



RADIO TEST REPORT

Test Report No. : 11765859S-A-R1

Applicant : SEIKO EPSON CORPORATION
Type of Equipment : GPS Sports Monitor
Model No. : J-367
FCC ID : BKMAP011
Test regulation : FCC Part 15 Subpart C: 2017
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 11765859S-A.

Date of test: July 11 to 13, 2017

Representative test engineer:

Hikaru Shirasawa
Engineer
Consumer Technology Division

Approved by:

Shinichi Takano
Engineer
Consumer Technology Division



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

UL Japan, Inc.

Shonan EMC Lab.

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13-EM-F0429

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SECTION 1: Customer information

Company Name	:	SEIKO EPSON CORPORATION
Address	:	3-3-5 Owa, Suwa-shi, Nagano-ken, 392-8502, Japan
Telephone Number	:	+81-263-52-4335
Facsimile Number	:	+81-263-53-3702
Contact Person	:	Yoshinobu Murakami

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

2.1 Identification of E.U.T.

Type of Equipment	:	GPS Sports Monitor
Model No.	:	J-367
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.7 V
Receipt Date of Sample	:	June 30, 2017
Country of Mass-production	:	China
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: J-367 (referred to as the EUT in this report) is a GPS Sports Monitor.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Power Supply (radio part input)	:	DC 3.1 V
Antenna type	:	2.4 GHz Helical Monopole
Antenna Gain	:	1.5 dBi
Clock frequency (Maximum)	:	32 kHz, 32 MHz, 48 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on June 14, 2017 and effective July 14, 2017

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 June 14, 2017, 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	17.5 dB, 0.15000 MHz, N, QP, Tx 2402 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: Section 15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	5.3 dB 9608.00 MHz, AV, Horizontal, Tx 2402 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 3.1 V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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3.3 Addition to standard

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

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.
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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	2.6 dB	2.5 dB	2.6 dB	2.5 dB	2.5 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB	-	-
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB	-	-
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB	-	-
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB	-	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.6 dB	4.6 dB	4.6 dB	-	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.72 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.85 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.91 dB
Spurious emission (Conducted) below 1GHz	1.6 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.3 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.2 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 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

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Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401
JAB Accreditation No. RTL02610

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

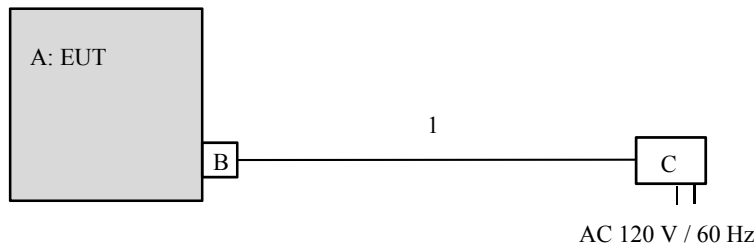
Refer to APPENDIX.

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

4.1 Operating Mode(s)

Test	Operating Mode	Tested frequency
All items	Bluetooth Low Energy	2402 MHz, 2440 MHz 2480 MHz
*Transmitting duty was 100 % on all tests. *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel) *Power of the EUT was set by the software as follows; Power settings: Fixed Software (Firmware): Version 0.82 *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	GPS Sports Monitor	J-367	ES000 00021 *1) ES000 00029 *2)	SEIKO EPSON	EUT
B	Clip	-	ES002 00110	SEIKO EPSON	-
C	SWITCH-MODE POWER SUPPLY	6A-052WU05B	-	TOKI Trading	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

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

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a 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 80 cm 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.

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, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 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	Average Power Method: RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces If duty cycle was less than 98%, a duty factor was added to the results.	RBW: 100 kHz VBW: 300kHz
Test Distance	3 m	3.97 m *2) (1 GHz – 13 GHz), 1 m *3) (13 GHz – 26.5 GHz)		3.97 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: $20 \times \log(3.97 \text{ m} / 3.0 \text{ m}) = 2.44 \text{ dB}$

*3) Distance Factor: $20 \times \log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

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The carrier levels and noise levels were confirmed with and without clip (power supply) / at each position of X, Y and Z axes to see the position of maximum noise, and the test was made under the condition that has the maximum noise.

Antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (1 GHz -13 GHz)	Spurious (13 GHz -26.5 GHz)
Horizontal	X (with Clip)	X (with Clip)	X (with Clip)	X (with Clip)
Vertical	Y (with Clip)	X (with Clip)	Y (with Clip)	X (with Clip)

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	20 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) *4)
Conducted Spurious Emission *5)	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) The test was not performed at RBW:3 kHz however the measurement is to be performed with RBW:3kHz in the regulation, because, the measurement value with RBW:3 kHz is less than the value of RBW:30 kHz and the test data met the limit with RBW:30 kHz.

*5) 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

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APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2017/07/13

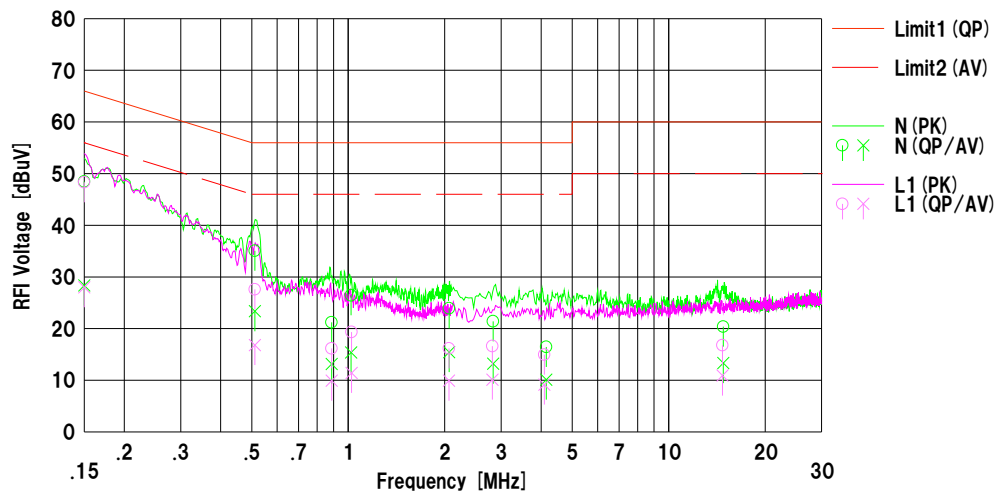
Mode : BLE Tx 2402 MHz

Power : AC 120 V / 60 Hz
Temp./Humi. : 21 deg.C / 77 %RH

Remarks : -

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

Engineer : Hikaru Shirasawa



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	35.96	15.81	12.54	48.50	28.35	66.00	56.00	17.5	27.6	N	
2	0.51140	22.49	10.78	12.58	35.07	23.36	56.00	46.00	20.9	22.6	N	
3	0.88796	8.58	0.51	12.64	21.22	13.15	56.00	46.00	34.7	32.8	N	
4	1.02079	13.80	2.76	12.63	26.43	15.39	56.00	46.00	29.5	30.6	N	
5	2.06541	11.18	2.71	12.74	23.92	15.45	56.00	46.00	32.0	30.5	N	
6	2.83185	8.59	0.38	12.82	21.41	13.20	56.00	46.00	34.5	32.8	N	
7	4.15237	3.45	-2.89	13.00	16.45	10.11	56.00	46.00	39.5	35.8	N	
8	14.80840	5.92	-1.14	14.46	20.38	13.32	60.00	50.00	39.6	36.6	N	
9	0.15000	35.77	15.44	12.54	48.31	27.99	66.00	56.00	17.6	28.0	L1	
10	0.51116	15.01	4.22	12.58	27.59	16.80	56.00	46.00	28.4	29.2	L1	
11	0.88796	3.52	-2.72	12.64	16.16	9.92	56.00	46.00	39.8	36.0	L1	
12	1.02469	6.71	-1.20	12.63	19.34	11.43	56.00	46.00	36.6	34.5	L1	
13	2.06221	3.42	-2.82	12.74	16.16	9.92	56.00	46.00	39.8	36.0	L1	
14	2.81905	3.79	-2.72	12.82	16.61	10.10	56.00	46.00	39.3	35.9	L1	
15	4.09243	1.95	-3.83	12.99	14.94	9.18	56.00	46.00	41.0	36.8	L1	
16	14.72150	2.35	-3.53	14.44	16.79	10.91	60.00	50.00	43.2	39.0	L1	

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

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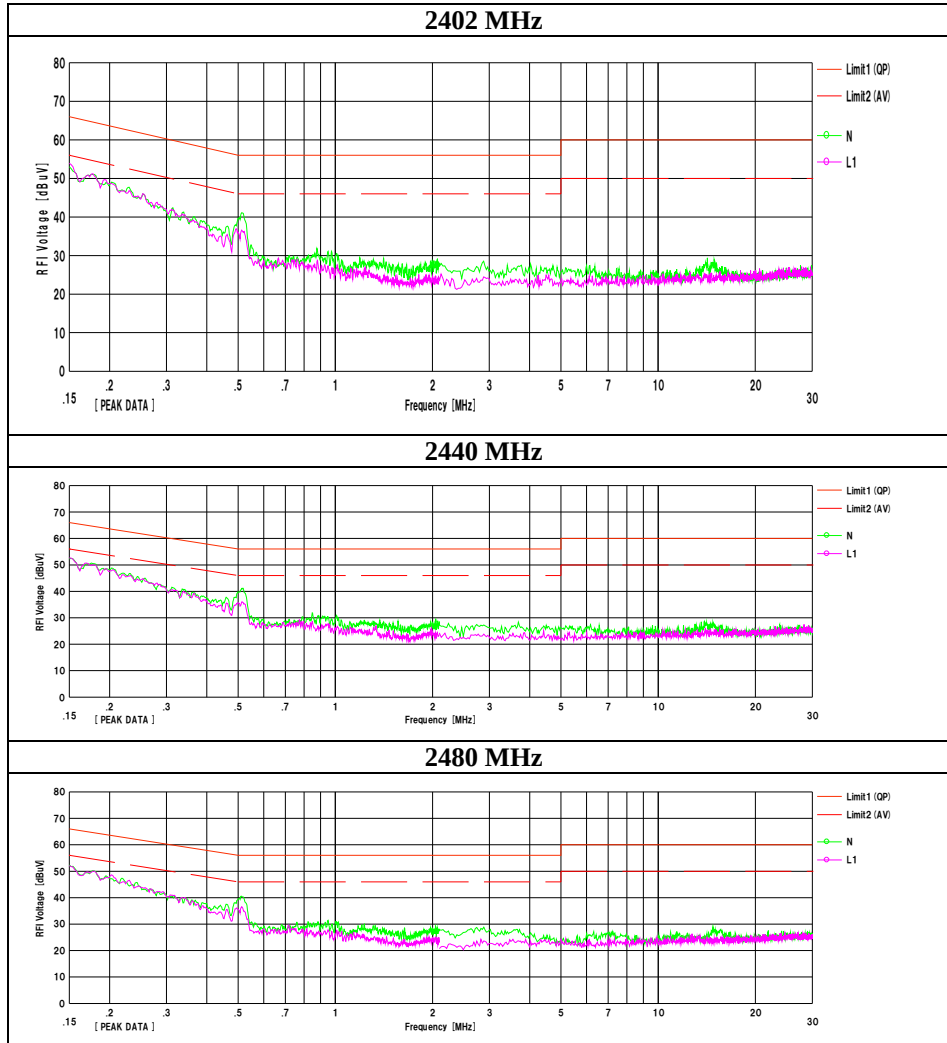
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Conducted Emission

Test place : Shonan EMC Lab. No.3 Shielded Room
Report No. : 11765859S-A-R1
Date : July 13, 2017
Temperature / Humidity : 21 deg. C / 77 % RH
Engineer : Hikaru Shirasawa
Mode : Tx BT LE



6dB Bandwidth

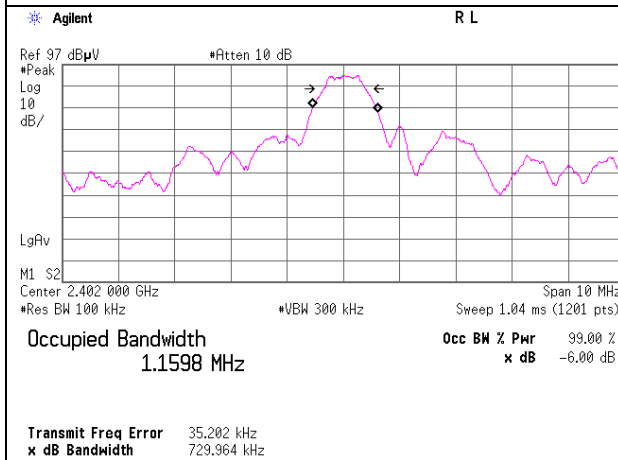
Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11765859S-A-R1
Date July 13, 2017
Temperature / Humidity 25 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx

Mode	Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
BT LE	2402	0.730	> 500
	2440	0.717	> 500
	2480	0.706	> 500

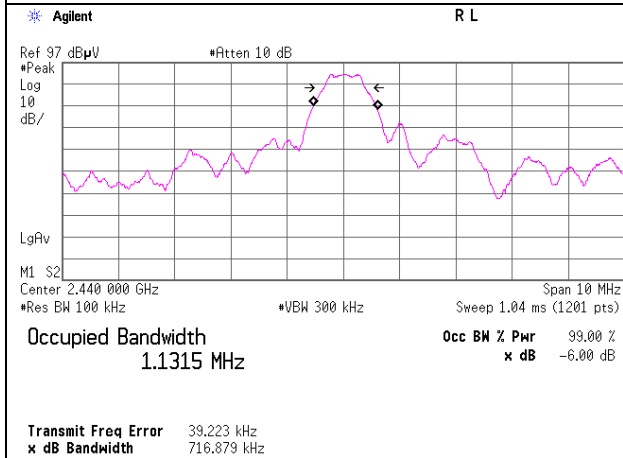
6dB Bandwidth

BT LE

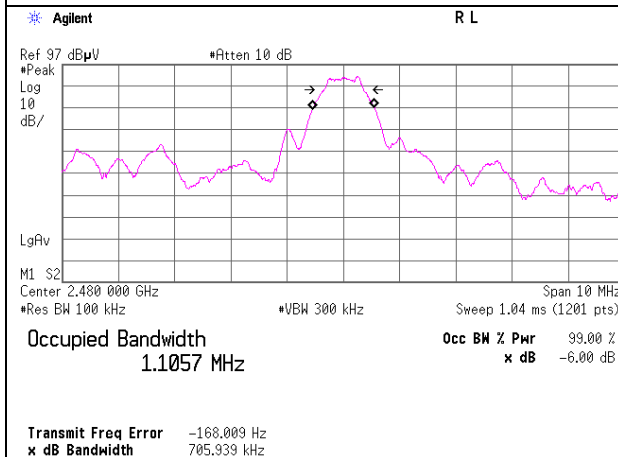
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11765859S-A-R1
Date July 13, 2017
Temperature / Humidity 25 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2402	-13.29	1.13	9.64	-2.52	0.56	30.00	1000	32.52
2440	-13.77	1.14	9.64	-2.99	0.50	30.00	1000	32.99
2480	-13.82	1.15	9.65	-3.02	0.50	30.00	1000	33.02

Sample Calculation:

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

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

Average Output Power
(Reference data for RF Exposure)

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11765859S-A-R1
Date July 13, 2017
Temperature / Humidity 25 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
2402	-14.38	1.13	9.64	-3.61	0.44	0.00	-3.61	0.44
2440	-14.88	1.14	9.64	-4.10	0.39	0.00	-4.10	0.39
2480	-15.44	1.15	9.65	-4.64	0.34	0.00	-4.64	0.34

Sample Calculation:

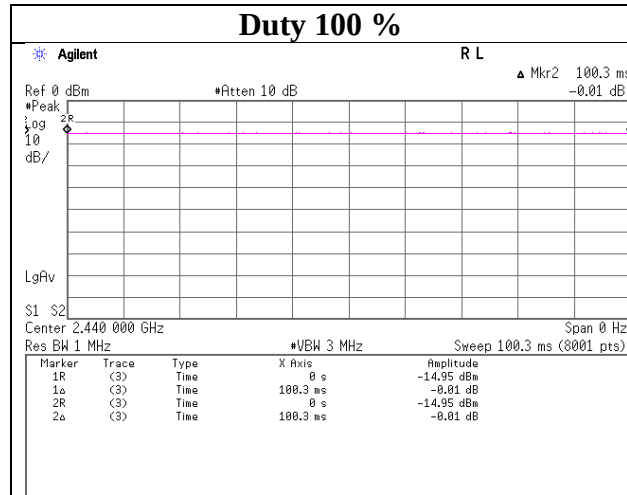
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Result (Burst power average) = Time average + Duty factor

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

Burst rate confirmation

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11765859S-A-R1
Date July 13, 2017
Temperature / Humidity 25 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx BT LE



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

Radiated Spurious Emission

Report No.	11765859S-A-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.3
Date	July 11, 2017	July 13, 2017
Temperature / Humidity	23 deg. C / 57 % RH	21 deg. C / 77 % RH
Engineer	Yosuke Ishikawa	Hikaru Shirasawa
	(30 MHz - 13 GHz)	(13 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.	192.002	QP	27.40	16.25	8.84	31.77	0.00	20.72	43.50	22.7	227	307	
Hori.	288.002	QP	35.80	12.99	6.54	31.68	0.00	23.65	46.00	22.3	116	43	
Hori.	432.001	QP	33.40	16.44	7.54	31.62	0.00	25.76	46.00	20.2	100	222	
Hori.	2390.000	PK	45.30	27.17	14.19	36.83	2.44	52.27	73.90	21.6	168	161	
Hori.	4804.000	PK	49.54	31.13	6.65	36.99	2.44	52.77	73.90	21.1	144	163	
Hori.	4806.056	PK	48.56	31.14	6.65	36.99	2.44	51.80	73.90	22.1	144	163	
Hori.	7206.000	PK	45.94	36.43	8.26	37.81	2.44	55.26	73.90	18.6	150	0	
Hori.	9608.000	PK	45.21	38.28	9.24	38.48	2.44	56.69	73.90	17.2	150	0	
Hori.	2390.000	AV	36.04	27.17	14.19	36.83	2.44	43.01	53.90	10.8	168	161	
Hori.	4804.000	AV	44.37	31.13	6.65	36.99	2.44	47.60	53.90	6.3	144	163	
Hori.	4806.056	AV	43.18	31.14	6.65	36.99	2.44	46.42	53.90	7.4	144	163	
Hori.	7206.000	AV	36.72	36.43	8.26	37.81	2.44	46.04	53.90	7.8	150	0	
Hori.	9608.000	AV	37.11	38.28	9.24	38.48	2.44	48.59	53.90	5.3	150	0	
Vert.	54.474	QP	30.40	9.42	7.23	31.89	0.00	15.16	40.00	24.8	100	105	
Vert.	82.033	QP	30.50	6.64	8.18	31.86	0.00	13.46	40.00	26.5	100	123	
Vert.	105.360	QP	25.90	10.88	7.98	31.84	0.00	12.92	43.50	30.5	100	141	
Vert.	120.908	QP	22.90	13.01	8.03	31.83	0.00	12.11	43.50	31.3	100	185	
Vert.	168.223	QP	23.80	15.65	8.81	31.79	0.00	16.47	43.50	27.0	100	24	
Vert.	192.003	QP	29.20	16.25	8.84	31.77	0.00	22.52	43.50	20.9	100	211	
Vert.	288.001	QP	32.00	12.99	6.54	31.68	0.00	19.85	46.00	26.1	100	146	
Vert.	432.003	QP	28.70	16.44	7.54	31.62	0.00	21.06	46.00	24.9	153	274	
Vert.	2390.000	PK	45.29	27.17	14.19	36.83	2.44	52.26	73.90	21.6	147	186	
Vert.	4804.000	PK	49.30	31.13	6.65	36.99	2.44	52.53	73.90	21.3	171	183	
Vert.	4806.058	PK	48.21	31.14	6.65	36.99	2.44	51.45	73.90	22.4	171	183	
Vert.	7206.000	PK	45.51	36.43	8.26	37.81	2.44	54.83	73.90	19.0	150	0	
Vert.	9608.000	PK	45.86	38.28	9.24	38.48	2.44	57.34	73.90	16.5	150	0	
Vert.	2390.000	AV	36.05	27.17	14.19	36.83	2.44	43.02	53.90	10.8	147	186	
Vert.	4804.000	AV	42.94	31.13	6.65	36.99	2.44	46.17	53.90	7.7	171	183	
Vert.	4806.058	AV	41.74	31.14	6.65	36.99	2.44	44.98	53.90	8.9	171	183	
Vert.	7206.000	AV	35.72	36.43	8.26	37.81	2.44	45.04	53.90	8.8	150	0	
Vert.	9608.000	AV	36.51	38.28	9.24	38.48	2.44	47.99	53.90	5.9	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log (3.97 m / 3.0 m) = 2.44 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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	84.01	27.21	14.20	36.83	2.44	91.03	-	-	Carrier
Hori.	2399.276	PK	52.56	27.20	14.19	36.83	2.44	59.56	71.03	11.5	
Hori.	2400.000	PK	49.95	27.20	14.19	36.83	2.44	56.95	71.03	14.1	
Vert.	2402.000	PK	83.38	27.21	14.20	36.83	2.44	90.40	-	-	
Vert.	2399.282	PK	52.53	27.20	14.19	36.83	2.44	59.53	70.40	10.9	
Vert.	2400.000	PK	50.52	27.20	14.19	36.83	2.44	57.52	70.40	12.9	Carrier

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log (3.97 m / 3.0 m) = 2.44 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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Shonan EMC Lab.

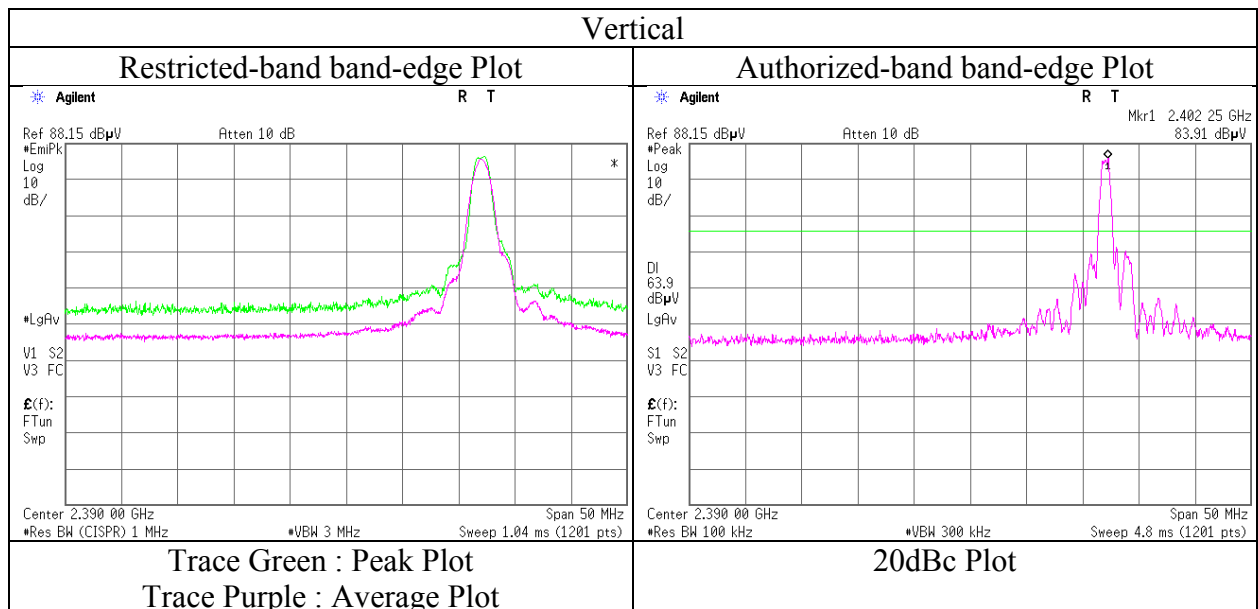
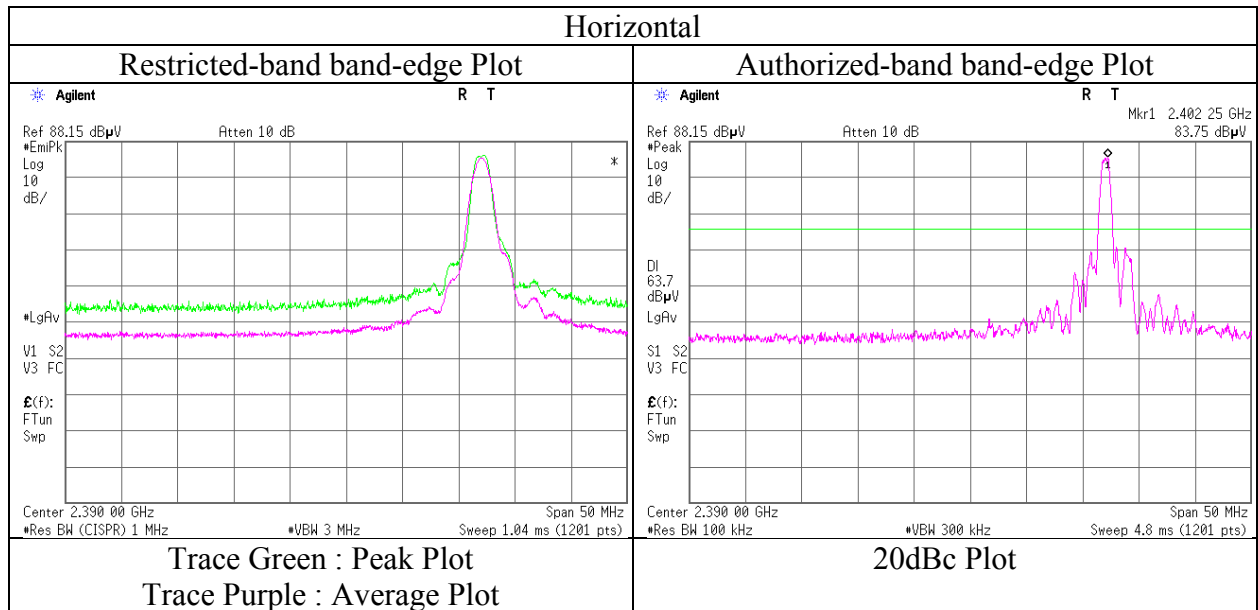
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11765859S-A-R1
Date	July 11, 2017
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
	(30 MHz - 13 GHz)
Mode	Tx BT LE 2402 MHz



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

Radiated Spurious Emission

Report No.	11765859S-A-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.3
Date	July 11, 2017	July 13, 2017
Temperature / Humidity	23 deg. C / 57 % RH	21 deg. C / 77 % RH
Engineer	Yosuke Ishikawa	Hikaru Shirasawa
	(30 MHz - 13 GHz)	(13 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.	192.003	QP	27.30	16.25	8.84	31.77	0.00	20.62	43.50	22.8	185	305	
Hori.	288.001	QP	35.90	12.99	6.54	31.68	0.00	23.75	46.00	22.2	109	49	
Hori.	336.004	QP	28.40	14.26	6.89	31.63	0.00	17.92	46.00	28.0	100	225	
Hori.	432.002	QP	33.20	16.44	7.54	31.62	0.00	25.56	46.00	20.4	100	235	
Hori.	4880.000	PK	47.66	31.29	6.75	37.03	2.44	51.11	73.90	22.7	120	142	
Hori.	4882.064	PK	47.41	31.29	6.75	37.03	2.44	50.86	73.90	23.0	120	142	
Hori.	7320.000	PK	44.57	36.63	8.39	37.88	2.44	54.15	73.90	19.7	150	0	
Hori.	9760.000	PK	44.98	38.52	9.33	38.67	2.44	56.60	73.90	17.3	150	0	
Hori.	4880.000	AV	41.11	31.29	6.75	37.03	2.44	44.56	53.90	9.3	120	142	
Hori.	4882.064	AV	41.21	31.29	6.75	37.03	2.44	44.66	53.90	9.2	120	142	
Hori.	7320.000	AV	36.35	36.63	8.39	37.88	2.44	45.93	53.90	7.9	150	0	
Hori.	9760.000	AV	36.81	38.52	9.33	38.67	2.44	48.43	53.90	5.4	150	0	
Vert.	54.501	QP	29.80	9.42	7.23	31.89	0.00	14.56	40.00	25.4	100	185	
Vert.	82.068	QP	29.90	6.65	8.18	31.86	0.00	12.87	40.00	27.1	100	141	
Vert.	104.915	QP	25.90	10.82	7.99	31.85	0.00	12.86	43.50	30.6	100	123	
Vert.	192.003	QP	28.90	16.25	8.84	31.77	0.00	22.22	43.50	21.2	100	211	
Vert.	288.001	QP	31.80	12.99	6.54	31.68	0.00	19.65	46.00	26.3	117	150	
Vert.	432.002	QP	28.90	16.44	7.54	31.62	0.00	21.26	46.00	24.7	146	268	
Vert.	513.821	QP	21.70	17.95	7.98	31.60	0.00	16.03	46.00	29.9	100	31	
Vert.	4880.000	PK	46.52	31.29	6.75	37.03	2.44	49.97	73.90	23.9	175	183	
Vert.	4882.088	PK	48.11	31.29	6.75	37.03	2.44	51.56	73.90	22.3	175	183	
Vert.	7320.000	PK	45.17	36.63	8.39	37.88	2.44	54.75	73.90	19.1	150	0	
Vert.	9760.000	PK	45.72	38.52	9.33	38.67	2.44	57.34	73.90	16.5	150	0	
Vert.	4880.000	AV	40.52	31.29	6.75	37.03	2.44	43.97	53.90	9.9	175	183	
Vert.	4882.088	AV	41.61	31.29	6.75	37.03	2.44	45.06	53.90	8.8	175	183	
Vert.	7320.000	AV	36.22	36.63	8.39	37.88	2.44	45.80	53.90	8.1	150	0	
Vert.	9760.000	AV	36.12	38.52	9.33	38.67	2.44	47.74	53.90	6.1	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+ (Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.97\text{ m} / 3.0\text{ m}) = 2.44\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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Radiated Spurious Emission

Report No.	11765859S-A-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.3
Date	July 11, 2017	July 13, 2017
Temperature / Humidity	23 deg. C / 57 % RH	21 deg. C / 77 % RH
Engineer	Yosuke Ishikawa	Hikaru Shirasawa
	(30 MHz - 13 GHz)	(13 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.	192.004	QP	27.20	16.25	8.84	31.77	0.00	20.52	43.50	22.9	179	310	
Hori.	288.002	QP	35.80	12.99	6.54	31.68	0.00	23.65	46.00	22.3	122	51	
Hori.	432.002	QP	33.10	16.44	7.54	31.62	0.00	25.46	46.00	20.5	100	240	
Hori.	747.938	QP	21.70	20.35	9.14	31.46	0.00	19.73	46.00	26.2	100	6	
Hori.	2483.500	PK	44.97	27.49	14.29	36.79	2.44	52.40	73.90	21.5	146	162	
Hori.	2484.459	PK	45.68	27.50	14.29	36.79	2.44	53.12	73.90	20.7	146	162	
Hori.	4958.057	PK	47.17	31.45	6.83	37.07	2.44	50.82	73.90	23.0	173	141	
Hori.	4960.000	PK	46.19	31.46	6.83	37.07	2.44	49.85	73.90	24.0	173	141	
Hori.	7440.000	PK	44.56	36.84	8.52	37.95	2.44	54.41	73.90	19.4	150	0	
Hori.	9920.000	PK	45.27	38.76	9.42	38.87	2.44	57.02	73.90	16.8	150	0	
Hori.	2483.500	AV	37.28	27.49	14.29	36.79	2.44	44.71	53.90	9.1	146	162	
Hori.	2484.459	AV	37.82	27.50	14.29	36.79	2.44	45.26	53.90	8.6	146	162	
Hori.	4958.057	AV	40.98	31.45	6.83	37.07	2.44	44.63	53.90	9.2	173	141	
Hori.	4960.000	AV	39.07	31.46	6.83	37.07	2.44	42.73	53.90	11.1	173	141	
Hori.	7440.000	AV	36.11	36.84	8.52	37.95	2.44	45.96	53.90	7.9	150	0	
Hori.	9920.000	AV	36.71	38.76	9.42	38.87	2.44	48.46	53.90	5.4	150	0	
Vert.	54.499	QP	30.50	9.42	7.23	31.89	0.00	15.26	40.00	24.7	100	197	
Vert.	82.128	QP	30.00	6.66	8.18	31.86	0.00	12.98	40.00	27.0	100	124	
Vert.	104.950	QP	25.60	10.82	7.99	31.85	0.00	12.56	43.50	30.9	100	106	
Vert.	154.054	QP	23.30	15.02	8.72	31.80	0.00	15.24	43.50	28.2	100	31	
Vert.	192.002	QP	29.10	16.25	8.84	31.77	0.00	22.42	43.50	21.0	100	222	
Vert.	288.003	QP	31.80	12.99	6.54	31.68	0.00	19.65	46.00	26.3	123	147	
Vert.	432.003	QP	28.60	16.44	7.54	31.62	0.00	20.96	46.00	25.0	146	269	
Vert.	788.824	QP	21.60	20.75	9.32	31.32	0.00	20.35	46.00	25.6	100	11	
Vert.	2483.500	PK	45.39	27.49	14.29	36.79	2.44	52.82	73.90	21.0	167	182	
Vert.	2483.500	PK	45.93	27.49	14.29	36.79	2.44	53.36	73.90	20.5	167	182	
Vert.	4958.039	PK	47.01	31.45	6.83	37.07	2.44	50.66	73.90	23.2	202	176	
Vert.	4960.000	PK	45.99	31.46	6.83	37.07	2.44	49.65	73.90	24.2	202	176	
Vert.	7440.000	PK	44.48	36.84	8.52	37.95	2.44	54.33	73.90	19.5	150	0	
Vert.	9920.000	PK	45.01	38.76	9.42	38.87	2.44	56.76	73.90	17.1	150	0	
Vert.	2483.500	AV	37.25	27.49	14.29	36.79	2.44	44.68	53.90	9.2	167	182	
Vert.	2483.500	AV	37.59	27.49	14.29	36.79	2.44	45.02	53.90	8.8	167	182	
Vert.	4958.039	AV	41.69	31.45	6.83	37.07	2.44	45.34	53.90	8.5	202	176	
Vert.	4960.000	AV	38.83	31.46	6.83	37.07	2.44	42.49	53.90	11.4	202	176	
Vert.	7440.000	AV	36.01	36.84	8.52	37.95	2.44	45.86	53.90	8.0	150	0	
Vert.	9920.000	AV	36.55	38.76	9.42	38.87	2.44	48.30	53.90	5.6	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log (3.97 m / 3.0 m) = 2.44 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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Shonan EMC Lab.

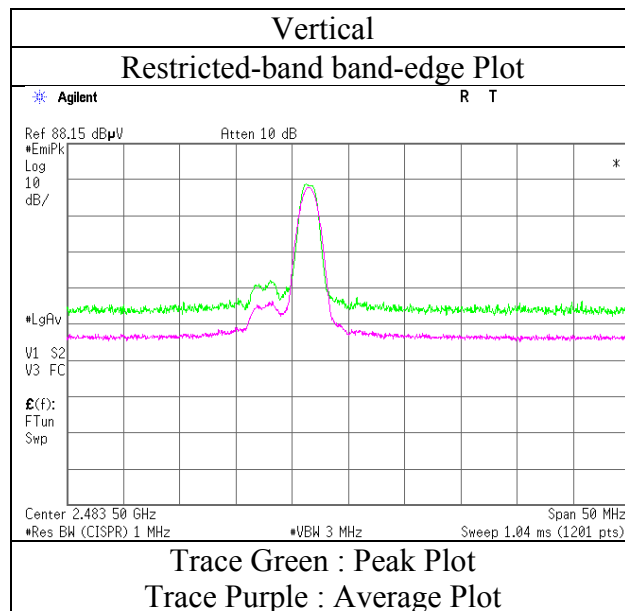
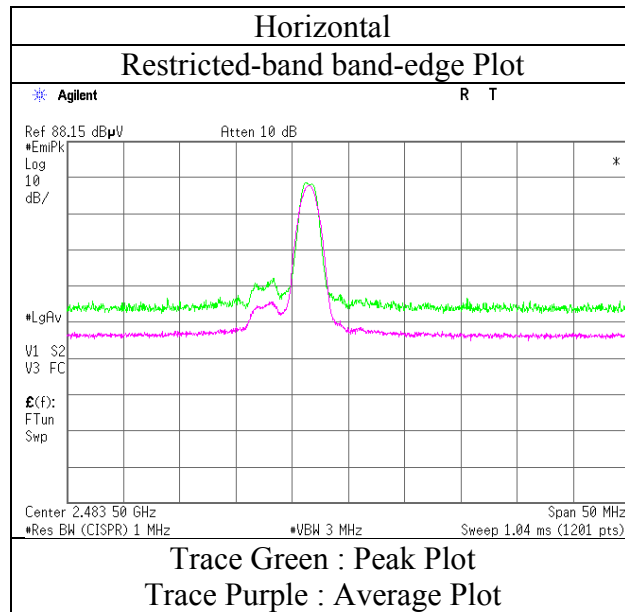
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission **(Reference Plot for band-edge)**

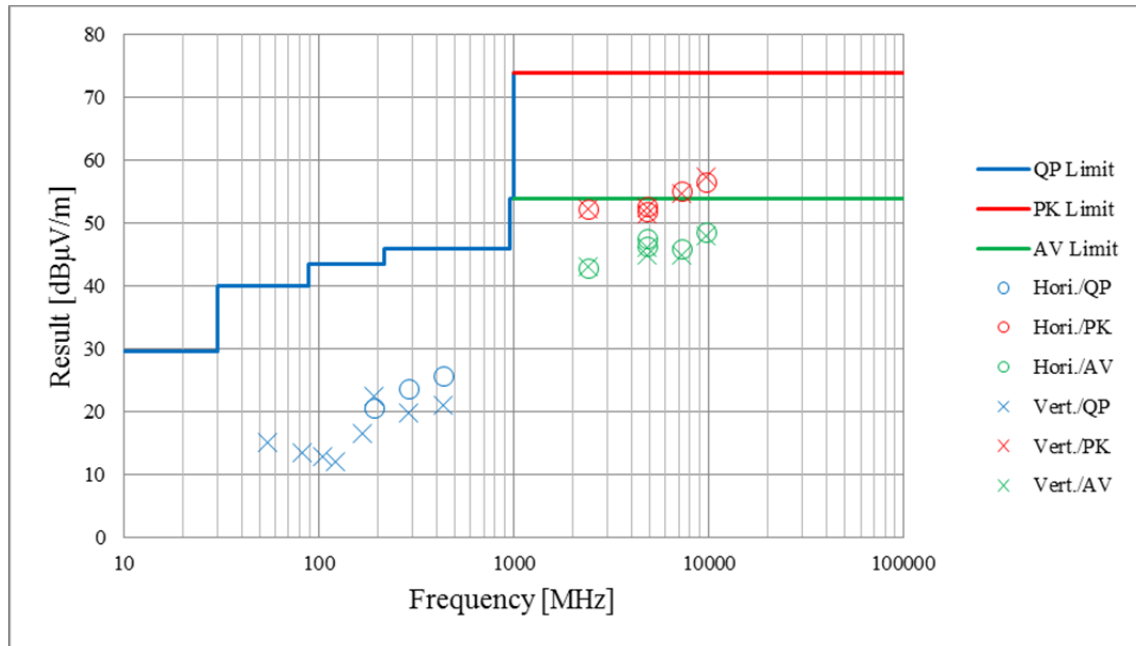
Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 11765859S-A-R1
Date : July 11, 2017
Temperature / Humidity : 23 deg. C / 57 % RH
Engineer : Yosuke Ishikawa
(30 MHz - 13 GHz)
Mode : Tx BT LE 2480 MHz



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

Radiated Spurious Emission (Plot data, Worst case)

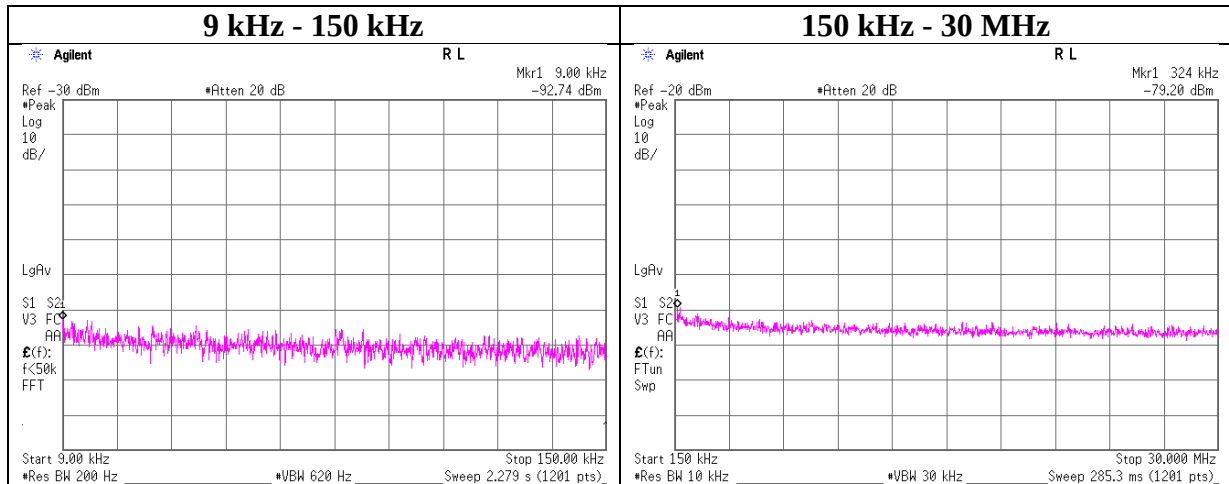
Report No.	11765859S-A-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.3
Date	July 11, 2017	July 13, 2017
Temperature / Humidity	23 deg. C / 57 % RH	21 deg. C / 77 % RH
Engineer	Yosuke Ishikawa (30 MHz - 13 GHz)	Hikaru Shirasawa (13 GHz - 26.5 GHz)
Mode	Tx BT LE 2402 MHz	



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

Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11765859S-A-R1
Date	July 13, 2017
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx BT LE 2402 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	-92.7	0.01	9.5	2.0	1	-81.2	300	6.0	-19.9	48.5	68.4	
324.00	-79.2	0.01	9.5	2.0	1	-67.7	300	6.0	-6.4	17.3	23.7	

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

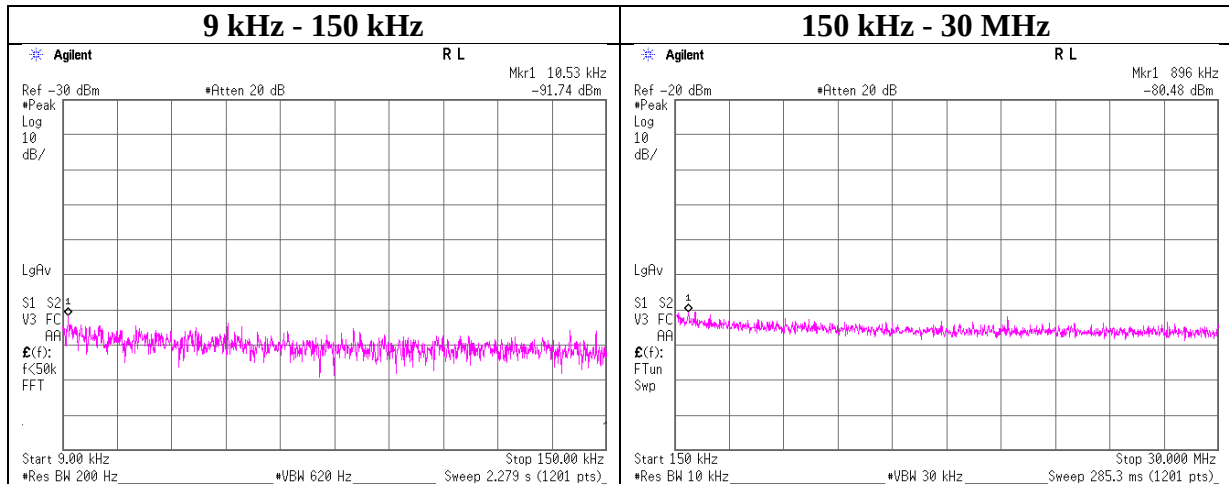
$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

*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.	11765859S-A-R1
Date	July 13, 2017
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx BT LE 2440 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
10.53	-91.7	0.01	9.5	2.0	1	-80.2	300	6.0	-18.9	47.1	66.0	
896.00	-80.5	0.01	9.5	2.0	1	-68.9	30	6.0	12.3	28.5	16.2	

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

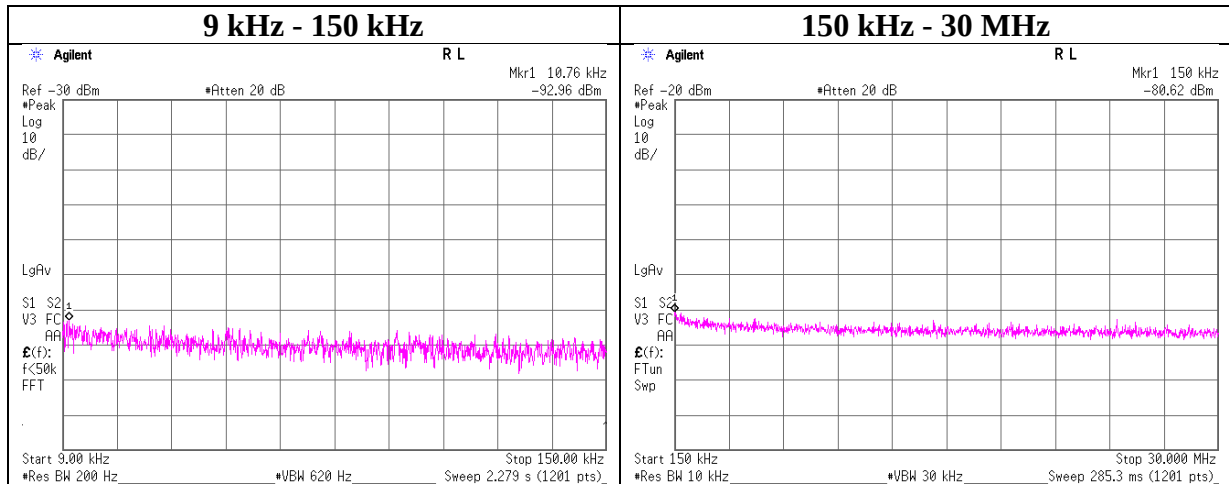
$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

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

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11765859S-A-R1
Date	July 13, 2017
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx BT LE 2480 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
10.76	-93.0	0.01	9.5	2.0	1	-81.4	300	6.0	-20.2	46.9	67.1	
150.00	-80.6	0.01	9.5	2.0	1	-69.1	300	6.0	-7.8	24.0	31.8	

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

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

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

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11765859S-A-R1
Date July 13, 2017
Temperature / Humidity 25 deg. C / 51 % RH
Engineer Hiroyuki Morikawa
Mode Tx BT LE

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2402.00	-26.74	1.13	9.64	-15.97	8.00	23.97
2440.00	-26.39	1.14	9.64	-15.61	8.00	23.61
2480.00	-27.19	1.15	9.65	-16.39	8.00	24.39

Sample Calculation:

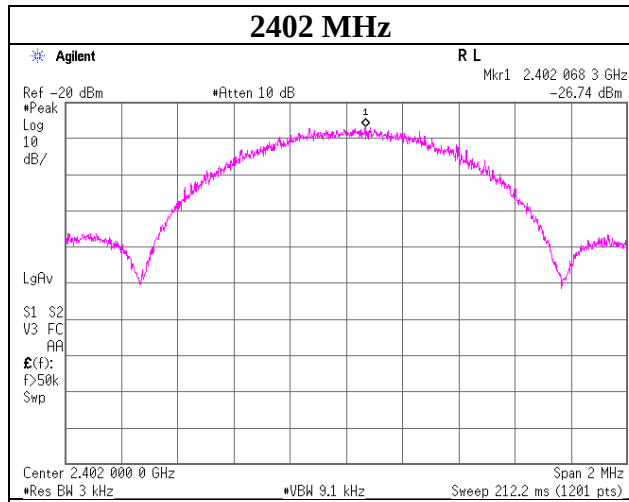
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

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

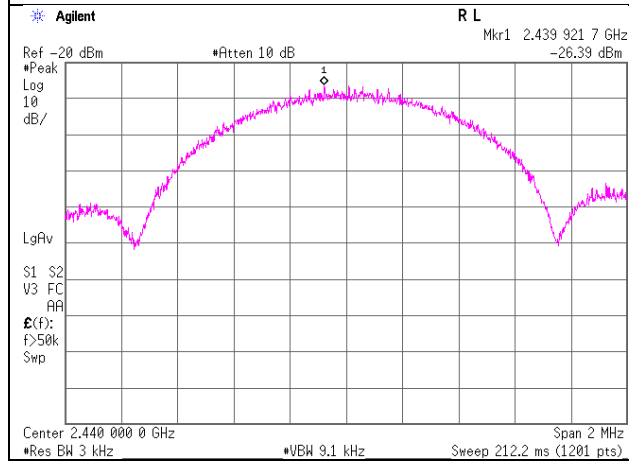
Power Density

BT LE

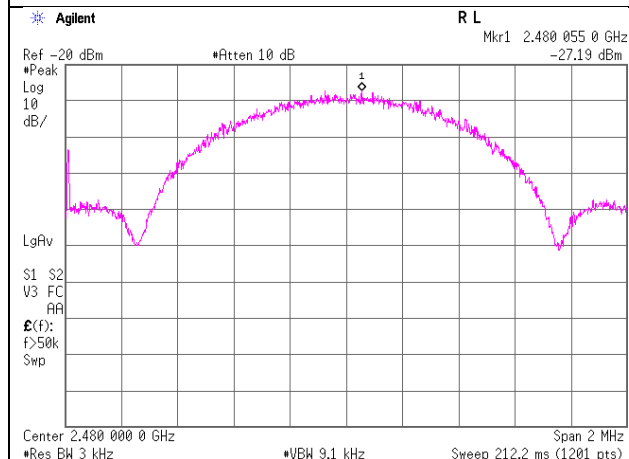
2402 MHz



2440 MHz



2480 MHz



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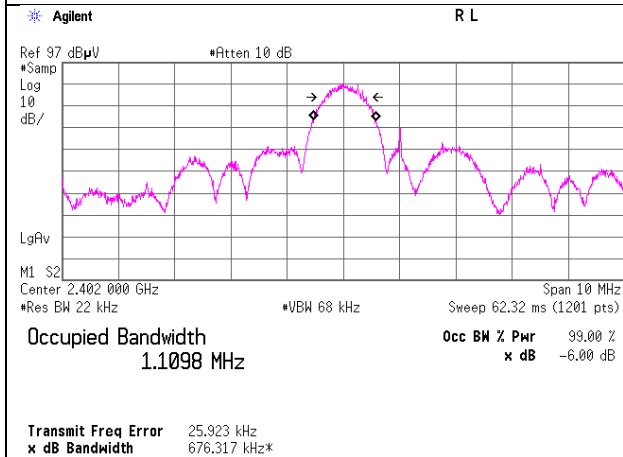
Facsimile : +81 463 50 6401

99%Occupied Bandwidth

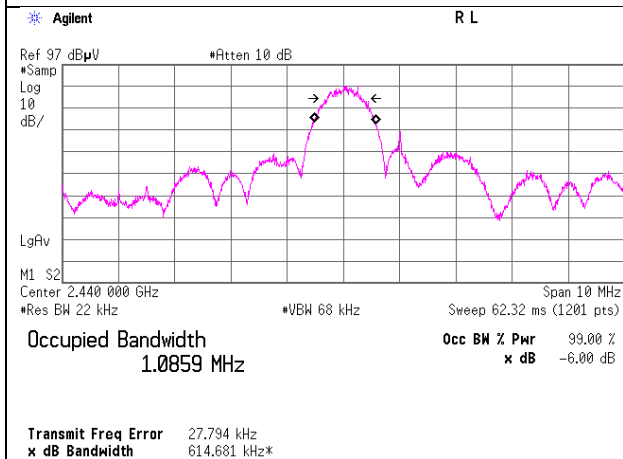
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	11765859S-A-R1
Date	July 13, 2017
Temperature / Humidity	25 deg. C / 51 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx BT LE

BT LE

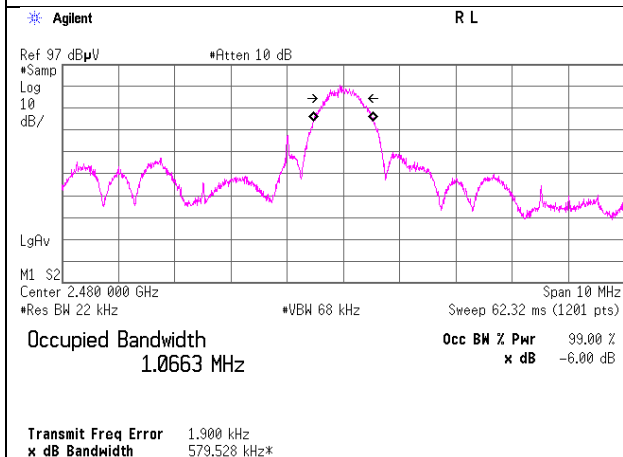
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test instruments

Test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2017/03/07 * 12
SCC-G31	Coaxial Cable	Junkosha	MWX241-0100 0KMSKMS	OCT-08-13-0 46	AT	2017/04/20 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2016/11/07 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2016/12/13 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2017/04/25 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2017/04/25 * 12
KTS-07	Digital Tester	SANWA	PC500	7019232	AT	2016/10/17 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2017/02/09 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2017/02/09 * 12
KAT3-10	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2016/07/26 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2016/11/23 * 12
SCC-B1/B3/B5/B 7/B8/B13/SRSE- 02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner /Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA /141PE/141PE/ 141PE/141PE/ NS4906	-/0901-270(R F Selector)	RE	2017/04/07 * 12
SCC-B2/B4/B6/B 7/B8/B13/SRSE- 02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner /Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA /141PE/141PE/ 141PE/141PE/ NS4906	-/0901-270(R F Selector)	RE	2017/04/07 * 12
SLA-06	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	195	RE	2017/01/05 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2016/10/12 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2016/09/28 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2017/06/08 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE ,CE,RFI,MF)	-	RE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2017/03/08 * 12
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2017/02/17 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16- 091	RE	2017/06/13 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2017/05/08 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-0100 0NFSNMS/B	1612S006	RE	2017/01/08 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2016/08/09 * 12
SAEC-02(SVSW R)	Semi-Anechoic Chamber	TDK	SAEC-02(SVS WR)	2	RE	2016/07/22 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2016/11/07 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2016/11/29 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2016/10/11 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	RE	2016/10/24 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2017/06/11 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-0 37	RE	2017/01/08 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2017/05/08 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-0100 0NFSNMS/B	1612S005	RE	2017/01/08 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2016/08/22 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2016/10/12 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2016/10/17 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2017/03/15 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2016/09/27 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2017/03/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-0100 0KMSKMS	-	RE	2017/04/20 * 12

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Test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-C9/C10/SR SE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141P E/NS4906	-/0901-271(R F Selector)	CE	2017/04/07 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2017/02/10 * 12
SAT3-10	Attenuator	JFW	50HF-003N	-	CE	2016/08/04 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2016/12/13 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	CE	2016/11/08 * 12
SJM-02	Measure	KOMELON	KMC-36	-	CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE ,CE,RFI,MF)	-	CE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	CE	2016/10/17 * 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 test**
 RE: Radiated Emission test
 AT: Antenna Terminal Conducted test