ADC
TELECOMMUNICATIONS

EXHIBIT X

ALIGNMENT PROCEDURE

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure

In the following procedure, the complete transmitter is adjusted for optimum performance, beginning with the start up procedure of the QAM modulator, followed by the QAM agile upconverter, then the digital transmitter, starting at the base band input and adjusting each circuit for its specified performance while observing the appropriate output parameters of the board or subassembly being adjusted.

Because of the broadband nature of most of the amplifier stages, this is a straightforward procedure, easily accomplished if base band, IF, and RF test equipment is available. In this procedure, the input signals are first connected and each circuit is adjusted in sequence by connecting the test equipment to the specified point.

Equipment Needed

Spectrum Analyzer
RF Power Meter
30 dB Directional Coupler
10 dB Directional Coupler
Volt Meter
50Ω Load

Adjust the spectrum analyzer for the following settings:

1. Resolution BW = 30 KHz
2. Video Averaging (ON)
3. Span = 20 MHz
4. Video Bandwidth = 30 kHz
5. Center Frequency = 44 MHz

The average power of a modulated QAM digital signal, with the specified analyzer settings, is +23dB higher than the displayed signal. The measurements in this alignment procedure will be given in average levels.

Example: Analyzer reading of –30 dBm
Average power = -30 dBm + 23 dBm = - 7 dBm.

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure - continued

WMTS (QAM MODULATOR TRAY)

Follow the steps listed in Sections 2.2.1 and 2.2.2 of Exhibit III to bring the WMTS modulator online.

The test described in the above sections involve a bi-directional “ping” test between a CPE (customer premise equipment) PC and the NMS (network management system) via the WMTS. Once this test is completed the front panel LED indicators on the WMTS are checked for proper operation.

This completes the set-up of the WMTS unit.

2.5 Alignment Procedure - continued

AGILE UPCONVERTER TRAY

Follow the steps listed below to bring the MA4040D Agile Upconverter online.

1. Turn on the tray by connecting the AC power cable to the power module and observing the front panel LEDs. The upconverter modules are configured using the LCD display and push buttons on the front panel of the power module.

2. Verify that the green power LED is illuminated on the front panel of the upconverter module. The power LED indicates that the module is installed correctly and that power is present.

3. Using the front panel push buttons, select the upconverter module that will be used for the test. The green Module Select LED will illuminate when selected.

4. Confirm that the Alarm LED is not illuminated. If illuminated check module and status codes on LCD. (Note: check manual for status code definitions)

5. Set the output frequency of the upconverter for channel A1 (222.00 MHz).

6. Set Auto IF to Enabled.

7. Using the front panel buttons select RF Pwr.

8. Using the arrow keys adjust the RF Pwr to approximately 55dBmv.

9. Using the front panel buttons select Output Enabled.

At this point the MA4040D Agile upconverter has been powered up and the output spectrum may be observed.

Using a spectrum analyzer verify the proper shape and center frequency (44 MHz) of the spectrum at the IF output port (J5). Verify that the power level corresponds to that set in step 7 above.

The upconverter circuitry requires no user adjustments.

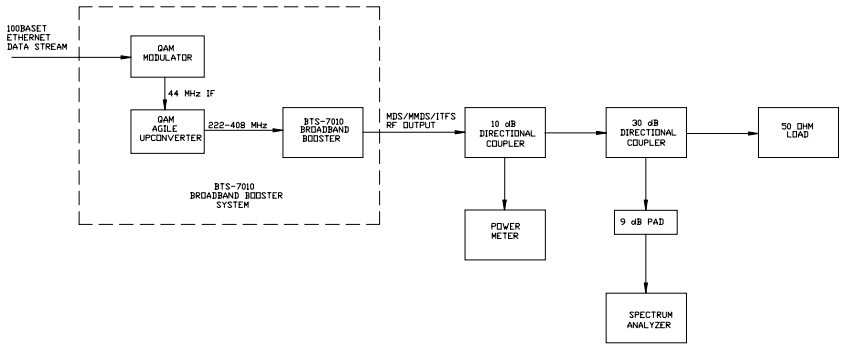
2.5 Alignment Procedure - continued

BTS-7010 BROADBAND BOOSTER

The various modules which make up the BTS-7010 set up at the factory for optimum performance using specially designed test fixtures. The internal circuits require no user adjustments and therefore this alignment procedure is presented on a system level.

1. Connect the output of the Agile Upconverter to the Sector #1 input (J231) on the rear of the Upper/Lower Signal Processing Chassis (note: this input is fed to the input of the Multiplexer Assembly).

2. Connect the RF output of the transmitter, J201 on the Band Pass Filter Chassis, to a spectrum analyzer and RF power meter using a directional couplers and suitable 50 Ohm load as shown below.



3. Connect AC power cord to AC input jack J220 on the rear of the Power Amplifier/Power Supply Chassis.

4. Place AC circuit breaker CB1 located on rear of Power Amplifier/Power Supply into the ON position.

5. Verify that the front panel power supply status LED's (±12VDC Switching Supply and +380VDC PFC Power Supply) are green (no fault).

6. Using the front panel push buttons located font panel of the System Monitoring Assembly, place Sector 1 transmitter into the Operate mode.

7. Connect external 10 MHz reference to J9 located on rear of Control Assembly chassis.

8. Verify that External Source Reference LED is illuminated on front panel of 10 MHz Reference Assembly.

2.0 TECHNICAL DESCRIPTION

2.5 Alignment Procedure - continued

9. Place switch SW1, located on the front panel of the Upconverter Assembly into the ALC1 position (note: ALC1 potentiometer adjust IF level into mixer).

10. Adjust front panel ALC1 potentiometer until both the Low Input and High Input LED's are green.

11. Place switch SW2, located on front panel of the Upconverter Assembly into the ALC2 position (note: ALC2 potentiometer adjust the RF output level).

12. Adjust front panel ALC2 potentiometer for rated output power as observed on the RF Power Meter.

13. Verify both inband and out-of-band performance of transmitter on spectrum analyzer (see specifications).

This completes the alignment/setup of the unit.