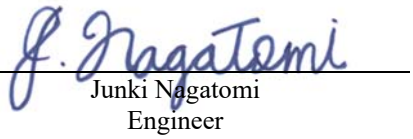
RADIO TEST REPORT

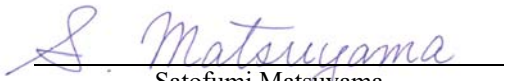
Test Report No. : 13226743H-C-R3

Applicant	:	**silex technology, Inc.**
Type of EUT	:	**Wireless E84 Digital Communication Unit**
Model Number of EUT	:	**WDCU-3310**
FCC ID	:	**N6C-WDCU3310**
Test regulation	:	**FCC Part 15 Subpart E: 2020**
Test Result	:	**Complied (Refer to SECTION 3.2)**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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 covers Radio technical requirements.
   It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.
8. The information provided from the customer for this report is identified in Section 1.
9. This report is a revised version of 13226743H-C-R2. 13226743H-C-R2 is replaced with this report.

Date of test: March 24 to August 19, 2020

Representative test engineer:

Junki Nagatomi
Engineer
Consumer Technology Division

Approved by:

Satofumi Matsuyama
Engineer
Consumer Technology Division

NVLAP TESTING NVLAP LAB CODE 200572-0 ilac-MRA

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
http://japan.ul.com/resources/emc_accredited/

☐ This report contains data that are not covered by the NVLAP accreditation.

☒ There is no testing item of "Non-accreditation".

REVISION HISTORY

Original Test Report No.: 13226743H-C

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13226743H-C	July 29, 2020	-	-
1	13226743H-C-R1	August 20, 2020	P 25, 26	Replacement to new test data in APPENDIX 1: Test data (Maximum Power Spectral Density)
2	13226743H-C-R2	August 26, 2020	P 5	Correction of Receipt Date of Sample in Section2.1 March 11, 2020→ March 11, 2020 (The test data before March 24, 2020 used this samples.) *1) June 9, 2020 (The test data after June 25, 2020 used this samples.) *1) The samples received on March 11, 2020 did not differ from the samples received on June 9, 2020.Therefore, the data for the tests performed with samples received on March 11, 2020 was used.
2	13226743H-C-R2	August 26, 2020	P 7	Correction of Test Specification in Section 3.1. FCC Part 15 final revised on May 26, 2020 and effective July 27, 2020 except 15.258→ FCC Part 15 final revised on June 26, 2020 and effective July 27, 2020 Addition of below explanatory note. * The revision does not affect the test result conducted before its effective date.
2	13226743H-C-R2	August 26, 2020	P 23	Correction of Result [mW] of Power Setting -20 dBm in APPENDIX 1: Test data (Maximum Conducted Output Power) Conducted: 5726 MHz, 5775 MHz: 0.01 → 0.007 5825 MHz: 0.00 → 0.005
3	13226743H-C-R3	August 31, 2020	P 5	Correction of explanatory note for Receipt Date of Sample *1) in Section2.1 *1) The samples received on March 11, 2020 did not differ from the samples received on June 9, 2020.Therefore, the data for the tests performed with samples received on March 11, 2020 was used. → *1) The samples received on June 9, 2020 have improved spurious emission characteristics over the samples received on March 11, 2020, due to improvements in the electromagnetic wave absorption sheet. There was no difference in the maximum conducted output power test results between the samples received on March 11, 2020 and the samples received on June 9, 2020, therefore the test data performed with samples received on March 11, 2020 was used for Antenna Terminal Conducted Tests (except for Maximum Power Spectral Density).

Reference: Abbreviations (Including words undescribed in this report)

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

CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	silex technology, Inc.
Address	:	2-3-1 Hikaridai, Seika-cho, Soraku-gun, Kyoto 619-0237, Japan
Telephone Number	:	+81-774-98-3878
Facsimile Number	:	+81-774-98-3758
Contact Person	:	Keisuke Ishiro

The information provided from the customer is as follows;
- Applicant, Type 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)
- 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 of Equipment	:	Wireless E84 Digital Communication Unit
Model No.	:	WDCU-3310
Serial No.	:	Refer to SECTION 4.2
Rating	:	DC 24 V
Receipt Date of Sample (Information from test lab.)	:	March 11, 2020 (The test data before March 24, 2020 used this samples.) *1) June 9, 2020 (The test data after June 25, 2020 used this samples.) *1) The samples received on June 9, 2020 have improved spurious emission characteristics over the samples received on March 11, 2020, due to improvements in the electromagnetic wave absorption sheet. There was no difference in the maximum conducted output power test results between the samples received on March 11, 2020 and the samples received on June 9, 2020, therefore the test data performed with samples received on March 11, 2020 was used for Antenna Terminal Conducted Tests (except for Maximum Power Spectral Density).
Country of Mass-production	:	Japan
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2.2 Product Description

Model: WDCU-3310 (referred to as the EUT in this report) is a Wireless E84 Digital Communication Unit.

Radio Specification

Radio Type	:	Transceiver
Method of Frequency Generation	:	Synthesizer

[short-range wireless 2.4 GHz]

Radio Type	:	Transceiver
Frequency of Operation	:	2403 MHz to 2480 MHz
Modulation	:	FSK
Antenna type	:	PCB Antenna
Antenna Gain	:	6 dBi
Clock frequency (Maximum)	:	32 MHz

[short-range wireless 5.8 GHz] *

Radio Type	:	Transceiver
Frequency of Operation	:	5726 MHz to 5825 MHz
Modulation	:	FSK
Antenna type	:	PCB Antenna
Antenna Gain	:	1 dBi
Clock frequency (Maximum)	:	32 MHz

* This test report applies to 5 GHz Band.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

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

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart E
Unlicensed National Information Infrastructure Devices
Section 15.407 General technical requirements

* The revision does not affect the test result conducted before its effective date.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013	**FCC:** 15.407 (b) (6) / 15.207	10.80 dB, 20.77440 MHz, N, AV	Complied a)	-
	ISED: RSS-Gen 8.8	**ISED:** RSS-Gen 8.8			
26 dB Emission Bandwidth	**FCC:** KDB Publication Number 789033	**FCC:** 15.407 (a) (1) (2) (3)	See data	N/A b)	Conducted
	ISED: -	**ISED:** -			
Maximum Conducted Output Power	**FCC:** KDB Publication Number 789033	**FCC:** 15.407 (a) (1) (2) (3)		Complied c)	Conducted
	ISED: -	**ISED:** RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.1			
Maximum Power Spectral Density	**FCC:** KDB Publication Number 789033	**FCC :** 15.407 (a) (1) (2) (3)		N/A d)	Conducted
	ISED: -	**ISED:** RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.1			
Spurious Emission Restricted Band Edge	**FCC:** ANSI C63.10-2013 KDB Publication Number 789033	**FCC:** 15.407 (b), 15.205 and 15.209	1.4 dB 48.000 MHz, QP, Vert.	Complied# e) / f)	Conducted (< 30 MHz) / Radiated (> 30 MHz) *1)
	ISED: -	**ISED:** RSS-247 6.2.1.2 6.2.2.2 6.2.3.2 6.2.4.2			
6 dB Emission Bandwidth	**FCC:** ANSI C63.10-2013	**FCC:** 15.407 (e)	See data	Complied g)	Conducted
	ISED: -	**ISED:** RSS-247 6.2.4.1			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) Radiated test was selected over 30 MHz based on section FCC 15.407 (b) and KDB 789033 D02 G.3.b).

a) Refer to APPENDIX 1 (data of Conducted Emission)
b) Refer to APPENDIX 1 (data of 26 dB Emission Bandwidth and 99 % Occupied Bandwidth)
c) Refer to APPENDIX 1 (data of Maximum Conducted Output Power)
d) Refer to APPENDIX 1 (data of Maximum Power Spectral Density)
e) Refer to APPENDIX 1 (data of Radiated Spurious Emission)
f) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
g) Refer to APPENDIX 1 (data of 6 dB 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.

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

FCC Part 15.31 (e)
This EUT provides stable voltage constantly to RF Module regardless of input voltage.
Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
The EUT has an external antenna connector, but it is installed by the professionals.
Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Band Width	**ISED:** RSS-Gen 6.7	**ISED:** -	N/A	a)	Conducted
a) Refer to APPENDIX 1 (data of 26 dB Emission Bandwidth and 99 % Occupied Bandwidth)					

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

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

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

Conducted emission

using Item	Frequency range	Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	3.4 dB
	0.15 MHz to 30 MHz	2.9 dB

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)	4.8 dB
		(Vertical)	5.0 dB
	200 MHz to 1000 MHz	(Horizontal)	5.2 dB
		(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	4.8 dB
	200 MHz to 1000 MHz	(Horizontal)	5.0 dB
		(Vertical)	5.0 dB
3 m	1 GHz to 6 GHz		4.9 dB
	6 GHz to 18 GHz		5.2 dB
1 m	10 GHz to 26.5 GHz		5.5 dB
	26.5 GHz to 40 GHz		5.5 dB
10 m	1 GHz to 18 GHz		5.2 dB

Antenna Terminal test

Test Item	Uncertainty (+/-)
26 dB Emission Bandwidth / 6 dB Emission Bandwidth /	0.96 %
Maximum Conducted Output Power / Average Output Power	1.4 dB
Burst Rate	0.10 %
Maximum Power Spectral Density	2.6 dB
Spurious Emission (Conducted)	2.6 dB

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.
*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

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 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

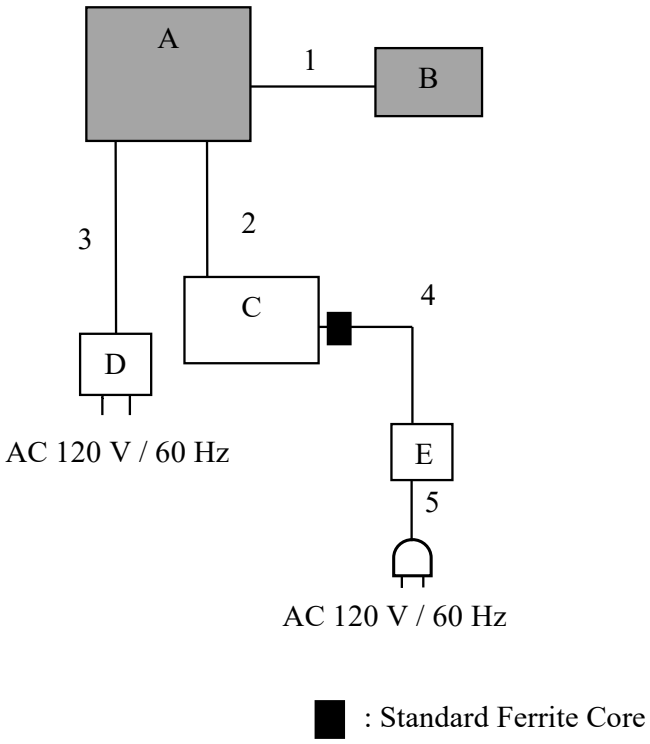
4.1 Operating Mode(s)

Mode	Remarks*
Transmitting (5 GHz)	Tx
*Transmitting duty was 100 % on all tests.	
*Power of the EUT was set by the software as follows; Power settings: 2 dBm (All Tests) , -20dBm (Maximum Peak Output Power only) Software: TeraTerm Ver 4.102 (Date: 2020.3.19, Storage location: Driven by connected PC) *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.	

*The details of Operation mode(s)

Test Item	Operating Mode	Tested Frequency
Conducted emission, 99 % Occupied Bandwidth, 6 dB Bandwidth, Maximum Conducted Output Power, Maximum Power Spectral Density, Radiated Spurious Emission (Below 1 GHz), Radiated Spurious Emission (Above 1 GHz), Conducted Spurious Emission,	Tx	5726 MHz 5775 MHz 5825 MHz

4.2 Configuration and peripherals



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

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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless E84 Digital Communication Unit	WDCU-3310	001	silex technology, Inc.	EUT
B	Antenna	JUM2458PO W1	001	silex technology, Inc.	EUT
C	Laptop PC	CF-LX4EDHCS	5GKSA17377	Panasonic	-
D	AC Adapter	WB-18D12R	Y19490019464	Asian Power Device. Inc	-
E	AC Adapter	CF-AA62J2C	64B2CM1147037 55B	Panasonic	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.4	Shielded	Shielded	-
2	RS-232C Cable	1.1	Shielded	Shielded	-
3	DC Cable	1.9	Unshielded	Unshielded	-
4	DC Cable	0.8	Unshielded	Unshielded	-
5	AC Cable	0.9	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

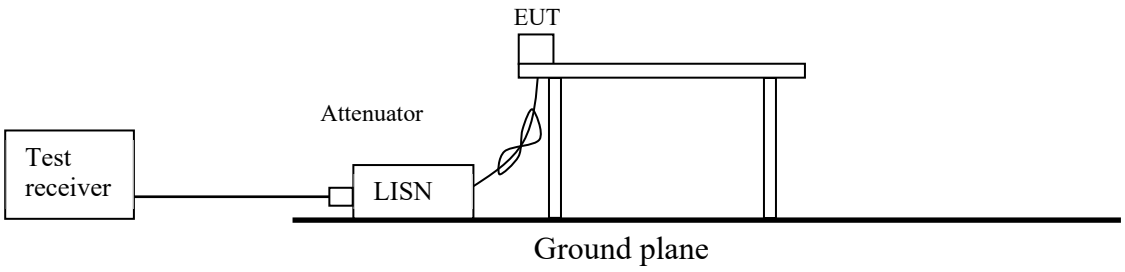
For the tests on EUT with other peripherals (as a whole system)
I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50 ohm connectors of the LISN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

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

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

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

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission and Band Edge Compliance

Test Procedure

< Below 1GHz >
EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

< Above 1GHz >
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

< Below 1GHz >

The result also satisfied with the general limits specified in section 15.209 (a).

< Above 1GHz >

Inside of restricted bands (Section 15.205):

Apply to limit in the Section 15.209 (a).

Outside of the restricted bands:

Apply to limit 68.2 dBuV/m, 3 m (-27 dBm e.i.r.p.*) in the Section 15.407 (b) (1) (2) (3).

For W58 Bandedge
-27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge in the section 15.407(b)(4)(i).

Restricted band edge:

Apply to limit in the Section 15.209 (a).
Since this limit is severer than the limit of the inside of restricted bands.

*Electric field strength to e.i.r.p. conversion:

$$E = \frac{1000000\ \sqrt{30P}}{3}\ \text{(uV/m)}$$:P is the e.i.r.p. (Watts)

Test Antennas are used as below;

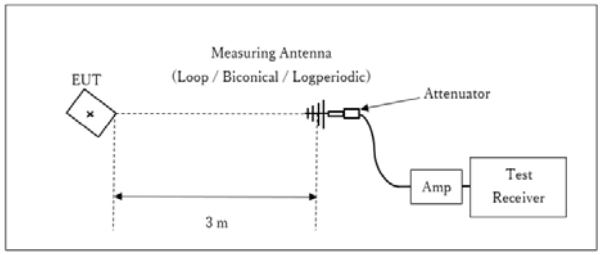
Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

Frequency	Below 1 GHz	Above 1 GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	Peak	Average
IF Bandwidth	BW: 120 kHz	RBW: 1 MHz VBW: 3 MHz	Method AD *1) RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: ≥ 100 traces If duty cycle was less than 98%, a duty factor was added to the results.

*1) The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

Figure 2: Test Setup

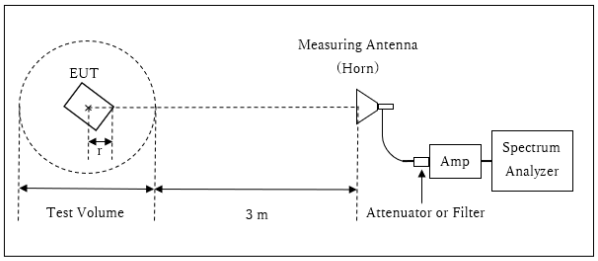
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz

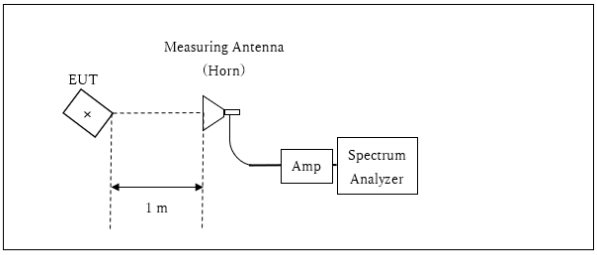


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.9 m / 3.0 m) = 2.28 dB
* Test Distance: (3 + Test Volume /2) - r = 3.9 m

Test Volume : 2.0 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.1 m

10 GHz - 40 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.5 dB
*Test Distance: 1 m

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

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

Measurement range : 30 MHz - 40 GHz
Test data : APPENDIX
Test result : Pass

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used and Test method
26 dB Bandwidth	Enough to capture the emission	Close to 1 % of EBW	> RBW	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 % to 5 % of OBW	≥ 3 RBW	Auto	Peak	Max Hold	Spectrum Analyzer
6 dB Bandwidth	Enough to capture the emission	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Conducted Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 80 MHz BW) (Method PM-G)
Maximum Power Spectral Density	Encompass the entire EBW	1 MHz or 470 kHz *2)	≥ 3 RBW	Auto	RMS or Sample Power Averaging (200 times)	Clear Write	Spectrum Analyzer
Conducted Spurious Emission*3)	9 kHz – 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz – 30 MHz	9.1 kHz	27 kHz				

* The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

*1) Peak hold was applied as Worst-case measurement.
*2) KDB 789033 D02 says that RBW is set to be 500 kHz for 5.725 GHz-5.850 GHz, but it is not possible with spectrum analyzer, so RBW Correction Factor (10 log(500 kHz / 470 kHz)) was added to the test result.
*3) In the frequency range below 30 MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9 kHz-150 kHz: RBW = 200 Hz, 150 kHz-30 MHz: RBW = 9.1 kHz)

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

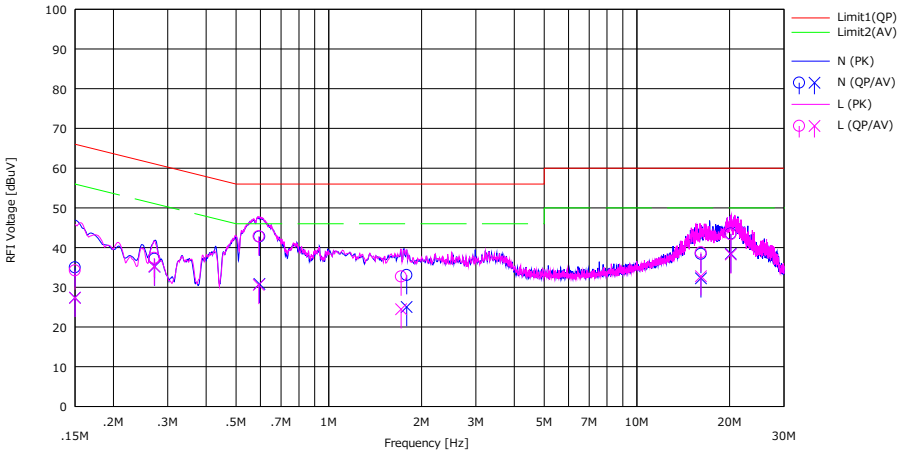
Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

Report No.	13226743H
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	June 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takeshi Hiyaji
Mode	Tx 5726 MHz

Limit : FCC_Part 15 Subpart E(15.207)



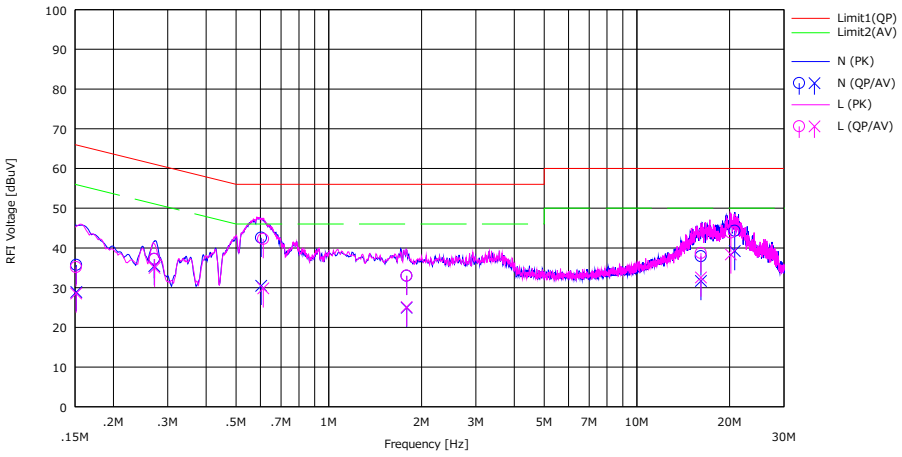
No.	Freq.	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		〈QP〉	〈AV〉			〈QP〉	〈AV〉	〈QP〉	〈AV〉	〈QP〉	〈AV〉		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	21.70	14.10	0.15	13.14	34.99	27.39	66.00	56.00	31.01	28.61	N	
2	0.27196	23.80	21.90	0.15	13.16	37.11	35.21	61.10	51.10	23.99	15.89	N	
3	0.59555	29.40	17.50	0.16	13.19	42.75	30.85	56.00	46.00	13.25	15.15	N	
4	1.78893	19.50	11.50	0.26	13.28	33.04	25.04	56.00	46.00	22.96	20.96	N	
5	16.13820	22.30	16.20	2.33	13.75	38.38	32.28	60.00	50.00	21.62	17.72	N	
6	20.17110	26.50	21.50	3.14	13.83	43.47	38.47	60.00	50.00	16.53	11.53	N	
7	0.15000	20.90	14.00	0.20	13.14	34.24	27.34	66.00	56.00	31.76	28.66	L	
8	0.27138	24.00	21.90	0.22	13.16	37.38	35.28	61.10	51.10	23.72	15.82	L	
9	0.59263	29.40	17.20	0.22	13.19	42.81	30.61	56.00	46.00	13.19	15.39	L	
10	1.71732	19.10	10.90	0.32	13.27	32.69	24.49	56.00	46.00	23.31	21.51	L	
11	16.13735	22.60	16.60	2.42	13.75	38.77	32.77	60.00	50.00	21.23	17.23	L	
12	20.16963	26.30	21.20	3.21	13.83	43.34	38.24	60.00	50.00	16.66	11.76	L	

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

Conducted Emission

Report No.	13226743H
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	June 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takeshi Hiyaji
Mode	Tx 5775 MHz

Limit : FCC_Part 15 Subpart E(15.207)



No.	Freq.	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP)	(AV)			(QP)	(AV)	(QP)	(AV)	(QP)	(AV)		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15160	22.40	15.60	0.15	13.14	35.69	28.89	65.90	55.90	30.21	27.01	N	
2	0.27138	23.90	22.10	0.15	13.16	37.21	35.41	61.10	51.10	23.89	15.69	N	
3	0.60346	29.20	17.10	0.16	13.19	42.55	30.45	56.00	46.00	13.45	15.55	N	
4	1.78893	19.40	11.40	0.26	13.28	32.94	24.94	56.00	46.00	23.06	21.06	N	
5	16.14151	21.80	15.60	2.33	13.75	37.88	31.68	60.00	50.00	22.12	18.32	N	
6	20.77440	27.20	22.10	3.26	13.84	44.30	39.20	60.00	50.00	15.70	10.80	N	
7	0.15131	21.80	15.20	0.20	13.14	35.14	28.54	65.90	55.90	30.76	27.36	L	
8	0.27196	23.80	21.60	0.22	13.16	37.18	34.98	61.10	51.10	23.92	16.12	L	
9	0.61261	28.80	16.40	0.22	13.19	42.21	29.81	56.00	46.00	13.79	16.19	L	
10	1.78893	19.40	11.50	0.33	13.28	33.01	25.11	56.00	46.00	22.99	20.89	L	
11	16.13822	22.50	16.40	2.42	13.75	38.67	32.57	60.00	50.00	21.33	17.43	L	
12	20.16662	26.80	21.30	3.21	13.83	43.84	38.34	60.00	50.00	16.16	11.66	L	

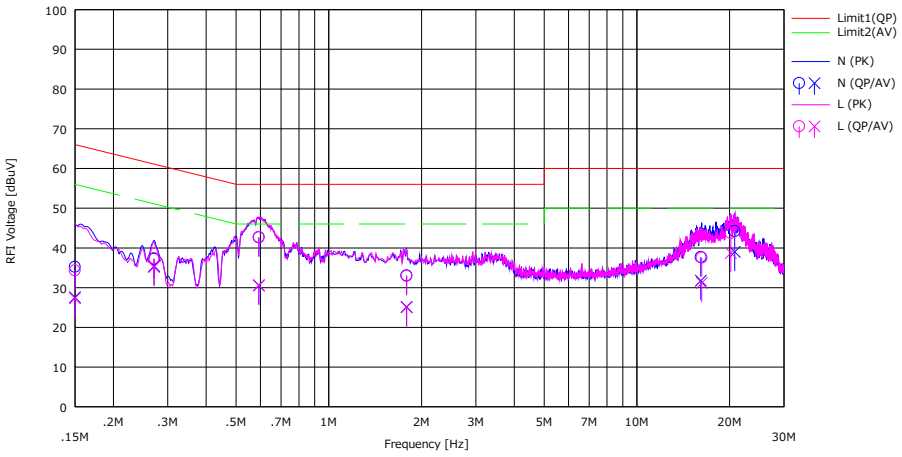
Except for the above table: adequate margin data below the limits.
CHART: WITH FACTOR Peak hold data. CALCULATION : RESULT = READING + C.F (LISN + CABLE + ATT)

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

Conducted Emission

Report No.	13226743H
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	June 28, 2020
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takeshi Hiyaji
Mode	Tx 5825 MHz

Limit : FCC_Part 15 Subpart E(15.207)



No.	Freq.	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		〈QP〉	〈AV〉			〈QP〉	〈AV〉	〈QP〉	〈AV〉	〈QP〉	〈AV〉		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	21.90	14.30	0.15	13.14	35.19	27.59	66.00	56.00	30.81	28.41	N	
2	0.27109	23.90	22.10	0.15	13.16	37.21	35.41	61.10	51.10	23.89	15.69	N	
3	0.59305	29.30	17.20	0.16	13.19	42.65	30.55	56.00	46.00	13.35	15.45	N	
4	1.78809	19.50	11.60	0.26	13.28	33.04	25.14	56.00	46.00	22.96	20.86	N	
5	16.12490	21.60	15.70	2.33	13.74	37.67	31.77	60.00	50.00	22.33	18.23	N	
6	20.77523	27.10	21.90	3.26	13.84	44.20	39.00	60.00	50.00	15.80	11.00	N	
7	0.15000	21.00	14.00	0.20	13.14	34.34	27.34	66.00	56.00	31.66	28.66	L	
8	0.27080	24.00	21.80	0.22	13.16	37.38	35.18	61.10	51.10	23.72	15.92	L	
9	0.59305	29.30	17.20	0.22	13.19	42.71	30.61	56.00	46.00	13.29	15.39	L	
10	1.78893	19.30	11.40	0.33	13.28	32.91	25.01	56.00	46.00	23.09	20.99	L	
11	16.24272	21.30	15.00	2.44	13.75	37.49	31.19	60.00	50.00	22.51	18.81	L	
12	20.17143	26.70	21.70	3.21	13.83	43.74	38.74	60.00	50.00	16.26	11.26	L	

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

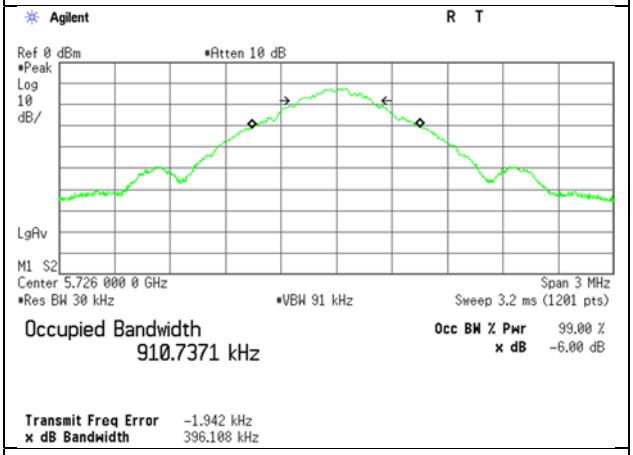
6 dB Bandwidth and 99 % Occupied Bandwidth

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	March 24, 2020
Temperature / Humidity	24 deg. C / 34 % RH
Engineer	Junki Nagatomi
Mode	Tx

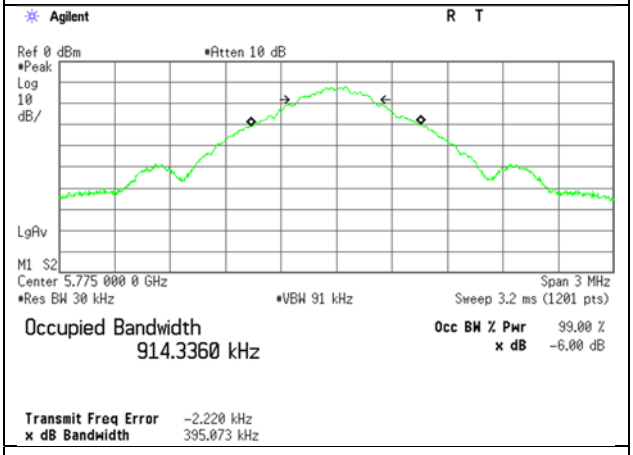
Frequency [MHz]	99% Occupied Bandwidth [kHz]	6dB Bandwidth [MHz]	Limit for 6dB Bandwidth [MHz]
5726	910.7	0.502	> 0.5000
5775	914.3	0.502	> 0.5000
5825	914.9	0.501	> 0.5000

99 % Occupied Bandwidth

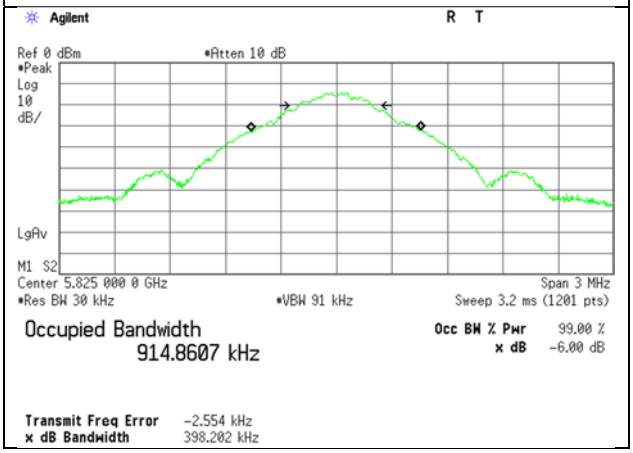
5726 MHz



5775 MHz

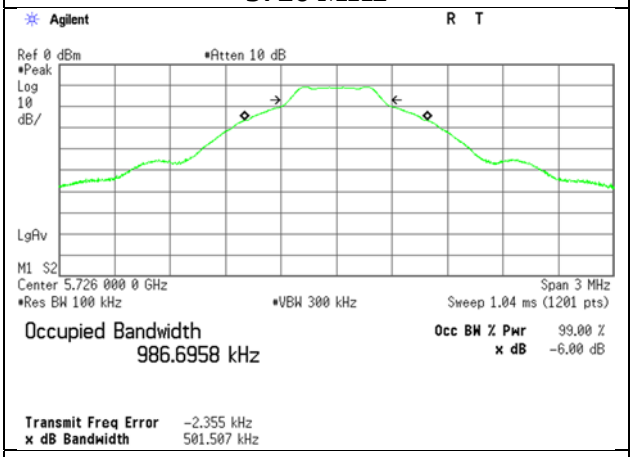


5825 MHz

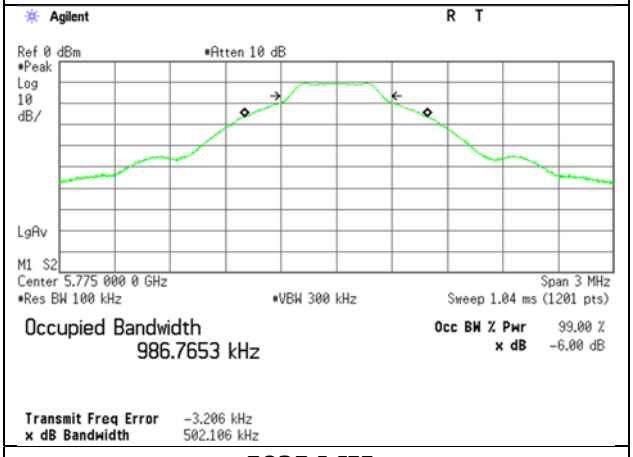


6 dB Bandwidth

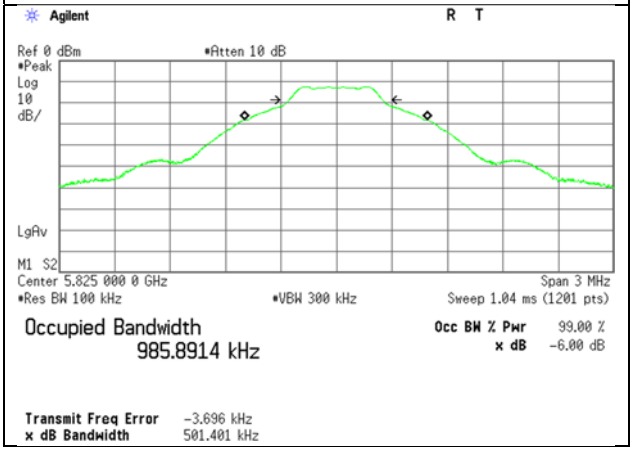
5726 MHz



5775 MHz



5825 MHz



Maximum Conducted Output Power

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	March 24, 2020
Temperature / Humidity	24 deg. C / 34 % RH
Engineer	Junki Nagatomi
Mode	Tx

Power Setting (2dBm) — Applied limit: 15.407, mobile and portable client device

Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Duty Factor	Antenna Gain	26 dB EBW (B for FCC)	99% OBW (B for IC)	Conducted Power Result		Conducted Power Limit	Conducted Power Margin	e.i.r.p. Result		e.i.r.p. Limit	e.i.r.p. Margin
[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBi]	[MHz]	[MHz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5726	-10.53	2.11	9.82	0.00	1.0	-	0.911	1.40	1.38	30.00	28.60	2.40	1.74	36.00	33.60
5775	-10.11	2.12	9.82	0.00	1.0	-	0.914	1.83	1.52	30.00	28.17	2.83	1.92	36.00	33.17
5825	-11.86	2.13	9.83	0.00	1.0	-	0.915	0.10	1.02	30.00	29.90	1.10	1.29	36.00	34.90

Power Setting (-20dBm) — Applied limit: 15.407, mobile and portable client device

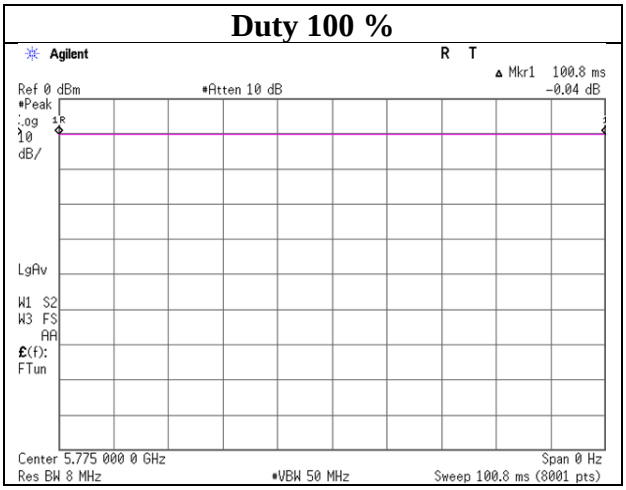
Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Duty Factor	Antenna Gain	26 dB EBW (B for FCC)	99% OBW (B for IC)	Conducted Power Result		Conducted Power Limit	Conducted Power Margin	e.i.r.p. Result		e.i.r.p. Limit	e.i.r.p. Margin
[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBi]	[MHz]	[MHz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5726	-33.75	2.11	9.82	0.00	1.0	-	0.911	-21.82	0.007	30.00	51.82	-20.82	0.01	36.00	56.82
5775	-33.40	2.12	9.82	0.00	1.0	-	0.914	-21.46	0.007	30.00	51.46	-20.46	0.01	36.00	56.46
5825	-35.13	2.13	9.83	0.00	1.0	-	0.915	-23.17	0.005	30.00	53.17	-22.17	0.01	36.00	58.17

Sample Calculation:
Conducted Power Result = Reading + Cable Loss + Atten Loss + Duty Factor
e.i.r.p. Result = Conducted Power Result + Antenna Gain
Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Burst rate confirmation

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	March 24, 2020
Temperature / Humidity	24 deg. C / 34 % RH
Engineer	Junki Nagatomi
Mode	Tx

Duty 100 %



* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

Maximum Power Spectral Density

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	August 19, 2020
Temperature / Humidity	24 deg. C / 48 % RH
Engineer	Yuta Moriya
Mode	Tx

Applied limit: 15.407, mobile and portable client device

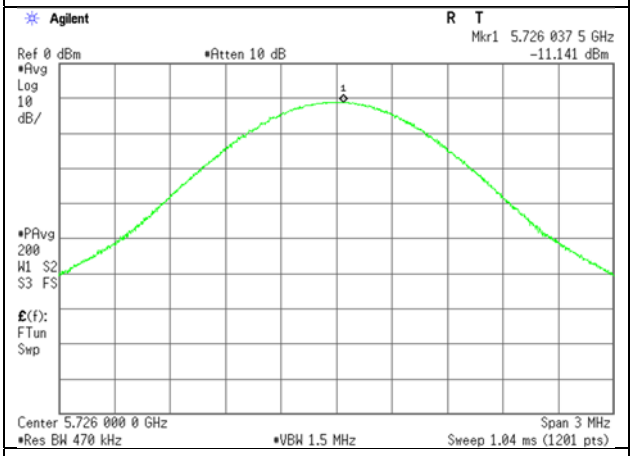
Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted) Result [dBm /MHz]	PSD (Conducted) Limit [dBm /MHz]	PSD (Conducted) Margin [dB]	PSD (e.i.r.p.) Result [dBm /MHz]	PSD (e.i.r.p.) Limit [dBm /MHz]	PSD (e.i.r.p.) Margin [dB]
5726	-11.14	2.07	10.11	0.00	1.0	0.27	1.31	30.00	28.69	2.31	36.00	33.69
5775	-11.20	2.08	10.11	0.00	1.0	0.27	1.26	30.00	28.74	2.26	36.00	33.74
5825	-12.87	2.09	10.11	0.00	1.0	0.27	-0.40	30.00	30.40	0.60	36.00	35.40

Sample Calculation:
PSD: Power Spectral Density
The PSD within 5725 MHz to 5825 MHz are based on any 500 kHz band.
RBW Correction Factor = 10 * log (Specified bandwidth / Measured bandwidth)
PSD Result (Conducted) = Reading + Cable Loss + Atten Loss + Duty Factor + RBW Correction Factor
PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain
The conducted PSD limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725 MHz-5850 MHz for IC)

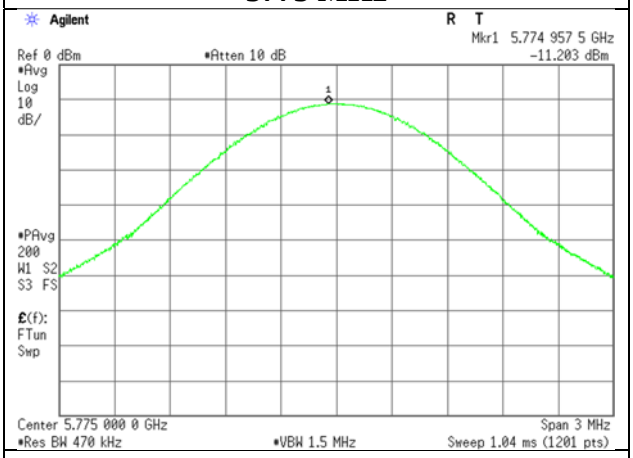
Maximum Power Spectral Density

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	August 19, 2020
Temperature / Humidity	24 deg. C / 48 % RH
Engineer	Yuta Moriya
Mode	Tx

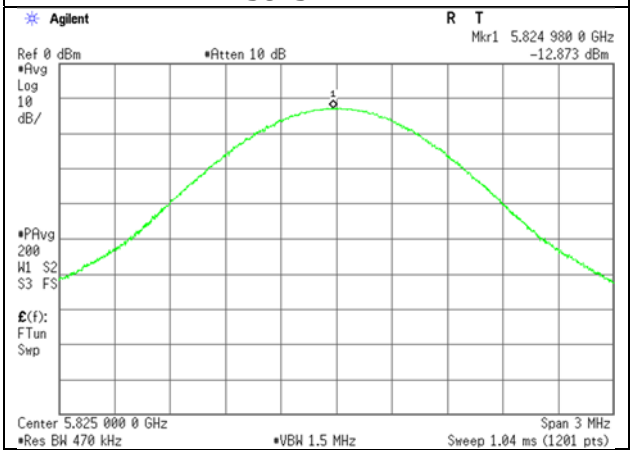
5726 MHz



5775 MHz



5825 MHz



Radiated Spurious Emission

Report No.	13226743H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	June 25, 2020	June 26, 2020	June 27, 2020
Temperature / Humidity	22 deg. C / 65 % RH	22 deg. C / 67 % RH	22 deg. C / 67 % RH
Engineer	Junki Nagatomi (1 GHz - 10 GHz)	Junki Nagatomi (10 GHz - 18 GHz)	Takeshi Hiyaji (18 GHz - 40 GHz) (Below 1GHz)
Mode	Tx 5726 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	48.000	QP	34.1	11.9	7.4	32.2	-	21.2	40.0	18.8	
Hori.	96.000	QP	44.7	9.6	8.0	32.1	-	30.2	43.5	13.4	
Hori.	120.000	QP	50.7	12.9	8.3	32.1	-	39.8	43.5	3.7	
Hori.	216.000	QP	43.2	11.1	9.3	32.0	-	31.5	43.5	12.0	
Hori.	264.000	QP	50.8	12.5	9.7	32.0	-	41.0	46.0	5.0	
Hori.	336.000	QP	46.3	14.7	10.2	32.0	-	39.3	46.0	6.7	
Hori.	2403.000	PK	59.6	27.7	4.8	32.7	-	59.4	68.2	8.9	
Hori.	3323.000	PK	47.1	28.3	5.3	32.3	-	48.3	68.2	19.9	
Hori.	5650.000	PK	40.9	31.8	6.2	31.8	-	47.0	68.2	21.2	
Hori.	5700.000	PK	43.6	31.9	6.2	31.8	-	49.9	105.2	55.3	
Hori.	5720.000	PK	42.7	32.0	6.2	31.8	-	49.0	110.8	61.8	
Hori.	5725.000	PK	77.5	32.0	6.2	31.8	-	83.9	122.2	38.3	
Hori.	6646.000	PK	52.4	34.2	6.5	32.3	-	60.8	68.2	7.4	
Hori.	7209.000	PK	44.2	36.0	6.7	32.6	-	54.3	68.2	13.9	
Hori.	11452.000	PK	42.9	40.1	-1.9	33.5	-	47.6	73.9	26.3	Floor noise
Hori.	13292.000	PK	44.6	40.7	-0.6	33.0	-	51.7	68.2	16.5	
Hori.	17178.000	PK	43.9	42.4	-0.3	32.7	-	53.4	73.9	20.5	Floor noise
Hori.	22904.000	PK	43.4	40.4	-1.2	32.3	-	50.3	73.9	23.6	Floor noise
Hori.	11452.000	AV	34.4	40.1	-1.9	33.5	-	39.1	53.9	14.8	Floor noise
Hori.	13292.000	AV	37.1	40.7	-0.6	33.0	-	44.2	68.2	24.0	
Hori.	17178.000	AV	35.6	42.4	-0.3	32.7	-	45.1	53.9	8.8	Floor noise
Hori.	22904.000	AV	34.4	40.4	-1.2	32.3	-	41.3	53.9	12.6	Floor noise
Vert.	48.000	QP	51.2	11.9	7.4	32.2	-	38.3	40.0	1.7	
Vert.	96.000	QP	48.0	9.6	8.0	32.1	-	33.5	43.5	10.1	
Vert.	120.000	QP	48.6	12.9	8.3	32.1	-	37.7	43.5	5.8	
Vert.	216.000	QP	42.4	11.1	9.3	32.0	-	30.7	43.5	12.8	
Vert.	264.000	QP	49.5	12.5	9.7	32.0	-	39.7	46.0	6.3	
Vert.	336.000	QP	41.3	14.7	10.2	32.0	-	34.3	46.0	11.7	
Vert.	2403.000	PK	58.4	27.7	4.8	32.7	-	58.1	68.2	10.1	
Vert.	3323.000	PK	48.0	28.3	5.3	32.3	-	49.3	68.2	18.9	
Vert.	5650.000	PK	40.8	31.8	6.2	31.8	-	46.9	68.2	21.3	
Vert.	5700.000	PK	43.6	31.9	6.2	31.8	-	49.8	105.2	55.4	
Vert.	5720.000	PK	42.7	32.0	6.2	31.8	-	49.0	110.8	61.8	
Vert.	5725.000	PK	76.6	32.0	6.2	31.8	-	82.9	122.2	39.3	
Vert.	6646.000	PK	52.0	34.2	6.5	32.3	-	60.5	68.2	7.7	
Vert.	7209.000	PK	46.5	36.0	6.7	32.6	-	56.6	68.2	11.6	
Vert.	11452.000	PK	42.6	40.1	-1.9	33.5	-	47.3	73.9	26.6	Floor noise
Vert.	13292.000	PK	44.9	40.7	-0.6	33.0	-	52.0	68.2	16.2	
Vert.	17178.000	PK	43.8	42.4	-0.3	32.7	-	53.3	73.9	20.6	Floor noise
Vert.	22904.000	PK	43.5	40.4	-1.2	32.3	-	50.4	73.9	23.5	Floor noise
Vert.	11452.000	AV	34.4	40.1	-1.9	33.5	-	39.1	53.9	14.8	Floor noise
Vert.	13292.000	AV	36.7	40.7	-0.6	33.0	-	43.9	68.2	24.3	
Vert.	17178.000	AV	35.6	42.4	-0.3	32.7	-	45.1	53.9	8.8	Floor noise
Vert.	22904.000	AV	34.4	40.4	-1.2	32.3	-	41.3	53.9	12.6	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

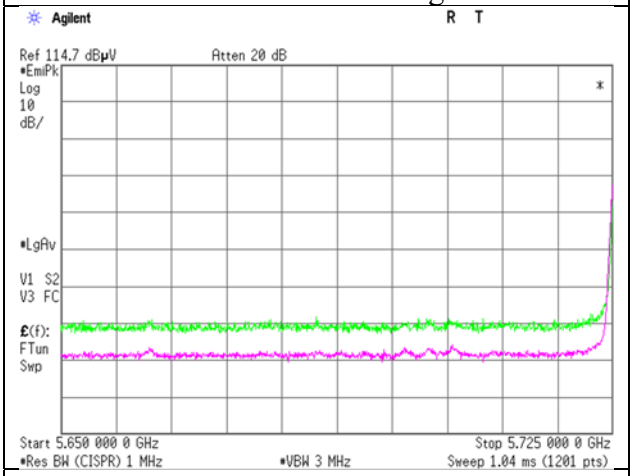
Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB
10 GHz - 40 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Report No.	13226743H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 25, 2020
Temperature / Humidity	22 deg. C / 65 % RH
Engineer	Junki Nagatomi
	(1 GHz - 10 GHz)
Mode	Tx 5726 MHz

Horizontal

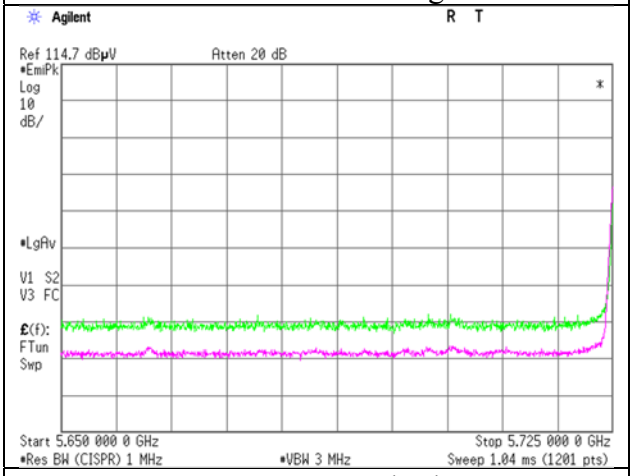
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

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

Radiated Spurious Emission

Report No.	13226743H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	June 25, 2020	June 26, 2020	June 27, 2020
Temperature / Humidity	22 deg. C / 65 % RH	22 deg. C / 67 % RH	22 deg. C / 67 % RH
Engineer	Junki Nagatomi (1 GHz - 10 GHz)	Junki Nagatomi (10 GHz - 18 GHz)	Takeshi Hiyaji (18 GHz - 40 GHz) (Below 1GHz)
Mode	Tx 5775 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	48.000	QP	34.0	11.9	7.4	32.2	-	21.1	40.0	18.9	
Hori.	96.000	QP	45.3	9.6	8.0	32.1	-	30.8	43.5	12.8	
Hori.	120.000	QP	50.6	12.9	8.3	32.1	-	39.7	43.5	3.8	
Hori.	264.000	QP	50.8	12.5	9.7	32.0	-	41.0	46.0	5.0	
Hori.	336.000	QP	46.2	14.7	10.2	32.0	-	39.2	46.0	6.8	
Hori.	480.000	QP	37.9	17.2	11.2	32.0	-	34.3	46.0	11.7	
Hori.	2403.000	PK	58.3	27.7	4.8	32.7	-	58.0	68.2	10.2	
Hori.	3372.000	PK	47.7	28.3	5.3	32.3	-	49.0	68.2	19.2	
Hori.	6744.000	PK	54.9	34.2	6.5	32.4	-	63.2	68.2	5.0	
Hori.	7209.000	PK	45.8	36.0	6.7	32.6	-	55.9	68.2	12.3	
Hori.	10116.000	PK	46.6	39.4	-2.4	33.5	-	50.1	68.2	18.1	
Hori.	11550.000	PK	43.0	39.8	-1.8	33.5	-	47.5	73.9	26.4	Floor noise
Hori.	13488.000	PK	45.8	41.2	-0.7	32.9	-	53.4	68.2	14.8	
Hori.	17325.000	PK	43.7	43.8	-0.3	32.7	-	54.6	73.9	19.3	Floor noise
Hori.	23100.000	PK	43.7	40.3	-1.2	32.3	-	50.6	73.9	23.4	Floor noise
Hori.	11550.000	AV	34.1	39.8	-1.8	33.5	-	38.6	53.9	15.3	Floor noise
Hori.	17325.000	AV	35.7	43.8	-0.3	32.7	-	46.5	53.9	7.4	Floor noise
Hori.	23100.000	AV	34.5	40.3	-1.2	32.3	-	41.4	53.9	12.6	Floor noise
Vert.	48.000	QP	51.5	11.9	7.4	32.2	-	38.6	40.0	1.4	
Vert.	96.000	QP	48.9	9.6	8.0	32.1	-	34.4	43.5	9.1	
Vert.	120.000	QP	48.9	12.9	8.3	32.1	-	38.0	43.5	5.5	
Vert.	264.000	QP	49.0	12.5	9.7	32.0	-	39.2	46.0	6.8	
Vert.	336.000	QP	41.1	14.7	10.2	32.0	-	34.1	46.0	11.9	
Vert.	480.000	QP	35.5	17.2	11.2	32.0	-	31.9	46.0	14.1	
Vert.	2403.000	PK	60.1	27.7	4.8	32.7	-	59.8	68.2	8.4	
Vert.	3372.000	PK	47.6	28.3	5.3	32.3	-	48.9	68.2	19.3	
Vert.	6744.000	PK	54.2	34.2	6.5	32.4	-	62.5	68.2	5.7	
Vert.	7209.000	PK	46.2	36.0	6.7	32.6	-	56.3	68.2	11.9	
Vert.	10116.000	PK	46.3	39.4	-2.4	33.5	-	49.8	68.2	18.4	
Vert.	11550.000	PK	42.3	39.8	-1.8	33.5	-	46.8	73.9	27.1	Floor noise
Vert.	13488.000	PK	45.4	41.2	-0.7	32.9	-	53.0	68.2	15.2	
Vert.	17325.000	PK	44.8	43.8	-0.3	32.7	-	55.7	73.9	18.3	Floor noise
Vert.	23100.000	PK	43.7	40.3	-1.2	32.3	-	50.6	73.9	23.4	Floor noise
Vert.	11550.000	AV	34.1	39.8	-1.8	33.5	-	38.6	53.9	15.3	Floor noise
Vert.	17325.000	AV	35.7	43.8	-0.3	32.7	-	46.5	53.9	7.4	Floor noise
Vert.	23100.000	AV	34.5	40.3	-1.2	32.3	-	41.4	53.9	12.6	Floor noise

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

Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB
10 GHz - 40 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Report No.	13226743H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	June 25, 2020	June 26, 2020	June 27, 2020
Temperature / Humidity	22 deg. C / 65 % RH	22 deg. C / 67 % RH	22 deg. C / 67 % RH
Engineer	Junki Nagatomi (1 GHz - 10 GHz)	Junki Nagatomi (10 GHz - 18 GHz)	Takeshi Hiyaji (18 GHz - 40 GHz) (Below 1GHz)
Mode	Tx 5825 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	48.000	QP	34.1	11.9	7.4	32.2	-	21.2	40.0	18.8	
Hori.	96.000	QP	44.8	9.6	8.0	32.1	-	30.3	43.5	13.3	
Hori.	120.000	QP	50.6	12.9	8.3	32.1	-	39.7	43.5	3.8	
Hori.	264.000	QP	50.8	12.5	9.7	32.0	-	41.0	46.0	5.0	
Hori.	336.000	QP	46.6	14.7	10.2	32.0	-	39.6	46.0	6.4	
Hori.	480.000	QP	38.3	17.2	11.2	32.0	-	34.7	46.0	11.3	
Hori.	2403.000	PK	59.3	27.7	4.8	32.7	-	59.0	68.2	9.2	
Hori.	3422.000	PK	49.0	28.5	5.3	32.3	-	50.5	68.2	17.7	
Hori.	5850.000	PK	41.0	32.2	6.2	31.8	-	47.6	122.2	74.6	
Hori.	5855.000	PK	40.6	32.2	6.2	31.8	-	47.2	110.8	63.6	
Hori.	5875.000	PK	41.6	32.3	6.3	31.8	-	48.2	105.2	57.0	
Hori.	5925.000	PK	40.9	32.3	6.3	31.9	-	47.6	68.2	20.6	
Hori.	6844.000	PK	54.2	34.5	6.6	32.4	-	62.9	73.9	11.1	
Hori.	7209.000	PK	46.7	36.0	6.7	32.6	-	56.8	68.2	11.4	
Hori.	10266.000	PK	48.5	39.9	-2.4	33.5	-	52.5	68.2	15.7	
Hori.	11650.000	PK	42.8	39.2	-1.8	33.4	-	46.8	73.9	27.1	Floor noise
Hori.	13688.000	PK	46.7	41.6	-0.7	32.9	-	54.8	68.2	13.4	
Hori.	17475.000	PK	43.5	44.7	-0.3	32.7	-	55.3	73.9	18.6	Floor noise
Hori.	23300.000	PK	43.7	40.3	-1.1	32.2	-	50.6	73.9	23.3	Floor noise
Hori.	11650.000	AV	34.2	39.2	-1.8	33.4	-	38.2	53.9	15.7	Floor noise
Hori.	17475.000	AV	35.4	44.7	-0.3	32.7	-	47.1	53.9	6.8	Floor noise
Vert.	48.000	QP	50.0	11.9	7.4	32.2	-	37.1	40.0	2.9	
Vert.	96.000	QP	46.8	9.6	8.0	32.1	-	32.3	43.5	11.3	
Vert.	120.000	QP	48.6	12.9	8.3	32.1	-	37.7	43.5	5.8	
Vert.	264.000	QP	49.0	12.5	9.7	32.0	-	39.2	46.0	6.8	
Vert.	336.000	QP	41.2	14.7	10.2	32.0	-	34.2	46.0	11.8	
Vert.	480.000	QP	35.6	17.2	11.2	32.0	-	32.0	46.0	14.0	
Vert.	2403.000	PK	59.8	27.7	4.8	32.7	-	59.5	68.2	8.7	
Vert.	3422.000	PK	47.5	28.5	5.3	32.3	-	49.1	68.2	19.2	
Vert.	5850.000	PK	41.4	32.2	6.2	31.8	-	48.0	122.2	74.2	
Vert.	5855.000	PK	41.2	32.2	6.2	31.8	-	47.9	110.8	62.9	
Vert.	5875.000	PK	41.3	32.3	6.3	31.8	-	48.0	105.2	57.2	
Vert.	5925.000	PK	40.6	32.3	6.3	31.9	-	47.3	68.2	20.9	
Vert.	6844.000	PK	53.2	34.5	6.6	32.4	-	61.9	68.2	6.3	
Vert.	7209.000	PK	46.2	36.0	6.7	32.6	-	56.3	68.2	11.9	
Vert.	10266.000	PK	46.5	39.9	-2.4	33.5	-	50.5	68.2	17.7	
Vert.	11650.000	PK	42.7	39.2	-1.8	33.4	-	46.7	73.9	27.2	Floor noise
Vert.	13688.000	PK	46.5	41.6	-0.7	32.9	-	54.6	68.2	13.6	
Vert.	17475.000	PK	43.5	44.7	-0.3	32.7	-	55.3	73.9	18.6	Floor noise
Vert.	23300.000	PK	43.7	40.3	-1.1	32.2	-	50.6	73.9	23.3	Floor noise
Vert.	11650.000	AV	34.2	39.2	-1.8	33.4	-	38.2	53.9	15.7	Floor noise
Vert.	17475.000	AV	35.4	44.7	-0.3	32.7	-	47.1	53.9	6.8	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

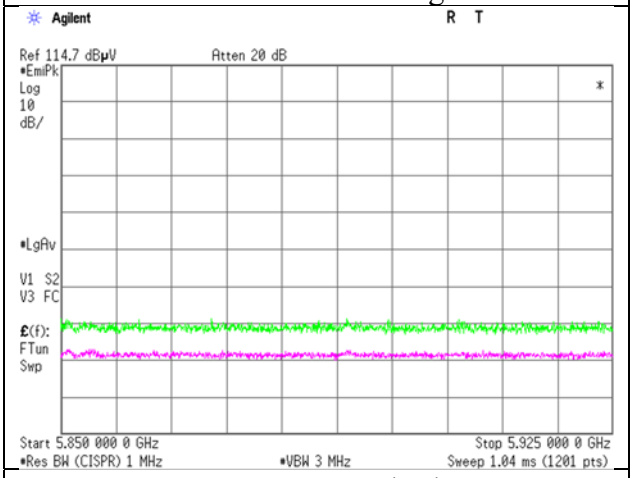
Distance factor: 1 GHz - 10 GHz 20log (3.9 m / 3.0 m) = 2.28 dB
10 GHz - 40 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Report No.	13226743H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	June 25, 2020
Temperature / Humidity	22 deg. C / 65 % RH
Engineer	Junki Nagatomi
	(1 GHz - 10 GHz)
Mode	Tx 5825 MHz

Horizontal

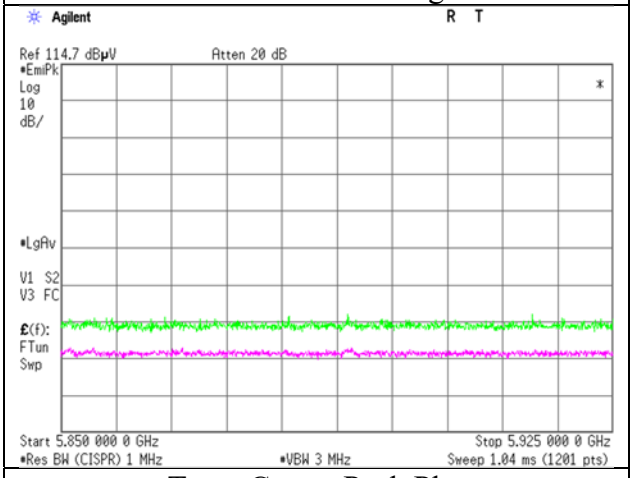
Restricted-band band-edge Plot



Trace Green: Peak Plot
Trace Purple: Average Plot

Vertical

Restricted-band band-edge Plot

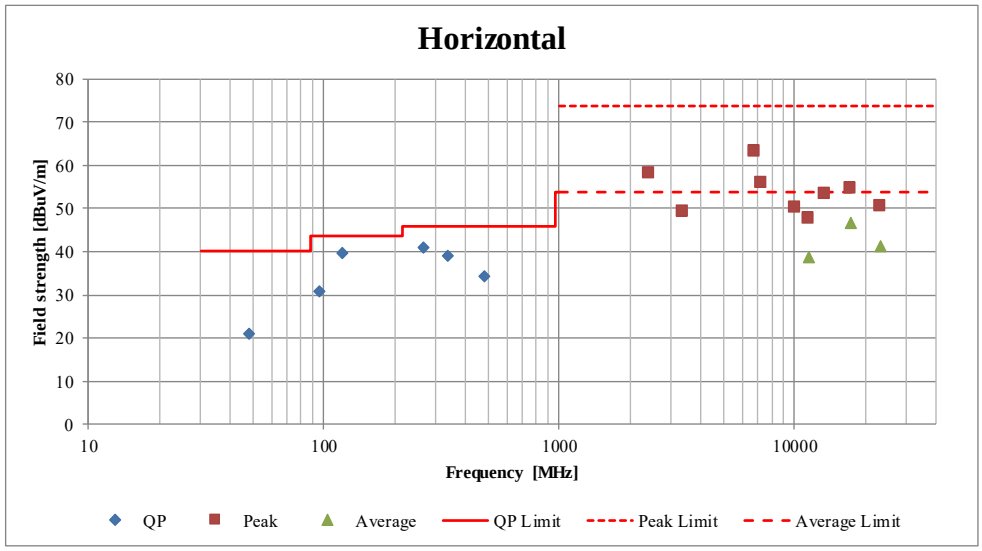


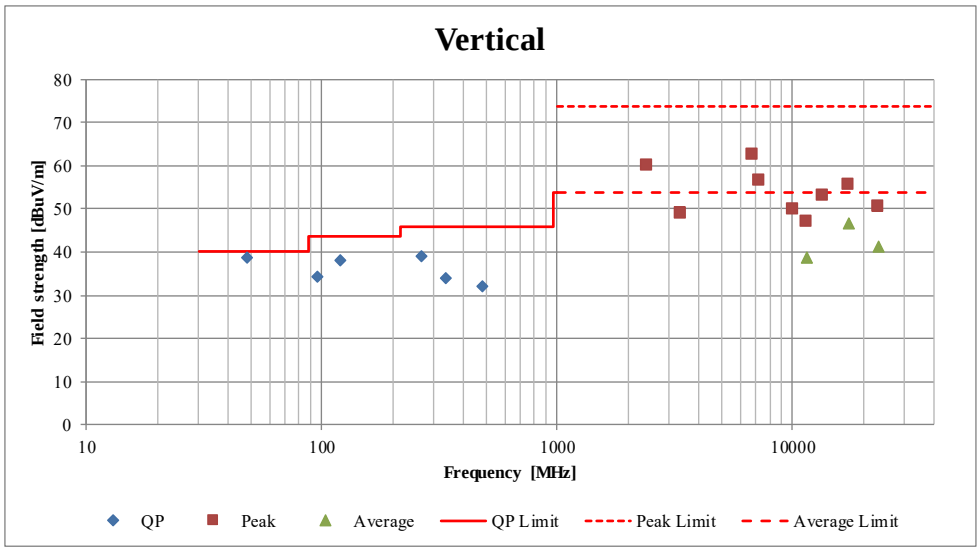
Trace Green: Peak Plot
Trace Purple: Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	13226743H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	June 25, 2020	June 26, 2020	June 27, 2020
Temperature / Humidity	22 deg. C / 65 % RH	22 deg. C / 67 % RH	22 deg. C / 67 % RH
Engineer	Junki Nagatomi (1 GHz - 10 GHz)	Junki Nagatomi (10 GHz - 18 GHz)	Takeshi Hiyaji (18 GHz - 40 GHz) (Below 1GHz)
Mode	Tx 5825 MHz		



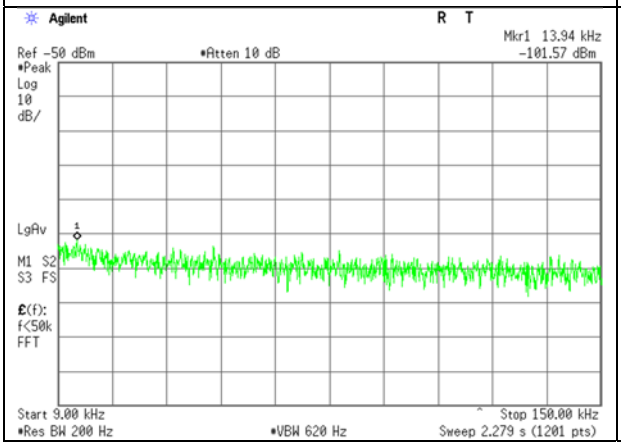


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

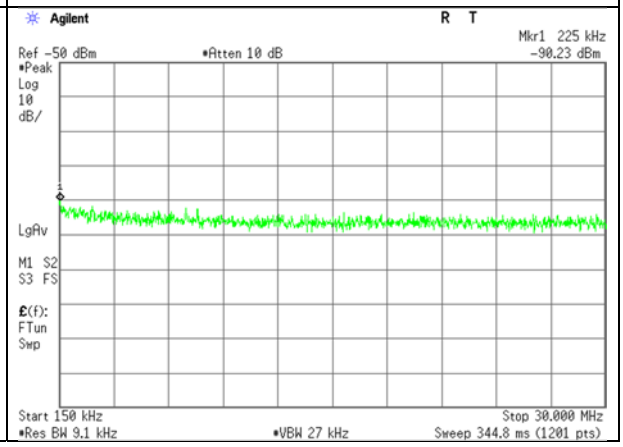
Conducted Spurious Emission

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	March 24, 2020
Temperature / Humidity	24 deg. C / 34 % RH
Engineer	Junki Nagatomi
Mode	Tx 5726 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
13.94	-101.6	2.11	9.8	2.0	1	-87.6	300	6.0	-26.4	44.7	71.1	
225.00	-90.2	2.11	9.8	2.0	1	-76.3	300	6.0	-15.0	20.5	35.5	

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

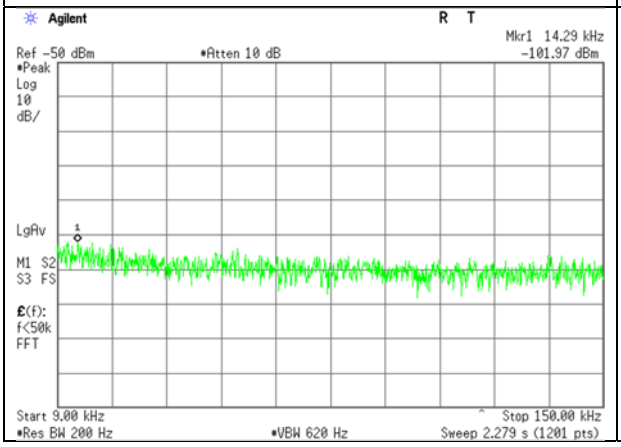
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

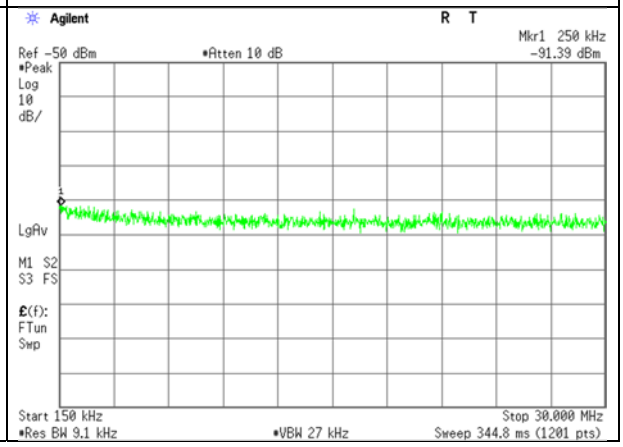
Conducted Spurious Emission

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	March 24, 2020
Temperature / Humidity	24 deg. C / 34 % RH
Engineer	Junki Nagatomi
Mode	Tx 5775 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
14.29	-102.0	2.12	9.8	2.0	1	-88.0	300	6.0	-26.8	44.5	71.3	
250.00	-91.4	2.12	9.8	2.0	1	-77.5	300	6.0	-16.2	19.6	35.8	

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

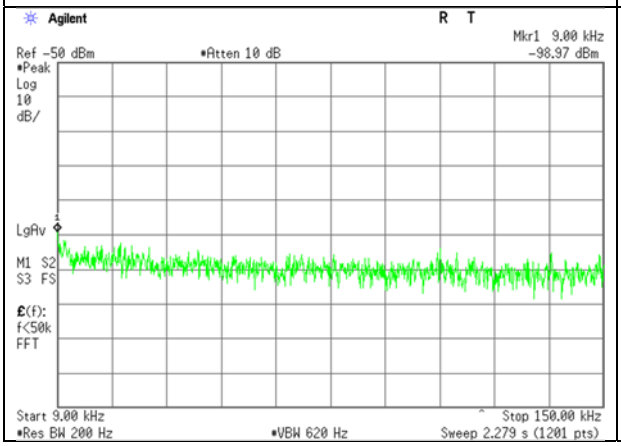
N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

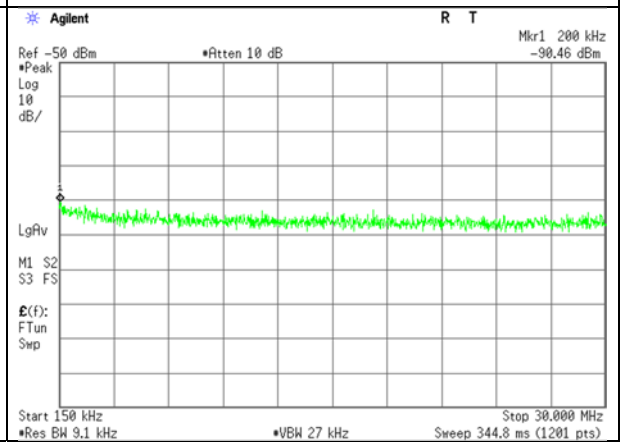
Conducted Spurious Emission

Report No.	13226743H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	March 24, 2020
Temperature / Humidity	24 deg. C / 34 % RH
Engineer	Junki Nagatomi
Mode	Tx 5825 MHz

9 kHz - 150 kHz



150 kHz - 30 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.00	-99.0	2.13	9.8	2.0	1	-85.0	300	6.0	-23.8	48.5	72.3	
200.00	-90.5	2.13	9.8	2.0	1	-76.5	300	6.0	-15.2	21.5	36.7	

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

*2.0 dBi was applied to the test result based on KDB 789033 since antenna gain was less than 2.0 dBi.

APPENDIX 2: Test instruments

Test equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	MSA-10	141899	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180655	2019/08/07	12
AT	MPM-01	141801	Power Meter	Keysight Technologies Inc	E4417A	GB41290639	2020/04/07	12
AT	MPSE-03	141837	Power sensor	Keysight Technologies Inc	E9327A	US40440576	2020/04/07	12
AT	MAT-88	141312	Attenuator	Weinschel Associates	WA56-10	56100304	2020/05/27	12
AT	MCC-66	141328	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	2020/04/02	12
AT	MOS-14	141561	Thermo-Hygrometer	CUSTOM	CTH-201	1401	2020/01/07	12
AT	MAT-10	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	2019/11/07	12
RE	MSA-10	141899	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180655	2019/08/07	12
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM	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	MAEC-03-SVSWR	142013	AC3_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	2019/04/08	24
RE	MHA-20	141507	Horn Antenna 1-18GHz	Schwarzbeck Mess - Elektronik	BBHA9120D	258	2019/09/26	12
RE	MPA-11	141580	MicroWave System Amplifier	Keysight Technologies Inc	83017A	MY39500779	2020/03/24	12
RE	MCC-231	177964	Microwave Cable	Junkosha INC.	MMX221	1901S329(1m)/1902S579(5m)	2020/03/02	12
RE	MAT-95	142314	Attenuator	Pasternack	PE7390-6	D/C 1504	2020/06/17	12
RE	MBA-03	141424	Biconical Antenna	Schwarzbeck Mess - Elektronik	VHA9103+BBA9106	1915	2019/08/24	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	2019/08/24	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	2020/02/10	12
RE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	2020/03/10	12
RE	MHA-29	141517	Horn Antenna 26.5-40GHz	ETS LINDGREN	3160-10	152399	2019/09/19	12
RE	MCC-224	160324	Coaxial Cable	Huber+Suhner	SUCOFLEX 102A	MY009/2A	2019/11/22	12
RE	MPA-22	141588	Pre Amplifier	MITEQ, Inc	AMF-6F-2600400-33-8P / AMF-4F-2600400-33-8P	1871355 /1871328	2019/09/27	12
RE/CE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	2020/03/10	12
RE/CE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2020/05/25	24
RE/CE	MOS-15	141562	Thermo-Hygrometer	CUSTOM	CTH-201	0010	2020/01/07	12
RE/CE	MMM-10	141545	DIGITAL HiTESTER	Hioki	3805	51201148	2020/01/06	12
RE/CE	MJM-26	142227	Measure	KOMELON	KMC-36	-	-	-
RE/CE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	MLS-23	141357	LISN(AMN)	Schwarzbeck Mess - Elektronik	NSLK8127	8127-729	2019/07/05	12
CE	MLS-24	141358	LISN(AMN)	Schwarzbeck Mess - Elektronik	NSLK8127	8127-730	2019/07/05	12
CE	MTA-52	141934	Terminator	TME	CT-01BP	-	2019/12/02	12
CE	MAT-67	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	2019/12/02	12
CE	MCC-112	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14/sucoform141-PE/421-010/RFM-E321(SW)	-/00640	2020/07/06	12

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

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

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

Test item:

CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test