

## Level 1 Troubleshooting Guide –

### Apex Family Equipment

#### STEP 1: Describe the symptom:

#### STEP 2: Review the common problems and solutions:

##### No Link (Lock =0 during linktest)

- 1) TX Frequency must EXACTLY match the RX frequency on the remote side. Type *freq* command to view. Verify that the frequencies used match the regulatory body (FCC) approved frequencies.
- 2) Opmode is off. Run *opmode* command to view, and run *opmode on* to enable. If the unit was rebooted and the default opmode is not on, the unit will come back on but the opmode will be off. To prevent, run *default\_opmode* on command and *save* (Apex)
- 3) Are the frequencies configured correctly on each radio (TX and RX)? High frequency on the Apex B model and low frequency on the Apex A model.
- 4) Is the waveguide transition installed properly? The rectangular openings on the ODU and transition must be lined up, and the transition tightened properly. Remove and reconnect if not. This is shown in the manual.
- 5) Are both Apex mounted on the same polarization? Apex Radios must be mounted with matching polarizations at each end of the link. If one side is mounted on the antenna differently than the other side, the link will not lot or the signal level will be 30 or more dB lower than expected.
- 6) IF ACM is being used, ACM may not be enabled on both ends of the link. Enable the ACM and reset the speed on each end. The speed must be set the same on both ends.

**MSE is too high and/or bit errors are showing when running linktest**

**NOTE: MSE= -32 dB or lower is typical for 256 QAM, -29 is a worse number and is not typical**

- 1) Is the transmitter power set too high for the modulation being used. Consult the license information to verify that the power level is no higher than the maximum allowed for the highest modulation that will be used.
- 2) Target RSSI setup may be set incorrectly. It should be set about 3 to 5 dB lower than the actual RSSI so that the Apex will set its RX gain for optimum Noise figure and input level.
- 3) Are both Apex radios mounted on the same polarization? Apex radios must be mounted with matching polarizations at each end of the link. If one side is mounted on the antenna differently than the other side, the link will not lock or the signal level will be 30 or more dB lower than expected.
- 4) Is the waveguide transition installed properly? The rectangular openings on the Apex and transition must be lined up, and the transition tightened properly. Remove and reconnect if not. This is shown in the manual.
- 5) Presence of microwave transmitters on same frequency (uncommon): To check for possible interference from other licensees, turn off the opposite end transmitter and run the *rssi* command. The signal level should be -60 or lower. The level should be steady within a dB or so.

**Receive Signal Level is too low**

- 1) Target RSSI setup may be set incorrectly. It should be set about 3 to 5 dB lower than the actual RSSI so that the Apex will set its RX gain for optimum Noise figure and input level.
- 2) Reported RSSI more than 3 dB off the expected RSSI: There may be an alignment problem with the antenna, especially if both sides of the link show the same symptom. Solution: Realign the antenna(s). Opmode must be on at the remote side of the link to do alignment of the local side. Ensure that ATPC is off and that after the alignment is completed the alignment mode is turned off.
- 3) Are both Apex radios mounted on the same polarization? Apex radios must be mounted with matching polarizations at each end of the link. If one side is mounted on the antenna differently than the other side, the link will not lock or the signal level will be 30 or more dB lower than expected.

- 4) Is the waveguide transition installed properly? The rectangular openings on the Apex and transition must be lined up, and the transition tightened properly. Remove and reconnect if not. This is shown in the manual.

**RF Link is good but packet loss is occurring:**

- 1) Verify the duplex and speed settings in the Ethernet port are correct (100 or 1 Gbit) and match the connected equipment, and that no CRC errors on the port are occurring.
- 2) Verify that the Ethernet ports are connected properly. The Apex family of Radios are port mapped, meaning that the traffic going into Ethernet Port 1 on the local side will only appear at port 1 of the remote side, local side port 2 traffic will appear on the remote side port 2, etc..
- 3) Check the Ethernet cables for correct wiring. If 1000BaseT is being implemented, Cat6 cable should be used. Ensure that the cable is shielded and proper grounding is applied to the RJ45 connector.

**No Radio Management connection over the link**

- 1) Verify the In-Band management is set up properly - Check to see if the IP configuration is correct, the VLAN ID is set and matches on both ends, and that IBM is enabled. (See How To on IBM)

**Step 3 : Collect Product Setup Information prior to sending to Tech Support.**

1) Equipment:	<b>Apex A</b>		<b>Apex A</b>
	S/N		S/N
	Firmware		Firmware
	Model		Model
	Antenna/Pol		Antenna/Pol
	Power Supply		Power Supply

	<b>Apex A</b>		<b>Apex B</b>
Distance:		miles	
TX Freq	GHz		GHz
TX Power	dBm		dBm
Speed/Mod			
ACM ON			
ATPC ON			
Expected RSSI :	dBm		dBm
Surge Suppressor on the Apex(s)?	<input type="checkbox"/> Yes		<input type="checkbox"/> No

How long has the link been running without problems?

Any significant event like extreme weather or a power outage occur around the time the symptom started showing up? Please elaborate:

**Step 4: Record Current Link Parameters if the system is locked**

Apex A :	MSE	RSSI	Lock Status	Speed
Apex B :	MSE	RSSI	Lock Status	Speed



Is this any different than when the product was installed? If yes, then provide the original values:

Apex A :	MSE	RSSI	Lock Status	Speed
Apex B :	MSE	RSSI	Lock Status	Speed