

# Tune Up

Specific Operating Power Range:

GSM850:

Power Class 1;

Power Control Level 5	+32dBm +1dB/-1dB
Power Control Level 6	+31dBm +2.0dB/-2.0dB
Power Control Level 7	+29dBm +2.0dB/-2.0dB
Power Control Level 8	+27dBm +2.0dB/-2.0dB
Power Control Level 9	+25dBm +2.0dB/-2.0dB
Power Control Level 10	+23dBm +2.0dB/-2.0dB
Power Control Level 11	+21dBm +2.0dB/-2.0dB
Power Control Level 12	+19dBm +2.0dB/-2.0dB
Power Control Level 13	+17dBm +2.0dB/-2.0dB
Power Control Level 14	+15dBm +2.0dB/-2.0dB
Power Control Level 15	+13dBm +2.0dB/-2.0dB
Power Control Level 16	+11dBm +2.0dB/-2.0dB
Power Control Level 17	+9dBm +2.0dB/-2.0dB
Power Control Level 18	+7dBm +2.0dB/-2.0dB
Power Control Level 19	+5dBm +2.0dB/-2.0dB

GSM1900:

Power Class 1;

Power Control Level 0	+28dBm +1.0dB/-1.0dB
Power Control Level 1	+27dBm +3.0dB/-3.0dB
Power Control Level 2	+26dBm +3.0dB/-3.0dB
Power Control Level 3	+24dBm +3.0dB/-3.0dB
Power Control Level 4	+22dBm +3.0dB/-3.0dB
Power Control Level 5	+20dBm +3.0dB/-3.0dB
Power Control Level 6	+18dBm +3.0dB/-3.0dB
Power Control Level 7	+16dBm +3.0dB/-3.0dB
Power Control Level 8	+14dBm +3.0dB/-3.0dB
Power Control Level 9	+12dBm +4.0dB/-4.0dB
Power Control Level 10	+10dBm +4.0dB/-4.0dB
Power Control Level 11	+8dBm +4.0dB/-4.0dB
Power Control Level 12	+6dBm +4.0dB/-4.0dB
Power Control Level 13	+4dBm +4.0dB/-4.0dB
Power Control Level 14	+2dBm +5.0dB/-5.0dB
Power Control Level 15	+0dBm +5.0dB/-5.0dB

GPRS Multi-slot Class:

GPRS850-1TS	32dBm +1.0dB/-1.0dB
GPRS850-2TS	31dBm +1.0dB/-1.0dB
GPRS850-3TS	29.5dBm +1.0dB/-1.0dB
GPRS850-4TS	28.5dBm +1.0dB/-1.0dB
GPRS1900-1TS	28dBm +1.0dB/-1.0dB
GPRS1900-2TS	27.5dBm +1.0dB/-1.0dB
GPRS1900-3TS	26dBm +1.0dB/-1.0dB
GPRS1900-4TS	25dBm +1.0dB/-1.0dB

Note; Effective radiation efficiency is -3.7dB

EGPRS Multi-slot Class:

EGPRS 850-1TS: 32dBm +1.0dB/-1.0dB  
EGPRS 850-2TS: 31dBm +1.0dB/-1.0dB  
EGPRS 850-3TS: 29.5dBm +1.0dB/-1.0dB  
EGPRS 850-4TS: 28.5dBm +1.0dB/-1.0dB  
EGPRS 1900-1TS: 28dBm +1.0dB/-1.0dB  
EGPRS 1900-2TS: 27.5dBm +1.0dB/-1.0dB  
EGPRS 1900-3TS: 26dBm +1.0dB/-1.0dB  
EGPRS 1900-4TS: 25dBm +1.0dB/-1.0dB

WCDMA Band II:

WCDMA Band II: 22 dBm +1.0dB/-1.0dB  
HSDPA Band II Sub-1: 22 dBm +1.0dB/-1.0dB  
HSDPA Band II Sub-2: 20 dBm +1.0dB/-1.0dB  
HSDPA Band II Sub-3: 19 dBm +1.0dB/-1.0dB  
HSDPA Band II Sub-4: 18 dBm +1.0dB/-1.0dB  
HSUPA Band II Sub-1: 20 dBm +1.0dB/-1.0dB  
HSUPA Band II Sub-2: 21 dBm +1.0dB/-1.0dB  
HSUPA Band II Sub-3: 19 dBm +1.0dB/-1.0dB  
HSUPA Band II Sub-4: 21 dBm +1.0dB/-1.0dB  
HSUPA Band II Sub-5: 19 dBm +1.0dB/-1.0dB

WCDMA Band V:

WCDMA Band V: 23.5 dBm +1.0dB/-1.0dB  
HSDPA Band V Sub-1: 22.5 dBm+1.0dB/-1.0dB  
HSDPA Band V Sub-2: 20 dBm +1.0dB/-1.0dB  
HSDPA Band V Sub-3: 19 dBm +1.0dB/-1.0dB  
HSDPA Band V Sub-4: 19 dBm +1.0dB/-1.0dB  
HSUPA Band V Sub-1: 21.5 dBm +1.0dB/-1.0dB  
HSUPA Band V Sub-2: 21 dBm +1.0dB/-1.0dB  
HSUPA Band V Sub-3: 19 dBm +1.0dB/-1.0dB  
HSUPA Band V Sub-4: 22 dBm +1.0dB/-1.0dB  
HSUPA Band V Sub-5: 19 dBm +1.0dB/-1.0dB

WIFI Band:

IEC 802.11 b: 17.5dBm +1.0dB/-1.0dB  
IEC 802.11 g:16.0dBm +1.0dB/-1.0dB  
IEC 802.11 n-20:15.5dBm +1.0dB/-1.0dB  
IEC802.11n-40:15.0dBm+1.0dB/-1.0dB

Bluetooth Band:

Bluetooth Band: 3.0dBm +1.0dB/-1.0dB

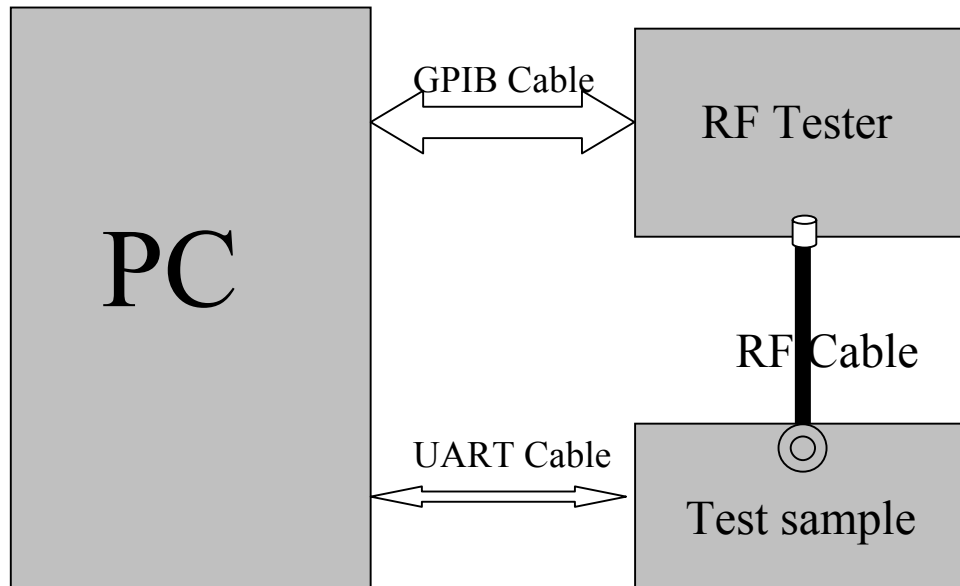


Figure 1

### 1 Adjustment of RF Output Power:

(1) The equipment setup as shown in Figure 1.

(2) Operation of PC adjusts equipment.

(3) Use RF Engineering Tools at PC side.

Select GSM850/WCDMA Band V:

- 1) Set GSM850 Band.
- 2) Set ARFCN: 190 ,4183(WCDMA Band V)
- 3) TX ON.
- 4) Adjust the power to 32dBm (+1.0dB/-1.0dB, Power control level: PCL=5) and 22.5dBm(+1.0dB/-1.0dB) by PA DAC value.
- 5) Repeat 4) for 15 times,and adjust the power level to 30.5, 28.8, 27, 25, 23, 21, 19, 17, 15, 13, 11, 9, 7, 5. For WCDMA Band V,adjust the power level to 20.0.
- 6) Make 16 Ramp-Up/Ramp-Down data from the adjustment value of (5) and (6).

7) Data of 5) and 6) is written to flash memory.

Select PCS1900/WCDMA Band II Band:

- 1) Set PCS1900/WCDMA Band II Band.
- 2) Set ARFCN: 512(PCS1900), 9262 (WCDMA Band II).
- 3) TX ON.
- 4) Adjust the power to 28.5 dBm (+1.0dB/-1.0dB, Power control level: PCL=0) and 23.0dBm(+1.0dB/-1.0dB) by PA DAC value.
- 5) Repeat 4) for 15 times, and adjust the power level to 27.5, 26, 24, 22, 20, 18, 16, 14, 12, 10, 8, 6, 4, 2, 0. For WCDMA Band II, adjust the power level to 20.0
- 6) Make 16 Ramp-Up/Ramp-Down data from the adjustment value of (5) and (6).
- 7) Data of 5) and 6) is written to flash memory.

## **2 Adjustment of oscillation frequency of VCXO:**

- (1) The equipment setup as shown in Figure 1.
- (2) Use Crystal AFC Control Tools to Set CapID and AFC DAC value.
- (3) Set Band=GSM850/WCDMA Band V, Set ARFCN=190/4183, Set PCL=12.
  - 1) Set AFC DAC=4096, fixed. (Check that  $V_{afc}=1.4V$ ).
  - 2) Set CapID=0, and verify that frequency error  $\gg 10KHz$ .
  - 3) Set CapID=63, and verify that frequency error  $\ll -10KHz$ .
  - 4) If the above 3 items are verified, then change CapID value to make frequency error be closed to 0 Hz as possible, record this CapID value.
  - 5) Set CapID value got from step 4), then change AFC DAC value to make frequency error be closed to 0 Hz as possible, record this AFC DAC value.
  - 6) Download the CapID value and AFC DAC value to flash memory.

## **3 Adjustment of RX Sensitivity:**

- (1) Select GSM850/WCDMA Band V Band:
  - 1) Set BCCH level: -85dBm; ARFCN: 128/4132.
  - 2) Test sample make a call to connect RF Tester..
  - 3) Set TCH level: -106dBm.
  - 4) Measure BER II error at TCH ARFCN: 128, 190, 251.
  - 5) Tune up the RX matching circuit to make sure  $BER II < 2\%$  at each ARFCN.

(2) Select PCS1900/WCDMA Band II Band:

1) Set BCCH level:-85dBm;ARFCN:512/9262.

2) Test sample make a call to connect RF Tester..

3) Set TCH level:-106dBm.

4) Measure BER II error at TCH ARFCN:512, 661, 810 and 9162,9400,9538 for WCDMA Band II.

5) Tune up the RX matching circuit to make sure BER II <2% at each ARFCN.

4. WCDMA Power Limit

(1) Maximum Output Power 23.0 dBm+1/-3dB

(2) Frequency Error  $\pm$  (0.1ppm+10Hz)

(3) Adjacent Channel Leakage Power Ratio +5 MHz or .5 MHz

ACLR limit 33 dB +10 MHz or .10 MHz

ACLR limit 43 dB

(4) Reference Sensitivity Level

-106.7dBm@BER shall not exceed 0.1%

## 2. BT GENERAL INFORMATION

### 2.1 Product Information

<b>Product</b>	WCDMAMobile Phone
<b>Trade Name</b>	unnecto <sup>TM</sup>
<b>Model Number</b>	U-720-2
<b>Series Number:</b>	N/A
<b>Description of Differences:</b>	N/A
<b>Power Supply</b>	DC: 3.7V by Li-ion Battery; DC: 5V by AC Adapter(100V-240V 50/60Hz);
<b>Frequency Range</b>	2402MHz -2480MHz
<b>Modulation Type</b>	FHSS
<b>Transmit Data Rate</b>	GFSK(1Mbps), II/4-DQPSK(2Mbps), 8-DPSK(3Mbps)
<b>Antenna Type:</b>	Internal Fixed
<b>Channel Spacing:</b>	1MHz
<b>Channel Number</b>	79(CH Low: 2402MHz, CH Mid: 2441MHz, CH High: 2480MHz)
<b>Temperature Range</b>	-20°C ~ 50°C

#### **NOTE:**

1. Please refer to Appendix I for the photographs of the EUT. For a more detailed features description about the EUT, please refer to User's Manual.

## 2.2 Product WIFI Information

<b>Product</b>	WCDMA Mobile Phone
<b>Brand Name</b>	unnecto <sup>TM</sup>
<b>Model Number</b>	U-720-2
<b>Frequency Range</b>	2412MHz – 2462MHz
<b>Modulation Technique</b>	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) IEEE 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65.0Mbps)
<b>Channel Number</b>	IEEE 802.11b/g/n mode: 11 Channels
<b>Antenna Type:</b>	0.0 dBi, PCB Antenna
<b>Power Supply</b>	DC: 3.7V by Li-ion Battery; DC: 5V by AC Adapter(100V-240V 50/60Hz);
<b>Temperature Range:</b>	-20°C ~ 50°C

**NOTE:**

1. For a more detailed features description about the EUT, please refer to User's Manual.