TEST REPORT

Report Number: 3066039-43-1-0
Project Number: 3066039
October 22, 2004

Testing performed on the
AirSite Base Station
Model Number: BTS4000XE
FCCID: MZKBTS4000-1900
to

FCC Part 24 Subpart E
RSS-133

For
Airnet Communications Corporation

Test Performed by:	Test Authorized by:
Intertek 1950 Evergreen Blvd, Suite 100 Duluth, GA 30096	Airnet Communications Corporation 3950 Dow Road Melbourne, Florida 32934-9216

Prepared by	Reviewed by
Chris Capelle, EMC Project Engineer	David J. Schramm, EMC Department Manager

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Executive Summary

Testing performed for: Airnet Communications Corporation

Equipment Under Test: BTS4000XE, AirSite Base Station

FCC RULE	IC RULE RSS-133	DESCRIPTION OF TEST	RESULT	PAGE
§2.1046	§5.4, §6.2	RF Power Output	Passed	10
§2.1049	§5.6	Emission Limitation, Occupied Bandwidth	Passed	11
§2.1051 §24.238(a)	§6.3	Out of Band Emissions at Antenna Terminals	Passed	15
§2.1053	§6.3	Field Strength of Spurious Radiation	N/S	20
§15.107	ICES-003	Power Line Conducted Emissions	N/S	20
§2.1055 §24.235	§7	Frequency Stability	N/S	25
§2.1091 §2.1093	§8	Specific Absorption Rate	N/S	25
§15.109	§9	Receiver Spurious Emissions	Passed	26

N/S: This test was not under the scope of this evaluation

1 JOB DESCRIPTION

1.1 Client information

The AirSite Base Station has been tested at the request of

Company:	Airnet Communications Corporation 3950 Dow Road Melbourne, Florida 32934-9216
Name of contact:	Joe McAllister
Telephone:	321.676.6700
Fax:	321.757.0624

1.2 Test plan reference:

Tests were performed to the following standards:

- FCC Part 24 Subpart E
- RSS-133

1.3 Equipment Under Test (EUT)

Product	**AirSite Base Station**
EUT Model Number	BTS4000XE
EUT Serial Number	AN0438BT04049
Whether quantity (>1) production is planned	Quantity production is planned.
Cellular Phone standards	GSM (PCS)
Type(s) of Emission	300KG7W (This report), 300KGXW (Original filing)
RF Output Power	2 dBm
Frequency Range	1930.2 MHz to 1989.8 MHz GSM (PCS)
Receiver L.O. frequency	2047.4 MHz
External input	[ ] Audio [X] Digital Data

EUT receive date: October 18, 2004

EUT receive condition: The EUT was received in good condition with no apparent damage.

Test start date: October 19, 2004

Test completion date: October 21, 2004

The test results in this report pertain only to the item tested.

The EUT is a GSM base station operating in the PCS band. All testing within this report was performed while EUT was operating with EDGE modulation functionality. This added function is the purpose for this testing and report.

1.3.1 System Support Equipment

Table 1-1 contains the details of the support equipment associated with the Equipment Under Test.

Table 1-1: System Support Equipment

Description	Manufacturer	Model Number	Serial Number	FCC ID number
DC Supply	HP	HP 6683A	3619A-00205	NA
RF Terminator	JFW	50FH-030-300-2	AN27	NA
RF Terminator	JFW	50T-069-2	01061	NA
Support PC	Dell	Dimension XPS	03378	NA

1.3.2 Cables associated with EUT

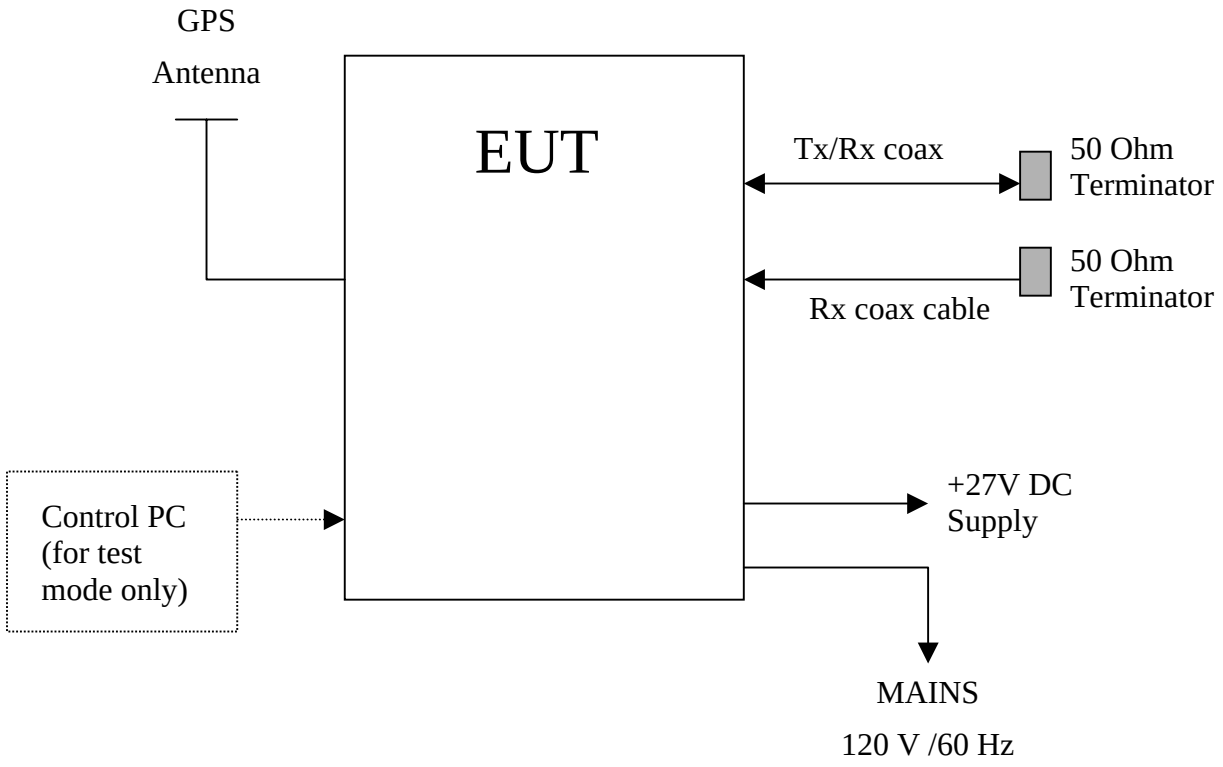
Table 1-2 contains the details of the cables associated with the EUT.

Table 1-2: External EUT cables

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
AC Power	10’	Yes	None	EUT	AC power source
Tx/Rx N-Type RG8 Coax	25’	Yes	None	EUT	Tx/Rx Port
Rx N-Type RG8 Coax	25’	Yes	None	EUT	Rx Port
GPS Antenna R658 Coax	30’	Yes	None	EUT	GPS module

1.3.3 System Block Diagram

The diagram below details the interconnection of the EUT and support equipment. For specific layout, refer to the test configuration photograph in the relevant section of this report.



1.4 Mode(s) of operation

The EUT was powered from 120 Vac / 60 Hz. A single channel was brought up at maximum power and with EDGE Modulation and pseudo-random data. Actual channels tested are listed in the test results.

1.5 Modifications required for compliance

No modifications were implemented by Intertek.

1.6 Related Submittal(s) Grants

A similar product was previously granted under FCCID: MZKBPU3000-1900.

2 TEST FACILITY

The ITS-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 CISPR 16-1: 1999 and 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.

The Industry Canada file number for this site is IC 2077.

3 RF POWER OUTPUT

CFR 47 §2.1046

RSS-133 §6.2

3.1 Test Procedure

The transmitter antenna output was connected to a spectrum analyzer, via low-loss coax cable for RF power measurements. Measured power was read off the spectrum analyzer in dBm units. The power output at the transmitter antenna port was determined by adding cable loss to the power meter reading.

Tests were performed at three frequencies (low, middle, and high channels) and on all power levels, which can be setup on each of the transmitters.

The spectrum analyzer bandwidth settings were set to 1 MHz or greater.

3.2 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration Due Date
Spectrum Analyzer	R&S	FSEK 30	100253	8/30/05

3.3 Test Results

Table 3-1 RF Power Output

Peak/Average Detector	Frequency (MHz)	Channel	Power Output (dBm)	Power Output (Watts)
P	1930.2	512	1.2	.00132
P	1960.0	661	1.9	.00155
P	1989.8	810	0.7	.00175

4 EMISSION LIMITATIONS, OCCUPIED BANDWIDTH

CFR 47 §2.1049

RSS-133 §5.6

4.1 Test Procedure

The transmitter antenna output was connected to a spectrum analyzer, via low-loss coax cable. The 99% bandwidth function of the spectrum analyzer was used to measure occupied bandwidth.

4.2 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration Due Date
Spectrum Analyzer	R&S	FSEK 30	100253	8/30/05

4.3 Test Results

Frequency MHz	Channel	Occupied Bandwidth kHz
1930.2	512	240.5
1960.0	661	240.5
1989.8	810	240.5

Figure 4-1: 99% Bandwidth measurement, Channel 512

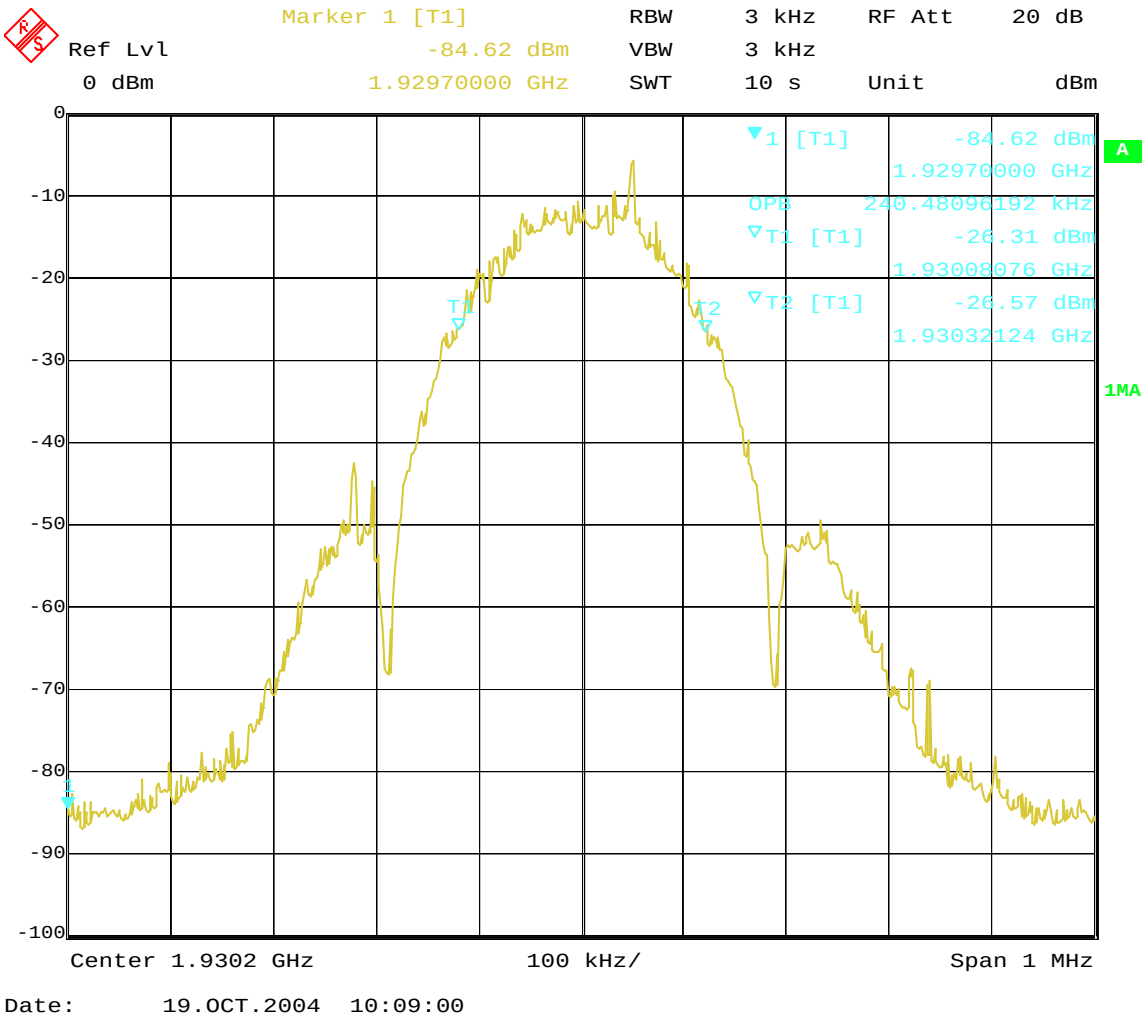


Figure 4-2: 99% Bandwidth measurement, Channel 661

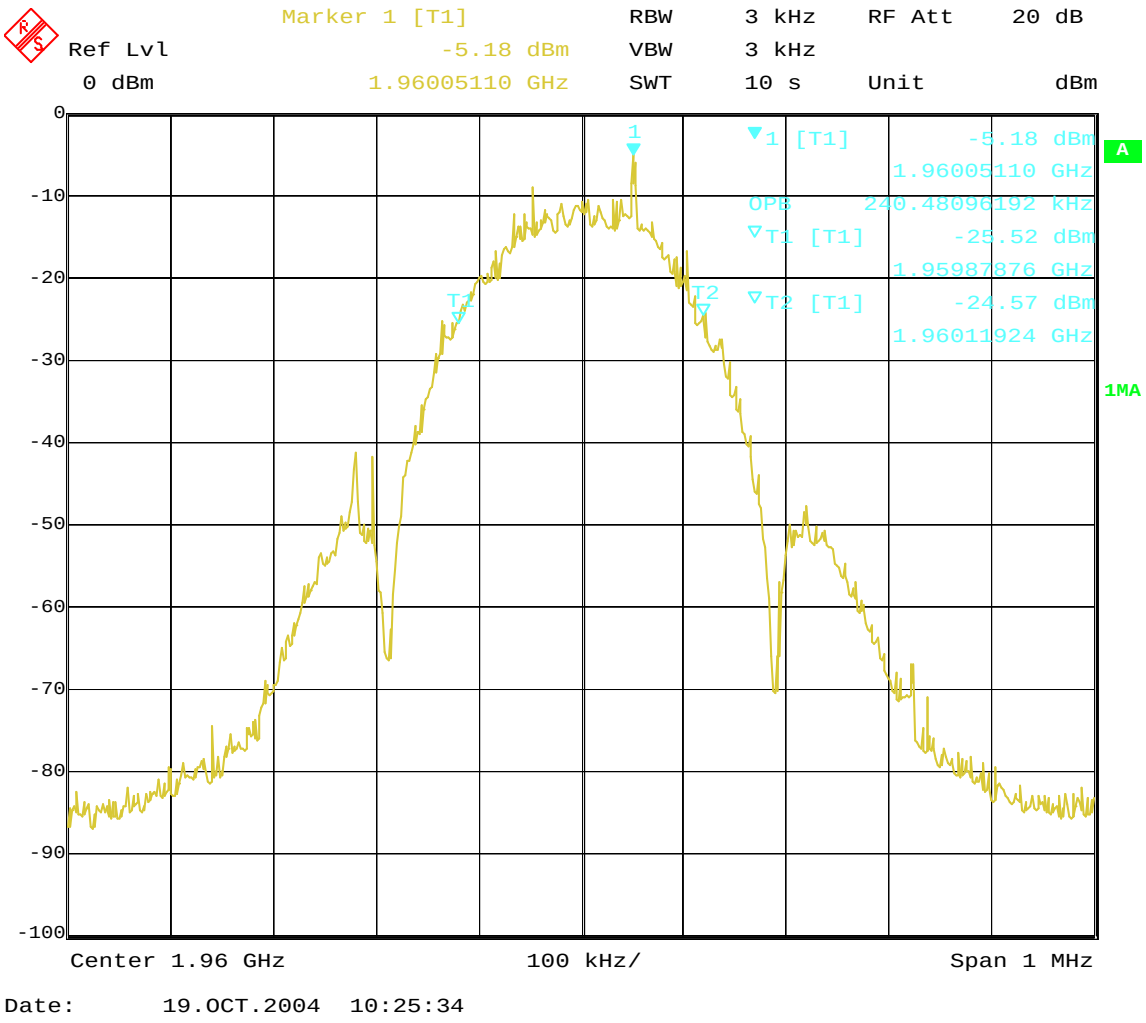
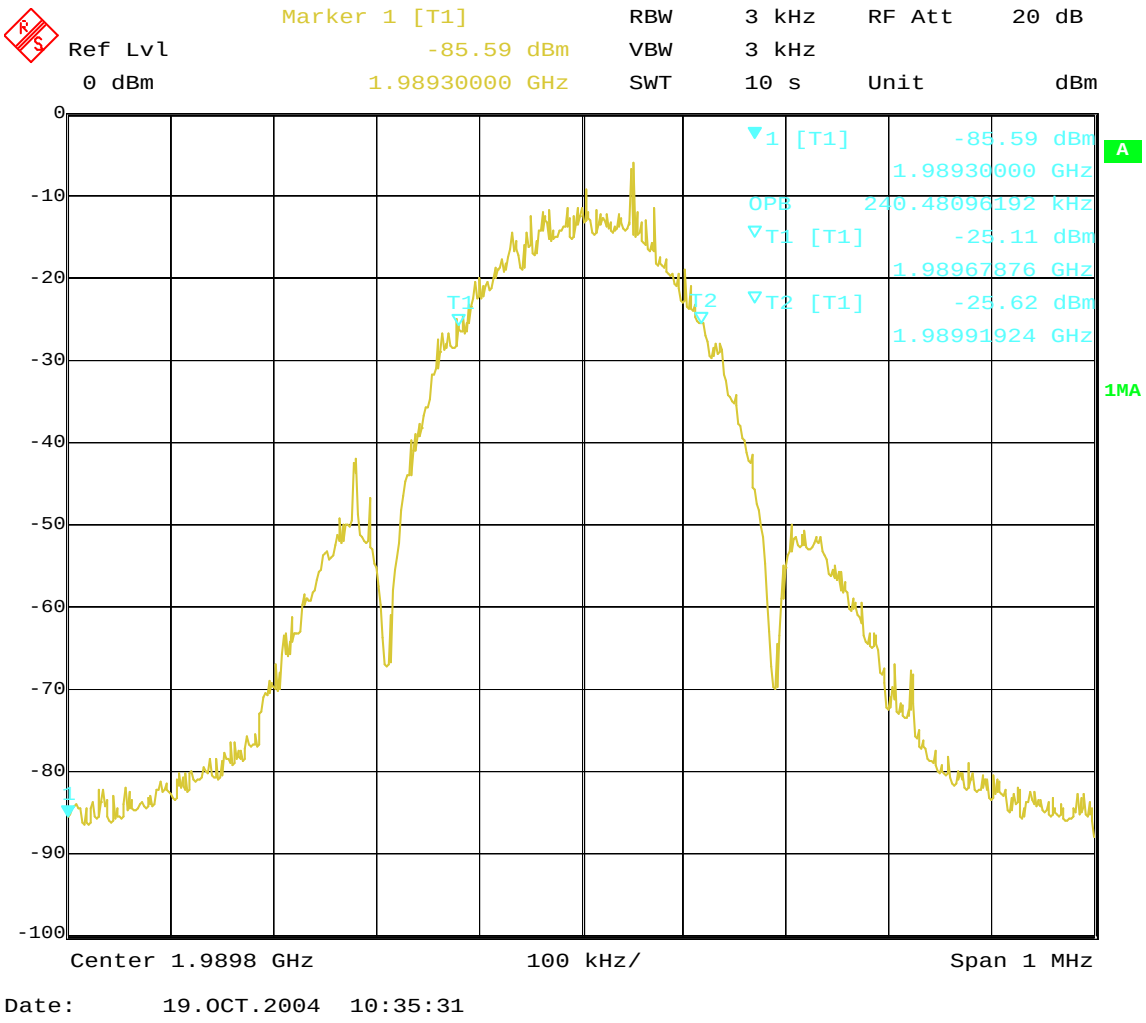


Figure 4-3: 99% Bandwidth measurement, Channel 810



5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

CFR 47 §2.1047, 24.238(a)

RSS-133

Out of Band Emissions: The mean power of emissions must be attenuated below the mean power of the un-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43 + 10 log P dB.

5.1 Test Procedure

The transmitter antenna output was connected to a spectrum analyzer, via a low-loss coax cable. The resolution and video bandwidth of the spectrum analyzer were set to 1 MHz. Sufficient scans were taken to show the out of band Emissions, if any, up to the 10th harmonic.

5.2 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration Due Date
Spectrum Analyzer	R&S	FSEK 30	100253	8/30/05

5.3 Test Results

Table 5-1: Summary of test results

Channel	Description
512	Conducted spurious emissions, 30 MHz to 20 GHz
512	Emissions within 1 MHz of band edge
661	Conducted spurious emissions, 30 MHz to 20 GHz
810	Conducted spurious emissions, 30 MHz to 20 GHz
810	Emissions within 1 MHz of band edge

Figure 5-1: Out of band emissions at antenna terminals, Channel 512

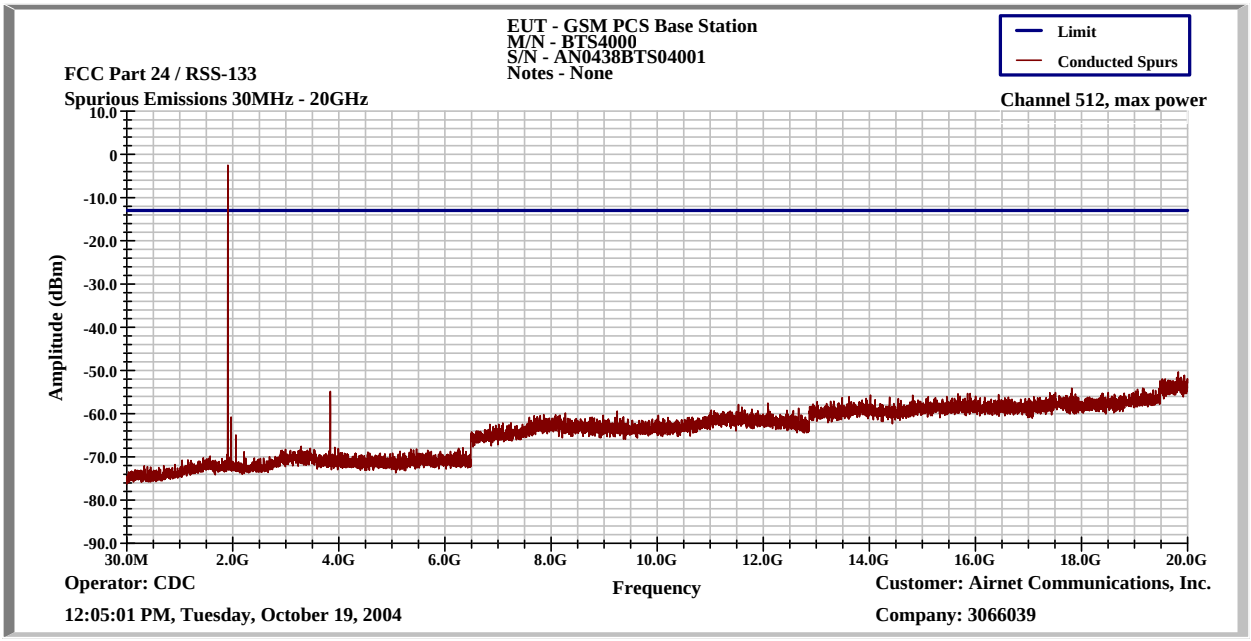


Figure 5-2: Emissions within 1 MHz of Bandedge, Channel 512 (Power reduced by 10 dB)

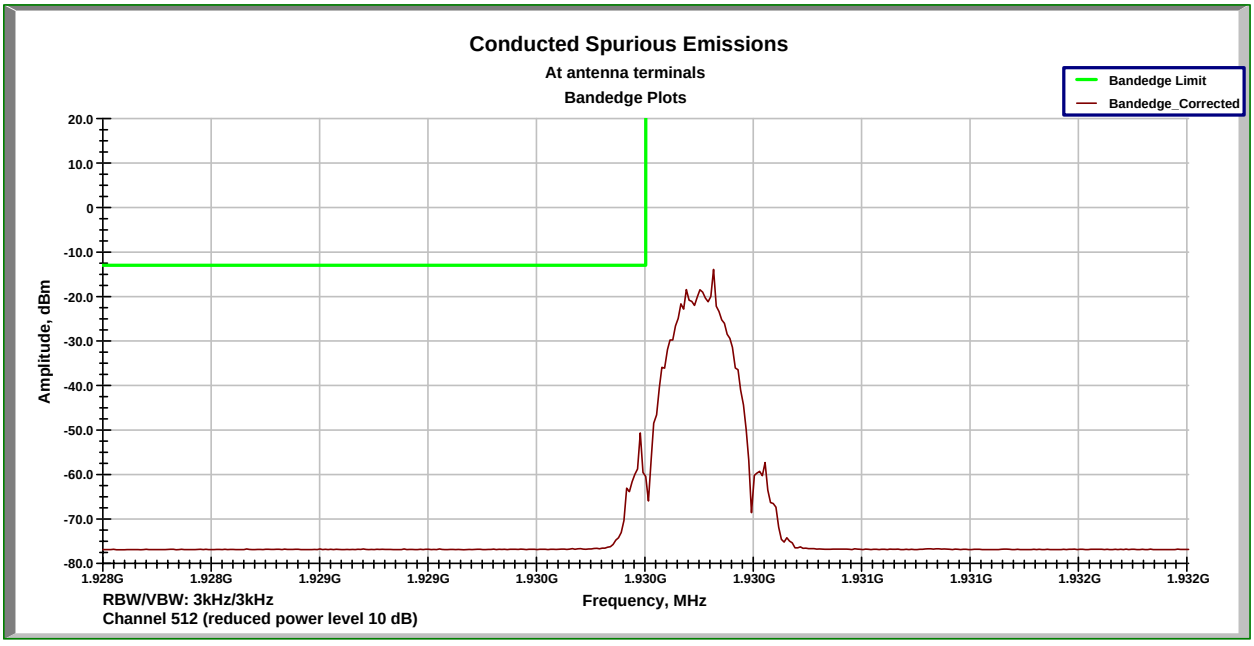


Figure 5-3: Emissions within 1 MHz of Bandedge, Channel 513

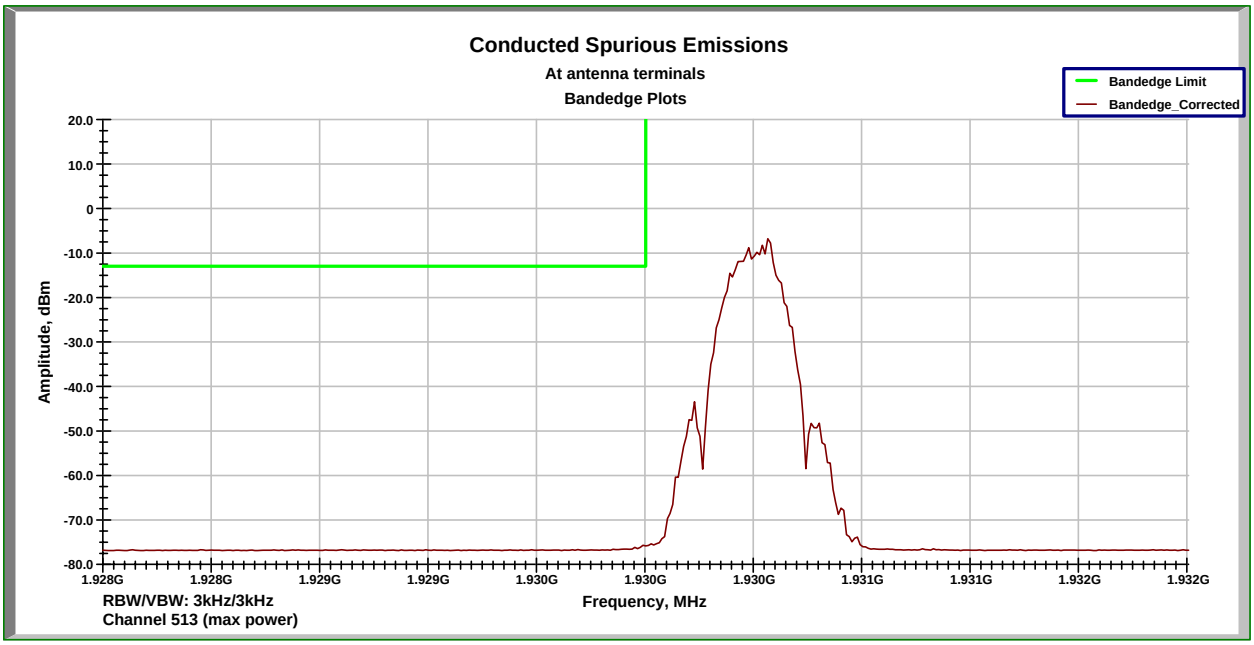


Figure 5-4: Out of band emissions at antenna terminals, Channel 661

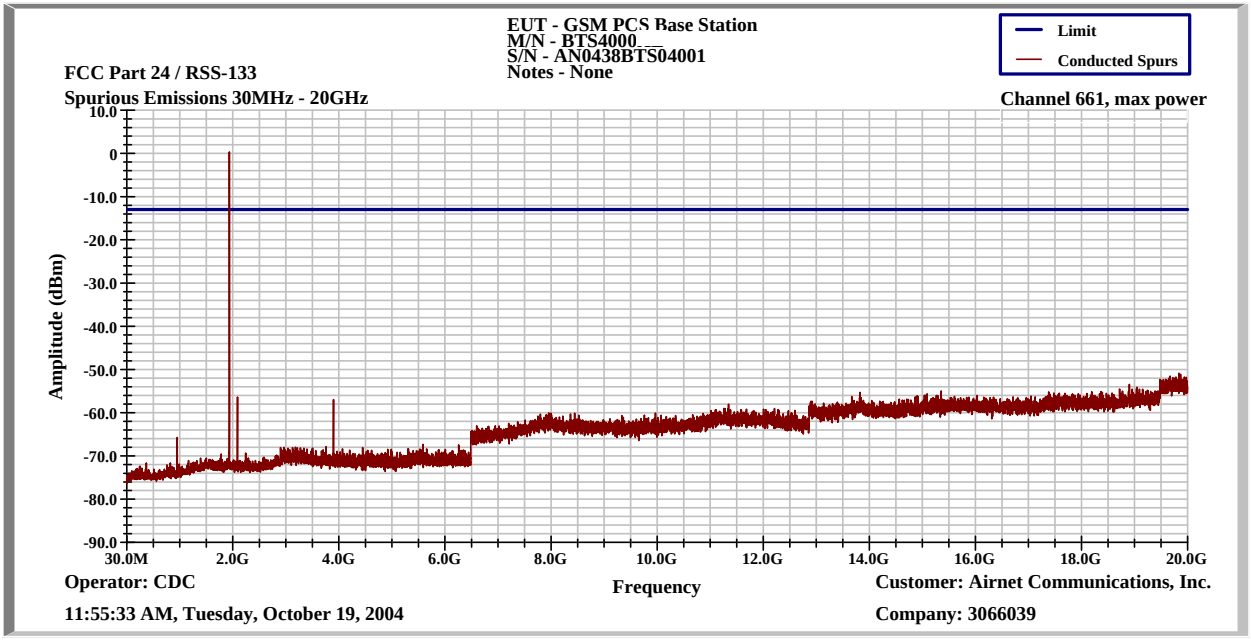


Figure 5-5: Emissions within 1 MHz of Bandedge, Channel 809

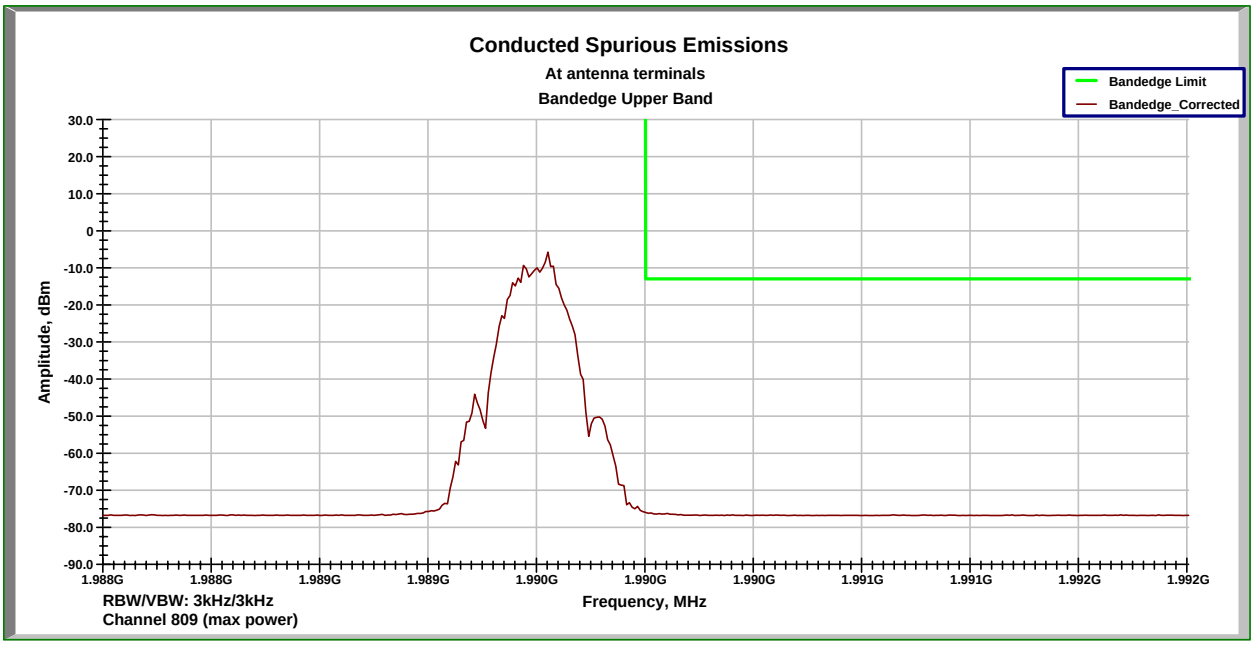


Figure 5-6: Out of band emissions at antenna terminals, Channel 810

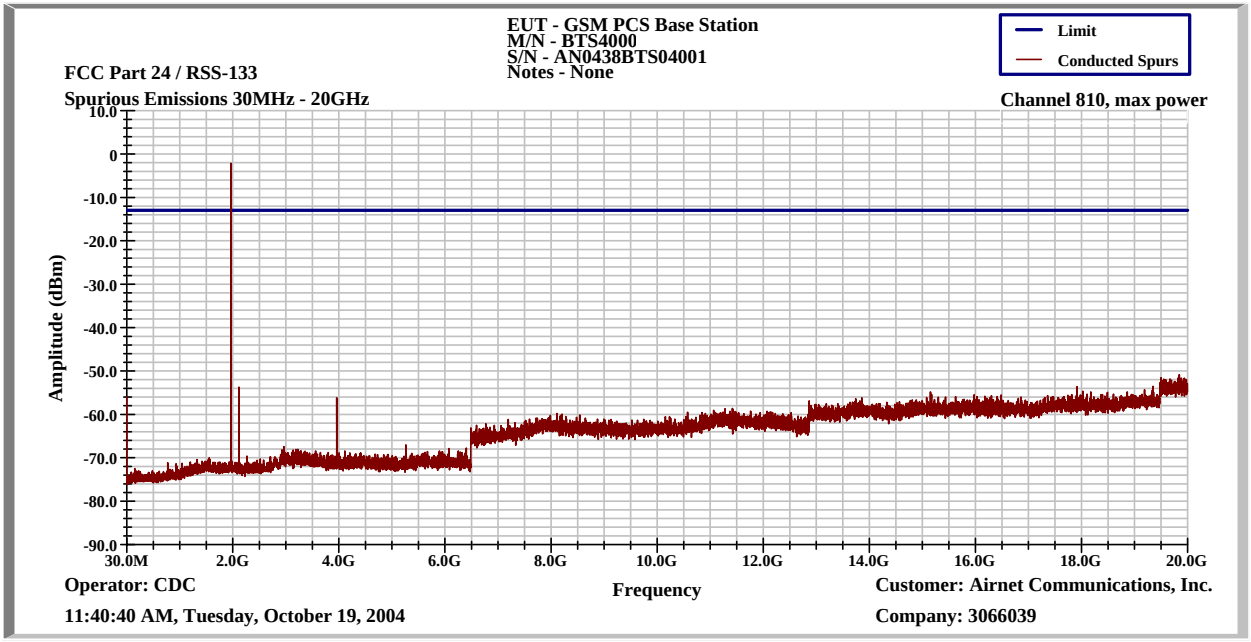
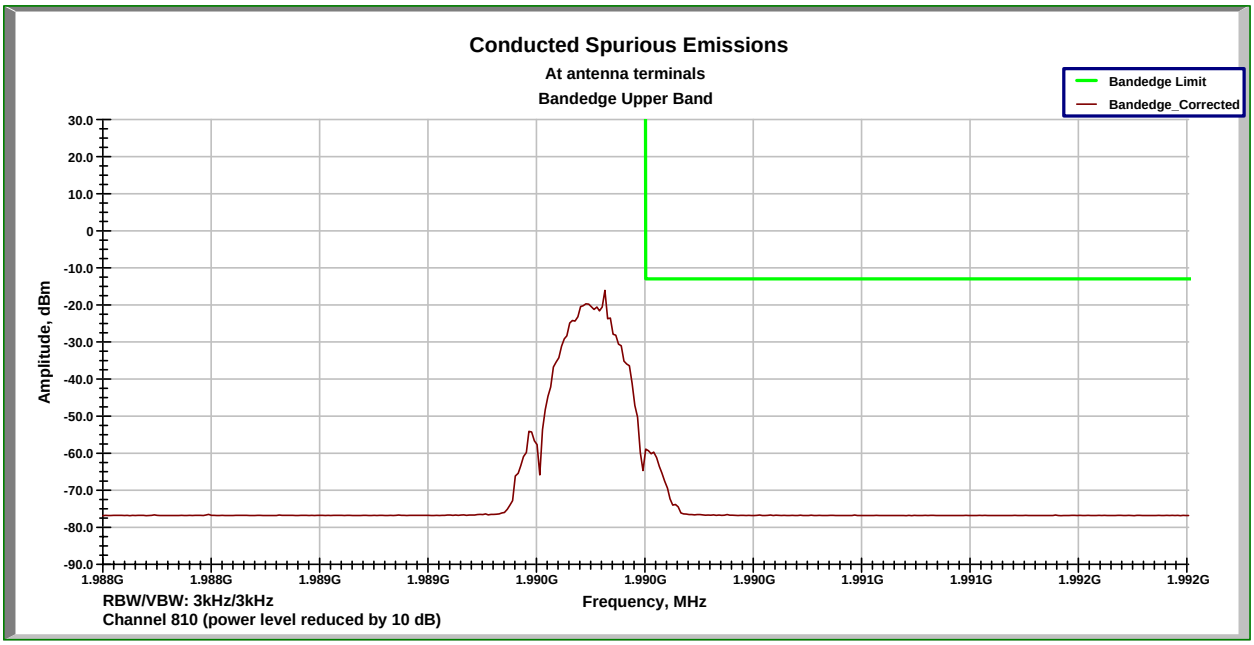


Figure 5-7: Out of band emissions at antenna terminals, Channel 810 (Power reduced by 10 dB)



6 FIELD STRENGTH OF SPURIOUS RADIATION

CFR 47 §2.1053

6.1 Test Procedure

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The EUT set to operate at maximum power; was connected through a certified amplifier; and was terminated into a non-radiating coaxial load.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle, and high channels). Once spurious emissions were identified and within 20 dB of the limit, the power of the emission was determined using the substitution method.

6.2 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration Due Date
EMC Receiver	HP	8546A	3650A00362	12/23/05
Spectrum analyzer	R&S	FSEK30	100253	8/30/2005
Pre-amplifier	TEC	PA-102	44939	8/2/2005
Pre-amplifier	HP	8449B	3008A00989	4/19/2005
Bi-Log Antenna	Chase	CBL6112B	2622	8/30/2005
Horn Antenna	EMCO	3115	9208-3919	3/4/2005

6.3 Test Results

Table 6-1: Summary of test result

Channel	Mode	Description
513	Transmit	Conducted spurious emissions, 30 MHz to 1 GHz
513	Transmit	Conducted spurious emissions, 1 GHz to 18 GHz
513	Transmit	Conducted spurious emissions, 18 GHz to 20 GHz
661	Transmit	Conducted spurious emissions, 30 MHz to 1 GHz
661	Transmit	Conducted spurious emissions, 1 GHz to 18 GHz
661	Transmit	Conducted spurious emissions, 18 GHz to 20 GHz
809	Transmit	Conducted spurious emissions, 30 MHz to 1 GHz
809	Transmit	Conducted spurious emissions, 1 GHz to 18 GHz
809	Transmit	Conducted spurious emissions, 18 GHz to 20 GHz

Figure 6-1: spurious emissions, Transmit Mode, Channel 513, 30 MHz to 1 GHz

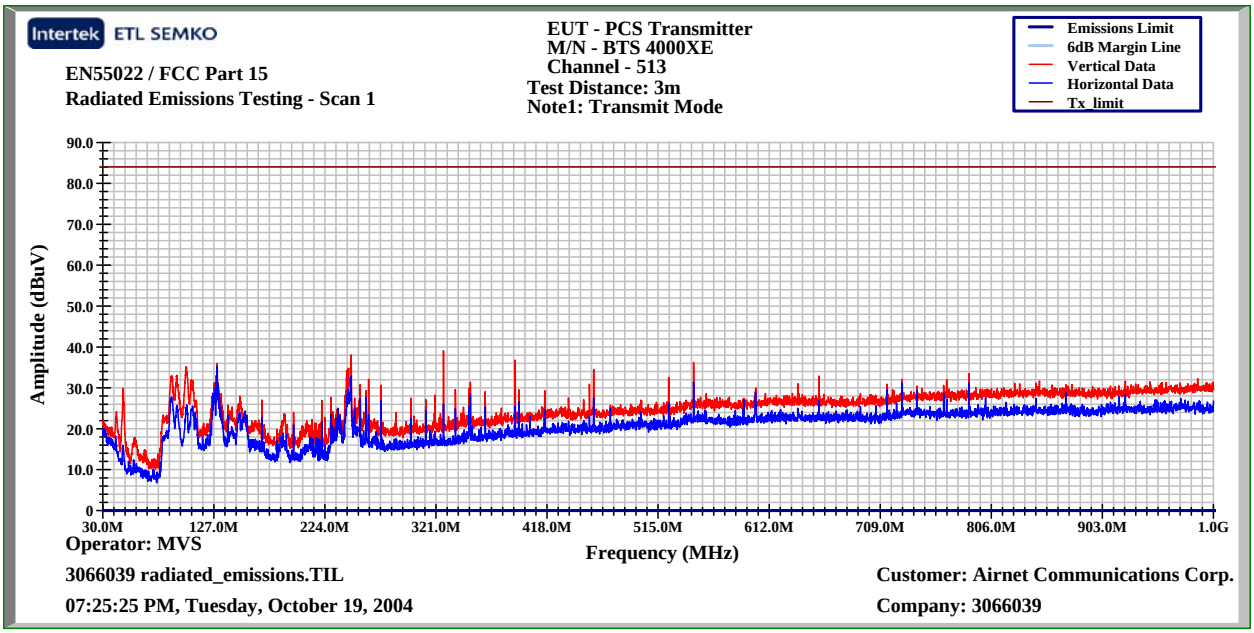


Figure 6-2: spurious emissions, Transmit Mode, Channel 513, 1 GHz to 18 GHz

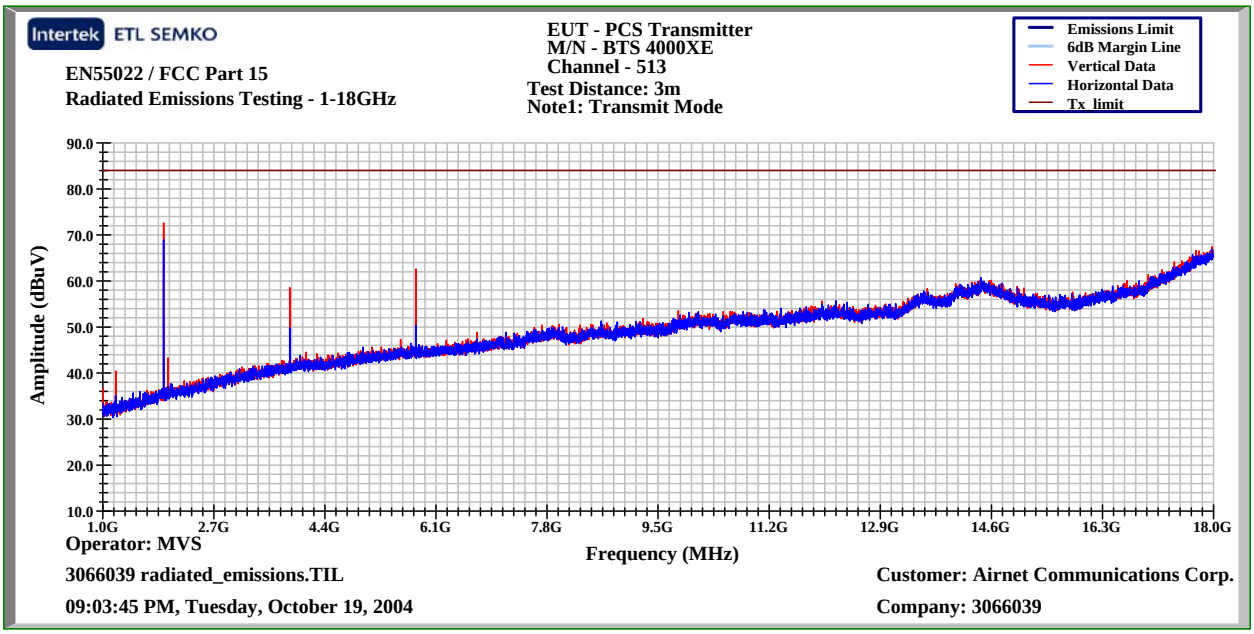


Figure 6-3: spurious emissions, Transmit Mode, Channel 513, 18 GHz to 20 GHz

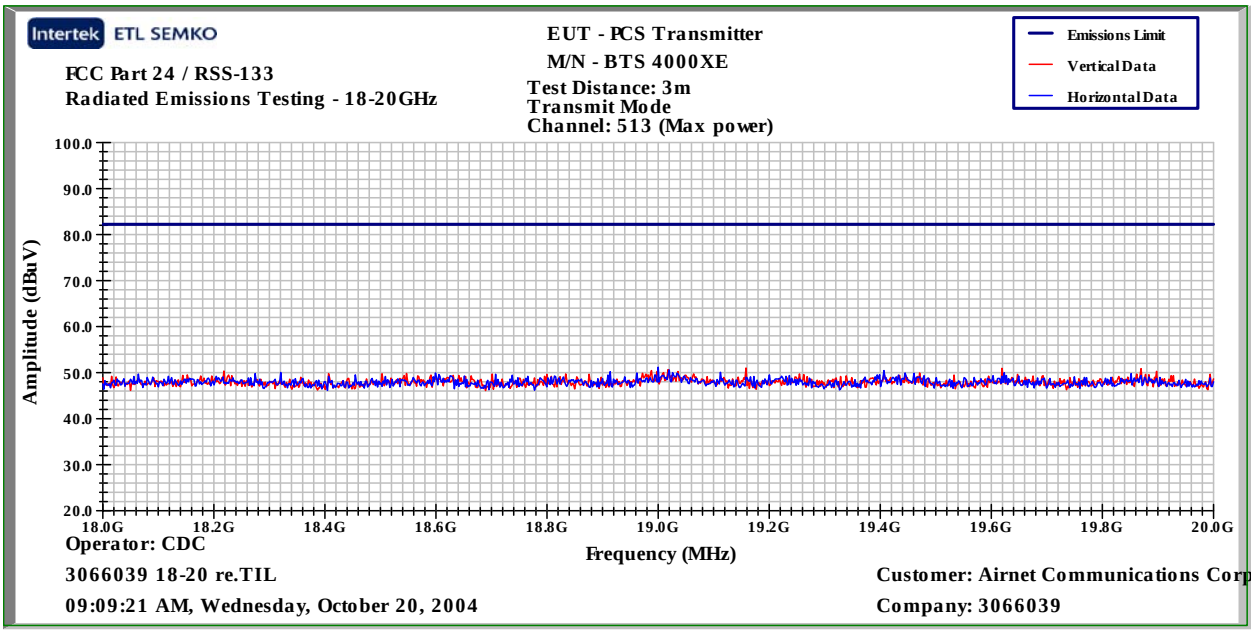


Figure 6-4: spurious emissions, Transmit Mode, Channel 661, 30 MHz to 1 GHz

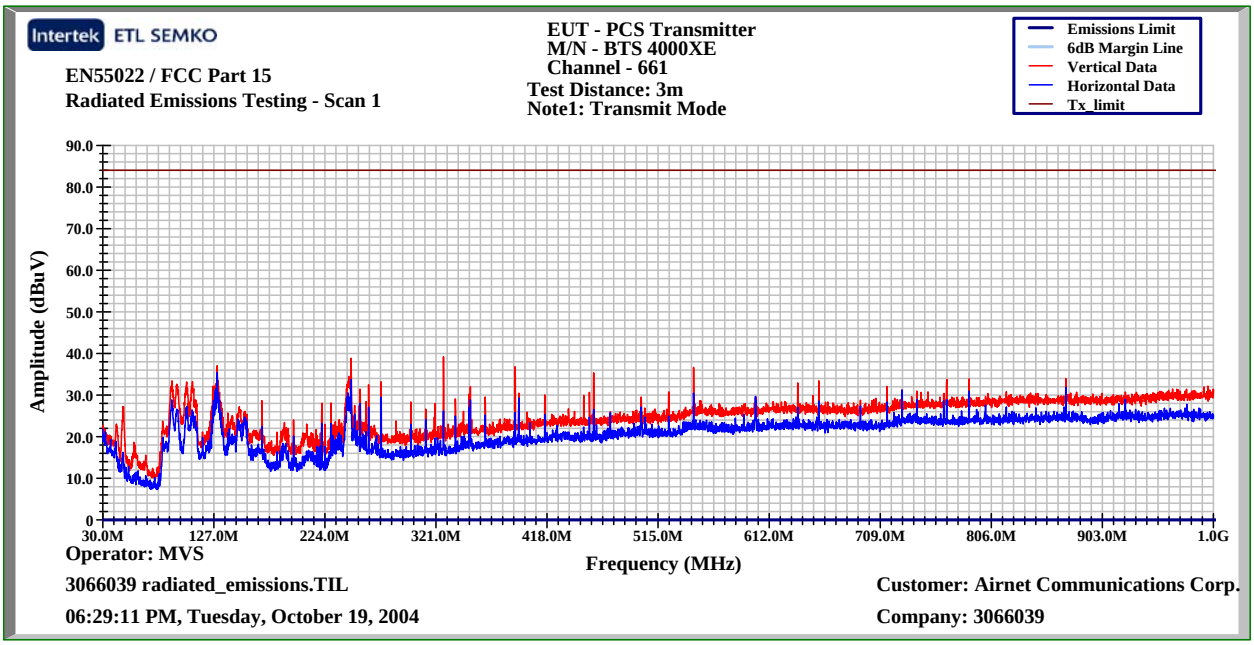


Figure 6-5: spurious emissions, Transmit Mode, Channel 661, 1 GHz to 18 GHz

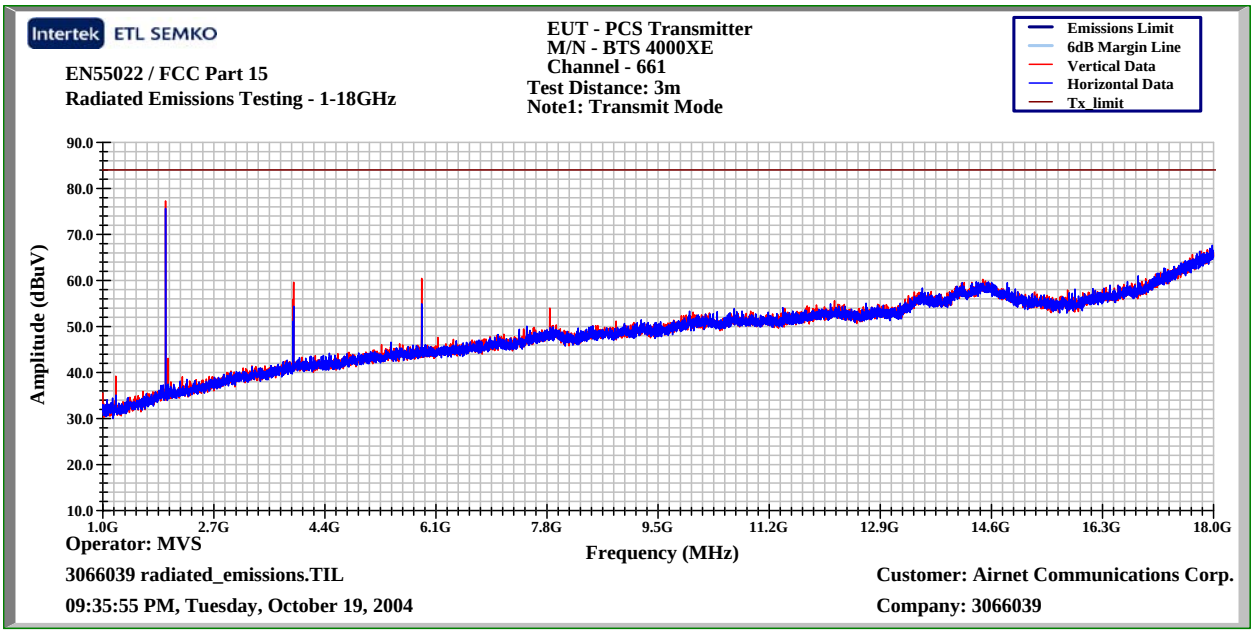


Figure 6-6: spurious emissions, Transmit Mode, Channel 661, 18 GHz to 20 GHz

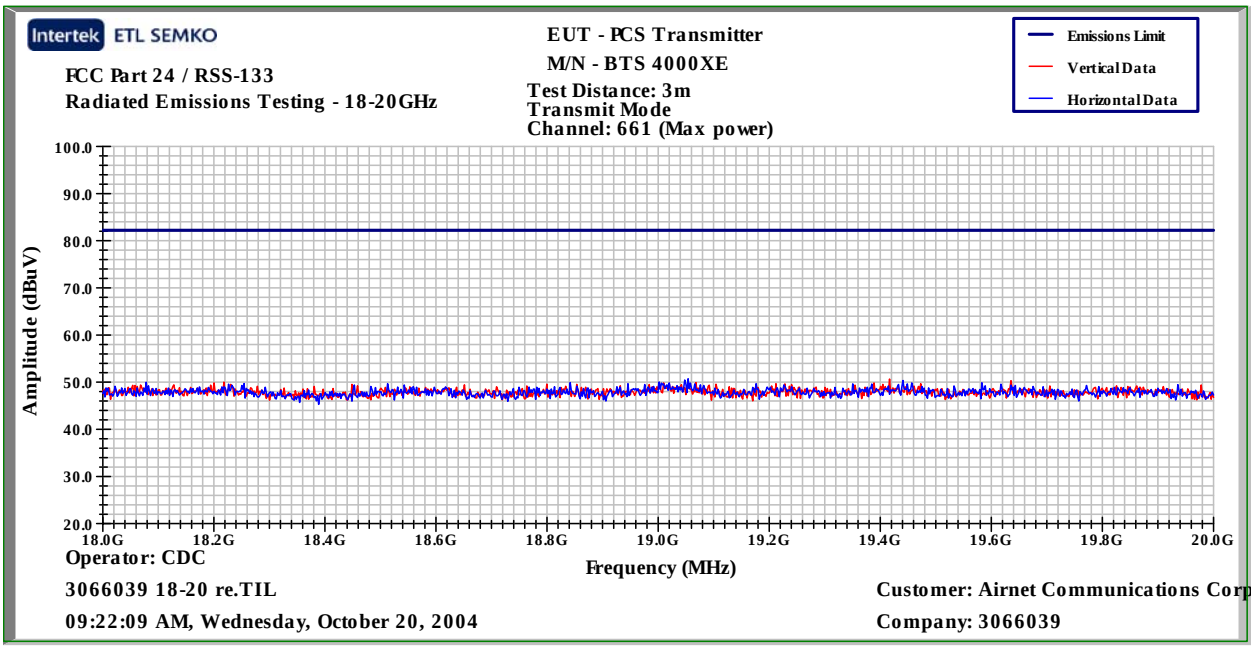


Figure 6-7: spurious emissions, Transmit Mode, Channel 809, 30 MHz to 1 GHz

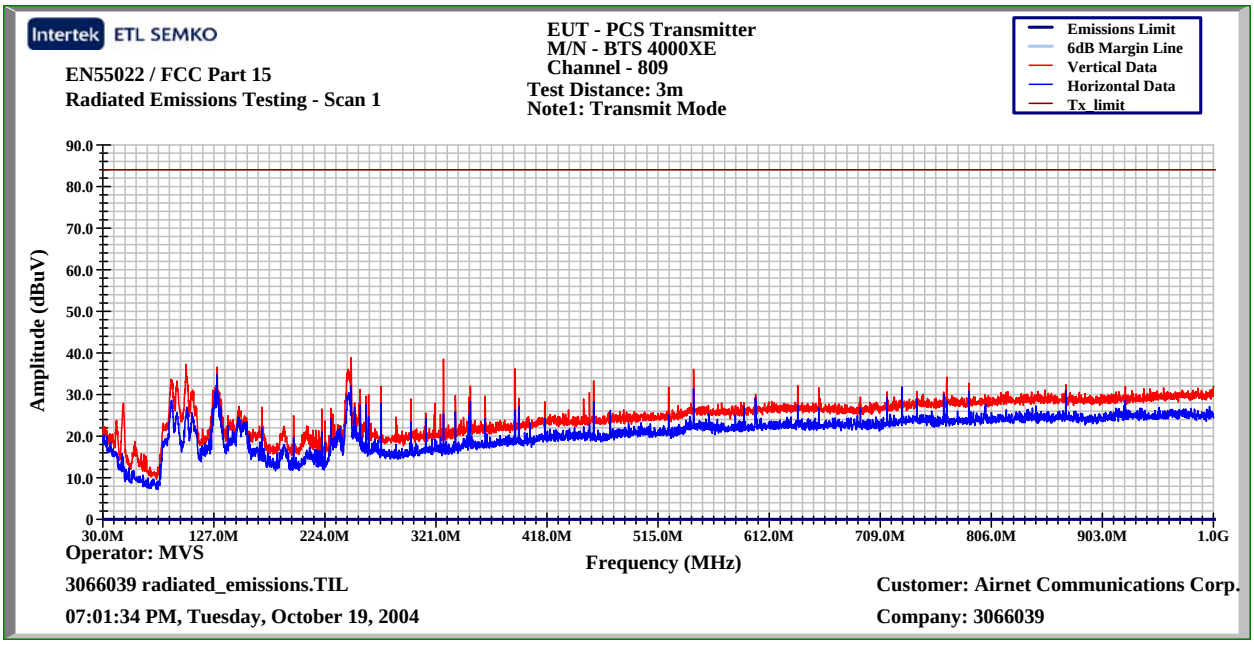


Figure 6-8: spurious emissions, Transmit Mode, Channel 809, 1 GHz to 18 GHz

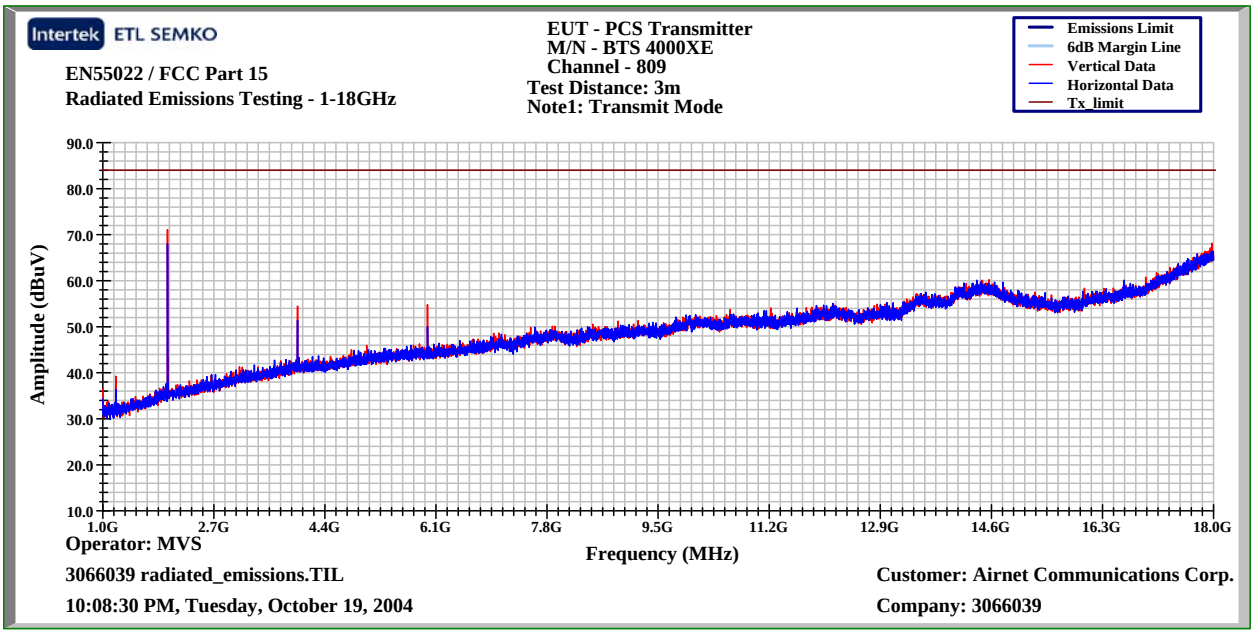
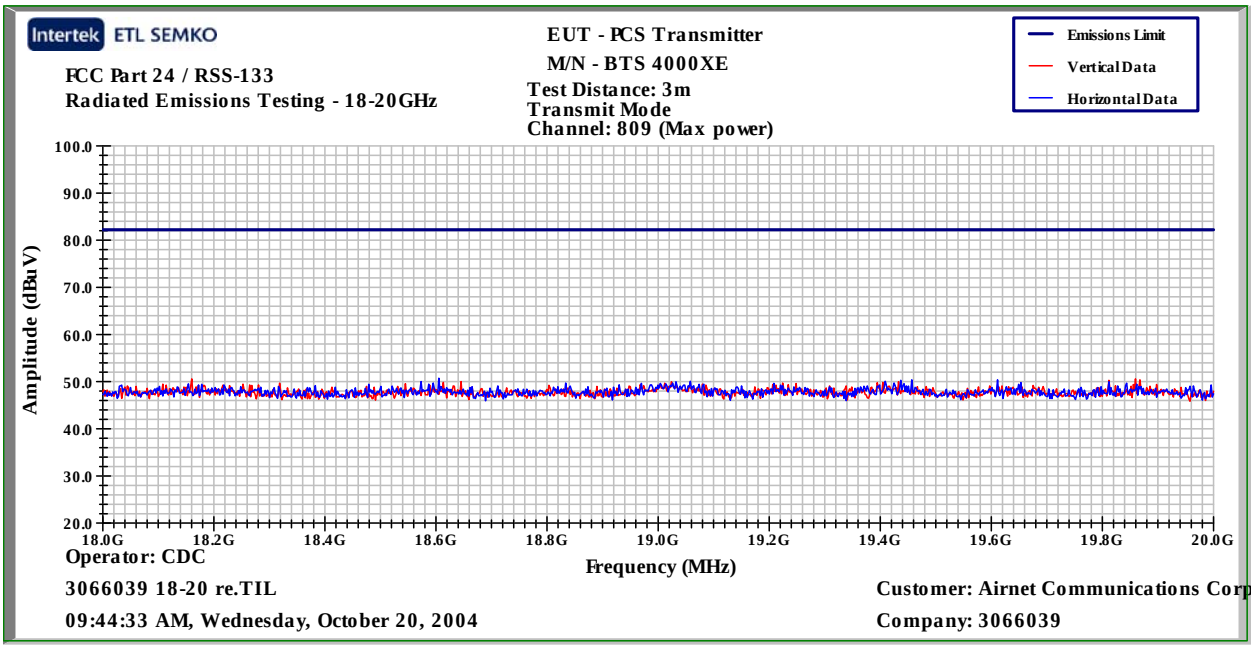


Figure 6-9: spurious emissions, Transmit Mode, Channel 809, 18 GHz to 20 GHz



7 POWER LINE CONDUCTED EMISSIONS

Evaluation Not Within Scope

8 SPECIFIC ABSORPTION RATE

Evaluation Not Within Scope

9 FREQUENCY STABILITY

Evaluation Not Within Scope

10 RECEIVER SPURIOUS EMISSIONS

CFR 47 §15.109, RSS-133 §9

10.1 Test Procedure

Radiated emissions

Measurements were conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 10000 MHz. The measuring receiver met the requirements of CISPR 16-1: 1999 and the measuring antenna correlated to a balanced dipole. In the frequency range of 30 MHz to 1000 MHz, bandwidths of 120 kHz or higher were used. In the frequency range above of 1 GHz, bandwidths of 1 MHz or higher were used.

Measurements of the radiated field were made with the antenna located at a distance of 3 meters from the EUT.

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

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

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

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

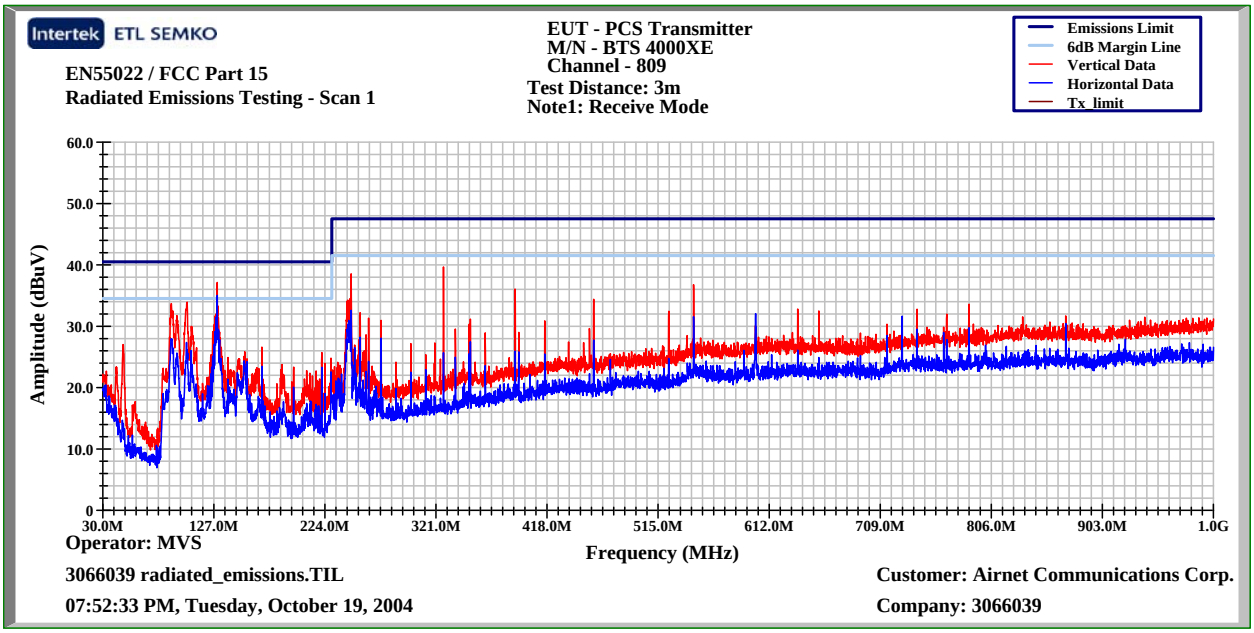
Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4: 2003 and ICES-003.

10.2 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration Due Date
EMC Receiver	HP	8546A	3650A00362	12/23/05
Spectrum analyzer	R&S	FSEK30	100253	8/30/2005
Pre-amplifier	TEC	PA-102	44939	8/2/2005
Pre-amplifier	HP	8449B	3008A00989	4/19/2005
Bi-Log Antenna	Chase	CBL6112B	2622	8/30/2005
Horn Antenna	EMCO	3115	9208-3919	3/4/2005

10.3 Test Results

Figure 10-1: Receiver spurious emissions, Receive Mode, Channel 809, 30 MHz to 1 GHz



Client: Airnet Communications Corp.
Model Number: BTS 4000XE
Project Number: 3066039
Tested By: MVS
Date: 10/19/2004
Frequency Range (MHz): 30-1000
Input power: 120VAC/60Hz
Notes: Receive Mode - Channel 809

Receiver: HP 8546A
Antenna: Chase 2622
Cables: E01+MP3+E05
Preamp: PA-102
Limit: FCC15 Class B-3m
Test Distance (m): 3m
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**
V	90.038	43.0	8.4	1.3	23.7	29.1	40.5	-11.4
V	102.375	37.9	12.4	1.5	23.7	28.1	40.5	-12.4
V	129.988	44.2	13.6	1.6	23.7	35.6	40.5	-4.9
V	247.000	46.5	12.4	2.2	23.7	37.4	47.5	-10.1
V	327.680	45.8	14.0	2.7	23.7	38.8	47.5	-8.7
V	390.010	41.8	15.7	2.9	23.7	36.7	47.5	-10.8

Figure 10-2: Receiver spurious emissions, Receive Mode, Channel 809, 1 GHz to 11 GHz