RADIO TEST REPORT

Test Report No. : 12531961H-A

Applicant	:	**Tokyo Communication Equipment MFG Co.,ltd.**
Type of Equipment	:	**BLE module**
Model No.	:	**PC-1420001**
FCC ID	:	**2ACJJPC1420001**
Test regulation	:	**FCC Part 15 Subpart C: 2018**
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 regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. 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.

Date of test: October 19 to 21, 2018

Representative test engineer:
Ryota Yamanaka
Engineer
Consumer Technology Division

Approved by:
Takayuki Shimada
Leader
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/

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

REVISION HISTORY

Original Test Report No.: 12531961H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12531961H-A	October 29, 2018	-	-

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	Tokyo Communication Equipment MFG Co.,ltd.
Address	:	3-8-14 takanawa minato-ku,tokyo,108-0074 Japan
Telephone Number	:	+81-3-3447-2421
Facsimile Number	:	+81-3-3447-0426
Contact Person	:	Masaya Mikami

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

2.1 Identification of E.U.T.

Type of Equipment	:	BLE module
Model No.	:	PC-1420001
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.3 V
Receipt Date of Sample	:	October 3, 2018
Country of Mass-production	:	Japan
Condition of EUT	:	Production model
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: PC-1420001 (referred to as the EUT in this report) is a BLE module.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Antenna type	:	Pattern antenna
Antenna Gain	:	-2.3 dBi
Clock frequency (Maximum)	:	32 MHz

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 902-928 MHz,
2400-2483.5 MHz, and 5725-5850 MHz

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	**QP** 34.0 dB, 0.47194 MHz, N 34.0 dB, 0.47194 MHz, L **AV** 28.4 dB, 0.47194 MHz, N 28.4 dB, 0.54629 MHz, N	Complied	-
	IC: RSS-Gen 8.8	**IC:** RSS-Gen 8.8			
6dB Bandwidth	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section 15.247(a)(2)	See data.	Complied	Conducted
	IC: -	**IC:** RSS-247 5.2(a)			
Maximum Peak Output Power	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section 15.247(b)(3)		Complied	Conducted
	IC: RSS-Gen 6.12	**IC:** RSS-247 5.4(d)			
Power Density	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section 15.247(e)		Complied	Conducted
	IC: -	**IC:** RSS-247 5.2(b)			
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05	**FCC:** Section15.247(d)	2.0 dB 2484.086 MHz, Horizontal, AV	Complied#	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)
	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) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05 8.5 and 8.6.

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 stable voltage was provided to the EUT during the tests. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
The antenna is not removable from 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	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 6.7	**IC:** -	N/A	Complied	Conducted

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.

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.

Antenna Terminal test

Test Item		Uncertainty (+/-)
RF output power		1.3 dB
Antenna terminal conducted emission / Power dencity /		2.7 dB
Adjacent channnel power / Channnel power		
	Below 3GHz	1.9 dB
	3 GHz ot 6 GHz	2.1 dB

Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)
3 m	9 kHz to 30 MHz	3.3 dB
10 m		3.2 dB
3 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	5.0 dB
	200 MHz to 1000 MHz (Horizontal)	5.2 dB
	(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	4.9 dB
	200 MHz to 1000 MHz (Horizontal)	5.0 dB
	(Vertical)	5.0 dB
3 m	1 GHz to 6 GHz	5.0 dB
	6 GHz to 18 GHz	5.3 dB
1 m	10 GHz to 26.5 GHz	5.8 dB
	26.5 GHz to 40 GHz	5.8 dB
10 m	1 GHz to 18 GHz	5.2 dB

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 / FCC Test Firm Registration Number: 199967

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 2.0m 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)

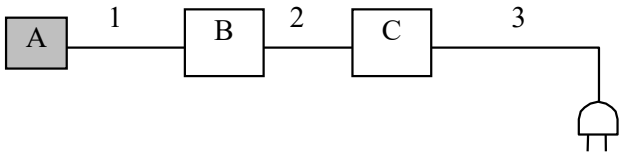
Mode	Remarks*
Bluetooth Low Energy (BT LE)	Payload: PRBS9
*Transmitting duty was 100 % on all tests.	
*Power of the EUT was set by the software as follows; Power settings: 3(maximum), 1(minimum) Firmware version: Ver1.0 *This setting of software is the worst case. Any conditions under the normal use 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 6dB Bandwidth 99% Occupied Bandwidth Maximum Peak Output Power Spurious Emission(Radiated / Conducted) Power Density	Tx BT LE	2402 MHz 2440 MHz 2480 MHz

4.2 Configuration and peripherals

[For Conducted Emission test]



AC 120 V / 60 Hz

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

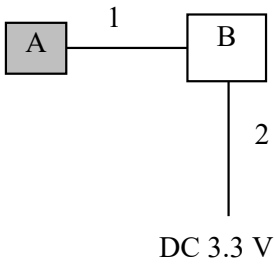
Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	BLE module	PC-1420001	A-0000	Tokyo Communication Equipment MFG Co.,ltd.	EUT
B	Jig	PC-1080003	000	Tokyo Communication Equipment MFG Co.,ltd.	-
C	DC Power supply	PMC35-2A	13090501	Kikusui	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal and DC Cable	0.1	Shielded	Shielded	-
2	DC Cable	1.0	Unshielded	Unshielded	-
3	AC Cable	1.0	Unshielded	Unshielded	-

[For Radiated Emission test]



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

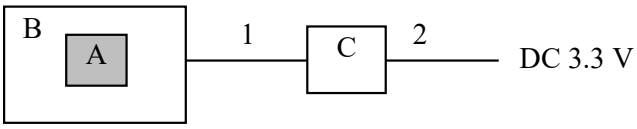
Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	BLE module	PC-1420001	A-0000	Tokyo Communication Equipment MFG Co.,ltd.	EUT
B	Jig	PC-1080003	000	Tokyo Communication Equipment MFG Co.,ltd.	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal and DC Cable	0.1	Shielded	Shielded	-
2	DC Cable	2.0	Unshielded	Unshielded	-

[For Antenna Terminal Conducted Tests]



* 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	Remarks
A	BLE module	PC-1420001	A-0001	Tokyo Communication Equipment MFG Co.,ltd.	EUT
B	Jig for debug	-	-	Tokyo Communication Equipment MFG Co.,ltd.	-
C	Jig	PC-1080003	000	Tokyo Communication Equipment MFG Co.,ltd.	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal and DC Cable	0.1	Shielded	Shielded	-
2	DC Cable	0.5	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

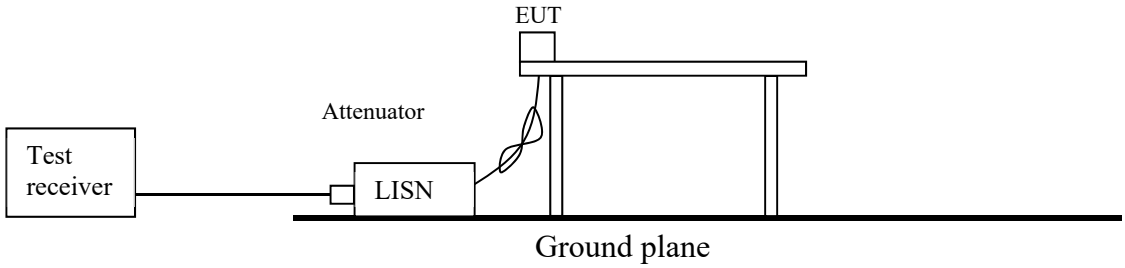
Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

1) For the tests on EUT with other peripherals (as a whole system)
I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

[Test Setup]



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

Detector : QP and CISPR AV
Measurement range : 0.15 MHz - 30 MHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05".

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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 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.

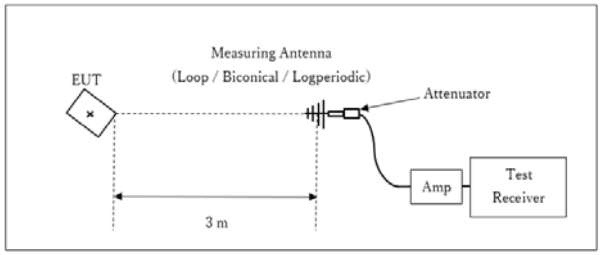
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	11.12.2.5.1 RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces 11.12.2.5.2 The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results.	RBW: 100 kHz VBW: 300kHz

*1) Average Power Measurement was performed based on ANSI C63.10-2013.

[Test Setup]

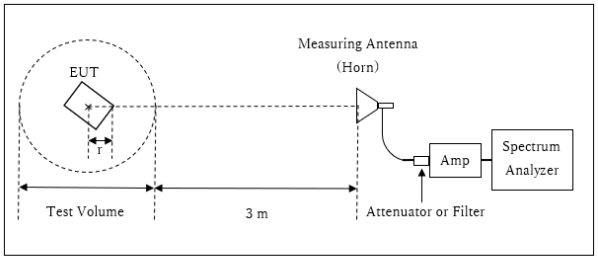
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



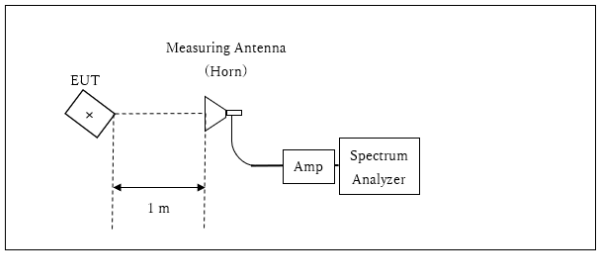
r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.75 m*/3.0 m) = 1.94 dB
* Test Distance: (3 + Test Volume /2) - r = 3.75 m

Test Volume: 1.5 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.0 m

* The test was performed with r = 0.0 m since EUT is small and it was the rather conservative condition.

10 GHz – 26.5 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m* / 3.0 m) = -9.5 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.

Measurement range : 30 MHz - 26.5 GHz
Test data : APPENDIX
Test result : Pass

SECTION 7: 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	3 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	10 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	9.1 kHz	27 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 low enough as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz).

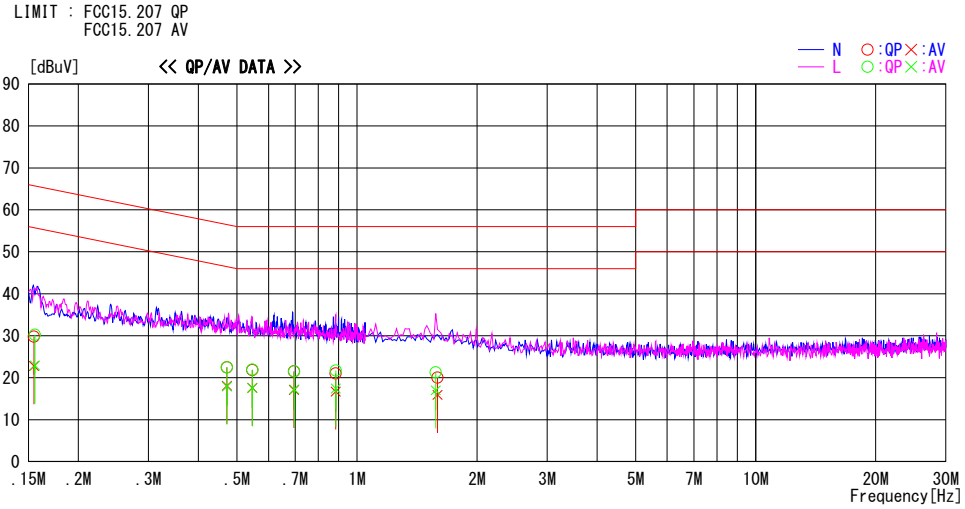
The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

Report No.	12531961H
Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
Mode	Tx BT LE 2402MHz



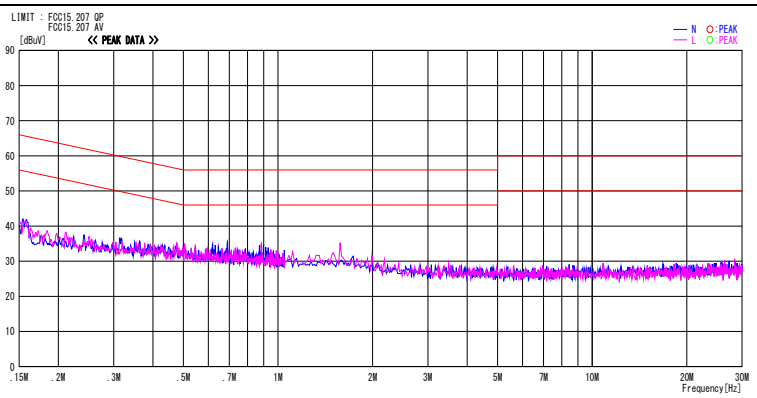
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15491	16.4	9.4	13.4	29.8	22.8	65.7	55.7	35.9	32.9	N	
0.47194	9.1	4.7	13.4	22.5	18.1	56.5	46.5	34.0	28.4	N	
0.54629	8.4	4.2	13.4	21.8	17.6	56.0	46.0	34.2	28.4	N	
0.69509	8.0	3.6	13.5	21.5	17.1	56.0	46.0	34.5	28.9	N	
0.88357	7.5	3.2	13.5	21.0	16.7	56.0	46.0	35.0	29.3	N	
1.59168	6.4	2.3	13.6	20.0	15.9	56.0	46.0	36.0	30.1	N	
0.15561	16.8	9.5	13.4	30.2	22.9	65.7	55.7	35.5	32.8	L	
0.47194	9.1	4.5	13.4	22.5	17.9	56.5	46.5	34.0	28.6	L	
0.54629	8.5	4.1	13.4	21.9	17.5	56.0	46.0	34.1	28.5	L	
0.69619	8.0	3.7	13.5	21.5	17.2	56.0	46.0	34.5	28.8	L	
0.88467	8.2	3.9	13.5	21.7	17.4	56.0	46.0	34.3	28.6	L	
1.57575	7.7	3.4	13.6	21.3	17.0	56.0	46.0	34.7	29.0	L	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)
Except for the above table: adequate margin data below the limits.

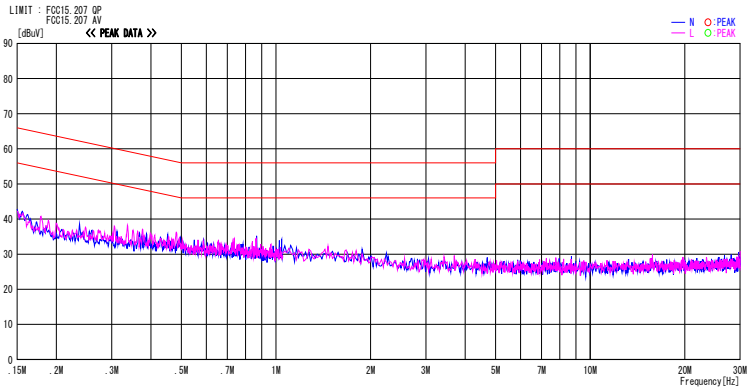
Conducted Emission

Report No.	12531961H
Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
Mode	Tx BT LE 2402MHz

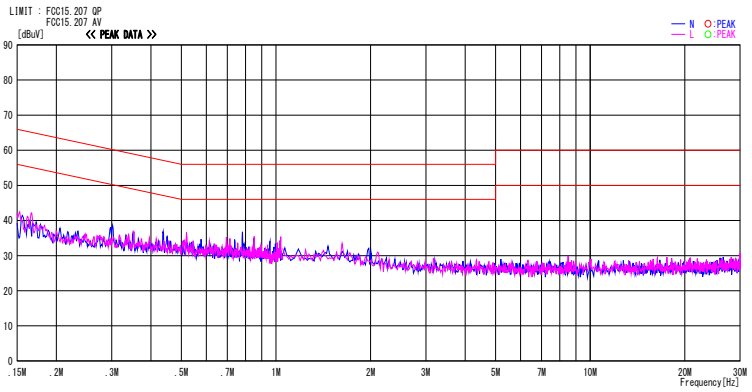
2402 MHz



2440 MHz



2480 MHz



Y scale [dBuV] Chart — N — L

6 dB Bandwidth and 99 % Occupied Bandwidth

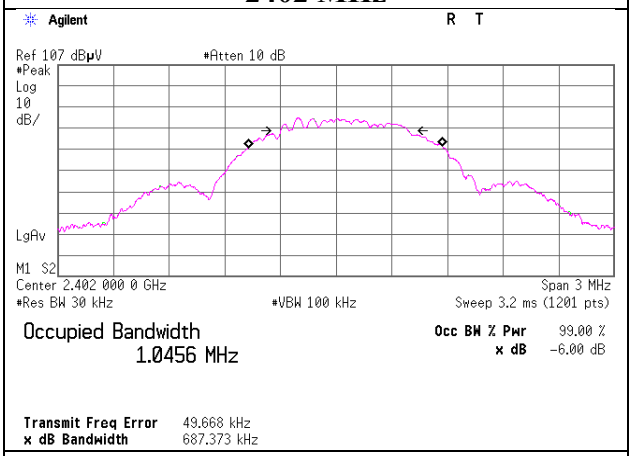
Report No.	12531961H
Test place	Ise EMC Lab. No.5 Measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 55 % RH
Engineer	Ryota Yamanaka
Mode	Tx BT LE

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
BT LE	2402	1045.6	0.727	> 0.500
	2440	1049.7	0.724	> 0.500
	2480	1048.3	0.732	> 0.500

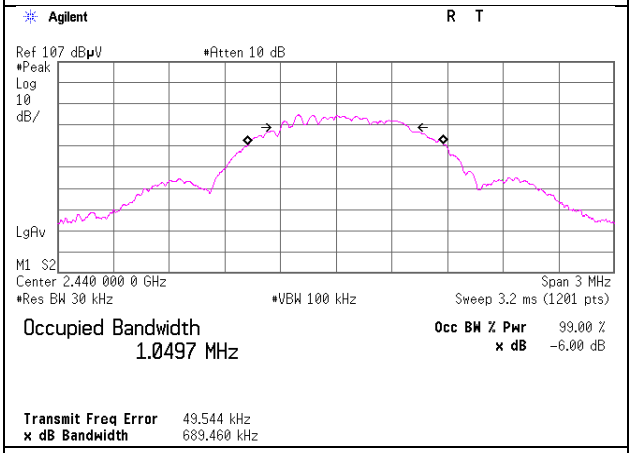
99%Occupied Bandwidth

BT LE

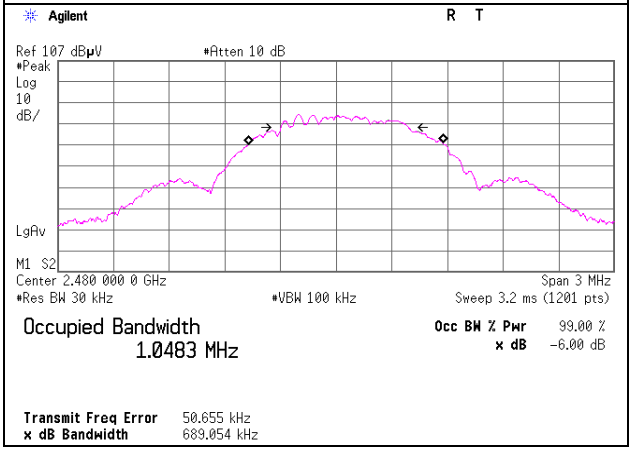
2402 MHz



2440 MHz



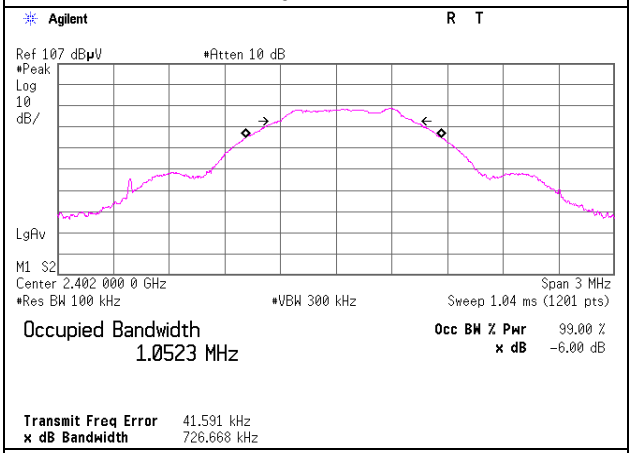
2480 MHz



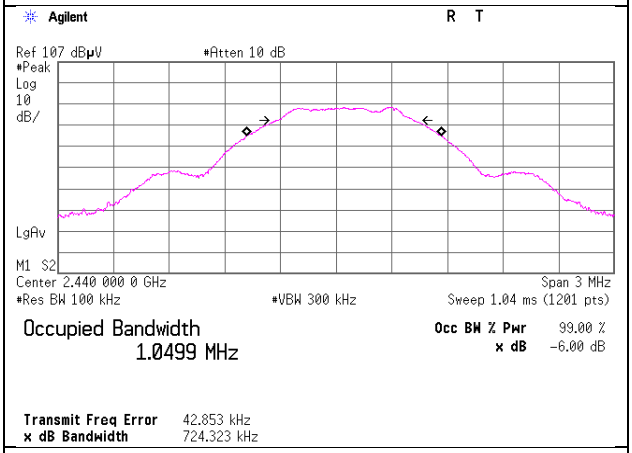
6dB Bandwidth

BT LE

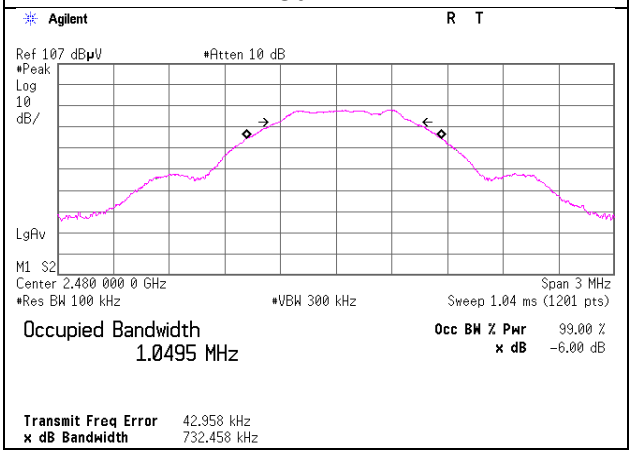
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Report No.	12531961H
Test place	Ise EMC Lab. No.5 Measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 55 % RH
Engineer	Ryota Yamanaka
Mode	Tx BT LE

Power setting: 3

				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	-9.35	0.10	0.00	-9.25	0.12	30.00	1000	39.25	-2.30	-11.55	0.07	36.02	4000	47.57
2440	-9.57	0.10	0.00	-9.47	0.11	30.00	1000	39.47	-2.30	-11.77	0.07	36.02	4000	47.79
2480	-9.86	0.10	0.00	-9.76	0.11	30.00	1000	39.76	-2.30	-12.06	0.06	36.02	4000	48.08

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.

Power setting: 1

				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	-15.81	0.10	0.00	-15.71	0.03	30.00	1000	45.71	-2.30	-18.01	0.02	36.02	4000	54.03
2440	-16.07	0.10	0.00	-15.97	0.03	30.00	1000	45.97	-2.30	-18.27	0.01	36.02	4000	54.29
2480	-16.44	0.10	0.00	-16.34	0.02	30.00	1000	46.34	-2.30	-18.64	0.01	36.02	4000	54.66

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.	12531961H
Test place	Ise EMC Lab. No.5 Measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 55 % RH
Engineer	Ryota Yamanaka
Mode	Tx BT LE

Power setting: 3

Freq.	Reading	Cable Loss	Atten. Loss	Result Burst power average	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2402	-9.55	0.10	0.00	-9.45	0.11
2440	-9.75	0.10	0.00	-9.65	0.11
2480	-10.08	0.10	0.00	-9.98	0.10

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

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

Power setting: 1

Freq.	Reading	Cable Loss	Atten. Loss	Result Burst power average	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
2402	-16.91	0.10	0.00	-16.81	0.02
2440	-17.30	0.10	0.00	-17.20	0.02
2480	-17.84	0.10	0.00	-17.74	0.02

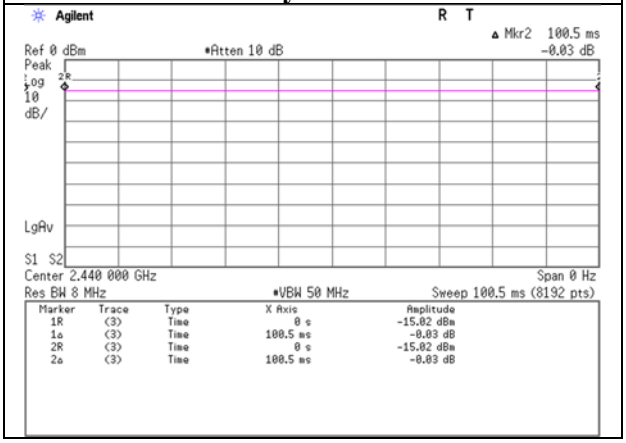
Sample Calculation:
Result (Burst power average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Los

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

Burst rate confirmation

Report No.	12531961H
Test place	Ise EMC Lab. No.5 measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 63 % RH
Engineer	Ryota Yamanaka
Mode	Tx BT LE

Duty 100 %



* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Radiated Spurious Emission

Report No.	12531961H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
Mode	Tx BT LE 2402 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	32.000	QP	24.8	17.6	6.8	30.5	-	18.7	40.0	21.3	
Hori	43.627	QP	24.6	13.4	6.9	30.5	-	14.4	40.0	25.6	
Hori	106.994	QP	24.3	11.2	7.5	30.2	-	12.8	43.5	30.7	
Hori	183.989	QP	23.7	16.1	8.1	29.7	-	18.2	43.5	25.3	
Hori	687.376	QP	22.9	19.6	10.6	29.3	-	23.8	46.0	22.2	
Hori	882.968	QP	22.2	21.8	11.3	28.1	-	27.2	46.0	18.8	
Hori	2390.000	PK	49.2	27.7	5.2	34.4	-	47.7	73.9	26.2	
Hori	4804.000	PK	42.2	31.2	7.3	33.7	-	47.0	73.9	26.9	Floor noise
Hori	7206.000	PK	42.7	35.5	8.4	33.6	-	53.0	73.9	20.9	Floor noise
Hori	9608.000	PK	44.1	38.4	9.4	33.9	-	58.0	73.9	15.9	Floor noise
Hori	2390.000	AV	44.6	27.7	5.2	34.4	-	43.1	53.9	10.8	
Hori	4804.000	AV	34.2	31.2	7.3	33.7	-	39.0	53.9	14.9	Floor noise
Hori	7206.000	AV	34.7	35.5	8.4	33.6	-	45.0	53.9	8.9	Floor noise
Hori	9608.000	AV	33.5	38.4	9.4	33.9	-	47.4	53.9	6.5	Floor noise
Vert	32.000	QP	24.9	17.6	6.8	30.5	-	18.8	40.0	21.2	
Vert	43.627	QP	24.6	13.4	6.9	30.5	-	14.4	40.0	25.6	
Vert	106.994	QP	24.3	11.2	7.5	30.2	-	12.8	43.5	30.7	
Vert	183.307	QP	23.8	16.1	8.1	29.7	-	18.3	43.5	25.2	
Vert	687.376	QP	22.9	19.6	10.6	29.3	-	23.8	46.0	22.2	
Vert	882.968	QP	22.2	21.8	11.3	28.1	-	27.2	46.0	18.8	
Vert	2390.000	PK	49.0	27.7	5.2	34.4	-	47.5	73.9	26.4	
Vert	4804.000	PK	43.1	31.2	7.3	33.7	-	47.9	73.9	26.0	Floor noise
Vert	7206.000	PK	43.1	35.5	8.4	33.6	-	53.4	73.9	20.5	Floor noise
Vert	9608.000	PK	43.7	38.4	9.4	33.9	-	57.6	73.9	16.3	Floor noise
Vert	2390.000	AV	44.1	27.7	5.2	34.4	-	42.6	53.9	11.3	
Vert	4804.000	AV	34.1	31.2	7.3	33.7	-	38.9	53.9	15.0	Floor noise
Vert	7206.000	AV	34.9	35.5	8.4	33.6	-	45.2	53.9	8.7	Floor noise
Vert	9608.000	AV	33.8	38.4	9.4	33.9	-	47.7	53.9	6.2	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

20dBc Data Sheet

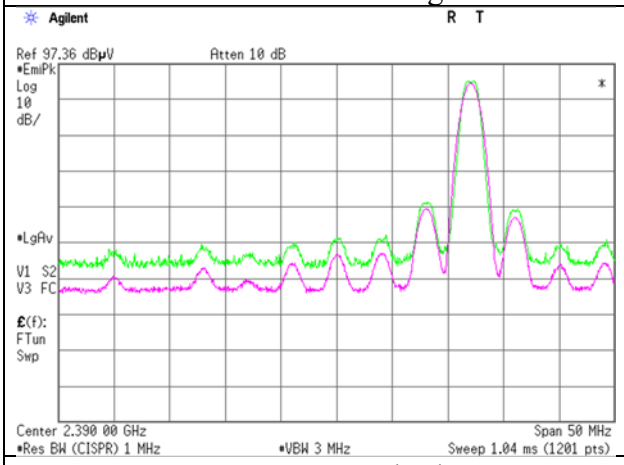
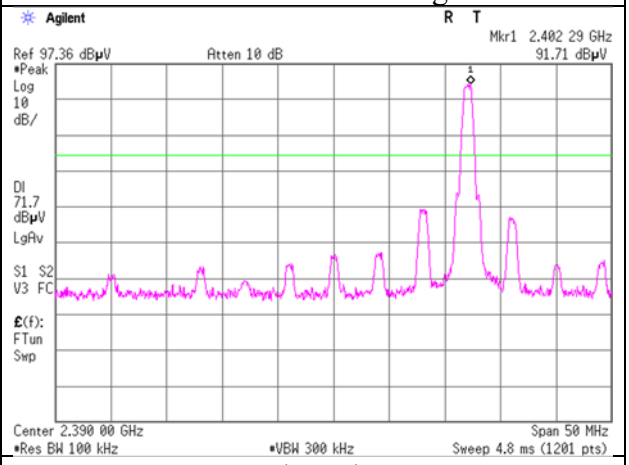
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	91.7	27.7	5.2	34.4	90.2	-	-	Carrier
Hori	2398.300	PK	56.8	27.7	5.2	34.4	55.3	70.2	14.9	
Hori	2400.000	PK	39.8	27.8	5.2	34.4	38.4	70.2	31.8	
Vert	2402.000	PK	91.1	27.7	5.2	34.4	89.6	-	-	Carrier
Vert	2398.300	PK	56.2	27.7	5.2	34.4	54.7	69.6	14.9	
Vert	2400.000	PK	40.4	27.8	5.2	34.4	39.0	69.6	30.6	

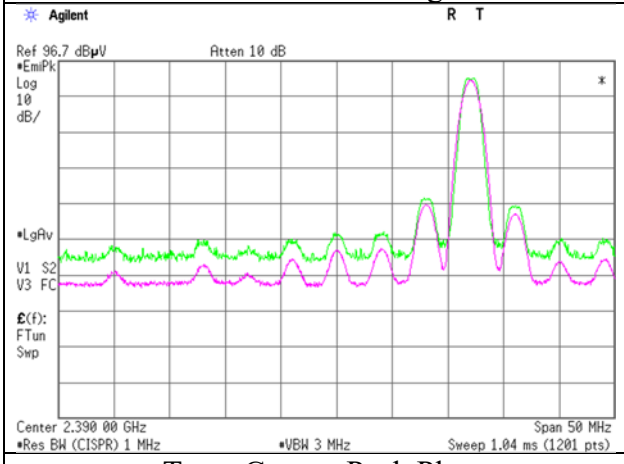
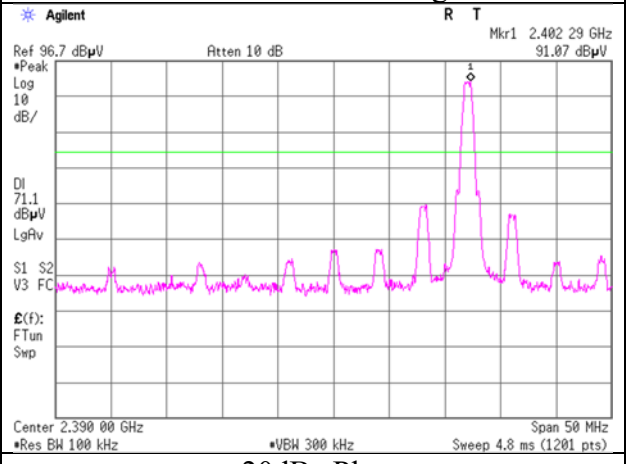
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amprifier)

Distance factor: 1 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12531961H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
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.	12531961H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
Mode	Tx BT LE 2440 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	32.000	QP	24.9	17.6	6.8	30.5	-	18.8	40.0	21.2	
Hori	43.627	QP	24.5	13.4	6.9	30.5	-	14.3	40.0	25.7	
Hori	106.994	QP	24.4	11.2	7.5	30.2	-	12.9	43.5	30.6	
Hori	183.989	QP	23.8	16.1	8.1	29.7	-	18.3	43.5	25.2	
Hori	687.376	QP	23.0	19.6	10.6	29.3	-	23.9	46.0	22.1	
Hori	882.968	QP	22.2	21.8	11.3	28.1	-	27.2	46.0	18.8	
Hori	4880.000	PK	41.8	31.5	7.4	33.7	-	47.0	73.9	26.9	Floor noise
Hori	7320.000	PK	42.3	35.9	8.4	33.6	-	53.0	73.9	20.9	Floor noise
Hori	9760.000	PK	43.5	38.6	9.5	34.0	-	57.6	73.9	16.3	Floor noise
Hori	4880.000	AV	34.2	31.5	7.4	33.7	-	39.4	53.9	14.5	Floor noise
Hori	7320.000	AV	34.7	35.9	8.4	33.6	-	45.4	53.9	8.5	Floor noise
Hori	9760.000	AV	33.6	38.6	9.5	34.0	-	47.7	53.9	6.2	Floor noise
Vert	32.000	QP	24.9	17.6	6.8	30.5	-	18.8	40.0	21.2	
Vert	43.627	QP	24.6	13.4	6.9	30.5	-	14.4	40.0	25.6	
Vert	106.994	QP	24.3	11.2	7.5	30.2	-	12.8	43.5	30.7	
Vert	183.307	QP	23.8	16.1	8.1	29.7	-	18.3	43.5	25.2	
Vert	687.376	QP	23.0	19.6	10.6	29.3	-	23.9	46.0	22.1	
Vert	882.968	QP	22.1	21.8	11.3	28.1	-	27.1	46.0	18.9	
Vert	4880.000	PK	42.0	31.5	7.4	33.7	-	47.2	73.9	26.7	Floor noise
Vert	7320.000	PK	42.5	35.9	8.4	33.6	-	53.2	73.9	20.7	Floor noise
Vert	9760.000	PK	42.7	38.6	9.5	34.0	-	56.8	73.9	17.1	Floor noise
Vert	4880.000	AV	34.5	31.5	7.4	33.7	-	39.7	53.9	14.2	Floor noise
Vert	7320.000	AV	34.7	35.9	8.4	33.6	-	45.4	53.9	8.5	Floor noise
Vert	9760.000	AV	33.4	38.6	9.5	34.0	-	47.5	53.9	6.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Report No.	12531961H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
Mode	Tx BT LE 2480 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	32.000	QP	24.9	17.6	6.8	30.5	-	18.8	40.0	21.2	
Hori	43.627	QP	24.6	13.4	6.9	30.5	-	14.4	40.0	25.6	
Hori	106.994	QP	24.2	11.2	7.5	30.2	-	12.7	43.5	30.8	
Hori	183.989	QP	23.7	16.1	8.1	29.7	-	18.2	43.5	25.3	
Hori	687.376	QP	22.8	19.6	10.6	29.3	-	23.7	46.0	22.3	
Hori	882.968	QP	22.2	21.8	11.3	28.1	-	27.2	46.0	18.8	
Hori	2483.500	PK	56.5	27.5	5.2	34.4	-	54.8	73.9	19.1	
Hori	2484.086	PK	56.5	27.5	5.2	34.4	-	54.8	73.9	19.1	
Hori	4960.000	PK	42.8	31.7	7.4	33.7	-	48.2	73.9	25.7	Floor noise
Hori	7440.000	PK	41.6	36.1	8.5	33.6	-	52.6	73.9	21.3	Floor noise
Hori	9920.000	PK	43.2	38.5	9.6	34.0	-	57.3	73.9	16.6	Floor noise
Hori	2483.500	AV	52.6	27.5	5.2	34.4	-	50.9	53.9	3.0	
Hori	2484.086	AV	53.6	27.5	5.2	34.4	-	51.9	53.9	2.0	
Hori	4960.000	AV	34.0	31.7	7.4	33.7	-	39.4	53.9	14.5	Floor noise
Hori	7440.000	AV	34.0	36.1	8.5	33.6	-	45.0	53.9	8.9	Floor noise
Hori	9920.000	AV	33.5	38.5	9.6	34.0	-	47.6	53.9	6.3	Floor noise
Vert	32.000	QP	24.9	17.6	6.8	30.5	-	18.8	40.0	21.2	
Vert	43.627	QP	24.7	13.4	6.9	30.5	-	14.5	40.0	25.5	
Vert	106.994	QP	24.3	11.2	7.5	30.2	-	12.8	43.5	30.7	
Vert	183.307	QP	23.7	16.1	8.1	29.7	-	18.2	43.5	25.3	
Vert	687.376	QP	22.8	19.6	10.6	29.3	-	23.7	46.0	22.3	
Vert	882.968	QP	22.1	21.8	11.3	28.1	-	27.1	46.0	18.9	
Vert	2483.500	PK	54.9	27.5	5.2	34.4	-	53.2	73.9	20.7	
Vert	2484.086	PK	56.1	27.5	5.2	34.4	-	54.4	73.9	19.5	
Vert	4960.000	PK	41.3	31.7	7.4	33.7	-	46.7	73.9	27.2	Floor noise
Vert	7440.000	PK	42.3	36.1	8.5	33.6	-	53.3	73.9	20.6	Floor noise
Vert	9920.000	PK	42.8	38.5	9.6	34.0	-	56.9	73.9	17.0	Floor noise
Vert	2483.500	AV	52.2	27.5	5.2	34.4	-	50.5	53.9	3.4	
Vert	2484.086	AV	53.3	27.5	5.2	34.4	-	51.6	53.9	2.3	
Vert	4960.000	AV	34.2	31.7	7.4	33.7	-	39.6	53.9	14.3	Floor noise
Vert	7440.000	AV	34.1	36.1	8.5	33.6	-	45.1	53.9	8.8	Floor noise
Vert	9920.000	AV	33.6	38.5	9.6	34.0	-	47.7	53.9	6.2	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

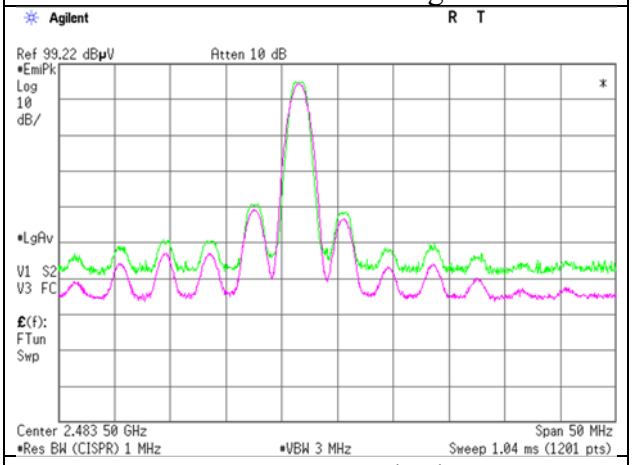
Distance factor: 1 GHz - 10 GHz 20log (3.75 m / 3.0 m) = 1.94 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12531961H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
Mode	Tx BT LE 2480 MHz

Horizontal

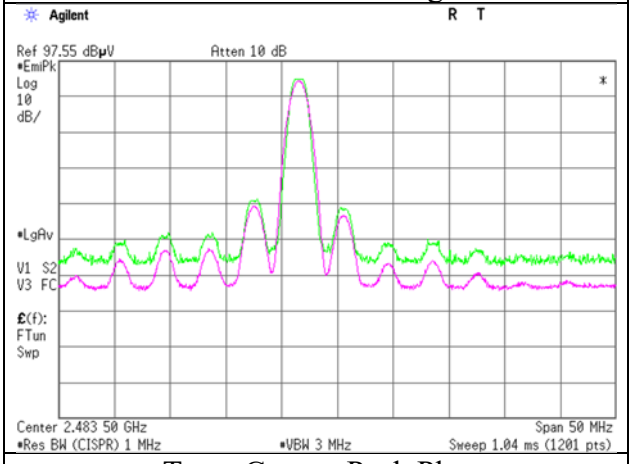
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

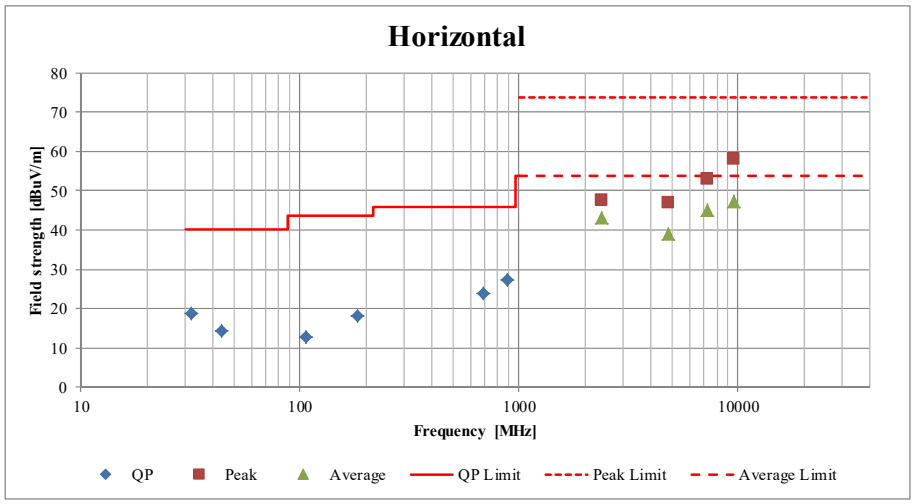


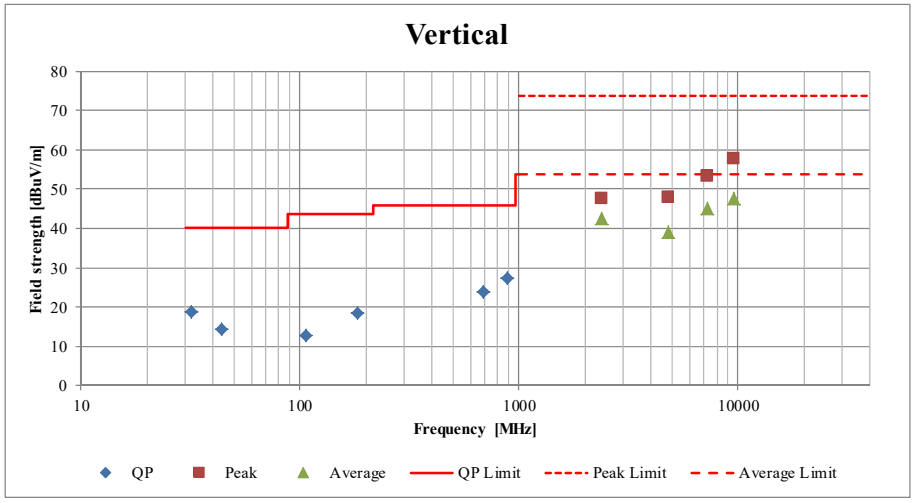
Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12531961H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	October 19, 2018
Temperature / Humidity	23 deg. C / 51 % RH
Engineer	Akihiko Maeda
Mode	Tx BT LE 2402 MHz



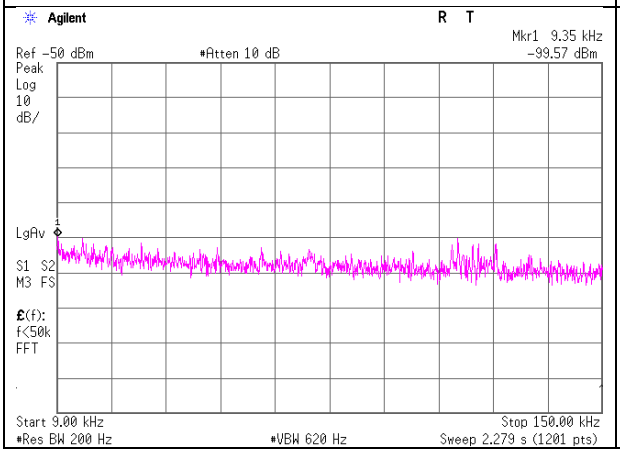


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

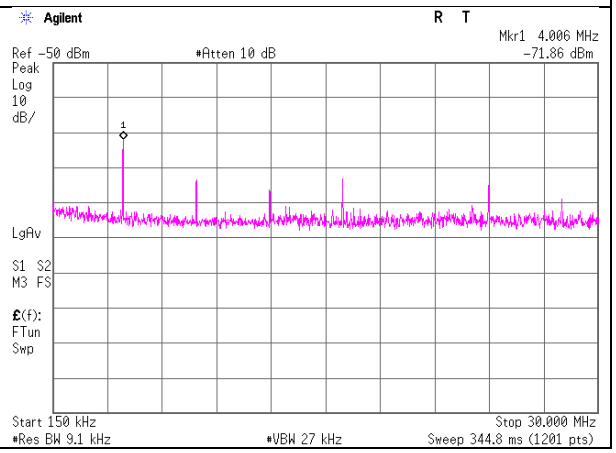
Conducted Spurious Emission

Report No.	12531961H
Test place	Ise EMC Lab. No.5 Measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 55 % RH
Engineer	Ryota Yamanaka
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
9.35	-99.6	0.10	9.8	2.0	1	-87.6	300	6.0	-26.4	48.1	74.5	
4006.00	-71.9	0.12	9.8	2.0	1	-59.9	30	6.0	21.4	29.5	8.2	

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)

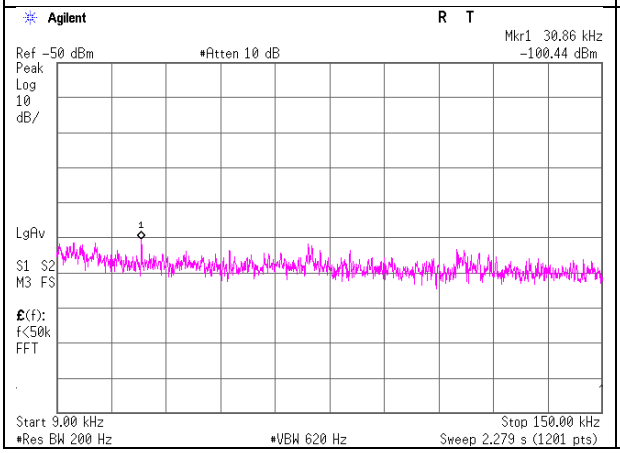
N: Number of output

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

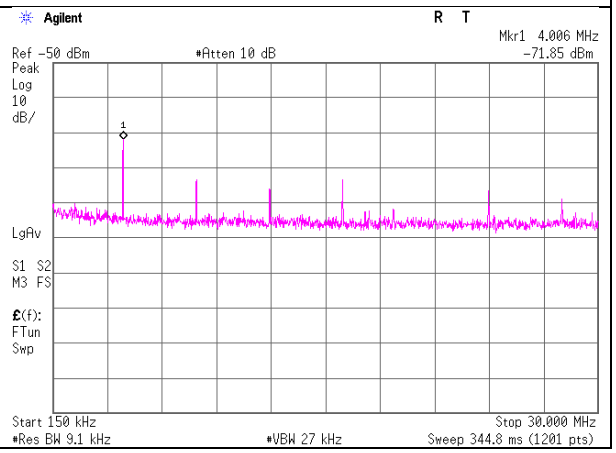
Conducted Spurious Emission

Report No.	12531961H
Test place	Ise EMC Lab. No.5 Measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 55 % RH
Engineer	Ryota Yamanaka
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
30.86	-100.4	0.10	9.8	2.0	1	-88.5	300	6.0	-27.3	37.8	65.1	
4006.00	-71.9	0.12	9.8	2.0	1	-59.9	30	6.0	21.4	29.5	8.2	

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)

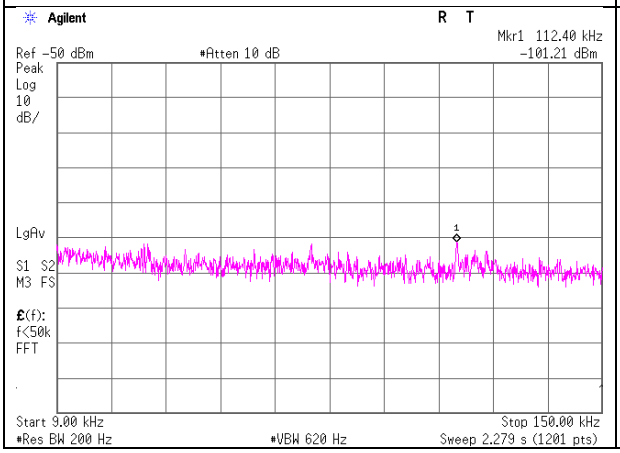
N: Number of output

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

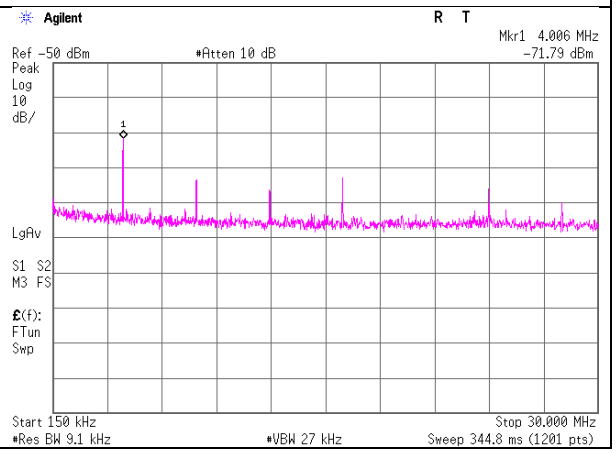
Conducted Spurious Emission

Report No.	12531961H
Test place	Ise EMC Lab. No.5 Measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 55 % RH
Engineer	Ryota Yamanaka
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
112.40	-101.2	0.10	9.8	2.0	1	-89.3	300	6.0	-28.0	26.5	54.5	
4006.00	-71.8	0.12	9.8	2.0	1	-59.8	30	6.0	21.4	29.5	8.1	

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.	12531961H
Test place	Ise EMC Lab. No.5 Measurement Room
Date	October 21, 2018
Temperature / Humidity	23 deg. C / 55 % RH
Engineer	Ryota Yamanaka
Mode	Tx BT LE

BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-36.49	1.04	10.04	-25.41	8.00	33.41
2440.00	-36.58	1.04	10.04	-25.50	8.00	33.50
2480.00	-36.99	1.05	10.04	-25.90	8.00	33.90

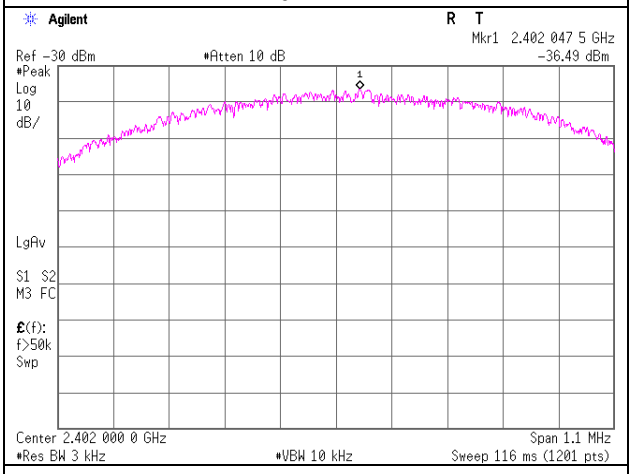
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

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

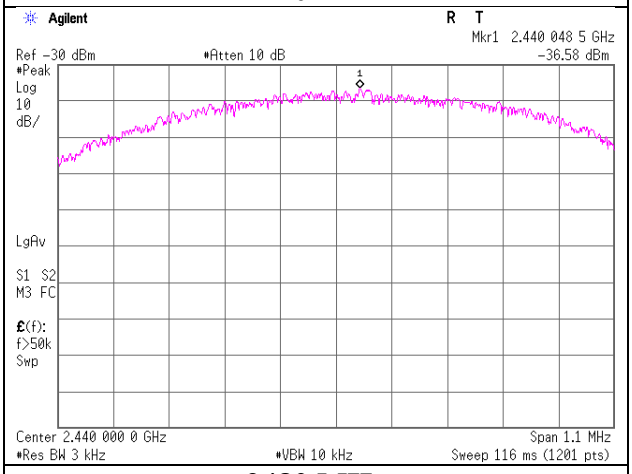
Power Density

BT LE

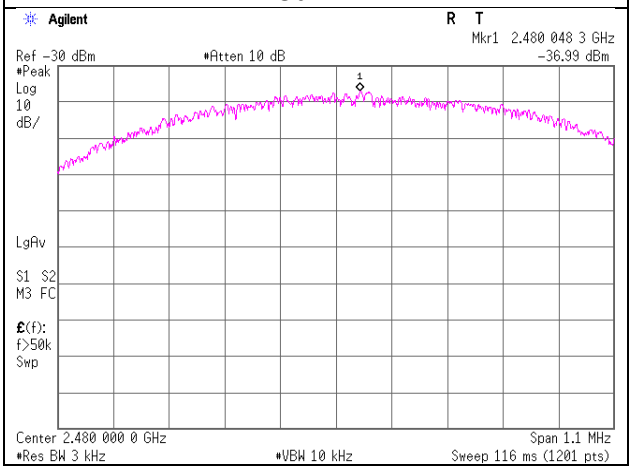
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test instruments

Test Instruments

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
CE	141358	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	7/25/2018	7/31/2019	12
CE	141247	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	12/19/2017	12/31/2018	12
CE	141222	Coaxial Cable	FUJIKURA	3D-2W(12m)/ 5D-2W(5m)/ 5D-2W(0.8m)/ 5	-	2/23/2018	2/28/2019	12
RE	141296	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	9/19/2018	9/30/2019	12
RE	141579	Pre Amplifier	AGILENT	8449B	3008A02142	1/23/2018	1/31/2019	12
RE	141503	Horn Antenna 18-26.5GHz	EMCO	Sep-60	1265	6/6/2018	6/30/2019	12
RE	141427	Biconical Antenna	Schwarzbeck	VHA9103B	8031	5/31/2018	5/31/2019	12
RE	141265	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-190	5/31/2018	5/31/2019	12
RE	141317	Coaxial Cable	Fujikura/Agilent	-	-	2/23/2018	2/28/2019	12
RE	141203	Attenuator(6dB)	Weinschel Corp	2	BK7970	11/14/2017	11/30/2018	12
RE	141392	Microwave Cable	Junkosha	MWX221	1604S253(1 m) / 1608S087(5 m)	8/8/2018	8/31/2019	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	6/6/2018	6/30/2019	12
RE	141884	Spectrum Analyzer	AGILENT	E4448A	MY44020357	11/7/2017	11/30/2018	12
RE	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	4/1/2018	4/29/2019	12
RE/CE	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	8/8/2018	8/31/2019	12
RE/CE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	8/21/2018	8/31/2019	12
RE/CE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
RE/CE	141556	Thermo-Hygrometer	CUSTOM	CTH-201	0003	12/21/2017	12/31/2018	12
RE/CE	142228	Measure	KOMELON	KMC-36	-	-	-	-
RE/CE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	6/29/2018/	6/30/2020	24
AT	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/14/2017	11/30/2018	12
AT	141395	Coaxial Cable	UL Japan	-	-	12/15/2017	12/31/2018	12
AT	141269	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	3/12/2018	3/31/2019	12
AT	141224	Microwave Cable	Junkosha	MWX221	1409S496	3/30/2018	3/31/2019	12
AT	141840	Power sensor	ANRITSU	MA2411B	11737	10/16/2018	10/31/2019	12
AT	141805	Power Meter	ANRITSU	ML2495A	6K00003338	10/16/2018	10/31/2019	12
AT	141899	Spectrum Analyzer	AGILENT	E4448A	MY46180655	8/10/2018	8/31/2019	12
AT	141563	Thermo-Hygrometer	CUSTOM	CTH-180	1701	1/24/2018	1/31/2019	12

***Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**

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: **CE: Conducted Emission test**
RE: Radiated Emission test
AT: Antenna Terminal Conducted test