5   OneRAN 20W RU Interface Cabling [Slim RU Series]

5.1   RF Cabling – Sector Configuration

The OneRAN transmitter exciter output and diversity receiver inputs are connected to the Sector RU units which contain the duplexer, LNA (Low Noise pre-Amplifier) and HPA (High Power Amplifier) functions. One Sector RU unit is provided for each sector (total of 3 for 3 sector configurations. Connect using jumper cables as shown in Figure 5-1.

Use only the cables supplied with the RU system for interconnection to the OneRAN. Cables are labeled for ease of installation. See Figure 5-2 for cable specification.
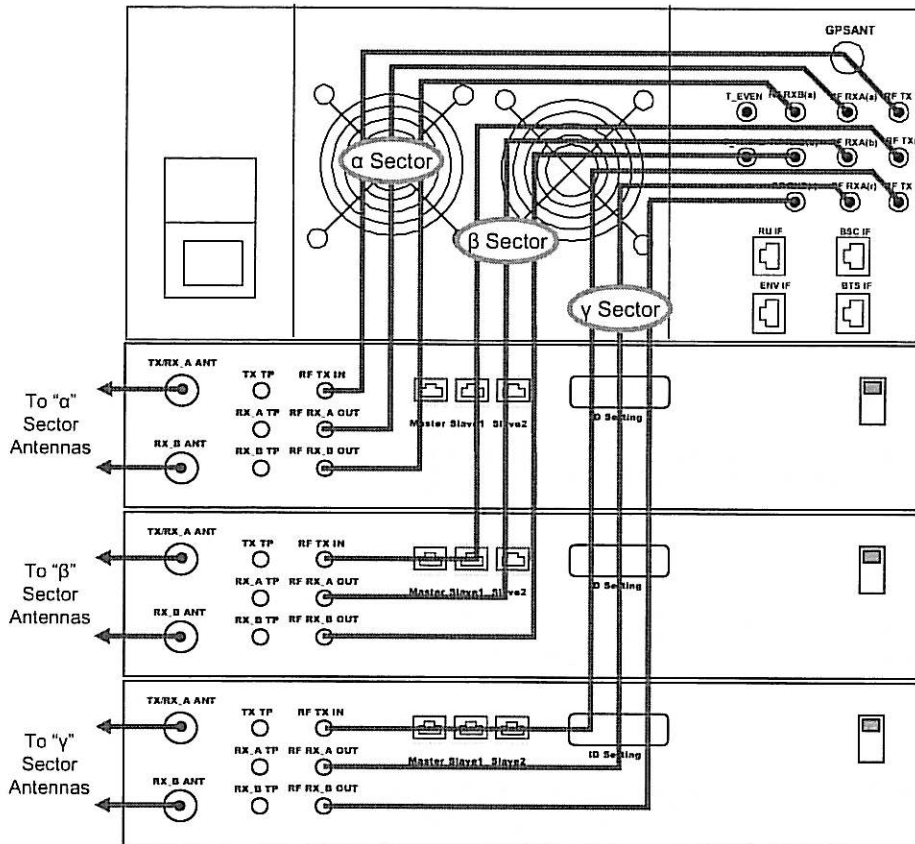

Figure 5-1 Sector RU RF Cabling Diagram (Sector Configuration)

It is important to ensure transmit and receive connections are made correctly to prevent damage or field operational problems such as:

- Damage due to transmitting into a receiver port

- Crossed over diversity receive ports

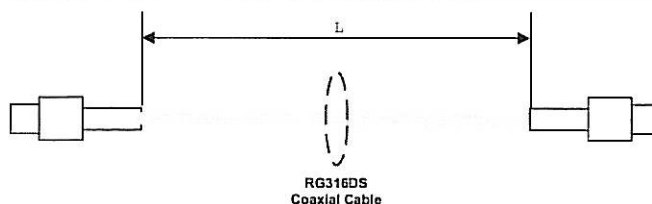- Crossed over sectors which could disrupt RF system design/optimization

Figure 5-2 OneRAN to RU RF Cable Specification

Antenna Connections

Connect the external transmission lines from the diversity antenna systems to the RU Antenna connections as shown in Figure 6-1. External connectors are "N-Type".

Note that transmission line (or jumpers to transmission line) type and length will impact the overall link budget calculations for the cell site. Be sure to include these losses in the RF system design calculations for coverage.

5.2 RF Cabling – Omni Configuration

Omni configurations are cabled similarly to the Omni case, except that only 1 RU unit is provided. Connect the RU unit to the OneRAN main unit using jumper cables as shown in Figure 5-3.
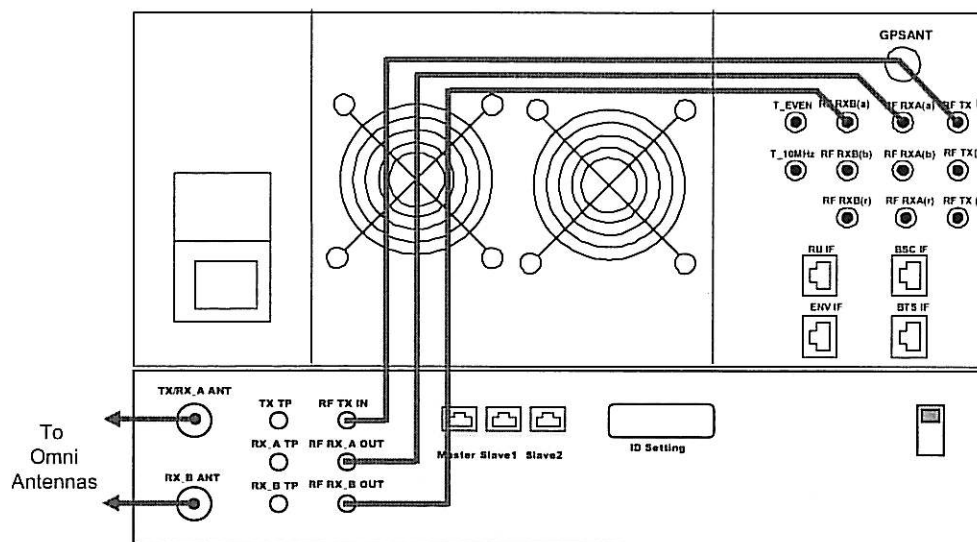

Figure 5-3 Sector RU RF Cabling Diagram (Omni Configuration)

Use only the cables supplied with the RU system for interconnection to the OneRAN. Cables are labeled for ease of installation. See Figure 5-2 for cable specification.

Observe the same RF jumper cable installation precautions and antenna connection precautions identified in section 5.1 (Sector Configuration).

5.3 OneRAN IPC Cable (Inter-Processor Communications link)

The IPC cable is normally installed at the factory, but may require installation in the field as shown in Figure 5-4. The connectors (BTS MMI & BSC MMI) are located on the main unit front panel (behind the filter door). Use only the cable supplied with the IP-RAN.
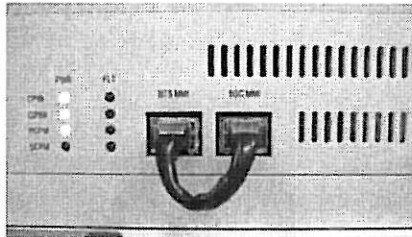

Figure 5-4 IPC Interconnection Cable

The IPC cable provides an alternate path for BSC to BTS communications in case an Ethernet connection problem prevents BSC-BTS communications via the normal Ethernet switch path. Use of the IPC link is not mandatory, but can it be helpful in supporting remote diagnostics under some communications failure conditions. Therefore installation of the IPC cable is recommended for all base station sites.

5.4 Serial RU and Ethernet Cable Wiring

For Omni configurations connect the master RU interface cable between the main unit port marked "RU I/F" and the master RU port marked "Master", as shown in Figure 6-5. Use only the marked serial cable supplied with the RU system for this purpose. Ensure the RJ-45 connectors are properly seated ("click") to prevent accidental disconnection. This connection allows the OneRAN to communication with master RU system for the purposes of transferring measurements, alarms and control functions.

For sector systems, connect a slave RU interface cable from the master RU (sector α) first slave port to the second RU (sector β) slave port. Connect a second slave RU interface cable from the master RU (sector α) second slave port to the sector γ slave RU slave port as shown in Figure 5-5.

Use only the RU interface cables supplied with the RU unit. Each RU comes with a master and a slave RU interface cable which are not interchangeable. Discard unused cables after installing the correct cables for the application.

Connect the external Ethernet connections (cable not supplied) from the local Ethernet switch or hub at the cell site to the BTS and BSC Ethernet ports on the OneRAN as shown in Figure 5-5. Use category 5 Ethernet cable (or better) for best performance. These connections allow the IP-RAN system to communicate with the MSC/MG switch center.
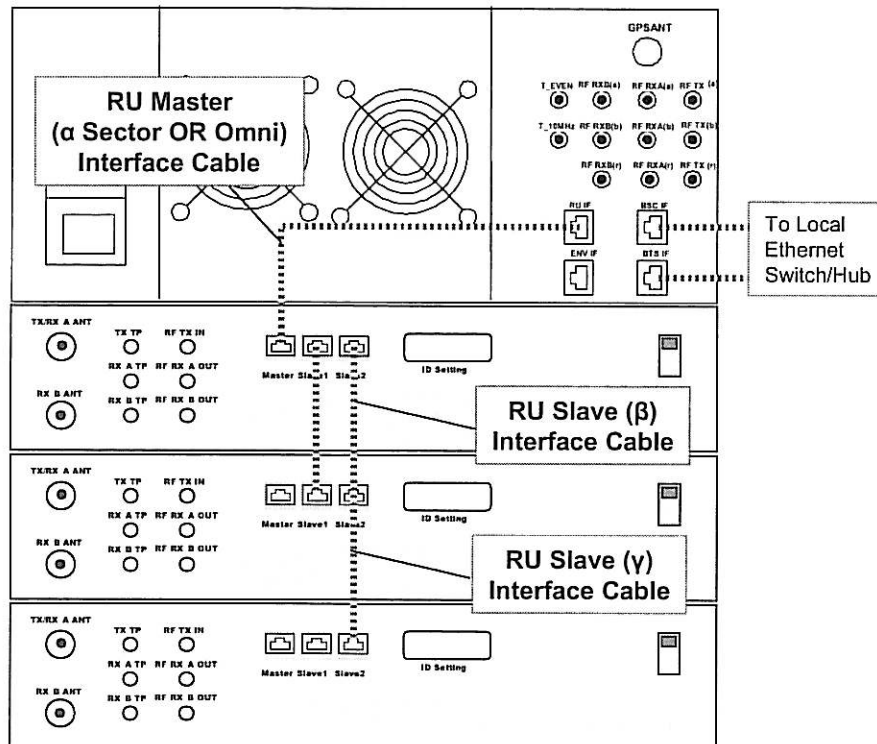
Figure 5-5 Ethernet & RU Interface Cable Wiring

5.5 Grounding

Grounding of the IP-RAN system to the local site grounding system is essential for both safety and proper RF performance. The grounding of the IP-RAN system should be integrated with the overall site grounding plan as designed by the site planning engineer. A "halo" perimeter grounding system is recommended for site equipped with external antennas that are subject to possible lightning strikes.

A ground strap is provided with each IP-RAN system and each RU system to allow bonding to a ground bus bar or to a common rack grounding point. Each ground strap is installed on the IP-RAN main unit and on the RU amplifier system as shown in the Figure 5-6 below.

Other ground cabling or bus bars used in site installation must be suited to the purpose and meet any applicable local electrical codes.

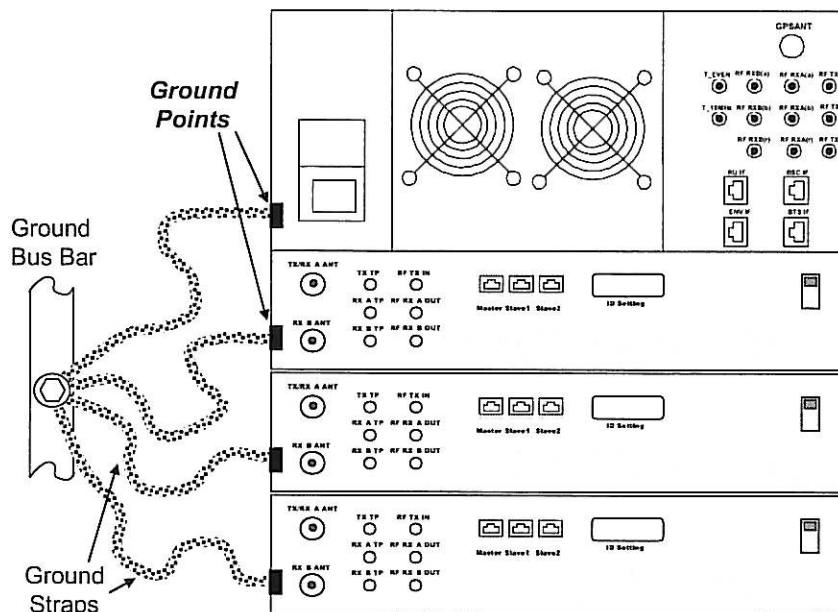Ground connections should be tested for continuity after installation.

Figure 5-6 Ground Strap Wiring

5.6 Power Supply Wiring (AC Powered Versions)

Connect OneRAN main unit and the Sector RU system(s) to suitable AC power sources as shown in Figure 5-7. Use only the AC power cables provided with OneRAN unit and the RU unit to ensure continued safe operation.
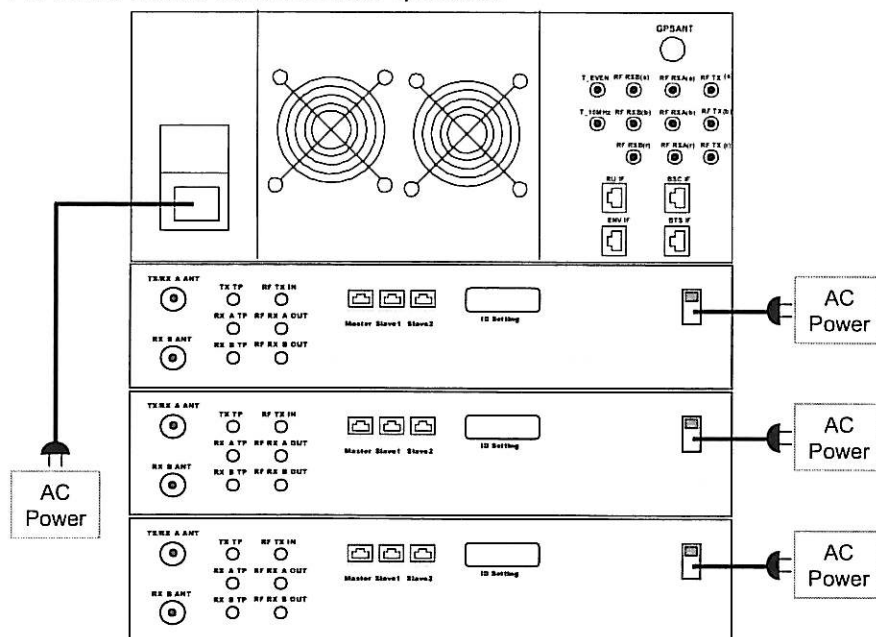

Figure 5-7 OneRAN Power Cabling

5.7 Power Supply Interconnect Wiring [DC Powered Models]

Systems equipped for DC operation include a separate DC distribution unit (RPSU) which provides DC power distribution and over current protection for connected equipment. The RPSU also provides voltage and current measurement meters on the front panel. An RPSU can support up to 3 RU systems and therefore can be used on both Omni and Sector DC powered configurations. Note the RPSU must also be grounded in a similar manner as the other system components.

Connect OneRAN main unit power interconnect cable between the main unit and the RPSU power supply as shown in Figure 5-8. Use only the cable supplied with the RU system for this purpose. Tighten connector captivating screws to prevent accidental disconnection.

Connect the RU power interconnect cable between the first sector RU assembly and RPSU as shown in Figure 5-8. Use only the cable supplied with the RU system for this purpose. Tighten connector captivating screws to prevent accidental disconnection.

For sector configurations connect the second and third RU power interconnect cable between the RU assemblies and the RPSU unit as shown in Figure 5-8. Use only the cable supplied with RU system for this purpose. Tighten connector captivating screws to prevent accidental disconnection.
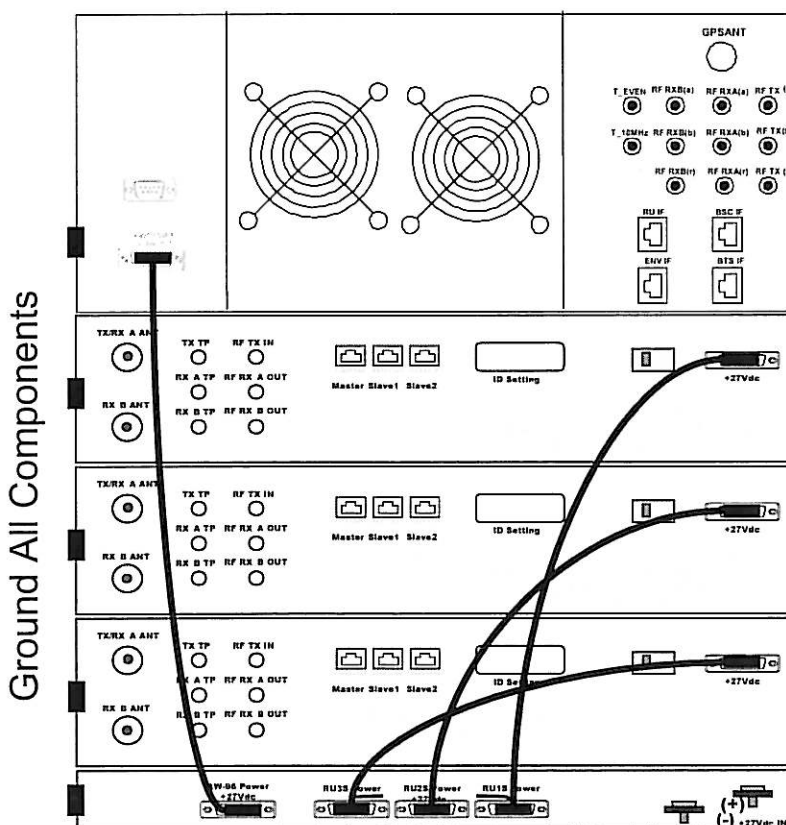

Figure 5-8 OneRAN & RU to RPSU Power Connections [DC models]

Connect the RPSU main power bus to the external DC power supply system using the two hole bolted connections as shown in Figure 5-9. Note power lugs and connection bolts are not supplied with the IP-RAN system
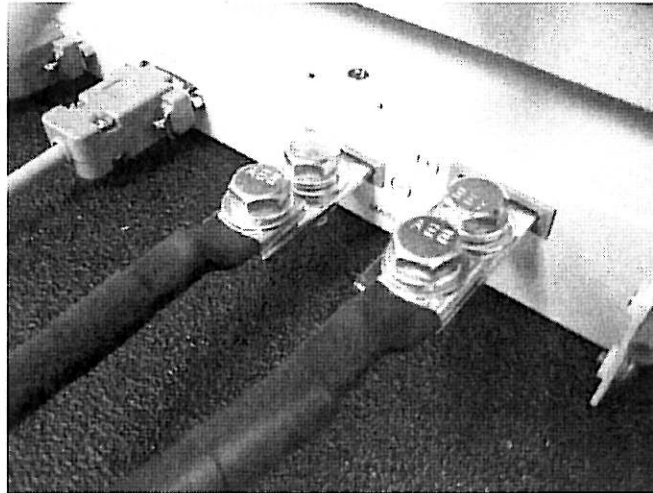

Figure 5-9 External DC Bus Power Connections [DC models]

The following practices are recommended for DC bus connections:

- Use suitable lugs (Blackburn CTL2-2516 or equivalent lug recommended)

- Use suitable gauge cables (#2/#4 gauge flexible stranded recommended)

- Tighten bolts firmly to prevent movement or arcing

- Use heat shrink tubing, or equivalent, to cover and protect connections

- Power source should be independently fused at the origin point

IMPORTANT – Do not turn on power source until installation is fully completed.

IMPORTANT – Extra care is required when working with high current DC power systems to avoid personal injury. Protect all DC connections to avoid accidental short circuits.

5.8 GPS Antenna Cable Wiring

Connect the external GPS antenna RF cable to the GPS antenna port on the OneRAN unit as shown in Figure 5-10. The GPS connector is a "TNC" connector. The AirWalk OneRAN Series GPS antenna kit (AWANC001GPCA01) includes a GPS antenna, mounting hardware and a 25m cable (RG-58 or better).

Note the GPS antenna must located outside in a position to see the general sky. The GPS antenna must see at least 4 GPS satellites in the sky to receive enough time information for proper system operation.
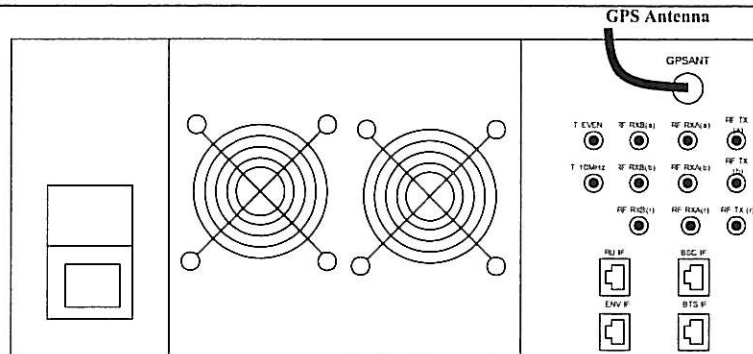
Figure 5-10 GPS Antenna Cable Wiring

5.9 Optional DC Output Connection [DC Models ONLY]

OneRAN IP-RAN DC powered models are equipped with an optional +12 VDC output connection which can be used to power local equipment such as a small Ethernet switch or hub. Maximum available 12V output current from this connection is 3A.

The capability is provided because a local Ethernet switch is usually required to support BTS to BSC communications, but often a 12V power source is not available in a DC power cell site. Using the optional +12 VDC output eliminates the need for an expensive independent 24V to 12V DC/DC converter unit.

The DC 12V OUT connection is located on the rear power connection panel. The connector is a chassis mounted DB-9 MALE connector (mating cable must be DB-9 FEMALE connector). The connector and pin-out connections are shown in Figure 5-11.
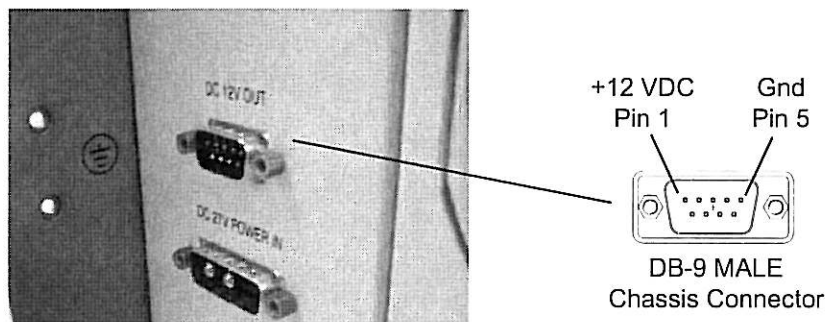

+12 VDC   Gnd
Pin 1   Pin 5

DB-9 MALE
Chassis Connector

Figure 5-11 Optional DC Out Connector