

RADIO TEST REPORT

Test Report No. 16020622S-A-R1

Customer	Minebea AccessSolutions Inc.
Description of EUT	NFC Reader
Model Number of EUT	MASNFC-2
FCC ID	MLBMASNFC-2
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	December 12, 2025
Remarks	-

Representative test engineer

Kouki Yamada
Engineer

Approved by

Toyokazu Imamura
Engineer

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".

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- 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)	16020622S-A	October 29, 2025	-
1	16020622S-A-R1	December 12, 2025	<u>Clause 3.3</u> Corrected statement for FCC Part 15.31 (e): From "The stable voltage was supplied by the end product which was required to have a power supply regulator." to "This EUT provides stable voltage constantly to RF part regardless of input voltage."

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	Minebea AccessSolutions Inc.
Address	3700, Shimonaka, Sadowara-cho, Miyazaki-City, Miyazaki, 880-0293, Japan
Telephone Number	+81-80-9834-1891
Contact Person	Keishiro Kimura

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	NFC Reader
Model Number	MASNFC-2
Serial Number	Refer to SECTION 4.2
Condition	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	October 15, 2025
Test Date	October 15 to 18, 2025

2.2 Product Description

General Specification

Rating	DC 12 V
Operating Temperature	-40 deg. C to +85 deg. C

Radio Specification

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

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.

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 (incl. Errata) for ISED
ANSI C63.25.1-2018

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
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 was not performed since the EUT was DC device.			

FCC Part 15.31 (e)

This EUT provides stable voltage constantly to RF part regardless of input voltage.
Therefore, this 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

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT.

Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.4 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 (+/-)
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

Antenna terminal test	Uncertainty (+/-)
Frequency Measurement (13.56 MHz)	1.6×10^{-7}
Bandwidth Measurement	0.012 %
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

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)

The mode is used:

Test mode	Remarks
Transmitting mode (Tx)	The EUT Transmits and Receives at the same time and there is no receiving mode.
The EUT was operated in a manner similar to typical use during the tests.	
*Power of the EUT was set by the software as follows; Software: 3MA_51_Ver_1.1.0_NoEntryRM120min Version: 110 (Date: 2025.03.28, 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
Spectrum Mask	Tx Mod on, with Tag
20 dB Bandwidth and 99 % Occupied Bandwidth	Tx Mod on, with/without Tag
Electric Field Strength of Spurious Emission	Tx Mod on, with Tag
Frequency Tolerance	Tx Mod on, without Tag

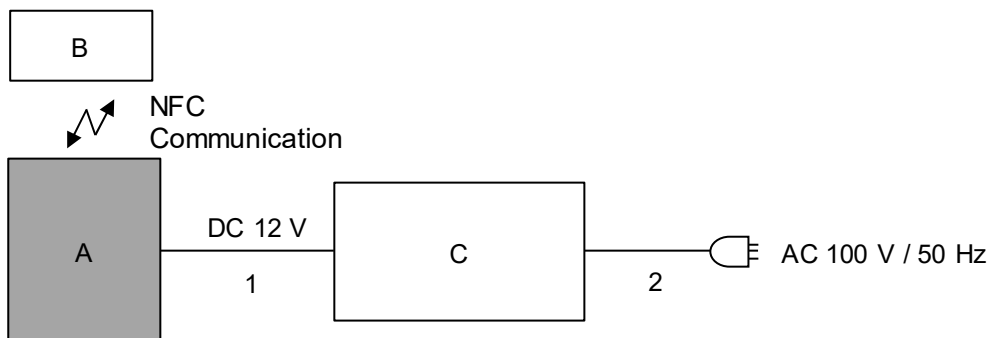
This EUT has two modes which Tag is attached or not.

The worst case was confirmed with and without Tag attached, as a result, the test was performed the worst case.

The worst-case distance between the EUT and the Tag was selected from a distance of 8 mm and 28 mm based on the specification.

Frequency Tolerance	
Temperature	-20 deg. C to +50 deg. C: Step 10 deg. C
Voltage	Normal Voltage DC 12 V Maximum Voltage DC 13.8 V (DC 12 V +15 %) Minimum Voltage DC 10.2 V (DC 12 V -15 %)
*This EUT provides stable voltage constantly to RF Part regardless of input voltage	

4.2 Configuration and peripherals



* 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	Remarks
A	NFC Reader	MASNFC-2	2	Minebea AccessSolutions Inc.	EUT
B	NFC tag	3MA-2G001-000	083	IDEMIA	-
C	Power Supply (DC)	PAN60-10A	NL002383	KIKUSUI	RE
		PNA16-10A	ER001085	KIKUSUI	FT, BW

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	1.2 (RE) 1.4 + 1.6 (FT,BW)	Unshielded	Unshielded	-
2	AC	2.9	Unshielded	Unshielded	-

RE: Radiated Emission

FT, BW: Frequency Tolerance, Bandwidth

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., 45 deg., 90 deg., and 135 deg.) and horizontal polarization.

*Refer to Figure 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 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

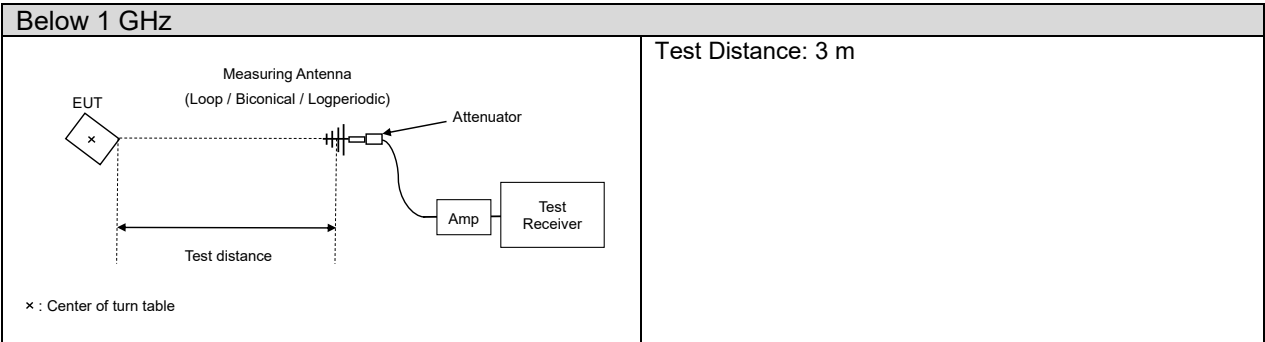
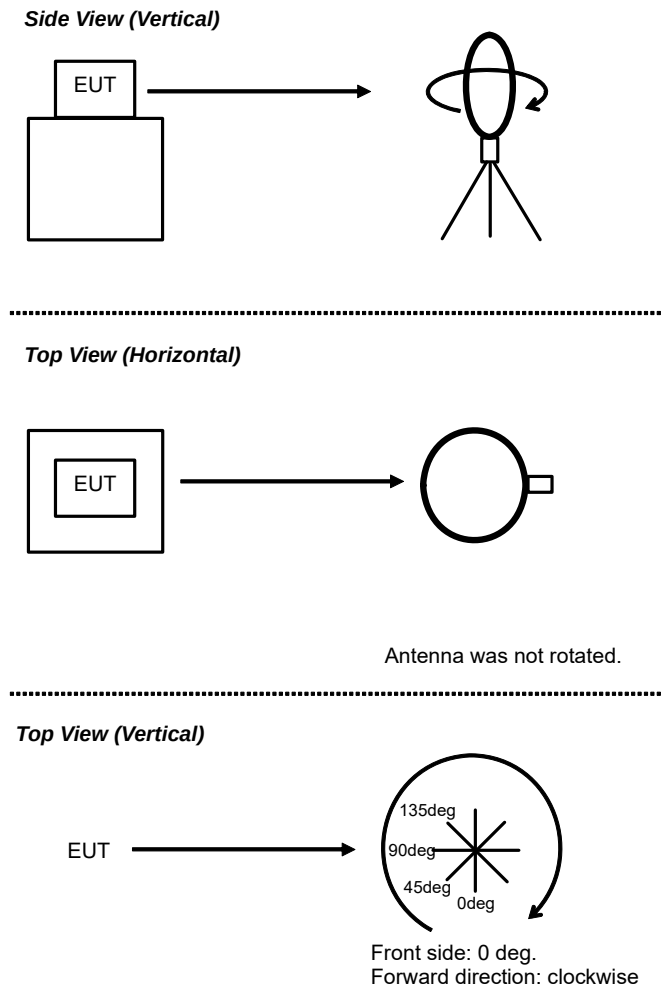


Figure 2: Direction of the Loop Antenna



The test was made on EUT at the normal use position.

The test results and limit are rounded off to one decimal place, 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 99 % Occupied Bandwidth	Enough width to display emission skirts	1 kHz or 1 to 5 % of OBW	$\geq$ Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Spectrum Analyzer *2)
*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. *2) The measurement was performed with Marker Frequency Counter Function.							

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Fundamental Emission and Spectrum Mask

Mode	Transmitting mode (Tx)			
Remarks	with Tag (Distance between Tag and EUT: 28 mm), Vertical polarization (antenna angle) of the worst case: 0 deg			
Date	Test site	Temperature	Humidity	Engineer
October 15, 2025	SAC2	23 deg. C	56 % RH	Yasumasa Owaki

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	73.2	83.1	9.4	6.6	32.0	-40.0	17.3	27.2	83.9	66.6	56.7

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	28.4	28.8	9.5	6.6	32.0	-40.0	-27.5	-27.1	29.5	57.0	56.6
2	13.348	33.0	41.3	9.5	6.6	32.0	-40.0	-22.9	-14.61	40.5	63.4	55.1
3	13.410	31.3	38.8	9.5	6.6	32.0	-40.0	-24.6	-17.1	40.5	65.1	57.6
4	13.489	33.5	42.1	9.5	6.6	32.0	-40.0	-22.4	-13.8	50.4	72.8	64.2
5	13.553	59.8	69.8	9.4	6.6	32.0	-40.0	3.9	13.86	50.4	46.5	36.5
6	13.567	57.3	67.3	9.4	6.6	32.0	-40.0	1.4	11.36	50.4	49.0	39.0
7	13.631	33.5	42.2	9.4	6.6	32.0	-40.0	-22.5	-13.75	50.4	72.9	64.2
8	13.710	30.8	38.1	9.4	6.6	32.0	-40.0	-25.2	-17.86	40.5	65.7	58.4
9	13.772	32.4	40.8	9.4	6.6	32.0	-40.0	-23.6	-15.17	40.5	64.1	55.7
10	14.010	28.0	28.2	9.4	6.6	32.0	-40.0	-28.0	-27.78	29.5	57.5	57.3

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	Transmitting mode (Tx)
Remarks	Below 30 MHz (Distance between Tag and EUT: 28 mm), with Tag Above 30 MHz (Distance between Tag and EUT: 8 mm), with Tag

Date	Test site	Temperature	Humidity	Engineer
October 15, 2025	SAC2	23 deg. C	56 % RH	Yasumasa Owaki

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.	12.713	QP	31.1	9.6	6.6	32.0	-40.0	-24.7	29.5	54.2	-	220	* Limit: 30 m
Hori.	14.408	QP	29.1	9.3	6.6	32.0	-40.0	-26.9	29.5	56.4	-	220	* Limit: 30 m
Hori.	27.120	QP	27.8	7.0	6.9	31.9	-40.0	-30.3	29.5	59.8	-	253	* Limit: 30 m
Hori.	40.680	QP	44.6	14.6	7.0	31.9	0.0	34.3	40.0	5.7	279	134	
Hori.	67.800	QP	45.1	6.8	7.1	31.9	0.0	27.2	40.0	12.8	257	287	
Hori.	447.480	QP	32.0	16.8	7.6	31.7	0.0	24.7	46.0	21.3	100	233	
Hori.	474.600	QP	38.1	17.2	7.8	31.7	0.0	31.4	46.0	14.6	100	50	
Vert.	12.713	QP	37.0	9.6	6.6	32.0	-40.0	-18.8	29.5	48.3	-	221	* Limit: 30 m
Vert.	14.408	QP	34.4	9.3	6.6	32.0	-40.0	-21.6	29.5	51.1	-	221	* Limit: 30 m
Vert.	27.120	QP	30.6	7.0	6.9	31.9	-40.0	-27.5	29.5	57.0	-	217	* Limit: 30 m
Vert.	40.680	QP	50.2	14.6	7.0	31.9	0.0	39.9	40.0	0.1	100	51	
Vert.	66.950	QP	31.3	7.0	7.1	31.9	0.0	13.4	40.0	26.6	100	34	
Vert.	67.800	QP	53.7	6.8	7.1	31.9	0.0	35.8	40.0	4.2	100	56	
Vert.	94.920	QP	41.7	9.3	8.1	31.9	0.0	27.2	43.5	16.3	100	222	
Vert.	122.040	QP	35.8	13.3	8.0	31.9	0.0	25.3	43.5	18.3	100	218	
Vert.	149.160	QP	33.8	14.6	8.6	31.8	0.0	25.1	43.5	18.4	100	53	
Vert.	474.600	QP	37.3	17.2	7.8	31.7	0.0	30.6	46.0	15.4	100	321	

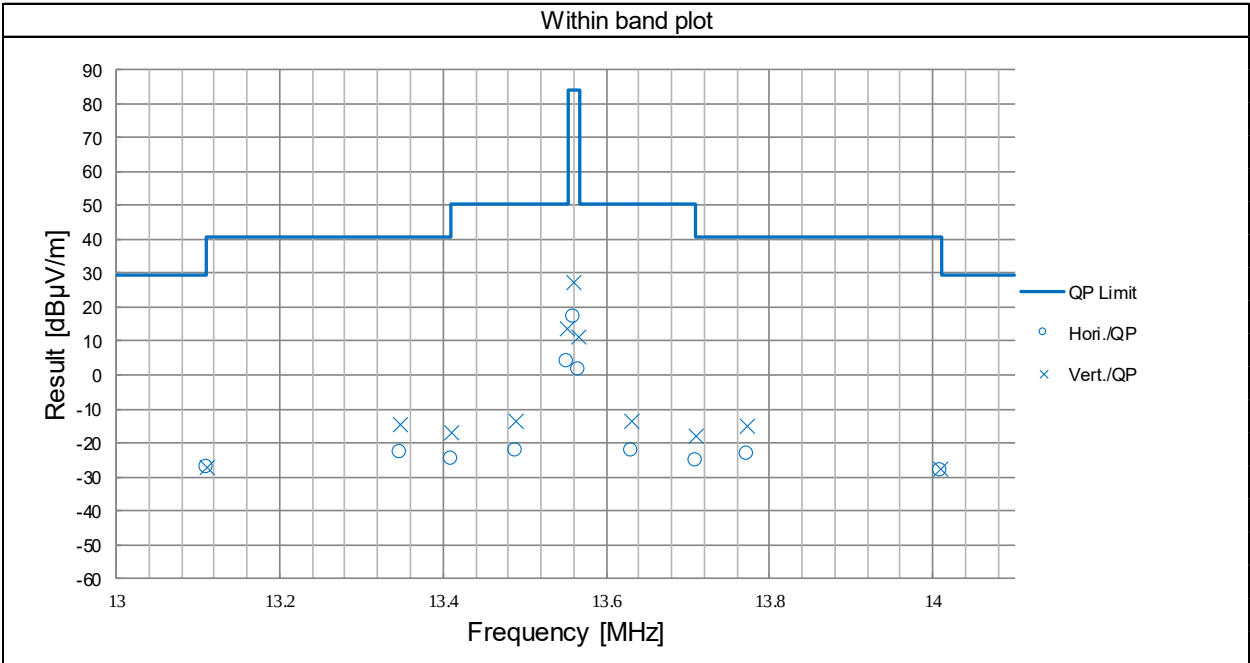
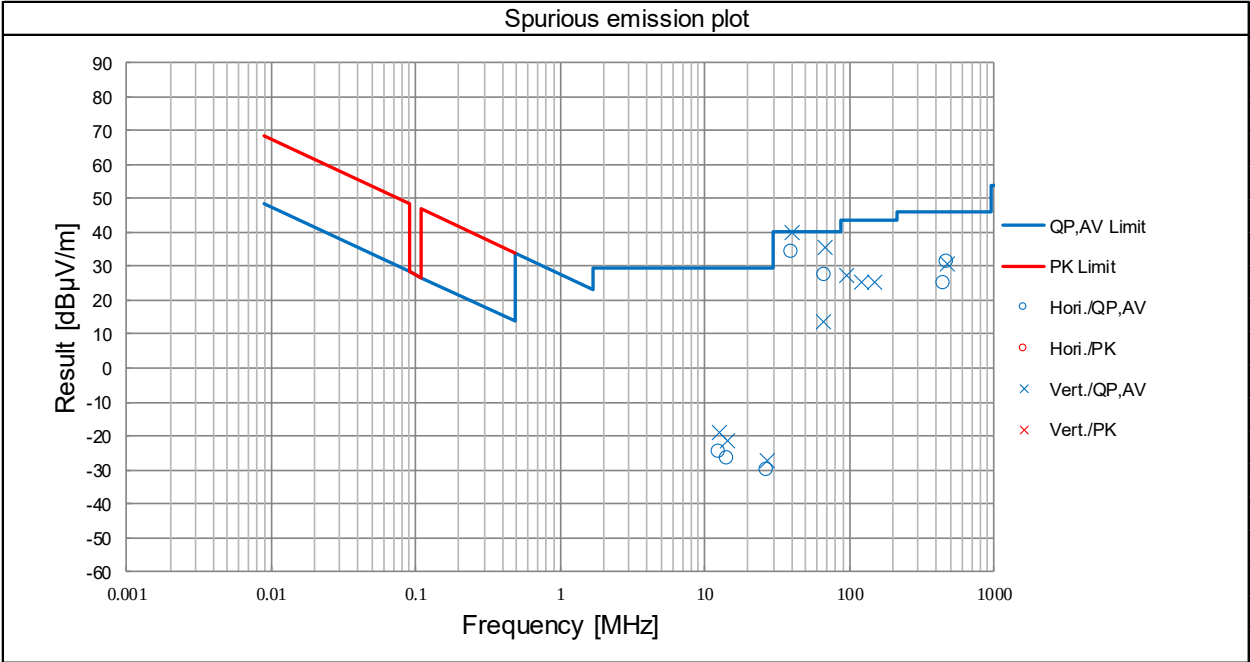
Result = Reading + Ant Factor + Loss (Cable+ATT+ΔAF(above 30 MHz)) - Gain(Amplifier) + Distance factor(below 30 MHz)

* 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= 57.3 dBuV/m, Ver= 67.2 dBuV/m

Radiated Spurious Emission

Mode	Transmitting mode (Tx)			
Date	Test site	Temperature	Humidity	Engineer
October 15, 2025	SAC2	23 deg. C	56 % RH	Yasumasa Owaki

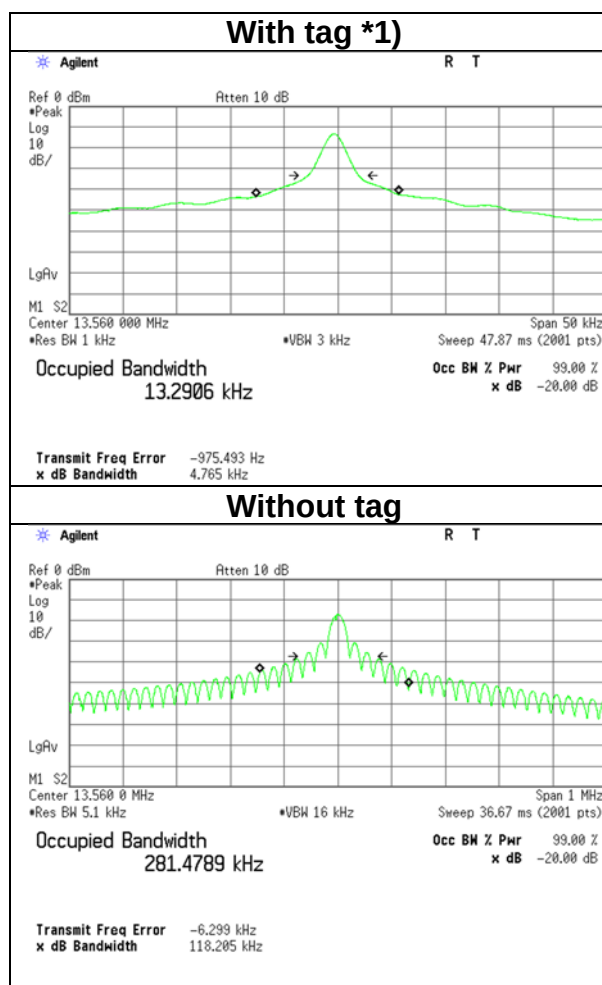


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

20 dB Bandwidth and 99 % Occupied Bandwidth

Mode	Transmitting mode (Tx)			
Date	Test site	Temperature	Humidity	Engineer
October 18, 2025	SR5	25 deg. C	54 % RH	Kouki Yamada

FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	With Tag	4.765	13.2906
	Without Tag	118.205	281.4789



*1) 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	Transmitting mode (Tx)			
Date	Test site	Temperature	Humidity	Engineer
October 18, 2025	SR5	25 deg. C	54 % RH	Kouki Yamada

Test condition Temp. [deg. C]	Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
50	12	Power on	13.559486	-0.000514	-0.00379	-37.9	0.01
		+ 2 min.	13.559458	-0.000542	-0.00400	-40.0	0.01
		+ 5 min.	13.559587	-0.000413	-0.00304	-30.4	0.01
		+ 10 min.	13.559505	-0.000495	-0.00365	-36.5	0.01
40	12	Power on	13.559510	-0.000490	-0.00361	-36.1	0.01
		+ 2 min.	13.559320	-0.000680	-0.00502	-50.2	0.01
		+ 5 min.	13.559589	-0.000411	-0.00303	-30.3	0.01
		+ 10 min.	13.559576	-0.000424	-0.00312	-31.2	0.01
30	12	Power on	13.559589	-0.000411	-0.00303	-30.3	0.01
		+ 2 min.	13.559713	-0.000287	-0.00212	-21.2	0.01
		+ 5 min.	13.559609	-0.000391	-0.00288	-28.8	0.01
		+ 10 min.	13.559607	-0.000393	-0.00290	-29.0	0.01
20	12	Power on	13.559796	-0.000204	-0.00151	-15.1	0.01
		+ 2 min.	13.559689	-0.000311	-0.00229	-22.9	0.01
		+ 5 min.	13.559912	-0.000088	-0.00065	-6.5	0.01
		+ 10 min.	13.559656	-0.000344	-0.00254	-25.4	0.01
20	10.2 (12V -15%)	Power on	13.559863	-0.000137	-0.00101	-10.1	0.01
		+ 2 min.	13.560097	0.000097	0.00072	7.2	0.01
		+ 5 min.	13.559772	-0.000228	-0.00168	-16.8	0.01
		+ 10 min.	13.559825	-0.000175	-0.00129	-12.9	0.01
20	13.8 (12V +15%)	Power on	13.560040	0.000040	0.00030	3.0	0.01
		+ 2 min.	13.559870	-0.000130	-0.00096	-9.6	0.01
		+ 5 min.	13.559855	-0.000145	-0.00107	-10.7	0.01
		+ 10 min.	13.559942	-0.000058	-0.00043	-4.3	0.01
10	12	Power on	13.559810	-0.000190	-0.00140	-14.0	0.01
		+ 2 min.	13.559865	-0.000135	-0.00100	-10.0	0.01
		+ 5 min.	13.559812	-0.000188	-0.00139	-13.9	0.01
		+ 10 min.	13.559752	-0.000248	-0.00183	-18.3	0.01
0	12	Power on	13.559997	-0.000003	-0.00002	-0.2	0.01
		+ 2 min.	13.559902	-0.000098	-0.00072	-7.2	0.01
		+ 5 min.	13.560028	0.000028	0.00021	2.1	0.01
		+ 10 min.	13.559914	-0.000086	-0.00063	-6.3	0.01
-10	12	Power on	13.560248	0.000248	0.00183	18.3	0.01
		+ 2 min.	13.560098	0.000098	0.00072	7.2	0.01
		+ 5 min.	13.559995	-0.000005	-0.00003	-0.3	0.01
		+ 10 min.	13.560094	0.000094	0.00069	6.9	0.01
-20	12	Power on	13.560035	0.000035	0.00026	2.6	0.01
		+ 2 min.	13.560084	0.000084	0.00062	6.2	0.01
		+ 5 min.	13.560036	0.000036	0.00027	2.7	0.01
		+ 10 min.	13.560028	0.000028	0.00021	2.1	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	2025/09/11	12
FT, BW	146212	Digital Hitester	HIOKI E. E. CORPORATION	3805-50	80997828	2025/09/10	12
FT, BW	146178	Search coil	Langer	RF-R 400-1	02-0634	-	-
FT, BW	145200	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	2025/04/10	12
FT, BW	259713	Thermo-Hygrometer	CUSTOM. Inc	CTH-230	-	2025/04/11	12
FT	235269	Spectrum Analyzer	Rohde & Schwarz	FSW43	102488	2025/09/26	12
RE	150921	Attenuator	JFW	50HF-003N	-	2025/02/19	12
RE	167096	Attenuator	JFW	50HF-006N	-	2025/02/19	12
RE	248305	Attenuator	JFW	50HFFA-006-2/18N	-	2025/05/14	12
RE	145022	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	91032665	2025/04/22	12
RE	194601	Coaxial Cable	Fjikura	5D-2W	-	2024/11/21	12
RE	144975	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2025/04/05	12
RE	144976	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2025/04/05	12
RE	145793	Digital Hitester	HIOKI E. E. CORPORATION	3805-50	80997819	2025/05/23	12
RE	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	Ver 3.1.0612	-	-
RE	236418	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VULP 9118 B	00975	2025/07/22	12
RE	245074	Loop(Active) Antenna	ETS-Lindgren	6502	00262458	2025/04/09	12
RE	145004	Pre Amplifier	SONOMA	310N	290212	2025/02/19	12
RE	145568	Semi Anechoic Chamber(ME)	TDK	Semi Anechoic Chamber 3m/10m	1, 2, 3	2024/10/12	24
RE	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2025/03/05	12
RE	207277	Tape Measure	ASKUL	-	-	-	-
RE	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2025/08/29	12
RE	259709	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