EMC TEST REPORT

Test Report No. : 22GE0004-YK-2

Applicant	:	**Advanced Technology and Systems Co., Ltd.**
Type of Equipment	:	**Array MasStor-K Series**
Model No.	:	**AXRR-K616S**
FCC ID	:	**NLCAXRRK01D**
Test standard	:	**FCC Part 15 Subpart B**
Test Result	:	**Complied**

1. This test report shall not be reproduced except in full, without the written approval of A-Pex International Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this test report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test:
EMI: February 15, 2002

Tested by:
EMI: A. Sato
Akira Sato
EMC section

Approved by: O. Watatani
Osamu Watatani
Site Assistant Manager of Yamakita Lab.

Date of issue: February 28, 2002

A-pex International Co., Ltd.
YAMAKITA LAB.
907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

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CONTENTS

SECTION 1: Client information

Company Name	:	Advanced Technology and Systems Co., Ltd.
Brand Name	:	ADTX
Address	:	9F, East Tower, Yokohama Business Park, 134 Gohdo-cho, Hodogaya-ku, Yokohama-shi, Kanagawa-ken, 240-0005, Japan
Telephone Number	:	+81-45-334-0040
Facsimile Number	:	+81-45-334-0094
Contact Person	:	Katsuya Suzuki

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Regulation(s)	:	FCC Part 15 Subpart B
Type of Equipment	:	Array MasStor-K Series
Model No.	:	AXRR-K616S
Serial No.	:	FCC sample
FCC ID	:	NLCAXRRK01D
Rating	:	AC:100-240V, 50Hz/60Hz, 1.4A
Condition of EUT	:	Production model
Country of Manufacture	:	Japan
Tested Date	:	February 15, 2002
Receipt Date of Sample	:	February 14, 2002

2.2 Product description

Advanced Technology and Systems Co., Ltd., Model: AXRR- K********S (*****:0-9 or blank)
(referred to as the EUT in this report) is a Array MasStor-K Series.
The clock frequency used in EUT is
Base clock:14.318MHz/40MHz/66MHz
The inside Clock of CPU:100MHz

Ultra160 SCSI of maximum data transmission speed 160 MB/sec Loading (Theoretical value)
RAID 0, 0+1, 5
Power Supply → Dual

SECTION 3: Test specification, methods & procedures

3.1 Test specification

Test Specification : FCC Part 15 Subpart B

Title : FCC 47CFR Part 15 Radio Frequency Device
Subpart B Unintentional Radiators

3.2 Methods & Procedures

No.	Item	Test Procedure	Limits	Remarks
1	Conducted emission	ANSI C63.4:1992	class B	-
2	Radiated emission	ANSI C63.4:1992	class B	Test Distance:3m

No addition, deviation nor exclusion have been made from standards.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating modes

The EUT exercise program used during testing was designed to exercise the various system components in a manner
similar to typical use.

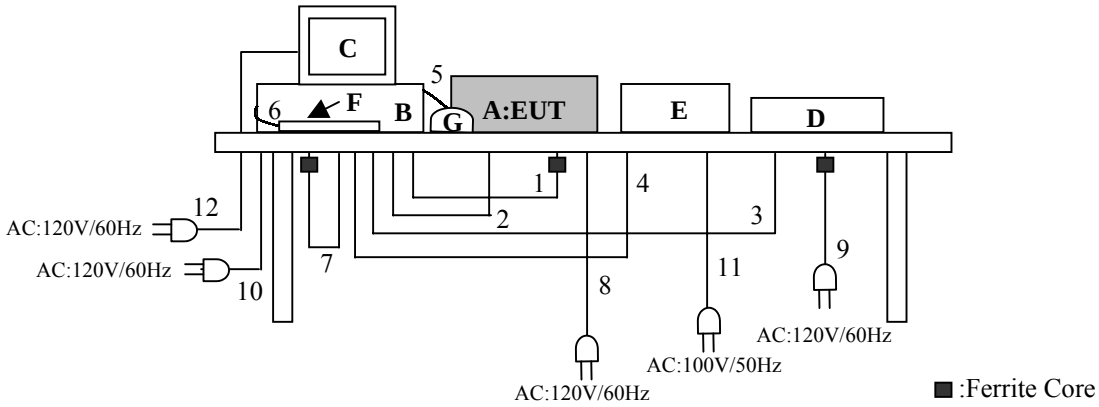
Test sequence is used : Standby mode (Conducted emission test only)
Random Read/Write mode

Operation : File Copy Operation at Windows 2000

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

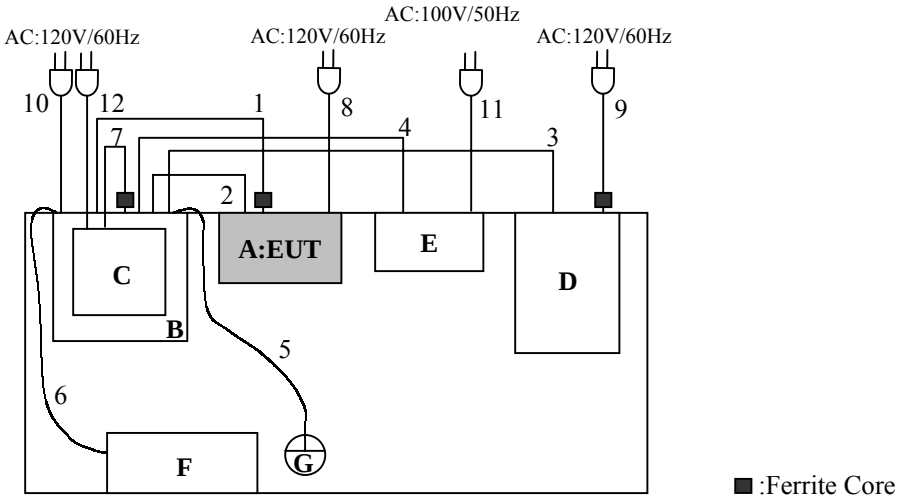
4.2 Configuration and peripherals

Front View



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

Top View



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

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	ArrayMasStor-K Series	AXRR-K616S	-	CORE MICRO SYSTEMS INC.	(FCC sample)
B	PC	VECTRA VL410 SF	SG20307179	HP	D.O.C.
C	Monitor	6540-02E	66-R4737	IBM	H41CM14018
D	Scanner	ScanJet5200C	SG933160ZC	HP	D.O.C.
E	Printer	BJ-F100	ETB09986	CANON	D.O.C.
F	Keyboard	SK-2502C	M011225194	HP	D.O.C.
G	Mouse	NOM-1	LZE14654691	HP	JNZ201213

Meshed column are represented EUT

List of cables used

No.	Name	Length (m)	Shield	Backshell material
1	SCSI cable	12.0	Shielded	Polyvinyl Chloride
2	Serial cable	3.0	Shielded	Polyvinyl Chloride
3	USB cable	1.8	Shielded	Polyvinyl Chloride
4	Pararell cable	2.0	Shielded	Polyvinyl Chloride
5	Mouse cable	1.8	Unshielded	Polyvinyl Chloride
6	Keyboard cable	1.8	Unshielded	Polyvinyl Chloride
7	Monitor cable	1.5	Unshielded	Polyvinyl Chloride
8	AC power cable for EUT	1.8	Unshielded	Polyvinyl Chloride
9	AC power cable for Scanner	1.8	Unshielded	Polyvinyl Chloride
10	AC power cable for PC	1.8	Unshielded	Polyvinyl Chloride
11	AC power cable for Printer	1.8	Unshielded	Polyvinyl Chloride
12	AC power cable for Monitor	1.8	Unshielded	Polyvinyl Chloride

SECTION 5: Summary of test results

5.1 Test results

No.	Item	Test Procedure	Limits	Worst margin	Results
1	Conducted emission	ANSI C63.4:1992	class B	Standby mode 5.3dB (0.5178MHz:L1)	complied
2	Radiated emission	ANSI C63.4:1992	class B	2.6dB (200.02MHz: Horizontal)	complied

A-PEX INTERNATIONAL hereby confirms that E.U.T. , in the configuration tested, complies with the specifications FCC Part15 Subpart B.

5.2 Uncertainty

EMI

Conducted Emission Test

The measurement uncertainty (with 95% confidence level) for this test is ±1.3dB.

☐ The data listed in this test report may exceed the test limit because it does not have enough margin.
■ The data listed in this test report has enough margin.

Radiated Emission Test

■ Measurement distance of 3m:

The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ±4.8dB.
The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.

■ The data listed in this test report may exceed the test limit because it does not have enough margin.
☐ The data listed in this test report has enough margin, more than site margin.

5.3 Test Location

☑ A-PEX International Co., Ltd. Yamakita No.1 Open Test Site.
This site has been fully described in a report dated September 24, 1999 submitted to FCC office, and accepted in a letter dated October 8, 1999 (No.1 Open Test Site: 95486).

*NVLAP Lab. code : 200441-0

Address : 907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken, 258-0124 JAPAN

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5.4 Photographs of test setup

Refer to Appendix 1.

5.5 Test instruments

Refer to Appendix 2.

5.6 Data of EMI Test

Refer to Appendix 3.

SECTION 6: Conducted emission

6.1 Operating environment

The test was carried out in a shielded room 8.0 × 5.0 × 2.5m.

Temperature : 26 ℃
Humidity : 23 %

6.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were 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 50Ω connectors of the LISN were resistively terminated in 50Ω when not connected to the measuring equipment.

A drawing of the set up is shown in the photos of Appendix 1.

6.3 Test conditions

Frequency range : 0.45MHz – 30MHz
EUT position : Table top

6.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a screened room.
The EUT was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, with an average detector.
The EUT was put into operation at Standby mode and Random Read/Write mode.

The conducted emission measurements were made with the following detector function of the test receiver.

Frequency : 0.45MHz-30MHz
Detector Type : Quasi-Peak
IF Bandwidth : 9kHz

6.5 Results

Summary of the test results : Pass

Date : February 15, 2002 Test engineer : A. Sato

SECTION 7: Radiated emission

7.1 Operating environment

The test was carried out in an open site.

Temperature : 18 ℃
Humidity : 34 %

7.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.8m, 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 bundled 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.

A drawing of the set up is shown in the photos of Appendix 1.

7.3 Test conditions

Frequency range : 30MHz – 1000MHz
Test distance : 3m
EUT position : Table top

7.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.
Pre check measurements were performed within a screened room or used search coil for ambient noise at high-level, especially 80-90MHz, 270-290MHz and 600-700MHz. Measurements were performed with a quasi-peak detector.
The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization.
The EUT was put into operation at Random Read/Write.

The radiated emission measurements were made with the following detector function of the test receiver.

Frequency : 30MHz-1000MHz
Detector Type : Quasi-Peak
IF Bandwidth : 120kHz

7.5 Results

Summary of the test results : Pass

Date : February 15, 2002 Test engineer : A. Sato

APPENDIX 1: Photographs of test setup

This section contains the following photographs:

APPENDIX 2: Test instruments

APPENDIX 3: Data of EMI test

This section contains the following data

A-pex International Co., Ltd.
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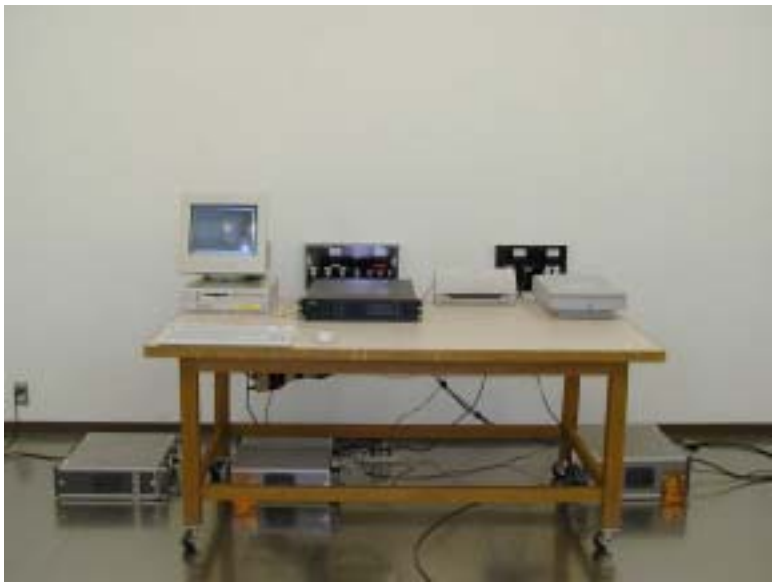
Conducted emission



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Radiated emission

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Test Report No :22GE0004-YK-2

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
KAF-01	Pre Amplifier	Hewlett Packard	8447D	RE	2001/08/25 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE	2001/09/03 * 12
KBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2001/08/31 * 12
KCC-10/11/12/13/18	Coaxial Cable	Fujikura/Suhner	8D-2W/12D-SFA/S04272B/S04272B/S04272B	RE	2001/09/05 * 12
KCC-14/15/16/18/KPL-01	Coaxial Cable/Pulse Limitter	Fujikura/Suhner/PMM	5D-2W/8D-2W/S04272B/S04272B/PL01	CE	2001/09/05 * 12
KLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2001/04/04 * 12
KLS-01(EUT)	LISN	Schwarzbeck	NSLK8126	CE	2001/09/04 * 12
KLS-02(AE)	LISN	Schwarzbeck	NSLK8127	CE	2001/09/04 * 12
KLS-06(AE)	LISN	Schwarzbeck	NSLK8127	CE	2001/10/23 * 12
KOTS-01	Open Area Test Site	JSE	30m	RE	2001/08/27 * 12
KSA-01	Spectrum Analyzer	Advantest	R3365	CE/RE	2001/07/20 * 12
KTR-02	EMI Test Receiver	Rohde & Schwarz	ESCS30	CE/RE	2001/12/17 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
CE: Conducted emission,
RE: Radiated emission,

DATA OF CONDUCTION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Shielded Room
Report No. : 22GE0004-YK-2

Applicant : Advanced Technology and Systems Co., Ltd.
Kind of Equipment : ArrayMasStor-K Series
Model No. : AXRR-K616S
Serial No. : -
Power : AC120V/60Hz
Mode : Standby
Remarks :
Date : 2/15/2002
Phase : Single Phase
Temperature : 26 ℃
Humidity : 23 %
Regulation : FCC Part15B §15.107(a)

A. Sato
Engineer : Akira Sato

No.	FREQ. [MHz]	READING(N) QP [dBuV]	READING(N) AV [dBuV]	READING(L1) QP [dBuV]	READING(L1) AV [dBuV]	LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMITS QP [dBuV]	LIMITS AV [dBuV]	MARGIN QP [dB]	MARGIN AV [dB]
1.	0.5178	36.2	-	42.1	-	0.4	0.2	0.0	42.7	-	48.0	0.0	5.3	-
2.	0.6456	33.2	-	36.3	-	0.4	0.2	0.0	36.9	-	48.0	0.0	11.1	-
3.	0.8087	29.4	-	30.3	-	0.3	0.2	0.0	30.8	-	48.0	0.0	17.2	-
4.	1.1667	34.0	-	34.9	-	0.3	0.2	0.0	35.4	-	48.0	0.0	12.6	-
5.	11.8642	36.2	-	37.3	-	0.5	1.2	0.0	39.0	-	48.0	0.0	9.0	-
6.	14.7728	30.3	-	29.7	-	0.5	1.4	0.0	32.2	-	48.0	0.0	15.8	-
7.	22.7998	32.2	-	32.3	-	0.8	1.7	0.0	34.8	-	48.0	0.0	13.2	-

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

■LISN :KLS-01(NSLK8126) ■COAXIAL CABLE:KCC-14/15/16/18
■PULSE LIMTTER:KPL-01 ■EMI RECEIVER:KTR-02(ESCS30)

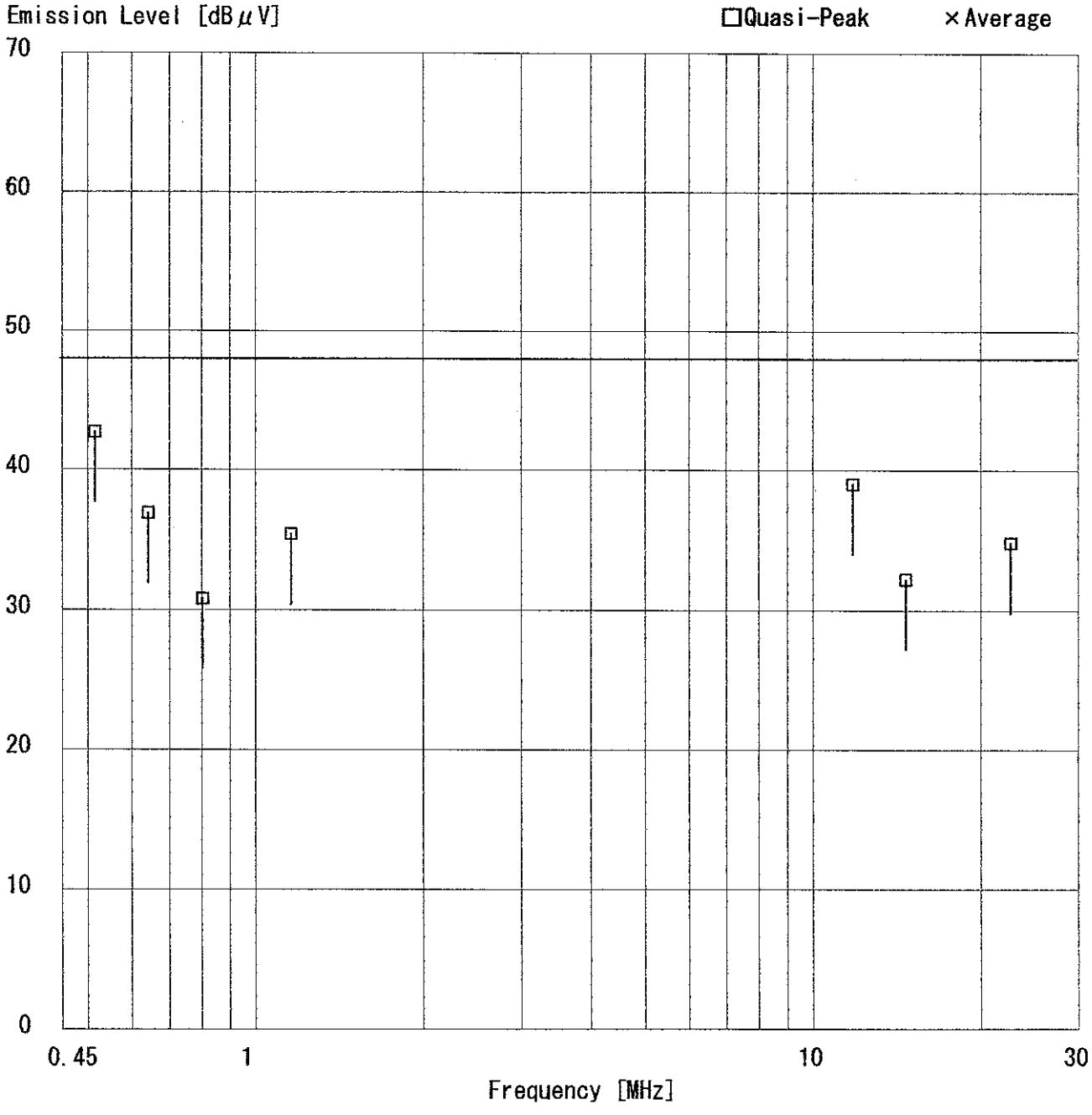
DATA OF CONDUCTION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Shielded Room
Report No.: 22GE0004-YK-2

Applicant	: Advanced Technology and Systems Co., Ltd.
Kind of Equipment	: ArrayMasStor-K Series
Model No.	: AXRR-K616S
Serial No.	: -
Power	: AC120V/60Hz
Mode	: Standby
Remarks	:
Date	: 2/15/2002
Phase	: Single Phase
Temperature	: 26 ℃
Humidity	: 23 %
Regulation	: FCC Part15B §15.107(a)

a. Sato

Engineer : Akira Sato

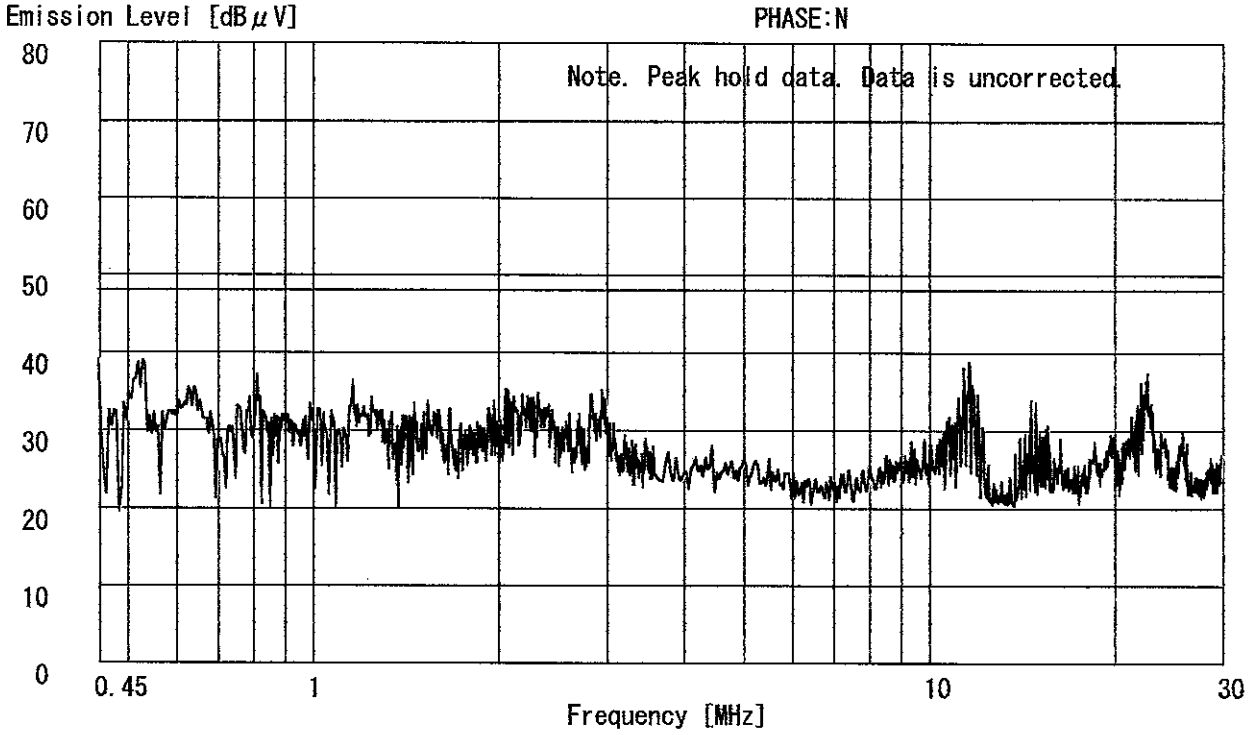


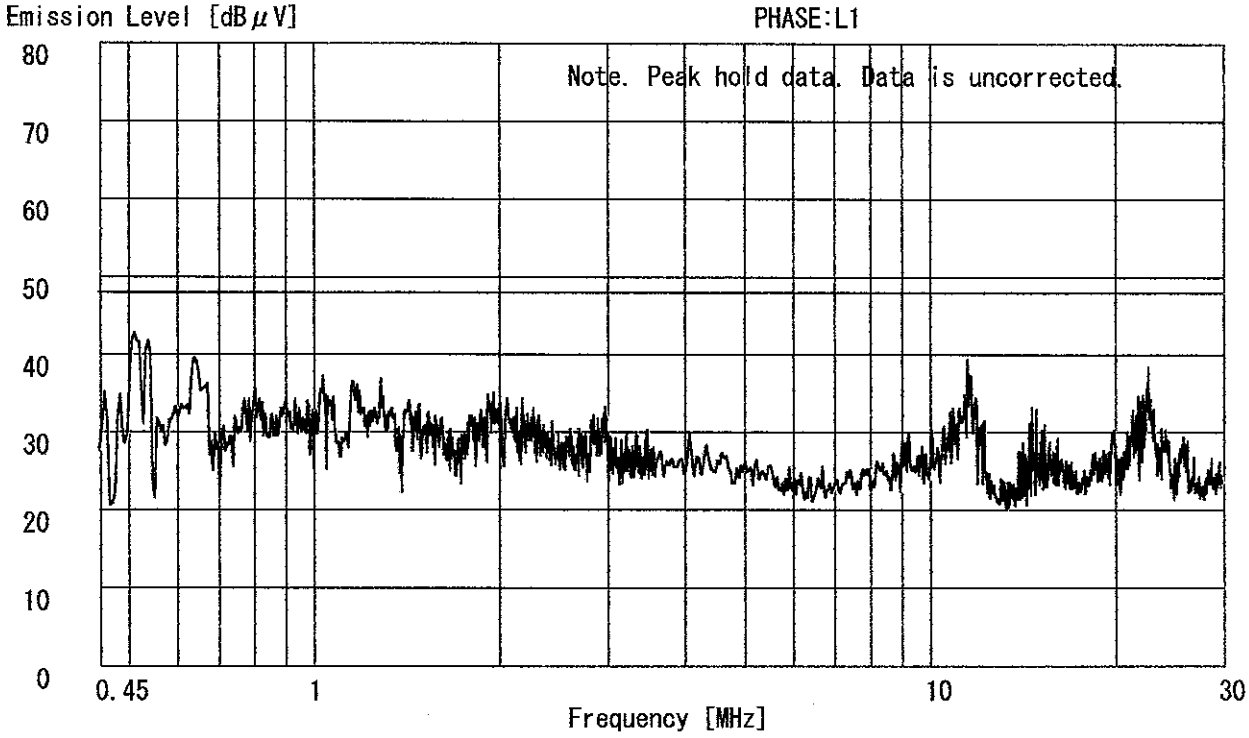
DATA OF CONDUCTION TEST CHART

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Shielded Room
Report No.: 22GE0004-YK-2

Applicant	: Advanced Technology and Systems Co., Ltd.
Kind of Equipment	: ArrayMasStor-K Series
Model No.	: AXRR-K616S
Serial No.	: -
Power	: AC120V/60Hz
Mode	: Standby
Remarks	:
Date	: 2/15/2002
Phase	: Single Phase
Temperature	: 26 ℃
Humidity	: 23 %
Regulation 1	: FCC Part15B §15.107(a)
Regulation 2	: None

A. Sato
Engineer : Akira Sato





DATA OF CONDUCTION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Shielded Room
Report No. : 22GE0004-YK-2

Applicant : Advanced Technology and Systems Co., Ltd.
Kind of Equipment : ArrayMasStor-K Series
Model No. : AXRR-K616S
Serial No. : -
Power : AC120V/60Hz
Mode : Random Read/Write
Remarks :
Date : 2/15/2002
Phase : Single Phase
Temperature : 26 ℃
Humidity : 23 %
Regulation : FCC Part15B §15.107(a)

Engineer : Akira Sato

No.	FREQ. [MHz]	READING(N) QP [dBuV]	READING(N) AV [dBuV]	READING(L1) QP [dBuV]	READING(L1) AV [dBuV]	LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMITS QP [dBuV]	LIMITS AV [dBuV]	MARGIN QP [dB]	MARGIN AV [dB]
1.	0.5265	34.5	-	41.4	-	0.4	0.2	0.0	42.0	-	48.0	0.0	6.0	-
2.	0.6521	32.5	-	36.1	-	0.4	0.2	0.0	36.7	-	48.0	0.0	11.3	-
3.	1.1824	31.6	-	33.9	-	0.3	0.2	0.0	34.4	-	48.0	0.0	13.6	-
4.	1.9554	29.7	-	31.7	-	0.3	0.3	0.0	32.3	-	48.0	0.0	15.7	-
5.	11.5376	31.9	-	31.4	-	0.5	1.1	0.0	33.5	-	48.0	0.0	14.5	-
6.	14.7542	30.2	-	29.9	-	0.5	1.4	0.0	32.1	-	48.0	0.0	15.9	-
7.	22.7848	34.7	-	34.3	-	0.8	1.7	0.0	37.2	-	48.0	0.0	10.8	-

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

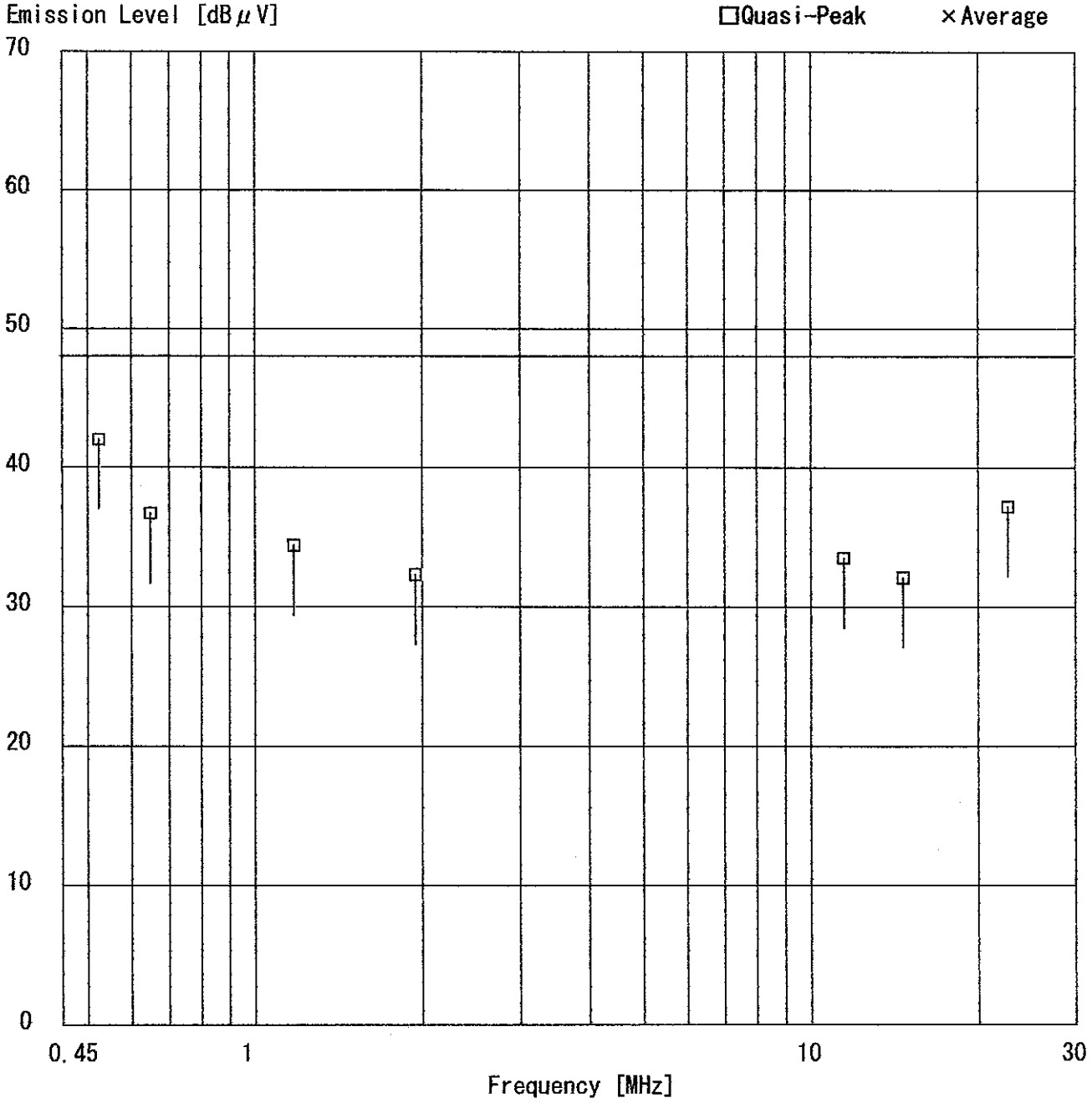
■LISN :KLS-01(NSLK8126) ■COAXIAL CABLE:KCC-14/15/16/18
■PULSE LIMTTER:KPL-01 ■EMI RECEIVER:KTR-02(ESCS30)

DATA OF CONDUCTION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Shielded Room
Report No.: 22GE0004-YK-2

Applicant	: Advanced Technology and Systems Co., Ltd.
Kind of Equipment	: ArrayMasStor-K Series
Model No.	: AXRR-K616S
Serial No.	: -
Power	: AC120V/60Hz
Mode	: Random Read/Write
Remarks	:
Date	: 2/15/2002
Phase	: Single Phase
Temperature	: 26 ℃
Humidity	: 23 %
Regulation	: FCC Part15B §15.107(a)

Engineer : Akira Sato

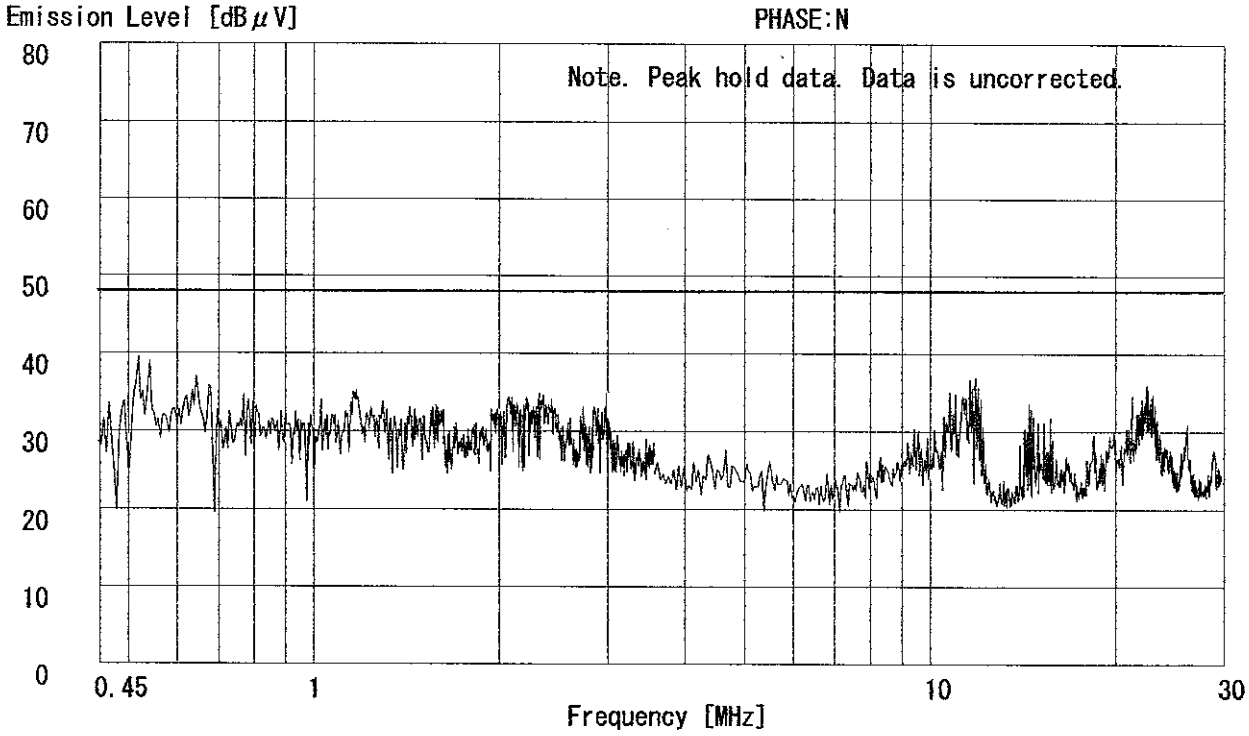


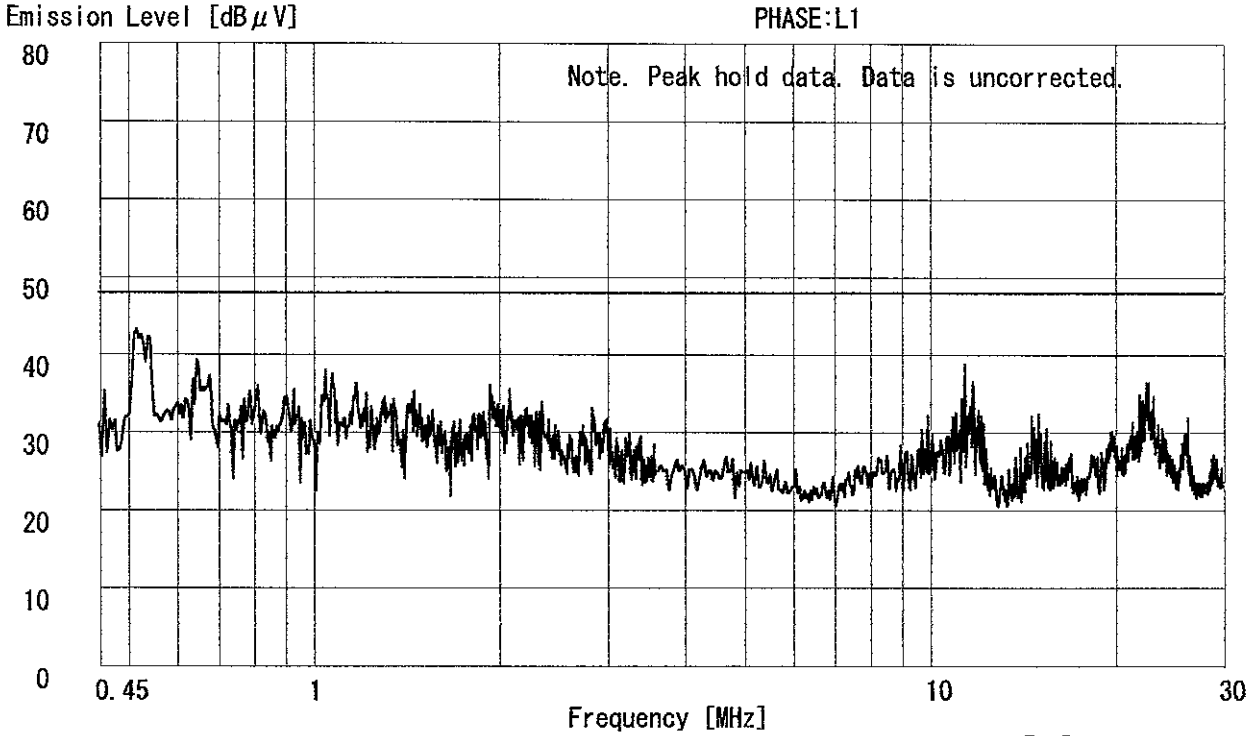
DATA OF CONDUCTION TEST CHART

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Shielded Room
Report No.: 22GE0004-YK-2

Applicant	: Advanced Technology and Systems Co., Ltd.
Kind of Equipment	: ArrayMasStor-K Series
Model No.	: AXRR-K616S
Serial No.	: -
Power	: AC120V/60Hz
Mode	: Random Read/Write
Remarks	:
Date	: 2/15/2002
Phase	: Single Phase
Temperature	: 26 ℃
Humidity	: 23 %
Regulation 1	: FCC Part15B §15.107(a)
Regulation 2	: None

Engineer : Akira Sato





DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Open Test Site
Report No. : 22GE0004-YK-2

Applicant	:	Advanced Technology and Systems Co., Ltd.
Kind of Equipment	:	ArrayMasStor-K Series
Model No.	:	AXRR-K616S
Serial No.	:	-
Power	:	AC120V/60Hz
Mode	:	Random Read/Write
Remarks	:	
Date	:	2/15/2002
Test Distance	:	3 m
Temperature	:	18 ℃
Humidity	:	34 %
Regulation	:	FCC Part15B §15.109(a)

Engineer : Akira Sato

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	40.80	BB	26.4	36.2	14.0	28.5	1.6	6.0	19.5	29.3	40.0	20.5	10.7
2.	79.19	BB	49.1	50.3	6.5	28.4	2.2	6.0	35.4	36.6	40.0	4.6	3.4
3.	133.64	BB	40.4	40.0	13.9	28.5	2.9	6.0	34.7	34.3	43.5	8.8	9.2
4.	198.11	BB	35.3	38.5	16.6	28.2	3.6	6.0	33.3	36.5	43.5	10.2	7.0
5.	200.02	BB	42.8	41.8	16.7	28.2	3.6	6.0	40.9	39.9	43.5	2.6	3.6
6.	200.46	BB	40.4	42.1	16.7	28.2	3.6	6.0	38.5	40.2	43.5	5.0	3.3
7.	295.18	BB	34.3	30.8	20.0	27.8	5.4	6.0	37.9	34.4	46.0	8.1	11.6
8.	323.98	BB	38.3	35.2	15.3	28.0	5.4	6.0	37.0	33.9	46.0	9.0	12.1
9.	467.72	BB	27.3	26.3	17.9	29.1	5.9	6.0	28.0	27.0	46.0	18.0	19.0
10.	500.05	BB	33.2	40.2	18.1	29.2	6.2	6.0	34.3	41.3	46.0	11.7	4.7
11.	601.05	BB	28.5	39.2	19.4	29.4	6.9	6.0	31.4	42.1	46.0	14.6	3.9
12.	725.96	BB	32.3	31.9	21.2	29.3	7.7	6.0	37.9	37.5	46.0	8.1	8.5
13.	901.57	BB	24.3	31.0	22.5	29.6	8.8	6.0	32.0	38.7	46.0	14.0	7.3
14.	960.00	BB	29.2	29.2	23.0	29.5	9.2	6.0	37.9	37.9	46.0	8.1	8.1

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

■ANTENNA:KBA-01(BBA9106)30-299.99MHz/KLA-01(USLP9143)300-1000MHz
■PREAMP:KAF-01(8447D) ■EMI RECEIVER:KTR-02(ESCS30) ■CABLE:KCC-10/11/12/13/18

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
Yamakita No.1 Open Test Site
Report No. : 22GE0004-YK-2

Applicant	:	Advanced Technology and Systems Co., Ltd.
Kind of Equipment	:	ArrayMasStor-K Series
Model No.	:	AXRR-K616S
Serial No.	:	-
Power	:	AC120V/60Hz
Mode	:	Random Read/Write
Remarks	:	
Date	:	2/15/2002
Test Distance	:	3 m
Temperature	:	18 ℃
Humidity	:	34 %
Regulation	:	FCC Part15B §15.109(a)

Engineer : Akira Sato