RADIO TEST REPORT

Test Report No. 15680434H-R2

Customer	**Minebea AccessSolutions Inc.**
Description of EUT	**FOB of 2R Smart Key System**
Model Number of EUT	**HLSS-9B**
FCC ID	**MLBHLSS-9B**
Test Regulation	**FCC Part 15 Subpart C**
Test Result	**Complied**
Issue Date	**May 30, 2025**
Remarks	**-**

Representative test engineer	Approved by
	
Tetsuro Yoshida Engineer	Shinichi Miyazono Leader

CERTIFICATE 5107.02

☐ 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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REVISION HISTORY

Original Test Report No. 15680434H

This report is a revised version of 15680434H-R1. 15680434H-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	15680434H	April 15, 2025	-
1	15680434H-R1	May 19, 2025	**Section 1: Customer Information** -Changed of customer Information Address 3700 Shimonaka, sadowara-cho, Miyazaki-shi, 880-0293 → 535-14 Oaza-Ishizue, Takanezawa-machi, Shioya-gun, Tochigi, 329-1225, Japan Telephone Number +81-80-6409-6137 → +81-28-680-1661 Contact Person Shinji Kameyama → Takanori Abe
2	15680434H-R2	May 30, 2025	**Section 4.1** -Added below sentence. This EUT has two buttons ... (omit) Therefore the test was performed with Bike Mark transmission as a representative.

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

CONTENTS PAGE

SECTION 1: Customer Information

Company Name	Minebea AccessSolutions Inc.
Address	535-14 Oaza-Ishizue, Takanezawa-machi, Shioya-gun, Tochigi 329-1225 Japan
Telephone Number	+81-28-680-1661
Contact Person	Takanori Abe

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	FOB of 2R Smart Key System
Model Number	HLSS-9B
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	February 20, 2025
Test Date	March 3, 2025

2.2 Product Description

General Specification

Rating	DC 3 V
Operating temperature	-20 deg. C to 60 deg. C

Radio Specification

Equipment Type	Transmitter
Frequency of Operation	433.92 MHz
Type of Modulation	FSK

[Receiver]

Equipment Type	Receiver
Frequency of Operation	125 kHz

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 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

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	N/A	N/A	*1)
Automatically deactivate	**FCC:** ANSI C63.10:2013 6 Standard test methods **ISED:** -	**FCC:** Section 15.231(a)(1) **ISED:** RSS-210 A1.2	N/A	Complied	Radiated
Electric Field Strength of Fundamental Emission	**FCC:** ANSI C63.10:2013 6 Standard test methods **ISED:** RSS-Gen 6.12	**FCC:** Section 15.231(b) **ISED:** RSS-210 A1.3	0.9 dB 433.920 MHz Vertical, AV	Complied	Radiated
Electric Field Strength of Spurious Emission	**FCC:** ANSI C63.10:2013 6 Standard test methods **ISED:** RSS-Gen 6.13	**FCC:** Section 15.205 Section 15.209 Section 15.231(b) **ISED:** RSS-210 A1.3 RSS-Gen 8.9	2.2 dB 4339.200 MHz Vertical, AV	Complied	Radiated
-20 dB Bandwidth	**FCC:** ANSI C63.10:2013 6 Standard test methods **ISED:** -	**FCC:** Section 15.231(c) **ISED:** Reference data	N/A	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 does not have AC Mains.					

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, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

3.3 Addition to Standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% emission bandwidth	ANSI C63.10:2013 6 Standard test methods	Reference data	N/A	-	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.

3.4 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.

Radiated emission

Measurement distance	Frequency range		Unit	Calculated Uncertainty (+/-)
3 m	9 kHz to 30 MHz		dB	3.3
10 m			dB	3.1
3 m	30 MHz to 200 MHz	Horizontal	dB	5.0
		Vertical	dB	5.0
	200 MHz to 1000 MHz	Horizontal	dB	5.2
		Vertical	dB	6.2
10 m	30 MHz to 200 MHz	Horizontal	dB	5.5
		Vertical	dB	5.4
	200 MHz to 1000 MHz	Horizontal	dB	5.5
		Vertical	dB	5.5
3 m	1 GHz to 6 GHz		dB	5.1
	6 GHz to 18 GHz		dB	5.4
1 m	10 GHz to 18 GHz		dB	5.4
	18 GHz to 26.5 GHz		dB	5.3
	26.5 GHz to 40 GHz		dB	4.8
0.5 m	26.5 GHz to 40 GHz		dB	5.0

Antenna Terminal Conducted

Item	Unit	Calculated Uncertainty (+/-)
Antenna terminated conducted emission / Power density / Burst power	dB	3.50
Adjacent channel power (ACP)	dB	2.32
Bandwidth (OBW)	%	0.96
Time readout (time span upto 100 msec)	%	0.11
Time readout (time span upto 1000 msec)	%	0.11
Time readout (time span upto 60 sec)	%	0.02
Power measurement (Power meter < 8 GHz)	dB	1.43
Power measurement (Call box < 6 GHz)	dB	1.89
Frequency readout (Frequency counter)	ppm	0.67
Frequency readout (Spectrum analyzer frequency readout function)	ppm	2.13
Temperature (constant temperature bath)	deg. C	0.69
Humidity (constant temperature bath)	%RH	2.98
Modulation characteristics	%	6.93
Frequency for mobile	ppm	0.08
Contention-based protocol	dB	2.97

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan
Telephone: +81-596-24-8999
*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919
ISED Lab Company Number: 2973C / CAB identifier: JP0002

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.10 shielded room	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room	2.6 x 3.4 x 2.5	N/A	-	-
Large Chamber	16.9 x 22.1 x 10.17	16.9 x 22.1	-	10 m
Small Chamber	5.3 x 6.69 x 3.59	5.3 x 6.69	-	-

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)

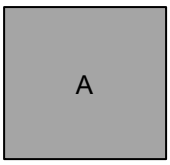
Test mode	Remarks
1) Normal use mode	-
2) Transmitting mode (Tx 433.92 MHz) *1)	-
* The system was configured in typical fashion (as a user would normally use it) for testing.	
*Power of the EUT was set by the software as follows; Software: K1Y-_2A_VER2.0.0 (Date: January 22, 2024, Storage location: 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.	

*1) The software of this mode is the same as one of normal product, except that EUT continues to transmit (For Normal use mode, EUT stops to transmit in a given time, even if transceiver button is being pressed.).

This EUT has two buttons which Bike Mark and Key Mark. The worst case of transmission was confirmed on Bike Mark and Key Mark, as a result, the pre-check on Bike Mark was the worst case. Therefore the test was performed with Bike Mark transmission as a representative.

This EUT has two modes which mechanical key is folded in or not. The worst case was confirmed on the mechanical key folded-in and folded-out, as a result, the test on mechanical key folded-in was the worst case. Therefore, the test on mechanical key folded-in was performed only.

4.2 Configuration and Peripherals



* Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial Number	Manufacturer	Remark
A	FOB of 2R Smart Key System	HLSS-9B	MLT-S1 *1) MLT-SA1 *2) MLT-SA2 *3)	Minebea AccessSolutions Inc.	EUT

*1) Used for Mode 1
*2) Used for Mode 2 (Radiated Emission test)
*3) Used for Mode 2 (Antenna Terminal Conducted test)

SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 30 MHz]
The noise level was checked by moving a search-coil (Loop Antenna) close to the EUT.

[For 30 MHz to 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.

The measuring antenna height was varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.
The measurements were performed for both vertical and horizontal antenna polarization.
The radiated emission measurements were made with the following detector function of the test receiver / spectrum analyzer.

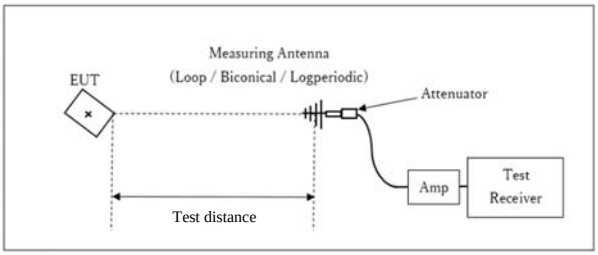
Test Antennas are used as below;

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

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	Above 1 GHz
Detector Type	Peak	Peak	Peak	Peak	Peak and Peak with Duty factor	Peak and Peak with Duty factor
IF Bandwidth	200 Hz	200 Hz	9.1 kHz	9.1 kHz	120 kHz	PK: S/A: RBW: 1 MHz, VBW: 3 MHz

[Test Setup]

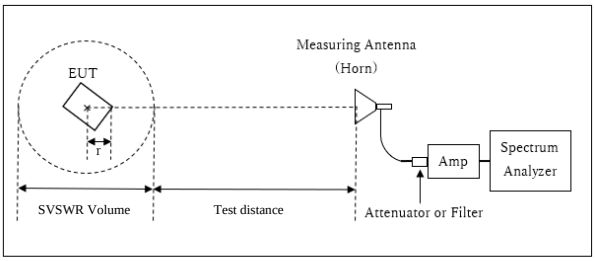
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz to 4.4 GHz



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

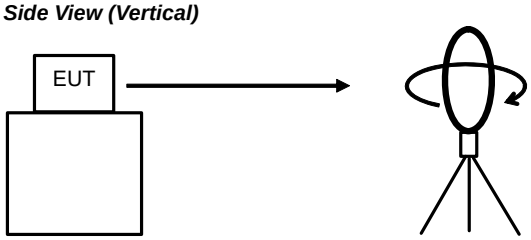
Distance Factor: 20 x log (4.0 m* / 3.0 m) = 2.5 dB
*(Test Distance + SVSWR Volume /2) - r = 4.0 m

Test Distance: 3 m
SVSWR Volume: 2 m
(SVSWR Volume has been calibrated based on CISPR 16-1-4.)
r: 0.0m

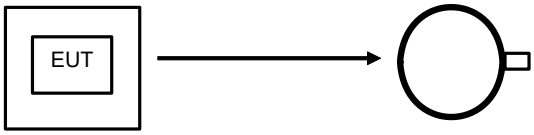
(The test was performed with r = 0.0 m since EUT is small and it was the rather conservative condition.)

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

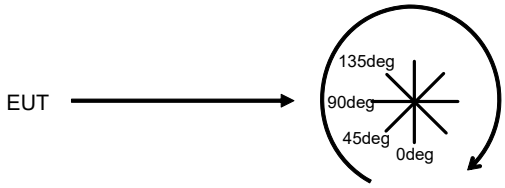


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

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.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range : 9 kHz to 4.4 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Automatically deactivate

Test Procedure

The measurement was performed with Electric field strength using a spectrum analyzer.

Test data : APPENDIX
Test result : Pass

SECTION 7: -20 dB Bandwidth and 99% emission bandwidth

Test Procedure

The test was measured with a spectrum analyzer using a test fixture.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
-20 dB Bandwidth / 99% emission bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
*1) Peak hold was applied as Worst-case measurement.							

Test data : APPENDIX
Test result : Pass

SECTION 8: Average Output Power

Test Procedure

Average Output Power was measured with a Power Meter to measure Burst Average.
The test data is reference data for RF Exposure.

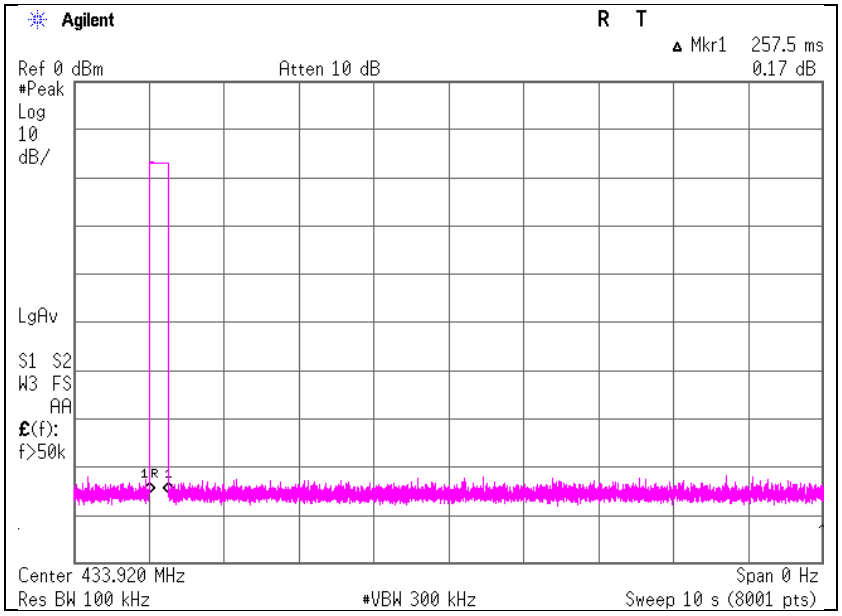
Test data : APPENDIX

APPENDIX 1: Test Data

Automatically deactivate

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 3, 2025
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 1

Time of Transmitting [s]	Limit [s]	Result
0.2575	5.00	Pass



Average Output Power
(Reference data for RF Exposure)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 3, 2025
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 2

				Conducted Power	
Freq.	Reading	Cable	Atten.	Result	
	(P/M)	Loss	Loss	(Burst)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
433.92	-3.98	0.34	9.89	6.25	4.22

Sample Calculation:
Conducted Power Result = Reading + Cable Loss + Atten. Loss
*The equipment and cables were not used for factor 0 dB of the data sheets.
*Since Burst Power is higher than Time Average Power, the test was performed at Burst Power to be more conservative.
The measurement of Burst Power used Gate function.

Radiated Emission (Fundamental and Spurious Emission)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 3, 2025
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 2

Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (PK) [dBuV/m]	Result (PK with Duty Factor) [dBuV/m]	Limit (PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (PK) [dB]	Margin (AV) [dB]	Inside or Outside of Restricted Bands	Remarks
Hori.	433.920	84.1	16.2	10.6	32.0	-	78.9	78.9	100.8	80.8	21.9	1.9	Carrier	
Hori.	867.840	40.5	21.9	12.9	31.1	-	44.2	44.2	80.8	60.8	36.6	16.6	Outside	
Hori.	1301.760	44.0	25.7	4.6	34.0	-	40.3	40.3	73.9	53.9	33.6	13.6	Inside	
Hori.	1735.680	46.9	25.1	4.7	33.0	-	43.7	43.7	80.8	60.8	37.1	17.1	Outside	
Hori.	2169.600	45.1	28.0	4.9	32.3	-	45.7	45.7	80.8	60.8	35.1	15.1	Outside	
Hori.	2603.520	48.5	27.6	5.1	32.1	-	49.1	49.1	80.8	60.8	31.7	11.7	Outside	
Hori.	3037.440	41.0	28.7	5.3	32.0	-	43.0	43.0	80.8	60.8	37.8	17.8	Outside	Floor noise
Hori.	3471.360	43.1	28.8	5.5	31.7	-	45.7	45.7	80.8	60.8	35.1	15.1	Outside	
Hori.	3905.280	45.4	29.8	5.7	31.5	-	49.4	49.4	73.9	53.9	24.5	4.5	Inside	
Hori.	4339.200	46.6	30.6	5.8	31.4	-	51.6	51.6	73.9	53.9	22.3	2.3	Inside	
Vert.	433.920	85.1	16.2	10.6	32.0	-	79.9	79.9	100.8	80.8	20.9	***0.9***	Carrier	
Vert.	867.840	39.3	21.9	12.9	31.1	-	43.0	43.0	80.8	60.8	37.8	17.8	Outside	
Vert.	1301.760	43.4	25.7	4.6	34.0	-	39.7	39.7	73.9	53.9	34.2	14.2	Inside	
Vert.	1735.680	48.3	25.1	4.7	33.0	-	45.1	45.1	80.8	60.8	35.7	15.7	Outside	
Vert.	2169.600	44.7	28.0	4.9	32.3	-	45.3	45.3	80.8	60.8	35.5	15.5	Outside	
Vert.	2603.520	48.4	27.6	5.1	32.1	-	49.0	49.0	80.8	60.8	31.8	11.8	Outside	
Vert.	3037.440	41.0	28.7	5.3	32.0	-	43.0	43.0	80.8	60.8	37.8	17.8	Outside	Floor noise
Vert.	3471.360	43.6	28.8	5.5	31.7	-	46.2	46.2	80.8	60.8	34.6	14.6	Outside	
Vert.	3905.280	46.1	29.8	5.7	31.5	-	50.1	50.1	73.9	53.9	23.8	3.8	Inside	
Vert.	4339.200	46.7	30.6	5.8	31.4	-	51.7	51.7	73.9	53.9	22.2	***2.2***	Inside	

Sample calculation:
Result of PK = Reading + Ant Factor + Loss {Cable + Attenuator + Filter (above 1 GHz) +Distance factor (above 1 GHz)} - Gain (Amplifier)
Result of PK with Duty factor (PK / W) = Reading + Ant Factor + Loss {Cable + Attenuator + Filter (above 1 GHz) +Distance factor (above 1 GHz)} - Gain (Amplifier) + Duty factor

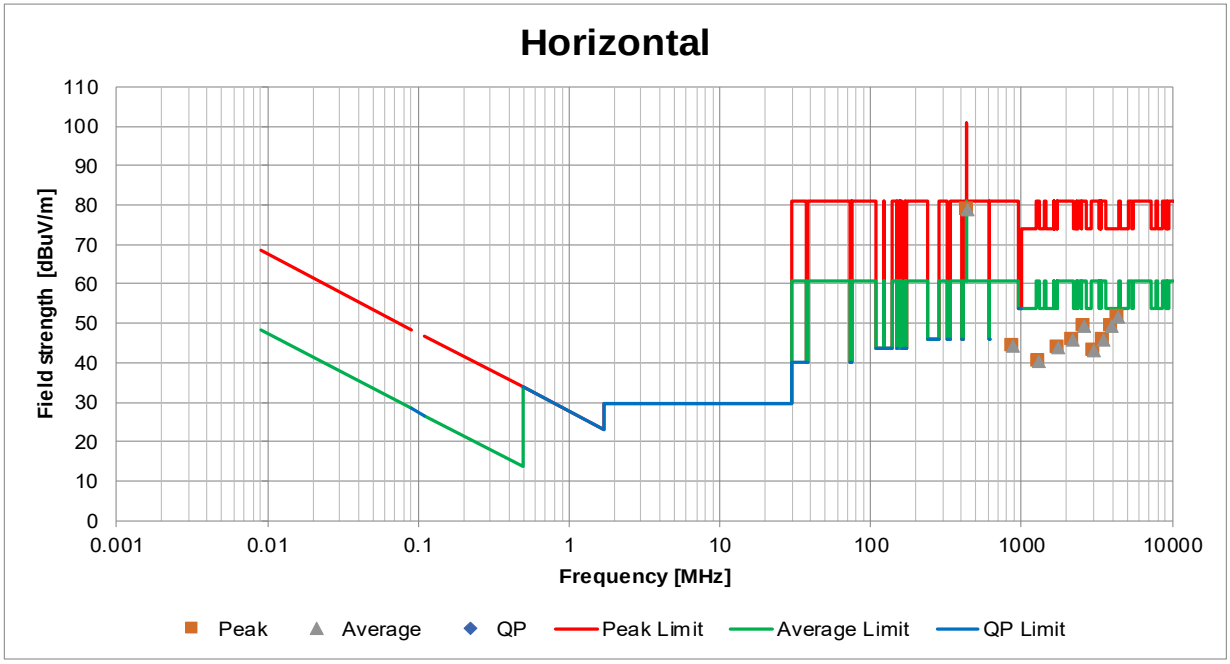
For above 1 GHz: Distance Factor: 20 x log (4.0 m/3.0 m) = 2.50 dB
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

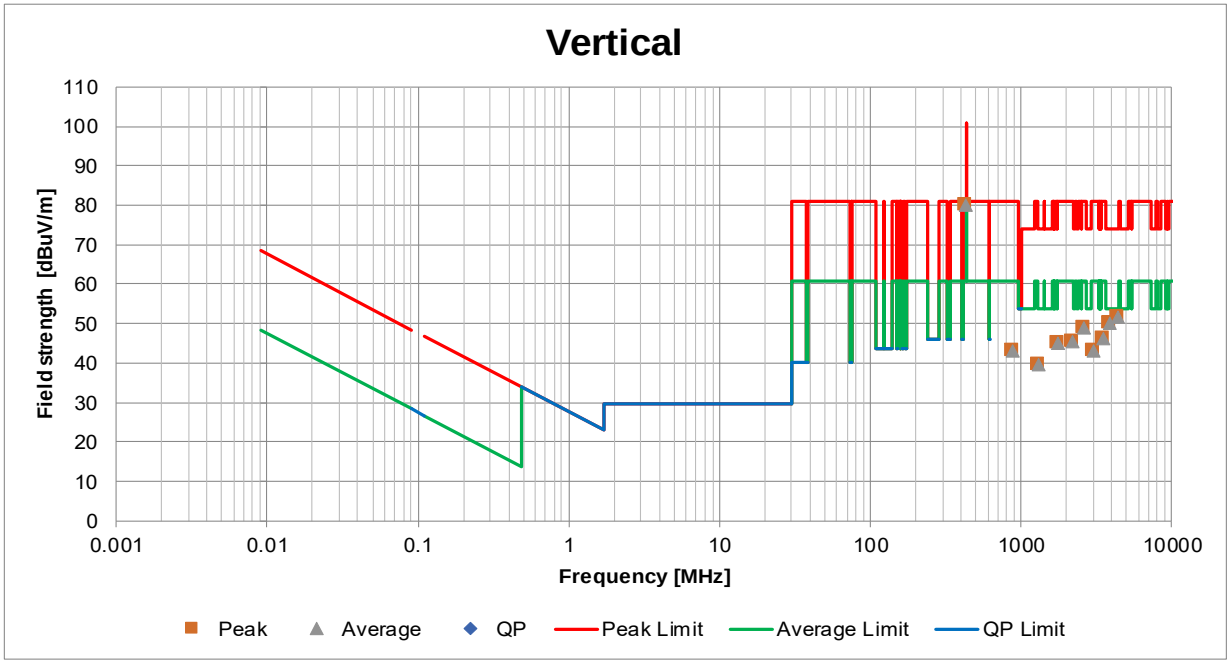
Since the peak emission result satisfied the average limit, duty factor was omitted.
Although Duty of this product was 100% or less, the result of AV (PK with Duty factor) was calculated by applying Duty 100 % as worst.

If Gain 0.0 dB shown in the above table, pre-amplifier was not used to avoid the influence of carrier power. The pre-amplifier used for carrier frequency measurement was not saturated.

Radiated Spurious Emission
(Plot data, Worst case for Fundamental Emission)

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 3, 2025
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 2





-20 dB Bandwidth / 99% emission bandwidth

Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 3, 2025
Temperature / Humidity	20 deg. C / 40 % RH
Engineer	Tetsuro Yoshida
Mode	Mode 2

Bike Mark Button

Bandwidth Limit : Fundamental Frequency 433.92 MHz x 0.25 % = 1084.800 kHz

-20 dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
50.794	1084.800	Pass

99% emission bandwidth [kHz]	Bandwidth Limit [kHz]	Result
55.6065	1084.800	Pass

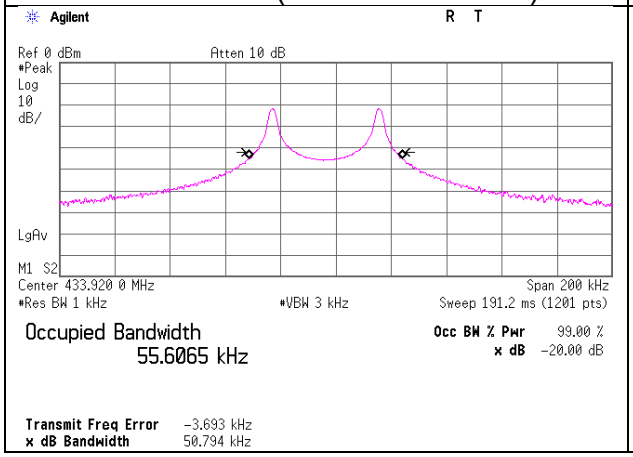
Key Mark Button

Bandwidth Limit : Fundamental Frequency 433.92 MHz x 0.25 % = 1084.800 kHz

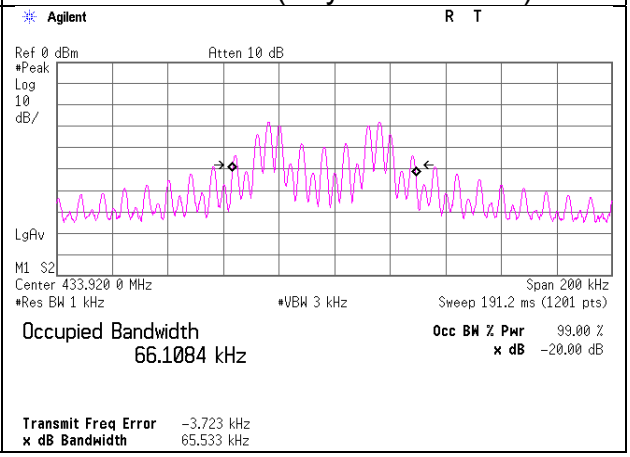
-20 dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
65.533	1084.800	Pass

99% emission bandwidth [kHz]	Bandwidth Limit [kHz]	Result
66.1084	1084.800	Pass

433.92 MHz (Bike Mark Button)



433.92 MHz (Key Mark Button)



APPENDIX 2: Test Instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/11/2024	12
AT	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	00650	10/30/2024	12
AT	141830	Power sensor	Anritsu Corporation	MA2411B	738285	05/22/2024	12
AT	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	12/11/2023	24
AT	244709	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202103	01/19/2025	12
RE	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-191	08/23/2024	12
RE	141323	Coaxial cable	UL-ISE	-	-	09/13/2024	12
RE	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+BBA9106	08031	07/30/2024	12
RE	141507	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	258	11/11/2024	12
RE	141532	DIGITAL HiTESTER	HIOKI E. E. CORPORATION	3805	051201197	01/16/2025	12
RE	141580	MicroWave System Amplifier	Keysight Technologies Inc	83017A	MY39500779	03/08/2024	12
RE	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/14/2025	12
RE	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	05/09/2024	12
RE	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	06/05/2024	12
RE	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	12/11/2023	24
RE	142013	AC3_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/12/2023	24
RE	142183	Measure	KOMELON	KMC-36	-	10/21/2024	12
RE	142314	Attenuator	Pasternack Enterprises	PE7390-6	D/C 1504	06/06/2024	12
RE	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	242978	High Pass Filter 1-13 GHz	Pasternak	PE87FL1018	D.C. 2215	02/14/2025	12
RE	244709	Thermo-Hygrometer	HIOKI E. E. CORPORATION	LR5001	231202103	01/19/2025	12
RE	246001	Microwave Cable	Huber+Suhner	SF103/11PC35/ 11PC35/1000mm / SF126E/5000mm	800673(1m) / 610204(5m)	03/06/2024	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
AT: Antenna Terminal Conducted