RADIO TEST REPORT

Test Report No. : 12403128S-E-R4

Applicant	:	**Pioneer Corporation**
Type of Equipment	:	**Pedaling Monitor Sensor**
Model No.	:	**SGY-PM930HR**
FCC ID	:	**AJDK109**
Test regulation	:	**FCC Part 15 Subpart C: 2018** **(* Bluetooth low energy part)**
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 limits of the above regulation.
4. The test results in this test 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 any agency of the Federal Government.
6. This test report covers EMC technical requirements.
   It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. This report is a revised version of 12403128S-E-R3. 12403128S-E-R3 is replaced with this report.

Date of test: August 8 to September 4, 2018

Representative test engineer:
Kazuya Noda
Engineer
Consumer Technology Division

Approved by:
Hikaru Shirasawa
Engineer
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.: 12403128S-E

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12403128S-E	September 27, 2018	-	-
1	12403128S-E-R1	October 1, 2018	4, 15	Correction of Antenna gain: -6.9 dBi →-4.1 dBi
			5	Correction of Section 3.2: This EUT provides stable voltage constantly to RF Part regardless of input voltage. → The test was performed with the New Battery and the stable voltage was supplied to the EUT during the tests.
2	12403128S-E-R2	October 5, 2018	9	Correction of Configuration and peripherals: Delete antenna cable and add battery
			12	Correction of remarks: *3) "KDB 558074 D01 DTS Meas Guidance v04" → "ANSI C63.10-2013"
				Delete *4) *5), then add *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. (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)
3	12403128S-E-R3	October 9, 2018	11	Deletion of remarks *4)
4	12403128S-E-R4	October 10, 2018	12	Correction of remarks: *3) Section 10.2 → Section 11.10.2

CONTENTS PAGE

SECTION 1: Customer information....4
SECTION 2: Equipment under test (E.U.T.)....4
SECTION 3: Test specification, procedures & results....5
SECTION 4: Operation of E.U.T. during testing....8
SECTION 5: Radiated Spurious Emission....10
SECTION 6: Antenna Terminal Conducted Tests....12
APPENDIX 1: Test data....13
6 dB Bandwidth and 99 % Occupied Bandwidth....13
Maximum Peak Output Power....15
Average Output Power....16
Radiated Spurious Emission....18
Conducted Spurious Emission....24
Power Density....27
APPENDIX 2: Test instruments....29
APPENDIX 3: Photographs of test setup....30
Radiated Spurious Emission....30
Worst Case Position....31

SECTION 1: Customer information

Company Name	:	Pioneer Corporation
Address	:	25-1 Yamada, Kawagoe-shi, Saitama, 350-8555, Japan
Telephone Number	:	+81-49-228-7787
Facsimile Number	:	+81-49-228-6493
Contact Person	:	Masahiro Sato

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

2.1 Identification of E.U.T.

Type of Equipment	:	Pedaling Monitor Sensor
Model No.	:	SGY-PM930HR
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.0 V
Receipt Date of Sample	:	August 8, 2018
Country of Mass-production	:	Japan
Condition of EUT	:	Production 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: SGY-PM930HR (referred to as the EUT in this report) is a Pedaling Monitor Sensor.

Radio Specification

Bluetooth Low Energy

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Antenna type	:	PCB Antenna (SGY-PM930HR)
Antenna Gain	:	-4.1 dBi
Clock frequency (Maximum)	:	-10 deg.C to +50 deg.C.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on March 12, 2018 and effective April 11, 2018
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

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods **IC:** RSS-Gen 8.8	**FCC:** Section 15.207 **IC:** RSS-Gen 8.8	-	N/A	-
6dB Bandwidth	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** -	**FCC:** Section 15.247(a)(2) **IC:** RSS-247 5.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** RSS-Gen 6.12	**FCC:** Section 15.247(b)(3) **IC:** RSS-247 5.4(d)		Complied	Conducted
Power Density	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** -	**FCC:** Section 15.247(e) **IC:** RSS-247 5.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 DTS Meas Guidance v04 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	1.0 dB 9920.000 MHz, AV, Hori. Tx 2480 MHz	Complied#	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 DTS Meas Guidance v04 12.2.7.

Symbols:
Complied The data of this test item has enough margin, more than the measurement uncertainty.
Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

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

FCC Part 15.31 (e)
The test was performed with the New Battery and the stable voltage was supplied to the EUT during the tests. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	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

EMI

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	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.5 dB	2.5 dB	2.5 dB	2.6 dB	2.6 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.2 dB	3.2 dB	3.3 dB	-	-
	30 MHz-200 MHz	4.9 dB	4.8 dB	4.9 dB	-	-
	200 MHz-1 GHz	6.1 dB	6.1 dB	6.1 dB	-	-
	1 GHz-6 GHz	4.7 dB	4.7 dB	4.7 dB	-	-
	6 GHz-18 GHz	5.3 dB	5.3 dB	5.3 dB	-	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB	-	-

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

Antenna terminal test	Jncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.48 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.66 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.47 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.64 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	0.90 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.04 dB
Spurious emission (Conducted) below 1GHz	1.8 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.5 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.7 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

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
FCC Test Firm Registration Number: 839876

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

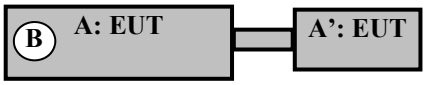
4.1 Operating Mode(s)

Mode	Remarks*
Bluetooth Low Energy (BT LE)	PRBS9
*Power of the EUT was set by the software as follows; Power settings: Fixed Software: 0.001 *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.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission Spurious Emission 6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	Tx BT LE	2402 MHz 2440 MHz 2480 MHz

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Pedaling Monitor Sensor (Transmitter)	SGY-PM930HR	RHTP600005WL *1) RHTP600040WL *2)	Pioneer	EUT
A'	Pedaling Monitor Sensor (Junction Box)	SGY-PM930HR	RHTP600005WL *1) RHTP600040WL *2)	Pioneer	EUT
B	Battery	CR2032	-	-	-

*1) Used for AT (Antenna Terminal Conducted test)
*2) Used for RE (Radiated emission test)

SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "11.0 Emissions in non-restricted frequency bands" of "KDB 558074 D01 DTS Meas Guidance v04".

[For below 1 GHz]
EUT was placed on a platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane.
The table is made of expanded polystyrol and expanded polypropylene and the table top is covered with polycarbonate. That has very low permittivity. 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 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

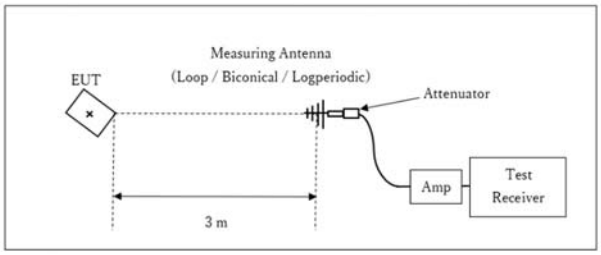
In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired 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 *1) *2)	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 and Averaging factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

*1) Average Power Measurement was performed based on 6.0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v04".
*2) As for Carrier related spurious emissions, “Averaging factor” based on FCC section 15.35(c) / RSS-Gen section 8.2 were used.

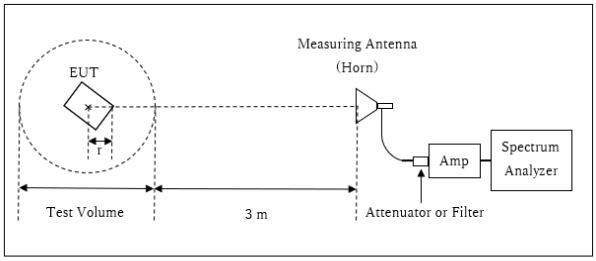
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz

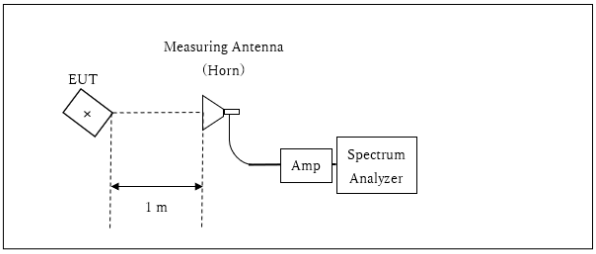


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.98 m*/3.0 m) = 2.45 dB
* Test Distance: (3 + Test Volume /2) - r = 3.98 m

Test Volume: 2 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.02 m

13 GHz – 26.5 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m* / 3.0 m) = -9.54 dB
*Test Distance: 1 m

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

Combinations of the worst case

Frequency / Antenna polarization	Spurious				
	Below 1 GHz	1 GHz – 2.8 GHz	2.8 GHz – 13 GHz	13 GHz-18 GHz	18 GHz-26 GHz
Horizontal	X	Z	X	X	X
Vertical	X	Y	Z	X	X

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

Measurement range : 30 MHz - 26 GHz
Test data : APPENDIX 1
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
6dB 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	Peak	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 6dB 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 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".
*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.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)

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

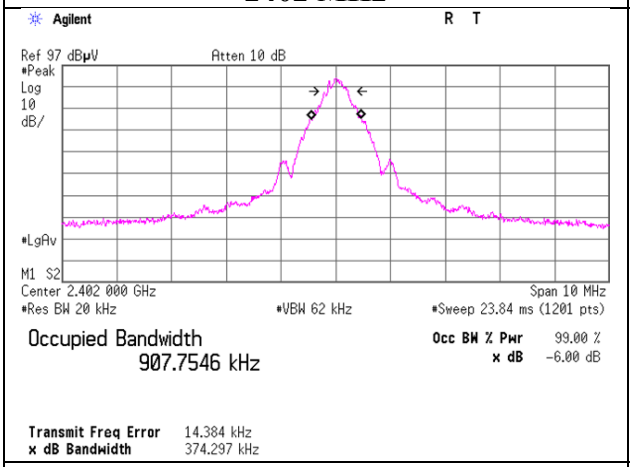
6 dB Bandwidth and 99 % Occupied Bandwidth

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE

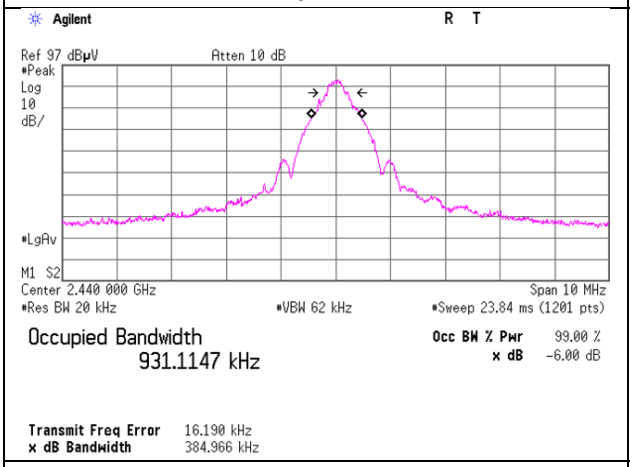
Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
BT LE	2402	907.8	0.512	> 0.5000
	2440	931.1	0.503	> 0.5000
	2480	941.4	0.510	> 0.5000

99%Occupied Bandwidth

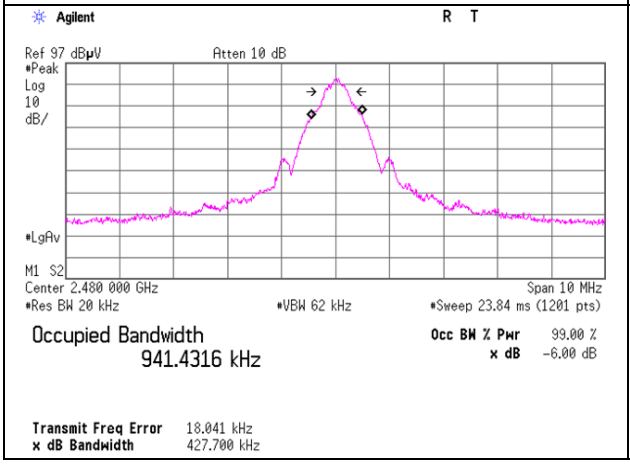
2402 MHz



2440 MHz

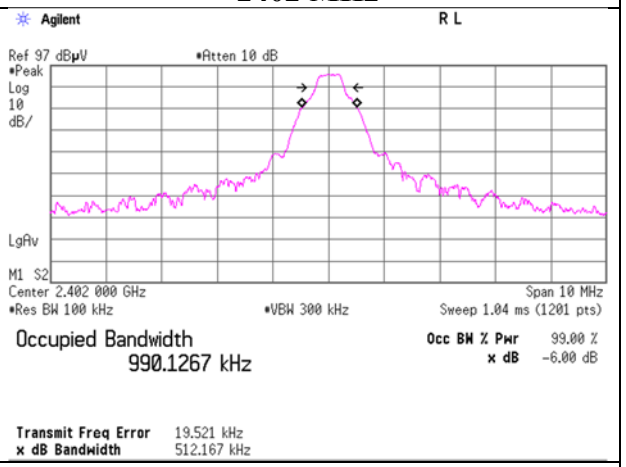


2480 MHz

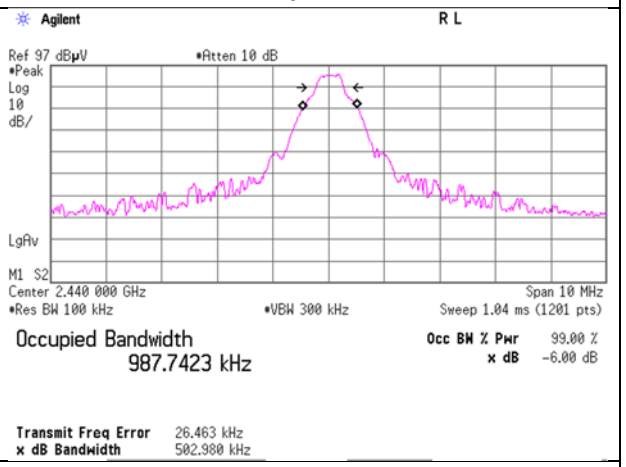


6 dB Bandwidth

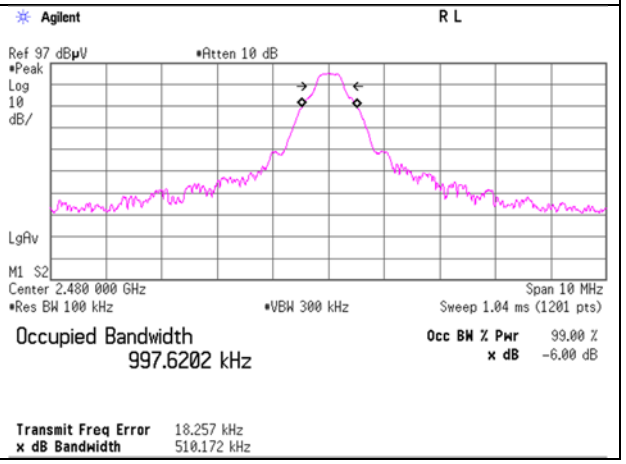
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE

BT LE				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-13.42	2.05	10.18	-1.19	0.76	30.00	1000	31.19	-4.10	-5.29	0.30	36.02	4000	41.31
2440	-13.65	2.07	10.18	-1.40	0.72	30.00	1000	31.40	-4.10	-5.50	0.28	36.02	4000	41.52
2480	-13.97	2.08	10.18	-1.71	0.67	30.00	1000	31.71	-4.10	-5.81	0.26	36.02	4000	41.83

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain
*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)

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE

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	-14.47	2.05	10.18	-2.24	0.60	0.23	-2.01	0.63
2440	-14.64	2.07	10.18	-2.39	0.58	0.23	-2.16	0.61
2480	-14.99	2.08	10.18	-2.73	0.53	0.23	-2.50	0.56

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

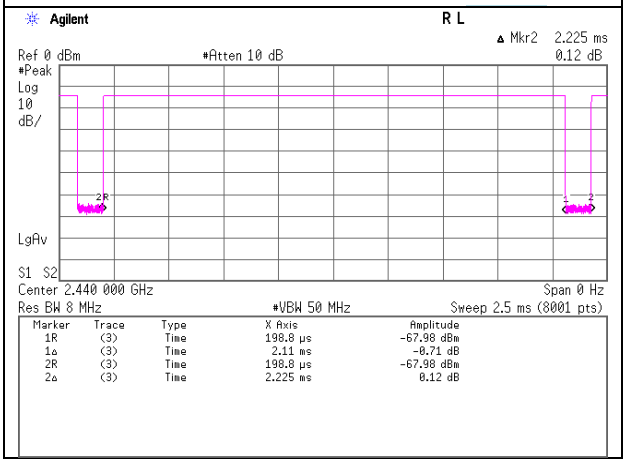
*The equipment and cables were not used for factor 0 dB of the data sheets.

Burst rate confirmation

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE

BT LE

Tx on / (Tx on + Tx off) * 100 =	**94.8 %**
For Average Output Power	
Duty factor = 10 * log (2.225 / 2.11) =	**0.23 dB**
For Radiated Spurious Emission	
Duty factor = 20 * log (2.225 / 2.11) =	**0.46 dB**



Radiated Spurious Emission

Report No.	12403128S-E-R4		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1		
Date	September 4, 2018	September 3, 2018	September 4, 2018
Temperature / Humidity	22 deg. C / 70 % RH	21 deg. C / 58 % RH	22 deg. C / 70 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Yosuke Ishikawa
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz – 26 GHz)
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.	132.859	QP	21.32	14.16	8.51	31.79	0.00	12.20	43.50	31.3	100	359	
Hori.	161.032	QP	21.42	15.29	8.81	31.78	0.00	13.74	43.50	29.7	100	2	
Hori.	571.996	QP	21.16	18.43	8.23	32.03	0.00	15.79	46.00	30.2	100	358	
Hori.	771.835	QP	20.86	20.45	9.10	31.92	0.00	18.49	46.00	27.5	100	1	
Hori.	2390.000	PK	46.67	27.89	14.57	39.46	2.45	52.12	73.90	21.7	150	166	
Hori.	4804.000	PK	49.12	31.35	7.21	39.50	2.45	50.63	73.90	23.2	144	71	
Hori.	7206.000	PK	47.44	36.78	8.95	39.29	2.45	56.33	73.90	17.5	100	343	
Hori.	9608.000	PK	48.57	38.10	10.41	39.52	2.45	60.01	73.90	**13.8**	120	298	
Vert.	187.974	QP	21.25	16.51	9.09	31.77	0.00	15.08	43.50	28.4	100	359	
Vert.	609.187	QP	21.21	19.57	8.37	32.01	0.00	17.14	46.00	28.8	100	2	
Vert.	802.803	QP	20.78	20.83	9.23	31.88	0.00	18.96	46.00	27.0	100	1	
Vert.	2390.000	PK	46.86	27.89	14.57	39.46	2.45	52.31	73.90	21.5	139	217	
Vert.	4804.000	PK	49.49	31.35	7.21	39.50	2.45	51.00	73.90	22.9	149	307	
Vert.	7206.000	PK	47.23	36.78	8.95	39.29	2.45	56.12	73.90	17.7	181	281	
Vert.	9608.000	PK	46.46	38.10	10.41	39.52	2.45	57.90	73.90	16.0	133	21	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.98 m / 3.0 m) = 2.45 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	36.34	27.89	14.57	39.46	0.46	2.45	42.25	53.90	11.7	*1)
Hori.	2400.000	AV	37.59	27.89	14.58	39.46	0.46	2.45	43.51	53.90	10.4	
Hori.	4804.000	AV	43.52	31.35	7.21	39.50	0.46	2.45	45.49	53.90	8.4	
Hori.	7206.000	AV	39.08	36.78	8.95	39.29	0.46	2.45	48.43	53.90	5.5	
Hori.	9608.000	AV	39.66	38.10	10.41	39.52	0.46	2.45	51.56	53.90	**2.3**	
Vert.	2390.000	AV	36.14	27.89	14.57	39.46	0.46	2.45	42.05	53.90	11.9	*1)
Vert.	4804.000	AV	42.65	31.35	7.21	39.50	0.46	2.45	44.62	53.90	9.3	
Vert.	7206.000	AV	38.66	36.78	8.95	39.29	0.46	2.45	48.01	53.90	5.9	
Vert.	9608.000	AV	37.73	38.10	10.41	39.52	0.46	2.45	49.63	53.90	4.3	

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 (3.98 m / 3.0 m) = 2.45 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)

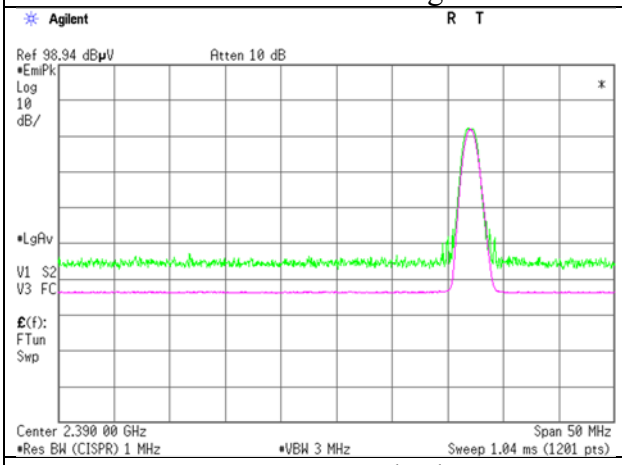
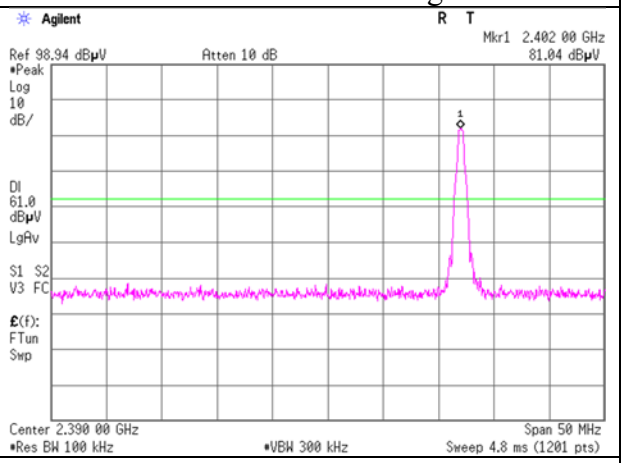
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

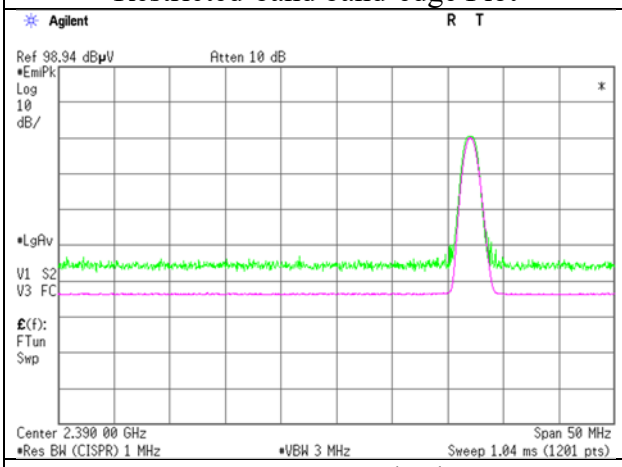
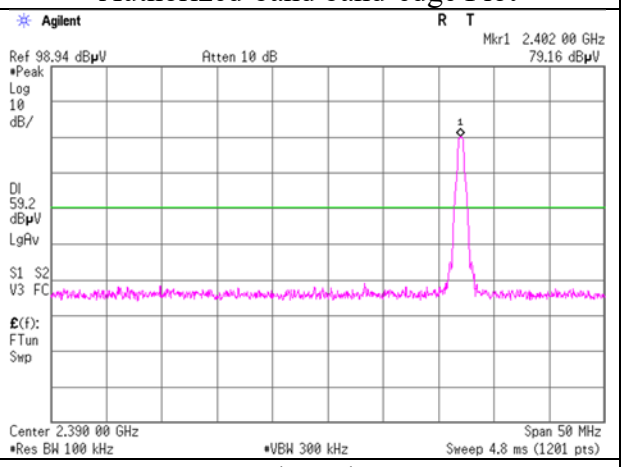
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	80.58	27.88	14.58	39.46	2.45	86.03	-	-	
Hori.	2400.000	PK	37.25	27.89	14.58	39.46	2.45	42.71	66.03	23.3	
Vert.	2402.000	PK	81.06	27.88	14.58	39.46	2.45	86.51	-	-	
Vert.	2400.000	PK	37.28	27.89	14.58	39.46	2.45	42.74	66.51	23.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.98 m / 3.0 m) = 2.45 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.	12403128S-E-R4
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	September 3, 2018
Temperature / Humidity	21 deg. C / 58 % RH
Engineer	Yosuke Ishikawa (1 GHz - 13 GHz)
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	20dBc Plot

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

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

Radiated Spurious Emission

Report No.	12403128S-E-R4		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1		
Date	September 4, 2018	September 3, 2018	September 4, 2018
Temperature / Humidity	22 deg. C / 70 % RH	21 deg. C / 58 % RH	22 deg. C / 70 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Yosuke Ishikawa
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz – 26 GHz)
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.	151.341	QP	21.23	14.93	8.71	31.78	0.00	13.09	43.50	30.4	100	2	
Hori.	462.614	QP	21.25	16.90	7.76	31.89	0.00	14.02	46.00	31.9	100	359	
Hori.	822.994	QP	20.75	21.01	9.34	31.76	0.00	19.34	46.00	26.6	100	2	
Hori.	4880.000	PK	49.03	31.20	7.30	39.50	2.45	50.48	73.90	23.4	140	232	
Hori.	7320.000	PK	47.27	36.71	9.10	39.35	2.45	56.18	73.90	17.7	100	148	
Hori.	9760.000	PK	47.15	38.60	10.43	39.41	2.45	59.22	73.90	**14.6**	108	132	
Vert.	189.202	QP	21.19	16.57	9.10	31.77	0.00	15.09	43.50	28.4	100	1	
Vert.	306.608	QP	21.15	14.06	6.96	31.77	0.00	10.40	46.00	35.6	100	358	
Vert.	636.239	QP	21.18	19.39	8.49	32.05	0.00	17.01	46.00	28.9	100	1	
Vert.	764.235	QP	21.11	20.30	9.07	31.93	0.00	18.55	46.00	27.4	100	2	
Vert.	4880.000	PK	48.70	31.20	7.30	39.50	2.45	50.15	73.90	23.7	172	109	
Vert.	7320.000	PK	47.41	36.71	9.10	39.35	2.45	56.32	73.90	17.5	226	284	
Vert.	9760.000	PK	46.41	38.60	10.43	39.41	2.45	58.48	73.90	15.4	206	36	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.98 m / 3.0 m) = 2.45 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	42.33	31.20	7.30	39.50	0.46	2.45	44.24	53.90	9.7	
Hori.	7320.000	AV	38.71	36.71	9.10	39.35	0.46	2.45	48.08	53.90	5.8	
Hori.	9760.000	AV	38.01	38.60	10.43	39.41	0.46	2.45	50.54	53.90	**3.4**	
Vert.	4880.000	AV	40.52	31.20	7.30	39.50	0.46	2.45	42.43	53.90	11.5	
Vert.	7320.000	AV	39.86	36.71	9.10	39.35	0.46	2.45	49.23	53.90	4.7	
Vert.	9760.000	AV	37.21	38.60	10.43	39.41	0.46	2.45	49.74	53.90	4.2	

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 (3.98 m / 3.0 m) = 2.45 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.	12403128S-E-R4		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1		
Date	September 4, 2018	September 3, 2018	September 4, 2018
Temperature / Humidity	22 deg. C / 70 % RH	21 deg. C / 58 % RH	22 deg. C / 70 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Yosuke Ishikawa
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz – 26 GHz)
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.	193.883	QP	21.04	16.67	9.15	31.77	0.00	15.09	43.50	28.4	100	1	
Hori.	274.400	QP	21.22	13.06	6.63	31.76	0.00	9.15	46.00	36.8	100	2	
Hori.	677.800	QP	21.08	19.58	8.71	32.05	0.00	17.32	46.00	28.6	100	1	
Hori.	2483.500	PK	48.96	27.64	14.67	39.46	2.45	54.26	73.90	19.6	229	342	
Hori.	4960.000	PK	49.50	31.40	7.38	39.50	2.45	51.23	73.90	22.6	138	197	
Hori.	7440.000	PK	48.82	36.84	9.28	39.42	2.45	57.97	73.90	15.9	100	165	
Hori.	9920.000	PK	47.92	38.77	10.44	39.30	2.45	60.28	73.90	**13.6**	103	291	
Vert.	116.321	QP	21.45	12.75	8.34	31.80	0.00	10.74	43.50	32.7	100	358	
Vert.	330.611	QP	20.97	14.55	7.12	31.77	0.00	10.87	46.00	35.1	100	358	
Vert.	628.001	QP	21.25	19.55	8.45	32.04	0.00	17.21	46.00	28.7	100	2	
Vert.	926.616	QP	20.07	22.09	9.74	31.16	0.00	20.74	46.00	25.2	100	1	
Vert.	2483.500	PK	48.33	27.64	14.67	39.46	2.45	53.63	73.90	20.2	138	306	
Vert.	4960.000	PK	48.58	31.40	7.38	39.50	2.45	50.31	73.90	23.5	152	39	
Vert.	7440.000	PK	49.26	36.84	9.28	39.42	2.45	58.41	73.90	15.4	265	274	
Vert.	9920.000	PK	47.89	38.77	10.44	39.30	2.45	60.25	73.90	**13.6**	103	256	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.98 m / 3.0 m) = 2.45 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	36.36	27.64	14.67	39.46	0.46	2.45	42.12	53.90	11.8	*1)
Hori.	4960.000	AV	43.13	31.40	7.38	39.50	0.46	2.45	45.32	53.90	8.6	
Hori.	7440.000	AV	41.10	36.84	9.28	39.42	0.46	2.45	50.71	53.90	3.2	
Hori.	9920.000	AV	40.07	38.77	10.44	39.30	0.46	2.45	52.89	53.90	**1.0**	
Vert.	2483.500	AV	36.37	27.64	14.67	39.46	0.46	2.45	42.13	53.90	11.8	*1)
Vert.	4960.000	AV	41.25	31.40	7.38	39.50	0.46	2.45	43.44	53.90	10.5	
Vert.	7440.000	AV	41.17	36.84	9.28	39.42	0.46	2.45	50.78	53.90	3.1	
Vert.	9920.000	AV	38.65	38.77	10.44	39.30	0.46	2.45	51.47	53.90	2.4	

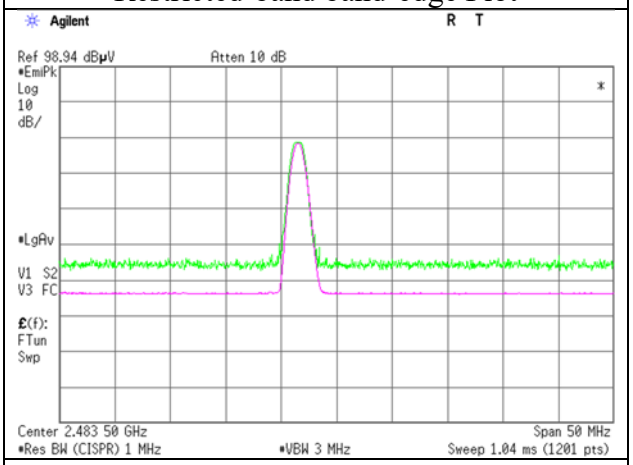
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.98 m / 3.0 m) = 2.45 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	September 3, 2018
Temperature / Humidity	21 deg. C / 58 % RH
Engineer	Yosuke Ishikawa (1 GHz - 13 GHz)
Mode	Tx BT LE 2480 MHz

Horizontal

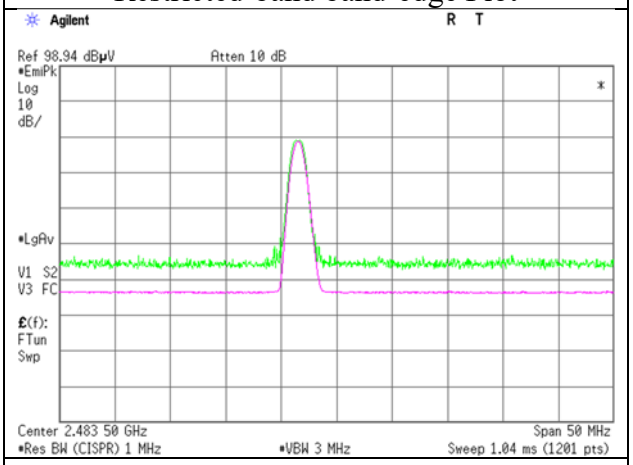
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

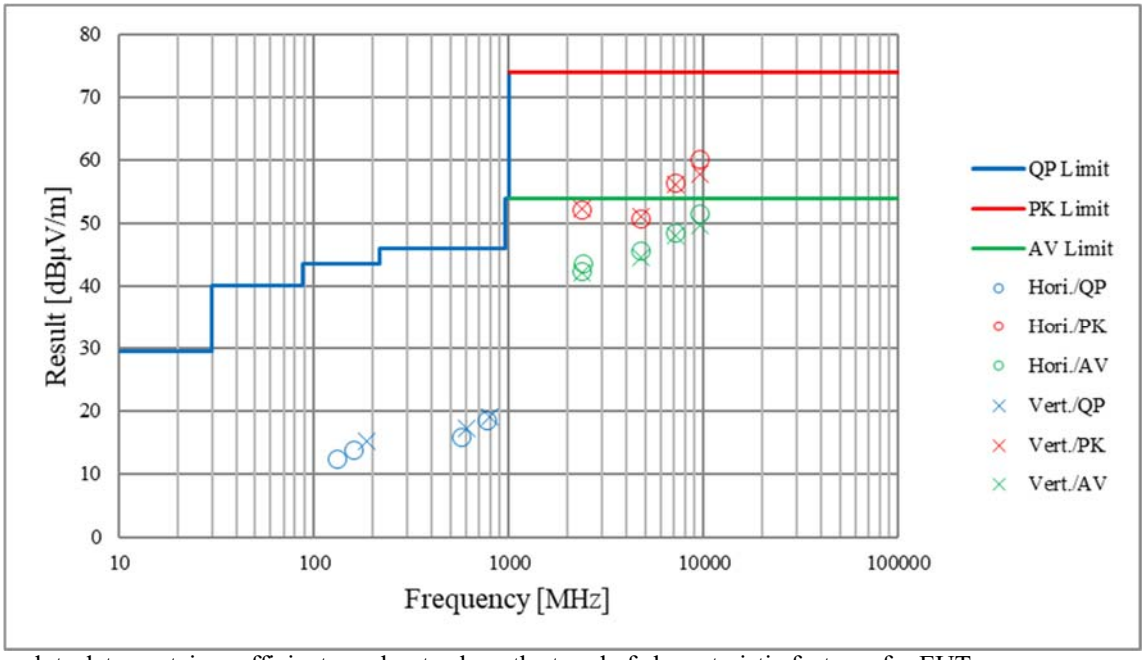


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12403128S-E-R4		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.1		
Date	September 4, 2018	September 3, 2018	September 4, 2018
Temperature / Humidity	22 deg. C / 70 % RH	21 deg. C / 58 % RH	22 deg. C / 70 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Yosuke Ishikawa
	(30 MHz - 1000 MHz)	(1 GHz - 13 GHz)	(13 GHz – 26 GHz)
Mode	Tx BT LE 2402 MHz		

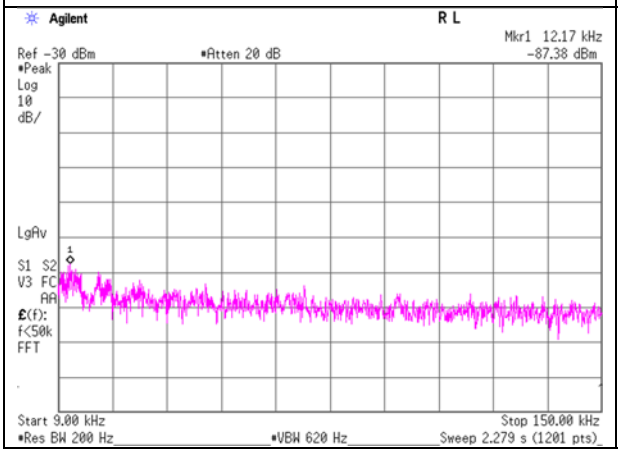


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

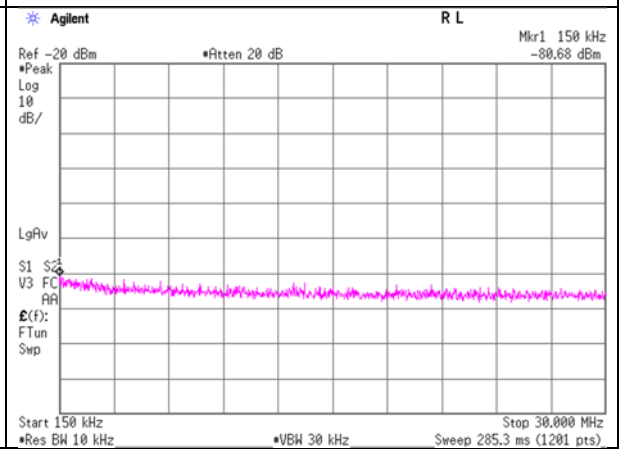
Conducted Spurious Emission

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE 2402 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator 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
12.17	-87.38	0.01	10.11	2.0	1	-75.3	300	6.0	-14.0	45.8	59.8	
150.00	-80.68	0.02	10.11	2.0	1	-68.6	300	6.0	-7.3	24.0	31.3	

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

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

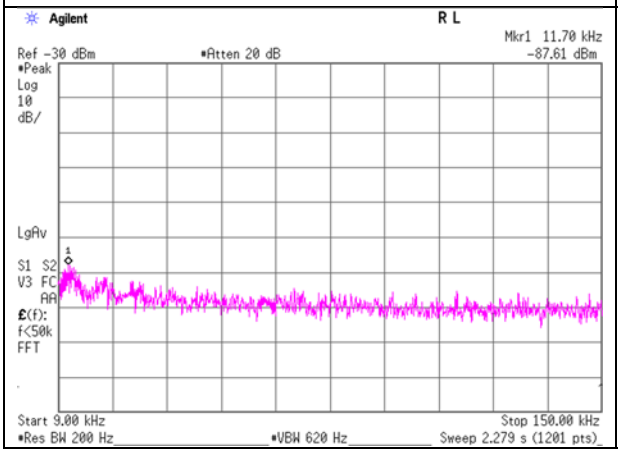
N: Number of output

*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

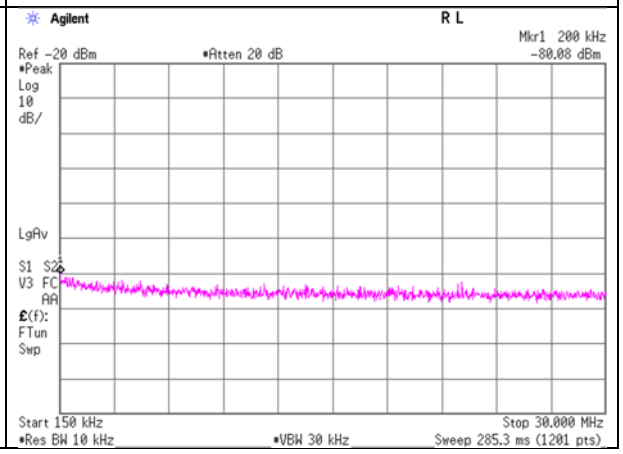
Conducted Spurious Emission

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator 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
11.70	-87.61	0.01	10.11	2.0	1	-75.5	300	6.0	-14.2	46.2	60.4	
200.00	-80.08	0.02	10.11	2.0	1	-68.0	300	6.0	-6.7	21.5	28.2	

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

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

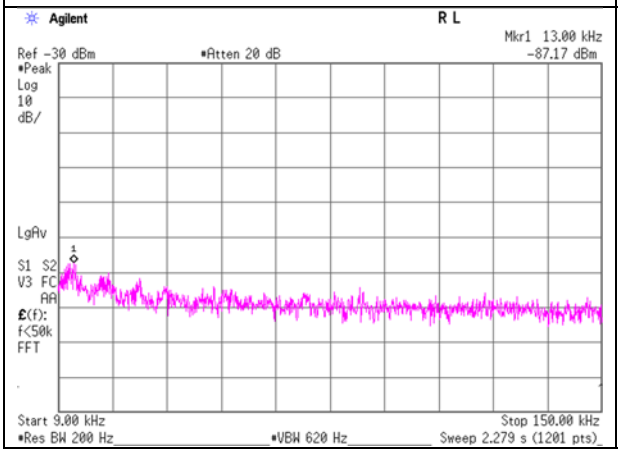
N: Number of output

*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

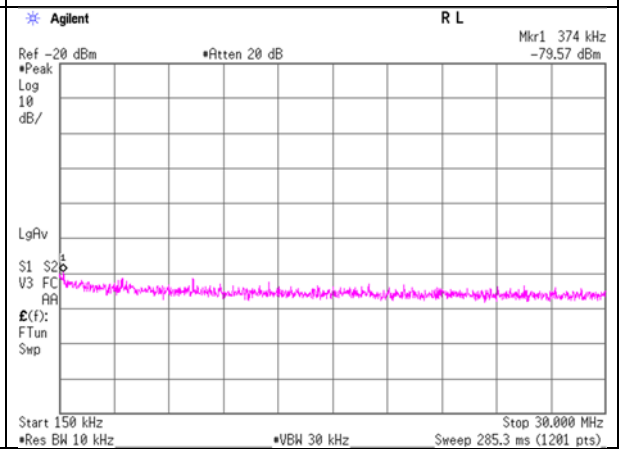
Conducted Spurious Emission

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE 2480 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator 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
13.00	-87.17	0.01	10.11	2.0	1	-75.1	300	6.0	-13.8	45.3	59.1	
374.00	-79.57	0.03	10.11	2.0	1	-67.4	300	6.0	-6.2	16.1	22.3	

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

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

Power Density

Report No.	12403128S-E-R4
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2018
Temperature / Humidity	26 deg. C / 51 % RH
Engineer	Kazuya Noda
Mode	Tx BT LE

BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402	-25.28	2.05	10.18	-13.05	8.00	21.05
2440	-24.16	2.07	10.18	-11.91	8.00	19.91
2480	-25.65	2.08	10.18	-13.39	8.00	21.39

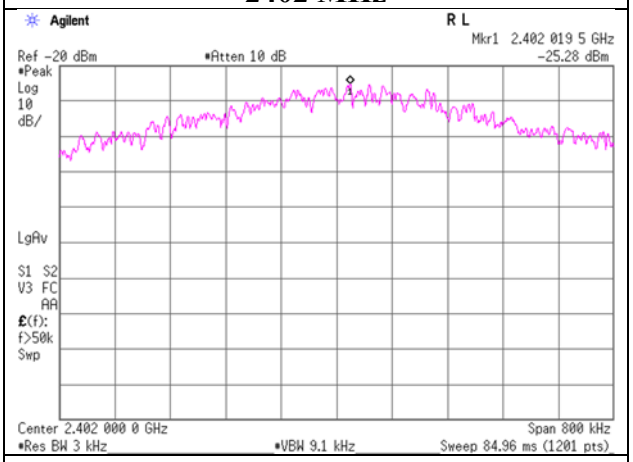
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

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

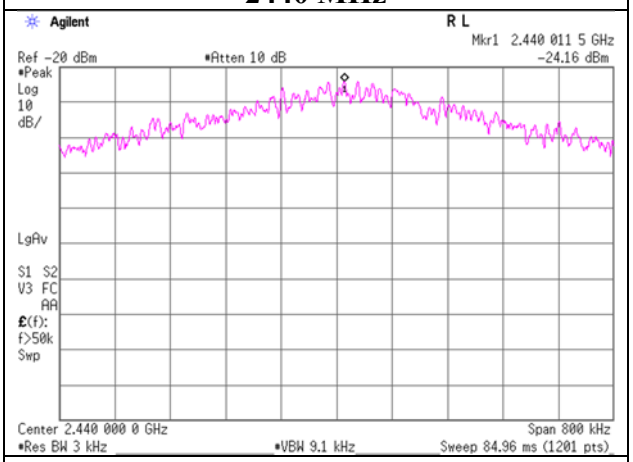
Power Density

BT LE

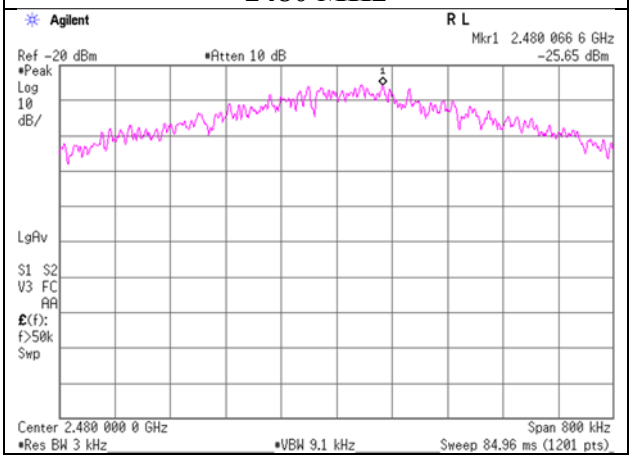
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test instruments

Test Instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2018/03/05 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2018/07/13 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY53260009	AT	2018/07/13 * 12
SCC-G32	Coaxial Cable	Junkosha	MWX241-02000K MSKMS	OCT-09-13-005	AT	2017/11/22 * 12
SAT10-15	Attenuator	Weinschel Corp.	54A-10	83406	AT	2017/12/08 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2017/12/21 * 12
SAEC-01(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	RE	2018/07/19 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2018/06/26 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2018/01/29 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2018/05/11 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2018/07/23 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2017/10/30 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2017/10/10 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2017/10/16 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2017/11/16 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2017/11/22 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-01000N FSNMS/B	1612S006	RE	2018/01/29 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2018/02/16 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2017/12/14 * 12
SAT3-09	Attenuator	JFW	50HF-003N	-	RE	2018/08/23 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2018/06/05 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2018/04/12 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2018/04/12 * 12
SLA-05	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	193	RE	2018/06/05 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2018/04/13 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2018/05/29 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2018/07/23 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2017/09/22 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2018/03/19 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000K MSKMS	-	RE	2018/04/20 * 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