

RADIO TEST REPORT

Test Report No. 15886546S-R2

Customer	Fukuda Denshi Co., Ltd.
Description of EUT	ECG, Respiration and SpO2 Transmitter
Model Number of EUT	LX-1300E
FCC ID	DV8LX13002
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	December 2, 2025
Remarks	-

Representative Test Engineer



Toshinori Yamada
Engineer

Approved By



Toyokazu Imamura
Engineer



CERTIFICATE 1266.03

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- For any test report referred in this report, the latest version (including any revisions) is always referred to.
- If the latest version is a revision, it replaces the previous version. See the table below for revisions and versions.

REVISION HISTORY

Revision	Test Report No.	Date	Page Revised Contents																						
- (Original)	15886546S	July 30, 2025	-																						
1	15886546S-R1	November 19, 2025	Page.5 Added “(Actual operating voltage range: DC 2.4 V to DC 3.6 V)”. Page 9 Corrected the Maximum Voltage and Minimum Voltage notations. Updated the operation mode in the table. Added the table. <table><tr><th>Test mode</th><th>Comment</th></tr><tr><td>Type A 106 Kbps</td><td>-</td></tr><tr><td>Type A 212 Kbps</td><td>-</td></tr><tr><td>Type A 424 Kbps</td><td>-</td></tr><tr><td>Type A 848 Kbps</td><td>The worst of Radiated Emissions test and carrier level</td></tr><tr><td>Type B 106 Kbps</td><td>-</td></tr><tr><td>Type B 212 Kbps</td><td>-</td></tr><tr><td>Type B 424 Kbps</td><td>-</td></tr><tr><td>Type B 848 Kbps</td><td>-</td></tr><tr><td>Type F 212 Kbps</td><td>-</td></tr><tr><td>Type F 424 Kbps</td><td>-</td></tr></table> Page 14 to 16 Corrected the mode name. Page 19 Corrected the Test Equipment.	Test mode	Comment	Type A 106 Kbps	-	Type A 212 Kbps	-	Type A 424 Kbps	-	Type A 848 Kbps	The worst of Radiated Emissions test and carrier level	Type B 106 Kbps	-	Type B 212 Kbps	-	Type B 424 Kbps	-	Type B 848 Kbps	-	Type F 212 Kbps	-	Type F 424 Kbps	-
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2	15886546S-R2	December 2, 2025	Page 6 Corrected the Test report No. in *2)																						

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

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SECTION 1: Customer Information

Company Name	Fukuda Denshi Co., Ltd.
Address	35-8, Hongo 2-Chome, Bunkyo-ku, Tokyo 113-8420, Japan
Telephone Number	+81 3 5684 1300
Contact Person	Naoki Yoshida

The information provided by 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

SECTION 2: Equipment Under Test (EUT)

2.1 Identification of EUT

Description	ECG, Respiration and SpO2 Transmitter
Model Number	LX-1300E
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	January 16, 2025
Test Date	June 30 and July 10, 2025

2.2 Product Description

General Specification

Rating	DC 3 V (Battery) (Actual operating voltage range: DC 2.4 V to DC 3.6 V)
Operating Temperature	+10 deg. C to +40 deg. C

Radio Specification

NFC

Equipment Type	Transceiver
Frequency of Operation	13.56 MHz
Type of Modulation	ASK

WMTS

Equipment Type	Transmitter
Frequency of Operation	608.0125 MHz to 613.9875 MHz
Type of Modulation	FSK
Antenna Gain	Less than +2.14 dBi
Frequency stability	+/-2.5 ppm

SECTION 3: Test Summary

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
Title	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.225 Operation within the band 13.110-14.010 MHz.

The EUT is used for the purpose of being related to medical treatment. Therefore this device applies to §15.103(e), exempted from FCC Part 15 Subpart B.

3.2 Reference Standards

ANSI/USEMCSC C63.2-2023
ANSI C63.4-2014/C63.4a-2017
ANSI C63.5-2017
ANSI C63.10-2020
ANSI/USEMCSC C63.10/Cor 1-2023
ANSI/USEMCSC C63.10a-2024 for ISED
ANSI C63.25.1-2018
RSS-Gen Issue 5/Amendment 1/Amendment 2 for ISED

3.3 Summary of Test Results

Item	Specification	Results	Remarks
Conducted Emission	<FCC> Section 15.207 <ISED> RSS-Gen 8.8	N/A	*1)
Electric Field Strength of Fundamental Emission	<FCC> Section 15.225(a) <ISED> RSS-210 B.6 (a)	Complied	Radiated
Spectrum Mask	<FCC> Section 15.225(b)(c) <ISED> RSS-210 B.6 (a)	Complied	Radiated
20 dB Bandwidth	<FCC> Section15.215(c) <ISED> -	Complied	Radiated
Electric Field Strength of Spurious Emission	<FCC> Section 15.209, Section 15.225 (d) <ISED> RSS-210 B.6 (a), RSS-Gen 8.9	Complied	Radiated *2)
Frequency Tolerance	<FCC> Section 15.225(e) <ISED> RSS-210 B.6 (b)	Complied	Radiated
Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.			
*1) The test is not applicable since the EUT has no AC mains.			
*2) The test above 1 GHz has been covered by the test report 15886545S.			

FCC Part 15.31 (e)

The test was performed with the New Battery and the stable voltage was supplied to the EUT during the tests. Therefore, the EUT complies with the requirement.
However, the supply voltage was varied and tested at 85 % and 115 % of the nominal rated supply voltage during frequency tolerance test according to Section 15.225(e).

FCC Part 15.203 Antenna requirement

The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.4 Addition to standard

Item	Test Procedure	Results	Remarks
99 % emission bandwidth	<ISED>RSS-Gen 6.7	-	Radiated

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

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

3.5 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	3.0 dB
Radiated Emission (Measurement distance: 3 m)	9 kHz to 30 MHz	3.3 dB
	30 MHz to 200 MHz	4.8 dB
	200 MHz to 1 GHz	6.1 dB
	1 GHz to 6 GHz	4.7 dB
	6 GHz to 18 GHz	5.3 dB
	18 GHz to 40 GHz	5.5 dB
Radiated Emission (Measurement distance: 1 m)	1 GHz to 18 GHz	5.6 dB
	18 GHz to 40 GHz	5.8 dB

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)	1.3 dB
Power Measurement above 1 GHz (Peak Detector)	1.5 dB
Spurious Emission (Conducted) below 1 GHz	0.93 dB
Conducted Emissions Power Density Measurement 1 GHz to 3 GHz	0.93 dB
Conducted Emissions Power Density Measurement 3 GHz to 18 GHz	3.0 dB
Spurious Emission (Conducted) 18 GHz to 26.5 GHz	2.8 dB
Spurious Emission (Conducted) 26.5 GHz to 40 GHz	2.3 dB
Bandwidth Measurement	0.012 %
Duty Cycle and Time Measurement	0.27 %
Temperature	2.2 deg.C.
Humidity	3.4 %
Voltage	0.92 %

3.6 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 (SR1)	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room (SR2)	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room (SR3)	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room (SR4)	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room (SR5)	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room (SR6)	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 Shielded room (SR8)	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room (MR1)	2.55 x 4.1 x 2.5	-	-
No.2 Measurement room (MR2)	4.5 x 3.5 x 2.5	-	-
Wireless shielded room 1 (WSR1)	3.0 x 4.5 x 2.7	3.0 x 4.5	-
Wireless shielded room 2 (WSR2)	3.0 x 4.5 x 2.7	3.0 x 4.5	-

3.7 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Test mode	Remarks
Transmitting mode (Tx)	-
*Power of the EUT was set by the software as follows; Software: V01-01 Version: V01-02 (Date: 2025.01.15, Storage location: EUT memory) *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. Justification: The system was configured in typical fashion (as a user would normally use it) for testing.	

Test Item	Operating mode*
Electric Field Strength of Fundamental Emission	Tx Mod on, with Tag (Type A, 848 kbps)
Spectrum Mask	Tx Mod on, with Tag (Type A, 848 kbps)
20 dB Bandwidth and 99 % Occupied Bandwidth	Tx Mod on, with Tag (Type A, Type B, Type F)
Electric Field Strength of Spurious Emission	Tx Mod on, with Tag (Type A, 848 kbps)
Frequency Tolerance	Tx Mod off, without Tag

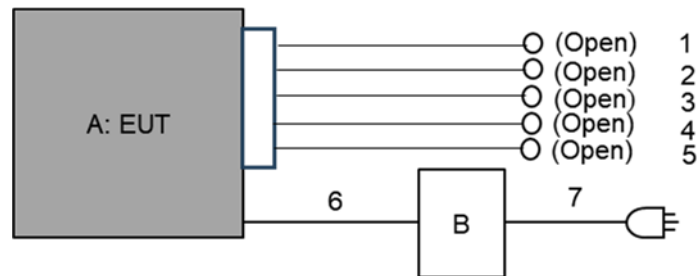
* After the comparison of the test data between with Tag and without Tag, the tests were performed with the worst case.

Test mode	Comment
Type A 106 kbps	-
Type A 212 kbps	-
Type A 424 kbps	-
Type A 848 kbps	The worst of Radiated Emissions test and carrier level
Type B 106 kbps	-
Type B 212 kbps	-
Type B 424 kbps	-
Type B 848 kbps	-
Type F 212 kbps	-
Type F 424 kbps	-

Frequency Tolerance	
Temperature	-20 deg. C to +50 deg. C Step 10 deg. C
Voltage	Normal Voltage DC 3 V Maximum Voltage DC 3.45 V (DC 3 V +15 %) Minimum Voltage DC 2.55 V (DC 3 V -15 %)
*This EUT provides stable voltage constantly to RF Part regardless of input voltage	

4.2 Configuration and peripherals

Frequency Tolerance tests and Other tests



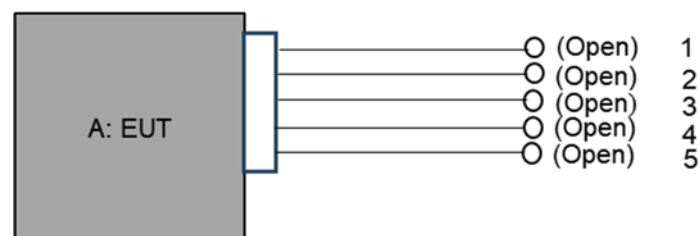
Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remark
A	ECG, Respiration and SpO2 Transmitter	LX-1300E	WAF00001	Fukuda Denshi Co., Ltd.	EUT
B	Power Supply (DC)	PW16-5ADP	19100034	GW Instek	-

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal	0.9	Shielded	Unshielded	-
2	Signal	0.9	Shielded	Unshielded	-
3	Signal	0.9	Shielded	Unshielded	-
4	Signal	0.9	Shielded	Unshielded	-
5	Signal	0.9	Shielded	Unshielded	-
6	DC	0.25+0.4+0.8	Unshielded	Unshielded	-
7	AC	1.8	Unshielded	Unshielded	-

Radiated Emission test



* Cabling and setup 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	Remark
A	ECG, Respiration and SpO2 Transmitter	LX-1300E	WAF00001	Fukuda Denshi Co., Ltd.	EUT

List of Cables Used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal	0.9	Shielded	Unshielded	-
2	Signal	0.9	Shielded	Unshielded	-
3	Signal	0.9	Shielded	Unshielded	-
4	Signal	0.9	Shielded	Unshielded	-
5	Signal	0.9	Shielded	Unshielded	-

SECTION 5: Radiated Emission (Fundamental, Spurious Emission and Spectrum Mask)

Test Procedure

EUT was placed on the 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.

[Limit conversion]

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 Ohms. 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.

[Frequency: From 9 kHz to 30 MHz]

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical polarization (antenna angle: 0 deg.) and horizontal polarization.

*Refer to 2 about Direction of the Loop Antenna.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

These tests were performed in semi anechoic chamber. Therefore the measured level of emissions may be higher than if measurements were made without a ground plane. However test results were confirmed to pass against standard limit.

[Frequency: From 30 MHz to 1 GHz]

The measuring antenna height 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 intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

[Test instruments and test settings]

Frequency	Below 30 MHz	30 MHz to 200 MHz	200 MHz to 1 GHz
Antenna Type	Loop	Biconical	Logperiodic

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.

Frequency	From 9 kHz to 90 kHz and From 110 kHz to 150 kHz	From 90 kHz to 110 kHz	From 150 kHz to 490 kHz	From 490 kHz to 30 MHz	From 30 MHz to 1 GHz
Instrument used	Test Receiver				
Detector	PK / AV	QP	PK / AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Test Distance	3 m *1)	3 m *1)	3 m *1)	3 m *2)	3 m

*1) Distance Factor: $40 \times \log (3 \text{ m} / 300 \text{ m}) = -80 \text{ dB}$

*2) Distance Factor: $40 \times \log (3 \text{ m} / 30 \text{ m}) = -40 \text{ dB}$

Figure 1: Test Setup

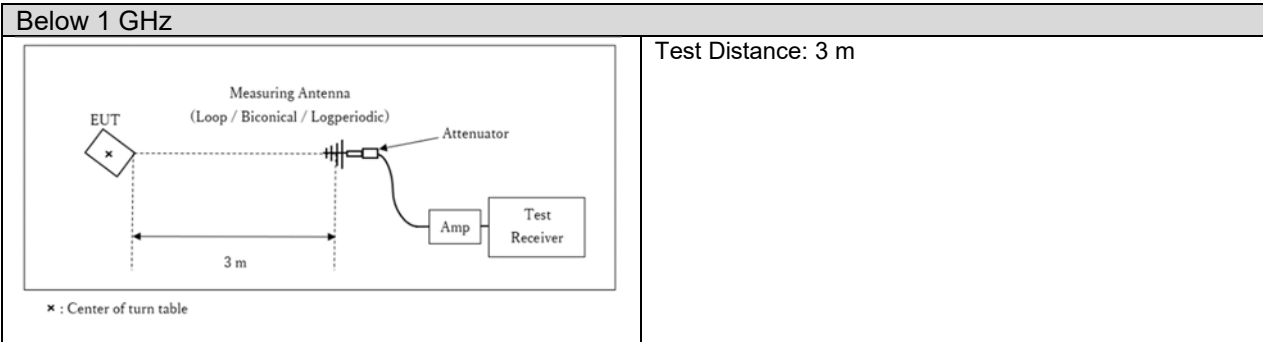
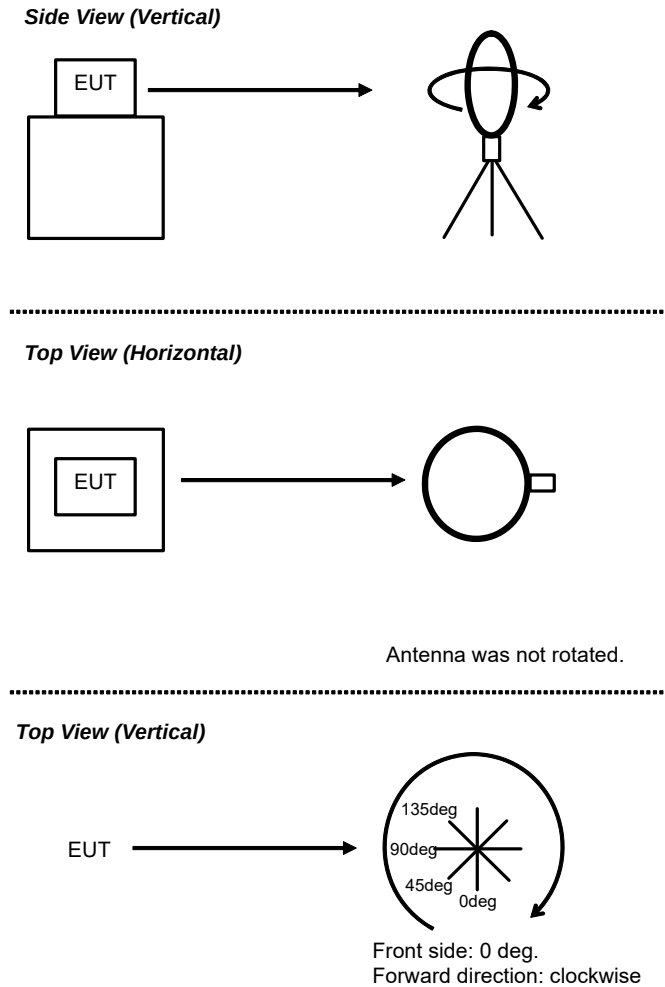


Figure 2: Direction of the Loop Antenna



- 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.

	Below 30 MHz	Above 30 MHz
Horizontal	Z-axis	X-axis
Vertical	Y-axis	X-axis

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

Measurement range : 9 kHz to 1 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Other tests

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20 dB Bandwidth	100 kHz	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Frequency counter
*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100 %. Peak hold was applied as Worst-case measurement.							

Test data : APPENDIX

Test result : Pass

APPENDIX 1: Test data

Fundamental Emission and Spectrum Mask

Mode	Tx Mod on, with Tag (Type A, 848 kbps)			
Date	Test site	Temperature	Humidity	Engineer
June 30, 2025	SAC1	25 deg. C	65 % RH	Toshinori Yamada

Fundamental emission

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	Loss [dB]	AMP GAIN [dB]	Distance factor [dB]	RESULT		LIMIT (30 m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	52.00	61.70	9.44	6.57	31.86	-40.0	-3.85	5.85	83.9	87.8	78.1

Calculation: Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]+Distance factor[dB]

Distance factor: $40 \times \log(3 \text{ m} / 30 \text{ m}) = -40 \text{ dB}$

Spurious emission within the band

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	Loss [dB]	AMP GAIN [dB]	Distance factor [dB]	RESULT		LIMIT (30 m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	28.10	28.90	9.51	6.56	31.86	-40.0	-27.69	-26.89	29.5	57.2	56.4
2	13.410	27.80	28.20	9.47	6.57	31.86	-40.0	-28.02	-27.62	40.5	68.5	68.1
3	13.553	38.10	46.92	9.44	6.57	31.86	-40.0	-17.75	-8.93	50.4	68.2	59.3
4	13.567	38.00	46.90	9.44	6.57	31.86	-40.0	-17.85	-8.95	50.4	68.3	59.4
5	13.710	27.90	27.90	9.42	6.57	31.86	-40.0	-27.97	-27.97	40.5	68.5	68.5
6	14.010	27.90	28.30	9.39	6.58	31.86	-40.0	-27.99	-27.59	29.5	57.5	57.1

Calculation: Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]+Distance factor[dB]

Distance factor: $40 \times \log(3 \text{ m} / 30 \text{ m}) = -40 \text{ dB}$

Outside filed strength frequencies

- Fc±7 kHz:13.553 MHz to 13.567 MHz
 - Fc±150 kHz:13.410 MHz to 13.710 MHz
 - Fc±450 kHz:13.110 MHz to 14.010 MHz
- Fc = 13.56 MHz

Spurious Emission

Mode	Tx Mod on, with Tag (Type A, 848 kbps)
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Date	Test site	Temperature	Humidity	Engineer
June 30, 2025	SAC1	25 deg. C	65 % RH	Toshinori Yamada

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.	27.12	QP	45.70	6.95	6.89	31.85	-40.0	-12.31	29.5	41.8	-	339	* Limit: 30 m
Hori.	176.279	QP	35.50	16.04	8.80	31.79	0.0	28.55	43.5	15.0	176	225	
Hori.	216.962	QP	35.50	16.60	9.18	31.78	0.0	29.50	46.0	16.5	148	45	
Hori.	458.253	QP	32.70	17.35	7.85	31.94	0.0	25.96	46.0	20.0	100	57	
Hori.	556.727	QP	29.70	19.01	8.45	32.09	0.0	25.07	46.0	20.9	153	32	
Vert.	27.12	QP	43.4	7.0	6.9	31.9	-40.0	-14.61	29.5	44.1	-	282	* Limit: 30 m
Vert.	135.605	QP	34.50	14.05	8.35	31.80	0.0	25.10	40.0	14.9	100	154	
Vert.	162.705	QP	35.80	15.39	8.80	31.80	0.0	28.19	43.5	15.3	100	127	
Vert.	176.279	QP	41.40	16.04	8.80	31.79	0.0	34.45	46.0	11.6	100	138	
Vert.	189.845	QP	34.30	16.36	8.82	31.79	0.0	27.69	46.0	18.3	100	328	
Vert.	203.398	QP	34.40	16.51	9.06	31.79	0.0	28.18	46.0	17.8	100	118	
Vert.	216.962	QP	40.30	16.60	9.18	31.78	0.0	34.30	46.0	11.7	100	356	
Vert.	230.519	QP	33.10	17.06	9.29	31.78	0.0	27.67	46.0	18.3	100	80	
Vert.	271.213	QP	30.80	17.90	9.64	31.78	0.0	26.56	46.0	19.4	100	359	
Vert.	298.321	QP	30.10	19.45	9.87	31.80	0.0	27.62	46.0	18.4	100	271	
Vert.	458.253	QP	30.70	17.35	7.85	31.94	0.0	23.96	46.0	22.0	145	226	

Result = Reading + Ant Factor + Loss (Cable+ATT+ΔAF(above 30 MHz)) - Gain(Amplifier) + Distance factor(below 30 MHz)

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

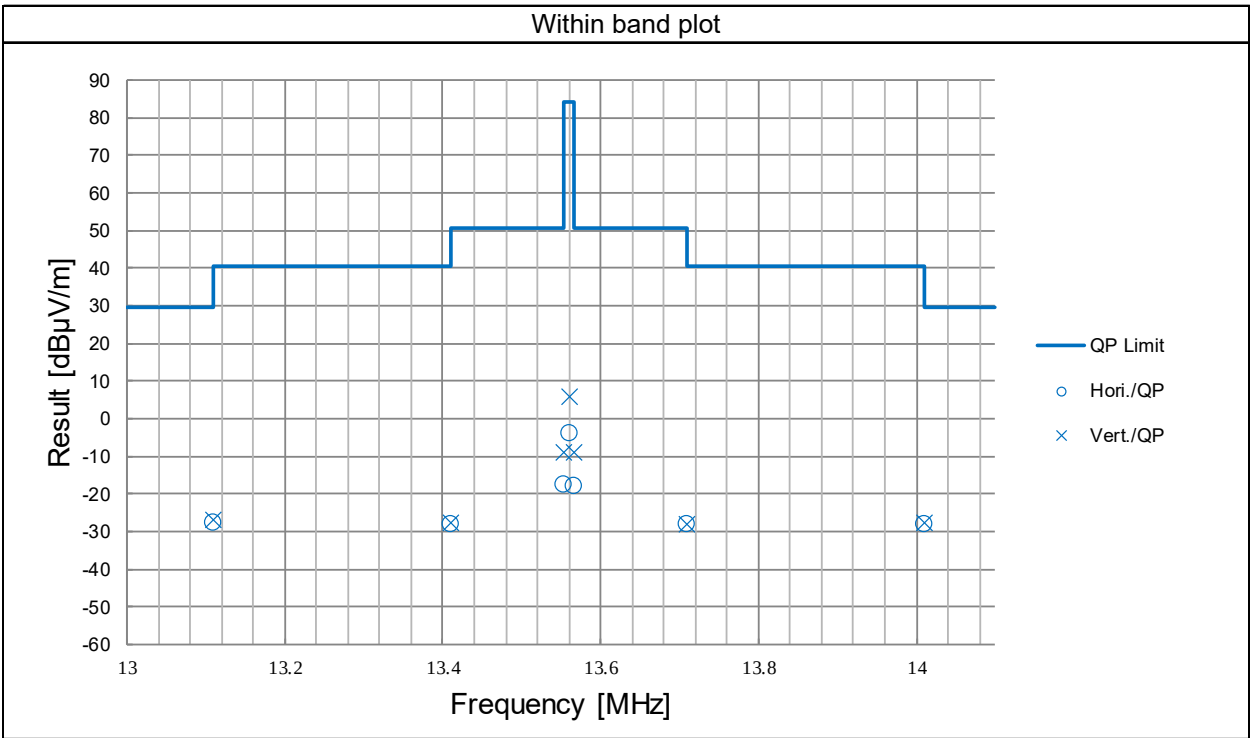
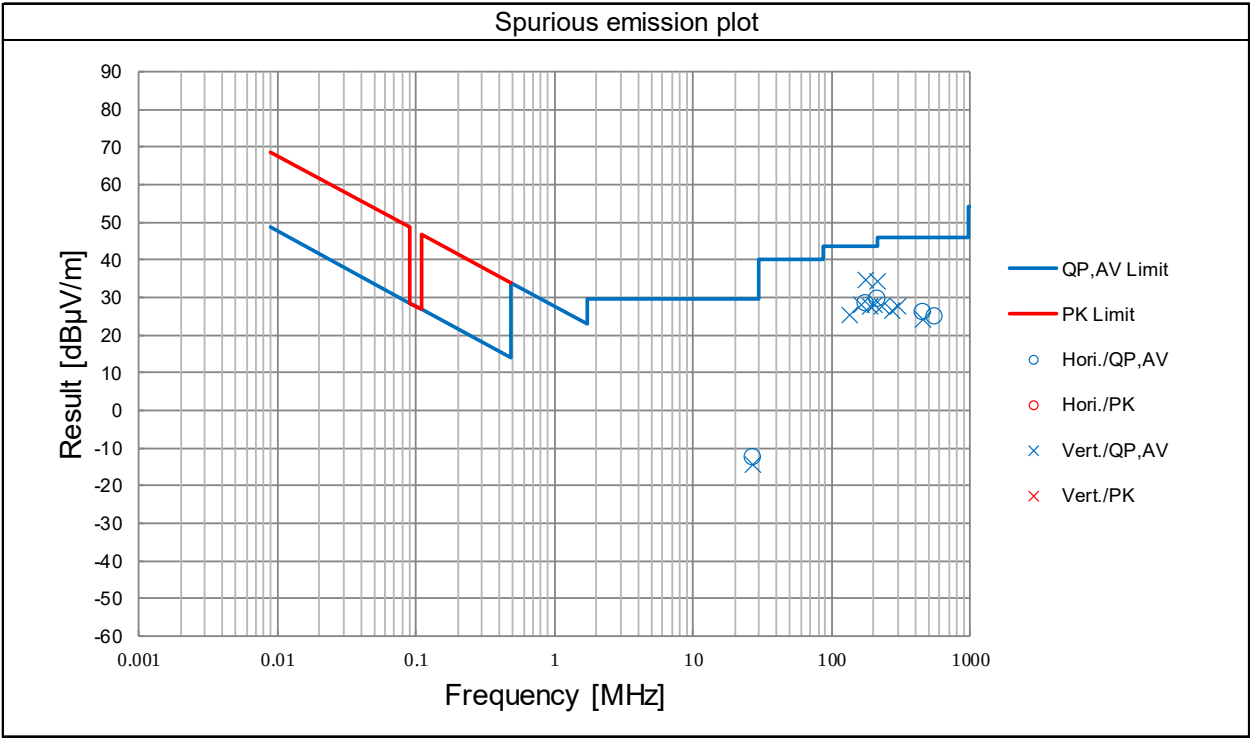
* Carrier level (Result at 3 m): Hor= 36.2 dBuV/m, Ver= 45.9 dBuV/m

Radiated Spurious Emission

Mode	Tx Mod on, with Tag (Type A, 848 kbps)			
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Date	Test site	Temperature	Humidity	Engineer
June 30, 2025	SAC1	25 deg. C	65 % RH	Toshinori Yamada

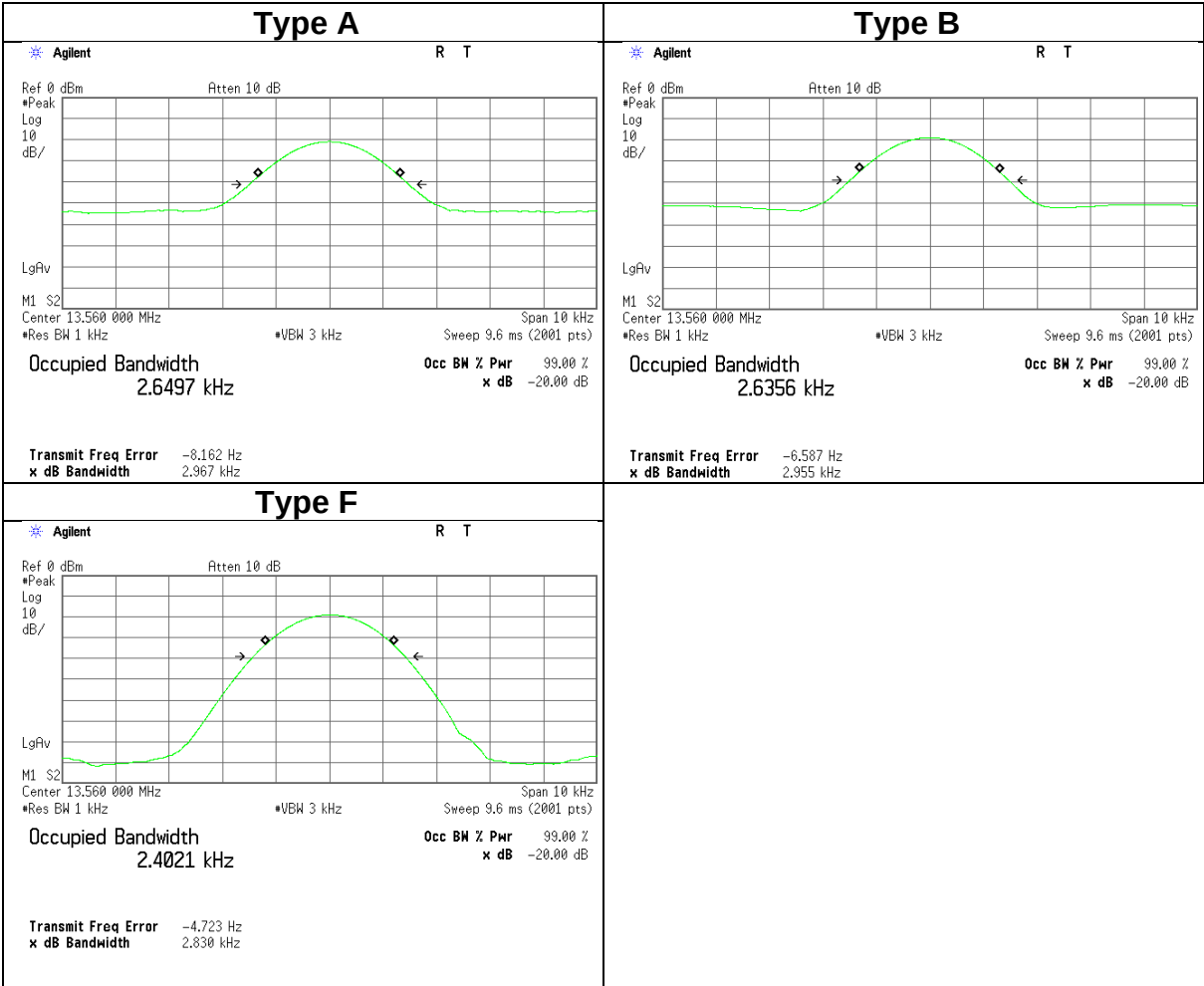
*These plots data contains sufficient number to show the trend of characteristic features for EUT.



20 dB Bandwidth and 99% Occupied Bandwidth

Mode	Tx Mod on, with Tag (Type A, Type B, Type F)			
Date	Test site	Temperature	Humidity	Engineer
July 10, 2025	SR5	23 deg. C	55 % RH	Yohsuke Matsuzawa

FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	With Tag (Type A)	2.967	2.6497
	With Tag (Type B)	2.955	2.6356
	With Tag (Type F)	2.830	2.4021



Since the transmitter signal is CW-like it is impractical to use a RBW setting of 1 – 5% of the emission bandwidth since the emission bandwidth will be proportional to the RBW.

Frequency Tolerance

Mode	Tx Mod off
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Date	Test site	Temperature	Humidity	Engineer
July 10, 2025	SR5	23 deg. C	55 % RH	Yohsuke Matsuzawa

Test condition Temp. [deg. C]	Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
50	3	Power on	13.559963	-0.000037	-0.00027	-2.7	0.01
		+ 2 min.	13.559963	-0.000037	-0.00027	-2.7	0.01
		+ 5 min.	13.559961	-0.000039	-0.00029	-2.9	0.01
		+ 10 min.	13.559960	-0.000040	-0.00029	-2.9	0.01
40	3	Power on	13.559975	-0.000025	-0.00018	-1.8	0.01
		+ 2 min.	13.559971	-0.000029	-0.00021	-2.1	0.01
		+ 5 min.	13.559970	-0.000030	-0.00022	-2.2	0.01
		+ 10 min.	13.559978	-0.000022	-0.00016	-1.6	0.01
30	3	Power on	13.560005	0.000005	0.00004	0.4	0.01
		+ 2 min.	13.560003	0.000003	0.00002	0.2	0.01
		+ 5 min.	13.560001	0.000001	0.00001	0.1	0.01
		+ 10 min.	13.559993	-0.000007	-0.00005	-0.5	0.01
20	3	Power on	13.560035	0.000035	0.00026	2.6	0.01
		+ 2 min.	13.560023	0.000023	0.00017	1.7	0.01
		+ 5 min.	13.560022	0.000022	0.00016	1.6	0.01
		+ 10 min.	13.560020	0.000020	0.00015	1.5	0.01
20	2.55 (3V -15%)	Power on	13.560029	0.000029	0.00021	2.1	0.01
		+ 2 min.	13.560023	0.000023	0.00017	1.7	0.01
		+ 5 min.	13.560022	0.000022	0.00016	1.6	0.01
		+ 10 min.	13.560021	0.000021	0.00015	1.5	0.01
20	3.45 (3V +15%)	Power on	13.560027	0.000027	0.00020	2.0	0.01
		+ 2 min.	13.560024	0.000024	0.00018	1.8	0.01
		+ 5 min.	13.560023	0.000023	0.00017	1.7	0.01
		+ 10 min.	13.560021	0.000021	0.00015	1.5	0.01
10	3	Power on	13.560059	0.000059	0.00044	4.4	0.01
		+ 2 min.	13.560058	0.000058	0.00043	4.3	0.01
		+ 5 min.	13.560054	0.000054	0.00040	4.0	0.01
		+ 10 min.	13.560052	0.000052	0.00038	3.8	0.01
0	3	Power on	13.560079	0.000079	0.00058	5.8	0.01
		+ 2 min.	13.560078	0.000078	0.00058	5.8	0.01
		+ 5 min.	13.560076	0.000076	0.00056	5.6	0.01
		+ 10 min.	13.560074	0.000074	0.00055	5.5	0.01
-10	3	Power on	13.560070	0.000070	0.00052	5.2	0.01
		+ 2 min.	13.560077	0.000077	0.00057	5.7	0.01
		+ 5 min.	13.560079	0.000079	0.00058	5.8	0.01
		+ 10 min.	13.560080	0.000080	0.00059	5.9	0.01
-20	3	Power on	13.560046	0.000046	0.00034	3.4	0.01
		+ 2 min.	13.560055	0.000055	0.00041	4.1	0.01
		+ 5 min.	13.560058	0.000058	0.00043	4.3	0.01
		+ 10 min.	13.560061	0.000061	0.00045	4.5	0.01

Calculation formula: Frequency error = Measured frequency - Tested frequency
Result [%] = Frequency error / Tested frequency * 100

Tested frequency: 13.56 MHz
Limit (+/-): 0.01 % (+/- 100ppm)

*The test was begun from 50 deg. C and the temperature was lowered each 10 deg. C.

APPENDIX 2: Test instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
BW	145801	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250152	2024/08/29	12
FT	183119	Microwave Counter	Keysight Technologies Inc	53151A	US40511493	2024/12/02	12
FT	145200	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	2025/04/10	12
FT, BW	146178	Search coil	Langer	RF-R 400-1	02-0634	-	-
FT, BW	145111	Digital Tester	SANWA	PC500	7019232	2024/09/24	12
FT, BW	259713	Thermo-Hygrometer	CUSTOM. Inc	CTH-230	-	2025/04/11	12
RE	144899	Attenuator	Inmet	18N-6dB	-	2024/11/21	12
RE	144959	Attenuator	JFW	50HF-003N	-	2024/08/22	12
RE	167096	Attenuator	JFW	50HF-006N	-	2025/02/19	12
RE	145161	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032664	2025/04/22	12
RE	194601	Coaxial Cable	Fjikura	5D-2W	-	2024/11/21	12
RE	144968	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	2025/04/05	12
RE	145792	Digital Hister	HIOKI E. E. CORPORATION	3805-50	80997812	2024/09/24	12
RE	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	Ver 3.1.0546	-	-
RE	145533	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	UHALP9108A	UHALP 9108-A 0901	2025/05/16	12
RE	245074	Loop(Active) Antenna	ETS-Lindgren	6502	00262458	2025/04/09	12
RE	145003	Pre Amplifier	SONOMA	310N	290211	2025/02/19	12
RE	145568	Semi Anechoic Chamber(ME)	TDK	Semi Anechoic Chamber 3m/10m	1, 2, 3	2024/10/12	24
RE	145597	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	2025/04/04	12
RE	207279	Tape Measure	ASKUL	-	-	-	-
RE	145790	Test Receiver	Rohde & Schwarz	ESU40	100093	2025/04/18	12
RE	259708	Thermo-Hygrometer	CUSTOM. Inc	CTH-230	-	2025/04/11	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
FT: Frequency Tolerance
BW: Bandwidth