

EMI TEST REPORT

Test Report No.: 14694404H-A-R2

Customer	LiLz Inc.
Description of EUT	LiLz Cam
Model Number of EUT	LC-10
FCC ID	2BA68LC
Test Regulation	FCC Part 15 Subpart B, Class A
Test Result	Complied (Refer to SECTION 3)
Issue Date	June 21, 2023
Remarks	-

Representative test engineer



Yuichiro Yamazaki
Engineer

Approved by



Satofumi Matsuyama
Engineer



CERTIFICATE 5107.02

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 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.: 14694404H-A

This report is a revised version of 14694404H-A-R1. 14694404H-A-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14694404H-A	April 28, 2023	-
1	14694404H-A-R1	June 19, 2023	SECTION 2.2: Product Description General Specification -Addition to Clock frequency (ies) in the system (Maximum)
1	14694404H-A-R1	June 19, 2023	SECTION 6: Radiated Emission -Correction of below sentence in Section 6.4: Test procedure. The 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 representative X-axis since no difference was found among each position. → 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.
2	14694404H-A-R2	June 21, 2023	SECTION 2.2: Product Description Radio Specification -Deletion of WWAN: GSM and WCDMA specification. -Correction of frequency band for Band 41. Band 41: 2496 MHz to 2400 MHz → Band 41: 2496 MHz to 2690 MHz

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	GPS	Global Positioning System
AAN	Asymmetric Artificial Network	Hori.	Horizontal
AC	Alternating Current	ICES	Interference-Causing Equipment Standard
AM	Amplitude Modulation	I/O	Input/Output
AMN	Artificial Mains Network	IEC	International Electrotechnical Commission
Amp, AMP	Amplifier	IEEE	Institute of Electrical and Electronics Engineers
ANSI	American National Standards Institute	IF	Intermediate Frequency
Ant, ANT	Antenna	ILAC	International Laboratory Accreditation Conference
AP	Access Point	ISED	Innovation, Science and Economic Development Canada
ASK	Amplitude Shift Keying	ISN	Impedance Stabilization Network
Atten., ATT	Attenuator	ISO	International Organization for Standardization
AV	Average	JAB	Japan Accreditation Board
BPSK	Binary Phase-Shift Keying	LAN	Local Area Network
BR	Bluetooth Basic Rate	LCL	Longitudinal Conversion Loss
BT	Bluetooth	LIMS	Laboratory Information Management System
BT LE	Bluetooth Low Energy	LISN	Line Impedance Stabilization Network
BW	BandWidth	MRA	Mutual Recognition Arrangement
C.F	Correction Factor	N/A	Not Applicable
Cal Int	Calibration Interval	NIST	National Institute of Standards and Technology
CAV	CISPR AV	NS	No signal detect.
CCK	Complementary Code Keying	NSA	Normalized Site Attenuation
CDN	Coupling Decoupling Network	OBW	Occupied BandWidth
Ch., CH	Channel	OFDM	Orthogonal Frequency Division Multiplexing
CISPR	Comite International Special des Perturbations Radioelectriques	PER	Packet Error Rate
Corr.	Correction	PK	Peak
CPE	Customer premise equipment	PLT	long-term flicker severity
CW	Continuous Wave	POHC(A)	Partial Odd Harmonic Current
DBPSK	Differential BPSK	Pol., Pola.	Polarization
DC	Direct Current	PR-ASK	Phase Reversal ASK
DET	Detector	Pst	short-term flicker severity
D-factor	Distance factor	QAM	Quadrature Amplitude Modulation
Dmax	maximum absolute voltage change during an observation period	QP	Quasi-Peak
DQPSK	Differential QPSK	QPSK	Quadrature Phase Shift Keying
DSSS	Direct Sequence Spread Spectrum	r.m.s., RMS	Root Mean Square
DUT	Device Under Test	RBW	Resolution BandWidth
EDR	Enhanced Data Rate	RE	Radio Equipment
e.i.r.p., EIRP	Equivalent Isotropically Radiated Power	REV	Reverse
EM clamp	Electromagnetic clamp	RF	Radio Frequency
EMC	ElectroMagnetic Compatibility	RFID	Radio Frequency Identifier
EMI	ElectroMagnetic Interference	RNSS	Radio Navigation Satellite Service
EMS	ElectroMagnetic Susceptibility	RSS	Radio Standards Specifications
EN	European Norm	Rx	Receiving
e.r.p., ERP	Effective Radiated Power	SINAD	Ratio of (Signal + Noise + Distortion) to (Noise + Distortion)
ETSI	European Telecommunications Standards Institute	S/N	Signal to Noise ratio
EU	European Union	SA, S/A	Spectrum Analyzer
EUT	Equipment Under Test	SG	Signal Generator
Fac.	Factor	SVSWR	Site-Voltage Standing Wave Ratio
FCC	Federal Communications Commission	THC(A)	Total Harmonic Current
FHSS	Frequency Hopping Spread Spectrum	THD(%)	Total Harmonic Distortion
FM	Frequency Modulation	TR, T/R	Test Receiver
Freq.	Frequency	Tx	Transmitting
FSK	Frequency Shift Keying	VBW	Video BandWidth
Fund	Fundamental	Vert.	Vertical
FWD	Forward	WLAN	Wireless LAN
GFSK	Gaussian Frequency-Shift Keying	xDSL	Generic term for all types of DSL technology
GNSS	Global Navigation Satellite System		(DSL: Digital Subscriber Line)

CONTENTS	PAGE
SECTION 1: Customer information	5
SECTION 2: Equipment under test (EUT).....	5
SECTION 3: Test specification, procedures & results	7
SECTION 4: Operation of EUT during testing.....	9
SECTION 5: Conducted Emission	11
SECTION 6: Radiated Emission.....	12
APPENDIX 1: Test data	14
Conducted Emission	14
Radiated Emission	16
APPENDIX 2: Test instruments	20
APPENDIX 3: Photographs of test setup.....	21
Conducted Emission	21
Radiated Emission	22
Worst Case Position.....	24

SECTION 1: Customer information

Company Name	LiLz Inc.
Address	2F 2-3-7 Ganeko Ginowan-city, Okinawa, 901-2214 Japan
Telephone Number	+81-98-917-0267
Contact Person	Keigo Onishi

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	LiLz Cam
Model Number	LC-10
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 6, 2023
Test Date	March 23 and 26, 2023

2.2 Product Description

General Specification

Rating	DC 3.8 V(typ), DC 3.3 V(min) to 4.2 V(max) (lithium-ion battery) DC 5.0 V (External charging cable)
Clock frequency (ies) in the system (Maximum)	1.3 GHz
Operating temperature	-20 deg. C to +75 deg. C

Radio Specification**[Bluetooth (Low Energy)]**

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480 MHz
Type of Modulation	GFSK
Antenna Gain	1.90 dBi

[WWAN: LTE]

	[Up Link] Band 2: 1850 MHz to 1910 MHz Band 4: 1710 MHz to 1755 MHz Band 5: 824 MHz to 849 MHz Band 7: 2500 MHz to 2570 MHz Band 12: 699 MHz to 716 MHz Band 13: 777 MHz to 787 MHz Band 25: 1850 MHz to 1915 MHz Band 26: 814 MHz to 849 MHz Band 38: 2570 MHz to 2620 MHz Band 41: 2496 MHz to 2690 MHz	[Down Link] Band 2: 1930 MHz to 1990 MHz Band 4: 2110 MHz to 2155 MHz Band 5: 869 MHz to 894 MHz Band 7: 2620 MHz to 2690 MHz Band 12: 729 MHz to 746 MHz Band 13: 746 MHz to 756 MHz Band 25: 1930 MHz to 1995 MHz Band 26: 859 MHz to 894 MHz Band 38: 2570 MHz to 2620 MHz Band 41: 2496 MHz to 2690 MHz
Modulation	QPSK, 16QAM, 64QAM	
Antenna Gain	Band 2: 2.5 dBi Band 4: 2.5 dBi Band 5: 0.5 dBi Band 7: 2.5 dBi Band 12: 0.5 dBi Band 13: 0.5 dBi Band 25: 2.5 dBi Band 26: 1.0 dBi Band 38: 2.5 dBi Band 41: 2.5 dBi	

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart B The latest version on the first day of the testing period
Title	FCC 47CFR Part15 Radio Frequency Device Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin	Result	Remarks
Conducted emission	ANSI C63.4: 2014 7. AC power - line conducted emission measurements	Class A	N/A	27.81 dB 0.53387 MHz, AV, Phase: L (Mode 1)	Complied a)	-
Radiated emission	ANSI C63.4: 2014 8. Radiated emission measurements	Class A	N/A	13.19 dB 486.027 MHz, Horizontal (Mode 2)	Complied b)	-

* Note: UL Japan, Inc.'s EMI Work Procedure: Work Instructions-ULID-003591.

a) Refer to APPENDIX 1 (data of Conducted Emission)
b) Refer to APPENDIX 1 (data of Radiated Emission)

3.3 Addition to standard

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

Using Item	Frequency range	Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	3.7 dB
	0.15 MHz to 30 MHz	3.3 dB

Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)	
3 m	30 MHz to 200 MHz	Horizontal	4.8 dB
		Vertical	5.0 dB
	200 MHz to 1000 MHz	Horizontal	5.1 dB
		Vertical	6.2 dB
10 m	30 MHz to 200 MHz	Horizontal	4.8 dB
		Vertical	4.8 dB
	200 MHz to 1000 MHz	Horizontal	4.9 dB
		Vertical	5.0 dB
3 m	1 GHz to 6 GHz	Test Receiver	5.0 dB
		Spectrum analyzer	4.9 dB
	6 GHz to 18 GHz	Test Receiver	5.3 dB
		Spectrum analyzer	5.2 dB
1 m	10 GHz to 26.5 GHz	Spectrum analyzer	5.5 dB
	26.5 GHz to 40 GHz	Spectrum analyzer	5.4 dB
0.5 m	26.5 GHz to 40 GHz	Spectrum analyzer	5.4 dB
10 m	1 GHz to 18 GHz	Test Receiver	5.3 dB

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919

ISED Lab Company Number: 2973C / CAB identifier: JP0002

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 Japan

Telephone: +81-596-24-8999

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	-	-

* Size of vertical conducting plane (for Conducted Emission test): 2.0 x 3.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

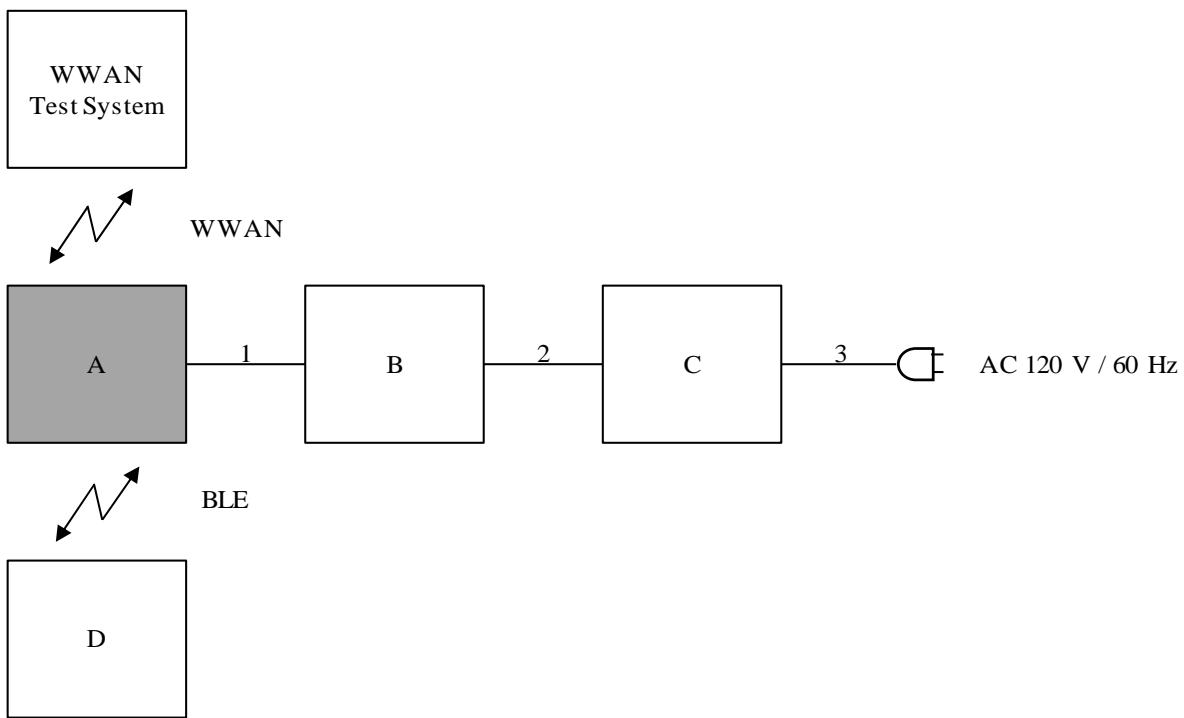
SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Mode	1. WWAN Communication mode *2. BLE Communication mode
Remarks	*Mode 1: The tests were performed on LTE Band 7 as a representative.
Software(s)	EMC test firmware: e1.2.7

4.2 Configuration and peripherals

<Conducted emission>



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

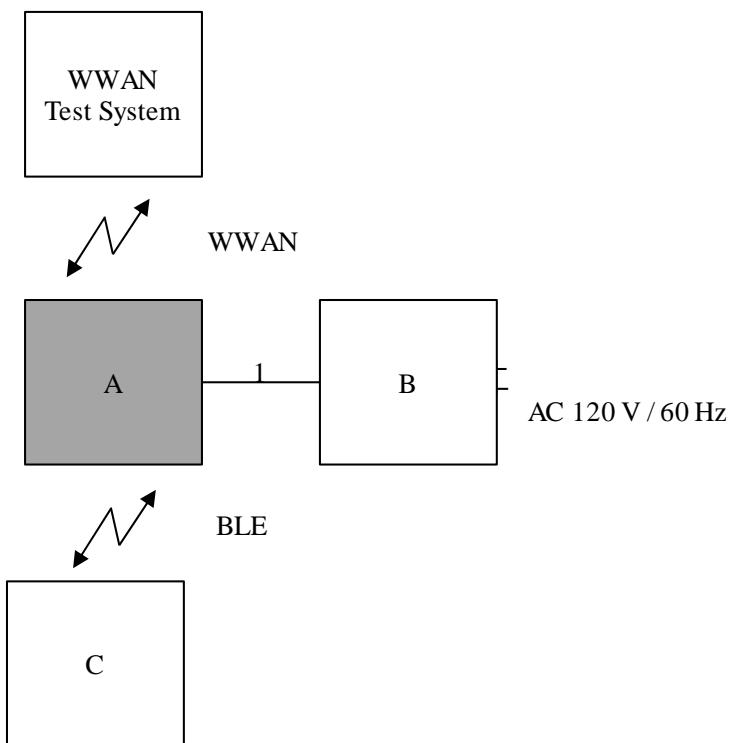
Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	LiLz Cam	LC-10	2468800051800520	LiLz Inc.	EUT
B	Laptop PC	FMV-A8260	R8800679	Fujitsu Limited	-
C	AC Adapter	APP-80NB A	10268063C	Fujitsu Limited	-
D	iPhone	MQ782J/A	FFMY54Y7JC6G	Apple Inc.	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	0.6	Shielded	Shielded	-
2	DC Cable	1.9	Unshielded	Unshielded	-
3	AC Cable	1.0	Unshielded	Unshielded	-

< Radiated emission >



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	LiLz Cam	LC-10	2468800051800520	LiLz Inc.	EUT
B	AC Adapter	G208	-	TERA International	-
C	i Phone	MQ782J/A	FFMY54Y7JC6G	Apple Inc.	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	0.6	Shielded	Shielded	-

SECTION 5: Conducted Emission

5.1 Operating environment

Date : See data
Test place : See data
Temperature : See data
Humidity : See data
Test engineer : See data

5.2 Test configuration

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 and its peripherals was 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 the LISN/AMN. I/O cables that were connected to the other 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. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN/AMN to the input power source. All unused 50 ohm connectors of the LISN/AMN were resistivity terminated in 50 ohm when not connected to the measuring equipment.

Photographs of the set up are shown in APPENDIX 3.

Frequency range : 0.15 MHz to 30 MHz
EUT position : Table top
EUT operation mode : See Clause 4.1

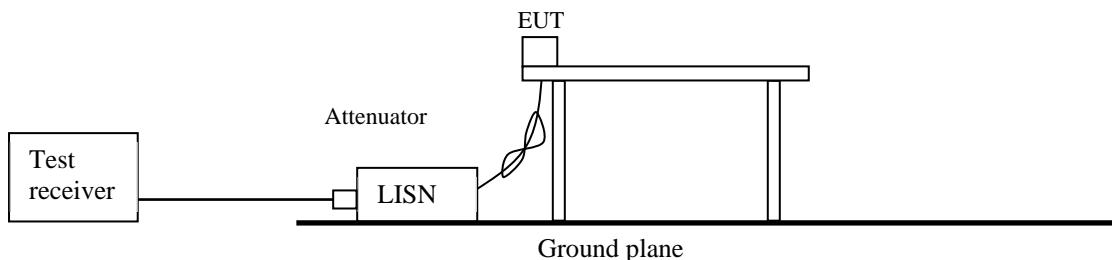
5.3 Test procedure

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT within a semi anechoic chamber. The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains network (AMN). An overview sweep with peak detection has been performed. The measurements have been performed with a quasi-peak detector and if required, with an average detector.

The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type : QP and CAV
IF Bandwidth : 9 kHz

Figure 1: Test Setup



5.4 Test result

Summary of the test results: Pass

The test result is rounded off to one or two decimal places, so some differences might be observed.

SECTION 6: Radiated Emission

6.1 Operating environment

Date : See data
Test place : See data
Temperature : See data
Humidity : See data
Test engineer : See data

6.2 Test configuration

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 EUT was set on the edge of the tabletop.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Photographs of the set up are shown in APPENDIX 3.

6.3 Test conditions

Frequency range : 30 MHz to 200 MHz (Biconical antenna)
200 MHz to 1000 MHz (Logperiodic antenna)
1000 MHz to 13450 MHz (Horn antenna)
Test distance : 10 m (30 MHz to 1000 MHz) / 3 m (1000 MHz to 10000 MHz)
/ 1 m (10000 MHz to 13450 MHz)
EUT position : Table top
EUT operation mode : See Clause 4.1

6.4 Test procedure

The height of the measuring antenna 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 with the Test Receiver.

The radiated emission measurements were made with the following detector function of the Test Receiver.

Test antenna was aimed at the emission source for receiving the maximum signal and always kept. (above 1 GHz)

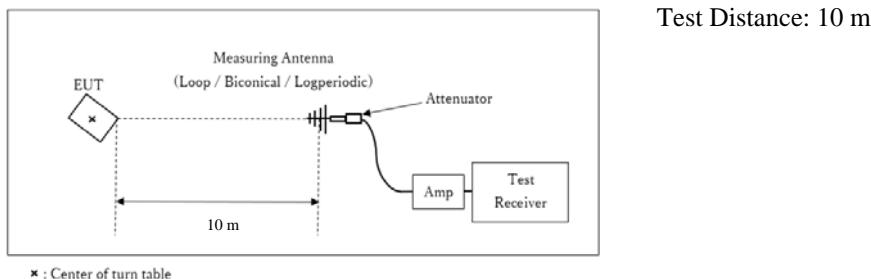
Frequency	Below 1GHz	Above 1GHz *1)
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CAV: BW 1 MHz

*1) The measurement data was adjusted to a 10 m distance using the following Distance Factor.

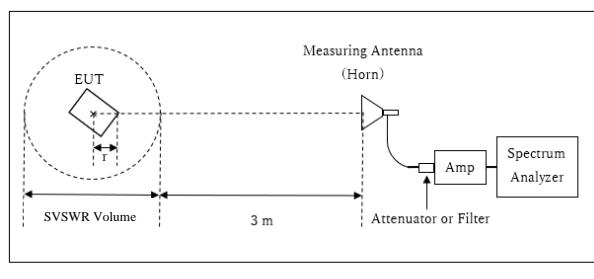
Distance Factor: See Figure 2.

Figure 2: Test Setup

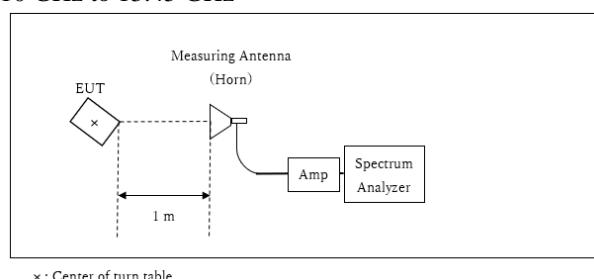
Below 1 GHz



1 GHz to 10 GHz



10 GHz to 13.45 GHz



- 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.

6.5 Test result

Summary of the test results: Pass

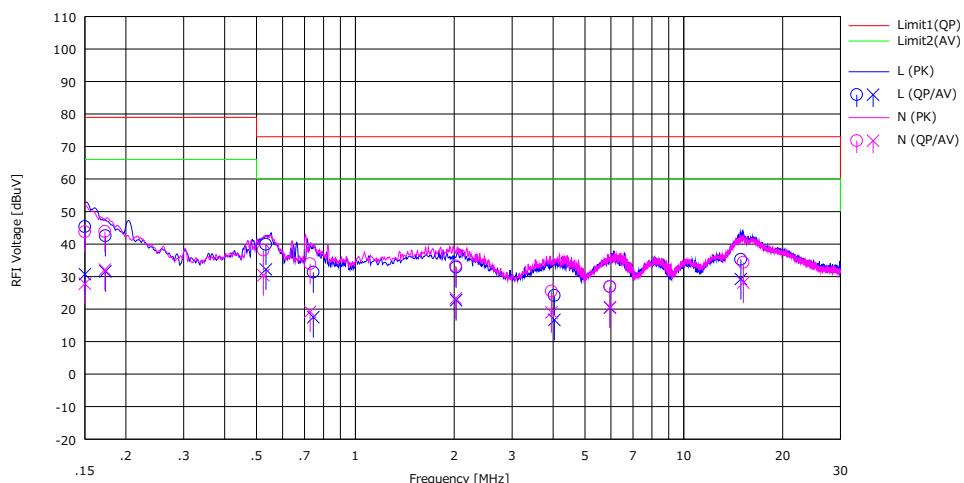
The limit is rounded down to one decimal place.

The test result is rounded off to one or two decimal places, so some differences might be observed.

APPENDIX 1: Test data**Conducted Emission**

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.4
 Date March 23, 2023
 Temperature / Humidity 20 deg. C / 63 % RH
 Engineer Yuichiro Yamazaki
 Mode Mode 1

Limit : FCC_Part 15 Subpart B(15.107)_Class A



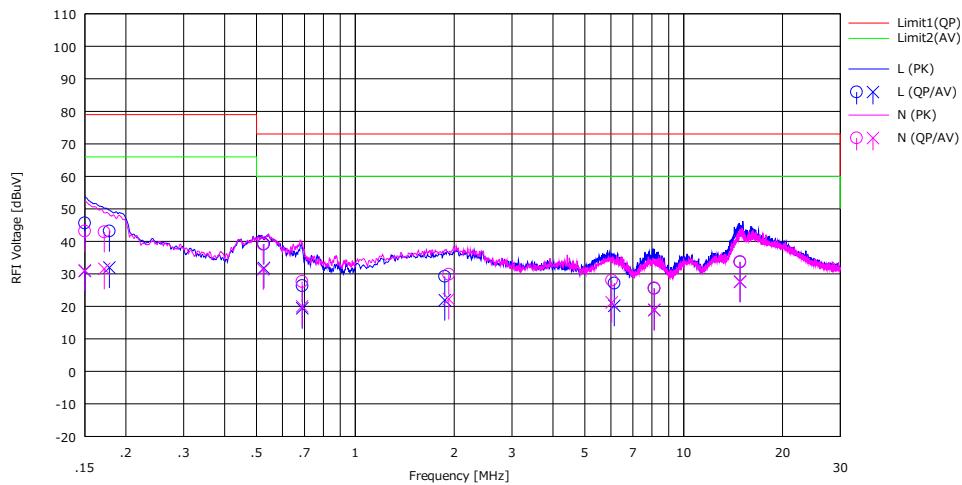
No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		$\langle QP \rangle$ [dBuV]	$\langle AV \rangle$ [dBuV]			$\langle QP \rangle$ [dBuV]	$\langle AV \rangle$ [dBuV]	$\langle QP \rangle$ [dBuV]	$\langle AV \rangle$ [dBuV]	$\langle QP \rangle$ [dB]	$\langle AV \rangle$ [dB]		
1	0.15000	32.20	17.60	0.02	13.10	45.32	30.72	79.00	66.00	33.68	35.28	L	
2	0.17329	29.40	18.50	0.02	13.10	42.52	31.62	79.00	66.00	36.48	34.38	L	
3	0.53387	26.70	19.00	0.05	13.14	39.89	32.19	73.00	60.00	33.11	27.81	L	
4	0.74423	18.10	4.30	0.05	13.16	31.31	17.51	73.00	60.00	41.69	42.49	L	
5	2.02789	19.50	9.40	0.07	13.26	32.83	22.73	73.00	60.00	40.17	37.27	L	
6	4.03633	10.70	3.20	0.10	13.37	24.17	16.67	73.00	60.00	48.83	43.33	L	
7	5.95843	13.30	6.90	0.13	13.46	26.89	20.49	73.00	60.00	46.11	39.51	L	
8	14.91504	21.20	15.20	0.32	13.72	35.24	29.24	73.00	60.00	37.76	30.76	L	
9	0.15000	30.60	14.70	0.05	13.10	43.75	27.85	79.00	66.00	35.25	38.15	N	
10	0.17272	30.70	19.00	0.05	13.10	43.85	32.15	79.00	66.00	35.15	33.85	N	
11	0.52443	24.90	17.20	0.06	13.14	38.10	30.40	73.00	60.00	34.90	29.60	N	
12	0.72805	20.70	6.00	0.06	13.16	33.92	19.22	73.00	60.00	39.08	40.78	N	
13	2.02123	19.90	10.00	0.09	13.26	33.25	23.35	73.00	60.00	39.75	36.65	N	
14	3.95432	12.00	5.50	0.12	13.37	25.49	18.99	73.00	60.00	47.51	41.01	N	
15	5.96549	13.30	7.00	0.15	13.46	26.91	20.61	73.00	60.00	46.09	39.39	N	
16	15.19144	20.30	14.10	0.32	13.72	34.34	28.14	73.00	60.00	38.66	31.86	N	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)
 Except for the above table: adequate margin data below the limits.

Conducted Emission

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.4
 Date March 23, 2023
 Temperature / Humidity 20 deg. C / 63 % RH
 Engineer Yuichiro Yamazaki
 Mode Mode 2

Limit : FCC_Part 15 Subpart B(15.107)_Class A



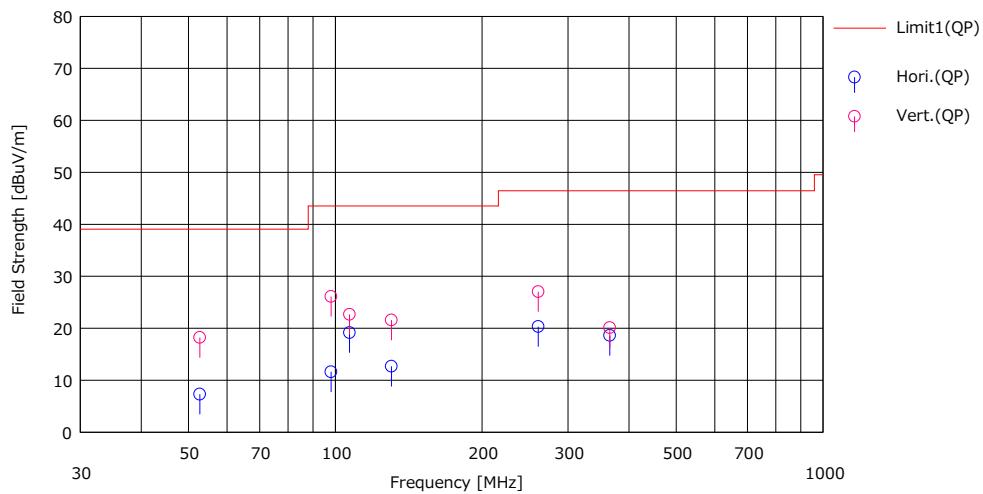
No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		⟨QP⟩ [dBuV]	⟨AV⟩ [dBuV]			⟨QP⟩ [dBuV]	⟨AV⟩ [dBuV]	⟨QP⟩ [dBuV]	⟨AV⟩ [dBuV]	⟨QP⟩ [dB]	⟨AV⟩ [dB]		
1	0.15000	32.50	17.80	0.02	13.10	45.62	30.92	79.00	66.00	33.38	35.08	L	
2	0.17823	30.00	18.80	0.03	13.11	43.14	31.94	79.00	66.00	35.86	34.06	L	
3	0.52638	26.00	18.60	0.05	13.14	39.19	31.79	73.00	60.00	33.81	28.21	L	
4	0.68936	13.10	6.20	0.05	13.16	26.31	19.41	73.00	60.00	46.69	40.59	L	
5	1.87319	15.90	8.60	0.07	13.25	29.22	21.92	73.00	60.00	43.78	38.08	L	
6	6.14990	13.50	6.60	0.14	13.47	27.11	20.21	73.00	60.00	45.89	39.79	L	
7	8.13821	11.80	5.20	0.18	13.53	25.51	18.91	73.00	60.00	47.49	41.09	L	
8	14.85848	19.60	13.50	0.32	13.72	33.64	27.54	73.00	60.00	39.36	32.46	L	
9	0.15000	30.00	17.90	0.05	13.10	43.15	31.05	79.00	66.00	35.85	34.95	N	
10	0.17196	29.70	18.40	0.05	13.10	42.85	31.55	79.00	66.00	36.15	34.45	N	
11	0.52403	25.90	18.20	0.06	13.14	39.10	31.40	73.00	60.00	33.90	28.60	N	
12	0.68880	14.40	6.80	0.06	13.16	27.62	20.02	73.00	60.00	45.38	39.98	N	
13	1.92623	16.50	8.90	0.09	13.25	29.84	22.24	73.00	60.00	43.16	37.76	N	
14	6.04150	14.40	7.60	0.15	13.46	28.01	21.21	73.00	60.00	44.99	38.79	N	
15	8.12390	11.90	5.20	0.19	13.53	25.62	18.92	73.00	60.00	47.38	41.08	N	
16	14.84152	19.70	13.50	0.32	13.72	33.74	27.54	73.00	60.00	39.26	32.46	N	

CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + LISN + LOSS (CABLE + ATT)
 Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date March 26, 2023
 Temperature / Humidity 20 deg. C / 51 % RH
 Engineer Masaya Minami
 (Below 1 GHz)
 Mode Mode 1

Limit : FCC_Part 15 Subpart B(15.109)_Class A



No.	Freq. [MHz]	Reading (QP) [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result (QP)		Limit (QP) [dBuV/m]	Margin (QP) [dB]	Pola.	Height [H/V]	Angle [deg]	Ant. Type	Comment
						Result (QP) [dB]	Limit (QP) [dBuV/m]							
1	52.740	28.30	10.09	7.68	38.75	7.32	39.08	31.76	359	Hori.	400	359	BA	
2	98.004	32.20	9.89	8.37	38.85	11.61	43.52	31.91	400	Hori.	400	249	BA	
3	106.930	38.30	11.23	8.48	38.85	19.16	43.52	24.36	400	Hori.	400	179	BA	
4	130.340	29.00	13.79	8.76	38.87	12.68	43.52	30.84	400	Hori.	400	195	BA	
5	260.700	35.90	13.11	10.07	38.75	20.33	46.44	26.11	250				LA20	
6	365.291	30.80	15.38	10.91	38.47	18.62	46.44	27.92	250	Hori.	265	64	LA20	
7	52.740	39.20	10.09	7.68	38.75	18.22	39.08	20.86	200	Vert.	200	232	BA	
8	98.004	46.70	9.89	8.37	38.85	26.11	43.52	17.41	201	Vert.	100	201	BA	
9	106.930	41.80	11.23	8.48	38.85	22.66	43.52	20.86	100	Vert.	100	252	BA	
10	130.340	37.90	13.79	8.76	38.87	21.58	43.52	21.94	100	Vert.	100	233	BA	
11	260.700	42.60	13.11	10.07	38.75	27.03	46.44	19.41	100	Vert.	100	60	LA20	
12	365.291	32.30	15.38	10.91	38.47	20.12	46.44	26.32	100	Vert.	100	130	LA20	

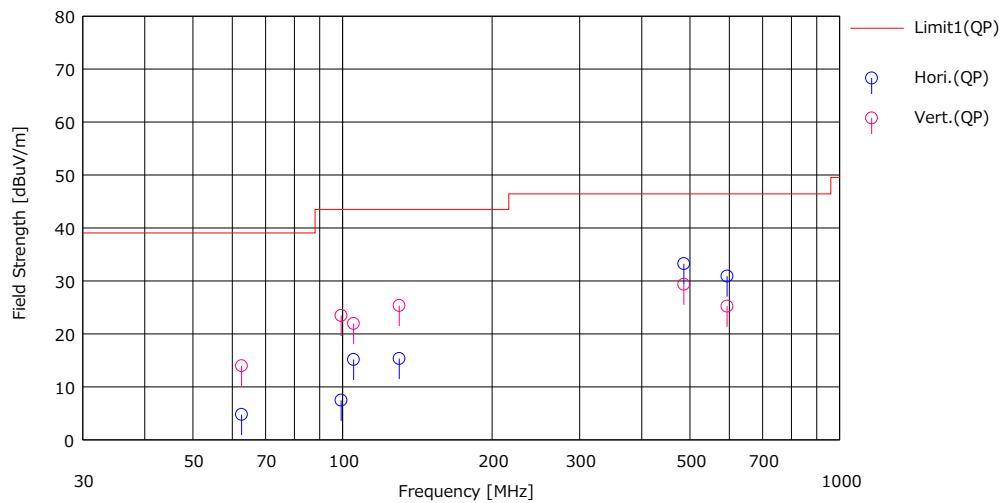
CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)
 Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date March 26, 2023
 Temperature / Humidity 20 deg. C / 51 % RH
 Engineer Masaya Minami
 (Below 1 GHz)
 Mode Mode 2

Limit : FCC_Part 15 Subpart B(15.109)_Class A



No.	Freq. (QP) [MHz]	Reading (QP) [dBuV]	Ant.Foc [dB/m]	Loss [dB]	Gain [dB]	Result. (QP)	Limit. (QP)	Margin. (QP)	Pola.	Heigh. [m]	Angle [deg]	Ant. Type	Comment
1	62.644	28.50	7.22	7.84	38.78	4.78	39.08	34.30	Hori.	400	38	BA	
2	99.360	27.90	10.04	8.39	38.65	7.48	43.52	36.04	Hori.	400	28	BA	
3	105.240	34.60	10.95	8.46	38.85	15.16	43.52	28.36	Hori.	400	350	BA	
4	130.028	31.70	13.76	8.76	38.87	15.35	43.52	28.17	Hori.	400	352	BA	
5	486.027	41.80	18.01	11.76	38.32	33.25	46.44	13.19	Hori.	162	350	LA20	
6	594.034	37.10	19.45	12.44	38.08	30.91	46.44	15.53	Hori.	173	350	LA20	
7	62.644	37.70	7.22	7.84	38.78	13.98	39.08	25.10	Vert.	100	266	BA	
8	99.360	43.90	10.04	8.39	38.85	23.48	43.52	20.04	Vert.	100	0	BA	
9	105.240	41.40	10.95	8.46	38.85	21.96	43.52	21.56	Vert.	100	243	BA	
10	130.028	41.70	13.76	8.76	38.87	25.35	43.52	18.17	Vert.	100	260	BA	
11	486.027	37.90	18.01	11.76	38.32	29.35	46.44	17.09	Vert.	100	125	LA20	
12	594.034	31.40	19.45	12.44	38.08	25.21	46.44	21.23	Vert.	100	345	LA20	

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz :- HORN

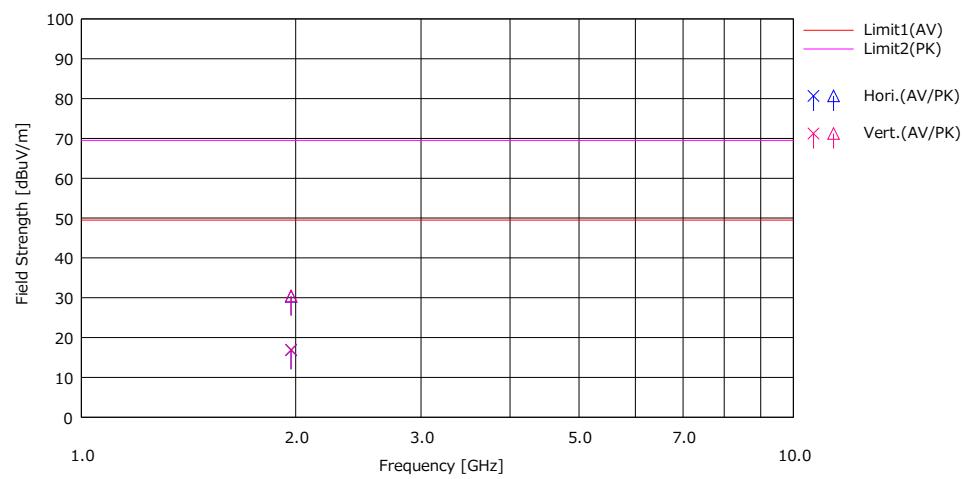
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

Except for the above table: adequate margin data below the limits.

Radiated Emission

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date March 26, 2023
 Temperature / Humidity 20 deg. C / 51 % RH
 Engineer Masaya Minami
 (Above 1 GHz)
 Mode Mode 1

Limit : FCC_Part 15 Subpart B(15.109)_Class A



No.	Freq. [MHz]	Reading		Ant.Fac	Loss	Gan	Result		Limit		Margin		Pda.	Height [cm]	Angle [deg]	Ant. Type	Comment
		(AV) [dBuV]	(PK) [dBuV]				(AV) [dB]	(PK) [dB]	(dBuV/m)	(dBuV/m)	(AV) [dB]	(PK) [dB]					
1	1970.801	32.60	46.10	26.12	-5.78	36.10	16.84	30.34	49.50	69.50	32.66	39.16	Hori.	100	53	HA5	
2	1970.801	32.70	46.20	26.12	-5.78	36.10	16.94	30.44	49.50	69.50	32.56	39.06	Vert.	100	214	HA5	

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN

CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)

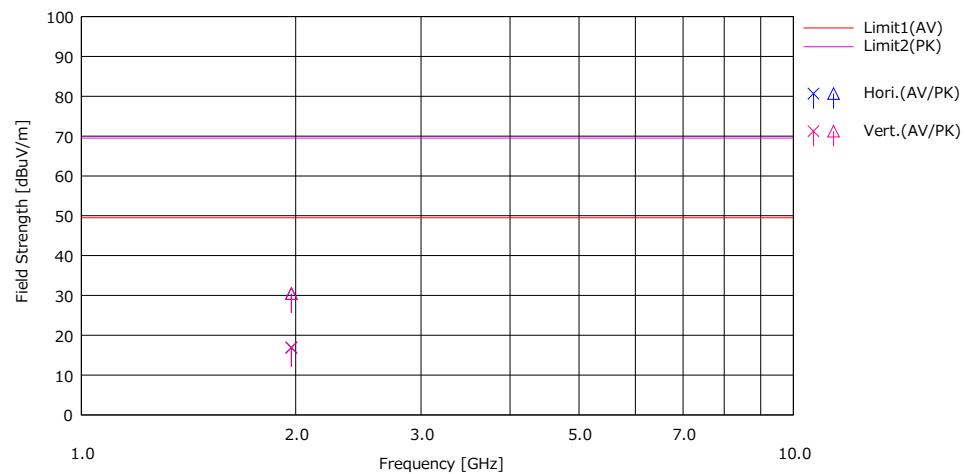
Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

Radiated Emission

Test place Ise EMC Lab.
 Semi Anechoic Chamber No.1
 Date March 26, 2023
 Temperature / Humidity 20 deg. C / 51 % RH
 Engineer Masaya Minami
 (Above 1 GHz)
 Mode Mode 2

Limit : FCC_Part 15 Subpart B(15.109)_Class A



No.	Freq. [MHz]	Reading				Ant.Fac	Loss	Gain	Result				Limit		Margin		Pda	Height [cm]	Angle [deg]	Ant. Type	Comment
		(AV) [dBuV]	(PK) [dBuV]	(AV) [dB/m]	(PK) [dB]				(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dB]	(PK) [dB]	(H/V)				
		(AV) [dBuV]	(PK) [dBuV]	(AV) [dB/m]	(PK) [dB]				(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dBuV/m]	(PK) [dBuV/m]	(AV) [dB]	(PK) [dB]					
1	1972.404	32.70	46.20	26.13	-5.78	36.10	16.95	30.45	49.50	69.50	32.55	39.05	Hori.	100	53	HA5					
2	1972.404	32.60	46.20	26.13	-5.78	36.10	16.85	30.45	49.50	69.50	32.65	39.05	Vert.	100	214	HA5					

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)
 Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

APPENDIX 2: Test instruments

Test equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2022	24
CE	MAT-64	141290	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	12/22/2022	12
CE	MCC-113	141217	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM141/421-010/sucoform141-PE/RFM-E121(SW)	-/04178	06/11/2022	12
CE	MJM-29	142230	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
CE	MLS-23	141357	LISN(AMN)	Schwarzbeck Mess-Elektronik OHG	NSLK8127	8127-729	07/28/2022	12
CE	MMM-10	141545	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201148	01/18/2023	12
CE	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	01/13/2023	12
CE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	07/25/2022	12
CE	MURC-11	173681	Radio Communication Analyzer	Anritsu Corporation	MT8821C	6261879781	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	KBA-05	141198	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+BBA9106	2513	05/14/2022	12
RE	MAEC-01	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	06/28/2022	24
RE	MAEC-01-SVSWR	141994	AC1_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 10m	DA-06881	04/05/2021	24
RE	MAT-08	141213	Attenuator(6dB)	Weinschel Corp	2	BK7971	11/19/2022	12
RE	MCC-02	141350	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	03/03/2023	12
RE	MCC-217	141393	Microwave Cable	Junkosha	MWX221	1604S254(1 m) / 1608S088(5 m)	08/02/2022	12
RE	MHA-05	141511	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	253	09/20/2022	12
RE	MJM-25	142226	Measure, Tape, Steel	KOMELON	KMC-36	-	-	-
RE	MLA-20	141264	Logperiodic Antenna(200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	189	05/14/2022	12
RE	MMM-09	141533	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201195	01/18/2023	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-19	141585	Pre Amplifier	L3 Narda-MITEQ	MLA-10K01-B01-35	1237616	02/02/2023	12
RE	MTR-09	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	10/11/2022	12
RE	MURC-11	173681	Radio Communication Analyzer	Anritsu Corporation	MT8821C	6261879781	-	-

*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