EMI TEST REPORT

Test Report No. : 24IE0270-HO

Applicant	:	**YAMAHA MOTOR CO., LTD.**
Type of Equipment	:	**CLi ID READER BOARD**
Model No.	:	**KGR-M4452-011 /KGR-M4452-111**
Test standard	:	**FCC Part 15 Subpart C : 2004 Section 15.207 and 15.225**
FCC ID	:	**SBBKGR-M4452-011**
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: June 7 and 9, 2004

Tested by: Hiroka Umeyama
EMC Service

Approved by : Naoki Sakamoto
Group Leader of
EMC Service

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

CONTENTS **PAGE**

SECTION 1: Client information

Company Name	:	YAMAHA MOTOR CO., LTD.
Brand or Trade name	:	YAMAHA
Address	:	882 Soude, Hamamatsu, Shizuoka, 435-0054 Japan
Telephone Number	:	+81-53-460-6116
Facsimile Number	:	+81-53-460-6147
Contact Person	:	Yasuhiro Suzuki

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

2.1 Identification of E.U.T.

Type of Equipment	:	CLi ID READER BOARD
Model No.	:	KGR-M4452-011
Serial No.	:	1) 450292 Except for Frequency Tolerance and Spurious Emission(above 30MHz) Test 2) 450283 for Frequency Tolerance and Spurious Emission(above 30MHz) Test
Rating	:	DC 5.0V/0.3A
Country of Manufacture	:	Japan
Receipt Date of Sample	:	June 7, 2004
Condition of EUT	:	Production model

2.2 Product Description

Model No: KGR-M4452-011is the CLi ID READER BOARD.
The clock frequency of EUT is 6.0MHz (CPU) and 13.56MHz (RFID ASIC).

Equipment Type	:	Transceiver
Frequency band	:	13.553-13.567 MHz
Frequency of Operation	:	13.56 MHz
Type of modulation	:	EUT to TAG: 100% ASK
Power control	:	No
Mode of operation	:	Simplex
Antenna Type	:	Loop
Method of Frequency Generation	:	Crystal
Operating voltage	:	DC 5.0V
Operating Temperature	:	0 deg. C. to +40 deg. C.

*Series model: KGR-M4452-111
Model No.:KGR-M4452-011 has ten antennas that are all identical antennas.
Model No.:KGR-M4452-111 has eight antennas that are all identical antennas.
Each model differs from the number of antennas, and its antenna characteristics is all the same.
Moreover, not more than two antennas do not radiate at the same time, and one antenna at a time radiates in this EUT.
The test was made with the KGR-M4452-011 which is a represented model.

FCC 15.31 (e)
This EUT provides stable voltage(DC5.0V) 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 the EUT. 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 : 2004

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.225 : Operation within the band 13.110-14.010MHz

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A	*See the worst margins(marked as shading) in the data sheet in APPENDIX 3	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(a)	Radiated	N/A		Complied
3	Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(b)(c)	Radiated	N/A		Complied
4	-20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.215(c)	Radiated	N/A		Complied
5	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.209, Section 15.225 (d)	Radiated	N/A		Complied
6	Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.225(e)	Radiated	N/A		Complied

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

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 is ±1.3dB.

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.

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	RSS210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004	RSS210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004	Radiated	N/A	N/A	Complied

3.4 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart C: 2004 Section 15.225.

3.5 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

	Listed date (for FCC)	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	February 01, 2002	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	June 05, 2002	846015	IC4247-2	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.

3.6 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 EUT was operated in a manner similar to typical use during the tests.

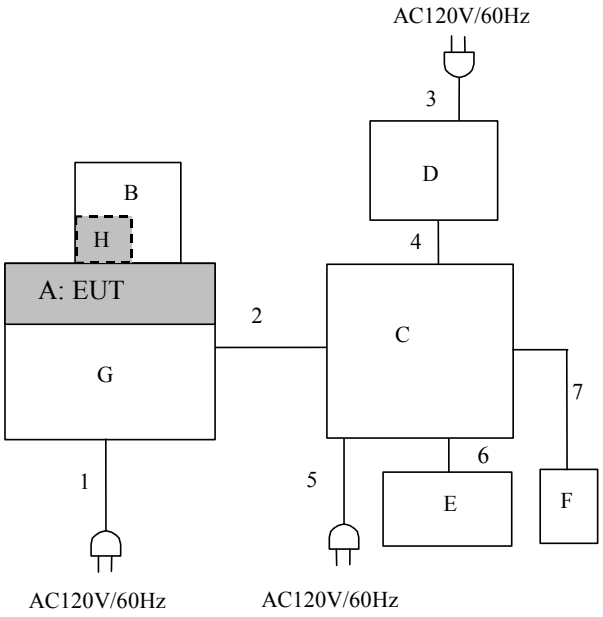
The mode is used : Communication mode (Transmitting) With Tag (With CLi Feeder)
/ Without Tag (Without CLi Feeder)

*Ten antennas (No.1 to No.10) that are all identical ones are installed on this EUT.
Not more than two antennas do not radiate at the same time, and one antenna at a time radiates in this EUT, The test was made with No.1 antenna in Transmitting mode since there are no differences in antenna characteristics in all ten antennas.

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

Temperature for the extreme tests : -20 deg.C.(minimum) to + 50deg.C.(maximum)
Voltage for the extreme tests : DC 5.0V
*This EUT provides stable voltage(DC5.0V) constantly to RF Module regardless of input voltage.

4.2 Configuration and peripherals



* 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	Remarks
A	CLi ID READER BOARD	KGK-M4452-011	450292 *1 450283 *2	YAMAHA	SBBKGR-M4452-011	EUT
B	CLi Feeder	-	-	YAMAHA	-	-
C	Personal Computer	OptiPlex GX60	-	DELL	-	-
D	Monitor	E152FPb	-	DELL	-	-
E	KeyBoard	OptiPlex GX60	-	DELL	-	-
F	Mouse	OptiPlex GX60	-	DELL	-	-
G	Test Box	-	-	YAMAHA	-	-
H	Tag	ME-Y1D1-PDN(WT)YMC	-	Hitachi Maxell	SBBKGR-M4452-011	EUT

*1:Except for Frequency Tolerance and Spurious Emission(above 30MHz) Test
*2:for Frequency Tolerance and Spurious Emission(above 30MHz) Test

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	AC Cable	2.0	N	Polyvinyl chloride
2	Serial Cable	2.0	Y	Polyvinyl chloride
3	AC Cable	2.0	N	Polyvinyl chloride
4	Monitor Cable	2.0	Y	Polyvinyl chloride
5	AC Cable	2.0	N	Polyvinyl chloride
6	KeyBoard Cable	2.0	Y	Polyvinyl chloride
7	Mouse Cable	2.0	Y	Polyvinyl chloride

SECTION 5: Conducted emission

5.1 Operating environment

Test place : No.1 semi anechoic chamber.
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 rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT and its peripherals was 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 LISN/AMN and excess AC cable was bundled in center. 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 at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN/ an AMN to the input power source. All unused 50ohm connectors of the LISN/ AMN were resistively terminated in 50ohm when not connected to the measuring equipment.
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a horizontal conducting plane 4.0 x 4.0m and a vertical conducting plane 2.0 x 2.0m in a No.2 semi Anechoic Chamber.
A drawing of the set up is shown in the photos of APPENDIX 1.

5.3 Test conditions

Frequency range : 0.15MHz – 30MHz
EUT position : Table top
EUT operation mode : Continuous Transmitting

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT in the semi Anechoic Chamber.
The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains Network (AMN).
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 conducted emission measurements were made with the following detector function of the test receiver.
Detector Type : QP and AV
IF Bandwidth : 9kHz

5.5 Test result

Summary of the test results : Pass

Date : June 9, 2004 Test engineer : Hiroka Umeyama

SECTION 6: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)

6.1 Operating environment

The test was carried out in a No.1 semi Anechoic Chamber

Temperature : See data
Humidity : See data

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 carrier level (or, noise levels) was (or were) measured at each position of all three axis A, B and C, and the position that has the maximum noise was determined.
With the position, the noise levels of all the frequencies were measured.
* 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])

SECTION 7: -20dB Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test data : APPENDIX 3
Test result : Pass

SECTION 8: 99% Occupied Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test data : APPENDIX 3
Test result : Pass

SECTION 9: Frequency Tolerance

Test Procedure

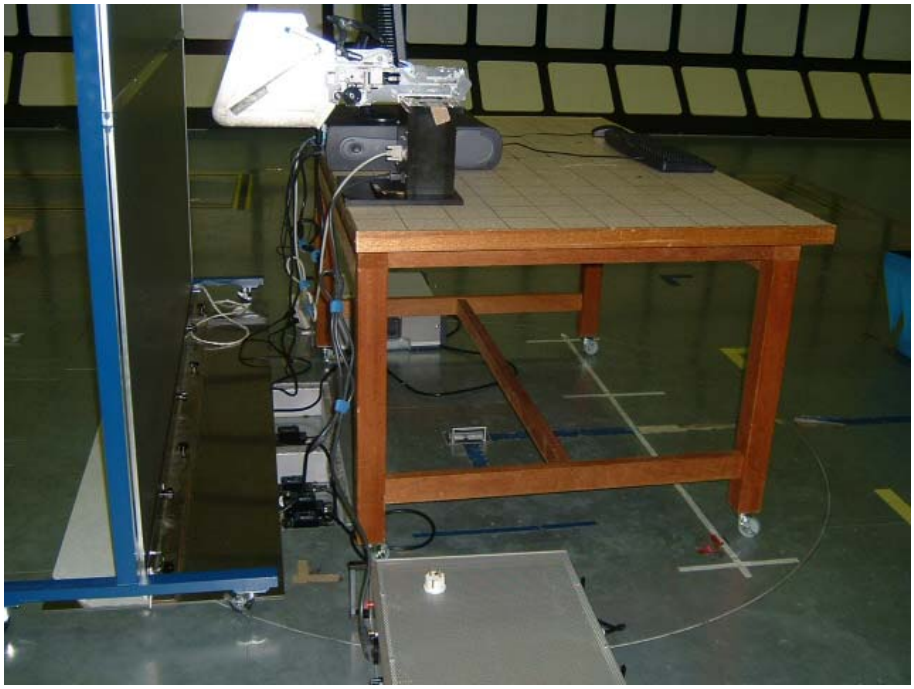
The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test data : APPENDIX 3
Test result : Pass

APPENDIX 1: Photographs of test setup

Conducted emission
With CLi Feeder
Front

Rear



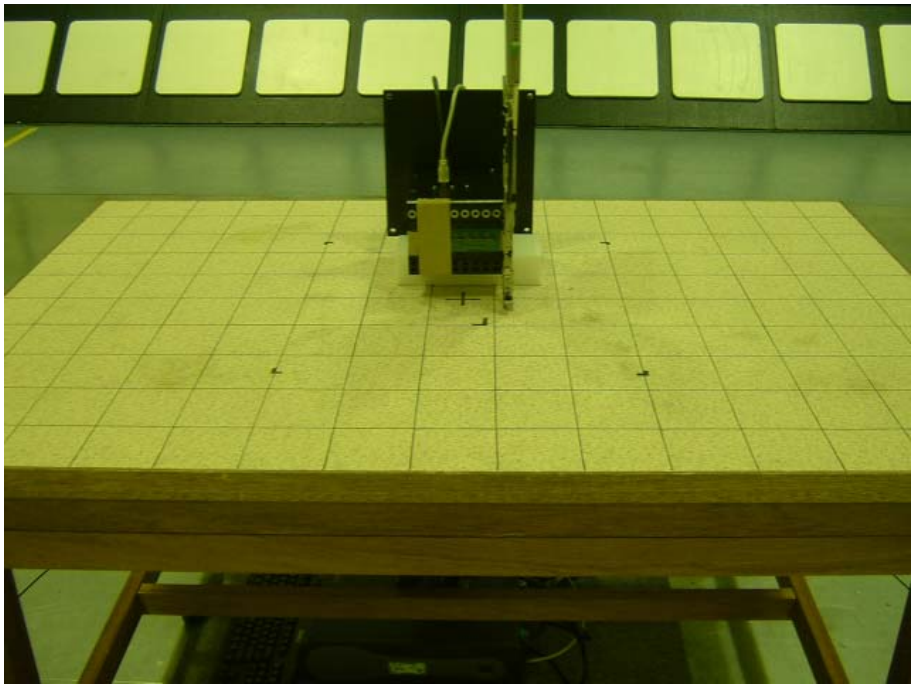
Conducted emission
Without CLi Feeder
Front

Rear

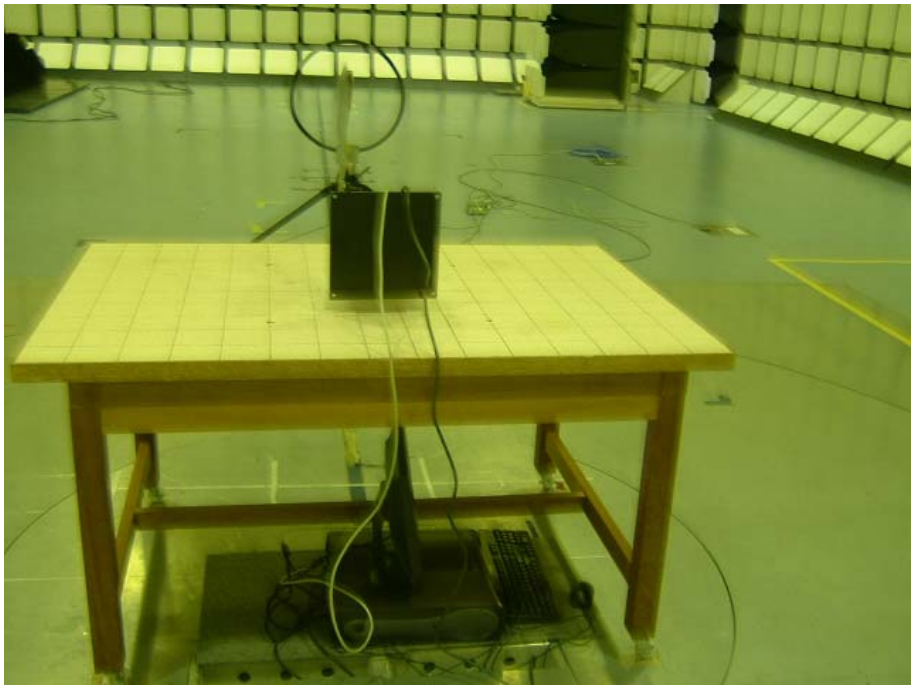
Radiated emission

With CLi Feeder

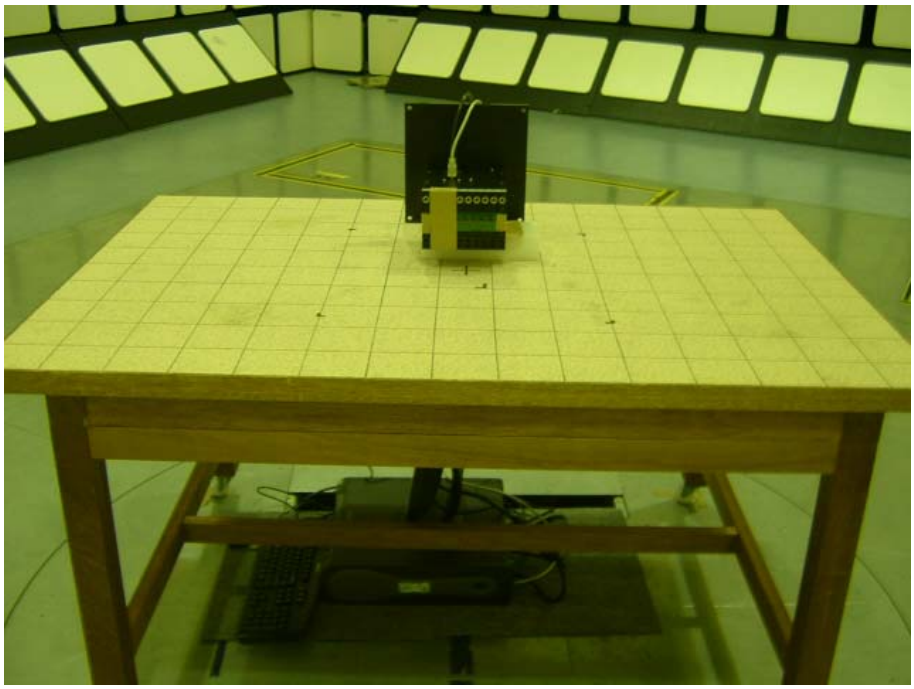
Front



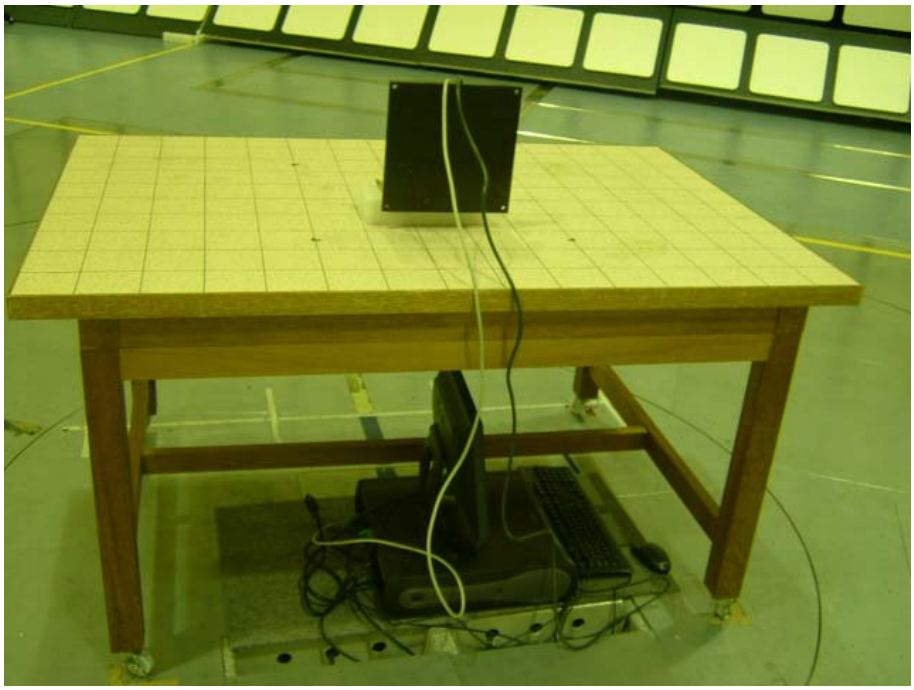
Rear



Radiated emission
Without CLi Feeder
Front

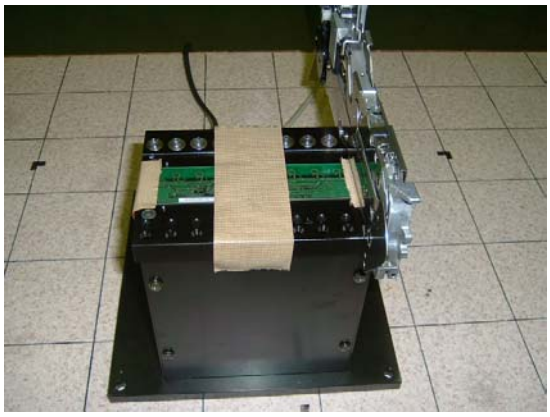


Rear

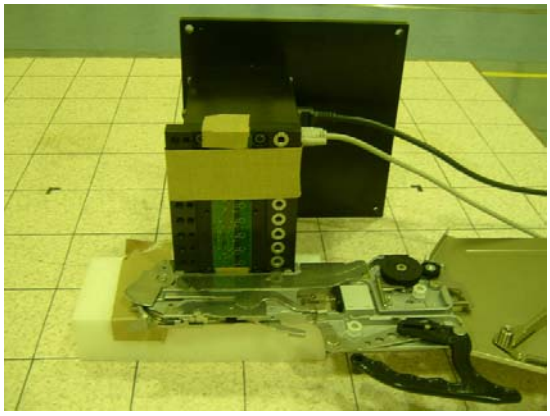


Worst Case Position (Z-axis)

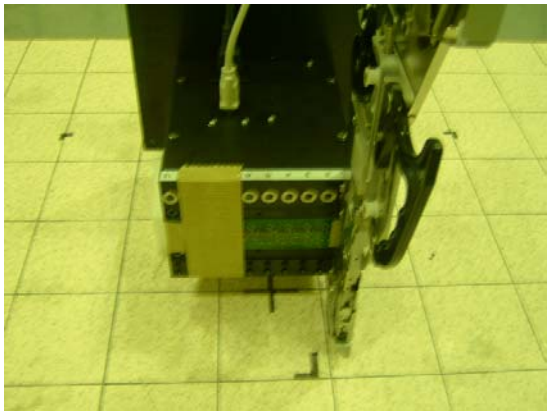
X-axis



Y-axis



Z-axis



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	CE/RE	2003/12/27 * 12
MCH-01	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	FT	2003/12/18 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	CE/RE	2003/11/12 * 12
MCC-01	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	RE	2003/12/19 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agilent/TSJ	-	CE/RE	2003/12/24 * 12
MLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	CE（EUT)	2003/11/10 * 12
MLS-03	LISN(AMN)	Schwarzbeck	NSLK8127	CE	2003/11/10 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/10/15 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/10/15 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2004/05/25 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2003/12/16 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE	2004/01/08 * 12
MBTR10	Spectrum Analyzer	Rohde & Schwarz	FSP30	FT	2003/11/12 * 12
MCC-07	coaxial cable	-	-	RE	2004/01/26 * 12
MCC-08	coaxial cable	-	-	RE	2004/01/26 * 12
MTA-04	Termination	MCL	NTRM-50	CE	2004/02/16 * 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,
FT: Frequency Tolerance

APPENDIX 3: Data of EMI test

Conducted emission

DATA OF CONDUCTED EMISSION TEST

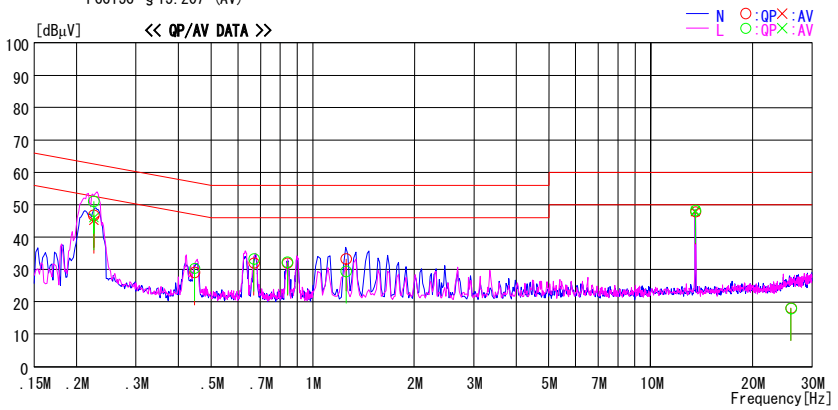
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/06/09 13:58:45

Applicant : YAMAHA MOTOR CO.,LTD.
Kind of EUT : CLi ID READER BOARD
Model No. : KGR-M4452-011
Serial No. : 450292

Report No. : 24IE0270-HO
Power : DC5V(AC120V/60Hz)
Temp℃/Humi% : 25deg.C / 58%
Operator : Hiroka Umeyama

Mode / Remarks: Transmitting(13.56MHz), With CLi Feeder (Test Communication mode)

LIMIT : FCC15C §15.207 (QP)
FCC15C §15.207 (AV)



Frequency	Reading Level QP	Reading Level AV	Corr. Factor	Results QP	Results AV	Limit QP	Limit AV	Margin QP	Margin AV	Phase
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
0.22490	46.6	44.8	0.2	46.8	45.0	62.6	52.6	15.8	7.6	N
0.22490	50.9	45.8	0.2	51.1	46.0	62.6	52.6	11.5	6.6	L
0.44610	28.5	----	0.5	29.0	----	56.9	----	27.9	----	N
0.44610	29.9	----	0.5	30.4	----	56.9	----	26.5	----	L
0.66970	31.4	----	0.6	32.0	----	56.0	----	24.0	----	N
0.66970	32.6	----	0.6	33.2	----	56.0	----	22.8	----	L
0.84170	31.4	----	0.6	32.0	----	56.0	----	24.0	----	N
0.84170	31.7	----	0.6	32.3	----	56.0	----	23.7	----	L
1.25600	28.9	----	0.5	29.4	----	56.0	----	26.6	----	L
1.25670	32.8	----	0.5	33.3	----	56.0	----	22.7	----	N
13.56000	46.1	46.0	1.8	47.9	47.8	60.0	50.0	12.1	2.2	N
13.56000	46.4	46.3	1.8	48.2	48.1	60.0	50.0	11.8	1.9	L
26.00000	15.5	----	2.6	18.1	----	60.0	----	41.9	----	N
26.00000	15.4	----	2.6	18.0	----	60.0	----	42.0	----	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.

Conducted emission

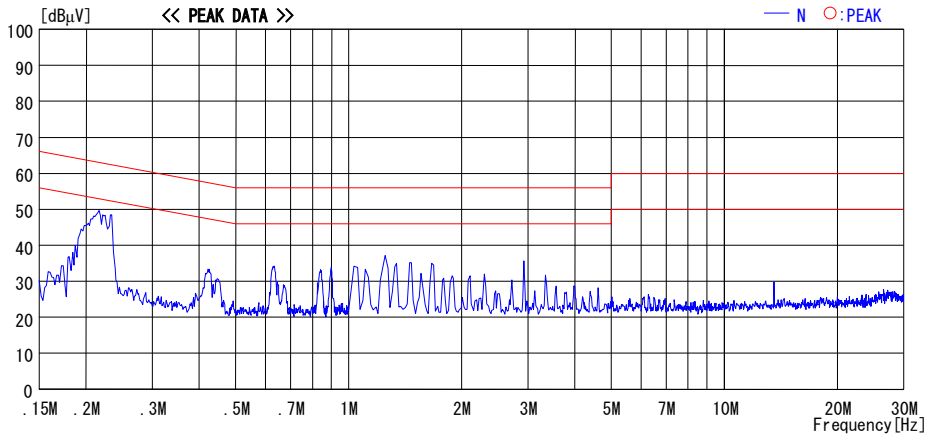
DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/06/09 14:15:40

Applicant	: YAMAHA MOTOR CO.,LTD.	Report No.	: 24IE0270-HO
Kind of EUT	: CLi ID READER BOARD	Power	: DC5V(AC120V/60Hz)
Model No.	: KGR-M4452-011	Temp℃/Humi%	: 25deg.C / 58%
Serial No.	: 450292	Operator	: Hiroka Umeyama

Mode / Remarks: Transmitting(13.56MHz), Without CLi Feeder

LIMIT : FCC15C §15.207 (QP)
FCC15C §15.207 (AV)



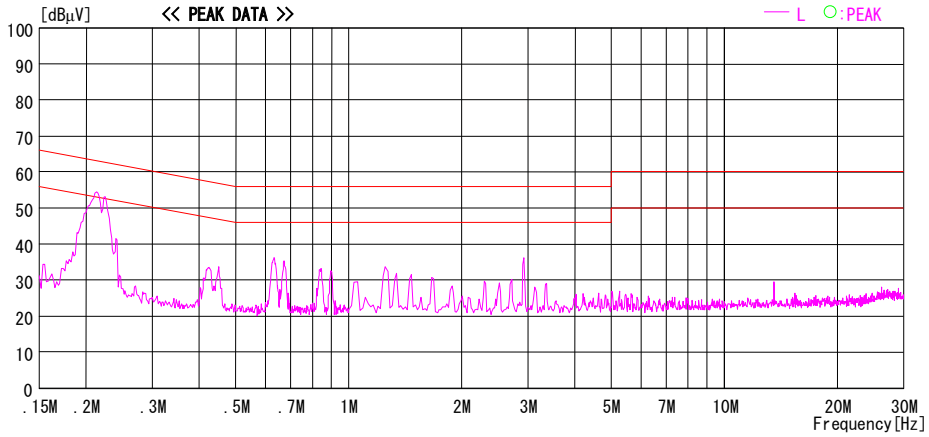


CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

DATA OF CONDUCTED EMISSION TEST

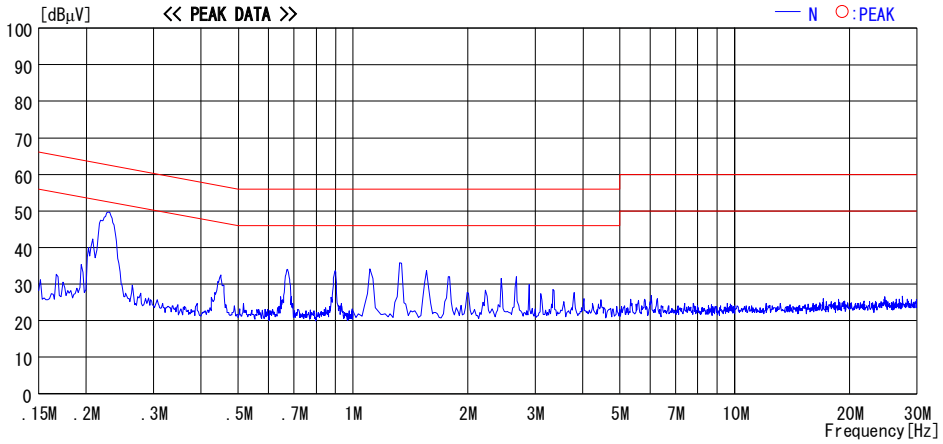
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/06/09 14:23:14

Applicant : YAMAHA MOTOR CO.,LTD.
Kind of EUT : CLi ID READER BOARD
Model No. : KGR-M4452-011
Serial No. : 450292

Report No. : 24IE0270-HO
Power : DC5V(AC120V/60Hz)
Temp℃/Humi% : 25deg.C / 58%
Operator : Hiroka Umeyama

Mode / Remarks: Standby

LIMIT : FCC15C §15.207 (QP)
FCC15C §15.207 (AV)



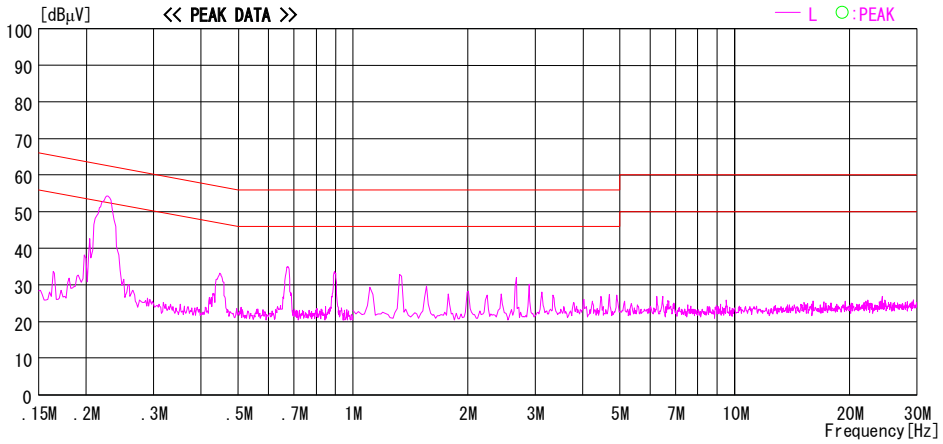


CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

Radiated emission(Fundamental emission and Spectrum Mask)

UL Apex Co., Ltd.
Head Office EMC Lab. No1 Semi Anechoic Chamber

COMPANY	:	YAMAHA MOTOR CO.,LTD.	REPORT NO.	:	24IE0270-HO
EQUIPMENT	:	CLi ID READER BOARD	REGULATION	:	FCC 15.225
MODEL	:	KGR-M4452-011	TEST DISTANCE	:	3m
S/ N	:	450292	DATE	:	06/07/2004
POWER	:	DC5V(AC120V/60Hz)	TEMPERATURE	:	22 deg.C.
MODE	:	Transmitting / With CLi Feeder	HUMIDITY	:	60 %
			ENGINEER	:	Hiroka Umeyama

With CLi Feeder

FREQ [MHz]	T/R Reading [dBuV]	Ant Factor [dB/m]	C.F [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna angle [deg.]
13.1100	25.6	20.2	-20.9	24.9	69.5	44.6	0
13.4100	25.6	20.2	-20.9	24.9	80.5	55.6	0
13.5530	27.9	20.2	-20.9	27.2	90.4	63.2	0
13.5600	42.9	20.2	-20.9	42.2	123.9	81.7	0
13.5670	27.9	20.2	-20.9	27.2	90.4	63.2	0
13.7100	25.8	20.3	-20.9	25.2	80.5	55.3	0
14.0100	25.7	20.3	-20.9	25.1	69.5	44.4	0

Calculation : Reading + Ant. Factor + C.F(Cable loss - AMP.Gain + Atten).
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

Radiated emission(Fundamental emission and Spectrum Mask)

UL Apex Co., Ltd.
Head Office EMC Lab. No1 Semi Anechoic Chamber

COMPANY	:	YAMAHA MOTOR CO.,LTD.	REPORT NO.	:	24IE0270-HO
EQUIPMENT	:	CLi ID READER BOARD	REGULATION	:	FCC 15.225
MODEL	:	KGR-M4452-011	TEST DISTANCE	:	3m
S/ N	:	450292	DATE	:	06/07/2004
POWER	:	DC5V(AC120V/60Hz)	TEMPERATURE	:	22 deg.C.
MODE	:	Transmitting / Without CLi Feeder	HUMIDITY	:	60 %
			ENGINEER	:	Hiroka Umeyama

Without CLi Feeder

FREQ [MHz]	T/R Reading [dBuV]	Ant Factor [dB/m]	C.F [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna angle [deg.]
13.1100	25.6	20.2	-20.9	24.9	69.5	44.6	0
13.4100	25.5	20.2	-20.9	24.8	80.5	55.7	0
13.5530	38.5	20.2	-20.9	37.8	90.4	52.6	0
13.5600	53.7	20.2	-20.9	53.0	123.9	70.9	0
13.5670	38.3	20.2	-20.9	37.6	90.4	52.8	0
13.7100	25.6	20.3	-20.9	25.0	80.5	55.5	0
14.0100	25.5	20.3	-20.9	24.9	69.5	44.6	0

Calculation : Reading + Ant. Factor + C.F(Cable loss - AMP.Gain + Atten).
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

Radiated emission (Spurious emission : below 30MHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No1 Semi Anechoic Chamber

COMPANY	:	YAMAHA MOTOR CO.,LTD.	REPORT NO.	:	24IE0270-HO
EQUIPMENT	:	CLi ID READER BOARD	REGULATION	:	FCC 15.225
MODEL	:	KGR-M4452-011	TEST DISTANCE	:	3m
S/ N	:	450292	DATE	:	06/07/2004
POWER	:	DC5V(AC120V/60Hz)	TEMPERATURE	:	22 deg.C.
MODE	:	Transmitting / With CLi Feeder	HUMIDITY	:	60 %
			ENGINEER	:	Hiroka Umeyama

With CLi Feeder

FREQ [MHz]	T/R Reading [dBuV]	Ant Factor [dB/m]	C.F [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna angle [deg.]
27.1200	25.0	20.8	-20.2	25.6	69.5	43.9	0

Calculation : Reading + Ant. Factor + C.F(Cable loss - AMP.Gain + Atten).
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

Radiated emission (Spurious emission : below 30MHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No1 Semi Anechoic Chamber

COMPANY	:	YAMAHA MOTOR CO.,LTD.	REPORT NO.	:	24IE0270-HO
EQUIPMENT	:	CLi ID READER BOARD	REGULATION	:	FCC 15.225
MODEL	:	KGR-M4452-011	TEST DISTANCE	:	3m
S/ N	:	450292	DATE	:	06/07/2004
POWER	:	DC5V(AC120V/60Hz)	TEMPERATURE	:	22 deg.C.
MODE	:	Transmitting / Without CLi Feeder	HUMIDITY	:	60 %
			ENGINEER	:	Hiroka Umeyama

Without CLi Feeder

FREQ [MHz]	T/R Reading [dBuV]	Ant Factor [dB/m]	C.F [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna angle [deg.]
27.1200	24.8	20.8	-20.2	25.4	69.5	44.1	0

Calculation : Reading + Ant. Factor + C.F(Cable loss - AMP.Gain + Atten).
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

Radiated emission (Spurious emission : above 30MHz)

DATA OF RADIATED EMISSION TEST

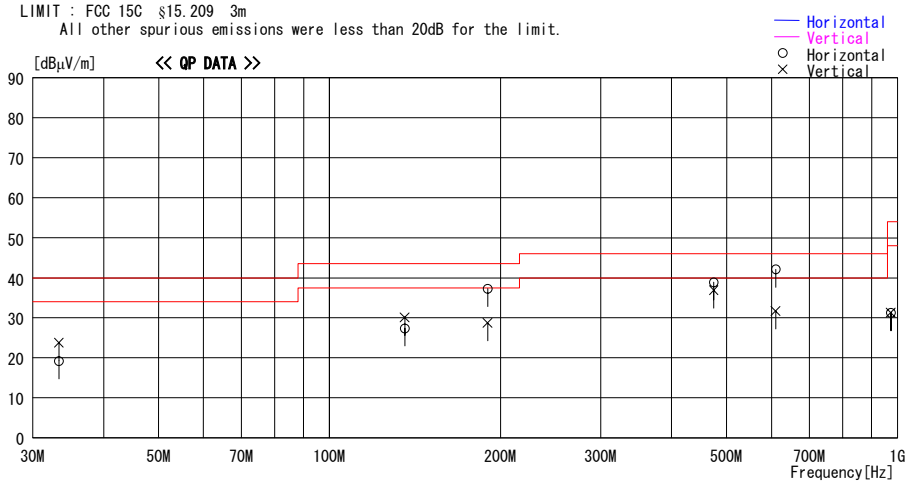
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/06/07 15:22:32

Applicant : YAMAHA MOTOR CO.,LTD.
Kind of EUT : CLi ID READER BOARD
Model No. : KGR-M4452-011
Serial No. : 450283

Report No. : 24IE0270-HO
Power : DC5V(AC120V/60Hz)
Temp℃/Humi% : 22deg.C / 60%
Operator : Hiroka Umeyama

Mode / Remarks : Transmitting(13.56MHz) / Z-Axis(MAX) With CLi Feeder

LIMIT : FCC 15C §15.209 3m
All other spurious emissions were less than 20dB for the limit.



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]
33.384	22.7	QP	17.1	-20.6	19.2	0	300	Hori.	40.0	20.8
33.384	27.2	QP	17.1	-20.6	23.7	0	100	Vert.	40.0	16.3
135.590	32.5	QP	13.8	-18.9	27.4	230	300	Hori.	43.5	16.1
135.590	35.2	QP	13.8	-18.9	30.1	0	100	Vert.	43.5	13.4
189.800	38.8	QP	16.5	-18.0	37.3	230	300	Hori.	43.5	6.2
189.800	30.2	QP	16.5	-18.0	28.7	280	100	Vert.	43.5	14.8
474.600	38.5	QP	18.0	-17.6	38.9	230	100	Hori.	46.0	7.1
474.600	36.5	QP	18.0	-17.6	36.9	245	100	Vert.	46.0	9.1
610.200	39.5	QP	19.6	-17.0	42.1	0	123	Hori.	46.0	3.9
610.200	29.1	QP	19.6	-17.0	31.7	20	165	Vert.	46.0	14.3
973.355	23.7	QP	22.7	-15.1	31.3	0	100	Vert.	54.0	22.7
973.355	23.6	QP	22.7	-15.1	31.2	0	100	Hori.	54.0	22.8

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)

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DATA OF RADIATED EMISSION TEST

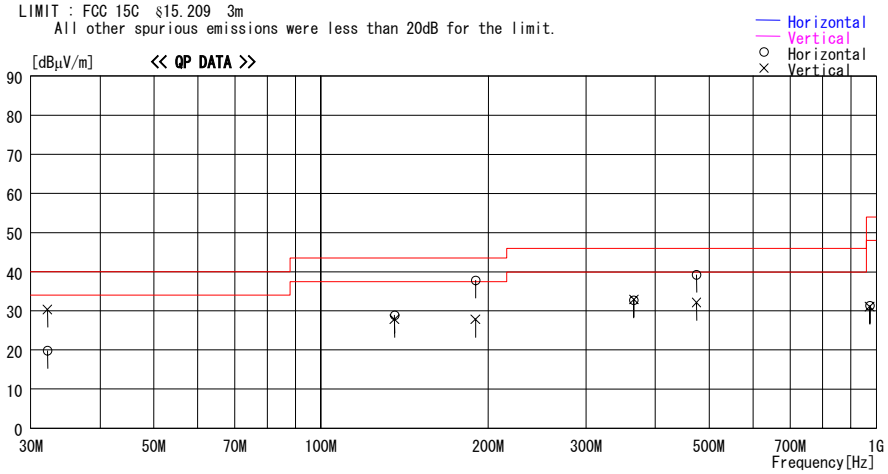
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/06/07 16:32:35

Applicant : YAMAHA MOTOR CO.,LTD.
Kind of EUT : CLi ID READER BOARD
Model No. : KGR-M4452-011
Serial No. : 450283

Report No. : 24IE0270-HO
Power : DC5V(AC120V/60Hz)
Temp℃/Humi% : 22deg.C / 60%
Operator : Hiroka Umeyama

Mode / Remarks : Transmitting(13.56MHz) / Z-Axis(MAX) Without CLi Feeder

LIMIT : FCC 15C §15.209 3m
All other spurious emissions were less than 20dB for the limit.



Frequency	Reading	DET	Antenna Factor	Loss& Gain	Level	Angle	Height	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
32.160	33.2	QP	17.7	-20.6	30.3	0	100	Vert.	40.0	9.7
32.160	22.7	QP	17.7	-20.6	19.8	0	300	Hori.	40.0	20.2
135.590	33.9	QP	13.8	-18.9	28.8	40	240	Hori.	43.5	14.7
135.590	32.9	QP	13.8	-18.9	27.8	0	100	Vert.	43.5	15.7
189.800	39.3	QP	16.5	-18.0	37.8	80	150	Hori.	43.5	5.7
189.800	29.3	QP	16.5	-18.0	27.8	200	100	Vert.	43.5	15.7
366.130	32.6	QP	17.0	-16.9	32.7	67	100	Hori.	46.0	13.3
366.130	32.8	QP	17.0	-16.9	32.9	357	165	Vert.	46.0	13.1
474.600	31.7	QP	18.0	-17.6	32.1	300	100	Vert.	46.0	13.9
474.600	38.8	QP	18.0	-17.6	39.2	280	210	Hori.	46.0	6.8
973.355	23.7	QP	22.7	-15.1	31.3	0	100	Hori.	54.0	22.7
973.355	23.5	QP	22.7	-15.1	31.1	0	100	Vert.	54.0	22.9

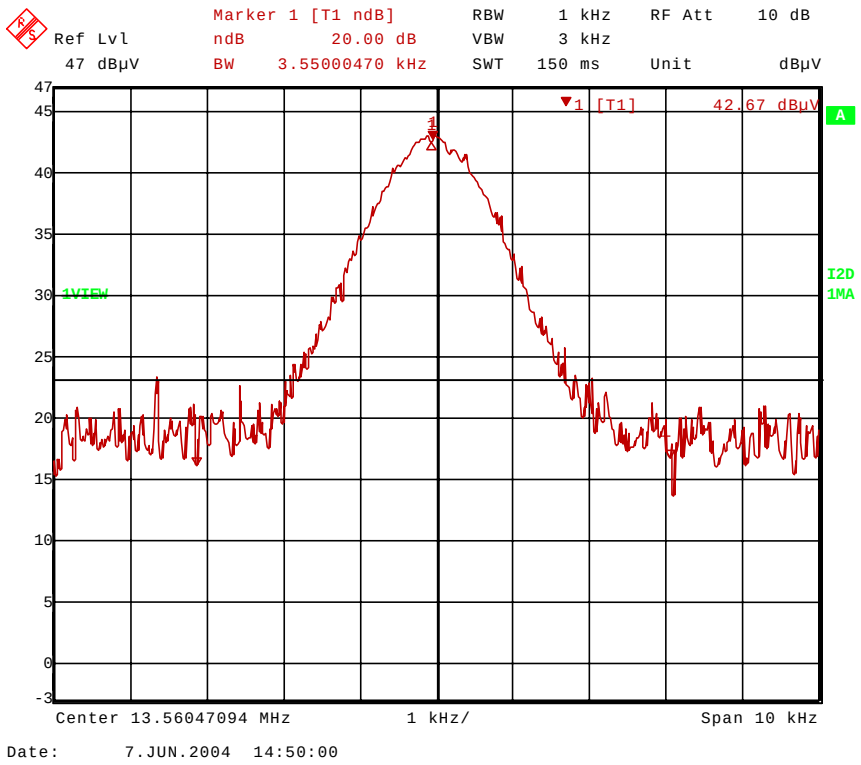
CHART:WITH FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - GAIN(AMP)

–20dB Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No1 Semi Anechoic Chambe

COMPANY	:	YAMAHA MOTOR CO.,LTD.	REPORT NO.	:	24IE0270-HO
EQUIPMENT	:	CLi ID READER BOARD	REGULATION	:	FCC 15.225
MODEL	:	KGR-M4452-011	TEST DISTANCE	:	3m
S/ N	:	450292	DATE	:	06/07/2004
POWER	:	DC5V(AC120V/60Hz)	TEMPERATURE	:	22 deg.C.
MODE	:	Transmitting / With CLi Feeder	HUMIDITY	:	60 %
			ENGINEER	:	Hiroka Umeyama

FREQ [MHz]	-20dB Bandwidth [kHz]
13.56	3.55

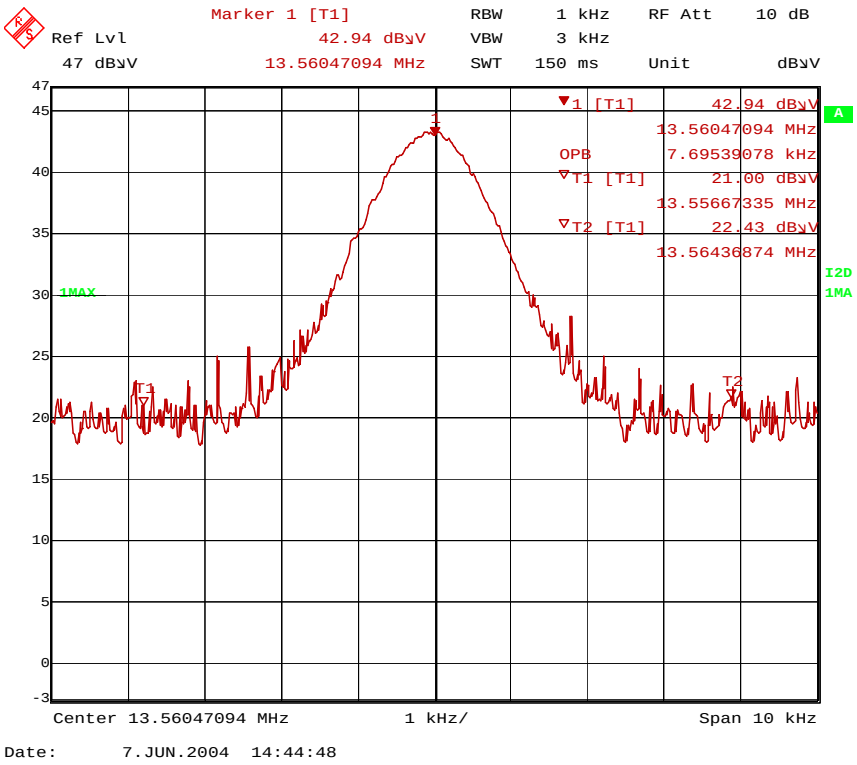


99% Occpied Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No1 Semi Anechoic Chambe

COMPANY	:	YAMAHA MOTOR CO.,LTD.	REPORT NO.	:	24IE0270-HO
EQUIPMENT	:	CLi ID READER BOARD	REGULATION	:	RSS210
MODEL	:	KGR-M4452-011	TEST DISTANCE	:	3m
S/ N	:	450292	DATE	:	06/07/2004
POWER	:	DC5V(AC120V/60Hz)	TEMPERATURE	:	22 deg.C.
MODE	:	Transmitting / With CLi Feeder	HUMIDITY	:	60 %
			ENGINEER	:	Hiroka Umeyama

FREQ [MHz]	99% Occpied Bandwidth [kHz]
13.56	7.69



Frequency Tolerance

UL Apex Co., Ltd.
Head Office EMC Lab. No1 Semi Anechoic Chamber

COMPANY	:	YAMAHA MOTOR CO.,LTD.	REPORT NO.	:	24IE0270-HO
EQUIPMENT	:	CLi ID READER BOARD	REGULATION	:	FCC 15.225
MODEL	:	KGR-M4452-011	TEST DISTANCE	:	3m
S/ N	:	450283	DATE	:	06/07/2004
POWER	:	DC5V(AC120V/60Hz)	TEMPERATURE	:	22 deg.C.
MODE	:	Transmitting	HUMIDITY	:	60 %
			ENGINEER	:	Hiroka Umeyama

Test Condition	Test Timing	FREQ [MHz]	Result	Limit	Margin
T min -20℃	Power on	13.56044000	0.003245%	0.010000%	0.006755%
	on 2min.	13.56056000	0.004130%	0.010000%	0.005870%
	on 5min.	13.56048000	0.003540%	0.010000%	0.006460%
	on 10min.	13.56048000	0.003540%	0.010000%	0.006460%
T max 50℃	Power on	13.56056000	0.004130%	0.010000%	0.005870%
	on 2min.	13.56056000	0.004130%	0.010000%	0.005870%
	on 5min.	13.56056000	0.004130%	0.010000%	0.005870%
	on 10min.	13.56044000	0.003245%	0.010000%	0.006755%

Limit : 13.56 MHz +/-0.01 %