

**ADC Telecommunications Inc.  
1930-1990 MHz GSM Base Station**

**FCC ID: OEWMBS19  
Model No.: MBSS-1900  
FCC Rule Parts: 2, 24**

**General Overview**

The MBSS-1900 is a FCC Part 24 PCS base station radio. The MBSS-1900 includes up to 4 identical radio boards in an Ultrawave Micro BTS cabinet, and E1 digital communications card, with an AC-DC rectifier module to provide -48VDC normal operating voltage. A description of the theory of operation and product configuration is found in an attachment to this application and report.

**SPECIFICATIONS**

Transmitter

TX operating frequency:	1930.2 – 1989.8 MHz
TX output power:	40 watts, 44.98 watts (46.53 dBm) measured
Modulation:	GSM (GMSK) Modulation is internally generated and limited
Power requirements:	110VAC, 30 A/220VAC,15A/-48-60VDC, 40A
Frequency Tolerance	0.0024 ppm -30 to +50 C 85%-115% supply voltage at 25C

**Test Dates:** 10, 11,23, and 26 September 2008

**Test Site**

Antenna port conducted tests and frequency stability tests were performed at the ADC test lab location in Mountain View, CA. Radiated spurious emissions, unintentional radiator emission, and AC line conducted tests were performed at Compliance Certification Services in Fremont, CA.



THOMAS N. COKENIAS  
Consultant, EMC&Radio Type Approvals  
Agent for ADC Telecommunications Inc.

14 October 2008

## Report Revision Information

Revision No.	Date	Description	Revised by
-	10/02/2008	Original Issue	T. Cokenias
1	10/14/2008	Correct typo in freq. stability data Add freq. drift calculation Include TIA/603 Reference	T. Cokenias

## FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2.

**Test Procedure:** TIA/EIA 603-B Land Mobile FM or PM Communication  
Equipment, Measurement and Performance Standards

**2.1033(c)1** Applicant: ADC Telecommunications Inc.  
2495 Leghorn St.,  
Mountain View, CA 94043

**2.1033(c)2** FCC ID: OEWMBS19

**2.1033(c)4,5** Emission type and Frequency range

Modulation: GMSK from internal source  
Emission designator: **323KG1D**

**2.1033(c) 6 Range of Operating Power**

40 watts peak (46.0 dBm) in single configuration  
15 watts peak (41.76 dBm) in 2 transmitter combined configuration

**2.1033(c) 7 Maximum Power Rating**

46.53 dBm measured = 44.98 watts

**2.1033(c) 13 Description of Modulation System**

GMSK per the GMS standard

## 2.1033(c) 14 Test Data per 2.1046 – 2.1057, 15.107, 15.109

### CCS Test Equipment

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	09/28/07	09/28/08
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/08	03/31/09
Spectrum Analyzer	Agilent / HP	E4446A	C01069	04/08/08	10/08/09
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	09/27/07	09/27/08
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/08	04/22/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/07	10/25/08
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/25/07	10/25/08
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	02/06/08	08/06/09

### ADC Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal Date
Spectrum analyzer	Rohde & Schwartz	FSEM	849016/022	01/30/08
Power meter	Gigatronics	8652A	8650697	03/27/08
Power Sensor	Gigatronics	80701A	1834070	03/27/08
Frequency counter	HP	53132A	KR91201283	03/27/08
Frequency source	Quartzlock	A8-Rb	048	NCR
Attenuator	Bird	100-SA-MFN-30	n/a	NCR

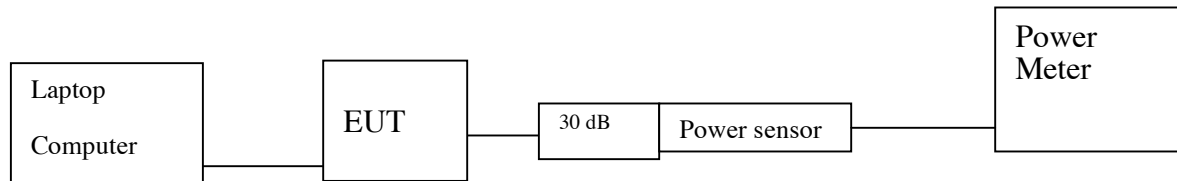
## 2.1046 RF Output Power Measurements Requirement/Limit: 24.232

a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below. See §24.53 for HAAT calculation method. Base station antenna heights may exceed 300 meters with a corresponding reduction in power; see Table 1 of this section. The service area boundary limit and microwave protection criteria specified in §§24.236 and 24.237 apply.

Table 1\_Reduced Power for Base Station Antenna Heights Over 300 Meters

HAAT in meters	Maximum EIRP watts
[le] 300.....	1640
[le] 500.....	1070
[le] 1000.....	490
[le] 1500.....	270
[le] 2000.....	160

### Test set-up: Figure 1



### Test Procedures

1. Set the transmitter to produce maximum modulated power at the desired frequency
2. Read PEAK output power.

Note: For GMSK modulation, a constant carrier modulation,  $P_{ave} = P_{pk}$ , supported by data as  $P_{pk} - P_{av} < 0.5$  dB, within measurement tolerance between power meter and analyzer.

### Test Results

Channel Number	Frequency, MHz	Pout, dBm(PM)	Pout, dBm(Pk)	Pout, dBm(Av)
512 (low channel)	1930.2	38.78	39.32	39.10
513 (low chmax P)	1930.4	45.31	45.83	45.54
661 (mid channel)	1960.0	45.86	46.53	46.10
809 (high ch max P)	1989.6	45.64	46.19	45.89
810 (high channel)	1989.8	38.98	39.32	39.10

EUT software automatically limits output power to 39 dBm at Low and High channel to meet out of band emissions limits at band edge.

## Section 2.1047 Modulation Characteristics

### Section 2.1049 Occupied Bandwidth

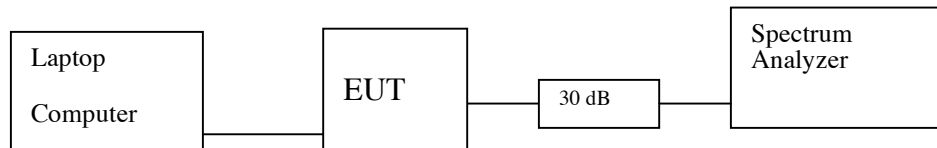
#### Requirement/Limit: 24.238 Emission limitations for Broadband PCS equipment

(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.

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

#### Test set-up:

Figure 2



Ref level offset = cable loss + 30 dB = 31 dB

#### Test Procedures and Results:

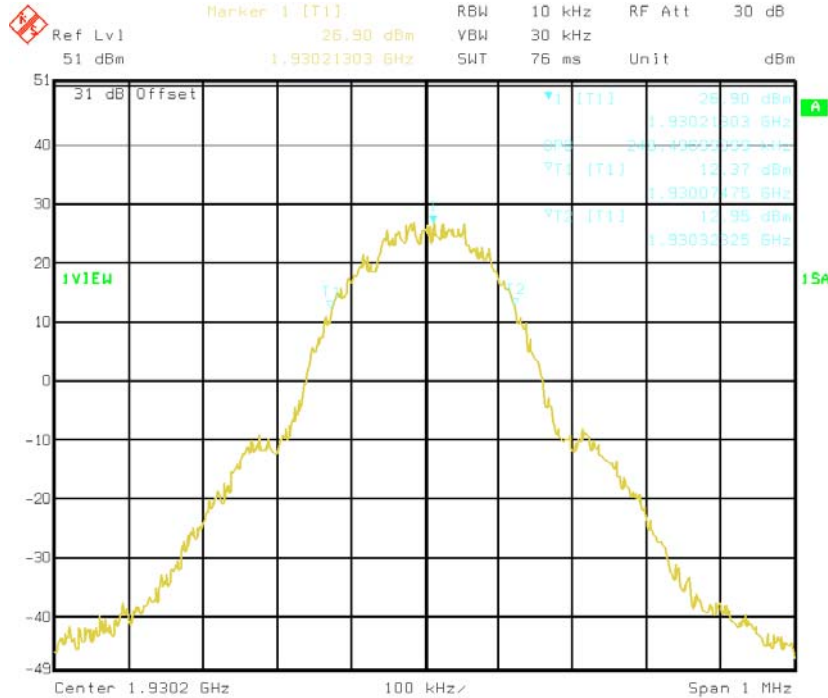
99% BW and -26 dBc occupied bandwidth was measured using spectrum analyzer display line and delta marker functions.

#### Test Results

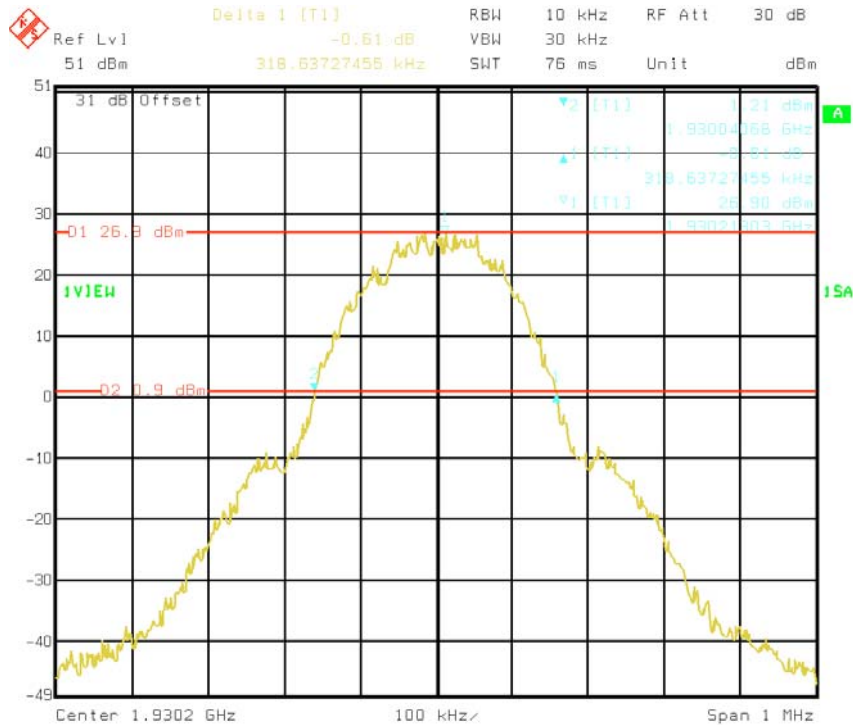
Maximum 26 dB BW: 322.65 kHz.

Refer to spectrum analyzer plots below.

## Occupied Bandwidth, 99% and -26 dB, Channel 512

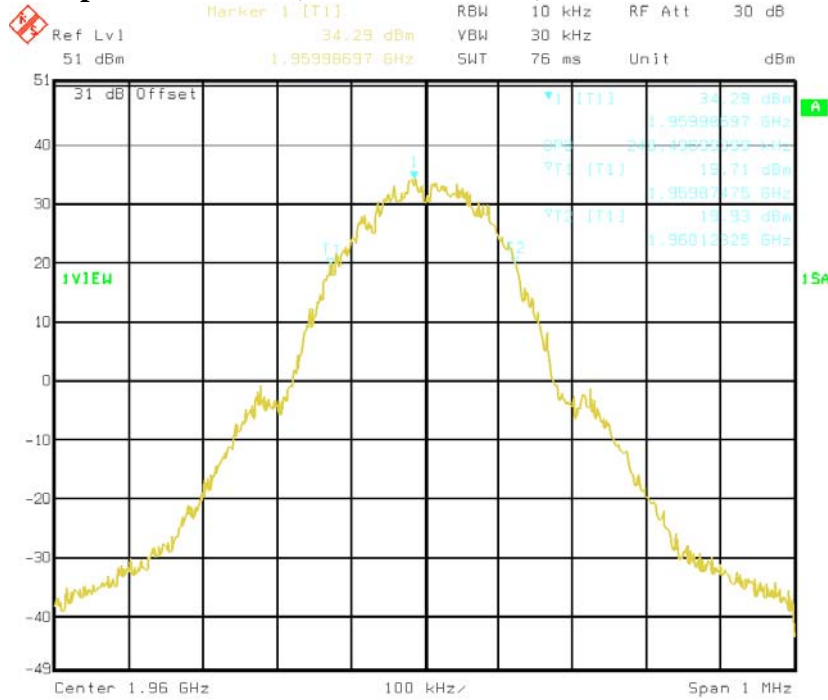


Title: Ch 512 Occupied Bandwidth, Power=+39dBm  
Comment A: 99% OBW is measured by Spec. An1  
Date: 10.SEP.2008 16:10:46

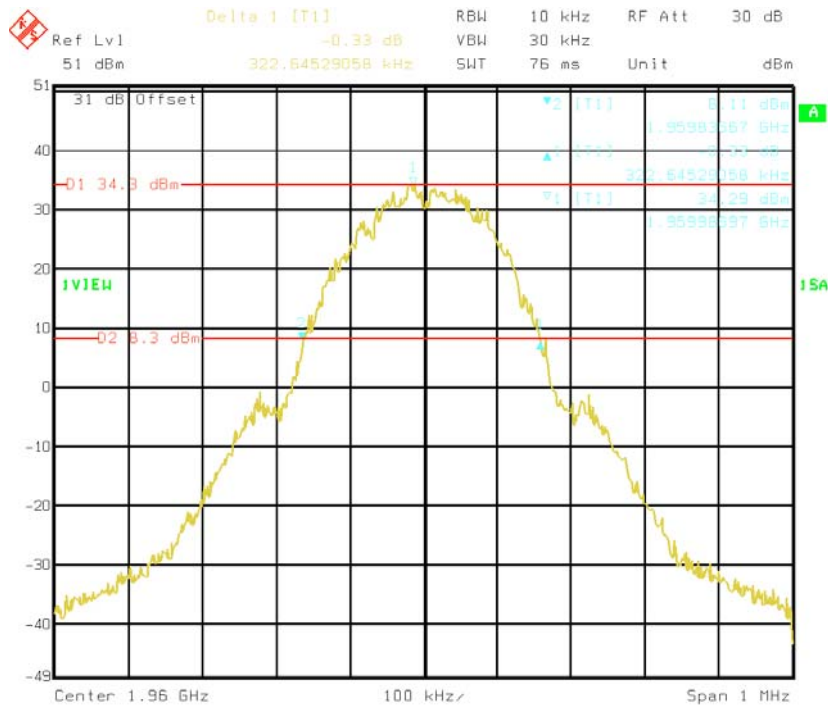


Title: Ch 512 Occupied Bandwidth, Power=+39dBm  
Comment A: 26 dB method, D-line1=peak, D2=-26 dB, Marker Delta1=BW  
Date: 10.SEP.2008 15:53:40

### Occupied Bandwidth, 99% and -26 dB, Channel 661



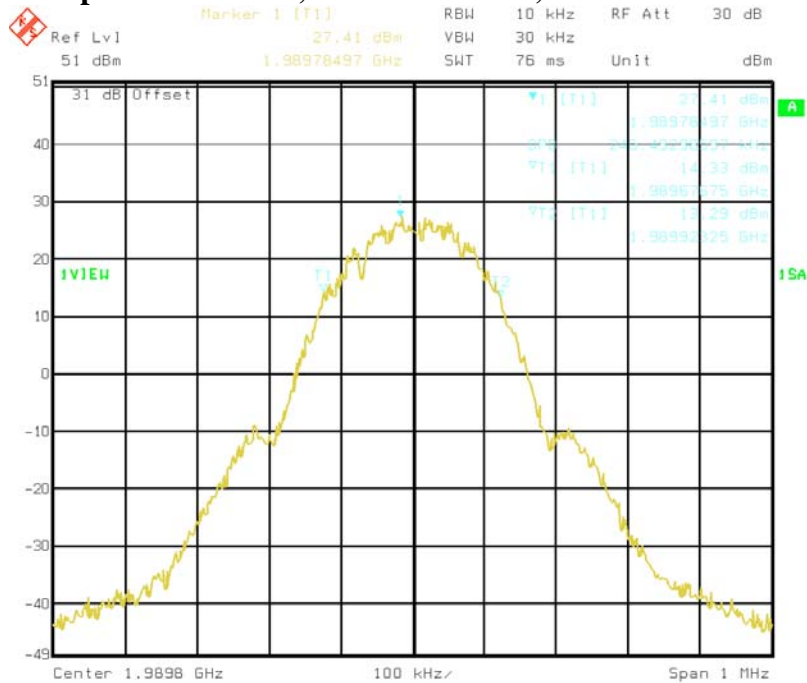
Title: Ch 661 Occupied Bandwidth, Power=+46dBm  
Comment A: 99% OBW is measured by Spec Anl  
Date: 10.SEP.2008 15:27:26



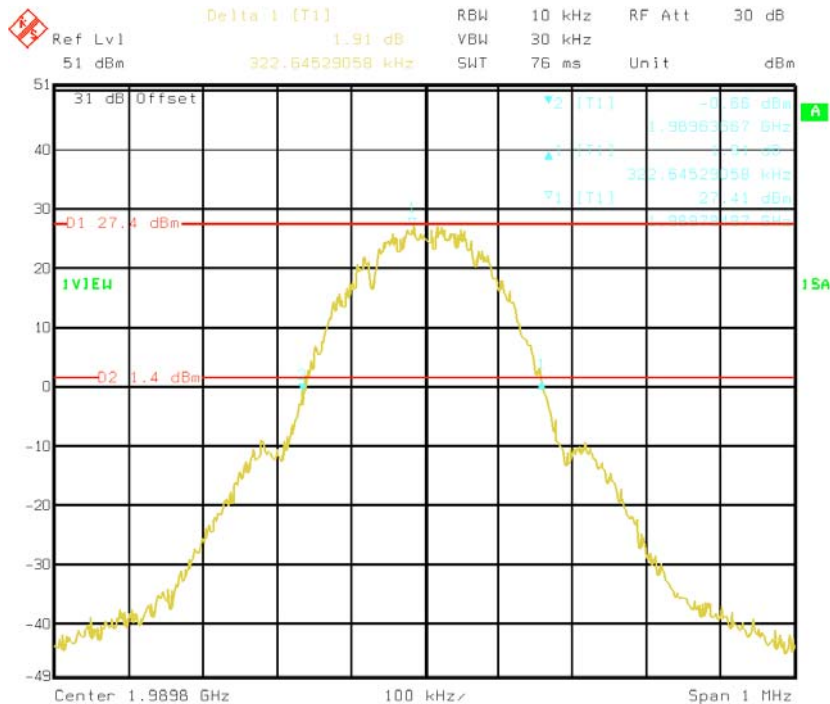
Title: Ch 661 Occupied Bandwidth, Power=+46dBm  
Comment A: 26 dB method, D-line1=peak, D2=-26 dB, Marker Delta1=BW  
Date: 10.SEP.2008 15:47:35



## Occupied Bandwidth, 99% and -26 dB, Channel 810



Title: Ch 810 Occupied Bandwidth, Power=+39dBm  
Comment A: 99% OBW is measured by Spec. An1  
Date: 10.SEP.2008 16:13:34



Title: Ch 810 Occupied Bandwidth, Power=+39dBm  
Comment A: 26 dB method, D-line1=Peak, D2=-26 dB, Marker Delta1=BW  
Date: 10.SEP.2008 16:18:13

## Section 2.1051 Spurious and Harmonic Emissions at Antenna Terminals Requirement/Limit: 24.238 Emission limitations for Broadband PCS equipment

(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.

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### Test set-up:

Refer to Figure 2 above

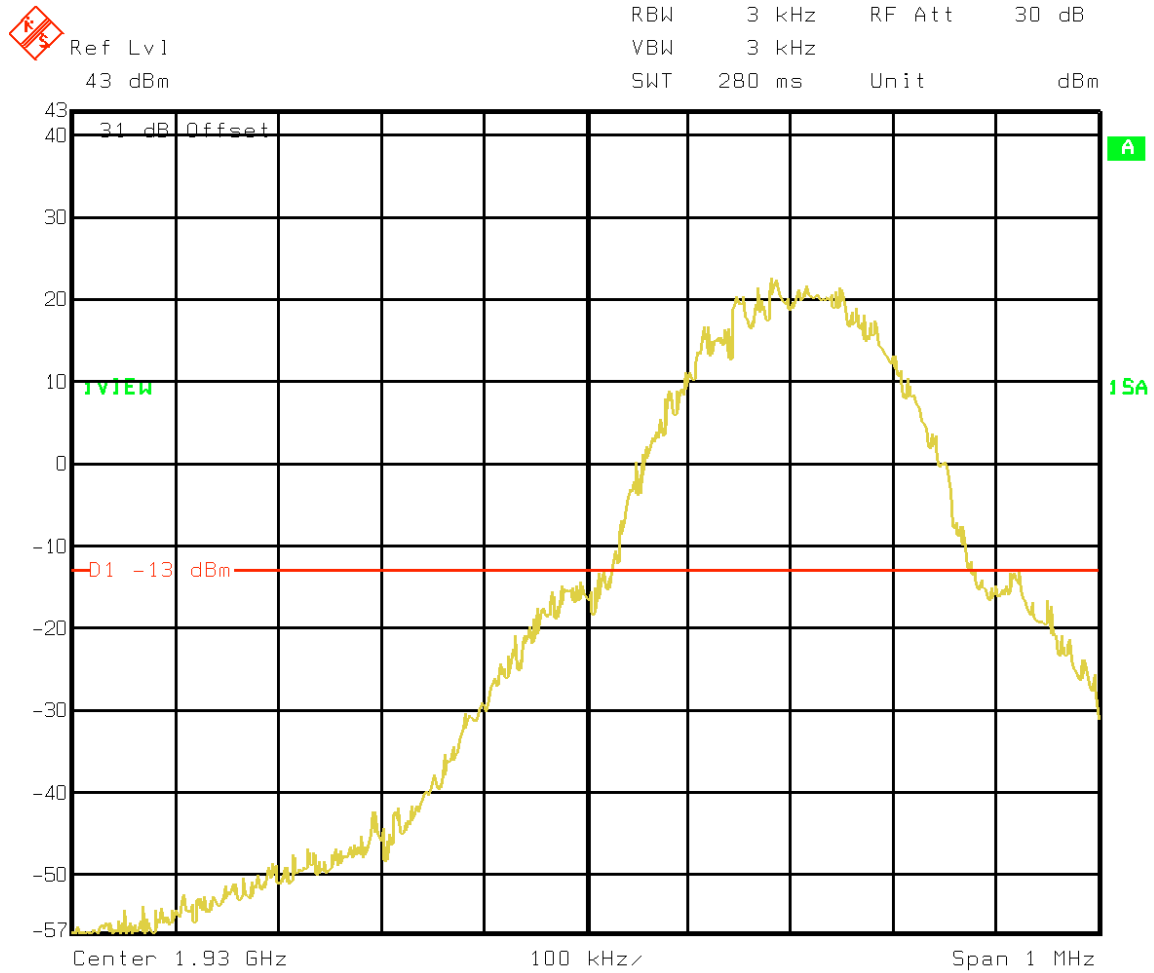
### Test Procedures

1. Record band edge emissions using 3 kHz resolution band width (1% emission BW).
2. Record transmitter output spectrum from 1 MHz to 10<sup>th</sup> harmonic of TX output frequency using 1MHz resolution bandwidth

### Test Results

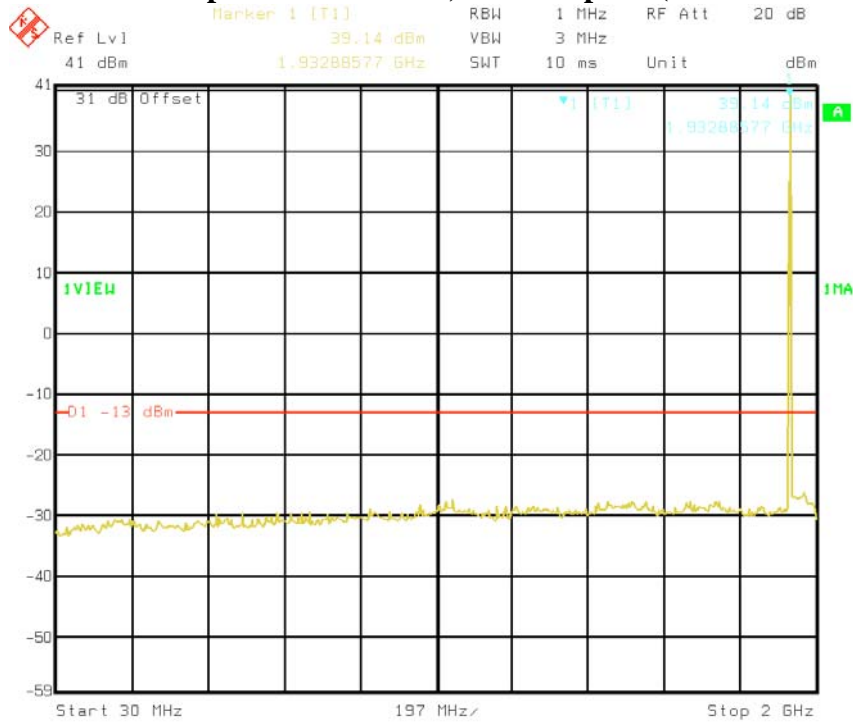
**PASS.** Refer to data plots below.

**Channel 512 Band edge emissions, antenna port (Pout = 39 dBm)**

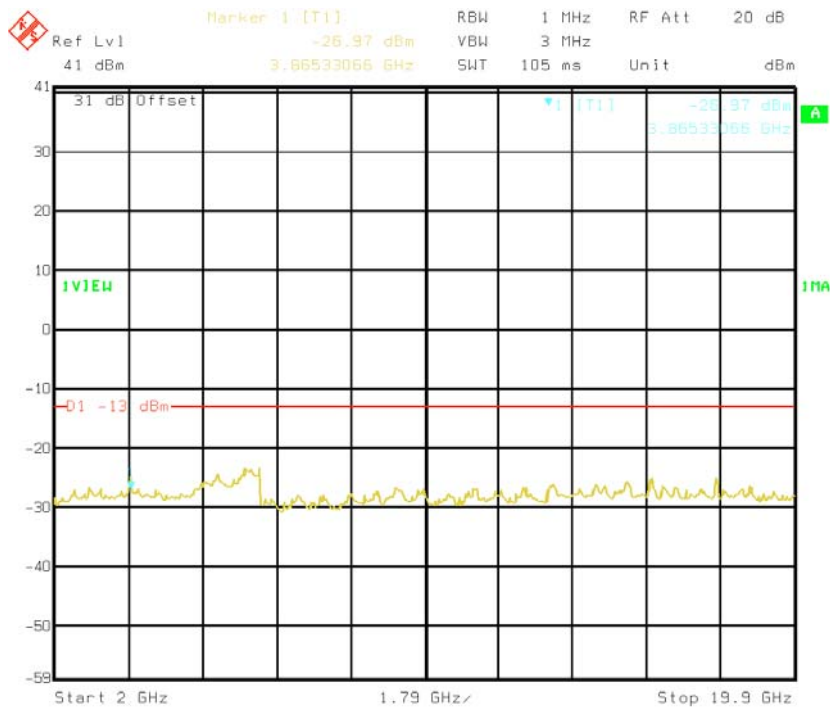


Title: Ch 512 Bandedge Emissions, Pout=+39 dBm  
Date: 10.SEP.2008 16:32:03

### Channel 512 Spurious emissions, antenna port (Pout = 39 dBm)

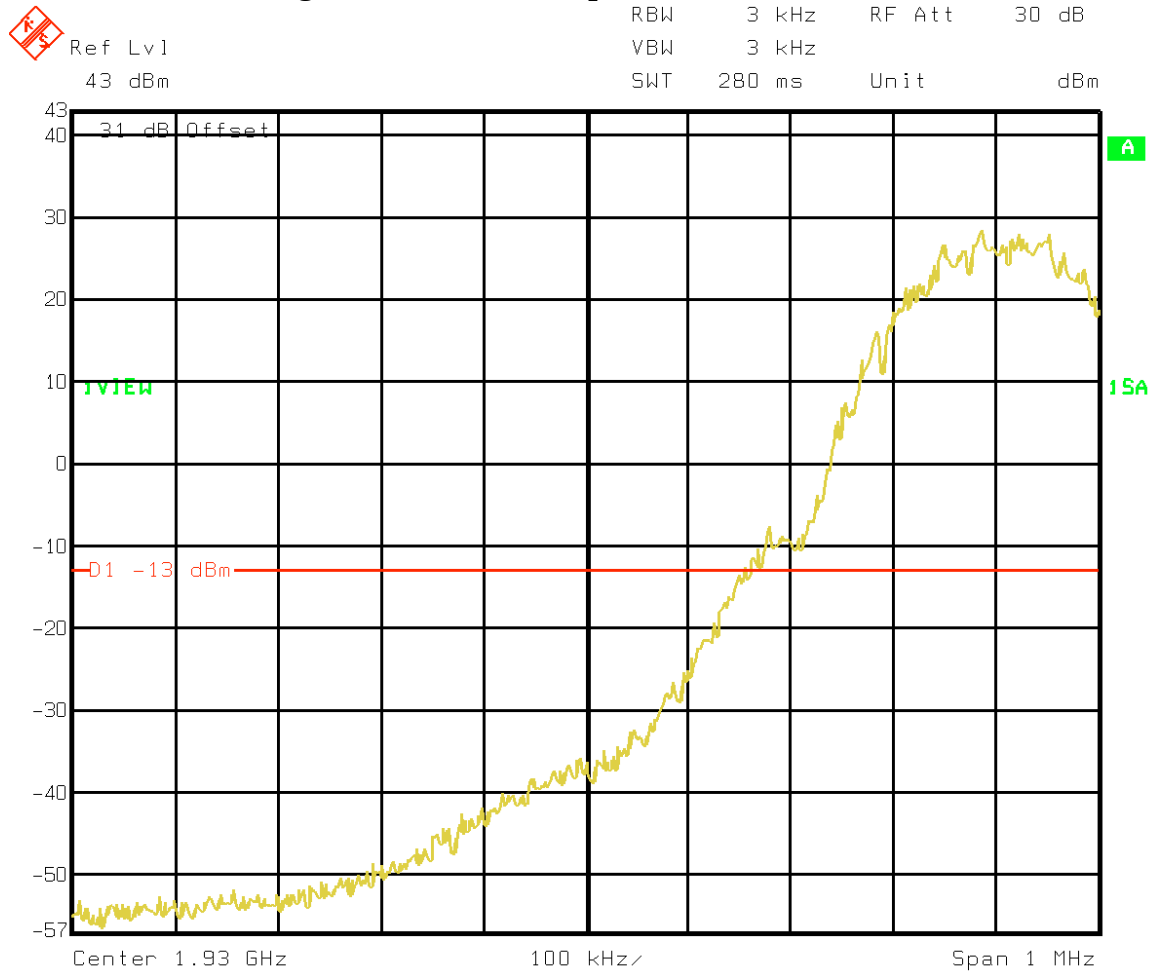


Title: Ch 512 Spurious 30MHz - 26GHz, Pout=+39 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:43:10



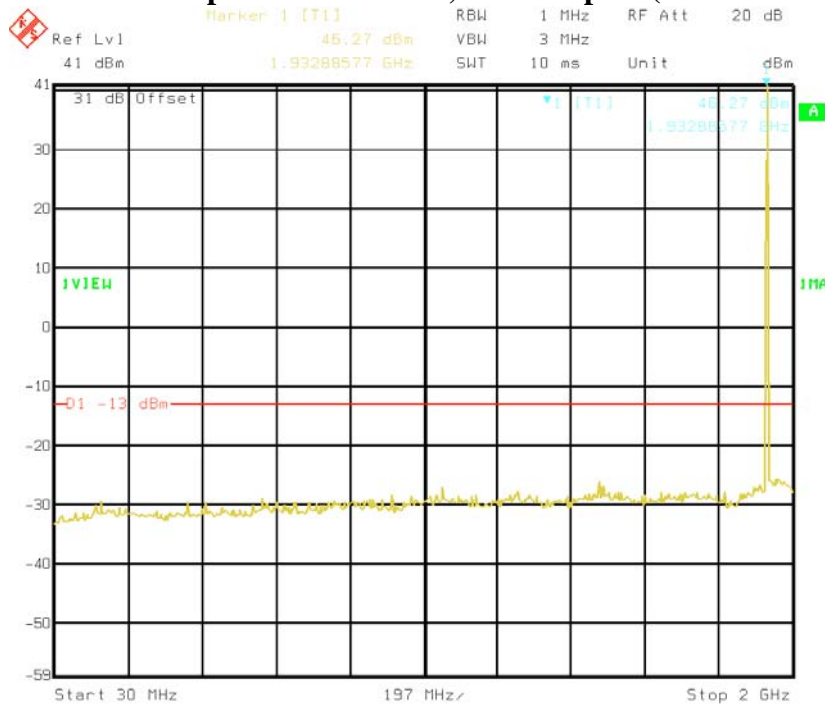
Title: Ch 512 Spurious 26GHz - 19.96GHz, Pout=+39 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:40:47

**Channel 513 band edge emission, antenna port (Pout = 46 dBm)**

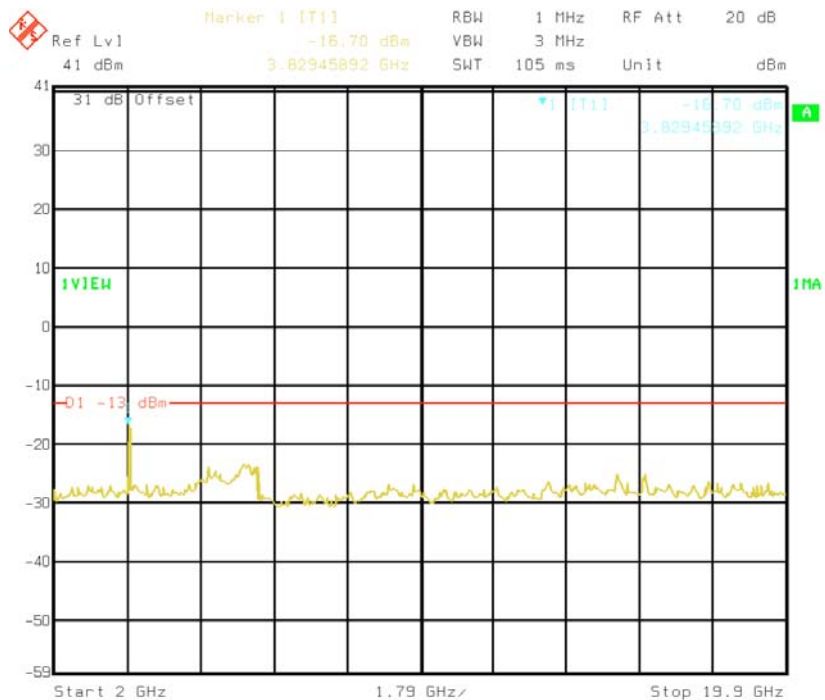


Title: Ch 513 Bandedge Emissions, Pout=+46 dBm  
 Date: 10.SEP.2008 16:56:27

### Channel 513 Spurious emissions, antenna port (Pout = 46 dBm)

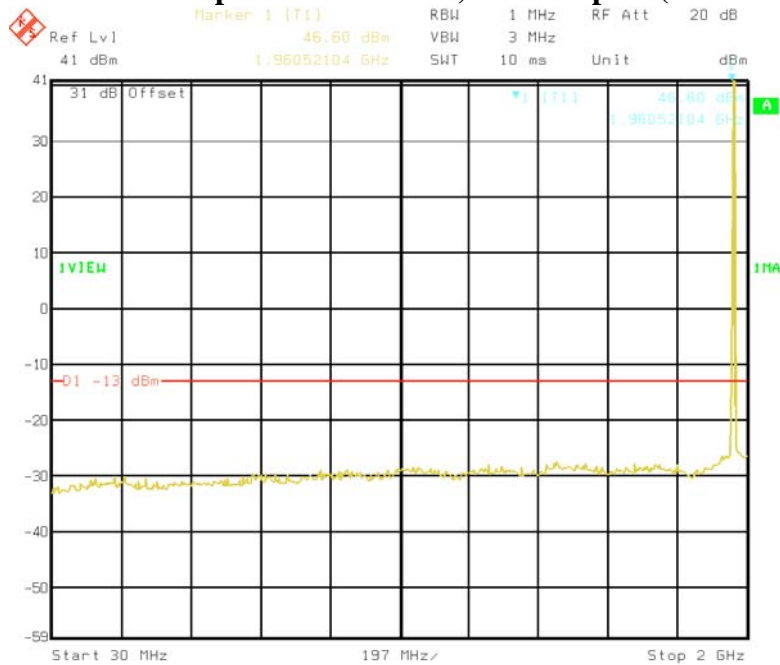


Title: Ch 513 Spurious 30MHz - 2GHz, Pout=+46 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:15:16

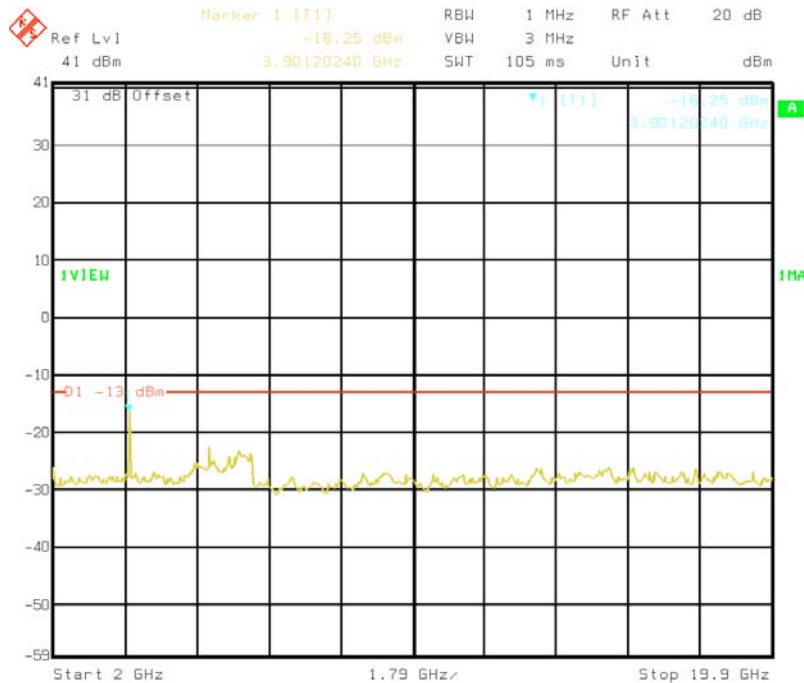


Title: Ch 513 Spurious 26Hz - 19.96Hz, Pout=+46 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:12:48

### Channel 661 Spurious emissions, antenna port (Pout = 46 dBm)

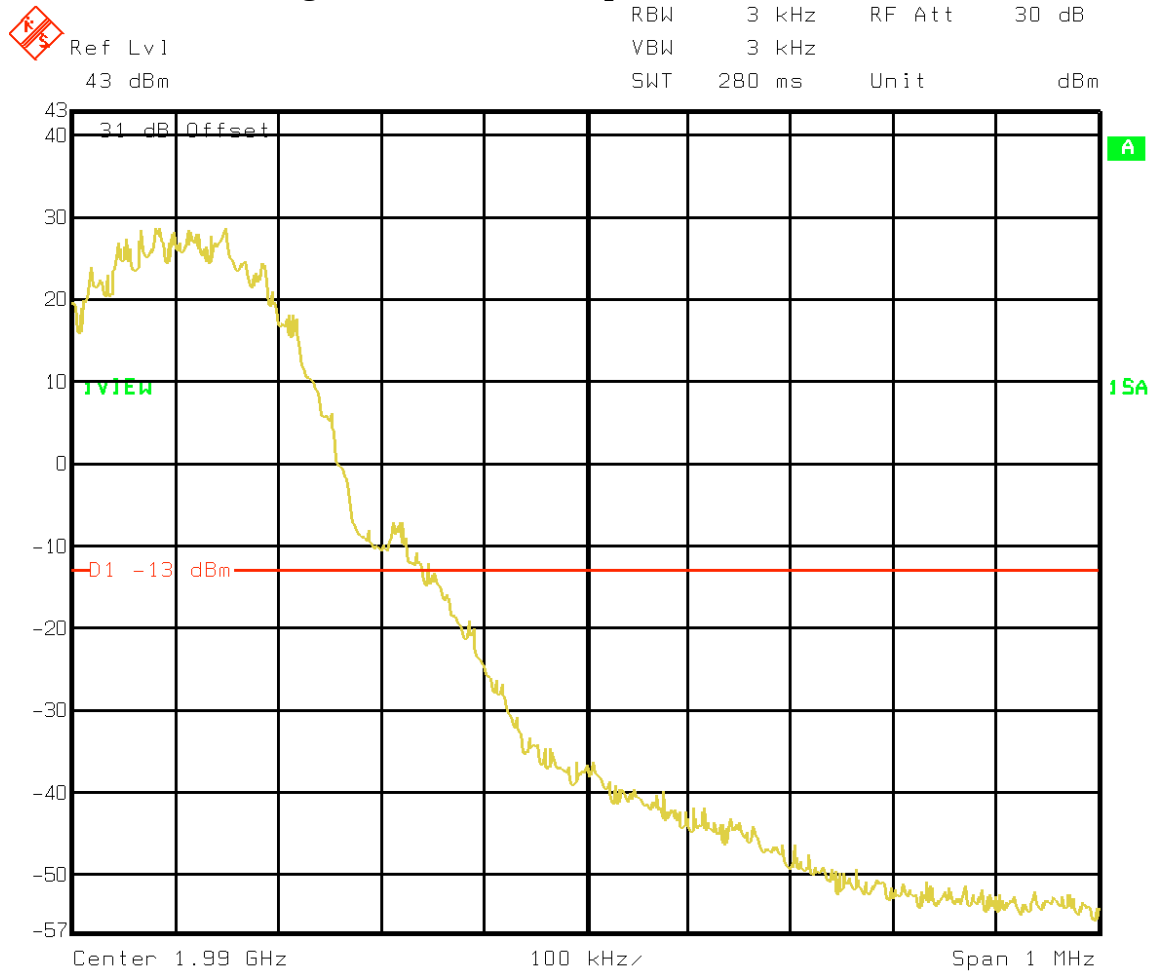


Title: Ch 661 Spurious 30MHz - 2GHz, Pout=+46 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:07:20



Title: Ch 661 Spurious 26Hz - 19.96GHz, Pout=+46 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:10:39

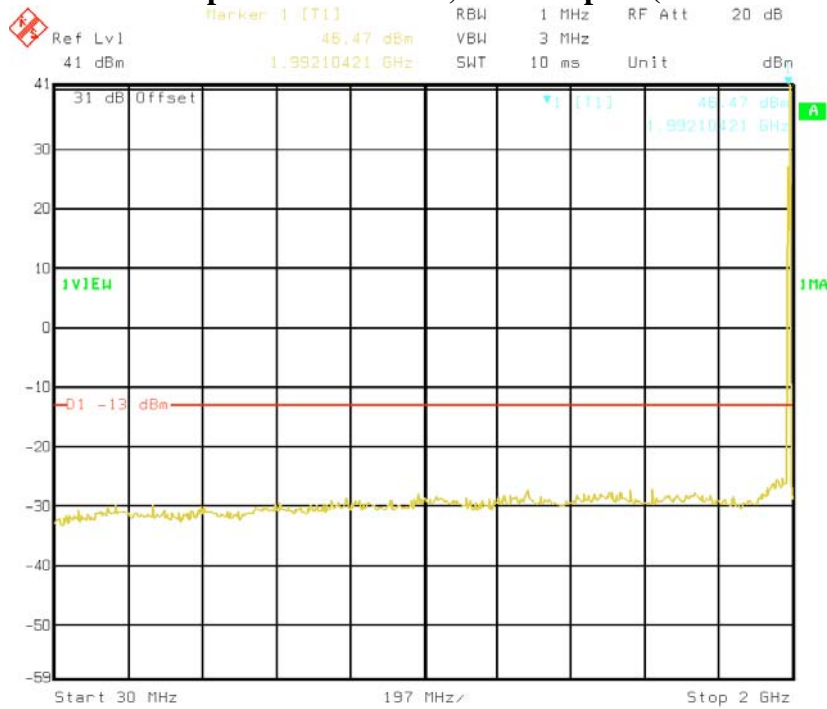
**Channel 809 Band edge emissions, antenna port (Pout = 46 dBm)**



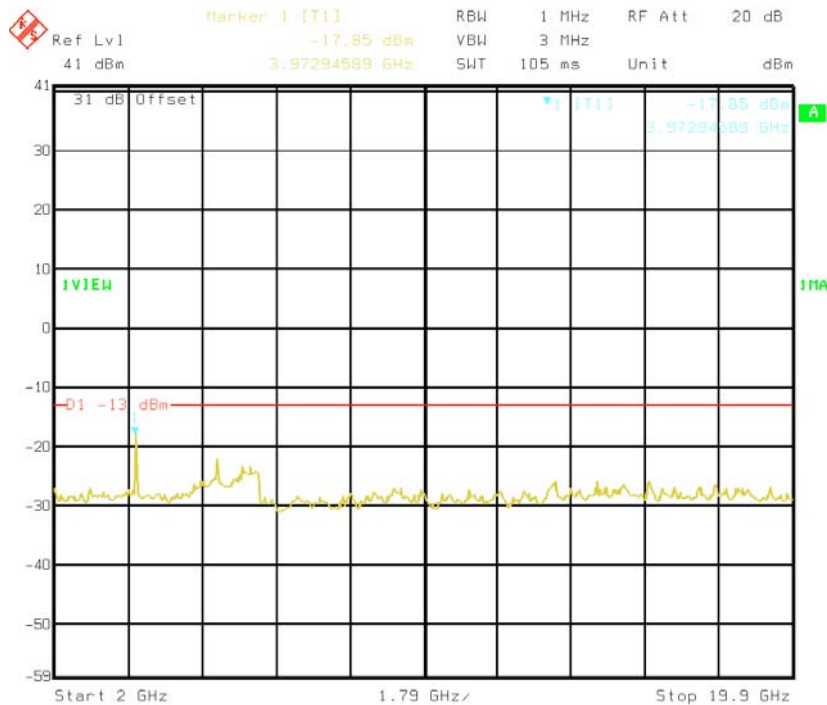
Title: Ch 809 Bandedge Emissions, Pout=+46 dBm  
Date: 10.SEP.2008 16:41:17



### Channel 809 Spurious emissions, antenna port (Pout = 46 dBm)

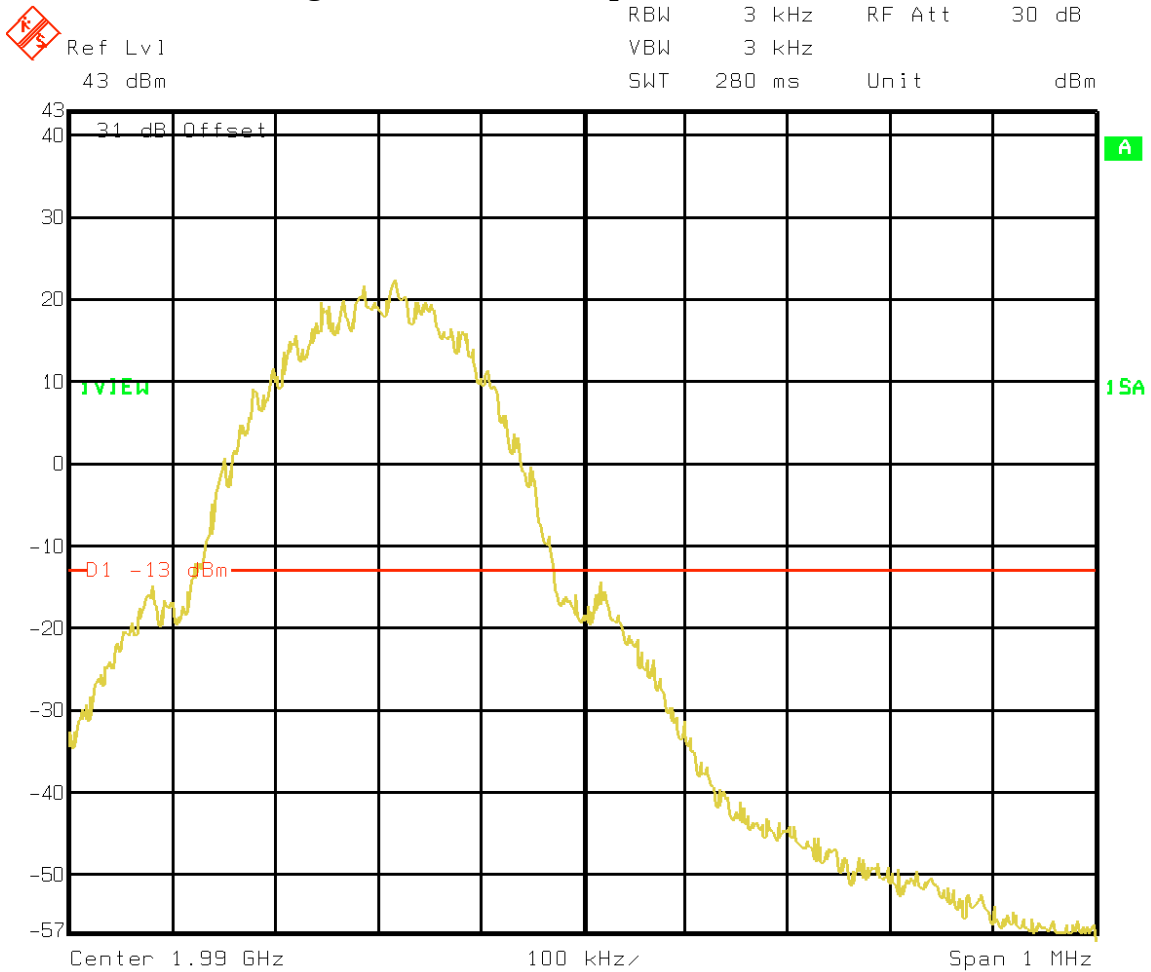


Title: Ch 809 Spurious 30MHz - 26Hz, Pout=+46 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:17:33



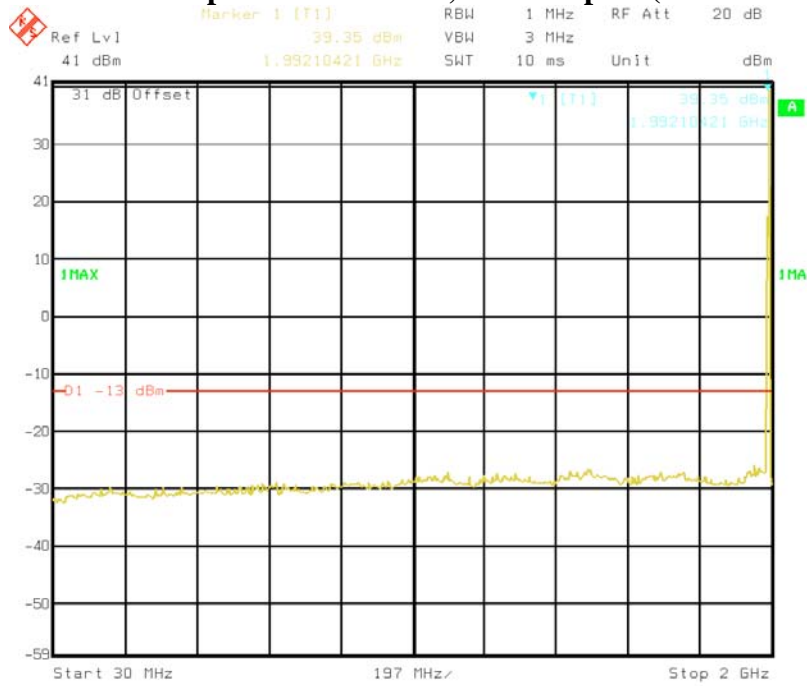
Title: Ch 809 Spurious 26Hz - 19.9GHz, Pout=+46 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:20:08

**Channel 810 Band edge emissions, antenna port (Pout = 39 dBm)**

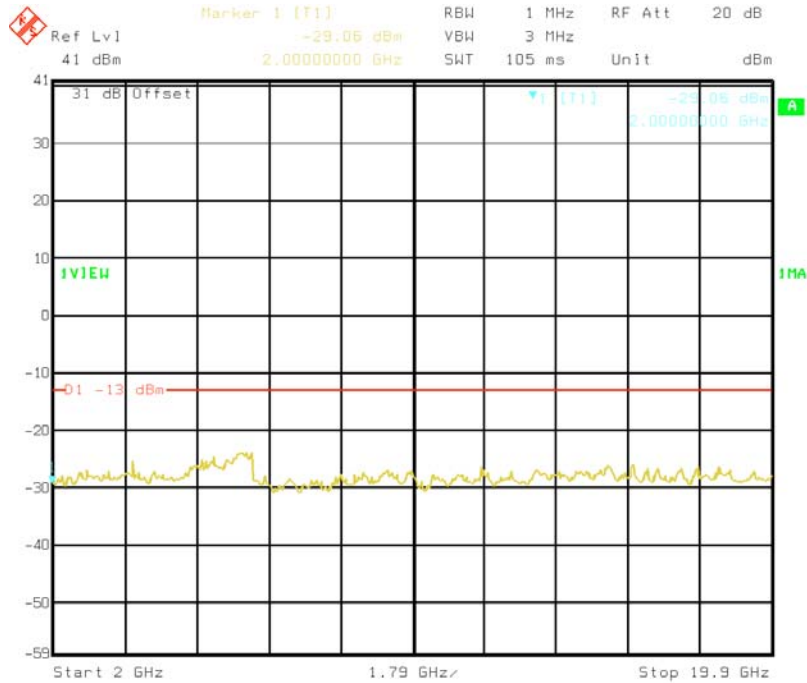


Title: Ch 810 Bandedge Emissions, Pout=+39 dBm  
Date: 10.SEP.2008 16:28:33

# Channel 810 Spurious emissions, antenna port (Pout = 39 dBm)



Title: Ch 810 Spurious 30MHz - 26GHz, Pout=+39 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:33:23



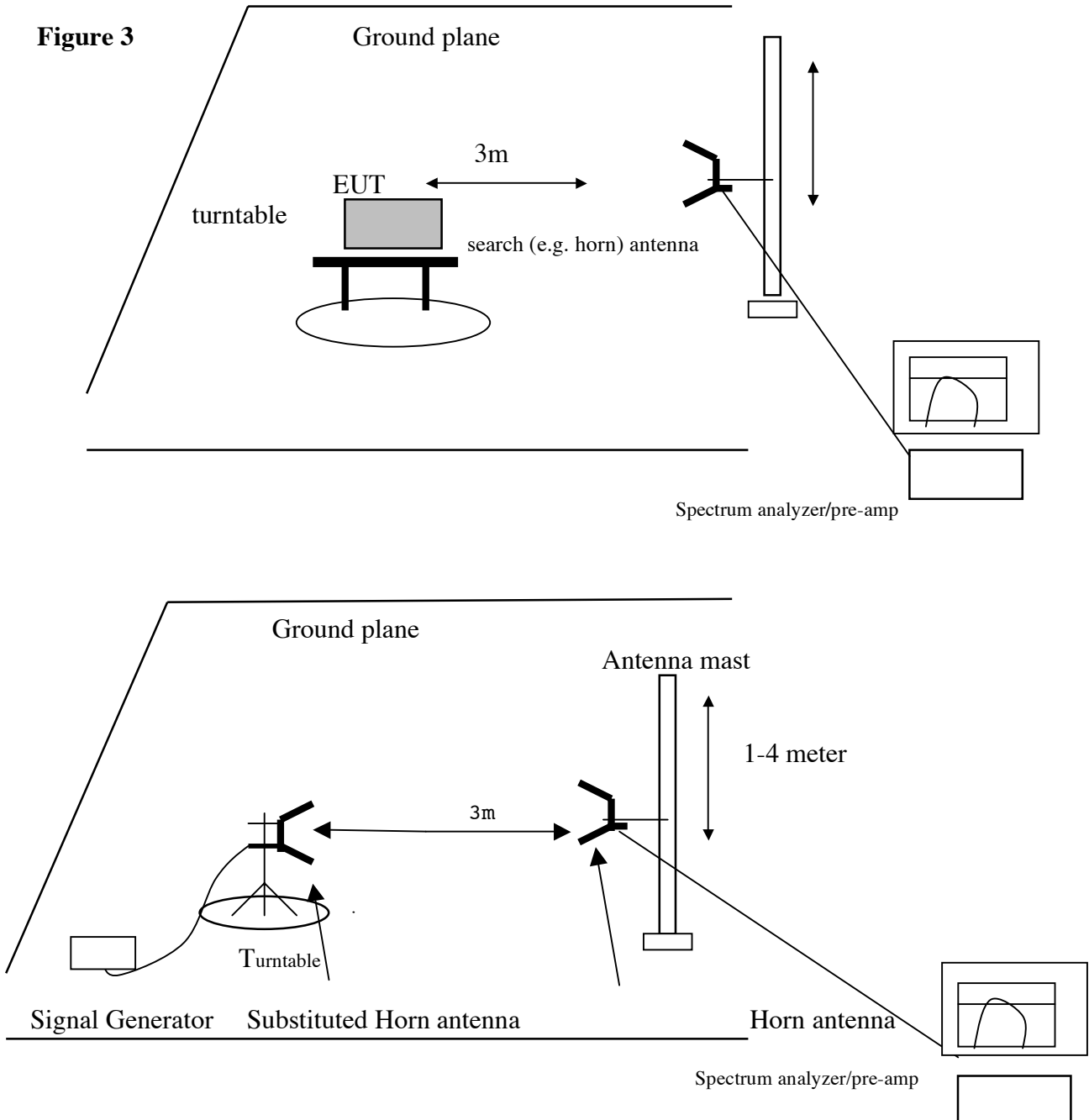
Title: Ch 810 Spurious 26Hz - 19.96GHz, Pout=+39 dBm  
Comment A: Peak hold mode, Att=31.0 dB  
Date: 11.SEP.2008 10:36:23

**Section 2.1053 Field Strength of Spurious and Harmonic Radiation**  
**Requirement/Limit: 24.238 Emission limitations for Broadband PCS equipment**

(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.

**Test Set-Up**

**Figure 3**



## Minimum Requirement

-13 dBm ERP

## Test Method

The antenna output port of the EUT was terminated with a 50-ohm load. With the transmitter operating at full power, the EUT was rotated 360° and the search antenna was raised and lowered in both polarities, all in an attempt to maximize the levels of the received emission for each harmonic and spurious emission up to 10 fo.

The EUT was removed and was replaced by a substitution antenna connected via coax to a signal generator. The generator output was set to each emission frequency detected, the search antenna was raised and lowered, the turntable was rotated, and until the maximum emission level was obtained. The signal generator output level was adjusted to match the radiated emission level from the EUT. After correcting for substitution antenna factor and generator cable loss, output power level is compared to the limit.

## Test Results

**Pass.** All emissions detected were at least 28.9 dB below limits. Refer to worst-case data below.

## Radiated Emissions Below 1 GHz

30 - 1000MHz Substitution Measurement										
Compliance Certification Services, Fremont 5m B-Chamber										
Company:		ADC								
Project #:		08U12124								
Date:		9/26/08								
Test Engineer:		Thanh Nguyen								
Configuration:		EUT StandAlone								
Mode:		Transmit								
Test Equipment:										
Bilog Antenna		Cable		Pre-amplifier 8447D		Limit				
5m Chamber Sunol Bilog		5m Chamber Cable		TS 8447D		EIRP				
f MHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Channel 513, 1930.4MHz										
62.01	50.5	V	-65.2	1.1	-2.1	-4.3	-68.4	-13.0	-55.4	
102.75	52.3	V	-57.5	1.3	-1.2	-3.3	-60.0	-13.0	-47.0	
195.87	45.2	V	-64.3	1.7	4.1	1.9	-62.0	-13.0	-49.0	
351.07	40.3	V	-65.8	2.2	6.0	3.9	-62.0	-13.0	-49.0	
380.17	41.0	V	-64.5	2.3	6.0	3.9	-60.8	-13.0	-47.8	
195.87	47.2	H	-62.4	1.7	4.1	1.9	-60.1	-13.0	-47.1	
208.48	47.8	H	-59.8	1.8	5.5	3.4	-56.1	-13.0	-43.1	
248.25	53.0	H	-56.2	1.9	6.1	3.9	-52.1	-13.0	-39.1	
676.02	37.3	H	-64.1	3.1	6.8	4.6	-60.4	-13.0	-47.4	
Mid Channel 661, 1960MHz										
107.60	46.7	H	-62.3	1.4	-1.6	-3.8	-65.3	-13.0	-52.3	
194.90	45.7	H	-63.9	1.7	4.0	1.9	-61.7	-13.0	-48.7	
247.28	51.9	H	-57.4	1.9	6.0	3.9	-53.2	-13.0	-40.2	
519.85	37.5	H	-65.8	2.7	6.3	4.2	-62.2	-13.0	-49.2	
676.02	36.2	H	-65.3	3.1	6.8	4.6	-61.6	-13.0	-48.6	
69.77	50.2	V	-64.7	1.2	-1.8	-3.9	-67.6	-13.0	-54.6	
107.60	51.2	V	-57.8	1.4	-1.6	-3.8	-60.7	-13.0	-47.7	
195.87	41.8	V	-67.7	1.7	4.1	1.9	-65.3	-13.0	-52.3	
248.25	42.7	V	-66.5	1.9	6.1	3.9	-62.4	-13.0	-49.4	
380.17	40.8	V	-64.7	2.3	6.0	3.9	-61.0	-13.0	-48.0	
High Channel 809, 1989.6MHz										
62.01	49.8	V	-65.8	1.1	-2.1	-4.3	-69.1	-13.0	-56.1	
102.75	52.2	V	-57.6	1.3	-1.2	-3.3	-60.1	-13.0	-47.1	
195.87	44.7	V	-64.8	1.7	4.1	1.9	-62.5	-13.0	-49.5	
351.07	40.3	V	-65.8	2.2	6.0	3.9	-62.0	-13.0	-49.0	
380.17	39.7	V	-65.8	2.3	6.0	3.9	-62.1	-13.0	-49.1	
102.75	47.5	H	-62.3	1.3	-1.2	-3.3	-64.8	-13.0	-51.8	
195.87	45.5	H	-64.1	1.7	4.1	1.9	-61.8	-13.0	-48.8	
208.48	47.6	H	-60.0	1.8	5.5	3.4	-56.3	-13.0	-43.3	
247.28	51.9	H	-57.4	1.9	6.0	3.9	-53.2	-13.0	-40.2	
676.02	39.2	H	-62.3	3.1	6.8	4.6	-58.6	-13.0	-45.6	

Rev. 4.29.7

## Radiated Emissions Above 1 GHz

High Frequency Substitution Measurement Compliance Certification Services, Fremont 5m B-Chamber									
<b>Company:</b>		ADC							
<b>Project #:</b>		08U12124							
<b>Date:</b>		9/23/08							
<b>Test Engineer:</b>		Thanh Nguyen							
<b>Configuration:</b>		EUT StandAlone							
<b>Mode:</b>		GSM_GPRS							
<b>Test Equipment:</b>									
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">EMCO Horn 1-18GHz</div> <div style="border: 1px solid black; padding: 2px;">T73; S/N: 6717 @3m</div>			<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Horn &gt; 18GHz</div> <div style="border: 1px solid black; padding: 2px;"></div>				<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Limit</div> <div style="border: 1px solid black; padding: 2px;">EIRP</div>		
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 60%;"> <p>Hi Frequency Cables</p> <div style="display: flex; gap: 10px;"> <div><input checked="" type="checkbox"/> (2 ft)</div> <div><input type="checkbox"/> (2 ~ 3 ft)</div> <div><input type="checkbox"/> (4 ~ 6 ft)</div> <div><input checked="" type="checkbox"/> (12 ft)</div> </div> </div> <div style="width: 35%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Pre-amplifer 1-26GHz</div> <div style="border: 1px solid black; padding: 2px;">T145 Agilent 3008A</div> </div> <div style="width: 5%;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Pre-amplifer</div> <div style="border: 1px solid black; padding: 2px;"></div> </div> </div>									
f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)
<b>Low Channel 1930.4MHz (Ch 513)</b>									
3.8608	41.3	V	-54.0	6.6	9.7	7.5	-50.8	-13.0	-37.8
5.791	42.2	V	-49.4	8.2	11.8	9.6	-45.8	-13.0	-32.8
3.861	40.4	H	-54.8	6.6	9.7	7.5	-51.6	-13.0	-38.6
5.791	45.1	H	-45.5	8.2	11.8	9.6	-41.9	-13.0	-28.9
<b>Mid Channel 1960MHz (Ch 661)</b>									
3.920	39.8	H	-55.1	6.6	9.7	7.5	-52.0	-13.0	-39.0
5.880	43.5	H	-47.2	8.3	12.0	9.8	-43.5	-13.0	-30.5
7.840	39.2	H	-48.4	9.2	12.8	10.7	-44.7	-13.0	-31.7
3.920	41.5	V	-53.5	6.6	9.7	7.5	-50.4	-13.0	-37.4
5.880	42.3	V	-49.4	8.3	12.0	9.8	-45.7	-13.0	-32.7
7.840	39.0	V	-49.4	9.2	12.8	10.7	-45.7	-13.0	-32.7
<b>High Channel 1989.6MHz</b>									
3.980	41.0	V	-53.7	6.7	9.7	7.5	-50.7	-13.0	-37.7
5.969	41.6	V	-50.0	8.3	12.2	10.0	-46.2	-13.0	-33.2
7.959	38.4	V	-49.9	9.2	12.9	10.7	-46.2	-13.0	-33.2
3.980	42.0	H	-52.6	6.7	9.7	7.5	-49.6	-13.0	-36.6
5.969	41.6	H	-49.0	8.3	12.2	10.0	-45.2	-13.0	-32.2
7.959	38.1	H	-49.4	9.2	12.9	10.7	-45.8	-13.0	-32.8
Rev. 4.12.7									

## 2.1055 Frequency Stability

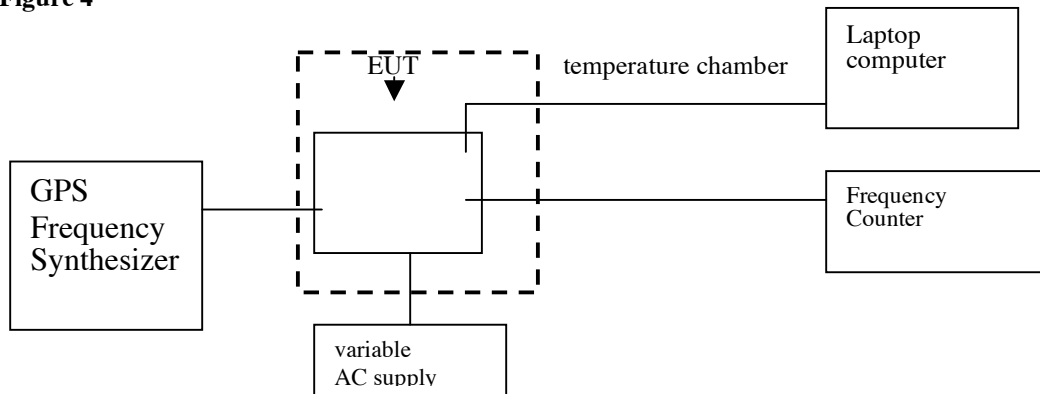
**Requirement/Limit: 24.235 Frequency stability**

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Temperature Range: -30C to +50 C  
Supply Voltage Range: 85% - 115% nominal 13.6 VDC (11.6 - 15.6 VDC)

### Test Setup

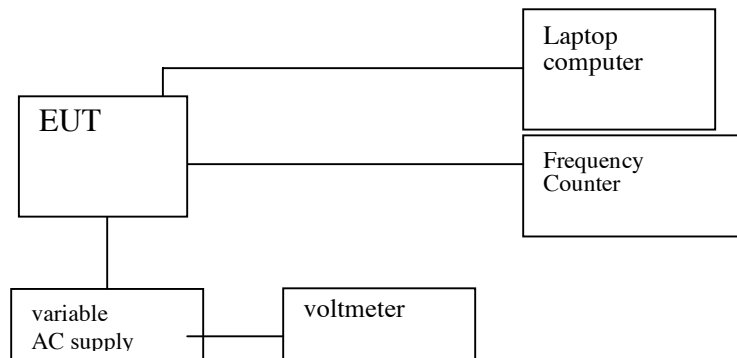
Figure 4



### Operating Voltage v Frequency

### Test Setup

Figure 5





## Test Results

Pass. All emissions remained within the authorized operating frequency band. Actual performance better than 4.8 Hz drift, or 0.0024 ppm.

### A. Frequency v Supply Voltage Variation Temperature: 25°C

AC voltage	Low (Ch 512), MHz	Mid (Ch 661), MHz	High (Ch 810), MHz
102V (-15%)	1930.1999868	1959.9999866	1979.7999864
120V (0%)	1930.1999868	1959.9999866	1979.7999864
138V (+15%)	1930.1999868	1959.9999866	1979.7999864

### B. Frequency v Temperature

#### At 120V AC input voltage

Temperature (°C)	Low (Ch 512), MHz	Mid (Ch 661), MHz	High (Ch 810), MHz
-30	1930.1999882	1959.9999880	1979.7999877
-20	1930.1999876	1959.9999874	1979.7999872
-10	1930.1999874	1959.9999872	1979.7999870
0	1930.1999873	1959.9999871	1979.7999869
+10	1930.1999875	1959.9999873	1979.7999871
+20	1930.1999871	1959.9999869	1979.7999867
+25	1930.1999868	1959.9999866	1979.7999864
+30	1930.1999866	1959.9999863	1979.7999861
+40	1930.1999846	1959.9999844	1979.7999841
+50	1930.1999824	1959.9999822	1979.7999819

### Frequency Drift v Temperature

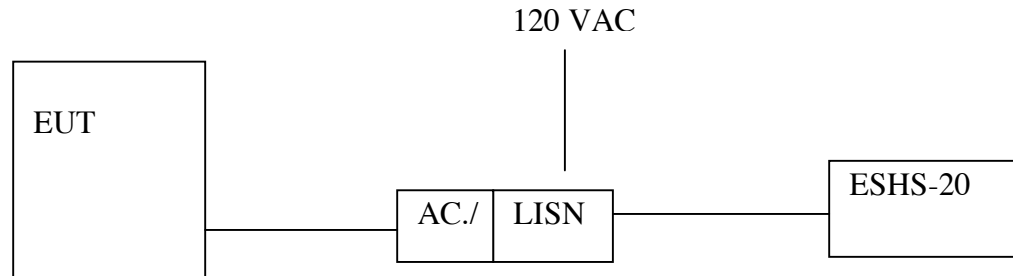
Low Channel 1930.199987 MHz  
Mid Ch. 1959.999987 MHz  
High Ch. 1979.799986 MHz

ADC Telecommunications  
FCC ID: OEWMDS19

Temp, C	LOW Ch.	Drift, Hz	MID Ch.	Drift, Hz	HIGH Ch.	Drift, Hz
	1930.199988	-0.6	1959.999987	-0.4	1979.799987	-1.2
	1930.199987	-0.4	1959.999987	-0.2	1979.799987	-1.0
	1930.199987	-0.3	1959.999987	-0.1	1979.799987	-0.9
	1930.199988	-0.5	1959.999987	-0.3	1979.799987	-1.1
	1930.199987	-0.1	1959.999987	0.1	1979.799987	-0.7
	1930.199987	0.2	1959.999987	0.4	1979.799986	-0.4
	1930.199987	0.4	1959.999986	0.7	1979.799986	-0.1
	1930.199985	2.4	1959.999984	2.6	1979.799984	1.9
	1930.199982	<b>4.6</b>	1959.999982	<b>4.8</b>	1979.799982	<b>4.1</b>
	Max. Drift ppm	0.0024		0.0024		0.0021

**AC Line Conducted Emissions from digital network interface**  
**Test Requirement: 15.107**

**AC Conducted Set-up**



**Test Procedure**

1. The EUT was placed on a floor with a metal ground plane, 40 cm from a vertical ground plane.
2. The EUT was set to transmit in normally.
3. Line conducted data was recorded for both NEUTRAL and HOT lines.

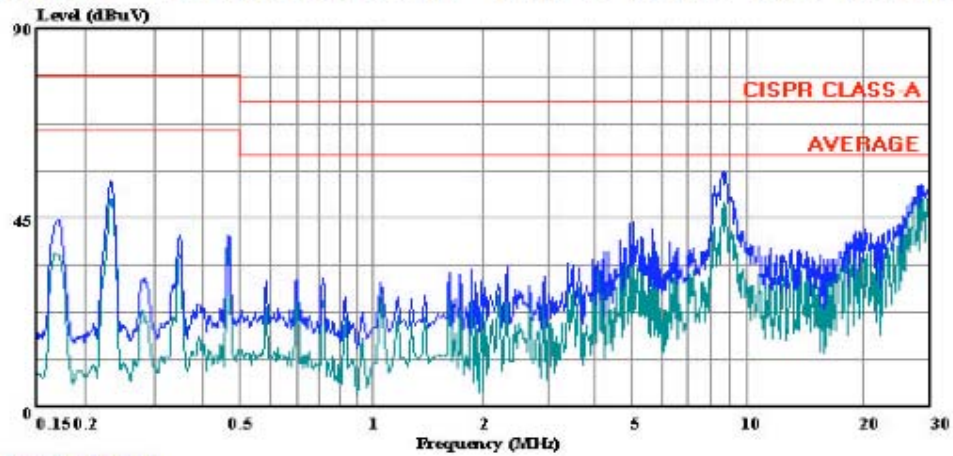
**Test Results**

Pass. Meets class A EN55022 limits.



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 14 File#: 08U12124LC.EMI Date: 09-26-2008 Time: 11:51:36



(Line Conduction)

Trace: 12

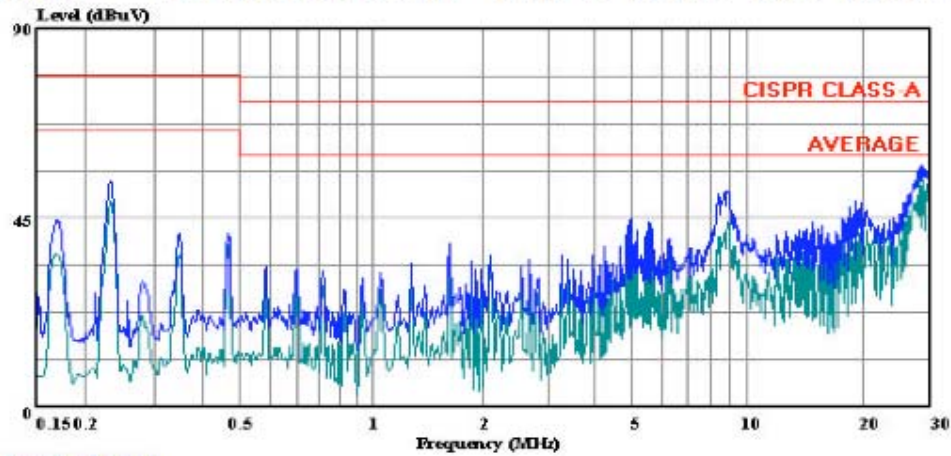
Ref Trace:

Condition: CISPR CLASS-A  
Test Operator:: Thanh Nguyen  
Project #: : 08U12124  
Company: : ADC  
Configuration:: EUT StandAlone  
Mode: : Tx Worst case  
Target: : FCC CLASS A  
Voltage: : Line 1, 115VAC 60Hz



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 7 File#: 08U12124LC.EMI Date: 09-26-2008 Time: 11:38:59



(Line Conduction)

Trace: 5

Ref Trace:

Condition: CISPR CLASS-A  
Test Operator:: Thanh Nguyen  
Project #: : 08U12124  
Company: : ADC  
Configuration:: EUT StandAlone  
Mode: : Tx Worst case  
Target: : FCC CLASS A  
Voltage: : Line 2, 115VAC 60Hz

**Radiated emissions from digital network interface**  
**Rule Section: 15.109**

Emissions from the digital portion of the EUT were tested to class A limits as the EUT is not sold or used in residences.

**Test Set-up**

Figure 3 above.

**Test Procedures**

The EUT was placed on a turntable located in a 5m anechoic chamber. The EUT was tested twice, once with the transmitter ON, the second time with the transmitter off but with the rest of the circuitry active (digital board, GPS receiver, and Bluetooth module).

EUT emissions were maximized by raising the search antenna 1-4 m in both horizontal and vertical polarities, and by rotating the turntable through a full 360 degrees.

**Test Results**

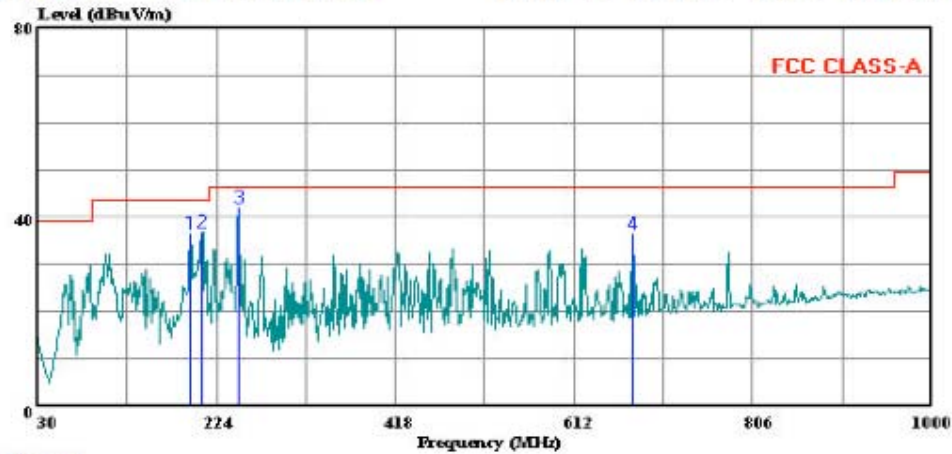
PASS. With addition of ferrite core to AC cable, radiated emissions meet class A limit. Details of ferrite installation are located in a separate attachment submitted with the certification application.

# Standard Network Configuration, Horizontal



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 32 File#: Vert1.EMI Date: 09-26-2008 Time: 11:10:04



(Present)  
Trace: 31

Ref Trace:

Condition: HORIZONTAL  
Test Operator:: Thanh Nguyen  
Project #: 08U12124  
Company: ADC  
Configuration:: EUT StandAlone  
Mode : TX Low Ch 513, 1930.4 MHz  
Target: FCC Class A  
Add ferrite at AC pwr cord

Page: 1

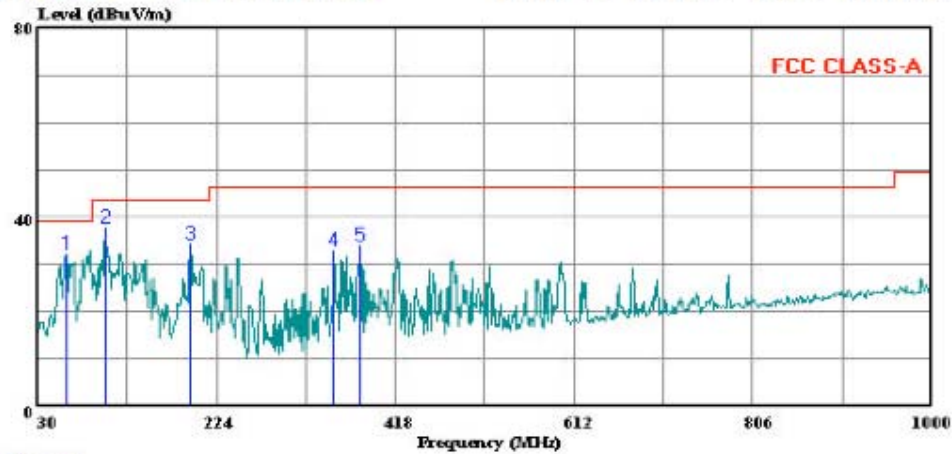
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	195.870	47.17	-10.71	36.45	43.50	-7.05	Peak
2	208.480	47.75	-11.03	36.72	43.50	-6.78	Peak
3	248.250	53.00	-11.19	41.81	46.40	-4.59	Peak
4	676.020	37.33	-1.12	36.22	46.40	-10.18	Peak

# Standard Network Configuration, Vertical



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 34 File#: Vert1.EMI Date: 09-26-2008 Time: 11:17:13



(Present)

Trace: 33

Ref Trace:

Condition: VERTICAL  
Test Operator:: Thanh Nguyen  
Project #: 08U12124  
Company: ADC  
Configuration:: EUT StandAlone  
Mode : TX Low Ch 513, 1930.4 MHz  
Target: FCC Class A  
Add ferrite at AC pwr cord

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	62.010	50.50	-18.30	32.20	39.00	-6.80	Peak
2	102.750	52.33	-14.42	37.91	43.50	-5.59	Peak
3	195.870	45.17	-10.71	34.45	43.50	-9.05	Peak
4	351.070	40.33	-7.48	32.86	46.40	-13.54	Peak
5	380.170	41.00	-7.17	33.83	46.40	-12.57	Peak

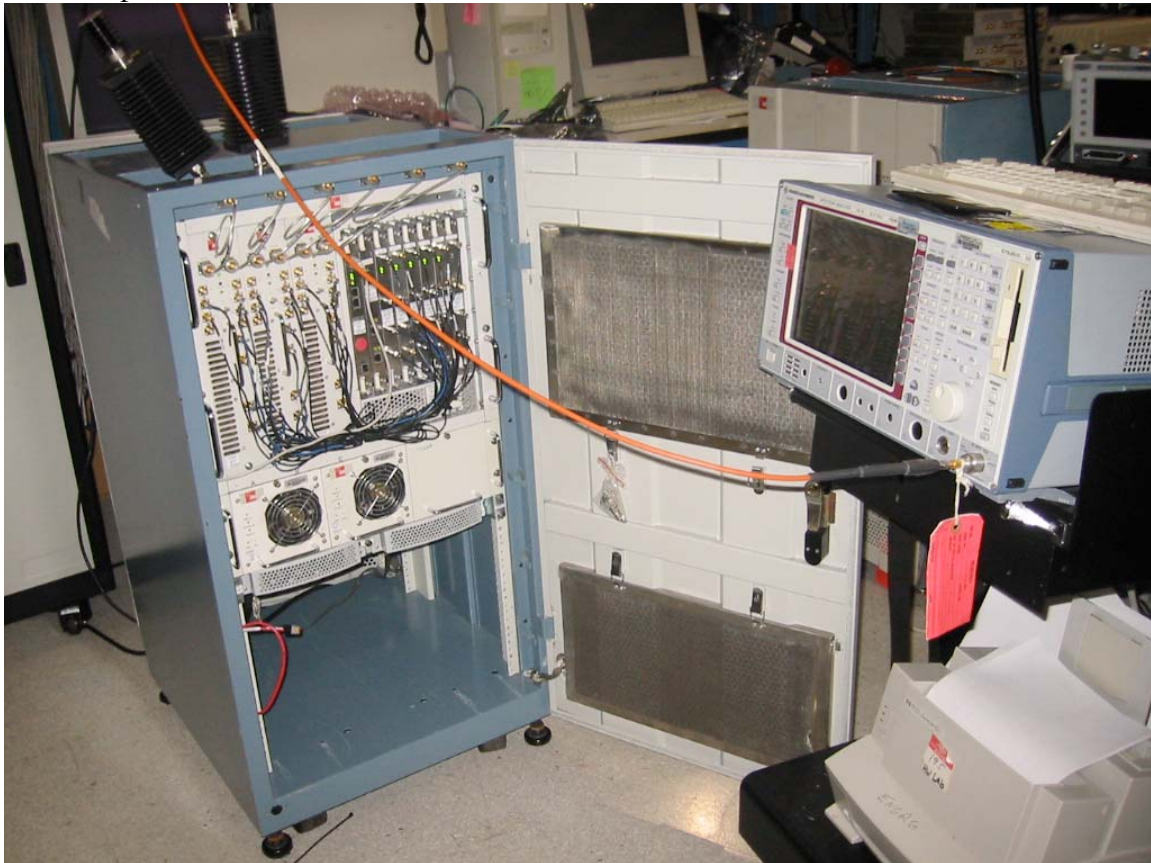
**RF hazards.**

Per the requirements of FCC Rule Sections 1.1307 and 1.1310, RF exposure issues will be addressed at time of licensing.

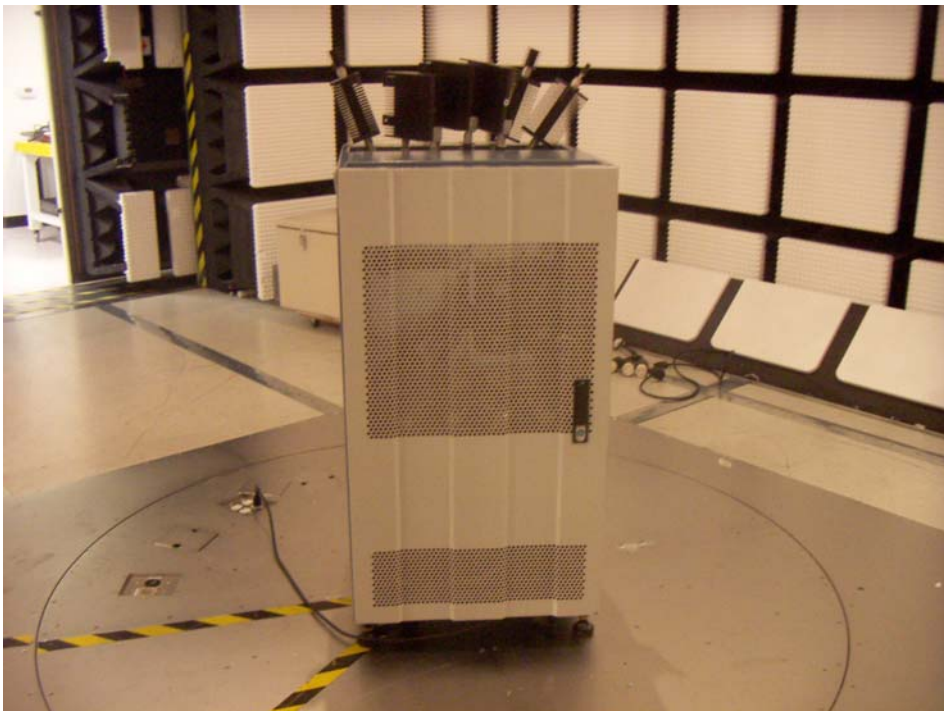
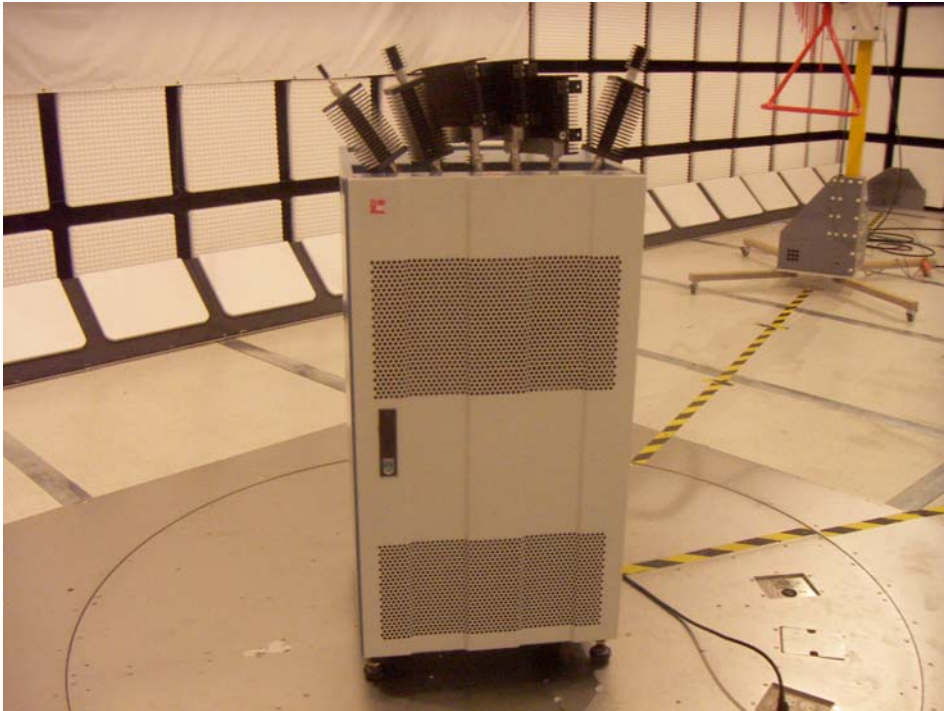


## Test Set-up Photographs

Antenna port conducted emissions



Radiated emissions



### AC Line Conducted Emissions

