# Set TX Power

The recommended single user TX output power (QPSK/16QAM) is +18dBm for 3.4-3.6GHz, +20dBm for 1.8-1.9GHz, and +21dBm for all other bands. This procedure is used to measure the TX output power when set up in commissioning mode 1.

## System Soak

It is necessary that the system is powered up for at least two hours to allow for temperature stabilisation before proceeding with the measurement of the TX power

## Tools and equipment needed.

| Item | Description | Recommended Model | Quantity |
|---|---|---|---|
| 1 | 50 ohm Termination 10W | ArraN9510 | 1 |
| 2 | RF Power Meter | Anritsu Sitemaster S400A or Marconi 6970 | 1 |
| 3 | Power Sensor | Anritsu 560-7N50B or Marconi 6932 | 1 |
| 4 | Attenuator for use with Anritsu | HP 8491 (N Type) | 1 |

## Test TX Output Power (Test 5)

**Note: If adding a shelf to a rack that is already in service it is necessary to remove the RF card for any shelf sharing the power amplifier in order to make power measurements. This is best done when traffic loading is at its lowest**

 In order to commission the output power of the rack, a Power Meter must be connected via a power sensor to the N-Type connector on the DIP/LNA at the top of the rack. Protect the meter by connecting a 30dB attenuator (HP 8491) to the output of the DIP/LNA as the output power can exceed 33dBm.

**Note:** The output from RF cards 1 and 2 is measured on DIP/LNA1. The output from RF cards 3 and 4 is measured on the DIP/LNA2. If the AS4020 shelf has been added to an existing rack then the RF card used must be inserted prior to measuring the shelf power. The port not under test if not connected to an antenna should be terminated with a 10W termination.

**Measure the output of AS4020.** (This test is repeated for other installed AS4020 shelves)
Connect RF meter via a 30dB attenuator on the antenna port to protect the power sensor from damage.
Configure the AS4020 using the menus on the front panel. From the Top Menu >Setup Menu >RF Menu set the following values:
**Note:** The PN code should always be set prior to entering commissioning mode.

| **RF Menu** | |
|---|---|
| TX Clipping | 00101 |
| Disable TX and RX | False |
| Downlink Frequency | Enter DL frequency kHz with leading 0 e.g 03522751 |

| | |
|---|---|
| Uplink Frequency | Enter UL frequency kHz with leading 0 e.g 03522651 |
| Channel Bandwidth | 00002 (=3MHz) |
| PN Code | PN code as supplied** |
| RF Commissioning | Mode 1 **Note:** If in commissioning mode the top menu displays RF commissioning alarm |
| Card Type | enter card type ( See number on RF card) |
| RX Sensitivity | 02500 |
| TX Power | 03000 |
| | |

** The commissioning procedure described in this document is not restricted to any particular RF channel or PN code. However the user should make sure that both the CT and ST are programmed with identical RF channel and PN code. At the CT end, the RF channel and PN code can be selected from the front panel in RF menu. In system operating Release 7.2x once the user changes the PN code he needs to re-enable the commissioning mode in order for this change to take effect properly. Release 7.30 however fixes this problem and the user should be able to change the PN code without the need to re-enable the commissioning mode.

## RF Card Cross Reference Chart

| RF Card Part Number | AS4020 Card Type | Band |
|---|---|---|
| 605-0010-296 | 303-0087-904 | 3.4-3.6 Plan 13 X6 |
| 605-0010-092 | 303-0087-920 | 3.4-3.6 Plan 1 X1 |
| 605-0010-093 | 303-0087-920 | 3.4-3.6 Plan 1 X1 |
| 605-0010-102 | 303-0087-922 | 3.4-3.6 Plan X3 |
| 605-0010-103 | 303-0087-922 | 3.4-3.6 Plan X3 |
| 605-0010-237 | 303-0087-923 | 3.4-3.6 Plan 2 X4 |
| 605-0010-238 | 303-0087-923 | 3.4-3.6 Plan 2 X4 |
| 605-0010-294 | 303-0087-924 | 3.4-3.6 Plan 13 X6 |
| 605-0010-322 | 303-0087-925 | 3.4-3.6 Plan 10 X7A |
| 605-0010-073 | 303-0093-900 | 2.0-2.3 Plan C2 |
| 605-0010-074 | 303-0093-900 | 2.0-2.3 Plan C2 |
| 605-0010-069 | 303-0093-902 | 2.0-2.3 Plan C1 |
| 605-0010-070 | 303-0093-902 | 2.0-2.3 Plan C1 |
| 605-0010-077 | 303-0093-904 | 2.0-2.3 Plan C3 |
| 605-0010-078 | 303-0093-904 | 2.0-2.3 Plan C3 |
| 605-0010-081 | 303-0093-906 | 2.3-2.5 Plan S1 |
| 605-0010-082 | 303-0093-906 | 2.3-2.5 Plan S1 |
| 605-0010-075 | 303-0093-920 | 2.0-2.3 Plan 2 C2 |
| 605-0010-076 | 303-0093-920 | 2.0-2.3 Plan 2 C2 |
| 605-0010-071 | 303-0093-922 | 2.0-2.3 Plan 1 C1 |
| 605-0010-072 | 303-0093-922 | 2.0-2.3 Plan 1 C1 |
| 605-0010-079 | 303-0093-924 | 2.0-2.3 Plan C3 |
| 605-0010-080 | 303-0093-924 | 2.0-2.3 Plan C3 |
| 605-0010-352 | 303-0093-925 | 2.0-2.3 Plan 5 C4 |
| 605-0010-083 | 303-0093-926 | 2.3-2.5 Plan S1 |
| 605-0010-084 | 303-0093-926 | 2.3-2.5 Plan S1 |
| 605-0010-163 | 303-1041-900 | 1.8-1.9 Plan P |
| 605-0010-122 | 303-1041-920 | 1.8-1.9 Plan P |
| 605-0010-295 | 303-1041-921 | 1.7-1.8 Plan P |
| 605-0010-330 | 303-1070-920 | 3.4-3.6 Plan X1 |
| 605-0010-394 | 303-1070- | 3.4-3.6 Plan 10 XHi |
| 605-0010-396 | 303-1070-924 | 3.4-3.6 Plan 13 XLo |
| 605-0010-399 | 303- | 2.0-2.3GHZ, Plan 5 C4 |

Go to Top Menu >Setup Menu >RF Menu>TX Power

**TX power**
To set the CT to transmit at QPSK or 16QAM adjust the TX Power until the output of the transmitter by increasing or decreasing the value until the level tabulated below is reached. If the CT is required to operate with a downlink of 64QAM then the output should be backed off by 3dB. **Note:** This will affect the system coverage and should be taken into account at the radio planning stage.

| Band | Power Meter Reading QPSK and 16QAM | Power Meter Reading for 64QAM |
|---|---|---|
| P | See Below | N/A |
| X | 21.4dBm | 18.4dBm |
| All other | 24.4dBm | 21.4dBm |

**P Band**
To comply with FCC requirements for Spurious Emissions at Block Edges, the transmit power of the CT should be reduced for channels 180, 181, 214 and 215 as detailed below.

| Channel | Downlink (MHz) | Uplink (MHz) | Power Commissioning mode 1 |
|---|---|---|---|
| 180 | 1932.00 | 1852.00 | 18.9 dBm |
| 181 | 1933.00 | 1853.00 | 22.4 dBm |
| 182 to 213 | - | - | 23.4dBm |
| 214 | 1987.00 | 1907.00 | 22.4 dBm |
| 215 | 1988.00 | 1908.00 | 19.4 dBm |

Record the value and output level.

Set commissioning mode to Off, then set to commissioning mode 3. Check that the power meter reading increases by 8.7dB (+/- 1dB). If the reading is lower RF compression may be occurring.

Note if it is required to measure the output power with all the RWs enabled set the CT commissioning mode to **off** and then set the commissioning mode to 2. This sets all 13 RWs active. To return to commissioning mode 1 set the CT commissioning mode to off and then set the commissioning mode to 1. (Note the setting to off is important and it is not possible to go directly between 1 and 2.)