

EMI TEST REPORT

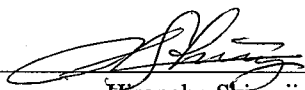
Test Report No. : 23FE0038-HO-3

Applicant : TOHOKU ALPS CO., LTD.
Type of Equipment : Keyless Entry System (Receiver)
Model No. : 88035AG03A
Test standard : FCC Part 15 Subpart B Class B
FCC ID : NHVWD1U711
Test Result : Complied

1. This test report shall not be reproduced in full or partial, 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 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 : March 13, 2003

Tested by : 
Yoshiaki Iwasa
EMC Head Office Division

Approved by : 
Hironobu Shimoji
Group Leader of EMC Head Office Division

A-Pex International Co., Ltd.

EMC Head Office Division.

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SECTION 1: Client information

Company name : TOHOKU ALPS CO., LTD.
Brand name : ALPS
Address : 6-3-36, NAKAZATO, FURUKAWA-CITY, MIYAGI-PREF., 989-6143 JAPAN
Telephone Number : +81-229-23-5111
Facsimile Number : +81-229-22-3755
Contact Person : Akira Miyazawa

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

2.1 Identification of E.U.T.

Type of Equipment : Keyless Entry System (Receiver)
Model No. : 88035AG03A
Serial No. : 1
Rating : DC 12V
Country of Manufacture : Mexico
Receipt Date of Sample : March 13, 2003
Condition of EUT : Production prototype

2.2 Product Description

TOHOKU ALPS CO., LTD. Model: 88035AG03A (referred to as the EUT in this report) is the Keyless Entry System (Receiver).

Frequency Operation : 433.92MHz
Local Oscillator Frequency : 423.22MHz
Intermediate Frequency : 10.7MHz
Type of Modulation : Amplitude Modulation
Mode of operation : Simplex
Antenna Type : Inner Antenna

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Method of Frequency Generation : Crystal

Operating voltage : 9V-16V

Operating Temperature Range : -30 degree C. to +80 degree C.

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SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B
Title : FCC 47CFR Part15 Radio Frequency Device
Subpart B Unintentional Radiators

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2001	Class B	Excluded *1)	N/A	N/A
2	Radiated emission	ANSI C63.4:2001	Class B	N/A	13.6dB 248.905MHz Vertical	Complied

*1) The test is not applicable since the EUT does not have AC Mains.

3.3 Confirmation

A-Pex International Co., Ltd. hereby confirms that E.U.T. , in the configuration tested, complies with the specifications FCC Part15 Subpart B.

3.4 Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.5 dB.

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

☐ 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.

3.5 Test Location

A-Pex International Co., Ltd. EMC Head Office Division, No. 1 semi anechoic chamber, 19.2 x 11.2 x 7.7 m
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This site has been fully described in a report submitted to FCC office, and listed on February 01, 2002

(Registration number: 313583)

Industry Canada: IC4247

*NVLAP Lab. Code:200572-0

3.6 Test setup, Data of EMI and Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating Modes

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

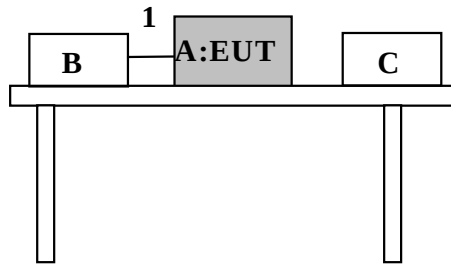
The operating mode/system was as follows:

Operation mode : Continuous Receiving of conventional ASK Signal from keyless transmitter.

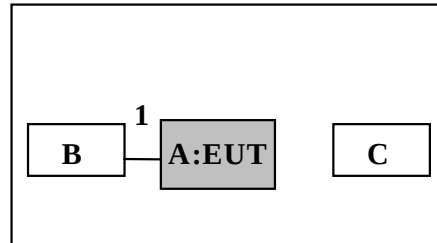
Justification : The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Front View



Top view



* Test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Keyless Entry System (Receiver)	88035AG03A	1	TOHOKU ALPS CO., LTD.	NHVWD1U711
B	Battery	B19L	161001C	Panasonic	-
C	Keyless Entry System (Transmitter)	88036AG000	1	TOHOKU ALPS CO., LTD.	NHVWB1U711

List of cable used

No.	Item	Length(m)	Shield	Backshell Material
1	DC Power Cable	0.8	N	Polyvinyl chloride

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SECTION 5: Radiated emission

5.1 Operating environment

The test was carried out in No.1 semi anechoic chamber, 19.2 x 11.2 x 7.7 m.

Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

The EUT was set on the center of the tabletop.

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.

5.3 Test conditions

Frequency range : 30MHz-1000MHz
Test distance : 3m
EUT position : Tabletop
EUT operation mode : Receiving

5.4 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.

Measurements were performed with a 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 radiated emission measurements were made with the following detector function of the test receiver.

Detector Type : Quasi-peak
IF Bandwidth : 120kHz

-The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise level was recorded.

5.5 Results

Summary of the test results: Pass

Date: March 13, 2003

Tested by: Yoshiaki Iwasa

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APPENDIX 1: Photographs of test setup

Page 9 : Radiated emission

APPENDIX 2: Test instruments

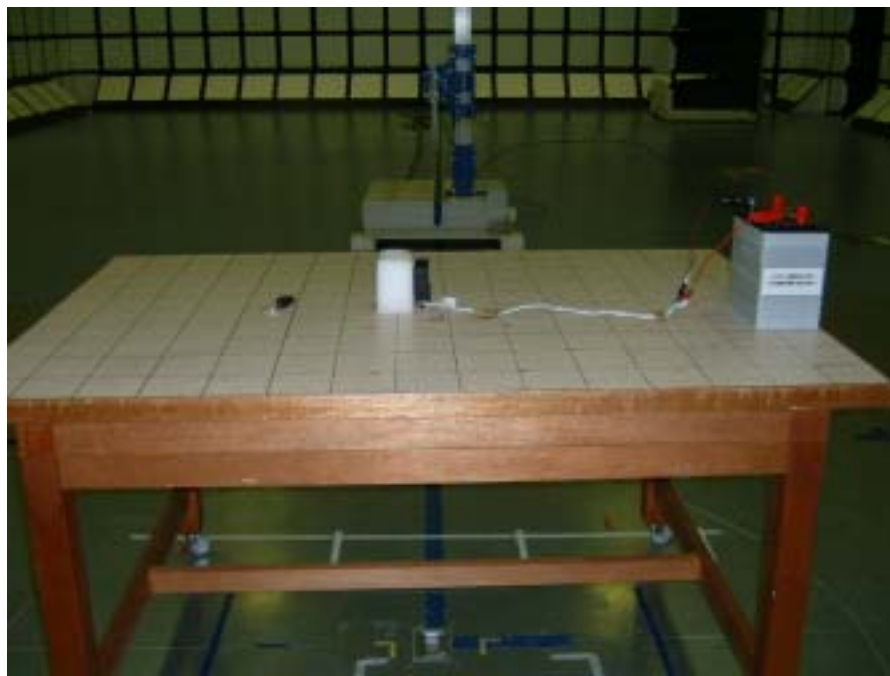
Page 10 : Test instruments

APPENDIX 3: Data of EMI test

Page 11-14 : Radiated Emission

APPENDIX 1: Photographs of test setup

Radiated emission (Worst case position)



Test Report No : 23FE0038-HO-3

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	2002/12/28 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2002/12/24 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2002/10/16 * 12
MCC-01	Coaxial Cable	Suhner/storm/Agilent/TS J	-	RE	2002/12/19 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2002/10/16 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2002/12/26 * 12
MSA-02	Spectrum Analyzer	Advantest	R3265A	RE	2002/09/20 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2003/01/31 * 12

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

Test Item:

RE: Radiated emission,

DATA OF RADIATED EMISSION TEST

A-Pex International EMC HEAD OFFICE DIVISION No.1 SEMI ANECHOIC CHAMBER
Date : 2003/03/13 17:38:13

Applicant : TOHOKU ALPS CO.,LTD.
Kind of EUT : Keyless Entry System (Receiver)
Model No. : 88035AG03A
Serial No. : 1

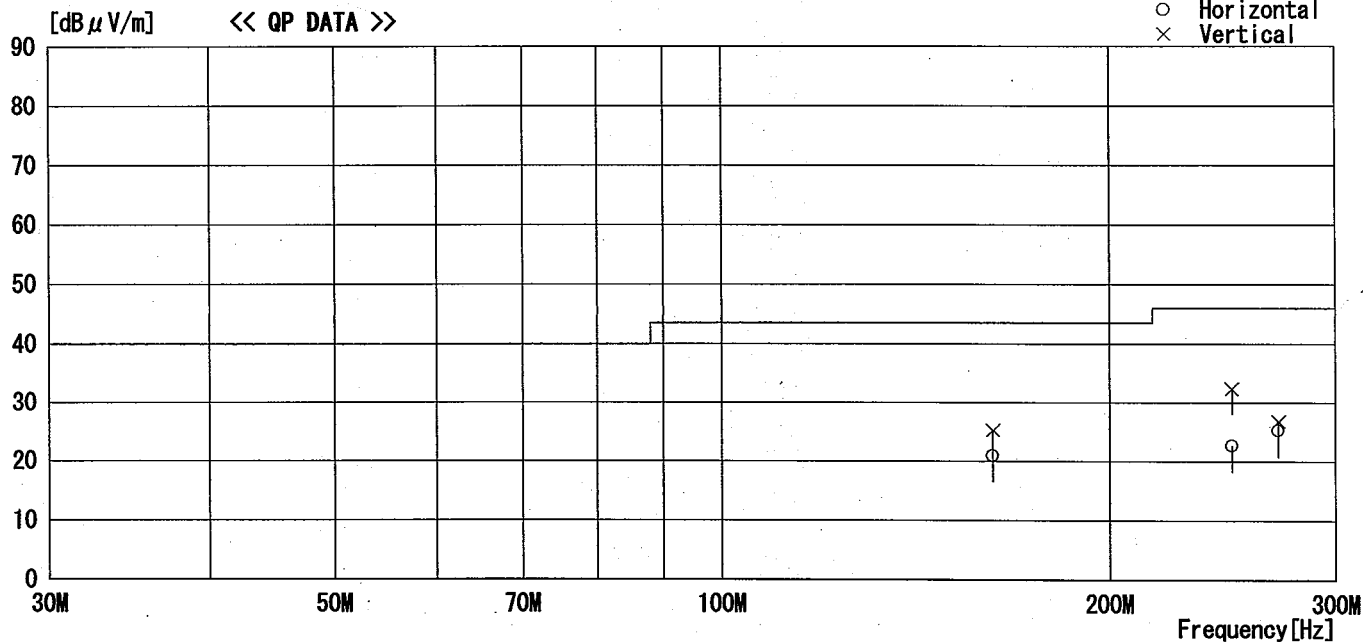
Report No. : 23FE0038-H0 - 3
Power : DC 12V
Temp°C/Humi% : 24 / 30
Operator : Yoshiaki Iwasa

Mode / Remarks : Receive Mode, FCC ID:NHVWD1U711, IC Number:3495A-WD1U711

LIMIT : FCC Part15 Class B(3m)/USA

Except for the data below : adequate margin data below the limits.

— Horizontal
— Vertical
○ Horizontal
× Vertical



No.	FREQ [MHz]	READING QP [dB μ V]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dB μ V/m]	LIMIT [dB μ V/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
Horizontal										
1	162.375	21.0	14.9	8.7	23.7	20.9	43.5	22.6	400	0
2	248.905	19.7	16.9	9.5	23.5	22.6	46.0	23.4	400	0
3	270.627	21.0	18.1	9.6	23.5	25.2	46.0	20.8	268	0
Vertical										
4	162.375	25.3	14.9	8.7	23.7	25.2	43.5	18.3	100	0
5	248.905	29.5	16.9	9.5	23.5	32.4	46.0	13.6	100	0
6	270.627	22.5	18.1	9.6	23.5	26.7	46.0	19.3	100	0

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - AMP. GAIN

Page:

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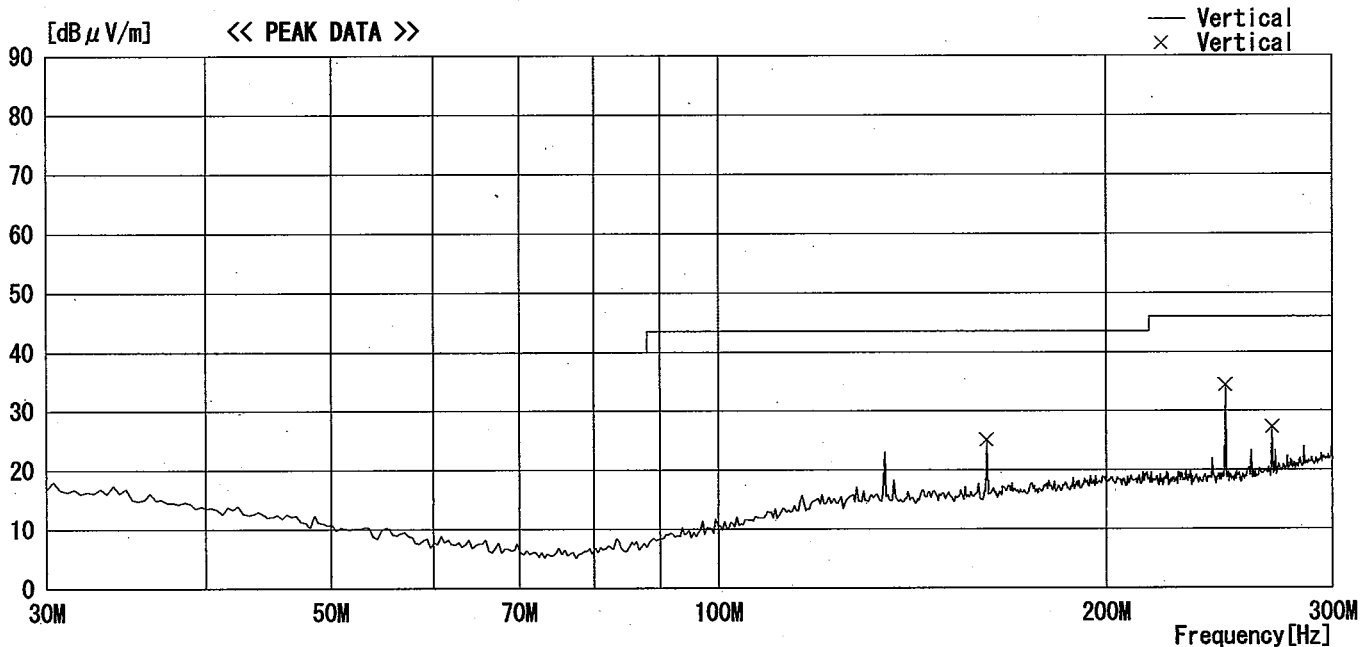
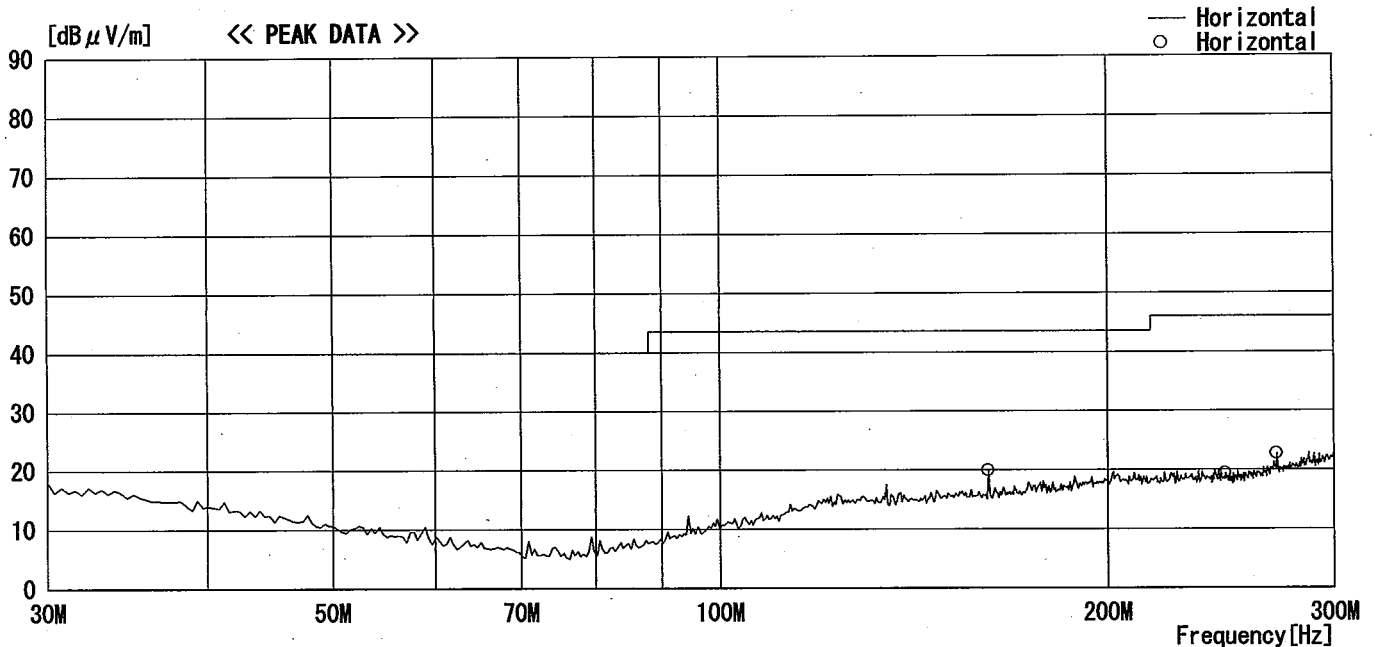


CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - AMP. GAIN

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DATA OF RADIATED EMISSION TEST

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Date : 2003/03/13 18:23:40

Applicant : TOHOKU ALPS CO.,LTD.
Kind of EUT : Keyless Entry System (Receiver)
Model No. : 88035AG03A
Serial No. : 1

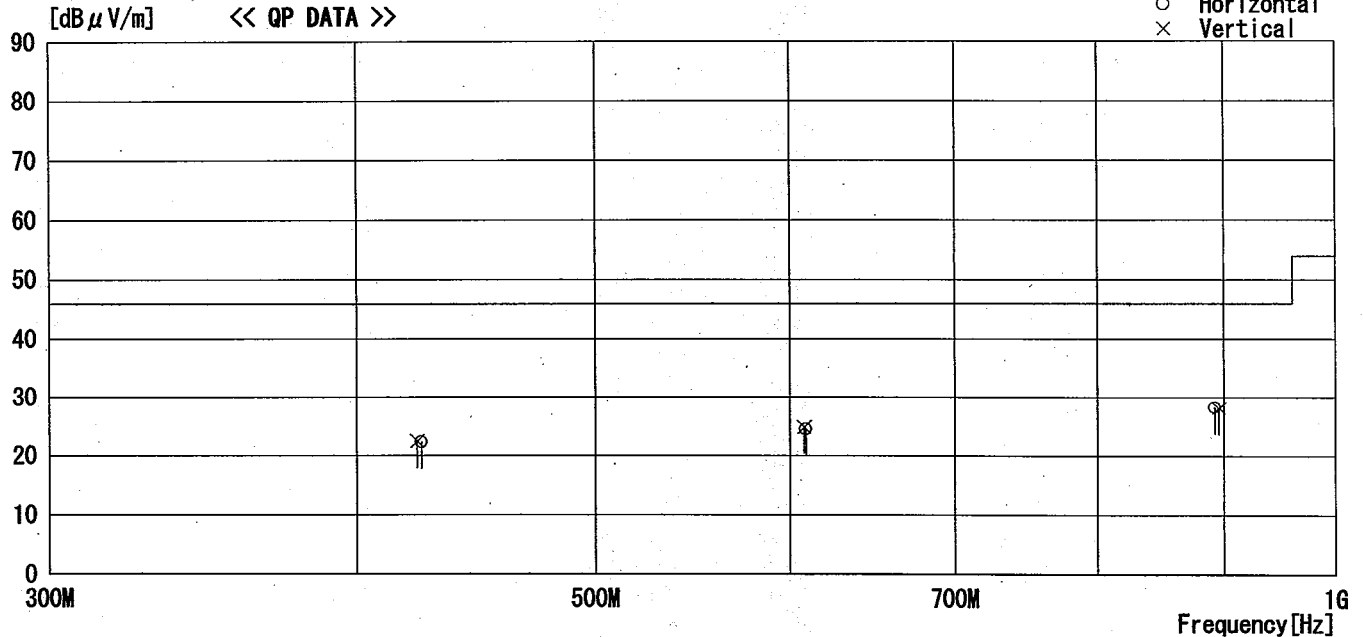
Report No. : 23FE0038-H0 - 3
Power : DC 12V
Temp°C/Humi% : 24 / 30
Operator : Yoshiaki Iwasa

Mode / Remarks : Receive Mode, FCC ID:NHVWD1U711, IC Number:3495A-WD1U711

LIMIT : FCC Part15 Class B(3m)/USA

Except for the data below : adequate margin data below the limits.

— Horizontal
— Vertical
○ Horizontal
× Vertical



No.	FREQ [MHz]	READING QP [dB μ V]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dB μ V/m]	LIMIT [dB μ V/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
— Horizontal —										
1	425.000	17.1	18.0	10.6	23.4	22.3	46.0	23.7	100	0
2	609.000	16.6	19.7	11.5	23.4	24.4	46.0	21.6	100	0
3	893.000	16.5	22.4	12.8	23.5	28.2	46.0	17.8	100	0
— Vertical —										
4	423.220	17.2	18.0	10.6	23.4	22.4	46.0	23.6	100	0
5	608.000	17.0	19.7	11.5	23.4	24.8	46.0	21.2	100	0
6	896.000	16.4	22.4	12.8	23.5	28.1	46.0	17.9	100	0

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - AMP. GAIN

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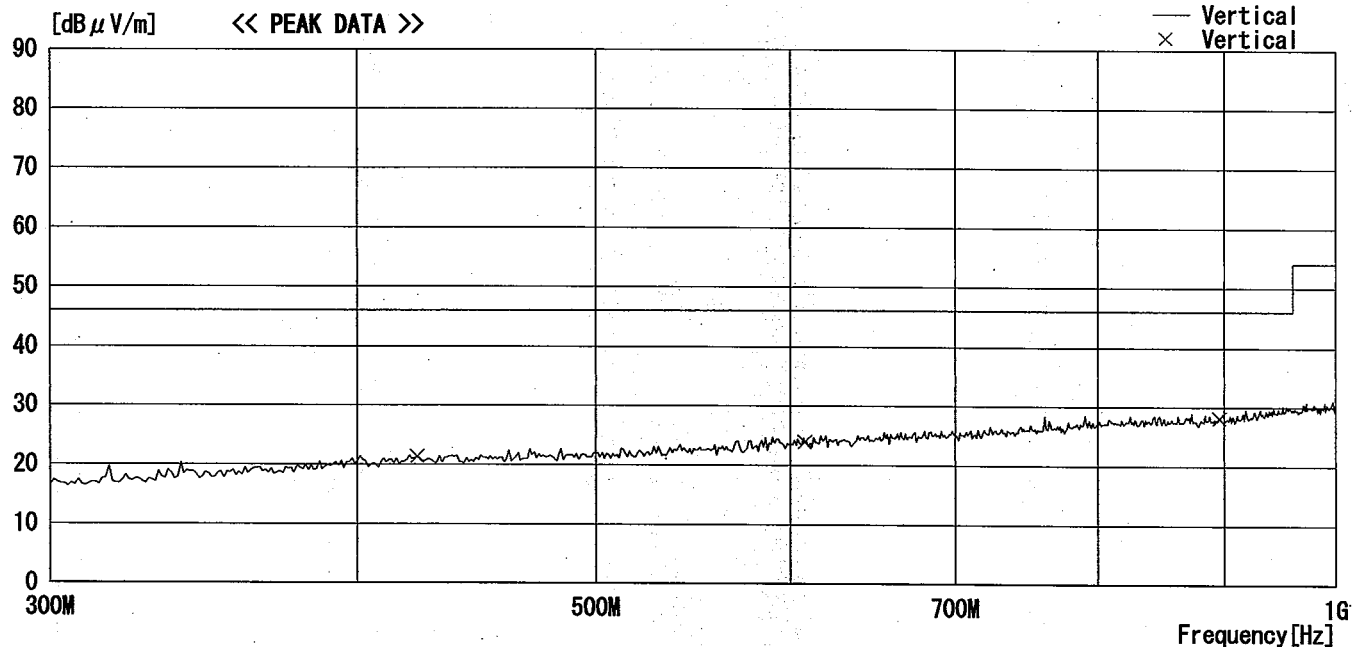
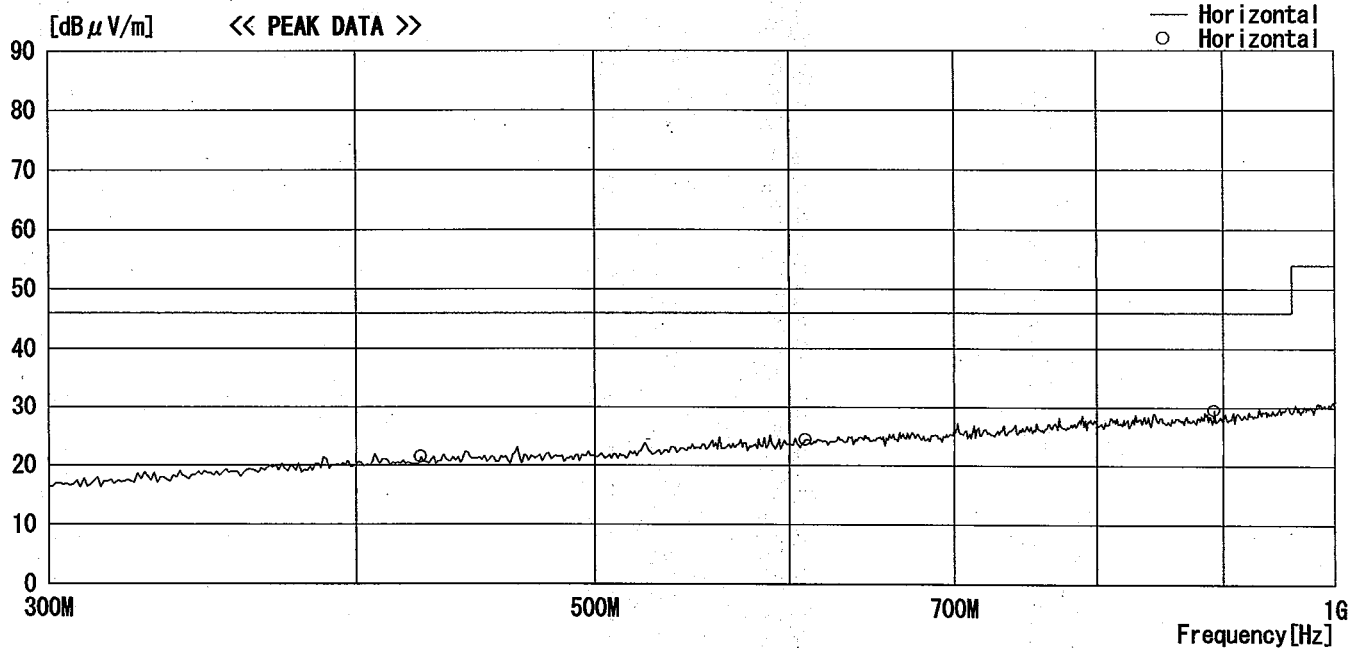


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CALCULATION : READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - AMP. GAIN