Lab Code: 200167-0

FCC PART 90
MEASUREMENT AND TEST REPORT

For

Vecima Networks, Inc.

150 Cardinal Place,Saskatoon, Saskatchewan
Canada S7L 6H7

FCC ID: OPPOBR3650
Model: VistaMax OBR3650

Report Type:	**Product Type:**
Original Report	3.65 GHz WiMax Base Station Transceiver

Test Engineer:	James Ma
Report Number:	R0805024
Report Date:	2008-07-14
Reviewed By:	Boni Baniqued Sr. RF Engineer
Prepared By: **(66)**	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave. Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

This BACL measurement and test report has been prepared on behalf of *Vecima Networks, Inc.* product, FCC ID: OPPOBR3650, Model: *OBR3650* or the "EUT" as referred to in this report is a WiMAX/IEEE 802.16-2004 outdoor base station operating in the 3650~3675 MHz band.

	Omni	**90° Vertical**
Antenna gain (dB)	11dBi	16dBi
Polarization	Vertical	Vertical
Azimuth Beam width	360°	90°
Elevation Beam width	9° (Typical)	8° (Typical)
Transmitter Power	50W max	6W max
Tuned Frequency	3.3GHz - 3.7GHz	3.3GHz - 3.7GHz

EUT Photos

EUT detail photos in exhibit C

1.2 Mechanical Description

The EUT is of metallic construction and measures approximately 50.8 cm (L) x 20 cm (W) x 12.7 mm (H) with an approximate weight of 9 kg.

** The test data gathered are from typical production sample, serial number: 1827342 provided by the manufacturer.*

1.3 Objective

This type approval report is prepared on behalf of *Vercima Networks, Inc.* – in accordance with Part 2, Subpart J, Part 90 Subpart Z of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF Output Power, Occupied Bandwidth, Spurious Emissions at Antenna Terminal, Field Strength of Spurious Radiation, and Frequency Stability.

1.4 Related Submittal(s)/Grant(s)

No Related Submittals

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 90 Subparts Z – Private Land Mobile Radio Services

Applicable Standards: TIA EIA 98-C, TIA/EIA603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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 NIS 81, 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.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.7 Test Facility

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 sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has 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 facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2001670.htm

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing with instructions provided by the manufacturer which set the rated power at antenna port.

The final qualification test was performed with the EUT operating with testing software provided by the manufacturer.

2.2 Equipment Modifications

No modifications were necessary for the EUT to comply with the applicable limits and requirements.

2.3 Local Support Equipment List and Details

N/A

2.4 Power Supply Information

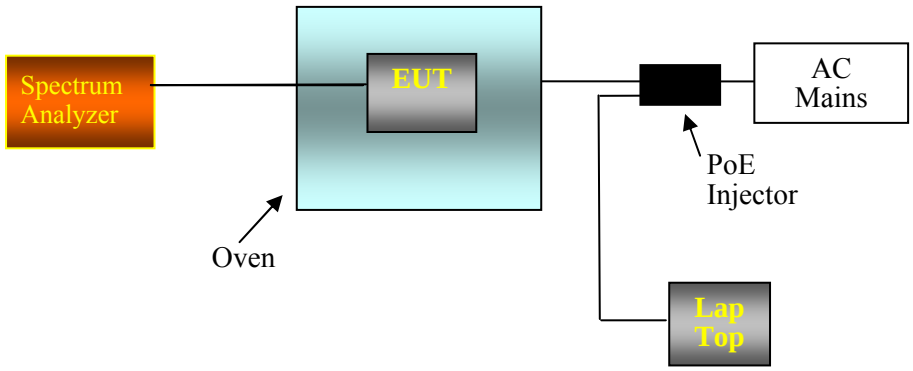
Manufacturer	Description	Model	Serial Number
Elite Connect Power Injector	POE Injector	SMCPWR-INJ3	T17420076

2.5 Interface Ports and Cabling

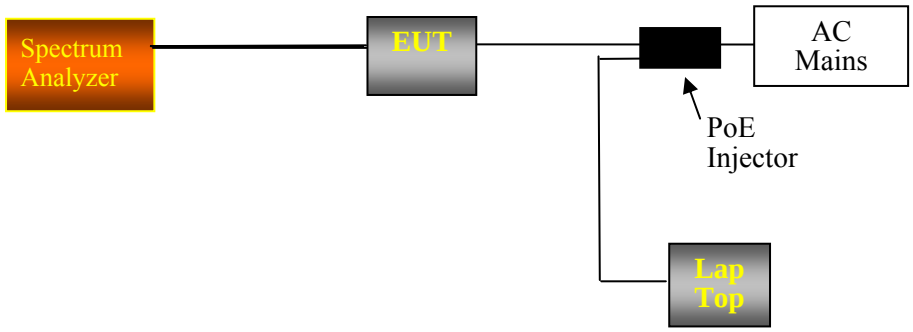
Cable Description	Length (m)	From	To
Ethernet Cable (RJ-45)	1.5	PC	POE Injector
Ethernet Cable (RJ-45)	1.5	POE Injector	EUT

2.6 Test Setup Block Diagram

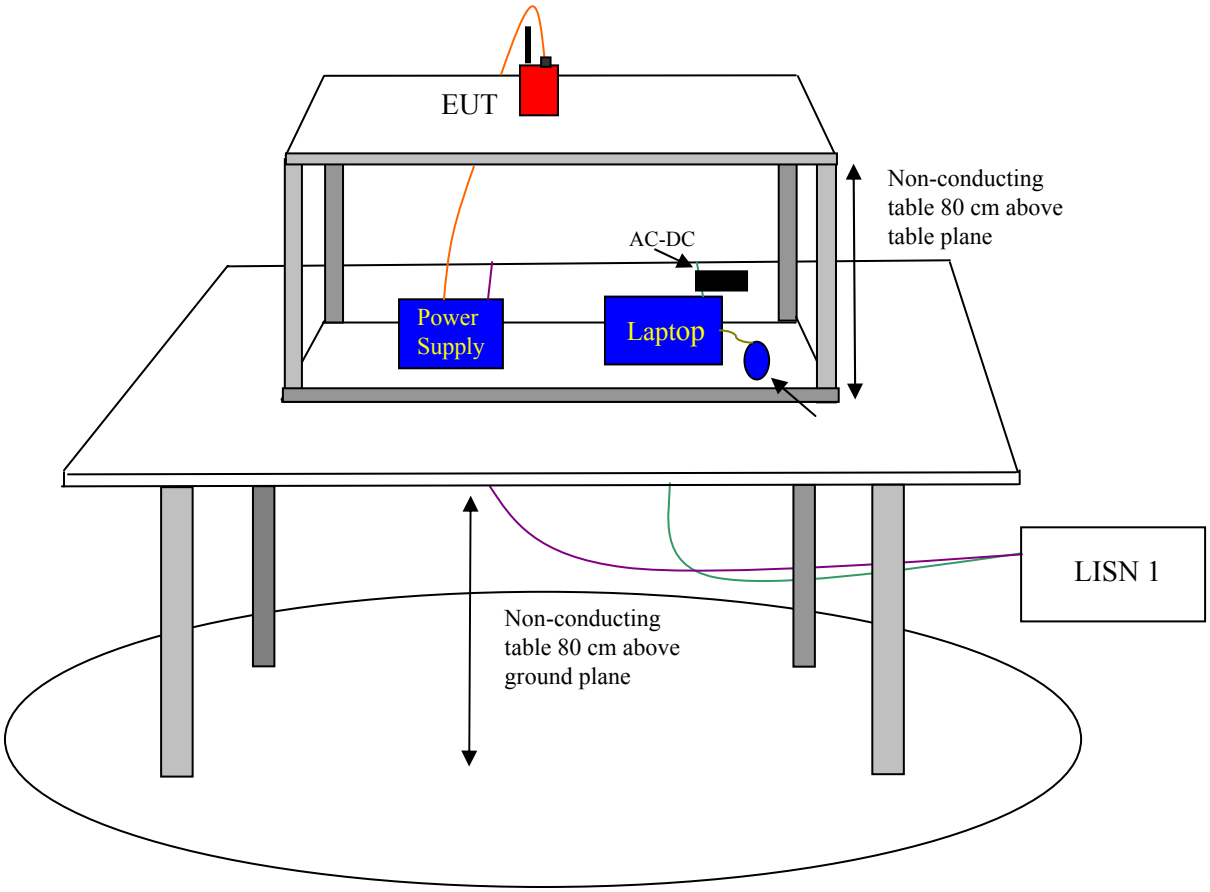
2.6.1 Frequency Stability



2.6.2 All other Tests



2.6.3 Radiated Emission



3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310; §2.1091, §90.1335	RF Exposure	Compliant
§ 2.1046; § 90.1321	RF Output Power	Compliant
§ 2.1049	99 % Occupied Bandwidth & 26 dB Bandwidth	Compliant
§ 2.1051; § 90.1323	Spurious Emissions at Antenna Terminals	Compliant
§ 2.1053; § 90.1323	Field Strength of Spurious Radiation	Compliant
§ 2.1055	Frequency Stability vs. Temperature Frequency Stability vs. Voltage	Compliant

4 §1.1310, §2.1091, §90.1335 – RF EXPOSURE

4.1 Applicability

According to §1.1307(b), 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

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	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

Prediction of MPE limit at a given distance

Equation from page 18 of 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

Maximum peak output power at antenna input terminal (dBm):	20.95
Maximum peak output power at antenna input terminal (mW):	124.45
Prediction distance (cm):	23
Prediction frequency (MHz):	3651.75
Maximum Antenna Gain, typical (dBi):	16.0
Maximum Antenna Gain (numeric):	39.81
Power density of prediction frequency at 23.0 cm (mW/cm^2):	0.746
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.00

4.3 Test Result

The EUT is a PCB device, which when situated 23 cm from the general public has a power density of 0.746 mW/cm^2, is below the uncontrolled limit of 1.0 mW/cm^2. The RF Exposure information has been addressed in the user manual.

5 §2.1046; §90.1321– POWER AND ANTENNA LIMITS

5.1 Applicable Standard

According to FCC §2.1046, §90.1321

Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum.

5.2 Test Procedure

Conducted:

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

5.2.1 Environmental Conditions

Temperature:	20.3 ºC
Relative Humidity:	38.3 %
ATM Pressure:	102.5 kPa

** The testing was performed by James Ma on 2008-07-08.*

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Dates
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19

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

5.4 Test Results

EIRP: Channel BW = 3.5 MHz

1) Omni Directional Antenna Gain =11 dBi (3.4 GHz to 3.7 GHz)

RF Output Power (dBm)			Antenna Gain (dBi)	EIRP (dBm)			EIRP Limit (dBm)
3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)		3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)	
20.95	20.70	20.80	11	31.95	31.70	31.80	44

Note: Measured under CW Mode

2) 90 Degree Vertical Antenna Gain = 16 dBi (3.4 GHz to 3.7 GHz)

RF Output Power (dBm)			Antenna Gain (dBi)	EIRP (dBm)			EIRP Limit (dBm)
3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)		3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)	
20.95	20.70	20.80	16	36.95	36.70	36.80	44

Note: Measured under CW Mode

EIRP: Channel BW = 7.0 MHz

3) Omni Directional Antenna Gain =11 dBi (3.4 GHz to 3.7 GHz)

RF Output Power (dBm)			Antenna Gain (dBi)	EIRP (dBm)			EIRP Limit (dBm)
3653.50 (MHz)	3662.50 (MHz)	3671.50 (MHz)		3653.50 (MHz)	3662.50 (MHz)	3671.50 (MHz)	
20.50	20.25	19.70	11	31.50	31.25	30.70	44

Note: Measured under CW Mode

4) 90 Degree Vertical Antenna Gain = 16 dBi (3.4 GHz to 3.7 GHz)

RF Output Power (dBm)			Antenna Gain (dBi)	EIRP (dBm)			EIRP Limit dBm
3653.50 (MHz)	3662.50 (MHz)	3671.50 (MHz)		3653.50 (MHz)	3662.50 (MHz)	3671.50 (MHz)	
20.50	20.25	19.70	16	36.50	36.25	35.70	44

Note: Measured under CW Mode

EIRP Power Density:

Channel BW = 3.5 MHz

1) Omni Directional Antenna Gain =11 dBi (3.4 GHz to 3.7 GHz)

Power Density (dBm/MHz)			Ant. Gain (dBi)	EIRP Power Density (dBm/MHz)			EIRP Limit (dBm/MHz)
3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)		3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)	
13.02	12.94	12.95	11	24.02	23.94	23.95	30

Note: Measured under CW Mode

2) 90 Degree Vertical Antenna Gain = 16 dBi (3.4 GHz to 3.7 GHz)

Power Density (dBm/MHz)			Ant. Gain (dBi)	EIRP Power Density (dBm/MHz)			EIRP Limit (dBm/MHz)
3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)		3651.75 (MHz)	3662.50 (MHz)	3673.25 (MHz)	
13.02	12.94	12.95	16	29.02	28.94	28.95	30

Note: Measured under CW Mode

Channel BW = 7.0 MHz

3) Omni Directional Antenna Gain =11 dBi (3.4 GHz to 3.7 GHz)

Power Density (dBm/MHz)			Ant. Gain (dBi)	EIRP Power Density (dBm/MHz)			EIRP Limit (dBm/MHz)
3653.50 (MHz)	3662.50 (MHz)	3671.50 (MHz)		3653.50 (MHz)	3662.50 (MHz)	3671.50 (MHz)	
13.30	13.36	13.37	11	24.30	24.36	24.37	30

Note: Measured under CW Mode

4) 90 Degree Vertical Antenna Gain = 16 dBi (3.4 GHz to 3.7 GHz)

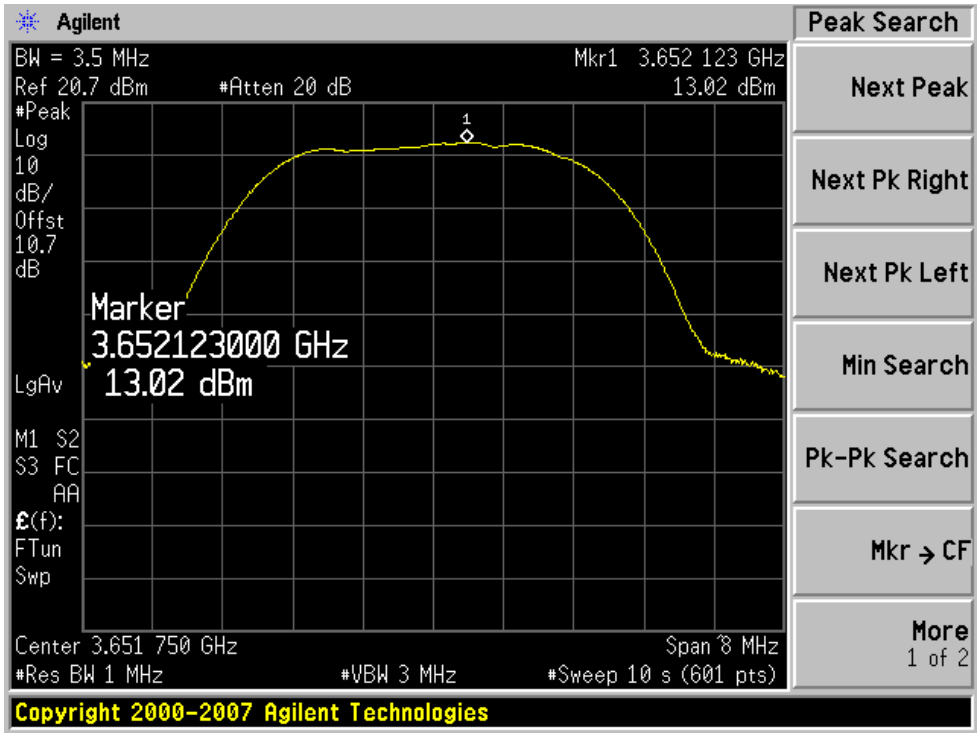
Power Density (dBm/MHz)			Ant. Gain (dBi)	EIRP Power Density (dBm/MHz)			EIRP Limit (dBm/MHz)
3653.50	3662.50	3671.50		3653.50	3662.50	3671.50	
13.30	13.36	13.37	16	29.30	29.36	29.37	30

Note: Measured under CW Mode

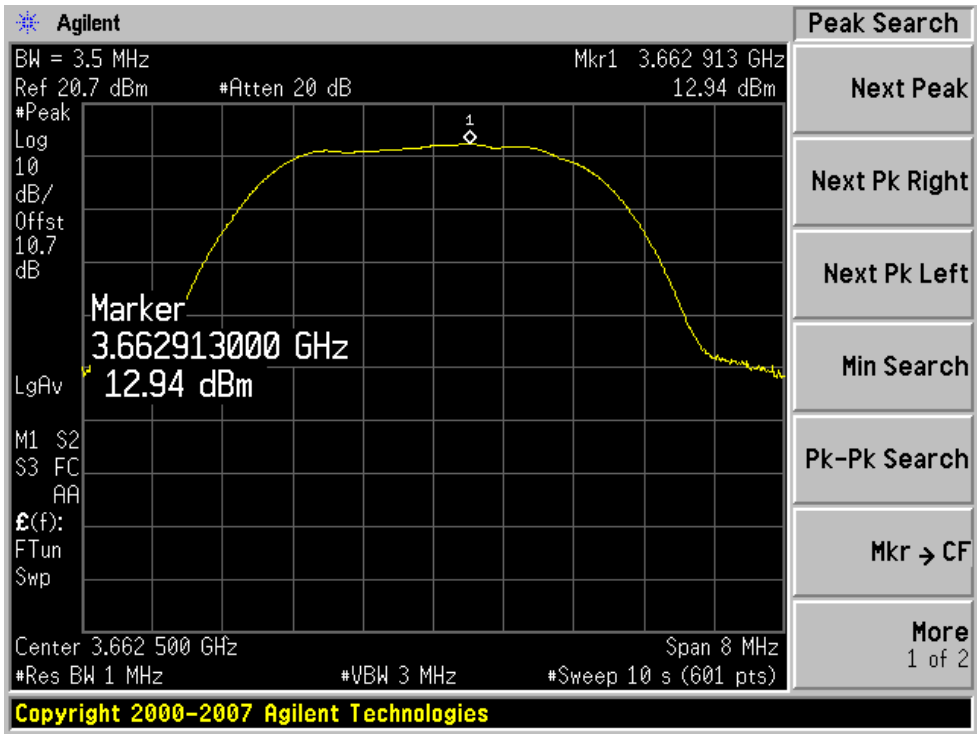
Please refer to the hereinafter plots.

Power Density: Channel BW = 3.5 MHz

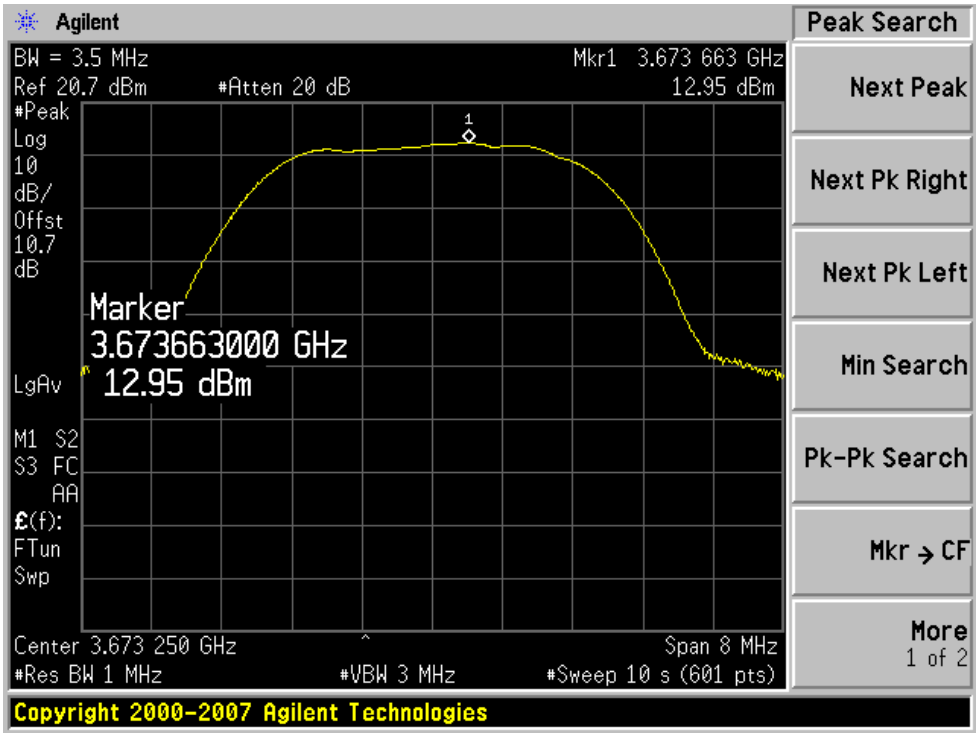
Low Channel



Middle Channel

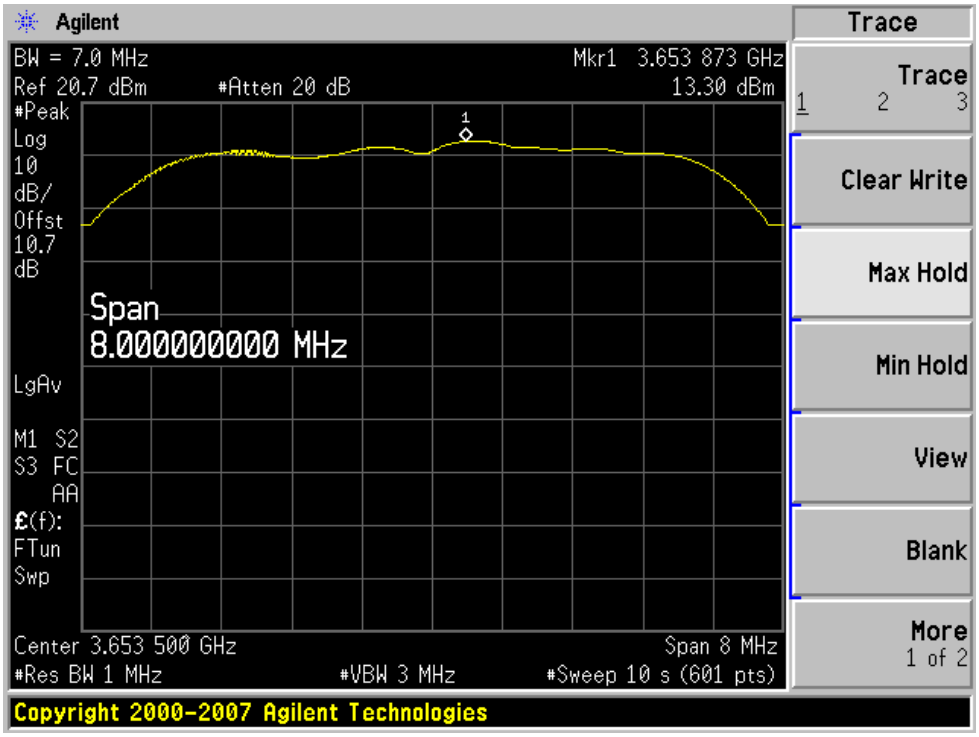


High Channel

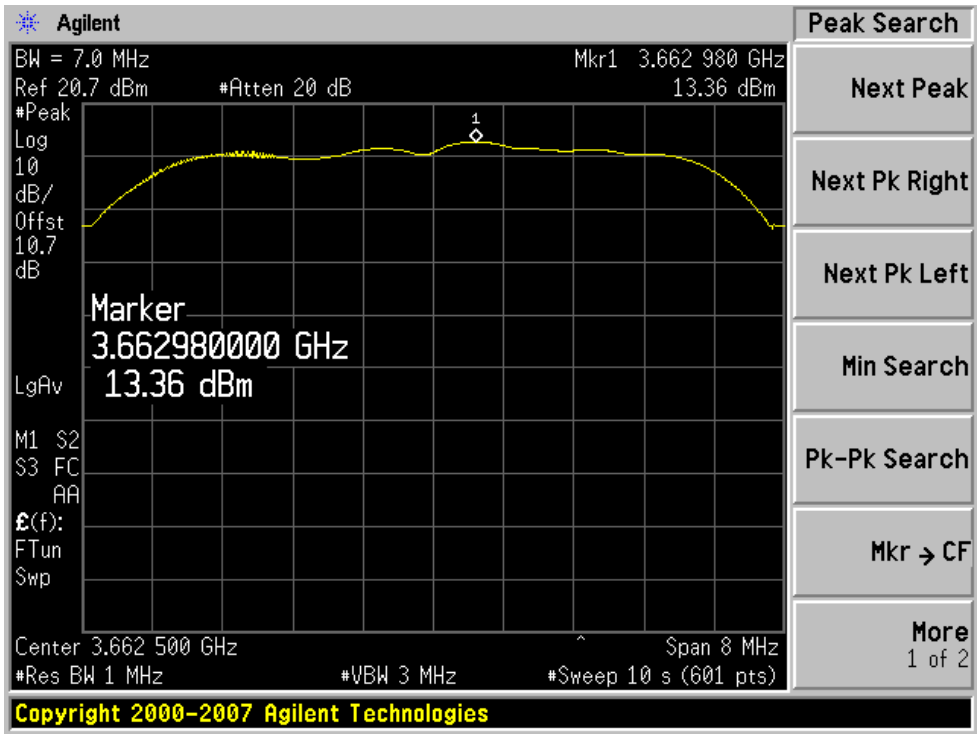


Power Density: Channel BW = 7.0 MHz

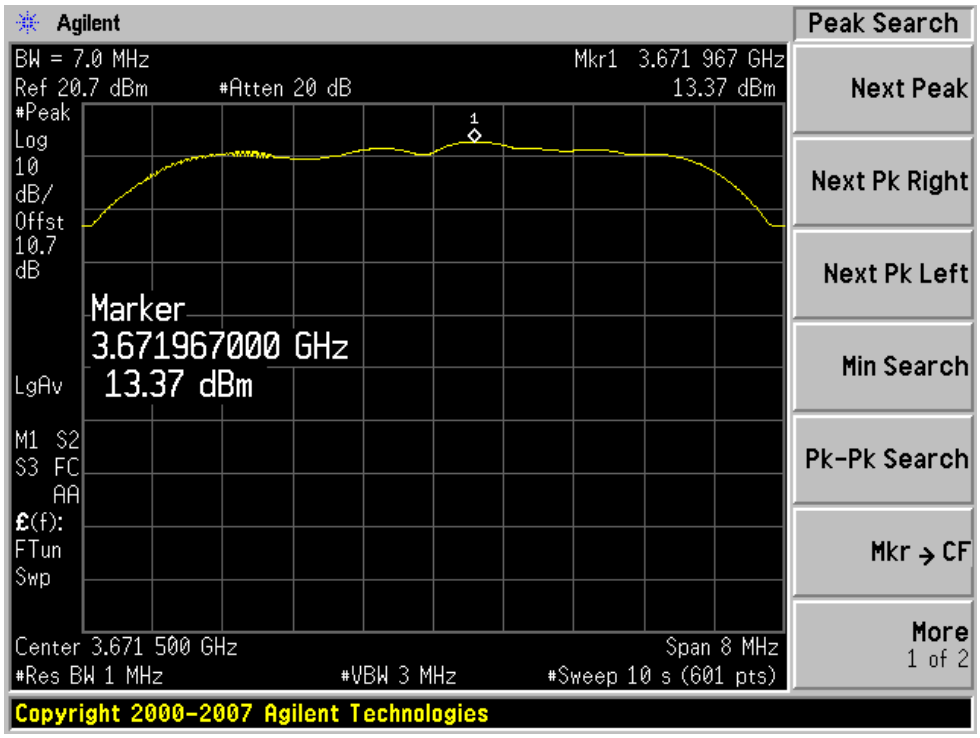
Low Channel



Middle Channel



High Channel



6 §2.1049 – 99% OCCUPIED BANDWIDTH & 26 BANDWIDTH

6.1 Applicable Standard

§2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

a) Radiotelegraph transmitters for manual operation when keyed at 16 dots per second.

(b) Other keyed transmitters—when keyed at the maximum machine speed.

(c) Radiotelephone transmitters equipped with a device to limit modulation or peak envelope power shall be modulated as follows. For single sideband and independent sideband transmitters, the input level of the modulating signal shall be 10 dB greater than that necessary to produce rated peak envelope power.

6.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at ≥ 1% of Occupied Bandwidth and the VBW ≥ RBW on the spectrum.

6.3 Environmental Conditions

Temperature:	20.3 ºC
Relative Humidity:	38.3 %
ATM Pressure:	102.5 kPa

** The testing was performed by James Ma on 2008-07-08.*

6.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19

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

6.5 Test Result

Channel Band width = 3.5 MHz

Frequency (MHz)	99 % Bandwidth (MHz)	-26 dB Bandwidth (MHz)
3651.75	3.1374	3.542
3662.50	3.1505	3.534
3673.25	3.1248	3.526

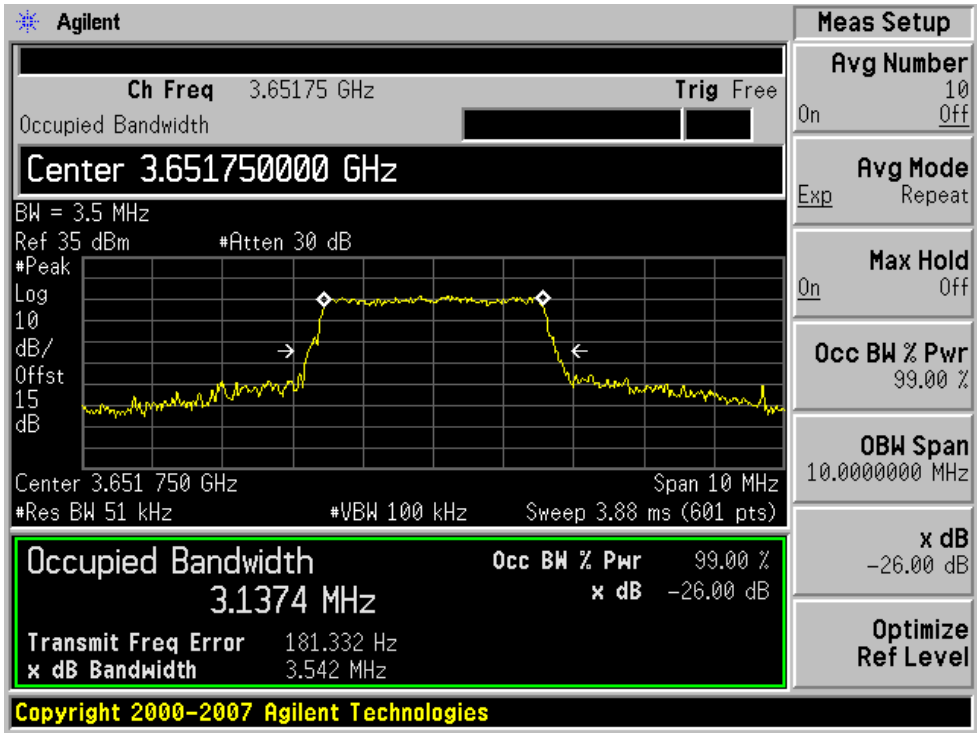
Channel Band width = 7.0 MHz

Frequency (MHz)	99 % Bandwidth (MHz)	-26 dB Bandwidth (MHz)
3653.50	6.2938	7.062
3662.50	6.2969	7.105
3671.50	6.2836	7.125

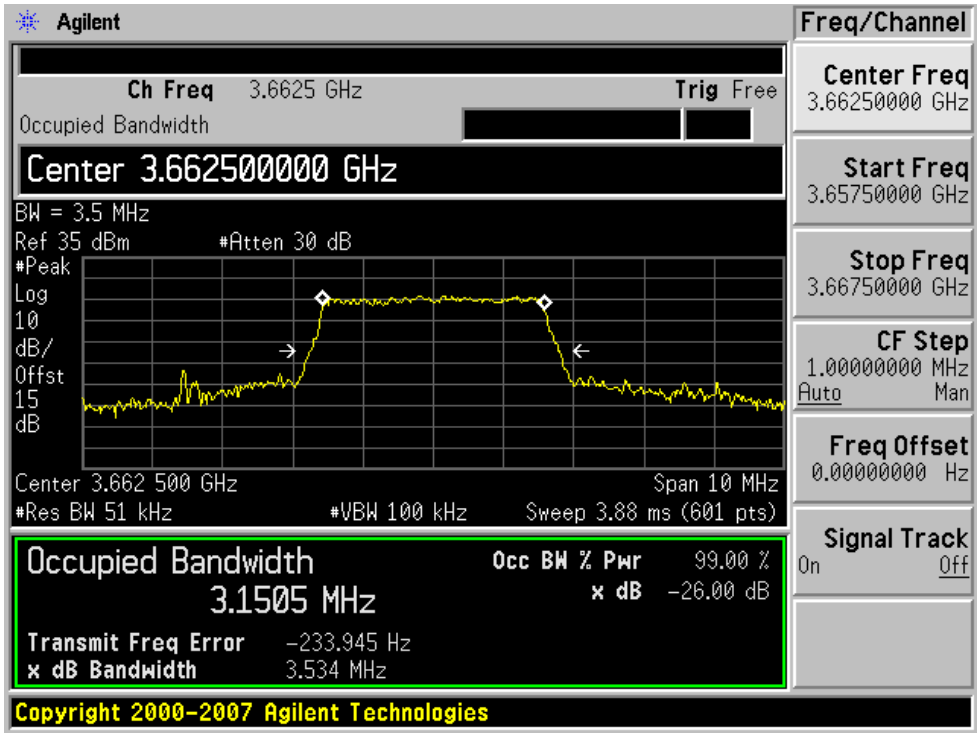
Please refer to the hereinafter plots.

BW = 3.5 MHz

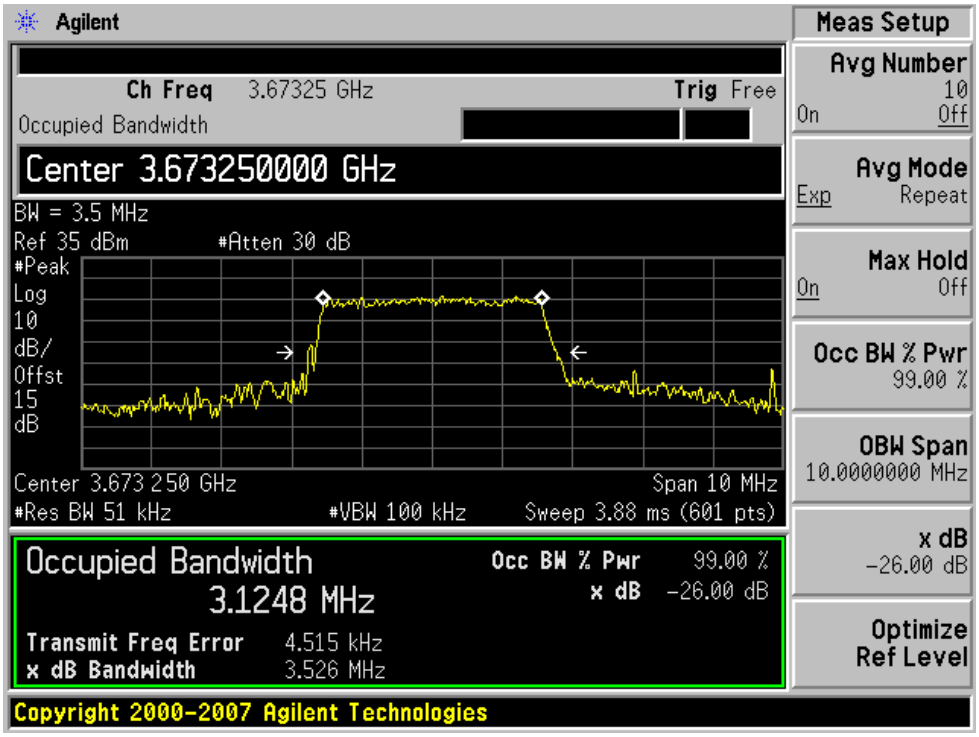
Low Channel



Middle Channel

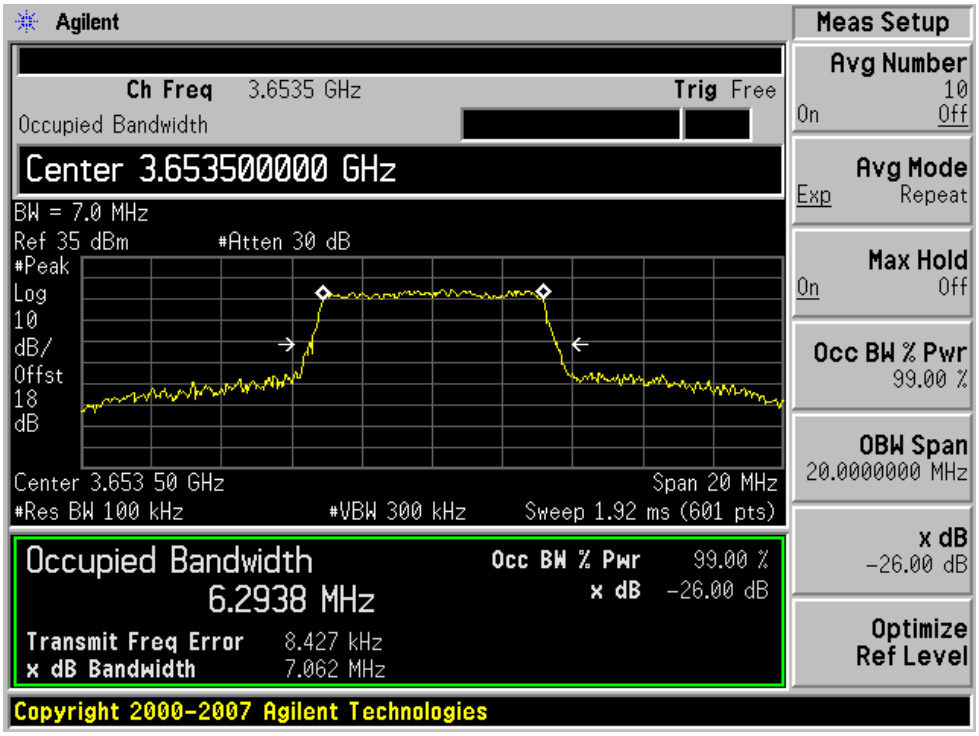


High Channel

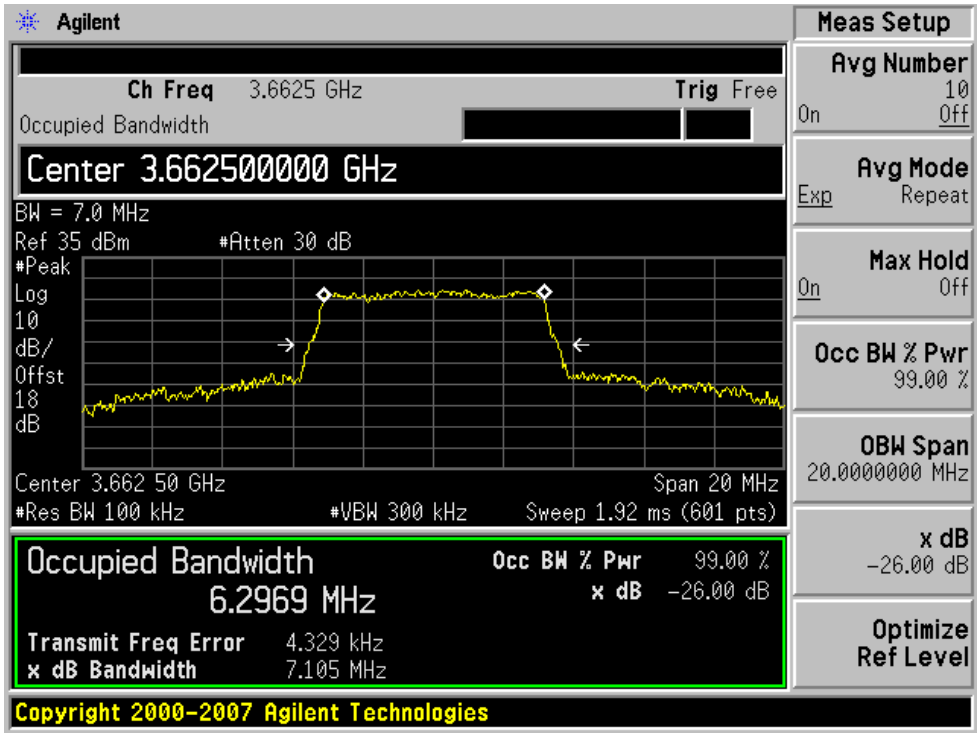


BW = 7.0 MHz

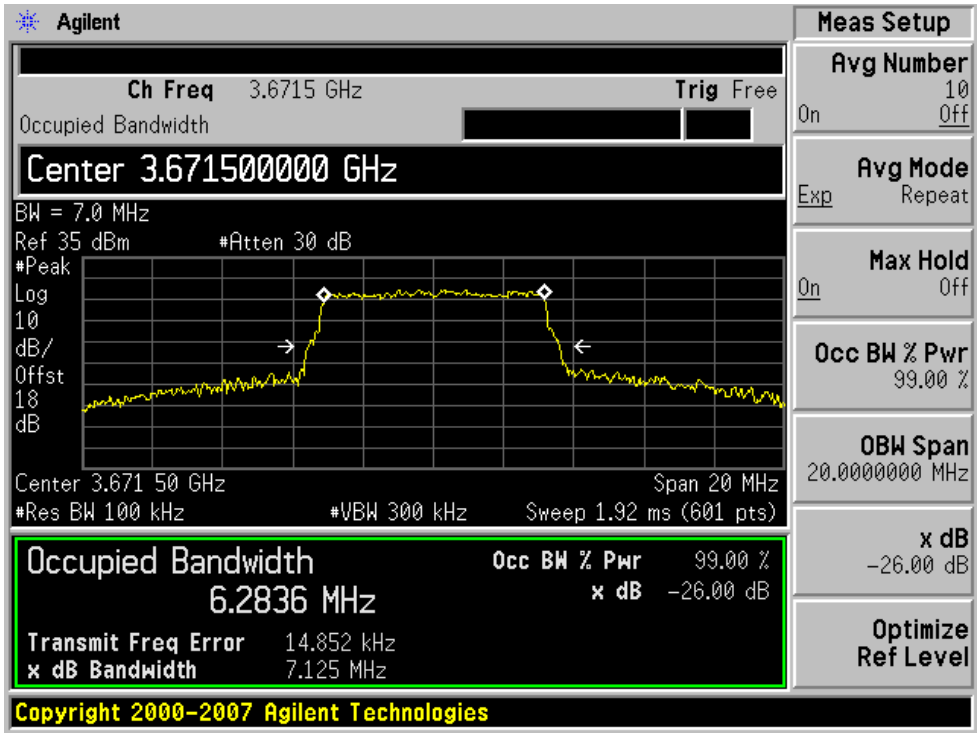
Low Channel



Middle Channel



High Channel



7 § 90.1323 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 Applicable Standard

Requirements: CFR 47 § 2.1051, § 90.1323.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

7.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

7.3 Environmental Conditions

Temperature:	23 ºC
Relative Humidity:	32 %
ATM Pressure:	100.9 kPa

** The testing was performed by James Ma on 2008-07-09.*

7.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19

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

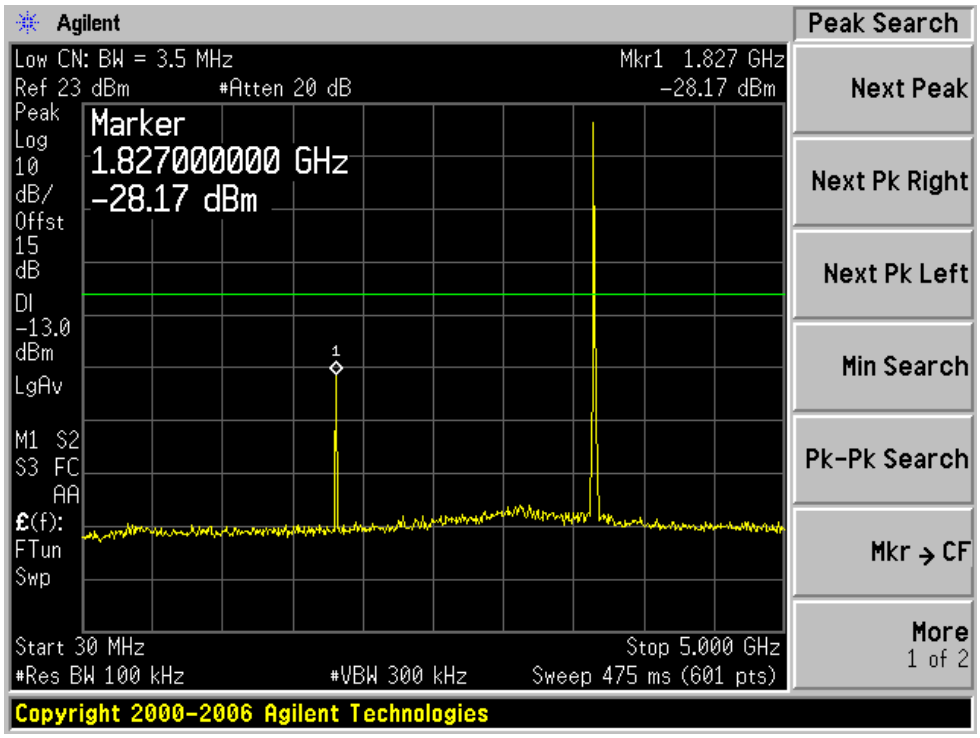
7.5 Test Results

Please refer to the hereinafter plots.

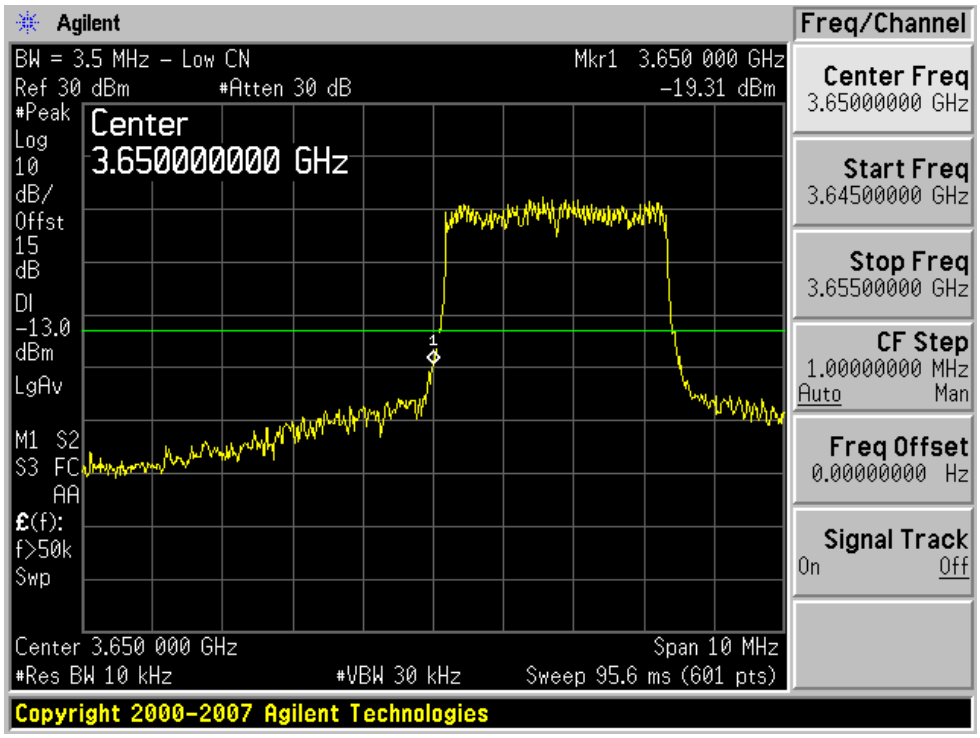
BW = 3.5 MHz

Low Channel

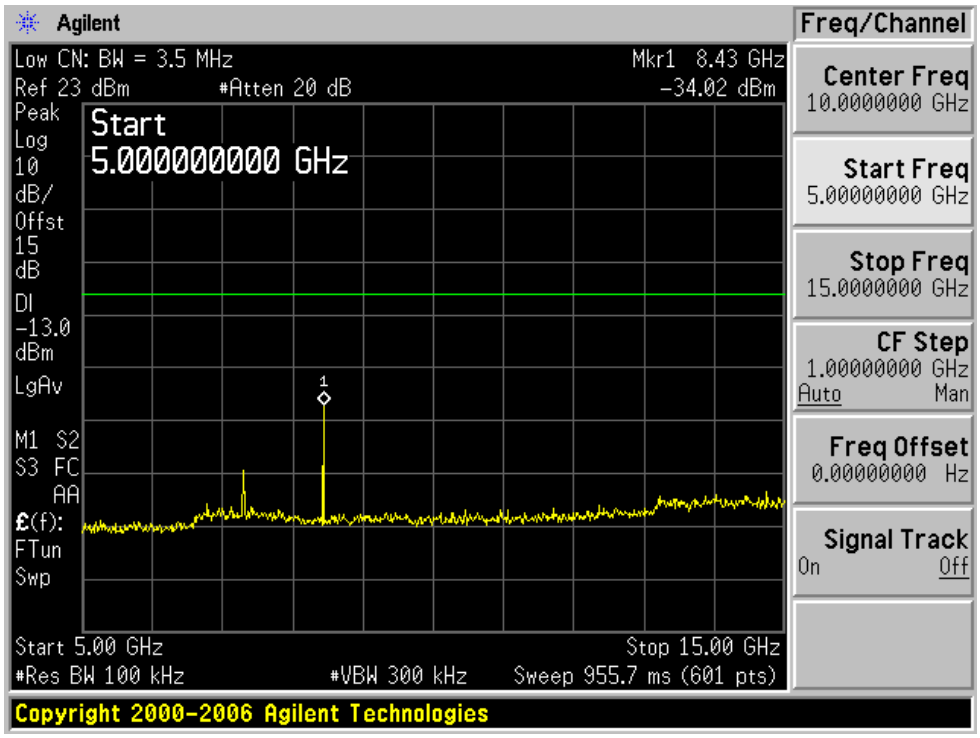
30MHz-5GHz



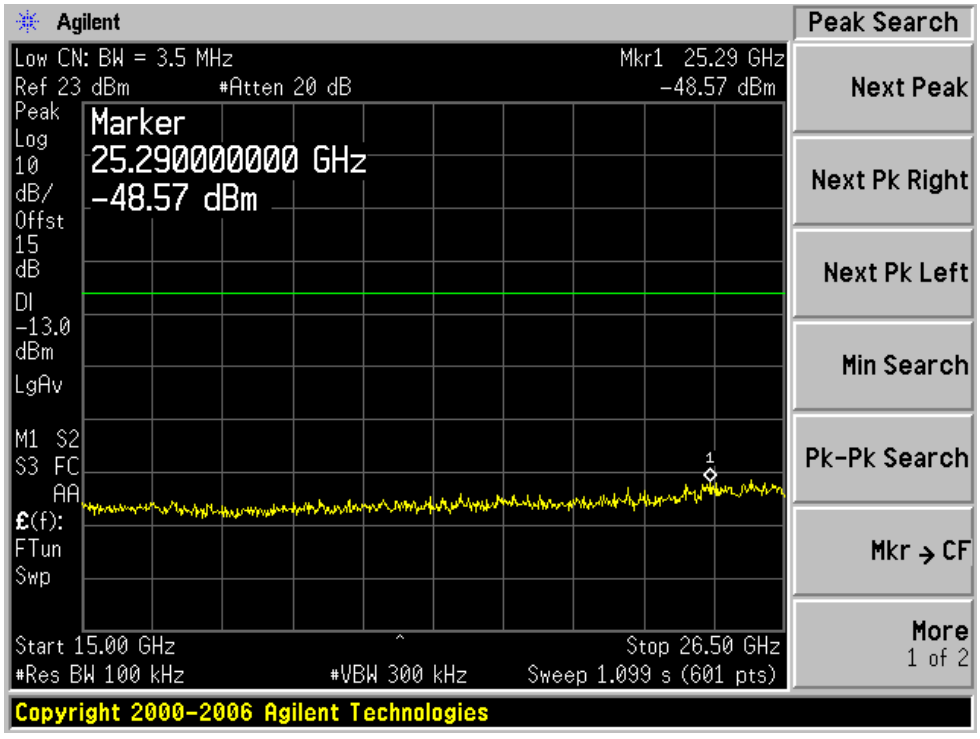
Band Edge: Low Channel



5GHz-15GHz

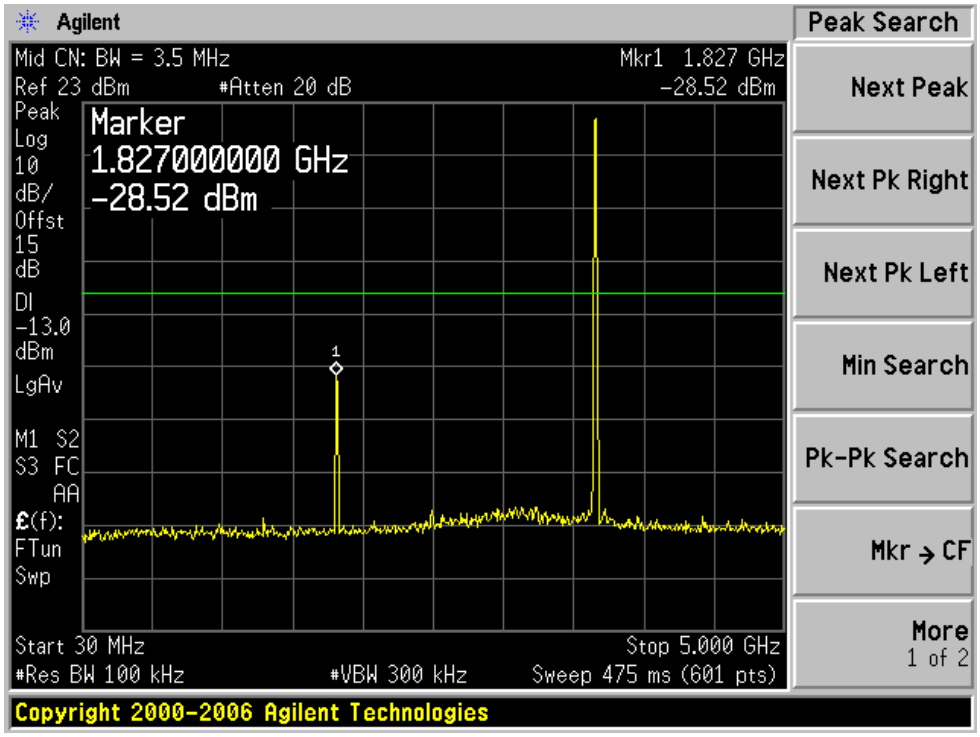


15GHz-26.5GHz

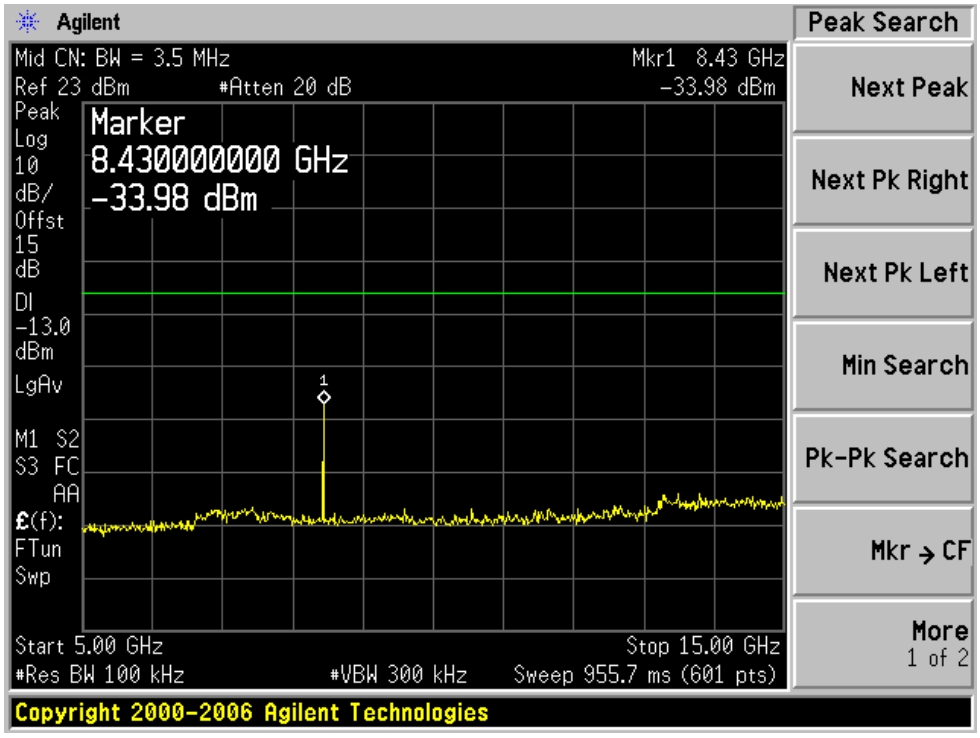


Middle Channel

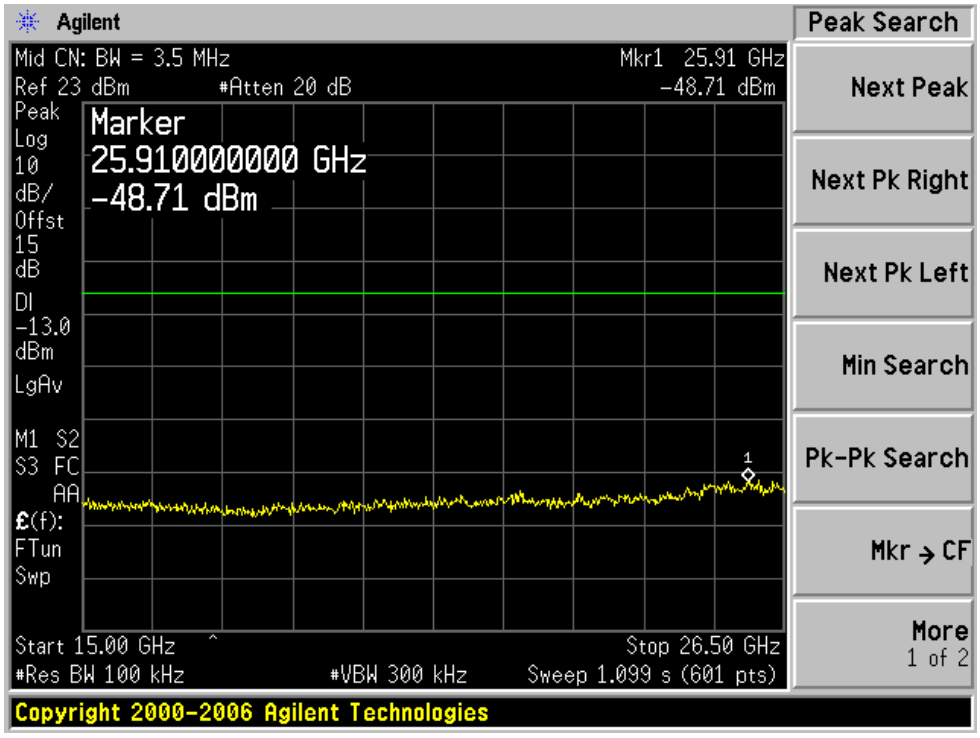
30MHz-5GHz



5GHz-15GHz

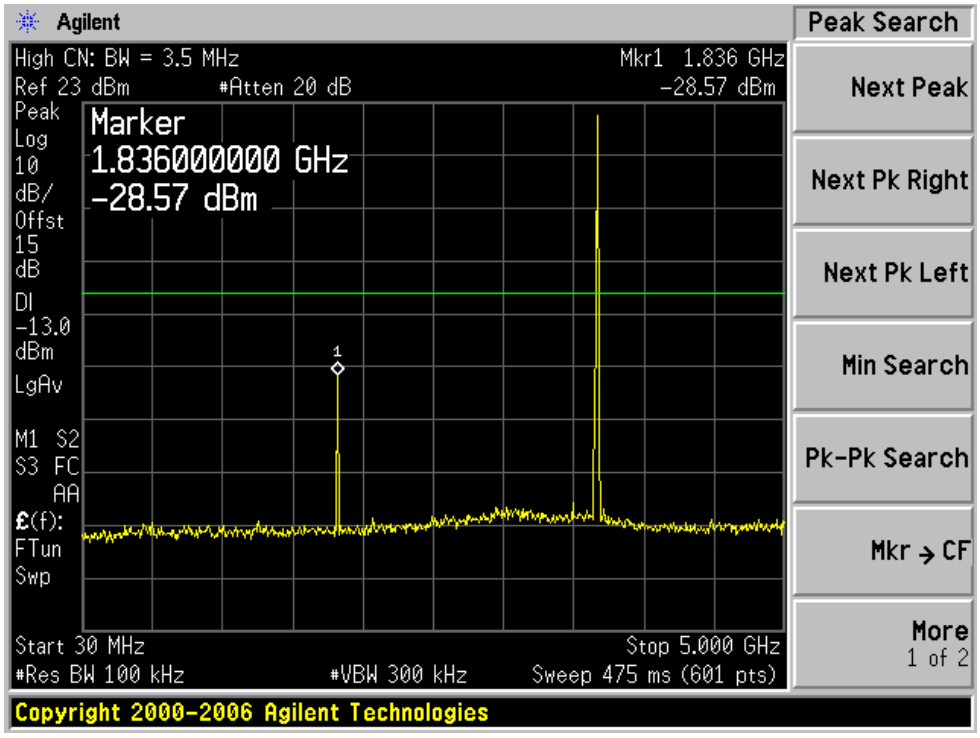


15GHz-26.5GHz

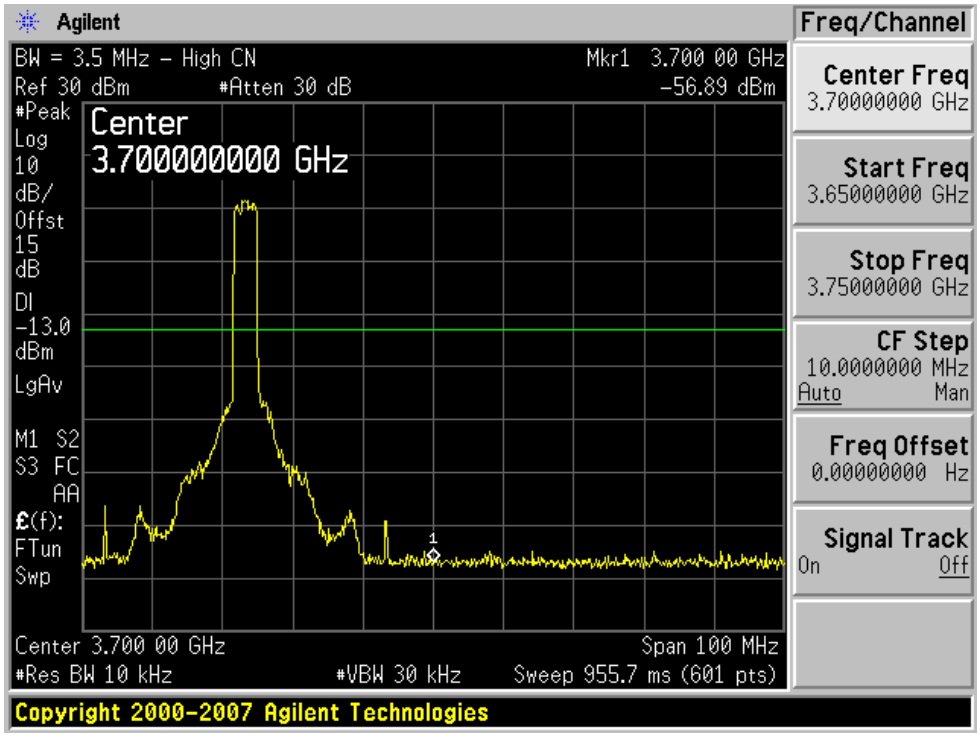


High Channel

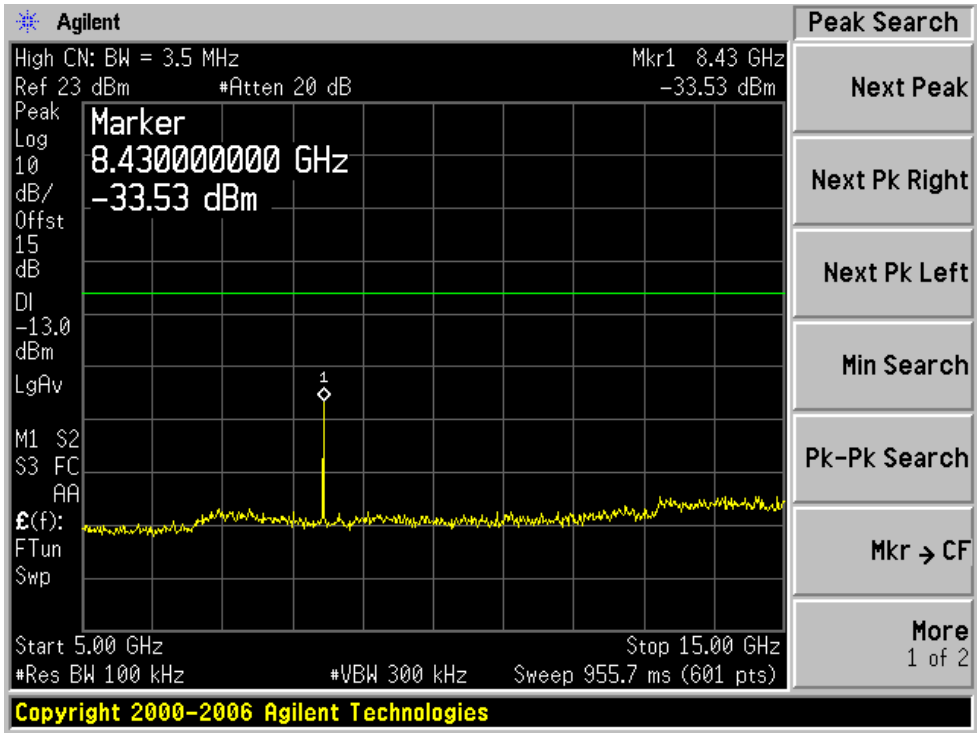
30MHz-5GHz



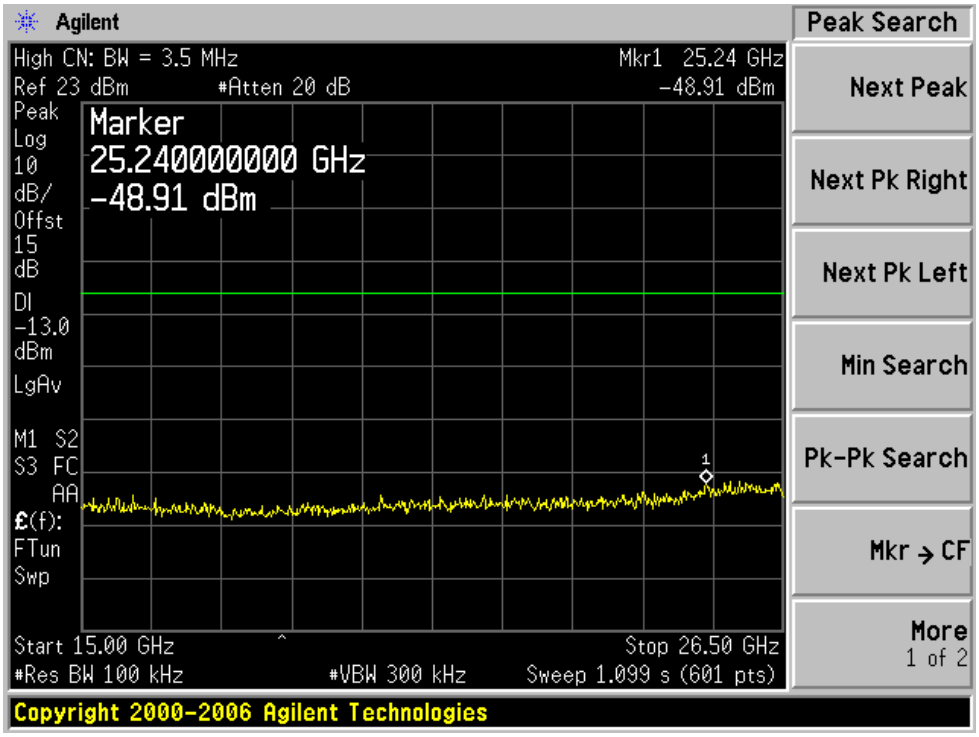
Band Edge: High Channel



5GHz-15GHz



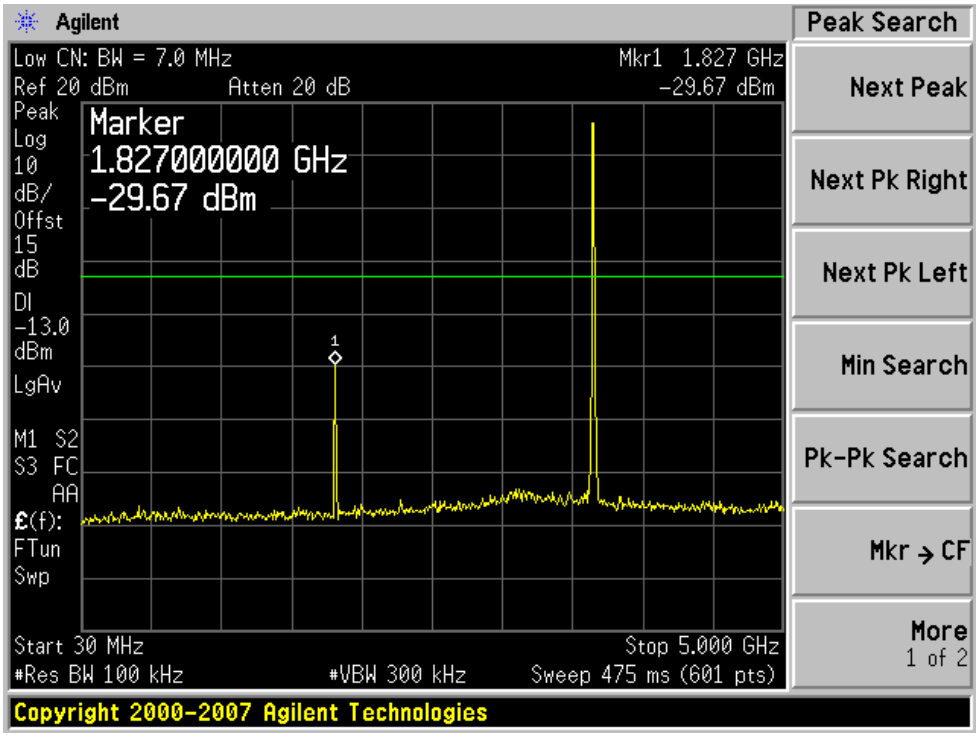
15GHz-26.5GHz



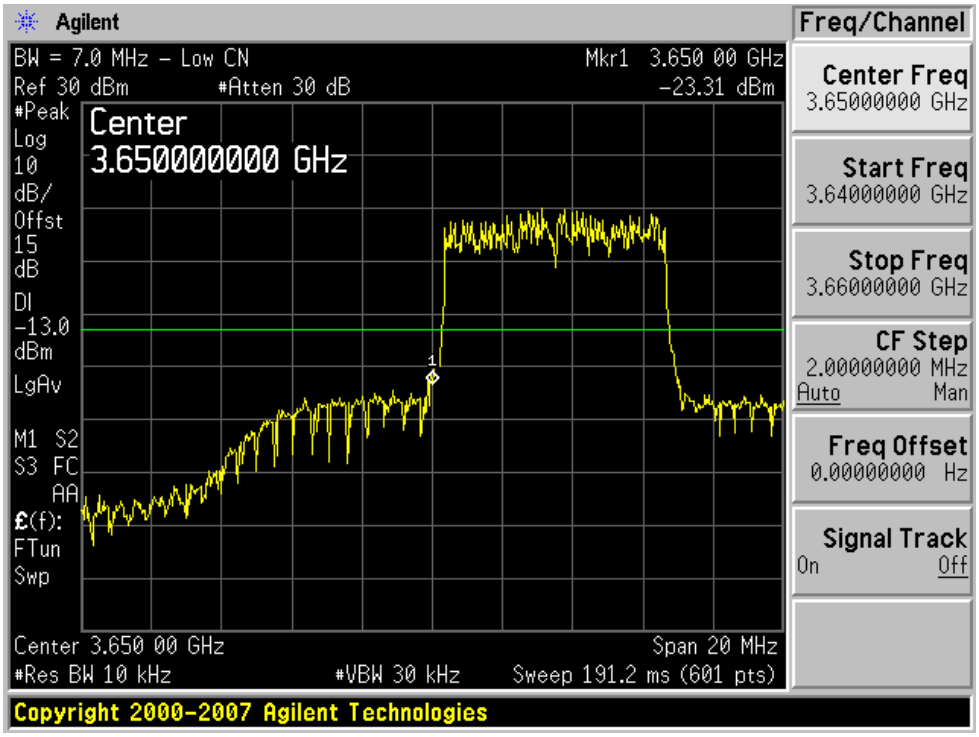
BW = 7.0 MHz

Low Channel

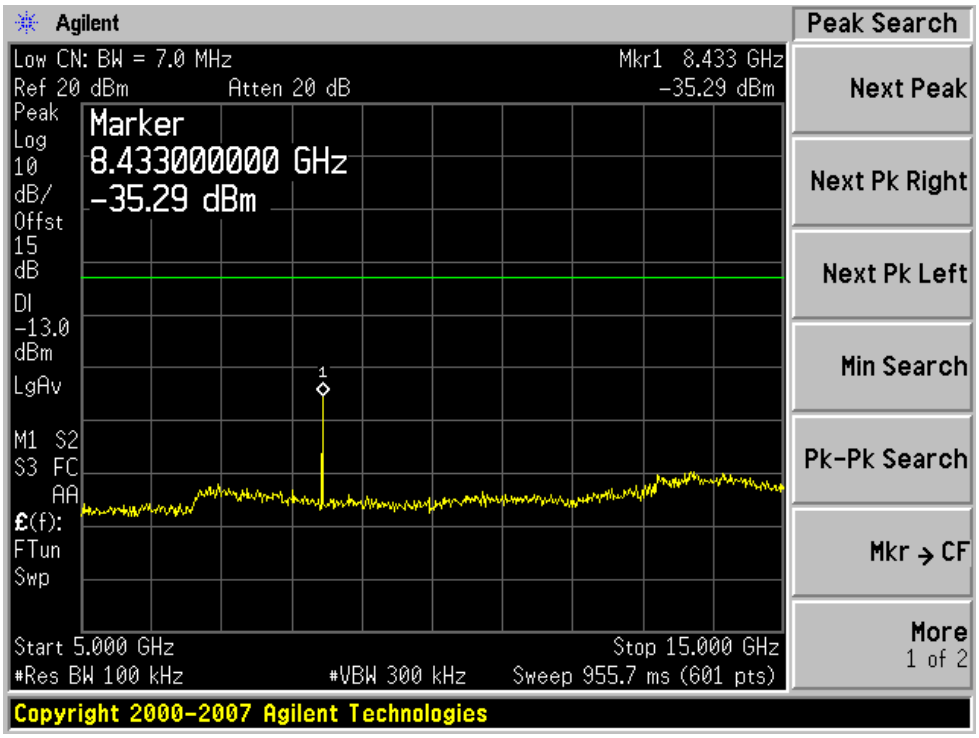
30MHz-5GHz



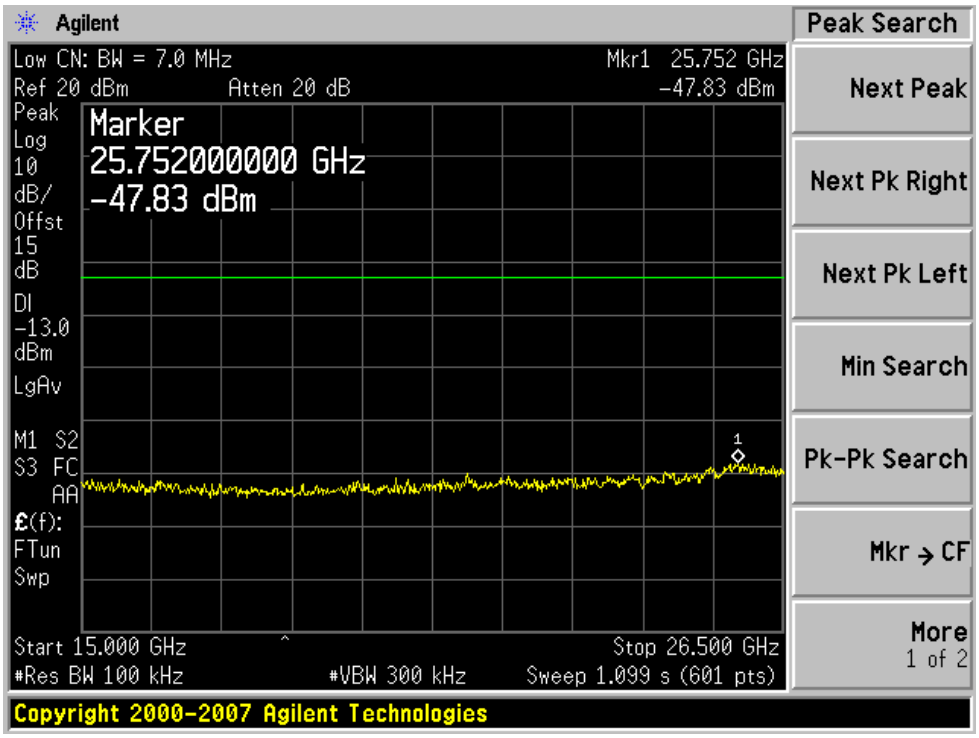
Band Edge: Low Channel



5GHz-15GHz

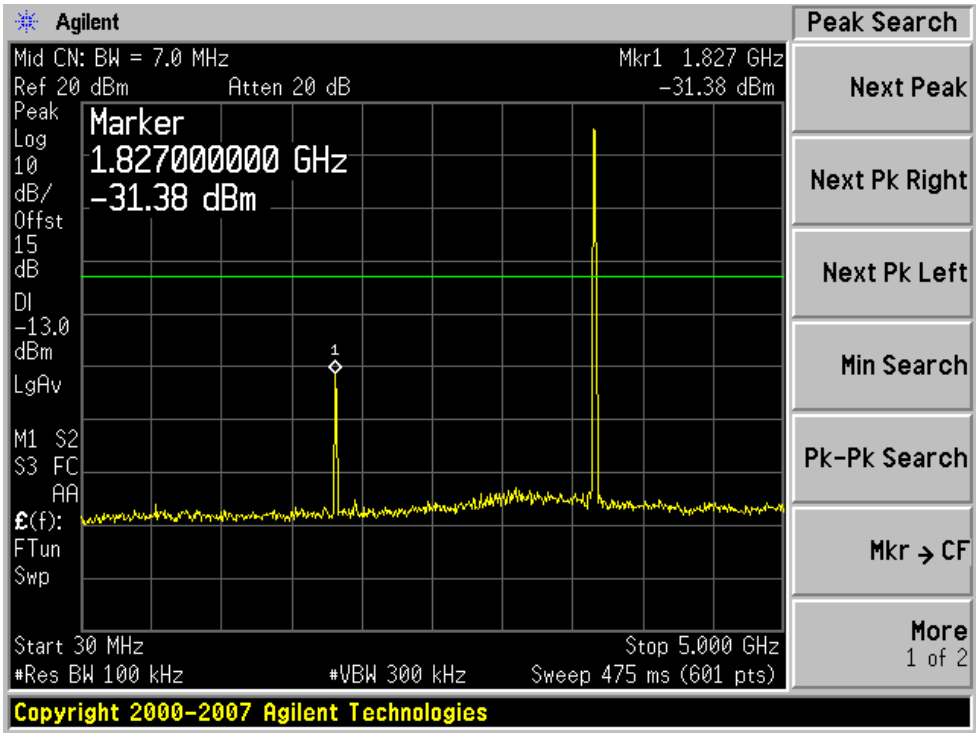


15GHz-26.5GHz

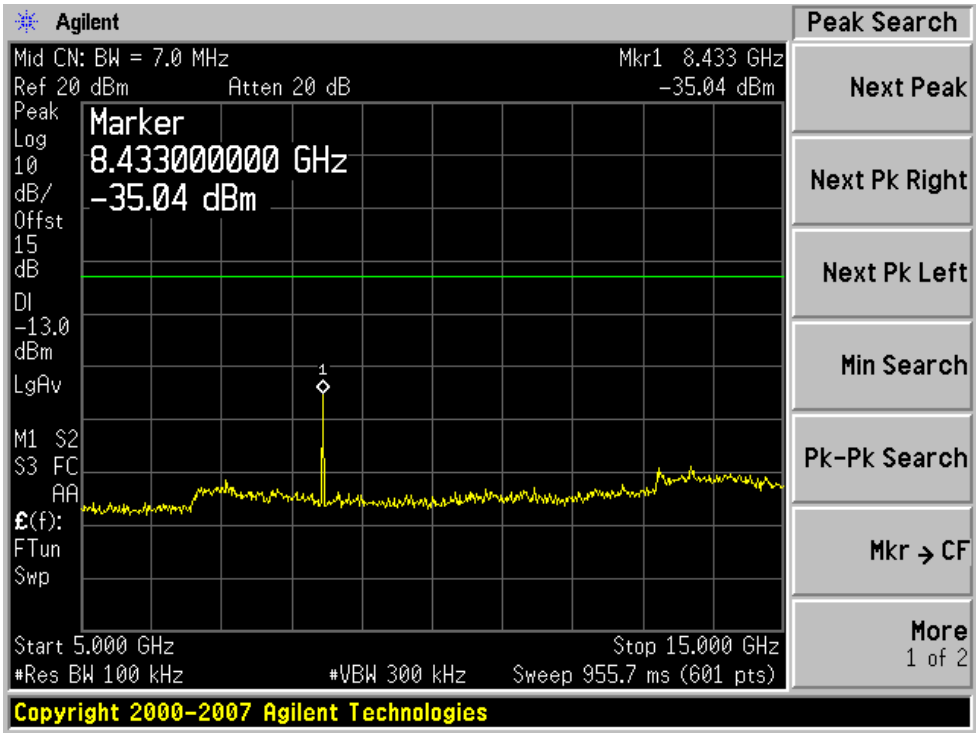


Middle Channel

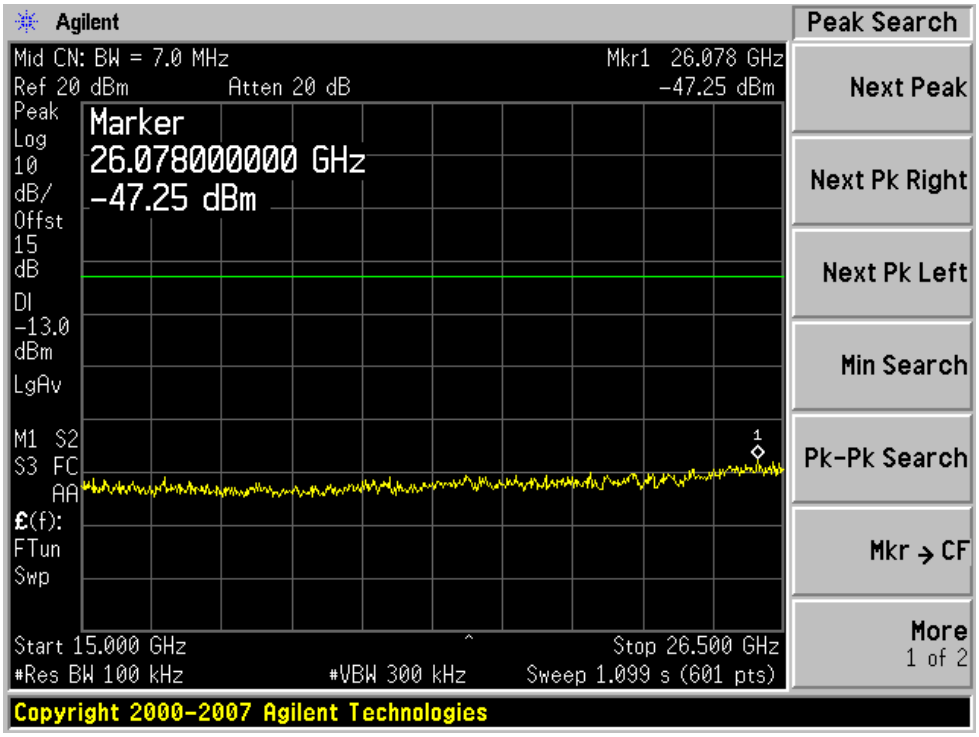
30MHz-5GHz



5GHz-15GHz

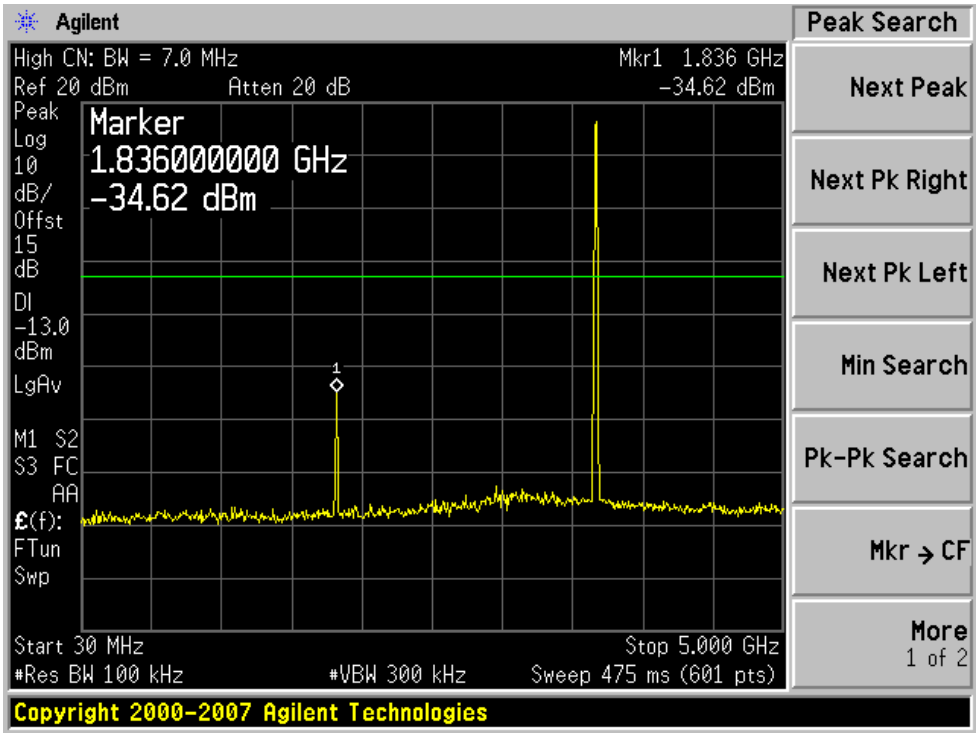


15GHz-26.5GHz

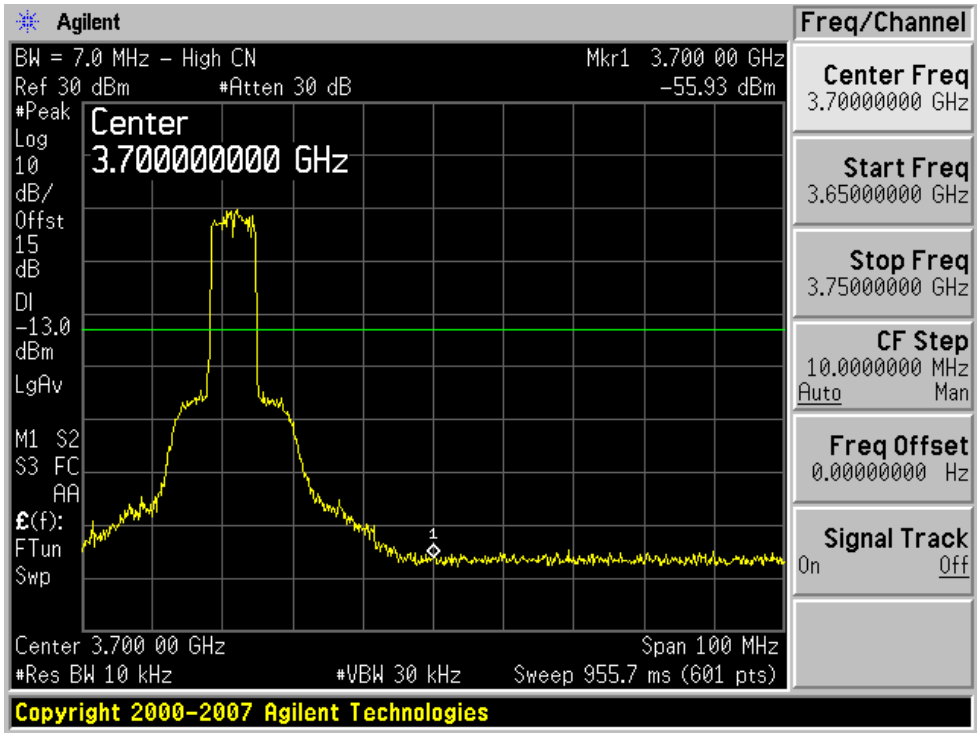


High Channel

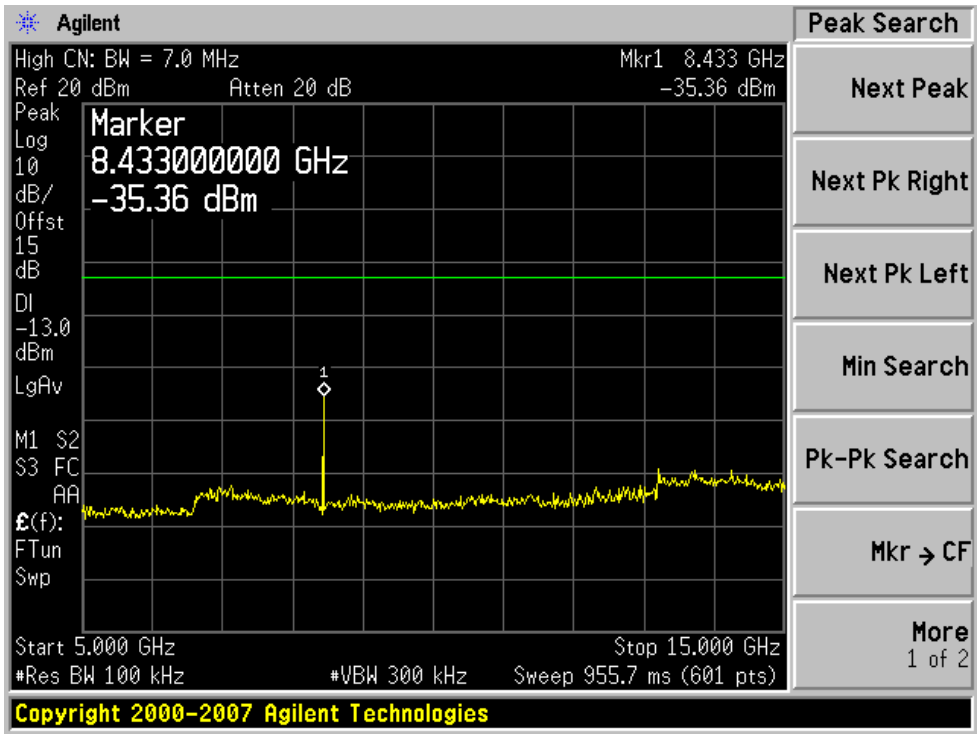
30MHz-5GHz



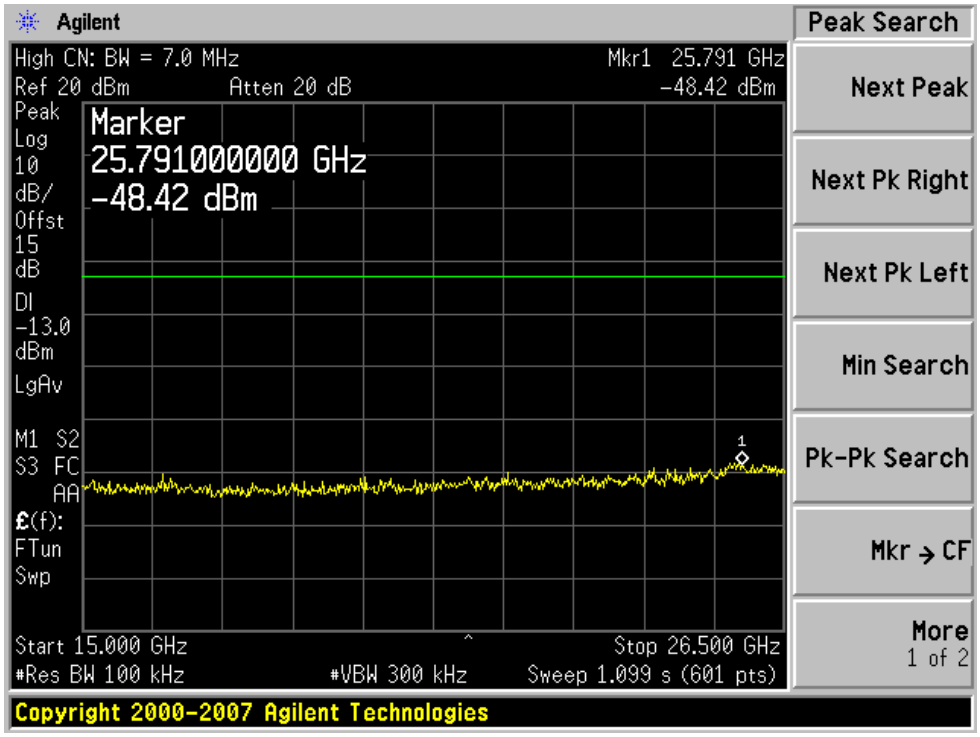
Band Edge: High Channel



5GHz-15GHz



15GHz-26.5GHz



8 §2.1053, §90.1323 - SPURIOUS RADIATED EMISSIONS

8.1 Applicable Standard

Requirements: CFR 47, 2.1053, 90.1323

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

8.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Limit (dBm) = Power (dBm) – Spurious attenuation limit (dB)

8.2.1 Environmental Conditions

Temperature:	20.3 ºC
Relative Humidity:	38.3 %
ATM Pressure:	102.5 kPa

** The testing was performed by James Ma on 2008-07-10.*

8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Dates
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19
HP	Amplifier, Pre	8449B	3147A00400	2007-11-02
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2007-06-07 (2yrs)
A.R.A.	Antenna, Horn	DRG-118/A	1132	2007-06-18 (2 yrs)
HP	Generator, Signal	83650B	3614A00276	2008-05-28

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

8.4 Test Results

Omni Directional Antenna = 11dBi

-17.9 dB at **1827 MHz** in the **Vertical** polarization, Low Channel
-17.1 dB at **1831 MHz** in the **Vertical** polarization, Middle Channel
-17.6 dB at **1837 MHz** in the **Vertical** polarization, High Channel

90 Degree Vertical Antenna = 16dBi

-14.4 dB at **1827 MHz** in the **Horizontal** polarization, Low Channel
-14.2 dB at **1831 MHz** in the **Horizontal** polarization, Middle Channel
-14.7 dB at **1837 MHz** in the **Horizontal** polarization, High Channel

Omni Directional Antenna = 11dBi

Low Channel: 3651.75 MHz

Indicated Frequency (MHz)	Table		Test Antenna		Substituted		Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Amplitude (dBuV)	Angle (degree)	Height (meter)	Polar (H/V)	Frequency (MHz)	Level (dBm)					
1827.0	70.20	25	2.0	V	1827.0	-38.2	8.8	1.54	-30.9	-13	-17.9
1827.0	67.30	50	1.8	H	1827.0	-39.4	8.8	1.54	-32.1	-13	-19.1
8442.0	40.00	10	1.0	H	8442.0	-46.4	9.8	4.90	-41.5	-13	-28.5
8442.0	39.70	10	1.0	V	8442.0	-49.0	9.8	4.90	-44.1	-13	-31.1

Middle Channel: 3662.5 MHz

Indicated Frequency (MHz)	Table		Test Antenna		Substituted		Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Amplitude (dBuV)	Angle (degree)	Height (meter)	Polar (H/V)	Frequency (MHz)	Level (dBm)					
1831.0	71.00	25	1.4	V	1831.0	-37.4	8.8	1.54	-30.1	-13	-17.1
1831.0	67.10	50	1.8	H	1831.0	-39.6	8.8	1.54	-32.3	-13	-19.3
8440.0	40.00	10	2.5	H	8440.0	-46.4	9.8	4.90	-41.5	-13	-28.5
8440.0	40.20	10	1.2	V	8440.0	-48.5	9.8	4.90	-43.6	-13	-30.6

High Channel: 3673.25 MHz

Indicated Frequency (MHz)	Table		Test Antenna		Substituted		Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Amplitude (dBuV)	Angle (degree)	Height (meter)	Polar (H/V)	Frequency (MHz)	Level (dBm)					
1837.0	70.50	25	1.0	V	1837.0	-37.9	8.8	1.54	-30.6	-13	-17.6
1837.0	67.20	50	1.8	H	1837.0	-39.5	8.8	1.54	-32.2	-13	-19.2
8437.0	39.80	10	2.5	H	8437.0	-46.6	9.8	4.90	-41.7	-13	-28.7
8437.0	40.00	10	1.2	V	8437.0	-48.7	9.8	4.90	-43.8	-13	-30.8

90 Degree Vertical Antenna = 16dBi

Low Channel: 3651.75 MHz

Indicated Frequency (MHz)	Table		Test Antenna		Substituted		Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Amplitude (dBuV)	Angle (degree)	Height (meter)	Polar (H/V)	Frequency (MHz)	Level (dBm)					
1827.0	72.00	80	2.5	H	1827.0	-34.7	8.8	1.54	-27.4	-13	-14.4
1827.0	71.80	5	2.5	V	1827.0	-36.6	8.8	1.54	-29.3	-13	-16.3
8443.0	43.80	10	1.8	H	8443.0	-42.6	9.8	4.90	-37.7	-13	-24.7
8443.0	44.00	10	2.0	V	8443.0	-44.7	9.8	4.90	-39.8	-13	-26.8

Middle Channel: 3662.5 MHz

Indicated Frequency (MHz)	Table		Test Antenna		Substituted		Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Amplitude (dBuV)	Angle (degree)	Height (meter)	Polar (H/V)	Frequency (MHz)	Level (dBm)					
1831.0	72.20	80	2.2	H	1831.0	-34.5	8.8	1.54	-27.2	-13	-14.2
1831.0	71.20	5	2.3	V	1831.0	-37.2	8.8	1.54	-29.9	-13	-16.9
8441.0	44.00	10	1.8	H	8441.0	-42.4	9.8	4.90	-37.5	-13	-24.5
8441.0	44.30	10	2.0	V	8441.0	-44.4	9.8	4.90	-39.5	-13	-26.5

High Channel: 3673.25 MHz

Indicated Frequency (MHz)	Table		Test Antenna		Substituted		Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Amplitude (dBuV)	Angle (degree)	Height (meter)	Polar (H/V)	Frequency (MHz)	Level (dBm)					
1837.0	71.70	80	2.2	H	1837.0	-35.0	8.8	1.54	-27.7	-13	-14.7
1837.0	70.00	10	2.5	V	1837.0	-38.4	8.8	1.54	-31.1	-13	-18.1
8437.0	44.00	10	1.8	H	8437.0	-42.4	9.8	4.90	-37.5	-13	-24.5
8437.0	44.10	10	2.0	V	8437.0	-44.6	9.8	4.90	-39.7	-13	-26.7

9 §2.1055 – FREQUENCY STABILITY

9.1 Applicable Standard

Requirements: FCC § 2.1055.

9.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable AC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

9.2.1 Environmental Conditions

Temperature:	20.3 ºC
Relative Humidity:	38.3 %
ATM Pressure:	102.5 kPa

** The testing was performed by James Ma on 2008-07-10.*

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19
ESPEC	Oven, Temperature	ESL-4CA	18010	N/A

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

9.4 Test Results

Low Channel: 3651.75 MHz

Frequency Stability versus Temperature

Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Results
Voltage (Vac)	Temperature (^{O}C)					
120	-30	3651.75	3651.7548	1.3144	20	Pass
120	20	3651.75	3651.7500	0.0000	20	
120	50	3651.75	3651.7520	0.5477	20	

Frequency Stability versus Voltage

Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Results
Voltage (Vac)	Temperature (^{O}C)					
102	20	3651.75	3651.7503	0.0822	20	Pass
138	20	3651.75	3651.7505	0.1369	20	

Middle Channel: 3662.5 MHz

Frequency Stability versus Temperature

Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (PPM)	Limit (PPM)	Results
Voltage (Vac)	Temperature (^{O}C)					
120	-30	3662.50	3662.5052	1.4198	20	Pass
120	20	3662.50	3662.5003	0.0819	20	
120	50	3662.50	3662.5025	0.6826	20	

Frequency Stability versus Voltage

Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Results
Voltage (Vac)	Temperature (^{O}C)					
102	20	3662.50	3662.5005	0.1365	20	Pass
138	20	3662.50	3662.5003	0.0819	20	

High Channel: 3673.25 MHz

Frequency Stability versus Temperature

Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Results
Voltage (Vac)	Temperature (^{O}C)					
120	-30	3673.25	3673.2572	1.9601	20	Pass
120	20	3673.25	3673.2503	0.0817	20	
120	50	3673.25	3673.2535	0.9528	20	

Frequency Stability versus Voltage

Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)	Results
Voltage (Vac)	Temperature (^{O}C)					
102	20	3673.25	3673.2505	0.1361	20	Pass
138	20	3673.25	3673.2508	0.2178	20	