

## **Base Station**

### **Output Power Tune up procedures;**

The BTS transmitter output power is tuned and set during BTS calibration, one of the standard steps in BTS installation & commissioning procedure. BTS tunes its output power by varying the gain of the transmitter chain. For each TX gain setting, the transmitter output power is measured through the calibration cable and compared with the maximum output power setting at EMS (1 watt). When the output power reaches the EMS setting, the TX output power tuning will be terminated and the corresponding TX gain will be kept un-changed.

### **Description of all active components in the system**

The Base station consists of a RF shelf and a digital shelf. RF shelf contains 8 RF modules and channel filters. Digital shelf contains two synthesizer modules (one active, one spare for redundancy), two IF modules, two channel processor modules, two modulator/demodulator modules, and two communication modules (one active, one spare for redundancy).

- RF module: RF module basically does two functions: Frequency conversions and high power amplification during transmitter period. It works in TDD mode. During receive period, it amplifies and converts the received RF signal to IF signal. During transmission period, it converts the IF signal received from IF module and amplifies the RF signal to a high level set by EMS during I&C. Some filtering is carried out at RF module as well.
- IF module: During the receive period, the IF signal received from RF module will be quadrature demodulated into base band signal and sent to channel processor module. During the transmitter period, the base band signal from channel processor module will be quadrature modulated into IF signal. IF module provides the majority of the filtering required for receiver selectivity.
- Channel processor module: Both the up and down link beam forming (antenna array) are performed at channel processor modules. It also performs the multi-carrier channelization during uplink and summation during the downlink.
- Modulation/Demodulation module: The modulation/demodulation modules perform modulation during down link period and demodulation during uplink period.
- Communication module: It provides the network interference between network backhaul and Navini BTS.
- Synthesizer module: It provides all the frequencies required for IF and RF conversions.
- Channel Filter: 10MHz Bandwidth. It rejects transmitter out-of-band noise for FCC out-of-band emission compliance.

### **Operational description**

The BTS operates in TDD mode. During the transmission period, the data received from network will have the following sequence of the operations: format conversion at communication module, modulation at modulation/demodulation module, summation (multi-carriers) and beam forming (antenna array) at channelization module, frequency conversion (from base band to IF) at IF module, and frequency conversion (from IF to RF) and amplification at RF module. During the receive period, the data received from the antenna will have the following sequence of the operations: amplification (small signal) and frequency conversion (from RF to IF) at RF module, frequency conversion (from base band to IF) at IF module, beam forming (antenna array) and channelization (multi-carriers) at channelization module, demodulation at modulation/demodulation module, and format conversion at communication module.