

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Product Name:** Smart Phone

**Brand Name:** Dell

**Model No.:** V04B

**Model Difference:** N/A

**FCC ID:** E2KV04B001

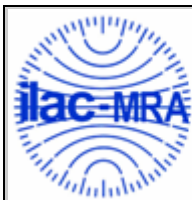
**Report No.:** EH/2011/A0023

**Issue Date:** Nov. 14, 2011

**FCC Rule Part:** §15.407

**Prepared for:** Dell Inc.  
One Dell Way, Round Rock, TX 78682

**Prepared by:** SGS Taiwan Ltd.  
Electronics & Communication Laboratory  
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Taipei County, Taiwan.



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### VERIFICATION OF COMPLIANCE

**Applicant:** Dell Inc.  
 One Dell Way, Round Rock, TX 78682

**Product Name:** Smart Phone

**Brand Name:** Dell

**FCC ID:** E2KV04B001

**Model No.:** V04B

**Model Difference:** N/A

**File Number:** EH/2011/A0023

**Date of test:** Oct. 20, 2011 ~ Nov. 11, 2011

**Date of EUT Received:** Oct. 20, 2011

#### We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407.

The test results of this report relate only to the tested sample identified in this report.

**Test By:** *Marcus Tseng* **Date:** Nov. 14, 2011

*Marcus Tseng / Engineer*

**Prepared By:** *Celine Chou* **Date:** Nov. 14, 2011

*Celine Chou / Clerk*

**Approved By:** *Jim Chang* **Date:** Nov. 14, 2011

*Jim Chang / Supervisor*

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## Version

Version No.	Date	Description
00	Nov. 14, 2011	Initial creation of document

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## 1. GENERAL INFORMATION

### 1.1. Product Description

General:

Product Name:	Smart Phone	
Brand Name:	Dell	
Model No.:	V04B	
Model Difference:	N/A	
Simple Hands-Free:	Model No.: DA80 525283 FOSTER, Supplier: PCH	
Data Cable / USB Cable:	Model No.: G6YM1, Supplier: PCH	
Power Supply:	3.7Vdc Li-ion battery or 5Vdc by AC/DC power adapter	
	Battery:	Model No.: V04B, Supplier: Dell
	Adapter:	Model No.: 32HD9, Supplier: PCH

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**WLAN: 802.11 a/b/g/n**

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	Type of Emission
11b/g	2412-2462	11	b: 17.73 dBm g: 20.08 dBm	DSSS, OFDM	b : 11M2G1D g : 16M5G1D
11n (2.4GHz)	HT20 2412-2462	11	n: 18.27 dBm	OFDM	16M4G1D
11a	5150~5250	4	16.11 dBm	OFDM	16M4G1D
	5250~5350	4	17.87 dBm		16M5G1D
11n	HT20 5150~5250	4	HT20:16.25 dBm	OFDM	16M4G1D
	HT20 5250~5350	4	HT20:17.93 dBm		16M5G1D
11a	5725-5850	5	a : 17.20 dBm	OFDM	16M5G1D
11n (5GHz)	HT20 5725-5850	5	HT20: 17.15 dBm		16M4G1D
Antenna Designation		PIFA Antenna, 2.4GHz: -0.8dBi; 5GHz Gain: -0.05dBi			
Modulation type		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition Rate:		802.11 a: 6/9/12/18/24/36/48/54 Mbps; 802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps			

The 2.4G max antenna gain is -0.8dBi which was choosing for Radiated Spurious Emission test.

The 5G max antenna gain is -0.05dBi which was choosing for Radiated Spurious Emission test.

The EUT is compliance with IEEE 802.11 a/b/g /n Standard.

This report applies for frequency bands 5150 MHz– 5250 MHz and 5250MHz-5350MHz.

## 1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: E2KV04B001** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

## 1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003) & DA 02 2138 published on 08, 30, 2002. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

## 1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

## 1.5. Special Accessories

Not available for this EUT intended for grant.

## 1.6. Equipment Modifications

Not available for this EUT intended for grant.

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## 2. SYSTEM TEST CONFIGURATION

### 2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2. EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

### 2.3. Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003, conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and Average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." Is still within the 3Db illumination BW of the measurement antenna. According to the requirements in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.4-2003.

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## 2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

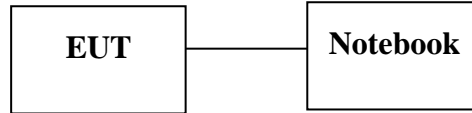


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	HP	ProBook 4411s	CNU9316V4C	Un-shield	Un-shield

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### 3. SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.407(a)	26 dB Emission Bandwidth	Compliant
§15.407(a)	Peak Output Power Measurement	Compliant
§15.407(a)	Peak Power Spectral Density Measurement	Compliant
15.407(a)(6)	Peak Excursion Measurement	Compliant
§15.407(b)	Undesirable Emission – Conducted Measurement	Compliant
§15.407(b)	Undesirable Emission – Radiated Measurement	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.407(a)	Antenna Requirement	Compliant
§15.407(d)	TPC and DFS Measurement	Compliant

### 4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting mode is programmed.

a mode:

5150MHz-5250MHz: Channel lowest (5180MHz) 、Mid (5220MHz) and Highest (5240MHz).

5250MHz-5350MHz: Channel lowest (5260MHz) 、Mid (5300MHz) and Highest (5320MHz) with 6Mbps data rate are chosen for full testing.

n HT 20 mode :

5150MHz-5250MHz: Channel lowest (5180MHz) 、Mid (5220MHz) and Highest (5240MHz).

5250MHz-5350MHz: Channel lowest (5260MHz) 、Mid (5300MHz) and Highest (5320MHz) with 6.5Mbps data rate are chosen for full testing

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

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## 5. AC POWER LINE CONDUCTED EMISSION TEST

### 5.1. Standard Applicable

According to §15.207 and RSS-Gen §7.2.4, frequency range within 150 KHz to 30 MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

- 1.The lower limit shall apply at the transition frequencies
- 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 5.2. EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2003.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz power source.

### 5.3. Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

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#### 5.4. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	828985/004	09/23/2010	09/22/2012
LISN	Rolf-Heine	NNB-2/16Z	99012	03/31/2011	03/30/2012
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/31/2011	03/30/2012
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2010	11/27/2011

#### 5.5. Measurement Result

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

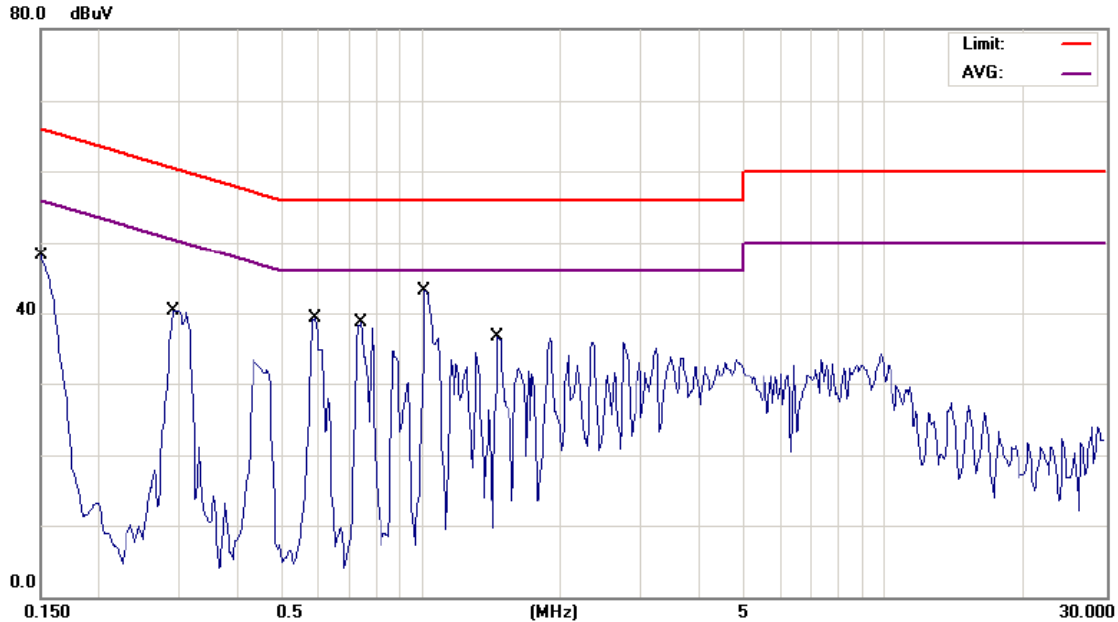
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation	Test Date:	Nov. 10, 2011
Temperature:	26 °C	Humidity:	59 %
		Test By:	Marcus

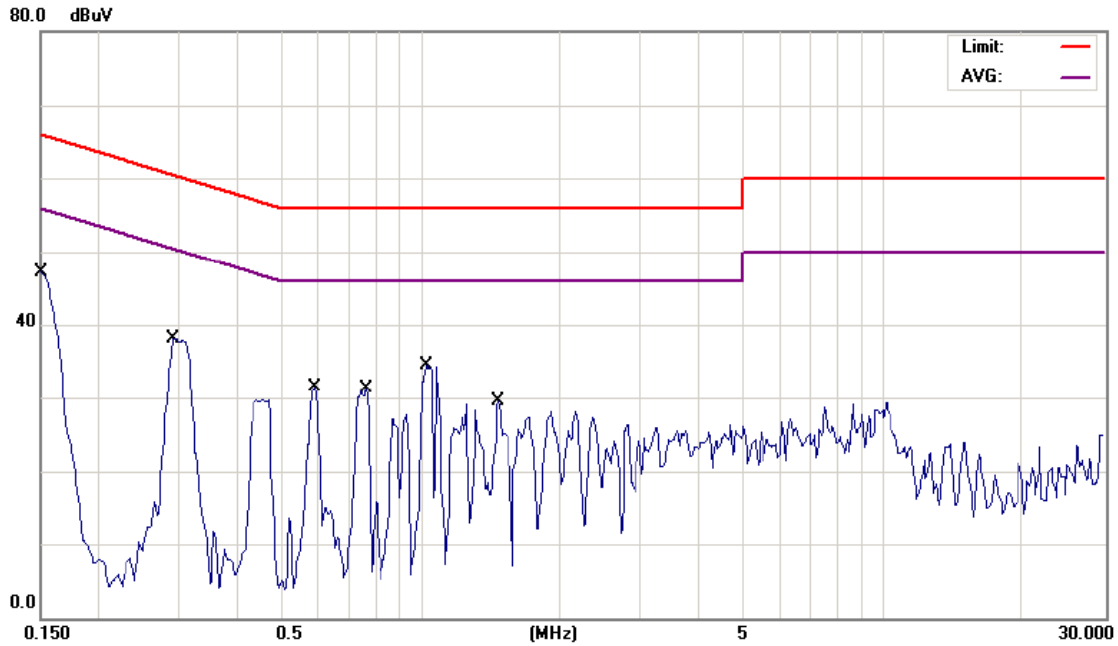


Site SGS CONDUCTED #1 Phase: **L1** Temperature: 26 °C  
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 59 %  
 EUT: Smart Phone Distance: Air Pressure: hpa  
 M/N: V04B  
 Note: Charge + Wifi Stand by

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	47.88	0.14	48.02	66.00	-17.98	QP	
2		0.2900	40.20	0.12	40.32	60.52	-20.20	QP	
3		0.5900	39.13	0.12	39.25	56.00	-16.75	QP	
4		0.7400	38.65	0.11	38.76	56.00	-17.24	QP	
5	*	1.0200	42.98	0.11	43.09	56.00	-12.91	QP	
6		1.0200	22.52	0.11	22.63	46.00	-23.37	AVG	
7		1.4600	36.52	0.12	36.64	56.00	-19.36	QP	

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Site SGS CONDUCTED #1 Phase: **N** Temperature: 26 °C  
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 59 %  
 EUT: Smart Phone Distance: Air Pressure: hpa  
 M/N: V04B  
 Note: Charge + Wifi Stand by

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1524	46.55	0.18	46.73	65.87	-19.14	QP	
2		0.2900	37.98	0.16	38.14	60.52	-22.38	QP	
3		0.5900	31.27	0.16	31.43	56.00	-24.57	QP	
4		0.7600	31.23	0.15	31.38	56.00	-24.62	QP	
5		1.0300	34.34	0.15	34.49	56.00	-21.51	QP	
6		1.4700	29.28	0.16	29.44	56.00	-26.56	QP	

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## 6. 26dB BANDWIDTH MEASUREMENT

### 6.1 Standard Applicable

According to §15.407(a). No Limit required.

### 6.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100KHz, VBW =3\* RBW, Span= 50MHz, Sweep=auto
4. Mark the peak frequency and -26dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

### 6.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Sensor	Anritsu	MA2411B	917032	01/21/2010	01/20/2012
Power Meter	Anritsu	ML2495A	1005007	02/17/2010	02/16/2012
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2011	07/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S10W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S20W5	001	01/05/2011	01/04/2012
Splitter	Agilent	11636B	N/A	01/05/2011	01/04/2012

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## 6.4 Measurement Result

UNII, 5150~5250 MHz

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5180	18.82	12.75
5220	19.11	12.81
5240	20.62	13.14

UNII, 5250~5350 MHz

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5260	19.49	12.90
5300	19.88	12.98
5320	20.50	13.12

UNII HT20, 5150~5250 MHz

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5180	19.03	12.79
5220	18.85	12.75
5240	18.88	12.76

UNII HT20, 5250~5350 MHz

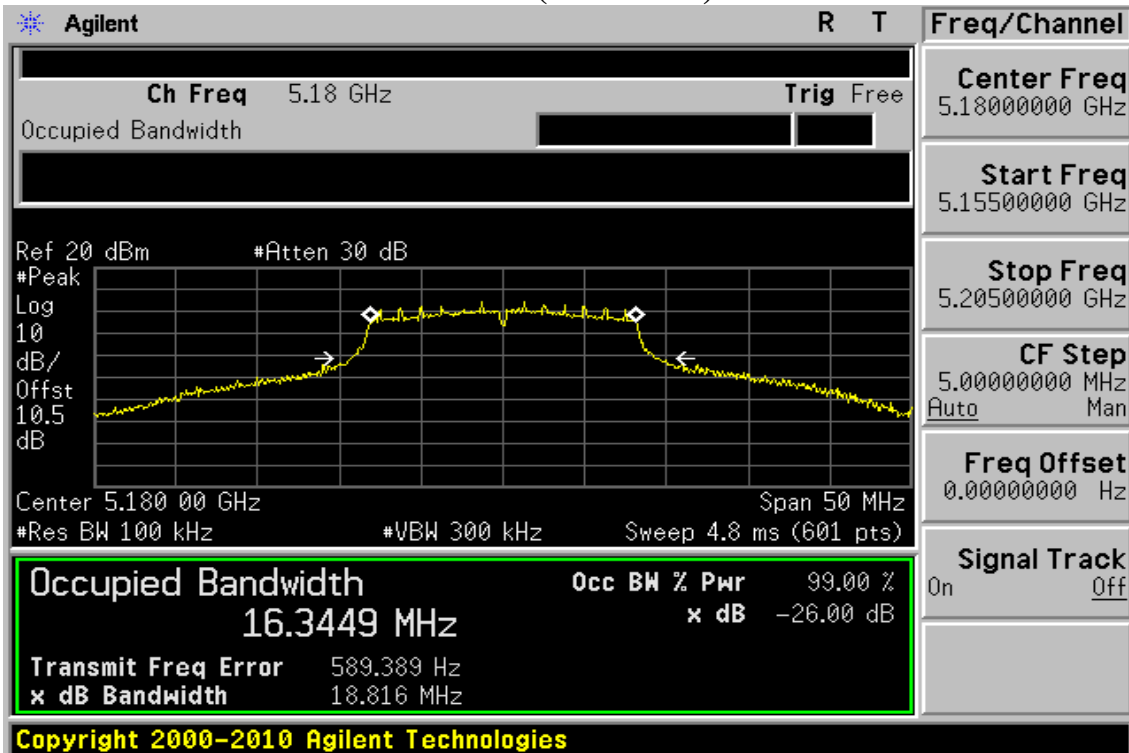
Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5260	20.99	13.22
5300	19.53	12.91
5320	19.80	12.97

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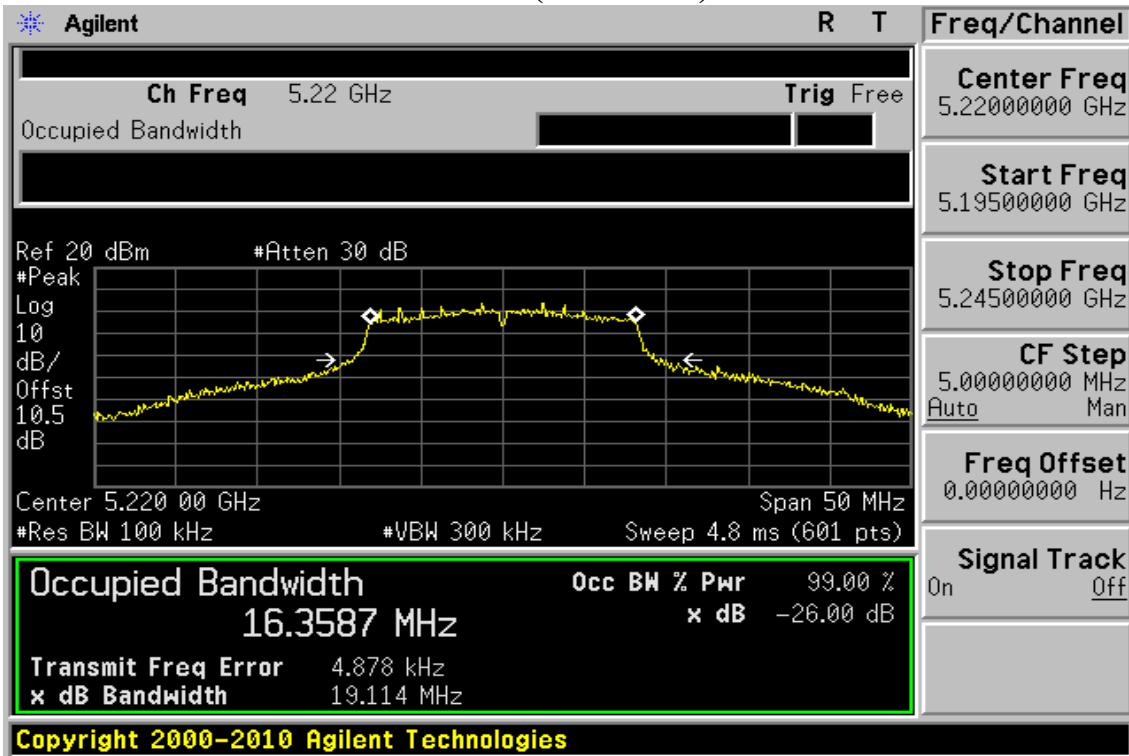
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**UNII, 5150~5250 MHz**

**26dB Band Width Test Data CH-Low (5180MHz)**



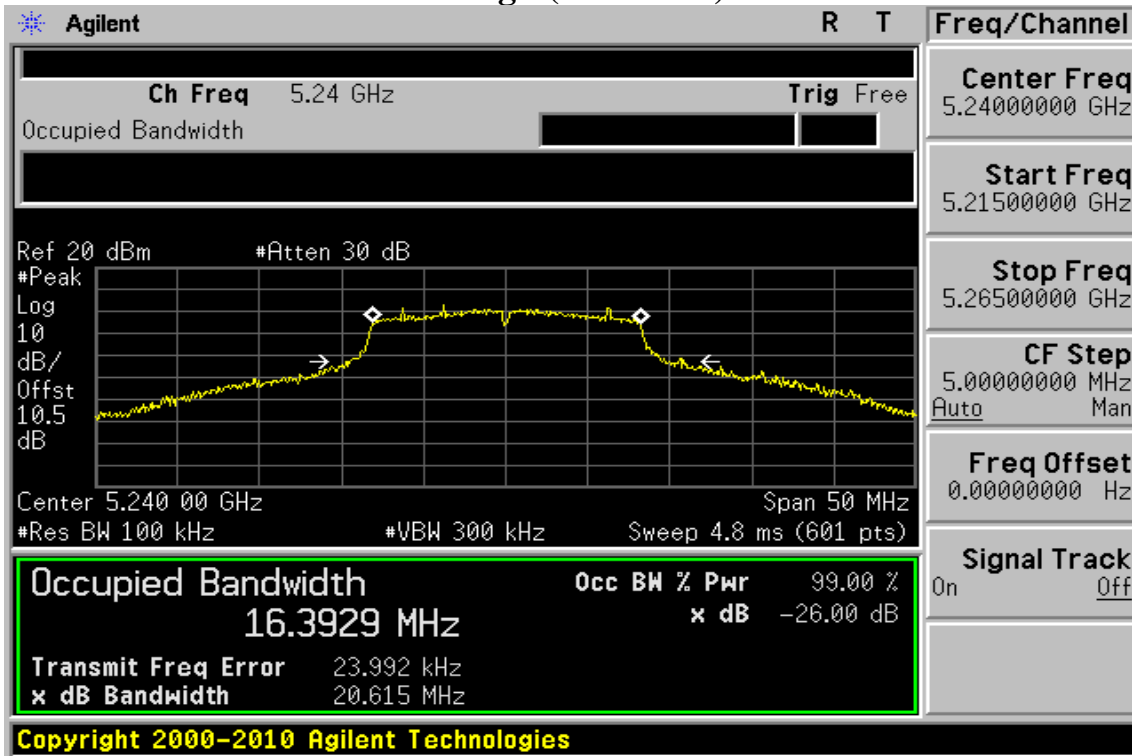
**26dB Band Width Test Data CH-Mid (5220MHz)**



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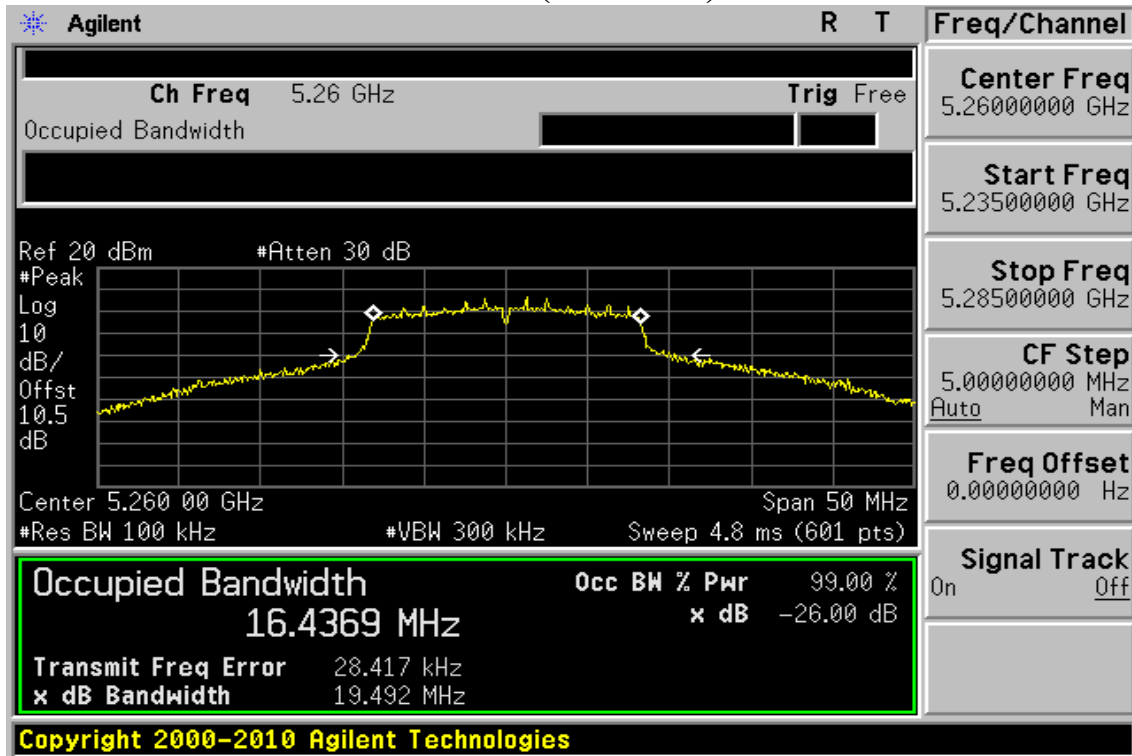
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**26dB Band Width Test Data CH-High (5240MHz)**



**UNII, 5250~5350 MHz**

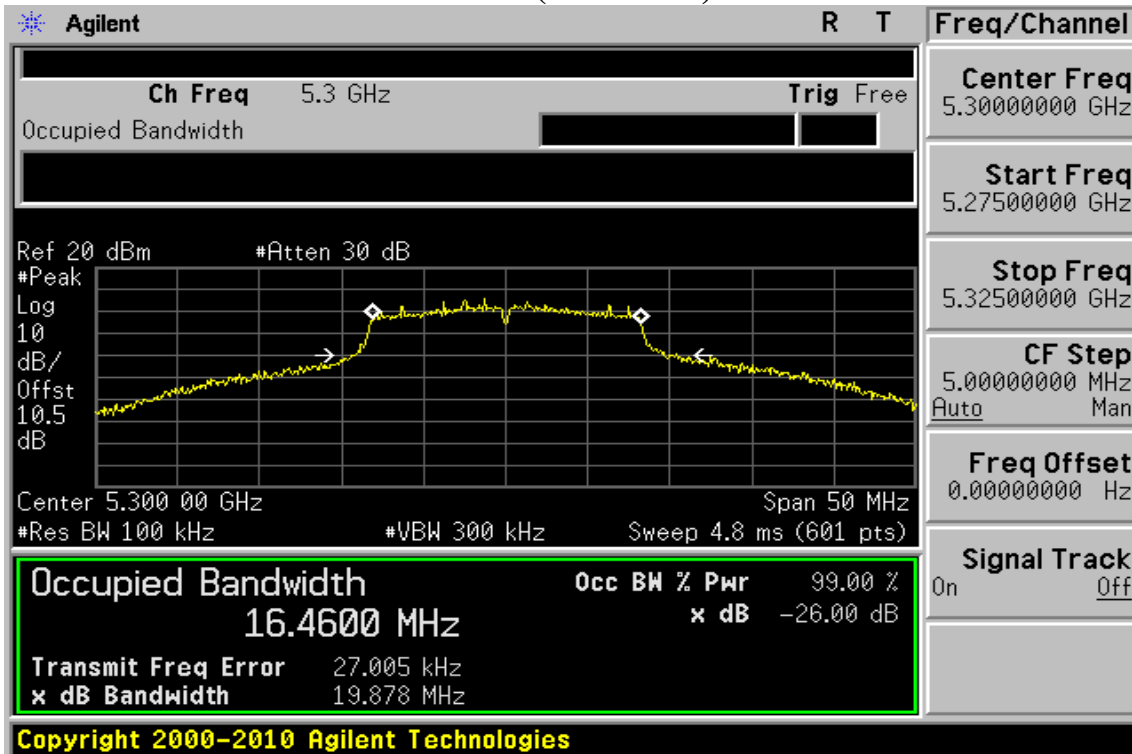
**26dB Band Width Test Data CH-Low (5260MHz)**



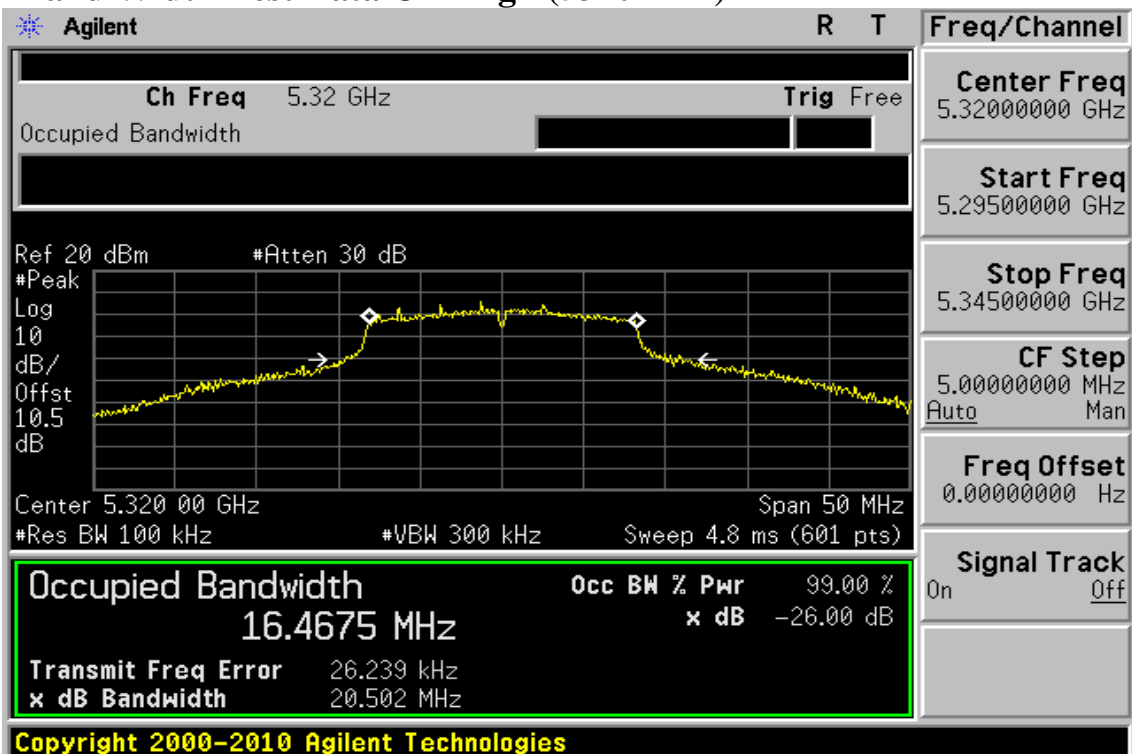
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### 26dB Band Width Test Data CH-Mid (5300MHz)



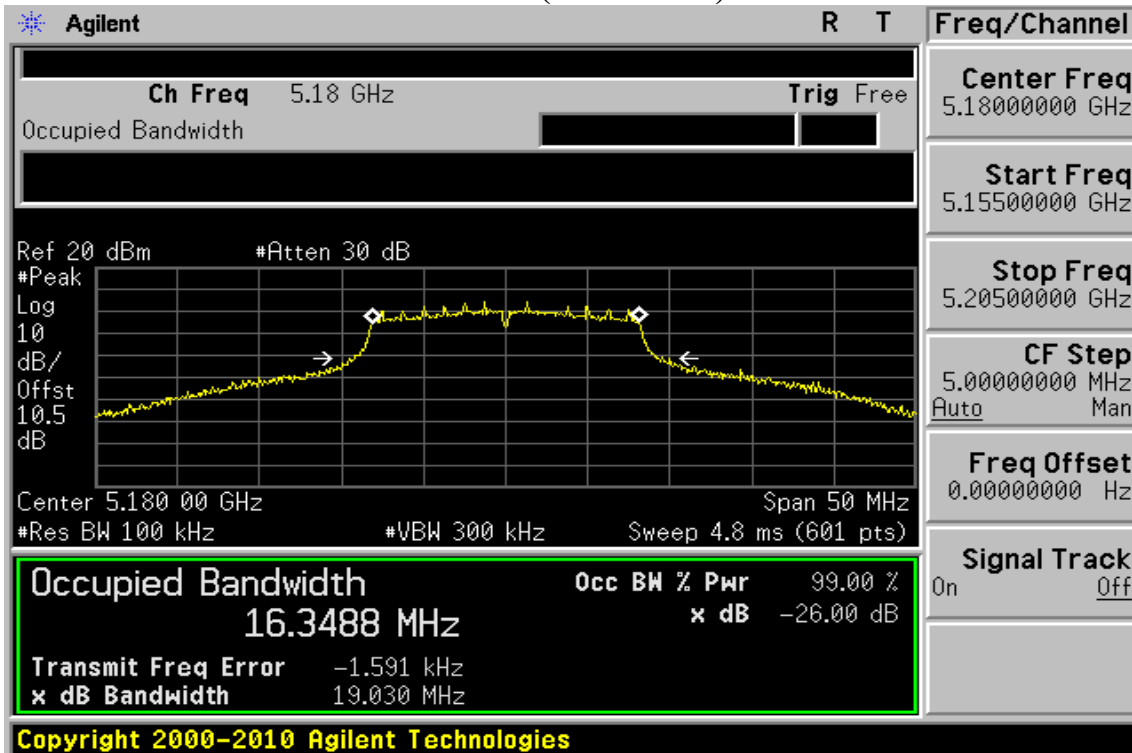
### 26dB Band Width Test Data CH-High (5320MHz)



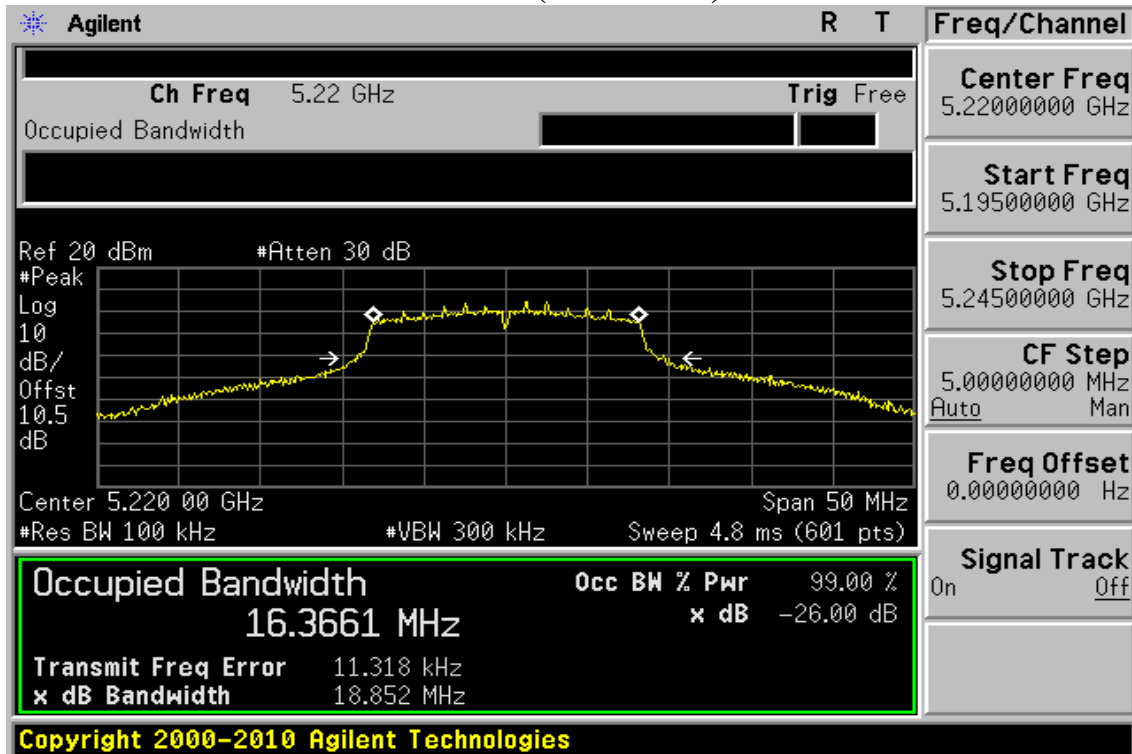
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**UNII, HT 20, 5150~5250 MHz**  
**26dB Band Width Test Data CH-Low (5180 MHz)**



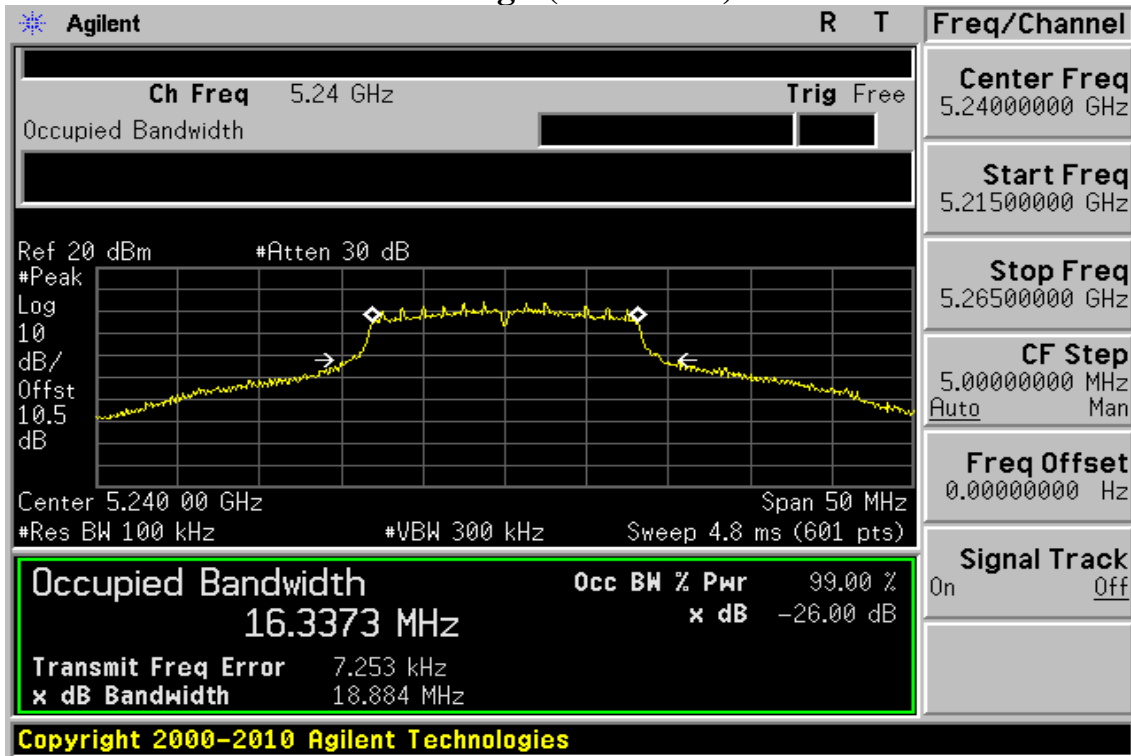
**26dB Band Width Test Data CH-Mid (5220 MHz)**



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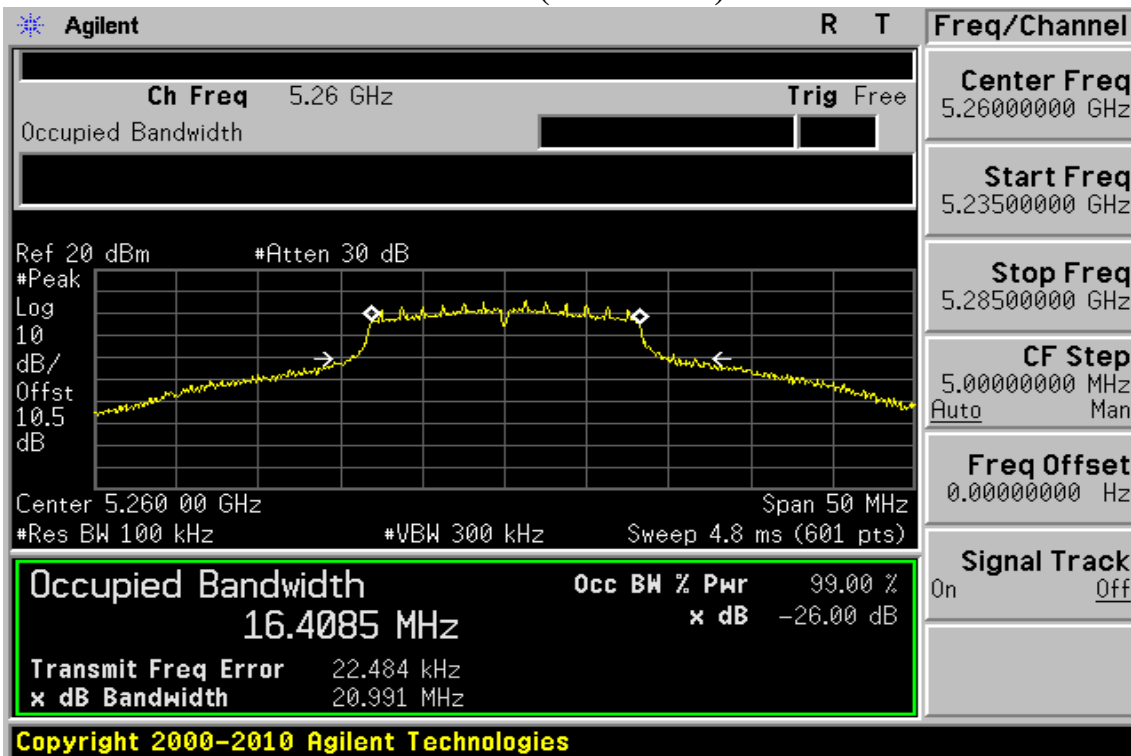
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**26dB Band Width Test Data CH-High (5240 MHz)**



**UNII, HT 20, 5250~5350 MHz**

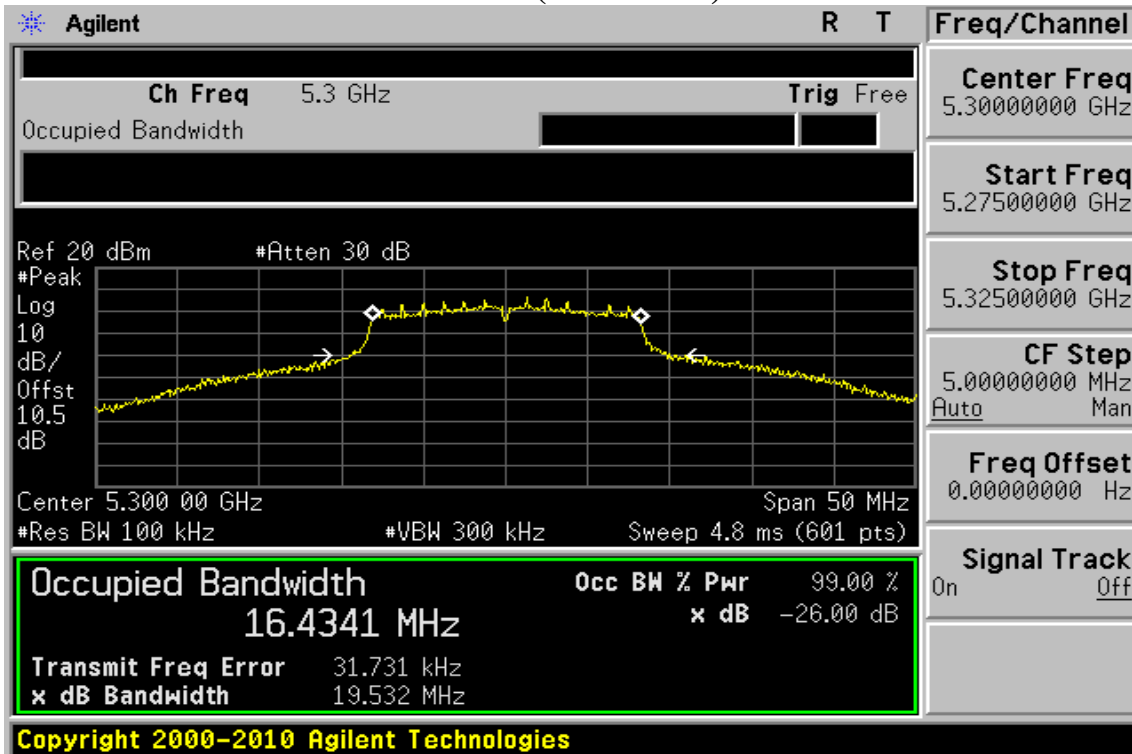
**26dB Band Width Test Data CH-Low (5260 MHz)**



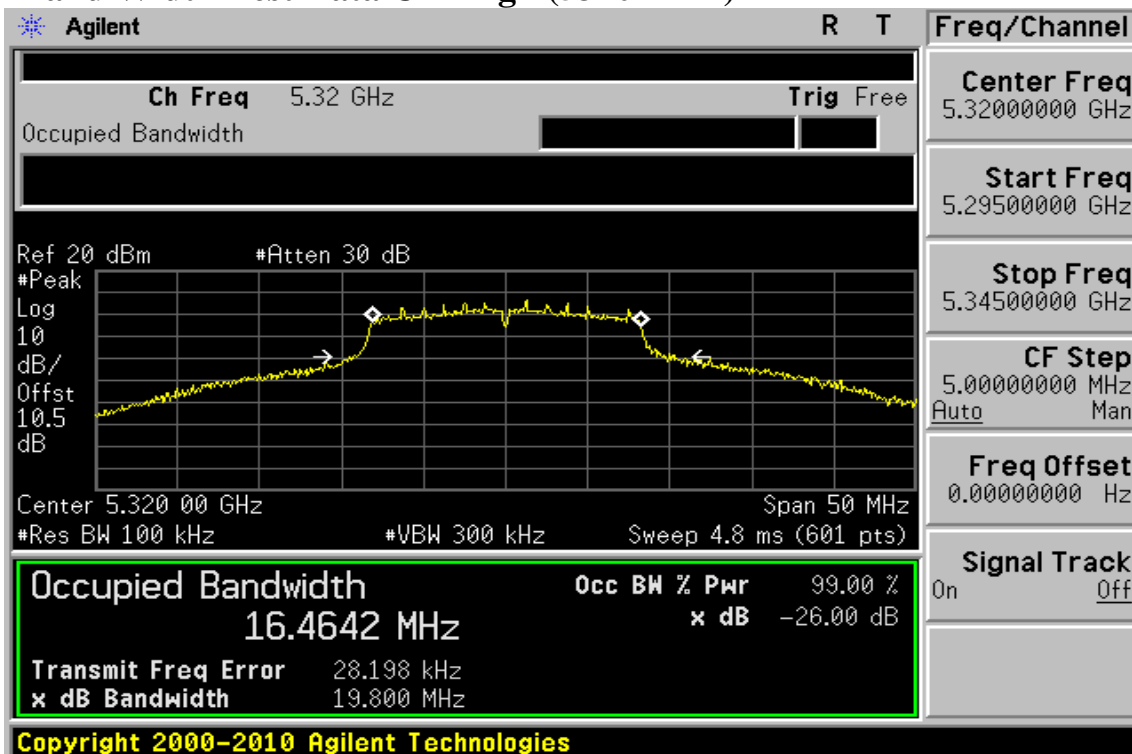
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### 26dB Band Width Test Data CH-Mid (5300 MHz)



### 26dB Band Width Test Data CH-High (5320 MHz)



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## 7. PEAK OUTPUT POWER MEASUREMENT

### 7.1 Standard Applicable

According to §15.407(a)

1. For the band 5.15-5.25 GHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B.
2. For the band 5.25-5.35 GHz and 5.47-5.725GMHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B.
3. For the band 5.725-5.825 GHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 1W (30dBm) or 17 dBm + 10log B.

### 7.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Channel Power Function, RBW=1MHz,VBW=3MHz, ACP Bandwidth =26dB Emission Bandwidth)
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

### 7.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Sensor	Anritsu	MA2411B	917032	01/21/2010	01/20/2012
Power Meter	Anritsu	ML2495A	1005007	02/17/2010	02/16/2012
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2011	07/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S10W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S20W5	001	01/05/2011	01/04/2012
Splitter	Agilent	11636B	N/A	01/05/2011	01/04/2012

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## 7.4 Measurement Result

### UNII

Cable loss = 0		Peak Power Output								Required Limit
CH	Frequency (MHz)	Data Rate								
		6	9	12	18	24	36	48	54	
36	5180	16.11	15.89	15.71	15.55	15.06	14.28	13.87	13.42	50mWatt or 4+10log(B) = 16.91dBm
44	5220	16.07	15.93	15.34	14.40	15.11	14.20	13.76	13.43	50mWatt or 4+10log(B) = 16.91dBm
48	5240	15.95	15.69	15.36	15.11	14.88	14.05	13.54	13.01	50mWatt or 4+10log(B) = 16.92dBm
52	5260	17.53	17.30	17.02	16.86	16.44	15.48	15.03	14.64	250mWatt or 11+log(B) = 23.90dBm
60	5300	17.82	17.76	17.43	17.20	16.68	16.00	15.57	15.26	250mWatt or 11+log(B) = 23.88dBm
64	5320	17.87	17.50	17.34	17.04	16.75	16.25	15.88	15.33	250mWatt or 11+log(B) = 23.89dBm

Cable loss = 0		Average Power Output								Required Limit
CH	Frequency (MHz)	Data Rate								
		6	9	12	18	24	36	48	54	
36	5180	12.63	12.54	12.31	12.11	11.34	10.82	10.22	9.69	50mWatt or 4+10log(B) = 16.91dBm
44	5220	12.72	12.61	11.89	11.14	11.06	10.94	10.34	9.97	50mWatt or 4+10log(B) = 16.91dBm
48	5240	12.41	11.77	11.40	11.15	10.77	10.12	10.02	9.48	50mWatt or 4+10log(B) = 16.92dBm
52	5260	14.22	13.95	13.67	13.58	13.12	12.58	12.21	11.99	250mWatt or 11+log(B) = 23.90dBm
60	5300	14.47	14.25	13.76	13.47	12.88	12.43	12.06	11.86	250mWatt or 11+log(B) = 23.88dBm
64	5320	14.39	14.33	13.68	13.40	13.03	12.70	12.11	11.87	250mWatt or 11+log(B) = 23.89dBm

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UNII HT20

Cable loss = 0		Peak Power Output								Required Limit
CH	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
36	5180	16.22	16.01	15.73	15.27	14.64	14.22	13.87	13.66	50mWatt or 4+10log(B) = 17.01dBm
44	5220	16.25	16.11	15.65	15.20	14.71	14.38	14.11	14.03	50mWatt or 4+10log(B) = 17.03dBm
48	5240	15.96	15.55	15.21	14.88	14.55	14.21	14.06	13.96	50mWatt or 4+10log(B) = 17.04dBm
52	5260	17.80	17.34	17.07	16.57	16.12	15.75	15.32	14.78	250mWatt or 11+log(B) = 24.11dBm
60	5300	17.93	17.65	17.21	16.74	16.23	15.87	15.45	14.89	250mWatt or 11+log(B) = 24.09dBm
64	5320	17.89	17.51	17.30	16.65	16.26	15.75	15.20	14.77	250mWatt or 11+log(B) = 24.15dBm

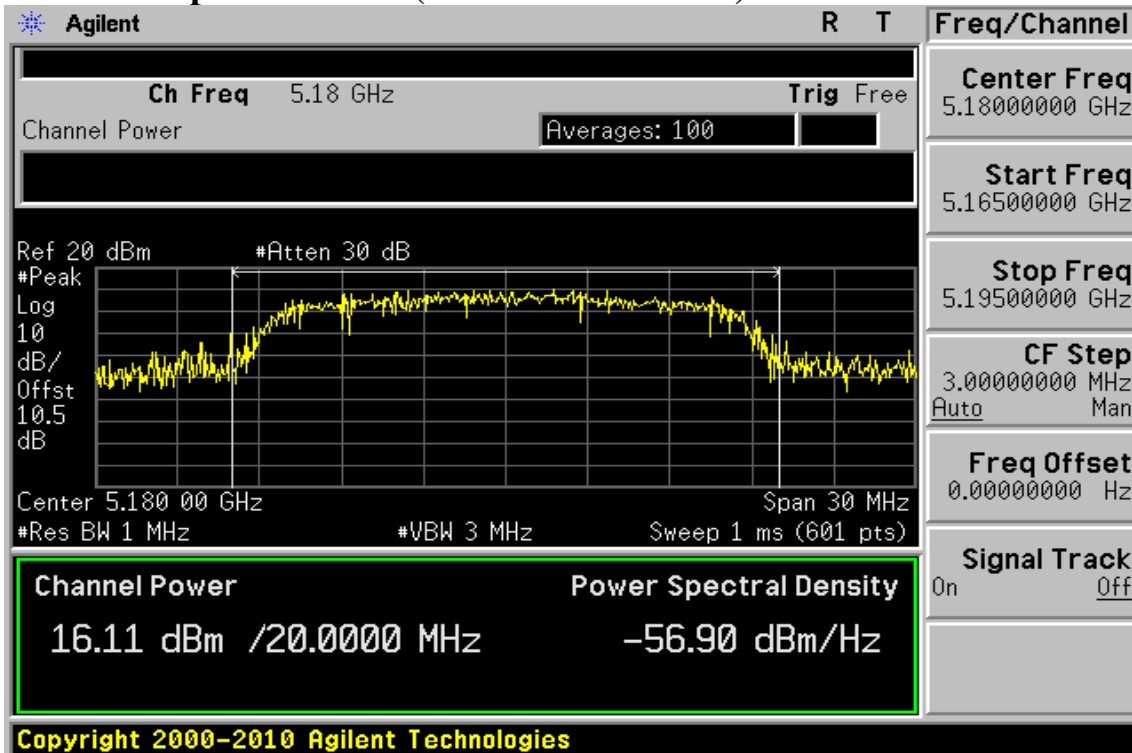
Cable loss = 0		Average Power Output								Required Limit
CH	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
36	5180	12.73	12.24	12.03	11.84	11.33	10.87	10.35	9.98	50mWatt or 4+10log(B) = 17.01dBm
44	5220	12.61	12.33	12.11	11.78	11.24	10.77	10.44	10.12	50mWatt or 4+10log(B) = 17.03dBm
48	5240	12.59	12.22	12.05	11.68	11.21	10.63	10.32	10.06	50mWatt or 4+10log(B) = 17.04dBm
52	5260	14.30	13.67	13.24	12.77	12.31	12.06	11.68	11.34	250mWatt or 11+log(B) = 24.11dBm
60	5300	14.33	13.63	13.19	12.68	12.16	12.03	11.47	11.29	250mWatt or 11+log(B) = 24.09dBm
64	5320	14.45	13.77	13.34	12.66	12.26	12.10	11.65	11.24	250mWatt or 11+log(B) = 24.15dBm

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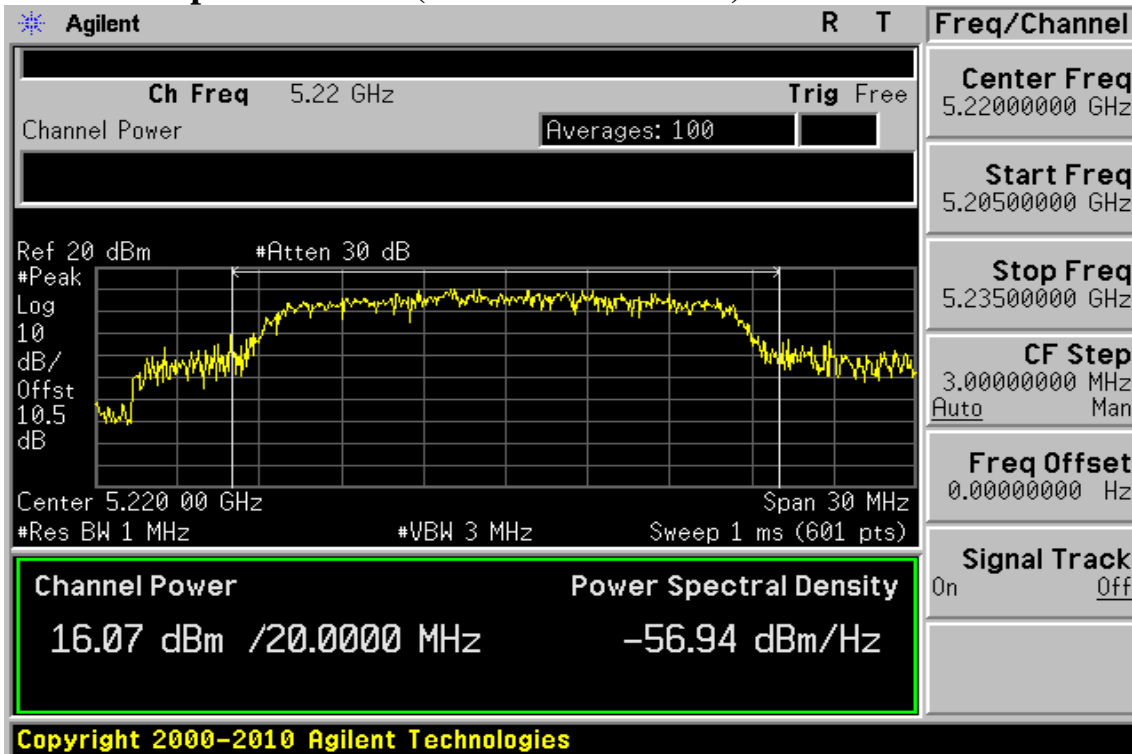
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**UNII, 5150~5250 MHz**

**Peak Power Output Data Plot (CH Low 5180 MHz)**



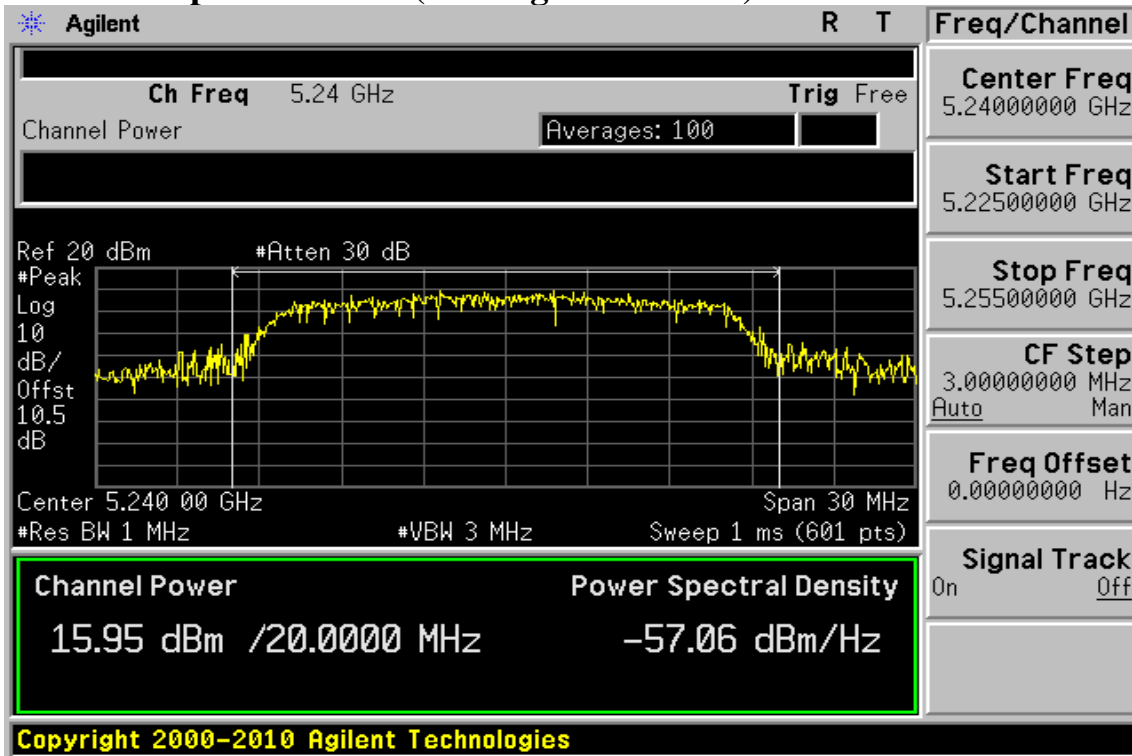
**Peak Power Output Data Plot (CH Mid 5220 MHz)**



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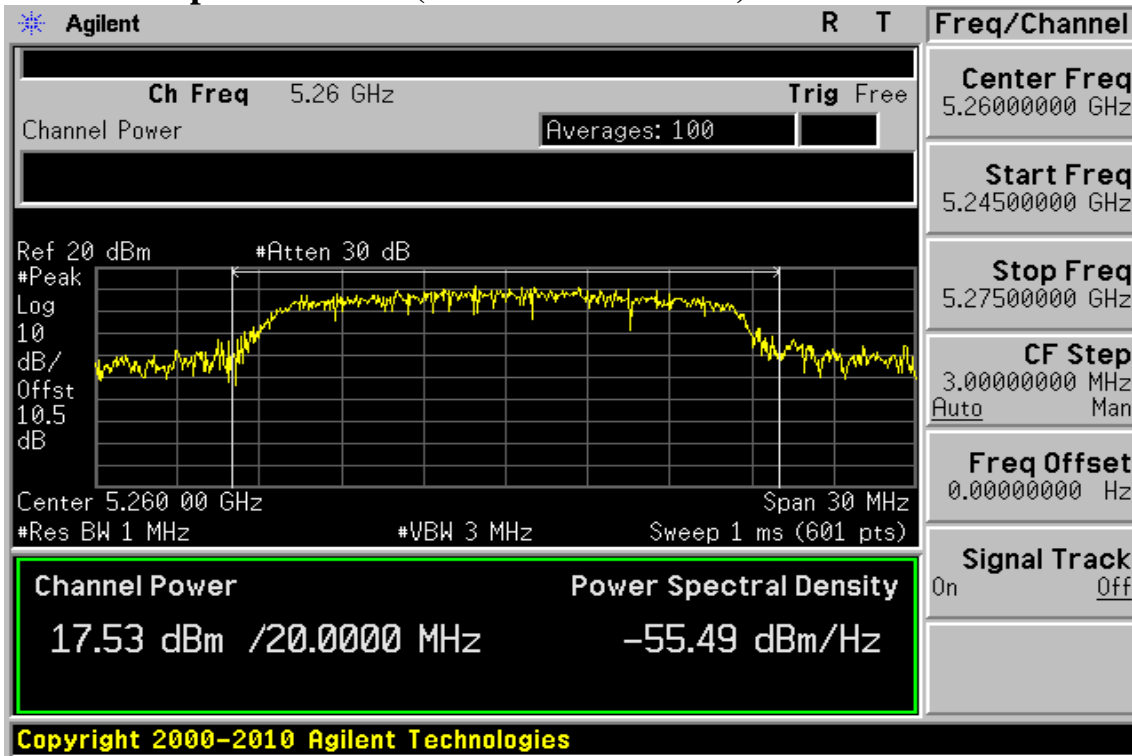
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**Peak Power Output Data Plot (CH High 5240 MHz)**



**UNII, 5250~5350 MHz**

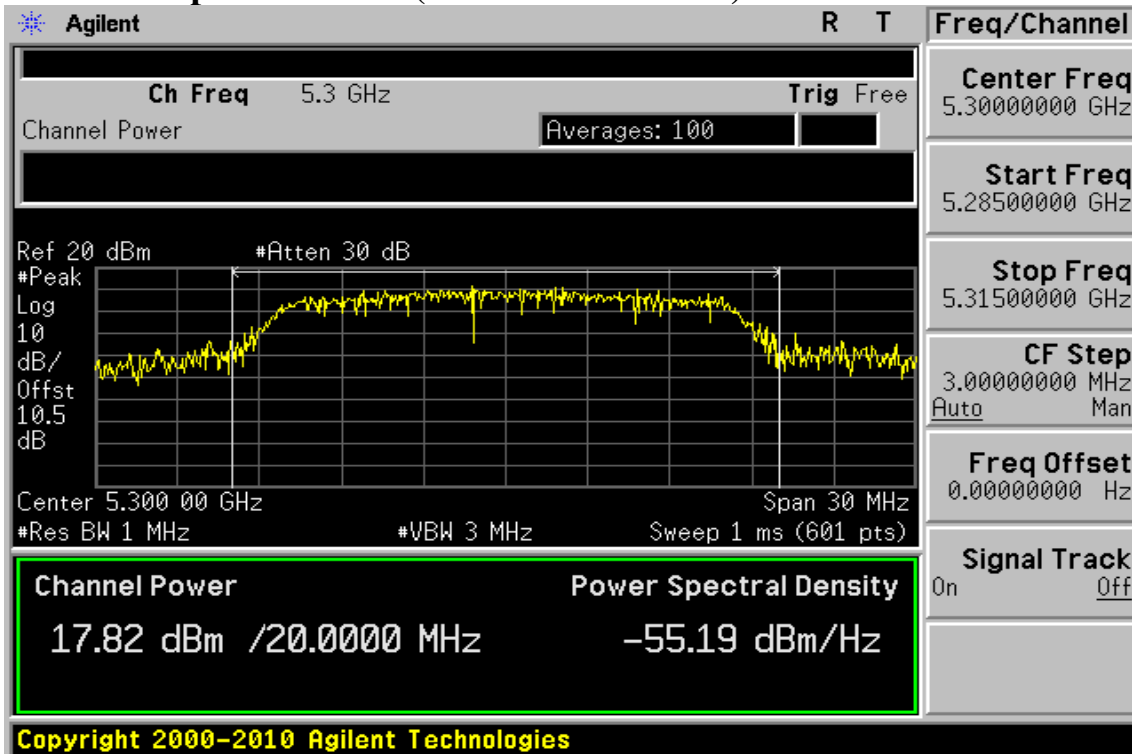
**Peak Power Output Data Plot (CH Low 5260 MHz)**



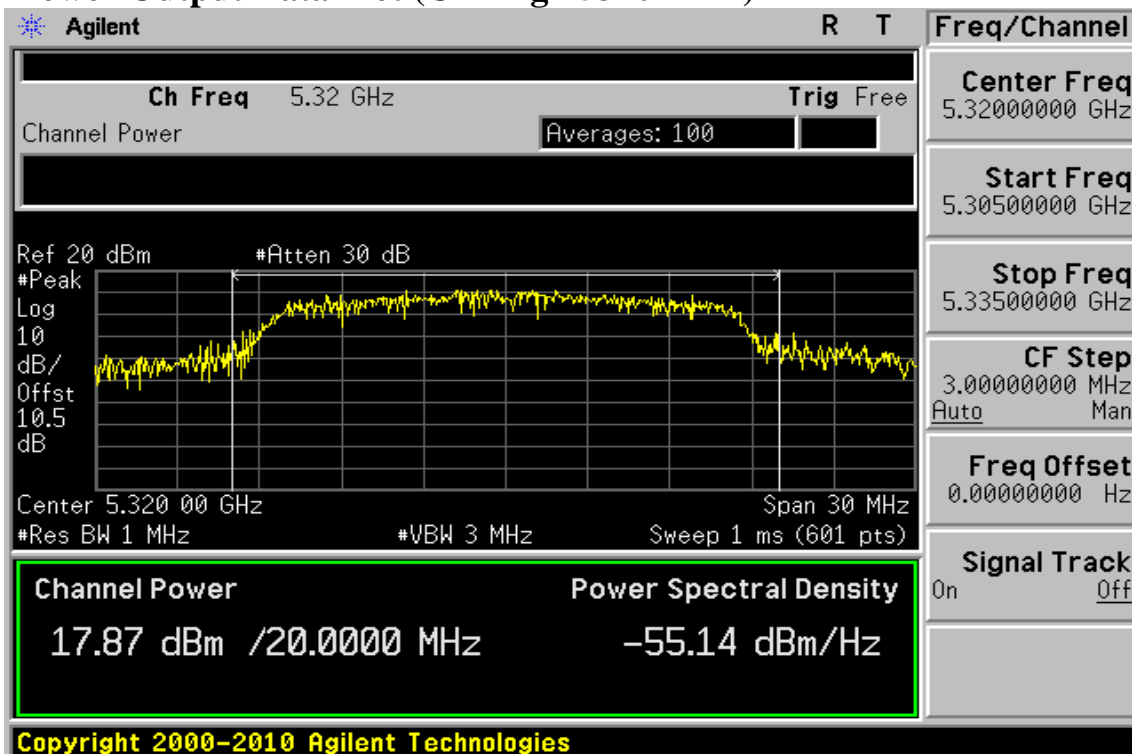
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**Peak Power Output Data Plot (CH Mid 5300 MHz)**



**Peak Power Output Data Plot (CH High 5320 MHz)**

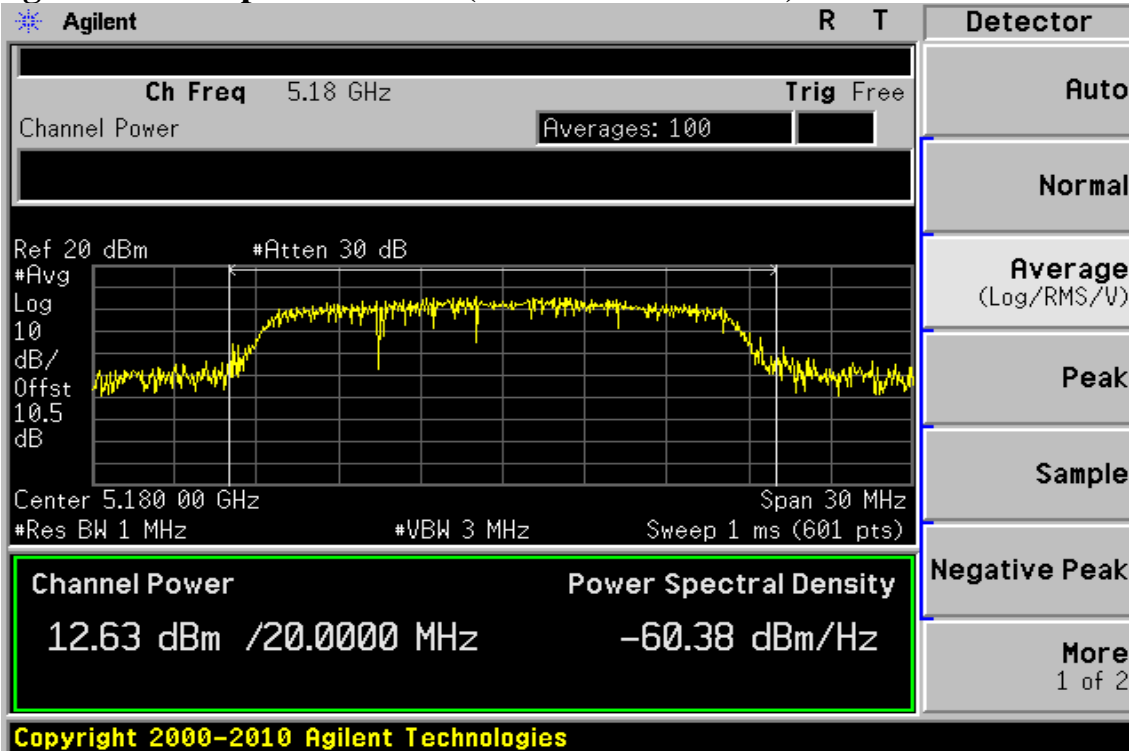


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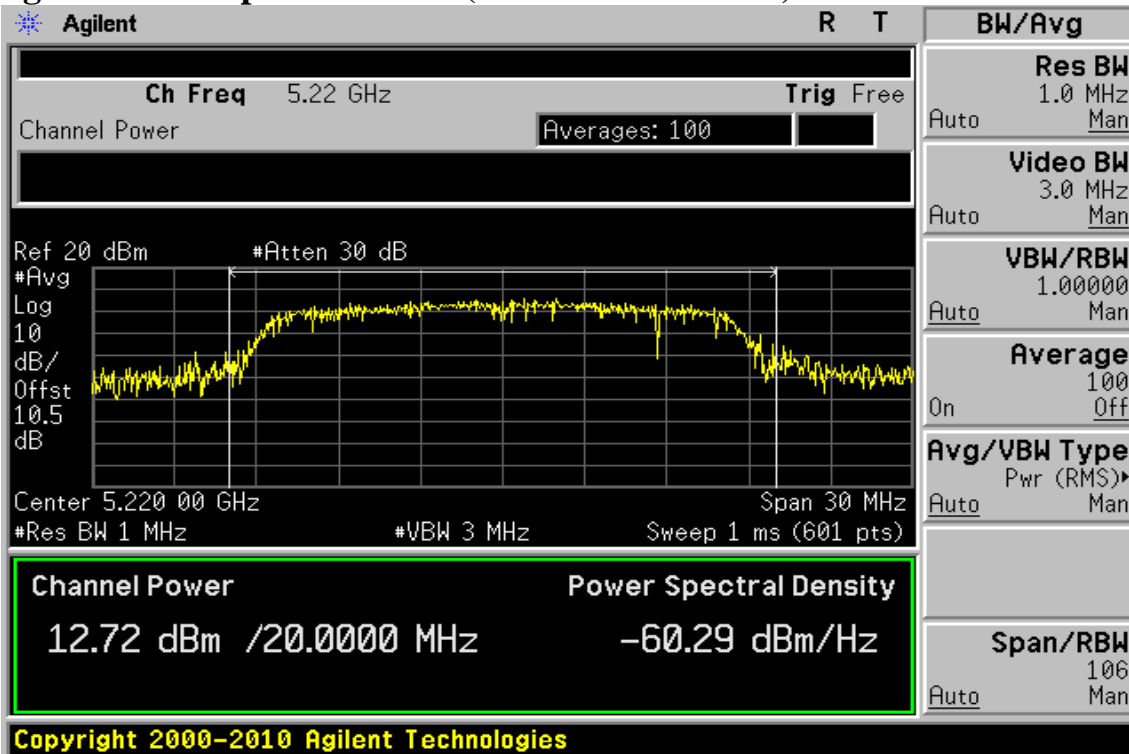
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**UNII, 5150~5250 MHz**

**Average Power Output Data Plot (CH Low 5180 MHz)**



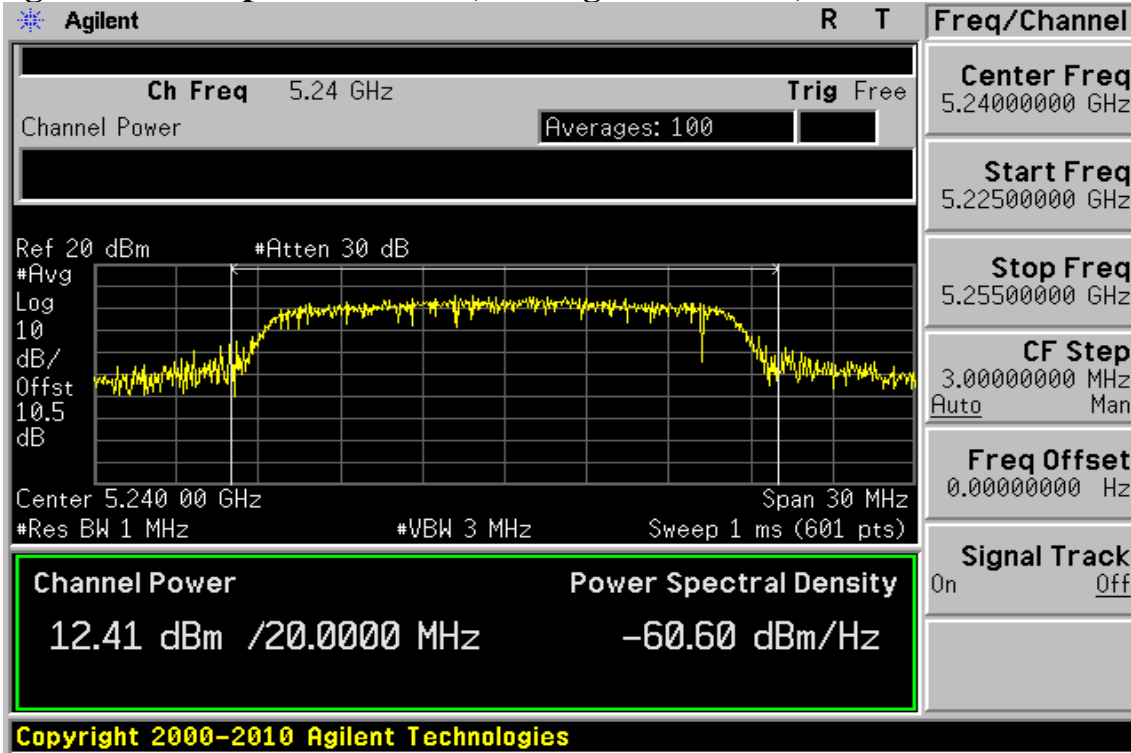
**Average Power Output Data Plot (CH Mid 5220 MHz)**



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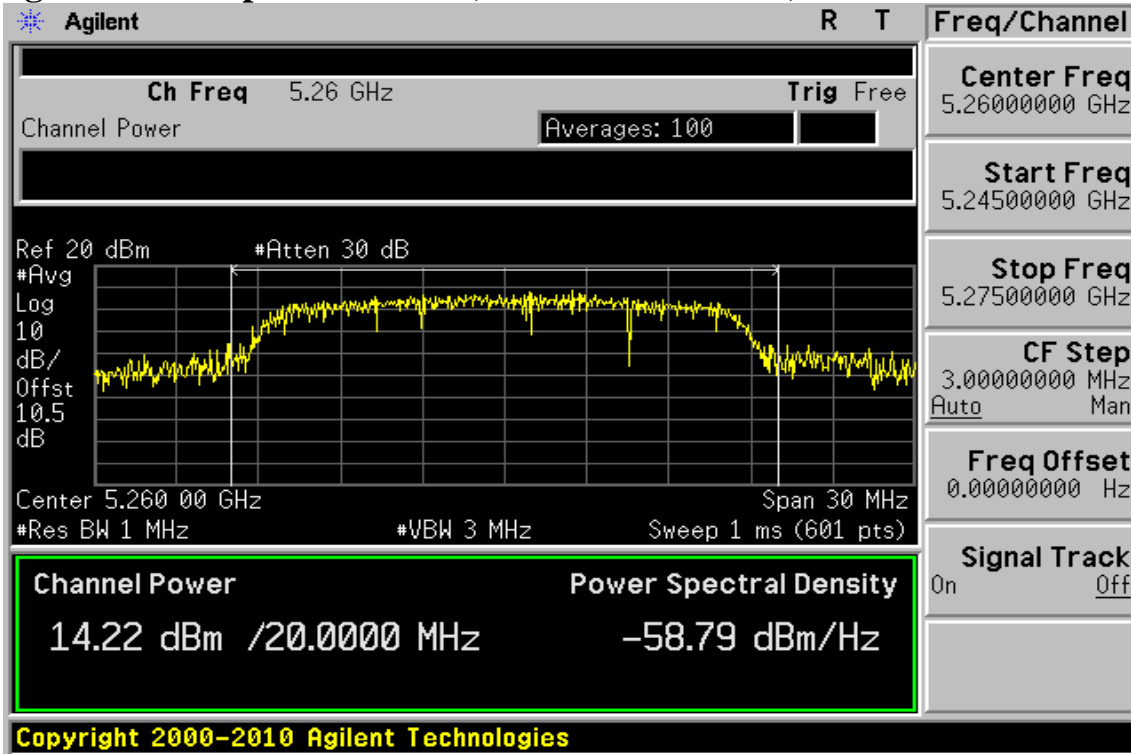
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**Average Power Output Data Plot (CH High 5240 MHz)**



**UNII, 5250~5350 MHz**

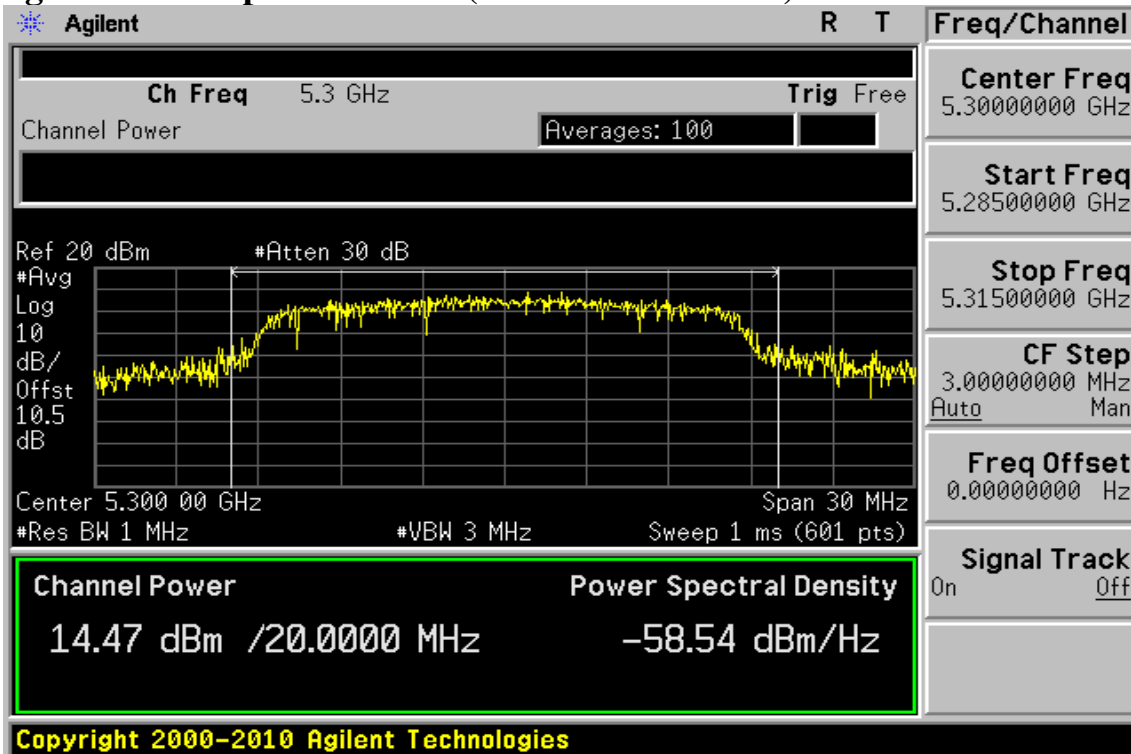
**Average Power Output Data Plot (CH Low 5260 MHz)**



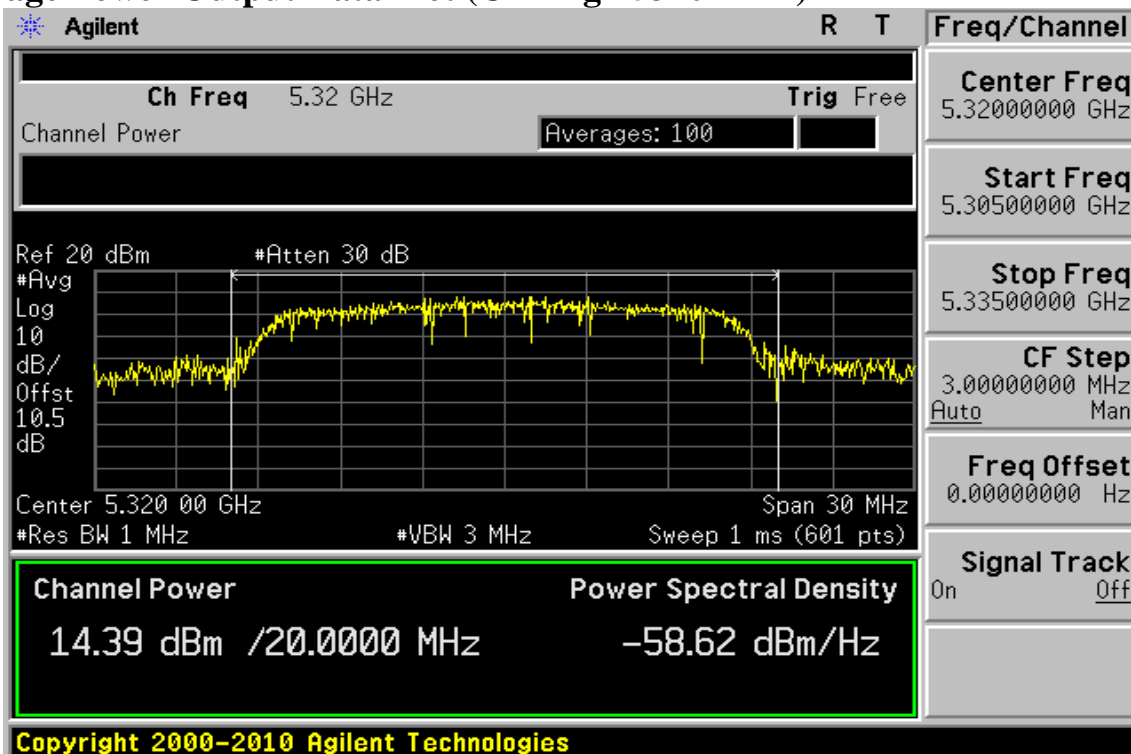
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**Average Power Output Data Plot (CH Mid 5300 MHz)**



**Average Power Output Data Plot (CH High 5320 MHz)**



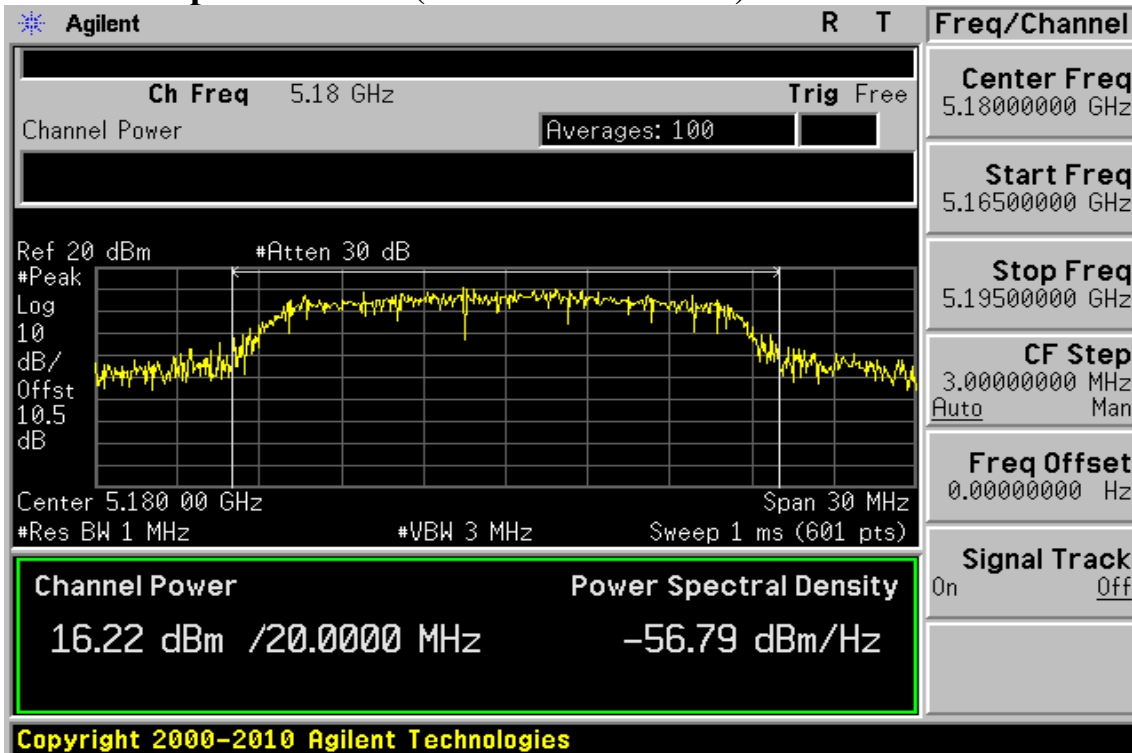
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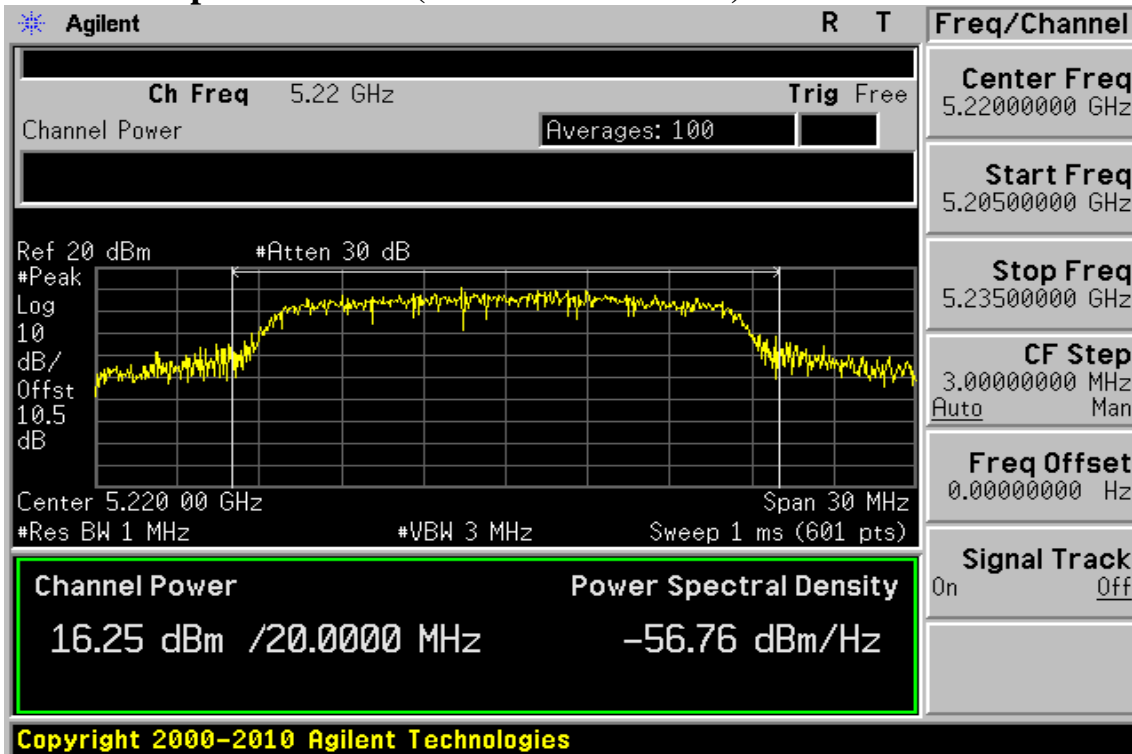


**UNII HT20, 5150~5250 MHz**

**Peak Power Output Data Plot (CH Low 5180 MHz)**



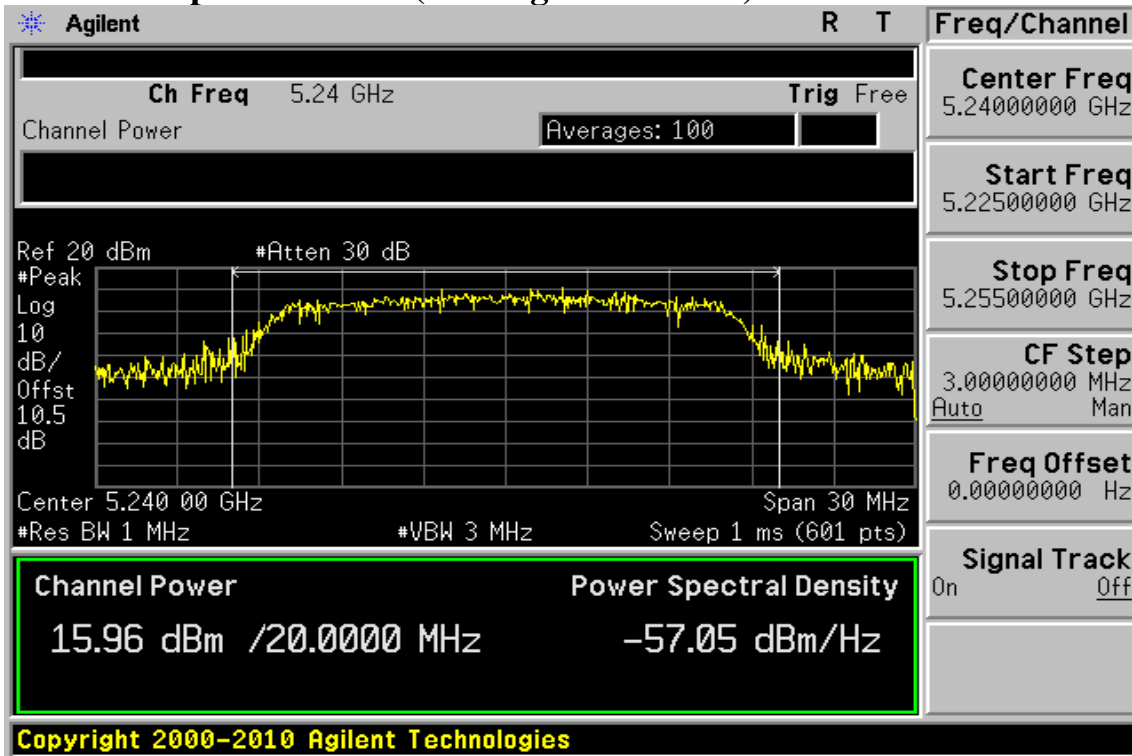
**Peak Power Output Data Plot (CH Mid 5220 MHz)**



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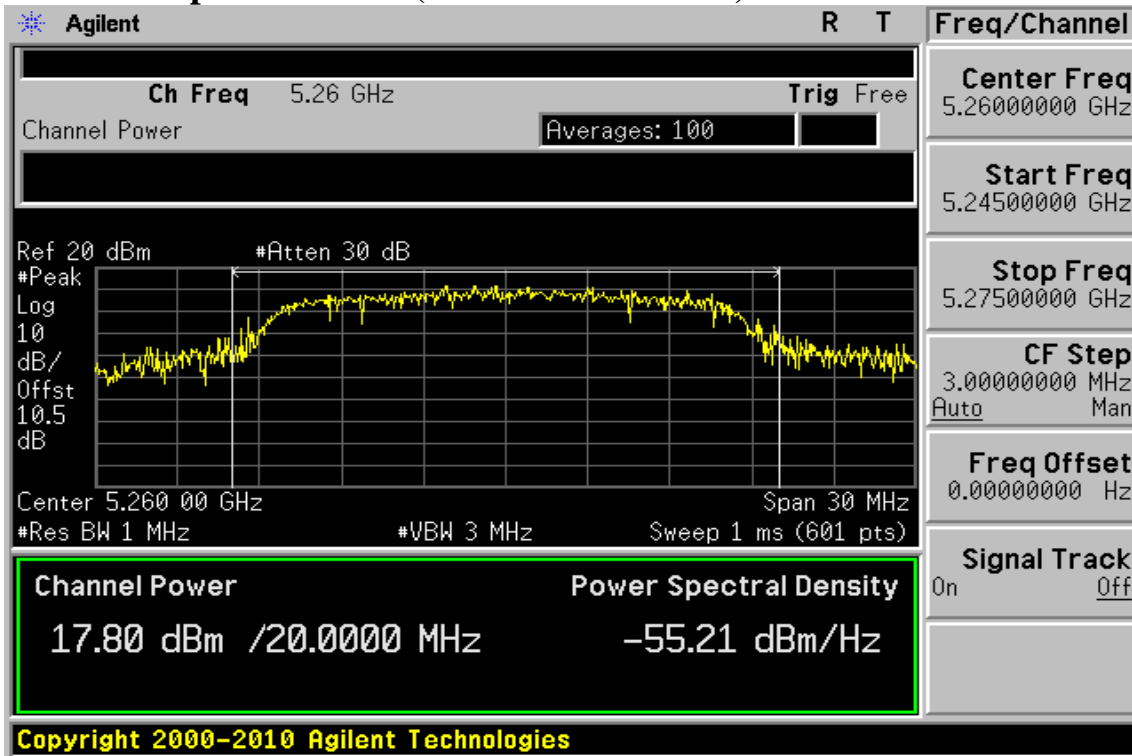
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**Peak Power Output Data Plot (CH High 5240 MHz)**



**UNII HT20, 5250~5350 MHz**

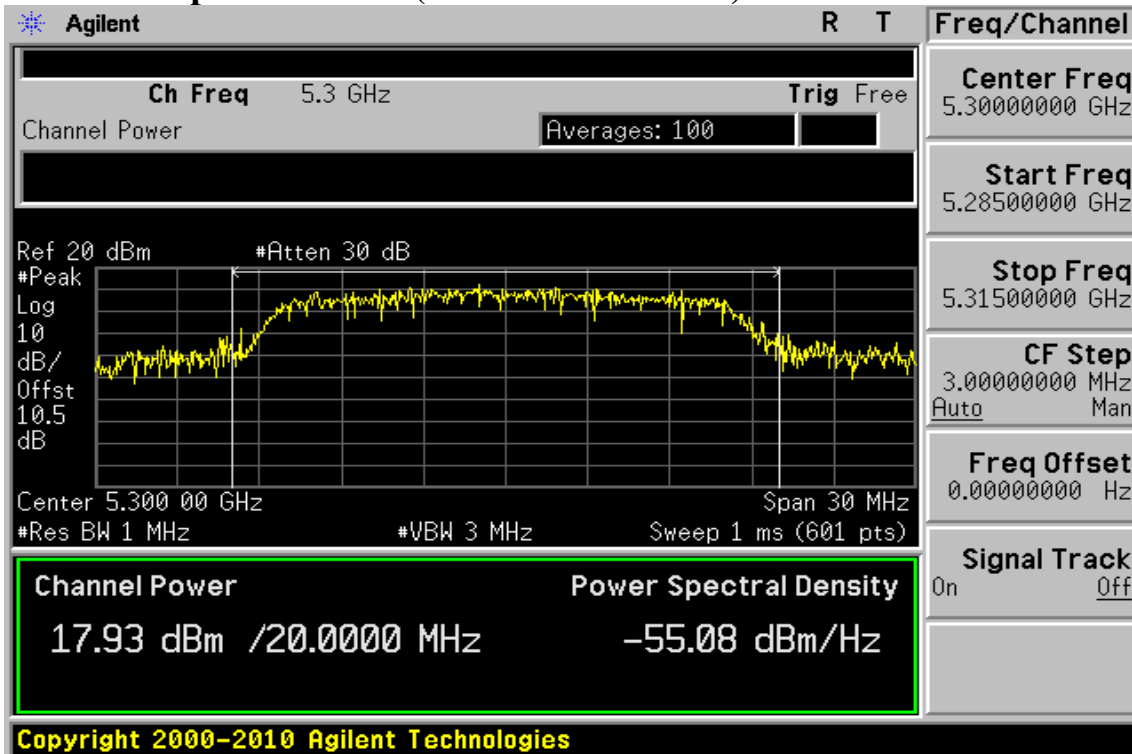
**Peak Power Output Data Plot (CH Low 5260 MHz)**



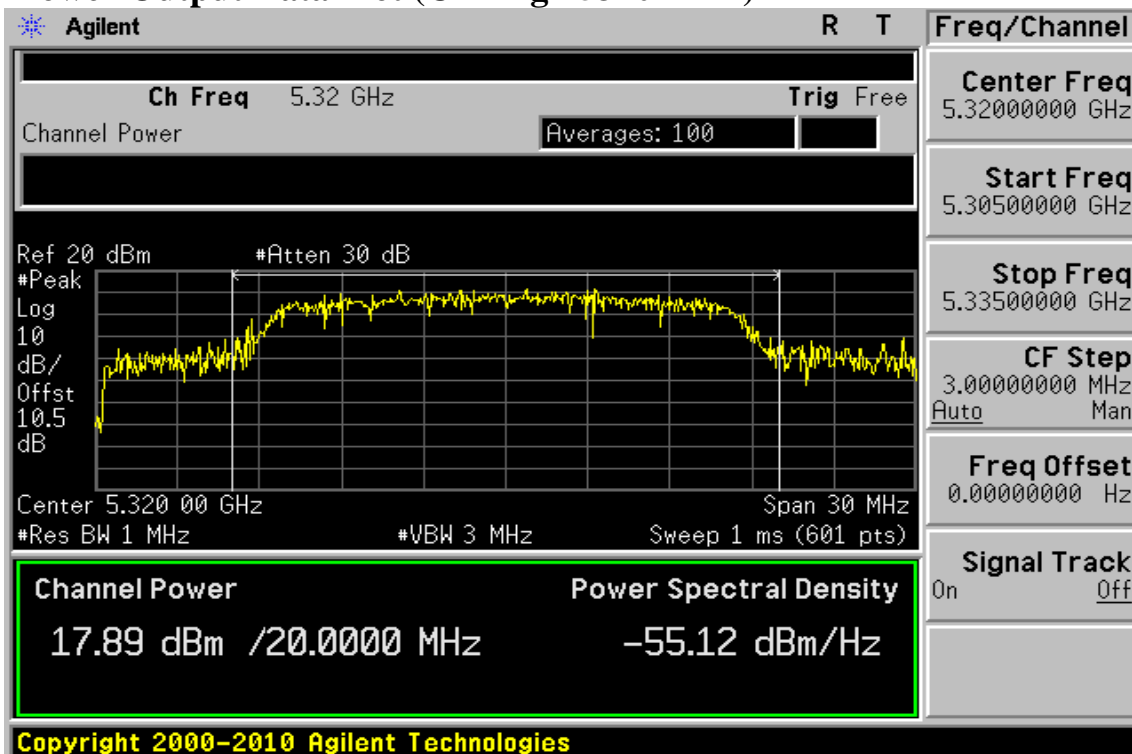
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**Peak Power Output Data Plot (CH Mid 5300 MHz)**



**Peak Power Output Data Plot (CH High 5320 MHz)**

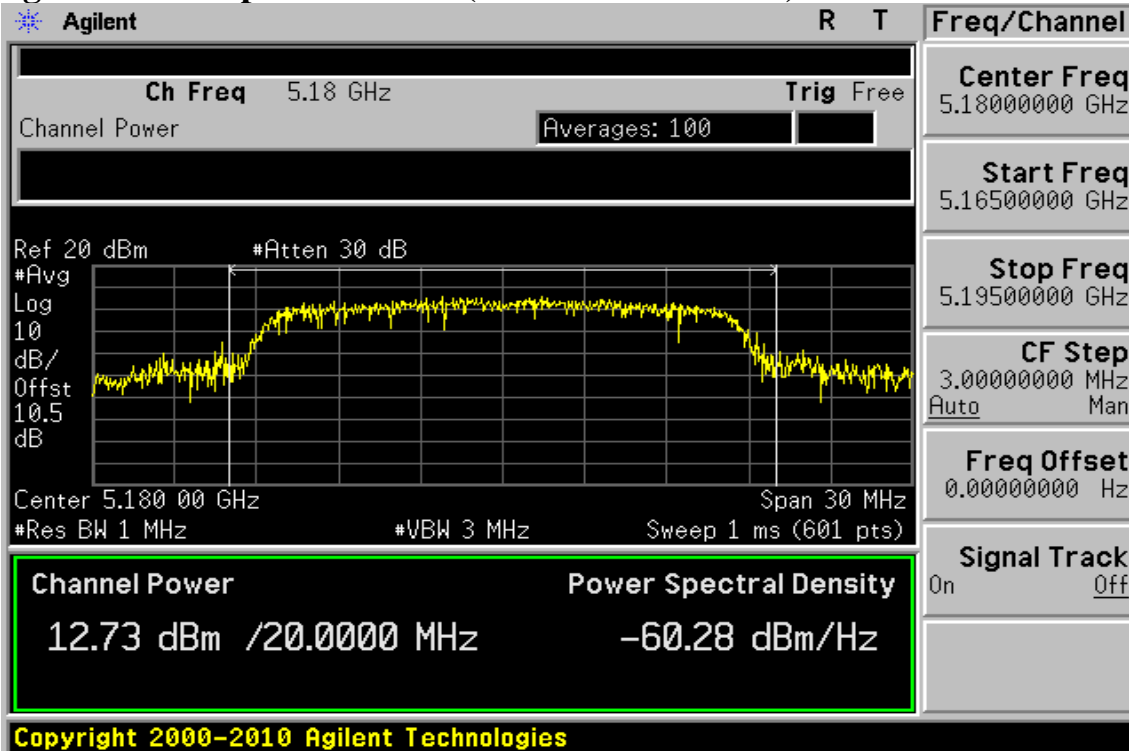


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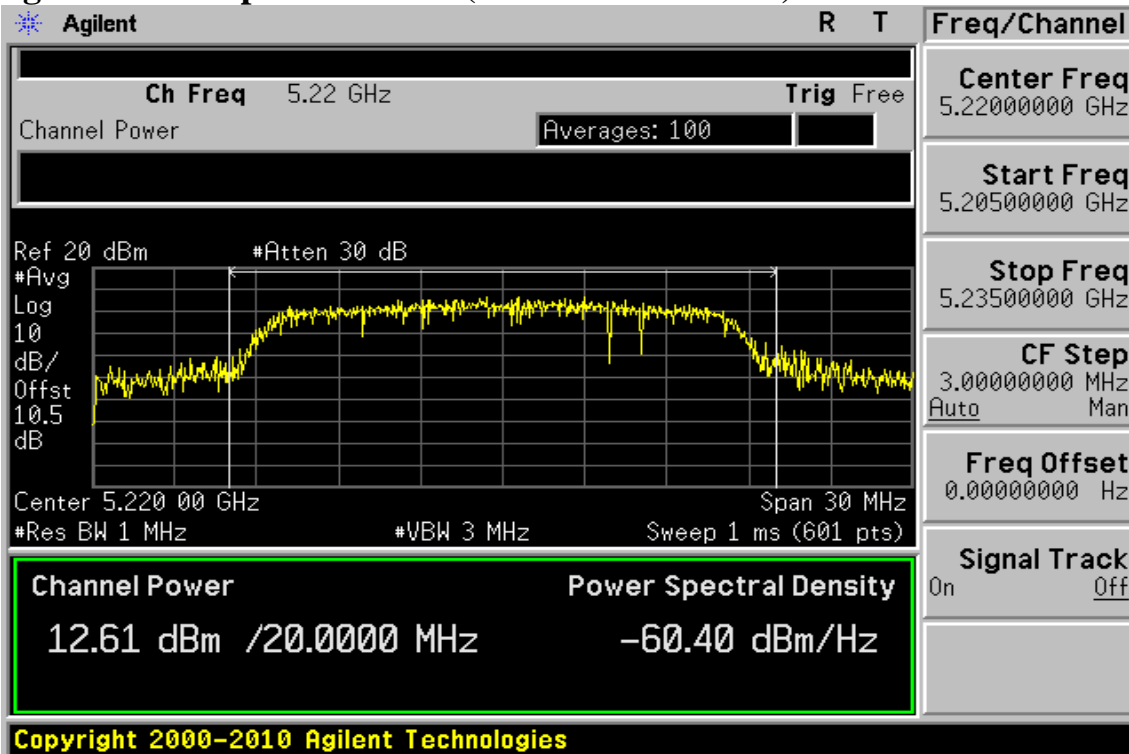
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**UNII HT20, 5150~5250 MHz**

**Average Power Output Data Plot (CH Low 5180 MHz)**



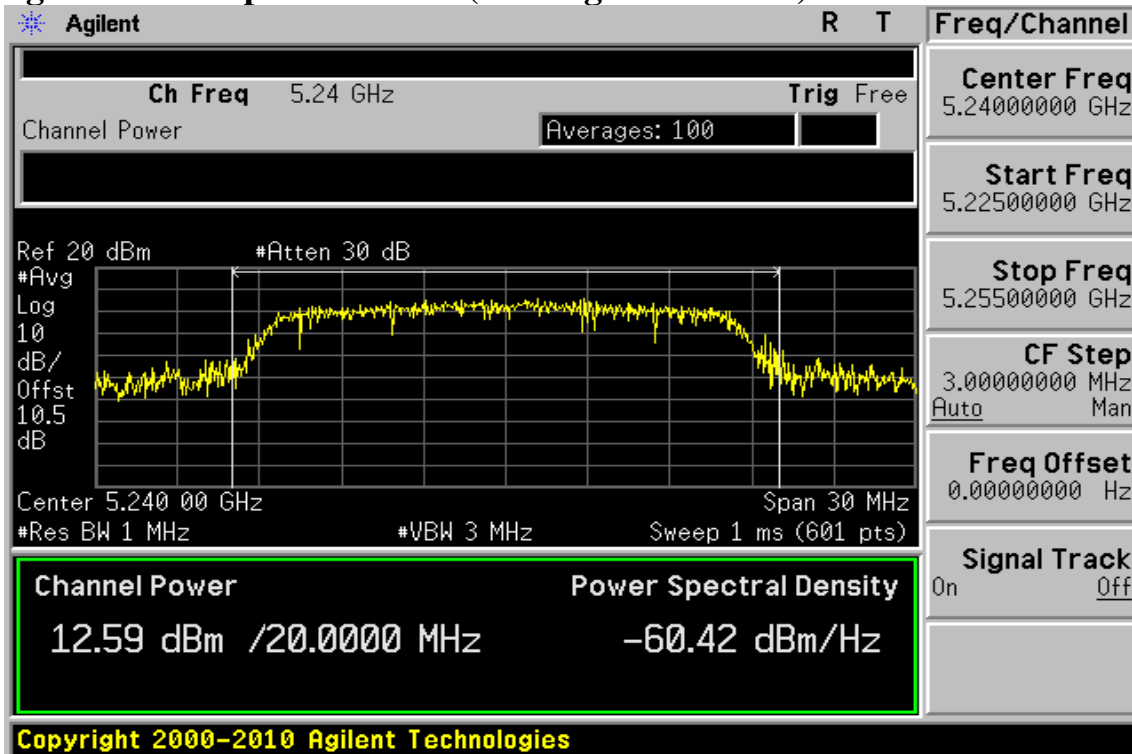
**Average Power Output Data Plot (CH Mid 5220 MHz)**



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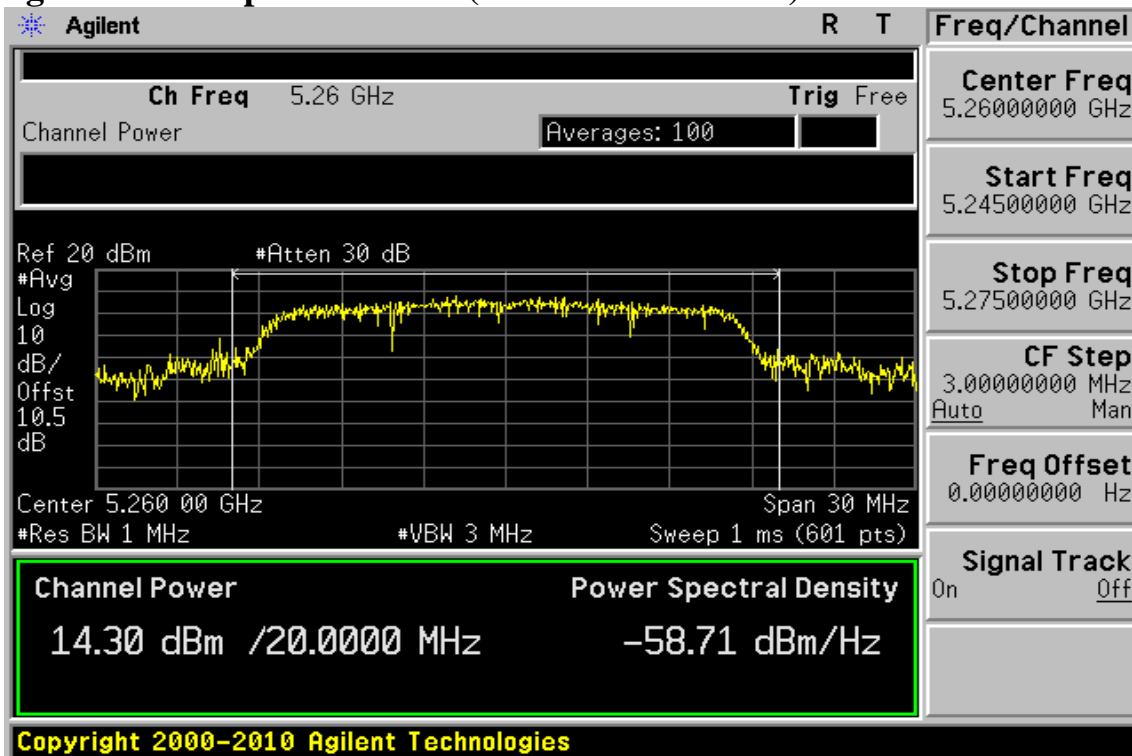
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**Average Power Output Data Plot (CH High 5240 MHz)**



**UNII HT20, 5250~5350 MHz**

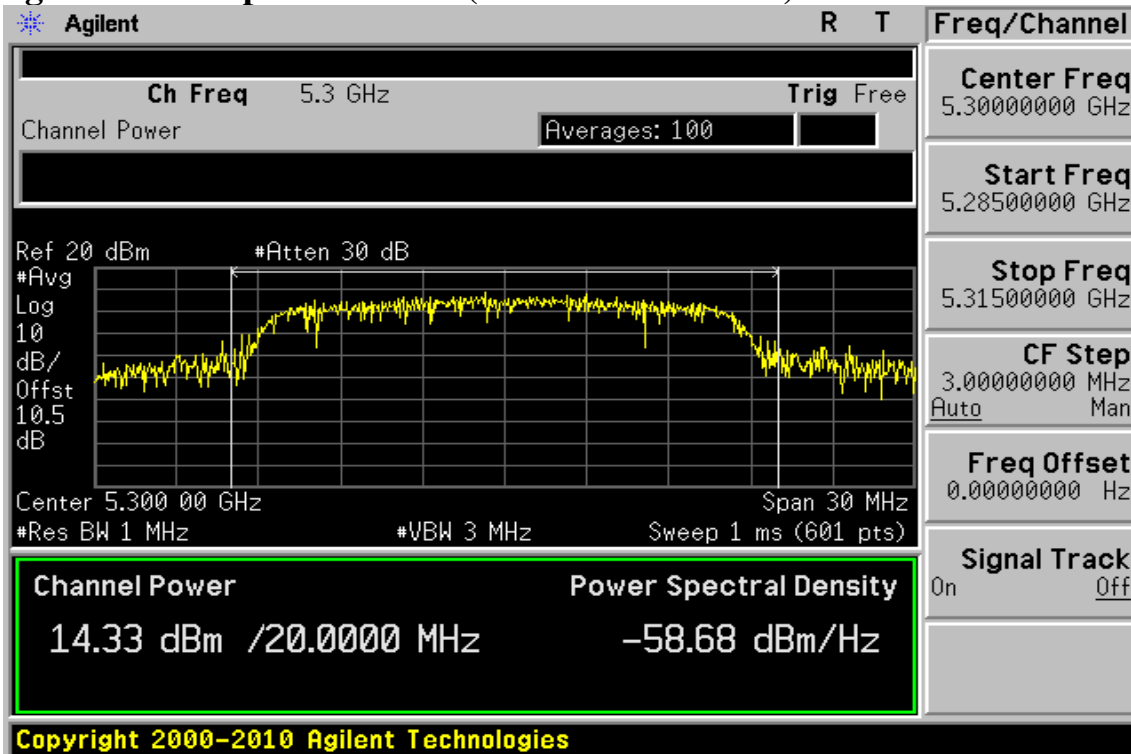
**Average Power Output Data Plot (CH Low 5260 MHz)**



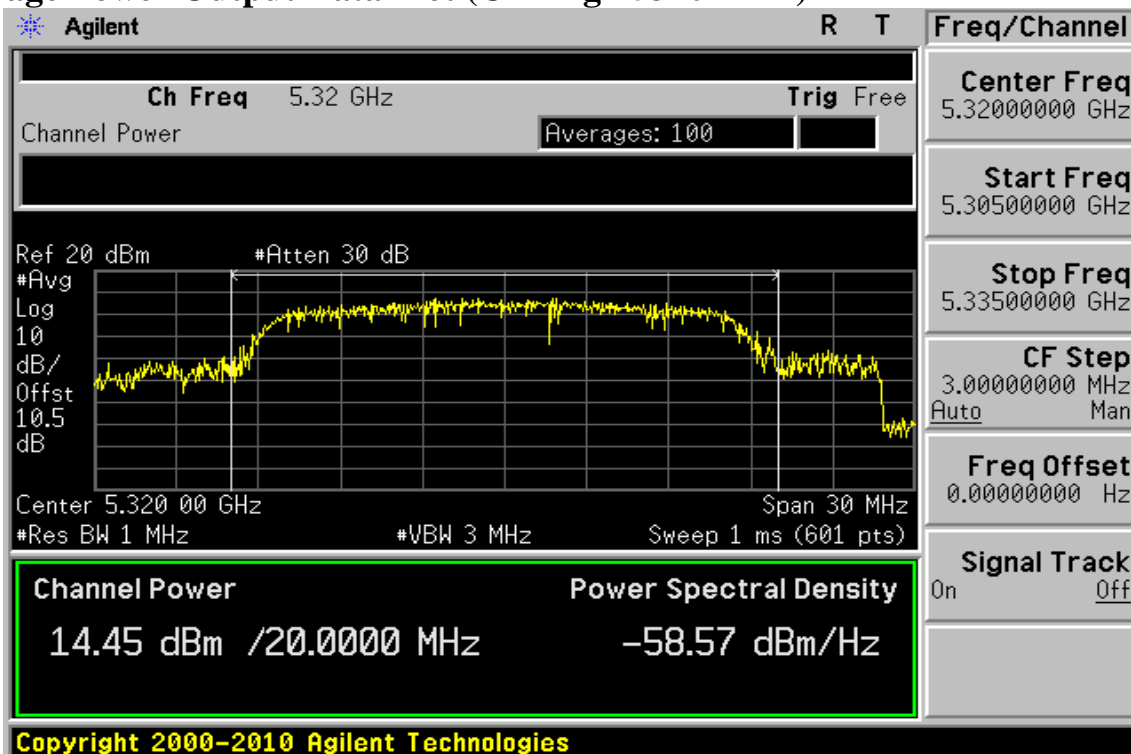
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**Average Power Output Data Plot (CH Mid 5300 MHz)**



**Average Power Output Data Plot (CH High 5320 MHz)**



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## 8. PEAK POWER SPECTRAL DENSITY

### 8.1 Standard Applicable

According to §15.407(a)

1. For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band.
2. For the band 5.25-5.35 GHz and 5.47-5.725GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band.
3. For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band.

Where B is the -26dBc emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

### 8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
3. Set RBW=1MHz,VBW=3MHz, Span=50MHz (Base Mode), Sweep time = Auto, traces 100 sweeps of video averaging.
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

### 8.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Sensor	Anritsu	MA2411B	917032	01/21/2010	01/20/2012
Power Meter	Anritsu	ML2495A	1005007	02/17/2010	02/16/2012
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2011	07/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S10W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S20W5	001	01/05/2011	01/04/2012
Splitter	Agilent	11636B	N/A	01/05/2011	01/04/2012

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## 8.4 Measurement Result

### UNII, 5150~5250 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	-5.75	4.00	-9.75
5220	-6.41	4.00	-10.41
5240	-4.30	4.00	-8.30

### UNII, 5250~5350 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5260	-4.63	11.00	-15.63
5300	-3.53	11.00	-14.53
5320	-3.61	11.00	-14.61

### UNII HT20, 5150~5250 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	-4.32	4.00	-8.32
5220	-4.96	4.00	-8.96
5240	-3.18	4.00	-7.18

### UNII HT20, 5250~5350 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5260	-3.91	11.00	-14.91
5300	-3.39	11.00	-14.39
5320	-4.24	11.00	-15.24

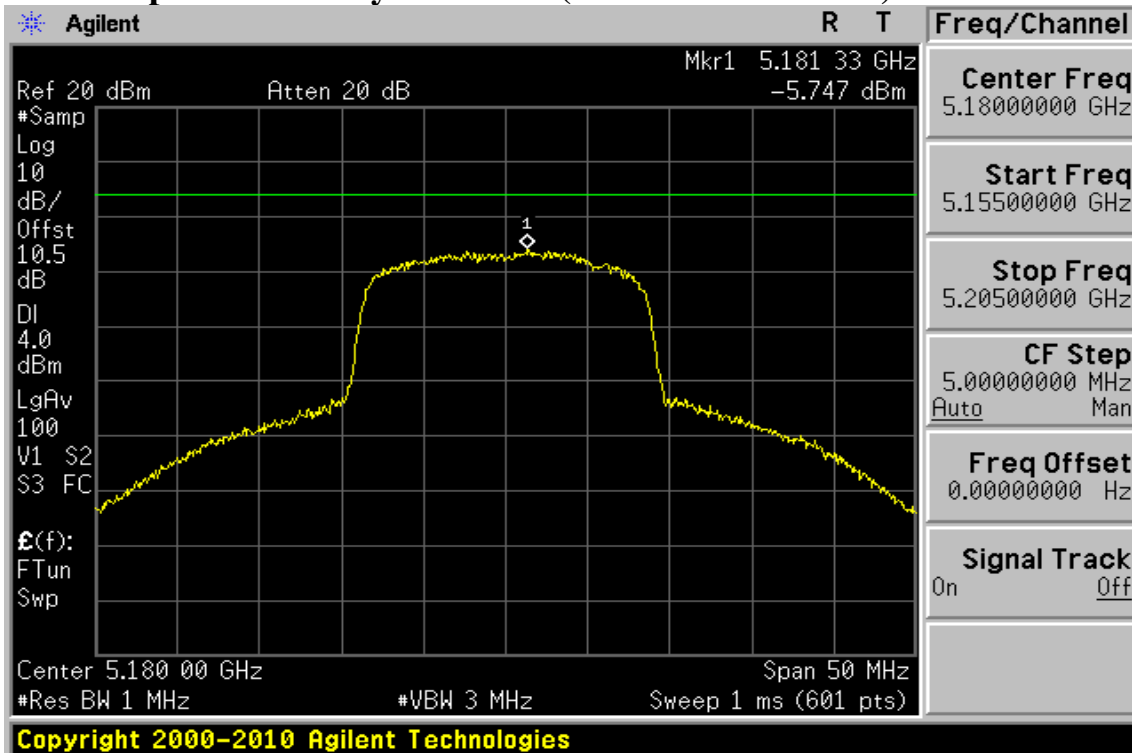
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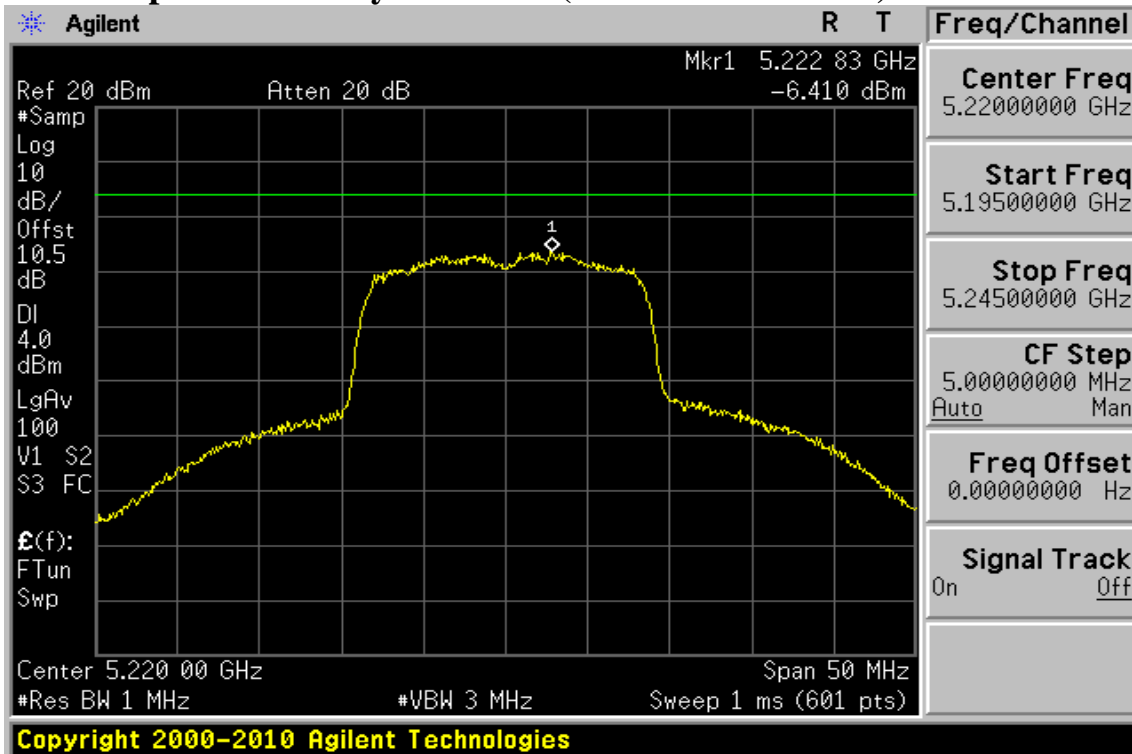


**UNII, 5150~5250 MHz**

**Peak Power Spectral Density Data Plot (CH Low 5180 MHz)**



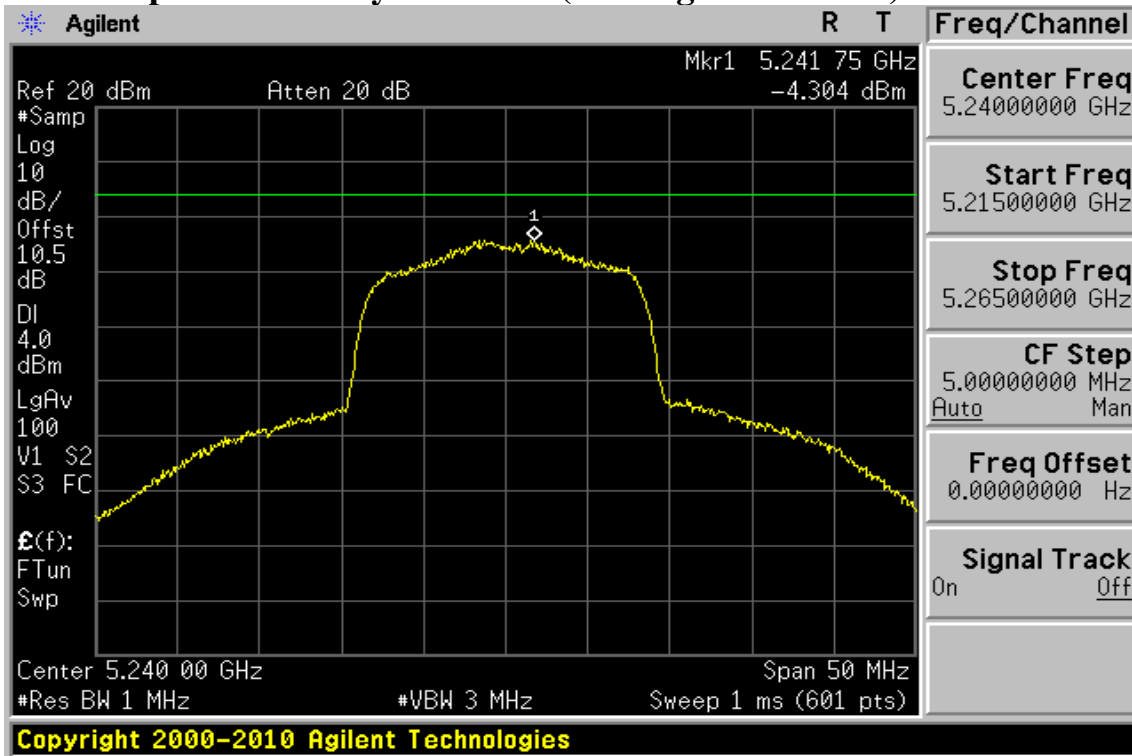
**Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)**



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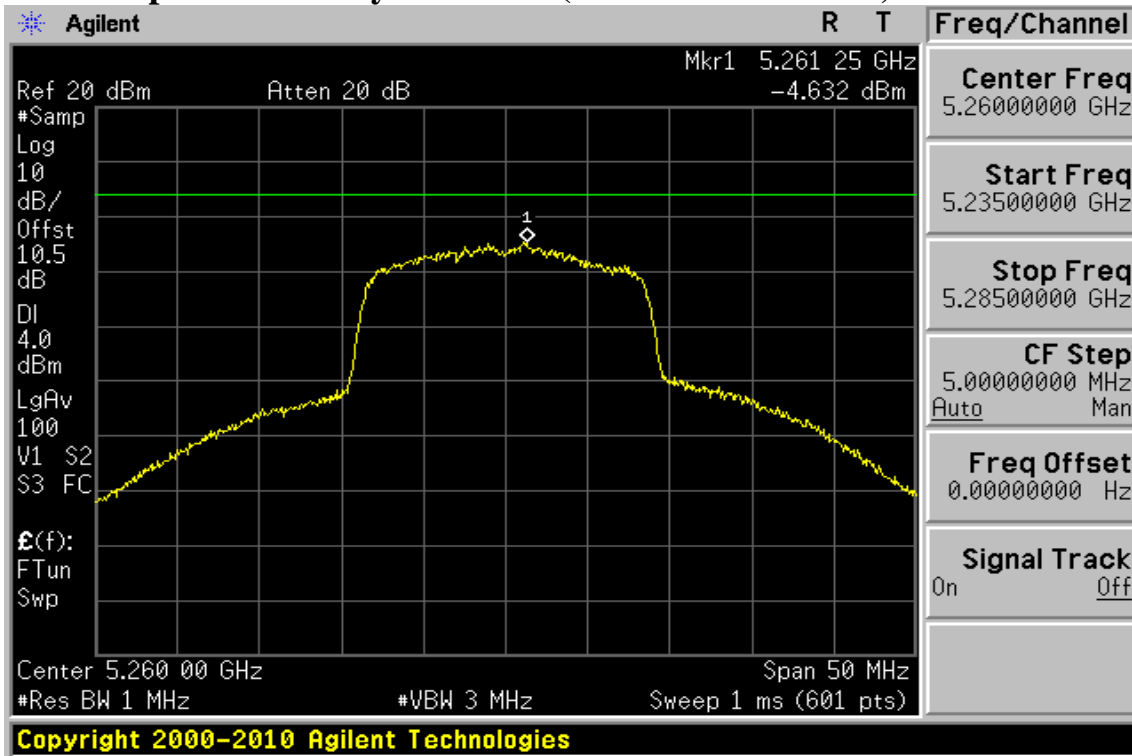
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**Peak Power Spectral Density Data Plot (CH High 5240 MHz)**



**UNII, 5250~5350 MHz**

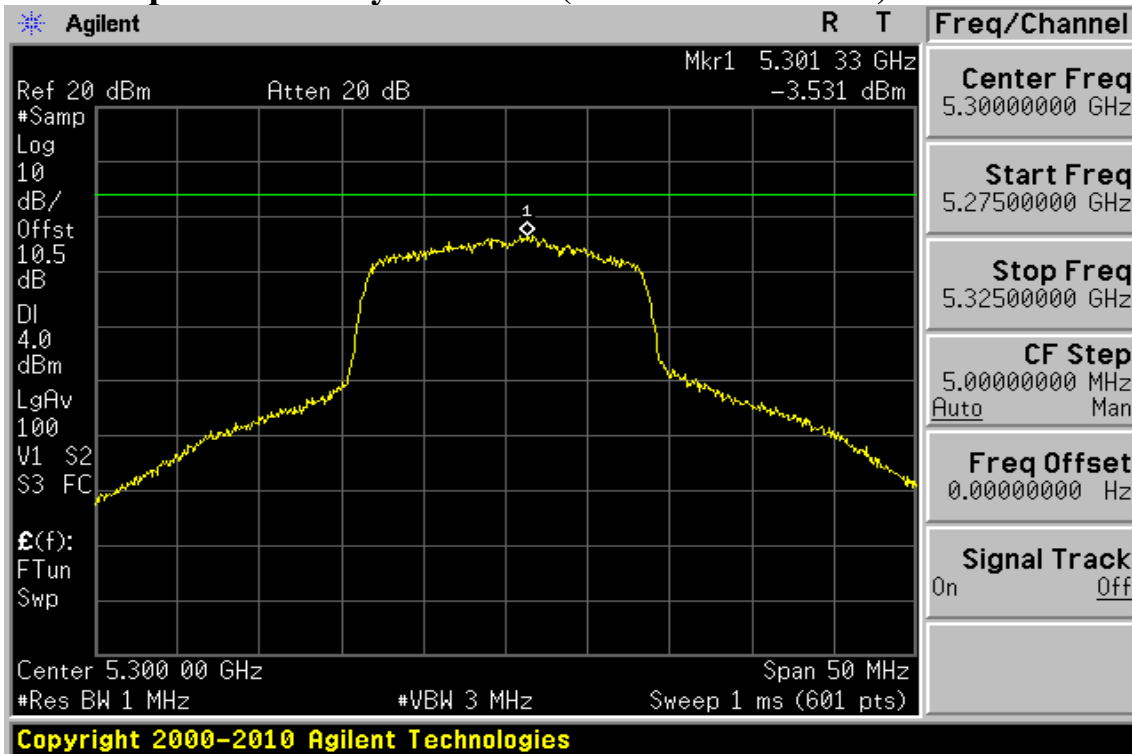
**Peak Power Spectral Density Data Plot (CH Low 5260 MHz)**



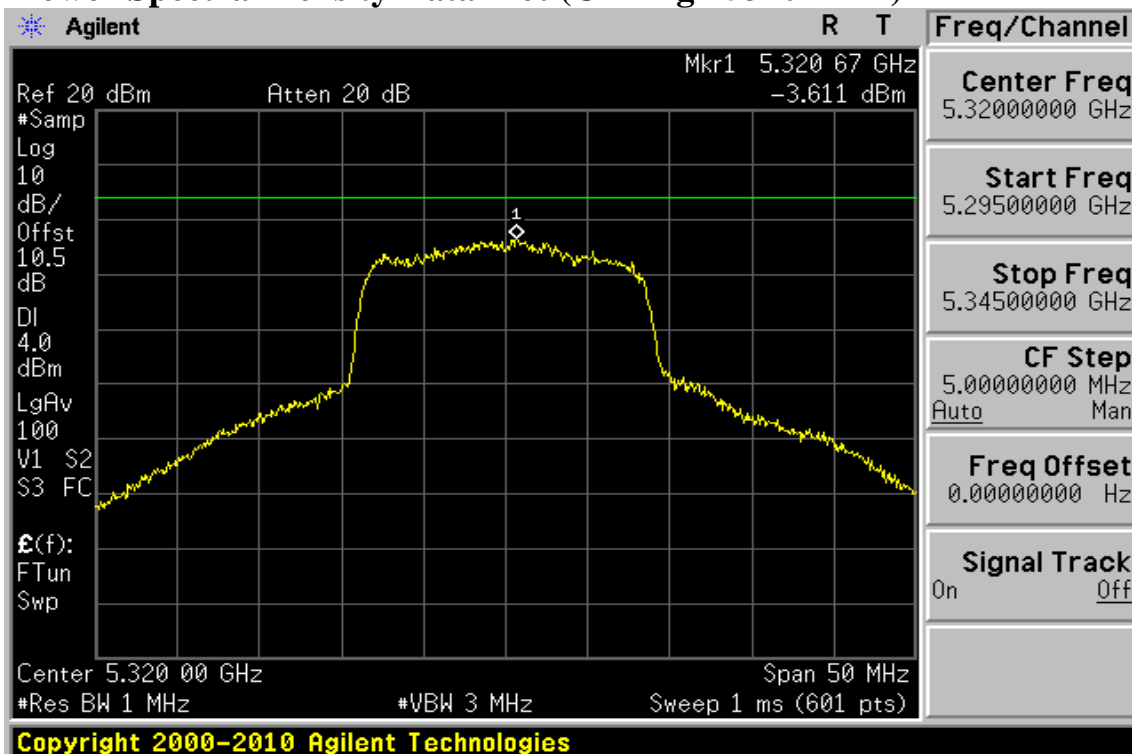
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**Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)**



**Peak Power Spectral Density Data Plot (CH High 5320 MHz)**

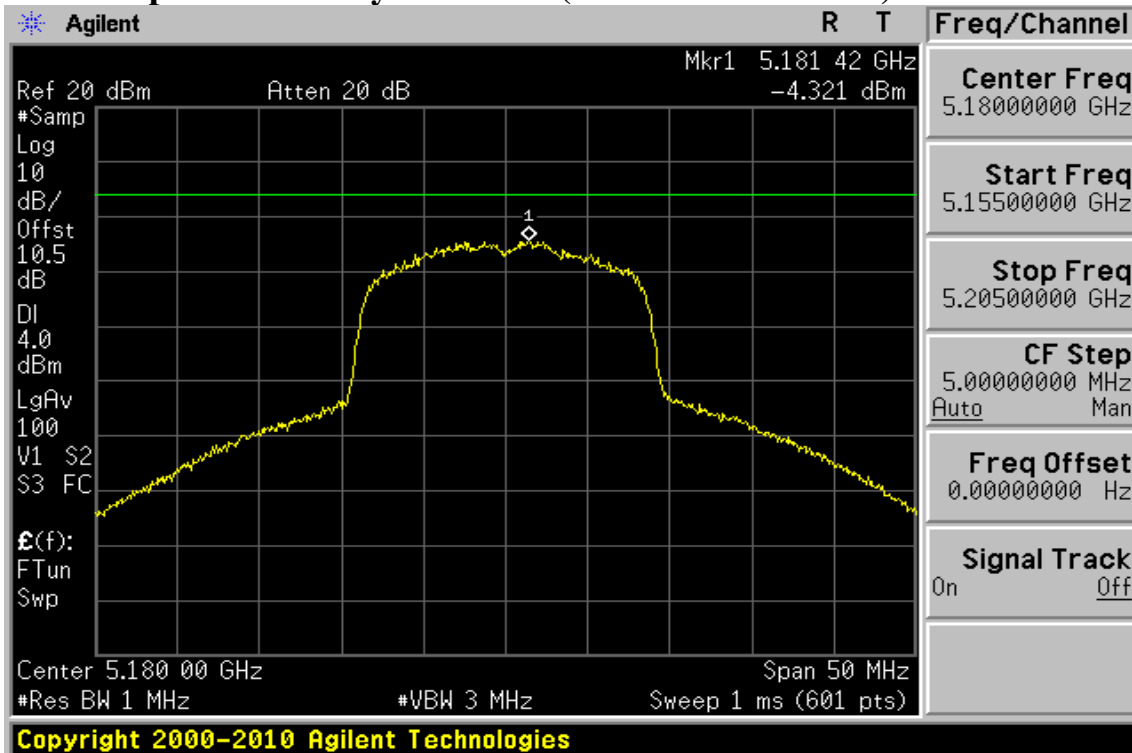


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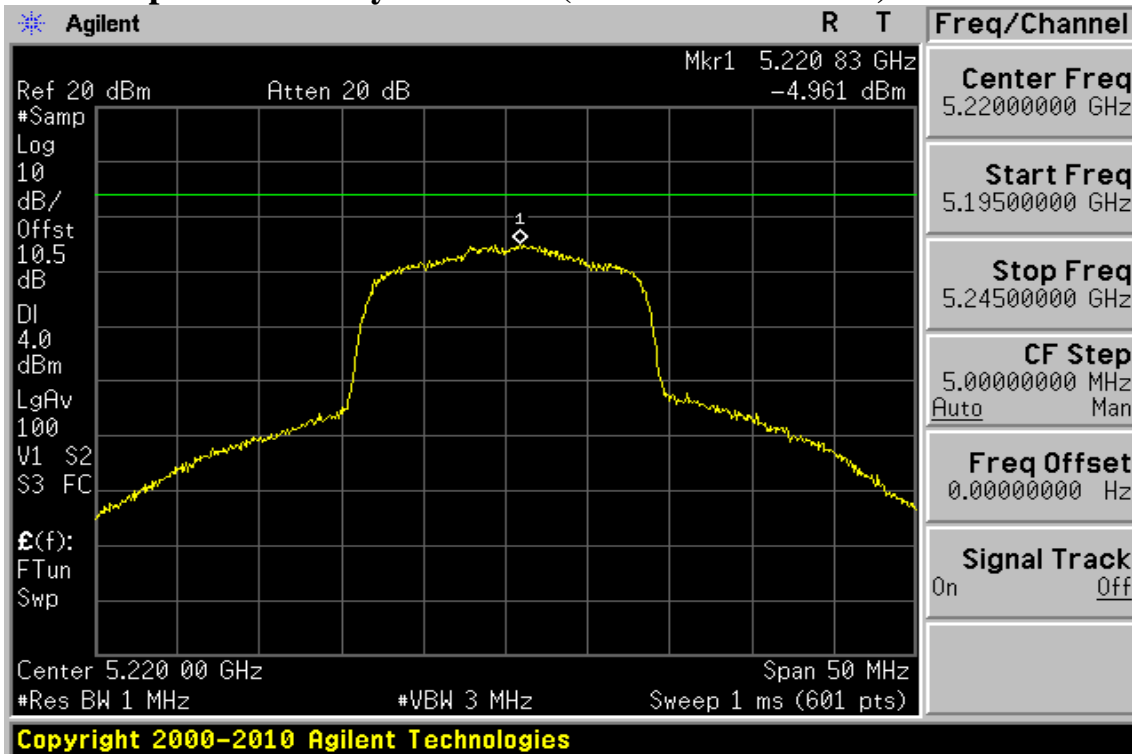
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**UNII HT20, 5150~5250 MHz**

**Peak Power Spectral Density Data Plot (CH Low 5180 MHz)**



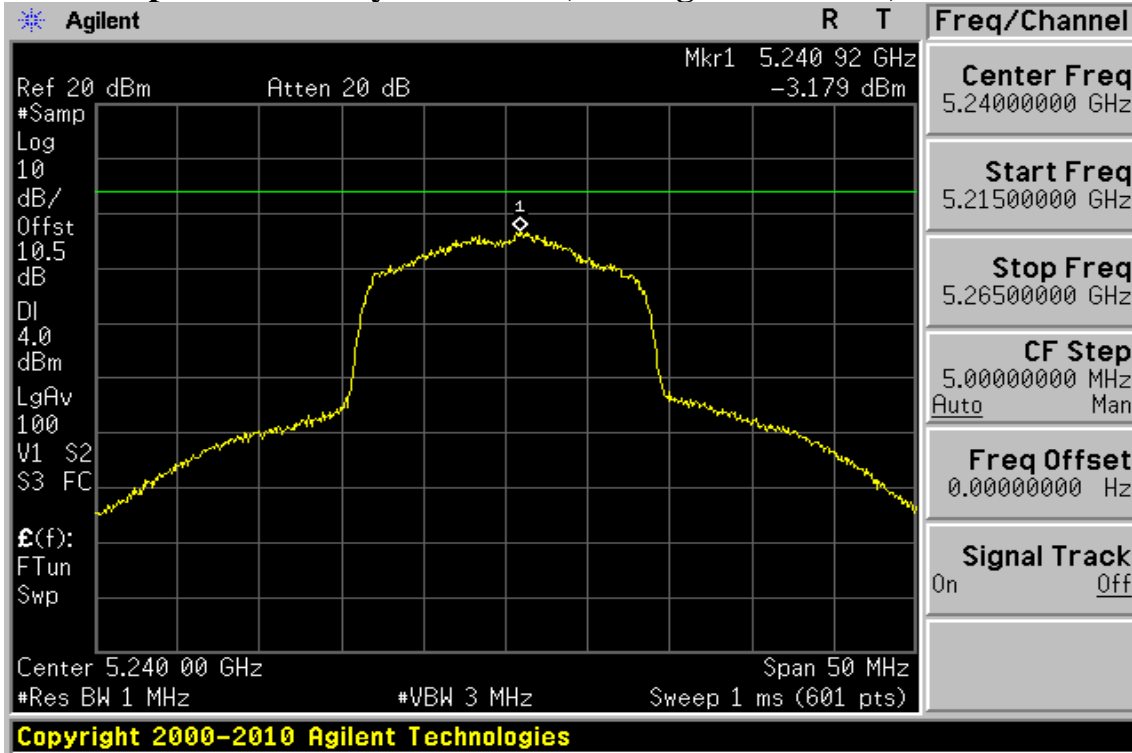
**Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)**



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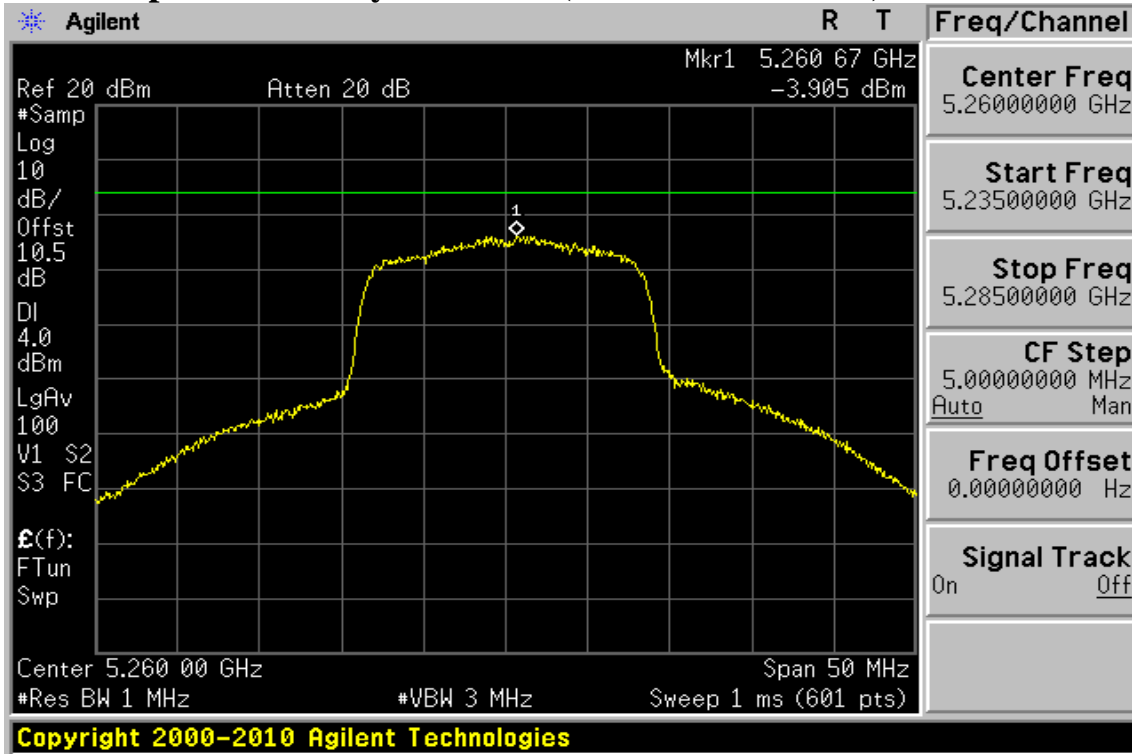
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**Peak Power Spectral Density Data Plot (CH High 5240 MHz)**



**UNII HT20, 5250~5350 MHz**

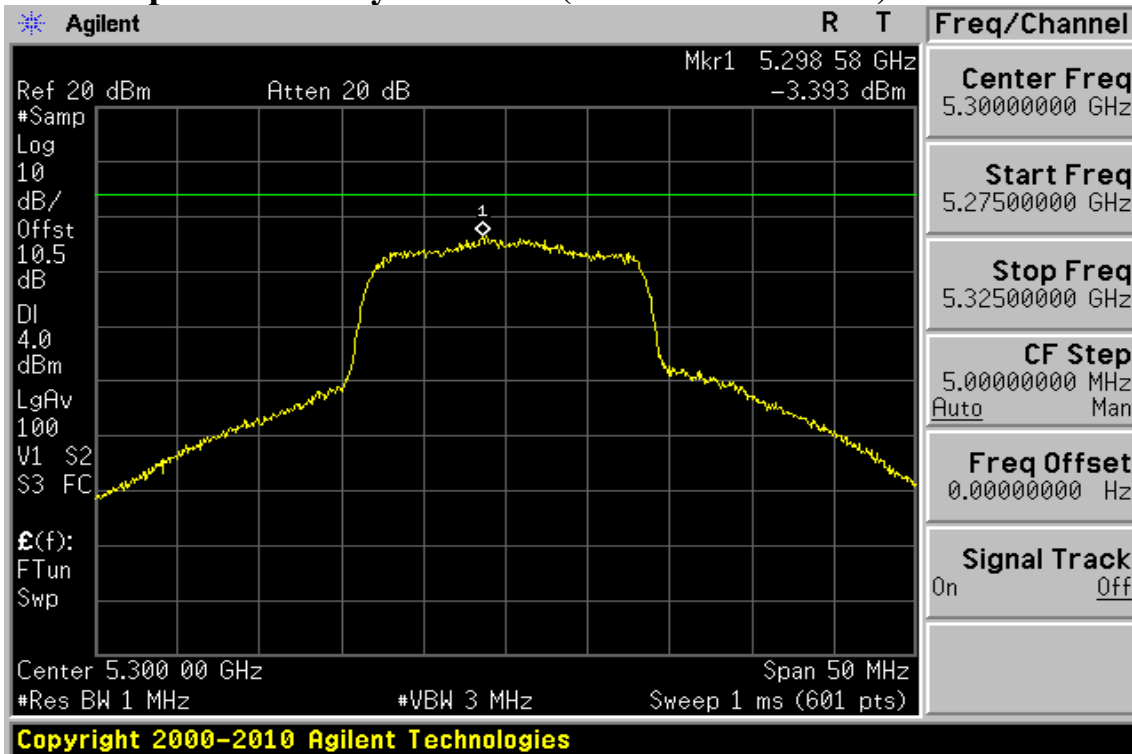
**Peak Power Spectral Density Data Plot (CH Low 5260MHz)**



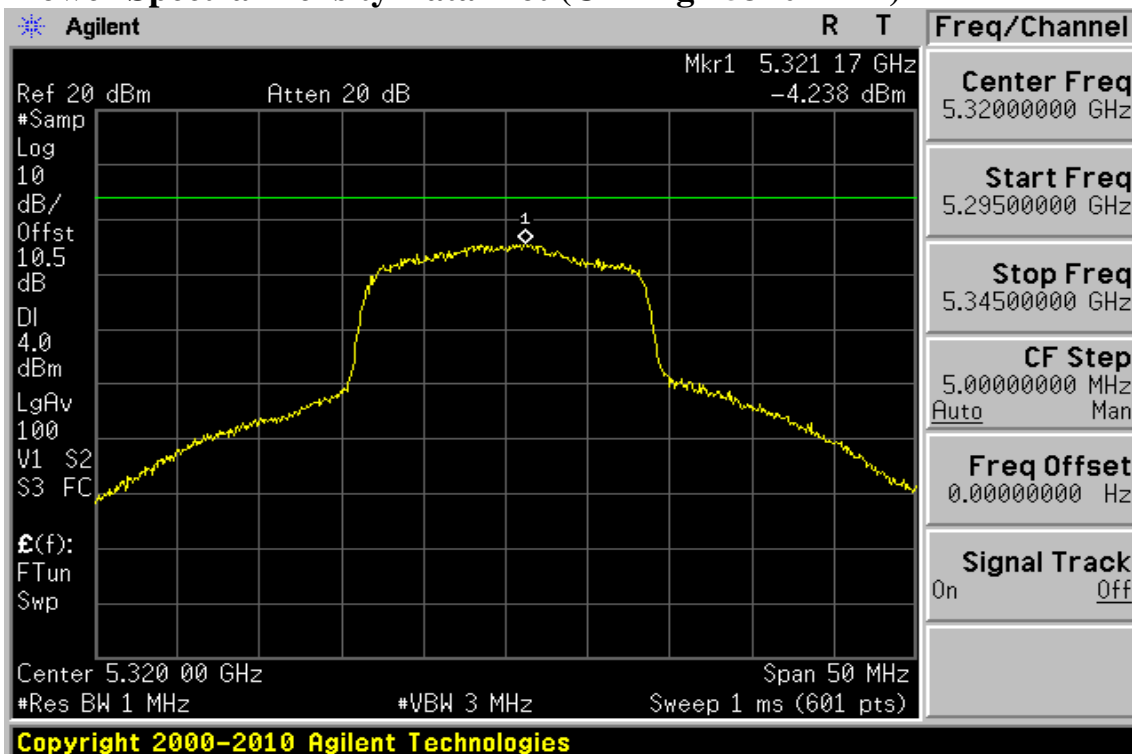
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**Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)**



**Peak Power Spectral Density Data Plot (CH High 5320 MHz)**



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## 9. PEAK EXCURSION MEASUREMENT

### 9.1 Standard Applicable

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.

### 9.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to spectrum.
3. Trace A, Set RBW=1MHz, VBW = 3MHz, Span = 26dBc, Max. hold.
4. Trace B, Set RBW=1MHz, VBW = 30KHz, Span = 26dBc, Max. hold..
5. Delta Mark trace A center frequency and trace B center frequency.
6. Repeat above procedures until all frequency measured were complete.

### 9.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Sensor	Anritsu	MA2411B	917032	01/21/2010	01/20/2012
Power Meter	Anritsu	ML2495A	1005007	02/17/2010	02/16/2012
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2011	07/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S10W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S20W5	001	01/05/2011	01/04/2012
Splitter	Agilent	11636B	N/A	01/05/2011	01/04/2012

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## 9.4 Test Results:

### UNII, 5150~5250 MHz

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	6.55	13.00	-6.45
Mid	5220	6.19	13.00	-6.81
High	5240	6.17	13.00	-6.83

### UNII, 5250~5350 MHz

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	6.62	13.00	-6.38
Mid	5300	6.53	13.00	-6.47
High	5320	7.44	13.00	-5.56

### UNII HT20, 5150~5250 MHz

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	6.62	13.00	-6.38
Mid	5220	7.49	13.00	-5.51
High	5240	6.85	13.00	-6.15

### UNII HT20, 5250~5350 MHz

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	7.07	13.00	-5.93
Mid	5300	7.18	13.00	-5.82
High	5320	6.86	13.00	-6.14

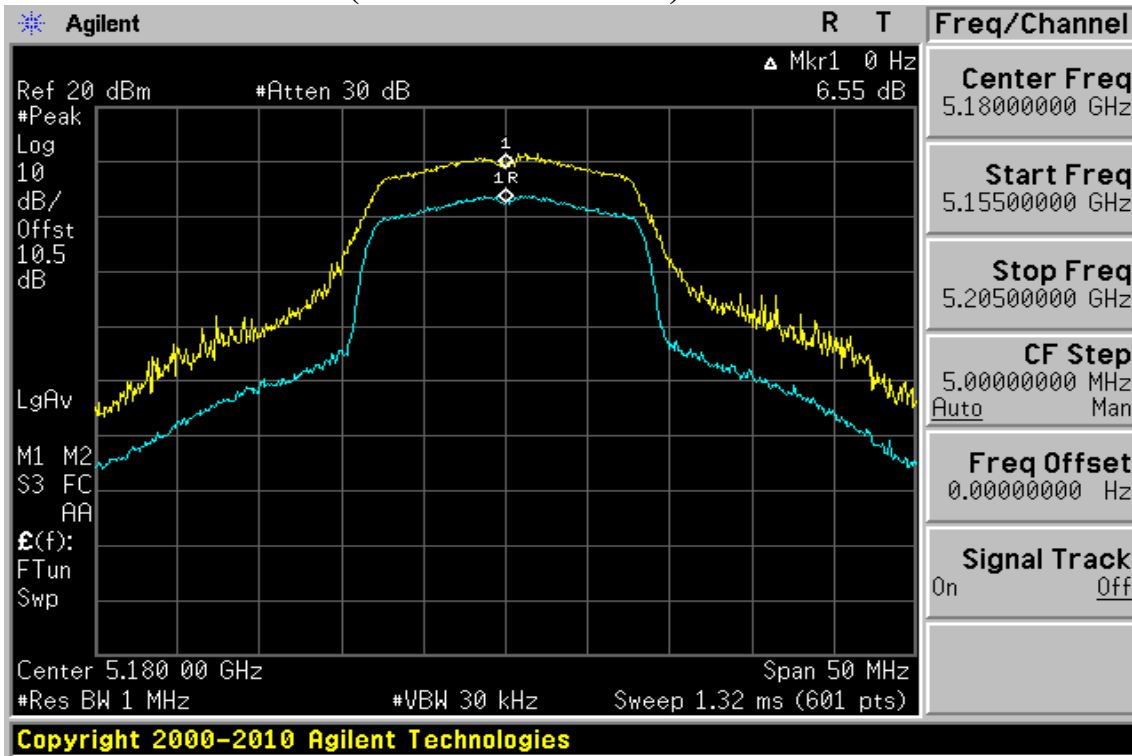
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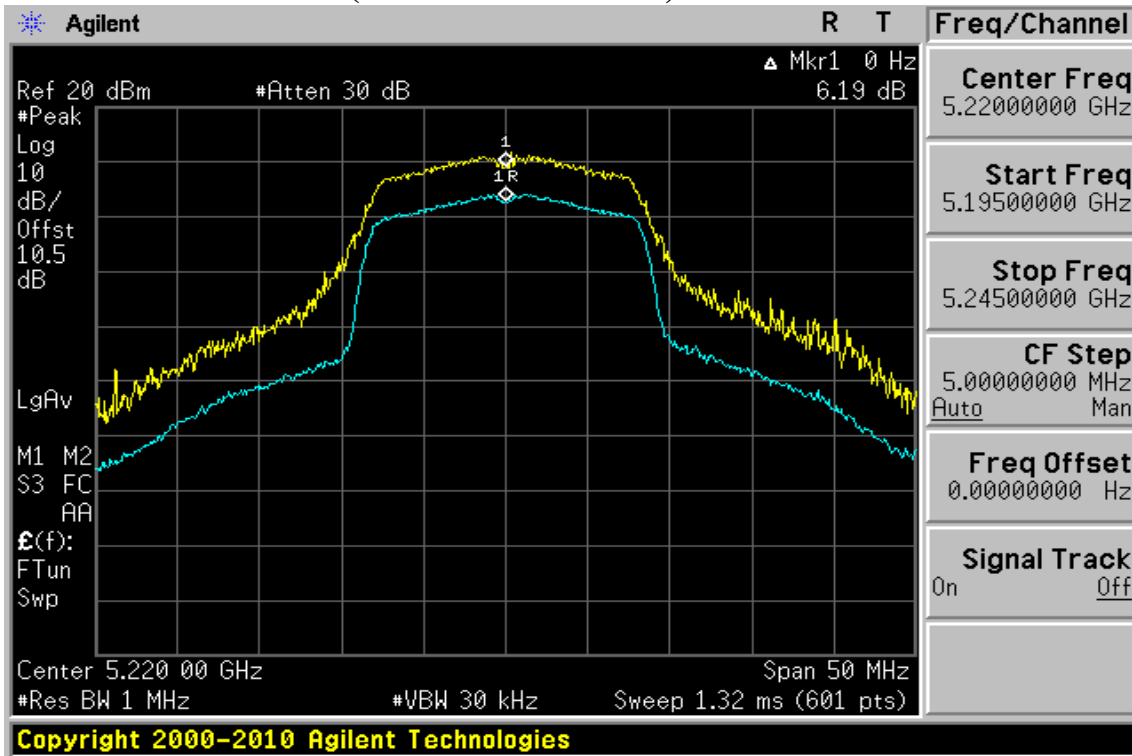


UNII, 5150~5250 MHz

Peak Excursion Data Plot (CH Low 5180 MHz)



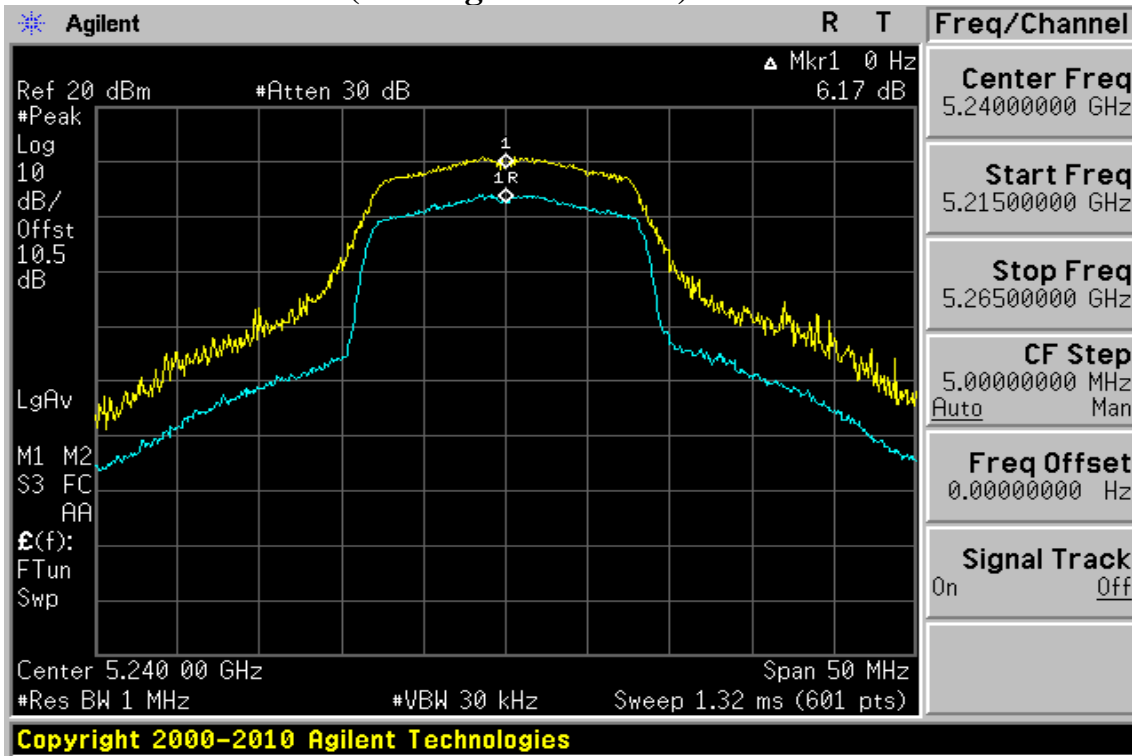
Peak Excursion Data Plot (CH Mid 5220 MHz)



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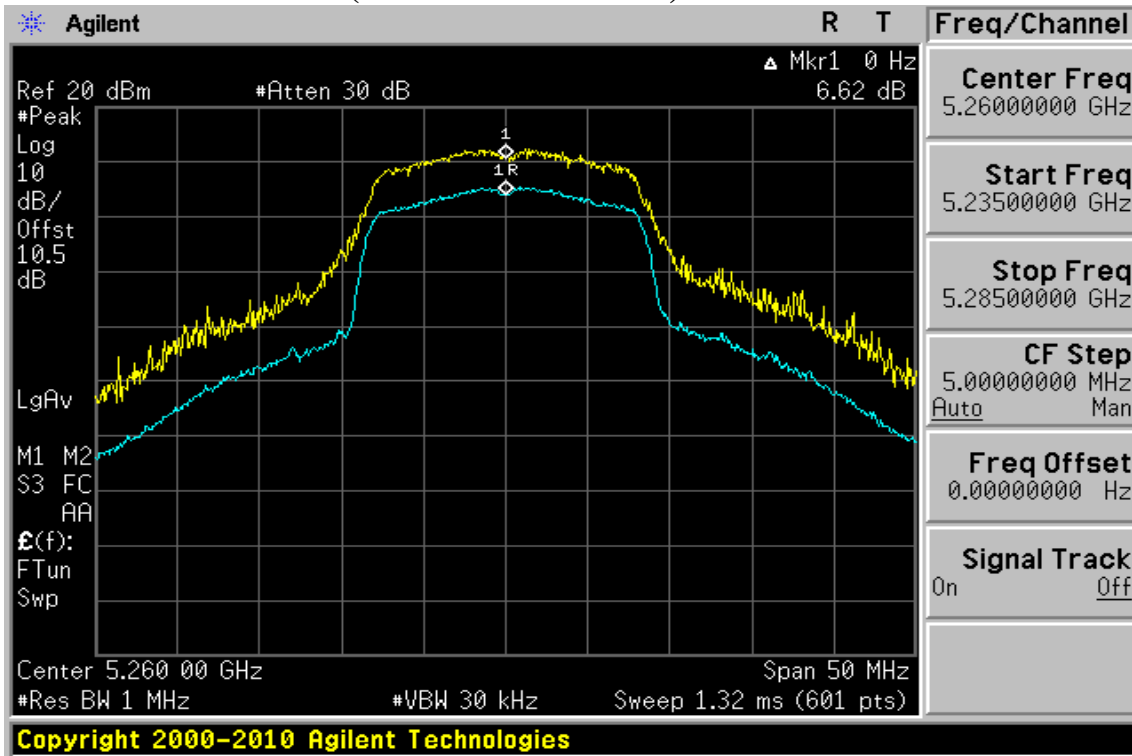
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**Peak Excursion Data Plot (CH High 5240 MHz)**



**UNII, 5250~5350 MHz**

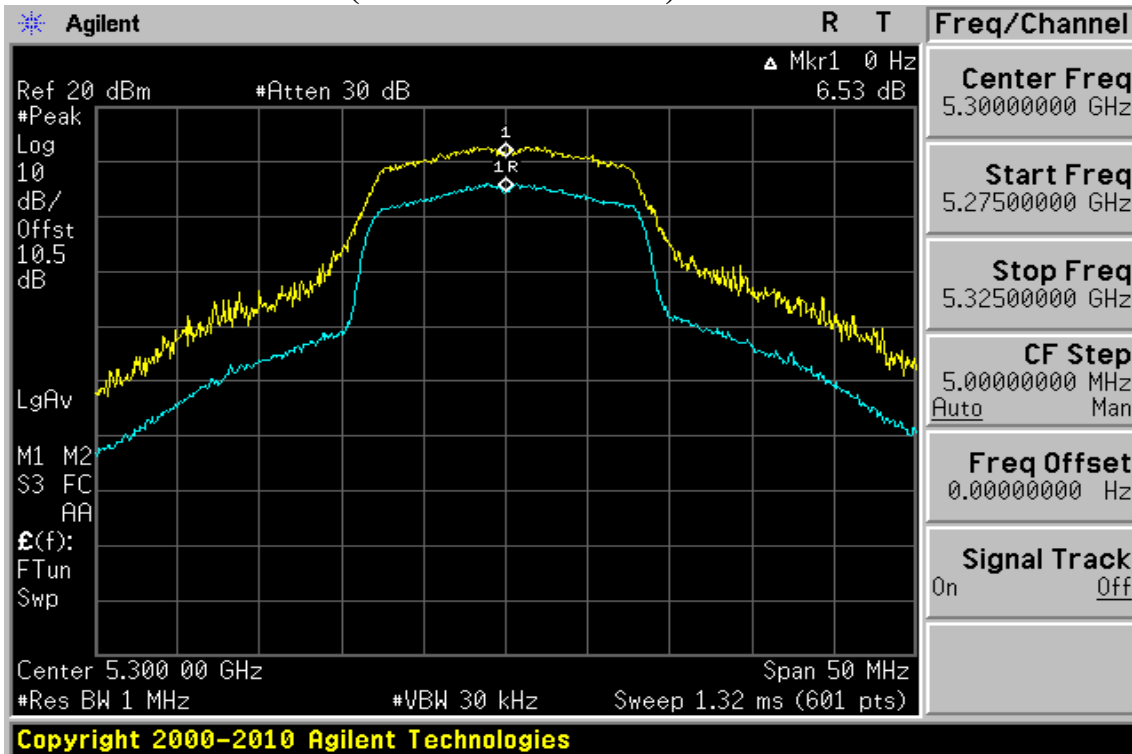
**Peak Excursion Data Plot (CH Low 5260 MHz)**



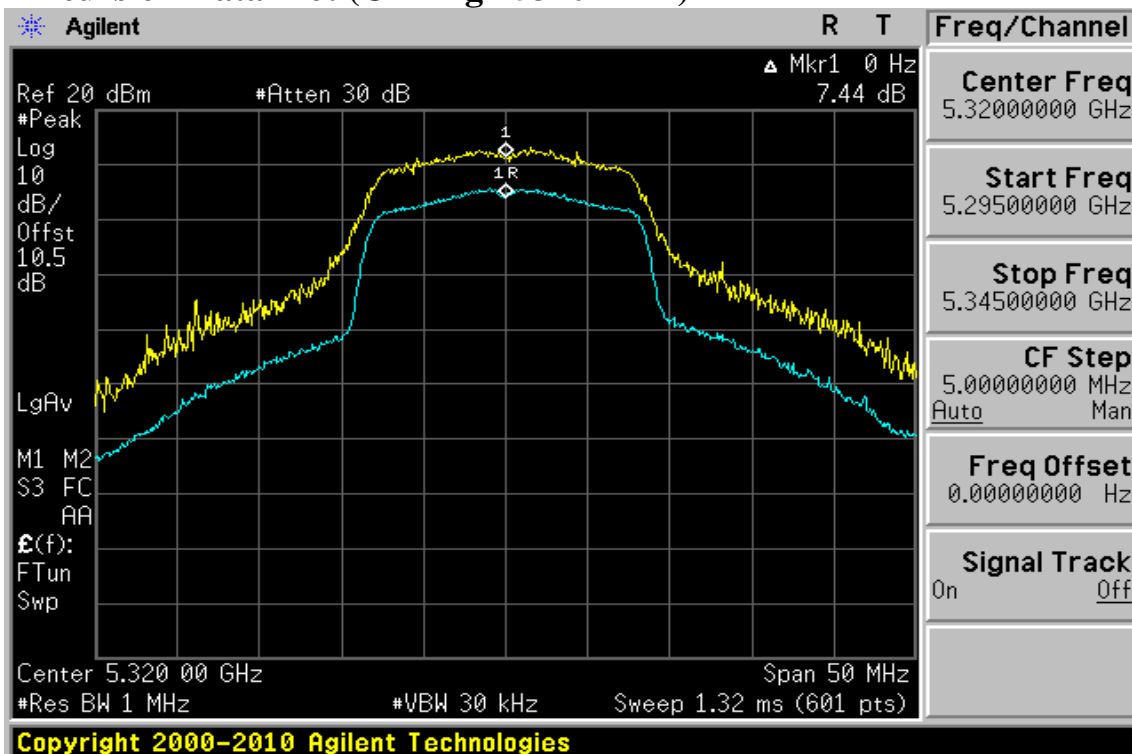
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**Peak Excursion Data Plot (CH Mid 5300 MHz)**



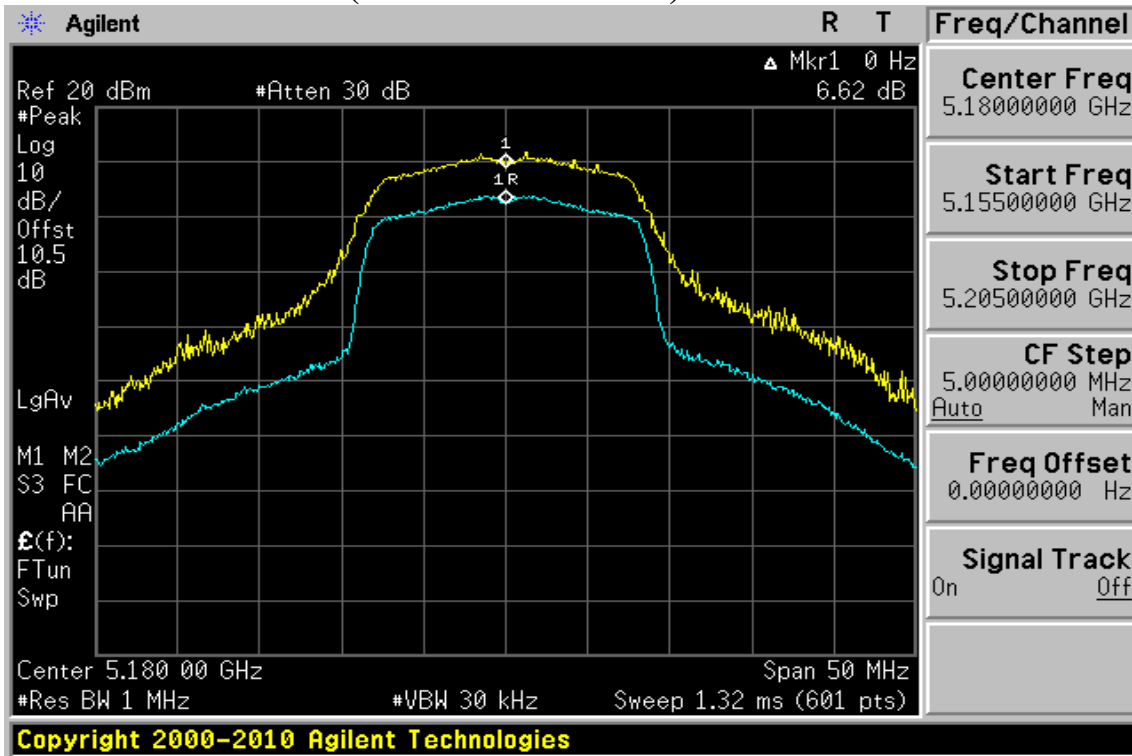
**Peak Excursion Data Plot (CH High 5320 MHz)**



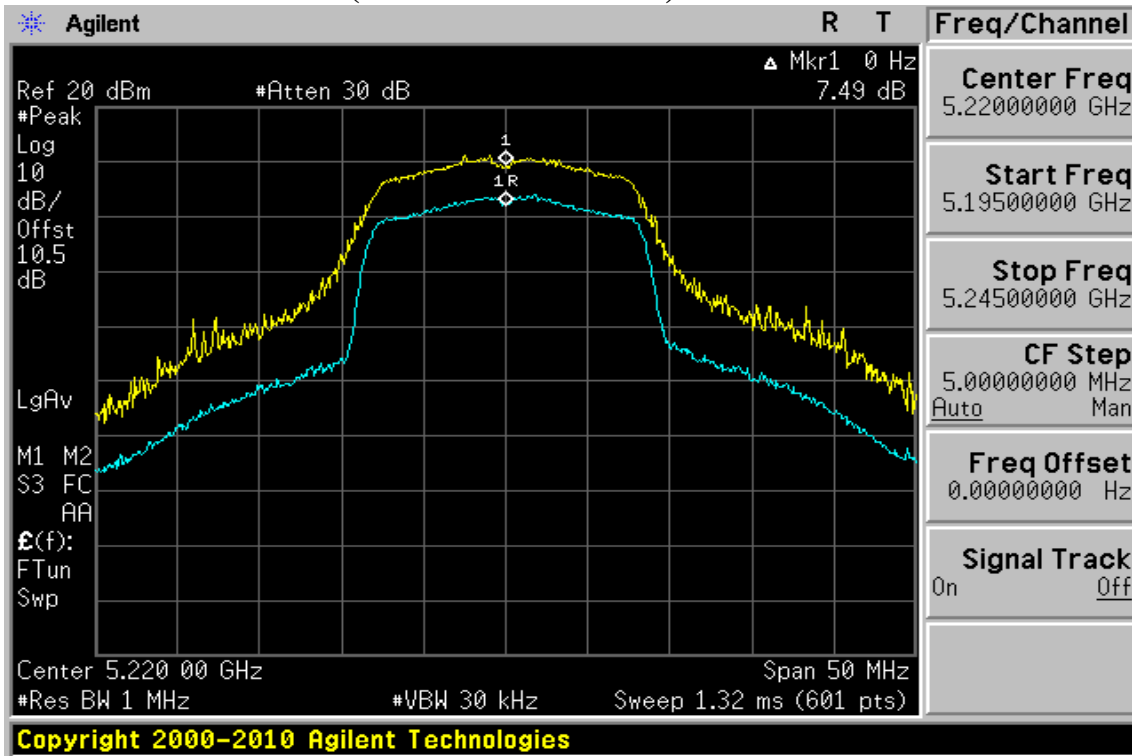
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**UNII, HT20, 5150~5250 MHz**  
**Peak Excursion Data Plot (CH Low 5180 MHz)**



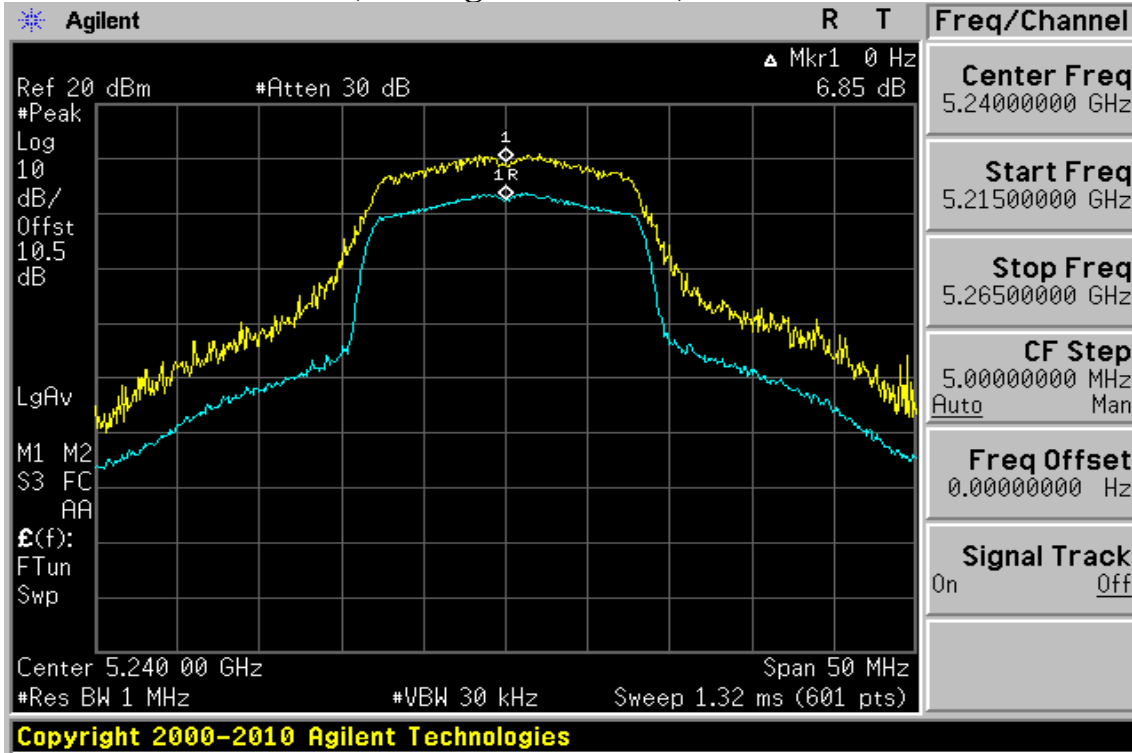
**Peak Excursion Data Plot (CH Mid 5220 MHz)**



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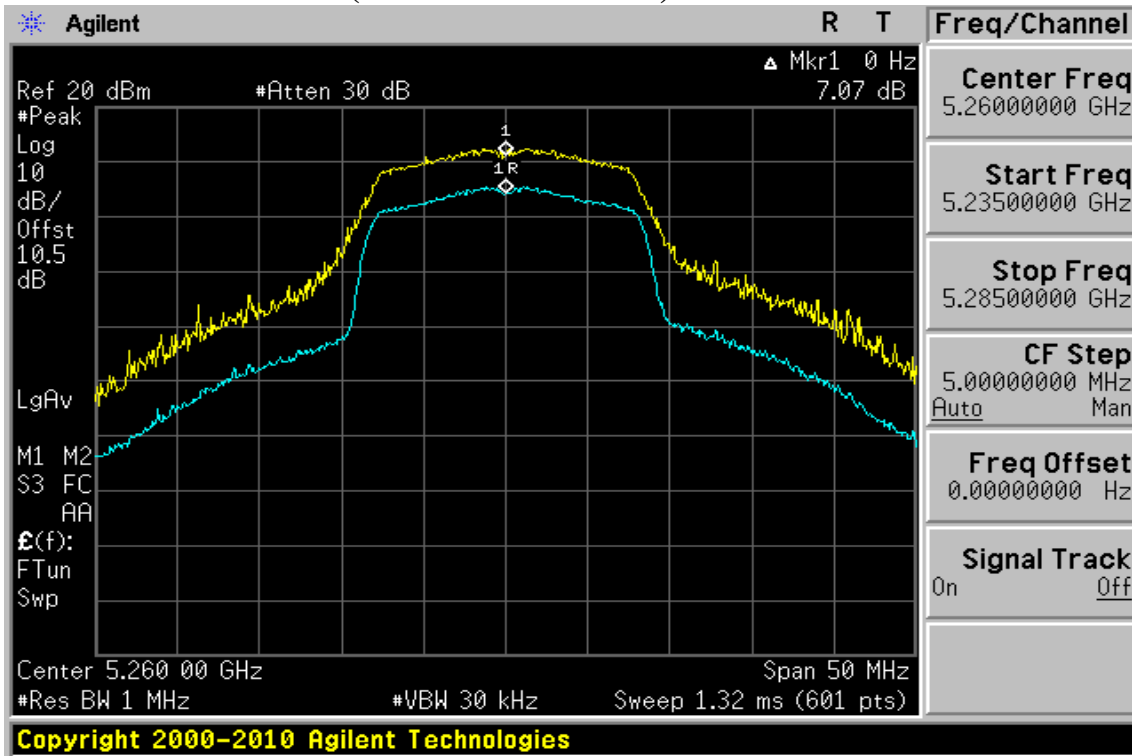
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**Peak Excursion Data Plot (CH High 5240 MHz)**



**UNII, HT20, 5250~5350 MHz**

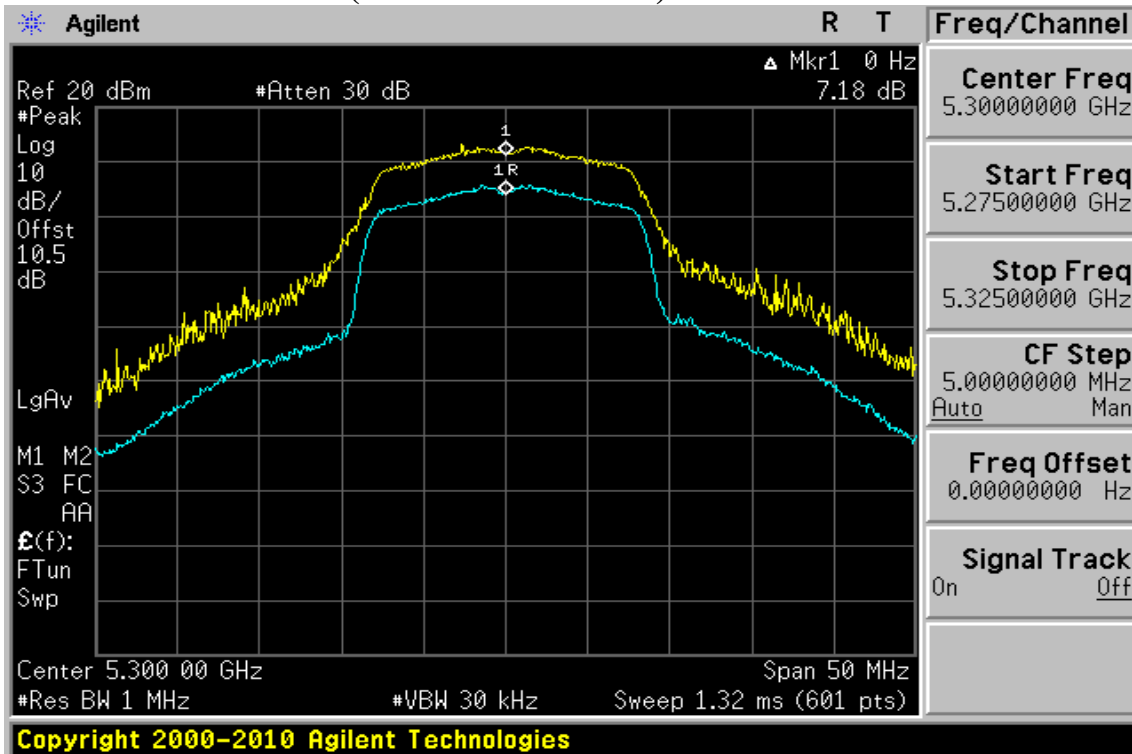
**Peak Excursion Data Plot (CH Low 5260MHz)**



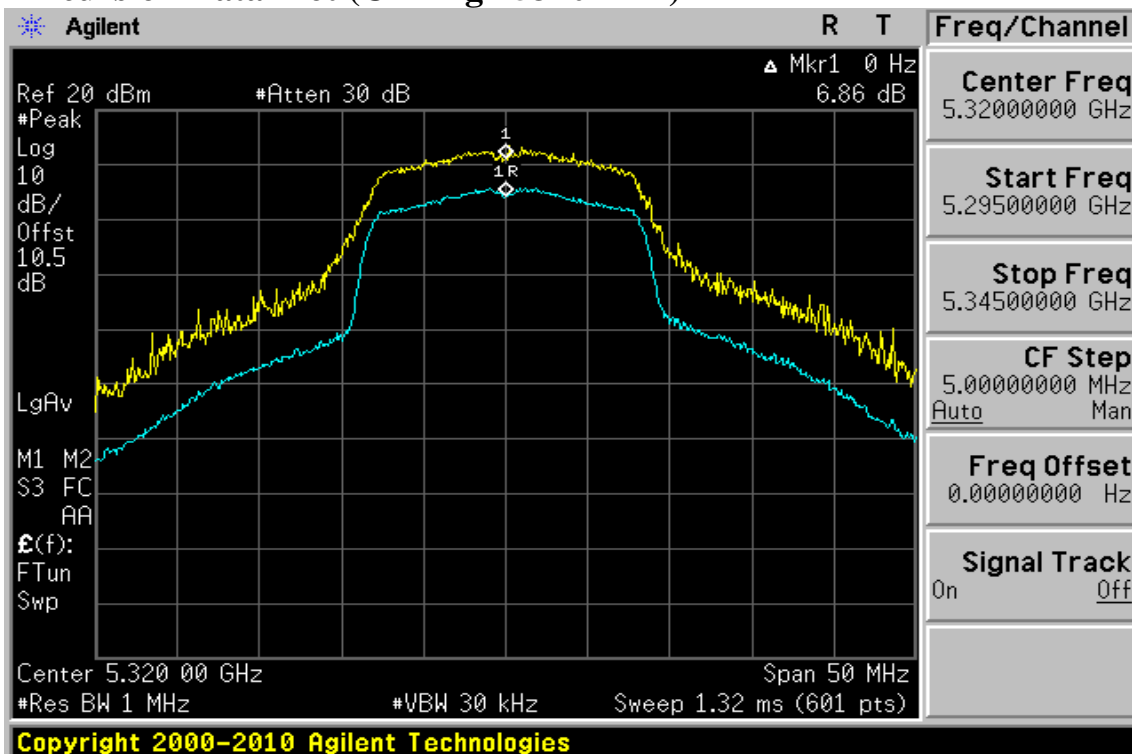
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**Peak Excursion Data Plot (CH Mid 5300MHz)**



**Peak Excursion Data Plot (CH High 5320MHz)**



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## 10. UNDESIRABLE EMISSION - CONDUCTED MEASUREMENT

### 10.1 Standard Applicable

According to §15.407(b),

(b) Undesirable Emission Limits: Except as shown in Paragraph (b)(6) of this section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
- (3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.
- (5) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.
- (7) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

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## 10.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to spectrum.
3. Set Spectrum RBW=1MHz, VBW = 1MHz for peak measurement and 10Hz for average measurement.
4. Set Spectrum at lower/upper band edge and the restricted band adjacent to the lower/upper edge of the authorized band, with the transmitter set to the lowest/highest channel.
5. Set Spectrum over the 30MHz to 40GHz range with the transmitter set to the lowest, middle, and highest channels.

Conducted RF measurements of the transmitter output were made at the band edges and the adjacent restricted bands.

Also, conducted RF measurements of the transmitter output over the 30 MHz to 40 GHz band were made in order to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

## 10.3 Measurement Equipment Used:

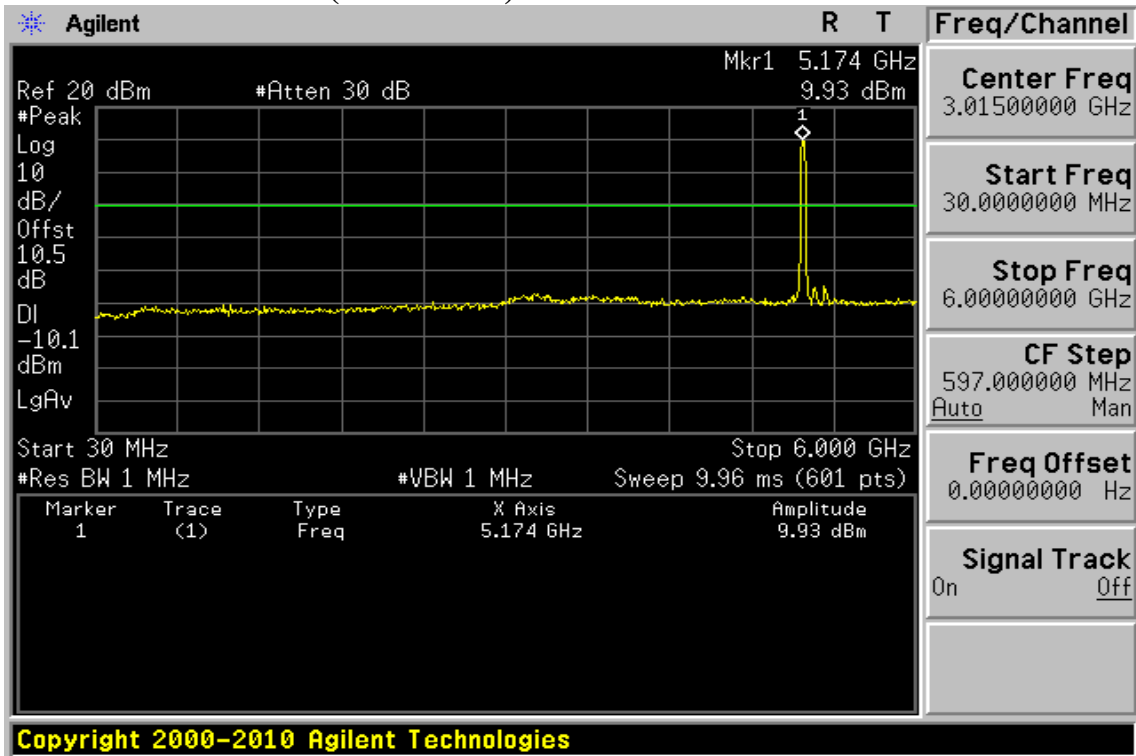
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Sensor	Anritsu	MA2411B	917032	01/21/2010	01/20/2012
Power Meter	Anritsu	ML2495A	1005007	02/17/2010	02/16/2012
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2011	07/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S10W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S20W5	001	01/05/2011	01/04/2012
Splitter	Agilent	11636B	N/A	01/05/2011	01/04/2012

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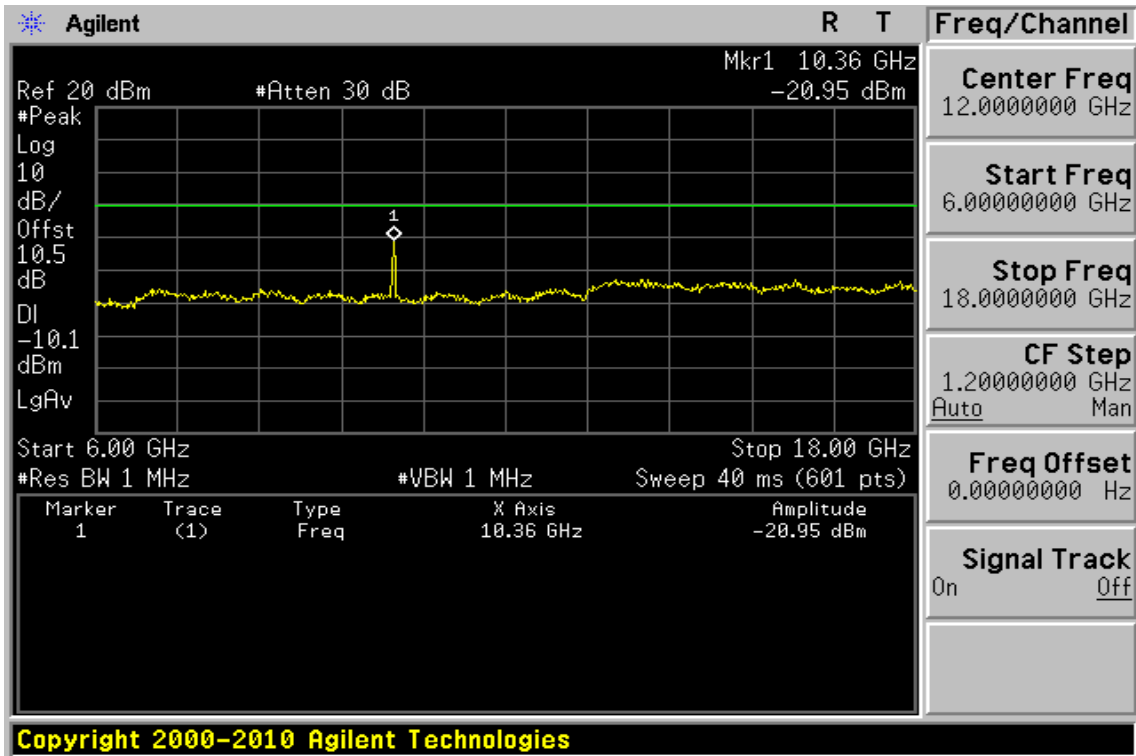
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**UNII, 5150~5250 MHz**  
**Ch Low 30MHz – 6GHz (5180 MHz)**



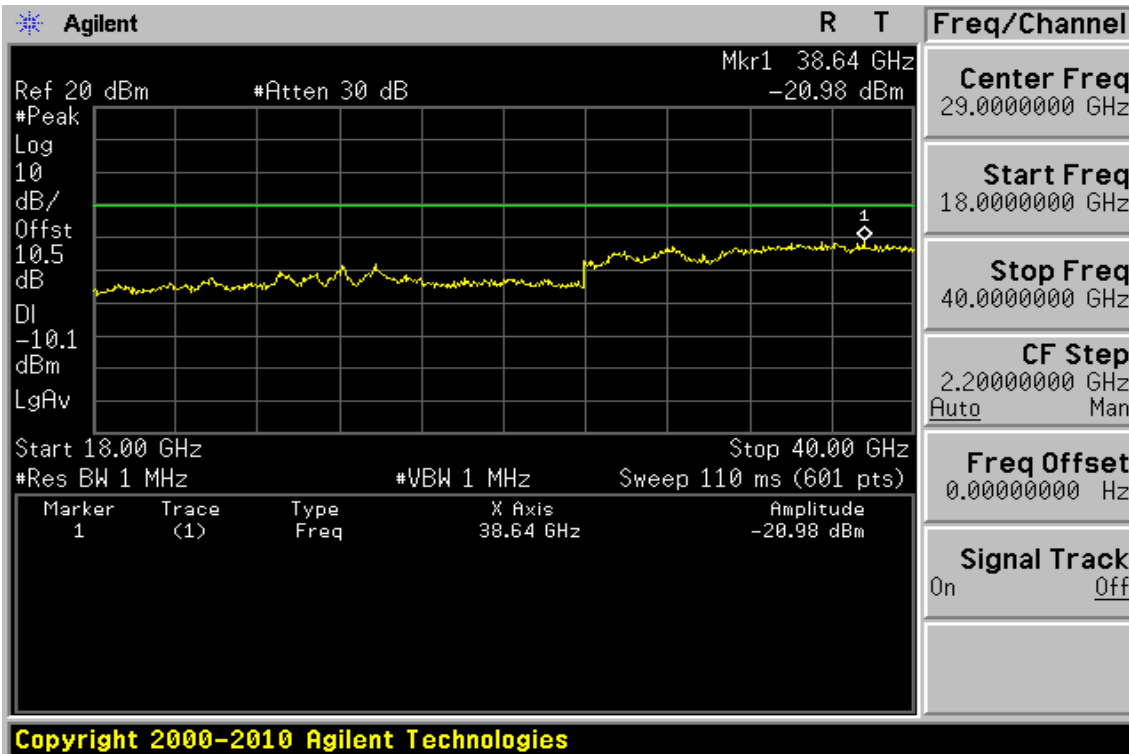
**Ch Low 6GHz – 18GHz**



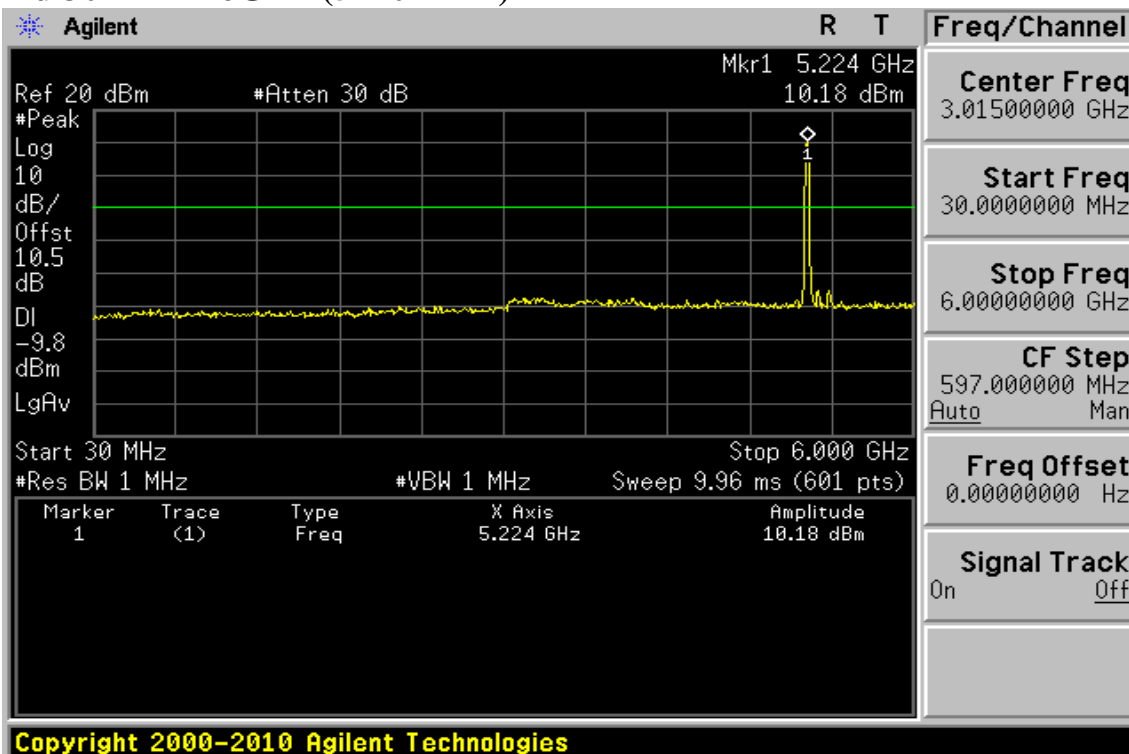
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**Ch Low 18GHz – 40GHz**



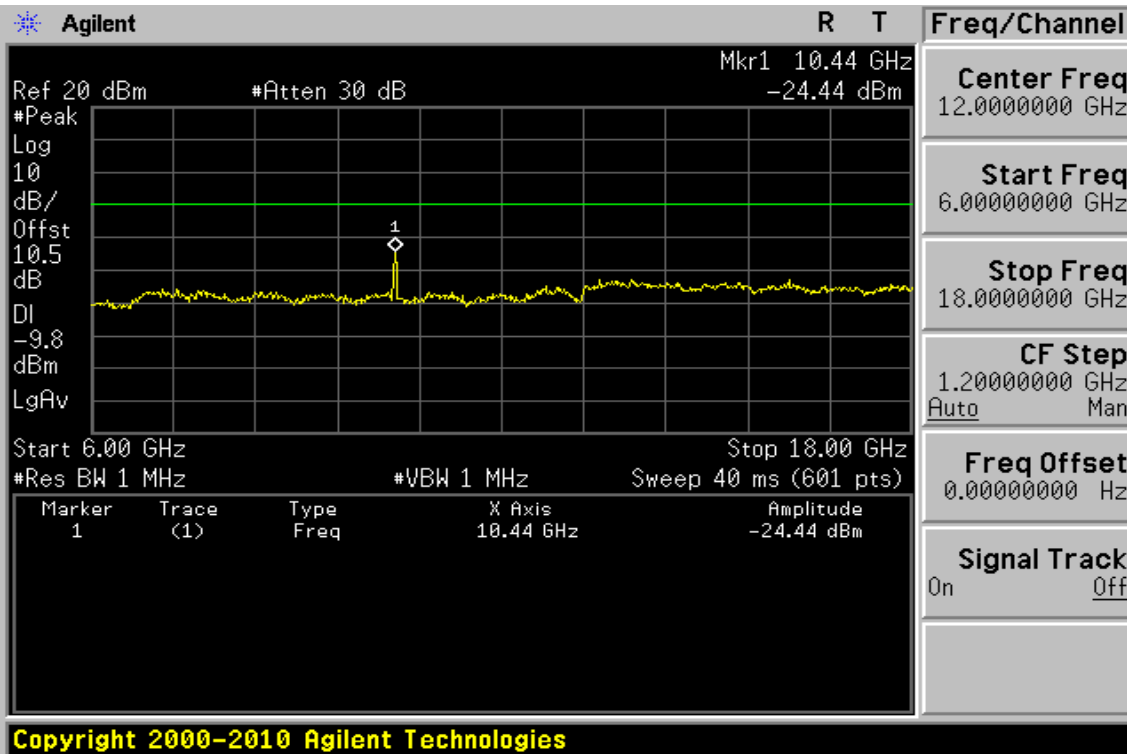
**Ch Mid 30MHz – 6GHz (5220 MHz)**



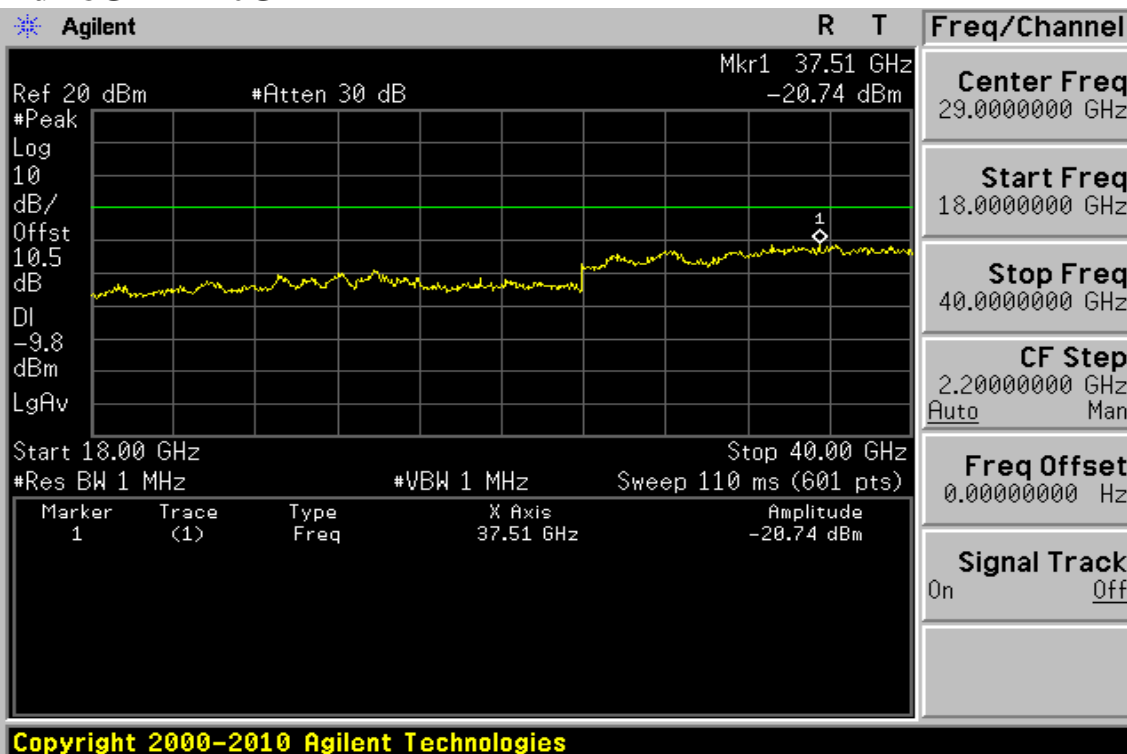
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Ch Mid 6GHz – 18GHz



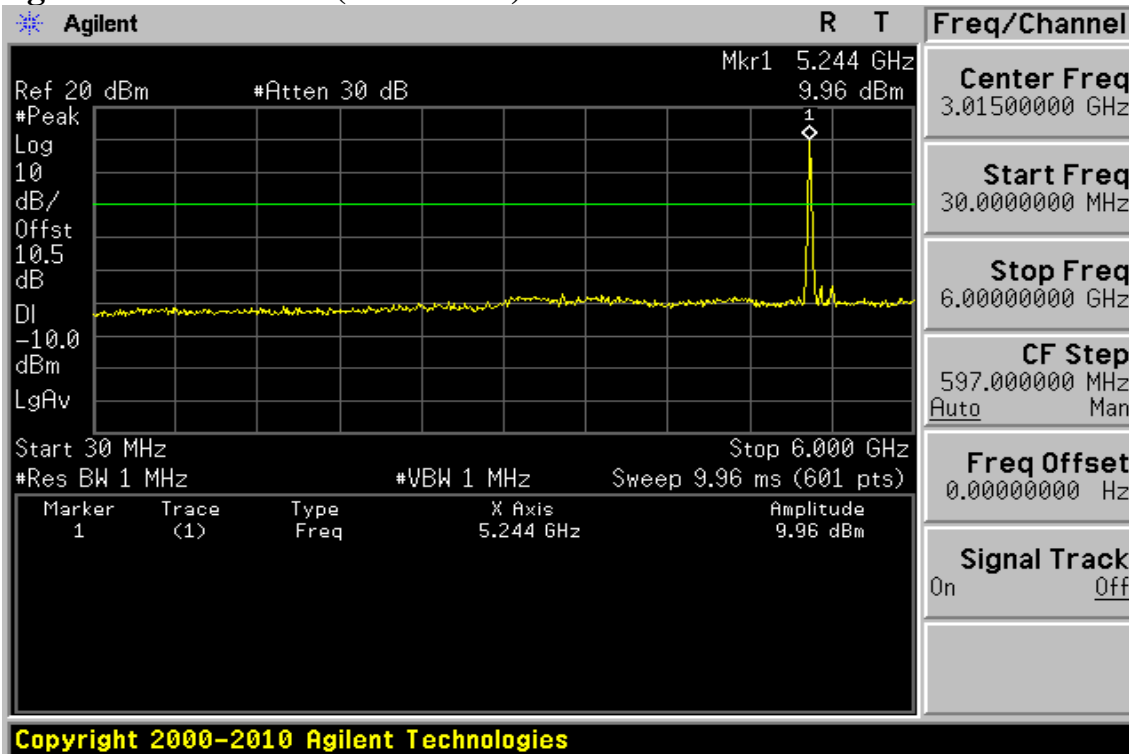
Ch Mid 18GHz – 40GHz



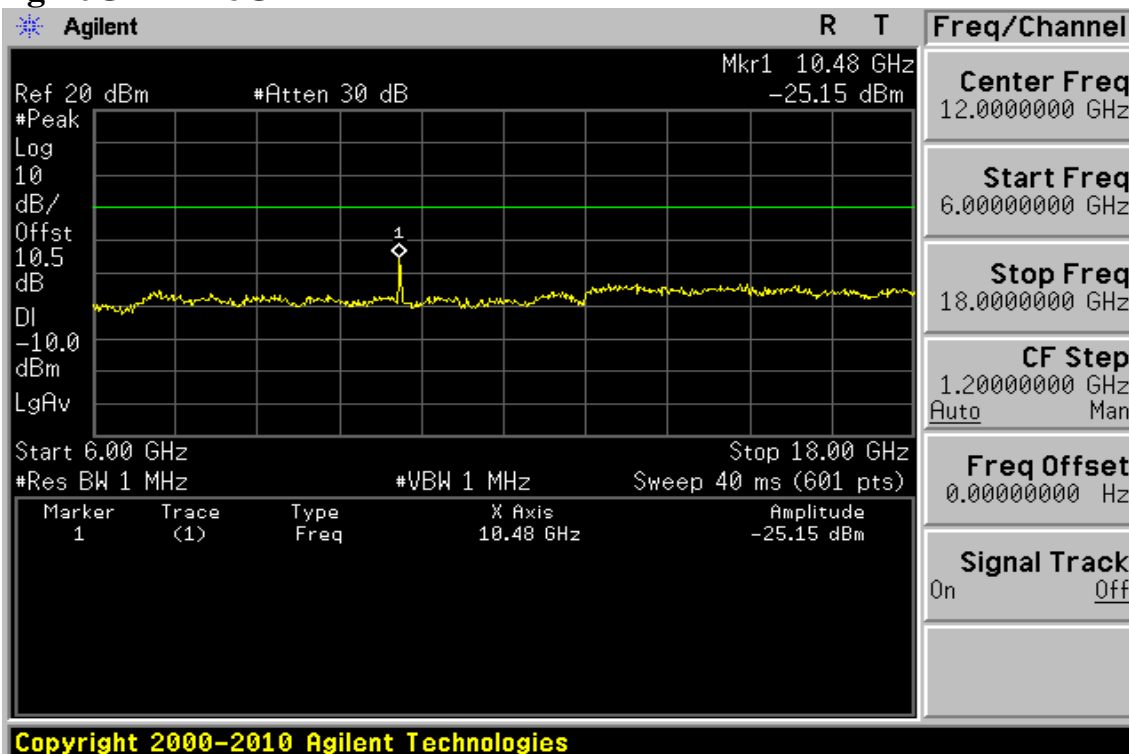
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**Ch High 30MHz – 6GHz (5240 MHz)**



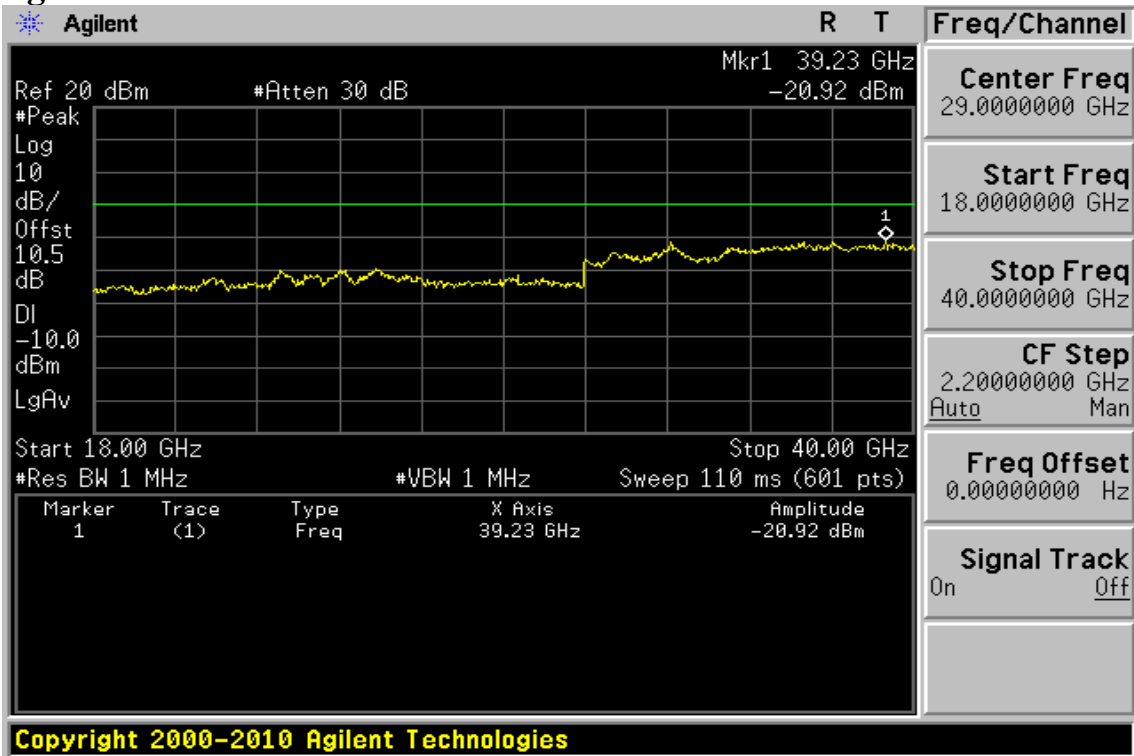
**Ch High 6GHz – 18GHz**



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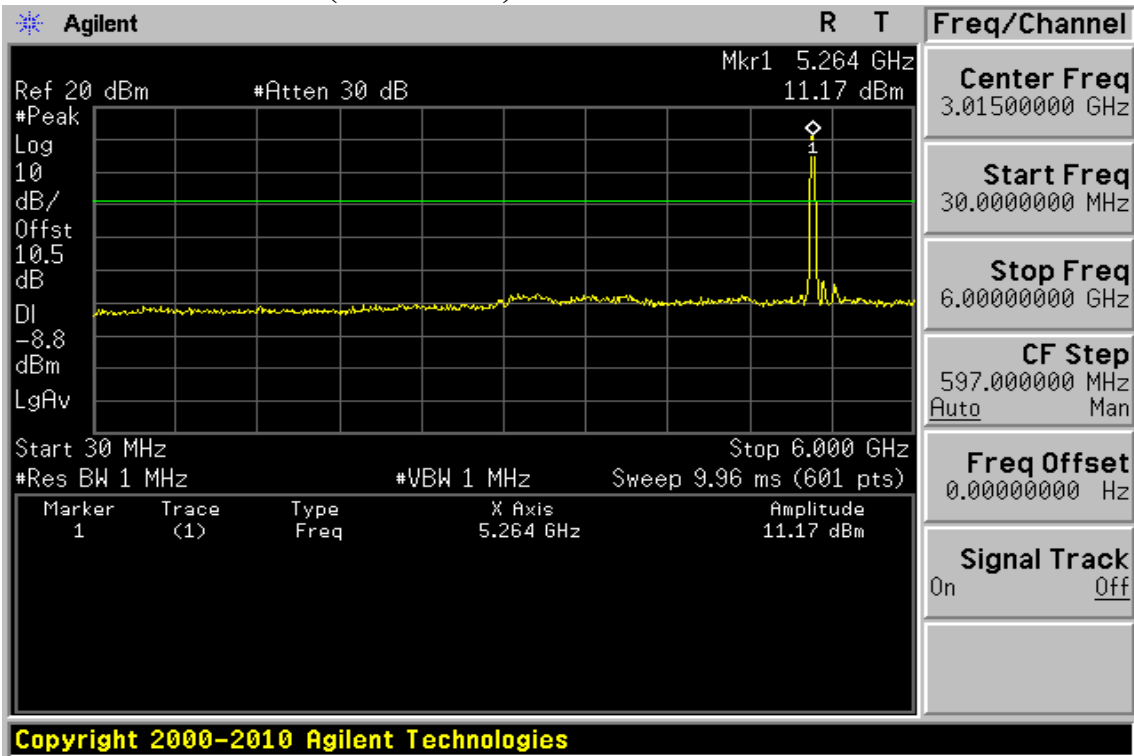
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**Ch High 18GHz – 40GHz**



**UNII, 5250~5350 MHz**

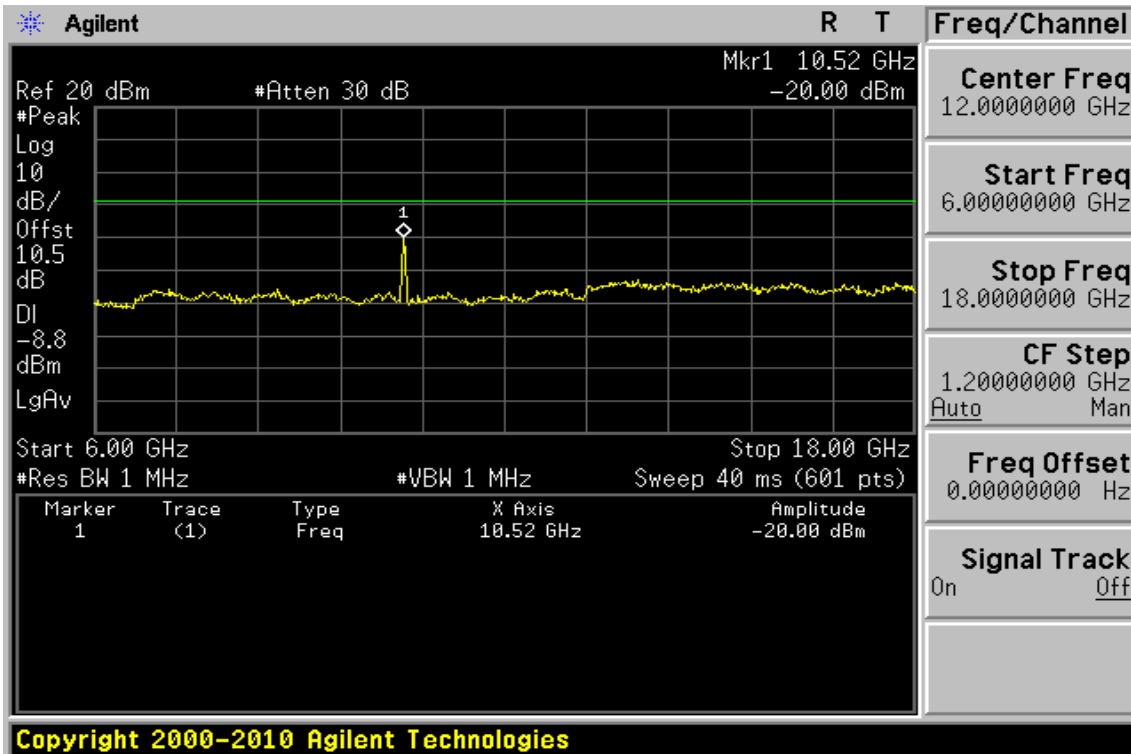
**Ch Low 30MHz – 6GHz (5260 MHz)**



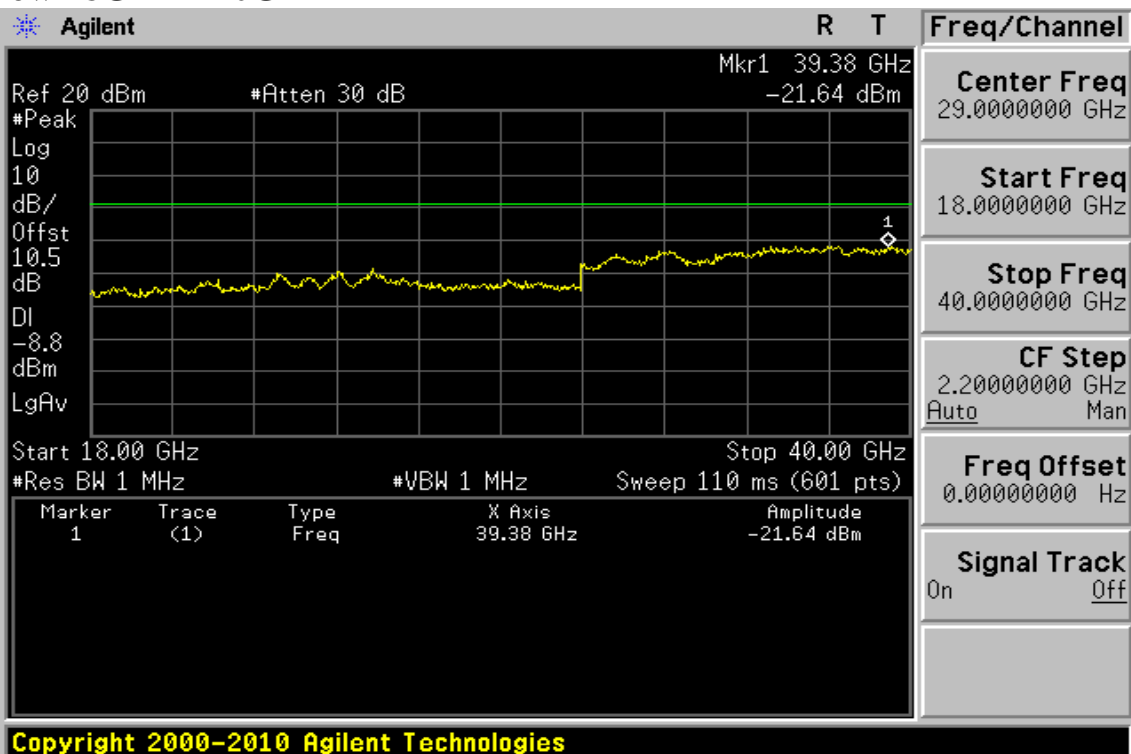
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Ch Low 6GHz – 18GHz



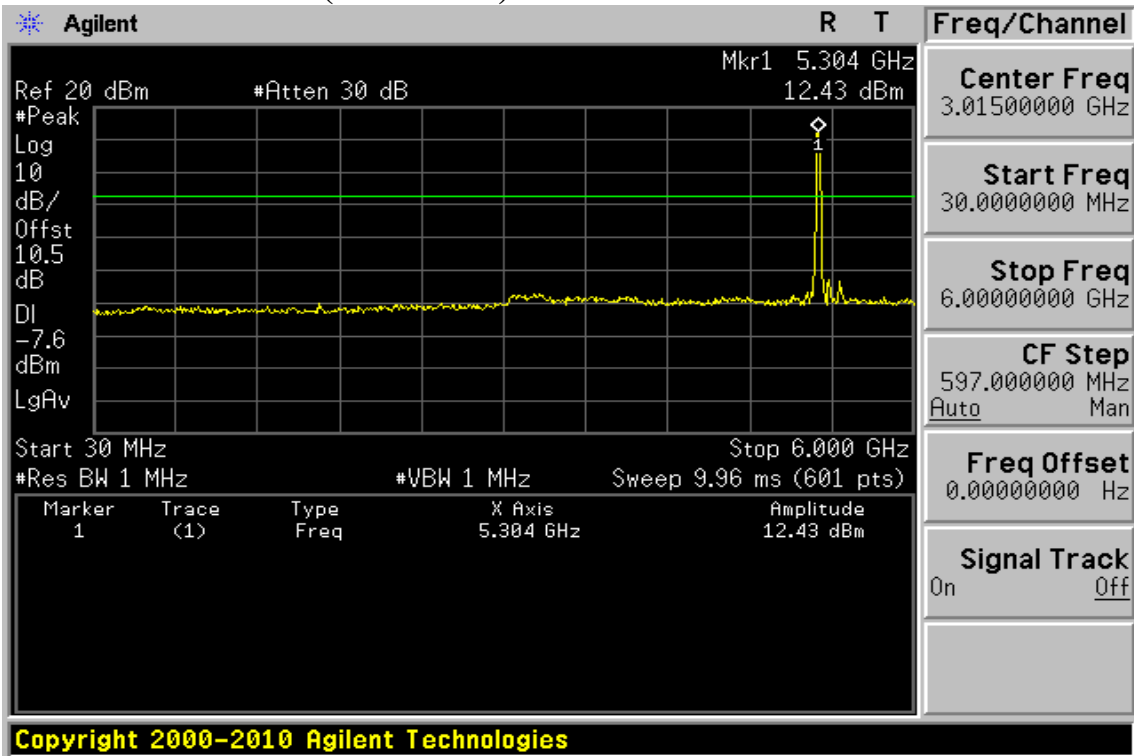
Ch Low 18GHz – 40GHz



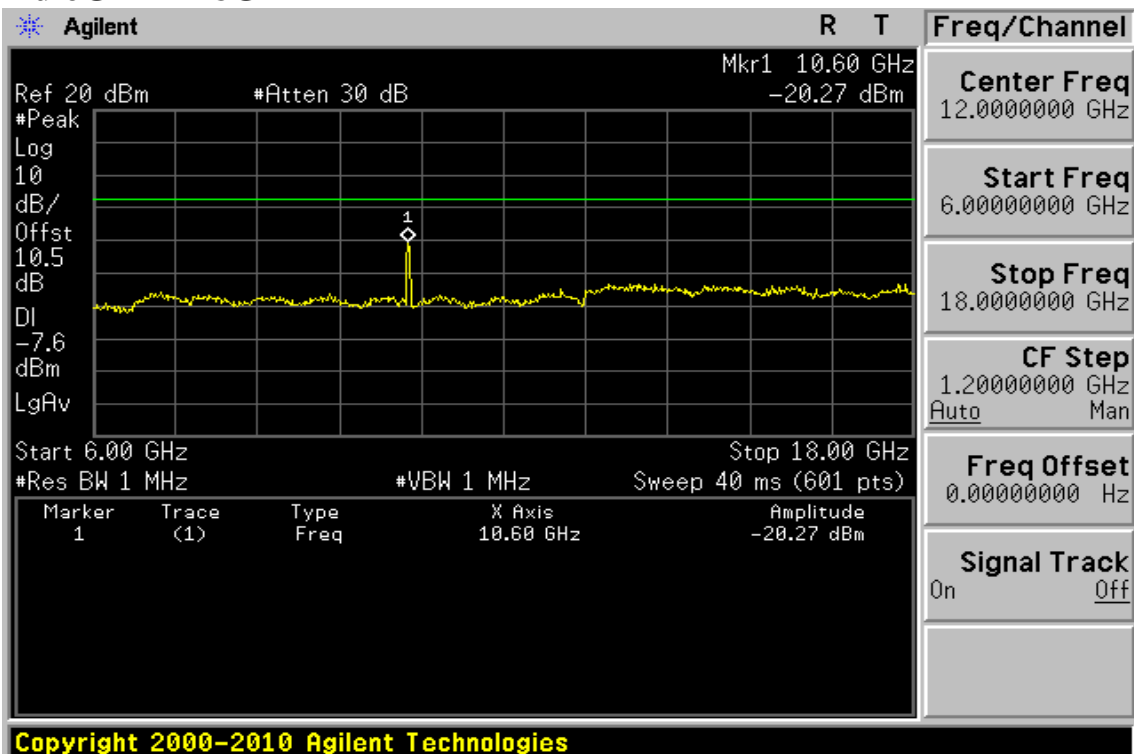
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**Ch Mid 30MHz – 6GHz (5300 MHz)**



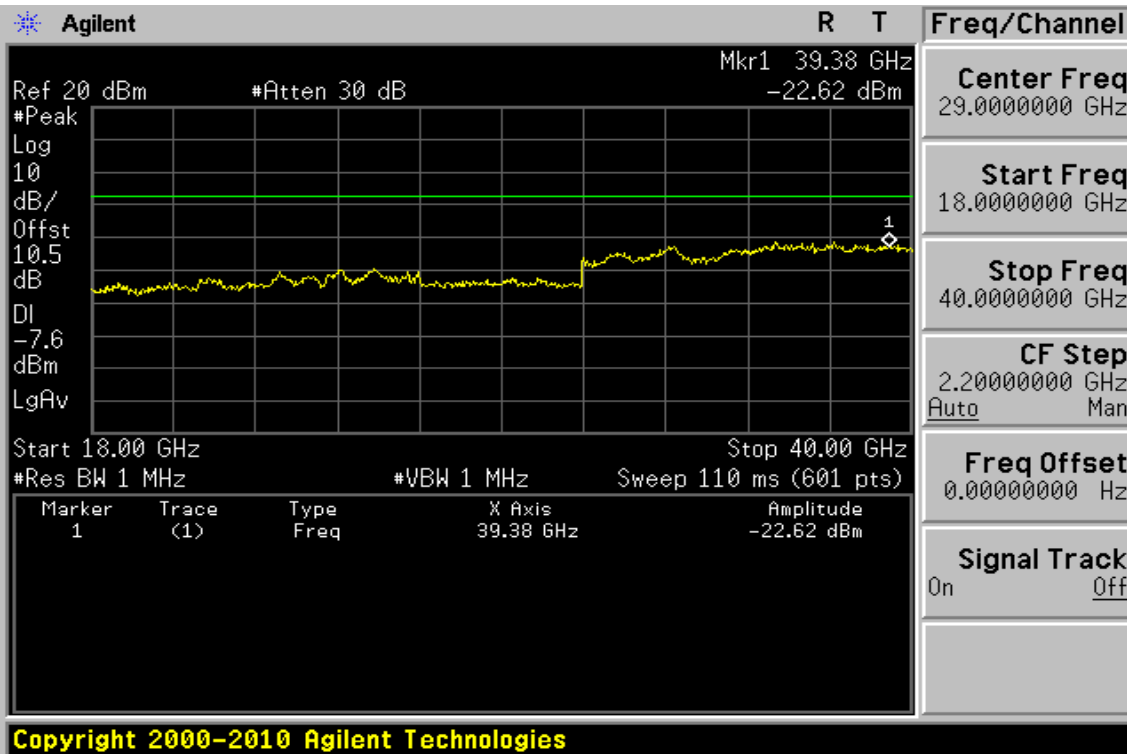
**Ch Mid 6GHz – 18GHz**



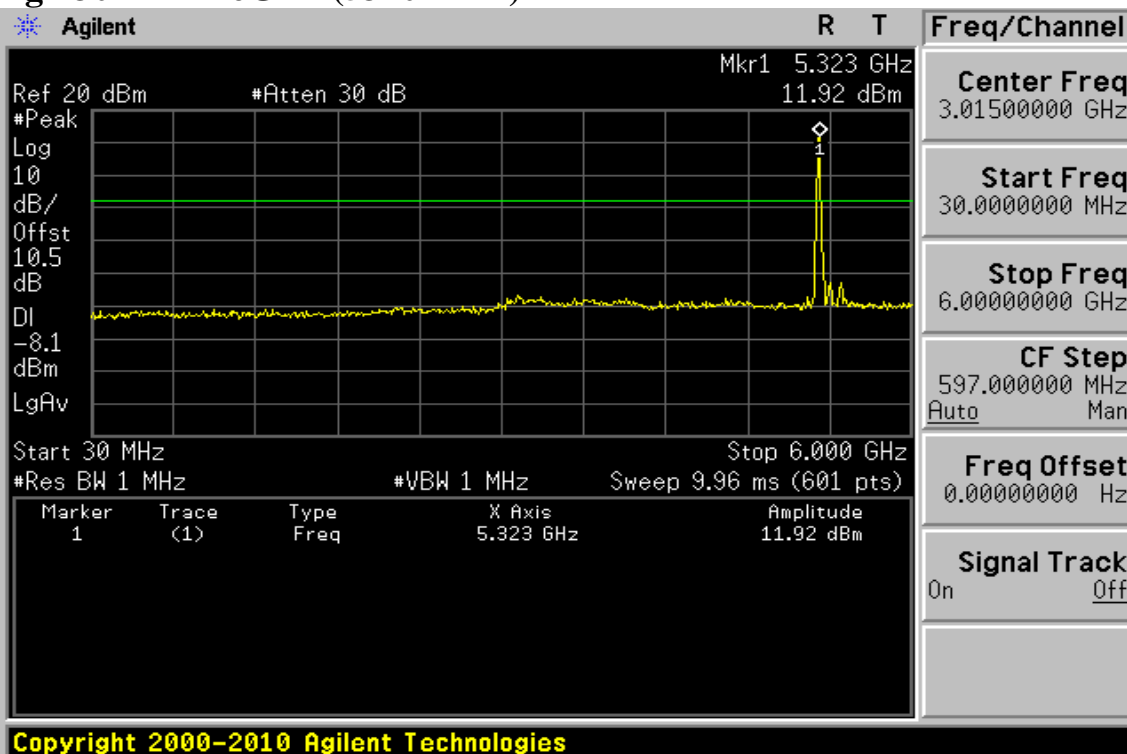
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Ch Mid 18GHz – 40GHz



Ch High 30MHz – 6GHz (5320 MHz)

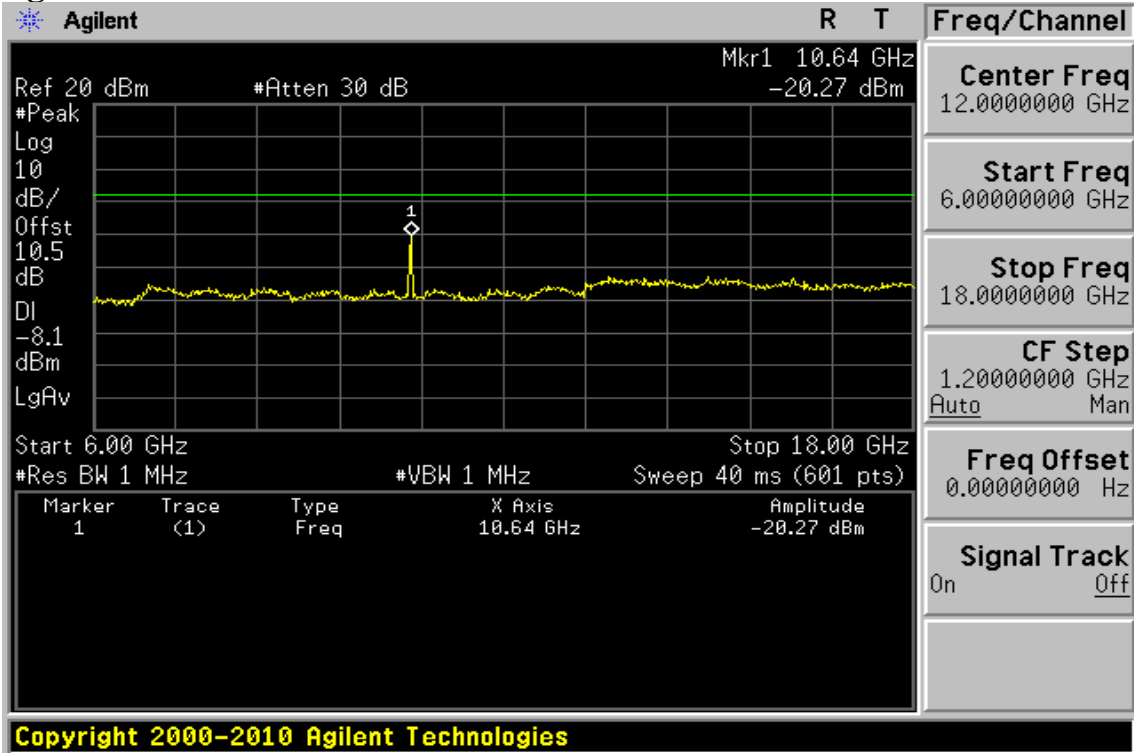


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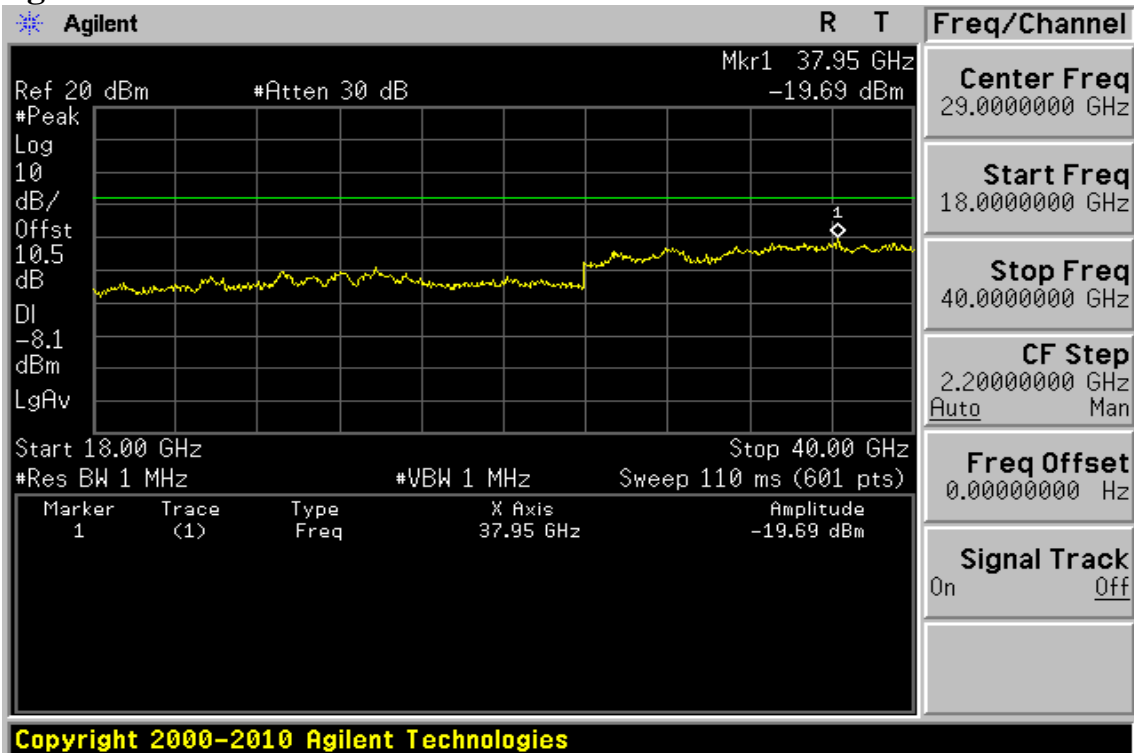
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**Ch High 6GHz – 18GHz**



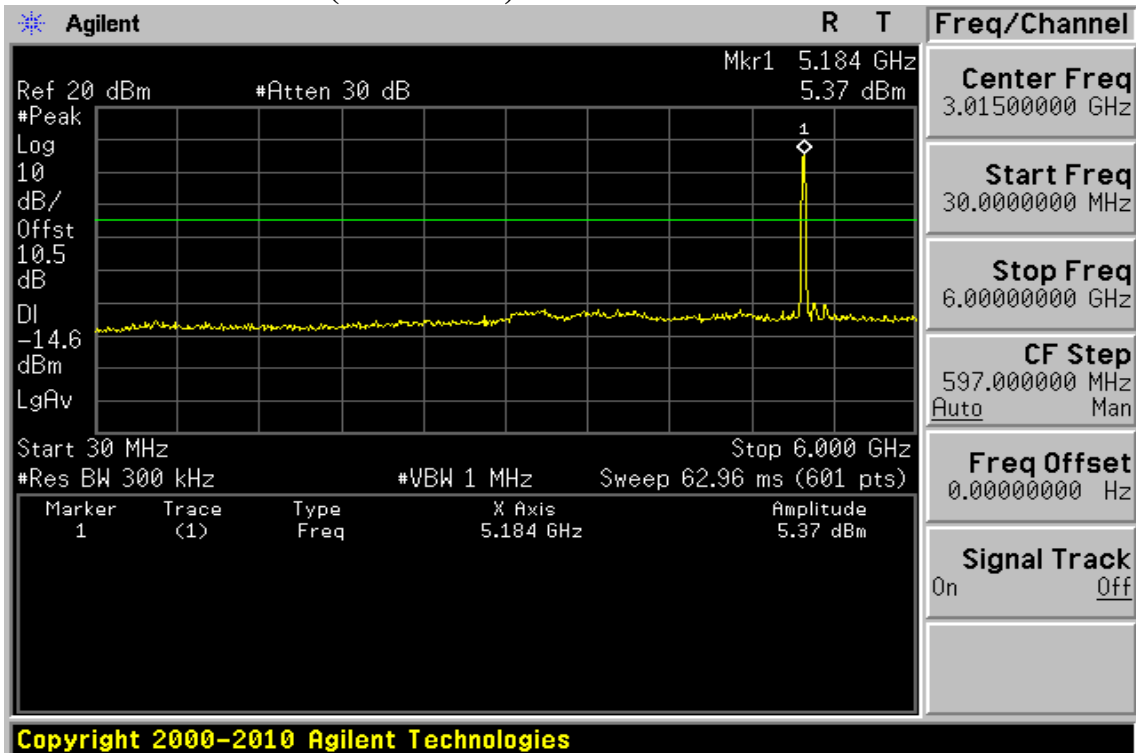
**Ch High 18GHz – 40GHz**



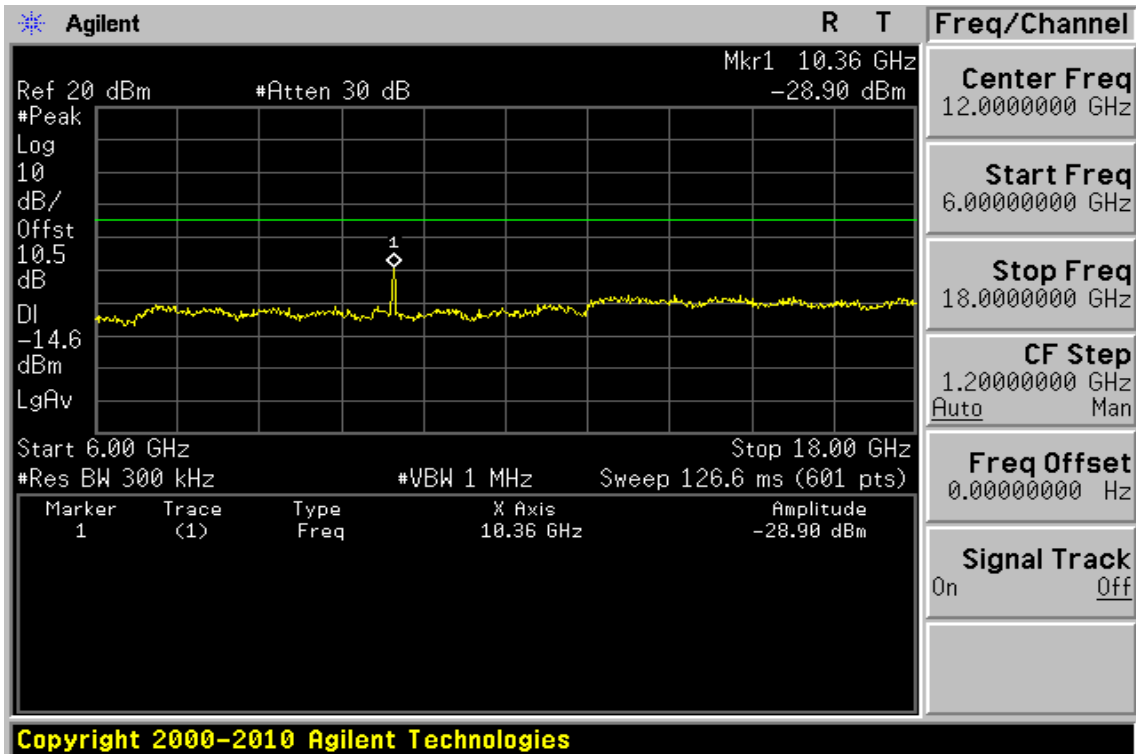
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**UNII HT20, 5150~5250 MHz**  
**Ch Low 30MHz – 6GHz (5180 MHz)**



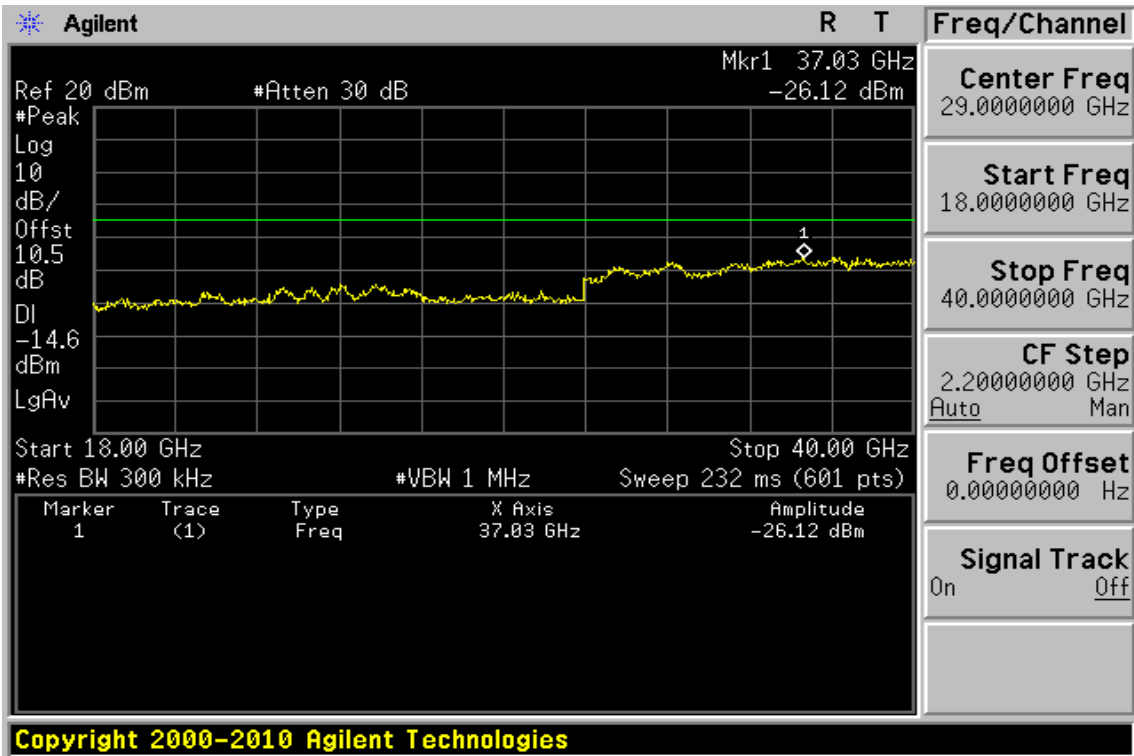
**Ch Low 6GHz – 18GHz**



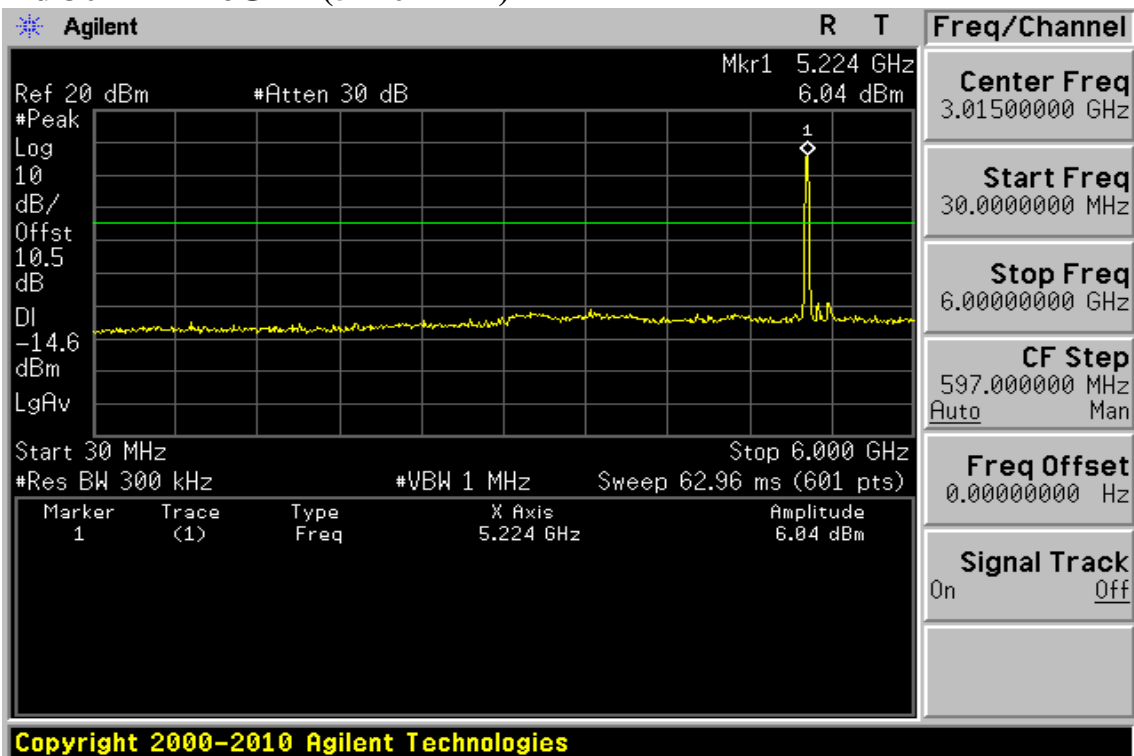
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**Ch Low 18GHz – 40GHz**



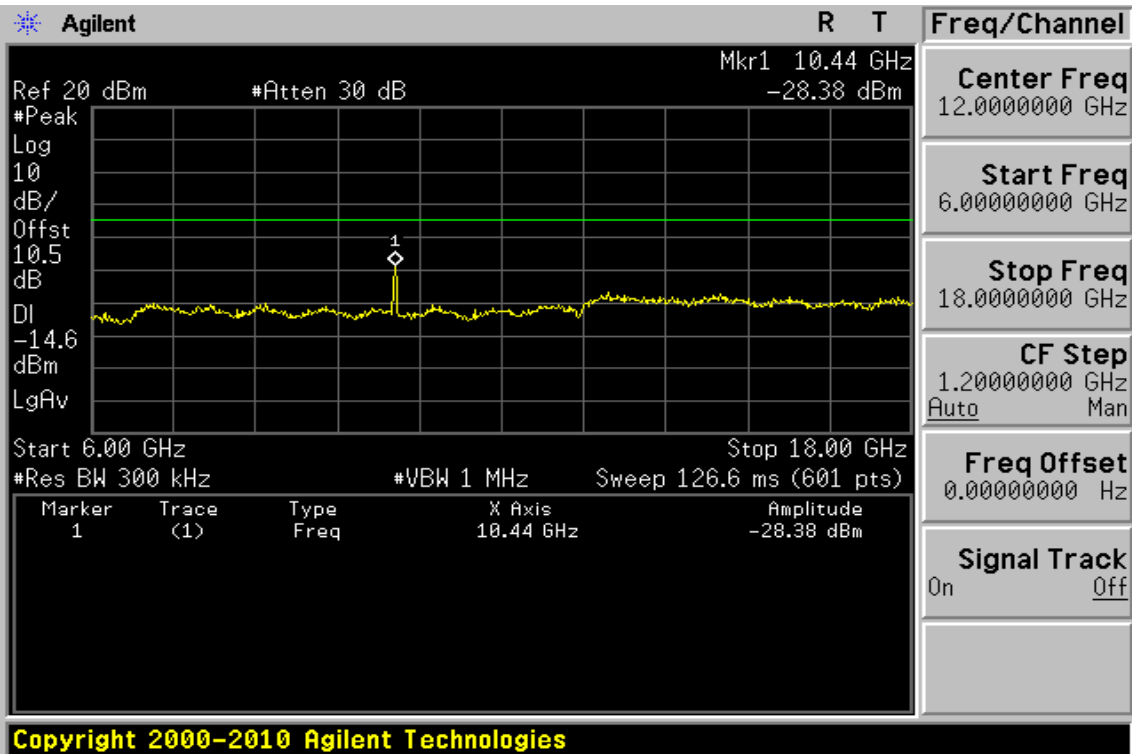
**Ch Mid 30MHz – 6GHz (5220 MHz)**



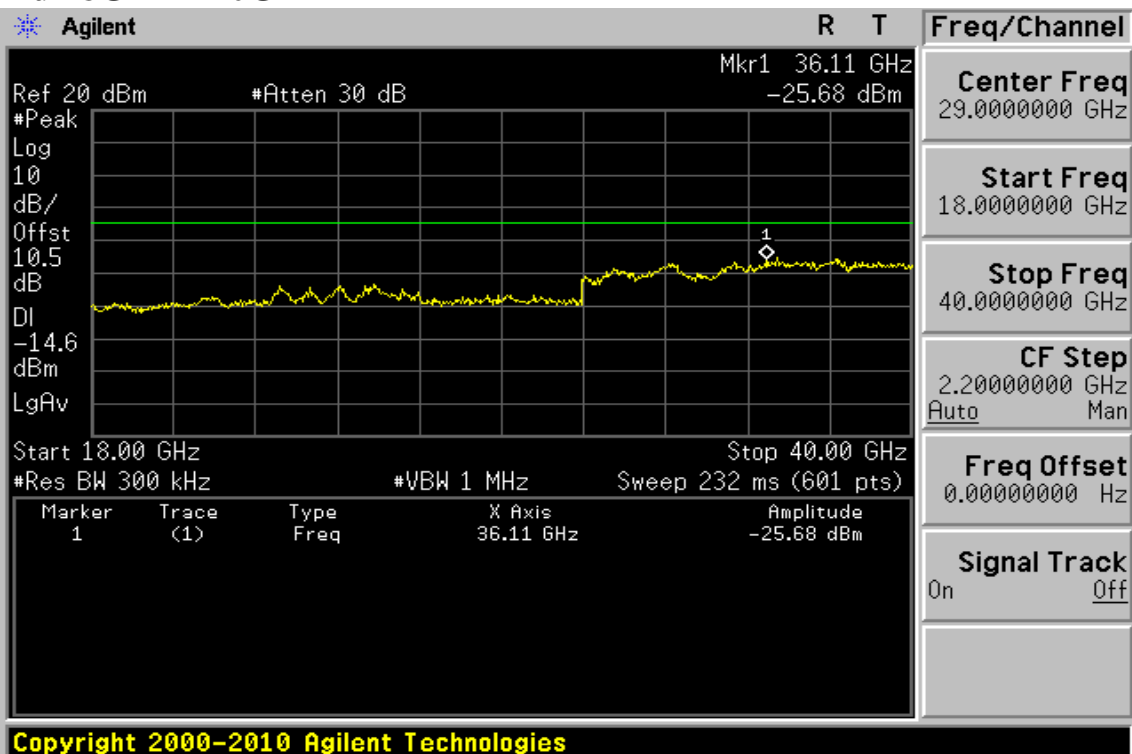
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Ch Mid 6GHz – 18GHz



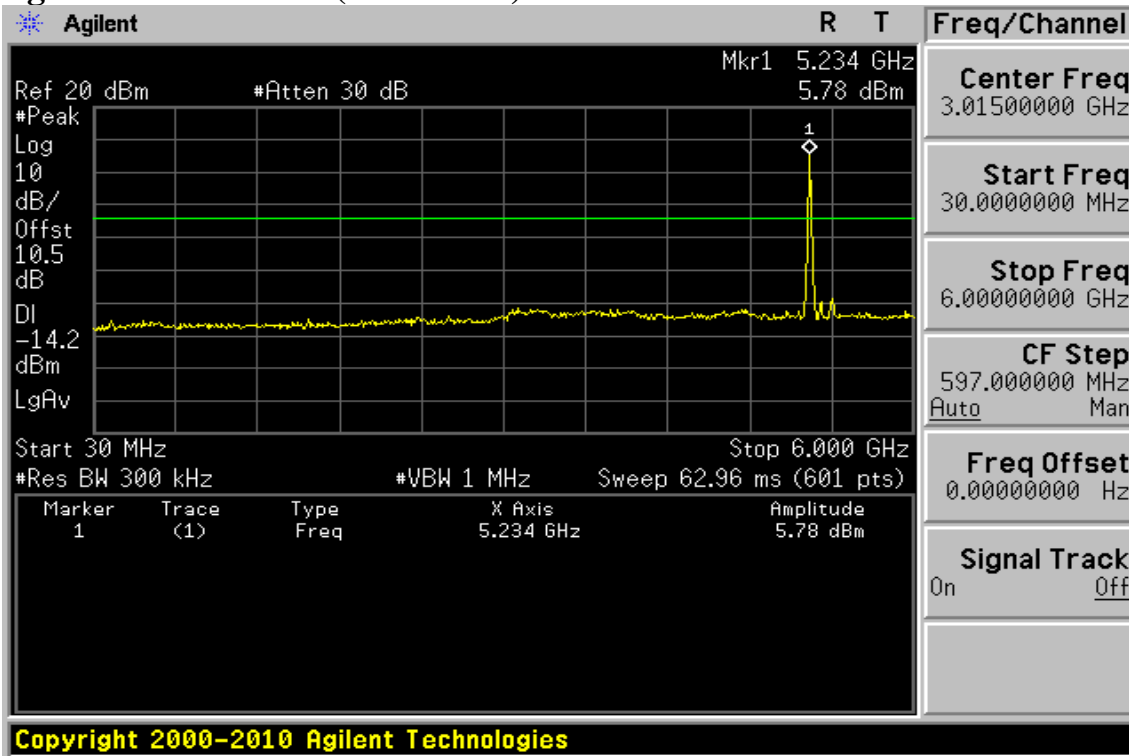
Ch Mid 18GHz – 40GHz



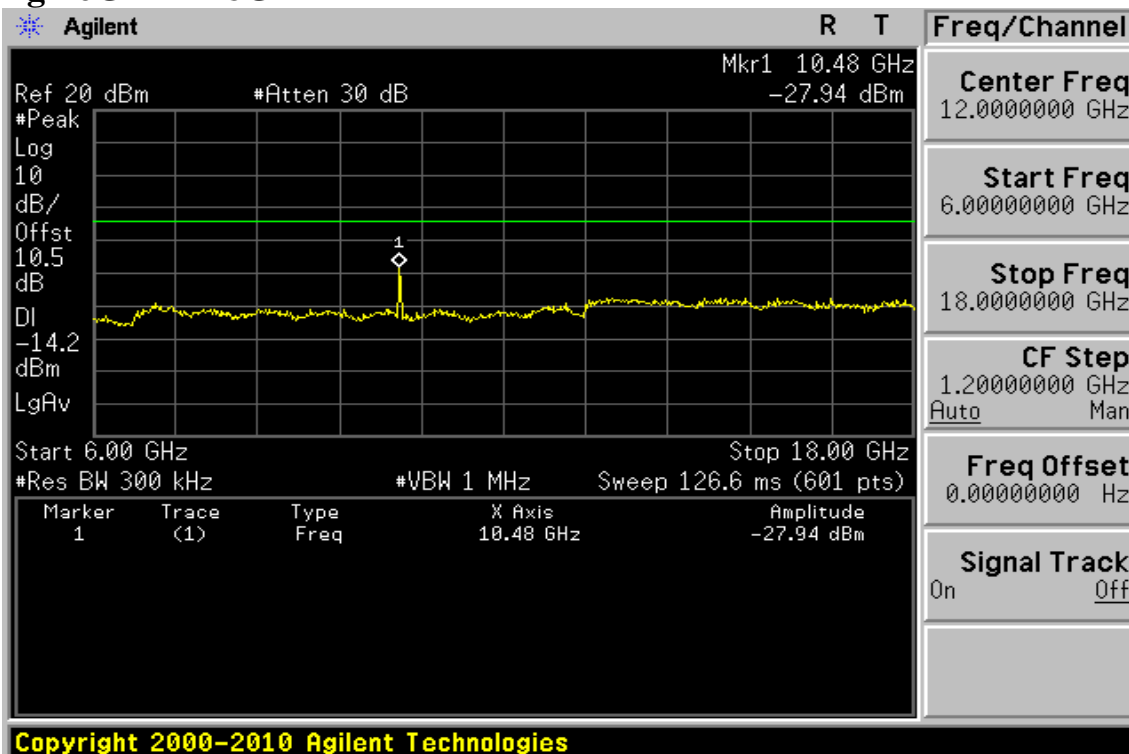
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**Ch High 30MHz – 6GHz (5240 MHz)**



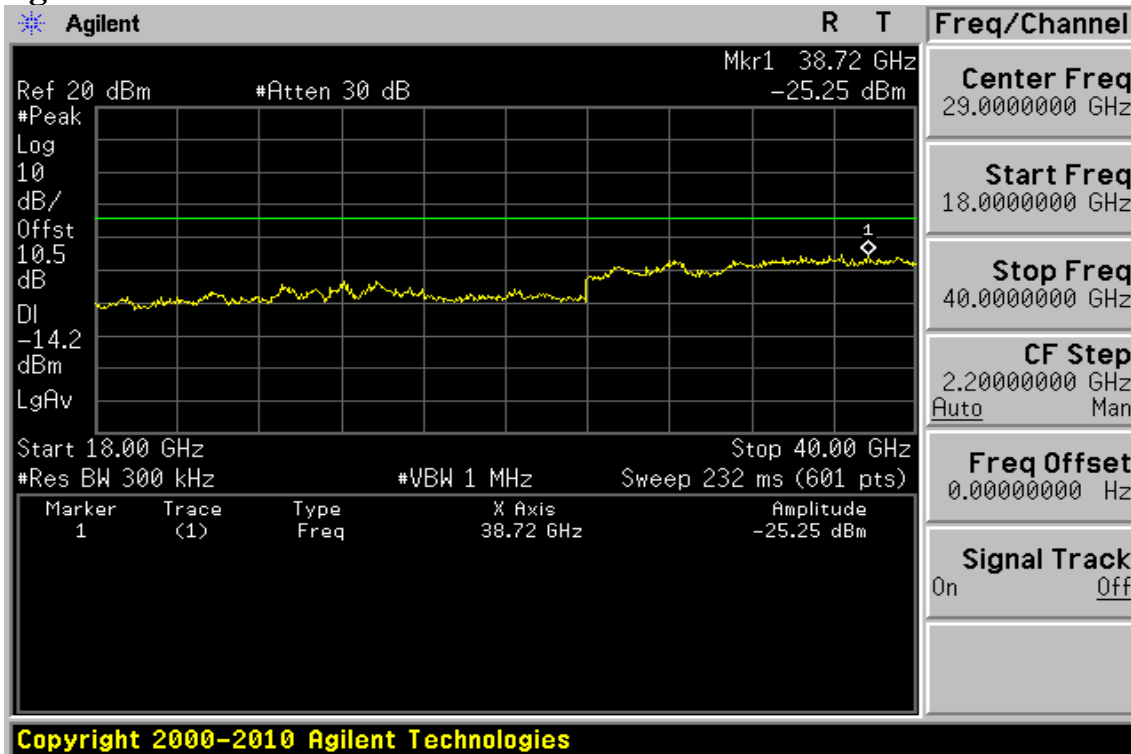
**Ch High 6GHz – 18GHz**



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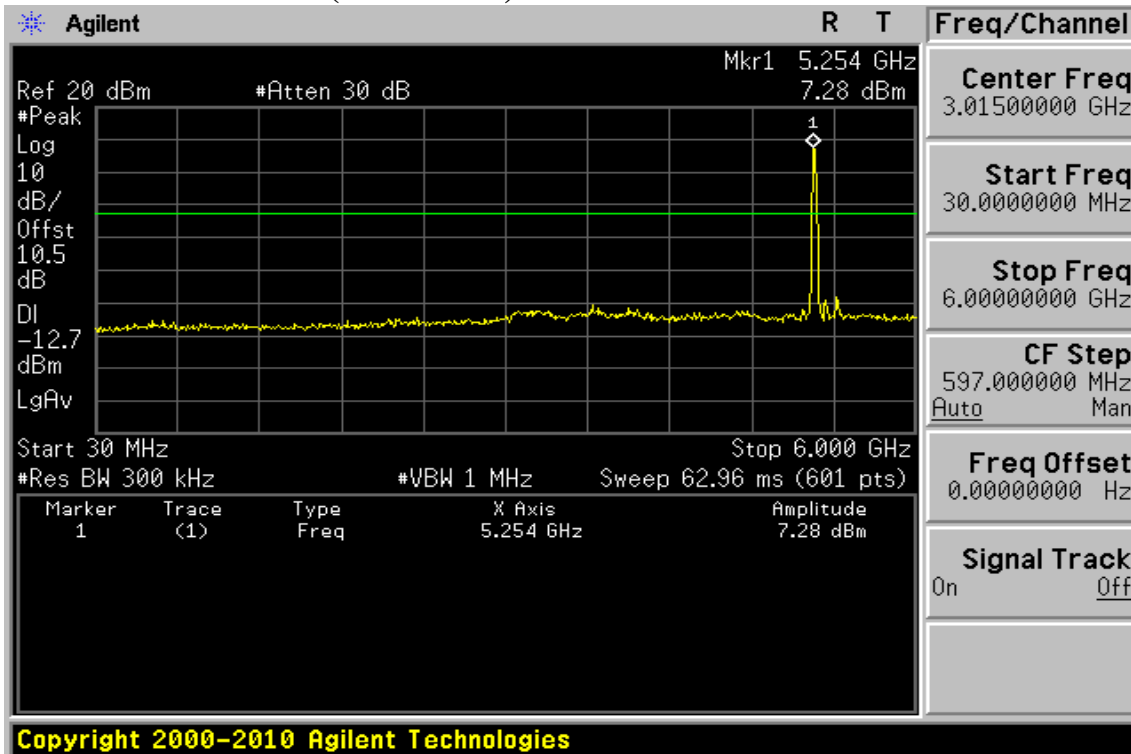
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**Ch High 18GHz – 40GHz**



**UNII HT20, 5250~5350 MHz**

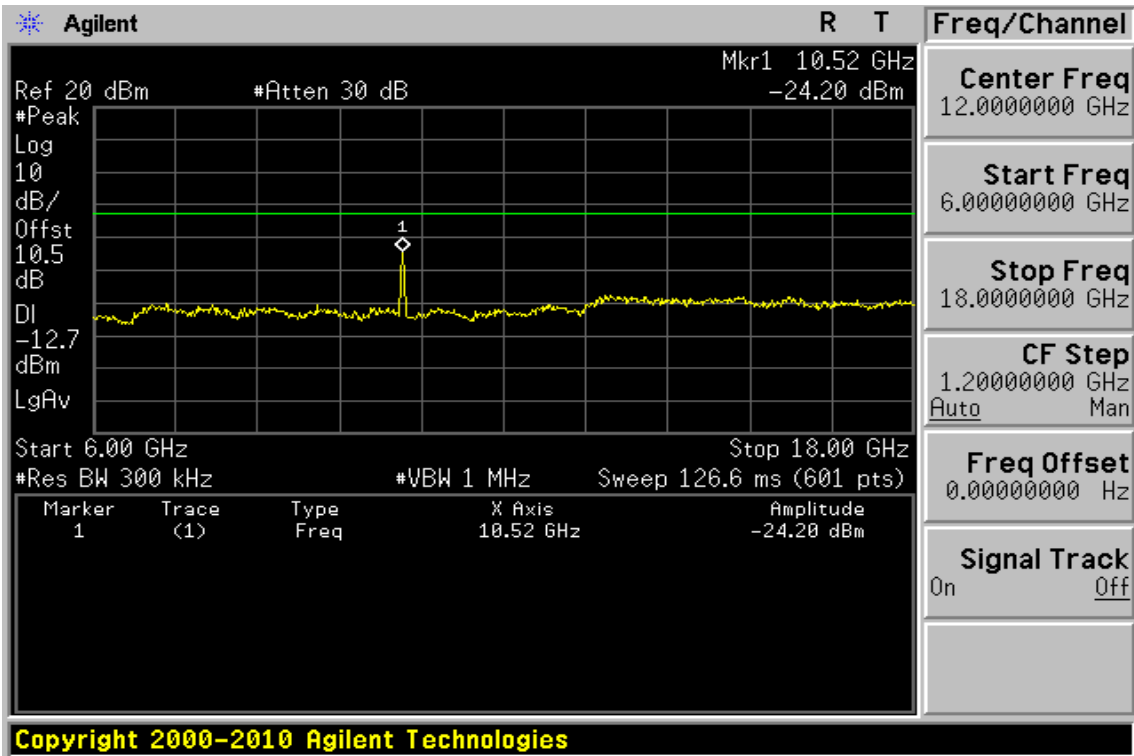
**Ch Low 30MHz – 6GHz (5260 MHz)**



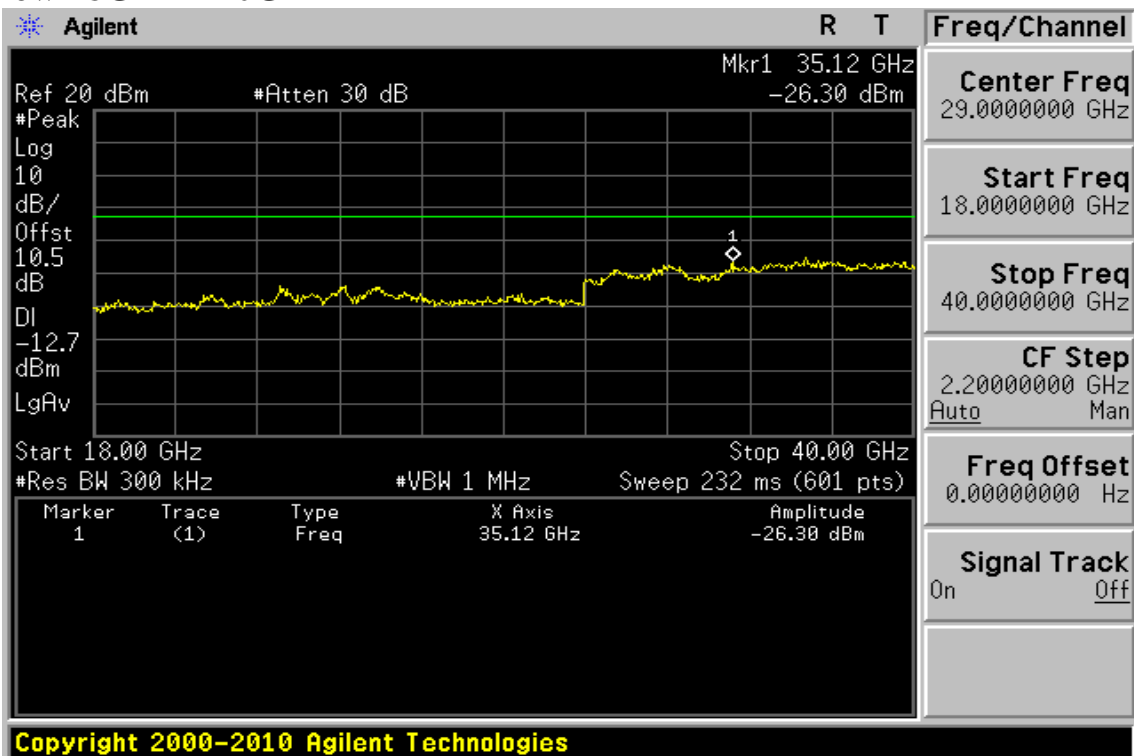
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Ch Low 6GHz – 18GHz



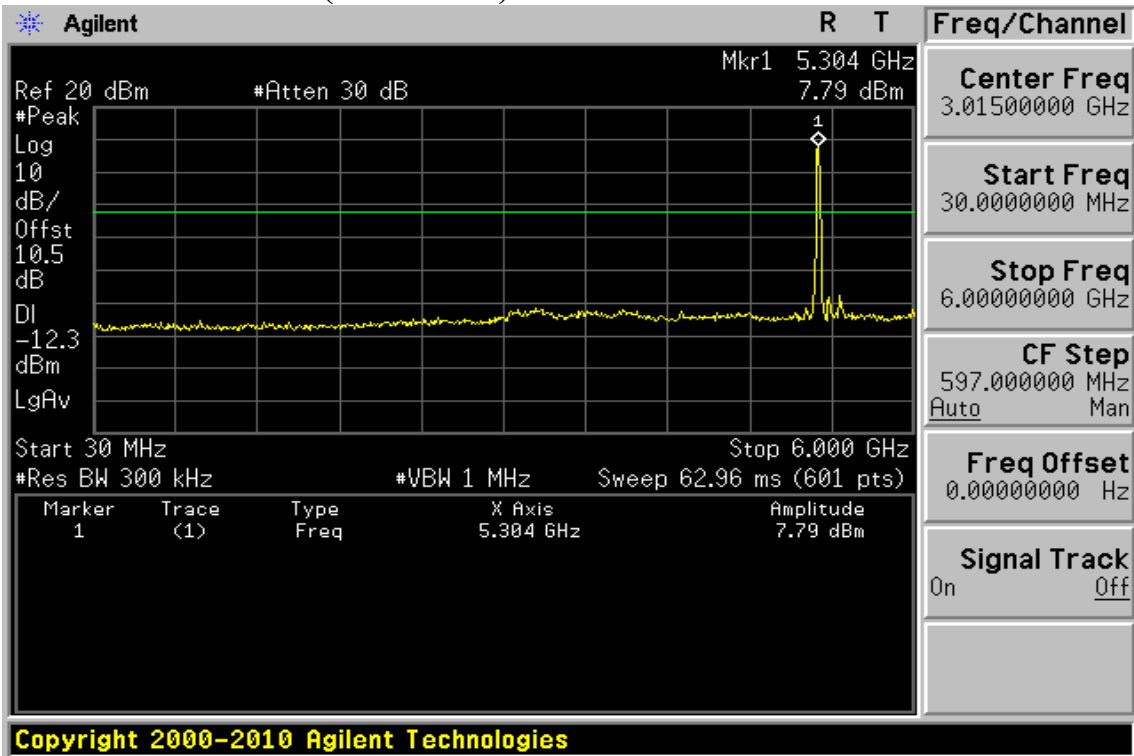
Ch Low 18GHz – 40GHz



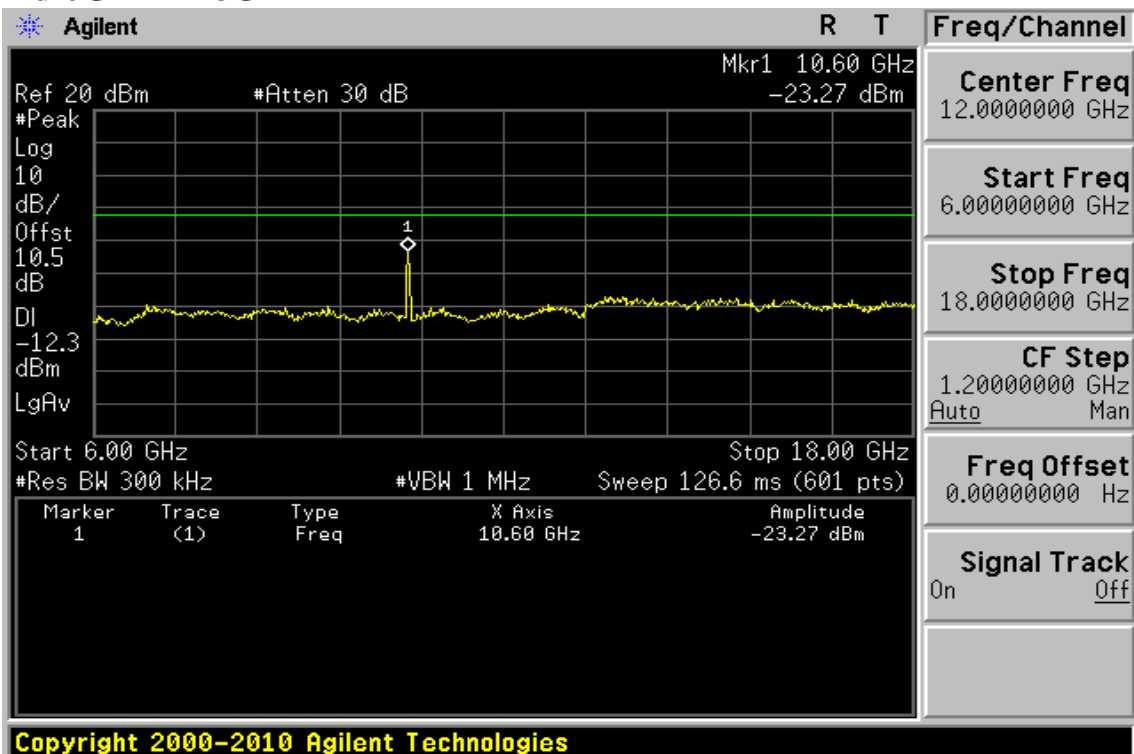
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**Ch Mid 30MHz – 6GHz (5300 MHz)**



**Ch Mid 6GHz – 18GHz**

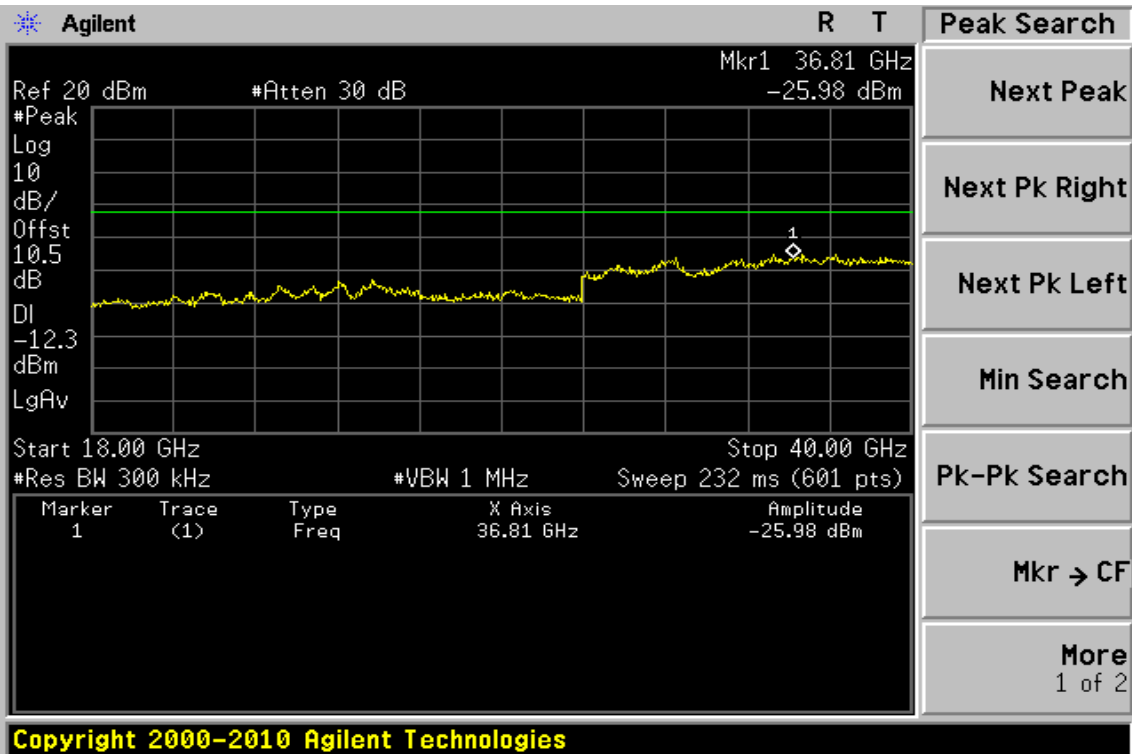


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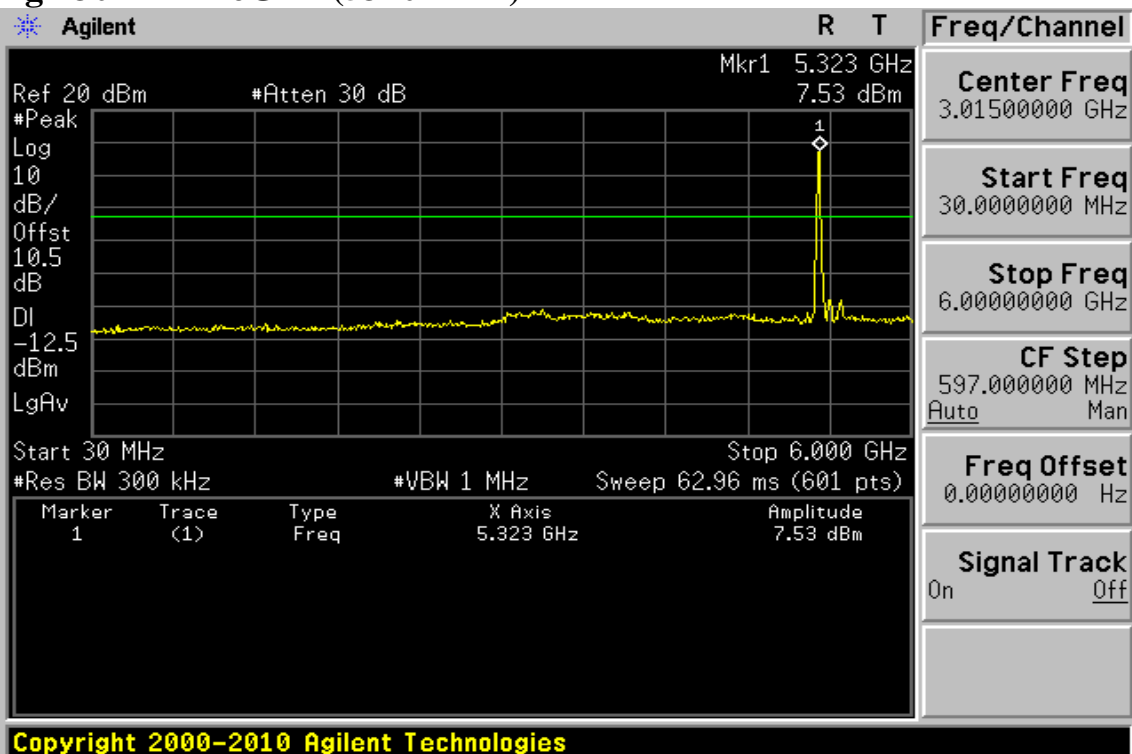
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Ch Mid 18GHz – 40GHz



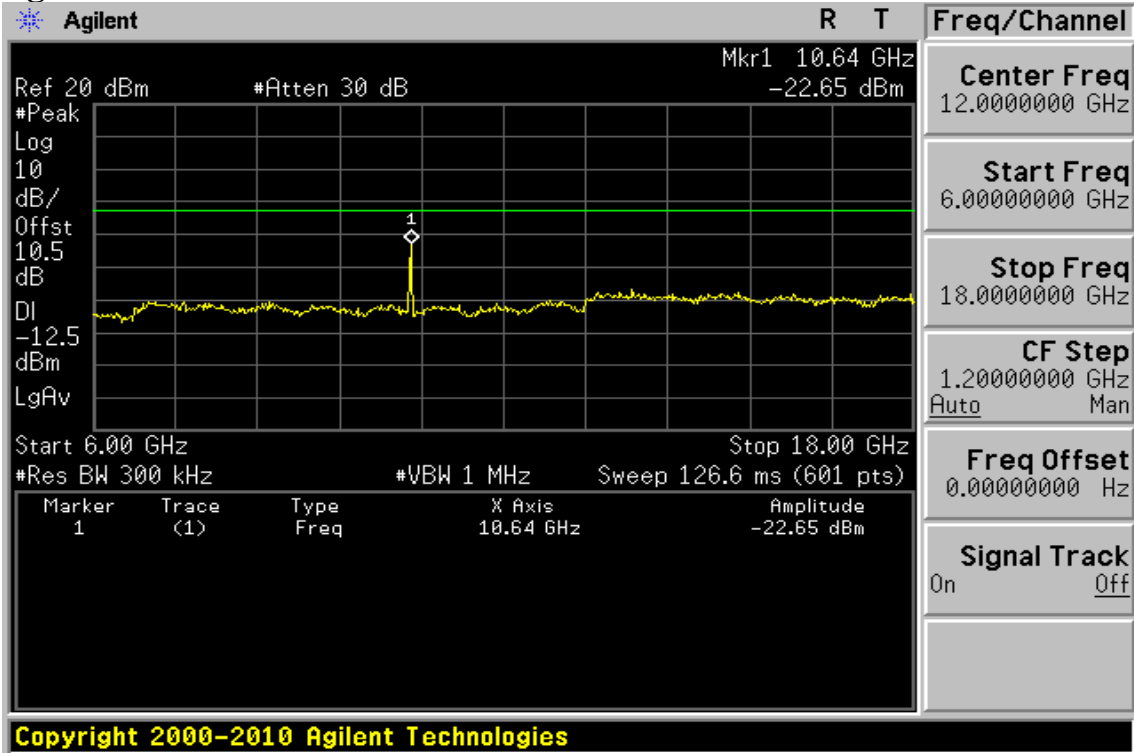
Ch High 30MHz – 6GHz (5320 MHz)



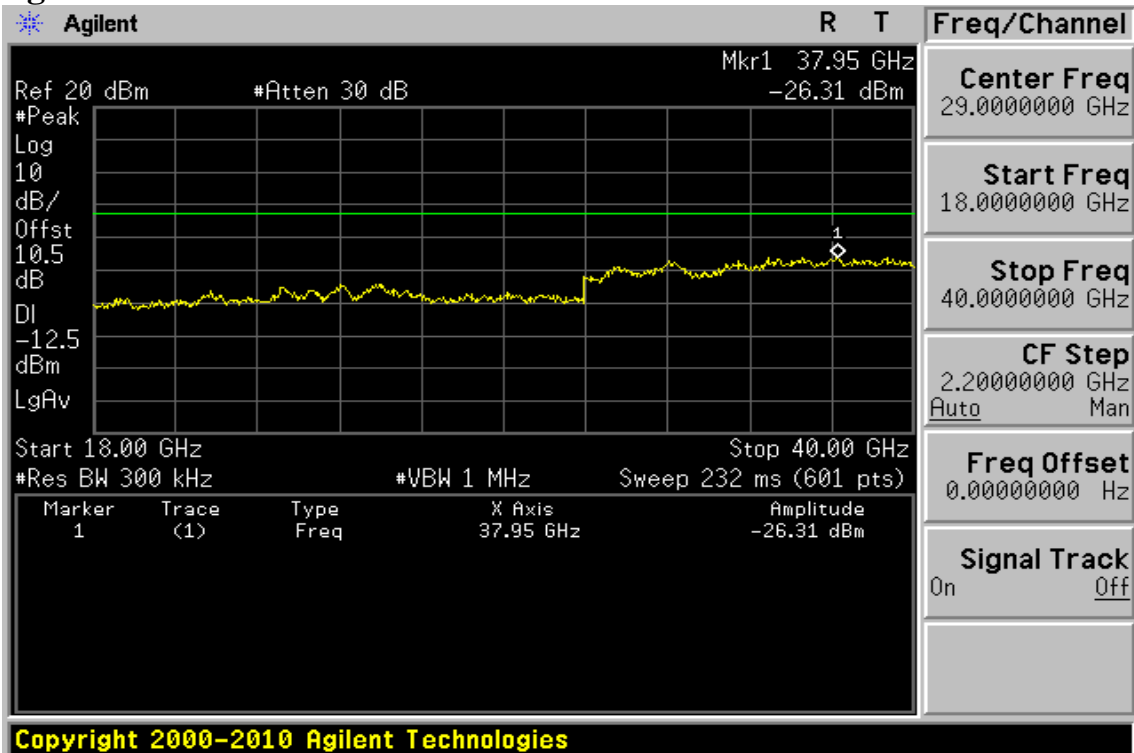
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### Ch High 6GHz – 18GHz



### Ch High 18GHz – 40GHz



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## 11. UNDESIRABLE EMISSION - RADICTED MEASUREMENT

### 11.1 Standard Applicable

#### According to §15.407(b),

(b) Undesirable Emission Limits: Except as shown in Paragraph (b)(6) of this section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
- (3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.
- (5) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.
- (7) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

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**§15.205- RESTRICTED BANDS OF OPERATIONS**

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

**§15.209- RADIATED EMISSION LIMITS: GENERAL REQUIREMENTS**

FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

**11.2 EUT Setup**

1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-1992.
2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 120Vac/60Hz power source.

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### 11.3 Measurement Procedure

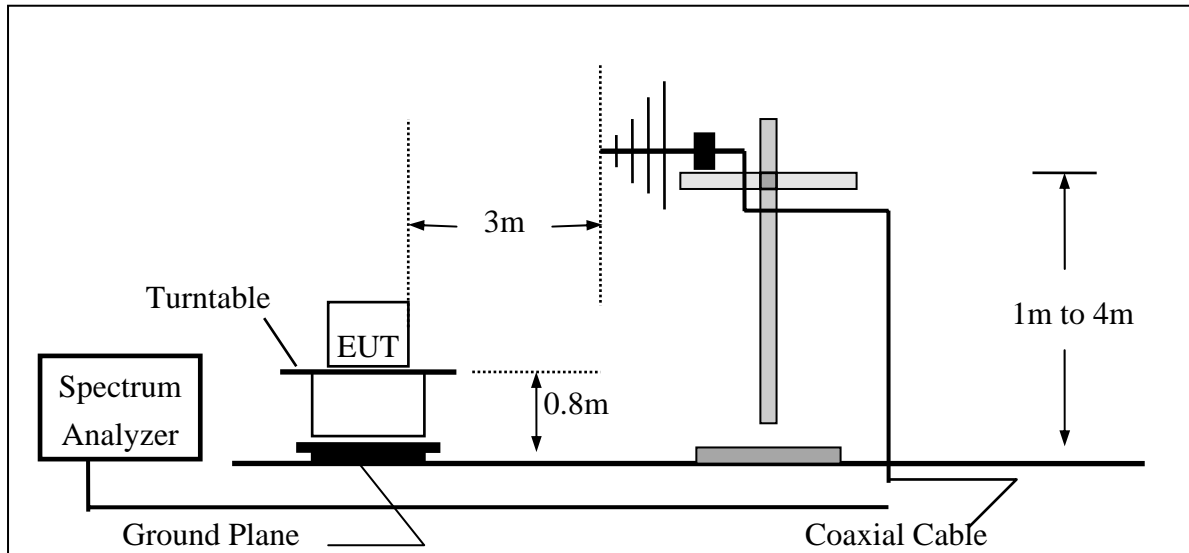
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

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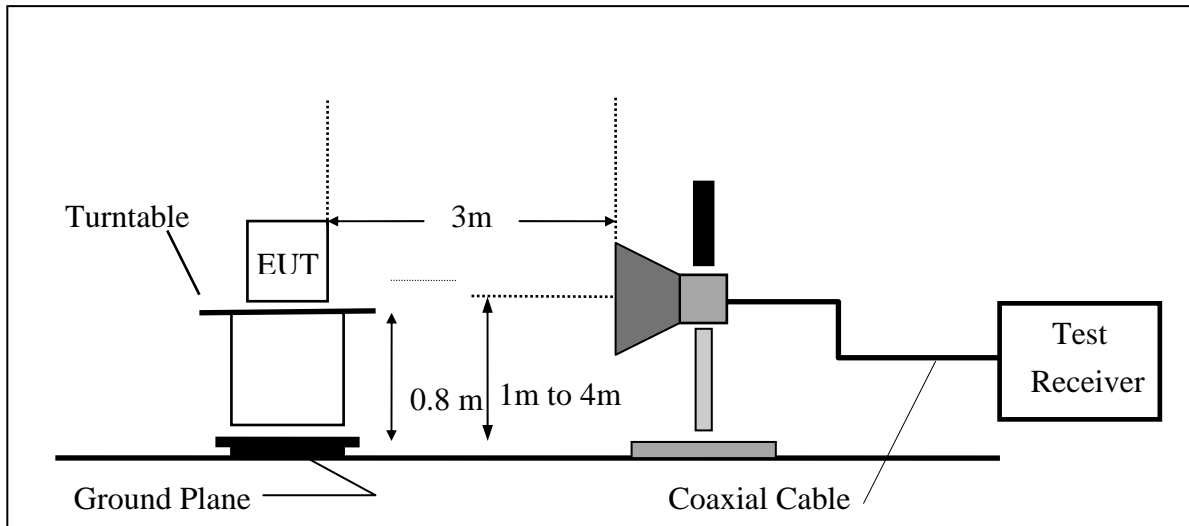
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### 11.4 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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### 11.5 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	03/30/2011	03/29/2012
Bilog Antenna	SCHWAZBECK	VULB9160	3136	11/19/2010	11/18/2011
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	01/22/2010	01/21/2012
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2010	11/27/2011
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2011	01/04/2012
Radio Communication Analyzer	R & S	CMU200	102189	08/12/2010	08/11/2012
DC Block	Agilent	BLK-18	155452	01/05/2011	01/04/2012
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2011	01/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2011	01/04/2012
3m Site	SGS	966 chamber	N/A	07/15/2011	07/14/2012

### 11.6 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

### 11.7 Measurement Result

Refer to attach tabular data sheets.

#### NOTE:

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 100kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

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**Radiated Spurious Emission Measurement Result UNII, 5150~5250 MHz**

Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
78.50	S	Peak	47.30	-17.71	29.59	40.00	-10.41
165.80	S	Peak	53.59	-12.14	41.45	43.50	-2.05
254.07	S	Peak	46.54	-13.27	33.27	46.00	-12.73
350.10	S	Peak	37.07	-11.04	26.03	46.00	-19.97
546.04	S	Peak	41.08	-8.00	33.08	46.00	-12.92
717.73	S	Peak	41.13	-4.78	36.35	46.00	-9.65
1591.50	S	Peak	50.58	0.89	51.47	74.00	-22.53
10360.00	H	Peak	34.08	17.85	51.93	74.00	-22.07
15540.00	---						
20720.00	---						
25900.00	---						
31080.00	---						
36260.00	---						
41440.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	42.74	-17.11	25.63	40.00	-14.37
165.80	S	Peak	41.41	-12.14	29.27	43.50	-14.23
253.10	S	Peak	48.55	-13.28	35.27	46.00	-10.73
354.95	S	Peak	39.86	-11.01	28.85	46.00	-17.15
446.13	S	Peak	35.78	-9.44	26.34	46.00	-19.66
635.28	S	Peak	43.06	-6.09	36.97	46.00	-9.03
1598.00	S	Peak	48.94	1.53	50.47	74.00	-23.53
10360.00	---						
15540.00	---						
20720.00	---						
25900.00	---						
31080.00	---						
36260.00	---						
41440.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5220	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
33.88	S	Peak	49.87	-13.85	36.02	40.00	-3.98
169.68	S	Peak	51.88	-12.45	39.43	43.50	-4.07
251.16	S	Peak	47.70	-13.30	34.40	46.00	-11.60
442.25	S	Peak	41.56	-9.52	32.04	46.00	-13.96
551.86	S	Peak	40.74	-7.92	32.82	46.00	-13.18
643.04	S	Peak	37.11	-5.94	31.17	46.00	-14.83
1598.00	S	Peak	51.78	0.96	52.74	74.00	-21.26
10440.00	H	Average	27.15	18.28	45.43	54.00	-8.57
10440.00	H	Peak	36.19	18.28	54.47	74.00	-19.53
15660.00	---						
20880.00	---						
26100.00	---						
31320.00	---						
36540.00	---						
41760.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5220	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	45.33	-17.11	28.22	40.00	-11.78
166.77	S	Peak	45.63	-12.20	33.43	43.50	-10.07
255.04	S	Peak	56.37	-13.25	43.12	46.00	-2.88
354.95	S	Peak	47.31	-11.01	36.30	46.00	-9.70
444.19	S	Peak	44.09	-9.50	34.59	46.00	-11.41
548.95	S	Peak	36.88	-7.98	28.90	46.00	-17.10
1598.00	S	Peak	51.36	1.53	52.89	74.00	-21.11
10440.00	H	Average	25.44	18.36	43.80	54.00	-10.20
10440.00	H	Peak	35.92	18.36	54.28	74.00	-19.72
15660.00	---						
20880.00	---						
26100.00	---						
31320.00	---						
36540.00	---						
41760.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5240	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
34.85	S	Peak	50.61	-13.86	36.75	40.00	-3.25
166.77	S	Peak	52.35	-12.20	40.15	43.50	-3.35
251.16	S	Peak	45.55	-13.30	32.25	46.00	-13.75
446.13	S	Peak	41.65	-9.44	32.21	46.00	-13.79
544.10	S	Peak	42.79	-8.03	34.76	46.00	-11.24
633.34	S	Peak	40.28	-6.10	34.18	46.00	-11.82
1598.00	S	Peak	50.11	0.96	51.07	74.00	-22.93
10480.00	H	Average	26.99	17.90	44.89	54.00	-9.11
10480.00	H	Peak	35.33	17.90	53.23	74.00	-20.77
15720.00	---						
20960.00	---						
26200.00	---						
31440.00	---						
36680.00	---						
41920.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5240	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
82.38	S	Peak	46.47	-17.09	29.38	40.00	-10.62
166.77	S	Peak	48.25	-12.20	36.05	43.50	-7.45
255.04	S	Peak	46.97	-13.25	33.72	46.00	-12.28
301.60	S	Peak	40.15	-11.86	28.29	46.00	-17.71
354.95	S	Peak	35.01	-11.01	24.00	46.00	-22.00
442.25	S	Peak	37.59	-9.52	28.07	46.00	-17.93
1598.00	S	Peak	45.13	1.53	46.66	74.00	-27.34
10480.00	H	Average	26.74	17.68	44.42	54.00	-9.58
10480.00	H	Peak	35.43	17.68	53.11	74.00	-20.89
15720.00	---						
20960.00	---						
26200.00	---						
31440.00	---						
36680.00	---						
41920.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
33.88	S	Peak	49.62	-13.85	35.77	40.00	-4.23
166.77	S	Peak	51.47	-12.20	39.27	43.50	-4.23
255.04	S	Peak	46.48	-13.25	33.23	46.00	-12.77
438.37	S	Peak	41.73	-9.61	32.12	46.00	-13.88
547.01	S	Peak	43.64	-7.98	35.66	46.00	-10.34
634.31	S	Peak	41.79	-6.09	35.70	46.00	-10.30
1591.50	S	Peak	49.57	0.89	50.46	74.00	-23.54
10360.00	---						
15540.00	---						
20720.00	---						
25900.00	---						
31080.00	---						
36260.00	---						
41440.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	47.08	-17.11	29.97	40.00	-10.03
166.77	S	Peak	47.53	-12.20	35.33	43.50	-8.17
254.07	S	Peak	45.02	-13.27	31.75	46.00	-14.25
358.83	S	Peak	33.80	-10.95	22.85	46.00	-23.15
446.13	S	Peak	38.78	-9.44	29.34	46.00	-16.66
727.43	S	Peak	30.45	-4.52	25.93	46.00	-20.07
1598.00	S	Peak	48.00	1.53	49.53	74.00	-24.47
10360.00	---						
15540.00	---						
20720.00	---						
25900.00	---						
31080.00	---						
36260.00	---						
41440.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5220	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
34.85	S	Peak	51.10	-13.86	37.24	40.00	-2.76
169.68	S	Peak	52.88	-12.45	40.43	43.50	-3.07
249.22	S	Peak	45.60	-13.35	32.25	46.00	-13.75
448.07	S	Peak	39.45	-9.42	30.03	46.00	-15.97
549.92	S	Peak	41.97	-7.93	34.04	46.00	-11.96
692.51	S	Peak	32.69	-5.26	27.43	46.00	-18.57
1598.00	S	Peak	51.28	0.96	52.24	74.00	-21.76
10440.00	H	Average	25.48	18.28	43.76	54.00	-10.24
10440.00	H	Peak	36.71	18.28	54.99	74.00	-19.01
15660.00	---						
20880.00	---						
26100.00	---						
31320.00	---						
36540.00	---						
41760.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5220	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	46.55	-17.11	29.44	40.00	-10.56
168.71	S	Peak	47.22	-12.43	34.79	43.50	-8.71
255.04	S	Peak	57.16	-13.25	43.91	46.00	-2.09
352.04	S	Peak	44.23	-11.04	33.19	46.00	-12.81
447.10	S	Peak	35.96	-9.45	26.51	46.00	-19.49
712.88	S	Peak	32.04	-4.89	27.15	46.00	-18.85
1598.00	S	Peak	47.20	1.53	48.73	74.00	-25.27
10440.00	H	Average	25.38	18.45	43.83	54.00	-10.17
10440.00	H	Peak	36.32	18.45	54.77	74.00	-19.23
15660.00	---						
20880.00	---						
26100.00	---						
31320.00	---						
36540.00	---						
41760.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5240	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
33.88	S	Peak	50.24	-13.85	36.39	40.00	-3.61
169.68	S	Peak	50.60	-12.45	38.15	43.50	-5.35
251.16	S	Peak	47.01	-13.30	33.71	46.00	-12.29
353.01	S	Peak	42.18	-10.99	31.19	46.00	-14.81
431.58	S	Peak	42.76	-9.73	33.03	46.00	-12.97
550.89	S	Peak	44.96	-7.90	37.06	46.00	-8.94
1598.00	S	Peak	49.72	0.96	50.68	74.00	-23.32
10480.00	H	Average	26.10	17.59	43.69	54.00	-10.31
10480.00	H	Peak	36.74	17.59	54.33	74.00	-19.67
15720.00	---						
20960.00	---						
26200.00	---						
31440.00	---						
36680.00	---						
41920.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5240	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	47.33	-17.11	30.22	40.00	-9.78
169.68	S	Peak	47.41	-12.45	34.96	43.50	-8.54
254.07	S	Peak	54.23	-13.27	40.96	46.00	-5.04
353.01	S	Peak	39.73	-10.99	28.74	46.00	-17.26
450.01	S	Peak	35.93	-9.35	26.58	46.00	-19.42
576.11	S	Peak	31.16	-7.50	23.66	46.00	-22.34
1598.00	S	Peak	50.25	1.53	51.78	74.00	-22.22
10480.00	H	Average	24.12	17.99	42.11	54.00	-11.89
10480.00	H	Peak	35.15	17.99	53.14	74.00	-20.86
15720.00	---						
20960.00	---						
26200.00	---						
31440.00	---						
36680.00	---						
41920.00	---						

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**Radiated Spurious Emission Measurement Result UNII, 5250MHz-5350MHz**

Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5260	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBµV/m) = SPA. Reading level(dBµV) + Factor(dB)

Factor(dB) = Antenna Factor(dBµV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Safe Margin dB
33.88	S	Peak	50.55	-13.85	36.70	40.00	-3.30
166.77	S	Peak	49.53	-12.20	37.33	43.50	-6.17
255.04	S	Peak	45.96	-13.25	32.71	46.00	-13.29
438.37	S	Peak	43.53	-9.61	33.92	46.00	-12.08
551.86	S	Peak	45.39	-7.92	37.47	46.00	-8.53
718.70	S	Peak	35.21	-4.79	30.42	46.00	-15.58
1598.00	S	Peak	48.57	0.96	49.53	74.00	-24.47
10520.00	H	Average	29.14	18.23	47.37	54.00	-6.63
10520.00	H	Peak	37.04	18.23	55.27	74.00	-18.73
15780.00	---						
21040.00	---						
26300.00	---						
31560.00	---						
36820.00	---						
42080.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5260	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	46.60	-17.11	29.49	40.00	-10.51
168.71	S	Peak	48.89	-12.43	36.46	43.50	-7.04
254.07	S	Peak	54.20	-13.27	40.93	46.00	-5.07
351.07	S	Peak	38.85	-11.06	27.79	46.00	-18.21
450.01	S	Peak	36.33	-9.35	26.98	46.00	-19.02
723.55	S	Peak	29.96	-4.59	25.37	46.00	-20.63
1598.00	S	Peak	48.72	1.53	50.25	74.00	-23.75
10520.00	H	Average	29.26	18.31	47.57	54.00	-6.43
10520.00	H	Peak	37.64	18.31	55.95	74.00	-18.05
15780.00	---						
21040.00	---						
26300.00	---						
31560.00	---						
36820.00	---						
42080.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5300	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
33.88	S	Peak	50.26	-13.85	36.41	40.00	-3.59
166.77	S	Peak	53.86	-12.20	41.66	43.50	-1.84
255.04	S	Peak	49.62	-13.25	36.37	46.00	-9.63
450.98	S	Peak	34.38	-9.37	25.01	46.00	-20.99
548.95	S	Peak	42.87	-7.98	34.89	46.00	-11.11
719.67	S	Peak	37.21	-4.67	32.54	46.00	-13.46
1598.00	S	Peak	50.00	0.96	50.96	74.00	-23.04
10600.00	H	Average	26.57	17.94	44.51	54.00	-9.49
10600.00	H	Peak	36.45	17.94	54.39	74.00	-19.61
15900.00	---						
21200.00	---						
26500.00	---						
31800.00	---						
37100.00	---						
42400.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5300	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
166.77	S	Peak	44.04	-12.20	31.84	43.50	-11.66
254.07	S	Peak	42.79	-13.27	29.52	46.00	-16.48
300.63	S	Peak	40.16	-11.85	28.31	46.00	-17.69
353.98	S	Peak	34.83	-11.00	23.83	46.00	-22.17
541.19	S	Peak	36.61	-8.08	28.53	46.00	-17.47
643.04	S	Peak	41.75	-5.94	35.81	46.00	-10.19
1598.00	S	Peak	46.50	1.53	48.03	74.00	-25.97
10600.00	H	Average	26.48	17.96	44.44	54.00	-9.56
10600.00	H	Peak	37.33	17.96	55.29	74.00	-18.71
15900.00	---						
21200.00	---						
26500.00	---						
31800.00	---						
37100.00	---						
42400.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
34.85	S	Peak	50.72	-13.86	36.86	40.00	-3.14
166.77	S	Peak	53.15	-12.20	40.95	43.50	-2.55
251.16	S	Peak	47.70	-13.30	34.40	46.00	-11.60
354.95	S	Peak	38.64	-11.01	27.63	46.00	-18.37
550.89	S	Peak	41.65	-7.90	33.75	46.00	-12.25
681.84	S	Peak	39.89	-5.42	34.47	46.00	-11.53
1591.50	S	Peak	50.87	0.89	51.76	74.00	-22.24
10640.00	H	Average	25.49	18.38	43.87	54.00	-10.13
10640.00	H	Peak	35.06	18.38	53.44	74.00	-20.56
15960.00	---						
21280.00	---						
26600.00	---						
31920.00	---						
37240.00	---						
42560.00	---						

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Operation Band	:A	Test Date	:2011-11-01
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	39.53	-17.11	22.42	40.00	-17.58
169.68	S	Peak	40.81	-12.45	28.36	43.50	-15.14
250.19	S	Peak	47.35	-13.35	34.00	46.00	-12.00
355.92	S	Peak	39.82	-10.99	28.83	46.00	-17.17
543.13	S	Peak	35.05	-8.05	27.00	46.00	-19.00
636.25	S	Peak	43.10	-6.07	37.03	46.00	-8.97
1591.50	S	Peak	46.69	1.45	48.14	74.00	-25.86
10640.00	H	Average	30.22	18.37	48.59	54.00	-5.41
10640.00	H	Peak	37.64	18.37	56.01	74.00	-17.99
15960.00	---						
21280.00	---						
26600.00	---						
31920.00	---						
37240.00	---						
42560.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5260	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
34.85	S	Peak	50.63	-13.86	36.77	40.00	-3.23
165.80	S	Peak	53.86	-12.14	41.72	43.50	-1.78
255.04	S	Peak	52.07	-13.25	38.82	46.00	-7.18
353.01	S	Peak	39.94	-10.99	28.95	46.00	-17.05
544.10	S	Peak	38.82	-8.03	30.79	46.00	-15.21
646.92	S	Peak	38.16	-5.94	32.22	46.00	-13.78
1591.50	S	Peak	50.86	0.89	51.75	74.00	-22.25
10520.00	H	Average	27.15	18.23	45.38	54.00	-8.62
10520.00	H	Peak	38.34	18.23	56.57	74.00	-17.43
15780.00	---						
21040.00	---						
26300.00	---						
31560.00	---						
36820.00	---						
42080.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5260	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
169.68	S	Peak	46.73	-12.45	34.28	43.50	-9.22
254.07	S	Peak	52.92	-13.27	39.65	46.00	-6.35
351.07	S	Peak	43.00	-11.06	31.94	46.00	-14.06
443.22	S	Peak	41.68	-9.50	32.18	46.00	-13.82
552.83	S	Peak	37.71	-7.89	29.82	46.00	-16.18
732.28	S	Peak	38.53	-4.46	34.07	46.00	-11.93
1598.00	S	Peak	47.68	1.53	49.21	74.00	-24.79
10520.00	H	Average	27.53	18.31	45.84	54.00	-8.16
10520.00	H	Peak	38.76	18.31	57.07	74.00	-16.93
15780.00	---						
21040.00	---						
26300.00	---						
31560.00	---						
36820.00	---						
42080.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5300	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
33.88	S	Peak	50.21	-13.85	36.36	40.00	-3.64
166.77	S	Peak	50.61	-12.20	38.41	43.50	-5.09
253.10	S	Peak	48.26	-13.28	34.98	46.00	-11.02
446.13	S	Peak	42.51	-9.44	33.07	46.00	-12.93
546.04	S	Peak	45.21	-8.00	37.21	46.00	-8.79
778.84	S	Peak	33.64	-3.89	29.75	46.00	-16.25
1598.00	S	Peak	49.90	0.96	50.86	74.00	-23.14
10600.00	H	Average	26.10	17.94	44.04	54.00	-9.96
10600.00	H	Peak	36.11	17.94	54.05	74.00	-19.95
15900.00	---						
21200.00	---						
26500.00	---						
31800.00	---						
37100.00	---						
42400.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5300	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
81.41	S	Peak	47.90	-17.11	30.79	40.00	-9.21
166.77	S	Peak	46.89	-12.20	34.69	43.50	-8.81
254.07	S	Peak	55.29	-13.27	42.02	46.00	-3.98
354.95	S	Peak	40.46	-11.01	29.45	46.00	-16.55
450.98	S	Peak	38.78	-9.37	29.41	46.00	-16.59
646.92	S	Peak	30.07	-5.94	24.13	46.00	-21.87
1598.00	S	Peak	43.74	1.53	45.27	74.00	-28.73
10600.00	H	Average	26.98	17.96	44.94	54.00	-9.06
10600.00	H	Peak	36.56	17.96	54.52	74.00	-19.48
15900.00	---						
21200.00	---						
26500.00	---						
31800.00	---						
37100.00	---						
42400.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
33.88	S	Peak	50.59	-13.85	36.74	40.00	-3.26
166.77	S	Peak	54.53	-12.20	42.33	43.50	-1.17
253.10	S	Peak	54.16	-13.28	40.88	46.00	-5.12
546.04	S	Peak	41.24	-8.00	33.24	46.00	-12.76
645.95	S	Peak	39.15	-5.97	33.18	46.00	-12.82
724.52	S	Peak	37.33	-4.58	32.75	46.00	-13.25
1591.50	S	Peak	49.32	0.89	50.21	74.00	-23.79
10640.00	H	Average	24.30	18.38	42.68	54.00	-11.32
10640.00	H	Peak	35.31	18.38	53.69	74.00	-20.31
15960.00	---						
21280.00	---						
26600.00	---						
31920.00	---						
37240.00	---						
42560.00	---						

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Operation Band	:A20	Test Date	:2011-11-01
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

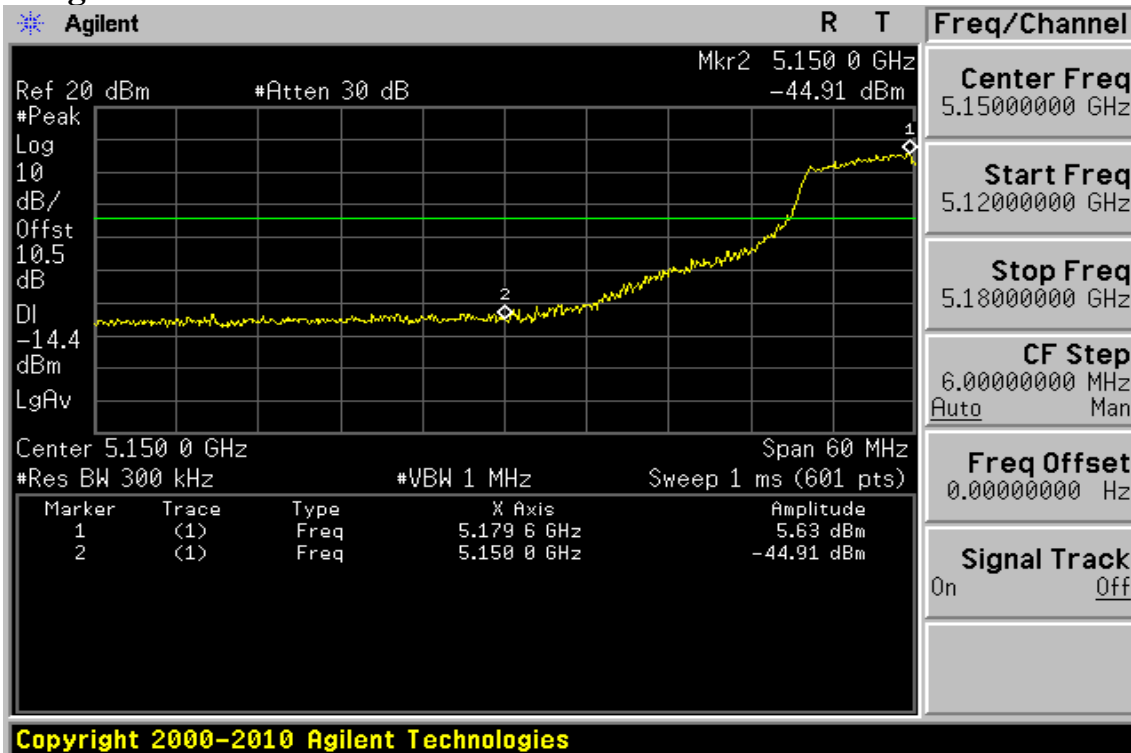
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
169.68	S	Peak	44.90	-12.45	32.45	43.50	-11.05
252.13	S	Peak	47.41	-13.33	34.08	46.00	-11.92
353.98	S	Peak	40.17	-11.00	29.17	46.00	-16.83
443.22	S	Peak	39.69	-9.50	30.19	46.00	-15.81
637.22	S	Peak	37.79	-6.06	31.73	46.00	-14.27
733.25	S	Peak	36.58	-4.42	32.16	46.00	-13.84
1591.50	S	Peak	49.17	1.45	50.62	74.00	-23.38
10640.00	H	Average	26.32	18.37	44.69	54.00	-9.31
10640.00	H	Peak	36.02	18.37	54.39	74.00	-19.61
15960.00	---						
21280.00	---						
26600.00	---						
31920.00	---						
37240.00	---						
42560.00	---						

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**UNII, 5150~5350 MHz**  
**Band Edges Test Data CH-Low**



**Band Edges Test Data CH-High**



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**Radiated Emission: UNII mode**

Operation Band	:A	Test Date	:2011-10-31
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
5150.00	E	Average	30.81	10.24	41.05	54.00	-12.95
5150.00	E	Peak	43.45	10.24	53.69	74.00	-20.31

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Operation Band	:A	Test Date	:2011-10-31
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
5150.00	E	Average	31.37	10.34	41.71	54.00	-12.29
5150.00	E	Peak	42.60	10.34	52.94	74.00	-21.06

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Operation Band	:A	Test Date	:2011-10-31
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
5350.00	E	Average	31.05	10.51	41.56	54.00	-12.44
5350.00	E	Peak	42.06	10.51	52.57	74.00	-21.43

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Operation Band	:A	Test Date	:2011-10-31
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

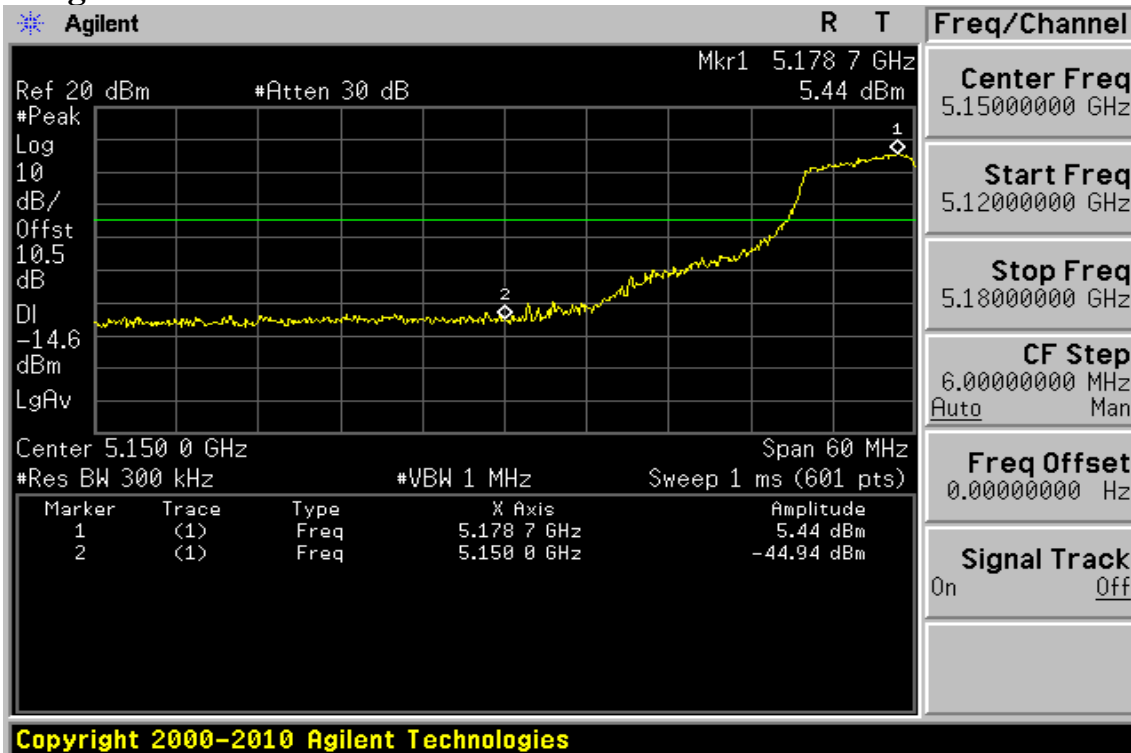
“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
5350.00	E	Average	31.61	10.81	42.42	54.00	-11.58
5350.00	E	Peak	44.36	10.81	55.17	74.00	-18.83

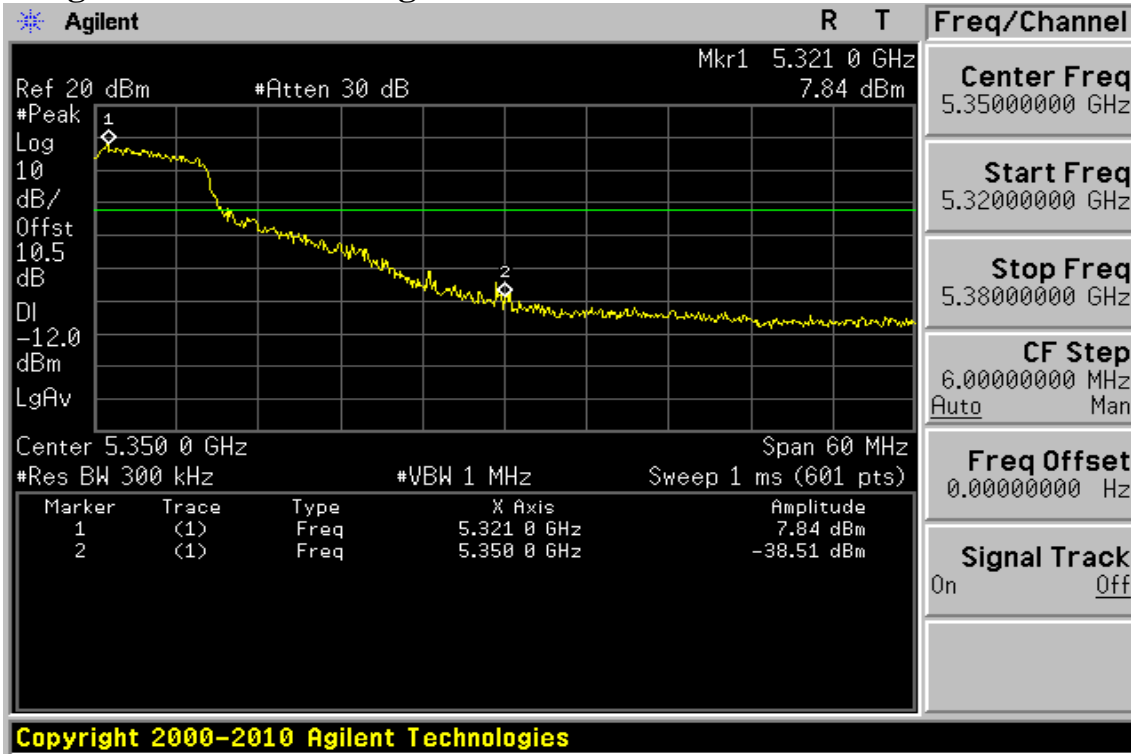
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**UNII HT20, 5150~5350 MHz  
Band Edges Test Data CH-Low**



**Band Edges Test Data CH-High**



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**Radiated Emission: UNII HT20 Mode**

Operation Band	:A20	Test Date	:2011-10-31
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5150.00	E	Average	30.73	10.24	40.97	54.00	-13.03
5150.00	E	Peak	41.08	10.24	51.32	74.00	-22.68

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Operation Band	:A20	Test Date	:2011-10-31
Fundamental Frequency	:5180	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX LOW BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5150.00	E	Average	31.13	10.34	41.47	54.00	-12.53
5150.00	E	Peak	43.84	10.34	54.18	74.00	-19.82

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Operation Band	:A20	Test Date	:2011-10-31
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Average	31.04	10.51	41.55	54.00	-12.45
5350.00	E	Peak	41.58	10.51	52.09	74.00	-21.91

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Operation Band	:A20	Test Date	:2011-10-31
Fundamental Frequency	:5320	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX HIGH BANDEDGE	Engineer	:Marcus
EUT Pol.	:H	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Average	31.56	10.81	42.37	54.00	-11.63
5350.00	E	Peak	42.16	10.81	52.97	74.00	-21.03

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## 12. TRANSMISSION IN THE ABSENCE OF DATA

### 12.1 Standard Applicable

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

### 12.2 Result:

No non-compliance noted:

Refer to the theory of operation.

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## 13. FREQUENCY STABILITY

### 13.1 Standard Applicable

According to §15.407 (g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

### 13.2 Result:

No non-compliance noted:

$\pm 20$ ppm ppm was defined in product specification.

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## 14. ANTENNA REQUIREMENT

### 14.1 Standard Applicable

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

### 14.2 Antenna Connected Construction

The directional gains of antenna used for transmitting is -0.8dBi for 2.4GHz, -0.05dBi for 5GHz and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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## 15. TPC AND DFS MEASUREMENT

### 15.1 TPC: Standard Applicable

According to §15.407(h)(1), 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.

**15.1.1. Result:** N/A, The output power is less than 500mW.

### 15.2 DFS: Standard Applicable

According to §15.407(h)(2), Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection.

#### 15.2.1. Limit

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

Requirement	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

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

Requirement	Operational Mode		
	Master	Client(without radar detection)	Client(with radar detection)
<b>Cannel Closing Transmission time</b>	Yes	Yes	Yes
<b>Channel Move time</b>	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 assuming a 0 dBi receive antenna  
 Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

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**Table 4: DFS Response requirement values**

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
<i>U-NII Detection Bandwidth</i>	Minimum 80% of the 99% power bandwidth See Note 3.

Note 1: 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.

Note 2: 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 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.

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**Table 5: Radar Test Waveforms**

**Short Pulse Radar**

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
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 (Radar Types 1-4)				80%	120

**Long Pulse Radar**

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

**Frequency Hopping Radar**

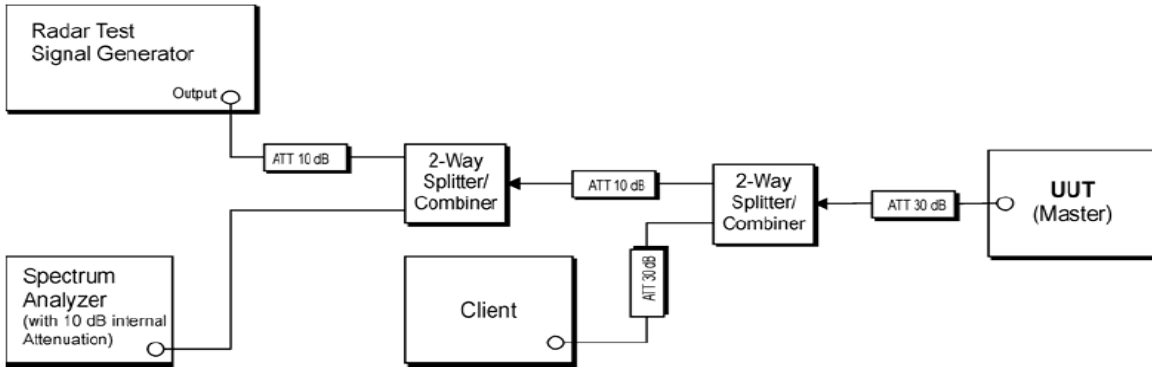
Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	.333	300	70%	30

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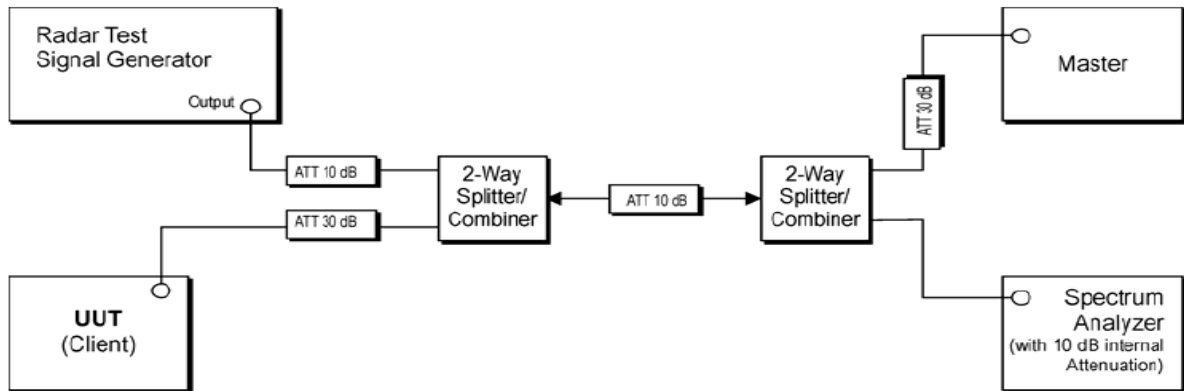
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### 15.2.2. Test Setup

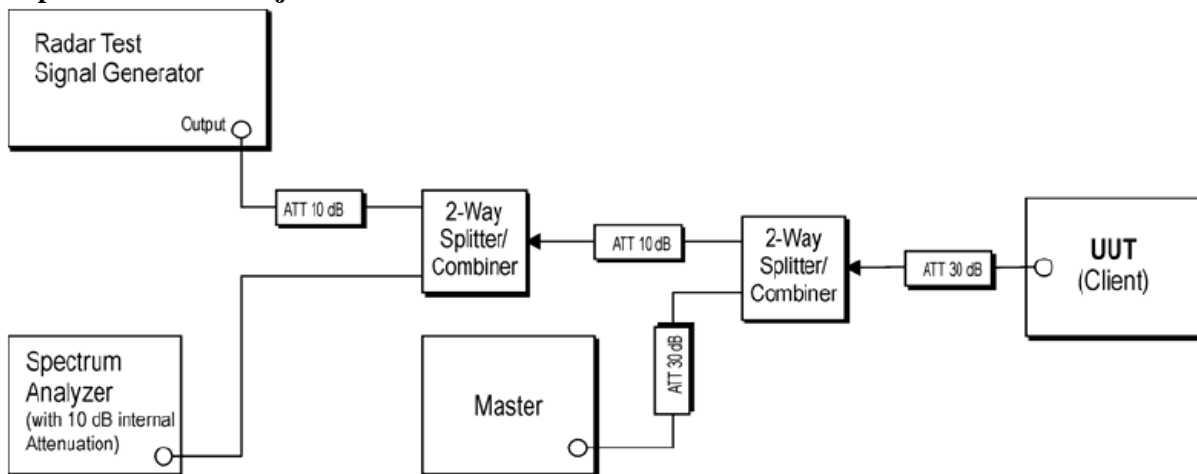
#### Setup for Master with injection at the Master



#### Setup for Client with injection at the Master



#### Setup for Client with injection at the Client



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**15.2.3. Test Equipment Used:**

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2010	04/18/2012
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/25/2011	01/24/2012
DC Block	Agilent	BLK-18	155452	07/05/2011	07/04/2012
Attenuator	Mini-Circuit	BW-S6W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S10W5	001	01/05/2011	01/04/2012
Attenuator	Mini-Circuit	BW-S20W5	001	01/05/2011	01/04/2012
Splitter	Mini-Circuit	ZFSC-2-10G	001	07/05/2011	07/04/2012
Splitter	Mini-Circuit	ZFSC-2-10G	002	07/05/2011	07/04/2012
Splitter	Agilent	POWER DIVIDER	51818	07/05/2011	07/04/2012
Splitter	Agilent	POWER DIVIDER	51820	07/05/2011	07/04/2012
Access point	CISCO	AIR-AP1252 G-A-K9	FTX122091Y2 FCC ID: LDK102062	N/A	N/A
ESG VECTOR SIGNAL GENERATOR	Agilent	E4438C	MY45093613	07/08/2011	07/07/2012

**15.2.4. Description of EUT :**

EUT operates over the 5250-5350MHz and 5470-5725MHz ranges and EUT is a slave device (client equipment) w/o radar detection and DFS capability. EUT has a gain of 3dBi in the 5GHz Band.

The EUT utilizes the 802.11a architecture, with a nominal channel bandwidth of 20MHz WLAN traffic is generated by streaming the mpeg file from the master to slave in full monitor video mode using the media player.

The rated output power of the master unit is >23dBm(EIRP).therefore the required interference threshold level is -64dBm.after correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is -64+6=-58, and the master device as employed for the applicable DFS test is CISCO router whose FCC ID= LDK102061

**15.2.5. Test results**

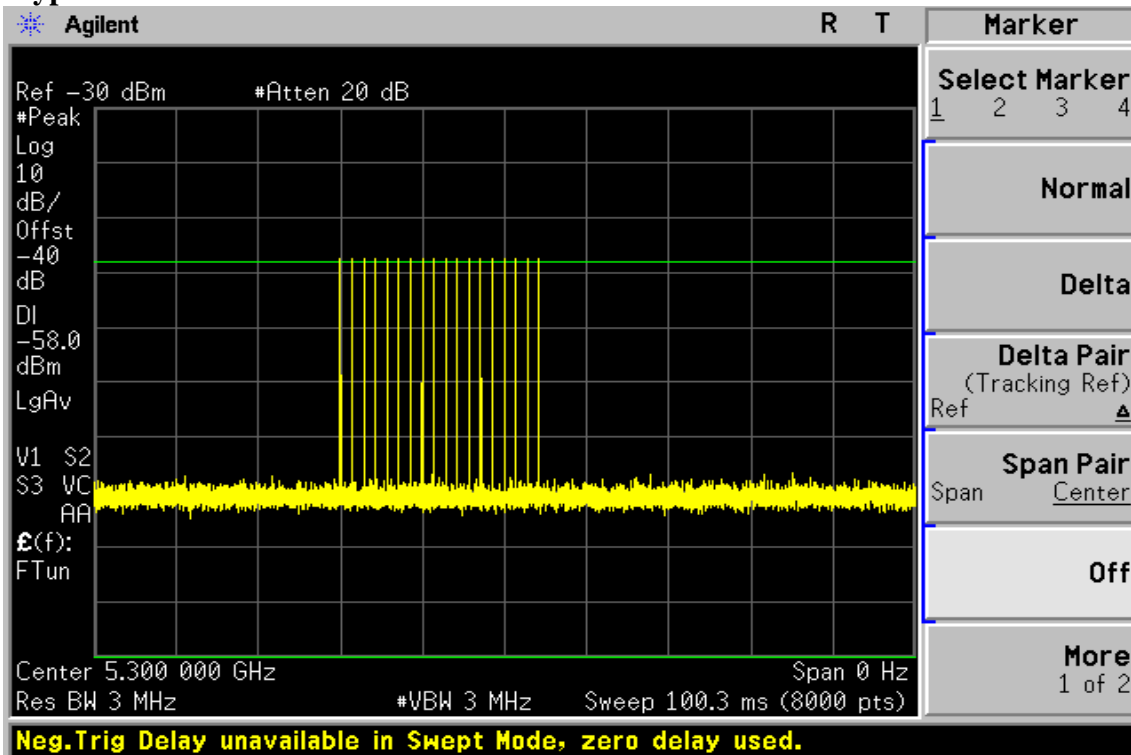
Refer to next page for plots.

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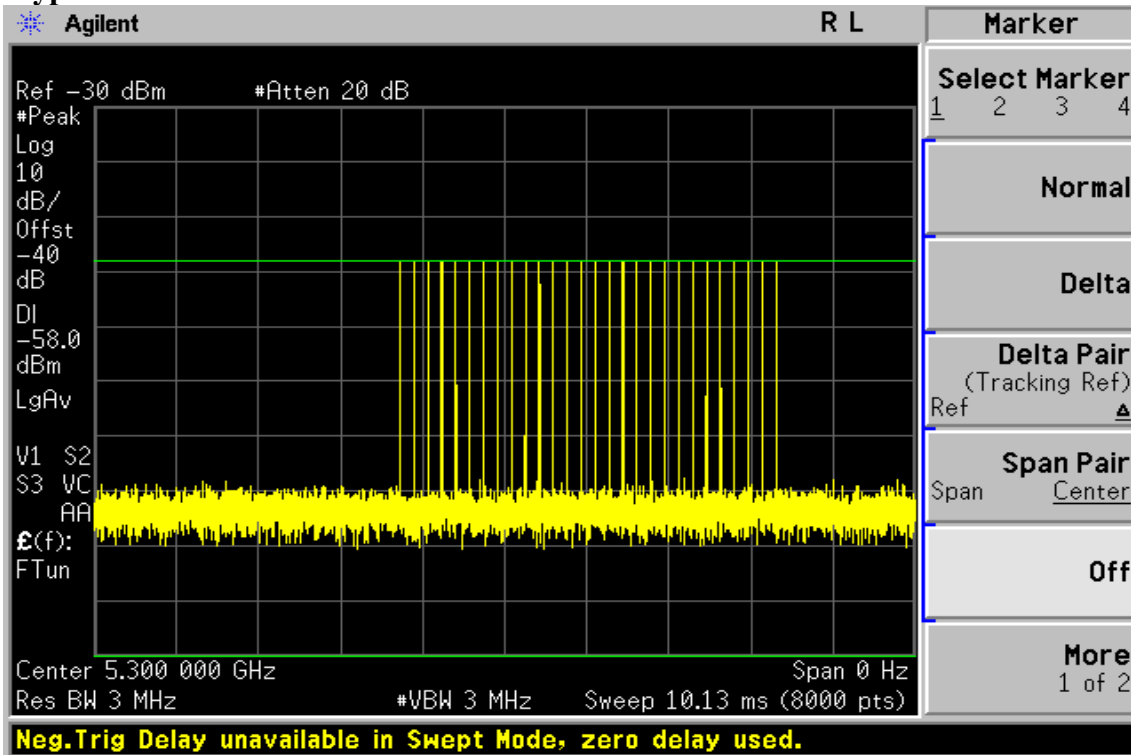
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Calibration plots for each of the required radar waveforms

Radar type 1



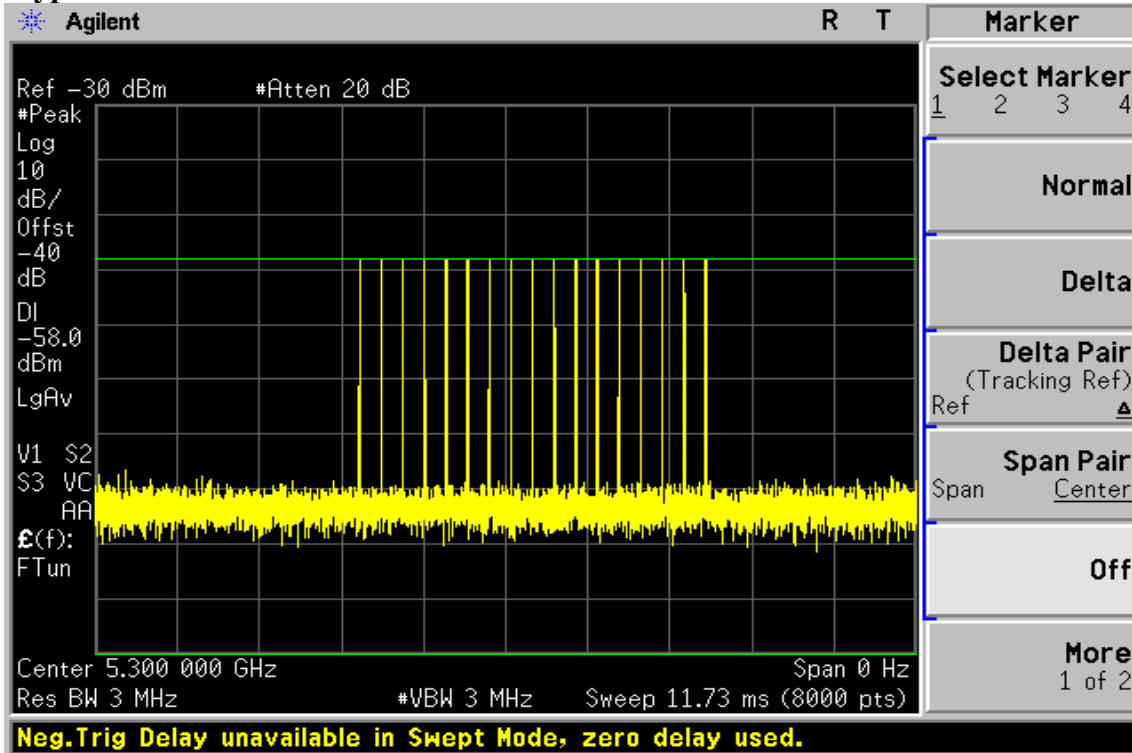
Radar type 2



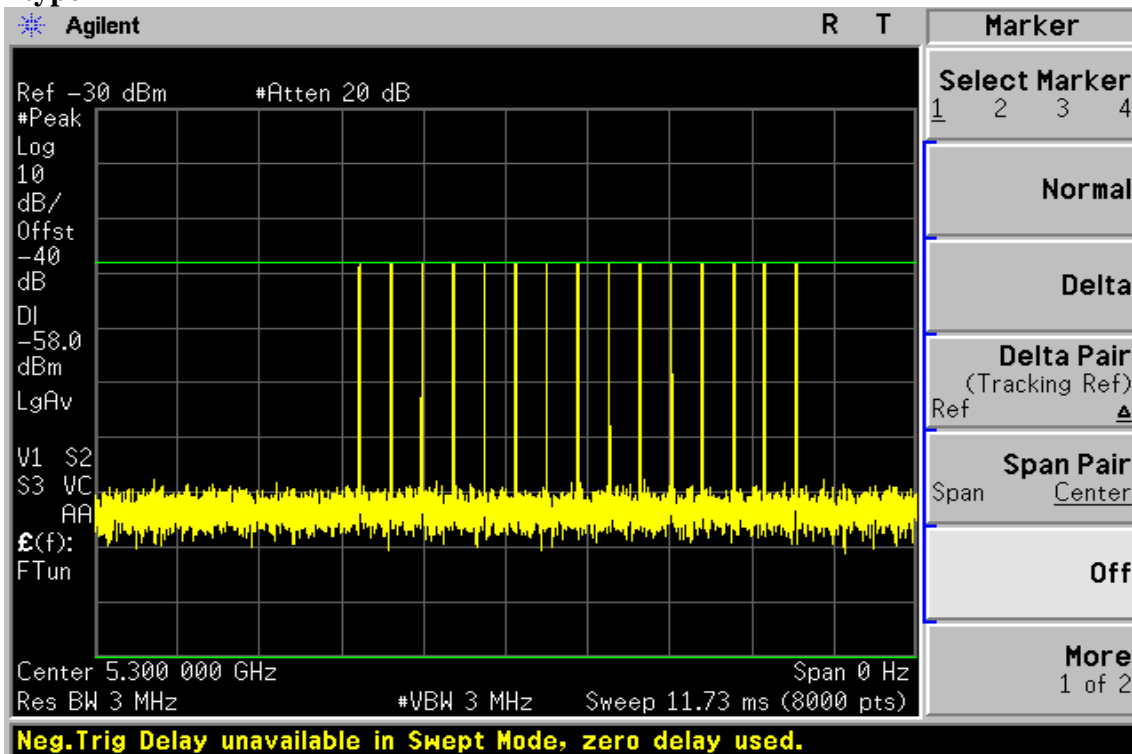
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**Radar type 3**



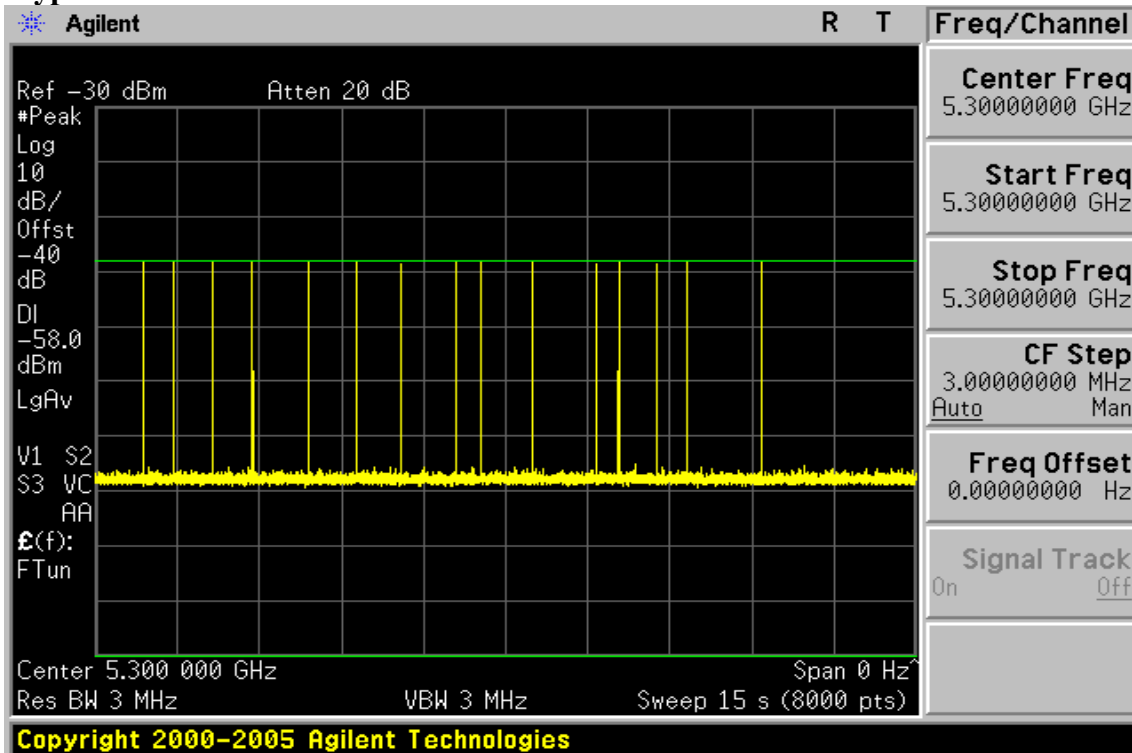
**Radar type 4**



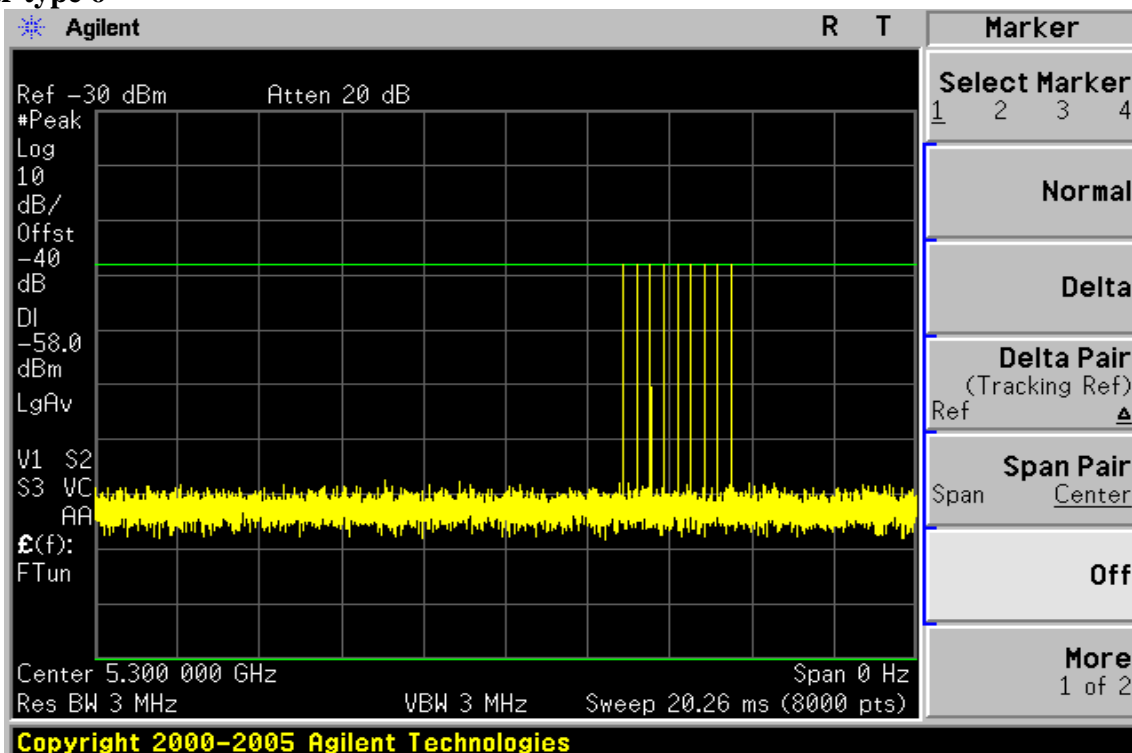
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**Radar type 5**



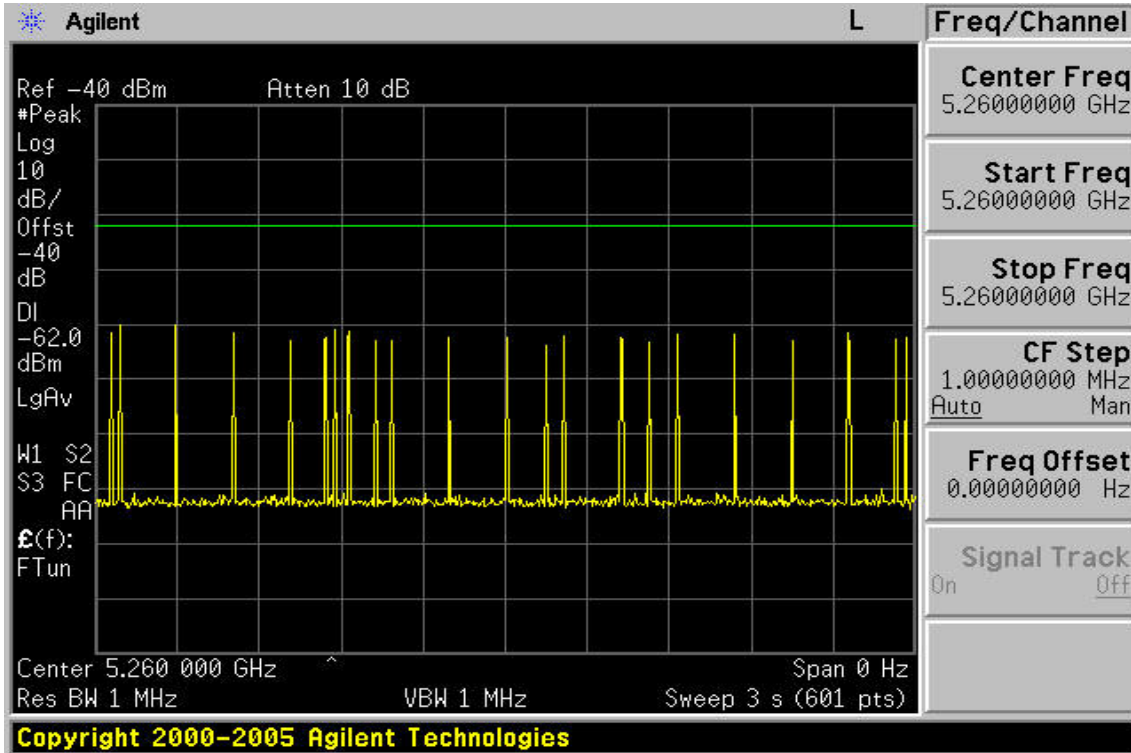
**Radar type 6**



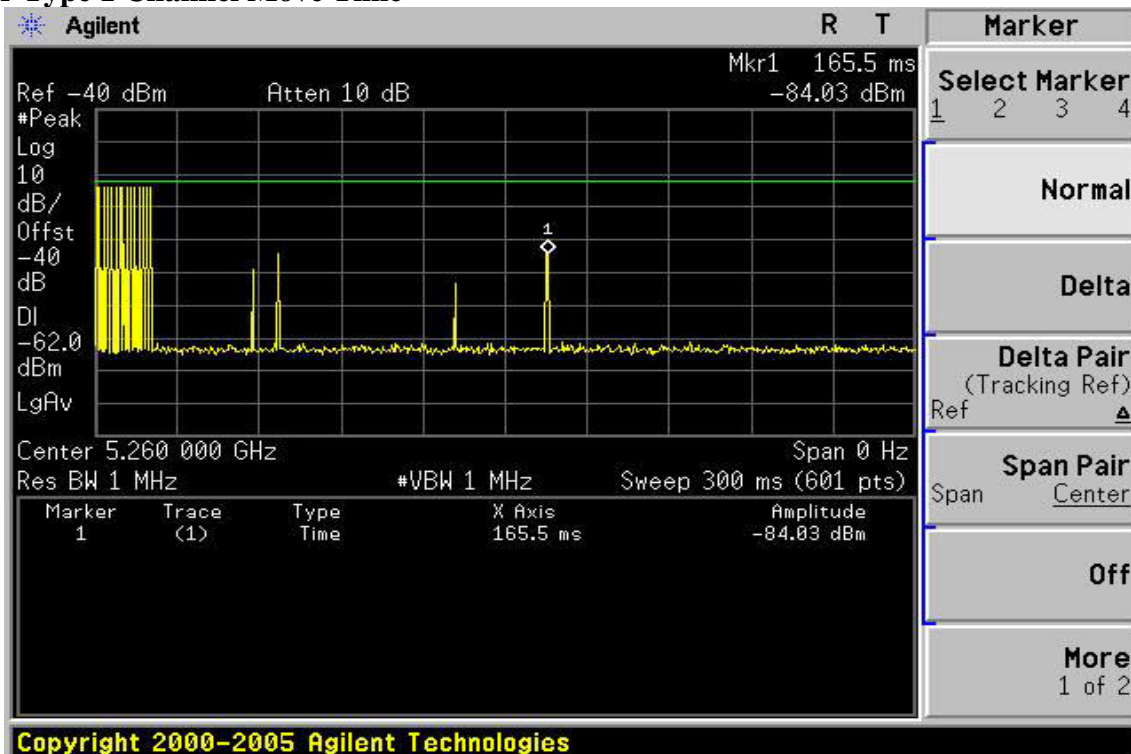
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WLAN traffic



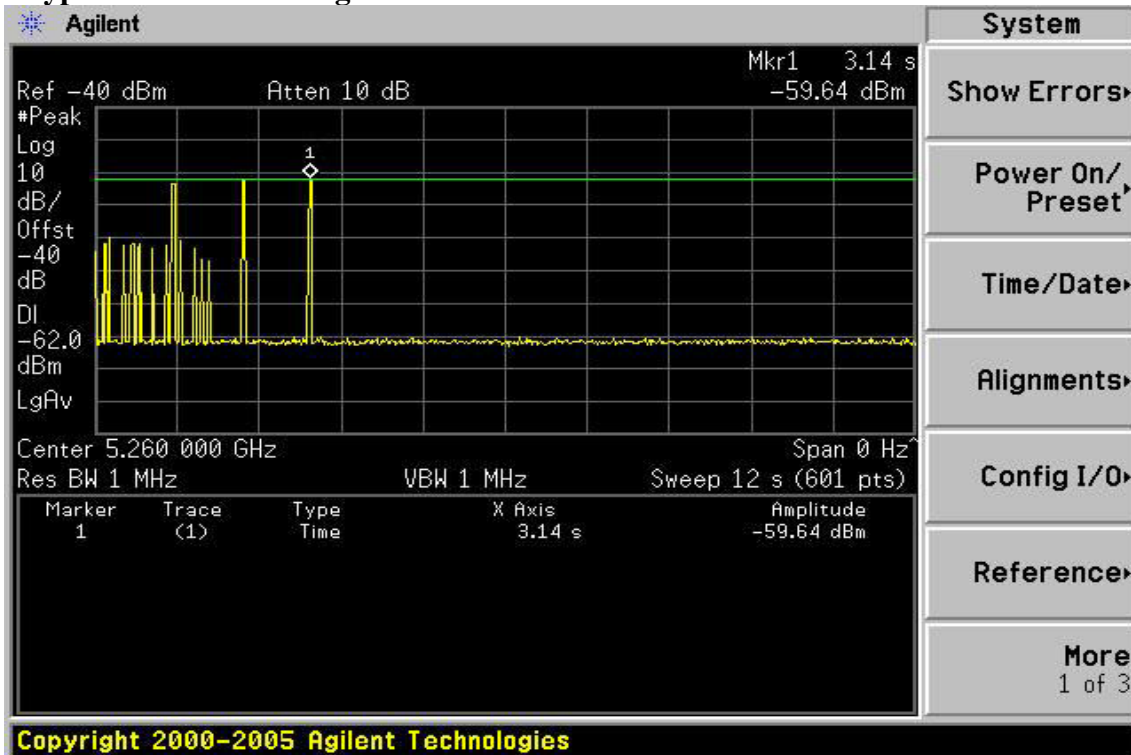
Radar Type 1 Channel Move Time



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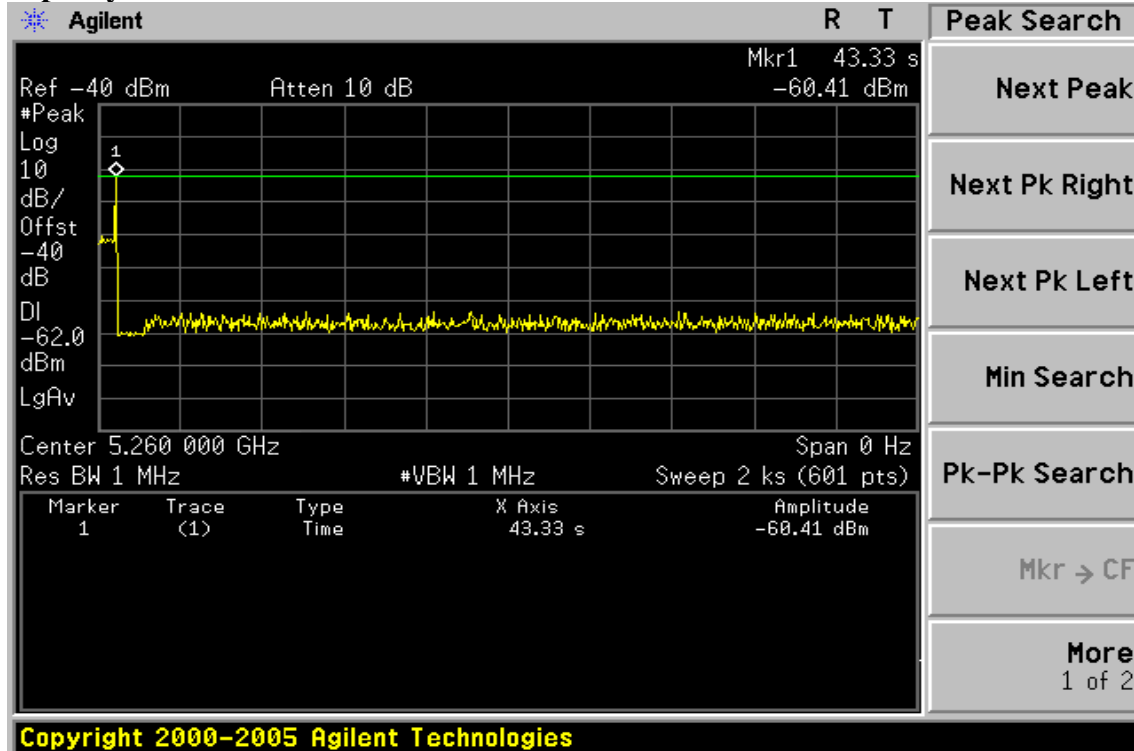
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**Radar Type 1 Channel Closing Transmission Time**



$3.14\text{ s} * 3 = 9.42\text{ s}$

**Non-occupancy Period**



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