ATP for MA2000 Cabinet/mini-ENC RF Tests

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Contents

1. Scope

This document describes the ATP (Acceptance Test Procedure) for testing processes for the:
- MA2000 Cabinet AC/DC
- MA2000 mini-ENC.

Note: From now on "Cabinet" in ATP refers to MA2000 Cabinet AC/DC and MA2000 mini-ENC.

2. Required Equipment

2.1. Network Analyzer
2.2. 2 x Network Analyzer RF cable up to 2.5GHz
2.3. Spectrum Analyzer
2.4. BU Standard
2.5. Fiber Optics cable pair
2.6. RF Combiner up to 2.5GHz
2.7. 4 x RF cable up to 2.5GHz
2.8. Stand Alone LNA Preamplifier up to 2.5GHz
2.9. Optical Power Meter

3. Optical Power and PDI Testing Process

3.1. Read the laser threshold current (Ith [mA]) and laser slope efficiency (SE [mW/mA]) from the laser data sheet.

3.2. Calculate the tolerance of the optical power by the following formulas:
Pout [mW] = SE*Ith
Pout [dBm] = 10*log (Pout [mW] / 1mW)

Pout_min [dBm] = Pout [dBm] – 1dB
Pout_max [dBm] = Pout [dBm] + 1dB

3.3. Record Pout_min and Pout_max as optical limits to the ATR.

3.4. Connect Optical Power testing setup according to Figure 3.1.

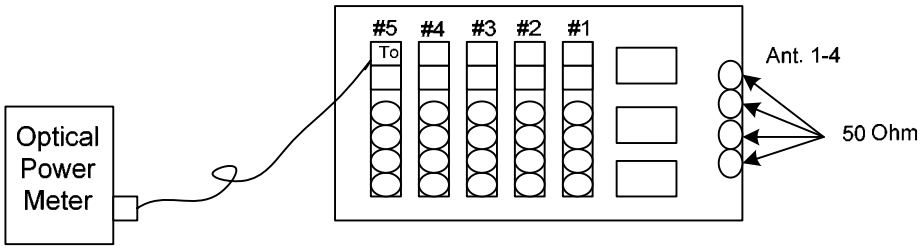

Figure 3.1 Optical Power Setup

3.5. Record result to the ATR.

3.6. Repeat steps 3.1-3.5 for the rest RHU`s.

3.7. Connect PDI testing setup 1 according to Figure 3.2.

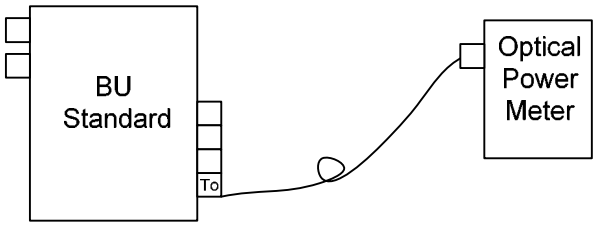

Figure 3.2 PDI Setup 1

3.8. Measure the optical output power of the BU Standard.

3.9. Select the appropriate PDI limits from Table 3.1.

Power in [dBm]	PDI Monitor Table	
	Low Limit	High Limit
-9	14	39
-8.9	15	39
-8.8	15	39
-8.7	16	40
-8.6	16	41
-8.5	16	42
-8.4	16	42
-8.3	17	43
-8.2	17	44
-8.1	18	44
-8	18	45
-7.9	18	46
-7.8	19	47
-7.7	20	47
-7.6	20	48
-7.5	20	49
-7.4	20	50
-7.3	21	51
-7.2	21	52
-7.1	22	53
-7	22	54
-6.9	22	55
-6.8	24	56
-6.7	25	57
-6.6	25	57
-6.5	26	59
-6.4	26	61
-6.3	26	61
-6.2	27	62
-6.1	28	63
-6	29	64
-5.9	30	66
-5.8	30	67
-5.7	31	68
-5.6	32	69
-5.5	32	71
-5.4	34	71
-5.3	34	74
-5.2	35	75
-5.1	36	75

-5	37	77
-4.9	37	79
-4.8	38	81
-4.7	38	83
-4.6	39	84
-4.5	41	85
-4.4	42	88
-4.3	42	88
-4.2	44	90
-4.1	45	92
-4	45	94
-3.9	47	97
-3.8	48	98
-3.7	49	100
-3.6	50	102
-3.5	51	104
-3.4	52	106
-3.3	53	109
-3.2	55	111
-3.1	56	116
-3	57	117
-2.9	59	118
-2.8	61	120
-2.7	61	122
-2.6	63	124
-2.5	64	126
-2.4	66	129
-2.3	68	131
-2.2	68	133
-2.1	71	136
-2	72	139
-1.9	73	142
-1.8	76	144
-1.7	78	147
-1.6	79	150
-1.5	80	153
-1.4	83	158
-1.3	85	159
-1.2	87	162
-1.1	88	165
-1	89	168
-0.9	91	172
-0.8	95	175
-0.7	98	179
-0.6	100	182
-0.5	102	186
-0.4	105	190
-0.3	107	193
-0.2	111	197

-0.1	114	202
0	116	206

Table 3.1 PDI Monitor Limits

3.10. Record limits to the ATR.
3.11. Connect PDI testing setup 2 according to Figure 3.3.

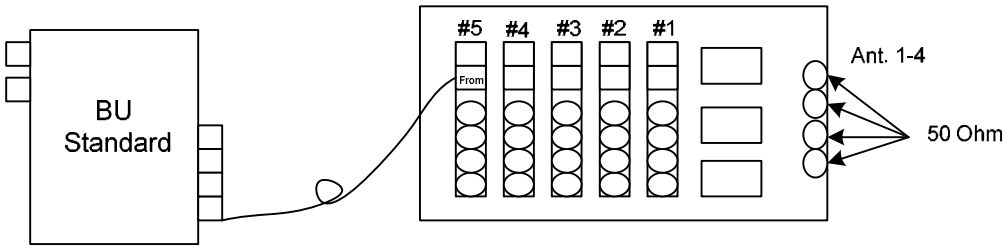

Figure 3.3 PDI Setup 2

3.12. Run the RHU GUI and read PDI Monitor value.
3.13. Record result to the ATR.
3.14. Remove optical fiber from the PD connector.
3.15. Read PDI Monitor value.
3.16. Record result to the ATR.
3.17. Repeat steps 3.1-3.16 for other RHU`s.

4. Downlink Mean Gain & Ripple Testing Process

4.1. Calibrate Network Analyzer according to Table 4.1, based on the relevant band, S21 measurement.

Setup	Application	Measure	Source Power	Start Freq.	Stop Freq.	MKR 1	MKR 2	Sweep Time	Scale/ Div
1	Downlink Cell Low Band	S21	-35 dBm	750 MHz	1000 MHz	869 MHz	894 MHz	Auto	2 dB
2	Downlink GSM Low Band	S21	-35 dBm	750 MHz	1000 MHz	935 MHz	960 MHz	Auto	2 dB
3	Downlink SMR Low Band	S21	-35 dBm	750 MHz	1000 MHz	929 MHz	941 MHz	Auto	2 dB
4	Downlink iDEN Low Band	S21	-35 dBm	750 MHz	1000 MHz	851 MHz	869 MHz	Auto	2 dB
5	Downlink Orange Low Band	S21	-35 dBm	750 MHz	1000 MHz	947 MHz	960 MHz	Auto	2 dB
6	Downlink DCS High Band	S21	-35 dBm	1700 MHz	2000 MHz	1805 MHz	1880 MHz	Auto	2 dB
7	Downlink PCS High Band	S21	-35 dBm	1700 MHz	2000 MHz	1930 MHz	1990 MHz	Auto	2 dB
8	Downlink UMTS High Band	S21	-35 dBm	1700 MHz	2000 MHz	2110 MHz	2170 MHz	Auto	2 dB

Table 4.1 Network Analyzer DL Mean Gain & Ripple Setup

4.2. Connect Network Analyzer to the relevant Cabinet Antenna port, DL BU port and BU to the relevant RHU in the Cabinet, as shown at Figure 3.1.

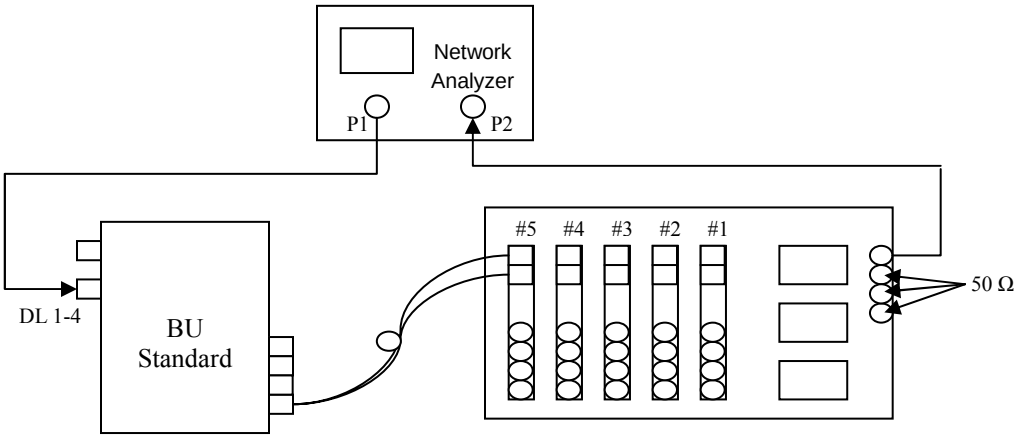

Figure 4.1 DL Mean Gain & Ripple Setup

4.3. Measure the Mean Gain & Ripple between MKR1 to MKR2.

4.4. Record results to the ATR.

4.5. Repeat steps 4.1-4.4 for rest Antennas/RHU/relevant bands.

5. Downlink IMD3 Testing Process

5.1. Set Spectrum Analyzer according to Table 5.1, based on the relevant band, DL IMD3 measurement.

Setup	Application	Center Freq.	Span	Reference Level	RBW Hz	VBW Hz	Attn. dB
1	Downlink Cell Low Band	881.5MHz	10MHz	10dBm	3kHz	Auto	Auto
2	Downlink GSM Low Band	947.5MHz	10MHz	10dBm	3kHz	Auto	Auto
3	Downlink SMR Low Band	935MHz	10MHz	10dBm	3kHz	Auto	Auto
4	Downlink iDEN Low Band	860MHz	10MHz	10dBm	3kHz	Auto	Auto
5	Downlink Orange Low Band	953.5MHz	10MHz	10dBm	3kHz	Auto	Auto
6	Downlink DCS High Band	1842.5MHz	10MHz	10dBm	3kHz	Auto	Auto
7	Downlink PCS High Band	1960MHz	10MHz	10dBm	3kHz	Auto	Auto
8	Downlink UMTS High Band	2140MHz	10MHz	10dBm	3kHz	Auto	Auto

Table 5.1 Spectrum Analyzer DL IMD3 Setup

5.2. Connect Spectrum Analyzer to the relevant Cabinet Antenna port, BU to the relevant RHU in the cabinet and Signal Generators to the DL port in the BU (via RF Combiner), as shown at Figure 5.1.

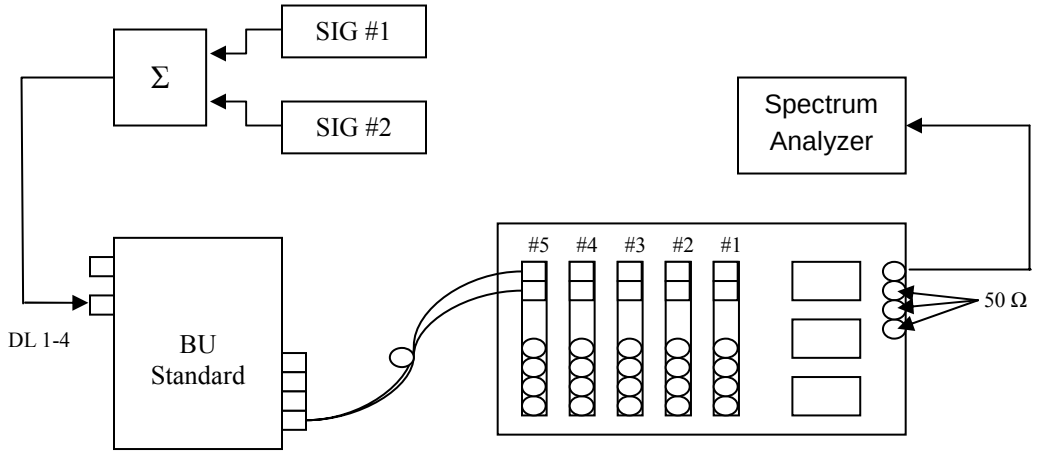

Figure 5.1 DL IMD3 Setup

5.3. Set Signal Generator #1 to Center Freq.-1MHz and Signal Generator #2 to Center Freq. +1MHz, based on the relevant band, see Table 5.1, with amplitude -10dBm per tone after combiner (P_{in} [dBm]).

5.4. Verify Spectrum Analyzer isn't saturated.
5.5. Measure the worst IMD3 by the following formula.
(Freq. low IMD3 = 2*f1-f2, Freq. high IMD3 = 2*f2-f1).
5.6. Record results to the ATR.
5.7. Repeat steps 5.1-5.6 for rest Antennas/RHU/relevant bands.

6. Uplink Mean Gain & Ripple Testing Process

6.1. Calibrate Network Analyzer according to Table 6.1, based on the relevant band, S12 measurement.

Setup	Application	Measure	Source Power	Start Freq.	Stop Freq.	MKR 1	MKR 2	Sweep Time	Scale/ Div
1	Uplink Cell Low Band	S12	-35 dBm	750 MHz	1000 MHz	824 MHz	849 MHz	Auto	2 dB
2	Uplink GSM Low Band	S12	-35 dBm	750 MHz	1000 MHz	890 MHz	915 MHz	Auto	2 dB
3	Uplink SMR Low Band	S12	-35 dBm	750 MHz	1000 MHz	896 MHz	901 MHz	Auto	2 dB
4	Uplink iDEN Low Band	S12	-35 dBm	750 MHz	1000 MHz	806 MHz	824 MHz	Auto	2 dB
5	Uplink Orange Low Band	S12	-35 dBm	750 MHz	1000 MHz	902 MHz	915 MHz	Auto	2 dB
6	Uplink DCS High Band	S12	-35 dBm	1700 MHz	2000 MHz	1710 MHz	1785 MHz	Auto	2 dB
7	Uplink PCS High Band	S12	-35 dBm	1700 MHz	2000 MHz	1850 MHz	1910 MHz	Auto	2 dB
8	Uplink UMTS High Band	S12	-35 dBm	1700 MHz	2000 MHz	1920 MHz	1980 MHz	Auto	2 dB

Table 6.1 Network Analyzer UL Mean Gain & Ripple Setup

6.2. Connect Network Analyzer to the relevant Cabinet Antenna port, UL BU port and BU to the relevant RHU in the cabinet, as shown at Figure 6.1.

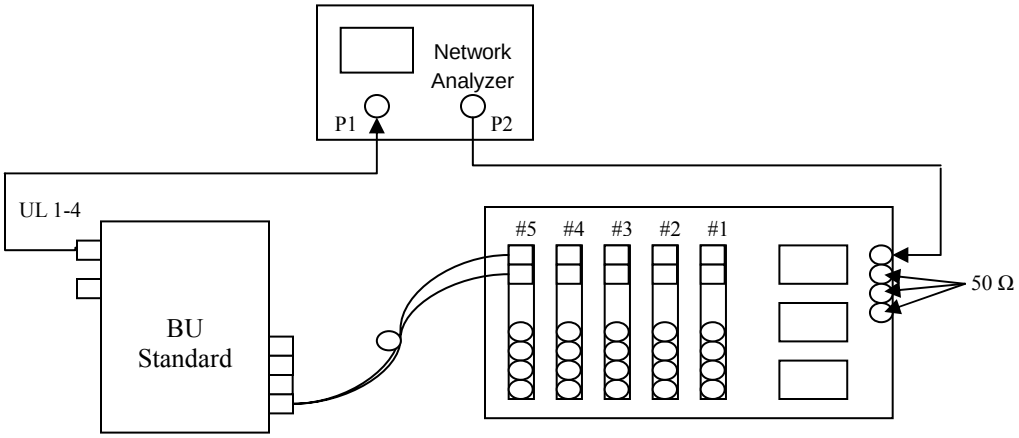

Figure 6.1 UL Mean Gain & Ripple Setup

6.3. Measure the Mean Gain & Ripple between MKR1 to MKR2.
6.4. Record results to the ATR.
6.5. Repeat steps 6.1-6.4 for rest Antennas/RHU/relevant bands.

7. Uplink IIP3 Testing Process

7.1. Set Spectrum Analyzer according to Table 7.1, based on the relevant band, UL IIP3 measurement.

Setup	Application	Center Freq.	Span	Reference Level	RBW Hz	VBW Hz	Attn. dB
1	Uplink Cell Low Band	836.5MHz	5MHz	-25dBm	3kHz	Auto	Auto
2	Uplink GSM Low Band	902.5MHz	5MHz	-25dBm	3kHz	Auto	Auto
3	Uplink SMR Low Band	898.5MHz	5MHz	-25dBm	3kHz	Auto	Auto
4	Uplink IDEN Low Band	815MHz	5MHz	-25dBm	3kHz	Auto	Auto
5	Uplink Orange Low Band	908.5MHz	5MHz	-25dBm	3kHz	Auto	Auto
6	Uplink DCS High Band	1747.5MHz	5MHz	-25dBm	3kHz	Auto	Auto
7	Uplink PCS High Band	1880MHz	5MHz	-25dBm	3kHz	Auto	Auto
8	Uplink UMTS High Band	1950MHz	5MHz	-25dBm	3kHz	Auto	Auto

Table 7.1 Spectrum Analyzer UL IIP3 Setup

7.2. Connect Spectrum Analyzer to the UL BU port, BU to the relevant RHU in the cabinet and Signal Generators to the relevant Cabinet Antenna port, as shown at Figure 7.1.

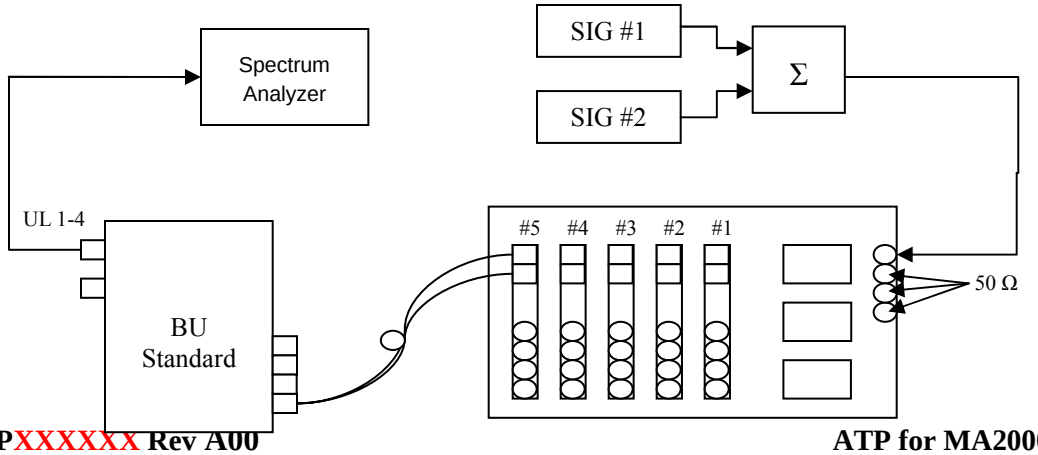

Figure 7.1 UL IIP3 Setup

7.3. Set Signal Generator #1 to Center Freq.-1MHz and Signal Generator #2 to Center Freq. +1MHz, based on the relevant band, see Table 7.1, with amplitude -35dBm per tone after combiner (P_{in} [dBm]).
7.4. Verify Spectrum Analyzer isn't saturated.
7.5. Measure the lower of the signals at the BU output (Pout [dBm]).
7.6. Measure the worst IMD3 level (P_{IMD3} [dBm]).

7.7. Calculate the IIP3 by the following formula: **IIP3 [dBm]=P_{in}+((P_{out}-P_{IMD3})/2)**
7.8. Record results to the ATR.
7.9. Repeat steps 7.1-7.8 for rest Antennas/RHU/relevant bands.

8. Uplink Noise Figure Testing Process

8.1. Set Spectrum Analyzer according to Table 8.1, based on the relevant band, UL Noise Figure measurement.

Setup	Application	Center Freq.	Span	Reference Level	RBW Hz	VBW Hz	Attn. dB
1	Uplink Cell Low Band	836.5MHz	200kHz	10dBm	Auto	Auto	Auto
2	Uplink GSM Low Band	902.5MHz	200kHz	10dBm	Auto	Auto	Auto
3	Uplink SMR Low Band	898.5MHz	200kHz	10dBm	Auto	Auto	Auto
4	Uplink IDEN Low Band	815MHz	200kHz	10dBm	Auto	Auto	Auto
5	Uplink Orange Low Band	908.5MHz	200kHz	10dBm	Auto	Auto	Auto
6	Uplink DCS High Band	1747.5MHz	200kHz	10dBm	Auto	Auto	Auto
7	Uplink PCS High Band	1880MHz	200kHz	10dBm	Auto	Auto	Auto
8	Uplink UMTS High Band	1950MHz	200kHz	10dBm	Auto	Auto	Auto

Table 8.1 Spectrum Analyzer UL Noise Figure Setup

8.2. Connect Spectrum Analyzer (via LNA) to the relevant Cabinet Antenna port, BU to the relevant RHU in the cabinet and Signal Generator to the relevant Cabinet Antenna port, as shown at Figure 8.1.

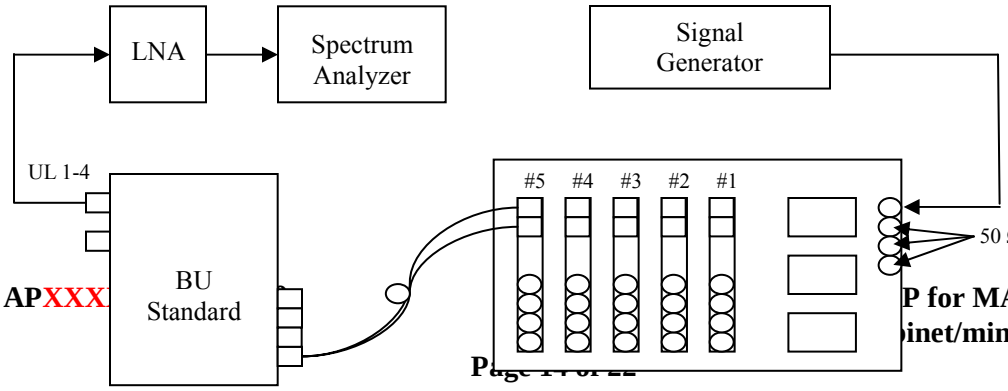

Figure 8.1 UL Noise Figure Setup

8.3. Set Signal Generator to the relevant frequency, see Table 8.1, with amplitude -35dBm (P_{in} [dBm]).
8.4. Measure the signal level at the LNA output (P_{out} [dBm]).
8.5. Calculate the Gain by the following formula: **G [dB]=P_{out}-P_{in}**.

8.6. Turn off the Signal Generator.
8.7. Set Spectrum Analyzer to:
Marker Noise: On
Input Attenuation: 0dB
Ref. Level: -75dBm
Average: On
8.8. Measure Noise Floor [dBm/Hz] at the relevant frequency, see Table 8.1.
8.9. Calculate the Noise Figure by the following formula:
Noise Figure [dBm/Hz] =174+ (Noise Floor-Gain)
8.10. Record the result to the ATR.
8.11. Repeat steps 8.1-8.10 for rest Antennas/RHU/relevant bands.

9. Uplink Return Loss Testing Process

9.1. Calibrate Network Analyzer according to Table 9.1, based on the relevant band, S22 measurement.

Setup	Application	Measure	Source Power	Start Freq.	Stop Freq.	MKR 1	MKR 2	Sweep Time	Scale/ Div
1	Uplink Cell Low Band	S22	-10 dBm	750 MHz	1000 MHz	824 MHz	849 MHz	Auto	2 dB
2	Uplink GSM Low Band	S22	-10 dBm	750 MHz	1000 MHz	890 MHz	915 MHz	Auto	2 dB
3	Uplink SMR Low Band	S22	-10 dBm	750 MHz	1000 MHz	896 MHz	901 MHz	Auto	2 dB
4	Uplink iDEN Low Band	S22	-10 dBm	750 MHz	1000 MHz	806 MHz	824 MHz	Auto	2 dB
5	Uplink Orange Low Band	S22	-10 dBm	750 MHz	1000 MHz	902 MHz	915 MHz	Auto	2 dB
6	Uplink DCS High Band	S22	-10 dBm	1700 MHz	2000 MHz	1710 MHz	1785 MHz	Auto	2 dB
7	Uplink PCS High Band	S22	-10 dBm	1700 MHz	2000 MHz	1850 MHz	1910 MHz	Auto	2 dB
8	Uplink UMTS High Band	S22	-10 dBm	1700 MHz	2000 MHz	1920 MHz	1980 MHz	Auto	2 dB

Table 9.1 Network Analyzer UL Return Loss Setup

9.2. Connect Network Analyzer to the relevant Cabinet Antenna port, UL BU port and BU to the relevant RHU in the cabinet, as shown at Figure 9.1.

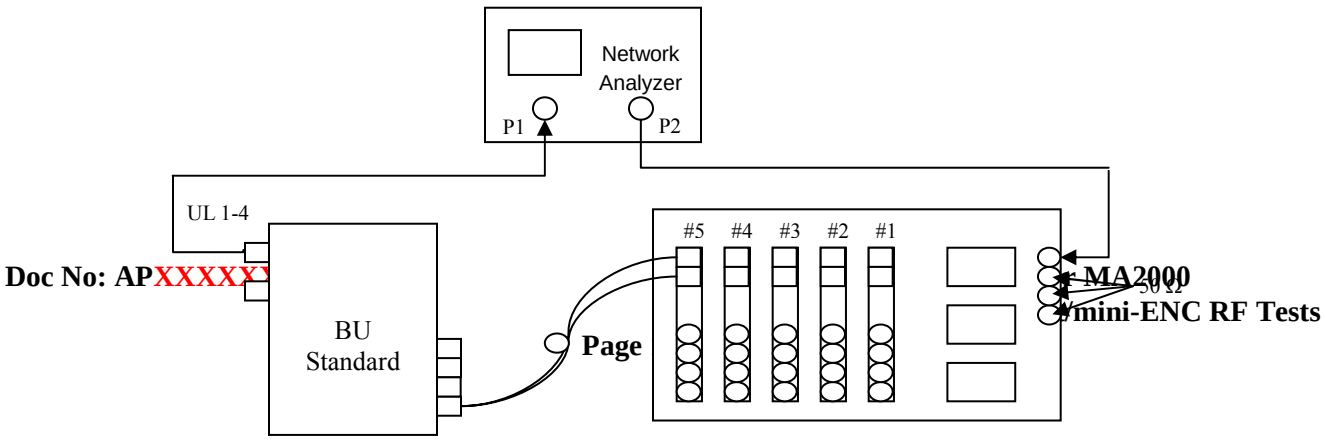

Figure 9.1 UL Return Loss Setup

9.3. Measure the maximum Return Loss between MKR1 to MKR2.
9.4. Record results to the ATR.
9.5. Repeat steps 9.1-9.4 for rest Antennas/RHU/relevant bands.

10. Downlink Port Unbalance Testing Process

10.1. Calibrate Network Analyzer according to Table 10.1, based on the relevant band, S21 measurement.

Setup	Application	Measure	Source Power	Start Freq.	Stop Freq.	MKR 1	MKR 2	Sweep Time	Scale/ Div
1	Downlink Cell Low Band	S21	-35 dBm	750 MHz	1000 MHz	869 MHz	894 MHz	Auto	2 dB
2	Downlink GSM Low Band	S21	-35 dBm	750 MHz	1000 MHz	935 MHz	960 MHz	Auto	2 dB
3	Downlink SMR Low Band	S21	-35 dBm	750 MHz	1000 MHz	929 MHz	941 MHz	Auto	2 dB
4	Downlink iDEN Low Band	S21	-35 dBm	750 MHz	1000 MHz	851 MHz	869 MHz	Auto	2 dB
5	Downlink Orange Low Band	S21	-35 dBm	750 MHz	1000 MHz	947 MHz	960 MHz	Auto	2 dB
6	Downlink DCS High Band	S21	-35 dBm	1700 MHz	2000 MHz	1805 MHz	1880 MHz	Auto	2 dB
7	Downlink PCS High Band	S21	-35 dBm	1700 MHz	2000 MHz	1930 MHz	1990 MHz	Auto	2 dB
8	Downlink UMTS High Band	S21	-35 dBm	1700 MHz	2000 MHz	2110 MHz	2170 MHz	Auto	2 dB

Table 10.1 Network Analyzer DL Port Unbalance Setup

10.2. Connect Network Analyzer to the relevant Cabinet Antenna port, BU to the relevant RHU in the Cabinet and Signal Generator to the DL port in the BU, as shown at Figure 10.1.

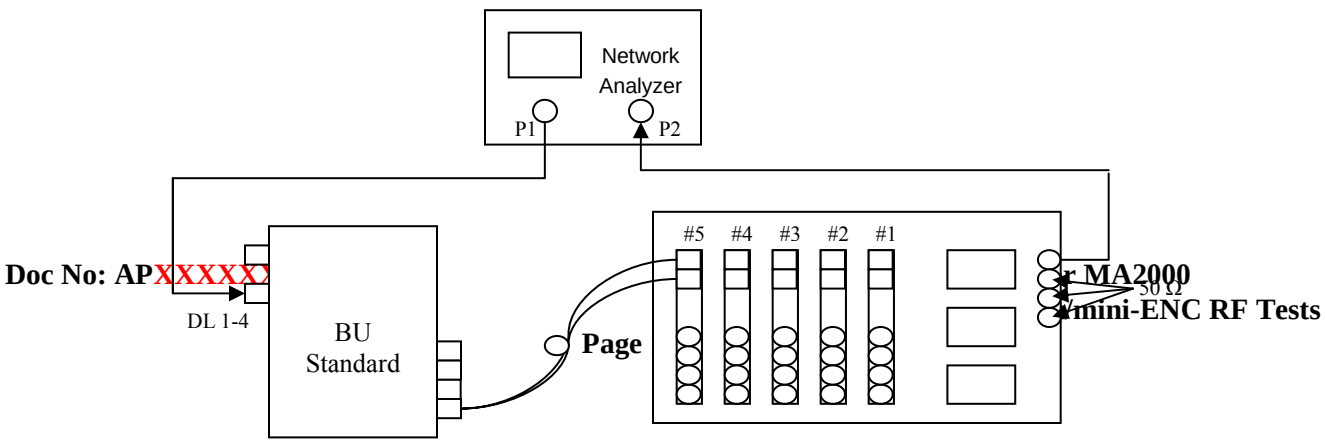

Figure 10.1 DL Port Unbalance Setup

10.3. Measure the Mean Gain between MKR1 to MKR2 at the Cabinet Antenna output (P_{out} [dBm]).
10.4. Repeat steps 10.1-10.3 for rest Antenna ports of this RHU.
10.5. Calculate difference between Gain of Antenna ports 2, 3, 4 in comparison to 1.
10.6. Record result to the ATR.
10.7. Repeat steps10.1-10.6 for rest RHU/relevant bands.

11. Interference Testing Process

11.1. Set Signal Generator #1 and Signal Generator #2 according to Table 11.2, based on the relevant band, with amplitude 8dBm per tone after combiner (P_{in} [dBm]).
11.2. Set Spectrum Analyzer according to Table 11.1, based on the relevant band according to Table 11.2, DL-to-UL Interference measurement.

Setup	Application	Span	Reference Level	RBW Hz	VBW Hz	Attn. dB
1	Cell Low Band	100kHz	-60dBm	Auto	Auto	Auto
2	GSM Low Band	100kHz	-60dBm	Auto	Auto	Auto
3	SMR Low Band	100kHz	-60dBm	Auto	Auto	Auto
4	IDEN Low Band	100kHz	-60dBm	Auto	Auto	Auto
5	Orange Low Band	100kHz	-60dBm	Auto	Auto	Auto
6	DCS High Band	100kHz	-60dBm	Auto	Auto	Auto
7	PCS High Band	100kHz	-60dBm	Auto	Auto	Auto
8	UMTS High Band	100kHz	-60dBm	Auto	Auto	Auto

Table 11.1 Spectrum Analyzer Interference DL-to-UL Setup

Setup	Configuration Type	DL-to-UL measurements				
		DL System Two tone in [MHz]			UL System Interference out [MHz]	
1	iDEN _SMR+Add-on PCS Cell_PCS	iDEN	851.2	861.4	iDEN	820.6
		iDEN	851.2	853.6	Cell	848.8
		SMR	929.2	943.4	SMR	900.8
		PCS	1930.2	1950.6	PCS	1909.8
		Cell	869.2	889.6	Cell	848.8
		Cell	891.4	893.8	SMR	896.2
2	iDEN_PCS Cell_PCS SMR_PCS	iDEN	851.2	861.4	iDEN	820.6
		iDEN	851.2	853.6	Cell	848.8
		SMR	929.2	943.4	SMR	900.8
		PCS	1930.2	1950.6	PCS	1909.8
		Cell	869.2	889.6	Cell	848.8
		Cell	891.4	893.8	SMR	896.2
3	Cell_PCS+Add-on PCS	Cell	869.2	889.6	Cell	848.8
		PCS	1930.2	1950.6	PCS	1909.8
4	iDEN_SMR+Add-on PCS	iDEN	851.2	861.4	iDEN	820.6
		SMR	929.2	943.4	SMR	900.8
		PCS	1930.2	1950.6	PCS	1909.8
5	Cell_PCS+Add-on PCS iDEN _SMR	iDEN	851.2	861.4	iDEN	820.6
		iDEN	851.2	853.6	Cell	848.8
		SMR	929.2	943.4	SMR	900.8
		PCS	1930.2	1950.6	PCS	1909.8
		Cell	869.2	889.6	Cell	848.8
		Cell	891.4	893.8	SMR	896.2
6	Cell_DCS Orange_DCS+Add-on UMTS iDEN_PCS (only iDEN)	Cell	869.2	889.6	Cell	848.8
		Cell	885.4	893.8	Orange	902.2
		DCS	1805.2	1825.6	DCS	1784.8
		DCS	1839.4	1879.8	UMTS	1920.2
		Orange	947.5	959.5	Orange	911.5
		UMTS	2110.2	2153.7	UMTS	1979.7
		iDEN	851.2	861.4	iDEN	820.6
		iDEN	851.2	853.6	Cell	848.8
7	Cell_PCS iDEN _SMR	Cell	869.2	889.6	Cell	848.8
		Cell	891.4	893.8	SMR	896.2
		PCS	1930.2	1950.6	PCS	1909.8
		iDEN	851.2	861.4	iDEN	820.6
		iDEN	851.2	853.6	Cell	848.8
		SMR	929.2	943.4	SMR	900.8
8	Cell_PCS	Cell	869.2	889.6	Cell	848.8

	Cell_PCS iDEN_PCS SMR_PCS	Cell	891.4	893.8	SMR	896.2
		PCS	1930.2	1950.6	PCS	1909.8
		iDEN	851.2	861.4	iDEN	820.6
		iDEN	851.2	853.6	Cell	848.8
		SMR	929.2	943.4	SMR	900.8
9	Cell_PCS+Add-on PCS Cell_PCS	Cell	869.2	889.6	Cell	848.8
		PCS	1930.2	1950.6	PCS	1909.8
10	Cell_PCS+Add-on PCS Cell_PCS+Add-on PCS	Cell	869.2	889.6	Cell	848.8
		PCS	1930.2	1950.6	PCS	1909.8
11	iDEN _PCS+Add-on PCS Cell_PCS Cell_PCS	iDEN	851.2	861.4	iDEN	820.6
		iDEN	851.2	853.6	Cell	848.8
		PCS	1930.2	1950.6	PCS	1909.8
		Cell	869.2	889.6	Cell	848.8
12	iDEN _SMR+Add-on PCS	iDEN	851.2	861.4	iDEN	820.6
		SMR	929.2	943.4	SMR	900.8
		PCS	1930.2	1950.6	PCS	1909.8

Table 11.2 Interference measurements configurations

11.3. Connect Spectrum Analyzer to the relevant Cabinet Antenna port, BU to the relevant RHU in the Cabinet and Signal Generator to the relevant Cabinet Antenna port, as shown at Figure 11.1.

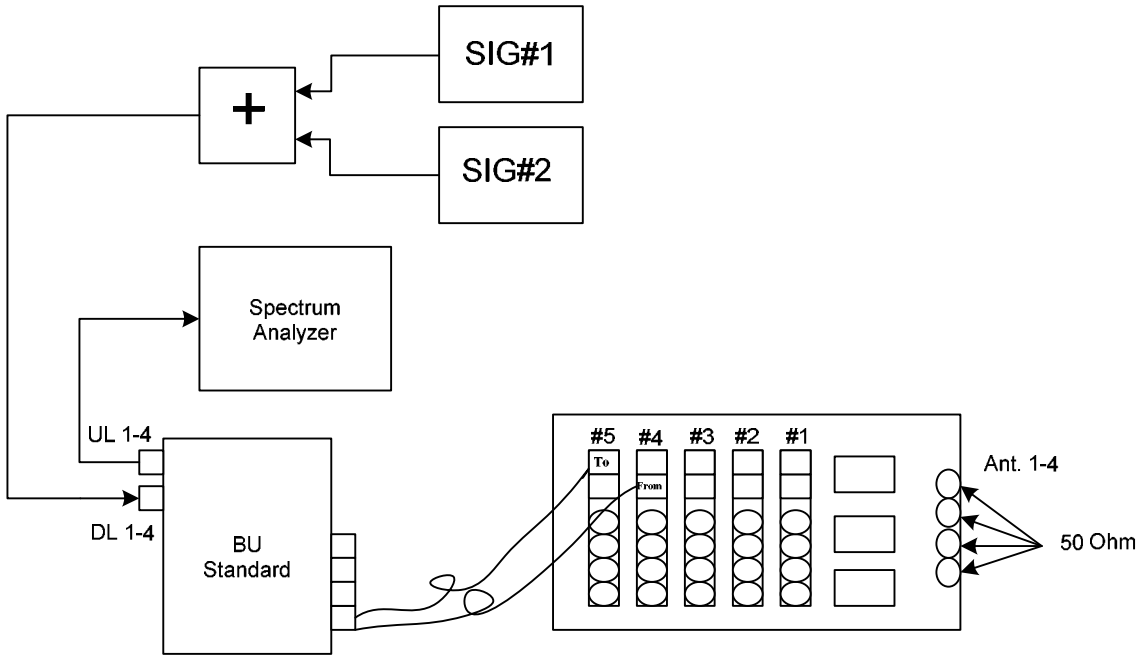

Figure 11.1 Interference DL-to-UL Setup

11.4. Measure interferences in the relevant DL bands.
11.5. Record results to the ATR.
11.6. Repeat steps 11.1-11.5 for rest Antennas/RHU/relevant bands.

12. Downlink Power Detector Testing Process

12.1. Set Spectrum Analyzer according to Table 12.1, based on the relevant band, DL Power Detector measurement.

Setup	Application	Center Freq.	Span	Reference Level	RBW Hz	VBW Hz	Attn. dB
1	Downlink Cell Low Band	881.5MHz	1MHz	30dBm	Auto	Auto	Auto
2	Downlink GSM Low Band	947.5MHz	1MHz	30dBm	Auto	Auto	Auto
3	Downlink SMR Low Band	935MHz	1MHz	30dBm	Auto	Auto	Auto
4	Downlink iDEN Low Band	860MHz	1MHz	30dBm	Auto	Auto	Auto
5	Downlink Orange Low Band	953.5MHz	1MHz	30dBm	Auto	Auto	Auto
6	Downlink DCS High Band	1842.5MHz	1MHz	30dBm	Auto	Auto	Auto
7	Downlink PCS High Band	1960MHz	1MHz	30dBm	Auto	Auto	Auto
8	Downlink UMTS High Band	2140MHz	1MHz	30dBm	Auto	Auto	Auto

Table 12.1 Spectrum Analyzer DL Power Detector Setup

12.2. Connect Spectrum Analyzer to the relevant Cabinet Antenna port, BU to the relevant RHU in the cabinet and Signal Generator to the DL port in the BU, as shown at Figure 12.1.

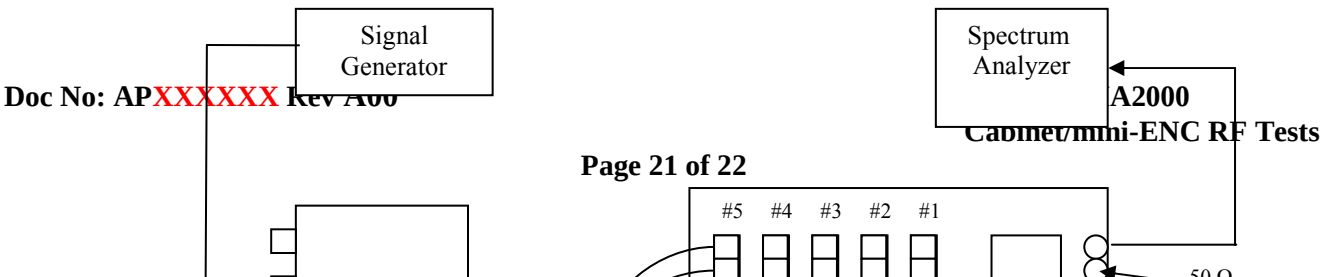

Figure 12.1 DL Power Detector Setup

12.3. Set Signal Generator get power output of 1dBm at the Cabinet output.
12.4. Read the "DL NB Pwr" value on the RHU GUI.
The result on Spectrum Analyzer should be equal to the result at "DL NB Pwr" ±1dB.

12.5. Record result to the ATR.
12.6. Increase Signal Generator output power to get 1dB increase at the Cabinet output.
12.7. Read the "DL NB Pwr" value on the RHU GUI for Low Band.
12.8. Record result to the ATR.
12.9. Repeat steps 12.1-12.8 till Cabinet power output reaches 19dBm for RHU.
12.10. Repeat steps 12.1-12.9 for High Band (19dBm for RHU and 22dBm for Add-on).
12.11. Repeat steps 12.1-12.10 for other RHU`s/Add-on`s.