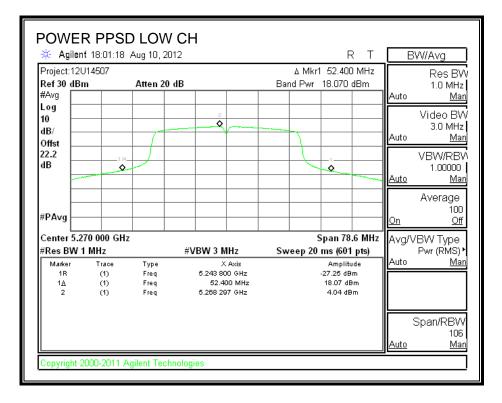
### **Output Power Results**

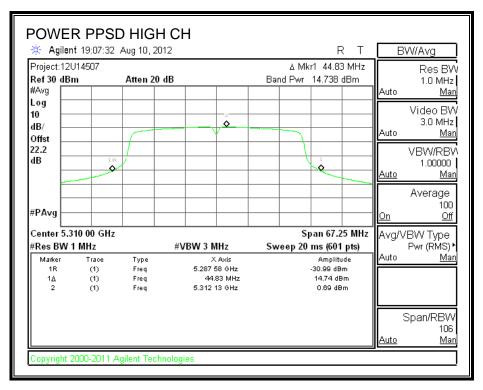
Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	18.070	18.070	24.0000	-5.9300
High	5310	14.738	14.738	24.0000	-9.2620

## **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	4.04	4.04	11.0000	-6.9600
High	5310	0.69	0.69	11.0000	-10.3100

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## 8.6.5. PEAK EXCURSION

### **LIMITS**

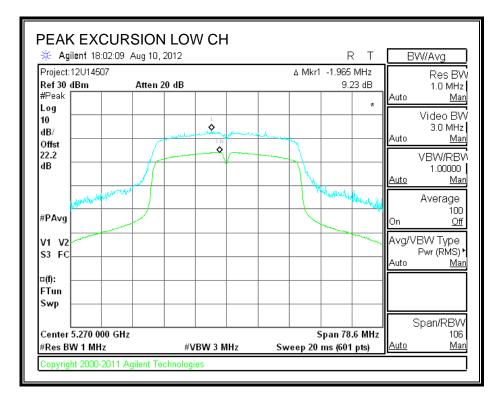
FCC §15.407 (a) (6)

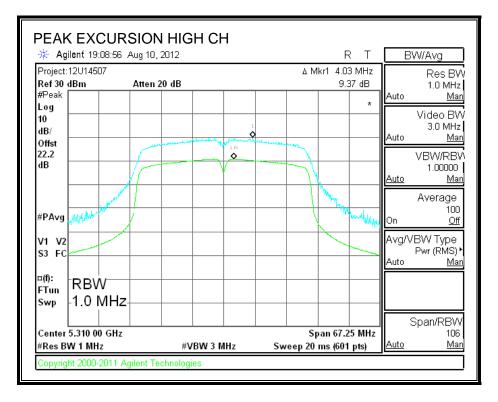
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5270	9.23	13	-3.77
High	5310	9.37	13	-3.63

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## 8.6.6. TPC POWER

### **LIMITS**

FCC §15.407 (h) (1)

IC RSS-210 A9.2 (2)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

### DIRECTIONAL ANTENNA GAIN

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

### **RESULTS**

EIRP = 18.2 dBm + 4.25 dBi = **22.45 dBm**, which is less than the threshold of 500 mW (27 dBm); therefore, TPC is not required

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# 8.7. 802.11a MODE IN THE 5.6 GHz BAND

## 8.7.1. 26 dB BANDWIDTH

## **LIMITS**

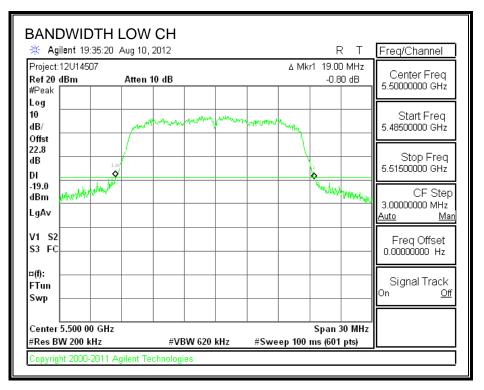
None; for reporting purposes only.

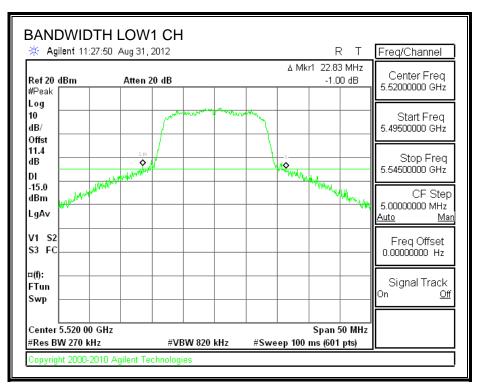
### **RESULTS**

Channel	Frequency	26 dB Bandwidth		
	(MHz)	(MHz)		
Low	5500	19.00		
Low1	5520	22.83		
Mid	5580	23.55		
High1	5680	21.08		
High	5700	18.95		

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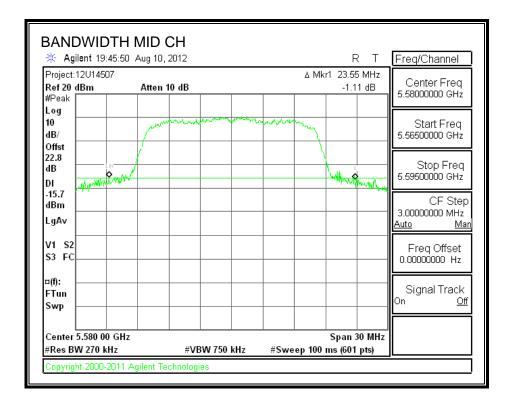
### 26 dB BANDWIDTH

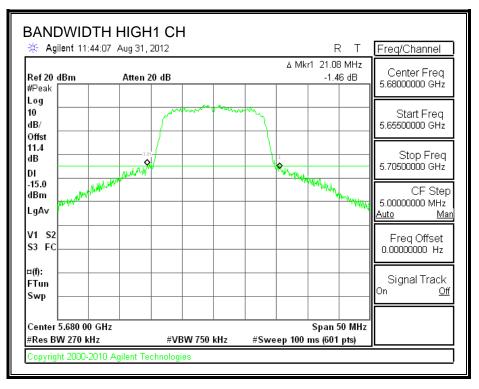




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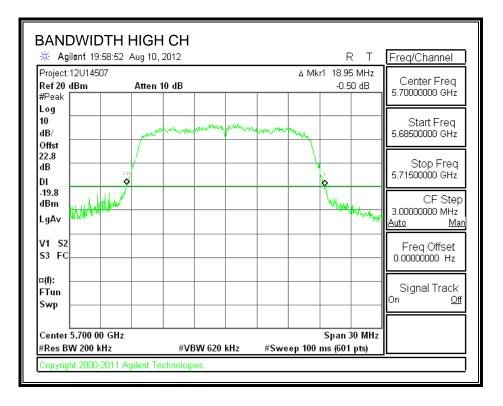
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## 8.7.2. 99% BANDWIDTH

### DATE: AUGUST 15, 2012 IC: 579C-A1458

## LIMITS

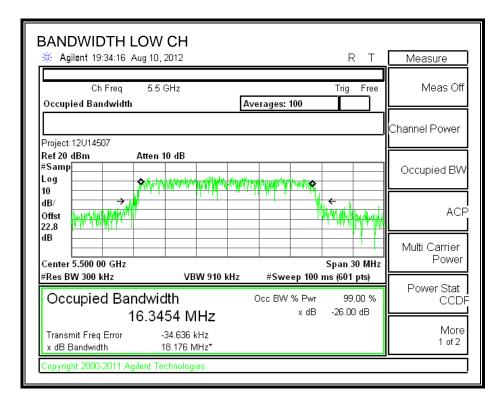
None; for reporting purposes only.

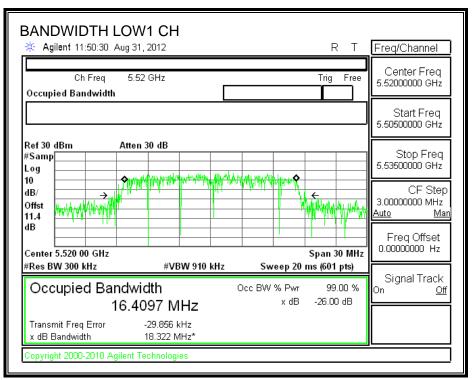
## **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5500	16.3454
Low1	5520	16.4097
Mid	5580	16.3627
High1	5680	16.4280
High	5700	16.3432

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BANDWIDTH MI			RТ	BW	//Avg
Ch Freq &	5.58 GHz	Averages: 100	Trig Free	Auto	Res BV 300.0 kHz <u>Mar</u> Video BV 910.0 kHz
#Samp	en 10 dB			Auto , On	Mai /BVV/RBV 3.00000 <u>Mai</u> Average 100 <u>Off</u> 3W Type
Center 5.580 00 GHz #Res BW 300 kHz	VBW 910 k	Hz #Sweep 100	Span 30 MHz ms (601 pts)	Log-Pwr <u>Auto</u>	r (Video) <u>Ma</u>
Occupied Band 16.	width 3627 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	SI	oan/RBV
Transmit Freq Error x dB Bandwidth	-41.822 kHz 18.557 MHz*			<u>Auto</u>	106 <u>Ma</u> i

BANDWIDTH HIGH1 CH	Span
Ch Freq 5.68 GHz Trig Free Occupied Bandwidth	Span 30.0000000 MHz
	Span Zoom
Ref 30 dBm         Atten 30 dB           #Samp	Full Span
dB/ Offst 11.4	Zero Span
Center 5.680 00 GHz Span 30 MHz	Last Span
#Res BW 300 kHz #VBW 910 kHz Sweep 20 ms (601 pts) Occupied Bandwidth Occ BW % Pwr 99.00 %	
16.4280 MHz × dB -26.00 dB	
Transmit Freq Error 18.261 kHz x dB Bandwidth 18.612 MHz*	
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BANDWIDTH HIGH Agilent 19:56:37 Aug 10,	-	R T	Measure
Ch Freq 5.7 Occupied Bandwidth	GHz Averages:	Trig Free	Meas Off
Project:12U14507			Channel Power
Ref 20 dBm Atten #Samp Log	10 dB		Occupied BW
dB/ → //			ACP
dB		Span 30 MHz	Multi Carrier Power
#Res BW 300 kHz		eep 100 ms (601 pts)	Power Stat
Occupied Bandwi 16.34	dth Occ BW I32 MHz	′% Pwr 99.00 % xdB -26.00 dB	
	-39.888 kHz 18.171 MHz*		More 1 of 2
Copyright 2000-2011 Agilent Te	echnologies		

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### 8.7.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5500	15.49
Low1	5520	17.95
Mid	5580	17.98
High 1	5680	17.91
High	5700	15.00

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### 8.7.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density 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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#### Limits FCC 15.407

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5500	24	19.00	23.79	4.51	23.79	11.00
Low1	5520	24	22.83	24.59	4.51	24.00	11.00
Mid	5580	24	23.55	24.72	4.51	24.00	11.00
High1	5680	24	21.08	24.24	4.51	24.00	11.00
High	5700	24	18.95	23.78	4.51	23.78	11.00

#### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	16.394	16.394	23.79	-7.394
Low1	5520	18.972	18.972	24.00	-5.028
Mid	5580	18.393	18.393	24.00	-5.607
High1	5680	19.021	19.021	24.00	-4.979
High	5700	15.513	15.513	23.78	-8.263

### **PPSD Results**

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	5.95	5.95	11.00	-5.05
Low1	5520	8.53	8.53	11.00	-2.47
Mid	5580	7.95	7.95	11.00	-3.05
High1	5680	8.65	8.65	11.00	-2.35
High	5700	5.07	5.07	11.00	-5.93

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### IC RSS-210 A9.2(1)

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5500	24	16.3454	23.1340	4.51	23.1340	11.0000
Low1	5520	24	16.4097	23.1510	4.51	23.1510	11.0000
Mid	5580	24	16.3627	23.1385	4.51	23.1385	11.0000
High1	5680	24	16.4280	23.1558	4.51	23.1558	11.0000
High	5700	24	16.3432	23.1334	4.51	23.1334	11.0000

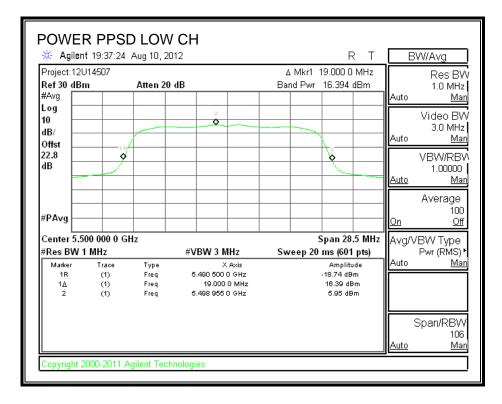
### **Output Power Results**

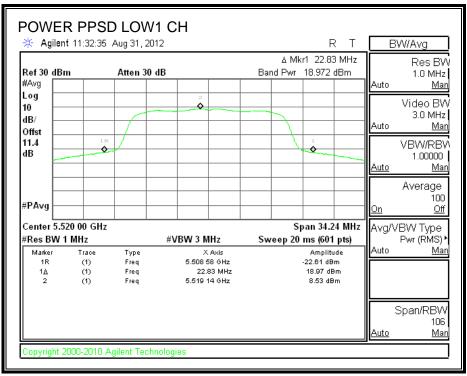
Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	16.394	16.394	23.1340	-6.7400
Low1	5520	18.972	18.972	23.1510	-4.1790
Mid	5580	18.393	18.393	23.1385	-4.7455
High1	5680	19.021	19.021	23.1558	-4.1348
High	5700	15.513	15.513	23.1334	-7.6204

### **PPSD Results**

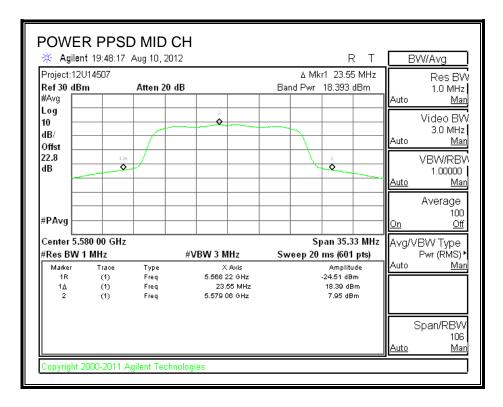
Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	5.95	5.95	11.0000	-5.0500
Low1	5520	8.53	8.53	11.0000	-2.4700
Mid	5580	7.95	7.95	11.0000	-3.0500
High1	5680	8.65	8.65	11.0000	-2.3500
High	5700	5.07	5.07	11.0000	-5.9300

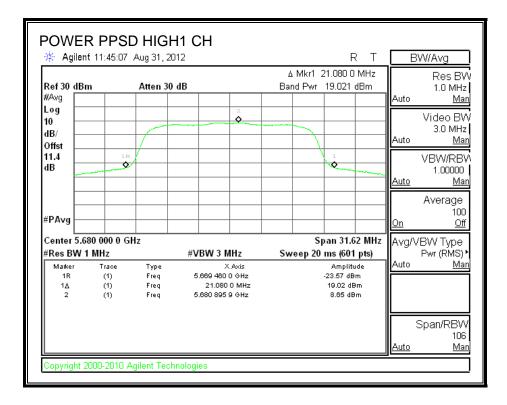
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-		Aug 10, 201	2			R		B	W/Avg
Project:12U Ref 30 dBn #Avg		Atten 20 d	IB	Bar	∆ Mkr nd Pwr	1 18.95 15.513 c		Auto	Res BV 1.0 MHz <u>Ma</u> r
Log 10 dB/ Offst			2					Auto	Video BV 3.0 MHz <u>Ma</u> r
22.8 dB	18					2		<u>Auto</u>	VBW/RB\ 1.00000 <u>Ma</u>
#PAvg								<u>On</u>	Average 100 <u>Off</u>
Center 5.70 #Res BW 1			#VBW 3 MHz	Sw	Sp /eep 20 i	an 28.4 ms (601			BW Type Pwr (RMS)
Marker 1R 1 <u>∆</u> 2	Trace (1) (1) (1)	Type Freq Freq Freq	X Axis 5.690 52 GHz 18.95 MHz 5.699 15 GHz			Amplitu 19.55 dBr 15.51 dBi 5.07 dBi	n m	Auto	Ma
								< Auto	Span/RBV 106 <u>Ma</u>

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### 8.7.5. PEAK EXCURSION

### LIMITS

FCC §15.407 (a) (6)

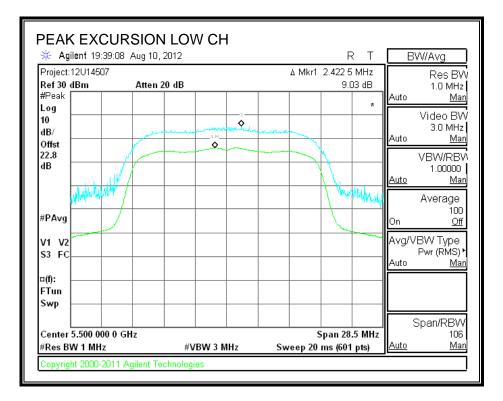
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

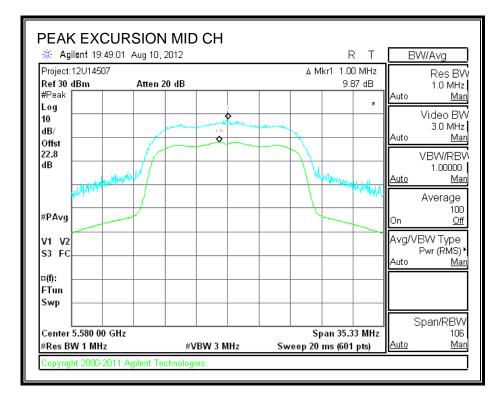
### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	9.03	13	-3.97
Mid	5580	9.87	13	-3.13
High	5700	9.58	13	-3.42

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PEAK EXCURSION Agilent 20:01:25 Aug 10,			RТ	B	W/Avg
Project:12U14507 <b>Ref 30 dBm Atten 2</b> #Peak	10 dB	∆ Mkr1 1. 9	04 MHz 9.58 dB	Auto	Res BW 1.0 MHz <u>Man</u>
Log 10 dB/ Offst		umaneta a	*	Auto	Video BW 3.0 MHz <u>Man</u>
22.8 dB				<u>Auto</u>	VBW/RBV 1.00000 <u>Man</u>
#PAvg			MULL	On	Average 100 <u>Off</u>
V1 V2 S3 FC				Avg/V Auto	BW Type Pwr (RMS) • <u>Man</u>
¤(f): FTun Swp					
Center 5.700 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 28 Sweep 20 ms (6(	.43 MHz )1 pts)	< Auto	Span/RBW 106 <u>Man</u>

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### 8.7.6. TPC POWER

### **LIMITS**

FCC §15.407 (h) (1)

IC RSS-210 A9.2 (3)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

### DIRECTIONAL ANTENNA GAIN

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

### **RESULTS**

EIRP = 18.453 dBm + 4.51 dBi = **22.963 dBm**, which is less than the threshold of 500 mW (27 dBm); therefore, TPC is not required

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# 8.7.7. CONDUCTED WEATHER RADAR BAND EMISSIONS

Since the EUT is a client device, this test is not required.

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# 8.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND

## 8.8.1. 26 dB BANDWIDTH

### **LIMITS**

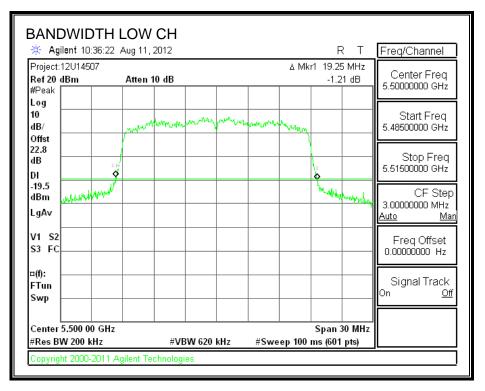
None; for reporting purposes only.

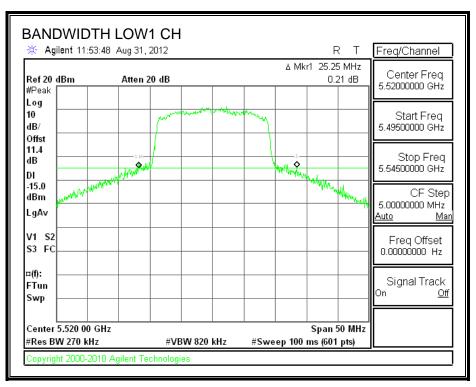
### **RESULTS**

Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5500	19.25
Low1	5520	25.25
Mid	5580	25.10
High1	5580	22.67
High	5700	19.15

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#### 26 dB BANDWIDTH

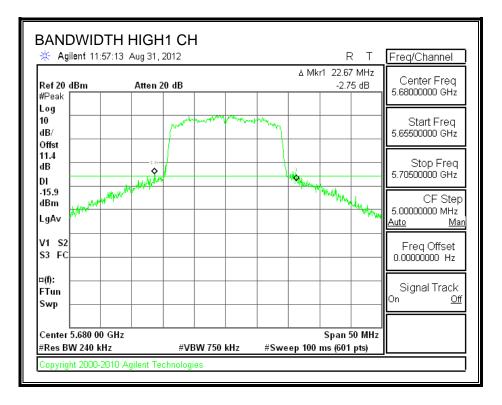




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Project:12U14507	i:53 Aug 11, 2012		Δ Mkr1 25.1	R T	Freq/Channel
Ref 20 dBm #Peak	Atten 10 dB			27 dB	Center Freq 5.58000000 GHz
Log 10 dB/		the start of the s	annan		Start Freq 5.56500000 GHz
Offst 22.8 dB DI			- Maringham	and the state of t	Stop Freq 5.59500000 GHz
-15.0 dBm LgAv					CF Step 3.0000000 MHz <u>Auto Ma</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Of</u> f
Center 5.580 00 ( #Res BW 300 kHz		10 10 - #1	Span Sweep 100 ms (60	30 MHz	



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	BANDWIDTH HIGH CH Agilent 11:24:25 Aug 11, 2012 R T Freq/Channel							1		
Project:12U145 Ref 20 dBm #Peak	07	en 10 dB				∆ Mk	r1 19.15		Center Freq 5.7000000 GHz	
Log 10 dB/ Offst	per	warna	man	mren	yer-salaya	Marry			Start Freq 5.6850000 GHz	
22.8 dB DI							1		Stop Freq 5.71500000 GHz	
-19.5 dBm LgAv	When a						hereby	Wintern	CF Step 3.0000000 MHz <u>Auto Man</u>	l
V1 S2 S3 FC									Freq Offset 0.00000000 Hz	
¤(f): FTun Swp									Signal Track On <u>Off</u>	
	Center 5.700 00 GHz Span 30 MHz #Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms (601 pts)									
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## 8.8.2. 99% BANDWIDTH

### DATE: AUGUST 15, 2012 IC: 579C-A1458

### **LIMITS**

None; for reporting purposes only.

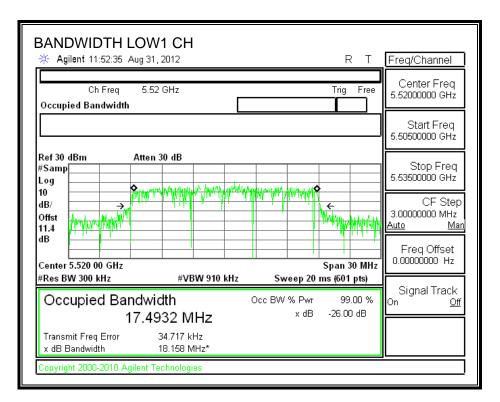
### **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5500	17.5429
Low1	5520	17.4932
Mid	5580	17.5380
High1	5680	17.5589
High	5700	17.5252

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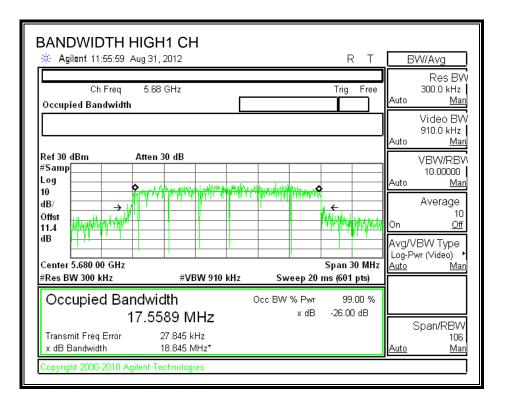
BANDWIDTH LC	-		R T	Measure
Ch Freq Occupied Bandwidth	5.5 GHz	Averages: 100	Trig Free	Meas Off
				Channel Power
#Samp	tten 10 dB	1		Occupied BV
dB/ →				AC
Center 5.500 00 GHz #Res BW 300 kHz	VBW 910 kH	Iz #Sweep 100	Span 30 MHz ns (601 pts)	Multi Carrier Power
Occupied Banc 17	width .5429 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Power Stat CCD
Transmit Freq Error x dB Bandwidth	-29.210 kHz 18.711 MHz*			More 1 of 2



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BANDWIDTH MID	-		RТ	Maggura
🔆 Agilent 10.54.25 Aug 1	1,2012		R I	Measure
Ch Freq 5.4 Occupied Bandwidth	58 GHz	Averages: 100	Trig Free	Meas Off
				Channel Power
Project:12U14507				
#Samp	n 10 dB	helen hale American		Occupied BW
10 → 1 dB/ Offst 22.8				AC
dB				Multi Carrier Power
Center 5.580 00 GHz			Span 30 MHz	Power
#Res BW 300 kHz	VBW 910 kHz	#Sweep 100 i	ns (601 pts)	Power Stat
Occupied Bandw	idth 380 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	CCD
Transmit Freq Error x dB Bandwidth	-30.347 kHz 19.024 MHz*			More 1 of 2
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BANDWIDTH HIGH	-		RТ	Measure
Ch Freq 5.7 Occupied Bandwidth	GHz	Averages: 100	Trig Free	Meas Off
Project:12U14507				Channel Power
#Samp	10 dB			Occupied BW
dB/ Offst 22.8				ACP
dB			Span 30 MHz	Multi Carrier Power
#Res BW 300 kHz	VBW 910 kHz	z #Sweep 100	ms (601 pts)	Power Stat
Occupied Bandwi 17.52	dth 252 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	CCDF
Transmit Freq Error x dB Bandwidth	-27.644 kHz 18.645 MHz*			More 1 of 2
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### 8.8.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5500	14.92
Low1	5520	18.00
Mid	5580	18.00
High1	5680	17.97
High	5700	15.00

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### 8.8.4. OUTPUT POWER AND PPSD

### <u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density 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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#### Limits FCC15.407

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5500	24	19.25	23.84	4.51	23.84	11.00
Low1	5520	24	25.25	25.02	4.51	24.00	11.00
Mid	5580	24	25.10	25.00	4.51	24.00	11.00
High1	5680	24	22.67	24.55	4.51	24.00	11.00
High	5700	24	19.15	23.82	4.51	23.82	11.00

#### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	15.804	15.804	23.84	-8.040
Low1	5520	15.862	18.860	24.00	-5.140
Mid	5580	18.577	18.577	24.00	-5.423
High1	5680	18.879	18.879	24.00	-5.121
High	5700	15.792	15.792	23.82	-8.030

### **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	5.16	5.16	11.00	-5.84
Low1	5520	8.22	8.22	11.00	-2.78
Mid	5580	7.90	7.90	11.00	-3.10
High1	5680	8.24	8.24	11.00	-2.76
High	5700	5.18	5.18	11.00	-5.82

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### IC RSS-210 A9.2(1)

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5500	24	17.5429	23.4410	4.51	23.4410	11.0000
Low1	5520	24	17.4932	23.4287	4.51	23.4287	11.0000
Mid	5580	24	17.5380	23.4398	4.51	23.4398	11.0000
High1	5680	24	17.5589	23.4450	4.51	23.4450	11.0000
High	5700	24	17.5252	23.4366	4.51	23.4366	11.0000

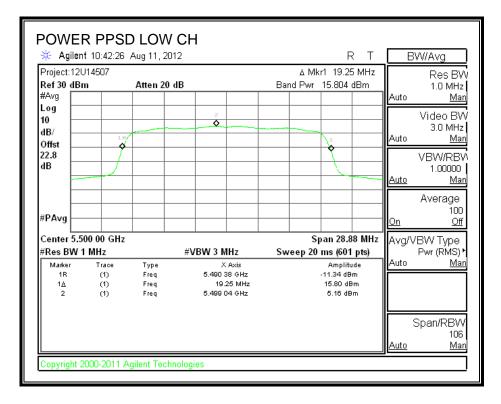
### **Output Power Results**

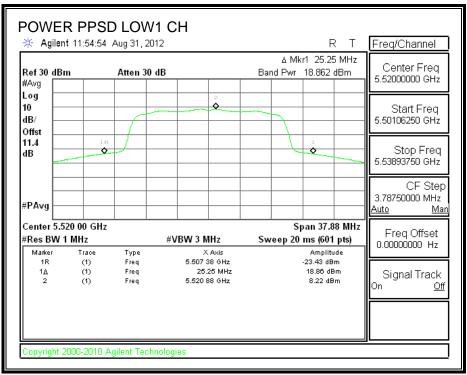
Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	15.804	15.804	23.44	-7.6370
Low1	5520	15.862	15.862	23.43	-7.5667
Mid	5580	18.577	18.577	23.44	-4.8628
High1	5680	18.879	18.879	23.44	-4.5660
High	5700	15.792	15.792	23.44	-7.6446

#### **PPSD** Results

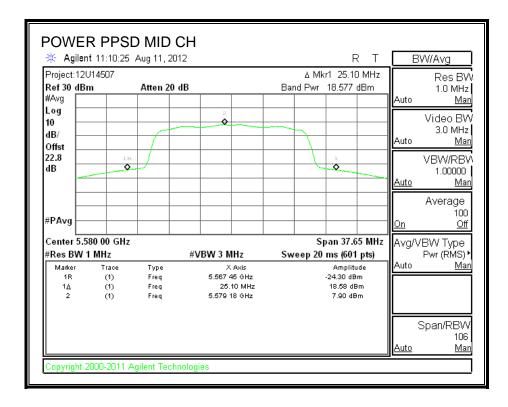
Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	5.16	5.16	11.0000	-5.8400
Low1	5520	8.22	8.22	11.0000	-2.7800
Mid	5580	7.90	7.90	11.0000	-3.1000
High1	5680	8.24	8.24	11.0000	-2.7600
High	5700	5.18	5.18	11.0000	-5.8200

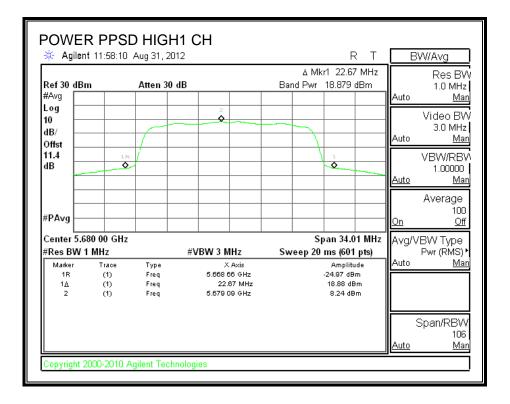
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🔆 Agilent	11:26:56	Aug 11, 201	2		RT	E	3W/Avg
Project:12U <sup>+</sup> Ref 30 dBm #Avg		Atten 20 d	IB		∆ Mkr1 19.15 MHz Pwr 15.792 dBm	Auto	Res BV 1.0 MHz <u>Mar</u>
Log 10 dB/ Offst	18,				1	Auto	Video BV 3.0 MHz <u>Mar</u>
22.8 dB	$\downarrow$					Auto	VBW/RB\ 1.00000 <u>Mar</u>
#PAvg						<u>On</u>	Average 100 <u>Off</u>
Center 5.70 #Res BW 1			#VBW 3 MHz	Swee	Span 28.73 MH: p 20 ms (601 pts)	z Avg∧	/BW Type Pwr (RMS) <sup>1</sup>
Marker 1R 1 <u>A</u> 2	Trace (1) (1) (1)	Type Freq Freq Freq	X Axis 5.690 42 GHz 19.15 MHz 5.700 86 GHz		Amplitude -10.33 dBm 15.79 dBm 5.18 dBm	Auto	Mar
						Auto	Span/RBV\ 106 <u>Ma</u>

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### 8.8.5. PEAK EXCURSION

### LIMITS

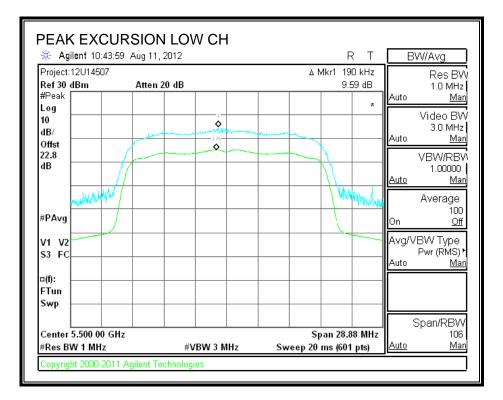
FCC §15.407 (a) (6)

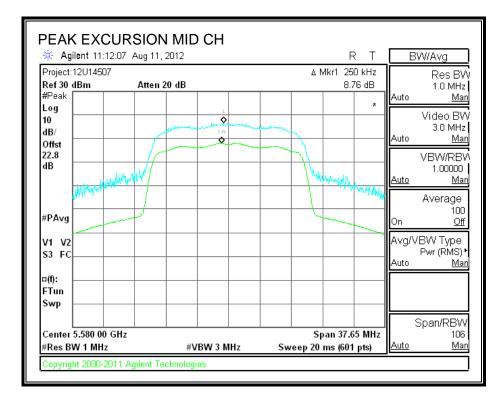
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	9.59	13	-3.41
Mid	5580	8.76	13	-4.24
High	5700	9.01	13	-3.99

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PEAK EXCUR		H CH				F	? Т		
Image: Agilent 11:29:54           Project:12U14507           Ref 30 dBm           #Peak	Atten 20 dB				∆ Mkr	1 -1.92			W/Avg Res BW 1.0 MHz
IO dB/		1	1R-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		- Luce		*	Auto Auto	<u>Man</u> Video BW 3.0 MHz <u>Man</u>
22.8 dB			<u>ہ</u>					<u>Auto</u>	VBW/RBW 1.00000 <u>Man</u>
#PAvg						<u>\\\</u>	Althyai	On	Average 100 <u>Off</u>
V1 V2 S3 FC								A∨g/∖ Auto	/BW Type Pwr (RMS) <b>^</b> <u>Man</u>
¤(f): FTun Swp									
Center 5.700 00 GHz #Res BW 1 MHz	#V	/BW 3 MI	Hz	Swe	•	an 28.7 ms (601		<u>Auto</u>	Span/RBW 106 <u>Man</u>
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### 8.8.6. TPC POWER

### **LIMITS**

FCC §15.407 (h) (1)

IC RSS-210 A9.2 (3)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

### DIRECTIONAL ANTENNA GAIN

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

### **RESULTS**

EIRP = 18.637 dBm + 4.51 dBi = **23.147 dBm**, which is less than the threshold of 500 mW (27 dBm); therefore, TPC is not required

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# 8.8.7. CONDUCTED WEATHER RADAR BAND EMISSIONS

Since the EUT is a client device, this test is not required.

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# 8.9. 802.11n HT40 MODE IN THE 5.6 GHz BAND

## 8.9.1. 26 dB BANDWIDTH

### **LIMITS**

None; for reporting purposes only.

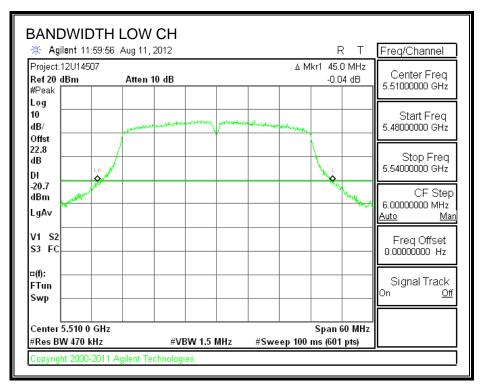
### **RESULTS**

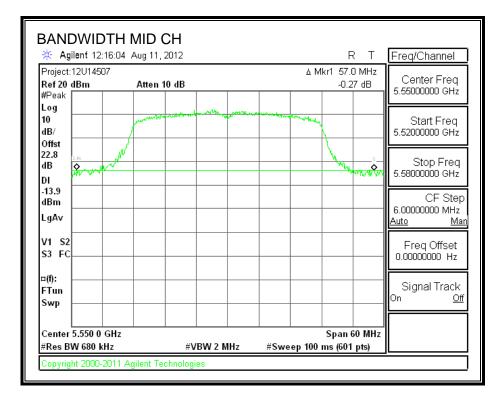
Channel	Frequency	26 dB Bandwidth
	(MHz)	(MHz)
Low	5510	45.00
Mid	5550	57.00
High	5670	43.90

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### 26 dB BANDWIDTH





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			R	Т	
Image: Agilent 12:34:0           Project:12U14507           Ref 20 dBm           #Peak	Atten 10 dB		۲. ۵ Mkr1 43.9 -0.70	MHz	Freq/Channel Center Freq 5.67000000 GHz
Log 10 dB/ Offst	perminante	when we we have been a	an man and a state of the state		Start Freq 5.6400000 GHz
22.8 dB DI			Nice No.		Stop Freq 5.70000000 GHz
-17.7 Jydawa <sup>n</sup> dBm LgAv				WW	CF Step 6.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 5.670 0 GHz #Res BW 470 kHz		V 1.5 MHz #Sw	Span 6( eep 100 ms (601 )		
Copyright 2000-2011	Agilent Technologies	3			

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# 8.9.2. 99% BANDWIDTH

#### DATE: AUGUST 15, 2012 IC: 579C-A1458

# **LIMITS**

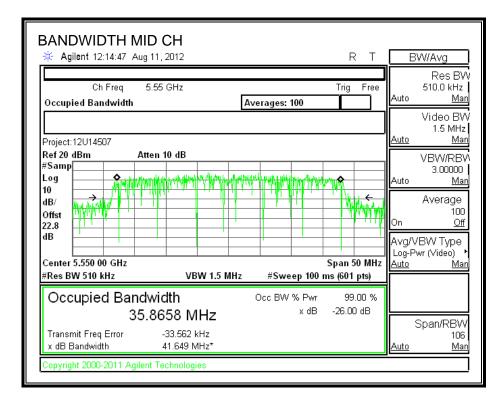
None; for reporting purposes only.

# **RESULTS**

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	5510	35.8493
Mid	5550	35.8658
High	5670	35.8122

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BANDWIDTH LOW		F	RΤ	Measure
Ch Freq 5.51 Occupied Bandwidth	GHz Averag	Trig es: 100	Free	Meas Off
Project:12U14507				Channel Power
Ref 20 dBm Atten 1 #Samp Log		u Lindinur Ind In Law. 🔷		Occupied BW
10 dB/ → 0ffst 22.8			¢.	ACP
dB		Span	50 MHz	Multi Carrier Power
#Res BW 510 kHz	VBW 1.5 MHz #\$	weep 100 ms (601		
Occupied Bandwic 35.84	th ۵۵۵۱ 93 MHz	3W % Pwr 99 x dB -26.0	9.00 % 0 dB	Power Stat CCDF
Transmit Freq Error -	46.959 kHz 0.302 MHz*			More 1 of 2
Copyright 2000-2011 Agilent Te	chnologies			



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BANDWIDTH HIGH CH	Measure
Ch Freq 5.67 GHz Trig Free Occupied Bandwidth Averages: 100	Meas Off
Project: 12U14507	Channel Power
Ref 20 dBm Atten 10 dB #Samp Log 10	Occupied BW
dB/ Offst 22.8	ACP
dB Center 5.670 00 GHz Span 50 MHz	Multi Carrier Power
Res BW 470 kHz         VBW 1.5 MHz         #Sweep 100 ms (601 pts)           Occupied Bandwidth         Occ BW % Pwr         99.00 %	Power Stat CCDF
35.8122 MHz × dB -26.00 dB	
Transmit Freq Error -46.063 kHz x dB Bandwidth 40.115 MHz*	More 1 of 2
Copyright 2000-2011 Agilent Technologies	

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# 8.9.3. 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 11.4 dB (including 10 dB pad and 1.4 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	5510	13.0
Mid	5550	18.0
High	5670	16.0

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# 8.9.4. OUTPUT POWER AND PPSD

## <u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density 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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#### Limits FCC15.407

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit		Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5510	24	45.00	27.53	4.51	24.00	11.00
Mid	5550	24	57.00	28.56	4.51	24.00	11.00
High	5670	24	43.90	27.42	4.51	24.00	11.00

#### **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	14.029	14.029	24.00	-9.971
Mid	5550	18.531	18.531	24.00	-5.469
High	5670	16.628	16.628	24.00	-7.372

## **PPSD** Results

Channel	Frequency	Meas	Corr'd	PPSD	PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	-0.01	-0.01	11.00	-11.01
Mid	5550	4.42	4.42	11.00	-6.58
High	5670	2.60	2.60	11.00	-8.40

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## IC RSS-210 A9.2(1)

Channel	Frequency	Fixed	В	11 + 10 Log B	Directional	Power	PPSD
		Limit	99%	Limit	Gain	Limit	Limit
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)
Low	5510	24	35.8493	26.5448	4.51	24.0000	11.0000
Mid	5550	24	35.8658	26.5468	4.51	24.0000	11.0000
High	5670	24	35.8122	26.5403	4.51	24.0000	11.0000

## **Output Power Results**

Channel	Frequency	Meas	Corr'd	Power	Power
		Power	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	14.029	14.029	24.0000	-9.9710
Mid	5550	18.531	18.531	24.0000	-5.4690
High	5670	16.628	16.628	24.0000	-7.3720

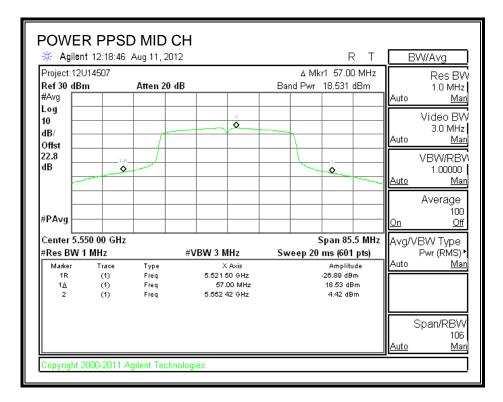
## **PPSD Results**

Channel	Frequency	Meas	eas Corr'd PPSD		PPSD
		PPSD	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	-0.01	-0.01	11.0000	-11.0100
Mid	5550	4.42	4.42	11.0000	-6.5800
High	5670	2.60	2.60	11.0000	-8.4000

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🔆 Agilent	-	D LOW Aug 11, 20	-		RТ	BV	V/Avg
Project:12U <sup>+</sup> Ref 30 dBm #Avg		Atten 20	iB	∆ Mkr1 45 Band Pwr 14.0:		Auto	Res BW 1.0 MHz <u>Man</u>
Log 10 dB/ Offst			2 •			Auto	Video BW 3.0 MHz <u>Man</u>
22.8 dB	1F	P 1				Auto V	VBVV/RBV 1.00000 <u>Man</u>
#PAvg						<u>On</u>	Average 100 <u>Off</u>
Center 5.51				•	67.5 MHz		3W Type
#Res BW 1 MHz # Marker Trace Type 1R (1) Freq 1∆ (1) Freq 2 (1) Freq		#VBW 3 MHz X Axis 5.487 50 GHz 45.00 MHz 5.507 64 GHz	-31.92 14.00	plitude	Auto	⊃wr (RMS) ► <u>Man</u>	
						S <u>Auto</u>	pan/RBW 106 <u>Man</u>



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	f 12:37:31	Aug 11, 20	12				R	₹ T	B	/V/Avg
Project:12U Ref 30 dBr #Avg		Atten 20	dB		Ban		r1 43.90 16.628 (		Auto	Res BV 1.0 MHz <u>Mar</u>
Log 10 dB/ Offst				2 •		_			Auto	Video BV 3.0 MHz <u>Mar</u>
22.8 dB							4		<u>Auto</u>	VBW/RBV 1.00000 <u>Mar</u>
#PAvg									<u>On</u>	Average 100 <u>Off</u>
Center 5.6							an 65.8		Avg/V	BW Type
# <b>Res BW</b> 1 Marker 1R 1 <u>∆</u> 2	Trace (1) (1) (1) (1)	Type Freq Freq Freq	5.648 43	MHz X Axis 05 GHz 90 MHz 98 GHz	Sw		ms (601 Amplitu -28.15 dB 16.63 dB 2.60 dB	nde m Im	Auto	Pwr (RMS) <sup>•</sup> <u>Mar</u>
									Auto	Span/RBV 106 <u>Ma</u>

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# 8.9.5. PEAK EXCURSION

## **LIMITS**

FCC §15.407 (a) (6)

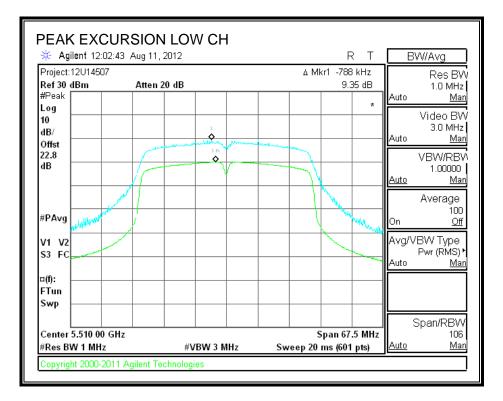
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

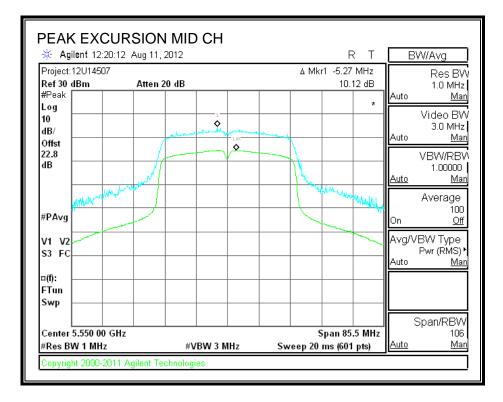
## **RESULTS**

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5510	9.35	13	-3.65
Mid	5550	10.12	13	-2.88
High	5670	9.77	13	-3.23

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PEAK EXCURSION		RT	BW/Avg
Project:12U14507 <b>Ref 30 dBm Atten</b> #Peak	20 dB	∆ Mkr1 -5.05 MHz 9.77 dB	Res BW 1.0 MHz Auto <u>Man</u>
Log 10 dB/ Offst		the substitute of the	Video BW 3.0 MHz Auto <u>Man</u>
dB	×		VBVV/RBW 1.00000 Auto Man
#PAvg		- Charles - Charles	Average 100 On <u>Off</u>
V1 V2 S3 FC			Avg/VBW Type Pwr (RMS) • Auto <u>Man</u>
¤(f): FTun Swp			-
Center 5.670 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 65.85 MHz Sweep 20 ms (601 pts)	Span/RBW 106 <u>Auto Man</u>

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# 8.9.6. TPC POWER

## **LIMITS**

FCC §15.407 (h) (1)

IC RSS-210 A9.2 (3)

Transmit power control (TPC). U-NII devices operating in the 5.25–5.35 GHz band and the 5.47–5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

## DIRECTIONAL ANTENNA GAIN

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

## **RESULTS**

EIRP = 18.661 dBm + 4.51 dBi = **23.171 dBm**, which is less than the threshold of 500 mW (27 dBm); therefore, TPC is not required

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# 8.9.7. CONDUCTED WEATHER RADAR BAND EMISSIONS

Since the EUT is a client device, this test is not required.

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# 9. RADIATED TEST RESULTS

# 9.1. 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.

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; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

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.

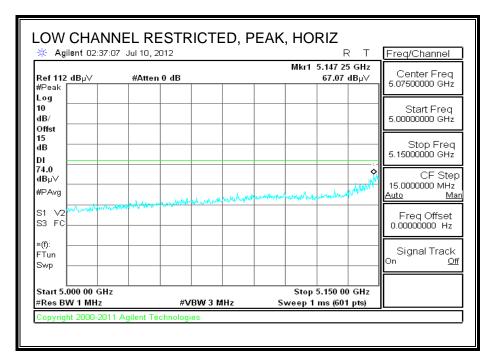
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

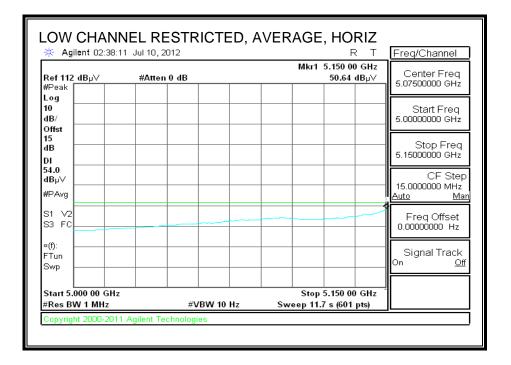
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# 9.2. TRANSMITTER ABOVE 1 GHz

# 9.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

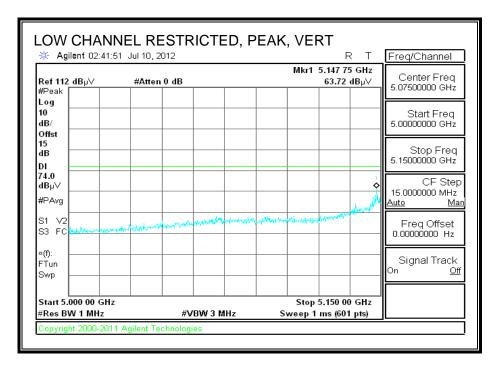
## RESTRICTED BANDEDGE (LOW CHANNEL)

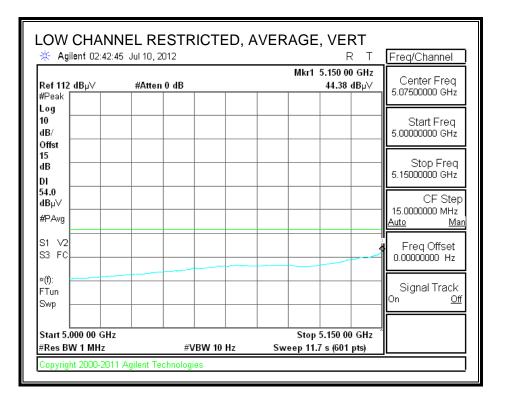




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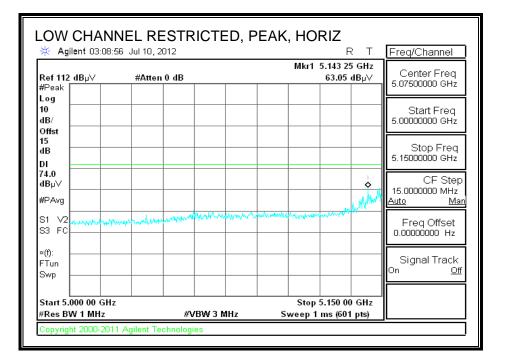
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

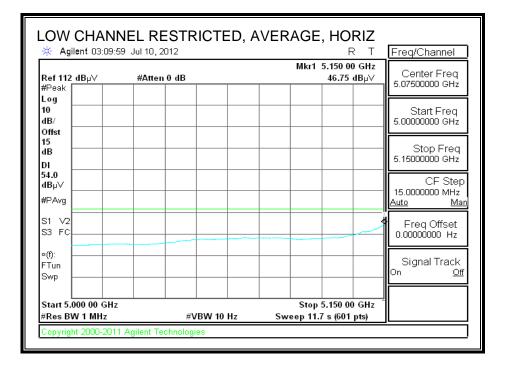
Read Analyzer Reading AF Antenna Factor	D Corr Dist Avg Ave Peak Calc HPF High	amp Gain tance Correc erage Field St culated Peak h Pass Filter	trength @ Field Stre	3 m	Peak Fiel Margin v	Field Stren ld Strength 3. Average	Limit	
GHz (m) dBuV dB/m dB	Amp D C				Margin v	s. Peak Lir		
		Corr Fltr	Corr.			Ant. Pol.		Notes
Low Cn, 5160MITZ	dB d	IB dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
15.540 3.0 35.0 39.0 12.5	-34.0 0	.0 0.7	53.2	74.0	-20.8	v	P	
15.540 3.0 23.0 39.0 12.5		.0 0.7	41.2	54.0	-12.8	v	Ā	
15.540 3.0 36.0 39.0 12.5	-34.0 0	.0 0.7	54.2	74.0	-19.8	H	P	,
15.540 3.0 22.5 39.0 12.5	-34.0 0	.0 0.7	40.7	54.0	-13.3	H	A	
			ļ					
Mid Ch, 5200MHz			ļ					
		.0 0.7	53.3	74.0	-20.7	V	P	
15.600 3.0 22.4 38.8 12.5		.0 0.7	40.4	54.0	-13.6	V	A	
15.600 3.0 34.8 38.8 12.5		.0 0.7	52.9	74.0	-21.1	H	P	
15.600 3.0 22.4 38.8 12.5	-34.0 0	.0 0.7	40.5	54.0	-13.5	H	A	
High Ch, 5240MHz								
15.720 3.0 35.3 38.4 12.6	-34.0 0	.0 0.7	53.0	74.0	-21.0	v	Р	
15.720 3.0 22.1 38.4 12.6		.0 0.7	39.8	54.0	-14.2	v	Ā	
15.720 3.0 35.1 38.4 12.6		.0 0.7	52.9	74.0	-21.1	Ĥ	P	
15.720 3.0 22.1 38.4 12.6		.0 0.7	39.8	54.0	-14.2	H	A	,
			ĺ					
Rev. 4.1.2.7	above the s							

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## 9.2.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

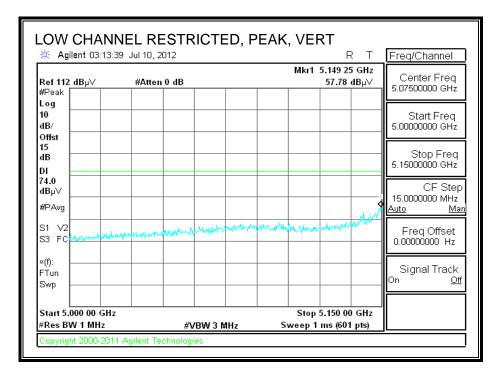
#### **RESTRICTED BANDEDGE (LOW CHANNEL)**

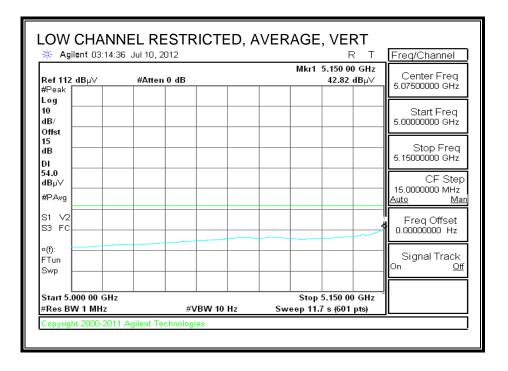




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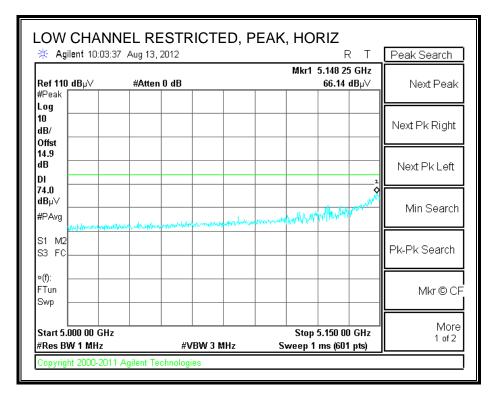
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

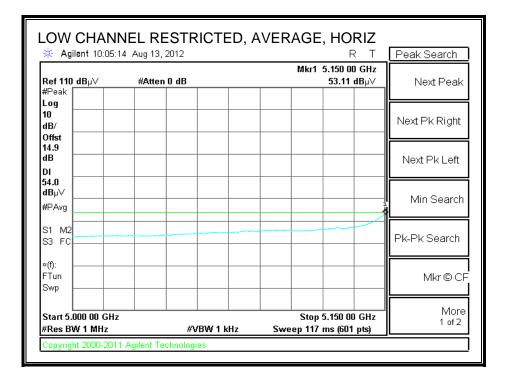
Itest Engr:       Chin Pang 08/06/12         Date:       08/06/12         Project #:       12/14507         Company:       Apple         Test Target:       FCC 15.407         Mode Oper:       HT20, TX, 5.2GHz         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength (@ 3 m)       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Average Limit         CL       Cable Loss       HPF       High Pass Filter       Margin vs. Peak Limit       Notes         f       Dist       Read       AF       CL       Anup D       Corr       Limit dBuV/m dBuV/m dBuV/m       Margin Ant. Pol.       Det.       Notes         f       Dist       Read       AF       CL       Anup D       O.7       53.9       74.0       -20.1       H       P         Low Ch, S180MHz       -       -       -       -       -       -       -       -       -       -       -       - </th <th>Complia</th> <th>nce Cer</th> <th>tification</th> <th>Service</th> <th>s, Frei</th> <th>nont 5n</th> <th>n Chamb</th> <th>er</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	Complia	nce Cer	tification	Service	s, Frei	nont 5n	n Chamb	er						
Project #:       12U14507         Company:       Apple         est Target:       FCC 15.407         Iode Oper:       HT20, TX, 5.2GHz         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Average Field Strength @ 3 m       Margin vs. Average Limit       Margin vs. Peak Limit         CL       Calculated Peak Field Strength       @ 3 m       Margin vs. Peak Limit       Det.       Notes         f       Mess       HE       High Pass Files       Her       Her       Her       Notes         f       Dist       Read       AF       Athenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Peak Limit       Notes         f       Mist       Read       AF       CL       Amp       D Corr       Itim tor       Margin vs. Peak Limit         c       GHz       MB/W       MB       dB       dB       BuV/m       MB       VH       P/A/QP         owth, S180MHz       0       0.0       0.7       53.6       74.0       -20.1       H       A <th>est Engr</th> <th></th> <th>Chin Pa</th> <th>ng</th> <th></th>	est Engr		Chin Pa	ng										
Company:         Apple est Target:         FCC 15.407 FCC 15.407           Idode Oper:         HT20, TX, 5.2GHz           f         Measurement Frequency Amp Dist         Preamp Gain Are Antenna D Corr         Average Field Strength Limit Distance to Antenna Read         Analyzer Reading Are Antenna Factor         Average Field Strength (@ 3 m Margin vs. Average Limit Margin vs. Peak Limit           f         Dist         Read         AF         Calculated Peak Field Strength         Margin vs. Peak Limit           CL         Cable Loss         HPF         High Pass Filter         Corr         Limit         Margin Ant. Pol.         Det.         Notes           f         Dist         Read         AF         CL         Sano         0.0         0.7         53.9         74.0         -20.1         H         P           s540         3.0         35.7         39.0         12.5         -34.0         0.0         0.7         53.6         74.0         -20.1         H         P         5540         3.0         35.7         39.0         12.5         -34.0         0.0         0.7         40.8         54.0         -13.2         H         A           600         3.0         35.7         38.8         12.5         -34.0         0.0         0.7	ate:		08/06/12	-										
f         Measurement Frequency Amp         Preamp Gain         Average Field Strength Limit           Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Rad         Analyzer Reading         Avg         Average Field Strength Q 3 m         Margin vs. Average Limit           AF         Antenna Factor         Peak         Teid Strength         Margin vs. Average Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit           f         Dist         Read         AF         CL         Cable Loss         HPF           stance         HPF         High Pass Filter         Margin vs. Peak Limit         Notes           f         Dist         Read         AF         CL         Amp         D Corr         53.9         74.0         -20.1         H         P         5.540         3.0         35.7         39.0         12.5         -34.0         0.0         0.7         53.6         74.0         -20.1         H         A           5.540         3.0         35.7         39.0         12.5         -34.0         0.0         0.7         53.6         74.0         -20.4         V         P      <	roject #	:	12U1450	7										
f       Measurement Frequency Amp Dist       Preamp Gain Distance Correct to 3 meters Aread       Average Field Strength Limit Peak Field Strength Limit Aread       Average Field Strength Limit Margin vs. Average Limit Margin vs. Average Limit Margin vs. Average Limit CL         f       Dist       Read Analyzer Reading AF       Average Antenna Factor Calculated Peak Field Strength @ 3 m Margin vs. Average Limit Margin vs. Average Limit Margin vs. Average Limit Margin vs. Peak Limit         f       Dist (m)       Read BW       AF       CL       Amp BB       D Corr BB       Limit dB       Margin vs. Average Limit Margin vs. Average Limit         f       Dist (m)       Read BW       AF       CL       Amp BB       D Corr       Limit dB       Margin vs. Average Limit         state       A       State       AF       Antenna Factor (a)       Peak       Calculated Peak Field Strength (b)       Margin vs. Average Limit         state       Margin vs. Peak Limit       Margin vs. Peak Limit       Margin vs. Peak Limit       Notes         f       Obst (a)       BB       O Corr       Filt       Corr       Limit Margin vs. Peak Limit         state       3.0       12.5       34.0       0.0       0.7       53.9       74.0       -20.1       H       P         5.540       3.0       12.5       34.0       0.0       <	Company		Apple											
f       Measurement Frequency Amp Dist       Preamp Gain       Average Field Strength Limit         Bist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength @ 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       HPF       High Pass Filter       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. Peak Limit         store       Margin vs. 5100       Julia       Julia <td< th=""><th>est Targ</th><th>et:</th><th>FCC 15.</th><th>407</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td<>	est Targ	et:	FCC 15.	407										
Dist         Distance to Antenna Read         D Corr         Distance Correct to 3 meters Arg         Peak Field Strength Limit Margin vs. Average Limit           AF         Antenna Factor CL         Cable Loss         Average Field Strength HPF         3 m         Margin vs. Average Limit           f         Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           f         Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           state         HPF         High Pass Filter         D         Orr         Fltr         Corr.         Limit         Margin vs. Peak Limit           state         A.0         35.7         39.0         12.5         -34.0         0.0         0.7         53.6         74.0         -20.1         H         P           5.540         3.0         35.4         39.0         12.5         -34.0         0.0         0.7         40.8         54.0         -13.2         H         A           5.540         3.0         22.6         39.0         12.5         -34.0         0.0         0.7         53.7         74	lode Op	er:	HT20, TX	i, 5.2GH	Iz									
Dist Read         Distance to Antenna Analyzer Reading AF         D Corr         Distance Correct to 3 meters Average Field Strength @ 3 m         Peak Field Strength Limit Margin vs. Average Limit Margin vs. Peak Limit           f         Dist CL         Read         AF         CL         Amp dB         D Corr         Fltr         Corr. dl         Limit         Margin vs. Average Limit           f         Dist CL         Read         AF         CL         Amp dB         D Corr         Fltr         Corr. dl         Limit         Margin vs. Peak Limit           f         Dist CH         Read         AF         CL         Amp dB         D Corr         Fltr         Corr. dl         Limit         Margin vs. Peak Limit           f         Dist CH         Read         AF         CL         Amp dB         D Corr         Fltr         Corr. dl         Limit         Margin vs. Peak Limit           i.so         3.0         35.7         39.0         12.5         -34.0         0.0         0.7         53.6         74.0         -20.1         H         A           i.so40         3.0         35.7         38.8         12.5         -34.0         0.0         0.7         53.6         74.0         -20.4         V         P <t< td=""><td></td><td>f</td><td>Measuren</td><td>nent Fred</td><td>mency</td><td>Amp</td><td>Preamp</td><td>Gain</td><td></td><td></td><td>Average</td><td>Field Stren</td><td>eth Limit</td><td></td></t<>		f	Measuren	nent Fred	mency	Amp	Preamp	Gain			Average	Field Stren	eth Limit	
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CL         Cable Loss         HPF         High Pass Filter           f         Dist (m)         Read dBuV         AF         CL dB         Amp dB         D Corr dB         Fltr dB         Corr. dB         Limit dB         Margin dB         Ant. Pol. V/H         Det. P/A/QP         Notes           ow Ch, 5180 (m)         dBuV         dB         dB         dB         dB         dB         dB         dB         V/H         P/A/QP           ow Ch, 5180 (m)         3.0         35.7         39.0         12.5         -34.0         0.0         0.7         53.9         74.0         -20.1         H         P           5.540         3.0         32.6         39.0         12.5         -34.0         0.0         0.7         40.8         54.0         -13.2         H         A           5.540         3.0         22.6         39.0         12.5         -34.0         0.0         0.7         53.6         74.0         -20.4         V         P           5.600         3.0         25.7         38.8         12.5         -34.0         0.0         0.7         53.7         74.0         -20.3         H         P           5.600         3.0         22.4         <			-	-		_	_			-	_	_		
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						•								Notes
5.540       3.0       35.7       39.0       12.5       -34.0       0.0       0.7       53.9       74.0       -20.1       H       P         5.540       3.0       22.6       39.0       12.5       -34.0       0.0       0.7       40.8       54.0       -13.2       H       A         5.540       3.0       35.4       39.0       12.5       -34.0       0.0       0.7       53.6       74.0       -20.4       V       P         5.540       3.0       22.6       39.0       12.5       -34.0       0.0       0.7       40.8       54.0       -13.2       H       A         5.540       3.0       22.6       39.0       12.5       -34.0       0.0       0.7       40.8       54.0       -13.2       V       A         5.600       3.0       35.7       38.8       12.5       -34.0       0.0       0.7       53.7       74.0       -20.3       H       P         5.600       3.0       22.4       38.8       12.5       -34.0       0.0       0.7       52.8       74.0       -21.2       V       P         5.600       3.0       22.3       38.8       12.5       -34				dB/m	dB	dB	dB	dB	dBuV/n	i dBuV/m	dB	V/H	P/A/QP	
5.540       3.0       22.6       39.0       12.5       -34.0       0.0       0.7       40.8       54.0       -13.2       H       A         5.540       3.0       35.4       39.0       12.5       -34.0       0.0       0.7       53.6       74.0       -20.4       V       P         5.540       3.0       22.6       39.0       12.5       -34.0       0.0       0.7       40.8       54.0       -13.2       V       A         5.540       3.0       22.6       39.0       12.5       -34.0       0.0       0.7       40.8       54.0       -13.2       V       A         6id Ch, 5200MHz														
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$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			<b>*</b>		¢		¢	¢			• <b>•</b> • • • • • • • • • • • • • • • • •			
Iid Ch, $5200MH_Z$ Image: Character of the system of			<b>*</b>		¢		¢	¢			· •			
5.600 $3.0$ $35.7$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $53.7$ $74.0$ $-20.3$ H       P         5.600 $3.0$ $22.4$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $40.4$ $54.0$ $-13.6$ H       A         5.600 $3.0$ $22.4$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $52.8$ $74.0$ $-21.2$ V       P         5.600 $3.0$ $22.3$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $52.8$ $74.0$ $-21.2$ V       P         5.600 $3.0$ $22.3$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $40.4$ $54.0$ $-13.6$ V       A         Iigh Ch. $5240$ MHz       Iigh Ch. $5240$ MHz<	5.540	3.0	22.0	39.0	14.5	-34.0	0.0	0.7	40.8	54.0	-13.2	v	A	
5.600 $3.0$ $35.7$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $53.7$ $74.0$ $-20.3$ H       P         5.600 $3.0$ $22.4$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $40.4$ $54.0$ $-13.6$ H       A         5.600 $3.0$ $22.4$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $52.8$ $74.0$ $-21.2$ V       P         5.600 $3.0$ $22.3$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $52.8$ $74.0$ $-21.2$ V       P         5.600 $3.0$ $22.3$ $38.8$ $12.5$ $-34.0$ $0.0$ $0.7$ $40.4$ $54.0$ $-13.6$ V       A         Iigh Ch. $5240$ MHz       Iigh Ch. $5240$ MHz<	Gd Ch	5200MTH			•									
5.600       3.0       22.4       38.8       12.5       -34.0       0.0       0.7       40.4       54.0       -13.6       H       A         5.600       3.0       34.8       38.8       12.5       -34.0       0.0       0.7       52.8       74.0       -21.2       V       P         5.600       3.0       22.3       38.8       12.5       -34.0       0.0       0.7       52.8       74.0       -21.2       V       P         5.600       3.0       22.3       38.8       12.5       -34.0       0.0       0.7       40.4       54.0       -13.6       V       A         iigh Ch, 5240MIHz			·····	38.8	12.5	-34.0	0.0	0.7	53.7	74.0	-20.3	н	Р	
5.600       3.0       34.8       38.8       12.5       -34.0       0.0       0.7       52.8       74.0       -21.2       V       P         5.600       3.0       22.3       38.8       12.5       -34.0       0.0       0.7       40.4       54.0       -13.6       V       A         ligh Ch, 5240MHz					¢		¢	¢				o		
5.600       3.0       22.3       38.8       12.5       -34.0       0.0       0.7       40.4       54.0       -13.6       V       A         figh Ch, 5240MHz					\$¢	·····	¢	¢						
5.720         3.0         35.0         38.4         12.6         -34.0         0.0         0.7         52.7         74.0         -21.3         H         P           5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         39.9         54.0         -14.1         H         A           5.720         3.0         34.4         38.4         12.6         -34.0         0.0         0.7         52.1         74.0         -21.9         V         P           5.720         3.0         34.4         38.4         12.6         -34.0         0.0         0.7         52.1         74.0         -21.9         V         P           5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         39.8         54.0         -14.2         V         A			••••••••		o		¢	¢						
5.720         3.0         35.0         38.4         12.6         -34.0         0.0         0.7         52.7         74.0         -21.3         H         P           5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         39.9         54.0         -14.1         H         A           5.720         3.0         34.4         38.4         12.6         -34.0         0.0         0.7         52.1         74.0         -21.9         V         P           5.720         3.0         34.4         38.4         12.6         -34.0         0.0         0.7         52.1         74.0         -21.9         V         P           5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         39.8         54.0         -14.2         V         A			ļ											
5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         39.9         54.0         -14.1         H         A           5.720         3.0         34.4         38.4         12.6         -34.0         0.0         0.7         52.1         74.0         -21.9         V         P           5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         52.1         74.0         -21.9         V         P           5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         39.8         54.0         -14.2         V         A			· · · · · · · · · · · · · · · · · · ·		ļ		ļ	ļ						
5.720         3.0         34.4         38.4         12.6         -34.0         0.0         0.7         52.1         74.0         -21.9         V         P           5.720         3.0         22.1         38.4         12.6         -34.0         0.0         0.7         39.8         54.0         -14.2         V         A			••••••••••••••••••••••••••••••••••••••		o		÷	¢					· · · · · · · · · · · · · · · · · · ·	
5.720 3.0 22.1 38.4 12.6 -34.0 0.0 0.7 39.8 54.0 -14.2 V A			••••••••••••••••••••••••••••••••••••••		\$¢	›	÷	¢			· • · · · · · · · · · · · · · · · · · ·			
			<b>*</b>		¢		¢	¢			· • · · · · · · · · · · · · · · · · · ·			
xev. 4.1.2.7	5.720	3.0	22.1	38.4	12.6	-34.0	0.0	0.7	39.8	54.0	-14.2	V	A	
ev. 4.1.2.7														
Note: No other emissions were detected above the system noise floor.			:											

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# 9.2.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

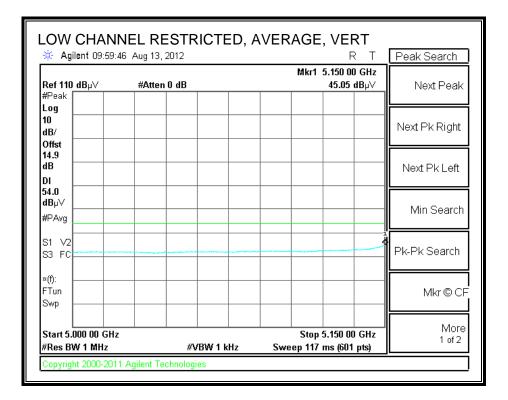
#### **RESTRICTED BANDEDGE (LOW CHANNEL)**





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we Agrient 09:5	7:30 Aug 13, 2012			RT	Peak Search
<b>Ref 110 dB</b> µ∨ #Peak	#Atten 0 dB		Mkr1 (	5.147 00 GHz 58.59 dBµ∨	Next Peak
Log 10 dB/					Next Pk Right
14.9 dB DI					Next Pk Left
74.0 dBµ∀ #PAvg				1	Min Search
M1 S2 S3 FC	niteristing (second rates and		ale a Vicen		Pk-Pk Search
×(f): FTun Swp					Mkr © CF
Start 5.000 00 G #Res BW 1 MHz		VBW 3 MHz		5.150 00 GHz ms (601 pts)	More 1 of 2



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#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

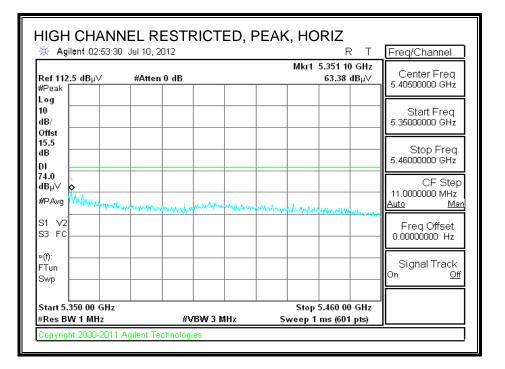
Project #:       12U14507         Company:       Apple         Fest Target:       FCC 15.407         Mode Oper:       HT40, 5.2GHz, TX         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength @ 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Peak Limit         cL       Cable Loss       HPF       High Pass Filter       Margin dBuV/mdBuV/mdBV/mdB       Det.       No         f5.570       3.0       34.9       38.9       12.5       -34.0       0.0       0.7       53.0       74.0       -21.0       V       P         15.570       3.0       35.7       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0       35.7       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0       35
Date:       08/06/12         Project #:       12U14507         Company:       Apple         Test Target:       FCC 15.407         Mode Oper:       HT40, 5.2GHz, TX         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength @ 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Peak Limit         CL       Cable Loss       HPF       High Pass Filter       Margin Nat. Pol.       Det.       No         GHz       (m)       dBuV       dB       dB       dB       dB       dB       V/m       P/A/QP       VP         Low Ch, 5190MHz
Date:       08/06/12         Project #:       12U14507         Company:       Apple         Test Target:       FCC 15.407         Mode Oper:       HT40, 5.2GHz, TX         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength @ 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Peak Limit         CL       Cable Loss       HPF       High Pass Filter       Margin Nat. Pol.       Det.       No         GHz       (m)       dBuV       dB       dB       dB       dB       dB       V/M       P/A/QP       No         15.570       3.0       22.5       38.9       12.5       -34.0       0.0       0.7       53.0       74.0       -21.0       V       P         15.570       3.0       22.6       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0
Project #: 12U14507 Company: Apple Test Target: FCC 15.407 Mode Oper: HT40, 5.2GHz, TX f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Average Limit CL Cable Loss HPF High Pass Filter f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin Ant. Pol. Det. No GHz (m) dBuV dB/m dB
Company:       Apple         Test Target:       FCC 15.407         Mode Oper:       HT40, 5.2GHz, TX         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength Q 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Peak Limit         CL       Cable Loss       HPF       High Pass Filter       Corr.       Limit       Margin Ant. Pol.       Det.       No         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. Peak Limit         cl       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. VP       Piant         low       Ch       dB       dB       dB       dB       O       O
Test Target:       FCC 15.407         Mode Oper:       HT40, 5.2GHz, TX         f       Measurement Frequency Amp Dist       Preamp Gain Distance to Antenna       Average Field Strength Limit         Read       Analyzer Reading AF       Avg       Average Field Strength (@ 3 m Average Field Strength)       Average Limit         AF       Antenna Factor       Peak Peak       Calculated Peak Field Strength       Margin vs. Average Limit         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs.       Peak       No         f       Dist       Read       AF       CL       Amp       D Corr       Fltr       Corr.       Limit       Margin vs.       Peak       Dotov       Pio       Dotov<
Mode Oper:         HT40, 5.2GHz, TX           f         Measurement Frequency Amp Dist         Preamp Gain Distance to Antenna         Average Field Strength Limit           Read         Analyzer Reading AF         Average         Average Field Strength @ 3 m Margin vs. Average Limit           AF         Antenna Factor CL         Peak         Calculated Peak Field Strength Margin vs. Average Limit           f         Dist CL         Read Buby MBV         AF         CL         Amp Buby AB         D Corr Blt         Fltr Corr.         Limit Limit         Margin vs. Average Limit           f         Dist         Read         AF         CL         Amp BdB         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           f         Dist CHz         Read         AF         CL         Amp BdB         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           f         Dist         Read         AF         CL         Amp BdB         D Corr         Fltr         Corr.         Limit         Margin vs.         Peak         No           f         Dist         Read         AF         CL         Amp BdB         D Corr         Fltr         Corr.         Limit         Margin vs.         No
fMeasurement Frequency Amp Distance to Antenna ReadProcessPreamp Gain Distance Correct to 3 meters Distance Correct to 3 meters Peak Field Strength Limit Margin vs. Average Limit Margin vs. Average Limit Margin vs. Peak Limit Margin vs. Peak Limit Margin vs. Peak LimitfDist CLRead Cable LossAF CLCLAmp ABD Corr BFltr BCorr. Corr.Limit Margin vs. Peak Limit Margin vs. Peak LimitDet. PANofDist CHzRead (m)AF dBuV dB/mCLAmp ABD Corr dBFltr Corr.Limit Margin vs. Peak LimitDet. PA/QPNofDist CHzRead (m)AF dBCLAmp ABD CorrFltr dBCorr. dBLimit Margin vs. Peak LimitfDist CHzRead (m)AF dBCLAmp ABD CorrFltr Corr.Limit Margin vs. Peak LimitfDist AB dBRead dBAF dBCorr.Limit Margin vs. Peak LimitDet.NofDist CHzRead dBAF dBCLAmp ABD CorrFltr Corr.Limit Margin vs. Peak LimitNofDist AB BRead dBD CorrFltr AB dBCorr.Limit Margin vs. Peak LimitDet.NofDistore CHzRead dBD CorrFltr dBCorr.Limit MB dBMargin vs. Peak LimitNofDistore CHzDistore <br< th=""></br<>
Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit         Margin vs. Peak Limit           f         Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           GHz         (m)         dBuV         dB         dB         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           Low Ch, 5190MHz         0         0         0.7         53.0         74.0         -21.0         V         P           15.570         3.0         34.9         38.9         12.5         -34.0         0.0         0.7         53.0         74.0         -21.0         V         P           15.570         3.0         35.7         38.9         12.5         -34.0         0.0         0.7         53.8         74.0         -
Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Peak Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit         Margin vs. Peak Limit           f         Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           f         Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           Low Ch, 5190MHz         Image: Size
Read AF CL         Analyzer Reading Arg Cable Loss         Avg Peak HPF         Average Field Strength (2) 3 m Calculated Peak Field Strength High Pass Filter         Margin vs. Average Limit Margin vs. Peak Limit           f         Dist CL         Read dBuV         AF dB         CL         Amp AB         D Corr dB         Fltr Cable Loss         Corr. Limit         Limit Margin vs. Peak Limit         Det. P/A/QP         No           f         Dist CHz         Read dBuV         AF dB         CL         Amp AB         D Corr dB         Fltr Corr.         Limit Margin vs. Peak Limit         Det.         No           15.570         3.0         34.9         38.9         12.5         -34.0         0.0         0.7         53.0         74.0         -21.0         V         P           15.570         3.0         35.7         38.9         12.5         -34.0         0.0         0.7         53.8         74.0         -20.2         V         P           15.570         3.0         35.7         38.9         12.5         -34.0         0.0         0.7         53.8         74.0         -20.2         V         P           15.570         3.0         35.7         38.9         12.5         -34.0         0.0         0.7         40.7 <td< td=""></td<>
AF CL       Antenna Factor Cable Loss       Peak HPF       Calculated Peak Field Strength High Pass Filter       Margin vs. Peak Limit         f       Dist CHz       Read dBuV       AF dB       CL       Amp dB       D Corr dB       Fltr       Corr. dB       Limit dB       Margin vs. Peak Limit         f       Dist CHz       Read (m)       AF dB       CL       Amp dB       D Corr dB       Fltr       Corr. dB       Limit dB       Margin vs. Peak Limit         f       Dist (m)       Read dBvV       AF dB       CL       Amp dB       D Corr dB       Fltr       Corr. dB       Limit dB       Margin vs. Peak Limit         f       Dist (m)       Read dBvV       AF dB       CL       Amp dB       D Corr       Fltr dB       Limit dBvV/m       Margin Ant. Pol. DV       Det. P/A/QP       No         Low Ch, 5190MHz       38.9       12.5       -34.0       0.0       0.7       53.0       74.0       -21.0       V       P         15.570       3.0       32.6       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0
CL         Cable Loss         HPF         High Pass Filter           f         Dist (m)         Read BuV         AF (BuV         CL dB         Amp dB         D Corr dB         Filtr dB         Corr. dB         Limit dB         Margin dB         Ant. Pol. V/H         Det. P/A/QP         No           Low Ch, 5190MHz
CHz         (m)         dBuV         dB/m         dB         dB         dB         dB         dB         dB         Um         dB         V/H         P/A/QP           Low Ch, 5190MIHz         34.9         38.9         12.5         -34.0         0.0         0.7         53.0         74.0         -21.0         V         P           15.570         3.0         34.9         38.9         12.5         -34.0         0.0         0.7         53.0         74.0         -21.0         V         P           15.570         3.0         22.5         38.9         12.5         -34.0         0.0         0.7         40.6         54.0         -13.4         V         A           15.570         3.0         35.7         38.9         12.5         -34.0         0.0         0.7         53.8         74.0         -20.2         V         P           15.570         3.0         22.6         38.9         12.5         -34.0         0.0         0.7         40.7         54.0         -13.3         V         A           15.570         3.0         22.6         38.9         12.5         -34.0         0.0         0.7         40.7         54.0         -13.
CHz         (m)         dBuV         dB/m         dB         dB         dB         dB         dB         dB         Um         dB         V/H         P/A/QP           Low Ch, 5190MIHz         34.9         38.9         12.5         -34.0         0.0         0.7         53.0         74.0         -21.0         V         P           15.570         3.0         34.9         38.9         12.5         -34.0         0.0         0.7         53.0         74.0         -21.0         V         P           15.570         3.0         22.5         38.9         12.5         -34.0         0.0         0.7         40.6         54.0         -13.4         V         A           15.570         3.0         35.7         38.9         12.5         -34.0         0.0         0.7         53.8         74.0         -20.2         V         P           15.570         3.0         22.6         38.9         12.5         -34.0         0.0         0.7         40.7         54.0         -13.3         V         A           15.570         3.0         22.6         38.9         12.5         -34.0         0.0         0.7         40.7         54.0         -13.
Low Ch, 5190MHz         Interference         Interferen
15.570       3.0       34.9       38.9       12.5       -34.0       0.0       0.7       53.0       74.0       -21.0       V       P         15.570       3.0       22.5       38.9       12.5       -34.0       0.0       0.7       40.6       54.0       -13.4       V       A         15.570       3.0       35.7       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0       35.7       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0       22.6       38.9       12.5       -34.0       0.0       0.7       40.7       54.0       -13.3       V       A         15.570       3.0       22.6       38.9       12.5       -34.0       0.0       0.7       40.7       54.0       -13.3       V       A         High Ch, 5230MHz
15.570       3.0       22.5       38.9       12.5       -34.0       0.0       0.7       40.6       54.0       -13.4       V       A         15.570       3.0       35.7       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0       22.6       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0       22.6       38.9       12.5       -34.0       0.0       0.7       40.7       54.0       -13.3       V       A         High Ch, 5230MHz         15.690       3.0       35.9       38.5       12.6       -34.0       0.0       0.7       53.7       74.0       -20.3       H       P         15.690       3.0       22.5       38.5       12.6       -34.0       0.0       0.7       40.3       54.0       -13.7       H       A
15.570       3.0       35.7       38.9       12.5       -34.0       0.0       0.7       53.8       74.0       -20.2       V       P         15.570       3.0       22.6       38.9       12.5       -34.0       0.0       0.7       40.7       54.0       -13.3       V       A         High Ch, 5230MHz         15.690       3.0       35.9       38.5       12.6       -34.0       0.0       0.7       53.7       74.0       -20.3       H       P         15.690       3.0       22.5       38.5       12.6       -34.0       0.0       0.7       40.3       54.0       -13.7       H       A
High Ch, 5230MHz 15.690 3.0 35.9 38.5 12.6 -34.0 0.0 0.7 53.7 74.0 -20.3 H P 15.690 3.0 22.5 38.5 12.6 -34.0 0.0 0.7 40.3 54.0 -13.7 H A
High Ch, 5230MHz 15.690 3.0 35.9 38.5 12.6 -34.0 0.0 0.7 53.7 74.0 -20.3 H P 15.690 3.0 22.5 38.5 12.6 -34.0 0.0 0.7 40.3 54.0 -13.7 H A
15.690         3.0         35.9         38.5         12.6         -34.0         0.0         0.7         53.7         74.0         -20.3         H         P           15.690         3.0         22.5         38.5         12.6         -34.0         0.0         0.7         40.3         54.0         -13.7         H         A
15.690 3.0 22.5 38.5 12.6 -34.0 0.0 0.7 40.3 54.0 -13.7 H A
15.690 3.0 22.5 38.5 12.6 -34.0 0.0 0.7 40.3 54.0 -13.7 H A
15.690 3.0 35.9 38.5 12.6 -34.0 0.0 0.7 53.8 74.0 -20.2 V P
15.690 3.0 22.5 38.5 12.6 -34.0 0.0 0.7 40.3 54.0 -13.7 V A
Rev. 4.1.2.7 Note: No other emissions were detected above the system noise floor.

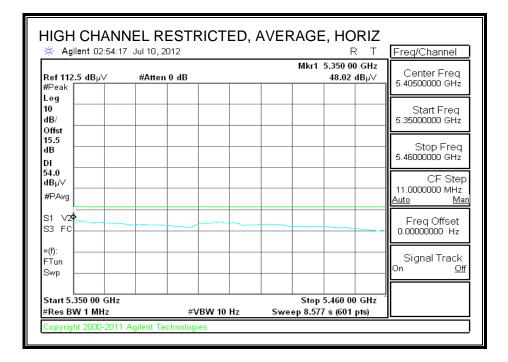
UL CCS FORM NO: CCSUP4701H 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

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# 9.2.4. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

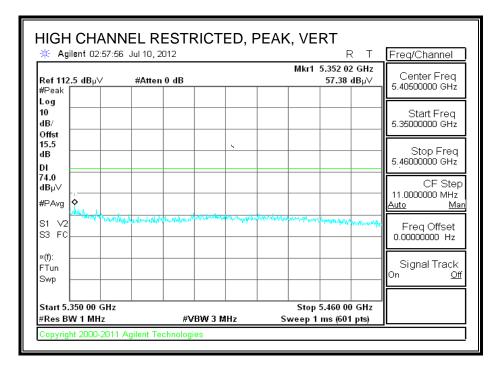
#### **RESTRICTED BANDEDGE (HIGH CHANNEL)**

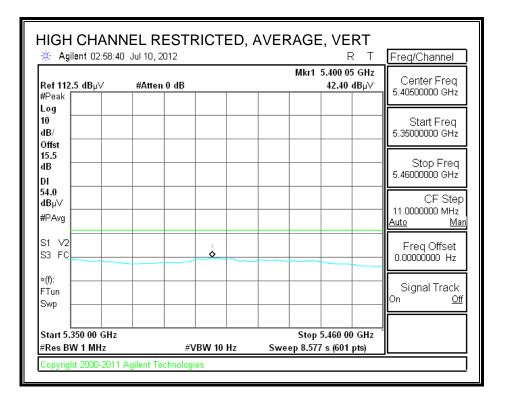




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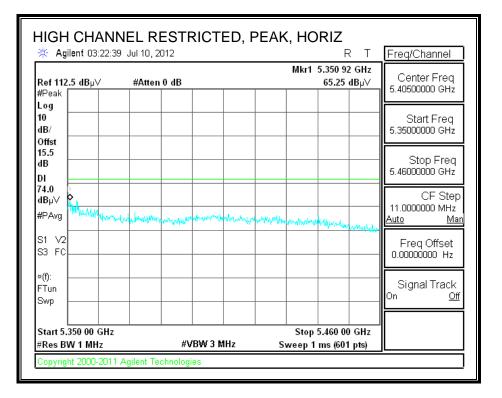
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

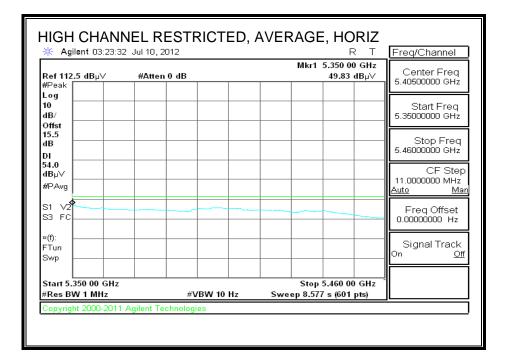
Company: Fest Target:         Apple FCC 15.407           Image: Formation of the property of the pro			Chin De											
Project #: 12U14507 Company: Apple Test Target: FCC 15.407 Mode Oper: a mode, 5.3GHz	_	•		-										
Company: Test Target:         Apple FCC 15.407           Istance to Antenna Read AF         D Corr         Distance Correct to 3 meters AF         Average Field Strength Limit Margin vs. Average Limit Margin vs. Average Limit Margin vs. Average Limit CL           f         Measurement Frequency Amp AF         Preamp Gain Avg         Average Field Strength Limit Margin vs. Average Limit Margin vs. Average Limit Margin vs. Peak Limit CL           f         Dist nee to Antenna Read         Avg         Average Field Strength @ 3 m Arg         Margin vs. Peak Limit Margin vs. Peak Limit           f         Dist         Read         AF         CL         Margin Ant. Pol.         Det.           chulded Peak Field Strength         Margin vs. Peak Limit         Margin vs. Peak Limit         Margin vs. Peak Limit           f         Dist         Read         AF         CL         Antenna         D           f         MBUV         dB         dB         dB         dB         VH         P/A/QP           Low Ch. 5260MHz                  15.780         3.0         35.4         38.2         12.6         33.9         0.0         0.7         39.9         54.0         -14.1         H           Mid Ch. 5300MHz <th></th>														
Test Target:       FCC 15.407         Mode Oper:       a mode, 5.3CHz         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Bist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength       Margin vs. Average Limit       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Average Limit       Margin vs. Peak Limit         ft       Ibist       Read       AF       CL       Cable Loss       HPF       High Pass Filter         ft       Mode       Or       S1.5       74.0       -20.5       V       P         li5.780       3.0       35.2       12.6       -33.9       0.0       0.7       53.5       74.0       -20.5       V       P         li5.780       3.0       22.2       38.2       12.6       -33.9       0.0       0.7       53.5       74.0       -20.5       V       P         li5.780       3.0       22.3       38.2       12.6       -33.9       0.0       0.7       53.0       74.0       -21.0       H				· ·										
Mode Oper:         a mode, 5.3CHz           f         Measurement Frequency Amp Distance to Antenna Read Analyzer Reading Ar Antenna Factor CL         Pream Distance Correct to 3 meters Antenna Factor CL         Average Field Strength Limit Margin vs. Average Limit Vs. Pek Limit Passo 15.700 3.0     Option Solve Solve Vs. P       15.700 4.0     21.2     38.2     12.6     -33.9     0.0     0.7     53.0     74.0     -20.5     V     P           15.700 3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -26.3         V			••	407										
f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak       Field Strength Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength @ 3 m       Margin vs. Average Limit       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       High Pass Filter         f       Dist       Read       AF       CL       Amp       D Corr       Limit       Margin vs. Peak Limit         f       Dist       Read       AF       CL       Amp       D Corr       Limit       Margin vs. Peak Limit       Notes         f       Dist       Read       AF       CL       Amp       D Corr       Titr       Corr.       Limit       Margin vs. Peak Limit       Notes         f       Dist       Read       AF       CL       Amp       D.00       0.7       53.5       74.0       -20.5       V       P         Low Ch, 5260MHz       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - </th <th>-</th> <th></th>	-													
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Niode Op	er.	a moue,	5.56112										
Dist Read AF         Distance to Antenna Analyzer Reading AF         D Corr Antenna Factor CL         D Corr Peak Calculated Peak Field Strength @ 3 m Calculated Peak Field Strength HpF         Peak Limit High Pass Filter         Margin vs. Average Limit Margin vs. Peak Limit           f         Dist CHz         Read (m)         AF         CL         Amp BB         D Corr BB         Fltr Calculated Peak Field Strength BB         Margin vs. Average Limit Margin vs. Peak Limit           f         Dist (m)         Read BB         AF         CL         Amp BB         D Corr BB         Fltr Calculated Peak Field Strength         Margin vs. Peak Limit           f         Dist (m)         Read BB         AF         CL         Amp BB         D Corr         Fltr BB         Corr.         Limit Margin vs. Peak Limit         Margin vs. Peak Limit           f         Oist (HZ)         AF         CL         Amp BB         D Corr         Fltr VB         Corr.         Limit BB         Margin vs. Peak Limit           f         Mid Dt.         S5.0         3.0         0.1         0.7         53.5         74.0         -20.5         V         P           15.780         3.0         22.3         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -26.3         V         P<		f	Measuren	nent Fred	wency	Amp	Preamp (	Gain			Average	Field Stren	eth Limit	
Read AF CL         Analyzer Reading Atransma Factor Cable Loss         Average Field Strength HPF $3 \text{ m}$ HPF         Margin vs. Average Limit Margin vs. Peak Limit         Margin vs. Peak Limit           f         Dist CH         Read (m)         AF BBU         CL         Amp BB         D Corr BB         Field Strength BB         Margin vs. Average Limit Margin vs. Peak Limit         Margin vs. Peak Limit           f         Dist CH         Read BB         AF BB         CL         Amp BB         D Corr BB         Limit BB         Margin vs. Average Limit Margin vs. Peak Limit           10000         30.0         35.9         38.2         12.6         -33.9         0.0         0.7         53.6         74.0         -20.5         V         P           15.780         3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -21.0         H         P           15.780         3.0         22.3         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -21.0         H         P           16.780         3.0         22.3         38.3         9.7         -35.7         0.0         0.8         45.0         -14.1         H         A </td <td></td> <td>Dist</td> <td></td> <td></td> <td></td> <td>•</td> <td>•</td> <td></td> <td>t to 3 me</td> <td>ters</td> <td>_</td> <td></td> <td>-</td> <td></td>		Dist				•	•		t to 3 me	ters	_		-	
AF CL         Antenna Factor Cable Loss         Peak HPF         Calculated Peak Field Strength High Pass Filter         Margin vs. Peak Limit Margin vs. Peak Limit           f         Dist CHz         Read (m)         AF dB/m         CL         Amp dB         D Corr dB         Fltr         Corr. dB         Limit dB         Margin vs. Peak Limit dB         Notes           f         Dist CHz         Read (m)         AF dB/m         CL         Amp dB         D Corr         Fltr         Corr. dB         Limit dBuV/m         Margin vs. Peak Limit           15.780         3.0         35.9         38.2         12.6         -33.9         0.0         0.7         53.5         74.0         -20.5         V         P           15.780         3.0         32.2         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -21.0         H         P           15.780         3.0         22.3         38.2         12.6         -33.9         0.0         0.7         39.9         54.0         -14.1         H         A           Mid Ch, 5300MHz         -         -         -         -         -         -         -         -         -         -         -         -		Read										_		
CL         Cable Loss         HPF         High Pass Filter           f         Dist GHz         Read (m)         AF         CL         Amp B         D Corr B         Fltr         Corr. B         Limit B         Margin B         Ant. Pol. B         Det. P/A/QP         Notes           Low Ch, 5200MHz		AF	-	-		-	-				-	-		
CHz         (m)         dBuV         dB         dB </td <td></td> <td>CL</td> <td>Cable Los</td> <td>88</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td>		CL	Cable Los	88						-	-			
Low Ch, 5260/Hz         -	f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
15.780       3.0       35.9       38.2       12.6       -33.9       0.0       0.7       53.5       74.0       -20.5       V       P         15.780       3.0       22.2       38.2       12.6       -33.9       0.0       0.7       39.8       54.0       -14.2       V       A         15.780       3.0       35.4       38.2       12.6       -33.9       0.0       0.7       53.0       74.0       -21.0       H       P         15.780       3.0       22.3       38.2       12.6       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         15.780       3.0       34.7       38.3       9.7       -35.7       0.0       0.8       47.7       74.0       -26.3       V       P         10.600       3.0       34.7       38.3       9.7       -35.7       0.0       0.8       35.0       54.0       -19.0       V       A         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         16.600       3.0       22.6       37.8       12.7       <	GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Low Ch, s	5260MH	z											
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	15.780	3.0	35.9	38.2	12.6	-33.9	0.0	0.7	53.5	74.0	-20.5	V	P	
15.780       3.0       22.3       38.2       12.6       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         Mid Ch, 5300MHz					¢	¢					<b>*</b>	å	····· • • • • • • • • • • • • • • • • •	
Mid Ch, 5300MHz         Mid Ch, 5300MHz         Mid Ch, 5300MHz         Mid Ch, 5300MHz           10.600         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         V         P           10.600         3.0         22.0         38.3         9.7         -35.7         0.0         0.8         35.0         54.0         -19.0         V         A           15.900         3.0         35.5         37.8         12.7         -33.9         0.0         0.7         52.7         74.0         -21.3         V         P           15.900         3.0         22.6         37.8         12.7         -33.9         0.0         0.7         52.7         74.0         -21.3         V         P           15.900         3.0         22.6         37.8         12.7         -33.9         0.0         0.7         53.1         74.0         -26.0         H         P           10.600         3.0         22.6         37.8         12.7         -33.9         0.0         0.7         53.1         74.0         -26.9         H         P           15.900         3.0         21.6         37.8 <td></td> <td></td> <td>• • • • • • • • • • • • • • • • • • • •</td> <td></td> <td><b>***********</b>*********</td> <td>¢</td> <td>÷</td> <td></td> <td></td> <td></td> <td></td> <td>۵</td> <td></td> <td></td>			• • • • • • • • • • • • • • • • • • • •		<b>***********</b> *********	¢	÷					۵		
10.600       3.0       34.7       38.3       9.7       -35.7       0.0       0.8       47.7       74.0       -26.3       V       P         10.600       3.0       22.0       38.3       9.7       -35.7       0.0       0.8       35.0       54.0       -19.0       V       A         15.900       3.0       35.5       37.8       12.7       -33.9       0.0       0.7       52.7       74.0       -21.3       V       P         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         10.600       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         10.600       3.0       22.4       38.3       9.7       -35.7       0.0       0.8       35.4       54.0       -18.6       H       A         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         15.900       3.0       21.6       37.8       12.7 <td< td=""><td>15.780</td><td>3.0</td><td>22.3</td><td>38.2</td><td>12.6</td><td>-33.9</td><td>0.0</td><td>0.7</td><td>39.9</td><td>54.0</td><td>-14.1</td><td>H</td><td>A</td><td></td></td<>	15.780	3.0	22.3	38.2	12.6	-33.9	0.0	0.7	39.9	54.0	-14.1	H	A	
10.600       3.0       34.7       38.3       9.7       -35.7       0.0       0.8       47.7       74.0       -26.3       V       P         10.600       3.0       22.0       38.3       9.7       -35.7       0.0       0.8       35.0       54.0       -19.0       V       A         15.900       3.0       35.5       37.8       12.7       -33.9       0.0       0.7       52.7       74.0       -21.3       V       P         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         10.600       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         10.600       3.0       22.4       38.3       9.7       -35.7       0.0       0.8       35.4       54.0       -18.6       H       A         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         15.900       3.0       21.6       37.8       12.7 <td< td=""><td></td><td>2003 07</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>		2003 07												
10.600       3.0       22.0       38.3       9.7       -35.7       0.0       0.8       35.0       54.0       -19.0       V       A         15.900       3.0       35.5       37.8       12.7       -33.9       0.0       0.7       52.7       74.0       -21.3       V       P         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         10.600       3.0       35.0       38.3       9.7       -35.7       0.0       0.8       48.0       74.0       -26.0       H       P         10.600       3.0       22.4       38.3       9.7       -35.7       0.0       0.8       48.0       74.0       -26.0       H       P         10.600       3.0       22.4       38.3       9.7       -35.7       0.0       0.8       35.4       54.0       -18.6       H       A         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         15.900       3.0       21.5       37.8       12.7				20.2	07	25 7	0.0	0.0	47.7	74.0	26.2	v	ъ	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					å	ò	÷				å	å		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			• • • • • • • • • • • • • • • • • • • •		¢	o	<b>*</b>	›			\$			
10.600       3.0       35.0       38.3       9.7       -35.7       0.0       0.8       48.0       74.0       -26.0       H       P         10.600       3.0       22.4       38.3       9.7       -35.7       0.0       0.8       35.4       54.0       -18.6       H       A         15.900       3.0       35.8       37.8       12.7       -33.9       0.0       0.7       53.1       74.0       -20.9       H       P         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         High Ch, 5320MHz         Index to the second		•••••••••••••••••••	• • • • • • • • • • • • • • • • • • • •		¢	••••••••••••••••••••••••••••••••••••••	¢	·····			••••••••	o		
10.600       3.0       22.4       38.3       9.7       -35.7       0.0       0.8       35.4       54.0       -18.6       H       A         15.900       3.0       35.8       37.8       12.7       -33.9       0.0       0.7       53.1       74.0       -20.9       H       P         15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         High Ch, 5320MHz         Index of the second			• • • • • • • • • • • • • • • • • • • •		¢	¢	<b>*</b>	,			<b>*</b>	¢	····· • • • • • • • • • • • • • • • • •	
15.900       3.0       22.6       37.8       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         High Ch, 5320MHz	10.600	3.0	22.4	38.3	9.7	-35.7	0.0	0.8	35.4	54.0		H	A	
High Ch, 5320MHz         -	15.900	3.0	35.8	37.8	12.7	-33.9	0.0	0.7	53.1	74.0	-20.9	H	P	
10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         V         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         V         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.5         54.0         -19.5         V         A           15.960         3.0         35.9         37.6         12.7         -33.9         0.0         0.7         53.0         74.0         -21.0         V         P           15.960         3.0         22.6         37.6         12.7         -33.9         0.0         0.7         39.7         54.0         -14.3         V         A           10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         H         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4 <td>15.900</td> <td>3.0</td> <td>22.6</td> <td>37.8</td> <td>12.7</td> <td>-33.9</td> <td>0.0</td> <td>0.7</td> <td>39.9</td> <td>54.0</td> <td>-14.1</td> <td>H</td> <td>A</td> <td></td>	15.900	3.0	22.6	37.8	12.7	-33.9	0.0	0.7	39.9	54.0	-14.1	H	A	
10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         V         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         V         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.5         54.0         -19.5         V         A           15.960         3.0         35.9         37.6         12.7         -33.9         0.0         0.7         53.0         74.0         -21.0         V         P           15.960         3.0         22.6         37.6         12.7         -33.9         0.0         0.7         39.7         54.0         -14.3         V         A           10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         H         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>ļ</td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td></td> <td></td>							ļ					•		
10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.5         54.0         -19.5         V         A           15.960         3.0         35.9         37.6         12.7         -33.9         0.0         0.7         53.0         74.0         -21.0         V         P           15.960         3.0         22.6         37.6         12.7         -33.9         0.0         0.7         39.7         54.0         -14.3         V         A           15.960         3.0         22.6         37.6         12.7         -33.9         0.0         0.7         39.7         54.0         -14.3         V         A           10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         H         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           15.960         3.0         35.8         37.6         12.7         -33.9         0.0         0.7         52.9         74.0         -21.1<						~		~ ~					_	
15.960         3.0         35.9         37.6         12.7         -33.9         0.0         0.7         53.0         74.0         -21.0         V         P           15.960         3.0         22.6         37.6         12.7         -33.9         0.0         0.7         39.7         54.0         -14.3         V         A           10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         H         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           15.960         3.0         35.8         37.6         12.7         -33.9         0.0         0.7         52.9         74.0         -21.1         H         P			• • • • • • • • • • • • • • • • • • • •		¢	¢		,			\$	¢	····· • • • • • • • • • • • • • • • • •	
15.960         3.0         22.6         37.6         12.7         -33.9         0.0         0.7         39.7         54.0         -14.3         V         A           10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         H         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           15.960         3.0         35.8         37.6         12.7         -33.9         0.0         0.7         52.9         74.0         -21.1         H         P			• • • • • • • • • • • • • • • • • • • •		¢	¢	<b>*</b>	,			<b>*</b>	٥		
10.640         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         H         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         47.7         74.0         -26.3         H         P           10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           15.960         3.0         35.8         37.6         12.7         -33.9         0.0         0.7         52.9         74.0         -21.1         H         P			• • • • • • • • • • • • • • • • • • • •		¢	¢	¢				\$			
10.640         3.0         21.5         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           15.960         3.0         35.8         37.6         12.7         -33.9         0.0         0.7         52.9         74.0         -21.1         H         P			• • • • • • • • • • • • • • • • • • • •		¢	¢	¢				\$	å		
15.960 3.0 35.8 37.6 12.7 -33.9 0.0 0.7 52.9 74.0 -21.1 H P					¢	¢	¢					ö		
······································			• • • • • • • • • • • • • • • • • • • •		å	¢	¢				<b></b>	\$		
	15.960	3.0	22.6	37.6	12.7	-33.9	0.0	0.7	39.7	54.0	-14.3	H	·····	
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# 9.2.5. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

#### **RESTRICTED BANDEDGE (HIGH CHANNEL)**

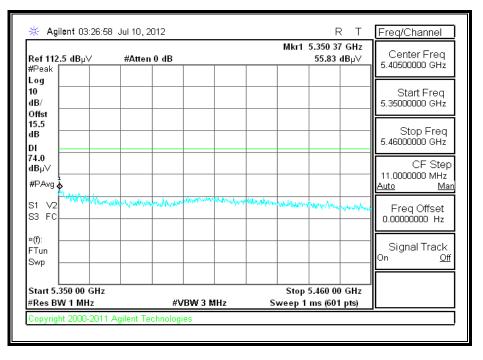


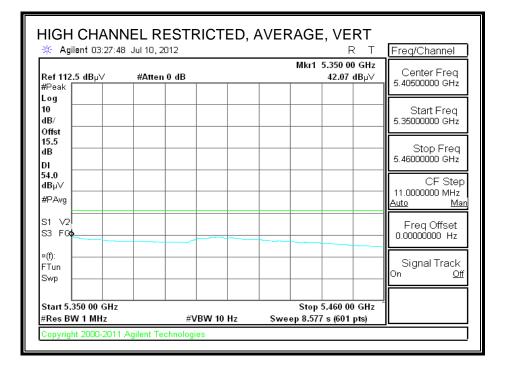


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## HIGH CHANNEL RESTRICTED, PEAK, VERT





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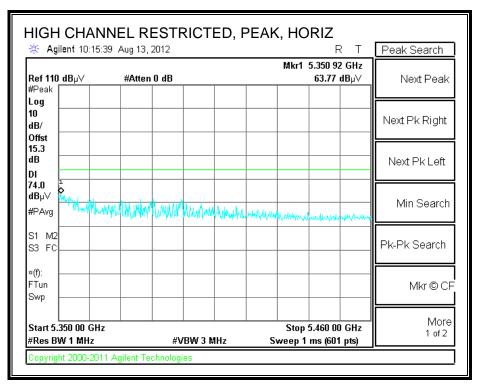
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

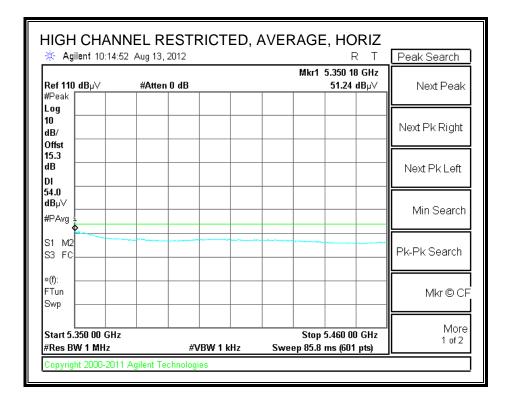
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t:	12U1450 Apple FCC 15.4	07										
t:	FCC 15.4	407										
		407										
r:	HT20. 5.,											
	,,	3GHz										
f	Measurem			-	Preamp (				-	Field Stren	-	
Dist	Distance	to Anter	nna	D Corr	Distance	Correc	ct to 3 me	aters	Peak Fie	ld Strength	Limit	
Read	-	-	4	Avg	-				-	-		
AF				Peak				ength	Margin v	rs. Peak Lis	mit	
CL	Cable Los	\$ <b>5</b>		HPF	High Pas	s Filter	r					
Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/n	dBuV/m	dB	V/H	P/A/QP	
		28.7	12.6	22.0	0.0	07	<b>53.0</b>	74.0	21.0	u	n	
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3.0	22.2	38.2	12.6	-33.9	0.0	0.7	39.8	54.0	-14.2	v		
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3.0	34.2		9.7	·	0.0	¢	47.1	74.0	-26.9	H	P	
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3.0	35.4	37.8	12.7	-33.9	0.0	0.7	52.7	74.0		v		
3.0	22.6	37.8	12.7		0.0	0.7	39.9	54.0	-14.1	V	A	
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		20.2	0.7	25 7	0.0		40 5	74.0		U		
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	·		·			¢				å	·····	
3.0	34.6	38.3	9.7	-35.7	0.0	0.8	47.6		-26.4	V	P	
3.0	21.6	38.3	9.7	-35.7	0.0	0.8	34.6	54.0	-19.4	V	A	
5.0		37.6	12.7	-33.9	0.0	0.7	52.9	74.0	-21.1	V	P	
3.0 3.0	35.7 22.6		12.7	-33.9	0.0	0.7	39.8	54.0	-14.2	v	Α	
2	Dist Read AF CL <b>Dist</b> (m) <b>3.0</b> 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Dist         Distance           Read         Analyzer           AF         Antenna           CL         Cable Los           Dist         Read           (m)         dBuV           600MHz         3.0           3.0         35.4           3.0         35.5           3.0         22.2           3.0         35.5           3.0         22.2           000MHz         3.0           3.0         21.6           3.0         22.6           3.0         21.6           3.0         25.4           3.0         22.6           3.0         35.4           3.0         22.6           3.0         35.4           3.0         22.6           3.0         35.4           3.0         35.5           3.0         35.5           3.0         35.5           3.0         21.6           3.0         35.5           3.0         35.5           3.0         35.5           3.0         21.6	Dist         Distance to Anter           Read         Analyzer Reading           AF         Antenna Factor           CL         Cable Loss           Dist         Read         AF           (m)         dBuV         dB/m           600MHz         30.         35.4         38.2           3.0         22.2         38.2         3.0         25.5         38.2           3.0         25.5         38.2         3.0         35.5         38.3           3.0         21.6         38.3         3.0         21.6         38.3           3.0         21.6         38.3         3.0         21.6         38.3           3.0         21.6         38.3         3.0         21.6         38.3           3.0         21.6         38.3         3.0         21.6         38.3           3.0         21.6         38.3         3.0         21.6         38.3           3.0         21.6         38.3         3.0         21.6         38.3           3.0         21.6         38.3         3.0         21.6         38.3           3.0         21.6         38.3         3.0         21.6         38.3	Dist         Distance to Antenna           Read         Analyzer Reading           AF         Antenna Factor           CL         Cable Loss           Dist         Read         AF         CL           (m)         dBuV         dB/m         dB           260MHz	Dist         Distance to Antenna         D Corr           Read         Analyzer Reading         Avg           AF         Antenna Factor         Peak           CL         Cable Loss         HPF           Dist         Read         AF         CL         Amp           (m)         dBuV         dB/m         dB         dB           260MHz	Dist         Distance to Antenna         D Corr         Distance           Read         Analyzer Reading         Avg         Average           AF         Antenna Factor         Peak         Calculate           CL         Cable Loss         HPF         High Pas           Dist         Read         AF         CL         Amp         D Corr           (m)         dBuV         dB/m         dB         dB         dB           3.0         35.4         38.2         12.6         -33.9         0.0           3.0         35.4         38.2         12.6         -33.9         0.0           3.0         35.5         38.2         12.6         -33.9         0.0           3.0         32.2         38.2         12.6         -33.9         0.0           3.0         34.2         38.3         9.7         -35.7         0.0           3.0         34.2         38.3         9.7         -35.7         0.0           3.0         34.2         38.3         9.7         -35.7         0.0           3.0         22.6         37.8         12.7         -33.9         0.0           3.0         21.6         38.3 <td>Dist         Distance to Antenna         D Corr         Distance Correct           Read         Analyzer Reading         Avg         Average Field S           AF         Antenna Factor         Peak         Calculated Peak           CL         Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr           (m)         dBuV         dB/m         dB         dB         dB         dB         dB           3.0         35.4         38.2         12.6         -33.9         0.0         0.7           3.0         35.4         38.2         12.6         -33.9         0.0         0.7           3.0         35.5         38.2         12.6         -33.9         0.0         0.7           3.0         34.2         38.3         9.7         -35.7         0.0         0.8           3.0         34.2         38.3         9.7         -35.7         0.0         0.8           3.0         21.6         38.3         9.7         -35.7         0.0         0.8           3.0         21.6         38.3         9.7         -35.7         0.0         0.8</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 me           Read         Analyzer Reading         Avg         Average Field Strength @           AF         Antenna Factor         Peak         Calculated Peak Field Strength @           CL         Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           (m)         dBuV         dB/m         dB         dB         dB         dB         dB         dB         dB         dB         u/m           3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         53.1           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         53.1           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         53.1           3.0         34.2         38.3         9.7         -35.7         0.0         0.8         47.1           3.0         34.2         38.3</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters           Read         Analyzer Reading         Avg         Average Field \$trength @ 3 m           AF         Antenna Factor         Peak         Calculated Peak Field \$trength           CL         Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit           (m)         dBuV         dB/m         dB         dB         dB         dB         dBuV/m         dBuV/m           3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0         74.0           3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.1         74.0           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         53.1         74.0           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         53.1         74.0           3.0         34.2         38.3         9.7         -35.7         0.0         0.8         44.6         54.0</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Fiel           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin v           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin v           CL         Cable Loss         HPF         High Pass Filter         Margin v           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin v           01st         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin v           0200         035.5         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -21.0           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         39.8         54.0         -14.2           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         39.8         54.0         -14.2           000MHz        </td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength         Margin vs. Average           Read         Analyzer Reading         Avg         Average Field Strength         @ 3 m         Margin vs. Average           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Lir           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Lir           0         dBuV         dB/m         dB         dB         dB         dBuV/mt dBuV/mt         dB         V/H           060MHz                  3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -21.0         H           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         39.8         54.0         -14.2         V           00MHz</td> <td>Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit         Det.         P/A/QP           600MHz        </td>	Dist         Distance to Antenna         D Corr         Distance Correct           Read         Analyzer Reading         Avg         Average Field S           AF         Antenna Factor         Peak         Calculated Peak           CL         Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr           (m)         dBuV         dB/m         dB         dB         dB         dB         dB           3.0         35.4         38.2         12.6         -33.9         0.0         0.7           3.0         35.4         38.2         12.6         -33.9         0.0         0.7           3.0         35.5         38.2         12.6         -33.9         0.0         0.7           3.0         34.2         38.3         9.7         -35.7         0.0         0.8           3.0         34.2         38.3         9.7         -35.7         0.0         0.8           3.0         21.6         38.3         9.7         -35.7         0.0         0.8           3.0         21.6         38.3         9.7         -35.7         0.0         0.8	Dist         Distance to Antenna         D Corr         Distance Correct to 3 me           Read         Analyzer Reading         Avg         Average Field Strength @           AF         Antenna Factor         Peak         Calculated Peak Field Strength @           CL         Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.           (m)         dBuV         dB/m         dB         dB         dB         dB         dB         dB         dB         dB         u/m           3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         53.1           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         53.1           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         53.1           3.0         34.2         38.3         9.7         -35.7         0.0         0.8         47.1           3.0         34.2         38.3	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters           Read         Analyzer Reading         Avg         Average Field \$trength @ 3 m           AF         Antenna Factor         Peak         Calculated Peak Field \$trength           CL         Cable Loss         HPF         High Pass Filter           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit           (m)         dBuV         dB/m         dB         dB         dB         dB         dBuV/m         dBuV/m           3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0         74.0           3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.1         74.0           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         53.1         74.0           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         53.1         74.0           3.0         34.2         38.3         9.7         -35.7         0.0         0.8         44.6         54.0	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Fiel           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin v           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin v           CL         Cable Loss         HPF         High Pass Filter         Margin v           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin v           01st         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin v           0200         035.5         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -21.0           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         39.8         54.0         -14.2           3.0         32.2         38.2         12.6         -33.9         0.0         0.7         39.8         54.0         -14.2           000MHz	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength         Margin vs. Average           Read         Analyzer Reading         Avg         Average Field Strength         @ 3 m         Margin vs. Average           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Lir           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Lir           0         dBuV         dB/m         dB         dB         dB         dBuV/mt dBuV/mt         dB         V/H           060MHz                  3.0         35.4         38.2         12.6         -33.9         0.0         0.7         53.0         74.0         -21.0         H           3.0         35.5         38.2         12.6         -33.9         0.0         0.7         39.8         54.0         -14.2         V           00MHz	Dist         Distance to Antenna         D Corr         Distance Correct to 3 meters         Peak Field Strength Limit           Read         Analyzer Reading         Avg         Average Field Strength @ 3 m         Margin vs. Average Limit           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Average Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit           Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin vs. Peak Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit         Det.         P/A/QP           600MHz

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# 9.2.6. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND

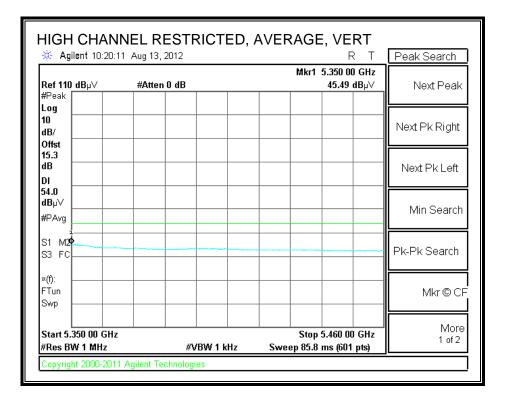
## **RESTRICTED BANDEDGE (HIGH CHANNEL)**





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🔆 Agilent 10:19			EAK, VERT	R T Peak Search
<b>Ref 110 dB</b> µ∨ #Peak	#Atten 0 dB		Mkr1 5.353 85 58.71	
Log 10 dB/ Offst				Next Pk Right
15.3 dB DI				Next Pk Left
74.0 dBµ∀ 1 #PAvg ₩₩₩₩₩₩₩₩₩	man Merch man work	Andreas	nn Anthe Marchael	Min Search
M1 S2 S3 FC				Pk-Pk Search
×(f): FTun Swp				Mkr © Cf
Start 5.350 00 GH #Res BW 1 MHz		W 3 MHz	Stop 5.460 00 Sweep 1 ms (601	



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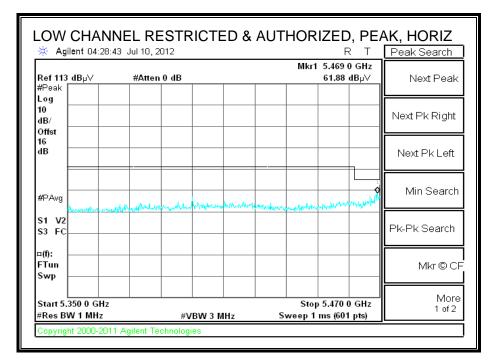
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

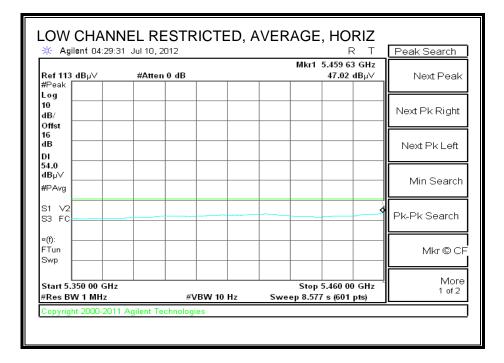
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Date:       08/06/12         Project #:       12/14507         Company:       Apple         lest Target:       FCC 15.407         Mode Oper:       HT40, 5.3GHz         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength (Limit)         Read       Analyzer Reading       Avg       Average Field Strength (Limit)         Read       Analyzer Reading       Avg       Average Field Strength (Limit)         CL       Cable Loss       HPF       High Pass Filter       Margin vs. Peak Limit         f       Dist       Read       AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Peak Limit         CL       Cable Loss       HPF       High Pass Filter       Margin vs. Peak Limit       Notes         fs810       3.0       35.0       38.1       12.6       -33.9       0.0       0.7       52.7       74.0       -21.8       H         is810       3.0       35.0       38.1       12.6       -33.9       0.0       0.7       52.5       74.0       -21.6       H       P         is810       3.0       <	complia	nce Cer	incation	Service	s, fre	mont 51	n Chamb	er						
Project #:       12U14507         Company:       Apple         Itest Target:       FCC 15.407         Jode Oper:       HT40, 5.3GHz         f       Measurement Frequency Amp       Preamp Gain       Average Field Strength Limit         Dist       Distance to Antenna       D Corr       Distance Correct to 3 meters       Peak Field Strength Limit         Read       Analyzer Reading       Avg       Average Field Strength @ 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Peak Limit         CL       Cable Loss       HPF       High Pass Filter       Margin vs. Peak Limit       Notes         f       Morgin vs.       Astron       CL       Astron       CL       Amp       D Corr       Fitz       Corr.       Limit       Margin vs. Peak Limit         ct       Cable Loss       HPF       High Bas       B       B       B       B       B       B       V       P        Notes         f       Notes       0.0       0.7       52.7       74.0       -21.3       V       P          issue       3.0       35.0       38.1       12.6       -33.9       0.	lest Engr		Chin Pa	ng										
Company:         Apple Fest Target:         FCC 15.407 FCC 15.407           Jode Oper:         HT40, 5.3GHz           f         Measurement Frequency Amp Dist         Preamp Gain         Average Field Strength Limit           Read         Analyzer Reading         Avg         Average Field Strength Limit           Read         Analyzer Reading         Avg         Average Field Strength (@ 3 m)         Margin vs. Average Limit           AF         Antenna Factor         Peak         Calculated Peak Field Strength         Margin vs. Peak Limit           CL         Cable Loss         HPF         High Pass Filter         Margin vs. Peak Limit         Notes           f         Dist         Read         AF         CL         Amp         D Corr         Flt         Corr.         Limit         Margin vs. Peak Limit           vow Ch. 5270MHz         0.0         0.7         52.7         74.0         -21.3         V         P           5810         3.0         32.2         38.1         12.6         -33.9         0.0         0.7         52.5         74.0         -21.6         H         P           0.620         3.0         31.1         12.6         -33.9         0.0         0.7         52.5         74.0         -21.6<	Date:		08/06/12	_										
Fest Target:       FCC 15.407         Mode Oper:       HT40, 5.3GHz         f       Measurement Frequency Amp Dist Distance to Antenna Read Analyzer Reading Ary       Preamp Gain Average Field Strength Limit Peak Field Strength Limit Margin vs. Average Limit Margin vs. Average Limit Margin vs. Average Limit Margin vs. Peak Limit         f       Dist Read (CL)       AF       CL       Amp dB       D Corr Peak       Filth Corr.       Limit Limit       Margin vs. Average Limit         f       Dist CL       Cable Loss       HPF       B dB       D Corr       Fltr Corr.       Limit       Margin vs. Peak Limit         f       Dist CH2       Read       AF       CL       Amp dB       D Corr       Fltr Corr.       Limit       Margin vs. Peak Limit         f       Dist CH2       Read       AF       CL       Amp dB       D Corr       Fltr Corr.       Limit       Margin vs.       Peak Field Strength       Notes         f       Dist Read       AF       CL       Amp dB       D Corr       Fltr       Corr.       Limit       Margin vs.       Peat Limit       Notes         f       Dist 12.6       33.9       0.0       0.7       52.7       74.0       -21.5       H       P         css10       3.0       32.7       35.7	Project #	:	12U1450	7										
Mode Oper:       HT40, 5.3CHz         f       Measurement Frequency Amp Dist       Preamp Gain       Average Field Strength Limit         Read       Analyzer Reading       Avg       Avgrage Field Strength @ 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength @ 3 m       Margin vs. Average Limit         AF       Antenna Factor       Peak       Calculated Peak Field Strength       Margin vs. Average Limit         f       Dist       Read       AF       CL       calculated Peak Field Strength       Margin vs. Peak Limit         f       Dist       Read       AF       CL       htpp       Pith       Notes         gdbau       dBu       dB       dB       dB       dB       dB       Margin vs. Peak Limit         station       dBuV       dB       dB       dB       dB       dB       dB         station       3.0       35.2       38.1       12.6       -33.9       0.0       0.7       52.7       74.0       -21.3       V       P         5.810       3.0       22.7       38.1       12.6       -33.9       0.0       0.7       52.7       74.0       -21.3       V       P	Company	y:	Apple											
f       Measurement Frequency Amp Dist ance to Antenna       D Corr Average Field Strength Limit Margin vs. Average Limit Margin vs. Peak Limit         f       Dist AF Antenna Factor CL       Ar Average Tield Strength Dos       Average Field Strength Margin vs. Average Limit Margin vs. Peak Limit         f       Dist CL       Read Abby Cable Loss       AF HPF       Corr HBF       Fltr Corr BB       Corr BB       Limit BBW/m       Margin Margin vs. Peak Limit         f       Dist CHz       Read (m)       AF BB       CL       Amp AB       D Corr BB       Fltr Corr       Limit BBW/m       Margin vs. Average Limit Margin vs. Peak Limit         f       Dist CHz       Read (m)       AF BB       CL       Amp AB       D Corr       Fltr Corr       Limit BBW/m       Margin vs. Average Limit Margin vs. Peak Limit         f       Dist (m)       Read BB       AF CL       Corr       Fltr Corr       Limit BBW/m       Margin vs. Peak Limit         store       Notes       O       O       O       O       O       O       O       O       O         store       Store       Store       Store       Store       Store       Notes         store       Store       Store       O       O	-													
Dist Read Analyzer Reading AF CL         D Corr Antenna Factor CL         D Corr Avy Antenna Factor CL         D Corr Peak HPF         D Corr Peak HPF         D Corr Calculated Peak Field Strength HPF         Peak Field Strength Calculated Peak Field Strength HPF         Margin vs. Average Limit Margin vs. Peak Limit           f         D ist CHz         Read dBuV         AF         CL         Amp dB         D Corr dB         Fltr Corr.         Limit Limit         Margin vs. Peak Limit           f         D ist CHz         Read dBuV         AF         CL         Amp dB         D Corr         Fltr dB         Corr.         Limit Limit         Margin vs. Average Limit           f         D ist CHz         Read dBuV         AF         CL         Amp dB         D Corr         Fltr dB         Corr.         Limit Limit         Margin vs. Peak Limit           isto         3.0         3.5.2         38.1         12.6         -33.9         0.0         0.7         52.5         74.0         -21.3         V         P           istance	Mode Op	er:	HT40, 5.	3GHz										
Dist Read Analyzer Reading AF CL         D Corr Antenna Factor CL         D Corr Avy Antenna Factor CL         D Corr Peak HPF         D Corr Peak HPF         D Corr Calculated Peak Field Strength HPF         Peak Field Strength Calculated Peak Field Strength HPF         Margin vs. Average Limit Margin vs. Peak Limit           f         D ist CHz         Read dBuV         AF         CL         Amp dB         D Corr dB         Fltr Corr.         Limit Limit         Margin vs. Peak Limit           f         D ist CHz         Read dBuV         AF         CL         Amp dB         D Corr         Fltr dB         Corr.         Limit Limit         Margin vs. Average Limit           f         D ist CHz         Read dBuV         AF         CL         Amp dB         D Corr         Fltr dB         Corr.         Limit Limit         Margin vs. Peak Limit           isto         3.0         3.5.2         38.1         12.6         -33.9         0.0         0.7         52.5         74.0         -21.3         V         P           istance														
Read AF CL         Antenna Factor Cable Loss         Avg Peak HPF         Average Field Strength (alculated Peak Field Strength)         Margin vs. Average Limit Margin vs. Peak Limit           f         Dist CHZ         Read dBuV         AF dB dB         CL         Amp AB         D Corr BB         Fltr Corr.         Limit Limit         Margin vs. Average Limit         Margin vs. Peak Limit           f         Dist CHZ         Read dBuV         AF dB         CL         Amp AB         D Corr BB         Fltr Corr.         Limit Limit         Margin vs. Average Limit           own Ch, 5270MHz         B         D         Corr         Fltr BB         Corr.         Limit BB         Margin vs. Peak Limit         Notes           5.810         3.0         35.2         38.1         12.6         -33.9         0.0         0.7         52.7         74.0         -21.3         V         P           5.810         3.0         22.7         38.1         12.6         -33.9         0.0         0.7         52.5         74.0         -21.5         H         P           5.810         3.0         22.7         38.1         12.6         -33.9         0.0         0.7         52.5         74.0         -26.4         V         P           0.620		-				-					-		-	
AF CL         Antenna Factor Cable Loss         Peak HPF         Calculated Peak Field Strength Hgp Pass Filter         Margin vs. Peak Limit Margin vs. Peak Limit           f         Dist CHz         Read MBV         AF MBV         CL         Amp MB         D Corr MB         Fltr AB         Corr. BB         Limit MB         Margin vs. Peak Limit         Det. P/A/QP         Notes           iow Ch, 5270MHz         iow Ch, 5270Mz         iow Ch, 5200Mz         iow Ch, 5200Mz <th></th> <th>_</th> <th></th> <th></th>												_		
CL         Cable Loss         HPF         High Pass Filter           f         Dist GHz         Read (m)         AF dBuV         CL dB/m         Amp dB         D Corr dB         Filtr dB         Corr. dB         Limit dB         Margin dB         Ant. Pol. V/H         Det. P/AQP         Notes           .ow Ch, 5270MHz         -			-	-		-	_		_		_	_		
f         Dist         Read         AF         CL         Amp         D Corr         Fltr         Corr.         Limit         Margin         Ant. Pol.         Det.         Notes           GHz         (m)         dBuV         dB/m         dB         dB         dB         dBuV/m         Margin         Ant. Pol.         Det.         Notes           cow Ch, 5270MHz										ength	Margin v	rs. Peak Lir	nit	
CHz         (m)         dBuV         dB         dB         dB         dB         dB         dB         dBuV/m         dB         V/H         P/A/QP           .ow Ch, 5270MHz         3.0         35.2         38.1         12.6         -33.9         0.0         0.7         52.7         74.0         -21.3         V         P           5.810         3.0         22.7         38.1         12.6         -33.9         0.0         0.7         40.2         54.0         -13.8         V         A           5.810         3.0         35.0         38.1         12.6         -33.9         0.0         0.7         52.5         74.0         -21.5         H         P           5.810         3.0         22.7         38.1         12.6         -33.9         0.0         0.7         40.2         54.0         -13.8         H         A           5.810         3.0         22.7         38.1         12.6         -33.9         0.0         0.7         40.2         54.0         -13.8         H         A           0.620         3.0         34.7         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4 <th></th> <th>CL</th> <th>Cable Los</th> <th>38</th> <th></th> <th>HPF</th> <th>High Pas</th> <th>s Filter</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>		CL	Cable Los	38		HPF	High Pas	s Filter						
.ow Ch, $5270$ MHz						-					-			Notes
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
15.810       3.0       22.7       38.1       12.6       -33.9       0.0       0.7       40.2       54.0       -13.8       H       A         High Ch, 5310MHz				381	126	33.0	0.0	07	52.7	74.0	21 2	v	σ	
15.810       3.0       22.7       38.1       12.6       -33.9       0.0       0.7       40.2       54.0       -13.8       H       A         High Ch, 5310MHz			<b>*</b>		<b>\$</b>		• • • • • • • • • • • • • • • • • • • •					v		
15.810       3.0       22.7       38.1       12.6       -33.9       0.0       0.7       40.2       54.0       -13.8       H       A         High Ch, 5310MHz	15.810		\$		¢	¢	• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •		\$	H	P	
0.620       3.0       34.7       38.3       9.7       -35.7       0.0       0.8       47.6       74.0       -26.4       V       P         0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       34.6       54.0       -19.4       V       A         5.930       3.0       36.2       37.7       12.7       -33.9       0.0       0.7       53.4       74.0       -20.6       V       P         5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       53.4       74.0       -20.6       V       P         5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         0.620       3.0       34.5       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -26.6       H       P         0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -19.4       H       A         5.930       3.0       35.7       37.7       12.7       -33.9 <td>15.810</td> <td></td> <td>\$</td> <td></td> <td>¢</td> <td>\$</td> <td>0.0</td> <td></td> <td>• • • • • • • • • • • • • • • • • • • •</td> <td></td> <td>\$</td> <td></td> <td></td> <td></td>	15.810		\$		¢	\$	0.0		• • • • • • • • • • • • • • • • • • • •		\$			
0.620       3.0       34.7       38.3       9.7       -35.7       0.0       0.8       47.6       74.0       -26.4       V       P         0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       34.6       54.0       -19.4       V       A         5.930       3.0       36.2       37.7       12.7       -33.9       0.0       0.7       53.4       74.0       -20.6       V       P         5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       53.4       74.0       -20.6       V       P         5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         0.620       3.0       34.5       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -26.6       H       P         0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -19.4       H       A         5.930       3.0       35.7       37.7       12.7       -33.9 <td></td> <td></td> <td><u> </u></td> <td></td> <td>ļ</td> <td>ļ</td> <td></td> <td></td> <td></td> <td></td> <td>ļ</td> <td></td> <td></td> <td></td>			<u> </u>		ļ	ļ					ļ			
0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       34.6       54.0       -19.4       V       A         15.930       3.0       36.2       37.7       12.7       -33.9       0.0       0.7       53.4       74.0       -20.6       V       P         15.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       53.4       74.0       -20.6       V       P         15.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         0.620       3.0       34.5       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -26.6       H       P         0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -26.6       H       P         5.930       3.0       35.7       37.7       12.7       -33.9       0.0       0.7       52.9       74.0       -21.1       H       A         5.930       3.0       22.7       37.7       12.7       -33.	·····	c	·····		<u>.</u>	ļ								
5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         0.620       3.0       34.5       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -26.6       H       P         0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       34.6       54.0       -19.4       H       A         5.930       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       34.6       54.0       -19.4       H       A         5.930       3.0       35.7       37.7       12.7       -33.9       0.0       0.7       52.9       74.0       -21.1       H       P         5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         .5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         .5.930       3.0       22.7       37.7       12.7       -33.9					¢		- • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •			V		
5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       V       A         0.620       3.0       34.5       38.3       9.7       -35.7       0.0       0.8       47.4       74.0       -26.6       H       P         0.620       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       34.6       54.0       -19.4       H       A         5.930       3.0       21.7       38.3       9.7       -35.7       0.0       0.8       34.6       54.0       -19.4       H       A         5.930       3.0       35.7       37.7       12.7       -33.9       0.0       0.7       52.9       74.0       -21.1       H       P         5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         .5.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         .5.930       3.0       22.7       37.7       12.7       -33.9					•••••••	-35.7	• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •			V	A P	
0.620         3.0         21.7         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           15.930         3.0         35.7         37.7         12.7         -33.9         0.0         0.7         52.9         74.0         -21.1         H         P           15.930         3.0         22.7         37.7         12.7         -33.9         0.0         0.7         39.9         54.0         -14.1         H         A           Rev. 4.1.2.7			•••••••••••••••••••••••••		•••••••		• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •		· · · · · · · · · · · · · · · · · · ·	v		
0.620         3.0         21.7         38.3         9.7         -35.7         0.0         0.8         34.6         54.0         -19.4         H         A           15.930         3.0         35.7         37.7         12.7         -33.9         0.0         0.7         52.9         74.0         -21.1         H         P           15.930         3.0         22.7         37.7         12.7         -33.9         0.0         0.7         39.9         54.0         -14.1         H         A           Rev. 4.1.2.7	10.620		••••••••••••••••••••••••••		<b></b>		• • • • • • • • • • • • • • • • • • • •	·····				H	P	
15.930       3.0       35.7       37.7       12.7       -33.9       0.0       0.7       52.9       74.0       -21.1       H       P         15.930       3.0       22.7       37.7       12.7       -33.9       0.0       0.7       39.9       54.0       -14.1       H       A         Rev. 4.1.2.7	10.620		•••••••••••••••••••••••••••••		<b>*</b>	••••••••••••••••••••••••••••••••••••••	• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •		·····			
Rev. 4.1.2.7	15.930	3.0		37.7	12.7	-33.9	0.0	0.7	52.9	74.0	- <b>21.1</b>	H		
	15.930	3.0	22.7	37.7	12.7	-33.9	0.0	0.7	39.9	54.0	-14.1	H	A	
					ļ									
Note: No other emissions were detected above the system noise floor.									-					
	Note: No	other e	missions	were de	tected	above i	the syster	m nois	se floor.					

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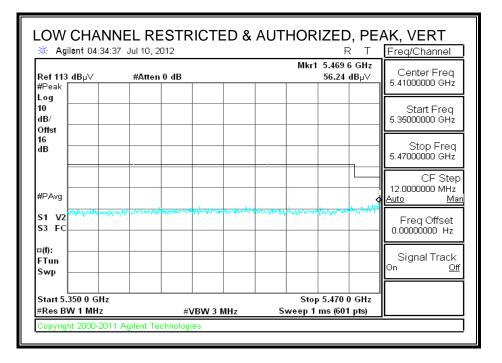
## 9.2.7. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND

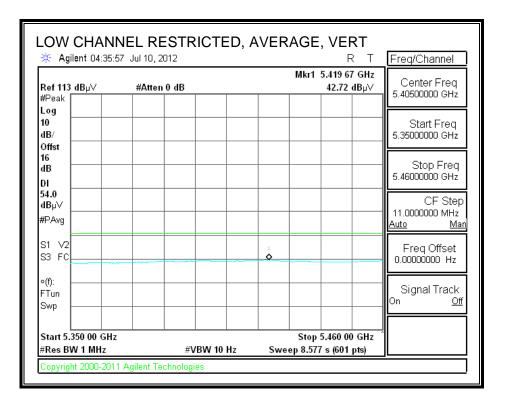
#### **RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)**





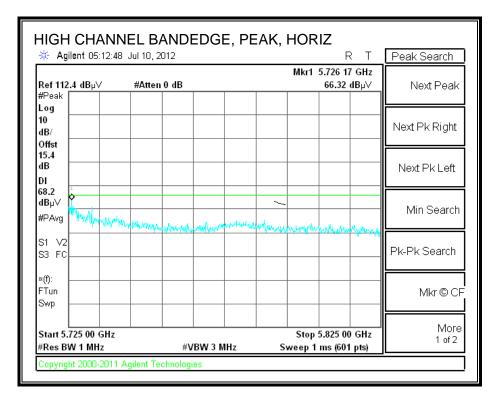
Page 179 of 237 UL CCS FORM NO: CCSUP4701H 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

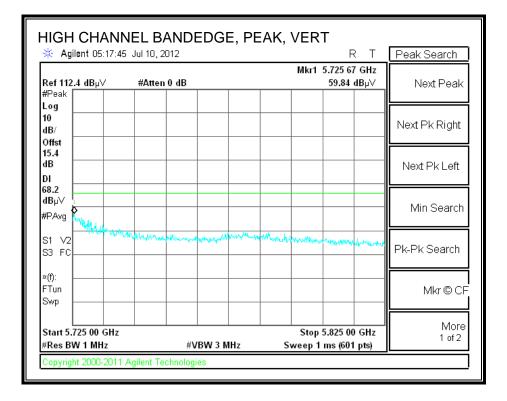




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#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 **AUTHORIZED BANDEDGE (HIGH CHANNEL)**





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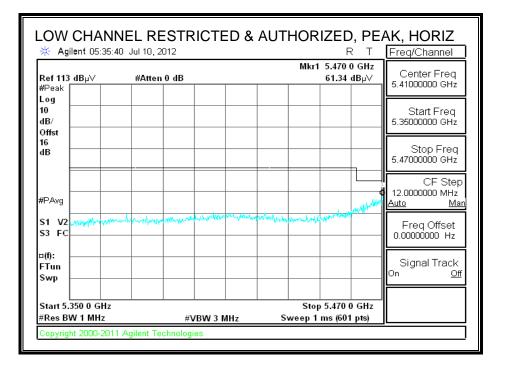
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

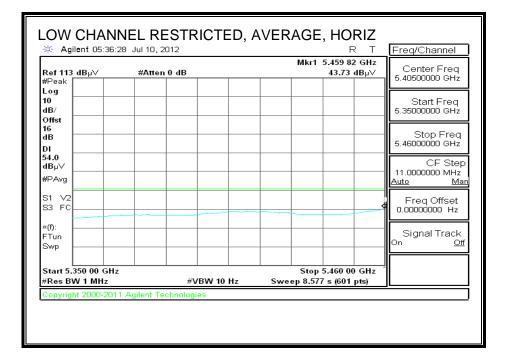
-		Measuren tification		s, Frei	mont 5n	n Chamb	er						
est Engr		Chin Pa	ng										
ate:		08/07/12	-										
Project #		12U1450	7										
Company	y:	Apple											
est Targ	et:	FCC 15.	407										
fode Op	er:	a mode,	5.6GHz										
	f	Measuren	nent Fred	wency	Amp	Preamp (	Gain			Average	Field Stren	eth Limit	
	Dist	Distance			-	Distance		t to 3 me	ters	-	d Strength	-	
	Read	Analyzer			Avg			trength @			vs. Average		
	AF	Antenna	-		Peak	_		Field Stre		_	vs. Peak Li		
	CL	Cable Los			HPF	High Pas							
f	Dist	Read	AF	CL	-	D Corr		Corr.			Ant. Pol.		Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
ow Ch,	5500MH	z											
1.000	3.0	34.1	38.4	10.1	-35.6	0.0	0.7	47.6	74.0	- <b>26.4</b>	V	P	
1.000	3.0	23.6		10.1	-35.6	0.0	0.7	37.1	54.0	-16.9	V	A	
1.000	3.0	34.4		¢	-35.6	0.0	0.7	47.9	74.0	-26.1	H	P	
1.000	3.0	23.6	38.4	10.1	-35.6	0.0	0.7	37.1	54.0	-16.9	H	A	
CI CL	5580MH	1											
na Cn, 1.160	3.0	35.2	38.5	10.2	-35.6	0.0	0.7	49.1	74.0	-24.9	V	P	
1.160	3.0	24.5	38.5	¢	-35.6	0.0	0.7	38.4	54.0	-15.6	v	A	
1.160	3.0	34.8		10.2	-35.6	0.0	0.7	48.7	74.0	-25.3	H	P	
1.160	3.0	24.4		10.2	o	0.0	0.7	38.3	54.0	-15.7	H	Ā	
ligh Ch	, 5700MI	Īz		•	•		•••••				••••••		
1.400	3.0	34.9	38.7	10.4	-35.6	0.0	0.7	49.3	74.0	-24.7	V	P	
1.400	3.0	24.3	38.7	10.4	-35.6	0.0	0.7	38.6	54.0	-15.4	V	A	
1.400	3.0	35.4	38.7	10.4	-35.6	0.0	0.7	49.7	74.0	-24.3	H	P	
1.400	3.0	24.2	38.7	10.4	-35.6	0.0	0.7	38.6	54.0	-15.4	H	A	
		ļ			ļ	ļ				Ļ	ļ		
Rev. 4.1.1 Note: No		missions	were de	tected	l above t	the system	m nois	e floor.					

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#### 9.2.8. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

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

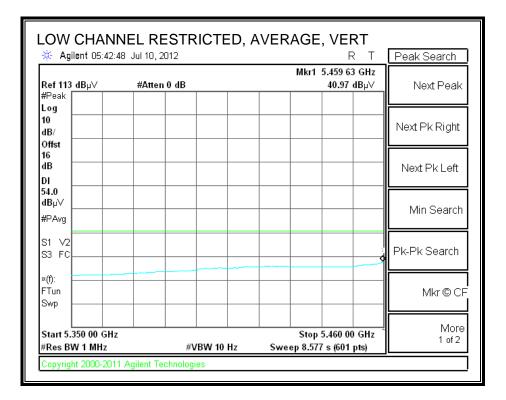




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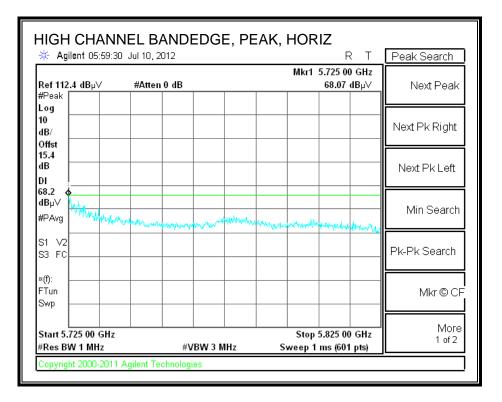
🔆 Agilent 05:41:5		ED & AUTHORIZE	ŔТ	Peak Search
Ref 113 dBµ∨ #Peak	#Atten 0 dB	Mkr1 5.4 58.	67 2 GHz .54 dBµ∨	Next Peak
Log 10 dB/ Offst				Next Pk Right
dB				Next Pk Left
#PAvg				Min Search
S1 V2 S3 FC	Wertensteineren auf der State der Ausseiner	lagen den strategel verne stategel den de service	end and an	Pk-Pk Search
⊐(f): FTun Swp				Mkr © Cl
Start 5.350 0 GHz #Res BW 1 MHz	#VBW 3	•	70 0 GHz (601 pts)	More 1 of 2

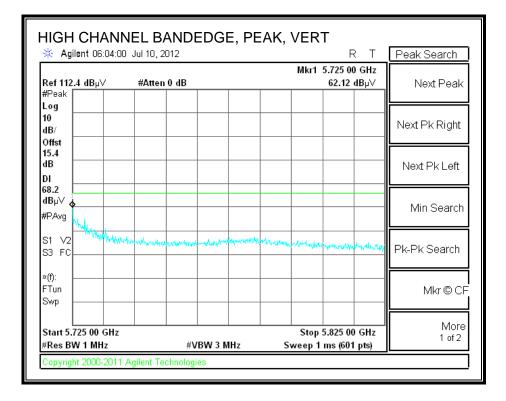


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#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 **AUTHORIZED BANDEDGE (HIGH CHANNEL)**





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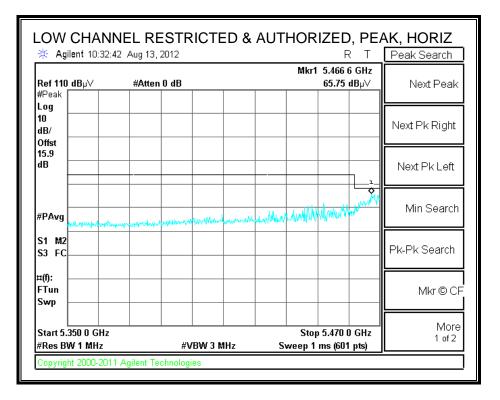
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

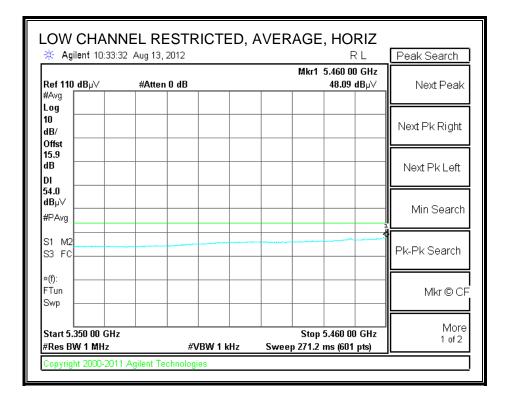
-		Measuren tification		s, Frei	nont 5n	n Chamb	er						
est Engr		Chin Pa	ng										
Date:		08/07/12											
Project #		12U1450	7										
Company	4	Apple											
est Targ	et:	FCC 15.4	407										
lode Op	er:	HT20, 5.	6GHz										
	f	Measuren	nent Fre	quency	Amp	Preamp (	Gain			Average	Field Stren	gth Limit	
	Dist	Distance	to Anter	nna	D Corr	Distance	Correc	t to 3 me	ters	Peak Fie	ld Strength	Limit	
	Read	Analyzer	Reading		Avg	Average	Field St	rength @	3 m		vs. Average		
	AF	Antenna	-		Peak	Calculate				_	vs. Peak Lis		
	CL	Cable Los	15		HPF	High Pas			-	2			
f	Dist	Read dBuV	AF	CL dB	Amp dB	D Corr dB			Limit dBuV/m		Ant. Pol.		Notes
GHz	(m)		dB/m	dD	dD	dD	db	dBuV/n	dBuV/m	dB	V/H	P/A/QP	
ow Ch,		~	20.4	10.1					=4.0		v	P	
1.000	3.0	34.0	38.4	10.1	-35.6	0.0	0.7	47.5	74.0	-26.5			
1.000	3.0	23.5		10.1	-35.6	0.0	0.7	37.0	54.0	-17.0	V	A	
1.000 1.000	3.0 3.0	33.7 23.4		¢	-35.6 -35.6	0.0	0.7 0.7	47.2 36.9	74.0 54.0	-26.8 -17.1	H	P	
1.000	3.0	43.4	30.4	10.1	-35.0	0.0	U./	30.7	24.0	-1/.1	H	Α	
fid Ch. :	5580MH	<b>z</b>		÷		•				†	•		
1.160	3.0	34.6	38.5	10.2	-35.6	0.0	0.7	48.5	74.0	-25.5	V	P	
1.160	3.0	24.3	38.5	¢	-35.6	0.0	0.7	38.2	54.0	-15.8	v	Ā	
1.160	3.0	35.0	38.5	¢	-35.6	0.0	0.7	48.9	74.0	-25.1	H	P	
1.160	3.0	24.3		\$	-35.6	0.0	0.7	38.2	54.0	-15.8	H	A	
												ĺ	
ligh Ch,	5700MI	Iz		ļ									
1.400	3.0	35.7	38.7	10.4	-35.6	0.0	0.7	50.0	74.0	-24.0	V	P	
1.400	3.0	24.2	38.7	10.4	-35.6	0.0	0.7	38.5	54.0	-15.5	V	A	
1.400	3.0	34.6	38.7	10.4	-35.6	0.0	0.7	48.9	74.0	-25.1	H	P	
1.400	3.0	24.2	38.7	10.4	-35.6	0.0	0.7	38.5	54.0	-15.5	H	A	
,		ļ		ļ		ļ				ļ			
Rev. 4.1.2	.7	missions		•					54.0	-10.0	п	A	

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#### 9.2.9. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND

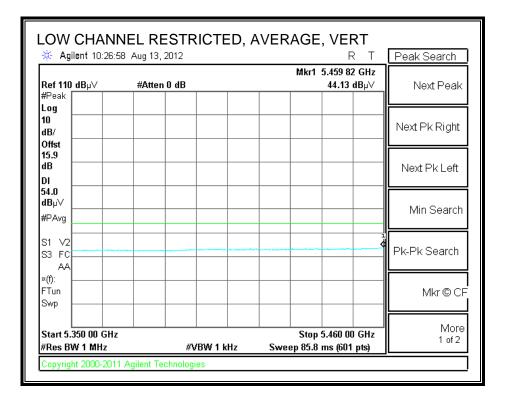
#### **RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)**





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🔆 Agilent 10:29	5:25 Aug 13, 2012		R	L	Peak Search
<b>Ref 110 dB</b> µ∨ #Peak	#Atten 0 dB		Mkr1 5.469 4 57.14 d		Next Peak
Log 10 dB/ Offst					Next Pk Right
dB					Next Pk Left
#PAvg	watherstand	بالمراجع والمراجع	wanner where the dark	- I	Min Search
S1 M2 S3 FC					Pk-Pk Search
¤(f): FTun Swp					Mkr © CF
Center 5.410 0 G #Res BW 1 MHz		¥VBW 3 MHz	Span 120 Sweep 1 ms (601		More 1 of 2

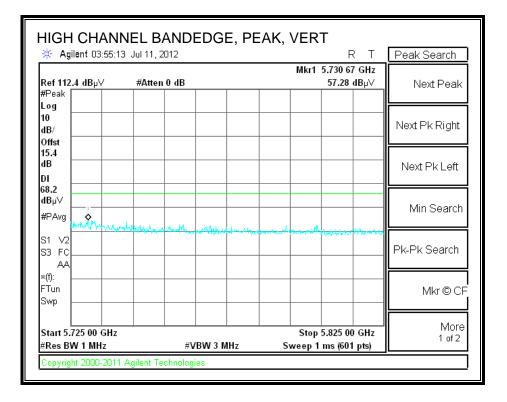


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#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 **AUTHORIZED BANDEDGE (HIGH CHANNEL)**

Mkr1         5.733         00           Ref 112.4 dBµV         #Atten 0 dB         66.03 d           #Peak	
10 dB/ Offst 15.4 dB DI 68.2 dBµV ₩PAvg S1 V2 S3 FC	
15.4	Next Pk Right
dBµ√	Next Pk Left
S3 FC	Min Search
	Pk-Pk Search
*(f): FTun Swp	Mkr © CF
Start 5.725 00 GHz         Stop 5.825 00           #Res BW 1 MHz         #VBW 3 MHz         Sweep 1 ms (601	



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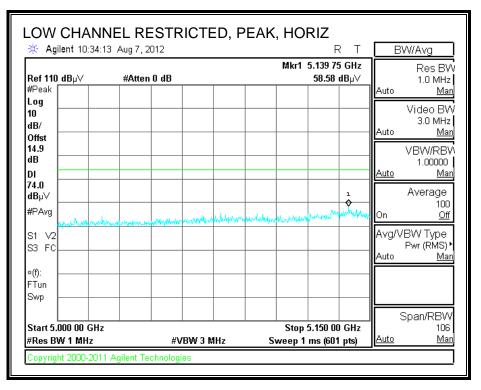
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

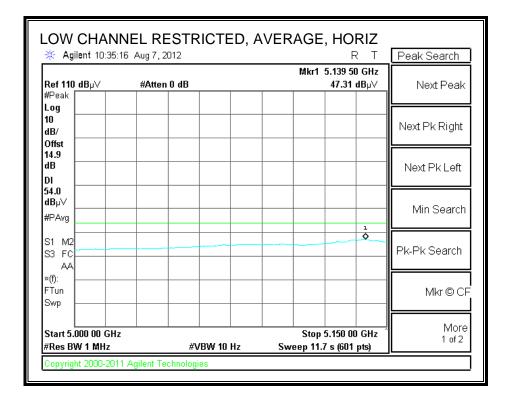
Test Engr: Date: Project #: Company: Test Target: Mode Oper: f Dist Read AF CL f Dist CHz (m) Low Ch, 5510MH 11.020 3.0 11.020 3.0	Antenna Cable Lo Read dBuV Iz	97 407 6GHz, 1 nent Free to Anter Reading Factor	quency ina CL	D Corr Avg Peak HPF	Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	Field Strength	Limit	
Project #: Company: Test Target: Mode Oper: f Dist Read AF CL f Dist CHz (m) .ow Ch, 5510MH 1.020 3.0	12U1450 Apple FCC 15. HT40, 5. Measuren Distance Analyzer Antenna Cable Loo Read dBuV Iz	407 6GHz, 1 nent Free to Anter Reading Factor 35 AF	quency ina CL	D Corr Avg Peak HPF	Distance Average Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	ld Strength	Limit	
Company: Cest Target: Mode Oper: f Dist Read AF CL f Dist CHz (m) .ow Ch, 5510MH 1.020 3.0 1.020 3.0	Apple FCC 15. HT40, 5. Measuren Distance Analyzer Antenna Cable Loo Read dBuV Iz	407 6GHz, 1 nent Free to Anter Reading Factor 38 AF	quency ina CL	D Corr Avg Peak HPF	Distance Average Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	ld Strength	Limit	
f Dist Read AF CL f Dist Read AF CL f GHz (m) ow Ch, 5510MH 1.020 3.0	FCC 15. HT40, 5. Measuren Distance Analyzer Antenna Cable Loo Read dBuV Iz	6GHz, T nent Free to Anter Reading Factor ss AF	quency ina CL	D Corr Avg Peak HPF	Distance Average Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	ld Strength	Limit	
f Dist Read AF CL f Dist CL f OHz (m) ow Ch, 5510MH 1.020 3.0	HT40, 5. Measuren Distance Analyzer Antenna Cable Loo Read dBuV Iz	6GHz, T nent Free to Anter Reading Factor ss AF	quency ina CL	D Corr Avg Peak HPF	Distance Average Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	ld Strength	Limit	
f Dist Read AF CL <b>f Dist</b> <b>GHz (m)</b> ow Ch, 5510MH 1.020 3.0 1.020 3.0	Measuren Distance Analyzer Antenna Cable Los <b>Read</b> <b>dBuV</b> Iz	nent Free to Anter Reading Factor ss AF	quency ina CL	D Corr Avg Peak HPF	Distance Average Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	ld Strength	Limit	
Dist Read AF CL <b>f</b> Dist GHz (m) ow Ch, 5510MH 1.020 3.0 1.020 3.0	Distance Analyzer Antenna Cable Los Read dBuV Iz	to Anter Reading Factor SS AF	CL	D Corr Avg Peak HPF	Distance Average Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	ld Strength	Limit	
Dist Read AF CL <b>f</b> Dist GHz (m) .ow Ch, 5510MH 1.020 3.0 1.020 3.0	Distance Analyzer Antenna Cable Los Read dBuV Iz	to Anter Reading Factor SS AF	CL	D Corr Avg Peak HPF	Distance Average Calculate High Pas	Correc Field S ed Peak	trength @ Field Str	3 m	Peak Fie Margin v	ld Strength	Limit	
Read AF CL GHz (m) .ow Ch, 5510MH 1.020 3.0 1.020 3.0	Analyzer Antenna Cable Loo Read dBuV Iz	Reading Factor ss AF	CL	Avg Peak HPF	Average Calculate High Pas	Field S ed Peak	trength @ Field Str	3 m	Margin v	-		
AF CL GHz (m) ow Ch, 5510MH 1.020 3.0 1.020 3.0	Antenna Cable Lo Read dBuV Iz	Factor ss AF	CL	Peak HPF	Calculate High Pas	ed Peak	Field Str		_			
CL f Dist GHz (m) ow Ch, 5510MH 1.020 3.0 1.020 3.0	Cable Los Read dBuV Iz	AF		HPF	High Pas				Margin v	s. Peak Lir		
GHz         (m)           ow Ch, 5510MH         1.020         3.0           1.020         3.0         3.0	dBuV Iz			Amp	-					S. I Car Di		
ow Ch, 5510MH 1.020 3.0 1.020 3.0	Iz	dB/m	dB			Fltr	Corr.			Ant. Pol.	Det.	Notes
1.020 3.0 1.020 3.0				dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
1.020 3.0						ļ						
	33.1	38.4	10.1	-35.6	0.0	0.7	46.7	74.0	-27.3	V	P	
1020 20	23.5		10.1	-35.6	0.0	0.7	37.0	54.0	-17.0	V	A	
	33.1		<b>0</b>	-35.6	0.0	0.7	46.6	74.0	-27.4	H	P	
1.020 3.0	23.4	38.4	10.1	-35.6	0.0	0.7	37.0	54.0	-17.0	H	A	
fid Ch, 5550MH												
1.100 3.0	34.5	38.7	10.4	-35.6	0.0	0.7	48.7	74.0	-25.3	н	P	
1.100 3.0	24.6	38.7	\$	-35.6	0.0	0.7	38.8	54.0	-15.2	H	A	
1.100 3.0	35.0	•••••••••••••••••••	10.4	-35.6	0.0	0.7	49.2	74.0	-24.8	v	P	
1.100 3.0	24.4	38.7	\$	-35.6	0.0	0.7	38.6	54.0	-15.4	v	Ā	
	1			<u> </u>	ļ				ĺ		ĺ	
ligh Ch, 5670M	Hz		ļ	]		Į					l	
1.340 3.0	34.3		10.4	-35.6	0.0	0.7	48.5	74.0	-25.5	H	P	
1.340 3.0	24.2	• • • • • • • • • • • • • • • • • • • •	¢	-35.6	0.0	0.7	38.4	54.0	-15.6	H	A	
1.340 3.0	34.5	•	10.4	-35.6	0.0	0.7	48.7	74.0	-25.3	V	P	
1.340 3.0	24.2	38.7	10.4	-35.6	0.0	0.7	38.4	54.0	-15.6	V	A	
									<u>.</u>			
Rev. 4.1.2.7 Note: No other e		:					-	:				

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# 9.2.1. 2.4GHZ AND 5GHZ BAND CO-LOCATION

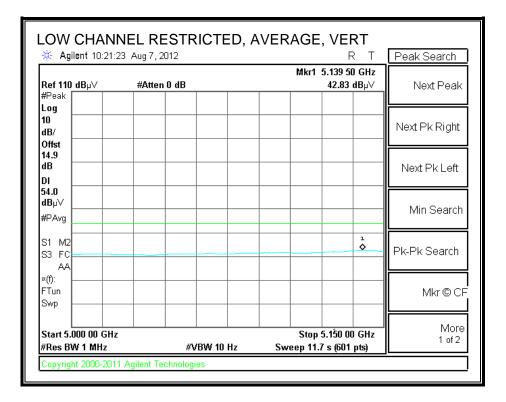
#### BANDEDGE (CHANNEL 36 and Bluetooth High CHANNEL)





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🔆 Agilent 10:19:4	41 Aug 7, 2012	RT	Peak Search
<b>Ref 110 dB</b> µ∀ #Peak	#Atten 0 dB	Mkr1 5.140 75 GHz 53.52 dBµ∨	Next Peak
Log 10 dB/ Offst			Next Pk Right
dB			Next Pk Left
74.0 dBµ∨ #PAvg			Min Search
S1 V2	al to an	and a second	Pk-Pk Search
≈(f): FTun Swp			Mkr © CF
Start 5.000 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Stop 5.150 00 GHz Sweep 1 ms (601 pts)	More 1 of 2



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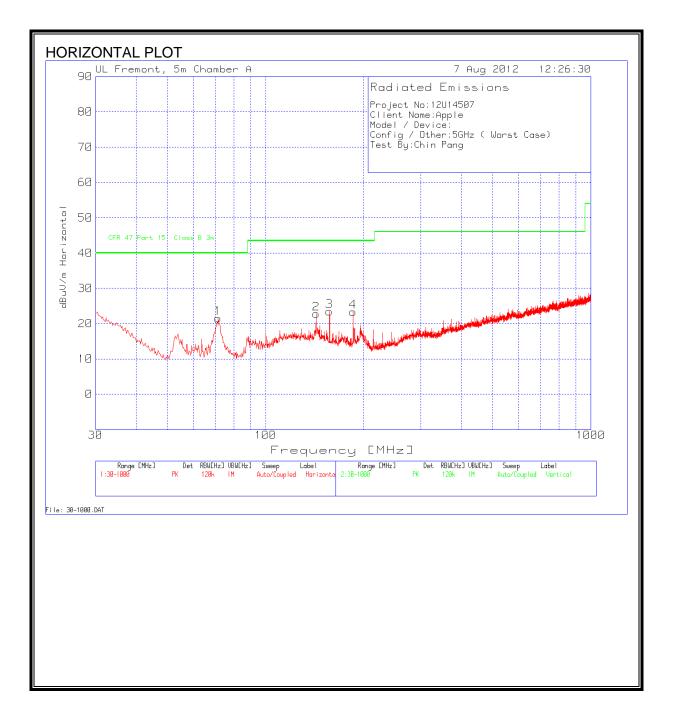
#### REPORT NO: 12U14507-2 FCC ID: BCGA1458 HARMONICS AND SPURIOUS EMISSIONS

		Measuren ification		s, Fren	nont 5n	n Chamb	er						
Test Engr	•	Chin Pa	ng										
Date:		08/14/12											
Project #		12U1450	7										
Company		Apple											
Test Targ		FCC 15.											
Mode Op	er:	Co-locat	ion, 5G	Hz an	d BT Hi	gh Ch, T	X						
	f	Measuren	nent Frec	uency	Amp	Preamp (	Gain			Average	Field Stren	gth Limit	
	Dist	Distance	to Anten	ina	D Corr	Distance	Correc	t to 3 me	ters	Peak Fie	ld Strength	Limit	
	Read	Analyzer	Reading		Avg	Average	Field St	rength @	3 m	Margin v	s. Average	Limit	
	AF	Antenna			Peak	Calculate	d Peak	Field Stre	ength	Margin v	s. Peak Lir	nit	
	CL	Cable Los	<b>SS</b>		HPF	High Pas	s Filter						
f	Dist	Read	AF dP/m		Amp	D Corr		Corr.	Limit dBuV/m	e – e	Ant. Pol.		Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	-	8	dBuV/m	<u> </u>	V/H	P/A/QP	
<u>10.360</u> 10.360	3.0	35.5 22.5	<u>38.2</u> 38.2	9.4 9.4	-35.8 -35.8	0.0	0.0 0.0	47.4 34.3	74.0 54.0	-26.6 -19.7	V V	P	
10.360 15.540	3.0	35.3	<u>38.2</u> 39.0	9.4 12.5	-35.8	0.0	0.0	<u>34.3</u> 52.8	54.0 74.0	-19.7	v V	A P	
15.540	3.0	22.3	<u>39.0</u>	12.5	-34.0	0.0	0.0	39.8	54.0	-14.2	v	A	
10.360	3.0	35.3	38.2	9.4	-35.8	0.0	0.0	47.1	74.0	-26.9	Ĥ	P	
10.360	3.0	22.5	38.2	9.4	-35.8	0.0	0.0	34.3	54.0	-19.7	Н	Α	
15.540	3.0	36.0	39.0	12.5	-34.0	0.0	0.0	53.5	74.0	-20.5	Н	Р	
15.540	3.0	22.3	39.0	12.5	-34.0	0.0	0.0	39.8	54.0	-14.2	Н	A	
										ļ			
Rev. 4.1.2	1												
<u>Note: No</u>	othere	<u>missions</u>	were de	tected	above t	<u>he syster</u>	<u>n nois</u>	e floor.					

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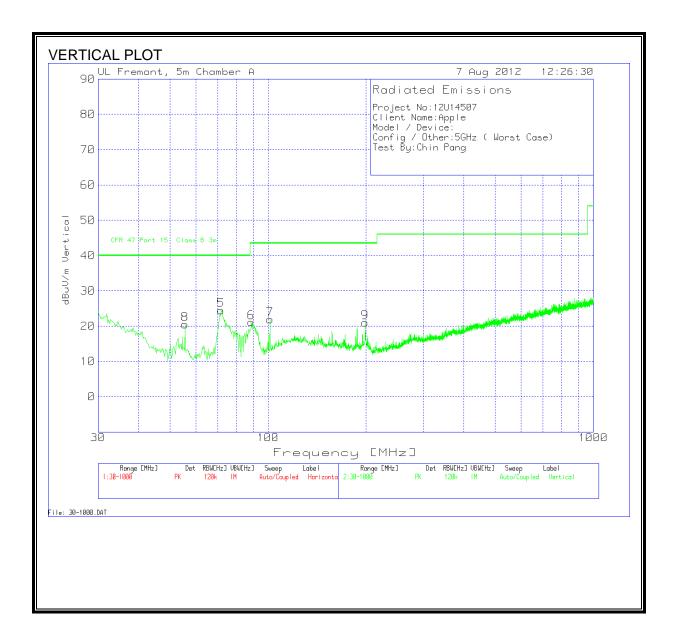
# 9.3. WORST-CASE BELOW 1 GHz

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



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Project No:	:12U14507							
Client Nam	ie:Apple							
Model / De	vice:							
Config / Ot	her:5GHz (	Worst Cas	e)					
Test By:Chi	n Pang							
Horizontal					17.14			
Frequency	-		25MHz-1GHz				-	Polarity
71.4828	40.6	PK	-27.1	8.1	21.6	40	-18.4	Horz
143.0116	36.77	PK	-26.6	12.6	22.77	43.5	-20.73	Horz
157.3561	37.94	PK	-26.5	12	23.44	43.5	-20.06	Horz
186.0452	38.52	PK	-26.4	11.2	23.32	43.5	-20.18	Horz
Vertical 30			/					
Frequency	Reading	Detector	25MHz-1GHz	T243 Sunol	dBuV/m	CFR 47 Part 15B	Margin	Polarity
71.6767	43.46	PK	-27.1	8.1	24.46	40	-15.54	Vert
88.735	40.59	PK	-27	7.5	21.09	43.5	-22.41	Vert
101.3349	38.26	PK	-26.9	10.6	21.96	43.5	-21.54	Vert
55.5875	40.69	PK	-27.3	7.1	20.49	40	-19.51	Vert
199.0328	35.02	PK	-26.2	12.2	21.02	43.5	-22.48	Vert

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# **10. 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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

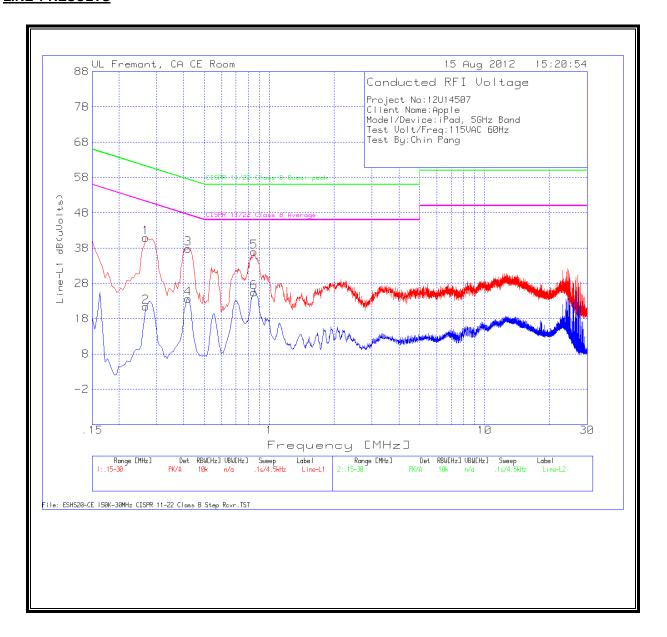
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

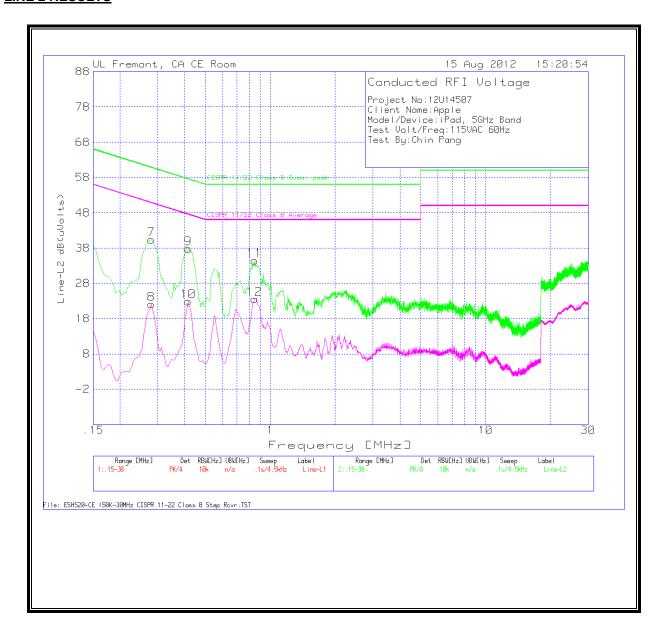
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#### **6 WORST EMISSIONS**

Project No	o:12U14507	7							
Client Nar	me:Apple								
Model/De	vice:iPad,	5GHz Band	ł						
Test Volt/	Freq:115V	AC 60Hz							
Test By:Cł	nin Pang								
Line-L1.1	5 - 30MHz								
Frequency	Reading	Detector	T24 IL L1.	LC Cables	dB(uVolts	CISPR Class B Q-p	Margin	CISPR Class B Avg	Margin
0.267	40.79	PK	0.1	0	40.89	61.2	-20.31	-	-
0.267	21.31	Av	0.1	0	21.41	-	-	51.2	-29.79
0.42	37.74	PK	0.1	0	37.84	57.4	-19.56	-	-
0.42	23.55	Av	0.1	0	23.65	-	-	47.4	-23.75
0.8475	36.85	PK	0.1	0	36.95	56	-19.05	-	-
0.8475	25.42	Av	0.1	0	25.52	-	-	46	-20.48
Line-L2.1	5 - 30MHz								
Frequency	Reading	Detector	T24 IL L1.	LC Cables	dB(uVolts	CISPR Class B Q-p	Margin	CISPR Class B Avg	Margin
0.2805	40.38	PK	0.1	0	40.48	60.8	-20.32	-	-
0.2805	22.02	Av	0.1	0	22.12	-	-	50.8	-28.68
0.4155	37.71	PK	0.1	0	37.81	57.5	-19.69	-	-
0.4155	22.82	Av	0.1	0	22.92	-	-	47.5	-24.58
0.843	34.31	PK	0.1	0.1	34.51	56	-21.49	-	-
0.843	23.34	Av	0.1	0.1	23.54	-	-	46	-22.46



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# 11. DYNAMIC FREQUENCY SELECTION

# 11.1. OVERVIEW

# 11.1.1. LIMITS

#### INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-210 Issue 7 A9.4 (b) (ii) Channel Availability Check Time: ...

Additional requirements for the band 5600-5650 MHz: Until further notice, devices subject to this Section shall not be capable of transmitting in the band 5600-5650 MHz, so that Environment Canada weather radars operating in this band are protected.

RSS-210 Issue 7 A9.4 (b) (iv) **Channel closing time:** the maximum channel closing time is 260 ms.

# <u>FCC</u>

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

Testing was also conducted per KDB 365942.

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# Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operatio	Operational Mode						
	Master	Client (without radar detection)	Client (with radar detection)					
Non-Occupancy Period	Yes	Not required	Yes					
DFS Detection Threshold	Yes	Not required	Yes					
Channel Availability Check Time	Yes	Not required	Not required					
Uniform Spreading	Yes	Not required	Not required					

### Table 2: Applicability of DFS requirements during normal operation

Requirement	Operationa	Operational Mode				
	Master	Client	Client			
		(without DFS)	(with DFS)			
DFS Detection Threshold	Yes	Not required	Yes			
Channel Closing Transmission Time	Yes	Yes	Yes			
Channel Move Time	Yes	Yes	Yes			

# Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value
	(see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver a Note 2: Throughout these test procedures an addition of the test transmission waveforms to account for var will ensure that the test signal is at or above the determined response.	nal 1 dB has been added to the amplitude riations in measurement equipment. This

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#### Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period

The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows:

For the Short pulse radar Test Signals this instant is the end of the Burst.

For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated.

For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

# Table 5 – Short Pulse Radar Test Waveforms Radar Pulse Width PRI Pulses

Radar	Pulse Width	PRI	Pulses	Minimum	Minimum
Туре	(Microseconds)	(Microseconds)		Percentage of	Trials
				Successful	
				Detection	
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (F	Radar Types 1-4)	80%	120		

### Table 6 – Long Pulse Radar Test Signal

Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000- 2000	80%	30

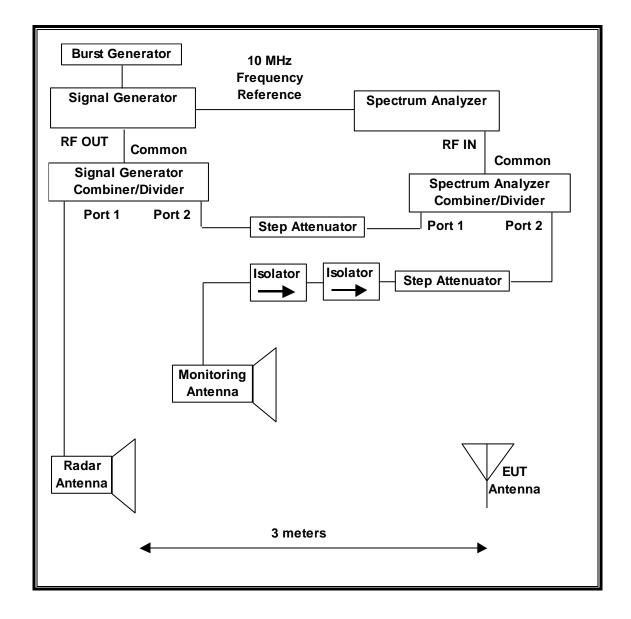
### Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (µsec)	PRI (µsec)	Burst Length (ms)	Pulses per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	.333	70%	30

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# 11.1.2. TEST AND MEASUREMENT SYSTEM

#### RADIATED METHOD SYSTEM BLOCK DIAGRAM



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#### SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at runtime.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from  $F_L$  to  $F_H$  for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

#### SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

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#### ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

#### TEST AND MEASUREMENT EQUIPMENT

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

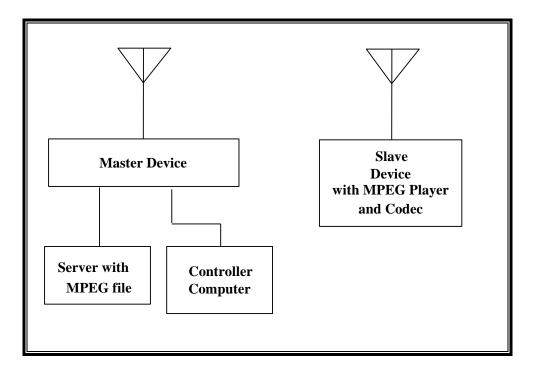
TEST EQUIPMENT LIST									
Description Manufacturer Model Asset Number Cal D									
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/15/12					
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	11/17/12					

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# 11.1.3. SETUP OF EUT

#### **CLIENT MODE:**

#### RADIATED METHOD EUT TEST SETUP



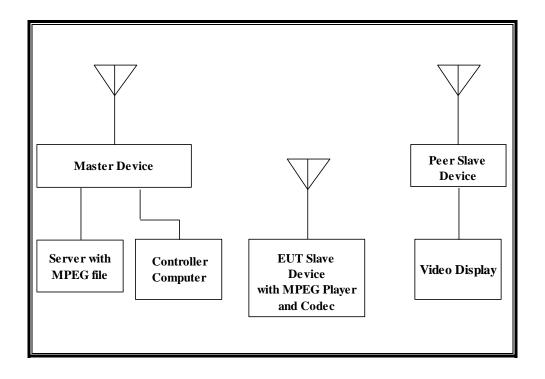
#### SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

	PERIPHERAL SUPPORT EQUIPMENT LIST									
Description	Manufacturer	Model	Serial Number	FCC ID						
Wireless Access Point (Master Device)	Cisco	AIR-AP1252AG-A- K9	FTX130390D9	LDK102061						
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH1049902N	DoC						
Notebook PC (Server)	Apple	MacBook Pro A1150	AOU257941	DoC						
AC Adapter (Server)	Delta Electronics	A1344	MV05104CNAL1A	DoC						
Notebook PC (Controller)	Dell	PP18L	10657517725	DoC						
AC Adapter (Controller PC)	Dell	LA65SN0-00	CN-ODF263-71615- 6AU-1019	DoC						

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#### RADIATED METHOD EUT TEST SETUP



#### SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST									
Description	Manufacturer	Model	Serial Number	FCC ID					
Wireless Access Point	Cisco	AIR-AP1252AG-A-	FTX130390D9	LDK102061					
(Master Device)		K9							
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH1049902N	DoC					
Notebook PC (Server)	Apple	MacBook Pro A1150	AOU257941	DoC					
AC Adapter (Server)	Delta Electronics	A1344	MV05104CNAL1A	DoC					
Notebook PC (Controller)	Dell	PP18L	10657517725	DoC					
AC Adapter (Controller PC)	Dell	LA65SN0-00	CN-ODF263-71615- 6AU-1019	DoC					
Apple TV (Peer Slave Device)	Apple	A1427	C07GY040F14P	BCGA1427					
LCD Monitor	Dell	Prototype	6279	N/A					

# 11.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 22.45 dBm EIRP in the 5250-5350 MHz band and 23.17 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 4.25 dBi in the 5250-5350 MHz band and 4.51 dBi in the 5470-5725 MHz band.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is -64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The EUT uses one transmitter/receiver chain connected to an antenna to perform radiated tests.

In the client mode, WLAN traffic is generated by streaming the video file TestFile.mp2 "6 ½ Magic Hours" from the Master to the Slave in full motion video mode using Safari web browser. In the Client-to-Client Communications mode, WLAN traffic is generated by streaming the video file TestFile.mp2 "6 ½ Magic Hours" from the Master, to the Slave, and mirror to the peer slave device in full motion video mode using Safari web browser.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths of 20 MHz and 40 MHz are implemented in standard client mode.

One nominal channel bandwidth of 20 MHz is implemented in Client-to-Client Communications mode.

The software installed in the EUT is IOS (Build 10A371).

#### UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

#### **OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS**

The Master Device is a Cisco Access Point, FCC ID: LDK102061. The minimum antenna gain for the Master Device is 3.5 dBi.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is -64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

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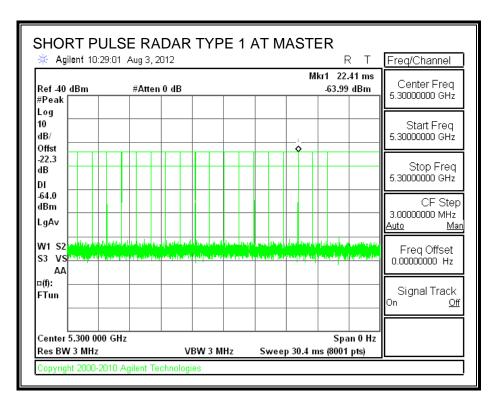
# 11.2. CLIENT MODE RESULTS FOR 20 MHz BANDWIDTH

# 11.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5300 MHz.

# 11.2.2. RADAR WAVEFORM AND TRAFFIC

#### RADAR WAVEFORM



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### **TRAFFIC**

Ket 40 dbm       #Atten 0 db       -7.5.3 dbm       5.3000000         #Peak	Channel	Freq/Cha	≀ T	SLAVE TRAFFIC									
Log 10 dB/ Offst 22.3 dB Dl 64.0 dBm LgAv W1 S2 S3 FS AA n(f): FTun	iter Freq 10000 GHz	Center 5.30000000			1	1	1		0 dB	#Atten	1	dBm	
-22.3	art Freq 10000 GHz	Start 5.30000000											Log 10 dB/
.64.0	top Freq 10000 GHz	Stop 5.3000000								1			-22.3 dB
S3 FS 0.000000 a(f): FTun Signal On	CF Step 10000 MHz <u>Ma</u>	3.00000000			i lutanes				an a tha an the second s	e te la grana p		Alex Presser Alex	-64.0 dBm
FTun	q Offset 00000 Hz	Freq 0 0.0000000											\$3 FS
	nal Track <u>Off</u>	Signal <sup>-</sup> On											
Center 5.300 000 GHz Span 0 Hz Res BW 3 MHz VBW 3 MHz Sweep 16 s (8001 pts)			n 0 Hz pts)	•	 veep 16	Sv	  Hz	BW 3 M	v	:			

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# 11.2.3. OVERLAPPING CHANNEL TESTS

#### **RESULTS**

These tests are not applicable.

# 11.2.4. MOVE AND CLOSING TIME

#### **REPORTING NOTES**

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) \* (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

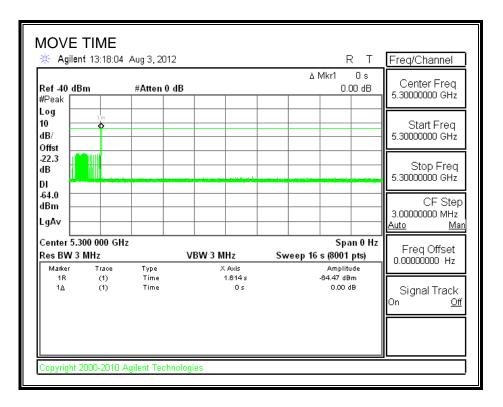
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

#### **RESULTS**

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.000	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	0.0	60
IC	0.0	260

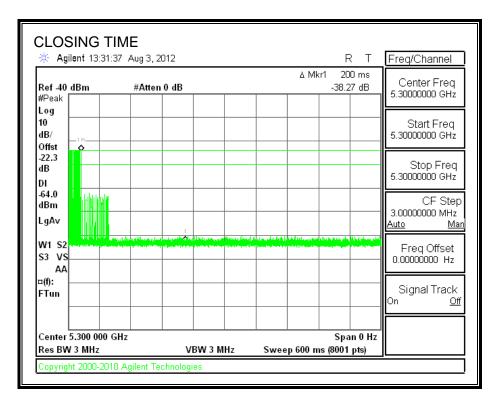
#### MOVE TIME



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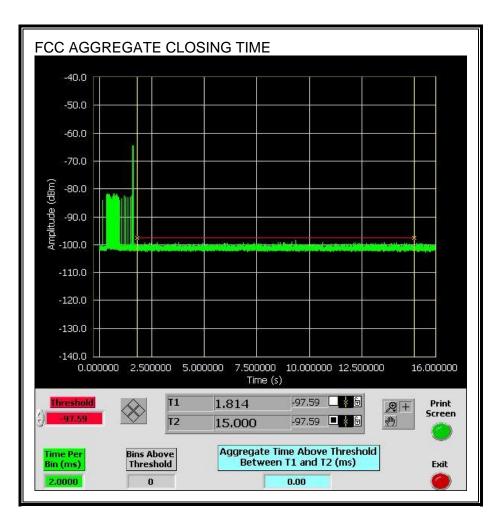
#### CHANNEL CLOSING TIME



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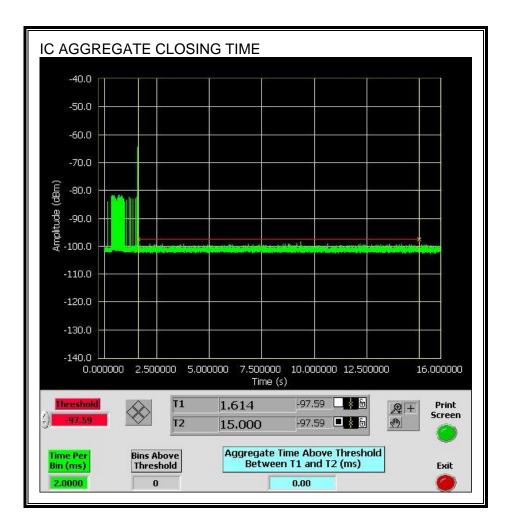
#### AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



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No transmissions are observed during the IC aggregate monitoring period.



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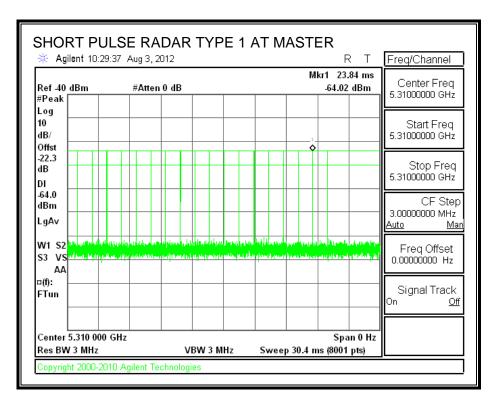
# 11.3. CLIENT MODE RESULTS FOR 40 MHz BANDWIDTH

## 11.3.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5310 MHz.

# 11.3.2. RADAR WAVEFORM AND TRAFFIC

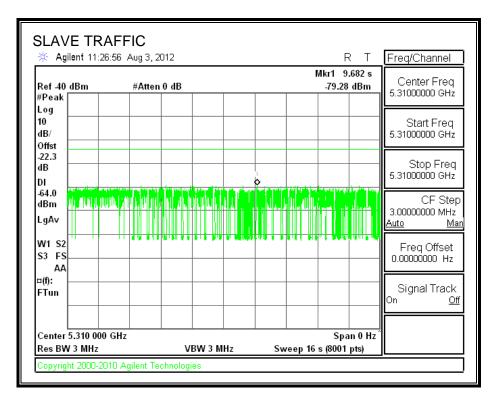
## RADAR WAVEFORM



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## **TRAFFIC**



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# 11.3.3. OVERLAPPING CHANNEL TESTS

### RESULTS

These tests are not applicable.

## 11.3.4. MOVE AND CLOSING TIME

### **REPORTING NOTES**

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) \* (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

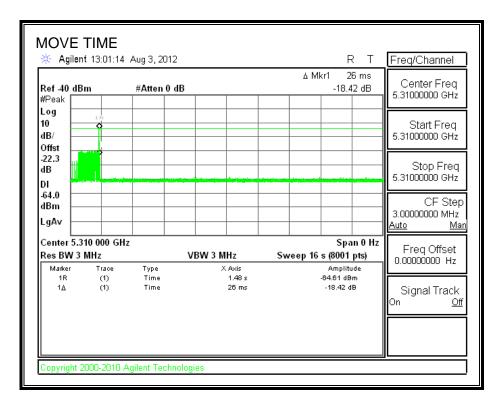
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

### **RESULTS**

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.026	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	0.0	60
IC	26.0	260

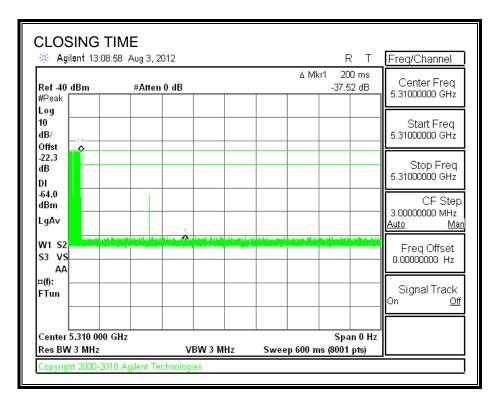
### **MOVE TIME**



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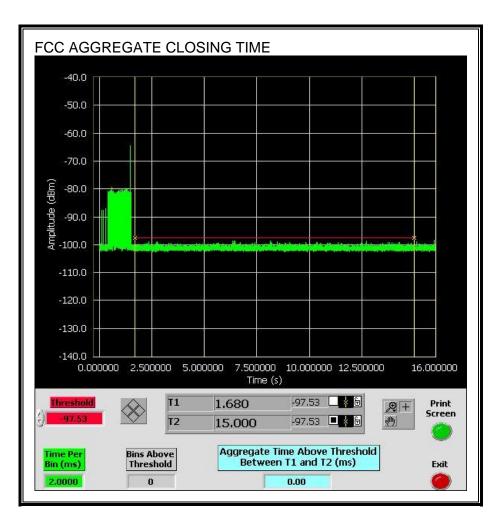
## CHANNEL CLOSING TIME



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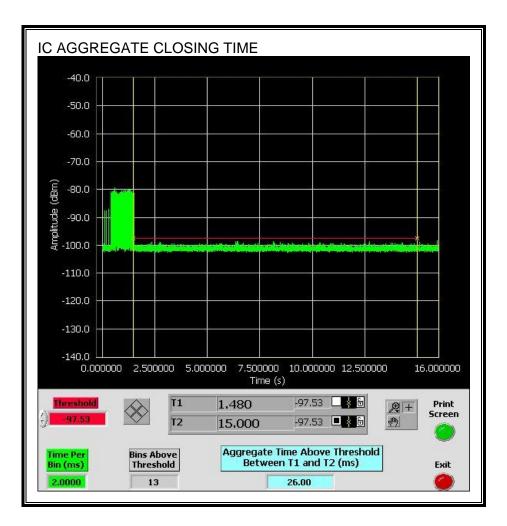
## AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



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Only intermittent transmissions are observed during the IC aggregate monitoring period.

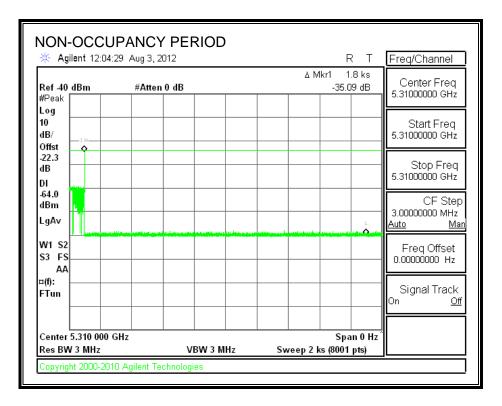


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# 11.3.5. NON-OCCUPANCY PERIOD

### **RESULTS**

No EUT transmissions were observed on the test channel during the 30-minute observation time.



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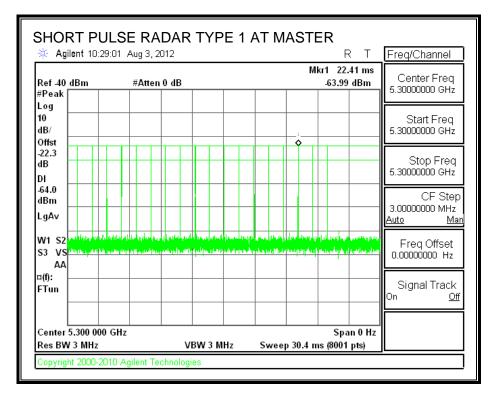
# 11.4. CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 20 MHz BANDWIDTH

# 11.4.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5300 MHz.

# 11.4.2. RADAR WAVEFORM AND TRAFFIC

## RADAR WAVEFORM



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## **TRAFFIC**

SLAVE TI	RAFFIC 1:18:15 Aug 3, 2	012				F	? Т	Freq/Channel
Ref -40 dBm #Peak	#Atten	0 dB			I	Mkr1 -79.79	l 1.3 s dBm	Center Freq 5.3000000 GHz
Log 10 dB/								Start Freq 5.3000000 GHz
Offst -22.3 dB DI					1			Stop Freq 5.3000000 GHz
-64.0 dBm LgAv								CF Step 3.0000000 MHz <u>Auto Man</u>
W1 S2 S3 FS AA								Freq Offset 0.00000000 Hz
¤(f): FTun								Signal Track On <u>Off</u>
Center 5.300 0 Res BW 3 MHz		VBW 3 I	 MHz	Sw	eep 16 :		n0Hz <sup>°</sup> pts)	
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# 11.4.3. OVERLAPPING CHANNEL TESTS

### **RESULTS**

These tests are not applicable.

# 11.4.4. MOVE AND CLOSING TIME

### **REPORTING NOTES**

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) \* (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

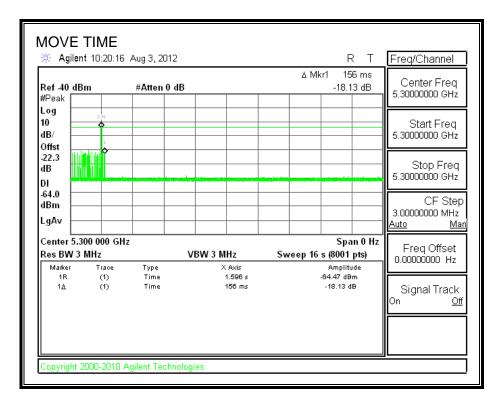
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

### **RESULTS**

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.156	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	0.0	60
IC	16.0	260

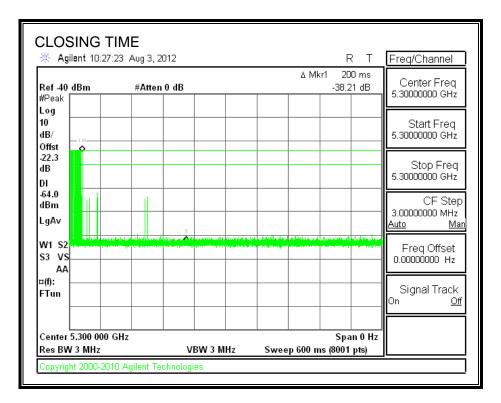
### MOVE TIME



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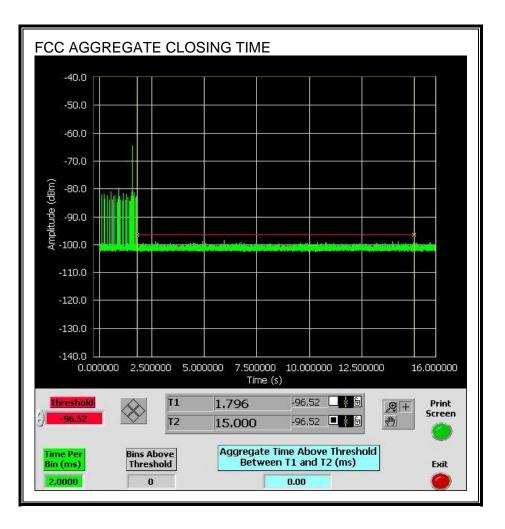
## CHANNEL CLOSING TIME



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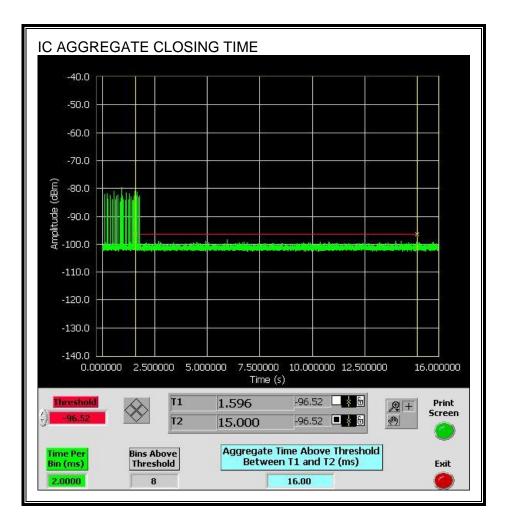
## AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



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Only intermittent transmissions are observed during the IC aggregate monitoring period.



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