Sierra Wireless HL7688
Wireless Modem
Tune-Up Procedure

Document #:	
Revision:	**1.0**

The Sierra Wireless HL7688 wireless modem is equipped with radios to support LTE technologies. The main antenna/RF port supports the following FCC regulated bands, maximum output power levels and factory tolerances:

Technology	Band	Up-link Frequency (MHz)	Down-link Frequency (MHz)	Maximum Output power
WCDMA	**Band 2**	1850 – 1910	1930 – 1990	23 dBm (+/- 1 dB)
	Band 5	824 – 849	869 – 894	23 dBm (+/- 1 dB)
LTE	**Band 2**	1850 – 1910	1930 – 1990	23 dBm (+/- 1 dB)
	Band 4	1710 – 1755	2110 – 2155	23 dBm (+/- 1 dB)
	Band 5	824 – 849	869 – 894	23 dBm (+/- 1 dB)
	Band 17	704 – 716	734 – 746	23 dBm (+/- 1 dB)

The Sierra Wireless HL7688 wireless modem calibration process is a set of RF TX, RX and modulation tests that gather tuning values, which are saved inside each DUT. Each supported band is calibrated separately.

Calibration equipment consists of an RF signal generator, a power meter and a radio communication test set that combines both. A mechanical fixture holds the DUT in place and is responsible for reliably mating the RF connector of the jig to the DUT. The entire fixture is enclosed in an RF shield box whose purpose is to prevent external RF signals from interfering or contributing to measurements of the DUT's RF performance. RF shielded coaxial cable connecting the instrumentation to the jig is used for the same reason. All of this equipment is mounted in a rack and is known as a Calibration test station.

All TX power measurements made by the instruments must report the power at the DUT's RF connector. This is not the same power that is seen at the test instrument because the RF signal loses power as it travels through the RF cabling between the DUT and instrument. The longer the cable, the greater the decrease. This phenomenon requires us to know how much the cable loss is, and adjust for it during testing. Further test equipment and power meters have their own unique error that is usually too large to be acceptable for calibration. A process known as RF Normalization measures both the RF cable loss and meter inaccuracy values for a test station. These values allow us to calculate the real power at the DUT connector.

The Calibration process is automated, with a host PC controlling both the test equipment and DUT. The PC's Calibration program ensures that the calculated tuning values are reasonable by applying limits to them, and by running calibration performance tests that get the DUT to use its internal calibration values. If all these tests and limits checks pass then the DUT is allowed to be shipped to the customer.