

RADIO TEST REPORT

No. 309691-2

EQUIPMENT UNDER TEST

Equipment: Repeater
Type / model: AR 3430
Manufacturer: LGP Allgon AB
Tested by request of: LGP Allgon AB

SUMMARY

The equipment complies with the requirements of the following standards:

FCC Part 24 E (2002)
FCC Part 15, subpart B; class A (2002)

This report supersedes the report dated December 22, 2004.



Date of issue: June 2, 2004

Tested by:

Jan Adolfsson /

Linda Heikurainen

Approved by:

Björn Rosenquist

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1. CLIENT INFORMATION

The EUT has been tested by request of

Company: LGP Allgon AB

Name of contact: Kjell Knuutinen

2. EQUIPMENT UNDER TEST (EUT)**2.1 Identification of the EUT according to the manufacturer/client declaration**

Equipment:	Repeater
Type/Model:	AR 3430
Brand name:	LGP Allgon
Serial number:	--
Manufacturer:	LGP Allgon AB
Rating/Supplying voltage:	115 V AC
Rating RF output power:	Uplink 33 dBm Downlink 38 dBm
External antenna connector:	YES
Operating temperature range:	-25 to +55 °C (tested to -30 to 60 °C)
Frequency range:	1,87 – 1,91 GHz 1,95 – 1,99 GHz
Modulation characteristics:	CDMA



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2.2 Additional hardware information about the EUT

The EUT consists of the following unit:

Unit	Type and version	
CU board	K103/3	R1A
BSA board	K221/11	R1B
BSA board	K221/21	R1B
PA UL board	K223/13	R1A
PA DL board	K223/14	R1A
BA 19 board	K225/1	P1F2
Duplex filter	UA106 04/1	NA
LNA UL	UA107 23/3	P1A
LNA DL	UA107 23/4	P1A
DCM 18/19	UA107 18/1	R1A
DCB 18/19	UA107 19/1	P1A

2.3 Peripheral equipment

Peripheral equipment is defined as equipment needed for correct operation of the EUT, but not included as a part of the testing and evaluation of the EUT.

Equipment	Manufacturer / Type	Serial number
CDMA generator:	Agilent/ E4432B	MY41310334
Generator	HP 83712A	3314A00182

2.4 Modifications during the test

No modifications have been made during the tests.



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3. TEST SPECIFICATIONS

3.1 Standards

FCC part 24 (2002): Public Mobile Services, Subpart E – Broadband PCS

FCC part 15 (2002): Subpart B, class A

3.2 Additions, deviations and exclusions from standards

No additions, deviations or exclusions have been made from standards.



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4. TEST SUMMARY

The results in this report apply only to the sample tested.

FCC reference	Test	Result	Note
24.232(a)	RF output power	Pass	
24.238 (a-d)	Occupied Bandwidth, Input vs. Output	Pass	
24.238 (a-d)	Spurious emission at antenna terminal	Pass	
24.238 (a)	Spurious emission radiated	Pass	
15	Spurious emission at AC terminal	Pass	
24.235	Stability Performance	Pass	



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5. RF OUTPUT POWER

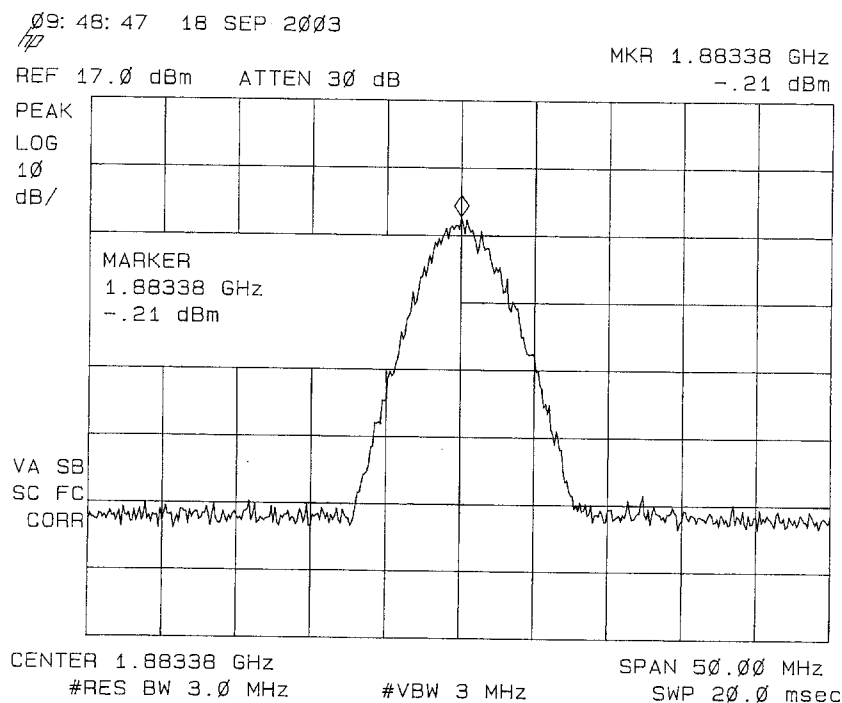
5.1 Test protocol

Date of test: September 18, 2003

EUT mode of operation: carrier modulated with a CDMA signal.

Channel (MHz)	Peak Output Power (dBm)	Limit value (dBm)
1883	39,0	< 50
1890	37,5	
1897	35,8	
1963	43,9	
1970	42,5	
1977	43,9	

Measurement results are corrected for attenuation in the set-up configuration.

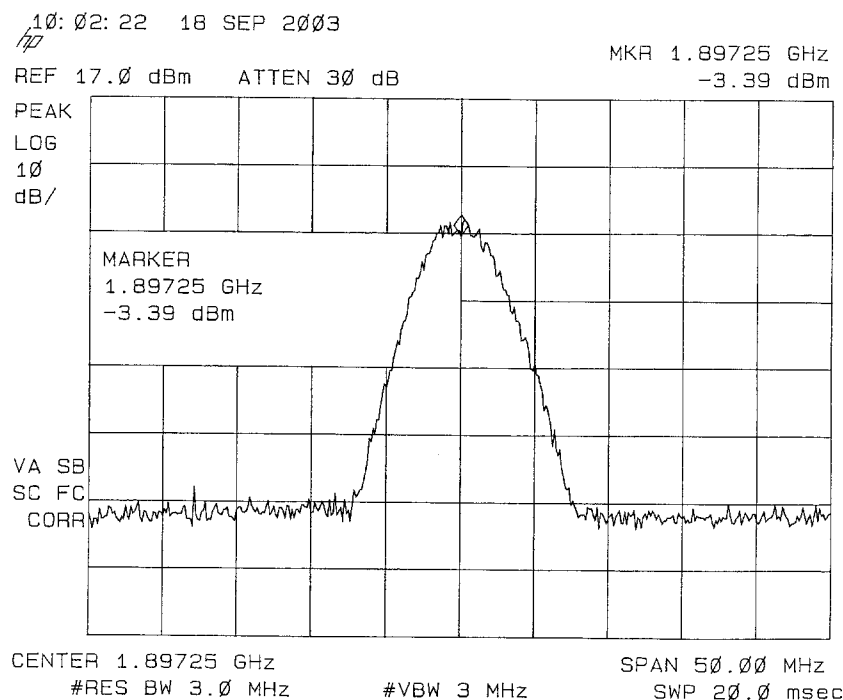
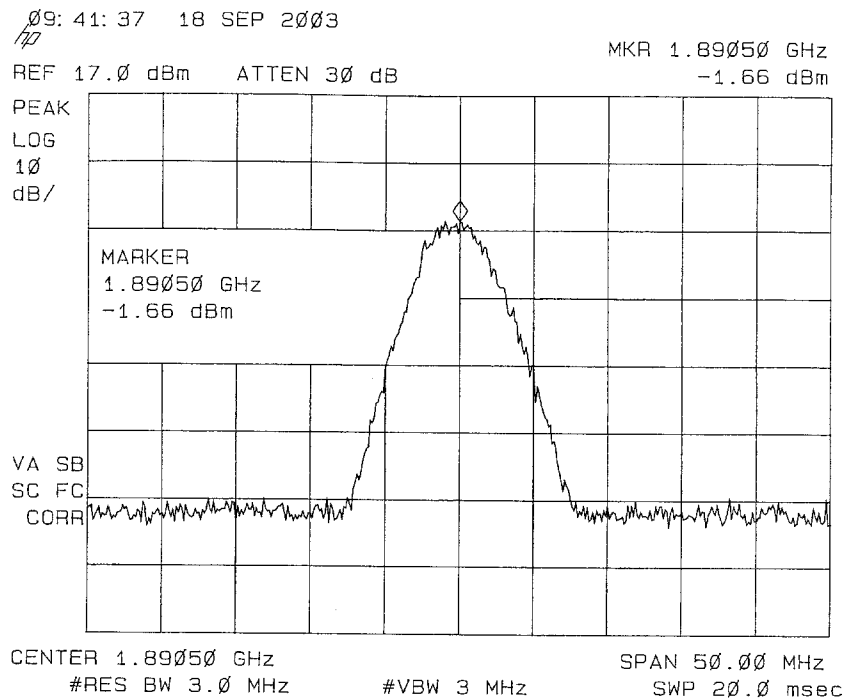


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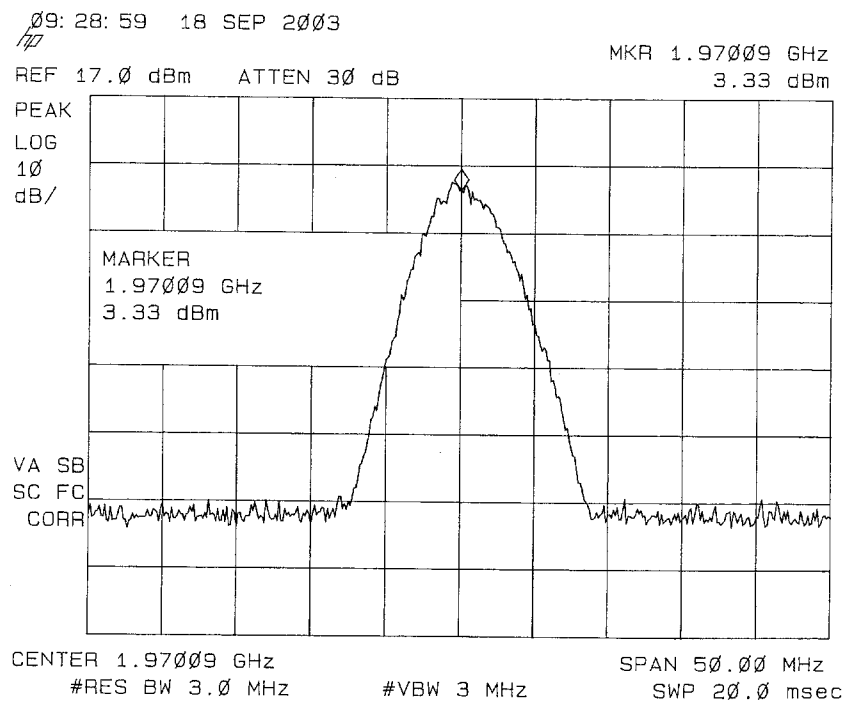
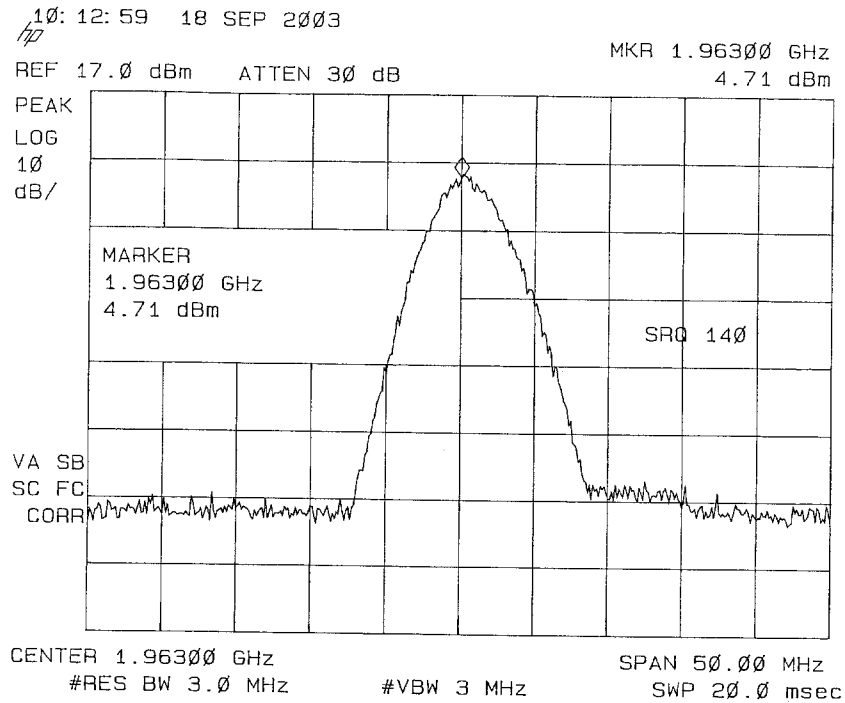
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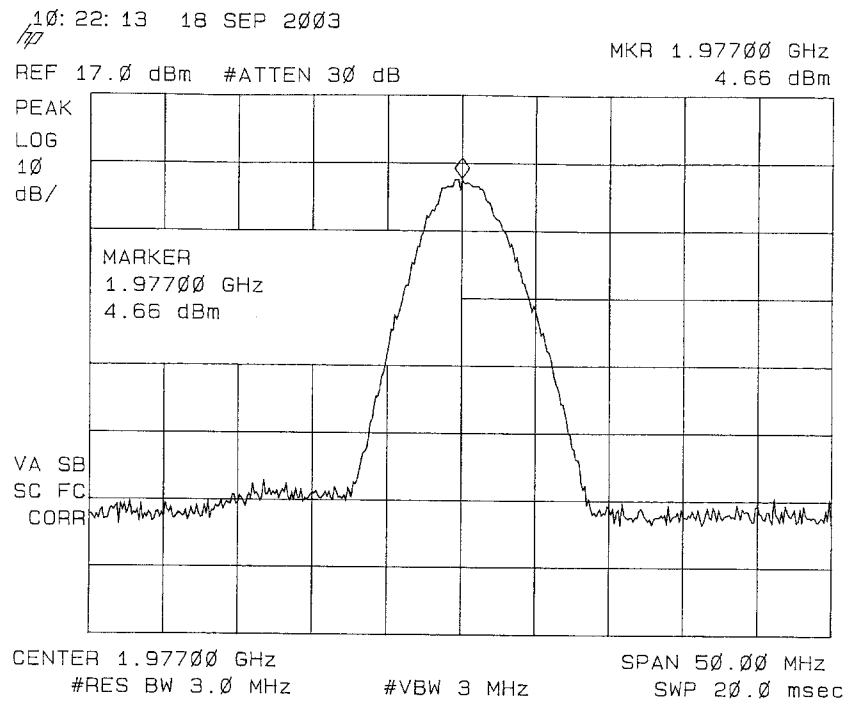


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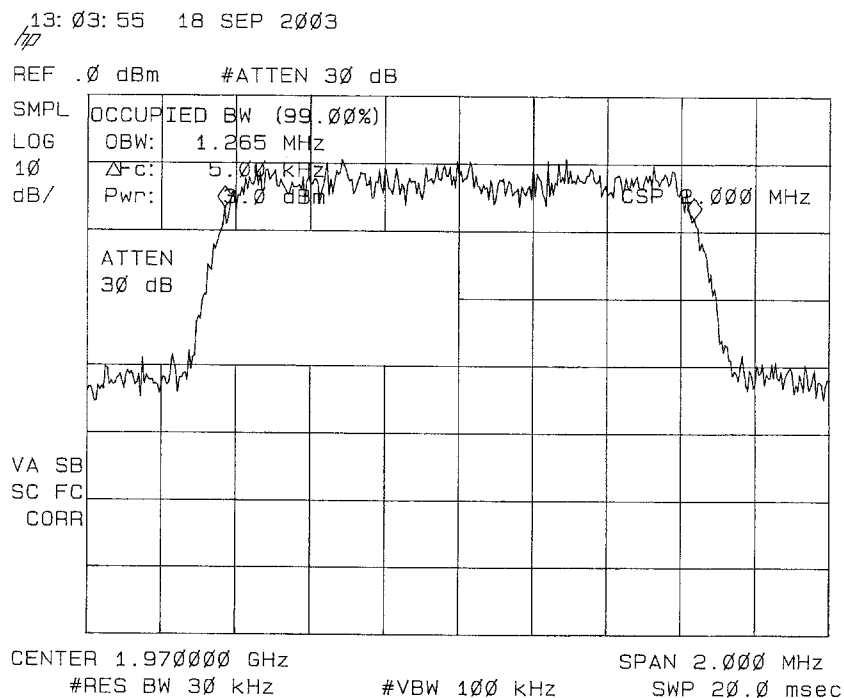
6. OCCUPIED BANDWIDTH

6.1 Test protocol

Date of test: September 18, 2003

EUT mode of operation: carrier modulated with a CDMA signal.

Channel	99% Bandwidth (kHz)	Limit value (kHz)
Down link	1265	< 1275
Up link	1255	



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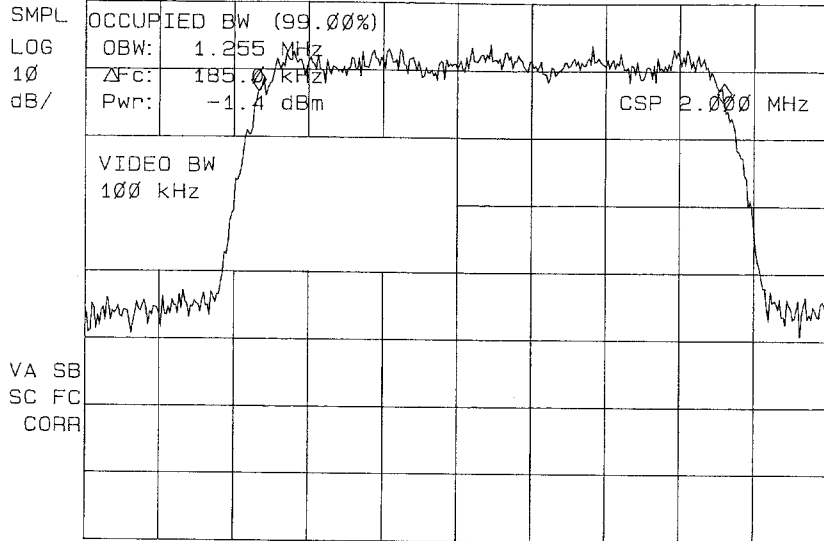
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12: 44: 30 18 SEP 2003
/P

REF -8.0 dBm #ATTEN 10 dB



CENTER 1.889910 GHz SPAN 2.000 MHz
#RES BW 30 kHz #VBW 100 kHz SWP 20.0 msec



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7. STABILITY PERFORMANCE

7.1 Test protocol

Date of test: December 10, 2003

EUT mode of operation: Carrier unmodulated

Channel (MHz)	Temperature +25 C		
	Frequency (MHz)	Output Power (dBm)	
Up link	1900,000000	39,4	
Down link	1980,000000	44,8	

Channel (MHz)	Temperature -30 C		
	Frequency (MHz)	Output Power (dBm)	
Up link	1900,000000	40,2	
Down link	1980,000000	39,4	

Channel (MHz)	Temperature +60 C		
	Frequency (MHz)	Output Power (dBm)	
Up link	1900,000000	37,5	
Down link	1980,000000	39,2	



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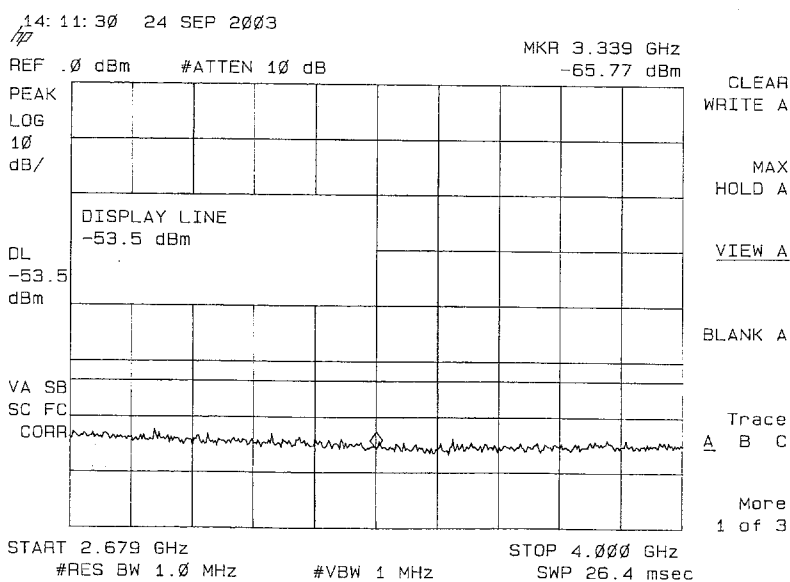
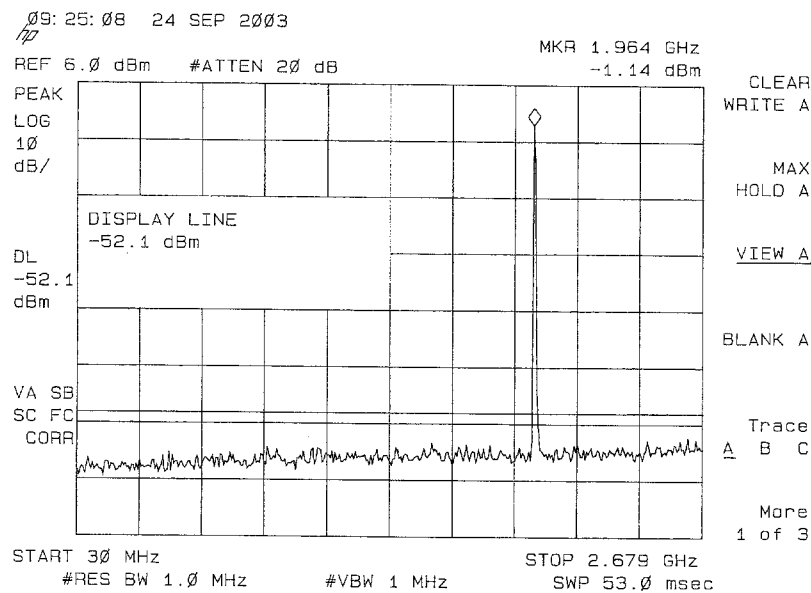
8. CONDUCTED SPURIOUS EMISSION, ANTENNA PORT

8.1 Test protocol

Date of test: September 24, 2003

EUT mode of operation: carrier modulated with a CDMA signal.

Uplink



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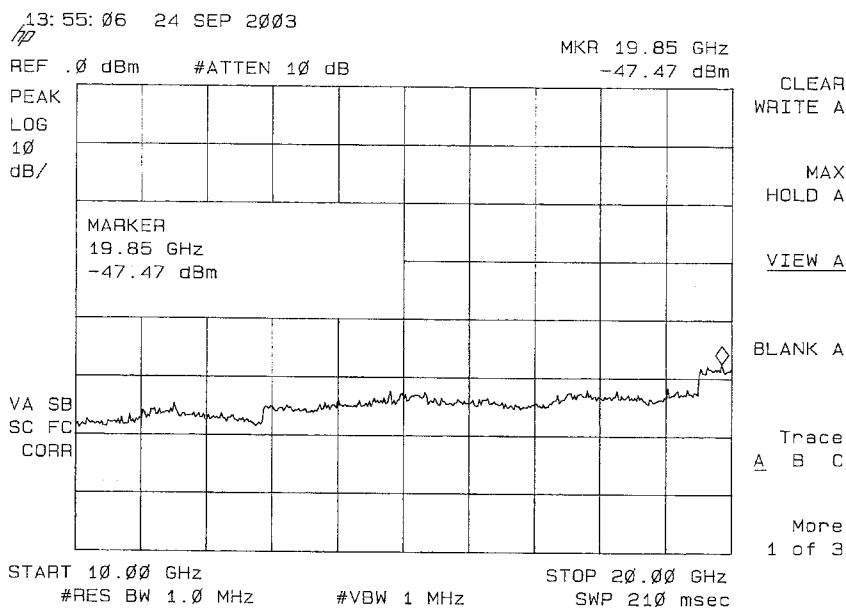
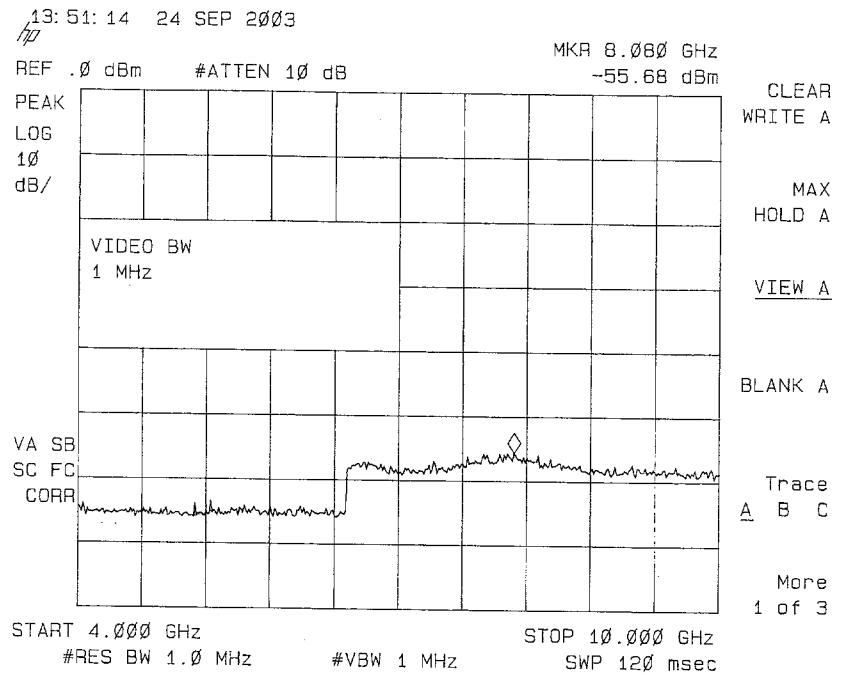
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EUT mode of operation: carrier modulated with a CDMA signal.

Uplink



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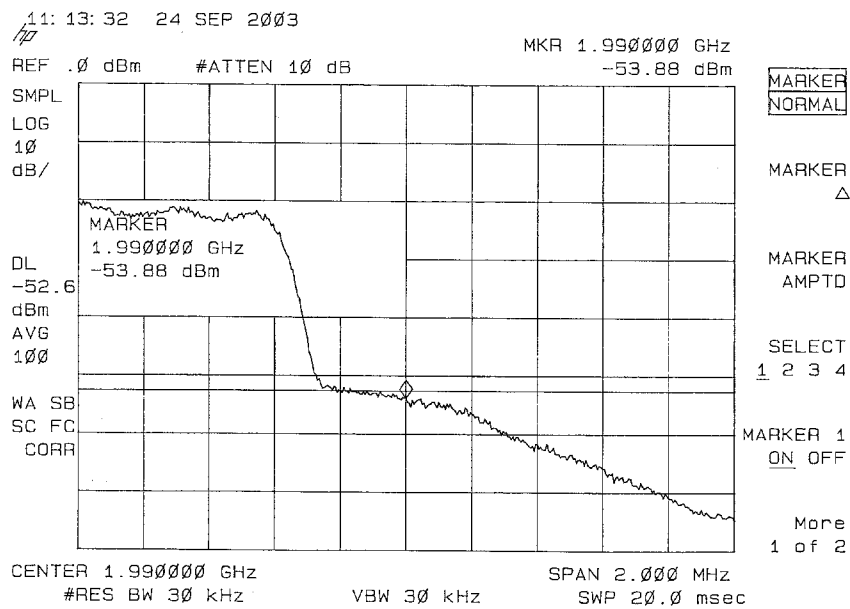
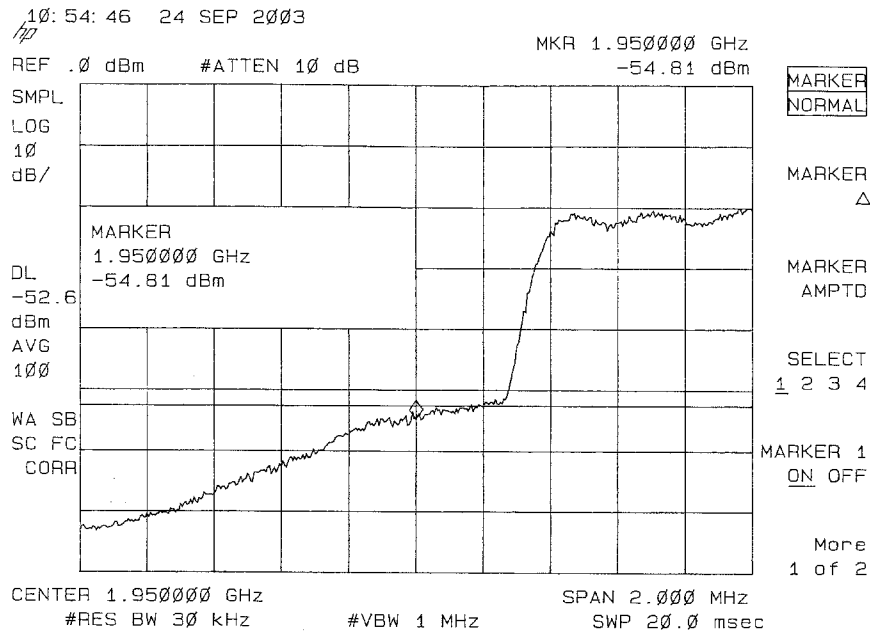
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EUT mode of operation: carrier modulated with a CDMA signal.

Uplink



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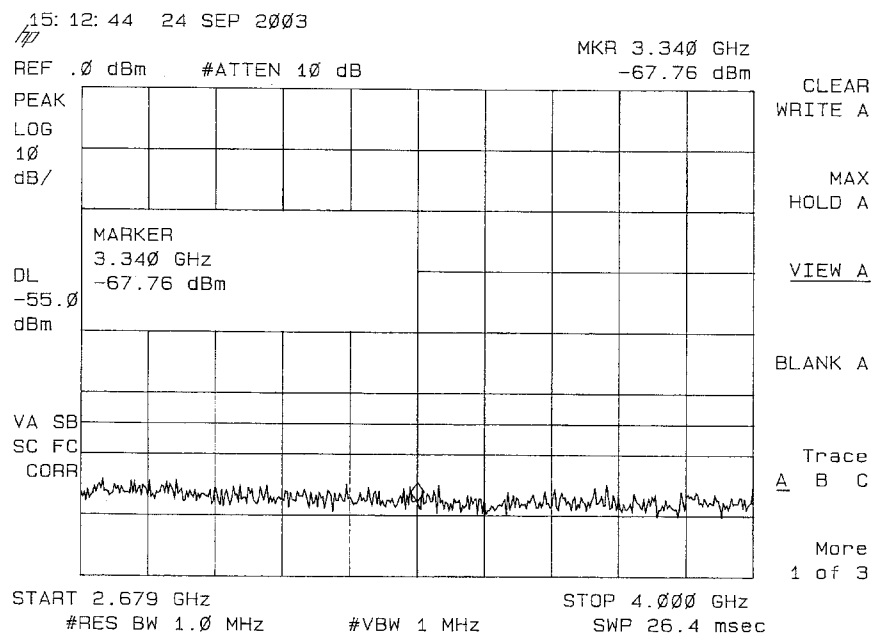
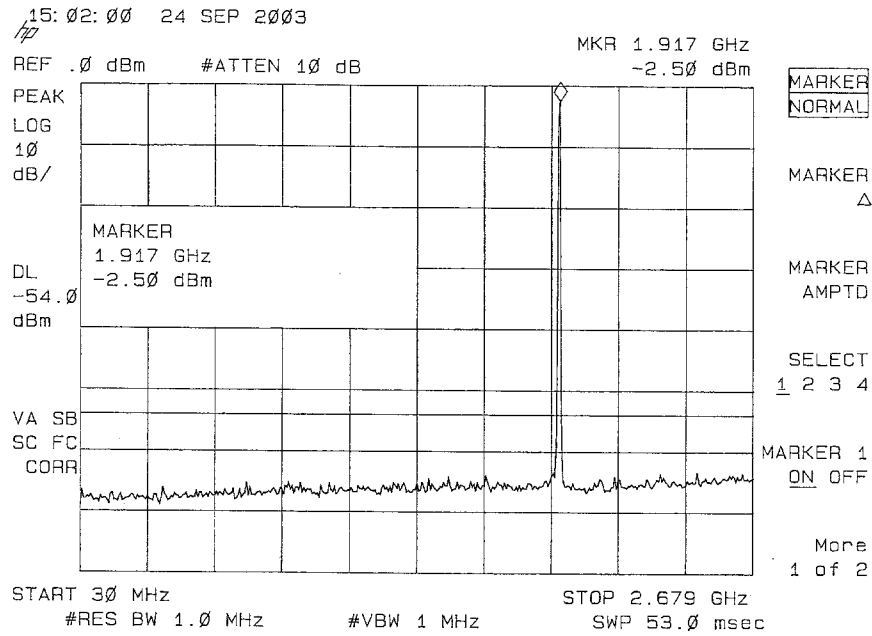
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EUT mode of operation: carrier modulated with a CDMA signal.

Downlink



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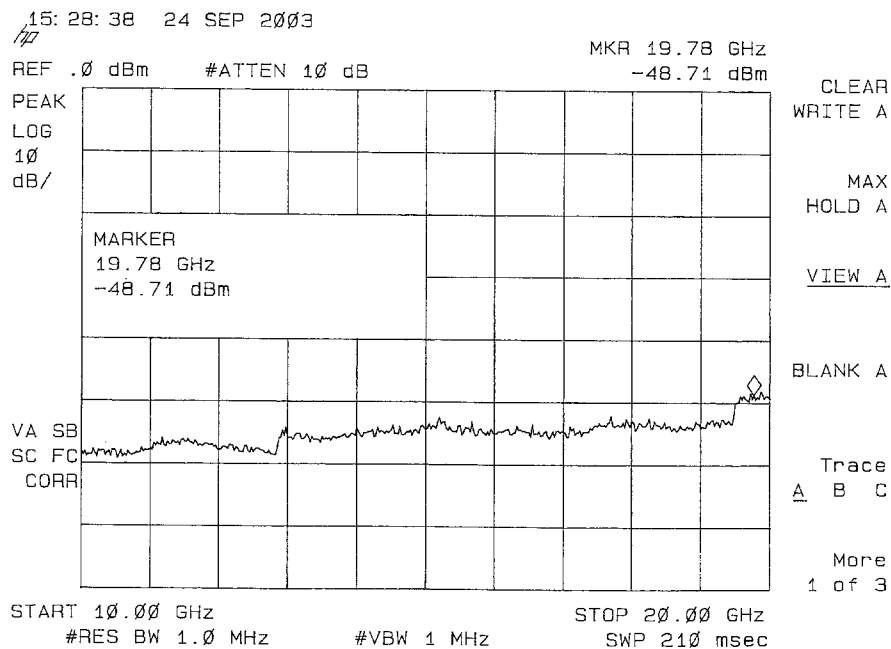
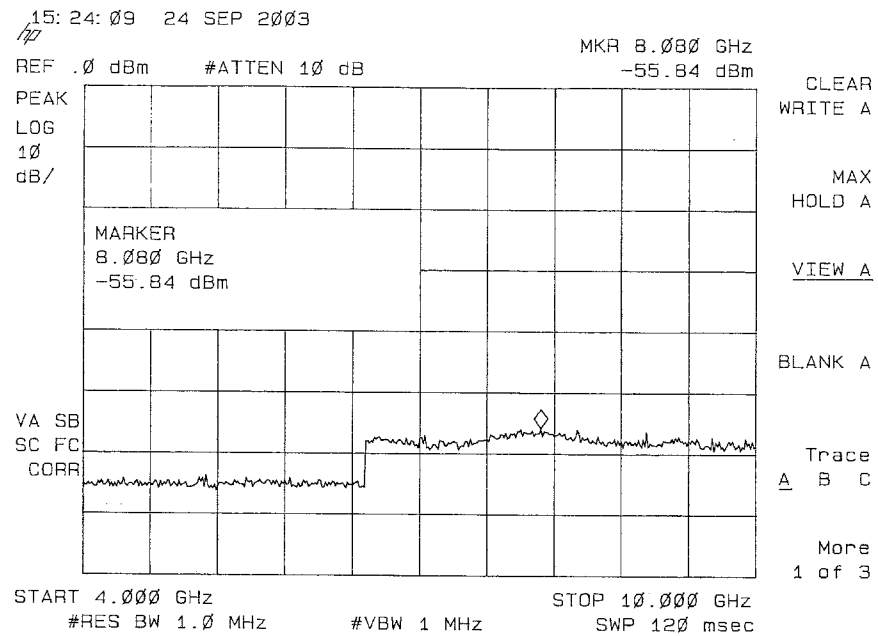
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Downlink



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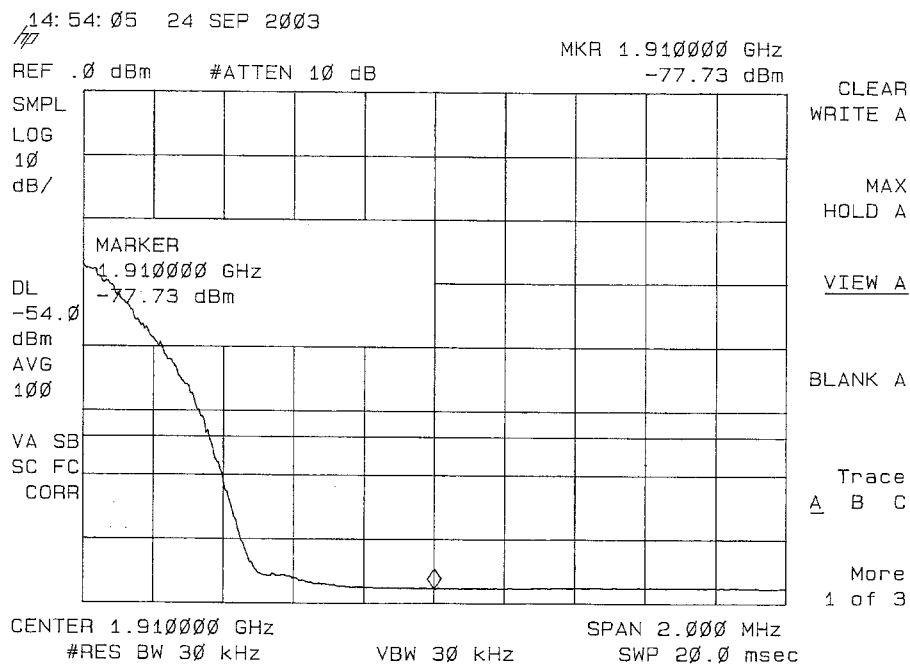
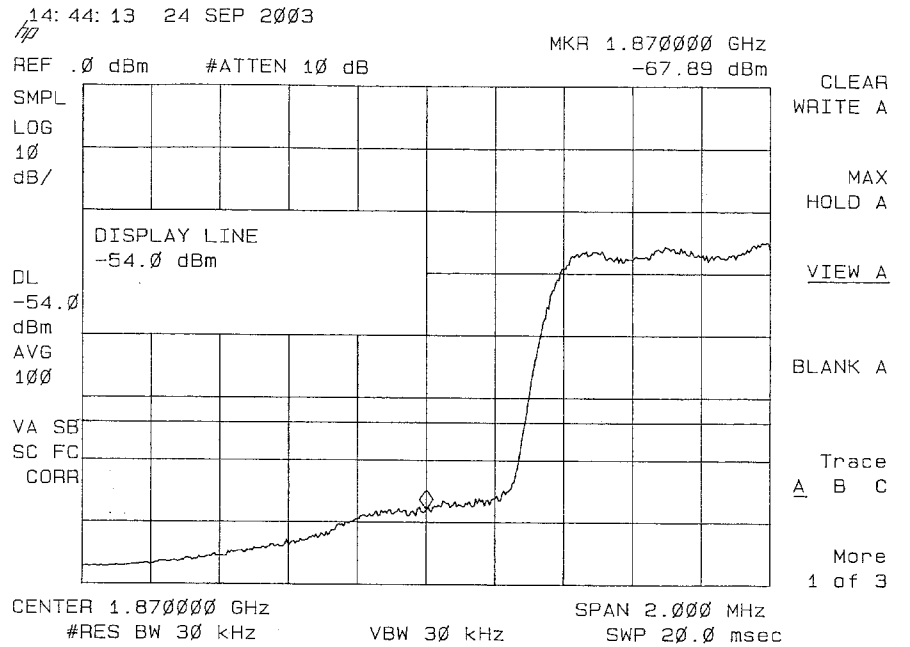
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EUT mode of operation: carrier modulated with a CDMA signal.

Downlink



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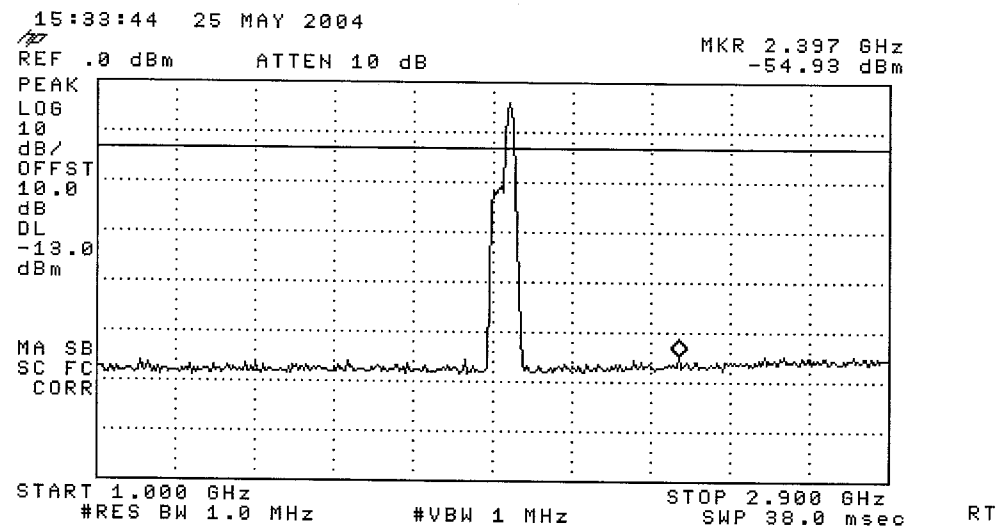
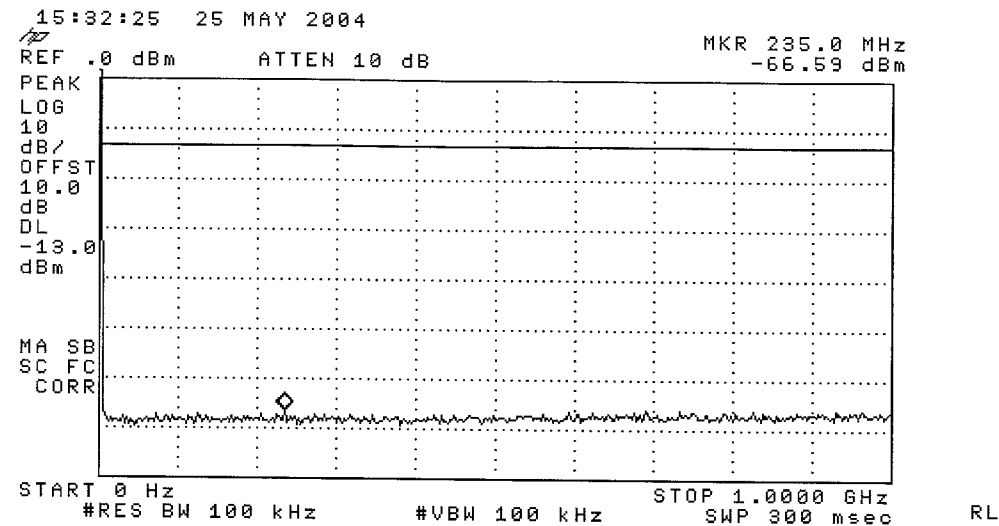
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Date of test: May 25, 2004

EUT mode of operation: Low power, unmodulated carrier.

Downlink

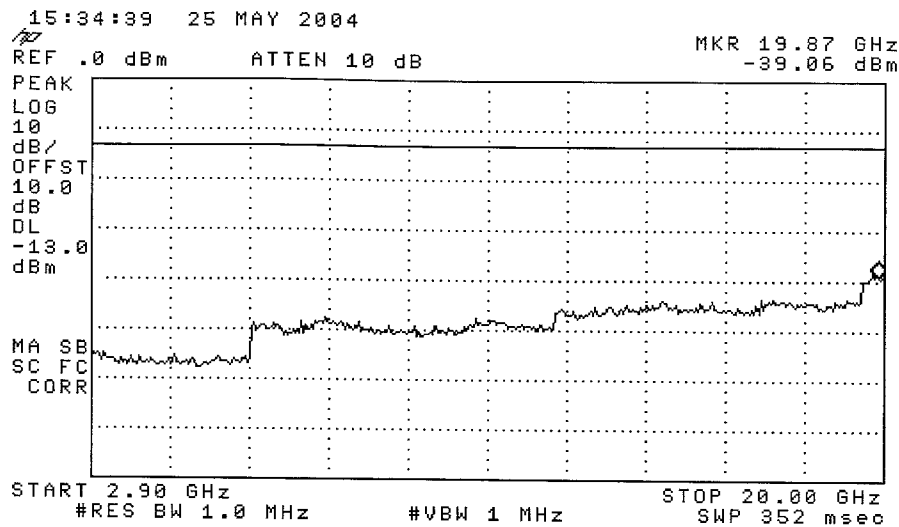


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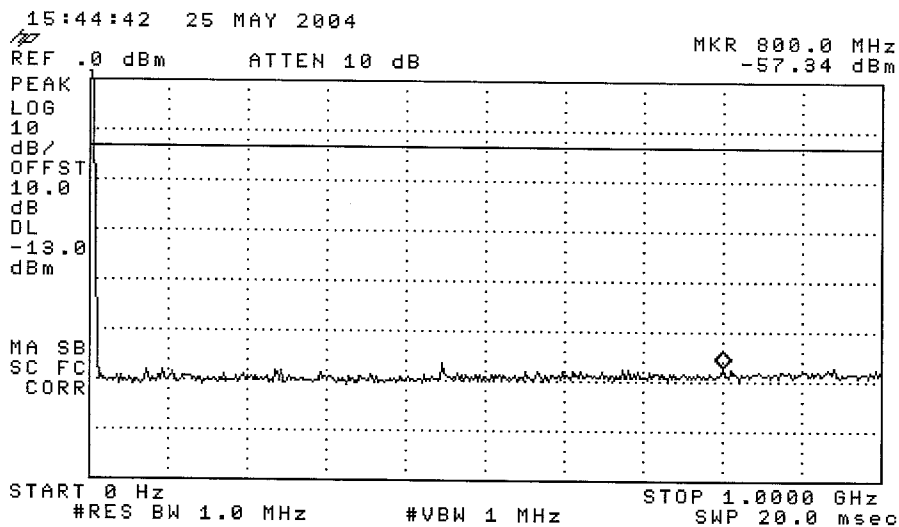
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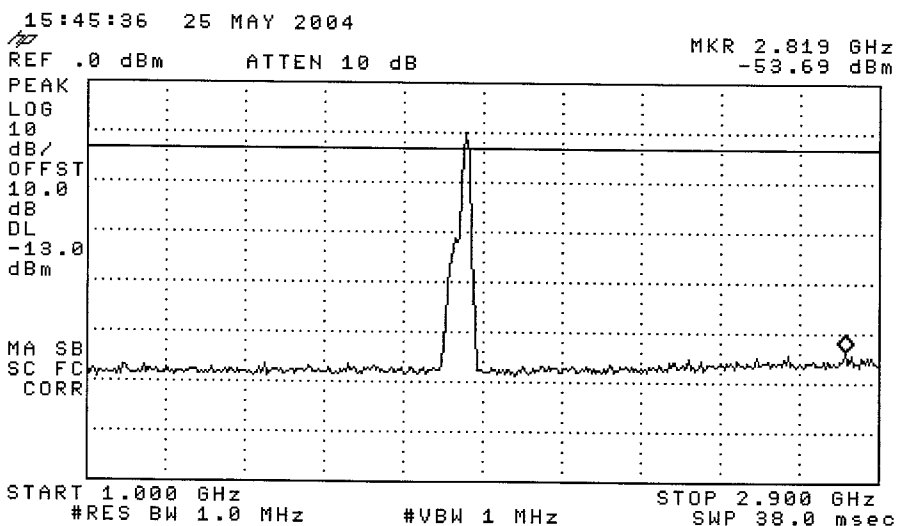


RT

Downlink



RT



RT

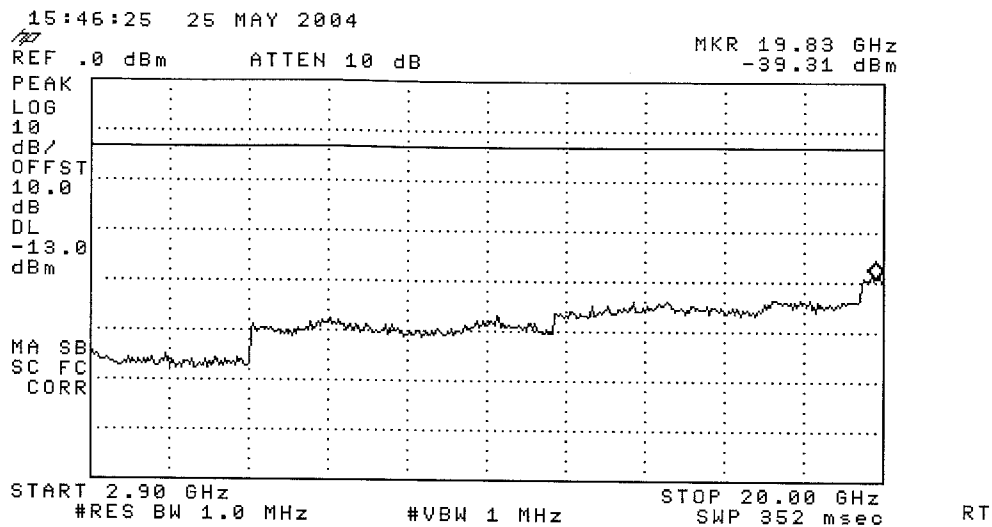


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Data summary

Spurious emissions, conducted at DL Antenna port					
Frequency [MHz]	RBW [kHz]	Measured level		Limit	
		Peak [dBm]		Peak [dBm]	
30 - 1 000	30	-		-13	
1 000 - 2 900	100	< -28		-13	
2 900 - 20 000	1000	< - 18		-13	

Spurious emissions, conducted at UL Antenna port					
Frequency [MHz]	RBW [kHz]	Measured level		Limit	
		Peak [dBm]		Peak [dBm]	
30 - 1 000	30	-		-13	
1 000 - 2 900	100	< -16		-13	
2 900 - 20 000	1000	< - 18		-13	



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9. RADIATED SPURIOUS EMISSIONS

9.1 Operating environment

Temperature: 21 °C (15 - 35 °C)
 Relative Humidity: 43 % (20 - 75 %)

9.2 Measurement set-up

Test site: Semi-anechoic shielded chamber (30MHz – 20 GHz)

The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 10 m and the EUT was placed on a non-metallic table, 1,5 m above the reference ground plane. The specified test mode was enabled. Test set-up photo is given below.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1,5 m, 2,5 m and 3,5 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps.

At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out.

Test set-up photo:



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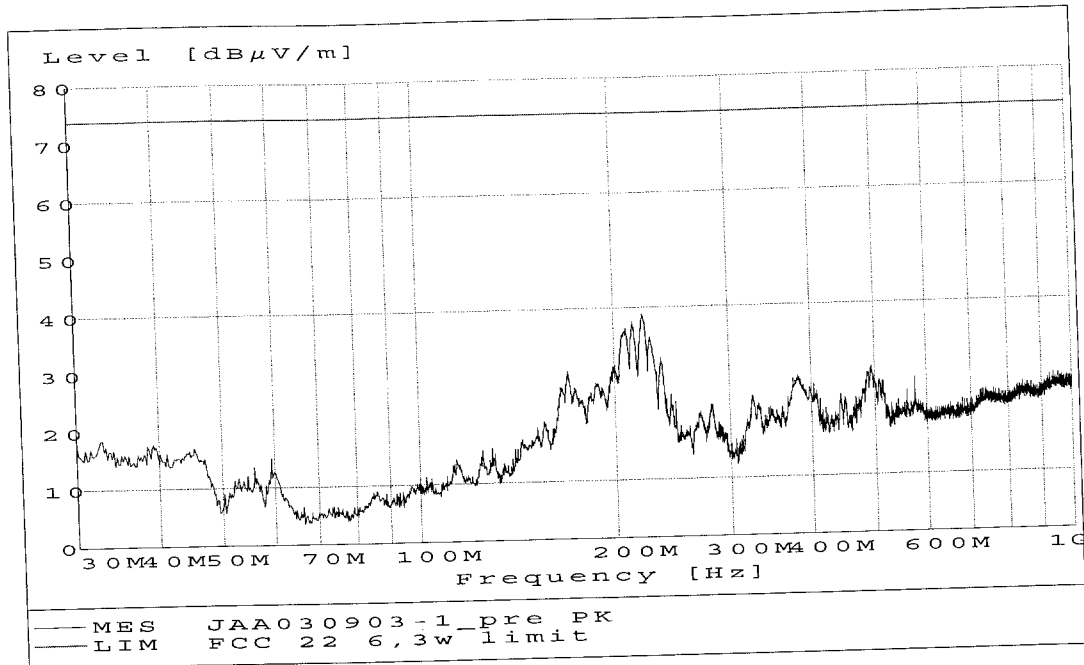
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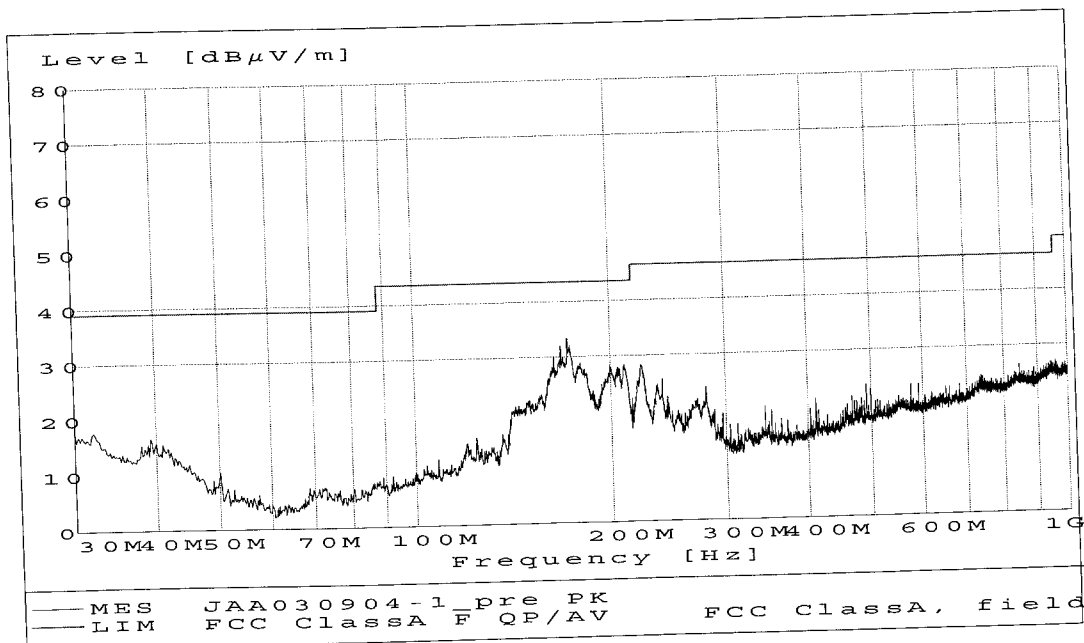
9.3 Test protocol

Semi-anechoic shielded chamber

Date of test: September 3, 2003



30 – 1000 MHz, max peak at a distance of 10 m TX mode.



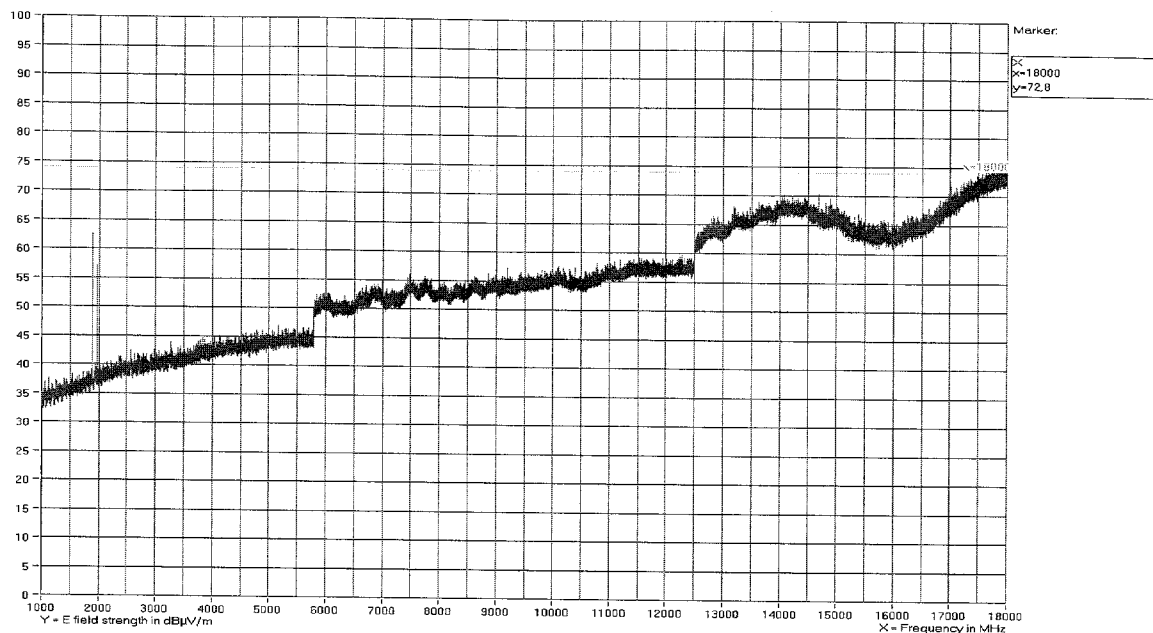
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Semi-anechoic shielded chamber



TX-mode

13: 28: 07 04 SEP 2003

309691. JHB
TX

REF 107.0 dBµV ATTEN 10 dB

PEAK
LOG
10
dB/

VA SB
SC FC
CORR

START 18.000 GHz

#RES BW 1.0 MHz

#VBW 1 MHz

STOP 20.000 GHz

SWP 49.6 msec

TX-mode

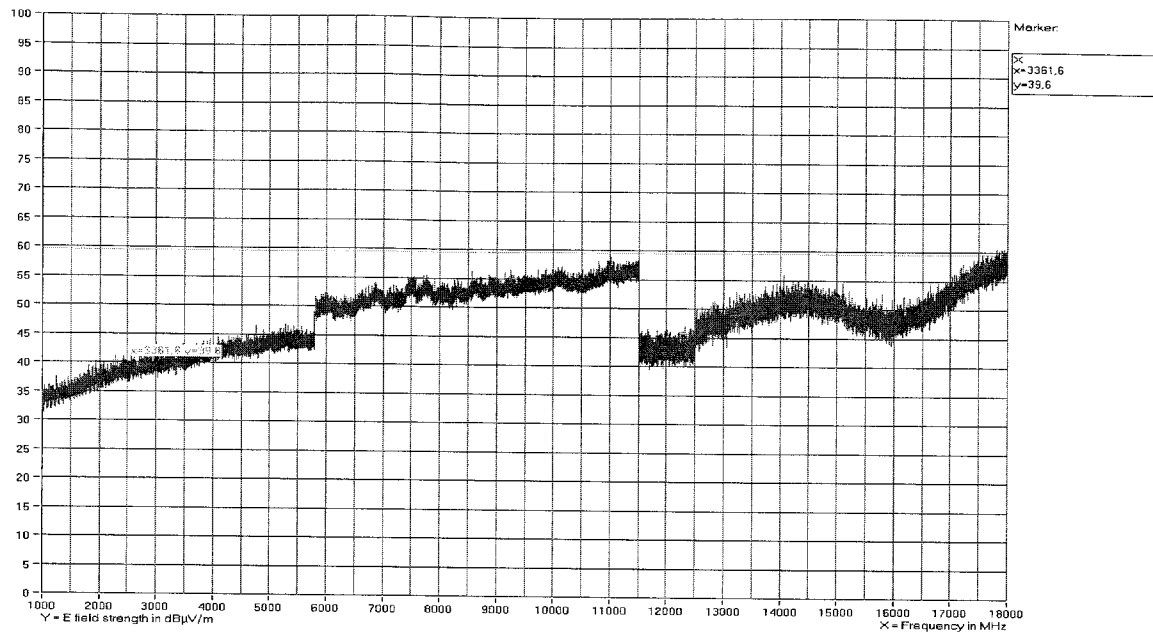


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RX mode

Limit in TX mode:

$P = 6 \text{ W (38 dBm)}$

$E = 7 \sqrt{P} / 10 @ 10 \text{ m} \Rightarrow E = 1,7 \text{ V/m or } 124,7 \text{ dBuV/m}$

The spurious emission shall be attenuated by $43 + 10 \log (P) \Rightarrow 50,7 \text{ dB}$

The spurious limit @ 10 m will be $124,7 - 50,7 = 73,9 \text{ dBuV/m}$

In analogue so will the limit @ 3 m be : $84,4 \text{ dBuV/m}$



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10. CONDUCTED SPURIOUS EMISSION, AC PORT
10.1 Test protocol

Date of test: December 16, 2003

Frequency /MHz	Quasi-Peak		Average
	Disturbance Level /dB(μ V)	Permitted limit /dB(μ V)	Permitted limit /dB(μ V)
0,21	64	79	66
0,26	62	79	66
0,39	42	79	66
0,53	50	73	60


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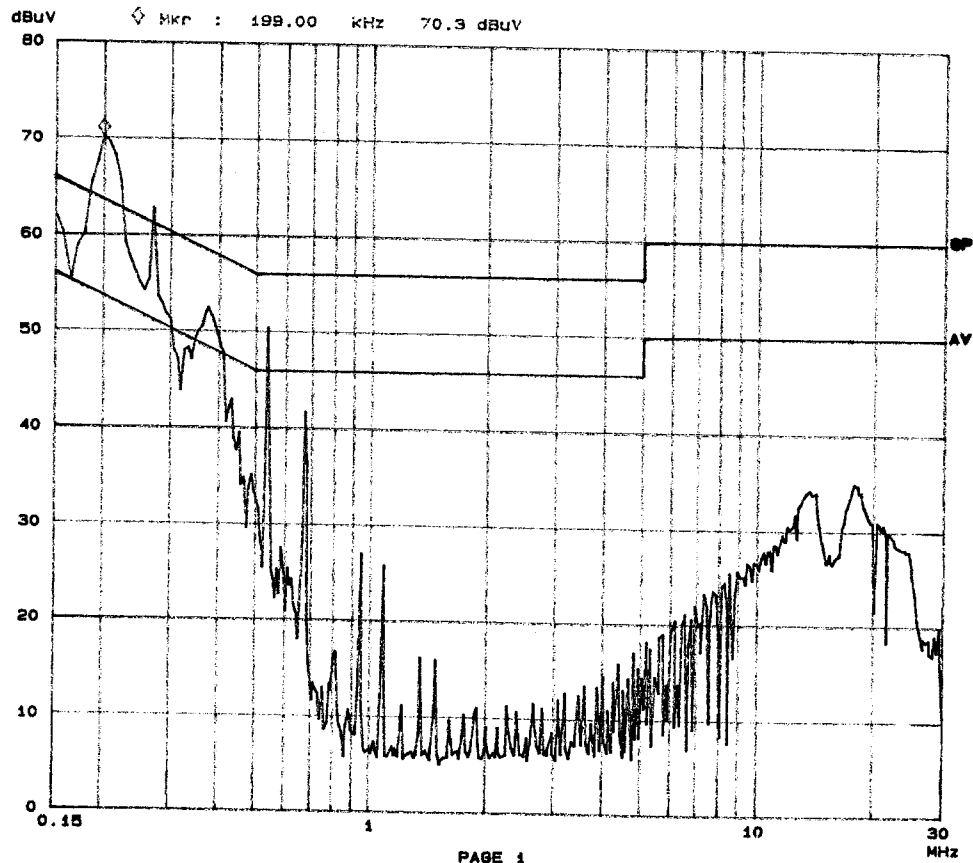
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EMC-CENTER
FCC part 15B, class B

16. Dec 03 13:24

EUT: AR3430
Manuf: LGP ALLGON AB
Operator: BJR
Test Spec: Mains terminals. Peak measurements.
Comment: ANSI C.63: 2001

Scan Settings (1 Range) ----- Receiver Settings -----
Start Stop Step IF BW Detector M-Time Atten Preamp OpAmp
150k 30M 7k 10k PK 20ms AUTO LN OFF 60dB



The limit printed in the graph is class B. The product shall only fulfil the class A limit.

The class A limit is:	QP	AV
0,15 – 0,50 MHz	79 dBuV	66 dBuV
0,50 – 30 MHz	73 dBuV	60 dBuV

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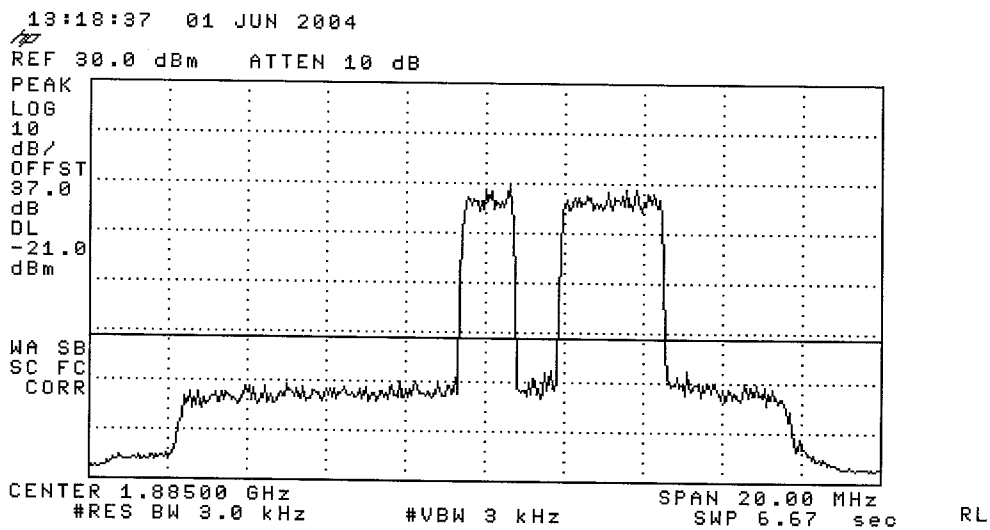
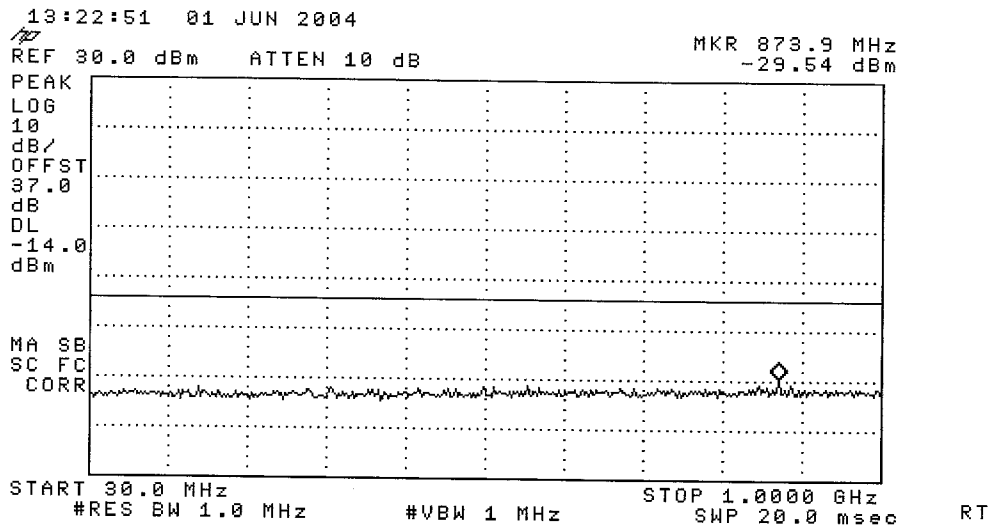
11. 3-TONE INTERMODULATION ATTENUATION

11.1 Test protocol

Date of test: June 1, 2004

EUT mode of operation: 3 tone carrier modulated with a CDMA signal.

Uplink

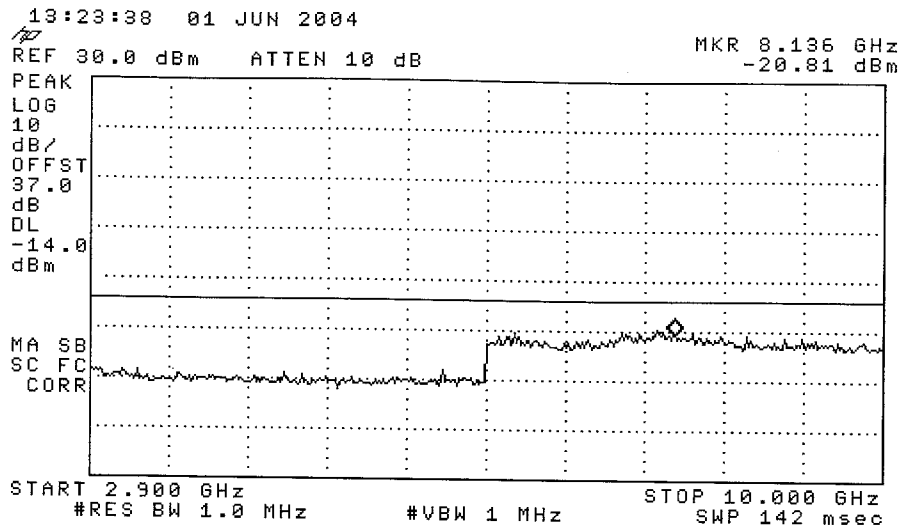


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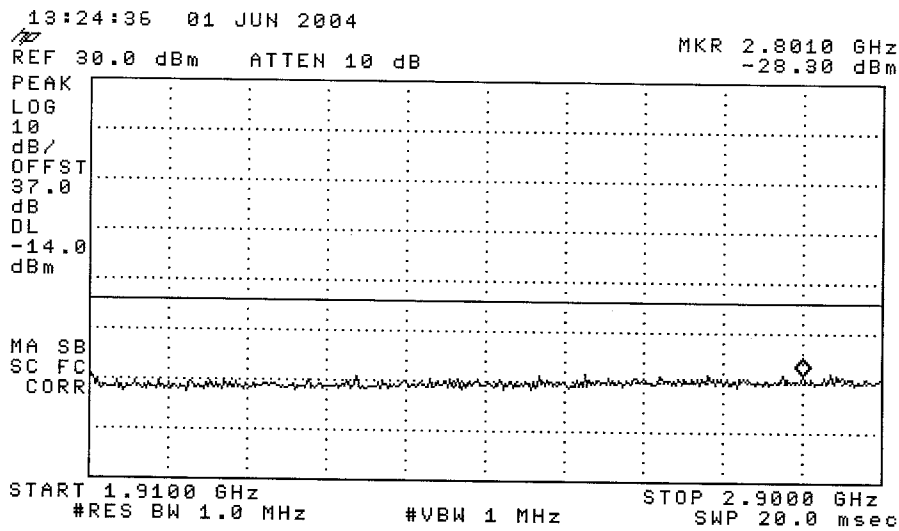
Torshamnsgatan 43, Box 1103, SE-164 22 Kista, Sweden

Telephone +46 8 750 00 00, Fax +46 8 750 60 30, www.sweden.intertek-etlsemko.com

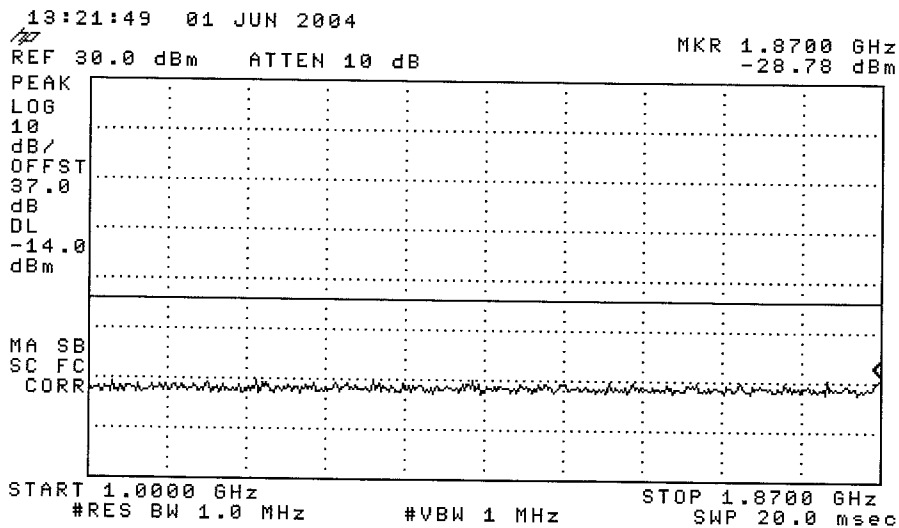
Registered in Sweden: No SE556024059901, Registered office: As address



RT



RL



RT



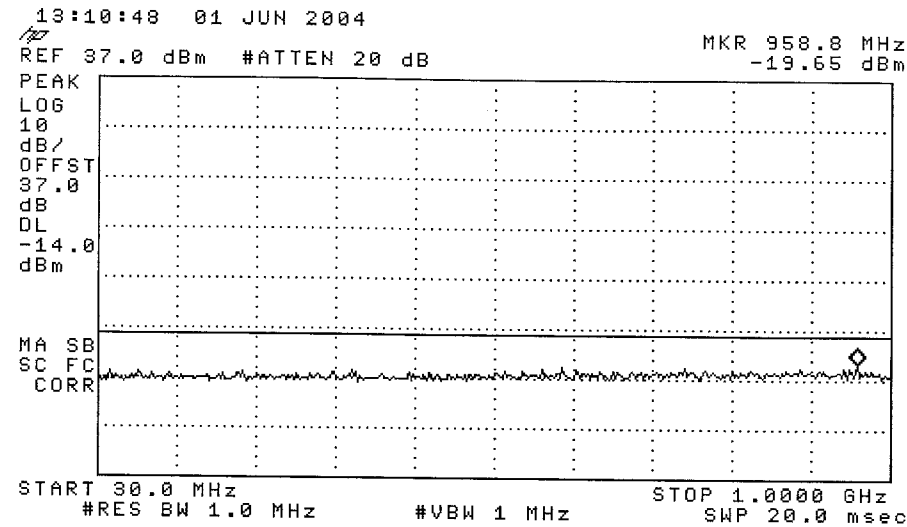
Intertek Semko AB

Torshamnsgatan 43, Box 1103, SE-164 22 Kista, Sweden

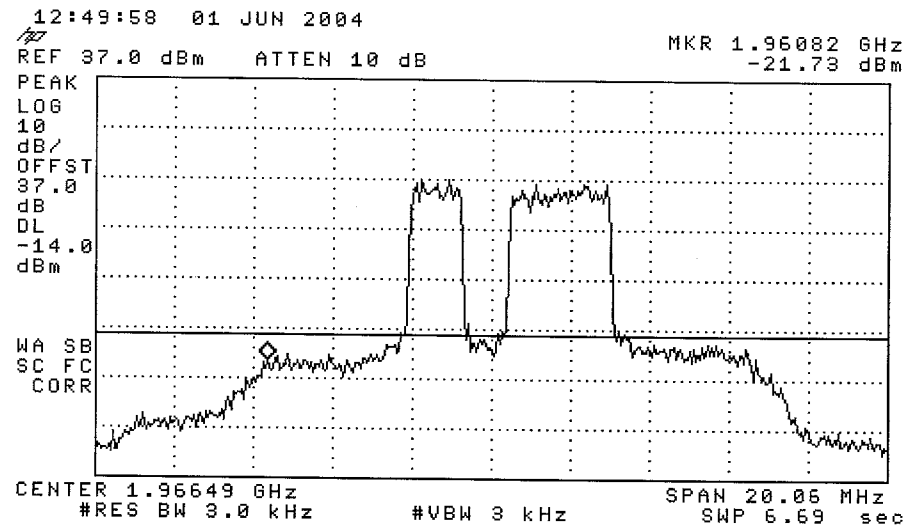
Telephone +46 8 750 00 00, Fax +46 8 750 60 30, www.sweden.intertek-etlsemko.com

Registered in Sweden: No SE556024059901, Registered office: As address

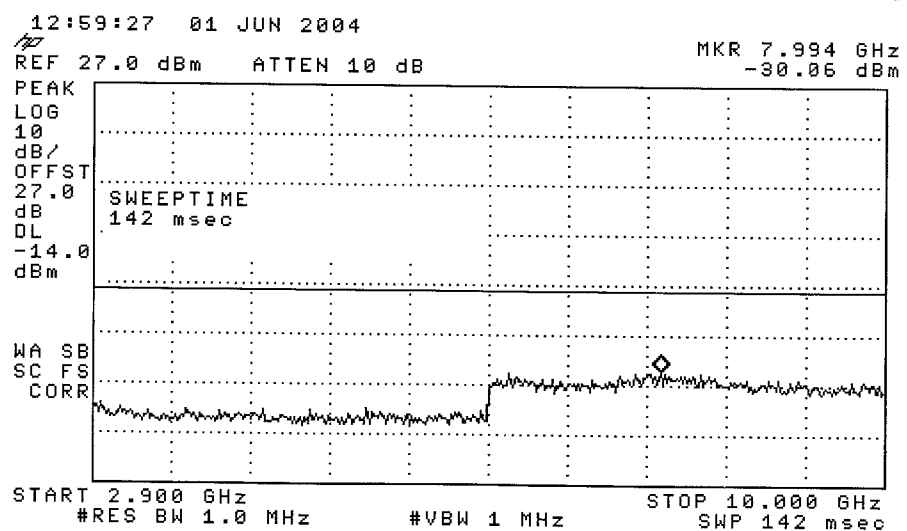
Downlink



RT



RL



RL

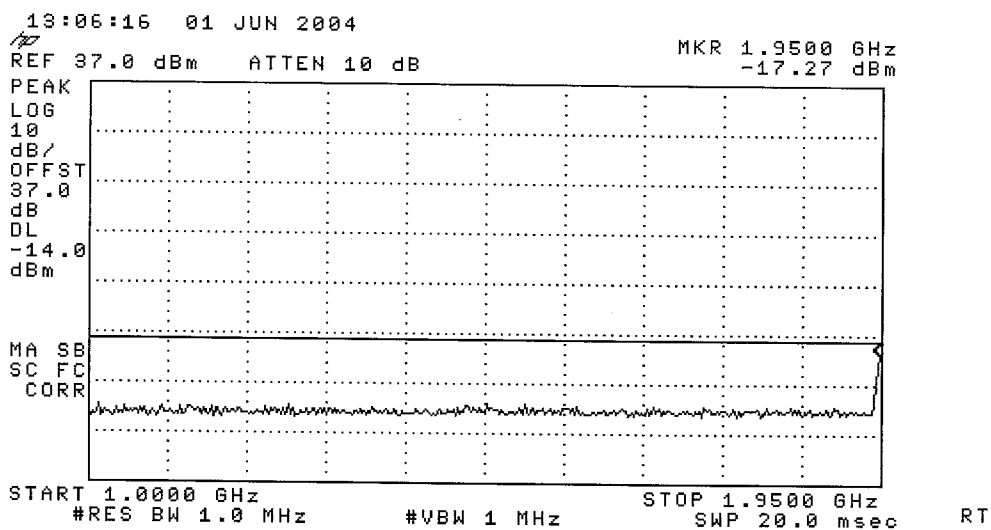
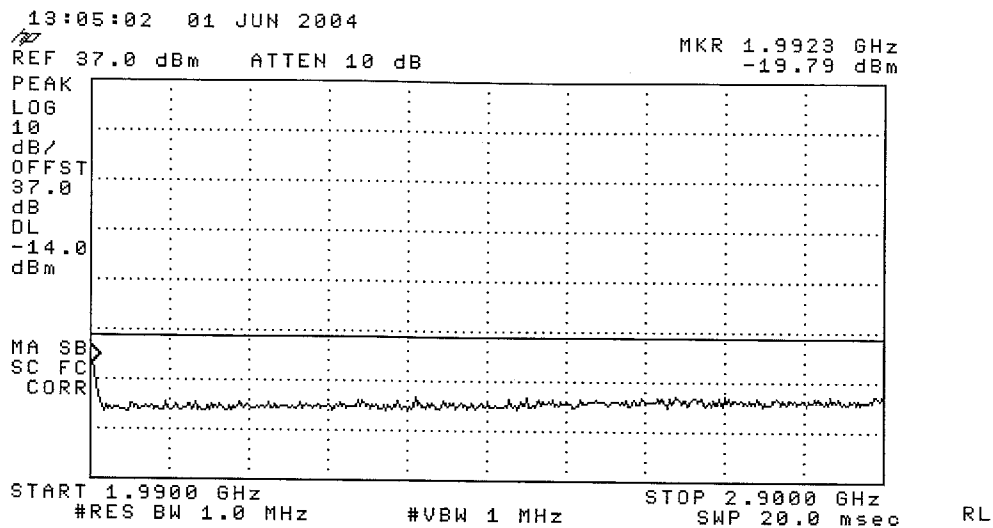


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Frequency /MHz	Tested port	Intermod. product level /dBm	Permitted limit /dBm
30 - 1 000	UL	<-29	-13
1 000 - 2 900	UL	<-28	-13
2 900 - 20 000	UL	<-20	-13
30 - 1 000	DL	<-19	-13
1 000 - 1 960	DL	<-21	-13
1 990 - 2 900	DL	<-19	-13
2 900 - 20 000	DL	<-30	-13



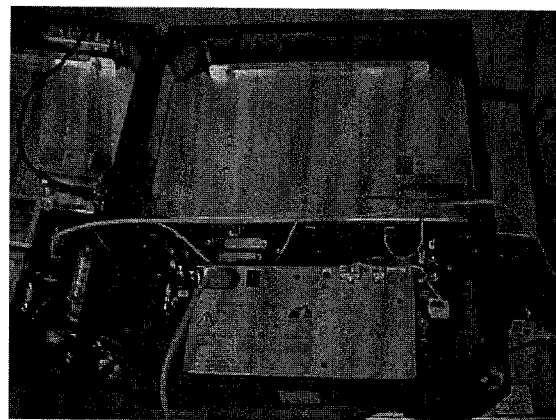
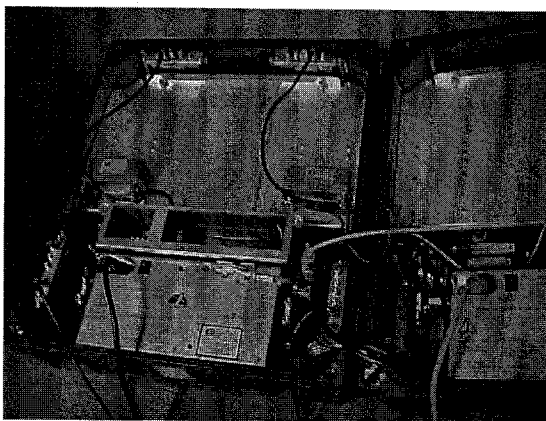
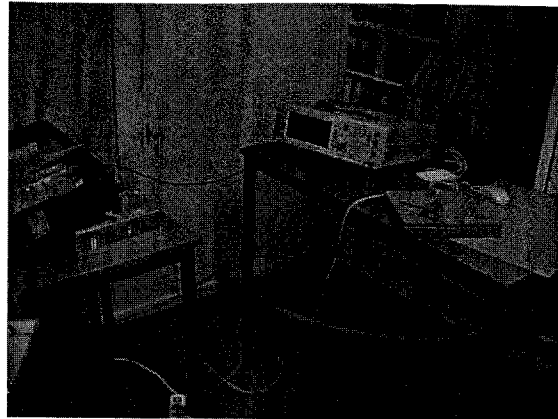
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APPENDIX – PHOTOS OF THE EUT



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APPENDIX - TEST EQUIPMENT

Equipment	Manufacturer	Type	No.
<i>Test site: Semi-anechoic shielded chamber, 10 x 20 x 8,5 m (W x L x H)</i>			30300
Software:	Rohde & Schwarz	ES-K1, V1.60	
Measurement receiver:	Rohde & Schwarz	ESAI	2973/2974
Spectrum analyser:	Hewlett Packard	HP8566B	7617
Spectrum analyser:	Hewlett Packard	HP8593E	6661
Antenna amplifier:	SEMKO		7992/7993
Antenna amplifier:	Hewlett Packard	HP8449B	6685
Antenna, bilog:	Chase	CBL6111B	971
Double Ridge Guide Horn:	EMCO	3115	3006
Horn antenna:	EMCO	3160-09	30101
Filter:	K&L	4H10-X4500/18000	5133
Attenuator	JFW	50FH-20dB-10W	
Attenuator:	JFW	50FH-20dB-10W	
CDMA generator:	Agilent	E4432B	MY41310334
CDMA generator:	Agilent	E4432B	GB40051404
Power reflection meter	Rohde & Schwarz	NRT	100509
Power sensor (directional)	Rohde & Schwarz	NRT-Z43	100129



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