TEST REPORT

Report Number: 3115850ATL-004

February 26, 2007

Product Designation: BTS 4000 RM 850MHz

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

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

Client:
Airnet Communications Corp
3950 Dow Road
Melbourne, FL 32934
Contact: Steve Cassidy
Phone: 321.953.6616
Fax: 321.757.0624

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)	02/12/2007	
5.0	Description of test facility (Test Site Location)		
6.0	RF Output Power (Conducted) (FCC Part 2.1046 Cond)	02/12/2007	PASS
7.0	Occupied Bandwidth (FCC Part 2.1049)	02/13/2007	PASS
8.0	Spurious emissions at antenna terminals (FCC Part 2.1051)	02/13/2007	PASS
9.0	Field strength of spurious radiation (FCC Part 2.1053)	02/12/2007	PASS
NA	Conducted emissions on AC power lines (Conducted Emissions) was waived due to EUT is DC powered only.		

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
GSM Base Station	AirNet Communications	BTS4000RM (850 MHz)	ANCCAN0703BRM00004

EUT receive date:	2/12/2007
EUT receive condition:	Good

Description of EUT provided by Client:
The BTS4000RM is a 19" rack mounted GSM cellular base station. The unit consists of a baseband processing unit (BPU) module and a high power multi-carrier amplifier (HPA) module. This unit provides high capacity GSM and EDGE services in a compact form factor.

EUT Operation and Exercising:
The BPU was configured using test functions to produce GSMK or 8PSK modulated carriers. The data streams consist of pseudo-random data. The BPU then upconverts the baseband signal to the final RF frequency. The upconverted signal is then sent to the multi-carrier amplifier module for amplification for over the air transmission. All non-RF ports were either terminated or configured for loopback.

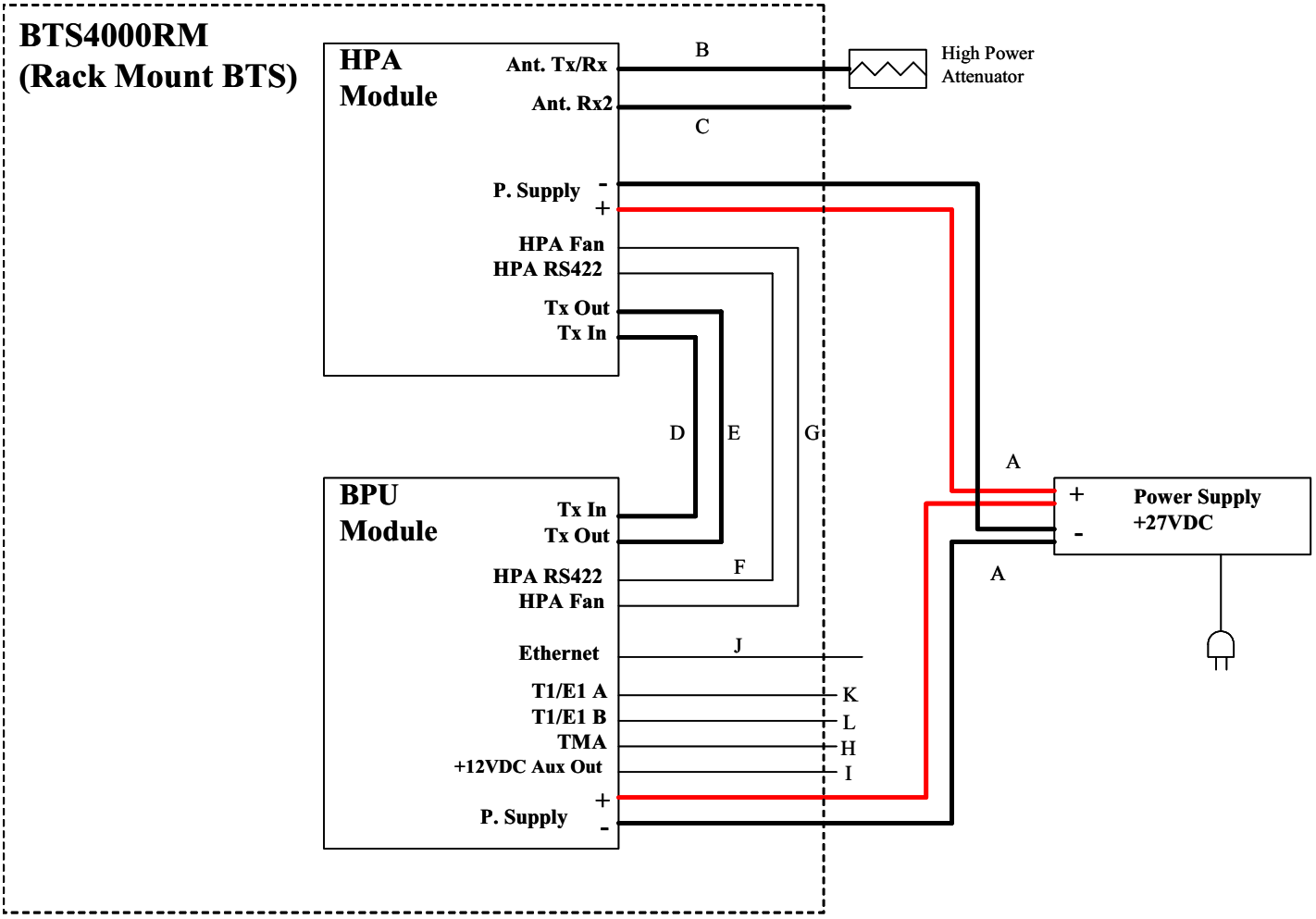
4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

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

Photo:

BTS4000RM Radiated Emissions Setup



Block Diagram

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 Cables (2)	3'	None	None	DC Power Supply	BPU and HPA Modules
B	Antenna Tx/Rx	25'	Coax	None	HPA Module	50 Ohm Termination
C	Antenna Rx2	25'	Coax	None	HPA Module	50 Ohm Termination
D	Tx In Cable	3'	Coax	None	BPU Module	HPA Module
E	Tx Out Cable	3'	Coax	None	HPA Module	BPU Module
F	HPA RS422	3'	None	None	BPU Module	HPA Module
G	HPA Fan	3'	None	None	BPU Module	HPA Module
H	TMA	10'	None	None	BPU Module	Loopback
I	+12VDC Aux Out	6'	None	None	BPU Module	8 kOhm Termination
J	Ethernet	10'	None	None	BPU Module	Loopback
K	T1/E1 A	15'	None	None	BPU Module	Loopback
L	T1/E1 B	15'	None	None	BPU Module	Loopback

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
High Power Attenuator	JFW	50FH-030-100-2	n/a
AC to DC Power Supply	Powerstax Plc	R2250-A211	627000024
AC Power Strip	IBR	IBR12-20	U18549154
Power Amplifier	Airnet Communications, Inc.	G3L-850-135	VS00011N6E
Laptop PC	DELL	Inspiron 1150	3862

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 (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, 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
EMI Receiver	Hewlett Packard	8546A	211388	08/04/2006	08/04/2007
EMI Receiver, Preselector section	Hewlett Packard	85460A	211389	08/04/2006	08/04/2007

Results: The sample tested was found to Comply.

Photo:

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

Test set up

Data:

EUT Mode	Frequency MHz	Channel	RBW/VBW MHz	Measured Power dBm			Limit (1) dBm	Margin dB
				+60°C	+20°C	-30°C		
GSM	869.4	129 (Lo)	1 / 3		1.54		57	-55
	881.4	189 (Mid)	1 / 3		-0.15		57	-57
	893.6	250 (Hi)	1 / 3		1.18		57	-56
Edge	869.4	129 (Lo)	1 / 3		1.72		57	-55
	881.4	189 (Mid)	1 / 3		1.66		57	-55
	893.6	250 (Hi)	1 / 3		0.93		57	-56

Note (1): The limit is specified in Part 22.913 of the FCC rules
Note (2): Evaluation done on BDX transceiver section only as the Powerwave Amplifier was previously certified.

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.

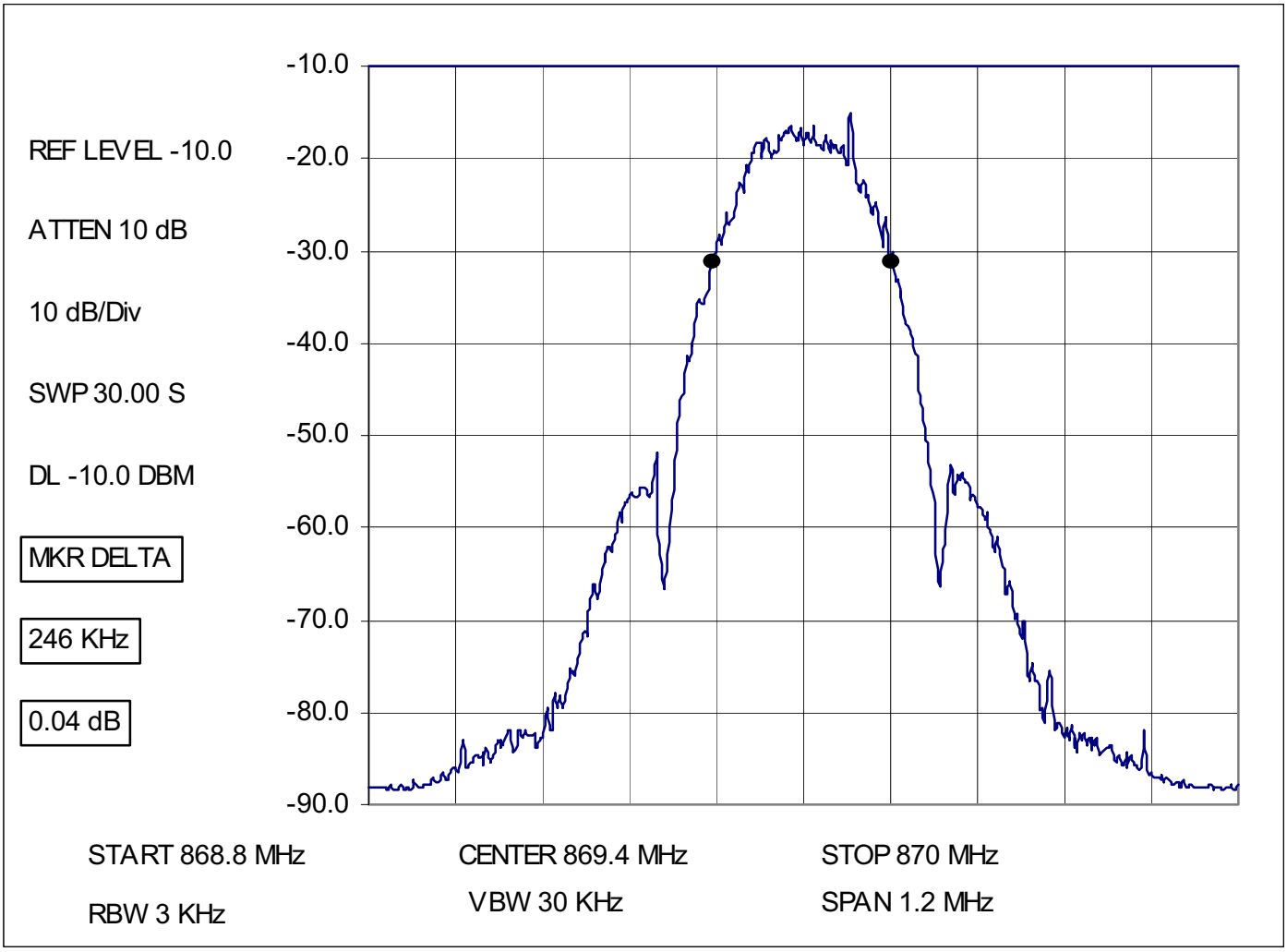
For amplifiers, the output bandwidth shall be less than or equal to the input bandwidth.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Attenuator, 10 dB, 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
Spectrum Analyzer	Hewlett Packard	8593E	213180	04/18/2006	04/18/2007

Results: The sample tested was found to Comply.

Photo:

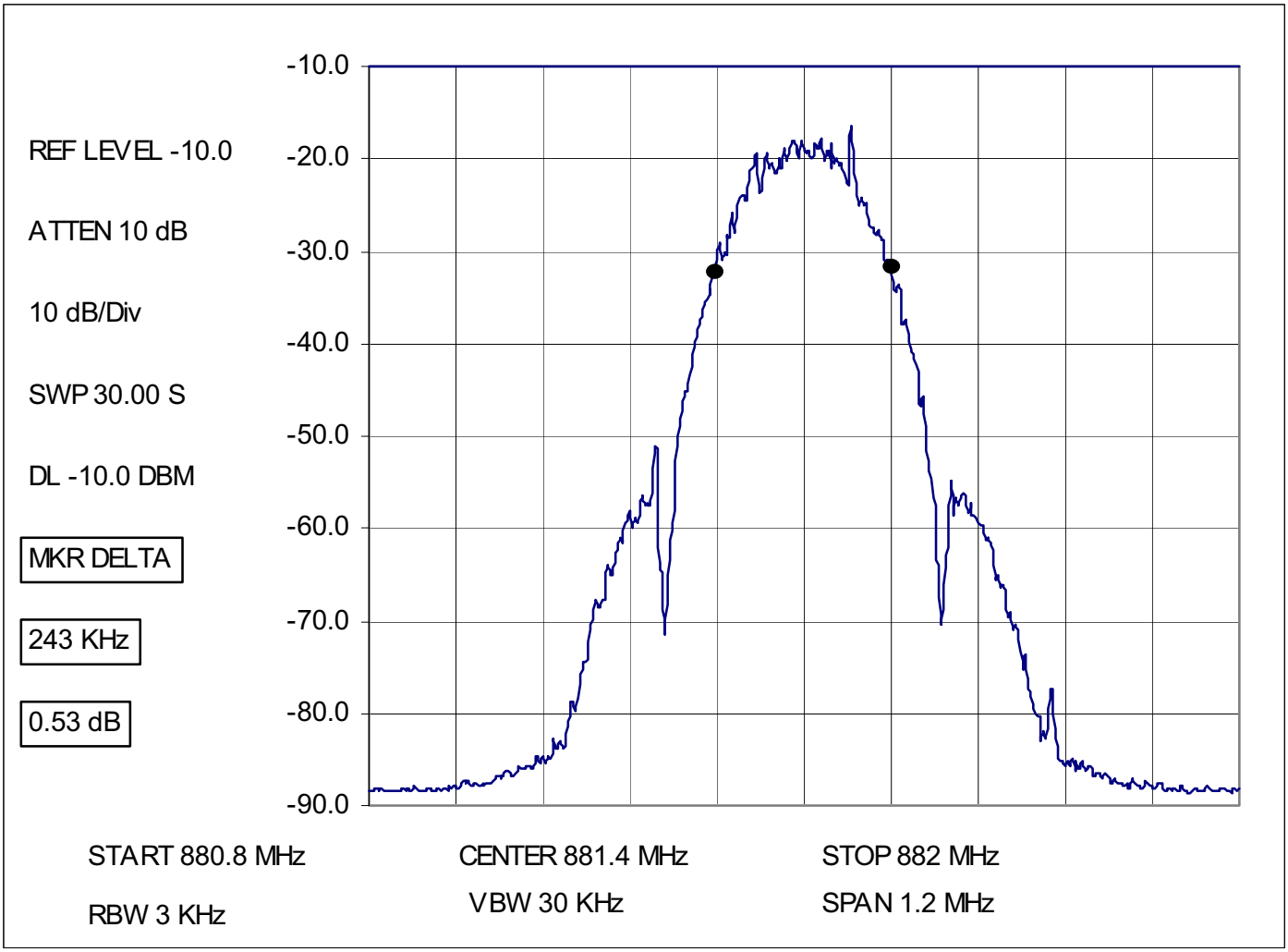


7.0 Occupied Bandwidth (FCC Part 2.1049)

GSM Mode Ch 129 Lo Ch

7.0 Occupied Bandwidth (FCC Part 2.1049)

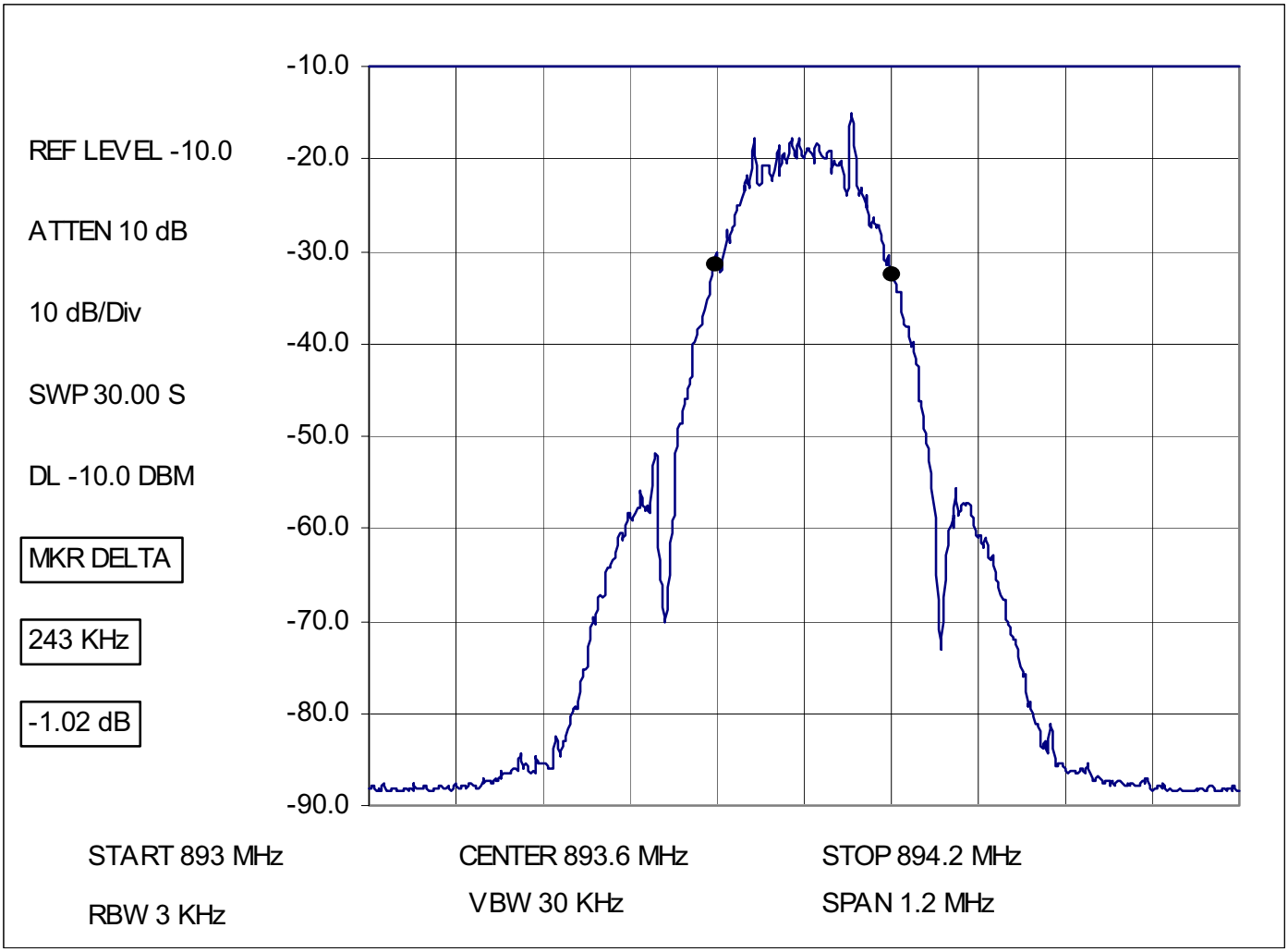
Photo:



GSM Mode Ch 189 Mid Ch.

7.0 Occupied Bandwidth (FCC Part 2.1049)

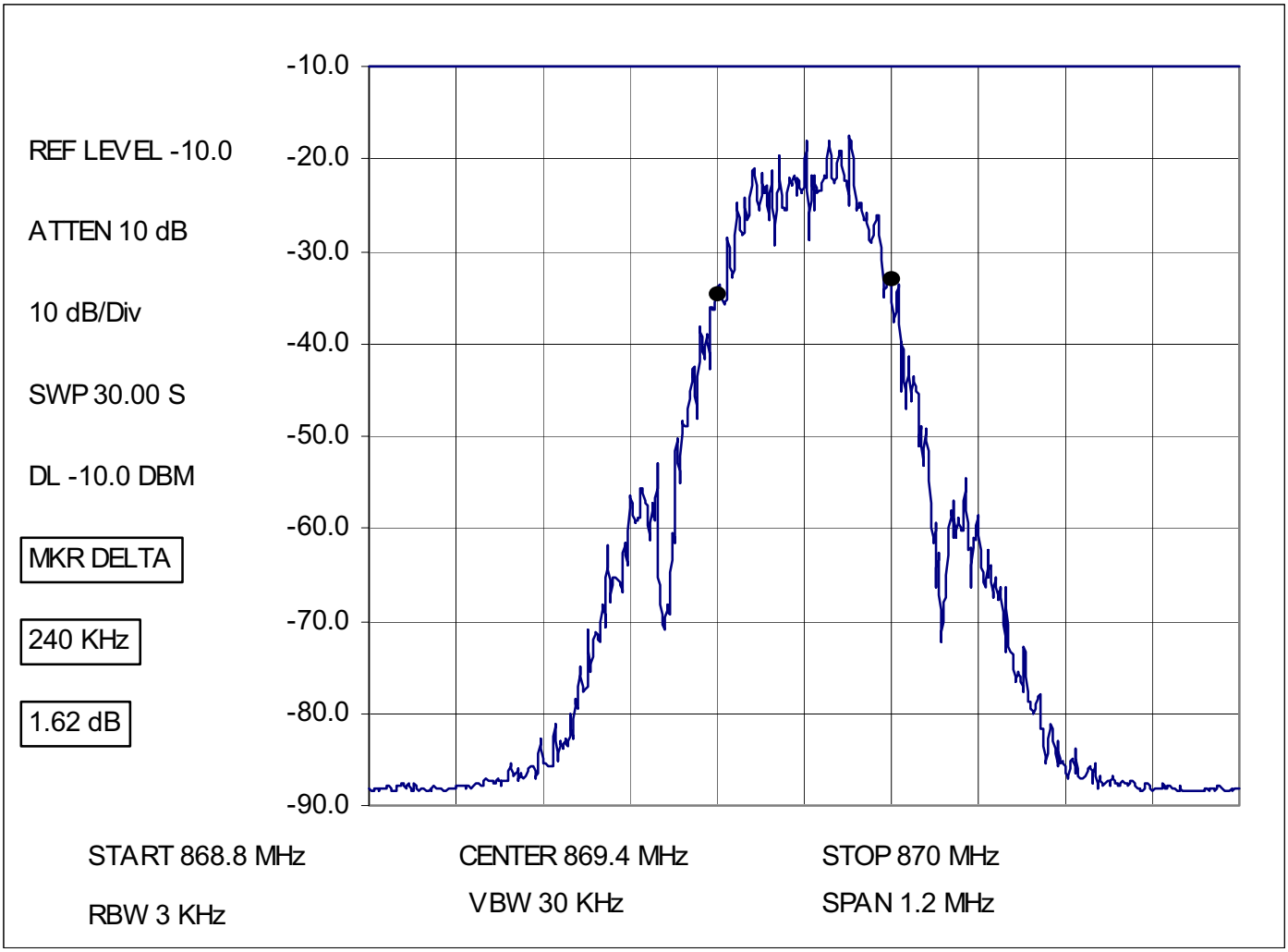
Photo:



GSM Mode Ch. 250 Hi Ch.

7.0 Occupied Bandwidth (FCC Part 2.1049)

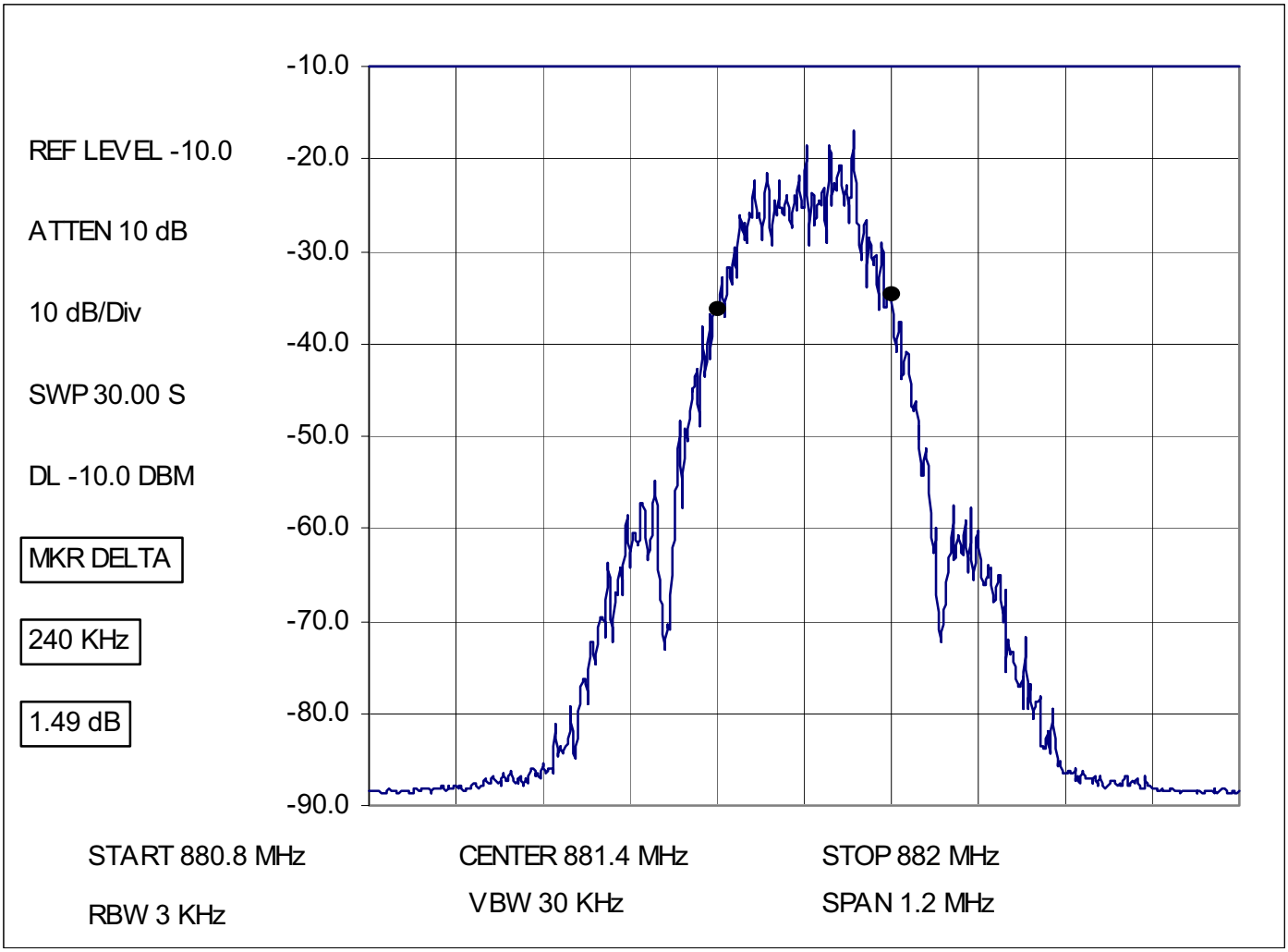
Photo:



EDGE Mode Ch. 129 Lo Ch.

7.0 Occupied Bandwidth (FCC Part 2.1049)

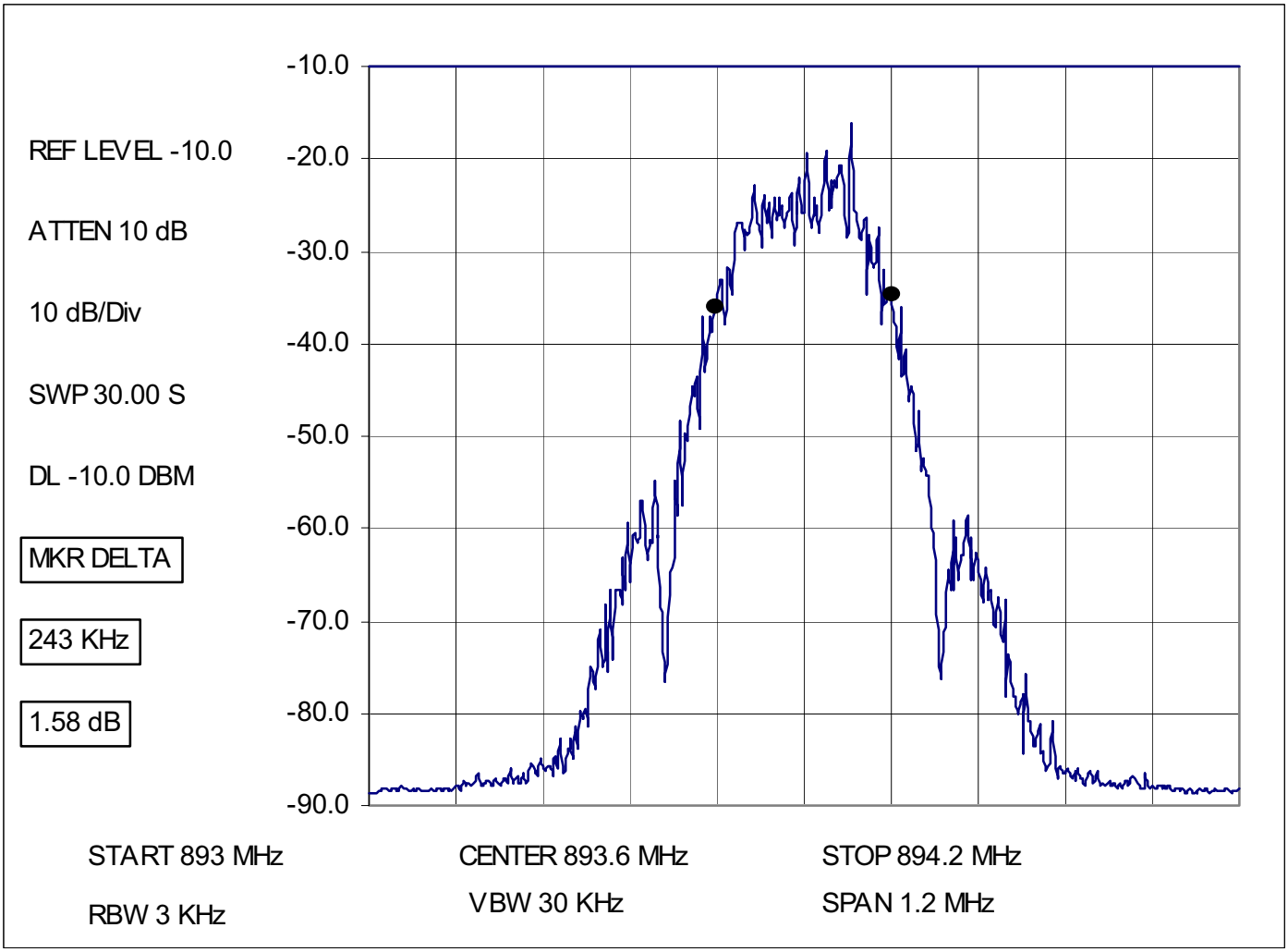
Photo:



EDGE Mode Ch. 189 Mid Ch.

7.0 Occupied Bandwidth (FCC Part 2.1049)

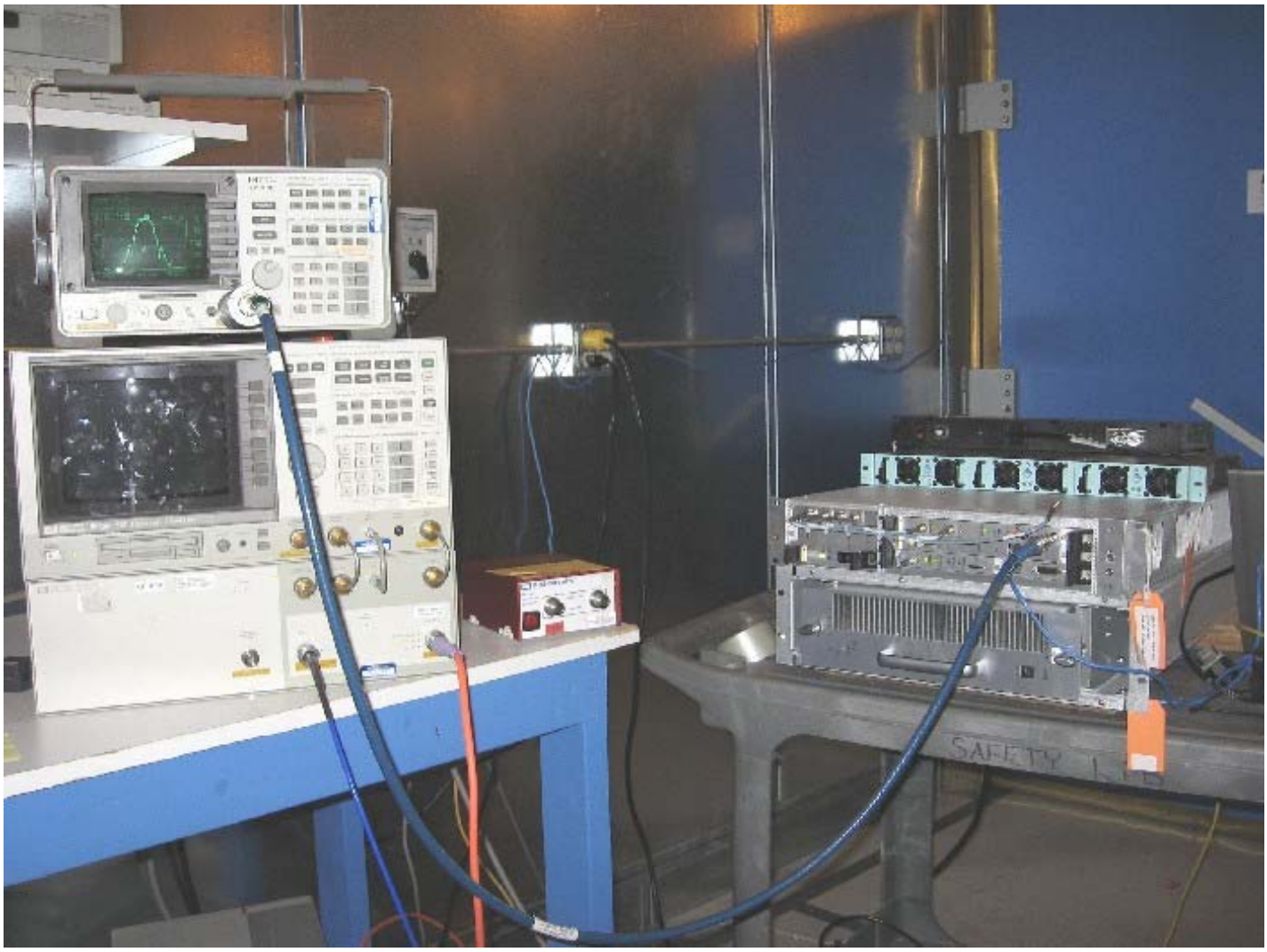
Photo:



EDGE Mode Ch. 250 Hi Ch.

7.0 Occupied Bandwidth (FCC Part 2.1049)

Photo:



Test set up

Data:

7.0 Occupied Bandwidth (FCC Part 2.1049)

Mode	Frequency MHz	Resolution Bandwidth (1)	Video Bandwidth	Sweep time Seconds	Output Measured Bandwidth KHz
GSM	869.4	3KHz	30KHz	30	246KHz
GSM	881.4	3KHz	30KHz	30	243KHz
GSM	893.6	3KHz	30KHz	30	243KHz
Edge	869.4	3KHz	30KHz	30	240KHz
Edge	881.4	3KHz	30KHz	30	240KHz
Edge	893.6	3KHz	30KHz	30	243KHz

Note (1): Greater or equal to 1% of emission bandwidth.

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, 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
Spectrum Analyzer	Hewlett Packard	8593E	213180	04/18/2006	04/18/2007

Results: The sample tested was found to Comply.

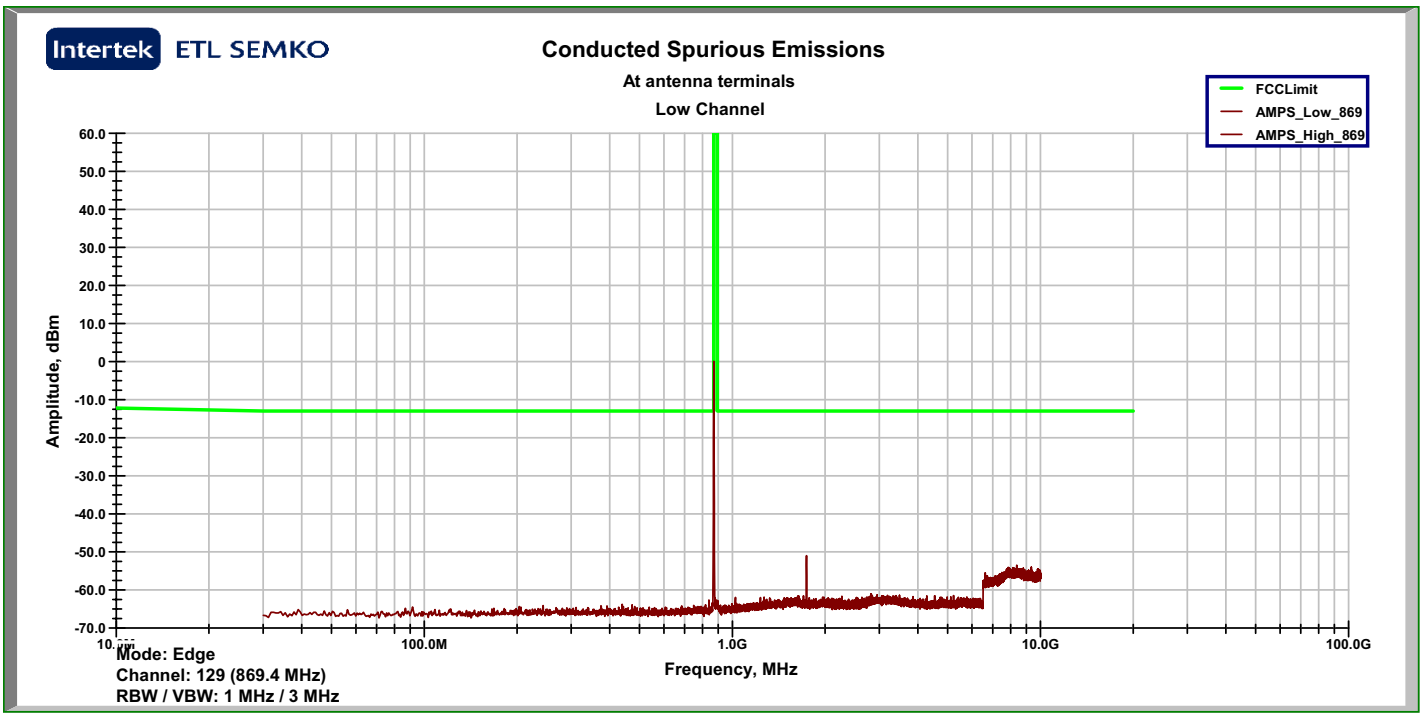
Photo:

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Test set up

Plot:

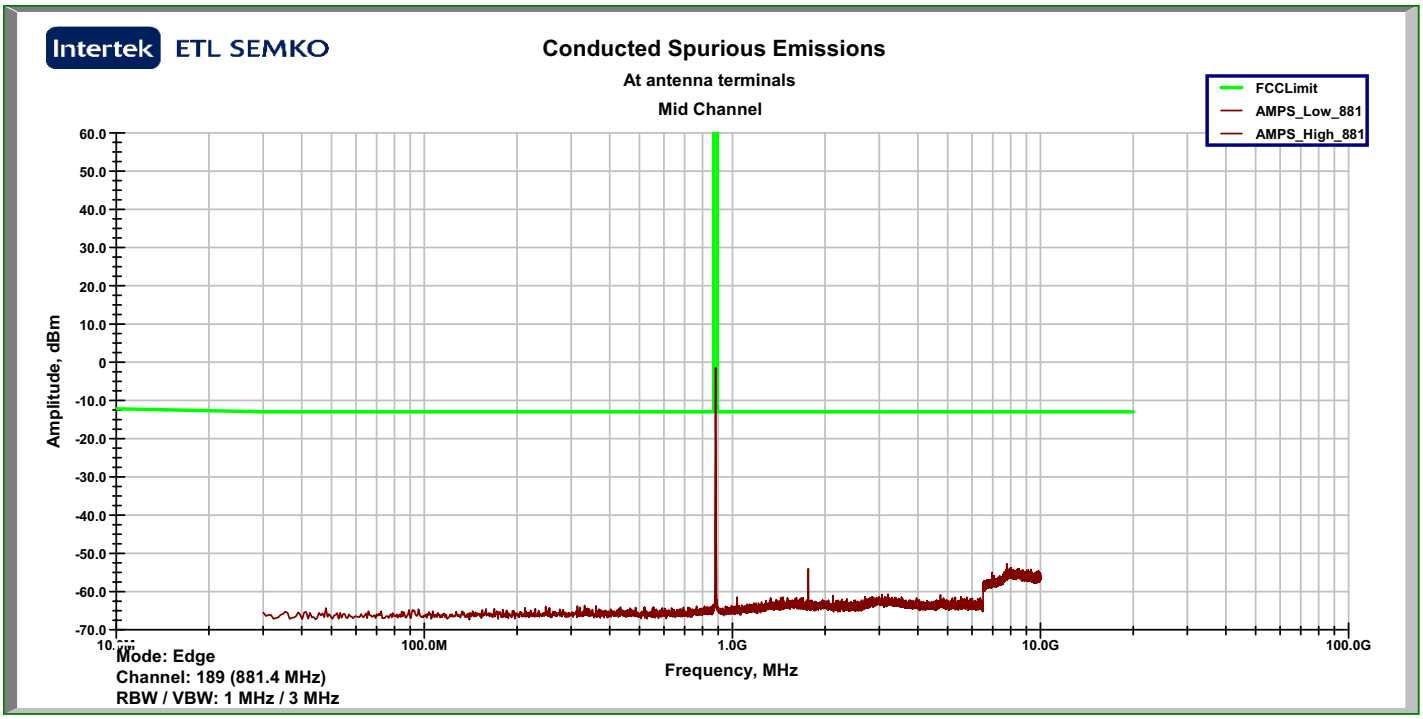
8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)



EDGE Mode Ch. 129 Lo Ch.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

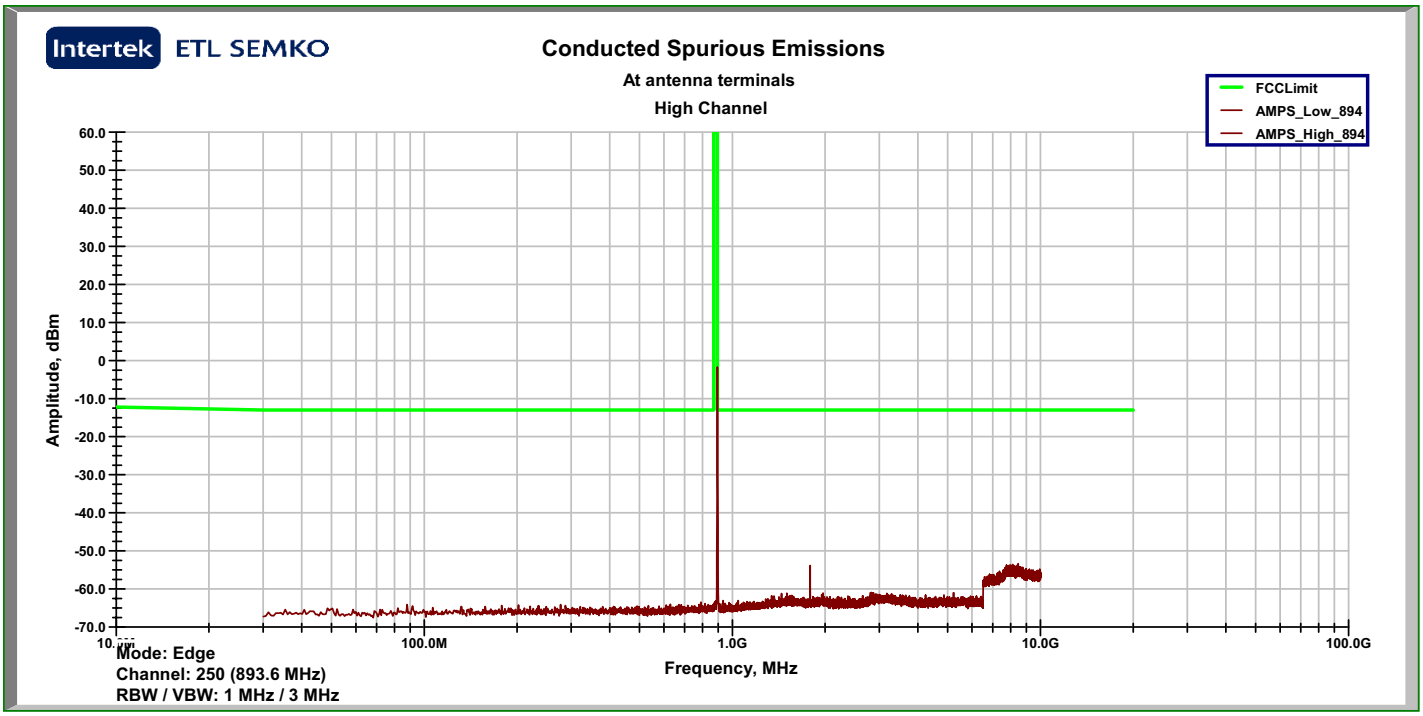
Plot:



EDGE Mode Ch. 189 Mid Ch.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

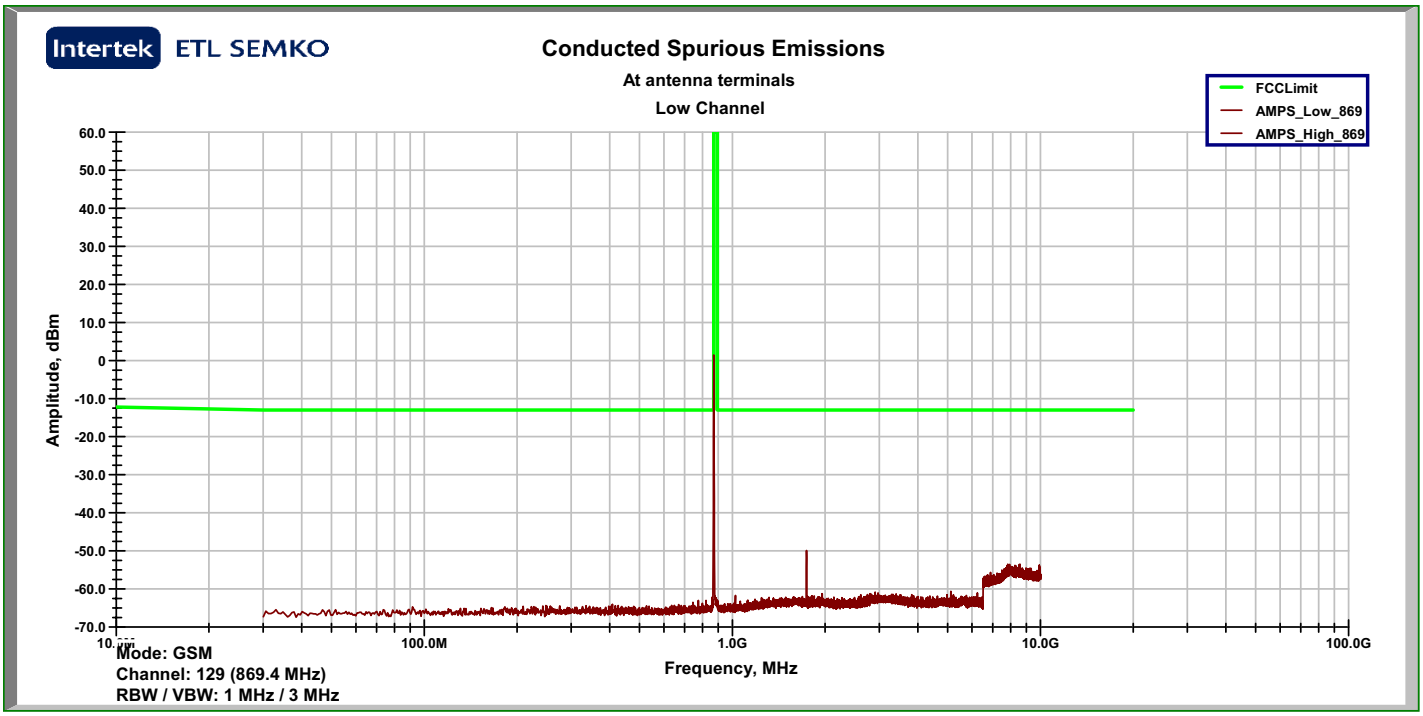
Plot:



EDGE Mode Ch. 250 Hi Ch.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

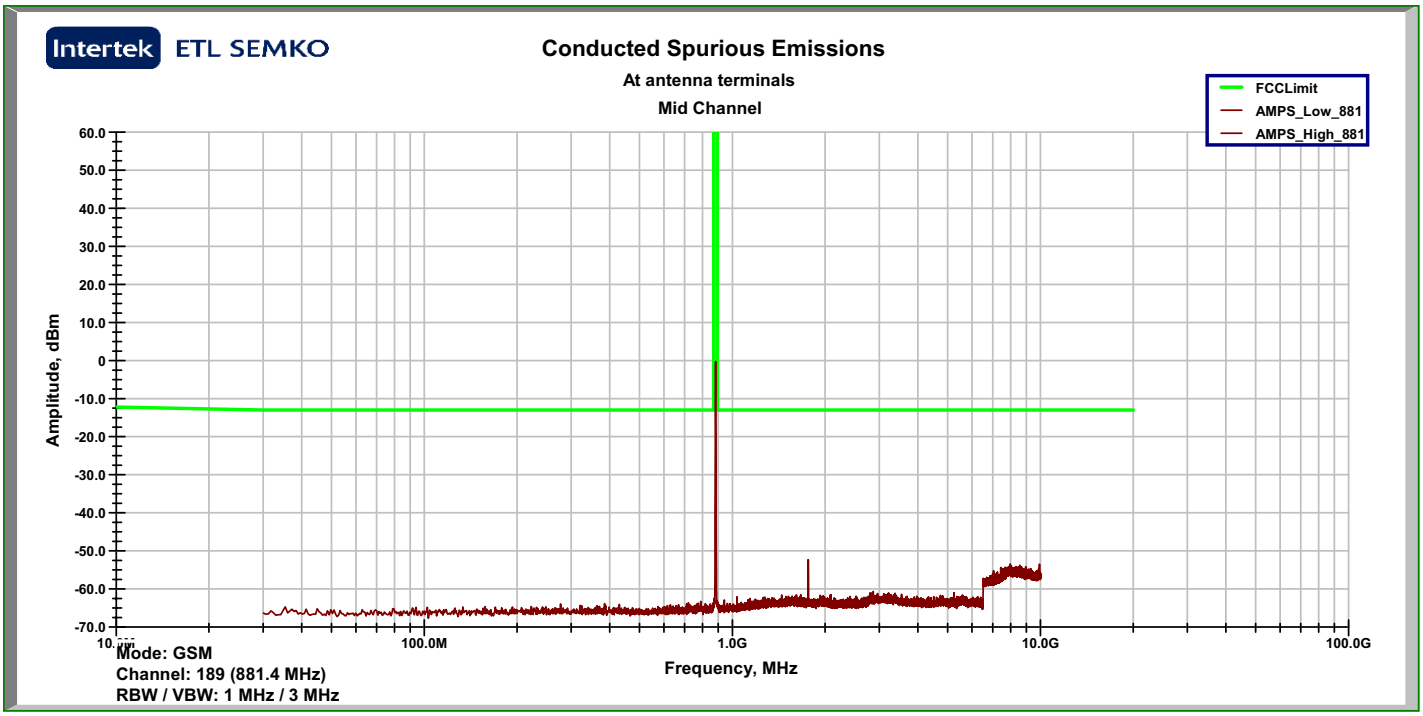
Plot:



GSM Mode Ch 129 Lo Ch

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

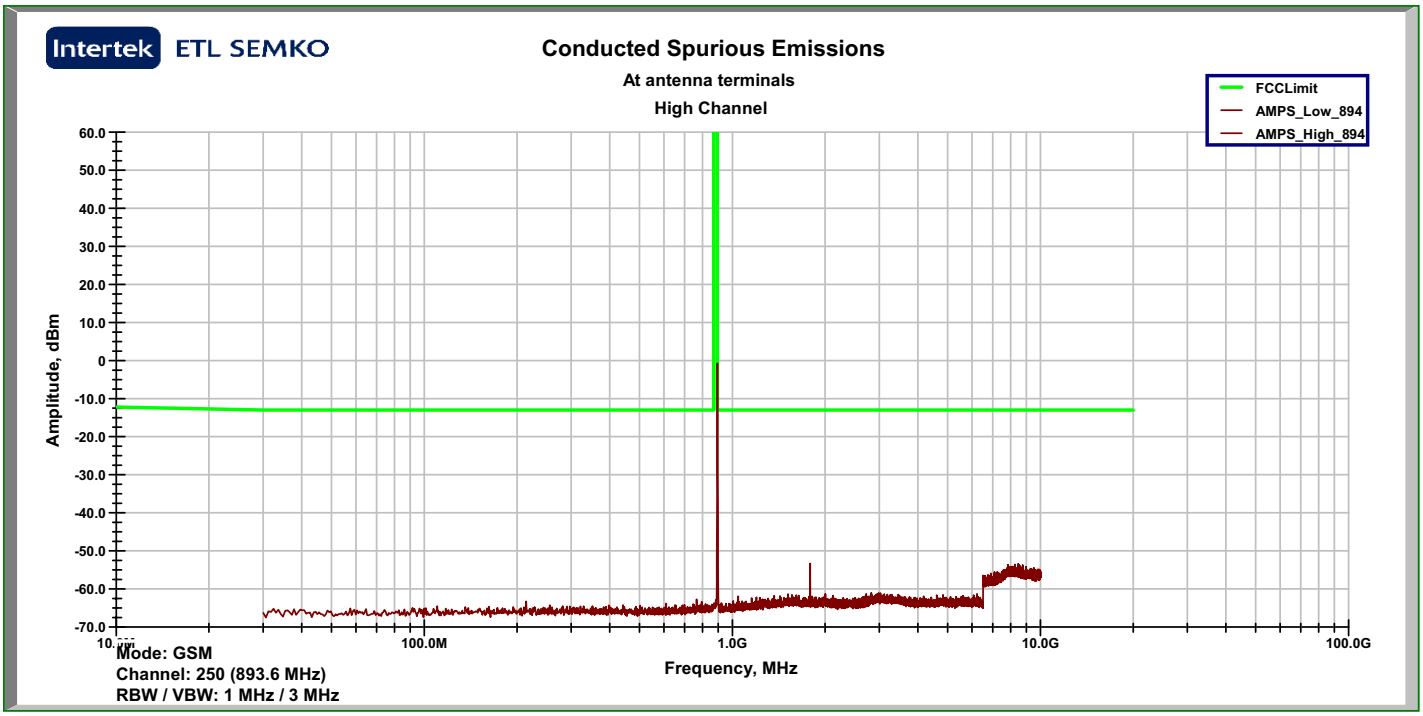
Plot:



GSM Mode Ch 189 Mid Ch.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

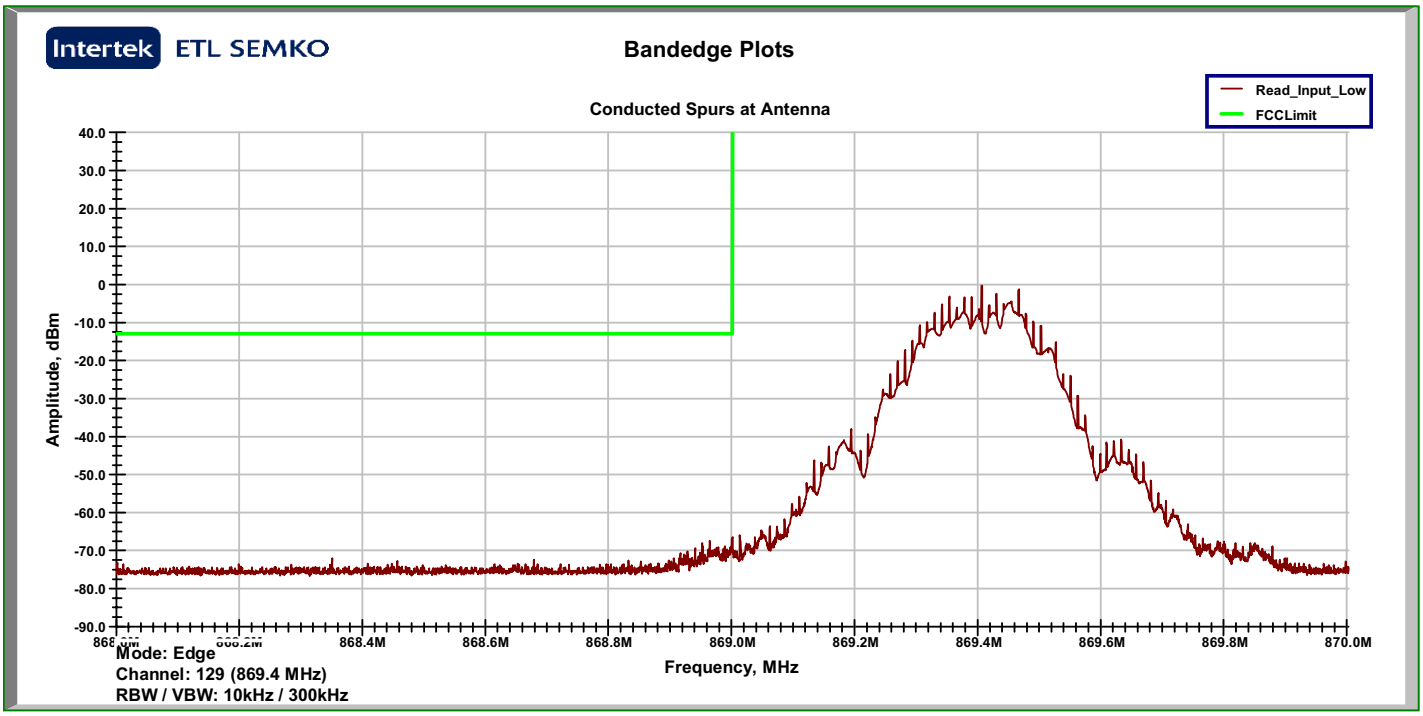
Plot:



GSM Mode Ch. 250 Hi Ch.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

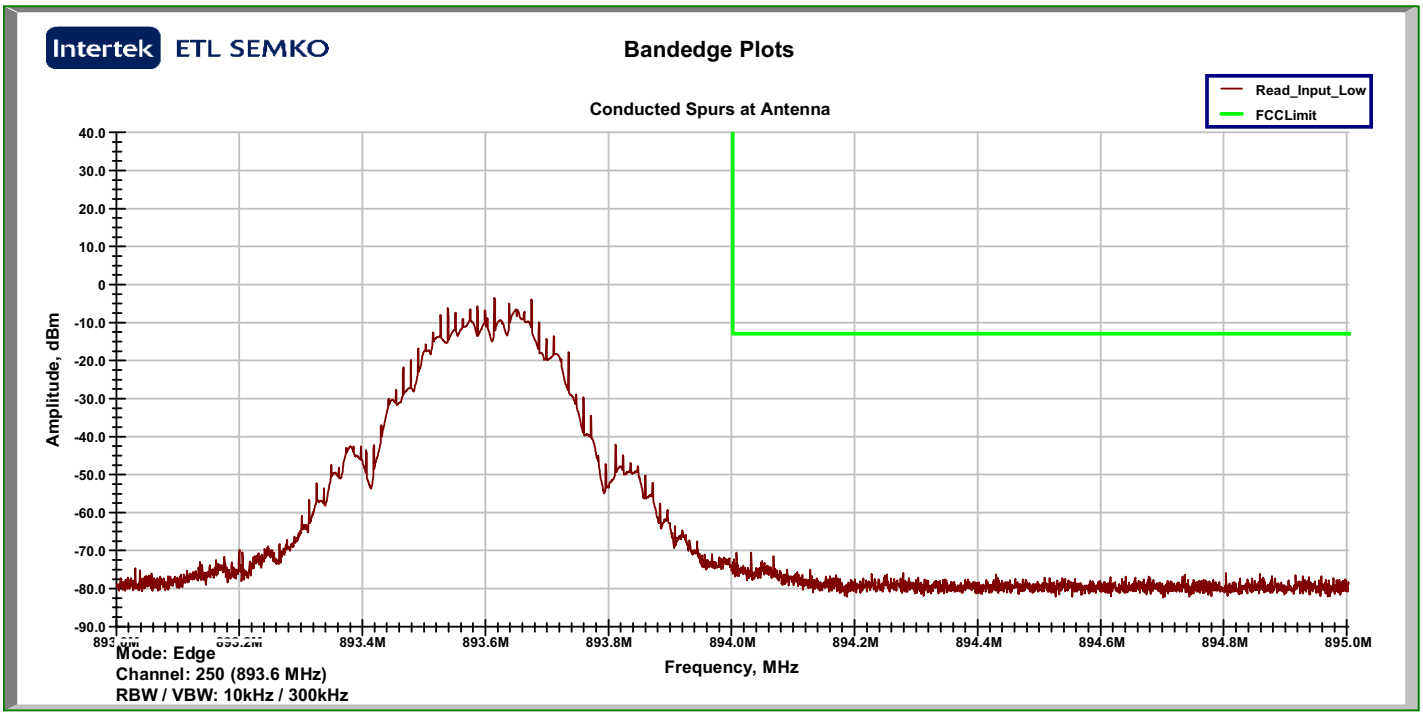
Plot:



EDGE Mode Ch. 129 Lo Ch.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

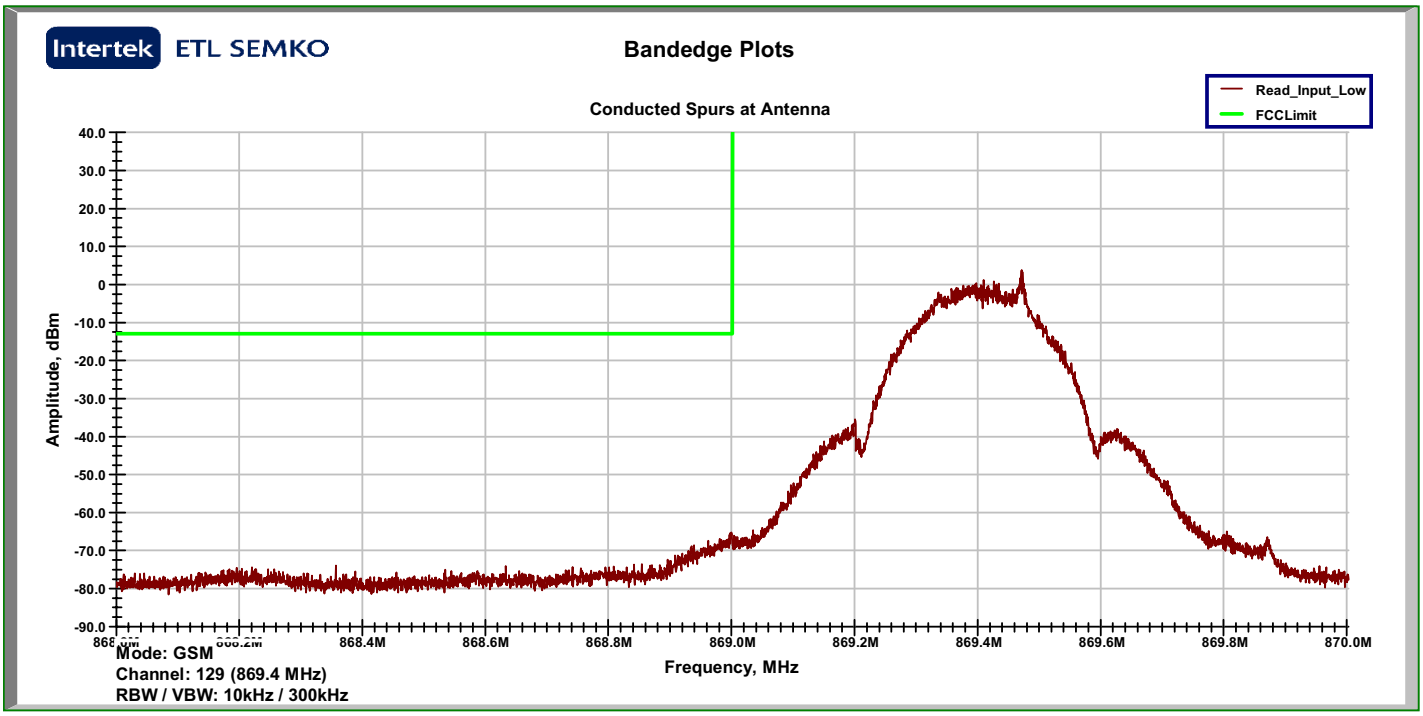
Plot:



EDGE Mode Ch. 250 Hi Ch.

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

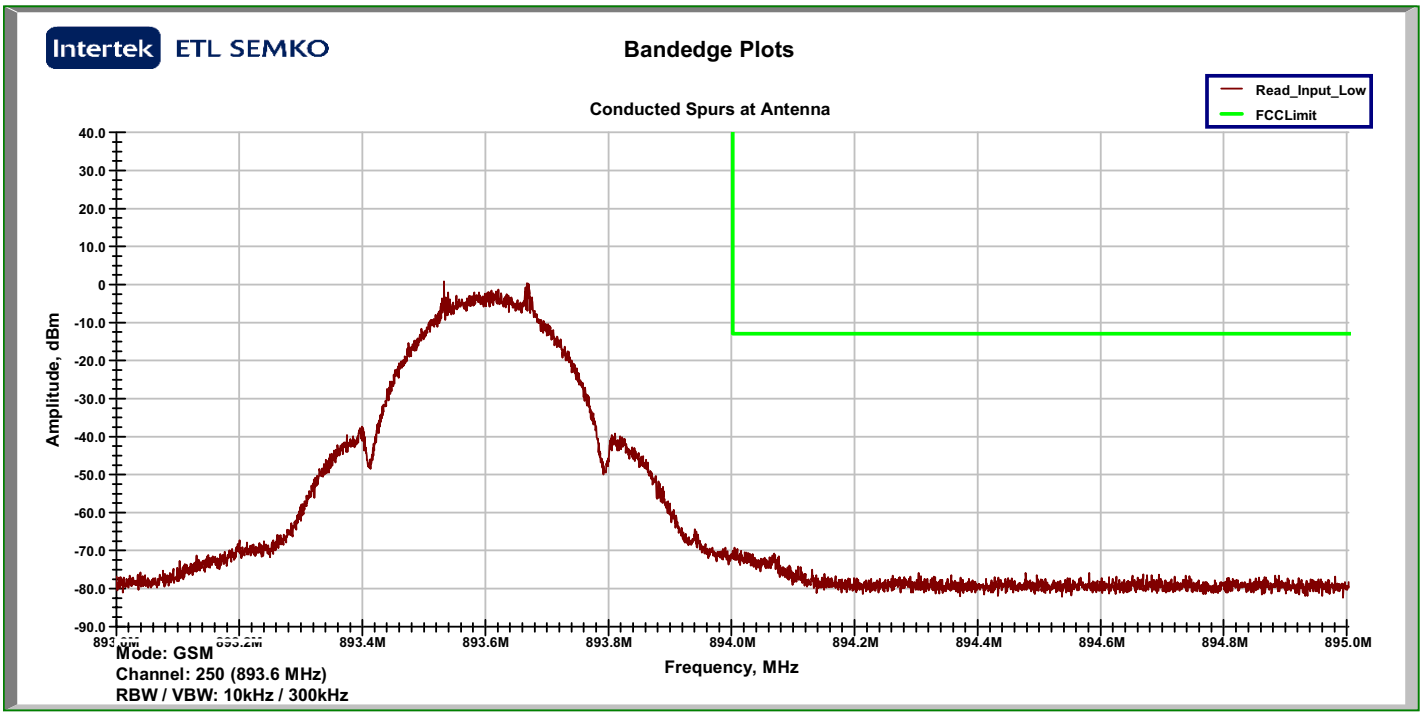
Plot:



GSM Mode Ch 129 Lo Ch

8.0 Spurious emissions at antenna terminals (FCC Part 2.1051)

Plot:



GSM Mode Ch. 250 Hi Ch.

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
Edge	1739	1MHz/3MHz	-49.6	-13	-36.6
Edge	1762	1MHz/3MHz	-53.7	-13	-40.7
Edge	1787	1MHz/3MHz	-53.8	-13	-40.8
GSM	1739	1MHz/3MHz	-49.9	-13	-36.9
GSM	1763	1MHz/3MHz	-52.3	-13	-39.3
GSM	1787	1MHz/3MHz	-53.3	-13	-40.3

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 uW) 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, 1-18 GHz	EMCO	3115	213061	03/28/2006	03/28/2007
Cable E05 (Formerly HS 1500 N-N)	Huber-Suhner	Sucoflex 104PEA	E05	05/11/2006	05/11/2007
Cable, 18 GHz, N, 118 inches	Megaphase	TM18 NKNK 118	E201	01/15/2007	01/15/2008
Cable, 18 GHz, N, 394 inches	Megaphase	G919-NKNK-394	MP3	05/11/2006	05/11/2007
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
Preamplifier, 10 MHz to 2000 MHz, 30 dB gain	Mini-Circuits	ZKL-2	200069	11/29/2006	11/29/2007
Preamplifier, 30MHz to 26GHz, 32 dB gain	Miteq	JS4-00102600-29-	015533	01/10/2007	01/10/2008
Spectrum Analyzer	Hewlett Packard	8593E	213180	04/18/2006	04/18/2007

Results: The sample tested was found to Comply.

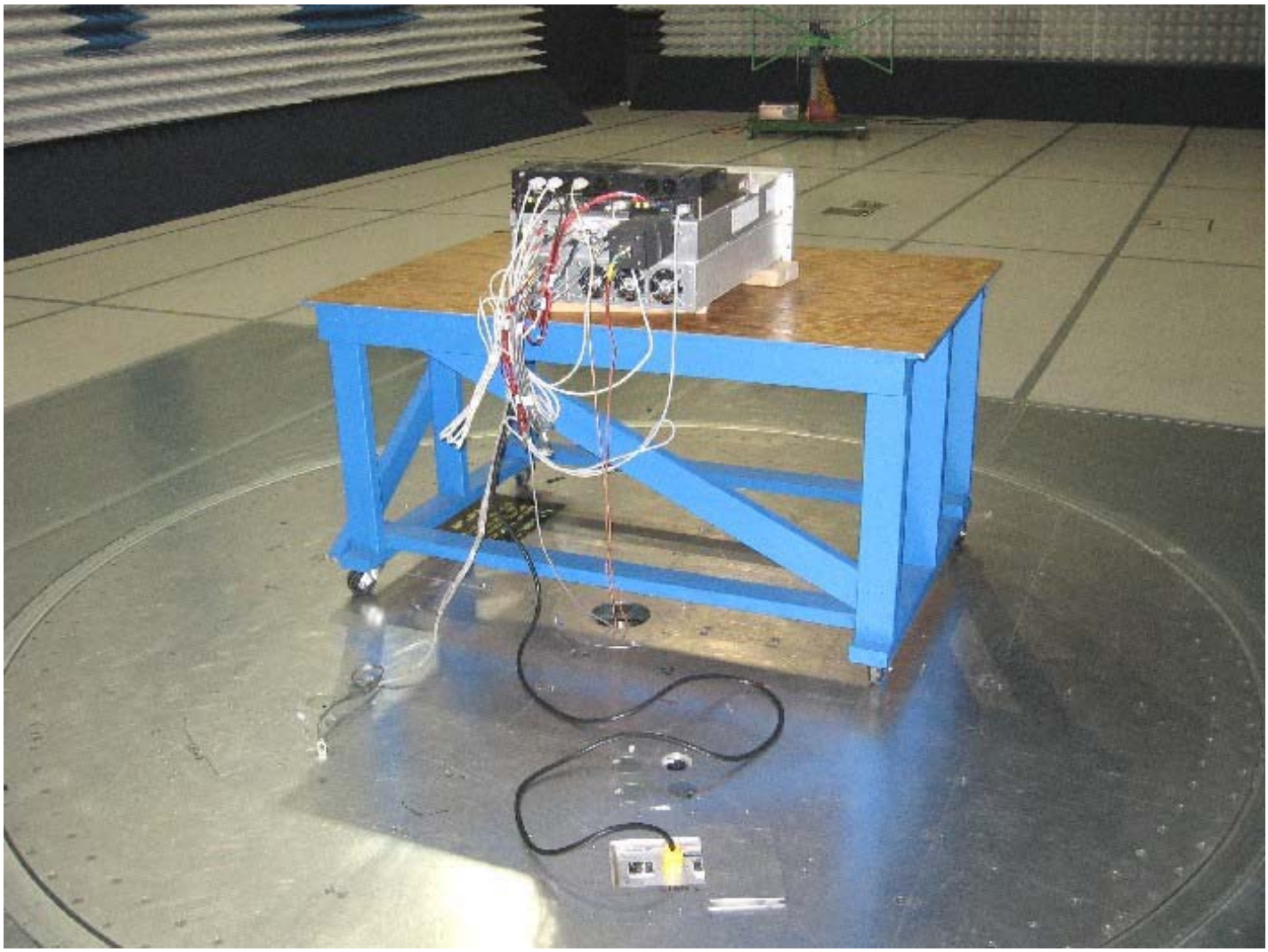
Photo:

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Test set up front

9.0 Field strength of spurious radiation (FCC Part 2.1053)

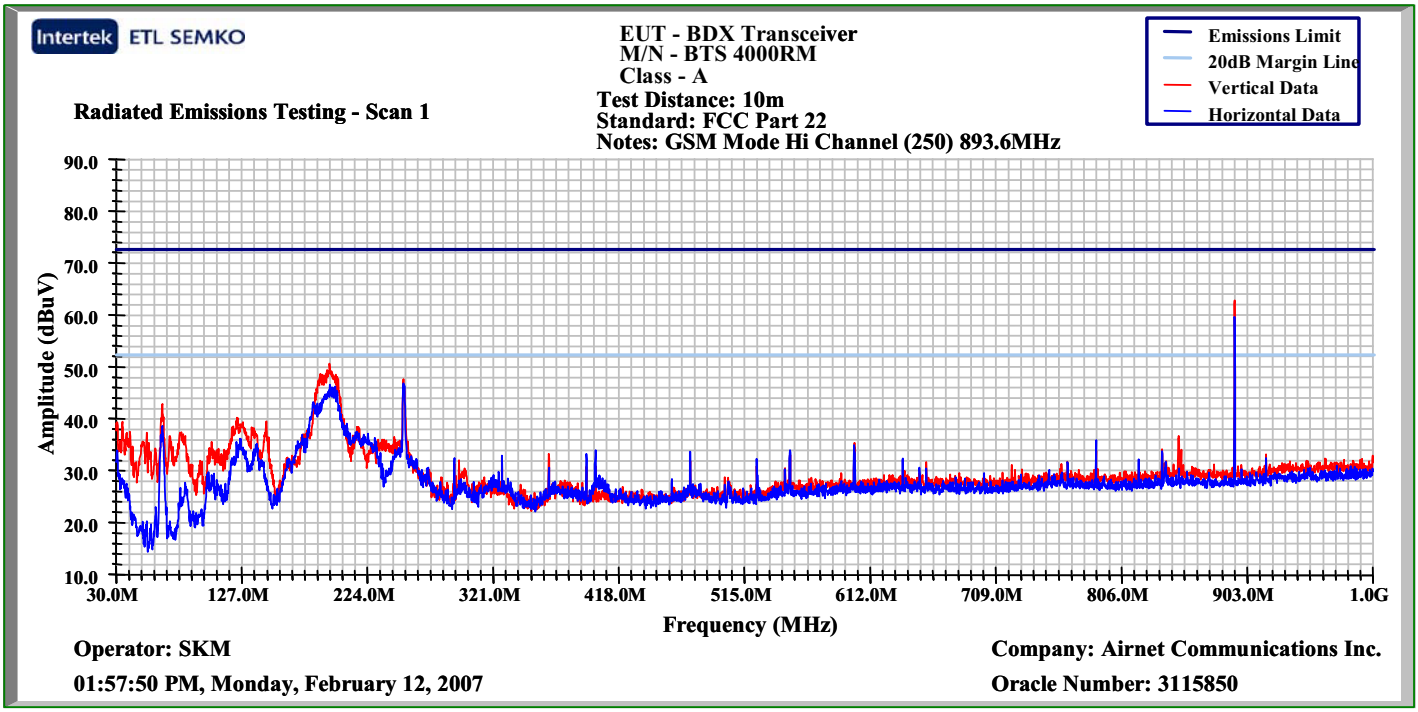
Photo:



Test set up rear

Plot:

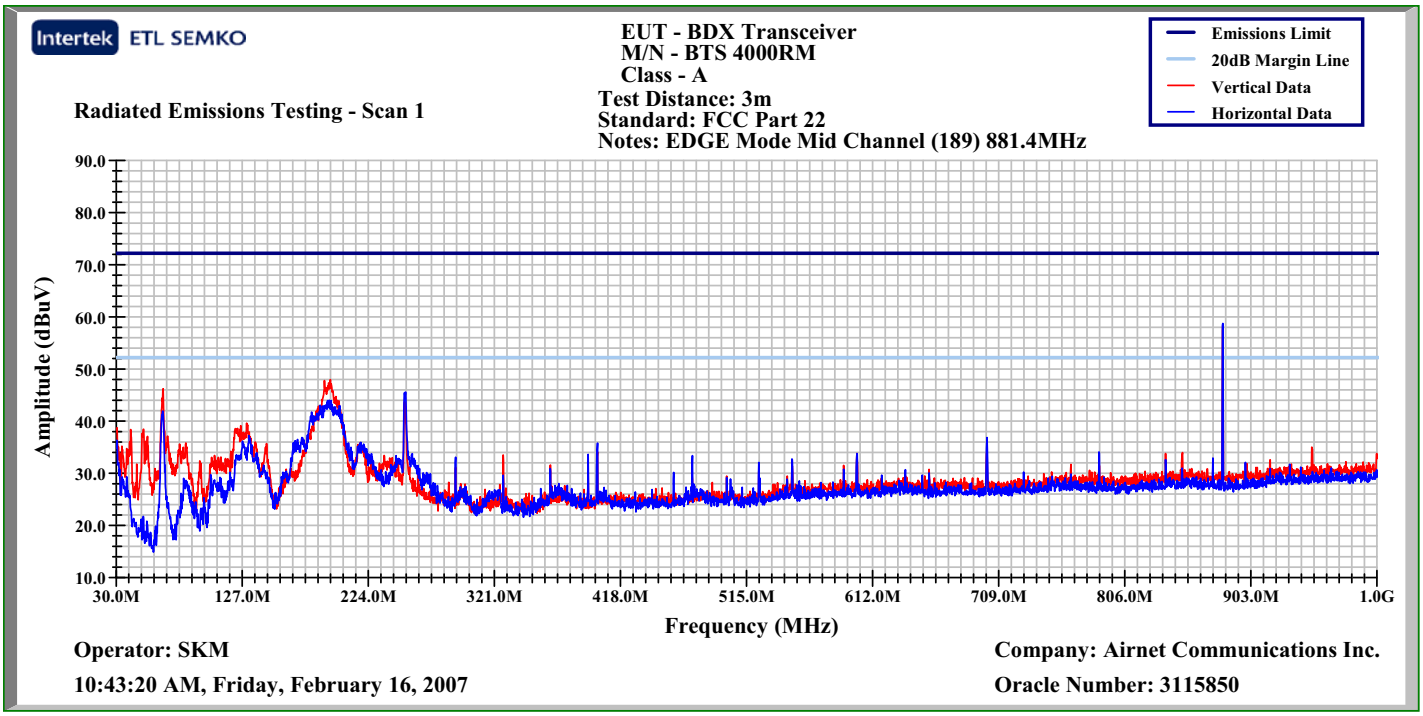
9.0 Field strength of spurious radiation (FCC Part 2.1053)



Scan Plot GSM Mode Hi Channel 30 to 1000MHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

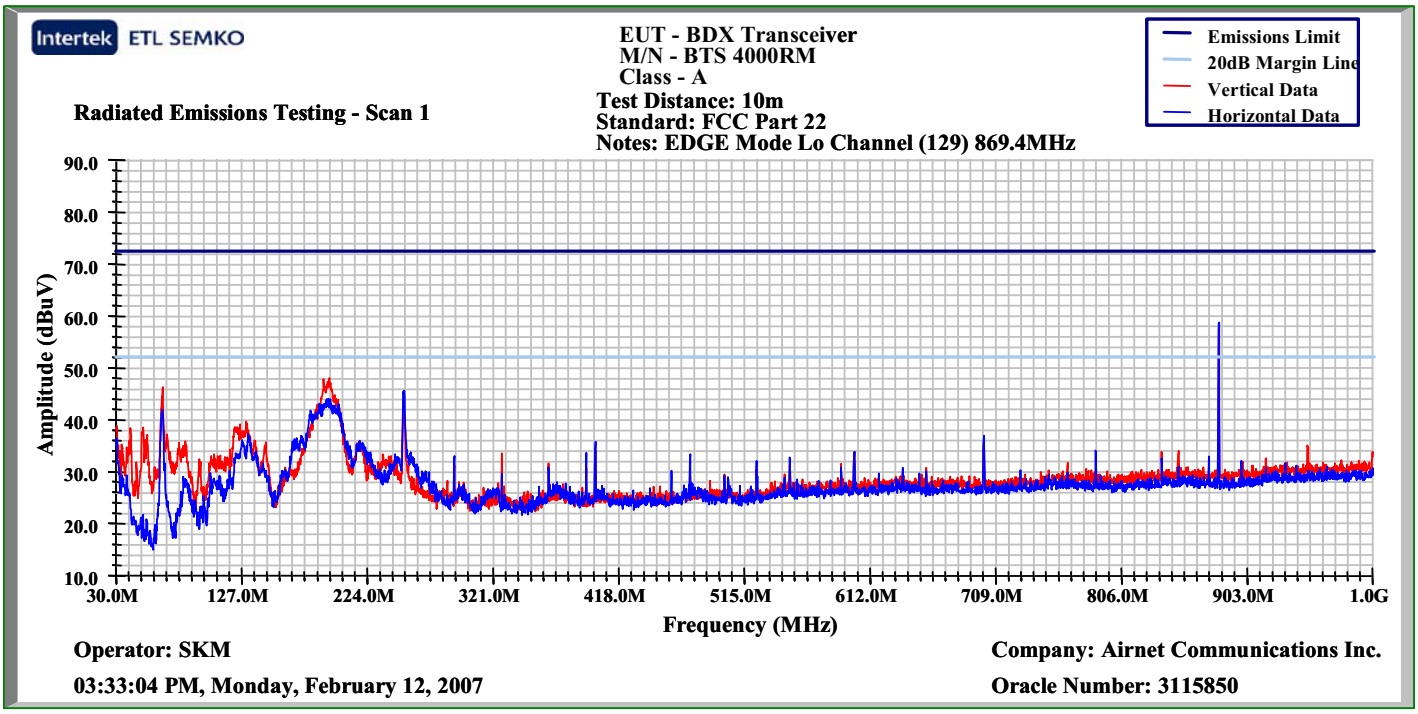
Plot:



Scan Plot Edge Mode Mid Channel 30to1000MHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

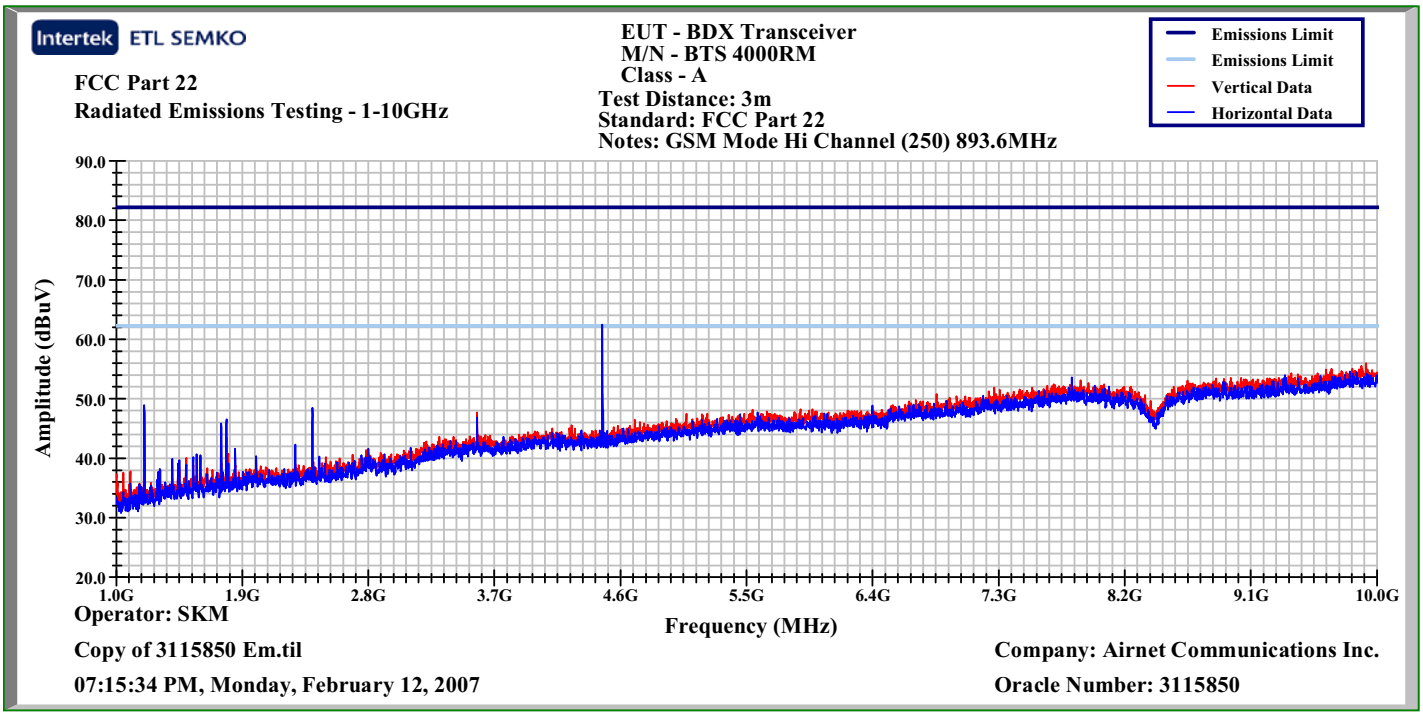
Plot:



Scan Plot Edge Mode Lo Channel 30to1000MHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

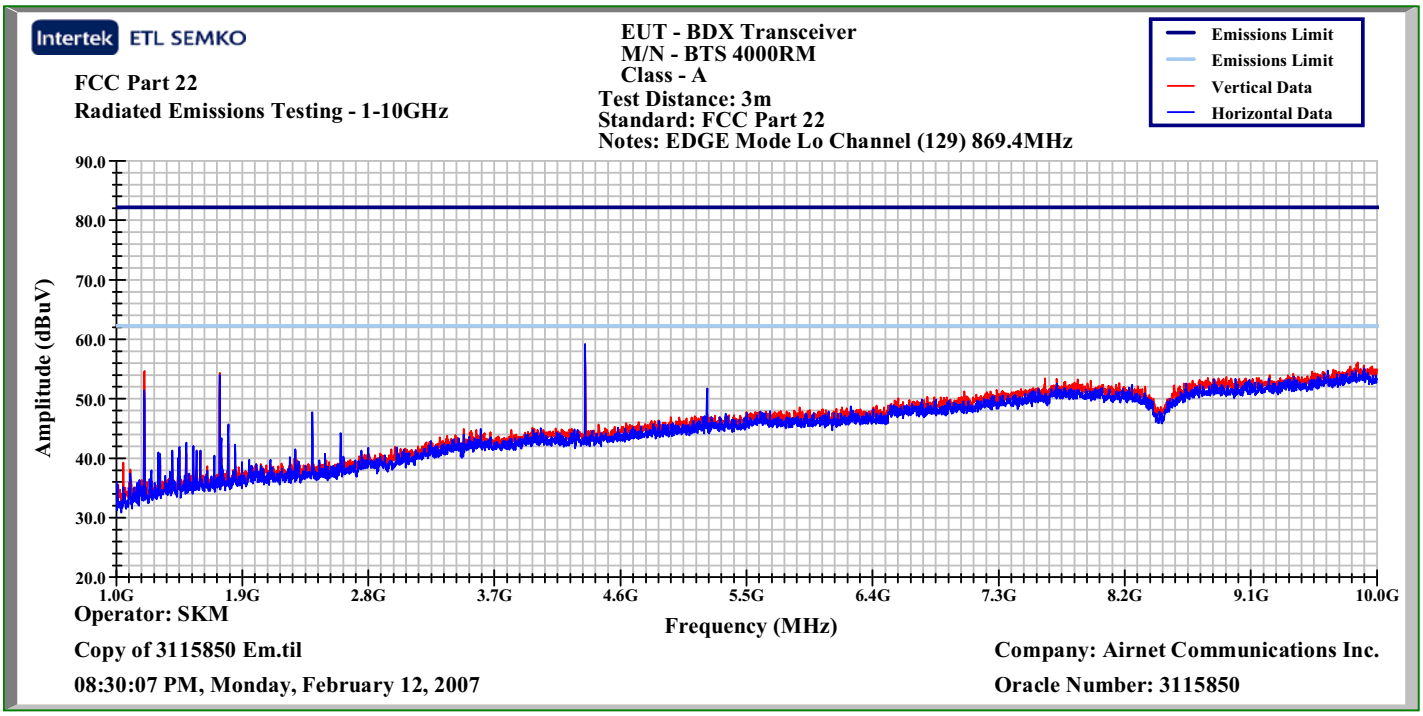
Plot:



SCan plot GSM Mode Hi Channel 1 to 10GHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

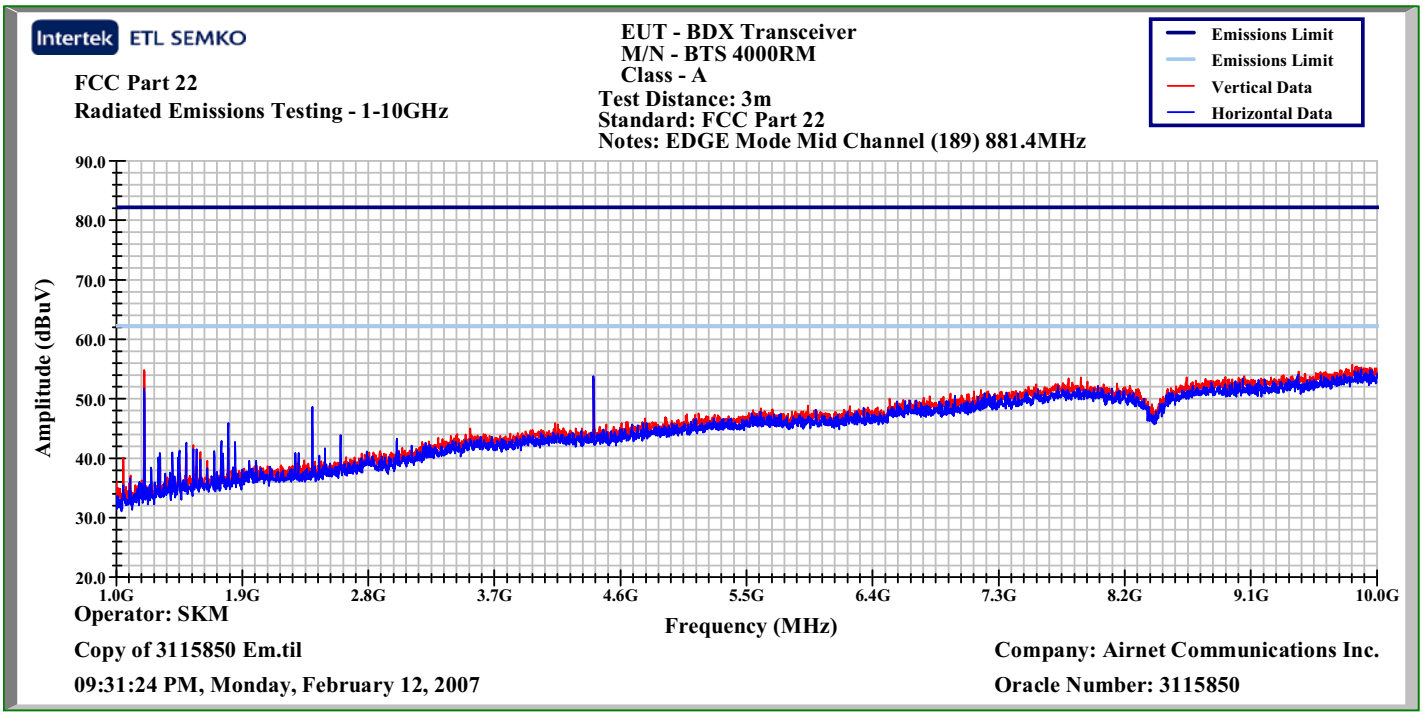
Plot:



Scan Plot Edge Mode Lo Channel 1 to 10GHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Plot:



Scan Plot Edge Mode Mid Channel 1 to 10GHz

Data:

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Date: 2-12-2007 **Limit:** FCC 22
Frequency Range (MHz): 30to1000 **Test Distance (m):** 10
Input power: 27VDC
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**
GSM Mode Hi Channel (250) 893.6MHz									
V	30.400	46.5	17.6	1.1	28.3	36.9	72.2	-35.3	QP 120K/300K
V	34.475	47.5	15.4	1.1	28.3	35.7	72.2	-36.5	QP 120K/300K
V	125.338	49.6	11.6	1.5	28.2	34.5	72.2	-37.7	QP 120K/300K
V	65.675	59.2	5.5	1.3	28.3	37.8	72.2	-34.5	QP 120K/300K
V	145.600	52.4	10.7	1.5	28.2	36.4	72.2	-35.8	QP 120K/300K
V	193.636	62.3	9.6	1.5	28.2	45.2	72.2	-27.0	QP 120K/300K
H	194.500	57.9	9.2	1.5	28.2	40.4	72.2	-31.8	QP 120K/300K
H	251.630	55.1	12.5	2.3	28.2	41.8	72.2	-30.5	QP 120K/300K
V	251.730	56.7	12.1	2.3	28.2	43.0	72.2	-29.3	QP 120K/300K
Emission at 893.6MHz is the fundamental									
Calculations		G=C+D+E-F		I=G-H					

Data GSM Mode Hi Channel 30 to 1000MHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Data:

Date: 02/12/2007 **Limit:** FCC22
Frequency Range (MHz): 1000-10000 **Test Distance (m):** 3
Input power: 120/60
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**
GSM CH 250 893.6MHz									
H	1200.160	53.9	24.5	6.5	37.2	47.7	82.2	-34.5	Pk/1M/1M
H	4468.320	48.9	33.1	13.5	34.8	60.7	82.2	-21.6	Pk/1M/1M
Calculations		G=C+D+E-F		I=G-H					

Data GSM Mode Hi Channel 1 to 10GHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Data:

Date: 02/12/2007 **Limit:** FCC22
Frequency Range (MHz): 1000-10000 **Test Distance (m):** 3
Input power: 120/60
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**
EDGE CH 129 869.4MHz									
V	1999.000	53.8	27.6	6.5	36.2	51.7	82.2	-30.5	Pk/1M/1M
H	4346.000	48.1	33.1	13.5	34.8	59.9	82.2	-22.3	Pk/1M/1M
Calculations		G=C+D+E-F		I=G-H					

Data Edge Mode Lo Ch 1 to 10GHz

9.0 Field strength of spurious radiation (FCC Part 2.1053)

Data:

Date: 02/12/2007 **Limit:** FCC 22
Frequency Range (MHz): 1000-10000 **Test Distance (m):** 3
Input power: 120/60
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**
EDGE CH 129 869.4MHz									
V	1200.020	52.1	24.4	6.5	37.2	45.9	82.2	-36.3	Pk/1M/1M
H	4406.985	47.6	33.1	13.5	34.8	59.3	82.2	-22.9	Pk/1M/1M
Calculations		G=C+D+E-F		I=G-H					

Data Edge Mode Hi Ch 1 to 10GHz