



RADIO TEST REPORT

Test Report No. : 27FE0134-HO-A-R2

Applicant : ALPINE ELECTRONICS, INC.
Type of Equipment : Bluetooth Module Board
Model No. : 96-09386Z98
FCC ID : A269ZUA128
Test standard : FCC Part 15 Subpart C
Section 15.247: 2007
Test Result : Complied


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2. The results in this report apply only to the sample tested.
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4. The test results in this report are traceable to the national or international standards.
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6. Original test report number of this report is 27FE0134-HO-A.

Date of test:

May 24 to June 4, 2007

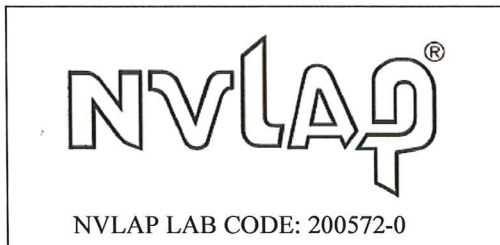
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CONTENTS	PAGE
SECTION 1: Customer information.....	3
SECTION 2: Equipment under test (E.U.T.).....	3
SECTION 3: Test specification, procedures & results.....	4
SECTION 4: Operation of E.U.T. during testing	8
SECTION 5: Spurious Emission	9
SECTION 6: Bandwidth	10
SECTION 7: Maximum Peak Output Power	10
SECTION 8: Carrier Frequency Separation	10
SECTION 9: Number of Hopping Frequency	10
SECTION 10: Dwell time	10
APPENDIX 1: Photographs of test setup	11
Spurious Emission (Radiated).....	11
Bluetooth Module Board: Normal Position (Horizontal: X-axis / Vertical: X-axis)	12
Antenna: Worst Case Position (Horizontal: X-axis / Vertical: Y-axis)	12
Spurious Emission (Radiated setup).....	13
APPENDIX 2: Data of EMI test.....	14
Carrier Frequency Separation	14
20dB Bandwidth	16
Number of Hopping Frequency	18
Dwell time	20
Maximum Peak Output Power	23
Radiated Spurious Emission (below 1GHz)	24
Radiated Spurious Emission (above 1GHz)	28
Conducted Spurious Emission	32
99% Occupied Bandwidth.....	37
APPENDIX 3: Test instruments	38

SECTION 1: Customer information

Company Name : ALPINE ELECTRONICS, INC.
Address : 20-1 Yoshima-kogyodanchi Iwaki Fukushima Japan
Telephone Number : +81-246-36-4111
Facsimile Number : +81-246-36-6090
Contact Person : Shinichi Asuke

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

2.1 Identification of E.U.T.

Type of Equipment : Bluetooth Module Board
Model No. : 96-09386Z98
Serial No. : 1
Country of Manufacture : Japan
Receipt Date of Sample : May 23, 2007
Condition of EUT : Production model
Modification of EUT : No modification by the test lab.

2.2 Product Description

Model No: 96-09386Z98 (referred to as the EUT in this report) is the Bluetooth Module Board.
The EUT is installed in the vehicular host (Car Audio) for testing purpose.

Clock frequency(ies) in the system : 26MHz (Bluetooth part), 13.5MHz (other clock)
Equipment Type : Transceiver
Frequency of Operation : 2402-2480MHz
Bandwidth & Channel spacing : 79MHz & 1MHz / CH
Modulation : FHSS
Antenna Type : Passive Antenna
Antenna Connector Type : N/A
Antenna Gain : 1.5dBi max
Operating voltage : DC3.3V (to Module), DC5.0V, DC8.5V (to Board)

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C : 2007

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz : 2007

FCC 15.31 (e)

The EUT (Bluetooth Module Board) is provided with DC5.0V and DC8.5V, and the RF module of EUT is constantly provided with stable voltage (DC3.3V) through regulator (in Bluetooth Module Board) 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 end-product (Car Audio) manufactured by ALPINE ELECTRONICS, INC.
Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

[FHSS]

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
1	Conducted emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements IC: RSS-Gen 7.2.2	FCC: Section 15.207 IC: RSS-Gen 7.2.2	-	N/A *1)	N/A	N/A
2	Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(a)(1) IC: RSS-210 A8.1 (b)	Conducted	N/A	See data.	Complied
3	20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(a)(1) IC: RSS-210 A8.1 (a)	Conducted	N/A		Complied
4	Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)	Conducted	N/A		Complied
5	Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)	Conducted	N/A		Complied
6	Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.6	FCC: Section 15.247(b)(1) IC: RSS-210 A8.4 (2)	Conducted	N/A		Complied
7	Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section 15.247(d) IC: RSS-210 A8.5	Conducted	N/A		Complied
8	Spurious Emission	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.7 RSS-Gen 4.8	FCC: Section 15.247(d) IC: RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3	Conducted/ Radiated	N/A		<Tx> 6.6dB 260.851MHz, QP, Horizontal <Rx> 5.2dB 4886.0MHz, AV, Vertical

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.

*1) The test is not applicable since the EUT is for vehicular use.

*These tests were also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".

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

*In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.6.1	-	Conducted	N/A	N/A	N/A

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3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Spurious Emission (Radiated)

The measurement uncertainty for this test using Biconical antenna is $\pm 4.88\text{dB}(3\text{m})$.

The measurement uncertainty for this test using Logperiodic antenna is $\pm 4.86\text{dB}(3\text{m})$.

The measurement uncertainty for this test using Horn antenna is $\pm 5.77\text{dB}$.

The data listed in this report meets the limits unless the uncertainty is taken into consideration. (for Receiver spurious emission)

The data listed in this test report has enough margin, more than the site margin. (for Transmitter spurious emission)

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty for this test is $\pm 3.0\text{dB}$.

3.5 Test Location

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	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	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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Test report No. : 27FE0134-HO-A-R2
Page : 7 of 38
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3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

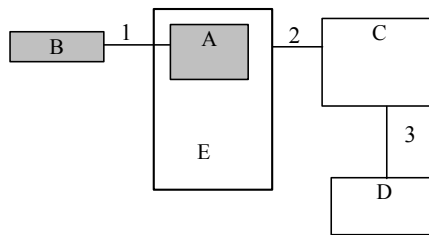
4.1 Operating Modes

The mode used for test : Transmitting mode(Packet size DH5(Worst), Data packet: PRBS9)
- Low Channel : 2402MHz
- Mid Channel : 2441MHz
- High Channel : 2480MHz
Inquiry mode
Receiving mode
- Mid Channel : 2441MHz

As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.
However, the limit level 125mWof AFH mode was used for the test.

4.2 Configuration and peripherals



* Cabling and setup were 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	Remark
A	Bluetooth Module Board	96-09386Z98	1	ALPINE ELECTRONICS, INC.	EUT
B	Antenna	-	1	ALPINE ELECTRONICS, INC.	EUT
C	Vehicular Host	-	1	ALPINE ELECTRONICS, INC.	Car Audio
D	Car Battery	40B19L	A030402	YUASA	-
E	Vehicular Host Jig	-	-	ALPINE ELECTRONICS, INC.	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.5	Unshielded	Unshielded	*1)
2	Signal Cable	0.2	Unshielded	Unshielded	-
3	DC Cable	1.5	Unshielded	Unshielded	-

*1) There are two types of antenna cable. One is short cable (0.5m), and the other is long cable (3.0m).
The test was made with short cable since the carrier power of short cable was larger than the one of long cable.

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SECTION 5: Spurious Emission

[Conducted]

Test Procedure

The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2

Test result : Pass

[Radiated]

Test Procedure

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 10GHz).

The height of the measuring 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 with the Test Receiver, or the Spectrum Analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 2 of RSS-210 2.7 (IC) and outside the restricted band of FCC15.205 / Table 1 of RSS-210 2.7 (IC).

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector	QP: BW 120kHz(T/R)	PK: RBW:1MHz/VBW: 1MHz
IF Bandwidth	20dBc : RBW: 100kHz VBW: 300kHz (S/A)	AV: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise. (for antenna)

- The test was made on EUT at the normal use position (X-axis). (for Bluetooth Module Board)

Test data : APPENDIX 2

Test result : Pass

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SECTION 6: Bandwidth

Test Procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

SECTION 7: Maximum Peak Output Power

Test Procedure

The Maximum Peak Output Power was measured with a power meter (tested bandwidth: 50MHz) connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

SECTION 8: Carrier Frequency Separation

Test Procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

SECTION 9: Number of Hopping Frequency

Test Procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

SECTION 10: Dwell time

Test Procedure

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

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