

5. Test Commands & Test Procedure List

Test Command Table

To change the phone from normal mode to test mode, you should enter the following keys :
Press [*759#813580]

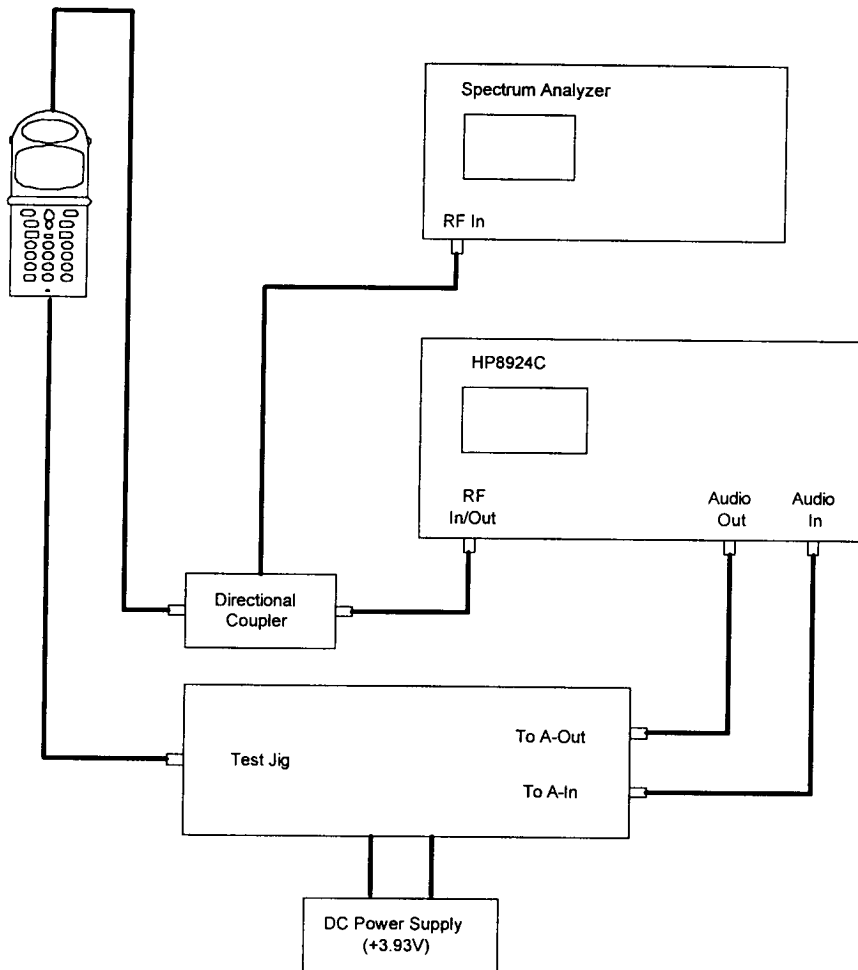
Command No	Command SW Name	Description
01(1F,0,0)	T_SUSPEND_I	Enter to test menu
02(3F,0,0)	T_RESTART_I	Escape from test menu
04(1D,0,1)	T_GET_MODE_I	Get mode CDMA/FM
07(81,0,0)	T_CARRIERON_I	Turn on the carrier
08(82,0,0)	T_CARRIEROFF_I	Turn off the carrier
09(83,4,0)	T_LOADSYN_I	Load the synthesizer for locking
10(84,1,0)	T_PWRLEVEL_I	Change RF power level
11(85,0,0)	T_RXMUTE_I	Mute rx audio
12(86,0,0)	T_RXUNMUTE_I	Unmute rx audio
13(87,0,0)	T_TXMUTE_I	Mute tx audio
14(88,0,0)	T_TXUNMUTE_I	Unmute tx audio
15	T_VOC_ESEC_I	Echo Canceller On/Off
16(8F,0,0)	T_STON_I	Transmit a continuous Signaling Tone(ST)
17(90,0,0)	T_STOFF_I	Stop transmit a continuous Signaling Tone(ST)
18	T_LCD_CONTRAST_I	Tune LCD contrast
20	T_LNA_GAIN_WR_I	write LNA gain for IMD test
21	T_TEST_SYS_I	set test system & Channel
22(91,96,96)	T_SNDNAM_I ¹⁾	Display & Send NAM Information
23(95,3,4)	T_SNDVERSION_I ¹⁾	Display & Send Software Version
24(9F,7,8)	T_SNDESN_I ¹⁾	Display & return ESN
25(92,0,0)	T_BACKLIGHT_ON_I	Backlight on
26(93,0,0)	T_BACKLIGHT_OFF_I	Backlight off
27(96,0,0)	T_LAMP_ON_I	LAMP on
28(97,0,0)	T_LAMP_OFF_I	LAMP off
30(9D,15,0)	T_PLINE_I	Display and return production date
31	T_AUTOANSWER_I	Enable Auto-answer mode
32(A0,1,0)	T_SATON_I ²⁾	Enable the transmission of SAT
33(A1,0,0)	T_SATOFF_I ²⁾	Disable the transmission of SAT
34(A2,0,0)	T_CDATA_I	Continuously send TX Control data
37	T_RXRAS_FLATNESS_I	Adjust CDMA RX RAS flatness.
38	T_VOC_ENC_OFFSET_I	Vocoder ENC offset
39	T_VOC_DEC_OFFSET_I	Vocoder DEC offset
40(A7,3,0)	T_VOC_CDMA_UNITY_GAIN_I	Vocoder CDMA unity gain
41	T_VOC_FM_HFRX_UPGAIN_I	Vocoder FM hfrx upgain
42(AA,1,0)	T_DTMFON_I ³⁾	Turn on DTMF
43(AB,0,0)	T_DTMFOFF_I ³⁾	Turn off DTMF
44(B0,0,0)	T_COMPANDORON_I	Turn on compandor
45(B1,0,0)	T_COMPANDOROF_I	Turn off compandor
46(B2,0,0)	T_FM_VCLINE_I ⁴⁾	Enter FM voice state
47(B3,3,0)	T_FM_AUD_GAIN_I	FM audio gain
48(B4,0,0)	T_VIBRATOR_ON_I	Activate a vibrator
49(B5,0,0)	T_VIBRATOR_OFF_I	Inactivate a vibrator
50(B6,0,4)	T_BATT_TYPE_I	Battery Type

Command No	Command SW Name	Description
52(B9,0,8)	T_HW_VERSION_I	View HW version
53	T_CARRIER_I	Target Carrier option (Change banner)
54	T_VOC13K_I	Target Service option
55(AC,1,0)	T_EXT_AUDIO_I	External Audio Path On/Off
57(BC,0,0)	T_MIC_ON_I	Unmute MIC Path
58(BD,0,0)	T_MIC_OFF_I	mute MIC Path
59(BE,0,0)	T_ALLPATH_I	Tune on the all audio path
60(BF,3,0)	T_FM_TX_GAIN_I ⁽³⁾	AMPS Tx Audio Gain Control
61(C0,3,0)	T_FM_RX_GAIN_I ⁽³⁾	AMPS Rx Audio Gain Control
62(C1,3,0)	T_DTMF_VOL_TX_I ⁽³⁾	AMPS Tx DTMF Gain Control
63(C2,3,0)	T_TX_LIMITER_I ⁽³⁾	AMPS Tx Limiter Gain Control
64(C3,3,0)	T_FM_SAT_LEVEL_I ⁽³⁾	AMPS Tx SAT level Control
65(C4,3,0)	T_FM_FREQ_SGAIN_I ⁽³⁾	AMPS Tx Master Gain Control
66(C5,3,0)	T_FM_ST_GAIN_I ⁽³⁾	AMPS Tx ST Gain Control
67(C6,0,6)	T_READ_BATT_I ⁽¹⁾	Saved Low battery value read
68(C8,0,3)	T_VBATT1_I ⁽¹⁾	Set the low battey position in the standby
69(C9,0,3)	T_VBATT2_I ⁽¹⁾	Set the low battey position in the talking
70(CA,3,0)	T_WRITE_BATT_I ⁽³⁾	write a BATT
71(D1,3,0)	T_CDMA_TXADJ_I ⁽³⁾	Sets tx_agc_adj for CDMA mode
72(D2,3,0)	T_FM_TXADJ_I ⁽³⁾	Sets tx_agc_adj for AMPS mode
73(D3,1,0)	T_SET_PA_R_I ⁽¹⁾	Sets PA R1,R0 range bits
75(D5,0,3)	T_READ_RSSI_I ⁽¹⁾	Read a RSSI
76(D6,3,0)	T_CDMA_CH_FLATNESS_BP_ON_I	Adjust CDMA TX low power RAS flatness
77(D7,0,3)	T_READ_TEMP_I	Read a TEMP
79(D9,1,0)	T_BUZZER_ON_I ⁽¹⁾	Buzzer on
80(DA,0,0)	T_BUZZER_OFF_I	Buzzer off
81(E3,0,0)	T_VOC_PCMLPON_I	Turn on to play a PCM LOOP BACK
82(E4,0,0)	T_VOC_PCMLPOFF_I	Turn off to play a PCM LOOP BACK
83	T_BYPASS_ON_I	Set Low power mode
84	T_BYPASS_OFF_I	Set High power mode
85(E7,0,0)	T_SPEAKER_ON_I	Turn on the speaker path
86(E8,0,0)	T_SPEAKER_OFF_I	Tturn off the speaker path
87(E9,0,0)	T_FM_LOOP_TEST_I	FM loop back
88(EA,3,0)	T_TRK_ADJ_I ⁽¹⁾	TRK LOCAL ADJUST
89(EB,3,0)	T_CDTRK_ADJ_I	CDMA TRK LOCAL ADJUST
90(F0,2,0)	T_FM_CH_FLATNESS_I	Adjust FM channel flatness
92(D4,5,0)	T_TXRAS_ADJ_I	CDMA TX high power RAS table(not adjustable)
93(F3,4,0)	T_RXRAS_ADJ_I	CDMA RX RAS table(not adjustable)
96(F6,4,0)	T_CH_FLATNESS_I	Adjust TX high power RAS
97(F2,4,0)	T_FM_TX_PWR_I	Adjust FM Power level 2 ~ 7
98(F8,3,0)	T_TXRAS_ADJ_BP_ON_I	CDMA TX low power RAS table(not adjustable)
99(FC,4,0)	T_SND_GAIN_I	Mic/Speaker Gain control

List of Equipment

- DC Power Supply
- Test Jig
- Test Cable
- CDMA Mobile Station Test Set HP8924C, HP83236A, CMD-80, etc
- Spectrum Analyzer(include CDMA Test Mode) HP8596E

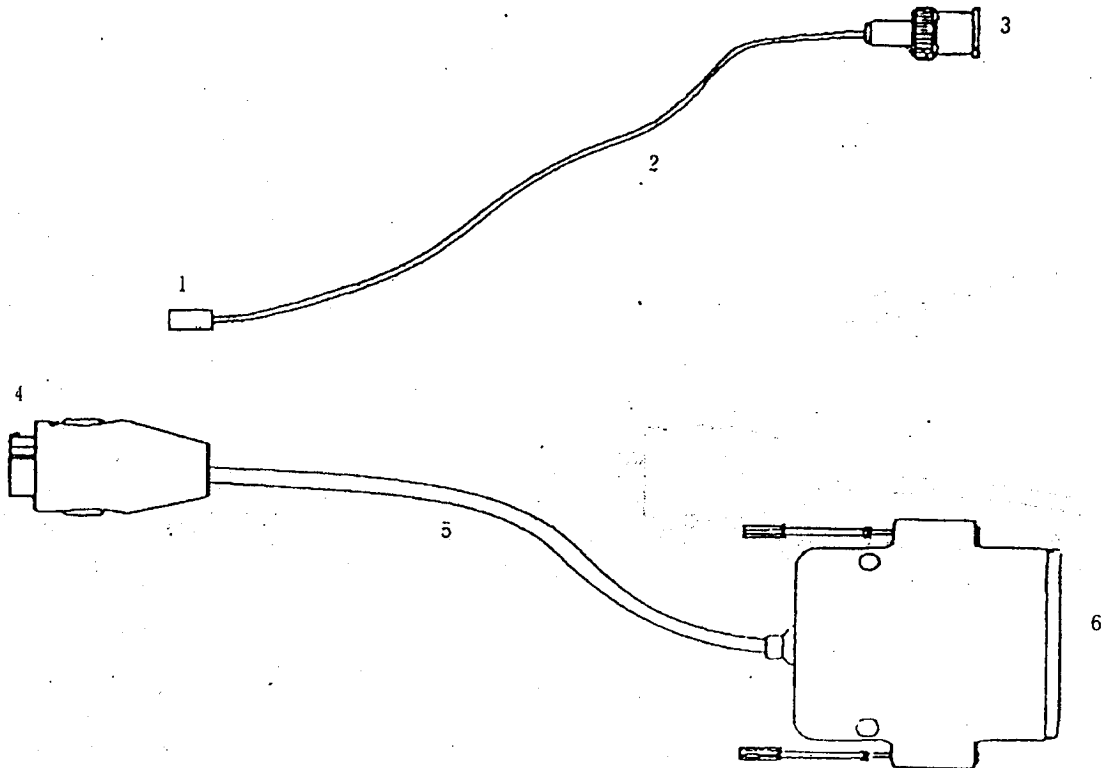
Configuration of Test



- CAUTION : The test jig and data cable has a voltage drop of 0.33V at FM Max power output, you'd better set the DC power supply to 3.93V for normal test condition.
(Nominal voltage of battery is 3.6V at cellular phone)

TEST CABLE DESCRIPTION FOR SCH-850

1. TEST CABLE

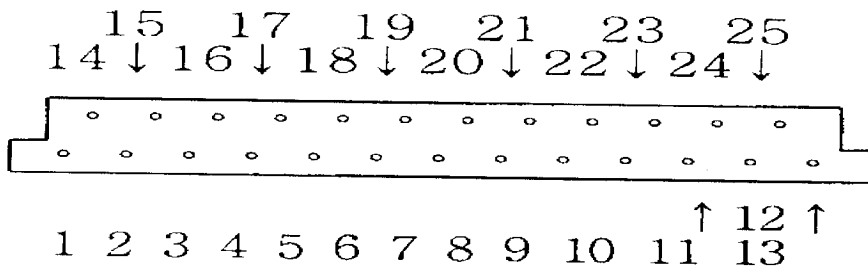


2. TEST CABLE CONNECTIONS

1	MHC 172
2	RF CABLE (1.4 dB Loss for CDMA800 and AMPS)
3	BNC CONNECTOR (RF)
4	PLUG CONNECT TO SCH-850
5	DATA CABLE
6	Dsub 25PIN CONNECTOR (DATA)

3. Dsub 25 PIN CONNECTOR PIN DESCRIPTION (TEST CABLE 1, BACK SIDE)

DATA DESCRIPTION	Dsub CONN. PIN NO.	DATA DESCRIPTION	Dsub CONN. PIN NO.
V_F	12,21	DP_RX_DATA	8
DGND	2,4,6,13,19	HP_PWR	9
BATT	15,16,22	RI	10
C_F	3,20	CD	11
TX_AUDIO	5	RTS	14
DP_TX_DATA	7	CTS	17
RX_AUDIO	1	DTR	18



4. CONVERSION TABLE OF FREQUENCY vs CHANNEL

T Y P E	CHANNEL	CONVERSION EQUATION	REMARK
TX FREQUENCY	1 ••N•• 799 990 ••N••1023	F=0.03 •• N + 825.00 F=0.03 •• (N-1023) + 825.00	N ; CH NUMBER
RX FREQUENCY	1 ••N•• 799 990 ••N••1023	F=0.03 •• N + 870.00 F=0.03 •• (N-1023) + 870.00	F ; FREQUENCY (AMPS/CDMA)

Change to Test Mode

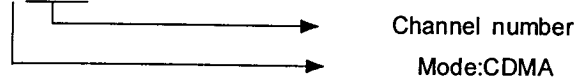
A T c a g t e h n ' s a e r m o m l o e o e t o e Y u h u d n e t e o l w n
k y .

* 5 # 1 5 0

B T e o m n " 1 i m d a d h n e c a g , r s " K t s v .

"10000" or "10001" : AMPS's Sytem A and Sytem B

"20363"



C. The command "0 1" is Suspend.

D. To finish the Test Mode, You should enter the command "0 2".

Channel Selection and Tx Power Output Level Control

1.AMPS(FM)

A. Enter to Test Mode ("* 7 5 9 # 8 1 3 5 8 0").

B.The command "21" is mode and channel change

"10000" or "10001" : AMPS's Sytem A and Sytem B

C. To finish the Test Mode, You should enter the command "0 2".

D. "0 1" : Suspend.

E. "4 6" : Vocoder initial to Analog mode.

F. "0 9 0 3 6 3 #" : Set to '0363' channel.

G. "0 7" : Carrier On.

H. "9 7 * * *" : Output RF power level is set as power level 2

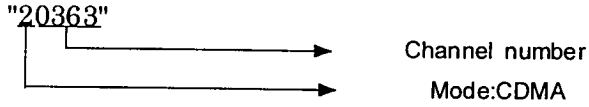
"* * *" means AGC level and AGC level range is from 0 to 511.

I. "1 0 2" : RF Power level control, 2(0~7) means power level .

2.CDMA

A. Enter to Test Mode ("* 7 5 9 # 8 1 3 5 8 0").

B.The command "21" is mode and channel change , press "OK" to save.



C. To finish the Test Mode, You should enter the command "0 2".

D. "0 1" : Suspend.

E. "0 9 0 3 6 3 #" : Set to '0363' channel.

F. "0 7" : Carrier On.

G. "3 4" : Spread spectrum to 1.23MHz band width.

H. "8 4" : High Power-mode On

I. "9 6 * * * " : Output RF power level is set max power

"* * *" means AGC level and AGC level range is from 000 to 511.

LAMPS(EM)

TEST ITEMS	PROCEDURE														
1. PREPARATION	<p>Set test equipments up.</p> <p>Confirm that the phone is in the Analog Mode! ("10000" or "10001" at Test Command "2 0".)</p> <p>"* 7 5 9 # 8 1 3 5 8 0": Enter the Test Mode</p> <p>"0 1": Suspend</p> <p>"4 6": Initialize Vocoder in Analog mode</p> <p>If a wrong key would be selected, press "#", and then enter new command.</p> <p>To exit the Test Mode at any time, just press [0 2].</p>														
2. RF POWER	<p>"0 1" : Suspend.</p> <p>"4 6" : Initialize Vocoder in Analog mode.</p> <p>"0 9 Q 3 6 3 #": Set channel to 363.</p> <p>"0 7" : Carrier On.</p> <p>"1 0 2" : RF Power level selection, "2" means one of the power levels (0-7).</p> <p>Measurement of the Power Output Levels</p> <table border="0"><tr><td style="text-align: center;"><u>Level</u></td><td></td></tr><tr><td style="text-align: center;">0 - 2</td><td style="text-align: center;">+ 26.8 dBm + 0.2/-4 dB</td></tr><tr><td style="text-align: center;">3</td><td style="text-align: center;">+ 23 dBm +2/-4 dB</td></tr><tr><td style="text-align: center;">4</td><td style="text-align: center;">+ 19 dBm +2/-4 dB</td></tr><tr><td style="text-align: center;">5</td><td style="text-align: center;">+ 15 dBm +2/-4 dB</td></tr><tr><td style="text-align: center;">6</td><td style="text-align: center;">+ 12 dBm +2/-4 dB</td></tr><tr><td style="text-align: center;">7</td><td style="text-align: center;">+ 9 dBm +2/-4 dB</td></tr></table> <p>"0 8" : Carrier off</p> <p>Note 1 : In case of using the antenna cable, compensation for the cable loss should be added (about 1.5dB).</p> <p>Note 2 : To prevent phones from being damaged, they must be measured only by calibrated test equipments.</p> <p>Warning ! Adjustments without calibrated equipments can cause phones to be heated excessively and would void the warranty.</p>	<u>Level</u>		0 - 2	+ 26.8 dBm + 0.2/-4 dB	3	+ 23 dBm +2/-4 dB	4	+ 19 dBm +2/-4 dB	5	+ 15 dBm +2/-4 dB	6	+ 12 dBm +2/-4 dB	7	+ 9 dBm +2/-4 dB
<u>Level</u>															
0 - 2	+ 26.8 dBm + 0.2/-4 dB														
3	+ 23 dBm +2/-4 dB														
4	+ 19 dBm +2/-4 dB														
5	+ 15 dBm +2/-4 dB														
6	+ 12 dBm +2/-4 dB														
7	+ 9 dBm +2/-4 dB														
3. TX FREQUENCY	<p>"0 1" : Suspend.</p> <p>"4 6": Initialize Vocoder in Analog mode.</p> <p>"0 9 Q 3 6 3 #" : Set channel to 363.</p> <p>"0 7" : Carrier On.</p> <p>Measure the TX frequency : 835.89 MHz*2.5ppm.</p>														

TEST ITEMS	PROCEDURE
4. VOICE DEVIATION	<p>"0 1" : Suspend. "4 6" : Initialize Vocoder in Analog mode. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "1 4" : TX Audio unmute.</p> <p>Set the audio generator output to 1kHz, 3.0Vrms.</p> <p>Measure the Tx voice deviation by using the HPF of 20Hz and the LPF of 99kHz (spec : less than **12kHz).</p>
5. ST DEVIATION	<p>"0 1" : Suspend. "4 6" : Initialize Vocoder in Analog mode. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "1 6" : ST on.</p> <p>Measure the Tx ST deviation by using the HPF of 50Hz (spec : 8kHz**10%).</p> <p>"1 7" : ST off.</p>
6. SAT DEVIATION	<p>"0 1" : Suspend. "4 6" : Initialize Vocoder in Analog mode. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "3 2" : SAT on.</p> <p>Set the equipment as following. RF frequency : 880.89MHz Input RF level : -80dBm Modulation frequency : 6kHz Frequency deviation : 2kHz</p> <p>Measure the Tx SAT deviation by using the HPF of 50Hz and the LPF of 6kHz (spec : 2kHz**10%).</p> <p>"3 3" : SAT off.</p>

TEST ITEMS	PROCEDURE
7. WBD DEVIATION	"0 1" : Suspend. "4 6" : Initialize Vocoder in Analog mode. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "3 4" : WBD on. Measure the WBD deviation by using the HPF of 50Hz and the LPF of 20kHz (spec : 8kHz*10%).
8. RX AUDIO	"0 1" : Suspend. "4 6" : Initialize Vocoder in Analog mode. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "1 2" : RX Audio unmute. Set the equipment as following. RF frequency : 880.89MHz Input RF level : -80dBm Modulation frequency : 1kHz Frequency deviation : 8kHz Measure audio AC level.

2.CDMA

TEST ITEMS	PROCEDURE
1. PREPARANCE	<p>Set test equipments up.</p> <p>Confirm that the phone is in the CDMA Mode. ("2XXXX" at Test Command "0 2")</p> <p>"* 7 5 9 # 8 1 3 5 8 0" : Enter the Test Mode "0 1" : Suspend</p> <p>If you select a wrong key, press "#", then enter new command. To exit the Test Mode at any time, just press [0 2].</p>
2. FREQUENCY ACCURACY	<p>"0 1" : Suspend. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "9 6" :You can read the number.(the code) and the push the #•• "7 1 2 6 0 #" : Set AGC level to the numer of reading(about 188). Measure the TX frequency : 835.89MHz••300Hz.</p>
3. OCCUPIED CDMA BANDWIDTH	<p>"0 1" : Suspend. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "3 4" : Spread spectrum. "8 4" : High power mode "9 6" :You can read the number.(the code) and the push the #•• "7 1 2 6 0 #" : Set AGC level to the numer of reading(about 188). Measure the bandwidth (spec: 1.32MHz).</p>
4. LIMITATIONS ON EMISSIONS	<p>"0 1" : Suspend. "0 9 0 3 6 3 #" : Set channel to 363. "0 7" : Carrier On. "3 4" : Spread spectrum. "8 4" : High power mode "9 6" :You can read the number.(the code) and the push the #•• "7 1 2 6 0 #" : Set AGC level to the numer of reading(about 188).</p> <p>Measure the spurious at F_c••900kHz, F_c••1.98MHz, $2F_c$, $3F_c$, $1/2F_c$. spec: F_c••900kHz below 42dBc/30kHz F_c••1.98MHz below 54dBc/30kHz Outside Receive Band $43+10\log(PY)$ PY: Mean Output Power in watts</p>
5. GATED POWER & TIME	<p>Set the service option 2. Set the data rate Eighth (1200bps). Registering: HHP •• HP8924C. Call : HP8924C •• HHP. Measure the Gated Power & Time. spec : Gated Power - at least 20dB Gated Time - Rising Time : below 6•• Falling Time : below 6•• Burst Time : below 1.25••</p>