

### **Tune-Up Procedure and Power Tune-Up – Power Limiting**

- 1.It must provide an operational voltage (3.5~4.2V DC) to turn on the phone and on one certain channel in service mode by means of company proprietary software.
- 2.Base station simulator (Rohde& Schwarz CMU200 or Agilent 8960) measures the WCDMA phone specific RF characteristics.
- 3.The maximum gain of each individual phone is adjusted until the target value met.

#### **For GSM850**

For each power control level, the output power shall be tune up to the tolerances shown in the under table.

| PCL | Output power (dBm) | Tolerances (dB) |
|-----|--------------------|-----------------|
| 5   | 32                 | +0.4/-1         |
| 6   | 31                 | +/-1            |
| 7   | 29                 | +/-1            |
| 8   | 27                 | +/-1            |
| 9   | 25                 | +/-1            |
| 10  | 23                 | +/-1            |
| 11  | 21                 | +/-1            |
| 12  | 19                 | +/-1            |
| 13  | 17                 | +/-1            |
| 14  | 15                 | +/-1            |
| 15  | 13                 | +/-1            |
| 16  | 11                 | +/-1            |
| 17  | 9                  | +/-1            |
| 18  | 7                  | +/-1            |
| 19  | 5                  | +/-1            |

#### **For PCS1900**

For each power control level, the output power shall be tune up to the tolerances shown in the under table.

| PCL | Output power (dBm) | Tolerances (dB) |
|-----|--------------------|-----------------|
| 0   | 29                 | +0/-1           |
| 1   | 28                 | +/-1            |
| 2   | 26                 | +/-1            |
| 3   | 24                 | +/-1            |
| 4   | 22                 | +/-1            |
| 5   | 20                 | +/-1            |
| 6   | 18                 | +/-1            |
| 7   | 16                 | +/-1            |
| 8   | 14                 | +/-1            |
| 9   | 12                 | +/-1            |
| 10  | 10                 | +/-1            |
| 11  | 8                  | +/-1            |
| 12  | 6                  | +/-1            |

|    |   |      |
|----|---|------|
| 13 | 4 | +/-1 |
| 14 | 2 | +/-1 |
| 15 | 0 | +/-1 |

### For GSM850&PCS1900 GPRS Power

| Number of timeslots | Permissible nominal reduction of maximum output power, (dB) |
|---------------------|-------------------------------------------------------------|
| 1                   | 0                                                           |
| 2                   | 0 to 3                                                      |
| 3                   | 1.8 to 4.8                                                  |
| 4                   | 3 to 6                                                      |

For WCDMA Band II & Band V Max power =22+/-1 dBm

For GSM Ber < 2% at static condition

GSM 850 RX sensitivity < -106dBm

PCS1900 RX sensitivity < -105dBm

For GPRS Bler <10% at static condition

| Type of channel | GSM850 GPRS | PCS1900 GPRS |
|-----------------|-------------|--------------|
| CS1             | -107        | -106         |
| CS2             | -107        | -106         |
| CS3             | -107        | -106         |
| CS4             | -104        | -103         |

For WCDMA Ber < 0.001% at static condition

WCDMA Band II & Band V RX sensitivity < -106dBm

Then these appropriate gain settings are stored in each phone individually. The user has no possibility to change these settings later on, and during manufacturing each phone will be individual calibrated. The measurement is done in fully calibrated setup, which is based on a Agilent 8960 base station simulator. Furthermore, the highest power level is verified afterwards in a call measurement on three channels (low, middle and high).

## Tune Up Procedure

### 1. GSM RX Gain Calibration

- a. Put DUT in test mode
- b. Put DUT in BCH mode
- c. Put DUT in selected channel band
- d. Total gain chain calibration at center ARFCN
- e. Frequency Ripple calibration
- f. Complete RX\_AGC Gain table

### 2. GSM TX Power Calibration

- a. Put DUT in test mode
- b. Put DUT in BCH mode
- c. Put DUT in selected channel band
- d. Calibrate Rampscale value at center ARFCN
- e. Frequency Ripple calibration
- f. Complete TX\_APC table

### 3. AFC calibration

- a. Put DUT in test mode
- b. Put DUT in selected channel band
- c. Calibrate AFC at center ARFCN
- d. Complete AFC result table

#### 4. GPRS TX Power Calibration

- a. Put DUT in test mode
- b. Put DUT in BCH mode
- c. Put DUT in selected channel band
- d. Calibrate inter slot Ramp value at center ARFCN
- e. Calibrate TX rollback value at center ARFCN
- f. Complete GPRS TX Power table

#### 5. WCDMA RX Gain Calibration

- a. Put DUT in test mode
- b. Put DUT in BCH mode
- c. Put DUT in selected channel band
- d. Total gain chain calibration at center ARFCN
- e. Frequency Ripple calibration
- f. Complete RX\_AGC Gain table

#### 6. WCDMA TX Power Calibration

- a. Put DUT in test mode
- b. Put DUT in BCH mode
- c. Put DUT in selected channel band
- d. Calibrate PA Gain value at center ARFCN
- e. Calibrate Couple loss value at center ARFCN
- f. Frequency Ripple calibration
- g. Complete TX\_APC table