

**Exhibit 14****SECTION 2.1049 MEASUREMENT OF OCCUPIED BANDWIDTH**

Because of the Multi Carrier application of the **ULAM**, occupied bandwidth measurements were performed for all three of the **MCA** configurations. This documents the typical performance of the **ULAM** while supplied with single, dual and three CDMA carriers. Since the **ULAM** is a fixed gain device all power adjustments were performed via the **CBR/ FCC ID: AS5CMP-26**.

The occupied bandwidth of the **ULAM/ FCC ID: AS5CMP-34** was measured using a Rohde & Schwarz ESMI EMI Test Receiver and a HP Model 7470A Plotter. The RF power level was measured and adjusted via the test setup in Figure 14A. The calibrated RF output from the transmitter was reduced (to an amplitude usable by the spectrum analyzer) by using a calibrated attenuator. This attenuation was offset on the display and the signal adjusted to the -16.2 dBc level corresponding to the corrected RF power level for a 30 kHz resolution bandwidth. The power calibration was individually verified at each carrier for a 1.25 MHz resolution bandwidth which corresponds to the top of the Occupied Bandwidth mask. The top of the mask accurately corresponds to the specified power of 16 watts per carrier / 42 dBm. All of the plots are presented with a 7.5 MHz span and the center frequency of the specific sub-Block of interest. This allows for ease of comparison of the single, dual and three carrier performance.

*The frequencies and channels used are tabulated on the bottom of each plot. Input and output signals are plotted at each frequency/ channel. Plots are provided for Left Edge, Center and Right Edge of each PCS Block evaluated. These frequencies were chosen to show the occupied bandwidth in the channels in each of the PCS Blocks in which this radio can be operated, in compliance with Section 24.229 and 24.238 (c) of the Commission code. There are no SAT or Wide band data signals associated with CDMA. The signal used to show the occupied bandwidth is defined in table 14.1. This is the signal recommended in ANSI-J-STD-008 Section 3.1.4. The power output level was adjusted to provide the documented power levels at the bottom of each chart.*

The applied signal met the recommended characteristics per ANSI J-STD-008 section 3.1.4 as defined below.

Type	Number of Channels	Fraction of Power (Linear)	Fraction of Power (dB)	Comments
Pilot	1	0.1490	-8.3	Walsh 0
Sync	1	0.015/p	-18.3	Walsh 32, always 1/8 rate
Paging	1	0.054	-12.7	Walsh 1, full rate only
Traffic	6	0.13 each	-8.8 each	Variable Walsh Assignments, full rate only

**TABLE 14.1 Base Station Test Model, Nominal**

**Exhibit 14 continued**

**The minimum standard presented in ANSI-J-STD-008 Section 4.5.1.3.1 was followed.**

**“Suppression Inside the Licensee’s Frequency Block(s)”**

For all frequencies within the base station transmit band of 1930.000 to 1990.000 MHz that are within the specific block(s) allocated to the operator's system, the total conducted spurious emissions in any 30kHz band greater than 885 kHz for the CDMA channel center frequency shall not exceed a level of -45 dBc....

Measurement at a Resolution Bandwidth of 30 kHz is based on our experience with Section 24.238 of The Code and lacking other guidance.

The spectrum analysis output plots shows the peak of the CDMA channel signal 16.19 dB below the Mask reference / “zero dBc line” of the spectrum analyzer for the following reason: For the CDMA system there is no carrier without modulation. The following relationship was used to provide the correct level for an unmodulated carrier vs. the modulated signal.

$$10*\log (\text{Resolution Bandwidth}/ \text{Transmit Bandwidth}) = \text{Signal Offset} \quad (1)$$

For the peak of the CDMA signal measured with a resolution bandwidth of 30 kHz the signal offset is:

$$\text{Signal Offset} = 10*\log (30 \text{ kHz} / 1.25 \text{ MHz} ) = -16.19 \text{ dB}$$

**Measurement**

All of the tolerance lines are referenced to the top line of the Occupied Bandwidth mask, which is defined as zero dBc. For all measurements of the **ULAM / MCA's** Occupied Bandwidth, the output power was measured / adjusted individually to the 16 W level for each carrier and this is the 42.04 dBm value at the 0 dBc reference line.

In order to depict the tolerance lines that are required by Sec 24.238 of the FCC Rules and ANSI J-STD-008, all measurements were made with a resolution bandwidth of 30 kHz and the limits were adjusted using equation (1). An average detector was employed using minimum of 10 sweeps per trace.

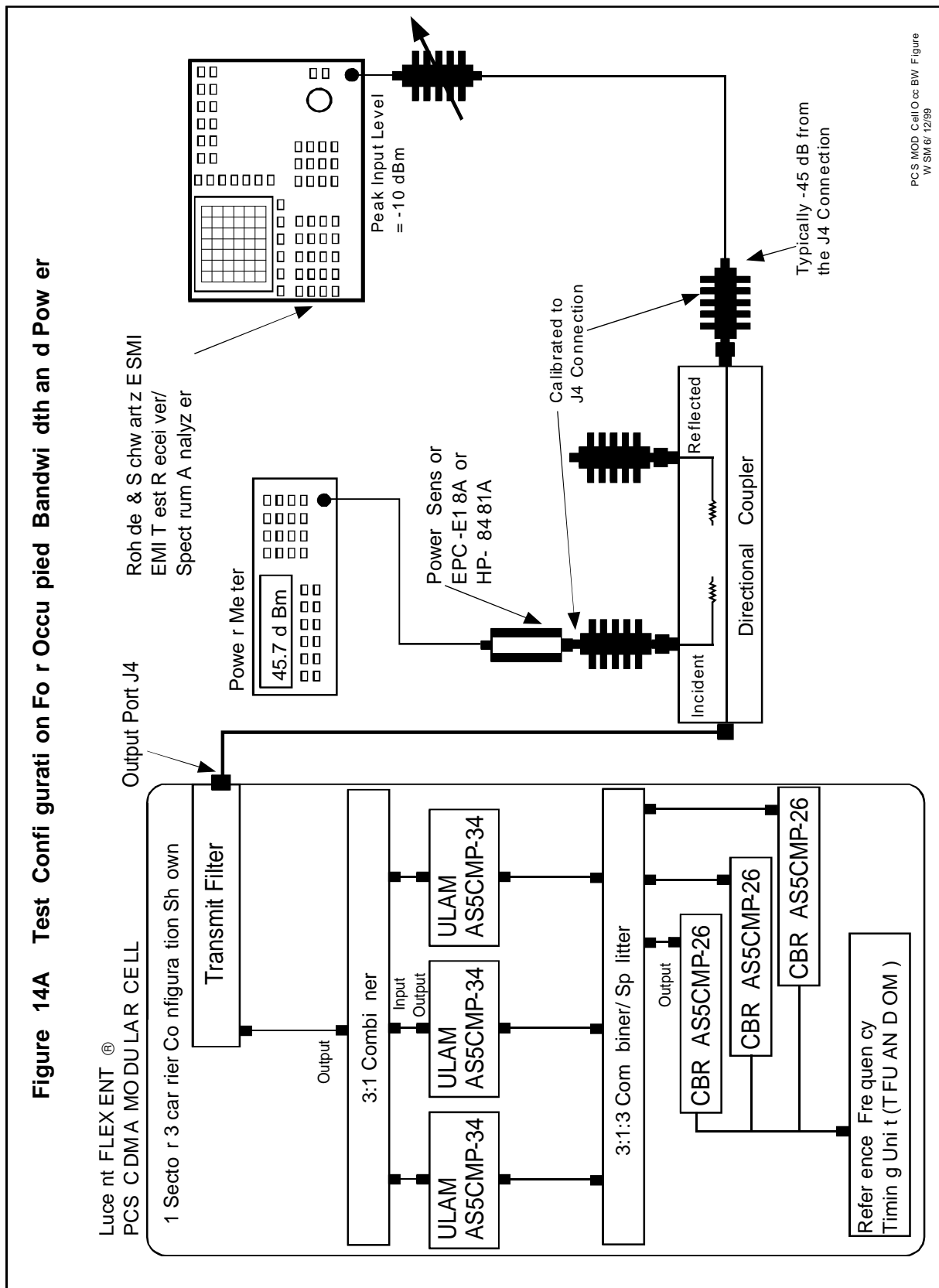
## Exhibit 14 continued

### Mask Description for Single Carrier

The Mask limits are identical for the left and right side of the PCS Blocks and are as follows. Figure 14-B shows the Mask limit for PCS channel 25 which is the left block edge for Block A and the band edge for the PCS band. The top of a typical CDMA signal viewed at a resolution bandwidth of 30 kHz is shown at the -16.2 dBc line. This line is based on equation 1, and the ratio of the 1.25 MHz bandwidth and the 30 kHz resolution bandwidth of the spectrum analyzer. The vertical line from a to b (i.e. a-b) is at 885 kHz from the center of channel 25 (i.e. Fc), per ANSI J-STD-008. The horizontal line b-c is 45 dB below the 0 dBc reference level. The vertical line c-d is at 1.25 MHz from the center of the channel. The placement of line d-e is derived from evaluation of the signal and 12.5 kHz resolution bandwidth, using the suggested value in section 24.238 of the rules. The ratio of 30 kHz to 12.5 kHz in equation (1) gives 3.8 dB. Adjusting the tolerance line to reflect this difference puts the -13 dBm limit line at -9.2 dBm or -51.24 dBc below the reference line. The vertical line, e-f is at 2.25 MHz from the center of channel 25. The horizontal line f-g is drawn at -70.27 dBc below the 0 dBc / 42.04 dBm reference because the rules require a 1 MHz resolution bandwidth for measurements 1 MHz or greater outside the PCS band. Again, equation (1) and the ratio of 1 MHz to 1.25 MHz provides this value. The same logic was used in determining the other block and band edge tolerances.

### Mask Description for Multiple Carrier

The mask for multiple carriers only adjusts the width of the carrier portion of the mask. For the example given with multiple carriers there would be no adjustments made to the "Left Edge of Block" requirements. The specified "Right Edge Limit" is treated as an expansion of the non Block edge corner aa to be the required + 885 kHz from the center of the "right most" channel. The "Right Edge of Block" limits were derived consistently.



**Exhibit 14 Continued****Test Equipment and Results****Measurement Equipment used in Figure 14A For Measurement of Occupied Bandwidth**

<b>Modular Cell</b>	Fully Populated PCS Modular Cell
<b>OM 1&amp;2 :</b>	Oscillator Module, 15 MHz Rubidium and Crystal types
<b>CBR: 1-9</b>	CDMA Baseband Radio (FCC ID: AS5CMP-26)
<b>ULAM: 1-9</b>	Ultra Linear Amplifier Module (FCC ID: AS5CMP-34)
<b>Transmit Filter:</b>	PCS Block Transmit Filter appropriate for the investigated Block
<b>Directional Coupler:</b>	HP 778D and 772D Dual Directional Coupler
<b>Power Meter:</b>	HP E4419A Power Meter with EPC-E18A Power Head
<b>Plotter:</b>	HP Model 7470A Plotter
<b>Attenuators, Variable</b>	HP 8494B and 8495B digital attenuators
<b>Attenuators, Fixed</b>	Weinschel Corp DC-18 GHz, various values
<b>Spectrum Analyzer:</b>	Rohde & Schwarz ESMI EMI Test Receiver

**RESULTS:** The following exhibits illustrate the spectrums investigated and document compliance.

***W. Steve Majkowski NCE***



Exhibit 14 continued

Figure 14B Occupied Bandwidth Mask

