Exhibit 12 – Measurement Techniques

Motorola Customer Premise Equipment (CPE)

FCC ID: MIJTELCPE-USB-01

Telaxis Model No. XCV-31-UB1H-R2

12.0 Measurement Techniques

12.1 Radiated Spurious and Harmonic Emissions

12.1.1 Definition

Radiated spurious and harmonic emissions from the equipment at a frequency and/or frequencies which are outside an occupied band sufficient to insure transmission of information of required quality for the class of communication desired. The reduction in the level of these spurious emissions will not effect the quality of information being transmitted.

12.1.2 Minimum Standard

For the CPE data transmitter, the mean power of radiated spurious and harmonic emissions shall be attenuated as per 101.12(a)(2)(ii). The frequency offset attenuation is based on an authorized bandwidth of 75 MHz and mean output power of +24 dBm. For frequencies removed greater than 50% to less than or equal to 250% of the authorized bandwidth and measured in a 1 MHz bandwidth, the attenuation requirement is as follows:

Attenuation (dBc) = 12 + 0.4 * (Percent-50)+10 * Log_{10} (Bandwidth)

Note: Attenuation of greater than 56 dBc is not required.

For frequencies removed greater than 250% of the authorized bandwidth and measured in a 4 kHz bandwidth, the attenuation requirement is as follows:

Attenuation (dBc) = 43 + 10 * Log_{10} (mean output power)

Note: Attenuation of greater than 80 dBc is not required.

12.1.3 Method of Measurement

Facility Description:
All final testing reported herein was performed at the Motorola SSG semi-anecohic chamber, located at 8201 E. McDowell Rd., Scottsdale, AZ. 85252. The facility has also been issued a Certificate of Accreditation through the National Voluntary Laboratory Accreditation Program (NVLAP) by NIST. This is under NVLAP Code: 100405-0 and is effective through September 30, 2000.

Measurement Description:
Spurious and harmonic emissions were measured as radiated emissions in an anecohic chamber (6.1m x 7.3m x 4.9m). The HUB equipment does not require a CPE to operate. The CPE requires the HUB's Pilot tone to enable it to transmit. Therefore, when the HUB was tested only the HUB was in the test chamber and when the CPE was tested with both the HUB and the CPE in the chamber. The DOCSIS modulation was provided by a Rohde and Schwartz Signal Generator SMIQ.

Radiated emissions were measured from 30 MHz to 100 GHz. For all emissions with the exception of the transmitter's fundamental frequency and its harmonics, 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. All emissions detected were greater than 20 dB below the emission limitations of 47 CFR 101.111 (see paragraph 12.1.2 of this Exhibit). Therefore, no Open Area Test Site (OATS) measurements were made.

Testing of the transmitter's fundamental frequency and its harmonics were performed in the main beam of the transmit antenna. The receive antenna was positioned at a distance to maximize the received signal. Spurious and harmonic levels were then compared to the radiated level of the fundamental signal. The attenuation requirement was based on 47 CFR 101.111 (see paragraph 12.1.2 of this Exhibit).

12.2 Frequency Stability

12.2.1 Definition

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency

12.2.2 Minimum Standard

The minimum frequency stability shall be 0.001% at any time during normal operation.

12.2.3 Method of Measurement

The CPE was placed in a temperature chamber. The support equipment (signal generator, spectrum analyzer and voltage power supply) were placed external to the chamber. The temperature was varied from -30^{o} to 50^{o} C in 10^{o} steps. The CPE was allowed to aclimate at each temperature setting. At each temperature increment, a frequency measurement was made at the $\pm$ 15% limits of the input supply voltage.