





RADIO TEST REPORT

Test Report No. 14980493H-A-R1

Customer	Denso Wave Incorporated
Description of EUT	RF Tag Handy Scanner
Model Number of EUT	SE1-BUB-C
FCC ID	PZWSE1BUBC
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied
Issue Date	January 17, 2024
Remarks	-

Representative Test Engineer	Approved By
	
Sayaka Hara Engineer	Ryota Yamanaka Engineer
	 
	CERTIFICATE 5107.02
<input type="checkbox"/> The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.	
<input checked="" type="checkbox"/> There is no testing item of "Non-accreditation".	

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

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- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 14980493H-A

This report is a revised version of 14980493H-A. 14980493H-A is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14980493H-A	November 6, 2023	-
1	14980493H-A-R1	January 17, 2024	Addition of note in Radio Specification of SECTION 2.2
1	14980493H-A-R1	January 17, 2024	Correction of erroneous description in table subtitle for Conducted Spurious Emission test (page. 33); From 30 MHz to 25 GHz To 30 MHz to 10 GHz

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	Denso Wave Incorporated
Address	1 Yoshiike, Kusagi, Agui-cho, Chita-gun, Aichi 470-2297 Japan
Telephone Number	+81-569-49-5298
Contact Person	Yousuke Okayama

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	RF Tag Handy Scanner
Model Number	SE1-BUB-C
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 6, 2023
Test Date	October 11 and 12, 2023

2.2 Product Description

General Specification

Rating	DC 2.4 V
Operating temperature	-5 deg. C to +50 deg. C

Radio Specification

This report contains data provided by the customer which can impact the validity of results. UL Japan, Inc. is only responsible for the validity of results after the integration of the data provided by the customer. The data provided by the customer is marked "a)" in the table below.

RFID

Equipment Type	Transceiver
Frequency of Operation	915.25 MHz to 927.50 MHz
Type of Modulation	PRASK
Antenna Gain ^{a)}	-3.15 dBi

Bluetooth (BR / EDR) *1)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	GFSK ($\pi/4$ -DQPSK. 8DPSK)
Antenna Gain	1.7 dBi

*1) This is a FCC certificated module. (FCC ID: PZWDWBT013)

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	FCC: Section 15.207	-	N/A	*1)
	ISED: RSS-Gen 8.8	ISED: RSS-Gen 8.8			
Carrier Frequency Separation	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02	FCC: Section15.247(a)(1)	See data.	Complied	Conducted
	ISED: -	ISED: RSS-247 5.1 (b)			
20dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02	FCC: Section15.247(a)(1)			
	ISED: -	ISED: RSS-247 5.1 (a)			
Number of Hopping Frequency	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02	FCC: Section15.247(a)(1)(iii)			
	ISED: -	ISED: RSS-247 5.1 (d)			
Dwell time	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02	FCC: Section15.247(a)(1)(iii)			
	ISED: -	ISED: RSS-247 5.1 (d)			
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02	FCC: Section15.247(b)(1)			
	ISED: RSS-Gen 6.12	ISED: RSS-247 5.4 (b)			
Spurious Emission & Band Edge Compliance	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02	FCC: Section15.247(d)	8.1 dB 3686.00 MHz, Horizontal, AV	Complied	Conducted/ Radiated (above 30 MHz) *2)
	ISED: RSS-Gen 6.13	ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			
Note: UL Japan, Inc.'s EMI Work Procedures: 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) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line. *2) Radiated test was selected over 30 MHz based on section 15.247(d).					

FCC Part 15.31 (e)

The EUT is a battery-operated device and test was performed with the full-charged battery. 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% Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	-	Conducted

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	4.8
		Vertical	5.0
	200 MHz to 1000 MHz	Horizontal	5.1
		Vertical	6.2
10 m	30 MHz to 200 MHz	Horizontal	4.8
		Vertical	4.8
	200 MHz to 1000 MHz	Horizontal	4.9
		Vertical	5.0
3 m	1 GHz to 6 GHz	dB	4.9
	6 GHz to 18 GHz	dB	5.2
1 m	10 GHz to 26.5 GHz	dB	5.5
	26.5 GHz to 40 GHz	dB	5.4
10 m	1 GHz to 18 GHz	dB	5.3

Antenna Terminal Conducted Tests

Item	Unit	Calculated Uncertainty (+/-)
Antenna Terminated Conducted Emission / Power density / Burst power	dB	3.28
Adjacent Channel Power (ACP)	dB	2.27
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)	dB	1.50
Frequency Readout (Frequency counter)	ppm	0.67
Frequency Readout (Spectrum analyzer frequency readout function)	ppm	1.61
Temperature (Constant temperature bath)	deg. C	0.78
Humidity (Constant temperature bath)	%RH	2.80
Modulation Characteristics	%	6.93
Frequency for Mobile	ppm	0.08

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)

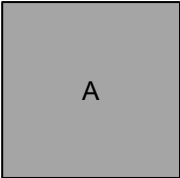
Mode	Remarks*
Transmitting mode (Tx)	-
<p>*EUT has the power settings by the software as follows; Power Setting: 10 dBm Software: Indy Tool Version: 2.6.0 (Date: 2023.10.10, Storage location: Driven by connected PC)</p> <p>*This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.</p>	

Details of Operating Mode(s)

Test Item	Mode	Hopping	Tested Frequency
Radiated Spurious Emission (Below 1 GHz)	Tx	Off	915.25 MHz *1)
20dB Bandwidth, Carrier Frequency Separation, Maximum Peak Output Power, Conducted Spurious Emission, Radiated Spurious Emission (Above 1 GHz)	Tx	Off	915.25 MHz 921.50 MHz 927.50 MHz
Number of Hopping Frequency	Tx	On	-
Dwell time	Tx	On	915.25 MHz 921.50 MHz 927.50 MHz
Band Edge Compliance (Conducted)	Tx	On ----- Off	915.25 MHz 921.50 MHz 927.50 MHz
99% Occupied Bandwidth	Tx	On ----- Off	915.25 MHz 921.50 MHz 927.50 MHz
<p>*1) Radiated Spurious Emission for frequencies below 1 GHz were limited to the channel that had the highest power during the antenna terminal test, as preliminary testing indicated that changing the operating frequency had no significant impact on the emissions in those frequency bands.</p>			

4.2 Configuration and Peripherals

Radiated Spurious Emission

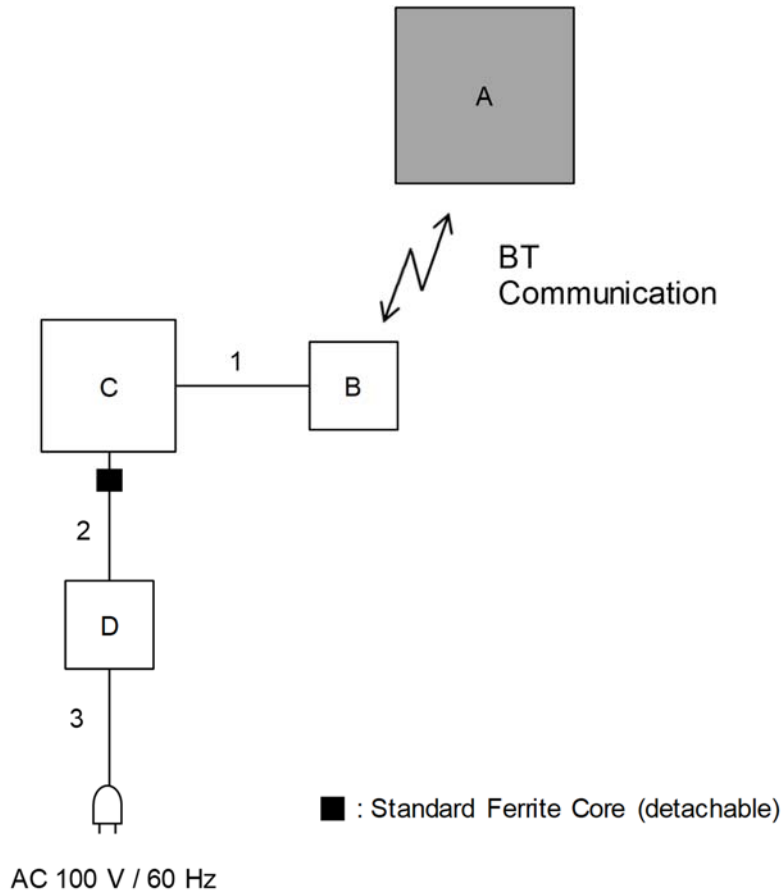


* Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	RF Tag Handy Scanner	SE1-BUB-C	4548009690300040	Denso Wave Incorporated	EUT

Antenna Terminal Conducted Tests



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

Description of EUT

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	RF Tag Handy Scanner	SE1-BUB-C	4548009690300043	Denso Wave Incorporated	EUT
B	Bluetooth Adapter	BA10-RKU	4549200010502348	Denso Wave Incorporated	-
C	Laptop PC	PR63PBAA337AD 7X	6F053913H	TOSHIBA	-
D	AC Adapter	PA51770-1ACA	FX10800NSKACC	TOSHIBA	-

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	1.0	Shielded	Shielded	-
2	DC Cable	1.7	Unshielded	Unshielded	-
3	AC Cable	0.8	Unshielded	Unshielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 1.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

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

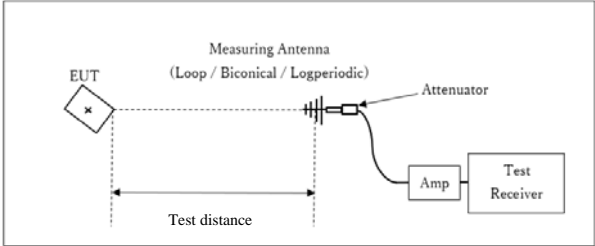
In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired 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: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

Figure 2: Test Setup

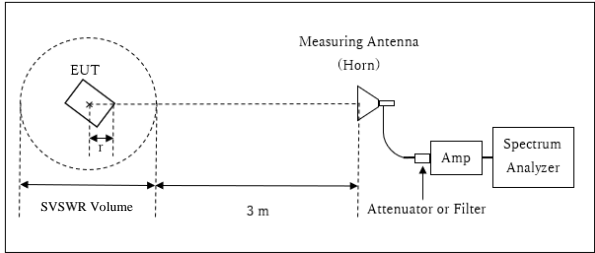
Below 1 GHz



* : 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: $20 \times \log(3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$
 * Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.95 \text{ m}$

SVSWR Volume : 2.0 m
 (SVSWR Volume has been calibrated based on CISPR 16-1-4.)
 $r = 0.05 \text{ m}$

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

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

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

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument Used
20dB Bandwidth	1 MHz	3 kHz	9.1 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak/Average *2)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	750 kHz	10 kHz	30 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	20 MHz	75 kHz	240 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz	300 kHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3) *4)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				
	30 MHz to 10 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) Peak hold was applied as Worst-case measurement.

*2) Reference data

*3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz)

*4) 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.

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

Test Data : APPENDIX

Test Result : Pass

APPENDIX 1: Test data

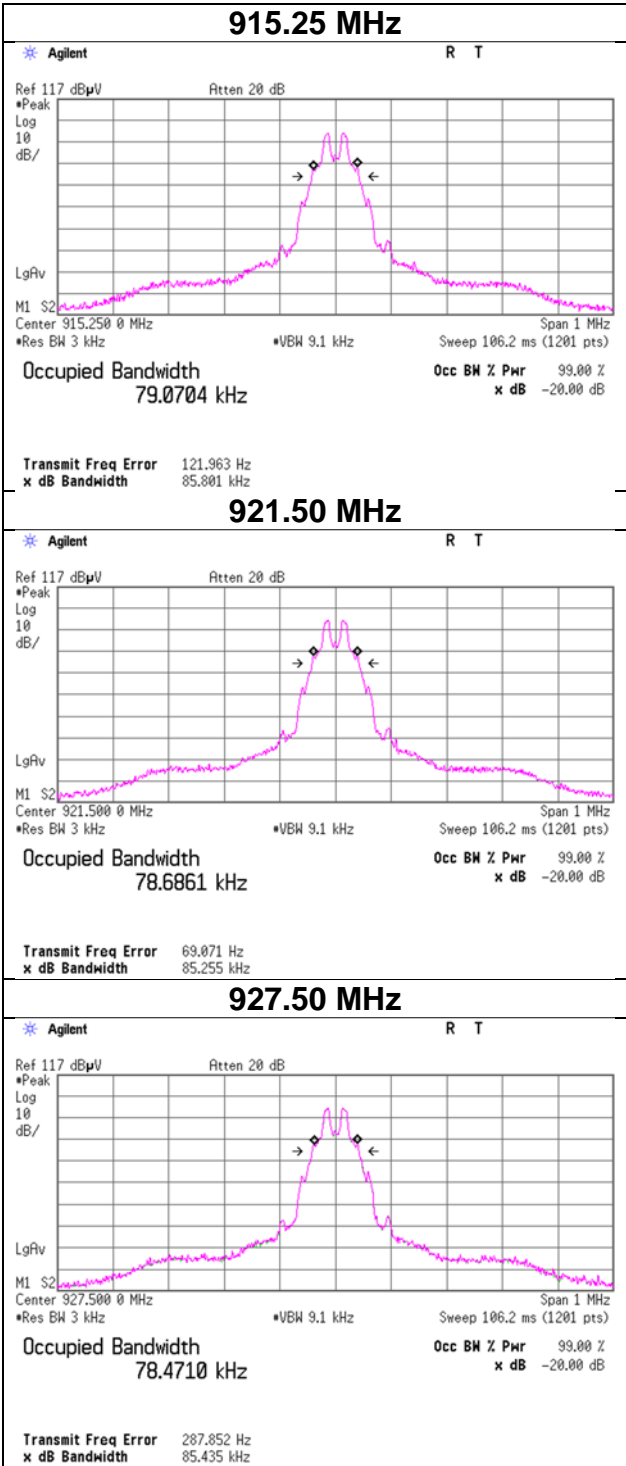
20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation

Test place Ise EMC Lab. No.6 Measurement Room
Date October 12, 2023
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Sayaka Hara
Mode Tx, Hopping Off, Tx, Hopping On

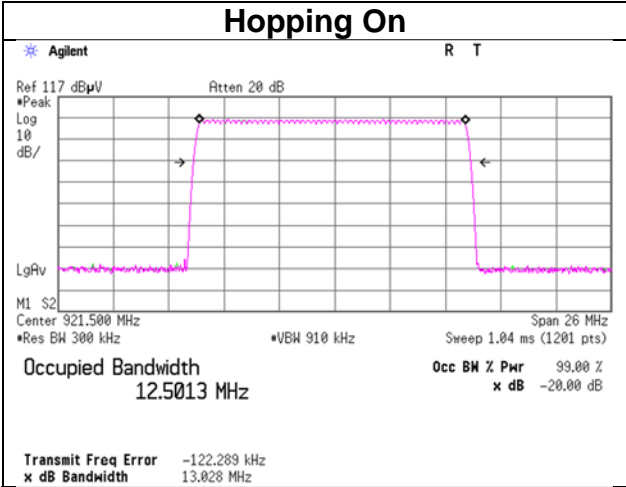
Freq. [MHz]	20 dB Bandwidth [kHz]	Limit for 20 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]	Carrier Frequency Separation [kHz]	Limit for Carrier Frequency separation [kHz]
915.25	85.801	500	79.070	250.000	>= 85.801
921.50	85.255	500	78.686	250.000	>= 85.255
927.50	85.435	500	78.471	250.000	>= 85.435
Hopping On	-	-	12501.3	-	-

Limit: 20dB Bandwidth or 25 kHz (whichever is greater).

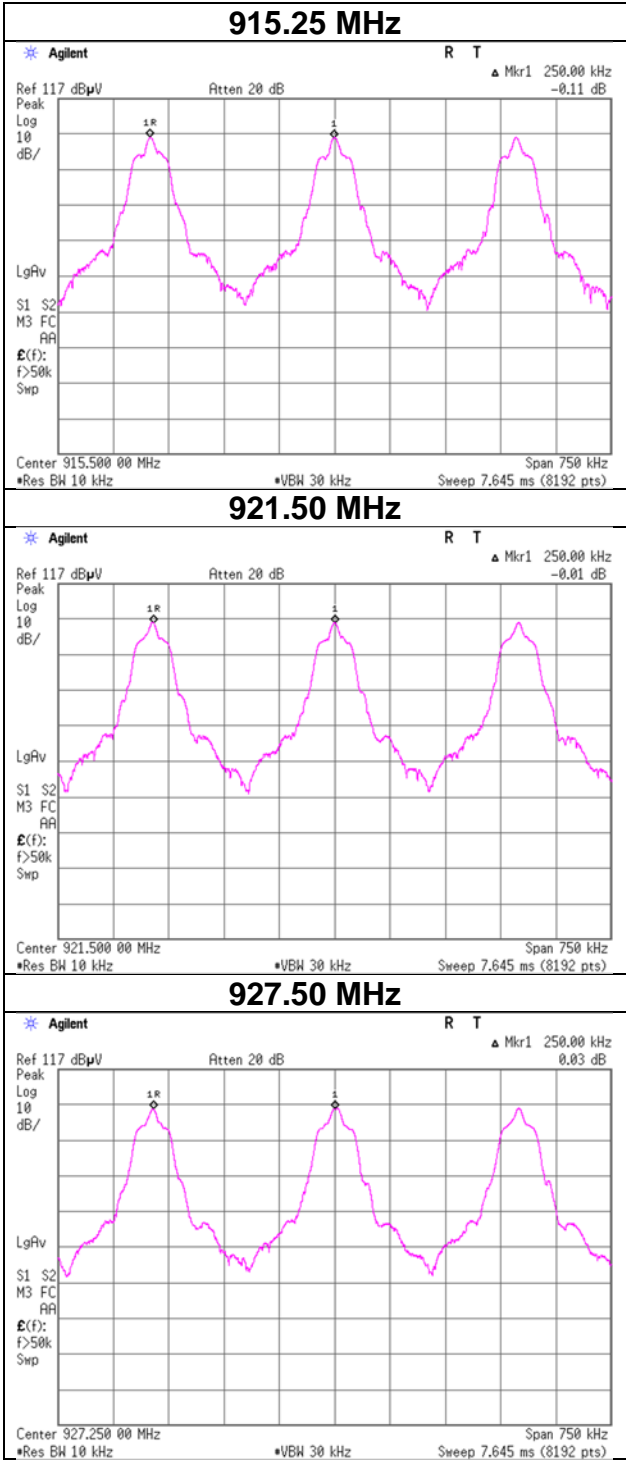
20dB Bandwidth and 99% Occupied Bandwidth



20dB Bandwidth and 99% Occupied Bandwidth



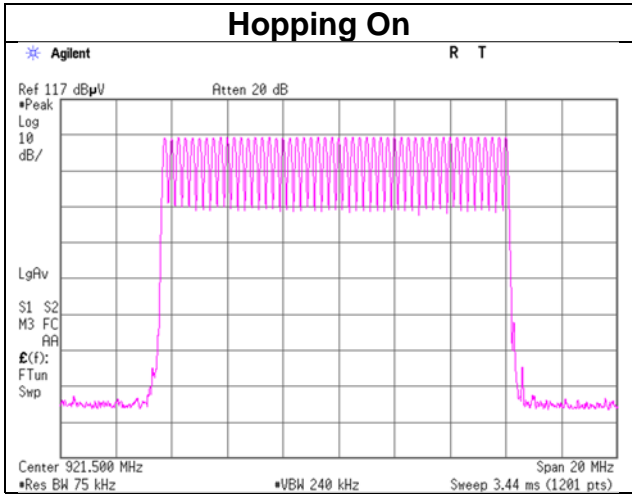
Carrier Frequency Separation



Number of Hopping Frequency

Test place Ise EMC Lab. No.6 Measurement Room
Date October 11, 2023
Temperature / Humidity 23 deg. C / 39 % RH
Engineer Sayaka Hara
Mode Tx, Hopping On

Number of channel [channels]	Limit [channels]
50	>= 50



Dwell time

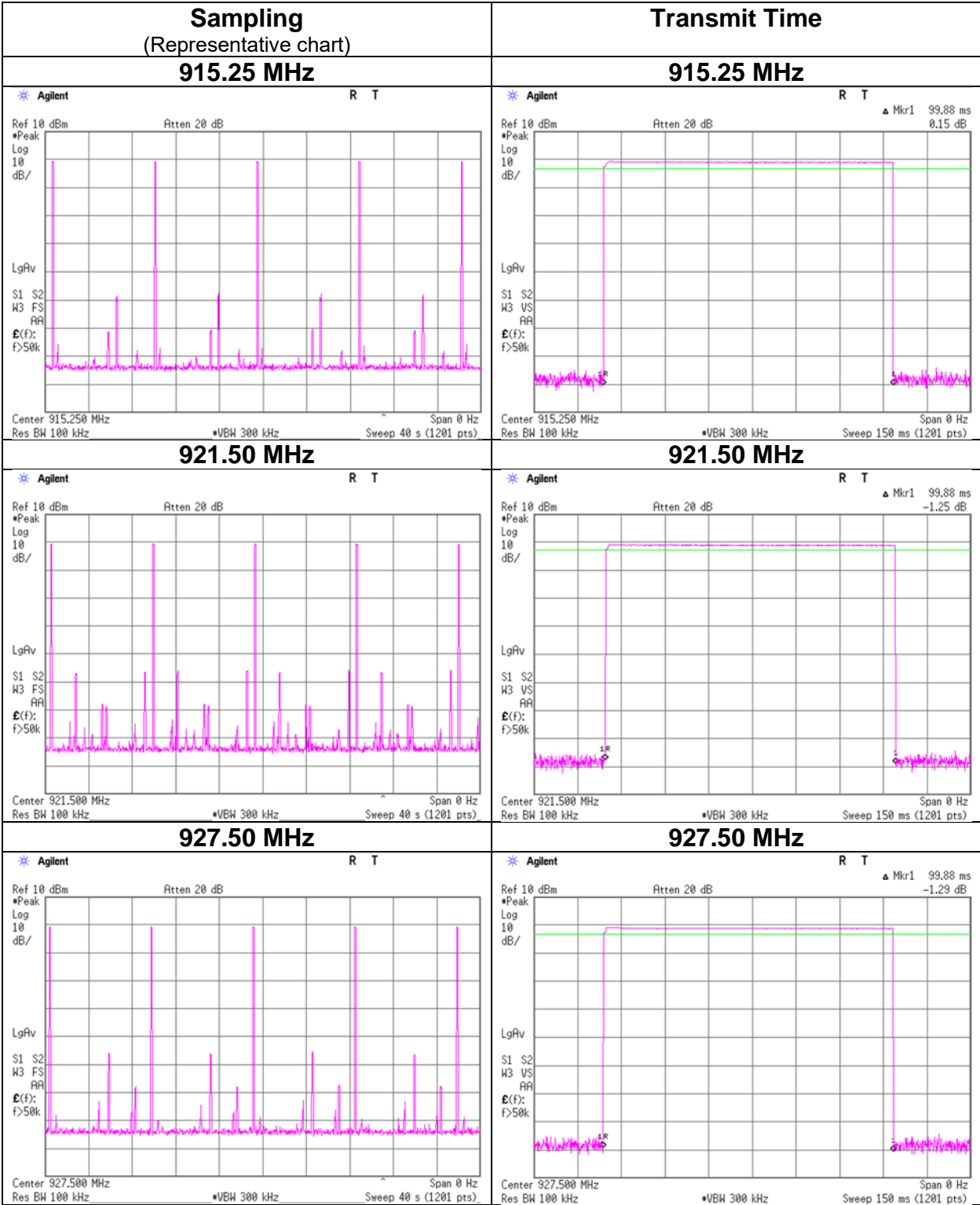
Test place Ise EMC Lab. No.6 Measurement Room
Date October 12, 2023
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Sayaka Hara
Mode Tx, Hopping On

Frequency	Number of transmission in 20 sec period	Length of transmission [ms]	Result [ms]	Limit [ms]
915.25	3	99.880	299.640	400
921.50	3	99.880	299.640	400
927.50	3	99.880	299.640	400

Sample Calculation

Result = Number of transmission x Length of transmission

Dwell time



Maximum Peak Output Power

Test place Ise EMC Lab. No.6 Measurement Room
Date October 11, 2023
Temperature / Humidity 23 deg. C / 39 % RH
Engineer Sayaka Hara
Mode Tx, Hopping Off

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power					e.i.r.p. for RSS-247					
				Result		Limit		Margin	Antenna Gain [dBi]	Result		Limit		Margin
				[dBm]	[mW]	[dBm]	[mW]			[dB]	[dBm]	[mW]	[dBm]	
915.25	-1.18	1.28	9.79	9.89	9.75	30.00	1000	20.11	-3.15	6.74	4.72	36.02	4000	29.28
921.50	-1.21	1.28	9.79	9.86	9.68	30.00	1000	20.14	-3.15	6.71	4.69	36.02	4000	29.31
927.50	-1.38	1.28	9.79	9.69	9.31	30.00	1000	20.31	-3.15	6.54	4.51	36.02	4000	29.48

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Average Output Power
(Reference data for RF Exposure)

Test place Ise EMC Lab. No.6 Measurement Room
Date October 11, 2023
Temperature / Humidity 23 deg. C / 39 % RH
Engineer Sayaka Hara
Mode Tx, Hopping Off

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
				[dBm]	[mW]		[dBm]	[mW]
915.25	-3.31	1.28	9.79	7.76	5.97	0.00	7.76	5.97
921.50	-3.34	1.28	9.79	7.73	5.93	0.00	7.73	5.93
927.50	-3.49	1.28	9.79	7.58	5.73	0.00	7.58	5.73

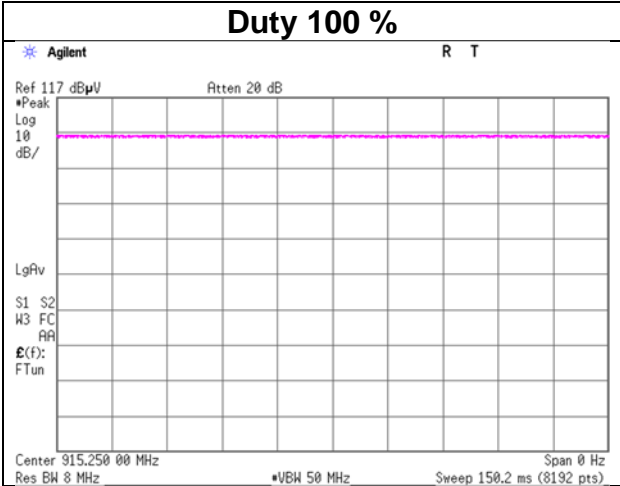
Sample Calculation:

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

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

Burst Rate Confirmation

Test place Ise EMC Lab. No.6 Measurement Room
Date October 11, 2023
Temperature / Humidity 23 deg. C / 39 % RH
Engineer Sayaka Hara
Mode Tx, Hopping Off



Radiated Spurious Emission

Test place	Ise EMC Lab.	No.1
Semi Anechoic Chamber	No.3	October 11, 2023
Date	October 11, 2023	October 11, 2023
Temperature / Humidity	22 deg. C / 52 % RH	22 deg. C / 42 % RH
Engineer	Junki Nagatomi	Nachi Konegawa
	(Below 1GHz)	(Above 1GHz)
Mode	Tx, Hopping Off 915.25 MHz	

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	34.6	21.9	-	16.9	7.1	32.1	-	13.8	-	40.0	-	26.2	-	
Hori.	70.6	21.4	-	6.4	7.6	32.1	-	3.3	-	40.0	-	36.7	-	
Hori.	125.2	21.2	-	13.4	8.1	32.0	-	10.7	-	43.5	-	32.8	-	
Hori.	218.5	20.8	-	11.2	8.9	32.0	-	8.9	-	46.0	-	37.1	-	
Hori.	300.0	21.0	-	13.7	9.7	32.0	-	12.3	-	46.0	-	33.7	-	
Hori.	400.0	21.4	-	15.7	10.2	32.1	-	15.2	-	46.0	-	30.8	-	
Hori.	2745.8	44.6	36.7	28.4	6.1	36.2	-	42.9	35.0	73.9	53.9	31.0	18.9	Floor noise
Hori.	3661.0	48.2	42.5	29.4	7.9	35.9	-	49.6	43.9	73.9	53.9	24.3	10.1	
Hori.	4576.3	43.8	35.7	31.0	7.9	35.7	-	47.0	38.9	73.9	53.9	26.9	15.0	Floor noise
Hori.	5491.5	44.2	34.9	32.0	8.2	35.6	-	48.8	39.5	73.9	53.9	25.1	14.4	Floor noise
Hori.	6406.8	43.4	34.8	33.9	8.6	35.6	-	50.4	41.7	73.9	53.9	23.5	12.2	Floor noise
Hori.	7322.0	44.9	35.5	36.4	9.2	35.7	-	54.8	45.3	73.9	53.9	19.1	8.6	Floor noise
Hori.	8237.3	44.1	35.1	36.5	9.6	35.8	-	54.4	45.4	73.9	53.9	19.5	8.5	Floor noise
Hori.	9152.5	43.6	34.8	38.2	9.8	36.1	-	55.5	46.7	73.9	53.9	18.4	7.2	Floor noise
Vert.	34.6	21.8	-	16.9	7.1	32.1	-	13.7	-	40.0	-	26.3	-	
Vert.	70.6	23.2	-	6.4	7.6	32.1	-	5.1	-	40.0	-	34.9	-	
Vert.	125.2	21.2	-	13.4	8.1	32.0	-	10.7	-	43.5	-	32.8	-	
Vert.	218.5	20.9	-	11.2	8.9	32.0	-	9.0	-	46.0	-	37.0	-	
Vert.	300.0	21.3	-	13.7	9.7	32.0	-	12.6	-	46.0	-	33.4	-	
Vert.	400.0	21.1	-	15.7	10.2	32.1	-	14.9	-	46.0	-	31.1	-	
Vert.	2745.8	44.6	36.7	28.4	6.1	36.2	-	42.9	35.0	73.9	53.9	31.0	18.9	Floor noise
Vert.	3661.0	46.8	40.8	29.4	7.9	35.9	-	48.1	42.2	73.9	53.9	25.8	11.7	
Vert.	4576.3	43.8	35.7	31.0	7.9	35.7	-	47.0	38.9	73.9	53.9	26.9	15.0	Floor noise
Vert.	5491.5	44.2	34.9	32.0	8.2	35.6	-	48.8	39.5	73.9	53.9	25.1	14.4	Floor noise
Vert.	6406.8	43.4	34.8	33.9	8.6	35.6	-	50.4	41.7	73.9	53.9	23.5	12.2	Floor noise
Vert.	7322.0	44.9	35.5	36.4	9.2	35.7	-	54.8	45.3	73.9	53.9	19.1	8.6	Floor noise
Vert.	8237.3	44.1	35.1	36.5	9.6	35.8	-	54.4	45.4	73.9	53.9	19.5	8.5	Floor noise
Vert.	9152.5	43.6	34.8	38.2	9.8	36.1	-	55.5	46.7	73.9	53.9	18.4	7.2	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
 Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
 *Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
 *QP detector was used up to 1GHz.

20dBc Data Sheet

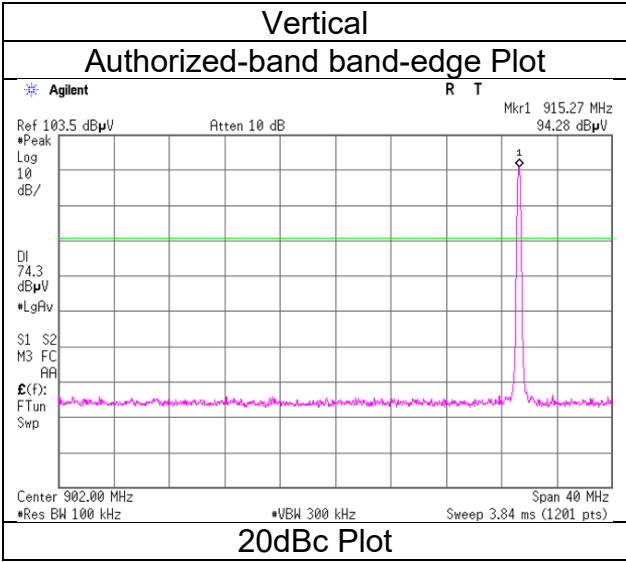
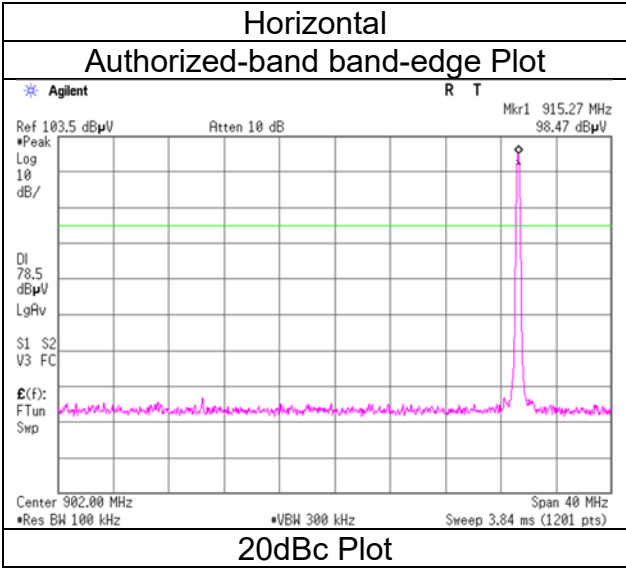
Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	915.3	98.5	22.1	12.5	31.0	102.0	-	-	Carrier
Hori.	902.0	28.6	22.0	12.4	31.1	32.0	82.0	50.0	
Hori.	1830.5	57.8	25.6	5.3	36.2	52.5	82.0	29.4	
Vert.	915.3	94.3	22.1	12.5	31.0	97.8	-	-	Carrier
Vert.	902.0	29.3	22.0	12.4	31.1	32.7	77.8	45.1	
Vert.	1830.5	57.8	25.6	5.3	36.2	52.6	77.8	25.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
 Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB

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

Test place
 Semi Anechoic Chamber
 Date
 Temperature / Humidity
 Engineer
 Mode

Ise EMC Lab.
 No.3
 October 11, 2023
 22 deg. C / 52 % RH
 Junki Nagatomi
 (Below 1GHz)
 TX, Hopping Off 915.25 MHz



* 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	Ise EMC Lab.	No.1
Semi Anechoic Chamber	No.3	No.1
Date	October 11, 2023	October 11, 2023
Temperature / Humidity	22 deg. C / 52 % RH	22 deg. C / 42 % RH
Engineer	Junki Nagatomi	Nachi Konegawa
	(Below 1GHz)	(Above 1GHz)
Mode	Tx, Hopping Off 921.50 MHz	

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2764.5	44.7	36.5	28.5	6.1	36.2	-	43.1	34.8	73.9	53.9	30.8	19.1	Floor noise
Hori.	3686.0	49.3	44.4	29.4	7.9	35.9	-	50.7	45.8	73.9	53.9	23.2	8.1	
Hori.	4607.5	44.2	35.4	31.1	7.9	35.7	-	47.5	38.7	73.9	53.9	26.4	15.2	Floor noise
Hori.	5529.0	43.6	34.7	32.0	8.2	35.6	-	48.2	39.3	73.9	53.9	25.7	14.6	Floor noise
Hori.	6450.5	43.8	35.1	34.1	8.7	35.6	-	50.9	42.3	73.9	53.9	23.0	11.6	Floor noise
Hori.	7372.0	44.2	35.5	36.5	9.2	35.7	-	54.1	45.5	73.9	53.9	19.8	8.4	Floor noise
Hori.	8293.5	44.0	35.4	36.4	9.6	35.8	-	54.3	45.6	73.9	53.9	19.6	8.3	Floor noise
Hori.	9215.0	44.1	35.2	38.5	9.8	36.1	-	56.4	47.4	73.9	53.9	17.5	6.5	Floor noise
Vert.	2764.5	44.7	36.5	28.5	6.1	36.2	-	43.1	34.8	73.9	53.9	30.8	19.1	Floor noise
Vert.	3686.0	47.5	41.1	29.4	7.9	35.9	-	48.9	42.5	73.9	53.9	25.0	11.5	
Vert.	4607.5	44.2	35.4	31.1	7.9	35.7	-	47.5	38.7	73.9	53.9	26.4	15.2	Floor noise
Vert.	5529.0	43.6	34.7	32.0	8.2	35.6	-	48.2	39.3	73.9	53.9	25.7	14.6	Floor noise
Vert.	6450.5	43.8	35.1	34.1	8.7	35.6	-	50.9	42.3	73.9	53.9	23.0	11.6	Floor noise
Vert.	7372.0	44.2	35.5	36.5	9.2	35.7	-	54.1	45.5	73.9	53.9	19.8	8.4	Floor noise
Vert.	8293.5	44.0	35.4	36.4	9.6	35.8	-	54.3	45.6	73.9	53.9	19.6	8.3	Floor noise
Vert.	9215.0	44.1	35.2	38.5	9.8	36.1	-	56.4	47.4	73.9	53.9	17.5	6.5	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
 Result (AV) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
 *Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
 *QP detector was used up to 1GHz.

20dBc Data Sheet

Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	921.5	98.5	22.0	12.5	31.0	101.9	-	-	Carrier
Hori.	1843.0	55.8	25.7	5.3	36.2	50.7	81.9	31.3	
Vert.	921.5	91.0	22.0	12.5	31.0	94.5	-	-	Carrier
Vert.	1843.0	55.7	25.7	5.3	36.2	50.5	74.5	24.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
 Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB

Radiated Spurious Emission

Test place	Ise EMC Lab.	No.1
Semi Anechoic Chamber	No.3	No.1
Date	October 11, 2023	October 11, 2023
Temperature / Humidity	22 deg. C / 52 % RH	22 deg. C / 42 % RH
Engineer	Junki Nagatomi	Nachi Konegawa
	(Below 1GHz)	(Above 1GHz)
Mode	Tx, Hopping Off 927.50 MHz	

Polarity [Hori/Vert]	Frequency [MHz]	Reading (QP / PK) [dBuV]	Reading (AV) [dBuV]	Ant. Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result (QP / PK) [dBuV/m]	Result (AV) [dBuV/m]	Limit (QP / PK) [dBuV/m]	Limit (AV) [dBuV/m]	Margin (QP / PK) [dB]	Margin (AV) [dB]	Remark
Hori.	2782.5	44.9	36.0	28.5	6.1	36.2	-	43.3	34.5	73.9	53.9	30.6	19.4	Floor noise
Hori.	3710.0	48.1	42.3	29.5	7.8	35.9	-	49.6	43.8	73.9	53.9	24.3	10.1	
Hori.	4637.5	43.9	35.1	31.2	7.9	35.7	-	47.3	38.5	73.9	53.9	26.6	15.4	Floor noise
Hori.	5565.0	43.6	35.0	32.0	8.2	35.6	-	48.2	39.6	73.9	53.9	25.7	14.3	Floor noise
Hori.	6492.5	43.5	35.0	34.3	8.7	35.6	-	50.9	42.3	73.9	53.9	23.1	11.6	Floor noise
Hori.	7420.0	44.4	35.9	36.5	9.2	35.7	-	54.4	45.9	73.9	53.9	19.5	8.0	Floor noise
Hori.	8347.5	43.9	35.2	36.4	9.6	35.8	-	54.1	45.4	73.9	53.9	19.8	8.5	Floor noise
Hori.	9275.0	44.3	35.3	38.7	9.9	36.1	-	56.8	47.8	73.9	53.9	17.1	6.1	Floor noise
Vert.	2782.5	44.9	36.0	28.5	6.1	36.2	-	43.3	34.5	73.9	53.9	30.6	19.4	Floor noise
Vert.	3710.0	47.1	41.2	29.5	7.8	35.9	-	48.6	42.6	73.9	53.9	25.3	11.3	
Vert.	4637.5	43.9	35.1	31.2	7.9	35.7	-	47.3	38.5	73.9	53.9	26.6	15.4	Floor noise
Vert.	5565.0	43.6	35.0	32.0	8.2	35.6	-	48.2	39.6	73.9	53.9	25.7	14.3	Floor noise
Vert.	6492.5	43.5	35.0	34.3	8.7	35.6	-	50.9	42.3	73.9	53.9	23.1	11.6	Floor noise
Vert.	7420.0	44.4	35.9	36.5	9.2	35.7	-	54.4	45.9	73.9	53.9	19.5	8.0	Floor noise
Vert.	8347.5	43.9	35.2	36.4	9.6	35.8	-	54.1	45.4	73.9	53.9	19.8	8.5	Floor noise
Vert.	9275.0	44.3	35.3	38.7	9.9	36.1	-	56.8	47.8	73.9	53.9	17.1	6.1	Floor noise

Result (QP / PK) = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
 Result (AV)= Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor
 *Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
 *QP detector was used up to 1GHz.

20dBc Data Sheet

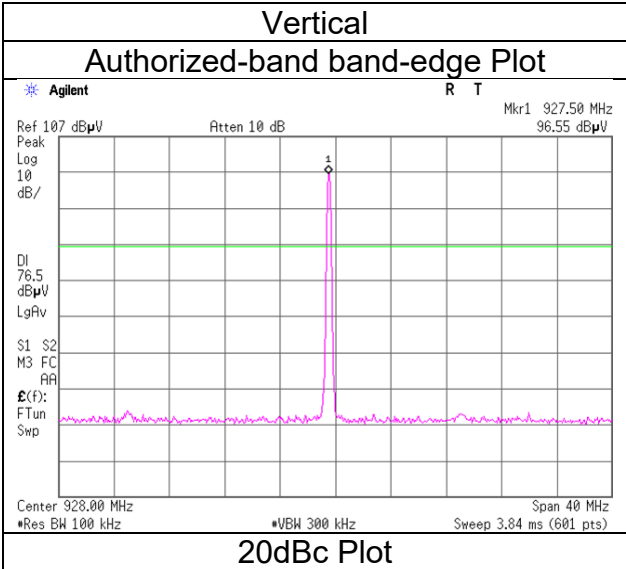
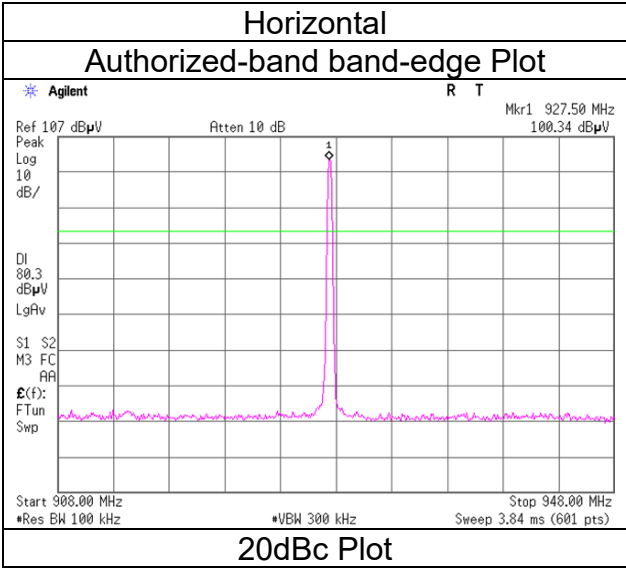
Polarity [Hori/Vert]	Frequency [MHz]	Reading (PK) [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	927.5	100.3	22.0	12.5	31.0	103.9	-	-	Carrier
Hori.	928.0	32.6	22.0	12.5	31.0	36.1	83.9	47.8	
Hori.	1855.0	56.0	25.7	5.4	36.2	50.9	83.9	33.0	
Vert.	927.5	96.6	22.0	12.5	31.0	100.1	-	-	Carrier
Vert.	928.0	29.6	22.0	12.5	31.0	33.1	80.1	47.0	
Vert.	1855.0	55.6	25.7	5.4	36.2	50.4	80.1	29.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
 Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB

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

Test place
 Semi Anechoic Chamber
 Date
 Temperature / Humidity
 Engineer
 Mode

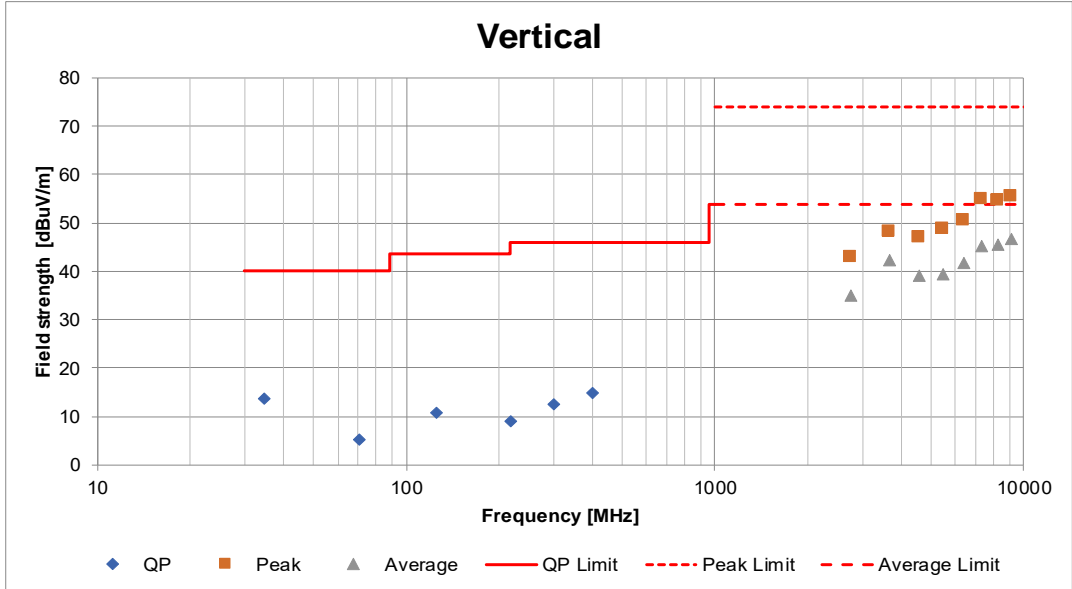
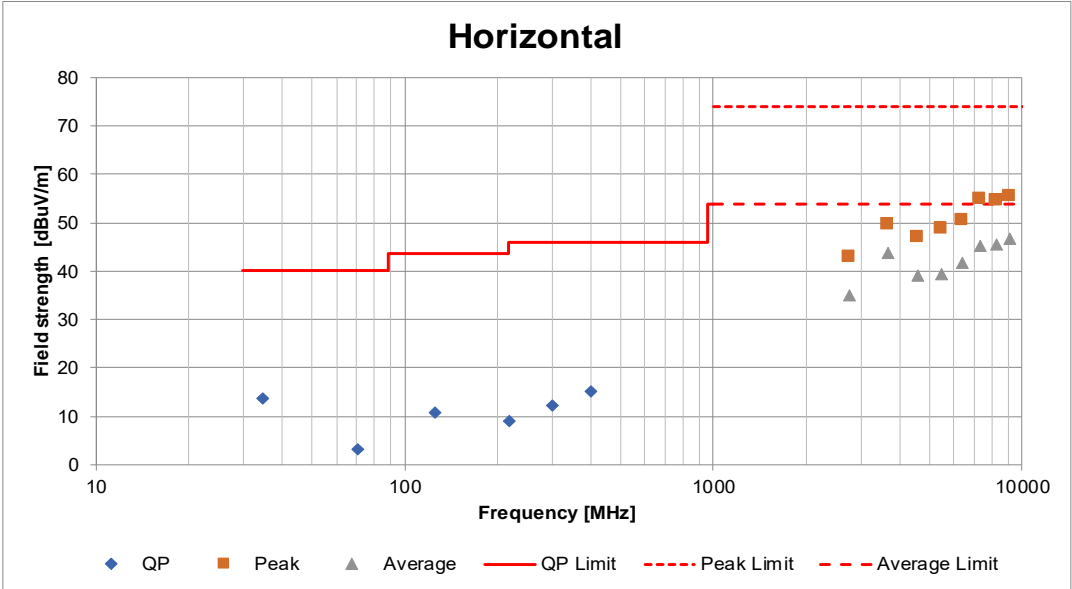
Ise EMC Lab.
 No.3
 October 11, 2023
 22 deg. C / 52 % RH
 Junki Nagatomi
 (Below 1GHz)
 Tx, Hopping Off 927.50 MHz



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

Radiated Spurious Emission
(Plot data, Worst case mode for Maximum Peak Output Power)

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.1
Date	October 11, 2023	October 11, 2023
Temperature / Humidity	22 deg. C / 52 % RH	22 deg. C / 42 % RH
Engineer	Junki Nagatomi	Nachi Konegawa
	(Below 1GHz)	(Above 1GHz)
Mode	Tx, Hopping Off 915.25 MHz	

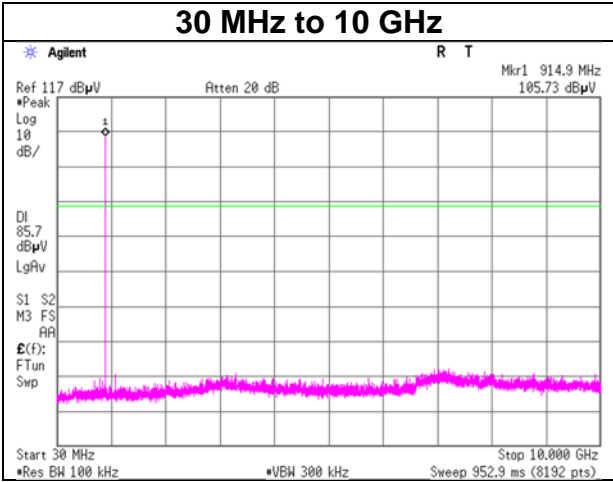
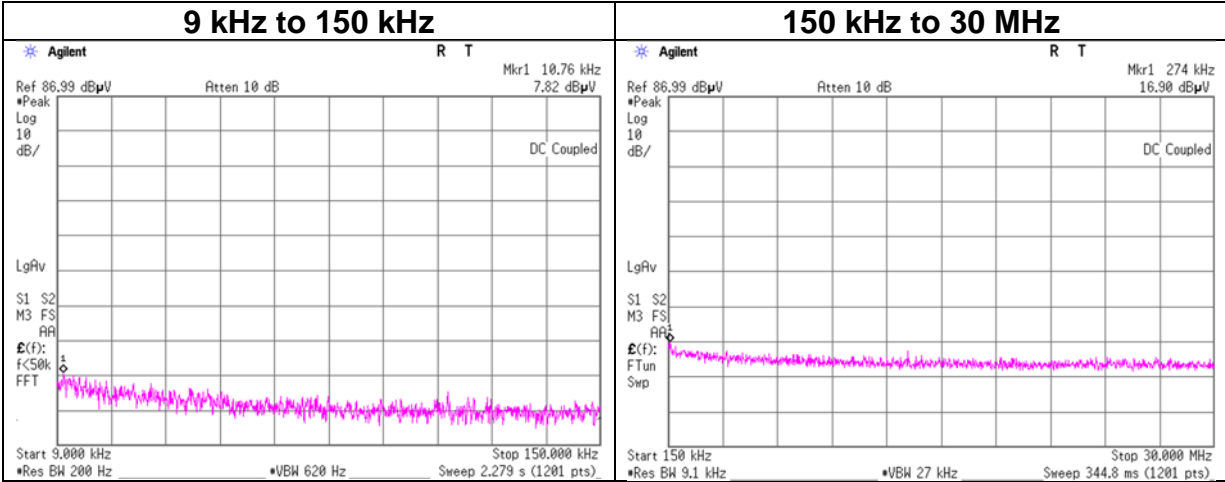


*These plots data contain sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place Ise EMC Lab. No.6 Measurement Room
Date October 12, 2023
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Sayaka Hara
Mode Tx, Hopping Off

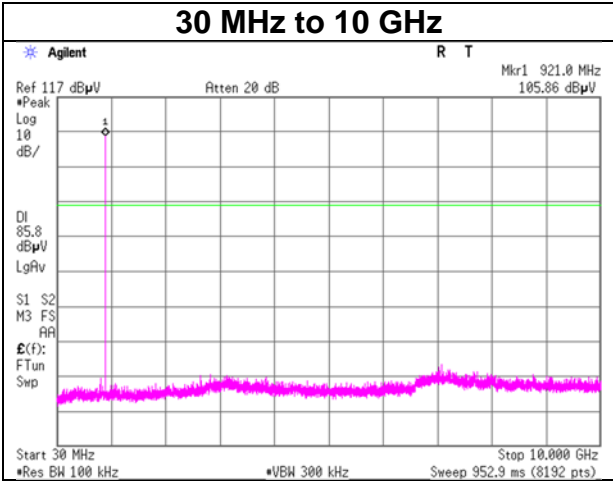
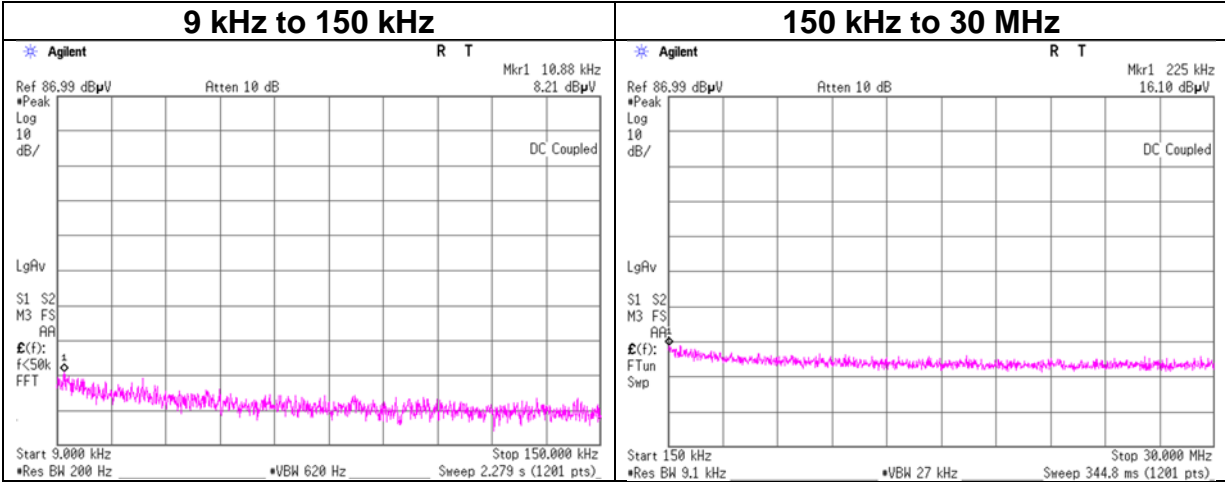
915.25 MHz



Conducted Spurious Emission

Test place Ise EMC Lab. No.6 Measurement Room
Date October 12, 2023
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Sayaka Hara
Mode Tx, Hopping Off

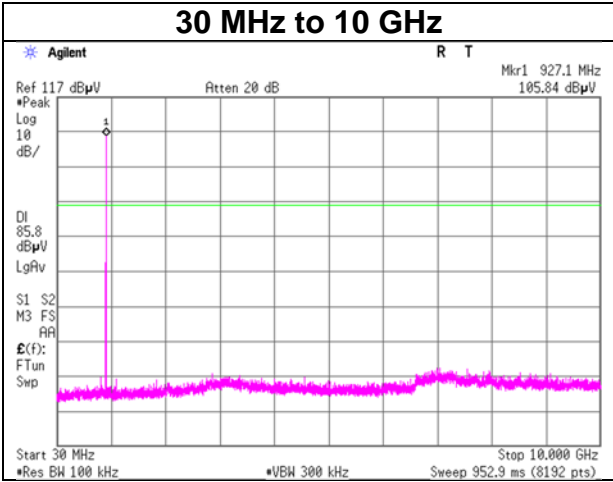
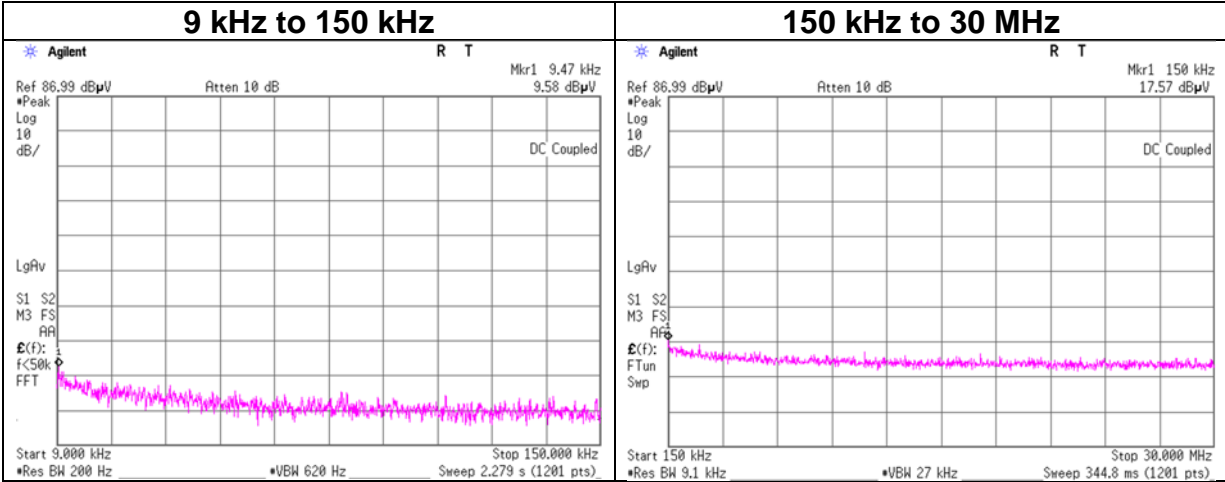
921.50 MHz



Conducted Spurious Emission

Test place Ise EMC Lab. No.6 Measurement Room
Date October 12, 2023
Temperature / Humidity 22 deg. C / 40 % RH
Engineer Sayaka Hara
Mode Tx, Hopping Off

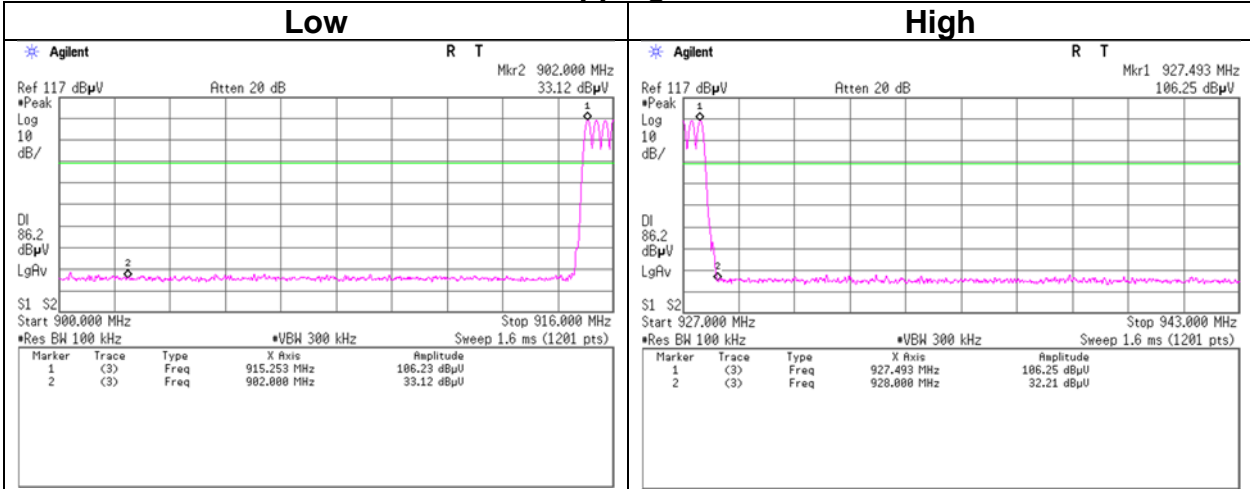
927.50 MHz



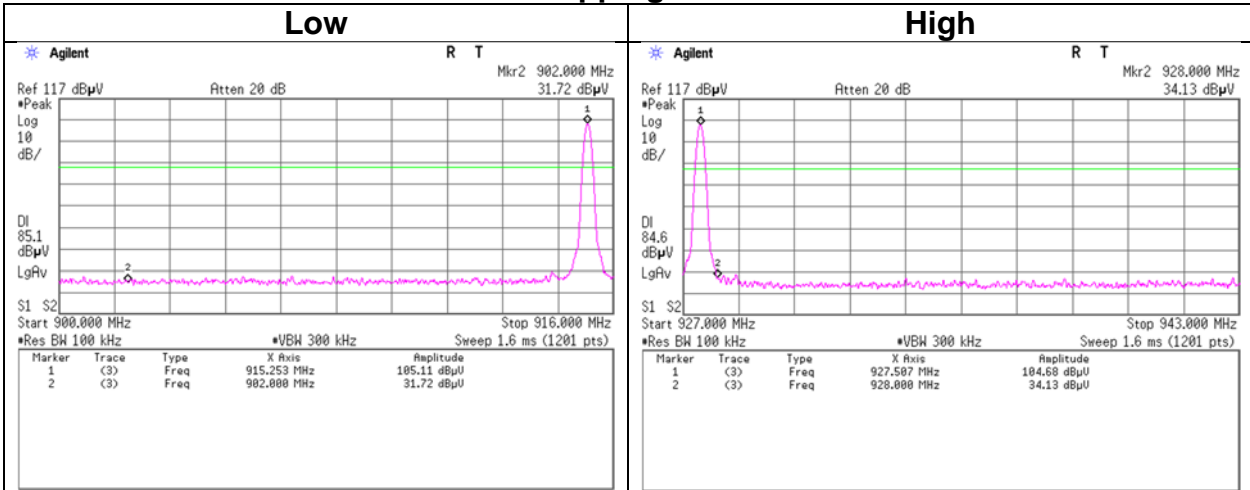
Conducted Emission Band Edge compliance

Test place Ise EMC Lab. No.6 Measurement Room
 Date October 11, 2023 October 12, 2023
 Temperature / Humidity 23 deg. C / 39 % RH 22 deg. C / 49 % RH
 Engineer Sayaka Hara Sayaka Hara
 Mode Tx, Hopping Off, Tx, Hopping On

Hopping On



Hopping Off



APPENDIX 2: Test Instruments

Test Equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-01-SVSWR	141994	AC1_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 10m	DA-06881	04/20/2023	24
RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2022	24
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/01/2023	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+ BBA9106	VHA 91031302	08/10/2023	12
RE	MCC-178	141227	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S305	03/03/2023	12
RE	MCC-217	141393	Microwave Cable	Junkosha	MWX221	1604S254(1 m) / 1608S088(5 m)	08/01/2023	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	11/18/2022	12
RE	MHA-05	141511	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	253	09/25/2023	12
RE	MHF-03	141402	High pass Filter 1.4-5.0GHz	Mini-Circuits	VHF-1320	10411	08/01/2023	12
RE	MHF-04	141403	High Pass Filter 1.22-4.60GHz	Mini-Circuits	VHF-1200	10435	08/02/2023	12
RE	MHF-26	141296	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	09/01/2023	12
RE	MJM-25	142226	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	MJM-29	142230	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	MLA-23	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-192	09/21/2023	12
RE	MMM-03	141530	Digital Tester	Fluke Corporation	FLUKE 26-3	78030621	01/18/2023	12
RE	MMM-10	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	01/18/2023	12
RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	01/13/2023	12
RE	MOS-27	141566	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	A08Q26	01/13/2023	12
RE	MPA-01	141576	Pre Amplifier	Keysight Technologies Inc	8449B	3008A01671	02/14/2023	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	04/05/2023	12
RE	MRENT-130	141855	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187750	12/01/2022	12
RE	MRF-12	192072	Band Rejection Filter (902-928MHz)	Wakoh Communication Industrial Co., Ltd.	WFR-481	19122541	03/07/2023	12
RE	MSA-10	141899	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180655	02/20/2023	12
RE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	04/10/2023	12
AT	MAT-22	141269	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	03/08/2023	12
AT	MAT-26	141244	Attenuator(10dB)	Weinschel - API Technologies Corp	WA8-10-34	A198	02/01/2023	12
AT	MCC-138	141410	Microwave cable	Huber+Suhner	SUCOFLEX 102	37953/2	09/04/2023	12
AT	MCC-38	141395	Coaxial Cable	UL Japan	-	-	11/18/2022	12
AT	MMM-18	141558	Digital Tester(TRUE RMS MULTIMETER)	Fluke Corporation	115	17930030	05/29/2023	12
AT	MOS-14	141561	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1401	01/13/2023	12
AT	MPM-12	141809	Power Meter	Anritsu Corporation	ML2495A	825002	05/26/2023	12
AT	MPSE-17	141830	Power sensor	Anritsu Corporation	MA2411B	738285	05/26/2023	12
AT	MSA-13	141900	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185823	06/16/2023	12

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

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

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

Test item:

RE: Radiated Emission test

AT: Antenna Terminal Conducted test