

EMI TEST REPORT

FCC Part 15 Subpart B, Class B

Product : ADSL MODEM
Model No. : SAM-335A

JOB NO. : KE-01-0286

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All tests necessary to show compliance to the requirements were and these results met the specifications requirement.

Date of test : June 4 to 5, 2001

Issued Date : June 8, 2001

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1. General Information

APPLICANT : SAMSUNG ELECTRONICS CO., LTD.

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Suwon-City, Kyungki-Do, Korea 442-742

CONTACT PERSON : Dong Keun, Ju
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CONTACT ADDRESS : 416, Maetan-3Dong, Paldal-Gu
Suwon-City, Kyungki-Do, Korea 442-742

REGULATION(S) : FCC Part 15 Subpart B, Class B

MODEL NUMBER : SAM-335A

SERIAL NUMBER : -

KIND OF PRODUCT : ADSL MODEM

TESTED DATE : June 4 to 5, 2001

TEST SITE : 3meter semi-anechoic chamber

TEST SITE ADDRESS : San 14, Nongseo-Ri, Kihung-Eup,
Yongin-City, Kyungki-Do, Korea, 449-900

1.1 Product Description

It is possible to access the Internet and other multimedia service networks through an existing telephone line(PSTN) using Samsung ADSL modem, SAM-335A.

Unlike previous dial-up modems, this ADSL modem provides the fastest speed available as well as allow use of the telephone at the same time.

This ADSL modem uses 20MHz of CPU clock and 17.644MHz of PLL clock.

The input voltage is AC110V and operating voltage is DC 5V.

See the attached SAM-335A User's Guide for more information.

1.2 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

Device Type	Manufacturer	Model Number	Serial No.	FCC ID / DoC
(1) ADSL Modem (EUT)	Samsung	SAM-335A	N/A	A3LSAM335A
(2) PC	Samsung	TD260-DT	C92DK409981	FCC DoC
(3) Monitor	Samsung	SyncMaster 17GLsi	H3MF400637	FCC DoC
(4) Keyboard	Samsung	5900	K09141644	FCC DoC
(5) Mouse	Logitech	M-SAS51	LZB00478743	JNZ211167
(6) Card Reader	DATAFAB	MDSM-B-USB	0223420865	FCC DoC
(7) Laser Printer	Samsung	ML-85	B1AJ700174	A3LML85
(8) ADSL DSLAM	Samsung	SMT-A310	91000AK023	Verification
(9) Telephone	Samsung	SP-F127	B2CKD21532	-

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4(1992).

Radiated testing was performed at a distance of 3 meters from the antenna to EUT.

1.4 Test Facility

All test described in this report were performed by :

Open area test site : 781-14, Chung-Ri, Dongtan-Myun, Hwasung-Kun, Kyungki-Do, Korea

Conducted measurement facility and 3meter Semi-anechoic chamber :

San 14, Nongseo-Ri, Kihung-Eup, Yongin-City, Kyungki-Do, Korea, 449-900

2. System Test Configuration

2.1 Operation Environment

	Conduction	Radiation
Temperature [] :	27	26
Humidity [%] :	45	45
Power supply :	AC110V/60Hz	AC110V/60Hz

2.2 Justification

The system was configured in typical fashion(as a customer would normally use it) for testing.

2.3 EUT Exercise Soft ware

The EUT exercise program used during radiated and conducted testing was ping and ADSL modem was simulated through ADSL DSRAM equipment. ADSL DSRAM equipment can simulate and monitor to ADSL modem.

2.4 Test Procedure

2.4.1 Conducted Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting ground plane.

The rear of EUT, including peripherals was aligned and flush with rear of tabletop. All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. I/O cables and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

Each EUT current-carrying power lead, except the ground(safety) lead, were individually connected through a LISN to the input power source.

All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.

2.4.2 Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

The rear of EUT, including peripherals was aligned and flush with rear of tabletop.

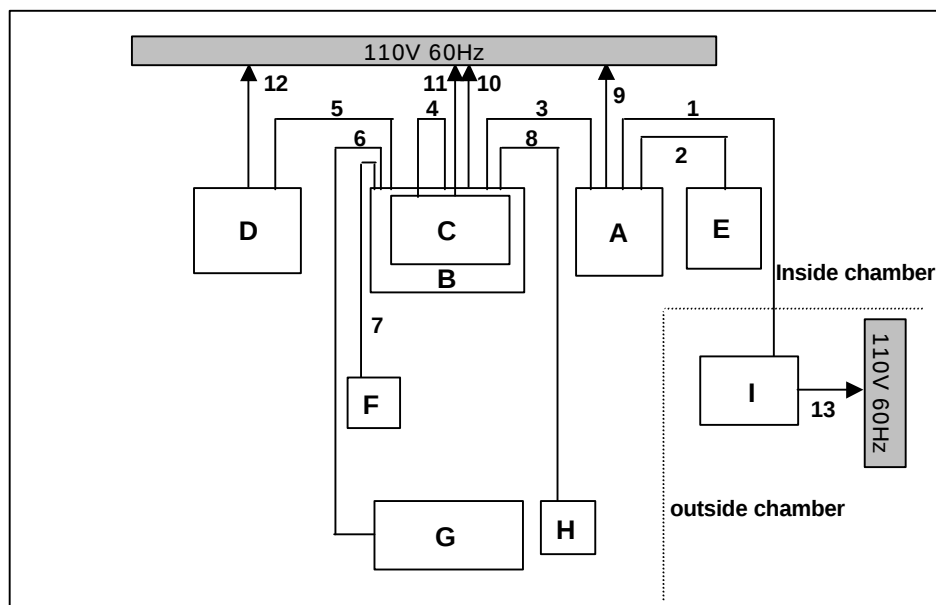
I/O cables that were connected to the peripherals were bundle in center.

They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

2.5 Test System configuration

2.5.1 System Block Diagram of Test Configuration



2.5.2 Configuration of EUT and peripherals

Mark	Item	Model No.	Serial No.	Manufacturer	Remark
A	ADSL Modem	SAM-335A	N/A	Samsung	EUT
B	Personal computer	TD260-DT	C92DK409981	Samsung	
C	Monitor	SyncMaster 17GLsi	H3MF400637	Samsung	
D	Laser printer	ML-85	B1AJ700174	Samsung	
E	Telephone	SP-F127	B2CKD21532	Samsung	
F	Card Reader	MDSM-B-USB	0223420865	DATAFAB	
G	Keyboard	5900	K09141644	Samsung	
H	Mouse	M-SAS51	LZB00478743	Logitech	
I	ADSL DSLAM	SMT-A310	91000AK023	Samsung	Outside of Chb.

2.5.3 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	ADSL cable	10	N	RJ11
2	Telephone cable	1.8	N	RJ11
3	Ethernet cable	1.8	N	RJ45
4	Video cable	1.7	Y	Dsub
5	Parallel cable	1.5	Y	DB25(IEEE1284)
6	Keyboard cable	2	N	PS/2
7	USB cable	1.5	N	USB
8	Mouse cable	1.5	N	PS/2
9	Power cable	1.6	N	
10	Power cable	1.6	N	
11	Power cable	1.6	N	
12	Power cable	1.6	N	
13	Power cable	1.6	N	

3. Conducted and Radiated Measurement Photos

* Cabling was taken into consideration and test data was taken under worse case conditions.

3.1 Conducted Measurement Photos

Conduction(Front View)



Conduction(Rear View)



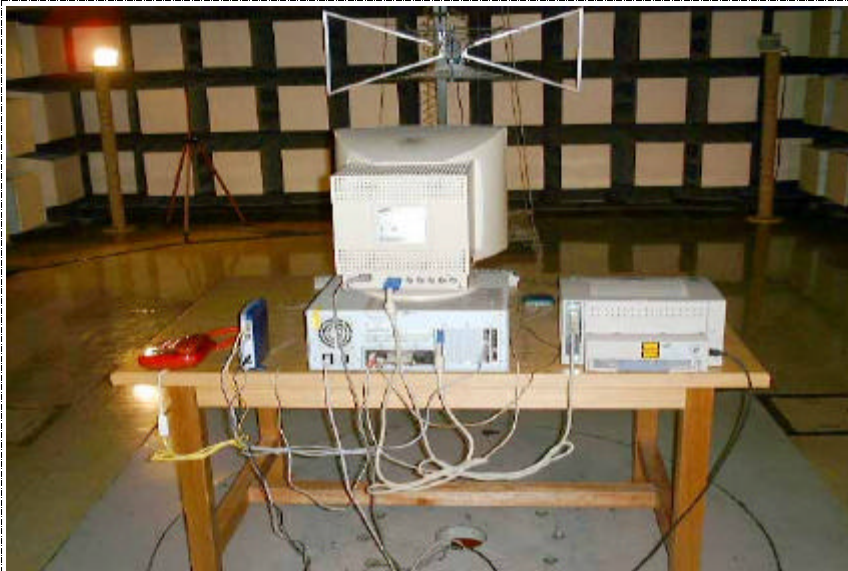
* Cabling was taken into consideration and test data was taken under worse case conditions.

3.2 Radiated Measurement Photos

Radiation(Front View)



Radiation(Rear View)



4. Measurement Uncertainty

All data in report are to be traceability to the national or international standards.

4.1 Conducted Emission Test

The measurement uncertainty(with a 95% confidence level)for this test was $\pm 2.2\text{dB}$.

The data listed in this test report may exceed the test limit because it does not have enough margin(more than 2.0dB).

The data listed in this test report has enough margin, more than 2.0dB .

4.2 Radiated Emission Test

The measurement uncertainty(with a 95% confidence level)for this test was $\pm 3.4\text{dB}$.

The data listed in this test report may exceed the test limit because it does not have enough margin(more than 2.0dB).

The data listed in this test report has enough margin, more than 3.4dB .

5. Conducted Emission Test Data

The initial step in collecting conducted data was to perform a quasi-peak scan over the measurement range using a spectrum analyzer.

During operating modes, ADSL modem was simulated by ADSL DSRAM equipment like as Ping. Investigated and then the worst-case emission(during execution of ping software) are reported. All other emission are non-significant.

The minimum margin to the limit is as follows :

Frequency : **24.173** [MHz]
Meter Reading : **36.1** [dBuV]
LISN Loss : **0.63** [dB]
Cable loss : **0.8** [dB]
Corrected Readings : **37.53** [dBuV/m]
Margin : **-10.43** [dB]

Test Data Sheet

Tested Frequency	Meter Reading [A]	LISN Pol.	Factor[B]		Corrected Reading [A+B]	Limits	Margin
			LISN Loss	Cable Loss			
	[MHz]		[dBuV]	[L1/L2]	[dB]		
0.481	25.7	L1	0.12	0.50	26.32	47.96	-21.64
0.610	18.6	L2	0.13	0.50	19.23	47.96	-28.73
24.173	36.1	L1	0.63	0.80	37.53	47.96	-10.43
24.180	35.72	L2	0.63	0.80	37.15	47.96	-10.81
24.196	35.23	L1	0.63	0.80	36.66	47.96	-11.30
25.950	29.9	L2	0.68	0.90	31.48	47.96	-16.48
28.219	30.33	L1	0.73	1.00	32.06	47.96	-15.90

- * All readings are quasi-peak mode.
- * The selected bandwidth in emission testing is 9kHz.
- * Results = Meter Reading + LISN Insertion loss + Cable loss
- * Margin = Corrected Reading - Limits
- * L1 = Hot, L2 = Neutral

6. Radiated Emission Test Data

The initial step in collecting radiated data was to perform a quasi-peak scan over the measurement range using a spectrum analyzer.

During operating modes, ADSL modem was simulated by ADSL DSRAM equipment like as Pin Investigated and then the worst-case emission(during execution of ping software) are reported. All other emission are non-significant.

The minimum margin to the limit is as follows :

Frequency	191.98 [MHz]
Meter Reading	27.1 [dBuV]
Antenna Factor	7.00 [dB]
Cable loss	1.10 [dB]
Corrected Reading	35.2 [dBuV/m]
Margin	-8.30 [dB]

Test Data Sheet

Frequency Range [MHz]	Tested Frequency [MHz]	Ant. Pol.	Meter Reading [A] [dBuV]	Factor[B]		Antenna Height [Cm]	Turn table Degree [Deg]	Corrected Reading [A+B] [dBuV/m]	Margin [dB]	Limits [3m]
				Ant. Factor	Cable Loss					[dBuV/m]
				[dB]						[dB]
30 - 88	59.6	V	15.3	3.60	0.20	1.5	100	19.1	-20.90	40.0
	70.3	V	16.8	6.60	0.30	1.8	120	23.7	-16.30	
	76.6	H	14.7	7.70	0.40	3.1	170	22.8	-17.20	
88 - 216	192.0	H	27.1	7.00	1.10	2.3	140	35.2	-8.30	43.5
216 - 960	247.9	V	13.0	9.20	1.48	1.3	250	23.7	-22.32	46.0
	288.6	V	12.8	10.60	1.56	1.5	60	25.0	-21.04	
	385.2	V	11.9	13.10	2.04	1.9	70	27.0	-18.96	
	398.5	H	14.2	13.50	2.10	2.8	120	29.8	-16.20	
	424.0	V	17.6	14.00	2.20	1.6	150	33.8	-12.20	
	528.4	V	15.4	15.90	2.62	1.4	100	33.9	-12.08	
960 -										54.0

* "<" Means equal or less than * All readings are quasi-peak mode.

* The selected bandwidth in emission testing is 100kHz.

* Corrected Reading = Meter Reading + Antenna Factor + Cable loss

* Margin = Corrected Reading - Limits

* H = Horizontal Polarization/Antenna, V = Vertical Polarization/Antenna

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8. Test Equipment Used

Equipment	Model No.	Serial No.	Makers	Last calibration and Interval
Spectrum analyzer	8568B	2928A04826	H.P	00/06/28, 12Months
		Firmware versions : REV 7.4.87		
Quasi-peak adapter	85650A	2811A01342	H.P	00/06/28, 12Months
RF Preselector	85685A	2837A00835	H.P	00/06/28, 12Months
EMI Test Receiver	ESCS30	830986/004	R & S	01/01/06, 12Months
		F/W ver. : N/A		
L.I.S.N	ESH2-Z5	831886/006	R & S	00/11/30, 12Months
	3825/2	1408	EMCO	00/11/11, 12Months
Biconilog Antenna	HL 562	361324/003	R & S	01/01/22, 12Months
EMI Measurement Software	HP	Firmware versions : Rev. A.00.00		