



RADIO TEST REPORT

Test Report No.: 29GE0083-YK-A

Applicant : PIONEER CORPORATION
Type of Equipment : Flash Memory Multi-Media AVN Navigation
Server System
Model No. : AVIC-U310BT
FCC ID : AJDK024
Test regulation : FCC Part15 Subpart C: 2009
Test result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.

Date of test: February 24 to 27, 2009

Tested by: T. Arai Tatsuya Arai & Y. Owaki Yasumasa Owaki

Approved by: T. Imamura
Toyokazu Imamura
Engineer of Yamakita EMC Lab.

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1 Applicant information

Company Name : PIONEER CORPORATION
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2 Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Flash Memory Multi-Media AVN Navigation Server System
Model No. : AVIC-U310BT
Serial No. : TPS
Rating : DC12.0 to 14.4V
Country of Mass-production : China
Receipt Date of Sample : February 24, 2009
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: AVIC-U310BT (referred to as the EUT in this report) is a Flash Memory Multi-Media AVN Navigation Server System.

The clock frequency used in EUT: 20MHz (System microcomputer), 1.3MHz (LCD), 39.9MHz (FM/AM Tuner), 480kHz, 500kHz (DC-DC Converter), 16.934Mhz, 48MHz (CD Mechanism), 2.25MHz, 12MHz, 32.768MHz (CPU), 26MHz (Bluetooth), 16.369MHz, 32.768MHz (GPS)

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Clock frequency : 26MHz
Bandwidth & channel spacing : 79MHz & 1MHz
Type of modulation : FHSS
Antenna model & type : EAMS03002, Embedded Single-Band type
(made by INPAQ TECHNOLOGY)
Antenna gain : 0.03dBi max
Antenna connector type : None
ITU code : F1D
Operation temperature range : -10 to +60 deg.C.

FCC Part15.31 (e)

The equipment provides the Bluetooth transmitter with stable power supply (DC 3.2 to 3.6V), therefore, the equipment complies power supply regulation.

FCC Part15.203 Antenna requirement

The equipment and its antenna comply with this requirement since this antenna is built in the equipment and it cannot be replaced by end users.

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3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2009, final revised on February 27, 2009
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
 Section 15.207 Conducted limits
 Section 15.209 Radiated emission limits, general requirements
 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
 and 5725-5850MHz

* The revision on February 27, 2009 does not influence the test specification applied to the EUT.
 The EUT complies with FCC Part 15 Subpart B: 2009, final revised on February 27, 2009. The test has been performed by the customer.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC Section 15.207	-	N/A *1)	N/A	N/A
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A		Complied
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (d) Section15.209	Conducted/ Radiated	N/A		2.5dB (2400.00MHz, AV, Horizontal, Tx 2402MHz)

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

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted	-	Complied

* Other than above, no addition, exclusion nor deviation has been made from the standard.

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3.3 Uncertainty

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

	No.1 open site (±)	No.2 open site (±)	No.1 anechoic chamber (±)
Radiated emission (3m)			
<30MHz	2.4 dB	2.4 dB	2.7 dB
30-300MHz	4.3 dB	4.3 dB	4.6 dB
300-1000MHz	4.3 dB	4.3 dB	4.5 dB
1GHz<	5.7 dB	5.8 dB	5.7 dB

Antenna port conducted test	(±)
Below 1GHz	0.4dB
1GHz and above	0.7dB

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.4 Test location

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Telephone number : +81 465 77 1011

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JAB Accreditation No. : RTL02610

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on July 23, 2008 (Registration No.: 95486).

IC Registration No. : 2973B-1

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on February 27, 2008 (Registration No.: 466226).

IC Registration No. : 2973B-3

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on October 22, 2008 (Registration No.: 95967).

IC Registration No. : 2973B-2

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 Semi-anechoic chamber	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7		

Open test site	Maximum measurement distance
No.1 open test site	30m
No.2 open test site	10m

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4 System test configuration

4.1 Justification

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

Test item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON/Inquiry, Payload: PRBS9	-
20dB bandwidth & Maximum peak output power	Transmitting Hopping OFF/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON) -DH1 -DH3 -DH5	-
	-Inquiry	
Spurious emission & Band edge compliance (Conducted) ----- (Radiated)	Transmitting (DH5), Payload: PRBS9 -Hopping ON/Inquiry -Hopping OFF	Spurious emission: 2402MHz, 2441MHz, 2480MHz Band edge compliance: 2402MHz, 2480MHz
	Transmitting (DH5), Payload: PRBS9	
99% occupied bandwidth	Transmitting (DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

*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 125mW of AFH mode was used for the test. The EUT has no EDR mode.

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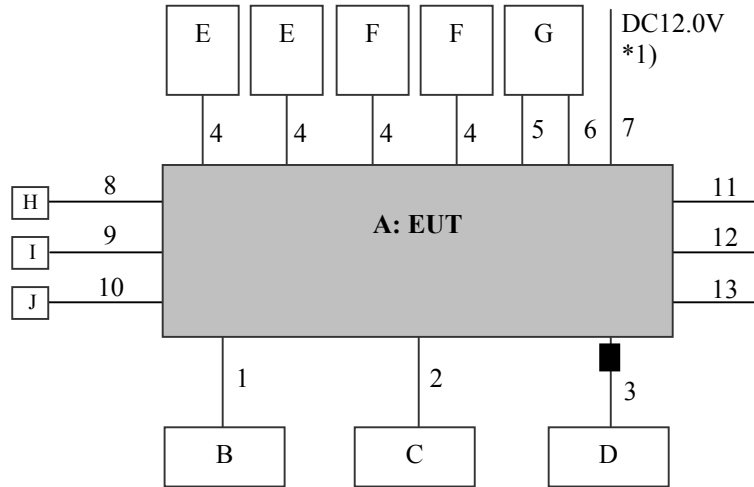
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4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

■ : Ferrite core (Standard attachment)

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Flash Memory Multi-Media AVN Navigation Server System	AVIC-U310BT	TPS	Pioneer	EUT
B	GPS Antenna	CXC8574-B	-	-	-
C	Hands-free Microphone	CMP1083-A	-	Pioneer	-
D	USB Memory	DTI/1GB	-	Kingston	-
E	4ohm dummy load	RHA100N	-	-	-
F	4ohm dummy load	RHF100	-	-	-
G	Wired Remote Controller	CD-MR80D	HC	Pioneer	-
H	75ohm termination	-	-	-	-
I	75ohm termination	-	-	-	-
J	75ohm termination	-	-	-	-

*1 DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

List of cables used*2

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	GPS Antenna cable	5.0	Shielded	Shielded	-
2	Microphone cable	4.0	Shielded	Shielded	-
3	USB cable	1.5	Shielded	Shielded	-
4	Speaker cable	1.0	Unshielded	Unshielded	x4
5	Wired Remote Controller cable	1.6	Shielded	Shielded	-
6	IP-BUS cable	1.5	Shielded	Shielded	-
7	DC cable	2.0	Unshielded	Unshielded	ACC, Battery +
8	Audio cable	1.5	Shielded	Shielded	-
9	Audio cable	0.9	Shielded	Shielded	-
10	Antenna cable	0.3	Shielded	Shielded	-
11	Antenna Control cable	0.15	Unshielded	Unshielded	-
12	ILL cable	0.15	Unshielded	Unshielded	-
13	Parking Brake cable	0.45	Unshielded	Unshielded	-

*2 All cables used for the measurement are exclusive use or marketed.

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5 Carrier frequency separation

Test procedure

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

Summary of the test results: Pass
Date : February 27, 2009 Test engineer : Tatsuya Arai

6 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.
The channel separation in Hopping mode and Inquiry mode was separated by 25kHz and 2/3 of the 20dB bandwidth.

Summary of the test results: Pass
Date : February 26, 2009 Test engineer : Tatsuya Arai

7 Number of hopping frequency

Test procedure

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

Summary of the test results: Pass
Date : February 27, 2009 Test engineer : Tatsuya Arai

8 Dwell time

Test procedure

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

Summary of the test results: Pass
Date : February 27, 2009 Test engineer : Tatsuya Arai

9 Maximum peak output power

Test procedure

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass
Date : February 27, 2009 Test engineer : Tatsuya Arai

10 Out of band emissions (Antenna port conducted)

Test procedure

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

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 conducted measurement.

Summary of the test results: Pass
Date : February 27, 2009 Test engineer : Tatsuya Arai

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11 Out of band emissions (Radiated)

11.1 Operating environment

The test was carried out in No.1 anechoic chamber.

11.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0m by 1.8m, raised 80cm above the conducting ground plane to prevent the reflection influence. The configuration was set in accordance with ANSI C63.4: 2003. Photographs of the set up are shown in Appendix 1.

11.3 Test conditions

Frequency range : 30MHz - 26GHz
Test distance : 3m

11.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 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 QP, PK, and AV detector. The radiated emission measurements were made with the following detector function of the test receiver.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 1MHz, AV RBW: 1MHz/VBW: 300Hz (See data) *1)
Measuring antenna	Biconical (30-300MHz) Logperiodic (300MHz-1GHz)	Horn

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

The EUT was tested in the direction normally used.

11.5 Band edge

Band edge level at 2390MHz, 2400MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of radiated emission.

11.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.

Date : February 24, 2009 Test engineer : Tatsuya Arai and Yasumasa Owaki

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APPENDIX 1: Photographs of test setup

Page 11 : Radiated emission

APPENDIX 2: Test data

Page 12 : Carrier frequency separation
Page 13 - 14 : 20dB bandwidth
Page 15 - 17 : Number of hopping frequency
Page 18 - 25 : Dwell time
Page 26 : Maximum peak output power
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Page 36 - 45 : Out of band emissions (Radiated)
Page 46 : Duty cycle
Page 47 - 48 : Occupied bandwidth

APPENDIX 3: Test instruments

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