RADIO TEST REPORT

Test Report No. : 13473650S-A-R2

Applicant	:	**CASIO COMPUTER CO., LTD.**
Type of EUT	:	**Watch**
Model Number of EUT	:	**GBA-900**
FCC ID	:	**BBQS10W**
Test regulation	:	**FCC Part 15 Subpart C: 2020**
Test Result	:	**Complied (Refer to SECTION 3.2)**

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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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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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. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13473650S-A-R1. 13473650S-A-R1 is replaced with this report.

Date of test: August 21 to 31, 2020

Representative test engineer:
Toshinori Yamada
Engineer
Consumer Technology Division

Approved by:
Akio Hayashi
Leader
Consumer Technology Division

CERTIFICATE 1266.03

☐ 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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REVISION HISTORY

Original Test Report No.: 13473650S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13473650S-A	September 28, 2020	-	-
1	13473650S-A-R1	November 30, 2020	5	Update of contact person: From “Hiroaki Suzuki” to “Yamashita Shuji”
2	13473650S-A-R2	January 19, 2021	26	Correction of data: From “9.82 kHz” to “11.23 kHz”

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation
AC	Alternating Current
AFH	Adaptive Frequency Hopping
AM	Amplitude Modulation
Amp, AMP	Amplifier
ANSI	American National Standards Institute
Ant, ANT	Antenna
AP	Access Point
ASK	Amplitude Shift Keying
Atten., ATT	Attenuator
AV	Average
BPSK	Binary Phase-Shift Keying
BR	Bluetooth Basic Rate
BT	Bluetooth
BT LE	Bluetooth Low Energy
BW	BandWidth
Cal Int	Calibration Interval
CCK	Complementary Code Keying
Ch., CH	Channel
CISPR	Comite International Special des Perturbations Radioelectriques
CW	Continuous Wave
DBPSK	Differential BPSK
DC	Direct Current
D-factor	Distance factor
DFS	Dynamic Frequency Selection
DQPSK	Differential QPSK
DSSS	Direct Sequence Spread Spectrum
EDR	Enhanced Data Rate
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
EN	European Norm
ERP, e.r.p.	Effective Radiated Power
EU	European Union
EUT	Equipment Under Test
Fac.	Factor
FCC	Federal Communications Commission
FHSS	Frequency Hopping Spread Spectrum
FM	Frequency Modulation
Freq.	Frequency
FSK	Frequency Shift Keying
GFSK	Gaussian Frequency-Shift Keying
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
Hori.	Horizontal
ICES	Interference-Causing Equipment Standard
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IF	Intermediate Frequency
ILAC	International Laboratory Accreditation Conference
ISED	Innovation, Science and Economic Development Canada
ISO	International Organization for Standardization
JAB	Japan Accreditation Board
LAN	Local Area Network
LIMS	Laboratory Information Management System
MCS	Modulation and Coding Scheme
MRA	Mutual Recognition Arrangement
N/A	Not Applicable
NIST	National Institute of Standards and Technology
NS	No signal detect.
NSA	Normalized Site Attenuation
NVLAP	National Voluntary Laboratory Accreditation Program
OBW	Occupied Band Width
OFDM	Orthogonal Frequency Division Multiplexing
P/M	Power meter
PCB	Printed Circuit Board
PER	Packet Error Rate
PHY	Physical Layer
PK	Peak
PN	Pseudo random Noise
PRBS	Pseudo-Random Bit Sequence
PSD	Power Spectral Density
QAM	Quadrature Amplitude Modulation
QP	Quasi-Peak
QPSK	Quadri-Phase Shift Keying
RBW	Resolution Band Width
RDS	Radio Data System
RE	Radio Equipment
RF	Radio Frequency
RMS	Root Mean Square
RSS	Radio Standards Specifications
Rx	Receiving
SA, S/A	Spectrum Analyzer
SG	Signal Generator
SVSWR	Site-Voltage Standing Wave Ratio
TR	Test Receiver
Tx	Transmitting
VBW	Video BandWidth
Vert.	Vertical
WLAN	Wireless LAN

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	CASIO COMPUTER CO., LTD.
Address	:	2-1, Sakaecho 3 chome, Hamura-shi, Tokyo 205-8555 Japan
Telephone Number	:	+81-42-579-7282
Facsimile Number	:	+81-42-579-7702
Contact Person	:	Yamashita Shuji

The information provided from the customer is as follows;
- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (EUT) other than the Receipt Date
- SECTION 4: Operation of EUT during testing

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type	:	Watch
Model Number	:	GBA-900
Serial Number	:	Refer to SECTION 4.2
Rating	:	GBA-900 (Watch): Typical: DC 3.0 V, Min.: DC 1.9 V, Max.: DC 3.3 V CW5641 (Module): Normal: DC 3.0 V, Min.: DC 1.9 V, Max.: DC 3.3 V
Receipt Date	:	August 19, 2020
Country of Mass-production	:	Thailand, Japan, China
Condition	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: GBA-900 (referred to as the EUT in this report) is a Watch.

* GBA-900 has alternative name as R032.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Antenna type	:	Chip antenna
Antenna Gain	:	2.5 dBi
Clock frequency (Maximum)	:	32 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on June 26, 2020 and effective July 27, 2020

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
6 dB Bandwidth	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(a)(2)	See data.	Complied a)	Conducted
	ISED: -	**ISED:** RSS-247 5.2(a)			
Maximum Peak Output Power	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(b)(3)		Complied b)	Conducted
	ISED: RSS-Gen 6.12	**ISED:** RSS-247 5.4(d)			
Power Density	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section 15.247(e)		Complied c)	Conducted
	ISED: -	**ISED:** RSS-247 5.2(b)			
Spurious Emission Restricted Band Edges	**FCC:** KDB 558074 D01 15.247 Meas Guidance v05r02	**FCC:** Section15.247(d)	7.5 dB 4960.000 MHz, AV, Vert. Tx BT LE 2480 MHz	Complied d), e)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *1)
	ISED: RSS-Gen 6.13	**ISED:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.

a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)
b) Refer to APPENDIX 1 (data of Maximum Peak Output Power)
c) Refer to APPENDIX 1 (data of Power Density)
d) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
e) Refer to APPENDIX 1 (data of Radiated Spurious Emission)

Symbols:

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

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

FCC Part 15.31 (e)
The EUT provides stable voltage constantly to the wireless transmitter regardless of input voltage.
Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the 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 requirement.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**ISED:** RSS-Gen 6.7	**ISED:** -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)					

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

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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. 4,5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.6 dB	2.5 dB	2.6 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.0 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.6 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.0 dB	-
	1 GHz-6 GHz	4.9 dB	4.9 dB	4.9 dB	-
	6 GHz-18 GHz	5.5 dB	5.5 dB	5.5 dB	-
	18 GHz-40 GHz	5.4 dB	5.4 dB	5.4 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.8 dB	5.8 dB	5.8 dB	-
	18 GHz-40 GHz	5.7 dB	5.7 dB	5.7 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	0.98 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	1.75 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.89 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.12 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	1.06 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.24 dB
Spurious emission (Conducted) below 1GHz	0.9 dB
Spurious emission (Conducted) 1 GHz-3 GHz	0.9 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.9 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.6 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.0 dB
Bandwidth Measurement	0.07 %
Duty cycle and Time Measurement	0.262 %
Temperature	0.95 deg.C.
Voltage	0.83 %

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
A2LA Certificate Number: 1266.03
(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

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 EUT during testing

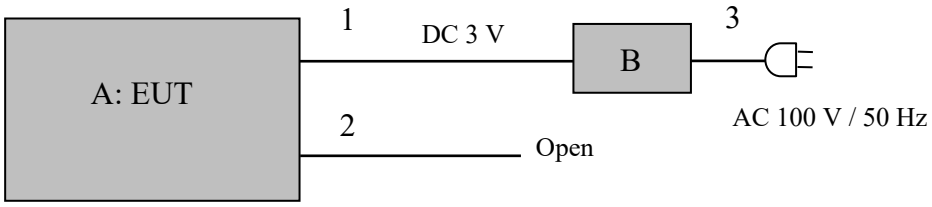
4.1 Operating Mode(s)

Mode	Frequency	Remarks*
Bluetooth Low Energy (BT LE)	2402 MHz, 2440 MHz, 2480 MHz	PRBS9

*Power of the EUT was set by the software as follows;
- Power Setting : Fixed
- Software : BLE RF Test Version 9.9
(Date: 2020.8.21, Storage location: EUT memory)

*The test was performed with the worst case that can be set in Test mode,
The worst case in actual operation mode is applied to Peak with Duty factor of Spurious emission.
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 and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Watch	GBA-900	82 *1) 63 *2)	CASIO COMPUTER CO., LTD.	EUT
B	Power Supply(DC)	PAN35-10A	NA000955	KIKUSUI	-

*1) For Antenna Terminal test
*2) For Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	0.1 + 1.5	Unshielded	Unshielded	*3)
2	Signal Cable	0.1	Unshielded	Unshielded	*4)
3	AC	2.0	Unshielded	Unshielded	-

*3) Cable for test operation
*4) Cable for system reset during the development, not used for the product

SECTION 5: Radiated Spurious Emission

Test Procedure

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.
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.

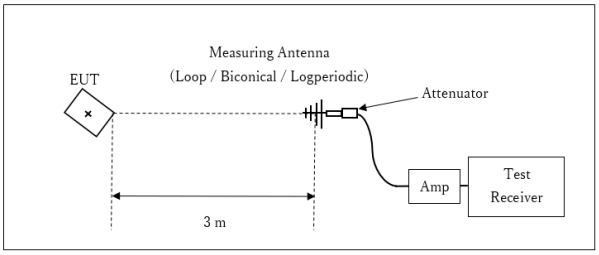
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	11.12.2.5.2 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

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

Figure 2: Test Setup

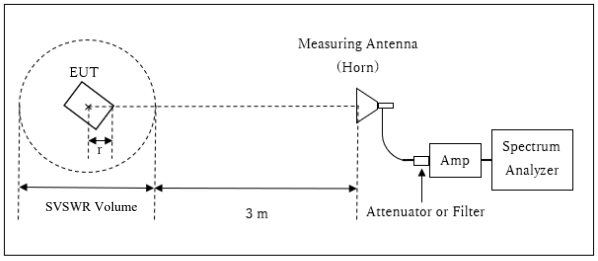
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz

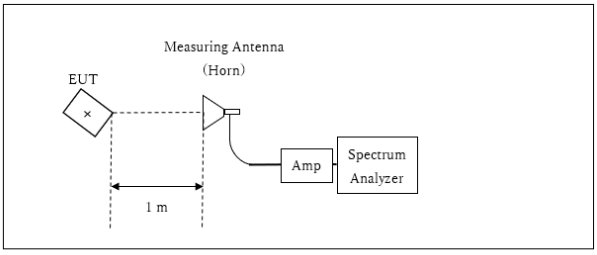


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.965 m / 3.0 m) = 2.43 dB
* Test Distance: (3 + SVSWR Volume /2) - r = 3.965 m

SVSWR Volume : 2.0 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r = 0.035 m

10 GHz – 26.5 GHz



× : Center of turn table

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

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Frequency / Antenna polarization	Spurious				
	Below 1 GHz	1 GHz – 2.8 GHz	2.8 GHz – 13 GHz	13 GHz-18 GHz	18 GHz-26 GHz
Horizontal	X	X	X	X	X
Vertical	X	X	X	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
6 dB 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: 160 MHz BW)
Peak Power Density	1.5 times the 6 dB Bandwidth	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
Conducted Spurious Emission *4) *5)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".
*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was low enough as shown in the chart.
(9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz).
*5) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohmes. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to 45.5 – 51.5 = -6.0 dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

The test results and limit are rounded off to two decimals place, so some differences might be observed.
The equipment and cables were not used for factor 0 dB of the data sheets.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

6 dB Bandwidth and 99 % Occupied Bandwidth

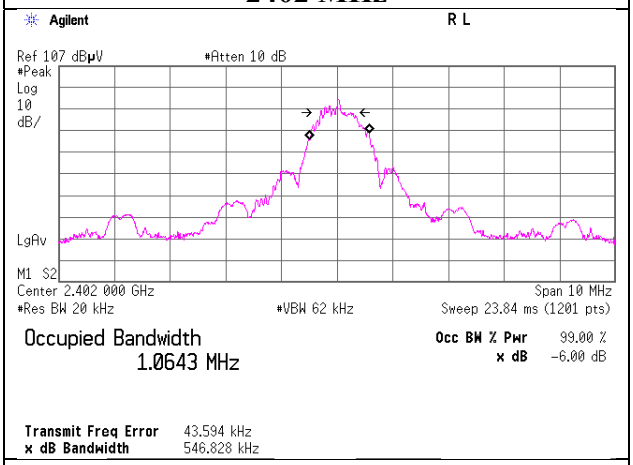
Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 28, 2020
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Toshinori Yamada
Mode	Tx BT LE

Mode	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
BT LE	2402	1064.3	0.711	> 0.5000
	2440	1060.0	0.714	> 0.5000
	2480	1058.7	0.718	> 0.5000

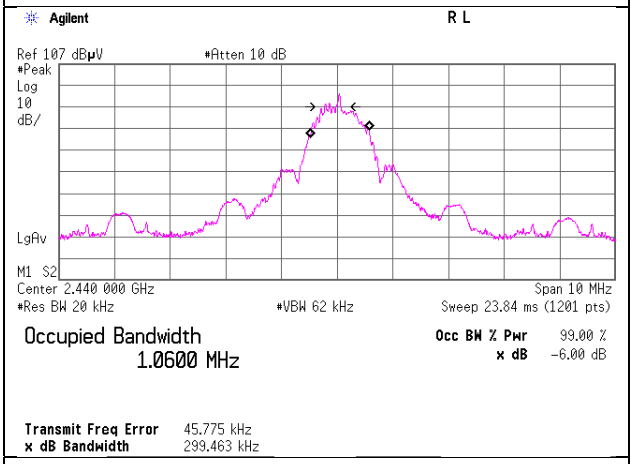
99%Occupied Bandwidth

BT LE

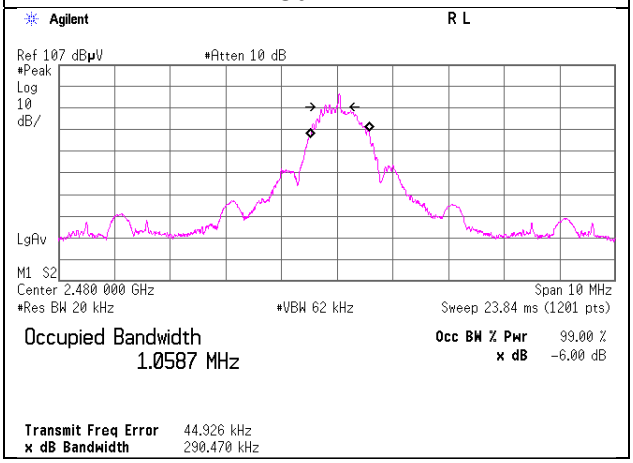
2402 MHz



2440 MHz



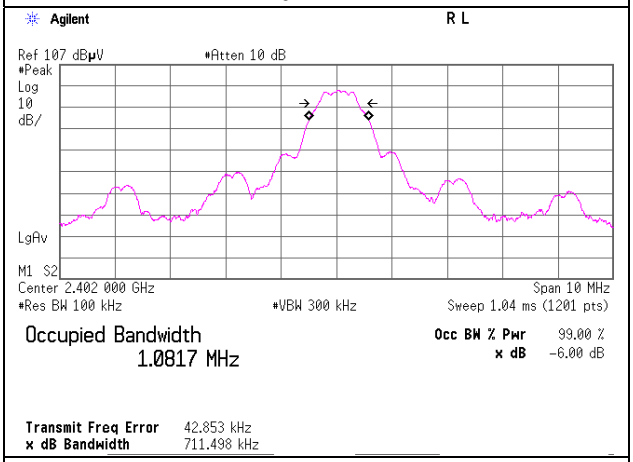
2480 MHz



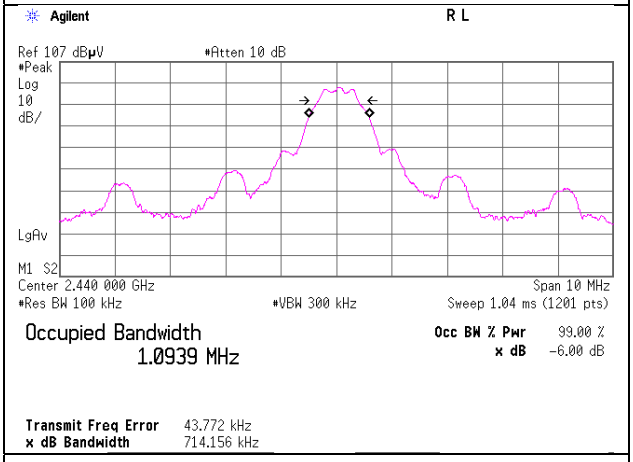
6dB Bandwidth

BT LE

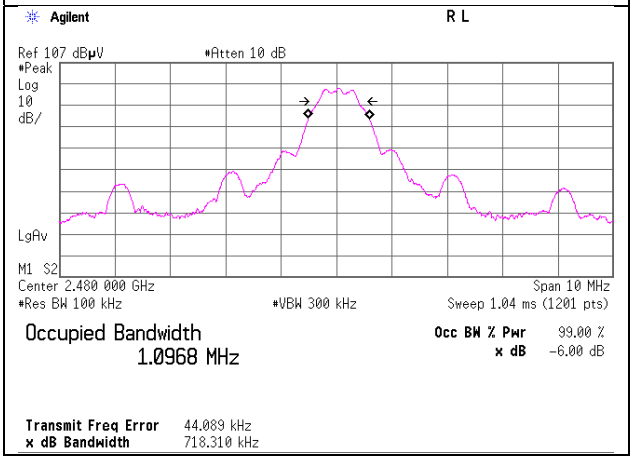
2402 MHz



2440 MHz



2480 MHz



Maximum Peak Output Power

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 31, 2020
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Toshinori Yamada
Mode	Tx BT LE

				Conducted Power					e.i.r.p. for RSS-247					
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-11.84	1.27	9.63	-0.94	0.81	30.00	1000	30.94	2.50	1.56	1.43	36.02	4000	34.46
2440	-11.78	1.27	9.63	-0.88	0.82	30.00	1000	30.88	2.50	1.62	1.45	36.02	4000	34.40
2480	-11.70	1.28	9.63	-0.79	0.83	30.00	1000	30.79	2.50	1.71	1.48	36.02	4000	34.31

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain
*The equipment and cables were not used for factor 0 dB of the data sheets.

Average Output Power
(Reference data for RF Exposure)

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 31, 2020
Temperature / Humidity	24 deg. C / 47 % RH
Engineer	Toshinori Yamada
Mode	Tx BT LE

Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-14.13	1.27	9.63	-3.23	0.48	1.68	-1.55	0.70
2440	-14.08	1.27	9.63	-3.18	0.48	1.68	-1.50	0.71
2480	-14.01	1.28	9.63	-3.10	0.49	1.68	-1.42	0.72

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

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

Burst rate confirmation

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 28, 2020
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Toshinori Yamada
Mode	Tx BT LE

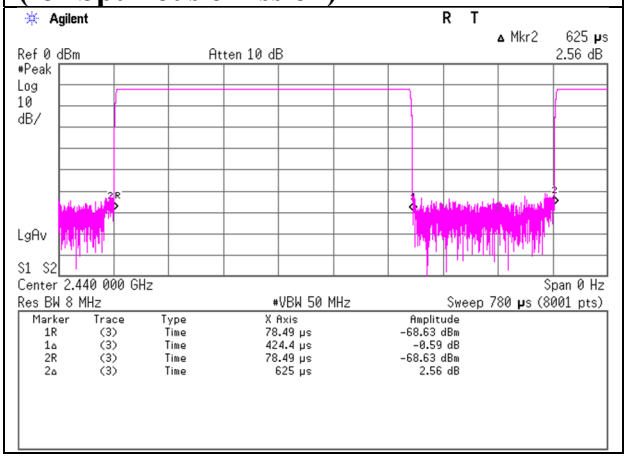
BT LE

Tx on / (Tx on + Tx off) =	**0.679**
Tx on / (Tx on + Tx off) * 100 =	**67.9 %**
Duty factor = 10 * log (0.625 / 0.4244) =	**1.68 dB**

(for Average power)

Tx on / (Tx on + Tx off) =	**0.679**
Tx on / (Tx on + Tx off) * 100 =	**67.9 %**
Duty factor = 20 * log (0.625 / 0.4244) =	**3.36 dB**

(for Spurious emission)



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

Radiated Spurious Emission

Report No.	13473650S-A-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	August 28, 2020	August 21, 2020
Temperature / Humidity	23 deg. C / 57 % RH	23 deg. C / 54 % RH
Engineer	Toshinori Yamada	Takahiro Suzuki
	(30 MHz - 1 GHz)	(1 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.	32.702	QP	21.50	17.67	6.88	31.90	0.00	14.15	40.00	25.8	100	0	-
Hori.	193.595	QP	21.00	16.44	8.78	31.77	0.00	14.45	43.50	29.0	100	0	-
Hori.	898.116	QP	20.30	22.10	9.46	30.88	0.00	20.98	46.00	25.0	100	359	-
Hori.	934.715	QP	20.10	21.90	9.62	30.62	0.00	21.00	46.00	25.0	100	0	-
Hori.	2390.000	PK	45.82	28.56	14.04	38.68	2.43	52.17	73.90	21.7	110	93	-
Hori.	4804.000	PK	48.54	31.62	6.57	38.54	2.43	50.62	73.90	23.2	132	160	-
Hori.	7206.000	PK	46.48	37.62	8.13	39.13	2.43	55.53	73.90	18.3	100	0	Floor noise
Hori.	7206.000	AV	35.38	37.62	8.13	39.13	2.43	44.43	53.90	9.4	100	0	Floor noise
Vert.	30.672	QP	21.60	18.52	6.83	31.90	0.00	15.05	40.00	24.9	100	0	-
Vert.	152.152	QP	21.70	14.93	8.64	31.80	0.00	13.47	43.50	30.0	100	359	-
Vert.	824.739	QP	20.80	20.87	9.13	31.23	0.00	19.57	46.00	26.4	100	0	-
Vert.	911.593	QP	20.30	22.11	9.52	30.78	0.00	21.15	46.00	24.8	100	0	-
Vert.	2390.000	PK	44.61	28.56	14.04	38.68	2.43	50.96	73.90	22.9	185	81	-
Vert.	4804.000	PK	50.42	31.62	6.57	38.54	2.43	52.50	73.90	21.4	100	49	-
Vert.	7206.000	PK	46.63	37.62	8.13	39.13	2.43	55.68	73.90	18.2	100	0	Floor noise
Vert.	7206.000	AV	35.61	37.62	8.13	39.13	2.43	44.66	53.90	9.2	100	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.965 m / 3.0 m) = 2.43 dB
10 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	34.92	28.56	14.04	38.68	3.36	2.43	44.63	53.9	9.2	*1)
Hori.	4804.000	AV	38.68	31.62	6.57	38.54	3.36	2.43	44.12	53.9	9.7	–
Vert.	2390.000	AV	34.52	28.56	14.04	38.68	3.36	2.43	44.23	53.9	9.6	*1)
Vert.	4804.000	AV	39.62	31.62	6.57	38.54	3.36	2.43	45.06	53.9	**8.8**	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.965 m / 3.0 m) = 2.43 dB
10 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)

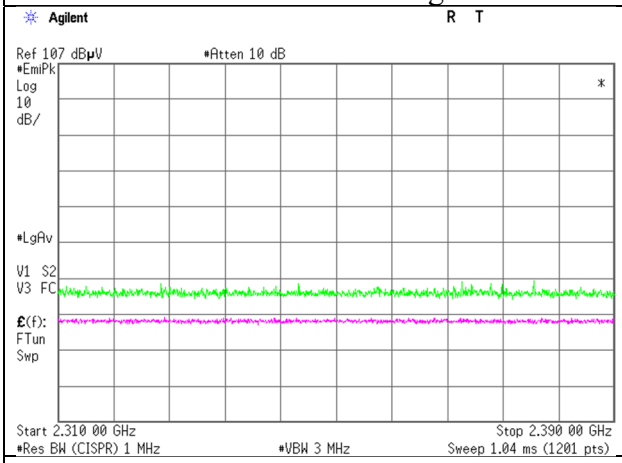
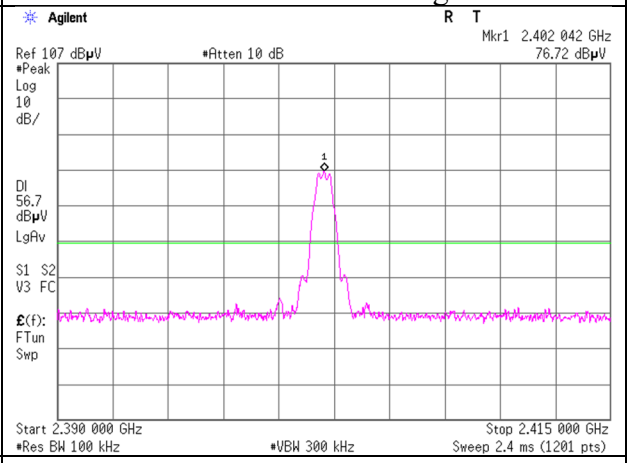
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Vert.	2402.000	PK	81.02	28.54	14.05	38.67	2.43	87.37	-	-	Carrier
Vert.	2400.000	PK	40.83	28.54	14.05	38.67	2.43	47.18	67.37	20.1	-
Hori.	2402.000	PK	80.98	28.54	14.05	38.67	2.43	87.33	-	-	Carrier
Hori.	2400.000	PK	40.28	28.54	14.05	38.67	2.43	46.63	67.33	20.7	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.965 m / 3.0 m) = 2.43 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

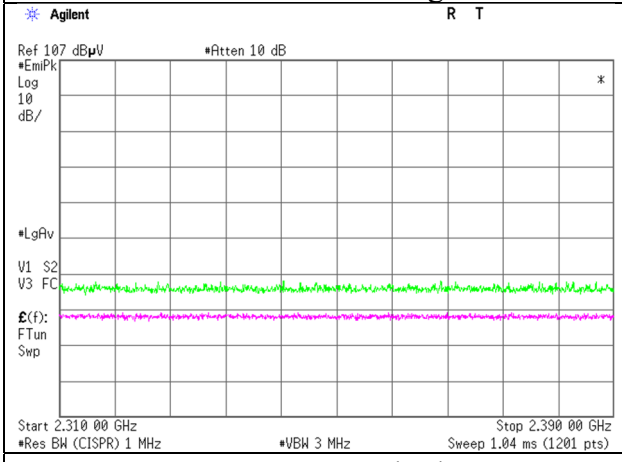
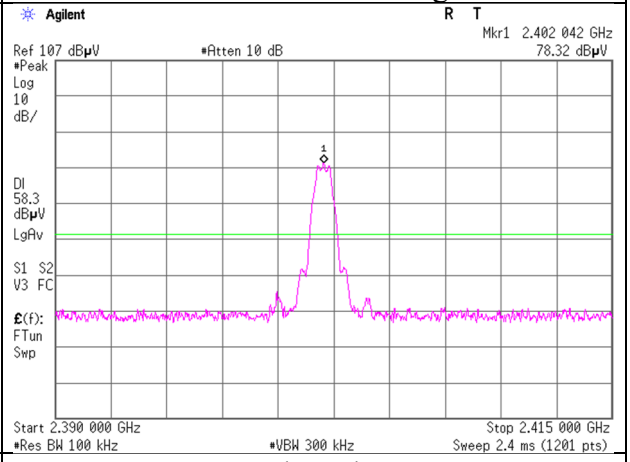
Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.2
Date	August 21, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Takahiro Suzuki
Mode	Tx BT LE 2402 MHz

Horizontal

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

Vertical

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

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No.	13473650S-A-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	August 28, 2020	August 21, 2020
Temperature / Humidity	23 deg. C / 57 % RH	23 deg. C / 54 % RH
Engineer	Toshinori Yamada	Takahiro Suzuki
	(30 MHz - 1 GHz)	(1 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.	30.042	QP	21.20	18.85	6.81	31.90	0.00	14.96	40.00	25.0	100	0	-
Hori.	194.025	QP	21.00	16.47	8.77	31.77	0.00	14.47	43.50	29.0	100	359	-
Hori.	907.797	QP	20.50	22.15	9.50	30.81	0.00	21.34	46.00	24.6	100	0	-
Hori.	923.713	QP	20.00	21.99	9.57	30.70	0.00	20.86	46.00	25.1	100	0	-
Hori.	4880.000	PK	47.54	31.58	6.63	38.54	2.43	49.64	73.90	24.2	100	161	-
Hori.	7320.000	PK	46.98	37.73	8.21	39.28	2.43	56.07	73.90	17.8	100	0	-
Hori.	7320.000	AV	34.48	37.73	8.21	39.28	2.43	43.57	53.90	10.3	100	0	-
Vert.	31.445	QP	22.00	18.18	6.84	31.90	0.00	15.12	40.00	24.8	100	359	-
Vert.	188.920	QP	21.40	16.33	8.76	31.77	0.00	14.72	43.50	28.7	100	0	-
Vert.	828.815	QP	20.60	20.92	9.15	31.21	0.00	19.46	46.00	26.5	100	0	-
Vert.	878.318	QP	20.60	22.09	9.37	30.96	0.00	21.10	46.00	24.9	100	359	-
Vert.	4880.000	PK	49.64	31.58	6.63	38.54	2.43	51.74	73.90	22.1	119	62	-
Vert.	7320.000	PK	47.13	37.73	8.21	39.28	2.43	56.22	73.90	17.6	100	0	-
Vert.	7320.000	AV	34.58	37.73	8.21	39.28	2.43	43.67	53.90	10.2	100	0	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.965 m / 3.0 m) = 2.43 dB
10 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	35.36	31.58	6.63	38.54	3.36	2.43	40.82	53.9	13.0	-
Vert.	4880.000	AV	39.43	31.58	6.63	38.54	3.36	2.43	44.89	53.9	**9.0**	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.965 m / 3.0 m) = 2.43 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission

Report No.	13473650S-A-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	August 28, 2020	August 21, 2020
Temperature / Humidity	23 deg. C / 57 % RH	23 deg. C / 54 % RH
Engineer	Toshinori Yamada	Takahiro Suzuki
	(30 MHz - 1 GHz)	(1 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.	30.106	QP	21.20	18.81	6.81	31.90	0.00	14.92	40.00	25.0	100	0	-
Hori.	199.413	QP	21.20	16.58	8.81	31.76	0.00	14.83	43.50	28.6	100	359	-
Hori.	860.835	QP	20.60	21.81	9.29	31.03	0.00	20.67	46.00	25.3	100	0	-
Hori.	922.380	QP	20.00	22.00	9.56	30.70	0.00	20.86	46.00	25.1	100	0	-
Hori.	2483.500	PK	44.62	28.40	14.13	38.62	2.43	50.96	73.90	22.9	218	153	-
Hori.	4960.000	PK	47.68	31.74	6.68	38.54	2.43	49.99	73.90	23.9	154	163	-
Hori.	7440.000	PK	47.62	37.84	8.30	39.43	2.43	56.76	73.90	17.1	100	0	-
Hori.	7440.000	AV	35.68	37.84	8.30	39.43	2.43	44.82	53.90	9.0	100	0	-
Vert.	32.000	QP	22.00	17.96	6.86	31.90	0.00	14.92	40.00	25.0	100	0	-
Vert.	179.240	QP	21.40	15.93	8.73	31.78	0.00	14.28	43.50	29.2	100	0	-
Vert.	790.528	QP	20.90	20.76	8.98	31.39	0.00	19.25	46.00	26.7	100	359	-
Vert.	933.611	QP	20.10	21.90	9.61	30.62	0.00	20.99	46.00	25.0	100	0	-
Vert.	2483.500	PK	47.23	28.40	14.13	38.62	2.43	53.57	73.90	20.3	223	143	-
Vert.	4960.000	PK	49.41	31.74	6.68	38.54	2.43	51.72	73.90	22.1	112	51	-
Vert.	7440.000	PK	47.18	37.84	8.30	39.43	2.43	56.32	73.90	17.5	100	0	-
Vert.	7440.000	AV	35.70	37.84	8.30	39.43	2.43	44.84	53.90	9.0	100	0	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.965 m / 3.0 m) = 2.43 dB
10 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	34.62	28.40	14.13	38.62	3.36	2.43	44.32	53.9	9.5	*1)
Hori.	4960.000	AV	36.22	31.74	6.68	38.54	3.36	2.43	41.89	53.9	12.0	-
Vert.	2483.500	AV	34.13	28.40	14.13	38.62	3.36	2.43	43.83	53.9	10.0	*1)
Vert.	4960.000	AV	40.69	31.74	6.68	38.54	3.36	2.43	46.36	53.9	**7.5**	-

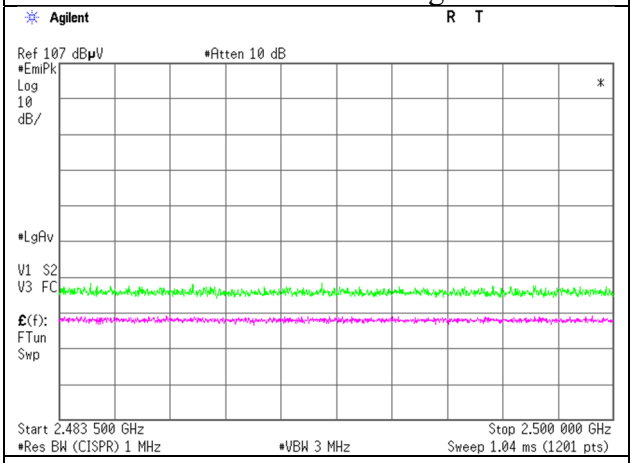
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Duty factor + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (3.965 m / 3.0 m) = 2.43 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
Duty factor refer to "Duty factor Calculation chart" sheet.
*1) Not out of band emission (Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.2
Date	August 21, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Takahiro Suzuki
Mode	Tx BT LE 2480 MHz

Horizontal

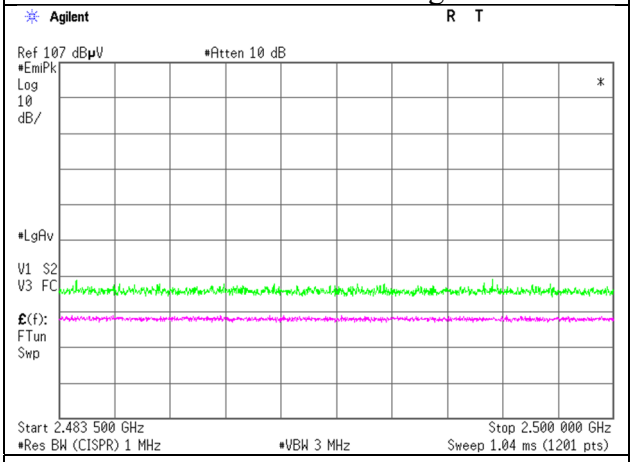
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

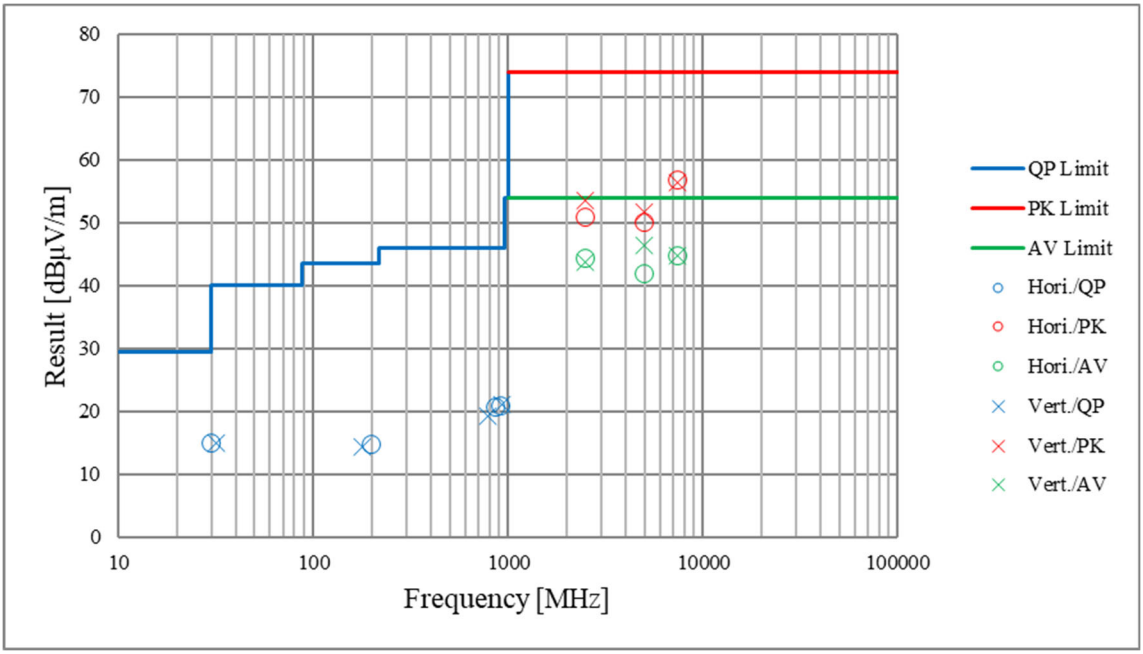


Trace Green : Peak Plot
Trace Purple : Average Plot

* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions. Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	13473650S-A-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	August 28, 2020	August 21, 2020
Temperature / Humidity	23 deg. C / 57 % RH	23 deg. C / 54 % RH
Engineer	Toshinori Yamada	Takahiro Suzuki
	(30 MHz - 1 GHz)	(1 GHz – 26.5 GHz)
Mode	Tx BT LE 2480 MHz	

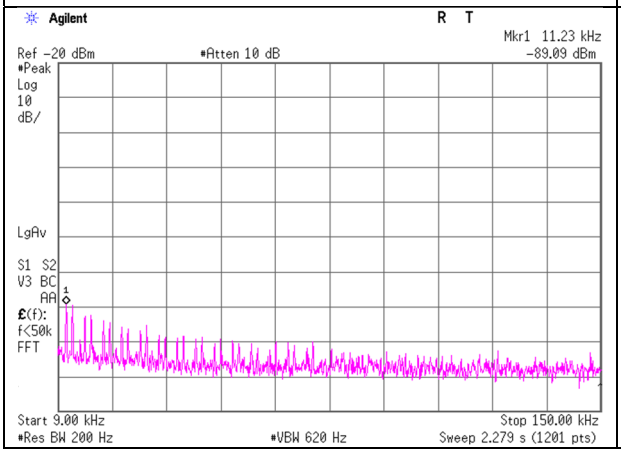


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

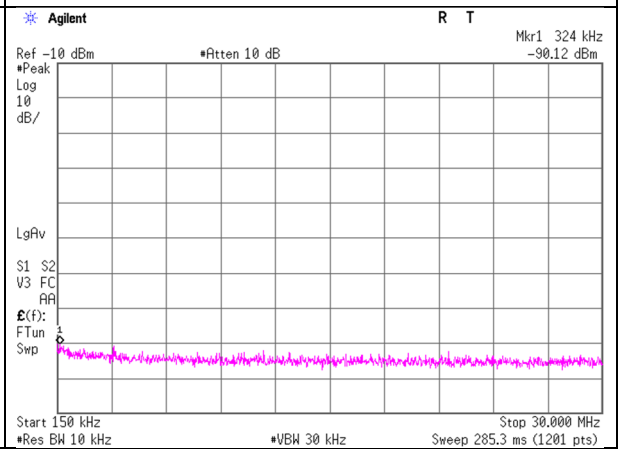
Conducted Spurious Emission

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 28, 2020
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Toshinori Yamada
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
11.23	-89.09	0.01	9.5	2.5	1	-77.0	300	6.0	-15.8	46.5	62.3	-
324.00	-90.12	0.01	9.5	2.5	1	-78.1	300	6.0	-16.8	17.3	34.1	-

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

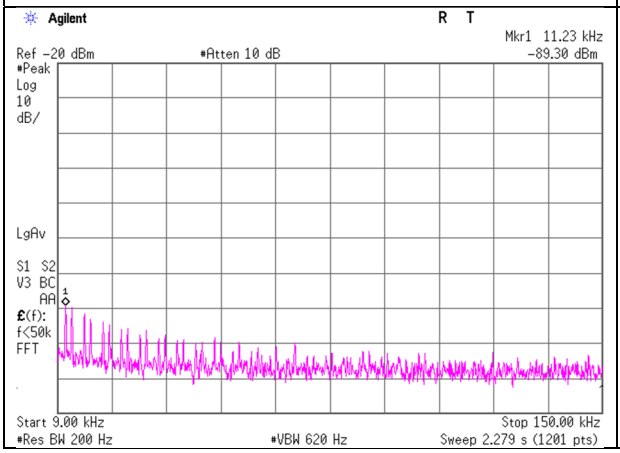
EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

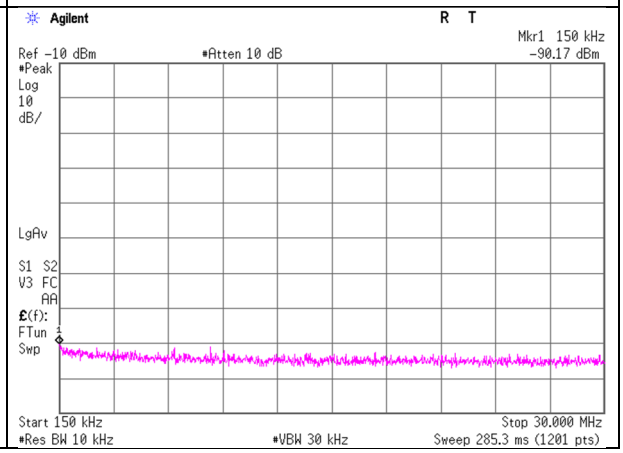
Conducted Spurious Emission

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 28, 2020
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Toshinori Yamada
Mode	Tx BT LE 2440 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.23	-89.30	0.01	9.5	2.5	1	-77.3	300	6.0	-16.0	46.5	62.5	-
150.00	-90.17	0.01	9.5	2.5	1	-78.1	300	6.0	-16.9	24.0	40.9	-

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

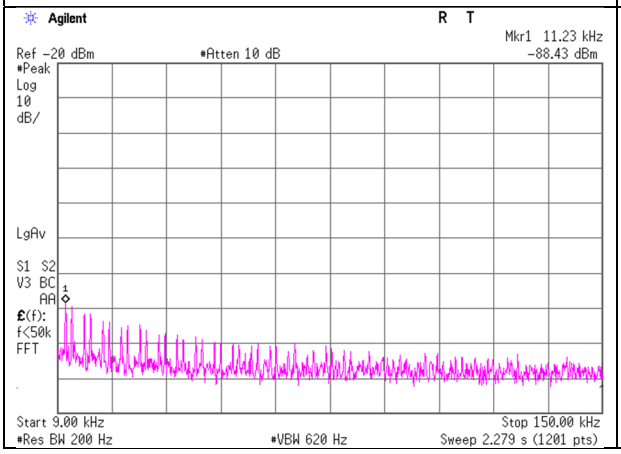
EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

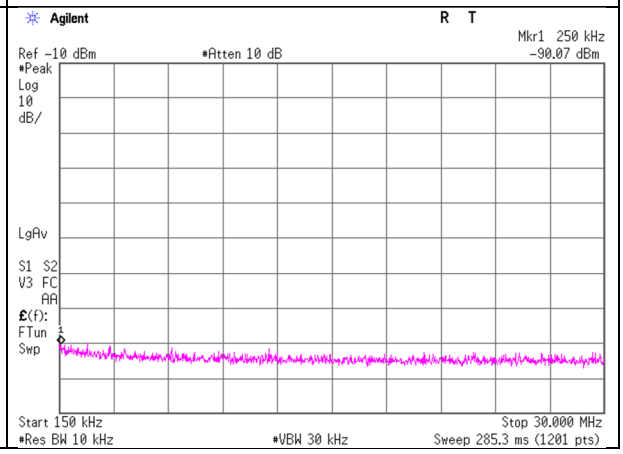
Conducted Spurious Emission

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 28, 2020
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Toshinori Yamada
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
11.23	-88.43	0.01	9.5	2.5	1	-76.4	300	6.0	-15.1	46.5	61.6	-
250.00	-90.07	0.01	9.5	2.5	1	-78.0	300	6.0	-16.8	19.6	36.4	-

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

Report No.	13473650S-A-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 28, 2020
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Toshinori Yamada
Mode	Tx BT LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402	-26.33	1.27	9.63	-15.43	8.00	23.43
2440	-26.75	1.27	9.63	-15.85	8.00	23.85
2480	-25.61	1.28	9.63	-14.70	8.00	22.70

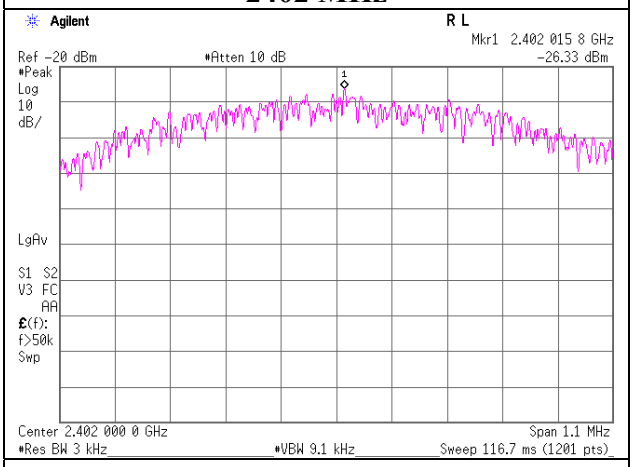
Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

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

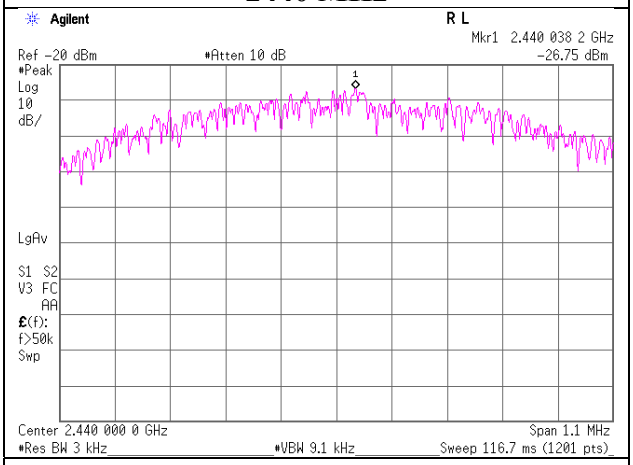
Power Density

BT LE

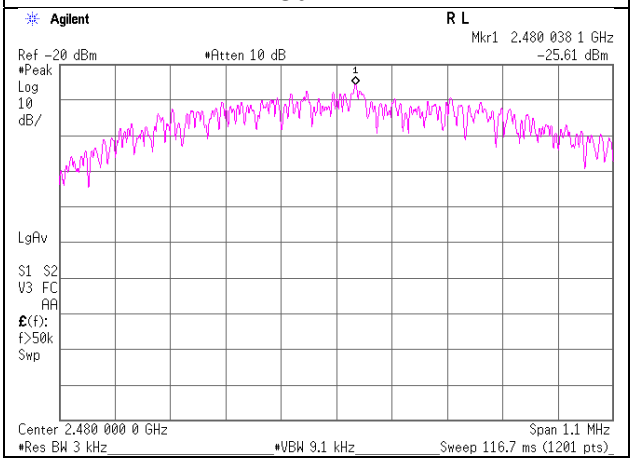
2402 MHz



2440 MHz



2480 MHz



APPENDIX 2: Test instruments

Test equipment (1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
RE	SAEC-02(NSA)	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2020/03/20	12
RE	SAEC-02(SVSWR)	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2020/05/07	12
RE	SAF-02	145004	Pre Amplifier	SONOMA	310N	290212	2020/02/19	12
RE	SAF-05	145128	Pre Amplifier	Toyo Corporation	TPA0118-36	1440490	2020/06/03	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2020/03/03	12
RE	SAT10-06	145137	Attenuator	Keysight Technologies Inc	8493C-010	74865	2019/11/06	12
RE	SAT3-11	150921	Attenuator	JFW	50HF-003N	-	2020/01/30	12
RE	SAT6-14	167095	Attenuator	JFW	50HF-006N	-	2020/02/21	12
RE	SBA-02	145022	Biconical Antenna	Schwarzbeck Mess - Elektronik	BBA9106	91032665	2020/04/04	12
RE	SCC-B1/B3/B5/B7/B8/B13/SRSE-02	144975	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2020/04/17	12
RE	SCC-B2/B4/B6/B7/B8/B13/SRSE-02	144976	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2020/04/17	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	2020/03/04	12
RE	SCC-G41	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2020/01/08	12
RE	SCC-G50	178573	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	MY13407/4E	2020/03/09	12
RE	SCC-G51	178572	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800288 /4A	2020/03/09	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2020/05/12	12
RE	SCC-G69	200009	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	575617/4	2020/07/07	12
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2019/11/06	12
RE	SHA-02	145384	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA9120D	9120D-726	2020/06/15	12
RE	SHA-04	145512	Horn Antenna	ETS LINDGREN	3160-09	00094868	2020/06/15	12
RE	SHA-09	194684	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA 9120 C	695	2020/02/17	12
RE	SJM-09	145336	Measure	PROMART	SEN1935	-	-	-
RE	SLA-06	145528	Logperiodic Antenna	Schwarzbeck Mess - Elektronik	VUSLP9111B	195	2020/04/04	12
RE	SOS-21	191838	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2019/12/12	12
RE	STR-01	145790	Test Receiver	Rohde & Schwarz	ESU40	100093	2020/04/24	12
RE	STS-02	145793	Digital Hitester	Hioki	3805-50	80997819	2020/04/09	12

Test equipment (2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	SAT10-09	145132	Attenuator	Weinschel Corp.	54A-10	W5692	2019/11/05	12
AT	SCC-G12	145040	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	2020/03/02	12
AT	SOS-27	191845	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2019/12/12	12
AT	SPM-07	146247	Power Meter	Keysight Technologies Inc	8990B	MY5100272	2020/05/27	12
AT	SPSS-04	146310	Power sensor	Keysight Technologies Inc	N1923A	MY5326009	2020/05/27	12
AT	STS-05	146212	Digital Hitester	Hioki	3805-50	80997828	2019/10/01	12
AT,RE	KSA-08	145089	Spectrum Analyzer	Keysight Technologies Inc	E4446A	MY46180525	2019/11/05	12

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

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item: RE: Radiated Emission test
AT: Antenna Terminal Conducted test