

Certification of Compliance

CFR 47 Part 15 Subpart B

Test Report File No. : 01-IST-146 Date of Issue : October 31, 2001

Model(s) : MNG-2000

Kind of Product : Cable Modem

Applicant : Net&Sys Co., LTD.

Address : DaewooJeungkwon B/D 3F 323-4, Shinjong-Dong, Yangchon-Gu,
Seoul, Korea, 158-077

Manufacturer : Net&Sys CO., LTD.

Address : DaewooJeungkwon B/D 3F 323-4, Shinjong-Dong, Yangchon-Gu,
Seoul, Korea, 158-077

Test Result

Positive

Negative

Reviewed By

Approved By

Joon H. Lee

Qiu Chung

J.H. Lee / General Manager of EMC

G. Chung / Chief

- The test report with appendix consists of 12 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC Laboratory.
- This equipment as for has been shown to be capable of continued compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4 1992.



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INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd.

San 21-8, Goan-Ri, Baekam-Myun, Yongin-City

Kyonggi-Do, 449-860, Korea

TEL : +82 31 333 4093

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ENVIRONMENTAL CONDITIONS

Temperature 16 degree

Humidity 35 percent

Atmospheric pressure 999 mbar

POWER SUPPLY SYSTEM USED

Power supply system 120Vac, 60Hz(For Desktop PC and AC/DC adapter)

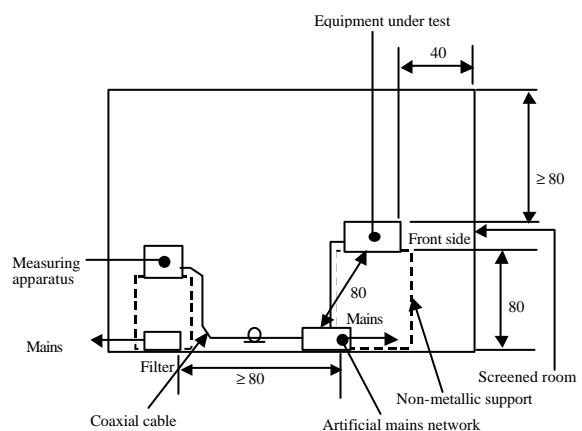
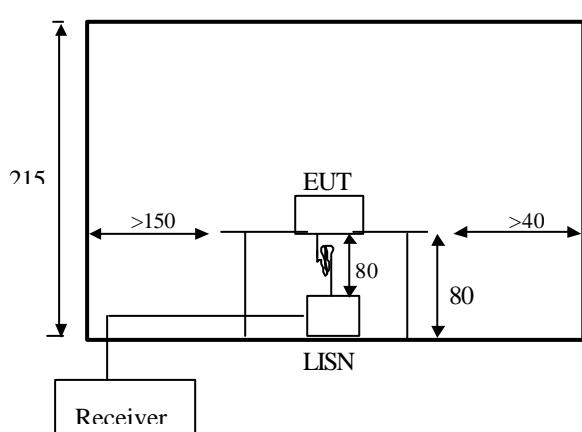
DESCRIPTIONS OF TEST

Conducted Emissions:

The measurement were performed over the frequency range of 0.45MHz to 30MHz using a 50 /50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10KHz or for "quasi-peak" within a bandwidth of 9KHz.

- Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1m X 1.5m wooden table 80cm height is placed 40cm away from the vertical wall and 1.5m away from the other wall of the shielded room. The R/S ESH3-Z5 and EMCO 3825/2 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80cm from the LISN and powered from the EMCO LISN .The peripheral equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the EMCO LISN. All interconnecting



cables more than 1m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.45 to 30MHz. The bandwidth of the receiver was set to 10kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.

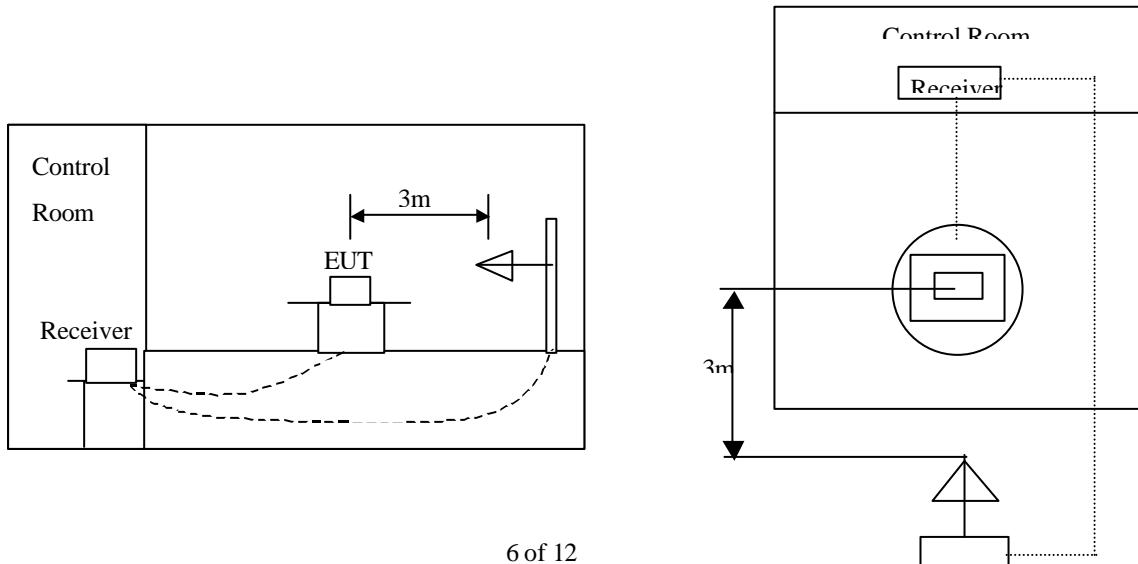
DESCRIPTION OF TEST

Radiated Emissions:

The measurement was performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120KHz.

- Procedure of Test

Preliminary measurements were made at 3 meter using bi-conical and log-periodic antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 40MHz to 300MHz using S/B biconical antenna and 300 to 1000MHz using S/B log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using S/B bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuations. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were rearranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.



SUMMARY

Conducted Emission

The requirements are MET Not MET

Minimum limit margin 10.4 dB at 1.546 MHz

Maximum limit exceeding

Remarks : The minimum margin was measured at Neutral Phase for
Ping mode

Attached the test plots in pages 9 to 10.

Radiated Emission

The requirements are MET Not MET

Minimum limit margin 2.7 dB at 480.01 MHz

Maximum limit exceeding

Remarks : Attached the test data in pages 12.

Reported By



H.C. Kim / EMC Engineer

Note :

means the test is applicable, is not applicable.

TEST CONDITIONS AND DATA

Conducted Emissions

[Applicable]

Test Equipment Used

Model Name	Manufacture	Description	Next Cal. Date
ESH3	Rohde Schwarz	Receiver	Jun. 16, 2002
ESH3-Z2	Rohde Schwarz	Pulse Limiter	Jul. 13, 2002
EZM	Rohde Schwarz	Spectrum monitor	-
3825/2	EMCO	LISN	Jul. 13, 2002
-	-	-	-

External Peripherals

Device Description	Model Name	Manufacture	FCC Compliance Information
Host Computer	Brio BA 600/550	Hewlett Packard	DoC
Monitor	529B	Daewoo Electronics.	C5F7NFCMC529B
Mouse	M-S48a	Hewlett Packard	JNZ201213
Keyboard	SK-2502C	Hewlett Packard	DoC
UP Converter	DUAL4040	Wavecom Electronics.	MIC (for Korea approval)
CMTS	UBR7200	CISCO	N/A
Diplex Filter	VSREDP-40	ViewSonic	

Test Program Ping mode

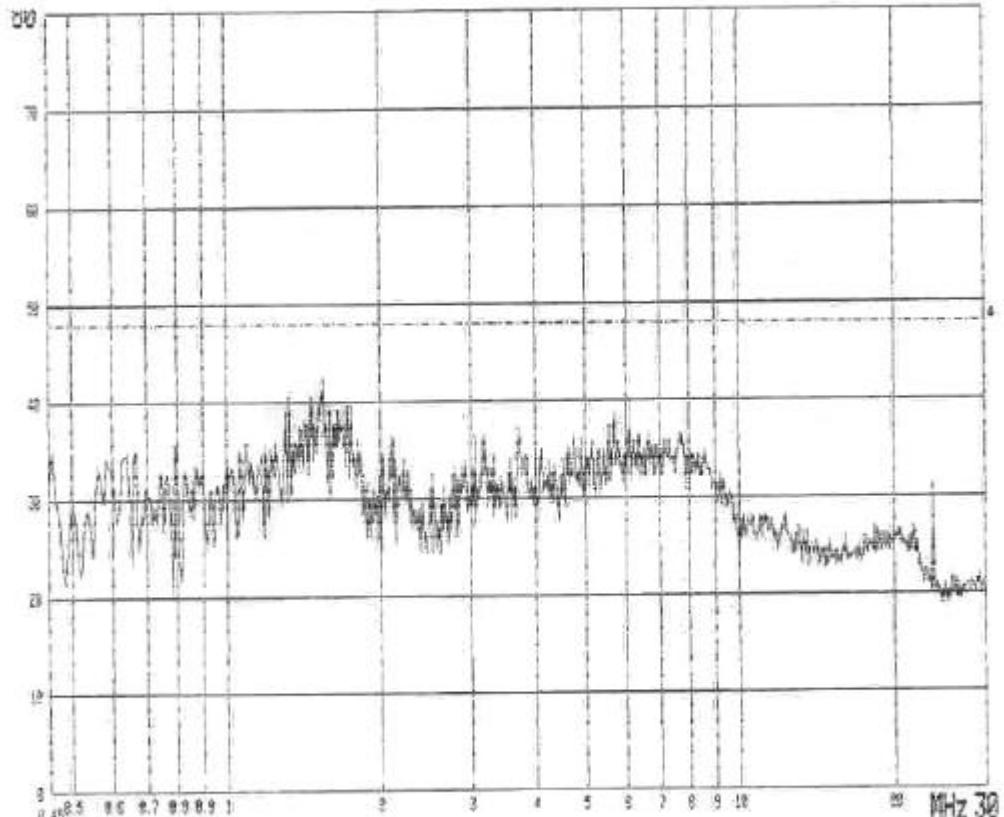
Test Area Shielded Room #3

Note : The ping operation was performed from the host computer to simulation system via DUT.

The bold italic external peripherals were used as simulation system at outside of test room. It was connected with coaxial cable.

Conducted Emissions

(Mains Terminal Disturbance Voltages)



MODEL : MNG-2000
120Vac 60Hz PHASE : LIVE

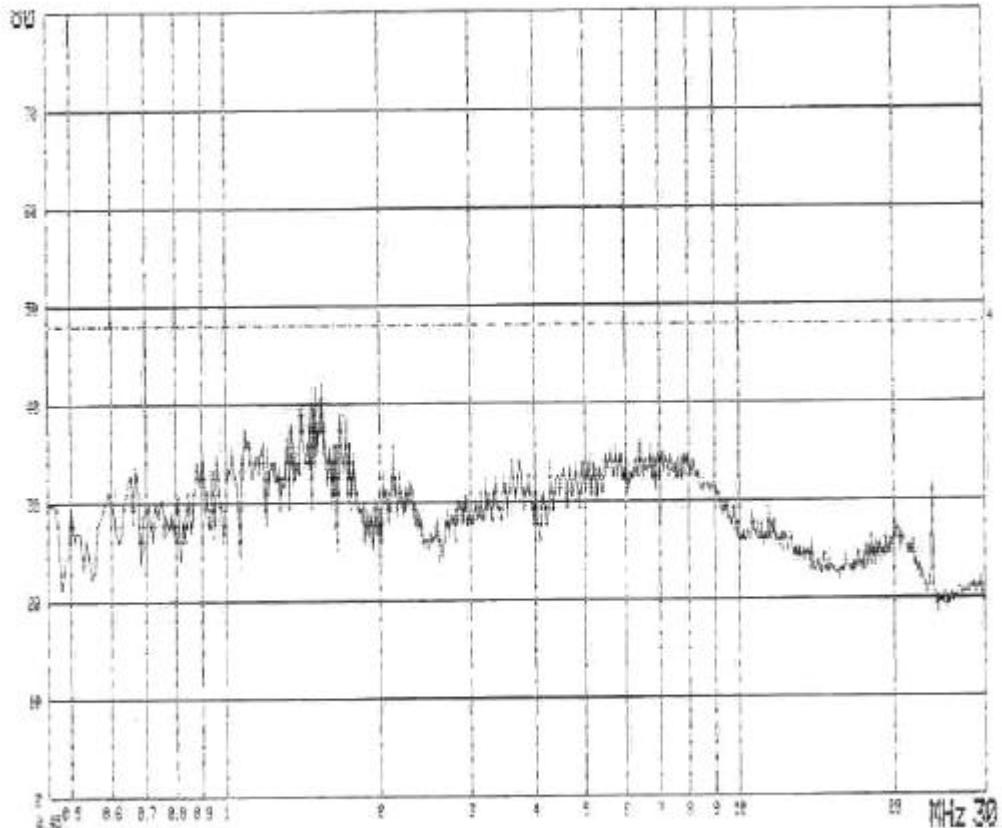
Ping Mode

Frequency [MHz]	Measurement [dBuV]	Insertion Loss [dB]	Limit [dBuV]	Margin [dBuV]
	Q-Peak		Q-Peak	Q-Peak
1.343	35.1	0.8	48.0	12.1
1.555	35.4	0.8	48.0	11.8
5.743	32.1	0.8	48.0	15.1
23.772	28.1	0.8	48.0	19.1

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)



MODEL : MNG-2000
120Vac 60Hz PHASE : NEUTRAL

Ping Mode

Frequency [MHz]	Measurement [dBuV]	Insertion Loss [dB]	Limit [dBuV]	Margin [dBuV]
	Q-Peak		Q-Peak	Q-Peak
1.342	35.5	0.8	48.0	11.7
1.546	36.8	0.8	48.0	10.4
5.742	32.6	0.8	48.0	14.6
23.769	28.7	0.8	48.0	18.5

Note :

TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

Test Equipment Used

Model Name	Manufacture	Description	Next Cal. Date
ESVP	Rohde Schwarz	Receiver	Jun 12, 2002
VULB9160	Schwarzbeck	Antenna	Jun 04, 2002
EZM	Rohde Schwarz	Spectrum monitor	-
-	-	-	-
-	-	-	-

External Peripherals

Device Description	Model Name	Manufacture	FCC Compliance Information
Host Computer	Brio BA 600/550	Hewlett Packard	DoC
Monitor	529B	Daewoo Electronics.	C5F7NFCMC529B
Mouse	M-S48a	Hewlett Packard	JNZ201213
Keyboard	SK-2502C	Hewlett Packard	DoC
UP Converter	DUAL4040	<i>Wavecom Electronics.</i>	<i>MIC (for Korea approval)</i>
CMTS	UBR7200	CISCO	<i>Type approval (for Korea)</i>
Diplex Filter	VSREDP-40	ViewSonic	<i>Type approval (for Korea)</i>

Test Program Ping mode

Test Area Open Field Test Site #2

Note : The ping operation was performed from the host computer to simulation system via DUT.

The bold italic external peripherals were used as simulation system at control room. It was connected with coaxial cable located under ground plane.

Radiated Emissions

(Disturbance Radiation)

[Applicable]

ping mode

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar. [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
60.00	17.8	11.3	1.7	278	378	V	30.8	40.0	9.2
63.52	14.1	10.9	1.8	273	388	V	26.7	40.0	13.3
71.98	21.2	9.5	1.9	336	249	H	32.6	40.0	7.4
84.05	24.0	8.0	2.1	355	273	H	34.0	40.0	6.0
96.31	22.5	9.3	2.2	350	400	V	34.0	43.5	9.5
192.00	18.8	9.7	3.3	322	131	H	31.9	43.5	11.6
250.00	19.0	10.8	3.9	10	370	V	33.7	46.0	12.3
336.00	17.2	13.2	4.7	233	122	H	35.1	46.0	10.9
383.99	19.0	14.4	5.1	30	100	H	38.5	46.0	7.5
480.01	21.1	16.3	5.9	48	100	V	43.3	46.0	2.7
499.99	18.0	16.7	6.0	10	200	V	40.6	46.0	5.4