ELECTROMAGNETIC EMISSION COMPLIANCE REPORT
FOR FCC CLASS B CERTIFICATION

Test Report No.	**: E058R-065**
Applicant	**: SAROTECH CO., LTD.**
Address	**: Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea**
Manufacturer	**: SAROTECH CO., LTD.**
Address	**: Hanlim Venture Town #204, 689-6, Gumjeong-Dong, Gunpo-City, Kyungki-Do, Korea**
Type of Equipment	**: External Storage (Peripheral Device for Class B Computing Device)**
FCC ID	**: PBCNDS-354**
Model Name	**: NDS-354**
Serial number	**: N/A**
Total page of Report	**: 14 pages (including this page)**
Date of Incoming	**: July 14, 2005**
Date of Issuing	**: August 26, 2005**

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART B, Class B.**
This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by: _____
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EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : SAROTECH CO., LTD.
-. ADDRESS : Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea
-. CONTACT PERSON : Mr. Cheol-Young, Cho / Manager
-. TELEPHONE NO : +82-2-480-5140
-. FCC ID : PBCNDS-354
-. MODEL NAME : NDS-354
-. SERIAL NUMBER : N/A
-. DATE : August 26, 2005

EQUIPMENT CLASS	JBP - Peripheral Device for Class B Computing Device
E.U.T. DESCRIPTION	External Storage - Unintentional Radiator
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15, SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	Yes
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

-. This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The SAROTECH CO., LTD., Model NDS-354 (referred to as the EUT in this report) is a External Storage. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1MHz)	12 MHz, 25 MHz and 50 MHz
NUMBER OF LAYERS	4 Layers: Main Board
EXTERNAL CONNECTOR	AC IN, USB IN/OUT, LAN IN/OUT

2.2 Model Differences

-. None

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only

2.4 Test System Details

The model numbers for all the equipments that were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
NDS-354	SAROTECH CO., LTD.	PBCNDS-354	External Storage (EUT)	Notebook PC
PP01L	DELL COMPUTER CORP.	DoC	Notebook PC	-
2225C	HP	DSI6XU2225	PRINTER	Notebook PC
020-0470	CARDINAL	GDE0196	MODEM	Notebook PC

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	SAROTECH CO., LTD.	NDS-354 V.1.0	N/A
POWER BOARD	N/A	N/A	N/A
HDD	MAXTOR	N/A	N/A

3.2 EUT exercise Software

After connecting the EUT to a notebook PC using the USB or LAN cables, the data were continuously read and written from the personal computer to the EUT.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
External Storage (EUT)	N	Y	1.2(P), 1.2(D)
Notebook PC	N	-	1.5(P)
Printer	N	Y	1.5(P), 1.2(D)
Modem	N	Y	1.5(P), 1.2(D)

* The marked "(P)" means the Power Cable and "D" means the I/O Cable.

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
External Storage (EUT)	N	N/A	Y	BOTH END
Notebook PC	-	-	-	-
Printer	N	N/A	Y	BOTH END
Modem	N	N/A	Y	BOTH END

3.5 Equipment Modifications

-. The R62(0 ohm) was changed to bead(220 ohm) in the line of Y1.

-. The R63(0 ohm) was changed to bead(220 ohm) in the line of Y2.

-. The bead(150 ohm) was added to the line of Y3.

-. The R3(22 ohm) was changed to bead(220 ohm) in the line of U1.

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-. The R2(22 ohm) was changed to bead(220 ohm) in the line of U1.

-. The R60, 61(0 ohm) were changed to bead(300 ohm) in the line of LAN port.

-. The R58, 59(0 ohm) were changed to bead(300 ohm) in the line of LAN port.

-. The L1, L2, L4, L5 were changed to bead(2000 ohm) in the line of power.

-. The CMF(Common Mode Filter – 90 ohm) was added to the line of USB port.

-. The bead(1000 ohm) was added to the line of USB port.

-. The bead(150 ohm) was added to the pins 51 and 52 of U8.

-. The bypass capacitor(0.1uF) was added to the line of +5V(VCC).

-. The EMI gasket was added to the inside of top enclosure.

-. The ferrite core was added to the USB cable.

3.6 Configuration of Test System

Line Conducted Test : The EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2003 7.2.3 to determine the worse operating conditions.

Radiated Emission Test : Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2001 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Data were continuously read and write by USB Port	-
Data were continuously read and write by LAN Port	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Data were continuously read and write by USB Port	**X**
Data were continuously read and write by LAN Port	-

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5. FINAL RESULT OF MEASURMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Conducted Emission Test

5.1.1 Operating Condition: Data were continuously read and write by USB Port

Humidity Level : 41 % Temperature : 22ºC

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107(a)

Type of Test : CLASS B

Result : PASSED BY –11.07 dB at 5.00 MHz

EUT : External Storage Date: August 11, 2005

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.18	H	50.97	64.72	-13.75
0.53	N	40.19	56.00	-15.81
1.95	N	41.15	56.00	-14.85
2.95	H	41.61	56.00	-14.39
5.00	N	44.93	56.00	-11.07
5.46	H	46.37	60.00	-13.63
Frequency (MHz)	**Line**	**Average (dBuV)**		**Margin (dB)**
		Emission level	**Limits**	
0.18	H	35.23	54.72	-19.49
2.95	H	20.80	46.00	-25.20
5.00	N	24.80	46.00	-21.20
5.46	H	28.87	50.00	-21.13

Line Conducted Emissions Tabulated Data

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5.1.2 Operating Condition: Data were continuously read and write by LAN Port

Humidity Level : 41 % Temperature : 22ºC

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107(a)

Type of Test : CLASS B

Result : PASSED BY –9.62 dB at 0.17 MHz

EUT : External Storage Date: August 11, 2005

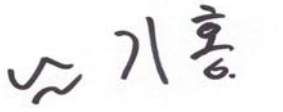
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.17	N	55.34	64.96	-9.62
0.19	H	51.35	64.26	-12.91
3.14	H	41.77	56.00	-14.23
5.53	H	45.94	60.00	-14.06
21.89	N	49.34	60.00	-10.66
26.79	N	46.00	60.00	-14.00
Frequency (MHz)	**Line**	**Average (dBuV)**		**Margin (dB)**
		Emission level	**Limits**	
0.17	N	37.09	54.96	-17.87
0.19	H	37.44	54.26	-16.82
21.89	N	21.97	50.00	-28.03
26.79	N	24.41	50.00	-25.59

Line Conducted Emissions Tabulated Data

Remark: “H”: Hot Line, “N”: Neutral line

See Appendix I for an overview sweep performed with peak and average detector.



Tested by: Ki-Hong, Nam / Test Engineer

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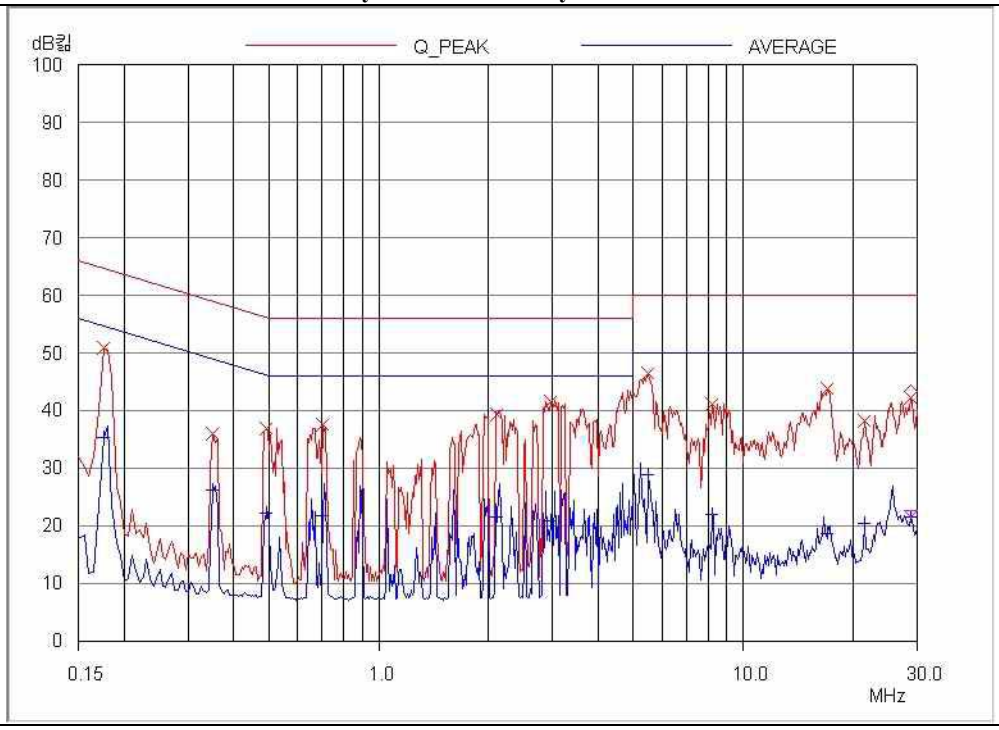
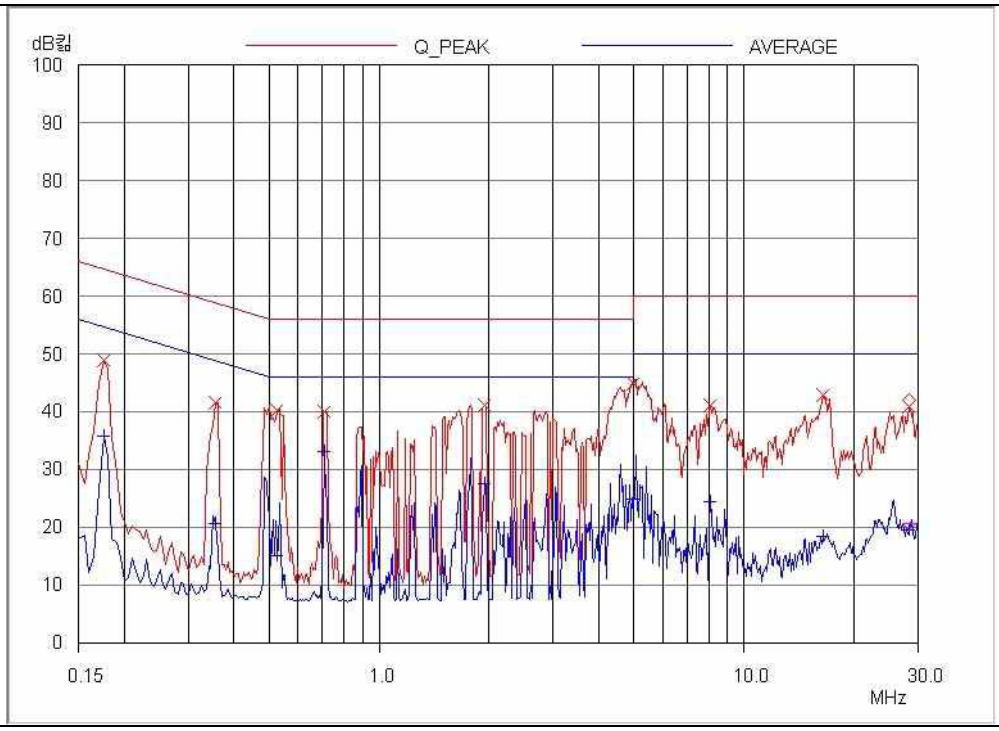
Operating Condition: Data were continuously read and write by USB Port



HOT LINE



NEUTRAL LINE

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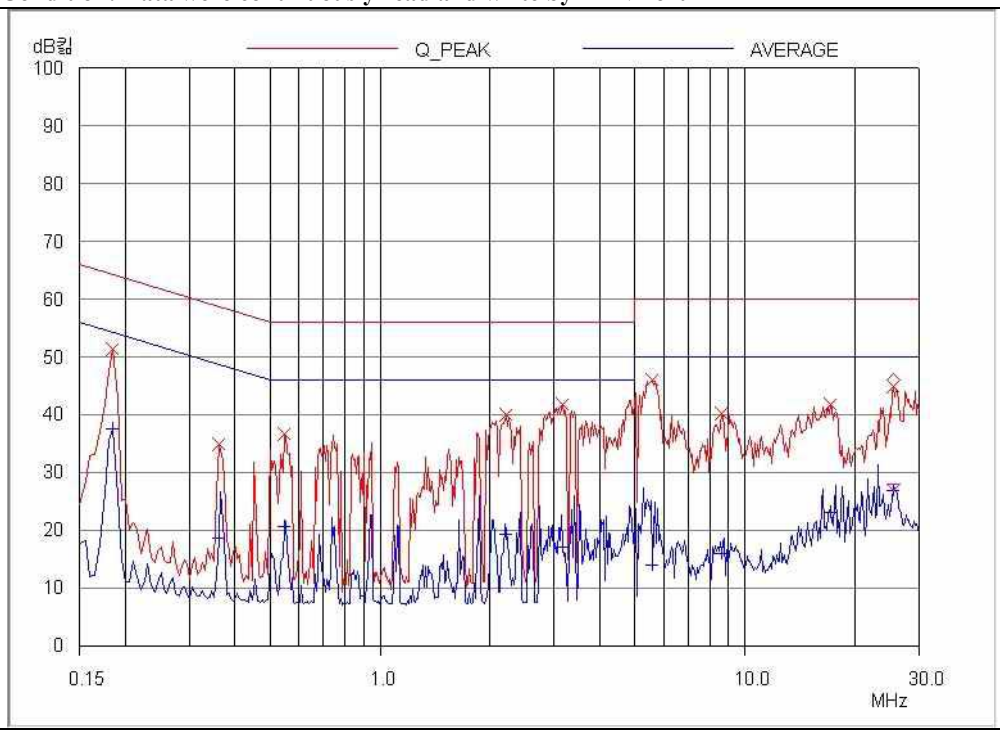
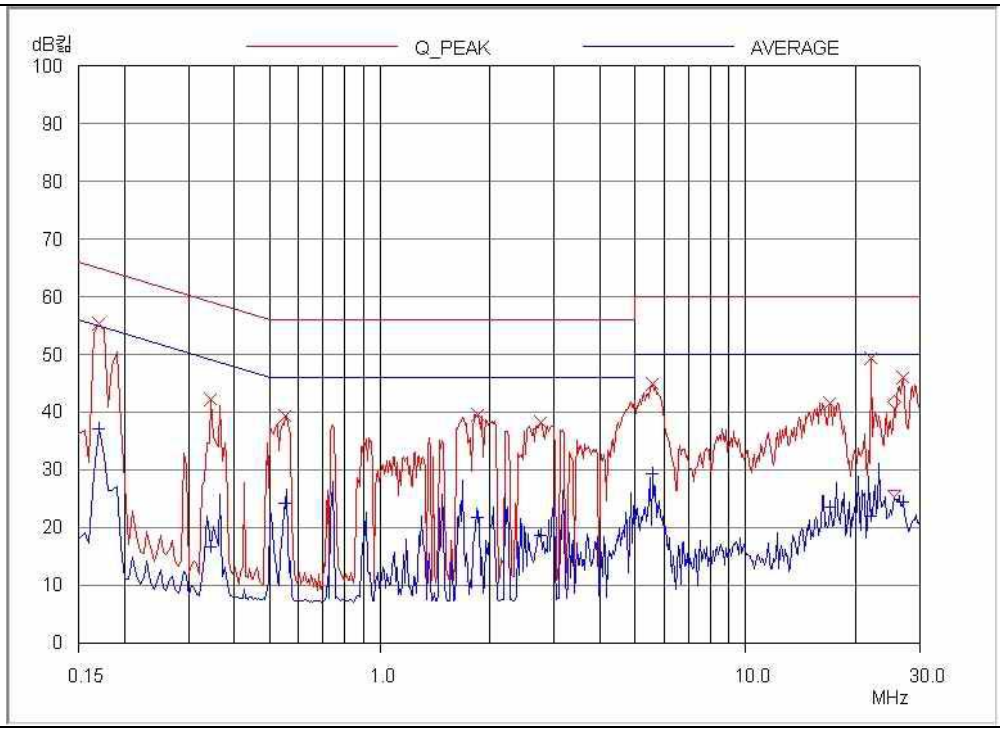
Operating Condition: Data were continuously read and write by LAN Port



HOT LINE



NEUTRAL LINE

5.2 Radiated Emission Test

5.2.1 Operating Condition: Data were continuously read and write by USB Port

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 47 %

Temperature: 24 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)

Type of Test : CLASS B

Result : PASSED BY -4.02 dB at 479.63 MHz

EUT : External Storage Date: August 18, 2005

Frequency Range : 30MHz – 1000MHz

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
69.73	26.24	H	5.56	1.50	33.30	40.00	-6.70
82.31	22.44	H	7.11	1.75	31.30	40.00	-8.70
239.31	22.00	V	16.77	3.23	42.00	46.02	-4.02
479.63	19.88	H	17.03	5.09	42.00	46.02	-4.02
599.78	17.50	H	18.65	5.30	41.45	46.02	-4.57
719.95	14.23	H	20.83	6.60	41.66	46.02	-4.36

Radiated Emissions Tabulated Data

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5.2.2 Operating Condition: Data were continuously read and write by LAN Port

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 47 % Temperature: 24 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)
Type of Test : CLASS B
Result : PASSED BY -5.00 dB at 374.16 MHz

EUT : External Storage Date: August 18, 2005
Frequency Range : 30MHz – 1000MHz
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
63.13	26.24	H	6.83	1.46	34.53	40.00	-5.47
83.13	22.44	H	7.23	1.76	31.43	40.00	-8.57
374.16	21.84	V	14.88	4.30	41.02	46.02	-5.00
499.53	17.34	H	17.21	5.49	40.04	46.02	-5.98
599.60	16.47	H	18.65	5.30	40.42	46.02	-5.60
624.01	16.46	H	18.95	5.49	40.90	46.02	-5.12

Radiated Emissions Tabulated Data

Tested by: Ki-Hong, Nam / Test Engineer

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6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+	Meter reading	(dBuV)
+	Cable Loss	(dB)
+	Antenna Factor (Loss)	(dB/meter)
=	Corrected Reading	(dBuV/meter)
-	Specification Limit	(dBuV/meter)
=	dB Relative to Spec	(+/- dB)

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7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS10	827864/005	DEC/04	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/05	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/05	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	APR/05	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	APR/05	12MONTH	■
6.	Quasi-Peak Adapter	HP	8574B	2811A01432	APR/05	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	APR/05	12MONTH	
8.	Biconical antenna	EMCO	3110	9003-1121	FEB/05	12MONTH	
		Schwarzbeck	VHA9103	91031852	JAN/05		■
9.	Log Periodic antenna	EMCO	3146	9001-2614	FEB/05	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	FEB/05		■
10.	LISN	EMCO	3825/2	9109-1867	JUL/04	12MONTH	
				9109-1869	NOV/04		■
		Schwarzbeck	NSLK 8128	8128-216	JUN/05		■
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■

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