# RADIO TEST REPORT

## Test Report No.: 30DE0159-YK-01-A

| | | |
|---|---|---|
| **Applicant** | : | **PIONEER CORPORATION** |
| **Type of Equipment** | : | **Multi-Media AVN Navigation Server System with BT** |
| **Model No.** | : | **AVIC-X920BT** |
| **FCC ID** | : | **AJDK031** |
| **Test regulation** | : | **FCC Part15 Subpart C: 2009** |
| **Test result** | : | **Complied** |

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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:** December 1, 2, 3 and 7, 2009

**Tested by:** M. Nakatake
Minoru Nakatake & Yasumasa Owaki

**Approved by:** T. Imamura
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# 1 Applicant information

| | | |
|---|---|---|
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| Contact Person | : | Kota Kumamoto, Tetsuya Higuchi |

# 2 Equipment under test (E.U.T.)

## 2.1 Identification of E.U.T.

| | | |
|---|---|---|
| Type of Equipment | : | Multi-Media AVN Navigation Server System with BT |
| Model No. | : | AVIC-X920BT |
| Serial No. | : | Refer to 4.2 in this report. |
| Rating | : | DC14.4V |
| Country of Mass-production | : | Thailand |
| Condition of EUT | : | Production prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification of EUT | : | No modification by the test lab. |
| Receipt Date of Sample | : | November 30, 2009 |

## 2.2 Product description

Model: AVIC-X920BT (referred to as the EUT in this report) is a Multi-Media AVN Navigation Server System with BT.

Clock frequency:
System microcomputer: 15MHz, CD mechanism: 27MHz
FM/AM Tuner: 39.9MHz (1st: 10.7MHz, 2nd: 700kHz), Bluetooth: 26MHz
CPU: 12MHz, 36.768kHz (42MHz, 24.576MHz, 33.23MHz, 33.3MHz)
GPS: 16.367677MHz
DC-DC converter (1): 480kHz/500kHz, DC-DC converter (2): 2.25MHz, DC-DC converter (3): 1.93MHz,
DC-DC converter (4): 780kHz/635kHz, DC-DC converter (5): 450kHz/400kHz,
DC-DC converter (6): 500kHz/430kHz, DC-DC converter (7): 2.31MHz,
DC-DC converter (8): 384.61kHz/405.4054kHz

| | | |
|---|---|---|
| Equipment type | : | Transceiver |
| Frequency of operation | : | 2402-2480MHz |
| Bandwidth & channel spacing | : | 79MHz & 1MHz |
| Type of modulation | : | FHSS |
| Antenna type | : | AMD0302-ST01, λ/4 type (made by Mitsubishi Material) |
| Antenna gain with cable loss | : | +1.6dBi |
| Antenna connector type | : | Micro coaxial |
| ITU code | : | F1D, G1D |
| Operation temperature range | : | -10 to +60 deg.C. |

The difference between the EUT and its derived models:

| Comparison item | AVIC-X920BT | AVIC-Z120BT |
|---|---|---|
| Screen size | 6.1-inch | 7-inch |
| Front panel | Not Removable | Removable |
| Rear monitor output | Visual | Visual, Audio |

FCC Part15.31 (e)
The equipment provides the Bluetooth transmitter with stable power supply (DC 3.3 V), 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.

# 3 Test specification, procedures and results

## 3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2009, final revised on December 2, 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 EUT complies with FCC Part 15 Subpart B: 2009, final revised on December 2, 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 | 3.7dB (866.67MHz, Horizontal, Tx 2480MHz, DH5) | Complied |
| Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15.<br>*1) The test is not applicable since the EUT has no AC mains. | | | | | | |

### 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.

### 3.4 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 |

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

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

### 3.5 Test location

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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 |

# 4 System test configuration

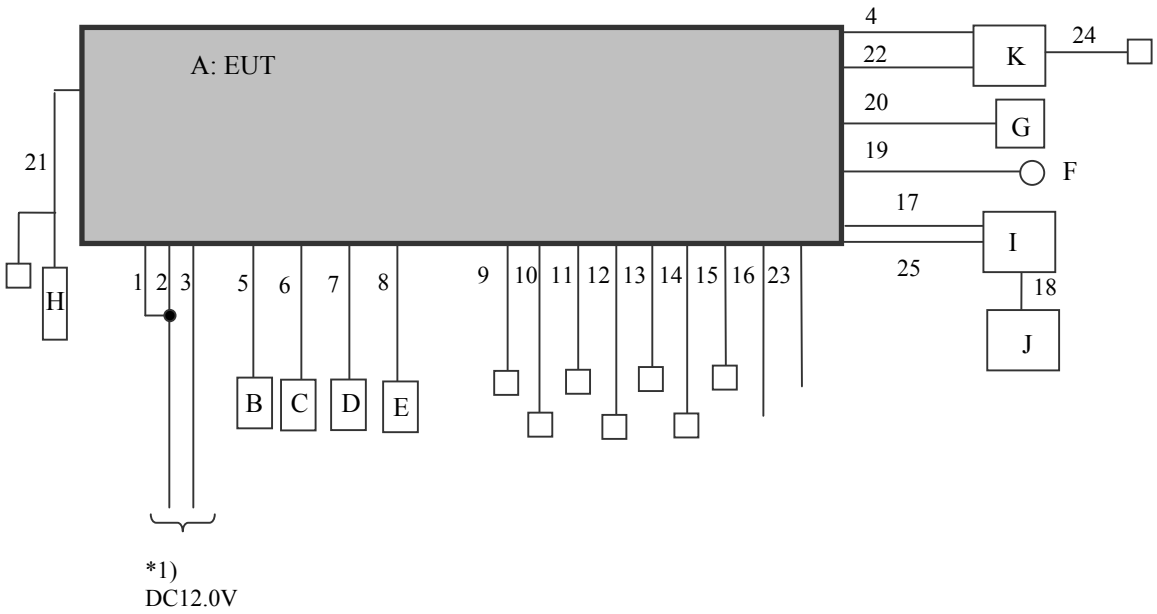
## 4.1 Justification

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 (DH5/3DH5)/Inquiry, Payload: PRBS9 | - |
| 20dB bandwidth | Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9 | 2402MHz, 2441MHz, 2480MHz |
| Number of hopping frequency | Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9 | - |
| Dwell time | Transmitting (Hopping ON)<br>-DH1, -DH3, -DH5<br>-3DH1, -3DH3, -3DH5 | - |
| | -Inquiry | |
| Maximum peak output power | Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9<br>-DH5, -2DH5, -3DH5 | 2402MHz, 2441MHz, 2480MHz |
| Band edge compliance & Spurious emission (Conducted) | Transmitting (DH5/3DH5), Payload: PRBS9<br>-Hopping ON/Inquiry<br>-Hopping OFF | Band edge compliance:<br>2402MHz, 2480MHz<br>Spurious emission:<br>2402MHz, 2441MHz, 2480MHz |
| (Radiated) | Transmitting (DH5/3DH5), Payload: PRBS9 | |
| 99% occupied bandwidth | Transmitting (DH5/3DH5), Payload: PRBS9<br>-Hopping ON<br>-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 125mWof AFH mode was used for the test.

### 4.2 Configuration and peripherals




* Test data was taken under worse case conditions.

**Description of EUT and support equipment**

| No. | Item | Model number | Serial number | Manufacturer | Remarks |
|---|---|---|---|---|---|
| A | Multi-Media AVN Navigation Server System with BT | AVIC-X920BT | *2) | PIONEER | EUT |
| B | Dummy speaker load | RHF100N | - | - | - |
| C | Dummy speaker load | RHF100N | - | - | - |
| D | Dummy speaker load | RHA100N | - | - | - |
| E | Dummy speaker load | RHA100N | - | - | - |
| F | Hands free Microphone | CPM1083-A | - | PIONEER | - |
| G | GPS antenna | CZX5496-A | - | PIONEER | - |
| H | USB memory | SOK-USM4GL (B) | - | SONY | - |
| I | Wired remote controller unit | CD-MR80D | 07200808C | PIONEER | - |
| J | Wired remote controller | CZX5156 | HH | PIONEER | - |
| K | MSN tuner | ND-MDT10 | IECZ000035UC | PIONEER | - |

*1) DC power supply (Model No.: PAN35-10A) was used for DC 12.0V input.
*2) Radiated emission: IKTP000060, Other test: IKTP000057

**List of cables used *3)**

| No. | Name | Length (m) | Shield | | Remark |
|---|---|---|---|---|---|
| | | | Cable | Connector | |
| 1 | Accessory cable | 0.1 + 3.0 | Unshielded | Unshielded | - |
| 2 | Battery cable | 0.1 + 3.0 | Unshielded | Unshielded | - |
| 3 | Ground cable | 0.1 + 3.0 | Unshielded | Unshielded | - |
| 4 | Coaxial cable (Antenna) | 0.3 | Shielded | Shielded | - |
| 5 | Speaker cable (Front L) | 0.1 + 0.9 | Unshielded | Unshielded | - |
| 6 | Speaker cable (Front R) | 0.1 + 0.9 | Unshielded | Unshielded | - |
| 7 | Speaker cable (Rear L) | 0.1 + 0.9 | Unshielded | Unshielded | - |
| 8 | Speaker cable (Rear R) | 0.1 + 0.9 | Unshielded | Unshielded | - |
| 9 | RCA cable (Front Output) | 0.1+ 1.9 | Shielded | Shielded | Terminated |
| 10 | RCA cable (Rear Output) | 0.1 + 1.0 | Shielded | Shielded | Terminated |
| 11 | RCA cable (Subwoofer Output) | 0.2 + 1.0 | Shielded | Shielded | Terminated |
| 12 | RCA cable (Audio Input) | 0.1 + 1.0 | Shielded | Shielded | Terminated |
| 13 | Video cable (Video Input) | 0.1 + 1.0 | Shielded | Shielded | Terminated |
| 14 | Video cable (Rear Monitor Output) | 0.15 + 1.0 | Shielded | Shielded | Terminated |
| 15 | Video cable (Rear View Camera In) | 0.15 + 1.0 | Shielded | Shielded | Terminated |
| 16 | System remote control cable | 0.3 | Unshielded | Unshielded | - |
| 17 | IP-BUS cable | 1.6 | Shielded | Shielded | - |
| 18 | Remote control cable | 0.15 | Shielded | Shielded | - |
| 19 | Microphone cable | 4.0 | Shielded | Shielded | - |
| 20 | GPS antenna cable | 3.5 | Shielded | Shielded | - |
| 21 | USB cable + Audio Input cable | 2.0 | Shielded | Shielded | - |
| 22 | MSN tuner unit cable | 1.0 | Shielded | Shielded | - |
| 23 | Mute cable | 0.3 | Unshielded | Unshielded | - |
| 24 | Coaxial cable (Antenna) | 0.85 | Shielded | Shielded | Terminated |
| 25 | Remote control cable | 1.45 | Shielded | Shielded | - |

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

## 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

## 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

## 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

## 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

## 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

## 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

# 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, 0.9m 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,<br>AV*1): RBW: 1MHz/VBW: See data |
| Measuring antenna | Biconical (30-300MHz)<br>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.

## 11.6 Results

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

## APPENDIX 1: Photographs of test setup



## APPENDIX 2: Test data



## APPENDIX 3: Test instruments