RADIO TEST REPORT

Test Report No. : 11920646S-D-R2

Applicant	:	**Ueda Japan Radio Co., Ltd.**
Type of Equipment	:	**Wireless Base Unit**
Model No.	:	**DTF-255**
FCC ID	:	**2ADKK-DTF255**
Test regulation	:	**FCC Part 15 Subpart C: 2018**
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)
7. This report is a revised version of 11920646S-D-R1. 11920646S-D-R1 is replaced with this report.

Date of test: December 6 to 23, 2017
January 27, 2018

Representative test engineer:
Hiroyuki Morikawa
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

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REVISION HISTORY

Original Test Report No.: 11920646S-D

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11920646S-D	February 26, 2018	-	-
1	11920646S-D-R1	April 10, 2018	4, 27, 50	Correction of typo
2	11920646S-D-R2	April 17, 2018	9	Correction of Shield information: from Unshielded to Shielded. (USB (DC 5 V))
2	11920646S-D-R2	April 17, 2018	20	Correction of 99% Occupied Bandwidth value: from 10450.0 to 1045.0 (BTLE / 2402 MHz) from 10501.0 to 1050.1 (BTLE / 2440 MHz) from 10514.0 to 1051.4 (BTLE / 2480 MHz)
2	11920646S-D-R2	April 17, 2018	23	Correction of Mode: from BTLE to SRD
2	11920646S-D-R2	April 17, 2018	23	Correction of 99% Occupied Bandwidth value: from 10452.0 to 1045.2 (SRD / 2402 MHz) from 10547.0 to 1054.7 (SRD / 2440 MHz) from 10523.0 to 1052.3 (SRD / 2480 MHz)
2	11920646S-D-R2	April 17, 2018	29	Correction of Limit value: from 72.64 to 71.20 (Hori. / 2530.043 MHz) from 71.20 to 72.64 (Vert. / 2530.043 MHz)
2	11920646S-D-R2	April 17, 2018	29	Correction of Margin value: from 26.2 to 24.8 (Hori. / 2530.043 MHz) from 25.5 to 26.9 (Vert. / 2530.043 MHz)
2	11920646S-D-R2	April 17, 2018	43	Correction of Reading value: from -78.0 to -77.0 (650.00 kHz)
2	11920646S-D-R2	April 17, 2018	43	Correction of Margin value: from 16.5 to 15.5 (650.00 kHz)

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SECTION 1: Customer information

Company Name	:	Ueda Japan Radio Co., Ltd.
Address	:	2-10-19, Fumiiri, Ueda City, Nagano Prefecture 386-8608, Japan
Telephone Number	:	+81-268-26-2112
Facsimile Number	:	+81-268-26-2070
Contact Person	:	Mitsugu Suzuki

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

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless Base Unit
Model No.	:	DTF-255
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 5 V
Receipt Date of Sample	:	December 5, 2017
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: DTF-255 (referred to as the EUT in this report) is a Wireless Base Unit.

Clock frequency (Maximum)	:	32 MHz (Oscillator)

Radio Specification

Bluetooth Low Energy

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Power Supply (radio part input)	:	DC 3.0 V
Antenna type	:	Inverted F type pattern antenna
Antenna Gain	:	0.4 dBi

Short Range Device

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Power Supply (radio part input)	:	DC 3.0 V
Antenna type	:	Inverted F type pattern antenna
Antenna Gain	:	2.9 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on February 2, 2018 and effective March 5, 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

* The revision on February 2, 2018, does not affect the test specification applied to the EUT.
* Also the EUT complies with FCC Part 15 Subpart B.

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	16.3 dB, 16.89896 MHz, N, AV Tx. SRD, 2440 MHz	Complied	-
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	7.2 dB 2351.982 MHz, AV, Vert. Tx BT LE 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.

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

FCC Part 15.31 (e)

This EUT provides stable voltage (DC 3.0 V) constantly to RF part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203Antenna 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	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

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	4.3 dB	4.3 dB	4.3 dB	-	-
	200 MHz-1 GHz	5.9 dB	5.9 dB	5.9 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	Uncertainty (+/-)
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
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 %

Conducted Emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test

The data listed in this test report has enough margin, more than the site margin.

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

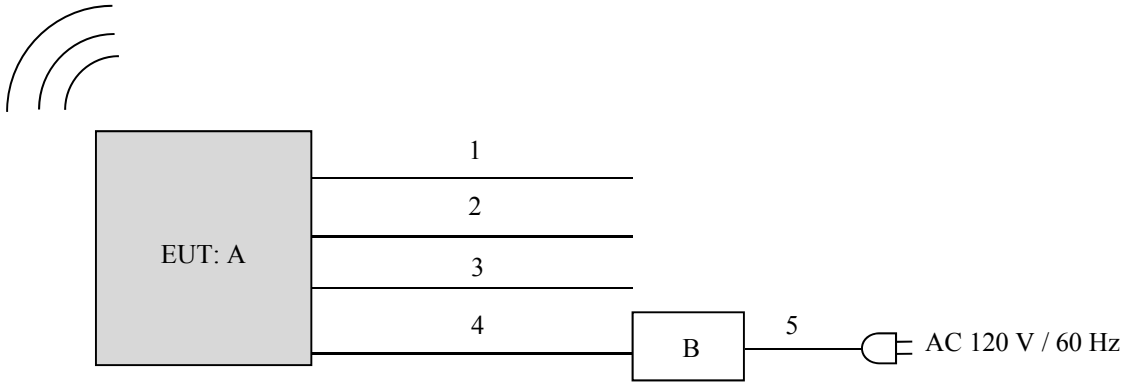
4.1 Operating Mode(s)

Mode	Frequency	Remarks*
Bluetooth Low Energy	2402 MHz 2440 MHz 2480 MHz	PRBS9
Short Range Device		

*Power of the EUT was set by the software as follows;
- Power Setting: Fixed
- Software: nRFgo Studio version 1.21.2.10

*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.

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 Base Unit	DTF-255	9990016	Ueda Japan Radio Co., Ltd.	EUT
B	Power Supply (DC)	PAN35-10A	NA000955	Kikusui	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	GND	1.0	Unshielded	Unshielded	-
2	Signal	1.2	Unshielded	Unshielded	-
3	Signal	0.7	Unshielded	Unshielded	-
4	USB (DC 5 V)	2.1 + 2.0	Shielded	Shielded	-
5	AC	1.8	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 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.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN / (AMN) to the input power source.

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

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 "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 urethane platform of nominal size, 1.0 m by 1.5 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 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 *a)		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	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: 300 kHz
Test Distance	3 m	3.95 m *2) (1 GHz – 13 GHz), 1 m *3) (13 GHz – 26.5 GHz)		3.95 m *2) (1 GHz – 13 GHz), 1 m *3) (13 GHz – 26.5 GHz)

*1) Average Power Measurement was performed based on 6. 0 & 12.2.5 of "KDB 558074 D01 DTS Meas Guidance v04".
*2) Distance Factor: 20 x log (3.95 m / 3.0 m) = 2.39 dB
*3) Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 dB

- 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.

[Bluetooth Low Energy]

Antenna polarization	Frequency				
	Below 1 GHz	1 GHz – 2.8 GHz	2.8 GHz - 13 GHz	13 GHz - 18 GHz	18 GHz – 26.5 GHz
Horizontal	Y	X	Z	X	X
Vertical	Z	X	X	X	X

[Short Range Device]

Antenna polarization	Frequency				
	Below 1 GHz	1 GHz – 2.8 GHz	2.8 GHz - 13 GHz	13 GHz - 18 GHz	18 GHz – 26.5 GHz
Horizontal	Y	X	Z	X	X
Vertical	Z	X	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 - 26.5 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	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 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v04".
*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

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/01/27

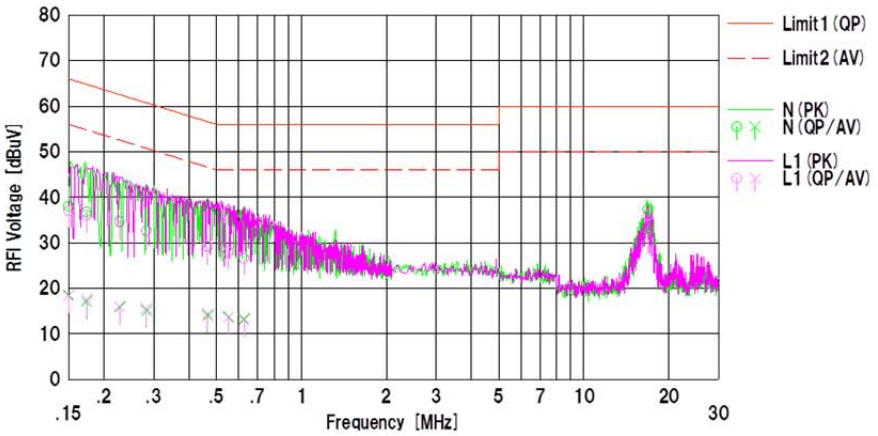
Mode : Tx. BTLE. 2402 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 31 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	25.60	6.00	12.43	38.03	18.43	66.00	56.00	27.9	37.5	N	
2	0.17356	24.30	4.60	12.44	36.74	17.04	64.79	54.79	28.0	37.7	N	
3	0.22732	22.20	3.50	12.44	34.64	15.94	62.55	52.55	27.9	36.6	N	
4	0.28284	20.20	2.60	12.47	32.67	15.07	60.73	50.73	28.0	35.6	N	
5	0.46610	16.60	1.50	12.49	29.09	13.99	56.58	46.58	27.4	32.5	N	
6	0.55264	15.50	1.20	12.50	28.00	13.70	56.00	46.00	28.0	32.3	N	
7	0.62697	14.00	0.80	12.50	26.50	13.30	56.00	46.00	29.5	32.7	N	
8	16.897 65	23.70	19.00	13.56	37.26	32.56	60.00	50.00	22.7	17.4	N	
9	0.15000	24.60	5.90	12.43	37.03	18.33	66.00	56.00	28.9	37.6	L1	
10	0.17352	23.60	5.10	12.44	36.04	17.54	64.79	54.79	28.7	37.2	L1	
11	0.22752	22.00	3.40	12.44	34.44	15.84	62.54	52.54	28.1	36.7	L1	
12	0.28291	20.10	3.10	12.47	32.57	15.57	60.73	50.73	28.1	35.1	L1	
13	0.46495	16.70	1.90	12.48	29.18	14.38	56.60	46.60	27.4	32.2	L1	
14	0.55312	15.50	1.10	12.50	28.00	13.60	56.00	46.00	28.0	32.4	L1	
15	0.62596	14.00	0.60	12.50	26.50	13.10	56.00	46.00	29.5	32.9	L1	
16	16.898 10	22.40	17.90	13.56	35.96	31.46	60.00	50.00	24.0	18.5	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) :SLS-02

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/01/27

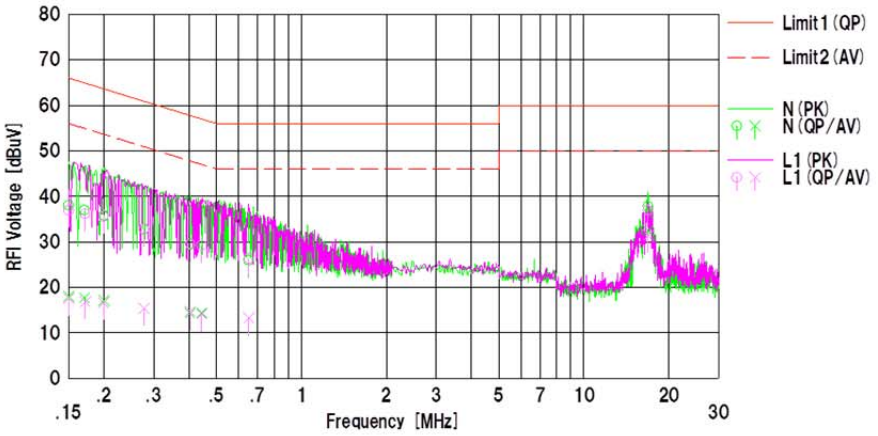
Mode : Tx. BTLE. 2440 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 31 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Takahiro Suzuki



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	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	25.60	5.50	12.43	38.03	17.93	66.00	56.00	27.9	38.0	N	
2	0.17064	24.50	5.20	12.44	36.94	17.64	64.93	54.93	27.9	37.2	N	
3	0.19972	23.40	4.60	12.43	35.83	17.03	63.62	53.62	27.7	36.5	N	
4	0.27704	20.30	2.80	12.47	32.77	15.27	60.90	50.90	28.1	35.6	N	
5	0.40391	16.90	1.80	12.48	29.38	14.28	57.77	47.77	28.3	33.4	N	
6	0.44382	16.70	1.80	12.48	29.18	14.28	56.99	46.99	27.8	32.7	N	
7	0.65140	13.40	0.70	12.51	25.91	13.21	56.00	46.00	30.0	32.7	N	
8	16.897 17	24.30	18.90	13.56	37.86	32.46	60.00	50.00	22.1	17.5	N	
9	0.15000	24.50	5.10	12.43	36.93	17.53	66.00	56.00	29.0	38.4	L1	
10	0.17163	23.70	4.40	12.44	36.14	16.84	64.88	54.88	28.7	38.0	L1	
11	0.19963	23.10	4.10	12.43	35.53	16.53	63.63	53.63	28.1	37.1	L1	
12	0.27708	20.40	2.80	12.47	32.87	15.27	60.90	50.90	28.0	35.6	L1	
13	0.40356	17.10	2.20	12.48	29.58	14.68	57.78	47.78	28.2	33.1	L1	
14	0.44376	16.70	1.60	12.48	29.18	14.08	56.99	46.99	27.8	32.9	L1	
15	0.65156	13.80	0.80	12.51	26.31	13.31	56.00	46.00	29.6	32.6	L1	
16	16.899 00	23.40	17.80	13.56	36.96	31.36	60.00	50.00	23.0	18.6	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) :SLS-02

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/01/27

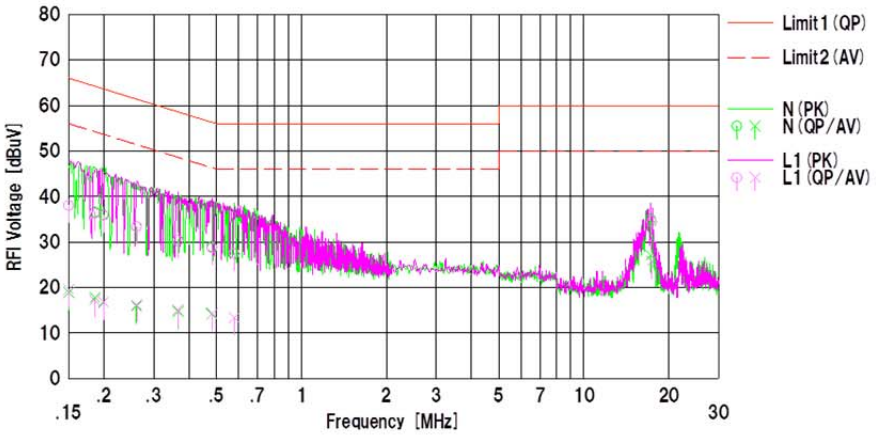
Mode : Tx. BTLE. 2480 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 31 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	25.60	6.40	12.43	38.03	18.83	66.00	56.00	27.9	37.1	N	
2	0.18574	24.10	5.40	12.44	36.54	17.84	64.22	54.22	27.6	36.3	N	
3	0.19936	23.50	4.30	12.43	35.93	16.73	63.64	53.64	27.7	36.9	N	
4	0.26068	20.90	3.40	12.46	33.36	15.86	61.41	51.41	28.0	35.5	N	
5	0.36624	17.80	2.20	12.48	30.28	14.68	58.59	48.59	28.3	33.9	N	
6	0.48268	16.40	1.70	12.49	28.89	14.19	56.29	46.29	27.4	32.1	N	
7	0.57916	14.90	0.90	12.50	27.40	13.40	56.00	46.00	28.6	32.6	N	
8	17.27802	21.40	13.50	13.57	34.97	27.07	60.00	50.00	25.0	22.9	N	
9	0.15000	25.60	7.10	12.43	38.03	19.53	66.00	56.00	27.9	36.4	L1	
10	0.18551	23.90	4.80	12.44	36.34	17.24	64.24	54.24	27.9	37.0	L1	
11	0.19941	23.40	4.30	12.43	35.83	16.73	63.64	53.64	27.8	36.9	L1	
12	0.26116	20.90	3.70	12.46	33.36	16.16	61.39	51.39	28.0	35.2	L1	
13	0.36558	17.80	2.50	12.48	30.28	14.98	58.60	48.60	28.3	33.6	L1	
14	0.48309	16.20	1.80	12.49	28.69	14.29	56.29	46.29	27.6	32.0	L1	
15	0.57836	15.00	0.90	12.50	27.50	13.40	56.00	46.00	28.5	32.6	L1	
16	17.42785	20.80	12.10	13.57	34.37	25.67	60.00	50.00	25.6	24.3	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) :SLS-02

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/01/27

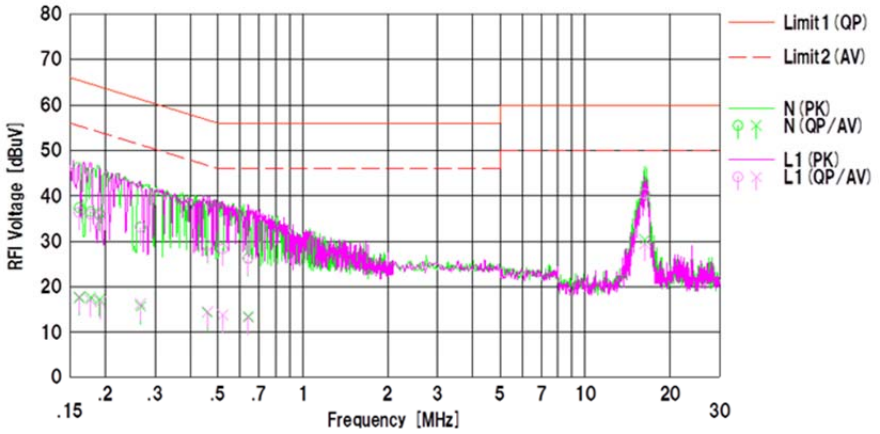
Mode : Tx. SRD. 2402 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 31 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.16160	24.90	5.10	12.44	37.34	17.54	65.38	55.38	28.0	37.8	N	
2	0.17730	24.10	5.20	12.44	36.54	17.64	64.61	54.61	28.0	36.9	N	
3	0.19093	23.60	4.80	12.44	36.04	17.24	64.00	54.00	27.9	36.7	N	
4	0.26701	20.60	3.20	12.46	33.06	15.66	61.21	51.21	28.1	35.5	N	
5	0.45892	16.60	1.80	12.48	29.08	14.28	56.71	46.71	27.6	32.4	N	
6	0.52092	15.80	1.40	12.49	28.29	13.89	56.00	46.00	27.7	32.1	N	
7	0.64140	13.70	0.90	12.50	26.20	13.40	56.00	46.00	29.8	32.6	N	
8	16.30727	26.90	16.80	13.53	40.43	30.33	60.00	50.00	19.5	19.6	N	
9	0.16184	23.90	5.40	12.44	36.34	17.84	65.37	55.37	29.0	37.5	L1	
10	0.17715	23.50	4.70	12.44	35.94	17.14	64.62	54.62	28.6	37.4	L1	
11	0.19157	23.10	4.20	12.44	35.54	16.64	63.97	53.97	28.4	37.3	L1	
12	0.26568	20.70	3.80	12.46	33.16	16.26	61.25	51.25	28.0	34.9	L1	
13	0.46023	16.60	2.00	12.48	29.08	14.48	56.69	46.69	27.6	32.2	L1	
14	0.52191	15.80	1.30	12.49	28.29	13.79	56.00	46.00	27.7	32.2	L1	
15	0.64140	13.80	0.70	12.50	26.30	13.20	56.00	46.00	29.7	32.8	L1	
16	16.29902	27.00	15.90	13.53	40.53	29.43	60.00	50.00	19.4	20.5	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) :SLS-02

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/01/27

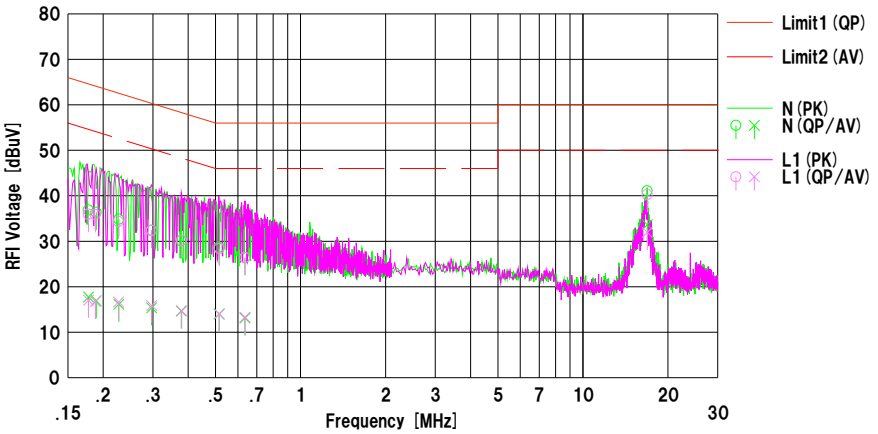
Mode : Tx, SRD, 2440 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 31 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.17747	24.40	5.30	12.44	36.84	17.74	64.60	54.60	27.7	36.8	N	
2	0.18891	23.90	4.50	12.44	36.34	16.94	64.08	54.08	27.7	37.1	N	
3	0.22724	22.40	3.70	12.44	34.84	16.14	62.55	52.55	27.7	36.4	N	
4	0.29672	19.90	2.90	12.47	32.37	15.37	60.33	50.33	27.9	34.9	N	
5	0.37777	17.60	2.20	12.47	30.07	14.67	58.33	48.33	28.2	33.6	N	
6	0.51444	16.20	1.50	12.49	28.69	13.99	56.00	46.00	27.3	32.0	N	
7	0.63564	13.90	0.60	12.50	26.40	13.10	56.00	46.00	29.6	32.9	N	
8	16.89896	27.50	20.10	13.56	41.06	33.66	60.00	50.00	18.9	16.3	N	
9	0.17744	23.50	4.60	12.44	35.94	17.04	64.60	54.60	28.6	37.5	L1	
10	0.18770	23.40	4.30	12.44	35.84	16.74	64.14	54.14	28.3	37.4	L1	
11	0.22652	21.90	4.20	12.44	34.34	16.64	62.58	52.58	28.2	35.9	L1	
12	0.29697	19.90	3.40	12.47	32.37	15.87	60.33	50.33	27.9	34.4	L1	
13	0.37933	17.70	2.20	12.47	30.17	14.67	58.29	48.29	28.1	33.6	L1	
14	0.51562	15.90	1.50	12.49	28.39	13.99	56.00	46.00	27.6	32.0	L1	
15	0.63560	13.90	0.80	12.50	26.40	13.30	56.00	46.00	29.6	32.7	L1	
16	16.89996	26.70	18.40	13.56	40.26	31.96	60.00	50.00	19.7	18.0	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) :SLS-02

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/01/27

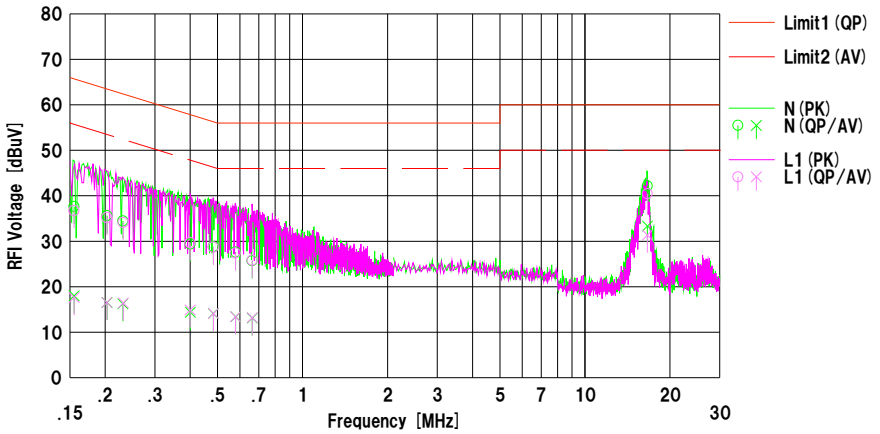
Mode : Tx, SRD, 2480 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 31 %RH

Remarks : -

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15524	25.20	5.60	12.43	37.63	18.03	65.71	55.71	28.0	37.6	N	
2	0.20320	23.20	4.10	12.43	35.63	16.53	63.48	53.48	27.8	36.9	N	
3	0.23093	22.00	3.80	12.44	34.44	16.24	62.42	52.42	27.9	36.1	N	
4	0.40048	16.90	1.90	12.48	29.38	14.38	57.84	47.84	28.4	33.4	N	
5	0.48282	16.30	1.60	12.49	28.79	14.09	56.29	46.29	27.5	32.2	N	
6	0.57948	15.10	0.90	12.50	27.60	13.40	56.00	46.00	28.4	32.6	N	
7	0.66340	13.20	0.60	12.51	25.71	13.11	56.00	46.00	30.2	32.8	N	
8	16.65300	28.60	19.80	13.55	42.15	33.35	60.00	50.00	17.8	16.6	N	
9	0.15520	24.30	5.20	12.43	36.73	17.63	65.72	55.72	28.9	38.0	L1	
10	0.20271	22.80	4.10	12.43	35.23	16.53	63.50	53.50	28.2	36.9	L1	
11	0.23176	21.70	4.00	12.44	34.14	16.44	62.39	52.39	28.2	35.9	L1	
12	0.39984	17.20	2.40	12.48	29.68	14.88	57.86	47.86	28.1	32.9	L1	
13	0.48348	16.20	1.60	12.49	28.69	14.09	56.28	46.28	27.5	32.1	L1	
14	0.57892	14.90	0.90	12.50	27.40	13.40	56.00	46.00	28.6	32.6	L1	
15	0.66372	13.30	0.70	12.51	25.81	13.21	56.00	46.00	30.1	32.7	L1	
16	16.65784	26.90	17.80	13.55	40.45	31.35	60.00	50.00	19.5	18.6	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) :SLS-02

6 dB Bandwidth and 99 % Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx BT LE

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Limit for 6dB Bandwidth [kHz]
BTLE	2402	0.729	1045.0	> 500
	2440	0.726	1050.1	> 500
	2480	0.730	1051.4	> 500

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
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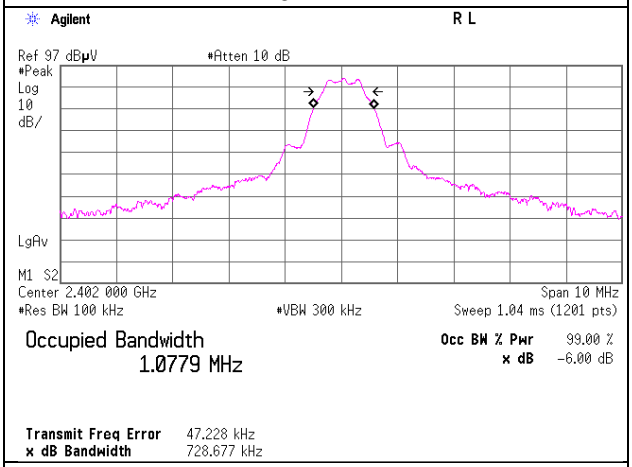
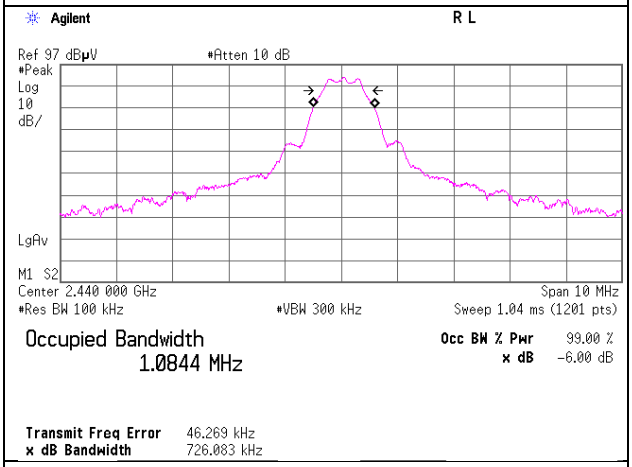
6dB Bandwidth

BTLE

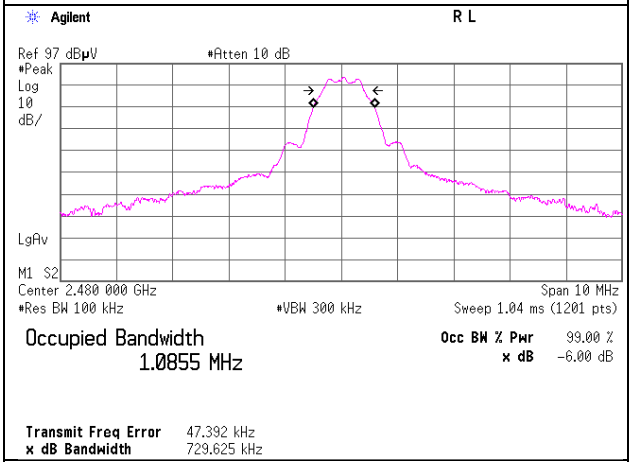
2402 MHz



2440 MHz



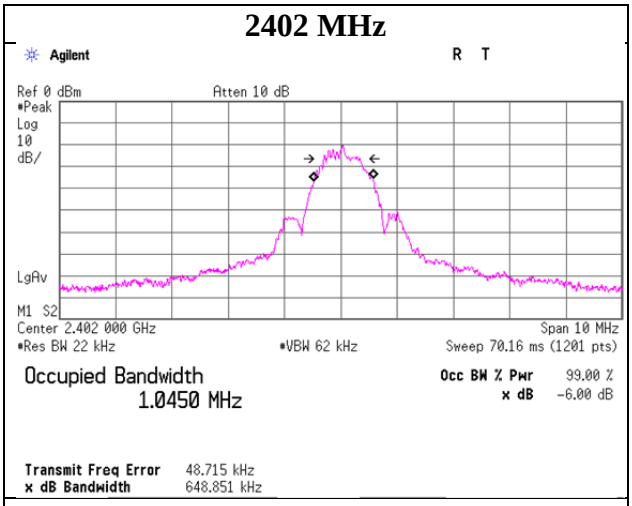
2480 MHz



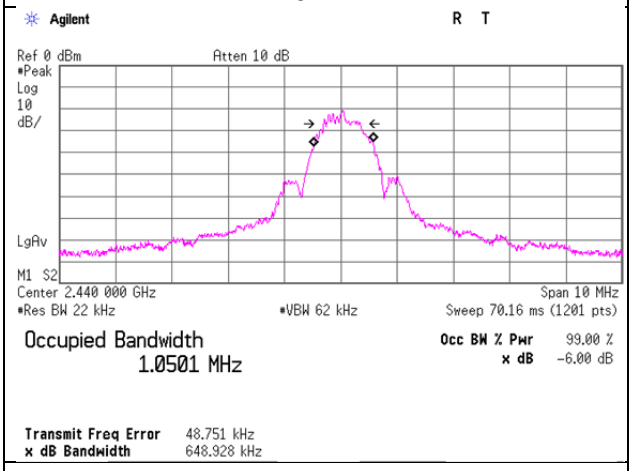
99%Occupied Bandwidth

BTLE

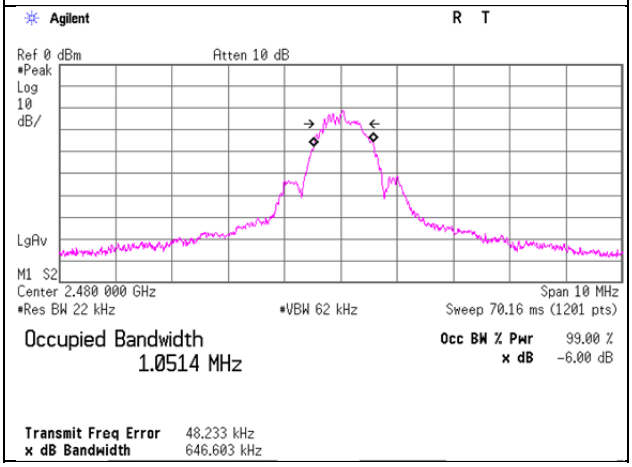
2402 MHz



2440 MHz



2480 MHz



6 dB Bandwidth and 99 % Occupied Bandwidth

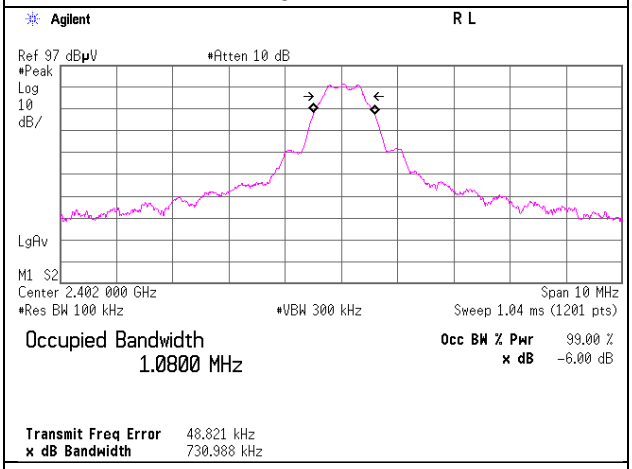
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx SRD

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Limit for 6dB Bandwidth [kHz]
SRD	2402	0.731	1045.2	> 500
	2440	0.735	1054.7	> 500
	2480	0.735	1052.3	> 500

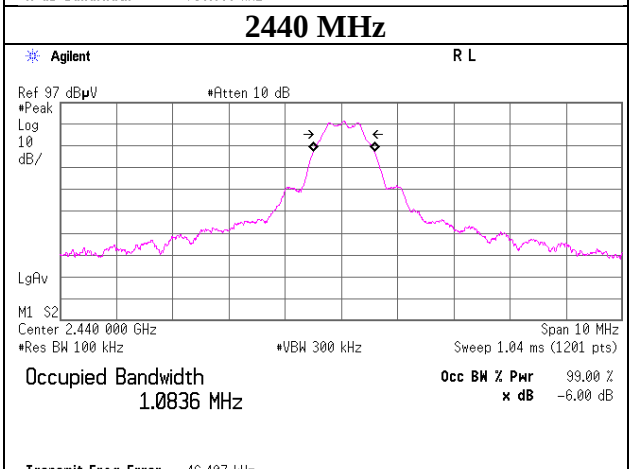
6dB Bandwidth

SRD

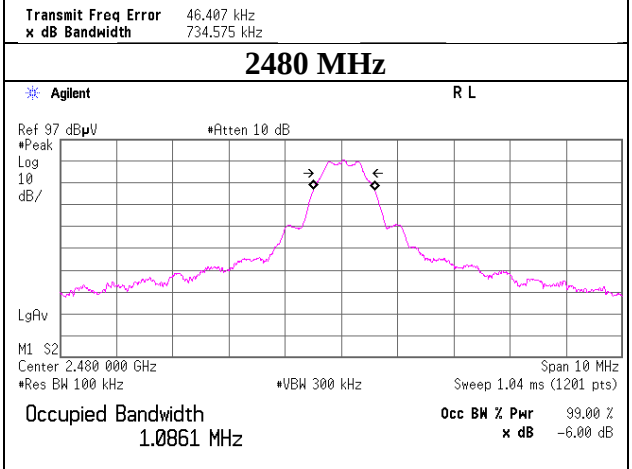
2402 MHz



2440 MHz



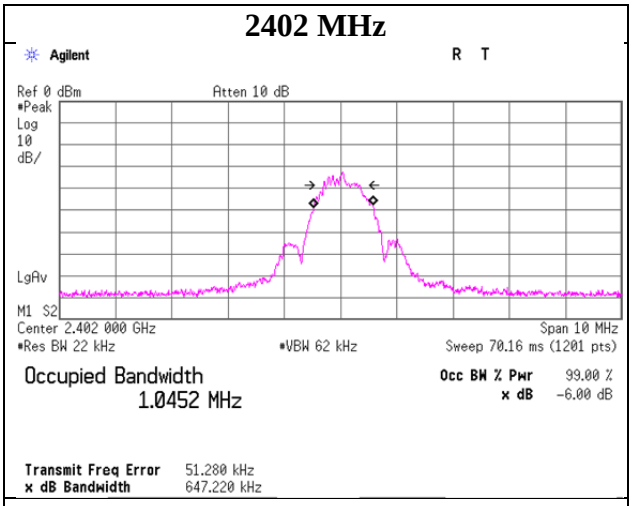
2480 MHz



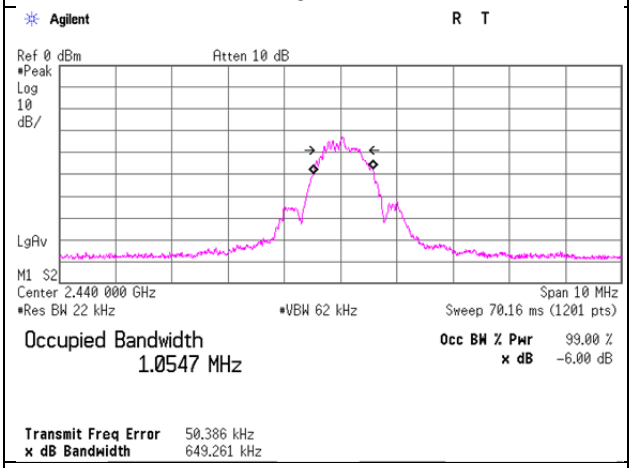
99%Occupied Bandwidth

SRD

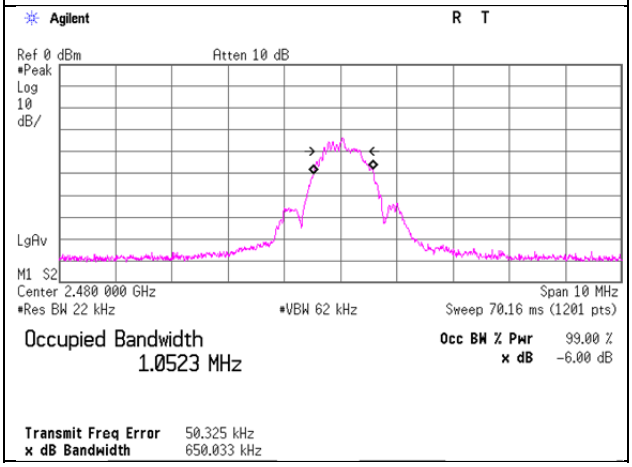
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx

BT LE

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-14.85	2.02	9.68	-3.15	0.48	30.00	1000	33.15
2440	-14.81	2.03	9.67	-3.11	0.49	30.00	1000	33.11
2480	-15.23	2.04	9.67	-3.52	0.44	30.00	1000	33.52

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

SRD

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-16.35	2.02	0.00	-14.33	0.04	30.00	1000	44.33
2440	-16.82	2.03	0.00	-14.79	0.03	30.00	1000	44.79
2480	-17.26	2.04	0.00	-15.22	0.03	30.00	1000	45.22

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

Average Output Power
(Reference data for RF Exposure)

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
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	-18.14	2.02	9.68	-6.44	0.23	1.96	-4.48	0.36
2440	-18.23	2.03	9.67	-6.53	0.22	1.96	-4.57	0.35
2480	-18.72	2.04	9.67	-7.01	0.20	1.96	-5.05	0.31

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

SRD

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	-20.62	2.02	0.00	-18.60	0.01	1.93	-16.67	0.02
2440	-20.96	2.03	0.00	-18.93	0.01	1.93	-17.00	0.02
2480	-21.70	2.04	0.00	-19.66	0.01	1.93	-17.73	0.02

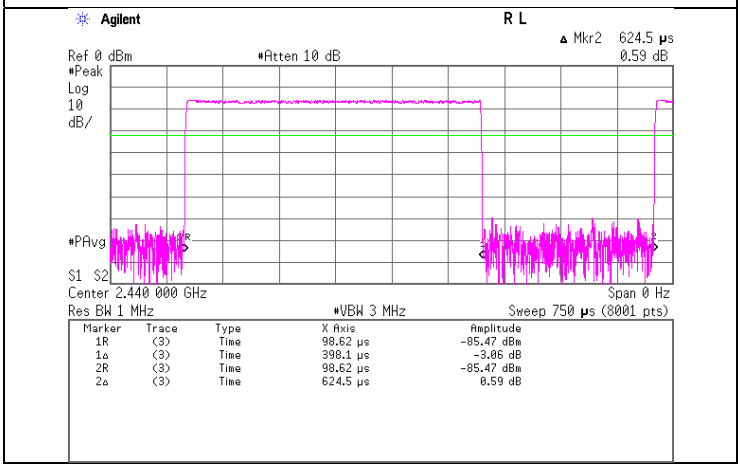
Sample Calculation:
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result (Burst power average) = Time average + Duty factor

Burst rate confirmation

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx

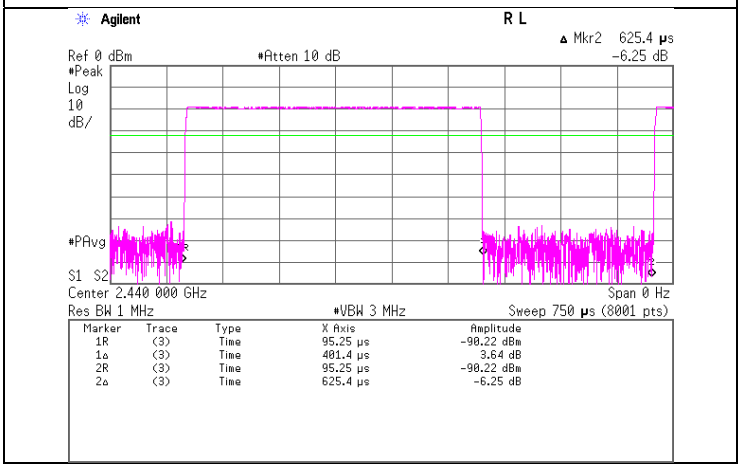
BTLE

Tx on / (Tx on + Tx off) =	**0.637**
Tx on / (Tx on + Tx off) * 100 =	**63.7 %**
Duty factor = 10 * log (0.625 / 0.398) =	**1.96 dB**
Duty factor = 20 * log (0.625 / 0.398) =	**3.92 dB**



SRD

Tx on / (Tx on + Tx off) =	**0.642**
Tx on / (Tx on + Tx off) * 100 =	**64.2 %**
Duty factor = 10 * log (0.625 / 0.401) =	**1.93 dB**
Duty factor = 20 * log (0.625 / 0.401) =	**3.85 dB**



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

Radiated Spurious Emission

Report No.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi	Kenichi Adachi	Kazuya Noda
	(1 GHz - 18 GHz)	(30 MHz – 1000 MHz)	(18 GHz – 26.5 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.	183.735	QP	26.15	16.18	8.98	31.77	0.00	19.54	43.50	23.9	165	253	
Hori.	260.345	QP	29.26	12.06	6.42	31.74	0.00	16.00	46.00	30.0	109	134	
Hori.	596.424	QP	30.14	19.10	8.58	31.95	0.00	25.87	46.00	20.1	171	254	
Hori.	642.579	QP	25.69	19.43	8.80	32.01	0.00	21.91	46.00	24.0	128	246	
Hori.	2274.076	PK	50.85	26.90	13.90	44.11	2.39	49.93	73.90	23.9	143	194	
Hori.	2390.000	PK	49.03	27.26	14.00	44.13	2.39	48.55	73.90	25.3	149	175	
Hori.	4804.000	PK	49.69	31.40	6.34	44.45	2.39	45.37	73.90	28.5	226	36	
Hori.	7206.000	PK	47.33	36.56	7.82	43.99	2.39	50.11	73.90	23.7	150	0	
Vert.	108.954	QP	31.98	11.36	8.17	31.79	0.00	19.72	43.50	23.7	100	14	
Vert.	121.872	QP	28.09	13.32	8.23	31.79	0.00	17.85	43.50	25.6	100	11	
Vert.	183.715	QP	26.45	16.18	8.98	31.77	0.00	19.84	43.50	23.6	100	83	
Vert.	219.735	QP	33.86	11.56	6.04	31.75	0.00	19.71	46.00	26.2	100	0	
Vert.	584.225	QP	30.57	18.91	8.53	31.96	0.00	26.05	46.00	**19.9**	121	164	
Vert.	629.641	QP	26.98	19.34	8.74	32.00	0.00	23.06	46.00	22.9	100	355	
Vert.	2274.076	PK	50.17	26.90	13.90	44.11	2.39	49.25	73.90	24.6	169	167	
Vert.	2390.000	PK	48.89	27.21	13.99	44.13	2.39	48.35	73.90	25.5	187	222	
Vert.	4804.000	PK	49.93	31.40	6.34	44.45	2.39	45.61	73.90	28.2	173	258	
Vert.	7206.000	PK	47.76	36.56	7.82	43.99	2.39	50.54	73.90	23.3	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 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.	2274.076	AV	41.80	26.90	13.90	44.11	3.90	2.39	44.78	53.90	9.1	
Hori.	2390.000	AV	39.88	27.26	14.00	44.13	3.90	2.39	43.30	53.90	10.6	*1)
Hori.	4804.000	AV	40.93	31.40	6.34	44.45	3.90	2.39	40.51	53.90	13.4	
Hori.	7206.000	AV	38.86	36.56	7.82	43.99	3.90	2.39	45.54	53.90	8.4	
Vert.	2274.076	AV	41.77	26.90	13.90	44.11	3.90	2.39	44.75	53.90	9.2	
Vert.	2390.000	AV	40.40	27.21	13.99	44.13	3.90	2.39	43.76	53.90	10.1	*1)
Vert.	4804.000	AV	40.29	31.40	6.34	44.45	3.90	2.39	39.87	53.90	14.0	
Vert.	7206.000	AV	38.97	36.56	7.82	43.99	3.90	2.39	45.65	53.90	**8.3**	

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 (3.95 m / 3.0 m) = 2.39 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	91.65	27.29	14.01	44.14	2.39	91.20	-	-	Carrier
Hori.	2530.043	PK	46.42	27.67	14.12	44.16	2.39	46.44	71.20	24.8	
Hori.	2400.000	PK	45.18	27.29	14.01	44.14	2.39	44.73	71.20	26.5	
Hori.	9608.000	PK	41.01	38.61	8.80	43.83	2.39	46.98	71.20	24.2	
Vert.	2402.000	PK	93.09	27.29	14.01	44.14	2.39	92.64	-	-	Carrier
Vert.	2530.043	PK	45.73	27.67	14.12	44.16	2.39	45.75	72.64	26.9	
Vert.	2400.000	PK	45.99	27.29	14.01	44.14	2.39	45.54	72.64	27.1	
Vert.	9608.000	PK	40.67	38.61	8.80	43.83	2.39	46.64	72.64	26.0	

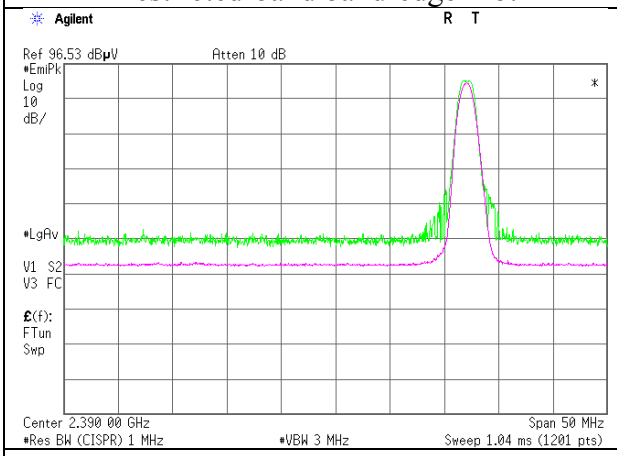
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	11920646S-D-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 14, 2017
Temperature / Humidity	26 deg. C / 30 % RH
Engineer	Shiro Kobayashi (1 GHz - 13 GHz)
Mode	Tx BT LE 2402 MHz

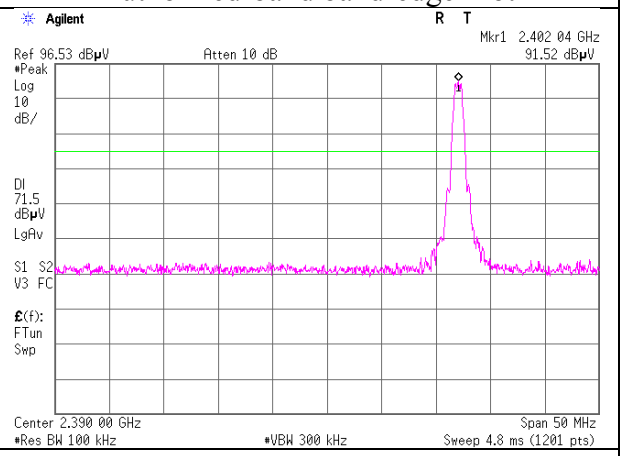
Horizontal

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

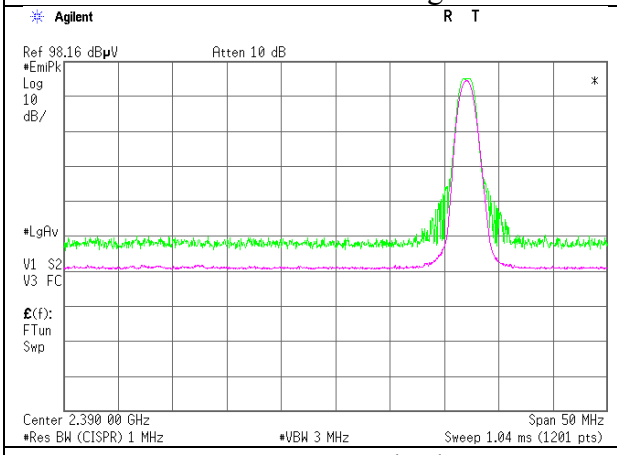
Authorized-band band-edge Plot



20dBc Plot

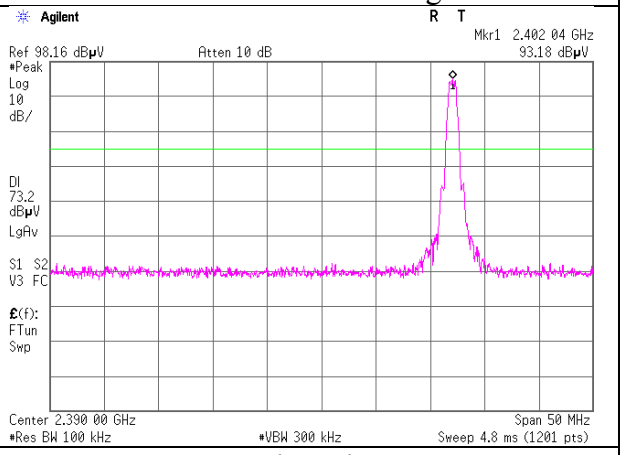
Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Authorized-band band-edge Plot



20dBc Plot

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

Radiated Spurious Emission

Report No.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi	Kenichi Adachi	Kazuya Noda
	(1 GHz - 18 GHz)	(30 MHz – 1000 MHz)	(18 GHz – 26.5 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.	182.823	QP	23.97	16.15	8.98	31.77	0.00	17.33	43.50	26.1	176	279	
Hori.	297.274	QP	26.37	13.36	6.75	31.76	0.00	14.72	46.00	31.2	111	132	
Hori.	605.703	QP	27.09	19.19	8.62	31.96	0.00	22.94	46.00	23.0	158	261	
Hori.	661.981	QP	24.93	19.55	8.90	32.01	0.00	21.37	46.00	24.6	131	246	
Hori.	2312.004	PK	50.19	27.01	13.93	44.11	2.39	49.41	73.90	24.4	151	179	
Hori.	4880.000	PK	50.37	31.61	6.40	44.48	2.39	46.29	73.90	27.6	223	32	
Hori.	7320.000	PK	47.16	36.76	7.93	44.03	2.39	50.21	73.90	23.6	150	0	
Vert.	110.779	QP	30.78	11.67	8.16	31.79	0.00	18.82	43.50	24.6	100	17	
Vert.	124.287	QP	27.98	13.45	8.27	31.79	0.00	17.91	43.50	25.5	100	16	
Vert.	183.724	QP	28.27	16.18	8.98	31.77	0.00	21.66	43.50	21.8	100	89	
Vert.	218.821	QP	30.69	11.56	6.03	31.75	0.00	16.53	46.00	29.4	100	0	
Vert.	586.241	QP	30.67	18.94	8.54	31.96	0.00	26.19	46.00	**19.8**	124	162	
Vert.	639.809	QP	25.98	19.41	8.79	32.01	0.00	22.17	46.00	23.8	100	296	
Vert.	2312.004	PK	50.15	27.01	13.93	44.11	2.39	49.37	73.90	24.5	133	213	
Vert.	4880.000	PK	48.86	31.61	6.40	44.48	2.39	44.78	73.90	29.1	174	322	
Vert.	7320.000	PK	47.60	36.76	7.93	44.03	2.39	50.65	73.90	23.2	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 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.	2312.004	AV	41.58	27.01	13.93	44.11	3.92	2.39	44.72	53.90	9.2	
Hori.	4880.000	AV	41.35	31.61	6.40	44.48	3.92	2.39	41.19	53.90	12.7	
Hori.	7320.000	AV	38.81	36.76	7.93	44.03	3.92	2.39	45.78	53.90	8.1	
Vert.	2312.004	AV	41.76	27.01	13.93	44.11	3.92	2.39	44.90	53.90	9.0	
Vert.	4880.000	AV	40.52	31.61	6.40	44.48	3.92	2.39	40.36	53.90	13.6	
Vert.	7320.000	AV	39.08	36.76	7.93	44.03	3.92	2.39	46.05	53.90	**7.9**	

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 (3.95 m / 3.0 m) = 2.39 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.	2440.000	PK	92.46	27.41	14.05	44.15	2.39	92.16	-	-	Carrier
Hori.	2567.916	PK	44.37	27.75	14.17	44.15	2.39	44.53	72.16	27.6	
Hori.	9760.000	PK	39.13	38.79	8.95	43.85	2.39	45.41	72.16	26.8	
Vert.	2440.000	PK	93.00	27.41	14.05	44.15	2.39	92.70	-	-	Carrier
Vert.	2567.916	PK	44.33	27.75	14.17	44.15	2.39	44.49	72.70	28.2	
Vert.	9760.000	PK	38.90	38.79	8.95	43.85	2.39	45.18	72.70	27.5	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi	Kenichi Adachi	Kazuya Noda
	(1 GHz - 18 GHz)	(30 MHz – 1000 MHz)	(18 GHz – 26.5 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.	182.827	QP	24.88	16.15	8.98	31.77	0.00	18.24	43.50	25.2	181	276	
Hori.	297.254	QP	26.72	13.36	6.75	31.76	0.00	15.07	46.00	30.9	108	129	
Hori.	597.568	QP	28.98	19.11	8.58	31.95	0.00	24.72	46.00	21.2	159	258	
Hori.	642.580	QP	25.19	19.43	8.80	32.01	0.00	21.41	46.00	24.5	133	238	
Hori.	2351.982	PK	51.60	27.14	13.97	44.12	2.39	50.98	73.90	22.9	142	181	
Hori.	2483.500	PK	54.57	27.55	14.09	44.16	2.39	54.44	73.90	19.4	139	181	
Hori.	4960.000	PK	49.36	31.83	6.46	44.51	2.39	45.53	73.90	28.3	219	37	
Hori.	7440.000	PK	47.18	36.97	8.06	44.08	2.39	50.52	73.90	23.3	150	0	
Vert.	110.759	QP	30.98	11.66	8.16	31.79	0.00	19.01	43.50	24.4	100	11	
Vert.	119.097	QP	31.76	13.06	8.19	31.79	0.00	21.22	43.50	22.2	100	28	
Vert.	182.798	QP	28.18	16.14	8.98	31.77	0.00	21.53	43.50	21.9	100	0	
Vert.	268.665	QP	27.33	12.36	6.49	31.74	0.00	14.44	46.00	31.5	100	213	
Vert.	583.521	QP	32.28	18.90	8.53	31.96	0.00	27.75	46.00	**18.2**	109	301	
Vert.	632.412	QP	25.46	19.36	8.76	32.00	0.00	21.58	46.00	24.4	100	296	
Vert.	2351.982	PK	51.81	27.14	13.97	44.12	2.39	51.19	73.90	22.7	189	224	
Vert.	2483.500	PK	55.22	27.55	14.09	44.16	2.39	55.09	73.90	18.8	166	221	
Vert.	4960.000	PK	49.73	31.83	6.46	44.51	2.39	45.90	73.90	28.0	172	325	
Vert.	7440.000	PK	47.14	36.97	8.06	44.08	2.39	50.48	73.90	23.4	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 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.	2351.982	AV	43.03	27.14	13.97	44.12	3.92	2.39	46.33	53.90	7.6	
Hori.	2483.500	AV	40.38	27.55	14.09	44.16	3.92	2.39	44.17	53.90	9.8	*1)
Hori.	4960.000	AV	40.80	31.83	6.46	44.51	3.92	2.39	40.89	53.90	13.0	
Hori.	7440.000	AV	39.13	36.97	8.06	44.08	3.92	2.39	46.39	53.90	7.5	
Vert.	2351.982	AV	43.44	27.14	13.97	44.12	3.92	2.39	46.74	53.90	**7.2**	
Vert.	2483.500	AV	40.62	27.55	14.09	44.16	3.92	2.39	44.41	53.90	9.5	*1)
Vert.	4960.000	AV	40.81	31.83	6.46	44.51	3.92	2.39	40.90	53.90	13.0	
Vert.	7440.000	AV	39.14	36.97	8.06	44.08	3.92	2.39	46.40	53.90	7.5	

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 (3.95 m / 3.0 m) = 2.39 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.	2480.000	PK	92.60	27.54	14.08	44.16	2.39	92.45	-	-	Carrier
Hori.	2608.006	PK	49.07	27.84	14.20	44.15	2.39	49.35	72.45	23.1	
Hori.	9920.000	PK	38.32	38.98	9.10	43.87	2.39	44.92	72.45	27.5	
Vert.	2480.000	PK	93.25	27.54	14.08	44.16	2.39	93.10	-	-	Carrier
Vert.	2608.006	PK	42.33	27.84	14.20	44.15	2.39	42.61	73.10	30.5	
Vert.	9920.000	PK	38.47	38.98	9.10	43.87	2.39	45.07	73.10	28.0	

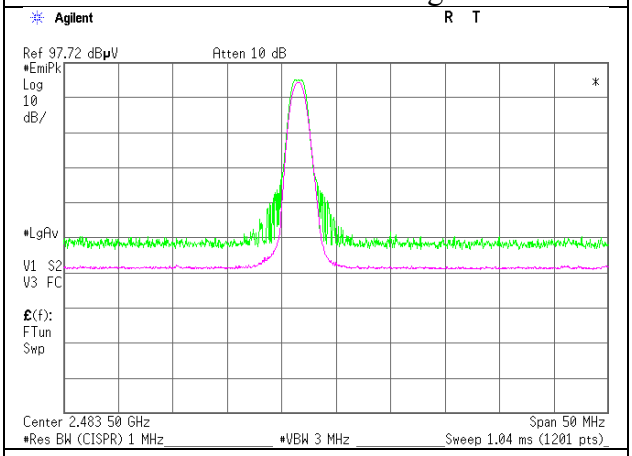
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	11920646S-D-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 14, 2017
Temperature / Humidity	26 deg. C / 30 % RH
Engineer	Shiro Kobayashi
	(1 GHz - 18 GHz)
Mode	Tx BT LE 2480 MHz

Horizontal

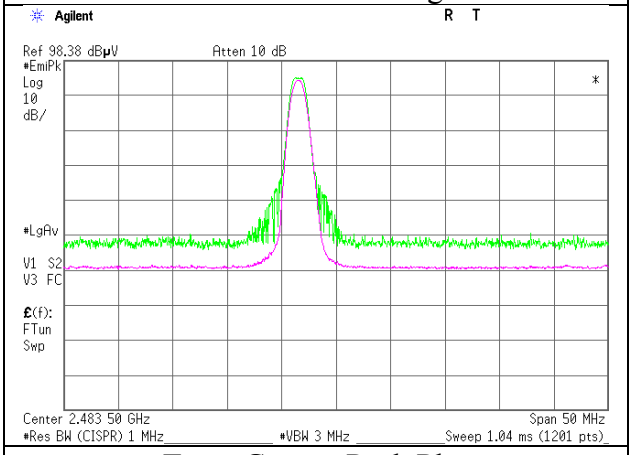
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

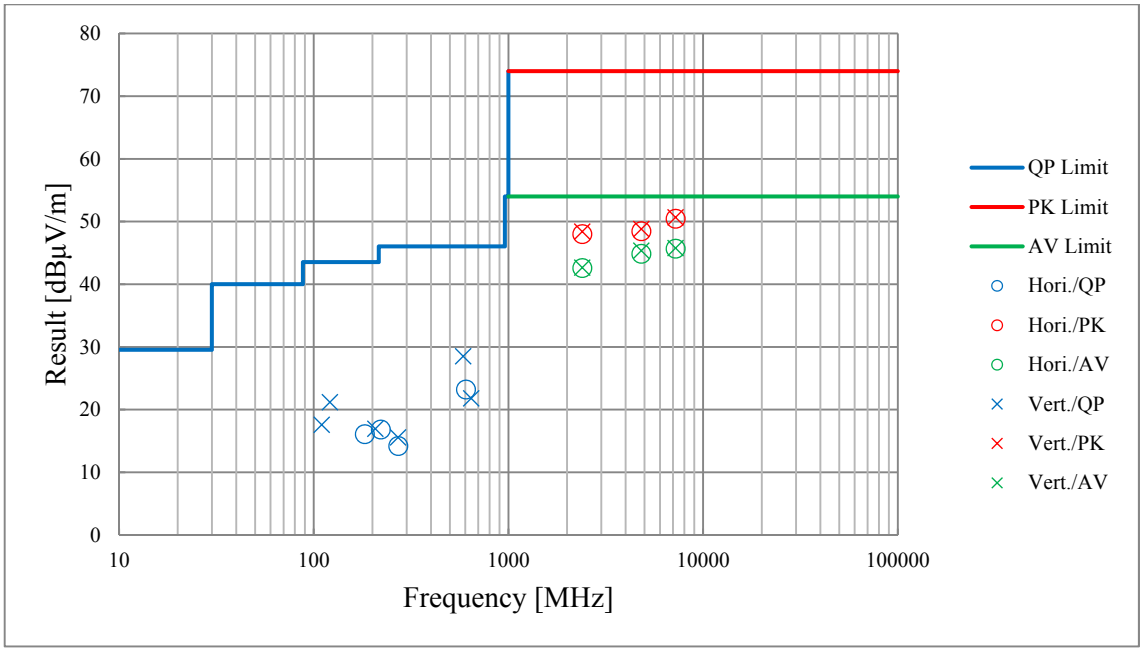


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi (1 GHz - 18 GHz)	Kenichi Adachi (30 MHz – 1000 MHz)	Kazuya Noda (18 GHz – 26.5 GHz)
Mode	Tx BT LE 2440 MHz		



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

Radiated Spurious Emission

Report No.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi	Kenichi Adachi	Kazuya Noda
	(1 GHz - 18 GHz)	(30 MHz – 1000 MHz)	(18 GHz – 26.5 GHz)
Mode	Tx SRD 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.	182.725	QP	22.74	16.14	8.98	31.77	0.00	16.09	43.50	27.4	174	209	
Hori.	220.565	QP	30.98	11.56	6.04	31.75	0.00	16.83	46.00	29.1	146	88	
Hori.	271.332	QP	26.97	12.45	6.52	31.74	0.00	14.20	46.00	31.8	118	134	
Hori.	603.594	QP	27.38	19.17	8.61	31.96	0.00	23.20	46.00	22.8	165	194	
Hori.	2390.000	PK	48.48	27.26	14.00	44.13	2.39	48.00	73.90	25.9	196	295	
Hori.	4804.000	PK	52.78	31.40	6.34	44.45	2.39	48.46	73.90	25.4	147	332	
Hori.	7206.000	PK	47.67	36.56	7.82	43.99	2.39	50.45	73.90	23.4	150	0	
Vert.	109.823	QP	29.69	11.51	8.16	31.79	0.00	17.57	43.50	25.9	100	11	
Vert.	120.895	QP	31.48	13.26	8.22	31.79	0.00	21.17	43.50	22.3	100	13	
Vert.	206.726	QP	31.28	11.50	5.91	31.76	0.00	16.93	43.50	26.5	100	303	
Vert.	270.692	QP	28.36	12.43	6.51	31.74	0.00	15.56	46.00	30.4	158	204	
Vert.	585.161	QP	32.98	18.93	8.54	31.96	0.00	28.49	46.00	**17.5**	100	291	
Vert.	642.363	QP	25.57	19.43	8.80	32.01	0.00	21.79	46.00	24.2	100	89	
Vert.	2390.000	PK	48.86	27.26	14.00	44.13	2.39	48.38	73.90	25.5	220	140	
Vert.	4804.000	PK	53.12	31.40	6.34	44.45	2.39	48.80	73.90	25.1	157	95	
Vert.	7206.000	PK	47.87	36.56	7.82	43.99	2.39	50.65	73.90	23.2	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 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	39.23	27.26	14.00	44.13	3.85	2.39	42.60	53.90	11.3	*1)
Hori.	4804.000	AV	45.32	31.40	6.34	44.45	3.85	2.39	44.85	53.90	9.1	
Hori.	7206.000	AV	39.06	36.56	7.82	43.99	3.85	2.39	45.69	53.90	**8.2**	
Vert.	2390.000	AV	39.28	27.26	14.00	44.13	3.85	2.39	42.65	53.90	11.3	*1)
Vert.	4804.000	AV	45.82	31.40	6.34	44.45	3.85	2.39	45.35	53.90	8.6	
Vert.	7206.000	AV	39.12	36.56	7.82	43.99	3.85	2.39	45.75	53.90	**8.2**	

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 (3.95 m / 3.0 m) = 2.39 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)**

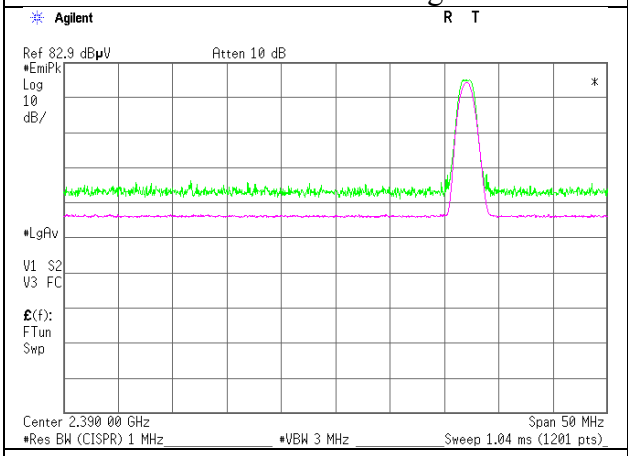
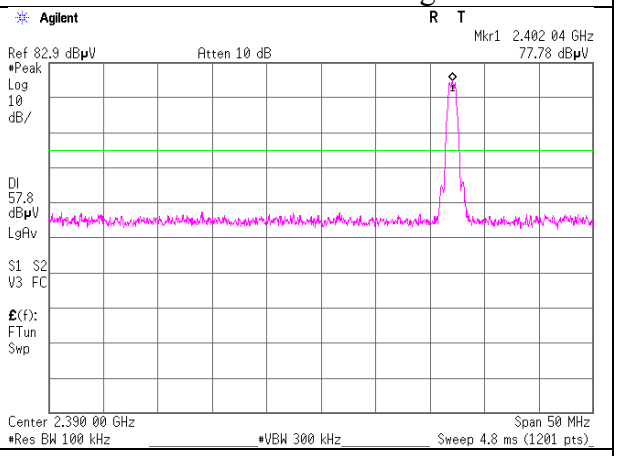
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	77.73	27.29	14.01	44.14	2.39	77.28	-	-	Carrier
Hori.	2400.000	PK	39.27	27.29	14.01	44.14	2.39	38.82	57.28	18.5	
Hori.	9608.000	PK	40.99	38.61	8.80	43.83	2.39	46.96	57.28	10.3	
Vert.	2402.000	PK	80.78	27.29	14.01	44.14	2.39	80.33	-	-	Carrier
Vert.	2400.000	PK	39.53	27.29	14.01	44.14	2.39	39.08	60.33	21.3	
Vert.	9608.000	PK	39.16	38.61	8.80	43.83	2.39	45.13	60.33	15.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

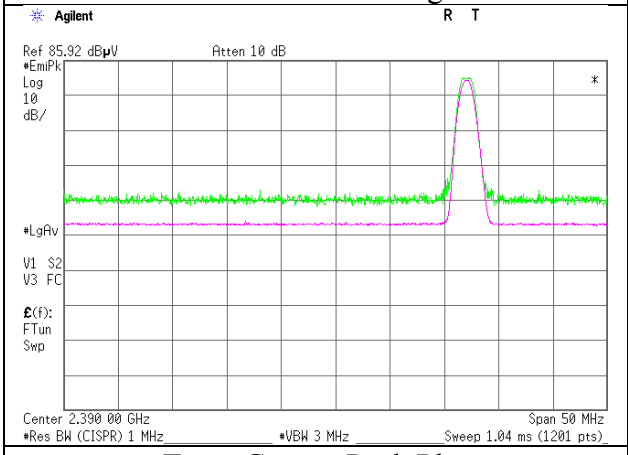
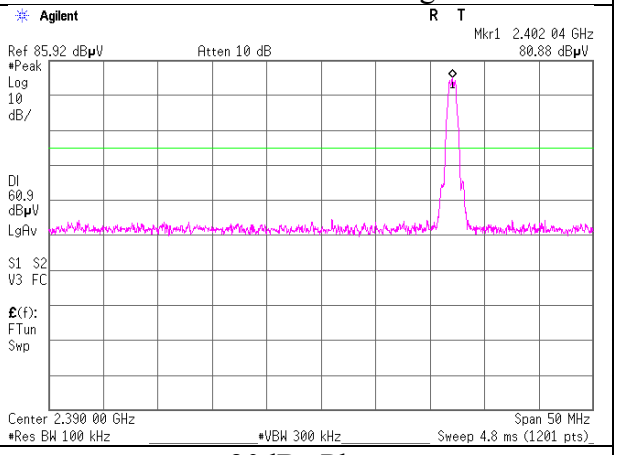
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	11920646S-D-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 14, 2017
Temperature / Humidity	26 deg. C / 30 % RH
Engineer	Shiro Kobayashi (1 GHz - 18 GHz)
Mode	Tx SRD 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.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi	Kenichi Adachi	Kazuya Noda
	(1 GHz - 18 GHz)	(30 MHz – 1000 MHz)	(18 GHz – 26.5 GHz)
Mode	Tx SRD 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.	182.783	QP	22.46	16.14	8.98	31.77	0.00	15.81	43.50	27.6	169	207	
Hori.	220.961	QP	30.32	11.57	6.05	31.75	0.00	16.19	46.00	29.8	144	84	
Hori.	271.344	QP	26.44	12.45	6.52	31.74	0.00	13.67	46.00	32.3	116	137	
Hori.	601.596	QP	27.21	19.16	8.60	31.95	0.00	23.02	46.00	22.9	165	186	
Hori.	4880.000	PK	52.17	31.61	6.40	44.48	2.39	48.09	73.90	25.8	139	13	
Hori.	7320.000	PK	48.37	36.76	7.93	44.03	2.39	51.42	73.90	22.4	150	0	
Vert.	109.796	QP	33.35	11.50	8.16	31.79	0.00	21.22	43.50	22.2	100	13	
Vert.	182.689	QP	25.88	16.14	8.98	31.77	0.00	19.23	43.50	24.2	100	317	
Vert.	208.531	QP	27.47	11.51	5.93	31.76	0.00	13.15	43.50	30.3	100	284	
Vert.	291.579	QP	30.08	13.16	6.70	31.76	0.00	18.18	46.00	27.8	184	236	
Vert.	585.963	QP	34.58	18.94	8.54	31.96	0.00	30.10	46.00	**15.9**	108	99	
Vert.	643.178	QP	26.79	19.43	8.81	32.02	0.00	23.01	46.00	22.9	100	86	
Vert.	4880.000	PK	51.01	31.61	6.40	44.48	2.39	46.93	73.90	26.9	157	90	
Vert.	7320.000	PK	47.89	36.76	7.93	44.03	2.39	50.94	73.90	22.9	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 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	44.82	31.61	6.40	44.48	3.85	2.39	44.59	53.90	9.3	
Hori.	7320.000	AV	38.75	36.76	7.93	44.03	3.85	2.39	45.65	53.90	8.3	
Vert.	4880.000	AV	43.91	31.61	6.40	44.48	3.85	2.39	43.68	53.90	10.2	
Vert.	7320.000	AV	39.15	36.76	7.93	44.03	3.85	2.39	46.05	53.90	**7.9**	

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 (3.95 m / 3.0 m) = 2.39 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.	2440.000	PK	78.58	27.41	14.05	44.15	2.39	78.28	-	-	Carrier
Hori.	9760.000	PK	39.28	38.79	8.95	43.85	2.39	45.56	58.28	12.7	
Vert.	2440.000	PK	78.25	27.41	14.05	44.15	2.39	77.95	-	-	Carrier
Vert.	9760.000	PK	39.27	38.79	8.95	43.85	2.39	45.55	57.95	12.4	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi	Kenichi Adachi	Kazuya Noda
	(1 GHz - 18 GHz)	(30 MHz – 1000 MHz)	(18 GHz – 26.5 GHz)
Mode	Tx SRD 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.	183.605	QP	22.45	16.18	8.98	31.77	0.00	15.84	43.50	27.6	179	201	
Hori.	220.342	QP	29.78	11.56	6.04	31.75	0.00	15.63	46.00	30.3	144	79	
Hori.	246.875	QP	26.24	11.69	6.29	31.73	0.00	12.49	46.00	33.5	124	138	
Hori.	586.789	QP	27.14	18.95	8.54	31.96	0.00	22.67	46.00	23.3	162	189	
Hori.	2483.500	PK	48.68	27.55	14.09	44.16	2.39	48.55	73.90	25.3	206	198	
Hori.	4960.000	PK	51.87	31.83	6.46	44.51	2.39	48.04	73.90	25.8	100	140	
Hori.	7440.000	PK	48.24	36.97	8.06	44.08	2.39	51.58	73.90	22.3	150	0	
Vert.	108.882	QP	33.69	11.35	8.17	31.79	0.00	21.42	43.50	22.0	100	9	
Vert.	181.781	QP	26.26	16.11	8.98	31.77	0.00	19.58	43.50	23.9	100	353	
Vert.	218.675	QP	32.11	11.56	6.03	31.75	0.00	17.95	46.00	28.0	100	345	
Vert.	250.975	QP	27.62	11.73	6.33	31.73	0.00	13.95	46.00	32.0	100	212	
Vert.	585.879	QP	33.68	18.94	8.54	31.96	0.00	29.20	46.00	**16.8**	100	294	
Vert.	636.635	QP	26.69	19.39	8.78	32.01	0.00	22.85	46.00	23.1	100	287	
Vert.	2483.500	PK	48.06	27.55	14.09	44.16	2.39	47.93	73.90	25.9	230	161	
Vert.	4960.000	PK	51.48	31.83	6.46	44.51	2.39	47.65	73.90	26.2	171	53	
Vert.	7440.000	PK	48.08	36.97	8.06	44.08	2.39	51.42	73.90	22.4	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 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	39.35	27.55	14.09	44.16	3.85	2.39	43.07	53.90	10.8	*1)
Hori.	4960.000	AV	44.27	31.83	6.46	44.51	3.85	2.39	44.29	53.90	9.6	
Hori.	7440.000	AV	38.96	36.97	8.06	44.08	3.85	2.39	46.15	53.90	7.8	
Vert.	2483.500	AV	39.17	27.55	14.09	44.16	3.85	2.39	42.89	53.90	11.0	*1)
Vert.	4960.000	AV	43.20	31.83	6.46	44.51	3.85	2.39	43.22	53.90	10.7	
Vert.	7440.000	AV	39.03	36.97	8.06	44.08	3.85	2.39	46.22	53.90	**7.7**	

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 (3.95 m / 3.0 m) = 2.39 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.	2480.000	PK	79.98	27.54	14.08	44.16	2.39	79.83	-	-	Carrier
Hori.	9920.000	PK	38.52	38.98	9.10	43.87	2.39	45.12	59.83	14.7	
Vert.	2480.000	PK	78.10	27.54	14.08	44.16	2.39	77.95	-	-	Carrier
Vert.	9920.000	PK	38.40	38.98	9.10	43.87	2.39	45.00	57.95	13.0	

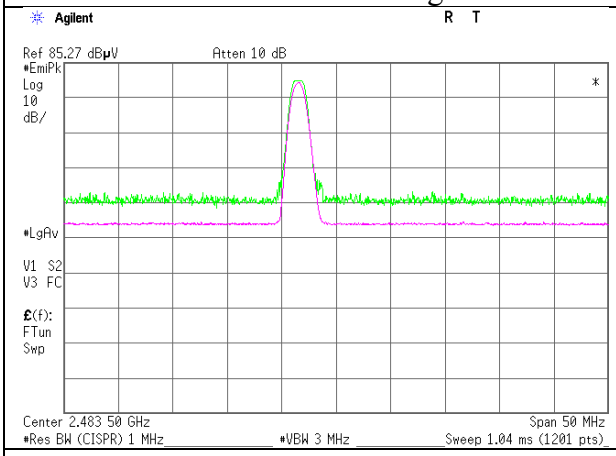
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	11920646S-D-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 14, 2017
Temperature / Humidity	26 deg. C / 30 % RH
Engineer	Shiro Kobayashi (1 GHz - 18 GHz)
Mode	Tx SRD 2480 MHz

Horizontal

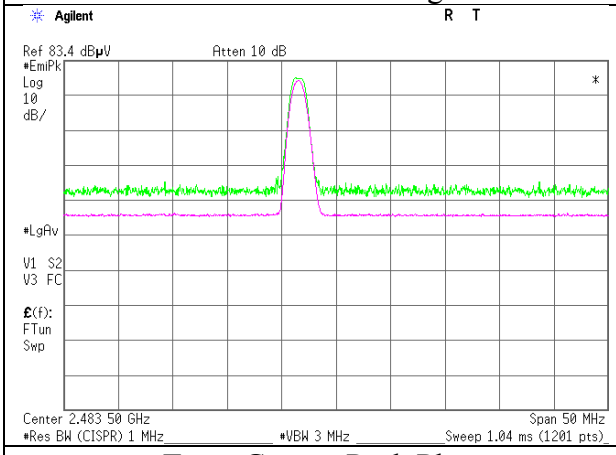
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

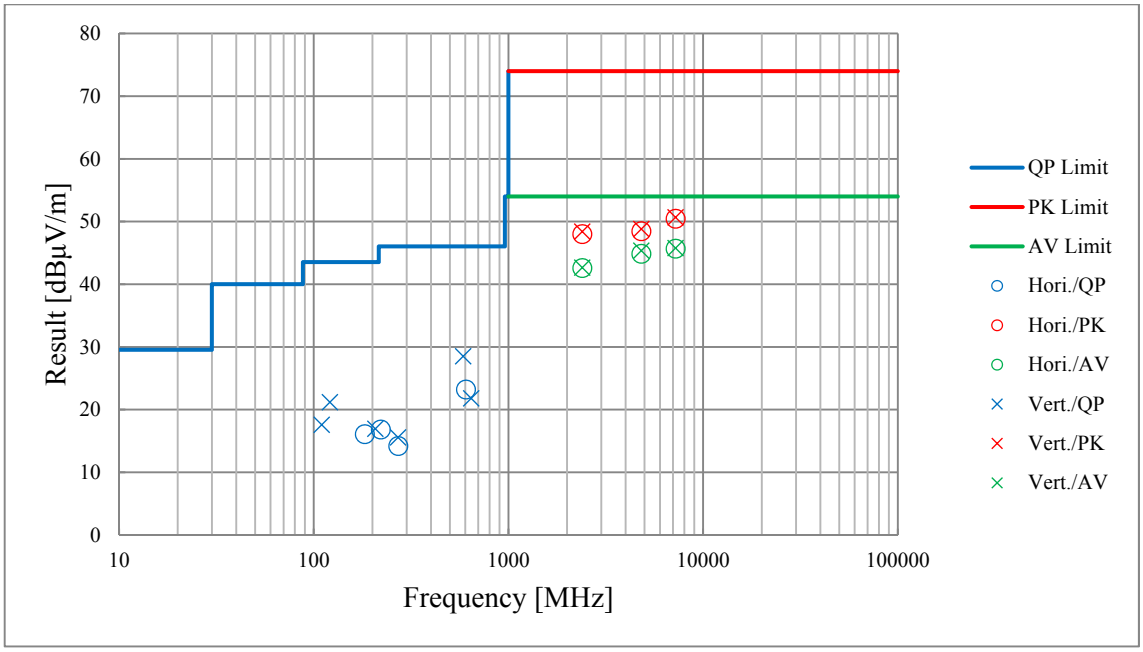


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	11920646S-D-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.3
Date	December 14, 2017	December 17, 2017	December 23, 2017
Temperature / Humidity	26 deg. C / 30 % RH	25 deg. C / 23 %RH	22 deg. C / 24 %RH
Engineer	Shiro Kobayashi (1 GHz - 18 GHz)	Kenichi Adachi (30 MHz – 1000 MHz)	Kazuya Noda (18 GHz – 26.5 GHz)
Mode	Tx SRD 2402 MHz		

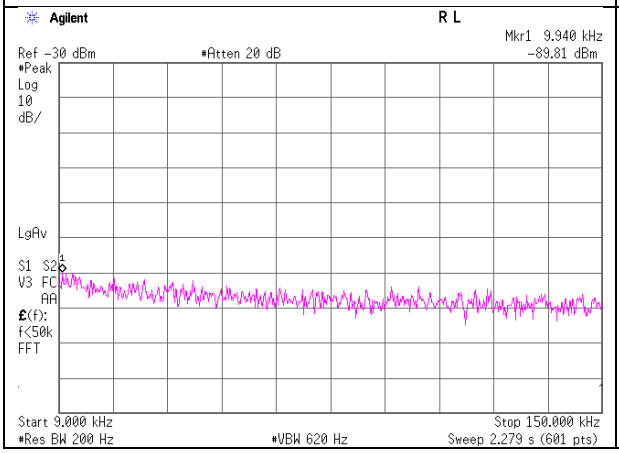


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

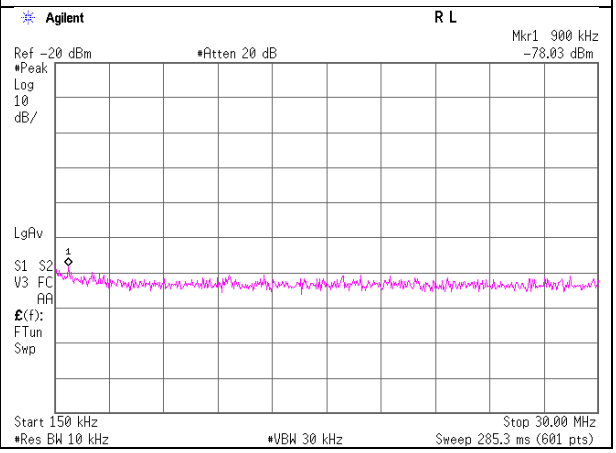
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
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
9.94	-89.8	0.01	9.5	2.0	1	-78.3	300	6.0	-17.0	47.6	64.6	
900.00	-78.0	0.03	9.5	2.0	1	-66.5	30	6.0	14.8	28.5	13.7	

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)

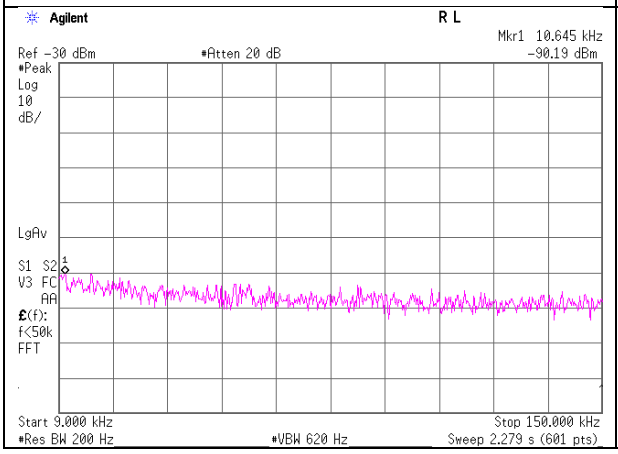
N: Number of output

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

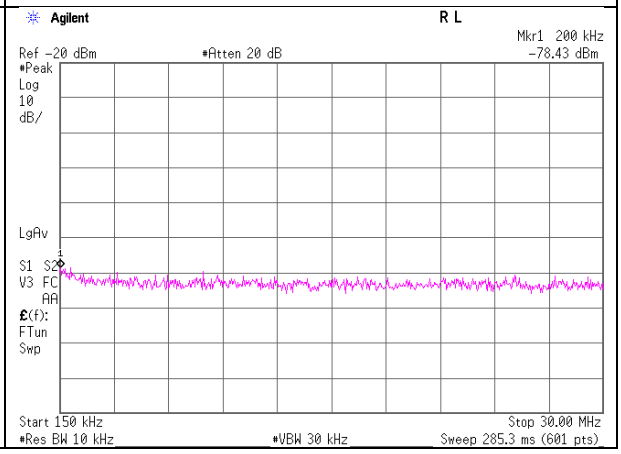
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
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
10.65	-90.2	0.01	9.5	2.0	1	-78.6	300	6.0	-17.4	47.0	64.4	
200.00	-78.4	0.02	9.5	2.0	1	-66.9	300	6.0	-5.6	21.5	27.1	

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)

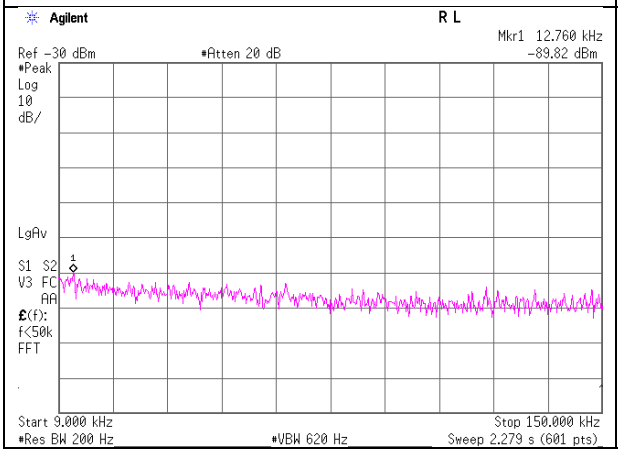
N: Number of output

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

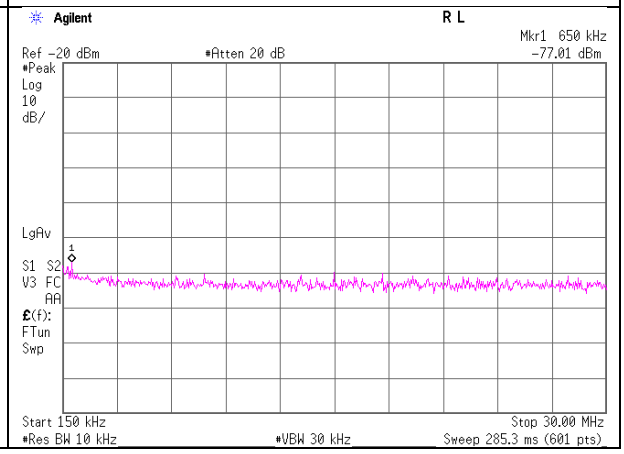
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
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
12.76	-89.8	0.01	9.5	2.0	1	-78.3	300	6.0	-17.0	45.4	62.4	
650.00	-77.0	0.02	9.5	2.0	1	-65.5	30	6.0	15.8	31.3	15.5	

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)

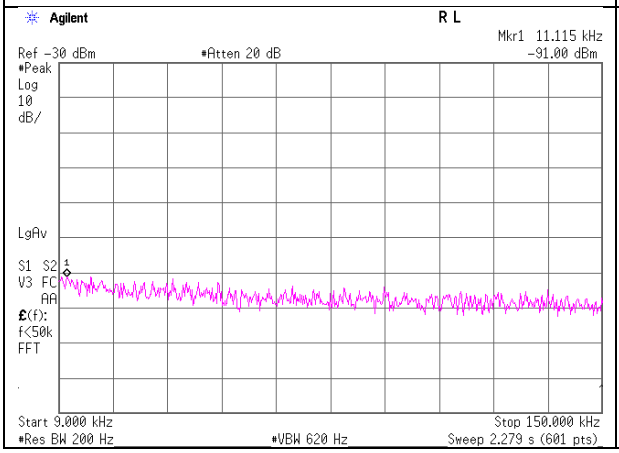
N: Number of output

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

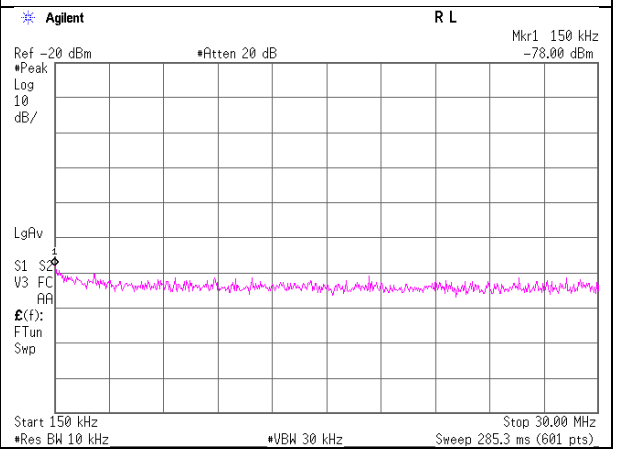
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx SRD 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
11.12	-91.0	0.01	9.5	2.9	1	-78.6	300	6.0	-17.3	46.6	63.9	
150.00	-78.0	0.02	9.5	2.9	1	-65.6	300	6.0	-4.3	24.0	28.3	

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

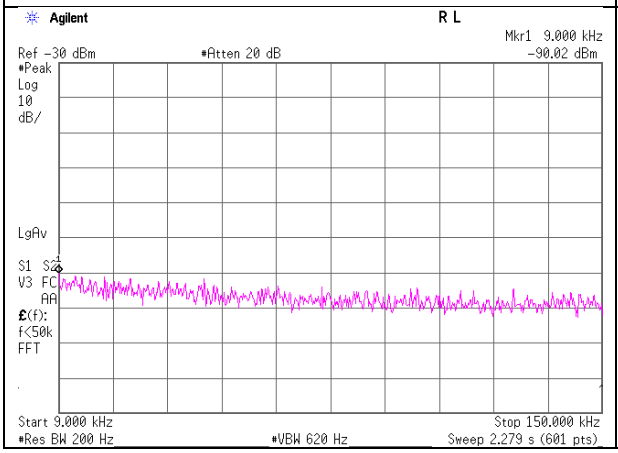
EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

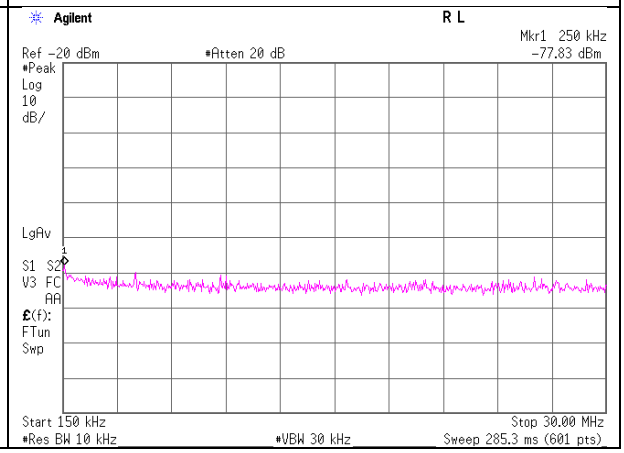
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx SRD 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
9.00	-90.0	0.01	9.5	2.9	1	-77.6	300	6.0	-16.3	48.5	64.8	
250.00	-77.8	0.02	9.5	2.9	1	-65.4	300	6.0	-4.1	19.6	23.7	

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

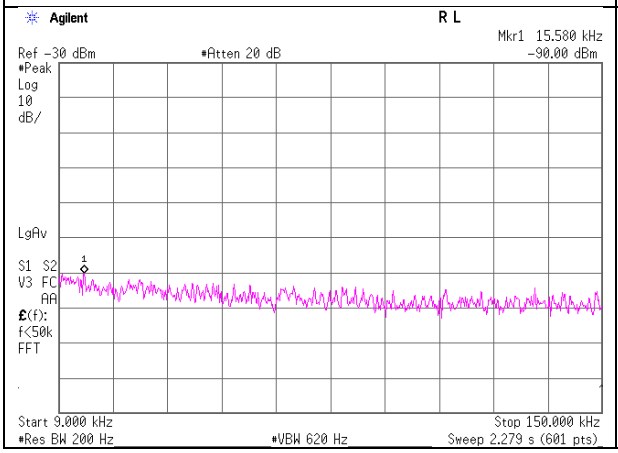
EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

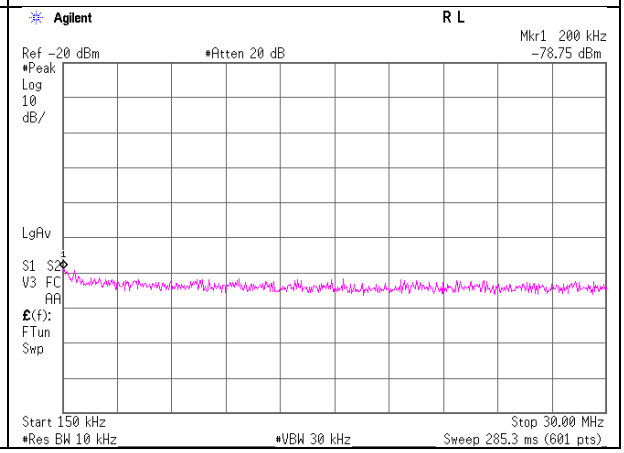
Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx SRD 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
15.58	-90.0	0.01	9.5	2.9	1	-77.6	300	6.0	-16.3	43.7	60.0	
200.00	-78.8	0.02	9.5	2.9	1	-66.3	300	6.0	-5.0	21.5	26.5	

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

Power Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx BT LE

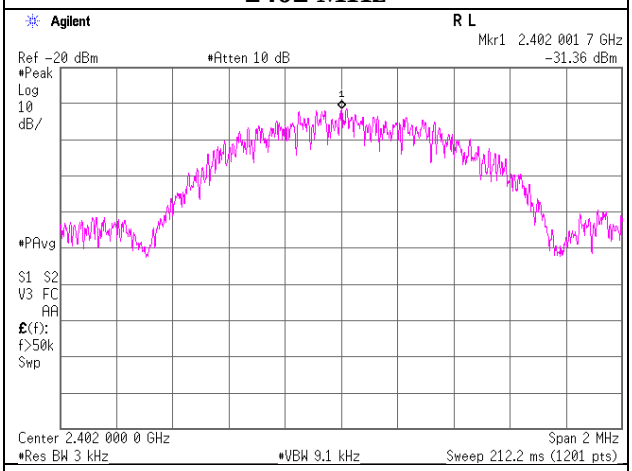
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-31.36	2.02	9.68	-19.66	8.00	27.66
2440.00	-31.41	2.03	9.67	-19.71	8.00	27.71
2480.00	-31.89	2.04	9.67	-20.18	8.00	28.18

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

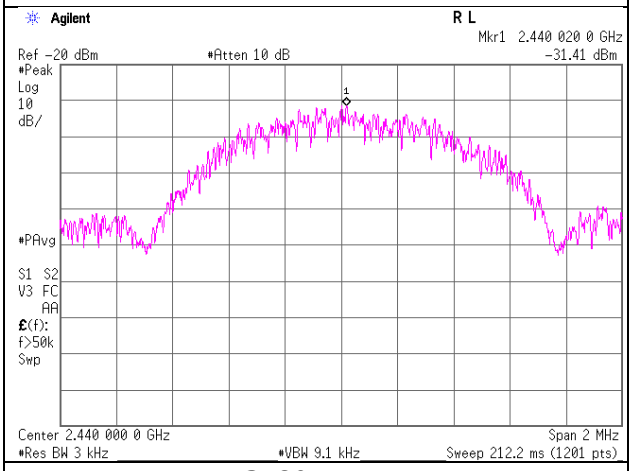
Power Density

BTLE

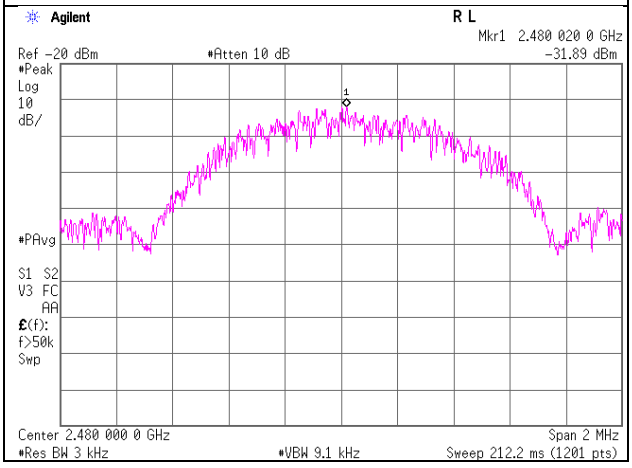
2402 MHz



2440 MHz



2480 MHz



Power Density

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11920646S-D-R2
Date	December 6, 2017
Temperature / Humidity	20 deg. C / 37 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx SRD

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-33.77	2.02	0.00	-31.75	8.00	39.75
2440.00	-34.23	2.03	0.00	-32.20	8.00	40.20
2480.00	-34.99	2.04	0.00	-32.95	8.00	40.95

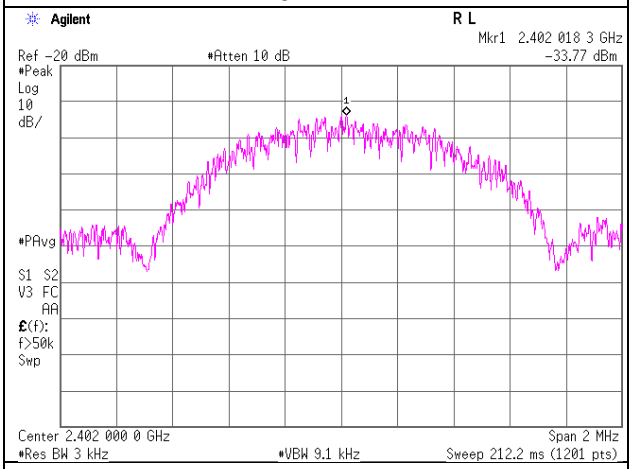
Sample Calculation:

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

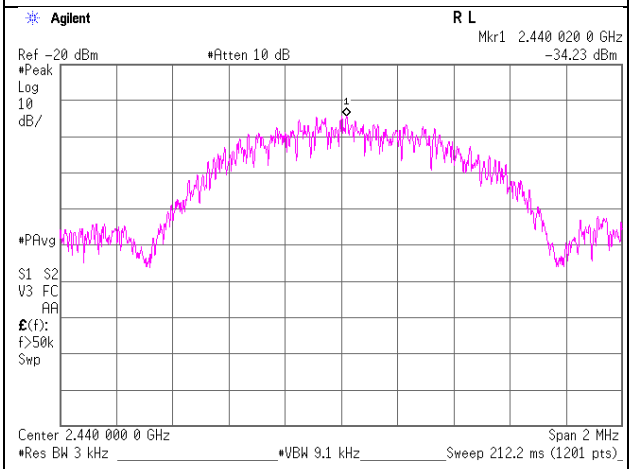
Power Density

SRD

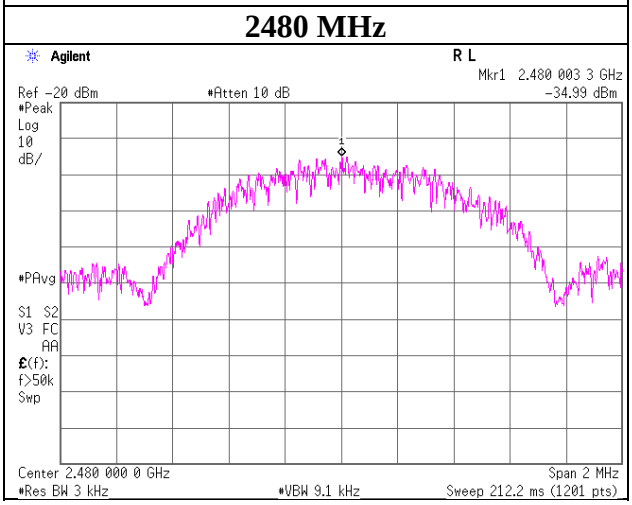
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test instruments

Test Instruments (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2017/09/22 * 12
SCC-G07	Coaxial Cable	Junkosha	J12J103316-00-R	OCT-12-17-054	RE	2017/10/23 * 12
SCC-G43	Coaxial Cable	HUBER+SUHNER	SUCOFLEX_104 E	SN MY 13406/4E	RE	2017/07/10 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-01000 NFSNMS/B	1612S006	RE	2017/01/08 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2017/08/23 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2017/03/07 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2017/07/17 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE, CE,RFI,MF)	-	RE,CE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2017/10/16 * 12
SAT10-05	Attenuator(above1 GHz)	Agilent	8493C-010	74864	RE	2017/11/22 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2017/11/16 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2017/06/09 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2017/10/21 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2017/12/14 * 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	2017/04/07 * 12
SLA-05	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	193	RE	2017/12/10 * 12
SAT3-09	Attenuator	JFW	50HF-003N	-	RE	2017/08/24 * 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	2017/04/07 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2017/02/09 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE, CE	2017/04/12 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2017/10/30 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2017/10/16 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2017/03/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000 KMSKMS	-	RE	2017/04/20 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM9861	RE	2017/07/11 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2017/03/17 * 12

Test Instruments (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-A12/A13/SRSE-01	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-269(RF Selector)	CE	2017/04/07 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2017/02/10 * 12
SAT3-07	Attenuator	JFW	50HF-003N	-	CE	2017/09/08 * 12
SOS-15	Humidity Indicator	A&D	AD-5681	7478311	CE	2017/02/21 * 12
KJM-09	Measure	KOMELON	KMC-36	-	CE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	CE	2017/10/16 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	AT	2017/10/12 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2017/05/01 * 12
SPSS-05	Power sensor	Agilent	N1923A	MY5349008	AT	2017/05/01 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2017/03/23 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2017/11/22 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2016/12/13 * 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:

CE: Conducted emission,
RE: Radiated emission,
AT: Antenna terminal disturbance voltage