



RADIO TEST REPORT

Test Report No.: 30AE0214-YK-01-B

Applicant : Canon Inc.
Type of Equipment : Wireless Lens Control Receiver Module
Model No. : RX PCB
FCC ID : AZD5247
Test regulation : FCC Part15 Subpart C: 2010
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: January 25, 26, 28 and February 1, 2, 3, 4, 2010

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1 Applicant information

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless Lens Control Receiver Module
Model No. : RX PCB
Serial No. : 0907ND004
Rating : DC 10.0V~17.0V
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 : January 25, 2010

2.2 Product description

Model: RX PCB (referred to as the EUT in this report) is a Wireless Lens Control Receiver Module.

Clock frequency : 10MHz (CPU)

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth & channel spacing : 79MHz & 1MHz
Type of modulation : FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)
Antenna type : Planar Inverted-F
Antenna gain : 3.21dBi
Antenna connector type : None
ITU code : F1D, G1D
Operation temperature range : -20 to +45 deg.C.

FCC Part15.31 (e)

The Bluetooth module has a regulator to regulate the power from DC 10.0V~17.0V to DC 3.3V. Therefore, the equipment complies with power supply regulation.

FCC Part15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the module, therefore, the equipment complies with the requirement of 15.203.

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3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2010,
 final revised on January 22, 2010 and effective March 1, 2010
 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 January 22, 2010 does not affect the test specification applied to the EUT.

The EUT complies with FCC Part 15 Subpart B: 2010. Refer to the test report 30AE0214-YK-01-K.

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	29.7dB (N, QP, 0.1967MHz, Tx 2402MHz, DH5 & 0.1949MHz, Tx 2402MHz, 3DH5)	Complied	
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		9.6dB (2397.44MHz, AV, Vertical, Tx 2402MHz, DH5)	Complied
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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3.4 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 semi-anechoic chamber (±)
Conducted emission (AC mains)			
150kHz-30MHz	3.5 dB	3.5 dB	3.5 dB
Radiated emission (3m)			
9kHz-30MHz	3.3 dB	3.2 dB	3.0 dB
30-300MHz	4.4 dB	4.5 dB	4.6 dB
300-1000MHz	4.6 dB	4.7 dB	4.7 dB
1-18GHz	3.8 dB	4.2 dB	4.5 dB
18-26.5GHz	4.4 dB	4.5 dB	4.5 dB

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

Conducted emission test

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

Radiated emission test

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

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

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4 System configuration

4.1 Justification

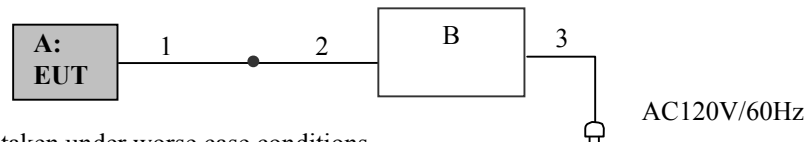
The system was configured in typical fashion (as a customer would normally use it) for testing.

Test item	Operating mode	Tested frequency
Conducted emission	Transmitting (DH5/3DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
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), Payload: PRBS9 -DH1, -DH3, -DH5 -3DH1, -3DH3, -3DH5 -Inquiry	-
Maximum peak output power	Transmitting (Hopping OFF), Payload: PRBS9 -DH5, -2DH5, -3DH5 -Inquiry	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON/Inquiry -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5/3DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3DH5), 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.

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	Wireless Lens Control Receiver Module	RX PCB	0907ND004	Canon	EUT
B	DC power supply	PAN55-20A	DD000084	Kikusui	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC cable	0.95	Unshielded	Unshielded	-
2	DC cable	0.7	Unshielded	Unshielded	-
3	AC cable	2.0	Unshielded	Unshielded	-

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5 Conducted emissions

5.1 Operating environment

The test was carried out in No.1 shielded room.

5.2 Test configuration

EUT was placed on a wooden platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of the EUT and its peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN) and excess AC cable was bundled in center. Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz

5.4 Test procedure

The EUT was connected to a LISN (AMN). An overview sweep with peak detection has been performed. The Conducted emission measurements were made with the following detector function of the test receiver.

Detector: QP/AV
IF Bandwidth: 9kHz

5.5 Results

Summary of the test results : Pass

6 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

7 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

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8 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

9 Dwell time

Test procedure

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

Summary of the test results: Pass

10 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

11 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

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12 Out of band emissions (Radiated)

12.1 Operating environment

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

12.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. EUT was placed on a urethane platform of nominal size, 1.8m by 0.9m, 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.

12.3 Test conditions

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

12.4 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*1): RBW: 1MHz/ VBW: 1MHz or 300Hz (See data)
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 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.

Antenna	Worst position	
	Below 1GHz	Above 1GHz
Horizontal	X	Y
Vertical	X	Y

12.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

12.6 Results

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

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APPENDIX 1: Photographs of test setup

Page 11	:	Conducted emission
Page 12	:	Radiated emission
Page 13	:	Pre-check of the worst position

APPENDIX 2: Test data

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Page 24	:	Carrier frequency separation
Page 25 - 27	:	20dB bandwidth
Page 28 - 32	:	Number of hopping frequency
Page 33 - 46	:	Dwell time
Page 47	:	Maximum peak output power
Page 48 - 65	:	Out of band emissions (Antenna Port Conducted)
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Page 84	:	Duty cycle
Page 85 - 87	:	Occupied bandwidth

APPENDIX 3: Test instruments

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