





# FCC PART 15.407 TEST AND MEASUREMENT REPORT

For

## Mimosa Networks

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Cambell, CA 95008, USA

**FCC ID: 2ABZJ-100-00001**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Point-to-Point Device
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\* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “\*” (Rev 1.0)

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**DOCUMENT REVISION HISTORY**

<b>Revision Number</b>	<b>Report Number</b>	<b>Description of Revision</b>	<b>Date of Revision</b>
0	R1402141-407 W52 W58	Original Report	2014-07-16

## 1 General Description

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### 1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Mimosa Networks.*, and their product model: *B5*, *FCC ID: 2ABZJ-100-00001*, which will henceforth be referred to as the “EUT” (Equipment under Test) in this report. The EUT is a point-to-point device operates in 5 GHz bands.

### 1.2 Mechanical Description of EUT

The EUT measures approximately 17.3 cm (L) x 17.3 cm (W) x 7.3 cm (H) and weighs 3.2 kg.

*The test data gathered are from typical production sample, serial number: 1346101000019 assigned by manufacturer.*

### 1.3 Objective

This report is prepared on behalf of *Mimosa Networks*, in accordance with FCC CFR 47 §15.407

The objective is to determine compliance with FCC rules for Antenna Requirments, AC Line Conducted Emissions, Occupied Bandwidth, Maximum Peak Output Power, Power Spectral Density, Radiated and Conducted Spurious Emissions, and Band Edge.

### 1.4 Related Submittal(s)/Grant(s)

N/A

### 1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz and FCC KDB 789033 D02 General UNII Test Procedures v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E

### 1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2: 2011, The Treatment of Uncertainty in EMC Measurements, the values ranging from  $\pm 2.0$  dB for Conducted Emissions tests and  $\pm 4.0$  dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

## 1.7 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:

1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminaires and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65:1996** by **A2LA** to certify:

1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.

2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.

3. Radio Communication Equipment for Singapore.

4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.

5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).

6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s), Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b>

## 2 EUT Test Configuration

### 2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009 and FCC KDB 789033 D02 General UNII Test Procedures v01

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

### 2.2 EUT Exercise Software

The test utility used version was 00.10.00-5 was provided by Mimosa Networks., and was verified Cipher Chu to comply with the standard requirements being tested against.

### 2.3 Equipment Modifications

No modifications were made to the EUT.

### 2.4 Special Accessories

There were no special accessories were required, included, or intended for use with EUT during these tests.

### 2.5 Local Support Equipment

Manufacturers	Description	Models	Serial Number
Lenovo	Laptop	T530	PK-0XD9H

### 2.6 Interface Ports and Cabling

Cable Description	Length (M)	From	To
RF Cable	>1.0	PSA	Antenna

### 2.7 Power Supply and Line Filters

Manufacturer	Description	Model Number	Serial Number
Fortune Power	AC/DC Adaptor of POE	GRT 480125A	130669328

## 2.8 EUT Internal Configurations

Manufacturers	Descriptions	Models	Serial Numbers
Mimosa Networks	Main PCB Board	B5	1346101000017



### 3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.407(f), §2.1091	RF Exposure	Calculation
§15.203	Antenna Requirement	Compliant
§15.207	AC Power Line Conducted Emissions	Compliant
§15.209(a), §15.407(b)	Spurious Emissions	Compliant
§15.407(a)	Emission Bandwidth	Compliant
§15.407(a)(1)(iii) §15.407 (a)(3)	Output Power	Compliant
§2.1051, §15.407(b)	Undesirable Emissions	Compliant
§15.407(a)(1)(iii) §15.407(a)(3)	Power Spectral Density	Compliant
§15.407(h)	DFS	N/A*

Note: N/A\* not applicable for 5.2 GHz and 5.8 GHz Bands.

## 4 FCC §15.407(f) & §2.1091 - RF Exposure

### 4.1 Applicable Standard

According to FCC §15.407(f) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

#### Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* (180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

### 4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

### 4.3 MPE Results

#### 5.2 GHz:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.48</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>35.32</u>
<u>Prediction distance (cm):</u>	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>5200</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>25</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>316.227</u>
<u>Power density of prediction frequency at 30.0 cm (mW/cm<sup>2</sup>):</u>	<u>0.987524</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

**5.8 GHz:**

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>22.54</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>179.47</u>
<u>Prediction distance (cm):</u>	<u>68</u>
<u>Prediction frequency (MHz):</u>	<u>5785</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>25</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>316.227</u>
<u>Power density of prediction frequency at 68.0 cm (mW/cm<sup>2</sup>):</u>	<u>0.977</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

The device meets FCC MPE requirement for uncontrolled exposure environment at 68 cm distance.

## 5 FCC §15.203 – Antenna Requirements

### 5.1 Applicable Standard

According to FCC §15.203, 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.

And according to FCC §15.407 (a)(1) and (2), If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

And according to FCC §15.407 (a)(1) (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

And according to FCC §15.407 (a)(3) , However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### 5.2 Antenna List

P/NO	Antenna Gain (dBi)
Center Fed Reflector/Pencil Beam	25

Note: This product shall be professional installation. The client provided the installation instruction to meet the FCC §15.203 requirment.

## 6 FCC §15.207 - AC Power Line Conducted Emissions

### 6.1 Applicable Standards

As per FCC §15.207 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*\*Decreases with the logarithm of the frequency.*

### 6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4-2009 measurement procedure. The specification used was FCC §15.207 limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

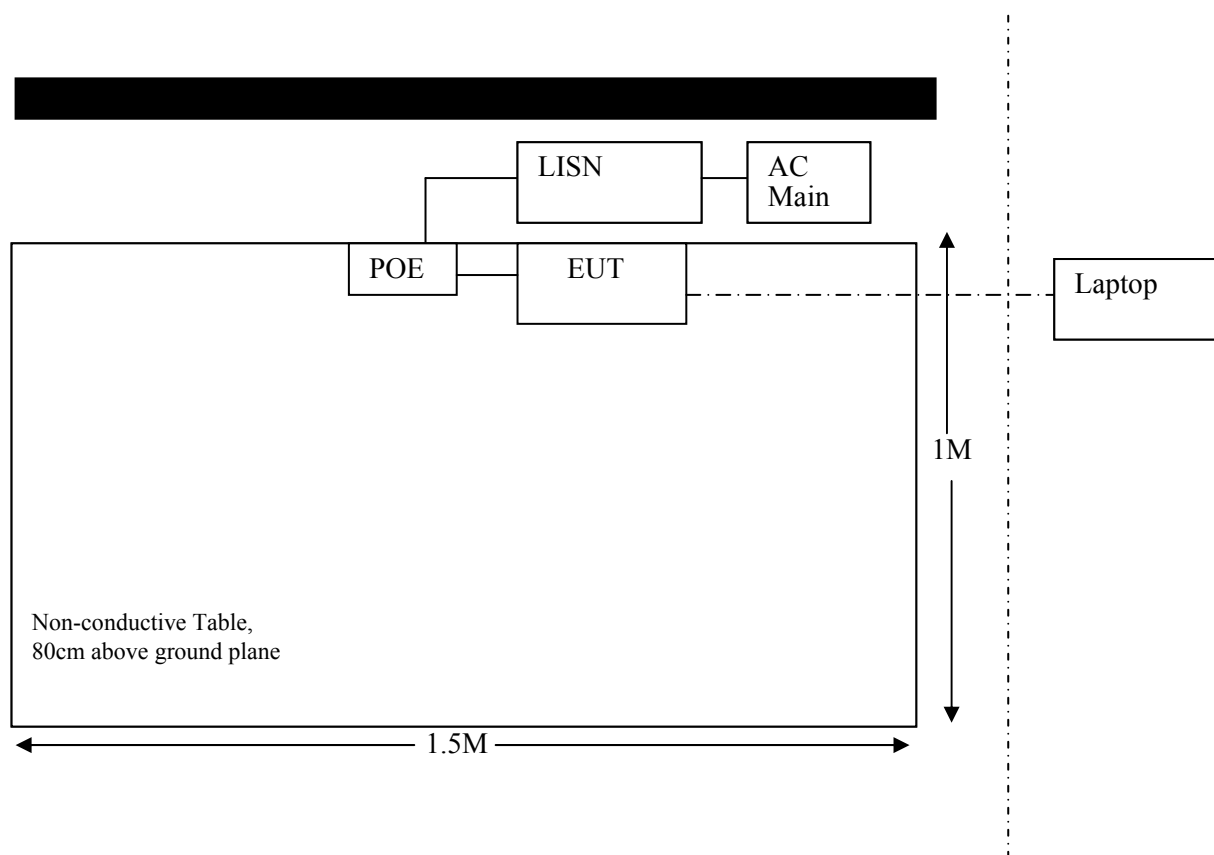
### 6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP." Average readings are distinguished with an "Ave".

## 6.4 Test Setup Block Diagram



## 6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = A_i + CL + \text{Atten}$$

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

## 6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2013-09-28	1 year
Solar Electronics	LISN	9252-R-24-BNC	511205	2013-10-25	1 year
TTE	Filter, High Pass	H985-150k-50-720N	M1149	2013-10-30	1 year

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

## 6.7 Test Environmental Conditions

Temperature:	21-23 °C
Relative Humidity:	43-48 %
ATM Pressure:	101.1-101.3 kPa

The testing was performed by Cipher Chu on 2014-03-06 to 2014-03-14 at the 10m chamber 1.

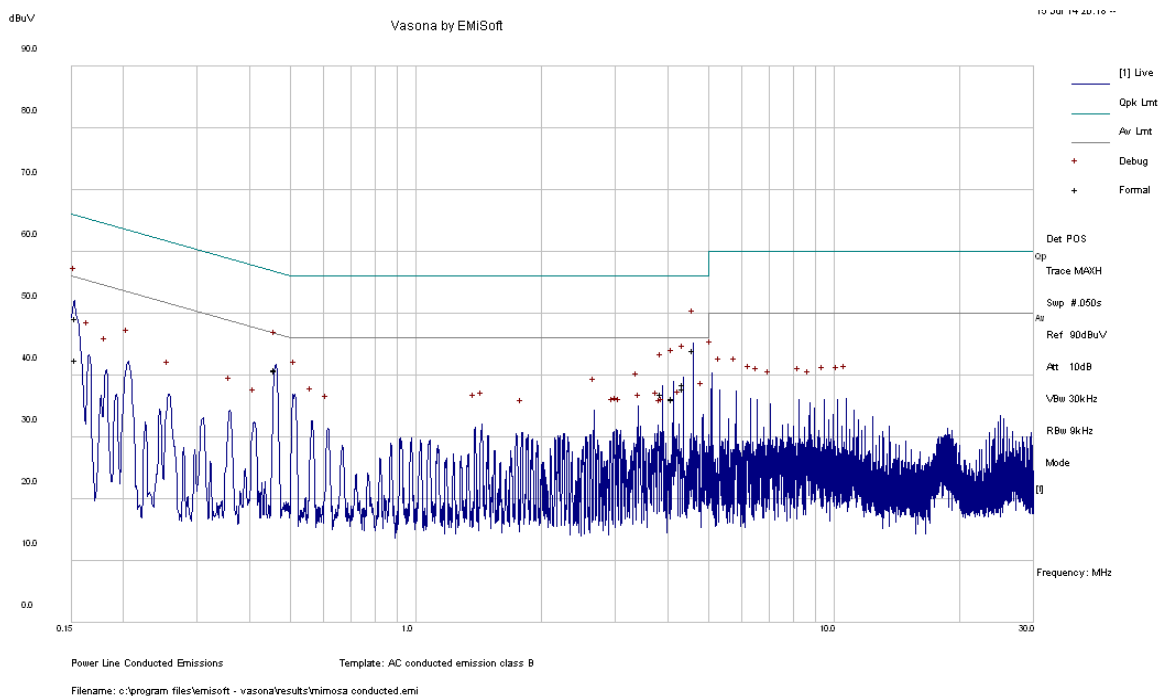
## 6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC standard's conducted emissions limits, with the margin reading of:

Connection: Connected to 120 V/60 Hz, AC			
Margin (dB)	Frequency (MHz)	Conductor Mode (Line/Neutral)	Range (MHz)
-1.76	4.602941	Neutral	0.15-30

## 6.9 Conducted Emissions Test Plots and Data

### 120 V, 60 Hz – Line

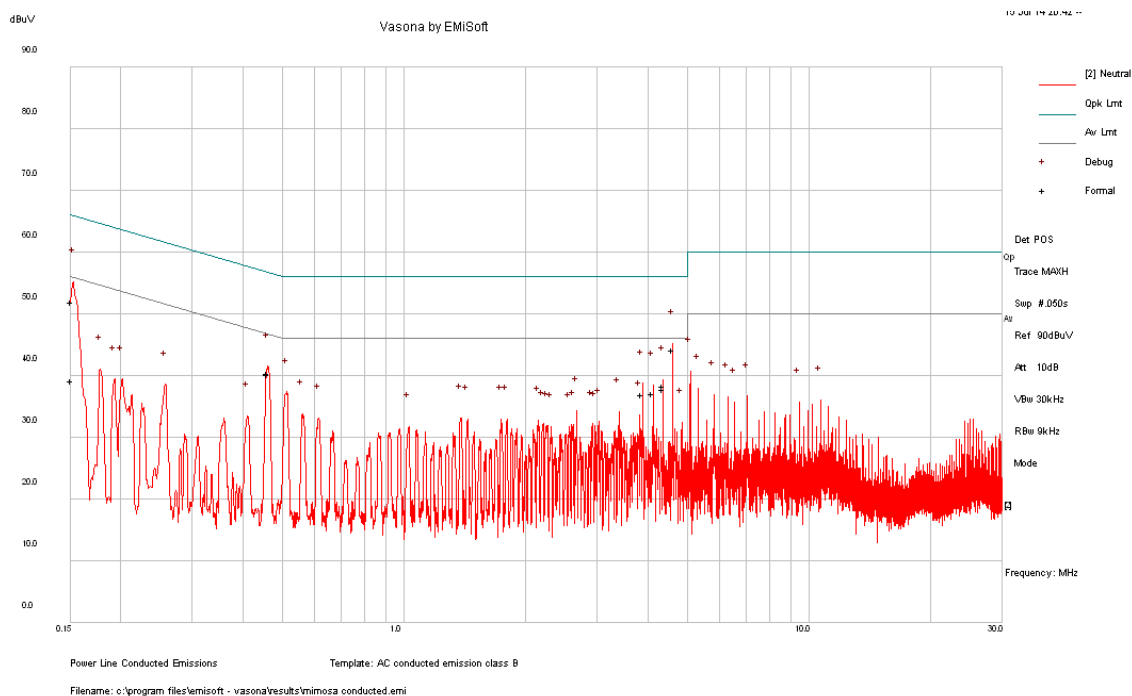


Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
4.603229	44.14	Line	56	-11.86	QP
0.462288	40.91	Line	56.65	-15.74	QP
0.153699	49.3	Line	65.8	-16.50	QP
4.361672	38.55	Line	56	-17.45	QP
3.876734	37.05	Line	56	-18.95	QP
4.120808	36.16	Line	56	-19.84	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
4.603229	44.1	Line	46	-1.90	Ave.
0.462288	40.86	Line	46.65	-5.79	Ave.
4.361672	37.79	Line	46	-8.21	Ave.
3.876734	37.03	Line	46	-8.97	Ave.
4.120808	36.27	Line	46	-9.73	Ave.
0.153699	42.47	Line	55.8	-13.33	Ave.



## 120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
4.602941	44.27	Neutral	56	-11.73	QP
0.151341	51.94	Neutral	65.93	-13.98	QP
0.462237	40.51	Neutral	56.65	-16.15	QP
4.361102	38.41	Neutral	56	-17.59	QP
4.119182	37.22	Neutral	56	-18.78	QP
3.877033	37.04	Neutral	56	-18.96	QP

Frequency (MHz)	Corrected Amplitude (dBμV)	Conductor (Line/Neutral)	Limit (dBμV)	Margin (dB)	Detector (QP/Ave.)
4.602941	44.24	Neutral	46	-1.76	Ave.
0.462237	40.31	Neutral	46.65	-6.34	Ave.
4.361102	37.81	Neutral	46	-8.19	Ave.
4.119182	37.2	Neutral	46	-8.80	Ave.
3.877033	36.95	Neutral	46	-9.05	Ave.
0.151341	39.28	Neutral	55.93	-16.64	Ave.

## 7 FCC §15.209 & §15.407(b) - Spurious Radiated Emissions And Out of Band Emissions

### 7.1 Applicable Standards

According to FCC §15.407(b)

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 e.i.r.p. of -27 dBm/MHz.

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 e.i.r.p. of -27 dBm/MHz.

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 e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 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 e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show 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	960 – 1240	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5.35 – 5.46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 – 167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3.3458 – 3.358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

## 7.2 Test Setup

The radiated emissions tests were performed in the 10-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15 Subpart E limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

## 7.3 Test Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E Section H: Unwanted emissions measurement as well as ANSI C63.4: 2009 as described below:

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 10 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

$$\text{RBW} = 100 \text{ kHz/VBW} = 300 \text{ kHz/Sweep} = \text{Auto}$$

Above 1000 MHz:

- (1) Peak: RBW = 1MHz/VBW = 1MHz/Sweep = Auto
- (2) Average: RBW = 1MHz/VBW = 10Hz/Sweep = Auto

## 7.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

## 7.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4440A	MY44303352	2013-10-16	1 year
EMCO	Antenna, Horn	3115	9511-4627	2013-10-17	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2013-05-09	1 year
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100337	2013-03-28	1 year
Sunol Sciences	Antenna, Biconi-Log	JB3	A020106-2	2013-08-12	1 year
HP	Pre-amplifier	8447D	2944A06639	2013-06-09	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R

**Statement of Traceability:** BACL attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.

## 7.6 Test Environmental Conditions

<b>Temperature:</b>	21-23° C
<b>Relative Humidity:</b>	43-48 %
<b>ATM Pressure:</b>	101.1-101.3 kPa

*The testing was performed by Cipher Chu on 2014-03-06 to 2014-03-14 at the 5m chamber 3.*

## 7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15E standard's radiated emissions limits, and had the worst margin of:

### 30-1000 MHz:

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-6.03	58.874	Vertical	20 MHz, Low

### 1-40 GHz:

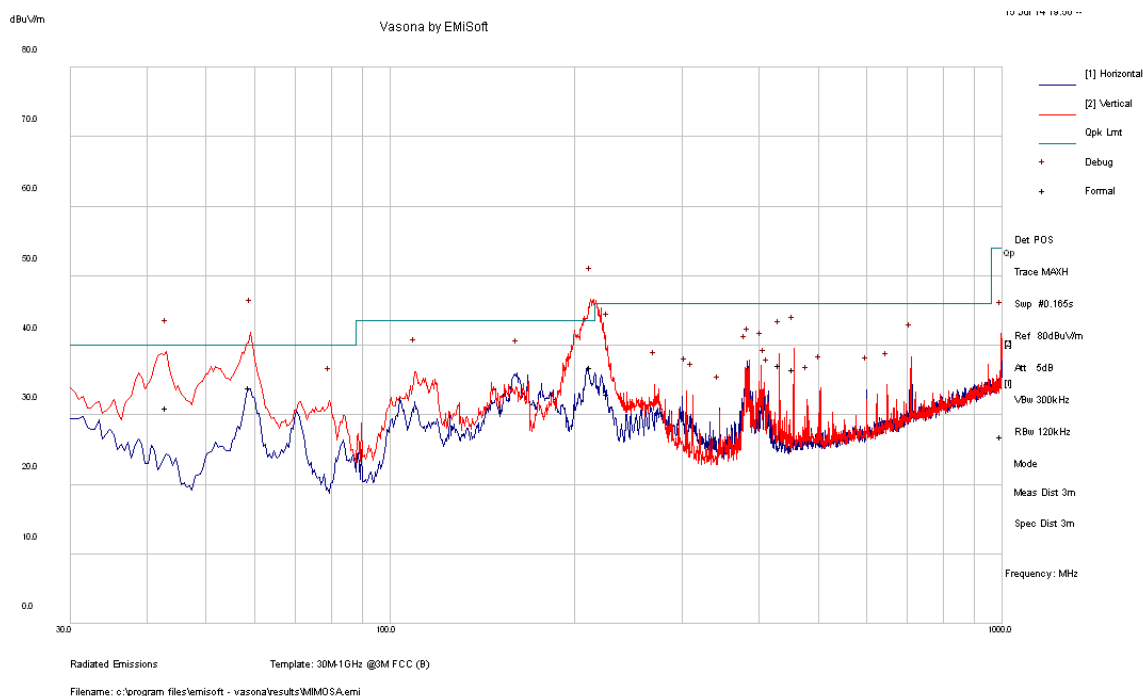
Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Mode, Channel
-0.468	5460	Vertical	80 MHz, Low

Please refer to the following table and plots for specific test result details.

## 7.8 Radiated Emissions Test Data and Plots

### 1) 30 MHz–1 GHz, Measured at 3 meters, Quasi-Peak Measurements

(Note: for all the emissions from 30 MHz to 1 GHz, they all below -27 dBm EIRP limit.)



#### 20 MHz Bandwidth, Low Channel

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
58.874	33.97	128	V	281	40	-6.03
212.5425	36.83	130	V	197	43.5	-6.67
431.978	37.12	101	V	360	46	-8.88
43.16275	31.09	98	V	263	40	-8.91
455.9815	36.6	102	V	212	46	-9.40
226.458	33.08	172	V	181	46	-12.92
996.0975	26.93	262	V	166	54	-27.07

## 2) 1–40 GHz, Measured at 3 meters

## 5.2 GHz Band:

20 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5165 MHz, measured at 3 meters											
5165	109.62	0	135	V	33.922	4.62		148.162	-	-	Peak/Fund
5165	107.83	0	120	H	33.922	4.62		146.372	-	-	Peak/Fund
5165	97.17	0	135	V	33.922	4.62		135.712	-	-	Ave/Fund
5165	96.47	0	120	H	33.922	4.62		135.012	-	-	Ave/Fund
10330	31.98	0	100	V	38.845	6.2	27.7	49.325	74	-24.675	Peak
10330	32.18	0	100	H	38.845	6.2	27.7	49.525	74	-24.475	Peak
10330	17.6	0	100	V	38.845	6.2	27.7	34.945	54	-19.055	Ave
10330	17.77	0	100	H	38.845	6.2	27.7	35.115	54	-18.885	Ave
15495	32	0	100	V	42.941	8.31	27.58	55.671	74	-18.329	Peak
15495	32.07	0	100	H	42.941	8.31	27.58	55.741	74	-18.259	Peak
15495	18.13	0	100	V	42.941	8.31	27.58	41.801	54	-12.199	Ave
15495	17.94	0	100	H	42.941	8.31	27.58	41.611	54	-12.389	Ave
20660	31.92	0	100	V	49.67	9.74	27.06	64.27	74	-9.73	Peak
20660	32.93	0	100	H	49.67	9.74	27.06	65.28	74	-8.72	Peak
20660	17.74	0	100	V	49.67	9.74	27.06	50.09	54	-3.91	Ave
20660	17.99	0	100	H	49.67	9.74	27.06	50.34	54	-3.66	Ave
Middle Channel 5200 MHz, measured at 3 meters											
5200	119.36	0	135	V	33.922	4.62		157.902	-	-	Peak/Fund
5200	119.71	0	120	H	33.922	4.62		158.252	-	-	Peak/Fund
5200	106.79	0	135	V	33.922	4.62		145.332	-	-	Ave/Fund
5200	107.85	0	120	H	33.922	4.62		146.392	-	-	Ave/Fund
10400	35.77	0	100	V	38.845	6.2	27.7	53.115	74	-20.885	Peak
10400	35.81	0	100	H	38.845	6.2	27.7	53.155	74	-20.845	Peak
10400	18.66	0	100	V	38.845	6.2	27.7	36.005	54	-17.995	Ave
10400	18.84	0	100	H	38.845	6.2	27.7	36.185	54	-17.815	Ave
15600	32.25	0	100	V	42.941	8.31	27.58	55.921	74	-18.079	Peak
15600	31.58	0	100	H	42.941	8.31	27.58	55.251	74	-18.749	Peak
15600	17.89	0	100	V	42.941	8.31	27.58	41.561	54	-12.439	Ave
15600	17.84	0	100	H	42.941	8.31	27.58	41.511	54	-12.489	Ave
20800	31.64	0	100	V	49.67	9.74	27.06	63.99	74	-10.01	Peak
20800	31.6	0	100	H	49.67	9.74	27.06	63.95	74	-10.05	Peak
20800	18.04	0	100	V	49.67	9.74	27.06	50.39	54	-3.61	Ave
20800	18.1	0	100	H	49.67	9.74	27.06	50.45	54	-3.55	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5240 MHz, measured at 3 meters											
5240	110.23	0	135	V	33.922	4.62		148.772	-	-	Peak/Fund
5240	109.92	0	120	H	33.922	4.62		148.462	-	-	Peak/Fund
5240	97.69	0	135	V	33.922	4.62		136.232	-	-	Ave/Fund
5240	97.95	0	120	H	33.922	4.62		136.492	-	-	Ave/Fund
10480	32.91	0	100	V	38.845	6.2	27.7	50.255	74	-23.745	Peak
10480	32.62	0	100	H	38.845	6.2	27.7	49.965	74	-24.035	Peak
10480	18.5	0	100	V	38.845	6.2	27.7	35.845	54	-18.155	Ave
10480	18.6	0	100	H	38.845	6.2	27.7	35.945	54	-18.055	Ave
15720	32.98	0	100	V	42.941	8.31	27.58	56.651	74	-17.349	Peak
15720	33.71	0	100	H	42.941	8.31	27.58	57.381	74	-16.619	Peak
15720	19.17	0	100	V	42.941	8.31	27.58	42.841	54	-11.159	Ave
15720	19.1	0	100	H	42.941	8.31	27.58	42.771	54	-11.229	Ave
20960	34.13	0	100	V	49.67	9.74	27.06	66.48	74	-7.52	Peak
20960	32.54	0	100	H	49.67	9.74	27.06	64.89	74	-9.11	Peak
20960	18.94	0	100	V	49.67	9.74	27.06	51.29	54	-2.71	Ave
20960	18.92	0	100	H	49.67	9.74	27.06	51.27	54	-2.73	Ave



## 40 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5175 MHz, measured at 3 meters											
5175	106.57	0	135	V	33.922	4.62		145.112	-	-	Peak/Fund
5175	104.66	0	120	H	33.922	4.62		143.202	-	-	Peak/Fund
5175	94.26	0	135	V	33.922	4.62		132.802	-	-	Ave/Fund
5175	93.16	0	120	H	33.922	4.62		131.702	-	-	Ave/Fund
10350	31.08	0	100	V	38.845	6.2	27.7	48.425	74	-25.575	Peak
10350	31.49	0	100	H	38.845	6.2	27.7	48.835	74	-25.165	Peak
10350	17.81	0	100	V	38.845	6.2	27.7	35.155	54	-18.845	Ave
10350	17.94	0	100	H	38.845	6.2	27.7	35.285	54	-18.715	Ave
15525	32.23	0	100	V	42.941	8.31	27.58	55.901	74	-18.099	Peak
15525	31.56	0	100	H	42.941	8.31	27.58	55.231	74	-18.769	Peak
15525	18.74	0	100	V	42.941	8.31	27.58	42.411	54	-11.589	Ave
15525	18.69	0	100	H	42.941	8.31	27.58	42.361	54	-11.639	Ave
20700	31.56	0	100	V	49.67	9.74	27.06	63.91	74	-10.09	Peak
20700	31.99	0	100	H	49.67	9.74	27.06	64.34	74	-9.66	Peak
20700	18.45	0	100	V	49.67	9.74	27.06	50.8	54	-3.2	Ave
20700	18.43	0	100	H	49.67	9.74	27.06	50.78	54	-3.22	Ave
Middle Channel 5200 MHz, measured at 3 meters											
5200	115.64	0	135	V	33.922	4.62		154.182	-	-	Peak/Fund
5200	116.68	0	120	H	33.922	4.62		155.222	-	-	Peak/Fund
5200	103.41	0	135	V	33.922	4.62		141.952	-	-	Ave/Fund
5200	104.74	0	120	H	33.922	4.62		143.282	-	-	Ave/Fund
10400	32.1	0	100	V	38.845	6.2	27.7	49.445	74	-24.555	Peak
10400	31.8	0	100	H	38.845	6.2	27.7	49.145	74	-24.855	Peak
10400	17.62	0	100	V	38.845	6.2	27.7	34.965	54	-19.035	Ave
10400	17.58	0	100	H	38.845	6.2	27.7	34.925	54	-19.075	Ave
15600	32.84	0	100	V	42.941	8.31	27.58	56.511	74	-17.489	Peak
15600	30.76	0	100	H	42.941	8.31	27.58	54.431	74	-19.569	Peak
15600	17.86	0	100	V	42.941	8.31	27.58	41.531	54	-12.469	Ave
15600	17.82	0	100	H	42.941	8.31	27.58	41.491	54	-12.509	Ave
20800	31.52	0	100	V	49.67	9.74	27.06	63.87	74	-10.13	Peak
20800	31.71	0	100	H	49.67	9.74	27.06	64.06	74	-9.94	Peak
20800	18.13	0	100	V	49.67	9.74	27.06	50.48	54	-3.52	Ave
20800	18.02	0	100	H	49.67	9.74	27.06	50.37	54	-3.63	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5230 MHz, measured at 3 meters											
5230	109.75	0	135	V	33.922	4.62		148.292	-	-	Peak/Fund
5230	109.14	0	120	H	33.922	4.62		147.682	-	-	Peak/Fund
5230	98.01	0	135	V	33.922	4.62		136.552	-	-	Ave/Fund
5230	97.71	0	120	H	33.922	4.62		136.252	-	-	Ave/Fund
10460	37.42	0	100	V	38.845	6.2	27.7	54.765	74	-19.235	Peak
10460	36.01	0	100	H	38.845	6.2	27.7	53.355	74	-20.645	Peak
10460	21.86	0	100	V	38.845	6.2	27.7	39.205	54	-14.795	Ave
10460	21.99	0	100	H	38.845	6.2	27.7	39.335	54	-14.665	Ave
15690	36.7	0	100	V	42.941	8.31	27.58	60.371	74	-13.629	Peak
15690	36.11	0	100	H	42.941	8.31	27.58	59.781	74	-14.219	Peak
15690	22.18	0	100	V	42.941	8.31	27.58	45.851	54	-8.149	Ave
15690	22.02	0	100	H	42.941	8.31	27.58	45.691	54	-8.309	Ave
20920	35.93	0	100	V	49.67	9.74	27.06	68.28	74	-5.72	Peak
20920	36.38	0	100	H	49.67	9.74	27.06	68.73	74	-5.27	Peak
20920	18.73	0	100	V	49.67	9.74	27.06	51.08	54	-2.92	Ave
20920	18.64	0	100	H	49.67	9.74	27.06	50.99	54	-3.01	Ave

## 80 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5195 MHz, measured at 3 meters											
5195	103.63	0	135	V	33.922	4.62		142.172	-	-	Peak/Fund
5195	102.48	0	120	H	33.922	4.62		141.022	-	-	Peak/Fund
5195	89.44	0	135	V	33.922	4.62		127.982	-	-	Ave/Fund
5195	89.41	0	120	H	33.922	4.62		127.952	-	-	Ave/Fund
10390	32.35	0	100	V	38.845	6.2	27.7	49.695	74	-24.305	Peak
10390	31.73	0	100	H	38.845	6.2	27.7	49.075	74	-24.925	Peak
10390	18.2	0	100	V	38.845	6.2	27.7	35.545	54	-18.455	Ave
10390	18.24	0	100	H	38.845	6.2	27.7	35.585	54	-18.415	Ave
15585	32.47	0	100	V	42.941	8.31	27.58	56.141	74	-17.859	Peak
15585	31.57	0	100	H	42.941	8.31	27.58	55.241	74	-18.759	Peak
15585	18.49	0	100	V	42.941	8.31	27.58	42.161	54	-11.839	Ave
15585	18.32	0	100	H	42.941	8.31	27.58	41.991	54	-12.009	Ave
20780	32.34	0	100	V	49.67	9.74	27.06	64.69	74	-9.31	Peak
20780	32.13	0	100	H	49.67	9.74	27.06	64.48	74	-9.52	Peak
20780	18.58	0	100	V	49.67	9.74	27.06	50.93	54	-3.07	Ave
20780	18.49	0	100	H	49.67	9.74	27.06	50.84	54	-3.16	Ave
Middle Channel 5200 MHz, measured at 3 meters											
5200	114.31	0	135	V	33.922	4.62		152.852	-	-	Peak/ Fund
5200	114.92	0	120	H	33.922	4.62		153.462	-	-	Peak/ Fund
5200	99.36	0	135	V	33.922	4.62		137.902	-	-	Ave/ Fund
5200	101.77	0	120	H	33.922	4.62		140.312	-	-	Ave/ Fund
10400	32.05	0	100	V	38.845	6.2	27.7	49.395	74	-24.605	Peak
10400	31.72	0	100	H	38.845	6.2	27.7	49.065	74	-24.935	Peak
10400	18.34	0	100	V	38.845	6.2	27.7	35.685	54	-18.315	Ave
10400	18.31	0	100	H	38.845	6.2	27.7	35.655	54	-18.345	Ave
15600	31.43	0	100	V	42.941	8.31	27.58	55.101	74	-18.899	Peak
15600	31.52	0	100	H	42.941	8.31	27.58	55.191	74	-18.809	Peak
15600	18.31	0	100	V	42.941	8.31	27.58	41.981	54	-12.019	Ave
15600	17.72	0	100	H	42.941	8.31	27.58	41.391	54	-12.609	Ave
20800	31.66	0	100	V	49.67	9.74	27.06	64.01	74	-9.99	Peak
20800	32.27	0	100	H	49.67	9.74	27.06	64.62	74	-9.38	Peak
20800	18.15	0	100	V	49.67	9.74	27.06	50.5	54	-3.5	Ave
20800	18.26	0	100	H	49.67	9.74	27.06	50.61	54	-3.39	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5210 MHz, measured at 3 meters											
5210	107.82	0	135	V	33.922	4.62		146.362	-	-	Peak/Fund
5210	106.67	0	120	H	33.922	4.62		145.212	-	-	Peak/Fund
5210	93.63	0	135	V	33.922	4.62		132.172	-	-	Ave/Fund
5210	93.6	0	120	H	33.922	4.62		132.142	-	-	Ave/Fund
10420	33.54	0	100	V	38.845	6.2	27.7	50.885	74	-23.115	Peak
10420	32.92	0	100	H	38.845	6.2	27.7	50.265	74	-23.735	Peak
10420	19.39	0	100	V	38.845	6.2	27.7	36.735	54	-17.265	Ave
10420	19.43	0	100	H	38.845	6.2	27.7	36.775	54	-17.225	Ave
15630	33.66	0	100	V	42.941	8.31	27.58	57.331	74	-16.669	Peak
15630	32.76	0	100	H	42.941	8.31	27.58	56.431	74	-17.569	Peak
15630	19.68	0	100	V	42.941	8.31	27.58	43.351	54	-10.649	Ave
15630	19.51	0	100	H	42.941	8.31	27.58	43.181	54	-10.819	Ave
20840	33.53	0	100	V	49.67	9.74	27.06	65.88	74	-8.12	Peak
20840	33.32	0	100	H	49.67	9.74	27.06	65.67	74	-8.33	Peak
20840	18.77	0	100	V	49.67	9.74	27.06	51.12	54	-2.88	Ave
20840	18.68	0	100	H	49.67	9.74	27.06	51.03	54	-2.97	Ave

**5.8 GHz Band:****20 MHz Bandwidth**

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5745 MHz, measured at 3 meters											
5745	119.79	0	135	V	33.922	4.62	0	158.332	-	-	Peak/Fund
5745	119.78	0	120	H	33.922	4.62	0	158.322	-	-	Peak/Fund
5745	107.32	0	135	V	33.922	4.62	0	145.862	-	-	Ave/Fund
5745	108.06	0	120	H	33.922	4.62	0	146.602	-	-	Ave/Fund
11490	39.75	0	100	V	38.845	6.2	27.7	57.095	74	-16.905	Peak
11490	41.62	0	100	H	38.845	6.2	27.7	58.965	74	-15.035	Peak
11490	20.49	0	100	V	38.845	6.2	27.7	37.835	54	-16.165	Ave
11490	21.31	0	100	H	38.845	6.2	27.7	38.655	54	-15.345	Ave
17235	31.85	0	100	V	42.941	8.31	27.58	55.521	138.332	-82.811	Peak
17235	31.98	0	100	H	42.941	8.31	27.58	55.651	138.322	-82.671	Peak
17235	17.77	0	100	V	42.941	8.31	27.58	41.441	125.862	-84.421	Ave
17235	17.82	0	100	H	42.941	8.31	27.58	41.491	126.602	-85.111	Ave
22980	31.17	0	100	V	49.67	9.74	27.06	63.52	74	-10.48	Peak
22980	31.36	0	100	H	49.67	9.74	27.06	63.71	74	-10.29	Peak
22980	17.64	0	100	V	49.67	9.74	27.06	49.99	54	-4.01	Ave
22980	17.61	0	100	H	49.67	9.74	27.06	49.96	54	-4.04	Ave
Middle Channel 5785 MHz, measured at 3 meters											
5785	119.17	0	135	V	33.922	4.62	0	157.712	-	-	Peak/Fund
5785	119.52	0	120	H	33.922	4.62	0	158.062	-	-	Peak/Fund
5785	106.6	0	135	V	33.922	4.62	0	145.142	-	-	Ave/Fund
5785	107.66	0	120	H	33.922	4.62	0	146.202	-	-	Ave/Fund
11570	35.58	0	100	V	38.845	6.2	27.7	52.925	74	-21.075	Peak
11570	35.62	0	100	H	38.845	6.2	27.7	52.965	74	-21.035	Peak
11570	18.47	0	100	V	38.845	6.2	27.7	35.815	54	-18.185	Ave
11570	18.65	0	100	H	38.845	6.2	27.7	35.995	54	-18.005	Ave
17355	32.06	0	100	V	42.941	8.31	27.58	55.731	137.712	-81.981	Peak
17355	31.39	0	100	H	42.941	8.31	27.58	55.061	138.062	-83.001	Peak
17355	17.7	0	100	V	42.941	8.31	27.58	41.371	125.142	-83.771	Ave
17355	17.65	0	100	H	42.941	8.31	27.58	41.321	126.202	-84.881	Ave
23140	31.45	0	100	V	49.67	9.74	27.06	63.8	137.712	-73.912	Peak
23140	31.41	0	100	H	49.67	9.74	27.06	63.76	138.062	-74.302	Peak
23140	17.85	0	100	V	49.67	9.74	27.06	50.2	125.142	-74.942	Ave
23140	17.91	0	100	H	49.67	9.74	27.06	50.26	126.202	-75.942	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
5825	118.61	0	135	V	33.922	4.62	0	157.152	-	-	Peak/Fund
5825	118.57	0	120	H	33.922	4.62	0	157.112	-	-	Peak/Fund
5825	106.24	0	135	V	33.922	4.62	0	144.782	-	-	Ave/Fund
5825	107.24	0	120	H	33.922	4.62	0	145.782	-	-	Ave/Fund
11650	35.43	0	100	V	38.845	6.2	27.7	52.775	74	-21.225	Peak
11650	40.14	0	100	H	38.845	6.2	27.7	57.485	74	-16.515	Peak
11650	18.82	0	100	V	38.845	6.2	27.7	36.165	54	-17.835	Ave
11650	20.87	0	100	H	38.845	6.2	27.7	38.215	54	-15.785	Ave
17475	31.33	0	100	V	42.941	8.31	27.58	55.001	137.152	-82.151	Peak
17475	32.59	0	100	H	42.941	8.31	27.58	56.261	137.112	-80.851	Peak
17475	17.23	0	100	V	42.941	8.31	27.58	40.901	124.782	-83.881	Ave
17475	17.31	0	100	H	42.941	8.31	27.58	40.981	125.782	-84.801	Ave
23300	31.12	0	100	V	49.67	9.74	27.06	63.47	137.152	-73.682	Peak
23300	32.29	0	100	H	49.67	9.74	27.06	64.64	137.112	-72.472	Peak
23300	17.61	0	100	V	49.67	9.74	27.06	49.96	124.782	-74.822	Ave
23300	17.63	0	100	H	49.67	9.74	27.06	49.98	125.782	-75.802	Ave

## 40 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5755 MHz, measured at 3 meters											
5755	115.75	0	135	V	33.922	4.62	0	154.292	-	-	Peak/Fund
5755	116.81	0	120	H	33.922	4.62	0	155.352	-	-	Peak/Fund
5755	103.46	0	135	V	33.922	4.62	0	142.002	-	-	Ave/Fund
5755	105.15	0	120	H	33.922	4.62	0	143.692	-	-	Ave/Fund
11510	32.41	0	100	V	38.845	6.2	27.7	49.755	74	-24.245	Peak
11510	32.69	0	100	H	38.845	6.2	27.7	50.035	74	-23.965	Peak
11510	17.96	0	100	V	38.845	6.2	27.7	35.305	54	-18.695	Ave
11510	18.44	0	100	H	38.845	6.2	27.7	35.785	54	-18.215	Ave
17265	30.84	0	100	V	42.941	8.31	27.58	54.511	134.292	-79.781	Peak
17265	31.54	0	100	H	42.941	8.31	27.58	55.211	135.352	-80.141	Peak
17265	17.82	0	100	V	42.941	8.31	27.58	41.491	122.002	-80.511	Ave
17265	17.85	0	100	H	42.941	8.31	27.58	41.521	123.692	-82.171	Ave
23020	31.22	0	100	V	49.67	9.74	27.06	63.57	134.292	-70.722	Peak
23020	31.35	0	100	H	49.67	9.74	27.06	63.7	135.352	-71.652	Peak
23020	17.17	0	100	V	49.67	9.74	27.06	49.52	122.002	-72.482	Ave
23020	17.35	0	100	H	49.67	9.74	27.06	49.7	123.692	-73.992	Ave
Middle Channel 5785 MHz, measured at 3 meters											
5785	115.45	0	135	V	33.922	4.62	0	153.992	-	-	Peak/Fund
5785	116.49	0	120	H	33.922	4.62	0	155.032	-	-	Peak/Fund
5785	103.22	0	135	V	33.922	4.62	0	141.762	-	-	Ave/Fund
5785	104.55	0	120	H	33.922	4.62	0	143.092	-	-	Ave/Fund
11570	31.91	0	100	V	38.845	6.2	27.7	49.255	74	-24.745	Peak
11570	31.61	0	100	H	38.845	6.2	27.7	48.955	74	-25.045	Peak
11570	17.43	0	100	V	38.845	6.2	27.7	34.775	54	-19.225	Ave
11570	17.39	0	100	H	38.845	6.2	27.7	34.735	54	-19.265	Ave
17355	32.65	0	100	V	42.941	8.31	27.58	56.321	133.992	-77.671	Peak
17355	30.57	0	100	H	42.941	8.31	27.58	54.241	135.032	-80.791	Peak
17355	17.67	0	100	V	42.941	8.31	27.58	41.341	121.762	-80.421	Ave
17355	17.63	0	100	H	42.941	8.31	27.58	41.301	123.092	-81.791	Ave
23140	31.33	0	100	V	49.67	9.74	27.06	63.68	133.992	-70.312	Peak
23140	31.52	0	100	H	49.67	9.74	27.06	63.87	135.032	-71.162	Peak
23140	17.94	0	100	V	49.67	9.74	27.06	50.29	121.762	-71.472	Ave
23140	17.83	0	100	H	49.67	9.74	27.06	50.18	123.092	-72.912	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5815 MHz, measured at 3 meters											
5815	115.54	0	135	V	33.922	4.62	0	154.082	-	-	Peak/Fund
5815	117.14	0	120	H	33.922	4.62	0	155.682	-	-	Peak/Fund
5815	103.24	0	135	V	33.922	4.62	0	141.782	-	-	Ave/Fund
5815	105.01	0	120	H	33.922	4.62	0	143.552	-	-	Ave/Fund
11630	32.65	0	100	V	38.845	6.2	27.7	49.995	74	-24.005	Peak
11630	33.5	0	100	H	38.845	6.2	27.7	50.845	74	-23.155	Peak
11630	18.69	0	100	V	38.845	6.2	27.7	36.035	54	-17.965	Ave
11630	18.88	0	100	H	38.845	6.2	27.7	36.225	54	-17.775	Ave
17445	31.24	0	100	V	42.941	8.31	27.58	54.911	134.082	-79.171	Peak
17445	31.43	0	100	H	42.941	8.31	27.58	55.101	135.682	-80.581	Peak
17445	17.27	0	100	V	42.941	8.31	27.58	40.941	121.782	-80.841	Ave
17445	17.32	0	100	H	42.941	8.31	27.58	40.991	123.552	-82.561	Ave
23260	31.9	0	100	V	49.67	9.74	27.06	64.25	134.082	-69.832	Peak
23260	32.14	0	100	H	49.67	9.74	27.06	64.49	135.682	-71.192	Peak
23260	17.65	0	100	V	49.67	9.74	27.06	50	121.782	-71.782	Ave
23260	17.64	0	100	H	49.67	9.74	27.06	49.99	123.552	-73.562	Ave



## 80 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5775 MHz, measured at 3 meters											
5775	114.12	0	135	V	33.922	4.62	0	152.662	-	-	Peak/Fund
5775	114.73	0	120	H	33.922	4.62	0	153.272	-	-	Peak/Fund
5775	99.17	0	135	V	33.922	4.62	0	137.712	-	-	Ave/Fund
5775	101.58	0	120	H	33.922	4.62	0	140.122	-	-	Ave/Fund
11550	31.86	0	100	V	38.845	6.2	27.7	49.205	74	-24.795	Peak
11550	31.53	0	100	H	38.845	6.2	27.7	48.875	74	-25.125	Peak
11550	18.15	0	100	V	38.845	6.2	27.7	35.495	54	-18.505	Ave
11550	18.12	0	100	H	38.845	6.2	27.7	35.465	54	-18.535	Ave
17325	31.24	0	100	V	42.941	8.31	27.58	54.911	132.662	-77.751	Peak
17325	31.33	0	100	H	42.941	8.31	27.58	55.001	133.272	-78.271	Peak
17325	18.12	0	100	V	42.941	8.31	27.58	41.791	117.712	-75.921	Ave
17325	17.53	0	100	H	42.941	8.31	27.58	41.201	120.122	-78.921	Ave
23100	31.47	0	100	V	49.67	9.74	27.06	63.82	74	-10.18	Peak
23100	32.08	0	100	H	49.67	9.74	27.06	64.43	74	-9.57	Peak
23100	17.96	0	100	V	49.67	9.74	27.06	50.31	54	-3.69	Ave
23100	18.07	0	100	H	49.67	9.74	27.06	50.42	54	-3.58	Ave
Middle Channel 5785 MHz, measured at 3 meters											
5785	115.61	0	135	V	33.922	4.62	0	154.152	-	-	Peak/Fund
5785	116.78	0	120	H	33.922	4.62	0	155.322	-	-	Peak/Fund
5785	103.11	0	135	V	33.922	4.62	0	141.652	-	-	Ave/Fund
5785	104.3	0	120	H	33.922	4.62	0	142.842	-	-	Ave/Fund
11570	31.97	0	100	V	38.845	6.2	27.7	49.315	74	-24.685	Peak
11570	31.63	0	100	H	38.845	6.2	27.7	48.975	74	-25.025	Peak
11570	17.41	0	100	V	38.845	6.2	27.7	34.755	54	-19.245	Ave
11570	17.34	0	100	H	38.845	6.2	27.7	34.685	54	-19.315	Ave
17355	32.66	0	100	V	42.941	8.31	27.58	56.331	134.152	-77.821	Peak
17355	30.52	0	100	H	42.941	8.31	27.58	54.191	135.322	-81.131	Peak
17355	17.66	0	100	V	42.941	8.31	27.58	41.331	121.652	-80.321	Ave
17355	17.66	0	100	H	42.941	8.31	27.58	41.331	122.842	-81.511	Ave
23140	31.31	0	100	V	49.67	9.74	27.06	63.66	134.152	-70.492	Peak
23140	31.54	0	100	H	49.67	9.74	27.06	63.89	135.322	-71.432	Peak
23140	17.89	0	100	V	49.67	9.74	27.06	50.24	121.652	-71.412	Ave
23140	17.81	0	100	H	49.67	9.74	27.06	50.16	122.842	-72.682	Ave

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
High Channel 5795 MHz, measured at 3 meters											
5795	113.82	0	135	V	33.922	4.62	0	152.362	-	-	Peak/Fund
5795	114.68	0	120	H	33.922	4.62	0	153.222	-	-	Peak/Fund
5795	98.74	0	135	V	33.922	4.62	0	137.282	-	-	Ave/Fund
5795	101.53	0	120	H	33.922	4.62	0	140.072	-	-	Ave/Fund
11590	31.27	0	100	V	38.845	6.2	27.7	48.615	74	-25.385	Peak
11590	32.34	0	100	H	38.845	6.2	27.7	49.685	74	-24.315	Peak
11590	18.35	0	100	V	38.845	6.2	27.7	35.695	54	-18.305	Ave
11590	18.41	0	100	H	38.845	6.2	27.7	35.755	54	-18.245	Ave
17385	31.92	0	100	V	42.941	8.31	27.58	55.591	132.362	-76.771	Peak
17385	31.96	0	100	H	42.941	8.31	27.58	55.631	133.222	-77.591	Peak
17385	17.93	0	100	V	42.941	8.31	27.58	41.601	117.282	-75.681	Ave
17385	17.96	0	100	H	42.941	8.31	27.58	41.631	120.072	-78.441	Ave
23180	31.46	0	100	V	49.67	9.74	27.06	63.81	132.362	-68.552	Peak
23180	32.05	0	100	H	49.67	9.74	27.06	64.4	133.222	-68.822	Peak
23180	17.83	0	100	V	49.67	9.74	27.06	50.18	117.282	-67.102	Ave
23180	17.87	0	100	H	49.67	9.74	27.06	50.22	120.072	-69.852	Ave

### 3) Restricted Band, Measured at 3 meters

#### 5.2 GHz Band:

##### 20 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5165 MHz, measured at 3 meters											
4500	31.37	0	135	V	33.835	4.56	0	69.765	74	-4.235	Peak
4500	29.44	0	120	H	33.835	4.56	0	67.835	74	-6.165	Peak
4500	14.29	0	135	V	33.835	4.56	0	52.685	54	-1.315	Ave
4500	13.8	0	120	H	33.835	4.56	0	52.195	54	-1.805	Ave
High Channel 5240 MHz, measured at 3 meters											
5350	25.92	0	135	V	33.835	4.56	0	64.315	74	-9.685	Peak
5350	23.78	0	120	H	33.835	4.56	0	62.175	74	-11.825	Peak
5350	12.33	0	135	V	33.835	4.56	0	50.725	54	-3.275	Ave
5350	10.26	0	120	H	33.835	4.56	0	48.655	54	-5.345	Ave

##### 40 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel 5175 MHz, measured at 3 meters											
4500	31.42	0	135	V	33.835	4.56	0	69.815	74	-4.185	Peak
4500	31.06	0	120	H	33.835	4.56	0	69.455	74	-4.545	Peak
4500	14.65	0	135	V	33.835	4.56	0	53.045	54	-0.955	Ave
4500	13.44	0	120	H	33.835	4.56	0	51.835	54	-2.165	Ave
High Channel 5230 MHz, measured at 3 meters											
5350	26.01	0	135	V	33.835	4.56	0	64.405	74	-9.595	Peak
5350	23.37	0	120	H	33.835	4.56	0	61.765	74	-12.235	Peak
5350	12.09	0	135	V	33.835	4.56	0	50.485	54	-3.515	Ave
5350	11.41	0	120	H	33.835	4.56	0	49.805	54	-4.195	Ave

## 80 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Channel 5195 MHz, measured at 3 meters											
4500	30.83	0	135	V	33.835	4.56	0	69.225	74	-4.775	Peak
4500	31.86	0	120	H	33.835	4.56	0	70.255	74	-3.745	Peak
4500	14.79	0	135	V	33.835	4.56	0	53.185	54	-0.815	Ave
4500	14.52	0	120	H	33.835	4.56	0	52.915	54	-1.085	Ave
Channel 5210 MHz, measured at 3 meters											
5350	25.66	0	135	V	33.835	4.56	0	64.055	74	-9.945	Peak
5350	24.13	0	120	H	33.835	4.56	0	62.525	74	-11.475	Peak
5350	11.8	0	135	V	33.835	4.56	0	50.195	54	-3.805	Ave
5350	10.89	0	120	H	33.835	4.56	0	49.285	54	-4.715	Ave

## 5.8 GHz Band:

## 20 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel measured at 3 meters											
5460	31.79	0	135	V	33.122	4.62	0	69.532	74	-4.468	Peak
5460	28.97	0	120	H	33.122	4.62	0	66.712	74	-7.288	Peak
5460	15.67	0	135	V	33.122	4.62	0	53.412	54	-0.588	Ave
5460	15.55	0	120	H	33.122	4.62	0	53.292	54	-0.708	Ave

## 40 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel measured at 3 meters											
5460	30.31	0	135	V	33.122	4.62	0	68.052	74	-5.948	Peak
5460	28.54	0	120	H	33.122	4.62	0	66.282	74	-7.718	Peak
5460	15.49	0	135	V	33.122	4.62	0	53.232	54	-0.768	Ave
5460	14.71	0	120	H	33.122	4.62	0	52.452	54	-1.548	Ave

## 80 MHz Bandwidth

Frequency (MHz)	S.A. Reading (dBμV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre- Amp. (dB)	Cord. Reading (dBμV/m)	FCC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	
Low Channel measured at 3 meters											
5460	30.57	0	135	V	33.122	4.62	0	68.312	74	-5.688	Peak
5460	28.29	0	120	H	33.122	4.62	0	66.032	74	-7.968	Peak
5460	15.79	0	135	V	33.122	4.62	0	53.532	54	-0.468	Ave
5460	13.41	0	120	H	33.122	4.62	0	51.152	54	-2.848	Ave

## 8 FCC §15.407(a)(1) & §15.407(e) - Emission Bandwidth

### 8.1 Applicable Standards

FCC §15.407(a)(1), and §15.407(e).

### 8.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section C: Emission bandwidth and section D: 99 Percent Occupied Bandwidth

### 8.3 Test Equipment List and Details

Manufacturers	Description	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2013-02-28	1 year
EMCO	Antenna, Horn	3115	9511-4627	2013-10-17	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2013-05-09	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 8.4 Test Environmental Conditions

Temperature:	21-23 °C
Relative Humidity:	43-48 %
ATM Pressure:	101.1-101.3 kPa

The testing was performed by CIPHER Chu on 2014-03-06 to 2014-03-14 at the 10m chamber 1.

### 8.5 Test Results

Please refer to the following tables and plots

**5.2 GHz Band:**

<b>TX Chain</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Emission Bandwidth (MHz)</b>	<b>26 dB Emission Bandwidth (MHz)</b>
<b>20 MHz Bandwidth</b>				
C1	Low	5165	18.1546	24.514
	Middle	5200	18.5148	30
	High	5240	18.1684	23.923
C2	Low	5165	18.1211	24.716
	Middle	5200	19.5548	30
	High	5240	18.388	25.044
C3	Low	5165	18.0944	24.924
	Middle	5200	18.1842	30
	High	5240	18.1674	23.923
C4	Low	5165	18.1234	25.407
	Middle	5200	18.1119	28.612
	High	5240	17.9763	24.14
<b>40 MHz Bandwidth</b>				
C1	Low	5175	36.3013	42.839
	Middle	5200	36.6305	60
	High	5230	36.388	42.316
C2	Low	5175	36.3109	42.366
	Middle	5200	36.7116	60
	High	5230	36.3994	42.227
C3	Low	5175	36.3171	41.9
	Middle	5200	36.4023	58.015
	High	5230	36.412	42.834
C4	Low	5175	36.3097	42.839
	Middle	5200	36.4212	56.849
	High	5230	36.2532	41.228
<b>80 MHz Bandwidth</b>				
C1	Low	5195	75.1916	81.41
	Middle	5200	75.8675	118.059
	High	5210	75.2621	80.554
C2	Low	5195	75.1966	80.267
	Middle	5200	77.6413	120
	High	5210	75.255	80.336
C3	Low	5195	75.3629	83.593
	Middle	5200	75.9919	116.428
	High	5210	75.2117	80.165
C4	Low	5195	75.196	82.522
	Middle	5200	75.7804	116.144
	High	5210	75.2208	80.146

**5.8 GHz Band:**

TX Chain	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)	Results
20 MHz Bandwidth						
C1	Low	5745	17.7278	17.653	> 500	Compliant
	Middle	5785	17.7515	17.707	> 500	Compliant
	High	5825	17.7536	17.696	> 500	Compliant
C2	Low	5745	17.7194	17.635	> 500	Compliant
	Middle	5785	17.7296	17.691	> 500	Compliant
	High	5825	17.7305	17.636	> 500	Compliant
C3	Low	5745	17.7600	17.634	> 500	Compliant
	Middle	5785	17.7807	17.633	> 500	Compliant
	High	5825	17.7092	17.642	> 500	Compliant
C4	Low	5745	17.7104	17.669	> 500	Compliant
	Middle	5785	17.7212	17.657	> 500	Compliant
	High	5825	17.7222	17.675	> 500	Compliant
40 MHz Bandwidth						
C1	Low	5755	36.1811	36.376	> 500	Compliant
	Middle	5785	36.1945	36.336	> 500	Compliant
	High	5815	36.2135	36.455	> 500	Compliant
C2	Low	5755	36.1737	36.406	> 500	Compliant
	Middle	5785	36.2103	36.434	> 500	Compliant
	High	5815	36.1809	36.400	> 500	Compliant
C3	Low	5755	36.2214	36.423	> 500	Compliant
	Middle	5785	36.2300	36.387	> 500	Compliant
	High	5815	36.2268	36.338	> 500	Compliant
C4	Low	5755	36.1937	36.389	> 500	Compliant
	Middle	5785	36.2268	36.402	> 500	Compliant
	High	5815	36.2081	36.364	> 500	Compliant
80 MHz Bandwidth						
C1	Low	5775	75.3012	74.346	> 500	Compliant
	Middle	5785	75.4059	75.613	> 500	Compliant
	High	5795	75.2797	75.544	> 500	Compliant
C2	Low	5775	75.2402	75.589	> 500	Compliant
	Middle	5785	75.2744	75.479	> 500	Compliant
	High	5795	75.1288	75.144	> 500	Compliant
C3	Low	5775	75.4016	75.582	> 500	Compliant
	Middle	5785	75.7384	72.198	> 500	Compliant
	High	5795	75.4116	75.497	> 500	Compliant
C4	Low	5775	75.4615	75.5	> 500	Compliant
	Middle	5785	75.7727	75.429	> 500	Compliant
	High	5795	75.5398	75.423	> 500	Compliant



**Beamforming****5.2 GHz Band:**

<b>TX Chain</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Emission Bandwidth (MHz)</b>	<b>26 dB Emission Bandwidth (MHz)</b>
<b>20 MHz Bandwidth</b>				
H	Low	5165	18.0161	23.812
	Middle	5200	18.2981	25.627
	High	5240	18.0371	23.782
V	Low	5165	18.0464	23.925
	Middle	5200	18.2902	25.51
	High	5240	18.0238	23.782
<b>40 MHz Bandwidth</b>				
H	Low	5175	36.3683	41.976
	Middle	5200	36.4098	42.014
	High	5230	36.3143	41.051
V	Low	5175	36.3743	42.076
	Middle	5200	36.3895	41.699
	High	5230	36.3214	41.147
<b>80 MHz Bandwidth</b>				
H	Low	5195	75.372	80.987
	Middle	5200	75.5198	95.302
	High	5210	75.2298	82.838
V	Low	5195	75.2489	81.579
	Middle	5200	75.5097	95.944
	High	5210	75.091	80.027

**5.8 GHz Band:**

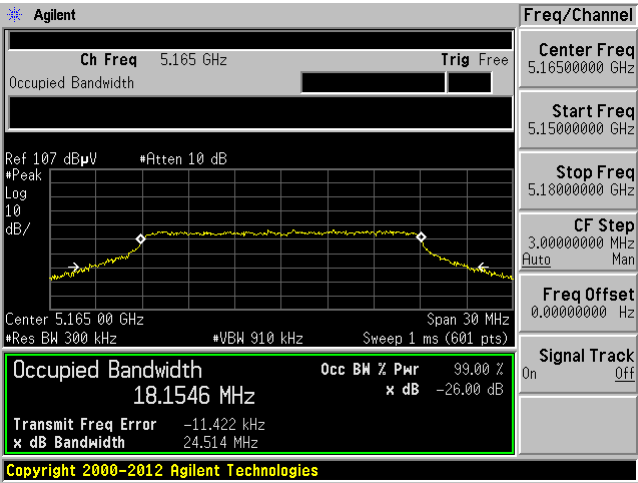
TX Chain	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)	Results
20 MHz Bandwidth						
H	Low	5745	17.7239	17.690	> 500	Compliant
	Middle	5785	17.7092	17.822	> 500	Compliant
	High	5825	17.7283	17.818	> 500	Compliant
V	Low	5745	17.7203	17.690	> 500	Compliant
	Middle	5785	17.7180	17.802	> 500	Compliant
	High	5825	17.7106	17.784	> 500	Compliant
40 MHz Bandwidth						
H	Low	5755	36.1928	36.527	> 500	Compliant
	Middle	5785	36.1388	36.542	> 500	Compliant
	High	5815	36.1782	36.581	> 500	Compliant
V	Low	5755	36.1992	36.107	> 500	Compliant
	Middle	5785	36.1443	36.541	> 500	Compliant
	High	5815	36.1708	36.528	> 500	Compliant
80 MHz Bandwidth						
H	Low	5775	75.2368	75.962	> 500	Compliant
	Middle	5785	75.0307	70.459	> 500	Compliant
	High	5795	75.0509	75.071	> 500	Compliant
V	Low	5775	75.2622	75.513	> 500	Compliant
	Middle	5785	75.0105	71.113	> 500	Compliant
	High	5795	75.1738	75.835	> 500	Compliant

Note: (1) Chain1 and Chain 4 is Vertical, and Chain 2 and Chain 3 is Horizontal  
 (2) C1, C2, C3 and C4 stands for TX Chain1, Chain2, Chain3 and Chain4.

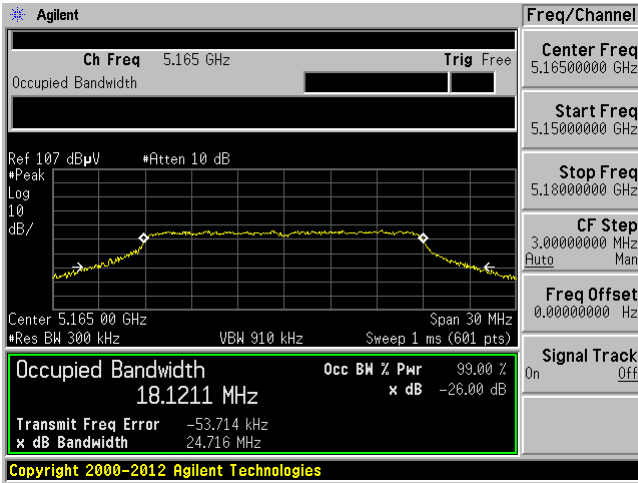
5.2 GHz Band:

20 MHz, Low Channel, 5165 MHz

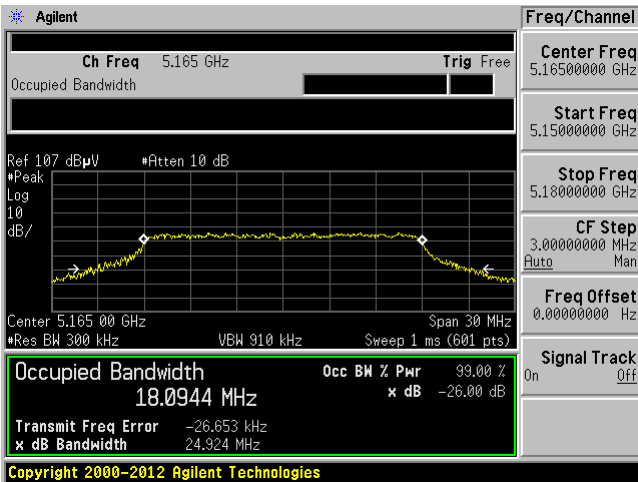
C1



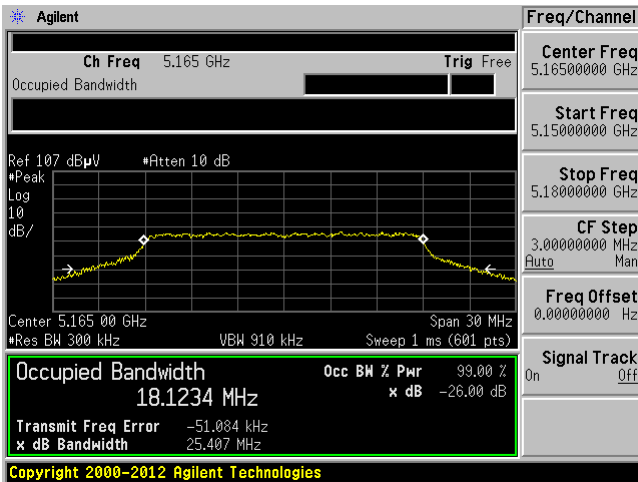
C2



C3

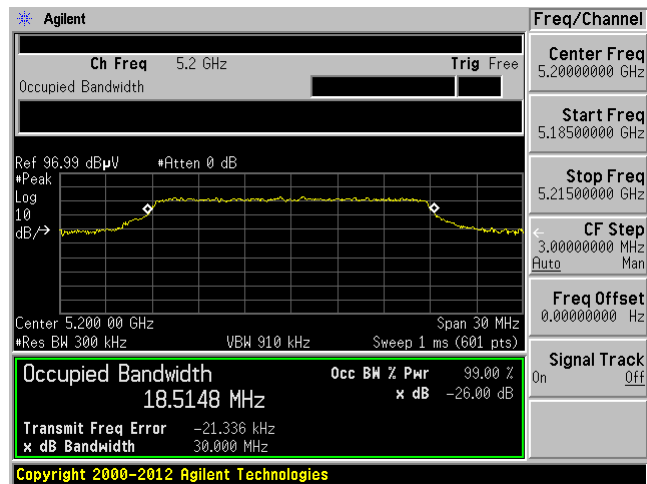


C4

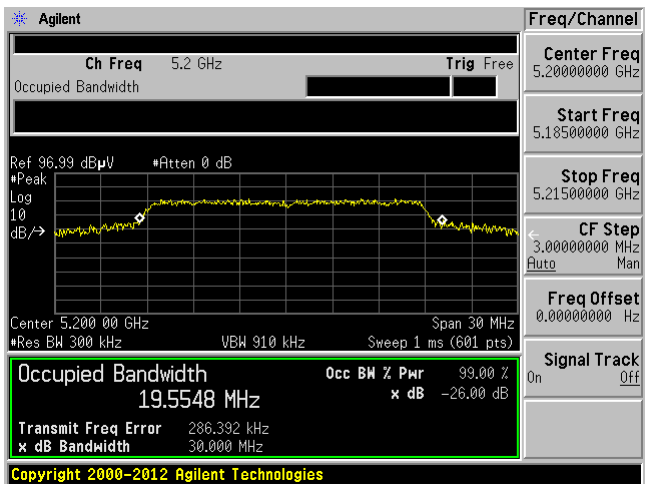


20 MHz, Middle Channel, 5200 MHz

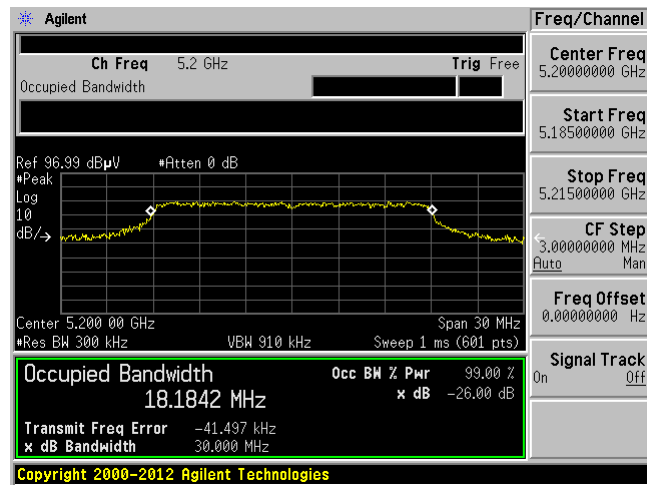
C1



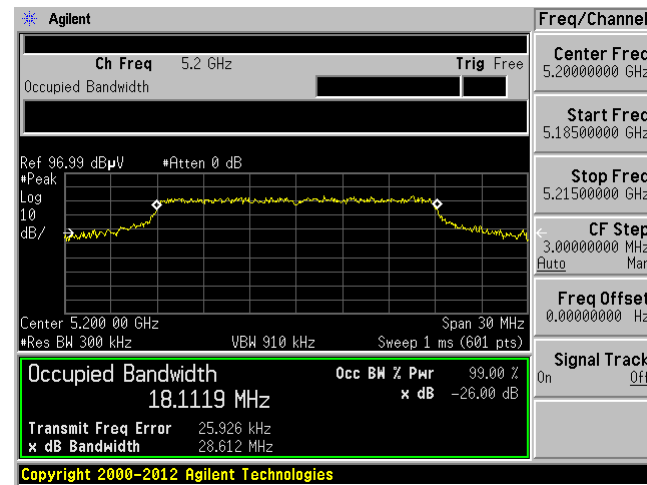
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C3

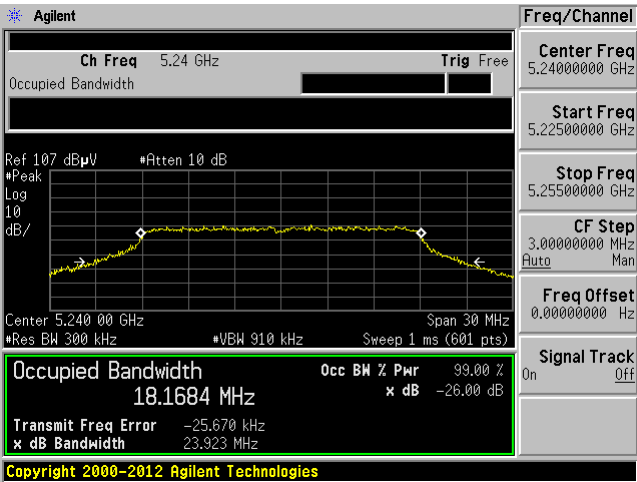


C4

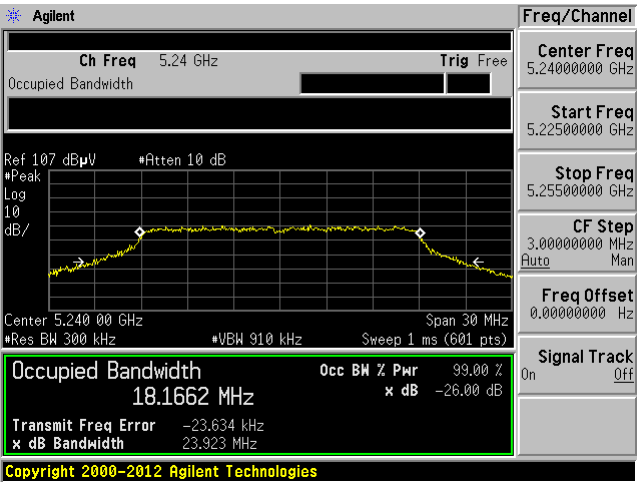


20 MHz, High Channel, 5240 MHz

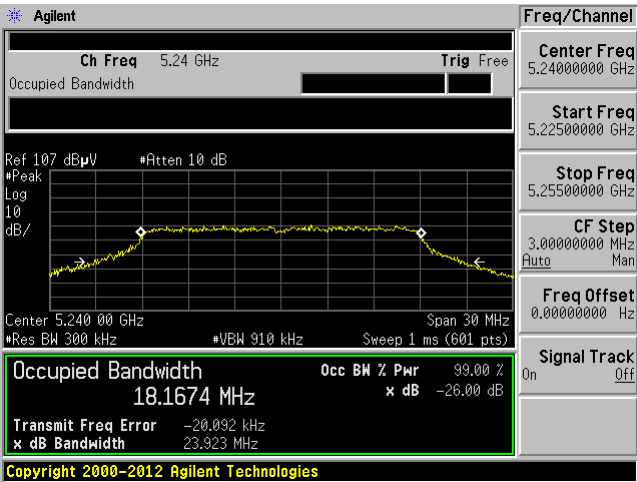
C1



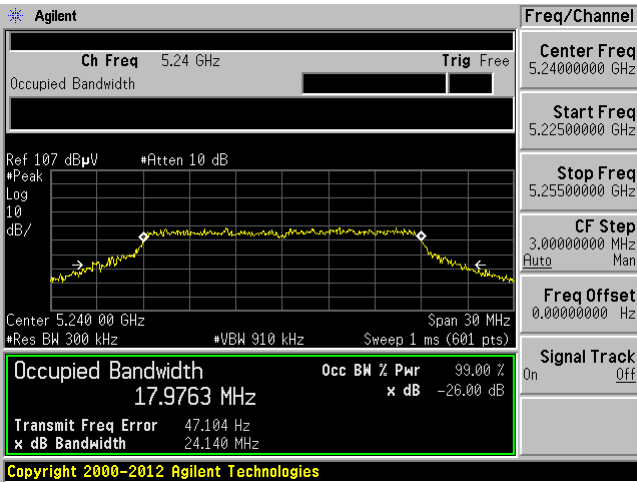
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C3

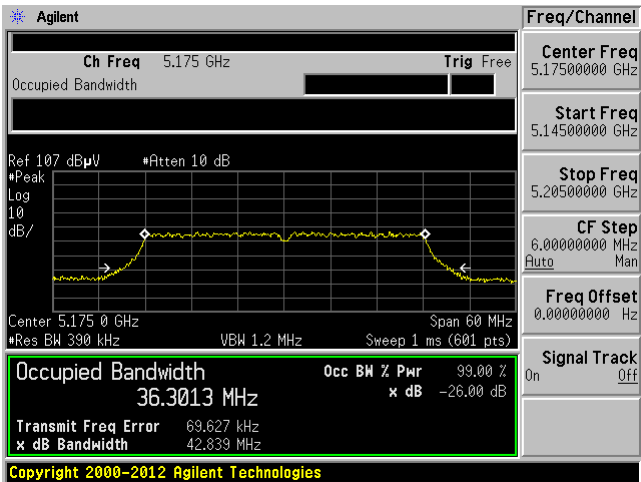


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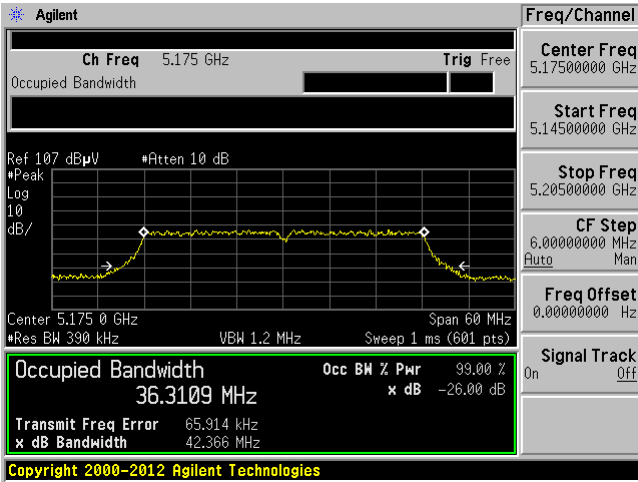


40 MHz, Low Channel, 5175 MHz

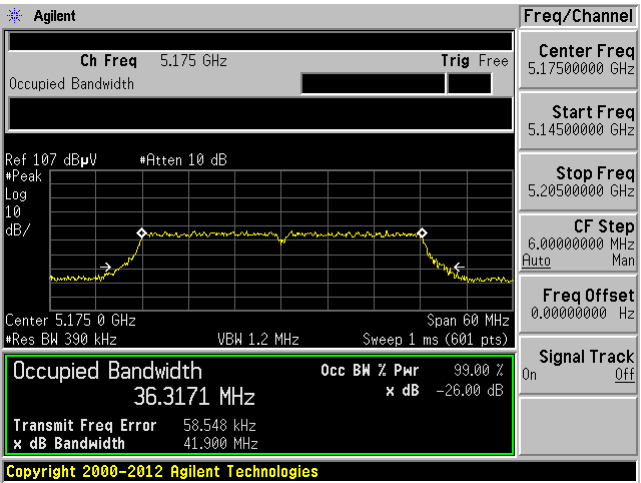
C1



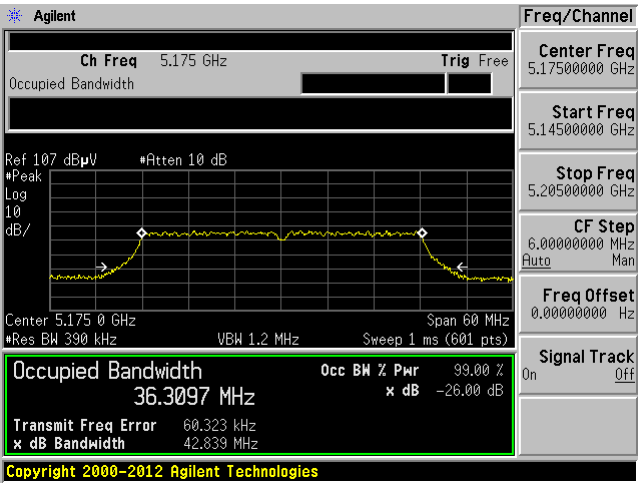
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C3

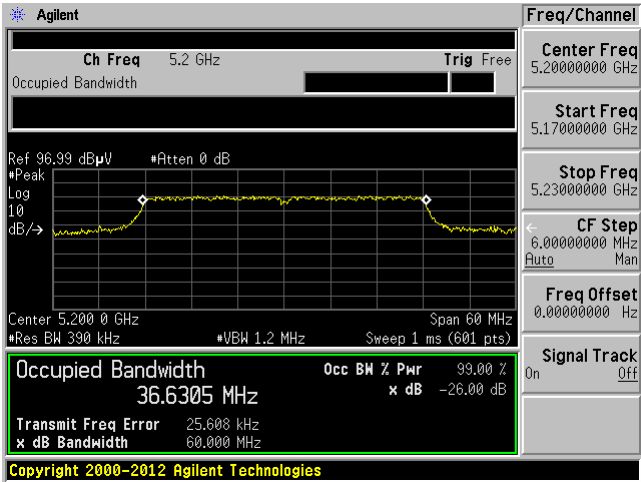


C4

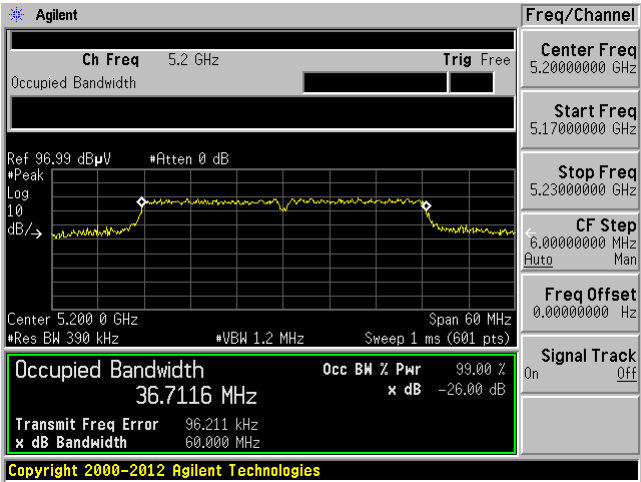


40 MHz, Middle Channel, 5200 MHz

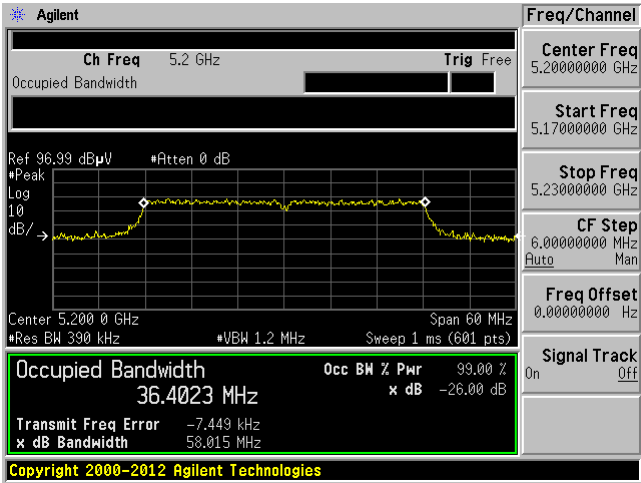
C1



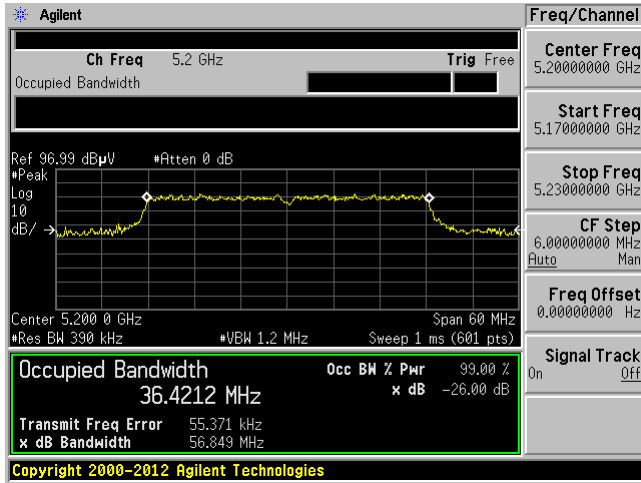
C2



C3

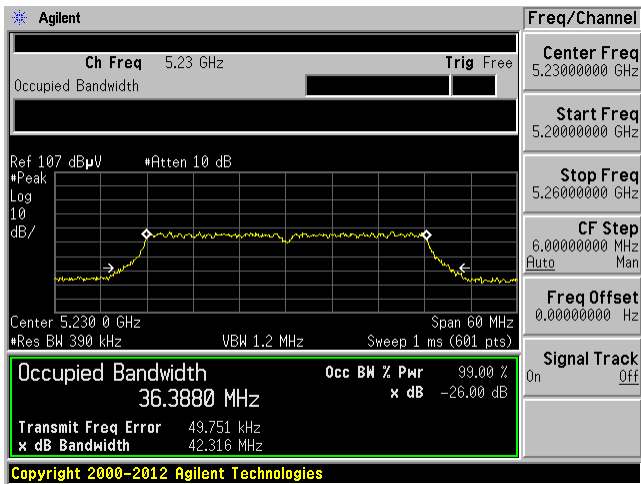


C4

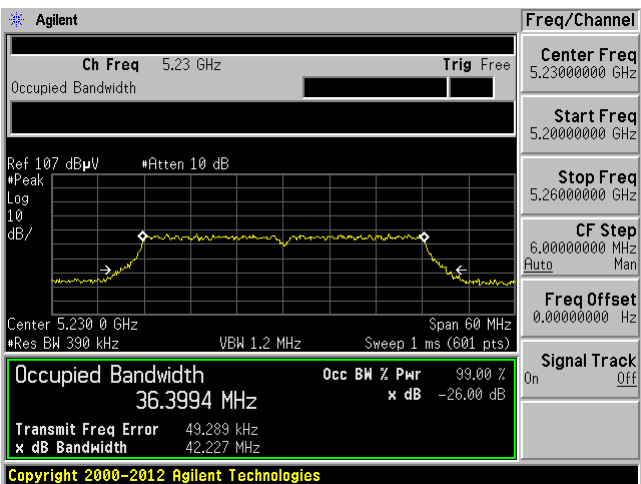


40 MHz, High Channel, 5230 MHz

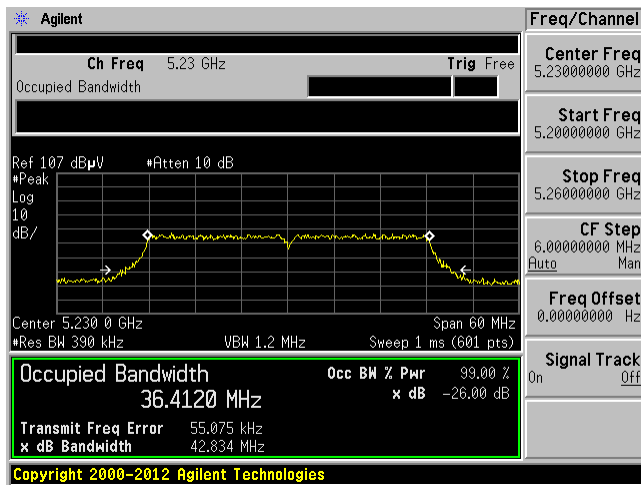
C1



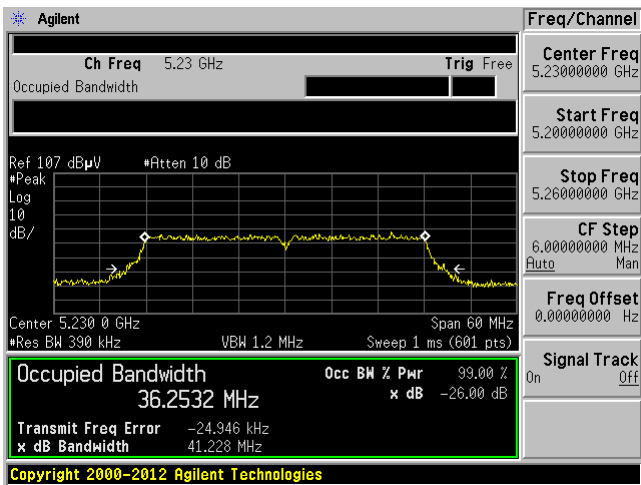
C2



C3



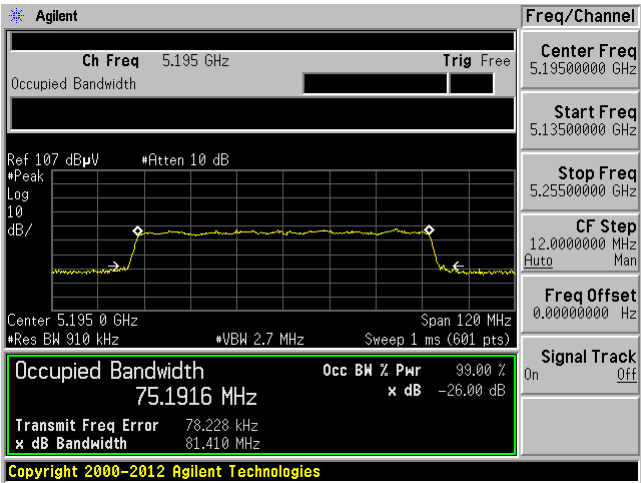
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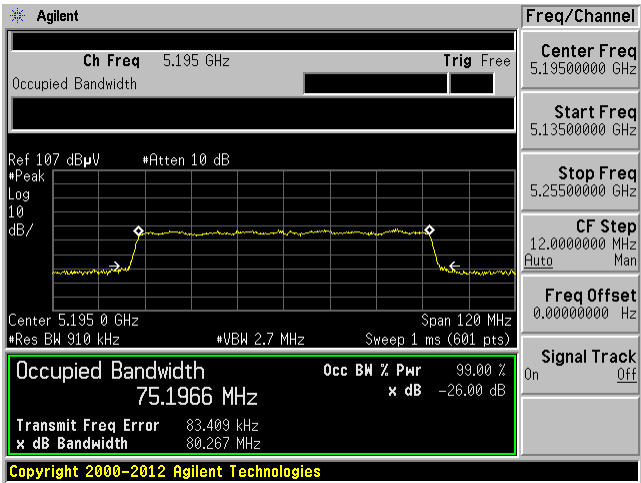


80 MHz, Low Channel, 5195 MHz

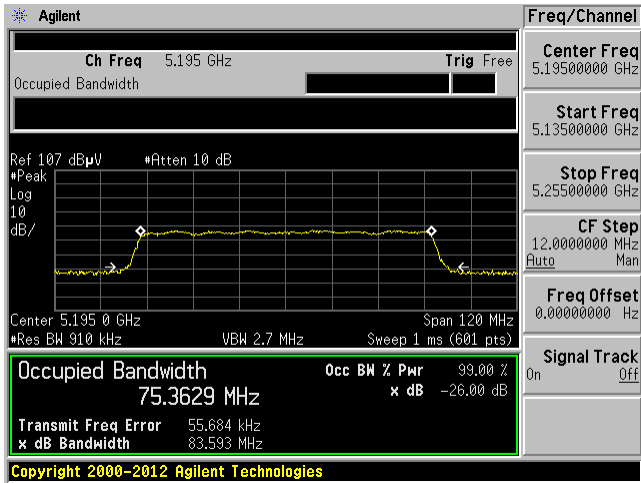
C1



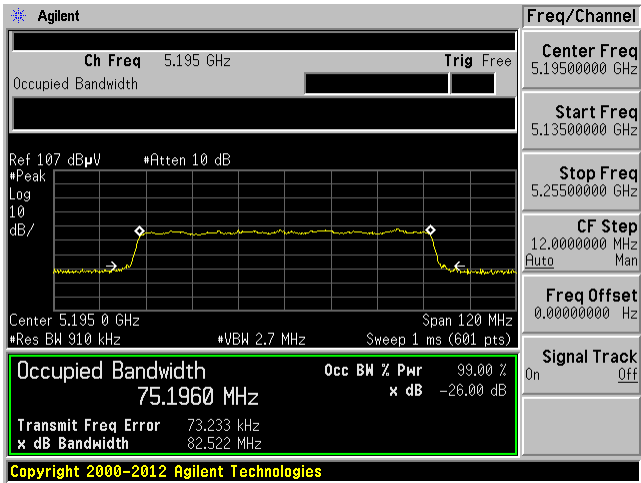
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C3

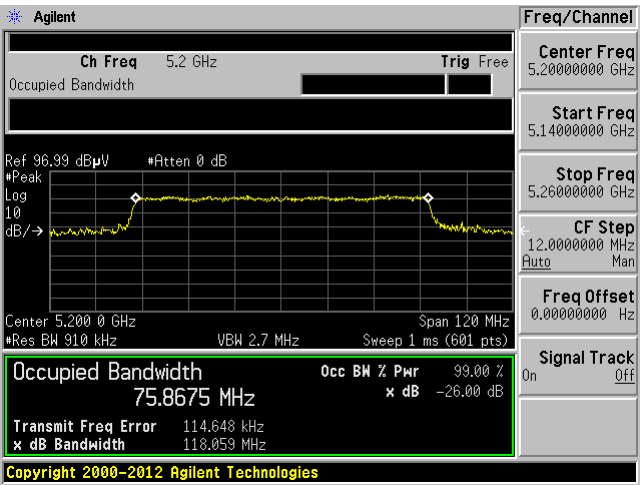


C4

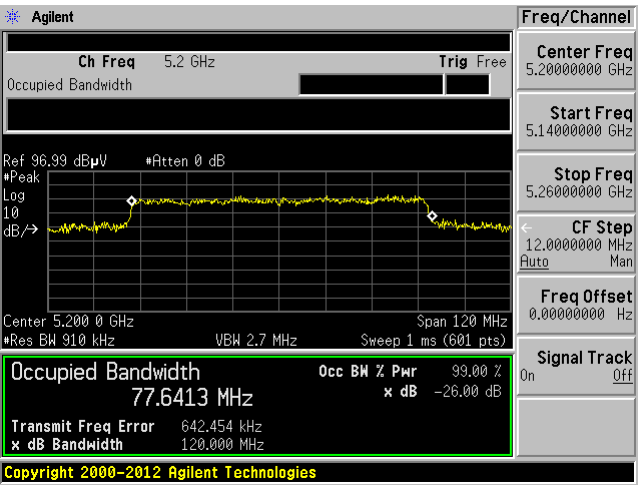


80 MHz, Middle Channel, 5200 MHz

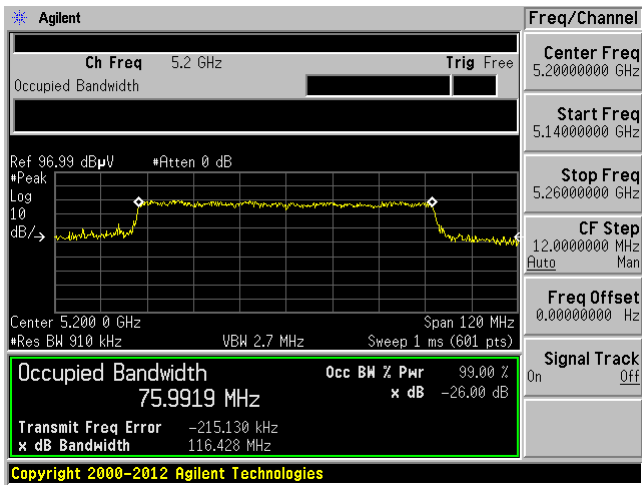
C1



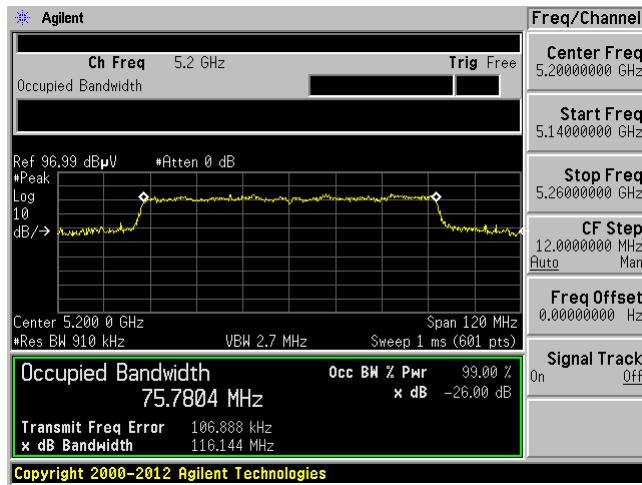
C2



C3

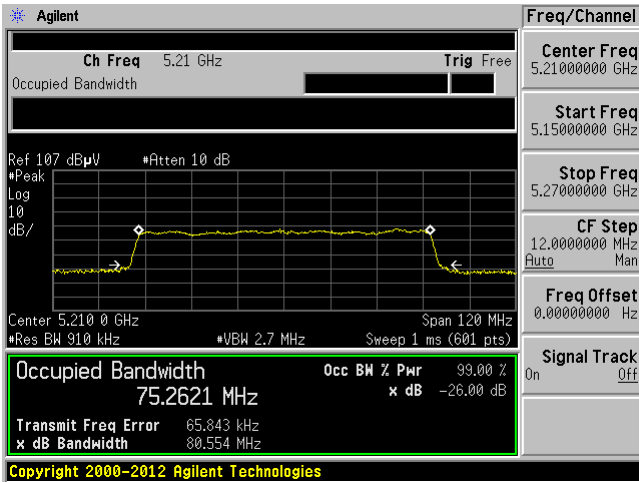


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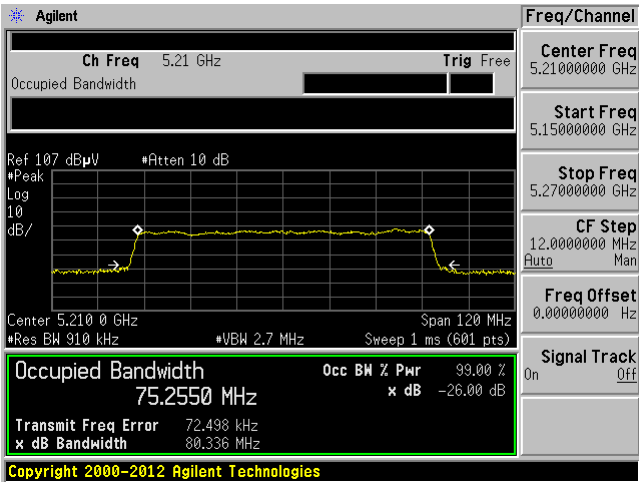


80 MHz, High Channel, 5210 MHz

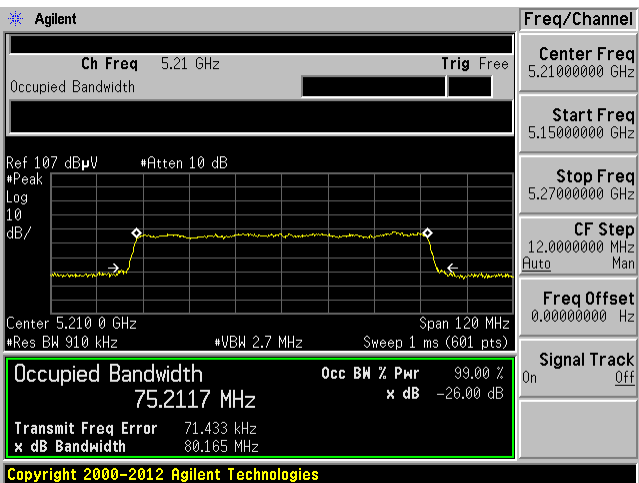
C1



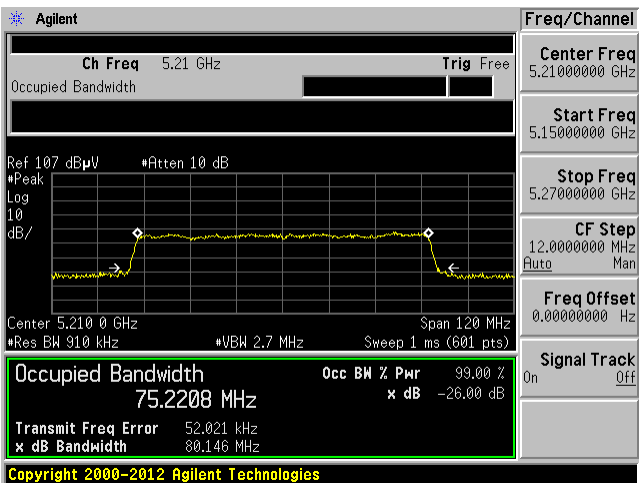
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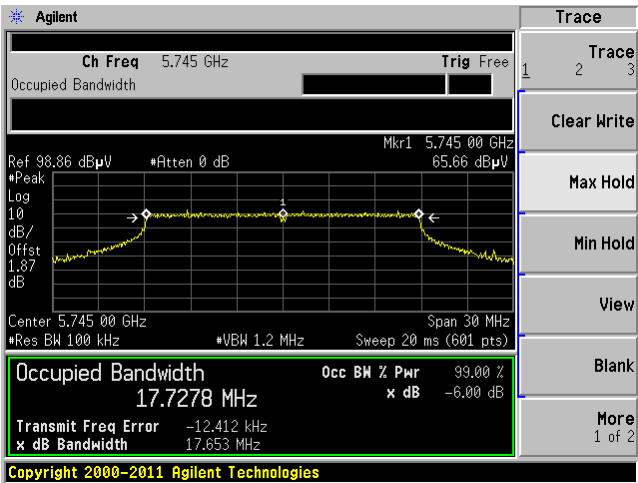
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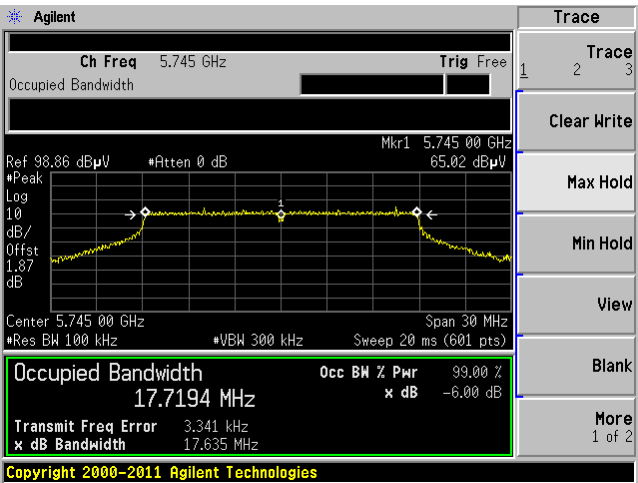
5.8 GHz Band:

20 MHz, Low Channel, 5745 MHz

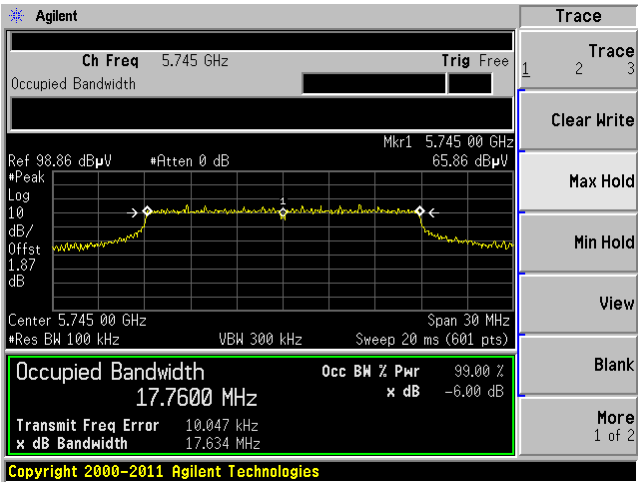
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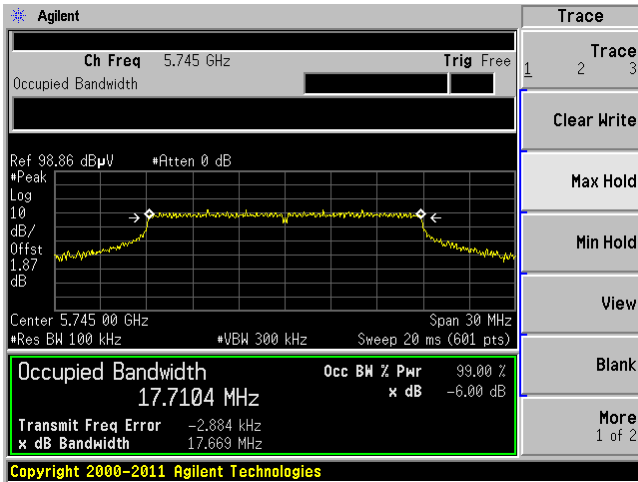
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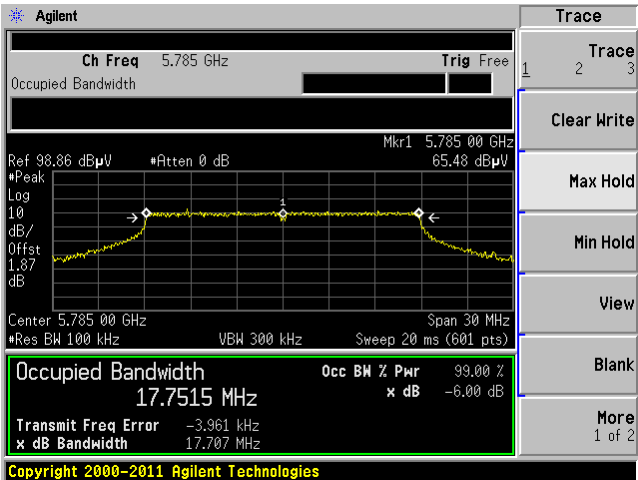


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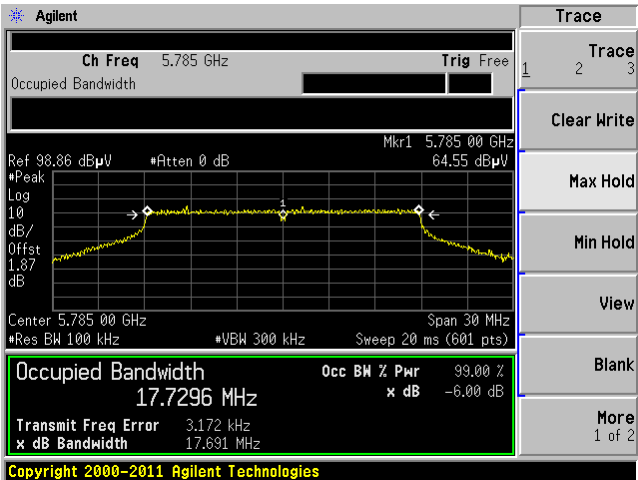


20 MHz, Middle Channel, 5785 MHz

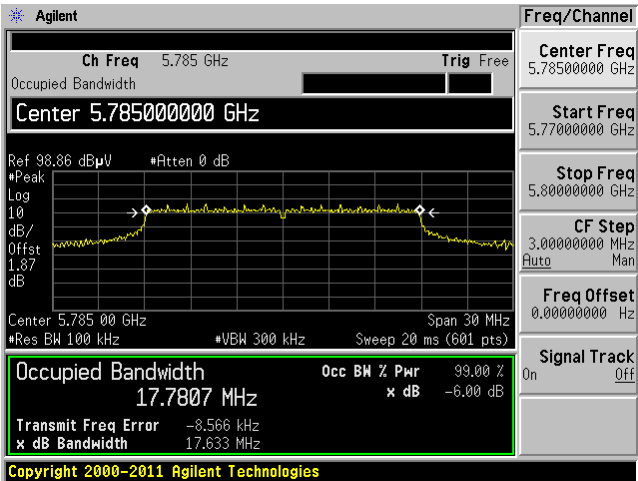
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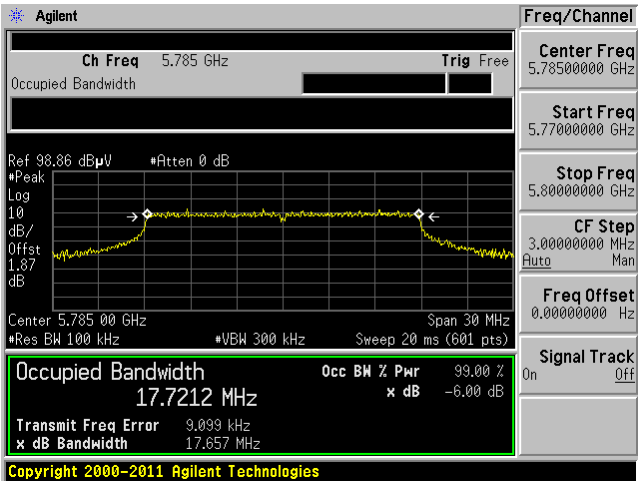
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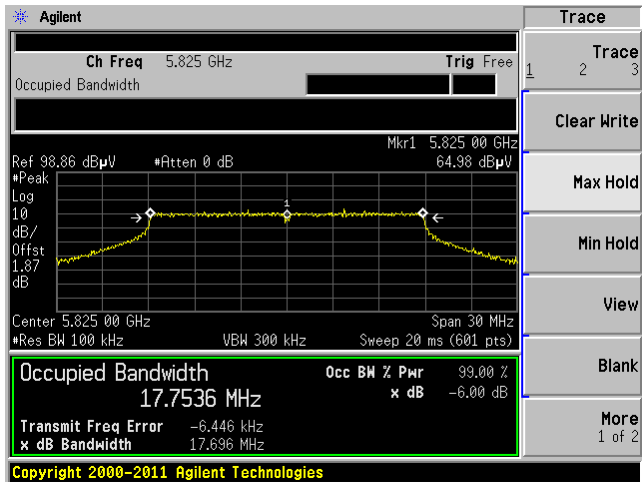


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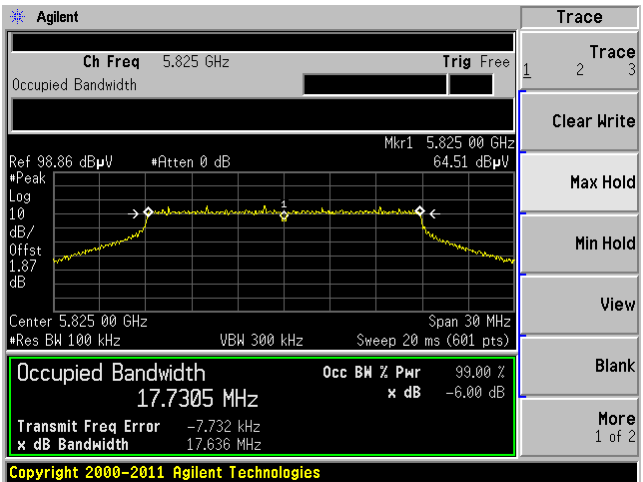


20 MHz, High Channel, 5825 MHz

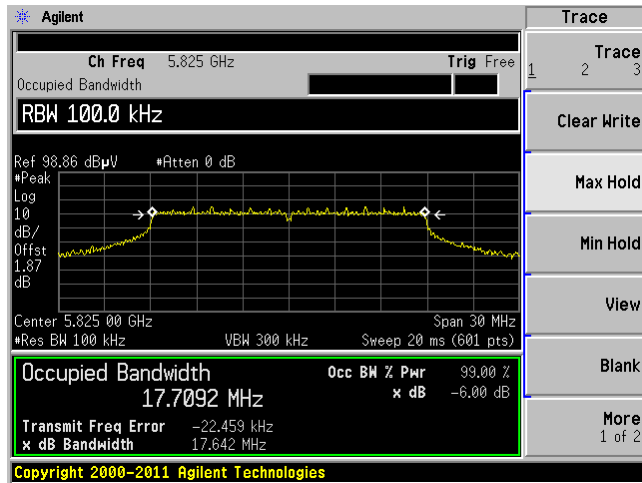
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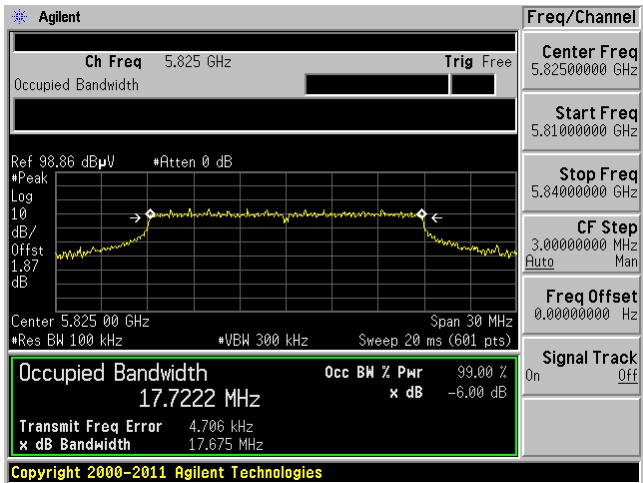
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C3

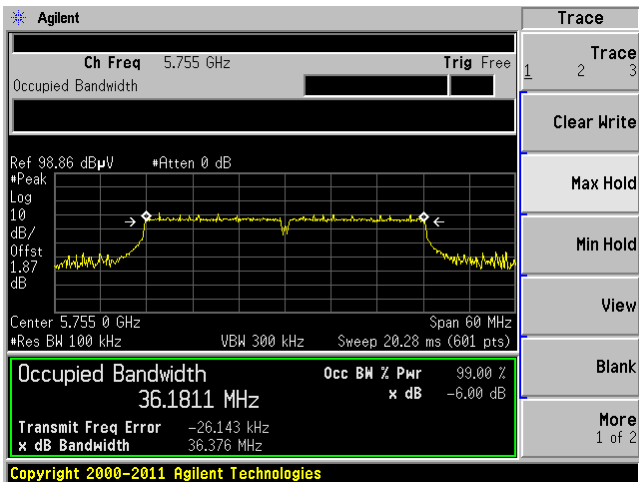


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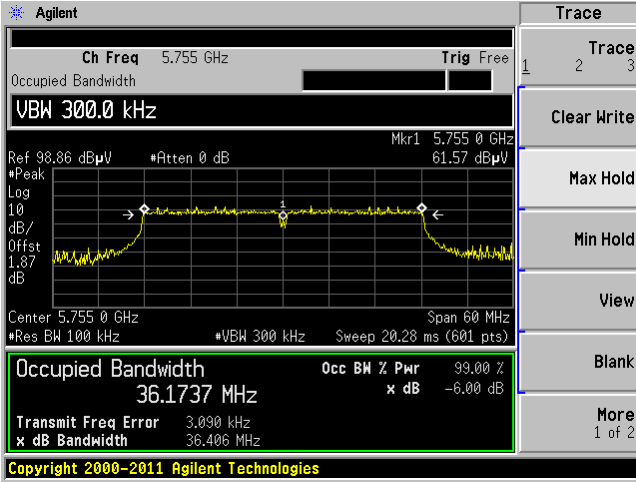


40 MHz, Low Channel, 5755 MHz

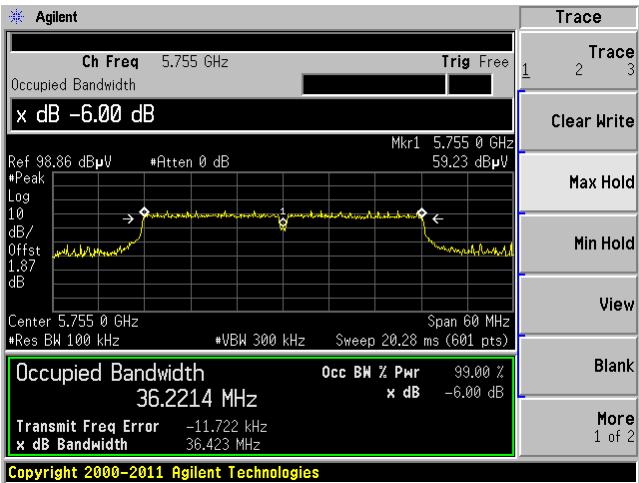
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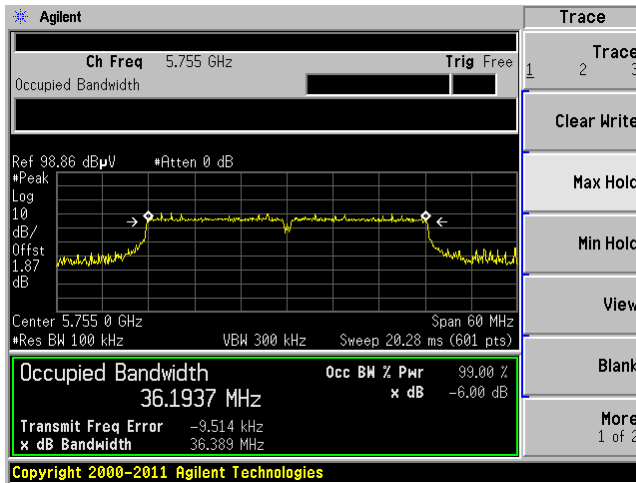
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C3

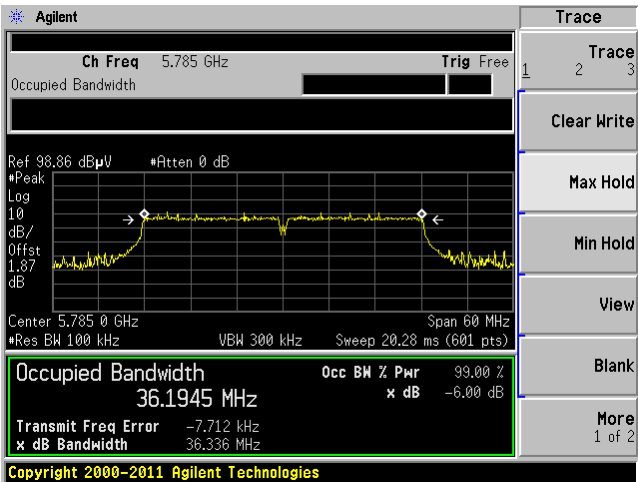


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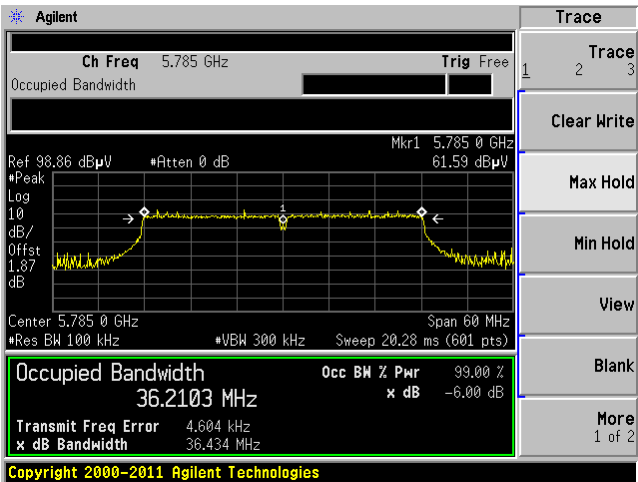


40 MHz, Middle Channel, 5785 MHz

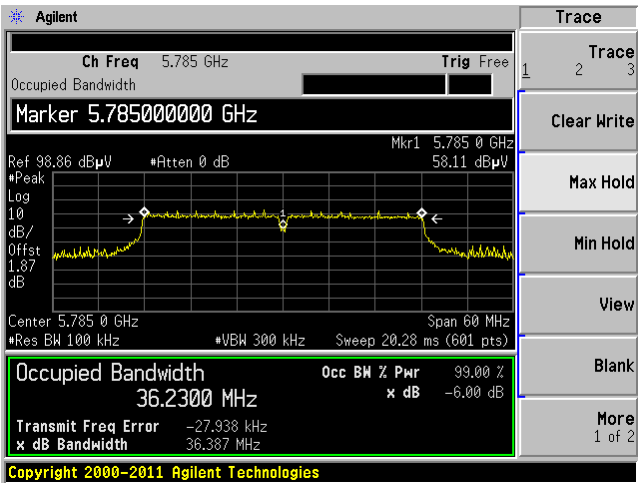
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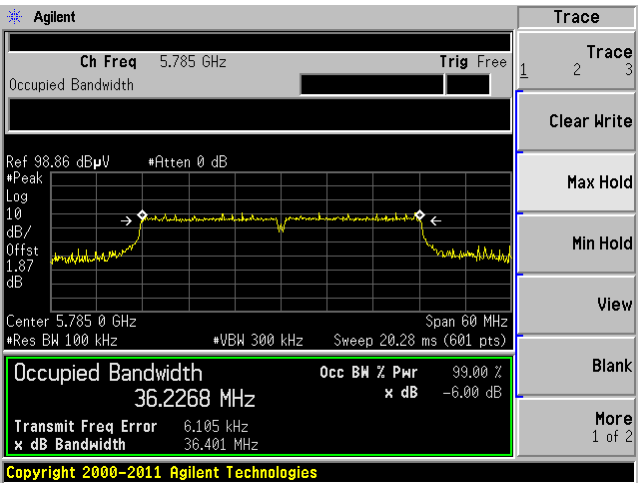
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C3



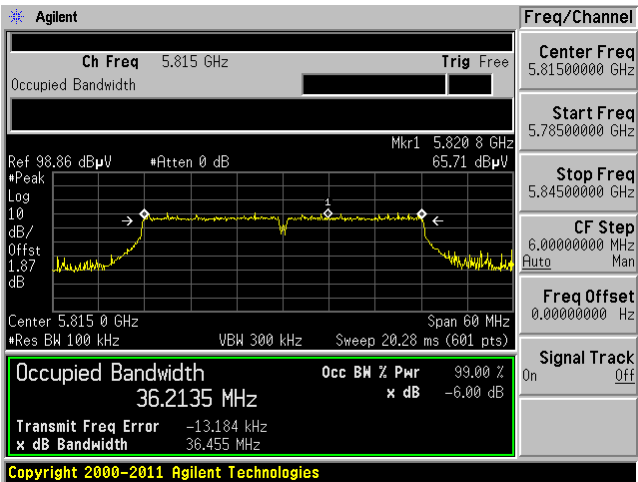
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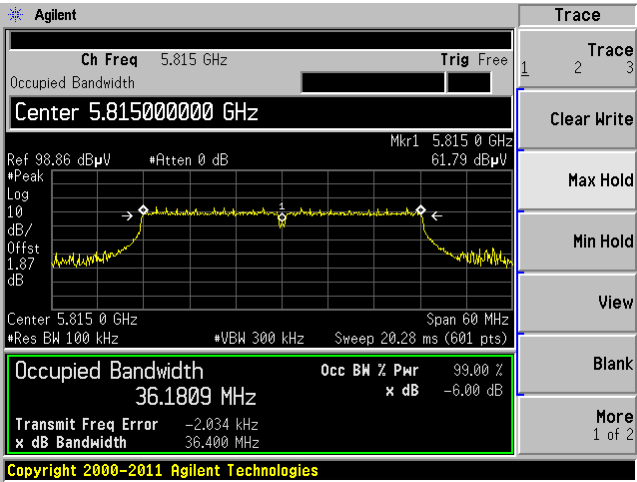


40 MHz, High Channel, 5815 MHz

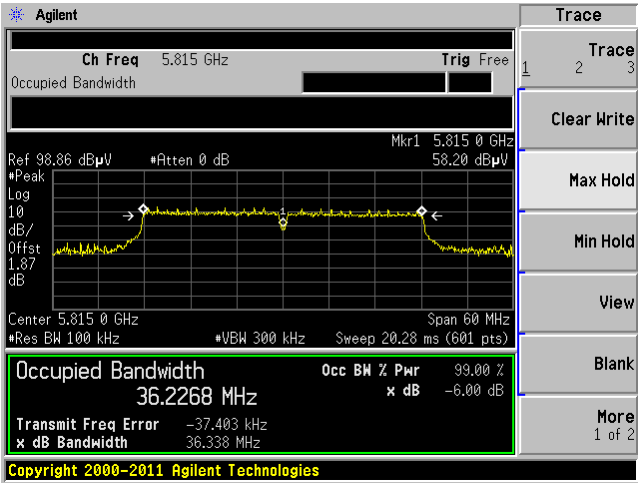
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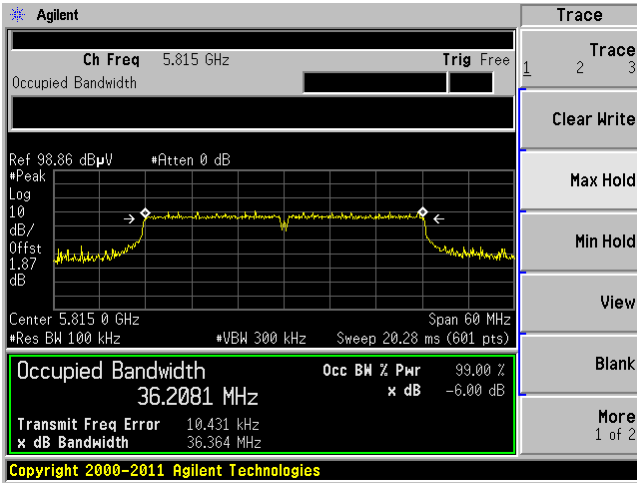
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C3

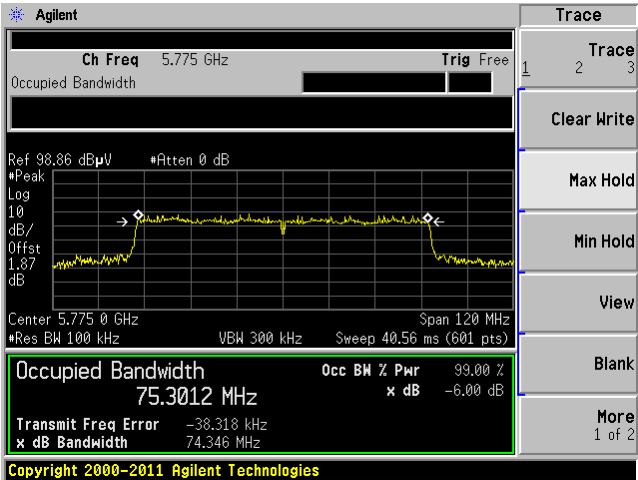


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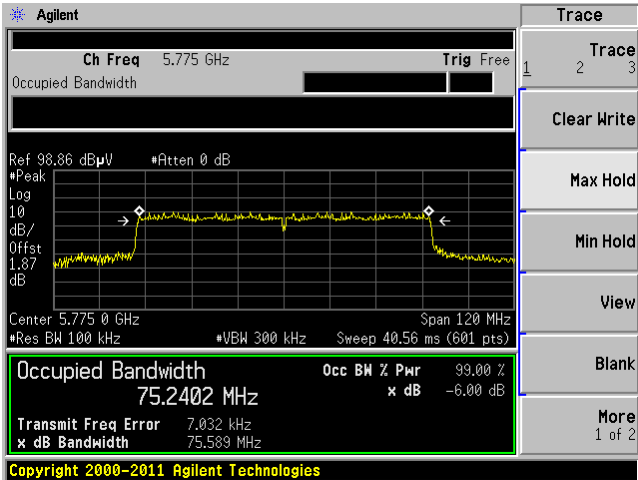


80 MHz, Low Channel, 5775 MHz

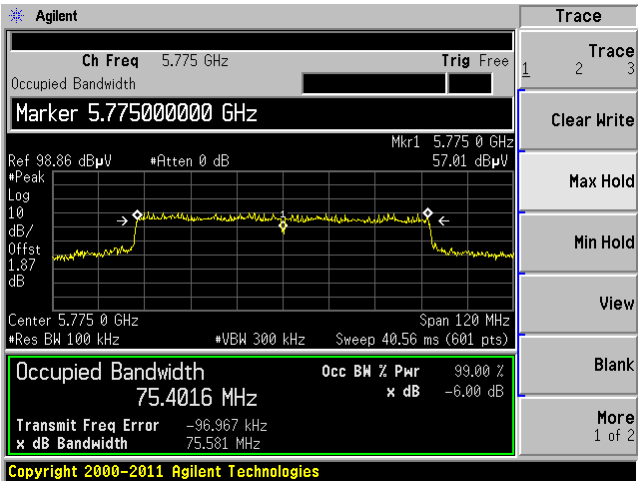
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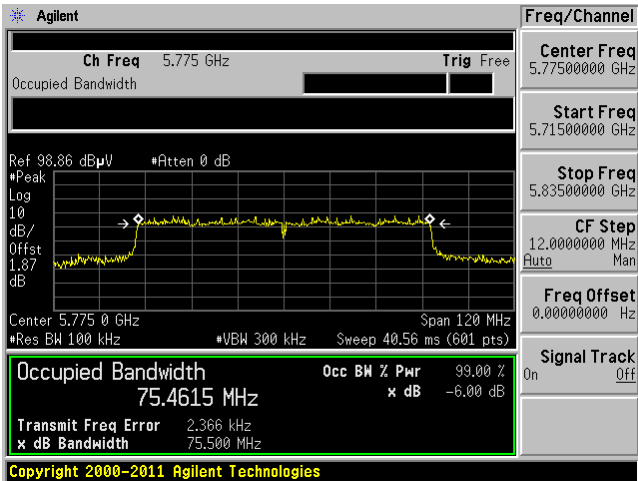
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C3

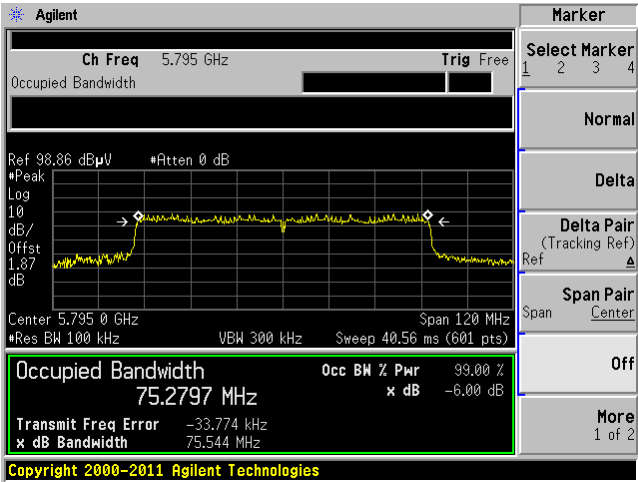


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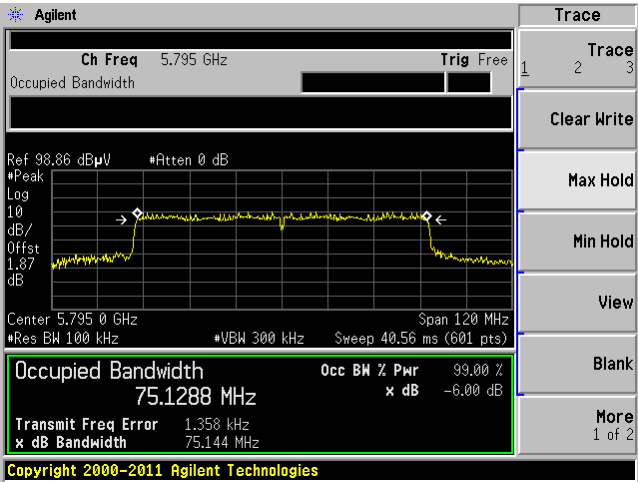


80 MHz, High Channel, 5795 MHz

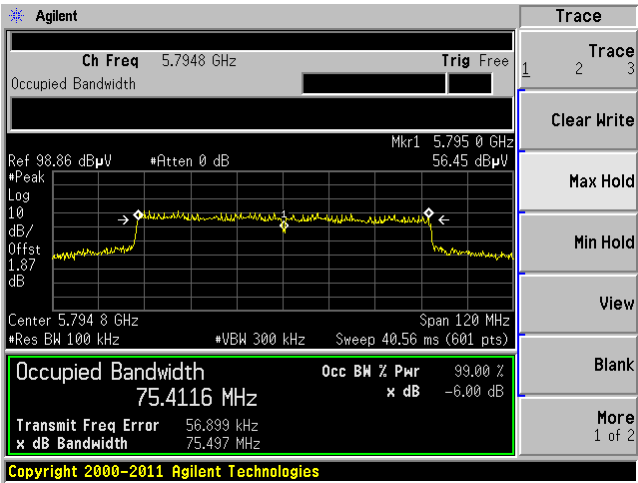
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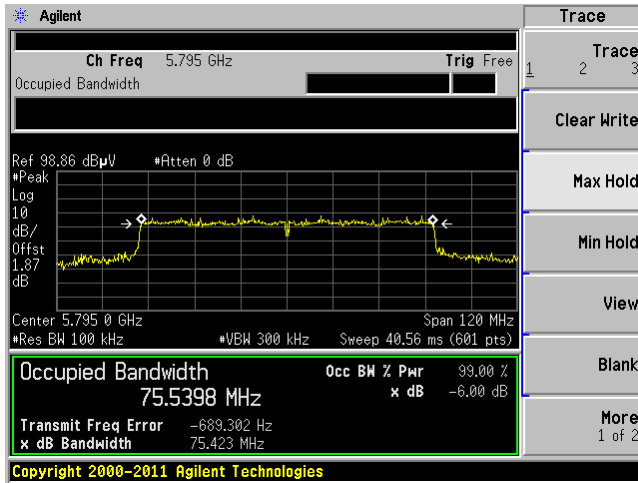
C2



C3



C4

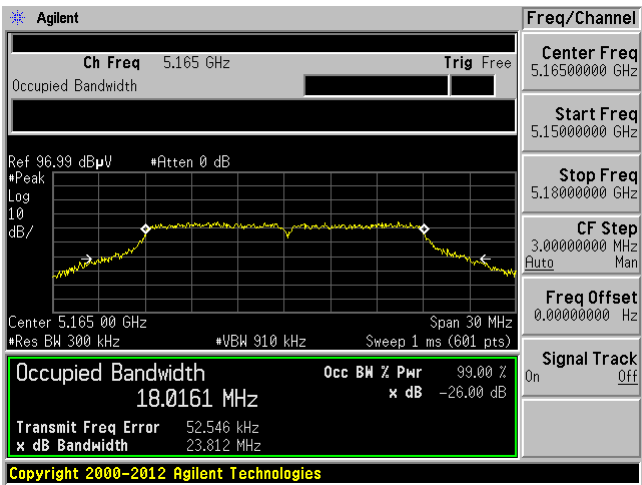


Beamforming

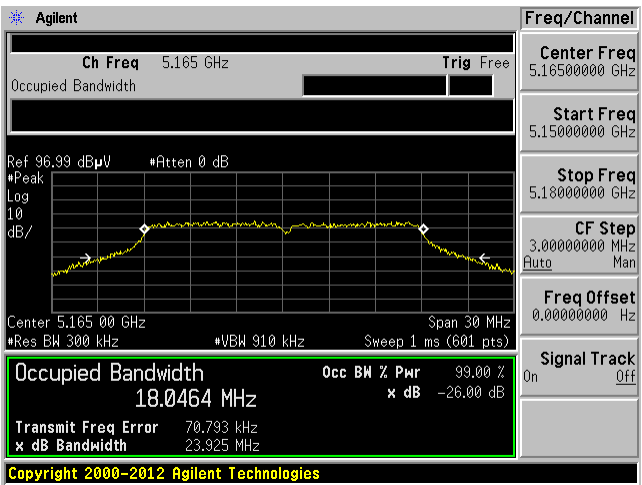
5.2 GHz Band:

20 MHz, Low Channel, 5165 MHz

H

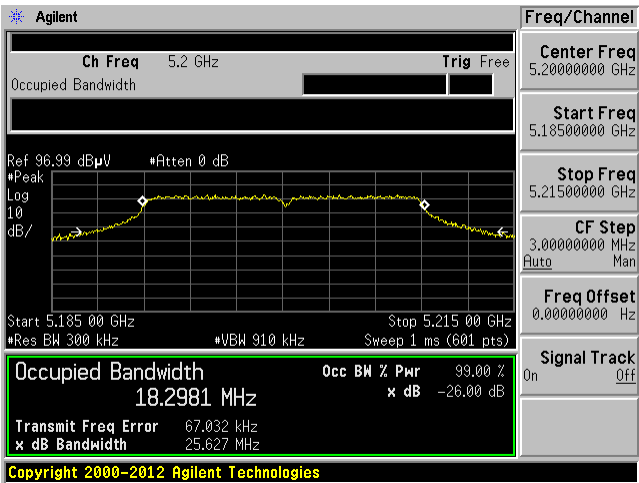


V

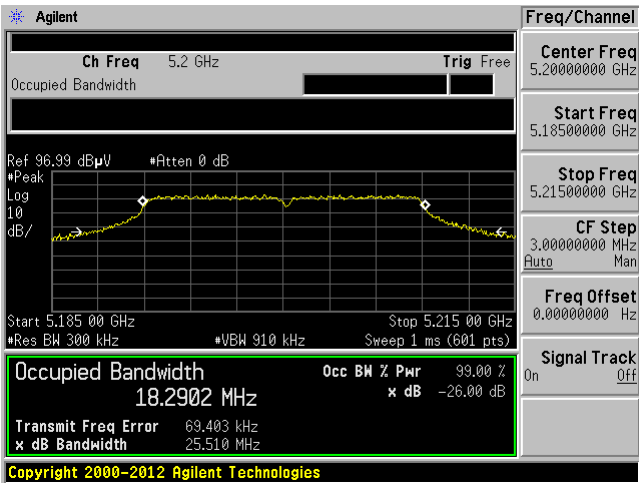


20 MHz, Middle Channel, 5200 MHz

H

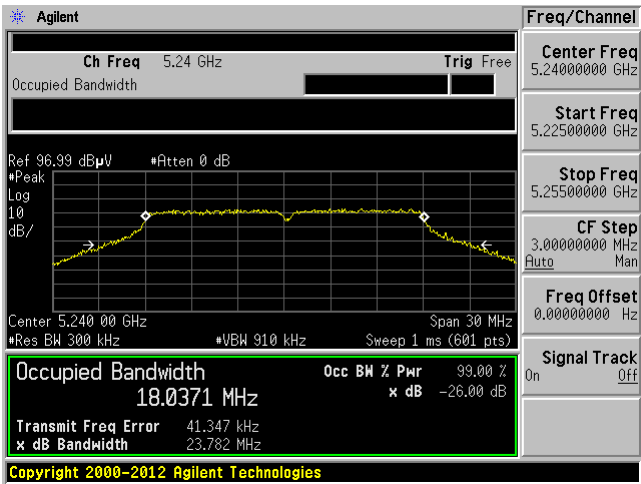


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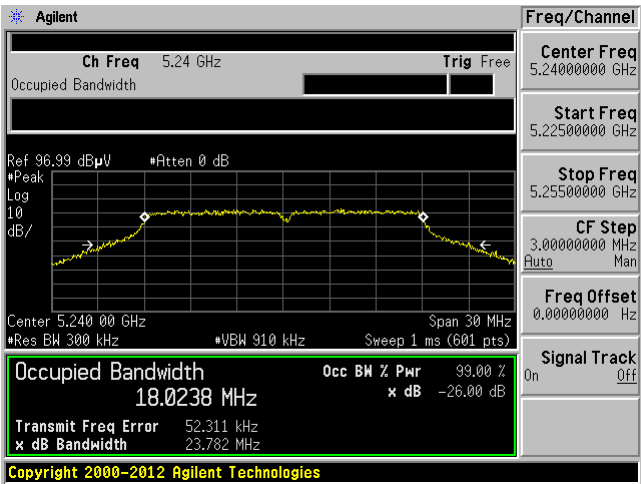


20 MHz, High Channel, 5240 MHz

H

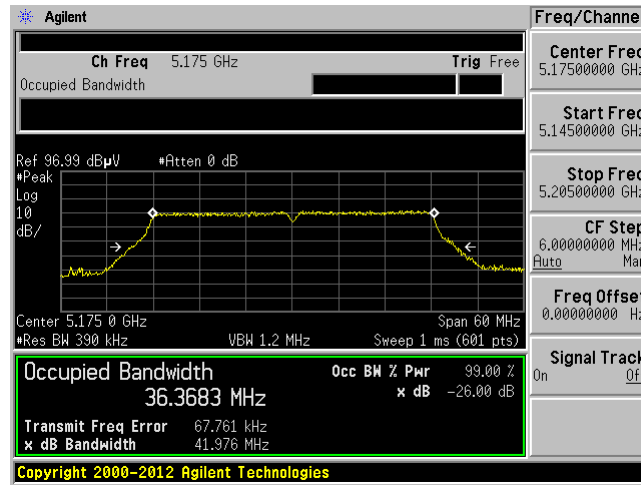


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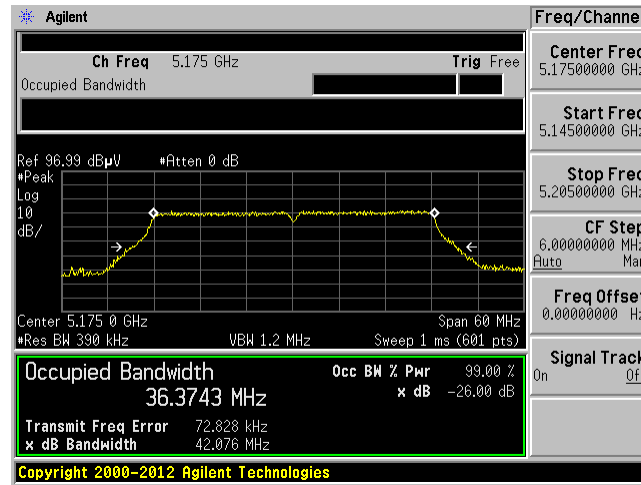


40 MHz, Low Channel, 5175 MHz

H

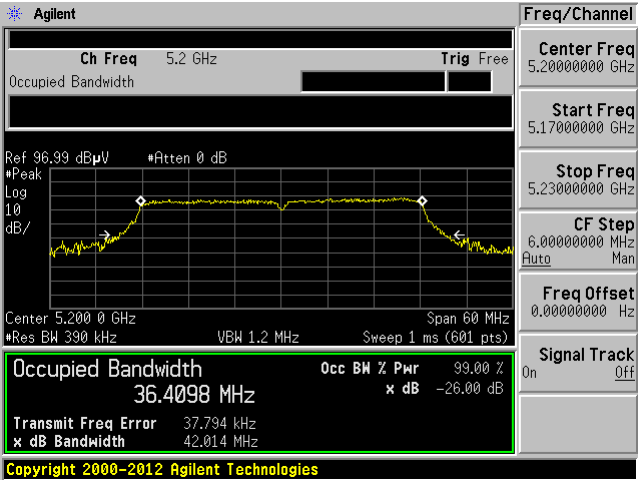


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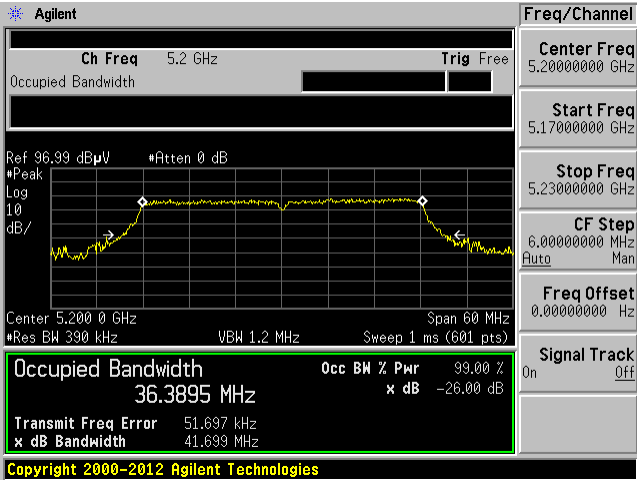


40 MHz, Middle Channel, 5200 MHz

H

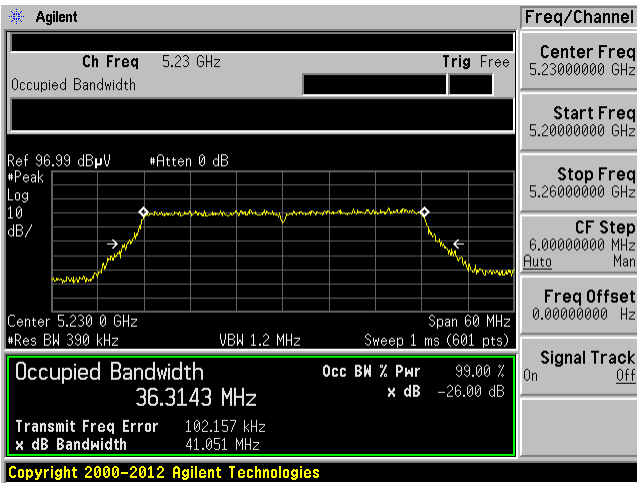


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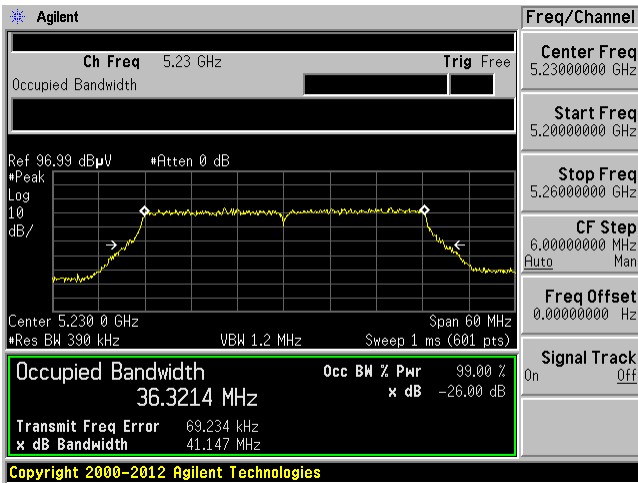


40 MHz, High Channel, 5230 MHz

H

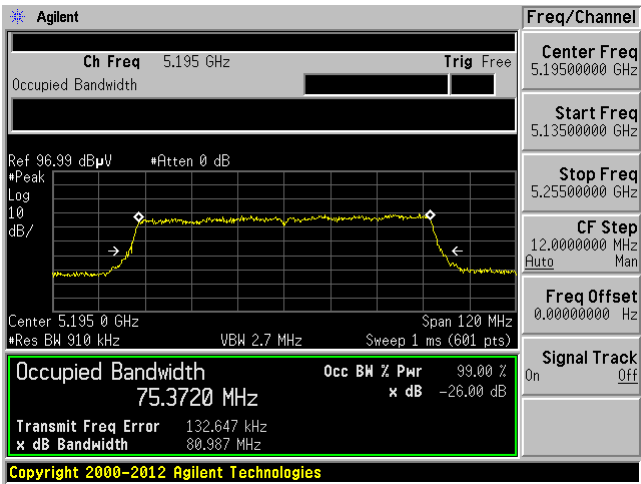


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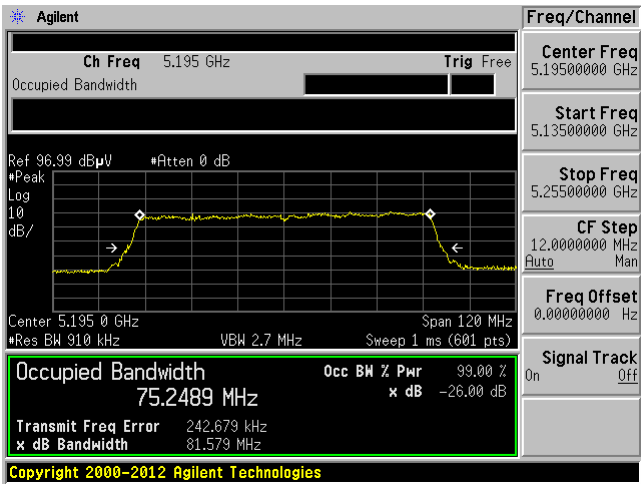


80 MHz, Low Channel, 5195 MHz

H

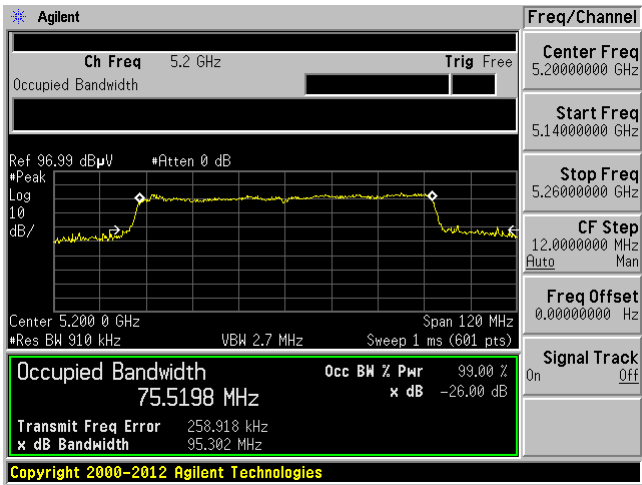


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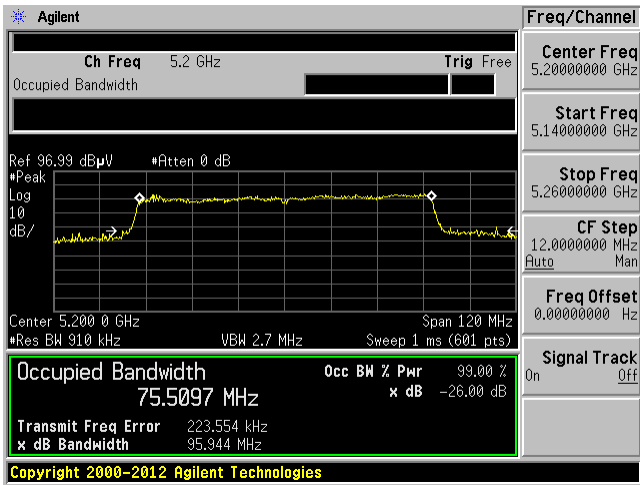


80 MHz, Middle Channel, 5200 MHz

H

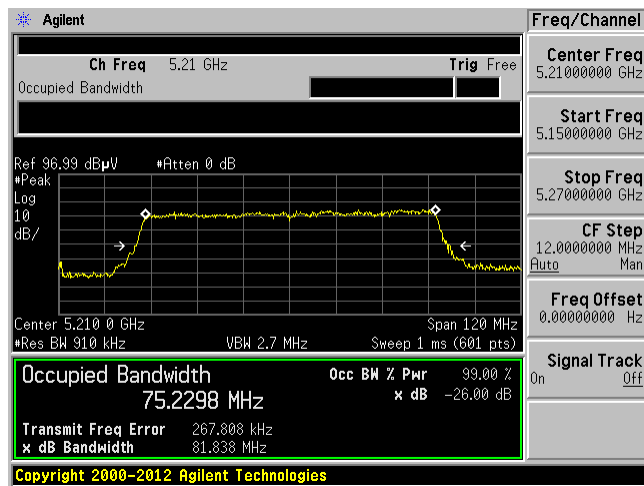


V

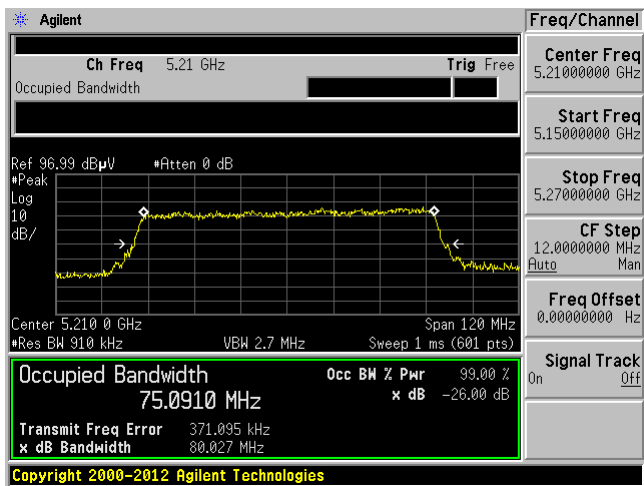


80 MHz, High Channel, 5210 MHz

H



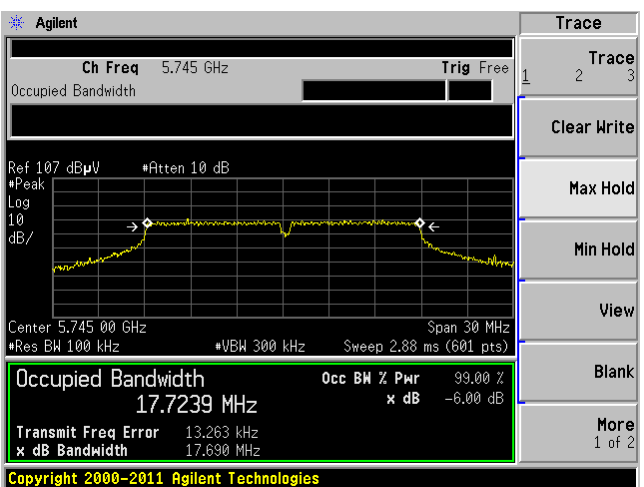
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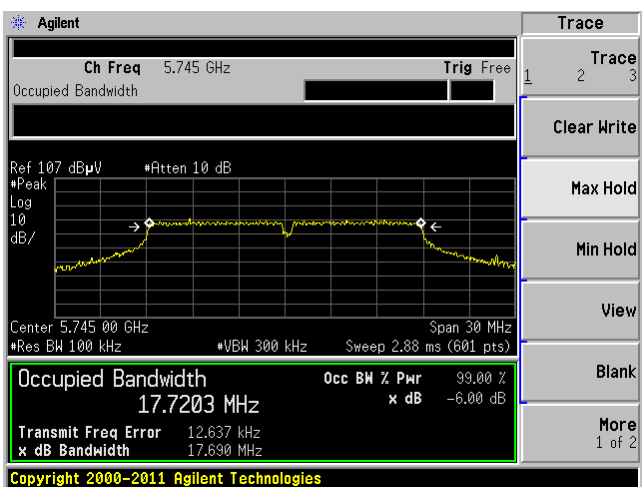
5.8 GHz Band :

20 MHz, Low Channel, 5745 MHz

H



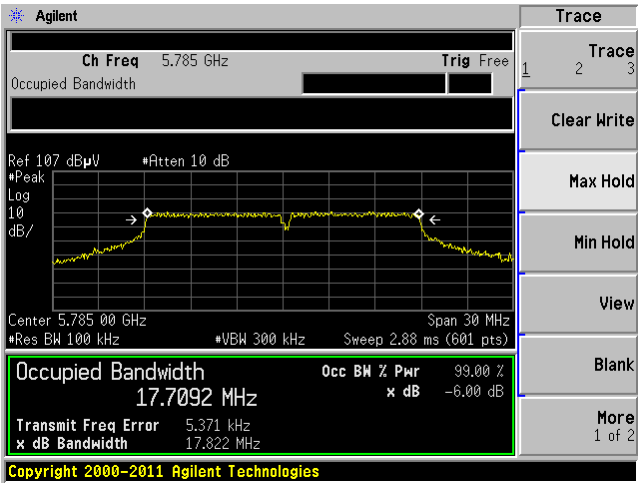
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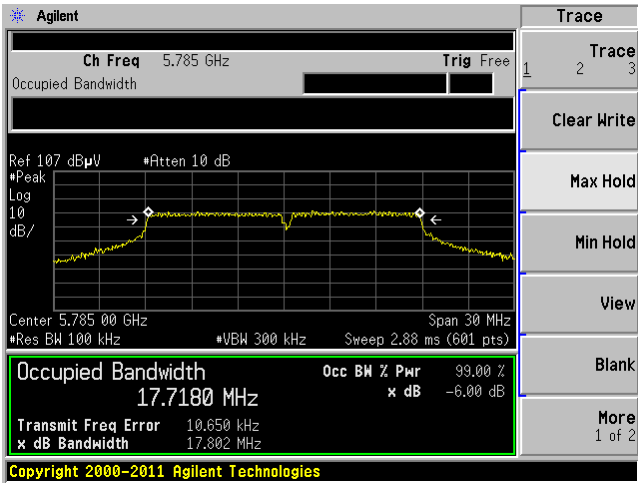


20 MHz, Middle Channel, 5785 MHz

H

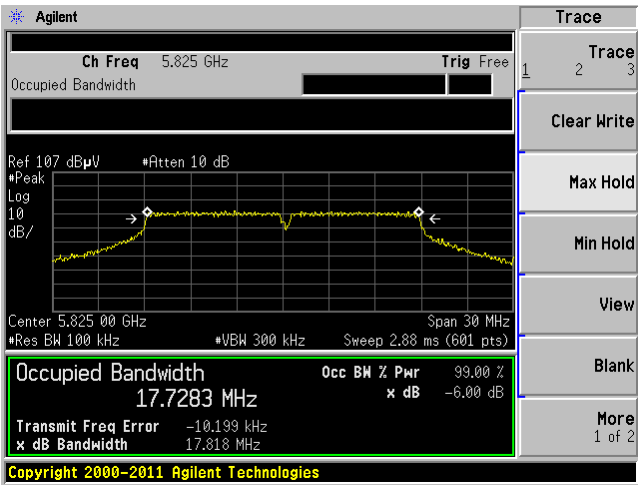


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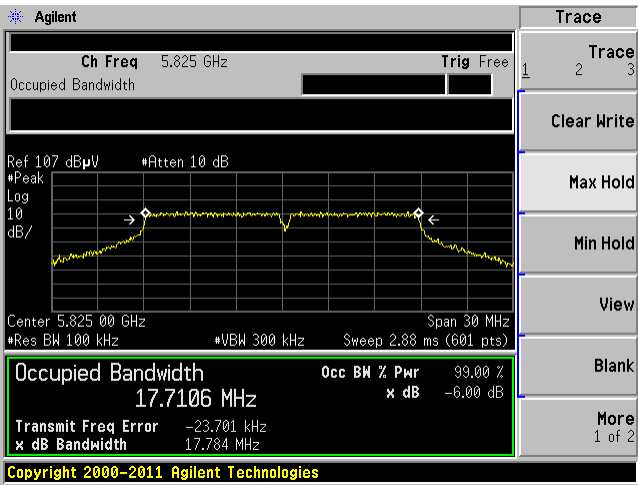


20 MHz, High Channel, 5825 MHz

H

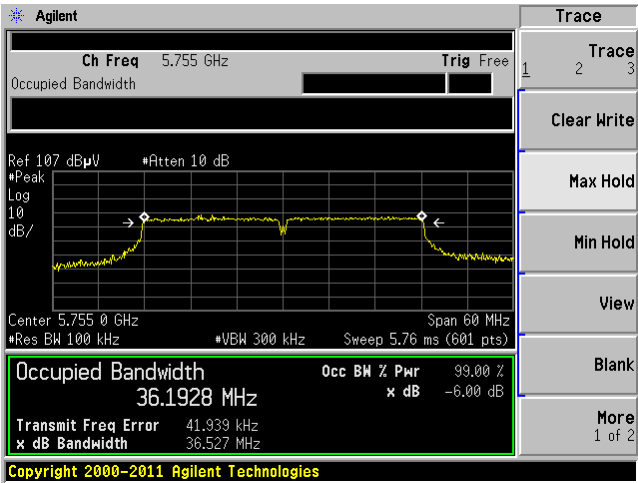


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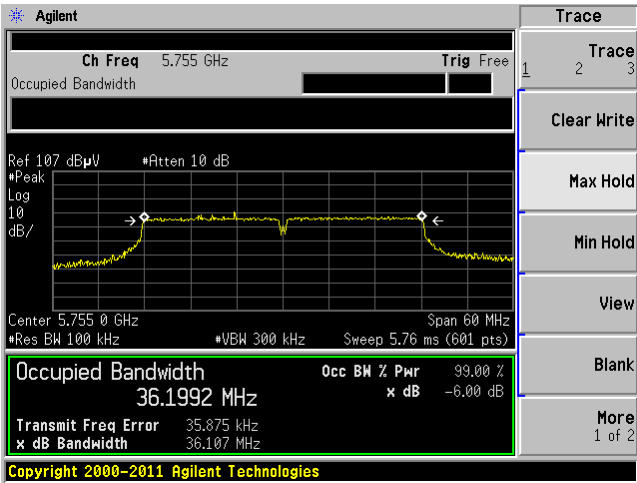


40 MHz, Low Channel, 5755 MHz

H

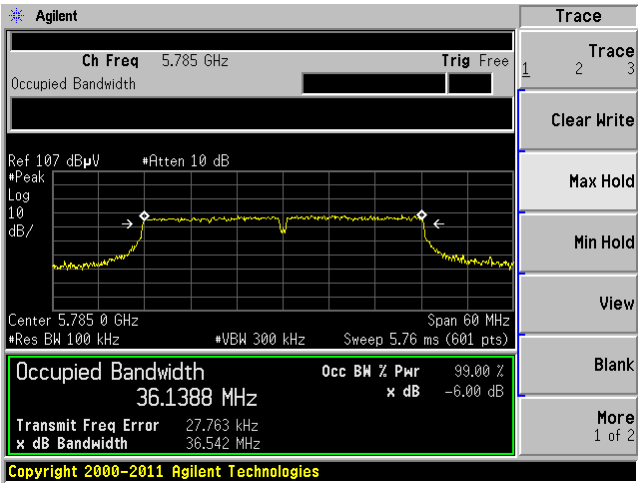


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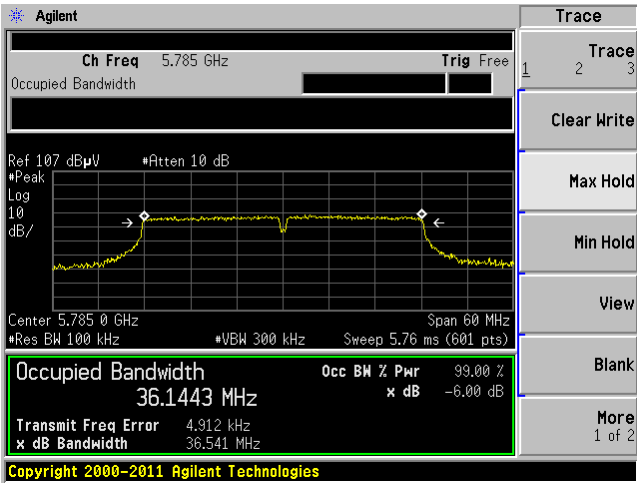


40 MHz, Middle Channel, 5785 MHz

H

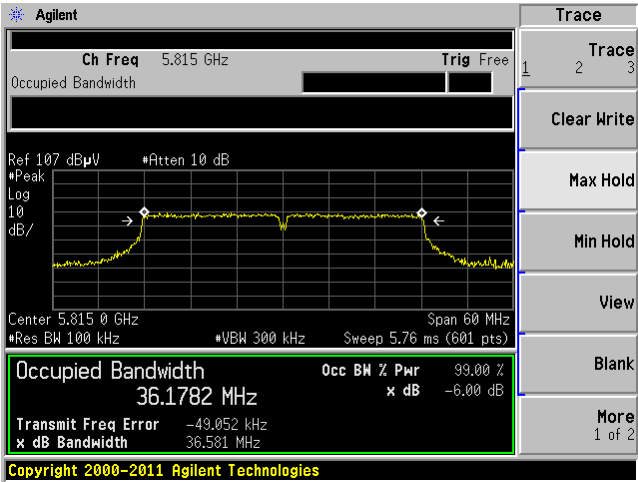


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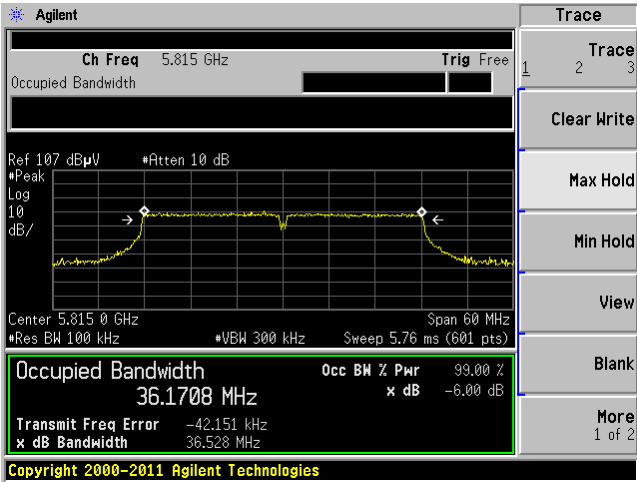


40 MHz, High Channel, 5815 MHz

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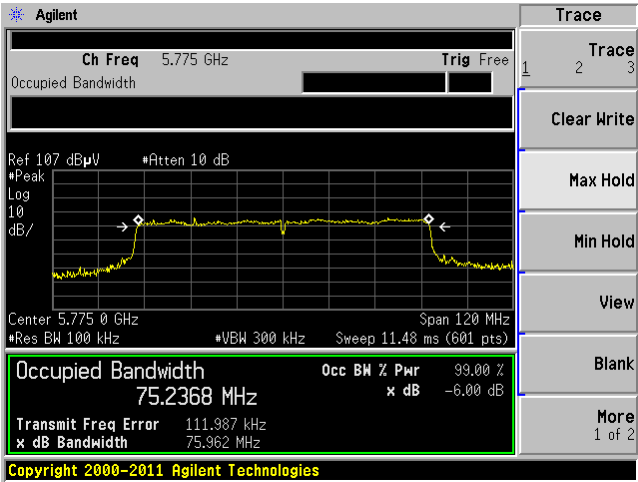


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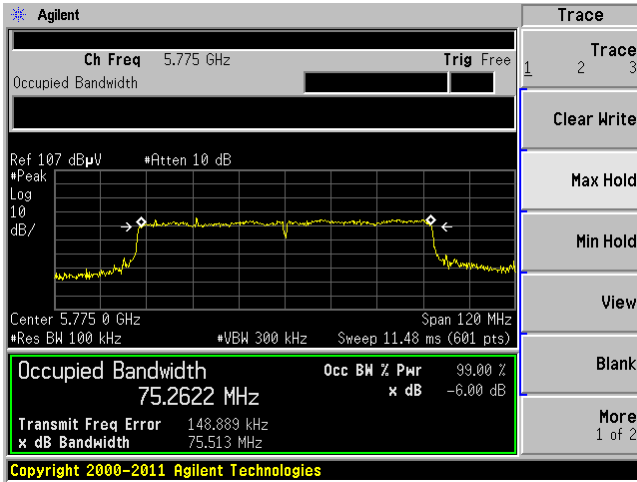


80 MHz, Low Channel, 5775 MHz

H

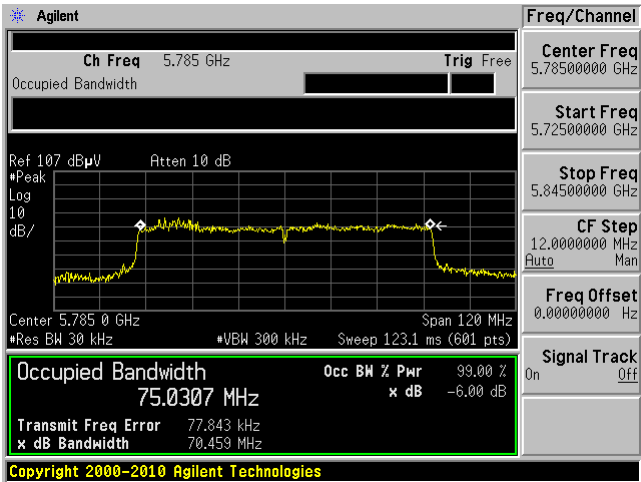


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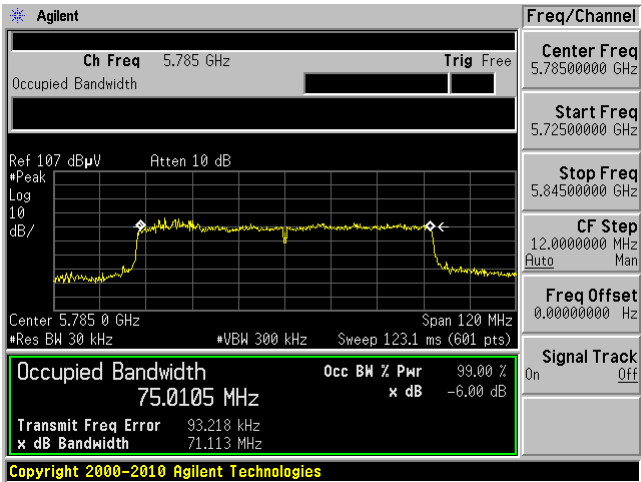


80 MHz, Middle Channel, 5785 MHz

H

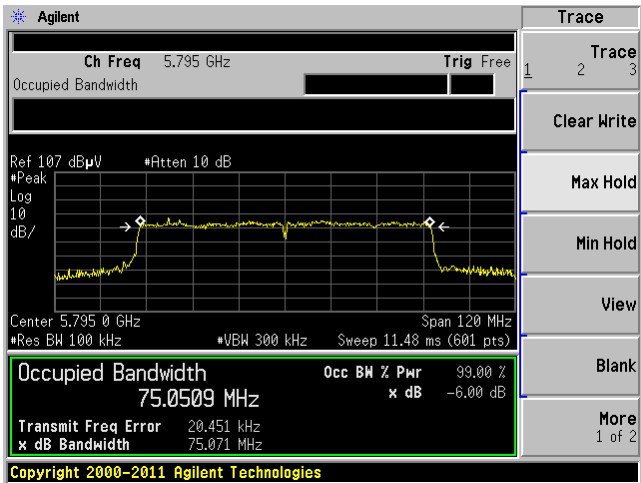


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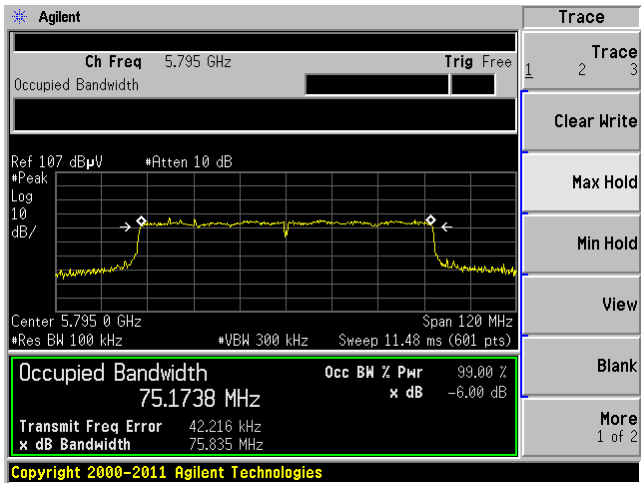


80 MHz, High Channel, 5795 MHz

H



V



## 9 FCC §15.407(a)(1) & §15.407 (a)(3) - Output Power

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### 9.1 Applicable Standards

#### According to FCC §15.407(a)(1)

For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB Emission Bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### According to FCC §15.407(a)(3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### 9.2 Measurement Procedure

The measurements are based on FCC KDB 789033 D02 General UNII Test Procedures v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E.

Radiated method was applied to the power measurement due to the integrated antennas. Maximum output power was calculated based on the field strength measured, antenna gain of EUT and converting to EIRP according to KDB 412172.

### 9.3 Test Equipment List and Details

Manufacturers	Description	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2013-02-28	1 year
EMCO	Antenna, Horn	3115	9511-4627	2013-10-17	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2013-05-09	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 9.4 Test Environmental Conditions

Temperature:	21-23 °C
Relative Humidity:	43-48 %
ATM Pressure:	101.1-101.3 kPa

The testing was performed by Cipher Chu on 2014-03-06 to 2014-03-14 at the 10m chamber 1.

### 9.5 Test Results

Note: Chain1 and Chain 4 is Vertical, and Chain 2 and Chain 3 is Horizontal

Note: C1, C2, C3 and C4 stands for Chain 1, Chain 2, Chain 3 and Chain 4.

The Calculated Conducted Output Power (dBm) was calculated from the following formula:

Conducted Output Power = EIRP – Antenna Gain = E[dBuV/m] + 20 log(d[meters]) - 104.77 - 25 dBi

**5.2 GHz Band:****20 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5165	68.52	V(chain 1)	33.977	0	4.59	25	-2.683
5165	71.75	H(chain 2)	33.977	0	4.59	25	0.547
5165	73.97	V(chain 4)	33.977	0	4.59	25	2.767
5165	73.46	H(chain 3)	33.977	0	4.59	25	2.257
5200	83.35	V(chain 1)	33.977	0	4.59	25	12.147
5200	83.98	H(chain 2)	33.977	0	4.59	25	12.777
5200	80.54	V(chain 4)	33.977	0	4.59	25	9.337
5200	82.39	H(chain 3)	33.977	0	4.59	25	11.187
5240	69.37	V(chain 1)	33.977	0	4.59	25	-1.833
5240	72.35	H(chain 2)	33.977	0	4.59	25	1.147
5240	74.68	V(chain 4)	33.977	0	4.59	25	3.477
5240	73.65	H(chain 3)	33.977	0	4.59	25	2.447

**40 MHz Bnadwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5175	68.17	V(chain 1)	33.977	0	4.59	25	-3.033
5175	68.82	H(chain 2)	33.977	0	4.59	25	-2.383
5175	69.39	V(chain 4)	33.977	0	4.59	25	-1.813
5175	69.56	H(chain 3)	33.977	0	4.59	25	-1.643
5200	74.51	V(chain 1)	33.977	0	4.59	25	3.307
5200	77.74	H(chain 2)	33.977	0	4.59	25	6.537
5200	72.96	V(chain 4)	33.977	0	4.59	25	1.757
5200	73.76	H(chain 3)	33.977	0	4.59	25	2.557
5230	66.93	V(chain 1)	33.977	0	4.59	25	-4.273
5230	68.49	H(chain 2)	33.977	0	4.59	25	-2.713
5230	72.38	V(chain 4)	33.977	0	4.59	25	1.177
5230	70.25	H(chain 3)	33.977	0	4.59	25	-0.953

## 80 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5195	66.16	V(chain 1)	33.977	0	4.59	25	-5.043
5195	67.29	H(chain 2)	33.977	0	4.59	25	-3.913
5195	69.94	V(chain 4)	33.977	0	4.59	25	-1.263
5195	69.28	H(chain 3)	33.977	0	4.59	25	-1.923
5200	71.56	V(chain 1)	33.977	0	4.59	25	0.357
5200	74.69	H(chain 2)	33.977	0	4.59	25	3.487
5200	65.18	V(chain 4)	33.977	0	4.59	25	-6.023
5200	68.37	H(chain 3)	33.977	0	4.59	25	-2.833
5210	65.32	V(chain 1)	33.977	0	4.59	25	-5.883
5210	64.97	H(chain 2)	33.977	0	4.59	25	-6.233
5210	71.16	V(chain 4)	33.977	0	4.59	25	-0.043
5210	68.27	H(chain 3)	33.977	0	4.59	25	-2.933

## 5.8 GHz Band:

## 20 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5745	69.01	V(chain 1)	33.922	20	4.62	25	17.782
5745	69.96	H(chain 2)	33.922	20	4.62	25	18.732
5745	69.59	V(chain 4)	33.922	20	4.62	25	18.362
5745	71.02	H(chain 3)	33.922	20	4.62	25	19.792
5785	69.26	V(chain 1)	33.922	20	4.62	25	18.032
5785	69.85	H(chain 2)	33.922	20	4.62	25	18.622
5785	70.32	V(chain 4)	33.922	20	4.62	25	19.092
5785	71.16	H(chain 3)	33.922	20	4.62	25	19.932
5825	69.79	V(chain 1)	33.922	20	4.62	25	18.562
5825	70.17	H(chain 2)	33.922	20	4.62	25	18.942
5825	70.76	V(chain 4)	33.922	20	4.62	25	19.532
5825	71.48	H(chain 3)	33.922	20	4.62	25	20.252



## 40 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5755	66.6	V(chain 1)	33.922	20	4.62	25	15.372
5755	66.63	H(chain 2)	33.922	20	4.62	25	15.402
5755	66.36	V(chain 4)	33.922	20	4.62	25	15.132
5755	66.62	H(chain 3)	33.922	20	4.62	25	15.392
5785	66.52	V(chain 1)	33.922	20	4.62	25	15.292
5785	66.64	H(chain 2)	33.922	20	4.62	25	15.412
5785	66.72	V(chain 4)	33.922	20	4.62	25	15.492
5785	66.86	H(chain 3)	33.922	20	4.62	25	15.632
5815	67.15	V(chain 1)	33.922	20	4.62	25	15.922
5815	67.21	H(chain 2)	33.922	20	4.62	25	15.982
5815	67.1	V(chain 4)	33.922	20	4.62	25	15.872
5815	67.26	H(chain 3)	33.922	20	4.62	25	16.032

## 80 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5775	64.12	V(chain 1)	33.922	20	4.62	25	12.892
5775	65.23	H(chain 2)	33.922	20	4.62	25	14.002
5775	65.01	V(chain 4)	33.922	20	4.62	25	13.782
5775	64.51	H(chain 3)	33.922	20	4.62	25	13.282
5785	62.88	V(chain 1)	33.922	20	4.62	25	11.652
5785	65.02	H(chain 2)	33.922	20	4.62	25	13.792
5785	65.27	V(chain 4)	33.922	20	4.62	25	14.042
5785	66.66	H(chain 3)	33.922	20	4.62	25	15.432
5795	63.89	V(chain 1)	33.922	20	4.62	25	12.662
5795	65.02	H(chain 2)	33.922	20	4.62	25	13.792
5795	65.52	V(chain 4)	33.922	20	4.62	25	14.292
5795	65.17	H(chain 3)	33.922	20	4.62	25	13.942

**Beamforming****5.2 GHz Band:****20 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5165	69.65	V	33.977	0	4.59	25	-1.553
5165	69.43	H	33.977	0	4.59	25	-1.773
5200	83.33	V	33.977	0	4.59	25	12.127
5200	82.71	H	33.977	0	4.59	25	11.507
5240	77.65	V	33.977	0	4.59	25	6.447
5240	77.88	H	33.977	0	4.59	25	6.677

**40 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5175	74.64	V	33.977	0	4.59	25	3.437
5175	75.16	H	33.977	0	4.59	25	3.957
5200	77.71	V	33.977	0	4.59	25	6.507
5200	76.15	H	33.977	0	4.59	25	4.947
5230	77.44	V	33.977	0	4.59	25	6.237
5230	78.36	H	33.977	0	4.59	25	7.157

**80 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5195	69.29	V	33.977	0	4.59	25	-1.913
5195	69.06	H	33.977	0	4.59	25	-2.143
5200	72.58	V	33.977	0	4.59	25	1.377
5200	73.04	H	33.977	0	4.59	25	1.837
5210	69.53	V	33.977	0	4.59	25	-1.673
5210	69.68	H	33.977	0	4.59	25	-1.523

**5.8 GHz Band:****20 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5745	87.71	V	33.922	0	4.62	25	16.48
5745	87.79	H	33.922	0	4.62	25	16.56
5785	88.84	V	33.922	0	4.62	25	17.61
5785	89.87	H	33.922	0	4.62	25	18.64
5825	90.4	V	33.922	0	4.62	25	19.17
5825	90.16	H	33.922	0	4.62	25	18.93

**40 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5755	86.04	V	33.922	0	4.62	25	14.81
5755	87.03	H	33.922	0	4.62	25	15.80
5785	88.04	V	33.922	0	4.62	25	16.81
5785	86.9	H	33.922	0	4.62	25	15.67
5815	88.51	V	33.922	0	4.62	25	17.28
5815	89.42	H	33.922	0	4.62	25	18.19

**80 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Calculated Conducted Output Power (dBm)
5775	86.54	V	33.922	0	4.62	25	15.31
5775	86.74	H	33.922	0	4.62	25	15.51
5785	86.05	V	33.922	0	4.62	25	14.82
5785	86.51	H	33.922	0	4.62	25	15.28
5795	87.65	V	33.922	0	4.62	25	16.42
5795	87.13	H	33.922	0	4.62	25	15.90

Combined Output Power:

## 5.2 GHz Band:

### 20 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power C1/C2 (dBm)	Conducted Output Power C3/C4 (dBm)	Total Output Power C1, C2 (dBm)	Total Output Power C3, C4 (dBm)	Limit (dBm)
Low	5165	-2.683/0.547	2.257/2.767	2.24	5.53	28
Middle	5200	12.147/12.777	11.187/9.337	<b>15.48</b>	13.37	28
High	5240	-1.833/1.147	2.447/3.477	2.92	6.00	28

### 40 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power C1/C2 (dBm)	Conducted Output Power C3/C4 (dBm)	Total Output Power C1, C2 (dBm)	Total Output Power C3, C4 (dBm)	Limit (dBm)
Low	5175	-3.033/-2.383	-1.643/1.813	0.31	1.28	28
Middle	5200	3.307/6.537	2.557/1.757	<b>8.23</b>	5.19	28
High	5230	-4.273/-2.713	-0.953/1.177	-0.41	3.25	28

### 80 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power C1/C2 (dBm)	Conducted Output Power C3/C4 (dBm)	Total Output Power C1, C2 (dBm)	Total Output Power C3, C4 (dBm)	Limit (dBm)
Low	5195	-5.043/-3.913	-1.923/-1.263	-1.43	1.43	28
Middle	5200	0.357/3.487	-2.833/-6.023	<b>5.21</b>	-1.13	28
High	5210	-5.883/-6.233	-2.933/-0.043	-3.04	1.76	28

Note: Antenna gain of EUT is 25 dBi which is over 2 dB of 23 dBi allowed by FCC Part 15.407 (a)(1)(iii), a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi

**5.8 GHz Band:**

## 20 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power C1/C2 (dBm)	Conducted Output Power C3/C4 (dBm)	Total Output Power C1, C2 (dBm)	Total Output Power C3, C4 (dBm)	Limit (dBm)
Low	5745	17.78/18.73	19.79/18.36	21.29	22.15	30
Middle	5785	18.03/18.62	19.93/19.09	21.35	<b>22.54</b>	30
High	5825	18.56/18.94	20.25/19.53	21.77	20.25	30

## 40 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power C1/C2 (dBm)	Conducted Output Power C3/C4 (dBm)	Total Output Power C1, C2 (dBm)	Total Output Power C3, C4 (dBm)	Limit (dBm)
Low	5755	15.37/15.4	15.39/15.13	18.40	18.27	30
Middle	5785	15.29/15.41	15.63/15.49	18.36	18.57	30
High	5815	15.92/15.98	16.03/15.87	18.96	<b>18.96</b>	30

## 80 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power C1/C2 (dBm)	Conducted Output Power C3/C4 (dBm)	Total Output Power C1, C2 (dBm)	Total Output Power C3, C4 (dBm)	Limit (dBm)
Low	5775	12.89/14.00	13.28/13.78	16.49	16.55	30
Middle	5785	11.65/13.79	14.04/15.43	15.86	<b>17.80</b>	30
High	5795	12.66/13.79	13.94/14.29	16.27	17.13	30

**Beamforming****5.2 GHz Band:****20 MHz Bandwidth**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Conducted Output Power @ V (dBm)</b>	<b>Conducted Output Power @ H (dBm)</b>	<b>Limit (dBm)</b>
Low	5165	-1.55	-1.77	28
Middle	5200	12.12	11.50	28
High	5240	6.44	6.67	28

**40 MHz Bandwidth**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Conducted Output Power @ V (dBm)</b>	<b>Conducted Output Power @ H (dBm)</b>	<b>Limit (dBm)</b>
Low	5175	3.43	3.95	28
Middle	5200	4.95	6.51	28
High	5230	6.23	7.15	28

**80 MHz Bandwidth**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Conducted Output Power @ V (dBm)</b>	<b>Conducted Output Power @ H (dBm)</b>	<b>Limit (dBm)</b>
Low	5195	-1.91	-2.14	28
Middle	5200	1.84	1.38	28
High	5210	-1.67	-1.52	28

Note: Antenna gain of EUT is 25 dBi which is over 2 dB of 23 dBi allowed by FCC Part 15.407 (a)(1)(iii), a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi

**5.8 GHz**

## 20 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power @ V (dBm)	Conducted Output Power @ H (dBm)	Limit (dBm)
Low	5745	16.48	16.56	30
Middle	5785	17.61	18.64	30
High	5825	19.17	18.93	30

## 40 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power @ V (dBm)	Conducted Output Power @ H (dBm)	Limit (dBm)
Low	5755	14.81	15.80	30
Middle	5785	16.81	15.67	30
High	5815	17.28	18.19	30

## 80 MHz Bandwidth

Channel	Frequency (MHz)	Conducted Output Power @ V (dBm)	Conducted Output Power @ H (dBm)	Limit (dBm)
Low	5775	15.31	15.51	30
Middle	5785	14.822	15.28	30
High	5795	16.42	15.90	30

## 10 FCC §15.407(b) - Out of Band Emissions

### 10.1 Applicable Standard

#### According to FCC §15.407(b)

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 e.i.r.p. of -27 dBm/MHz.

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 e.i.r.p. of -27 dBm/MHz.

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 e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 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 e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

### 10.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section H: Unwanted emissions measurement

### 10.3 Test Equipment List and Details

Manufacturers	Description	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2013-02-28	1 year
EMCO	Antenna, Horn	3115	9511-4627	2013-10-17	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2013-05-09	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 10.4 Test Environmental Conditions

Temperature:	21-23 °C
Relative Humidity:	43-48 %
ATM Pressure:	101.1-101.3 kPa

The testing was performed by Cipher Chu on 2014-03-06 to 2014-03-14 at the 10m chamber 1.



10.5 Test Results

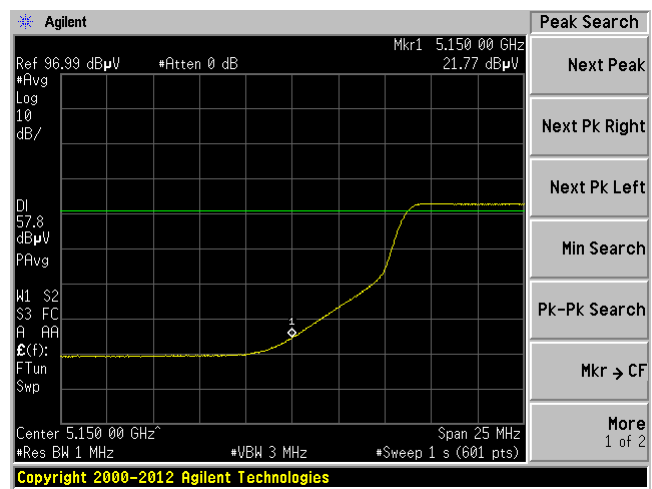
$E[dBuV/m] = EIRP[dBm] - 20 \log(d[meters]) + 104.77$   
 $d = 10m, EIRP = -27 \text{ dBm}, E = 57.77 \text{ dBuV/m}$

Note: Chain 1 and Chain 4 is Vertical, and Chain 2 and Chain 3 is Horizontal  
Note: C1, C2, C3 and C4 stands for Chain 1, Chain 2, Chain 3 and Chain 4.

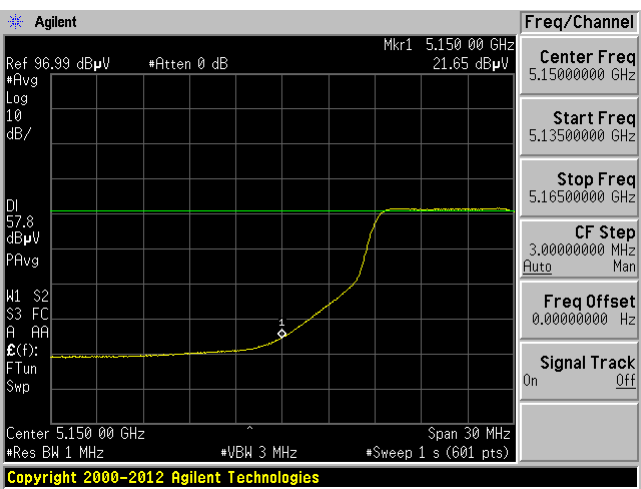
5.2 GHz Band:

20 MHz, Low Channel, 5165 MHz

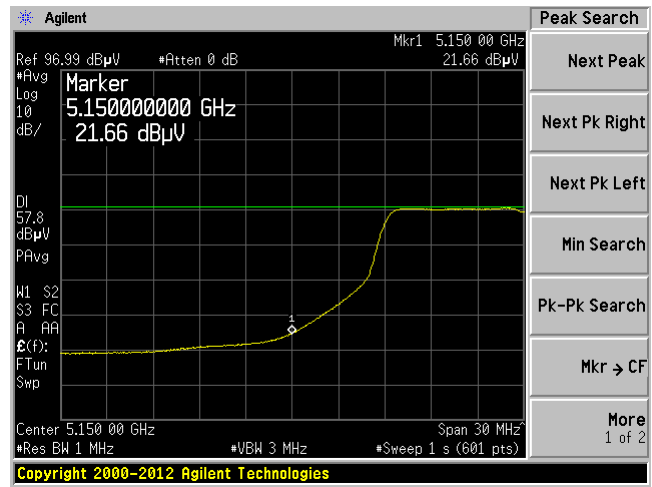
C1



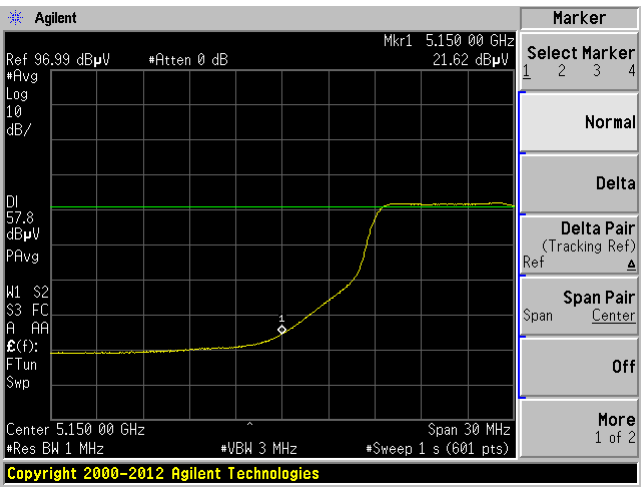
C2



C3

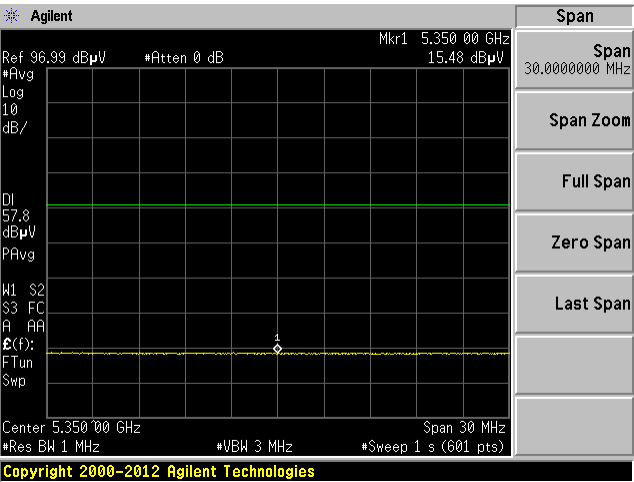


C4

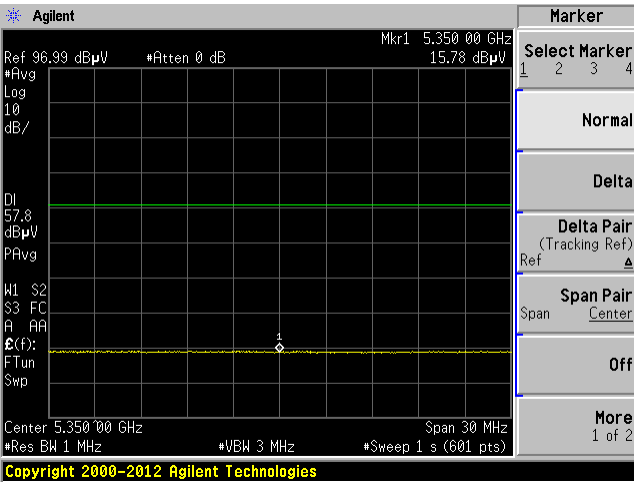


20 MHz, High Channel, 5240 MHz

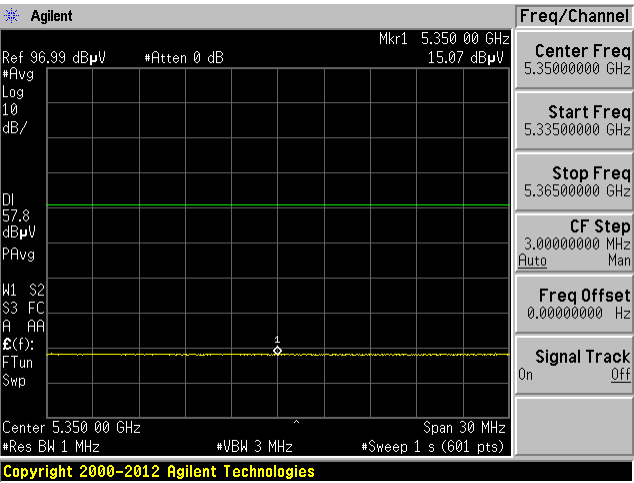
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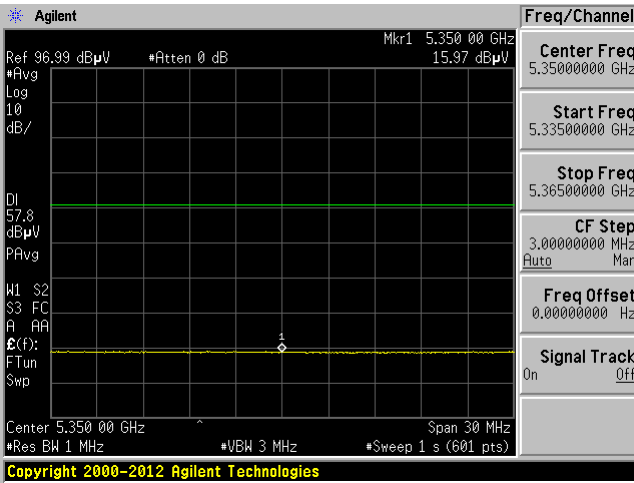
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C3

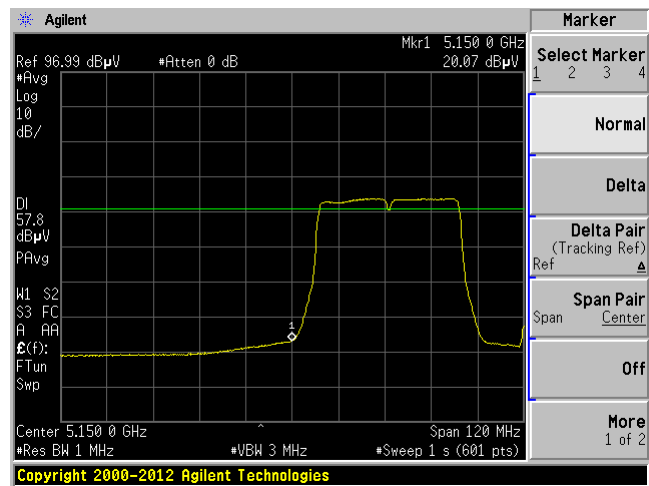


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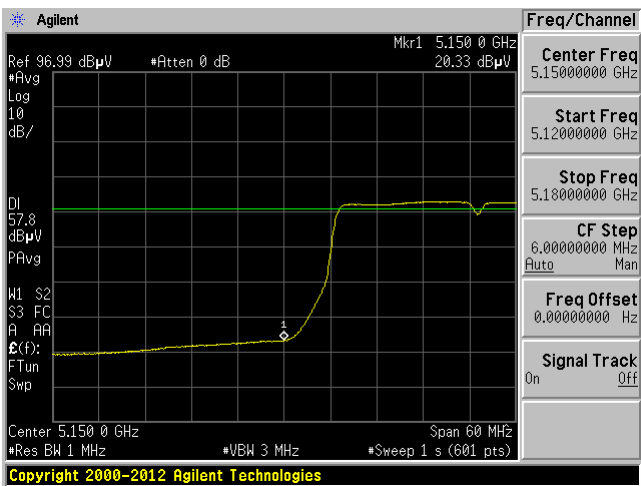


40 MHz, Low Channel, 5175 MHz

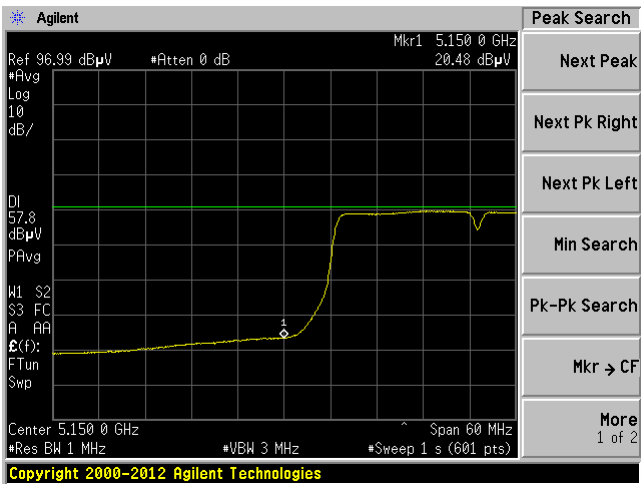
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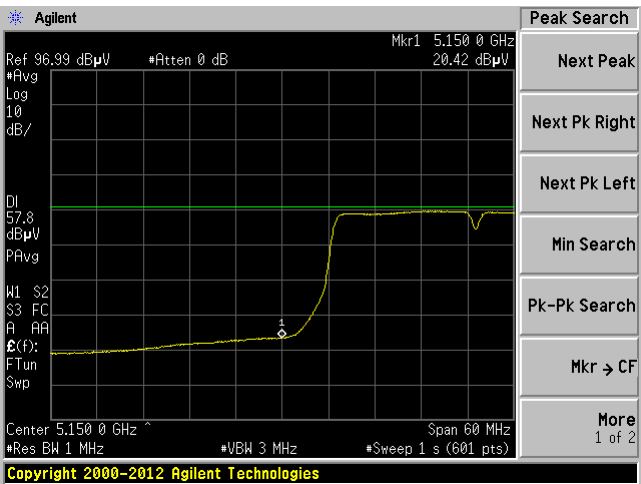
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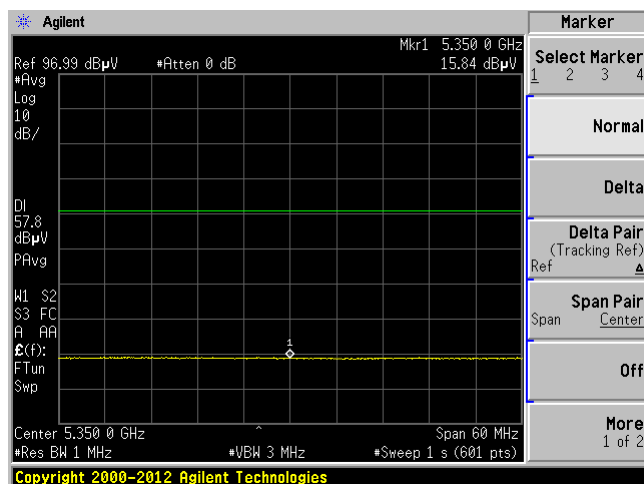
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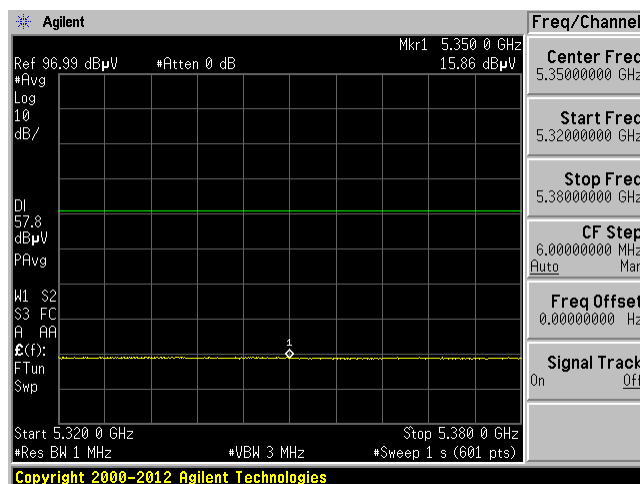
C4



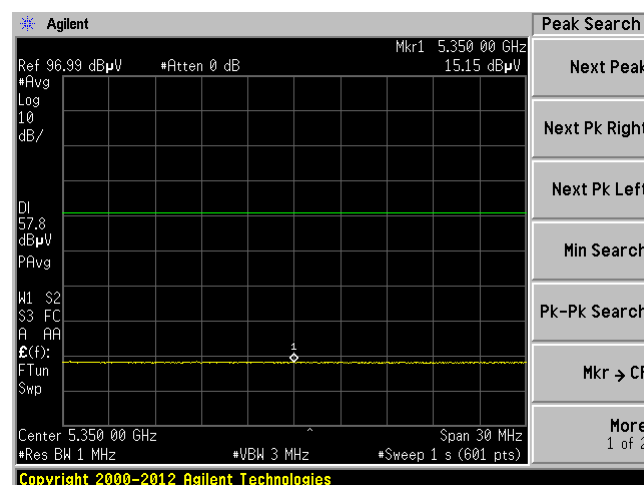
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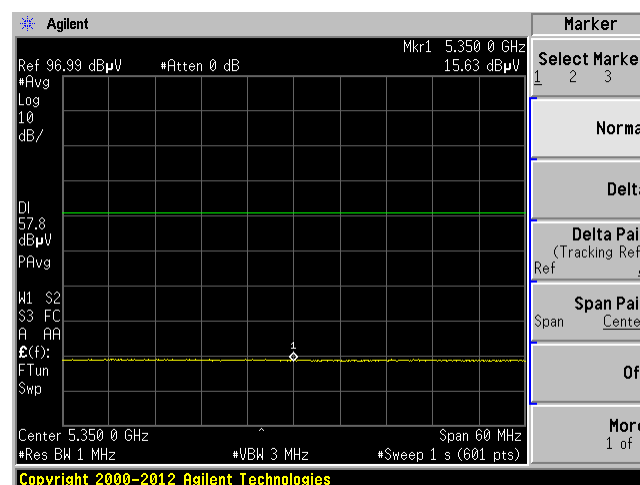
## C2



**C3**

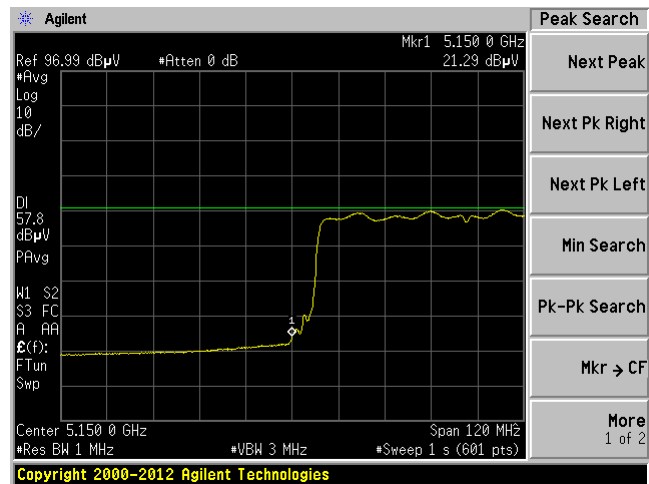


## C4

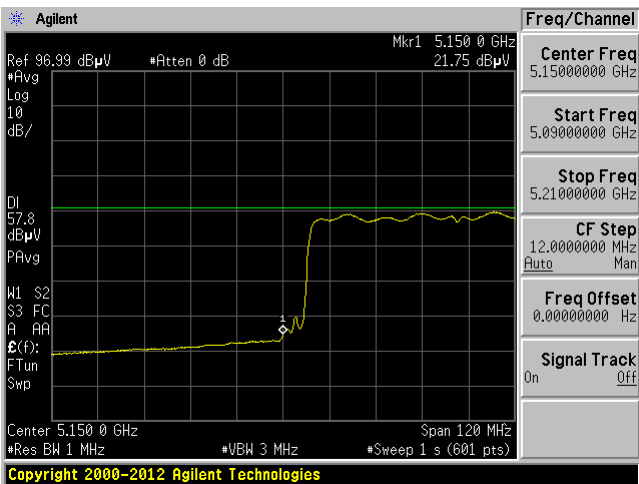


80 MHz, Low Channel, 5195 MHz

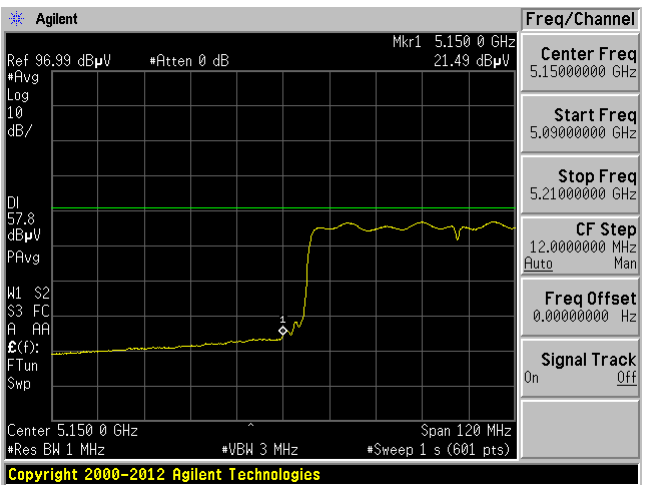
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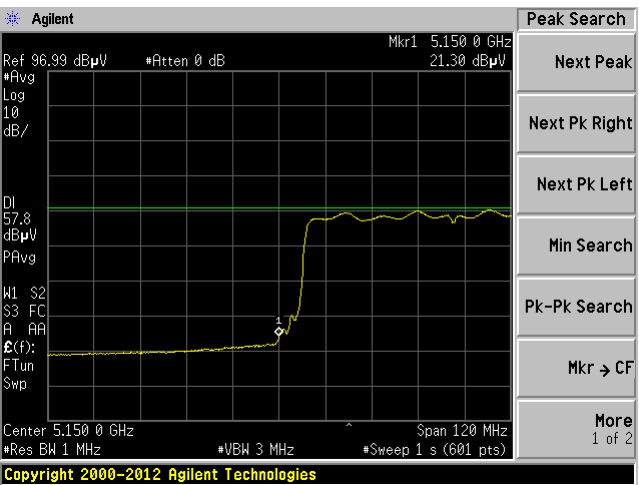
C2



C3

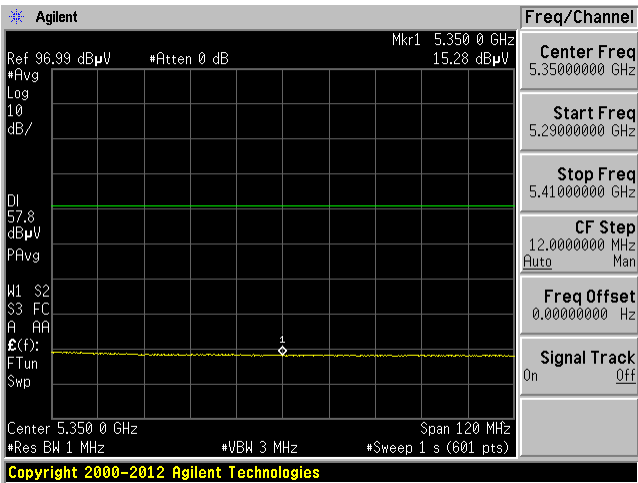


C4

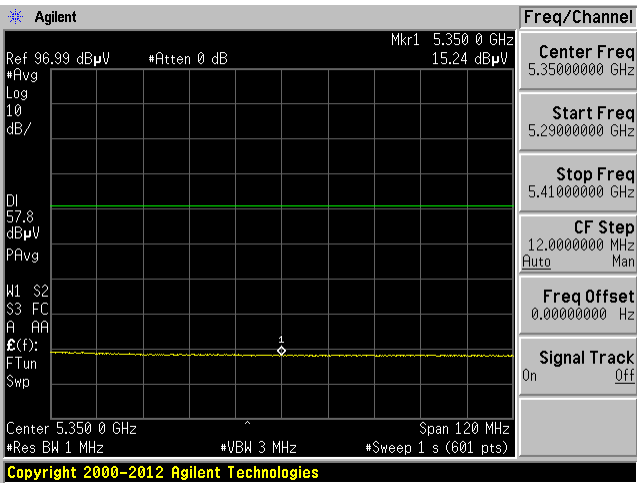


80 MHz, High Channel, 5210 MHz

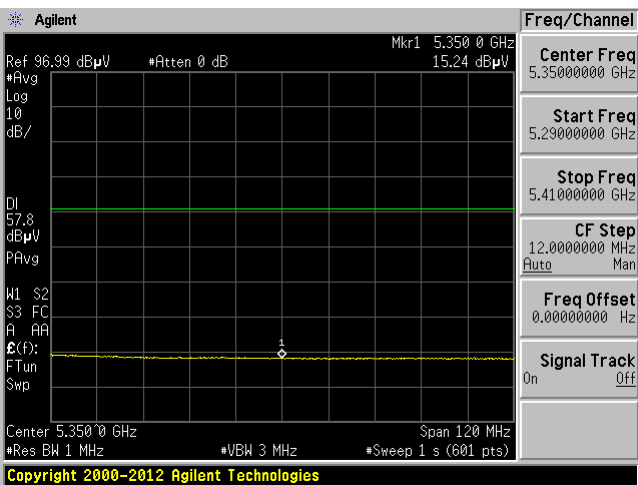
C1



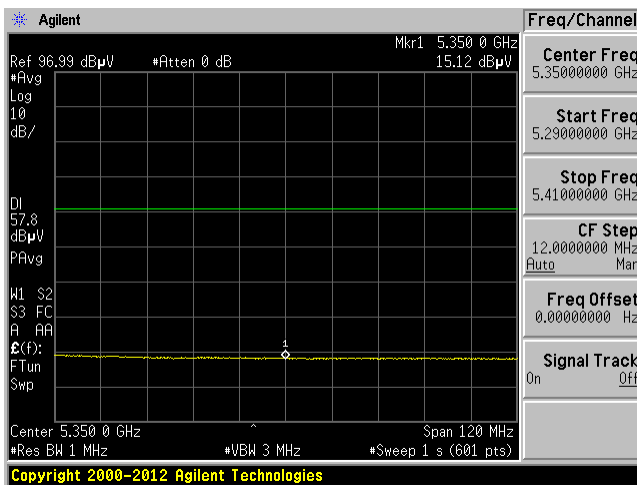
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C3



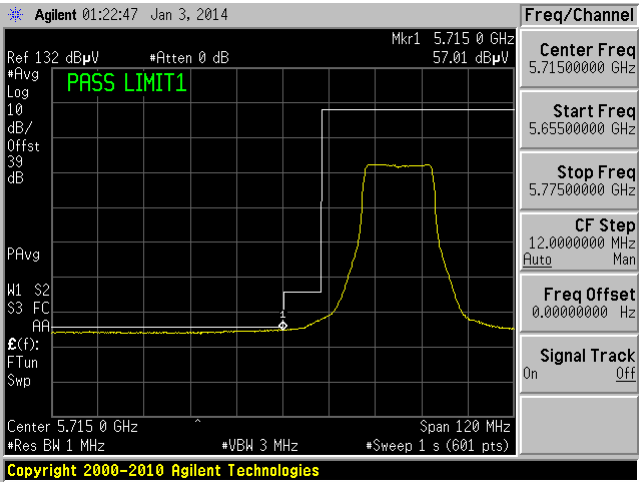
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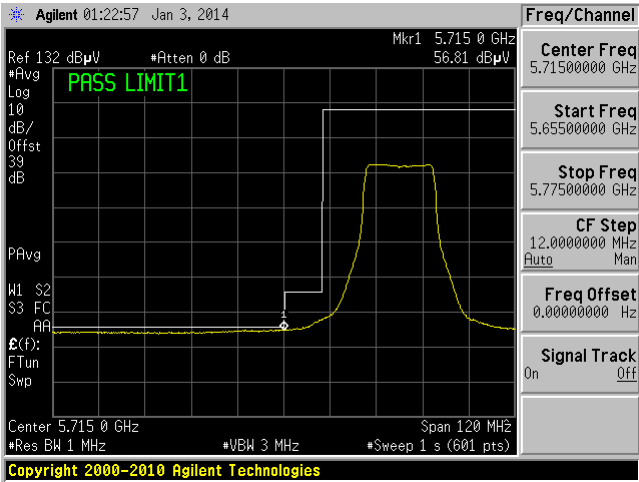
5.8 GHz Band:

20 MHz, Low Channel, 5745 MHz

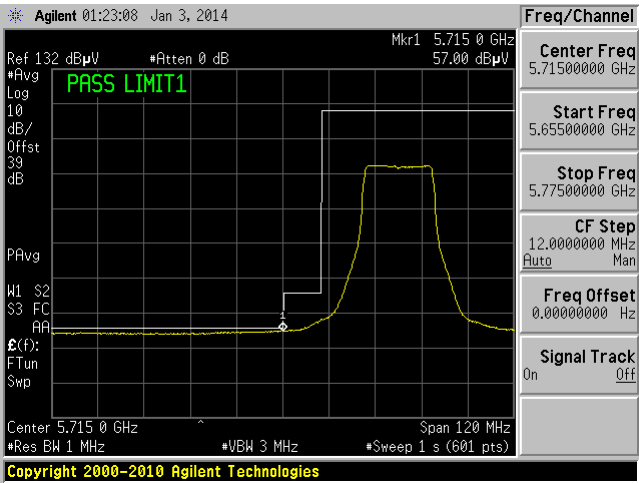
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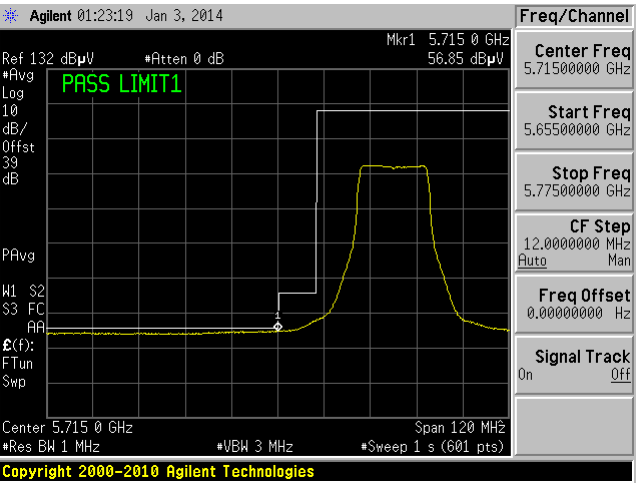
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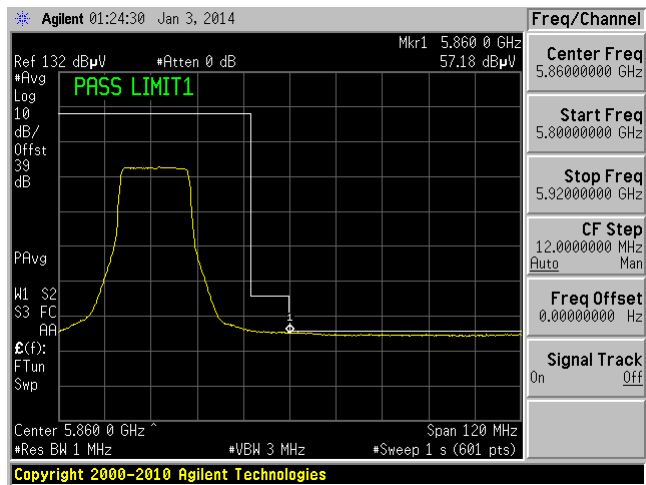


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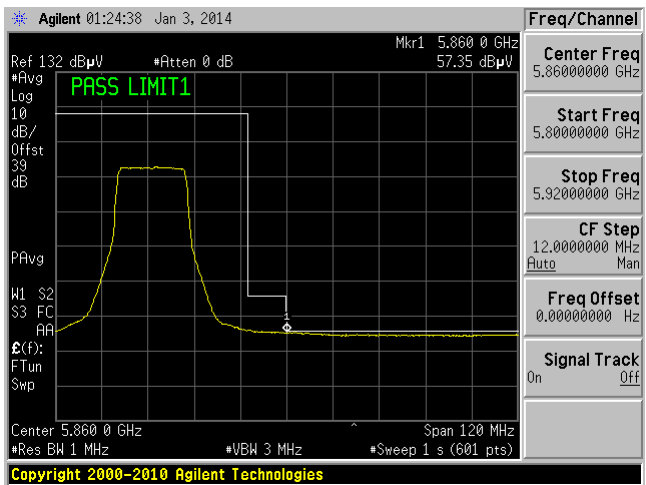


20 MHz, High Channel, 5825 MHz

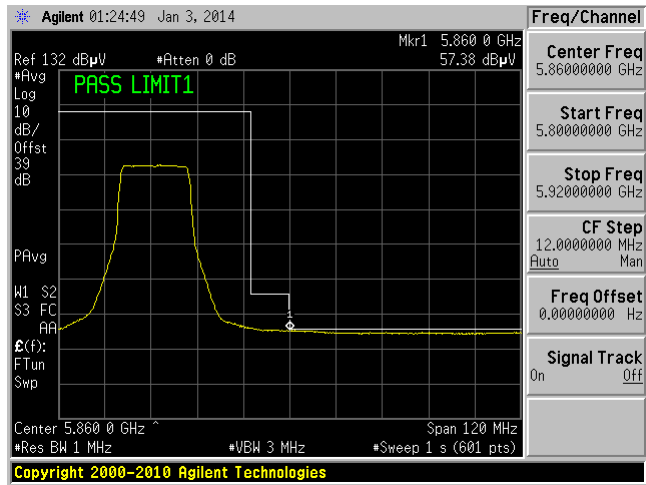
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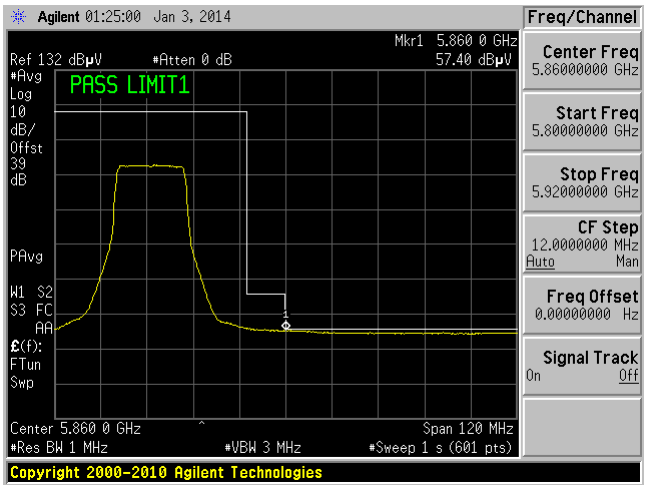
C2



C3



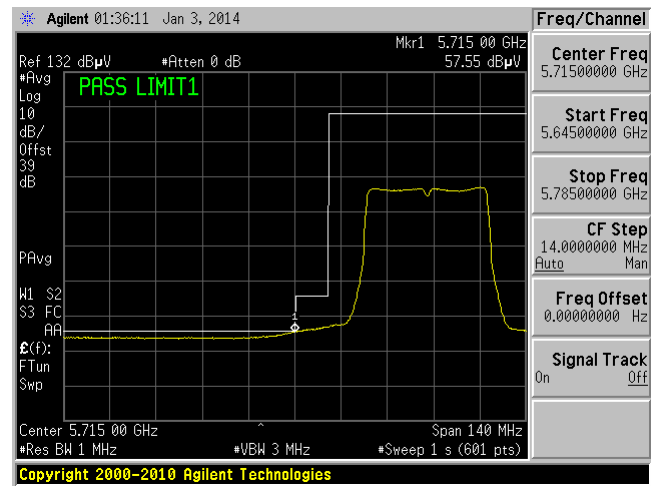
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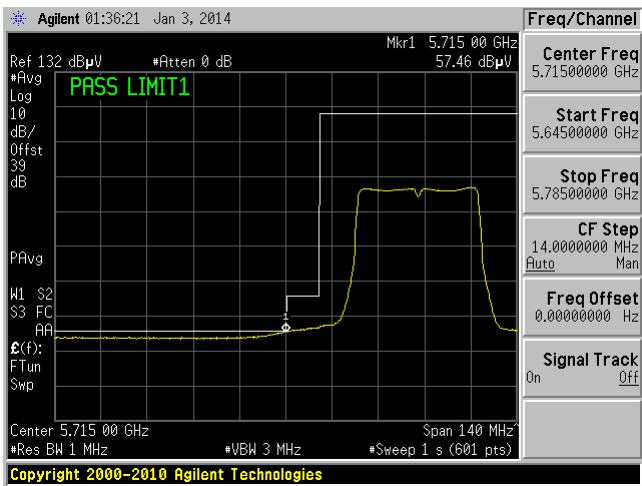


40 MHz, Low Channel, 5755 MHz

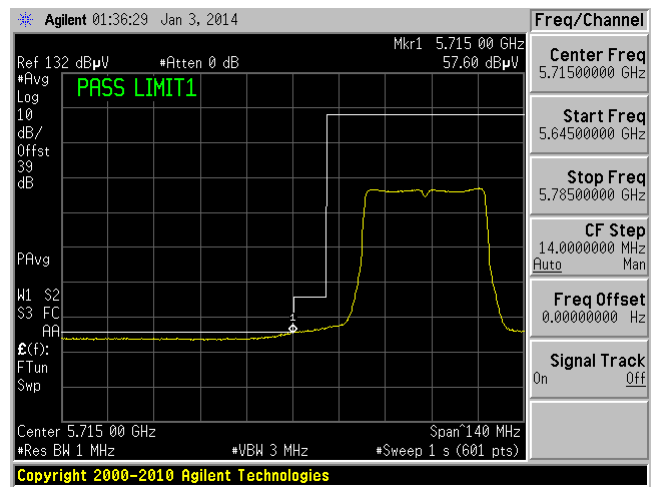
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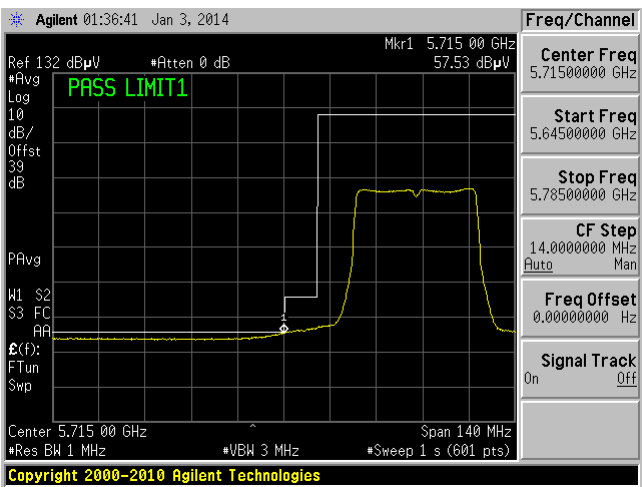
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C3

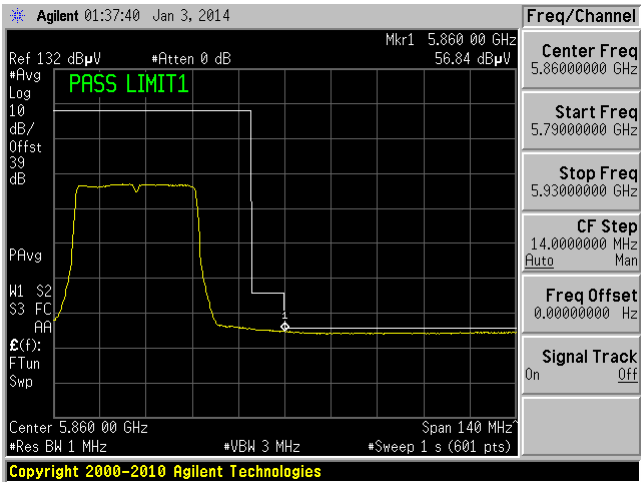


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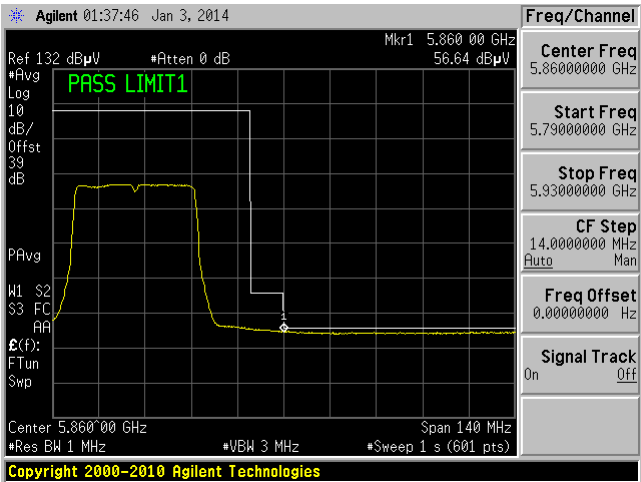


40 MHz, High Channel, 5815 MHz

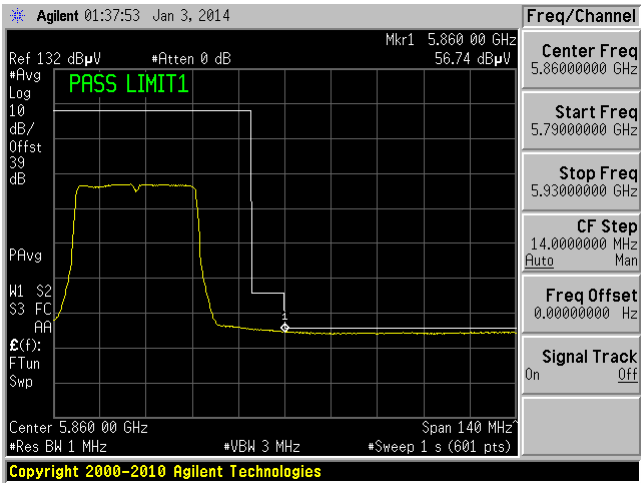
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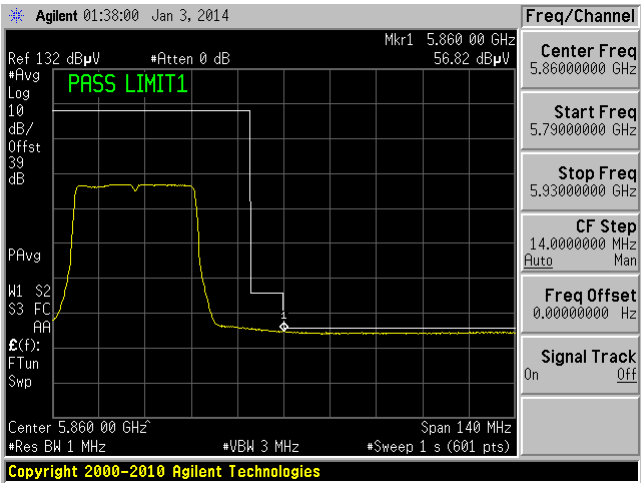
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C3

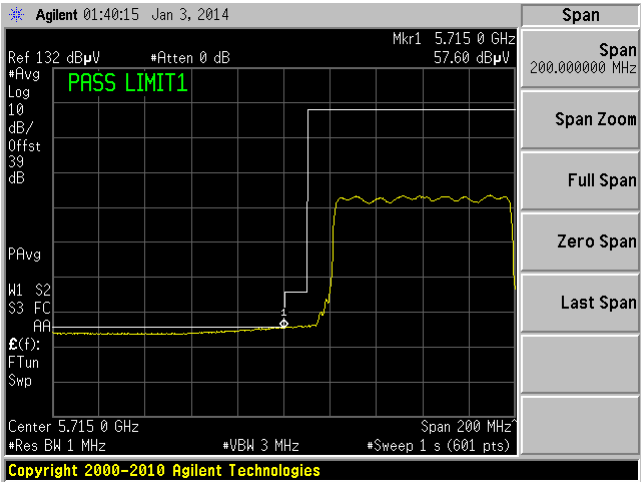


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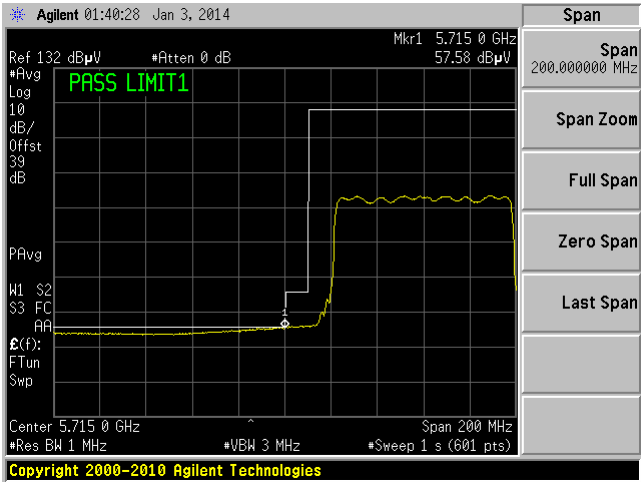


80 MHz, Low Channel, 5775 MHz

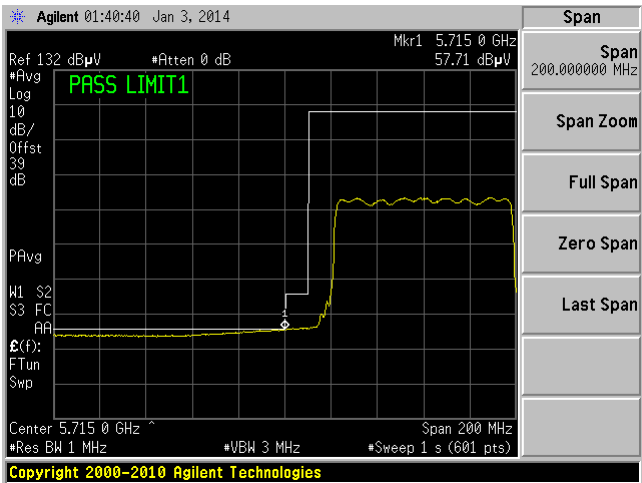
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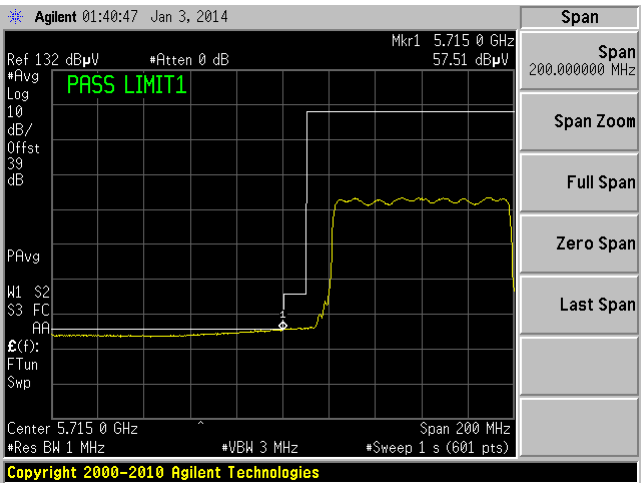
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C3

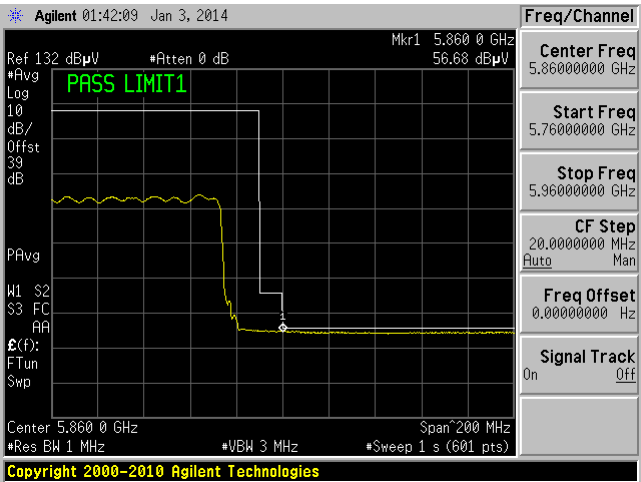


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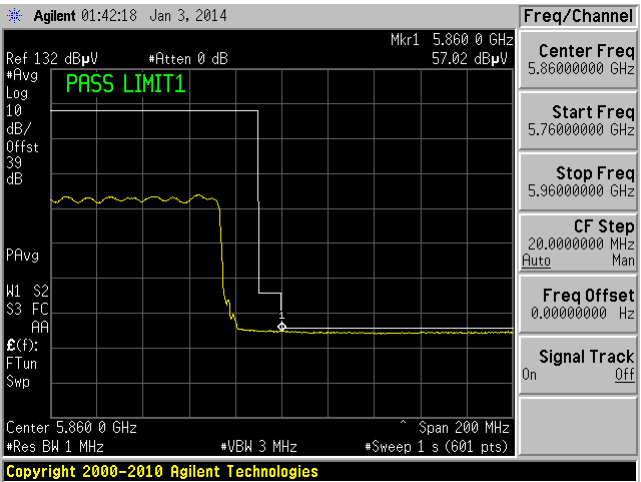


80 MHz, High Channel, 5795 MHz

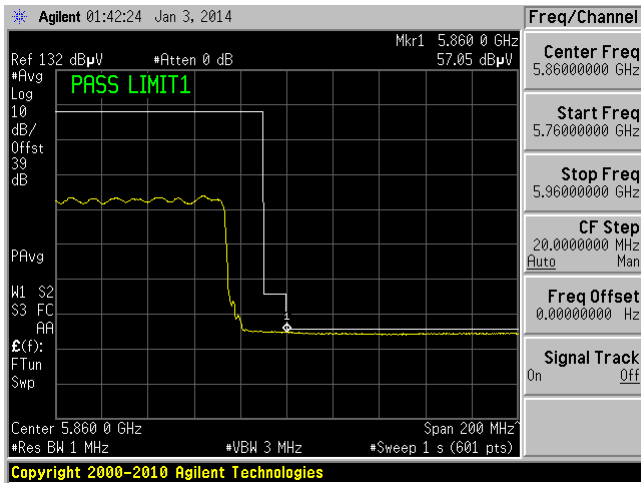
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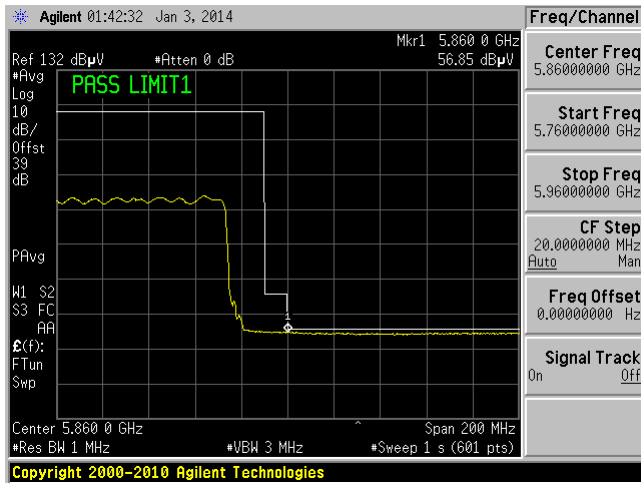
C2



C3



C4

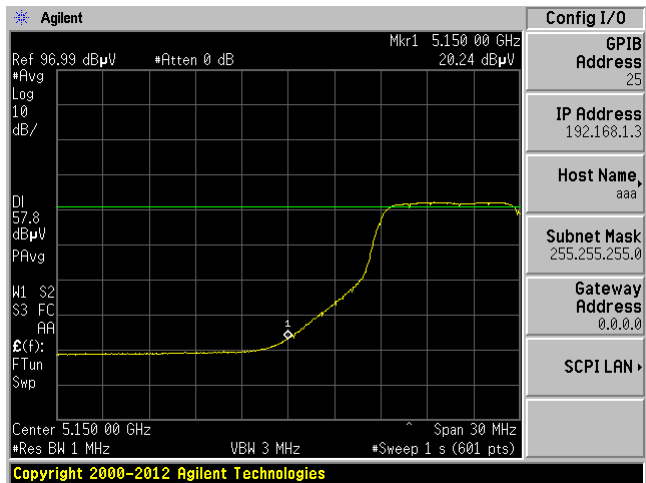


Beamforming

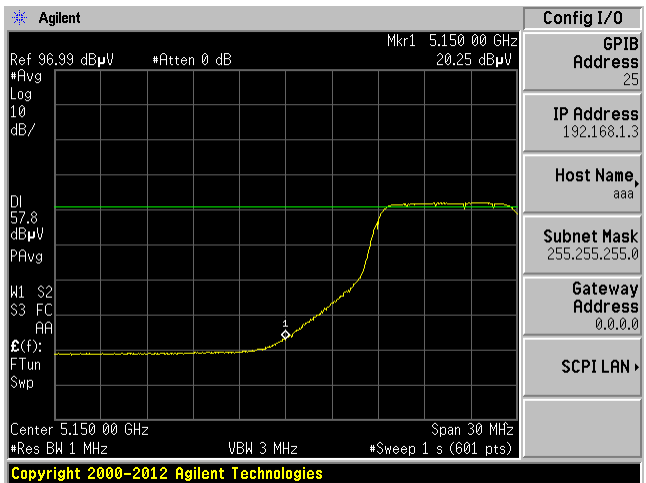
5.2 GHz Band:

20 MHz, Low Channel, 5165 MHz

H

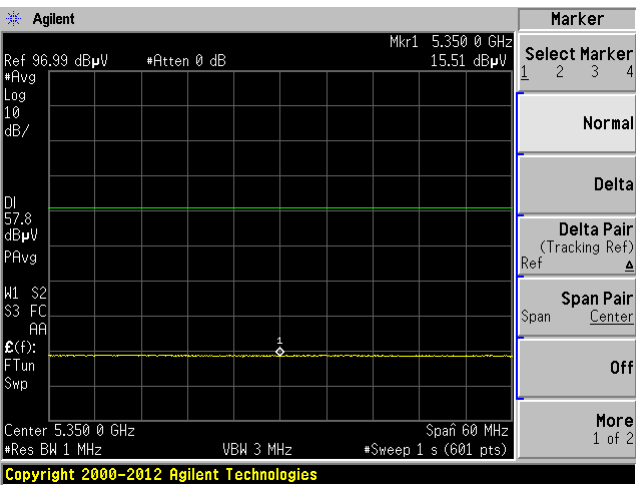


V

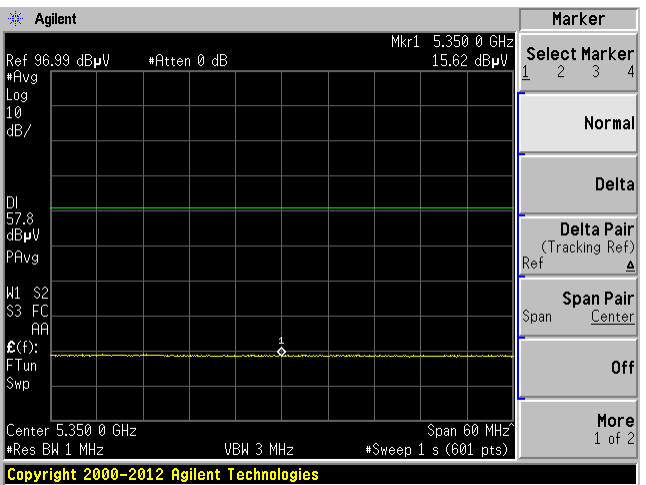


20 MHz, High Channel, 5240 MHz

H



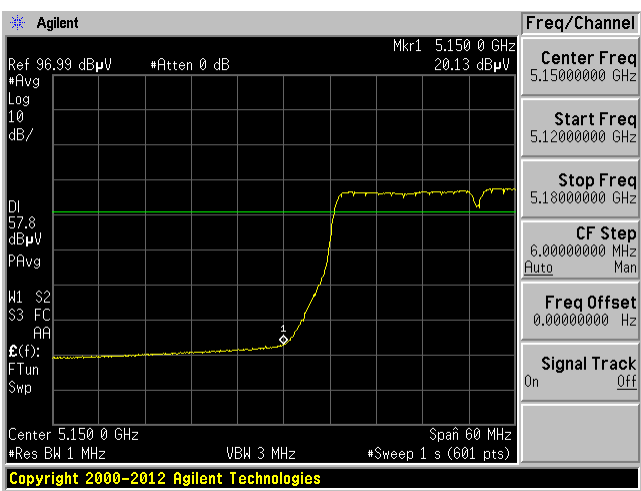
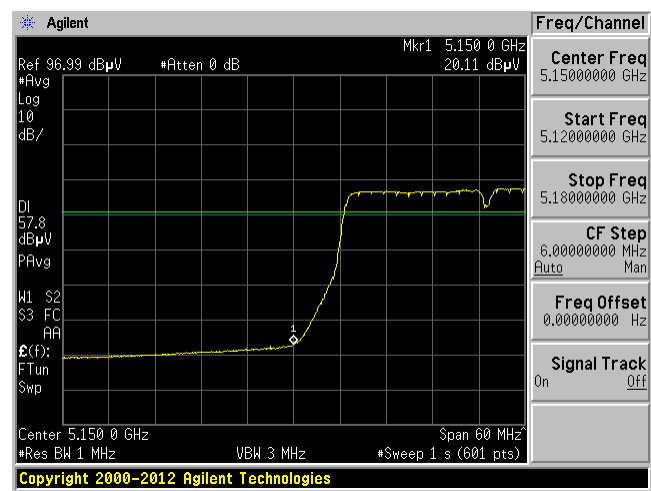
V



40 MHz, Low Channel, 5175 MHz

H

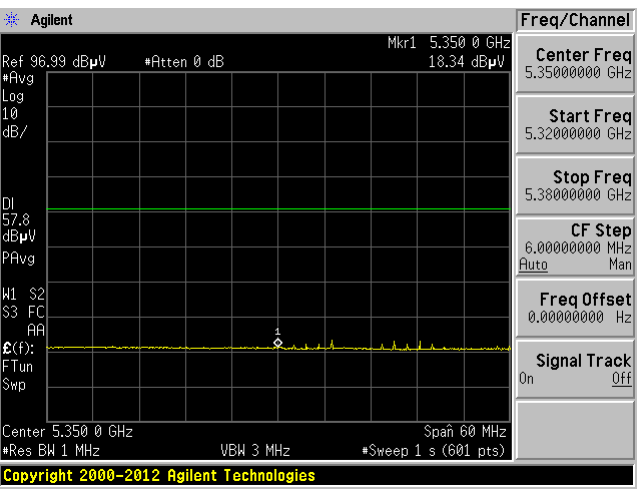
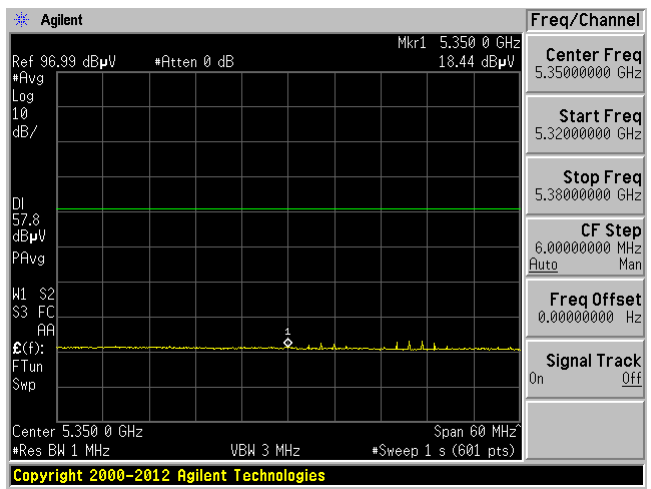
V



40 MHz, High Channel, 5230 MHz

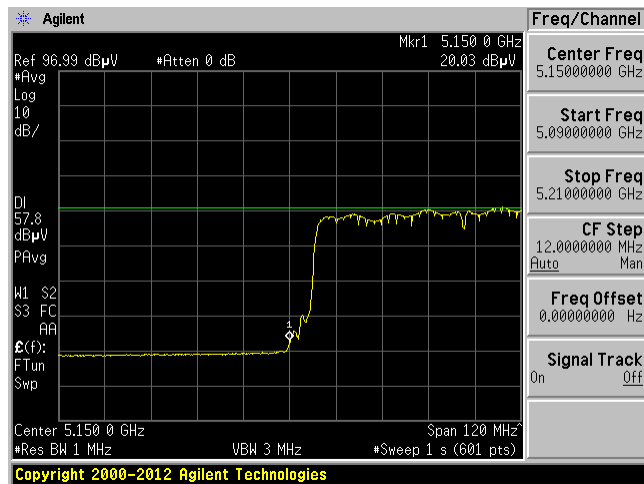
H

V

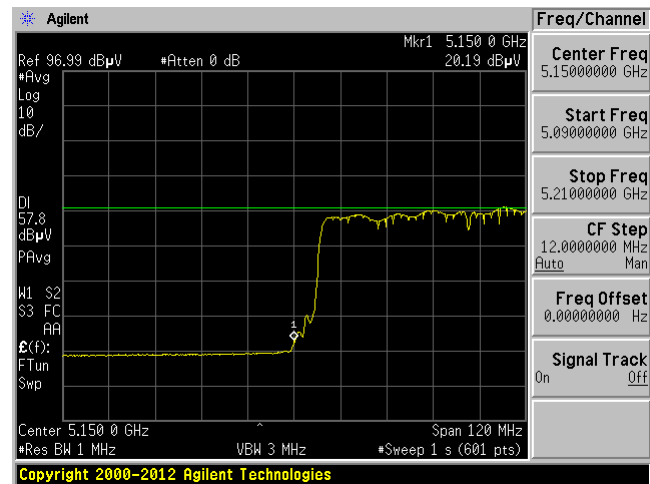


80 MHz, Low Channel, 5195 MHz

H

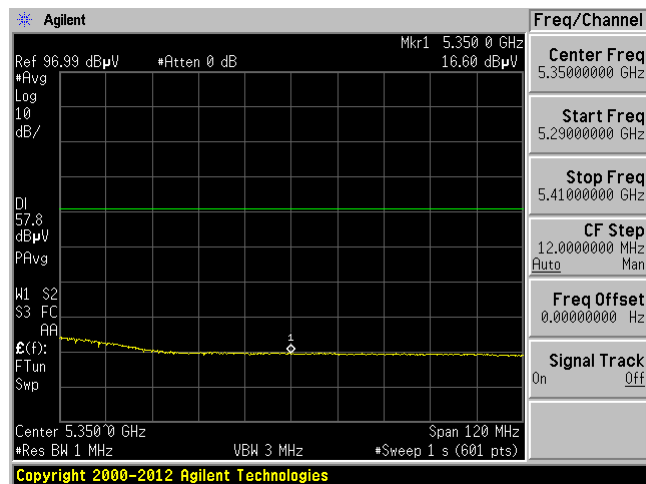


V

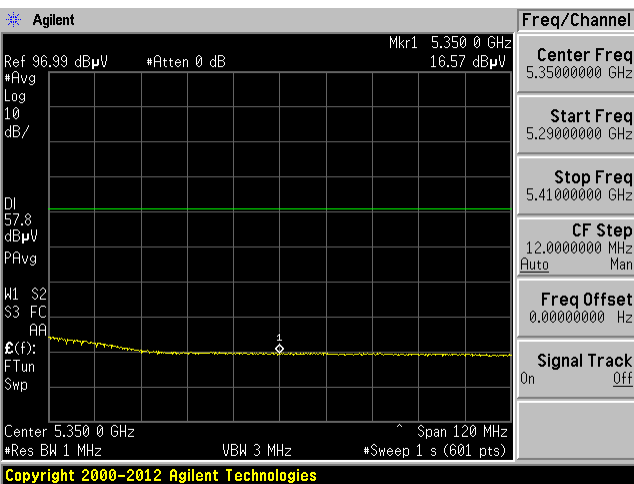


80 MHz, High Channel, 5210 MHz

H



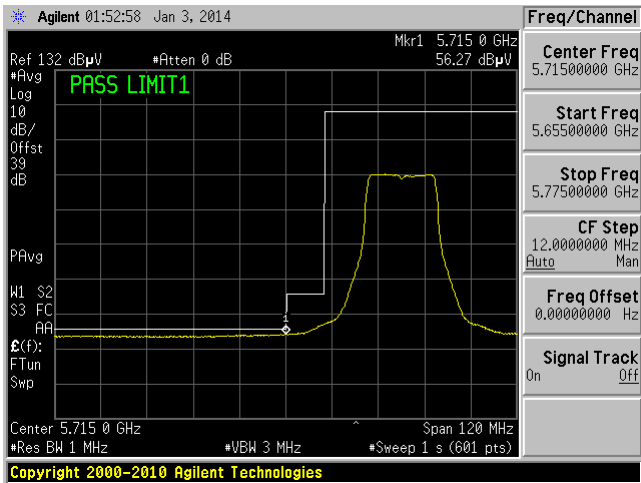
V



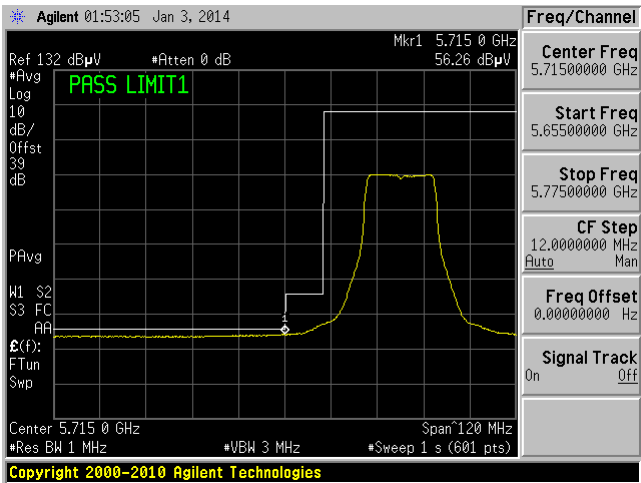
5.8 GHz Band:

20 MHz, Low Channel, 5745 MHz

H

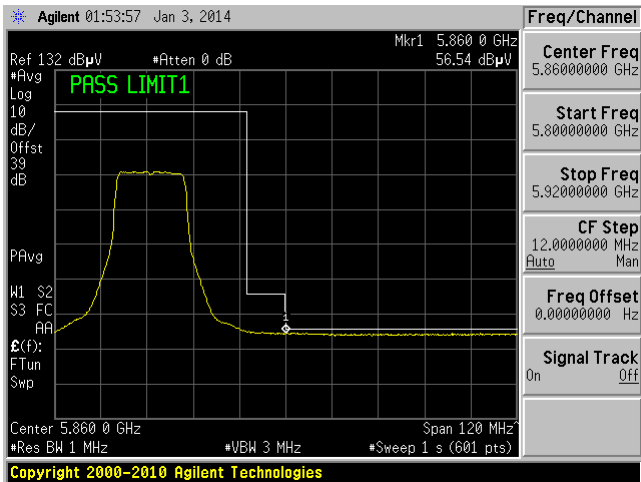


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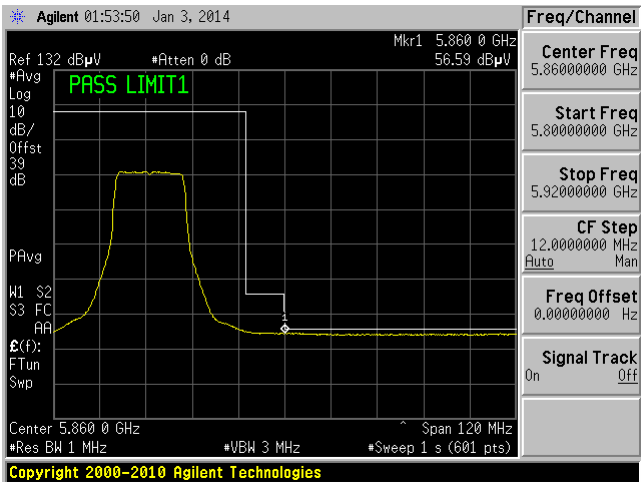


20 MHz, High Channel, 5825 MHz

H



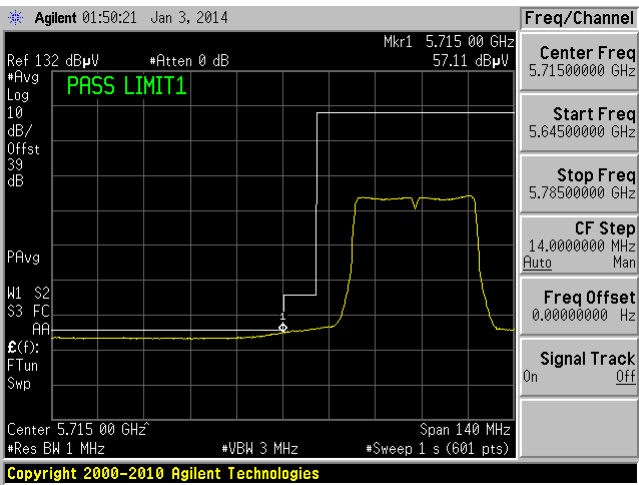
V



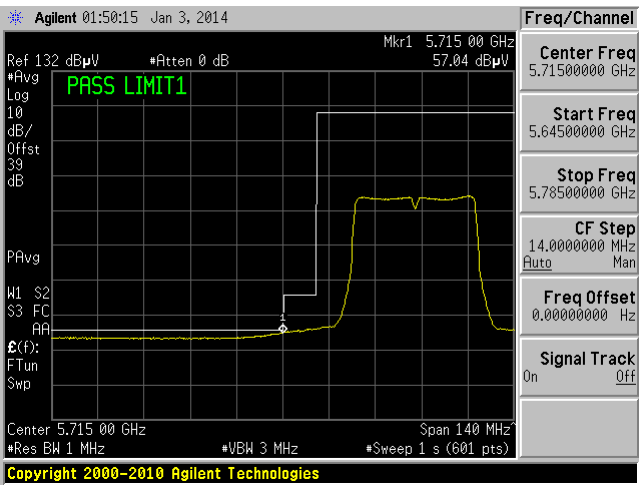


40 MHz, Low Channel, 5755 MHz

H

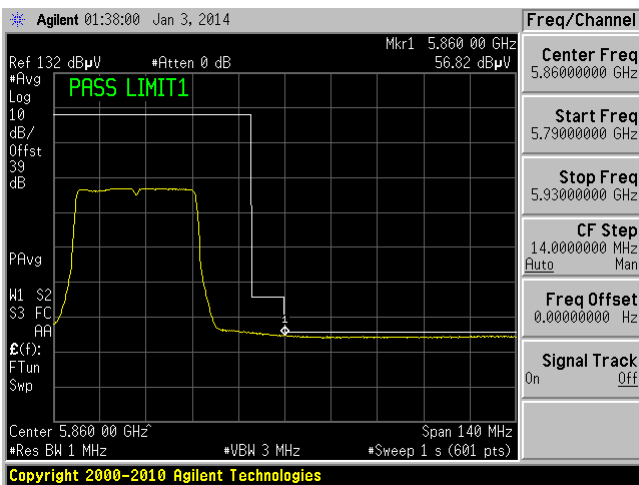


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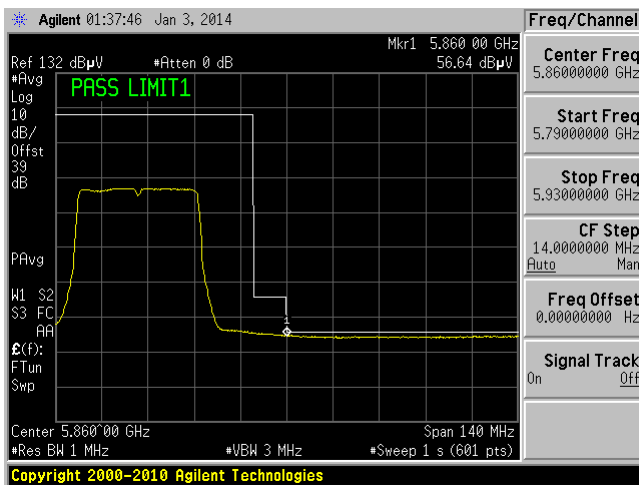


40 MHz, High Channel, 5815 MHz

H

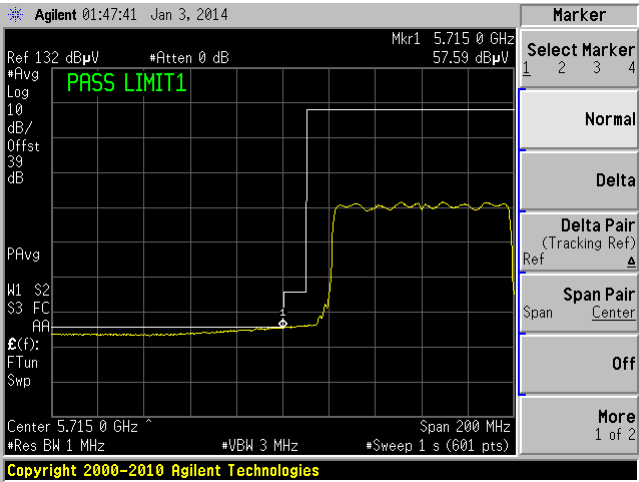


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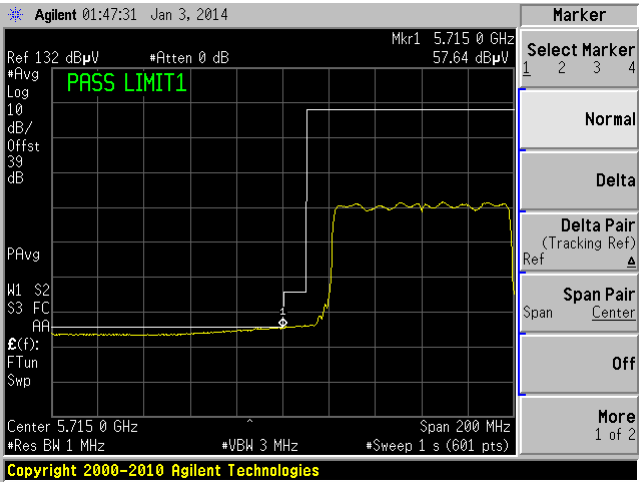


80 MHz, Low Channel, 5775 MHz

H

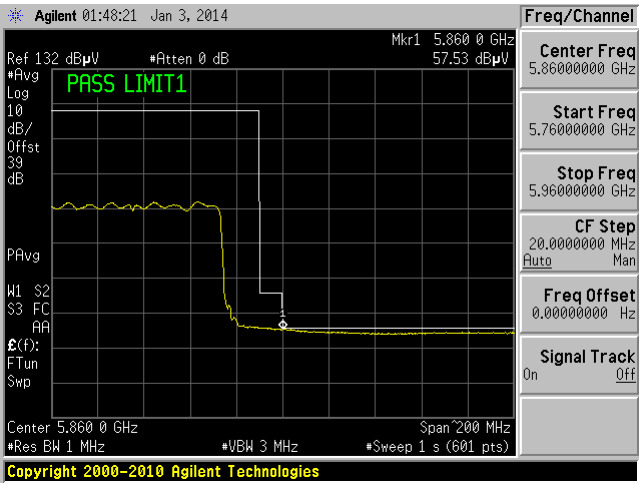


V

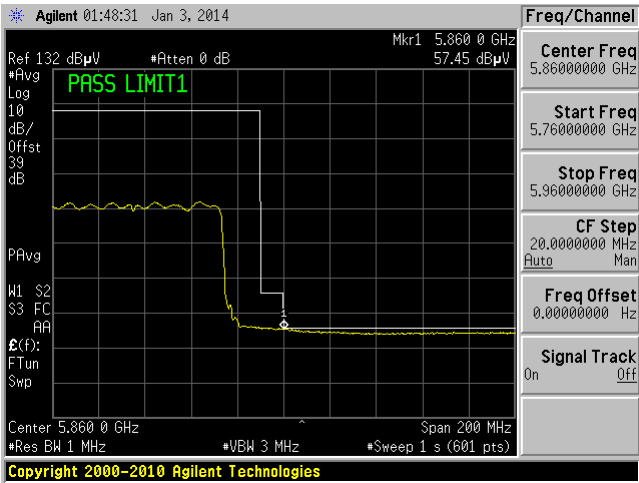


80 MHz, High Channel, 5795 MHz

H



V



## 11 FCC §15.407(a)(1) & (a)(3)- Power Spectral Density

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### 11.1 Applicable Standard

#### According to FCC §15.407(a)(1)

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

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where  $B$  is the 226 dB Emission Bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### According to FCC §15.407(a)(3)

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### 11.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D02 General UNII Test Procedures v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Peak power spectral density (PPSD)

### 11.3 Test Equipment List and Details

Manufacturers	Description	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US42221851	2013-02-28	1 year
EMCO	Antenna, Horn	3115	9511-4627	2013-10-17	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2013-05-09	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 11.4 Test Environmental Conditions

<b>Temperature:</b>	21-23 °C
<b>Relative Humidity:</b>	43-48 %
<b>ATM Pressure:</b>	101.1-101.3 kPa

The testing was performed by Cipher Chu on 2014-03-06 to 2014-03-14 at the 10m chamber 1.

### 11.5 Test Results

Note: Chain1 and Chain 4 is Vertical, and Chain 2 and Chain 3 is Horizontal

Note: C1, C2, C3 and C4 stands for Chain 1, Chain 2, Chain 3 and Chain 4.

The Calculated PSD (dBm) was calculated from the following formula:

$$\text{Corrected PSD} = \text{EIRP} - \text{Antenna Gain} = E[\text{dBuV/m}] + 20 \log(d[\text{meters}]) - 104.77 - 25 \text{ dBi}$$

Where d=10 meters

**5.2 GHz Band:****20 MHz Bandwidth**

<b>Frequency (MHz)</b>	<b>Radiated Reading dBμV @ 10m</b>	<b>Antenna Polarity (H/V)</b>	<b>Antenna Factor (dB/m)</b>	<b>Attenuator Loss (dB)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Gain (dBi)</b>	<b>Corrected PSD (dBm)</b>
5165	58.36	V(chain 1)	33.977	0	4.59	25	-12.843
5165	59.279	H(chain 2)	33.977	0	4.59	25	-11.924
5165	63.253	V(chain 4)	33.977	0	4.59	25	-7.95
5165	63.214	H(chain 3)	33.977	0	4.59	25	-7.989
5200	73.392	V(chain 1)	33.977	0	4.59	25	2.189
5200	73.142	H(chain 2)	33.977	0	4.59	25	1.939
5200	73.026	V(chain 4)	33.977	0	4.59	25	1.823
5200	70.054	H(chain 3)	33.977	0	4.59	25	-1.149
5240	59.928	V(chain 1)	33.977	0	4.59	25	-11.275
5240	62.4	H(chain 2)	33.977	0	4.59	25	-8.803
5240	64.853	V(chain 4)	33.977	0	4.59	25	-6.35
5240	63.618	H(chain 3)	33.977	0	4.59	25	-7.585

**40 MHz Bandwidth**

<b>Frequency (MHz)</b>	<b>Radiated Reading dBμV @ 10m</b>	<b>Antenna Polarity (H/V)</b>	<b>Antenna Factor (dB/m)</b>	<b>Attenuator Loss (dB)</b>	<b>Cable Loss (dB)</b>	<b>Antenna Gain (dBi)</b>	<b>Corrected PSD (dBm)</b>
5175	55.571	V(chain 1)	33.977	0	4.59	25	-15.632
5175	57.89	H(chain 2)	33.977	0	4.59	25	-13.313
5175	60.313	V(chain 4)	33.977	0	4.59	25	-10.89
5175	60.197	H(chain 3)	33.977	0	4.59	25	-11.006
5200	60.923	V(chain 1)	33.977	0	4.59	25	-10.28
5200	67.957	H(chain 2)	33.977	0	4.59	25	-3.246
5200	63.115	V(chain 4)	33.977	0	4.59	25	-8.088
5200	61.4	H(chain 3)	33.977	0	4.59	25	-9.803
5230	56.691	V(chain 1)	33.977	0	4.59	25	-14.512
5230	59.554	H(chain 2)	33.977	0	4.59	25	-11.649
5230	61.906	V(chain 4)	33.977	0	4.59	25	-9.297
5230	60.059	H(chain 3)	33.977	0	4.59	25	-11.144

## 80 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5195	55.472	V(chain 1)	33.977	0	4.59	25	-15.731
5195	57	H(chain 2)	33.977	0	4.59	25	-14.203
5195	59.336	V(chain 4)	33.977	0	4.59	25	-11.867
5195	58.222	H(chain 3)	33.977	0	4.59	25	-12.981
5200	56.277	V(chain 1)	33.977	0	4.59	25	-14.926
5200	62.006	H(chain 2)	33.977	0	4.59	25	-9.197
5200	56.572	V(chain 4)	33.977	0	4.59	25	-14.631
5200	53.795	H(chain 3)	33.977	0	4.59	25	-17.408
5210	55.599	V(chain 1)	33.977	0	4.59	25	-15.604
5210	56.807	H(chain 2)	33.977	0	4.59	25	-14.396
5210	59.385	V(chain 4)	33.977	0	4.59	25	-11.818
5210	58.195	H(chain 3)	33.977	0	4.59	25	-13.008

## 5.8 GHz Band:

## 20 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5745	61.041	V(chain 1)	33.922	0	4.62	25	-10.187
5745	63.733	H(chain 2)	33.922	0	4.62	25	-7.495
5745	58.862	V(chain 4)	33.922	0	4.62	25	-12.366
5745	64.169	H(chain 3)	33.922	0	4.62	25	-7.059
5785	62.888	V(chain 1)	33.922	0	4.62	25	-8.34
5785	65.981	H(chain 2)	33.922	0	4.62	25	-5.247
5785	63.348	V(chain 4)	33.922	0	4.62	25	-7.88
5785	67.892	H(chain 3)	33.922	0	4.62	25	-3.336
5825	60.6999	V(chain 1)	33.922	0	4.62	25	-10.5281
5825	63.23	H(chain 2)	33.922	0	4.62	25	-7.998
5825	58.768	V(chain 4)	33.922	0	4.62	25	-12.46
5825	63.848	H(chain 3)	33.922	0	4.62	25	-7.38

## 40 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5755	55.347	V(chain 1)	33.922	0	4.62	25	-15.881
5755	54.181	H(chain 2)	33.922	0	4.62	25	-17.047
5755	52.872	V(chain 4)	33.922	0	4.62	25	-18.356
5755	55.264	H(chain 3)	33.922	0	4.62	25	-15.964
5785	59.981	V(chain 1)	33.922	0	4.62	25	-11.247
5785	57.932	H(chain 2)	33.922	0	4.62	25	-13.296
5785	54.606	V(chain 4)	33.922	0	4.62	25	-16.622
5785	60.664	H(chain 3)	33.922	0	4.62	25	-10.564
5815	54.866	V(chain 1)	33.922	0	4.62	25	-16.362
5815	60.234	H(chain 2)	33.922	0	4.62	25	-10.994
5815	52.427	V(chain 4)	33.922	0	4.62	25	-18.801
5815	60.62	H(chain 3)	33.922	0	4.62	25	-10.608

## 80 MHz Bandwidth

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5775	52.902	V(chain 1)	33.922	0	4.62	25	-18.326
5775	51.467	H(chain 2)	33.922	0	4.62	25	-19.761
5775	50.315	V(chain 4)	33.922	0	4.62	25	-20.913
5775	50.503	H(chain 3)	33.922	0	4.62	25	-20.725
5785	51.978	V(chain 1)	33.922	0	4.62	25	-19.25
5785	52.907	H(chain 2)	33.922	0	4.62	25	-18.321
5785	50.516	V(chain 4)	33.922	0	4.62	25	-20.712
5785	50.842	H(chain 3)	33.922	0	4.62	25	-20.386
5795	51.845	V(chain 1)	33.922	0	4.62	25	-19.383
5795	52.516	H(chain 2)	33.922	0	4.62	25	-18.712
5795	50.022	V(chain 4)	33.922	0	4.62	25	-21.206
5795	51.706	H(chain 3)	33.922	0	4.62	25	-19.522

**Beamforming****5.2 GHz****20 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5165	58.461	V	33.977	0	4.59	25	-12.742
5165	59.087	H	33.977	0	4.59	25	-12.116
5200	73.323	V	33.977	0	4.59	25	-4.483
5200	73.367	H	33.977	0	4.59	25	-3.474
5240	67.954	V	33.977	0	4.59	25	-3.249
5240	67.945	H	33.977	0	4.59	25	-3.258

**40 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5175	64.71	V	33.977	0	4.59	25	-6.493
5175	65.356	H	33.977	0	4.59	25	-5.847
5200	66.72	V	33.977	0	4.59	25	-4.483
5200	67.729	H	33.977	0	4.59	25	-3.474
5230	67.24	V	33.977	0	4.59	25	-3.963
5230	67.455	H	33.977	0	4.59	25	-3.748

**80 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dBμV @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5195	58.565	V	33.977	0	4.59	25	-12.638
5195	58.844	H	33.977	0	4.59	25	-12.359
5200	58.934	V	33.977	0	4.59	25	-12.269
5200	60.954	H	33.977	0	4.59	25	-10.249
5210	65.19	V	33.977	0	4.59	25	-6.013
5210	65.361	H	33.977	0	4.59	25	-5.842



**5.8 GHz Band:****20 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dB $\mu$ V @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5745	60.529	V	33.922	0	4.62	25	-10.699
5745	61.381	H	33.922	0	4.62	25	-9.847
5785	62.491	V	33.922	0	4.62	25	-8.737
5785	62.818	H	33.922	0	4.62	25	-8.41
5825	60.079	V	33.922	0	4.62	25	-11.149
5825	60.429	H	33.922	0	4.62	25	-10.799

**40 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dB $\mu$ V @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5755	55.089	V	33.922	0	4.62	25	-16.139
5755	54.87	H	33.922	0	4.62	25	-16.358
5785	59.856	V	33.922	0	4.62	25	-11.372
5785	59.5	H	33.922	0	4.62	25	-11.728
5815	54.839	V	33.922	0	4.62	25	-16.389
5815	54.425	H	33.922	0	4.62	25	-16.803

**80 MHz Bandwidth**

Frequency (MHz)	Radiated Reading dB $\mu$ V @ 10m	Antenna Polarity (H/V)	Antenna Factor (dB/m)	Attenuator Loss (dB)	Cable Loss (dB)	Antenna Gain (dBi)	Corrected PSD (dBm)
5775	52.835	V	33.922	0	4.62	25	-18.393
5775	52.729	H	33.922	0	4.62	25	-18.499
5785	52.103	V	33.922	0	4.62	25	-19.125
5785	51.845	H	33.922	0	4.62	25	-19.383
5795	52.178	V	33.922	0	4.62	25	-19.05
5795	52.051	H	33.922	0	4.62	25	-19.177

Combined PSD:

## 5.2 GHz Band:

### 20 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD C1/C2 (dBm)	Conducted PSD C3/C4 (dBm)	Total PSD C1,C2 (dBm)	Total PSD C3,C4 (dBm)
Low	5165	-12.84/-11.92	-7.98/-7.95	-9.35	-4.96
Middle	5200	2.19/1.94	-1.15/1.82	5.08	3.60
High	5240	-11.27/-8.80	-7.58/-6.35	-6.86	-3.91

### 40 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD C1/C2 (dBm)	Conducted PSD C3/C4 (dBm)	Total PSD C1,C2 (dBm)	Total PSD C3,C4 (dBm)
Low	5175	-15.63/-13.31	-11.00/-10.89	-11.31	-7.94
Middle	5200	-10.28/-3.25	-9.8/-8.09	-2.46	-5.85
High	5230	-14.51/-11.64	-11.14/-9.29	-9.84	-7.11

### 80 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD C1/C2 (dBm)	Conducted PSD C3/C4 (dBm)	Total PSD C1,C2 (dBm)	Total PSD C3,C4 (dBm)
Low	5195	-15.73/-14.20	-12.98/-11.86	-11.89	-9.38
Middle	5200	-14.93/-9.2	-17.41/-14.63	-8.17	-12.79
High	5210	-15.60/-14.39	-13.00/-11.81	-11.95	-9.36

Note: Antenna gain of EUT is 25 dBi which is over 2 dB of 23 dBi allowed by FCC Part 15.407 (a)(1)(iii), a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi

**5.8 GHz Band:**

## 20 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD C1/C2 (dBm)	Conducted PSD C3/C4 (dBm)	Total PSD C1,C2 (dBm)	Total PSD C3,C4 (dBm)
Low	5745	-10.18/-7.49	-7.05/-12.36	-5.63	-5.94
Middle	5785	-8.34/-5.24	-3.33/-7.88	-3.51	-2.03
High	5825	-10.52/-7.99	-7.38/-12.46	-6.07	-6.21

## 40 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD C1/C2 (dBm)	Conducted PSD C3/C4 (dBm)	Total PSD C1,C2 (dBm)	Total PSD C3,C4 (dBm)
Low	5755	-15.88/-17.04	-15.96/-18.35	-13.41	-13.99
Middle	5785	-11.24/-13.29	-10.56/-16.62	-9.14	-9.60
High	5815	-16.36/-10.99	-10.60/-18.80	-9.89	-9.99

## 80 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD C1/C2 (dBm)	Conducted PSD C3/C4 (dBm)	Total PSD C1,C2 (dBm)	Total PSD C3,C4 (dBm)
Low	5775	-18.32/-19.76	-20.72/-20.91	-15.97	-17.81
Middle	5785	-19.25/-18.32	-20.38/-20.71	-15.75	-17.54
High	5795	-19.38/-18.71	-19.52/-21.20	-16.02	-17.27

**Beamforming****5.2 GHz Band:**

## 20 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD @ H (dBm)	Conducted PSD @ V (dBm)	Total PSD (dBm)
Low	5165	-12.11	-12.74	-9.41
Middle	5200	2.16	2.12	5.15
High	5240	-3.25	-3.24	-0.24

## 40 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD @ H (dBm)	Conducted PSD @ V (dBm)	Total PSD (dBm)
Low	5175	-5.84	-6.49	-3.15
Middle	5200	0.60	0.68	3.66
High	5230	-3.74	-3.96	-0.84

## 80 MHz Bandwidth

Channel	Frequency (MHz)	Conducted PSD @ H (dBm)	Conducted PSD @ V (dBm)	Total PSD (dBm)
Low	5195	-12.35	-12.63	-9.49
Middle	5200	1.40	1.07	4.25
High	5210	-5.84	-6.01	-2.92

**5.8 GHz Band:****20 MHz Bandwidth**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Conducted PSD @ H (dBm)</b>	<b>Conducted PSD @ V (dBm)</b>	<b>Total PSD (dBm)</b>
Low	5745	-9.84	-10.69	-7.24
Middle	5785	-8.41	-8.73	-5.56
High	5825	-10.79	-11.14	-7.96

**40 MHz Bandwidth**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Conducted PSD @ H (dBm)</b>	<b>Conducted PSD @ V (dBm)</b>	<b>Total PSD (dBm)</b>
Low	5755	-16.35	-16.13	-13.24
Middle	5785	-11.72	-11.37	-8.54
High	5815	-16.80	-16.38	-13.58

**80 MHz Bandwidth**

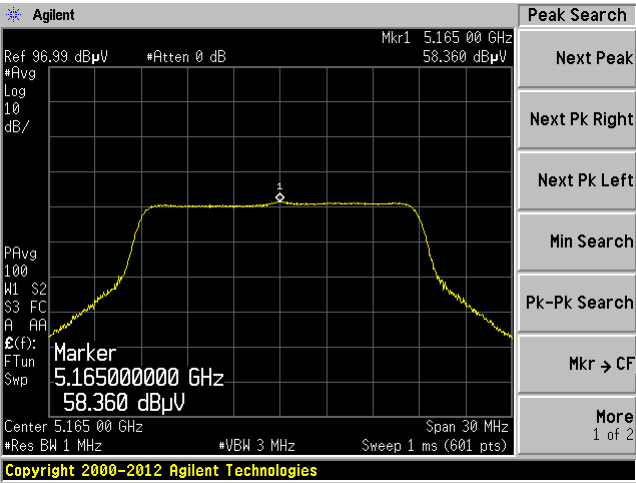
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Conducted PSD @ H (dBm)</b>	<b>Conducted PSD @ V (dBm)</b>	<b>Total PSD (dBm)</b>
Low	5775	-18.49	-18.39	-15.44
Middle	5785	-19.38	-19.12	-16.24
High	5795	-19.17	-19.05	-16.10

Please refer to the following plots.

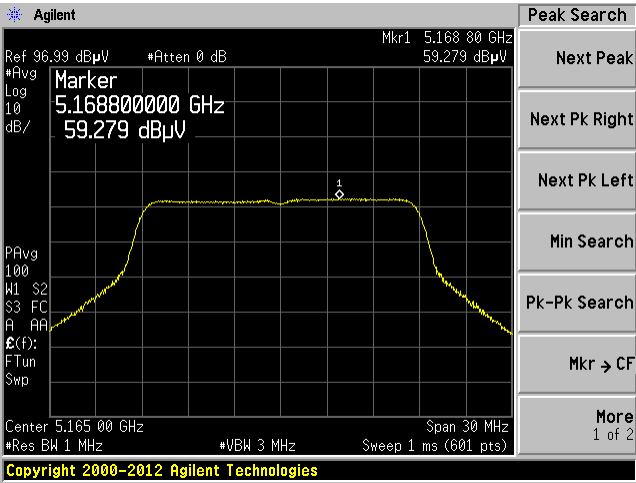
5.2 GHz Band:

20 MHz, Low Channel, 5165 MHz

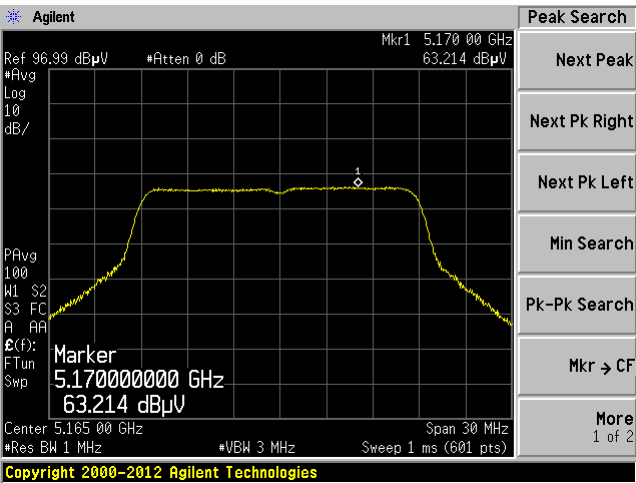
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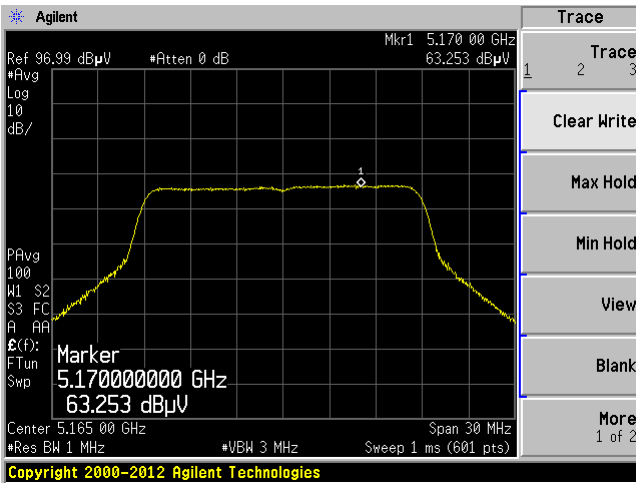
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C3

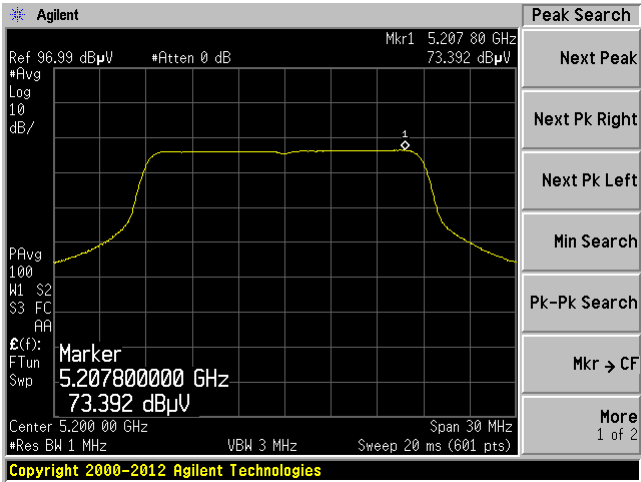


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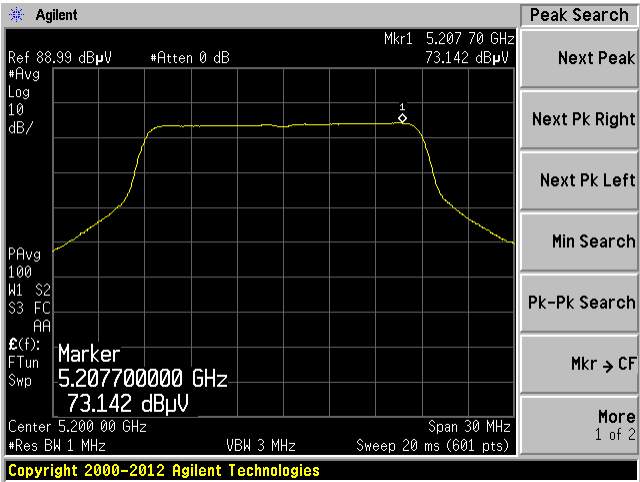


20 MHz, Middle Channel, 5200 MHz

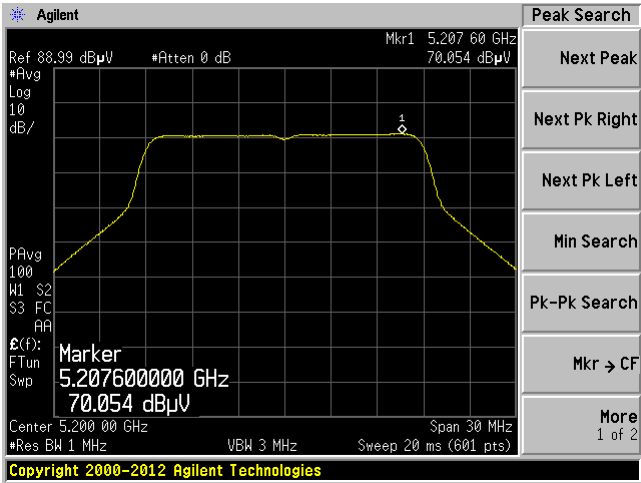
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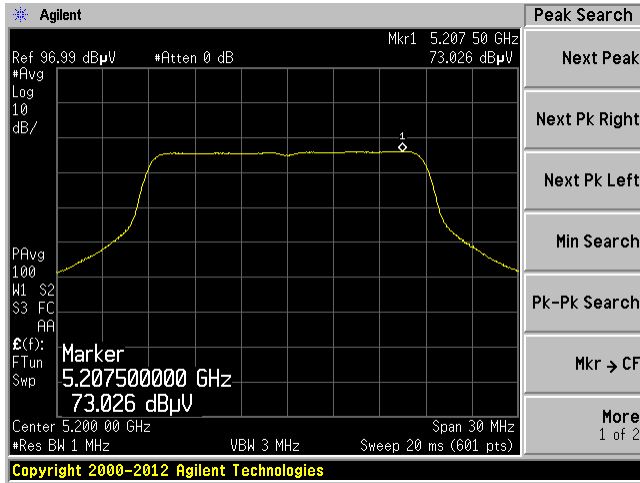
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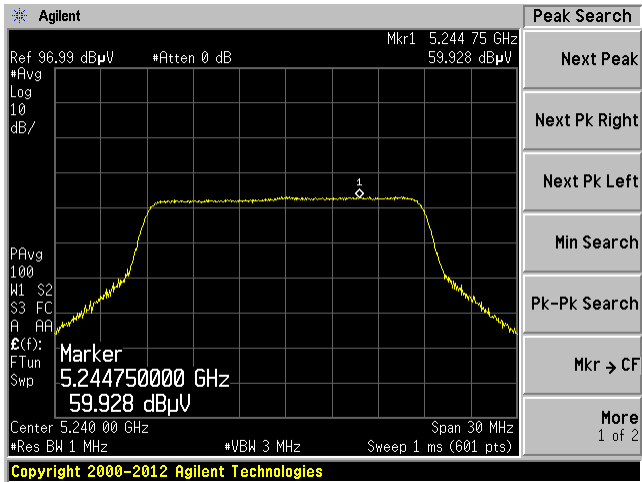


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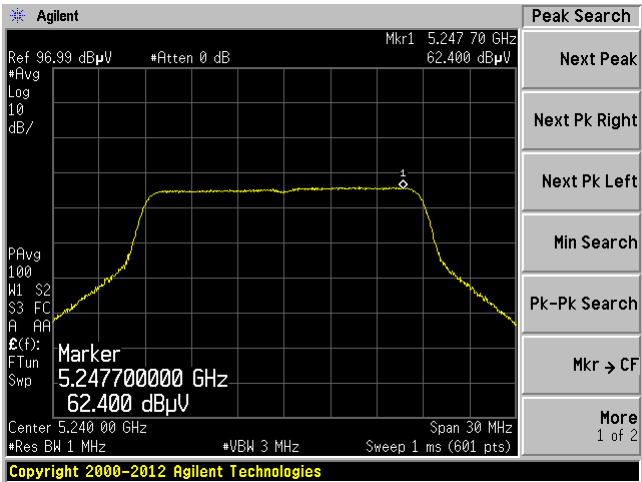


20 MHz, High Channel, 5240 MHz

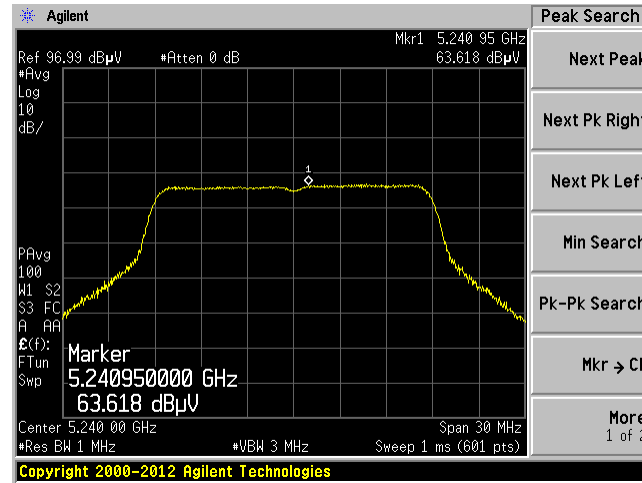
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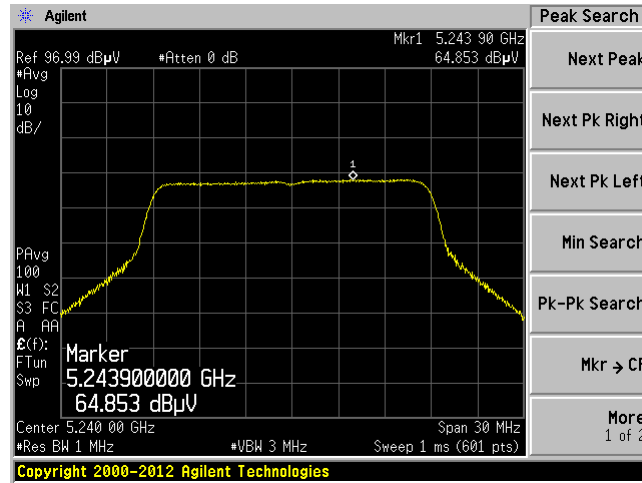
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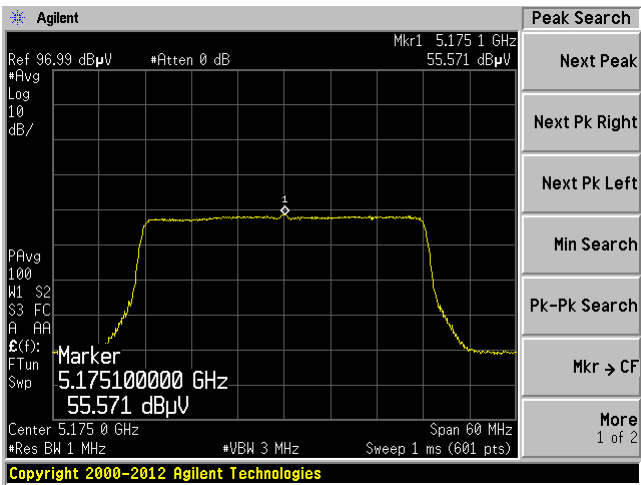
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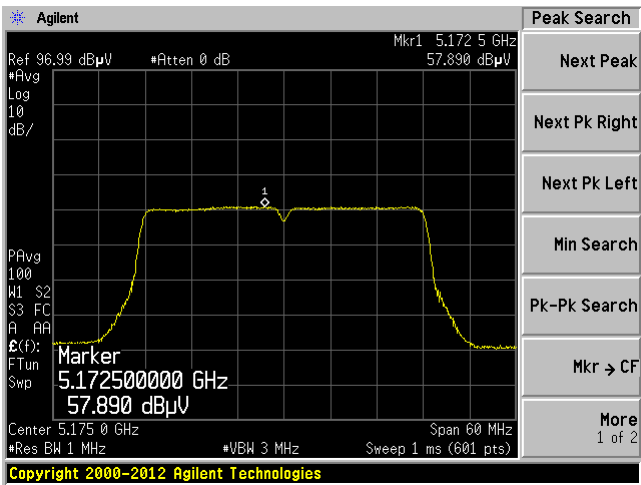


40 MHz, Low Channel, 5175 MHz

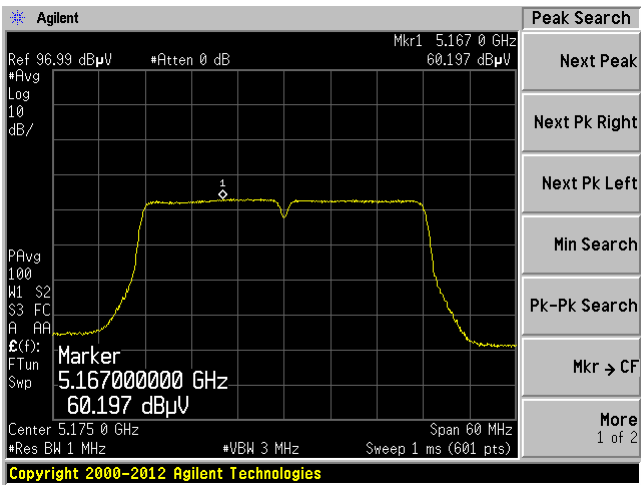
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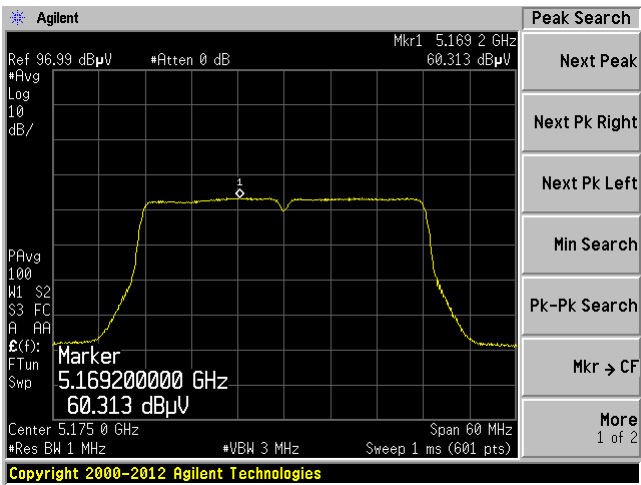
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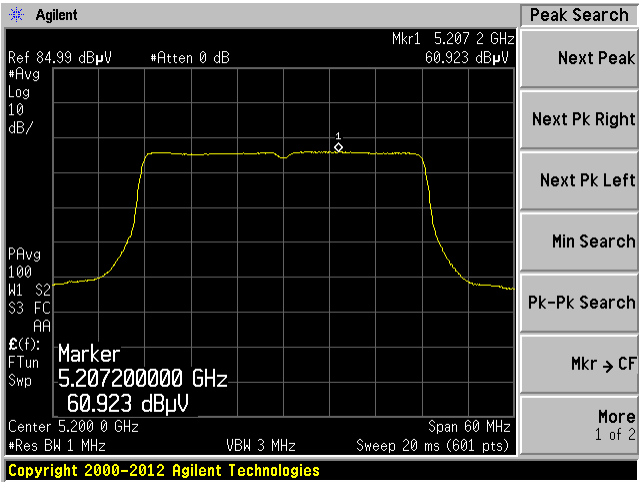


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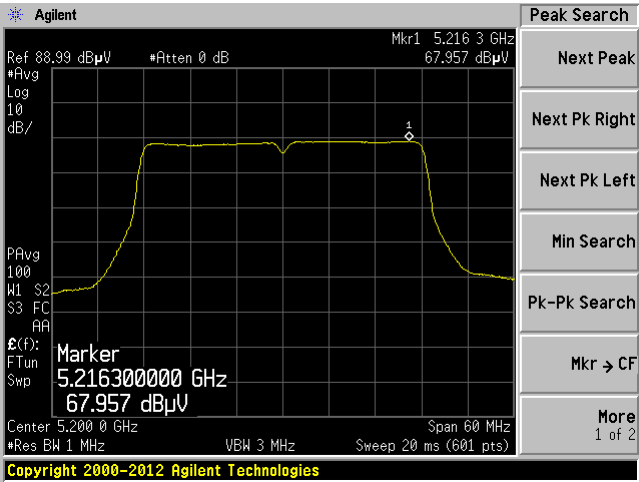


40 MHz, Middle Channel, 5200 MHz

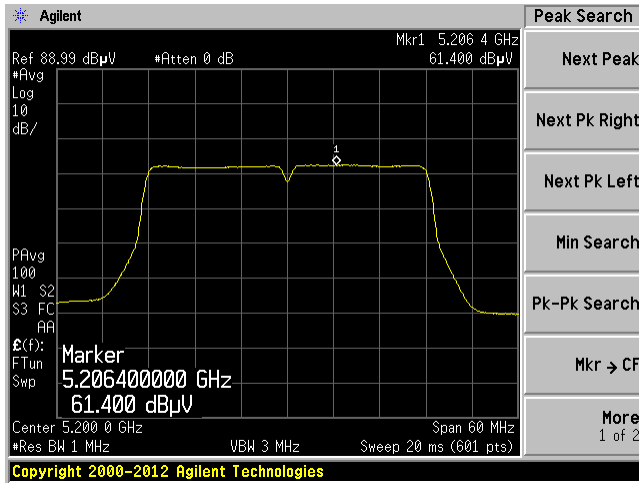
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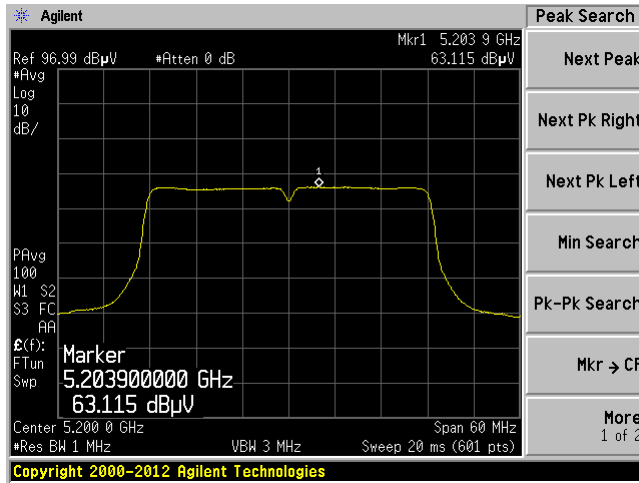
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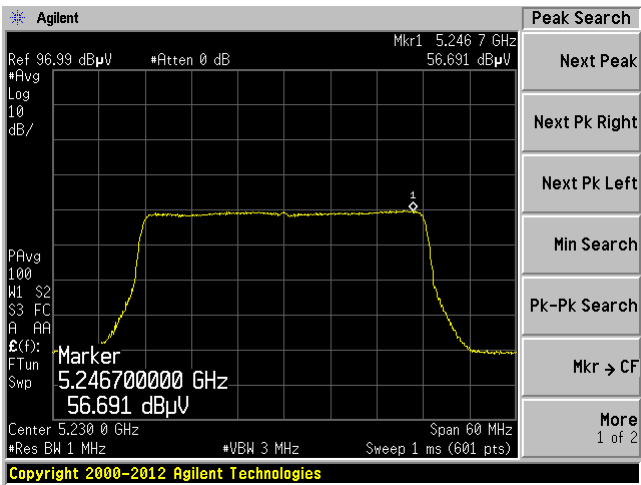


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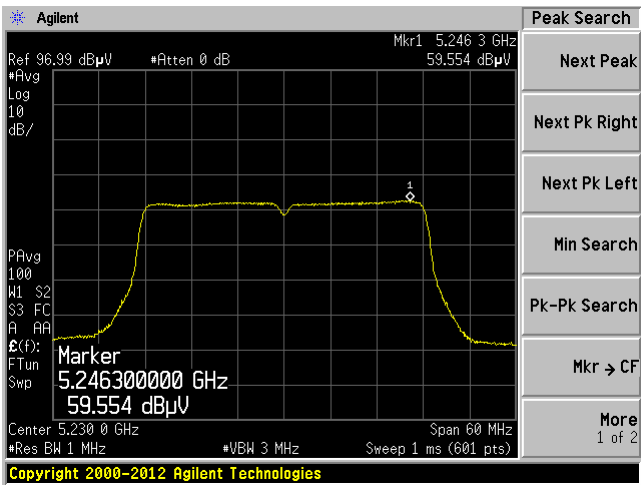


40 MHz, High Channel, 5230 MHz

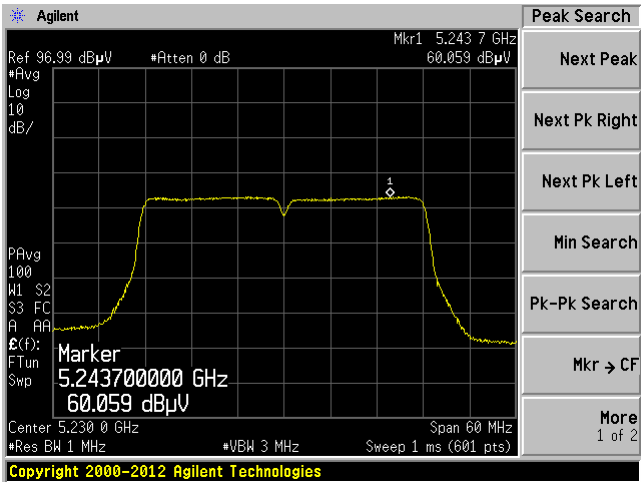
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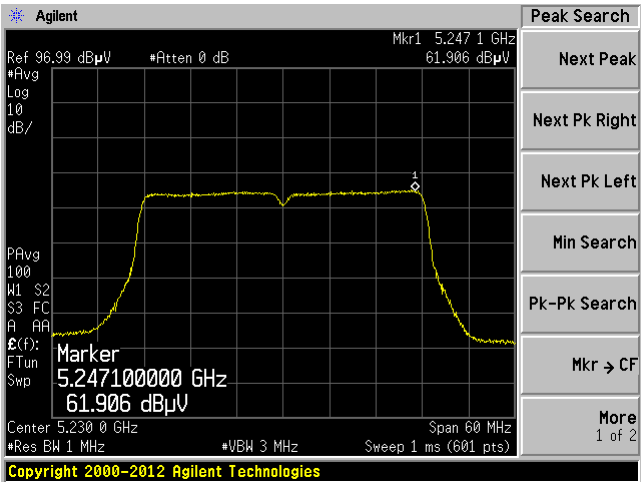
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C3

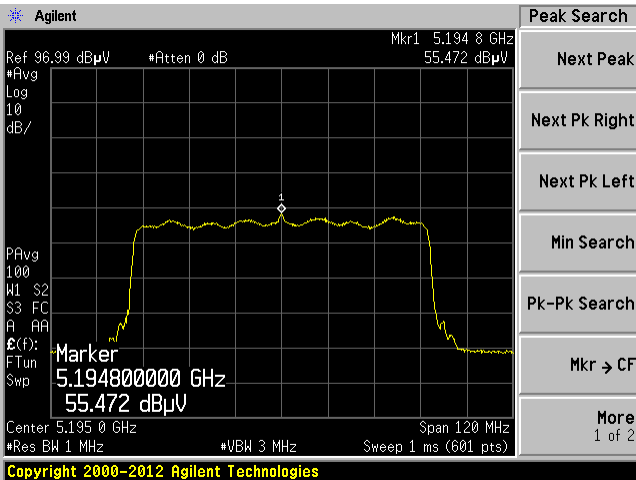


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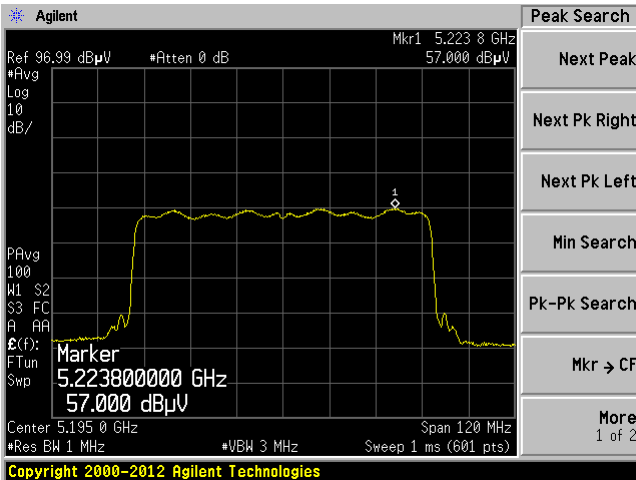


80 MHz, Low Channel, 5195 MHz

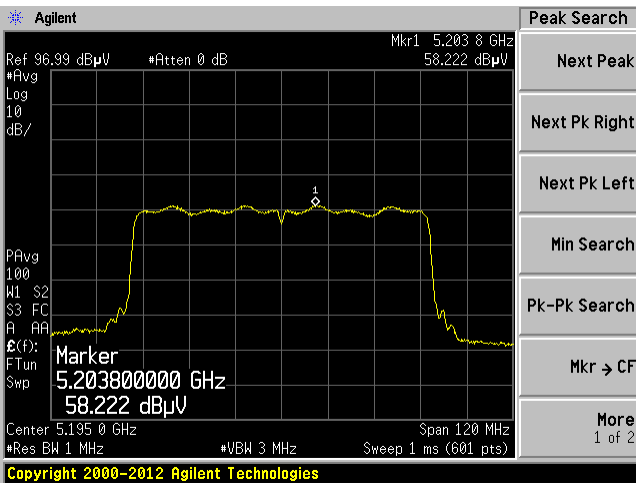
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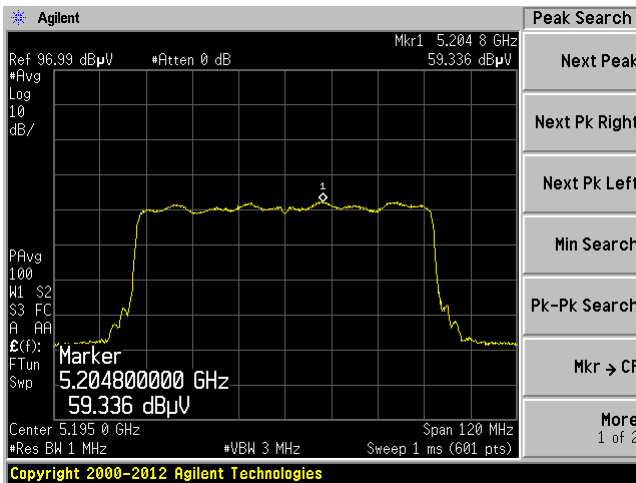
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C3

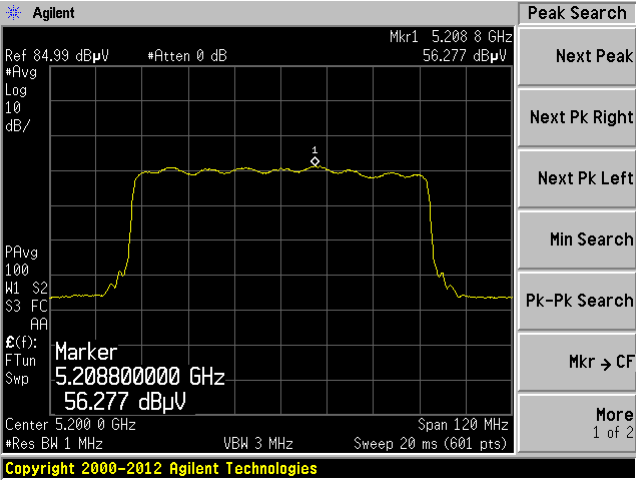


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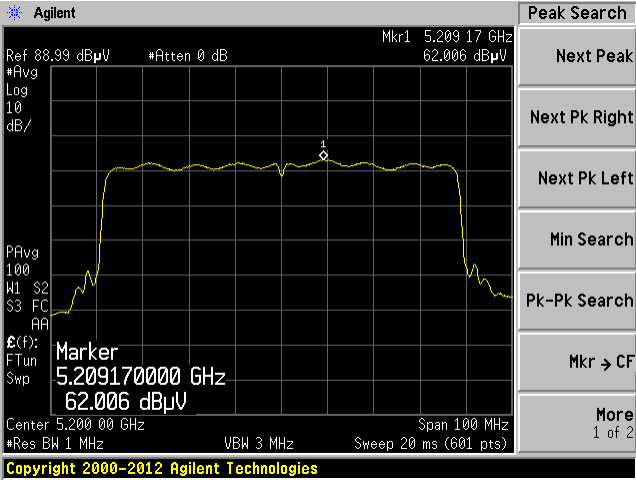


80 MHz, Middle Channel, 5200 MHz

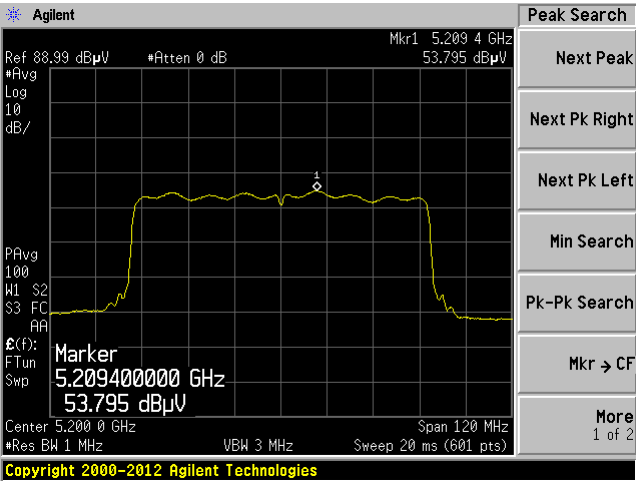
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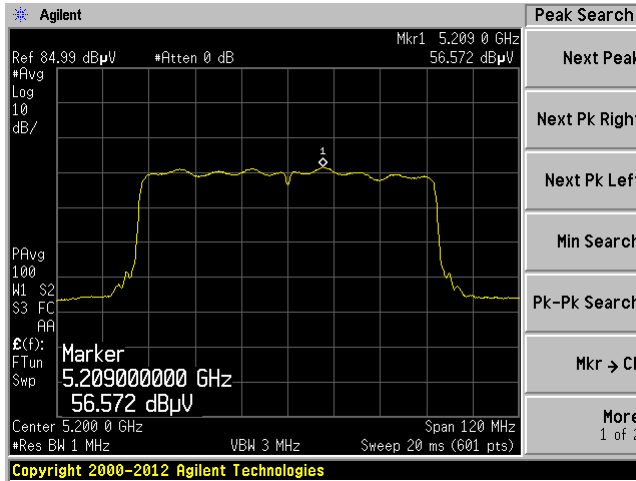
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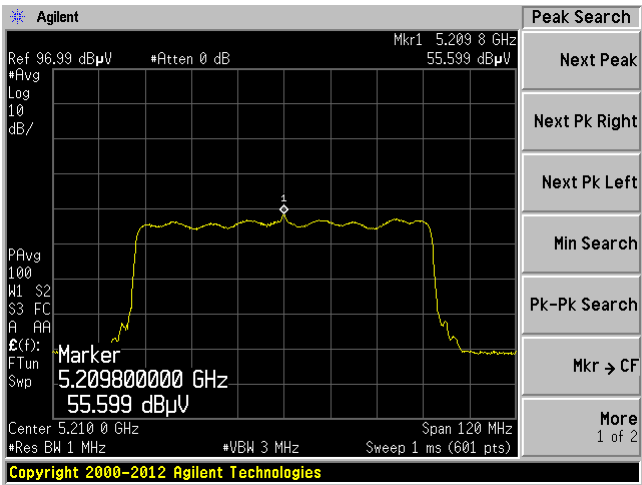


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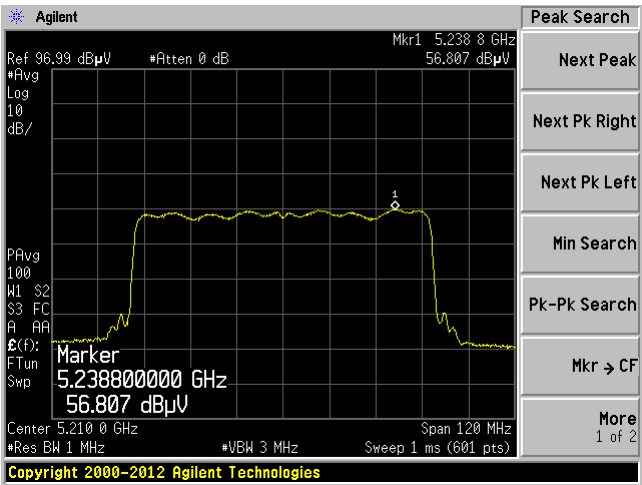


80 MHz, High Channel, 5210 MHz

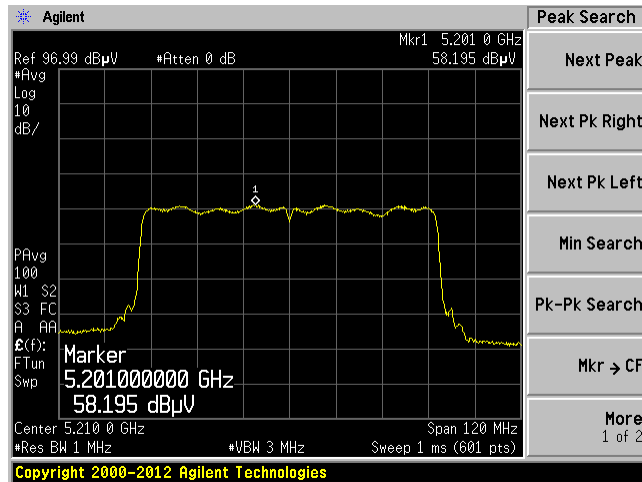
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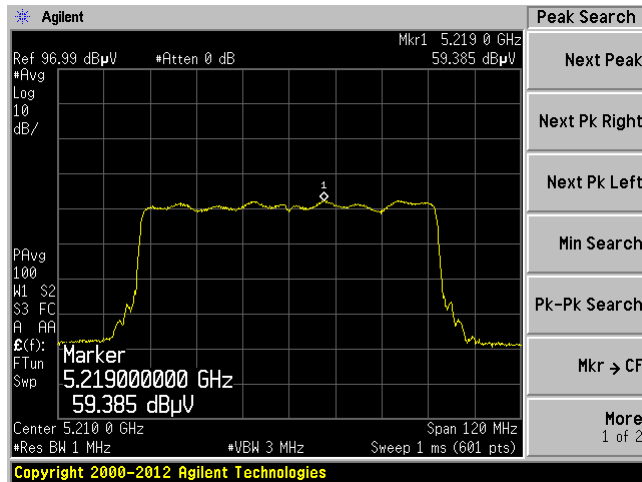
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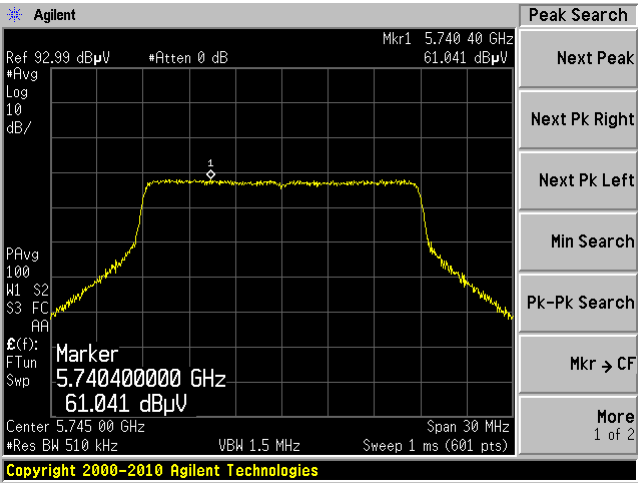
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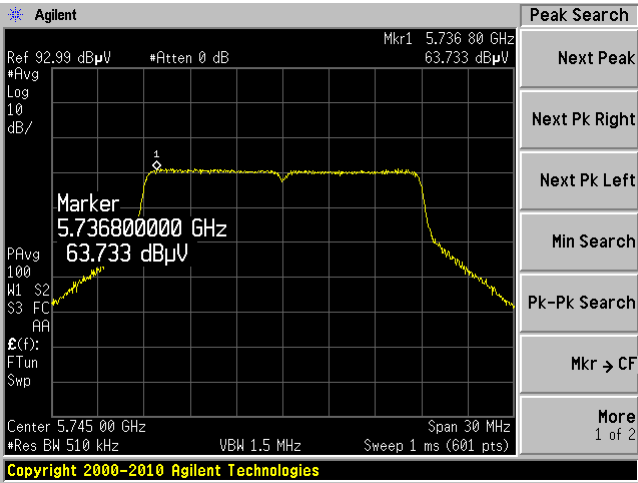
5.8 GHz Band :

20 MHz, Low Channel, 5745 MHz

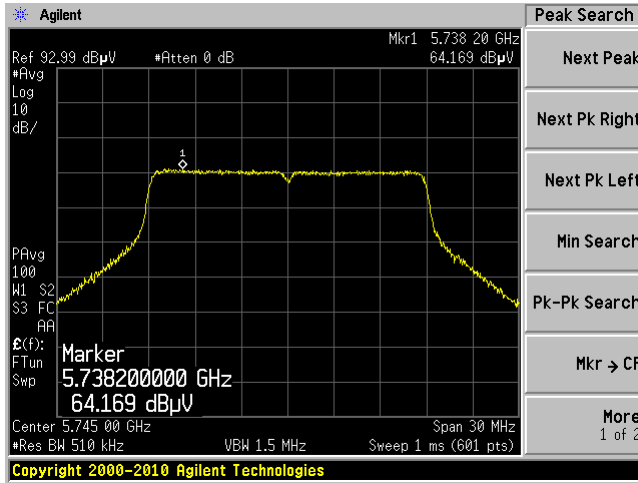
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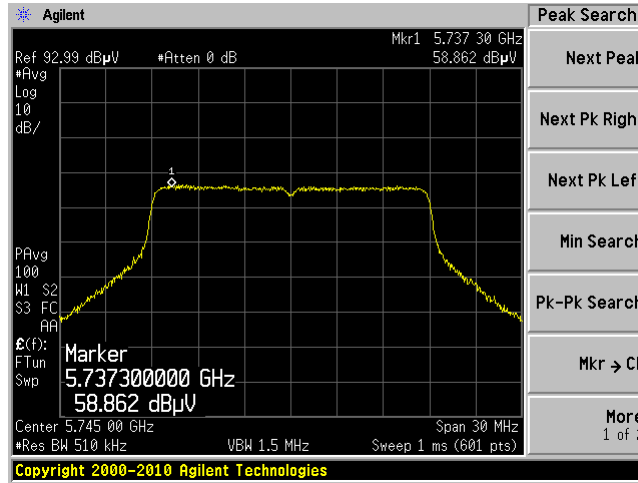
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C3

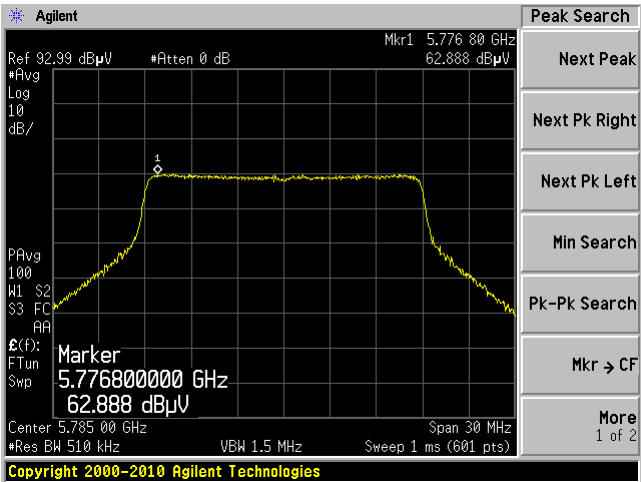


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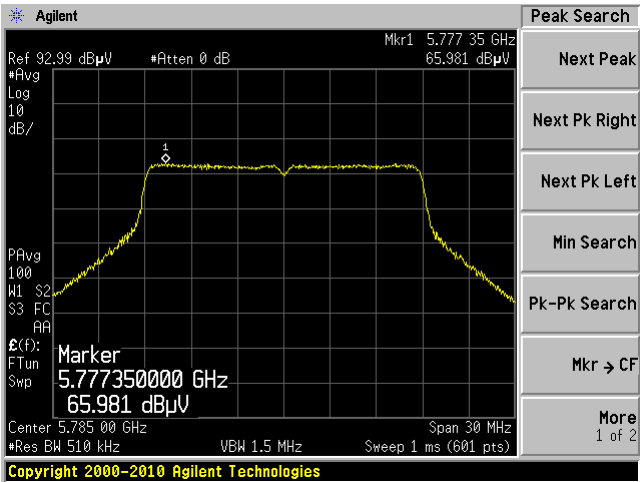


20 MHz, Middle Channel, 5785 MHz

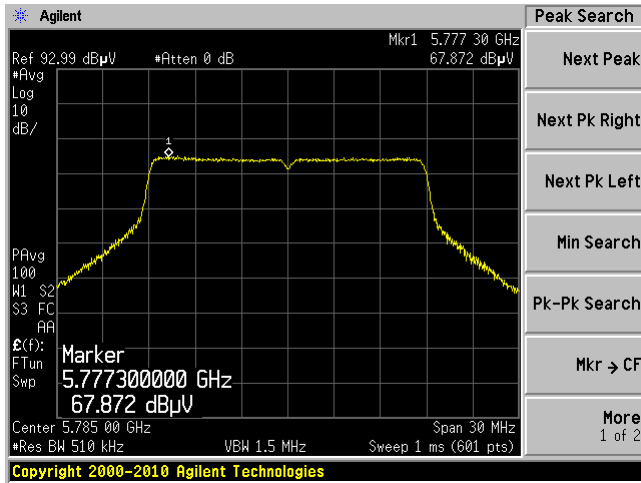
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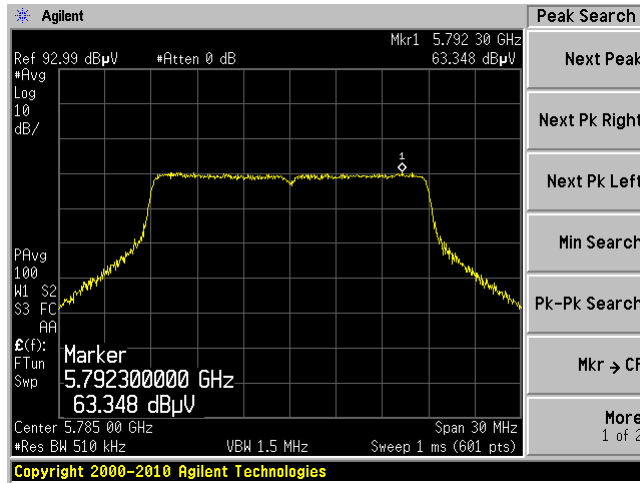
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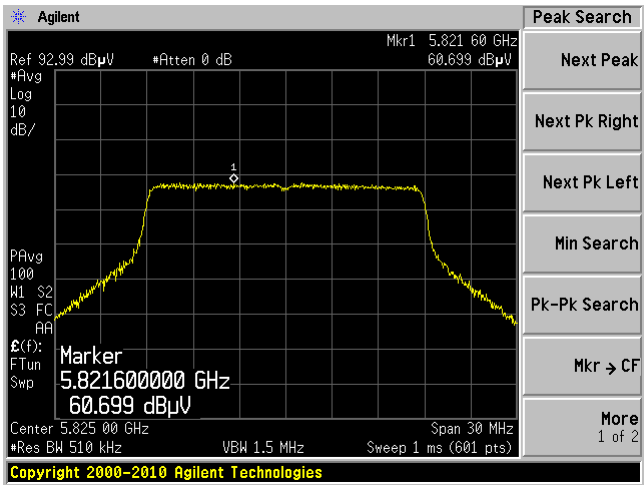
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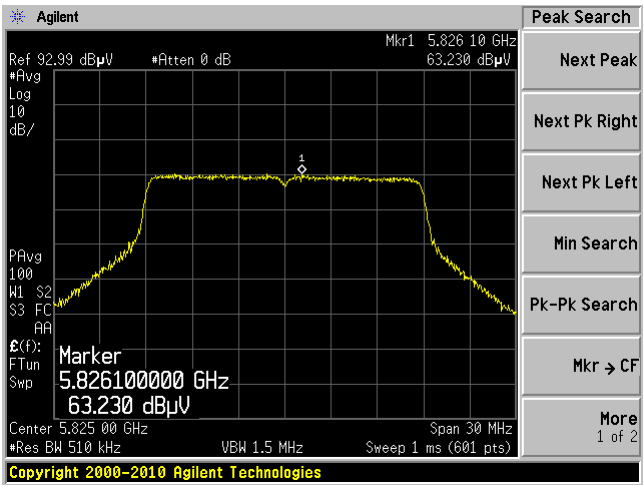


20 MHz, High Channel, 5825 MHz

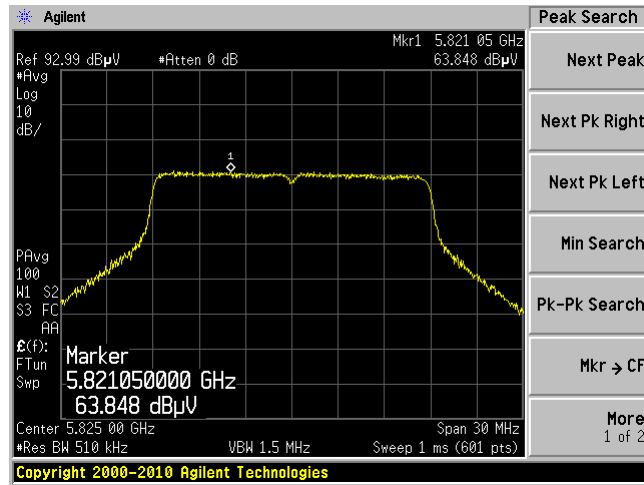
C1



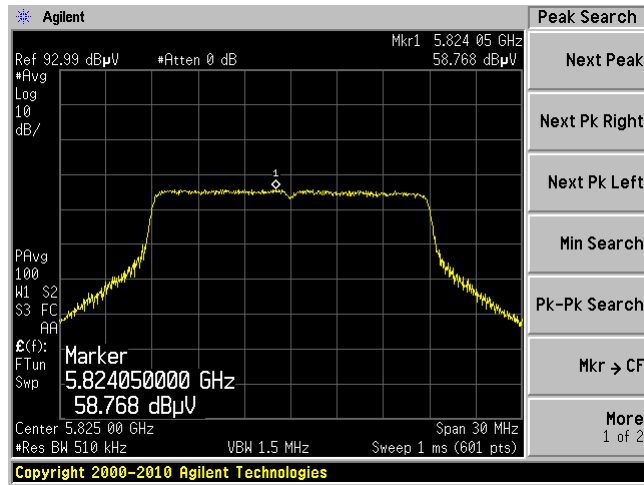
C2



C3

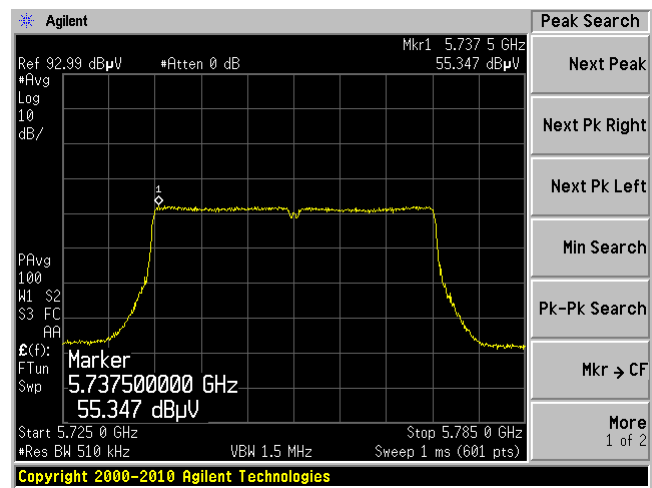


C4

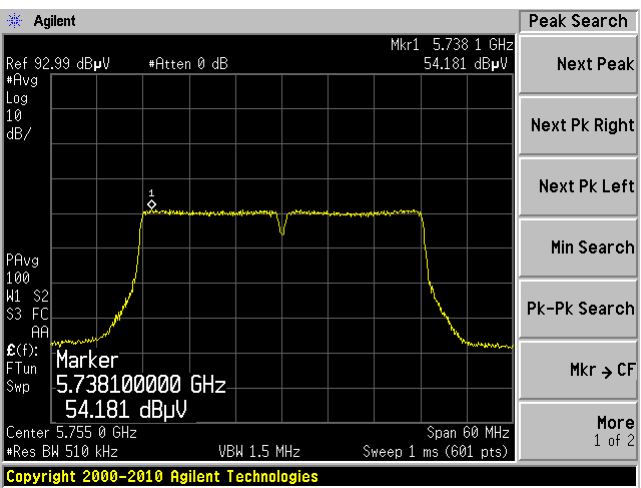


40 MHz, Low Channel, 5755 MHz

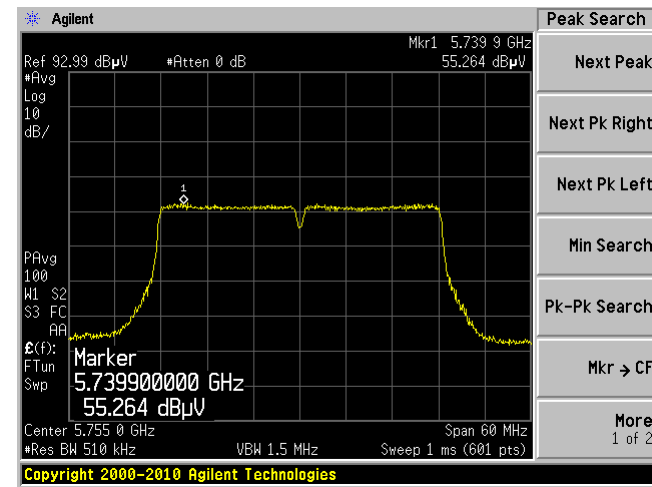
C1



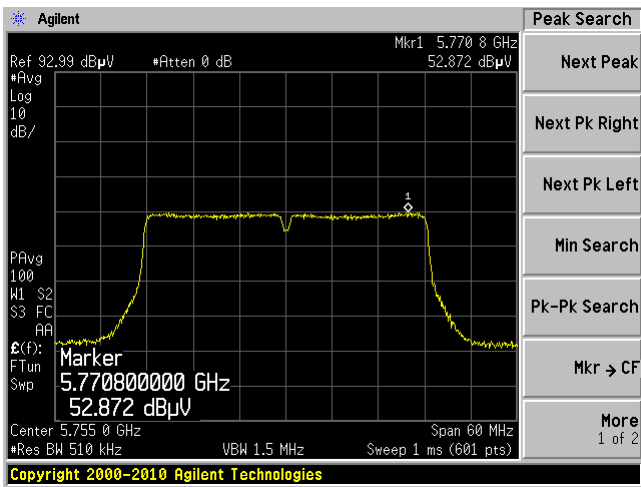
C2



C3

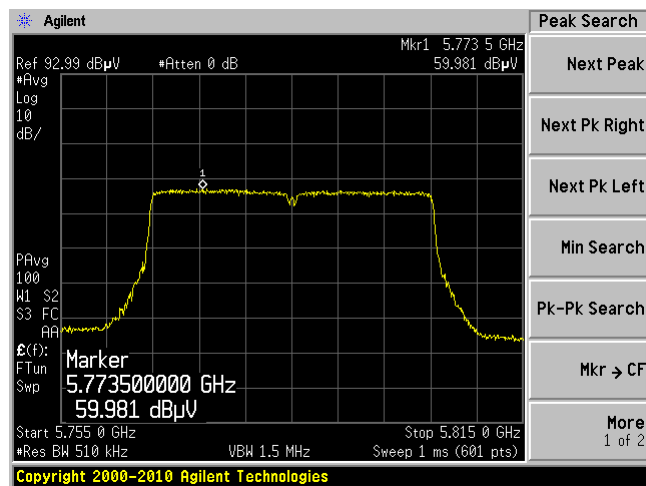


C4

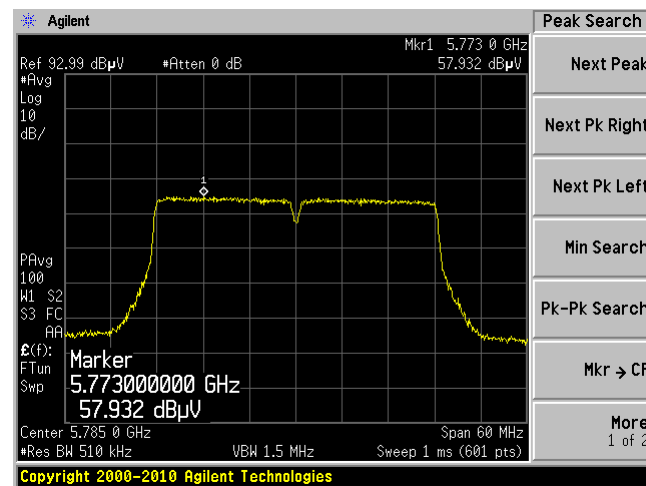


40 MHz, Middle Channel, 5785 MHz

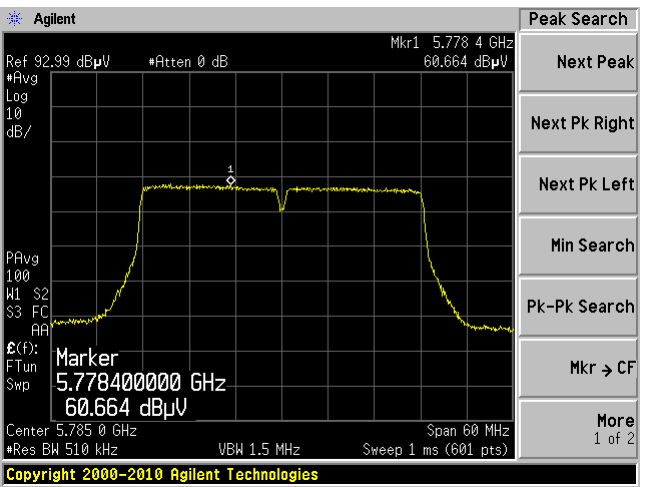
C1



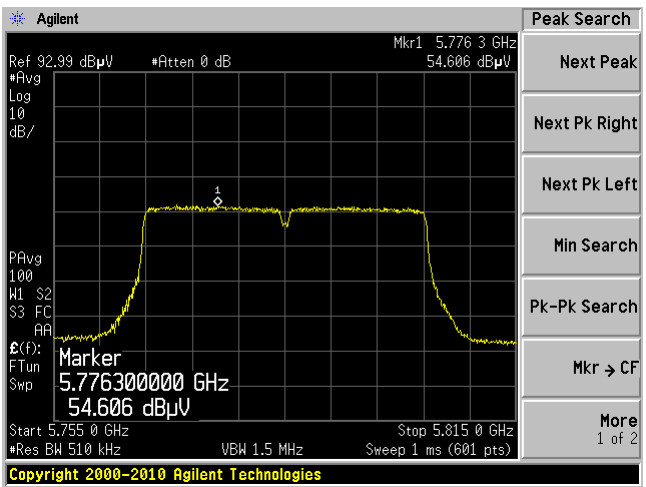
C2



C3

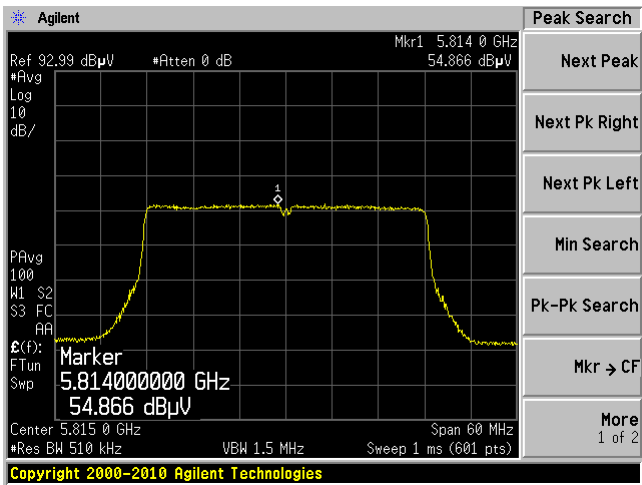


C4

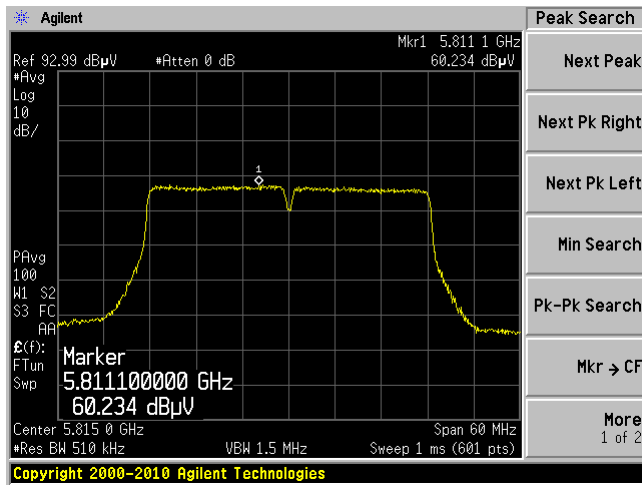


40 MHz, High Channel, 5815 MHz

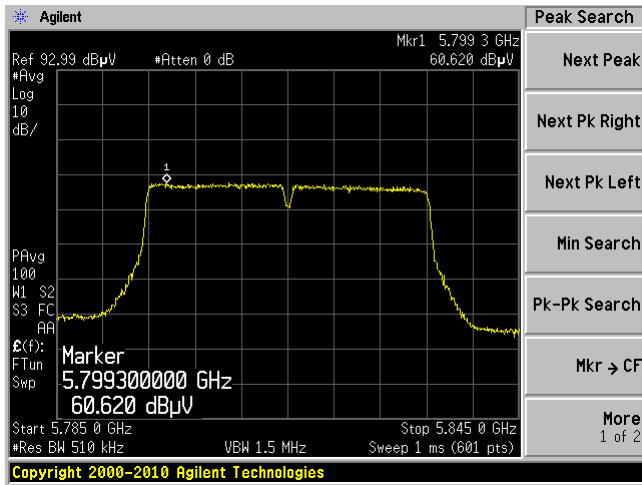
C1



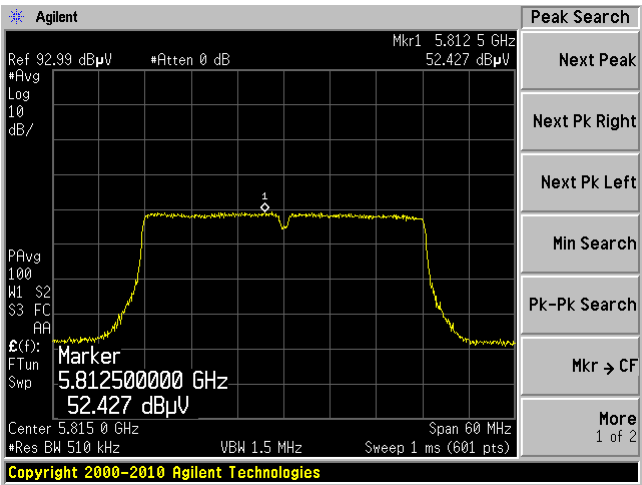
C2



C3

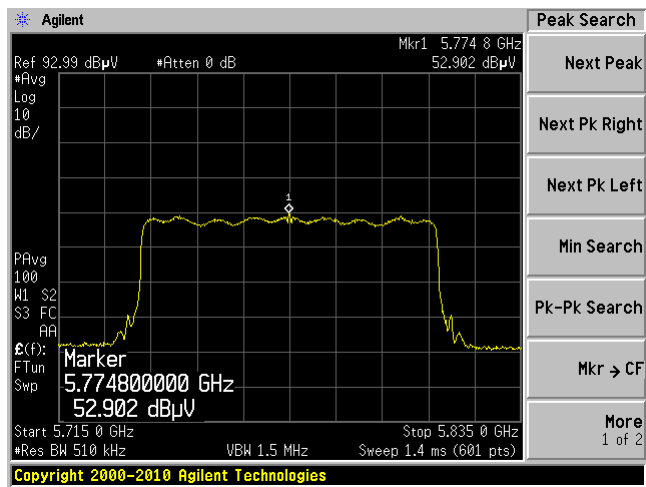


C4

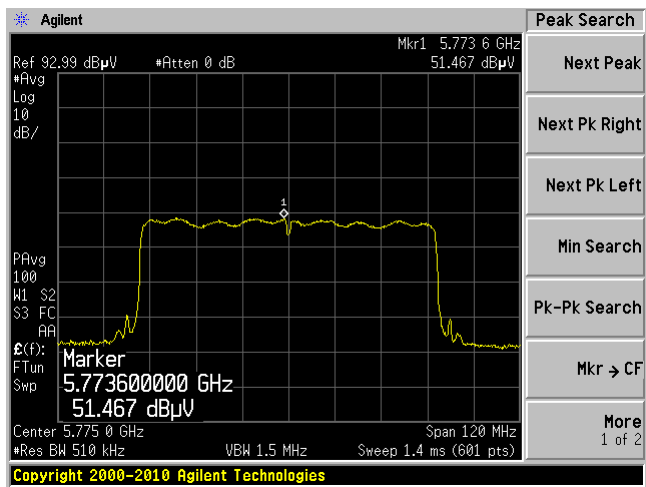


80 MHz, Low Channel, 5775 MHz

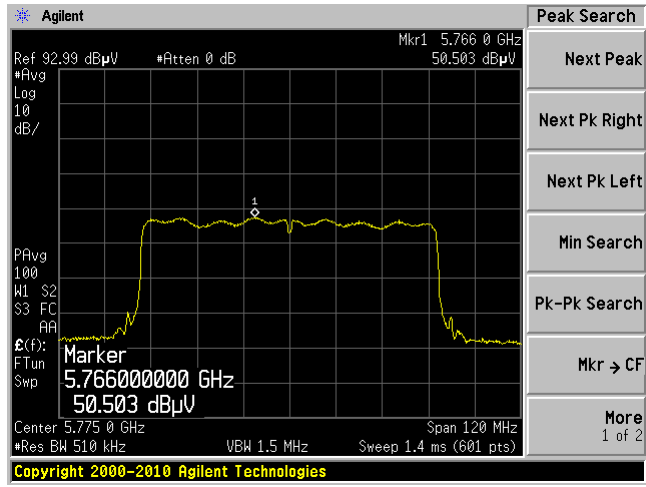
C1



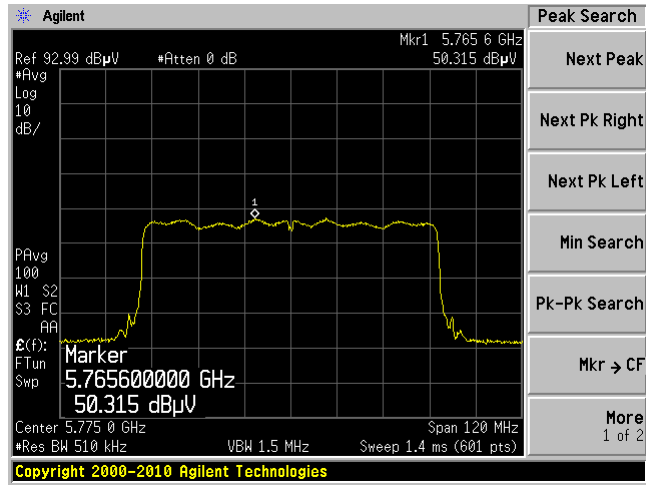
C2



C3

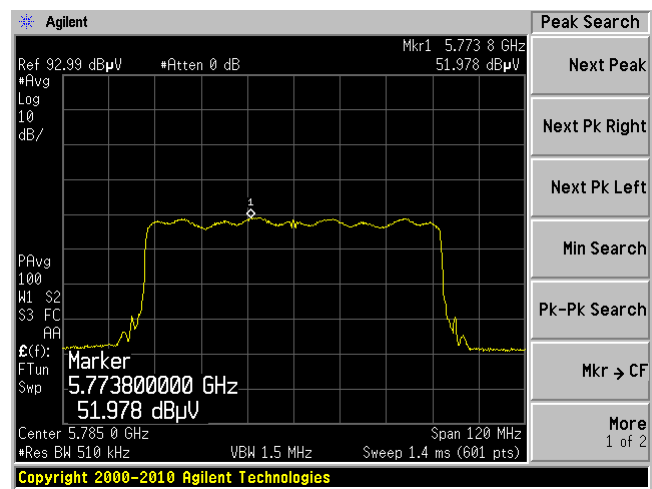


C4

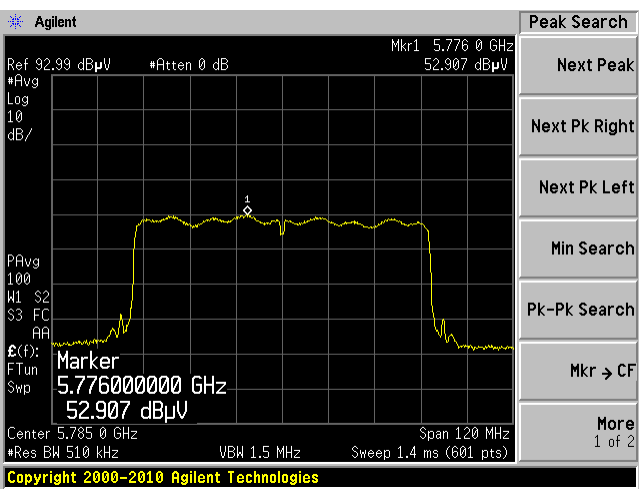


80 MHz, Middle Channel, 5785 MHz

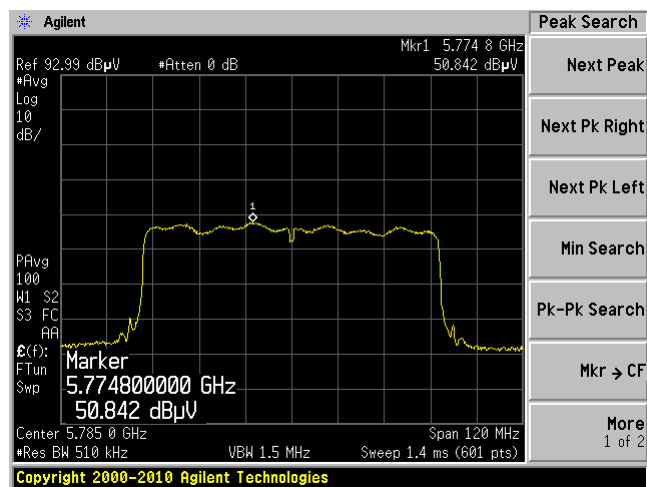
C1



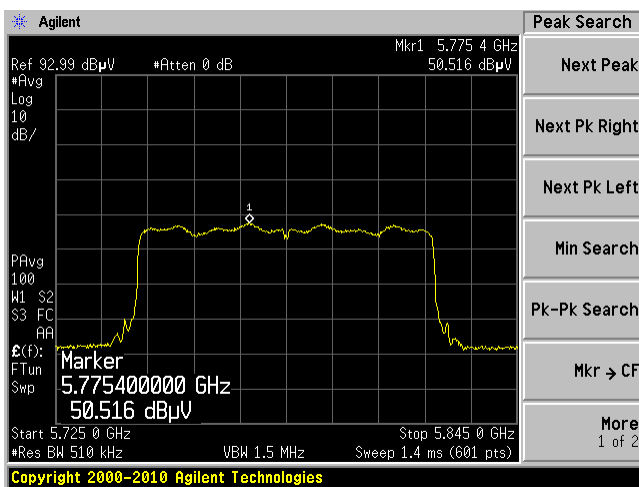
C2



C3

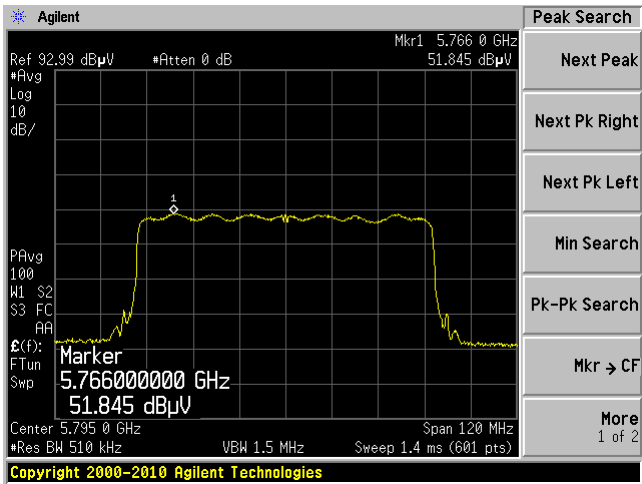


C4

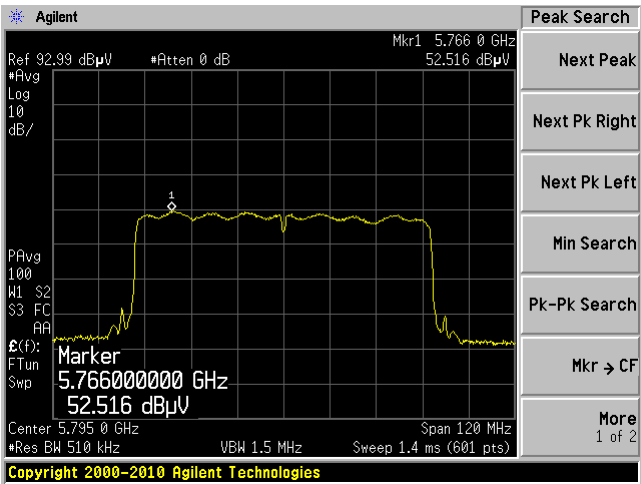


80 MHz, High Channel, 5795 MHz

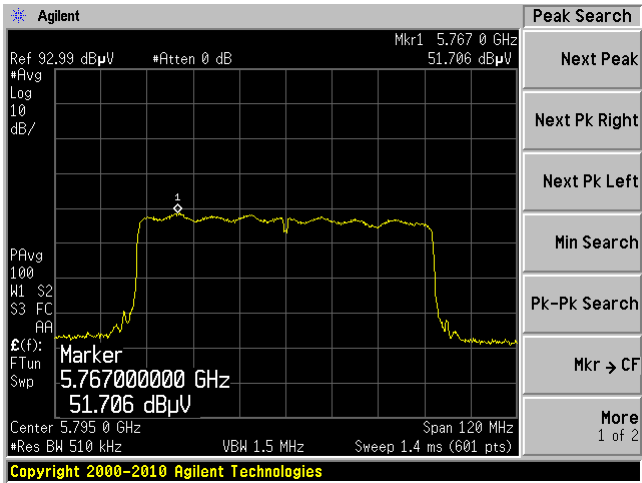
C1



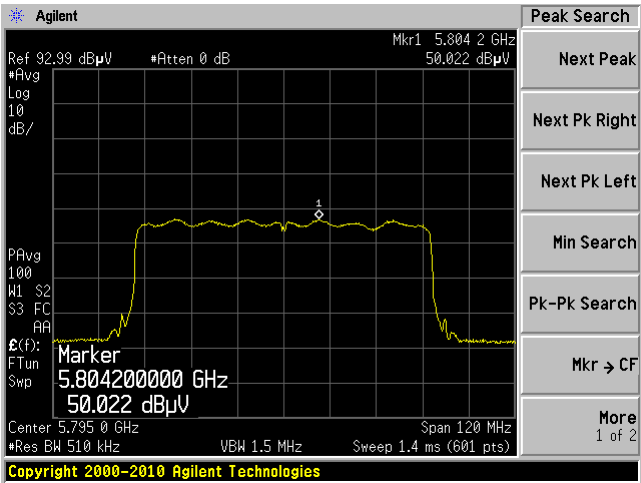
C2



C3



C4

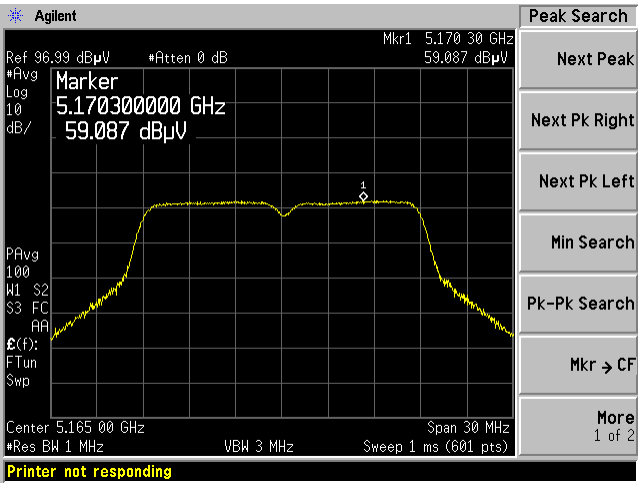


Beamforming

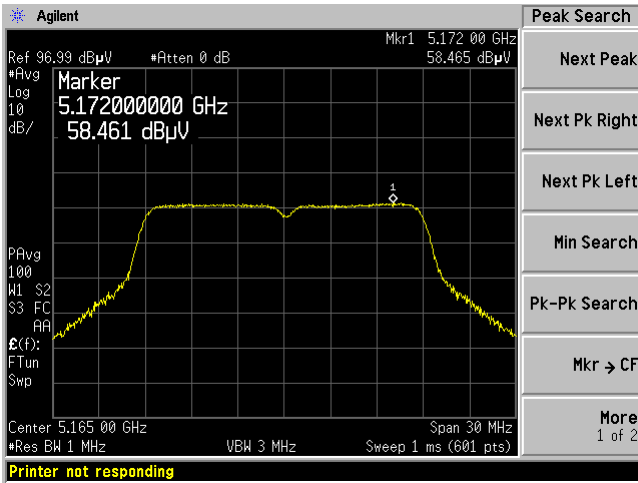
5.2 GHz Band:

20 MHz, Low Channel, 5165 MHz

H

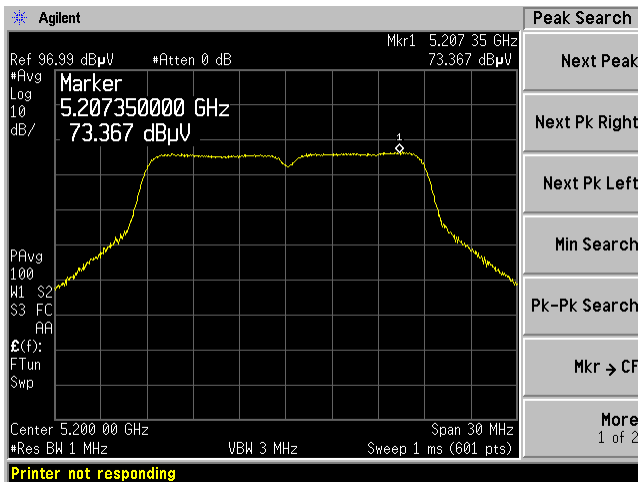


V

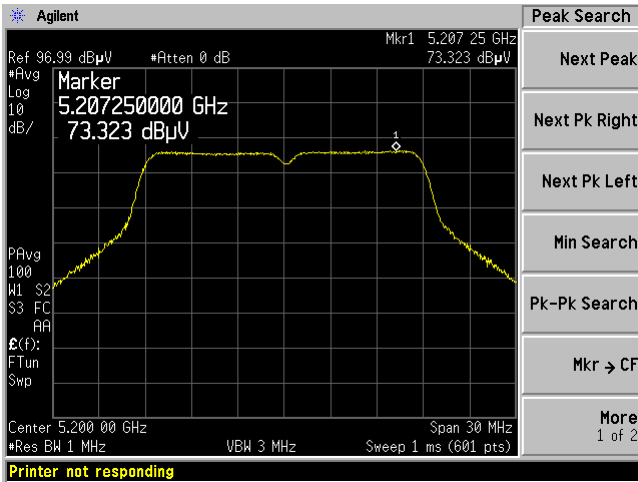


20 MHz, Middle Channel, 5200 MHz

H



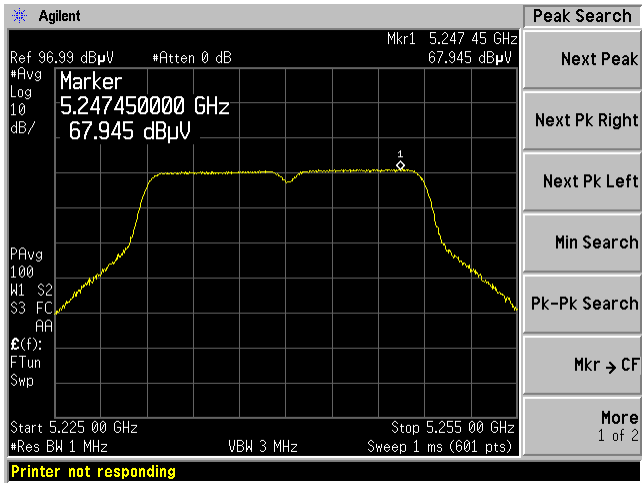
V



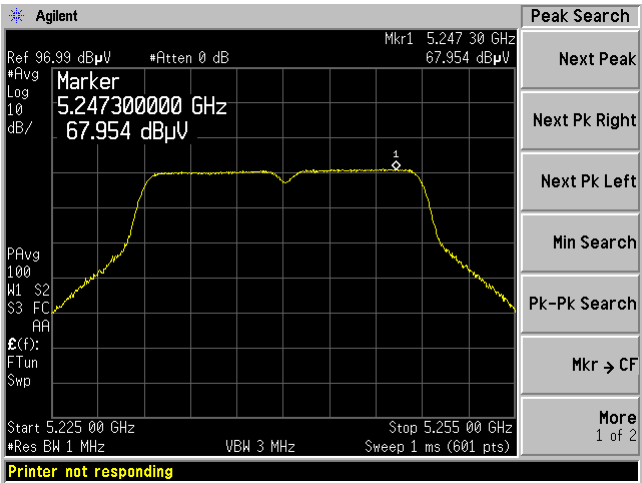


20 MHz, High Channel, 5240 MHz

H

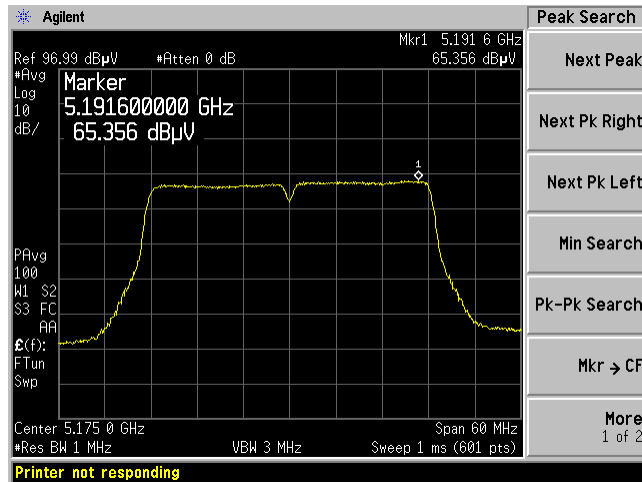


V

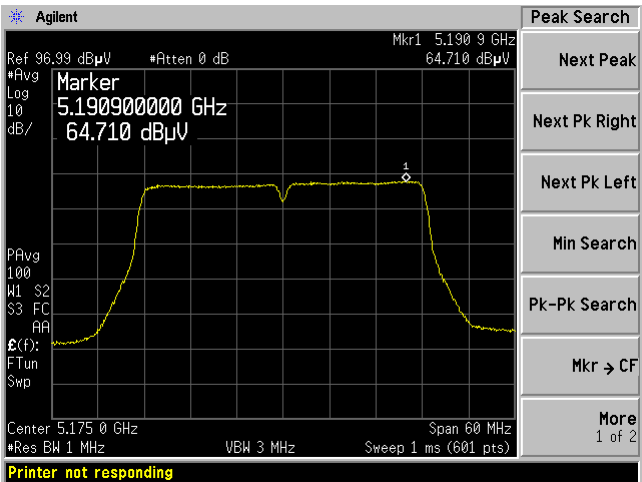


40 MHz, Low Channel, 5175 MHz

H

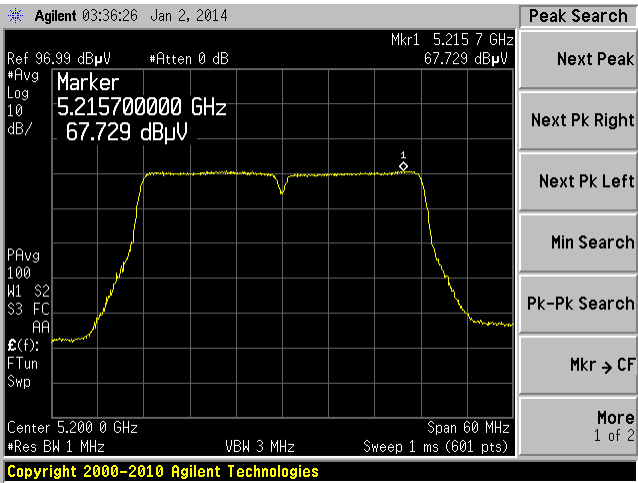


V

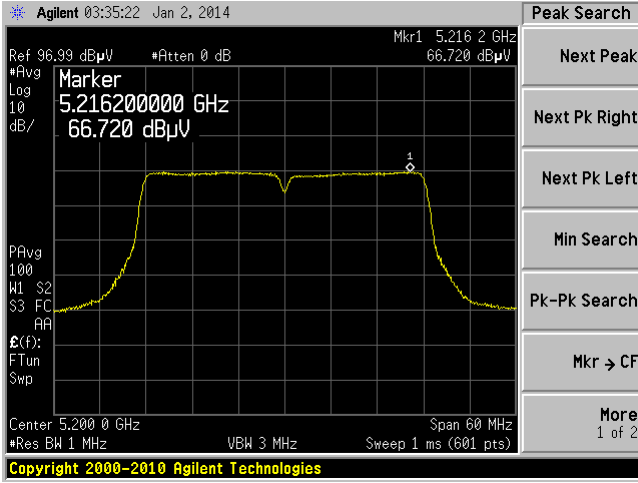


40 MHz, Middle Channel, 5200 MHz

H

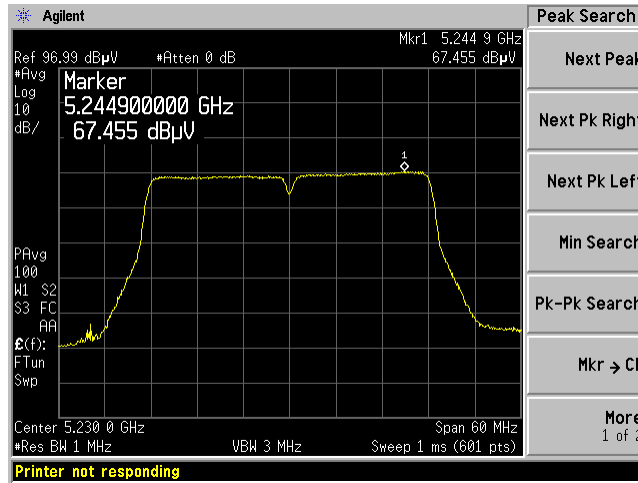


V

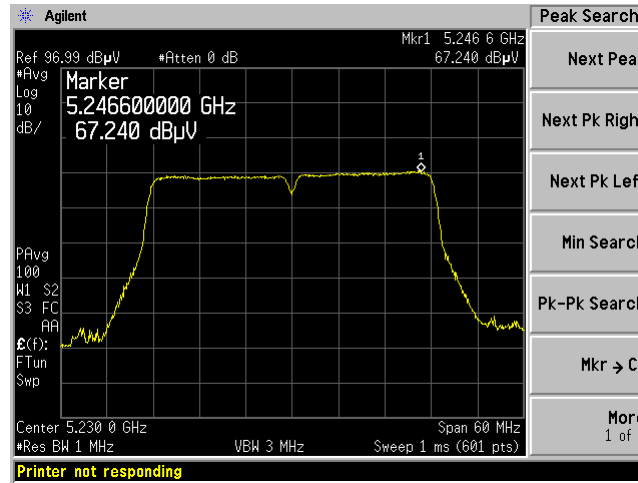


40 MHz, High Channel, 5230 MHz

H



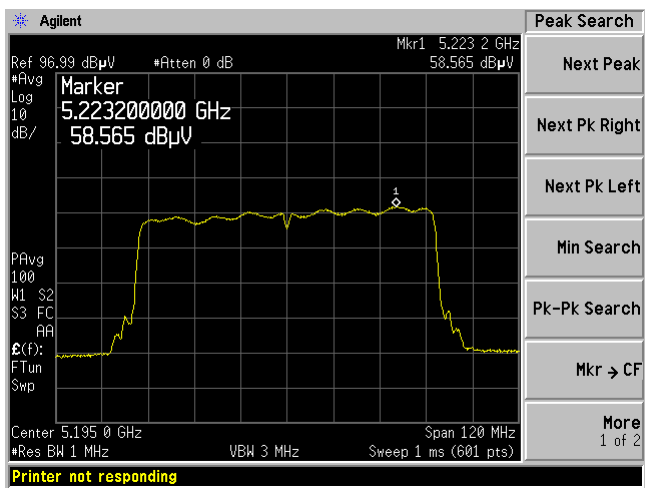
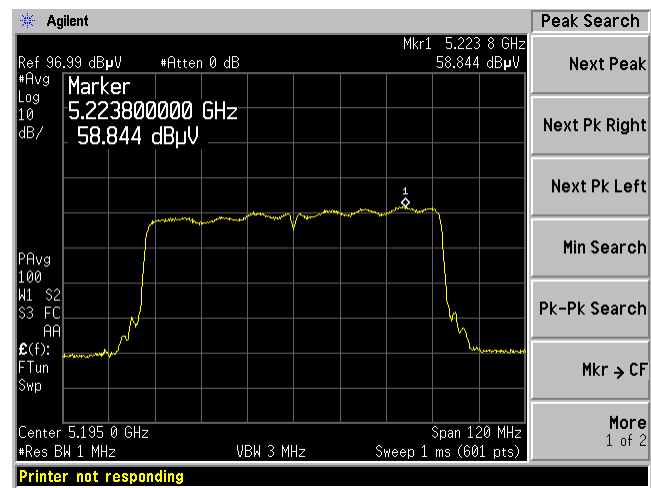
V



80 MHz, Low Channel, 5195 MHz

H

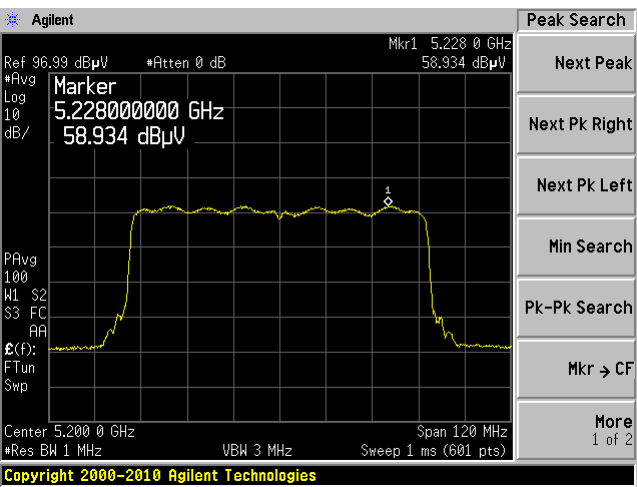
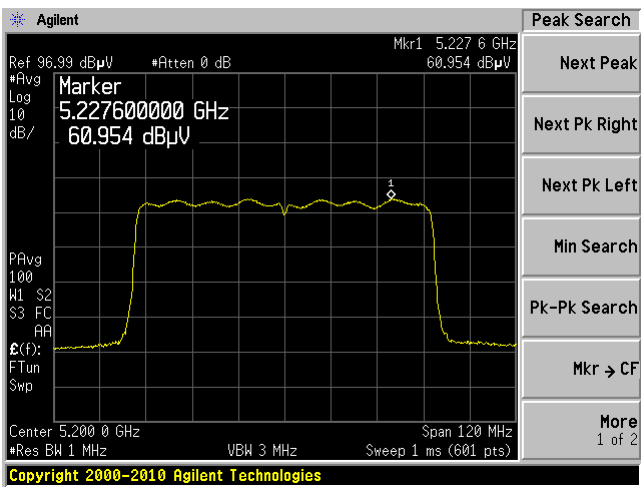
V



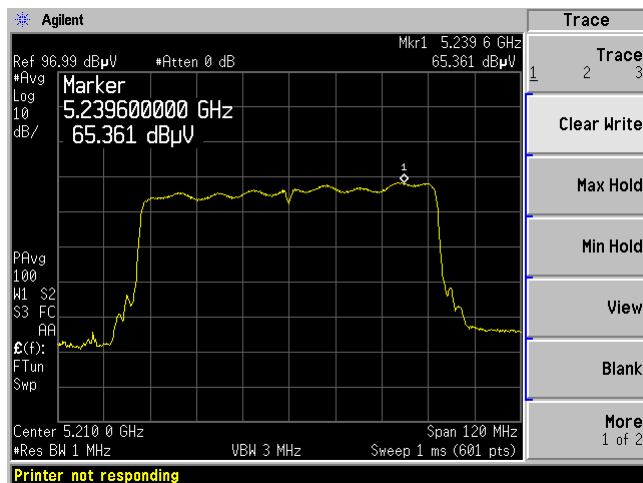
80 MHz, Middle Channel, 5200 MHz

H

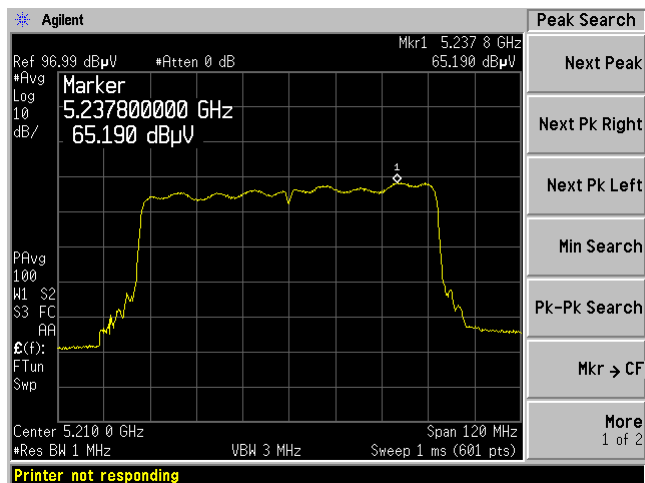
V



## H



V

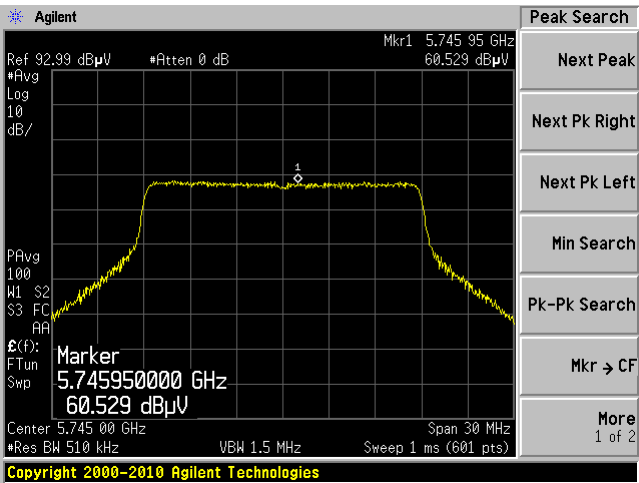
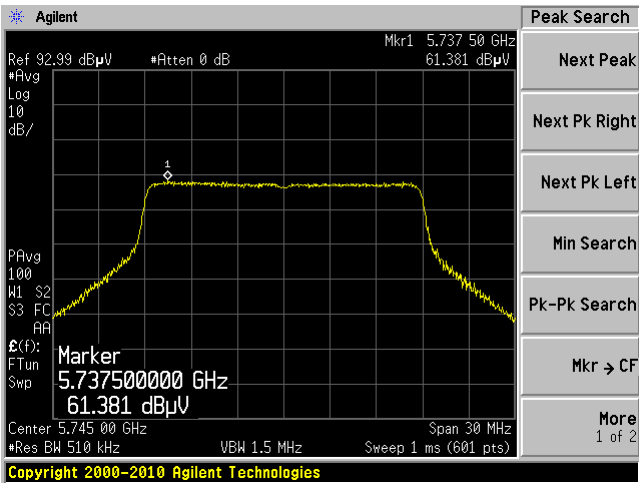


5.8 GHz Band:

20 MHz, Low Channel, 5745 MHz

H

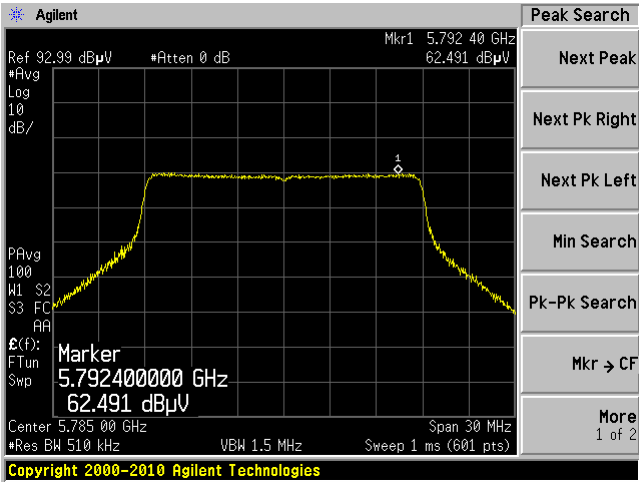
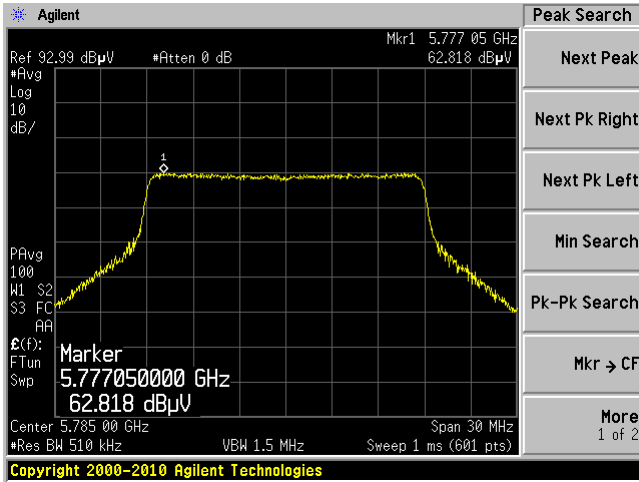
V



20 MHz, Middle Channel, 5785 MHz

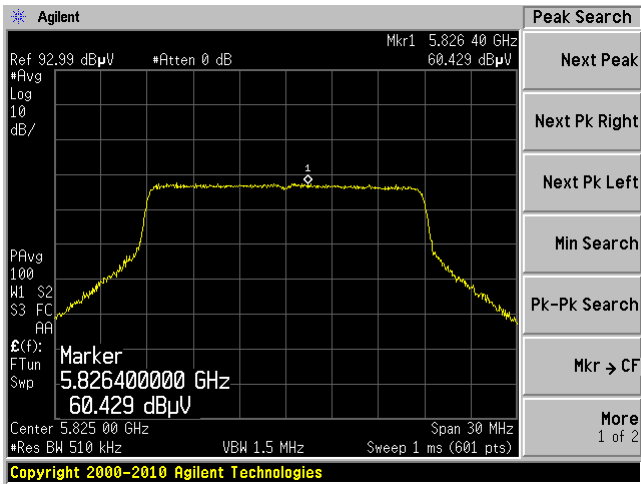
H

V

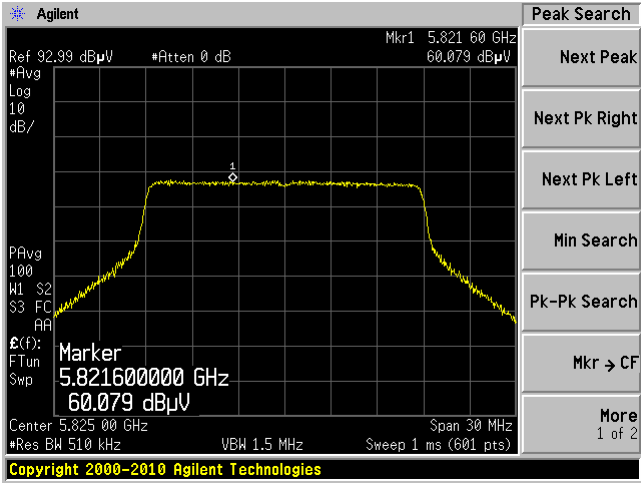


20 MHz, High Channel, 5825 MHz

H

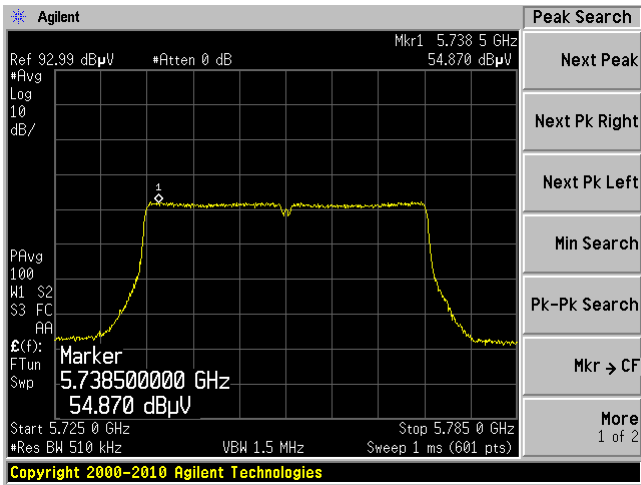


V

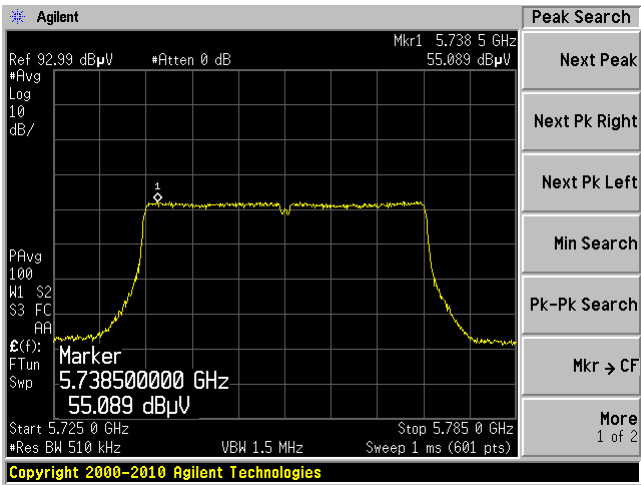


40 MHz, Low Channel, 5755 MHz

H

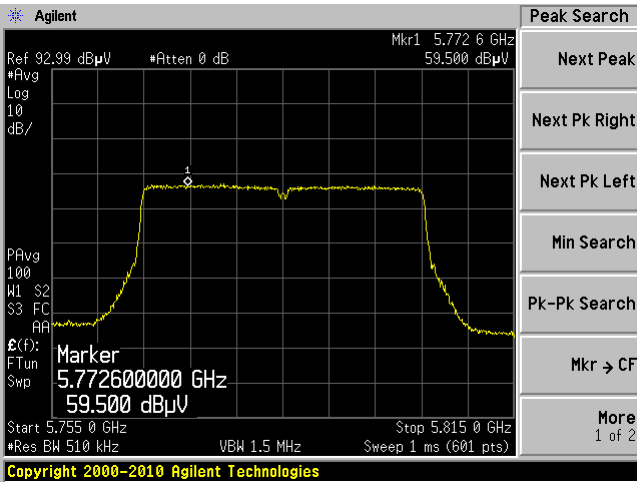


V

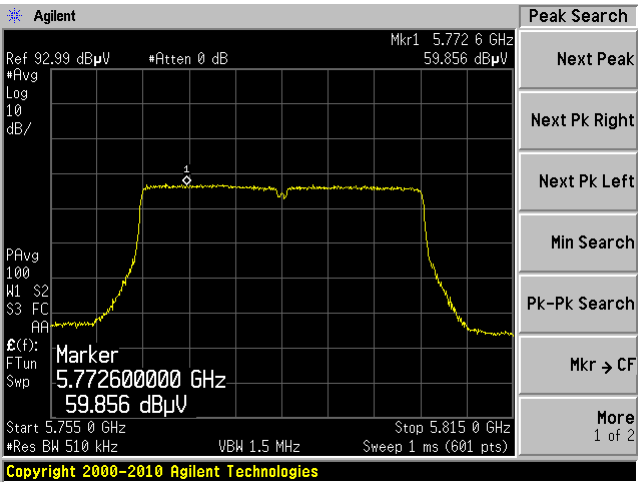


40 MHz, Middle Channel, 5785 MHz

H

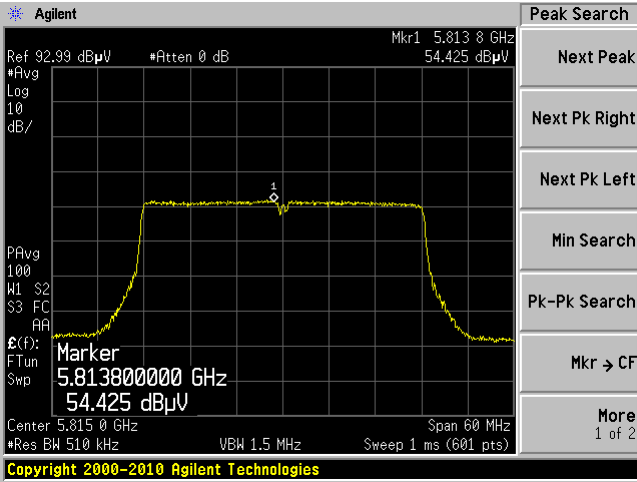


V

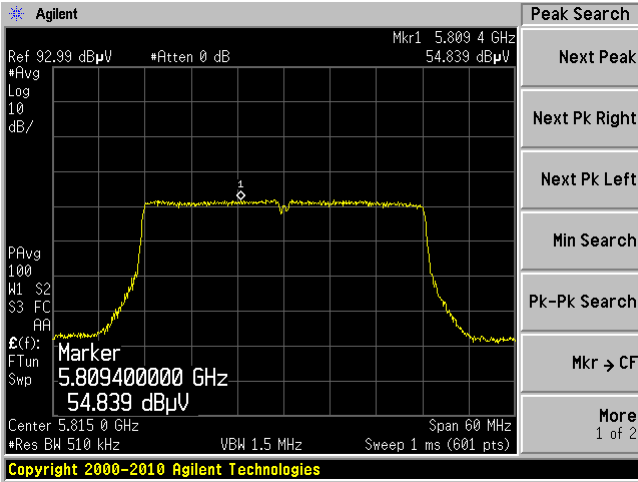


40 MHz, High Channel, 5815 MHz

H

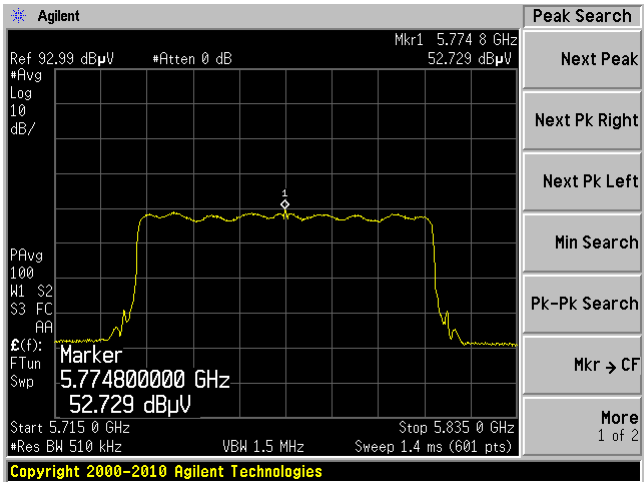


V

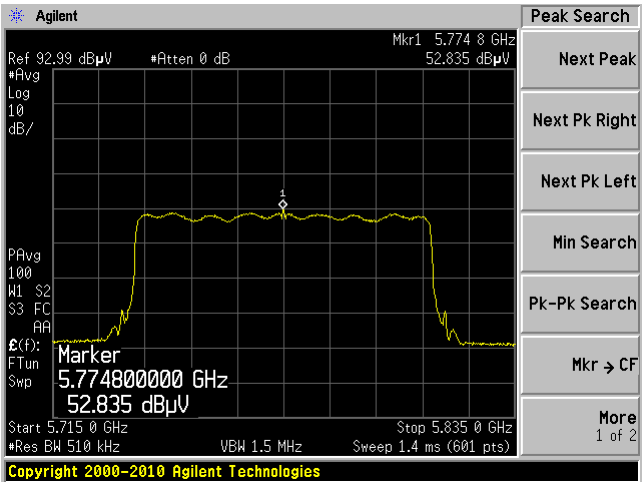


80 MHz, Low Channel, 5775 MHz

H

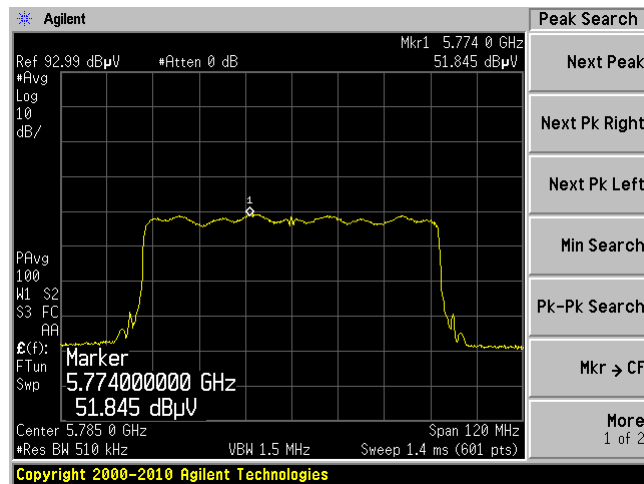


V

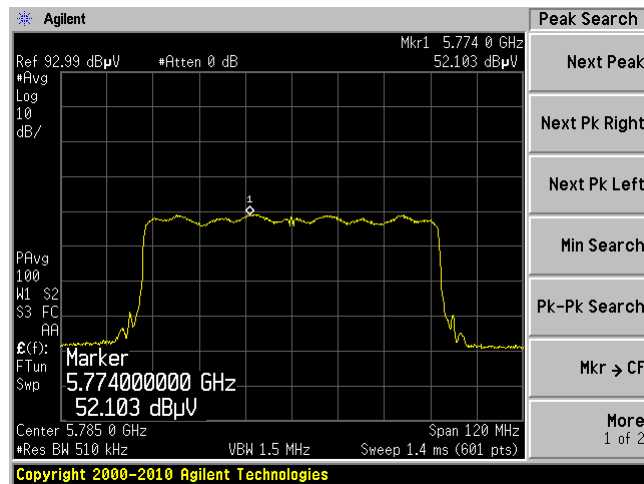


80 MHz, Middle Channel, 5785 MHz

H



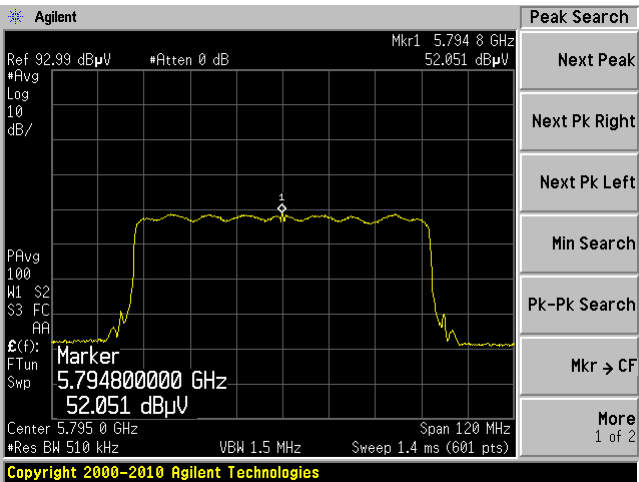
V





80 MHz, High Channel, 5795 MHz

H



V

