

MIMOMAX TORNADO TRANSMITTER TUNE-UP PROCEDURE

1.1 OVERVIEW

All power calibration is done at maximum average output power of +24dBm. This is calibrated at manufacture to within +/-0.2dB.

Power is not required to be calibrated for changing to a lower power level as this algorithmically derived from the maximum power calibration.

The settable power range is 0 to +24dBm in 0.5dB steps. The tolerance of power across the settable range is defined by the tolerance of the power calibration at maximum. As such a +/-0.2dB tolerance at maximum power calibration will dictate a +/-0.2dB tolerance at any set power within 0 to +24dBm.

1.2 EQUIPMENT REQUIRED: POWER METER

For accurate measurement of average power from MiMOMax transmitters a thermistor bolometer type of power meter (e.g. HP435A or similar) is required. Other types of power meter may give inaccurate average power readings when used with MiMOMax transmitters, and may be suitable only for relative power measurement.

1.3 POWER CALIBRATION

Figure 1 shows the Tx Power Calibration page in the “Configuration and Control Monitoring System” (CCMS). The calibration method is easy to follow using the instruction panel on the right of the screen. In summary:-

- Read the power value and enter it into the Tx1 Measured Power text box
- Press Calibrate
- Once Tx1 is calibrated buttons will appear that allow you to re-calibrate Tx1. This is a good method of checking that the original calibration is accurate as the Tx will key up and allow you to measure the power. In addition a next button will appear that will allow you to calibrate channel 2 power. **Ensure** that your power meter is connected to channel 2 before selecting ‘Next’.
- On calibrating Tx2 and selecting ‘Done’ this will cause CCMS to exit the calibration menu and remove associated warnings.

The screenshot shows the 'Tx Power Calibration' page in the CCMS. The page has a header with the 'mimoMax wireless' logo and the tagline 'maximizing the potential of advanced wireless communications'. Below the header, there is a status bar showing 'TRN_03.00.01 (RRU) No name set Link Inactive Mon Sep 29 09:56:54 UTC 2014'. The main content area is divided into three sections: a left sidebar with navigation links (Diagnostics, System, Test Modes, Calibration, RF Tx and Rx, Network, MDAP, MSEC, MRAP, DNP3), a central form area, and a right-hand instruction panel. The central form area is titled 'Tx1 Power Calibration' and contains the following fields: 'Tx1 Measured Power [dBm]' with an empty text input box, 'Current PG Cal' with the value '12000', and 'Current duplexer loss [dB]' with the value '3'. Below these fields are two buttons: 'Calibrate' and 'Abort'. The right-hand instruction panel is titled 'Tx Power Calibration' and contains the following text: 'If your change in frequency has resulted in duplexer retuning then you will need to re-calibrate the TX output power. This calibration is performed at maximum settable power of +24dBm.' Below this text are two numbered steps: '1. Please attach a power meter to channel 1 and enter the measured power value (dBm) in the field below' and '2. Press Calibrate to submit'.

Figure 1: Tx Power Calibration

1.4 POWER SETTING

The output power level can be set on the RF Tx and Rx page. Its range is between +0 to +24 dBm in 0.5dB steps. The power can be specified in either dBm or mW, by selecting either dBm or mW as the transmitter power unit.

The power cannot be set beyond a maximum of +24dBm (250mW) or below 0dBm (1mW).

The screenshot displays the MiMOMax wireless configuration interface. At the top, the logo 'mimo Max wireless' is visible, along with the tagline 'maximizing the potential of advanced wireless communications'. The status bar shows 'TRN_03.00.01 (NDL) Test_Unit Link Inactive Mon Feb 17 00:04:27 UTC 2014'. The main content area is titled 'Configure RF Transmitter & Receiver' and is divided into two sections: 'RF Transmitter & Receiver' and 'Advanced Configuration'. The 'RF Transmitter & Receiver' section includes fields for Transmitter frequency (757.500 MHz), Receiver frequency (787.500 MHz), Transmitter power (24), Transmitter power unit (dBm), and Duplexers (Internal). The 'Advanced Configuration' section includes fields for Tracking algorithm rate of adaptation (Normal), Tracking algorithm adaptation delay (Disabled), and Retrain detection time (50 ms). There are 'Save' and 'Cancel' buttons at the bottom of the configuration area. On the right side, there is a 'RF Transmitter & Receiver' section with descriptive text: 'This MIMO radio has 2 transmitters and 2 receivers, operating on common Tx and Rx frequencies.' and 'Transmitter power can be set in dBm or mW with steps of 0.5. This is the average power level at each antenna connector.' Below this, there is a 'Save' section with text: 'Save Allows to set power if the Transmitter Power field has been changed. Applies frequency retuning if one of the frequency fields for transmitter or receiver has been changed. Status bar will show if transmitters or/and receivers were OFF. Please follow further instructions on the page as they appear during the process.' The bottom of the interface shows 'Copyright © 2014 MiMOMax Wireless Ltd.' and 'Logged in as tech'.

Category	Parameter	Value
System	Transmitter frequency (MHz)	757.500
Calibration	Receiver frequency (MHz)	787.500
RF Tx and Rx	Transmitter power	24
Network	Transmitter power unit	dBm
MDAP	Duplexers	Internal
MSEC	Advanced Configuration	
MRAP	Tracking algorithm rate of adaptation	Normal
DNP3	Tracking algorithm adaptation delay	Disabled
Serial Interfaces	Retrain detection time (ms)	50
Control Panel	Save Cancel	
SFE	Tx Synth: Locked Rx Synth: Locked	

Figure 2 Transmitter Power Setting