



RADIO TEST REPORT

Test Report No.: 14586156M-A-R2

Customer	Fujikura Ltd.
Description of EUT	Optical Fiber Recoater
Model Number of EUT	FSR116
FCC ID	2A9PZ-FSR11X
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied (Refer to SECTION 3)
Issue Date	November 1, 2023
Remarks	-

Representative test engineer

Hiromitsu Tanabe
Engineer

Approved by

Kazuhiro Ando
Engineer



CERTIFICATE 1266.01

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

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 21.0

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- The information provided from the customer for this report is identified in Section 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 14586156M-A

This report is a revised version of 14586156M-A-R1. 14586156M-A-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14586156M-A	December 23, 2022	-
1	14586156M-A-R1	October 27, 2023	Page 5 - Revision of the end of the Test Date From December 8, 2022 to October 16, 2023 Page 6 Revision of the Worst margins - Electric field Strength of Fundamental Emission: From 96.8 dB to 96.6 dB - Spectrum Mask: From 45.1 dB, 13.11000 MHz /14.01000 MHz to 44.8 dB, 14.01000 MHz - Electric Field Strength of Spurious Emission: From 10.7 dB to 9.8 dB Page 9 Addition of Without Tag mode - Test mode and Operating mode Deletion of the Remark - “*The EUT does not have without tag mode because the tag is built into the EUT and these are always connected while in use.” Page 16, 18, 20, 22, 25 Addition of test data and Test equipment List for Without Tag mode Page 19 Addition of remark - *1) Result includes noise from Class A digital device Page 21 Replacement of the plot data Page 29 Addition of Photographs of test setup - With / Without Tag
2	14586156M-A-R2	November 1, 2023	Page 10 Revision of the AC Adapter’s model number From ADS-40SI-19-2 to ADC-21

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	Fujikura Ltd.
Address	1440 Mutsuzaki, Sakura-shi, Chiba, 285-8550 Japan
Telephone Number	+81-43-484-3961
Contact Person	Masayuki Takahashi

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	Optical Fiber Recoater
Model Number	FSR116
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	November 30, 2022
Test Date	December 1, 2022 to October 16, 2023

2.2 Product Description

General Specification

Rating	AC 100 V to 240 V, 1.5 A, 50 / 60 Hz
Operating temperature	10 deg. C to 30 deg. C

Radio Specification

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

2.3 Variant model(s)

The EUT has following similar model:

Model No.	Brand Name	Difference from the base model
FSR115	Fujikura	Without proof tester
FSR116 (EUT)	Fujikura	With proof tester (Flat Clamp)
FSR117	Fujikura	With proof tester (Mandrel Clamp)

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 15.207 Conducted limits Section 15.225 Operation within the band 13.110-14.010 MHz.

* The customer has declared that the EUT has complies with FCC Part 15 Subpart B as SDoC.

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	15.0 dB 0.15000 MHz, QP, N	Complied a)	-
Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.4, 6.12	<FCC> Section 15.225(a) ----- <ISED> RSS-210 B.6	96.6 dB, 13.56000 MHz, QP, 0 deg.	Complied b)	Radiated
Spectrum Mask	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.4, 6.13	<FCC> Section 15.225(b)(c) ----- <ISED> RSS-210 B.6	44.8 dB, 14.01000 MHz, QP, 0 deg.	Complied b)	Radiated
20 dB Bandwidth	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> -	<FCC> Section15.215(c) ----- <ISED> -	See data	Complied c)	Radiated
Electric Field Strength of Spurious Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.4, 6.13	<FCC> Section 15.209, Section 15.225 (d) ----- <ISED> RSS-210 B.6 RSS-Gen 8.9	9.8 dB 200.000 MHz, Horizontal, QP	Complied d)	Radiated
Frequency Tolerance	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.11, 8.11	<FCC> Section 15.225(e) ----- <ISED> RSS-210 B.6	See data	Complied e)	Radiated

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

- a) Refer to APPENDIX 1 (data of Conducted Emission)
- b) Refer to APPENDIX 1 (data of Fundamental emission and Spectrum Mask)
- c) Refer to APPENDIX 1 (data of 20 dB Bandwidth and 99% Occupied Bandwidth)
- d) Refer to APPENDIX 1 (data of Spurious emission)
- e) Refer to APPENDIX 1 (data of Frequency Tolerance)

FCC Part 15.31 (e)

The worst case stable voltage was provided to the EUT during the all tests.

And maximum and minimum voltage were provided to the EUT during the output power measurement test.

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.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% emission bandwidth	<ISED>RSS-Gen 6.7	-	N/A	- a)	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.
a) Refer to APPENDIX 1 (data of 20 dB Bandwidth and 99% Occupied Bandwidth)

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 $k = 2$.

Conducted emission

Frequency range	Calculate Uncertainty (+/-)
0.15 MHz to 30 MHz	3.2 dB

Radiated emission

Measurement distance	Frequency range	Calculate Uncertainty (+/-)
3 m	9 kHz to 30 MHz	2.9 dB
	30 MHz to 200 MHz	6.2 dB
	200 MHz to 1000 MHz	6.3 dB
	1 GHz to 6 GHz	5.0 dB
	6 GHz to 18 GHz	5.4 dB
	18 GHz to 40 GHz	5.5 dB
1 m	1 GHz to 18 GHz	5.4 dB
	18 GHz to 40 GHz	5.6 dB
0.5m	26.5 GHz to 40 GHz	5.9 dB

Antenna Terminal test

Test Item	Calculate Uncertainty (+/-)
Frequency Tolerance	2.2×10^{-7}
20 dB Bandwidth / 99 % Occupied Bandwidth	1.6 %

3.5 Test Location

UL Japan, Inc. Kashima EMC Lab.

1614 Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan

Telephone: +81 478 88 6500

A2LA Certificate Number: 1266.01 / FCC Test Firm Registration Number: 910230

ISED Lab Company Number: 4659A / CAB identifier: JP0006

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Open site	6.0 x 5.5 x 2.5	20 x 40	10 m
No.5 Open site	8.6 x 7.1 x 2.4	18 x 23	10 m
No.1 Shielded room	5.4 x 4.5 x 2.3	-	-
No.5 Shielded Room	4.2 x 3.1 x 2.5	-	-
No.9 Shielded Room	6.1 x 3.6 x 2.8	-	-
No.6 Semi-anechoic Chamber	8.5 x 5.5 x 5.2	-	3 m
No.10 Semi-anechoic Chamber	18.4 x 9.9 x 7.7	-	10 m
No.11 Semi-anechoic Chamber	9.0 x 6.5 x 5.2	-	3 m
No.1 Measurement room	5.0 x 3.7 x 2.6	-	-
No.2 Measurement room	4.3 x 4.4 x 2.7	-	-
No.3 Measurement room	4.5 x 5.3 x 2.7	-	-

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)

The mode is used:

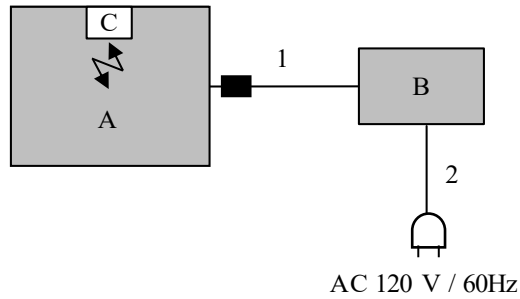
Test mode	Remarks
1) Transmitting (Tx and Rx) - With Tag - Without Tag	Modulated on (Mod on)
The EUT was operated in a manner similar to typical use during the tests.	
*Power of the EUT was set by the software as follows; Power Setting: Fixed Software: RE test Version: FSR11X_0100RE0_FPL (Date: November 28, 2022, 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.	

Test Item	Operating mode
Conducted Emission	Tx and Rx, Mod on, With Tag / Without Tag
Electric Field Strength of Fundamental Emission	Tx and Rx, Mod on, With Tag / Without Tag
Spectrum Mask	Tx and Rx, Mod on, With Tag / Without Tag
20 dB Bandwidth and 99 % Occupied Bandwidth	Tx and Rx, Mod on, With Tag / Without Tag
Electric Field Strength of Spurious Emission	Tx and Rx, Mod on, With Tag / Without Tag
Frequency Tolerance	Tx and Rx, Mod off, with Tag

Justification: The system was configured in typical fashion (as a user would normally use it) for testing.

Frequency Tolerance:	
Temperature	-20 deg. C to +50 deg. C Step 10 deg. C
Voltage	Normal Voltage AC 120 V Maximum Voltage AC 138 V (AC 120 V +15 %) Minimum Voltage AC 102 V (AC 120 V -15 %)
*This EUT provides stable voltage constantly to RF Part regardless of input voltage	

4.2 Configuration and peripherals



■ : Standard Ferrite Core

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

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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Optical Fiber Recoater	FSR116	00002	Fujikura Ltd.	EUT
B	AC Adapter	ADC-21	H27R1A492(A1)	Fujikura Ltd.	EUT
C	Tag (ISO 15693)	RF37S114HTFJB	-	TI	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.5	Unshielded	Unshielded	-
2	AC Cable	1.9	Unshielded	Unshielded	2 wire

SECTION 5: Conducted Emission

Test Procedure and conditions

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

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

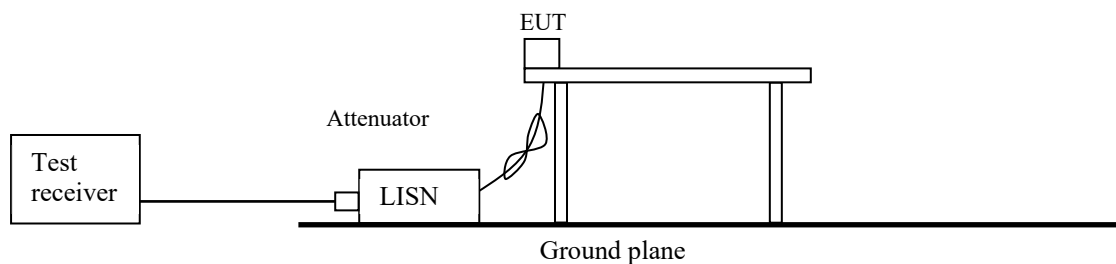
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN / (AMN) to the input power source.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

Figure 1: Test Setup



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

Detector	: QP and CISPR AV
Measurement range	: 0.15 MHz - 30 MHz
Test data	: APPENDIX
Test result	: Pass

SECTION 6: Radiated emission (Fundamental, Spurious Emission and Spectrum Mask)

Test Procedure

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 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 3 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 1 GHz
Antenna Type	Loop	Hybrid

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.

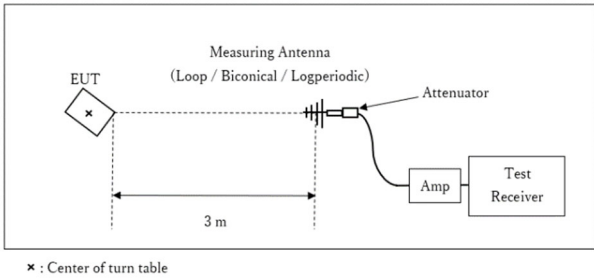
Frequency	From 9 kHz to 90 kHz and From 110 kHz to 150 kHz	From 90 kHz to 110 kHz	From 150 kHz to 490 kHz	From 490 kHz to 30 MHz	From 30 MHz to 1 GHz
Instrument used	Test Receiver				
Detector	PK / AV	QP	PK / AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Test Distance	3 m *1)	3 m *1)	3 m *1)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

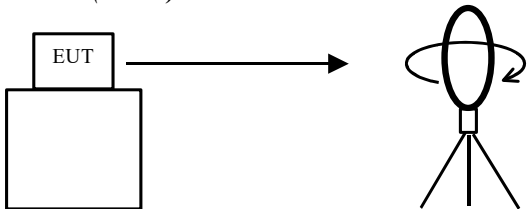
Below 1 GHz



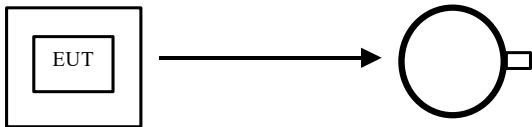
Test Distance: 3 m

Figure 3: Direction of the Loop Antenna

Side View (Vertical)

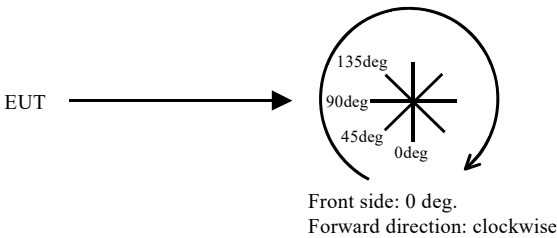


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



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 7: Other test

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20 dB Bandwidth	30 kHz	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
Frequency Tolerance *2)	-	-	-	-	-	-	Frequency counter and Spectrum Analyzer *3)

*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 temperature test was started after the temperature stabilization time of 30 minutes.
The test was begun from 50 deg. C and the temperature was lowered each 10 deg. C.

*3) The measurement was performed with Marker Frequency Counter Function.

Test data : APPENDIX

Test result : Pass

APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Kashima EMC Lab. No.10 Semi-Anechoic Chamber

Date : 2022/12/02

Mode : Transmitting and Receiving mode

Order No. : 14586156

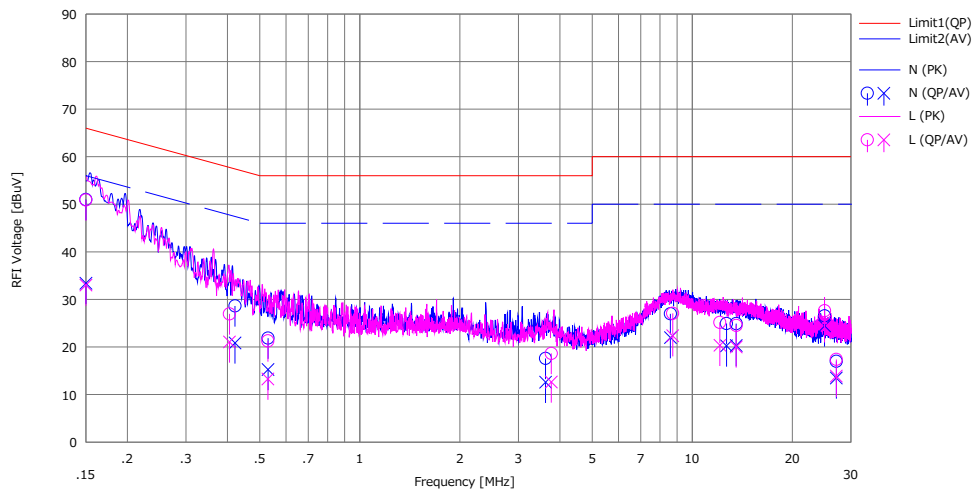
Power : AC 120 V / 60 Hz

Temp./Humi. : 19 deg.C / 55 %RH

Remarks : With Tag

Limit : FCC_Part 15 Subpart C(15.207)

Tested by : Hiromitsu Tanabe



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	40.80	23.20	10.19	50.99	33.39	66.00	56.00	15.0	22.6	N	
2	0.42139	18.40	10.60	10.24	28.64	20.84	57.42	47.42	28.7	26.5	N	
3	0.52987	11.60	5.00	10.26	21.86	15.26	56.00	46.00	34.1	30.7	N	
4	3.61900	7.00	2.00	10.60	17.60	12.60	56.00	46.00	38.4	33.4	N	
5	8.59550	16.00	11.00	10.97	26.97	21.97	60.00	50.00	33.0	28.0	N	
6	12.68250	13.70	9.00	11.23	24.93	20.23	60.00	50.00	35.0	29.7	N	
7	13.56000	13.60	9.00	11.30	24.90	20.30	60.00	50.00	35.1	29.7	N	
8	25.00000	14.60	12.50	11.94	26.54	24.44	60.00	50.00	33.4	25.5	N	
9	27.12000	5.00	1.50	11.99	16.99	13.49	60.00	50.00	43.0	36.5	N	
10	0.15000	40.70	22.80	10.20	50.90	33.00	66.00	56.00	15.1	23.0	L	
11	0.40558	16.70	10.80	10.25	26.95	21.05	57.74	47.74	30.7	26.6	L	
12	0.52900	11.00	3.00	10.27	21.27	13.27	56.00	46.00	34.7	32.7	L	
13	3.76637	8.00	2.00	10.64	18.64	12.64	56.00	46.00	37.3	33.3	L	
14	8.73600	16.00	11.30	11.07	27.07	22.37	60.00	50.00	32.9	27.6	L	
15	12.11000	13.80	9.00	11.37	25.17	20.37	60.00	50.00	34.8	29.6	L	
16	13.56000	13.00	8.50	11.51	24.51	20.01	60.00	50.00	35.4	29.9	L	
17	25.00000	15.30	13.00	12.30	27.60	25.30	60.00	50.00	32.4	24.7	L	
18	27.12000	5.00	1.50	12.37	17.37	13.87	60.00	50.00	42.6	36.1	L	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(AMN+Cable+ATT)[dB]
AMN: CLS-02

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

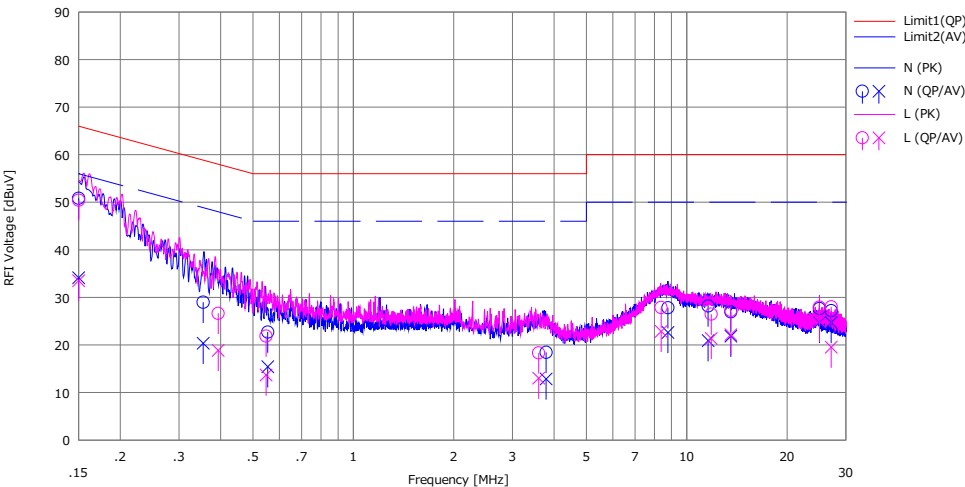
UL Japan, Inc. Kashima EMC Lab. No.10 Semi-Anechoic Chamber
Date : 2023/10/14

Mode : Transmitting and Receiving mode
Order No. : 14586156
Power : AC 120 V / 60 Hz
Temp./Humi. : 22 deg.C / 48 %RH

Remarks : Without Tag

Limit : FCC_Part 15 Subpart C(15.207)

Tested by : Hiromitsu Tanabe



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	40.50	23.80	10.34	50.84	34.14	66.00	56.00	15.1	21.8	N	
2	0.35468	18.60	10.00	10.37	28.97	20.37	58.85	48.85	29.8	28.4	N	
3	0.55385	12.30	5.00	10.41	22.71	15.41	56.00	46.00	33.2	30.5	N	
4	3.78722	7.70	2.10	10.75	18.45	12.85	56.00	46.00	37.5	33.1	N	
5	8.78112	16.70	11.50	11.13	27.83	22.63	60.00	50.00	32.1	27.3	N	
6	11.59399	16.89	9.60	11.30	28.19	20.90	60.00	50.00	31.8	29.1	N	
7	13.56000	15.50	10.40	11.44	26.94	21.84	60.00	50.00	33.0	28.1	N	
8	25.00601	15.50	12.60	12.16	27.66	24.76	60.00	50.00	32.3	25.2	N	
9	27.12000	15.00	12.50	12.22	27.22	24.72	60.00	50.00	32.7	25.2	N	
10	0.15000	40.10	23.20	10.31	50.41	33.51	66.00	56.00	15.5	22.4	L	
11	0.39325	16.30	8.50	10.35	26.65	18.85	57.99	47.99	31.3	29.1	L	
12	0.54759	11.50	3.30	10.37	21.87	13.67	56.00	46.00	34.1	32.3	L	
13	3.59620	7.60	2.30	10.73	18.33	13.03	56.00	46.00	37.6	32.9	L	
14	8.37742	16.70	11.70	11.17	27.87	22.87	60.00	50.00	32.1	27.1	L	
15	11.84088	15.00	9.90	11.47	26.47	21.37	60.00	50.00	33.5	28.6	L	
16	13.56000	15.60	10.50	11.66	27.26	22.16	60.00	50.00	32.7	27.8	L	
17	25.00000	15.40	12.40	12.56	27.96	24.96	60.00	50.00	32.0	25.0	L	
18	27.12000	15.40	6.90	12.63	28.03	19.53	60.00	50.00	31.9	30.4	L	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable)[dB]
LISN:CLS-02

Fundamental emission and Spectrum Mask

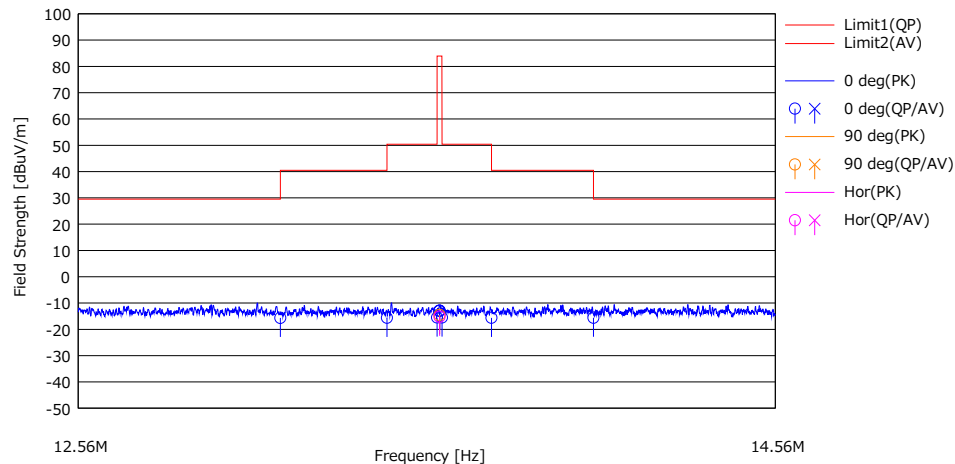
DATA OF RADIATED EMISSION(below 30MHz) TEST

UL Japan, Inc. Kashima EMC Lab. No.10 Semi-Anechoic Chamber
Date : 2022/12/01

Mode : Transmitting and Receiving mode
Order No. : 14586156
Power : AC 120 V / 60 Hz
Temp./Humi. : 21 deg.C / 54 %RH

Remarks : With Tag

Limit : FCC15.225,PK/AV/QP,9-90 kHz:PK/AV,110-490 kHz:PK/AV,other:QP(<490 kHz:300 m,>490 kHz:30 m)
Tested by : Hiromitsu Tanabe



No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Antenna [deg]	Table [deg]	Comment
		[QP] [dBuV]	[AV] [dBuV]				[QP] [dBuV/m]	[AV] [dBuV/m]	[QP] [dBuV/m]	[AV] [dBuV/m]	[QP] [dB]	[AV] [dB]			
1	13.11000	30.30	---	19.28	-33.04	32.21	-15.67	---	29.50	---	45.1	---	0 deg	215	
2	13.41000	30.30	---	19.29	-33.02	32.21	-15.64	---	40.50	---	56.1	---	0 deg	215	
3	13.55300	30.40	---	19.29	-33.01	32.21	-15.53	---	50.40	---	65.9	---	0 deg	215	
4	13.56000	33.00	---	19.29	-33.01	32.21	-12.93	---	83.90	---	96.8	---	0 deg	215	AC 102V
5	13.56000	33.00	---	19.29	-33.01	32.21	-12.93	---	83.90	---	96.8	---	0 deg	215	AC 120V
6	13.56000	33.00	---	19.29	-33.01	32.21	-12.93	---	83.90	---	96.8	---	0 deg	215	AC 138V
7	13.56700	30.40	---	19.29	-33.01	32.21	-15.53	---	50.40	---	65.9	---	0 deg	215	
8	13.71000	30.30	---	19.30	-33.01	32.21	-15.62	---	40.50	---	56.1	---	0 deg	215	
9	14.01000	30.30	---	19.30	-33.00	32.21	-15.61	---	29.50	---	45.1	---	0 deg	215	
10	13.56000	31.40	---	19.29	-33.01	32.21	-14.53	---	83.90	---	98.4	---	90 deg	295	
11	13.56000	30.70	---	19.29	-33.01	32.21	-15.23	---	83.90	---	99.1	---	Hor	190	

Calculation: Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable)[dB]-Gain(AMP)[dB]
Ant.Type=LOOP:Loop antenna

Result of the fundamental emission at 3 m without Distance factor

QP											
Ant Deg [deg]	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Duty Factor	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
0	13.56000	QP	33.00	19.29	6.99	32.21	-	27.07	-	-	Fundamental

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

Fundamental emission and Spectrum Mask

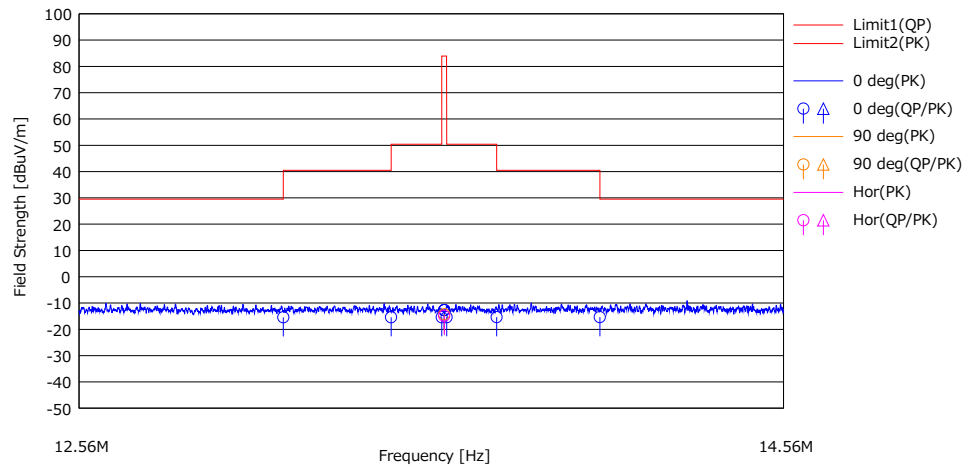
DATA OF RADIATED EMISSION(below 30MHz) TEST

UL Japan, Inc. Kashima EMC Lab. No.10 Semi-Anechoic Chamber
Date : 2023/10/16

Mode : Transmitting and Receiving mode
Order No. : 14586156
Power : AC 120 V / 60 Hz
Temp./Humi. : 24 deg.C / 55 %RH

Remarks : Without Tag

Limit : FCC15.225,PK/AV/QP,9-90 kHz:PK/AV,110-490 kHz:PK/AV,other:QP(<490 kHz:300 m,>490 kHz:30 m)
Tested by : Hiromitsu Tanabe



No.	Freq. [MHz]	Reading		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result		Limit		Margin		Antenna	Table [deg]	Comment
		[QP] [dBuV]	[PK] [dBuV]				[QP] [dBuV/m]	[PK] [dBuV/m]	[QP] [dBuV/m]	[PK] [dBuV/m]	[QP] [dB]	[PK] [dB]			
1	13.11000	30.50	---	19.28	-33.03	32.19	-15.44	---	29.50	---	44.9	---	0 deg	210	
2	13.41000	30.50	---	19.29	-33.01	32.19	-15.41	---	40.50	---	55.9	---	0 deg	210	
3	13.55300	30.50	---	19.29	-33.00	32.19	-15.40	---	50.40	---	65.8	---	0 deg	210	
4	13.56000	33.20	---	19.29	-33.00	32.19	-12.70	---	83.90	---	96.6	---	0 deg	210	AC 102 V
5	13.56000	33.20	---	19.29	-33.00	32.19	-12.70	---	83.90	---	96.6	---	0 deg	210	AC 120 V
6	13.56000	33.20	---	19.29	-33.00	32.19	-12.70	---	83.90	---	96.6	---	0 deg	210	AC 138 V
7	13.56700	30.50	---	19.29	-33.00	32.19	-15.40	---	50.40	---	65.8	---	0 deg	210	
8	13.71000	30.50	---	19.30	-33.00	32.19	-15.39	---	40.50	---	55.8	---	0 deg	210	
9	14.01000	30.50	---	19.30	-32.99	32.19	-15.38	---	29.50	---	44.8	---	0 deg	210	
10	13.56000	31.60	---	19.29	-33.00	32.19	-14.30	---	83.90	---	98.2	---	90 deg	132	
11	13.56000	31.00	---	19.29	-33.00	32.19	-14.90	---	83.90	---	98.8	---	Hor	180	

Calculation: Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]
Ant.Type=LOOP: Loop antenna

Result of the fundamental emission at 3 m without Distance factor

QP											
Ant Deg [deg]	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Duty Factor	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
0	13.56000	QP	33.20	19.29	7.00	32.19	-	27.30	-	-	Fundamental

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

Radiated Spurious Emission

Test place	Kashima EMC Lab.	
Semi Anechoic Chamber	No.10	No.10
Date	December 1, 2022	December 1, 2022
Temperature / Humidity	21 deg. C / 54 % RH	21 deg. C / 54 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe
	(Below 30 MHz)	(Above 30 MHz)
Mode	Transmitting and Receiving mode, With Tag	

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	27.120	QP	28.90	19.88	-32.52	32.21	-	-16.0	29.5	45.5	
Hori.	40.680	QP	26.00	13.34	6.08	31.60	-	13.8	40.0	26.2	*, Floor noise
Hori.	94.920	QP	29.50	8.22	6.85	31.51	-	13.1	43.5	30.4	*, Floor noise
Hori.	352.560	QP	26.10	14.38	9.62	31.26	-	18.8	46.0	27.2	*
Hori.	461.040	QP	25.30	17.24	10.43	31.19	-	21.8	46.0	24.2	*
Hori.	488.160	QP	28.70	17.54	10.60	31.18	-	25.7	46.0	20.3	*
Vert.	40.680	QP	28.40	13.34	6.08	31.60	-	16.2	40.0	23.8	*, Floor noise
Vert.	94.920	QP	41.50	8.22	6.85	31.51	-	25.1	43.5	18.4	*, Floor noise
Vert.	176.280	QP	33.20	12.41	7.71	31.39	-	21.9	43.5	21.6	*
Vert.	379.680	QP	24.10	15.14	9.89	31.24	-	17.9	46.0	28.1	*
Vert.	461.040	QP	23.70	17.24	10.43	31.19	-	20.2	46.0	25.8	*
Vert.	488.163	QP	28.40	17.54	10.60	31.18	-	25.4	46.0	20.6	*
Hori.	125.000	QP	40.50	11.84	7.19	31.45	-	28.1	43.5	15.4	*, 1)
Hori.	200.000	QP	46.30	9.85	7.94	31.33	-	32.8	43.5	10.7	*, 1)
Hori.	311.050	QP	36.60	13.75	9.05	31.29	-	28.1	46.0	17.9	*, 1)
Vert.	79.124	QP	40.30	9.25	6.66	31.54	-	24.7	40.0	15.3	*, 1)
Vert.	125.000	QP	39.60	11.84	7.19	31.45	-	27.2	43.5	16.3	*, 1)
Vert.	200.000	QP	41.50	9.85	7.94	31.33	-	28.0	43.5	15.5	*, 1)
Vert.	312.825	QP	32.70	13.80	9.07	31.29	-	24.3	46.0	21.7	*, 1)
Vert.	525.000	QP	33.30	18.24	10.72	31.15	-	31.1	46.0	14.9	*, 1)

Result = Reading + Ant Factor + Loss (Cable + Attenuator + D.Factor) - Gain(Amplifier)

*Result = Reading + Ant Factor + Loss (Cable + Attenuator) - Gain(Amplifier)

*1) Result includes noise from Class A digital device

Radiated Spurious Emission

Test place	Kashima EMC Lab.	
Semi Anechoic Chamber	No.10	No.10
Date	October 16, 2023	October 14, 2023
Temperature / Humidity	24 deg. C / 55 % RH	22 deg. C / 48 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe
	(Below 30 MHz)	(Above 30 MHz)
Mode	Transmitting and Receiving mode, Without Tag	

PK or QP

Ant Deg [deg] or Polarity [Hori/Vert]	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
0	27.120	QP	29.30	19.88	-32.52	32.18	-	-15.5	29.5	45.0	
Hori.	40.680	QP	28.60	13.35	5.93	31.31	-	16.6	40.0	23.4	*, Floor noise
Hori.	94.920	QP	29.60	8.28	6.58	31.22	-	13.2	43.5	30.3	*, Floor noise
Hori.	352.560	QP	26.30	14.44	8.48	30.98	-	18.2	46.0	27.8	*
Hori.	461.040	QP	26.10	17.23	9.07	30.90	-	21.5	46.0	24.5	*
Hori.	488.160	QP	28.00	17.65	9.20	30.88	-	24.0	46.0	22.0	*
Vert.	40.680	QP	29.20	13.35	5.93	31.31	-	17.2	40.0	22.8	*, Floor noise
Vert.	94.920	QP	41.10	8.28	6.58	31.22	-	24.7	43.5	18.8	*, Floor noise
Vert.	176.280	QP	34.20	12.46	7.30	31.11	-	22.9	43.5	20.7	*
Vert.	461.040	QP	26.20	17.23	9.07	30.90	-	21.6	46.0	24.4	*
Vert.	474.600	QP	26.30	17.48	9.13	30.89	-	22.0	46.0	24.0	*
	125.000	QP	40.60	11.84	6.86	31.17	-	28.1	43.5	15.4	*, 1)
Hori.	200.000	QP	47.40	9.89	7.48	31.05	-	33.7	43.5	9.8	*, 1)
Hori.	311.050	QP	34.40	13.80	8.22	31.01	-	25.4	46.0	20.6	*, 1)
Vert.	79.253	QP	42.40	9.23	6.42	31.25	-	26.8	40.0	13.2	*, 1)
Vert.	125.000	QP	39.00	11.84	6.86	31.17	-	26.5	43.5	17.0	*, 1)
Vert.	200.000	QP	42.30	9.89	7.48	31.05	-	28.6	43.5	14.9	*, 1)
Vert.	311.080	QP	31.80	13.80	8.22	31.01	-	22.8	46.0	23.2	*, 1)
Vert.	525.000	QP	32.90	18.27	9.39	30.85	-	29.7	46.0	16.3	*, 1)

Result = Reading + Ant Factor + Loss (Cable + Attenuator + D.Factor) - Gain(Amplifier)

*Result = Reading + Ant Factor + Loss (Cable + Attenuator) - Gain(Amplifier)

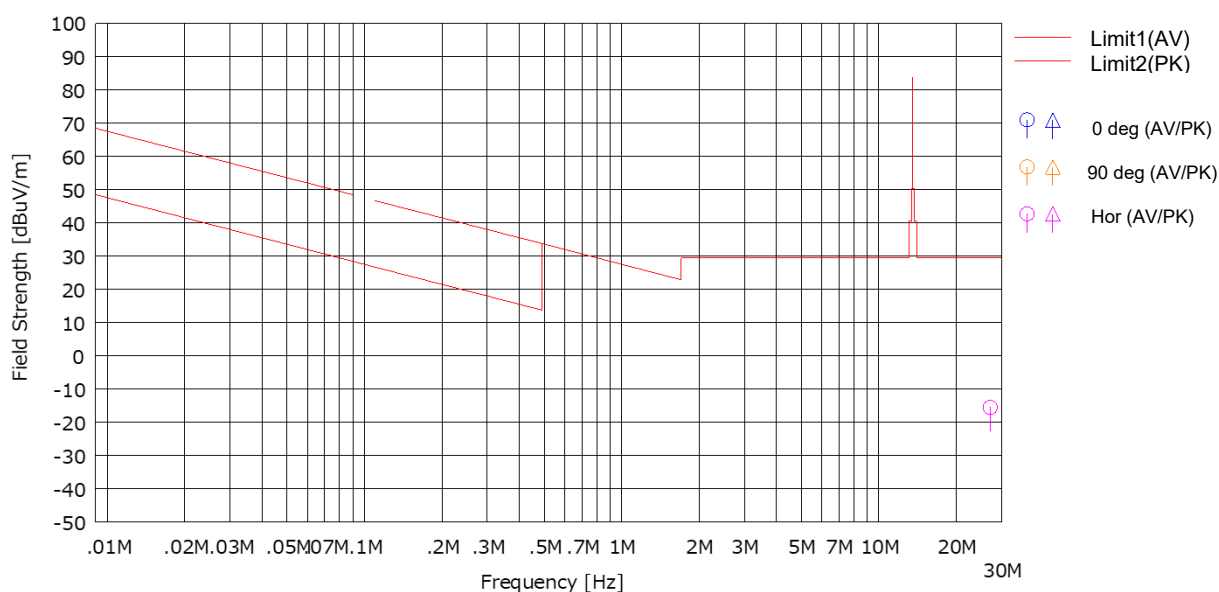
*1) Result includes noise from Class A digital device

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

Test place	Kashima EMC Lab.	No.10
Semi Anechoic Chamber	No.10	No.10
Date	October 16, 2023	October 14, 2023
Temperature / Humidity	24 deg. C / 55 % RH	22 deg. C / 48 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe
	(Below 30 MHz)	(Above 30 MHz)
Mode	Transmitting and Receiving mode, Without Tag	

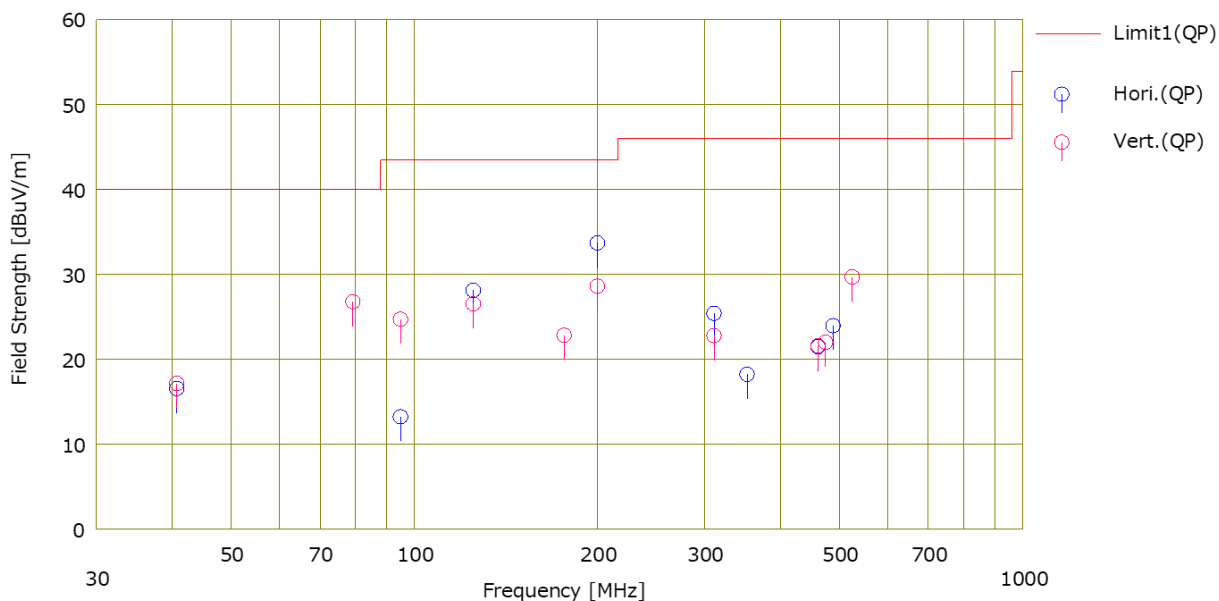
(below 30 MHz)

Limit : FCC15.209(a), 9-90kHz:PK, 110-490kHz:PK, other:QP



* Data above 490 kHz were measured using a QP detector.

(above 30 MHz)

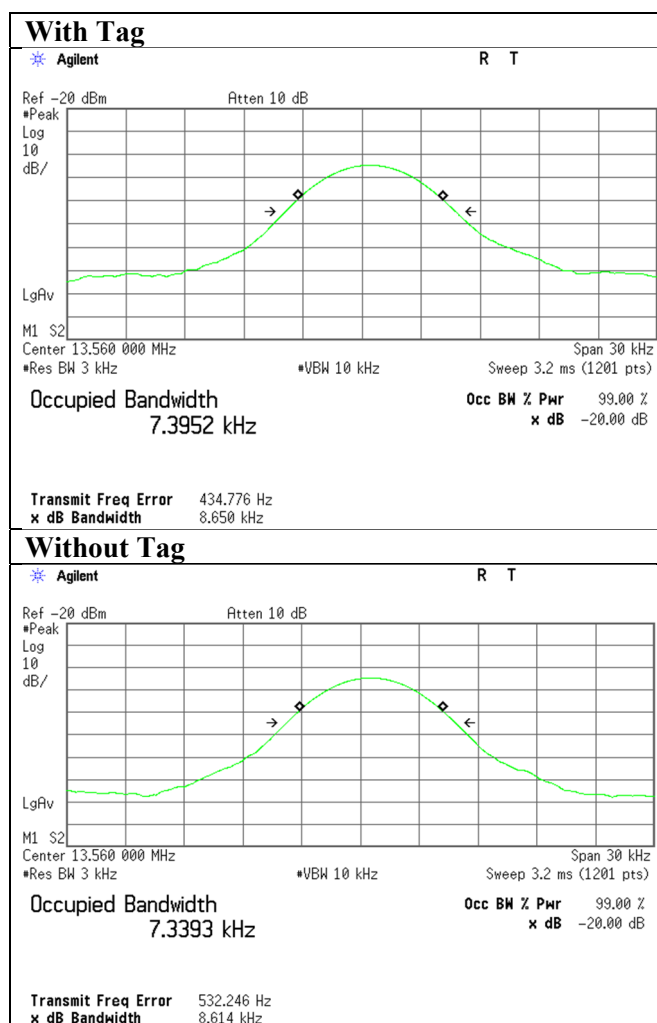


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

20 dB Bandwidth and 99% Occupied Bandwidth

Test place	Kashima EMC Lab. No.2 Measurement room	
Date	December 7, 2022	October 16, 2023
Temperature / Humidity	20 deg. C / 42 % RH	21 deg. C / 50 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe
Mode	Tx and Rx, Mod on	

FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	With Tag	8.65	7.40
	Without Tag	8.61	7.34



* 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

Test place	Kashima EMC Lab. No.2 Measurement room
Date	December 8, 2022
Temperature / Humidity	21 deg. C / 41 % RH
Engineer	Hiromitsu Tanabe
Mode	Tx Mod off

Test condition		Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
Temp. [deg. C]	Voltage [V]				[%]	[ppm]	
50	120	Power on	13.560366	0.000366	0.00270	27.0	0.01
		+ 2 min.	13.560369	0.000369	0.00272	27.2	0.01
		+ 5 min.	13.560372	0.000372	0.00274	27.4	0.01
		+ 10 min.	13.560375	0.000375	0.00277	27.7	0.01
40	120	Power on	13.560367	0.000367	0.00271	27.1	0.01
		+ 2 min.	13.560368	0.000368	0.00271	27.1	0.01
		+ 5 min.	13.560368	0.000368	0.00271	27.1	0.01
		+ 10 min.	13.560368	0.000368	0.00271	27.1	0.01
30	120	Power on	13.560378	0.000378	0.00279	27.9	0.01
		+ 2 min.	13.560376	0.000376	0.00277	27.7	0.01
		+ 5 min.	13.560376	0.000376	0.00277	27.7	0.01
		+ 10 min.	13.560376	0.000376	0.00277	27.7	0.01
20	120	Power on	13.560406	0.000406	0.00299	29.9	0.01
		+ 2 min.	13.560402	0.000402	0.00296	29.6	0.01
		+ 5 min.	13.560402	0.000402	0.00296	29.6	0.01
		+ 10 min.	13.560402	0.000402	0.00296	29.6	0.01
20	102 (120V -15%)	Power on	13.560410	0.000410	0.00302	30.2	0.01
		+ 2 min.	13.560404	0.000404	0.00298	29.8	0.01
		+ 5 min.	13.560403	0.000403	0.00297	29.7	0.01
		+ 10 min.	13.560402	0.000402	0.00296	29.6	0.01
20	138 (120V +15%)	Power on	13.560409	0.000409	0.00302	30.2	0.01
		+ 2 min.	13.560404	0.000404	0.00298	29.8	0.01
		+ 5 min.	13.560403	0.000403	0.00297	29.7	0.01
		+ 10 min.	13.560402	0.000402	0.00296	29.6	0.01
10	120	Power on	13.560434	0.000434	0.00320	32.0	0.01
		+ 2 min.	13.560431	0.000431	0.00318	31.8	0.01
		+ 5 min.	13.560431	0.000431	0.00318	31.8	0.01
		+ 10 min.	13.560431	0.000431	0.00318	31.8	0.01
0	120	Power on	13.560458	0.000458	0.00338	33.8	0.01
		+ 2 min.	13.560457	0.000457	0.00337	33.7	0.01
		+ 5 min.	13.560457	0.000457	0.00337	33.7	0.01
		+ 10 min.	13.560457	0.000457	0.00337	33.7	0.01
-10	120	Power on	13.560465	0.000465	0.00343	34.3	0.01
		+ 2 min.	13.560466	0.000466	0.00344	34.4	0.01
		+ 5 min.	13.560466	0.000466	0.00344	34.4	0.01
		+ 10 min.	13.560466	0.000466	0.00344	34.4	0.01
-20	120	Power on	13.560445	0.000445	0.00328	32.8	0.01
		+ 2 min.	13.560449	0.000449	0.00331	33.1	0.01
		+ 5 min.	13.560449	0.000449	0.00331	33.1	0.01
		+ 10 min.	13.560449	0.000449	0.00331	33.1	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)

APPENDIX 2: Test instruments

Test equipment, Tested on December 1 to December 8, 2022

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	CLS-02	143498	A.M.N.	Rohde & Schwarz	ESH3-Z5	828874/019	2022/07/20	12
CE	CCC-S10-C	143157	10 Site CE System	UL Japan	none	none	2022/08/27	12
CE	CTR-09	144199	Test Receiver	Keysight Technologies Inc	N9038A	MY53290016	2022/07/21	12
RE	CBL-08	143121	LOGBICON	Schwarzbeck Mess-Elektronik OHG	VULB 9168	343	2022/04/18	12
RE	CAT5-03	178806	5dB Fixed Atten.	Pasternack Enterprises	PE7047-5	none	2022/04/01	12
RE	CCC-S10-R3	143165	10 Site RE 3m System	UL Japan	none	none	2022/08/27	12
RE	CAF-28	183880	Pre-Amplifier	Mini-Circuits	ZKL-2	001	2022/04/06	12
RE	CTR-09	144199	Test Receiver	Keysight Technologies Inc	N9038A	MY53290016	2022/07/21	12
RE	CAEC-10(NSA)	144632	Semi Anechoic Chamber	TDK	NSA (No.10)	10	2022/05/15	12
RE	KLP-01	143833	Loop Antenna	Rohde & Schwarz	HFH2-Z2	827779/008	2022/10/05	12
RE	CCC-M01	143161	Coaxial Cable	Fujikura,HP,Mini-Circuits,Fujikura	3D2W	none	2022/05/16	12
RE	CAT6-17	144245	6dB Fixed Atten.	Suhner	6906.01.A	none	2022/07/20	12
RE	CAF-16	142936	Pre-Amplifier	SONOMA INSTRUMENT	310N	325015	2022/05/06	12
RE	CCC-S10-C	143157	10 Site CE System	UL Japan	none	none	2022/08/27	12
EMI	CSCL-26	222745	Measure	SHINWA RULES CO., LTD.	80862	none	-	-
EMI	COS-10	143542	Temperature & Humidity Indicator	HIOKI E.E. CORPORATION	3641/9680-50	090999895/090905406	2022/06/20	12
EMI	CBM-10	143133	Barometer	Sanoh Co., Ltd	SBR-151	001439	2021/11/24	36
EMI	CTS-14	144216	Digital Multimeter	Fluke Corporation	115	994460954	2022/10/19	12
EMI	COTS-CEMI-03	178804	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3 (RE,CE,ME,PE)	-	-	-
FT	CCH-04	143181	Temperature and Humidity Chamber	Espec	PL-1J	15004059	2022/10/05	12
FT	CFC-02	143423	Frequency Counter	Keysight Technologies Inc	53151A	US40511823	2022/04/13	12
FT, BW	CMS-07	143942	Near Field Probe	Langer	LF-R400	02-0815	-	-
FT, BW	CTS-08	144210	Digital Multimeter	Fluke Corporation	112	89790193	2022/10/12	12
FT, BW	COS-27	200034	Temperature & Humidity Logger	HIOKI E.E. CORPORATION	LR5001/LR9504	200636456/200699552	2022/07/22	12
FT, BW	CSA-07	143643	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY52490024	2022/06/23	12

Test equipment, Tested on October 14 to October 16, 2023

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	CLS-02	143498	A.M.N.	Rohde & Schwarz	ESH3-Z5	828874/019	2023/07/12	12
CE	CCC-S10-C	143157	10 Site CE System	UL Japan	none	none	2023/08/01	12
CE	CTR-09	144199	Test Receiver	Keysight Technologies Inc	N9038A	MY53290016	2023/07/05	12
RE	CBL-08	143121	LOGBICON	Schwarzbeck Mess-Elektronik OHG	VULB 9168	343	2023/04/18	12
RE	CAT5-03	178806	5dB Fixed Atten.	Pasternack Enterprises	PE7047-5	none	2023/04/18	12
RE	CCC-S10-R3	143165	10 Site RE 3m System	UL Japan	none	none	2023/08/01	12
RE	CAF-28	183880	Pre-Amplifier	UL Japan	ZKL-2	001	2023/04/21	12
RE	CAEC-10(NSA)	144632	Semi Anechoic Chamber	TDK	NSA (No.10)	10	2023/05/08	12
RE	KLP-01	143833	Loop Antenna	Rohde & Schwarz	HFH2-Z2	827779/008	2022/10/05	12
RE	CCC-M01	143161	Coaxial Cable	Fujikura,HP,Mini-Circuits,Fujikura	3D2W	none	2023/05/24	12
RE	CAT6-17	144245	6dB Fixed Atten.	Suhner	6906.01.A	none	2023/07/06	12
RE	CAF-16	142936	Pre-Amplifier	SONOMA INSTRUMENT	310N	325015	2023/05/23	12
RE	CCC-S10-C	143157	10 Site CE System	UL Japan	none	none	2023/08/01	12
RE	CTR-09	144199	Test Receiver	Keysight Technologies Inc	N9038A	MY53290016	2023/07/05	12
EMI	CSCL-26	222745	Measure	SHINWA RULES CO., LTD.	80862	none	-	-
EMI	COS-10	143542	Temperature & Humidity Indicator	HIOKI E.E. CORPORATION	3641/9680-50	090999895/090905406	2023/06/27	12
EMI	CBM-10	143133	Barometer	Sanoh Co., Ltd	SBR-151	001439	2023/03/10	36
EMI	CTS-14	144216	Digital Multimeter	Fluke Corporation	115	994460954	2022/10/19	12
EMI	COTS-CEMI-03	178804	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3 (RE,CE,ME,PE)	-	-	-
BW	CMS-07	143942	Near Field Probe	Langer	LF-R400	02-0815	-	-
BW	CTS-08	144210	Digital Multimeter	Fluke Corporation	112	89790193	2022/10/12	12
BW	COS-27	200034	Temperature & Humidity Logger	HIOKI E.E. CORPORATION	LR5001/LR9504	200636456/200699552	2023/07/18	12
BW	CSA-07	143643	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY52490024	2023/06/21	12

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

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

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

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

Test item:

**CE: Conducted Emission
RE: Radiated Emission
FT: Frequency Tolerance
BW: Bandwidth**