RADIO TEST REPORT

Test Report No. : 11485104S-B

Applicant	:	**Sony Corporation**
Type of Equipment	:	**Wireless Stereo Headset**
Model No.	:	**MDR-XB950B1**
FCC ID	:	**AK8XB950B1**
Test regulation	:	**FCC Part 15 Subpart C: 2016**
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 above regulation.
4. The test results in this report are traceable to the national or international standards.
5. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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: October 26 to 30, 2016

Representative test engineer:
Makoto Hosaka
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.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

REVISION HISTORY

Original Test Report No.: 11485104S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11485104S-B	November 21, 2016	-	-
1	11485104S-B	November 22, 2016	p.1, p.2, P.21-p.23	Added comments.

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SECTION 1: Customer information

Company Name	:	Sony Corporation
Address	:	1-7-1 Konan Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	:	+604-3835333
Contact Person	:	Wan Nurfazwina binti Mat Soti

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

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless Stereo Headset
Model No.	:	MDR-XB950B1
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.7 V: Built-in lithium-ion rechargeable battery DC 5 V: When charged using USB
Receipt Date of Sample	:	October 21, 2016
Country of Mass-production	:	China
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: MDR-XB950B1 (referred to as the EUT in this report) is a Wireless Stereo Headset.

The clock frequency used in the EUT: 26 MHz

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS, GFSK
Power Supply (radio part input)	:	DC 1.35 V
Antenna type	:	Omni-Directional
Antenna Gain	:	1.83 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC part 15 final revised on April 6, 2016
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

The EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report: 11485102S-E.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods	**FCC:** Section 15.207	-	-	N/A *1)
	IC: RSS-Gen 8.8	**IC:** RSS-Gen 8.8			
6 dB Bandwidth	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05	**FCC:** Section 15.247(a)(2)	See data.	Complied	Conducted
	IC: -	**IC:** RSS-247 5.2(1)			
Maximum Peak Output Power	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05	**FCC:** Section 15.247(b)(3)		Complied	Conducted
	IC: RSS-Gen 6.12	**IC:** RSS-247 5.4(4)			
Power Density	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05	**FCC:** Section 15.247(e)		Complied	Conducted
	IC: -	**IC:** RSS-247 5.2(2)			
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 DTS Meas Guidance v03r05	**FCC:** Section15.247(d)	**4.9 dB** 9608.000 MHz, AV, Horizontal & Vertical Tx 2402 MHz 9760.000 MHz, AV, Vertical Tx 2440 MHz	Complied	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *2)
	IC: RSS-Gen 6.13	**IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			

Note: UL Japan, Inc.'s EMI 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) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v03r05 12.2.7.

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

FCC Part 15.31 (e)
The EUT is a battery-operated device and test was performed with the full-charged battery. 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.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 6.6	**IC:** -	N/A	-	Conducted

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 $k = 2$.

Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.1 dB	2.1 dB	2.6 dB	2.2 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	2.7 dB	2.7 dB	3.1 dB	-
	30 MHz-300 MHz	4.4 dB	4.4 dB	4.6 dB	-
	300 MHz-1 GHz	5.6 dB	5.5 dB	5.3 dB	-
	1 GHz-13 GHz	5.2 dB	5.2 dB	5.2 dB	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.9 dB	4.9 dB	4.9 dB	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-

SAC=Semi-Anechoic Chamber
SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.76 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.79 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.08 dB
Spurious emission (Conducted) below 1GHz	1.5 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.4 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.5 dB
Bandwidth Measurement	0.66 %
Duty cycle and Time Measurement	0.012 %

Radiated emission test
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: +81 463 50 6400, Facsimile: +81 463 50 6401
JAB Accreditation No. RTL02610

Test site	IC Registration Number	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	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
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.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	-	-

3.6 Test data, Test instruments, and Test set up

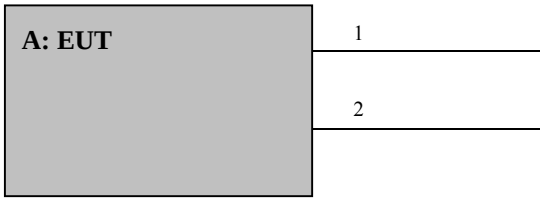
Refer to APPENDIX.

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

4.1 Operating Mode(s)

Mode	Tested frequency	Remarks*
Bluetooth Low Energy	2402 MHz, 2440 MHz, 2480 MHz	PRBS9
*Power of the EUT was set by the software as follows; Power settings: Default (fixed) Software: CSR BlueSuite BlueTest Version 2.5.0.93		

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

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Stereo Headset	MDR-XB950B1	0007 *1) 0008 *2)	Sony Corporation	EUT

*1) Used for Antenna Terminal conducted test
*2) Used for Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Audio	1.2	Unshielded	Unshielded	-
2	USB	0.5	Shielded	Shielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "558074 D01 DTS Meas Guidance v03r05".

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]
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 has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 and 4 m and EUT 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 with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *3)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	Average Power Method: 12.2.5.2 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (Linear voltage) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3 m	3.86 m*1) (1 GHz – 13 GHz), 1 m*2) (13 GHz – 25 GHz)		3.86 m*1) (1 GHz – 13 GHz), 1 m*2) (13 GHz – 25 GHz)

*1) Distance Factor: 20 x log (3.86 m/3.0 m) = 2.19 dB
*2) Distance Factor: 20 x log (1.0 m/3.0 m) = -9.54 dB
*3) Average Power Measurement was performed based on 6. 0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v03r05"

- 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 polarization	Carrier (Band edge)	Spurious		
		Below 1 GHz	Above 1 GHz	
			1 GHz -13 GHz	13 GHz -25 GHz
Horizontal	Z	X	Z	X
Vertical	X	Y	X	X

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

Measurement range : **30 MHz - 25 GHz**
Test data : **APPENDIX**
Test result : **Pass**

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6 dB Bandwidth	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Sample	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/ Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the 6 dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r05".
*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

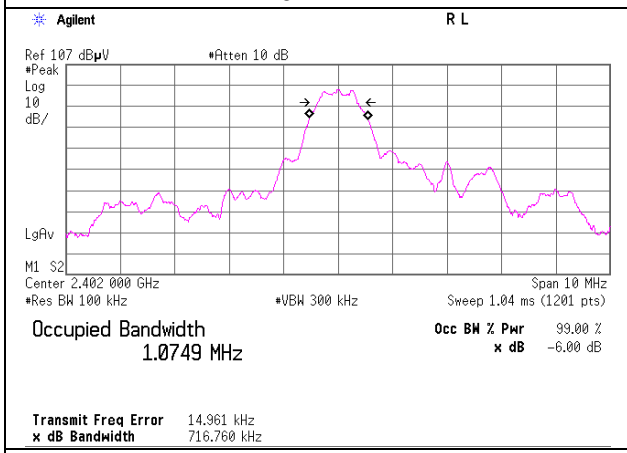
APPENDIX 1: Test data

6 dB Bandwidth

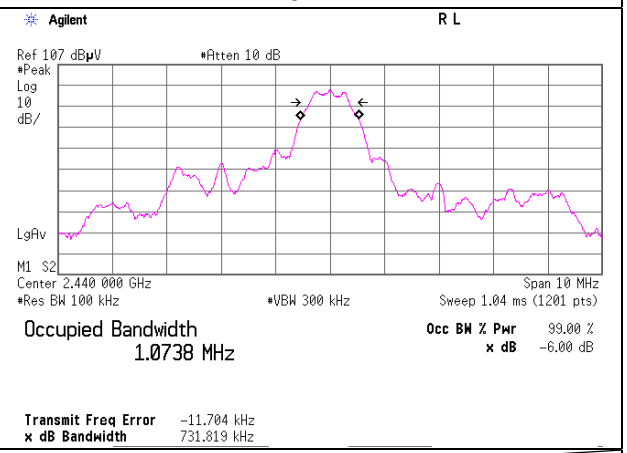
Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE

Mode	Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [kHz]
BT LE	2402	0.717	> 500
	2440	0.732	> 500
	2480	0.717	> 500

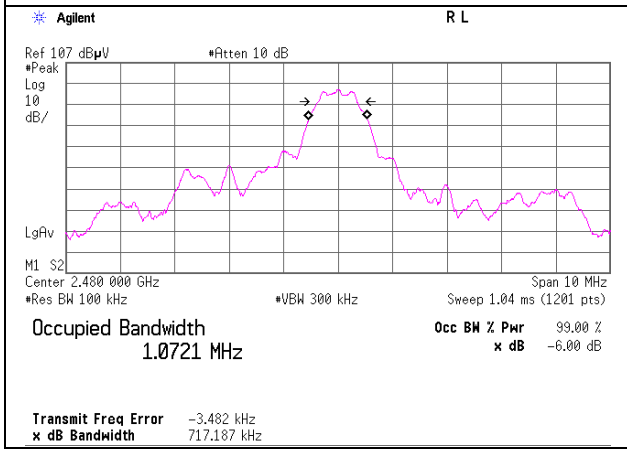
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-11.27	0.93	9.67	-0.67	0.86	30.00	1000	30.67
2440	-11.61	0.94	9.67	-1.00	0.79	30.00	1000	31.00
2480	-11.93	0.94	9.67	-1.32	0.74	30.00	1000	31.32

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Average Output Power
(Reference data for RF Exposure / SAR testing)

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-14.11	0.93	9.67	-3.51	0.45	1.85	-1.66	0.68
2440	-14.45	0.94	9.67	-3.84	0.41	1.85	-1.99	0.63
2480	-14.78	0.94	9.67	-4.17	0.38	1.85	-2.32	0.59

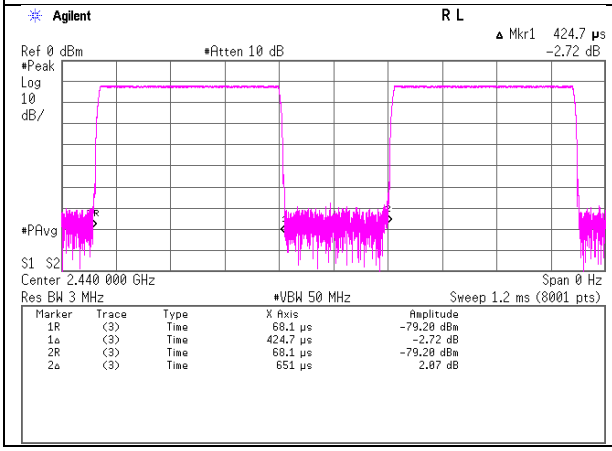
Sample Calculation:
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator loss
Result (Burst power average) = Time average + Duty factor

*The equipment and cables were not used for factor 0 dB of the data sheets.

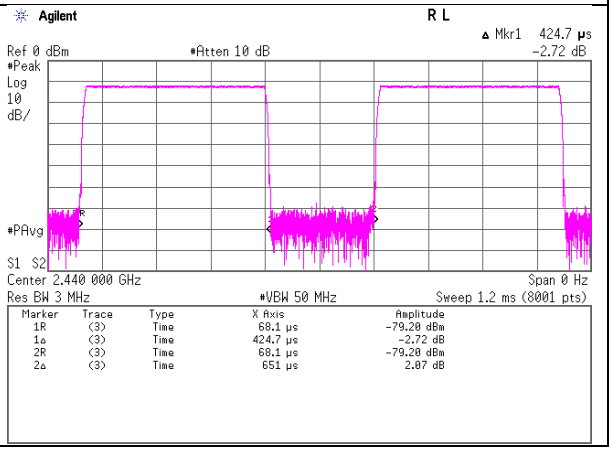
Burst rate confirmation

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE

Tx on / (Tx on + Tx off) = **0.652**
Tx on / (Tx on + Tx off) * 100 = **65.2 %**
Duty factor = 10 * log (0.651 / 0.4247) = **1.85 dB**



Tx on / (Tx on + Tx off) = **0.652**
Tx on / (Tx on + Tx off) * 100 = **65.2 %**
Duty factor = 20 * log (0.651 / 0.4247) = **3.71 dB**



Radiated Spurious Emission

Report No.	11485104S-B		
Test Place(AC No)	1	1	2
Date	October 26, 2016	October 27, 2016	October 30, 2016
Temperature / Humidity	26 deg. C / 49 % RH	24 deg. C / 44 % RH	20 deg. C / 52 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Makoto Hosaka
Mode	Tx BT LE 2402 MHz		

(* 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.	424.000	QP	28.10	16.59	7.38	31.63	0.00	20.44	46.00	25.5	100	185	
Hori.	428.000	QP	28.60	16.64	7.41	31.64	0.00	21.01	46.00	24.9	100	176	
Hori.	2390.000	PK	44.95	27.21	13.77	40.70	2.19	47.42	73.90	26.5	100	170	
Hori.	4804.000	PK	51.23	31.13	5.93	41.54	2.19	48.94	73.90	25.0	192	201	
Hori.	7206.000	PK	46.55	36.24	7.14	41.12	2.19	51.00	73.90	22.9	100	0	
Hori.	9608.000	PK	45.19	38.13	8.04	40.49	2.19	53.06	73.90	**20.8**	100	0	
Vert.	112.000	QP	26.30	11.91	7.91	31.84	0.00	14.28	43.50	29.2	100	76	
Vert.	116.000	QP	31.80	12.52	7.92	31.84	0.00	20.40	43.50	23.1	100	29	
Vert.	120.000	QP	28.10	13.12	7.95	31.83	0.00	17.34	43.50	26.1	100	81	
Vert.	436.000	QP	30.60	16.74	7.46	31.64	0.00	23.16	46.00	22.8	139	57	
Vert.	444.000	QP	27.30	16.84	7.51	31.64	0.00	20.01	46.00	25.9	141	43	
Vert.	2390.000	PK	44.44	27.21	13.77	40.70	2.19	46.91	73.90	27.0	100	340	
Vert.	4804.000	PK	51.15	31.13	5.93	41.54	2.19	48.86	73.90	25.0	100	162	
Vert.	7206.000	PK	46.72	36.24	7.14	41.12	2.19	51.17	73.90	22.7	100	0	
Vert.	9608.000	PK	44.52	38.13	8.04	40.49	2.19	52.39	73.90	21.5	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	36.33	27.21	13.77	40.70	3.71	2.19	42.51	53.90	11.4	*1)
Hori.	4804.000	AV	45.00	31.13	5.93	41.54	3.71	2.19	46.42	53.90	7.5	
Hori.	7206.000	AV	38.42	36.24	7.14	41.12	3.71	2.19	46.58	53.90	7.3	
Hori.	9608.000	AV	37.44	38.13	8.04	40.49	3.71	2.19	49.02	53.90	**4.9**	
Vert.	2390.000	AV	35.91	27.21	13.77	40.70	3.71	2.19	42.09	53.90	11.8	*1)
Vert.	4804.000	AV	43.73	31.13	5.93	41.54	3.71	2.19	45.15	53.90	8.8	
Vert.	7206.000	AV	38.73	36.24	7.14	41.12	3.71	2.19	46.89	53.90	7.0	
Vert.	9608.000	AV	37.42	38.13	8.04	40.49	3.71	2.19	49.00	53.90	**4.9**	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

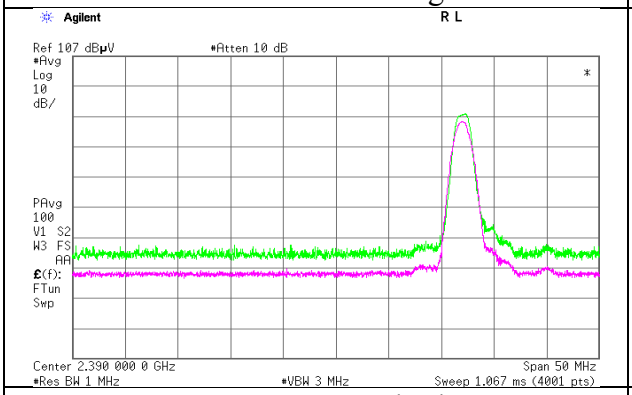
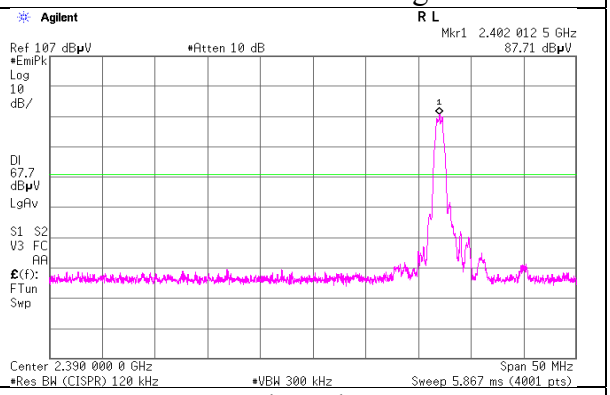
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

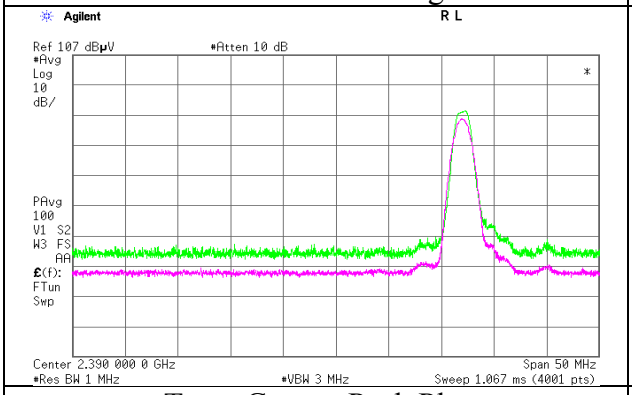
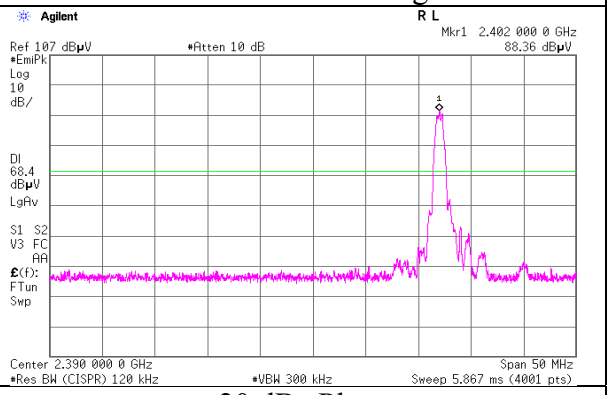
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	87.51	27.25	13.78	40.70	2.19	90.03	-	-	Carrier
Hori.	2400.000	PK	42.70	27.25	13.78	40.70	2.19	45.22	70.03	24.8	
Vert.	2402.000	PK	87.79	27.25	13.78	40.70	2.19	90.31	-	-	Carrier
Vert.	2400.000	PK	42.56	27.25	13.78	40.70	2.19	45.08	70.31	25.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	11485104S-B
Test Place(AC No)	1
Date	October 26, 2016
Temperature / Humidity	26 deg. C / 49 % RH
Engineer	Yosuke Ishikawa
Mode	Tx BT LE 2402 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20 dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20 dBc Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	11485104S-B		
Test Place(AC No)	1	1	2
Date	October 26, 2016	October 27, 2016	October 30, 2016
Temperature / Humidity	26 deg. C / 49 % RH	24 deg. C / 44 % RH	20 deg. C / 52 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Makoto Hosaka
Mode	Tx BT LE 2440 MHz		

(* 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.	416.000	QP	29.60	16.49	7.33	31.63	0.00	21.79	46.00	24.2	100	175	
Hori.	428.000	QP	30.00	16.64	7.41	31.64	0.00	22.41	46.00	23.5	100	169	
Hori.	4880.000	PK	50.34	31.29	5.96	41.39	2.19	48.39	73.90	25.5	216	197	
Hori.	7320.000	PK	46.72	36.40	7.17	41.24	2.19	51.24	73.90	22.7	100	0	
Hori.	9760.000	PK	44.41	38.35	8.10	40.41	2.19	52.64	73.90	21.3	100	0	
Vert.	112.000	QP	27.20	11.91	7.91	31.84	0.00	15.18	43.50	28.3	100	352	
Vert.	116.000	QP	32.10	12.52	7.92	31.84	0.00	20.70	43.50	22.8	100	38	
Vert.	120.000	QP	27.50	13.12	7.95	31.83	0.00	16.74	43.50	26.7	100	357	
Vert.	128.005	QP	25.90	13.61	8.09	31.83	0.00	15.77	43.50	27.7	100	45	
Vert.	420.000	QP	28.60	16.54	7.35	31.63	0.00	20.86	46.00	25.1	133	62	
Vert.	4880.000	PK	50.93	31.29	5.96	41.39	2.19	48.98	73.90	24.9	100	164	
Vert.	7320.000	PK	46.22	36.40	7.17	41.24	2.19	50.74	73.90	23.2	100	0	
Vert.	9760.000	PK	45.09	38.35	8.10	40.41	2.19	53.32	73.90	**20.6**	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4880.000	AV	43.52	31.29	5.96	41.39	3.71	2.19	45.28	53.90	8.6	
Hori.	7320.000	AV	38.41	36.40	7.17	41.24	3.71	2.19	46.64	53.90	7.3	
Hori.	9760.000	AV	36.53	38.35	8.10	40.41	3.71	2.19	48.47	53.90	5.4	
Vert.	4880.000	AV	43.16	31.29	5.96	41.39	3.71	2.19	44.92	53.90	9.0	
Vert.	7320.000	AV	38.40	36.40	7.17	41.24	3.71	2.19	46.63	53.90	7.3	
Vert.	9760.000	AV	37.06	38.35	8.10	40.41	3.71	2.19	49.00	53.90	**4.9**	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.

Radiated Spurious Emission

Report No.	11485104S-B		
Test Place(AC No)	1	1	2
Date	October 26, 2016	October 27, 2016	October 30, 2016
Temperature / Humidity	26 deg. C / 49 % RH	24 deg. C / 44 % RH	20 deg. C / 52 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Makoto Hosaka
Mode	Tx BT LE 2480 MHz		

(* 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.	400.000	QP	30.00	16.29	7.22	31.63	0.00	21.88	46.00	24.1	100	169	
Hori.	428.000	QP	29.00	16.64	7.41	31.64	0.00	21.41	46.00	24.5	100	176	
Hori.	2483.500	PK	47.54	27.52	13.86	40.69	2.19	50.42	73.90	23.5	114	225	
Hori.	2483.946	PK	48.75	27.53	13.86	40.69	2.19	51.64	73.90	22.3	114	225	
Hori.	4960.000	PK	50.61	31.45	5.99	41.23	2.19	49.01	73.90	24.9	228	197	
Hori.	7440.000	PK	45.99	36.57	7.19	41.37	2.19	50.57	73.90	23.3	100	0	
Hori.	9920.000	PK	43.11	38.58	8.18	40.32	2.19	51.74	73.90	22.2	100	0	
Vert.	112.000	QP	27.30	11.91	7.91	31.84	0.00	15.28	43.50	28.2	100	355	
Vert.	116.000	QP	32.20	12.52	7.92	31.84	0.00	20.80	43.50	22.7	100	48	
Vert.	120.000	QP	27.70	13.12	7.95	31.83	0.00	16.94	43.50	26.5	100	62	
Vert.	444.000	QP	29.30	16.84	7.51	31.64	0.00	22.01	46.00	23.9	132	27	
Vert.	564.000	QP	26.80	18.43	8.18	31.64	0.00	21.77	46.00	24.2	100	340	
Vert.	2483.500	PK	47.88	27.52	13.86	40.69	2.19	50.76	73.90	23.1	218	120	
Vert.	2483.952	PK	49.23	27.53	13.86	40.69	2.19	52.12	73.90	**21.8**	218	120	
Vert.	4960.000	PK	50.33	31.45	5.99	41.23	2.19	48.73	73.90	25.2	100	204	
Vert.	7440.000	PK	45.38	36.57	7.19	41.37	2.19	49.96	73.90	23.9	100	0	
Vert.	9920.000	PK	43.31	38.58	8.18	40.32	2.19	51.94	73.90	22.0	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	39.72	27.52	13.86	40.69	3.71	2.19	46.31	53.90	7.6	*1)
Hori.	2483.946	AV	40.34	27.53	13.86	40.69	3.71	2.19	46.94	53.90	7.0	
Hori.	4960.000	AV	43.83	31.45	5.99	41.23	3.71	2.19	45.94	53.90	8.0	
Hori.	7440.000	AV	37.64	36.57	7.19	41.37	3.71	2.19	45.93	53.90	8.0	
Hori.	9920.000	AV	35.95	38.58	8.18	40.32	3.71	2.19	48.29	53.90	5.6	
Vert.	2483.500	AV	40.10	27.52	13.86	40.69	3.71	2.19	46.69	53.90	7.2	*1)
Vert.	2483.952	AV	41.29	27.53	13.86	40.69	3.71	2.19	47.89	53.90	6.0	
Vert.	4960.000	AV	42.89	31.45	5.99	41.23	3.71	2.19	45.00	53.90	8.9	
Vert.	7440.000	AV	37.72	36.57	7.19	41.37	3.71	2.19	46.01	53.90	7.9	
Vert.	9920.000	AV	36.10	38.58	8.18	40.32	3.71	2.19	48.44	53.90	**5.5**	

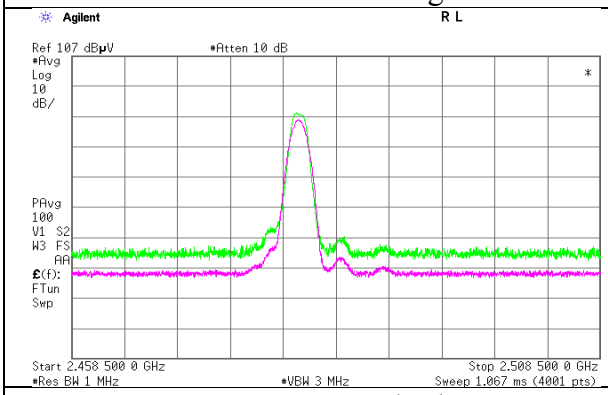
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	11485104S-B		
Test Place(AC No)	1	1	2
Date	October 26, 2016	October 27, 2016	October 30, 2016
Temperature / Humidity	26 deg. C / 49 % RH	24 deg. C / 44 % RH	20 deg. C / 52 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Makoto Hosaka
Mode	Tx BT LE 2480 MHz		

Horizontal

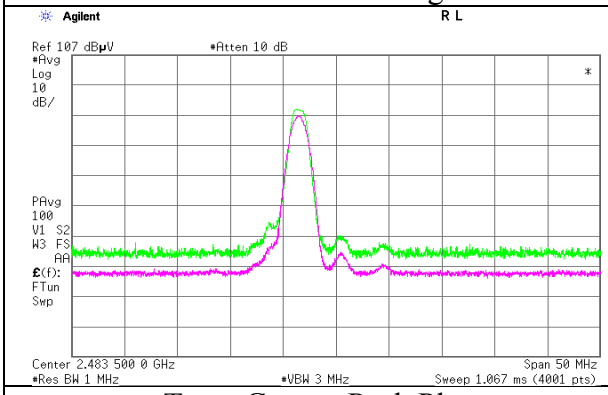
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

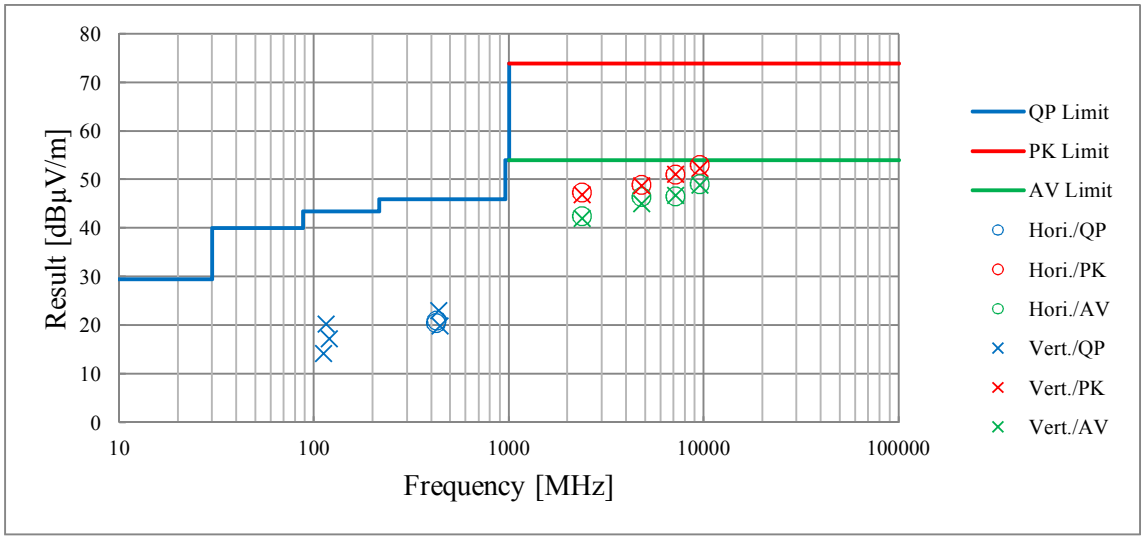


Trace Green : Peak Plot
Trace Purple : Average Plot

* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	11485104S-B		
Test Place(AC No)	1	1	2
Date	October 26, 2016	October 27, 2016	October 30, 2016
Temperature / Humidity	26 deg. C / 49 % RH	24 deg. C / 44 % RH	20 deg. C / 52 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Makoto Hosaka
Mode	Tx BT LE 2402 MHz		

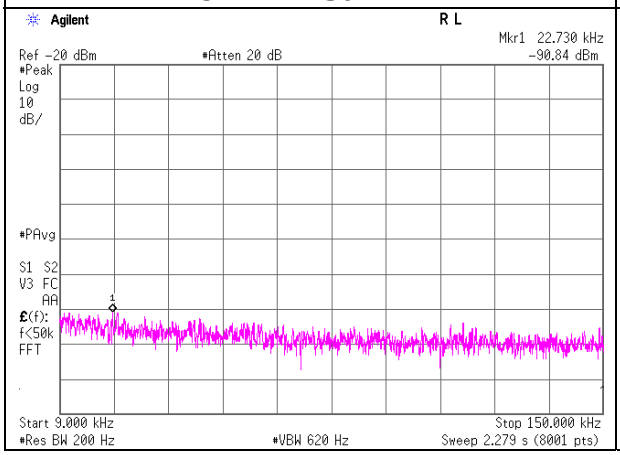


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

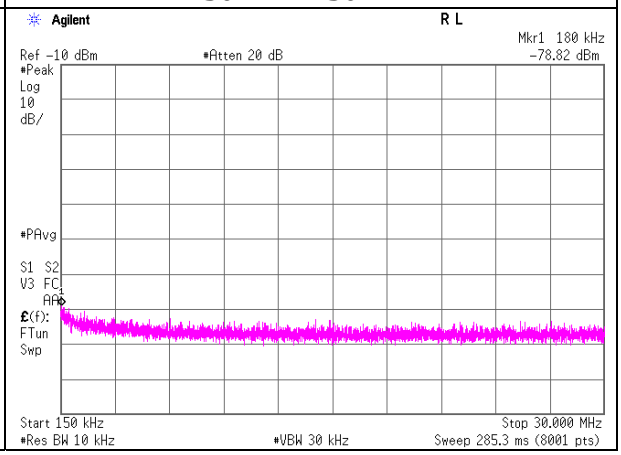
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE, 2402 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
22.73	-90.8	0.01	9.7	2.0	1	-79.2	300	6.0	-17.9	40.4	58.3	
180.00	-78.8	0.01	9.7	2.0	1	-67.1	300	6.0	-5.9	22.4	28.3	

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

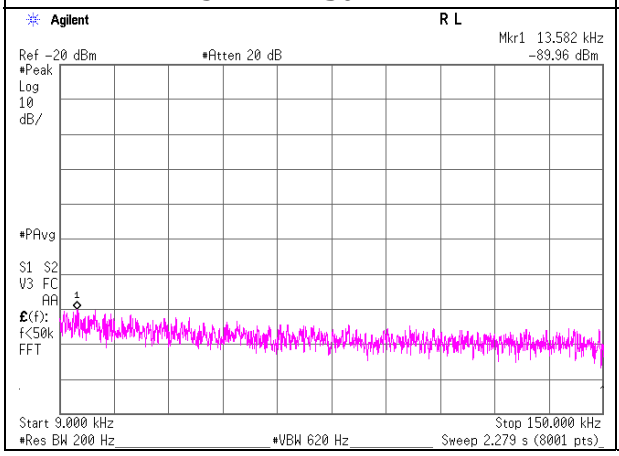
EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

* The antenna gain applied 2 dBi of section 12.2.6 of KDB558074 D01.

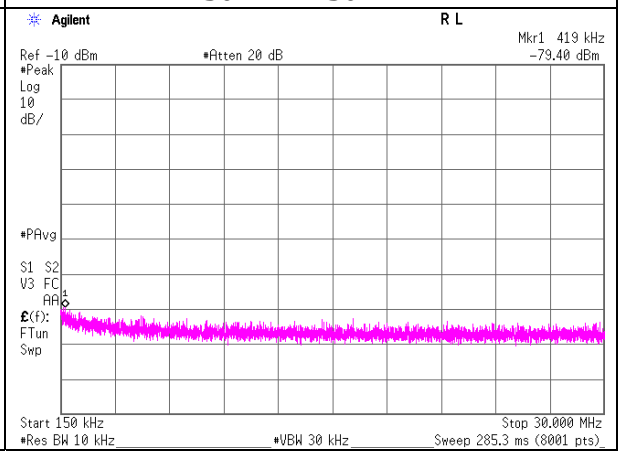
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE, 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
13.58	-90.0	0.01	9.7	2.0	1	-78.3	300	6.0	-17.0	44.9	61.9	
419.00	-79.4	0.01	9.7	2.0	1	-67.7	300	6.0	-6.5	15.1	21.6	

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

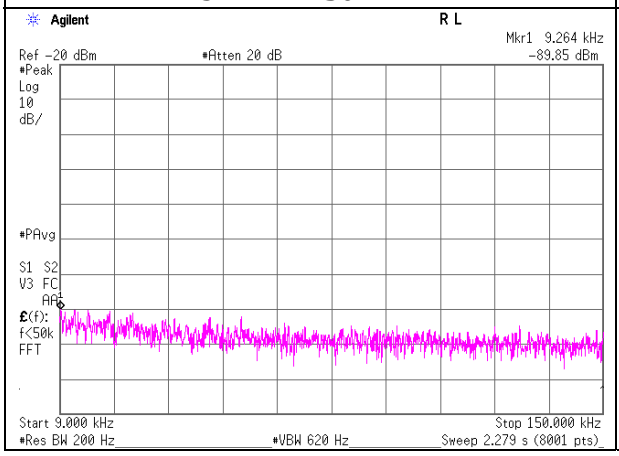
EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

* The antenna gain applied 2 dBi of section 12.2.6 of KDB558074 D01.

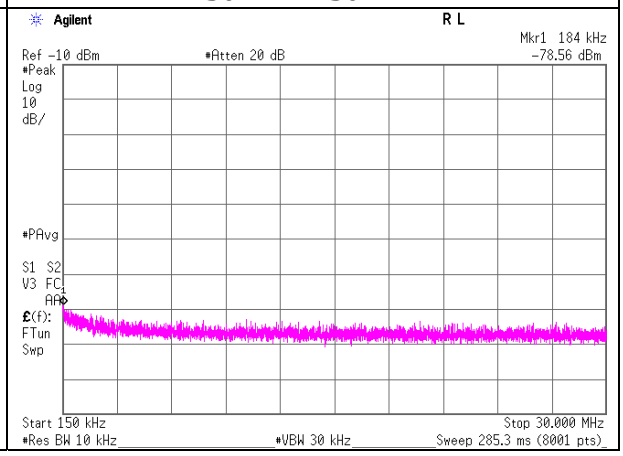
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE, 2480 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenator Loss [dB]	Antenna Gain [dBi]	N (Number of Output	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.26	-89.9	0.01	9.7	2.0	1	-78.2	300	6.0	-16.9	48.2	65.1	
184.00	-78.6	0.01	9.7	2.0	1	-66.9	300	6.0	-5.6	22.3	27.9	

E = EIRP - 20 log (D) + Ground bounce + 104.8 [dBuV/m]

EIRP = Reading + Cable Loss + Attenator Loss + Antenna Gain + 10 * log (N)

* The antenna gain applied 2 dBi of section 12.2.6 of KDB558074 D01.

Power Density

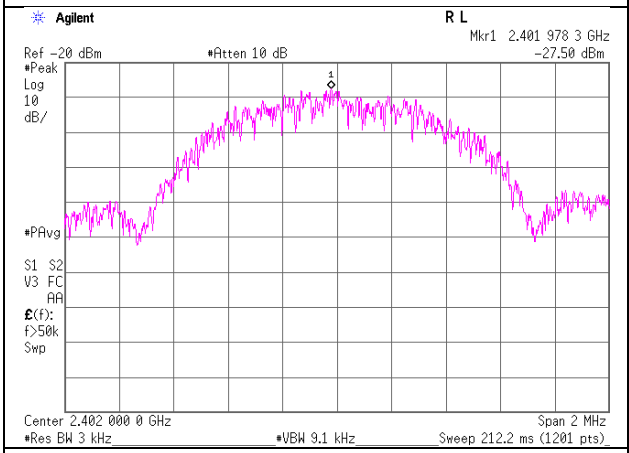
Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-27.50	0.93	9.67	-16.90	8.00	24.90
2440.00	-27.82	0.94	9.67	-17.21	8.00	25.21
2480.00	-28.13	0.94	9.67	-17.52	8.00	25.52

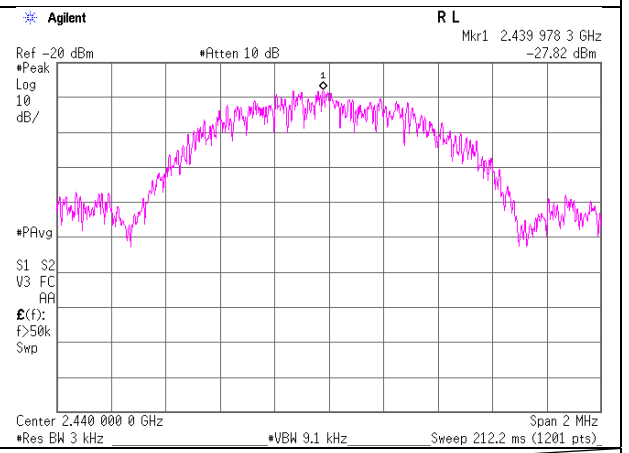
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

*The equipment and cables were not used for factor 0 dB of the data sheets.

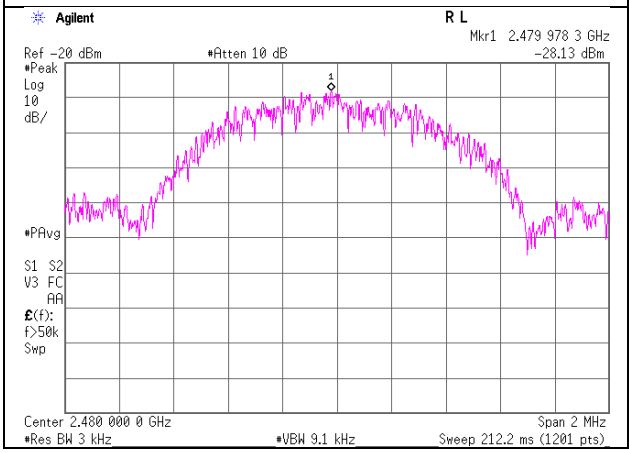
2402 MHz



2440 MHz



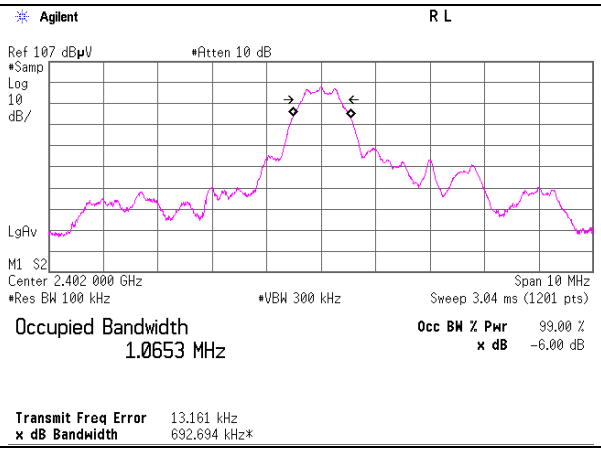
2480 MHz



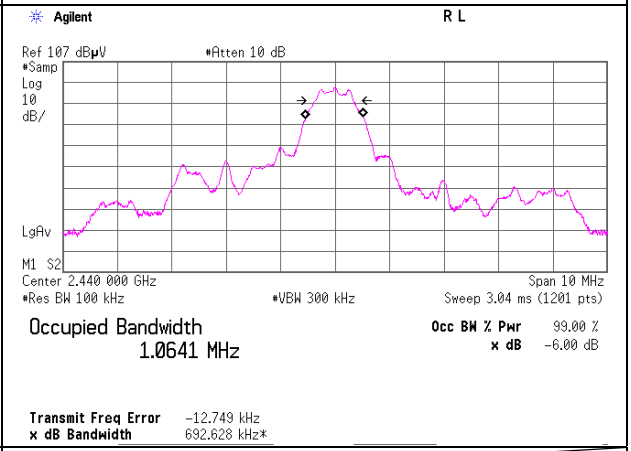
99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.3 Shielded Room
Report No.	11485104S-B
Date	October 26, 2016
Temperature / Humidity	25 deg. C / 47 % RH
Engineer	Kenichi Adachi
Mode	Tx BT LE

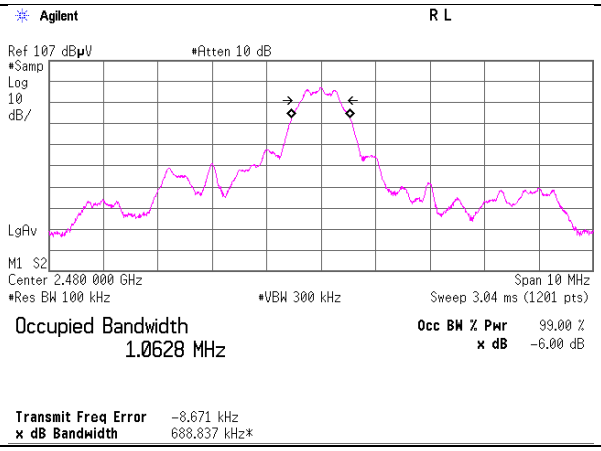
2402 MHz



2440 MHz



2480 MHz



UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2016/04/01 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2016/04/01 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	AT	2016/10/24 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2015/11/04 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2016/03/23 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	AT	2015/12/07 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2016/03/22 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16-09 1	RE	2016/06/14 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2016/05/11 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2016/08/09 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2016/10/12 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2016/03/23 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
SAEC-01(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	RE	2016/07/24 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2015/11/04 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2016/04/18 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2015/11/16 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2016/03/24 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2016/09/27 * 12
SCC-G20	Coaxial Cable	Junkosha	J12J102518-00	APR-15-15-003	RE	2016/04/18 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000K MSKMS	-	RE	2016/04/18 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	RE	2016/10/24 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2016/02/19 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2016/02/25 * 12
KAT3-10	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2016/07/26 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2015/11/02 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2016/04/22 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2016/04/22 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2015/11/03 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2016/10/12 * 12
TR-09	Test Receiver	Rohde & Schwarz	ESCI	100769	RE	2016/10/07 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2016/07/13 * 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