RADIO TEST REPORT

Test Report No.: 10039576S-A

(Original test report No.: 10008650S-A)

Applicant	**:**	**Sony Corporation**
Type of Equipment	**:**	**Bluetooth module**
Model No.	**:**	**BTMODR01**
FCC ID	**:**	**AK8BTMODR01**
Test regulation	**:**	**FCC Part15 Subpart C: 2013 (Class II change)**
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: July 29 to 30, 2013

Tested by: S. Takano

Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by : T. Imamura

Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service

☐ 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.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
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REVISION HISTORY

Original Test Report No.: 10039576S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10039576S-A	August 9, 2013	-	-

UL Japan, Inc.
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Contents

SECTION 1: Customer information

Company Name	:	Sony Corporation
Brand Name	:	SONY
Address	:	2-10-1 Osaki, Shinagawa-ku, Tokyo, 141-8610 Japan
Telephone Number	:	+81-50-3750-4417
Facsimile Number	:	+81-50-3750-6572
Contact Person	:	Shigeru Higai

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

2.1 Identification of E.U.T.

Type of Equipment	:	Bluetooth module
Model Number	:	BTMODR01
Serial Number	:	0004
Rating	:	DC3.7V
Country of Mass-production	:	China
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	July 26, 2013
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: BTMODR01 (referred to as the EUT in this report) is a Bluetooth module.

Change from the original sample (Test report No.: 10008650S-A):
An enclosure (Wireless Stereo Headset) in which the module is installed has been changed.

Clock frequency(ies) in the system : 4MHz (DD Converter), 26MHz (Bluetooth)

Radio specification:

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	1MHz & 1MHz
Type of modulation	:	FHSS
Antenna type	:	Chip
Antenna gain	:	2.03dBi
Antenna connector type	:	Integral
Operation temperature range	:	0 to +40 deg.C.

FCC 15.31 (e) / 212
The RF Module has its own regulator. The RF Module is constantly provided voltage (DC1.35V) through the regulator regardless of input voltage. Therefore, the equipment complies with the requirement.

FCC 15.203 / 212
The equipment and its antenna comply with this requirement since the antenna is not removable from the EUT.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : Test specification: FCC Part 15 Subpart C: 2013,
final revised on June 11, 2013 and effective July 11, 2013

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 C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A *1)	-	N/A
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	-	*2)		N/A
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	-	*2)		N/A
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	-	*2)	-	N/A
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	-	*2)		N/A
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	-	*2)		N/A
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Radiated	N/A	4.8dB Freq.: 2483.500 MHz Polarization: Horizontal Detection: Average Mode: Tx 2480MHz, 3DH5	Complied

Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422
*1) The EUT operates with a battery. AC Line can be connected to the EUT via PC; however, the EUT stops transmission during recharging. Therefore, the test is not applicable to the EUT.
*2) Refer to the original test report: 10008650S-A.

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 (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 dB
	1GHz-15GHz	4.8 dB	4.8 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.6 dB	5.6 dB	5.6 dB
	18GHz-40GHz	4.6 dB	4.3 dB	4.4 dB

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

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

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
JAB Accreditation No. : RTL02610

	FCC Registration No.	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	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	697847	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	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

Test item	Operating mode	Tested frequency
Band edge compliance	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	2402MHz, 2480MHz
Spurious emission (Radiated)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	2402MHz, 2441MHz, 2480MHz

*The worst mode was selected based on the result in the original test report: 10008650S-A.

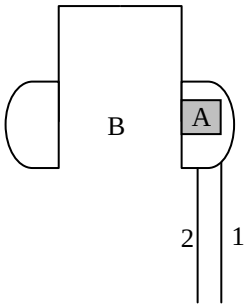
EUT has the power settings by the software as follows;
Power settings:
BDR: Ext.=23, Int.=44
EDR: Ext.=56, Int.=36

TX PA ATTEN settings:
BDR: 1
EDR: 0

Software: BlueTest3 Ver. 2.4

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	Bluetooth module	BTMODR01	0004	Sony	EUT
B	Wireless Stereo Headset	MDR-10RBT	0006	Sony	-

List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	USB	0.5	Shielded	Shielded	-
2	Audio	1.5	Unshielded	Unshielded	-

SECTION 5: Radiated emission

5.1 Operating environment

Test room : 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 polyurethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. The rear of host device was aligned and flushed with rear of tabletop. Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 30MHz to 25GHz
EUT position : Table top

5.4 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 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. 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.

The radiated emission measurements were made with the following detection.

Frequency		30 - 1000MHz	1 - 25GHz		20dBc
Detection Type	:	Quasi-Peak	Peak	* Average	Peak
IF Bandwidth	:	120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz	RBW: 100kHz, VBW: 300kHz

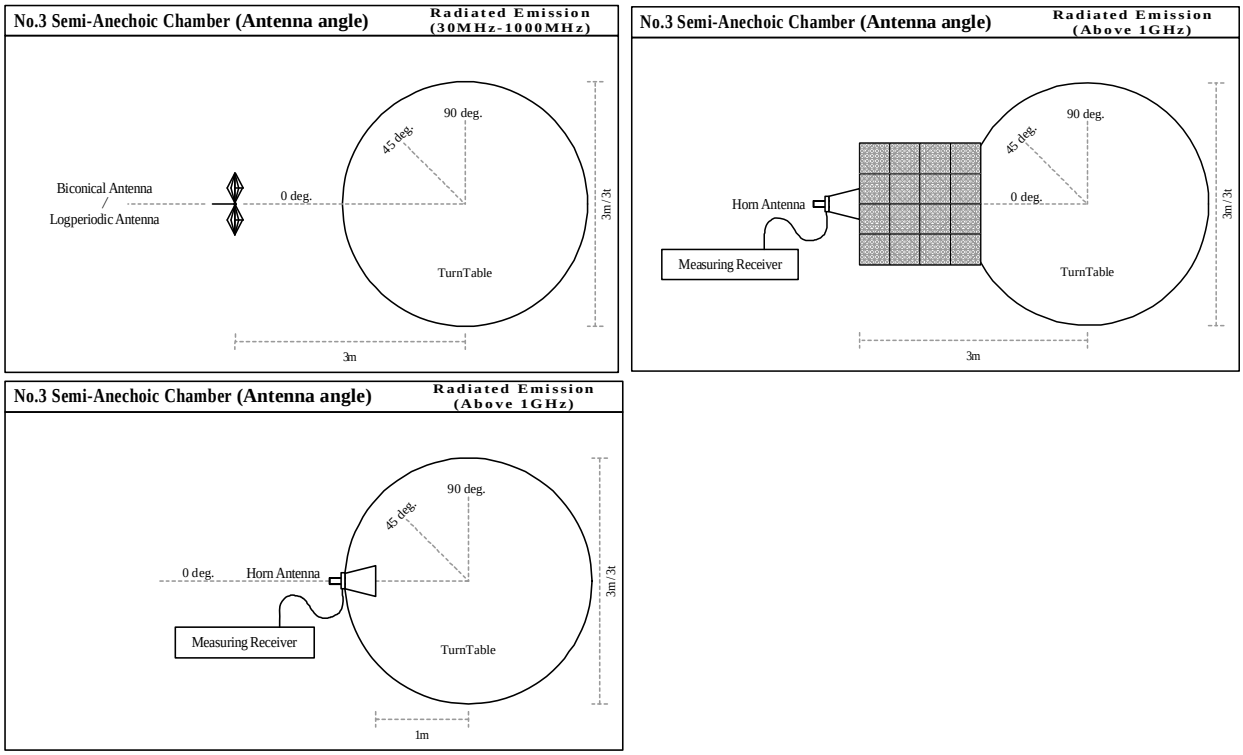
* When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.
Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

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.

Worst case:

Antenna polarization	Carrier (Band edge)	Spurious		
		Below 1GHz	1GHz – 18GHz	18GHz-26.5GHz
Horizontal	Y	X	Y	X
Vertical	Z	Z	Z	Y

Figure 1. Antenna angle



5.5 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.

5.6 Results

Summary of the test results: Pass *No noise was detected above the 9th order harmonics.

Refer to APPENDIX

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	June 29, 2013	June 30, 2013
Temperature / Humidity	25 deg.C, 58 %RH	25 deg.C, 59 %RH
Engineer	Wataru Kojima	Shinichi Takano
Mode	Tx, 2402 MHz	
	Tx, Bluetooth, BDR, PRBS9	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	359.996	QP	38.8	15.3	8.9	31.9	31.1	46.0	14.9	100	118	
Hori.	2247.000	PK	48.0	27.3	14.5	41.2	48.6	73.9	25.3	100	323	
Hori.	2390.000	PK	47.1	27.4	14.7	41.1	48.1	73.9	25.8	100	323	
Hori.	2557.000	PK	50.2	27.7	15.0	41.1	51.8	73.9	22.1	100	351	
Hori.	4804.000	PK	49.7	31.1	7.5	41.2	47.1	73.9	26.8	100	193	
Hori.	7206.000	PK	47.8	36.6	9.1	41.0	52.5	73.9	21.4	100	0	
Hori.	9608.000	PK	44.5	38.5	10.2	38.9	54.3	73.9	19.6	100	0	
Hori.	12010.000	PK	45.6	39.4	11.5	39.1	57.4	73.9	16.5	100	0	
Hori.	19219.970	PK	52.9	40.7	-2.5	45.3	45.8	73.9	28.1	100	224	
Hori.	2247.000	AV	34.7	27.3	14.5	41.2	35.3	53.9	18.6	100	323	
Hori.	2390.000	AV	34.9	27.4	14.7	41.1	35.9	53.9	18.0	100	323	
Hori.	2557.000	AV	41.8	27.7	15.0	41.1	43.4	53.9	10.5	100	351	
Hori.	4804.000	AV	39.5	31.1	7.5	41.2	36.9	53.9	17.0	100	193	
Hori.	7206.000	AV	35.0	36.6	9.1	41.0	39.7	53.9	14.2	100	0	
Hori.	9608.000	AV	30.9	38.5	10.2	38.9	40.7	53.9	13.2	100	0	
Hori.	12010.000	AV	32.7	39.4	11.5	39.1	44.5	53.9	9.4	100	0	
Hori.	19219.970	AV	43.8	40.7	-2.5	45.3	36.7	53.9	17.2	100	224	
Vert.	119.999	QP	35.2	13.0	7.2	32.1	23.3	43.5	20.2	100	359	
Vert.	359.999	QP	36.7	15.3	8.9	31.9	29.0	46.0	17.0	127	316	
Vert.	2247.000	PK	46.3	27.3	14.5	41.2	46.9	73.9	27.0	100	93	
Vert.	2390.000	PK	48.7	27.4	14.7	41.1	49.7	73.9	24.2	100	93	
Vert.	2557.000	PK	49.3	27.7	15.0	41.1	50.9	73.9	23.0	100	89	
Vert.	4804.000	PK	51.5	31.1	7.5	41.2	48.9	73.9	25.0	100	213	
Vert.	7206.000	PK	47.6	36.6	9.1	41.0	52.3	73.9	21.6	100	0	
Vert.	9608.000	PK	44.5	38.5	10.2	38.9	54.3	73.9	19.6	100	0	
Vert.	12010.000	PK	45.6	39.4	11.5	39.1	57.4	73.9	16.5	100	0	
Vert.	19219.980	PK	48.2	40.7	-2.5	45.3	41.1	73.9	32.8	103	194	
Vert.	2247.000	AV	34.5	27.3	14.5	41.2	35.1	53.9	18.8	100	93	
Vert.	2390.000	AV	34.7	27.4	14.7	41.1	35.7	53.9	18.2	100	93	
Vert.	2557.000	AV	39.0	27.7	15.0	41.1	40.6	53.9	13.3	100	89	
Vert.	4804.000	AV	42.2	31.1	7.5	41.2	39.6	53.9	14.3	100	213	
Vert.	7206.000	AV	35.0	36.6	9.1	41.0	39.7	53.9	14.2	100	0	
Vert.	9608.000	AV	31.0	38.5	10.2	38.9	40.8	53.9	13.1	100	0	
Vert.	12010.000	AV	32.8	39.4	11.5	39.1	44.6	53.9	**9.3**	100	0	
Vert.	19219.980	AV	38.8	40.7	-2.5	45.3	31.7	53.9	22.2	103	194	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	97.7	27.4	14.7	41.1	98.7	-	-	Carrier
Hori.	2399.957	PK	44.2	27.4	14.7	41.1	45.2	78.7	33.5	
Hori.	2400.000	PK	48.2	27.4	14.7	41.1	49.2	78.7	29.5	
Vert.	2402.000	PK	95.9	27.4	14.7	41.1	96.9	-	-	Carrier
Vert.	2399.957	PK	44.9	27.4	14.7	41.1	45.9	76.9	31.0	
Vert.	2400.000	PK	47.0	27.4	14.7	41.1	48.0	76.9	28.9	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter) - Gain(Amplifier)

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	June 29, 2013	June 30, 2013
Temperature / Humidity	25 deg.C, 58 %RH	25 deg.C, 59 %RH
Engineer	Wataru Kojima	Shinichi Takano
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, BDR, PRBS9	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	360.000	QP	38.3	15.3	8.9	31.9	30.6	46.0	15.4	100	107	
Hori.	2283.000	PK	47.5	27.3	14.6	41.2	48.2	73.9	25.7	100	0	
Hori.	2597.000	PK	50.6	27.7	15.0	41.1	52.2	73.9	21.7	100	340	
Hori.	4882.000	PK	50.7	31.3	7.5	41.1	48.4	73.9	25.5	100	63	
Hori.	7323.000	PK	47.8	36.6	9.0	41.1	52.3	73.9	21.6	100	0	
Hori.	9764.000	PK	44.1	38.7	10.1	38.8	54.1	73.9	19.8	100	0	
Hori.	12205.000	PK	44.7	39.5	11.4	39.1	56.5	73.9	17.4	100	0	
Hori.	19523.950	PK	50.3	40.8	-2.4	45.2	43.5	73.9	30.4	100	206	
Hori.	2283.000	AV	34.5	27.3	14.6	41.2	35.2	53.9	18.7	100	0	
Hori.	2597.000	AV	39.9	27.7	15.0	41.1	41.5	53.9	12.4	100	340	
Hori.	4882.000	AV	39.6	31.3	7.5	41.1	37.3	53.9	16.6	100	63	
Hori.	7323.000	AV	35.0	36.6	9.0	41.1	39.5	53.9	14.4	100	0	
Hori.	9764.000	AV	31.3	38.7	10.1	38.8	41.3	53.9	12.6	100	0	
Hori.	12205.000	AV	31.7	39.5	11.4	39.1	43.5	53.9	10.4	100	0	
Hori.	19523.950	AV	42.8	40.8	-2.4	45.2	36.0	53.9	17.9	100	206	
Vert.	119.991	QP	37.1	13.0	7.2	32.1	25.2	43.5	18.3	100	359	
Vert.	359.996	QP	36.6	15.3	8.9	31.9	28.9	46.0	17.1	123	323	
Vert.	2283.000	PK	47.5	27.3	14.6	41.2	48.2	73.9	25.7	100	0	
Vert.	2597.000	PK	49.2	27.7	15.0	41.1	50.8	73.9	23.1	100	110	
Vert.	4882.000	PK	51.9	31.3	7.5	41.1	49.6	73.9	24.3	106	203	
Vert.	7323.000	PK	47.8	36.6	9.0	41.1	52.3	73.9	21.6	100	0	
Vert.	9764.000	PK	44.0	38.7	10.1	38.8	54.0	73.9	19.9	100	0	
Vert.	12205.000	PK	45.0	39.5	11.4	39.1	56.8	73.9	17.1	100	0	
Vert.	19523.940	PK	49.0	40.8	-2.4	45.2	42.2	73.9	31.7	100	295	
Vert.	2283.000	AV	34.6	27.3	14.6	41.2	35.3	53.9	18.6	100	0	
Vert.	2597.000	AV	39.5	27.7	15.0	41.1	41.1	53.9	12.8	100	110	
Vert.	4882.000	AV	42.5	31.3	7.5	41.1	40.2	53.9	13.7	106	203	
Vert.	7323.000	AV	35.2	36.6	9.0	41.1	39.7	53.9	14.2	100	0	
Vert.	9764.000	AV	31.4	38.7	10.1	38.8	41.4	53.9	12.5	100	0	
Vert.	12205.000	AV	32.2	39.5	11.4	39.1	44.0	53.9	**9.9**	100	0	
Vert.	19523.940	AV	40.6	40.8	-2.4	45.2	33.8	53.9	20.1	100	295	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	June 29, 2013	June 30, 2013
Temperature / Humidity	25 deg.C, 58 %RH	25 deg.C, 59 %RH
Engineer	Wataru Kojima	Shinichi Takano
Mode	Tx, 2480 MHz	
	Tx, Bluetooth, BDR, PRBS9	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	359.996	QP	39.0	15.3	8.9	31.9	31.3	46.0	14.7	100	102	
Hori.	2323.000	PK	47.6	27.3	14.6	41.1	48.4	73.9	25.5	100	333	
Hori.	2483.500	PK	54.1	27.5	14.8	41.0	55.4	73.9	18.5	100	318	
Hori.	2637.000	PK	48.2	27.8	15.0	41.2	49.8	73.9	24.1	100	0	
Hori.	4960.000	PK	48.8	31.6	7.5	41.1	46.8	73.9	27.1	100	188	
Hori.	7440.000	PK	48.9	36.7	9.0	41.1	53.5	73.9	20.4	100	0	
Hori.	9920.000	PK	48.1	39.0	10.0	38.8	58.3	73.9	15.6	100	0	
Hori.	12400.000	PK	43.8	39.5	11.3	39.1	55.5	73.9	18.4	100	0	
Hori.	19835.950	PK	51.3	40.9	-2.3	45.1	44.8	73.9	29.1	112	154	
Hori.	2323.000	AV	35.3	27.3	14.6	41.1	36.1	53.9	17.8	100	333	
Hori.	2483.500	AV	44.4	27.5	14.8	41.0	45.7	53.9	**8.2**	100	318	
Hori.	2637.000	AV	37.3	27.8	15.0	41.2	38.9	53.9	15.0	100	0	
Hori.	4960.000	AV	37.7	31.6	7.5	41.1	35.7	53.9	18.2	100	188	
Hori.	7440.000	AV	34.8	36.7	9.0	41.1	39.4	53.9	14.5	100	0	
Hori.	9920.000	AV	32.4	39.0	10.0	38.8	45.6	53.9	11.3	100	0	
Hori.	12400.000	AV	31.4	39.5	11.3	39.1	43.1	53.9	10.8	100	0	
Hori.	19835.950	AV	44.0	40.9	-2.3	45.1	37.5	53.9	16.4	112	154	
Vert.	120.000	QP	35.7	13.0	7.2	32.1	23.8	43.5	19.7	100	359	
Vert.	359.998	QP	38.0	15.3	8.9	31.9	30.3	46.0	15.7	134	299	
Vert.	2323.000	PK	47.8	27.3	14.6	41.1	48.6	73.9	25.3	100	99	
Vert.	2483.500	PK	56.2	27.5	14.8	41.0	57.5	73.9	16.4	100	92	
Vert.	2637.000	PK	48.1	27.8	15.0	41.2	49.7	73.9	24.2	100	100	
Vert.	4960.000	PK	51.8	31.6	7.5	41.1	49.8	73.9	24.1	100	211	
Vert.	7440.000	PK	49.9	36.7	9.0	41.1	54.5	73.9	19.4	100	0	
Vert.	9920.000	PK	46.2	39.0	10.0	38.8	56.4	73.9	17.5	100	0	
Vert.	12400.000	PK	43.9	39.5	11.3	39.1	55.6	73.9	18.3	100	0	
Vert.	19835.920	PK	48.9	40.9	-2.3	45.1	42.4	73.9	31.5	100	302	
Vert.	2323.000	AV	35.2	27.3	14.6	41.1	36.0	53.9	17.9	100	99	
Vert.	2483.500	AV	43.8	27.5	14.8	41.0	45.1	53.9	8.8	100	92	
Vert.	2637.000	AV	36.6	27.8	15.0	41.2	38.2	53.9	15.7	100	100	
Vert.	4960.000	AV	42.2	31.6	7.5	41.1	40.2	53.9	13.7	100	211	
Vert.	7440.000	AV	34.4	36.7	9.0	41.1	39.0	53.9	14.9	100	0	
Vert.	9920.000	AV	32.2	39.0	10.0	38.8	45.4	53.9	11.5	100	0	
Vert.	12400.000	AV	31.2	39.5	11.3	39.1	42.9	53.9	11.0	100	0	
Vert.	19835.920	AV	40.7	40.9	-2.3	45.1	34.2	53.9	19.7	100	302	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	June 29, 2013	June 30, 2013
Temperature / Humidity	25 deg.C, 58 %RH	25 deg.C, 59 %RH
Engineer	Wataru Kojima	Shinichi Takano
Mode	Tx, 2402 MHz	
	Tx, Bluetooth, EDR, PRBS9	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	359.998	QP	39.3	15.3	8.9	31.9	31.6	46.0	14.4	100	99	
Hori.	2390.000	PK	47.9	27.4	14.7	41.1	48.9	73.9	25.0	100	317	
Hori.	2557.000	PK	49.1	27.7	15.0	41.1	50.7	73.9	23.2	100	0	
Hori.	4804.000	PK	49.4	31.1	7.5	41.2	46.8	73.9	27.1	100	190	
Hori.	7206.000	PK	49.4	36.6	9.1	41.0	54.1	73.9	19.8	100	0	
Hori.	9608.000	PK	45.0	38.5	10.2	38.9	54.8	73.9	19.1	100	0	
Hori.	12010.000	PK	45.9	39.4	11.5	39.1	57.7	73.9	16.2	100	0	
Hori.	19219.950	PK	51.3	40.7	-2.5	45.3	44.2	73.9	29.7	100	152	
Hori.	2390.000	AV	34.3	27.4	14.7	41.1	35.3	53.9	18.6	100	317	
Hori.	2557.000	AV	37.8	27.7	15.0	41.1	39.4	53.9	14.5	100	0	
Hori.	4804.000	AV	37.2	31.1	7.5	41.2	34.6	53.9	19.3	100	190	
Hori.	7206.000	AV	35.3	36.6	9.1	41.0	40.0	53.9	13.9	100	0	
Hori.	9608.000	AV	32.0	38.5	10.2	38.9	41.8	53.9	12.1	100	0	
Hori.	12010.000	AV	32.5	39.4	11.5	39.1	44.3	53.9	**9.6**	100	0	
Hori.	19219.950	AV	44.2	40.7	-2.5	45.3	37.1	53.9	16.8	100	152	
Vert.	119.999	QP	36.3	13.0	7.2	32.1	24.4	43.5	19.1	100	359	
Vert.	360.000	QP	38.2	15.3	8.9	31.9	30.5	46.0	15.5	136	301	
Vert.	2390.000	PK	47.1	27.4	14.7	41.1	48.1	73.9	25.8	100	91	
Vert.	2557.000	PK	48.7	27.7	15.0	41.1	50.3	73.9	23.6	100	94	
Vert.	4804.000	PK	50.4	31.1	7.5	41.2	47.8	73.9	26.1	100	209	
Vert.	7206.000	PK	47.8	36.6	9.1	41.0	52.5	73.9	21.4	100	0	
Vert.	9608.000	PK	44.5	38.5	10.2	38.9	54.3	73.9	19.6	100	0	
Vert.	12010.000	PK	45.6	39.4	11.5	39.1	57.4	73.9	16.5	100	0	
Vert.	19219.990	PK	50.0	40.7	-2.5	45.3	42.9	73.9	31.0	101	198	
Vert.	2390.000	AV	34.4	27.4	14.7	41.1	35.4	53.9	18.5	100	91	
Vert.	2557.000	AV	38.0	27.7	15.0	41.1	39.6	53.9	14.3	100	94	
Vert.	4804.000	AV	39.0	31.1	7.5	41.2	36.4	53.9	17.5	100	209	
Vert.	7206.000	AV	35.4	36.6	9.1	41.0	40.1	53.9	13.8	100	0	
Vert.	9608.000	AV	32.0	38.5	10.2	38.9	41.8	53.9	12.1	100	0	
Vert.	12010.000	AV	32.5	39.4	11.5	39.1	44.3	53.9	**9.6**	100	0	
Vert.	19219.990	AV	41.6	40.7	-2.5	45.3	34.5	53.9	19.4	101	198	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.7	27.4	14.7	41.1	95.7	-	-	Carrier
Hori.	2399.650	PK	45.0	27.4	14.7	41.1	46.0	75.7	29.7	
Hori.	2400.000	PK	46.6	27.4	14.7	41.1	47.6	75.7	28.1	
Vert.	2402.000	PK	94.0	27.4	14.7	41.1	95.0	-	-	Carrier
Vert.	2399.650	PK	45.8	27.4	14.7	41.1	46.8	75.0	28.2	
Vert.	2400.000	PK	47.3	27.4	14.7	41.1	48.3	75.0	26.7	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter) - Gain(Amplifier)

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	June 29, 2013	June 30, 2013
Temperature / Humidity	25 deg.C, 58 %RH	25 deg.C, 59 %RH
Engineer	Wataru Kojima	Shinichi Takano
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, EDR, PRBS9	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	360.000	QP	39.3	15.3	8.9	31.9	31.6	46.0	14.4	100	117	
Hori.	2287.000	PK	47.2	27.3	14.6	41.2	47.9	73.9	26.0	100	0	
Hori.	2597.000	PK	49.1	27.7	15.0	41.1	50.7	73.9	23.2	100	37	
Hori.	4882.000	PK	48.8	31.3	7.5	41.1	46.5	73.9	27.4	100	0	
Hori.	7323.000	PK	48.0	36.6	9.0	41.1	52.5	73.9	21.4	100	0	
Hori.	9764.000	PK	45.1	38.7	10.1	38.8	55.1	73.9	18.8	100	0	
Hori.	12205.000	PK	44.9	39.5	11.4	39.1	56.7	73.9	17.2	100	0	
Hori.	19523.970	PK	51.2	40.8	-2.4	45.2	44.4	73.9	29.5	105	155	
Hori.	2287.000	AV	34.6	27.3	14.6	41.2	35.3	53.9	18.6	100	0	
Hori.	2597.000	AV	36.8	27.7	15.0	41.1	38.4	53.9	15.5	100	37	
Hori.	4882.000	AV	36.8	31.3	7.5	41.1	34.5	53.9	19.4	100	0	
Hori.	7323.000	AV	35.0	36.6	9.0	41.1	39.5	53.9	14.4	100	0	
Hori.	9764.000	AV	31.7	38.7	10.1	38.8	41.7	53.9	12.2	100	0	
Hori.	12205.000	AV	32.3	39.5	11.4	39.1	44.1	53.9	**9.8**	100	0	
Hori.	19523.970	AV	44.0	40.8	-2.4	45.2	37.2	53.9	16.7	105	155	
Vert.	119.998	QP	35.9	13.0	7.2	32.1	24.0	43.5	19.5	100	359	
Vert.	359.995	QP	38.4	15.3	8.9	31.9	30.7	46.0	15.3	143	292	
Vert.	2287.000	PK	47.3	27.3	14.6	41.2	48.0	73.9	25.9	100	0	
Vert.	2598.090	PK	47.2	27.7	15.0	41.1	48.8	73.9	25.1	100	0	
Vert.	4882.000	PK	52.0	31.3	7.5	41.1	49.7	73.9	24.2	100	188	
Vert.	7323.000	PK	47.5	36.6	9.0	41.1	52.0	73.9	21.9	100	0	
Vert.	9764.000	PK	45.0	38.7	10.1	38.8	55.0	73.9	18.9	100	0	
Vert.	12205.000	PK	45.0	39.5	11.4	39.1	56.8	73.9	17.1	100	0	
Vert.	19523.970	PK	47.7	40.8	-2.4	45.2	40.9	73.9	33.0	100	306	
Vert.	2287.000	AV	34.6	27.3	14.6	41.2	35.3	53.9	18.6	100	0	
Vert.	2598.090	AV	35.4	27.7	15.0	41.1	37.0	53.9	16.9	100	0	
Vert.	4882.000	AV	39.5	31.3	7.5	41.1	37.2	53.9	16.7	100	188	
Vert.	7323.000	AV	35.1	36.6	9.0	41.1	39.6	53.9	14.3	100	0	
Vert.	9764.000	AV	31.9	38.7	10.1	38.8	41.9	53.9	12.0	100	0	
Vert.	12205.000	AV	32.3	39.5	11.4	39.1	44.1	53.9	**9.8**	100	0	
Vert.	19523.970	AV	39.8	40.8	-2.4	45.2	33.0	53.9	20.9	100	306	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	June 29, 2013	June 30, 2013
Temperature / Humidity	25 deg.C, 58 %RH	25 deg.C, 59 %RH
Engineer	Wataru Kojima	Shinichi Takano
Mode	Tx, 2480 MHz	
	Tx, Bluetooth, EDR, PRBS9	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	360.003	QP	39.2	15.3	8.9	31.9	31.5	46.0	14.5	100	99	
Hori.	2323.000	PK	49.6	27.3	14.6	41.1	50.4	73.9	23.5	100	330	
Hori.	2483.500	PK	57.6	27.5	14.8	41.0	58.9	73.9	15.0	100	330	
Hori.	2637.000	PK	49.9	27.8	15.0	41.2	51.5	73.9	22.4	100	0	
Hori.	4960.000	PK	48.5	31.6	7.5	41.1	46.5	73.9	27.4	100	0	
Hori.	7440.000	PK	47.2	36.7	9.0	41.1	51.8	73.9	22.1	100	0	
Hori.	9920.000	PK	45.3	39.0	10.0	38.8	55.5	73.9	18.4	100	0	
Hori.	12400.000	PK	45.4	39.5	11.3	39.1	57.1	73.9	16.8	100	0	
Hori.	19835.970	PK	50.0	40.9	-2.3	45.1	43.5	73.9	30.4	111	152	
Hori.	2323.000	AV	36.7	27.3	14.6	41.1	37.5	53.9	16.4	100	330	
Hori.	2483.500	AV	47.8	27.5	14.8	41.0	49.1	53.9	**4.8**	100	330	
Hori.	2637.000	AV	37.2	27.8	15.0	41.2	38.8	53.9	15.1	100	0	
Hori.	4960.000	AV	35.6	31.6	7.5	41.1	33.6	53.9	20.3	100	0	
Hori.	7440.000	AV	34.9	36.7	9.0	41.1	39.5	53.9	14.4	100	0	
Hori.	9920.000	AV	31.9	39.0	10.0	38.8	42.1	53.9	11.8	100	0	
Hori.	12400.000	AV	32.6	39.5	11.3	39.1	44.3	53.9	9.6	100	0	
Hori.	19835.970	AV	43.5	40.9	-2.3	45.1	37.0	53.9	16.9	111	152	
Vert.	119.999	QP	36.3	13.0	7.2	32.1	24.4	43.5	19.1	100	359	
Vert.	359.998	QP	37.0	15.3	8.9	31.9	29.3	46.0	16.7	122	306	
Vert.	2323.000	PK	46.7	27.3	14.6	41.1	47.5	73.9	26.4	100	0	
Vert.	2483.500	PK	49.8	27.5	14.8	41.0	51.1	73.9	22.8	100	0	
Vert.	2637.000	PK	47.9	27.8	15.0	41.2	49.5	73.9	24.4	100	0	
Vert.	4960.000	PK	49.2	31.6	7.5	41.1	47.2	73.9	26.7	100	302	
Vert.	7440.000	PK	47.5	36.7	9.0	41.1	52.1	73.9	21.8	100	0	
Vert.	9920.000	PK	44.7	39.0	10.0	38.8	54.9	73.9	19.0	100	0	
Vert.	12400.000	PK	45.8	39.5	11.3	39.1	57.5	73.9	16.4	100	0	
Vert.	19835.970	PK	47.7	40.9	-2.3	45.1	41.2	73.9	32.7	100	300	
Vert.	2323.000	AV	35.4	27.3	14.6	41.1	36.2	53.9	17.7	100	0	
Vert.	2483.500	AV	35.9	27.5	14.8	41.0	37.2	53.9	16.7	100	0	
Vert.	2637.000	AV	36.2	27.8	15.0	41.2	38.8	53.9	16.1	100	0	
Vert.	4960.000	AV	36.5	31.6	7.5	41.1	34.5	53.9	19.4	100	302	
Vert.	7440.000	AV	34.8	36.7	9.0	41.1	39.4	53.9	14.5	100	0	
Vert.	9920.000	AV	31.8	39.0	10.0	38.8	42.0	53.9	11.9	100	0	
Vert.	12400.000	AV	32.7	39.5	11.3	39.1	44.4	53.9	9.5	100	0	
Vert.	19835.970	AV	39.9	40.9	-2.3	45.1	33.4	53.9	20.5	100	300	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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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)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2013/07/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2013/07/22 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2013/04/11 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2013/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2012/08/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2012/10/04 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE	-
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2012/12/18 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2012/12/18 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2013/03/14 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2013/03/19 * 12
SCC-G18	Coaxial Cable	Suhner	SUCOFLEX 104A	46292/4A	RE	2013/03/16 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 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	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 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