

EMI TEST REPORT

FCC Part 15 Subpart B, Class B

Product : ADSL MODEM

Model No. : SAM-335

JOB NO. : 01ISM025

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

Date of test : Jan 16,2001

Issued Date : Jan 31, 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 : SeungBong, Yang
TEL. +82-31-218-7391

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-335

SERIAL NUMBER : -

KIND OF PRODUCT : ADSL Modem

TESTED DATE : Jan 16, 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

The Samsung ADSL modem, SAM-335 is possible to access the Internet and other multimedia service networks through an telephone line (PSTN). Max Data Rate is Down Stream 8Mbps and Up stream 640Kbps. CPU is Virata Helium&internal SAR(VC8410-PQC)48MHz. It has main clock 37MHz. The operating voltage is DC 5V/1.5A by Adaptor(110V). See the attached SAM-335 User's Guide for more information.

1.2 Tested System Details

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

Device Type	Manufacturer	Model Number	Serial No.	FCC ID / DoC
(1) ADSL Modem (EUT)	Samsung	ADSL Modem	N/A	A3LSAM335
(2) PC	HP	Pavilion 7850	MX04704167	FCC DoC
(3) Monitor	Samsung	6547-OBN	55-00006	FCC DoC
(4) Keyboard	HP	5183-9980	J94003612	FCC DoC
(5) Mouse	Sejin	SMB-400	4FEF027845	GJJS965CO
(6) External Modem	US Robotics	SPORTSTER	33083962	CJE-0149-217
(7) Laser Printer	Samsung	ML-85	B1AJ700174	A3LML85
(8) ADSL DSLAM	Sunrise Telecom	Sunset xdSL	TD001906	Verification

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 [] :	25.5	25.5
Humidity [%] :	22	22
Power supply :	AC120V/60Hz	AC120V/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.

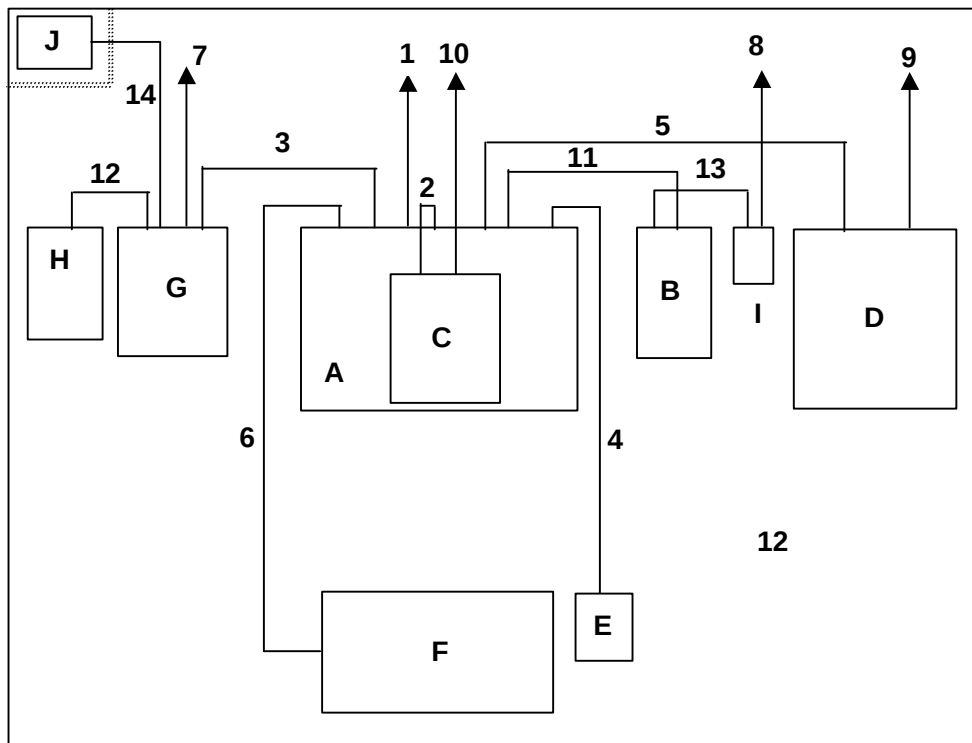
I/O cables that were connected to the peripherals were bundle in center.

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	Desktop computer	Pavilion7850	MX04704167	HP	
B	External Modem	SPORTSTER	33083962	US ROBOTICS	
C	Monitor	6547-OBN	55-00006	IBM	
D	Laser Printer	ML-85	B1AJ700174	Samsung	
E	PS/2 Mouse	SMB-400	4FEF027845	SEJIN	
F	Keyboard	D-91275	G019768I06	Cherry	
G	ADSL Modem	SAM-335	-	Samsung	EUT
H	Telephone	SP-F201	B2DFC15794	Samsung	
I	AC/DC Adaptor	AW-1220A	-	AnJeon	
J	ADSL DSRAM	Sunset xdSL	TD001906	Sunrise Telecom	Outside of Chb.

2.5.3 Used Cable Description

No.	Item	Length[m]	Shielded(Y/N)	Remark
1	AC Power cable	1.7	N	
2	Video cable	1.5	Y	
3	UTP cable	1.5	N	
4	Mouse cable	2	Y	
5	Printer cable	1.5	Y	
6	Keyboard Cable	1.5	Y	
7	DC Power cable	1.7	N	
8	AC Power cable	1.7	N	
9	AC Power cable	1.7	N	
10	AC Power cable	1.7	N	
11	Serial cable	1.5	Y	
12	Telephone cable	1.5	N	
13	DC Power cable	1.5	N	
14	ADSL cable	10	N	Connect to out side of Chamber

3. Conducted and Radiated Measurement Photos

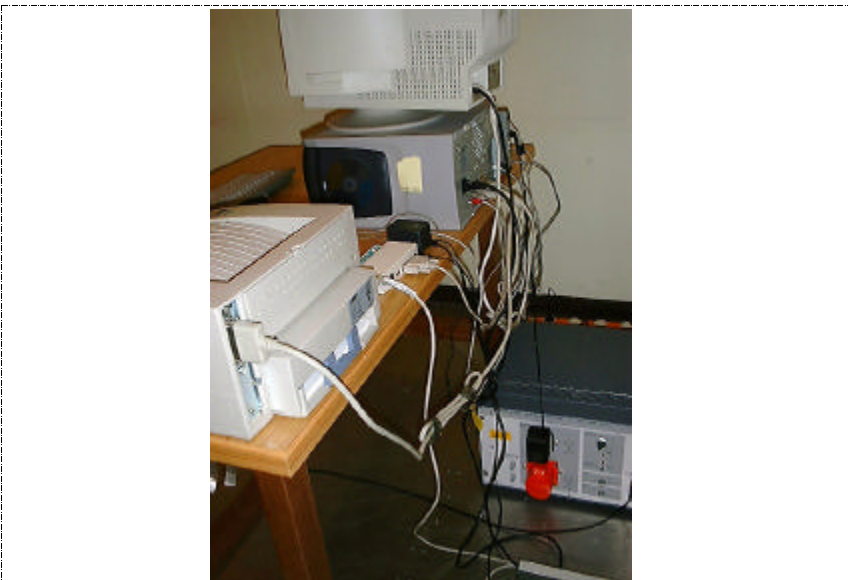
* Cabling was taken into consideration and test data was taken under worse case conditions.

3.1 Conducted Measurement Photos

o Conduction(Front View)



o Conduction(Rear View)



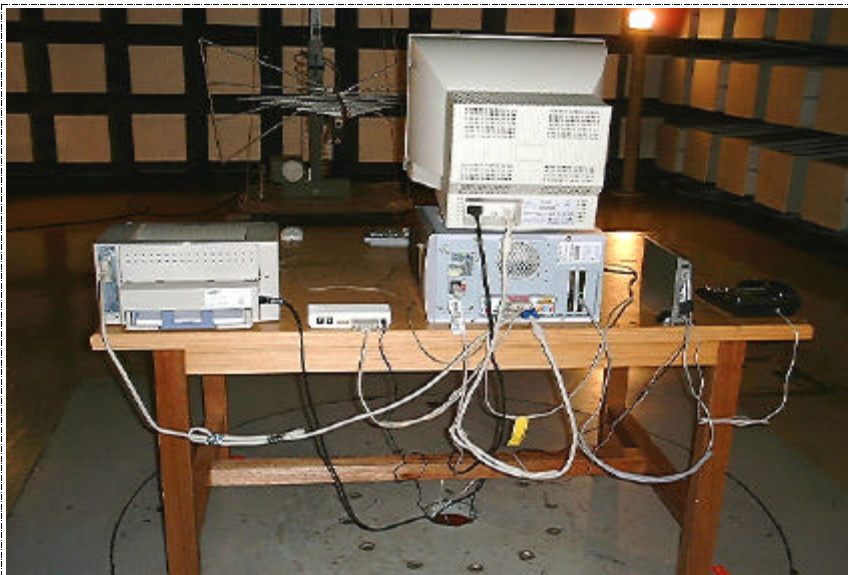
* Cabling was taken into consideration and test data was taken under worse case conditions.

3.2 Radiated Measurement Photos

o Radiation(Front View)



o 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 $\pm 2.08\text{dB}$.

- ☐ 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 2.08dB.*

4.2 Radiated Emission Test

The measurement uncertainty(with a 95% confidence level)for this test was as follow
30MHz~200MHz : ± 4.50 200MHz~1000MHz : ± 5.23

- ☐ 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 : 10.011 [MHz]
Meter Reading : 32.7 [dBuV]
LISN Loss : 0.32 [dB]
Cable loss : 0.7 [dB]
Corrected Readings : 33.72 [dBuV/m]
Margin : -14.24 [dB]

o Test Data Sheet

Tested Frequency	Meter Reading	LISN Pol.	Factor[B]		Corrected	Limits	Margin
	[A]		LISN Loss	Cable Loss	Reading		
	[dBuV]		[dB]		[A+B]		
[MHz]	[dBuV]	[L1/L2]			[dBuV/m]	[dBuV/m]	[dB]
0.452	25	N	0.11	0.20	25.31	47.96	-22.65
0.483	24.2	N	0.12	0.20	24.52	47.96	-23.44
0.505	24	N	0.12	0.20	24.32	47.96	-23.64
4.827	26.5	L1	0.25	0.70	27.45	47.96	-20.51
10.011	32.7	L1	0.32	0.70	33.72	47.96	-14.24
12.335	28.2	L1	0.39	0.80	29.39	47.96	-18.57
20.000	25.2	N	0.55	0.90	26.65	47.96	-21.31

- * All readings are quasi-peak mode.
- * Set resolution bandwidth to 9kHz minimum.
- * 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 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 : **48.00** [MHz]
Meter Reading : **24.1** [dBuV]
Antenna Factor : **8.79** [dB]
Cable loss : **0.10** [dB]
Corrected Reading : **33.0** [dBuV/m]
Margin : **-7.01** [dB]

o 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] [dBuV/m]
				Ant. Factor	Cable Loss					
				[dB]						
30 - 88	48.00	V	24.1	8.79	0.10	150	120	33.0	-7.01	40.0
	59.20	V	14.9	6.58	0.20	170	110	21.7	-18.32	
88 - 216	99.90	V	23.4	7.45	0.50	130	100	31.4	-12.15	43.5
	120.00	V	21.5	6.59	0.80	150	85	28.9	-14.61	
	144.00	V	25.1	9.10	0.90	125	98	35.1	-8.40	
	168.00	V	22.0	10.47	0.90	130	84	33.4	-10.13	
	192.10	H	24.1	10.48	1.10	250	100	35.7	-7.82	
216 - 960	240.00	H	14.1	12.57	1.46	170	90	28.1	-17.87	46.0
	247.20	H	14.9	12.82	1.48	150	170	29.2	-16.80	
	264.00	H	15.7	13.42	1.50	130	84	30.6	-15.38	
	384.00	V	16.9	16.24	2.04	150	180	35.2	-10.82	
	528.00	V	15.6	18.90	2.62	230	110	37.1	-8.88	
	721.00	H	12.1	21.70	3.00	200	120	36.8	-9.20	
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

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
Field strength meter	ESVS30	842807/007	R & S	00/06/02, 12Months
		F/W ver. : Main 3.10, OTP 02.01, GRA 02.03		
L.I.S.N	ESH2-Z5	831886/006	R & S	00/11/30, 12Months
	3825/2	1408	EMCO	00/11/11, 12Months
Biconilog Antenna	3142	9712-1236	EMCO	00/12/23, 12Months
Bi-conical Antenna	3104C	9001-4185	EMCO	00/06/01, 12Months
Log-periodic Antenna	3146	9603-4418	EMCO	00/06/01, 12Months
EMI Measurement Software	HP	Firmware versions : Rev. A.00.00		