



RADIO TEST REPORT

Test Report No.: 31CE0283-HO-01-A

Applicant : FUJIFILM Corporation
Type of Equipment : D-EVO G35i
Model No. : DR-ID 601SE
FCC ID : W2Z-01000001
Test regulation : FCC Part15 Subpart E: 2010
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:

November 30, December 1, 2 and 3, 2010

Representative
test engineer:

Tatsuya Arai
Engineer of EMC Service

Approved by:

Toyokazu Imamura
Leader of EMC Service

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone: +81 463 50 6400

Facsimile: +81 463 50 6401

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Table of Contents	Page
1 Applicant information	3
2 Equipment under test (E.U.T.)	3
3 Test specification, procedures and results	4
4 System test configuration	7
5 26dB Bandwidth & Occupied Bandwidth (99%)	9
6 Maximum Peak Output Power	9
7 Peak Power Spectral Density	9
8 Peak Excursion Ratio	9
9 Out of Band Emissions (Antenna Port Conducted)	9
10 Out of band emissions (Radiated)	10
Contents of Appendixes	11
APPENDIX 1: Photographs of test setup	12
APPENDIX 2: Test data	14
APPENDIX 3: Test instruments	92

1 Applicant information

Company Name : FUJIFILM Corporation
Address : 798 Miyanodai, Kaisei-Machi, Ashigarakami-Gun, Kanagawa-ken, 258-8538,
Japan
Telephone Number : +81-465-85-4054
Facsimile Number : +81-465-85-2043
Contact Person : Hiroshi Ikarashi

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

2.1 Identification of E.U.T.

Type of Equipment : D-EVO G35i
Model No. : DR-ID 601SE
Serial No. : A121014
Rating : DC12V
Country of Mass-production : Japan
Condition of EUT : Production 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 : November 29, 2010

2.2 Product description

Model: DR-ID 601SE (referred to as the EUT in this report) is a D-EVO G35i.

Equipment type : Transceiver
Frequency of operation : 802.11a, 11n-20: 5180-5240MHz
802.11n-40: 5190-5230MHz
Clock frequency : 40MHz
Bandwidth & channel spacing : Bandwidth : 20MHz / 40MHz
Channel spacing : 20MHz / 40MHz
Type of modulation : OFDM
Antenna type : Planar Inverted F Antenna
Antenna quantity : 3 pcs. (Location: Top, Side-top, Side-bottom)
All three antenna model are same. The different is the mounted location and the RF cable length b/w antenna and RF module.
IEEE 802.11a: Only the specified antenna transmits independently.
IEEE.802.11n: Specified two antennas, or all three antennas (diversity) can transmit and receive simultaneously, however up to 2 streams are supported when three antennas are transmitted. For the pre-selected multiple antenna transmission, only two antennas combination are supported either top and side-top antenna or top and side-bottom antenna
Antenna gain with cable loss : Stand alone: -3.5dBi
Mounted in host device
Antenna1 (side top): -7.3dBi
Antenna2 (side bottom): -10.2dBi
Antenna3 (top): -8.5dBi
Antenna connector type : U.FL
ITU code : D1D
Operation temperature range : +5 to +35 deg.C.

UL Japan, Inc. Shonan EMC Lab.

1-22-3 Megumioka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Facsimile: +81 463 50 6401

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.

3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part 15 Subpart E: 2010, final revised on October 13, 2010
Title : FCC 47CFR Part15 Radio Frequency Device
: Subpart E Unlicensed National Information Infrastructure Devices
: Section 15.407 General technical requirements

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	15.407 (b)(6) and 15.207	-	N/A *1)	N/A	N/A
26dB Emission Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.407(a)(1)(2)	Conducted	N/A	See data	Complied
Maximum Peak Output Power	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)	Conducted	N/A		Complied
Peak Power Spectral Density	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)	Conducted	N/A		Complied
Peak Excursion Ratio	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.407 (a)(6)	Conducted	N/A		Complied
Out of Band Emission & Restricted Band Edges	ANSI C63.4:2003 13. Measurement of intentional radiators	15.407 (b)(1)(2)(4)(6) (7), 15.205 and 15.209	Conducted	N/A		Complied
Out of Band Emission & Restricted Band Edges	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.109, 15.407 (b)(1)(2)(5)(6) (7), 15.205 and 15.209	Radiated	N/A	9.0dB (109.087MHz, Vertical, QP, 11a Tx 5180MHz)	Complied
Dynamic Frequency Selection	FCC 06-96 APPENDIX	FCC 15.407 (h)(2)	Conducted	N/A *2)	N/A	N/A

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

These tests were also referred to FCC Public Notice DA02-2138 "Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands".

*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.

*2) The test is not applicable since the EUT operated 5180MHz – 5240MHz.

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumiyaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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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

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

Item	Frequency range	No.1 SAC ^{*1} (±)	No.2 SAC (±)	No.3 SAC (±)
Radiated emission (Measurement distance: 3m)	30MHz-300MHz	4.6 dB	4.5 dB	4.9 dB
	300MHz-1GHz	4.5 dB	4.6 dB	5.1 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	4.2 dB	4.2 dB	4.2 dB

*1: SAC=Semi-Anechoic Chamber

Radiated Emission Test

The data listed in this test report has enough margin, more than site margin.

Antenna Conducted Test

Conducted emissions Measurement (below 1GHz) uncertainty for this test was: (±) 1.1dB
Conducted emissions Measurement (1G-3GHz) uncertainty for this test was: (±) 1.2dB
Conducted emissions, Power Density Measurement (3G-18GHz) uncertainty for this test was: (±) 2.9dB
Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 3.4dB
Conducted emissions Measurement (26.5G-40GHz) uncertainty for this test was: (±) 3.7dB
Power Measurement uncertainty above 1GHz for this test was: (±) 0.8dB
Bandwidth Measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone number : +81 463 50 6400

Facsimile number : +81 463 50 6401

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.

UL Japan, Inc.
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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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.

Mode	Remarks*
IEEE 802.11a	6Mbps, PN9
IEEE 802.11n-20	MCS0, PN9
IEEE 802.11n-40	MCS0, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Low Channel)	

Test Item	Operating Mode	Tested frequency
26dB Bandwidth Occupied Bandwidth (99%) Maximum Peak Output Power Peak Power Spectral Density	11a Tx, Ant3	5180MHz
	11n-20 Tx, Ant1+2+3	5220MHz
	11n-20 Tx, Ant1, Ant2, Ant 3	5240MHz
	11n-40 Tx, Ant1+2+3	5190MHz
Peak Excursion Ratio	11n-40 Tx, Ant1, Ant2, Ant 3	5230MHz
	11a Tx, Ant3	5180MHz
	11n-20 Tx, Ant1, Ant2, Ant 3	5220MHz
	5240MHz	
Out of Band Emissions (Radiated) Band Edge compliance (Conducted)	11n-40 Tx, Ant1, Ant2, Ant 3	5190MHz
	11a Tx, Ant3	5180MHz
	11n-20 Tx, Ant1+2+3	5220MHz
	5240MHz	
Out of Band Emissions (Conducted)	11n-40 Tx, Ant1+2+3	5190MHz
	11a Tx, Ant3	5180MHz
	11n-20 Tx, Ant3	5220MHz
	5240MHz	
	11n-40 Tx, Ant3	5190MHz
		5230MHz

*It was verified Data Rate and Antenna Port with maximum power.

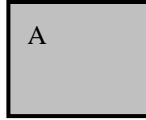
*The formal test were performed with maximum power.

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

Power settings: 11a:13dBm, 11n-20:10dBm, 11n-40:10dBm

Software: Tera Term Pro Version 2.3(1.11J)

4.2 Configuration and peripherals



Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remark)
A	D-EVO G35i	DR-ID 601SE	A121014	FUJIFILM	W2Z-01000001 (EUT)

5 26dB 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 : December 3, 2010

Test engineer : Akio Hayashi

6 Maximum Peak Output Power

Test Procedure

The Maximum Peak Output Power was measured with a spectrum analyzer connected to the antenna port.

The test was made with the spectrum analyzer that has a function of channel-power measurement.

We followed the method 1 specified in DA-02-2138A1.

Summary of the test results: Pass

Date : November 30, 2010

Test engineer : Tatsuya Arai

7 Peak Power Spectral Density

Test Procedure

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

We followed the method 2 specified in DA-02-2138A1.

Summary of the test results: Pass

Date : December 3, 2010

Test engineer : Akio Hayashi

8 Peak Excursion Ratio

Test Procedure

The Peak Excursion Ratio was measured with a spectrum analyzer connected to the antenna port.

The second sweep was measured based on method 1 specified in DA-02-2138A1

Summary of the test results: Pass

Date : December 3, 2010

Test engineer : Akio Hayashi

9 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.

Summary of the test results: Pass

Date : November 30, 2010

Test engineer : Tatsuya Arai

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone: +81 463 50 6400

Facsimile: +81 463 50 6401

10 Out of band emissions (Radiated)

10.1 Operating environment

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

10.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 1.5m, raised 80cm above the conducting ground plane. Photographs of the set up are shown in Appendix 1.

10.3 Test conditions

Frequency range : 30MHz - 40GHz

10.4 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 emission detected)
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 equipment was previously checked at each position of three axis X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement.

Combinations of the worst case

Model	Worst position	
	Below 1GHz	Above 1GHz
EUT	Horizontal: X, Vertical: X	11a: Horizontal: X, Vertical: Z 11n: Horizontal: Y, Vertical: X

10.5 Band edge

Band edge level at 5150MHz and 5350MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

10.6 Results

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

Date : December 1 and 2, 2010 Test engineer : Takahiro Suzuki, Hikaru Shirasawa and Tatsuya Arai

UL Japan, Inc.
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone: +81 463 50 6400

Facsimile: +81 463 50 6401

APPENDIX 1: Photographs of test setup

Page 12	:	Radiated emission
Page 13	:	Pre-check of the worst position

APPENDIX 2: Test data

Page 14 - 30	:	26dB bandwidth & 99% Occupied Bandwidth
Page 31 - 41	:	Peak Output Power
Page 42 - 57	:	Out of band emissions (Radiated)
Page 58 - 75	:	Out of band emissions (Antenna port conducted)
Page 76 - 83	:	Peak power density
Page 84 - 91	:	Peak Excursion Ratio

APPENDIX 3: Test instruments

Page 92	:	Test instruments
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