

YURASYS		Date 2003/06/25	Doc No. YRT-030625-1	Rev No. 1.0	File Name Tune_Up.doc	Page 8/8
Report by Ji-Hyo Kim	Approve by	Document control Manager Kong-Hoe Hur			Type of Document Technical Document	
Title : Tune up Procedure of 20W High Power RF Repeater System						

1.2.5. Test Procedure

- 1) System as Figure 4.
(Connect: Signal Generator – RX-OUT, Spectrum Analyzer – TX-OUT)
- 2) Execute calibration of Spectrum Analyzer as section 2.1.4.
- 3) Set the Forward Link of Repeater System to maximum gain (= ATT: 0dB) with Laptop or Key Pad, and HPA (FWD): On, set B3 band, ALC: Off and Temp. Comp: Off
- 4) Set Signal Generator as below
 - Frequency: 1967.5MHz
 - Mod: OFF
 - Amplitude: -52dBm
 - RF: ON
- 5) Set Spectrum Analyzer as below
 - Frequency: 1967.5MHz
 - ATTEN: 30dB
 - RRF LVL: +50dBm
 - Peak Search
 - MKR > Marker Delta
- 6) Control the Forward Link Gain by setting the ATT with 1dB Step Size with Laptop or Key Pads. (Please refer to Operating Manual)
- 7) Measure and record the delta value on Spectrum Analyzer based on specification.

YURASYS		Date 2003/06/25	Doc No. YRT-030625-1	Rev No. 1.0	File Name Tune_Up.doc	Page 9/9
Report by Ji-Hyo Kim	Approve by	Document control Manager Kong-Hoe Hur			Type of Document Technical Document	
Title : Tune up Procedure of 20W High Power RF Repeater System						

2. Tune Up Procedure for Reverse Link

2.1. Maximum Output Power, System Gain and Gain Control

2.1.1. Object

The characteristics of Maximum Output Power and System Gain shall meet the standard specification

2.1.2. Standard

Input Power	Output Power	Error
-65dBm/1FA	30dBm/1FA	-2dB ~ +2dB

Gain	Error
95 dB	< 7 2dB

2.1.3. Instrument List

- 1) HP8563E Spectrum Analyzer 1 Set
- 2) HP4432B Digital Signal Generator 1 Set
- 3) Power Meter 1 set and Power sensor 1 set
- 4) High Power 30dB Attenuator 1 EA (Over 100W) 1 Set
- 5) Cable Set
- 6) N-type(F) to N-type(F) Connector 1 Set

2.1.4. Calibration Procedure

- 1) Set System as follow Figure 5.

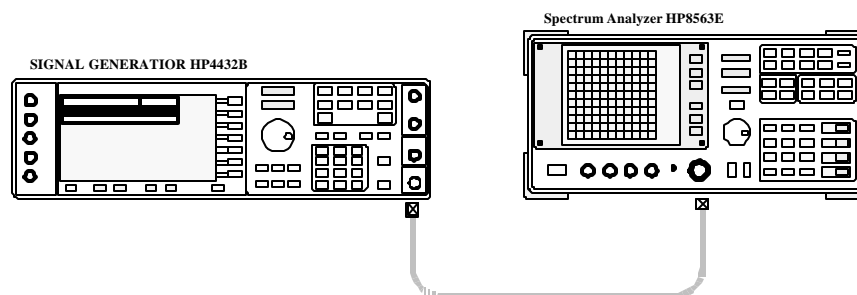



Figure 5 Signal Generator Calibration Configuration for Forward Link

- 2) Set Signal Generator as below.
 - (1) Frequency: 1852.5MHz
 - (2) Amplitude: -10dBm
 - (3) Mode > CDMA Formats > IS-95
 - (4) Multi carrier Define > Carrier: 9CH, 3 Carriers
 - (5) Offset Frequency: -1.25MHz, +1.25MHz
 - (6) CDMA: ON, Mult-Carrier: Off
 - (7) Amp Offset: 0dB

	Date 2003/06/25	Doc No. YRT-030625-1	Rev No. 1.0	File Name Tune_Up.doc	Page 10/10
	Report by Ji-Hyo Kim	Approve by	Document control Manager Kong-Hoe Hur	Type of Document Technical Document	
Title : Tune up Procedure of 20W High Power RF Repeater System					

- (8) Mod: On, RF: On
- 3) Set Spectrum Analyzer as below.
 - (1) Center Frequency: 1852.5MHz
 - (2) Span: 10MHz
 - (3) RBW: 30KHz, VBW: 300Hz
 - (4) Amplitude
 - ATTN: 10dB
 - REF LVL: 0dBm
 - (5) Set to Channel Power Mode
 - (6) Channel Bandwidth > 1.25MHz
- 4) Set Input Cable loss offset to Signal Generator
- 5) Set more Offset to Signal Generator the difference between the Amplitude of Signal Generator and the Power level of Spectrum Analyzer.
 - Ampl > More (1 of 2) > Ampl Offset : TBD
- 6) Set System as follow Figure 6.

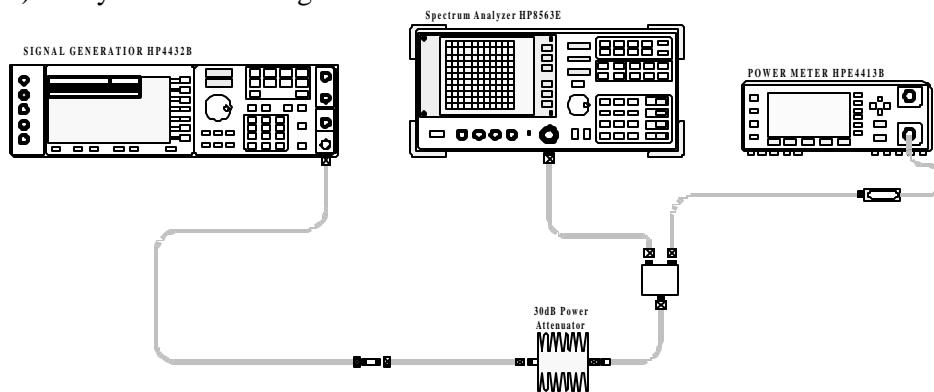



Figure 6 Spectrum Analyzer Calibration Configuration for Forward Link

- 7) Set Output cable loss offset to Spectrum Analyzer
- 8) Set more Offset to Spectrum Analyzer and Power Meter the difference between the Amplitude of Signal Generator and the power level of Power Meter.:
 - Amplitude > More (1 of 2) > REF LVL OFFSET : TBD
- 9) Set signal Generator as below
 - RF: OFF
- 10) Record the Offset data of Signal Generator and Spectrum Analyzer

	Date 2003/06/25	Doc No. YRT-030625-1	Rev No. 1.0	File Name Tune_Up.doc	Page 11/11
	Report by Ji-Hyo Kim	Approve by	Document control Manager Kong-Hoe Hur	Type of Document Technical Document	
Title : Tune up Procedure of 20W High Power RF Repeater System					

2.1.5. Test Configuration Diagram

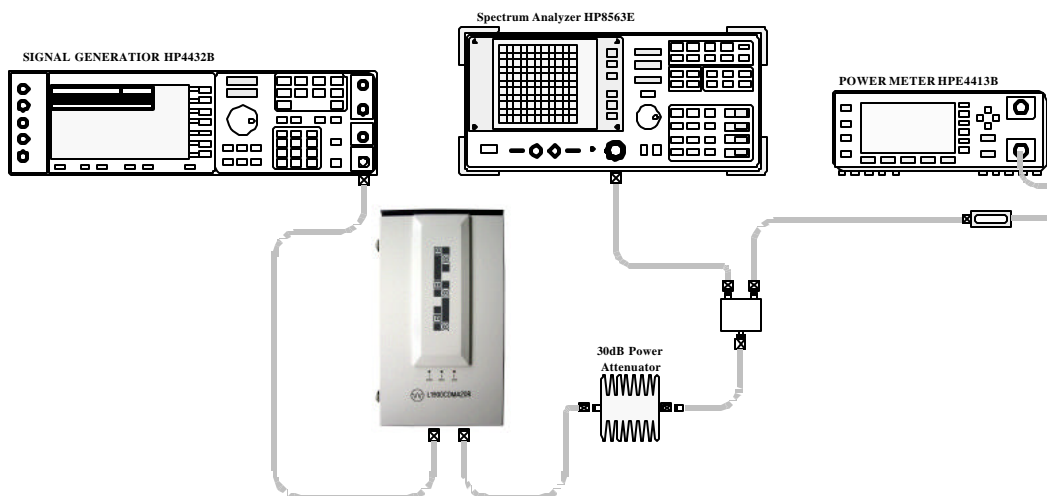


Figure 7 System Configuration Diagram with Spectrum Analyzer for forward link

2.1.6. Test Procedure

- Set system as Figure 7.
(Connect: Signal Generator – TX-OUT, Spectrum Analyzer – RX-OUT)

User Control Values			
Repeater ID	3424636	Alarm Reset	
Repeater Type	51	Update RTC	
System Version	0	Read Record	
Over Temp	70 °C	Change GT 1	
	FWD	RVS	
HPA Power	OFF	ON	
ALC	OFF	OFF	
Temp. Comp.	OFF	OFF	
ALC level	44	30	dBm
Ovr Pwr Level	46	33	dBm
ATT	30	0	dB
Band	C3	B3	
Set		Cancel	

Figure 7 Control Window GUI

YURASYS		Date 2003/06/25	Doc No. YRT-030625-1	Rev No. 1.0	File Name Tune_Up.doc	Page 12/12
Report by Ji-Hyo Kim	Approve by	Document control Manager Kong-Hoe Hur			Type of Document Technical Document	
Title : Tune up Procedure of 20W High Power RF Repeater System						

- 2) Set the Reverse Link of Repeater System to maximum gain (= ATT: 0dB) with Laptop or Key Pad, and HPA (RVS): ON, select A1 band, ALC: Off and Temp. Comp: Off (Please refer to Operating Manual)
- 3) Set Signal Generator as below
 - Amplitude: -65dBm
 - RF: ON
- 4) Set Spectrum Analyzer as below
 - ATTEN: 30dB
 - REF LVL: +50dBm
- 5) Measure and record the output power on Power Meter.
- 6) Calculate and record the system gain

- 7) Set Signal Generator as below;
 - Frequency: 1882.5MHz
- 8) Set Spectrum Analyzer as below
 - Frequency: 1882.5MHz
- 9) Set the Forward Link band: B3
- 10) Measure and record the output power on Power Meter.
- 11) Calculate and record the system gain

- 12) Set Signal Generator as below;
 - Frequency: 1907.5MHz
- 13) Set Spectrum Analyzer as below
 - Frequency: 1907.5MHz
- 14) Set the Forward Link band: C3
- 15) Measure and record the output power on Power Meter.
- 16) Calculate and record the system gain

YURASYS		Date 2003/06/25	Doc No. YRT-030625-1	Rev No. 1.0	File Name Tune_Up.doc	Page 13/13
Report by Ji-Hyo Kim	Approve by	Document control Manager Kong-Hoe Hur			Type of Document Technical Document	
Title : Tune up Procedure of 20W High Power RF Repeater System						

2.2. Gain Control Test

2.2.1. Object

The characteristics of Gain Control Range and Gain Control Error shall meet the standard specification

2.2.2. Standard

Gain Control Range	Step Size	Remarks
30 dB	1dB	

Step	Step Size	Error/Step
0 dB ~ 10 dB	1 dB	< 7 1.0 dB
10 dB ~ 20 dB	1 dB	< 7 1.0 dB
20 dB ~ 30 dB	1 dB	< 7 1.0dB

2.2.3. Instrument List

- 7) HP8563E Spectrum Analyzer 1 Set
- 8) HP4432B Digital Signal Generator 1 Set
- 9) Power Meter 1 set and Power sensor 1 set
- 10) High Power 30dB Attenuator 1 EA (Over 100W) 1 Set
- 11) Cable Set
- 12) N-type(F) to N-type(F) Connector 1 Set

2.2.4. Test Configuration Diagram

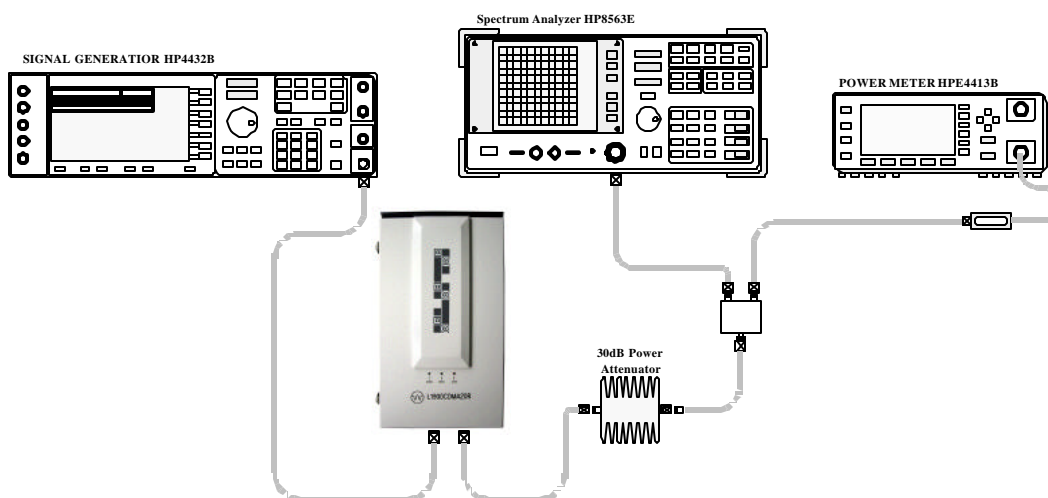



Figure 8 System Configuration Diagram with Spectrum Analyzer for forward link

	Date	Doc No.	Rev No.	File Name	Page
	2003/06/25	YRT-030625-1	1.0	Tune_Up.doc	14/14
	Report by	Approve by	Document control Manager	Type of Document	
Ji-Hyo Kim		Kong-Hoe Hur	Technical Document		
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2.2.5. Test Procedure

- 1) System as Figure 8.
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- 4) Set Signal Generator as below
 - Frequency: 1967.5MHz
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- 5) Set Spectrum Analyzer as below
 - Frequency: 1967.5MHz
 - ATTEN: 30dB
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