TEST REPORT

Report Number: 3131114ATL-019

January 22, 2008

Product Designation: MPCA - N+1

Standard: 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: 770.797.2530
Fax: 770.242.1417

Tests performed by:

Shawn K. McGuinness
EMC Project Engineer

Report reviewed by:

David J. Schramm
EMC Department Manager

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)		
5.0	RF Output Power (Conducted) (FCC Part 2.1046 Cond)	08/17/2007	PASS
6.0	Radiated emissions (E-field) (Radiated Emissions)	08/20/2007	PASS
7.0	Occupied Bandwidth (FCC Part 2.1049)	08/17/2007	PASS
8.0	Spurious emissions at antenna terminals (FCC Part 2.1051)	08/17/2007	PASS
9.0	Field strength of spurious radiation (FCC Part 2.1053)	08/22/2007	PASS
10.0	Revision History (Revision History)		

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
1900MHz MCPA (2Ea.)	Hitachi	HMC191901C-B00	A190702000055 & A190702000056
DUP/Comb Tray	Hitachi	HMCDD1911C	Not Labeled
Chassis	Hitachi	HMCSRS021C	HKN0707000001

EUT receive date:	August 13 2007
EUT receive condition:	Good

Description of EUT provided by Client:
The EUT is a 1900 MHz 190W MCPAN + 1 (Multi-Carrier Power Amplifier) for TDMA, CDMA, CW, 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.

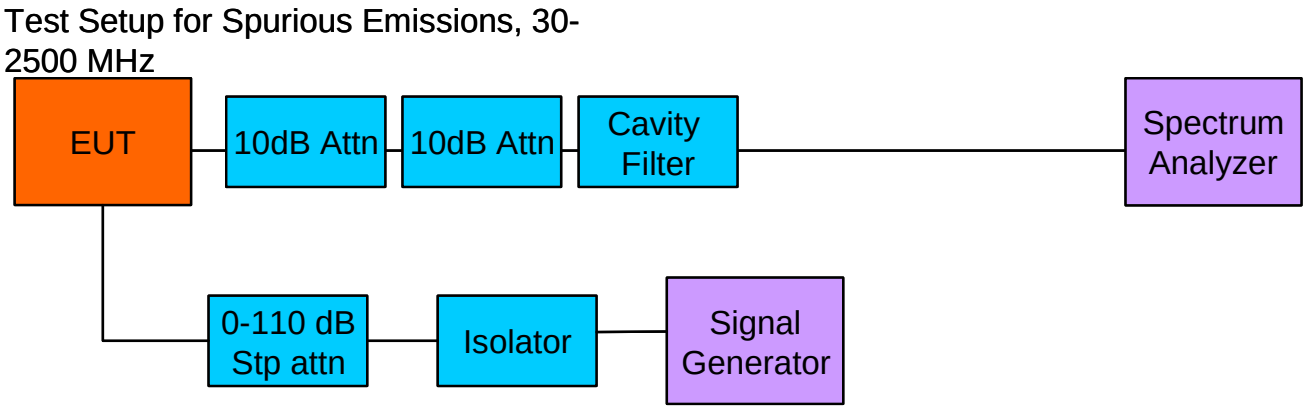
Description of EUT exercising:
During testing where a single carrier was used, the input level was adjusted to obtain 190 Watts out on a single channel. During testing where more than one channel is used, the power of each carrier must be reduced so the total power output is no greater than 190 Watts.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

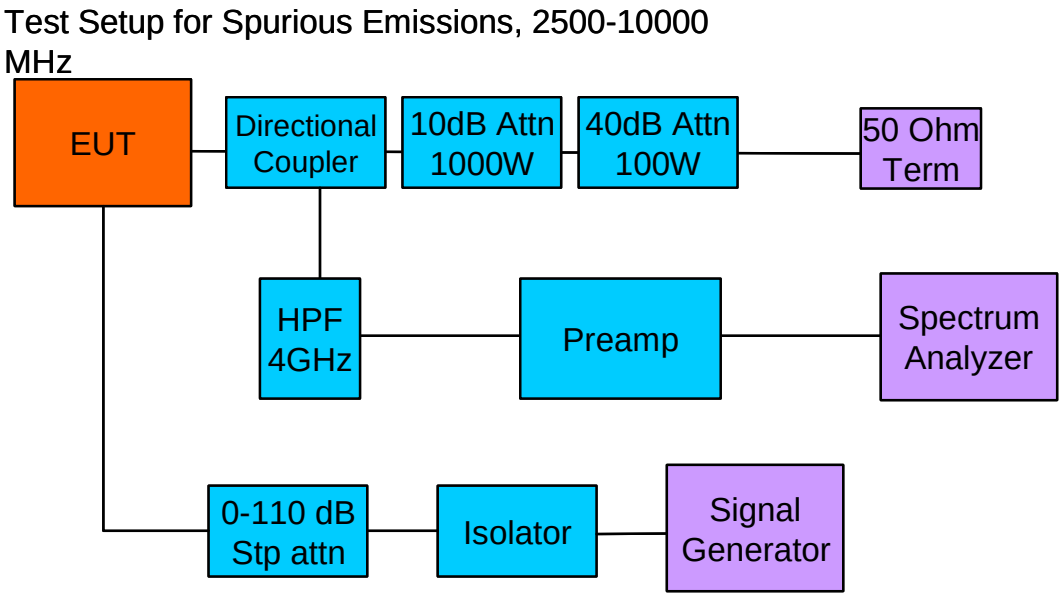
4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

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

Drawing:



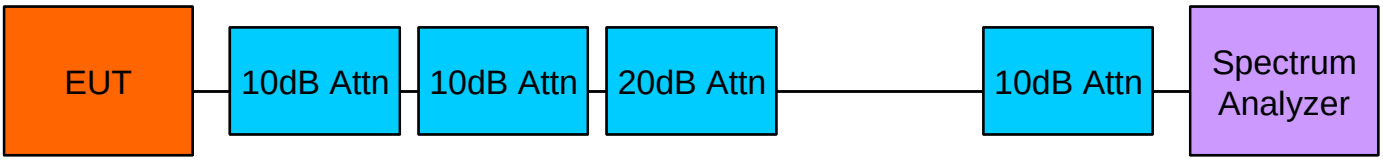


Block Diagram Spurious Test

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

Drawing:

Test Setup for Intermodulation and Band measurement



Block Diagram Intermod and Band

Data:

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

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
Signal Generator	Agilent	E4438C	MY4020632
Power Meter	Agilent	E4419B	Not listed
Step Attenuator	Agilent	11716A	14003296
DC Power Supply	H/P	6012B	2732A-02525

5.0 RF Output Power (Conducted) (FCC Part 2.1046 Cond)

Method:

Connect the transmitter output to a calibrated coaxial attenuator. Connect the other end of the attenuator to a power meter. Transmitter output 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.

Canada typically requires this test to be repeated at +60° C and at -30° C.

Test Equipment Used:

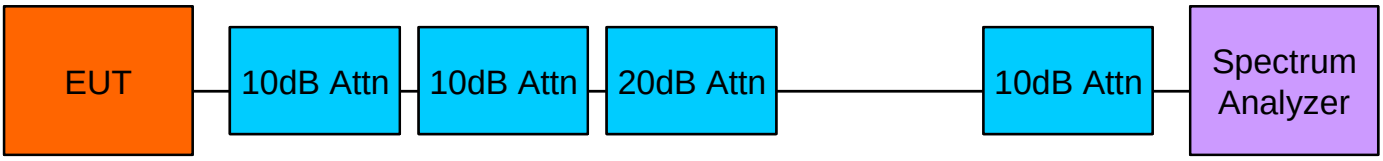
Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Attenuator, 10 dB	Weinschel Corp	2	200007	07/31/2007	07/31/2008
Attenuator, 10 dB, 1000 Watt	JFW Industries, Inc	50FHAM-010-1000	200073	03/07/2007	03/07/2008
Attenuator, 10 dB, 50 Watt, DC-18GHz	Weinschel	47-10-34	200061	08/01/2007	08/01/2008
Attenuator, 20 dB	Weinschel Corp	2	200008	08/01/2007	08/01/2008
Cable E05, <18GHz	Huber-Suhner	Sucoflex 104PEA	E05	05/10/2007	05/10/2008
Cable E11, <18GHz	Huber-Suhner	Sucoflex 104PEA	E11 211266	05/17/2007	05/17/2008
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	03/12/2007	03/12/2008

Results: The sample tested was found to Comply.

Drawing:

5.0 RF Output Power (Conducted) (FCC Part 2.1046 Cond)

Test Setup for Power measurement



Block Diagram Power Test

Data:

5.0 RF Output Power (Conducted) (FCC Part 2.1046 Cond)

EUT Mode	Frequency MHz	Channel	RBW/VBW MHz	Power (3) dBm	Measured Power (3) Watts	Power (4) dBm	Measured Power (4) Watts
				22°C		22°C	
CDMA	1931	Lo	APM(1)	51.76	150	52.78	190
	1960	Mid	APM(1)	51.76	150	52.78	190
	1989	Hi	APM(1)	51.76	150	52.78	190
TDMA	1930.06	Lo	APM(1)	51.76	150	52.78	190
	1960	Mid	APM(1)	51.76	150	52.78	190
	1989.4	Hi	APM(1)	51.76	150	52.78	190

Note (1): Used average power meter.
Note (2): Power for base stations are set at time of licensing.
Note (3): Power measured at output of duplexer.
Note (4): Power measured at output of MCPA.

6.0 Radiated emissions (E-field) (Radiated Emissions)

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. Above 1000 MHz, a peak detector shall be used. Peak values converted to average by appying the duty cycle correction factor, when applicable. When an average detector is used, it shall meet the requirements of Section One of CISPR 16. The measuring antenna shall correlate to a balanced dipole.

Bandwidths:
30 MHz to 1000 MHz: 120 kHz RBW and 1 MHz VBW
Above 1000 MHz: 1 MHz RBW and 3 MHz VBW

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	CBL6112A	211518	12/15/2006	12/15/2007
Antenna, Horn, 1-18 GHz	EMCO	3115	213061	04/02/2007	04/02/2008
Cable E01, <18GHz	Pasternack	RG214/U	E01	05/10/2007	05/10/2008
Cable, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/10/2007	05/10/2008
Cable, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	01/15/2007	01/15/2008
Cable, 40 GHz, 2.9, 9"	Megaphase	TM40 K1K1 9	E402	05/30/2007	05/30/2008
Cable, 40 GHz, 2.9, 9"	Megaphase	TM40 K1K1 9	E403	05/30/2007	05/30/2008
Coaxial Cable, 7m, N-N, 18 GHz	Storm Products Co.	PR90-206-7MTR	ST1	01/11/2007	01/11/2008
EMI Receiver	Hewlett Packard	8546A	211505	10/26/2006	10/26/2007
EMI Receiver, Preselector section	Hewlett Packard	85460A	015762	10/20/2006	10/20/2007
Excel spreadsheet for radiated emissions	Software	Excel - RE Worksh	SW004	07/31/2007	07/31/2008
Filter, Band Reject, Cavity Design, 50 dB	Wainwright Inst.	WRCG 1930/1990	200079	12/18/2006	12/18/2007
High Pass Filter, 4 GHz	Reactel, Inc.	7HS-4G/18G-S11	213153a	03/14/2007	03/14/2008
Preamplifier, 20MHz to 2GHz, 30 dB	A.H. Systems	PAM-0202	200082	10/09/2006	10/09/2007
Preamplifier, 30MHz to 26GHz, 32 dB gain	Miteq	JS4-00102600-29-	015533	06/20/2007	06/20/2008

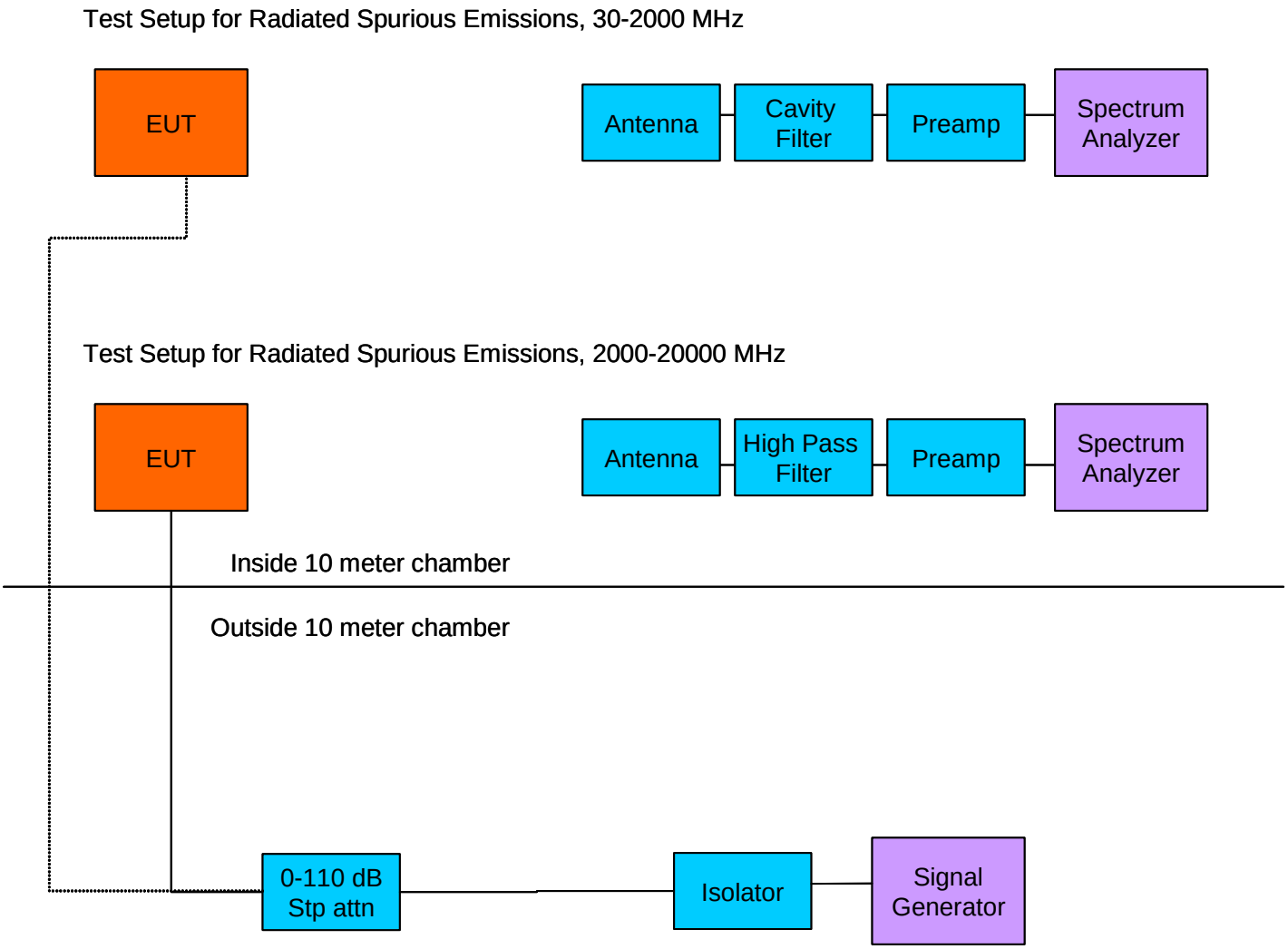
6.0 Radiated emissions (E-field) (Radiated Emissions)

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	03/12/2007	03/12/2008
Tile software profile for radiated and conducted emissions testing.	Software	Tile - Emissions	SW006	07/31/2007	07/31/2008

Results: The sample tested was found to Comply.

Drawing:



Block Diagram Radiated Emissions

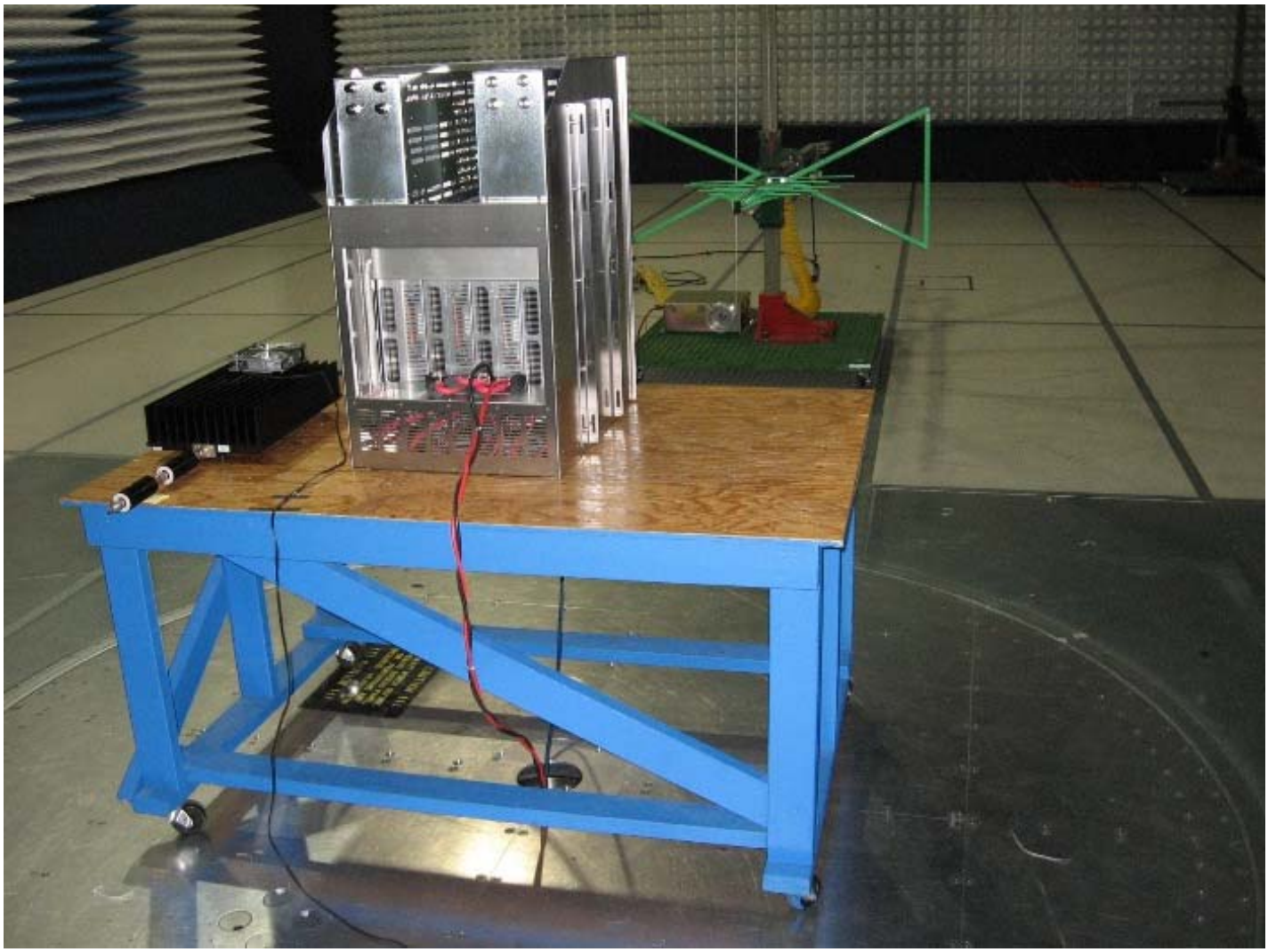
Photo:

6.0 Radiated emissions (E-field) (Radiated Emissions)

Test set up front

6.0 Radiated emissions (E-field) (Radiated Emissions)

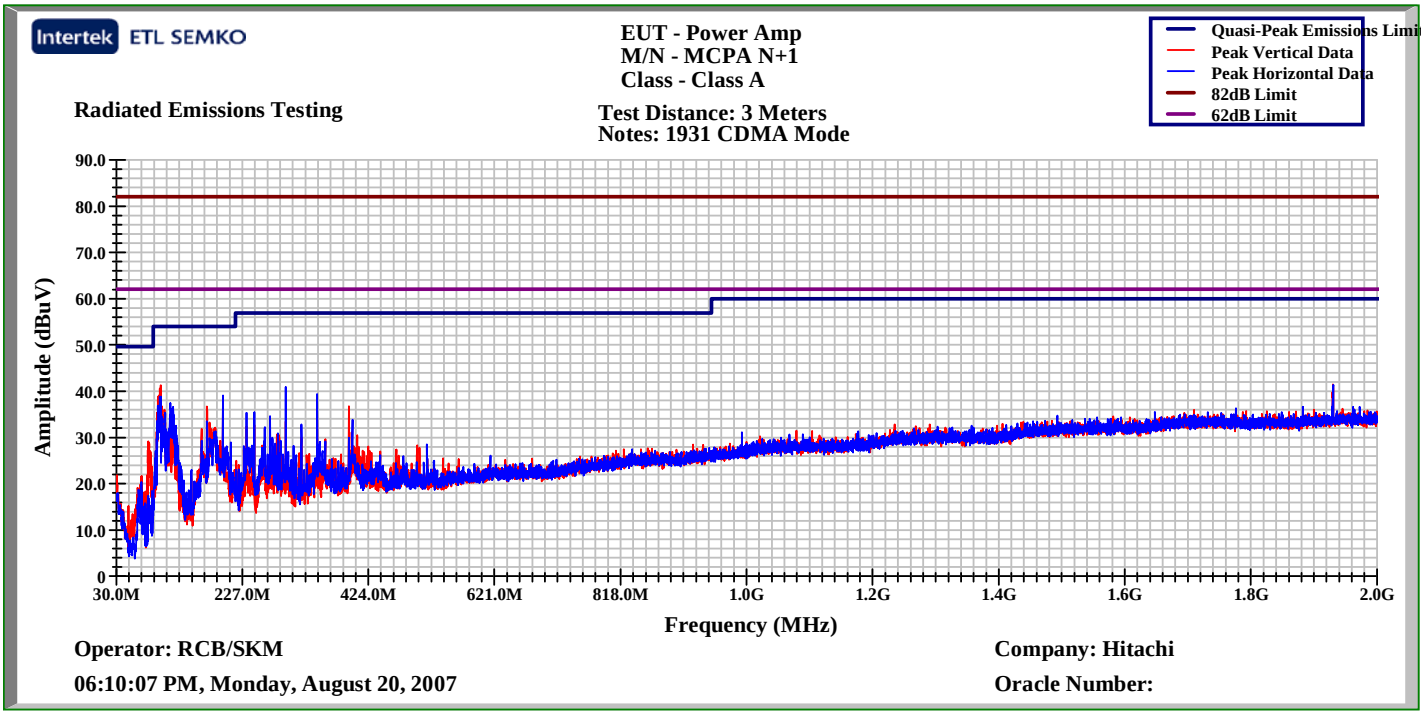
Photo:



Test set up rear

Plot:

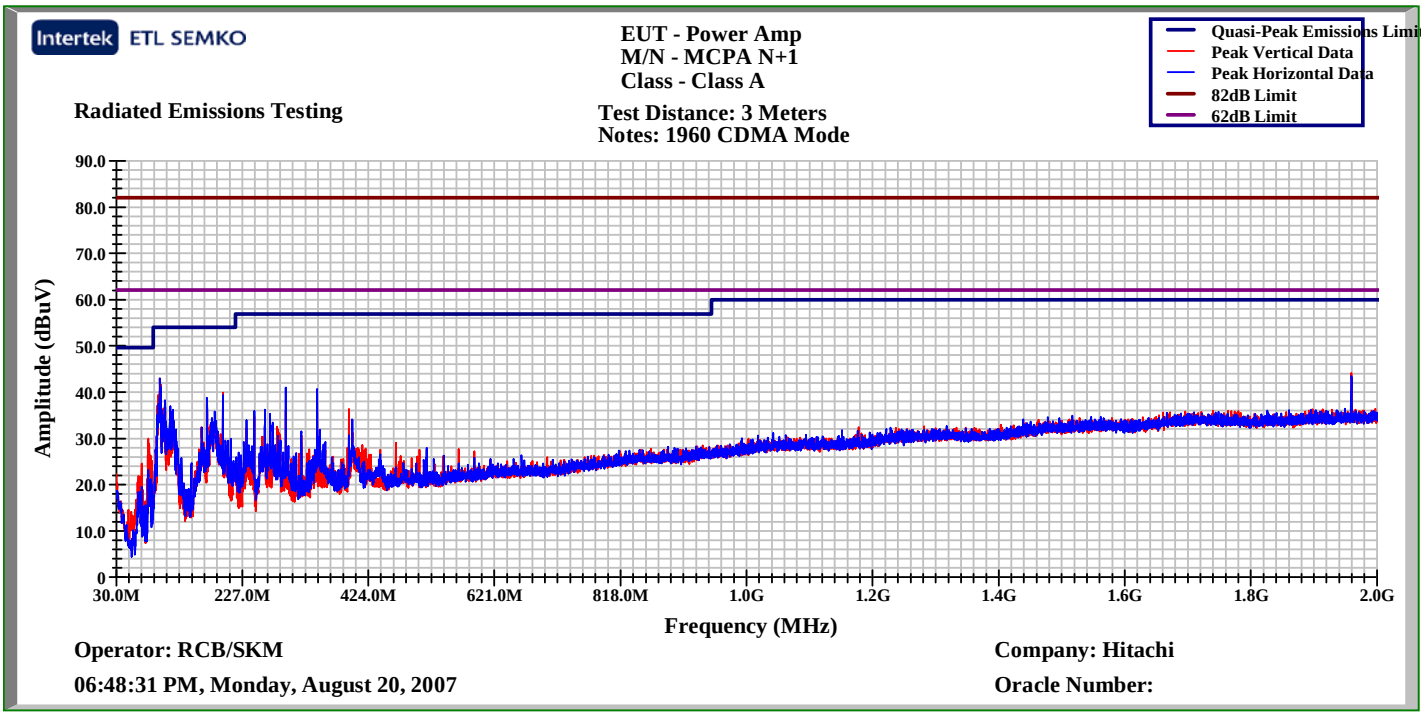
6.0 Radiated emissions (E-field) (Radiated Emissions)



CDMA Low Channel

6.0 Radiated emissions (E-field) (Radiated Emissions)

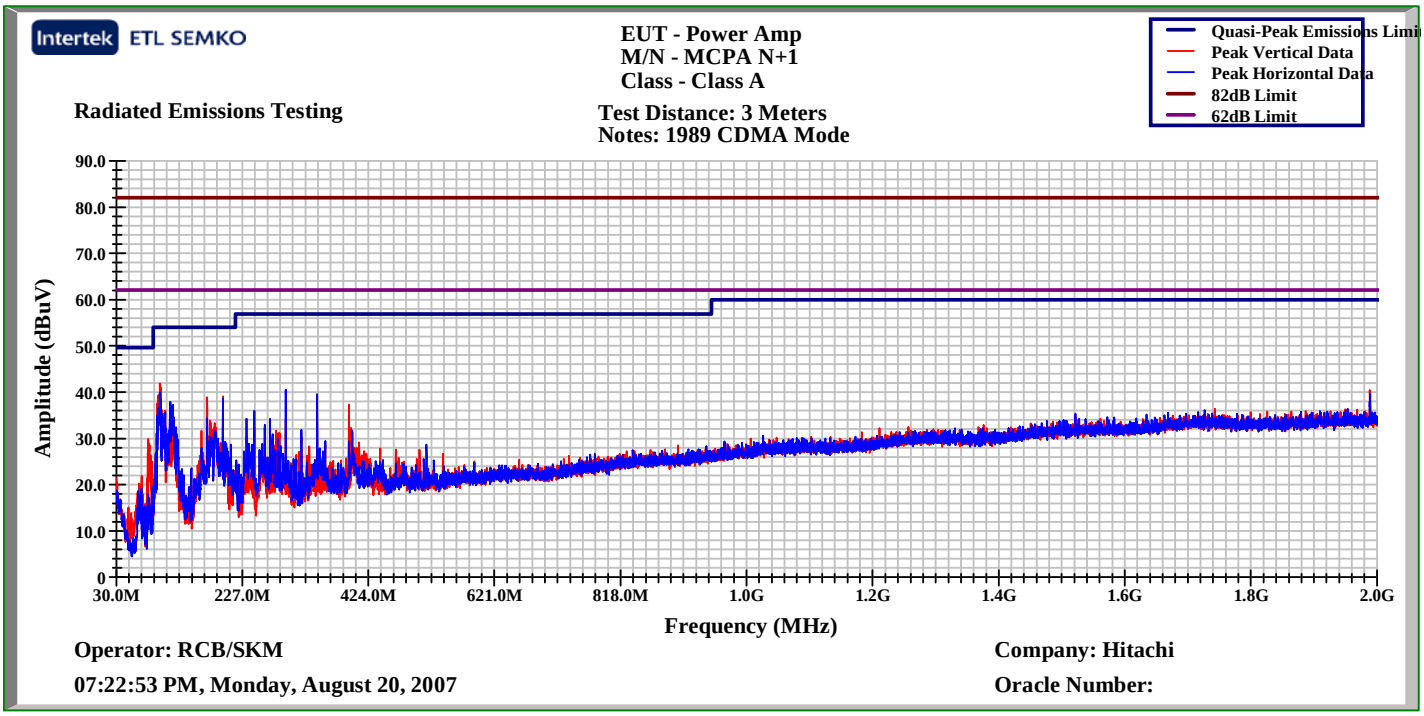
Plot:



CDMA Mid Channel

6.0 Radiated emissions (E-field) (Radiated Emissions)

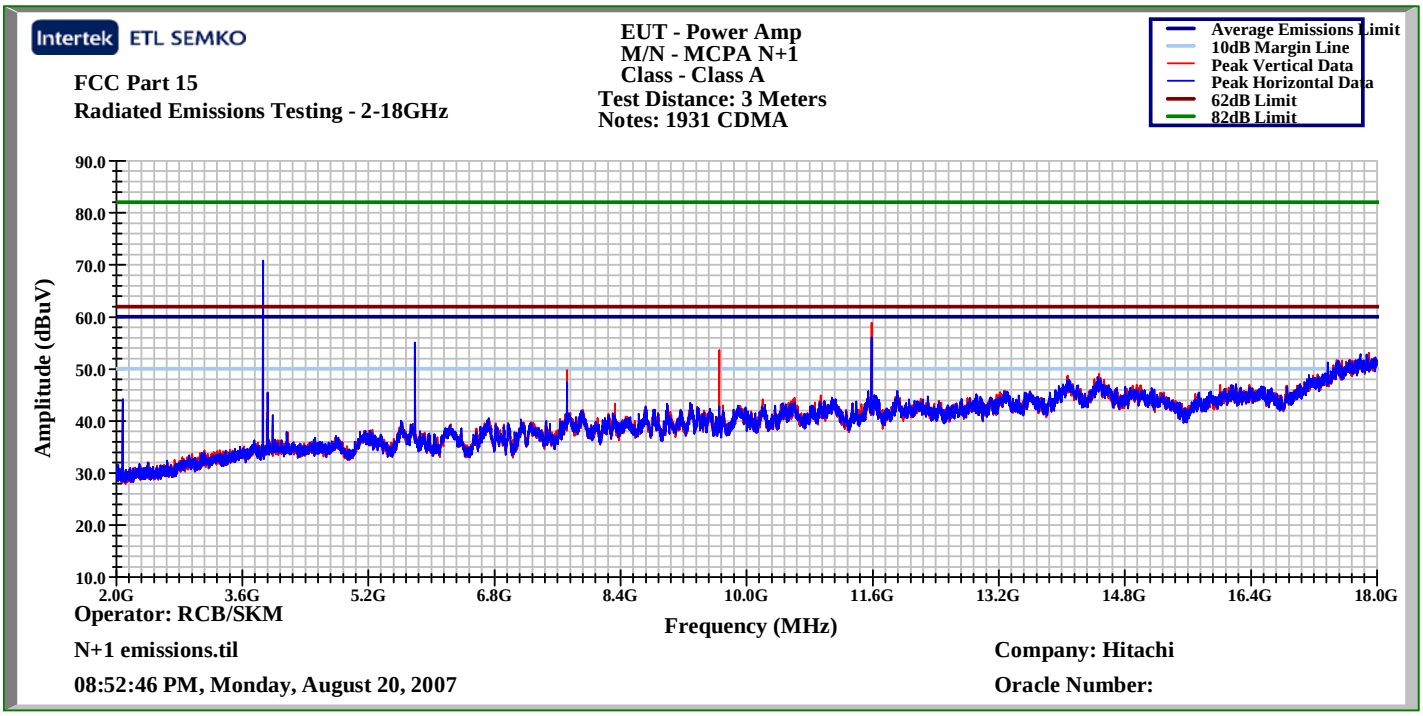
Plot:



CDMA Hi Channel

6.0 Radiated emissions (E-field) (Radiated Emissions)

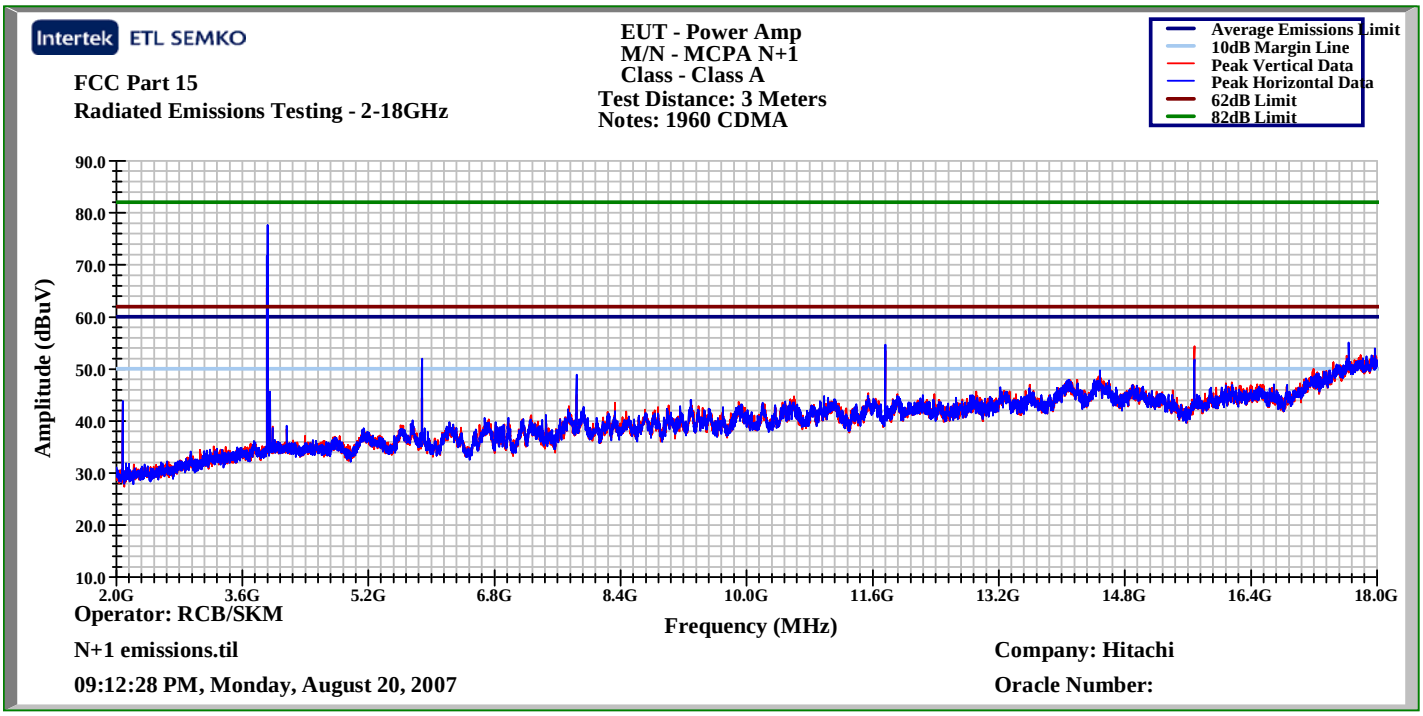
Plot:



CDMA Low Channel

6.0 Radiated emissions (E-field) (Radiated Emissions)

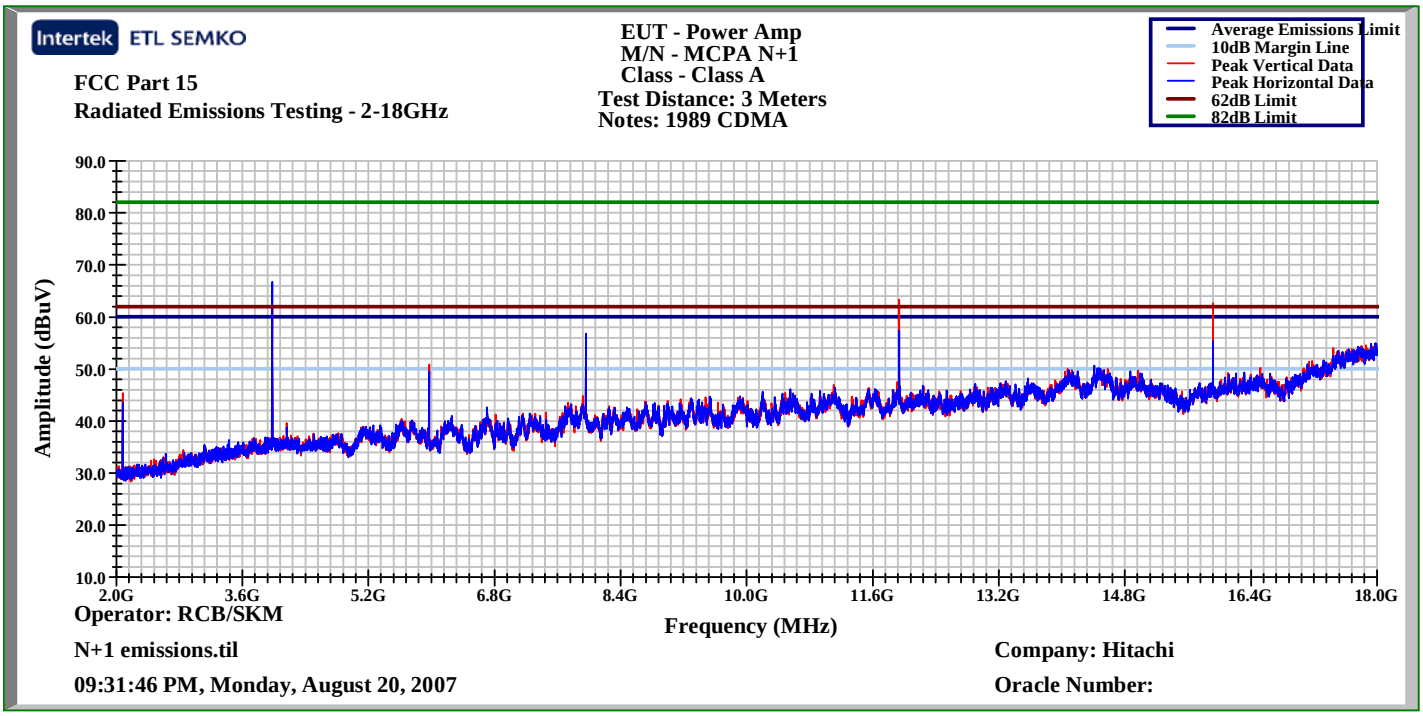
Plot:



CDMA Mid Channel

6.0 Radiated emissions (E-field) (Radiated Emissions)

Plot:



CDMA Hi Channel

Data:

6.0 Radiated emissions (E-field) (Radiated Emissions)

Frequency Range (MHz): 30to2000 **Test Distance (m):** 3
Input power: -48VDC **Limit:** FCC15 Class A-3m
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
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**	**Detectors / Bandwidths Det/RBW/VBW**
CDMA 1931MHz									
H	98.253	57.7	10.4	2.2	31.0	39.4	54.0	-14.6	QP 120K/300K
V	99.255	58.9	10.8	2.2	31.0	41.0	54.0	-13.0	QP 120K/300K
H	196.610	56.0	10.0	2.2	30.9	37.2	54.0	-16.8	QP 120K/300K
H	294.911	55.3	13.7	3.1	30.9	41.2	56.9	-15.7	QP 120K/300K
V	344.064	54.7	14.6	3.7	30.9	42.2	56.9	-14.7	QP 120K/300K
CDMA 1960MHz									
H	97.741	56.4	10.4	2.2	31.0	38.1	54.0	-15.9	QP 120K/300K
V	98.268	58.3	10.8	2.2	31.0	40.4	54.0	-13.6	QP 120K/300K
V	196.611	59.0	10.2	2.2	30.9	40.4	54.0	-13.6	QP 120K/300K
H	294.918	55.4	13.7	3.1	30.9	41.3	56.9	-15.6	QP 120K/300K
H	344.066	54.6	15.0	3.7	30.9	42.5	56.9	-14.4	QP 120K/300K
CDMA 1989MHz									
V	98.288	58.7	10.8	2.2	31.0	40.8	54.0	-13.2	QP 120K/300K
V	172.033	56.9	10.7	2.2	30.9	38.9	54.0	-15.1	QP 120K/300K
V	196.608	59.2	10.2	2.2	30.9	40.6	54.0	-13.4	QP 120K/300K
H	294.910	55.0	13.7	3.1	30.9	40.9	56.9	-16.0	QP 120K/300K
V	344.061	54.7	14.6	3.7	30.9	42.2	56.9	-14.7	QP 120K/300K
Calculations		G=C+D+E-F		I=G-H					

CDMA Data

6.0 Radiated emissions (E-field) (Radiated Emissions)

Data:

Frequency Range (MHz): 30to2000 **Test Distance (m):** 3

Input power: -48VDC **Limit:** FCC15 Class A-3m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
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**	**Detectors / Bandwidths Det/RBW/VBW**
TDMA 1930.4MHz									
H	98.281	57.2	10.4	2.2	31.0	38.9	54.0	-15.1	QP 120K/300K
V	99.285	59.0	10.8	2.2	31.0	41.1	54.0	-12.9	QP 120K/300K
H	196.610	57.3	10.0	2.2	30.9	38.6	54.0	-15.4	QP 120K/300K
H	294.912	55.4	13.7	3.1	30.9	41.3	56.9	-15.6	QP 120K/300K
V	344.065	53.5	14.6	3.7	30.9	40.9	56.9	-16.0	QP 120K/300K
TDMA 1960MHz									
H	97.762	56.7	10.4	2.2	31.0	38.4	54.0	-15.6	QP 120K/300K
V	98.298	60.3	10.8	2.2	31.0	42.4	54.0	-11.6	QP 120K/300K
V	196.609	59.7	10.2	2.2	30.9	41.1	54.0	-12.9	QP 120K/300K
H	294.918	55.7	13.7	3.1	30.9	41.6	56.9	-15.3	QP 120K/300K
H	344.064	55.4	15.0	3.7	30.9	43.3	56.9	-13.6	QP 120K/300K
TDMA 1989.6MHz									
V	98.294	59.1	10.8	2.2	31.0	41.2	54.0	-12.8	QP 120K/300K
V	172.034	56.3	10.7	2.2	30.9	38.3	54.0	-15.7	QP 120K/300K
V	196.609	58.2	10.2	2.2	30.9	39.6	54.0	-14.4	QP 120K/300K
H	294.915	54.1	13.7	3.1	30.9	40.0	56.9	-16.9	QP 120K/300K
V	344.066	55.0	14.6	3.7	30.9	42.5	56.9	-14.4	QP 120K/300K
Calculations		G=C+D+E-F		I=G-H					

TDMA Data

6.0 Radiated emissions (E-field) (Radiated Emissions)

Data:

Frequency Range (MHz): 2000-20000 **Test Distance (m):** 3

Input power: -48VDC **Limit:** FCC15 Class A-3m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
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**	**Detectors / Bandwidths Det/RBW/VBW**
No emissions detected that were unrelated to the transmitter									

CDMA and TDMA Data 2 to 20GHz

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 output bandwidth shall be less than or equal to the input bandwidth.

Test Equipment Used:

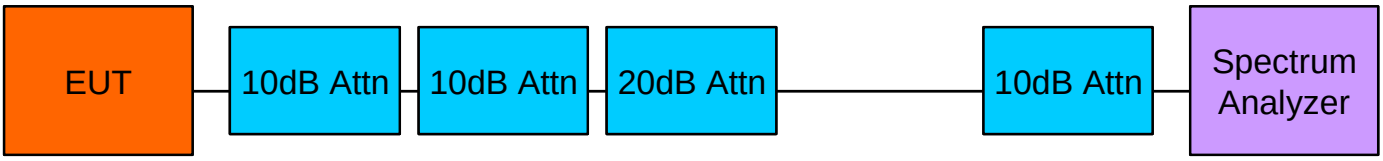
Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Attenuator, 10 dB	Weinschel Corp	2	200007	07/31/2007	07/31/2008
Attenuator, 10 dB, 1000 Watt	JFW Industries, Inc	50FHAM-010-1000	200073	03/07/2007	03/07/2008
Attenuator, 10 dB, 50 Watt, DC-18GHz	Weinschel	47-10-34	200061	08/01/2007	08/01/2008
Attenuator, 20 dB	Weinschel Corp	2	200008	08/01/2007	08/01/2008
Cable E05, <18GHz	Huber-Suhner	Sucoflex 104PEA	E05	05/10/2007	05/10/2008
Cable E11, <18GHz	Huber-Suhner	Sucoflex 104PEA	E11 211266	05/17/2007	05/17/2008
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	03/12/2007	03/12/2008

Results: The sample tested was found to Comply.

Drawing:

7.0 Occupied Bandwidth (FCC Part 2.1049)

Test Setup for Intermodulation and Band measurement



Block Diagram Intermod and Band

Photo:

7.0 Occupied Bandwidth (FCC Part 2.1049)

Test set up EUT

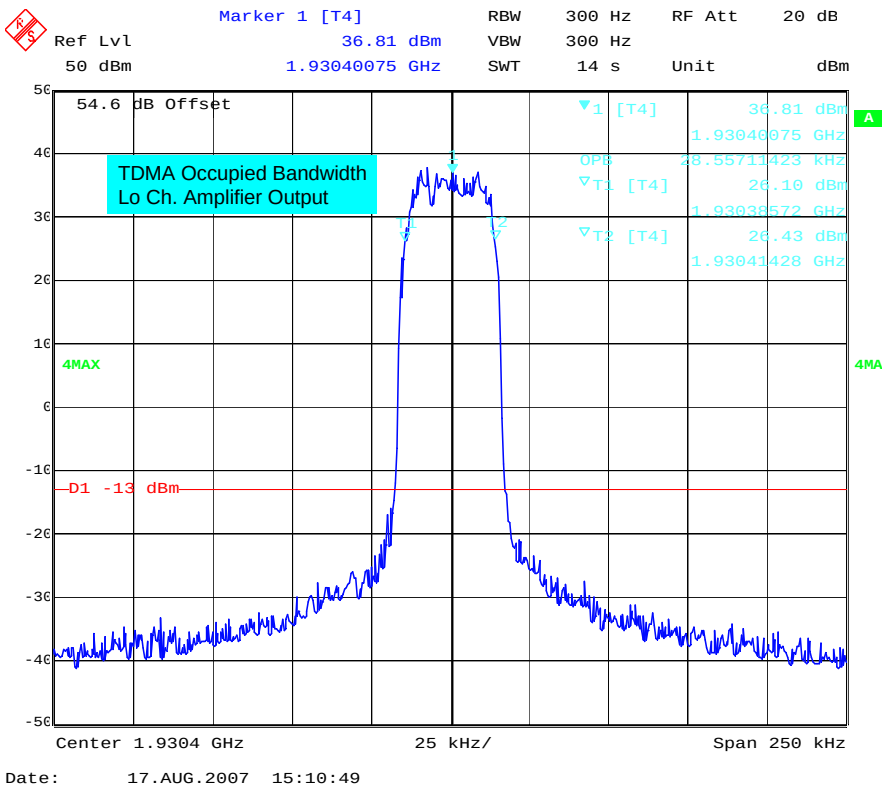
7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:

Test set up

Plot:

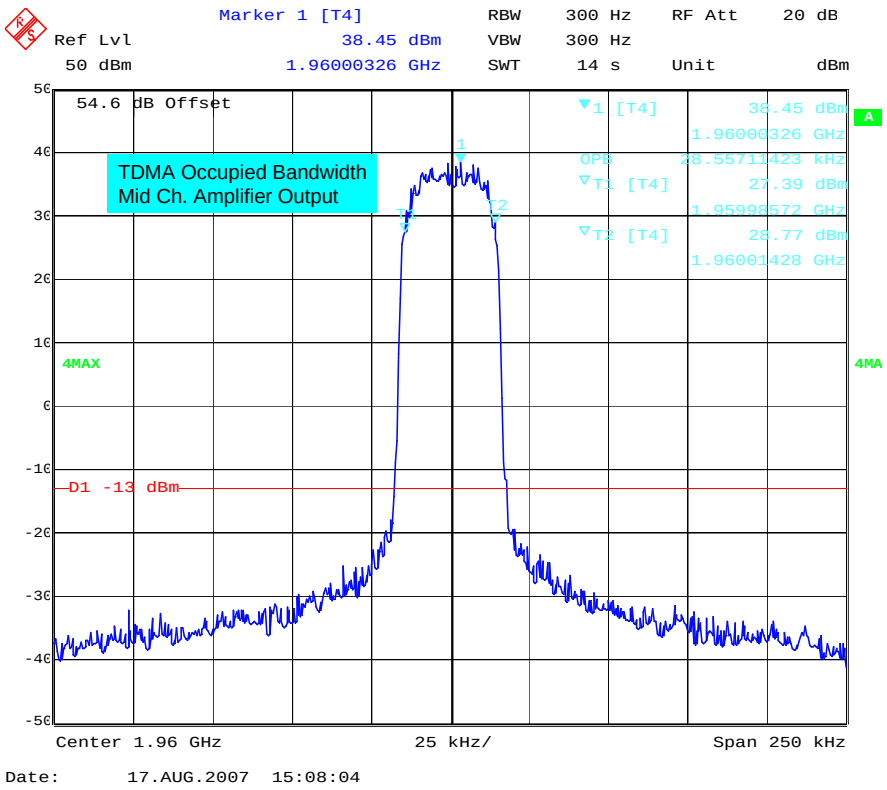
7.0 Occupied Bandwidth (FCC Part 2.1049)



TDMA Lo Channel

7.0 Occupied Bandwidth (FCC Part 2.1049)

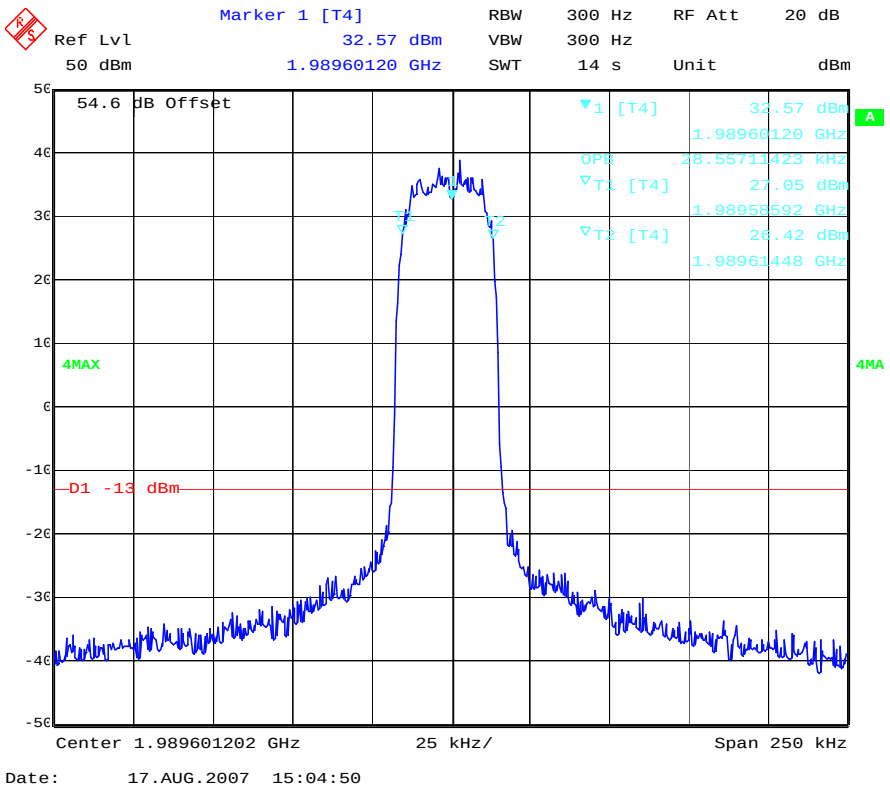
Plot:



TDMA Mid Channel

7.0 Occupied Bandwidth (FCC Part 2.1049)

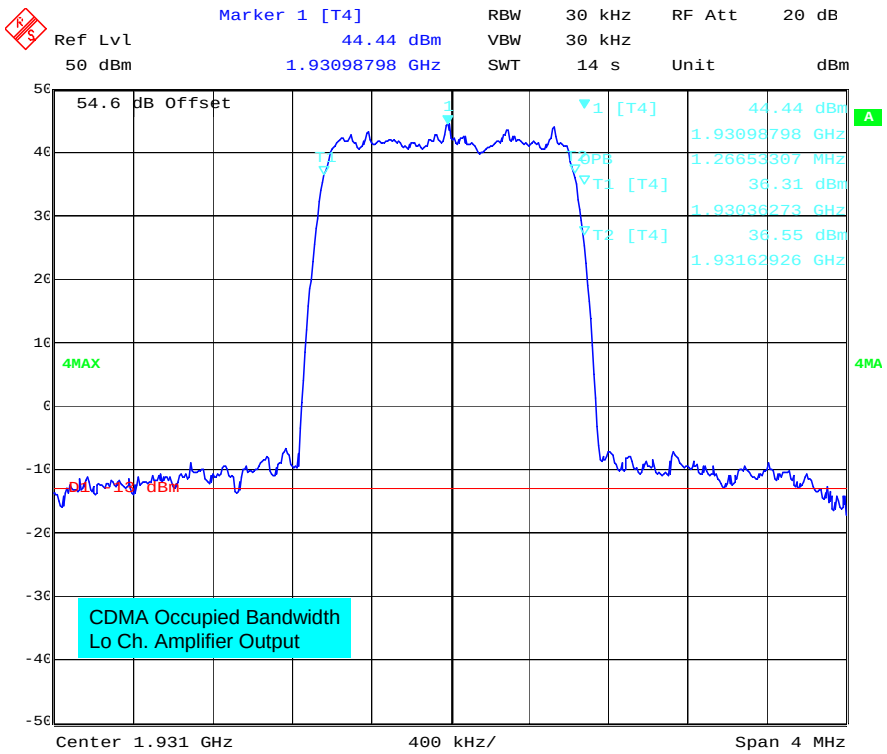
Plot:



TDMA Hi Channel

7.0 Occupied Bandwidth (FCC Part 2.1049)

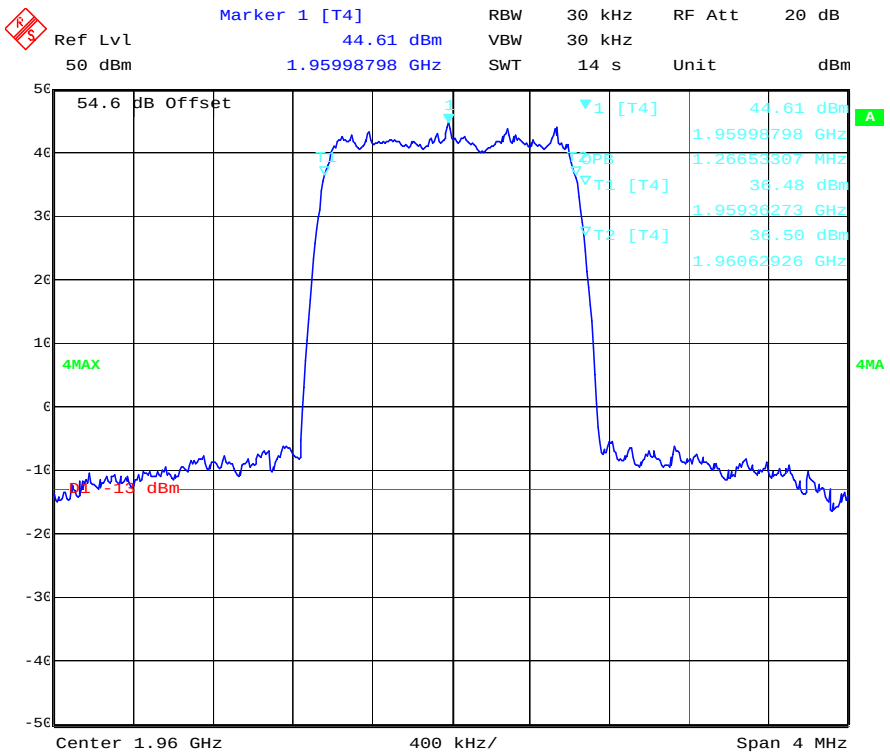
Plot:



CDMA Low Channel

7.0 Occupied Bandwidth (FCC Part 2.1049)

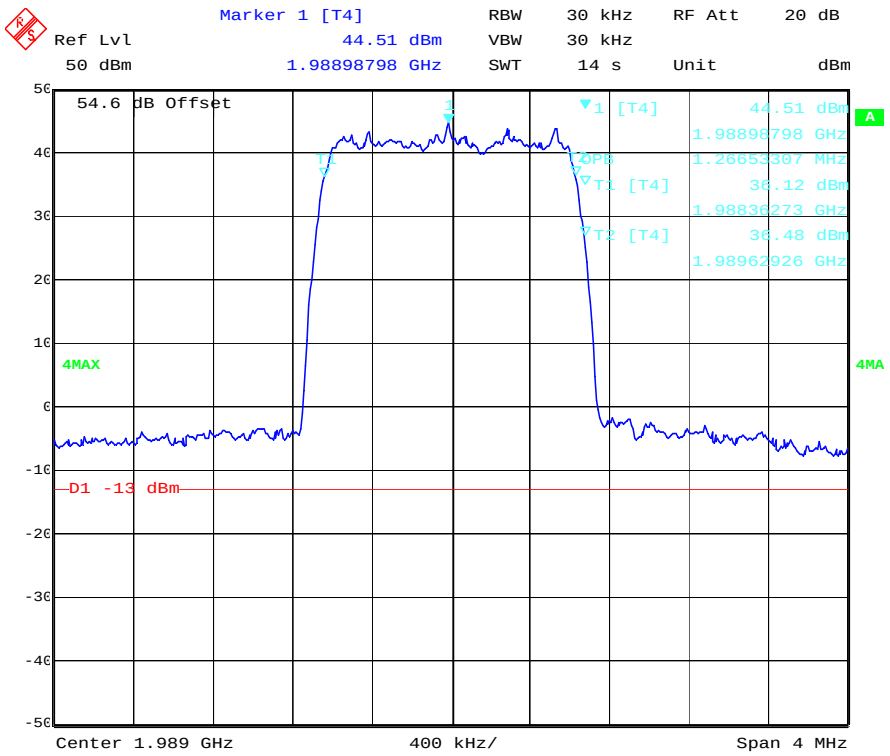
Plot:



CDMA Mid Channel

7.0 Occupied Bandwidth (FCC Part 2.1049)

Plot:



CDMA Hi Channel

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:

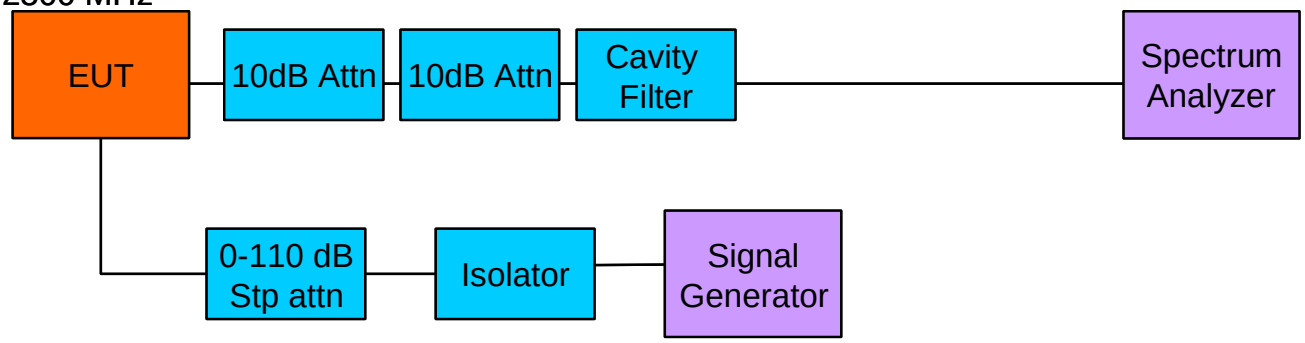
Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
1 to 26.5GHz Preamp	Hewlett Packard	8449A	3008A00775	03/06/07	03/06/08
Attenuator, 10 dB	Weinschel Corp	2	200009	07/31/2007	07/31/2008
Attenuator, 10 dB, 1000 Watt	JFW Industries, Inc	50FHAM-010-1000	200073	03/07/2007	03/07/2008
Attenuator, 10 dB, 150 Watt, <18GHz	Weinschel Corp	66-10-33	211683	03/14/2007	03/14/2008
Attenuator, 10 dB, 50 Watt, DC-18GHz	Weinschel	47-10-34	200061	08/01/2007	08/01/2008
Attenuator, 20 dB	Weinschel Corp	2	200008	08/01/2007	08/01/2008
Attenuator, 40 dB	Weinschel Corp	48-40-34	200021	08/01/2007	08/01/2008
Cable E05, <18GHz	Huber-Suhner	Sucoflex 104PEA	E05	05/10/2007	05/10/2008
Cable E11, <18GHz	Huber-Suhner	Sucoflex 104PEA	E11 211266	05/17/2007	05/17/2008
Filter, Band Reject, Cavity Design, 50 dB	Wainwright Inst.	WRCG 1930/1990	200079	12/18/2006	12/18/2007
High Pass Filter, 4 GHz	Reactel, Inc.	7HS-4G/18G-S11	213153a	03/14/2007	03/14/2008
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	03/12/2007	03/12/2008

Results: The sample tested was found to Comply.

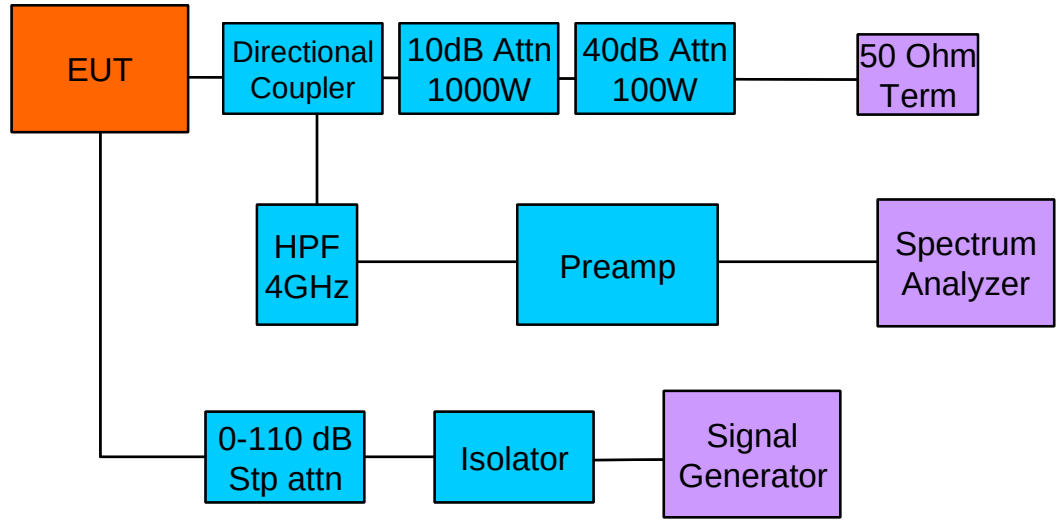
Drawing:

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Test Setup for Spurious Emissions, 30-2500 MHz



Test Setup for Spurious Emissions, 2500-10000 MHz



Block Diagram Spurious Emissions

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Drawing:

Test Setup for Intermodulation and Band measurement

Block Diagram Intermod and Band

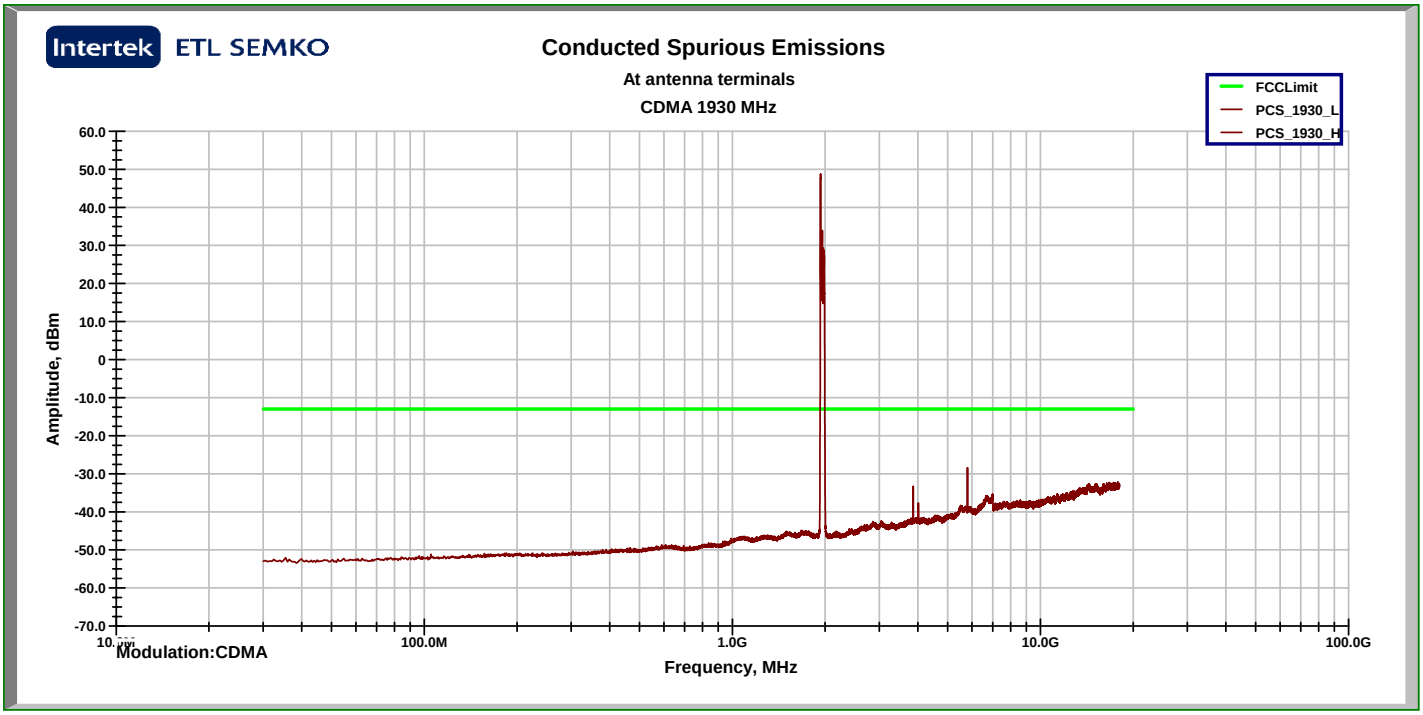
Photo:

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Test set up

Plot:

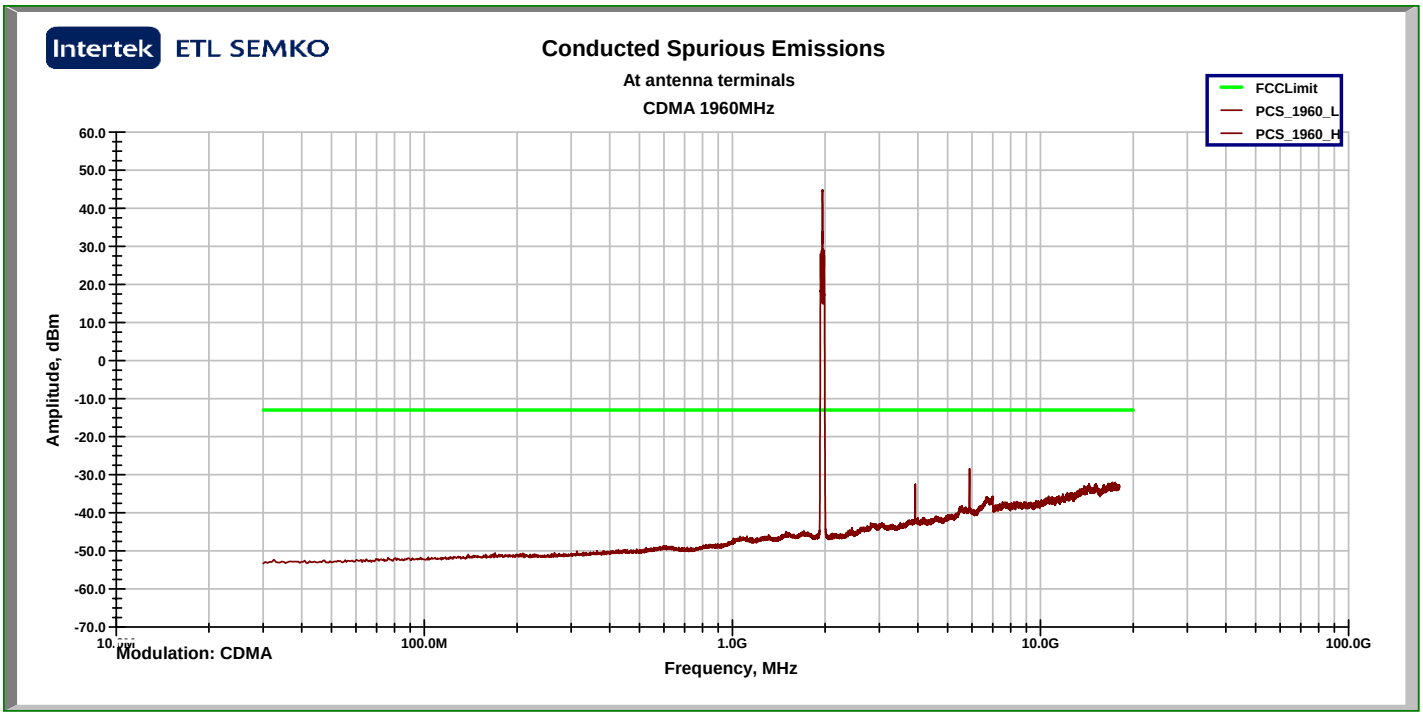
8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)



CDMA Low Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

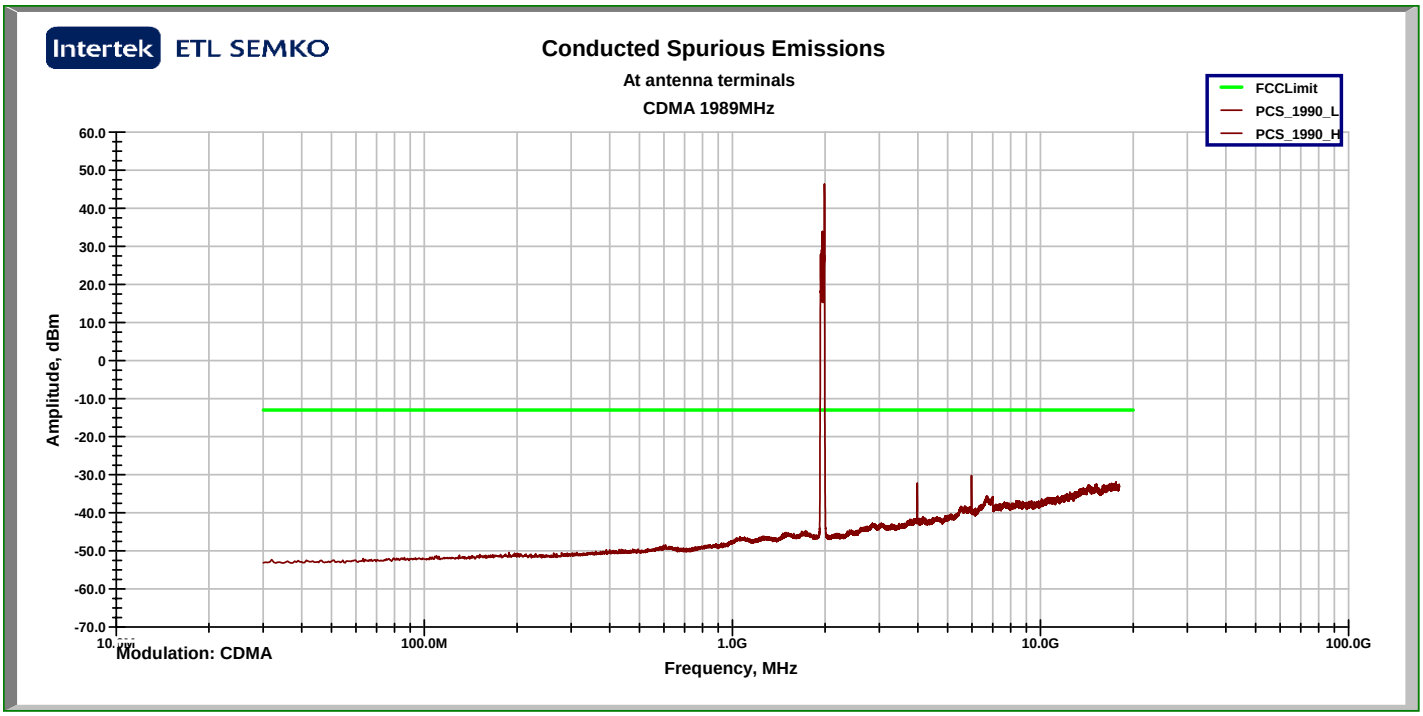
Plot:



CDMA Mid Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

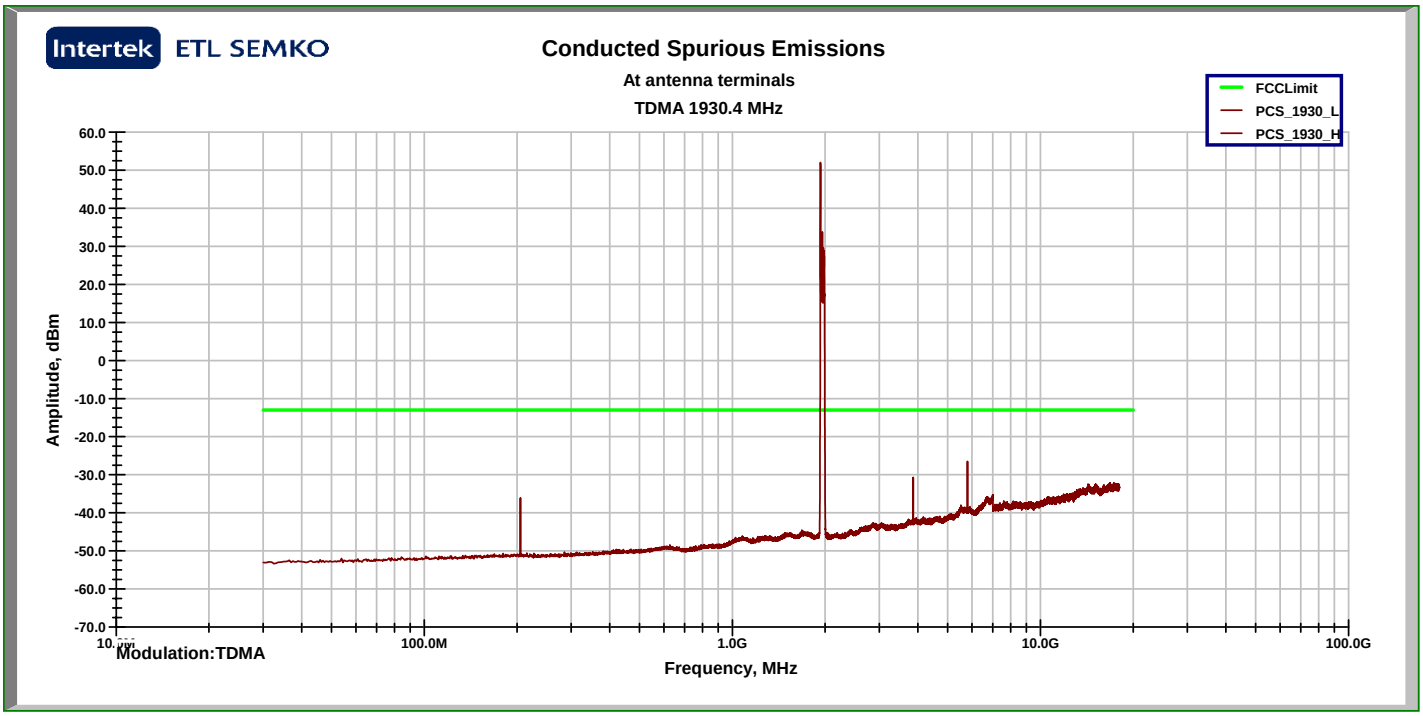
Plot:



CDMA Hi Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

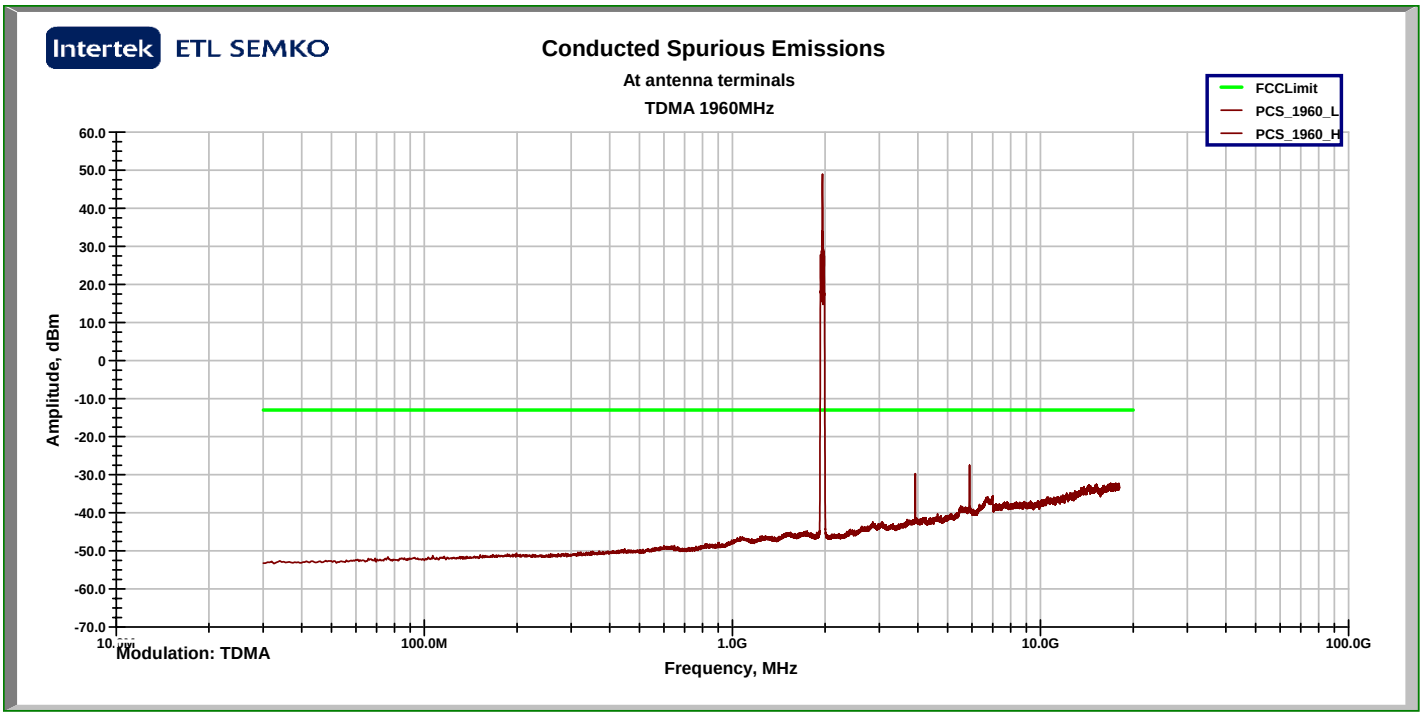
Plot:



TDMA Lo Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

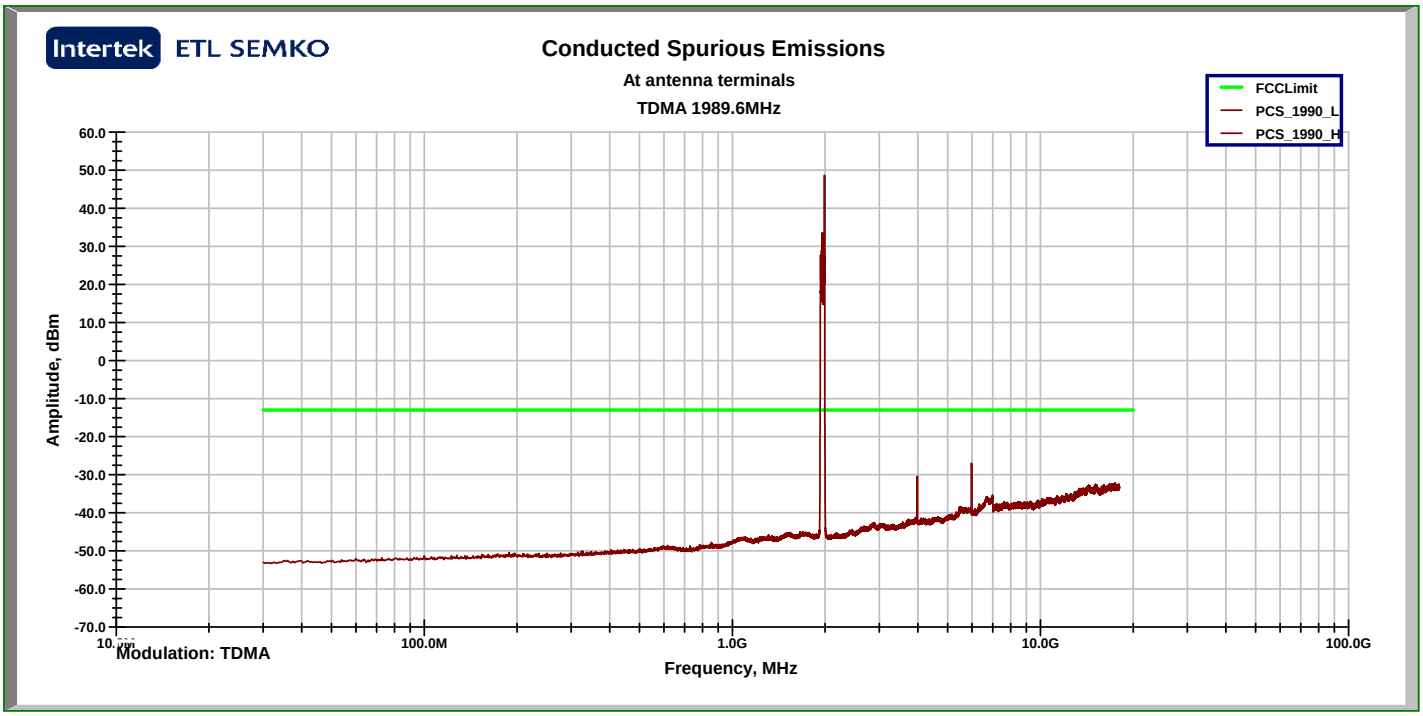
Plot:



TDMA Mid Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

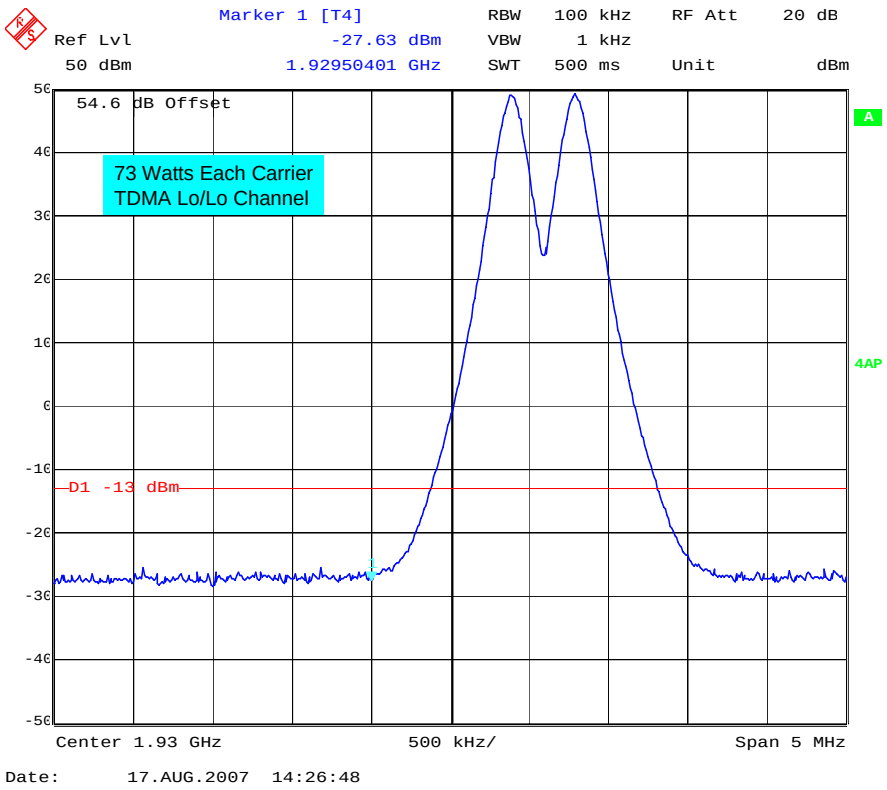
Plot:



TDMA Hi Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

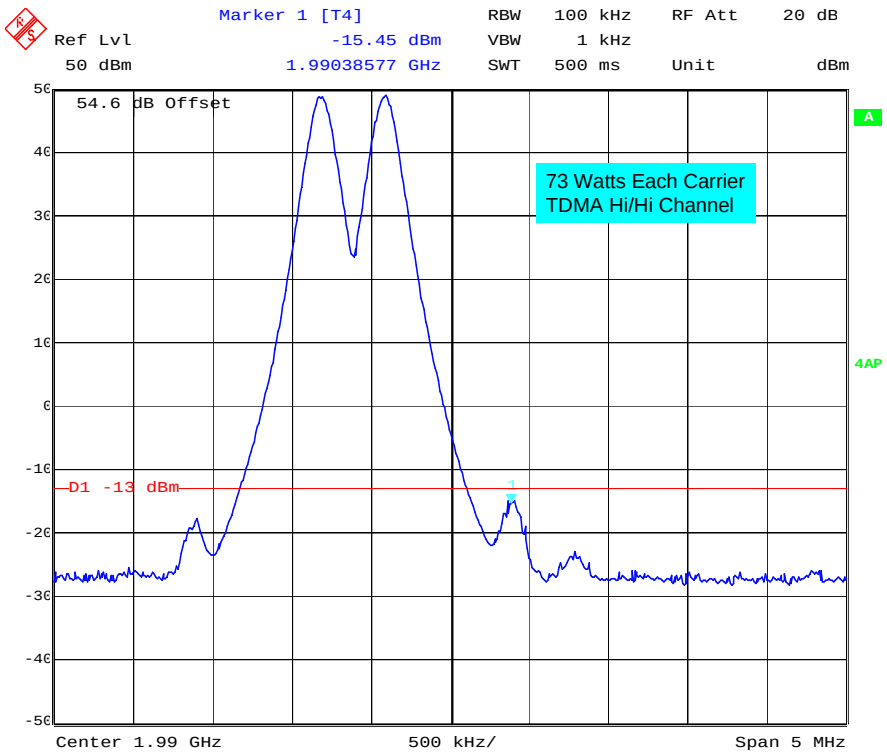
Plot:



TDMA Lo/Lo Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

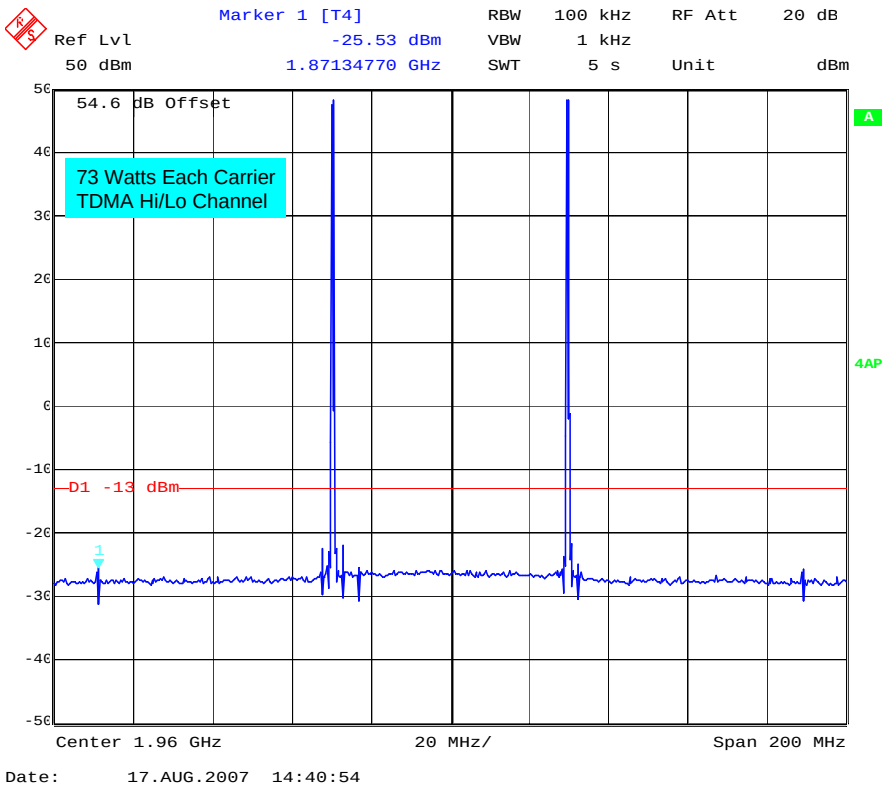
Plot:



TDMA Hi/Hi Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

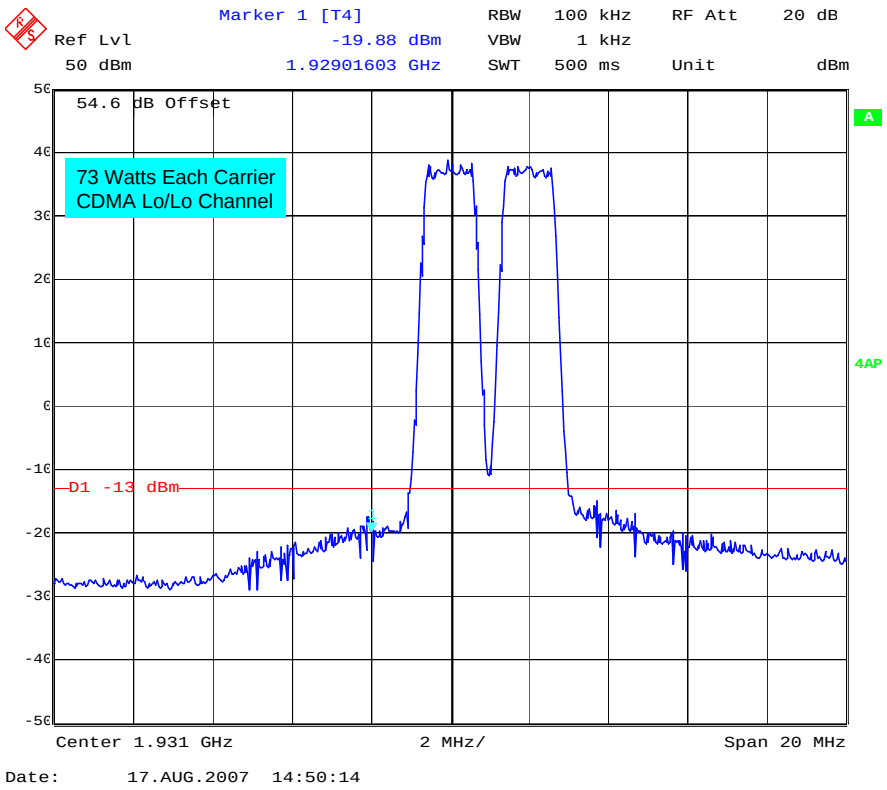
Plot:



TDMA Hi/Lo Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

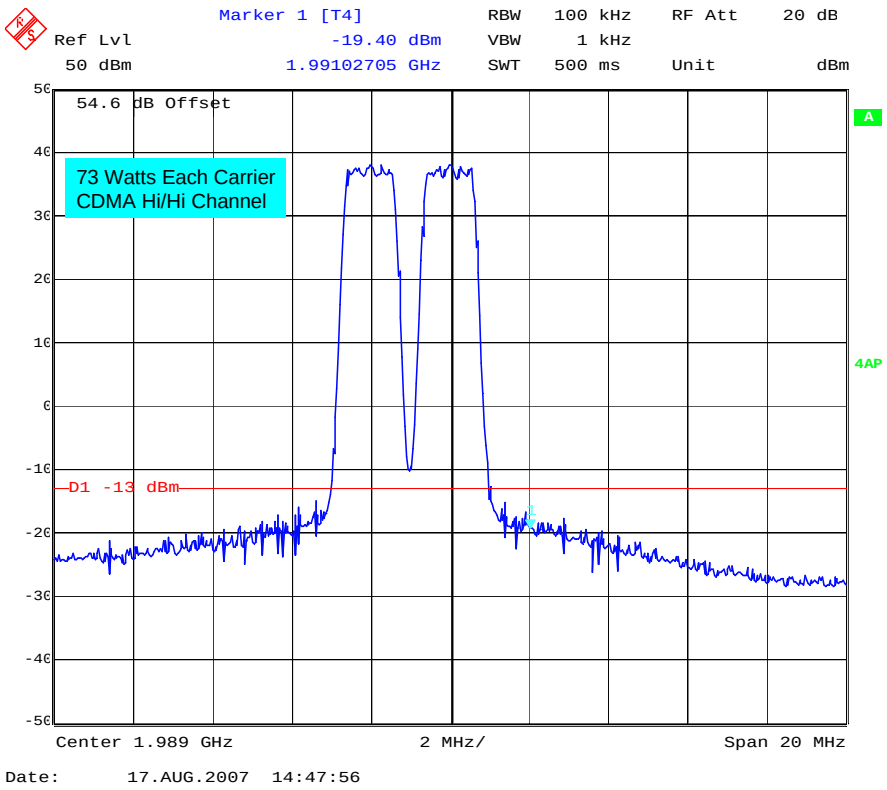
Plot:



CDMA Lo/Lo Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

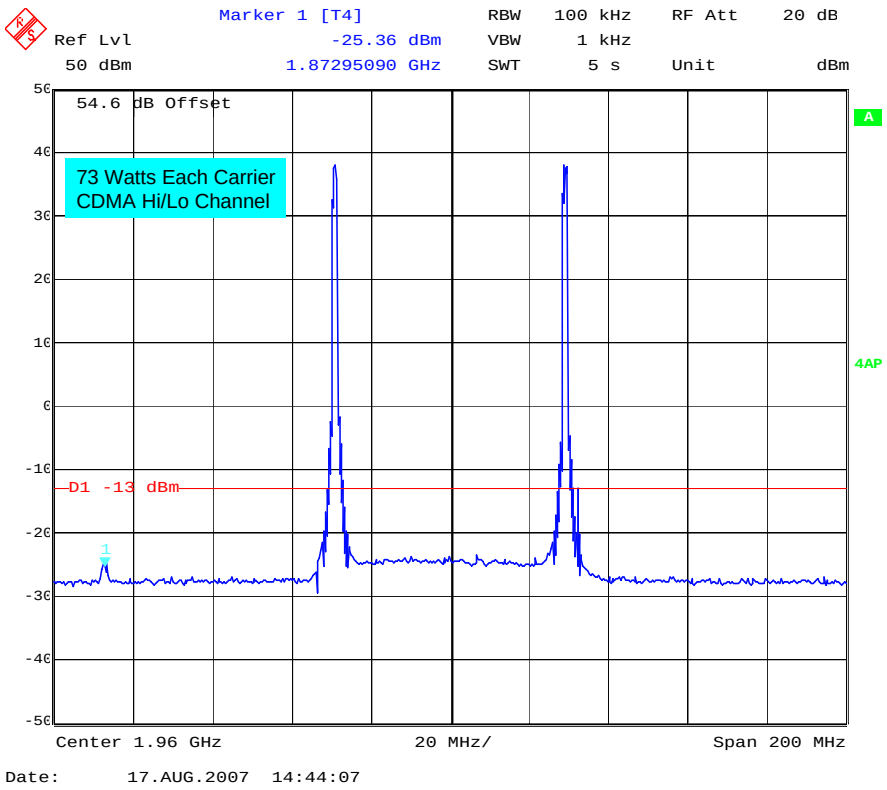
Plot:



CDMA Hi/Hi Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

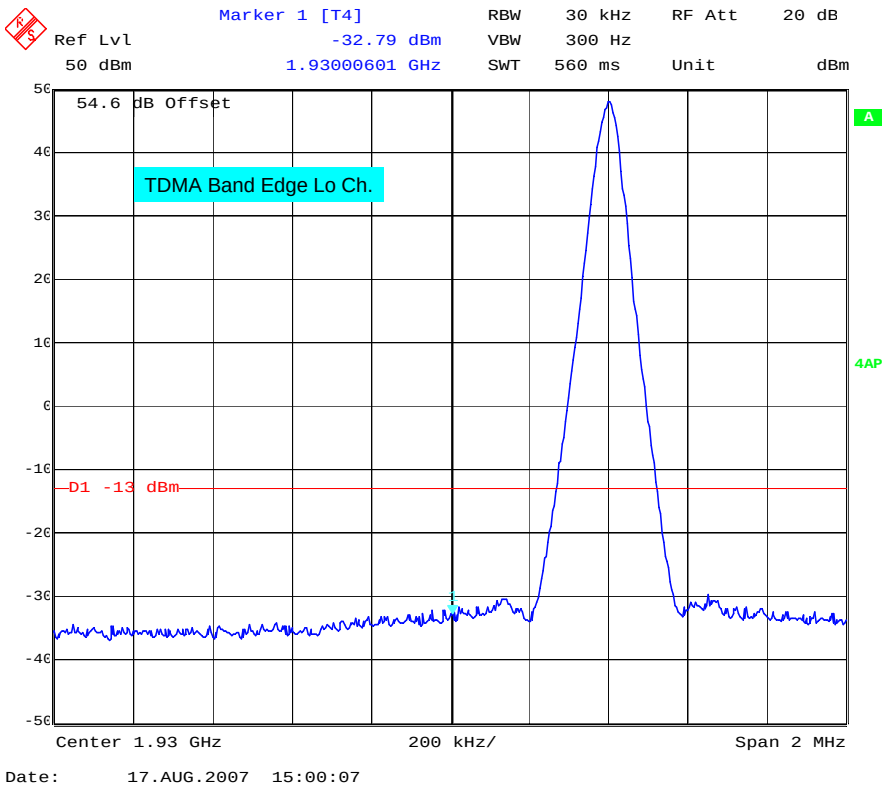
Plot:



CDMA Hi/Lo Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

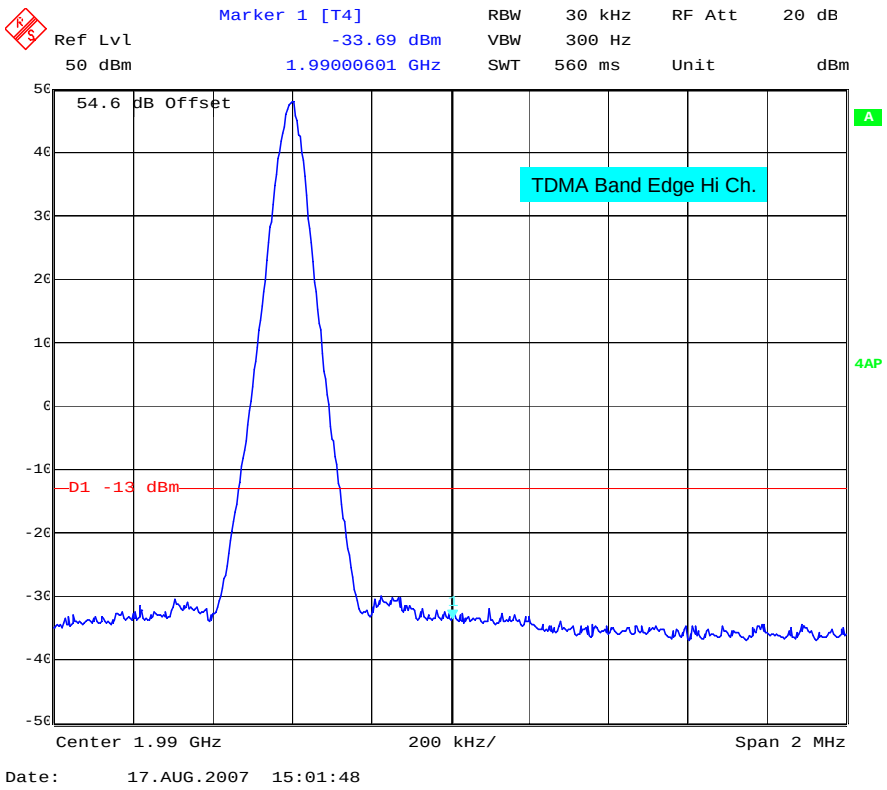
Plot:



TDMA Band Edge Lo Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

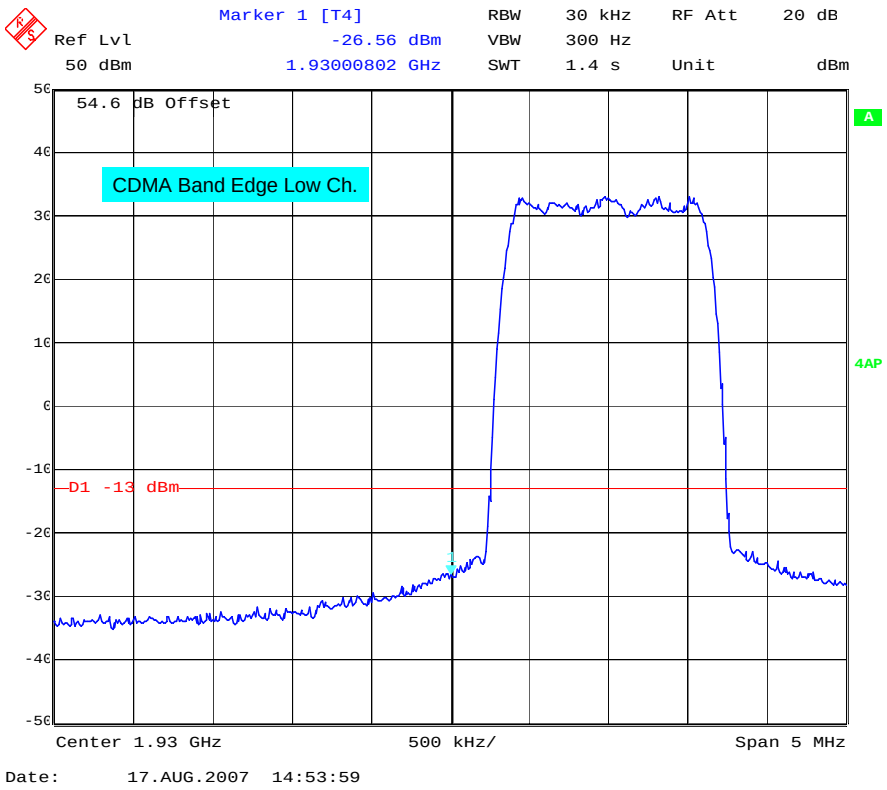
Plot:



TDMA Band Edge Hi Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

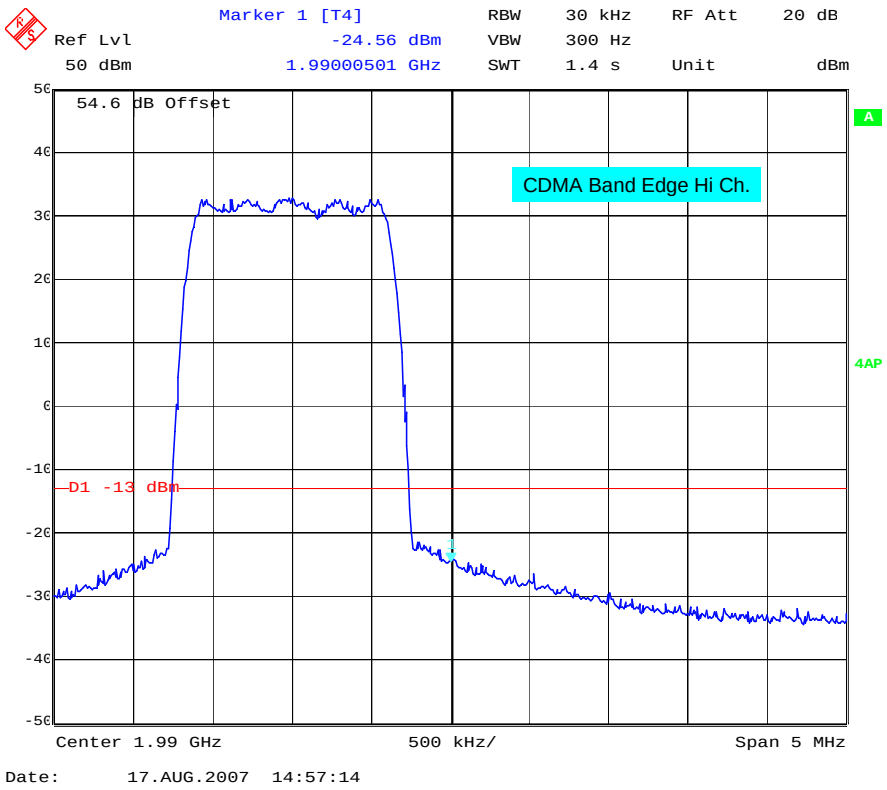
Plot:



CDMA Band edge Lo Channel

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Plot:



CDMA Band Edge Hi Channel

Data:

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Mode	Frequency MHz	RBW/VBW	Peak EUT Emission dBm	Limit dBm	Margin dB
CDMA 1930	5794	100 kHz	-28.4	-13	-15.4
CDMA 1960	5880	100 kHz	-28.43	-13	-15.43
CDMA 1989	5967	100 kHz	-30.24	-13	-17.24
TDMA 1930.4	5791	100 kHz	-26.56	-13	-13.56
TDMA 1960	5880	100 kHz	-28.5	-13	-15.5
TDMA 1989.6	5969	100 kHz	-26.96	-13	-13.96

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Method:

Applies to the following Standards:
TIA-603-C (land mobile)
FCC 47 CFR Part 90 (land mobile)
RSS-119 (land mobile/fixed)

PROCEDURE
A)Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the test site, in its normal operating position. If the transmitter is intended to be hand held, the testing must be repeated with the transmitter in three orthogonal orientations.
B)Attach a non-radiating standard load to the antenna port, using the shortest possible interconnecting shielded cable. For devices with integral, antennas, run the test with the integral antenna operating.
C)Select the larger test distance consistent with the site noise floor; use 10m if possible, 3m if ambient noise requires a shorter distance.
D)Typical spectrum analyzer settings are given below. Refer to the table above, and the specific standard, for correct settings.
1)RBW = 10 kHz below 1 GHz, 1 MHz above 1 GHz.
2)VBW = 300 kHz below 1 GHz, 3 MHz above 1 GHz.
3)Sweep speed sufficiently slow to maintain calibration.
4)detector mode = positive peak.
E)Place the test antenna in its vertical polarization position; use an attenuator with 6 - 10 dB loss (A) as a matching pad between the test antenna and its cable.
F)The spectrum is to be scanned from the lowest RF frequency generated in the equipment to the 10th harmonic of the carrier, excepting the occupied bandwidth. Specific standards may require a different maximum frequency.
G)For each spurious emission detected, raise and lower the test antenna from 1 to 4m with the transmitter facing the test antenna, and record the highest received signal from the transmitter in dBmR. Rotate the turntable through 360 degrees to find the maximum emission value at that frequency.
H)Rotate the test antenna to its horizontal polarization position. Repeat steps g) and h).
I)Replace the transmitter under test with a substitution antenna whose gain above that of a half-wave dipole is known to be G(dBd). Refer to the illustration below.
J)Place the center of the substitution antenna at the same location on the table as the transmitter under test, using vertical polarization for both substitution and test antennas. Connect the substitution antenna to the signal generator, using a cable with known signal loss LC. Use an attenuator with loss S as a matching pad between the substitution antenna and its cable.
K)Raise the test antenna from 1m to 4m to maximize the analyzer display from the substitution antenna. At the maximum display value for each spurious frequency, adjust the signal level dBmT so that the spectrum analyzer displays the maximum signal observed in steps g) - h) above.
L)Calculate the output power of the transmitter in ERP according to:
spurious power in (dBm) = dBmT - LC - S + dBd
M)Repeat steps k) - l) for both antennas horizontally polarized. Record the spurious power separately for the vertical and horizontal polarizations.

NOTE: For FCC purposes, emissions > 20 dB below the regulatory spurious limit do not have to be determined by the substitution method. The regulatory limit for many licensed transmitters is -13 dBm (50 ?W) or 84.4 dBuV/m at 3m.

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.

+/- 3.85 dB

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, Horn, 0.7 - 18 GHz	A.H. Systems	SAS-200/571	213058a	02/26/2007	02/26/2008
Antenna, Horn, 1-18 GHz	EMCO	3115	213061	04/02/2007	04/02/2008
Cable, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E202	01/15/2007	01/15/2008
Cable, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	01/15/2007	01/15/2008
Cable, 40 GHz, 2.9, 2m	Megaphase	TM40 K1K1 80	E404	05/30/2007	05/30/2008
Coaxial Cable, 7m, N-N, 18 GHz	Storm Products Co.	PR90-206-7MTR	ST1	01/11/2007	01/11/2008
Filter, Band Reject, Cavity Design, 50 dB	Wainwright Inst.	WRCG 1930/1990	200079	12/18/2006	12/18/2007
High Pass Filter, 3 GHz	Filtek	HP12/3000-5AB	213154a	03/14/2007	03/14/2008
Preamplifier, 30MHz to 26GHz, 32 dB gain	Miteq	JS4-00102600-29-	015533	06/20/2007	06/20/2008
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	03/12/2007	03/12/2008

Results: The sample tested was found to Comply.

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Data:

Date: 08/22/2007 **Limit:** -13dBm

Frequency Range (MHz): 2000-20000 **Test Distance (m):** 3

Input power: **Modifications for compliance (y/n):** No

A	B	C	D	E	F	G	H	I
Ant. Pol. (V/H)	**Frequency MHz**	**SG Setting dBm**	**Antenna Gain dBi**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dBm**	**Limit dBm**	**Margin dB**
1931, CDMA								
V	3860.786	-34.5	11.0	1.0	0.0	-22.5	-13.0	-9.5
1960, CDMA								
V	3920.195	-26.9	10.5	1.0	0.0	-15.4	-13.0	-2.4
1930.4, TDMA								
V	3860.786	-34.5	11.0	1.0	0.0	-22.5	-13.0	-9.5
1960, TDMA								
V	3919.989	-27.3	10.5	1.0	0.0	-15.8	-13.0	-2.8
Calculations		G=C+D+E-F		I=G-H				

Note: There were no other emission detected within 20 dB of the limit.

10.0 Revision History (Revision History)

Method:

Document the history of the report.

Data:

Revision Level	Date	Report Number	Notes
Original issue	August 31, 2007	3131114Atl-007	--
1	January 22, 2008	3131114Atl-007	Corrected references to 150 Watts and 290 Watts. 150 Watt is the output of the duplexer. 190 Watts is the output of the MCPA. Updated Section 5 to clearly show the output power measured.