

FCC PART 27  
TEST AND MEASUREMENT REPORT

For

**Vecima Networks Inc.**

150 Cardinal Place,  
Saskatoon, SK, Canada S7L 6H7

**FCC ID: OPPTR707**

|                                                                                                                                           |                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                    | <b>Product Type:</b><br>700 MHz Subscriber Transceiver                                                                                 |
| <b>Test Engineer:</b> Jack Liu                        |                                                                                                                                        |
| <b>Report Number:</b> R0908213-27                                                                                                         |                                                                                                                                        |
| <b>Report Date:</b> 2009-09-17                                                                                                            |                                                                                                                                        |
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\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" (Rev2)

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**DOCUMENT REVISION HISTORY**

| Revision Number | Report Number | Description of Revision | Date of Revision |
|-----------------|---------------|-------------------------|------------------|
| 0               | R0908213-27   | Original Report         | 2009-09-17       |

## 1 GENERAL INFORMATION

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

The Vecima Networks Inc. FCC ID: OPPTR707, Model: TR707+ or the "EUT" as referred to in this report is an Analog Transmitter / Receiver. TR707+ is a subscriber transceiver for use in wireless systems. The TR707+ and antenna are situated outdoors and connected to a cable modem indoors by standard RG-59 cable. A single RF connector on the weatherproofed enclosure provides the interface to the transmit/receive antenna for rapid setup. The transceiver is configured to work with standard cable modem frequency plans and levels, permitting direct connection. The transceiver also includes an RF mute function to reduce power consumption and broadband noise emissions.

IF Input Frequency: 24-42 MHz

Transmit Frequency: 698-716 MHz

Receiver Frequency: 728-746 MHz

### 1.2 Mechanical Description

EUT measures approximately 152mm (L) x 203 mm (W) x 38 mm (H), and weighs approximately 809g.

*\*The test data gathered are from production sample, serial number: 2446367 provided by the manufacturer.*

### 1.3 EUT Photo



*Please refer to Exhibit C for more EUT photographs.*

## 1.4 Objective

This type approval report is prepared on behalf of Vecima Networks Inc. in accordance with Part 2, Subpart J, Part 27, Subpart E, of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

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

No Related Submittals

## 1.6 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 27 Subpart C - MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

Applicable Standards: 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.

## 1.7 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 +2.0 dB for Conducted Emissions tests and +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.

## 1.8 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/ts/htdocs/210/214/scopes/2001670.htm>

## 2 SYSTEM TEST CONFIGURATION

### 2.1 Justification

The EUT was configured for testing according to TIA/EIA-603-C.

The final qualification test was performed with the EUT operating at normal mode.

### 2.2 EUT Exercise Software

Signal was sent through EUT using a signal generator; device was set to normal operating mode.

### 2.3 Equipment Modifications

No modifications were made to the EUT.

### 2.4 Local Support Equipment and Software List and Details

| Manufacturer    | Description             | Model      | Serial Number |
|-----------------|-------------------------|------------|---------------|
| Rohde & Schwarz | Signal Generator        | SMIQ03     | 849192/0085   |
| HP              | Amplifier, Pre          | 8447D      | 2944A06639    |
| Aeroflex        | Impedance Matching Pads | 9079-50/75 | -             |

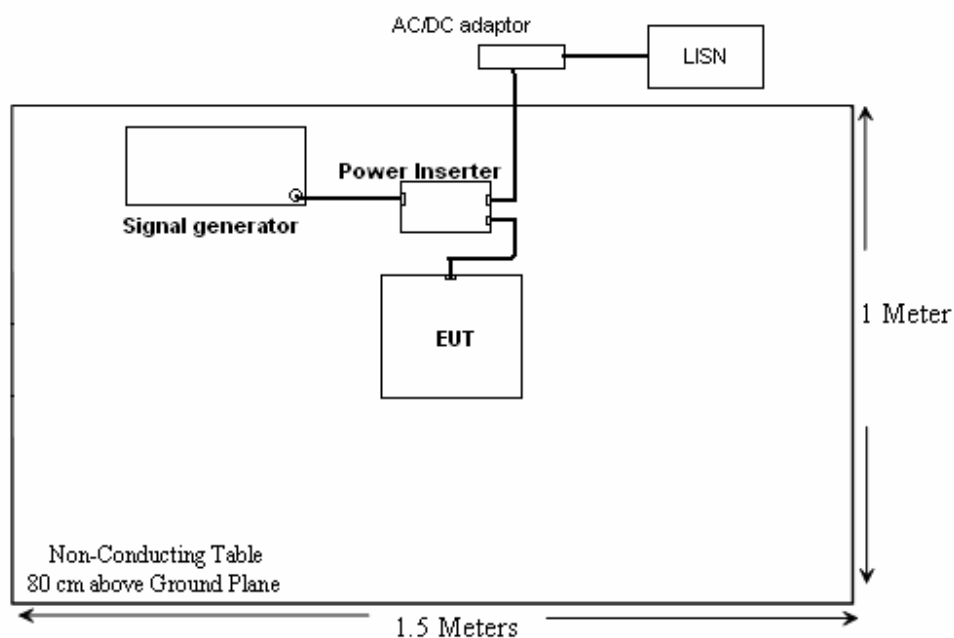
### 2.5 EUT Internal Configurations

| Manufacturer       | Description        | Model       | Serial Number |
|--------------------|--------------------|-------------|---------------|
| Vecima             | Main Board         | PC4C0101    | 2447431       |
| I.T.E Power Supply | AC/DC Power Supply | HK-B518-A24 | 804 032761    |

### 2.6 Interface Ports and Cables

| Cable Description | Length (m) | To                                    | From                            |
|-------------------|------------|---------------------------------------|---------------------------------|
| RG59              | < 1        | Signal Generator                      | Power Inserter “ Modem”<br>port |
| RG59              | < 1        | Power Inserter “ Transceiver”<br>port | TR707+ IF Input                 |
| RG59              | < 1        | TR707+ IF Input                       | Spectrum Analyzer               |

## 2.7 Test Setup Block Diagram



### 3 SUMMARY OF TEST RESULTS

| FCC Rules                   | Description of Tests                    | Results   |
|-----------------------------|-----------------------------------------|-----------|
| § 2.1046, § 27.50 (c)       | RF Output Power                         | Compliant |
| § 2.1047                    | Modulation Characteristics              | N/A       |
| § 2.1049, § 27.53           | Occupied Bandwidth                      | Compliant |
| § 2.1053, § 27.53 (g)       | Spurious Radiated Emissions             | Compliant |
| § 2.1051, § 27.53 (g)       | Spurious Emissions at Antenna Terminals | Compliant |
| § 27.53 (g)                 | Band Edge                               | Compliant |
| § 27.54                     | Frequency Stability                     | Compliant |
| § 1.1310, §2.1091<br>§27.52 | RF Exposure                             | Compliant |

## 4 FCC §2.1046 & §27.50 (c) – RF OUTPUT POWER

### 4.1 Applicable Standard

According to FCC §27.50 (c), the maximum effective radiated power (ERP) Control and mobile stations are limited to 30 watts ERP.

### 4.2 Test Procedure

*Conducted:*

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

### 4.3 Test Setup Block Diagram



### 4.4 Test Environmental Conditions

|                           |                 |
|---------------------------|-----------------|
| <b>Temperature:</b>       | 21-24°C         |
| <b>Relative Humidity:</b> | 35-40 %         |
| <b>ATM Pressure:</b>      | 101.3-102.3 kPa |

\* The testing was performed by Jack Liu on from 2009-09-03 to 2009-09-06 in RF Site.

### 4.5 Test Equipment List and Details

| Manufacturers   | Descriptions      | Model No. | Serial No.  | Calibration Due Date |
|-----------------|-------------------|-----------|-------------|----------------------|
| Agilent         | Spectrum Analyzer | E4446A    | US44300386  | 2010-06-29           |
| Rohde & Schwarz | Signal Generator  | SMIQ03    | 849192/0085 | 2009-12-03           |

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

#### 4.6 Summary of Test Results

Antenna Type: Yagi 10 dBi Gain, Modulation Type: QPSK

| Symbol Rates<br>(sym/sec) | Channel | Frequency<br>(MHz) | Output Power<br>(dBm) | Antenna<br>(dBi) | ERP<br>(dBm) | Part 27 ERP Limit |        |
|---------------------------|---------|--------------------|-----------------------|------------------|--------------|-------------------|--------|
|                           |         |                    |                       |                  |              | (dBm)             | (Watt) |
| 320k                      | Low     | 698.4              | 23.2                  | 10               | 31.05        | 44.77             | 30     |
|                           | Middle  | 706.4              | 23.8                  | 10               | 31.65        | 44.77             | 30     |
|                           | High    | 715.6              | 23.1                  | 10               | 30.95        | 44.77             | 30     |
| 640k                      | Low     | 698.6              | 23.2                  | 10               | 31.05        | 44.77             | 30     |
|                           | Middle  | 706.6              | 24.0                  | 10               | 31.85        | 44.77             | 30     |
|                           | High    | 715.4              | 23.2                  | 10               | 31.05        | 44.77             | 30     |
| 1280k                     | Low     | 699.0              | 23.9                  | 10               | 31.75        | 44.77             | 30     |
|                           | Middle  | 707.0              | 23.9                  | 10               | 31.75        | 44.77             | 30     |
|                           | High    | 715.0              | 23.4                  | 10               | 31.25        | 44.77             | 30     |

Antenna Type: Flat Planar 9 dBi Gain, Modulation Type: QPSK

| Symbol Rates<br>(sym/sec) | Channel | Frequency<br>(MHz) | Output Power<br>(dBm) | Antenna<br>(dBi) | ERP<br>(dBm) | Part 27 ERP Limit |        |
|---------------------------|---------|--------------------|-----------------------|------------------|--------------|-------------------|--------|
|                           |         |                    |                       |                  |              | (dBm)             | (Watt) |
| 320k                      | Low     | 698.4              | 23.2                  | 9                | 30.05        | 44.77             | 30     |
|                           | Middle  | 706.4              | 23.8                  | 9                | 30.65        | 44.77             | 30     |
|                           | High    | 715.6              | 23.1                  | 9                | 29.95        | 44.77             | 30     |
| 640k                      | Low     | 698.6              | 23.2                  | 9                | 30.05        | 44.77             | 30     |
|                           | Middle  | 706.6              | 24.0                  | 9                | 30.85        | 44.77             | 30     |
|                           | High    | 715.4              | 23.2                  | 9                | 30.05        | 44.77             | 30     |
| 1280k                     | Low     | 699.0              | 23.9                  | 9                | 30.75        | 44.77             | 30     |
|                           | Middle  | 707.0              | 23.9                  | 9                | 30.75        | 44.77             | 30     |
|                           | High    | 715.0              | 23.4                  | 9                | 30.25        | 44.77             | 30     |

Antenna Type: Window Mount Planar 7 dBi Gain, Modulation Type: QPSK

| Symbol Rates<br>(sym/sec) | Channel | Frequency<br>(MHz) | Output Power<br>(dBm) | Antenna<br>(dBi) | ERP<br>(dBm) | Part 27 ERP Limit |        |
|---------------------------|---------|--------------------|-----------------------|------------------|--------------|-------------------|--------|
|                           |         |                    |                       |                  |              | (dBm)             | (Watt) |
| 320k                      | Low     | 698.4              | 23.2                  | 7                | 28.05        | 44.77             | 30     |
|                           | Middle  | 706.4              | 23.8                  | 7                | 28.65        | 44.77             | 30     |
|                           | High    | 715.6              | 23.1                  | 7                | 27.95        | 44.77             | 30     |
| 640k                      | Low     | 698.6              | 23.2                  | 7                | 28.05        | 44.77             | 30     |
|                           | Middle  | 706.6              | 24.0                  | 7                | 28.85        | 44.77             | 30     |
|                           | High    | 715.4              | 23.2                  | 7                | 28.05        | 44.77             | 30     |
| 1280k                     | Low     | 699.0              | 23.9                  | 7                | 28.75        | 44.77             | 30     |
|                           | Middle  | 707.0              | 23.9                  | 7                | 28.75        | 44.77             | 30     |
|                           | High    | 715.0              | 23.4                  | 7                | 28.25        | 44.77             | 30     |

Antenna Type: Yagi 10 dBi Gain, Modulation Type: 16QAM

| Symbol Rates<br>(sym/sec) | Channel | Frequency<br>(MHz) | Output Power<br>(dBm) | Antenna<br>(dBi) | ERP<br>(dBm) | Part 27 ERP Limit |        |
|---------------------------|---------|--------------------|-----------------------|------------------|--------------|-------------------|--------|
|                           |         |                    |                       |                  |              | (dBm)             | (Watt) |
| 320k                      | Low     | 698.4              | 23.40                 | 10               | 31.25        | 44.77             | 30     |
|                           | Middle  | 706.4              | 23.28                 | 10               | 31.13        | 44.77             | 30     |
|                           | High    | 715.6              | 22.50                 | 10               | 30.35        | 44.77             | 30     |
| 640k                      | Low     | 698.6              | 23.38                 | 10               | 31.23        | 44.77             | 30     |
|                           | Middle  | 706.6              | 23.33                 | 10               | 31.18        | 44.77             | 30     |
|                           | High    | 715.4              | 22.63                 | 10               | 30.48        | 44.77             | 30     |
| 1280k                     | Low     | 699.0              | 23.26                 | 10               | 31.11        | 44.77             | 30     |
|                           | Middle  | 707.0              | 23.55                 | 10               | 31.40        | 44.77             | 30     |
|                           | High    | 715.0              | 23.35                 | 10               | 31.20        | 44.77             | 30     |

Antenna Type: Flat Planar 9 dBi Gain, Modulation Type: 16QAM

| Symbol Rates<br>(sym/sec) | Channel | Frequency<br>(MHz) | Output Power<br>(dBm) | Antenna<br>(dBi) | ERP<br>(dBm) | Part 27 ERP Limit |        |
|---------------------------|---------|--------------------|-----------------------|------------------|--------------|-------------------|--------|
|                           |         |                    |                       |                  |              | (dBm)             | (Watt) |
| 320k                      | Low     | 698.4              | 23.40                 | 9                | 30.25        | 44.77             | 30     |
|                           | Middle  | 706.4              | 23.28                 | 9                | 30.13        | 44.77             | 30     |
|                           | High    | 715.6              | 22.50                 | 9                | 29.35        | 44.77             | 30     |
| 640k                      | Low     | 698.6              | 23.38                 | 9                | 30.23        | 44.77             | 30     |
|                           | Middle  | 706.6              | 23.33                 | 9                | 30.18        | 44.77             | 30     |
|                           | High    | 715.4              | 22.63                 | 9                | 29.48        | 44.77             | 30     |
| 1280k                     | Low     | 699.0              | 23.26                 | 9                | 30.11        | 44.77             | 30     |
|                           | Middle  | 707.0              | 23.55                 | 9                | 30.40        | 44.77             | 30     |
|                           | High    | 715.0              | 23.35                 | 9                | 30.20        | 44.77             | 30     |

Antenna Type: Window Mount Planar 7 dBi Gain, Modulation Type: 16QAM

| Symbol Rates<br>(sym/sec) | Channel | Frequency<br>(MHz) | Output Power<br>(dBm) | Antenna<br>(dBi) | ERP<br>(dBm) | Part 27 ERP Limit |        |
|---------------------------|---------|--------------------|-----------------------|------------------|--------------|-------------------|--------|
|                           |         |                    |                       |                  |              | (dBm)             | (Watt) |
| 320k                      | Low     | 698.4              | 23.40                 | 7                | 28.25        | 44.77             | 30     |
|                           | Middle  | 706.4              | 23.28                 | 7                | 28.13        | 44.77             | 30     |
|                           | High    | 715.6              | 22.50                 | 7                | 27.35        | 44.77             | 30     |
| 640k                      | Low     | 698.6              | 23.38                 | 7                | 28.23        | 44.77             | 30     |
|                           | Middle  | 706.6              | 23.33                 | 7                | 28.18        | 44.77             | 30     |
|                           | High    | 715.4              | 22.63                 | 7                | 27.48        | 44.77             | 30     |
| 1280k                     | Low     | 699.0              | 23.26                 | 7                | 28.11        | 44.77             | 30     |
|                           | Middle  | 707.0              | 23.55                 | 7                | 28.40        | 44.77             | 30     |
|                           | High    | 715.0              | 23.35                 | 7                | 28.20        | 44.77             | 30     |

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## **5 FCC §2.1047 - MODULATION CHARACTERISTIC**

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### **5.1 Applicable Standard**

According to FCC § 2.1047(d) and part 25, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

### **5.2 Test Result**

N/A

## 6 FCC §2.1049 & §27.53 - OCCUPIED BANDWIDTH

### 6.1 Applicable Standard

Requirements: CFR 47, Section 2.1049 and Section 27.53.

### 6.2 Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 100 kHz and the 26 dB & 99% bandwidth was recorded.

### 6.3 Environmental Conditions

|                    |                 |
|--------------------|-----------------|
| Temperature:       | 21-24°C         |
| Relative Humidity: | 35-40 %         |
| ATM Pressure:      | 101.3-102.3 kPa |

\* The testing was performed by Jack Liu on from 2009-09-03 to 2009-09-06 in RF Site.

### 6.4 Test Equipment List and Details

| Manufacturers   | Descriptions      | Model No. | Serial No.  | Calibration Due Date |
|-----------------|-------------------|-----------|-------------|----------------------|
| Agilent         | Spectrum Analyzer | E4446A    | US44300386  | 2010-06-29           |
| Rohde & Schwarz | Signal Generator  | SMIQ03    | 849192/0085 | 2009-12-03           |

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

## 6.5 Summary of Test Results

### Modulation: QPSK

| Symbol Rate<br>(sym/sec) | Channel | Frequency<br>(MHz) | 26 dB Emission Bandwidth<br>(kHz) | 99% Emission Bandwidth<br>(kHz) |
|--------------------------|---------|--------------------|-----------------------------------|---------------------------------|
| 320k                     | Low     | 698.4              | 392.278                           | 332.7362                        |
|                          | Middle  | 706.4              | 396.611                           | 333.4640                        |
|                          | High    | 715.6              | 396.563                           | 334.6860                        |
| 640k                     | Low     | 698.6              | 784.857                           | 662.9721                        |
|                          | Middle  | 706.6              | 792.640                           | 664.7503                        |
|                          | High    | 715.4              | 780.820                           | 664.0156                        |
| 1280k                    | Low     | 699                | 1582                              | 1328.1                          |
|                          | Middle  | 707                | 1594                              | 1332                            |
|                          | High    | 715                | 1604                              | 1336.3                          |

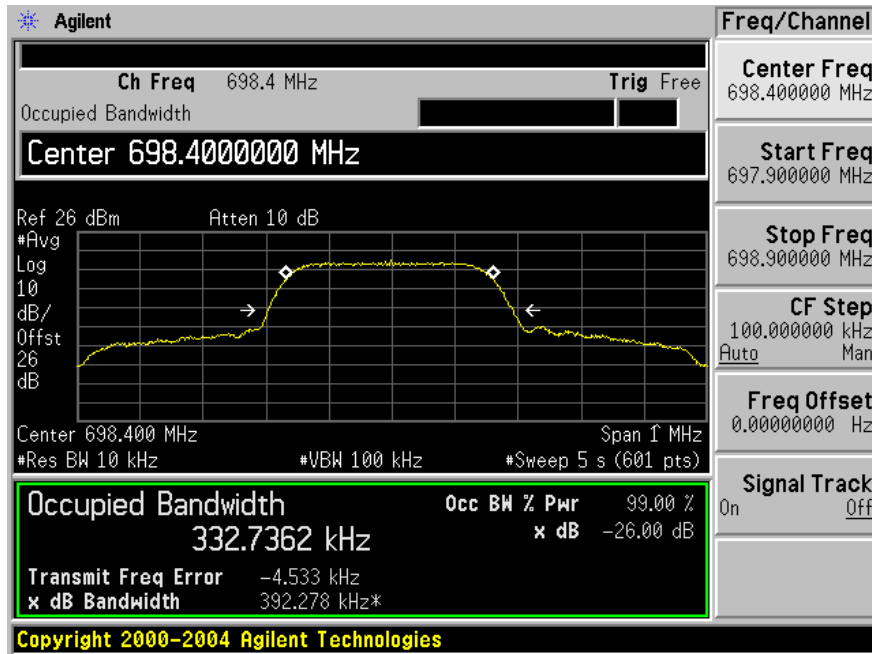
### Modulation: 16QAM

| Symbol Rate<br>(sym/sec) | Channel | Frequency<br>(MHz) | 26 dB Emission Bandwidth<br>(kHz) | 99% Emission Bandwidth<br>(kHz) |
|--------------------------|---------|--------------------|-----------------------------------|---------------------------------|
| 320k                     | Low     | 698.4              | 389.702                           | 335.0479                        |
|                          | Middle  | 706.4              | 384.664                           | 333.6291                        |
|                          | High    | 715.6              | 387.462                           | 334.3528                        |
| 640k                     | Low     | 698.6              | 763.352                           | 664.4701                        |
|                          | Middle  | 706.6              | 766.148                           | 664.5177                        |
|                          | High    | 715.4              | 770.069                           | 665.1852                        |
| 1280k                    | Low     | 699                | 1543                              | 1332                            |
|                          | Middle  | 707                | 1547                              | 1334.9                          |
|                          | High    | 715                | 1556                              | 1337.2                          |

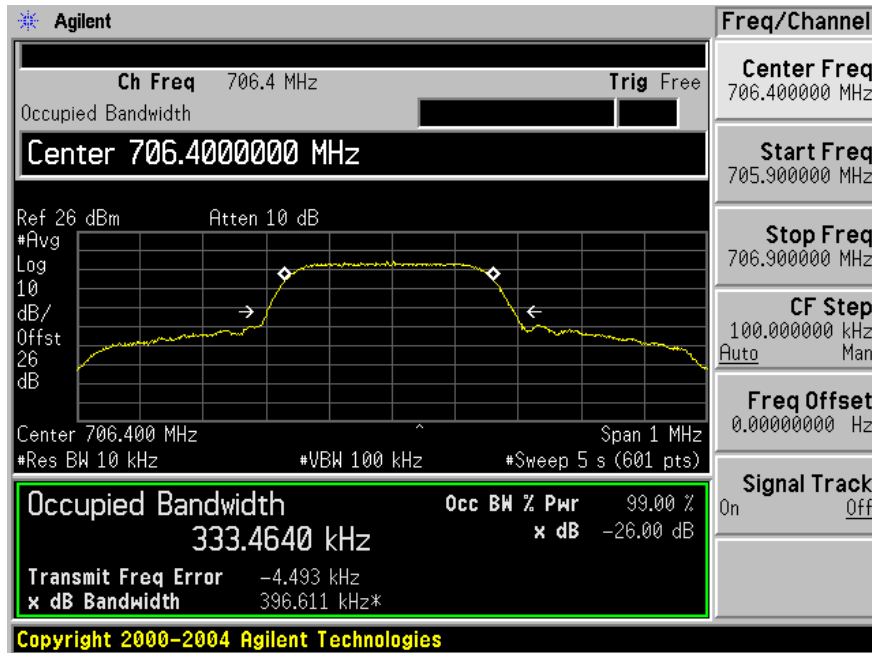
*Please refer to the following plots for details.*

**Modulation: QPSK**

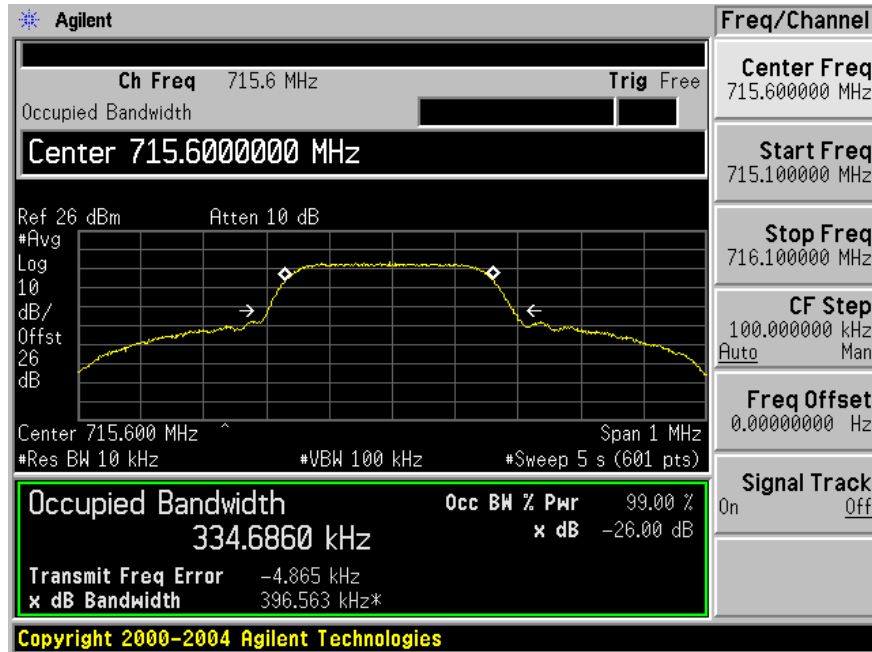
Plot 1: Frequency: 698.4 MHz, Symbol Rates: 320k (sym/sec)



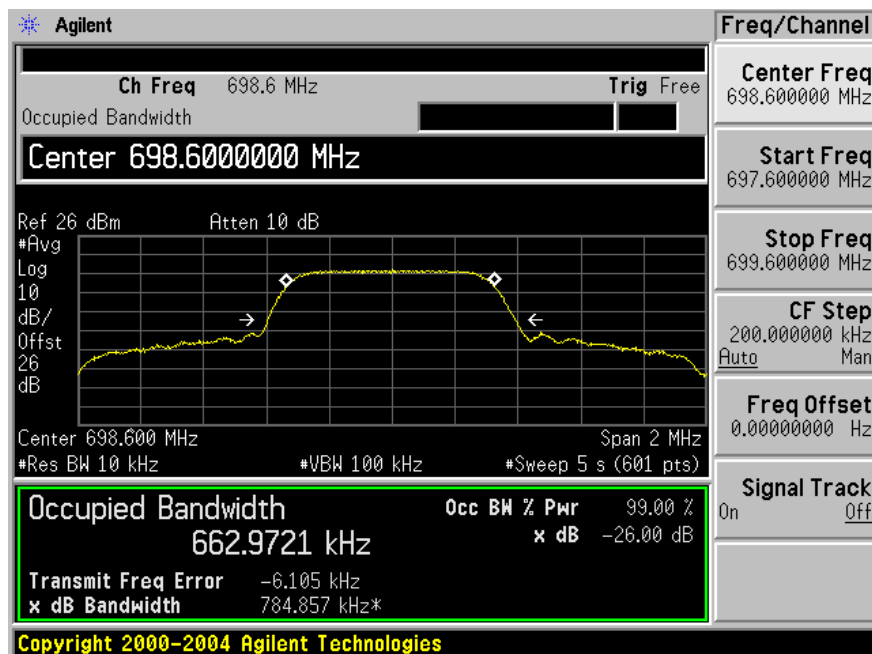
Plot 2: Frequency: 706.4 MHz, Symbol Rates: 320k (sym/sec)



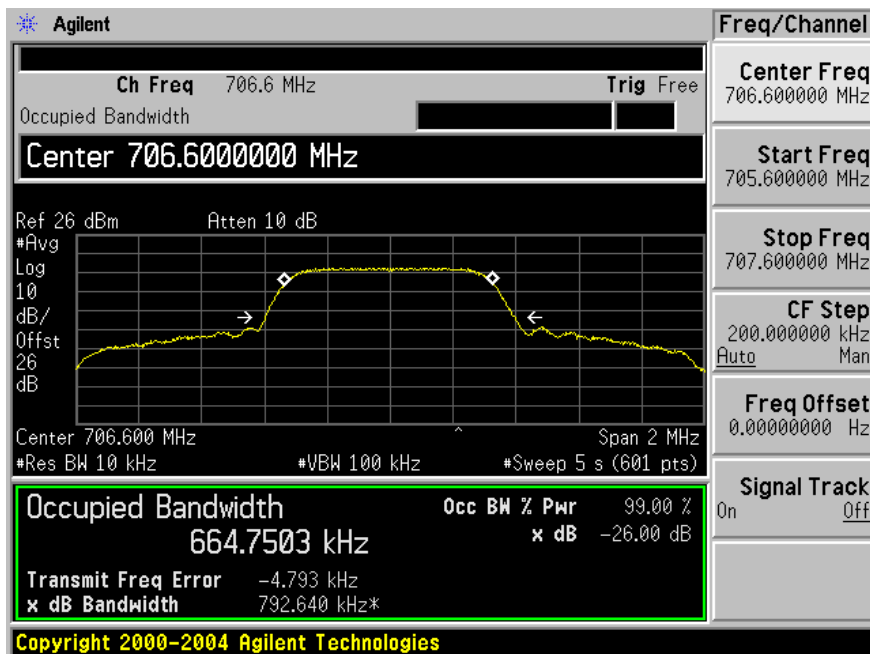
Plot 3: Frequency: 715.6 MHz, Symbol Rates: 320k (sym/sec)



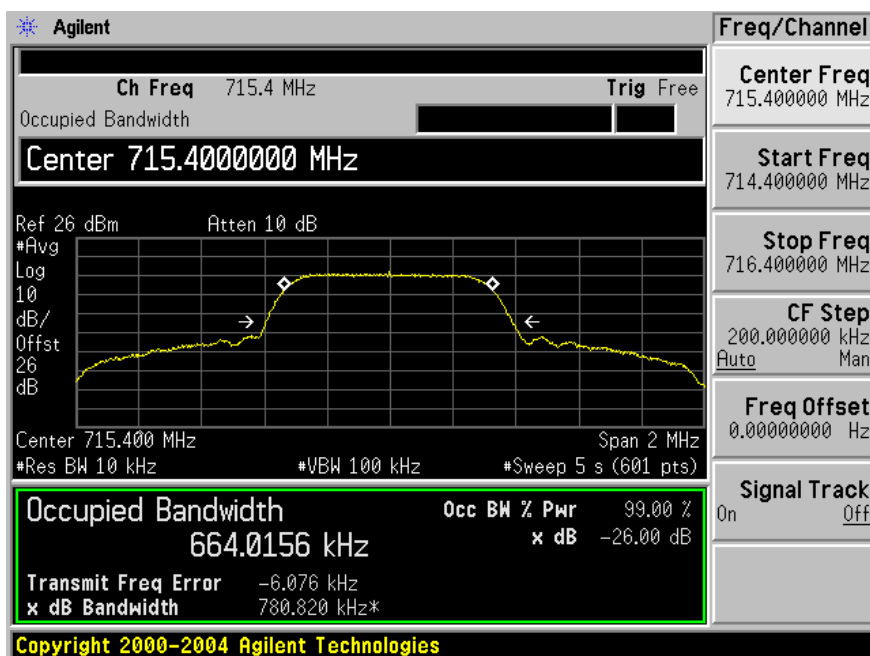
Plot 4: Frequency: 698.6 MHz, Symbol Rates: 640k (sym/sec)



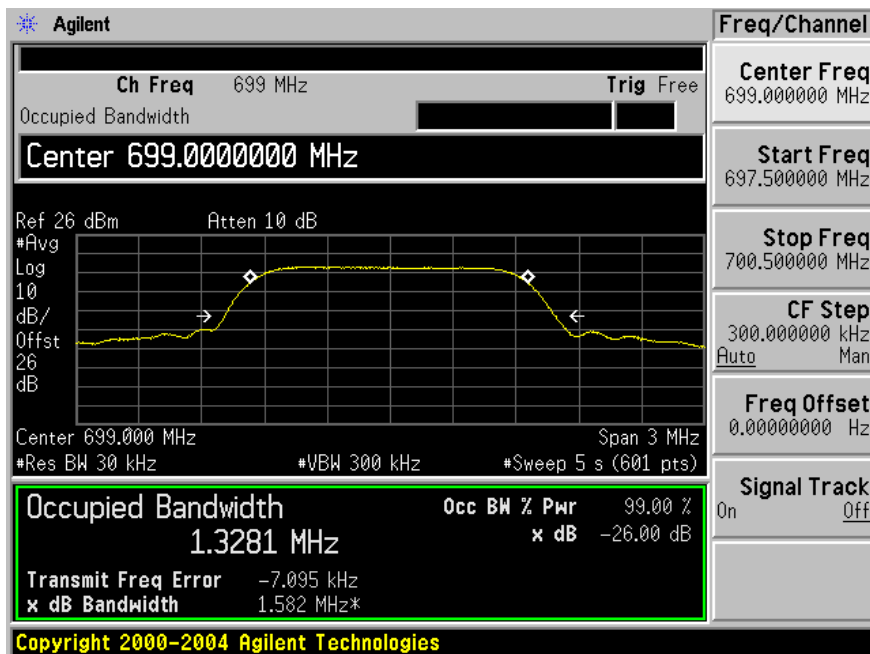
Plot 5: Frequency: 706.6 MHz, Symbol Rates: 640k (sym/sec)



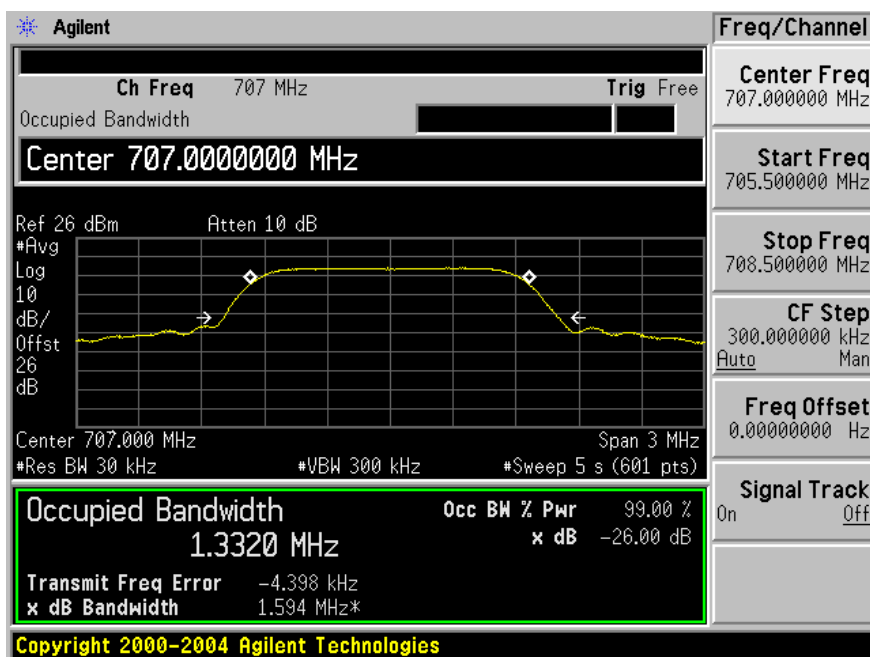
Plot 6: Frequency: 715.4 MHz, Symbol Rates: 640k (sym/sec)



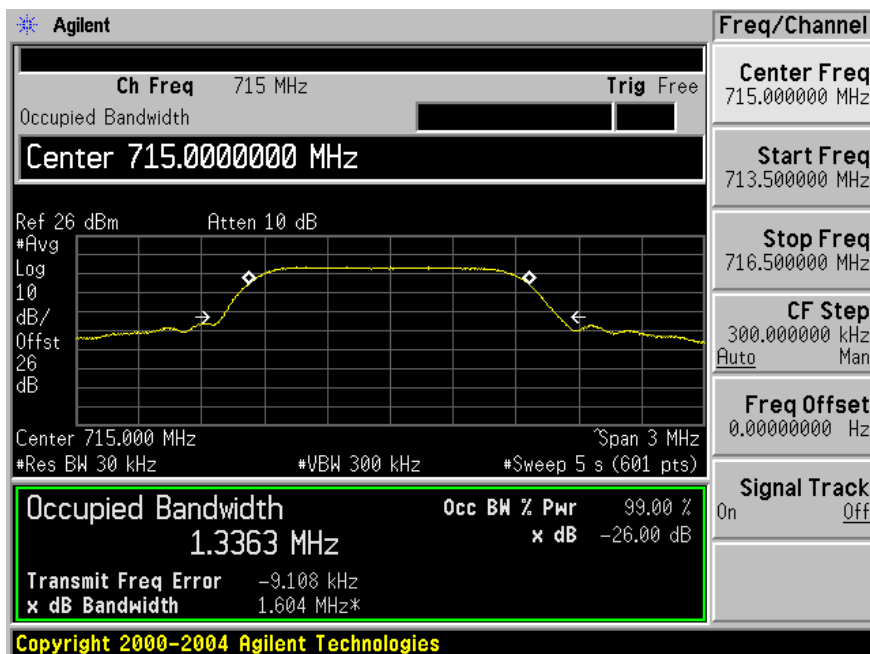
Plot 7: Frequency: 699 MHz, Symbol Rates: 1280k (sym/sec)



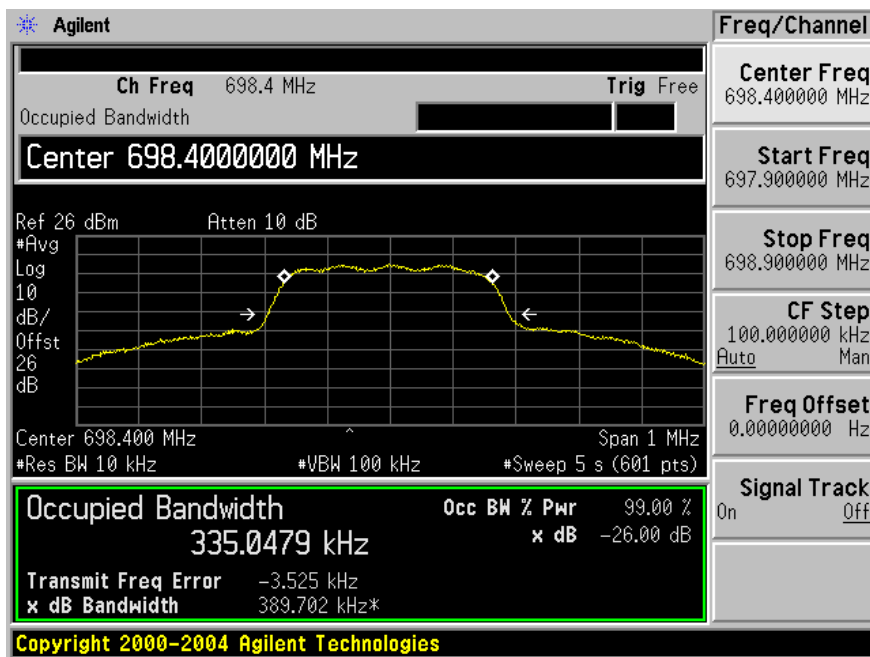
Plot 8: Frequency: 707 MHz, Symbol Rates: 1280k (sym/sec)



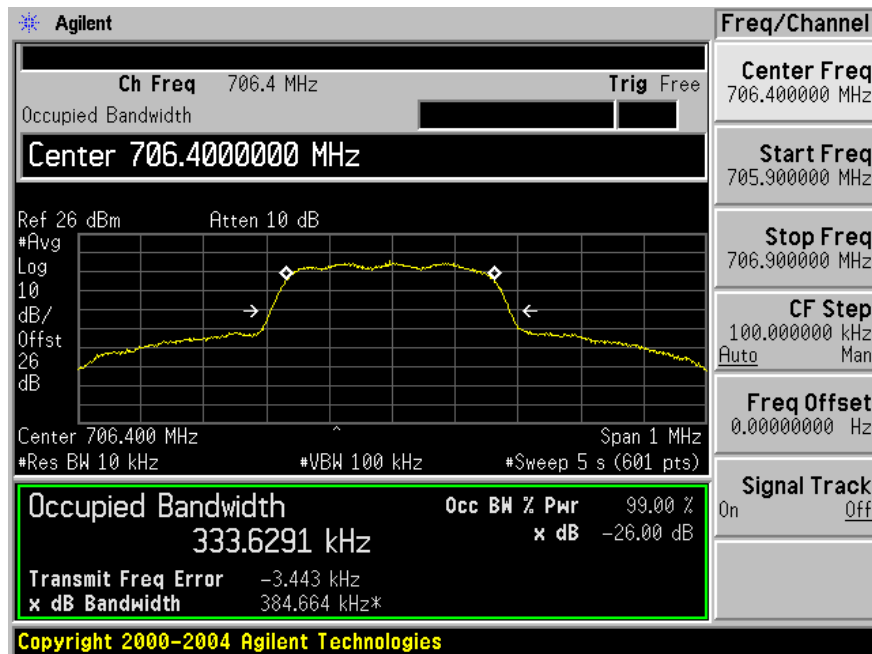
Plot 9: Frequency: 715 MHz, Symbol Rates: 1280k (sym/sec)

**Modulation: 16QAM**

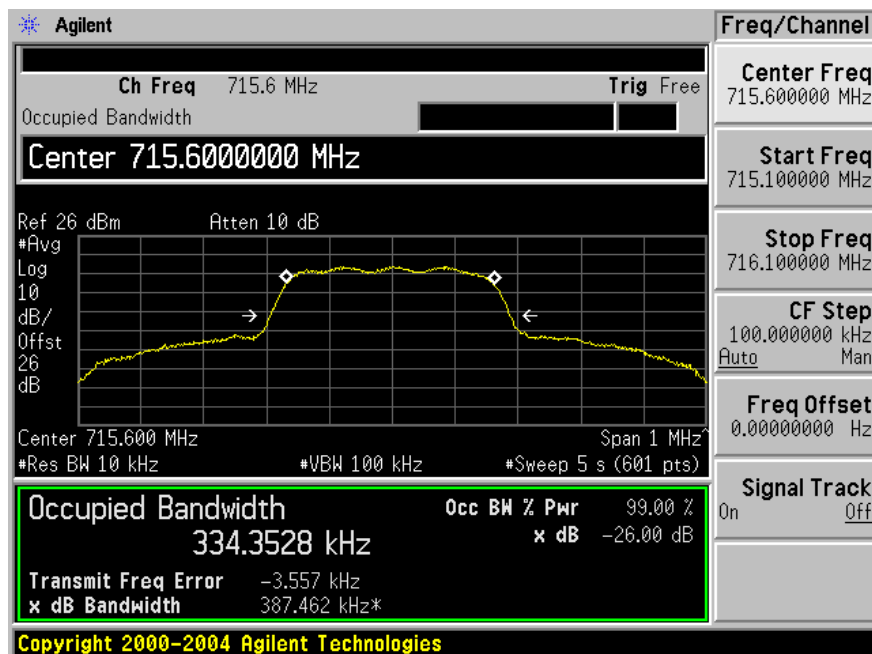
Plot 10: Frequency: 698.4 MHz, Symbol Rates: 320k (sym/sec)



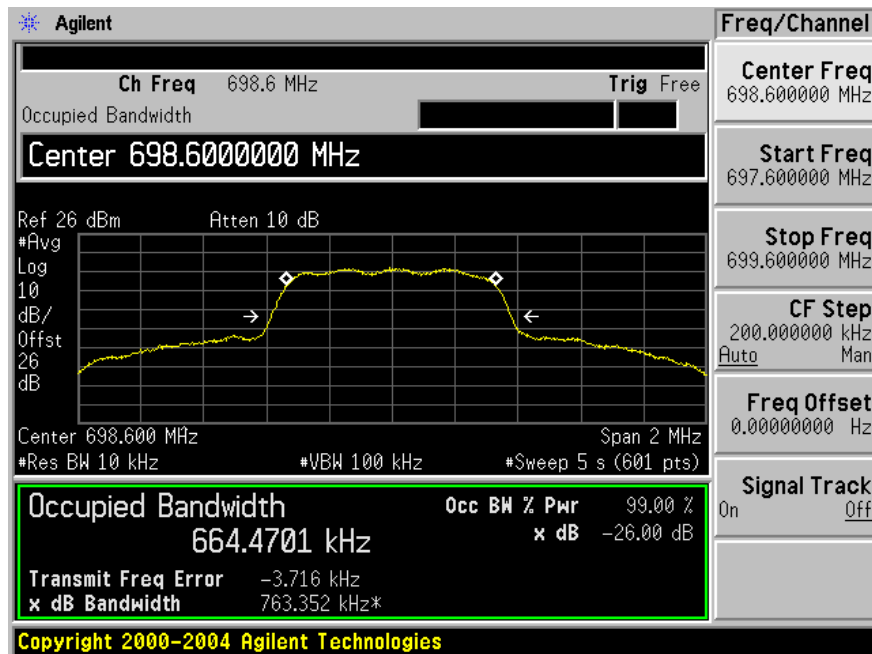
Plot 11: Frequency: 706.4 MHz, Symbol Rates: 320k (sym/sec)



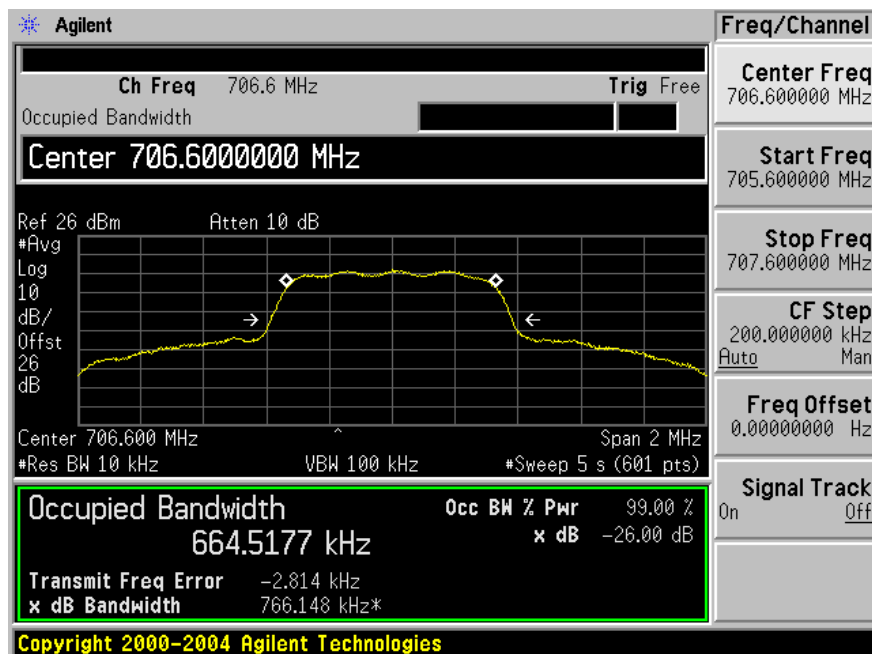
Plot 12: Frequency: 715.6 MHz, Symbol Rates: 320k (sym/sec)



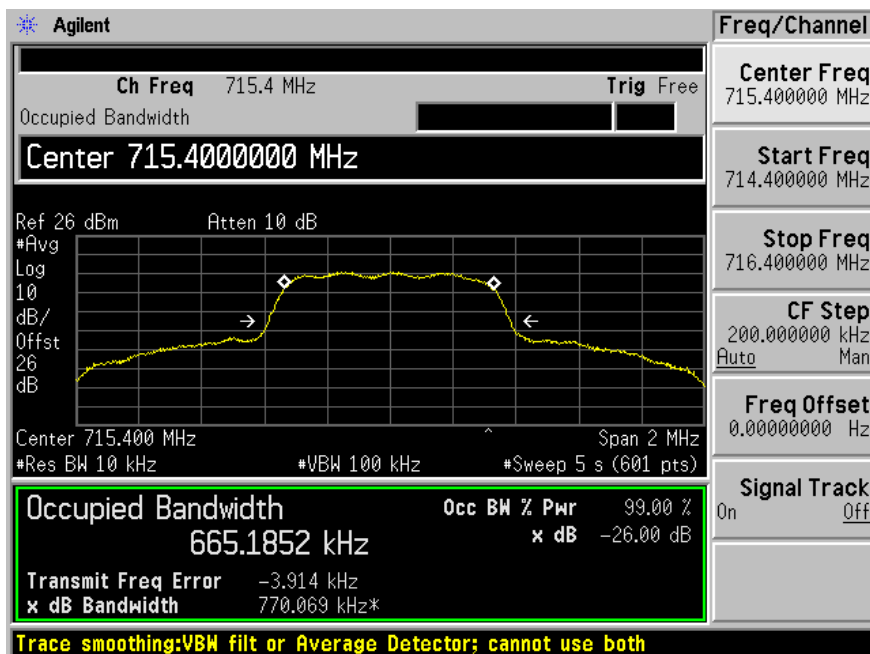
Plot 13: Frequency: 698.6 MHz, Symbol Rates: 640k (sym/sec)



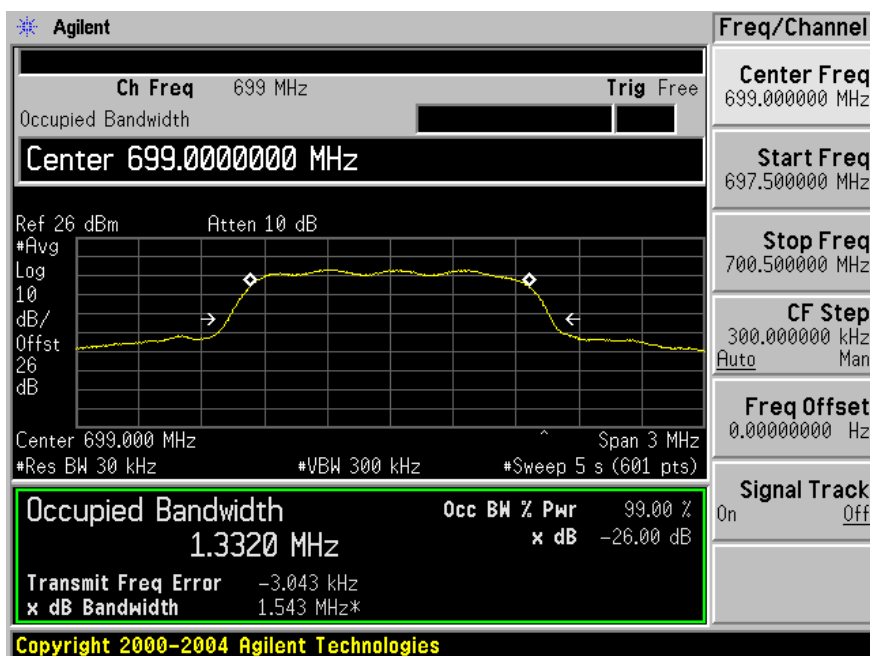
Plot 14: Frequency: 706.6 MHz, Symbol Rates: 640k (sym/sec)



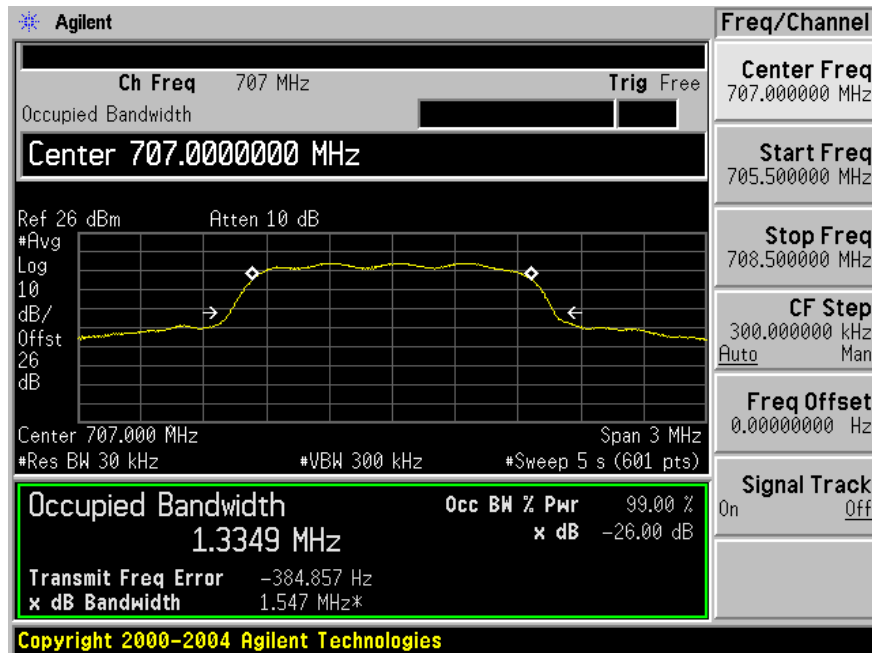
Plot 15: Frequency: 715.4 MHz, Symbol Rates: 640k (sym/sec)



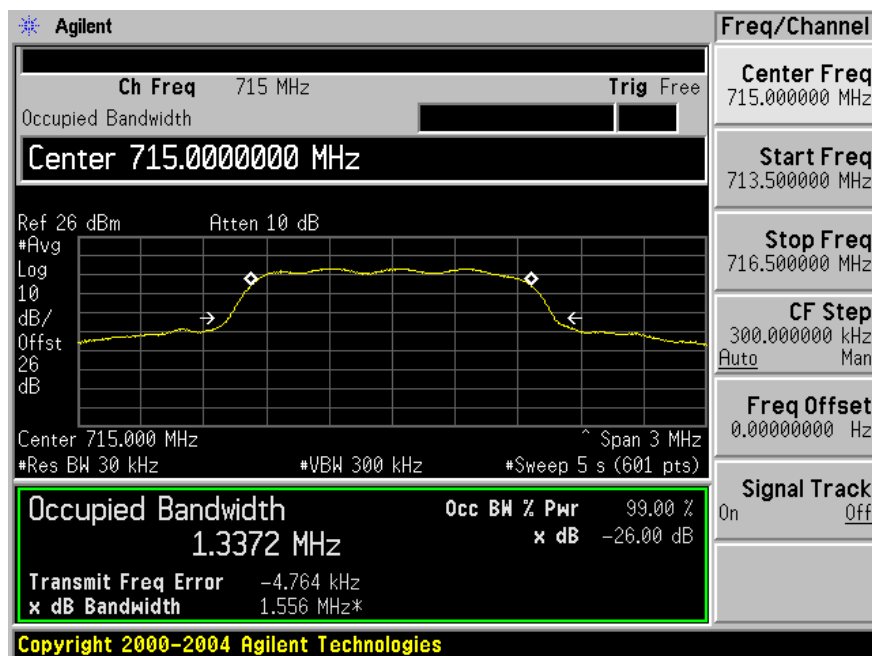
Plot 16: Frequency: 699 MHz, Symbol Rates: 1280k (sym/sec)



Plot 17: Frequency: 707 MHz, Symbol Rates: 1280k (sym/sec)



Plot 18: Frequency: 715 MHz, Symbol Rates: 1280k (sym/sec)



## 7 FCC §2.1053, §27.53 - SPURIOUS RADIATED EMISSIONS

### 7.1 Applicable Standard

Requirements: CFR 47, § 2.1053, § 27.53.

### 7.2 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 emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log<sub>10</sub> (power out in Watts)

### 7.3 Test Equipment List and Details

| Manufacturers   | Descriptions      | Model No.       | Serial No.  | Calibration Due Date |
|-----------------|-------------------|-----------------|-------------|----------------------|
| Agilent         | Spectrum Analyzer | E4440A          | US45303156  | 2010-07-23           |
| Rohde & Schwarz | Signal Generator  | SMIQ03          | 849192/0085 | 2009-12-03           |
| Sunol Sciences  | Antenna           | JB1             | A020106-1   | 2010-04-17           |
| A.R.A           | Horn Antenna      | DRG-118/A       | 1132        | 2010-07-28           |
| Ducommun        | Pre-Amplifier     | ALN-09173030-01 | 988251-03R  | 2010-03-04           |
| HP              | Pre-Amplifier     | 8447D           | 2944A06639  | 2010-06-05           |

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

### 7.4 Test Environmental Conditions

|                    |                 |
|--------------------|-----------------|
| Temperature:       | 21-24°C         |
| Relative Humidity: | 35-40 %         |
| ATM Pressure:      | 101.3-102.3 kPa |

\* The testing was performed by Jack Liu from 2009-09-03 to 2009-09-06 in 5 Meter Chamber 3.

## 7.5 Summary of Test Results

The worst case reading as follows:

### Modulation: QPSK

| Symbol Rates: 320k (sym/sec) |                 |                                    |
|------------------------------|-----------------|------------------------------------|
| Margin (dB)                  | Frequency (MHz) | Polarization (Horizontal/Vertical) |
| -25.31                       | 2825.6          | Vertical                           |

| Symbol Rates: 640k (sym/sec) |                 |                                    |
|------------------------------|-----------------|------------------------------------|
| Margin (dB)                  | Frequency (MHz) | Polarization (Horizontal/Vertical) |
| -24.54                       | 2826.4          | Vertical                           |

| Symbol Rates: 1280k (sym/sec) |                 |                                    |
|-------------------------------|-----------------|------------------------------------|
| Margin (dB)                   | Frequency (MHz) | Polarization (Horizontal/Vertical) |
| -23.84                        | 2828            | Vertical                           |

### Modulation: 16QAM

| Symbol Rates: 320k (sym/sec) |                 |                                    |
|------------------------------|-----------------|------------------------------------|
| Margin (dB)                  | Frequency (MHz) | Polarization (Horizontal/Vertical) |
| -21.85                       | 2825.6          | Vertical                           |

| Symbol Rates: 640k (sym/sec) |                 |                                    |
|------------------------------|-----------------|------------------------------------|
| Margin (dB)                  | Frequency (MHz) | Polarization (Horizontal/Vertical) |
| -19.77                       | 2826.4          | Vertical                           |

| Symbol Rates: 1280k (sym/sec) |                 |                                    |
|-------------------------------|-----------------|------------------------------------|
| Margin (dB)                   | Frequency (MHz) | Polarization (Horizontal/Vertical) |
| -23.61                        | 2828            | Vertical                           |

## 7.6 Test Results

### Modulation: QPSK

Middle Channel, Symbol Rates: 320k (sym/sec)

| Indicated       |                  | Table Azimuth (degree) | Test Antenna |                | Substituted     |                  |                    |                 |                      | Limit (dBm) | Margin (dB) |
|-----------------|------------------|------------------------|--------------|----------------|-----------------|------------------|--------------------|-----------------|----------------------|-------------|-------------|
| Frequency (MHz) | S.A. Amp. (dBuV) |                        | Height (cm)  | Polarity (H/V) | Frequency (MHz) | S.G. Level (dBm) | Antenna Cord. (dB) | Cable Loss (dB) | Absolute Level (dBm) |             |             |
| 2825.6          | 62.39            | 103                    | 118          | V              | 2825.6          | -47.73           | 9.9                | 0.48            | -38.31               | -13         | -25.31      |
| 2825.6          | 61.26            | 17                     | 150          | H              | 2825.6          | -48.74           | 9.9                | 0.48            | -39.32               | -13         | -26.32      |

Middle Channel, Symbol Rates: 640k (sym/sec)

| Indicated       |                  | Table Azimuth (degree) | Test Antenna |                | Substituted     |                  |                    |                 |                      | Limit (dBm) | Margin (dB) |
|-----------------|------------------|------------------------|--------------|----------------|-----------------|------------------|--------------------|-----------------|----------------------|-------------|-------------|
| Frequency (MHz) | S.A. Amp. (dBuV) |                        | Height (cm)  | Polarity (H/V) | Frequency (MHz) | S.G. Level (dBm) | Antenna Cord. (dB) | Cable Loss (dB) | Absolute Level (dBm) |             |             |
| 2826.4          | 63.16            | 127                    | 134          | V              | 2826.4          | -46.96           | 9.9                | 0.48            | -37.54               | -13         | -24.54      |
| 2826.4          | 62.60            | 168                    | 100          | H              | 2826.4          | -47.40           | 9.9                | 0.48            | -37.98               | -13         | -24.98      |

Middle Channel, Symbol Rates: 1280k (sym/sec)

| Indicated       |                  | Table Azimuth (degree) | Test Antenna |                | Substituted     |                  |                    |                 |                      | Limit (dBm) | Margin (dB) |
|-----------------|------------------|------------------------|--------------|----------------|-----------------|------------------|--------------------|-----------------|----------------------|-------------|-------------|
| Frequency (MHz) | S.A. Amp. (dBuV) |                        | Height (cm)  | Polarity (H/V) | Frequency (MHz) | S.G. Level (dBm) | Antenna Cord. (dB) | Cable Loss (dB) | Absolute Level (dBm) |             |             |
| 2828            | 63.86            | 126                    | 100          | V              | 2828            | -46.26           | 9.9                | 0.48            | -36.84               | -13         | -23.84      |
| 2828            | 60.43            | 199                    | 100          | H              | 2828            | -49.57           | 9.9                | 0.48            | -40.15               | -13         | -27.15      |

### Modulation: 16QAM

Middle Channel, Symbol Rates: 320k (sym/sec)

| Indicated       |                  | Table Azimuth (degree) | Test Antenna |                | Substituted     |                  |                    |                 |                      | Limit (dBm) | Margin (dB) |
|-----------------|------------------|------------------------|--------------|----------------|-----------------|------------------|--------------------|-----------------|----------------------|-------------|-------------|
| Frequency (MHz) | S.A. Amp. (dBuV) |                        | Height (cm)  | Polarity (H/V) | Frequency (MHz) | S.G. Level (dBm) | Antenna Cord. (dB) | Cable Loss (dB) | Absolute Level (dBm) |             |             |
| 2825.6          | 65.85            | 102                    | 115          | V              | 2825.6          | -44.27           | 9.9                | 0.48            | -34.85               | -13         | -21.85      |
| 2825.6          | 64.44            | 17                     | 150          | H              | 2825.6          | -45.56           | 9.9                | 0.48            | -36.14               | -13         | -23.14      |

## Middle Channel, Symbol Rates: 640k (sym/sec)

| Indicated          |                        | Table<br>Azimuth<br>(degree) | Test Antenna   |                   | Substituted        |                        |                          |                       |                            | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------|------------------------|------------------------------|----------------|-------------------|--------------------|------------------------|--------------------------|-----------------------|----------------------------|----------------|----------------|
| Frequency<br>(MHz) | S.A.<br>Amp.<br>(dBuV) |                              | Height<br>(cm) | Polarity<br>(H/V) | Frequency<br>(MHz) | S.G.<br>Level<br>(dBm) | Antenna<br>Cord.<br>(dB) | Cable<br>Loss<br>(dB) | Absolute<br>Level<br>(dBm) |                |                |
| 2826.4             | 67.93                  | 127                          | 134            | V                 | 2826.4             | -42.19                 | 9.9                      | 0.48                  | -32.77                     | -13            | -19.77         |
| 2826.4             | 65.87                  | 168                          | 100            | H                 | 2826.4             | -44.13                 | 9.9                      | 0.48                  | -34.71                     | -13            | -21.71         |

## Middle Channel, Symbol Rates: 1280k (sym/sec)

| Indicated          |                        | Table<br>Azimuth<br>(degree) | Test Antenna   |                   | Substituted        |                        |                          |                       |                            | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------|------------------------|------------------------------|----------------|-------------------|--------------------|------------------------|--------------------------|-----------------------|----------------------------|----------------|----------------|
| Frequency<br>(MHz) | S.A.<br>Amp.<br>(dBuV) |                              | Height<br>(cm) | Polarity<br>(H/V) | Frequency<br>(MHz) | S.G.<br>Level<br>(dBm) | Antenna<br>Cord.<br>(dB) | Cable<br>Loss<br>(dB) | Absolute<br>Level<br>(dBm) |                |                |
| 2828               | 64.09                  | 126                          | 100            | V                 | 2828               | -46.03                 | 9.9                      | 0.48                  | -36.61                     | -13            | -23.61         |
| 2828               | 63.23                  | 199                          | 100            | H                 | 2828               | -46.77                 | 9.9                      | 0.48                  | -37.35                     | -13            | -24.35         |

## 8 FCC §2.1051 & §22.917 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### 8.1 Applicable Standard

Requirements: FCC § 2.1051 and § 27.53.

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

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB

### 8.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator 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 10<sup>th</sup> harmonic.

### 8.3 Test Environmental Conditions

|                    |                 |
|--------------------|-----------------|
| Temperature:       | 21-24°C         |
| Relative Humidity: | 35-40 %         |
| ATM Pressure:      | 101.3-102.3 kPa |

\* The testing was performed by Jack Liu on from 2009-09-03 to 2009-09-06 in RF Site.

### 8.4 Test Equipment List and Details

| Manufacturers   | Descriptions      | Model No. | Serial No.  | Calibration Due Date |
|-----------------|-------------------|-----------|-------------|----------------------|
| Agilent         | Spectrum Analyzer | E4446A    | US44300386  | 2010-06-29           |
| Rohde & Schwarz | Signal Generator  | SMIQ03    | 849192/0085 | 2009-12-03           |

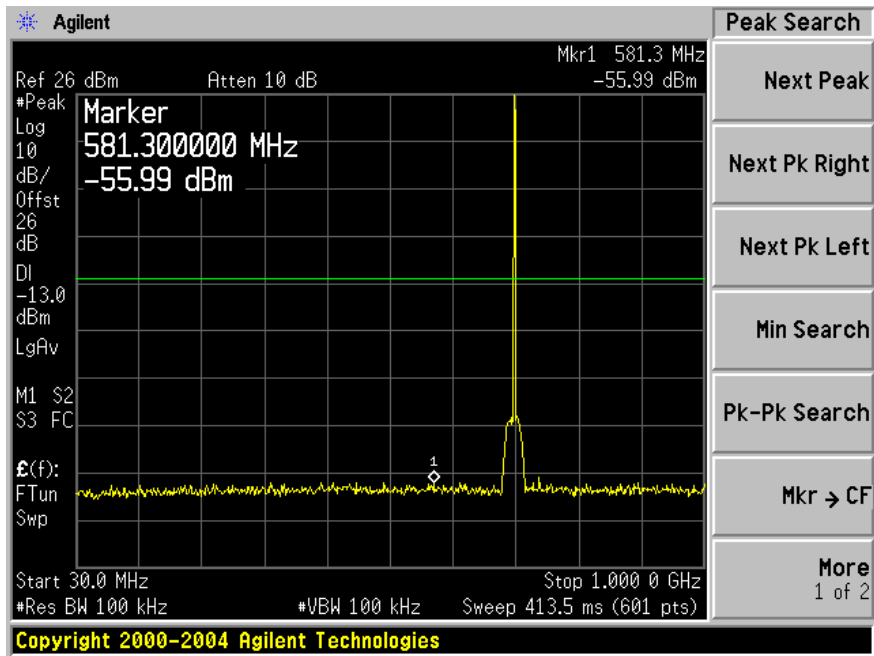
\* **Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### 8.5 Test Results

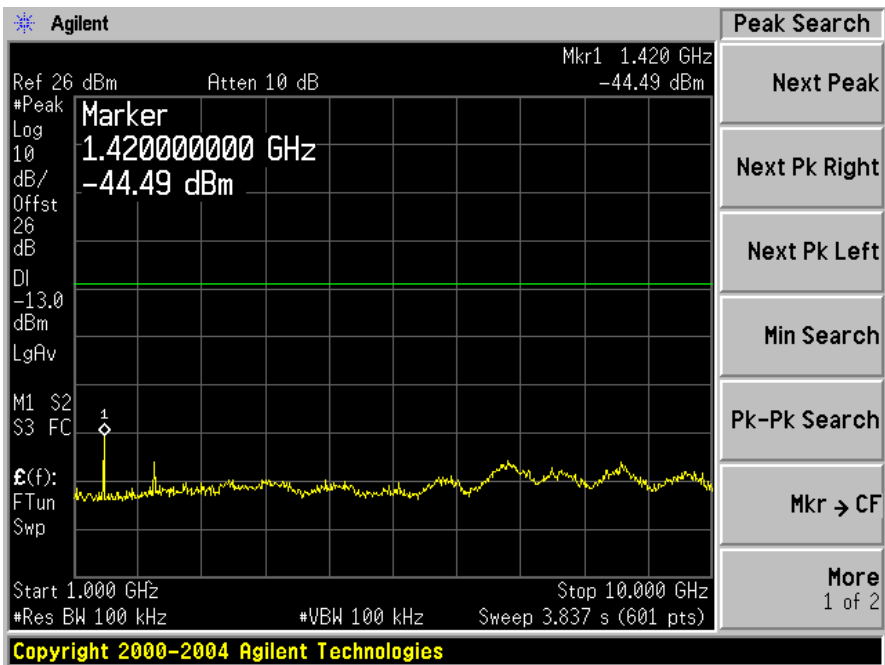
Please refer to the hereinafter plots.

**Modulation: QPSK, Middle Channel, Symbol Rates: 320k (sym/sec)**

30 MHz-1GHz

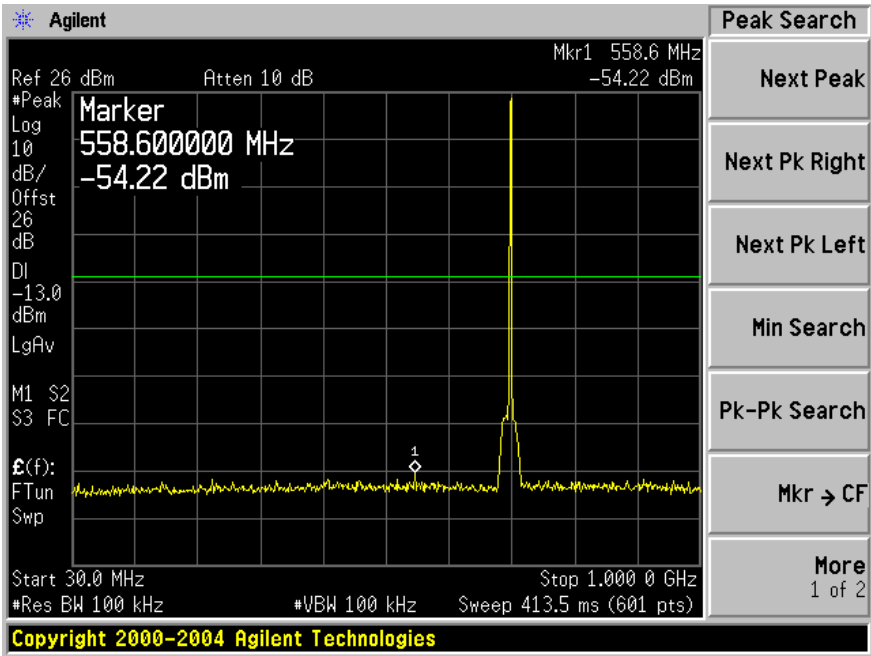


1-10 GHz

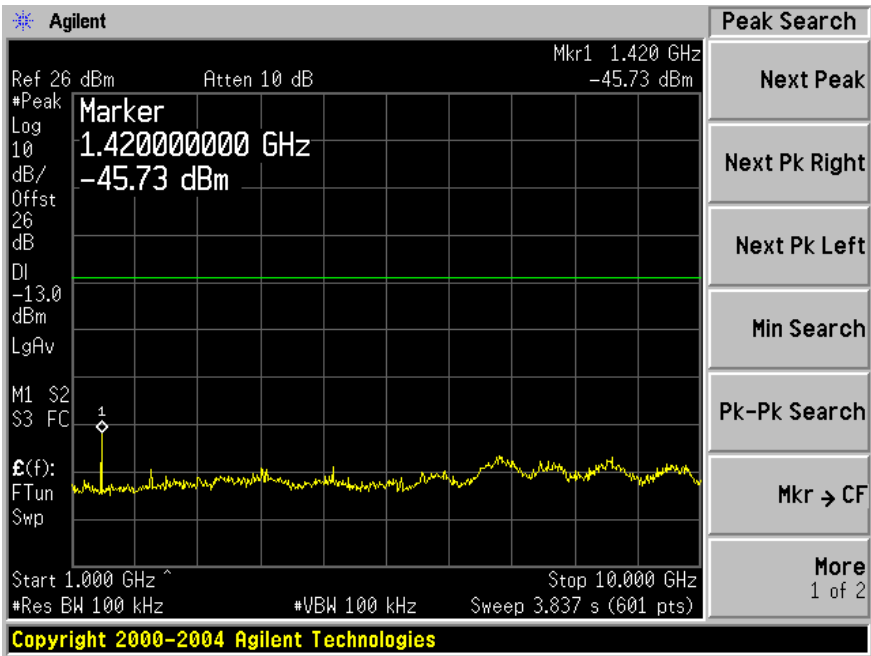


**Modulation: QPSK, Middle Channel, Symbol Rates: 640k (sym/sec)**

30 MHz-1 GHz

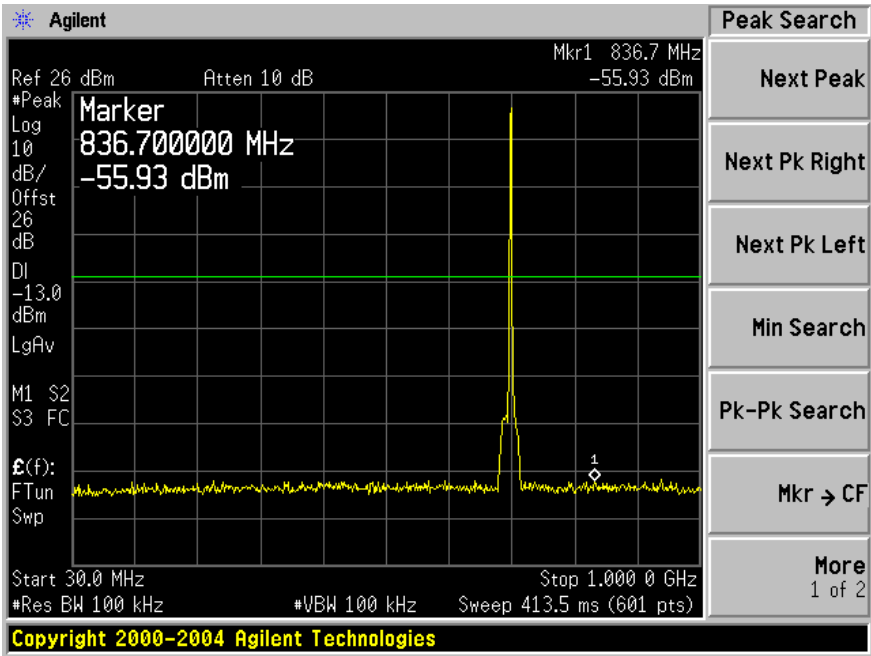


1-10 GHz

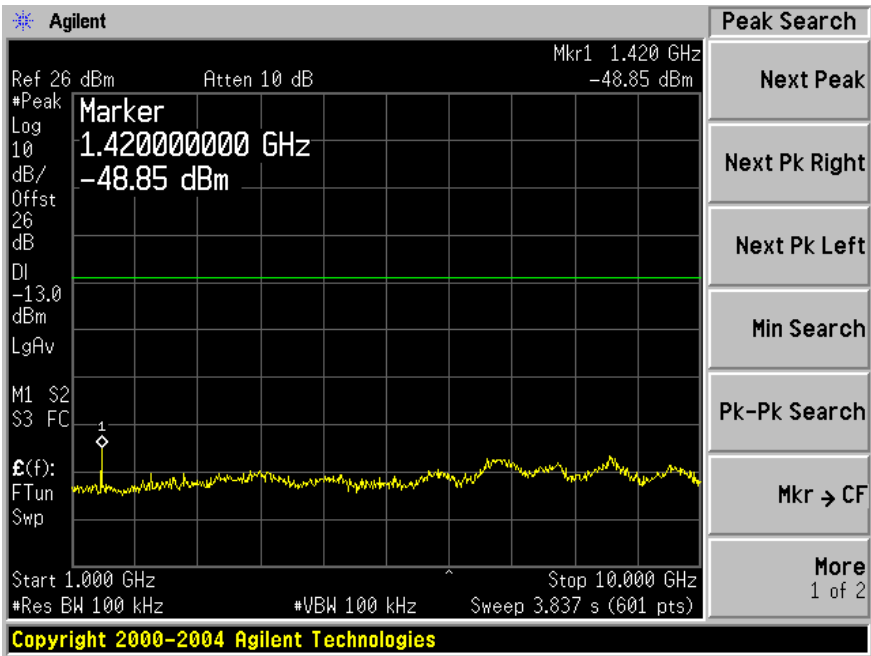


**Modulation: QPSK, Middle Channel, Symbol Rates: 1280k (sym/sec)**

30 MHz-1 GHz

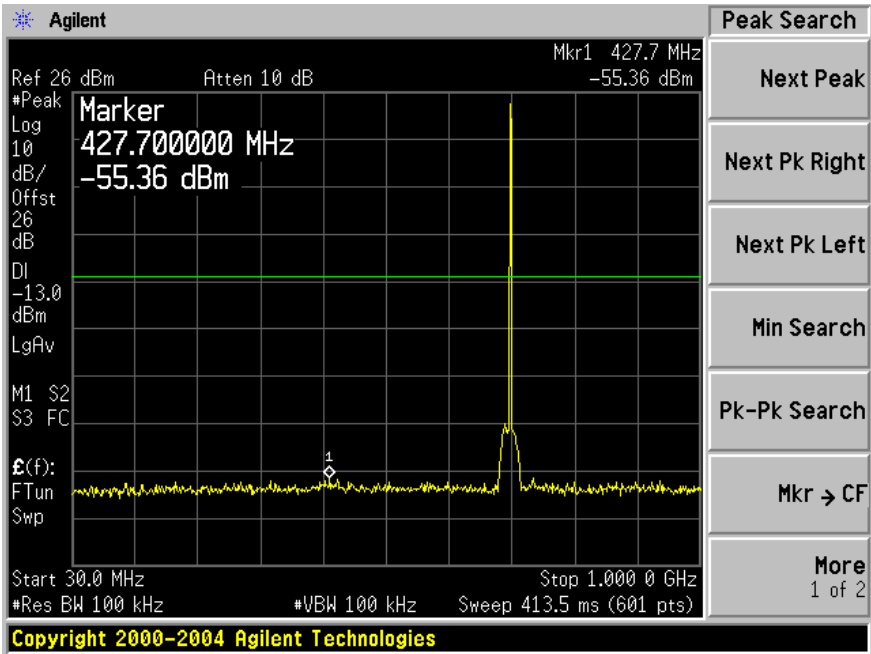


1-10 GHz

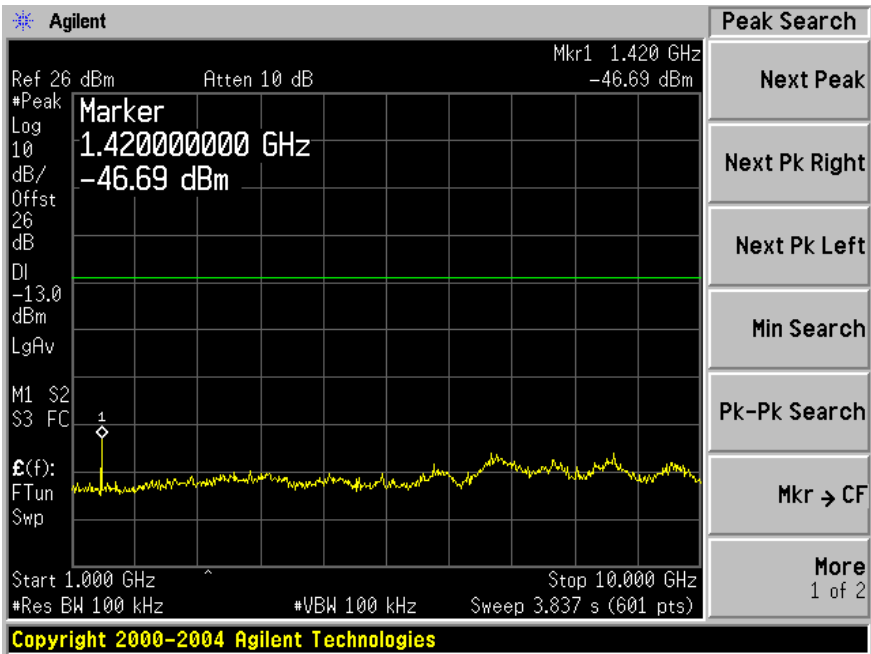


**Modulation: 16QAM, Middle Channel, Symbol Rates: 320k (sym/sec)**

30 MHz-1 GHz

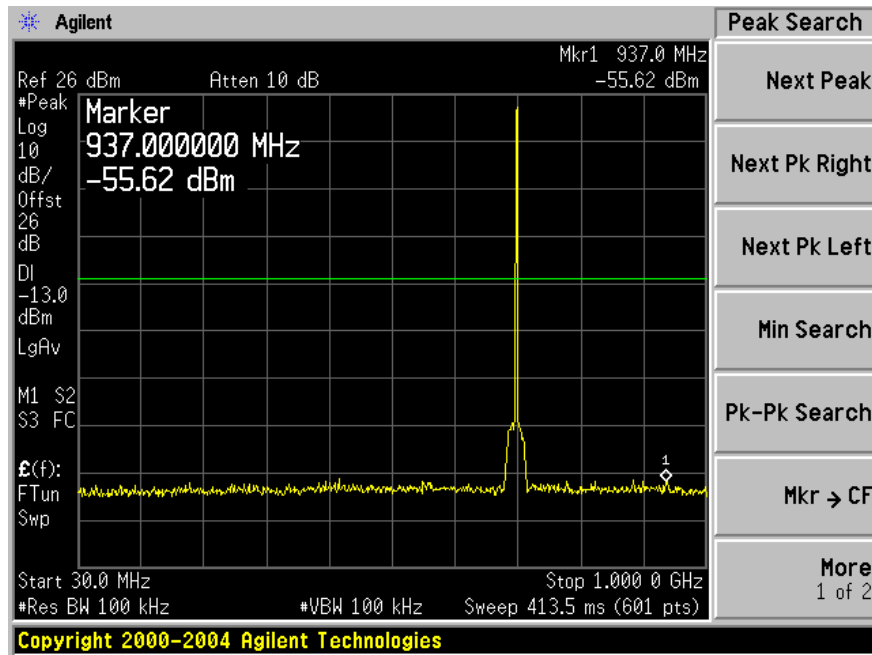


1-10 GHz

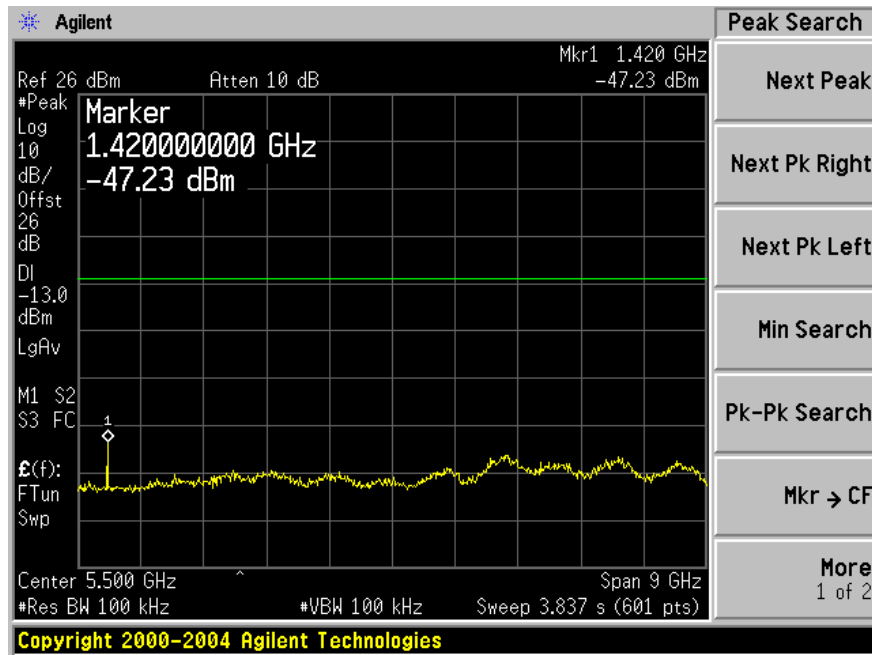


**Modulation: 16QAM, Middle Channel, Symbol Rates: 640k (sym/sec)**

30 MHz-1 GHz

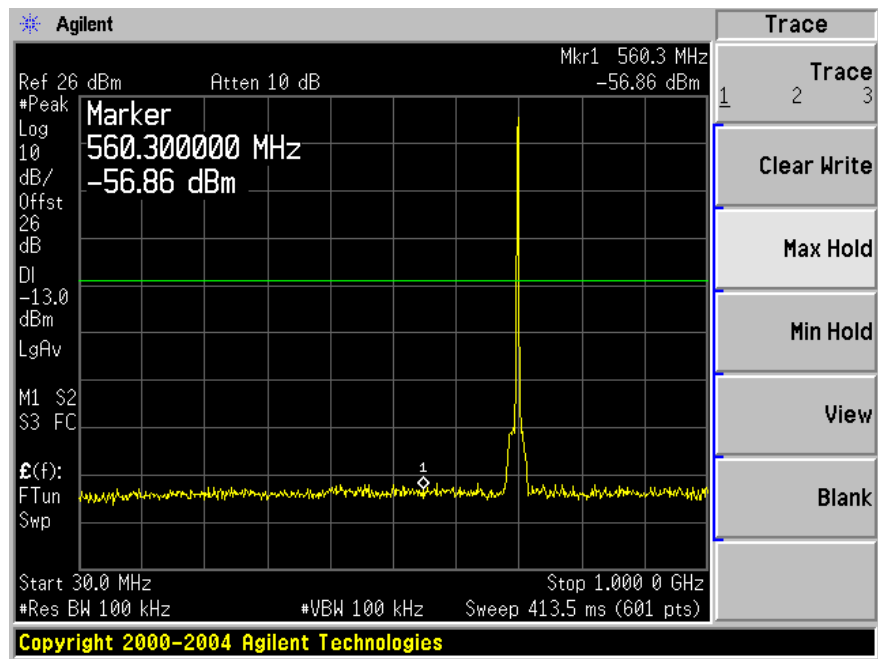


1-10 GHz

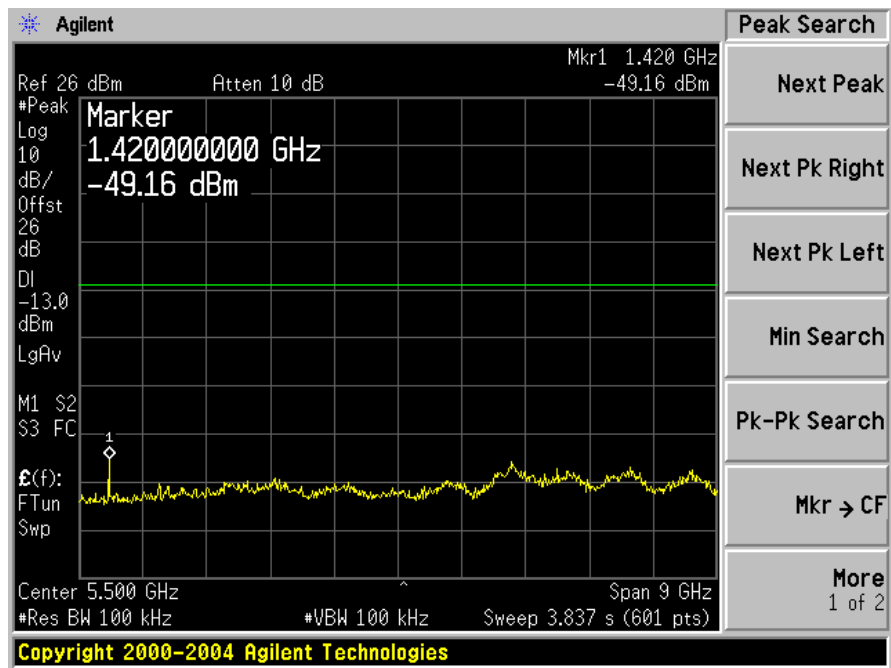


**Modulation: 16QAM, Middle Channel, Symbol Rates: 1280k (sym/sec)**

30 MHz-1 GHz



1-10 GHz



## 9 FCC §27.53 – BAND EDGE

### 9.1 Applicable Standard

According to § 27.53, the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### 9.2 Test Procedure

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

The center of the spectrum analyzer was set to block edge frequency.

### 9.3 Test Environmental Conditions

|                    |                 |
|--------------------|-----------------|
| Temperature:       | 21-24°C         |
| Relative Humidity: | 35-40 %         |
| ATM Pressure:      | 101.3-102.3 kPa |

\* The testing was performed by Jack Liu on from 2009-09-03 to 2009-09-06 in RF Site.

### 9.4 Test Equipment List and Details

| Manufacturers   | Descriptions      | Model No. | Serial No.  | Calibration Due Date |
|-----------------|-------------------|-----------|-------------|----------------------|
| Agilent         | Spectrum Analyzer | E4446A    | US44300386  | 2010-06-29           |
| Rohde & Schwarz | Signal Generator  | SMIQ03    | 849192/0085 | 2009-12-03           |

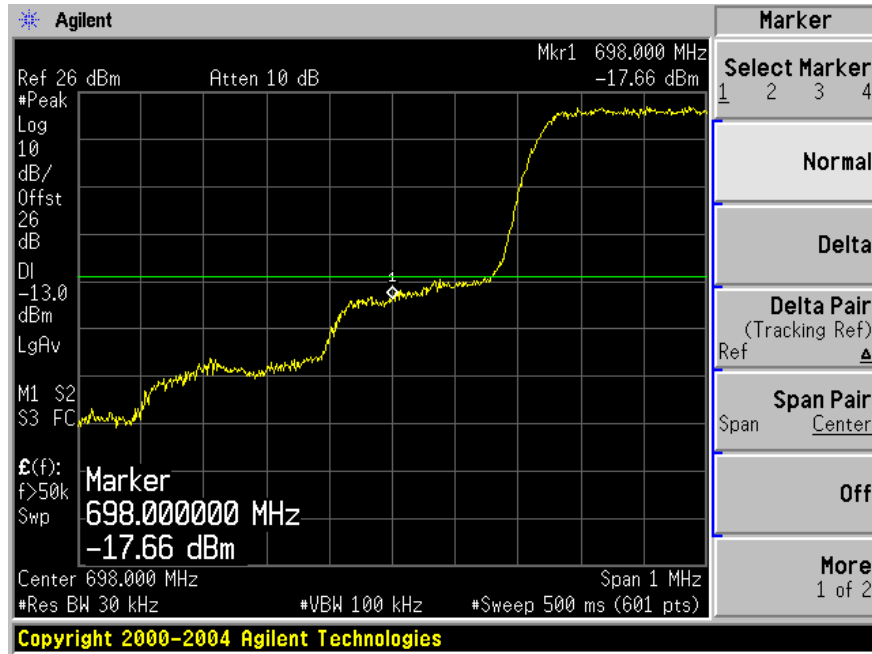
\* **Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

### 9.5 Test Results

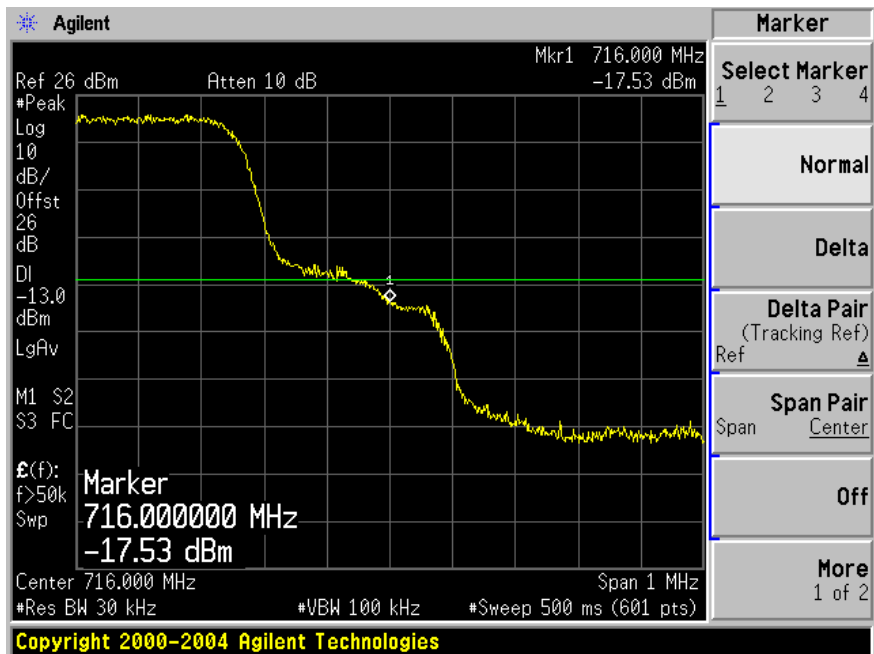
Please refer to the following plots.

**Modulation: QPSK, Symbol Rates: 320k (sym/sec)**

Plot 1: Lowest Edge

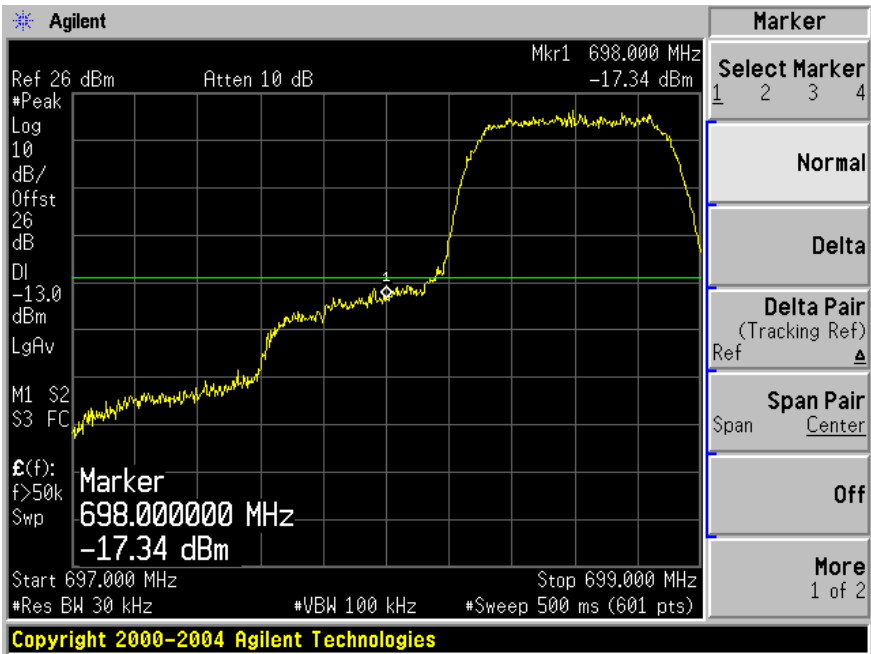


Plot 2: Highest Edge

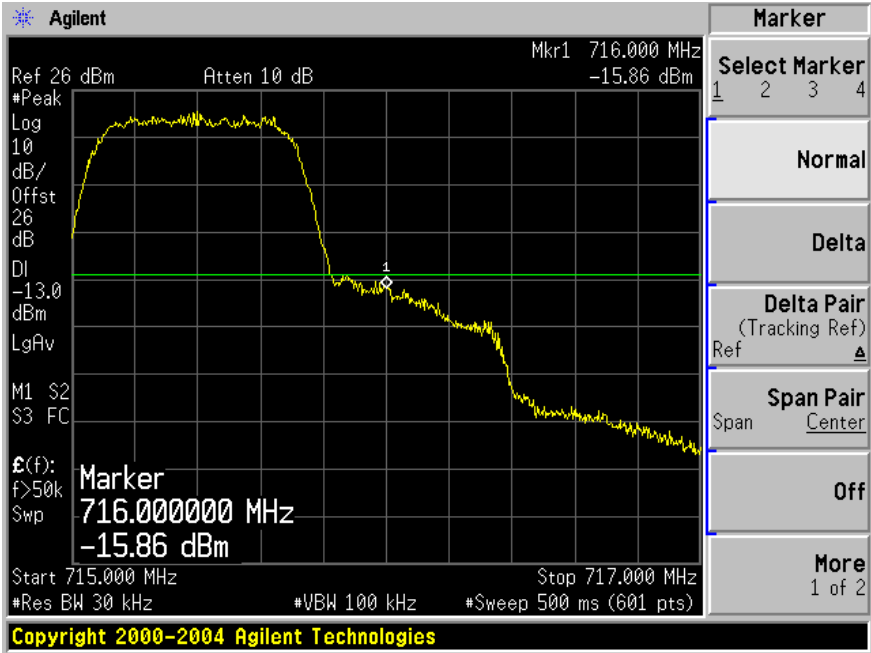


Modulation: QPSK, Symbol Rates: 640k (sym/sec)

Plot 1: Lowest Edge

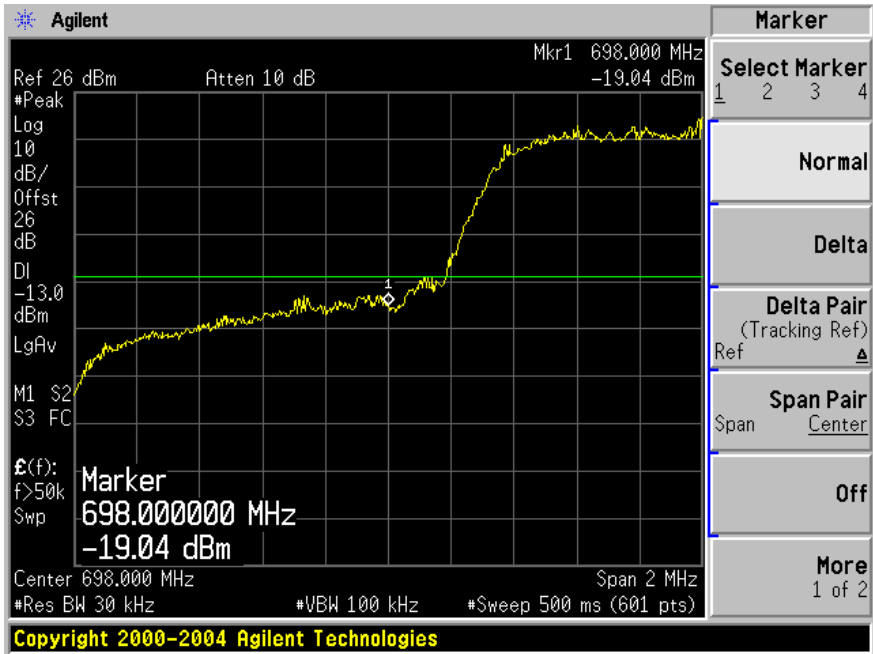


Plot 2: Highest Edge

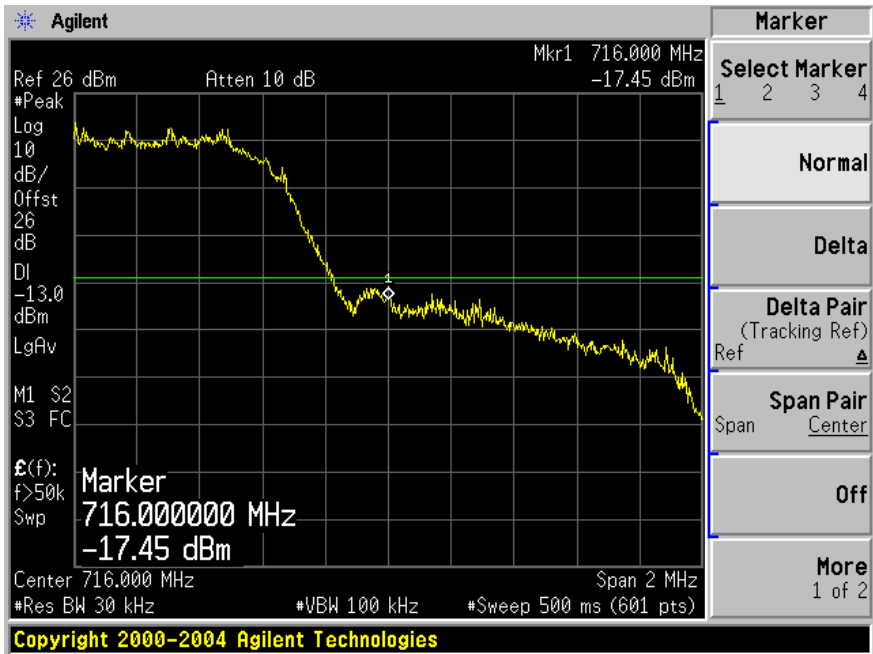


Modulation: QPSK, Symbol Rates: 1280k (sym/sec)

Plot 1: Lowest Edge

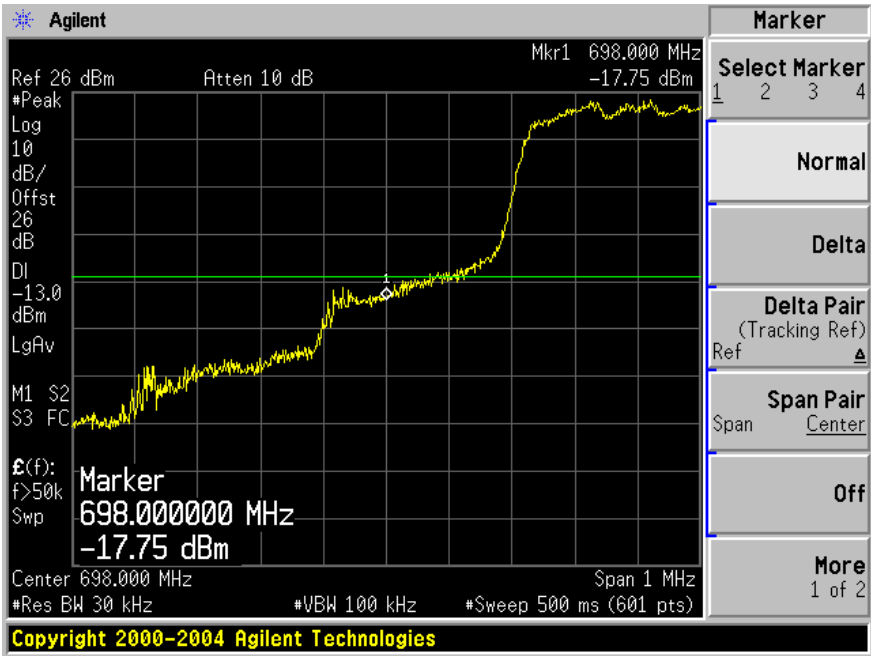


Plot 2: Highest Edge

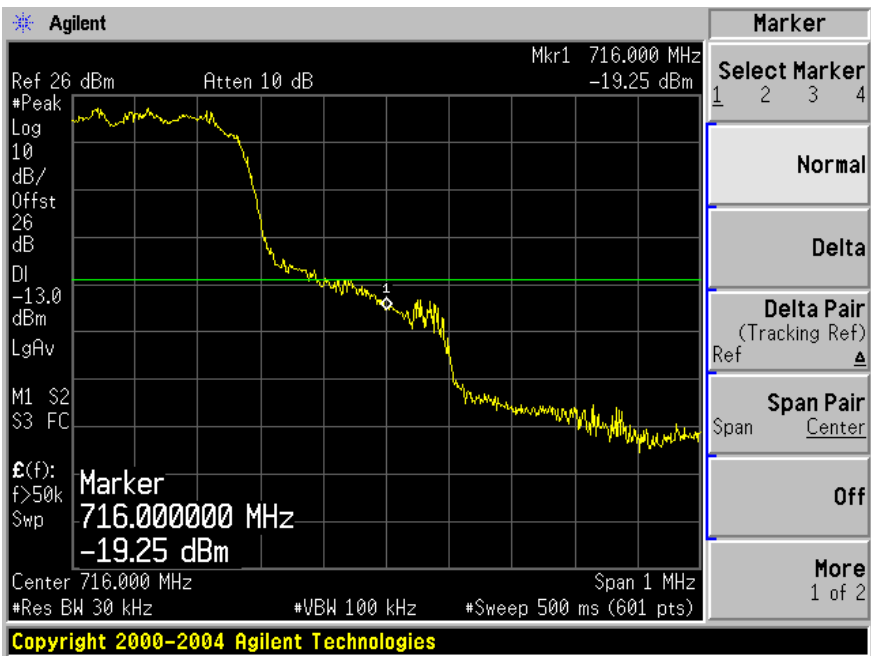


Modulation: 16QAM, Symbol Rates: 320k (sym/sec)

Plot 1: Lowest Edge

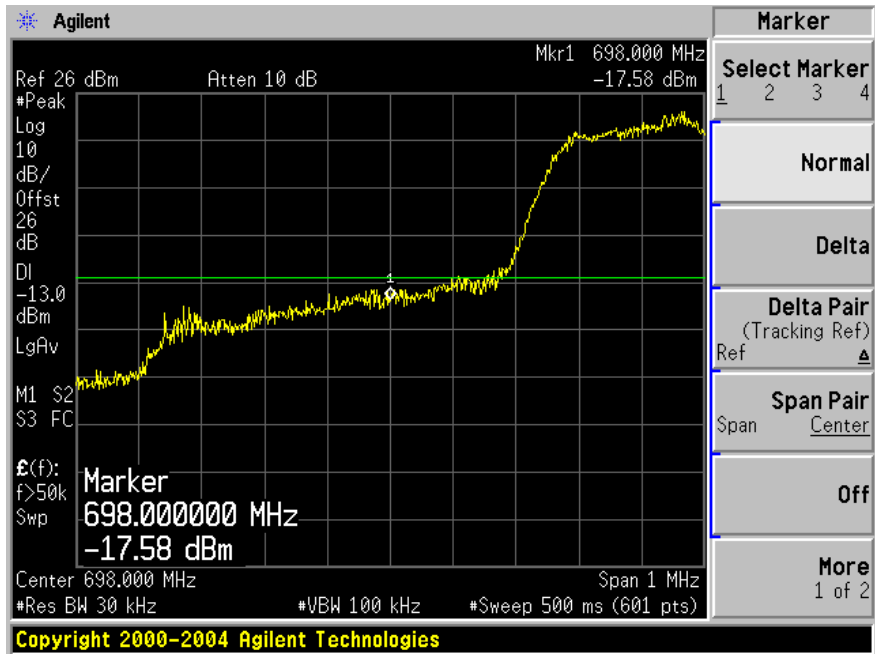


Plot 2: Highest Edge

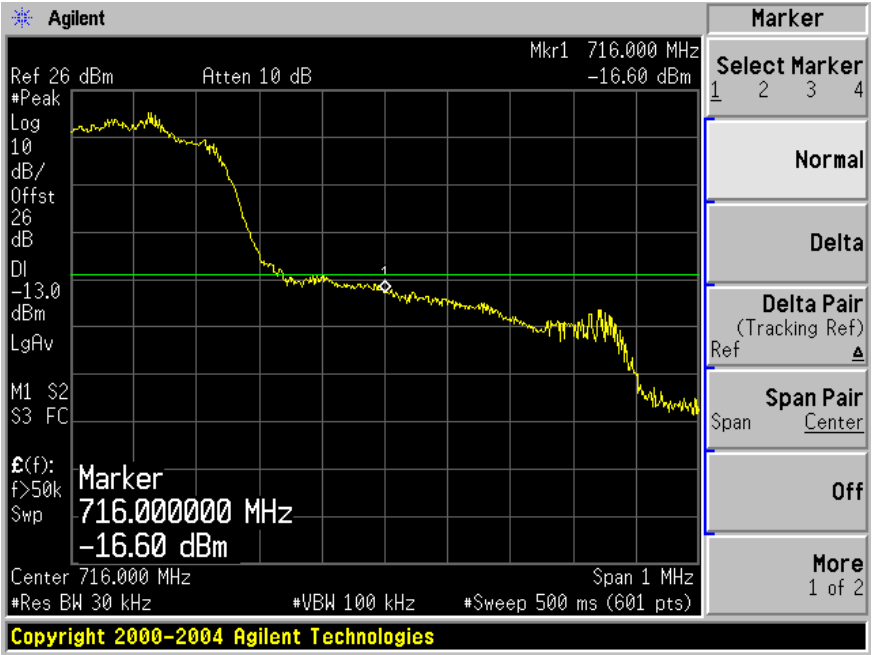


Modulation: 16QAM, Symbol Rates: 640k (sym/sec)

Plot 1: Lowest Edge

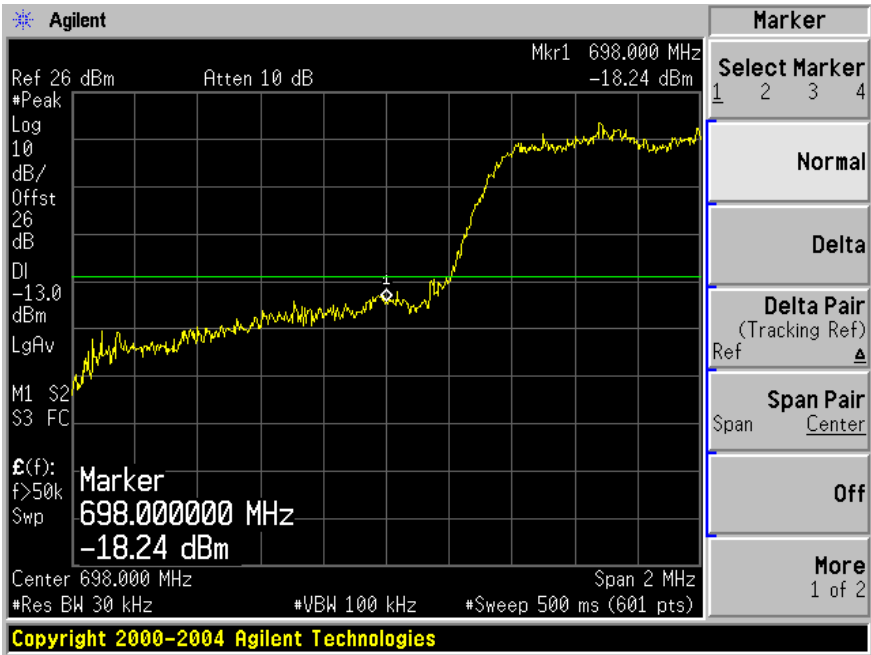


Plot 2: Highest Edge

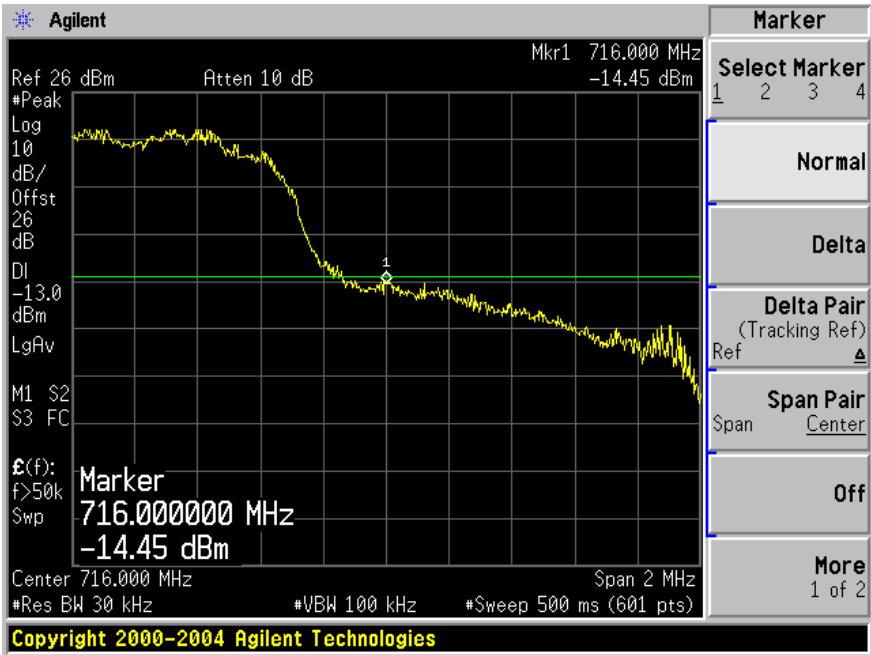


Modulation: 16QAM, Symbol Rates: 1280k (sym/sec)

Plot 1: Lowest Edge



Plot 2: Highest Edge



## 10 FCC §2.1055 & §27.54 – Frequency Stability

### 10.1 Applicable Standard

According to FCC § 27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 10.2 Test Procedure

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification — the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.000\ 25\%$  ( $\pm 2.5$  ppm) of the center frequency.

### 10.3 Test Environmental Conditions

|                           |                 |
|---------------------------|-----------------|
| <b>Temperature:</b>       | 21-24°C         |
| <b>Relative Humidity:</b> | 35-40 %         |
| <b>ATM Pressure:</b>      | 101.3-102.3 kPa |

\* The testing was performed by Jack Liu on from 2009-09-03 to 2009-09-06 in RF Site.

### 10.4 Test Equipment List and Details

| Manufacturers   | Descriptions      | Model No. | Serial No.  | Calibration Due Date |
|-----------------|-------------------|-----------|-------------|----------------------|
| Agilent         | Spectrum Analyzer | E4446A    | US44300386  | 2010-06-29           |
| Rohde & Schwarz | Signal Generator  | SMIQ03    | 849192/0085 | 2009-12-03           |
| Espec           | Chamber, Humidity | ESL-4CA   | 18010       | 2009-12-10           |

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

## 10.5 Test Results

Middle Channel, Symbol Rates: 320k (sym/sec)

Frequency Stability with Temperature

| Test Environment     |                  | Channel Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (MHz) | Frequency Error (ppm) |
|----------------------|------------------|-------------------------|--------------------------|-----------------------|-----------------------|
| Supply Voltage (Vac) | Temperature (°C) |                         |                          |                       |                       |
| 120                  | -30              | 706.400000              | 706.392340               | 0.007660              | -10.84371461          |
|                      | -20              | 706.400000              | 706.393499               | 0.006501              | -9.203001132          |
|                      | -10              | 706.400000              | 706.394100               | 0.005900              | -8.352208381          |
|                      | 0                | 706.400000              | 706.393900               | 0.006100              | -8.635334088          |
|                      | 10               | 706.400000              | 706.394100               | 0.005900              | -8.352208381          |
|                      | 20               | 706.400000              | 706.393000               | 0.007000              | -9.909399773          |
|                      | 30               | 706.400000              | 706.393210               | 0.006790              | -9.61211778           |
|                      | 40               | 706.400000              | 706.392950               | 0.007050              | -9.9801812            |
|                      | 50               | 706.400000              | 706.392900               | 0.007100              | -10.05096263          |

Frequency Stability with Supply Voltage

| Test Environment |                      | Channel Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (MHz) | Frequency Error (ppm) |
|------------------|----------------------|-------------------------|--------------------------|-----------------------|-----------------------|
| Temperature (°C) | Supply Voltage (Vac) |                         |                          |                       |                       |
| 20               | 102                  | 706.400000              | 706.393300               | -0.0067               | -9.484711212          |
|                  | 120                  | 706.400000              | 706.393000               | -0.007                | -9.909399773          |
|                  | 138                  | 706.400000              | 706.394000               | -0.006                | -8.493771234          |

Middle Channel, Symbol Rates: 640k (sym/sec)

#### Frequency Stability with Temperature

| Test Environment     |                  | Channel Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (MHz) | Frequency Error (ppm) |
|----------------------|------------------|-------------------------|--------------------------|-----------------------|-----------------------|
| Supply Voltage (Vac) | Temperature (°C) |                         |                          |                       |                       |
| 120                  | -30              | 706.600000              | 706.592500               | -0.0075               | -10.61420889          |
|                      | -20              | 706.600000              | 706.595500               | -0.0045               | -6.368525333          |
|                      | -10              | 706.600000              | 706.594600               | -0.0054               | -7.642230399          |
|                      | 0                | 706.600000              | 706.595200               | -0.0048               | -6.793093688          |
|                      | 10               | 706.600000              | 706.595100               | -0.0049               | -6.934616473          |
|                      | 20               | 706.600000              | 706.593000               | -0.007                | -9.906594962          |
|                      | 30               | 706.600000              | 706.594000               | -0.006                | -8.49136711           |
|                      | 40               | 706.600000              | 706.593210               | -0.00679              | -9.609397113          |
|                      | 50               | 706.600000              | 706.593100               | -0.0069               | -9.765072177          |

#### Frequency Stability with Supply Voltage

| Test Environment |                      | Channel Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (MHz) | Frequency Error (ppm) |
|------------------|----------------------|-------------------------|--------------------------|-----------------------|-----------------------|
| Temperature (°C) | Supply Voltage (Vac) |                         |                          |                       |                       |
| 20               | 102                  | 706.600000              | 706.595000               | -0.005                | -7.076139258          |
|                  | 120                  | 706.600000              | 706.593000               | -0.007                | -9.906594962          |
|                  | 138                  | 706.600000              | 706.594100               | -0.0059               | -8.349844325          |

Middle Channel, Symbol Rates: 1280k (sym/sec)

#### Frequency Stability with Temperature

| Test Environment     |                  | Channel Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (MHz) | Frequency Error (ppm) |
|----------------------|------------------|-------------------------|--------------------------|-----------------------|-----------------------|
| Supply Voltage (Vac) | Temperature (°C) |                         |                          |                       |                       |
| 120                  | -30              | 707.000000              | 706.990800               | -0.0092               | -13.01272984          |
|                      | -20              | 707.000000              | 706.992500               | -0.0075               | -10.60820368          |
|                      | -10              | 707.000000              | 706.995000               | -0.005                | -7.072135785          |
|                      | 0                | 707.000000              | 706.994100               | -0.0059               | -8.345120226          |
|                      | 10               | 707.000000              | 706.993800               | -0.0062               | -8.769448373          |
|                      | 20               | 707.000000              | 706.993000               | -0.007                | -9.900990099          |
|                      | 30               | 707.000000              | 706.993100               | -0.0069               | -9.759547383          |
|                      | 40               | 707.000000              | 706.992900               | -0.0071               | -10.04243281          |
|                      | 50               | 707.000000              | 706.992500               | -0.0075               | -10.60820368          |

#### Frequency Stability with Supply Voltage

| Test Environment |                      | Channel Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (MHz) | Frequency Error (ppm) |
|------------------|----------------------|-------------------------|--------------------------|-----------------------|-----------------------|
| Temperature (°C) | Supply Voltage (Vac) |                         |                          |                       |                       |
| 20               | 102                  | 707.000000              | 706.995000               | -0.005                | -7.072135785          |
|                  | 120                  | 707.000000              | 706.993000               | -0.007                | -9.900990099          |
|                  | 138                  | 707.000000              | 706.993300               | -0.0067               | -9.476661952          |

## 11 FCC §1.1307(b) (1) & §2.1091 - RF EXPOSURE

### 11.1 Applicable Standard

According to FCC §1.1310 and §2.1091 (Mobile Devices) RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

| Frequency Range<br>(MHz)                                   | Electric Field<br>Strength<br>(V/m) | Magnetic Field<br>Strength<br>(A/m) | Power Density<br>(mW/cm <sup>2</sup> ) | Averaging Time<br>(minute) |
|------------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|----------------------------|
| <b>Limits for General Population/Uncontrolled Exposure</b> |                                     |                                     |                                        |                            |
| 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                         |

Note: f = frequency in MHz

\* = Plane-wave equivalent power density

### 11.2 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

**QPSK Modulation:**

|                                                                                     |                |
|-------------------------------------------------------------------------------------|----------------|
| Maximum peak output power at antenna input terminal (dBm):                          | <u>24.0</u>    |
| Maximum peak output power at antenna input terminal (mW):                           | <u>251.188</u> |
| Prediction distance (cm):                                                           | <u>150</u>     |
| Prediction frequency (MHz):                                                         | <u>706.6</u>   |
| Antenna Gain, typical (dBi):                                                        | <u>10</u>      |
| Maximum Antenna Gain (numeric):                                                     | <u>10</u>      |
| Power density at predication frequency and distance (mW/cm <sup>2</sup> ):          | <u>0.0089</u>  |
| MPE limit for uncontrolled exposure at predication frequency (mW/cm <sup>2</sup> ): | <u>0.4711</u>  |

**16QAM Modulation:**

|                                                                                     |               |
|-------------------------------------------------------------------------------------|---------------|
| Maximum peak output power at antenna input terminal (dBm):                          | <u>23.55</u>  |
| Maximum peak output power at antenna input terminal (mW):                           | <u>226.46</u> |
| Prediction distance (cm):                                                           | <u>150</u>    |
| Prediction frequency (MHz):                                                         | <u>707</u>    |
| Antenna Gain, typical (dBi):                                                        | <u>10</u>     |
| Maximum Antenna Gain (numeric):                                                     | <u>10</u>     |
| Power density at predication frequency and distance (mW/cm <sup>2</sup> ):          | <u>0.008</u>  |
| MPE limit for uncontrolled exposure at predication frequency (mW/cm <sup>2</sup> ): | <u>0.4713</u> |

**11.3 MPE Conclusion**

The highest power density level at 150 cm is 0.0089 mW/cm<sup>2</sup>, which is below the uncontrolled exposure limit of 0.47 mW/cm<sup>2</sup>, the safety distance to meet the FCC RF exposure requirement has been mentioned in the user manual.