



RADIO TEST REPORT

Test Report No.: 31HE0102-SH-04-B

Applicant : KONICA MINOLTA MEDICAL & GRAPHIC, INC.
Type of Equipment : AeroDR SYSTEM
Model No. : AeroDR P-21
FCC ID : YR7AERODRP2
Test regulation : FCC Part15 Subpart C: 2011
Test result : Complied

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Date of test:

August 19 - 29, 2011

**Representative
test engineer:**

T. Arai

Tatsuya Arai
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UL Verification Service

Approved by:

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13-EM-F0429

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1 Applicant information

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Contact Person : Masayoshi Inoue

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

2.1 Identification of E.U.T.

Type of Equipment : AeroDR SYSTEM
Model No. : AeroDR P-21
Serial No. : 19
Rating : DC15V
Country of Mass-production : Japan
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.
Receipt Date of Sample : August 4, 2011

2.2 Product description

Model: AeroDR P-21 (referred to as the EUT in this report) is a AeroDR SYSTEM.

Equipment type : Transceiver
Frequency of operation : 5180-5320MHz *1
5500-5700MHz *1
5745-5825MHz
Clock frequency : 32.768kHz, 26MHz
Bandwidth & channel spacing : Bandwidth : 18MHz
Channel spacing : 20MHz
Type of modulation : 11a : OFDM
Antenna type : Planar Inverted F Antenna
Antenna gain with cable loss : +3.78dBi
Antenna connector type : U.FL
ITU code : D1D, G1D
Operation temperature range : +10 to +30 deg.C.

*1) Refer to 31HE0102-SH-04-A, FCC part 15E (FCC15.407) report.

FCC Part15.31 (e)

This EUT provides stable voltage (DC3.3V) constantly to RF part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part15.203 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.

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3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part 15 Subpart E: 2011, final revised on July 8, 2011 and effective August 8, 2011
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

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 15.207	-	N/A *1	N/A	N/A
6dB Bandwidth	"Guidance on Measurement for Digital Transmission Systems Section 15.247" & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(2) & 15.209	Conducted	N/A	-	Complied
Maximum Peak Output Power	"Guidance on Measurement for Digital Transmission Systems Section 15.247" & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (b)(3) & 15.209	Conducted	N/A	-	Complied
Out of Band Emission & Restricted Band Edges	"Guidance on Measurement for Digital Transmission Systems Section 15.247" & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	2.8dB (3883.331MHz, Horizontal, AV, 11a Tx 5825MHz)	Complied
Power Density	"Guidance on Measurement for Digital Transmission Systems Section 15.247" & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (e)	Conducted	N/A	-	Complied

*1) This equipment cannot operate WLAN card when it is connected to the control box at the interface cable. In that case, it can only use wire communication mode. This mode is tested by customer based on IEC 60601-1-2 for the compliance of Part 15 subpart B.

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

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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

Item	Frequency range	No.1 SAC ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.3 dB	2.7 dB	3.4 dB
	30MHz-300MHz	4.7 dB	4.5 dB	4.7 dB
	300MHz-1GHz	4.5 dB	4.6 dB	4.6 dB
	1GHz-13GHz	3.9 dB	3.9 dB	4.0 dB
Radiated emission (Measurement distance: 1m)	13GHz-18GHz	4.8 dB	4.8 dB	4.8 dB
	18GHz-40GHz	4.4 dB	4.2 dB	4.2 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides radiated emission

Radiated Emission Test

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

Antenna port conducted test

Power Measurement uncertainty above 1GHz for this test was: (±) 1.3dB

Spurious emission (Conducted), Power density Measurement (below 1GHz) uncertainty for this test was: (±) 1.9dB

Spurious emission (Conducted), Power density Measurement (1G-3GHz) uncertainty for this test was: (±) 2.5dB

Spurious emission (Conducted), Power density Measurement (3G-18GHz) uncertainty for this test was: (±) 3.8dB

Spurious emission (Conducted), Power density Measurement (18G-26.5GHz) uncertainty for this test was: (±) 4.1dB

Bandwidth Measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

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JAB Accreditation No. : RTL02610

No.1/ No.2/ No.3 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on April 17, 2009 (Registration No.: 697847).

IC Registration No. : 2973D-1 (No1 anechoic chamber)

2973D-2 (No2 anechoic chamber)

2973D-3 (No3 anechoic chamber)

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.1 Shielded room	6.8 x 4.1 x 2.7
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.2 Shielded room	6.8 x 4.1 x 2.7
No.3 Semi-anechoic chamber	12.7 x 7.7 x 5.35 Maximum measurement distance: 5m	No.3 Shielded room	6.3 x 4.7 x 2.7
No.4 Full-anechoic chamber	8.1 x 5.1 x 3.55	No.4 Shielded room	4.4 x 4.7 x 2.7
		No.5 Shielded room	7.8 x 6.4 x 2.7
		No.6 Shielded room	7.8 x 6.4 x 2.7

3.6 Test setup, Data of EMI & Test instruments

Refer to Appendix 1 to 3.

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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.

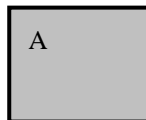
Test Item	Operating Mode	Tested frequency
Spurious Emission 6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	-IEEE802.11a Transmitting (Tx), 36Mbps, Payload: PN9	5745MHz(L) 5785MHz(M) 5825MHz(H)
*The worst condition was determined based on the test result of Maximum Peak Output Power (Low Channel)		

*EUT has the power settings by the software as follows;

Power settings: 14

Software: KM-TB7-R-052-00 Version 00

4.2 Configuration and peripherals



Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks (FCC ID)
A	AeroDR SYSTEM	AeroDR P-21	19	KONICA MINOLTA MEDICAL & GRAPHIC, INC.	EUT (YR7AERODRP2)

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5 6dB bandwidth & Occupied bandwidth (99%)

Test procedure

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

Summary of the test results: Pass

Date : August 25, 2011

Test engineer : Tatsuya Arai

6 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 : August 19, 2011

Test engineer : Shinichi Takano

7 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 radiated measurement.

In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass

Date : August 19, 2011

Test engineer : Shinichi Takano

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8 Out of band emissions (Radiated)

8.1 Operating environment

The test was carried out in No.3 anechoic chamber.

8.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. Photographs of the set up are shown in Appendix 1.

8.3 Test conditions

Frequency range : 30MHz - 40GHz

8.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m(below 13GHz) and 1m(above13GHz).

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 *1)
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 3MHz, AV RBW: 1MHz VBW: 10Hz (No pulse noise)
Measuring antenna	Biconical (30-300MHz) Logperiodic (300MHz-1GHz)	Horn
Test distance	3m	3m(below 13GHz) 1m(above 13GHz)

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

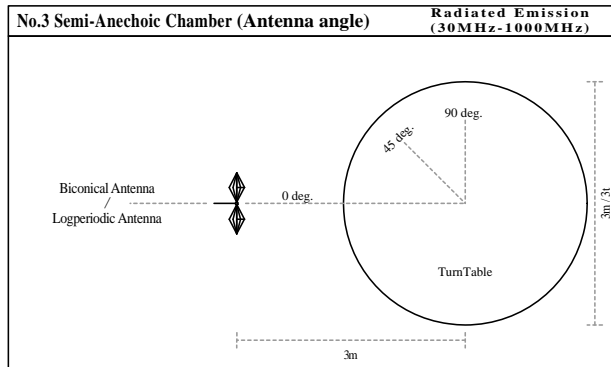
The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Combinations of the worst case

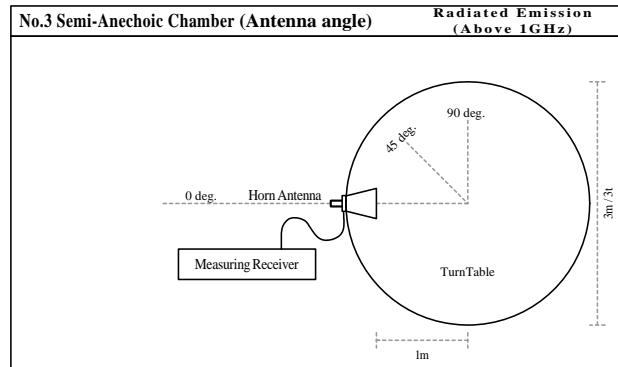
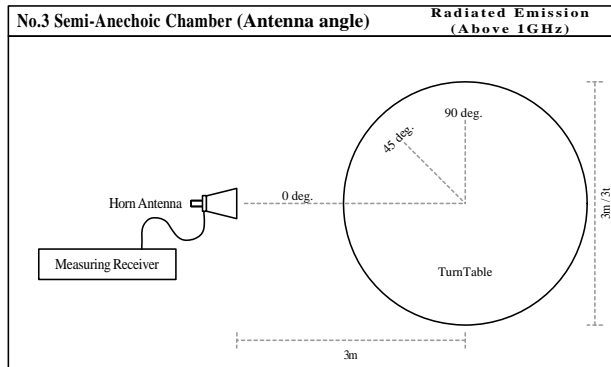
Model	Worst position	
	Below 1GHz	Above 1GHz
EUT	Horizontal: X, Vertical: X	Carrier: Horizontal: X, Vertical: Z Spurious: Horizontal: X, Vertical: Z

Figure 1. Antenna angle

Below 1GHz



Above 1GHz



8.5 Band edge

Band edge level at 5725MHz and 5850MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

8.6 Results

Summary of the test results : Pass

Date : August 22 - 29, 2011

Test engineer : Shinichi Takano and Tatsuya Arai

9 Peak power density

Test procedure

The peak power density was measured with a spectrum analyzer connected to the antenna port.

Instrument used : Spectrum Analyzer *1)

RBW / VBW : 30kHz / 100kHz *2)

*1) PSD Option 1 of " Measurement of Digital Transmission Systems Operating under Section 15.247".

*2) The test was not performed at RBW : 3kHz that was stated in the Regulation.

However, the measurement value with RBW: 3kHz is less than the value of RBW: 30kHz and the test data met the limit with RBW: 30kHz.

Summary of the test results: Pass

Date : August 19, 2011

Test engineer : Shinichi Takano

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APPENDIX 1: Test data

Page 12	:	6dB bandwidth
Page 13	:	Maximum peak output power
Page 14 - 16	:	Out of band emissions (Radiated)
Page 17 - 23	:	Out of band emissions (Antenna port conducted)
Page 24	:	Peak power density
Page 25	:	Occupied bandwidth

APPENDIX 2: Test instruments

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APPENDIX 3: Photographs of test setup

Page 28	:	Radiated emission
Page 29	:	Pre-check of the worst position