

Tune Up Procedure - 3G WCDMA

TX Calibration

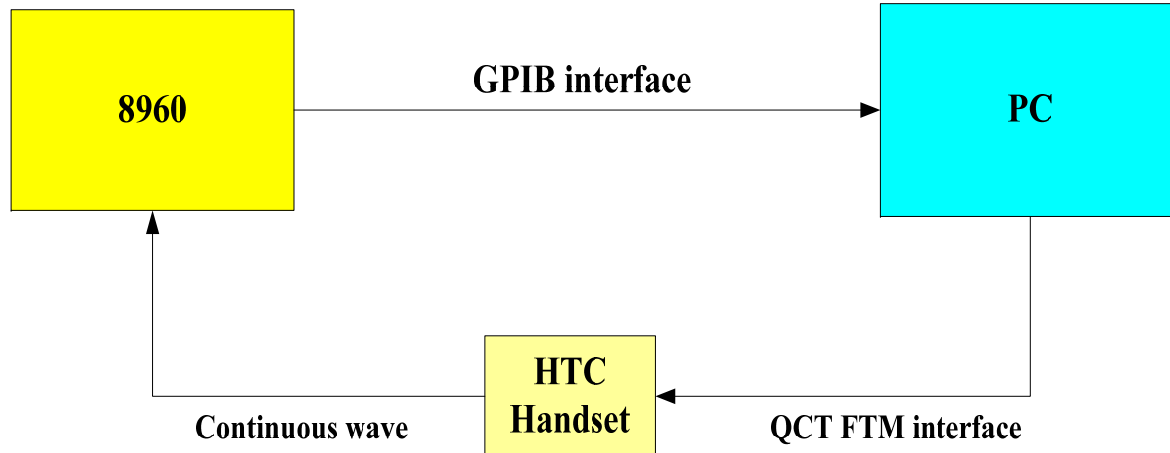
- Power accurately adjusting.
- Power detector calibration.
- Thermal calibration.

RX Calibration

- Radio Signal Strength Indicator (RSSI) Calibration
- IM2 calibration

Initiation

- Switch phone to Factory test mode.
- Set RF tune up environment.



Power accurately adjusting (1)

- 1. Configure test equipment (Spectrum analyzer/Call Processor) to captures TX sweep trace.
- 2. Set phone to PA range.
- 3. Set phone to max power by varying TX AGC PDM.

Power accurately adjusting (2)

- 4. Call Set TxCal() FTM command to start sweeping. This FTM command decreases TX AGC PDM value from the current PDM value (that gave max power) in steps of 10 PDM down to the desired minimum power level while the test equipment captures the trace.
- 5. Get the trace data from the test equipment and process the data to get the power level for each PDM level and build Power vs. PDM table.

Power detector calibration (1)

- 1. Set phone to PA_Range3 (highest PA gain state)
- 2. Set phone to the first RF cal channel
- 3. Set phone to output power level where limiting should occur (max power) by adjusting TX_AGC_ADJ PDM. Record the exact power level measured by the power measuring device of the cal station and the corresponding TX_AGC_ADJ PDM. Let the recorded power be Power[i] and the PDM value be Pdm[i] where 'i' is the channel index 0 to 15.

Power detector calibration (2)

- 4. Read and record HDET from appropriate DAC; take an average of at least 10 readings. Let the average HDET reading be HDET[i]
- 5. Repeat steps 3 and 4 for all remaining RF calibration channels.
- 6. Calculate
NV_WCDMA_TX_LIM_VS_FREQ

Thermal calibration

- 1. Read the ADC value at room temperature.
- 2. Determine the min and max temperature.
- 3. Determine the slope by characterizing certain number of phones. The value of slope that we use is $-1/3$.
- 4. Calculate the ADC values corresponding to min and max temperature by using a simple line equation ($y = mx + c$).

Radio Signal Strength Indicator (RSSI) Calibration

- 1. At reference channel, inject an Rx power signal, equivalent to the level above the noise floor; (all external losses and fixturing must be accounted for).
- 2. Call the FTM command *GetDVGAOffset()*. This FTM command calculates and returns the DVGA offset for the current channel of operation. When calling this FTM command, an AGC value equivalent to the applied receive power level must be passed. The AGC value corresponding to Rx power level applied when doing DVGA gain offset can be calculated using the following formula:
- Calculated AGCValue = $(1023/\text{DynamicRange}) * (\text{RxPower} - \text{RxMin}) - 512$

IM2 calibration

- 1. Place the LNA in its highest gain state (state 0) by using the FTM command *Set LNA Range*.
- 2. Configure the RF hardware to receive a signal at the reference frequency (using the appropriate FTM commands).
- 3. Using a signal generator, place an AM modulated carrier
- 4. Call the FTM command *GetCDMAIM2()*. It may take approximately one second for the function to return a value.