RADIO TEST REPORT

Test Report No.: 10836676S-A

(Original test report: 31JE0038-SH-01-A-R1)

Applicant	:	**FUJIFILM Corporation**
Type of Equipment	:	**Flat Panel Sensor**
Model No.	:	**DR-ID 613SE**
FCC ID	:	**W2Z-01000004**
Test regulation	:	**FCC Part15 Subpart E: 2015**
Test item	:	**Conducted emission, Radiated emission**
Test result	:	**Complied**

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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.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: June 30 to July 4, 2015

Representative test engineer:

Yosuke Ishikawa
Engineer
Consumer Technology Division

Approved by :

Toyokazu Imamura
Leader
Consumer Technology Division

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

RTL02610

UL Japan, Inc.
Shonan EMC Lab.
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REVISION HISTORY

Original Test Report No.: 10836676S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10836676S-A	July 21, 2015	-	-
1	10836676S-A	July 28, 2015	4	Correction of Rating
2	10836676S-A	August 17, 2015	7	Correction of information of AC Adaptor

Contents

SECTION 1: Customer 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	:	Tomonari Sendai

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

2.1 Identification of E.U.T.

Type of Equipment	:	Flat Panel Sensor
Model Number	:	DR-ID 613SE
Serial Number	:	26990005
Rating	:	DC 12 V AC 100 -240 V, 47-63 Hz (AC Adaptor)
Country of Mass-production	:	Japan
Condition of EUT	:	Production model
Receipt Date of Sample	:	June 18, 2015
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: DR-ID 613SE (referred to as the EUT in this report) is a Flat Panel Sensor.

Radio Specification

Radio Type	:	Transceiver
Method of Frequency Generation	:	Synthesizer
Power Supply (inner)	:	DC3.3V
Antenna Gain	:	2.14dBi
Antenna Cable loss	:	2.3dB(5.15GHz)～2.5dB(5.25GHz) *The cable loss is proportional from 5.15GHz to 5.25GHz.
Clock frequency	:	40MHz

	IEEE802.11a	IEEE802.11n (20 M band)	IEEE802.11n (40 M band)
Frequency of operation	5180-5240MHz	5180-5240MHz	5190 - 5230MHz
Type of modulation	OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channel spacing	20MHz	20MHz	40MHz
Antenna type	Planer inverted F antenna		
Antenna Connector type	U.FL Alternative connector		

FCC 15.31 (e)
This EUT provides stable voltage (DC3.3V) constantly to RF part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 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.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart E: 2015, final revised on June 12, 2015 and effective July 13, 2015
Title : FCC 47CFR Part15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.407 General technical requirements

* The revision on June 12, 2015 does not affect the test specification applied to the EUT.

3.2 Procedures & Results

Item	Test Procedure *1)	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.407 (b)(6) & 15.207	-	N/A	13.6 dB Freq.: 12.22356 MHz Detector: Average Phase: L1 Mode: IEEE802.11n(HT20), Tx, 5240 MHz	Complied
6dB, 26dB & 20dB emission bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3) FCC 15.215 (c)	Conducted	*2)	-	N/A
Maximum conducted output power	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3)	Conducted	*2)		N/A
Peak power spectral density	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3)	Conducted	*2)		N/A
Spurious emission & Restricted band edges	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.109, 15.407 (b), 15.205 & 15.209	Radiated	N/A	6.5 dB Freq.: 31.6 MHz Detector: Quasi-Peak Polarization: Vertical Mode: Tx, 5240 MHz IEEE802.11n (HT20)	Complied
Dynamic frequency selection	FCC 06-96 APPENDIX	FCC 15.407 (h)	Conducted	N/A*3)	N/A	N/A

*1) These tests were also referred to KDB 789033 (FCC), "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".
*2) Refer to the test report31JE0038-SH-01-A-R1.
*3) The test is not applicable since the EUT does not operate in the 5.25-5.35 GHz and 5.47-5.725 GHz bands.
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422

3.3 Addition to standard

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]/SR[*2] (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	3.6 dB	3.4 dB	3.4 dB
Radiated emission (Measurement distance: 3m)	9 kHz-30 MHz	3.7 dB	3.5 dB	3.5 dB
	30 MHz-300 MHz	4.9 dB	4.9 dB	4.7 dB
	300 MHz-1 GHz	5.0 dB	5.0 dB	4.8 dB
	1 GHz-15 GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB
	18 GHz-40 GHz	4.5 dB	4.3 dB	4.3 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

Conducted emission test

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

Radiated emission test

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

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
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Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐ No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.7 Shielded room	-	2.76 x 3.76 x 2.4	2.76 x 3.76	-
☐ No.8 Shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
☐ No.1 Measurement room	-	2.55 x 4.1 x 2.5	2.55 x 4.1	-

3.6 Test setup, Test data & Test instruments

Refer to APPENDIX 1 to 3.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating mode

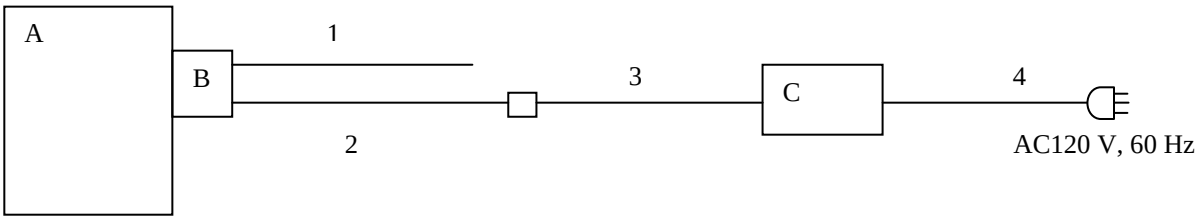
Test item	Mode	Tested frequency	Worst data rate *1)	Antenna
Conducted emission, Radiated emission (below 1GHz) *1)	Transmitting IEEE 802.11n (HT20), MIMO	5240 MHz	MCS8, PN9	Side & Bottom
Radiated emission (above 1GHz) *2)	Transmitting IEEE 802.11n (HT20), MIMO	5180 MHz, 5220 MHz, 5240 MHz	MCS8, PN9	Side & Bottom
	Transmitting IEEE 802.11n (HT40), MIMO	5190 MHz, 5230 MHz	MCS8, PN9	Side & Bottom
*1) Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - "of TCB Council Workshop October 2009. *2) Since 11a and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.				

EUT has the power settings by the software as follows;

Power settings	IEEE 802.11n (HT20): 11.0 dBm (5180-5240 MHz) IEEE 802.11n (HT40): 10.0 dBm (5190 MHz), 11.0 dBm (5230 MHz)
Software	Atheros Radio Test (ART) - Revision 0.9 BUILD #27 ART_11n - Customer Version (ANWI BUILD)

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

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	Flat Panel Detector	DR-ID613SE	26990005	Silex Technology Inc.	EUT
B	Connector	-	-	-	-
C	AC Adaptor	MPU64-105-NC3FXXG	-	SINPRO	-

List of cables used

No.	Cable Name	Length (m)	Shield (Cable)	Shield (Connector)	Remarks
1	LAN Cable	0.9	Shielded	Shielded	-
2	DC cable	1.1	Unshielded	Unshielded	-
3	Output Cord (AC Adaptor)	1.1	Unshielded	Unshielded	-
4	AC Cord	3.0	Unshielded	Unshielded	-

SECTION 5: Conducted emission

5.1 Operating environment

Test place : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

5.2 Test configuration

EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT and its peripheral was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from LISN.
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source.
Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 0.15 – 30 MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a Shielded room.
The EUT was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector.
The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ CISPR Average
IF Bandwidth : 9 kHz

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

SECTION 6: Radiated emission

6.1 Operating environment

Test place : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

6.2 Test configuration

EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 0.8 m 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 3.

6.3 Test conditions

Frequency range : 30 MHz – 40 GHz
EUT position : Table top

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3 m (below 15 GHz) / 1 m (above 15 GHz). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4 m 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. Drawing of the antenna direction is shown in Figure 1.
The radiated emission measurements were made with the following detection.

Frequency	30-1000 MHz	1-40 GHz	
Detection type	Quasi-Peak	Peak	Average *1)
IF Bandwidth	120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: *2

*1) The test method was referred to Section G) 6) d) Method VB (Averaging using reduced video bandwidth) of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E (Issued on June 6, 2014)"
*2) When duty cycle > 98 percent, VBW was set at 10Hz.
When duty cycle < 98 percent, VBW (Average) calculation sheet in APPENDIX 1.

Detector and averaging type set for linear voltage averaging.

Below 1 GHz
The result also satisfied with the general limits specified in FCC 15.209 (a).

Above 1 GHz
Inside of restricted bands (FCC 15.205): Limit in FCC 15.209 (a)
Outside of the restricted bands: Limit 68.2dBuV/m (-27dBm e.i.r.p.*) in FCC 15.407(b)(1)(2)(3)

Restricted band edge: Limit in FCC 15.209(a)
Since this limit is severer than the limit of the inside of restricted bands.

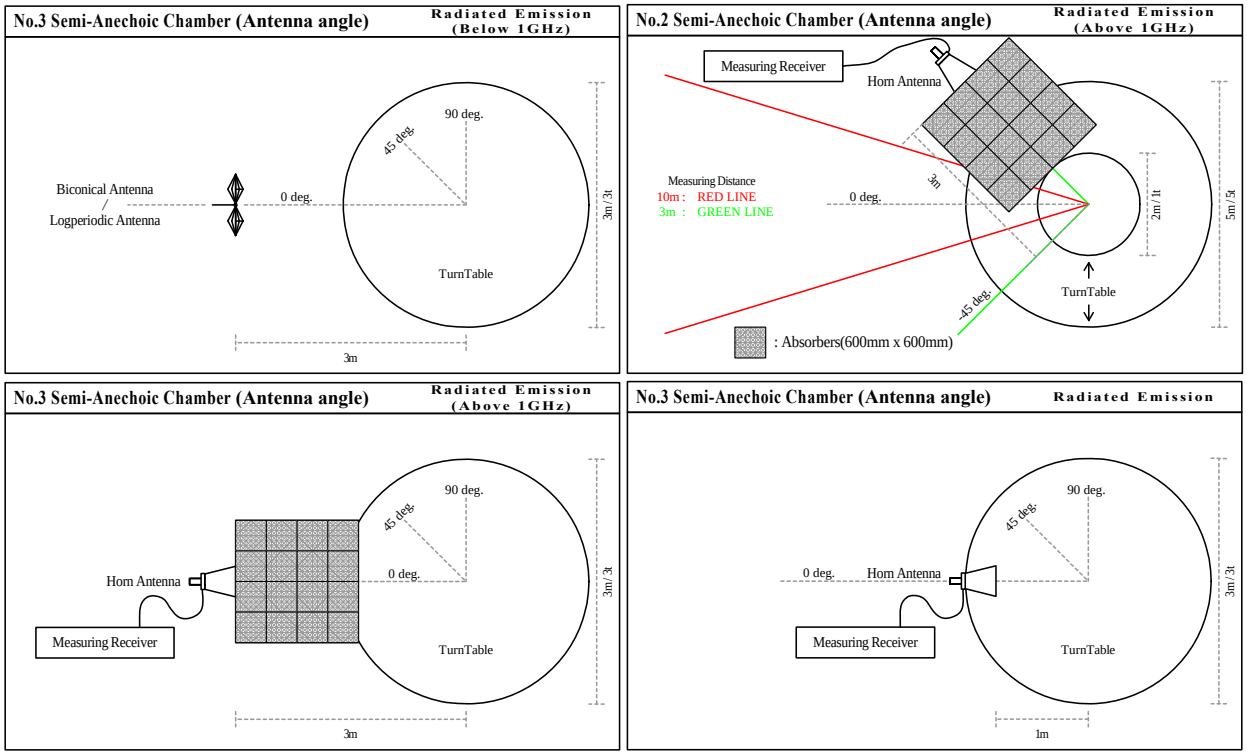
*Electric Field Strength to e.i.r.p. conversion
P [dBm] = E [dBuV/m] -95.2 [dB]
P [dBm] = 10 x LOG (({ (10 ^ (E [dBuV/m] / 20) * 10 ^ (-6) * (Distance = 3 [m])) ^ 2 } / 30) x 10^3) (uV/m):
P is the e.i.r.p. (Watts)

* Distance Factor for the measurement at 1 m: 20 x log (3.0 m/1.0 m) = 9.5 dB

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

Antenna polarization	Carrier	Spurious (30 M-1 GHz)	Spurious (1-6.4 GHz)	Spurious (6.4-15 GHz)	Spurious (15-18 GHz)	Spurious (18-26.5 GHz)	Spurious (26.5-40 GHz)
Horizontal	Y	Z	Y	Y	Z	X	X
Vertical	X	Z	X	Y	Z	X	X

Figure 1. Antenna angle



6.5 Results

Summary of the test results : Pass

* No noise was detected other than listed points.

Refer to APPENDIX 1

Contents of APPENDIXES

DATA OF CONDUCTED EMISSION TEST

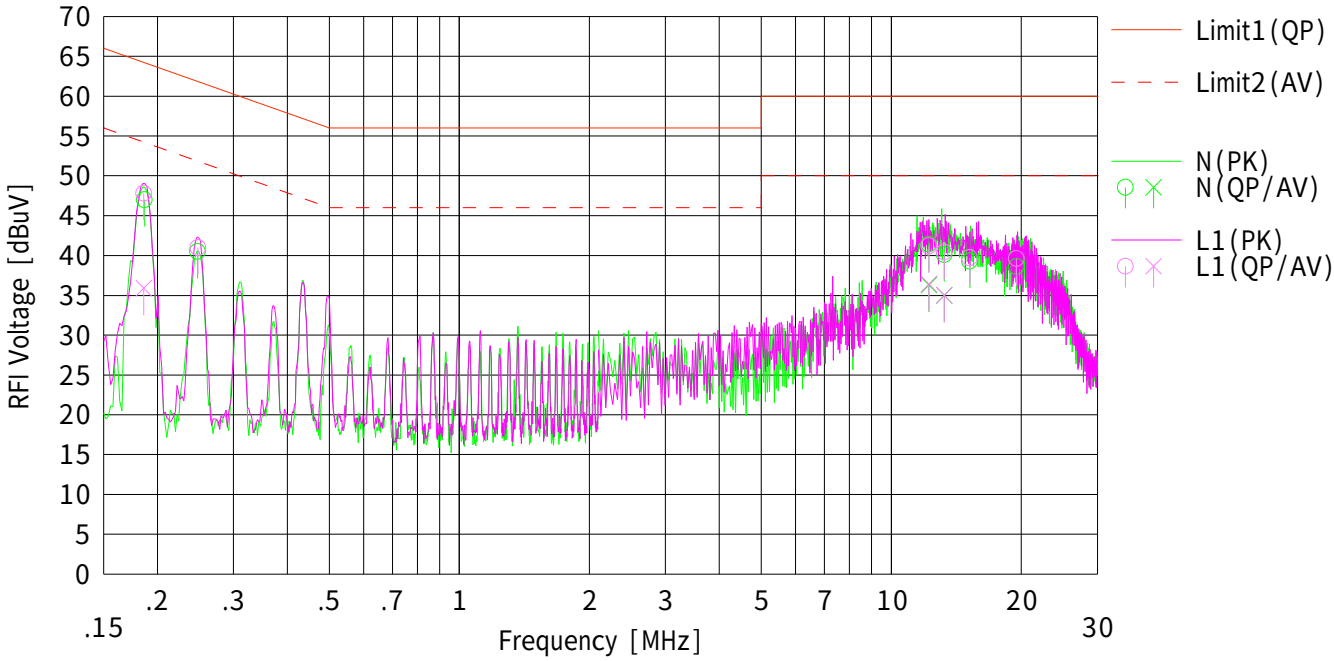
UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2015/07/03

Company : silex technology,Inc.
Kind of EUT : Flat Panel Detector
Model No. : DR-ID **613SE**
Serial No. : 26990005
Remarks : -

Mode : IEEE802.11n(HT20), Tx, 5240 MHz
Order No. : 10836676S
Power : AC 120 V / 60 Hz
Temp./Humi. : 26 deg.C / 48 %RH

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Wataru Kojima



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.18672	34.6	---	12.4	47.0	---	64.1	54.1	17.1	---	N	
2	0.24795	28.1	---	12.4	40.5	---	61.8	51.8	21.3	---	N	
3	12.22356	28.4	23.3	13.0	41.4	36.3	60.0	50.0	18.6	13.7	N	
4	13.27620	27.1	22.0	13.0	40.1	35.0	60.0	50.0	19.9	15.0	N	
5	15.20210	26.2	---	13.1	39.3	---	60.0	50.0	20.7	---	N	
6	19.48080	25.3	---	13.3	38.6	---	60.0	50.0	21.4	---	N	
7	0.18596	35.4	23.5	12.4	47.8	35.9	64.2	54.2	16.4	18.3	L1	
8	0.24809	28.6	---	12.4	41.0	---	61.8	51.8	20.8	---	L1	
9	12.22356	28.2	23.4	13.0	41.2	36.4	60.0	50.0	18.8	13.6	L1	
10	13.27620	27.4	22.0	13.0	40.4	35.0	60.0	50.0	19.6	15.0	L1	
11	15.20210	26.6	---	13.1	39.7	---	60.0	50.0	20.3	---	L1	
12	19.48080	26.3	---	13.3	39.6	---	60.0	50.0	20.4	---	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+Att)[dB]
LISN:SLS-05

Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	June 30, 2015	July 3, 2015	July 4, 2015
Temperature / Humidity	23 deg.C, 67 %RH	24 deg.C, 48 %RH	23 deg.C, 55 %RH
Engineer	Yosuke Ishikawa	Wataru Kojima	Yosuke Ishikawa
Mode	Tx, 5180 MHz Tx, IEEE802.11n HT20, PN9,		

(below 1GHz and above 1GHz Inside of the restricted band)

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10360.0	PK	45.4	39.3	7.9	39.1	3.1	56.6	73.9	17.3	100.0	359.0	
Hori.	15540.0	PK	48.1	39.6	0.9	40.9	-9.5	38.2	73.9	35.7	100.0	147.0	
Hori.	10360.0	AV	33.4	39.3	7.9	39.1	3.1	44.6	53.9	**9.3**	100.0	359.0	VBW:10Hz
Hori.	15540.0	AV	35.7	39.6	0.9	40.9	-9.5	25.8	53.9	28.1	100.0	147.0	VBW:10Hz
Vert.	10360.0	PK	45.3	39.3	7.9	39.1	3.1	56.5	73.9	17.4	100.0	359.0	
Vert.	15540.0	PK	47.6	39.6	0.9	40.9	-9.5	37.7	73.9	36.2	100.0	156.0	
Vert.	10360.0	AV	33.3	39.3	7.9	39.1	3.1	44.5	53.9	9.4	100.0	359.0	VBW:10Hz
Vert.	15540.0	AV	35.7	39.6	0.9	40.9	-9.5	25.8	53.9	28.1	100.0	156.0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance facto
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*The 4th harmonic was not seen so the result was its base noise level
Distance factor: 1GHz - 6.4GHz: 20log(3.75 m / 3.0 m) = 2.0 dB
6.4 GHz - 15 GHz : 20log (4.25 m / 3.0 m) = 3.1 dB
15 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

(Calculation) (above 1GHz Outside of the restricted band)

(* PK: Peak, AV: Average, QP: Quasi-Peak

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Result (EIRP [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5150.0	PK	44.4	31.3	16.0	33.9	2.0	59.8	-35.4	-27.0	**8.4**	100	304	
Vert.	5150.0	PK	43.7	31.3	16.0	33.9	2.0	59.1	-36.1	-27.0	9.1	100	174	

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance facto
Resrult(EIRP[dBm])=10*LOG（({ 10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m]) ^ 2 } / 30) *10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*The 4th harmonic was not seen so the result was its base noise level
Distance factor: 1GHz - 6.4GHz: 20log(3.75 m / 3.0 m) = 2.0 dB
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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	June 30, 2015	July 3, 2015	July 4, 2015
Temperature / Humidity	23 deg.C, 67 %RH	24 deg.C, 48 %RH	23 deg.C, 55 %RH
Engineer	Yosuke Ishikawa	Wataru Kojima	Yosuke Ishikawa
Mode	Tx, 5220 MHz Tx, IEEE802.11n HT20, PN9,		

(below 1GHz and above 1GHz Inside of the restricted band)

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10440.0	PK	44.5	39.4	8.0	39.1	3.1	55.9	73.9	18.0	100.0	0.0	
Hori.	15660.0	PK	46.6	39.1	1.1	40.8	-9.5	36.5	73.9	37.4	100.0	174.0	
Hori.	10440.0	AV	33.0	39.4	8.0	39.1	3.1	44.4	53.9	**9.5**	100.0	0.0	VBW:10Hz
Hori.	15660.0	AV	35.0	39.1	1.1	40.8	-9.5	24.9	53.9	29.0	100.0	174.0	VBW:10Hz
Vert.	10440.0	PK	44.8	39.4	8.0	39.1	3.1	56.2	73.9	17.7	100.0	359.0	
Vert.	15660.0	PK	47.5	39.1	1.1	40.8	-9.5	37.4	73.9	36.5	100.0	166.0	
Vert.	10440.0	AV	33.0	39.4	8.0	39.1	3.1	44.4	53.9	**9.5**	100.0	359.0	VBW:10Hz
Vert.	15660.0	AV	35.4	39.1	1.1	40.8	-9.5	25.3	53.9	28.6	100.0	166.0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance facto

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)

*The 4th harmonic was not seen so the result was its base noise level

Distance factor: 1GHz - 6.4GHz: 20log(3.75 m / 3.0 m) = 2.0 dB

6.4 GHz - 15 GHz : 20log (4.25 m / 3.0 m) = 3.1 dB

15 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	June 30, 2015	July 3, 2015	July 4, 2015
Temperature / Humidity	23 deg.C, 67 %RH	24 deg.C, 48 %RH	23 deg.C, 55 %RH
Engineer	Yosuke Ishikawa	Wataru Kojima	Yosuke Ishikawa
Mode	Tx, 5240 MHz Tx, IEEE802.11n HT20, PN9,		

(below 1GHz and above 1GHz Inside of the restricted band)

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	207.1	QP	34.4	16.4	8.1	32.0	0.0	26.9	43.5	16.6	150.0	170.0	
Hori.	210.1	QP	35.4	16.4	8.2	32.0	0.0	28.0	43.5	15.5	150.0	174.0	
Hori.	337.9	QP	33.0	14.9	8.8	31.9	0.0	24.8	46.0	21.2	100.0	283.0	
Hori.	419.5	QP	34.3	16.7	9.2	31.9	0.0	28.3	46.0	17.7	100.0	16.0	
Hori.	500.0	QP	34.4	17.8	9.5	32.0	0.0	29.7	46.0	16.3	100.0	204.0	
Hori.	800.0	QP	32.9	21.0	10.7	31.5	0.0	33.1	46.0	12.9	100.0	28.0	
Hori.	10480.0	PK	44.6	39.5	8.0	39.0	3.1	56.2	73.9	17.7	100.0	0.0	
Hori.	15720.0	PK	47.6	38.9	1.2	40.8	-9.5	37.4	73.9	36.5	100.0	170.0	
Hori.	10480.0	AV	33.0	39.5	8.0	39.0	3.1	44.6	53.9	9.3	100.0	0.0	VBW:10Hz
Hori.	15720.0	AV	34.8	38.9	1.2	40.8	-9.5	24.6	53.9	29.3	100.0	170.0	VBW:10Hz
Vert.	31.6	QP	42.0	16.9	6.7	32.1	0.0	33.5	40.0	**6.5**	100.0	356.0	
Vert.	59.4	QP	44.5	7.9	6.8	32.1	0.0	27.1	40.0	12.9	100.0	144.0	
Vert.	107.7	QP	36.1	11.1	7.4	32.1	0.0	22.5	43.5	21.0	100.0	105.0	
Vert.	800.0	QP	32.1	21.0	10.7	31.5	0.0	32.3	46.0	13.7	100.0	149.0	
Vert.	10480.0	PK	44.3	39.5	8.0	39.0	3.1	55.9	73.9	18.0	100.0	359.0	
Vert.	15720.0	PK	47.4	38.9	1.2	40.8	-9.5	37.2	73.9	36.7	100.0	185.0	
Vert.	10480.0	AV	33.0	39.5	8.0	39.0	3.1	44.6	53.9	9.3	100.0	359.0	VBW:10Hz
Vert.	15720.0	AV	34.8	38.9	1.2	40.8	-9.5	24.6	53.9	29.3	100.0	185.0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)

*The 4th harmonic was not seen so the result was its base noise level

Distance factor: 1GHz - 6.4GHz: 20log(3.75 m / 3.0 m) = 2.0 dB

6.4 GHz - 15 GHz : 20log (4.25 m / 3.0 m) = 3.1 dB

15 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	June 30, 2015	July 3, 2015	July 4, 2015
Temperature / Humidity	23 deg.C, 67 %RH	24 deg.C, 48 %RH	23 deg.C, 55 %RH
Engineer	Yosuke Ishikawa	Wataru Kojima	Yosuke Ishikawa
Mode	Tx, 5190 MHz Tx, IEEE802.11n HT40, PN9,		

(below 1GHz and above 1GHz Inside of the restricted band)

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10380.0	PK	45.3	39.3	7.9	39.1	3.1	56.5	73.9	17.4	100.0	0.0	
Hori.	15570.0	PK	46.4	39.5	0.9	40.9	-9.5	36.4	73.9	37.5	100.0	359.0	
Hori.	10380.0	AV	33.1	39.3	7.9	39.1	3.1	44.3	53.9	9.6	100.0	0.0	VBW:10Hz
Hori.	15570.0	AV	35.1	39.5	0.9	40.9	-9.5	25.1	53.9	28.8	100.0	359.0	VBW:10Hz
Vert.	10380.0	PK	45.2	39.3	7.9	39.1	3.1	56.4	73.9	17.5	100.0	359.0	
Vert.	15570.0	PK	47.4	39.5	0.9	40.9	-9.5	37.4	73.9	36.5	100.0	188.0	
Vert.	10380.0	AV	33.2	39.3	7.9	39.1	3.1	44.4	53.9	**9.5**	100.0	359.0	VBW:10Hz
Vert.	15570.0	AV	35.2	39.5	0.9	40.9	-9.5	25.2	53.9	28.7	100.0	188.0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance facto
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*The 4th harmonic was not seen so the result was its base noise level
Distance factor: 1GHz - 6.4GHz: 20log(3.75 m / 3.0 m) = 2.0 dB
6.4 GHz - 15 GHz : 20log (4.25 m / 3.0 m) = 3.1 dB
15 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

(Calculation) (above 1GHz Outside of the restricted band)

(* PK: Peak, AV: Average, QP: Quasi-Peak

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Result (EIRP [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5150.0	PK	44.0	31.3	16.0	33.9	2.0	59.4	-35.8	-27.0	8.8	100	133	
Vert.	5150.0	PK	44.5	31.3	16.0	33.9	2.0	59.9	-35.3	-27.0	**8.3**	100	236	

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance facto
Resrult(EIRP[dBm])=10*LOG（({ 10 ^ (Electric Field Strength [dBuV/m] / 20) * 10 ^ (-6) * Distance:3[m]) ^ 2 } / 30) *10^3)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*The 4th harmonic was not seen so the result was its base noise level
Distance factor: 1GHz - 6.4GHz: 20log(3.75 m / 3.0 m) = 2.0 dB
6.4 GHz - 15 GHz : 20log (4.25 m / 3.0 m) = 3.1 dB
15 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	June 30, 2015	July 3, 2015	July 4, 2015
Temperature / Humidity	23 deg.C, 67 %RH	24 deg.C, 48 %RH	23 deg.C, 55 %RH
Engineer	Yosuke Ishikawa	Wataru Kojima	Yosuke Ishikawa
Mode	Tx, 5230 MHz Tx, IEEE802.11n HT40, PN9,		

(below 1GHz and above 1GHz Inside of the restricted band)

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	10460.0	PK	45.2	39.5	8.0	39.1	3.1	56.7	73.9	17.2	100.0	359.0	
Hori.	15690.0	PK	46.3	39.0	1.1	40.8	-9.5	36.1	73.9	37.8	100.0	359.0	
Hori.	10460.0	AV	33.0	39.5	8.0	39.1	3.1	44.5	53.9	**9.4**	100.0	359.0	VBW:10Hz
Hori.	15690.0	AV	35.0	39.0	1.1	40.8	-9.5	24.8	53.9	29.1	100.0	359.0	VBW:10Hz
Vert.	10460.0	PK	45.4	39.5	8.0	39.1	3.1	56.9	73.9	17.0	100.0	359.0	
Vert.	15690.0	PK	47.2	39.0	1.1	40.8	-9.5	37.0	73.9	36.9	100.0	359.0	
Vert.	10460.0	AV	32.9	39.5	8.0	39.1	3.1	44.4	53.9	9.5	100.0	359.0	VBW:10Hz
Vert.	15690.0	AV	35.1	39.0	1.1	40.8	-9.5	24.9	53.9	29.0	100.0	359.0	VBW:10Hz

Result [dBuV/m] = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance facto
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)
*The 4th harmonic was not seen so the result was its base noise level
Distance factor: 1GHz - 6.4GHz: 20log(3.75 m / 3.0 m) = 2.0 dB
6.4 GHz - 15 GHz : 20log (4.25 m / 3.0 m) = 3.1 dB
15 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.5 dB

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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KAF-04	Pre Amplifier	Agilent	8449B	3008A01600	RE	2015/04/28 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-03 7	RE	2015/05/11 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2015/05/19 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2014/08/12 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2014/10/30 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2014/09/03 * 12
SJM-14	Measure	ASKUL	-	-	RE	-
SAEC-02(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	RE	2014/07/28 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2014/11/21 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2014/07/14 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2014/10/18 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2014/10/18 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2014/08/27 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2015/04/17 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2015/02/18 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2015/03/24 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/10/30 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2015/03/23 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2015/03/23 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2015/03/17 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2015/03/11 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2015/03/23 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2015/03/17 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2015/03/11 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2015/06/08 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2015/05/19 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2014/08/12 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2014/11/21 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards.
Test Item :
RE: Radiated emission,

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2015/04/17 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2015/02/24 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2015/02/18 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2014/12/24 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	CE	2015/03/24 * 12
SJM-15	Measure	ASKUL	-	-	CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	CE	-

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .
All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards.
Test Item :
CE: Conducted emission,