

# RADIO TEST REPORT

## Test Report No. 15048694S-A-R1

Customer	Teraoka Seiko Co., Ltd.
Description of EUT	UHF RFID Reader
Model Number of EUT	CSH-20013
FCC ID	2AF4P-CSH17136
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	January 31, 2024
Remarks	Conducted Emission and Radiated Spurious Emission only

### Representative Test Engineer



Hiromasa Sato  
Engineer

### Approved By



Kazutaka Takeyama  
Leader



CERTIFICATE 1266.03

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

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 23.0

## ANNOUNCEMENT

- This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
- The results in this report apply only to the sample tested. (Laboratory was not involved in sampling.)
- This sample tested is in compliance with the limits of the above regulation.
- The test results in this test report are traceable to the national or international standards.
- This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
- This test report covers Radio technical requirements.  
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
- The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
- The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan, Inc. has been accredited.
- The information provided from the customer for this report is identified in Section 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

## REVISION HISTORY

### Original Test Report No.: 15048694S-A

This report is a revised version of 15048694S-A. 15048694S-A is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15048694S-A	December 28, 2023	-
1	15048694S-A-R1	January 31, 2024	3.2 Procedures and Results Because of the replacement of the data, Worst Margin is changed. From "9.5 dB 0.44250 MHz, N 0.44500 MHz, L1 Mode: Tx 915.125 MHz" to "9.5 dB 0.44511 MHz, N, AV Mode: Tx 921.125 MHz" Replacement of the data: P.13 The data of the mode with the highest conducted power in the original report is adopted. P.14 For mode which is not the worst case, the data with the chart only is adopted Replacement of the data: P.26 The data of the mode with the highest conducted power in the original report is adopted.

**Reference: Abbreviations (Including words undescribed in this report)**

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

---

<b>CONTENTS</b>	<b>PAGE</b>
<b>SECTION 1: Customer Information</b> .....	<b>5</b>
<b>SECTION 2: Equipment Under Test (EUT)</b> .....	<b>5</b>
<b>SECTION 3: Test Specification, Procedures &amp; Results</b> .....	<b>6</b>
<b>SECTION 4: Operation of EUT during testing</b> .....	<b>8</b>
<b>SECTION 5: Conducted Emission</b> .....	<b>10</b>
<b>SECTION 6: Radiated Spurious Emission</b> .....	<b>11</b>
<b>APPENDIX 1: Test Data</b> .....	<b>13</b>
Conducted Emission .....	13
Radiated Spurious Emission.....	17
<b>APPENDIX 2: Test Instruments</b> .....	<b>27</b>
<b>APPENDIX 3: Photographs of Test Setup</b> .....	<b>28</b>
Conducted Emission .....	28
Radiated Spurious Emission.....	29
Pre-check of Worst Case Position .....	30

## **SECTION 1: Customer Information**

Company Name	Teraoka Seiko Co., Ltd.
Address	13-12 Kugahara 5-chome Ohta-ku, Tokyo 146-8580 Japan
Telephone Number	+81-3-3752-5917
Contact Person	Hideaki Haraguchi

The information provided from the customer is as follows;

- Customer, Description 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 and Test 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**

Description	UHF RFID Reader
Model Number	CSH-20013
Serial Number	Refer to SECTION 4.2
Condition	Production model
Modification	No Modification by the test lab
Receipt Date	November 22, 2023
Test Date	November 25 to December 2, 2023

### **2.2 Product Description**

#### **General Specification**

Rating	AC 100 V to 240 V, 50 / 60 Hz
Clock frequency (ies) in the system	32 MHz

#### **Radio Specification**

Equipment Type	Transceiver
Frequency of Operation	915.125 MHz to 927.375 MHz
Type of Modulation	PRASK
Antenna Gain	≤1 dBi

## SECTION 3: Test Specification, Procedures & Results

### 3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
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
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ISED: RSS-Gen 8.8	FCC: Section 15.207 ISED: RSS-Gen 8.8	9.5 dB 0.44511 MHz, N, AV Mode: Tx 921.125 MHz	Complied	-
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	1.6 dB 7419.000 MHz, AV, Vertical, Mode: Tx 927.375 MHz	Complied	Radiated (above 30 MHz) *1)

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.

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

\*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.

#### **FCC Part 15.31 (e)**

This EUT provides the stable voltage constantly to RF transmitter regardless of input voltage. Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

The EUT has a unique coupling/antenna connector (RP-SMA). Therefore, the EUT complies with the requirement.

### 3.3 Addition to Standard

No addition, exclusion nor deviation has been made from the standard.

### 3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement. Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor  $k = 2$ .

Item	Frequency range	Uncertainty (+/-)
Conducted Emission (AC Mains) LISN	150 kHz to 30 MHz	3.2 dB
Radiated Emission (Measurement distance: 3 m)	9 kHz to 30 MHz	3.3 dB
	30 MHz to 200 MHz	4.9 dB
	200 MHz to 1 GHz	6.2 dB
	1 GHz to 6 GHz	4.7 dB
	6 GHz to 10 GHz	5.3 dB

Antenna terminal test	Uncertainty (+/-)
Bandwidth Measurement	0.012 %
Duty Cycle and Time Measurement	0.27 %
Temperature_SCH-01	0.96 deg.C.
Humidity_SCH-01	4.0 %
Temperature_SCH-02	2.2 deg.C.
Voltage	0.74 %

### 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

A2LA Certificate Number: 1266.03

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

Test room	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber (SAC1)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber (SAC2)	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber (SAC3)	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber (SAC4)	8.1 x 5.1 x 3.55	8.1 x 5.1	-
Wireless anechoic chamber 1 (WAC1)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
Wireless anechoic chamber 2 (WAC2)	9.5 x 6.0 x 5.4	9.5 x 6.0	3 m
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	-	-
No.2 Measurement room	4.5 x 3.5 x 2.5	-	-
Wireless shielded room 1	3.0 x 4.5 x 2.7	3.0 x 4.5	-
Wireless shielded room 2	3.0 x 4.5 x 2.7	3.0 x 4.5	-

### 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)**

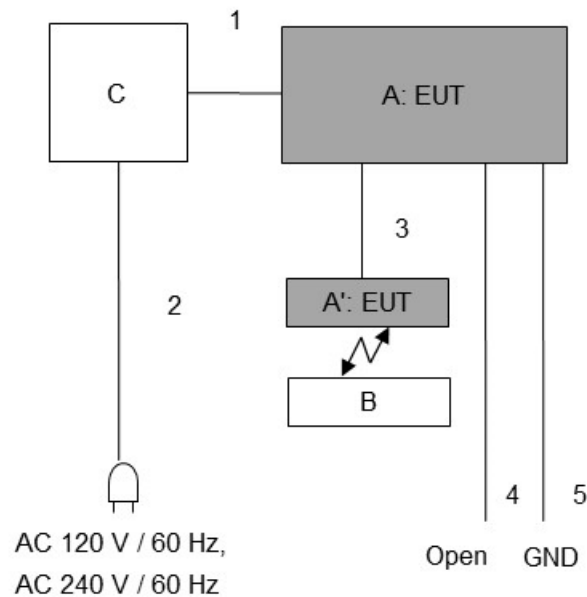
<b>Mode</b>	<b>Remarks*</b>
Tx (Hopping Off)	-
*Transmitting duty was 100 % on all tests.	
*Power of the EUT was set by the software as follows; Power Setting: 24 dBm / 0 dBm (Setting value) Software: LAN&COM Test Ver.1.70 (Date: 2019.11.13, Storage location: Driven by connected PC)	
*This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	
The carrier level and noise levels were confirmed with and without Tag, and the test was made with the condition that has the maximum noise (with Tag).	

\*The Details of Operating Mode(s)

<b>Test Item</b>	<b>Operating Mode</b>	<b>Tested Frequency</b>
Conducted Emission, Radiated Spurious Emission	Tx (Hopping Off)	915.125MHz, 921.125 MHz, 927.375 MHz



#### 4.2 Configuration and Peripherals



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

\*As a result of comparing AC 120 V and AC 240 V at pre-check, conducted emission test was performed with AC 120 V of the worst voltage as representative.

#### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	UHF RFID Reader	CSH-20013	WUC2300219	Teraoka Seiko Co., Ltd.	EUT
A'	Antenna	AN-UDUL1	22204-149	Teraoka Seiko Co., Ltd.	EUT
B	IC Tag	LinTRAK	CS231101	HID Global Corporation	-
C	AC Adapter	UI318-0530	M08-0632818	IDEC AUTO-ID SOLUTIONS CORPORATION	-

#### List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	DC	1.8	Unshielded	Unshielded	-
2	AC	2.0	Unshielded	Unshielded	-
3	RF	0.5	Shielded	Shielded	-
4	Signal	1.4	Unshielded	Unshielded	-
5	FG	2.0	Unshielded	Unshielded	-

## **SECTION 5: Conducted Emission**

### **Test Procedure and Conditions**

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.

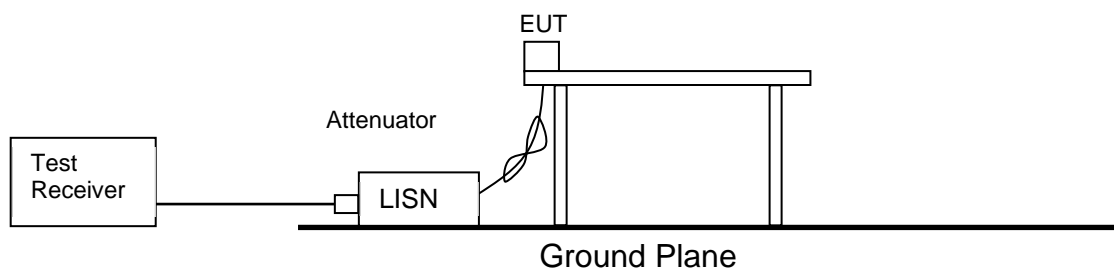
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via AC adapter in a shielded room. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

Test results are rounded off and limit are rounded down, so some differences might be observed.

<b>Detector</b>	<b>: QP and CISPR AV</b>
<b>Measurement Range</b>	<b>: 0.15 MHz to 30 MHz</b>
<b>Test Data</b>	<b>: APPENDIX</b>
<b>Test Result</b>	<b>: Pass</b>

**Figure 1: Test Setup**



## **SECTION 6: Radiated Spurious Emission**

### **Test Procedure**

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

[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. 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 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.

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.

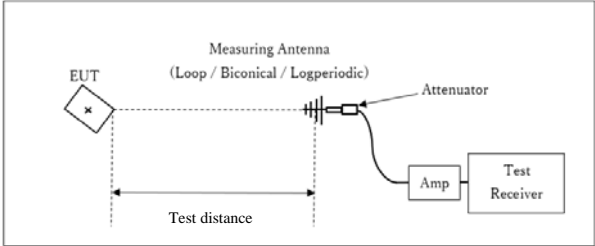
### **20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).**

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	RBW: 1 MHz VBW: 1/T (10 Hz) (T: burst length, refer to Burst rate confirmation sheet) Detector: Peak	RBW: 100 kHz VBW: 300 kHz

\*1) Average Power Measurement was performed based on KDB 558074 D01 15.247 Meas Guidance v05r02.

**Figure 2: Test Setup**

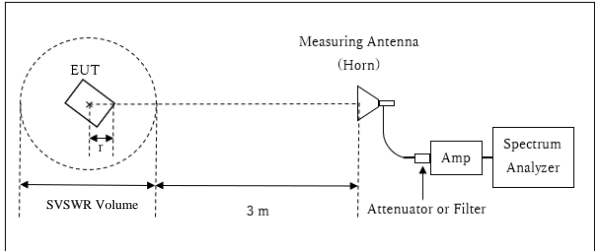
Below 1 GHz



\* : Center of turn table

Test Distance: 3 m

1 GHz to 10 GHz



r : Radius of an outer periphery of EUT  
 \* : Center of turn table

Distance Factor:  $20 \times \log(3.85 \text{ m} / 3.0 \text{ m}) = 2.17 \text{ dB}$   
 \* Test Distance:  $(3 + \text{SVSWR Volume} / 2) - r = 3.85 \text{ m}$

SVSWR Volume : 2.0 m  
 (SVSWR Volume has been calibrated based on CISPR 16-1-4.)  
 $r = 0.15 \text{ m}$

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

	Below 1 GHz	Above 1 GHz
Horizontal	Z	X
Vertical	Z	X

Test results are rounded off and limit are rounded down, so some differences might be observed.

**Measurement Range** : 30 MHz to 10 GHz  
**Test Data** : APPENDIX  
**Test Result** : Pass

**APPENDIX 1: Test Data**

**Conducted Emission**

**DATA OF CONDUCTED EMISSION TEST**

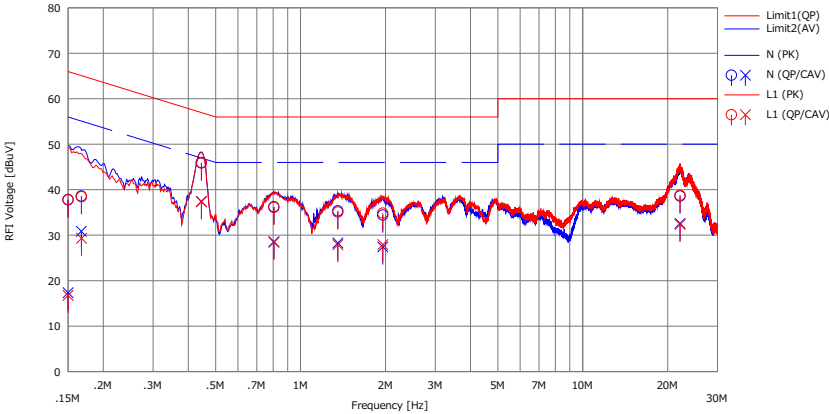
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2023/11/25

Mode : Tx 921.125 MHz  
Power : AC 120 V / 60 Hz  
Temp./Humi. : 26 deg.C / 31 %RH

Remarks : -

Limit : FCC\_Part 15 Subpart C(15.207)

Engineer : Hiromasa Sato



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(CAV) [dBuV]		(QP) [dBuV]	(CAV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	25.33	4.93	12.42	37.75	17.35	66.00	56.00	28.2	38.6	N	
2	0.16712	26.16	18.42	12.42	38.58	30.84	65.10	55.10	26.5	24.2	N	
3	0.44511	33.51	24.99	12.45	45.96	37.44	56.97	46.97	11.0	9.5	N	
4	0.80470	23.77	16.10	12.48	36.25	28.58	56.00	46.00	19.7	17.4	N	
5	1.35593	22.80	15.77	12.53	35.33	28.30	56.00	46.00	20.6	17.7	N	
6	1.95672	21.84	14.84	12.57	34.41	27.41	56.00	46.00	21.5	18.5	N	
7	22.11815	25.19	19.15	13.42	38.61	32.57	60.00	50.00	21.3	17.4	N	
8	0.15000	25.42	4.29	12.43	37.85	16.72	66.00	56.00	28.1	39.2	L1	
9	0.16742	26.04	16.88	12.42	38.46	29.30	65.09	55.09	26.6	25.7	L1	
10	0.44537	33.41	24.87	12.46	45.87	37.33	56.96	46.96	11.0	9.6	L1	
11	0.80455	23.64	15.93	12.48	36.12	28.41	56.00	46.00	19.8	17.5	L1	
12	1.35571	22.54	15.38	12.53	35.07	27.91	56.00	46.00	20.9	18.0	L1	
13	1.95668	22.29	15.38	12.57	34.86	27.95	56.00	46.00	21.1	18.0	L1	
14	22.11824	25.60	19.20	13.16	38.76	32.36	60.00	50.00	21.2	17.6	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]  
LISN(AMN) : 145542

### Conducted Emission

#### DATA OF CONDUCTED EMISSION TEST

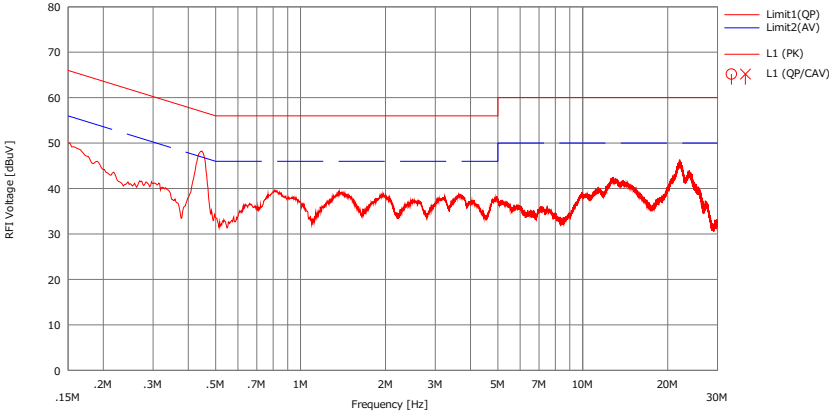
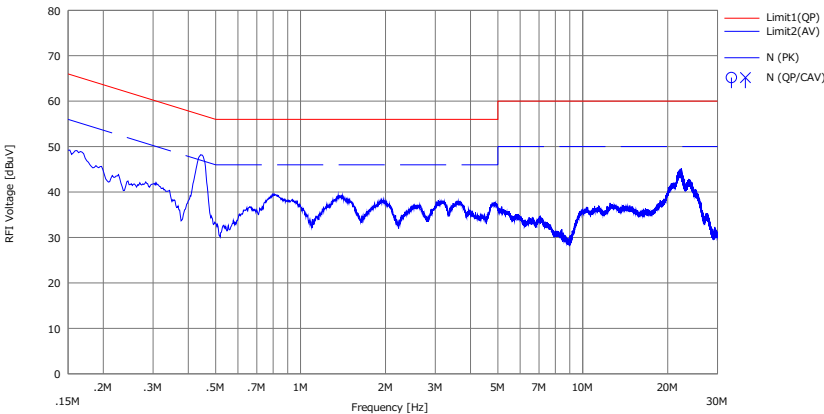
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2023/11/25

Mode : Tx 915.125 MHz  
Power : AC 120 V / 60 Hz  
Temp./Humi. : 26 deg.C / 31 %RH

Remarks : -

Limit : FCC\_Part 15 Subpart C(15.207)

Engineer : Hiromasa Sato



Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]  
LISN(AMN): 145542

# Conducted Emission

## DATA OF CONDUCTED EMISSION TEST

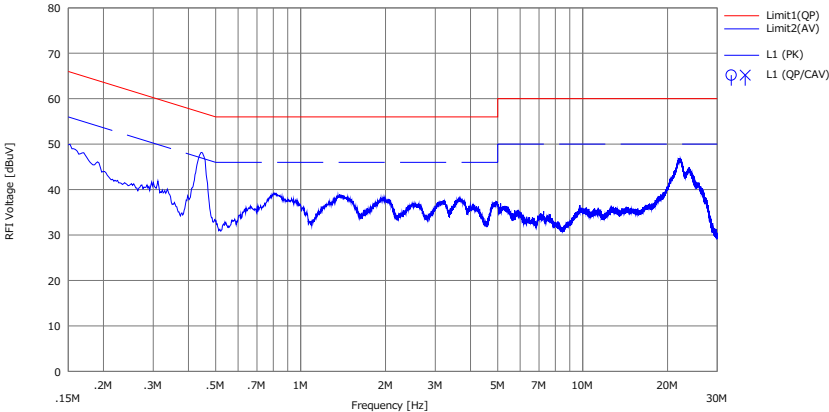
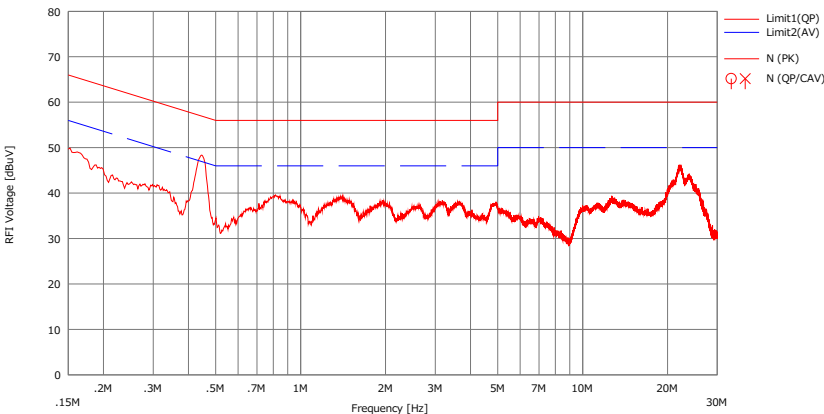
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2023/11/25

Mode : Tx 927.375 MHz  
Power : AC 120 V / 60 Hz  
Temp./Humi. : 26 deg.C / 31 %RH

Remarks : -

Limit : FCC\_Part 15 Subpart C(15.207)

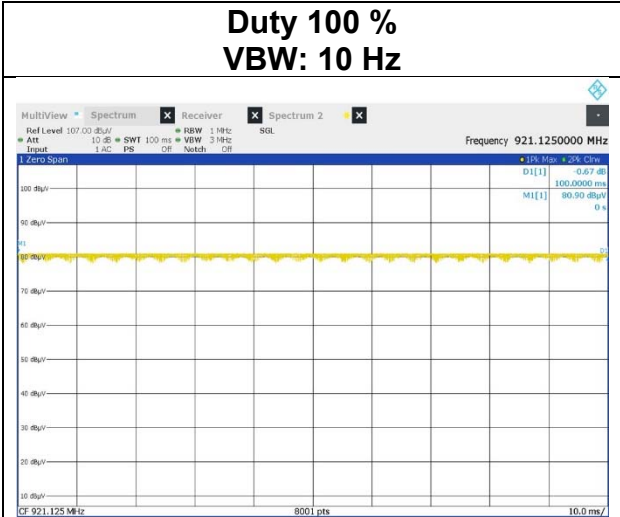
Engineer : Hiromasa Sato



Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]  
LISN(AMN): 145542

**Burst Rate Confirmation**

Test place                   Shonan EMC Lab. WAC 1  
Date                         November 30, 2023  
Temperature / Humidity    20 deg. C / 38 % RH  
Engineer                  Makoto Hosaka  
Mode                        Tx 921.125 MHz





## Radiated Spurious Emission

Test place	Shonan EMC Lab.	WAC 1
Semi Anechoic Chamber	SAC 1	
Date	December 2, 2023	November 30, 2023
Temperature / Humidity	21 deg. C / 32 % RH	20 deg. C / 38 % RH
Engineer	Hiromasa Sato	Makoto Hosaka
	(30 Hz to 1 GHz)	(1 GHz to 10 GHz)
Mode	Tx 915.125 MHz, Output: 24 dBm (Setting Value), with Tag	

(\* 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.	100.042	QP	40.38	10.26	8.37	31.81	0.00	27.20	43.5	16.3	391	350	-
Hori.	249.597	QP	48.22	11.70	6.40	31.73	0.00	34.59	46.0	11.4	139	263	-
Hori.	299.998	QP	42.37	12.90	6.81	31.76	0.00	30.32	46.0	15.6	100	177	-
Hori.	500.003	QP	48.12	17.43	8.23	31.84	0.00	41.94	46.0	<b>4.0</b>	100	30	-
Hori.	624.811	QP	35.81	19.88	8.95	31.96	0.00	32.68	46.0	13.3	100	32	-
Hori.	700.003	QP	36.27	20.44	9.43	31.98	0.00	34.16	46.0	11.8	158	194	-
Hori.	884.013	QP	32.63	22.26	10.70	31.38	0.00	34.21	46.0	11.7	224	237	-
Hori.	1830.250	PK	55.58	25.38	-36.86	0.00	2.17	46.27	73.9	27.6	149	283	-
Hori.	3660.500	PK	52.72	29.15	-35.46	0.00	2.17	48.58	73.9	25.3	376	36	-
Hori.	4575.625	PK	54.00	30.85	-34.81	0.00	2.17	52.21	73.9	21.6	263	68	-
Hori.	7321.000	PK	49.59	36.27	-32.97	0.00	2.17	55.06	73.9	18.8	290	136	-
Hori.	8236.125	PK	48.18	36.56	-31.59	0.00	2.17	55.32	73.9	18.5	138	185	-
Hori.	9151.250	PK	48.78	38.04	-30.54	0.00	2.17	58.45	73.9	15.4	136	193	-
Hori.	1830.250	AV	49.15	25.38	-36.86	0.00	2.17	39.84	53.9	14.0	149	283	-
Hori.	3660.500	AV	45.65	29.15	-35.46	0.00	2.17	41.51	53.9	12.3	376	36	-
Hori.	4575.625	AV	42.01	30.85	-34.81	0.00	2.17	40.22	53.9	13.6	263	68	-
Hori.	7321.000	AV	36.45	36.27	-32.97	0.00	2.17	41.92	53.9	11.9	290	136	-
Hori.	8236.125	AV	34.00	36.56	-31.59	0.00	2.17	41.14	53.9	12.7	138	185	-
Hori.	9151.250	AV	35.22	38.04	-30.54	0.00	2.17	44.89	53.9	9.0	136	193	-
Vert.	34.733	QP	31.34	16.73	7.22	31.83	0.00	23.46	40.0	16.5	100	174	-
Vert.	300.002	QP	41.31	12.90	6.81	31.76	0.00	29.26	46.0	16.7	184	72	-
Vert.	500.004	QP	41.65	17.43	8.23	31.84	0.00	35.47	46.0	10.5	153	331	-
Vert.	699.992	QP	35.58	20.44	9.43	31.98	0.00	33.47	46.0	12.5	100	353	-
Vert.	1830.250	PK	57.13	25.38	-36.86	0.00	2.17	47.82	73.9	26.0	328	258	-
Vert.	3660.500	PK	51.75	29.15	-35.46	0.00	2.17	47.61	73.9	26.2	300	251	-
Vert.	4575.625	PK	54.31	30.85	-34.81	0.00	2.17	52.52	73.9	21.3	340	0	-
Vert.	7321.000	PK	49.83	36.27	-32.97	0.00	2.17	55.30	73.9	18.6	144	29	-
Vert.	8236.125	PK	49.03	36.56	-31.59	0.00	2.17	56.17	73.9	17.7	100	330	-
Vert.	9151.250	PK	49.26	38.04	-30.54	0.00	2.17	58.93	73.9	14.9	317	303	-
Vert.	1830.250	AV	50.28	25.38	-36.86	0.00	2.17	40.97	53.9	12.9	328	258	-
Vert.	3660.500	AV	44.15	29.15	-35.46	0.00	2.17	40.01	53.9	13.8	300	251	-
Vert.	4575.625	AV	43.00	30.85	-34.81	0.00	2.17	41.21	53.9	12.6	340	0	-
Vert.	7321.000	AV	38.74	36.27	-32.97	0.00	2.17	44.21	53.9	9.6	144	29	-
Vert.	8236.125	AV	35.85	36.56	-31.59	0.00	2.17	42.99	53.9	10.9	100	330	-
Vert.	9151.250	AV	37.91	38.04	-30.54	0.00	2.17	47.58	53.9	6.3	317	303	-

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

Distance factor : 1 GHz - 10 GHz : 20log (3.85 m / 3.0 m) = 2.17 dB

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

Since the The switch box (LIMS ID: 237794) used for measurement has been calibrated including the included preamplifier, so Loss above 1 GHz is displayed as a minus sign and Gain is zero.

### 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.	902.000	PK	32.84	22.72	20.14	31.28	0.00	44.42	92.9	48.4	-
Hori.	915.125	PK	100.94	22.98	20.17	31.20	0.00	112.89	-	-	-
Vert.	902.000	PK	33.80	22.72	20.14	31.28	0.00	45.38	97.7	52.3	-
Vert.	915.125	PK	105.79	22.98	20.17	31.20	0.00	117.74	-	-	-

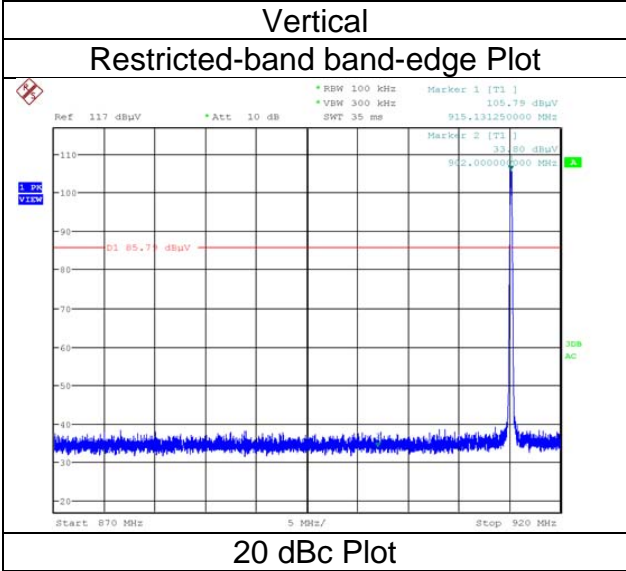
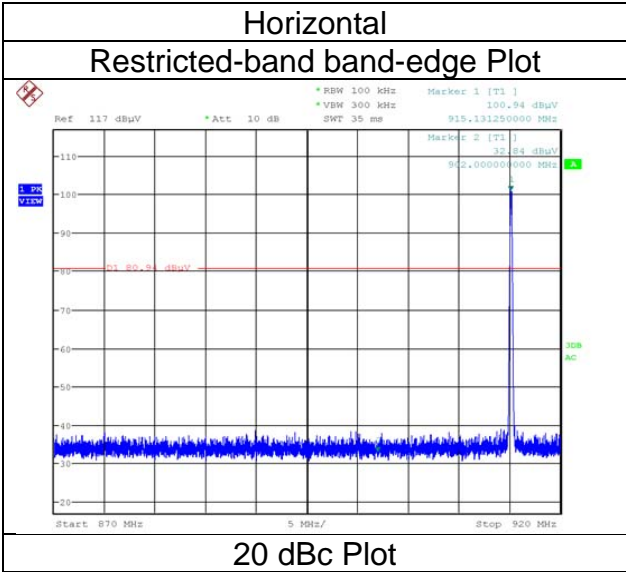
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator + Filter)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (3.85 m / 3.0 m) = 2.17 dB

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

Test place  
Semi Anechoic Chamber  
Date  
Temperature / Humidity  
Engineer  
  
Mode

Shonan EMC Lab.  
SAC 1  
December 2, 2023  
21 deg. C / 32 % RH  
Hiromasa Sato  
(30 Hz to 1 GHz)  
Tx 915.125 MHz, Output: 24 dBm (Setting Value), with Tag



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

## Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	SAC 1	WAC 1
Date	December 2, 2023	November 30, 2023
Temperature / Humidity	21 deg. C / 32 % RH	20 deg. C / 38 % RH
Engineer	Hironasa Sato	Makoto Hosaka
	(30 Hz to 1 GHz)	(1 GHz to 10 GHz)
Mode	Tx 921.125 MHz, Output: 24 dBm (Setting Value), with Tag	

(\* 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.	100.044	QP	40.21	10.26	8.37	31.81	0.00	27.03	43.5	16.4	399	336	-
Hori.	249.599	QP	48.58	11.70	6.40	31.73	0.00	34.95	46.0	11.0	142	274	-
Hori.	299.998	QP	42.11	12.90	6.81	31.76	0.00	30.06	46.0	15.9	100	161	-
Hori.	500.004	QP	47.53	17.43	8.23	31.84	0.00	41.35	46.0	4.6	100	35	-
Hori.	624.814	QP	36.36	19.88	8.95	31.96	0.00	33.23	46.0	12.7	100	45	-
Hori.	700.001	QP	33.74	20.44	9.43	31.98	0.00	31.63	46.0	14.3	154	200	-
Hori.	884.015	QP	32.43	22.26	10.70	31.38	0.00	34.01	46.0	11.9	235	226	-
Hori.	1842.250	PK	53.67	25.45	-36.86	0.00	2.17	44.43	73.9	29.4	107	159	-
Hori.	3684.500	PK	51.95	29.19	-35.45	0.00	2.17	47.86	73.9	26.0	400	28	-
Hori.	4605.625	PK	53.15	30.95	-34.81	0.00	2.17	51.46	73.9	22.4	259	69	-
Hori.	7369.000	PK	51.98	36.35	-32.93	0.00	2.17	57.57	73.9	16.3	308	135	-
Hori.	8290.125	PK	48.56	36.46	-31.57	0.00	2.17	55.62	73.9	18.2	149	186	-
Hori.	9211.250	PK	48.12	38.33	-30.46	0.00	2.17	58.16	73.9	15.7	136	193	-
Hori.	1842.250	AV	47.36	25.45	-36.86	0.00	2.17	38.12	53.9	15.7	107	159	-
Hori.	3684.500	AV	44.26	29.19	-35.45	0.00	2.17	40.17	53.9	13.7	400	28	-
Hori.	4605.625	AV	41.86	30.95	-34.81	0.00	2.17	40.17	53.9	13.7	259	69	-
Hori.	7369.000	AV	41.85	36.35	-32.93	0.00	2.17	47.44	53.9	6.4	308	135	-
Hori.	8290.125	AV	33.66	36.46	-31.57	0.00	2.17	40.72	53.9	13.1	149	186	-
Hori.	9211.250	AV	35.05	38.33	-30.46	0.00	2.17	45.09	53.9	8.8	136	193	-
Vert.	34.632	QP	31.58	16.77	7.22	31.83	0.00	23.74	40.0	16.2	100	183	-
Vert.	300.005	QP	41.16	12.90	6.81	31.76	0.00	29.11	46.0	16.8	188	69	-
Vert.	500.001	QP	41.32	17.43	8.23	31.84	0.00	35.14	46.0	10.8	151	333	-
Vert.	699.997	QP	34.61	20.44	9.43	31.98	0.00	32.50	46.0	13.5	100	358	-
Vert.	1842.250	PK	54.02	25.45	-36.86	0.00	2.17	44.78	73.9	29.1	220	243	-
Vert.	3684.500	PK	51.79	29.19	-35.45	0.00	2.17	47.70	73.9	26.2	383	274	-
Vert.	4605.625	PK	54.73	30.95	-34.81	0.00	2.17	53.04	73.9	20.8	400	0	-
Vert.	7369.000	PK	53.64	36.35	-32.93	0.00	2.17	59.23	73.9	14.6	100	264	-
Vert.	8290.125	PK	50.50	36.46	-31.57	0.00	2.17	57.56	73.9	16.3	100	328	-
Vert.	9211.250	PK	50.48	38.33	-30.46	0.00	2.17	60.52	73.9	13.3	306	68	-
Vert.	1842.250	AV	45.46	25.45	-36.86	0.00	2.17	36.22	53.9	17.6	220	243	-
Vert.	3684.500	AV	45.27	29.19	-35.45	0.00	2.17	41.18	53.9	12.7	383	274	-
Vert.	4605.625	AV	42.71	30.95	-34.81	0.00	2.17	41.02	53.9	12.8	400	0	-
Vert.	7369.000	AV	46.57	36.35	-32.93	0.00	2.17	52.16	53.9	1.7	100	264	-
Vert.	8290.125	AV	36.64	36.46	-31.57	0.00	2.17	43.70	53.9	10.2	100	328	-
Vert.	9211.250	AV	40.33	38.33	-30.46	0.00	2.17	50.37	53.9	3.5	306	68	-

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

Distance factor : 1 GHz - 10 GHz : 20log (3.85 m / 3.0 m) = 2.17 dB

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

Since theThe switch box (LIMS ID: 237794) used for measurement has been calibrated including the included preamplifier, so Loss above 1 GHz is displayed as a minus sign and Gain is zero.

## Radiated Spurious Emission

Test place	Shonan EMC Lab.	WAC 1
Semi Anechoic Chamber	SAC 1	
Date	December 2, 2023	November 30, 2023
Temperature / Humidity	21 deg. C / 32 % RH	20 deg. C / 38 % RH
Engineer	Hironasa Sato	Makoto Hosaka
	(30 Hz to 1 GHz)	(1 GHz to 10 GHz)
Mode	Tx 927.375 MHz, Output: 24 dBm (Setting Value), with Tag	

(\* 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.	100.020	QP	40.25	10.25	8.37	31.81	0.00	27.06	43.5	16.4	399	336	-
Hori.	249.597	QP	49.81	11.70	6.40	31.73	0.00	36.18	46.0	9.8	142	274	-
Hori.	299.994	QP	42.11	12.90	6.81	31.76	0.00	30.06	46.0	15.9	100	161	-
Hori.	500.001	QP	46.73	17.43	8.23	31.84	0.00	40.55	46.0	5.4	100	35	-
Hori.	624.817	QP	36.22	19.88	8.95	31.96	0.00	33.09	46.0	12.9	100	45	-
Hori.	700.003	QP	33.59	20.44	9.43	31.98	0.00	31.48	46.0	14.5	154	200	-
Hori.	884.016	QP	32.15	22.26	10.70	31.38	0.00	33.73	46.0	12.2	235	226	-
Hori.	1854.750	PK	55.14	25.52	-36.82	0.00	2.17	46.01	73.9	27.8	100	283	-
Hori.	3709.500	PK	50.57	29.24	-35.45	0.00	2.17	46.53	73.9	27.3	400	276	-
Hori.	4636.875	PK	51.66	31.05	-34.79	0.00	2.17	50.09	73.9	23.8	349	70	-
Hori.	7419.000	PK	51.44	36.43	-32.91	0.00	2.17	57.13	73.9	16.7	106	326	-
Hori.	8346.375	PK	48.70	36.49	-31.51	0.00	2.17	55.85	73.9	18.0	145	186	-
Hori.	9273.750	PK	49.95	38.53	-30.36	0.00	2.17	60.29	73.9	13.6	113	195	-
Hori.	1854.750	AV	47.93	25.52	-36.82	0.00	2.17	38.80	53.9	15.1	100	283	-
Hori.	3709.500	AV	41.50	29.24	-35.45	0.00	2.17	37.46	53.9	16.4	400	276	-
Hori.	4636.875	AV	39.00	31.05	-34.79	0.00	2.17	37.43	53.9	16.4	349	70	-
Hori.	7419.000	AV	41.34	36.43	-32.91	0.00	2.17	47.03	53.9	6.8	106	326	-
Hori.	8346.375	AV	34.11	36.49	-31.51	0.00	2.17	41.26	53.9	12.6	145	186	-
Hori.	9273.750	AV	35.16	38.53	-30.36	0.00	2.17	45.50	53.9	8.4	113	195	-
Vert.	34.477	QP	31.20	16.82	7.22	31.83	0.00	23.41	40.0	16.5	100	183	-
Vert.	300.003	QP	41.37	12.90	6.81	31.76	0.00	29.32	46.0	16.6	188	69	-
Vert.	500.004	QP	41.10	17.43	8.23	31.84	0.00	34.92	46.0	11.0	151	333	-
Vert.	699.999	QP	34.46	20.44	9.43	31.98	0.00	32.35	46.0	13.6	100	358	-
Vert.	1854.750	PK	52.29	25.52	-36.82	0.00	2.17	43.16	73.9	30.7	190	188	-
Vert.	3709.500	PK	54.25	29.24	-35.45	0.00	2.17	50.21	73.9	23.6	259	257	-
Vert.	4636.875	PK	53.05	31.05	-34.79	0.00	2.17	51.48	73.9	22.4	311	16	-
Vert.	7419.000	PK	52.84	36.43	-32.91	0.00	2.17	58.53	73.9	15.3	100	344	-
Vert.	8346.375	PK	51.10	36.49	-31.51	0.00	2.17	58.25	73.9	15.6	115	330	-
Vert.	9273.759	PK	49.90	38.53	-30.36	0.00	2.17	60.24	73.9	13.6	139	176	-
Vert.	1854.750	AV	43.86	25.52	-36.82	0.00	2.17	34.73	53.9	19.1	190	188	-
Vert.	3709.500	AV	47.70	29.24	-35.45	0.00	2.17	43.66	53.9	10.2	259	257	-
Vert.	4636.875	AV	40.97	31.05	-34.79	0.00	2.17	39.40	53.9	14.5	311	16	-
Vert.	7419.000	AV	46.56	36.43	-32.91	0.00	2.17	52.25	53.9	1.6	100	344	-
Vert.	8346.375	AV	38.21	36.49	-31.51	0.00	2.17	45.36	53.9	8.5	115	330	-
Vert.	9273.759	AV	39.02	38.53	-30.36	0.00	2.17	49.36	53.9	4.5	139	176	-

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

Distance factor : 1 GHz - 10 GHz : 20log (3.85 m / 3.0 m) = 2.17 dB

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

Since theThe switch box (LIMS ID: 237794) used for measurement has been calibrated including the included preamplifier, so Loss above 1 GHz is displayed as a minus sign and Gain is zero.

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

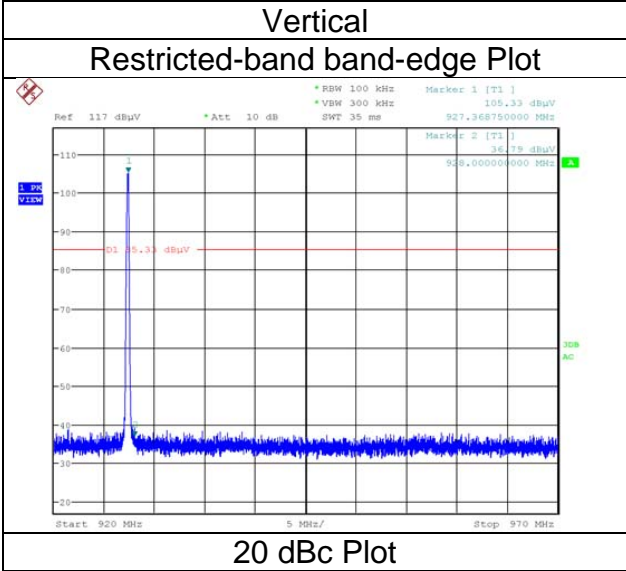
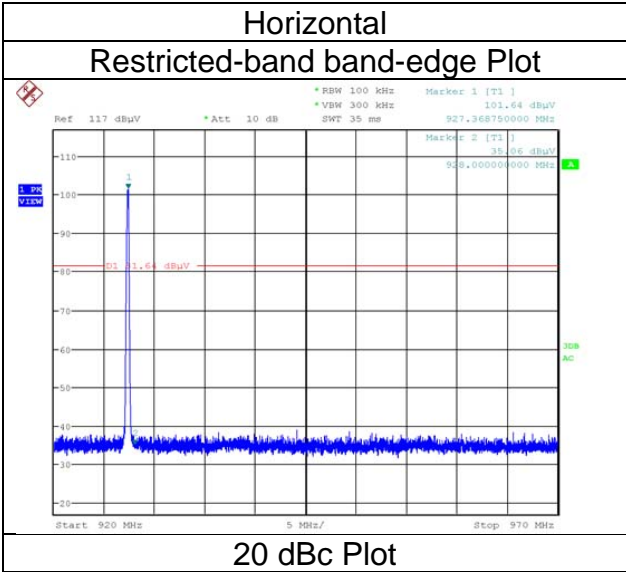
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	927.375	PK	101.64	22.14	20.21	31.13	0.00	112.86	-	-	-
Hori.	928.000	PK	35.06	22.13	20.21	31.12	0.00	46.28	92.9	46.5	-
Vert.	927.375	PK	105.33	22.14	20.21	31.13	0.00	116.55	-	-	-
Vert.	928.000	PK	36.79	22.13	20.21	31.12	0.00	48.01	96.6	48.5	-

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

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

Test place  
 Semi Anechoic Chamber  
 Date  
 Temperature / Humidity  
 Engineer  
 Mode

Shonan EMC Lab.  
 SAC 1  
 December 2, 2023  
 21 deg. C / 32 % RH  
 Hiromasa Sato  
 (30 Hz to 1 GHz)  
 Tx 927.375 MHz, Output: 24 dBm (Setting Value), with Tag



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

## Radiated Spurious Emission

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	SAC 1
Date	December 2, 2023
Temperature / Humidity	21 deg. C / 32 % RH
Engineer	Hiromasa Sato
	(30 Hz to 1 GHz)
Mode	Tx 915.125 MHz, Output: 0 dBm (Setting Value), with Tag

**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.	902.000	PK	33.67	22.72	20.14	31.28	0.00	45.25	70.8	25.5	-
Hori.	915.125	PK	78.85	22.98	20.17	31.20	0.00	90.80	-	-	-
Vert.	902.000	PK	33.61	22.72	20.14	31.28	0.00	45.19	75.9	30.7	-
Vert.	915.125	PK	83.94	22.98	20.17	31.20	0.00	95.89	-	-	-

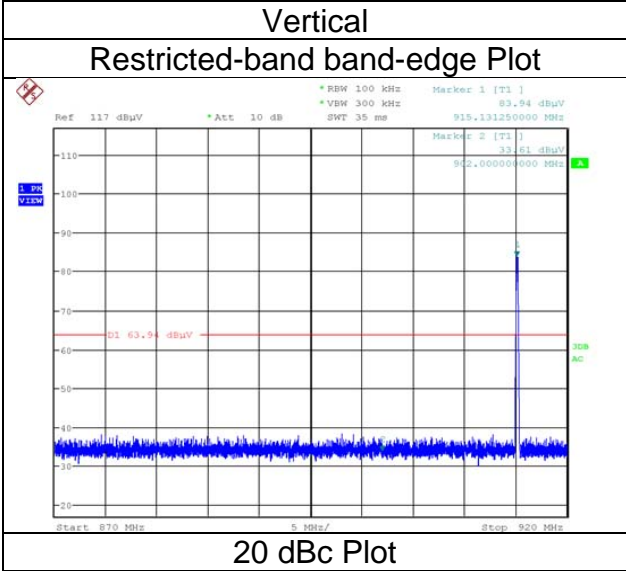
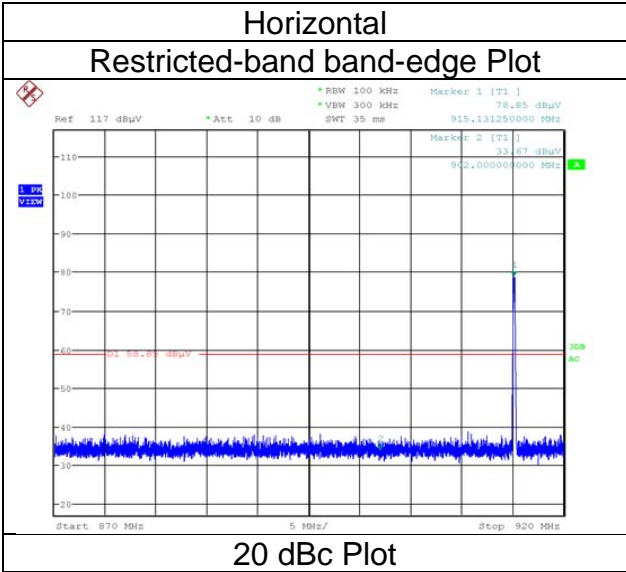
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator + Filter)) - Gain(Amplifier) + Distance factor  
 Distance factor : 1 GHz - 10 GHz :  $20\log(3.85\text{ m} / 3.0\text{ m}) = 2.17\text{ dB}$

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

Test place  
 Semi Anechoic Chamber  
 Date  
 Temperature / Humidity  
 Engineer

Shonan EMC Lab.  
 SAC 1  
 December 2, 2023  
 21 deg. C / 32 % RH  
 Hiromasa Sato  
 (30 Hz to 1 GHz)  
 Tx 915.125 MHz, Output: 0 dBm (Setting Value), with Tag

Mode



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

## Radiated Spurious Emission

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	SAC 1	WAC 1
Date	December 2, 2023	November 30, 2023
Temperature / Humidity	21 deg. C / 32 % RH	20 deg. C / 38 % RH
Engineer	Hiromasa Sato	Makoto Hosaka
	(30 Hz to 1 GHz)	(1 GHz to 10 GHz)
Mode	Tx 927.375 MHz, Output: 0 dBm (Setting Value), with Tag	

**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.	927.375	PK	79.80	22.14	20.21	31.13	0.00	91.02	-	-	-
Hori.	928.000	PK	34.78	22.13	20.21	31.12	0.00	46.00	71.0	25.0	-
Vert.	927.375	PK	83.52	22.14	20.21	31.13	0.00	94.74	-	-	-
Vert.	928.000	PK	34.24	22.13	20.21	31.12	0.00	45.46	74.7	29.2	-

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

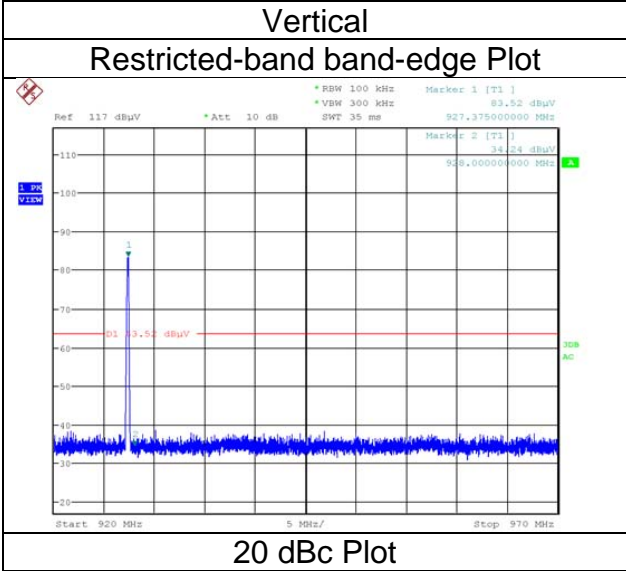
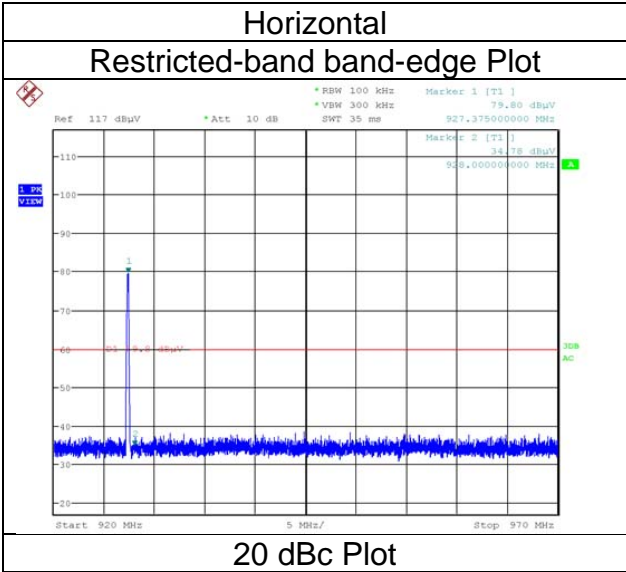
Distance factor : 1 GHz - 10 GHz :  $20\log(3.85\text{ m} / 3.0\text{ m}) = 2.17\text{ dB}$



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

Test place  
 Semi Anechoic Chamber  
 Date  
 Temperature / Humidity  
 Engineer  
 Mode

Shonan EMC Lab.  
 SAC 1  
 December 2, 2023  
 21 deg. C / 32 % RH  
 Hiromasa Sato  
 (30 Hz to 1 GHz)  
 Tx 927.375 MHz, Output: 0 dBm (Setting Value), with Tag

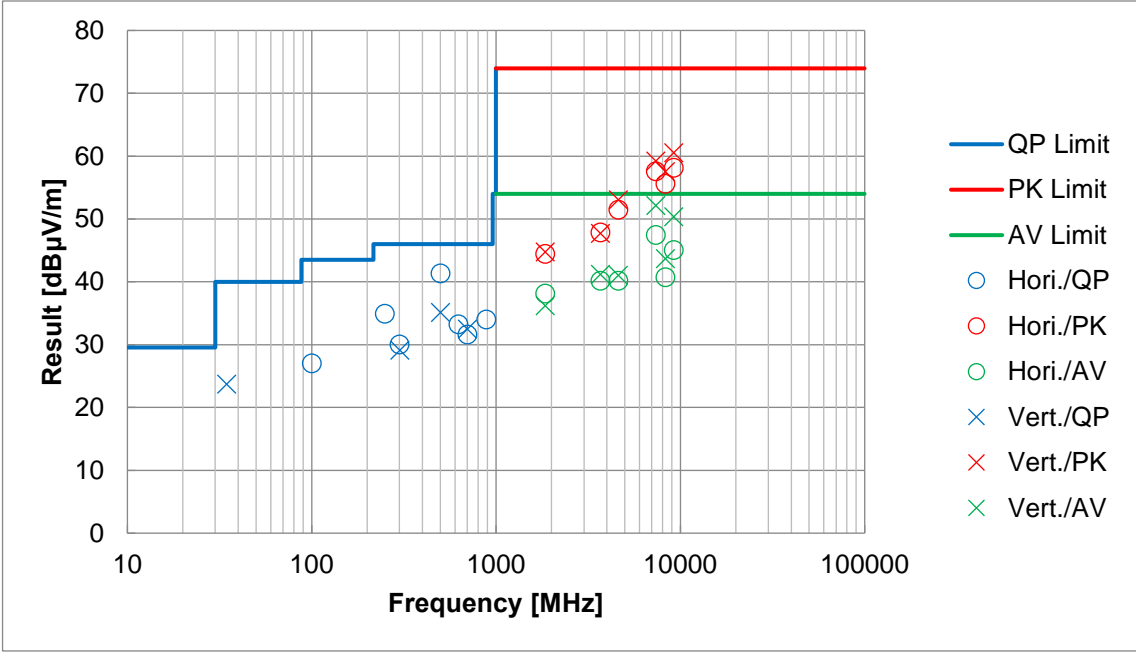


\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
 Final result of restricted band edge and authorized band edge were shown in tabular data.

**Radiated Spurious Emission**

(Plot data, Worst case mode for Maximum Peak Output Power of Original report(13295245S-A-R1))

Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	SAC 1	WAC 1
Date	December 2, 2023	November 30, 2023
Temperature / Humidity	21 deg. C / 32 % RH	20 deg. C / 38 % RH
Engineer	Hiromasato Sato	Makoto Hosaka
	(30 Hz to 1 GHz)	(1 GHz to 10 GHz)
Mode	Tx 921.125 MHz, Output: 24 dBm, with Tag	



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

## APPENDIX 2: Test Instruments

### Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	144960	Attenuator	JFW	50HF-003N	-	2023/08/22	12
CE	145036	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	2023/04/18	12
CE	145542	LISN	Rohde & Schwarz	ENV216	100516	2023/02/21	12
CE	146210	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997823	2023/09/25	12
CE	146294	Humidity Indicator	A&D Company	AD-5681	4062118	-	-
CE	146432	Tape Measure	TAJIMA	GL19-55	-	-	-
CE	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2023/08/25	12
CE,RE	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
RE	144899	Attenuator	Inmet	18N-6dB	-	2022/12/16	12
RE	144939	Highpass Filter	Micro-Tronics	HPM50115	2	2023/05/10	12
RE	144941	Horn Antenna	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	230	2023/05/11	12
RE	144959	Attenuator	JFW	50HF-003N	-	2023/08/22	12
RE	144967	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	2023/04/18	12
RE	144968	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	2023/04/18	12
RE	145003	Pre Amplifier	SONOMA	310N	290211	2023/02/09	12
RE	145029	Coaxial Cable	Fujikura Shoji Co., LTD	5D2W	-	2023/02/08	12
RE	145133	Attenuator	JFW	50HF-010N	-	2023/02/09	12
RE	145161	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032664	2023/04/12	12
RE	145300	Highpass Filter	Micro-Tronics	HPM50115	1	2023/10/11	12
RE	145597	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	2023/04/04	12
RE	145790	Test Receiver	Rohde & Schwarz	ESU40	100093	2023/04/22	12
RE	145792	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997812	2023/09/25	12
RE	191837	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	-	2023/08/03	12
RE	207279	Tape Measure	ASKUL	-	-	-	-
RE	207280	Tape Measure	ASKUL	-	-	-	-
RE	235267	Test Receiver	Rohde & Schwarz	ESW44	103018	2023/02/20	12
RE	235639	DIGITAL MULTIMETER	HIOKI E.E. CORPORATION	DT4261	230313156	2023/05/26	12
RE	235735	Thermo-Hygrometer	CUSTOM. Inc	CTH-230	-	2023/04/26	12
RE	236416	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VULP 9118 B	00974	2023/07/11	12
RE	236616	Semi-Anechoic Chamber	TDK	SWAC-01(SVSWR)	1	2023/06/01	12
RE	236719	Coaxial Cable	Huber+Suhner	SF106/SF106/SF106	2001166/2000781/2001160	2023/05/25	12
RE	237784	RF RELAY MATRIX	TSJ (Techno Science Japan)	RFM-E221261R	07795	2023/11/01	12
RE	239643	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	2306S021	2023/08/22	12
RE	239649	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	2001217/2	2023/08/22	12
RE	241390	Band Rejection Filter(902-928MHz)	Wakoh Communication Industrial Co., Ltd.	WFR-481	19122541	2023/01/23	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:

CE: Conducted Emission

RE: Radiated Emission