EMI TEST REPORT

Test Report No. : 24HE0055-HO-1

Applicant	:	**Matsushita Electric Industrial Co., Ltd.**
Type of Equipment	:	**SMART ECU of KEYLESS ACCESS SYSTEM**
Model No.	:	**CY-MH6461A, CY-MH6462A**
Test standard	:	**FCC Part 15 Subpart C : 2004 Section 15.209**
FCC ID	:	**ACJ932CY-MH646**
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 : May 1 to June 12, 2004

Tested by :
Makoto Kosaka
EMC Service

:
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	: Matsushita Electric Industrial Co., Ltd.
Brand name	: Panasonic
Address	: 3-1-1 yagumonakamachi, moriguchi-shi, Osaka 570-0005 Japan
Telephone Number	: +81-6-6906-4889
Facsimile Number	: +81-6-6906-6874
Contact Person	: Jiro Kitanaka

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

2.1 Identification of E.U.T.

Type of Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM
Model No.	: CY-MH6461A, CY-MH6462A
Sample No.	: 1
Country of Manufacture	: Japan
Receipt Date of Sample	: April 23, 2004
Condition of EUT	: Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

Model No: CY-MH6461A, CY-MH6462A are the SMART ECU of KEYLESS ACCESS SYSTEM.

Equipment Type	: Transmitter
Rating	: DC 12V
Temperature of operation	: -30 deg. C. - +80 deg. C.
Other Clock Frequency	: 16MHz (CPU Main clock), 32.768kHz (CPU Sub clock)

Explanation of the difference between CY-MH6461A and CY-MH6462A

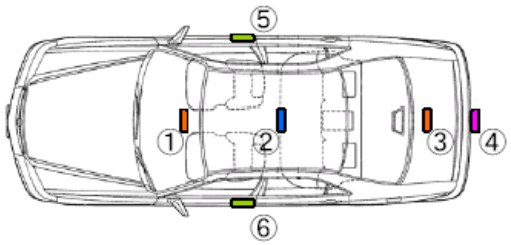
The difference between “CY-MH6461A” and “CY-MH6462A” is the condition of shipping only.
When repair parts of this device are shipped to the United States, there are 2 conditions of shipping as follow:

1. Shipping of ECU only
In this case, model name “CY-MH6461A” is used.

2. Shipping of ECU with Keyless remote
In this case, model name “CY-MH6462A” is used.

There are not any other differences except the above condition of shipping.
The device itself is totally identical between CY-MH6461A and CY-MH6462A.

Tx section

Frequency Characteristics	125kHz
Modulation	ASK
Information antenna 1. Front Antenna (F) 2. Rear Antenna (R) 3. Trunk Antenna (TI) 4. Bumper Antenna (TR) 5. Driver's Door Antenna (DR) 6.Assistant's Door Antenna (5,6 Same Antenna)	External / Ferrite Antenna (LCR series resonant) 
<The other characteristics of the EUT> ・Hands-free unlock (Driver seat, Assistant seat, Trunk), and engine start ・Keyless Entry (remote control) is possible ・Protect not to leave the KEYLESS REMOTE in the trunk ・Harder authentication than usual Keyless Entry System using bidirectional communication	

FCC 15.31 (e)
This test was performed with the New Battery (DC 12V) and the constant voltage was supplied to this EUT during the tests. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to remodel the EUT, because the antenna is mounted inside of the EUT as the final product. 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 Part 15 Subpart C : 2004
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.209 Radiated emission limits, general requirements

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Worst margin	Result
1	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.209	Radiated	<PK> 26.9dB 0.125.25MHz 0 deg. (TR) <AV> 39.3dB 0.125.25MHz 0 deg. (DR)	Complied
2	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.205 FCC Section 15.209	Radiated	2.2 dB QP 66.00MHz Horizontal (TR)	Complied
3	Conducted Emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC Section 15.207(a)	AC Mains only *1)	N/A	N/A
Note: UL Apex's EMI Work procedures No. QPM05 *1) This test is not applicable since the EUT does not have AC power port.						

*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	-26dB Bandwidth	ANSI C63.4:2003 Annex H.6 Occupied bandwidth measurements	Reference data	Radiated	N/A	N/A	N/A
2	99% Occupied Band Width	RSS-210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004	RSS-210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004	Radiated	N/A	N/A	N/A

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 15.209

3.5 Uncertainty

Radiated Emission Test
The measurement uncertainty (with a 95% confidence level) for this test using Loop antenna is ±1.8dB.
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 report meets the limits unless the uncertainty is taken into consideration.

3.6 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 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.

3.7 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

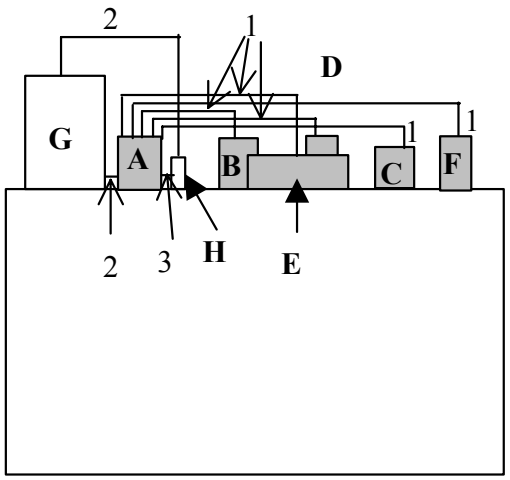
The EUT was operated in a manner similar to typical use during the tests.

The mode is used : 125kHz Continuous transmitting (*The Antennas do not transmit simultaneously.)

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

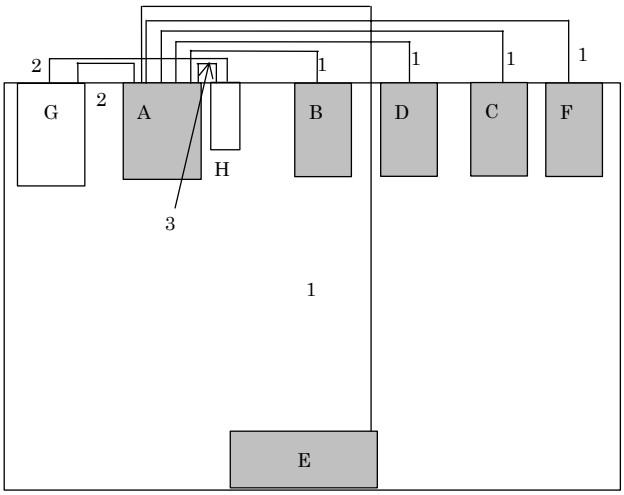
4.2 Configuration and peripherals

Front View



***The cables from B,C,D,E,F were connected to A.**

Top View



*Test data was taken under worse case conditions.
*Even if the length of cable or the environmental situation may change, ECU has the control of supply current to the antenna to be the same conditions of the installation in the vehicles.

Description of EUT

No.	Item	Model number	Sample No.	Manufacturer	Remarks	FCC ID
A	SMART ECU of KEYLESS ACCESS SYSTEM	CY-MH646	1	Matsushita Electric Industrial Co., Ltd.	EUT	ACJ932CY-MH646
B	Front Antenna	38387-SJA-003	-	Matsushita Electric Works, Ltd.	EUT	ACJ932CY-MH646
C	Rear Antenna	38388-SJA-003	-	Matsushita Electric Works, Ltd.	EUT	ACJ932CY-MH646
D	Trunk Antenna	38387-SJA-J010-M1	-	Matsushita Electric Works, Ltd.	EUT	ACJ932CY-MH646
E	Bumper Antenna	38389-SJA-003	-	Matsushita Electric Works, Ltd.	EUT	ACJ932CY-MH646
F	Door Antenna	38384-SJA-A010-M1	-	Valeo	EUT	ACJ932CY-MH646

Support Equipment

No.	Item	Model number	Sample No.	Manufacturer	FCC ID
G	Car Battery	50B24L	-	YUASA	-
H	Ant Controller PWB	-	-	Matsushita Electric Works, Ltd	-

List of cables used

No.	Name	Length (m)	Shield	Backshell materials
1	Antenna cable	0.5	N	AVSS
2	DC Power Cable	0.5	N	-
3	Antenna Controller Cable	0.1	N	-

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

Test place : No.1 and No.2 semi anechoic chamber
Temperature : See data
Humidity : See data

Test Procedure

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 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 axes X, Y and Z, 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])

5.2 Results

Summary of the test results: Pass

Date: May 1 to June 12, 2004 Tested by: Makoto Kosaka and Hiroka Umeyama

APPENDIX 1: Photographs of test setup

This page has been submitted for a seperate exhibit.

Pre check of worse-case positions

This page has been submitted for a seperate exhibit.

APPENDIX 2: Test Instruments

EMI Test Instrument

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	ME	2003/12/27 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	ME	2004/01/08 * 12
MPA-04	Pre Amplifier	Agilent	8447D	ME	2004/05/25 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agilent/ TSJ	-	ME	2003/12/24 * 12
MCC-07	coaxial cable	-	-	ME	2004/01/26 * 12
MCC-08	coaxial cable	-	-	ME	2004/01/26 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	ME	2003/11/12 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2004/04/12 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/10/15 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/10/15 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2003/12/16 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2004/02/24 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2004/04/16 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2004/02/03 * 12
MRENT-09	Spectrum Analyzer	Advantest	R3273	RE	2004/02/18 * 12

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

RE: Radiated emission
ME: Magnetic Field Strength 9kHz – 30MHz

APPENDIX 3: Data of EMI test

Radiated emission

Data of carrier and spurious emissions(9kHz to 30MHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/6/12
Power	: DC 12.0V (Car battery)	Temperature	: 25deg.C
Mode	: Transmitting (125kHz)	Humidity	: 60%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC No.	: 216J-CYMH646		
EUT Position	: X-axis （MAX）		
Antenna Type	: F		

Frequency Rage : 9-90kHz & 110-490kHz / AV & PK DETECT(Test Receiver: BW 200Hz or 9kHz)
Other Frequency Rage : 490kHz-30MHz QP DETECT(Test Receiver: BW 9kHz)

No.	FREQ	Loop Max Angle	T/R detector type	T/R READING	ANT Factor	ATTEN	CABLE LOSS	AMP GAIN	RESULT	LIMIT	MARGIN
	[kHz]	[deg]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]
1	125.25	0	PK	92.5	19.9	-	0.6	25.5	87.5	125.6	38.1
1	125.25	45	PK	91.0	19.9	-	0.6	25.5	86.0	125.6	39.6
1	125.25	90	PK	88.9	19.9	-	0.6	25.5	83.9	125.6	41.7
1	125.25	0	AV	62.3	19.9	-	0.6	25.5	57.3	105.6	48.3
2	250.05	0	PK	63.0	19.9	-	0.3	26.8	56.4	119.6	63.2
2	250.05	0	AV	35.8	19.9	-	0.3	26.8	29.2	99.6	70.4
3	375.65	0	PK	64.7	19.9	-	0.5	26.9	58.2	116.1	57.9
3	375.65	0	AV	38.9	19.9	-	0.5	26.9	32.4	96.1	63.7
4	501.00	0	QP	41.0	19.9	-	0.6	26.8	34.7	73.6	38.9
5	626.25	0	QP	53.7	19.8	-	0.6	27.2	46.9	71.7	24.8
6	751.50	0	QP	45.7	19.8	-	0.7	27.2	39.0	70.1	31.1
7	876.75	0	QP	55.0	19.8	-	0.7	27.2	48.3	68.7	20.4
8	1002.00	0	QP	51.3	19.8	-	0.7	27.2	44.6	67.6	23.0
9	1127.25	0	QP	55.3	19.8	-	0.7	27.2	48.6	66.6	18.0
10	1252.50	0	QP	53.3	19.8	-	0.6	27.2	46.5	65.6	19.1

REMARKS
ANTENNA TYPE : 9kHz-30MHz (Loop Antenna)
CALCULATION: READING + ANT Factor + Cable Loss - AMP Gain
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
All other spurious emissions are more than 20dB below the limits.
Used Equipment: MLPA-01, MPA-04, MCC-(07+08+03),MTR-01

Data of carrier and spurious emissions(9kHz to 30MHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/6/12
Power	: DC 12.0V (Car battery)	Temperature	: 25deg.C
Mode	: Transmitting (125kHz)	Humidity	: 60%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC No.	: 216J-CYMH646		
EUT Position	: X-axis (MAX)		
Antenna Type	: R		

Frequency Rage : 9-90kHz & 110-490kHz / AV & PK DETECT(Test Receiver: BW 200Hz or 9kHz)
Other Frequency Rage : 490kHz-30MHz QP DETECT(Test Receiver: BW 9kHz)

No.	FREQ [kHz]	Loop Max Angle [deg]	T/R detector type	T/R READING [dBuV]	ANT Factor [dB/m]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]
1	125.25	0	PK	100.5	19.9	-	0.6	25.5	95.5	125.6	30.1
1	125.25	45	PK	98.1	19.9	-	0.6	25.5	93.1	125.6	32.5
1	125.25	90	PK	96.6	19.9	-	0.6	25.5	91.6	125.6	34.0
1	125.25	0	AV	70.6	19.9	-	0.6	25.5	65.6	105.6	40.0
2	250.05	0	PK	74.2	19.9	-	0.3	26.8	67.6	119.6	52.0
2	250.05	0	AV	43.0	19.9	-	0.3	26.8	36.4	99.6	63.2
3	375.65	0	PK	75.7	19.9	-	0.5	26.9	69.2	116.1	46.9
3	375.65	0	AV	48.0	19.9	-	0.5	26.9	41.5	96.1	54.6
4	501.00	0	QP	47.0	19.9	-	0.6	26.8	40.7	73.6	32.9
5	626.25	0	QP	58.5	19.8	-	0.6	27.2	51.7	71.7	20.0
6	751.50	0	QP	41.8	19.8	-	0.7	27.2	35.1	70.1	35.0
7	876.75	0	QP	52.7	19.8	-	0.7	27.2	46.0	68.7	22.7
8	1002.00	0	QP	40.5	19.8	-	0.7	27.2	33.8	67.6	33.8
9	1127.25	0	QP	47.9	19.8	-	0.7	27.2	41.2	66.6	25.4
10	1252.50	0	QP	42.5	19.8	-	0.6	27.2	35.7	65.6	29.9

REMARKS
ANTENNA TYPE : 9kHz-30MHz (Loop Antenna)
CALCULATION: READING + ANT Factor + Cable Loss - AMP Gain
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
All other spurious emissions are more than 20dB below the limits.
Used Equipment: MLPA-01, MPA-04, MCC-(07+08+03),MTR-01

Data of carrier and spurious emissions(9kHz to 30MHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/6/12
Power	: DC 12.0V (Car battery)	Temperature	: 25deg.C
Mode	: Transmitting (125kHz)	Humidity	: 60%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC No.	: 216J-CYMH646		
EUT Position	: X-axis (MAX)		
Antenna Type	: TI		

Frequency Rage : 9-90kHz & 110-490kHz / AV & PK DETECT(Test Receiver: BW 200Hz or 9kHz)
Other Frequency Rage : 490kHz-30MHz QP DETECT(Test Receiver: BW 9kHz)

No.	FREQ [kHz]	Loop Max Angle [deg]	T/R detector type	T/R READING [dBuV]	ANT Factor [dB/m]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]
1	125.25	0	PK	98.3	19.9	-	0.6	25.5	93.3	125.6	32.3
1	125.25	45	PK	96.7	19.9	-	0.6	25.5	91.7	125.6	33.9
1	125.25	90	PK	94.6	19.9	-	0.6	25.5	89.6	125.6	36.0
1	125.25	0	AV	67.0	19.9	-	0.6	25.5	62.0	105.6	43.6
2	250.05	0	PK	66.0	19.9	-	0.3	26.8	59.4	119.6	60.2
2	250.05	0	AV	34.0	19.9	-	0.3	26.8	27.4	99.6	72.2
3	375.65	0	PK	68.3	19.9	-	0.5	26.9	61.8	116.1	54.3
3	375.65	0	AV	38.0	19.9	-	0.5	26.9	31.5	96.1	64.6
4	501.00	0	QP	47.4	19.9	-	0.6	26.8	41.1	73.6	32.5
5	626.25	0	QP	55.1	19.8	-	0.6	27.2	48.3	71.7	23.4
6	751.50	0	QP	44.5	19.8	-	0.7	27.2	37.8	70.1	32.3
7	876.75	0	QP	49.2	19.8	-	0.7	27.2	42.5	68.7	26.2
8	1002.00	0	QP	46.1	19.8	-	0.7	27.2	39.4	67.6	28.2
9	1127.25	0	QP	49.6	19.8	-	0.7	27.2	42.9	66.6	23.7
10	1252.50	0	QP	50.5	19.8	-	0.6	27.2	43.7	65.6	21.9

REMARKS
ANTENNA TYPE : 9kHz-30MHz (Loop Antenna)
CALCULATION: READING + ANT Factor + Cable Loss - AMP Gain
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
All other spurious emissions are more than 20dB below the limits.
Used Equipment: MLPA-01, MPA-04, MCC-(07+08+03),MTR-01

Data of carrier and spurious emissions(9kHz to 30MHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/6/12
Power	: DC 12.0V (Car battery)	Temperature	: 25deg.C
Mode	: Transmitting (125kHz)	Humidity	: 60%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC No.	: 216J-CYMH646		
EUT Position	: X-axis (MAX)		
Antenna Type	: TR		

Frequency Rage : 9-90kHz & 110-490kHz / AV & PK DETECT(Test Receiver: BW 200Hz or 9kHz)
Other Frequency Rage : 490kHz-30MHz QP DETECT(Test Receiver: BW 9kHz)

No.	FREQ [kHz]	Loop Max Angle [deg]	T/R detector type	T/R READING [dBuV]	ANT Factor [dB/m]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]
1	125.25	0	PK	103.7	19.9	-	0.6	25.5	98.7	125.6	26.9
1	125.25	45	PK	100.2	19.9	-	0.6	25.5	95.2	125.6	30.4
1	125.25	90	PK	99.8	19.9	-	0.6	25.5	94.8	125.6	30.8
1	125.25	0	AV	68.5	19.9	-	0.6	25.5	63.5	105.6	42.1
2	250.05	0	PK	77.2	19.9	-	0.3	26.8	70.6	119.6	49.0
2	250.05	0	AV	40.8	19.9	-	0.3	26.8	34.2	99.6	65.4
3	375.65	0	PK	74.9	19.9	-	0.5	26.9	68.4	116.1	47.7
3	375.65	0	AV	41.7	19.9	-	0.5	26.9	35.2	96.1	60.9
4	501.00	0	QP	49.5	19.9	-	0.6	26.8	43.2	73.6	30.4
5	626.25	0	QP	59.5	19.8	-	0.6	27.2	52.7	71.7	19.0
6	751.50	0	QP	45.7	19.8	-	0.7	27.2	39.0	70.1	31.1
7	876.75	0	QP	54.1	19.8	-	0.7	27.2	47.4	68.7	21.3
8	1002.00	0	QP	42.6	19.8	-	0.7	27.2	35.9	67.6	31.7
9	1127.25	0	QP	50.1	19.8	-	0.7	27.2	43.4	66.6	23.2
10	1252.50	0	QP	47.5	19.8	-	0.6	27.2	40.7	65.6	24.9

REMARKS
ANTENNA TYPE : 9kHz-30MHz (Loop Antenna)
CALCULATION: READING + ANT Factor + Cable Loss - AMP Gain
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
All other spurious emissions are more than 20dB below the limits.
Used Equipment: MLPA-01, MPA-04, MCC-(07+08+03),MTR-01

Data of carrier and spurious emissions(9kHz to 30MHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/6/12
Power	: DC 12.0V (Car battery)	Temperature	: 25deg.C
Mode	: Transmitting (125kHz)	Humidity	: 60%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC No.	: 216J-CYMH646		
EUT Position	: X-axis (MAX)		
Antenna Type	: DR		

Frequency Rage : 9-90kHz & 110-490kHz / AV & PK DETECT(Test Receiver: BW 200Hz or 9kHz)
Other Frequency Rage : 490kHz-30MHz QP DETECT(Test Receiver: BW 9kHz)

No.	FREQ [kHz]	Loop Max Angle [deg]	T/R detector type	T/R READING [dBuV]	ANT Factor [dB/m]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]
1	125.25	0	PK	101.5	19.9	-	0.6	25.5	96.5	125.6	29.1
1	125.25	45	PK	100.2	19.9	-	0.6	25.5	95.2	125.6	30.4
1	125.25	90	PK	98.0	19.9	-	0.6	25.5	93.0	125.6	32.6
1	125.25	0	AV	71.3	19.9	-	0.6	25.5	66.3	105.6	39.3
2	250.05	0	PK	68.3	19.9	-	0.3	26.8	61.7	119.6	57.9
2	250.05	0	AV	40.8	19.9	-	0.3	26.8	34.2	99.6	65.4
3	375.65	0	PK	72.7	19.9	-	0.5	26.9	66.2	116.1	49.9
3	375.65	0	AV	45.6	19.9	-	0.5	26.9	39.1	96.1	57.0
4	501.00	0	QP	39.0	19.9	-	0.6	26.8	32.7	73.6	40.9
5	626.25	0	QP	56.1	19.8	-	0.6	27.2	49.3	71.7	22.4
6	751.50	0	QP	35.3	19.8	-	0.7	27.2	28.6	70.1	41.5
7	876.75	0	QP	49.3	19.8	-	0.7	27.2	42.6	68.7	26.1
8	1002.00	0	QP	33.9	19.8	-	0.7	27.2	27.2	67.6	40.4
9	1127.25	0	QP	44.5	19.8	-	0.7	27.2	37.8	66.6	28.8
10	1252.50	0	QP	33.6	19.8	-	0.6	27.2	26.8	65.6	38.8

REMARKS
ANTENNA TYPE : 9kHz-30MHz (Loop Antenna)
CALCULATION: READING + ANT Factor + Cable Loss - AMP Gain
* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
All other spurious emissions are more than 20dB below the limits.
Used Equipment: MLPA-01, MPA-04, MCC-(07+08+03),MTR-01

DATA OF RADIATED EMISSION TEST

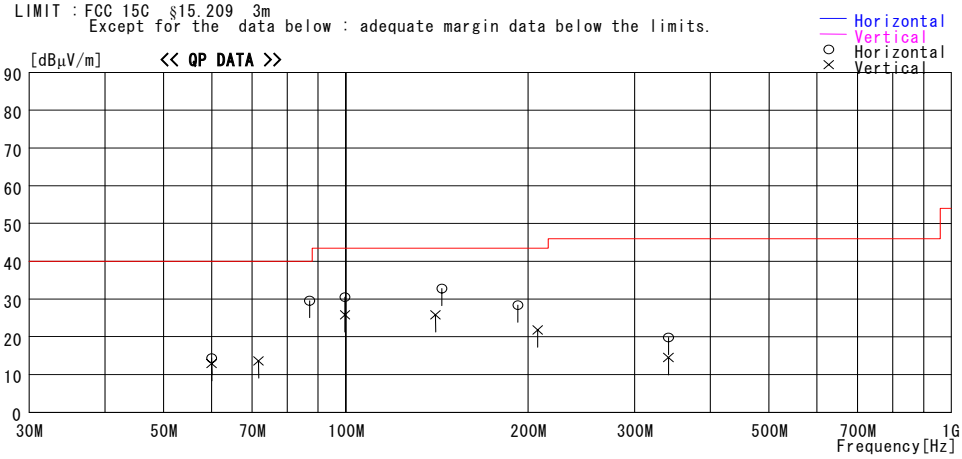
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2004/06/02 09:26:59

Applicant : Matsushita Electric Industrial Co.,Ltd.
Kind of EUT : SMART ECU of KEYLESS ACCESS SYSTEM
Model No. : CY-MH6461A, CY-MH6462A
Sample No. : 1

Report No. : 24HE0055-HO
Power : DC 12.0V (Car battery)
Temp℃/Humi% : 24deg.C / 59%
Operator : Hiroka Umeyama

Mode / Remarks: Transmitting (125kHz) / F X-axis(Max)

LIMIT : FCC 15C §15.209 3m
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	60.000	22.5	8.1	6.8	23.0	14.4	40.0	25.6	300	140
2	87.100	38.1	7.4	7.1	23.0	29.6	40.0	10.4	230	200
3	99.690	36.2	10.1	7.2	23.0	30.5	43.5	13.0	250	70
4	144.000	34.1	14.3	7.5	23.1	32.8	43.5	10.7	115	130
5	192.360	27.1	16.6	7.8	23.1	28.4	43.5	15.1	150	312
6	341.150	18.3	15.8	8.5	22.8	19.8	46.0	26.2	100	20
----- Vertical ------										
7	60.000	21.0	8.1	6.8	23.0	12.9	40.0	27.1	100	270
8	71.780	23.1	6.7	6.9	23.1	13.6	40.0	26.4	290	40
9	99.690	31.5	10.1	7.2	23.0	25.8	43.5	17.7	320	165
10	140.630	27.2	14.1	7.5	23.0	25.8	43.5	17.7	260	240
11	207.450	20.1	16.9	7.9	23.1	21.8	43.5	21.7	100	130
12	341.150	13.0	15.8	8.5	22.8	14.5	46.0	31.5	100	0

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

DATA OF RADIATED EMISSION TEST

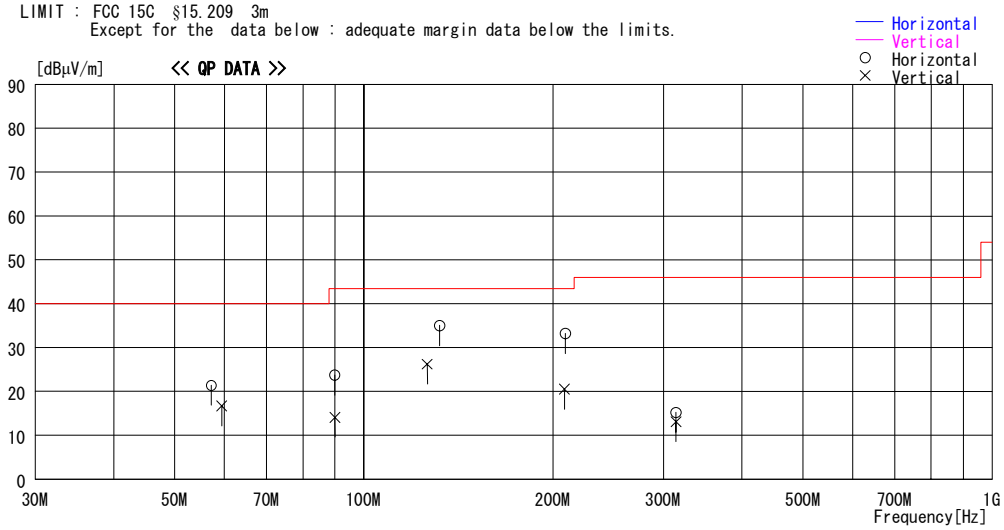
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2004/06/02 14:41:26

Applicant : Matsushita Electric Industrial
Kind of EUT : Smart ECU
Model No. : CY-MH6461A, CY-MH6462A
Sample No. : 1

Report No. : 24HE0055-HO
Power : DC 12.0V (Car battery)
Temp℃/Humi% : 24deg.C / 59%
Operator : Hiroka Umeyama

Mode / Remarks : Transmitting (125kHz)/ R X-axis(Max)

LIMIT : FCC 15C §15.209 3m
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	57.190	29.0	8.7	6.8	23.1	21.4	40.0	18.6	390	0
2	89.880	31.6	7.8	7.2	22.9	23.7	43.5	19.8	300	66
3	131.990	36.8	13.7	7.4	22.9	35.0	43.5	8.5	300	314
4	209.430	31.5	16.9	7.9	23.1	33.2	43.5	10.3	180	55
5	314.000	15.1	14.6	8.4	22.9	15.2	46.0	30.8	100	0
----- Vertical ------										
6	59.430	24.7	8.2	6.8	23.0	16.7	40.0	23.3	100	237
7	90.000	22.0	7.8	7.2	22.9	14.1	43.5	29.4	345	160
8	126.140	28.5	13.3	7.4	23.0	26.2	43.5	17.3	100	33
9	208.600	18.8	16.9	7.9	23.1	20.5	43.5	23.0	100	103
10	314.000	13.0	14.6	8.4	22.9	13.1	46.0	32.9	100	0

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

DATA OF RADIATED EMISSION TEST

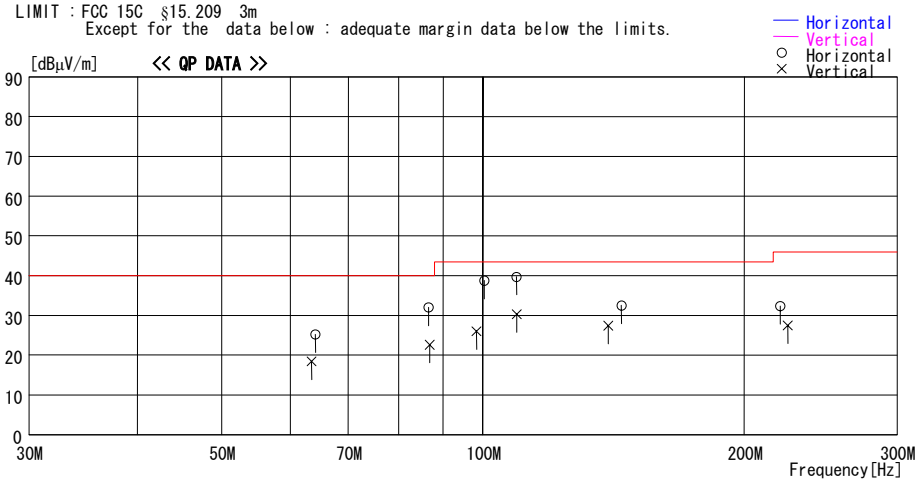
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2004/06/02 10:57:48

Applicant : Matsushita Electric Industrial Co.,Ltd.
Kind of EUT : SMART ECU of KEYLESS ACCESS SYSTEM
Model No. : CY-MH6461A, CY-MH6462A
Sample No. : 1

Report No. : 24HE0055-HO
Power : DC 12.0V (Car battery)
Temp℃/Humi% : 24deg.C / 59%
Operator : Hiroka Umeyama

Mode / Remarks: Transmitting (125kHz) / TI X-axis

LIMIT : FCC 15C §15.209 3m
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	64.120	33.8	7.6	6.9	23.1	25.2	40.0	14.8	220	220
2	86.600	40.6	7.3	7.1	23.0	32.0	40.0	8.0	200	45
3	100.390	44.2	10.3	7.2	23.0	38.7	43.5	4.8	300	249
4	109.300	43.8	11.5	7.3	22.9	39.7	43.5	3.8	300	249
5	144.440	33.8	14.3	7.5	23.1	32.5	43.5	11.0	300	124
6	220.000	30.3	17.0	8.0	23.0	32.3	46.0	13.7	143	110
7	324.600	26.2	15.1	8.4	22.9	26.8	46.0	19.2	100	100
----- Vertical ------										
8	63.480	27.0	7.6	6.9	23.1	18.4	40.0	21.6	100	170
9	86.850	31.2	7.3	7.1	23.0	22.6	40.0	17.4	380	310
10	98.300	32.0	9.8	7.2	23.0	26.0	43.5	17.5	330	0
11	109.400	34.4	11.5	7.3	22.9	30.3	43.5	13.2	200	155
12	139.490	28.8	14.1	7.5	23.0	27.4	43.5	16.1	100	92
13	224.671	25.4	17.1	8.0	23.0	27.5	46.0	18.5	100	74
14	324.600	15.0	15.1	8.4	22.9	15.6	46.0	30.4	100	0

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

DATA OF RADIATED EMISSION TEST

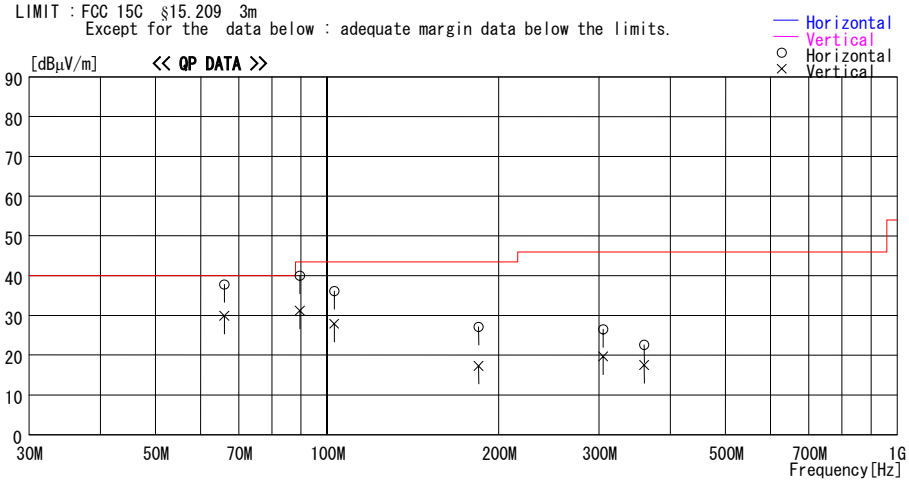
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2004/06/02 18:18:21

Applicant : Matsushita Electric Industrial Co.,Ltd.
Kind of EUT : SMART ECU of KEYLESS ACCESS SYSTEM
Model No. : CY-MH6461A, CY-MH6462A
Sample No. : 1

Report No. : 24HE0055-HO
Power : DC 12.0V (Car battery)
Temp℃/Humi% : 24deg.C / 59%
Operator : Hiroka Umeyama

Mode / Remarks: Transmitting (125kHz) / TR X-axis(MAX)

LIMIT : FCC 15C §15.209 3m
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	66.000	46.7	7.3	6.9	23.1	37.8	40.0	2.2	238	204
2	89.600	48.0	7.7	7.2	22.9	40.0	43.5	3.5	242	213
3	102.900	41.2	10.6	7.2	22.9	36.1	43.5	7.4	300	235
4	184.442	26.0	16.3	7.8	23.0	27.1	43.5	16.4	300	0
5	305.000	26.8	14.2	8.3	22.8	26.5	46.0	19.5	100	0
6	360.000	20.1	16.6	8.6	22.7	22.6	46.0	23.4	100	0
----- Vertical ------										
7	66.000	38.8	7.3	6.9	23.1	29.9	40.0	10.1	100	251
8	89.600	39.2	7.7	7.2	22.9	31.2	43.5	12.3	303	128
9	102.900	33.0	10.6	7.2	22.9	27.9	43.5	15.6	220	141
10	184.420	16.2	16.3	7.8	23.0	17.3	43.5	26.2	100	359
11	305.000	20.0	14.2	8.3	22.8	19.7	46.0	26.3	100	0
12	360.000	15.0	16.6	8.6	22.7	17.5	46.0	28.5	100	0

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

DATA OF RADIATED EMISSION TEST

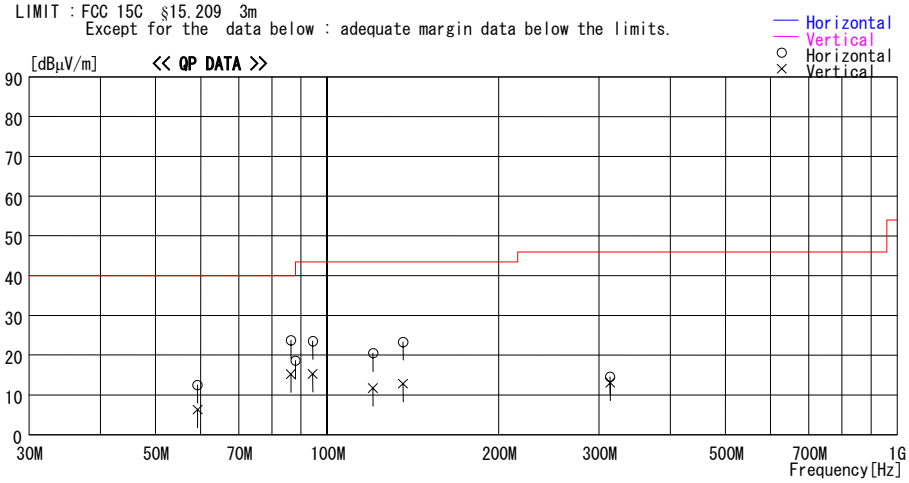
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2004/06/02 15:57:34

Applicant : Matsushita Electric Industrial Co.,Ltd.
Kind of EUT : SMART ECU of KEYLESS ACCESS SYSTEM
Model No. : CY-MH6461A, CY-MH6462A
Sample No. : 1

Report No. : 24HE0055-HO
Power : DC 12.0V (Car battery)
Temp℃/Humi% : 24deg.C / 59%
Operator : Hiroka Umeyama

Mode / Remarks: Transmitting (125kHz) / DR X-axis(Max)

LIMIT : FCC 15C §15.209 3m
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	59.250	20.4	8.3	6.8	23.0	12.5	40.0	27.5	300	355
2	86.400	32.4	7.2	7.1	23.0	23.7	40.0	16.3	305	225
3	88.000	26.9	7.5	7.1	22.9	18.6	40.0	21.4	305	225
4	94.400	30.4	8.9	7.2	23.0	23.5	43.5	20.0	305	225
5	120.370	22.9	13.0	7.4	22.8	20.5	43.5	23.0	200	132
6	135.890	25.0	13.9	7.4	23.0	23.3	43.5	20.2	300	282
7	314.000	14.5	14.6	8.4	22.9	14.6	46.0	31.4	100	0
----- Vertical ------										
8	59.250	14.2	8.3	6.8	23.0	6.3	40.0	33.7	100	0
9	86.400	23.9	7.2	7.1	23.0	15.2	40.0	24.8	300	160
10	94.400	22.2	8.9	7.2	23.0	15.3	43.5	28.2	350	115
11	120.370	14.1	13.0	7.4	22.8	11.7	43.5	31.8	100	130
12	135.890	14.5	13.9	7.4	23.0	12.8	43.5	30.7	100	175
13	314.000	13.0	14.6	8.4	22.9	13.1	46.0	32.9	100	0

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

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

-26dB bandwidth & 99% Occupied Bandwidth

-26dB Bandwidth and 99% OBW

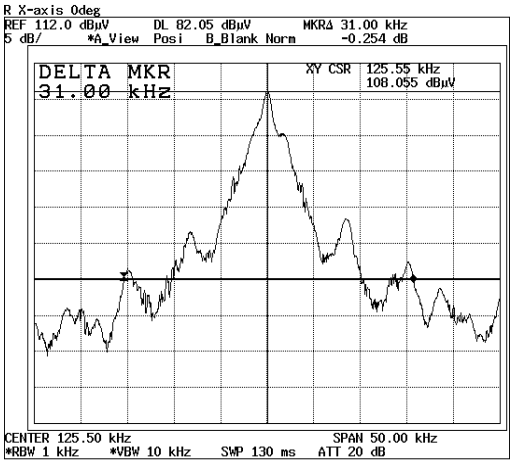
UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

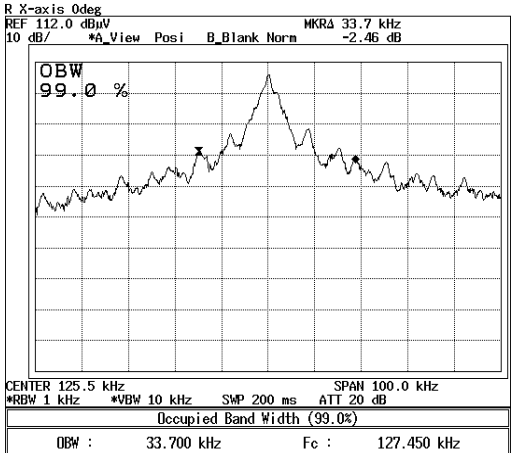
Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/5/1
Power	: DC 12.0V (Car battery)	Temperature	: 24deg.C
Mode	: Transmitting (125kHz)	Humidity	: 41%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC	: 216J-CYMH646		
Antenna Type	: F / X-axis		

-26dB Bandwidth and 99% OBW

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/5/1
Power	: DC 12.0V (Car battery)	Temperature	: 24deg.C
Mode	: Transmitting (125kHz)	Humidity	: 41%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC	: 216J-CYMH646		
Antenna Type	: R / X-axis		



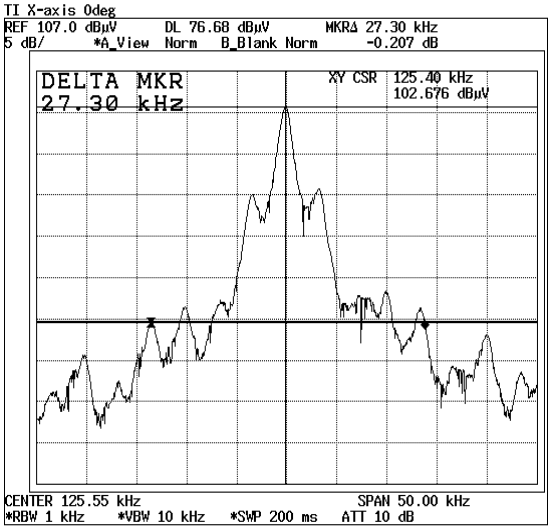


-26dB Bandwidth and 99% OBW

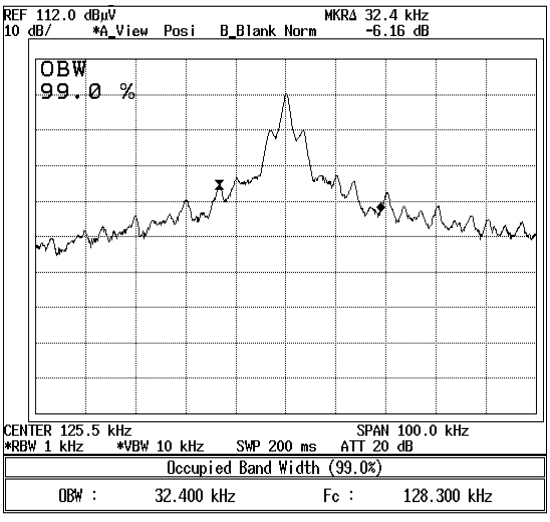
UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/5/1
Power	: DC 12.0V (Car battery)	Temperature	: 24deg.C
Mode	: Transmitting (125kHz)	Humidity	: 41%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC	: 216J-CYMH646		
Antenna Type	: TI / X-axis		

TI X-axis 0deg



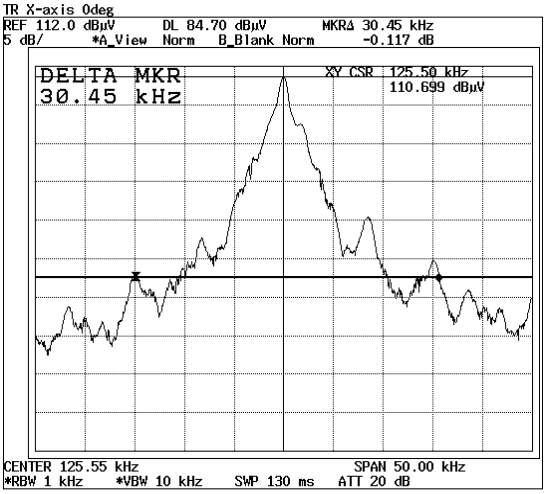
TI X-axis 0 deg.

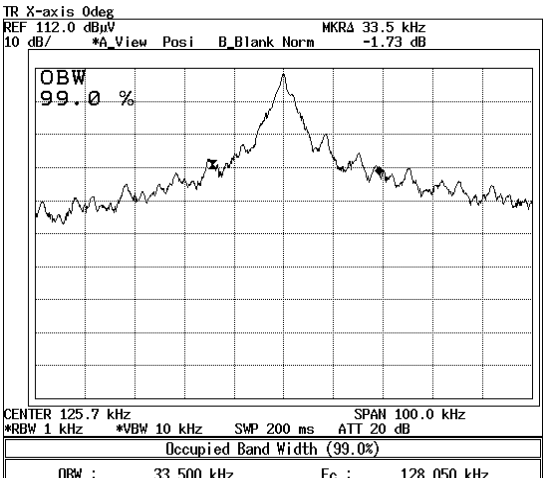


-26dB Bandwidth and 99% OBW

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/5/1
Power	: DC 12.0V (Car battery)	Temperature	: 24deg.C
Mode	: Transmitting (125kHz)	Humidity	: 41%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC	: 216J-CYMH646		
Antenna Type	: TR / X-axis		





-26dB Bandwidth & 99% OBW

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company	: Matsushita Electric Industrial Co.,Ltd.	Report No.	: 24HE0055-HO
Equipment	: SMART ECU of KEYLESS ACCESS SYSTEM	Regulation	: FCC Part15C Section 15.209
Model	: CY-MH6461A, CY-MH6462A	Test Distance	: 3m
Sample No.	: 1	Date	: 2004/5/1
Power	: DC 12.0V (Car battery)	Temperature	: 24deg.C
Mode	: Transmitting (125kHz)	Humidity	: 41%
FCC ID	: ACJ932CY-MH646	Engineer	: Makoto Kosaka
IC	: 216J-CYMH646		
Antenna Type	: DR / X-axis