

## **Exhibit 6 – Test Report**

### **Motorola Customer Premise Equipment (CPE)**

FCC ID: MIJZEP CPE-USB-01

Model No. LT 20M-00

## **6.0 Introduction**

### **6.0.1 Facility Description**

EMI testing of the Zephyr Outdoor Unit (ODU) was performed at the Motorola Systems Solutions Group's (SSG) EMI/TEMPEST Test Laboratory. This test laboratory is located in the southeast wing of the Hayden building at 8201 E. McDowell Road, Scottsdale, AZ. The EMI/TEMPEST Test Laboratory is certified and accredited through the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP).

### **6.0.2 Quality System**

The EMI/TEMPEST Test Laboratory maintains a Quality Manual that describes the quality assurance program of the EMC/TEMPEST Facility to set forth procedures covering all quality assurance functions. This manual has been constructed to reflect a quality program in compliance with the requirements of the following:

- National Institute of Standards & Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP)
- NIST/NVLAP EMC MIL-STD 462 Program Handbook (Apr. 1994)
- NVLAP EMC and Telecommunications FCC Methods Handbook 150-11 (Apr. 1995)
- MIL-Q-9858A, MIL-STD 461, 462, 463, 461D, 462D
- National Security Agency Technical and Security Requirements Document for the Endorsed TEMPEST Test Services Program, NSA TSRD No. 88-8B, 5 Oct. 1993
- System Solution Group of Motorola Quality Six Sigma Program.

### 6.0.3 Standard References

|            |                                                                                                                                                                                      |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR 2   | Code of Federal Regulations, Title 47, Part 2, "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"                                                       |
| 47 CFR 101 | Code of Federal Regulations, Title 47, Part 101, "Fixed Microwave Devices"                                                                                                           |
| C63.4-1992 | American National Standards Institute (ANSI), "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" |
| NFPA-70    | National Electric Code (1996)                                                                                                                                                        |

## 6.1 Test Procedures

The transmitter portion of the Zephyr ODU is subject to FCC Part 101 and Part 2 for FCC Certification for units deployable in the United States. The following tests, as specified in FCC Part 2, with limits as defined in FCC Part 101, and shown in Table 6.1-1 below were performed on the Zephyr ODU. The transmitter was operated at its maximum rated output power (+12dBm) for all tests.

**Table 6.1-1 Tests Required for Certification of the Zephyr ODU**

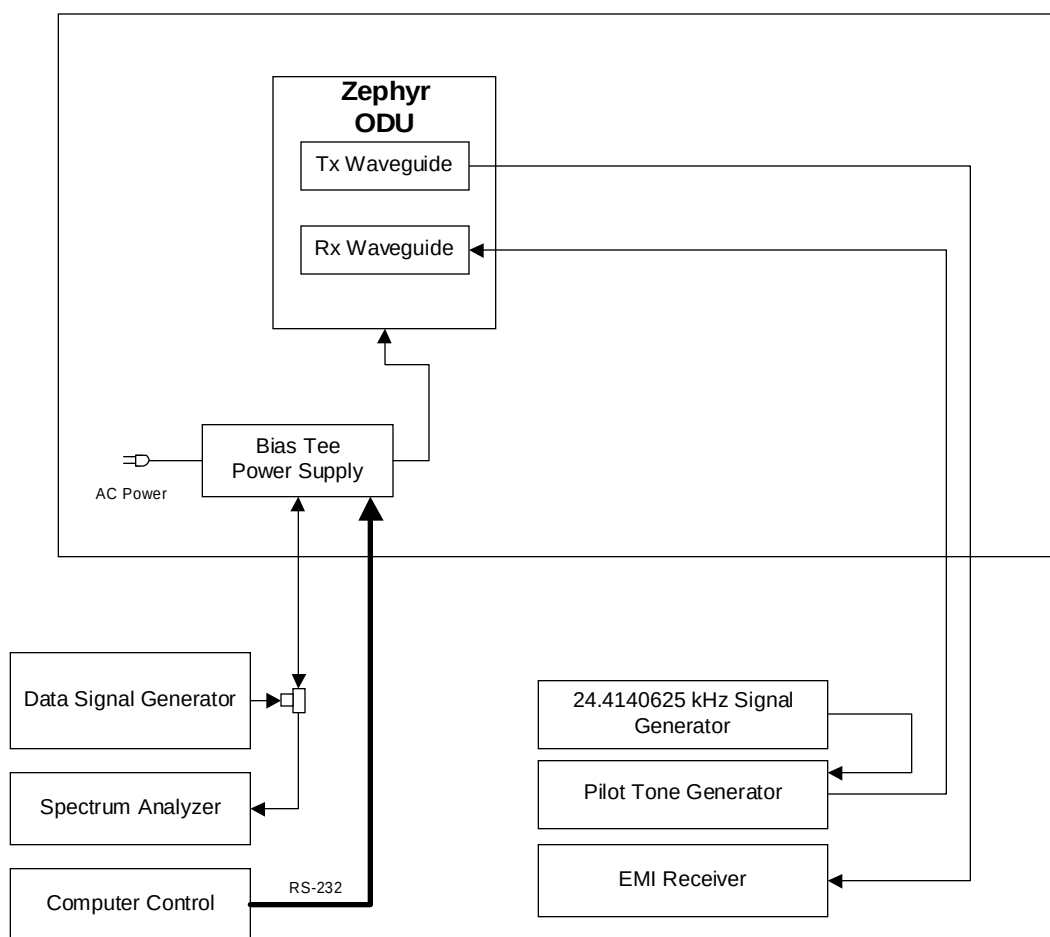
| Test Parameter                             | FCC Part 2<br>Paragraph<br>Number | FCC Part 101<br>Paragraph<br>Number | FCC Part 101<br>Limit                      |
|--------------------------------------------|-----------------------------------|-------------------------------------|--------------------------------------------|
| RF Power Output                            | 2.1046                            | 101.113                             | +55 dBW max. EIRP<br>+42 dBW/MHz max. EIRP |
| Modulation<br>Characteristics              | 2.1047                            | None                                | None                                       |
| Occupied Bandwidth                         | 2.1049                            | None                                | None                                       |
| Spurious Emissions at<br>Antenna Terminals | 2.1051                            | 101.111(a)(2) (ii)<br>& (iii)       | Refer to FCC Part 101                      |
| Field Strength of<br>Spurious Emissions    | 2.1053                            | 101.111(a)(2) (ii)<br>& (iii)       | Refer to FCC Part 101                      |
| Frequency Stability                        | 2.1055                            | 101.107                             | .001 %                                     |

### 6.1.1 RF Power Spectral Density

RF power spectral density is calculated by dividing the maximum rated output power by the 99% occupied bandwidth. The measurement is performed in a conducted mode using the setup of Figure 6.1-1.

**Table 6.1-2 IF Signal Input Parameters and Spectrum Analyzer Settings for Power Spectral Density and Occupied Bandwidth Tests**

| <b>Signal Source</b> | <b>Modulation/ Data Rate (MSymbols/sec.)</b> | <b>IF Tuned Freq. (MHz)</b> | <b>RF Freq. (GHz)</b> | <b>Measurement Bandwidth RBW/VBW (MHz/MHz)</b> |
|----------------------|----------------------------------------------|-----------------------------|-----------------------|------------------------------------------------|
| Rohde & Schwarz      | 16 QAM 0.384                                 | 17.5                        | 31.2255               | 0.1/0.3                                        |
| Rohde & Schwarz      | QPSK 0.32                                    | 17.5                        | 31.2255               | 0.1/0.3                                        |
| Rohde & Schwarz      | QPSK 0.64                                    | 17.9                        | 31.2259               | 0.2/0.5                                        |
| Rohde & Schwarz      | QPSK 1.28                                    | 18.4                        | 31.2264               | 0.3/1.0                                        |
| Rohde & Schwarz      | QPSK 2.56                                    | 19.4                        | 31.2274               | 0.5/2.0                                        |
| Rohde & Schwarz      | 16 QAM 0.384                                 | 29.5                        | 31.2625               | 0.1/0.3                                        |
| Rohde & Schwarz      | QPSK 0.32                                    | 29.5                        | 31.2625               | 0.1/0.3                                        |
| Rohde & Schwarz      | QPSK 0.64                                    | 29.5                        | 31.2625               | 0.2/0.5                                        |
| Rohde & Schwarz      | QPSK 1.28                                    | 29.5                        | 31.2625               | 0.3/1.0                                        |
| Rohde & Schwarz      | QPSK 2.56                                    | 29.5                        | 31.2625               | 0.5/2.0                                        |
| Rohde & Schwarz      | 16 QAM 0.384                                 | 41.4                        | 31.2994               | 0.1/0.3                                        |
| Rohde & Schwarz      | QPSK 0.32                                    | 41.4                        | 31.2994               | 0.1/0.3                                        |
| Rohde & Schwarz      | QPSK 0.64                                    | 41.1                        | 31.2981               | 0.2/0.5                                        |
| Rohde & Schwarz      | QPSK 1.28                                    | 40.6                        | 31.2986               | 0.3/1.0                                        |
| Rohde & Schwarz      | QPSK 2.56                                    | 39.7                        | 31.2977               | 0.5/2.0                                        |



Data Generator settings:

Frequency: 17 - 42 MHz

Data source: PRBS

Modulation/Symbol rate:

16QAM 0.384 MS/s

QPSK 0.32 MS/s

QPSK 0.64 MS/s

QPSK 1.28 MS/s

QPSK 2.56 MS/s

Filter: SQR COS / 0.15

Pilot Tone Generator settings:

Frequency: 31.0015 GHz

Output Power: -65 dBm

Modulation source:

External 24.4140625 kHz

Drive level: 1V<sub>ptp</sub>

Coupling: 100 kHz

Modulation: FM 1 MHz/V Deviation

**Figure 6.1-1 Setup for All Antenna Terminal Conducted Tests**

### 6.1.2 Modulation Characteristics

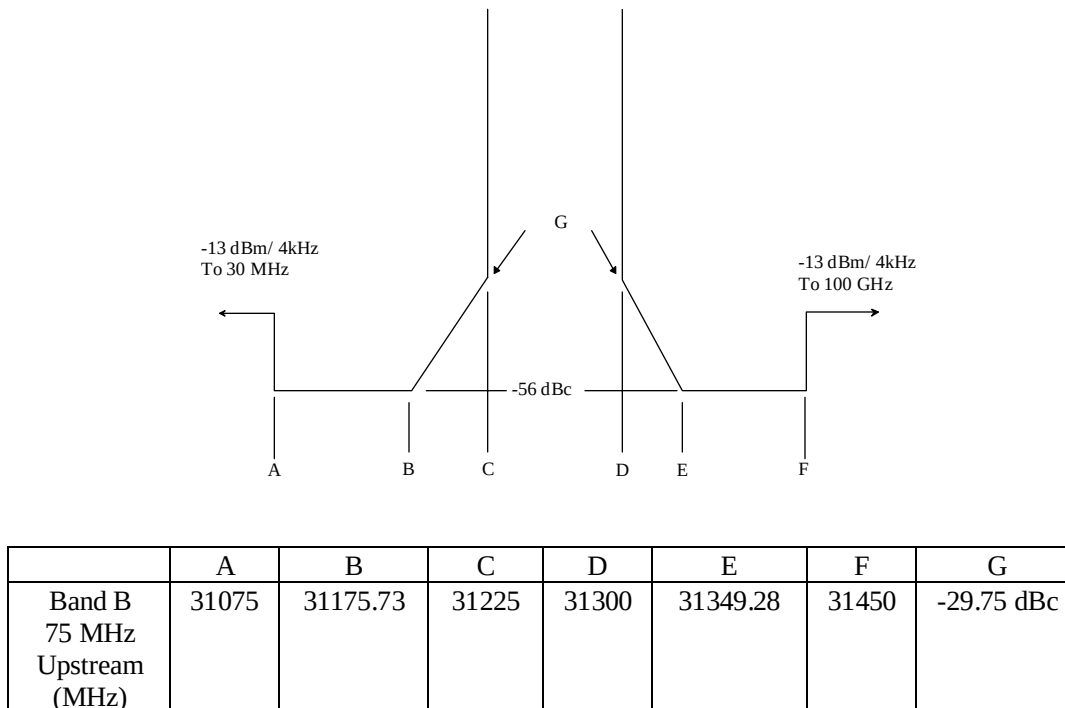
There is no specification limit on modulation characteristics except that the modulation source shall be representative of that used in an actual installation. Commercial test equipment (Rohde and Schwarz AMIQ Modulation Generator) was used to generate the modulated IF input signal.

### 6.1.3 Occupied Bandwidth

The occupied bandwidth measurement is performed in a conducted mode. See the RF power spectral density measurement paragraph (6.1.1) for the appropriate bandwidths. The 99% occupied bandwidth measurement is an automated measurement performed by the spectrum analyzer.

### 6.1.4 Conducted Spurious Emissions – Antenna Port

Conducted emissions at the antenna port were measured over the frequency range of 10 to 40 GHz. Refer to Figure 6.1-1 for test setup and Figure 6.1-2 for test limits. For frequencies  $\pm 250\%$  of the allocated bandwidth centered at 31.2625 GHz spectrum analyzer plots were made with the emission mask shown in Figure 6.1-2 loaded into the limit lines function of the spectrum analyzer with correction for resolution bandwidth relative to 1 MHz.



**Figure 6.1-2 Conducted Spurious Emissions Mask**

### **6.1.5 Radiated Spurious Emissions**

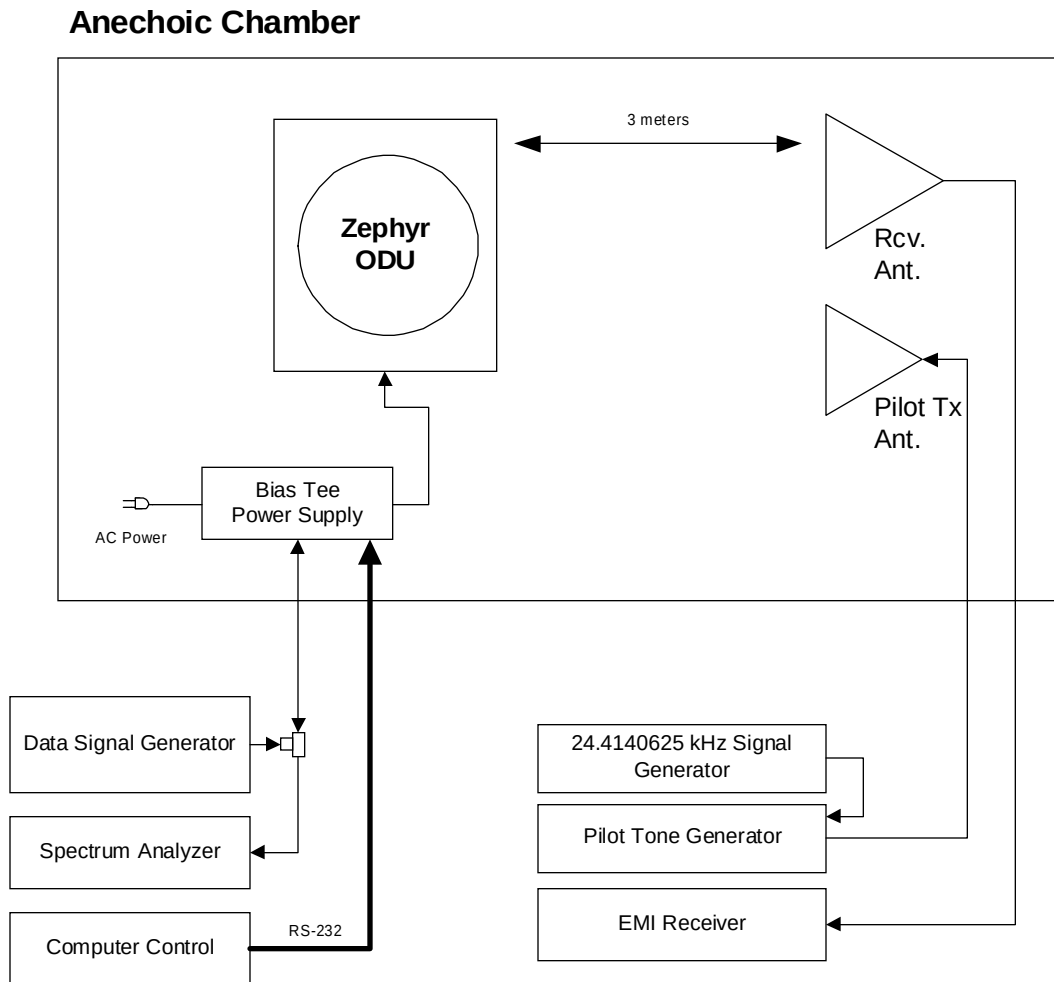
Radiated spurious emission were measured over the frequency range of 30 MHz to 100 GHz in an anechoic chamber (20ft x 24ft x 16ft). Refer to Figure 6.1-3 for test setup. The Zephyr ODU transmit output was routed to the transmit antenna.

For all emissions, measurements were made at a distance of 3 meters. All four sides of the EUT and both vertical and horizontal polarizations were tested for maximum radiated levels. Due to the operational frequency of the EUT and the fact that no emissions were detected, no Open Area Test Site (OATS) measurements were made.

For frequencies greater than 40 GHz, measurements were limited to harmonics of the local oscillator and the transmitter fundamental frequency.

### **6.1.6 Frequency Stability**

The Zephyr ODU was tested for frequency stability when operated in a CW mode at maximum rated power over the temperature range of  $-30^{\circ}$  to  $+50^{\circ}$  C and over an input power voltage range of  $\pm 15\%$ . Refer to Figure 6.1-1 for test setup.



Data Generator settings:

Frequency: 17 - 42 MHz  
 Data source: PRBS  
 Modulation/Symbol rate:  
 16QAM 0.384 MS/s  
 QPSK 0.32 MS/s  
 QPSK 0.64 MS/s  
 QPSK 1.28 MS/s  
 QPSK 2.56 MS/s  
 Filter: SQR COS / 0.15

Pilot Tone Generator settings:

Frequency: 31.0015 GHz  
 Output Power: -65 dBm  
 Modulation source:  
 External 24.4140625 kHz  
 Drive level: 1V<sub>ptp</sub>  
 Coupling: 100 kHz  
 Modulation: FM 1 MHz/V Deviation

**Figure 6.1-3 Radiated Spurious Emissions Test Setup**

## 6.2 Test Results

### 6.2.1 RF Power Spectral Density Measurement Test Results

All measurements were made at the Zephyr ODU maximum rated output power of +12 dBm at the transmit port of the roof unit. With an antenna gain of 35 dBi, the maximum EIRP of the Zephyr ODU, when operated at maximum rated output of +12 dBm, is 17 dBW which is within the limit specified in Part 101 Paragraph 101.113 of 55 dBW EIRP. RF power spectral density was calculated by dividing the maximum rated output power by the 99% occupied bandwidth of the Zephyr ODU. The RF power spectral density requirement specified in Part 101 Paragraph 101.113 is +42 dBW/MHz max. EIRP. See Table 6.2-1 for RF power spectral density data.

**Table 6.2-1 RF Power Density Measurement Table**

| Modulation/ Data Rate (MSymbols/sec.) | IF Tuned Freq. (MHz) | RF Freq. (GHz) | Measurement Bandwidth RBW/VBW (MHz/MHz) | Occupied Bandwidth (kHz) | Rated Output Power (dBm) | Antenna Gain (dBi) | Power Density (dBW/MHz) |
|---------------------------------------|----------------------|----------------|-----------------------------------------|--------------------------|--------------------------|--------------------|-------------------------|
| 16QAM 0.384                           | 17.50                | 31.2255        | 0.1/0.3                                 | 517.0                    | 12.0                     | 35.0               | 19.87                   |
| QPSK 0.32                             | 17.50                | 31.2255        | 0.1/0.3                                 | 461.0                    | 12.0                     | 35.0               | 20.36                   |
| QPSK 0.64                             | 17.90                | 31.2259        | 0.2/0.5                                 | 922.0                    | 12.0                     | 35.0               | 17.35                   |
| QPSK 1.28                             | 18.40                | 31.2264        | 0.3/1.0                                 | 1,660.0                  | 12.0                     | 35.0               | 14.80                   |
| QPSK 2.56                             | 19.40                | 31.2274        | 0.5/2.0                                 | 3,140.0                  | 12.0                     | 35.0               | 12.03                   |
| 16QAM 0.384                           | 29.50                | 31.2625        | 0.1/0.3                                 | 513.0                    | 12.0                     | 35.0               | 19.90                   |
| QPSK 0.32                             | 29.50                | 31.2625        | 0.1/0.3                                 | 460.0                    | 12.0                     | 35.0               | 20.37                   |
| QPSK 0.64                             | 29.50                | 31.2625        | 0.2/0.5                                 | 922.0                    | 12.0                     | 35.0               | 17.35                   |
| QPSK 1.28                             | 29.50                | 31.2625        | 0.3/1.0                                 | 1,650.0                  | 12.0                     | 35.0               | 14.83                   |
| QPSK 2.56                             | 29.50                | 31.2625        | 0.5/2.0                                 | 3,140.0                  | 12.0                     | 35.0               | 12.03                   |
| 16QAM 0.384                           | 41.40                | 31.2994        | 0.1/0.3                                 | 513.0                    | 12.0                     | 35.0               | 19.90                   |
| QPSK 0.32                             | 41.40                | 31.2994        | 0.1/0.3                                 | 460.0                    | 12.0                     | 35.0               | 20.37                   |
| QPSK 0.64                             | 41.10                | 31.2991        | 0.2/0.5                                 | 929.0                    | 12.0                     | 35.0               | 17.32                   |
| QPSK 1.28                             | 40.60                | 31.2986        | 0.3/1.0                                 | 1,650.0                  | 12.0                     | 35.0               | 14.83                   |
| QPSK 2.56                             | 39.70                | 31.2977        | 0.5/2.0                                 | 3,130.0                  | 12.0                     | 35.0               | 12.04                   |

### 6.2.2 Occupied Bandwidth Measurement Tests Results

All measurements were made at the Zephyr ODU maximum rated output power of +12 dBm at the transmit port of the ODU. Occupied bandwidth measurements are listed in Table 6.2-1.

### 6.2.3 Conducted Spurious Emissions – Antenna Port Measurement Test Results

All measurements were made at the Zephyr ODU maximum rated output power of +12 dBm at the transmit port of the ODU. Table 6.2-2 lists the emission mask test configurations. Figures B – 1 through B – 10 are expanded views of the conducted emission mask at the allocated band edges (31.225 and 31.300 GHz). These measurements were made with other than a 1 MHz resolution bandwidth. Therefore, the mask was adjusted to correct to the 1 MHz reference bandwidth.

In addition to the closeup scans at the band edges, three scans were performed that show the complete  $\pm 250$  % frequency range. See Figures B-11 through B-13. . Refer to Figure B-14 for a photograph of the antenna terminal conducted spurious emissions measurement test setup.

**Table 6.2-2 Emission Mask Measurement Table**

| Modulation/ Data Rate (MSymbols/sec.) | IF Tuned Freq. (MHz) | RF Freq. (GHz) | Measurement Bandwidth RBW/VBW (MHz/MHz) | Figure No. |
|---------------------------------------|----------------------|----------------|-----------------------------------------|------------|
| 16QAM 0.384                           | 17.50                | 31.2255        | 0.1/0.3                                 | B - 1      |
| QPSK 0.32                             | 17.50                | 31.2255        | 0.1/0.3                                 | B - 2      |
| QPSK 0.64                             | 17.90                | 31.2259        | 0.2/0.5                                 | B - 3      |
| QPSK 1.28                             | 18.40                | 31.2264        | 0.3/1.0                                 | B - 4      |
| QPSK 2.56                             | 19.40                | 31.2274        | 0.5/2.0                                 | B - 5      |
| 16QAM 0.384                           | 41.40                | 31.2994        | 0.1/0.3                                 | B - 6      |
| QPSK 0.32                             | 41.40                | 31.2994        | 0.1/0.3                                 | B - 7      |
| QPSK 0.64                             | 41.10                | 31.2991        | 0.2/0.5                                 | B - 8      |
| QPSK 1.28                             | 40.60                | 31.2986        | 0.3/1.0                                 | B - 9      |
| QPSK 2.56                             | 39.70                | 31.2977        | 0.5/2.0                                 | B - 10     |
| 16QAM 0.384                           | 17.50                | 31.2255        | 1.0/3.0                                 | B - 11     |
| 16QAM 0.384                           | 29.50                | 31.2625        | 1.0/3.0                                 | B - 12     |
| 16QAM 0.384                           | 41.40                | 31.2994        | 1.0/3.0                                 | B - 13     |

### 6.2.4 Radiated Spurious Emissions Measurement Test Results

All measurements were made at the Zephyr ODU maximum rated output power of +12 dBm with the antenna installed and transmitting as in a normal installation. Radiated spurious emissions scans were performed for the 16 QAM 0.384 MS/s modulation scheme only. The 16 QAM modulation was selected to be worst case because of the low data rate and amplitude modulation. Refer to Figure C-4 for a photograph of the Zephyr ODU as set up and to Figure C-5 for a photograph of the BiConilog antenna, one of the antennas used for the radiated spurious emissions measurement test.

#### 4.5 Frequency Stability Measurement Test Results

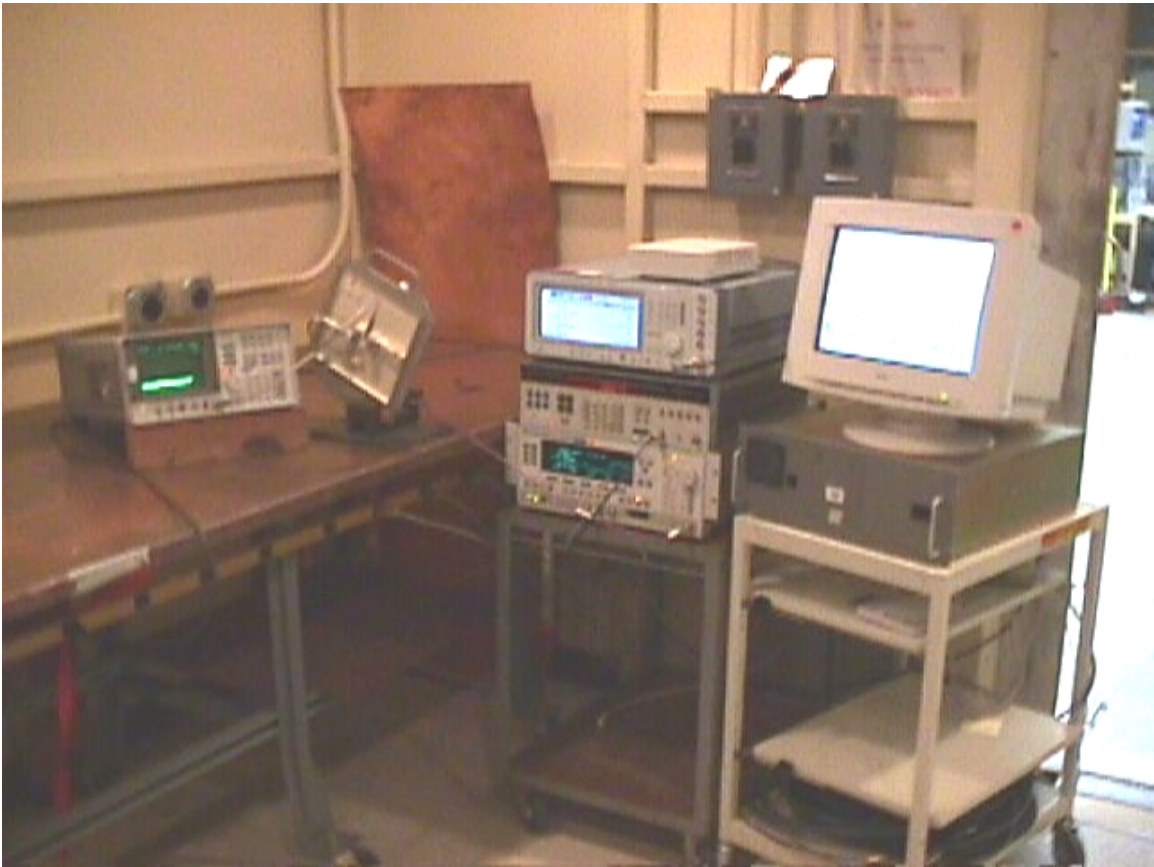
All measurements were taken on December 21, 1999. Tabulated data is presented in Table 6.2-3. Results from this test are plotted in Appendix D, Figure D-1. Refer to Figure D-2 for a photograph of the Zephyr ODU as set up in the temperature chamber and to Figure D-3 for a photograph of the test equipment used in support of the temperature stability test on the ODU.

**Table 6.2-3 Frequency Satbility Measurement Table**

| $f_0$ | 31.260938 GHz                 |                               | % Error                      |                              | FCC Limit |
|-------|-------------------------------|-------------------------------|------------------------------|------------------------------|-----------|
| °C    | f @ -15% rated voltage in GHz | f @ +15% rated voltage in GHz | % Error @ -15% rated voltage | % Error @ +15% rated voltage |           |
| -30   | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| -20   | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| -10   | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| 0     | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| 10    | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| 20    | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| 30    | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| 40    | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |
| 50    | 31.26093520                   | 31.26093520                   | -0.00000896%                 | -0.00000896%                 | 0.001%    |

## **Appendix A**

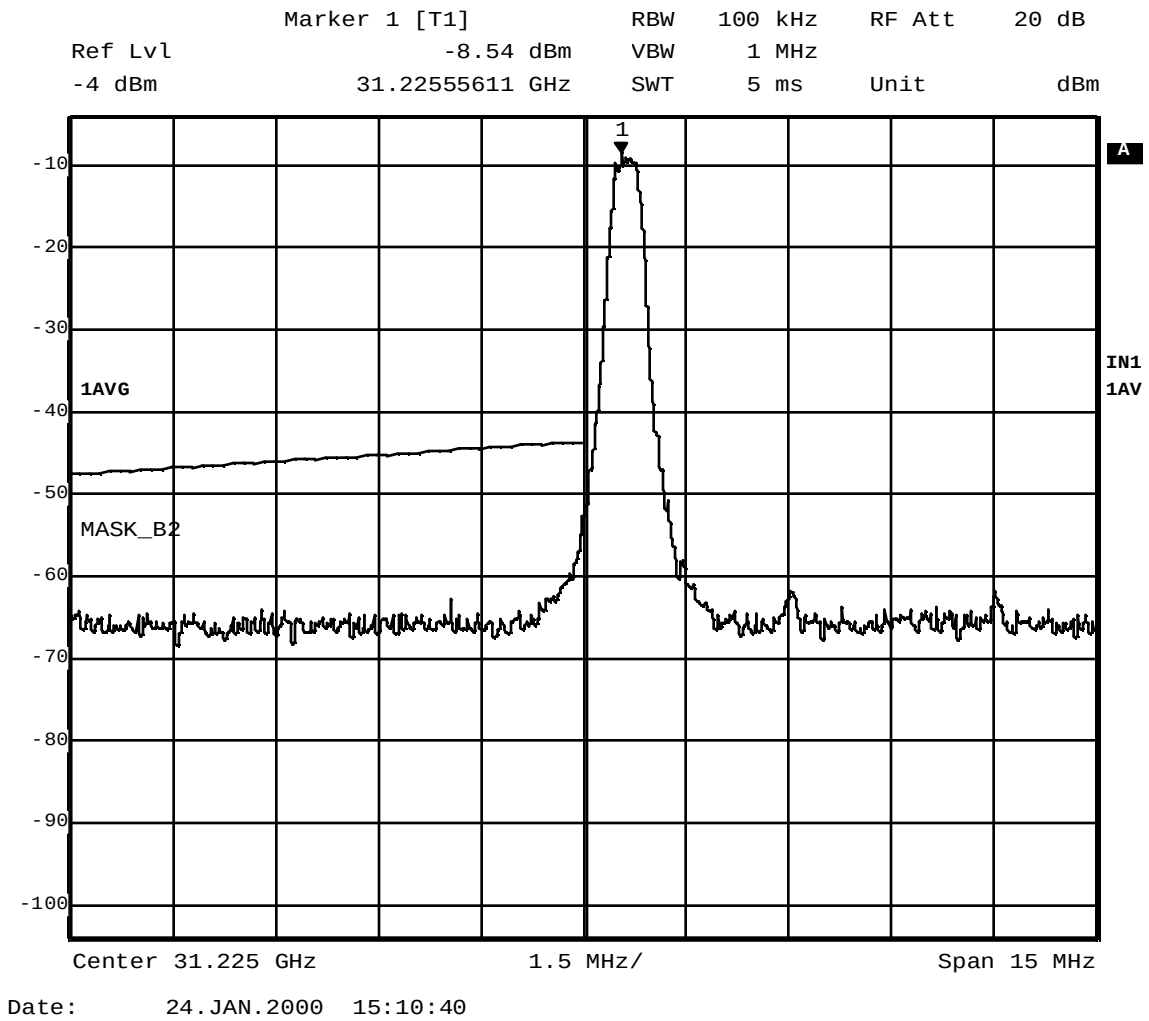
### **Occupied Bandwidth Measurements**



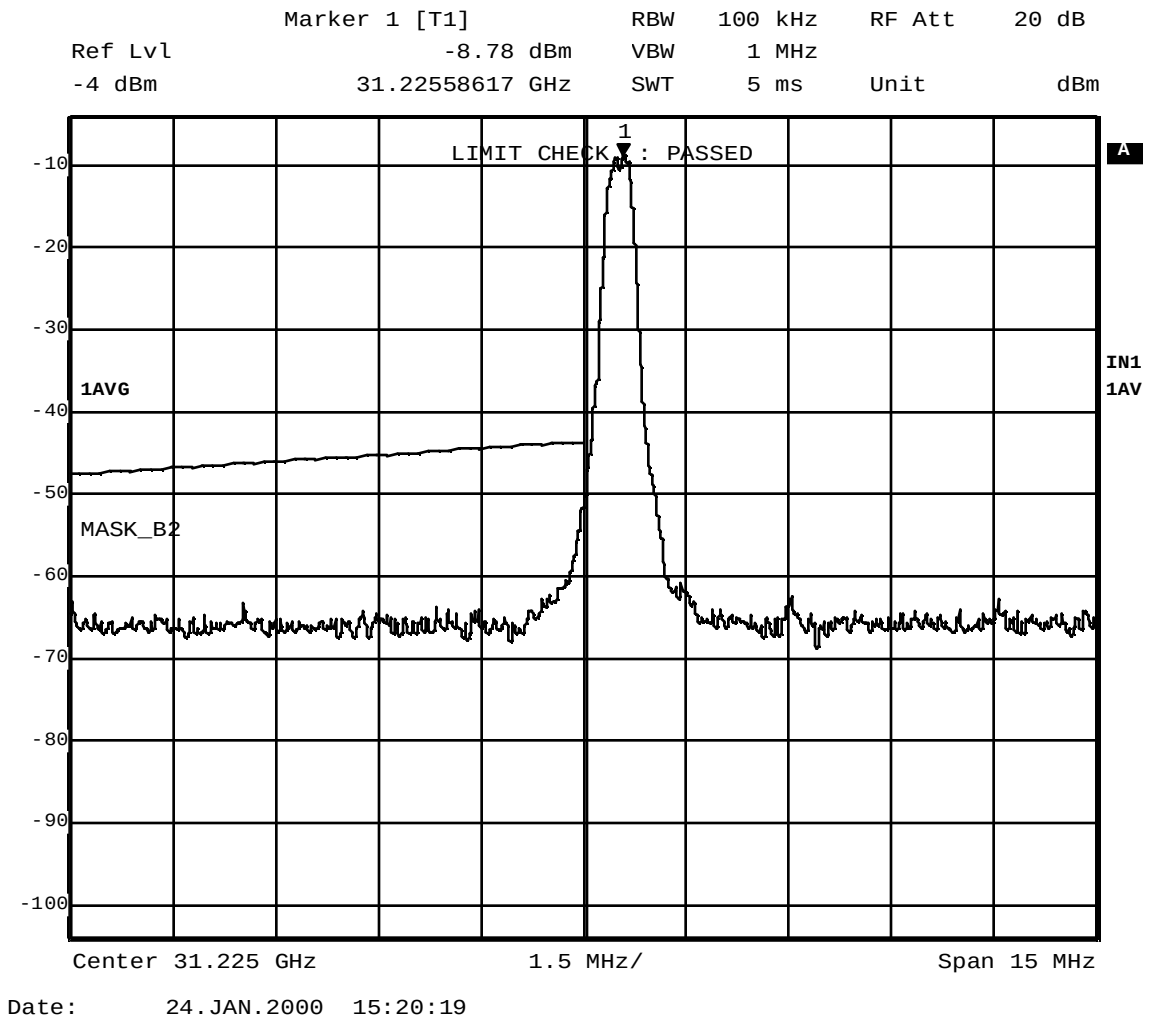
**Figure A – 1 Occupied Bandwidth Measurement Test Setup**

## **Appendix B**

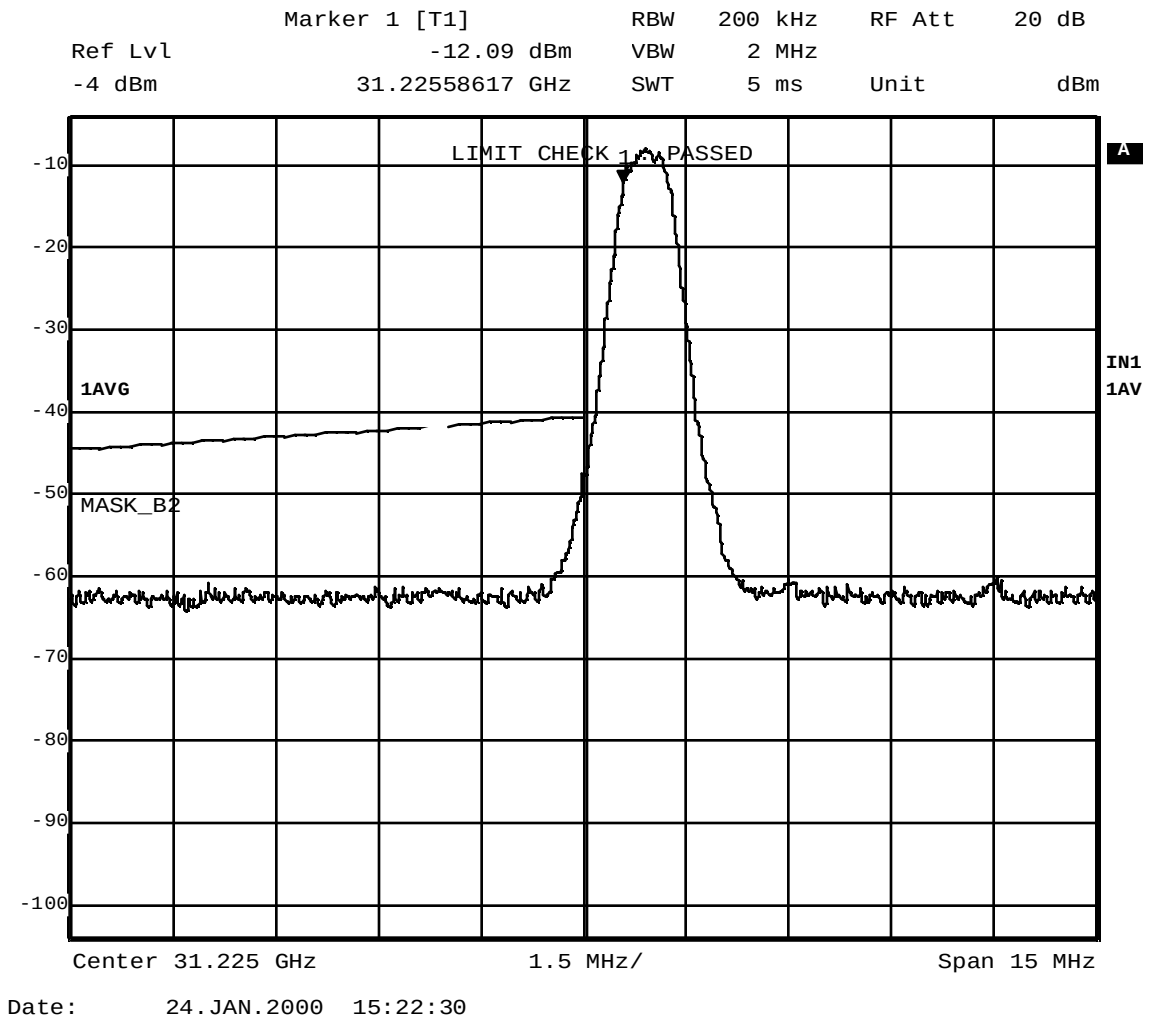
### **Antenna Terminal Conducted Spurious Emissions Measurement**



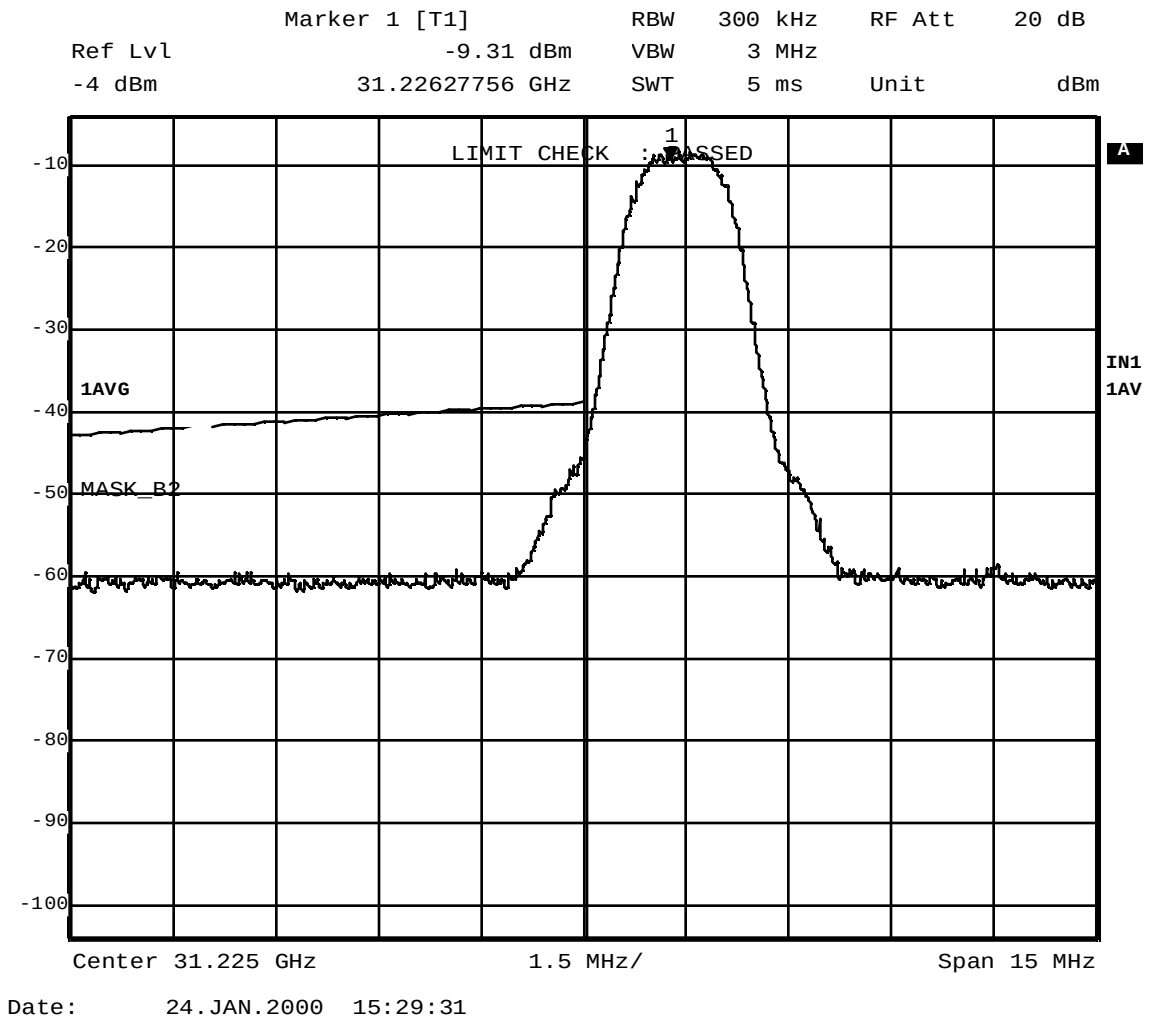
**Figure B – 1 Emission Mask; 31.2255 GHz; 16 QAM 0.384 MS/s**



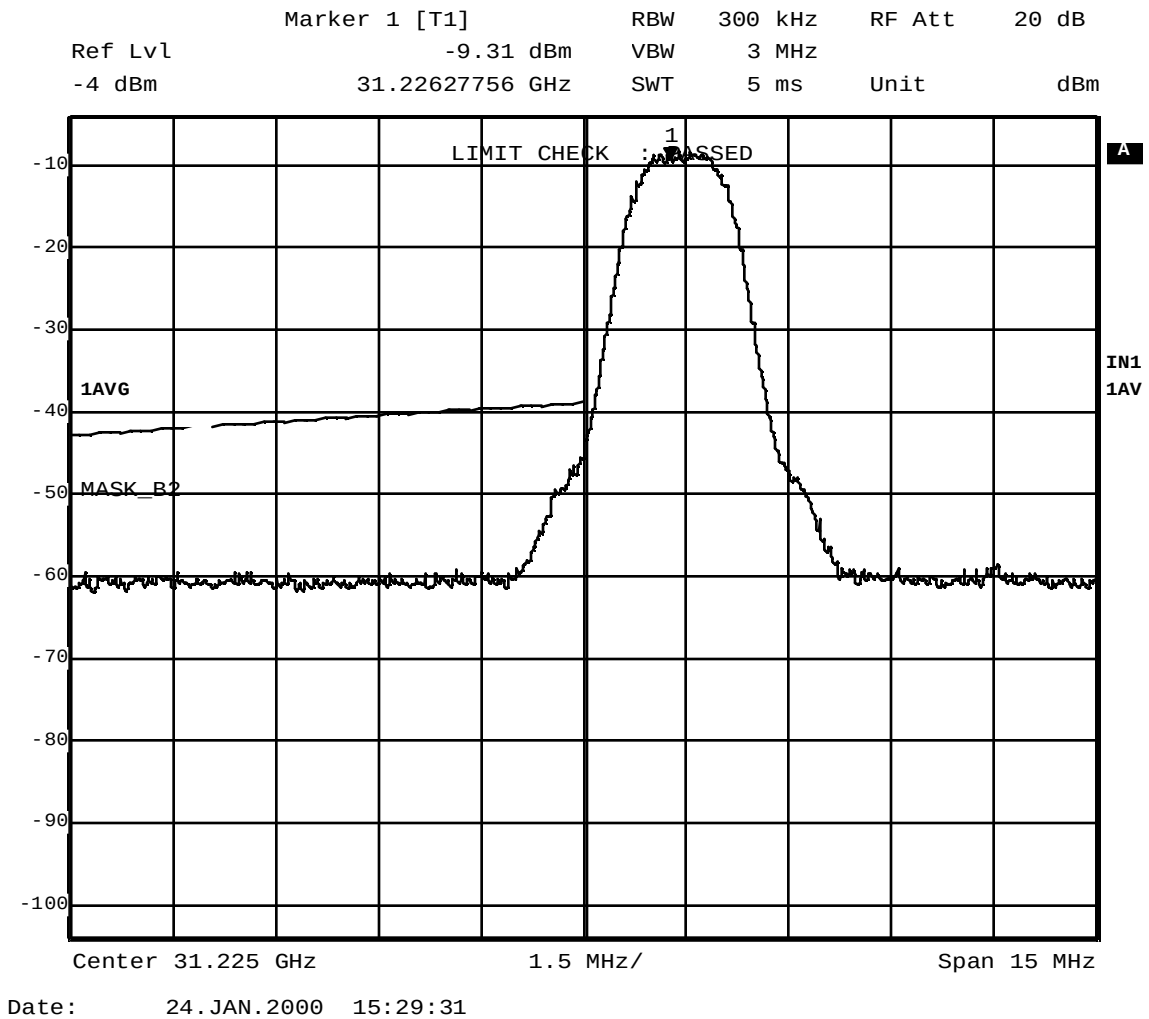
**Figure B – 2 Emission Mask; 31.2255 GHz; QPSK 0.32 MS/s**



**Figure B – 3 Emission Mask; 31.2259 GHz; QPSK 0.64 MS/s**



**Figure B – 4 Emission Mask; 31.2264 GHz; QPSK 1.28 MS/s**



**Figure B – 5 Emission Mask; 31.2274 GHz; QPSK 2.56 MS/s**

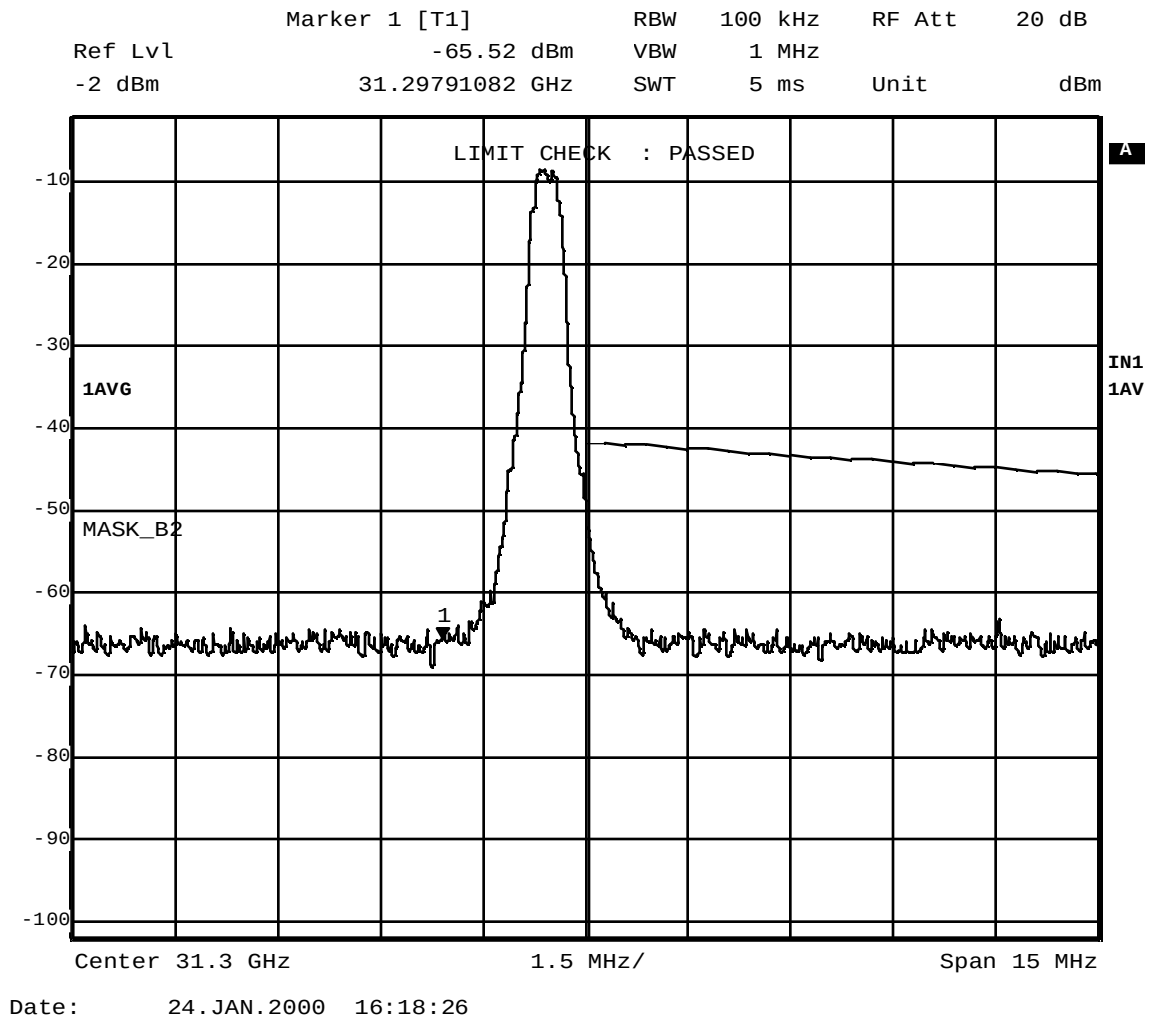
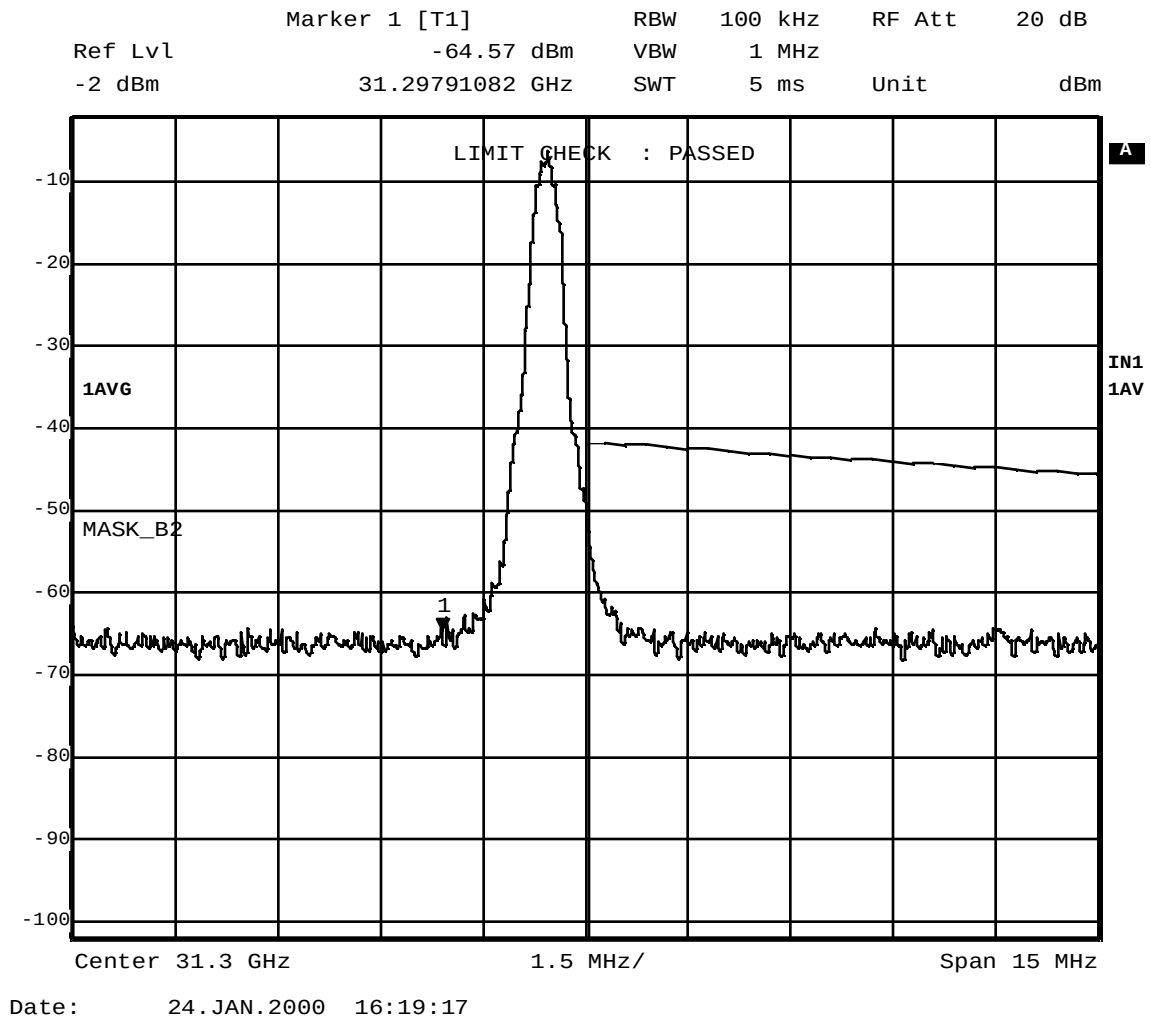
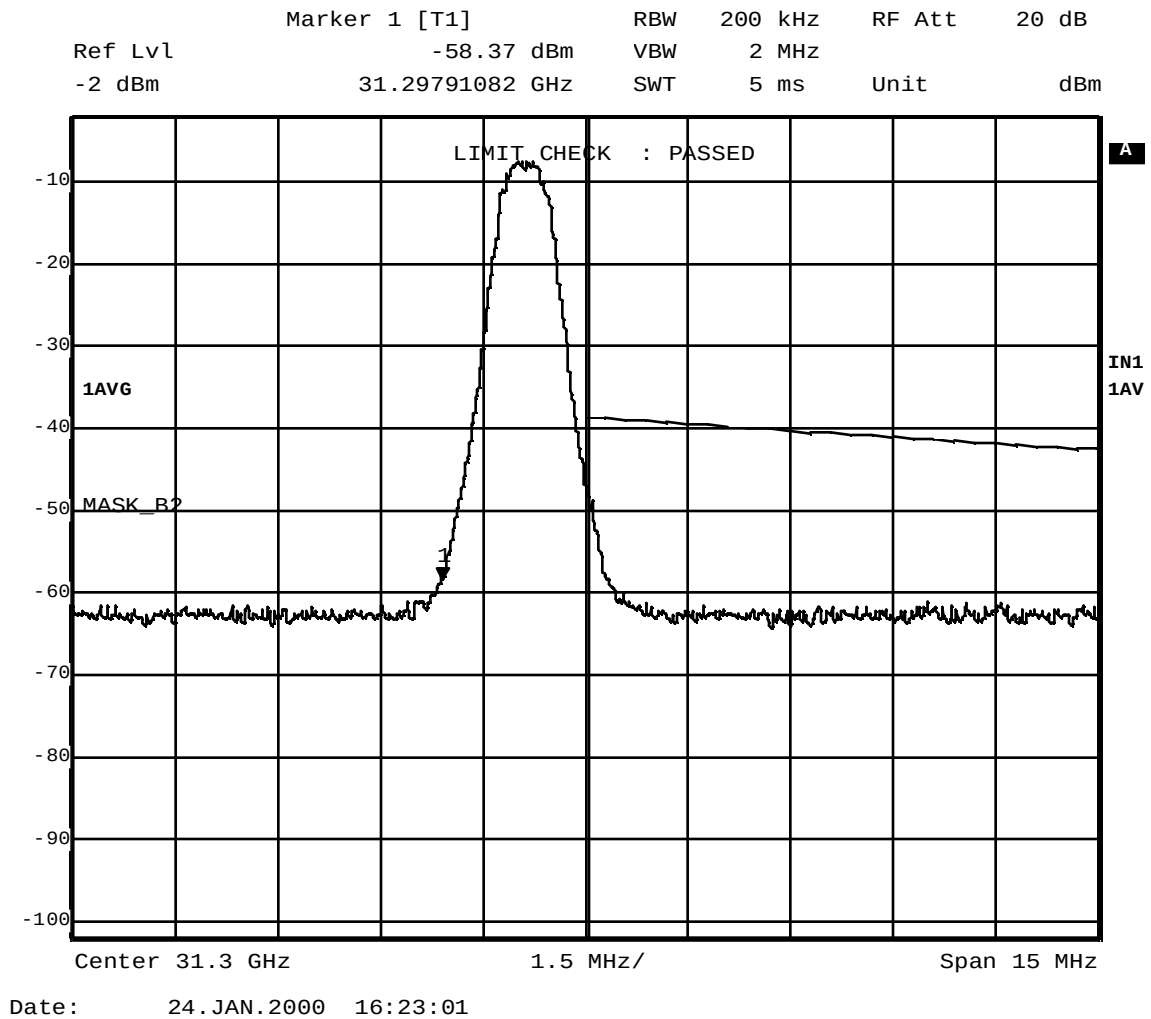


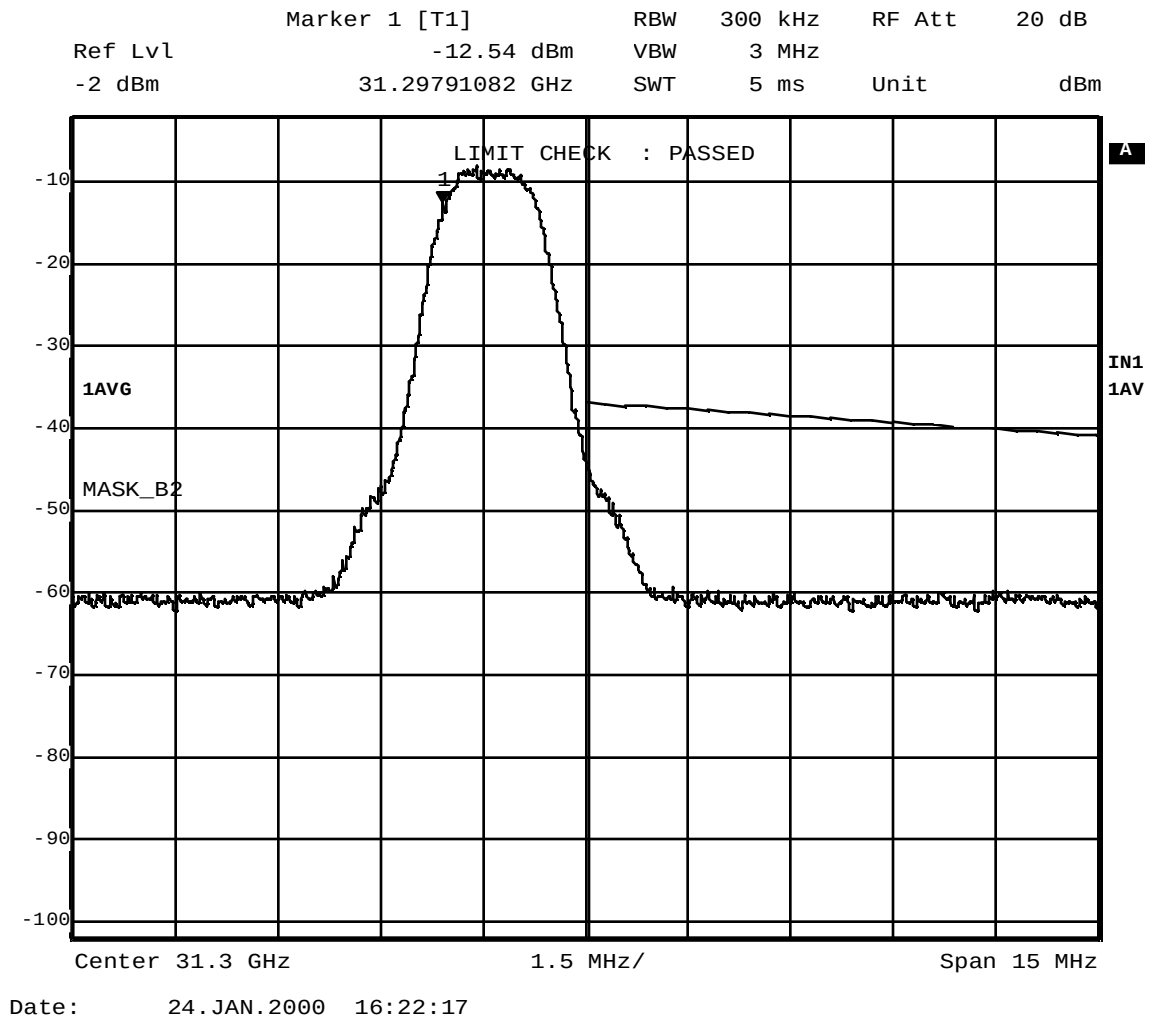
Figure B – 6 Emission Mask; 31.2994 GHz; 16 QAM 0.384 MS/s



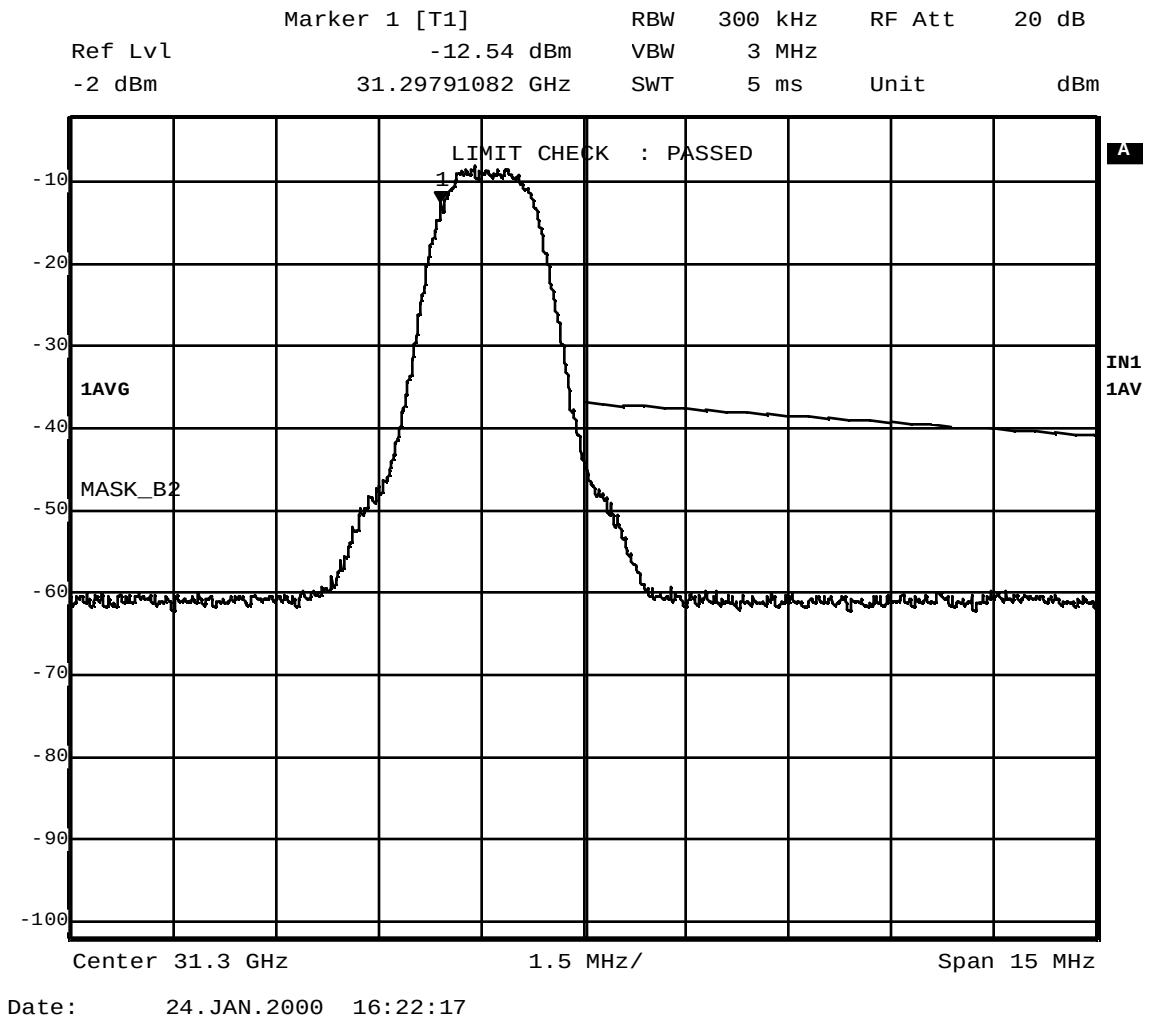
**Figure B – 7 Emission Mask; 31.2994 GHz; QPSK 0.32 MS/s**



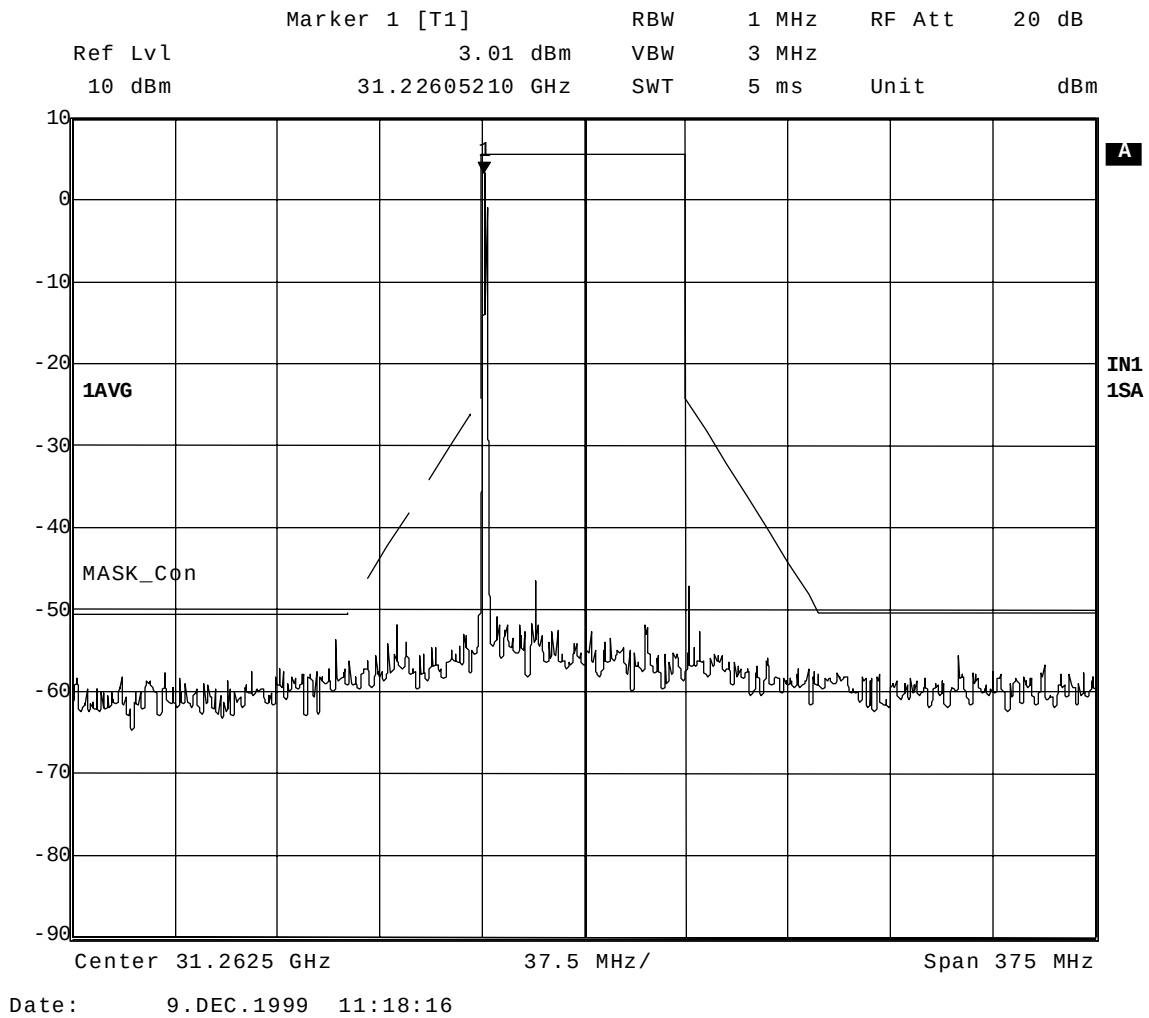
**Figure B – 8 Emission Mask; 31.2991 GHz; QPSK 0.64 MS/s**



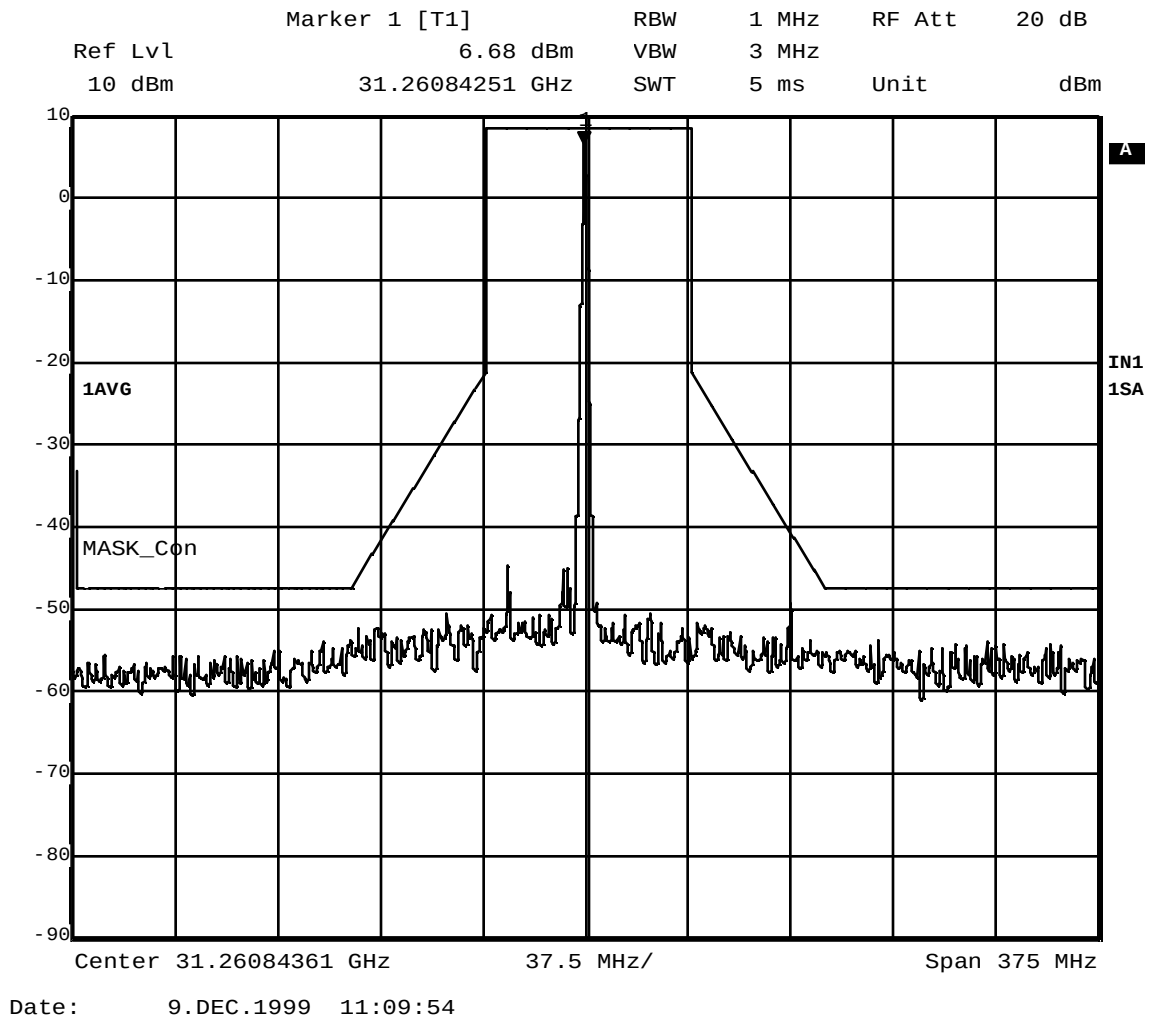
**Figure B – 9 Emission Mask; 31.2986 GHz; QPSK 1.28 MS/s**



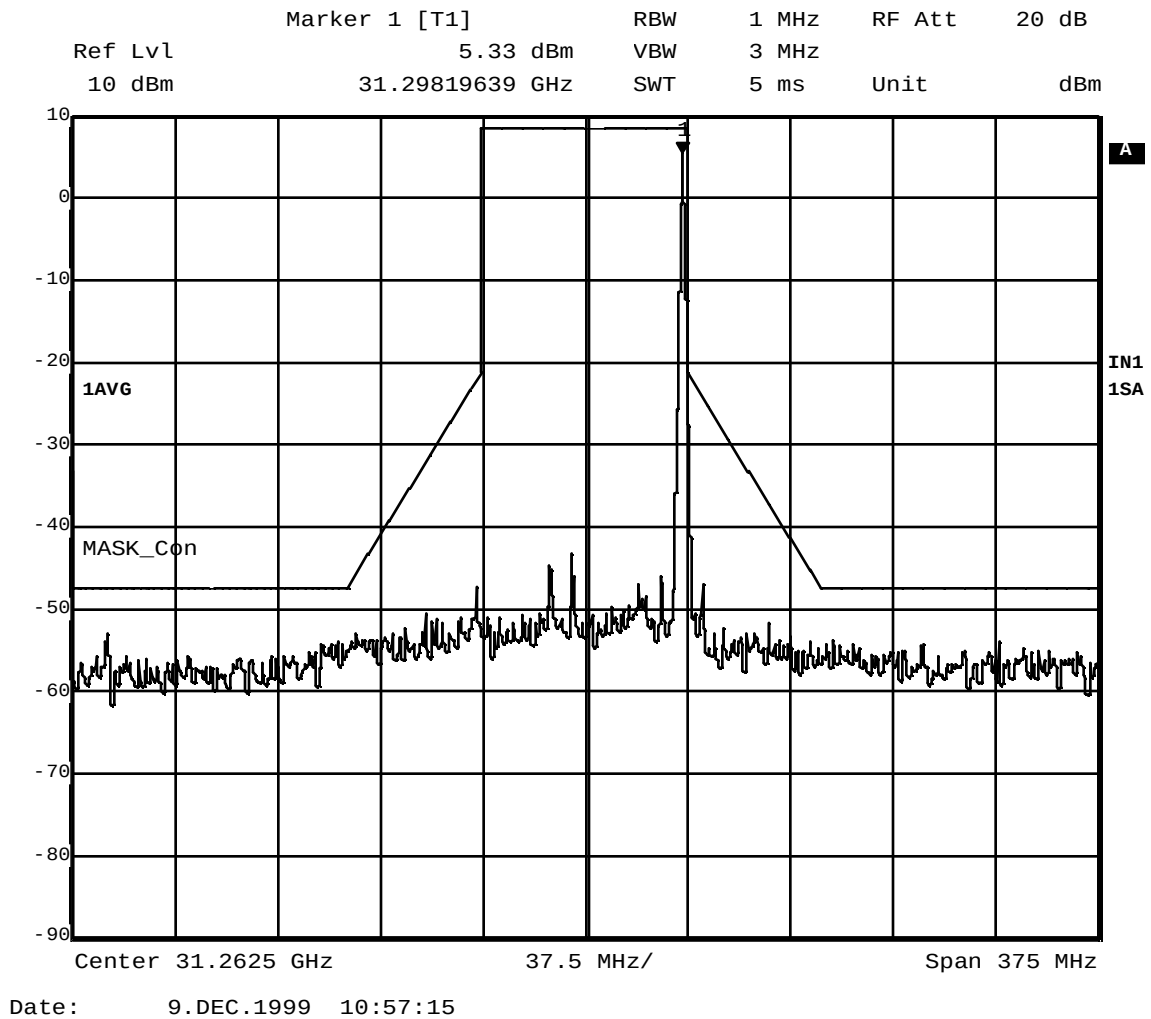
**Figure B – 10 Emission Mask; 31.2977 GHz; QPSK 2.56 MS/s**



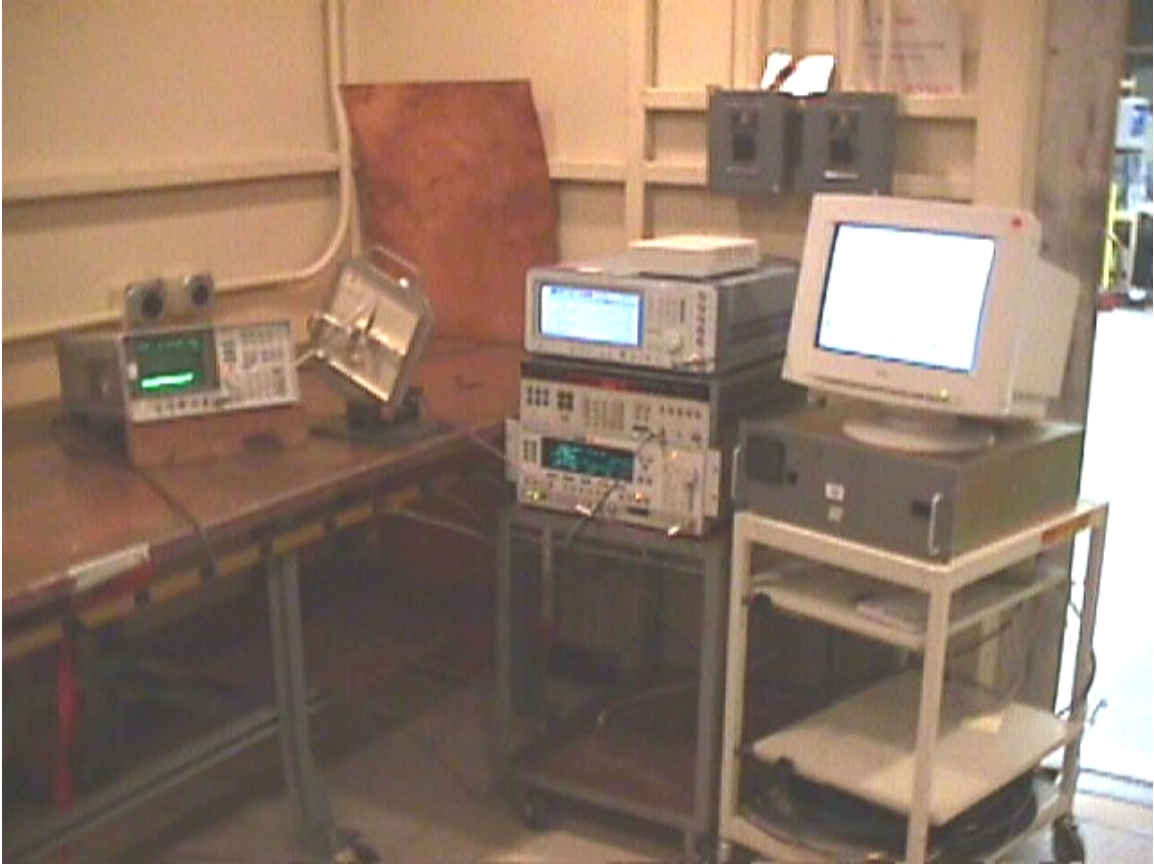
**Figure B – 11 Emission Mask  $\pm 250\%$ ; 31.2255 GHz; 16 QAM 0.384 MS/s**



**Figure B – 12 Emission Mask  $\pm 250\%$ ; 31.2625 GHz; 16 QAM 0.384 MS/s**



**Figure B – 13 Emission Mask  $\pm 250\%$ ; 31.2994 GHz; 16 QAM 0.384 MS/s**



**Figure B – 14 Emission Mask Test Setup**

## **Appendix C**

### **Radiated Spurious Emission Measurement**

Date : 1/25/00

S/N : P-004

EUT Configuration : Tx 31.2255 GHz; Maximum Output Power; 16 QAM 0.384 MSps

| For frequencies with $\pm 250\%$ of allocated bandwidth excluding intentional transmit frequency |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|--------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------|-------------------------------------------|----------------------------|-------------------------------|---------------------------------------------------|--------------------------------------|---------------------------------------|
| Frequency<br><br>(GHz)                                                                           | Meter<br>Reading<br><br>(dB $\mu$ V) | Measurement<br>Bandwidth<br>RBW/VBW<br>(MHz) | Bandwidth<br>Correction<br>Factor<br>(dB) | Cable<br>Loss*<br><br>(dB) | Antenna<br>Factor<br><br>(dB) | Corrected<br>Level<br><br>(dB $\mu$ V/m<br>/MHz)  | Limit<br><br>(dB $\mu$ V/m<br>/MHz)  | Comments                              |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      | No emissions detected.                       |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
| For frequencies < -250% and > 250% of allocated bandwidth                                        |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
| Frequency<br><br>(GHz)                                                                           | Meter<br>Reading<br><br>(dB $\mu$ V) | Measurement<br>Bandwidth<br>RBW/VBW<br>(kHz) | Bandwidth<br>Correction<br>Factor<br>(dB) | Cable<br>Loss*<br><br>(dB) | Antenna<br>Factor<br><br>(dB) | Corrected<br>Level<br><br>(dB $\mu$ V/m<br>/4kHz) | Limit<br><br>(dB $\mu$ V/m<br>/4kHz) | Comments                              |
| 62.451                                                                                           | 5                                    | 30/30                                        | -8.75                                     | 22.0                       | 43.4                          | 61.6                                              | 84.4                                 | Tx 2nd Harmonic;<br><b>Rcv. Noise</b> |
| 93.6765                                                                                          | 5                                    | 30/30                                        | -8.75                                     | 40.0                       | 46.8                          | 83.0                                              | 84.4                                 | Tx 3rd Harmonic;<br><b>Rcv. Noise</b> |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
|                                                                                                  |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |
| * Cable loss includes external mixer loss and cable loss                                         |                                      |                                              |                                           |                            |                               |                                                   |                                      |                                       |

**Figure C – 1 Zephyr ODU, Radiated Spurious Emissions,  $F_0 = 31.22550$  GHz**

Client : Motorola

Date : 1/25/00

EUT Model : Zephyr ODU

S/N : P-004

EUT Configuration : Tx 31.2625 GHz; Maximum Output Power; 16 QAM 0.384 MSps

| For frequencies with $\pm 250\%$ of allocated bandwidth excluding intentional transmit frequency |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|--------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------|-------------------------------------------|------------------------|---------------------------|-----------------------------------------------|----------------------------------|---------------------------------------|
| Frequency<br>(GHz)                                                                               | Meter<br>Reading<br>(dB $\mu$ V) | Measurement<br>Bandwidth<br>RBW/VBW<br>(MHz) | Bandwidth<br>Correction<br>Factor<br>(dB) | Cable<br>Loss*<br>(dB) | Antenna<br>Factor<br>(dB) | Corrected<br>Level<br>(dB $\mu$ V/m<br>/MHz)  | Limit<br>(dB $\mu$ V/m<br>/MHz)  | Comments                              |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  | No emissions detected.                       |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
| For frequencies < -250% and > 250% of allocated bandwidth                                        |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
| Frequency<br>(GHz)                                                                               | Meter<br>Reading<br>(dB $\mu$ V) | Measurement<br>Bandwidth<br>RBW/VBW<br>(kHz) | Bandwidth<br>Correction<br>Factor<br>(dB) | Cable<br>Loss*<br>(dB) | Antenna<br>Factor<br>(dB) | Corrected<br>Level<br>(dB $\mu$ V/m<br>/4kHz) | Limit<br>(dB $\mu$ V/m<br>/4kHz) | Comments                              |
| 62.525                                                                                           | 5                                | 30/30                                        | -8.75                                     | 22.0                   | 43.4                      | 61.6                                          | 84.4                             | Tx 2nd Harmonic;<br><b>Rcv. Noise</b> |
| 93.7875                                                                                          | 5                                | 30/30                                        | -8.75                                     | 40.0                   | 46.8                      | 83.0                                          | 84.4                             | Tx 3rd Harmonic;<br><b>Rcv. Noise</b> |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
| * Cable loss includes external mixer loss and cable loss                                         |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |

**Figure C – 2 Zephyr ODU, Radiated Spurious Emissions,  $F_0 = 31.2625$  GHz**

Client : Motorola

Date : 1/25/00

EUT Model : Zephyr ODU

S/N : P-004

EUT Configuration : Tx 31.2994 GHz; Maximum Output Power; 16 QAM 0.384 MSps

| For frequencies with $\pm 250\%$ of allocated bandwidth excluding intentional transmit frequency |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|--------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------|-------------------------------------------|------------------------|---------------------------|-----------------------------------------------|----------------------------------|---------------------------------------|
| Frequency<br>(GHz)                                                                               | Meter<br>Reading<br>(dB $\mu$ V) | Measurement<br>Bandwidth<br>RBW/VBW<br>(MHz) | Bandwidth<br>Correction<br>Factor<br>(dB) | Cable<br>Loss*<br>(dB) | Antenna<br>Factor<br>(dB) | Corrected<br>Level<br>(dB $\mu$ V/m<br>/MHz)  | Limit<br>(dB $\mu$ V/m<br>/MHz)  | Comments                              |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  | No emissions detected.                       |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
| For frequencies < -250% and > 250% of allocated bandwidth                                        |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
| Frequency<br>(GHz)                                                                               | Meter<br>Reading<br>(dB $\mu$ V) | Measurement<br>Bandwidth<br>RBW/VBW<br>(kHz) | Bandwidth<br>Correction<br>Factor<br>(dB) | Cable<br>Loss*<br>(dB) | Antenna<br>Factor<br>(dB) | Corrected<br>Level<br>(dB $\mu$ V/m<br>/4kHz) | Limit<br>(dB $\mu$ V/m<br>/4kHz) | Comments                              |
| 62.5988                                                                                          | 5                                | 30/30                                        | -8.75                                     | 22.0                   | 43.4                      | 61.6                                          | 84.4                             | Tx 2nd Harmonic;<br><b>Rcv. Noise</b> |
| 93.8982                                                                                          | 5                                | 30/30                                        | -8.75                                     | 40.0                   | 46.8                      | 83.0                                          | 84.4                             | Tx 3rd Harmonic;<br><b>Rcv. Noise</b> |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
|                                                                                                  |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |
| * Cable loss includes external mixer loss and cable loss                                         |                                  |                                              |                                           |                        |                           |                                               |                                  |                                       |

**Figure C – 3 Zephyr ODU, Radiated Spurious Emissions,  $F_o = 31.299400$  GHz**



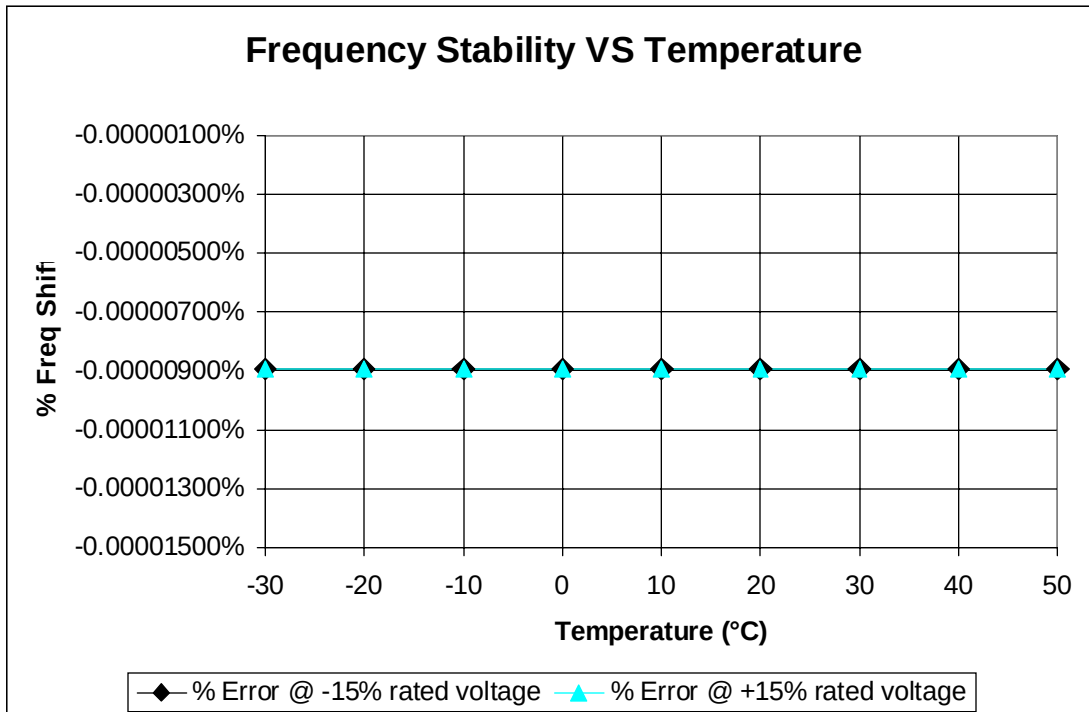
**Figure C – 4 Zephyr ODU Setup, Radiated Spurious Emissions**



**Figure C – 5 Receive Antenna, Radiated Spurious Emissions**

## **Appendix D**

### **Frequency Stability Measurement**



**Figure D – 1** Test Results, Frequency Stability Testing of the Zephyr ODU



**Figure D – 2      Test Setup, Frequency Stability Testing of the Zephyr ODU**



**Figure D – 3      Test Setup, Frequency Stability Testing of the Zephyr ODU**