FCC PART 24 TYPE APPROVAL
EMI MEASUREMENT AND TEST REPORT

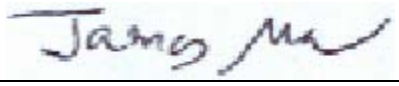
For

Advanced RF Technologies, Inc.

5440 Trabuco Road
Irvine, CA 92620

FCC ID: S2OADRFTECH002

This Report Concerns:	**Equipment Type:**
☒ Original Report	PCS Repeater

Test Engineer:	James Ma/ 
Report No.:	R0509152
Report Date:	2005-10-14
Reviewed By:	 Daniel Deng /
Prepared By:	Bay Area Compliance Laboratory Corporation 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Advanced RF Technologies, Inc.'s* product, FCC ID: S2OADRFTECH002 *or the* "EUT" as referred to in this report is a PCS 1900 Repeater. The EUT measures approximately 240.03mmL x 400.05mmW x 450.09mmH.

** The test data gathered are from production sample, serial number: E1W0507001, provided by the manufacturer.*

Objective

This type approval report is prepared on behalf of *Advanced RF Technologies, Inc.* in accordance with Part 2, Subpart J, and Part 24 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, spurious radiated emission, frequency stability, band edge and radiated margin.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 24 Subpart E - PCS

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4-2003, and TIA/EIA-603A.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters, except as noted below.

Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA with registration number:90464.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on
December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA 603A.

The final qualification test was performed with the EUT operating at normal mode.

Block Diagram

Please refer to Exhibit D.

Equipment Modifications

No modifications were made to the EUT.

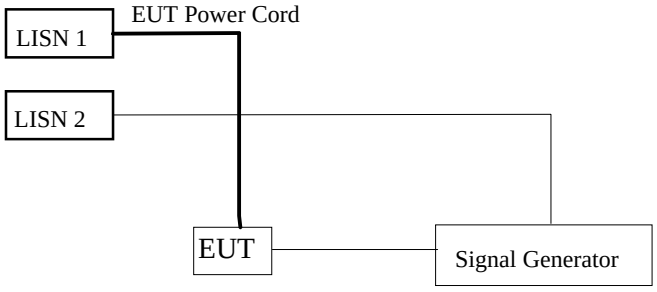
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Rohde & Schwarz	Generator	SMIQ03B	DE23746	DOC
Rohde & Schwarz	Modulation Generator	AMIQ – K11	DE30565	None
HP	Spectrum Analyzer	8565 EC	3946A00131	None
Compaq	Notebook PC	None	None	None

External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Shielded cable	2.0	RF Output / Generator	RF Port / EUT

Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: *001*.

FCC RULE	DESCRIPTION OF TEST	Result
§2.1046 § 24.232	RF power output	Compliant
§ 2.1049 § 24.238(b)	Emission Bandwidth	Compliant
2.1051 § 24.238(a)	Spurious emissions at antenna terminals	Compliant
IS-138A (3.4.4)	Two-Tone Test	Compliant
2.1053	Spurious Radiated Emissions	Compliant
§24.238	Band Edge	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 2.1055 § 24.235	Frequency stability	N/A

§2.1046 & §24.232 - RF POWER OUTPUT

Applicable Standard

According to FCC §2.1046 and §24.232 (b), mobile stations are limited to 2 watts eirp peak power.

Test Procedure

The antenna was removed and SMA connector was connected to the transmitter output. The transmitter output was connected to a calibrated coaxial attenuator (50 Ohm), the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter was determined by adding the value of the attenuator to the power meter reading.

The test was performed at three frequencies (low, middle, and high channels) and on all power levels which can be setup on the transmitter.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Power Meter	E4419E	MY41291511	8/31/2005
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	5/2/2005
Agilent	Sensor, Power	E9301A	MY41497252	5/06/2005

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	23° C
Relative Humidity:	48%
ATM Pressure:	1023 mbar

** The testing was performed by James Ma on 2005-10-03.*

Test Results

Output Power:

Mode	Signal	Channel Frequency MHz	Input Power dBm	Output Power dBm
Up-link		1851.25	-60	30.50
		1880.00	-60	30.70
		1908.75	-60	30.30
	CDMA	1867.50	-60	30.90
		1887.50	-60	31.04
		1892.50	-60	30.52
		1850.20	-55	29.28
		1880.00	-55	29.20
		1909.80	-55	28.22
	GSM	1867.50	-55	29.34
		1887.50	-55	29.12
		1892.50	-55	28.95
		1850.04	-55	29.20
		1879.98	-55	29.40
		1909.92	**-50**	27.80
	TDMA	1867.50	-55	29.05
		1887.50	-55	29.40
		1892.50	-55	28.70
Down-link		1931.25	-66	30.12
		1960.00	-66	30.22
		1988.75	-66	29.97
	CDMA	1947.50	-66	29.05
		1967.50	-66	30.92
		1972.50	-66	31.20
		1930.20	-55	28.76
		1960.00	-55	29.37
		1989.80	-55	29.12
	GSM	1947.50	-55	29.46
		1967.50	-55	29.47
		1972.50	-55	29.29
		1930.04	-55	28.64
		1959.98	-55	29.90
		1989.92	-55	29.56
	TDMA	1947.50	-55	29.14
		1967.50	-55	29.40
		1972.50	-55	29.60

Maximum input power

Mode	Signal	Channel Frequency MHz	Input Power dBm	Output Power dBm
Up-link		1851.25	-26	31.80
		1880.00	-26	31.30
		1908.75	-26	30.40
	CDMA	1867.50	-26	31.72
		1887.50	-26	30.72
		1892.50	-26	31.00
		1850.20	-26	29.02
		1880.00	-26	30.03
		1909.80	-26	27.82
	GSM	1867.50	-26	30.30
		1887.50	-26	29.25
		1892.50	-26	30.05
		1850.04	-26	29.10
		1879.98	-26	29.79
		1909.92	-26	28.10
	TDMA	1867.50	-26	30.02
		1887.50	-26	29.00
		1892.50	-26	29.70
Down-link		1931.25	-26	29.37
		1960.00	-26	30.10
		1988.75	-26	29.92
	CDMA	1947.50	-26	29.04
		1967.50	-26	30.65
		1972.50	-26	31.40
		1930.20	-26	28.67
		1960.00	-26	29.62
		1989.80	-26	29.05
	GSM	1947.50	-26	29.37
		1967.50	-26	29.46
		1972.50	-26	30.02
		1930.04	-26	28.75
		1959.98	-26	30.80
		1989.92	-26	29.50
	TDMA	1947.50	-26	30.12
		1967.50	-26	31.40
		1972.50	-26	31.70

Note : EUT operated under AGC mode

§2.1049 & §24.238 - EMISSION BANDWIDTH

Applicable Standards

According to FCC §2.1049 and §24.238 (b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 KHz and the spectrum was recorded.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	5/2/2005
Agilent	Analyzer, Spectrum	8564E	3943A01781	10/4/2004

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	23° C
Relative Humidity:	48%
ATM Pressure:	1023 mbar

** The testing was performed by James Ma on 2005-10-04.*

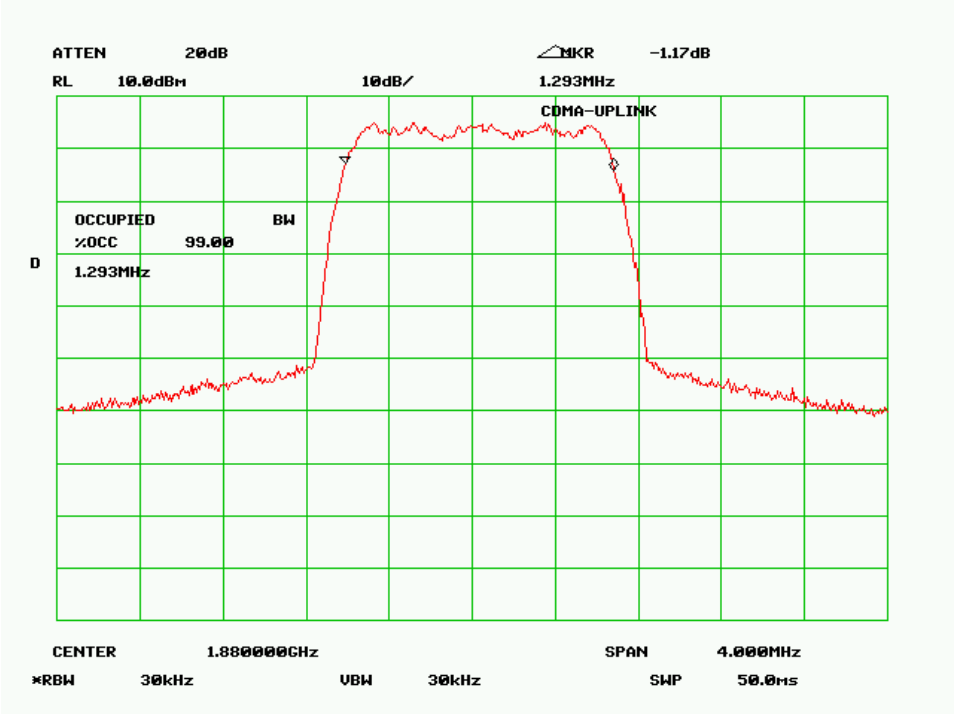
Test Results

Modulation	Mode	Frequency (MHz)	26dB Emission Bandwidth in kHz	99% Bandwidth in kHz
CDMA	Up-link	1880	1473	1293
	Down-link	1960	1460	1280
GSM	Up-link	1880	337	253.3
	Down-link	1960	340	253.3
TDMA	Up-link	1879.98	139.2	97.5
	Down-link	1959.98	137.5	97.5

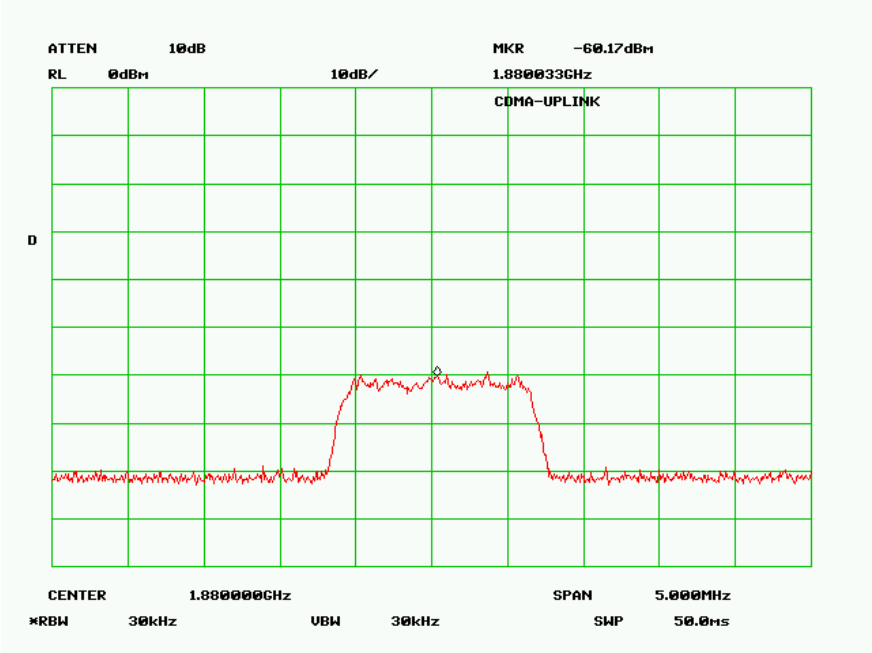
Please refer to plots hereinafter.

CDMA Uplink

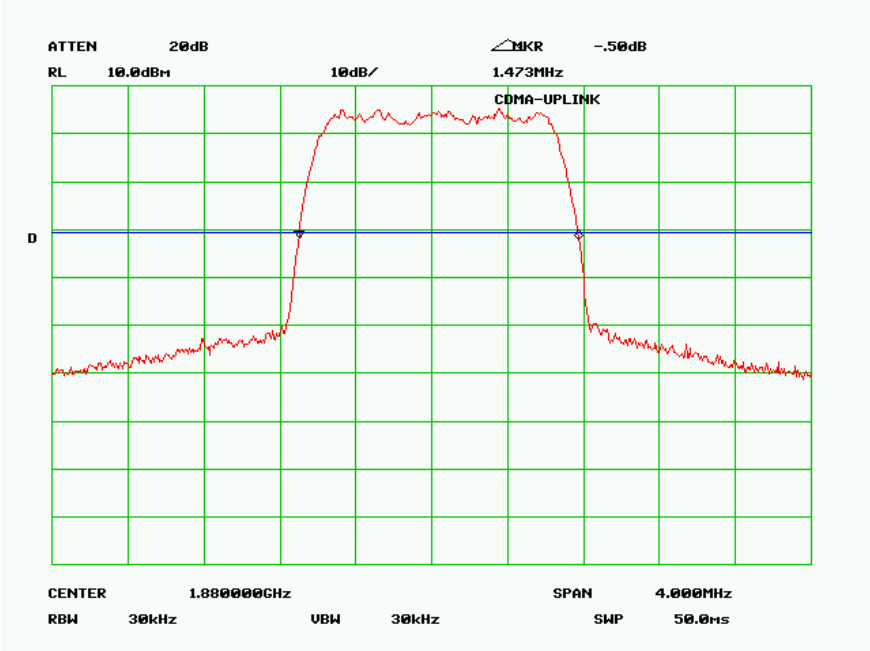
99% BW



Input Signal

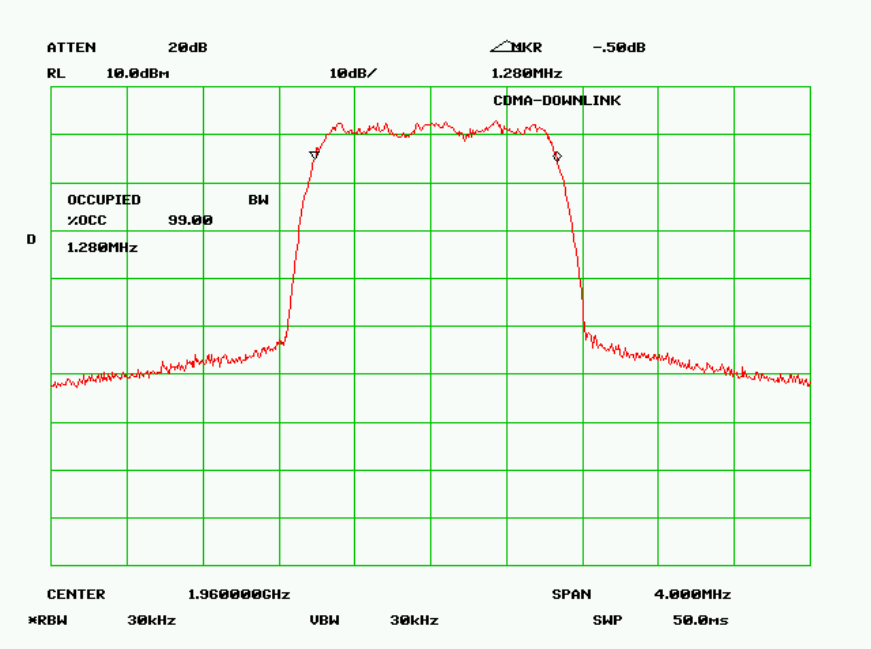


Uplink

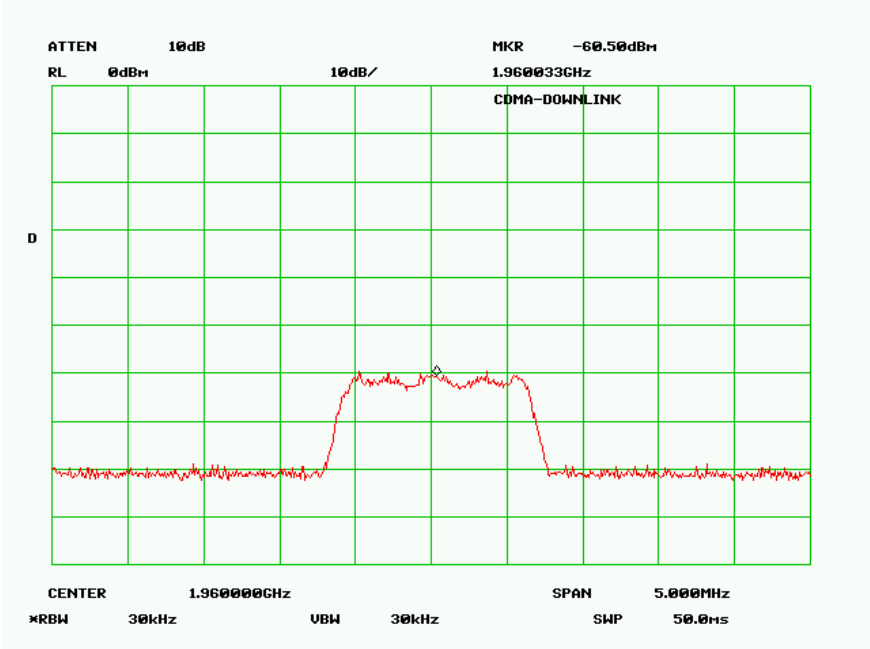


CDMA Downlink

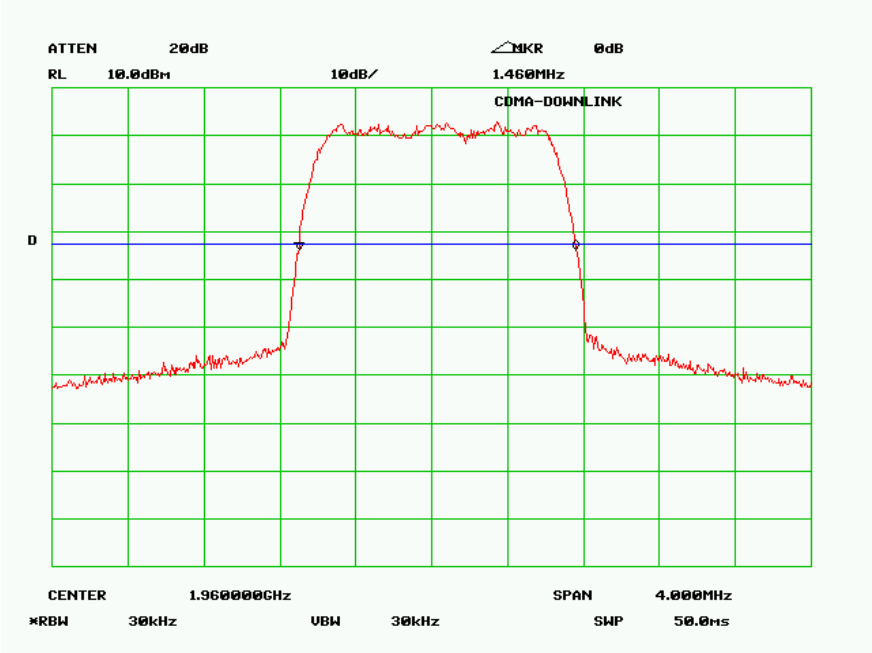
99% BW



Input Signal

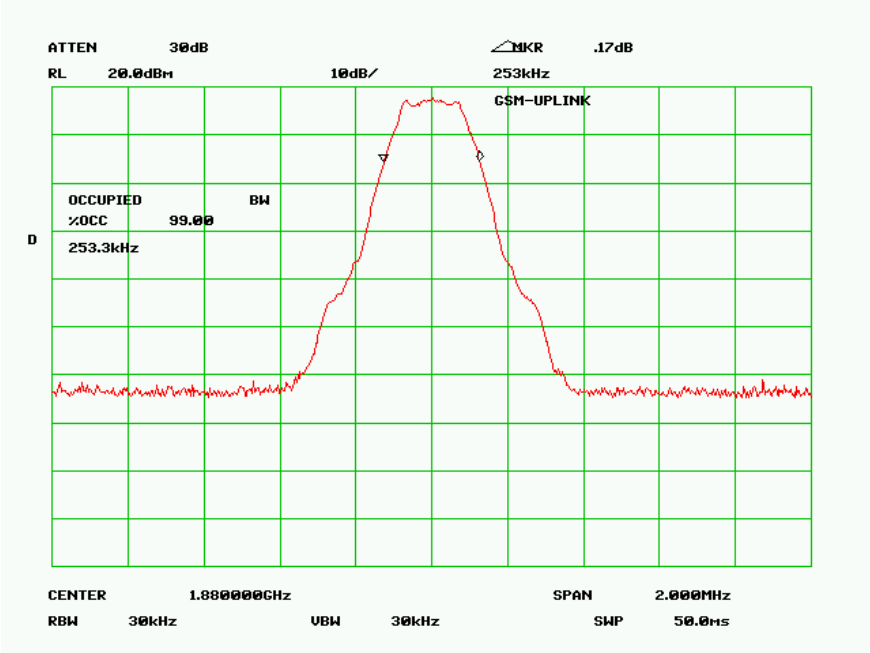


Downlink

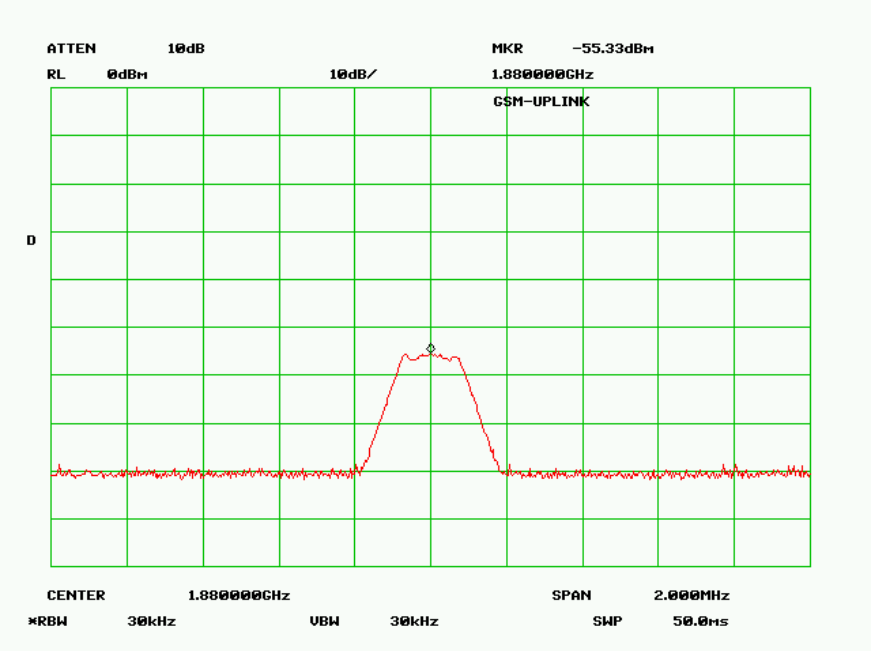


GSM Uplink

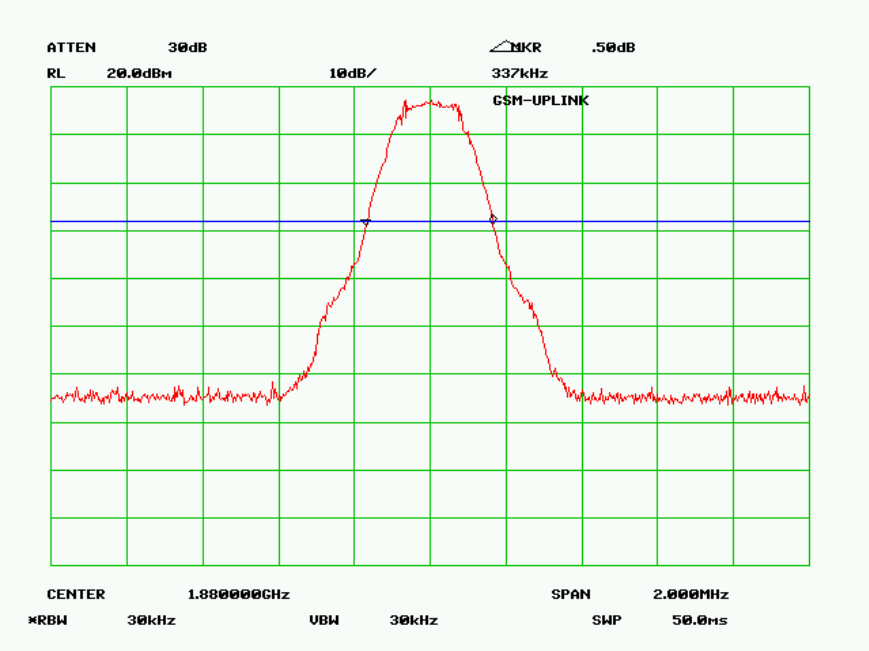
99% BW



Input Signal

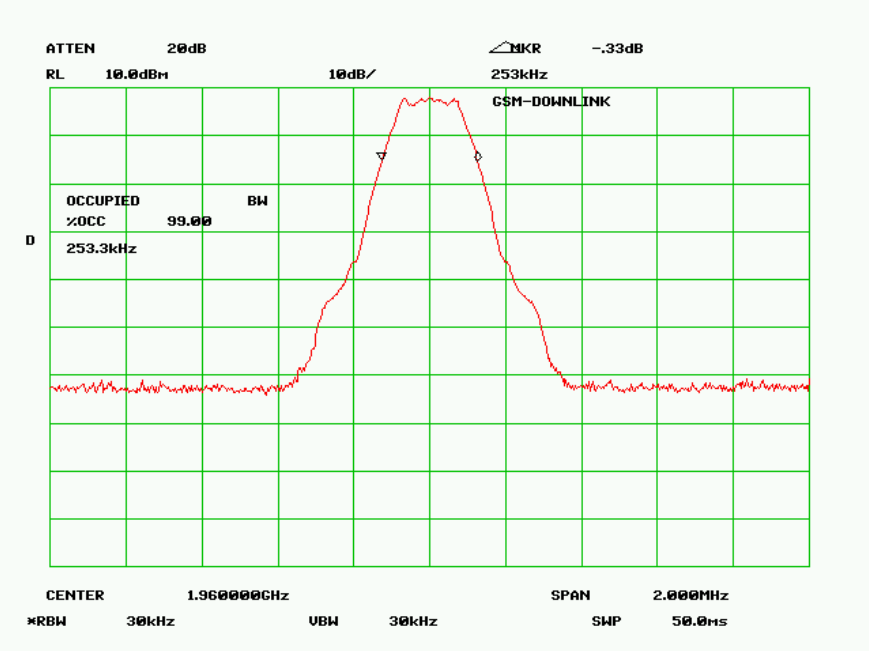


Uplink

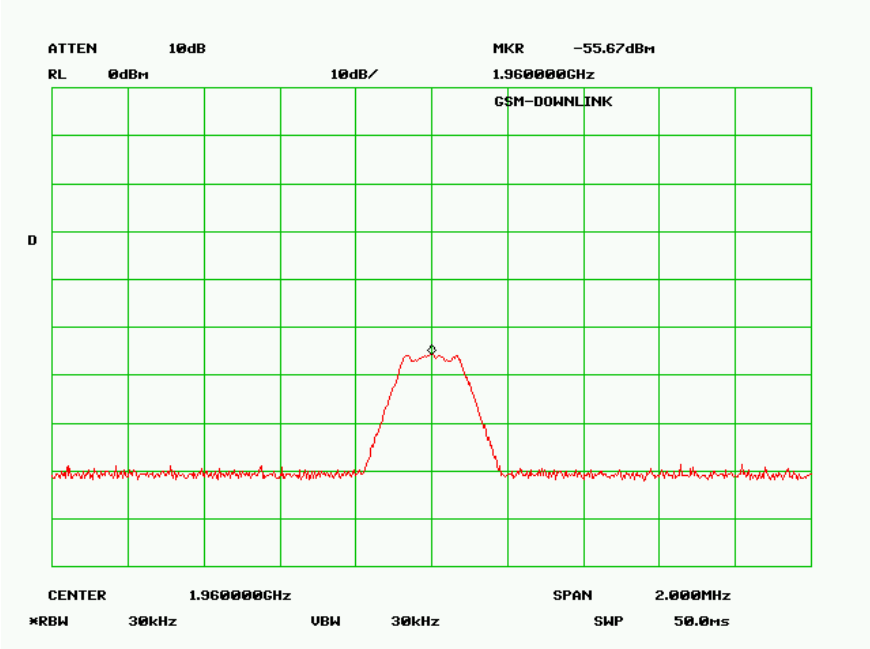


GSM Downlink

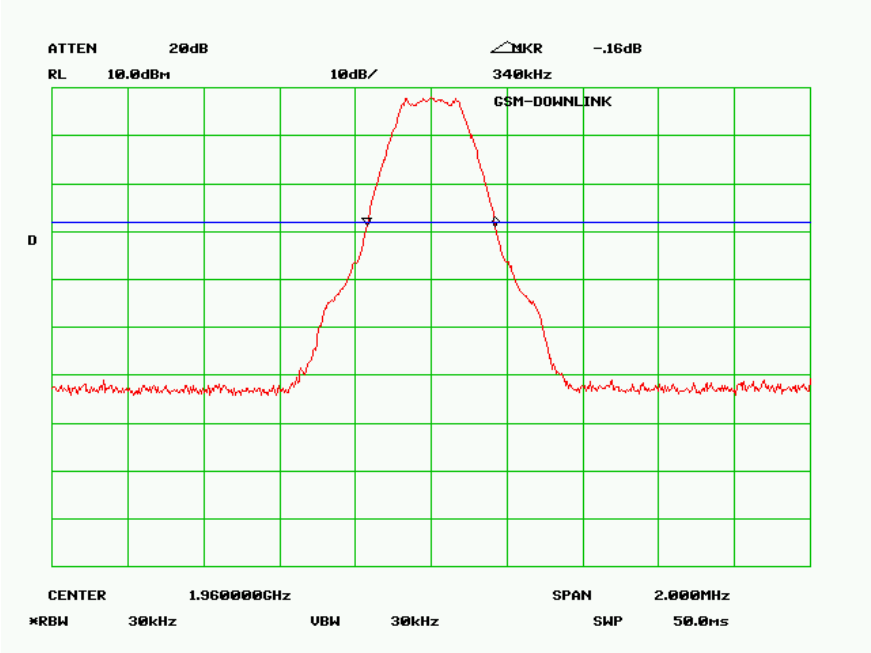
99% BW



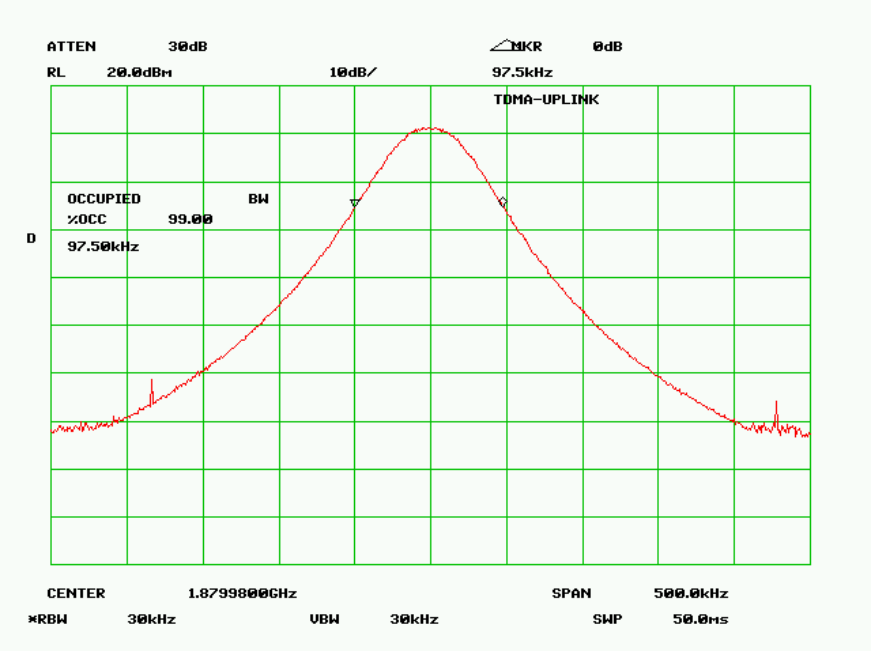
Input Signal



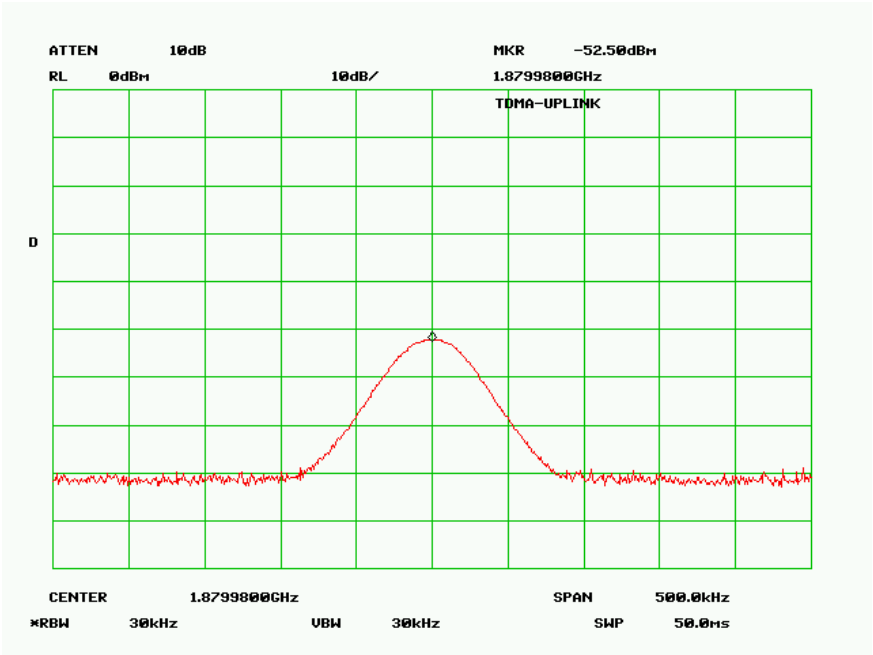
Downlink



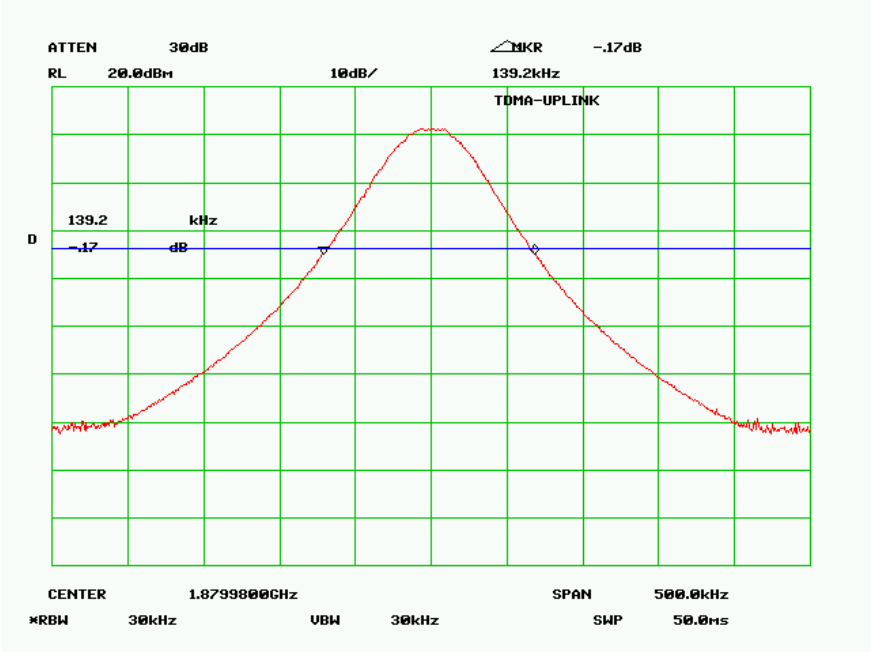
TDMA
99% BW



Input Signal

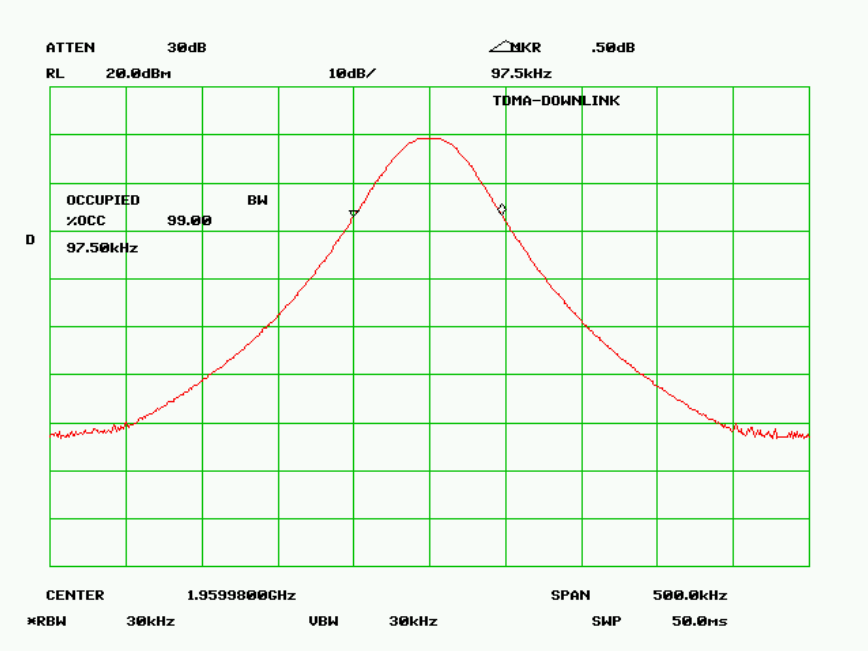


Uplink

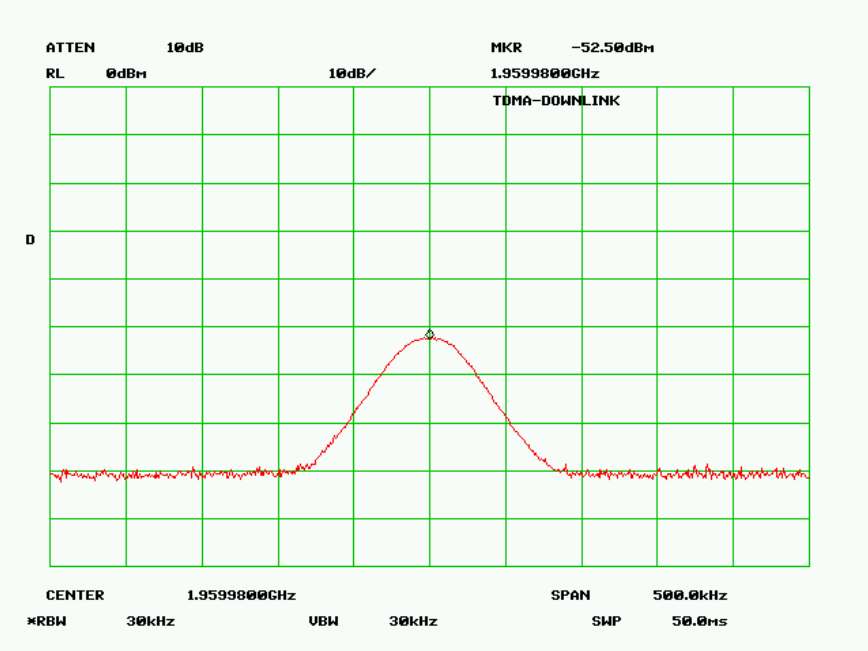


TDMA Downlink

99% BW



Input Signal



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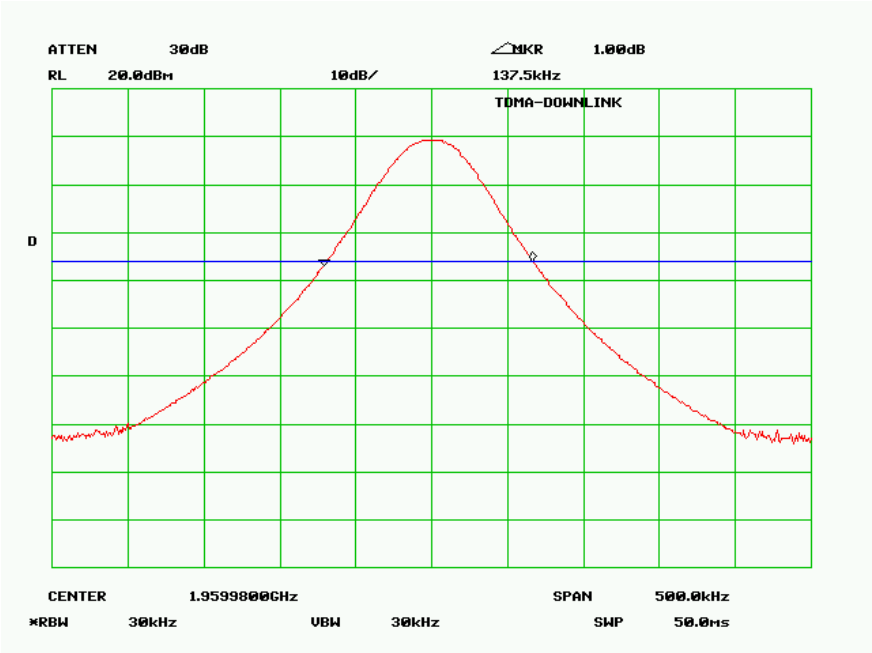

ATTEN 30dB
MKR 1.00dB
RL 20.0dBm
10dB/
137.5kHz
TDMA-DOWNLINK
D
CENTER 1.9599800GHz
SPAN 500.0kHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

§2.1051 & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standards

According to FCC §2.1049 and §24.238, on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 KHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	5/2/2005
Agilent	Analyzer, Spectrum	8564E	3943A01781	10/4/2004

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	23° C
Relative Humidity:	48%
ATM Pressure:	1023mbar

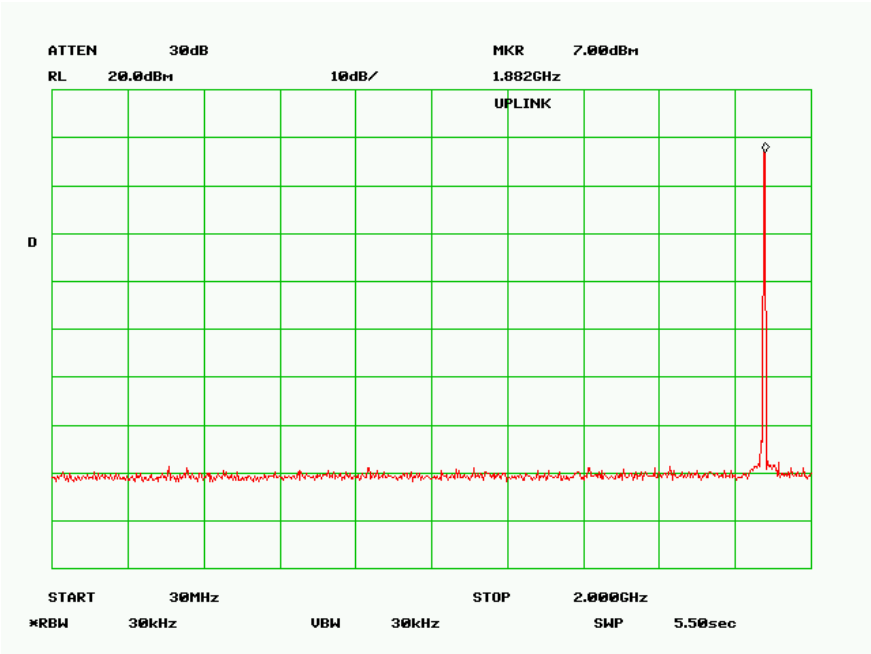
** The testing was performed by James Ma on 2005-10-05.*

Test Results

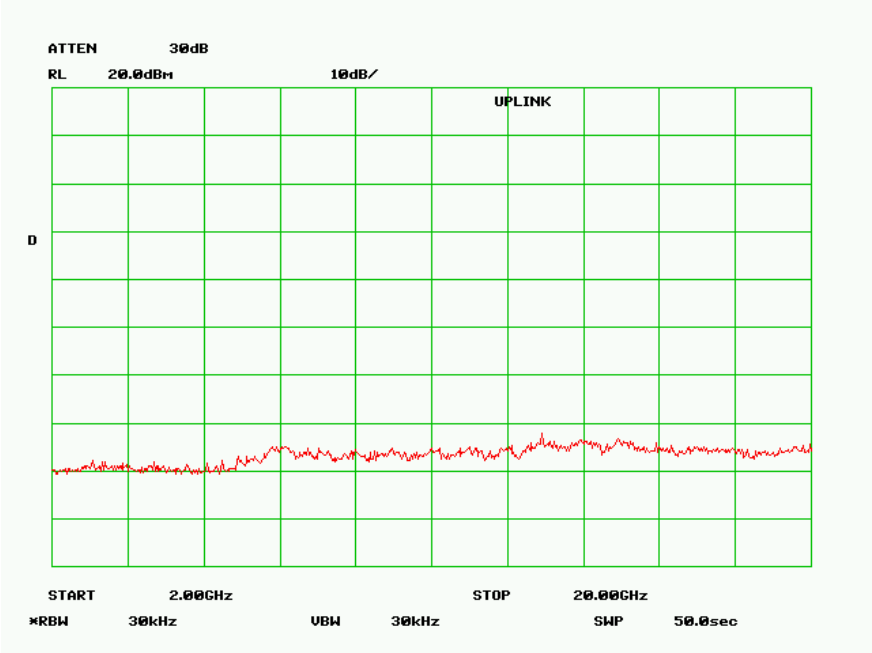
Please refer to the hereinafter plots.

CDMA Uplink:

30MHz – 2GHz

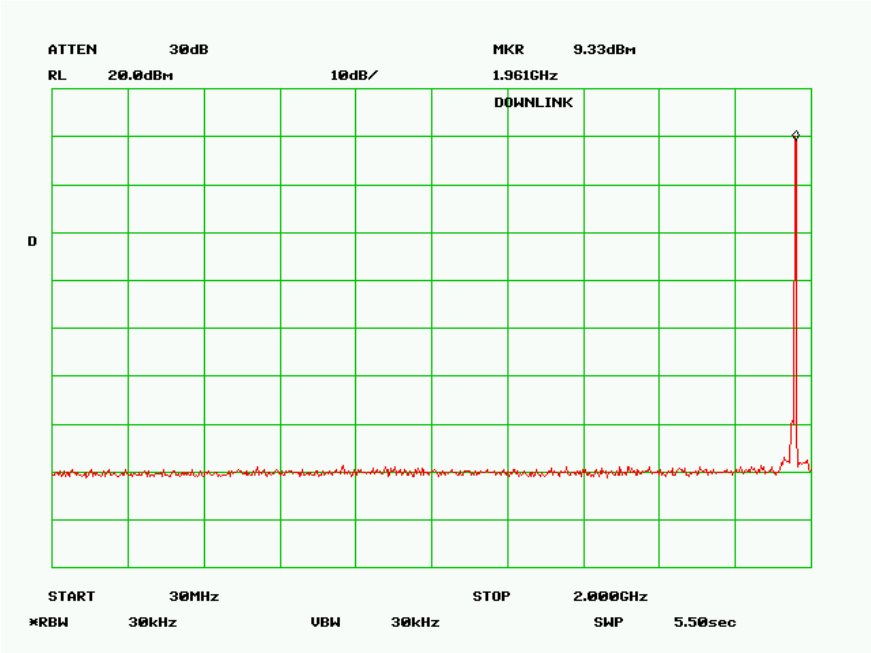


2GHz – 20GHz

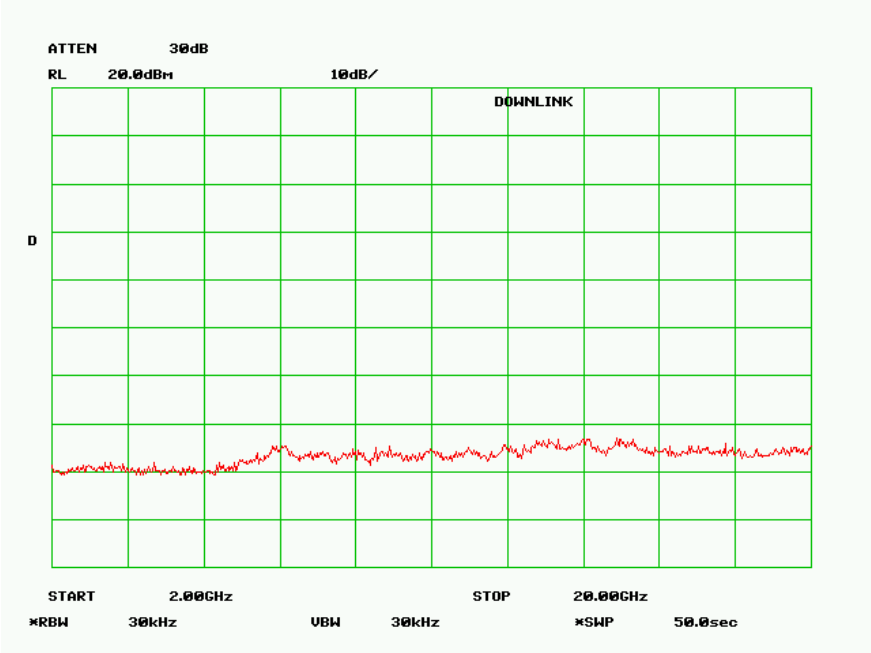


CDMA Downlink:

30MHz – 2GHz



2GHz – 20GHz



IS-138a (3.4.4) TWO-TONE TEST

Applicable Standards

According to IS-138A (3.4.4), Intermodulation products must be attenuated below the rated power of the EUT by at least 43 +10log (P), equivalent to –13 dBm.

Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 KHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic. Two input signals are equal in level (and can be raised equally), were send to the EUT.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	5/2/2005
Rohde & Schwarz	Modulation Generator	AMIQ - K11	DE 30565	10/4/2004
Agilent	Analyzer, Spectrum	8564E	3943A01781	10/4/2004

** The testing was performed by James Ma on 2005-02-25.*

Environmental Conditions

Temperature:	23° C
Relative Humidity:	48%
ATM Pressure:	1023mbar

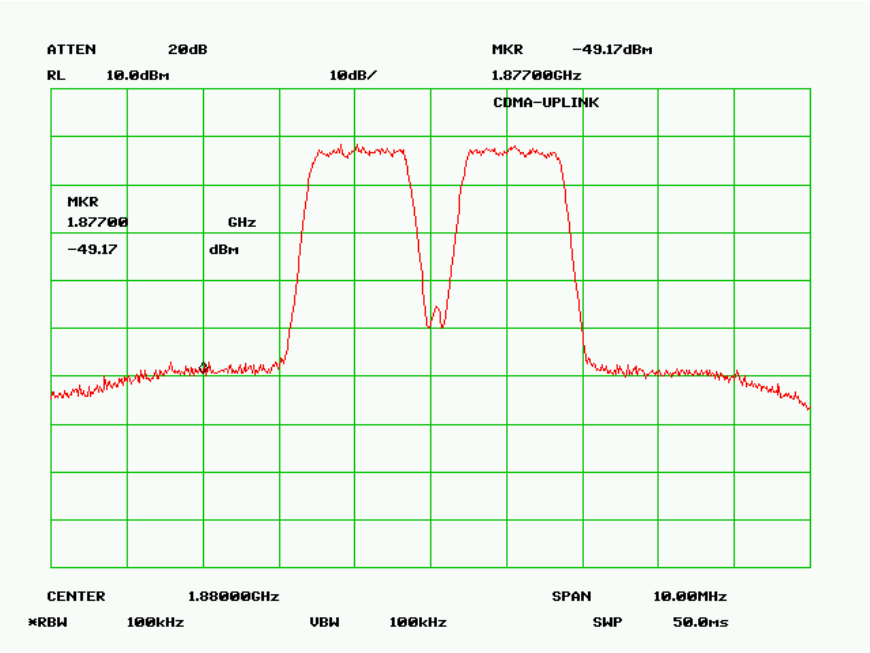
** The testing was performed by James Ma on 2005-10-06.*

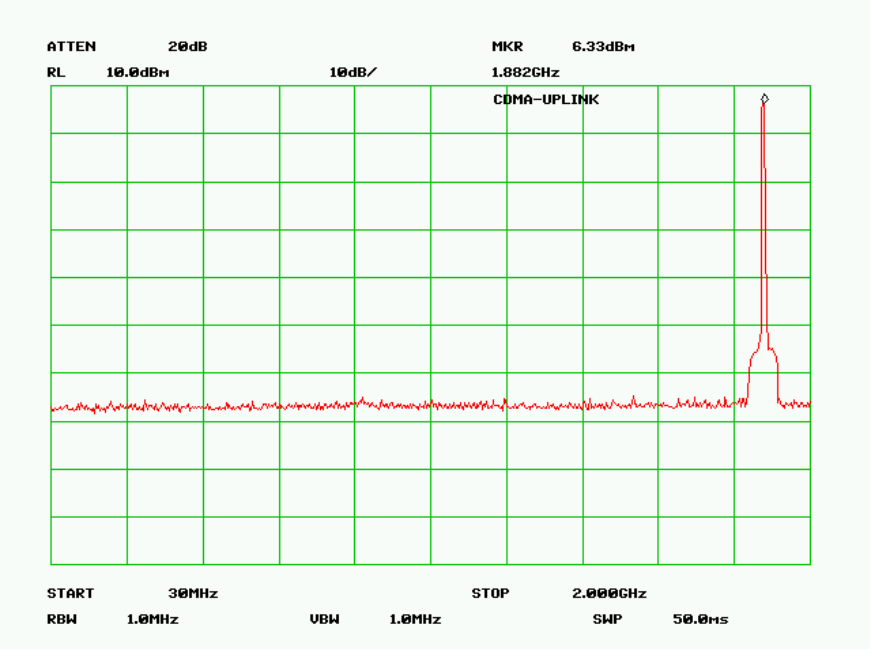
Plots of Two-Tone Test Result

Please refer to plots hereinafter.

CDMA

Uplink:


ATTEN 20dB
MKR -49.17dBm
RL 10.0dBm
10dB/
1.87700GHz
CDMA-UPLINK
MKR
1.87700 GHz
-49.17 dBm
CENTER 1.88000GHz
SPAN 10.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms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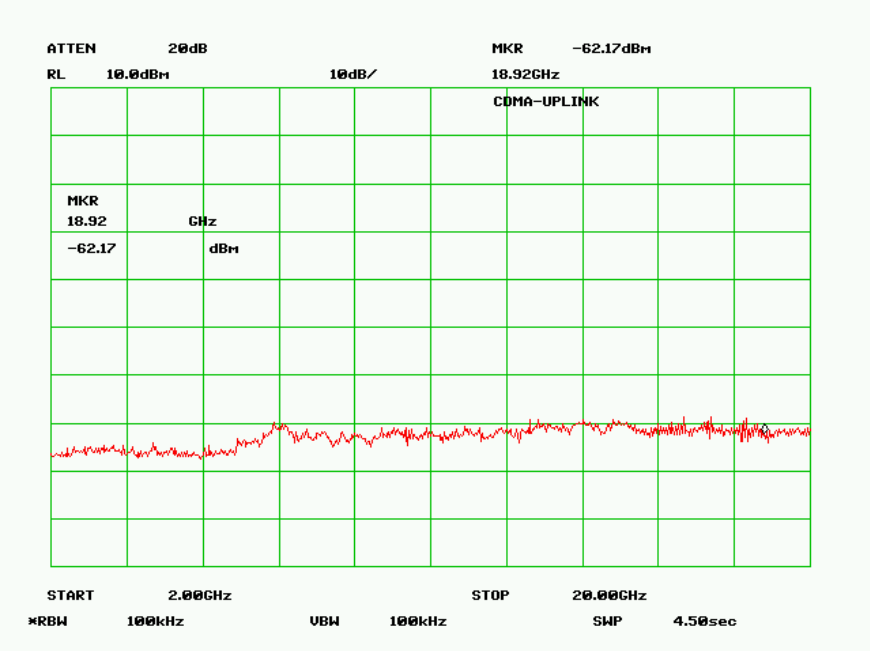
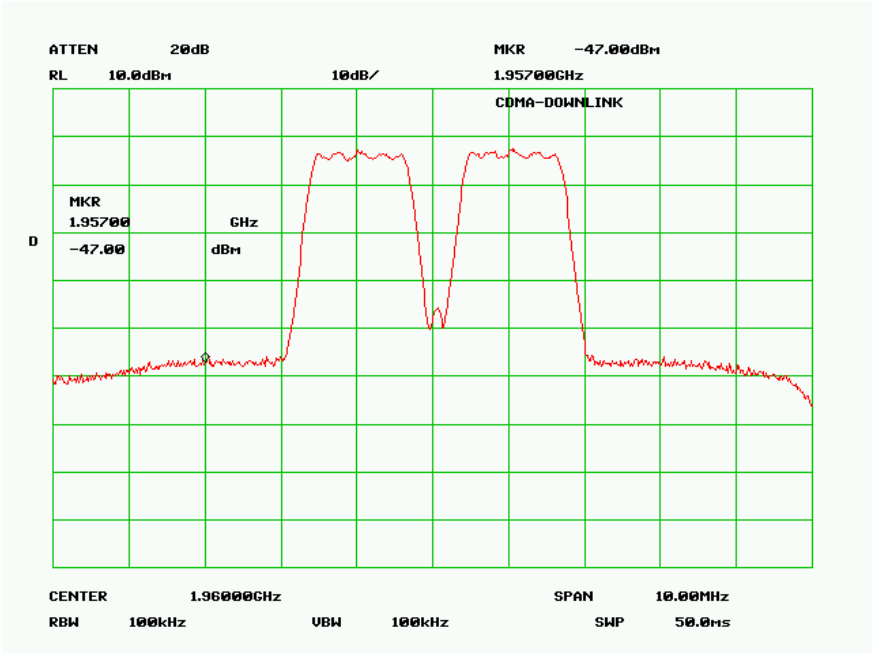
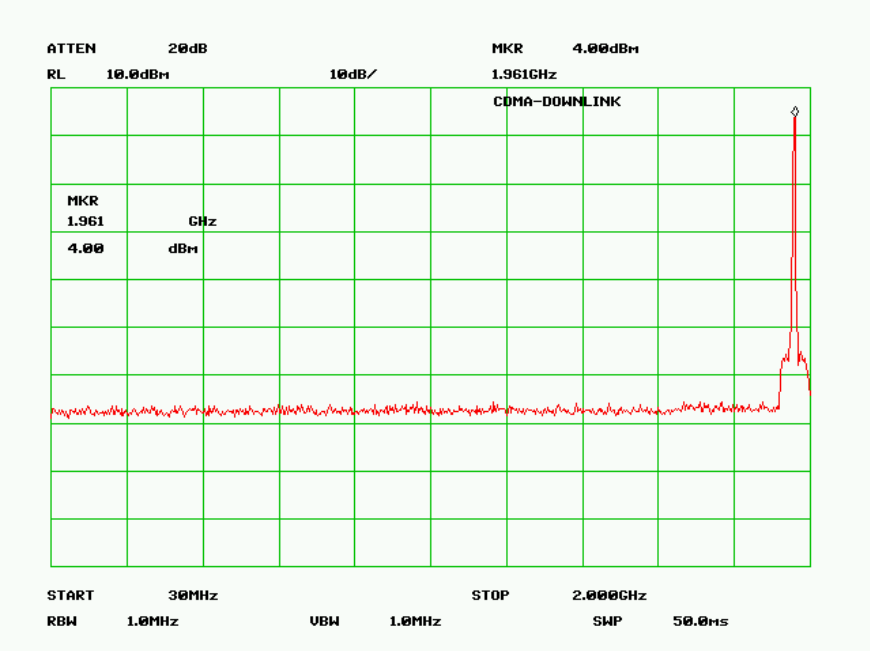
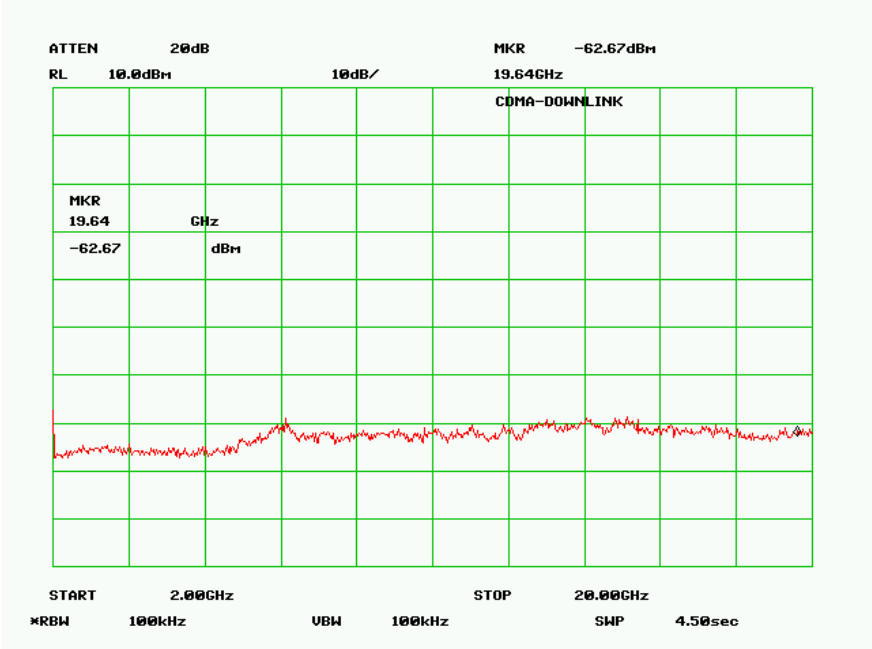
MKR 6.33dBm
RL 10.0dBm
10dB/
1.882GHz
CDMA-UPLINK
START 30MHz
STOP 2.000GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 20dB
MKR -62.17dBm
RL 10.0dBm
10dB/
18.92GHz
CDMA-UPLINK
MKR
18.92 GHz
-62.17 dBm
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
SWP 4.50sec

Downlink:

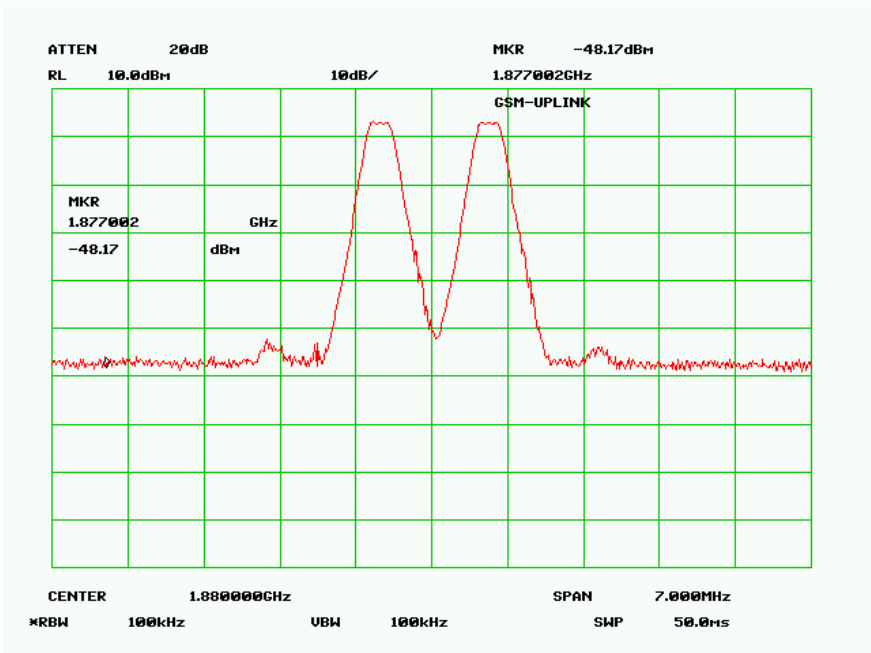

ATTEN 20dB
MKR -47.00dBm
RL 10.0dBm
10dB/
1.95700GHz
CDMA-DOWNLINK
MKR
1.95700 GHz
-47.00 dBm
CENTER 1.96000GHz
SPAN 10.00MHz
RBW 100kHz
VBW 100kHz
SWP 50.0ms

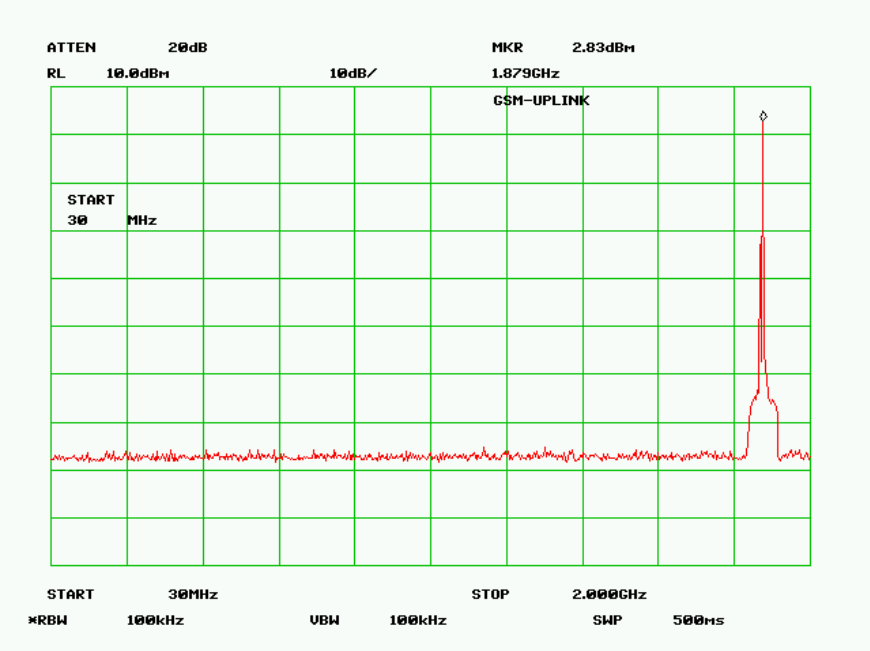

ATTEN 20dB
MKR 4.00dBm
RL 10.0dBm
10dB/
1.961GHz
CDMA-DOWNLINK
MKR
1.961 GHz
4.00 dBm
START 30MHz
STOP 2.000GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 20dB
MKR -62.67dBm
RL 10.0dBm
10dB/
19.64GHz
CDMA-DOWNLINK
MKR
19.64 GHz
-62.67 dBm
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
SWP 4.50sec

GSM

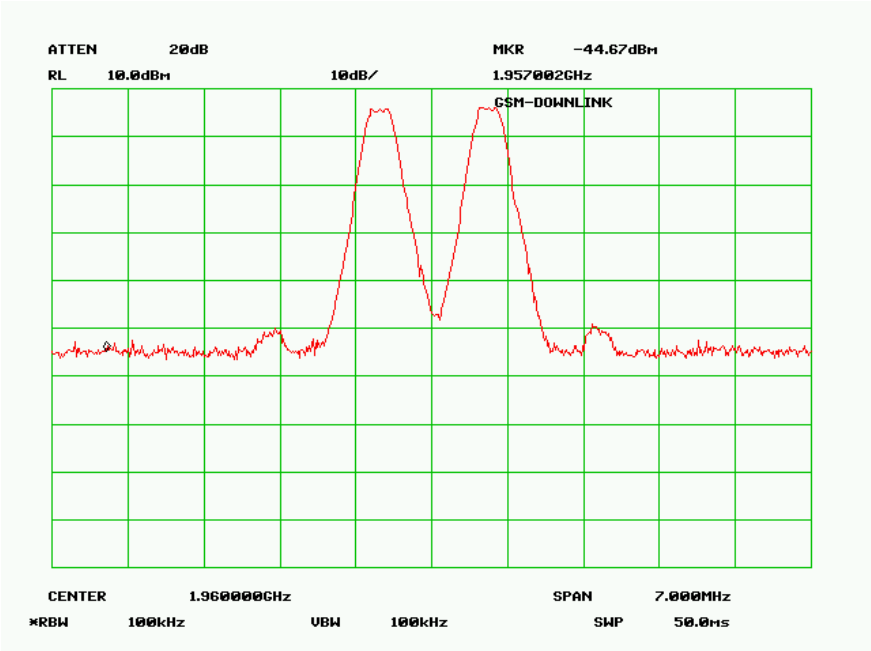
Uplink

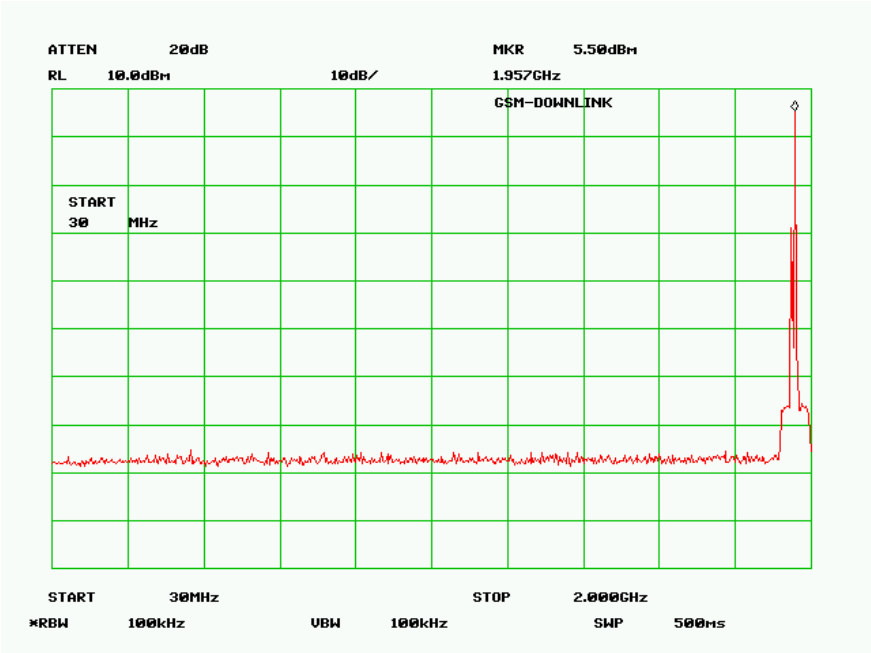

ATTEN 20dB
RL 10.0dBm
10dB/
MKR -48.17dBm
1.877002GHz
GSM-UPLINK
MKR
1.877002 GHz
-48.17 dBm
CENTER 1.880000GHz
SPAN 7.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

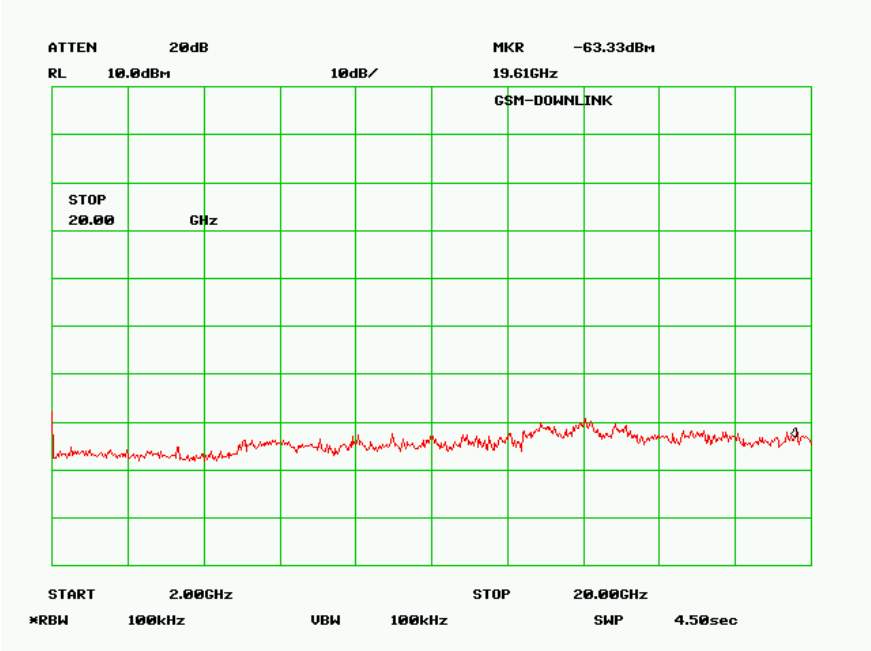

ATTEN 20dB
RL 10.0dBm
10dB/
MKR 2.83dBm
1.879GHz
GSM-UPLINK
START
30 MHz
START 30MHz
STOP 2.000GHz
*RBW 100kHz
VBW 100kHz
SWP 500ms


ATTEN 20dB
MKR -64.00dBm
RL 10.0dBm
10dB/
18.89GHz
GSM-UPLINK
STOP
20.00 GHz
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
SWP 4.50sec

Downlink:

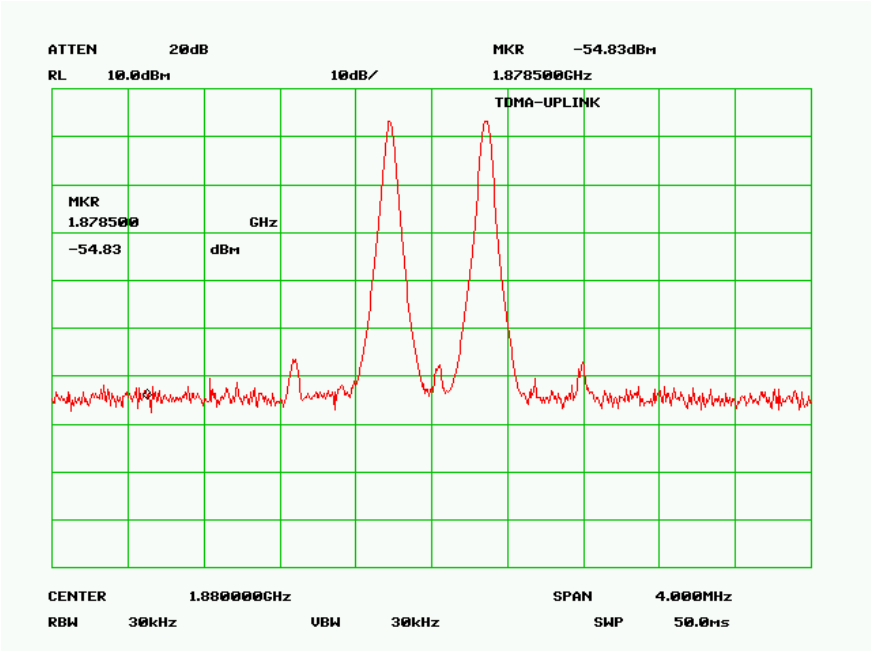

ATTEN 20dB
MKR -44.67dBm
RL 10.0dBm
10dB/
1.957002GHz
GSM-DOWNLINK
CENTER 1.960000GHz
SPAN 7.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

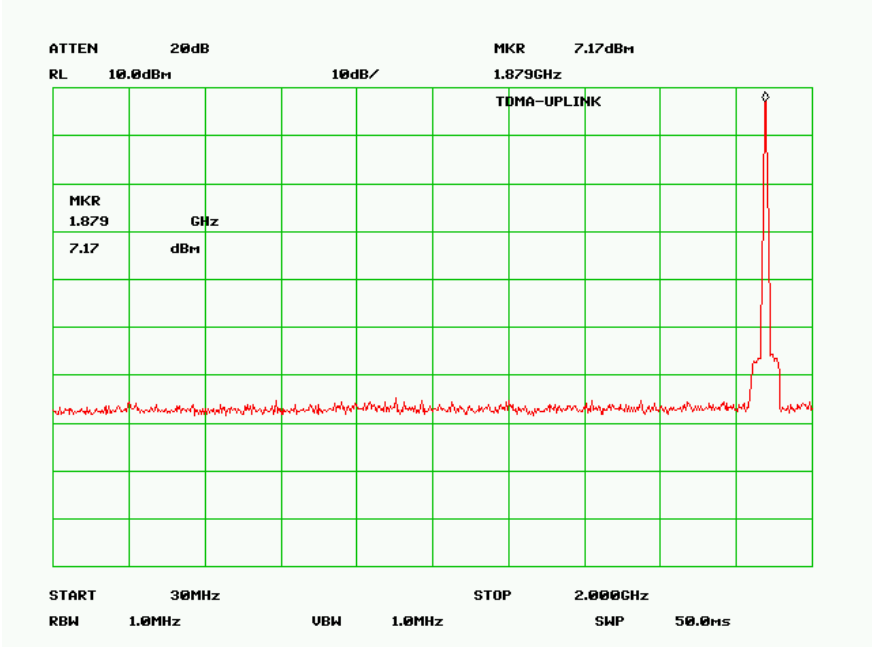

ATTEN 20dB
MKR 5.50dBm
RL 10.0dBm
10dB/
1.957GHz
GSM-DOWNLINK
START
30 MHz
START 30MHz
STOP 2.000GHz
*RBW 100kHz
VBW 100kHz
SWP 500ms

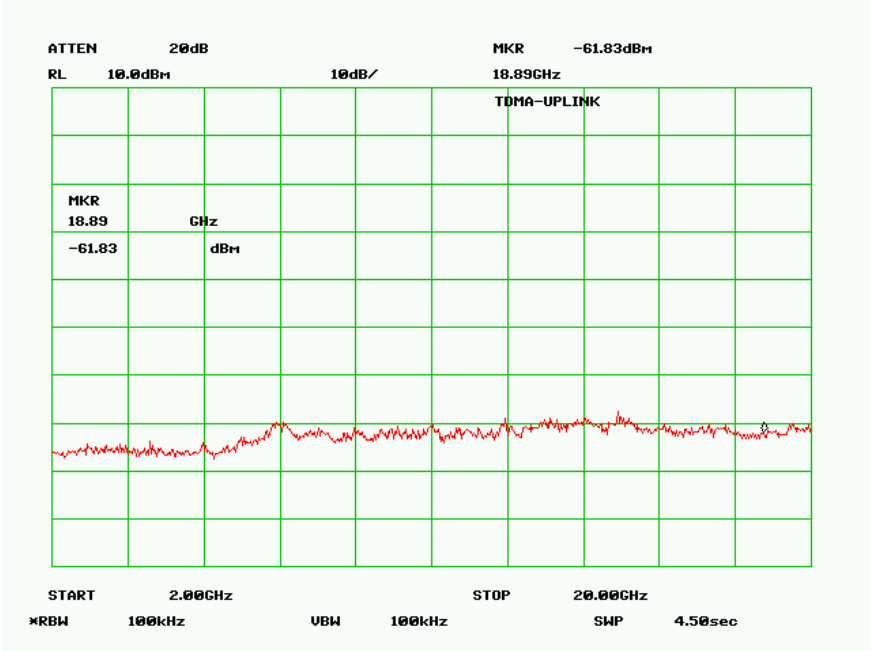

ATTEN 20dB
MKR -63.33dBm
RL 10.0dBm
10dB/
19.61GHz
GSM-DOWNLINK
STOP
20.00 GHz
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
SWP 4.50sec

TDMA

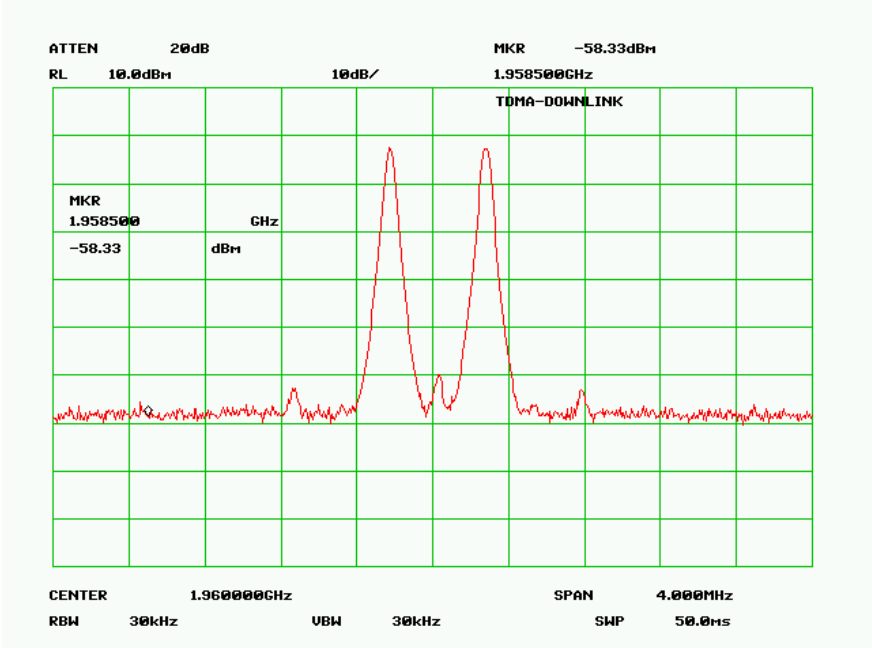
Uplink:

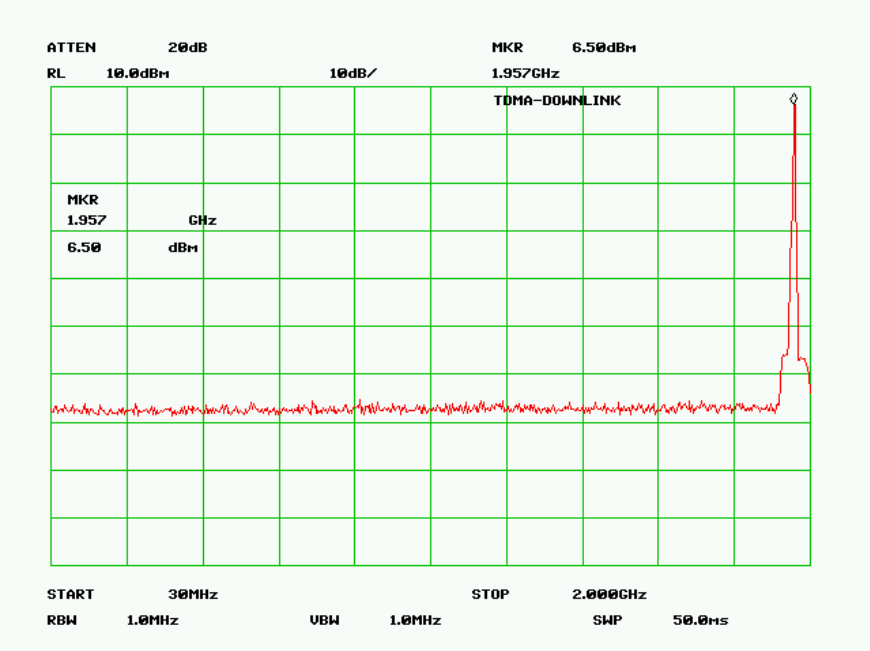

ATTEN 20dB
MKR -54.83dBm
RL 10.0dBm
10dB/
1.878500GHz
TDMA-UPLINK
MKR
1.878500 GHz
-54.83 dBm
CENTER 1.880000GHz
SPAN 4.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms

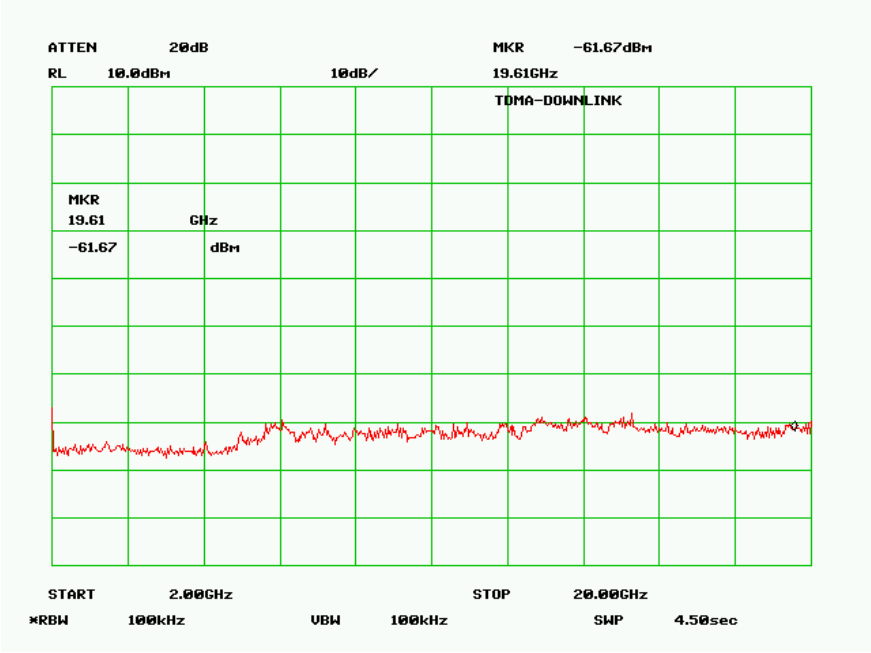

ATTEN 20dB
MKR 7.17dBm
RL 10.0dBm
10dB/
1.879GHz
TDMA-UPLINK
MKR
1.879 GHz
7.17 dBm
START 30MHz
STOP 2.000GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 20dB
MKR -61.83dBm
RL 10.0dBm
10dB/
18.89GHz
TDMA-UPLINK
MKR
18.89 GHz
-61.83 dBm
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
SWP 4.50sec

Downlink:


ATTEN 20dB
MKR -58.33dBm
RL 10.0dBm
10dB/
1.958500GHz
TDMA-DOWNLINK
MKR
1.958500 GHz
-58.33 dBm
CENTER 1.960000GHz
SPAN 4.000MHz
RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 20dB
MKR 6.50dBm
RL 10.0dBm
10dB/
1.957GHz
TDMA-DOWNLINK
MKR
1.957 GHz
6.50 dBm
START 30MHz
STOP 2.000GHz
RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 20dB
MKR -61.67dBm
RL 10.0dBm
10dB/
19.61GHz
TDMA-DOWNLINK
MKR
19.61 GHz
-61.67 dBm
START 2.00GHz
STOP 20.00GHz
*RBW 100kHz
VBW 100kHz
SWP 4.50sec

§2.1053 - SPURIOUS RADIATED EMISSION

Applicable Standards

Requirements: CFR 47, § 2.1053, and § 24.238 (a).

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	8564E	3943A01781	10/4/2004
ETS	Antenna, Log-Periodic	3148	4-1155	12/14/2004
ETS	Antenna, Biconical	3110B	9603-2315	12/14/2004
HP	Amplifier, Pre	8447D	2944A10198	8/17/2005
HP	Amplifier, Pre, Microwave	8449B	3147A00400	8/10/2005
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	5/2/2005
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	4/20/2005
HP	Generator, Signal	83650B	3614A00276	5/10/2005
A.R.A.	Antenna, Horn	DRG-118/A	1132	9/30/2003
Sunol Sciences	Antenna	JB1	A013105-3	2/11/2005
A.R.A.	Antenna, Horn	DRG-118/A	1132	8/17/2005
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100044	9/29/2004

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	22° C
Relative Humidity:	38%
ATM Pressure:	1021mbar

** The testing was performed by James Ma on 2005-10-07.*

Test Result

CDMA Up-link: -20.5 dB at 3760MHz

CDMA Down-link: -23.8 dB at 3920MHz

GSM Up-link: -18.5 dB at 3760MHz

GSM Down-link: -23.8 dB at 3920MHz

TDMA Up-link: -19.5 dB at 3759.96MHz

TDMA Down-link: -23.8 dB at 3919.96MHz

CDMA Uplink, Primary Scan Primary Scan 1GHz-20GHz (Fundamental 1880 MHz)

EUT					Generator					Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dB	Level dBm	Limit dBm	Margin dB
3760	45.5	0	1.7	v	3760	-40	10.3	3.83	-33.5	-13	-20.5
3760	38.0	45	1.7	h	3760	-43	10.3	3.83	-36.5	-13	-23.5

CDMA Downlink, Primary Scan Primary Scan 1GHz-20GHz (Fundamental 1960 MHz)

EUT					Generator					Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dB	Level dBm	Limit dBm	Margin dB
3920	38.0	180	1.7	v	3920	-43	10.3	4.07	-36.8	-13	-23.8
3920	38.0	180	1.7	h	3920	-43	10.3	4.07	-36.8	-13	-23.8

GSM Uplink, Primary Scan 1GHz-20GHz (Fundamental 1880 MHz)

EUT					Generator					Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dB	Level dBm	Limit dBm	Margin dB
3760	48.5	180	1.7	h	3760	-38	10.3	3.83	-31.5	-13	-18.5
3760	45.2	180	1.7	v	3760	-40	10.3	3.83	-33.5	-13	-20.5

GSM Downlink, Primary Scan 1GHz-20GHz (Fundamental 1960 MHz)

EUT					Generator					Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dB	Level dBm	Limit dBm	Margin dB
3920	38.0	180	1.7	v	3920	-43	10.3	4.07	-36.8	-13	-23.8
3920	38.0	180	1.7	h	3920	-43	10.3	4.07	-36.8	-13	-23.8

TDMA Uplink, Primary Scan 1GHz-20GHz (Fundamental 1879.98 MHz)

EUT					Generator					Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dB	Level dBm	Limit dBm	Margin dB
3759.96	46.4	0	1.7	v	3759.96	-39	10.3	3.83	-32.5	-13	-19.5
3759.96	42.0	270	1.7	h	3759.96	-41	10.3	3.83	-34.5	-13	-21.5

TDMA Downlink, Primary Scan 1GHz-20GHz (Fundamental 1959.98 MHz)

EUT					Generator					Standard	
Indicated		Table	Test Antenna		Substitution		Antenna	Cable	Absolute	FCC	FCC
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Corrected	Loss dB	Level dBm	Limit dBm	Margin dB
3919.96	38.0	0	1.7	v	3919.96	-43	10.3	4.07	-36.8	-13	-23.8
3919.96	38.0	270	1.7	h	3919.96	-43	10.3	4.07	-36.8	-13	-23.8

Note : 1) EUT connected to 50 ohm terminator
2) Other spurious emission are under noise level.

§24.238 – BAND EDGE

Applicable Standards

According to FCC §2.1049 and §24.238, when measuring the emission limits, carrier frequency shall be adjusted as close to the frequency block edges, both upper and lower.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. Adjust the carrier frequency as close to the frequency block edges both upper and lower. Sufficient scans were taken to show any out of band-edge emission.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	5/2/2005
Agilent	Analyzer, Spectrum	8564E	3943A01781	10/4/2004

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

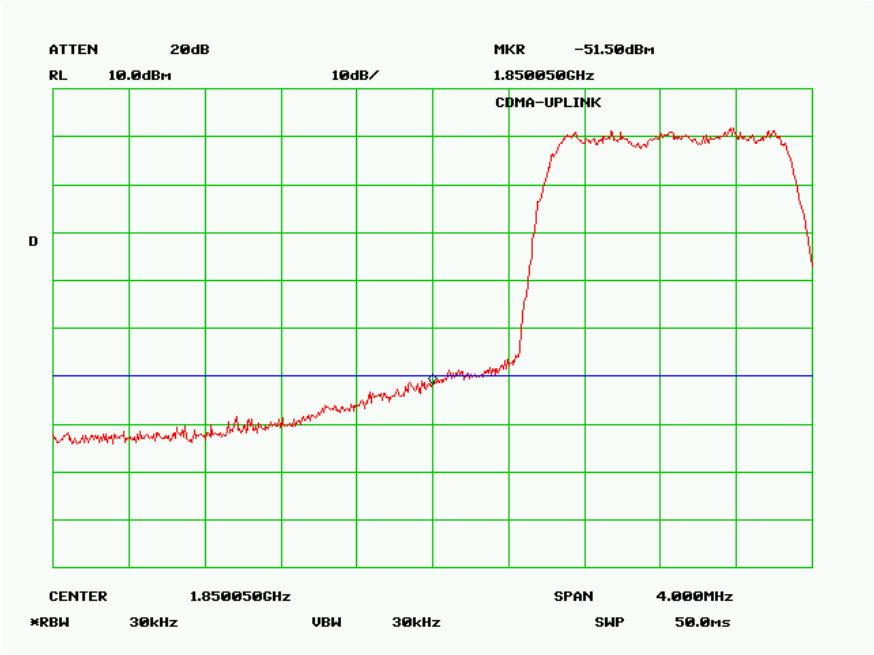
Temperature:	23° C
Relative Humidity:	48%
ATM Pressure:	1023 mbar

** The testing was performed by James Ma on 2005-10-06.*

Test Results

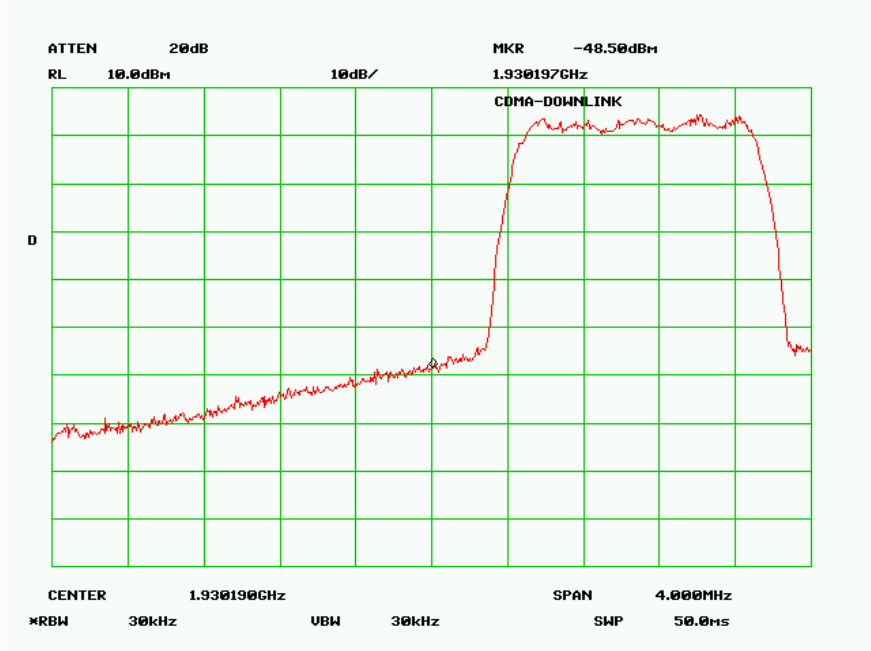
Please refer to plots hereinafter.

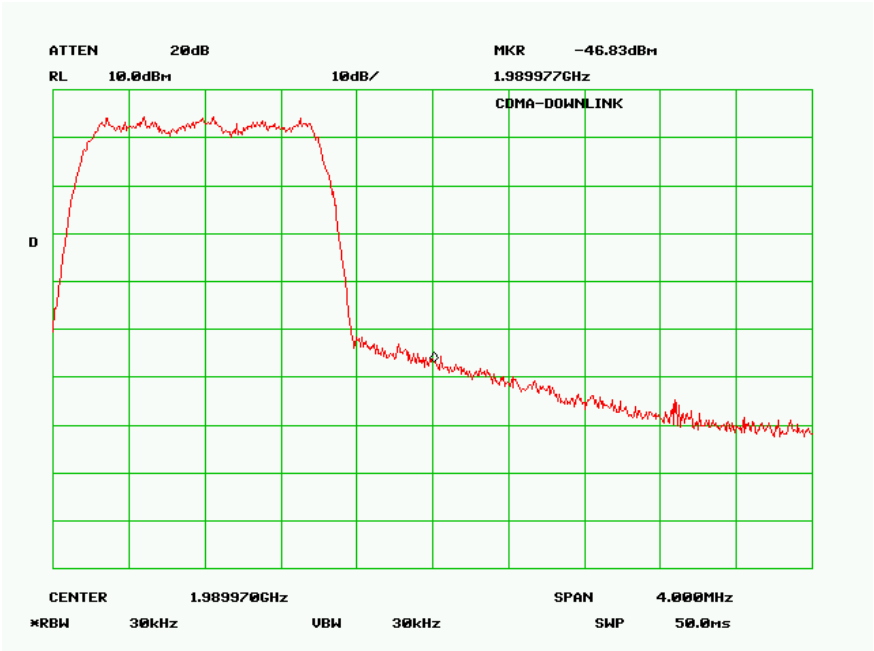
CDMA Uplink


ATTEN 20dB
MKR -51.50dBm
RL 10.0dBm
10dB/
1.8500500GHz
CDMA-UPLINK
D
CENTER 1.8500500GHz
SPAN 4.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

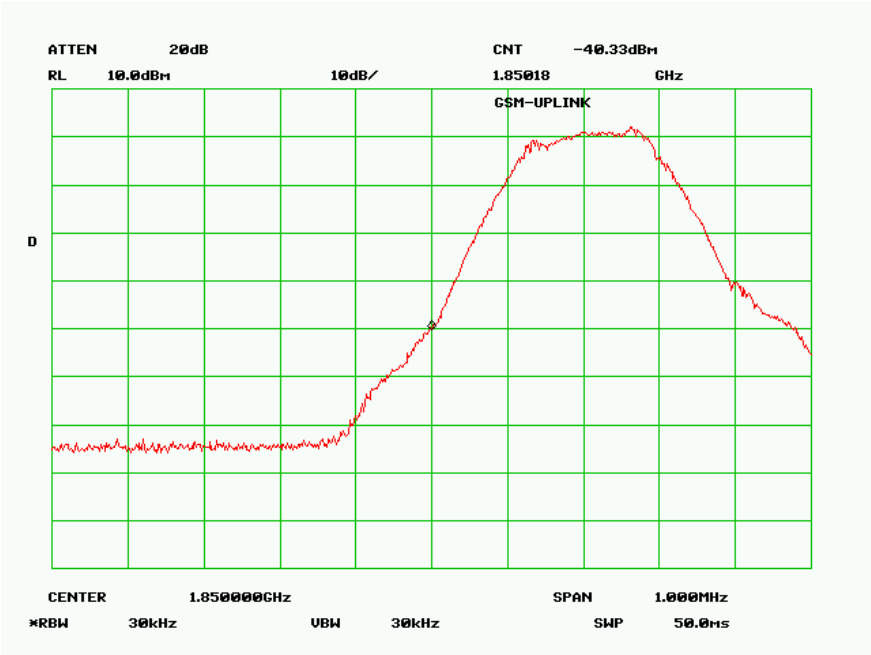

ATTEN 20dB
CNT -59.67dBm
RL 10.0dBm
10dB/
1.90876 GHz
CDMA-UPLINK
D
CENTER 1.9100000GHz
SPAN 4.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

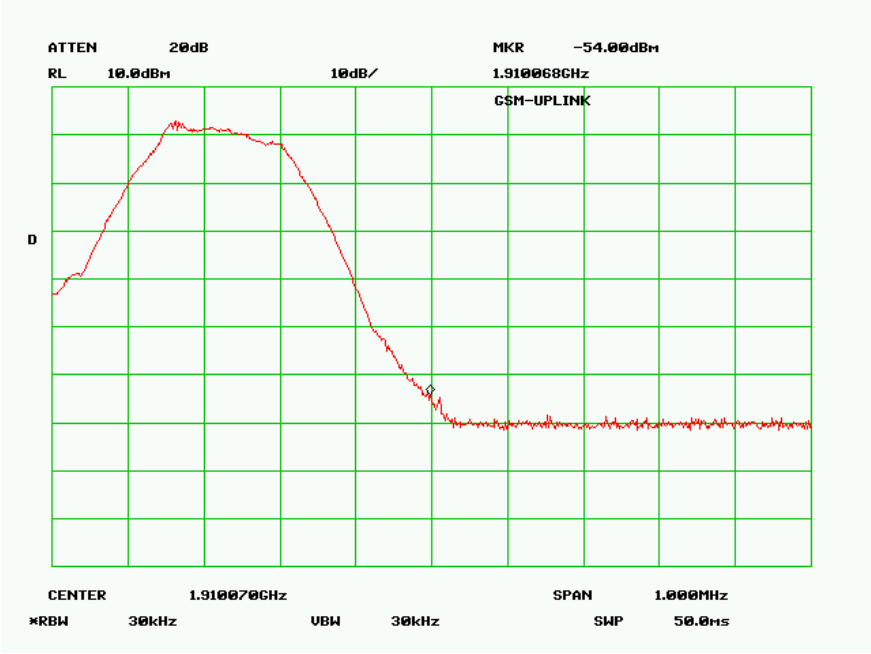
CDMA Downlink



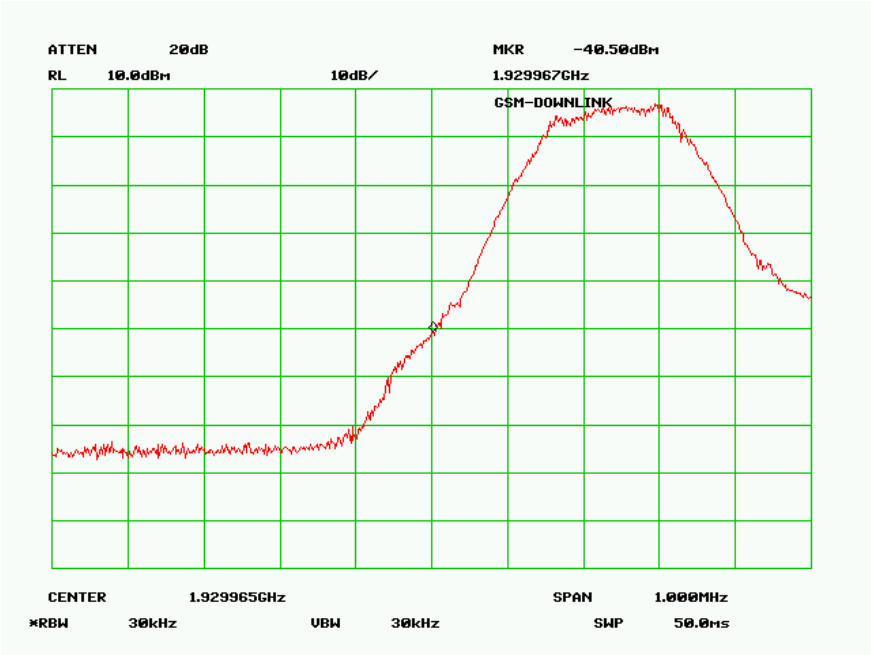


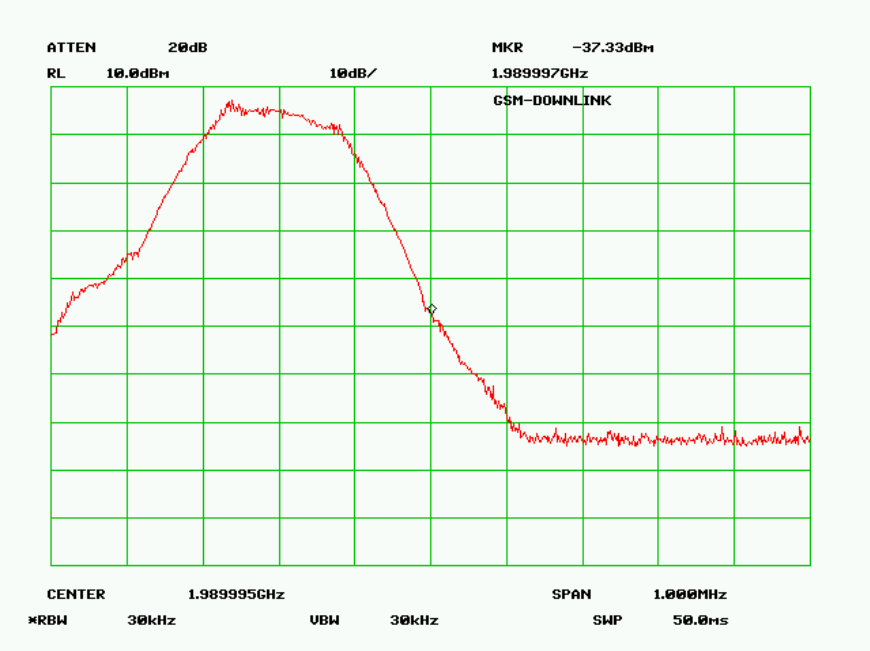
GSM Uplink


ATTEN 20dB
CNT -40.33dBm
RL 10.0dBm
10dB/
1.85018 GHz
GSM-UPLINK
D
CENTER 1.850000GHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

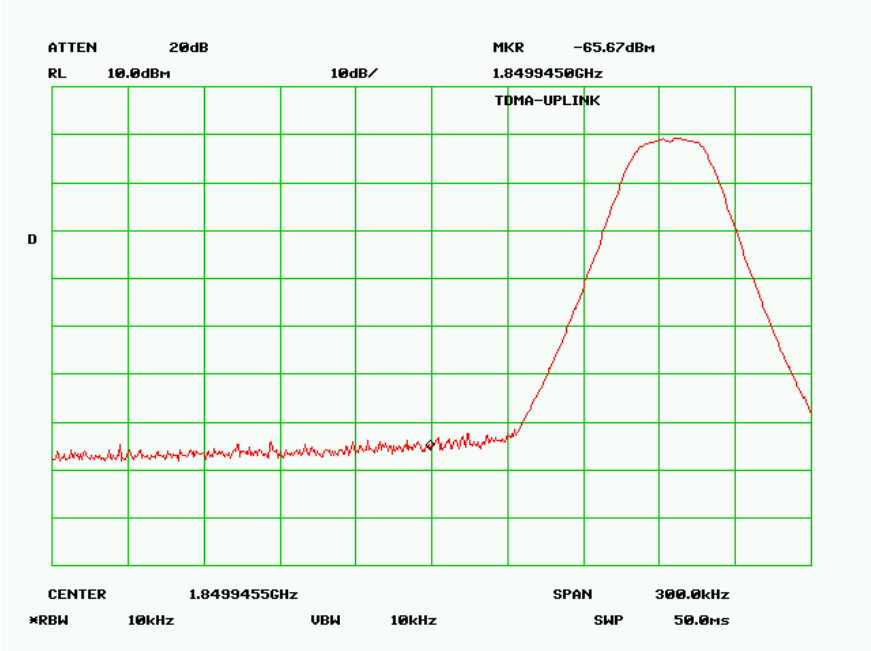

ATTEN 20dB
MKR -54.00dBm
RL 10.0dBm
10dB/
1.910068GHz
GSM-UPLINK
D
CENTER 1.910070GHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

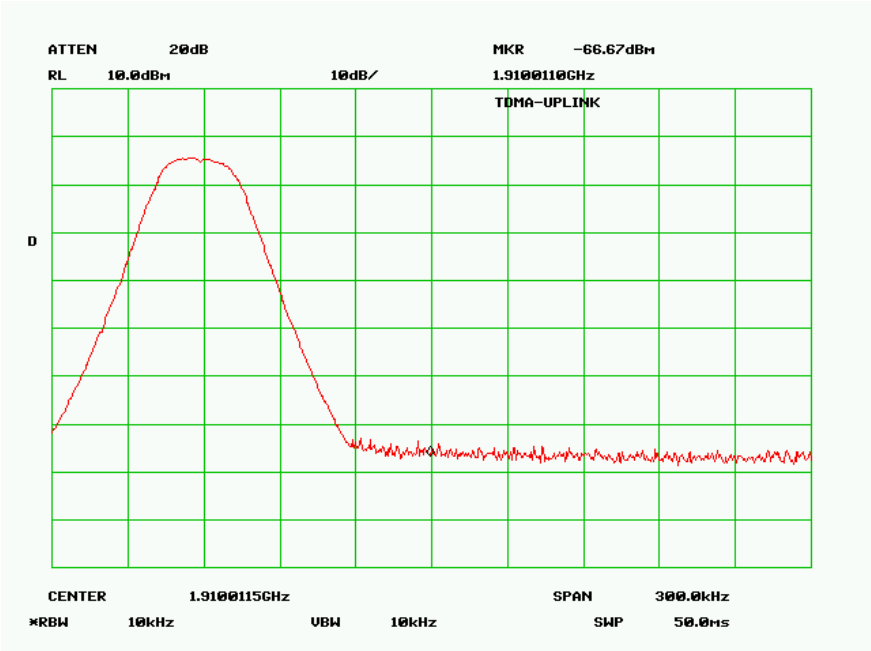
GSM Downlink



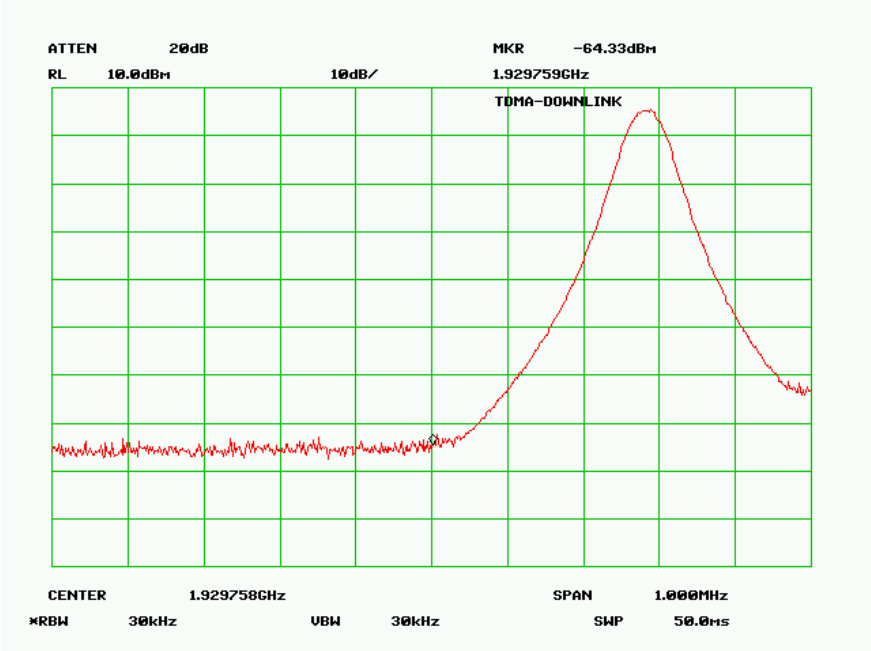


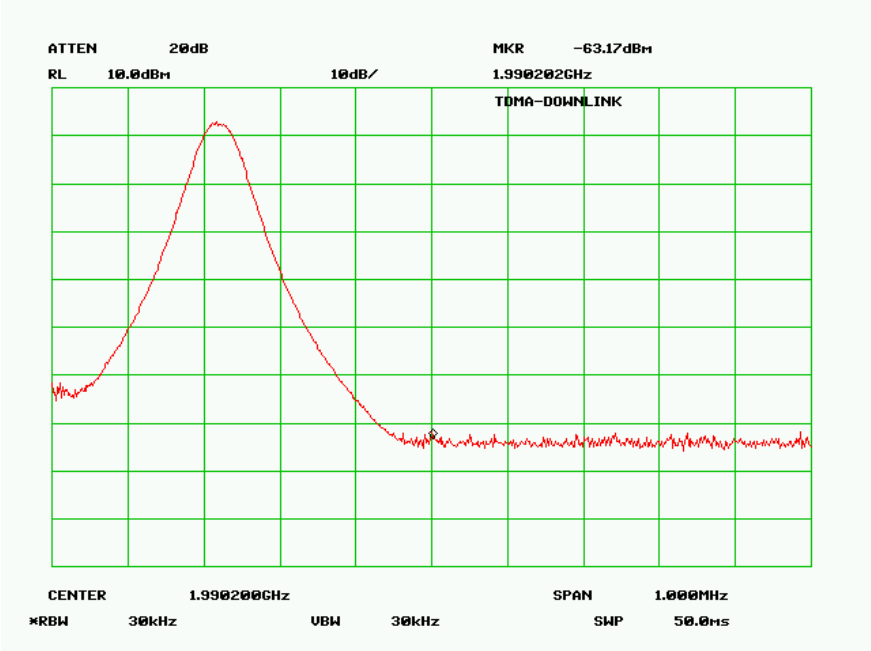
TDMA Uplink


ATTEN 20dB
MKR -65.67dBm
RL 10.0dBm
10dB/
1.8499450GHz
TDMA-UPLINK
D
CENTER 1.8499455GHz
SPAN 300.0kHz
*RBW 10kHz
VBW 10kHz
SWP 50.0ms


ATTEN 20dB
MKR -66.67dBm
RL 10.0dBm
10dB/
1.9100110GHz
TDMA-UPLINK
D
CENTER 1.9100115GHz
SPAN 300.0kHz
*RBW 10kHz
VBW 10kHz
SWP 50.0ms

TDMA Downlink





§2.1047 – Modulation Characteristics

This EUT only is a PCS 1900 Repeater, it is not a transmitter. There is no modulating circuit in the EUT and no modulating characteristics measurement required.

§2.1055(a0, §2.1055(d) & §24.235 - FREQUENCY STABILITY

No Frequency Stability test is required for this device.

§1.1307(b)(1) & §2.1091 - RF EXPOSURE

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-15000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Up-Link:
Maximum peak output power at antenna input terminal: 31.04 (dBm)
Maximum peak output power at antenna input terminal: 1270.57 (mW)
Prediction distance: 57 (cm)
Predication frequency: 1880 (MHz)
Antenna Gain (typical): 15 (dBi)
Maximum antenna gain: 31.62 (numeric)
Power density at predication frequency at 57 cm: 0.984 (mW/cm^2)
MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm^2)

Down-Link:
Maximum peak output power at antenna input terminal: 31.20 (dBm)
Maximum peak output power at antenna input terminal: 1318.26 (mW)
Prediction distance: 58 (cm)
Predication frequency: 1960 (MHz)
Antenna Gain (typical): 15 (dBi)
Maximum antenna gain: 31.62 (numeric)
Power density at predication frequency at 58 cm: 0.986 (mW/cm^2)
MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm^2)

Test Result

For Up-Link: The predicted power density level at 57 cm is 0.984 mW/cm². It is below the uncontrolled exposure limit of 1mW/cm² at 1880 MHz.

For Down-Link: The predicted power density level at 58 cm is 0.986 mW/cm². It is below the uncontrolled exposure limit of 1mW/cm² at 1960 MHz.