TEST REPORT

Report Number: 3093217ATL-007

December 5, 2006

Product Designation: HMC081901C (FCCID: HDLUSA-60750-KE-E)

Standard: FCC Part 22; and FCC Part 24; FCC Part 15, Subpart B

Tested by:
Intertek Testing Services NA Inc.
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096

Client:
Hitachi Telecom, USA
3617 Parkway Lane, Suite 100
Norcross, GA 30092
Contact: Nick Yasui
Phone: 770.446.8820
Fax: 770.797.2555

Tests performed by:

Shawn K. McGuinness
EMC Project Engineer

Report reviewed by:

David J. Schramm
EMC Department Manager

All services undertaken are subject to the following general policy: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. This report must not be used to claim product endorsement by A2LA, NIST, or any agency of the US Government.

1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatum text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)	03/21/2006	
5.0	Description of test facility (Test Site Location)	03/21/2006	
6.0	RF Output Power (FCC Part 2.1046)	03/15/2006	PASS
7.0	Occupied Bandwidth (FCC Part 2.1049)	03/15/2006	PASS
8.0	Spurious emissions at antenna terminals (FCC Part 2.1051)	03/15/2006	PASS
NA	FCC Part 22 Radiated Power (ERP) and FCC Part 24 Radiated Power (EIRP) (Radiated Power) was waived due to test not required for amplifiers.		
9.0	Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)	11/17/2006	PASS
10.0	Field strength of spurious radiation (FCC Part 2.1053)	03/17/2006	PASS
NA	Frequency Stability (FCC Part 2.1055) was waived due to test is not required for amplifiers.		
11.0	Radiated emissions (E-field) (FCC Part 15.109)	03/17/2006	PASS
12.0	Revision History (Revision History)		
NA	Conducted emissions on AC power lines (Conducted Emissions) was waived due to EUT is DC Powered		

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
850MHz MCPA	Hitachi	HMC081901C	A0002
DUP/Comb Tray	Hitachi	EJ08D1	05510009
Chassis	Hitachi	HRAC23SG1C	SG0001

EUT receive date:	February 14, 2006
EUT receive condition:	Good

Description of EUT provided by Client:
The EUT is an 850 MHz 190W MCPA (Multi-Carrier Power Amplifier) for GSM, EDGE and W-CDMA base-station applications. The amplifier is installed in a 19 inch rack which receives power from a +27 Vdc power source.

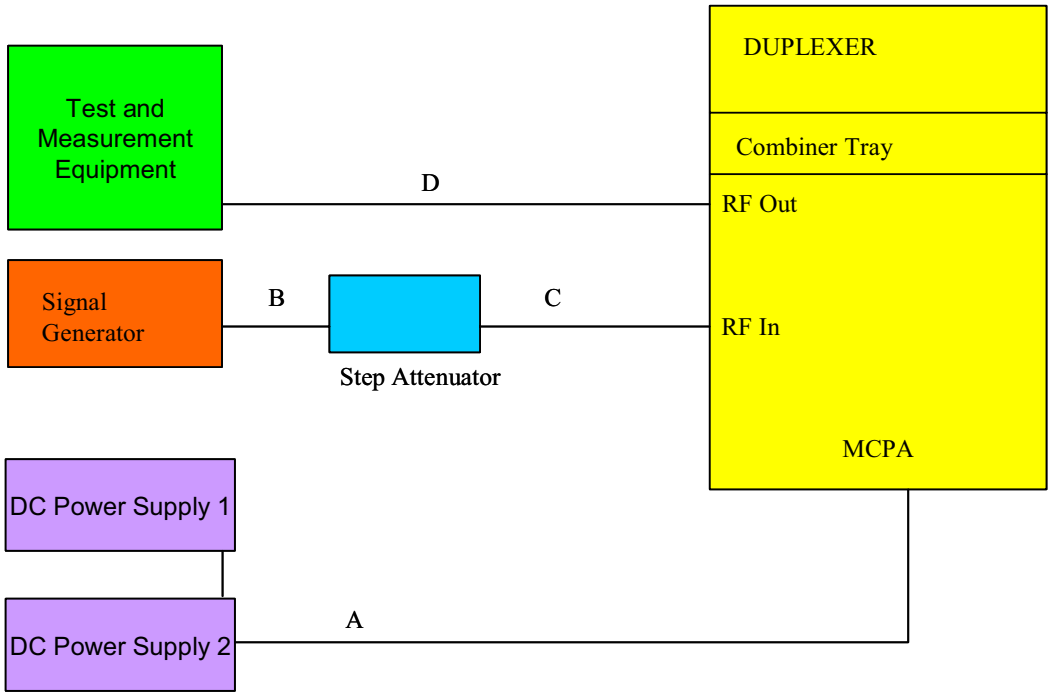
Description of EUT exercising:
During testing where a single carrier was used, the input level was adjusted to obtain 190 Watts out on a single channel. During testing where more than one channel is used, the power of each carrier must be reduced so the total power output is no greater than 190 Watts. CW, GSM and W-CDMA signal were used during the testing and are indicated in each section of this report as appropriate.

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

Photo:



Block Diagram

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Data:

EUT Cabling						
					Connection	
ID	Description	Length	Shielding	Ferrites	From	To
A	DC Power Line In	15m	no	no	DC PS Pair	EUT Chassis
B	Coax 1	1.0m	yes	no	Signal Generator	Step Attenuator
C	Coax 2	1.4m	yes	no	Step Attenuator	EUT Amp RF IN
D	Coax 3	2.0m	yes	no	EUT Amp RF Out	Test/Meas. Equipment

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Signal Generator	Agilent	E4438C	MY4020908
Step Attenuator	Agilent	11716A	14003296
DC Power Supply 1	H/P	6012B	2732A-02525
DC Power Supply 2	H/P	6012B	2614A-01234

5.0 Description of test facility (Test Site Location)

Method:

The Intertek-Duluth site is located at 1950 Evergreen Blvd., Suite 100, Duluth, Georgia. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of ANSI C63.4: 2003. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.

This site is on file with the FCC.

6.0 RF Output Power (FCC Part 2.1046)

Method:

Connect the transmitter output to a calibrated coaxial attenuator. Connect the other end of the attenuator to a power meter. Transmitter output (adjusted for external attenuation) was read off the power meter in dBm.

Performed the test at three frequencies (low, middle, and high channels) and on the highest power levels, which can be setup on the transmitter.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Attenuator, 06 dB	Weinschel Corp	2	200002	07/06/2005	07/06/2006
Attenuator, 06 dB	Weinschel Corp	2	200006	08/08/2005	08/08/2006
Attenuator, 10 dB, 150 Watt, <18GHz	Weinschel Corp	66-10-33	211683	03/06/2006	03/06/2007
Attenuator, 10 dB, 50 Watt, DC-18GHz	Weinschel	47-10-34	200061	05/12/2005	05/12/2006
Attenuator, 20 dB	Weinschel Corp	2	200001	08/08/2005	08/08/2006
Attenuator, 20 dB, SMA	Pasternack	PE7045-20	200014	07/06/2005	07/06/2006
Cable, 40 GHz, 2.9, 80 inches	Megaphase	TM40 K1K1 80	E405	05/13/2005	05/13/2006
Cable, 40 GHz, 2.9, 80 inches	Megaphase	TM40 K1K1 80	E404	05/13/2005	05/13/2006
Power Meter	Boonton	4232A	200063	10/25/2005	10/25/2006
Power Sensor, Dual Diode, 10kHz to 8GHz, 20 dBm	Boonton	51011-EMC	200064	10/25/2005	10/25/2006
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

Results: The sample tested was found to Comply.

6.0 RF Output Power (FCC Part 2.1046)

Data:

EUT Mode	Frequency MHz	Channel	RBW/VBW MHz	Measured Power dBm	Measured Power Watts
GSM	869.0	Low	APM (1)	52.77	189.2
	881.5	Mid	APM (1)	52.77	189.2
	894.0	High	APM (1)	52.77	189.2
GSM Edge	869.0	Low	APM (1)	52.80	190.5
	881.5	Mid	APM (1)	52.78	189.7
	894.0	High	APM (1)	52.80	190.5
WCDMA	871.5	Low	APM (1)	52.82	191.4
	881.5	Mid	APM (1)	52.79	190.1
	891.5	High	APM (1)	52.79	190.1

Note (1): Used average power meter
Note (2): Power for base stations are set at time of licensing.

7.0 Occupied Bandwidth (FCC Part 2.1049)

Method:

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Connect the antenna port of the EUT to a spectrum analyzer using a calibrated coaxial cable and attenuator. Set the EUT to transmit at its highest power setting. The 99% bandwidth function of the analyzer was used to automatically generate the occupied bandwidth plots. Repeat for low, mid, and high channels of each band of the EUT.

For Amplifiers, the spectral shape of the output should look similar to input for all modulations.

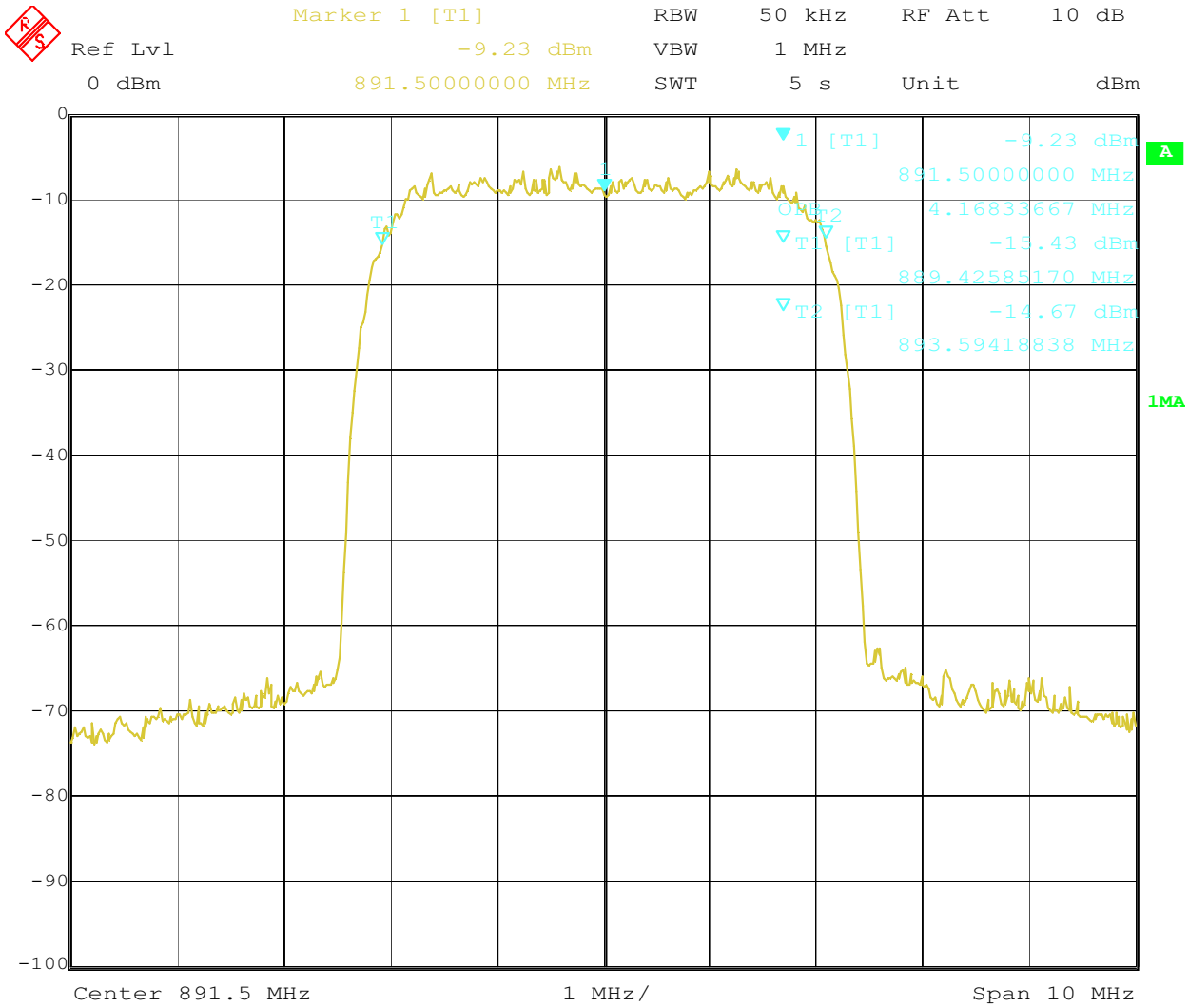
Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Attenuator, 10 dB, 150 Watt, <18GHz	Weinschel Corp	66-10-33	211683	03/06/2006	03/06/2007
Attenuator, 10 dB, 50 Watt, DC-18GHz	Weinschel	47-10-34	200061	05/12/2005	05/12/2006
Attenuator, 20 dB	Weinschel Corp	2	200001	08/08/2005	08/08/2006
Cable, 40 GHz, 2.9, 80 inches	Megaphase	TM40 K1K1 80	E405	05/13/2005	05/13/2006
Cable, 40 GHz, 2.9, 80 inches	Megaphase	TM40 K1K1 80	E404	05/13/2005	05/13/2006
ESG Vector Signal Generator	Agilent	E4438C	MY42081816	01/18/06	01/18/08
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

Results: The sample tested was found to Comply.

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

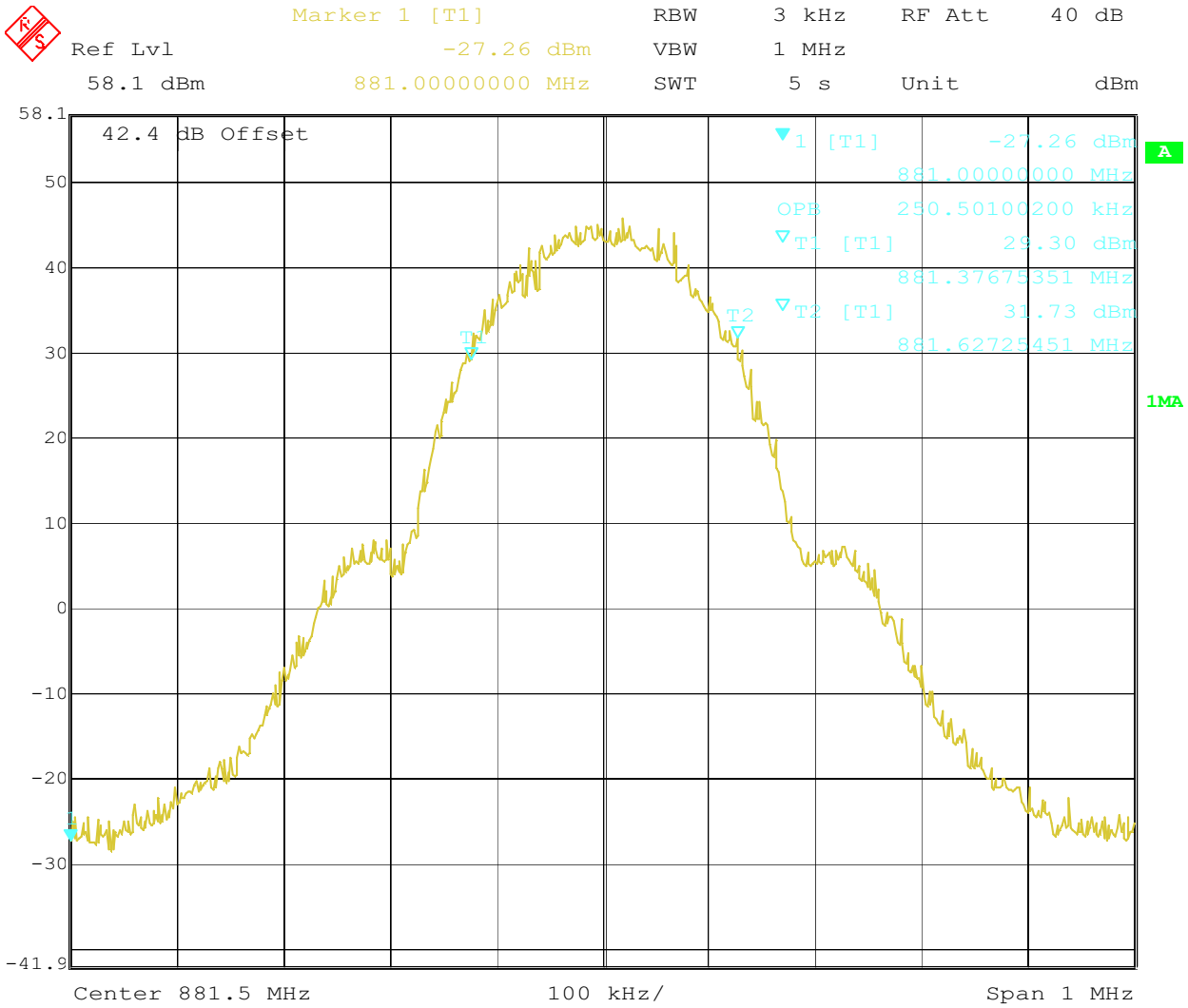


Date: 21.JUN.2006 08:13:03

WCDMA 891.5 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

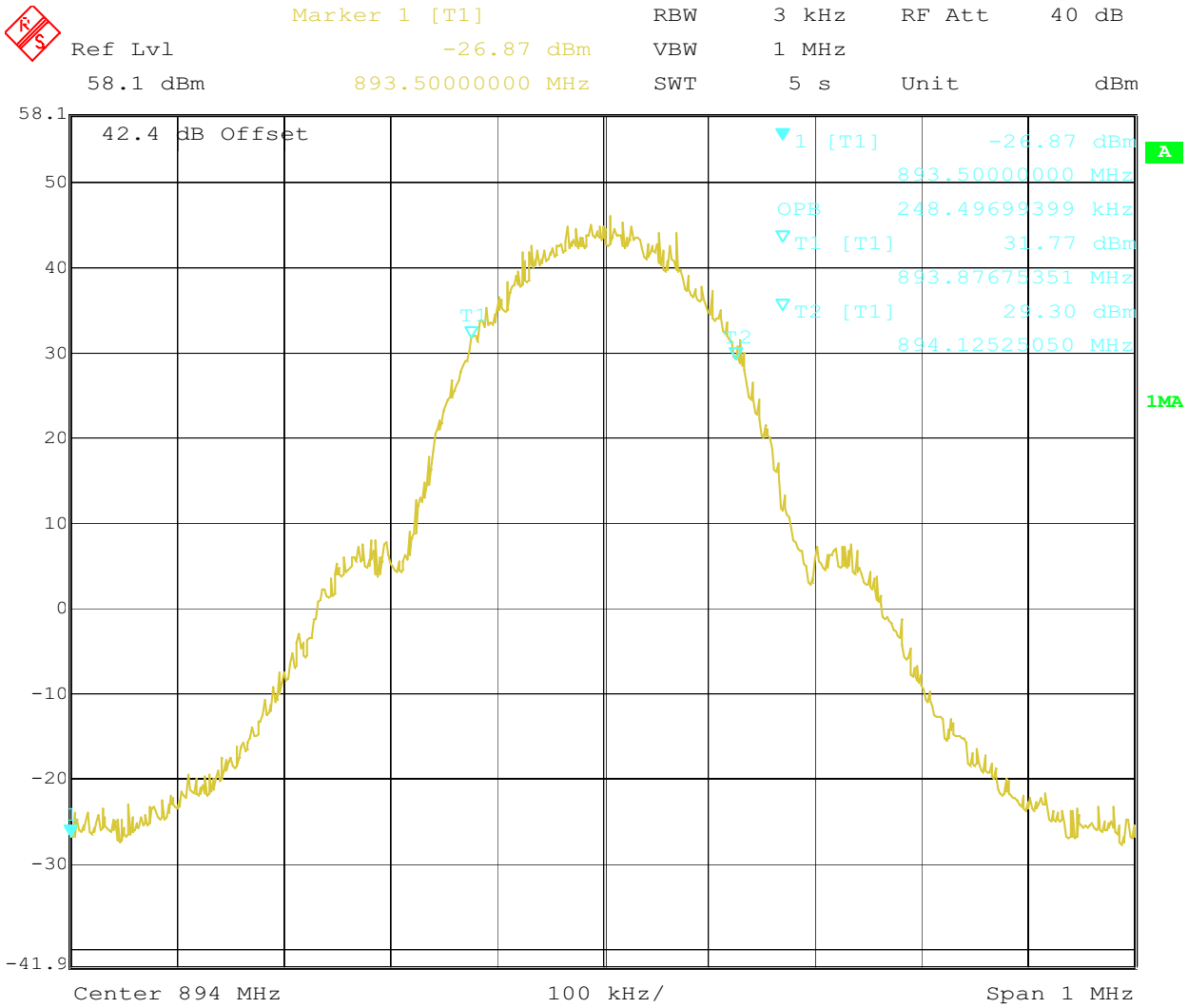


Date: 15.MAR.2006 13:48:33

GSM 881.5 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

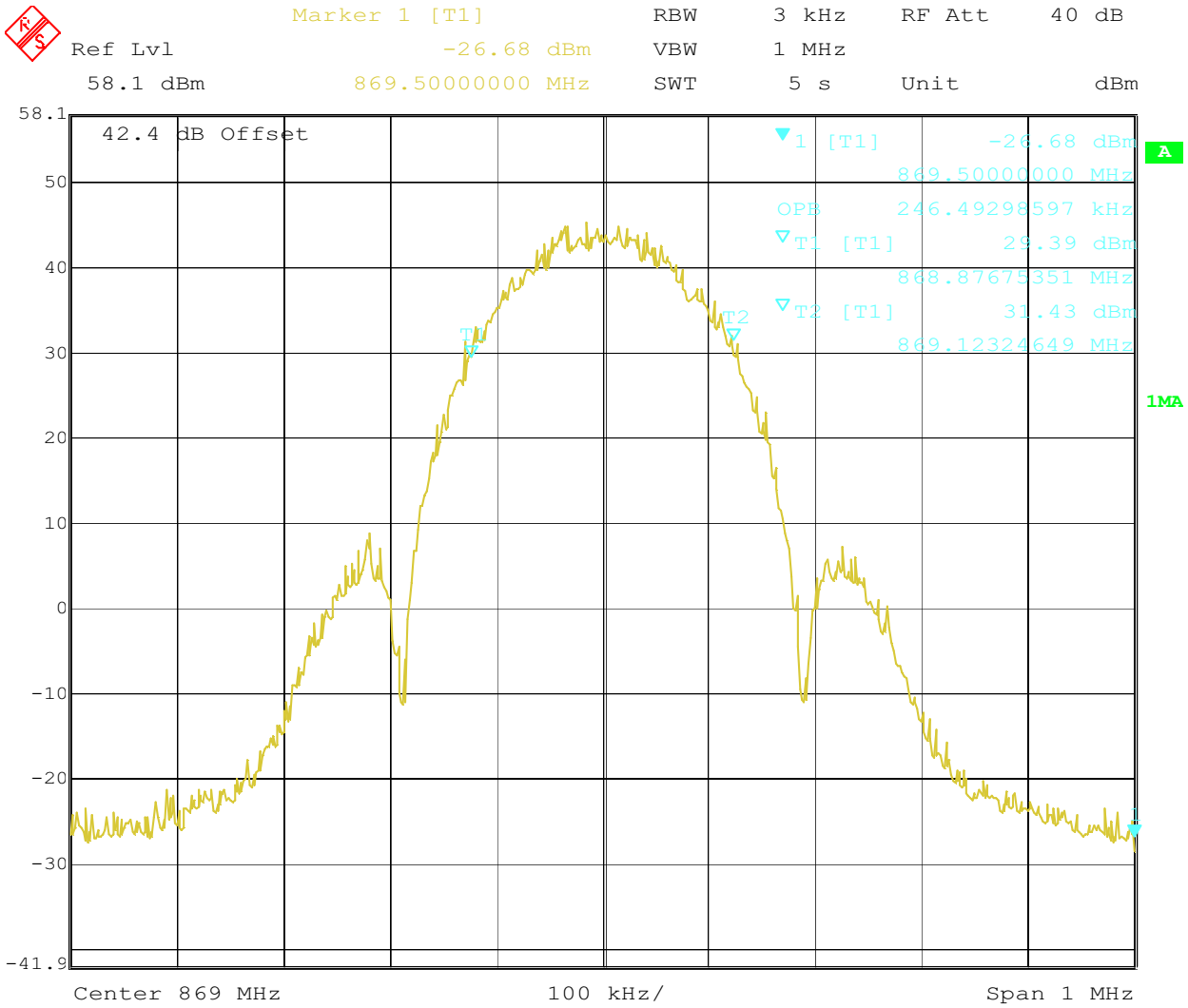


Date: 15.MAR.2006 13:49:04

GSM 894 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

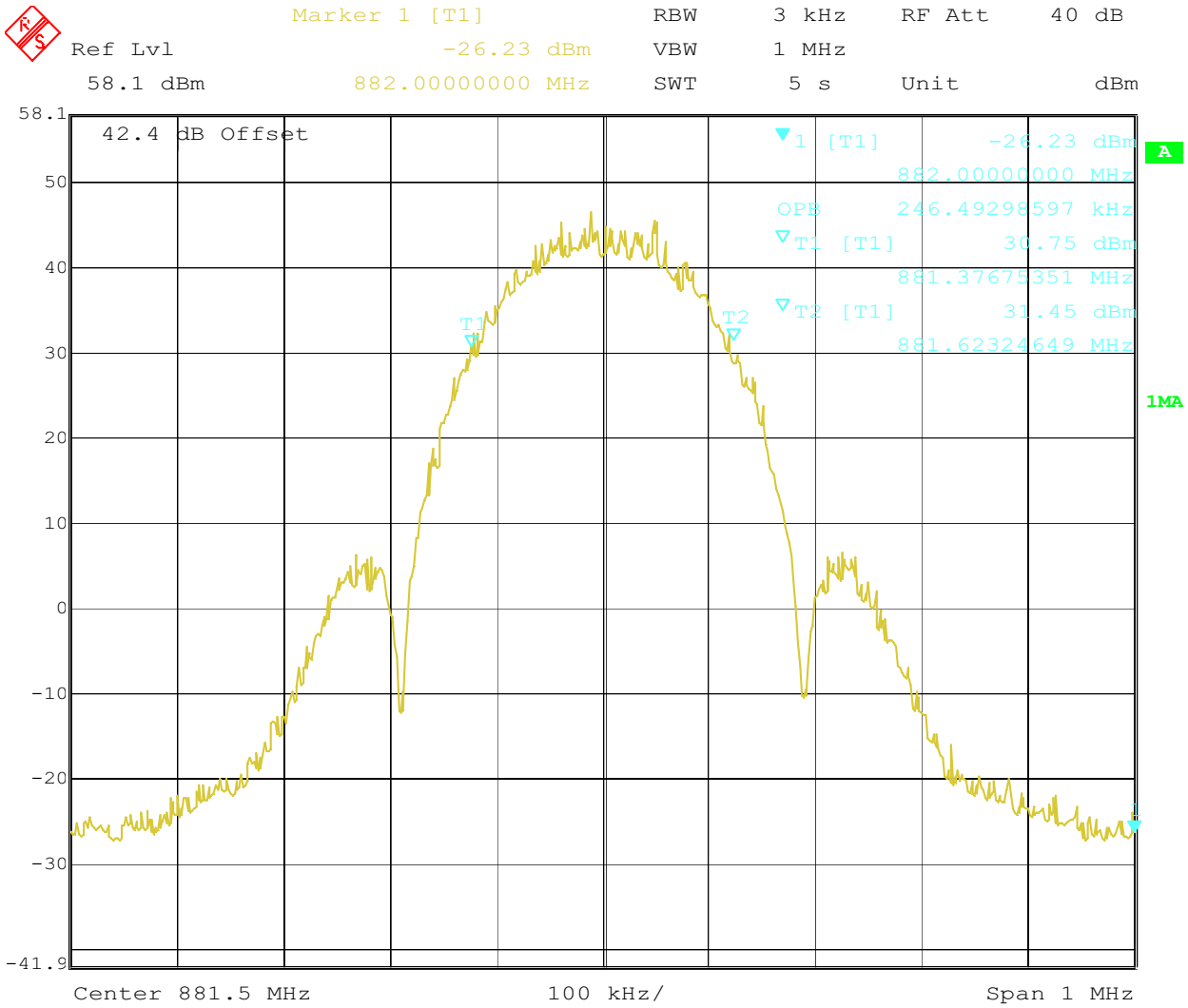


Date: 15.MAR.2006 13:51:06

GSM Edge 869 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

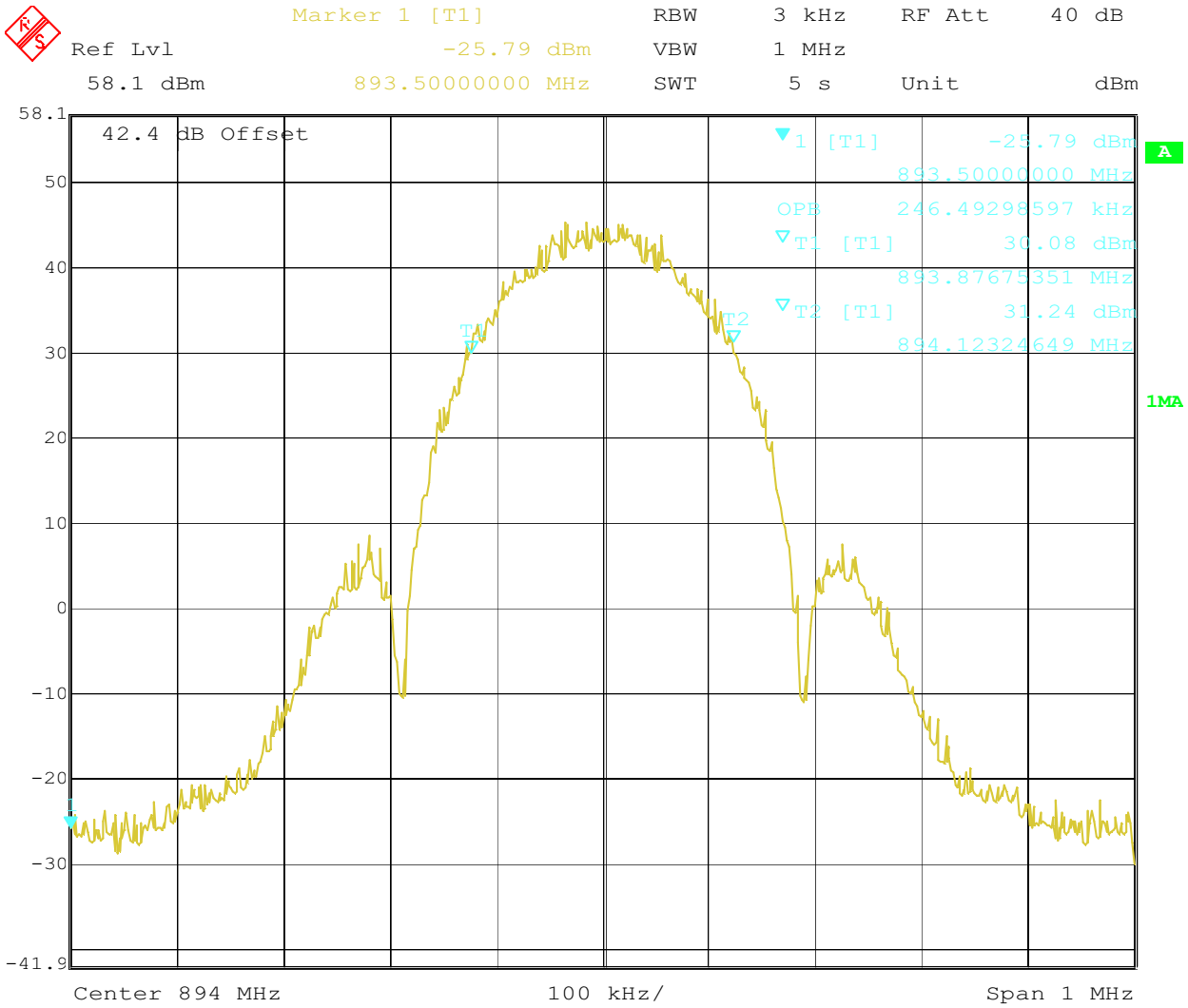
Photo:



GSM Edge 881.5 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

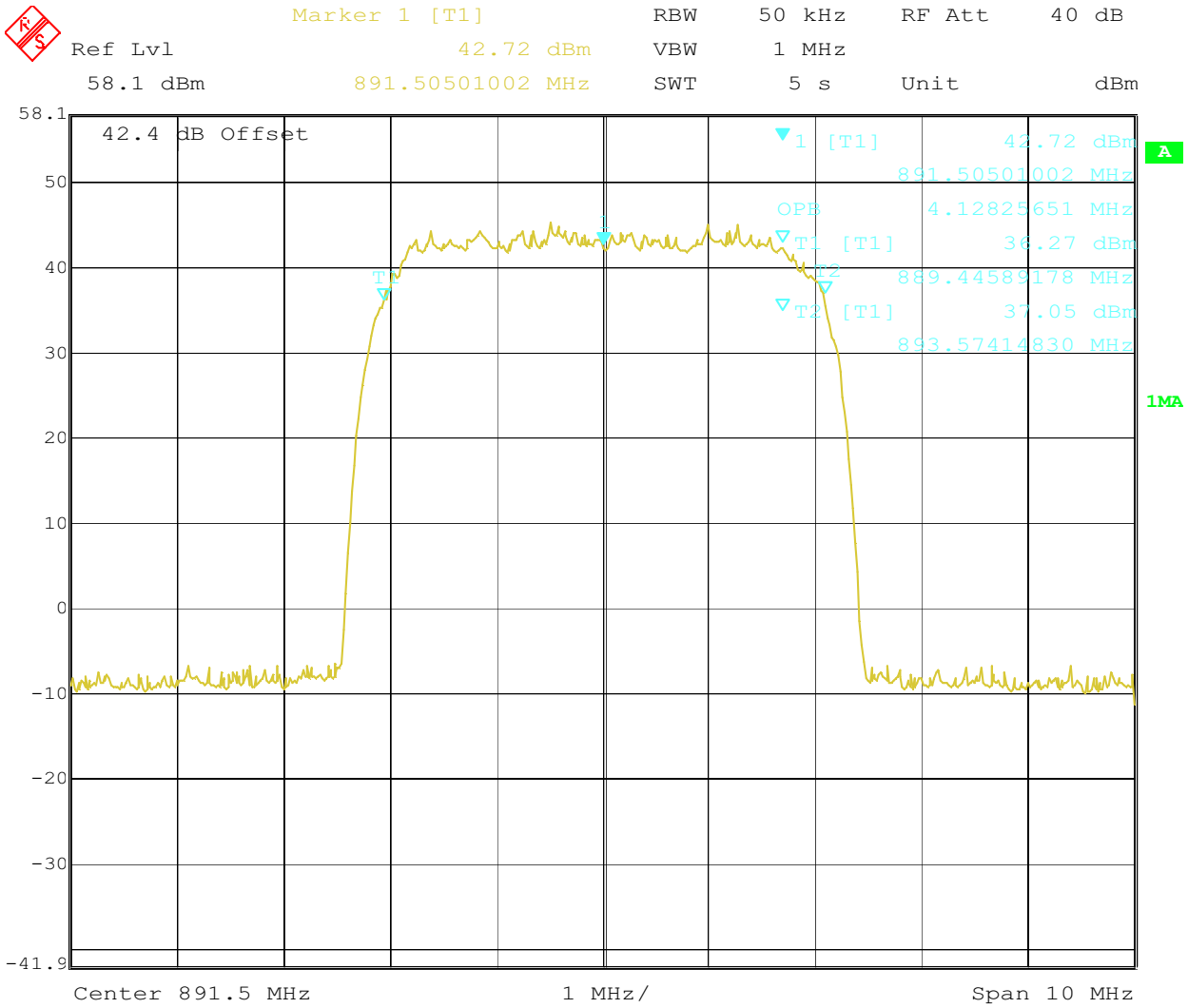


Date: 15.MAR.2006 13:50:05

GSM Edge 894 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

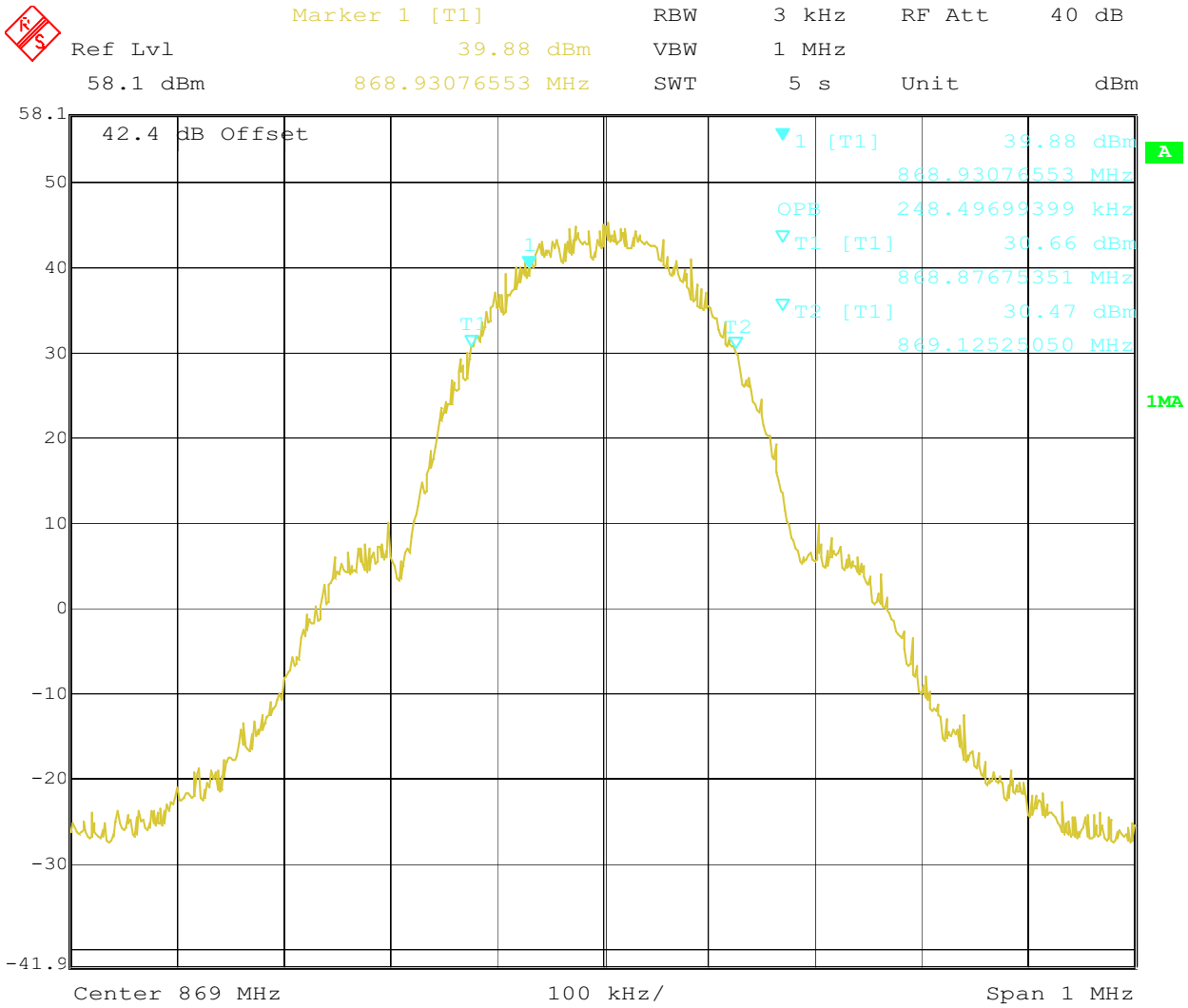


Date: 15.MAR.2006 13:41:43

WCDMA 891.5 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

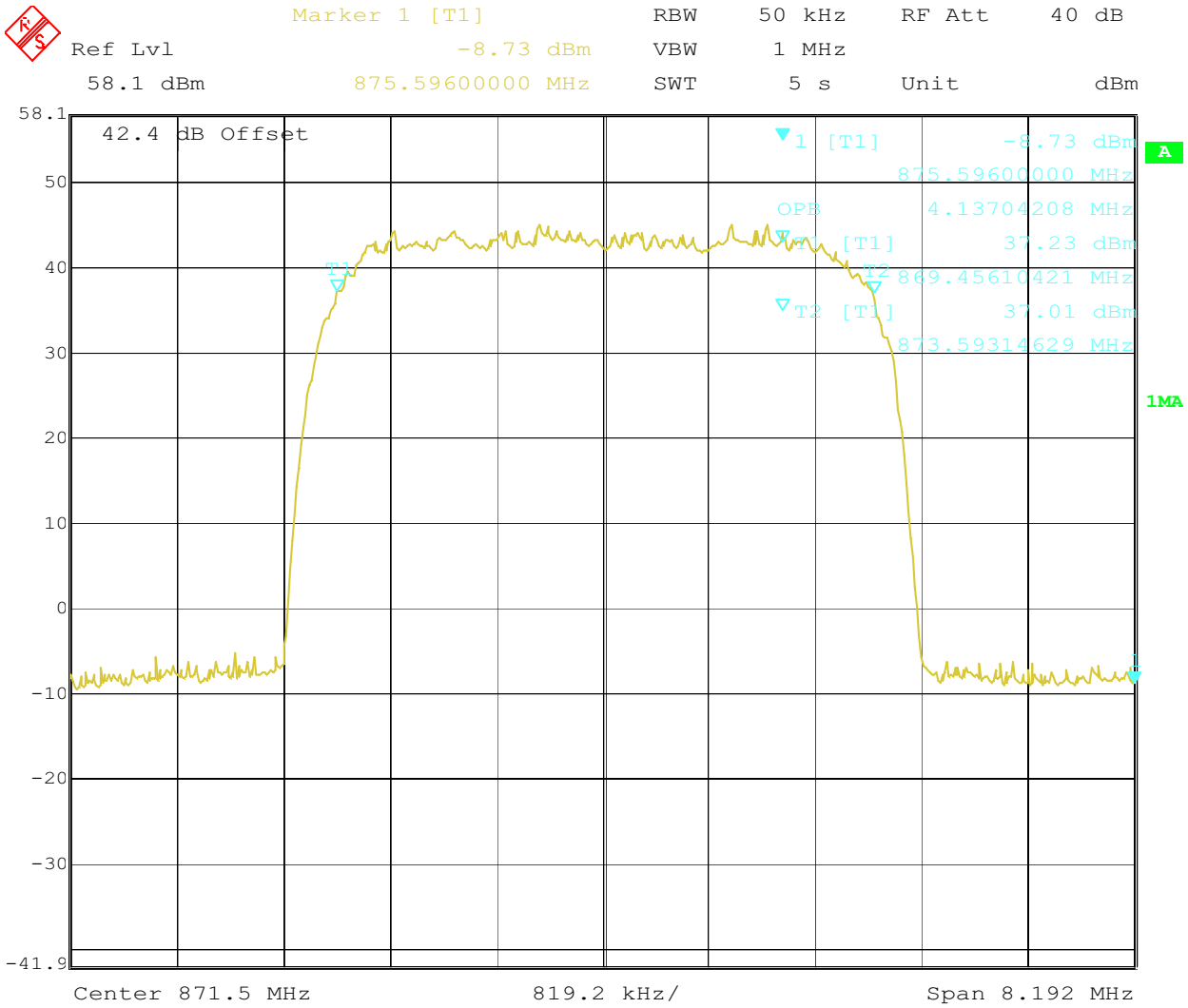


Date: 15.MAR.2006 13:47:34

GSM 869 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

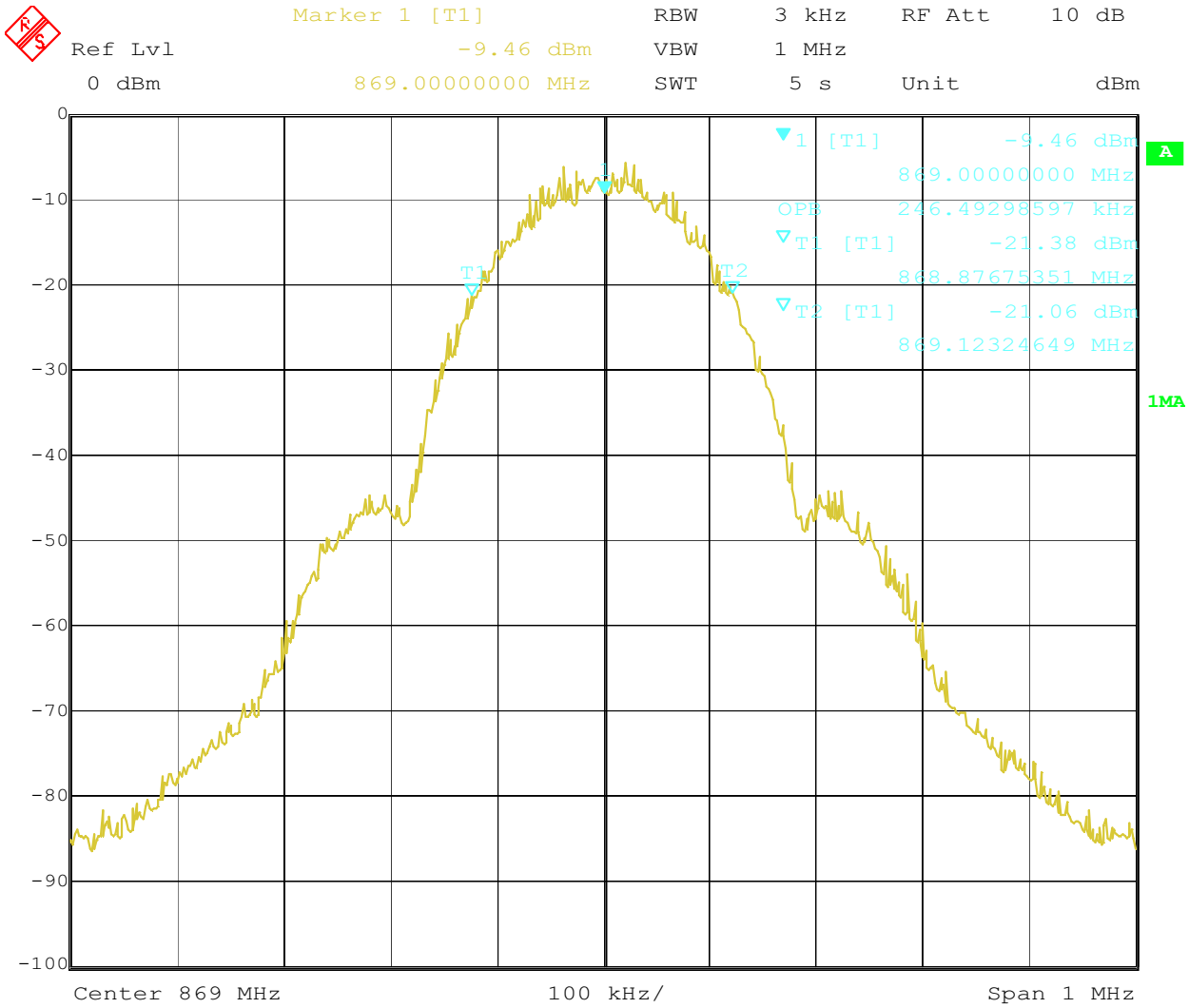


Date: 15.MAR.2006 13:45:26

WCDMA 871.5 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

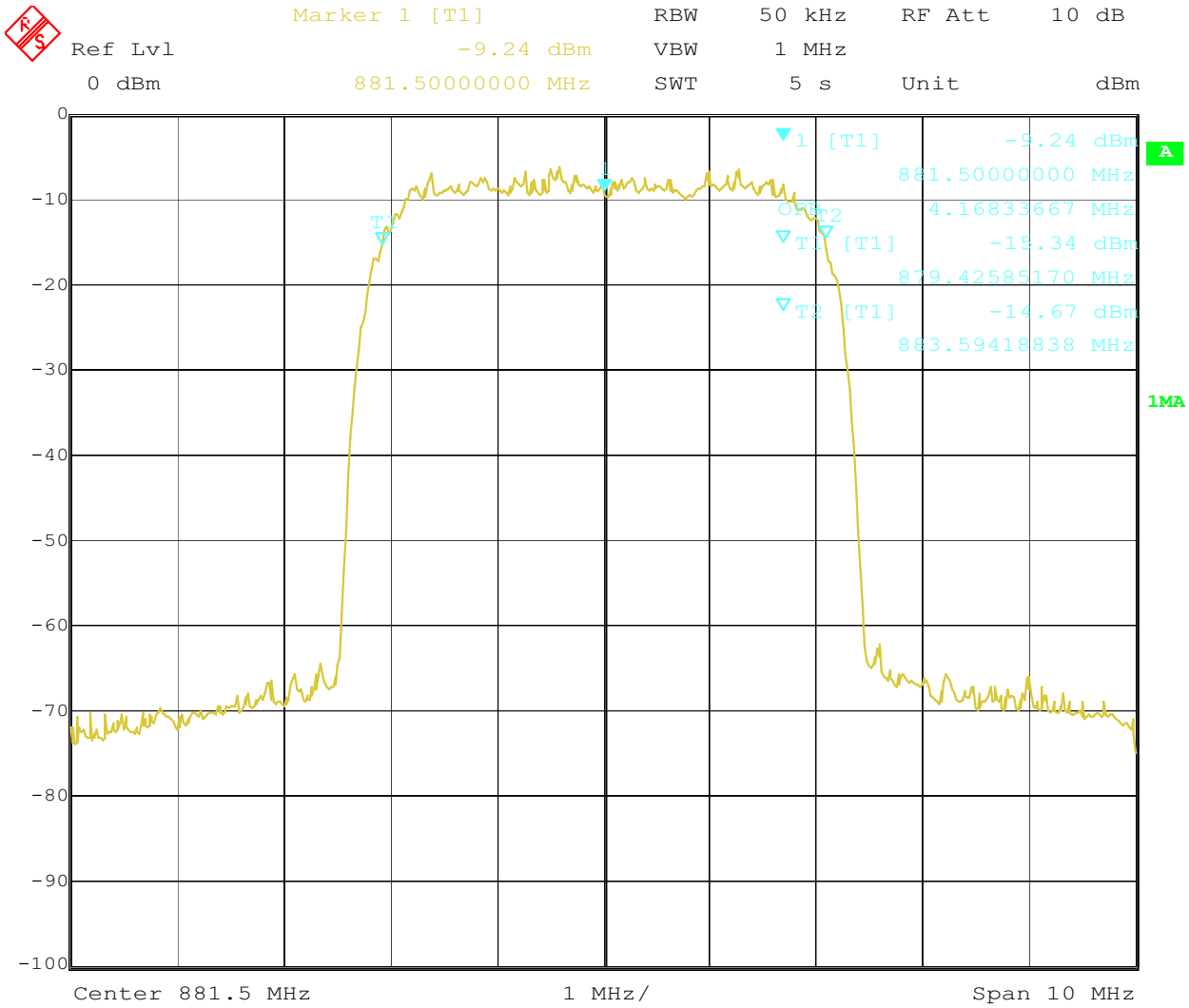


Date: 21.JUN.2006 08:23:56

GSM 869 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

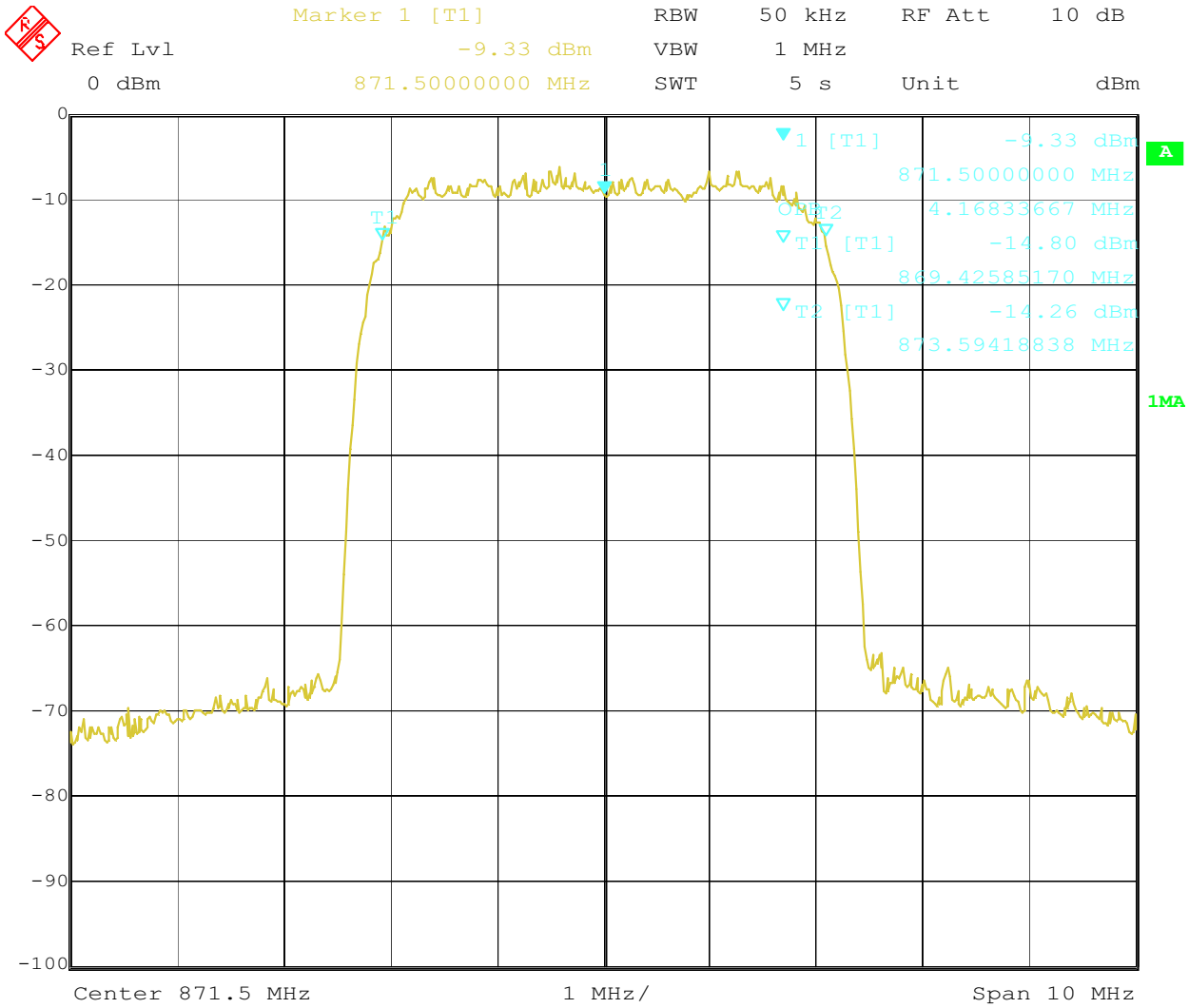


Date: 21.JUN.2006 08:15:03

WCDMA 881.5 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

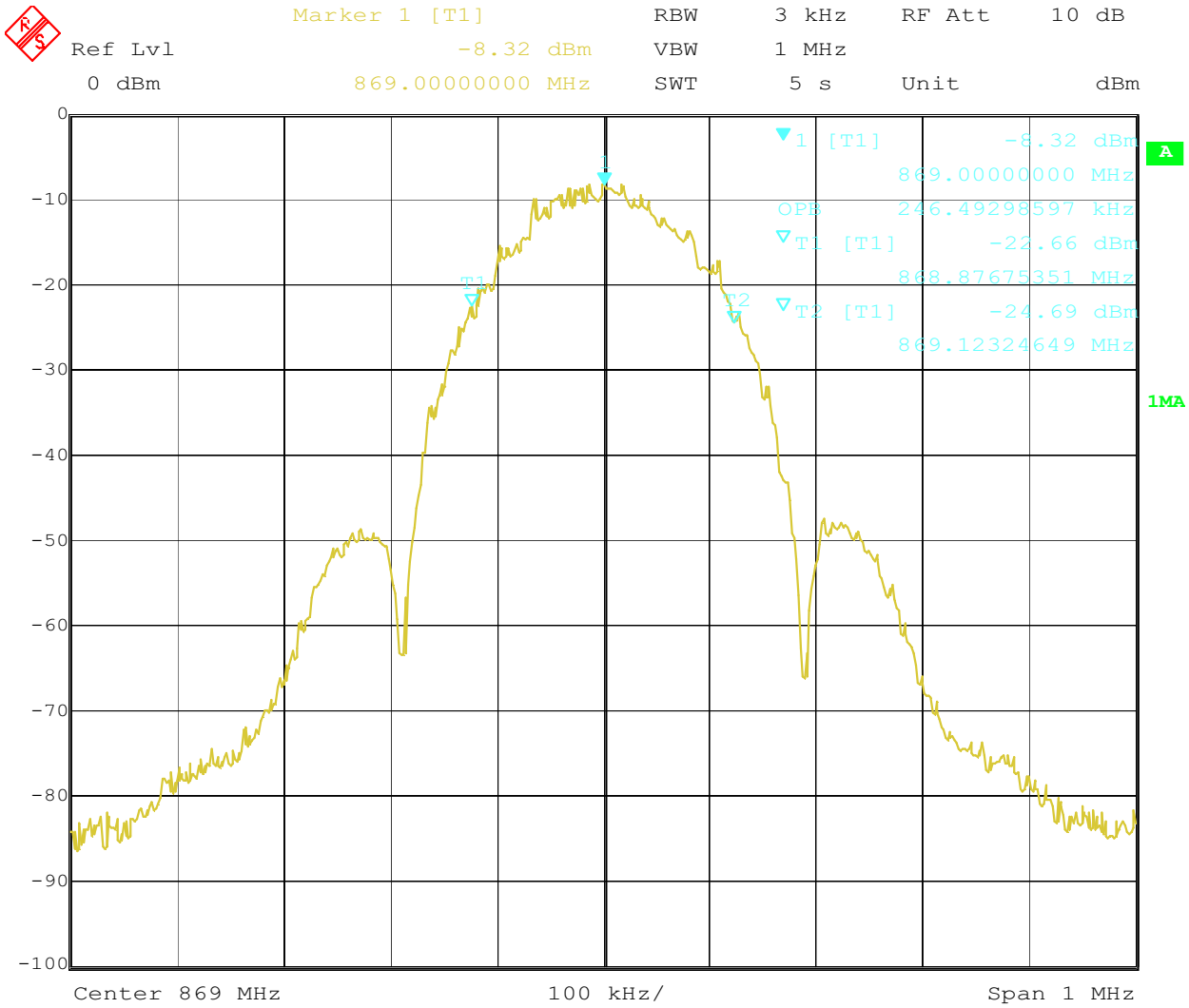


Date: 21.JUN.2006 08:15:54

WCDMA 871.5 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

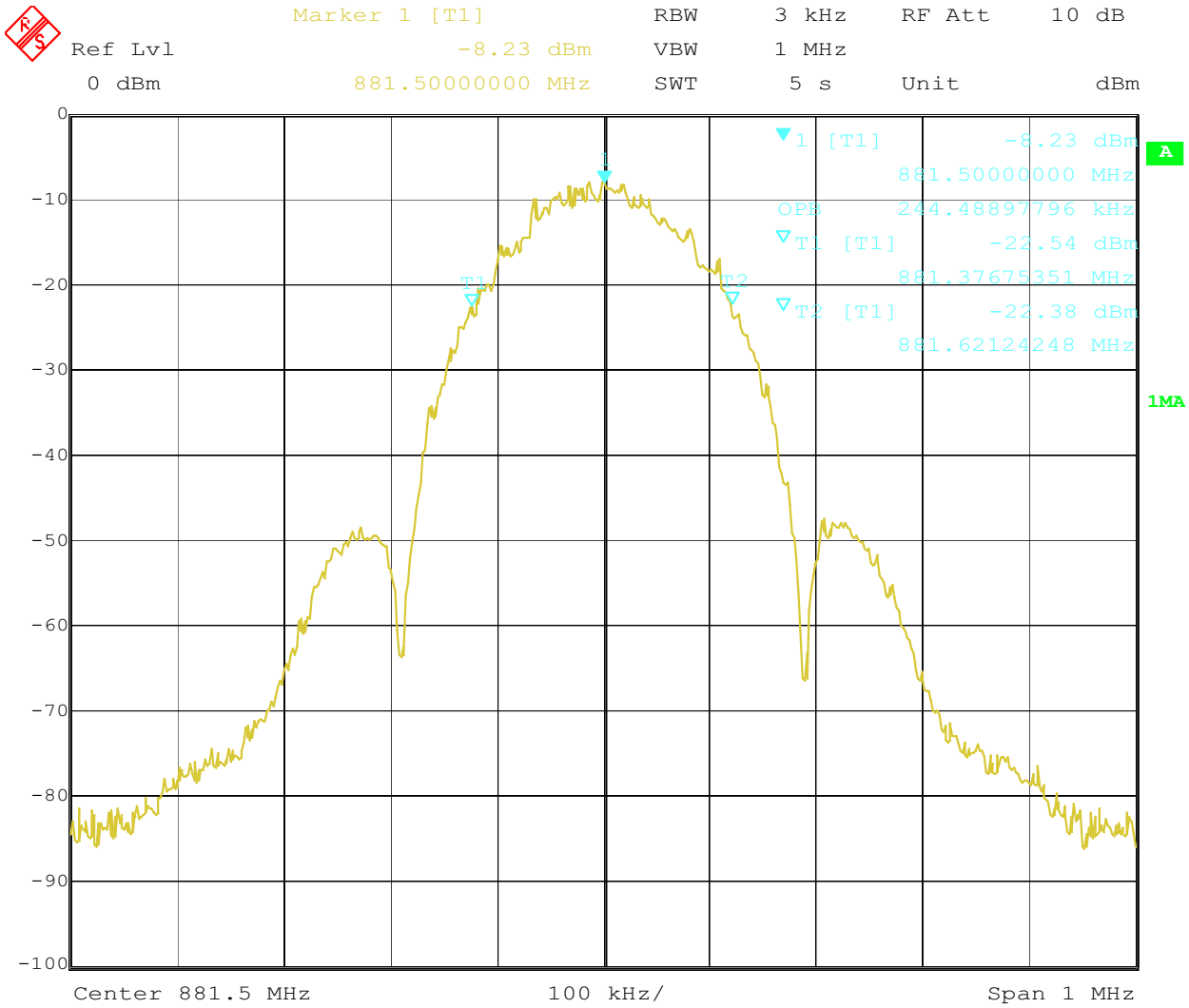


Date: 21.JUN.2006 08:17:33

GSM Edge 869 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

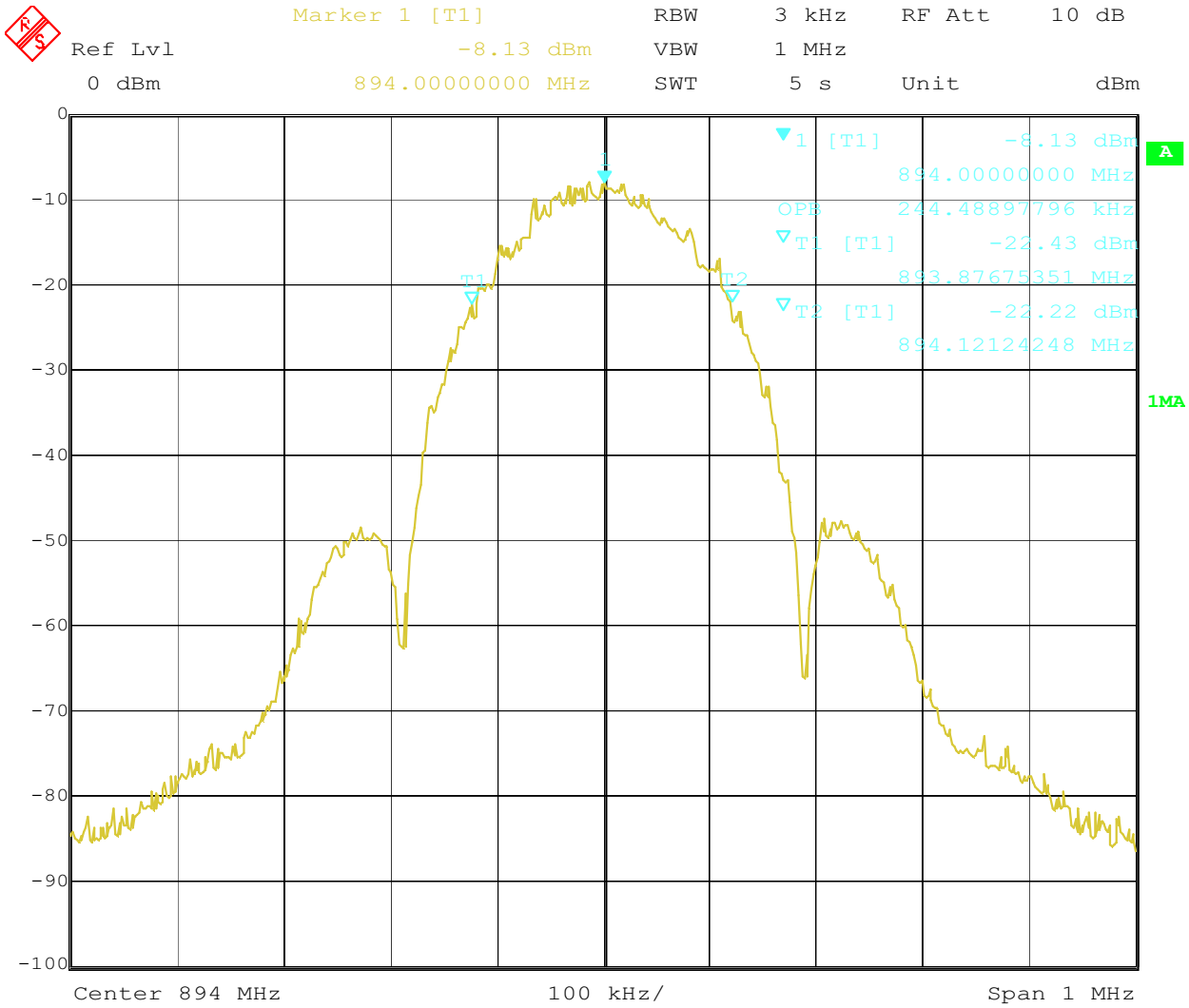


Date: 21.JUN.2006 08:18:58

GSM Edge 881.5 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

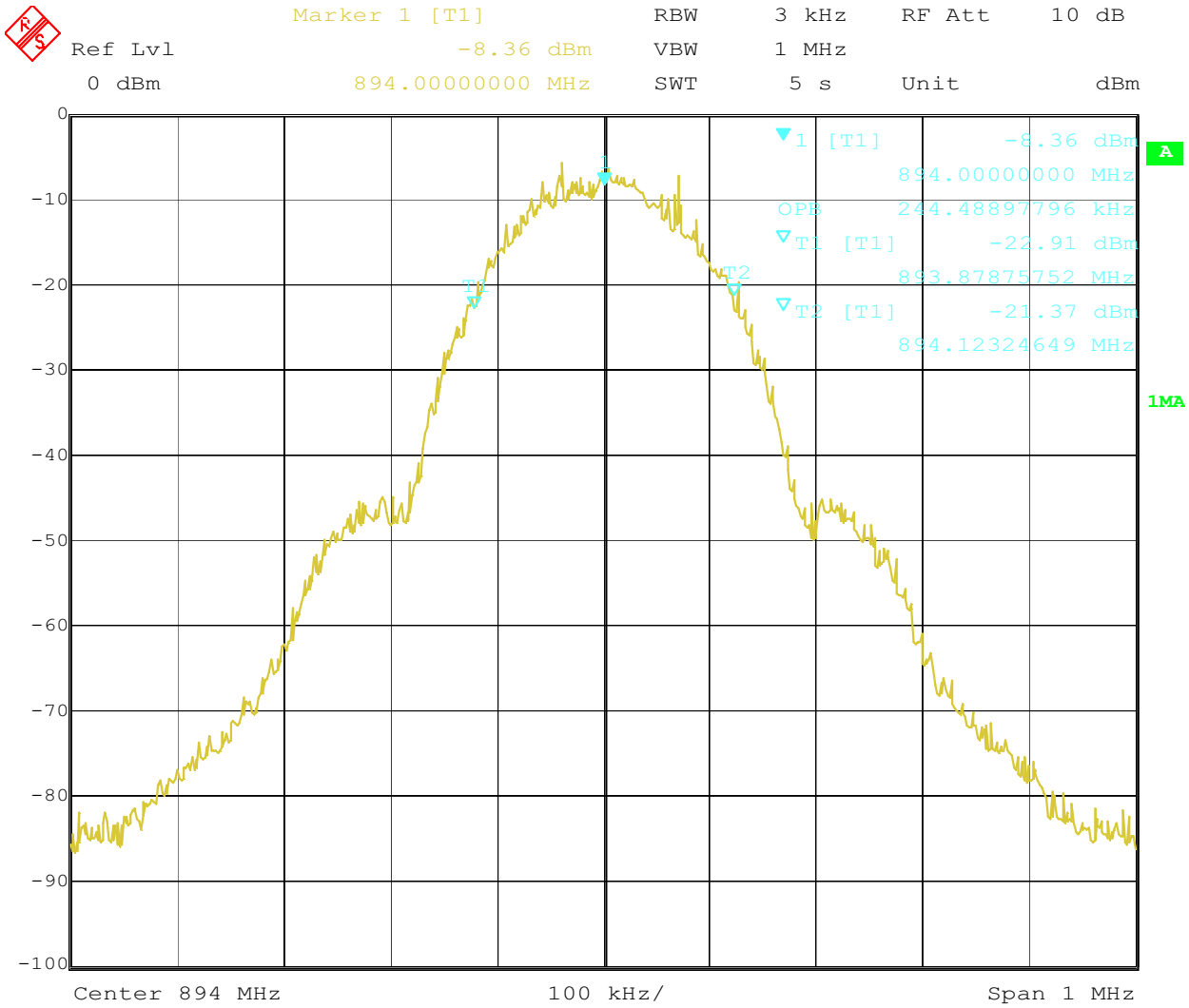


Date: 21.JUN.2006 08:19:50

GSM Edge 894 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

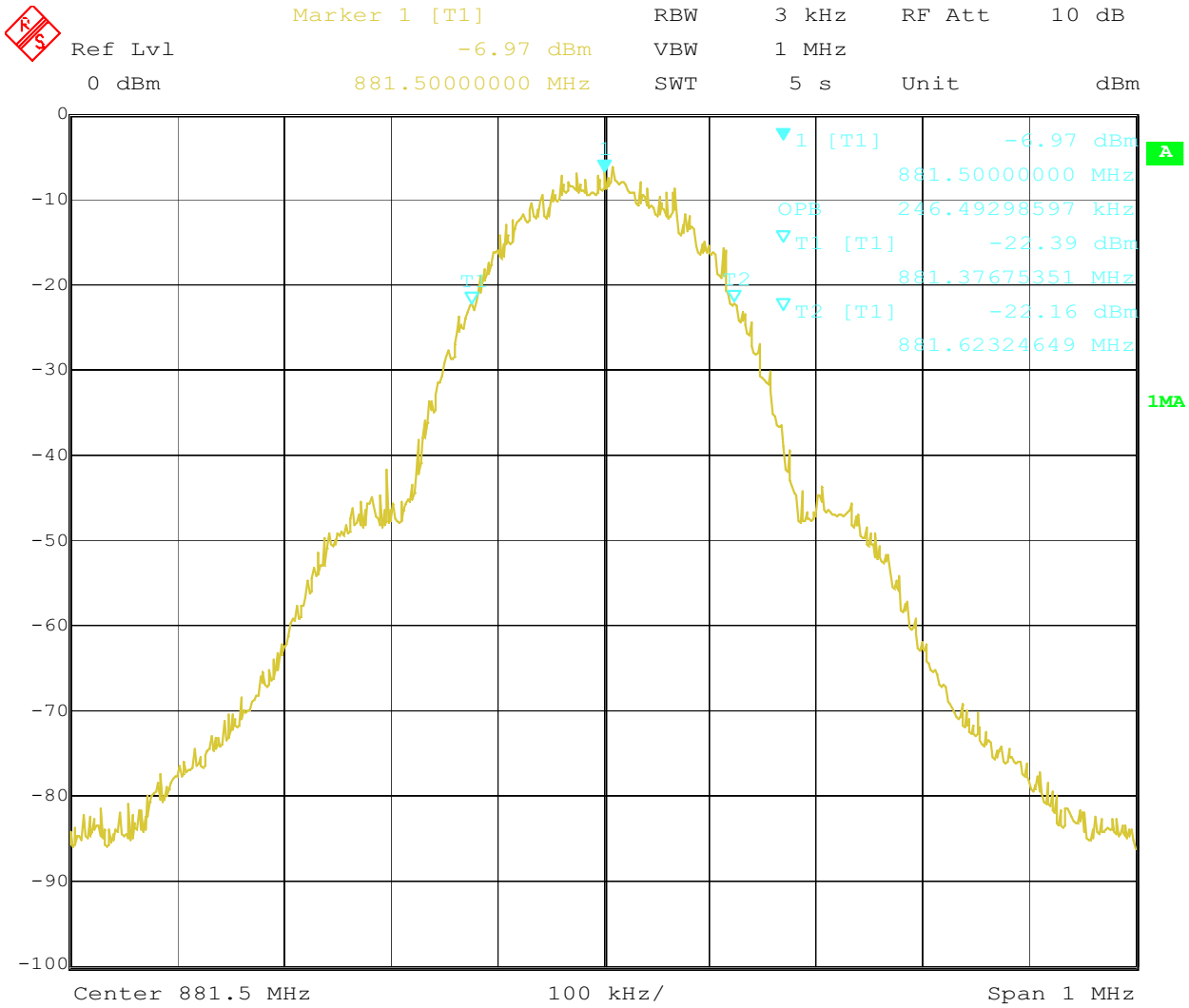


Date: 21.JUN.2006 08:21:59

GSM 894 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

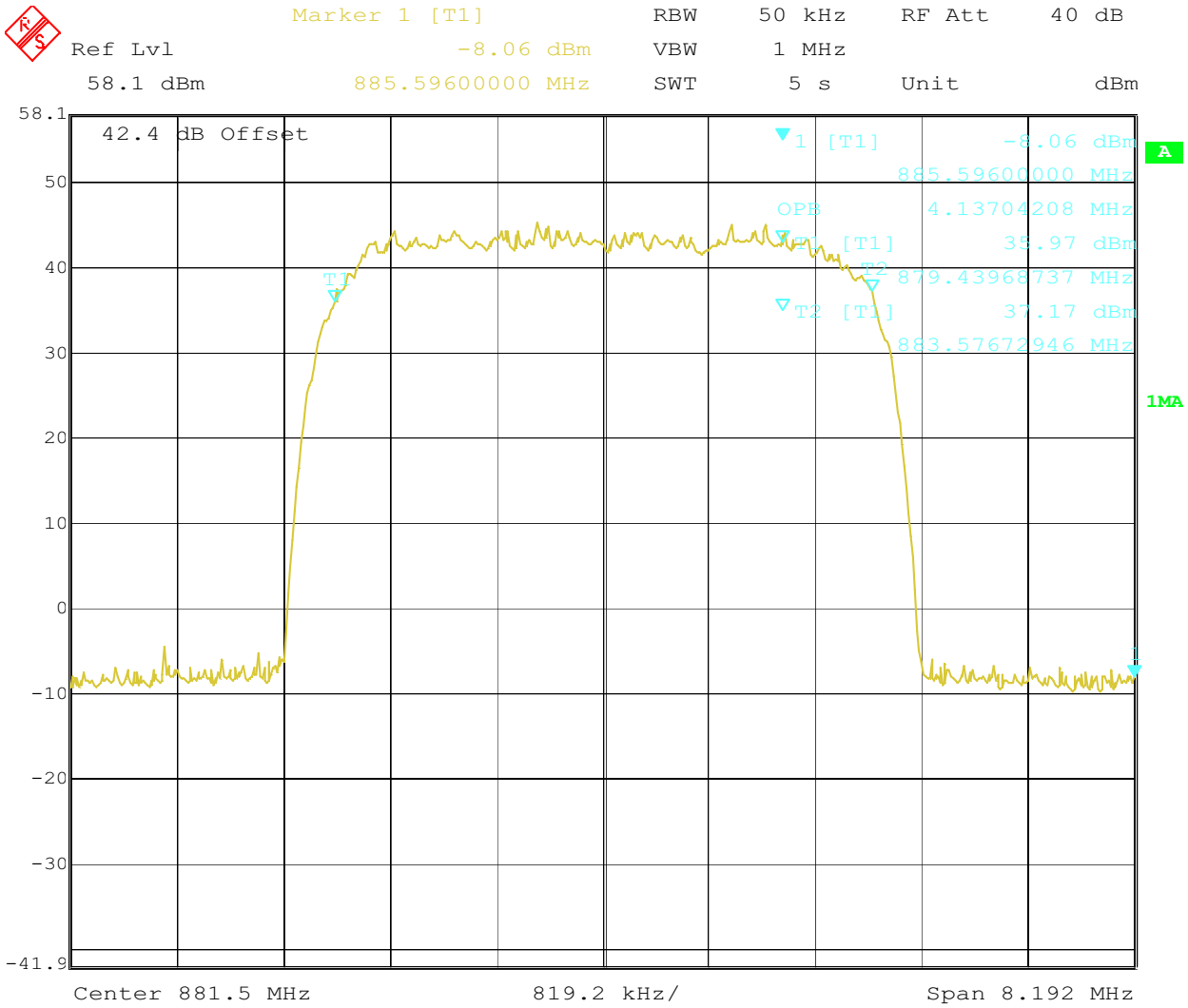


Date: 21.JUN.2006 08:22:43

GSM 881.5 MHz (Input)

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:



Date: 15.MAR.2006 13:44:53

WCDMA 881.5 MHz

7.0 Occupied Bandwidth (FCC Part 2.1049)

Data:

Mode	Frequency MHz	Resolution Bandwidth (1)	Video Bandwidth	Sweep time Seconds	Input Bandwidth (2) MHz	Output (EUT) Bandwidth MHz
GSM	869	3 kHz	1MHz	5	0.246	0.248
GSM	881.5	3 kHz	1MHz	5	0.244	0.250
GSM	894	3 kHz	1MHz	5	0.246	0.248
GSM Edge	869	3 kHz	1MHz	5	0.246	0.246
GSM Edge	881.5	3 kHz	1MHz	5	0.244	0.246
GSM Edge	894	3 kHz	1MHz	5	0.244	0.246
W CDMA 850	871.5	50 kHz	1MHz	5	4.168	4.130
W CDMA 850	881.5	50 kHz	1MHz	5	4.168	4.140
W CDMA 850	891.5	50 kHz	1MHz	5	4.137	4.140

Note (1): Greater or equal to 1% of emission bandwidth.
Note (2): Data taken on June 21, 2006

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Method:

FCC §2.1049, FCC §2.1051, §22.917(a), FCC §24.238(a)
Out of Band Emissions: The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for the Cellular band and 1 MHz or greater in the PCS band. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

Connect the RF output of the EUT to a spectrum analyzer through appropriate attenuation. Set the EUT to transmit at its maximum power level. Sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For Amplifiers, an intermodulation test is also performed. Test all modulations types [TDMA, CDMA, and FM (covers GSM and F1D)].
· CW signal rather than typical signal is acceptable (for FM).
· At maximum drive level, for each modulation: one test with three tones, or two tests (high-, low-band edge) with two tones
· Limit usually is -13dBm conducted.
· Not needed for Single Channel systems.
· Combination of modulation types not needed.

Test Equipment Used:

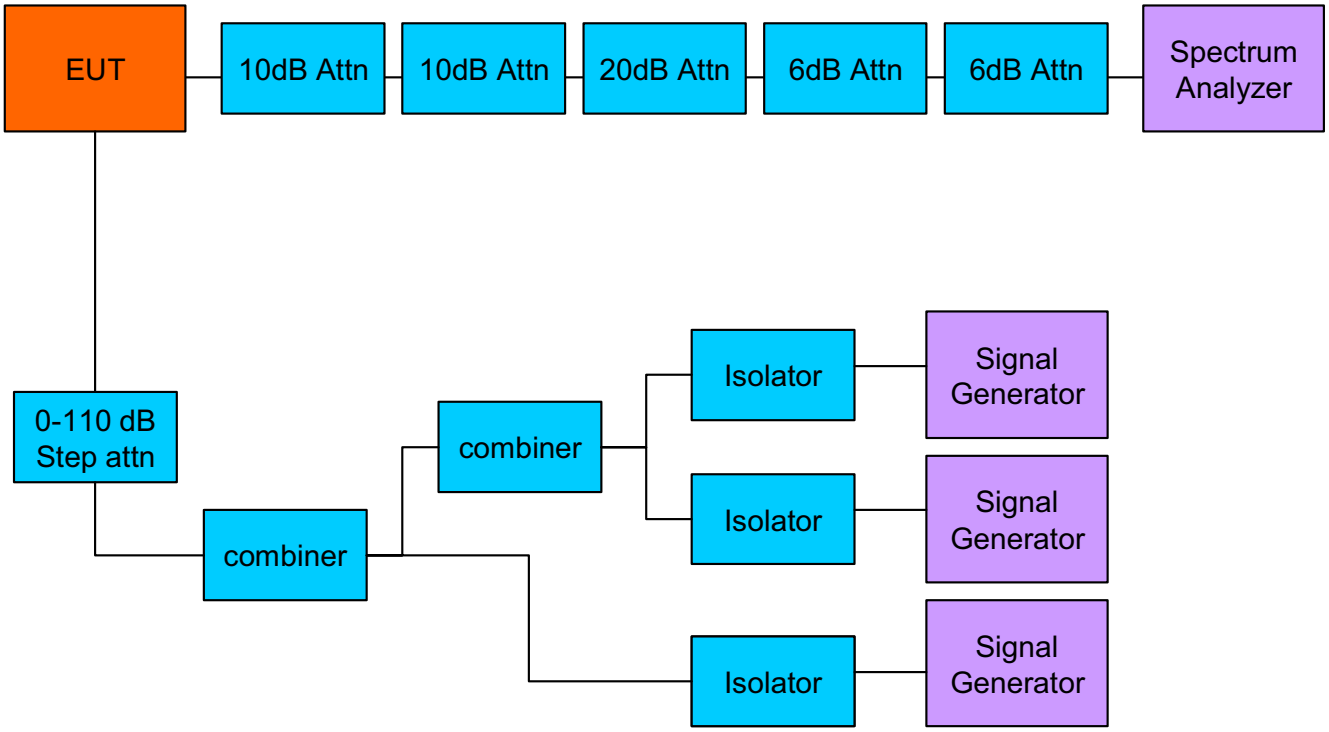
Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Attenuator, 06 dB	Weinschel Corp	2	200002	07/06/2005	07/06/2006
Attenuator, 06 dB	Weinschel Corp	2	200006	08/08/2005	08/08/2006
Attenuator, 10 dB, 150 Watt, <18GHz	Weinschel Corp	66-10-33	211683	03/06/2006	03/06/2007
Attenuator, 10 dB, 50 Watt, DC-18GHz	Weinschel	47-10-34	200061	05/12/2005	05/12/2006
Attenuator, 20 dB	Weinschel Corp	2	200001	08/08/2005	08/08/2006
Cable, 40 GHz, 2.9, 80 inches	Megaphase	TM40 K1K1 80	E405	05/13/2005	05/13/2006
Cable, 40 GHz, 2.9, 80 inches	Megaphase	TM40 K1K1 80	E404	05/13/2005	05/13/2006
Filter, Band Reject, Cavity Design, 80 dB	Wainwright Inst.	WRCG 869/894	200078	12/08/2005	12/08/2006
High Pass Filter, 2 GHz	Filtek	HP12/2000-5AB	213155a	03/06/2006	03/06/2007
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

Results: The sample tested was found to Comply.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Photo:

Test Setup for Inter-modulation measurement

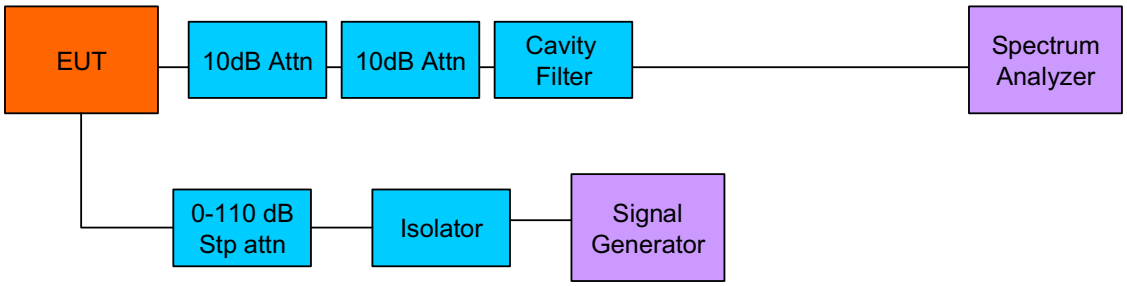


Test configuration diagram (Intermod)

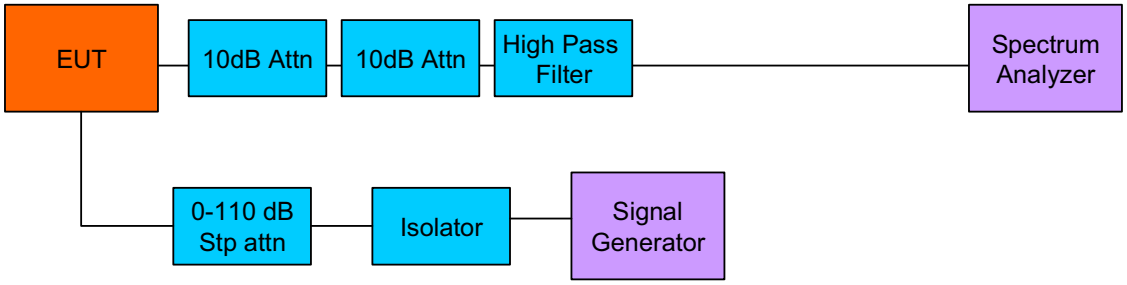
8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Photo:

Test Setup for Spurious Emissions, 30-2500 MHz



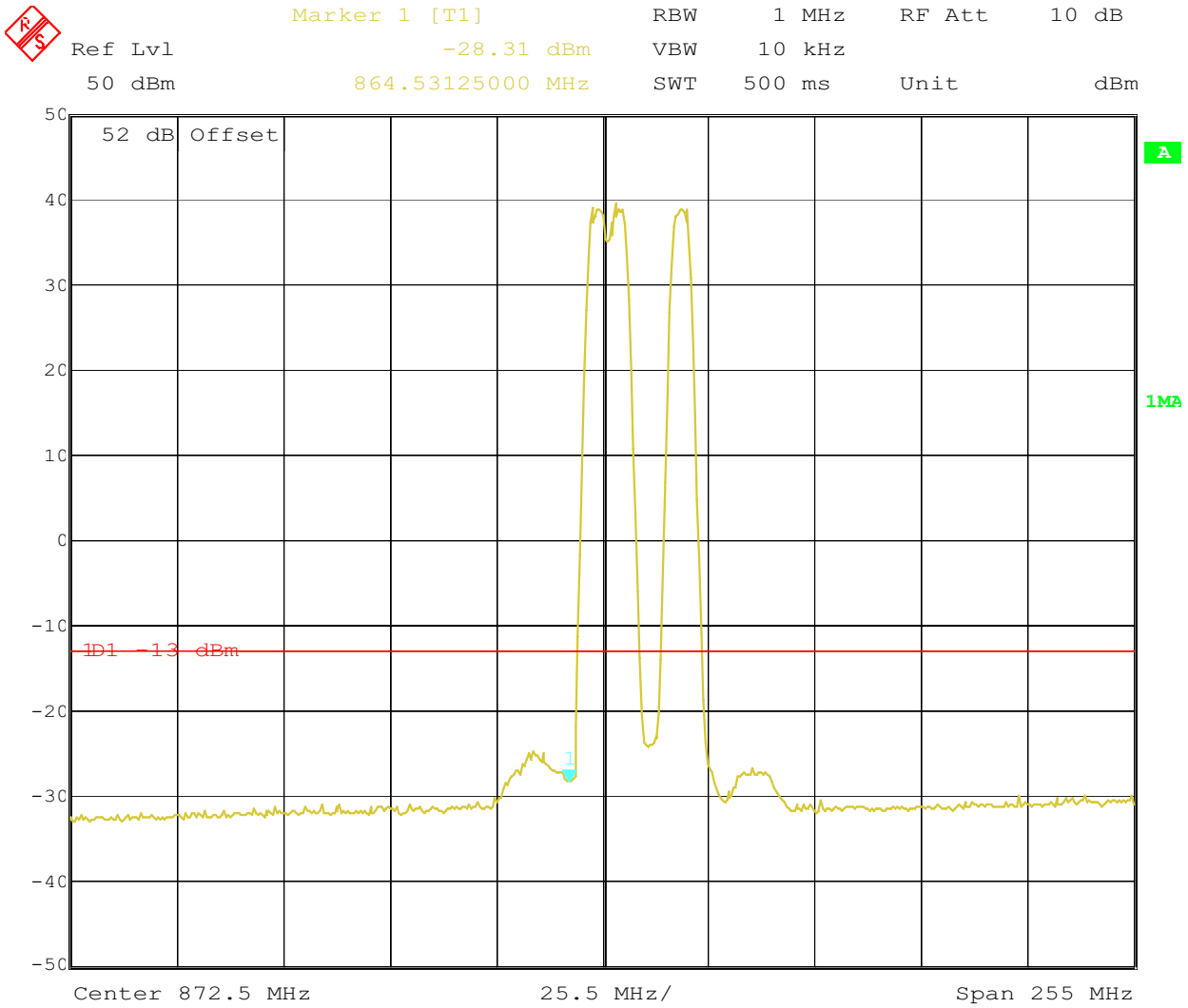
Test Setup for Spurious Emissions, 2500-20000 MHz



Test configuration diagram

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Photo:

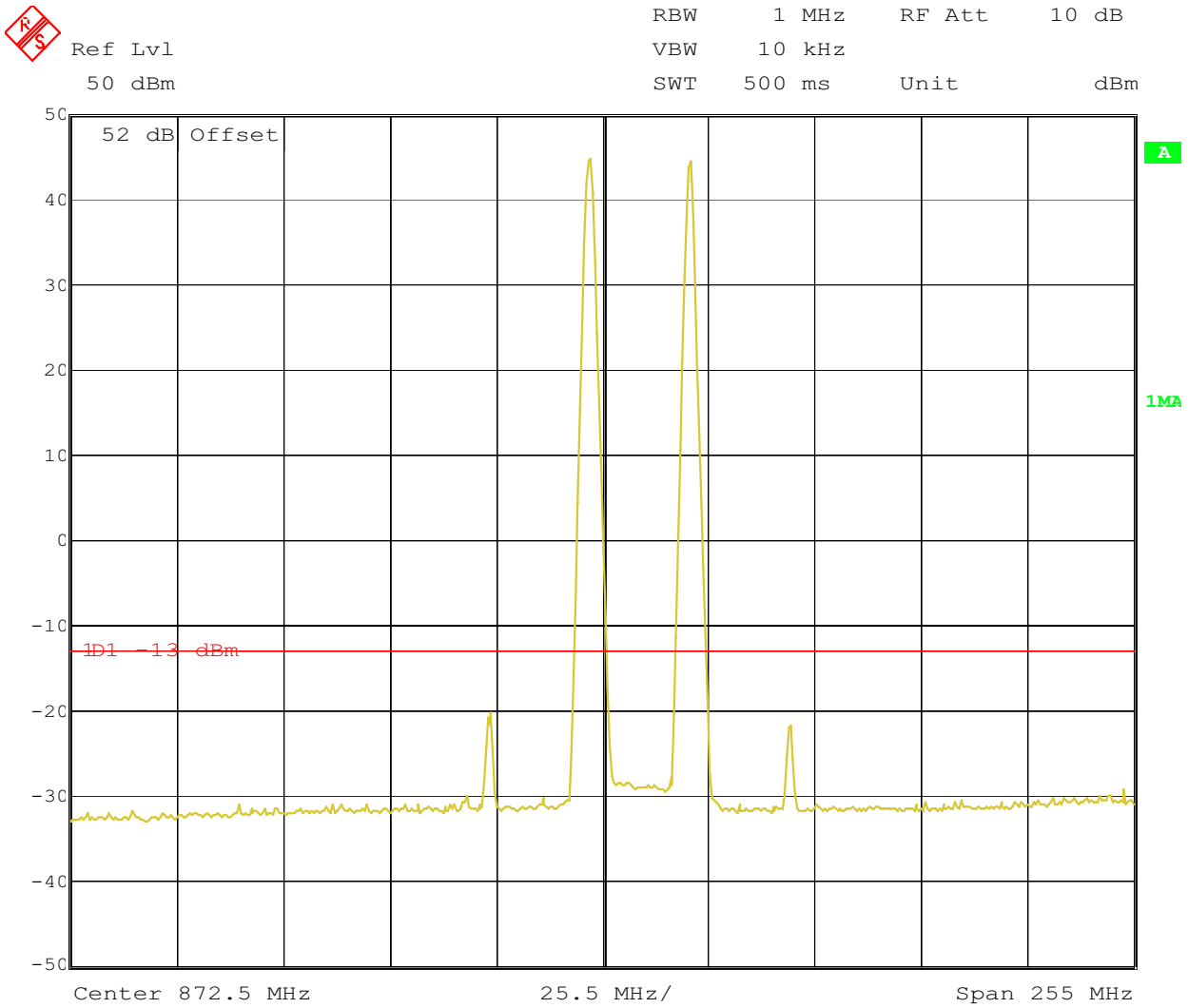


Date: 15.MAR.2006 09:14:14

Three Carrier Inter-Mod WCDMA (3 shown)

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Photo:

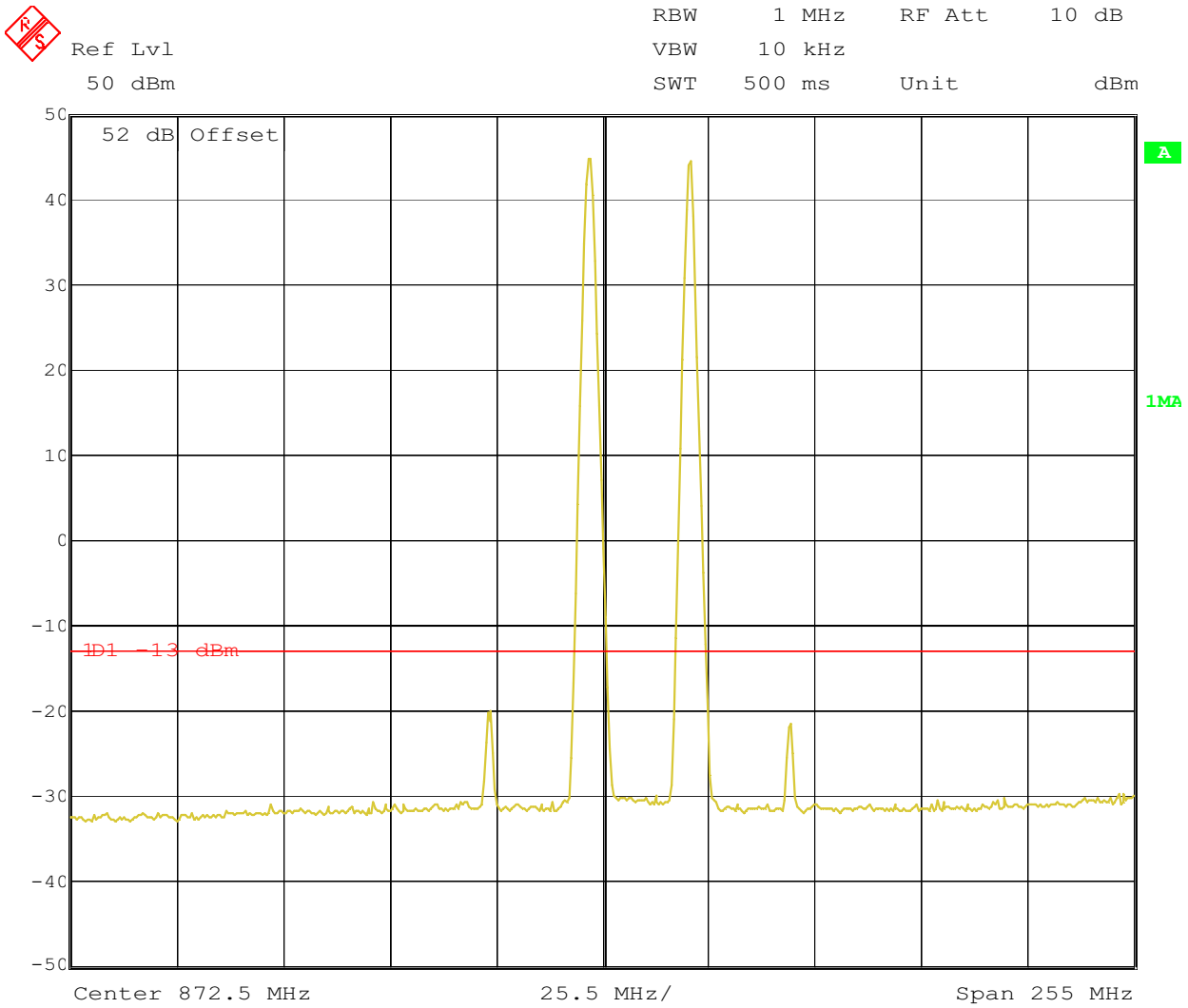


Date: 15.MAR.2006 08:58:30

Three Carrier Inter-Mod GSM Edge (3 shown)

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Photo:

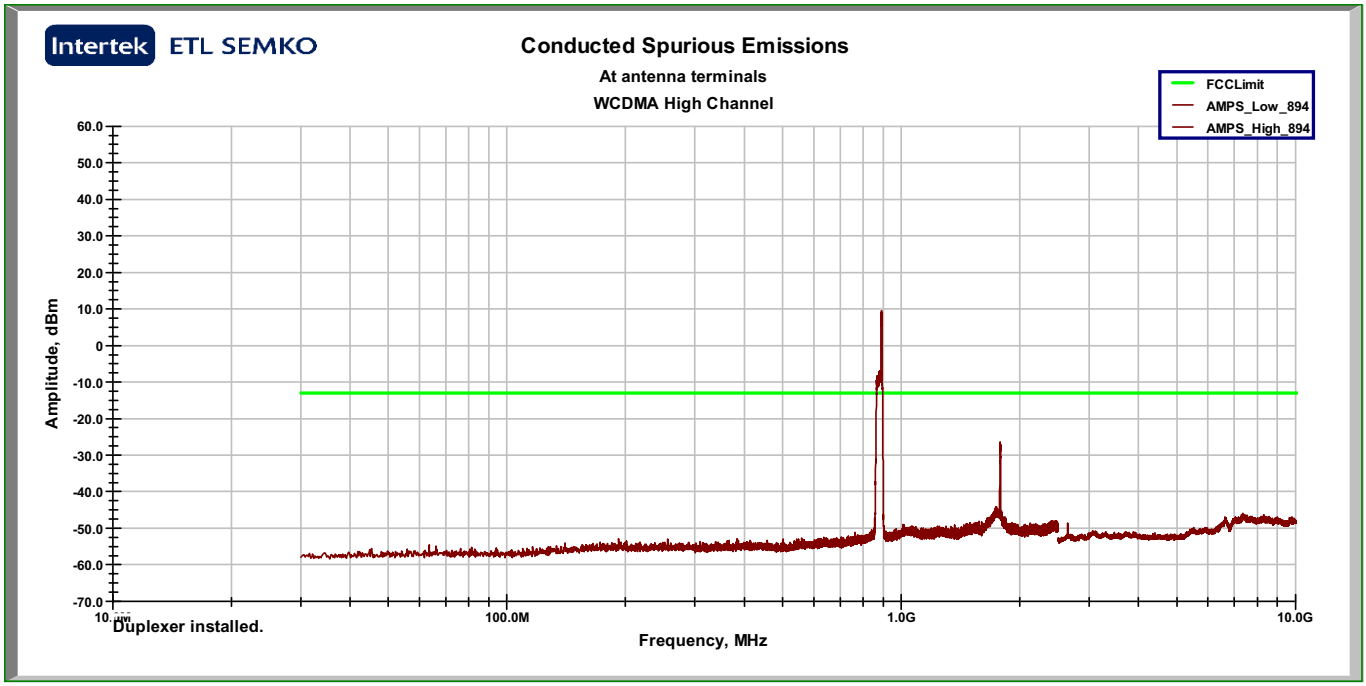


Date: 15.MAR.2006 08:59:35

Three Carrier Inter-Mod CW (3 shown)

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

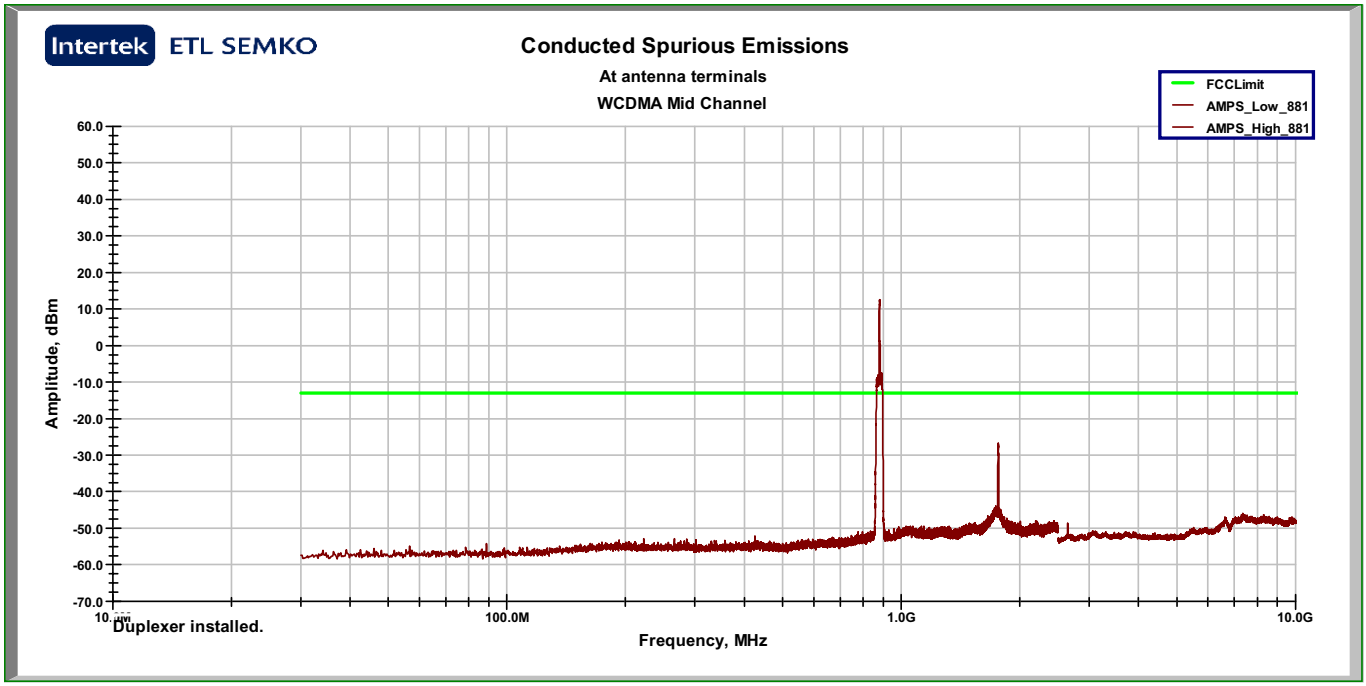
Plot:



WCDMA High channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

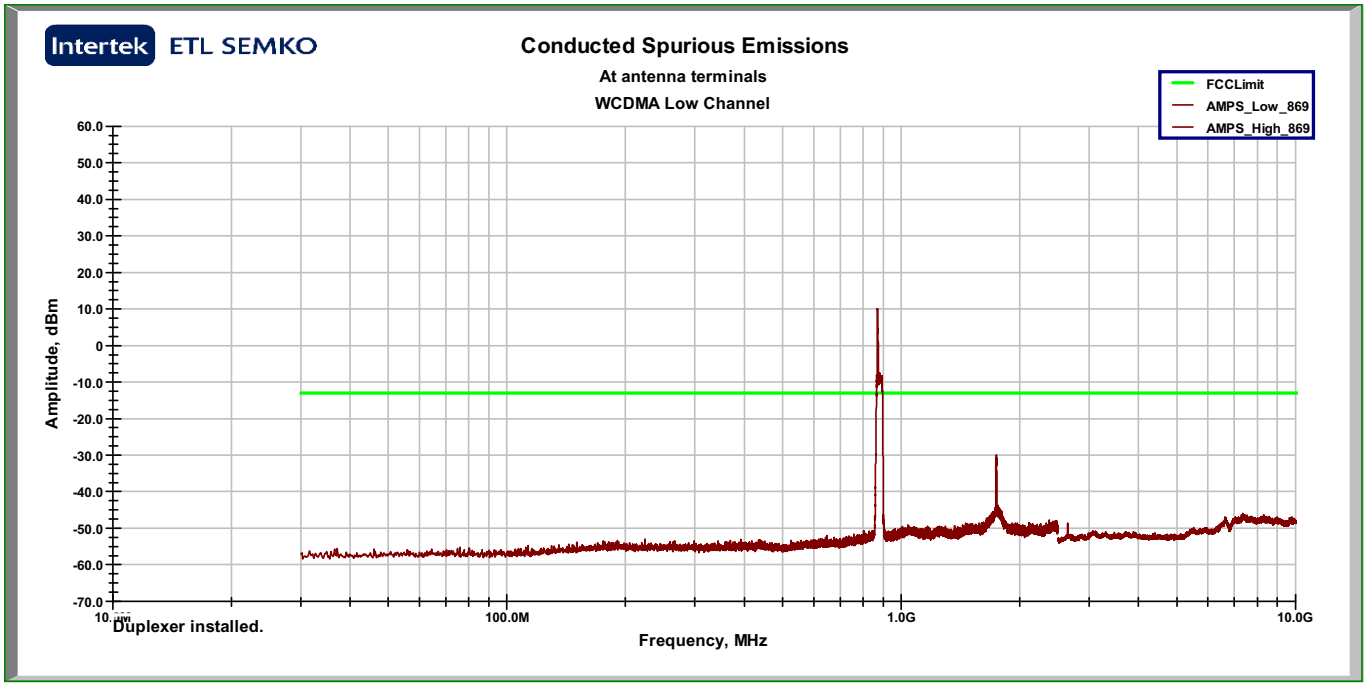
Plot:



WCDMA Mid channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

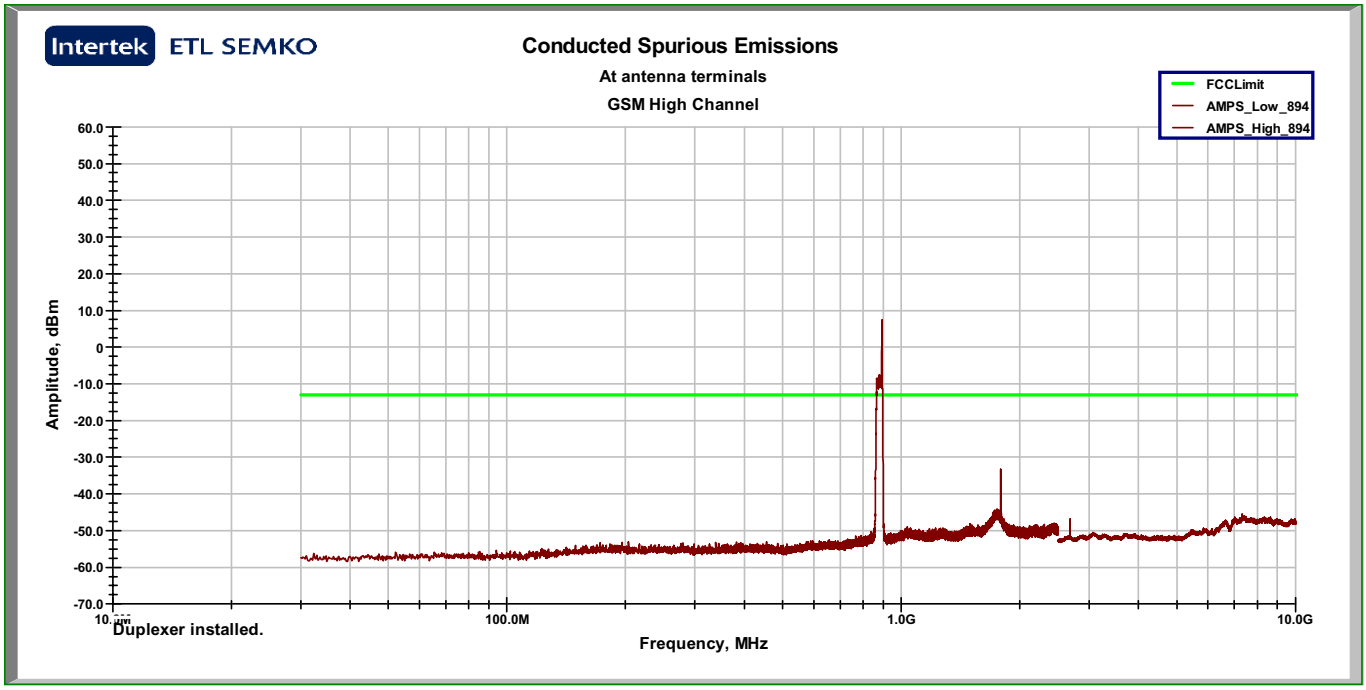
Plot:



WCDMA Low channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

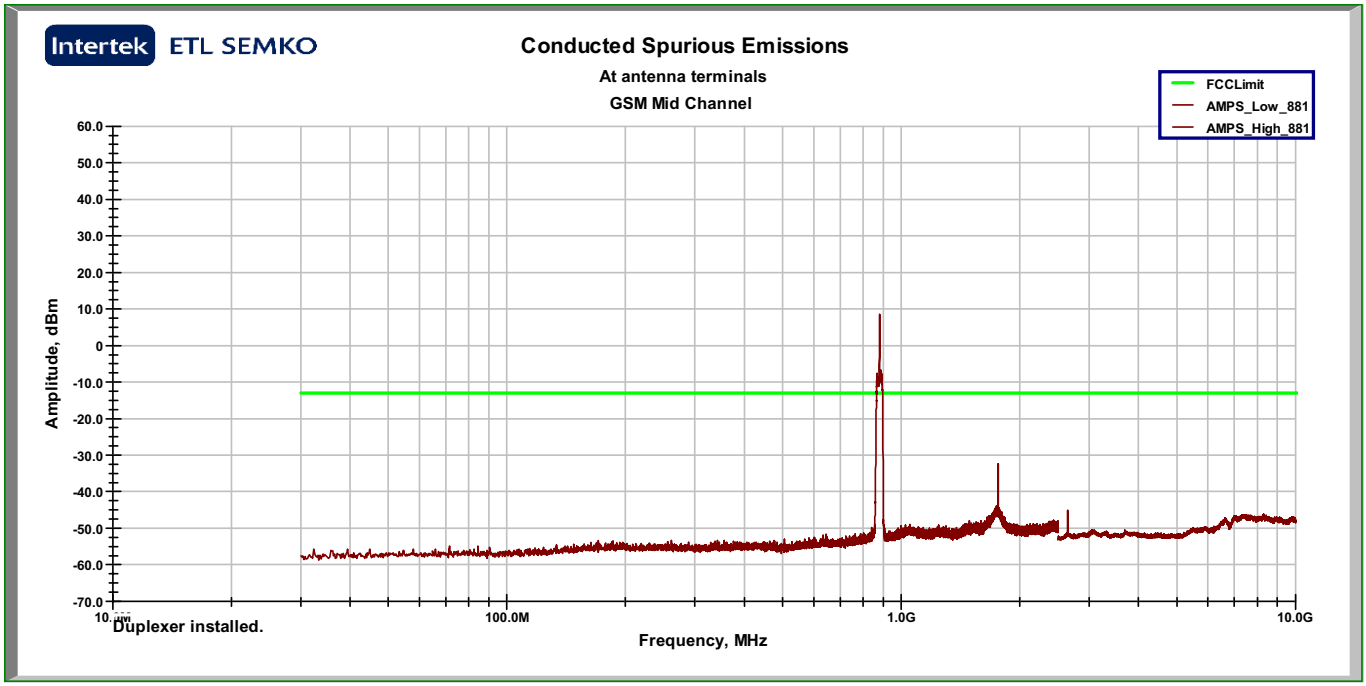
Plot:



GSM High channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

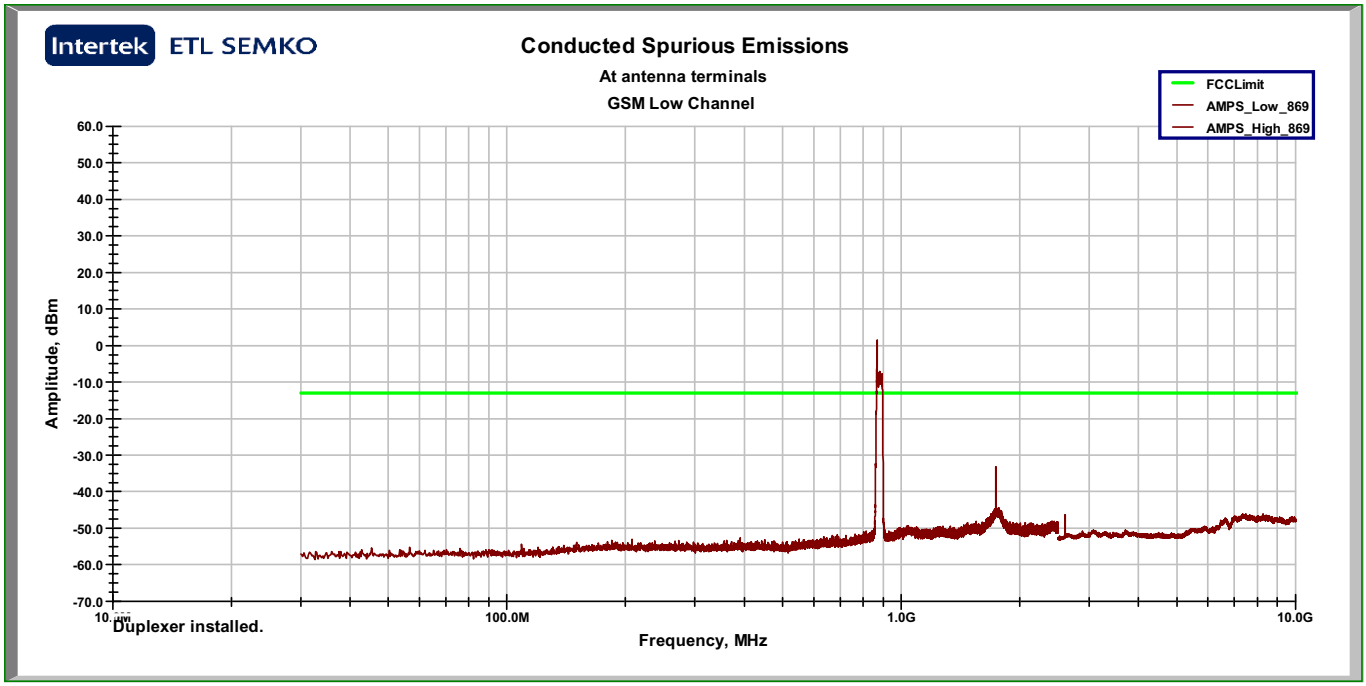
Plot:



GSM Mid channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Plot:



GSM Low channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Data:

Mode	Frequency MHz	RBW/VBW	Peak EUT Emission dBm	Limit dBm	Margin dB
GSM 868	1738	100 kHz / 1 MHz	-33.1	-13.0	-20.1
GSM 881.5	1763	100 kHz / 1 MHz	-32.6	-13.0	-19.6
GSM 894	1788	100 kHz / 1 MHz	-33.5	-13.0	-20.5
WCDMA 871.5	1745	100 kHz / 1 MHz	-30.1	-13.0	-17.1
WCDMA 881.5	1762	100 kHz / 1 MHz	-26.8	-13.0	-13.8
WCDMA 891.5	1783	100 kHz / 1 MHz	-26.7	-13.0	-13.7
3 Channel Intermod CW	--	1 MHz / 10 kHz	-20.0	-13.0	-7.0
3 Channel Intermod GSM	--	1 MHz / 10 kHz	-20.0	-13.0	-7.0
3 Channel Intermod WCDMA	--	1 MHz / 10 kHz	-24.0	-13.0	-11.0

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

Method:

FCC §2.1049, FCC §2.1051, §22.917(a), FCC §24.238(a)
Out of Band Emissions: The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for the Cellular band and 1 MHz or greater in the PCS band. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

Connect the RF output of the EUT to a spectrum analyzer through appropriate attenuation. Set the EUT to transmit at its maximum power level. Sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For Amplifiers, an intermodulation test is also performed. Test all modulations types [TDMA, CDMA, and FM (covers GSM and F1D)].
· CW signal rather than typical signal is acceptable (for FM).
· At maximum drive level, for each modulation: one test with three tones, or two tests (high-, low-band edge) with two tones
· Limit usually is -13dBm conducted.
· Not needed for Single Channel systems.
· Combination of modulation types not needed.

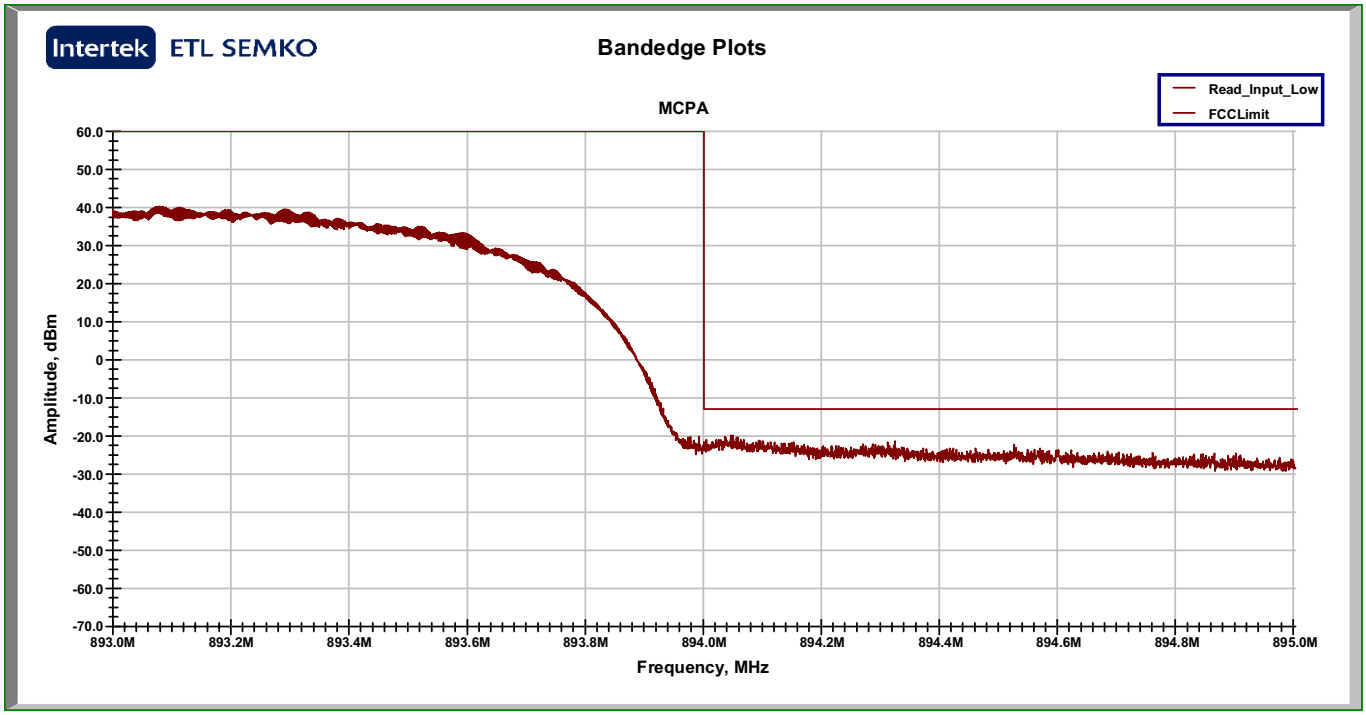
Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Attenuator, 10 dB	Weinschel Corp	2	200007	07/27/2006	07/27/2007
Attenuator, 10 dB, 1000 Watt	JFW Industries, Inc	40FHAM-010-1000	200073	VBU	VBU
Attenuator, 10 dB, 50 Watt, DC-18GHz	Weinschel	47-10-34	200061	07/18/2006	07/18/2007
Cable E05 (Formerly HS 1500 N-N)	Huber-Suhner	Sucoflex 104PEA	E05	05/11/2006	05/11/2007
Cable E06 (Formerly HS 1500 N-SMA)	Huber-Suhner	Sucoflex 104PEA	E06 211268	05/11/2006	05/11/2007
EMI Receiver	Hewlett Packard	8546A	211505	10/26/2006	10/26/2007

Results: The sample tested was found to Comply.

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

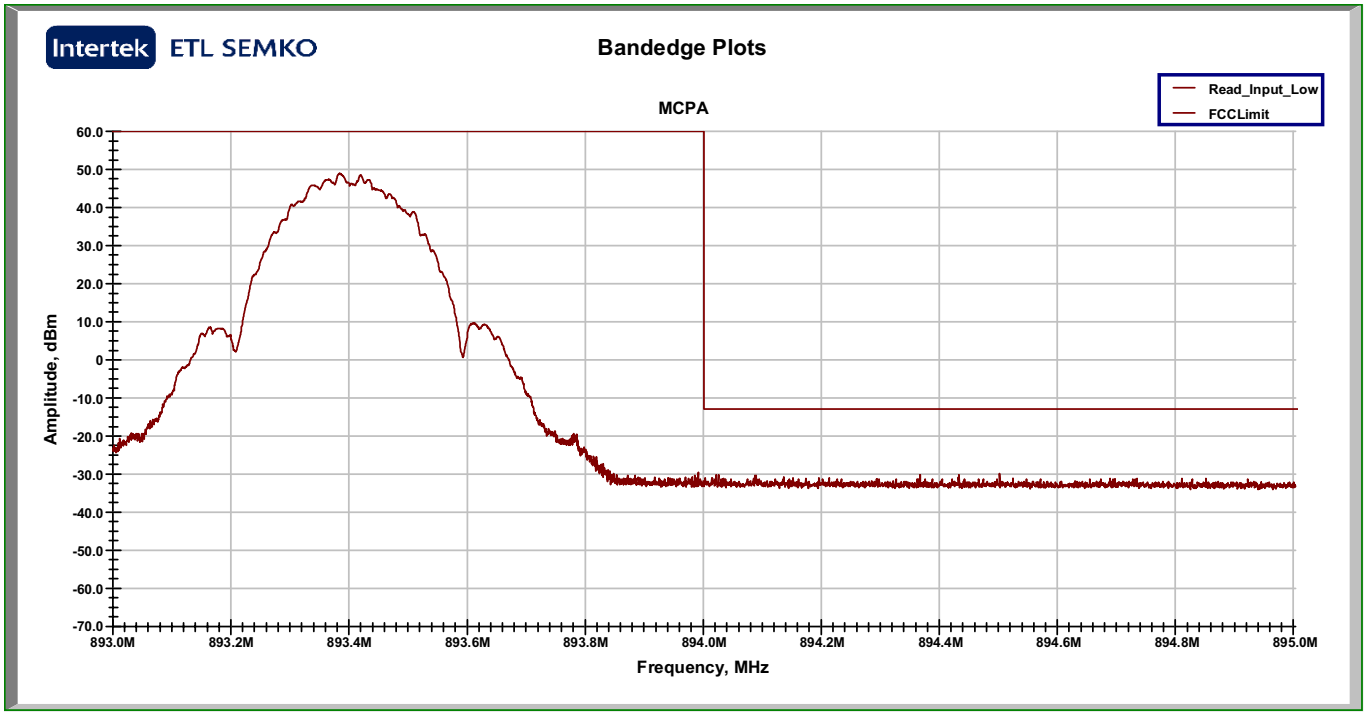
Plot:



WCDMA High channel

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

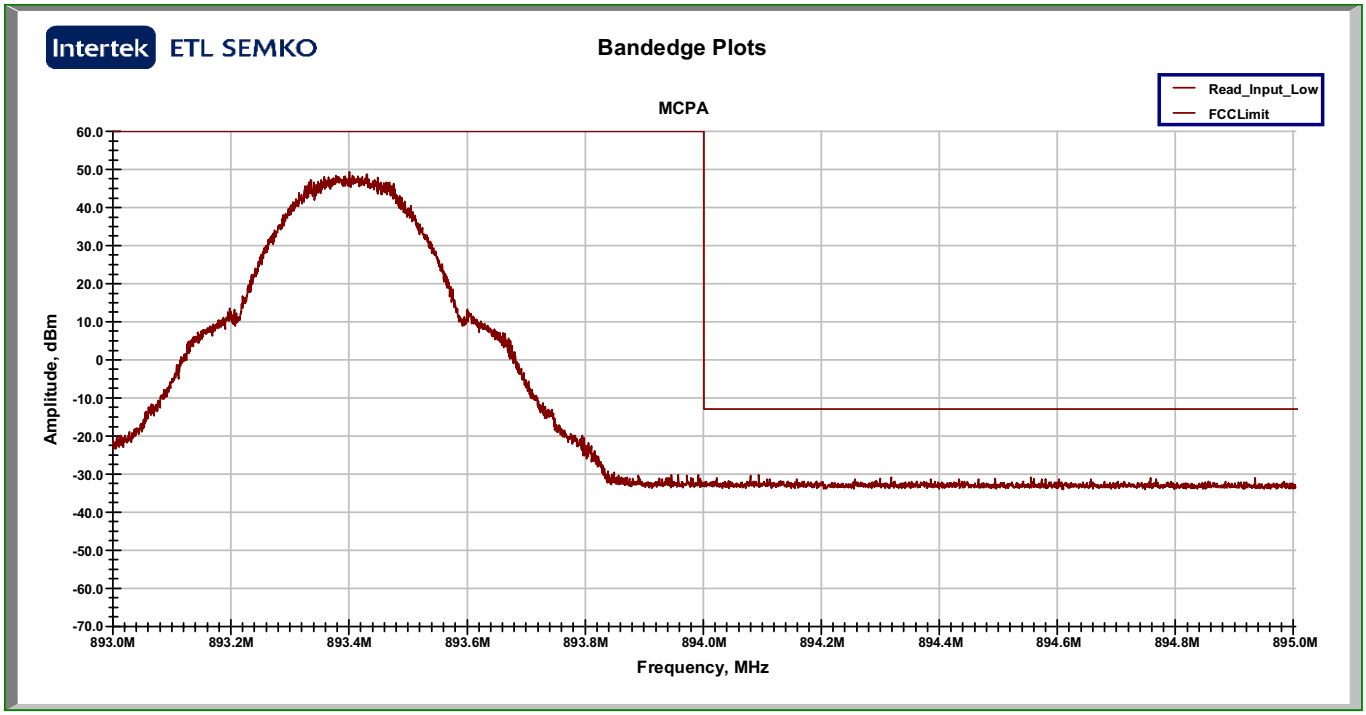
Plot:



GSM-Edge High channel

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

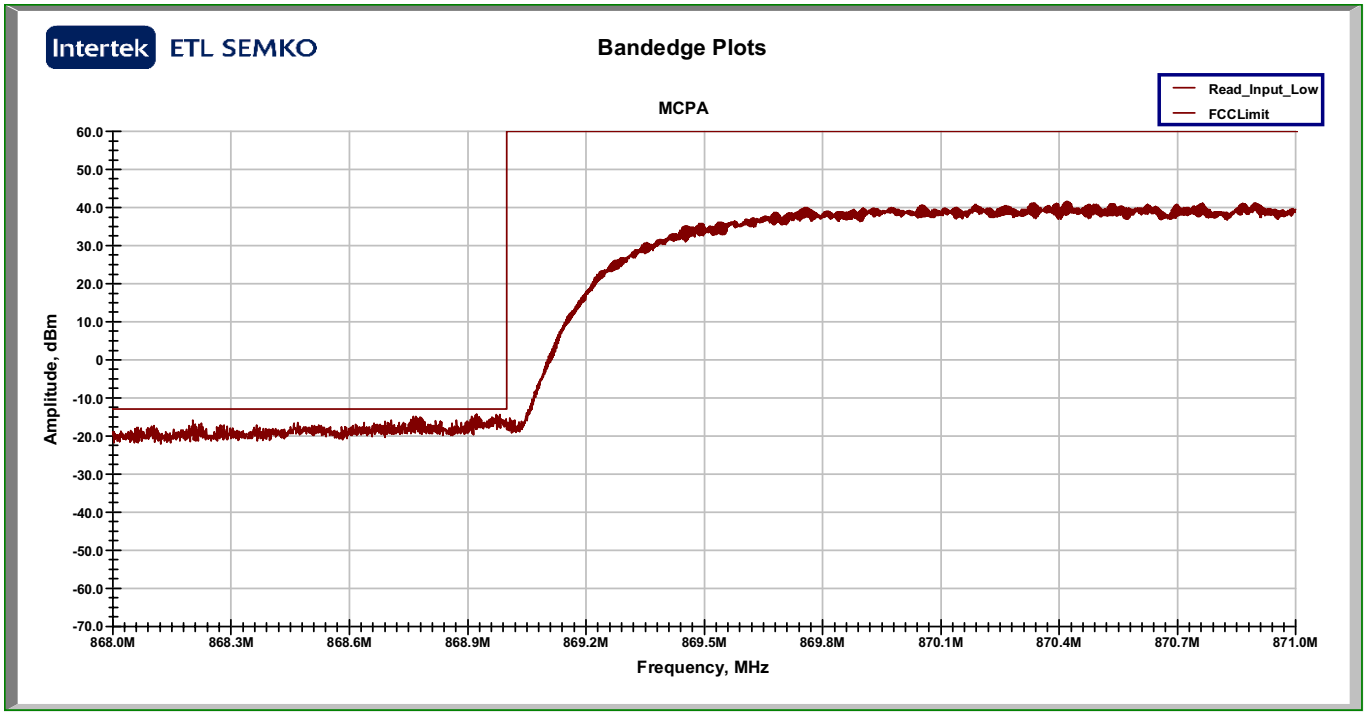
Plot:



GSM High channel

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

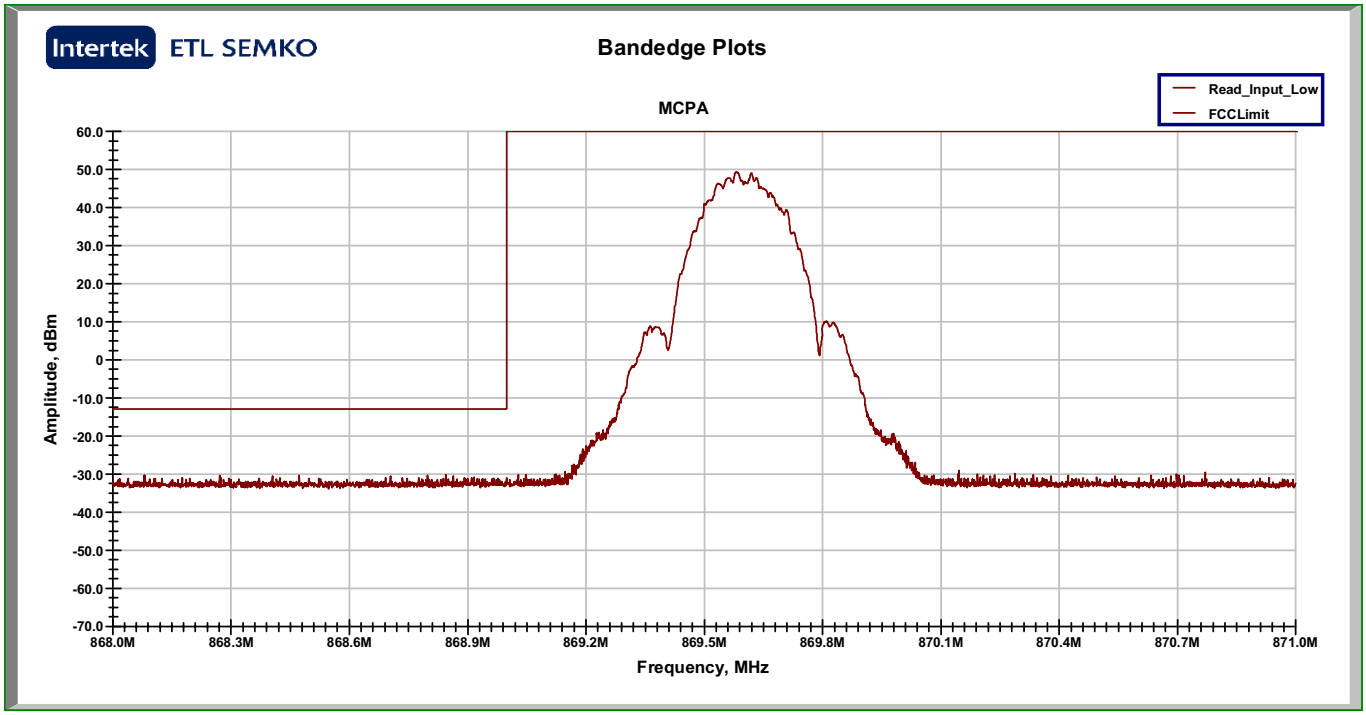
Plot:



WCDMA Low channel

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

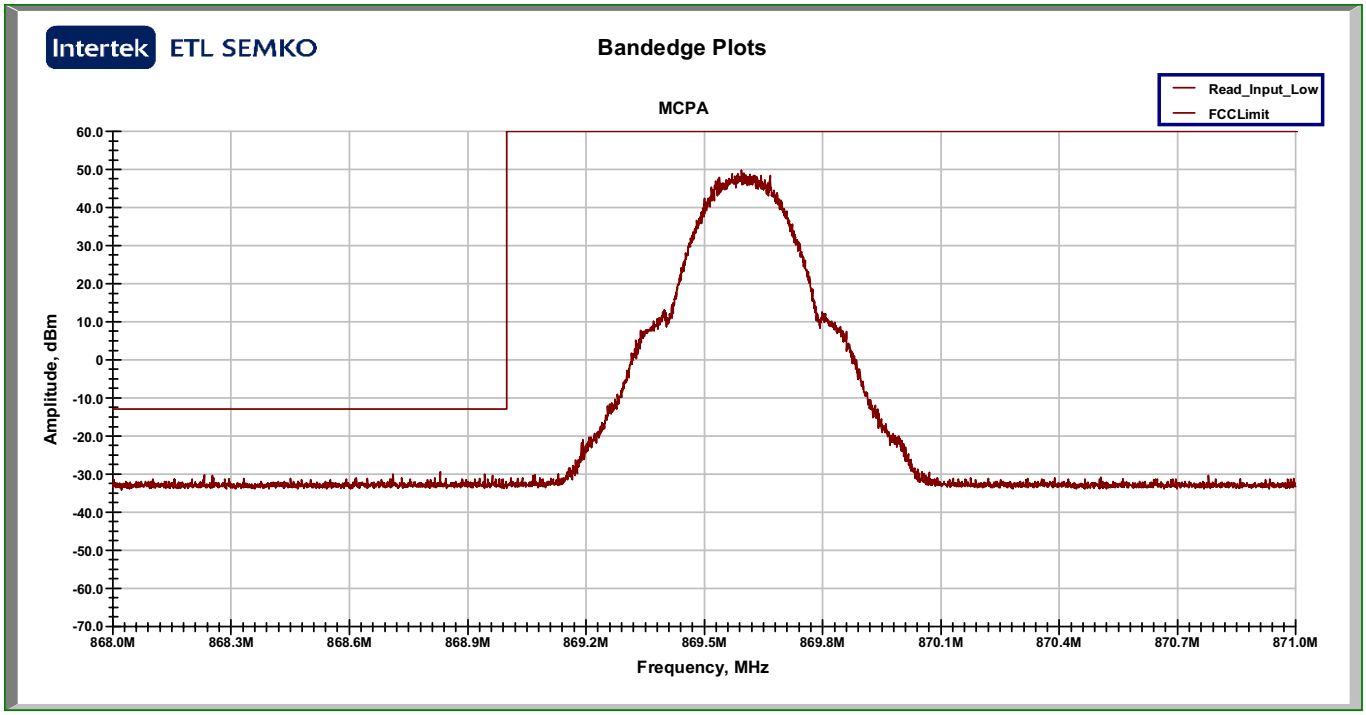
Plot:



GSM-Edge Low channel

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

Plot:



GSM Low channel

9.0 Spurious emissions at antenna terminals - Band Edge (FCC Part 2.1051)

Data:

Mode	Frequency MHz	RBW/VBW	Peak EUT Emission at bandedge dBm	Limit dBm	Margin dB
GSM	869.6	10 kHz / 30 kHz	-30	-13	-17
GSM	893.6	10 kHz / 30 kHz	-30	-13	-17
GSM-Edge	869.6	10 kHz / 30 kHz	-30	-13	-17
GSM-Edge	893.6	10 kHz / 30 kHz	-30	-13	-17
WCDMA	871.5	100 kHz / 300 kHz	-15	-13	-2
WCDMA	891.5	100 kHz / 300 kHz	-20	-13	-7

10.0 Field strength of spurious radiation (FCC Part 2.1053)

Method:

Place the EUT on a non-conductive table 0.8 meters above a ground plane. Place the measurement antenna a distance of 3 meters from the EUT in the horizontal polarization. During the tests, vary the antenna height and EUT azimuth in order to identify the maximum level of emissions from the EUT. If the EUT is a handheld device, this maximization process is to be repeated with the EUT positioned in each of its three orthogonal orientations. If the EUT is not a handheld device, then the maximization process is to be repeated whith the measurement antenna in the vertical polarization.

Investigate the frequency spectrum up to tenth harmonic of the EUT for each of three fundamental frequencies (low, middle, and high channels). Once spurious emissions were identified, the power of the emission was determined using the substitution method. Repeat for each band that the EUT operates.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and at the spurious emissions frequency.

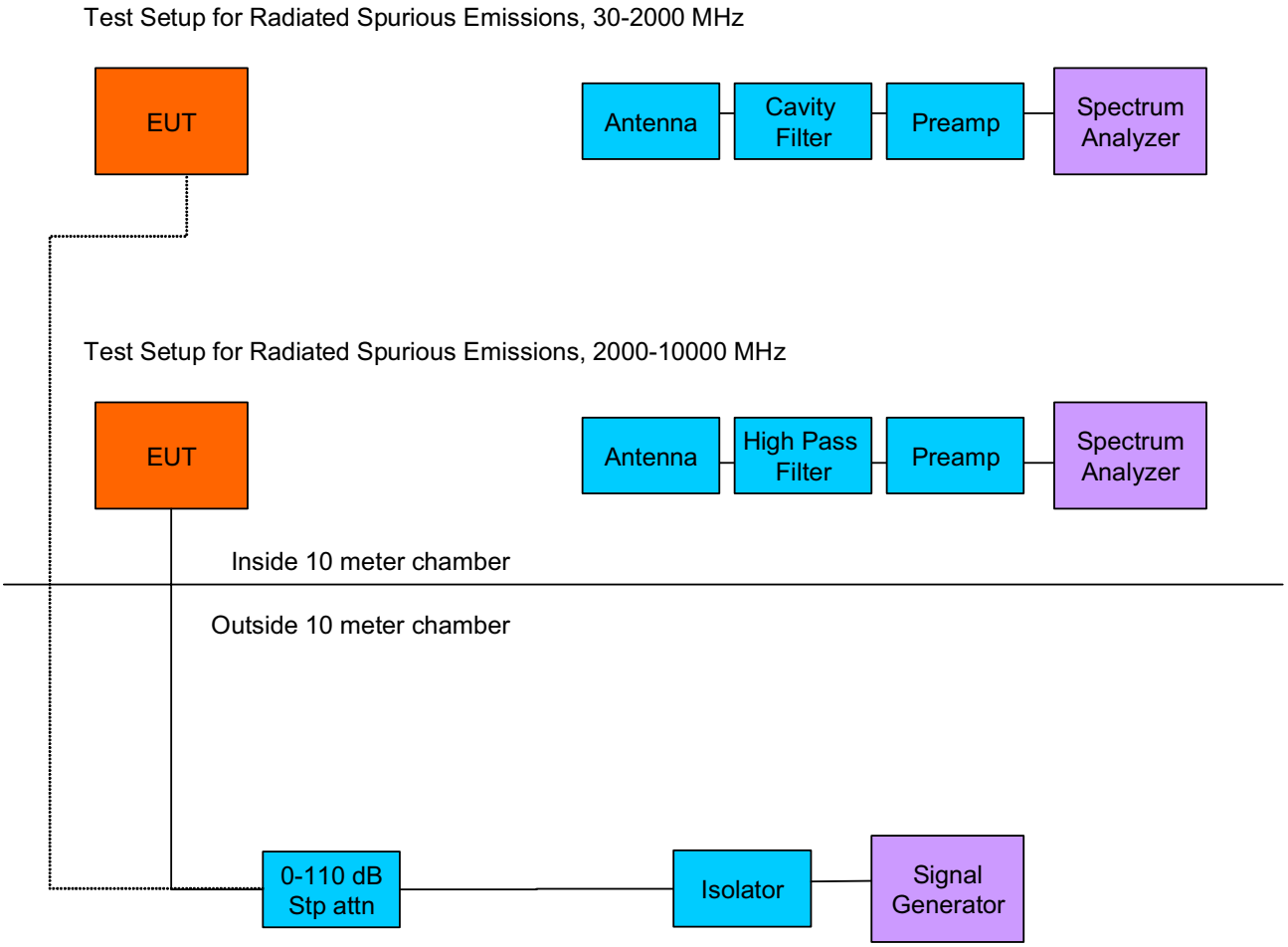
Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
EMI Receiver	Hewlett Packard	8546A	211505	02/13/2006	02/13/2007
EMI Receiver, Preselector section	Hewlett Packard	85460A	211506	02/13/2006	02/13/2007
Filter, Band Reject, Cavity Design, 80 dB	Wainwright Inst.	WRCG 869/894	200078	12/08/2005	12/08/2006
High Pass Filter, 2 GHz	Filtek	HP12/2000-5AB	213155a	03/06/2006	03/06/2007
Preamplifier, 10 MHz to 2000 MHz, 30 dB gain	Mini-Circuits	ZKL-2	200069	10/25/2005	10/25/2006
Preamplifier, 32 dB gain, 30MHz to 26GHz Preamplifier	Miteq	JS4-00102600-29-	015533	01/09/2006	01/09/2007
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

Results: The sample tested was found to Comply.

10.0 Field strength of spurious radiation (FCC Part 2.1053)

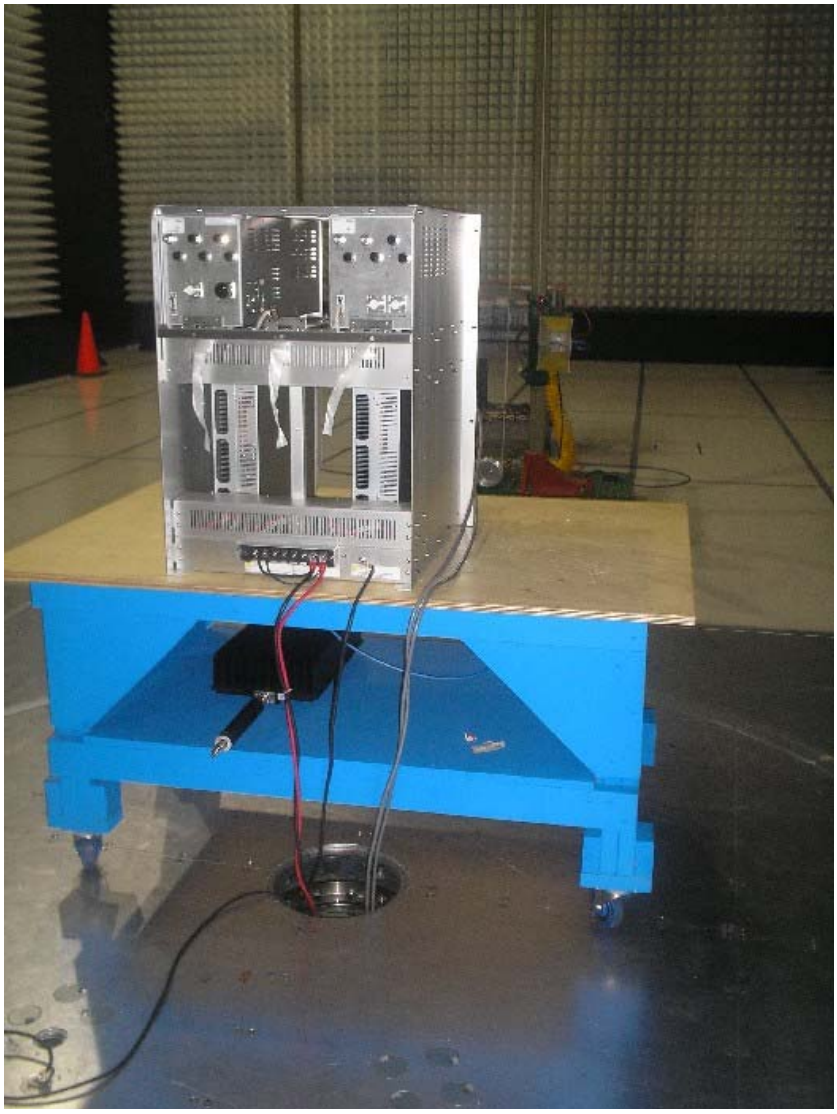
Photo:



Test configuration diagram

10.0 Field strength of spurious radiation (FCC Part 2.1053)

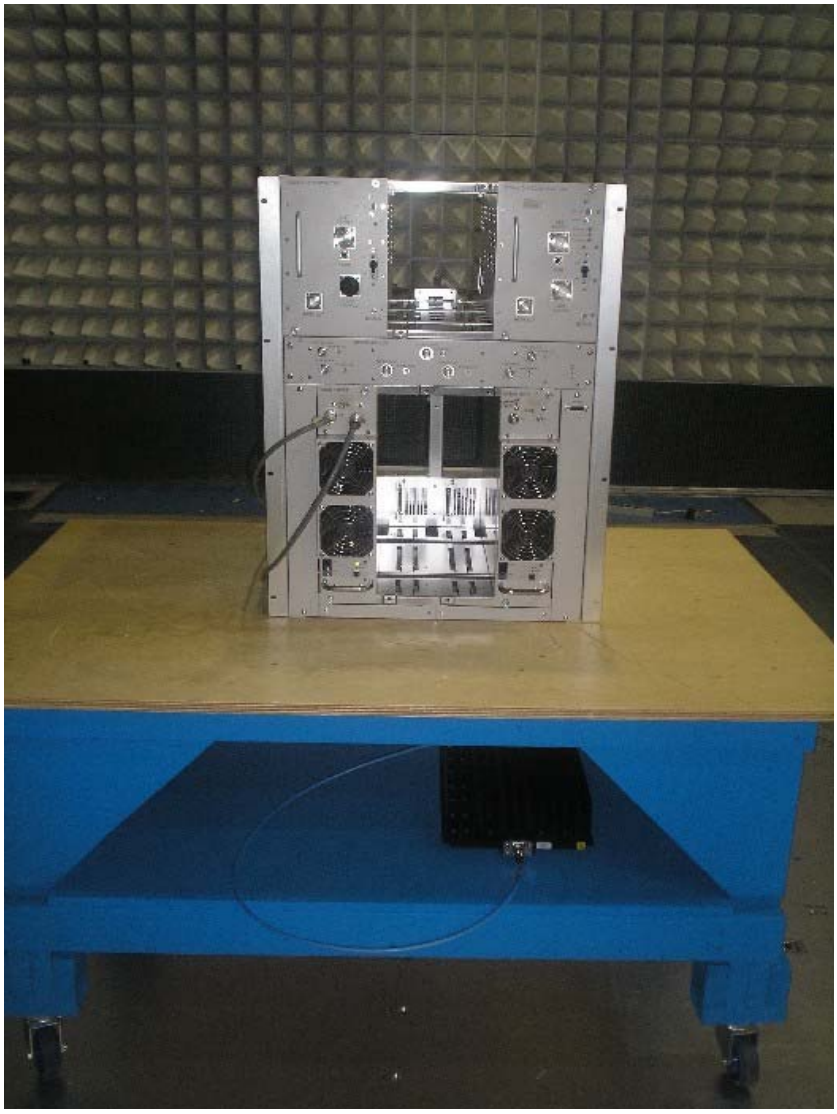
Photo:



Test set up rear

10.0 Field strength of spurious radiation (FCC Part 2.1053)

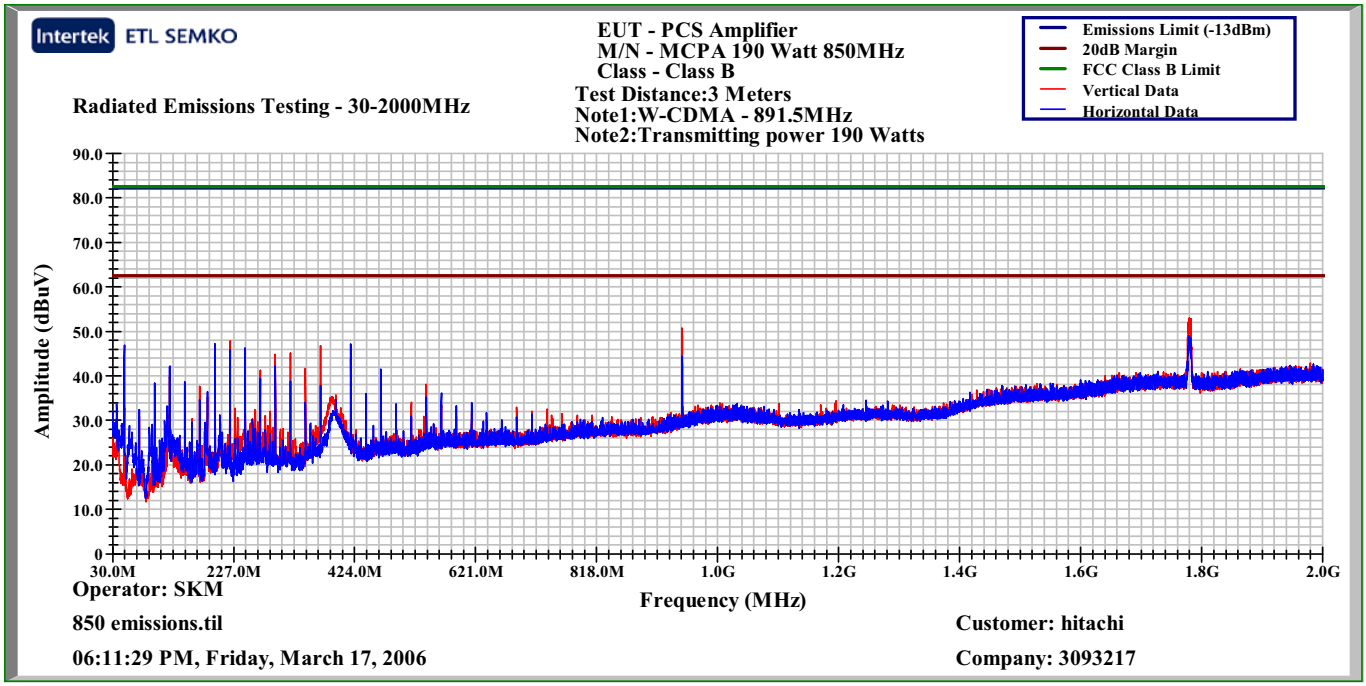
Photo:



Test set up front

10.0 Field strength of spurious radiation (FCC Part 2.1053)

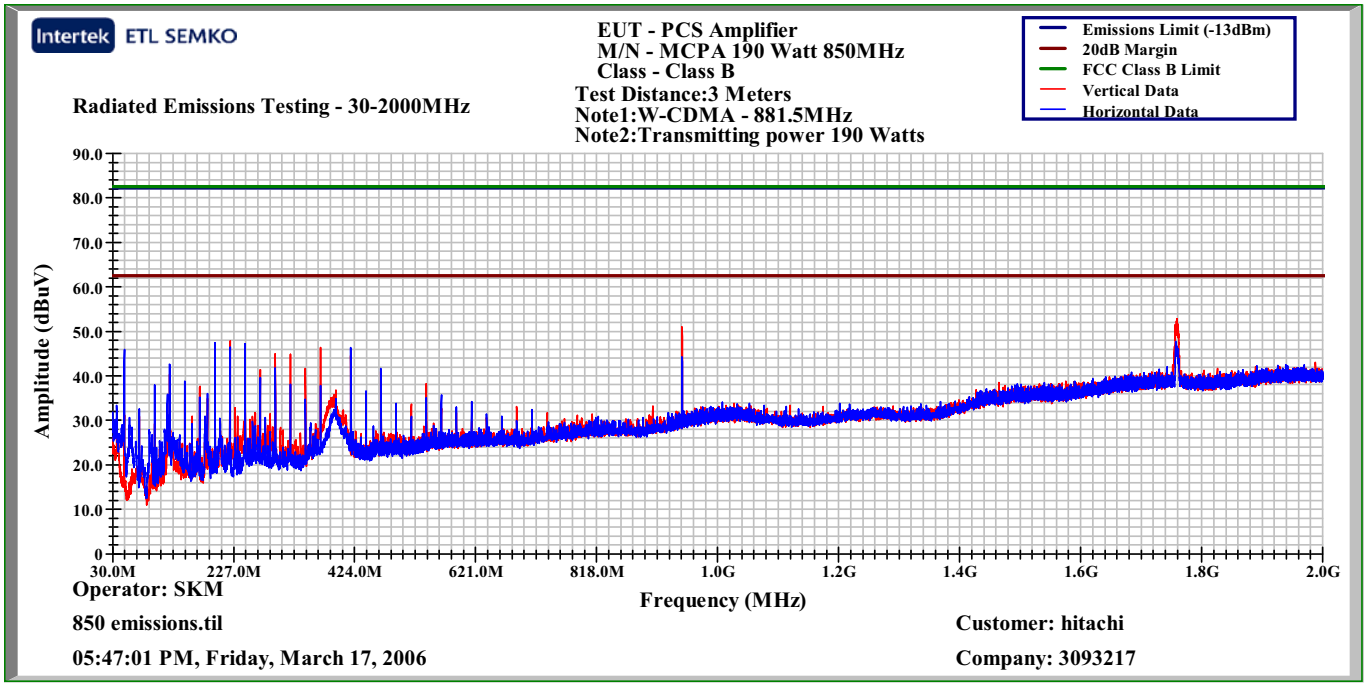
Plot:



WCDMA 891.5MHz 30-2000MHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

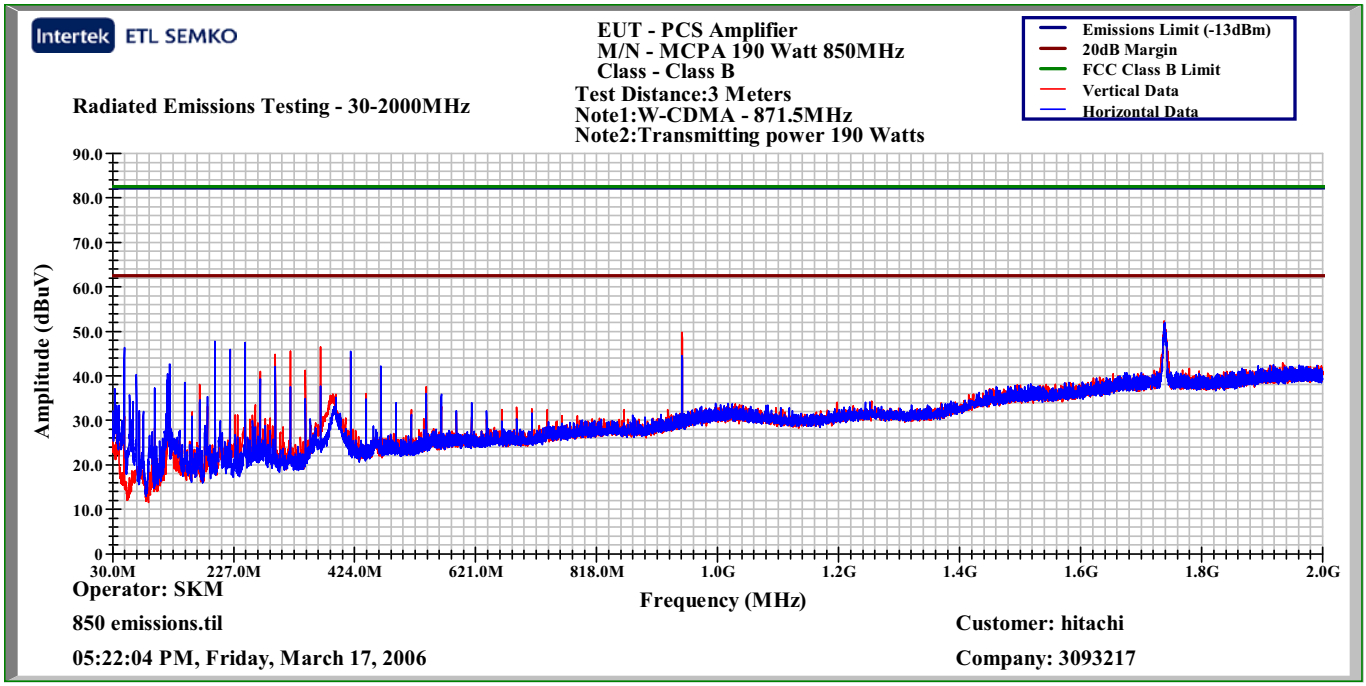
Plot:



WCDMA 881.5MHz 30-2000MHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

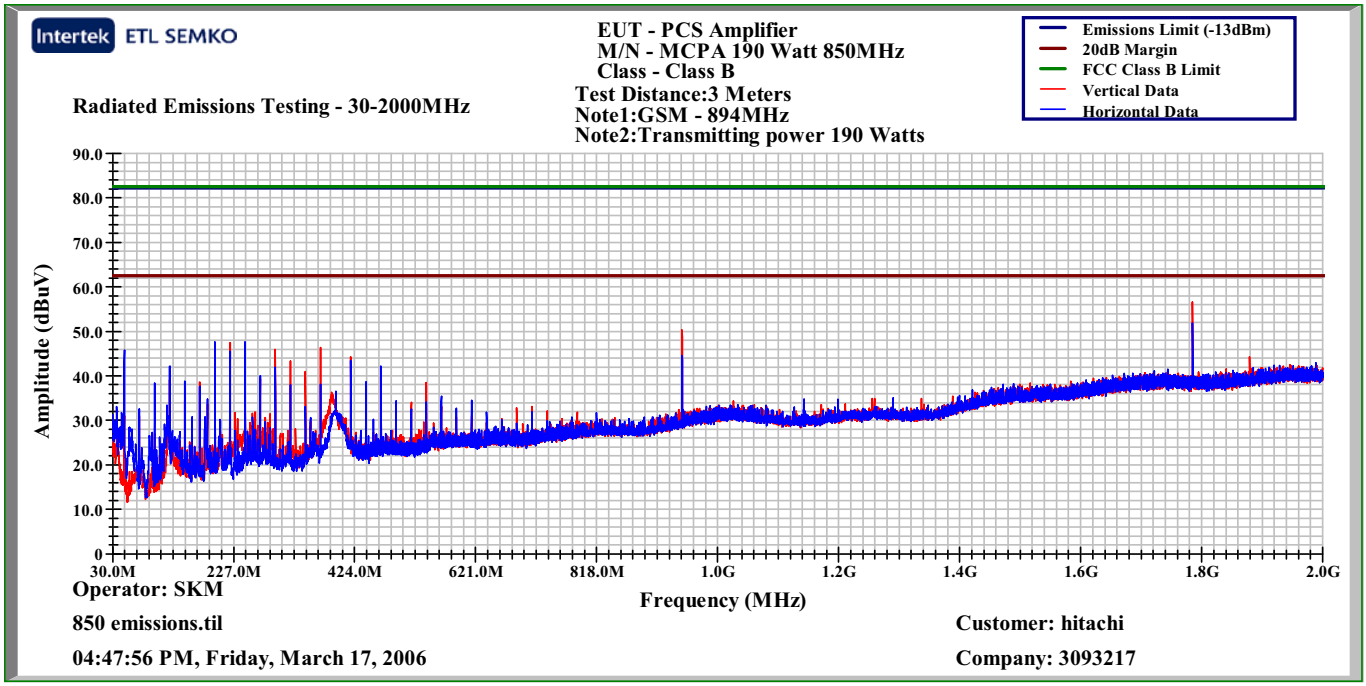
Plot:



WCDMA 871.5MHz 30-2000MHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

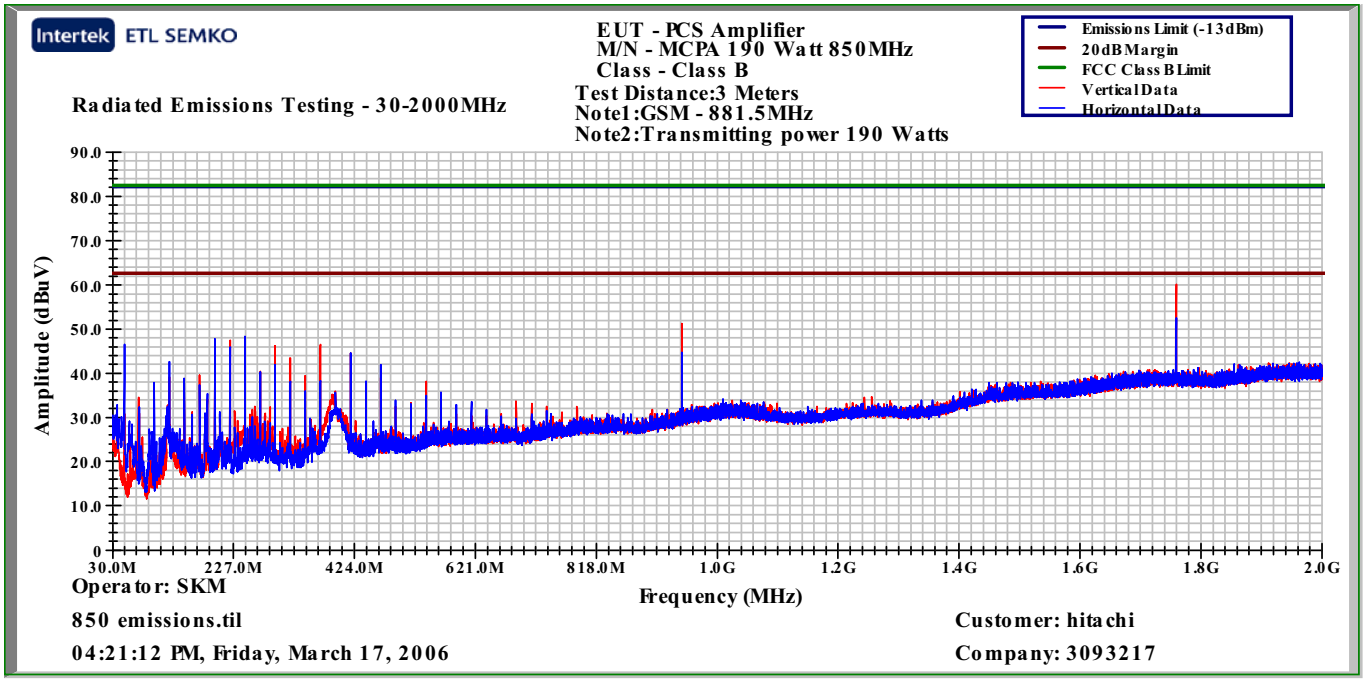
Plot:



GSM 894MHz 30-2000MHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

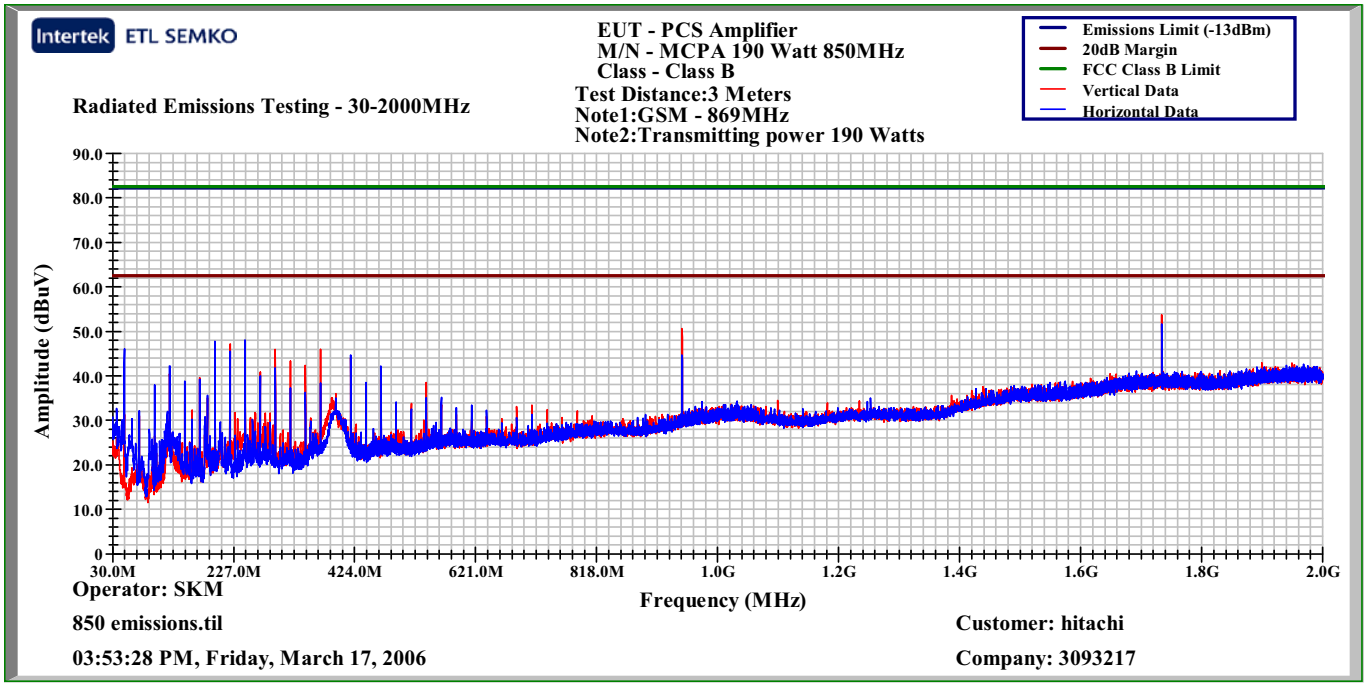
Plot:



GSM 881.5MHz 30-2000MHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

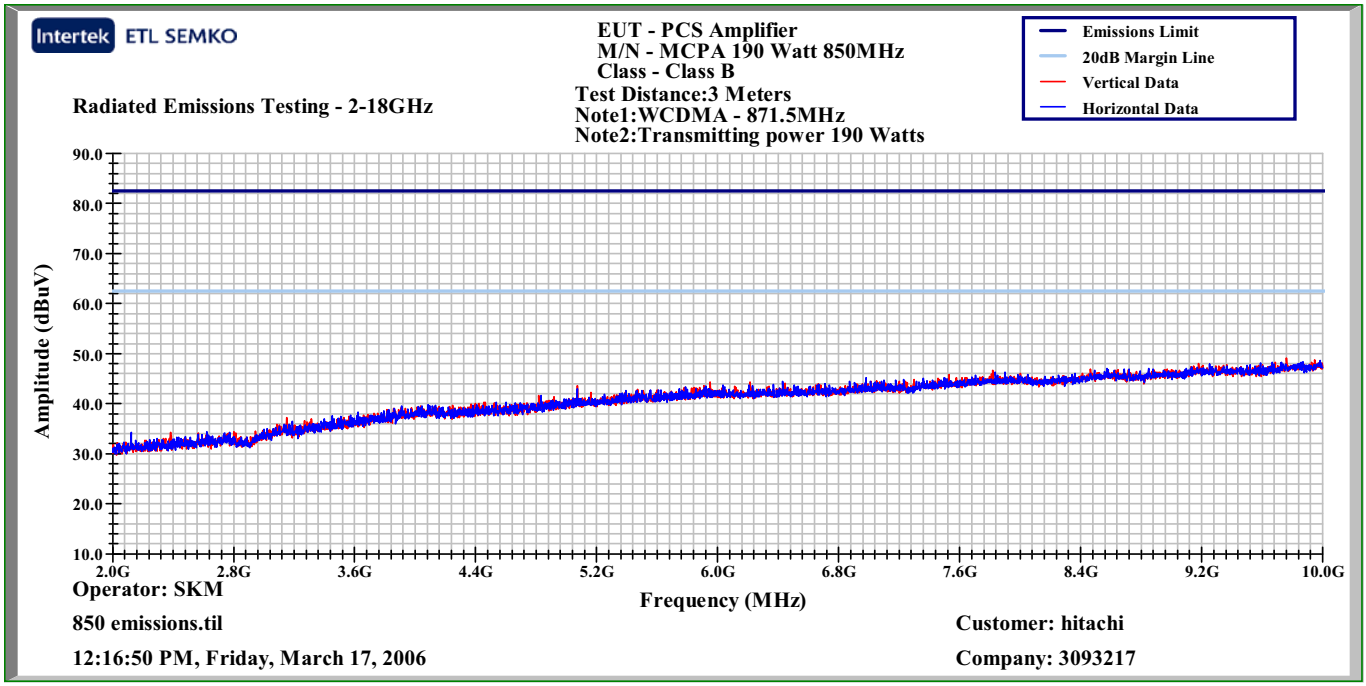
Plot:



GSM 869MHz 30-2000MHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

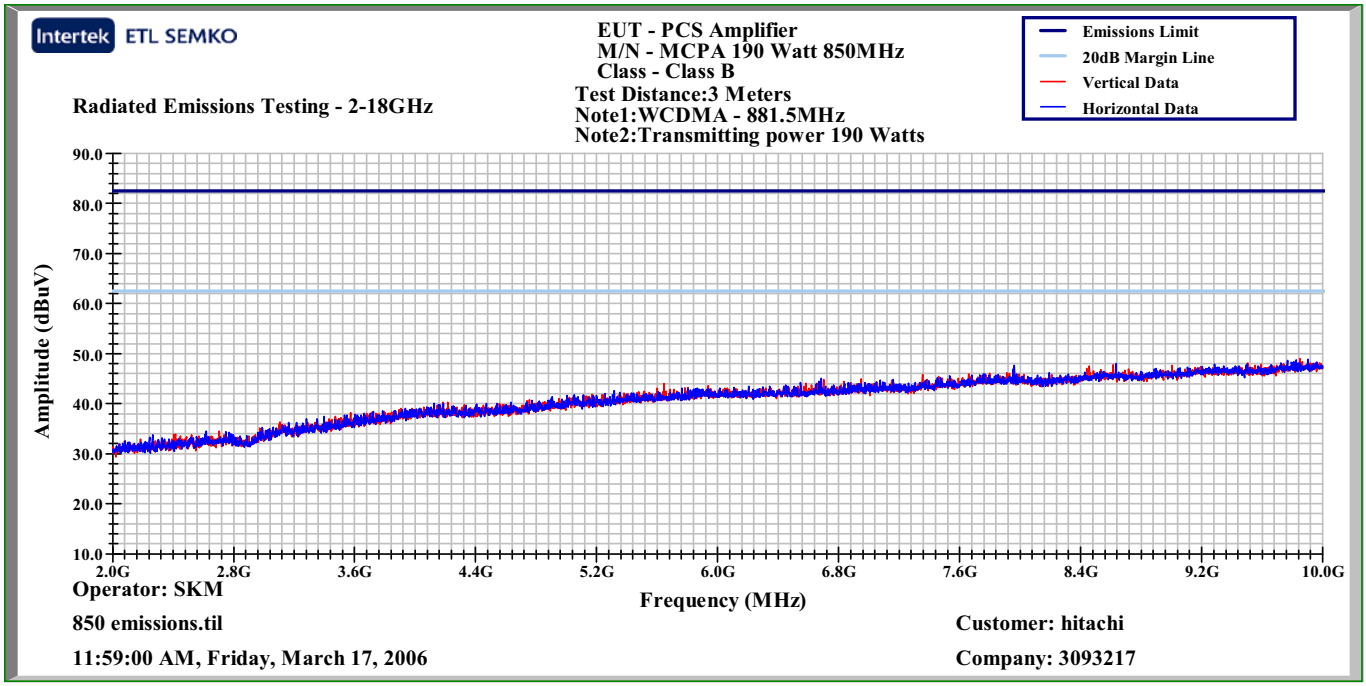
Plot:



WCDMA 871.5MHz 2-10GHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

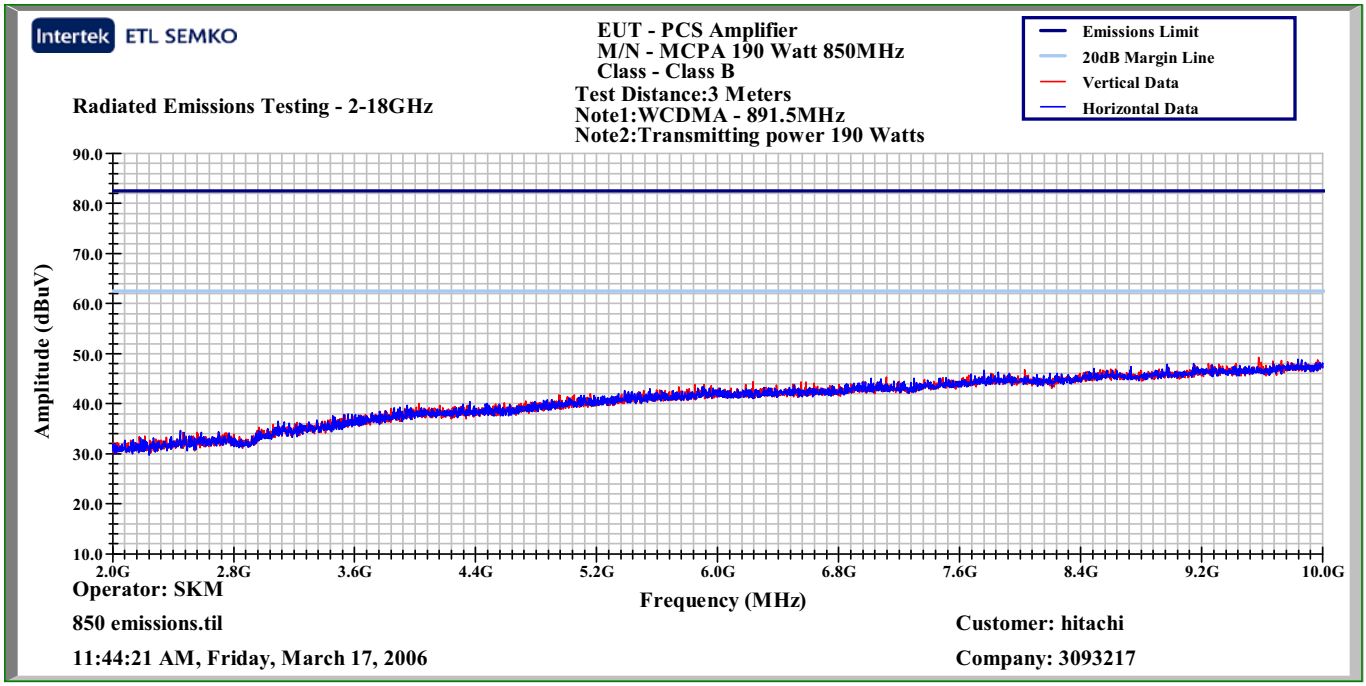
Plot:



WCDMA 881.5MHz 2-10GHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

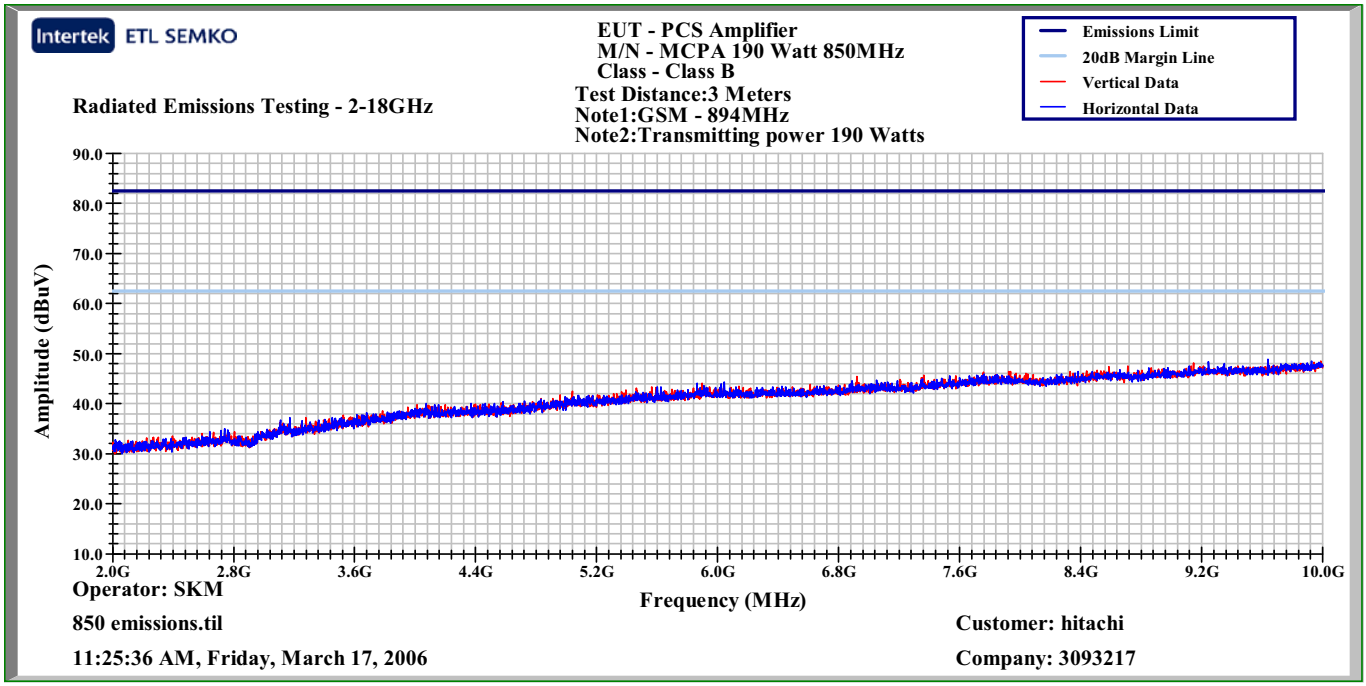
Plot:



WCDMA 891.5MHz 2-10GHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

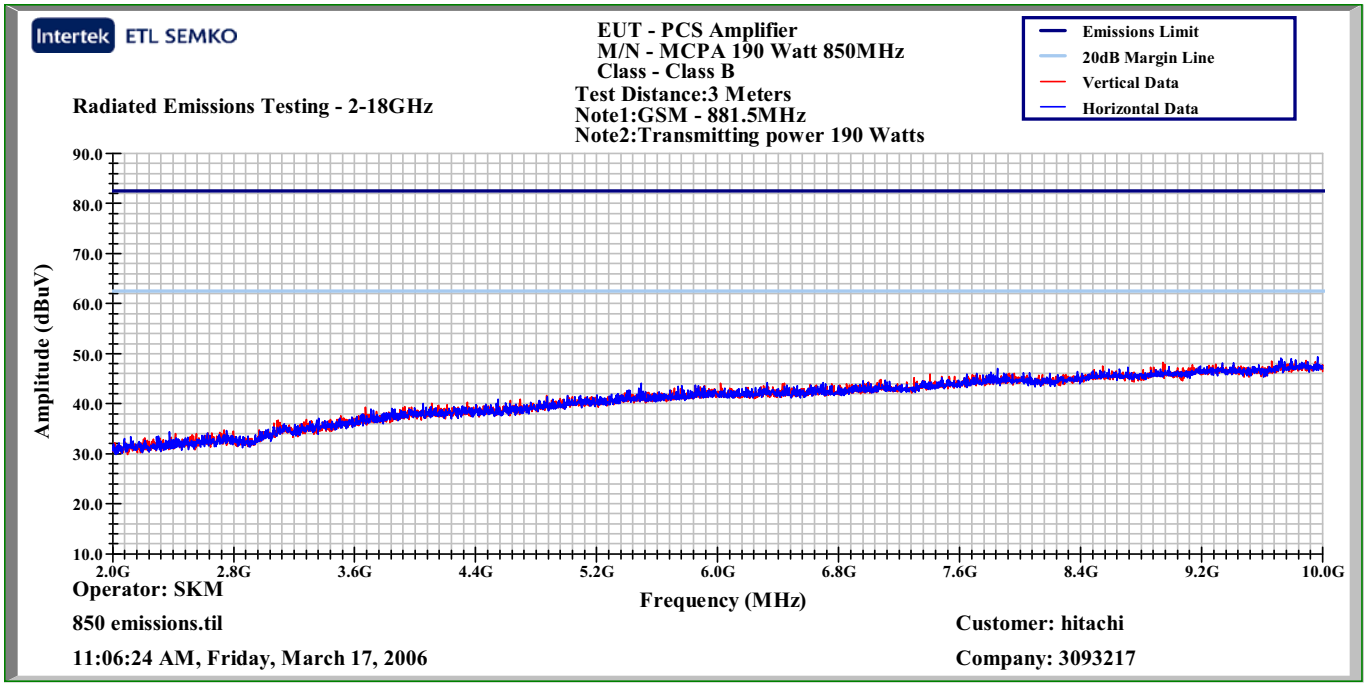
Plot:



GSM 894MHz 2-10GHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

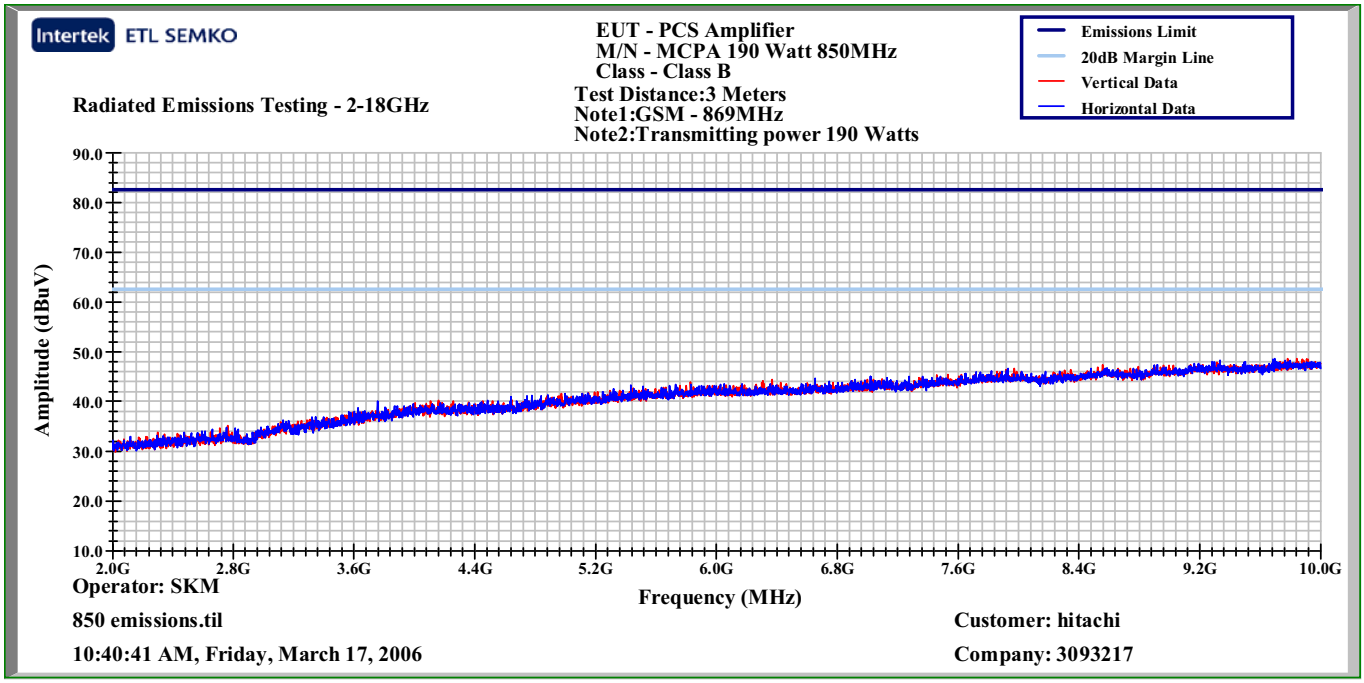
Plot:



GSM 881.5MHz 2-10GHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

Plot:



GSM 869MHz 2-10GHz Scans

10.0 Field strength of spurious radiation (FCC Part 2.1053)

Data:

There were no emissions within 20 dB of the limit. See plots for details.

11.0 Radiated emissions (E-field) (FCC Part 15.109)

Method:

Measurements in the frequency range of 30 MHz to 1000 MHz shall be performed with a quasi-peak detector instrument that meets the requirements of Section One of CISPR 16. The measuring antenna shall correlate to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 3 or 10 meters from the EUT. The limit applied to the measurement shall be appropriate for the test distance. The test distance shall be indicated in the results section.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Exploratory tests should be carried out while varying the cable positions to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system test components unless such placement is required by the inherent equipment design.

The antenna shall be adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth shall be varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) shall be varied during the measurements to find the maximum field-strength readings.

If the EUT is intended for tabletop use, it shall be placed on a table whose top is 0.8m above the ground plane. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the EUT was placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003, EN 55022:1998 +A1:2000 +A2:2003, AS/NZS CISPR22:2002 and VCCI V-3 / 2000.04.

TEST SITE
The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. The VCCI Registration Number for this site is R-1288.

MEASUREMENT UNCERTAINTY
Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of k=2.
30 MHz to 1000 MHz at 3 meters: +/- 3.9 dB
30 MHz to 1000 MHz at 10 meters: +/- 3.6 dB
1 GHz to 18 GHz at 3 meters: +/- 4.2 dB

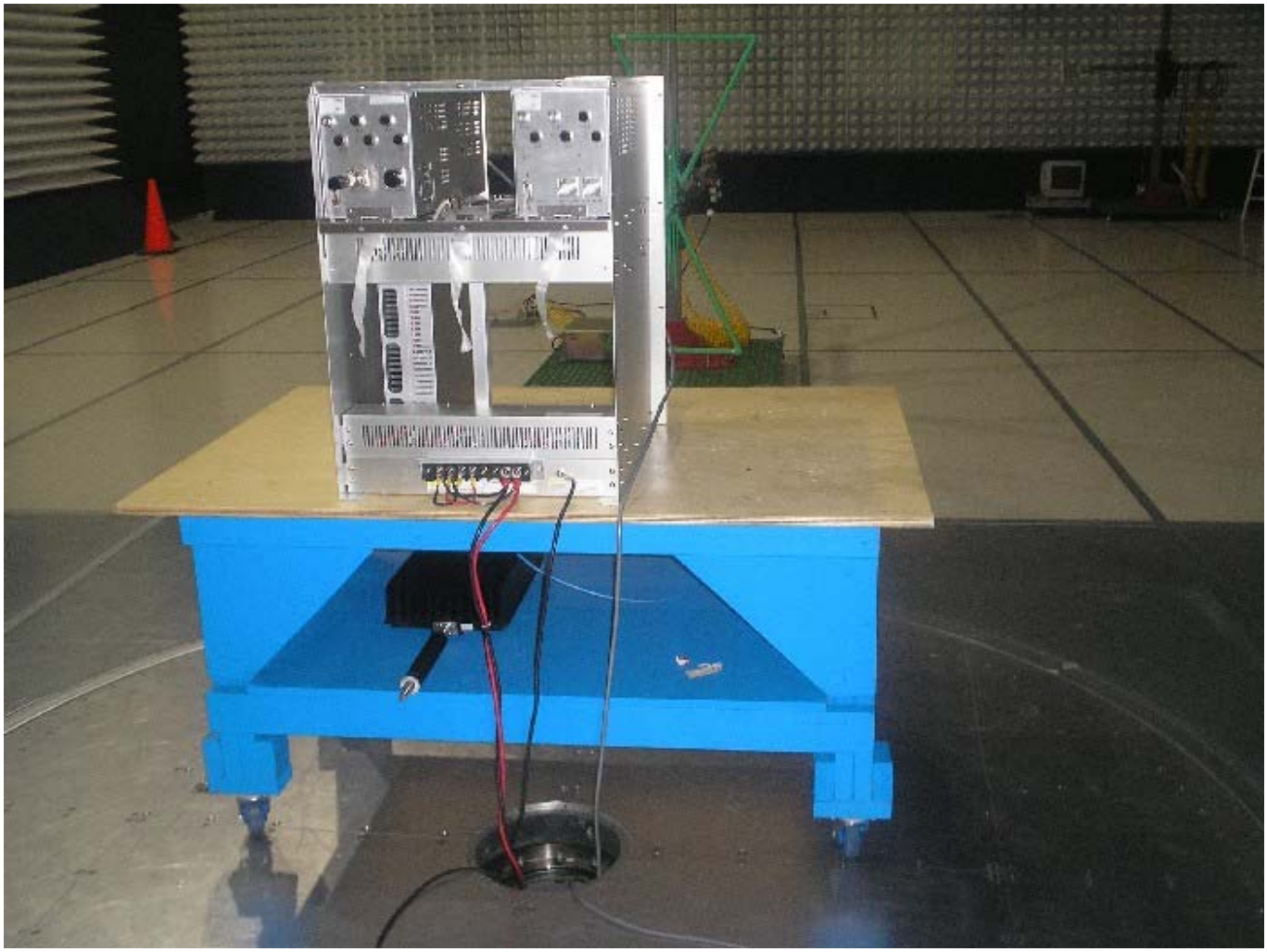
Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, Bilog (20MHz to 2GHz)	Chase	CBL6112B	211386	08/31/2005	08/31/2006
Cable E01 (Formerly PE7000N-N2 or N2)	Pasternack	RG214/U	E01	05/11/2005	05/11/2006
Cable E05 (Formerly HS 1500 N-N)	Huber-Suhner	Sucoflex 104PEA	E05	05/12/2005	05/12/2006
Cable, 18 GHz, N, 118 inches	Megaphase	TM18 NKNK 118	E202	05/13/2005	05/13/2006
Cable, 18 GHz, N, 394 inches	Megaphase	G919-NKNK-394	MP3	05/11/2005	05/11/2006
EMI Receiver	Hewlett Packard	8546A	211388	07/08/2005	07/08/2006
EMI Receiver, Preselector section	Hewlett Packard	85460A	211389	07/08/2005	07/08/2006
Preamplifier, 10 MHz to 2000 MHz, 30 dB gain	Mini-Circuits	ZKL-2	200069	10/25/2005	10/25/2006
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

Results: The sample tested was found to Comply.

11.0 Radiated emissions (E-field) (FCC Part 15.109)

Photo:



Test set up rear

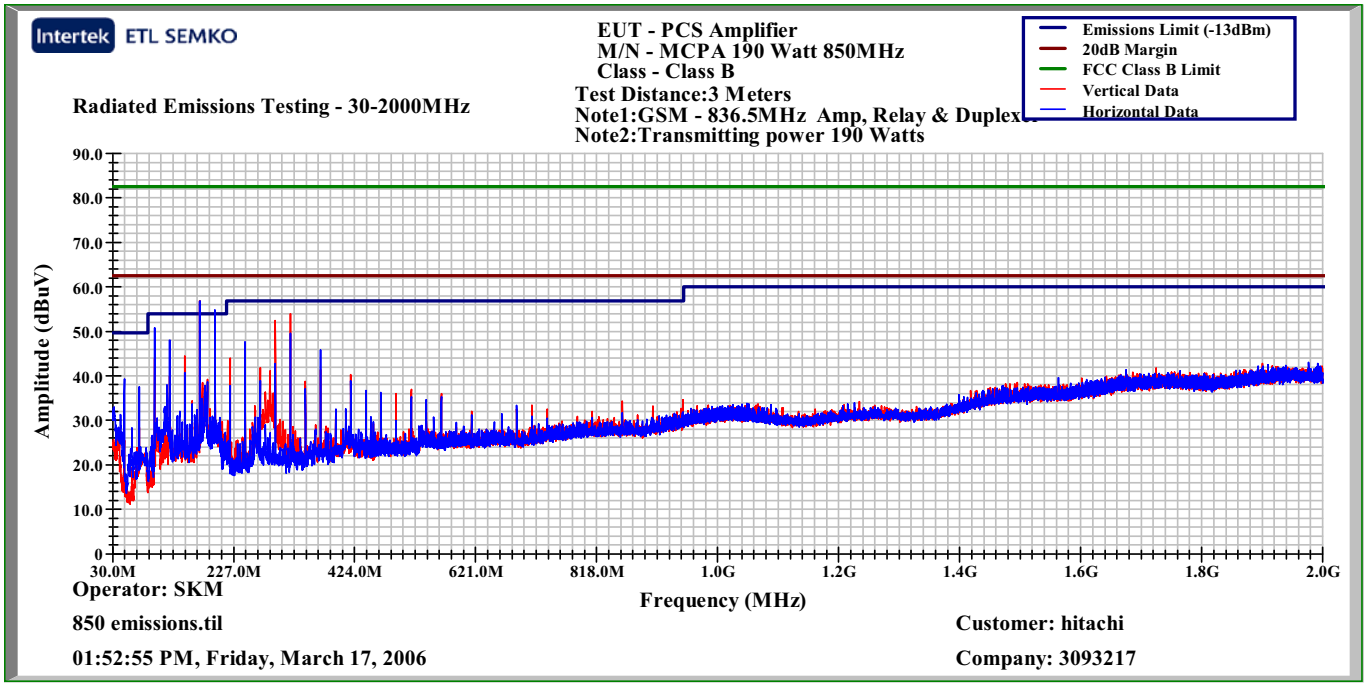
11.0 Radiated emissions (E-field) (FCC Part 15.109)

Photo:

Test set up front

11.0 Radiated emissions (E-field) (FCC Part 15.109)

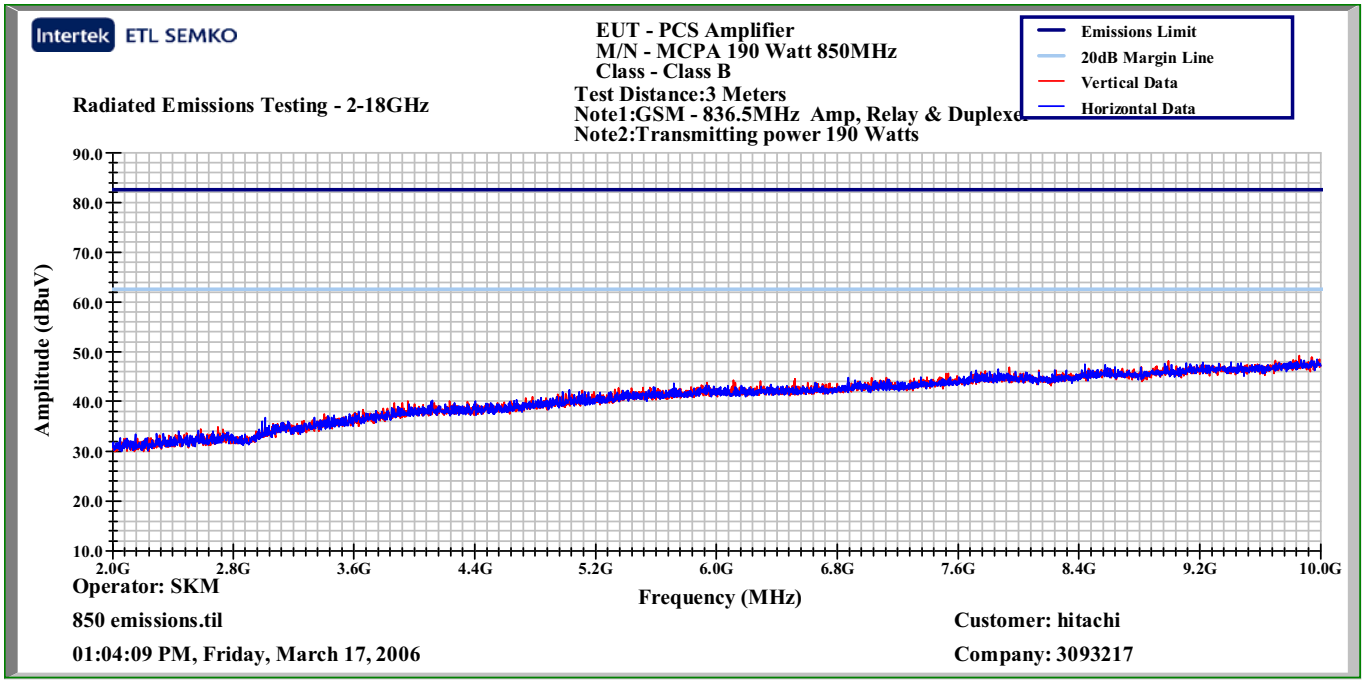
Plot:



GSM 836.5 MHz relay, duplexer, amp 30-2000MHz scan

11.0 Radiated emissions (E-field) (FCC Part 15.109)

Plot:



GSM 836.5MHz relay, duplexer, amp 2-10GHz Scans

11.0 Radiated emissions (E-field) (FCC Part 15.109)

Data:

Date: 03-16-2006 **Limit:** FCC15 Class A-3m
Frequency Range (MHz): 30to2000MHz **Test Distance (m):** 3
Input power: 27VDC **Modifications for compliance (y/n):** n

A	B	C	D	E	F	G	H	I
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dB(uV/m)**	**3m Limit dB(uV/m)**	**Margin dB**
Evaluation of relay duplexer and amp 836.5MHz								
H	96.350	64.5	10.5	1.2	28.0	48.3	54.0	-5.7
H	122.560	60.0	12.8	1.7	28.0	46.6	54.0	-7.4
H	172.030	67.8	10.3	1.7	28.0	51.9	54.0	-2.1
H	196.615	65.4	10.2	1.7	28.0	49.4	54.0	-4.6
V	294.923	62.5	13.1	2.7	27.9	50.4	56.9	-6.5
V	319.500	62.7	13.8	3.2	27.9	51.9	56.9	-5.0
Calculations		G=C+D+E-F		I=G-H				

12.0 Revision History (Revision History)

Method:

Document the history of the report.

Data:

Revision Level	Date	Report Number	Notes
Original issue	March 23, 2006	3093217ATL-007	--
1	June 21, 2006	3093217ATL-007	Added test data and plots for OBW input to EUT. Added block diagrams for clarification.
2	December 5, 2006	3093217ATL-007	Incorporated Bandedge measurements from 11/17/06