EMI TEST REPORT

Test Report No. : 26BE0100-HO-2b

Applicant	:	**Oki Data Corporation**
Type of Equipment	:	**Embedded RFID Read/Write System**
Model No.	:	**4336822A**
Test standard	:	**FCC Part 15 Subpart C : 2005 Section 15.209 and 15.207**
FCC ID	:	**B2K-4336822A**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex 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 report are traceable to the national or international standards.

Date of test: October 3 to 4 and November 18, 2005

Tested by: K. Adachi
Kenichi Adachi
EMC Services

Approved by :
Naoki Sakamoto
Group Leader of
EMC Services

UL Apex Co., Ltd.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
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SECTION 1: Client information

Company Name	:	Oki Data Corporation
Address	:	3-1, Futaba-cho, Takasaki-shi, Gunma, 370-8585 Japan
Telephone Number	:	+81-27-328-6183
Facsimile Number	:	+81-27-328-6396
Contact Person	:	Toshikazu Ito

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

2.1 Identification of E.U.T.

Type of Equipment	:	Embedded RFID Read/Write System
Model No.	:	4336822A
Serial No.	:	3 (for Conducted emissions test), 8 (for other tests)
Country of Manufacture	:	Japan
Rating	:	DC 5.0V
Receipt Date of Sample	:	September 30, 2005
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

Oki Data Corporation, Model No: 4336822A is the RFID module.
The clock frequency of EUT is 13.56MHz (ASIC), 105.9375KHz(RFID module).

(Transmitter)

Equipment Type	:	Transmitter
Frequency of operation	:	13.56MHz
Type of modulation	:	ASK
Mode of operation	:	Simplex
Antenna Type	:	Loop coil antenna
Antenna Connector Type	:	PH2 (JST)
Method of Frequency Generation	:	Crystal
Operating voltage (inner)	:	DC 3.3V±0.1V
Operating Temperature	:	+0 deg. C. - +50 deg. C.

(Receiver)

Type of Receiver	:	BPSK Demodulator
Frequency of operation	:	13.56MHz
Intermediate frequency	:	847.5kHz
Method of Frequency Generation	:	Crystal
Operating voltage (inner)	:	DC 3.3V±0.1V
Operating Temperature	:	+0 deg. C. - +50 deg. C.

FCC 15.31 (e)
This EUT provides stable voltage(DC3.3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of Printer. Therefore, the equipment complies with the antenna requirement of Section 15.203.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C : 2005

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.205 Restricted bands of operation
Section 15.209 Radiated emission limits, general requirements.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emissions	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC Section 15.207	Conducted	N/A	11.1dB, AV 0.15042MHz N	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.209	Radiated	N/A	28.9dB 13.55955MHz 90 deg.	Complied
3	Electric Field Strength of Spurious Emissions	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.205 FCC Section 15.209	Radiated	N/A	6.0dB 311.866MHz, 298.307MHz, 230.504MHz Horizontal	Complied
4	-20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.215	Radiated	N/A	N/A	Complied

Note: UL Apex's EMI Work Procedures No.QPM05 and QPM15.

Uncertainty:

*In case of the margin below the EMC Head Office's uncertainty.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test was ±1.3dB.
The data listed in this test report has enough margin, more than the site margin.

Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Loop antenna is ±1.9dB(3m)/ ±1.8dB(10m).
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB(3m)/ ±4.7dB(10m).
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB(3m)/ ±3.8dB(10m).
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±6.6dB.
The data listed in this test report has enough margin, more than the site margin.

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test is ±3.0dB.

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-210(issue 6): 2005	RSS-210(issue 6): 2005	Radiated	N/A	N/A	N/A

3.4 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	846015	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

3.5 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

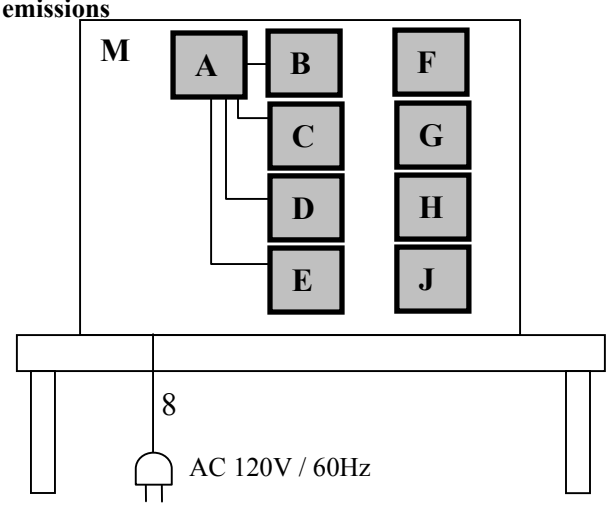
4.1 Operating Modes

The mode is used : Transmitting and Receiving mode (with Tag).

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

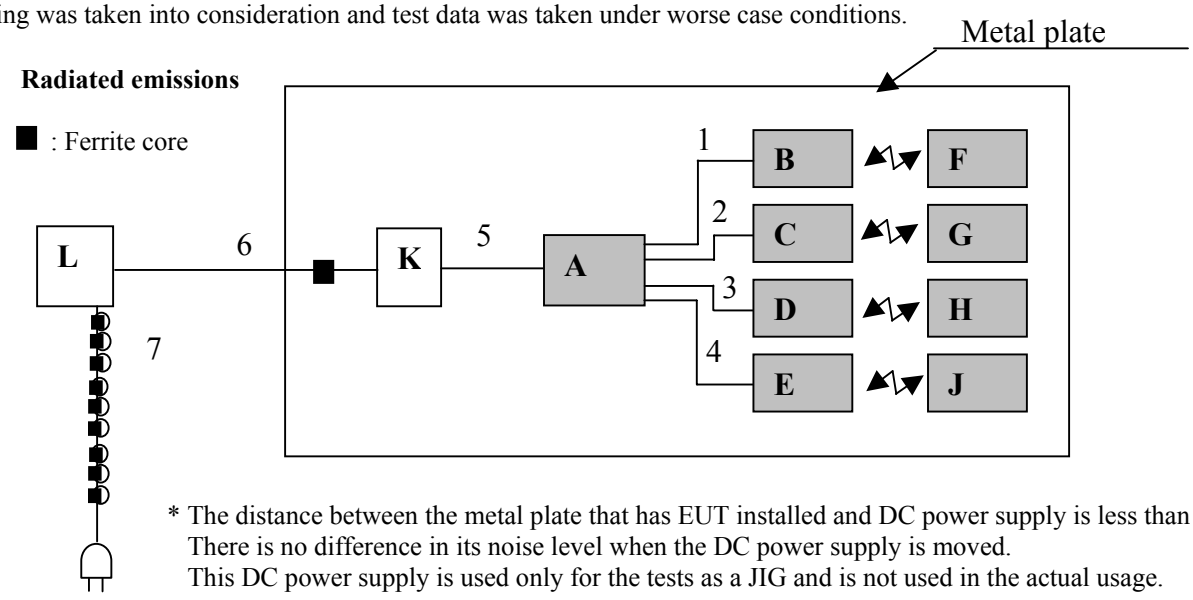
4.2 Configuration and peripherals

4.2.1 Conducted emissions



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

4.2.2 Radiated emissions



* The distance between the metal plate that has EUT installed and DC power supply is less than 10cm.
There is no difference in its noise level when the DC power supply is moved.
This DC power supply is used only for the tests as a JIG and is not used in the actual usage.

* 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	RFID module	4336822A	3 (for Conducted Emissions), 8 (for other tests)	Oki Data Corporation	B2K-4336822A
B	Antenna unit	-	-	Oki Data Corporation	B2K-4336822A
C	Antenna unit	-	-	Oki Data Corporation	B2K-4336822A
D	Antenna unit	-	-	Oki Data Corporation	B2K-4336822A
E	Antenna unit	-	-	Oki Data Corporation	B2K-4336822A
F	Tag	-	-	Oki Data Corporation	B2K-4336822A
G	Tag	-	-	Oki Data Corporation	B2K-4336822A
H	Tag	-	-	Oki Data Corporation	B2K-4336822A
J	Tag	-	-	Oki Data Corporation	B2K-4336822A
K	Micro-Computer for test	-	-	Oki Data Corporation	-
L	DC power supply	DMS35-1.5	1036277	METRONIX	-
M	Printer	N34112A	16	Oki Data Corporation	-

List of cables used

No.	Name	Length (m)	Shield
1	Antenna cable	0.1	N
2	Antenna cable	0.1	N
3	Antenna cable	0.1	N
4	Antenna cable	0.1	N
5	Signal cable	0.5	N
6	DC cable	0.2	N
7	AC cable	1.5	N
8	AC cable	1.8	N

SECTION 5: Conducted Emissions

5.1 Test Procedure and conditions

EUT was placed on a platform of nominal size, 0.5m by 1.0m, 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.
EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN /(AMN) to the input power source. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

Detector : CISPR quasi-peak and average detector (IF BW 9 kHz)
Measurement range : 0.15-30MHz
Test data : APPENDIX 3
Test result : Pass

SECTION 6: Radiated emissions (Fundamental and Spurious Emissions and Bandwidth)

6.1 Operating environment

Test place : No.1 semi Anechoic Chamber
Temperature : See data
Humidity : See data

6.2 Test Procedure

The Radiated Electric Field Strength intensity has been measured on No.1 semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency : From 9kHz to 30MHz at distance 3m
The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for each antenna angle 0deg. , 45deg. and 90deg.

Frequency : From 30MHz to 1GHz at distance 3m
The measuring antenna height was varied between 1 and 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.

Measurements were performed with a QP, PK, and AV detector.
The radiated emission measurements were made with the following detector function of the test receiver.

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

*The test was made on EUT in the normal use position.

* Part 15 Section 15.31 (f)(2) (9kHz-30MHz)
9kHz – 490kHz [Limit at 3m]=[Limit at 300m]-40log (3[m]/300[m])
490kHz – 30MHz[Limit at 3m]=[Limit at 30m]-40log (3[m]/30[m])

6.3 Test result

Summary of the test results : Pass

Date : October 3 to 4, 2005 Test engineer : Kenichi Adachi

APPENDIX 1: Photographs of test setup

Conducted emissions

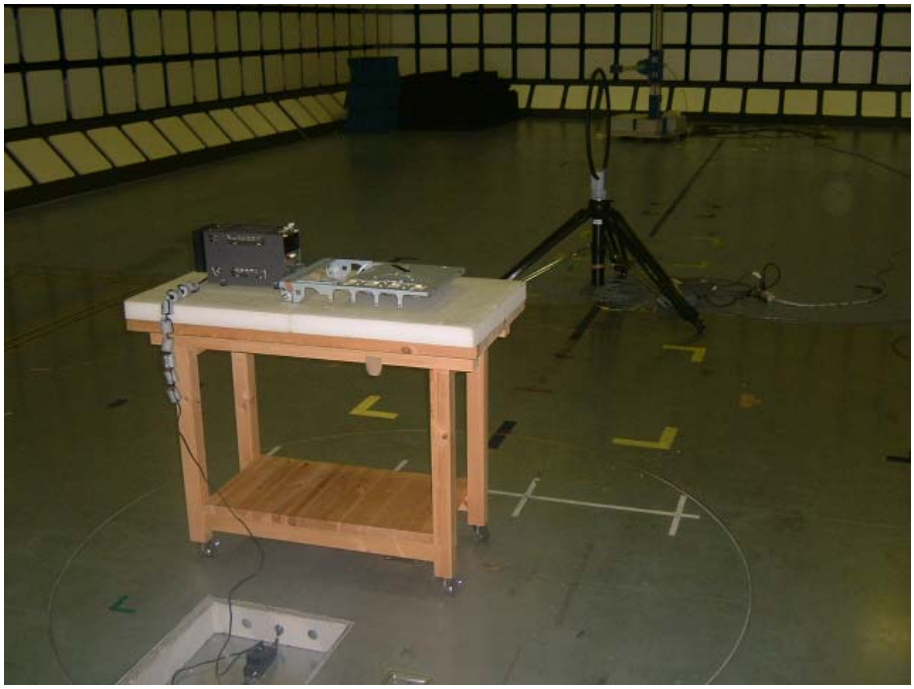
Front

Rear

Radiated emissions

Front

Rear



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE / CE / ME	2004/11/13 * 12, 2005/11/12 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE / CE / ME	2004/11/12 * 12, 2005/11/10 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/Agilent/TSJ	-	RE	2004/12/19 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2005/05/24 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2004/12/16 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2004/10/14 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2004/10/14 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agilent/TSJ	-	CE / ME	2004/12/24 * 12
MLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	CE (EUT)	2005/11/09 * 12
MPL-01	Pulse Limiter	Rohde & Schwarz	ESH3Z2	CE	2005/01/11 * 12
MCC-31	coaxial cable	ULApex	-	ME	2005/06/02 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	ME	2004/12/10 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

CE: Conducted emission,
RE: Radiated emission,
ME: Magnetic radiated emission

APPENDIX 3: Data of EMI test

Conducted emissions

DATA OF CONDUCTED EMISSION TEST

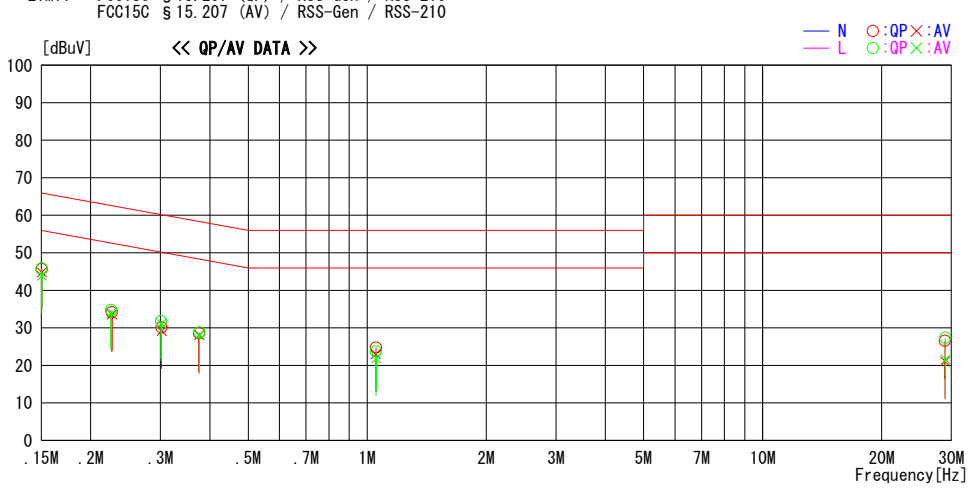
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2005/11/18 19:38:09

Applicant : Oki Data Corporation
Kind of EUT : Embedded RFID Reader/Writer System
Model No. : 4336822A (Printer: N34112A)
Serial No. : No.3 (Printer: 16)

Report No. : 26BE0100-HO
Power : AC120V / 60Hz
Temp./Humi. : 22deg.C / 33%
Operator : Kenichi Adachi

Mode / Remarks : Transmitting and Receiving mode

LIMIT : FCC15C §15.207 (QP) / RSS-Gen / RSS-210
FCC15C §15.207 (AV) / RSS-Gen / RSS-210



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV	Factor	QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.15042	35.6	34.9	10.0	45.6	44.9	66.0	56.0	20.4	11.1	N
0.22627	24.0	23.4	10.2	34.2	33.6	62.6	52.6	28.4	19.0	N
0.30199	20.0	19.1	10.1	30.1	29.2	60.2	50.2	30.1	21.0	N
0.37567	18.6	18.0	10.0	28.6	28.0	58.4	48.4	29.8	20.4	N
1.05206	14.6	12.8	10.2	24.8	23.0	56.0	46.0	31.2	23.0	N
28.89285	13.9	8.4	12.7	26.6	21.1	60.0	50.0	33.4	28.9	N
0.15040	35.9	33.9	10.0	45.9	43.9	66.0	56.0	20.1	12.1	L
0.22531	24.6	23.8	10.2	34.8	34.0	62.6	52.6	27.8	18.6	L
0.30122	21.7	21.1	10.1	31.8	31.2	60.2	50.2	28.4	19.0	L
0.37638	18.8	18.1	10.0	28.8	28.1	58.4	48.4	29.6	20.3	L
1.05331	13.6	11.7	10.2	23.8	21.9	56.0	46.0	32.2	24.1	L
28.95187	14.7	8.9	12.7	27.4	21.6	60.0	50.0	32.6	28.4	L

CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

Radiated emissions (Fundamental and Spurious emissions : below 30MHz)

DATA OF MAGNETIC RADIATED EMISSION TEST

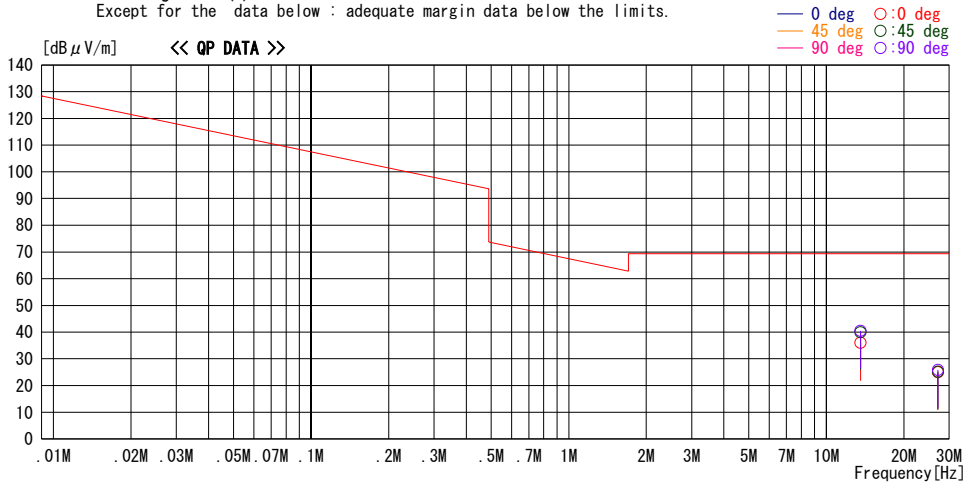
UL Apex Co.,LTD. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2005/10/04 11:08:23

Applicant : Oki Data Corporation
Kind of EUT : Embedded RFID Read/Write System
Model No. : 4336822A
Serial No. : 8

Report No. : 26BE0100-HO
Power : DC 5.0V
Temp./ Humi. : 24deg.C / 59%
Operator : Kenichi Adachi

Mode / Remarks : Transmitting and Receiving mode

LIMIT : FCC15C §15.209(a) 3m
Except for the data below : adequate margin data below the limits.



Freq. [MHz]	Reading [dBuV]	DET	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna	Table [deg]
13.55955	42.4	QP	20.0	1.5	27.9	36.0	69.4	33.4	0deg	175
13.55955	46.4	QP	20.0	1.5	27.9	40.0	69.4	29.4	45deg	359
13.55955	46.9	QP	20.0	1.5	27.9	40.5	69.4	28.9	90deg	37
27.12000	31.0	QP	19.9	2.1	28.0	25.0	69.4	44.4	0deg	273
27.11919	31.2	QP	19.9	2.1	28.0	25.2	69.4	44.2	45deg	5
27.11952	31.9	QP	19.9	2.1	28.0	25.9	69.4	43.5	90deg	42

CHART : WITH FACTOR ANT TYPE : LOOP
CALCULATION : READING + ANT FACTOR + LOSS(CABLE + ATTEN.-AMP.)

Page:

Radiated emissions (Spurious emissions : above 30MHz)

DATA OF RADIATED EMISSION TEST

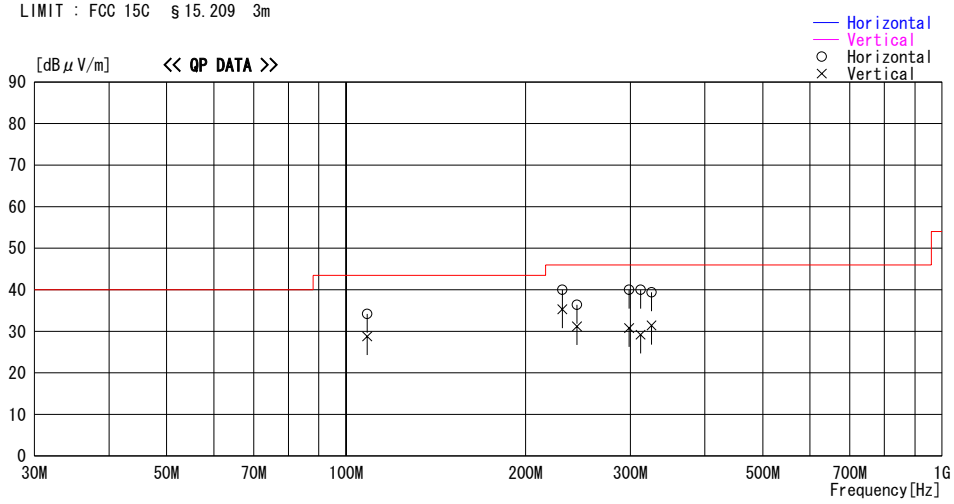
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2005/10/03 14:16:14

Applicant : Oki Data Corporation
Kind of EUT : Embedded RFID Read/Write System
Model No. : 4336822A
Serial No. : 8

Report No. : 26BE0100-HO
Power : DC 5.0V
Temp./Humi. : 26deg.C / 60%
Operator : Kenichi Adachi

Mode / Remarks : Transmitting and Receiving mode

LIMIT : FCC 15C §15.209 3m



Frequency [MHz]	Reading [dBuV]	DET	Antenna Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]
108.467	42.3	QP	11.4	-19.5	34.2	175	301	Hori.	43.5	9.3
108.470	36.9	QP	11.4	-19.5	28.8	78	100	Vert.	43.5	14.7
230.504	40.4	QP	17.3	-17.7	40.0	204	139	Hori.	46.0	6.0
230.512	35.7	QP	17.3	-17.7	35.3	285	100	Vert.	46.0	10.7
244.066	36.5	QP	17.4	-17.5	36.4	203	146	Hori.	46.0	9.6
244.060	31.3	QP	17.4	-17.5	31.2	275	100	Vert.	46.0	14.8
298.307	36.8	QP	20.4	-17.2	40.0	187	127	Hori.	46.0	6.0
298.314	27.6	QP	20.4	-17.2	30.8	242	136	Vert.	46.0	15.2
311.868	31.2	QP	15.1	-17.1	29.2	269	240	Vert.	46.0	16.8
311.866	42.0	QP	15.1	-17.1	40.0	201	100	Hori.	46.0	6.0
325.426	32.8	QP	15.6	-17.0	31.4	266	244	Vert.	46.0	14.6
325.433	40.8	QP	15.6	-17.0	39.4	176	100	Hori.	46.0	6.6

CHART:WITH FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - GAIN(AMP)
Except for the data below : adequate margin data below the limits.

–20dB Bandwidth and 99% Occpied Bandwidth

UL Apex Co., Ltd.
No.1 Semi Anechoic Chamber

COMPANY	:	Oki Data Corporation	REPORT NO	:	26BE0100-HO
EQUIPMENT	:	Embedded RFID Read/Write System	REGULATION	:	FCC 15.215 (c) / RSS-Gen 4.4.1
MODEL	:	4336822A	TEST DISTANCE	:	3m
S/ N	:	8	DATE	:	10/04/2005
POWER	:	DC 5V	TEMPERATURE	:	24 deg. C
MODE	:	Transmitting	HUMIDITY	:	59%
			ENGINEER	:	Kenichi Adachi

FREQ [MHz]	-20dB Bandwidth [kHz]
13.56	6.98

FREQ [MHz]	99% Occpied Bandwidth [kHz]
13.56	7.92