



RADIO TEST REPORT

Test Report No. 14259568S-A-R1

Customer	Ricoh Company, Ltd.
Description of EUT	Color Printer
Model Number of EUT	Pro C7500
FCC ID	BBP-RFTAU04
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied (Refer to SECTION 3)
Issue Date	July 5, 2022
Remarks	-

Representative Test Engineer

Hiromasa Sato
Engineer

Approved By

Kazuya Noda
Leader



CERTIFICATE 1266.03

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

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 20.0

ANNOUNCEMENT

- This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
- The results in this report apply only to the sample tested.
- This sample tested is in compliance with the limits of the above regulation.
- The test results in this test report are traceable to the national or international standards.
- This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
- This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
- The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
- The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan, Inc. has been accredited.
- The information provided from the applicant 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.: 14259568S-A

This report is a revised version of 14259568S-A. 14259568S-A is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents																																																																																
- (Original)	14259568S-A	May 31, 2022	-																																																																																
1	14259568S-A-R1	July 5, 2022	P.6 Correction of Spectrum Mask worst margin: From “44.43 dB” to “44.8 dB” P.19 Correction the one significant digit of Spurious emission within the band: From <table><tr><th colspan="2">RESULT</th><th>LIMIT (30m)</th><th colspan="2">MARGIN</th></tr><tr><th>Hor [dBuV/m]</th><th>Ver [dBuV/m]</th><th>[dBuV/m]</th><th>Hor [dB]</th><th>Ver [dB]</th></tr><tr><td>-15.5</td><td>-15.5</td><td>29.5</td><td>45.0</td><td>45.0</td></tr><tr><td>-15.4</td><td>-15.45</td><td>40.5</td><td>55.9</td><td>56.0</td></tr><tr><td>-11.3</td><td>-5.0</td><td>50.4</td><td>61.7</td><td>55.4</td></tr><tr><td>-11.3</td><td>-5.0</td><td>50.4</td><td>61.7</td><td>55.4</td></tr><tr><td>-15.4</td><td>-15.39</td><td>40.5</td><td>55.9</td><td>55.9</td></tr><tr><td>-15.4</td><td>-15.35</td><td>29.5</td><td>44.9</td><td>44.9</td></tr></table> to <table><tr><th colspan="2">RESULT</th><th>LIMIT (30m)</th><th colspan="2">MARGIN</th></tr><tr><th>Hor [dBuV/m]</th><th>Ver [dBuV/m]</th><th>[dBuV/m]</th><th>Hor [dB]</th><th>Ver [dB]</th></tr><tr><td>-15.6</td><td>-15.6</td><td>29.5</td><td>45.1</td><td>45.1</td></tr><tr><td>-15.5</td><td>-15.5</td><td>40.5</td><td>56.0</td><td>56.0</td></tr><tr><td>-11.4</td><td>-5.1</td><td>50.4</td><td>61.8</td><td>55.5</td></tr><tr><td>-11.4</td><td>-5.1</td><td>50.4</td><td>61.8</td><td>55.5</td></tr><tr><td>-15.5</td><td>-15.5</td><td>40.5</td><td>56.0</td><td>56.0</td></tr><tr><td>-15.4</td><td>-15.3</td><td>29.5</td><td>44.9</td><td>44.8</td></tr></table>	RESULT		LIMIT (30m)	MARGIN		Hor [dBuV/m]	Ver [dBuV/m]	[dBuV/m]	Hor [dB]	Ver [dB]	-15.5	-15.5	29.5	45.0	45.0	-15.4	-15.45	40.5	55.9	56.0	-11.3	-5.0	50.4	61.7	55.4	-11.3	-5.0	50.4	61.7	55.4	-15.4	-15.39	40.5	55.9	55.9	-15.4	-15.35	29.5	44.9	44.9	RESULT		LIMIT (30m)	MARGIN		Hor [dBuV/m]	Ver [dBuV/m]	[dBuV/m]	Hor [dB]	Ver [dB]	-15.6	-15.6	29.5	45.1	45.1	-15.5	-15.5	40.5	56.0	56.0	-11.4	-5.1	50.4	61.8	55.5	-11.4	-5.1	50.4	61.8	55.5	-15.5	-15.5	40.5	56.0	56.0	-15.4	-15.3	29.5	44.9	44.8
RESULT		LIMIT (30m)	MARGIN																																																																																
Hor [dBuV/m]	Ver [dBuV/m]	[dBuV/m]	Hor [dB]	Ver [dB]																																																																															
-15.5	-15.5	29.5	45.0	45.0																																																																															
-15.4	-15.45	40.5	55.9	56.0																																																																															
-11.3	-5.0	50.4	61.7	55.4																																																																															
-11.3	-5.0	50.4	61.7	55.4																																																																															
-15.4	-15.39	40.5	55.9	55.9																																																																															
-15.4	-15.35	29.5	44.9	44.9																																																																															
RESULT		LIMIT (30m)	MARGIN																																																																																
Hor [dBuV/m]	Ver [dBuV/m]	[dBuV/m]	Hor [dB]	Ver [dB]																																																																															
-15.6	-15.6	29.5	45.1	45.1																																																																															
-15.5	-15.5	40.5	56.0	56.0																																																																															
-11.4	-5.1	50.4	61.8	55.5																																																																															
-11.4	-5.1	50.4	61.8	55.5																																																																															
-15.5	-15.5	40.5	56.0	56.0																																																																															
-15.4	-15.3	29.5	44.9	44.8																																																																															

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	5
SECTION 2: Equipment Under Test (EUT).....	5
SECTION 3: Test specification, procedures & results.....	6
SECTION 4: Operation of EUT during testing.....	9
SECTION 5: Conducted Emission.....	12
SECTION 6: Radiated emission (Fundamental, Spurious Emission and Spectrum Mask).....	13
SECTION 7: Other test.....	16
APPENDIX 1: Test data	17
Conducted Emission	17
Fundamental emission and Spectrum Mask	19
Spurious emission.....	20
Radiated Spurious Emission	21
20 dB Bandwidth and 99% Occupied Bandwidth	22
Frequency Tolerance	23
APPENDIX 2: Test instruments	24
APPENDIX 3: Photographs of test setup	26
Conducted Emission	26
Radiated Emission	27
Frequency Tolerance	29

SECTION 1: Customer Information

Company Name	Ricoh Company, Ltd.
Address	2-7-1 Izumi, Ebina-shi, Kanagawa, 243-0460 Japan
Telephone Number	+81-462-49-8146
Contact Person	Atsushi Yasuda

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	Color Printer
Model Number	Pro C7500
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	March 30, 2022
Test Date	April 21 to May 10, 2022

2.2 Product Description

There is a variant model Pro C7500H.

This model is the same except that the toner is sold separately. These differences do not affect the radio.

General Specification

Rating	AC 208 V to 240 V, 50 Hz / 60 Hz
Operating temperature	+10 deg. C to +32 deg. C

Radio Specification

Equipment Type	Transceiver
Frequency of Operation	13.56 MHz
Type of Modulation	ASK
Operating Temperature	+5 deg. C to +45 deg. C

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C FCC Part 15 final revised on April 1, 2022 and effective May 2, 2022
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 revision does not affect the test result conducted before its effective date.

* 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	6.3 dB, 1.42680 MHz, AV, Phase: L1 Line: Main	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	77.2 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, 14.010 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	4.2 dB 96.519 MHz, Vertical, QP, 90 deg.	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)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration

FCC Part 15.31 (e)

This EUT provides stable voltage constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 Antenna requirement

The antenna is not removable from 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	Complied a)	Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
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

There is no applicable rule of uncertainty in this applied standard. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor $k = 2$.

Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)				
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.9 dB	2.8 dB	2.9 dB	2.9 dB	2.9 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.1 dB	-	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.7 dB	-	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.1 dB	-	-
	1 GHz-6 GHz	4.8 dB	4.8 dB	4.8 dB	-	-
	6 GHz-18 GHz	5.4 dB	5.4 dB	5.4 dB	-	-
Radiated emission (Measurement distance: 1 m)	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Other test	Uncertainty (+/-)
Temperature_SCH-01	0.93 deg.C.
Humidity_SCH-01	4.1 %
Temperature_SCH-02	2.0 deg.C.
Humidity_SCH-02	6.6 %
Voltage	0.97 %
Frequency Measurement (Spectrum Analyzer)	1.2×10^{-8}
Frequency Measurement (Frequency Counter)	8.3×10^{-8}

3.5 Test Location

UL Japan, Inc. Shonan EMC Lab.

1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401

A2LA Certificate Number: 1266.03

(FCC test firm registration number: 626366, ISED lab company number: 2973D / CAB identifier: JP0001)

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 Shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

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 mode (Tx) Modulated with Tag	The EUT Transmits and Receives at the same time and there is no receiving mode.
2) Transmitting mode (Tx) Modulated without Tag	
3) Transmitting mode (Tx) Unmodulated	

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: System Ver. 000.012, Engine Ver. 0.33.02
(Date: 2022.04 21, 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	2)
Electric Field Strength of Fundamental Emission	2)
Spectrum Mask	2)
20 dB Bandwidth and 99 % Occupied Bandwidth	2)
Electric Field Strength of Spurious Emission	1),2)
Frequency Tolerance	3)

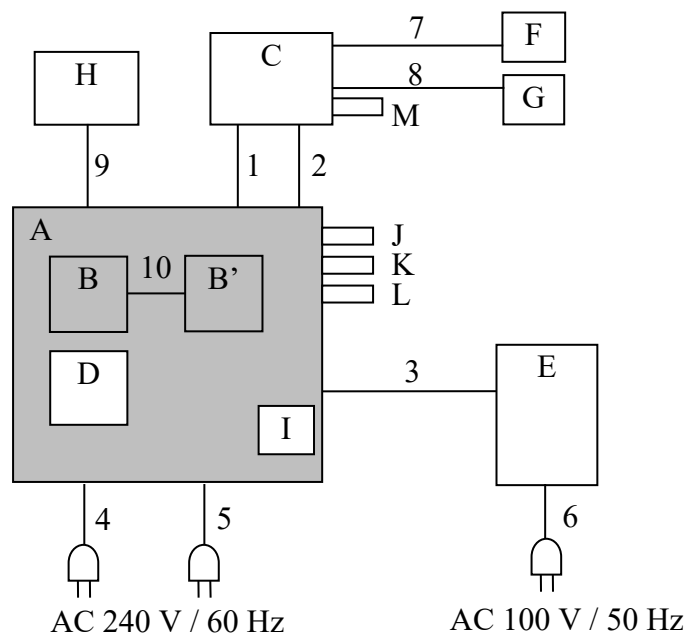
*After the comparison of the test data with each mode and the tests were performed with the worst case. (except Frequency Tolerance)

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 DC 5 V Maximum Voltage DC 5.75 V (DC 5 V +15 %) Minimum Voltage DC 4.25 V (DC 5 V -15 %)
*This EUT provides stable voltage constantly to RF Part regardless of input voltage	

4.2 Configuration and peripherals

<For Radiated Emission test>



* Test data was taken under worse case conditions.

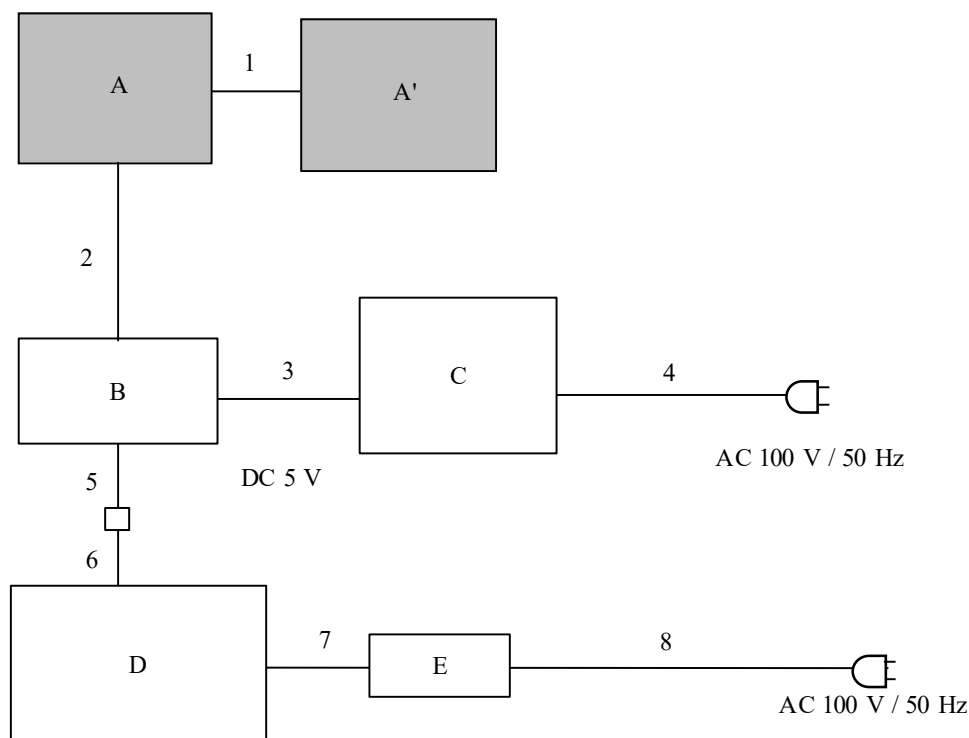
Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Printer	Pro C7500	5791FBY0018	RICOH	EUT
B	RF Module	RFID-CPU	M0EB5473-2106000058	RICOH	EUT
B'	RF Module	RFID-AFE	D0A55517-2107366903	RICOH	EUT
C	Operation panel	-	-	RICOH	-
D	Toner bottle RFID	RY5K500	-	RICOH	Tag
E	Printer Server	NX Pro-25	A00137438	RICOH	-
F	Mouse	1113	X821908-014	Microsoft	-
G	Keyboard	ACK-230U	1611008676	Solid Year	-
H	Switching HUB	EHC-G05MN-HJW	6AL829502975A	ELECOM	-
I	SD Card	PHSDC008GMMTG-F4	IGO8G2011-TR4KAA3037A02	PHISON	-
J	USB Memory	RUF3-K32GA-BK/N	P11122	Buffalo	-
K	USB Memory	RUF3-K32GA-BK/N	P11122	Buffalo	-
L	USB Memory	RUF3-K32GA-BK/N	P11122	Buffalo	-
M	USB Memory	RUF3-K32GB	P10108	Buffalo	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB	2.0	Shielded	Shielded	-
2	Display port	2.0	Unshielded	Unshielded	-
3	LAN	12.0	Unshielded	Unshielded	-
4	AC	3.0	Unshielded	Unshielded	-
5	AC	3.0	Unshielded	Unshielded	-
6	AC	2.0	Unshielded	Unshielded	-
7	USB	2.0	Shielded	Shielded	-
8	USB	2.0	Shielded	Shielded	-
9	LAN	2.0	Unshielded	Unshielded	-
10	Signal	0.1	Unshielded	Unshielded	-

<For Other test >



□ : connector

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	RF Module	RFID-CPU	MOEB5473-2106000085	RICOH	EUT
A'	RF Module	RFID-AFE	D0A55517-210514683	RICOH	EUT
B	Relay board	-	-	RICOH	-
C	Power Supply Unit	HW30A-5/A	-	TDK:Lamda	-
D	Laptop Computer	ADLX65YCC2D	8SSA10R16922C2TJ19M1368	LENOVO	-
E	AC Adapter	ThinkPad E14 Gen2	PF397TS8	LENOVO	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal	0.1	Unshielded	Unshielded	-
2	Signal	0.6+0.07	Unshielded	Unshielded	-
3	DC	0.7+0.07	Unshielded	Unshielded	-
4	AC	1.8	Unshielded	Unshielded	-
5	USB Serial	0.5	Shielded	Shielded	-
6	Signal	1.4+0.07	Unshielded	Unshielded	-
7	DC	1.8	Unshielded	Unshielded	-
8	AC	0.9	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a carpet for insulation above the ground plane EUT was set up typical spacing the other equipment
Photographs of the setup shown Appendix 3.

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.

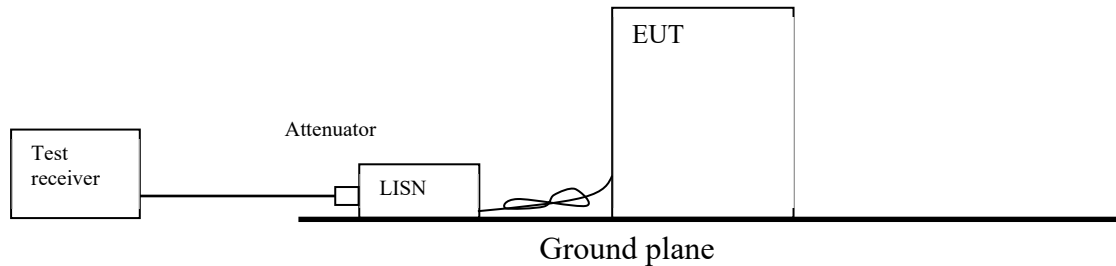
For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50 ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

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.

[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

[For below 1GHz]

EUT was placed on a carpet for insulation above the ground plane EUT was set up typical spacing the other equipment
Photographs of the setup shown Appendix 3.

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 1 about Direction of the Loop Antenna.

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.

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

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

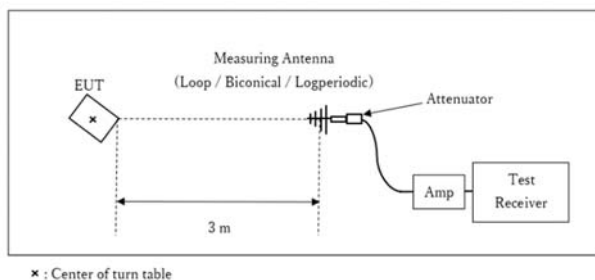
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open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

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 $45.5 - 51.5 = -6.0 \text{ dBuA/m}$, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

[Test Setup]
Below 1 GHz



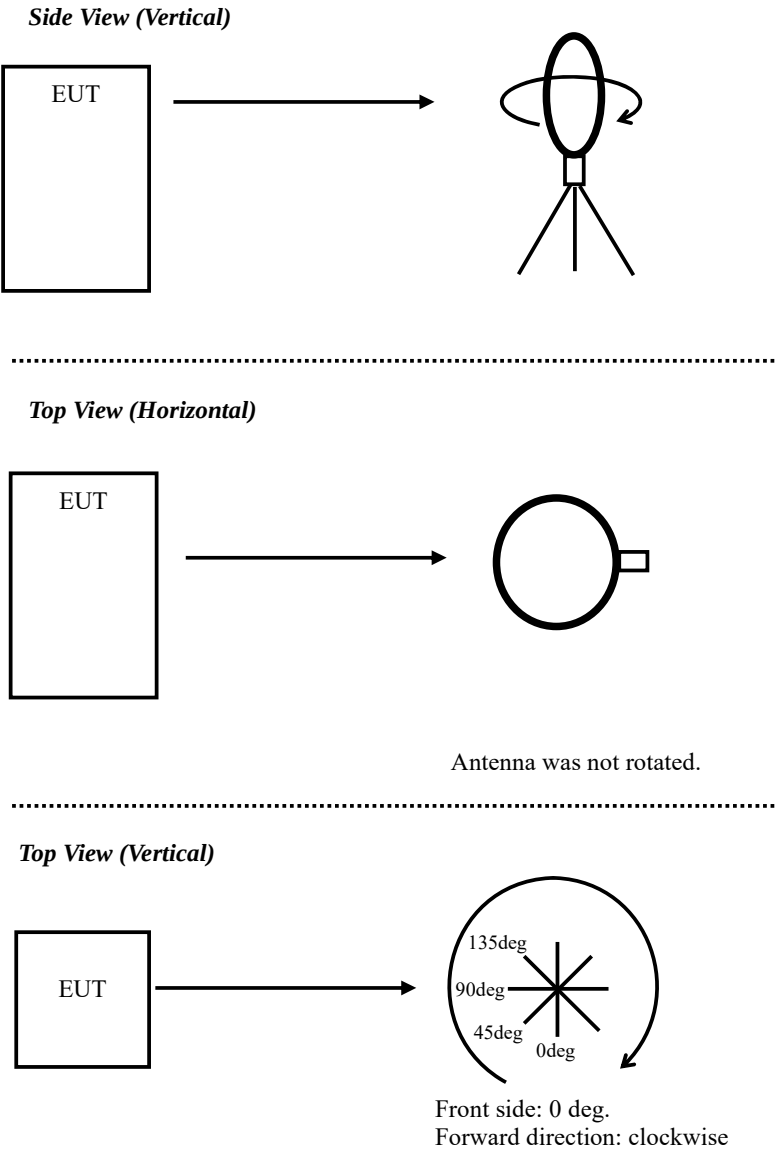
Test Distance: 3 m

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 1
Test result : Pass

Figure 1: Direction of the Loop Antenna



SECTION 7: Other test

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20 dB Bandwidth	100 kHz	1 kHz *1)	3 kHz *1)	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 *2)	Max Hold *2)	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Microwave Counter
*1) Since the transmitter signal is CW-like it is impractical to use a RBW setting of 1 – 5% of the emission bandwidth since the emission bandwidth will be proportional to the RBW. *2) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100 %. Peak hold was applied as Worst-case measurement.							

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

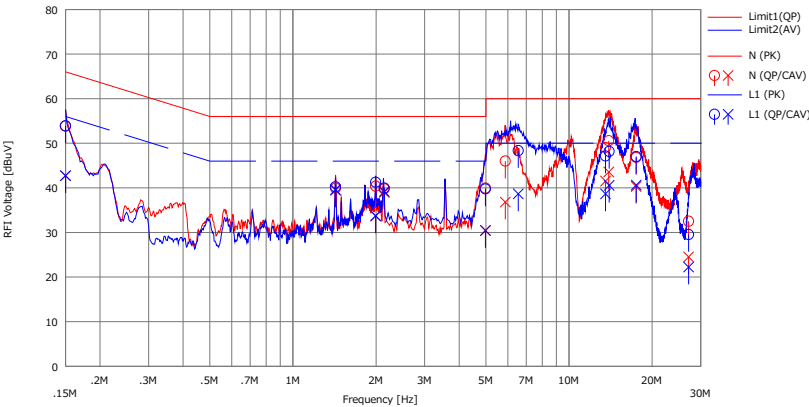
UL Japan,Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2022/04/21

Mode : Transmitter
Power : AC 240 V / 60 Hz
Temp./Humi. : 23 deg.C / 45 %RH

Remarks : Main

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yohsuke Matsuzawa



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(CAV) [dBuV]		(QP) [dBuV]	(CAV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	40.10	29.00	13.73	53.83	42.73	66.00	56.00	12.1	13.2	N	
2	1.42810	27.30	26.80	12.63	39.93	39.43	56.00	46.00	16.0	6.5	N	
3	1.99370	27.70	21.00	12.66	40.36	33.66	56.00	46.00	15.6	12.3	N	
4	2.14348	27.10	26.30	12.67	39.77	38.97	56.00	46.00	16.2	7.0	N	
5	4.98150	27.00	17.50	12.95	39.95	30.45	56.00	46.00	16.0	15.5	N	
6	5.87999	33.00	23.80	13.00	46.00	36.80	60.00	50.00	14.0	13.2	N	
7	13.56000	35.50	28.00	13.53	49.03	41.53	60.00	50.00	10.9	8.4	N	
8	13.93770	37.00	30.00	13.56	50.56	43.56	60.00	50.00	9.4	6.4	N	
9	17.50529	33.00	26.50	13.81	46.81	40.31	60.00	50.00	13.1	9.6	N	
10	27.12000	18.00	10.00	14.52	32.52	24.52	60.00	50.00	27.4	25.4	N	
11	0.15000	40.20	29.00	13.72	53.92	42.72	66.00	56.00	12.0	13.2	L1	
12	1.42680	27.60	27.00	12.63	40.23	39.63	56.00	46.00	15.7	6.3	L1	
13	1.99410	28.60	21.10	12.66	41.26	33.76	56.00	46.00	14.7	12.2	L1	
14	2.14388	27.30	26.50	12.67	39.97	39.17	56.00	46.00	16.0	6.8	L1	
15	4.97762	26.80	17.50	12.94	39.74	30.44	56.00	46.00	16.2	15.5	L1	
16	6.55139	35.30	25.60	13.04	48.34	38.64	60.00	50.00	11.6	11.3	L1	
17	13.56000	33.60	25.10	13.54	47.14	38.64	60.00	50.00	12.8	11.3	L1	
18	13.97226	34.60	27.00	13.57	48.17	40.57	60.00	50.00	11.8	9.4	L1	
19	17.51638	33.20	26.80	13.82	47.02	40.62	60.00	50.00	12.9	9.3	L1	
20	27.12000	15.00	7.70	14.54	29.54	22.24	60.00	50.00	30.4	27.7	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT+HighPassFilter)[dB]
LISN(AMN): SLS-06

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

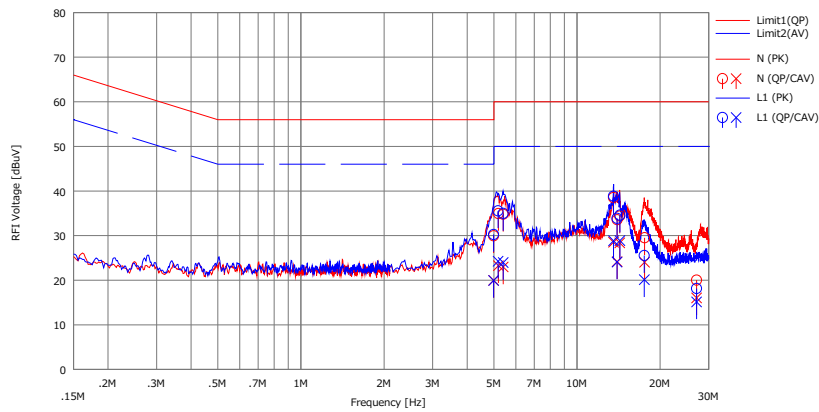
UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2022/04/21

Mode : Transmitter
Power : AC 240 V / 60 Hz
Temp./Humi. : 23 deg.C / 45 %RH

Remarks : Sub

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yohsuke Matsuzawa



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(CAV) [dBuV]		(QP) [dBuV]	(CAV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	4.98830	17.00	7.00	12.95	29.95	19.95	56.00	46.00	26.0	26.0	N	
2	5.18878	22.00	10.30	12.96	34.96	23.26	60.00	50.00	25.0	26.7	N	
3	5.40190	21.80	10.00	12.98	34.78	22.98	60.00	50.00	25.2	27.0	N	
4	13.56000	25.00	15.00	13.53	38.53	28.53	60.00	50.00	21.4	21.4	N	
5	13.98487	20.00	10.60	13.56	33.56	24.16	60.00	50.00	26.4	25.8	N	
6	14.28678	20.80	14.80	13.58	34.38	28.38	60.00	50.00	25.6	21.6	N	
7	17.56356	15.70	10.20	13.81	29.51	24.01	60.00	50.00	30.4	25.9	N	
8	27.12000	5.50	1.50	14.52	20.02	16.02	60.00	50.00	39.9	33.9	N	
9	4.98840	17.30	7.00	12.94	30.24	19.94	56.00	46.00	25.7	26.0	L1	
10	5.17360	22.60	11.30	12.95	35.55	24.25	60.00	50.00	24.4	25.7	L1	
11	5.40589	22.00	11.00	12.97	34.97	23.97	60.00	50.00	25.0	26.0	L1	
12	13.56000	25.30	15.30	13.54	38.84	28.84	60.00	50.00	21.1	21.1	L1	
13	13.95861	20.30	10.50	13.57	33.87	24.07	60.00	50.00	26.1	25.9	L1	
14	14.29058	21.00	15.30	13.58	34.58	28.88	60.00	50.00	25.4	21.1	L1	
15	17.53439	11.70	6.30	13.82	25.52	20.12	60.00	50.00	34.4	29.8	L1	
16	27.12000	3.60	0.60	14.54	18.14	15.14	60.00	50.00	41.8	34.8	L1	

Calculation: Result[dBuV] = Reading[dBuV] + C.Fac(LISN(AMN) + Cable + ATT + HighPassFilter)[dB]
LISN(AMN): SLS-06

Fundamental emission and Spectrum Mask

Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.2
Date	April 21, 2022
Temperature / Humidity	23 deg. C / 45 % RH
Engineer	Yohsuke Matsuzawa
Mode	Vertical polarization (antenna angle) of the worst case: 0 deg.
	Transmitting mode (Tx) Modulated without Tag

Fundamental emission

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	Loss [dB]	AMP GAIN [dB]	Distance factor [dB]	RESULT		LIMIT (30m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	46.6	52.1	20.0	6.5	32.0	-40.0	1.2	6.7	83.9	82.8	77.2

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

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

Limits (30m)

• 13.553 MHz to 13.567 MHz : 83.9 dBuV/m (FCC 15.225(a))

Spurious emission within the band

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	Loss [dB]	AMP GAIN [dB]	Distance factor [dB]	RESULT		LIMIT (30m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	29.9	29.9	20.0	6.5	32.0	-40.0	-15.6	-15.6	29.5	45.1	45.1
2	13.410	30.0	30.0	20.0	6.5	32.0	-40.0	-15.5	-15.5	40.5	56.0	56.0
3	13.553	34.1	40.4	20.0	6.5	32.0	-40.0	-11.4	-5.1	50.4	61.8	55.5
4	13.567	34.1	40.4	20.0	6.5	32.0	-40.0	-11.4	-5.1	50.4	61.8	55.5
5	13.710	30.0	30.0	20.0	6.5	32.0	-40.0	-15.5	-15.5	40.5	56.0	56.0
6	14.010	29.9	30.0	20.1	6.6	32.0	-40.0	-15.4	-15.3	29.5	44.9	44.8

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

Outside filed strength frequencies

• $F_c \pm 7 \text{ kHz}$: 13.553 MHz to 13.567 MHz

• $F_c \pm 150 \text{ kHz}$: 13.410 MHz to 13.710 MHz

• $F_c \pm 450 \text{ kHz}$: 13.110 MHz to 14.010 MHz

$F_c = 13.56 \text{ MHz}$

Limits (30m)

• 13.410 MHz to 13.553 MHz and 13.567 MHz to 13.710 MHz : 50.4 dBuV/m (FCC 15.225(b))

• 13.110 MHz to 13.410 MHz and 13.710 MHz to 14.010 MHz : 40.5 dBuV/m (FCC 15.225(c))

• Below 13.110 MHz and Above 14.010 MHz : 29.5 dBuV/m (FCC 15.225(d) and FCC 15.209)

Spurious emission

Test place Shonan EMC Lab.
Semi Anechoic Chamber No.2
Date April 21, 2022 No.2
Temperature / Humidity 23 deg. C / 45 % RH 23 deg. C / 47 % RH
Engineer Yohsuke Matsuzawa Yohsuke Matsuzawa
(Below 30 MHz) (Above 30 MHz)
Mode [Below 30 MHz]
Vertical polarization (antenna angle) of the worst case: 90 deg.
Transmitting mode (Tx) Modulated without Tag
[Above 30 MHz]
Transmitting mode (Tx) Modulated with Tag

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2.00	QP	41.7	19.6	6.1	32.0	-40.0	-4.6	29.5	34.1	-	216	* Limit: 30m
Hori.	14.55	QP	30.2	20.1	6.6	32.0	-40.0	-15.1	29.5	44.6	-	295	* Limit: 30m
Hori.	27.12	QP	30.0	21.2	6.9	32.0	-40.0	-13.9	29.5	43.4	-	121	* Limit: 30m
Hori.	130.540	QP	42.8	14.0	8.2	31.9	0.0	33.1	43.5	10.4	271	223	
Hori.	233.100	QP	43.2	17.3	9.3	31.8	0.0	38.0	46.0	8.0	157	246	
Hori.	299.701	QP	39.6	19.9	9.8	31.7	0.0	37.7	46.0	8.3	166	282	
Hori.	366.303	QP	50.2	15.4	6.9	31.7	0.0	40.8	46.0	5.2	151	43	
Hori.	499.499	QP	39.5	17.9	7.7	31.7	0.0	33.5	46.0	12.5	100	347	
Vert.	2.00	QP	45.1	19.6	6.1	32.0	-40.0	-1.2	29.5	30.7	-	163	* Limit: 30m
Vert.	14.55	QP	34.5	20.1	6.6	32.0	-40.0	-10.8	29.5	40.3	-	225	* Limit: 30m
Vert.	27.12	QP	30.8	21.2	6.9	31.9	-40.0	-13.0	29.5	42.5	-	341	* Limit: 30m
Vert.	48.646	QP	45.8	11.7	7.2	31.9	0.0	32.8	40.0	7.2	100	178	
Vert.	76.215	QP	51.2	6.37	7.9	31.9	0.0	33.6	40.0	6.4	100	67	
Vert.	96.519	QP	53.6	9.50	8.1	31.9	0.0	39.3	43.5	4.2	100	131	
Vert.	136.084	QP	45.7	14.3	8.3	31.9	0.0	36.5	43.5	7.0	100	162	
Vert.	300.00	QP	46.2	14.1	6.5	31.7	0.0	35.1	46.0	10.9	159	314	
Vert.	400.00	QP	40.2	16.5	7.1	31.7	0.0	32.1	46.0	13.9	145	341	
Vert.	500.00	QP	38.3	17.9	7.7	31.7	0.0	32.2	46.0	13.8	100	264	

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

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

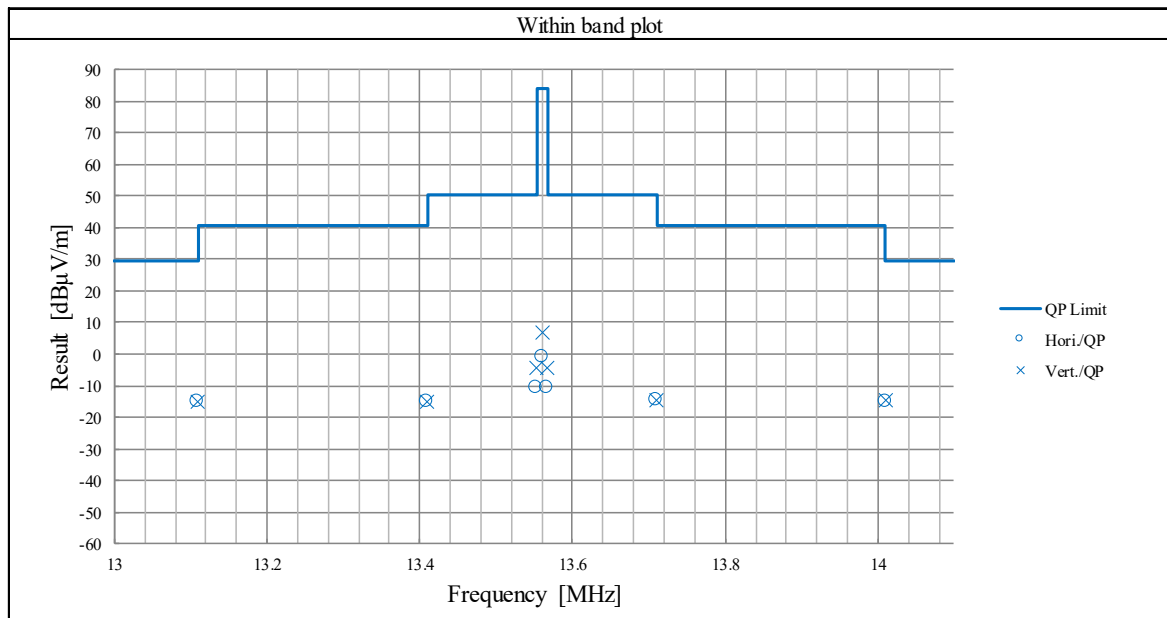
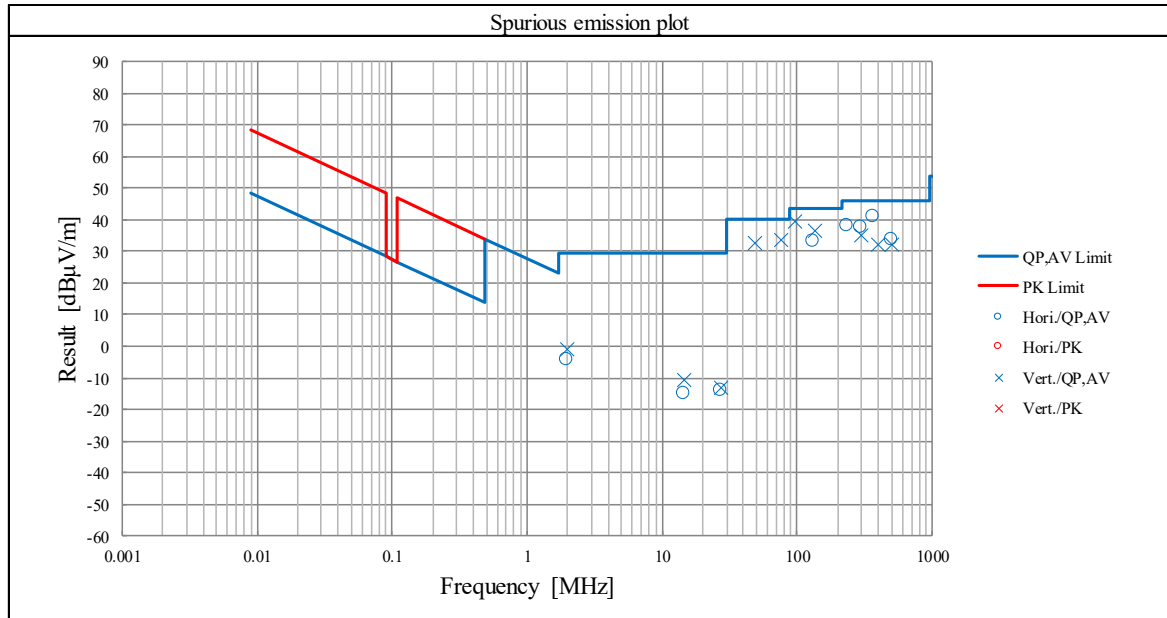
* Carrier level (Result at 3m): Hor= 41.2 dBuV/m, Ver= 46.7 dBuV/m

Radiated Spurious Emission

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Shonan EMC Lab.
No.2
April 21, 2022
23 deg. C / 45 % RH
Yohsuke Matsuzawa
(Below 30 MHz)

No.2
April 22, 2022
23 deg. C / 47 % RH
Yohsuke Matsuzawa
(Above 30 MHz)

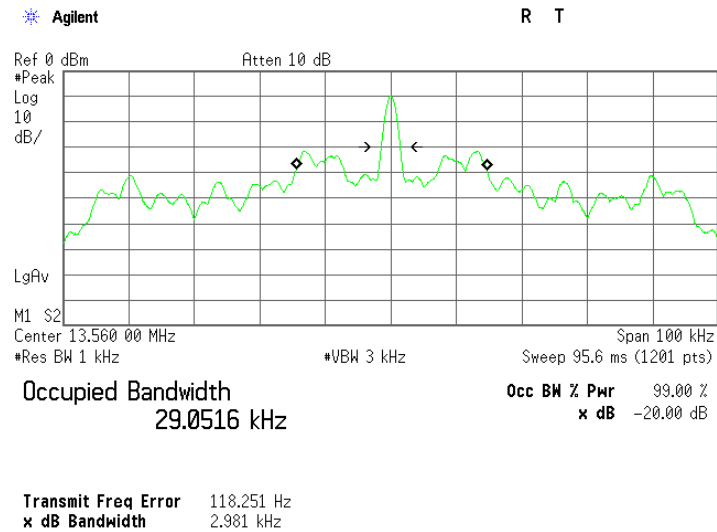


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

20 dB Bandwidth and 99% Occupied Bandwidth

Test place Shonan EMC Lab.
Shielded room No.5
Date May 10, 2022
Temperature / Humidity 24 deg. C / 48 % RH
Engineer Hiromasa Sato

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	2.98	29.05



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 Shonan EMC Lab.
 Shielded room No.5
 Date May 10, 2022
 Temperature / Humidity 24 deg. C / 48 % RH
 Engineer Hiromasa Sato

Test condition		Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit
Temp. [deg. C]	Voltage [V]				[%]	[ppm]	
50	5	Power on	13.559942	-0.000058	-0.00043	-4.3	0.01
		+ 2 min.	13.559941	-0.000059	-0.00044	-4.4	0.01
		+ 5 min.	13.559942	-0.000058	-0.00043	-4.3	0.01
		+ 10 min.	13.559941	-0.000059	-0.00044	-4.4	0.01
40	5	Power on	13.559969	-0.000031	-0.00023	-2.3	0.01
		+ 2 min.	13.559970	-0.000030	-0.00022	-2.2	0.01
		+ 5 min.	13.559969	-0.000031	-0.00023	-2.3	0.01
		+ 10 min.	13.559969	-0.000031	-0.00023	-2.3	0.01
30	5	Power on	13.560005	0.000005	0.00004	0.4	0.01
		+ 2 min.	13.560002	0.000002	0.00001	0.1	0.01
		+ 5 min.	13.560003	0.000003	0.00002	0.2	0.01
		+ 10 min.	13.560003	0.000003	0.00002	0.2	0.01
20	5	Power on	13.560038	0.000038	0.00028	2.8	0.01
		+ 2 min.	13.560036	0.000036	0.00027	2.7	0.01
		+ 5 min.	13.560035	0.000035	0.00026	2.6	0.01
		+ 10 min.	13.560036	0.000036	0.00027	2.7	0.01
20	4.25 (5V -15%)	Power on	13.560039	0.000039	0.00029	2.9	0.01
		+ 2 min.	13.560037	0.000037	0.00027	2.7	0.01
		+ 5 min.	13.560037	0.000037	0.00027	2.7	0.01
		+ 10 min.	13.560037	0.000037	0.00027	2.7	0.01
20	5.75 (5V +15%)	Power on	13.560038	0.000038	0.00028	2.8	0.01
		+ 2 min.	13.560036	0.000036	0.00027	2.7	0.01
		+ 5 min.	13.560036	0.000036	0.00027	2.7	0.01
		+ 10 min.	13.560037	0.000037	0.00027	2.7	0.01
10	5	Power on	13.560062	0.000062	0.00046	4.6	0.01
		+ 2 min.	13.560061	0.000061	0.00045	4.5	0.01
		+ 5 min.	13.560061	0.000061	0.00045	4.5	0.01
		+ 10 min.	13.560061	0.000061	0.00045	4.5	0.01
0	5	Power on	13.560066	0.000066	0.00049	4.9	0.01
		+ 2 min.	13.560067	0.000067	0.00049	4.9	0.01
		+ 5 min.	13.560067	0.000067	0.00049	4.9	0.01
		+ 10 min.	13.560067	0.000067	0.00049	4.9	0.01
-10	5	Power on	13.560051	0.000051	0.00038	3.8	0.01
		+ 2 min.	13.560052	0.000052	0.00038	3.8	0.01
		+ 5 min.	13.560053	0.000053	0.00039	3.9	0.01
		+ 10 min.	13.560054	0.000054	0.00040	4.0	0.01
-20	5	Power on	13.560002	0.000002	0.00001	0.1	0.01
		+ 2 min.	13.560008	0.000008	0.00006	0.6	0.01
		+ 5 min.	13.560009	0.000009	0.00007	0.7	0.01
		+ 10 min.	13.560009	0.000009	0.00007	0.7	0.01

Calculation formula:

Frequency error = Measured frequency - Tested frequency

Result [%] = Frequency error / Tested frequency * 100

APPENDIX 2: Test instruments

Test equipment(1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
BW	KSA-08	145089	Spectrum Analyzer	Keysight Technologies Inc	E4446A	MY46180525	2021/10/13	12
BW,FT	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2021/09/14	12
BW,FT	SCH-01	145200	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	2022/04/05	12
BW,FT	SOS-19	175823	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/10/14	12
BW,FT	SSCA-01	146178	Search coil	Langer	RF-R 400-1	02-0634	-	-
CE	KAT3-12	144896	Attenuator	JFW IND. INC.	50HF-003N	-	2021/07/12	12
CE	SCC-02	145030	Coaxial Cable	Fujikura Shoji Co., LTD	5D2W	-	2022/02/22	12
CE	SCC-B9/B10/B11/B13/SRSE-02	144970	Coaxial Cable&RF Selector	Suhner/Fujikura/Suhner/Suhner/TOYO	RG223U/12DSFA/141PE/NS4906	-/0901-270(RF Selector)	2022/04/20	12
CE	SHF-02	145504	Highpass Filter	Rohde & Schwarz	EZ-25	100022	2022/03/04	12
CE	SLS-01	145538	LISN	Rohde & Schwarz	ENV216	100511	2022/02/23	12
CE	SLS-03	145540	LISN	Rohde & Schwarz	ENV216	100513	2022/02/23	12
CE	SLS-04	145541	LISN	Rohde & Schwarz	ENV216	100514	2022/02/23	12
CE	SLS-06	145543	LISN	Schwarzbeck Mess-Elektronik OHG	NSLK8126	8126440	2022/04/13	12
CE	STM-02	145746	Terminator	TME	CT-01 BP	-	2021/12/10	12
CE	STM-07	146189	Terminator	TME	CT-01 BP	-	2021/12/10	12
CE	STM-12	145765	Terminator	TME	CT-01 BP	-	2021/12/10	12
CE,RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
CE,RE	SJM-20	207277	Measuring	ASKUL	-	-	-	-
CE,RE	SOS-21	191838	Humidity Indicator	CUSTOM. Inc	CTH-201	-	2021/08/02	12
CE,RE	STR-08	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2022/03/02	12
CE,RE	STS-02	145793	Digital Hitester	HIOKI E.E. CORPORATION	3805-50	80997819	2022/04/07	12
FT	SFC-03	183119	Microwave Counter	Keysight Technologies Inc	53151A	US40511493	2021/11/12	12
RE	KBA-03	144932	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	BBA9106	1926	2021/05/15	12
RE	SAEC-02(NSA)	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2022/03/20	12
RE	SAEC-ALL	145568	Semi Anechoic Chamber(ME)	TDK	Semi Anechoic Chamber 3m/10m	1, 2, 3	2020/12/25	24
RE	SAF-02	145004	Pre Amplifier	SONOMA	310N	290212	2022/02/24	12
RE	SAT3-11	150921	Attenuator	JFW	50HF-003N	-	2022/02/21	12
RE	SAT6-14	167095	Attenuator	JFW	50HF-006N	-	2022/02/21	12
RE	SAT6-15	167096	Attenuator	JFW	50HF-006N	-	2022/02/21	12

Test equipment(2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SCC-B1/B3/B5/B7/B8/B13/SRSE-02	144975	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2022/04/20	12
RE	SCC-B2/B4/B6/B7/B8/B13/SRSE-02	144976	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	2022/04/20	12
RE	SCC-M1	194601	Coaxial Cable	Fujikura	5D-2W	-	2021/12/10	12
RE	SLA-03	145533	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	UHALP9108A	UHALP 9108-A 0901	2021/05/15	12
RE	SLP-02	145536	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	2022/04/07	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