RADIO TEST REPORT

Test Report No. : 11997606H-A

Applicant	:	**OMRON HEALTHCARE Co., Ltd.**
Type of Equipment	:	**Blood Pressure Monitor**
Model No.	:	**HEM-6232T**
Test standard	:	**EN 300 328 V2.1.1**
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 above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

Date of test: November 6 and 7, 2017

Representative test engineer:
Takumi Shimada
Engineer
Consumer Technology Division

Approved by :
Takayuki Shimada
Engineer
Consumer Technology Division

NVLAP TESTING
NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
http://japan.ul.com/resources/emc_accredited/

REVISION HISTORY

Original Test Report No.: 11997606H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11997606H-A	November 30, 2017	-	-

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124

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SECTION 1: Customer information

Company Name	:	OMRON HEALTHCARE Co., Ltd.
Address	:	53, Kunotsubo, Terado-cho, Muko, KYOTO, 617-0002 Japan
Telephone Number	:	+81-75-925-2045
Facsimile Number	:	+81-75-925-2046
Contact Person	:	Yoshinori Tsurumi

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

2.1 Identification of E.U.T.

Type of Equipment	:	Blood Pressure Monitor
Model No.	:	HEM-6232T
Serial No.	:	Refer to Clause 4.2
Rating	:	DC 3 V
Receipt Date of Sample	:	November 1, 2017
Country of Mass-production	:	Japan, China, Vietnam
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

2.2 Product Description

Model: HEM-6232T (referred to as the EUT in this report) is a Blood Pressure Monitor.

Variant models: HEM-6232T-E, HEM-6232T-D, HEM-6232T-RU
These model numbers are only different depending on destination place.

General Specification

Clock frequency(ies) in the system	:	32.768 kHz, 26 MHz

Radio Specification

Bluetooth Low Energy

Module model No.	:	HHX-MD06T
Equipment Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480MHz
Type of Modulation	:	GFSK
Power Supply (inner)	:	DC 1.2 V
Antenna Type	:	Chip Antenna
Antenna Gain	:	5.05 dBi
Operating Temperature	:	0 deg. C - +40 deg. C
Receiver Category	:	Category 2

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Radio : EN 300 328 V2.1.1

Title : Wideband transmission systems; Data transmission equipment operating in the 2.4GHz ISM band and using wide band modulation techniques;
Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Purpose of test : Compliance with the harmonized RE directive 2014/53/EU.

3.2 Procedures and results

No.	Item	Test Procedure	Limit	Remarks	Worst margin	Exclusions	Results
1	RF output power	Clause 5.4.2	Clause 4.3.2.2	Conducted	-	N/A	Complied
2	Power Spectral Density	Clause 5.4.3	Clause 4.3.2.3	Conducted	-	N/A	Complied
3	Duty cycle, Tx-sequence, Tx-gap	Clause 5.4.2	Clause 4.3.2.4	Conducted	-	N/A	N/A *1)
4	Medium Utilisation (MU) factor	Clause 5.4.2	Clause 4.3.2.5	Conducted	-	N/A	N/A *1)
5	Adaptivity (adaptive equipment using modulations other than FHSS)	Clause 5.4.6	Clause 4.3.2.6	Conducted	-	N/A	N/A *2)
6	Occupied Channel Bandwidth	Clause 5.4.7	Clause 4.3.2.7	Conducted	-	N/A	Complied
7	Transmitter unwanted emissions in the out-of-band domain	Clause 5.4.8	Clause 4.3.2.8	Conducted	-	N/A	Complied
8	Transmitter unwanted emissions in the spurious domain	Clause 5.4.9	Clause 4.3.2.9	Radiated	19.0 dB 4804.00 MHz, Vertical	N/A	Complied
9	Receiver Spurious emissions	Clause 5.4.10	Clause 4.3.2.10	Radiated	No signal detected	N/A	Complied
10	Transmitter unwanted emissions in the spurious domain	Clause 5.4.9	Clause 4.3.2.9	Conducted	-	N/A	N/A *3)
11	Receiver Spurious emissions	Clause 5.4.10	Clause 4.3.2.10	Conducted	-	N/A	N/A *3)
12	Receiver Blocking	Clause 5.4.11	Clause 4.3.2.11	Conducted	-	N/A	Complied
13	Geo-location capability	-	Clause 4.3.2.12	-	-	N/A	N/A *4)

Note: UL Japan, Inc.'s EMI Work Procedure 13-EM-W0420.
*1) The test is not applicable since the EUT is an adaptive equipment and does not operate in a non-adaptive mode.
*2) The test is not applicable since the RF output power of the EUT is less than 10 dBm (e.i.r.p.).
*3) The EUT does not have antenna connector.
*4) The EUT does not have Geo-location capability.

3.3 Additions or deviations to standards

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.
Ise EMC Lab.

Item	Unit	Required Uncertainty (+/-)	Calculated Uncertainty (+/-)
Occupied Channel Bandwidth	%	5	0.96
RF output power, conducted	dB	1.5	1.2
Power Spectral Density, conducted	dB	3	1.8
Unwanted Emissions, conducted	dB	3	2.1
All emissions, radiated	dB	6	5.6
Temperature	deg. C	3	0.975
Supply voltages	%	3	1.6
Time	%	5	0.10

*Measurement uncertainties of UL Japan, Inc. do not exceed the uncertainties required in the standard.

[Transmitter unwanted emissions in the spurious domain (Radiated)]
The data listed in this test report has enough margin, more than the site margin.
[Receiver spurious emissions (Radiated)]
The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124
NVLAP Lab. code: 200572-0

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

Mode	Remarks*
Bluetooth (BT) Low Energy (LE)	Continuous Tx (Tx), PRBS9 Continuous Rx (Rx), PRBS9
*The worst condition was determined based on the test result of RF Output power. *EUT has the power settings by the software as follows; - Power Setting: 0 dBm - Software: Serial Command Explorer 2 This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

Details of Operating Mode(s)

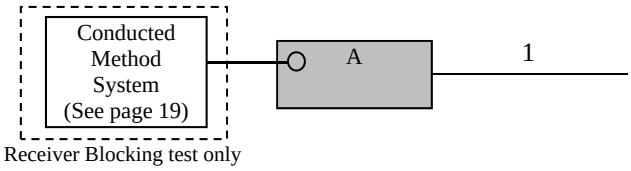
Bluetooth Low Energy [DSSS and other forms of modulation]

Test item	Operating mode	Tested frequency
RF output power, Power Spectral Density	BT LE Tx	2402 MHz 2440 MHz 2480 MHz
Occupied channel bandwidth, Transmitter unwanted emissions in the out-of-band domain, Transmitter unwanted emissions in the spurious domain (Radiated)	BT LE Tx	2402 MHz 2480 MHz
Receiver spurious emissions (Radiated)	BT LE Rx	2402 MHz 2480 MHz
Receiver blocking	Communication Bluetooth Low Energy (Direct test mode)	2402 MHz 2480 MHz

Extreme test condition	
Temperature	0 deg. C to +40 deg. C
Voltage	Vnom: DC 3 V: operating voltage range of EUT *

*The RF module is constantly provided with voltage (DC 1.2 V) regardless of input voltage, so the testing was performed with DC 3 V only.

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Blood Pressure Monitor	HEM-6232T	201709003120L *1) 201709003117L *2)	OMRON HEALTHCARE Co., Ltd.	EUT

*1) Used for Antenna Terminal Conducted tests
*2) Used for Radiated emission tests

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal Cable	0.2	Unshielded	Unshielded	-

SECTION 5: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Instrument used	Remark
RF Output Power	Power Meter	Normal and Extreme conditions
Power Spectral Density	Spectrum Analyzer	Normal condition
Occupied Channel Bandwidth	Spectrum Analyzer	Normal condition
Transmitter unwanted emissions in the out-of band domain	Spectrum Analyzer	Normal conditions - Detector mode: RMS - Trace: Max Hold - Band power was used on behalf of the time domain power function. - Filter mode: Gaussian Filter Since the data in this test report has enough margin
Receiver Blocking	Spectrum Analyzer	Normal condition

The test results are rounded off to two decimals place, so some differences might be observed.
The equipment and cables were not used for factor 0.0 dB of the data sheets.

Test data : APPENDIX
Test result : Pass

SECTION 6: Transmitter unwanted emissions in the spurious domain and Receiver spurious emissions (Radiated)

Test Procedure

1) EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in semi anechoic chamber at a distance of 3 m.
The measuring antenna height was varied between 1 m to 4 m and the turn table was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization.

2) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 1.5 m as the EUT. The frequency below 1 GHz of the Substitution Antenna was used the Half wave dipole Antenna, which was tuned the measured frequency in 1).
The frequency above 1 GHz of the Substitution Antenna was used Horn Antenna.
The Substitution Antenna was connected to the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field strength is equal to the measured value in 1) by means of varying the measuring antenna height between 1 m to 4 m to obtain maximum receiving level.
Its Output power of Signal Generator was recorded.

3) Below 1 GHz:
Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the Antenna (Horn Antenna) except for the Half wave dipole Antenna (2.15 dBi) for the Substitution Antenna, the Effective radiated power was calculated by compensating the finite difference in the Antenna gain of the Half wave dipole Antenna, and Substitution Antenna.
Above 1 GHz:
Equivalent isotropic radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the signal generator and the substitution antenna from the output power of the signal generator recorded in 2).
For the usage of the antenna (horn antenna) for the substitution antenna, the equivalent isotropic radiated power was calculated by compensating the finite substitution antenna.

Pre-check scan setting

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer	Spectrum Analyzer
IF Bandwidth	Peak, RBW: 100 kHz / VBW: 300 kHz	Peak, RBW: 1 MHz / VBW: 3 MHz
Trace mode	Max hold	Max hold

Measured setting

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer	Spectrum Analyzer
IF Bandwidth	RMS, RBW: 100 kHz / VBW: 300 kHz	RMS, RBW: 1 MHz / VBW: 3 MHz
Span / Sweep time	Zero / 120 % of detected burst	Zero / 120 % of detected burst
Trace mode	Clear Write (band power)	Clear Write (band power)

- 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.

The test results are rounded off to one decimal place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

RF Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11997606H
Date	November 6, 2017
Temperature / Humidity	25 deg. C / 28 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

Test Condition		Freq.	P/M (AV)	Cable	Atten.	Antenna	Result	Limit	Margin
Temp.	Volt.		Reading	Loss	Loss	Gain			
		[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]	[dB]
nom	nom	2402.0	-11.62	1.07	10.05	5.05	4.55	20.00	15.45
		2440.0	-11.49	1.07	10.05	5.05	4.68	20.00	15.32
		2480.0	-11.39	1.08	10.05	5.05	4.79	20.00	15.21
min	nom	2402.0	-11.26	1.07	10.05	5.05	4.91	20.00	15.09
		2440.0	-11.12	1.07	10.05	5.05	5.05	20.00	14.95
		2480.0	-10.90	1.08	10.05	5.05	5.28	20.00	14.72
max	nom	2402.0	-11.86	1.07	10.05	5.05	4.31	20.00	15.69
		2440.0	-11.75	1.07	10.05	5.05	4.42	20.00	15.58
		2480.0	-11.71	1.08	10.05	5.05	4.47	20.00	15.53

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Antenna Gain

Power Spectral Density

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11997606H
Date	November 6, 2017
Temperature / Humidity	25 deg. C / 28 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

Test Condition		Ch	S/A	S/A	RF Output	Result	Limit	Margin
Temp.	Volt.	Freq.	Maximum Reading	Total Power Reading	Power			
		[MHz]	[dBm/MHz]	[dBm]	[dBm]	[dBm/MHz]	[dBm/MHz]	[dB]
nom	nom	2402.00	-15.83	-15.79	4.55	4.52	10.00	5.48
		2440.00	-15.72	-15.69	4.68	4.65	10.00	5.35
		2480.00	-15.61	-15.58	4.79	4.76	10.00	5.24

Result [dBm/MHz] = S/A Maximum Reading [dBm/MHz] - S/A Total Power Reading [dBm] (*1) + RF Output Power [dBm] (*2)

(*1) Integrated value of 2400 MHz to 2483.5 MHz

(*2) Refer to RF Output Power

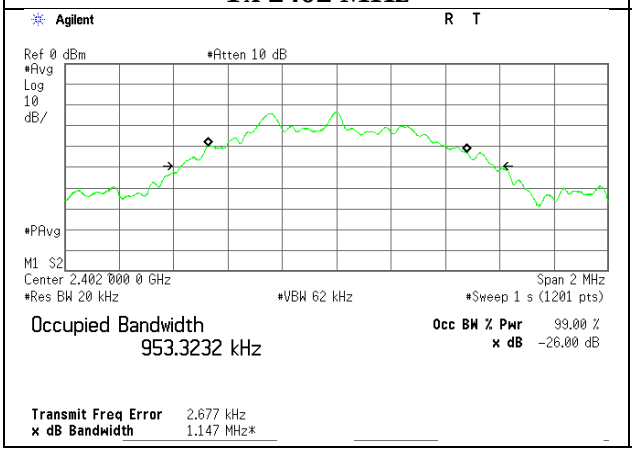
UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124

Occupied Channel Bandwidth

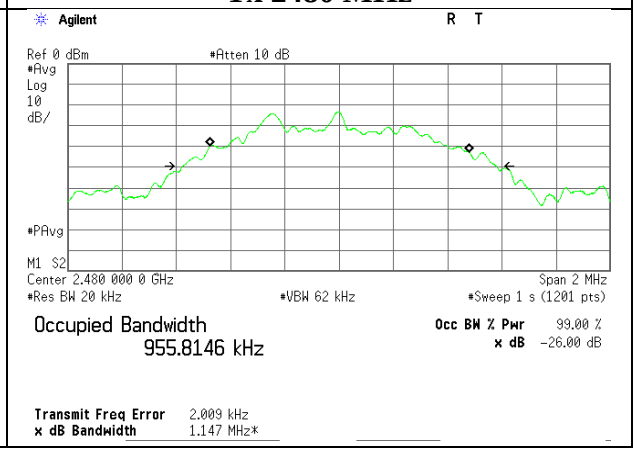
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11997606H
Date	November 6, 2017
Temperature / Humidity	25 deg. C / 28 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

Frequency [MHz]	Bandwidth [MHz]	Result [MHz]	Limit [MHz]
2402	0.9533	2401.5234	> 2400
2480	0.9558	2480.4779	< 2483.5

Tx 2402 MHz



Tx 2480 MHz



Transmitter unwanted emissions in the out-of-band domain

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11997606H
Date	November 6, 2017
Temperature / Humidity	25 deg. C / 28 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

Test Condition		Frequency	S/A (AV) Reading	Cable Loss	Atten. Loss	Antenna Gain	Result	Limit	Margin	Remarks
Temp.	Volt.	[MHz]	[dBm/MHz]	[dB]	[dB]	[dBi]	[dBm/MHz]	[dBm/MHz]	[dB]	
nom	nom	2398.5	-63.58	1.07	10.05	5.05	-47.41	-20.00	27.41	Lowest ch 2400 MHz - 2 BW
		2399.5	-61.15	1.07	10.05	5.05	-44.98	-10.00	34.98	Lowest ch 2400 MHz - BW
		2484.0	-65.58	1.08	10.05	5.05	-49.40	-10.00	39.40	Highest ch 2483.5 MHz + BW
		2485.0	-66.76	1.08	10.05	5.05	-50.58	-20.00	30.58	Highest ch 2483.5 MHz + 2 BW

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss + Antenna Gain

*Above test result was maximum value on each 1 BW.

Transmitter unwanted emissions in the spurious domain (Radiated)

Report No.	11997606H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	November 6, 2017
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Takumi Shimada
Mode	Tx BT LE

2402 MHz

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) <=1GHz, (EIRP) >1GHz [dBm]		Limit (ERP) <=1GHz, (EIRP) >1GHz [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
4804.00	41.1	43.3	-58.5	-55.9	5.8	12.7	0.0	-51.6	-49.0	-30.0	21.6	19.0	192	52	121	187	
7206.00	NS	NS	-	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9608.00	NS	NS	-	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
12010.00	NS	NS	-	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	

Below 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15,
Above 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss
Rx-ANTENNA : Biconical Antenna(25M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(25M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz: Spectrum Analyzer RMS Average(RBW:100kHz/VBW:300kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)

2480 MHz

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) <=1GHz, (EIRP) >1GHz [dBm]		Limit (ERP) <=1GHz, (EIRP) >1GHz [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
4960.00	37.2	41.1	-63.9	-58.9	5.9	12.9	0.0	-56.9	-51.9	-30.0	26.9	21.9	188	34	177	168	
7440.00	NS	NS	-	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9920.00	NS	NS	-	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
12400.00	NS	NS	-	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	

Below 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15,
Above 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss
Rx-ANTENNA : Biconical Antenna(25M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(25M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz: Spectrum Analyzer RMS Average(RBW:100kHz/VBW:300kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)

Receiver spurious emissions (Radiated)

Report No.	11997606H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	November 6, 2017
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Takumi Shimada
Mode	Rx

2402 MHz

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) <=1GHz, (EIRP) >1GHz [dBm]		Limit (ERP) <=1GHz, (EIRP) >1GHz [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
2402.00	NS	NS	-	-	-	-	-	-	-	-47.0	-	-	-	-	-	-	

Below 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15,
Above 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss
Rx-ANTENNA : Biconical Antenna(25M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(25M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz: Spectrum Analyzer RMS Average(RBW:100kHz/VBW:300kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)

2480 MHz

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) <=1GHz, (EIRP) >1GHz [dBm]		Limit (ERP) <=1GHz, (EIRP) >1GHz [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
2480.00	NS	NS	-	-	-	-	-	-	-	-47.0	-	-	-	-	-	-	

Below 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15,
Above 1GHz: Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss
Rx-ANTENNA : Biconical Antenna(25M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(25M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz: Spectrum Analyzer RMS Average(RBW:100kHz/VBW:300kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)

Receiver Blocking

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11997606H
Date	November 7, 2017
Temperature / Humidity	27 deg. C / 31 % RH
Engineer	Takafumi Noguchi
Mode	Communication BT LE

Wanted signal mean power from companion device (dBm)	Measured Receiver Sensitivity (dBm)	
	Lowest Channel	Highest Channel
Pmin	-92.1	-91.8
Pmin + 6 dB	-86.1	-85.8

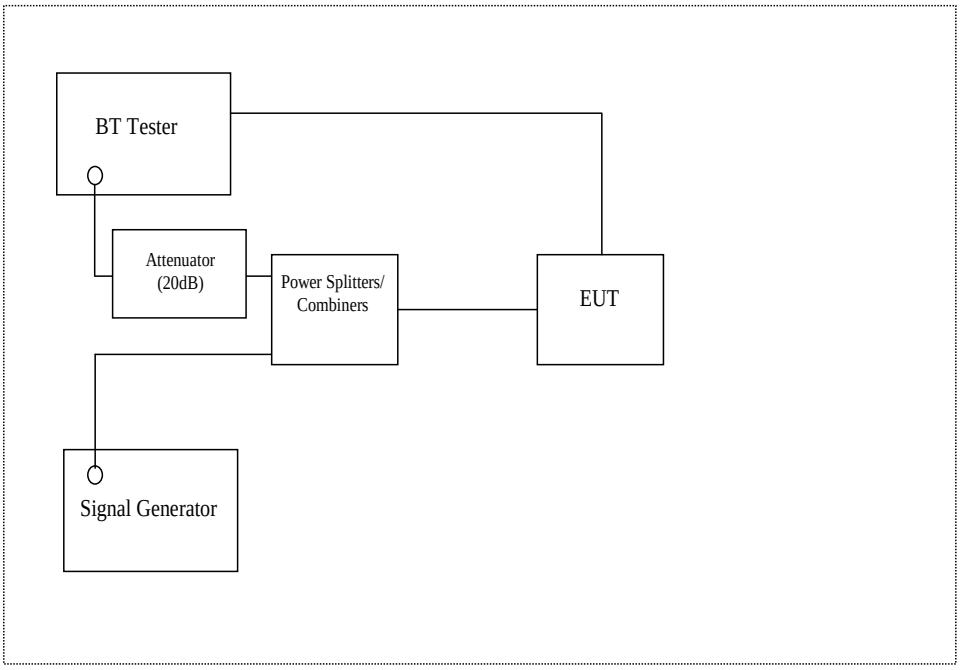
Receiver Category 2 equipment

Operating Channel	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)*1)	Result PER (%)	Limit PER (%)
Lowest Channel	P_{min} + 6 dB	2380	-57	0.00	≦10
		2503.5		0.08	
	P_{min} + 6 dB	2300	-47	0.00	
		2583.5		0.77	
Highest Channel	P_{min} + 6 dB	2380	-57	0.23	≦10
		2503.5		0.22	
	P_{min} + 6 dB	2300	-47	0.20	
		2583.5		0.82	

*Pmin is the minimum level of wanted signal (in dBm) required to meet the minimum performance criterion a PER less than or equal to 10 % in the absence of any blocking signal.

*1) Blocking signal power was adjusted by assumed antenna gain 5.05 dBi.

CONDUCTED METHODS SYSTEM BLOCK DIAGRAM of Receiver Blocking



APPENDIX 2: Test instruments

Test Equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2017/06/21 * 12
MAT-57	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2016/12/15 * 12
MCC-144	Microwave Cable	Junkosha	MWX221	1207S407	AT	2017/08/02 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2017/06/20 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2017/06/20 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2016/12/13 * 12
MCH-06	Temperature and Humidity Chamber	Tabai Espec	PL-1KT	14007630	AT	2017/04/10 * 12
MAT-21	Attenuator(20dB) (above1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-120	901247	AT	2016/12/14 * 12
MCC-173	Microwave Cable	Junkosha	MWX221	1409S496	AT	2017/03/13 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2017/10/06 * 12
MPSC-01	Power splitters/Combiners	Mini-Circuit	ZFSC-2-2500	0124	AT	2017/09/08 * 12
MSG-14	Signal Generator	Rohde & Schwarz	SMC100A	1411.4002k02	AT	2017/10/10 * 12
MURC-09	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	140481	AT	Pre Check
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2017/08/31 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2016/12/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2017/08/21 * 12
MBA-08	Biconical Antenna	Schwarzbeck	VHA9103B	08031	RE	2017/09/13 * 12
MLA-21	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-190	RE	2017/01/05 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2017/02/24 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2016/11/28 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2017/09/27 * 12
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	RE	2017/08/07 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2016/11/10 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2017/02/24 * 12
MCC-216	Microwave Cable	Junkosha	MWX221	1604S253(1 m) / 1608S087(5 m)	RE	2017/08/04 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2017/01/16 * 12
MHA-30	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	1611	RE	2017/09/15 * 12
MCC-130	Microwave Cable (1-30GHz)	HUBER+SUHNER	SF103/11PC3.5-31/ 11PC3.5-31/8.0m	54308/3	RE	2017/01/13 * 12

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item:

RE: Radiated emission test
AT: Antenna Terminal Conducted test

APPENDIX 3: Photographs of test setup

Radiated emission

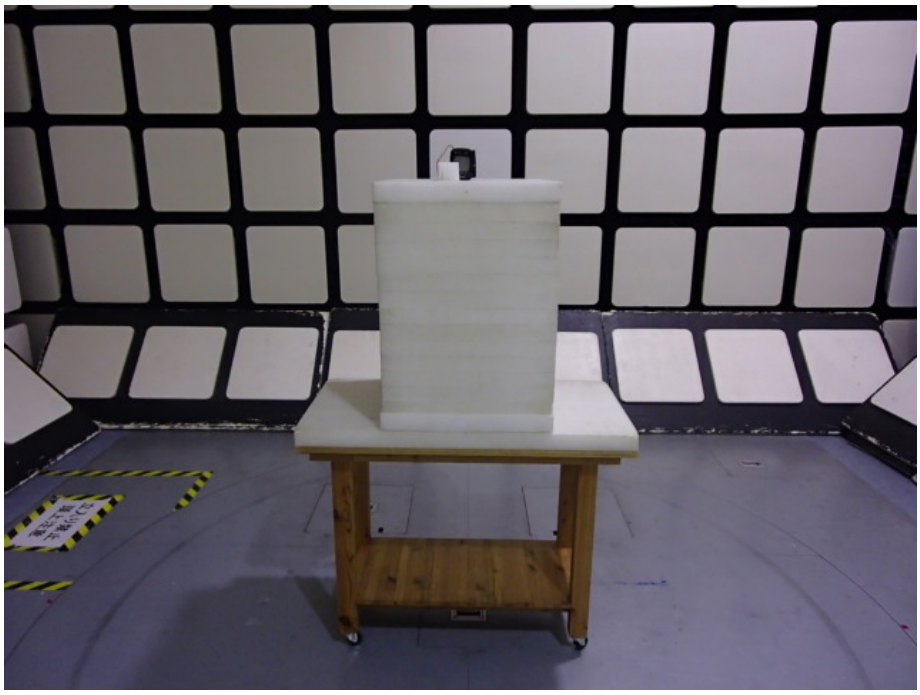


Photo 1

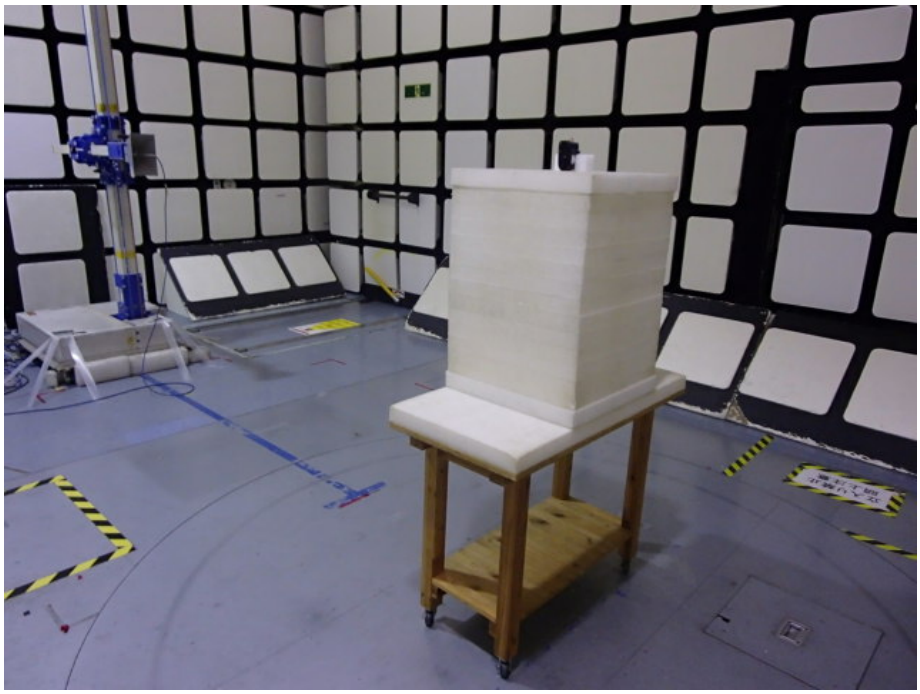


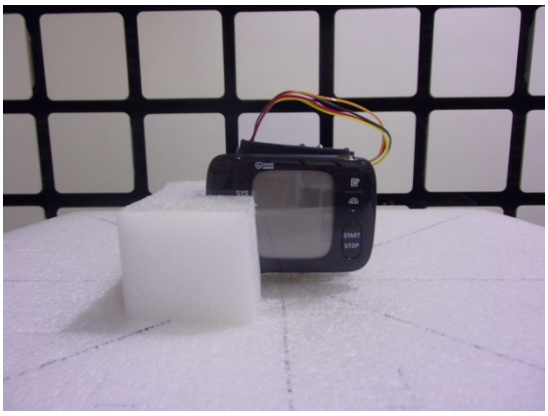
Photo 2

Worst Case Position

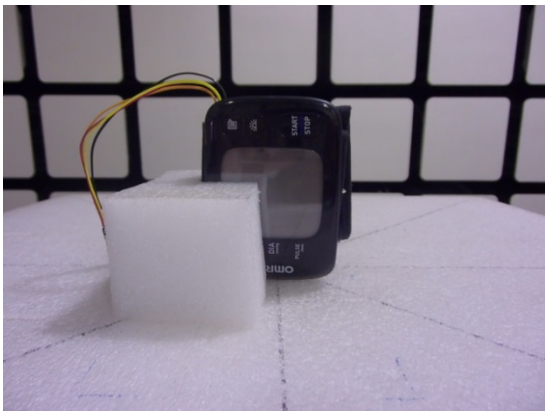
(Below 1GHz (Horizontal: X-axis / Vertical: X-axis))
(Above 1GHz (Horizontal: Z-axis /Vertical: Z-axis))

X-axis

Y-axis



Z-axis



Receiver Blocking

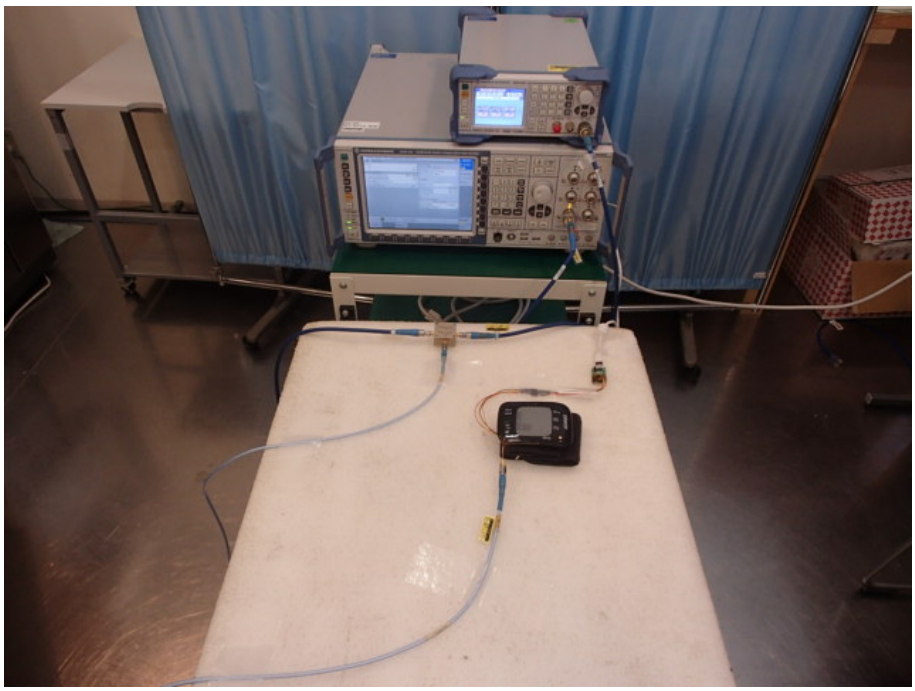


Photo 1

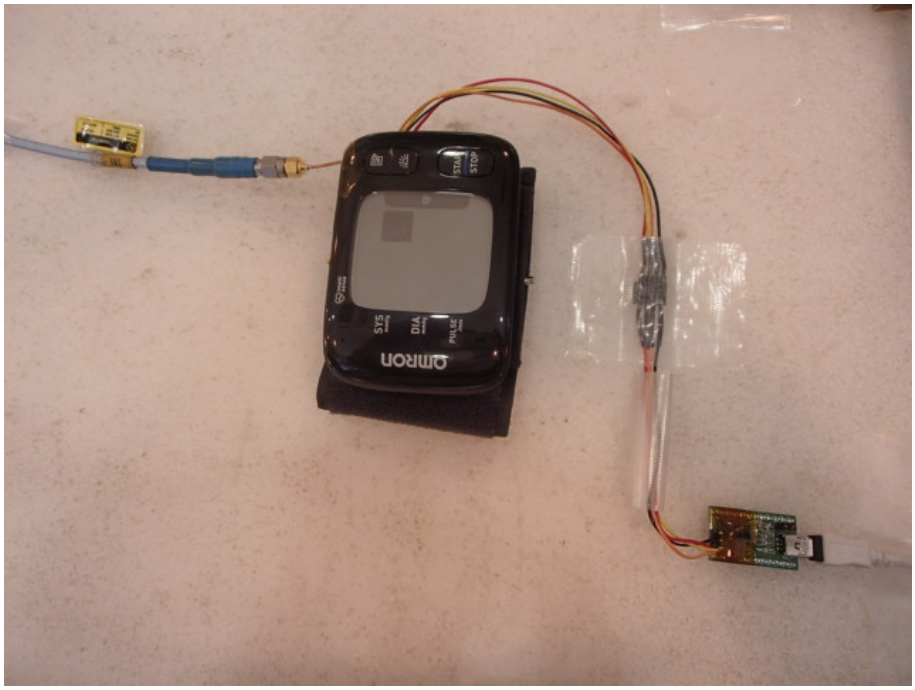


Photo 2

End of Report

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124