



EMC EMISSIONS - TEST REPORT (Full)

Test Report No. **BC300232-1** Issue Date: **Fri 20/Jun/2003**

Model / Serial No. **AMS-SM01 / SN: 103**

Product Type **Smart Modem**

Client **Alcohol Monitoring Systems**

Manufacturer **Alcohol Monitoring Systems**

License holder **Alcohol Monitoring Systems**

Address **9135 Ridgeline Blvd Suite 190**
Highlands Ranch, CO 80129

Test Criteria Applied **FCC CFR47 Part 15 Class B**
Test Result **PASS**

Test Project Number **BC300232** Title 47 CFR 15: RADIO FREQUENCY DEVICES
References
Total Pages **23**
Including
Appendices:

Todd Seeley

Robert Cresswell

Reviewed By : Todd Seeley

Approved By : Bob Cresswell

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Lab Code: 200624-0



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DIRECTORY

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STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty for Conducted Emissions in the frequency range of 150kHz – 30MHz is calculated to be $\pm 2.30\text{dB}$ and for Radiated Emissions is calculated to be $\pm 3.60\text{dB}$ in the frequency range of 30MHz – 200MHz and $\pm 3.38\text{dB}$ in the frequency range of 200MHz – 1000MHz.

EUT Received Date: 17-Jun-2003

Testing Start Date: 17-Jun-2003

Testing End Date: 17-Jun-2003

The tests were performed according to following regulations :

1. ICES-003

Emission Test Results:

Conducted Emissions, Powerline - N/A

Test Result

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Conducted Emissions, Data I/O (Ethernet, RJ11, etc.) - NA

Test Result

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated Emissions (Electric Field) - PASS

Test Result

Minimum limit margin 6.5 dB at 916.54 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

GENERAL REMARKS:

Alcohol Monitoring Systems has changed the antenna within the device only. All other circuitry remains identical. The report amends report No. BC201533 (last years report) of the device tested on March 25th & 26th of 2002.

Modifications required to pass: None

Test Specification Deviations: Additions to or Exclusions from: None

Test-setup photo(s):
Radiated Emissions



Test-setup photo(s):
Radiated Emissions



Appendix A

Test Data Sheets
and
Test Equipment Used

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 01**
 Test Method: FCC 15.249 <1GHz QP
 EUT Model #: AMS-SM01
 EUT Serial #: 103
 Manufacturer: AM
 EUT Description: Smart Modem

Test Area: Pinewood Site 1 (3m)
 Test Date: 17-Jun-2003
 EUT Power: 120 VAC 60 Hz

Temperature: 22 °C
 Relative Humidity: 49 %
 Air Pressure: 81 kPa
 Page: 1 of 3

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Notes: RF on, Base station on the table continuously transmitting.
 Pk Readings shown for compliance to 15.249(d) prescans taken to determine worst
 Pk readings (CW = highest peak output)

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC 15.249 <1GHz Q	DELTA2 (dB) PFCC 15.249 >1GHz
916.54	87.0 Qp	3.1 / 22.9 / 28.2	84.8	V / 1.2 / 99.0	-9.2	N/A
916.54	91.8 Pk	3.1 / 22.9 / 28.2	89.6	V / 1.2 / 99.0	-24.4	N/A
916.54	89.8 Qp	3.1 / 22.9 / 28.2	87.5	H / 1.2 / 191.0	-6.5	N/A
916.57	95.8 Pk	3.1 / 22.9 / 28.2	93.5	H / 1.2 / 191.0	-20.5	N/A
1833.02	58.7 Pk	3.4 / 28.4 / 37.3	53.2	V / 1.0 / 183.0	N/A	-20.8
1833.02	43.4 Av	3.4 / 28.4 / 37.3	37.8	V / 1.0 / 183.0	N/A	-16.2
2749.51	40.5 Pk	4.0 / 31.1 / 36.8	38.8	V / 1.0 / 199.0	N/A	-35.2
2749.51	35.8 Av	4.0 / 31.1 / 36.8	34.2	V / 1.0 / 199.0	N/A	-19.8
3666.00	39.8 Pk	4.5 / 33.3 / 38.0	39.6	V / 1.0 / 148.0	N/A	-34.4
3666.00	35.8 Av	4.5 / 33.3 / 38.0	35.7	V / 1.0 / 148.0	N/A	-18.3
1833.02	60.0 Pk	3.4 / 28.4 / 37.3	54.5	H / 1.3 / 199.0	N/A	-19.5
1833.02	43.5 Av	3.4 / 28.4 / 37.3	38.0	H / 1.3 / 199.0	N/A	-16.0
2749.51	37.4 Pk	4.0 / 31.1 / 36.8	35.7	H / 1.3 / 198.0	N/A	-38.3
2749.51	35.0 Av	4.0 / 31.1 / 36.8	33.3	H / 1.3 / 198.0	N/A	-20.7
3665.96	38.7 Pk	4.5 / 33.3 / 38.0	38.6	H / 1.0 / 200.0	N/A	-35.4
3666.00	35.2 Av	4.5 / 33.3 / 38.0	35.1	H / 1.0 / 200.0	N/A	-18.9
Noise floor reading						
4582.46	35.8 Pk	5.6 / 33.7 / 38.9	36.1	H / 1.0 / 200.0	N/A	-37.9
4582.46	33.5 Av	5.6 / 33.7 / 38.9	33.9	H / 1.0 / 200.0	N/A	-20.1
Noise floor reading						
5498.96	34.0 Pk	6.5 / 35.7 / 37.7	38.4	H / 1.0 / 200.0	N/A	-35.6
5498.96	32.0 Av	6.5 / 35.7 / 37.7	36.5	H / 1.0 / 200.0	N/A	-17.5
Noise floor reading						
6415.52	35.0 Pk	7.5 / 36.4 / 39.9	39.0	H / 1.0 / 200.0	N/A	-35.0
6415.52	32.6 Av	7.5 / 36.4 / 39.9	36.7	H / 1.0 / 200.0	N/A	-17.3

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 01**
 Test Method: FCC 15.249 <1GHz QP
 EUT Model #: AMS-SM01
 EUT Serial #: 103
 Manufacturer: AM
 EUT Description: Smart Modem

Test Area: Pinewood Site 1 (3m)
 Test Date: 17-Jun-2003
 EUT Power: 120 VAC 60 Hz

Temperature: 22 °C
 Relative Humidity: 49 %
 Air Pressure: 81 kPa
 Page: 2 of 3

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Notes: RF on, Base station on the table continuously transmitting.
 Pk Readings shown for compliance to 15.249(d) prescans taken to determine worst
 Pk readings (CW = highest peak output)

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC 15.249 <1GHz Q	DELTA2 (dB) PFCC 15.249 >1GHz
Noise floor reading						
7332.02	34.9 Pk	8.5 / 37.7 / 40.4	40.6	H / 1.0 / 200.0	N/A	-33.4
7332.02	33.1 Av	8.5 / 37.7 / 40.4	38.9	H / 1.0 / 200.0	N/A	-15.1
Noise floor reading						
4582.46	35.2 Pk	5.6 / 33.7 / 38.9	35.5	V / 1.0 / 200.0	N/A	-38.5
4582.46	33.5 Av	5.6 / 33.7 / 38.9	33.8	V / 1.0 / 200.0	N/A	-20.2
Noise floor reading						
5498.96	34.9 Pk	6.5 / 35.7 / 37.7	39.3	V / 1.0 / 200.0	N/A	-34.7
5498.96	32.1 Av	6.5 / 35.7 / 37.7	36.6	V / 1.0 / 200.0	N/A	-17.4
Noise floor reading						
6415.52	34.6 Pk	7.5 / 36.4 / 39.9	38.6	V / 1.0 / 200.0	N/A	-35.4
6415.52	32.7 Av	7.5 / 36.4 / 39.9	36.7	V / 1.0 / 200.0	N/A	-17.3
Noise floor reading						
7332.02	35.4 Pk	8.5 / 37.7 / 40.4	41.1	V / 1.0 / 200.0	N/A	-32.9
7332.02	33.2 Av	8.5 / 37.7 / 40.4	38.9	V / 1.0 / 200.0	N/A	-15.1
Noise floor reading						
8248.52	43.5 Pk	8.7 / 38.3 / 45.9	44.5	V / 1.0 / 200.0	N/A	-29.5
8248.52	42.8 Av	8.7 / 38.3 / 45.9	43.8	V / 1.0 / 200.0	N/A	-10.2
Noise floor reading						
9165.02	46.1 Pk	8.3 / 39.5 / 48.0	45.9	V / 1.0 / 200.0	N/A	-28.1
9165.02	44.2 Av	8.3 / 39.5 / 48.0	44.0	V / 1.0 / 200.0	N/A	-10.0
Noise floor reading						
8248.52	44.8 Pk	8.7 / 38.3 / 45.9	45.8	H / 1.0 / 200.0	N/A	-28.2
8248.52	42.5 Av	8.7 / 38.3 / 45.9	43.6	H / 1.0 / 200.0	N/A	-10.4
Noise floor reading						
9165.02	45.5 Pk	8.3 / 39.5 / 48.0	45.3	H / 1.0 / 200.0	N/A	-28.7
9165.02	44.2 Av	8.3 / 39.5 / 48.0	44.0	H / 1.0 / 200.0	N/A	-10.0

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 01** Test Area: Pinewood Site 1 (3m)
 Test Method: FCC 15.249 <1GHz QP Test Date: 17-Jun-2003
 EUT Model #: AMS-SM01 EUT Power: 120 VAC 60 Hz
 EUT Serial #: 103
 Manufacturer: AM

Temperature: 22 °C
 Relative Humidity: 49 %
 Air Pressure: 81 kPa
 Page: 3 of 3

EUT Description: Smart Modem

Notes: RF on, Base station on the table continuously transmitting.
 Pk Readings shown for compliance to 15.249(d) prescans taken to determine worst
 Pk readings (CW = highest peak output)

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB/m) (dB)	(dBuV)	(m) (DEG)	FCC 15.249 <1GHz Q	PFCC 15.249 >1GHz
***** Measurement Summary *****						
916.54	89.8 Qp	3.1 / 22.9 / 28.2	87.5	H / 1.2 / 191.0	-6.5	N/A
916.54	87.0 Qp	3.1 / 22.9 / 28.2	84.8	V / 1.2 / 99.0	-9.2	N/A

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 02**
 Test Method: FCC Part 15
 EUT Model #: AMS-SM01
 EUT Serial #: 103
 Manufacturer: AM
 EUT Description: Smart Modem
 Notes: RF on, Base station on the table continuously transmitting.
 30 MHz - 10 GHz checking for spurious emissions.

Test Area: Pinewood Site 1 (3m)
 Test Date: 17-Jun-2003
 EUT Power: 120 VAC 60 Hz

Temperature: 22 °C
 Relative Humidity: 49 %
 Air Pressure: 81 kPa
 Page: 2 of 7

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC B (< 1GHz)	DELTA2 (dB) FCC B (> 1GHz)
160.39	49.4 Qp	1.3 / 12.4 / 27.8	35.3	V / 1.0 / 95.0	-8.2	N/A
160.39	33.1 Qp	1.3 / 12.4 / 27.8	19.0	H / 1.7 / 0.0	-24.5	N/A
80.06	43.4 Qp	0.9 / 7.1 / 28.2	23.2	H / 1.7 / 90.0	-16.8	N/A
177.00	37.0 Qp	1.3 / 12.6 / 27.7	23.3	H / 1.7 / 90.0	-20.2	N/A
No higher emissions found: 180 Deg, horizontal						
80.06	45.0 Qp	0.9 / 7.1 / 28.2	24.8	H / 1.7 / 270.0	-15.2	N/A
177.00	37.5 Qp	1.3 / 12.6 / 27.7	23.8	H / 1.7 / 270.0	-19.7	N/A
No emissions found within 15 dB of the limit, nothing maximized						
30 - 200 MHz, horizontal						
200.08	32.8 Qp	1.5 / 11.3 / 27.6	17.9	V / 1.0 / 0.0	-25.6	N/A
234.96	35.9 Qp	1.6 / 11.0 / 27.3	21.2	V / 1.0 / 0.0	-24.8	N/A
240.09	40.7 Qp	1.7 / 11.3 / 27.3	26.4	V / 1.0 / 0.0	-19.6	N/A
280.08	29.8 Qp	1.9 / 13.1 / 27.2	17.6	V / 1.0 / 0.0	-28.4	N/A
340.08	32.5 Qp	2.0 / 14.5 / 27.3	21.7	V / 1.0 / 0.0	-24.3	N/A
348.34	31.7 Qp	2.0 / 14.9 / 27.4	21.2	V / 1.0 / 0.0	-24.8	N/A
352.54	34.0 Qp	2.1 / 14.6 / 27.4	23.1	V / 1.0 / 0.0	-22.9	N/A
356.74	32.9 Qp	2.1 / 14.4 / 27.5	21.9	V / 1.0 / 0.0	-24.1	N/A
430.13	30.2 Qp	2.2 / 15.8 / 28.1	20.1	V / 1.0 / 0.0	-25.9	N/A
560.40	35.1 Qp	2.5 / 18.0 / 28.5	27.1	V / 1.0 / 0.0	-18.9	N/A
538.27	37.0 Qp	2.4 / 17.9 / 28.5	28.9	V / 1.0 / 0.0	-17.1	N/A
548.10	38.6 Qp	2.4 / 18.0 / 28.5	30.5	V / 1.0 / 0.0	-15.5	N/A
550.56	39.2 Qp	2.4 / 17.8 / 28.5	31.0	V / 1.0 / 0.0	-15.0	N/A
577.59	31.8 Qp	2.5 / 18.0 / 28.4	23.9	V / 1.0 / 0.0	-22.1	N/A
607.08	33.7 Qp	2.5 / 18.5 / 28.5	26.2	V / 1.0 / 0.0	-19.8	N/A
609.55	34.1 Qp	2.5 / 18.5 / 28.5	26.7	V / 1.0 / 0.0	-19.3	N/A
616.93	35.4 Qp	2.6 / 18.3 / 28.4	27.8	V / 1.0 / 0.0	-18.2	N/A
624.28	35.2 Qp	2.6 / 18.7 / 28.4	28.1	V / 1.0 / 0.0	-17.9	N/A
626.75	37.7 Qp	2.6 / 19.0 / 28.4	30.9	V / 1.0 / 0.0	-15.1	N/A
629.21	37.6 Qp	2.6 / 19.3 / 28.3	31.1	V / 1.0 / 0.0	-14.9	N/A
636.57	37.1 Qp	2.6 / 20.0 / 28.3	31.4	V / 1.0 / 0.0	-14.6	N/A

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 02**
 Test Method: **FCC Part 15**
 EUT Model #: **AMS-SM01**
 EUT Serial #: **103**
 Manufacturer: **AM**
 EUT Description: **Smart Modem**

Test Area: **Pinewood Site 1 (3m)**
 Test Date: **17-Jun-2003**
 EUT Power: **120 VAC 60 Hz**

Temperature: **22** °C
 Relative Humidity: **49** %
 Air Pressure: **81** kPa
 Page: **3** of **7**

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Notes: **RF on, Base station on the table continuously transmitting.**
30 MHz - 10 GHz checking for spurious emissions.

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dBm) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC B (< 1GHz)	DELTA2 (dB) FCC B (> 1GHz)
707.85	36.1 Qp	2.7 / 21.7 / 28.2	32.4	V / 1.0 / 0.0	-13.6	N/A
911.62	31.2 Qp	3.1 / 22.8 / 28.2	28.8	V / 1.0 / 0.0	-17.2	N/A
911.82	29.4 Qp	3.1 / 22.8 / 28.2	27.1	V / 1.0 / 0.0	-18.9	N/A
914.07	34.9 Qp	3.1 / 22.9 / 28.2	32.7	V / 1.0 / 0.0	-13.3	N/A
914.07	18.8 Pk	3.1 / 22.9 / 28.2	16.6	V / 1.0 / 0.0	-29.4	N/A
918.99	40.3 Qp	3.1 / 23.0 / 28.2	38.2	V / 1.0 / 0.0	-7.8	N/A
923.93	29.9 Qp	3.1 / 23.1 / 28.1	28.0	V / 1.0 / 0.0	-18.0	N/A
951.14	28.6 Qp	3.2 / 23.2 / 27.6	27.4	V / 1.0 / 0.0	-18.6	N/A
960.97	28.2 Qp	3.2 / 23.3 / 27.6	27.0	V / 1.0 / 0.0	-27.0	N/A
200.08	36.0 Qp	1.5 / 11.3 / 27.6	21.2	V / 1.0 / 90.0	-22.3	N/A
240.09	40.2 Qp	1.7 / 11.3 / 27.3	25.9	V / 1.0 / 90.0	-20.1	N/A
530.90	33.5 Qp	2.4 / 17.8 / 28.4	25.3	V / 1.0 / 90.0	-20.7	N/A
570.21	33.6 Qp	2.5 / 18.2 / 28.4	25.9	V / 1.0 / 90.0	-20.1	N/A
589.88	35.6 Qp	2.5 / 18.2 / 28.4	27.9	V / 1.0 / 90.0	-18.1	N/A
599.71	37.8 Qp	2.5 / 18.4 / 28.5	30.2	V / 1.0 / 90.0	-15.8	N/A
607.08	38.0 Qp	2.5 / 18.5 / 28.5	30.5	V / 1.0 / 90.0	-15.5	N/A
609.55	38.5 Qp	2.5 / 18.5 / 28.5	31.1	V / 1.0 / 90.0	-14.9	N/A
616.93	38.8 Qp	2.6 / 18.3 / 28.4	31.2	V / 1.0 / 90.0	-14.8	N/A
624.28	37.2 Qp	2.6 / 18.7 / 28.4	30.2	V / 1.0 / 90.0	-15.8	N/A
626.75	39.8 Qp	2.6 / 19.0 / 28.4	32.9	V / 1.0 / 90.0	-13.1	N/A
626.75	39.8 Qp	2.6 / 19.0 / 28.4	32.9	V / 1.0 / 90.0	-13.1	N/A
636.57	39.2 Qp	2.6 / 20.0 / 28.3	33.5	V / 1.0 / 90.0	-12.5	N/A
626.75	39.8 Qp	2.6 / 19.0 / 28.4	32.9	V / 1.0 / 90.0	-13.1	N/A
200.08	41.1 Qp	1.5 / 11.3 / 27.6	26.3	V / 1.0 / 180.0	-17.2	N/A
340.08	40.8 Qp	2.0 / 14.5 / 27.3	30.0	V / 1.0 / 180.0	-16.0	N/A
352.54	39.4 Qp	2.1 / 14.6 / 27.4	28.5	V / 1.0 / 180.0	-17.5	N/A
234.96	38.6 Qp	1.6 / 11.0 / 27.3	23.9	V / 1.0 / 270.0	-22.1	N/A
240.09	44.8 Qp	1.7 / 11.3 / 27.3	30.5	V / 1.0 / 270.0	-15.5	N/A
626.75	39.4 Qp	2.6 / 19.0 / 28.4	32.5	V / 1.0 / 270.0	-13.5	N/A
629.21	39.1 Qp	2.6 / 19.3 / 28.3	32.6	V / 1.0 / 270.0	-13.4	N/A
688.19	36.8 Qp	2.7 / 20.9 / 28.3	32.1	V / 1.0 / 270.0	-13.9	N/A

The following were maximized between 200 and 1000 MHz, vertical

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 02**
 Test Method: FCC Part 15
 EUT Model #: AMS-SM01
 EUT Serial #: 103
 Manufacturer: AM
 EUT Description: Smart Modem
 Notes: RF on, Base station on the table continuously transmitting.
 30 MHz - 10 GHz checking for spurious emissions.

Test Area: Pinewood Site 1 (3m)
 Test Date: 17-Jun-2003
 EUT Power: 120 VAC 60 Hz

Temperature: 22 °C
 Relative Humidity: 49 %
 Air Pressure: 81 kPa
 Page: 4 of 7

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC B (< 1GHz)	DELTA2 (dB) FCC B (> 1GHz)
918.99	41.0 Qp	3.1 / 23.0 / 28.2	38.9	V / 1.0 / 352.0	-7.1	N/A
570.22	37.2 Qp	2.5 / 18.2 / 28.4	29.5	H / 1.5 / 0.0	-16.5	N/A
580.05	38.2 Qp	2.5 / 18.0 / 28.4	30.3	H / 1.5 / 0.0	-15.7	N/A
589.88	40.1 Qp	2.5 / 18.2 / 28.4	32.4	H / 1.5 / 0.0	-13.6	N/A
597.24	39.8 Qp	2.5 / 18.4 / 28.4	32.3	H / 1.5 / 0.0	-13.7	N/A
599.70	40.1 Qp	2.5 / 18.4 / 28.5	32.6	H / 1.5 / 0.0	-13.4	N/A
240.08	42.6 Qp	1.7 / 11.3 / 27.3	28.3	H / 1.5 / 90.0	-17.7	N/A
587.43	39.0 Qp	2.5 / 18.0 / 28.4	31.1	H / 1.5 / 180.0	-14.9	N/A
530.91	37.8 Qp	2.4 / 17.8 / 28.4	29.5	H / 1.5 / 270.0	-16.5	N/A
No emissions found within 10 dB of the limit, nothing maximized						
200 - 1000 MHz, horizontal						
1688.43	37.0 Av	3.2 / 27.7 / 37.5	30.4	V / 1.0 / 0.0	N/A	-23.6
1688.43	40.2 Av	3.2 / 27.7 / 37.5	33.6	V / 1.0 / 90.0	N/A	-20.4
No higher emissions found: 180 Deg, vertical						
No higher emissions found: 270 Deg, vertical						
No emissions found within 20 dB of the limit, nothing maximized						
1 - 4 GHz, vertical						
No higher emissions found: 0 Deg, horizontal						
No higher emissions found: 90 Deg, horizontal						
1688.47	40.1 Av	3.2 / 27.7 / 37.6	33.5	V / 1.0 / 180.0	N/A	-20.5
No higher emissions found: 270 Deg, horizontal						

Radiated Electromagnetic Emissions

Test Report #: BC300232 Run 02 Test Area: Pinewood Site 1 (3m)
 Test Method: FCC Part 15 Test Date: 17-Jun-2003
 EUT Model #: AMS-SM01 EUT Power: 120 VAC 60 Hz
 EUT Serial #: 103
 Manufacturer: AM
 EUT Description: Smart Modem
 Notes: RF on, Base station on the table continuously transmitting.
30 MHz - 10 GHz checking for spurious emissions.

Temperature: 22 °C
 Relative Humidity: 49 %
 Air Pressure: 81 kPa
 Page: 5 of 7

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB/m) (dB)	(dBuV/m)	(m) (DEG)	FCC B (< 1GHz)	FCC B (> 1GHz)
No emissions found within 20 dB of the limit, nothing maximized						
1 - 4 GHz, horizontal						
No emissions found: 0 Deg, horizontal						
No emissions found: 90 Deg, horizontal						
No emissions found: 180 Deg, horizontal						
No emissions found: 270 Deg, horizontal						
No emissions found: 4 - 8 GHz, horizontal						
No emissions found: 0 Deg, vertical						
No emissions found: 90 Deg, vertical						
No emissions found: 180 Deg, vertical						
No emissions found: 270 Deg, vertical						
No emissions found: 4 - 8 GHz						
No emissions found 8 - 10 GHz, vertical						
rotated table 360 Deg.						
No emissions found: 8 - 10 GHz, horizontal						
Rotated table 360 Deg.						

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 02**
 Test Method: **FCC Part 15**
 EUT Model #: **AMS-SM01**
 EUT Serial #: **103**
 Manufacturer: **AM**
 EUT Description: **Smart Modem**

Test Area: **Pinewood Site 1 (3m)**
 Test Date: **17-Jun-2003**
 EUT Power: **120 VAC 60 Hz**

Temperature: **22** °C
 Relative Humidity: **49** %
 Air Pressure: **81** kPa
 Page: **6** of **7**

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

Notes: **RF on, Base station on the table continuously transmitting.**
30 MHz - 10 GHz checking for spurious emissions.

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC B (< 1GHz)	DELTA2 (dB) FCC B (> 1GHz)
***** Measurement Summary *****						
80.06	53.5 Qp	0.9 / 7.1 / 28.2	33.3	V / 1.0 / 343.0	-6.7	N/A
918.99	41.0 Qp	3.1 / 23.0 / 28.2	38.9	V / 1.0 / 352.0	-7.1	N/A
160.39	49.4 Qp	1.3 / 12.4 / 27.8	35.3	V / 1.0 / 95.0	-8.2	N/A
636.57	39.2 Qp	2.6 / 20.0 / 28.3	33.5	V / 1.0 / 90.0	-12.5	N/A
626.75	39.8 Qp	2.6 / 19.0 / 28.4	32.9	V / 1.0 / 90.0	-13.1	N/A
914.07	34.9 Qp	3.1 / 22.9 / 28.2	32.7	V / 1.0 / 0.0	-13.3	N/A
599.70	40.1 Qp	2.5 / 18.4 / 28.5	32.6	H / 1.5 / 0.0	-13.4	N/A
629.21	39.1 Qp	2.6 / 19.3 / 28.3	32.6	V / 1.0 / 270.0	-13.4	N/A
589.88	40.1 Qp	2.5 / 18.2 / 28.4	32.4	H / 1.5 / 0.0	-13.6	N/A
707.85	36.1 Qp	2.7 / 21.7 / 28.2	32.4	V / 1.0 / 0.0	-13.6	N/A
597.24	39.8 Qp	2.5 / 18.4 / 28.4	32.3	H / 1.5 / 0.0	-13.7	N/A
688.19	36.8 Qp	2.7 / 20.9 / 28.3	32.1	V / 1.0 / 270.0	-13.9	N/A
616.93	38.8 Qp	2.6 / 18.3 / 28.4	31.2	V / 1.0 / 90.0	-14.8	N/A
587.43	39.0 Qp	2.5 / 18.0 / 28.4	31.1	H / 1.5 / 180.0	-14.9	N/A
609.55	38.5 Qp	2.5 / 18.5 / 28.5	31.1	V / 1.0 / 90.0	-14.9	N/A
550.56	39.2 Qp	2.4 / 17.8 / 28.5	31.0	V / 1.0 / 0.0	-15.0	N/A
240.09	44.8 Qp	1.7 / 11.3 / 27.3	30.5	V / 1.0 / 270.0	-15.5	N/A
548.10	38.6 Qp	2.4 / 18.0 / 28.5	30.5	V / 1.0 / 0.0	-15.5	N/A
607.08	38.0 Qp	2.5 / 18.5 / 28.5	30.5	V / 1.0 / 90.0	-15.5	N/A
580.05	38.2 Qp	2.5 / 18.0 / 28.4	30.3	H / 1.5 / 0.0	-15.7	N/A
624.28	37.2 Qp	2.6 / 18.7 / 28.4	30.2	V / 1.0 / 90.0	-15.8	N/A
340.08	40.8 Qp	2.0 / 14.5 / 27.3	30.0	V / 1.0 / 180.0	-16.0	N/A
530.91	37.8 Qp	2.4 / 17.8 / 28.4	29.5	H / 1.5 / 270.0	-16.5	N/A
570.22	37.2 Qp	2.5 / 18.2 / 28.4	29.5	H / 1.5 / 0.0	-16.5	N/A
538.27	37.0 Qp	2.4 / 17.9 / 28.5	28.9	V / 1.0 / 0.0	-17.1	N/A
200.08	41.1 Qp	1.5 / 11.3 / 27.6	26.3	V / 1.0 / 180.0	-17.2	N/A
911.62	31.2 Qp	3.1 / 22.8 / 28.2	28.8	V / 1.0 / 0.0	-17.2	N/A
352.54	39.4 Qp	2.1 / 14.6 / 27.4	28.5	V / 1.0 / 180.0	-17.5	N/A
923.93	29.9 Qp	3.1 / 23.1 / 28.1	28.0	V / 1.0 / 0.0	-18.0	N/A
951.14	28.6 Qp	3.2 / 23.2 / 27.6	27.4	V / 1.0 / 0.0	-18.6	N/A
560.40	35.1 Qp	2.5 / 18.0 / 28.5	27.1	V / 1.0 / 0.0	-18.9	N/A
911.82	29.4 Qp	3.1 / 22.8 / 28.2	27.1	V / 1.0 / 0.0	-18.9	N/A
41.88	37.0 Qp	0.7 / 11.5 / 28.3	20.9	V / 1.0 / 180.0	-19.1	N/A

Radiated Electromagnetic Emissions

Test Report #: **BC300232 Run 02**
 Test Method: **FCC Part 15**
 EUT Model #: **AMS-SM01**
 EUT Serial #: **103**
 Manufacturer: **AM**
 EUT Description: **Smart Modem**
 Notes: **RF on, Base station on the table continuously transmitting.**
30 MHz - 10 GHz checking for spurious emissions.

Test Area: **Pinewood Site 1 (3m)**
 Test Date: **17-Jun-2003**
 EUT Power: **120 VAC 60 Hz**

Temperature: **22** °C
 Relative Humidity: **49** %
 Air Pressure: **81** kPa
 Page: **7** of **7**

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB/m) (dB)	(dBuV/m)	(m) (DEG)	FCC B (< 1GHz)	FCC B (> 1GHz)
72.07	40.0 Qp	0.9 / 8.1 / 28.2	20.8	V / 1.0 / 0.0	-19.2	N/A
41.77	36.6 Qp	0.7 / 11.5 / 28.3	20.5	V / 1.0 / 180.0	-19.5	N/A
44.94	36.8 Qp	0.7 / 11.1 / 28.3	20.4	V / 1.0 / 90.0	-19.6	N/A
177.00	37.5 Qp	1.3 / 12.6 / 27.7	23.8	H / 1.7 / 270.0	-19.7	N/A
1688.43	40.2 Av	3.2 / 27.7 / 37.5	33.6	V / 1.0 / 90.0	N/A	-20.4
36.16	34.2 Qp	0.7 / 12.2 / 28.3	18.8	V / 1.0 / 0.0	-21.2	N/A
78.71	38.9 Qp	0.9 / 7.1 / 28.2	18.7	V / 1.0 / 180.0	-21.3	N/A
39.39	33.8 Qp	0.7 / 11.9 / 28.3	18.0	V / 1.0 / 180.0	-22.0	N/A
234.96	38.6 Qp	1.6 / 11.0 / 27.3	23.9	V / 1.0 / 270.0	-22.1	N/A
577.59	31.8 Qp	2.5 / 18.0 / 28.4	23.9	V / 1.0 / 0.0	-22.1	N/A
356.74	32.9 Qp	2.1 / 14.4 / 27.5	21.9	V / 1.0 / 0.0	-24.1	N/A
348.34	31.7 Qp	2.0 / 14.9 / 27.4	21.2	V / 1.0 / 0.0	-24.8	N/A
430.13	30.2 Qp	2.2 / 15.8 / 28.1	20.1	V / 1.0 / 0.0	-25.9	N/A
960.97	28.2 Qp	3.2 / 23.3 / 27.6	27.0	V / 1.0 / 0.0	-27.0	N/A
32.03	26.7 Qp	0.6 / 12.7 / 28.3	11.7	V / 1.0 / 90.0	-28.3	N/A
280.08	29.8 Qp	1.9 / 13.1 / 27.2	17.6	V / 1.0 / 0.0	-28.4	N/A
140.09	29.2 Qp	1.2 / 12.4 / 27.9	14.9	V / 1.0 / 90.0	-28.6	N/A
137.56	28.6 Pk	1.2 / 12.5 / 27.9	14.4	V / 1.0 / 0.0	-29.1	N/A
39.97	26.2 Pk	0.7 / 11.9 / 28.3	10.5	V / 1.0 / 0.0	-29.5	N/A

Project BC300232
Client AMS

Date: June 17, 2003

Equipment List

Radiated Emissions

ID #	Manufacturer	Cal Date	Cal Due
209	HP Spectrum Analyzer Display Section	10/21/02	10/21/03
210	HP Spectrum Analyzer	10/21/02	10/21/03
211	HP Quasi Peak Adapter	9-17-02	9-17-03
189	EMC Bicon Antenna	9-30-02	9-30-03
217	EMCO Log Periodic	9-11-02	9-11-03
187	EMCO Horn Antenna 1-18Ghz	8-1-02	8-1-03
202	Advantek RF Pre-Amp (8-18GHz)	4-23-2003	4-23-2004
203	Advantek RF Pre-Amp (4-8 GHz)	4-23-2003	4-23-2004
213	Mini- Circuits Amplifier	6-20-2002	6-20-2003
248	HP Pre-Amp 9KHz- 1.3GHz	6-5-2003	6-5-2004

Appendix B

Test Plan
and
Constructional Data Form
To be supplied by Customer

Appendix C

Measurement Protocol

And

Test Procedures



MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in ANSI C63.4 & CNS13438.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the applicable limit.

To convert between dB μ V and μ V, the following conversions apply:

- dB μ V = 20(log μ V)
- μ V = Inverse log(dB μ V/20)

RADIATED EMISSIONS

The final level, expressed in dB μ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB μ V) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the applicable limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example: At a Test Frequency of 30 MHz, with a peak reading on the spectrum analyzer or measuring receiver of 14 dB μ V:

Measured Level	+	Transducer & Cable Loss factor	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dB μ V)		(dB)		(dB μ V/m)	(dB μ V/m)		(dB μ V/m)		
14.0		14.9		28.9	40.0		28.9		-11.1

DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

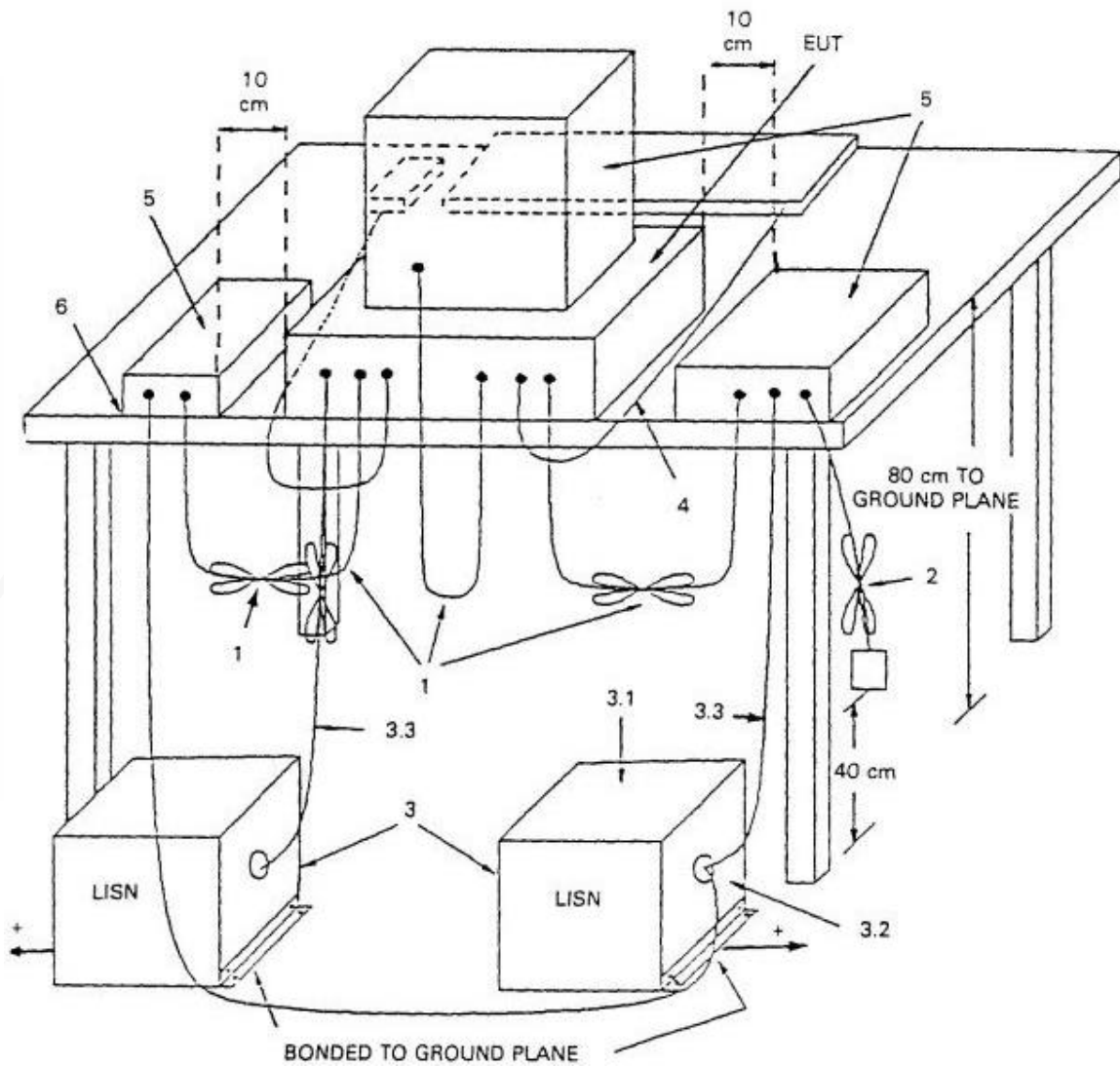
Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 22GHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

Conducted Emissions Diagram:



Radiated Emissions Diagram:

