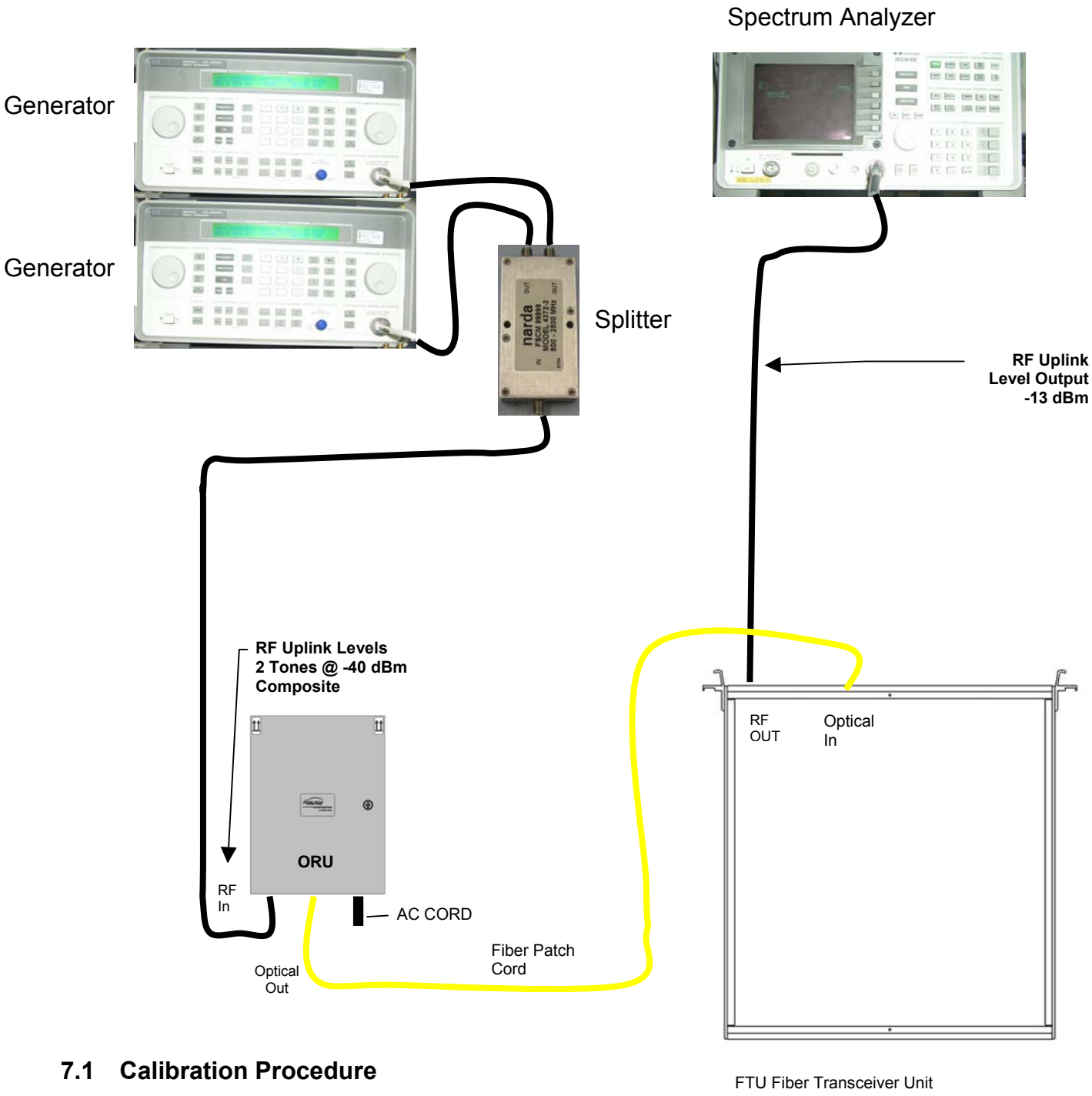

7.1 Calibration Procedure

7.1.1 Equipment Requirements

- RF Spectrum Analyzer capable of Marker Noise per Hz measurements in 800 to 900 MHz band and power measurements up to +30 dBm. (Equivalent Model is HP 8594E)
- Low Noise Pre-Amplifier 806 to 869 MHz Band pass with 20 to 30 dB Gain and Noise figure less than 10 dB. (Equivalent Model is Agilent 8447D, 25dB, 8.5 dB NF)

- RF cables and adapters as required
- Small Screwdriver Flathead
- Optical grade cleaning alcohol (99.6% pure)
- Fiber Optic Connector Cleaner

7.1.2 Measurement Setup Diagrams

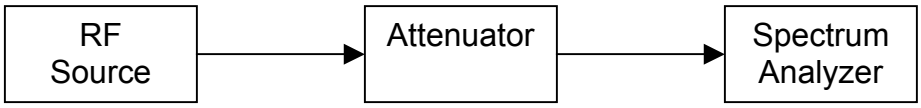

Figure 5. RF Signal Measurements

Attenuator is for high power RF measurements. The attenuator is not required for low power measurements (about 0 dBm RF Levels). For high RF power measurements, use a 10 dB, 2 Watt attenuator pad when maximum RF level into Spectrum Analyzer is at **+30 dBm**, set the analyzer input attenuator set to 50 dB.

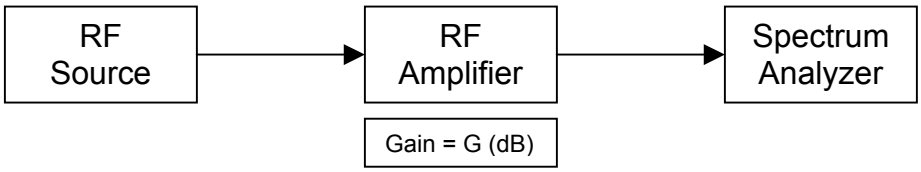

Figure 6. RF Noise Measurements

RF Amplifier is for low power RF Noise measurements. Analyzer input attenuator set to 0 dB. Spectrum Analyzer is set for marker noise mode to give noise per Hz display. The marker must be positioned on the noise floor and not on any spurious signals in the RF frequency band. Noise of RF source is analyzer noise measurement is:

$$RFnoise = Nsa - G \qquad (dBm/Hz) \qquad eq.1$$

Where, *RFnoise* is the RF Source noise in dBm/Hz, *Nsa* is noise measured on the spectrum analyzer in dBm/Hz, and G is the amplifier Gain in dB. Using the gain control of the FTU front panel potentiometer adjusts noise level to be compatible with the basestation requirements. LNA has uplink sensitivity level capability.

7.1.3 Start up Conditions

- Verify all RF cables are connected and all unused RF connections terminated with 50 Ohm terminations.
- Verify all Alarm and AC connections are properly made
- Apply AC power to system components.
- Connect fiber optic cables.

- Use fiber optic connector cleaning precautions to get the highest performance from the system. Do not make optical connector tip contact with any hard surface. Be sure the FC/APC key is aligned before tightening. Do not over tighten.

  Do Not exceed the Maximum Rf input level to units, FTU downlink is RF input 0 dBm Composite. ORU Uplink RF input is (-) 40 dBm Composite.

7.2 Downlink Results

The ORU has high output power and provides 1.26 Watts of RF Power (+31 dBm). The ORU has constant automatic level when the output reaches 31 dBm Composite. See Heading 6 for equipment setup. Inside the ORU the rf gain is factory adjust with a potentiometer and does not need to be adjusted.

7.3 Uplink Results

The Uplink rf gain is set to 27 dB with a 1 meter fiber patch cord. See Heading 7 for equipment setup. The noise figure is 4dB. Use the test configuration shown in part 7. Connect the spectrum analyzer to the RF out port corresponding to the transceiver being calibrated. Adjust the gain on the front panel of the Fiber Transceiver Unit (FTU) for the transceiver being calibrated to give an RF level required at the basestation.

7.4 Caution

BDA has internal AC power connections that can cause shock if operator is not careful. Always verify the AC Power Protection Cover is protecting the AC line connections on the terminal block connector. Do not leave tools inside of BDA that can cause dangerous shock hazard.

8 Maintenance

This Fiber Optic repeater system does not require maintenance. However, use precautions while installing optical fibers to keep connector surfaces clean. An unclean optical connector surface can damage the internal transceiver connector which will degrade system performance and void Fiber-Span warranty.

9 Company Information