



RADIO TEST REPORT

Test Report No. : 13439589H-A-R2

Applicant : **DAIHATSU MOTOR CO., LTD.**
Type of EUT : **Keyfree system**
Model Number of EUT : **DH19S-2**
FCC ID : **2AVSADH19S-2**
Test regulation : **FCC Part 15 Subpart C: 2020**
Test Result : **Complied (Refer to SECTION 3.2)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in Section 1.
10. This report is a revised version of 13439589H-A-R1. 13439589H-A-R1 is replaced with this report.

Date of test: July 26 and December 16, 2020

Representative test engineer:

Hiroyuki Furutaka
Engineer

Consumer Technology Division

Approved by:

Motoya Imura
Leader

Consumer Technology Division



CERTIFICATE 5107.02

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

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REVISION HISTORY

Original Test Report No.: 13439589H-A

Revision	Test report No.	Date	Page revised	Contents																				
- (Original)	13439589H-A	September 11, 2020	-	-																				
1	13439589H-A-R1	November 30, 2020	P.10	Correction of the note sentence of Clause 4.2; From “* The input voltage (DC 12 V) passes through Item No. A without affecting it and is supplied to the antennas (Item No. B to G) without any drop in voltage.” To “* The input voltage (DC 12 V) passes through Item No. A without affecting it and is supplied to the antennas (Item No. B) without any drop in voltage.”																				
1	13439589H-A-R1	November 30, 2020	P.21	Correction of the following value of Result of the fundamental emission at 3 m without Distance factor data; From <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Ant Factor [dB/m]</th> <th>Loss [dB]</th> <th>Gain [dB]</th> <th>Duty Factor [dB]</th> <th>Result [dBuV/m]</th> </tr> </thead> <tbody> <tr> <td>19.9</td> <td>6.1</td> <td>32.3</td> <td>-</td> <td>101.5</td> </tr> </tbody> </table> To <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Ant Factor [dB/m]</th> <th>Loss [dB]</th> <th>Gain [dB]</th> <th>Duty Factor [dB]</th> <th>Result [dBuV/m]</th> </tr> </thead> <tbody> <tr> <td>19.4</td> <td>6.0</td> <td>32.3</td> <td>-</td> <td>101.0</td> </tr> </tbody> </table>	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	19.9	6.1	32.3	-	101.5	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	19.4	6.0	32.3	-	101.0
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2	13439589H-A-R2	December 18, 2020	P.1	Addition of the test date to cover page.																				
2	13439589H-A-R2	December 18, 2020	P.10	Correction of worst margin for “Electric Field Strength of Spurious Emission” test due to mode 8 additional test in Clause 3.2; From 5.3 dB, 33.562 MHz, Vertical, QP To 1.8 dB, 30.578 MHz, Vertical, QP																				
2	13439589H-A-R2	December 18, 2020	P.10	Addition of the test mode 8 in Clause 4.1																				
2	13439589H-A-R2	December 18, 2020	P.10	Correction of erroneous description of Section 4.2; From Item B to Item G																				
2	13439589H-A-R2	December 18, 2020	P.13	Addition of the additional test date and engineer name.																				
2	13439589H-A-R2	December 18, 2020	P.23, 31, 32, 40	Addition of the mode 8 test results.																				
2	13439589H-A-R2	December 18, 2020	P. 41	Addition of the Test equipment used for Mode 8 test in APPENDIX 2.																				

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Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	MCS	Modulation and Coding Scheme
AC	Alternating Current	MRA	Mutual Recognition Arrangement
AFH	Adaptive Frequency Hopping	N/A	Not Applicable
AM	Amplitude Modulation	NIST	National Institute of Standards and Technology
Amp, AMP	Amplifier	NS	No signal detect.
ANSI	American National Standards Institute	NSA	Normalized Site Attenuation
Ant, ANT	Antenna	NVLAP	National Voluntary Laboratory Accreditation Program
AP	Access Point	OBW	Occupied Band Width
ASK	Amplitude Shift Keying	OFDM	Orthogonal Frequency Division Multiplexing
Atten., ATT	Attenuator	P/M	Power meter
AV	Average	PCB	Printed Circuit Board
BPSK	Binary Phase-Shift Keying	PER	Packet Error Rate
BR	Bluetooth Basic Rate	PHY	Physical Layer
BT	Bluetooth	PK	Peak
BT LE	Bluetooth Low Energy	PN	Pseudo random Noise
BW	BandWidth	PRBS	Pseudo-Random Bit Sequence
Cal Int	Calibration Interval	PSD	Power Spectral Density
CCK	Complementary Code Keying	QAM	Quadrature Amplitude Modulation
Ch., CH	Channel	QP	Quasi-Peak
CISPR	Comite International Special des Perturbations Radioelectriques	QPSK	Quadri-Phase Shift Keying
CW	Continuous Wave	RBW	Resolution Band Width
DBPSK	Differential BPSK	RDS	Radio Data System
DC	Direct Current	RE	Radio Equipment
D-factor	Distance factor	RF	Radio Frequency
DFS	Dynamic Frequency Selection	RMS	Root Mean Square
DQPSK	Differential QPSK	RSS	Radio Standards Specifications
DSSS	Direct Sequence Spread Spectrum	Rx	Receiving
EDR	Enhanced Data Rate	SA, S/A	Spectrum Analyzer
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	SG	Signal Generator
EMC	ElectroMagnetic Compatibility	SVSWR	Site-Voltage Standing Wave Ratio
EMI	ElectroMagnetic Interference	TR	Test Receiver
EN	European Norm	Tx	Transmitting
ERP, e.r.p.	Effective Radiated Power	VBW	Video BandWidth
EU	European Union	Vert.	Vertical
EUT	Equipment Under Test	WLAN	Wireless LAN
Fac.	Factor		
FCC	Federal Communications Commission		
FHSS	Frequency Hopping Spread Spectrum		
FM	Frequency Modulation		
Freq.	Frequency		
FSK	Frequency Shift Keying		
GFSK	Gaussian Frequency-Shift Keying		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
Hori.	Horizontal		
ICES	Interference-Causing Equipment Standard		
IEC	International Electrotechnical Commission		
IEEE	Institute of Electrical and Electronics Engineers		
IF	Intermediate Frequency		
ILAC	International Laboratory Accreditation Conference		
ISED	Innovation, Science and Economic Development Canada		
ISO	International Organization for Standardization		
JAB	Japan Accreditation Board		
LAN	Local Area Network		
LIMS	Laboratory Information Management System		

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SECTION 1: Customer information

Company Name : DAIHATSU MOTOR CO., LTD.*
Address : 2-1-1, Momozono, Ikeda-shi, Osaka, 563-8651, Japan
Telephone Number : +81-72-754-4526
Facsimile Number : +81-72-754-3857
Contact Person : Hideshige Nakano

***Remarks:**

DAIHATSU MOTOR CO., LTD. designates DENSO CORPORATION and TOKAI RIKA CO., LTD. as manufacturer of the product (Keyfree system).

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT 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
 - 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

Type : Keyfree system
Model Number : DH19S-2
Serial Number : Refer to SECTION 4.2
Rating : DC 12.0 V
Receipt Date : July 25, 2020
Country of Mass-production : Malaysia and Republic of Indonesia
Condition : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification : No Modification by the test lab

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2.2 Product Description

Model: DH19S-2 (referred to as the EUT in this report) is a Keyfree system.

Radio Specification

[Transmitter part]

Radio Type	:	LF Transmitter
Frequency of Operation	:	125 kHz
Oscillation circuit	:	Ceramic resonator
Oscillator frequency	:	4 MHz
Modulation	:	ASK
Antenna type	:	Antenna (Outside Antenna D) Antenna (Outside Antenna P) Antenna (Outside Antenna B) Antenna (Inside Antenna Fr) Antenna (Inside Antenna Rr) Antenna (Inside Antenna Mi) Immobilizer Antenna
Antenna Specification	:	Antenna (Outside, Inside): Ferrite antenna coil Immobilizer Antenna: Loop antenna coil
Clock Frequency (maximum)	:	MPU: 8 MHz

[Receiver part]

Frequency of Operation	:	433.92 MHz
Oscillator frequency	:	33.600 MHz (Crystal)
Intermediate frequency	:	525 kHz
Modulation	:	FSK
Type of receiving system	:	Super-heterodyne
Antenna Specification	:	Internal antenna (Inverted F antenna)
Receiver Bandwidth	:	120 kHz

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on June 26, 2020 and effective July 27, 2020

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits; general requirements.

- * The revision does not affect the test result conducted before its effective date.
- * Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results	Remarks
Conducted Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 8.8	<FCC> Section 15.207 <ISED> RSS-Gen 8.8	-	N/A	N/A	N/A	*1)
Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.5, 6.12	<FCC> Section 15.209 <ISED> RSS-210 4.4 RSS-Gen 8.9	Radiated	N/A	4.4 dB 125 kHz 0 deg. Peak with Duty factor	Complied a)	-
Electric Field Strength of Spurious Emission	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> RSS-Gen 6.5, 6.6, 6.13	<FCC> Section 15.209 <ISED> RSS-210 4.4 RSS-Gen 8.9	Radiated	N/A	1.8 dB 30.578 MHz Vertical, QP	Complied a)	-
-26 dB Bandwidth	<FCC> ANSI C63.10:2013 6 Standard test methods <ISED> -	<FCC> Reference data <ISED> -	Radiated	N/A	N/A	Complied b)	-

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

*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

a) Refer to APPENDIX 1 (data of Radiated emission)

b) Refer to APPENDIX 1 (data of -26 dB Bandwidth and 99 % Occupied Bandwidth)

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)

The battery voltage (DC 12V) is provided to the EUT. Input voltage to RF part doesn't go through the regulator. So the test was performed with the supply voltage varied between 85 % and 115% of the nominal rated supply voltage (DC 12 V) and the variation of the input power does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
99 % Occupied Band Width	RSS-Gen 6.7	-	Radiated	N/A	N/A	-

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

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.

Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)
3 m	9 kHz to 30 MHz	3.3 dB
10 m		3.2 dB
3 m	30 MHz to 200 MHz	(Horizontal)
		(Vertical)
	200 MHz to 1000 MHz	(Horizontal)
		(Vertical)
10 m	30 MHz to 200 MHz	(Horizontal)
		(Vertical)
	200 MHz to 1000 MHz	(Horizontal)
		(Vertical)

Antenna Terminal test

Test Item	Uncertainty (+/-)
-26 dB Bandwidth / 99 % Occupied Bandwidth	0.96 %

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3.5 Test Location

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A2LA Certificate Number: 5107.02

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.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0 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.

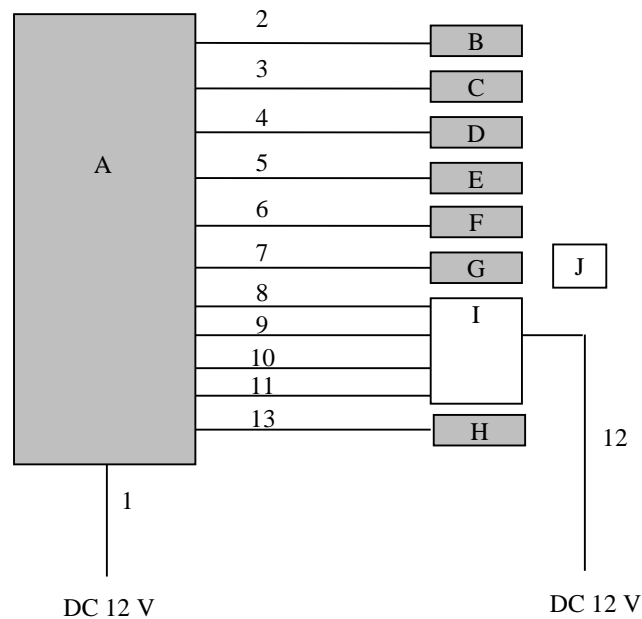
SECTION 4: Operation of EUT during testing

4.1 Operating Modes

Test mode	Remarks
1) Tx 125 kHz Outside Antenna D	-
2) Tx 125 kHz Outside Antenna P	-
3) Tx 125 kHz Outside Antenna B	-
4) Tx 125 kHz Inside Antenna Fr	-
5) Tx 125 kHz Inside Antenna Rr	-
6) Tx 125 kHz Inside Antenna Mi	-
7) Tx 125 kHz Immobilizer Antenna	-
8) Tx 125 kHz Outside Antenna D+P	-
* EUT was set by the software as follows; Software: 200213_RadioTest_TypeA.s (Date: February 13, 2020, Storage location: EUT memory) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.	

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

4.2 Configuration and peripherals



- * Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
- * The input voltage (DC 12 V) passes through Item No. A without affecting it and is supplied to the antennas (Item No. G) without any drop in voltage.
For the antenna (Item No. B to F and H), a fixed voltage is supplied through the regulator.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Body ECU	DH19S-2	No.286	DENSO CORPORATION	EUT
B	Antenna	Outside Antenna D	No.286-1	TOKAIRIKA CO.,LTD.	EUT
C	Antenna	Outside Antenna P	No.286-2	TOKAIRIKA CO.,LTD.	EUT
D	Antenna	Outside Antenna B	No.286-3	TOKAIRIKA CO.,LTD.	EUT
E	Antenna	Inside Antenna Fr	No.286-4	TOKAIRIKA CO.,LTD.	EUT
F	Antenna	Inside Antenna Rr	No.286-5	TOKAIRIKA CO.,LTD.	EUT
G	Antenna	Immobilizer Antenna	No.286	TOKAIRIKA CO.,LTD.	EUT
H	Antenna	Inside Antenna Mi	No.286-6	TOKAIRIKA CO.,LTD.	EUT
I	Evaluation Bench	-	18	DENSO CORPORATION	-
J	Smart Key	-	No.286	DENSO CORPORATION	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	3.0	Unshielded	Unshielded	-
2	Antenna Cable (AND)	3.0	Unshielded	Unshielded	-
3	Antenna Cable (ANP)	3.0	Unshielded	Unshielded	-
4	Antenna Cable (ANB)	3.0	Unshielded	Unshielded	-
5	Antenna Cable (ANF)	3.0	Unshielded	Unshielded	-
6	Antenna Cable (ANR)	3.0	Unshielded	Unshielded	-
7	Antenna Cable	3.0	Unshielded	Unshielded	-
8	Signal Cable (CN-C)	3.0	Unshielded	Unshielded	-
9	Signal Cable (CN-K)	3.0	Unshielded	Unshielded	-
10	Signal Cable (CN-M)	3.0	Unshielded	Unshielded	-
11	Signal Cable (CN-P)	3.0	Unshielded	Unshielded	-
12	DC Cable	3.0	Unshielded	Unshielded	-
13	Antenna Cable (ANM)	3.0	Unshielded	Unshielded	-

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SECTION 5: Radiated emission (Fundamental and Spurious Emission)

Test Procedure

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

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

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., 135 deg., and 180 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.

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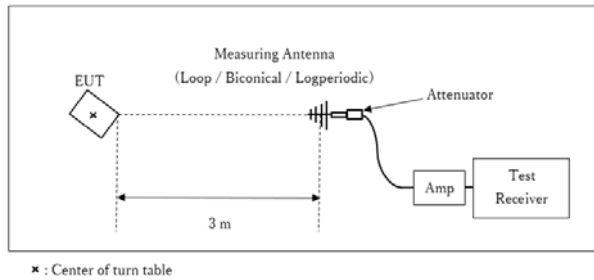
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[Test Setup]
Below 1 GHz



Test Distance: 3 m

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

This EUT has two modes which transponder key is inserted or not. The worst case was confirmed with and without transponder key, as a result, the test without transponder key was the worst case. Therefore the test without transponder key was performed only.

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

Measurement range : 9 kHz - 1 GHz
Test data : APPENDIX 1
Test result : Pass

Date: July 26, 2020 (day)
July 26, 2020 (night)
December 16, 2020

Test engineer: Hiroyuki Furutaka
Junya Okuno
Akihiko Maeda

UL Japan, Inc.

Ise EMC Lab.

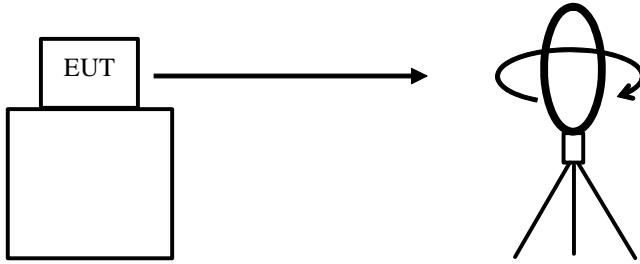
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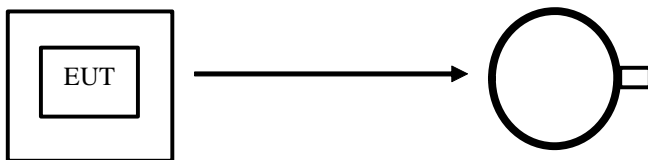
Facsimile : +81 596 24 8124

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

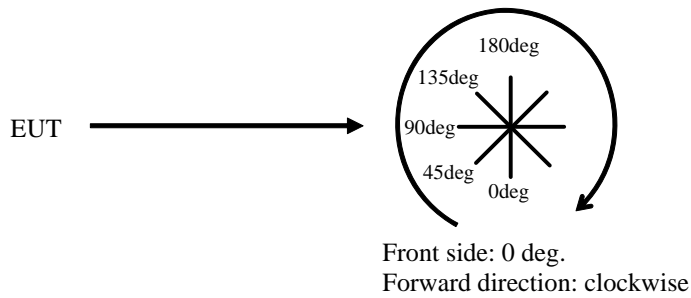


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



SECTION 6: -26 dB Bandwidth

Test Procedure

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

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
-26 dB Bandwidth	75 kHz 100 kHz	510 Hz	1.6 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

Test data : APPENDIX 1
Test result : Pass

SECTION 7: 99 % Occupied Bandwidth

Test Procedure

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

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
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

*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.

Test data : APPENDIX 1
Test result : Pass

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APPENDIX 1: Test data

Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 1

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
0deg	0.12500	PK	107.1	19.4	-74.0	32.3	-	20.3	45.6	25.3	Fundamental (DC 10.2 V)
0deg	0.12500	PK	107.1	19.4	-74.0	32.3	-	20.3	45.6	25.3	Fundamental (DC 12.0 V)
0deg	0.12500	PK	107.1	19.4	-74.0	32.3	-	20.3	45.6	25.3	Fundamental (DC 13.8 V)
0deg	0.25000	PK	73.3	19.5	-74.0	32.3	-	-13.5	39.6	53.1	
0deg	0.37500	PK	56.3	19.5	-73.9	32.3	-	-30.4	36.1	66.5	
0deg	0.50000	QP	37.3	19.4	-33.9	32.2	-	-9.4	33.6	43.0	
0deg	0.62500	QP	37.3	19.4	-33.9	32.2	-	-9.4	31.7	41.1	
0deg	0.75000	QP	31.3	19.4	-33.9	32.2	-	-15.4	30.1	45.5	
0deg	0.87500	QP	32.3	19.4	-33.9	32.2	-	-14.4	28.7	43.1	
0deg	1.00000	QP	30.5	19.5	-33.9	32.2	-	-16.1	27.6	43.7	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	107.1	19.4	-74.0	32.3	0.0	20.3	25.6	5.3	DC 10.2 V
0deg	0.12500	AV	107.1	19.4	-74.0	32.3	0.0	20.3	25.6	5.3	DC 12.0 V
0deg	0.12500	AV	107.1	19.4	-74.0	32.3	0.0	20.3	25.6	5.3	DC 13.8 V
0deg	0.25000	AV	73.3	19.5	-74.0	32.3	0.0	-13.5	19.6	33.1	
0deg	0.37500	AV	56.3	19.5	-73.9	32.3	0.0	-30.4	16.1	46.5	

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

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	107.1	19.4	6.0	32.3	-	100.3	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

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

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

UL Japan, Inc.

Ise EMC Lab.

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Facsimile : +81 596 24 8124

Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 2

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
0deg	0.12500	PK	107.1	19.4	-74.0	32.3	-	20.3	45.6	25.3	Fundamental (DC 10.2 V)
0deg	0.12500	PK	107.1	19.4	-74.0	32.3	-	20.3	45.6	25.3	Fundamental (DC 12.0 V)
0deg	0.12500	PK	107.1	19.4	-74.0	32.3	-	20.3	45.6	25.3	Fundamental (DC 13.8 V)
0deg	0.25000	PK	72.8	19.5	-74.0	32.3	-	-14.0	39.6	53.6	
0deg	0.37500	PK	55.3	19.5	-73.9	32.3	-	-31.4	36.1	67.5	
0deg	0.50000	QP	36.9	19.4	-33.9	32.2	-	-9.8	33.6	43.4	
0deg	0.62500	QP	36.7	19.4	-33.9	32.2	-	-10.0	31.7	41.7	
0deg	0.75000	QP	31.2	19.4	-33.9	32.2	-	-15.5	30.1	45.6	
0deg	0.87500	QP	32.4	19.4	-33.9	32.2	-	-14.3	28.7	43.0	
0deg	1.00000	QP	30.7	19.5	-33.9	32.2	-	-15.9	27.6	43.5	
0deg	1.12500	QP	30.3	19.5	-33.9	32.2	-	-16.3	26.5	42.8	
0deg	1.25000	QP	30.5	19.5	-33.9	32.2	-	-16.1	25.6	41.7	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	107.1	19.4	-74.0	32.3	0.0	20.3	25.6	5.3	DC 10.2 V
0deg	0.12500	AV	107.1	19.4	-74.0	32.3	0.0	20.3	25.6	5.3	DC 12.0 V
0deg	0.12500	AV	107.1	19.4	-74.0	32.3	0.0	20.3	25.6	5.3	DC 13.8 V
0deg	0.25000	AV	72.8	19.5	-74.0	32.3	0.0	-14.0	19.6	33.6	
0deg	0.37500	AV	55.3	19.5	-73.9	32.3	0.0	-31.4	16.1	47.5	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amprifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	107.1	19.4	6.0	32.3	-	100.3	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

* Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB)*The test result is rounded off to one or two decimal places, so some differences might be observed.

UL Japan, Inc.

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 3

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
0deg	0.12500	PK	108.0	19.4	-74.0	32.3	-	21.2	45.6	24.4	Fundamental (DC 10.2 V)
0deg	0.12500	PK	108.0	19.4	-74.0	32.3	-	21.2	45.6	24.4	Fundamental (DC 12.0 V)
0deg	0.12500	PK	108.0	19.4	-74.0	32.3	-	21.2	45.6	24.4	Fundamental (DC 13.8 V)
0deg	0.25000	PK	72.1	19.5	-74.0	32.3	-	-14.7	39.6	54.3	
0deg	0.37500	PK	63.0	19.5	-73.9	32.3	-	-23.7	36.1	59.8	
0deg	0.50000	QP	37.0	19.4	-33.9	32.2	-	-9.7	33.6	43.3	
0deg	0.62500	QP	38.6	19.4	-33.9	32.2	-	-8.1	31.7	39.8	
0deg	0.75000	QP	32.2	19.4	-33.9	32.2	-	-14.5	30.1	44.6	
0deg	0.87500	QP	32.6	19.4	-33.9	32.2	-	-14.1	28.7	42.8	
0deg	1.00000	QP	30.7	19.5	-33.9	32.2	-	-15.9	27.6	43.5	
0deg	1.12500	QP	30.2	19.5	-33.9	32.2	-	-16.4	26.5	42.9	
0deg	1.25000	QP	30.3	19.5	-33.9	32.2	-	-16.3	25.6	41.9	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	108.0	19.4	-74.0	32.3	0.0	21.2	25.6	4.4	DC 10.2 V
0deg	0.12500	AV	108.0	19.4	-74.0	32.3	0.0	21.2	25.6	4.4	DC 12.0 V
0deg	0.12500	AV	108.0	19.4	-74.0	32.3	0.0	21.2	25.6	4.4	DC 13.8 V
0deg	0.25000	AV	72.1	19.5	-74.0	32.3	0.0	-14.7	19.6	34.3	
0deg	0.37500	AV	63.0	19.5	-73.9	32.3	0.0	-23.7	16.1	39.8	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amprifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	108.0	19.4	6.0	32.3	-	101.2	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

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

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

UL Japan, Inc.

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 4

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
0deg	0.12500	PK	107.0	19.4	-74.0	32.3	-	20.2	45.6	25.4	Fundamental (DC 10.2 V)
0deg	0.12500	PK	107.0	19.4	-74.0	32.3	-	20.2	45.6	25.4	Fundamental (DC 12.0 V)
0deg	0.12500	PK	107.0	19.4	-74.0	32.3	-	20.2	45.6	25.4	Fundamental (DC 13.8 V)
0deg	0.25000	PK	73.6	19.5	-74.0	32.3	-	-13.2	39.6	52.8	
0deg	0.37500	PK	55.7	19.5	-73.9	32.3	-	-31.0	36.1	67.1	
0deg	0.50000	QP	37.4	19.4	-33.9	32.2	-	-9.3	33.6	42.9	
0deg	0.62500	QP	32.5	19.4	-33.9	32.2	-	-14.2	31.7	45.9	
0deg	0.75000	QP	31.0	19.4	-33.9	32.2	-	-15.7	30.1	45.8	
0deg	0.87500	QP	30.6	19.4	-33.9	32.2	-	-16.1	28.7	44.8	
0deg	1.00000	QP	30.2	19.5	-33.9	32.2	-	-16.4	27.6	44.0	
0deg	1.12500	QP	30.0	19.5	-33.9	32.2	-	-16.6	26.5	43.1	
0deg	1.25000	QP	30.0	19.5	-33.9	32.2	-	-16.6	25.6	42.2	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	107.0	19.4	-74.0	32.3	0.0	20.2	25.6	5.4	DC 10.2 V
0deg	0.12500	AV	107.0	19.4	-74.0	32.3	0.0	20.2	25.6	5.4	DC 12.0 V
0deg	0.12500	AV	107.0	19.4	-74.0	32.3	0.0	20.2	25.6	5.4	DC 13.8 V
0deg	0.25000	AV	73.6	19.5	-74.0	32.3	0.0	-13.2	19.6	32.8	
0deg	0.37500	AV	55.7	19.5	-73.9	32.3	0.0	-31.0	16.1	47.1	

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

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	107.0	19.4	6.0	32.3	-	100.2	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

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

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

UL Japan, Inc.

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 5

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
0deg	0.12500	PK	107.9	19.4	-74.0	32.3	-	21.1	45.6	24.5	Fundamental (DC 10.2 V)
0deg	0.12500	PK	107.9	19.4	-74.0	32.3	-	21.1	45.6	24.5	Fundamental (DC 12.0 V)
0deg	0.12500	PK	107.9	19.4	-74.0	32.3	-	21.1	45.6	24.5	Fundamental (DC 13.8 V)
0deg	0.25000	PK	77.0	19.5	-74.0	32.3	-	-9.8	39.6	49.4	
0deg	0.37500	PK	63.0	19.5	-73.9	32.3	-	-23.7	36.1	59.8	
0deg	0.50000	PK	37.3	19.4	-33.9	32.2	-	-9.4	33.6	43.0	
0deg	0.62500	PK	38.5	19.4	-33.9	32.2	-	-8.2	31.7	39.9	
0deg	0.75000	AV	31.3	19.4	-33.9	32.2	-	-15.4	30.1	45.5	
0deg	0.87500	AV	31.9	19.4	-33.9	32.2	-	-14.8	28.7	43.5	
0deg	1.00000	AV	30.3	19.5	-33.9	32.2	-	-16.3	27.6	43.9	
0deg	1.12500	AV	30.3	19.5	-33.9	32.2	-	-16.3	26.5	42.8	
0deg	1.25000	AV	30.0	19.5	-33.9	32.2	-	-16.6	25.6	42.2	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	107.9	19.4	-74.0	32.3	0.0	21.1	25.6	4.5	DC 10.2 V
0deg	0.12500	AV	107.9	19.4	-74.0	32.3	0.0	21.1	25.6	4.5	DC 12.0 V
0deg	0.12500	AV	107.9	19.4	-74.0	32.3	0.0	21.1	25.6	4.5	DC 13.8 V
0deg	0.25000	AV	77.0	19.5	-74.0	32.3	0.0	-9.8	19.6	29.4	
0deg	0.37500	AV	63.0	19.5	-73.9	32.3	0.0	-23.7	16.1	39.8	

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

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	107.9	19.4	6.0	32.3	-	101.1	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

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

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

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 6

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
0deg	0.12500	PK	107.8	19.4	-74.0	32.3	-	21.0	45.6	24.6	Fundamental (DC 10.2 V)
0deg	0.12500	PK	107.8	19.4	-74.0	32.3	-	21.0	45.6	24.6	Fundamental (DC 12.0 V)
0deg	0.12500	PK	107.8	19.4	-74.0	32.3	-	21.0	45.6	24.6	Fundamental (DC 13.8 V)
0deg	0.25000	PK	76.7	19.5	-74.0	32.3	-	-10.1	39.6	49.7	
0deg	0.37500	PK	56.4	19.5	-73.9	32.3	-	-30.3	36.1	66.4	
0deg	0.50000	PK	36.7	19.4	-33.9	32.2	-	-10.0	33.6	43.6	
0deg	0.62500	PK	38.3	19.4	-33.9	32.2	-	-8.4	31.7	40.1	
0deg	0.75000	AV	32.2	19.4	-33.9	32.2	-	-14.5	30.1	44.6	
0deg	0.87500	AV	30.6	19.4	-33.9	32.2	-	-16.1	28.7	44.8	
0deg	1.00000	AV	30.5	19.5	-33.9	32.2	-	-16.1	27.6	43.7	
0deg	1.12500	AV	30.2	19.5	-33.9	32.2	-	-16.4	26.5	42.9	
0deg	1.25000	AV	30.0	19.5	-33.9	32.2	-	-16.6	25.6	42.2	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	107.8	19.4	-74.0	32.3	0.0	21.0	25.6	4.6	DC 10.2 V
0deg	0.12500	AV	107.8	19.4	-74.0	32.3	0.0	21.0	25.6	4.6	DC 12.0 V
0deg	0.12500	AV	107.8	19.4	-74.0	32.3	0.0	21.0	25.6	4.6	DC 13.8 V
0deg	0.25000	AV	76.7	19.5	-74.0	32.3	0.0	-10.1	19.6	29.7	
0deg	0.37500	AV	56.4	19.5	-73.9	32.3	0.0	-30.3	16.1	46.4	

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

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	107.8	19.4	6.0	32.3	-	101.0	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

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

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

UL Japan, Inc.

Ise EMC Lab.

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 7

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
0deg	0.12500	PK	90.4	19.4	-74.0	32.3	-	3.6	45.6	42.0	Fundamental (DC 10.2 V)
0deg	0.12500	PK	90.4	19.4	-74.0	32.3	-	3.6	45.6	42.0	Fundamental (DC 12.0 V)
0deg	0.12500	PK	90.4	19.4	-74.0	32.3	-	3.6	45.6	42.0	Fundamental (DC 13.8 V)
0deg	0.25000	PK	47.6	19.5	-74.0	32.3	-	-39.2	39.6	78.8	
0deg	0.37500	PK	53.5	19.5	-73.9	32.3	-	-33.2	36.1	69.3	
0deg	0.50000	QP	31.4	19.4	-33.9	32.2	-	-15.3	33.6	48.9	
0deg	0.62500	QP	42.5	19.4	-33.9	32.2	-	-4.2	31.7	35.9	
0deg	0.75000	QP	30.5	19.4	-33.9	32.2	-	-16.2	30.1	46.3	
0deg	0.87500	QP	37.4	19.4	-33.9	32.2	-	-9.3	28.7	38.0	
0deg	1.00000	QP	29.8	19.5	-33.9	32.2	-	-16.8	27.6	44.4	
0deg	1.12500	QP	34.5	19.5	-33.9	32.2	-	-12.1	26.5	38.6	
0deg	1.25000	QP	34.3	19.5	-33.9	32.2	-	-12.3	25.6	37.9	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	90.4	19.4	-74.0	32.3	0.0	3.6	25.6	22.0	DC 10.2 V
0deg	0.12500	AV	90.4	19.4	-74.0	32.3	0.0	3.6	25.6	22.0	DC 12.0 V
0deg	0.12500	AV	90.4	19.4	-74.0	32.3	0.0	3.6	25.6	22.0	DC 13.8 V
0deg	0.25000	AV	47.6	19.5	-74.0	32.3	0.0	-39.2	19.6	58.8	
0deg	0.37500	AV	53.5	19.5	-73.9	32.3	0.0	-33.2	16.1	49.3	

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

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	90.4	19.4	6.0	32.3	-	83.6	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

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

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

UL Japan, Inc.

Ise EMC Lab.

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Radiated Emission below 30 MHz (Fundamental and Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date December 16, 2020
Temperature / Humidity 21 deg. C / 31 % RH
Engineer Akihiko Maeda
Mode Mode 8

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
0deg	0.12500	PK	100.3	18.9	-74.0	32.3	-	13.0	45.6	32.6	Fundamental (DC 10.2 V)
0deg	0.12500	PK	100.3	18.9	-74.0	32.3	-	13.0	45.6	32.6	Fundamental (DC 12.0 V)
0deg	0.12500	PK	100.3	18.9	-74.0	32.3	-	13.0	45.6	32.6	Fundamental (DC 13.8 V)
0deg	0.25000	PK	71.5	18.9	-74.0	32.3	-	-15.9	39.6	55.5	
0deg	0.37500	PK	71.2	18.8	-73.9	32.3	-	-16.2	36.1	52.3	
0deg	0.50000	QP	37.9	18.8	-33.9	32.2	-	-9.5	33.6	43.1	
0deg	0.62500	QP	54.3	18.8	-33.9	32.2	-	6.9	31.7	24.8	
0deg	0.75000	QP	33.8	18.8	-33.9	32.2	-	-13.5	30.1	43.6	
0deg	0.87500	QP	48.6	18.8	-33.9	32.2	-	1.3	28.7	27.4	
0deg	1.00000	QP	30.5	18.8	-33.9	32.2	-	-16.8	27.6	44.4	
0deg	1.12500	QP	44.2	18.8	-33.9	32.2	-	-3.1	26.5	29.6	
0deg	1.25000	QP	31.1	18.8	-33.8	32.2	-	-16.2	25.6	41.8	

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

PK with Duty factor

Ant Deg [deg]	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
0deg	0.12500	AV	100.3	18.9	-74.0	32.3	0.0	13.0	25.6	12.6	DC 10.2 V
0deg	0.12500	AV	100.3	18.9	-74.0	32.3	0.0	13.0	25.6	12.6	DC 12.0 V
0deg	0.12500	AV	100.3	18.9	-74.0	32.3	0.0	13.0	25.6	12.6	DC 13.8 V
0deg	0.25000	AV	71.5	18.9	-74.0	32.3	0.0	-15.9	19.6	35.5	
0deg	0.37500	AV	71.2	18.8	-73.9	32.3	0.0	-16.2	16.1	32.3	

Result = Reading + Ant Factor + Loss (Cable + Attenuator + Filter + D.Factor) - Gain(Amprifier) + Duty factor *

* Since the peak emission result satisfied the average limit, duty factor was omitted.

Result of the fundamental emission at 3 m without Distance factor

PK or QP

Ant Deg [deg]	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
0deg	0.12500	PK	100.3	18.9	6.0	32.3	-	93.0	-	-	Fundamental

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

*It was confirmed that there was no difference by the input voltage in the spurious emission.

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

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

UL Japan, Inc.

Ise EMC Lab.

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 23 deg. C / 70 % RH
Engineer Junya Okuno
Mode Mode 1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	58.555	QP	39.1	8.3	7.6	32.2	22.8	40.0	17.2	
Hori.	95.088	QP	35.4	9.4	8.1	32.1	20.7	43.5	22.8	
Hori.	132.621	QP	31.3	14.0	8.5	32.1	21.7	43.5	21.8	
Hori.	168.337	QP	32.3	15.7	8.9	32.1	24.9	43.5	18.6	
Hori.	215.900	QP	35.5	11.1	9.4	32.0	23.9	43.5	19.6	
Hori.	320.105	QP	35.8	14.1	10.2	32.0	28.1	46.0	17.9	
Vert.	32.569	QP	31.5	17.6	7.2	32.2	24.1	40.0	16.0	
Vert.	91.416	QP	38.5	8.8	8.1	32.2	23.2	43.5	20.3	
Vert.	132.619	QP	35.7	14.0	8.5	32.1	26.1	43.5	17.4	
Vert.	161.545	QP	31.7	15.5	8.9	32.1	24.0	43.5	19.5	
Vert.	211.892	QP	39.3	11.1	9.3	32.0	27.7	43.5	15.8	
Vert.	444.892	QP	29.1	16.4	11.1	32.0	24.6	46.0	21.4	

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

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

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

UL Japan, Inc.

Ise EMC Lab.

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 23 deg. C / 70 % RH
Engineer Junya Okuno
Mode Mode 2

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	57.553	QP	36.7	8.6	7.6	32.2	20.7	40.0	19.3	
Hori.	67.253	QP	42.5	6.6	7.8	32.2	24.7	40.0	15.3	
Hori.	158.045	QP	34.6	15.4	8.8	32.1	26.8	43.5	16.7	
Hori.	284.255	QP	37.4	13.4	9.9	32.0	28.7	46.0	17.3	
Hori.	382.834	QP	33.5	15.3	10.7	32.0	27.4	46.0	18.6	
Hori.	443.890	QP	34.2	16.4	11.1	32.0	29.7	46.0	16.3	
Vert.	32.559	QP	31.8	17.6	7.2	32.2	24.4	40.0	15.6	
Vert.	66.251	QP	41.0	6.7	7.7	32.2	23.2	40.0	16.8	
Vert.	157.793	QP	33.0	15.4	8.8	32.1	25.2	43.5	18.3	
Vert.	164.806	QP	32.2	15.6	8.9	32.1	24.7	43.5	18.8	
Vert.	321.095	QP	33.0	14.1	10.2	32.0	25.4	46.0	20.6	
Vert.	445.890	QP	31.2	16.5	11.1	32.0	26.7	46.0	19.3	

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

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

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

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 23 deg. C / 70 % RH
Engineer Junya Okuno
Mode Mode 3

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	58.555	QP	41.7	8.3	7.6	32.2	25.4	40.0	14.6	
Hori.	69.999	QP	37.1	6.4	7.8	32.2	19.1	40.0	20.9	
Hori.	212.370	QP	35.8	11.1	9.3	32.0	24.2	43.5	19.3	
Hori.	291.255	QP	36.5	13.4	10.0	32.0	27.9	46.0	18.1	
Hori.	308.035	QP	33.4	13.7	10.1	32.0	25.2	46.0	20.8	
Hori.	445.893	QP	33.1	16.5	11.1	32.0	28.6	46.0	17.4	
Vert.	32.528	QP	31.3	17.6	7.2	32.2	23.9	40.0	16.1	
Vert.	59.552	QP	41.7	8.0	7.6	32.2	25.2	40.0	14.8	
Vert.	92.413	QP	38.4	9.0	8.1	32.2	23.3	43.5	20.2	
Vert.	164.536	QP	29.2	15.6	8.9	32.1	21.7	43.5	21.9	
Vert.	211.119	QP	35.4	11.1	9.3	32.0	23.8	43.5	19.7	
Vert.	446.895	QP	30.4	16.5	11.1	32.0	26.0	46.0	20.0	

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

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

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

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 23 deg. C / 70 % RH
Engineer Junya Okuno
Mode Mode 4

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	58.555	QP	40.1	8.3	7.6	32.2	23.8	40.0	16.2	
Hori.	95.097	QP	35.1	9.4	8.1	32.1	20.4	43.5	23.1	
Hori.	132.621	QP	32.2	14.0	8.5	32.1	22.6	43.5	20.9	
Hori.	170.317	QP	30.4	15.9	8.9	32.1	23.1	43.5	20.4	
Hori.	215.900	QP	35.0	11.1	9.4	32.0	23.4	43.5	20.1	
Hori.	320.105	QP	35.1	14.1	10.2	32.0	27.4	46.0	18.6	
Vert.	32.569	QP	31.8	17.6	7.2	32.2	24.4	40.0	15.7	
Vert.	59.558	QP	40.5	8.0	7.6	32.2	24.0	40.0	16.1	
Vert.	91.404	QP	37.3	8.7	8.1	32.2	22.0	43.5	21.5	
Vert.	132.619	QP	37.0	14.0	8.5	32.1	27.4	43.5	16.1	
Vert.	215.900	QP	36.8	11.1	9.4	32.0	25.2	43.5	18.3	
Vert.	444.892	QP	28.3	16.4	11.1	32.0	23.8	46.0	22.2	

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

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

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

UL Japan, Inc.

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 23 deg. C / 70 % RH
Engineer Junya Okuno
Mode Mode 5

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	33.436	QP	28.0	17.3	7.2	32.2	20.3	40.0	19.7	
Hori.	58.552	QP	41.9	8.3	7.6	32.2	25.6	40.0	14.4	
Hori.	67.500	QP	36.6	6.5	7.8	32.2	18.7	40.0	21.3	
Hori.	73.756	QP	37.1	6.4	7.8	32.2	19.2	40.0	20.8	
Hori.	373.826	QP	35.0	15.1	10.6	32.0	28.7	46.0	17.3	
Hori.	443.885	QP	31.0	16.4	11.1	32.0	26.5	46.0	19.5	
Vert.	33.562	QP	42.5	17.3	7.2	32.2	34.8	40.0	5.3	
Vert.	59.555	QP	40.8	8.0	7.6	32.2	24.3	40.0	15.7	
Vert.	92.163	QP	39.9	8.9	8.1	32.2	24.7	43.5	18.8	
Vert.	102.590	QP	39.2	10.6	8.2	32.1	25.9	43.5	17.6	
Vert.	131.613	QP	34.2	13.9	8.5	32.1	24.5	43.5	19.0	
Vert.	342.095	QP	31.5	14.9	10.4	32.0	24.8	46.0	21.2	

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

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

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

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 23 deg. C / 70 % RH
Engineer Junya Okuno
Mode Mode 6

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	58.555	QP	40.1	8.3	7.6	32.2	23.8	40.0	16.2	
Hori.	64.740	QP	39.1	6.8	7.7	32.2	21.5	40.0	18.5	
Hori.	67.243	QP	39.3	6.6	7.8	32.2	21.5	40.0	18.5	
Hori.	215.883	QP	35.7	11.1	9.4	32.0	24.1	43.5	19.4	
Hori.	284.253	QP	37.5	13.4	9.9	32.0	28.8	46.0	17.2	
Hori.	443.887	QP	33.3	16.4	11.1	32.0	28.8	46.0	17.2	
Vert.	32.543	QP	31.7	17.6	7.2	32.2	24.3	40.0	15.7	
Vert.	63.997	QP	43.0	7.0	7.7	32.2	25.5	40.0	14.5	
Vert.	132.619	QP	36.6	14.0	8.5	32.1	27.0	43.5	16.5	
Vert.	144.010	QP	32.9	14.7	8.7	32.1	24.2	43.5	19.3	
Vert.	175.061	QP	31.8	16.1	9.0	32.0	24.9	43.5	18.6	
Vert.	215.883	QP	38.0	11.1	9.4	32.0	26.4	43.5	17.1	

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

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

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

UL Japan, Inc.

Ise EMC Lab.

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

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 23 deg. C / 70 % RH
Engineer Junya Okuno
Mode Mode 7

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	31.610	QP	22.1	17.9	7.1	32.2	14.9	40.0	25.1	
Hori.	37.059	QP	22.1	15.9	7.2	32.2	13.1	40.0	26.9	
Hori.	276.234	QP	28.5	13.2	9.9	32.0	19.6	46.0	26.5	
Hori.	284.247	QP	32.8	13.4	9.9	32.0	24.1	46.0	21.9	
Hori.	308.266	QP	33.0	13.7	10.1	32.0	24.8	46.0	21.2	
Hori.	316.314	QP	31.8	14.0	10.2	32.0	24.0	46.0	22.1	
Vert.	31.610	QP	25.0	17.9	7.1	32.2	17.8	40.0	22.2	
Vert.	37.059	QP	28.1	15.9	7.2	32.2	19.1	40.0	20.9	
Vert.	276.242	QP	30.5	13.2	9.9	32.0	21.6	46.0	24.5	
Vert.	284.247	QP	31.8	13.4	9.9	32.0	23.1	46.0	22.9	
Vert.	308.266	QP	27.5	13.7	10.1	32.0	19.3	46.0	26.7	
Vert.	316.314	QP	22.9	14.0	10.2	32.0	15.1	46.0	31.0	

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

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

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

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Radiated Emission above 30 MHz (Spurious Emission)

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date December 16, 2020
Temperature / Humidity 21 deg. C / 31 % RH
Engineer Akihiko Maeda
Mode Mode 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	30.085	QP	22.3	18.5	7.1	32.2	15.7	40.0	24.4	
Hori.	67.932	QP	29.4	6.5	7.8	32.2	11.5	40.0	28.5	
Hori.	276.243	QP	36.0	13.2	9.9	32.0	27.1	46.0	18.9	
Hori.	300.265	QP	32.3	13.5	10.1	32.0	23.9	46.0	22.2	
Hori.	404.829	QP	28.7	15.8	10.8	32.0	23.3	46.0	22.8	
Hori.	532.467	QP	26.2	17.5	11.6	32.0	23.4	46.0	22.7	
Vert.	30.578	QP	45.1	18.2	7.1	32.2	38.2	40.0	1.8	
Vert.	60.578	QP	37.0	7.6	7.6	32.2	20.1	40.0	19.9	
Vert.	276.243	QP	30.3	13.2	9.9	32.0	21.4	46.0	24.6	
Vert.	300.265	QP	33.4	13.5	10.1	32.0	25.0	46.0	21.1	
Vert.	404.829	QP	21.8	15.8	10.8	32.0	16.4	46.0	29.7	
Vert.	532.467	QP	23.3	17.5	11.6	32.0	20.5	46.0	25.6	

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

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

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

UL Japan, Inc.

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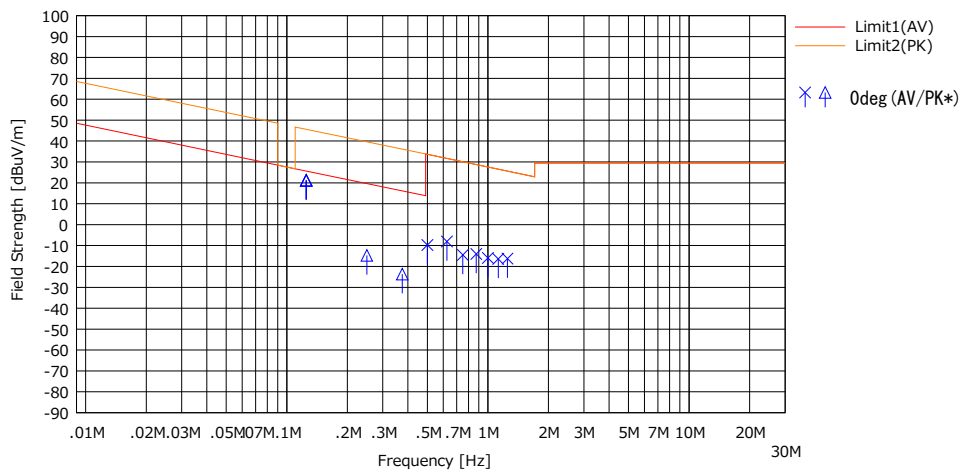
Facsimile : +81 596 24 8124

Radiated Emission Plot data, Worst case

Report No.	13439589H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	July 26, 2020	December 16, 2020
Temperature / Humidity	22 deg. C / 47 % RH	21 deg. C / 31 % RH
Engineer	Hiroyuki Furutaka (Below 30 MHz)	Akihiko Maeda (Above 30 MHz)
Mode	Mode 3	

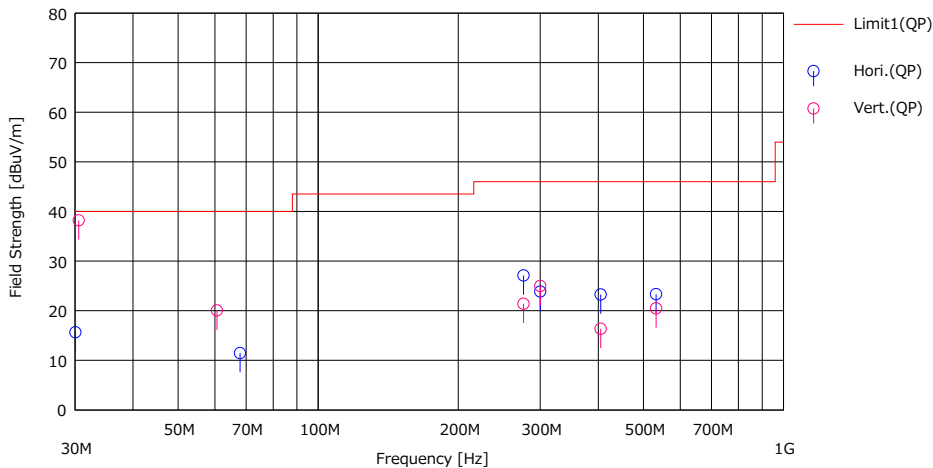
(Below 30MHz)

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



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

(Above 30MHz)



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

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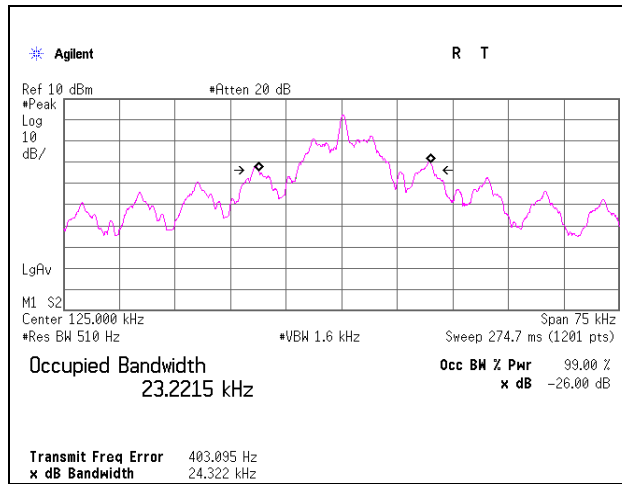
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

-26 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13439589H
 Test place Ise EMC Lab.
 Semi Anechoic Chamber No.3
 Date July 26, 2020
 Temperature / Humidity 22 deg. C / 47 % RH
 Engineer Hiroyuki Furutaka
 Mode Mode 1

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
24.322	23.2215

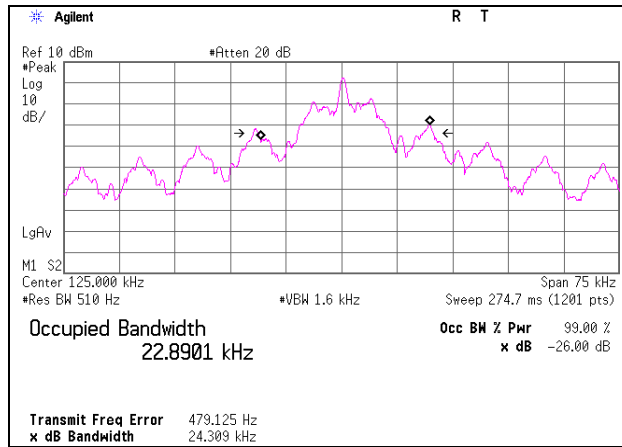


*It was confirmed that there was no difference by the input voltage.

-26 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13439589H
 Test place Ise EMC Lab.
 Semi Anechoic Chamber No.3
 Date July 26, 2020
 Temperature / Humidity 22 deg. C / 47 % RH
 Engineer Hiroyuki Furutaka
 Mode Mode 2

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
24.309	22.8901

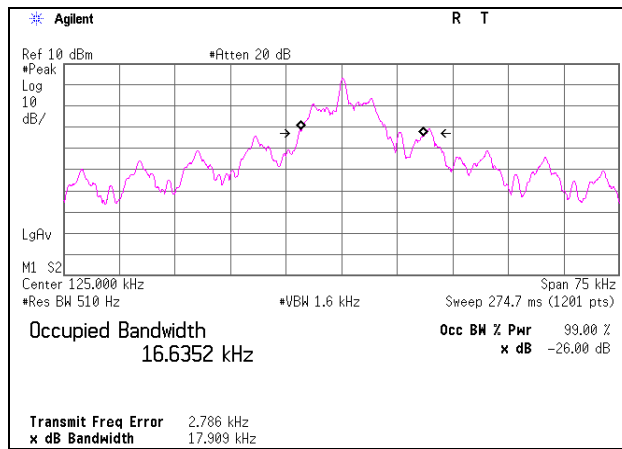


*It was confirmed that there was no difference by the input voltage.

-26 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 3

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
17.909	16.6352

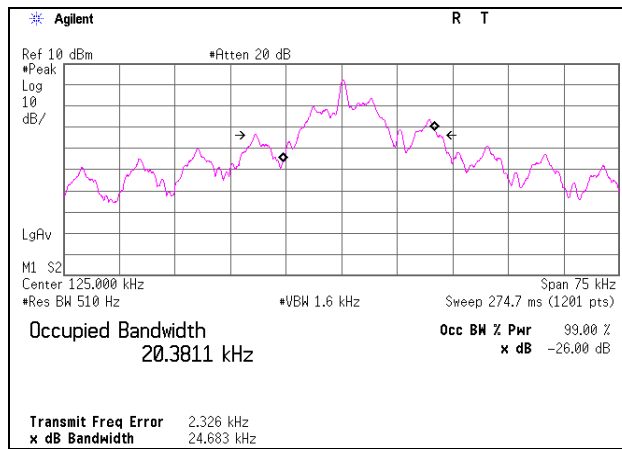


*It was confirmed that there was no difference by the input voltage.

-26 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 4

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
24.683	20.3811

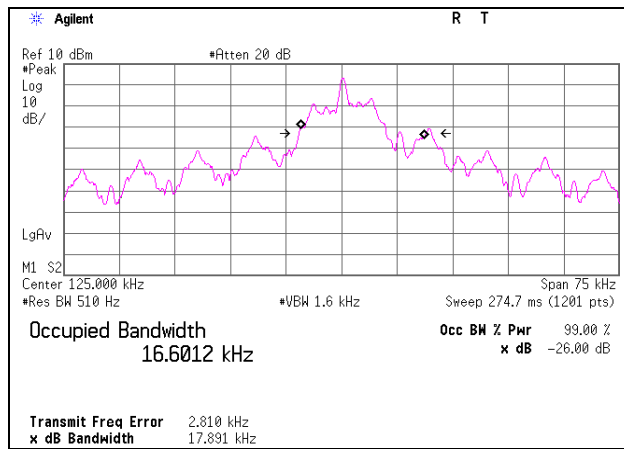


*It was confirmed that there was no difference by the input voltage.

-26 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13439589H
 Test place Ise EMC Lab.
 Semi Anechoic Chamber No.3
 Date July 26, 2020
 Temperature / Humidity 22 deg. C / 47 % RH
 Engineer Hiroyuki Furutaka
 Mode Mode 5

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
17.891	16.6012

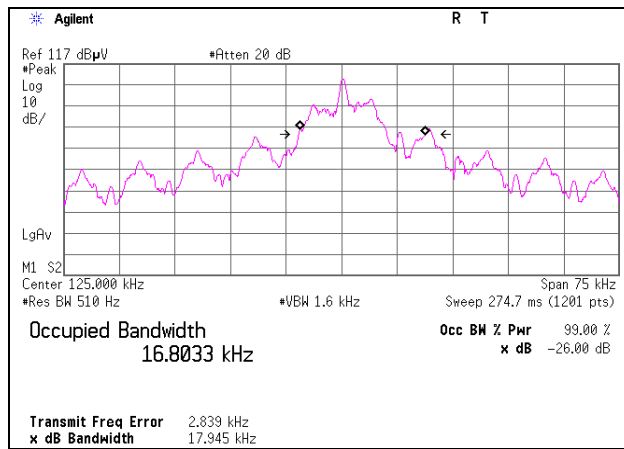


*It was confirmed that there was no difference by the input voltage.

-26 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 6

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
17.945	16.8033



*It was confirmed that there was no difference by the input voltage.

-26 dB Bandwidth and 99 % Occupied Bandwidth

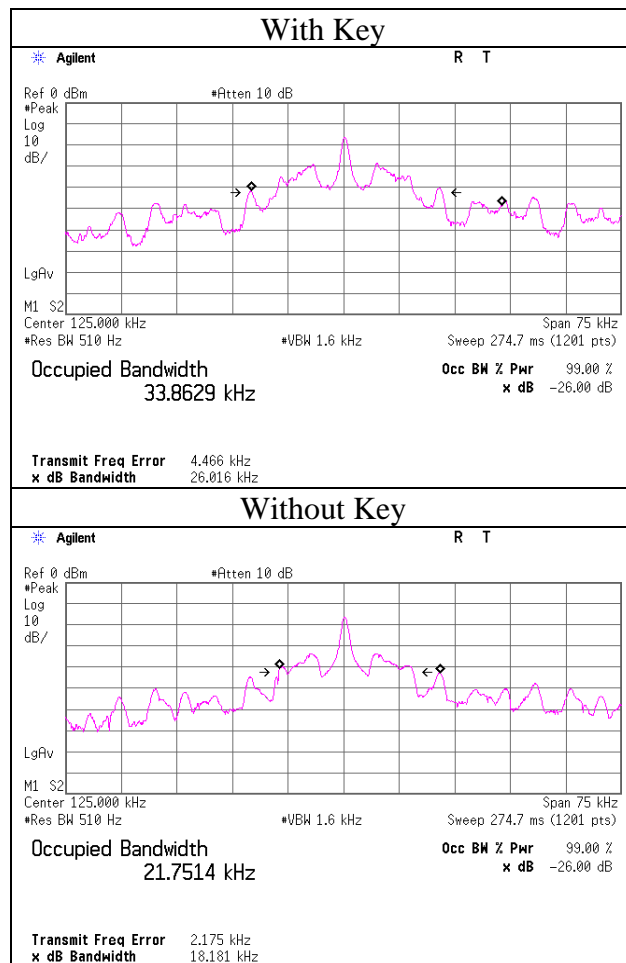
Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date July 26, 2020
Temperature / Humidity 22 deg. C / 47 % RH
Engineer Hiroyuki Furutaka
Mode Mode 7

With Key

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
26.016	33.8629

Without Key

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
18.181	21.7514



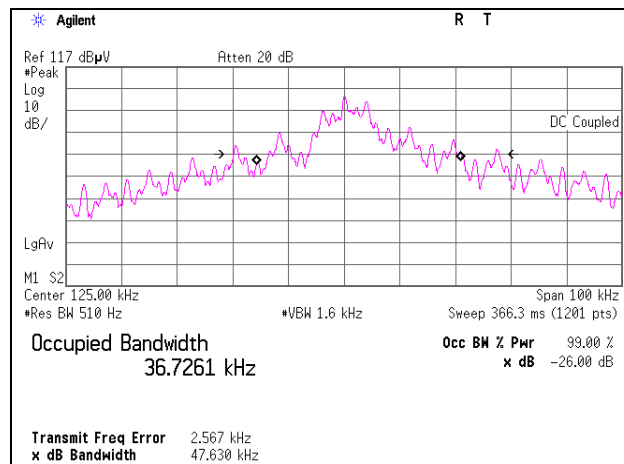
*It was confirmed that there was no difference by the input voltage.

-26 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13439589H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date December 16, 2020
Temperature / Humidity 21 deg. C / 31 % RH
Engineer Akihiko Maeda
Mode Mode 8

With Key

-26 dB Bandwidth [kHz]	99 % Occupied Bandwidth [kHz]
47.630	36.7261



*It was confirmed that there was no difference by the input voltage.

APPENDIX 2: Test instruments

Test equipment (Tested on July 26, 2020)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1301	01/07/2020	12
RE	MMM-08	141532	DIGITAL HiTESTER	Hioki	3805	51201197	01/06/2020	12
RE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAT-95	142314	Attenuator	Pasternack	PE7390-6	D/C 1504	06/17/2020	12
RE	MCC-143	141413	Coaxial Cable	UL Japan	-	-	06/18/2020	12
RE	MLPA-02	142152	Loop Antenna	Rohde & Schwarz	HFH2-Z2	836553/009	11/25/2019	12
RE	MCC-112	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14/sucoform141-PE/421-010/RFM-E321(SW)	-/00640	07/06/2020	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/10/2020	12
RE	MTR-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	08/02/2019	12
RE	MSA-04	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	11/21/2019	12
RE	MBA-03	141424	Biconical Antenna	Schwarzbeck Mess - Elektronik	VHA9103+BBA9106	1915	08/24/2019	12
RE	MCC-51	141323	Coaxial cable	UL Japan	-	-	07/06/2020	12
RE	MLA-22	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess - Elektronik	VUSLP9111B	9111B-191	08/24/2019	12

Test equipment (Tested on December 16, 2020)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2020/05/22	24
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1301	2020/01/07	12
RE	MMM-08	141532	DIGITAL HiTESTER	Hioki	3805	51201197	2020/01/06	12
RE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MLPA-02	142152	Loop Antenna	Rohde & Schwarz	HFH2-Z2	836553/009	2020/12/04	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	2020/02/10	12
RE	MCC-219	159670	Coaxial Cable	UL Japan Inc.	-	-	2020/11/17	12
RE	MAT-95	142314	Attenuator	Pasternack	PE7390-6	D/C 1504	2020/06/17	12
RE	MSA-15	141902	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187105	2020/10/15	12
RE	MTR-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	2020/08/18	12
RE	MBA-03	141424	Biconical Antenna	Schwarzbeck Mess - Elektronik	VHA9103+BBA9106	1915	2020/08/13	12
RE	MCC-51	141323	Coaxial cable	UL Japan	-	-	2020/07/06	12
RE	MLA-22	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess - Elektronik	VUSLP9111B	9111B-191	2020/08/13	12

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

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

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

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

Test item:

RE: Spurious emission

UL Japan, Inc.

Ise EMC Lab.

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