



RADIO TEST REPORT

Test Report No. : 13128136H-A-R4

Applicant : silex technology, Inc.
Type of EUT : Embedded Wireless Module
Model Number of EUT : SX-NEWAH
FCC ID : N6C-SXNEWAH
Test regulation : FCC Part 15 Subpart C: 2019
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 13128136H-A-R3. 13128136H-A-R3 is replaced with this report.

Date of test: March 13 to 23, 2020

Representative test engineer:

T. Noguchi

Takafumi Noguchi
Engineer

Consumer Technology Division

Approved by:

S. Matsuyama

Satofumi Matsuyama
Engineer

Consumer Technology Division



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".

UL Japan, Inc.
Ise EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124

REVISION HISTORY

Original Test Report No.: 13128136H-A

Revision	Test report No.	Date	Page revised	Contents																																																																																																																																																																																																																																																																																																																																																																																		
- (Original)	13128136H-A	April 6, 2020	-	-																																																																																																																																																																																																																																																																																																																																																																																		
1	13128136H-A-R1	April 23, 2020	P 9	• Correction of Power settings in SECTION 4.1 <table><tr><th>1MHz</th><th>903.5MHz</th><th>915.5MHz</th><th>926.5MHz</th></tr><tr><td>0.1.2.3.4.5.10</td><td>26</td><td>26</td><td>25</td></tr><tr><th>2MHz</th><th>905.0MHz</th><th>917.0MHz</th><th>925.0MHz</th></tr><tr><td>26</td><td>26</td><td>26</td><td>25</td></tr><tr><th>4MHz</th><th>910.0MHz</th><th>918.0MHz</th><th>922.0MHz</th></tr><tr><td>25</td><td>25</td><td>25</td><td>25</td></tr></table> → <table><tr><th>1MHz</th><th>903.5MHz</th><th>915.5MHz</th><th>926.5MHz</th></tr><tr><td>0.1.2.3.4.5.10</td><td>26</td><td>26</td><td>25</td></tr><tr><td>6</td><td>22</td><td>22</td><td>22</td></tr><tr><td>7</td><td>19</td><td>19</td><td>19</td></tr><tr><th>2MHz</th><th>905.0MHz</th><th>917.0MHz</th><th>925.0MHz</th></tr><tr><td>0.1.2.3.4.</td><td>26</td><td>26</td><td>25</td></tr><tr><td>5</td><td>25</td><td>25</td><td>25</td></tr><tr><td>6</td><td>20</td><td>20</td><td>20</td></tr><tr><td>7</td><td>19</td><td>19</td><td>19</td></tr><tr><th>4MHz</th><th>910.0MHz</th><th>918.0MHz</th><th>922.0MHz</th></tr><tr><td>0.1.2.3.4.5</td><td>25</td><td>25</td><td>25</td></tr><tr><td>6</td><td>20</td><td>20</td><td>20</td></tr><tr><td>7</td><td>19</td><td>19</td><td>19</td></tr></table> • Correction of Remarks of IEEE 802.11ah (2 MHz) in SECTION 4.1 MCS 7→MCS 0	1MHz	903.5MHz	915.5MHz	926.5MHz	0.1.2.3.4.5.10	26	26	25	2MHz	905.0MHz	917.0MHz	925.0MHz	26	26	26	25	4MHz	910.0MHz	918.0MHz	922.0MHz	25	25	25	25	1MHz	903.5MHz	915.5MHz	926.5MHz	0.1.2.3.4.5.10	26	26	25	6	22	22	22	7	19	19	19	2MHz	905.0MHz	917.0MHz	925.0MHz	0.1.2.3.4.	26	26	25	5	25	25	25	6	20	20	20	7	19	19	19	4MHz	910.0MHz	918.0MHz	922.0MHz	0.1.2.3.4.5	25	25	25	6	20	20	20	7	19	19	19																																																																																																																																																																																																																																																																																																						
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1	13128136H-A-R1	April 23, 2020	P 15	• Correction of Span, Detector and Trace for Peak Power Density in Test Procedure of SECTION 7 Span:1.5 times the 6dB Bandwidth→1.5 times the OBW Detector: Peak→Average Trace: Max Hold→100 traces • Correction of explanatory note *2) in Test Procedure of SECTION 7 ‘Section 11.10.2 Method PKPSD (peak PSD) of "ANSI C63.10-2013".’ → ‘Section 11.10.3 Method AVGPSD-1 of "ANSI C63.10-2013".’																																																																																																																																																																																																																																																																																																																																																																																		
1	13128136H-A-R1	April 23, 2020	P 33, 34, 35	• Addition of below explanatory note *1. of Maximum Average Output Power in APPENDIX 1: Test data *1.Duty factor is 98% or more, so Duty factor is not added. • Correction of rate of Maximum Average Output Power in APPENDIX 1: Test data 1 MHz: <table><tr><th colspan="5">915.5MHz</th><th colspan="5">915.5MHz</th></tr><tr><th>Rate</th><th>Reading</th><th>Reading</th><th>Remark</th><th></th><th>Rate</th><th>Reading</th><th>Reading</th><th>Remark</th><th></th></tr><tr><th>MCS</th><th>LGI</th><th>SGI</th><th></th><th></th><th>MCS</th><th>LGI</th><th>SGI</th><th></th><th></th></tr><tr><th></th><th>[dBm]</th><th>[dBm]</th><th></th><th></th><th></th><th>[dBm]</th><th>[dBm]</th><th></th><th></th></tr><tr><td>10</td><td>7.81</td><td>7.74</td><td>*LGI</td><td></td><td>10</td><td>6.77</td><td>6.73</td><td>*LGI</td><td></td></tr><tr><td>0</td><td>7.69</td><td>-</td><td></td><td></td><td>0</td><td>6.51</td><td>-</td><td></td><td></td></tr><tr><td>1</td><td>7.71</td><td>-</td><td></td><td></td><td>1</td><td>6.35</td><td>-</td><td></td><td></td></tr><tr><td>2</td><td>7.67</td><td>-</td><td></td><td></td><td>2</td><td>6.72</td><td>-</td><td></td><td></td></tr><tr><td>3</td><td>7.69</td><td>-</td><td></td><td></td><td>3</td><td>6.67</td><td>-</td><td></td><td></td></tr><tr><td>4</td><td>7.73</td><td>-</td><td></td><td></td><td>4</td><td>6.58</td><td>-</td><td></td><td></td></tr><tr><td>5</td><td>7.75</td><td>-</td><td></td><td></td><td>5</td><td>6.53</td><td>-</td><td></td><td></td></tr><tr><td>6</td><td>7.76</td><td>-</td><td></td><td></td><td>6</td><td>0.79</td><td>-</td><td></td><td></td></tr><tr><td>7</td><td>7.77</td><td>-</td><td></td><td></td><td>7</td><td>-0.99</td><td>-</td><td></td><td></td></tr></table> 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2	13128136H-A-R2	April 24, 2020	P 15	Addition of Span for 6dB Bandwidth in Test Procedure of SECTION 7 3 MHz (for 1MHz) /5 MHz (for 2MHz) /7 MHz (for 4MHz)																																																																																																																																																																																																																																																																																																																																																																																		
3	13128136H-A-R3	May 14, 2020	P 6	Correction of Sentences of FCC Part 15.31 (e) in SECTION 3.2 The RF Module has its own regulator. The RF Module is constantly provided voltage through the regulator regardless of input voltage. →The EUT has the power supply regulator. However one of the input voltages to RF part doesn't go through the regulator. The stable voltage will be supplied by the end product, which will be required to have a power supply regulator.																																																																																																																																																																																																																																																																																																																																																																																		
4	13128136H-A-R4	May 21, 2020	P 6	Correction of Sentences of FCC Part 15.31 (e) in SECTION 3.2 The stable voltage will be supplied by the end product, which will be required to have a power supply regulator.→ The stable voltage was supplied to the EUT from the host jig during the tests.																																																																																																																																																																																																																																																																																																																																																																																		

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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	:	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	:	Katsutoshi Daikoku

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 (E.U.T.), other than Receipt Date
- SECTION 4: Operation of E.U.T. 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	:	Embedded Wireless Module
Model Number	:	SX-NEWAH
Serial Number	:	Refer to SECTION 4.2
Rating	:	DC 4 V, DC 3.3 V
Receipt Date	:	February 16, 2020
Country of Mass-production	:	Japan
Condition	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: SX-NEWAH (referred to as the EUT in this report) is a Embedded Wireless Module.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	1 MHz: 903.5 MHz to 926.5 MHz 2 MHz: 905.0 MHz to 925.0 MHz 4 MHz: 910.0 MHz to 922.0 MHz
Modulation	:	OFDM with BPSK, QPSK, 16QAM, 64QAM
Antenna type	:	PCB Antenna ROD Antenna
Antenna Gain	:	PCB Antenna: 3.0 dBi ROD Antenna: 3.4 dBi
Clock frequency (Maximum)	:	32 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019 except 15.258

Title : FCC 47 CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz,
and 5725-5850 MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ISED: RSS-Gen 8.8	FCC: Section 15.207 ISED: RSS-Gen 8.8	10.18 dB 0.28050 MHz, QP	Complied a)	-
6dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(2) ISED: RSS-247 5.2(a)	See data.	Complied b)	Conducted
Maximum Average Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(b)(3) ISED: RSS-247 5.4(d)		Complied c)	Conducted
Power Density	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(e) ISED: RSS-247 5.2(b)		Complied d)	Conducted
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.1 dB 960.000 MHz QP, Horizontal (PCB Antenna)	Complied# e), f)	Conducted (below 30 MHz)/ Radiated (above 30 MHz) *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 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02 8.5 and 8.6.

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

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)

The EUT has the power supply regulator.
However one of the input voltages to RF part doesn't go through the regulator.
The stable voltage was supplied to the EUT from the host jig during the tests.
Therefore, the 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.

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3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	RSS-Gen 6.7	ISED: -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 6 dB Bandwidth and 99 % Occupied Bandwidth)					

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

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the 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 $k=2$.
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Antenna Terminal test

Test Item	Uncertainty (+/-)
20 dB Bandwidth / 99 % Occupied Bandwidth	0.96 %
Maximum Peak Output Power / Average Output Power	1.4 dB
Carrier Frequency Separation	0.42 %
Dwell time / Burst rate	0.10 %
Conducted Spurious Emission	2.6 dB

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) (Vertical)	4.8 dB
		5.0 dB
	200 MHz to 1000 MHz (Horizontal) (Vertical)	5.2 dB
		6.3 dB
10 m	30 MHz to 200 MHz (Horizontal) (Vertical)	4.8 dB
		4.8 dB
	200 MHz to 1000 MHz (Horizontal) (Vertical)	5.0 dB
		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

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3.5 Test Location

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*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

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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.

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SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009

Mode	Remarks*
IEEE 802.11ah (1 MHz)	MCS 10, PN9
IEEE 802.11ah (2 MHz)	MCS 0, PN9
IEEE 802.11ah (4 MHz)	MCS 0, PN9
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: Refer to below table Software: nrc7292_lmactest_freertos.bin nrc7292_boot.bin	
*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.	

<Power settings>

1MHz	903.5MHz	915.5MHz	926.5MHz
0.1.2.3.4.5.10	26	26	25
6	22	22	22
7	19	19	19
2MHz	905.0MHz	917.0MHz	925.0MHz
0.1.2.3.4.	26	26	25
5	25	25	25
6	20	20	20
7	19	19	19
4MHz	910.0MHz	918.0MHz	922.0MHz
0.1.2.3.4.5	25	25	25
6	20	20	20
7	19	19	19

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission *1)	Tx (1MHz)	915.5 MHz
	Tx (2MHz)	917.0 MHz
	Tx (4 MHz)	910.0 MHz
6dB Bandwidth 99 % Occupied Bandwidth Maximum Average Output Power Radiated Spurious Emission Conducted Spurious Emission Power Density	Tx (1MHz)	903.5 MHz
		915.5 MHz
		926.5 MHz
	Tx (2MHz)	905.0 MHz
		917.0 MHz
		925.0 MHz
	Tx (4 MHz)	910.0 MHz
		918.0 MHz
		922.0 MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.		

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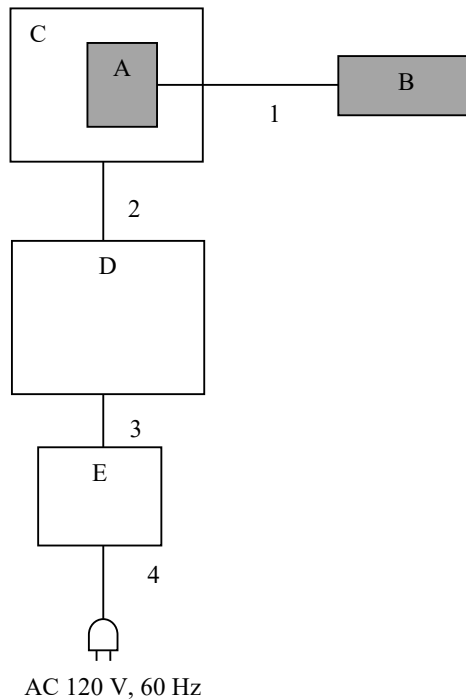
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4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Embedded Wireless Module	SX-NEWAH	84253F014013	silex technology, Inc.	EUT
B	PCB Antenna	T16-062-1022	001	STAF	EUT
	ROD Antenna	9000984-XLPDNB	001	ethertronics	EUT
C	Jig board	SX-NEWAH-EVK	ZXE04198	silex technology, Inc.	-
D	Laptop PC	Latitude 5590	8178787478	Dell	-
E	AC adaptor	LA90PM130	CN-05GT3K-L0C00-8A-4F28-A02	Dell	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.15	Shielded	Shielded	-
2	USB Cable	1.90	Shielded	Shielded	-
3	DC Cable	1.80	Unshielded	Unshielded	-
4	AC Cable	1.00	Unshielded	Unshielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

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

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

1) 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 50ohm 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.

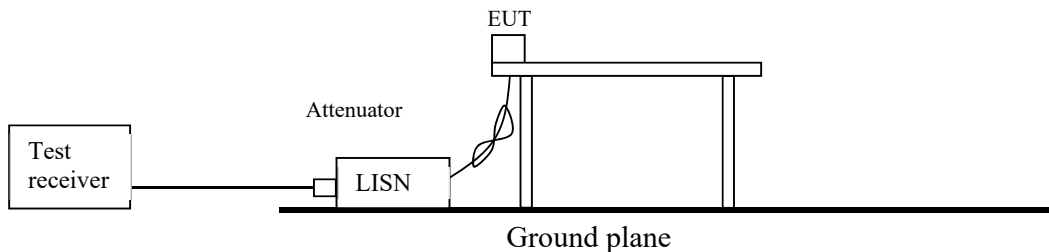
The EUT was connected to a LISN (AMN).

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 AV
Measurement range	: 0.15 MHz - 30 MHz
Test data	: APPENDIX
Test result	: Pass

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "8.5 and 8.6 of KDB 558074 D01 15.247 Meas Guidance v05r02".

[For below 1 GHz]

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.

[For above 1 GHz]

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.

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

In any 100 kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

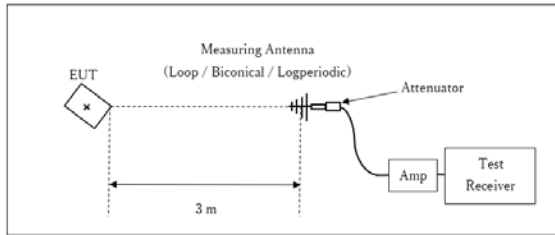
30 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9(ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		30 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	<u>11.12.2.5.1</u> RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces <u>11.12.2.5.2</u> The duty cycle was less than 98% for detected noise, a duty factor was added to the 11.12.2.5.1 results.	RBW: 100 kHz VBW: 300 kHz

*1) Average Power Measurement was performed based on ANSI C63.10-2013.

Figure 2: Test Setup

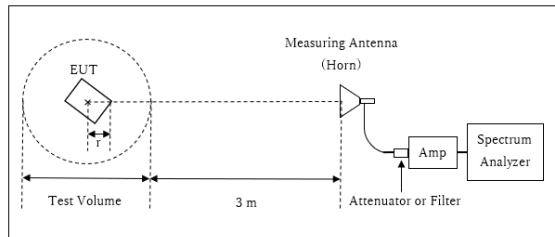
Below 1 GHz



x : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



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

Distance Factor: $20 \times \log (3.9 \text{ m} / 3.0 \text{ m}) = 2.28 \text{ dB}$

* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.9 \text{ m}$

Test Volume : 2.0 m

(Test Volume has been calibrated based on CISPR 16-1-4.)

$r = 0.1 \text{ m}$

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT and antennas 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 -10 GHz
Test data	: APPENDIX
Test result	: Pass

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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
6dB Bandwidth	3 MHz (for 1MHz) 5 MHz (for 2MHz) 7 MHz (for 4MHz)	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Average Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 50 MHz BW)
Peak Power Density	1.5 times the OBW	3 kHz	10 kHz	Auto	Average	100 traces	Spectrum Analyzer
Conducted Spurious Emission *3) *4)	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1 kHz	27 kHz				

*1) Peak hold was applied as Worst-case measurement.

*2) Section 11.10.3 Method AVGPSD-1 of "ANSI C63.10-2013".

*3) In the frequency range below 30MHz, 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)

*4) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to 45.5 – 51.5 = -6.0 dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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

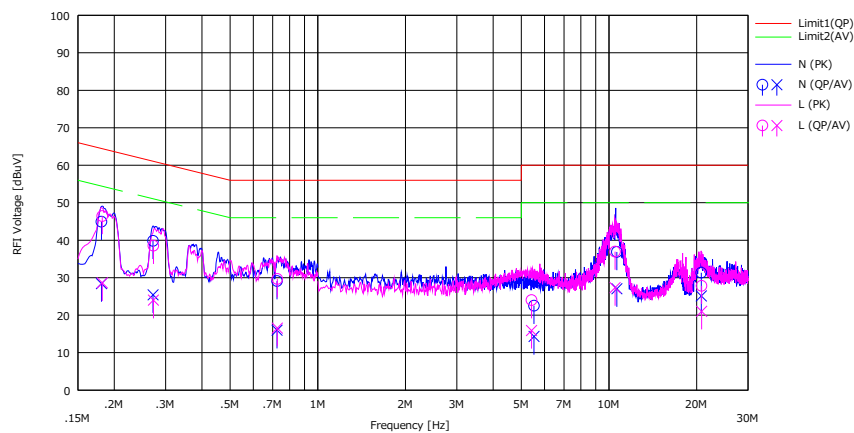
APPENDIX 1: Test data

Conducted Emission

Report No. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 915.5 MHz (1 MHz)

(PCB Antenna)

Limit : FCC_Part 15 Subpart C(15.207)

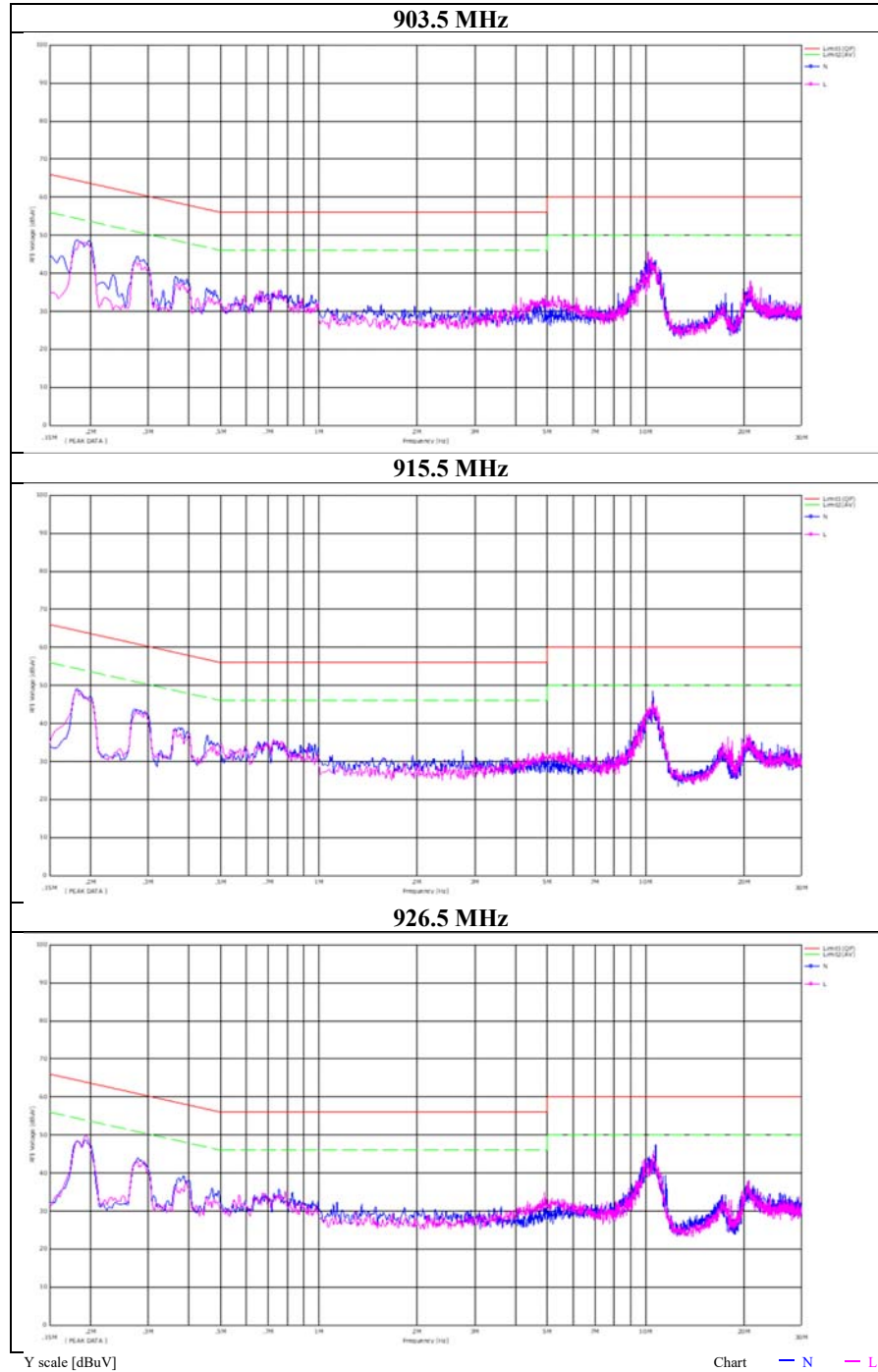


No.	Freq. [MHz]	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP)	(AV)			(QP)	(AV)	(QP)	(AV)	(QP)	(AV)		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.18080	31.70	15.20	0.07	13.14	44.91	28.41	64.40	54.40	19.49	25.99	N	
2	0.27170	26.60	12.20	0.07	13.15	39.82	25.42	61.10	51.10	21.28	25.68	N	
3	0.72430	15.80	2.70	0.08	13.19	29.07	15.97	56.00	46.00	26.93	30.03	N	
4	5.52400	8.90	0.70	0.15	13.46	22.51	14.31	60.00	50.00	37.49	35.69	N	
5	10.64000	23.00	13.20	0.23	13.61	36.84	27.04	60.00	50.00	23.16	22.96	N	
6	20.74000	17.10	10.90	0.39	13.84	31.33	25.13	60.00	50.00	28.67	24.87	N	
7	0.18190	33.20	15.40	0.07	13.14	46.41	28.61	64.40	54.40	17.99	25.79	L	
8	0.27250	25.30	10.80	0.06	13.15	38.51	24.01	61.00	51.00	22.49	26.99	L	
9	0.72590	16.40	3.30	0.05	13.19	29.64	16.54	56.00	46.00	26.36	29.46	L	
10	5.42000	10.40	2.30	0.16	13.44	24.00	15.90	60.00	50.00	36.00	34.10	L	
11	10.49000	23.10	13.50	0.25	13.60	36.95	27.35	60.00	50.00	23.05	22.65	L	
12	20.78000	13.50	6.70	0.48	13.84	27.82	21.02	60.00	50.00	32.18	28.98	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. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 915.5 MHz (1 MHz)



UL Japan, Inc.

Ise EMC Lab.

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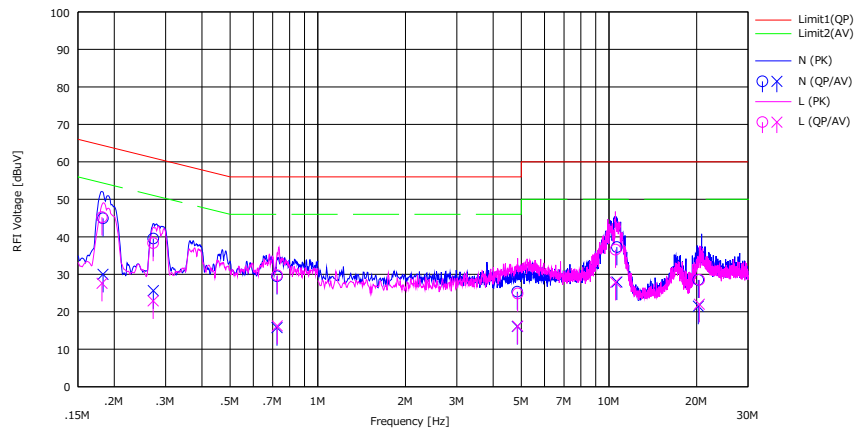
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

Report No. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 917.0 MHz (2 MHz)

Limit : FCC_Part 15 Subpart C(15.207)

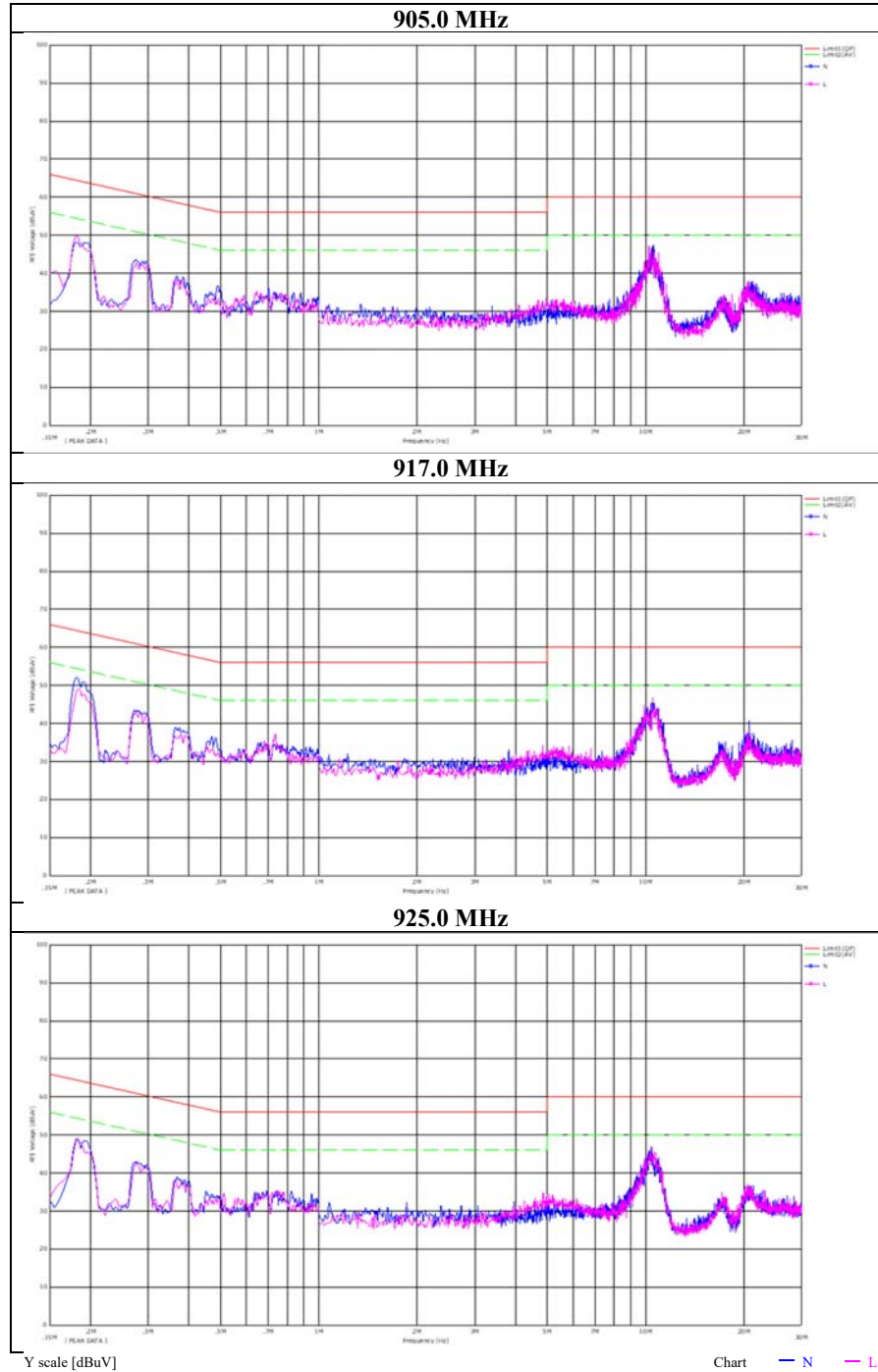


No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.18300	31.70	16.80	0.07	13.14	44.91	30.01	64.30	54.30	19.39	24.29	N	
2	0.27230	26.30	12.40	0.07	13.15	39.52	25.62	61.00	51.00	21.48	25.38	N	
3	0.72380	16.20	2.50	0.08	13.19	29.47	15.77	56.00	46.00	26.53	30.23	N	
4	4.84060	11.80	2.50	0.14	13.42	25.36	16.06	56.00	46.00	30.64	29.94	N	
5	10.64000	23.40	14.10	0.23	13.61	37.24	27.94	60.00	50.00	22.76	22.06	N	
6	20.26000	14.30	7.30	0.38	13.83	28.51	21.51	60.00	50.00	31.49	28.49	N	
7	0.18150	32.00	14.40	0.07	13.14	45.21	27.61	64.40	54.40	19.19	26.79	L	
8	0.27190	25.10	9.70	0.06	13.15	38.31	22.91	61.10	51.10	22.79	28.19	L	
9	0.72530	16.50	3.00	0.05	13.19	29.74	16.24	56.00	46.00	26.26	29.76	L	
10	4.85680	11.30	2.60	0.15	13.42	24.87	16.17	56.00	46.00	31.13	29.83	L	
11	10.53000	22.70	14.00	0.25	13.60	36.55	27.85	60.00	50.00	23.45	22.15	L	
12	20.42000	14.20	7.70	0.47	13.84	28.51	22.01	60.00	50.00	31.49	27.99	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. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 917.0 MHz (2 MHz)



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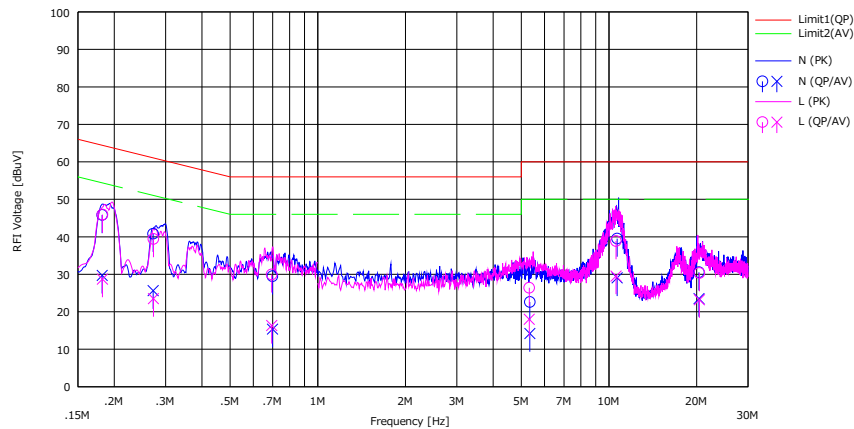
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

Report No. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 910.0 MHz (4 MHz)

Limit : FCC_Part 15 Subpart C(15.207)

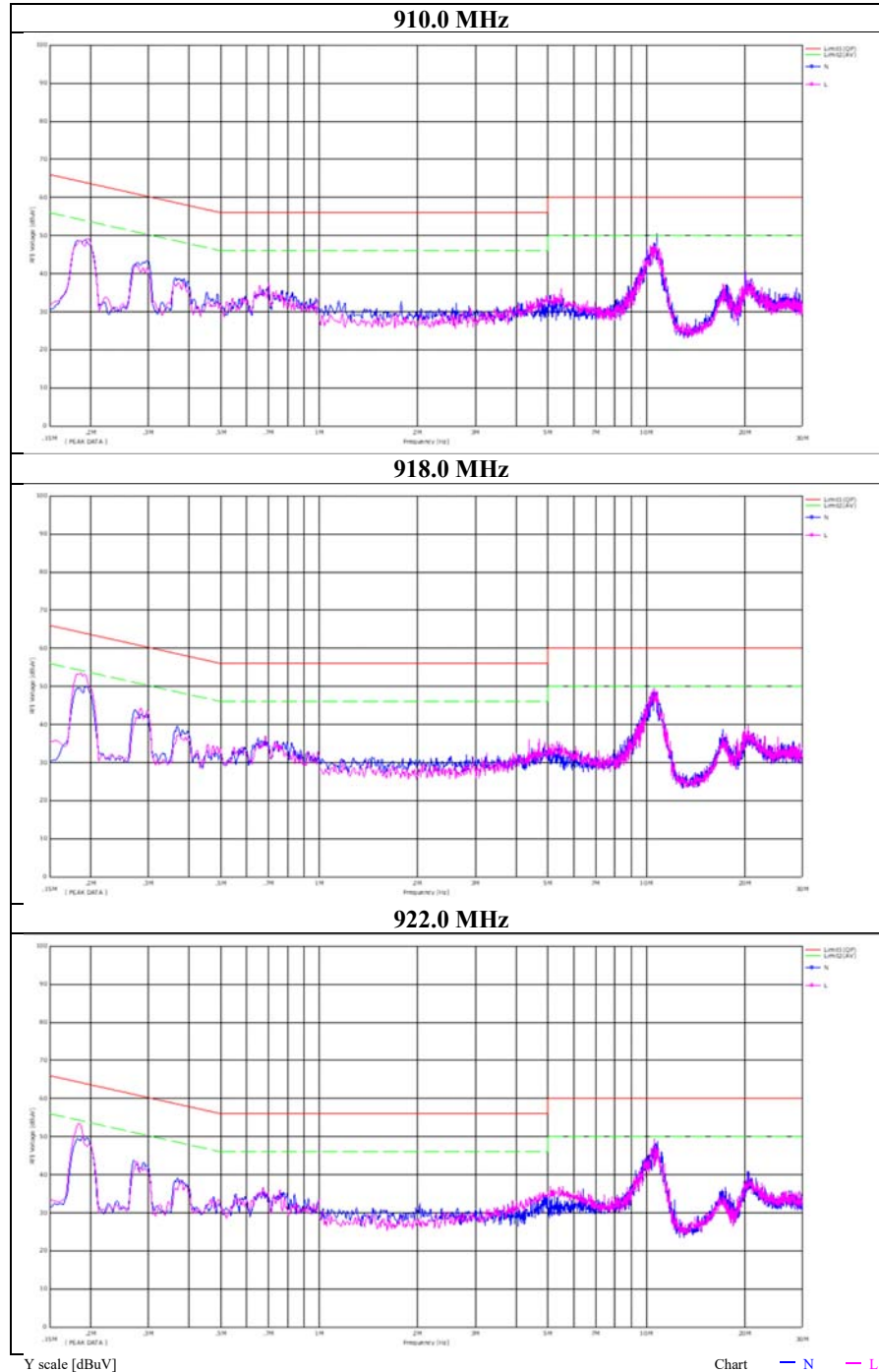


No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.18180	32.60	16.50	0.07	13.14	45.81	29.71	64.40	54.40	18.59	24.69	N	
2	0.27200	27.60	12.40	0.07	13.15	40.82	25.62	61.10	51.10	20.28	25.48	N	
3	0.69845	16.20	2.10	0.08	13.19	29.47	15.37	56.00	46.00	26.53	30.63	N	
4	5.34700	9.00	0.60	0.15	13.44	22.59	14.19	60.00	50.00	37.41	35.81	N	
5	10.66000	25.70	15.20	0.23	13.61	39.54	29.04	60.00	50.00	20.46	20.96	N	
6	20.36000	16.30	9.30	0.38	13.84	30.52	23.52	60.00	50.00	29.48	26.48	N	
7	0.18220	32.70	15.50	0.07	13.14	45.91	28.71	64.40	54.40	18.49	25.69	L	
8	0.27250	26.20	10.30	0.06	13.15	39.41	23.51	61.00	51.00	21.59	27.49	L	
9	0.69490	16.70	3.10	0.05	13.19	29.94	16.34	56.00	46.00	26.06	29.66	L	
10	5.32000	12.80	4.40	0.16	13.44	26.40	18.00	60.00	50.00	33.60	32.00	L	
11	10.56400	25.00	15.70	0.25	13.60	38.85	29.55	60.00	50.00	21.15	20.45	L	
12	20.44000	16.00	8.90	0.47	13.84	30.31	23.21	60.00	50.00	29.69	26.79	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. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 910.0 MHz (4 MHz)



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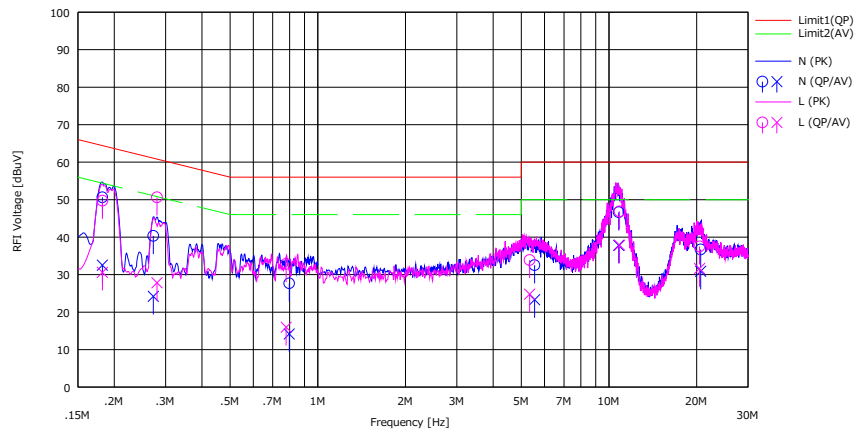
Facsimile : +81 596 24 8124

Conducted Emission

Report No. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 915.5 MHz (1 MHz)

(ROD Antenna)

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.18200	37.40	19.30	0.07	13.14	50.61	32.51	64.40	54.40	13.79	21.89	N	
2	0.27229	27.10	11.00	0.07	13.15	40.32	24.22	61.00	51.00	20.68	26.78	N	
3	0.79800	14.40	0.90	0.08	13.20	27.68	14.18	56.00	46.00	28.32	31.82	N	
4	5.55000	18.90	9.70	0.15	13.46	32.51	23.31	60.00	50.00	27.49	26.69	N	
5	10.79000	32.80	24.00	0.23	13.61	46.64	37.84	60.00	50.00	13.36	12.16	N	
6	20.64000	22.50	16.70	0.39	13.84	36.73	30.93	60.00	50.00	23.27	19.07	N	
7	0.18220	36.50	17.40	0.07	13.14	49.71	30.61	64.40	54.40	14.69	23.79	L	
8	0.28050	37.40	14.60	0.06	13.16	50.62	27.82	60.80	50.80	10.18	22.98	L	
9	0.77880	19.60	2.70	0.06	13.20	32.86	15.96	56.00	46.00	23.14	30.04	L	
10	5.34000	20.30	11.20	0.16	13.44	33.90	24.80	60.00	50.00	26.10	25.20	L	
11	10.86800	33.00	24.00	0.26	13.61	46.87	37.87	60.00	50.00	13.13	12.13	L	
12	20.46000	23.20	17.30	0.47	13.84	37.51	31.61	60.00	50.00	22.49	18.39	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.

UL Japan, Inc.

Ise EMC Lab.

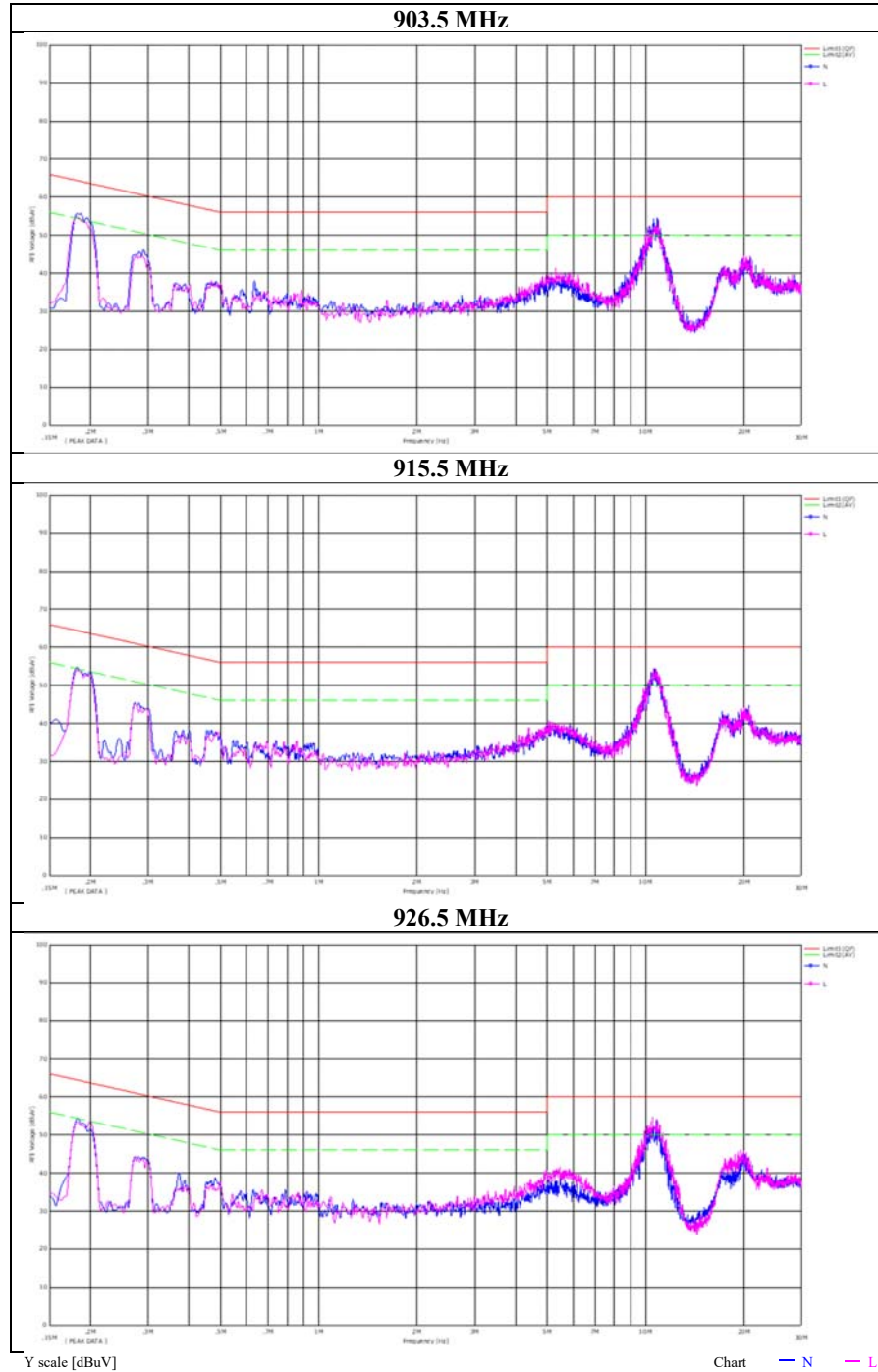
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Facsimile : +81 596 24 8124

Conducted Emission

Report No. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 915.5 MHz (1 MHz)



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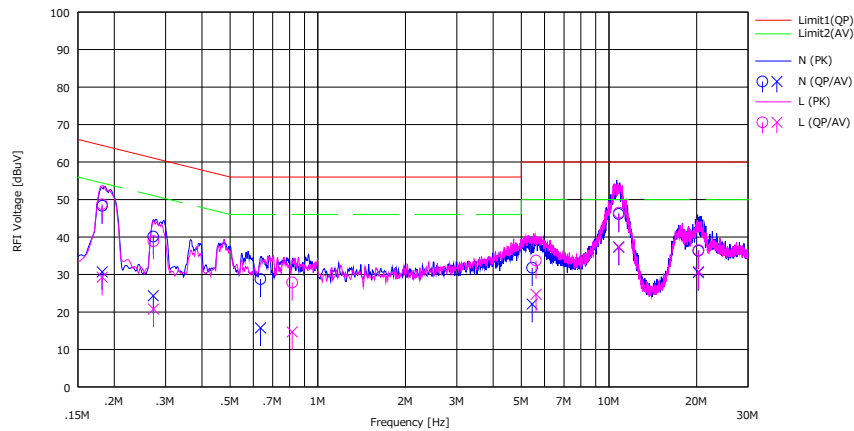
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

Report No. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 917.0 MHz (2 MHz)

Limit : FCC_Part 15 Subpart C(15.207)

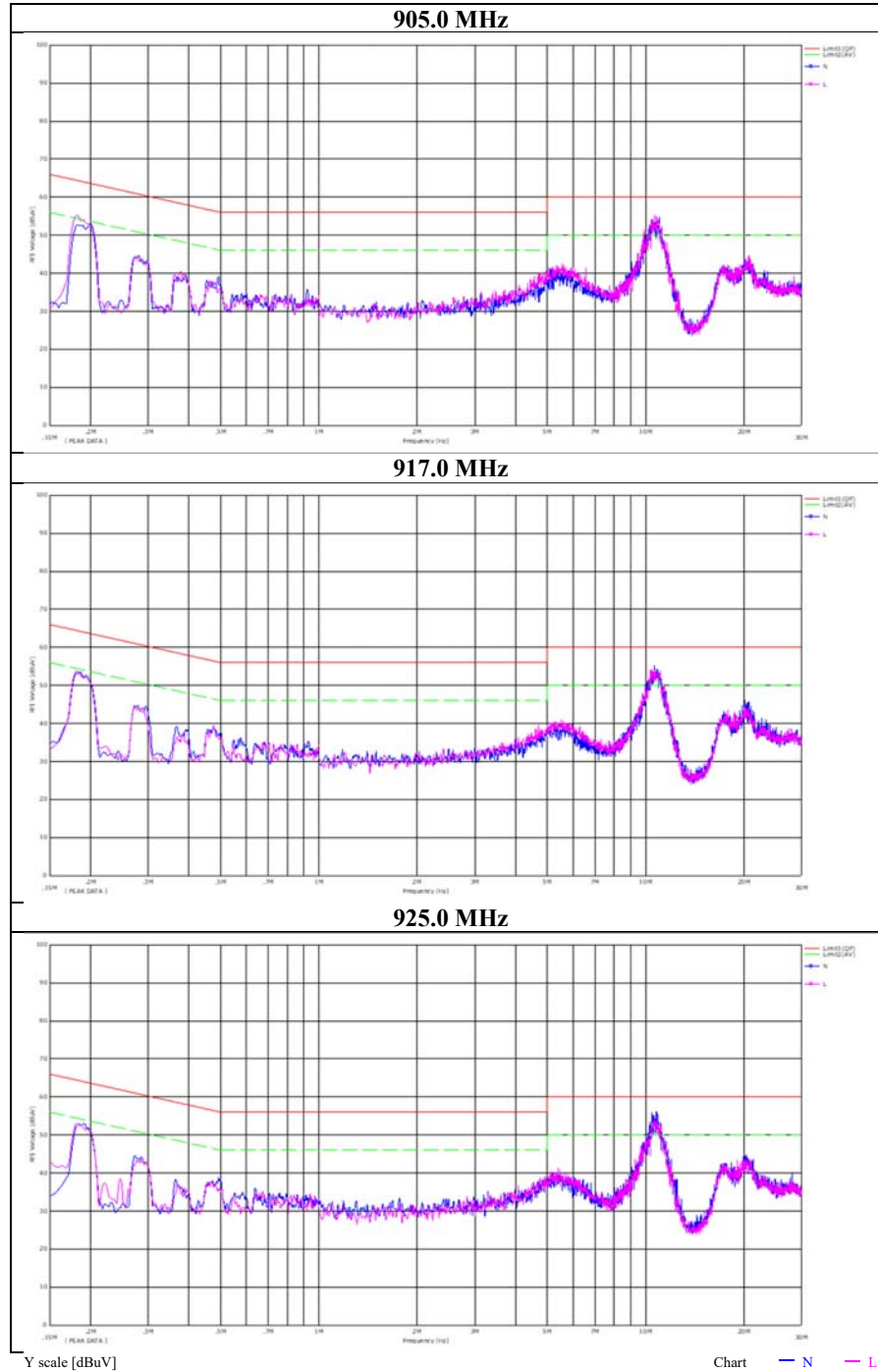


No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		[QP] [dBuV]	[AV] [dBuV]			[QP] [dBuV]	[AV] [dBuV]	[QP] [dBuV]	[AV] [dBuV]	[QP] [dB]	[AV] [dB]		
1	0.18180	35.10	17.50	0.07	13.14	48.31	30.71	64.40	54.40	16.09	23.69	N	
2	0.27215	26.90	11.10	0.07	13.15	40.12	24.32	61.10	51.10	20.98	26.78	N	
3	0.63530	15.50	2.50	0.08	13.18	28.76	15.76	56.00	46.00	27.24	30.24	N	
4	5.44400	18.20	8.50	0.15	13.44	31.79	22.09	60.00	50.00	28.21	27.91	N	
5	10.79000	32.30	23.50	0.23	13.61	46.14	37.34	60.00	50.00	13.86	12.66	N	
6	20.26000	22.10	16.30	0.38	13.83	36.31	30.51	60.00	50.00	23.69	19.49	N	
7	0.18180	35.50	16.10	0.07	13.14	48.71	29.31	64.40	54.40	15.69	25.09	L	
8	0.27275	25.70	7.60	0.06	13.15	38.91	20.81	61.00	51.00	22.09	30.19	L	
9	0.81660	14.60	1.40	0.06	13.20	27.86	14.66	56.00	46.00	28.14	31.34	L	
10	5.61400	20.10	11.10	0.16	13.46	33.72	24.72	60.00	50.00	26.28	25.28	L	
11	10.80800	32.60	23.40	0.26	13.61	46.47	37.27	60.00	50.00	13.53	12.73	L	
12	20.30000	22.20	16.50	0.46	13.84	36.50	30.80	60.00	50.00	23.50	19.20	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. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 917.0 MHz (2 MHz)



UL Japan, Inc.

Ise EMC Lab.

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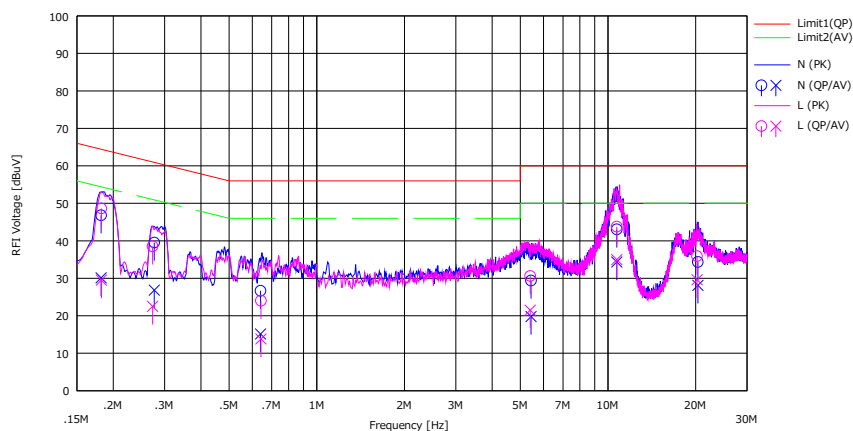
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

Report No. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 910.0 MHz (4 MHz)

Limit : FCC_Part 15 Subpart C(15.207)

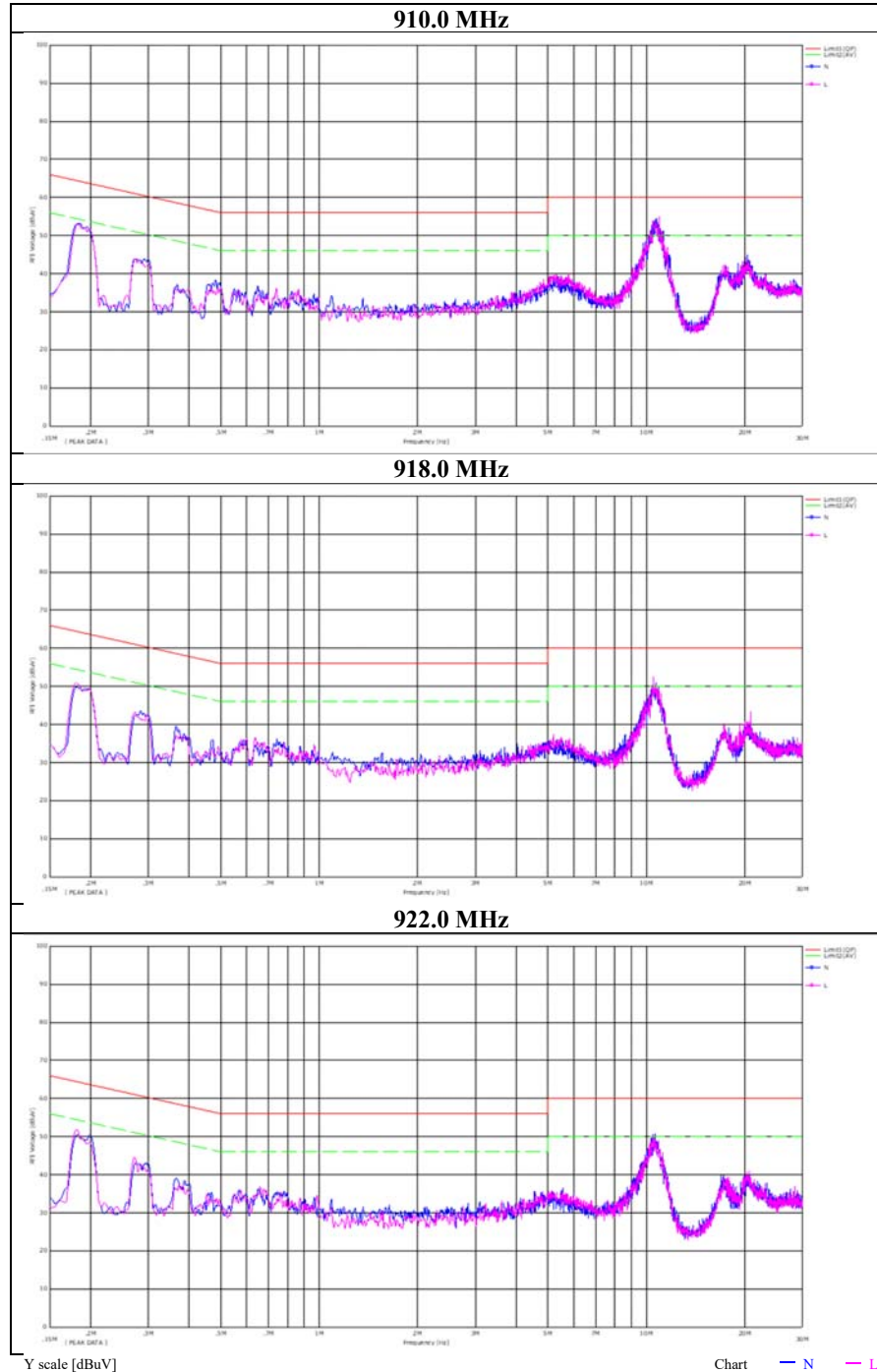


No.	Freq. [MHz]	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.18170	33.60	16.90	0.07	13.14	46.81	30.11	64.40	54.40	17.59	24.29	N	
2	0.27670	26.30	13.60	0.07	13.16	39.53	26.83	60.90	50.90	21.37	24.07	N	
3	0.64090	13.40	1.90	0.08	13.18	26.66	15.16	56.00	46.00	29.34	30.84	N	
4	5.43800	15.80	6.20	0.15	13.44	29.39	19.79	60.00	50.00	30.61	30.21	N	
5	10.72000	29.20	20.50	0.23	13.61	43.04	34.34	60.00	50.00	16.96	15.66	N	
6	20.34000	20.10	13.90	0.38	13.84	34.32	28.12	60.00	50.00	25.68	21.88	N	
7	0.18200	35.40	16.30	0.07	13.14	48.61	29.51	64.40	54.40	15.79	24.89	L	
8	0.27300	25.30	9.30	0.06	13.15	38.51	22.51	61.00	51.00	22.49	28.49	L	
9	0.64340	10.80	0.60	0.05	13.18	24.03	13.83	56.00	46.00	31.97	32.17	L	
10	5.40600	17.00	7.90	0.16	13.44	30.60	21.50	60.00	50.00	29.40	28.50	L	
11	10.71600	29.90	21.10	0.26	13.61	43.77	34.97	60.00	50.00	16.23	15.03	L	
12	20.22000	21.60	15.30	0.46	13.83	35.89	29.59	60.00	50.00	24.11	20.41	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. 13128136H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date March 23, 2020
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Yuta Moriya
Mode Tx 910.0 MHz (4 MHz)



UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

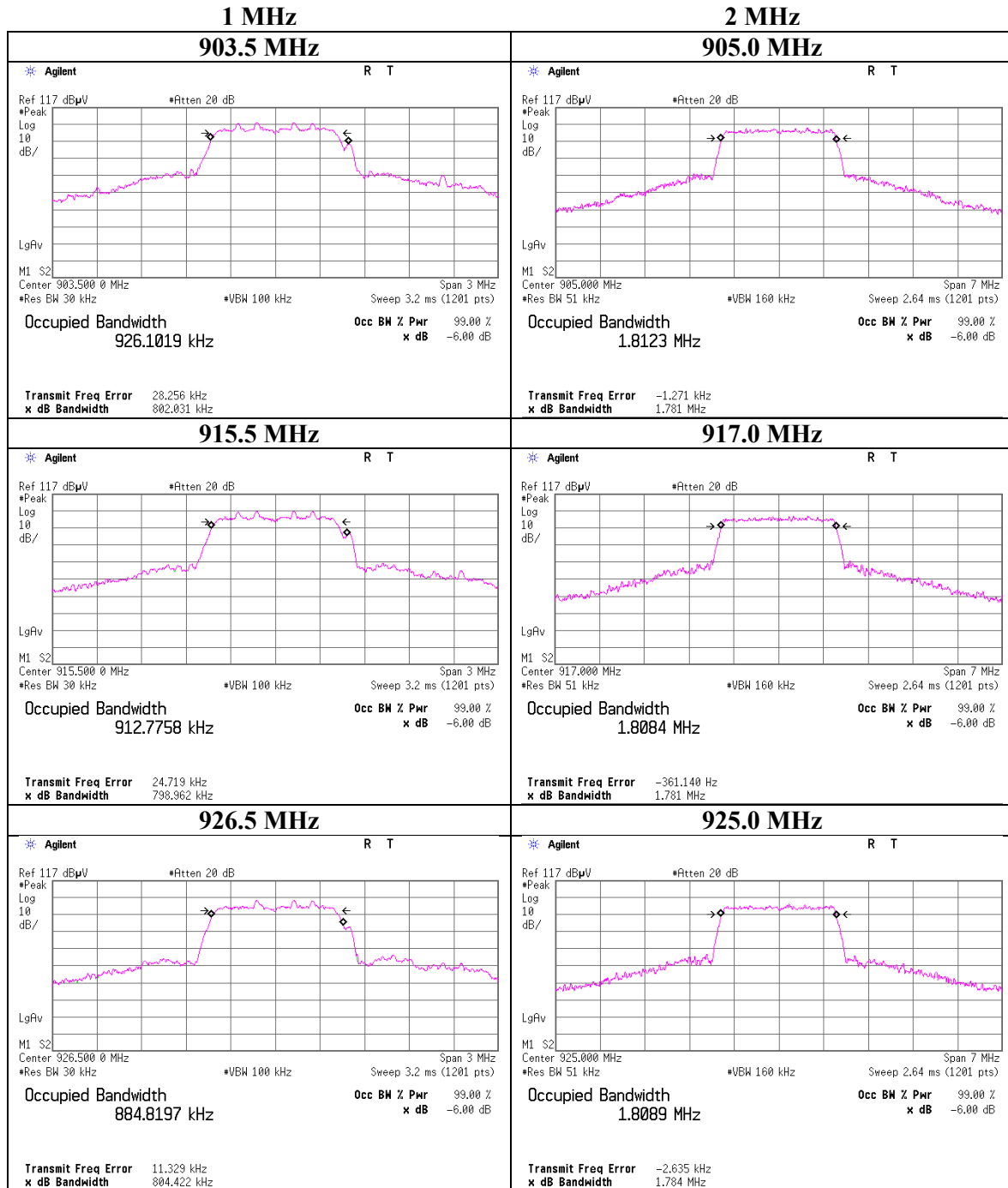
Facsimile : +81 596 24 8124

6 dB Bandwidth and 99 % Occupied Bandwidth

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 16, 2020
Temperature / Humidity 23 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx

Mode (Bandwidth)	Frequency [MHz]	99% Occupied Bandwidth [kHz]	6 dB Bandwidth [MHz]	Limit for 6 dB Bandwidth [MHz]
1 MHz	903.5	926.1	0.863	> 0.5000
	915.5	912.8	0.841	> 0.5000
	926.5	884.8	0.834	> 0.5000
2 MHz	905.0	1812.3	1.802	> 0.5000
	917.0	1808.4	1.771	> 0.5000
	925.0	1808.9	1.811	> 0.5000
4 MHz	910.0	3651.6	3.630	> 0.5000
	918.0	3674.3	3.638	> 0.5000
	922.0	3671.8	3.634	> 0.5000

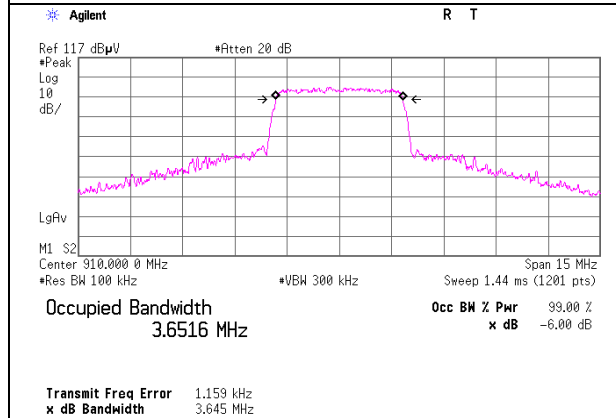
99 % Occupied Bandwidth



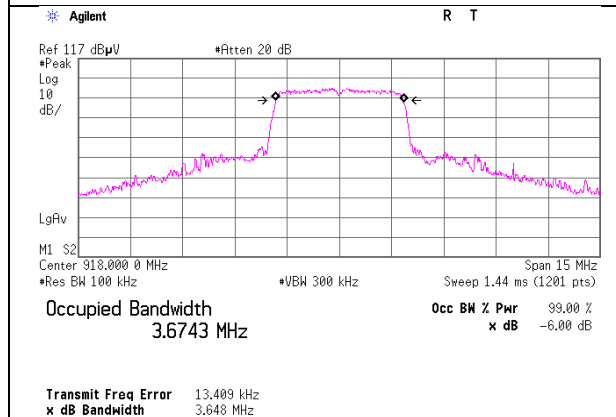
99 % Occupied Bandwidth

4 MHz

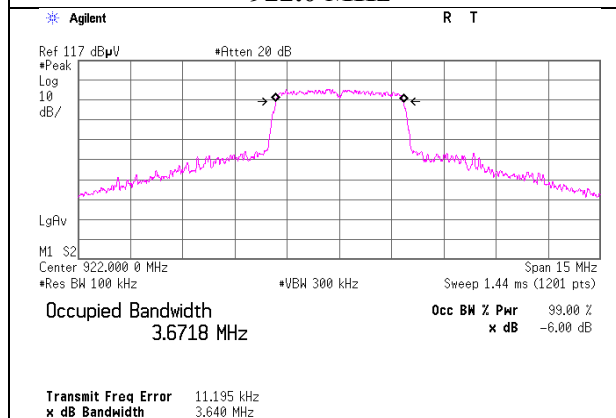
910.0 MHz



918.0 MHz



922.0 MHz



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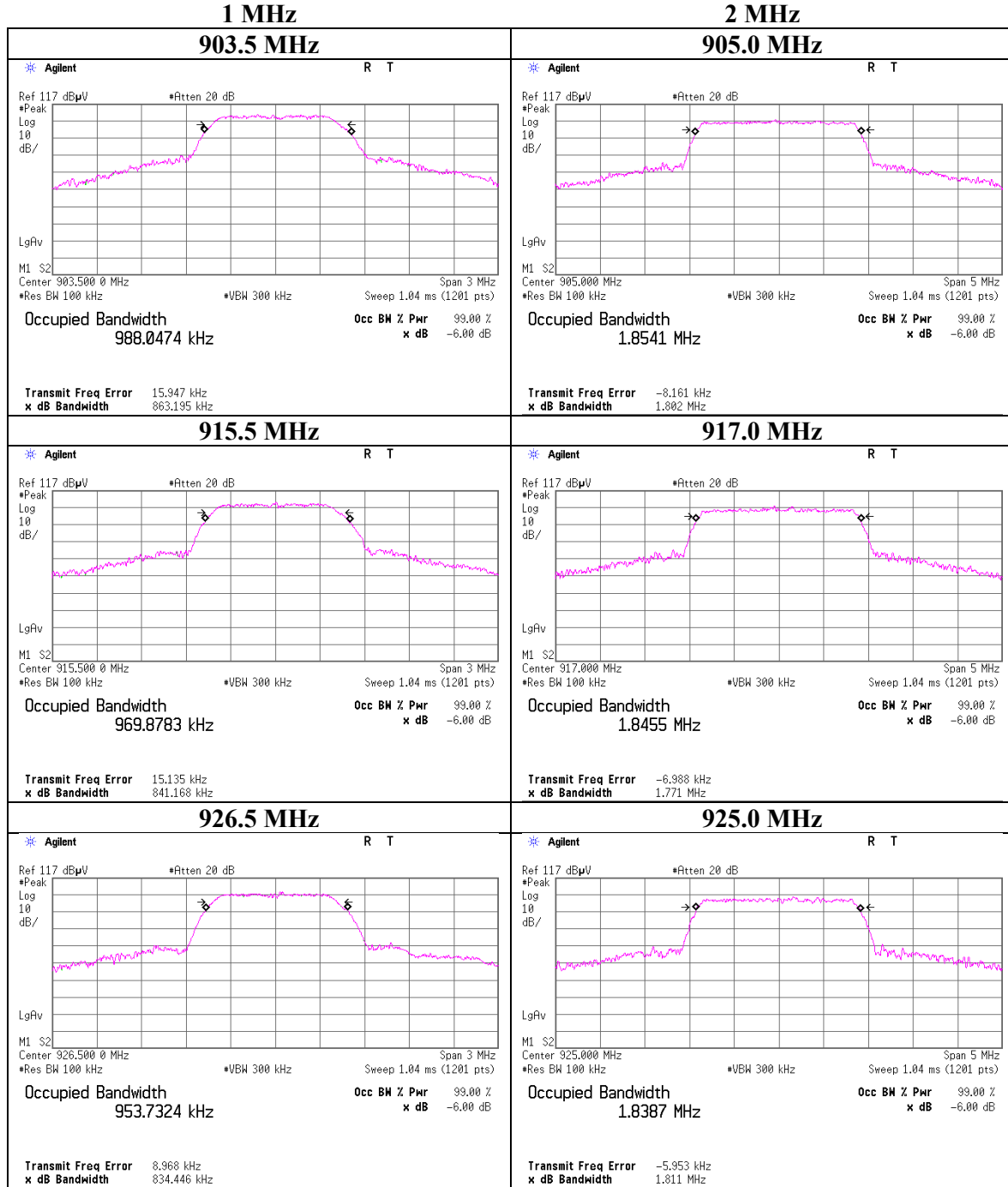
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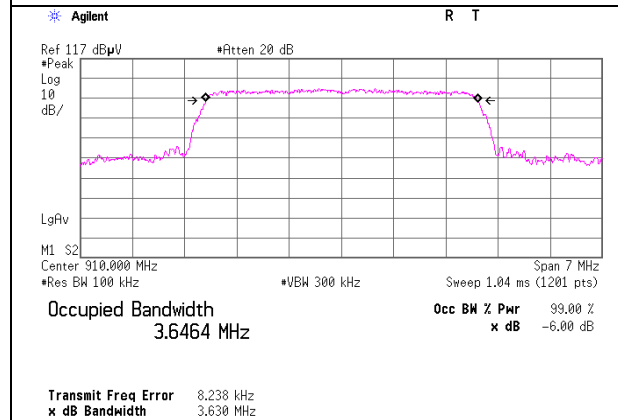
6 dB Bandwidth



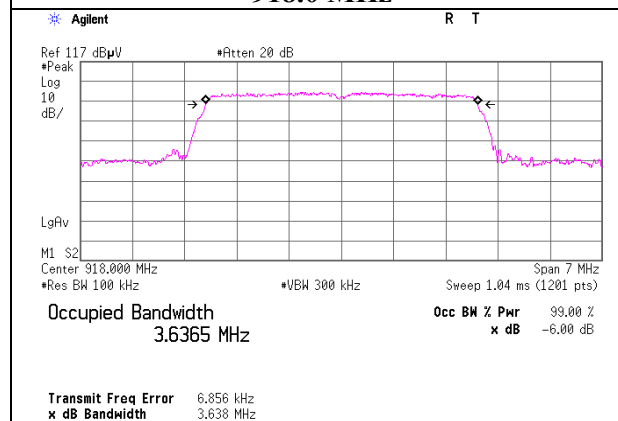
6 dB Bandwidth

4 MHz

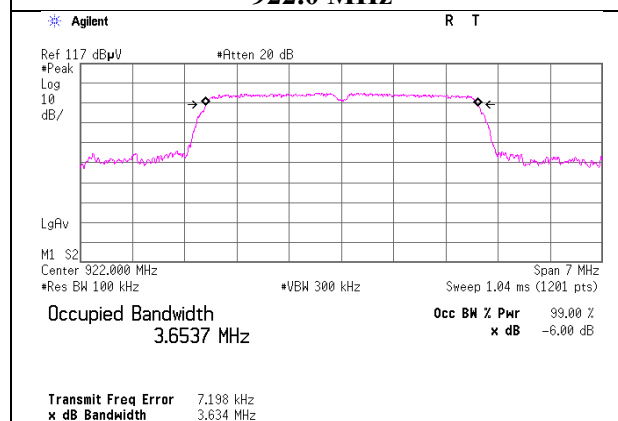
910.0 MHz



918.0 MHz



922.0 MHz



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Maximum Average Output Power

Report No.	13128136H		
Test place	Ise EMC Lab.		
	No.1 Measurement Room	No.4 Measurement Room	
Date	March 13, 2020		March 22, 2020
Temperature / Humidity	21 deg. C / 33 % RH		24 deg. C / 35 % RH
Engineer	Yuta Moriya	Junya Okuno	
Mode	Tx 1 MHz		

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power					e.i.r.p. for RSS-247					
				Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
903.5	2.95	0.36	19.92	23.23	210.38	30.00	1000	6.77	3.40	26.63	460.26	36.02	4000	9.39
915.5	3.10	0.36	19.92	23.38	217.77	30.00	1000	6.62	3.40	26.78	476.43	36.02	4000	9.24
926.5	1.90	0.36	19.92	22.18	165.20	30.00	1000	7.82	3.40	25.58	361.41	36.02	4000	10.44

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss(*1)

e.i.r.p. Result = Conducted Power Result + Antenna Gain

*1.Duty factor is 98% or more, so Duty factor is not added.

915.5MHz

Rate MCS	Reading LGI [dBm]	Reading SGI [dBm]	Remark
10	6.77	6.73	*LGI
0	6.51	-	
1	6.35	-	
2	6.72	-	
3	6.67	-	
4	6.58	-	
5	6.53	-	
6	0.79	-	
7	-0.99	-	

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Measured value is gating with the on-power.

*Difference between worst rate check data and formal test result is due to the different test condition.

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Maximum Average Output Power

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 13, 2020
Temperature / Humidity 21 deg. C / 33 % RH
Engineer Yuta Moriya
Mode Tx 2 MHz

				Conducted Power					e.i.r.p. for RSS-247						
Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]	
905.0	3.22	0.36	19.92	23.50	223.87	30.00	1000	6.50	3.40	26.90	489.78	36.02	4000	9.12	
917.0	3.53	0.36	19.92	23.81	240.44	30.00	1000	6.19	3.40	27.21	526.02	36.02	4000	8.81	
925.0	2.07	0.36	19.92	22.35	171.79	30.00	1000	7.65	3.40	25.75	375.84	36.02	4000	10.27	

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss (*1)

e.i.r.p. Result = Conducted Power Result + Antenna Gain

*1.Duty factor is 98% or more, so Duty factor is not added.

917.0MHz

Rate	Reading	Reading	Remark
MCS	LGI	SGI	
	[dBm]	[dBm]	
0	6.50	6.48	*LGI
1	6.44	-	
2	6.41	-	
3	6.46	-	
4	6.44	-	
5	5.16	-	
6	-2.01	-	
7	-3.03	-	

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Measured value is gating with the on-power.

*Difference between worst rate check data and formal test result is due to the different test condition.

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Ise EMC Lab.

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Maximum Average Output Power

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 13, 2020
Temperature / Humidity 21 deg. C / 33 % RH
Engineer Yuta Moriya
Mode Tx 4 MHz

Freq.	Reading	Cable Loss	Atten. Loss	Conducted Power					e.i.r.p. for RSS-247					
				Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
				[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
910.0	1.76	0.36	19.92	22.04	159.96	30.00	1000	7.96	3.40	25.44	349.95	36.02	4000	10.58
918.0	0.94	0.36	19.92	21.22	132.43	30.00	1000	8.78	3.40	24.62	289.73	36.02	4000	11.40
922.0	1.58	0.36	19.92	21.86	153.46	30.00	1000	8.14	3.40	25.26	335.74	36.02	4000	10.76

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss (*1)

e.i.r.p. Result = Conducted Power Result + Antenna Gain

*1.Duty factor is 98% or more, so Duty factor is not added.

918MHz

Rate	Reading	Reading	Remark
MCS	LGI	SGI	
[Mbps]	[dBm]	[dBm]	
0	4.60	4.57	*LGI
1	4.50	-	
2	4.56	-	
3	4.49	-	
4	4.51	-	
5	4.55	-	
6	-1.79	-	
7	-2.46	-	

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

*Difference between worst rate check data and formal test result is due to the different test condition.

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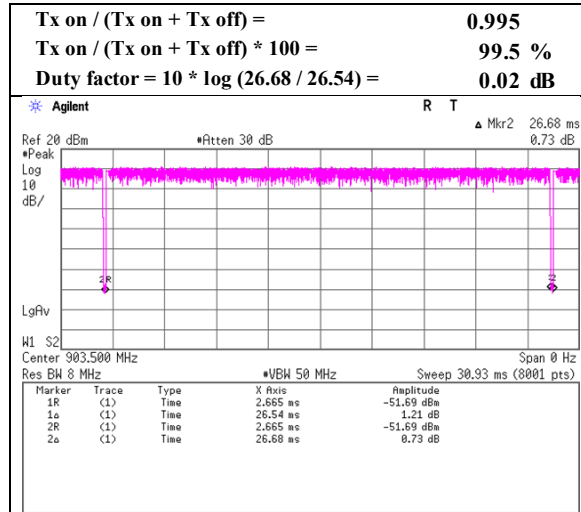
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Facsimile : +81 596 24 8124

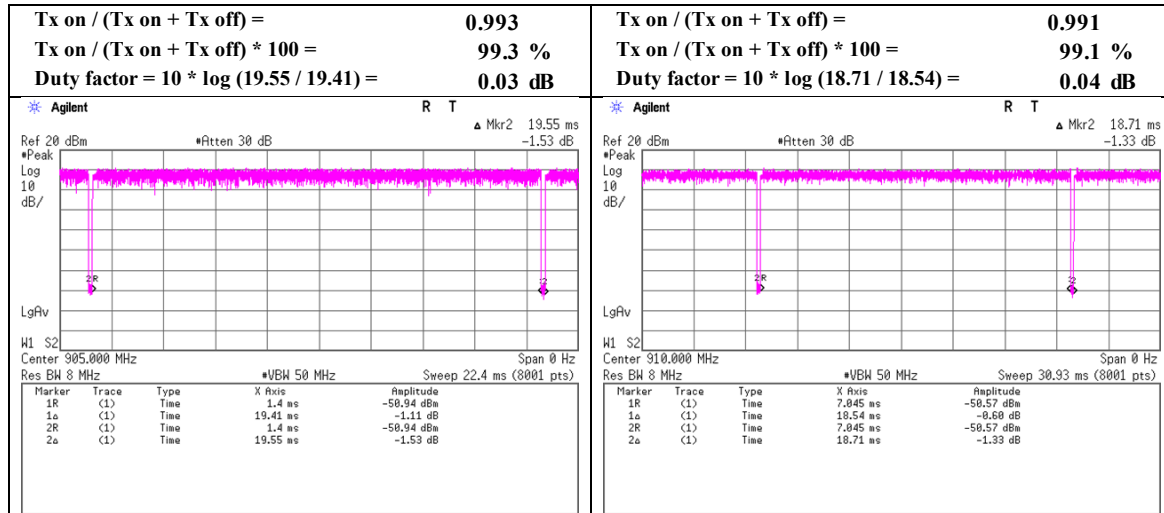
Burst rate confirmation

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 16, 2020
Temperature / Humidity 23 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx

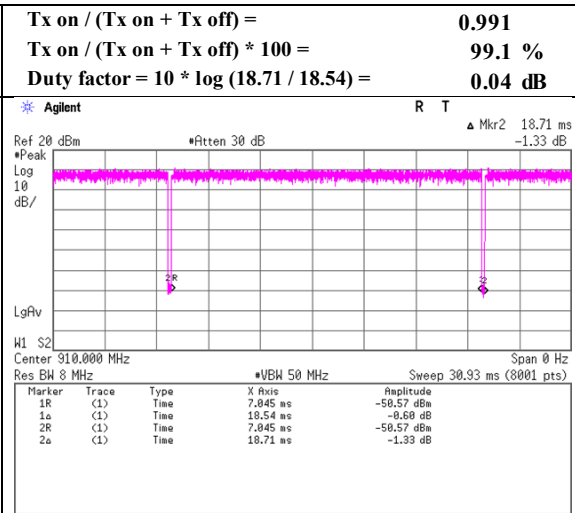
1 MHz



2 MHz



4 MHz



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

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 15, 2020	March 16, 2020
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH
Engineer	Takafumi Noguchi	Takafumi Noguchi
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 903.5 MHz (1 MHz)	

(PCB Antenna)

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.	960.000	QP	37.1	22.2	14.8	30.6	-	43.5	46.0	2.5	
Hori.	2710.500	PK	60.9	28.1	5.7	32.6	-	62.1	73.9	11.9	
Hori.	3614.000	PK	56.2	29.2	6.0	32.2	-	59.2	73.9	14.7	
Hori.	4517.500	PK	41.3	30.7	6.5	31.9	-	46.6	73.9	27.3	Floor noise
Hori.	5421.000	PK	41.1	31.6	6.9	31.9	-	47.8	73.9	26.2	Floor noise
Hori.	7228.000	PK	42.0	36.0	7.4	32.7	-	52.7	73.9	21.2	Floor noise
Hori.	8131.500	PK	41.5	36.6	7.8	32.8	-	53.0	73.9	20.9	Floor noise
Hori.	9035.000	PK	41.7	37.5	8.2	33.1	-	54.3	73.9	19.6	Floor noise
Hori.	2710.500	AV	48.4	28.1	5.7	32.6	-	49.6	53.9	4.3	
Hori.	3614.000	AV	42.5	29.2	6.0	32.2	-	45.5	53.9	8.4	
Hori.	4517.500	AV	33.3	30.7	6.5	31.9	-	38.6	53.9	15.3	Floor noise
Hori.	5421.000	AV	32.4	31.6	6.9	31.9	-	39.1	53.9	14.9	Floor noise
Hori.	7228.000	AV	34.0	36.0	7.4	32.7	-	44.7	53.9	9.2	Floor noise
Hori.	8131.500	AV	33.5	36.6	7.8	32.8	-	45.0	53.9	8.9	Floor noise
Hori.	9035.000	AV	33.8	37.5	8.2	33.1	-	46.5	53.9	7.4	Floor noise
Vert.	960.000	QP	34.9	22.2	14.8	30.6	-	41.3	46.0	4.7	
Vert.	2710.500	PK	59.4	28.1	5.7	32.6	-	60.5	73.9	13.4	
Vert.	3614.000	PK	57.1	29.2	6.0	32.2	-	60.1	73.9	13.8	
Vert.	4517.500	PK	41.4	30.7	6.5	31.9	-	46.7	73.9	27.2	Floor noise
Vert.	5421.000	PK	41.1	31.6	6.9	31.9	-	47.8	73.9	26.2	Floor noise
Vert.	7228.000	PK	42.0	36.0	7.4	32.7	-	52.7	73.9	21.2	Floor noise
Vert.	8131.500	PK	41.5	36.6	7.8	32.8	-	53.0	73.9	20.9	Floor noise
Vert.	9035.000	PK	41.5	37.5	8.2	33.1	-	54.2	73.9	19.8	Floor noise
Vert.	2710.500	AV	47.0	28.1	5.7	32.6	-	48.1	53.9	5.8	
Vert.	3614.000	AV	43.6	29.2	6.0	32.2	-	46.6	53.9	7.3	
Vert.	4517.500	AV	32.9	30.7	6.5	31.9	-	38.2	53.9	15.7	Floor noise
Vert.	5421.000	AV	32.5	31.6	6.9	31.9	-	39.1	53.9	14.8	Floor noise
Vert.	7228.000	AV	34.0	36.0	7.4	32.7	-	44.7	53.9	9.2	Floor noise
Vert.	8131.500	AV	33.5	36.6	7.8	32.8	-	45.0	53.9	8.9	Floor noise
Vert.	9035.000	AV	33.7	37.5	8.2	33.1	-	46.4	53.9	7.5	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	
Date	March 15, 2020	March 16, 2020	
Temperature / Humidity	22 deg. C / 30 % RH	22 deg. C / 30 % RH	
Engineer	Takafumi Noguchi	Takafumi Noguchi	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 903.5 MHz (1 MHz)		

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	903.500	PK	85.8	22.2	13.5	0.0	121.5	-	-	Carrier
Hori.	704.000	PK	33.1	19.8	13.4	32.0	34.2	91.5	57.2	
Hori.	711.500	PK	33.0	20.0	13.4	31.9	34.5	91.5	57.0	
Hori.	736.000	PK	37.4	20.1	13.5	31.8	39.2	91.5	52.3	
Hori.	768.000	PK	45.5	20.5	13.7	31.6	48.1	91.5	43.4	
Hori.	800.000	PK	40.1	20.8	13.9	31.4	43.3	91.5	48.2	
Hori.	832.000	PK	46.1	21.1	14.0	31.3	49.9	91.5	41.6	
Hori.	864.000	PK	52.1	21.8	14.3	31.1	57.1	91.5	34.4	
Hori.	902.000	PK	49.8	22.2	13.5	0.0	85.5	91.5	6.0	
Hori.	935.500	PK	50.6	22.0	15.1	30.7	57.0	91.5	34.5	
Hori.	1807.000	PK	71.8	25.2	5.4	33.4	69.0	91.5	22.5	
Hori.	6324.500	PK	35.7	33.0	7.2	32.2	43.8	91.5	47.7	
Vert.	903.500	PK	85.9	22.2	13.5	0.0	121.6	-	-	Carrier
Vert.	704.000	PK	33.0	19.8	13.4	32.0	34.2	91.6	57.5	
Vert.	711.500	PK	32.9	20.0	13.4	31.9	34.3	91.6	57.3	
Vert.	736.000	PK	34.7	20.1	13.5	31.8	36.5	91.6	55.1	
Vert.	768.000	PK	43.9	20.5	13.7	31.6	46.4	91.6	45.2	
Vert.	800.000	PK	43.3	20.8	13.9	31.4	46.5	91.6	45.2	
Vert.	832.000	PK	47.9	21.1	14.0	31.3	51.7	91.6	40.0	
Vert.	864.000	PK	52.4	21.8	14.3	31.1	57.4	91.6	34.3	
Vert.	902.000	PK	50.1	22.2	13.5	0.0	85.8	91.6	5.8	
Vert.	935.500	PK	49.0	22.0	15.1	30.7	55.4	91.6	36.2	
Vert.	1807.000	PK	73.1	25.2	5.4	33.4	70.3	91.6	21.4	
Vert.	6324.500	PK	35.9	33.0	7.2	32.2	44.0	91.6	47.6	

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

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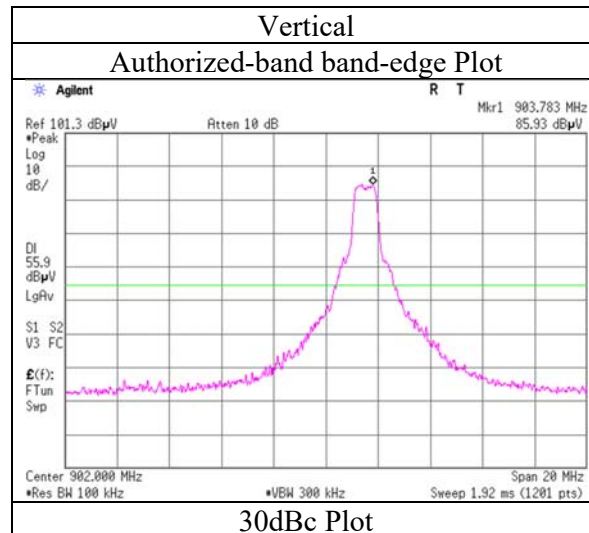
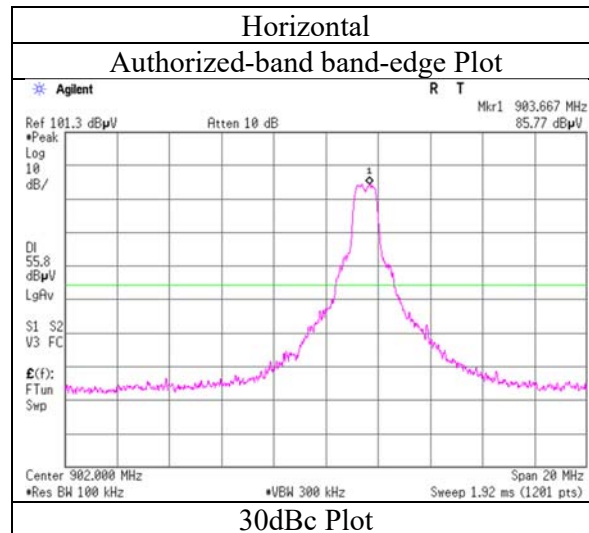
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 15, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)
Mode	Tx 903.5 MHz (1 MHz)

(PCB Antenna)



* 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. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date March 16, 2020 March 16, 2020
Temperature / Humidity 21 deg. C / 31 % RH 22 deg. C / 30 % RH
Engineer Takafumi Noguchi Takafumi Noguchi
(Below 1 GHz) (Above 1 GHz)
Mode Tx 915.5 MHz (1 MHz)

(PCB Antenna)

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.	960.000	QP	37.5	22.2	14.8	30.6	-	43.9	46.0	2.1	
Hori.	2746.500	PK	55.6	28.3	5.7	32.6	-	57.0	73.9	16.9	
Hori.	3662.000	PK	53.2	29.2	6.1	32.2	-	56.4	73.9	17.5	
Hori.	4577.500	PK	41.1	30.9	6.5	31.9	-	46.6	73.9	27.3	Floor noise
Hori.	5493.000	PK	40.8	31.7	7.0	31.9	-	47.6	73.9	26.3	Floor noise
Hori.	7324.000	PK	42.6	36.2	7.4	32.7	-	53.5	73.9	20.4	Floor noise
Hori.	8239.500	PK	42.4	36.4	7.8	32.9	-	53.7	73.9	20.2	Floor noise
Hori.	9155.000	PK	42.0	38.2	8.2	33.1	-	55.3	73.9	18.7	Floor noise
Hori.	2746.500	AV	47.9	28.3	5.7	32.6	-	49.3	53.9	4.6	
Hori.	3662.000	AV	44.2	29.2	6.1	32.2	-	47.4	53.9	6.6	
Hori.	4577.500	AV	32.8	30.9	6.5	31.9	-	38.3	53.9	15.6	Floor noise
Hori.	5493.000	AV	32.2	31.7	7.0	31.9	-	38.9	53.9	15.0	Floor noise
Hori.	7324.000	AV	34.2	36.2	7.4	32.7	-	45.1	53.9	8.8	Floor noise
Hori.	8239.500	AV	33.6	36.4	7.8	32.9	-	45.0	53.9	8.9	Floor noise
Hori.	9155.000	AV	33.8	38.2	8.2	33.1	-	47.1	53.9	6.8	Floor noise
Vert.	960.000	QP	35.5	22.2	14.8	30.6	-	41.9	46.0	4.1	
Vert.	2746.500	PK	54.0	28.3	5.7	32.6	-	55.4	73.9	18.5	
Vert.	3662.000	PK	52.1	29.2	6.1	32.2	-	55.2	73.9	18.7	
Vert.	4577.500	PK	40.8	30.9	6.5	31.9	-	46.3	73.9	27.6	Floor noise
Vert.	5493.000	PK	40.3	31.7	7.0	31.9	-	47.1	73.9	26.8	Floor noise
Vert.	7324.000	PK	42.5	36.2	7.4	32.7	-	53.4	73.9	20.5	Floor noise
Vert.	8239.500	PK	42.0	36.4	7.8	32.9	-	53.4	73.9	20.5	Floor noise
Vert.	9155.000	PK	42.1	38.2	8.2	33.1	-	55.3	73.9	18.6	Floor noise
Vert.	2746.500	AV	46.2	28.3	5.7	32.6	-	47.5	53.9	6.4	
Vert.	3662.000	AV	42.7	29.2	6.1	32.2	-	45.8	53.9	8.1	
Vert.	4577.500	AV	32.4	30.9	6.5	31.9	-	38.0	53.9	15.9	Floor noise
Vert.	5493.000	AV	32.4	31.7	7.0	31.9	-	39.1	53.9	14.8	Floor noise
Vert.	7324.000	AV	34.3	36.2	7.4	32.7	-	45.2	53.9	8.7	Floor noise
Vert.	8239.500	AV	33.7	36.4	7.8	32.9	-	45.0	53.9	8.9	Floor noise
Vert.	9155.000	AV	34.0	38.2	8.2	33.1	-	47.2	53.9	6.7	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

Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 16, 2020 No.3
Temperature / Humidity 21 deg. C / 31 % RH 22 deg. C / 30 % RH
Engineer Takafumi Noguchi Takafumi Noguchi
(Below 1 GHz) (Above 1 GHz)
Mode Tx 915.5 MHz (1 MHz)

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	915.500	PK	86.8	22.2	13.6	0.0	122.5	-	-	Carrier
Hori.	704.000	PK	32.2	19.8	13.4	32.0	33.4	92.5	59.1	
Hori.	723.500	PK	32.7	20.1	13.5	31.9	34.4	92.5	58.2	
Hori.	736.000	PK	32.1	20.1	13.5	31.8	33.9	92.5	58.6	
Hori.	768.000	PK	41.6	20.5	13.7	31.6	44.1	92.5	48.4	
Hori.	800.000	PK	41.6	20.8	13.9	31.4	44.8	92.5	47.7	
Hori.	832.000	PK	46.1	21.1	14.0	31.3	49.9	92.5	42.6	
Hori.	864.000	PK	49.5	21.8	14.3	31.1	54.5	92.5	38.0	
Hori.	883.500	PK	49.4	22.0	14.7	31.0	55.1	92.5	37.5	
Hori.	896.000	PK	49.0	22.1	14.9	30.9	55.1	92.5	37.5	
Hori.	947.500	PK	47.9	22.0	14.8	30.6	54.1	92.5	38.4	
Hori.	1831.000	PK	67.4	25.3	5.4	33.3	64.7	92.5	27.8	
Hori.	6408.500	PK	38.5	33.5	7.2	32.2	46.9	92.5	45.6	
Vert.	915.500	PK	85.4	22.2	13.6	0.0	121.2	-	-	Carrier
Vert.	704.000	PK	33.0	19.8	13.4	32.0	34.2	91.2	57.0	
Vert.	723.500	PK	33.0	20.1	13.5	31.9	34.7	91.2	56.5	
Vert.	736.000	PK	32.6	20.1	13.5	31.8	34.4	91.2	56.8	
Vert.	768.000	PK	42.8	20.5	13.7	31.6	45.3	91.2	45.8	
Vert.	800.000	PK	42.7	20.8	13.9	31.4	45.9	91.2	45.2	
Vert.	832.000	PK	49.6	21.1	14.0	31.3	53.4	91.2	37.8	
Vert.	864.000	PK	52.2	21.8	14.3	31.1	57.2	91.2	34.0	
Vert.	883.500	PK	50.3	22.0	14.7	31.0	56.0	91.2	35.2	
Vert.	896.000	PK	49.8	22.1	14.9	30.9	55.9	91.2	35.3	
Vert.	947.500	PK	46.7	22.0	14.8	30.6	52.9	91.2	38.3	
Vert.	1831.000	PK	69.9	25.3	5.4	33.3	67.3	91.2	23.9	
Vert.	6408.500	PK	36.0	33.5	7.2	32.2	44.4	91.2	46.8	

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

Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date March 16, 2020 March 16, 2020
Temperature / Humidity 21 deg. C / 31 % RH 22 deg. C / 30 % RH
Engineer Takafumi Noguchi Takafumi Noguchi
(Below 1 GHz) (Above 1 GHz)
Mode Tx 926.5 MHz (1 MHz)

(PCB Antenna)

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.	960.000	QP	37.2	22.2	14.8	30.6	-	43.6	46.0	2.4	
Hori.	2779.500	PK	55.7	28.5	5.7	32.6	-	57.3	73.9	16.6	
Hori.	3706.000	PK	54.6	29.4	6.1	32.2	-	57.9	73.9	16.0	
Hori.	4632.500	PK	40.5	31.1	6.5	31.9	-	46.2	73.9	27.7	Floor noise
Hori.	5559.000	PK	40.4	31.7	7.0	31.9	-	47.2	73.9	26.7	Floor noise
Hori.	7412.000	PK	42.6	36.3	7.5	32.7	-	53.6	73.9	20.3	Floor noise
Hori.	8338.500	PK	42.0	36.2	7.9	32.9	-	53.2	73.9	20.7	Floor noise
Hori.	9265.000	PK	42.5	38.8	8.2	33.2	-	56.3	73.9	17.6	Floor noise
Hori.	2779.500	AV	46.9	28.5	5.7	32.6	-	48.5	53.9	5.5	
Hori.	3706.000	AV	42.8	29.4	6.1	32.2	-	46.1	53.9	7.8	
Hori.	4632.500	AV	32.6	31.1	6.5	31.9	-	38.3	53.9	15.6	Floor noise
Hori.	5559.000	AV	32.0	31.7	7.0	31.9	-	38.7	53.9	15.2	Floor noise
Hori.	7412.000	AV	34.0	36.3	7.5	32.7	-	45.1	53.9	8.8	Floor noise
Hori.	8338.500	AV	34.1	36.2	7.9	32.9	-	45.3	53.9	8.6	Floor noise
Hori.	9265.000	AV	34.1	38.8	8.2	33.2	-	48.0	53.9	6.0	Floor noise
Vert.	960.000	QP	35.0	22.2	14.8	30.6	-	41.4	46.0	4.6	
Vert.	2779.500	PK	54.1	28.5	5.7	32.6	-	55.6	73.9	18.3	
Vert.	3706.000	PK	53.8	29.4	6.1	32.2	-	57.1	73.9	16.8	
Vert.	4632.500	PK	40.7	31.1	6.5	31.9	-	46.4	73.9	27.5	Floor noise
Vert.	5559.000	PK	40.6	31.7	7.0	31.9	-	47.4	73.9	26.5	Floor noise
Vert.	7412.000	PK	42.8	36.3	7.5	32.7	-	53.8	73.9	20.1	Floor noise
Vert.	8338.500	PK	42.1	36.2	7.9	32.9	-	53.3	73.9	20.6	Floor noise
Vert.	9265.000	PK	42.7	38.8	8.2	33.2	-	56.6	73.9	17.3	Floor noise
Vert.	2779.500	AV	45.2	28.5	5.7	32.6	-	46.8	53.9	7.1	
Vert.	3706.000	AV	41.6	29.4	6.1	32.2	-	44.9	53.9	9.0	
Vert.	4632.500	AV	32.6	31.1	6.5	31.9	-	38.4	53.9	15.5	Floor noise
Vert.	5559.000	AV	32.0	31.7	7.0	31.9	-	38.8	53.9	15.1	Floor noise
Vert.	7412.000	AV	34.1	36.3	7.5	32.7	-	45.1	53.9	8.8	Floor noise
Vert.	8338.500	AV	34.0	36.2	7.9	32.9	-	45.2	53.9	8.7	Floor noise
Vert.	9265.000	AV	34.1	38.8	8.2	33.2	-	48.0	53.9	6.0	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 16, 2020
Temperature / Humidity	21 deg. C / 31 % RH	22 deg. C / 30 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takafumi Noguchi (Above 1 GHz)
Mode	Tx 926.5 MHz (1 MHz)	

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	926.500	PK	86.0	22.1	13.6	0.0	121.7	-	-	Carrier
Hori.	704.000	PK	31.7	19.8	13.4	32.0	32.9	91.7	58.8	
Hori.	736.000	PK	31.3	20.1	13.5	31.8	33.1	91.7	58.6	
Hori.	768.000	PK	40.4	20.5	13.7	31.6	43.0	91.7	48.7	
Hori.	800.000	PK	38.4	20.8	13.9	31.4	41.6	91.7	50.1	
Hori.	832.000	PK	44.2	21.1	14.0	31.3	48.0	91.7	43.7	
Hori.	864.000	PK	49.3	21.8	14.3	31.1	54.3	91.7	37.4	
Hori.	896.000	PK	47.0	22.1	14.9	30.9	53.0	91.7	38.6	
Hori.	928.000	PK	47.7	22.0	13.7	0.0	83.4	91.7	8.3	
Hori.	958.500	PK	46.3	22.1	14.8	30.6	52.7	91.7	39.0	
Hori.	1853.000	PK	66.1	25.4	5.4	33.3	63.6	91.7	28.1	
Hori.	6485.500	PK	39.0	33.9	7.3	32.3	47.8	91.7	43.8	
Vert.	926.500	PK	85.0	22.1	13.6	0.0	120.7	-	-	Carrier
Vert.	704.000	PK	32.3	19.8	13.4	32.0	33.4	90.7	57.3	
Vert.	736.000	PK	31.7	20.1	13.5	31.8	33.5	90.7	57.2	
Vert.	768.000	PK	40.7	20.5	13.7	31.6	43.3	90.7	47.5	
Vert.	800.000	PK	41.0	20.8	13.9	31.4	44.2	90.7	46.5	
Vert.	832.000	PK	48.1	21.1	14.0	31.3	51.9	90.7	38.8	
Vert.	864.000	PK	51.3	21.8	14.3	31.1	56.3	90.7	34.4	
Vert.	896.000	PK	48.0	22.1	14.9	30.9	54.1	90.7	36.6	
Vert.	928.000	PK	46.8	22.0	13.7	0.0	82.5	90.7	8.2	
Vert.	958.500	PK	44.7	22.1	14.8	30.6	51.1	90.7	39.6	
Vert.	1853.000	PK	66.4	25.4	5.4	33.3	63.9	90.7	26.8	
Vert.	6485.500	PK	36.5	33.9	7.3	32.3	45.4	90.7	45.4	

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

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Ise EMC Lab.

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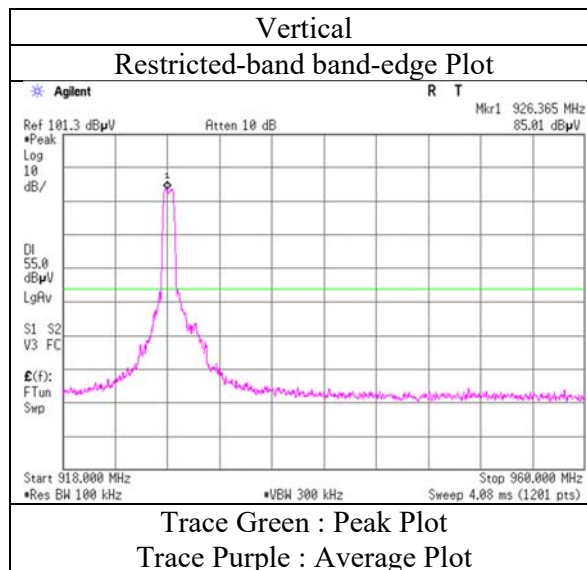
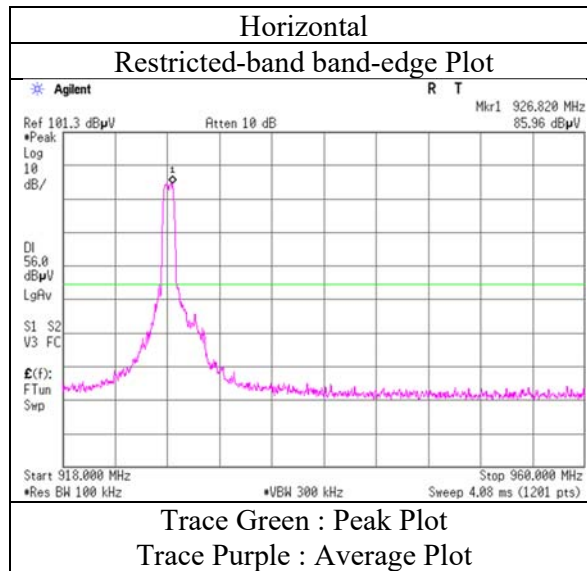
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 16, 2020
Temperature / Humidity	21 deg. C / 31 % RH
Engineer	Takafumi Noguchi
	(Below 1 GHz)
Mode	Tx 926.5 MHz (1 MHz)

(PCB Antenna)



* 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.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 31 % RH	23 deg. C / 35 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takumi Shimada (Above 1 GHz)
Mode	Tx 905 MHz (2 MHz)	

(PCB Antenna)

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.	960.000	QP	37.2	22.2	14.8	30.6	-	43.6	46.0	2.4	
Hori.	2715.000	PK	51.0	28.1	5.7	32.6	-	52.2	73.9	21.7	
Hori.	3620.000	PK	49.3	29.2	6.0	32.2	-	52.3	73.9	21.6	
Hori.	4525.000	PK	40.0	30.8	6.5	31.9	-	45.4	73.9	28.6	Floor noise
Hori.	5430.000	PK	40.8	31.6	6.9	31.9	-	47.5	73.9	26.4	Floor noise
Hori.	8145.000	PK	40.9	36.5	7.8	32.8	-	52.4	73.9	21.5	Floor noise
Hori.	9050.000	PK	40.9	37.6	8.2	33.1	-	53.6	73.9	20.3	Floor noise
Hori.	9955.000	PK	41.0	38.9	8.4	33.5	-	54.8	73.9	19.1	Floor noise
Hori.	2715.000	AV	40.0	28.1	5.7	32.6	-	41.2	53.9	12.7	
Hori.	3620.000	AV	39.7	29.2	6.0	32.2	-	42.7	53.9	11.2	
Hori.	4525.000	AV	32.5	30.8	6.5	31.9	-	37.9	53.9	16.1	Floor noise
Hori.	5430.000	AV	32.3	31.6	6.9	31.9	-	39.0	53.9	14.9	Floor noise
Hori.	8145.000	AV	33.8	36.5	7.8	32.8	-	45.2	53.9	8.7	Floor noise
Hori.	9050.000	AV	32.2	37.6	8.2	33.1	-	44.9	53.9	9.0	Floor noise
Hori.	9955.000	AV	33.3	38.9	8.4	33.5	-	47.1	53.9	6.8	Floor noise
Vert.	960.000	QP	35.1	22.2	14.8	30.6	-	41.5	46.0	4.5	
Vert.	2715.000	PK	55.6	28.1	5.7	32.6	-	56.8	73.9	17.1	
Vert.	3620.000	PK	49.8	29.2	6.0	32.2	-	52.8	73.9	21.1	
Vert.	4525.000	PK	40.3	30.8	6.5	31.9	-	45.6	73.9	28.3	Floor noise
Vert.	5430.000	PK	40.4	31.6	6.9	31.9	-	47.0	73.9	26.9	Floor noise
Vert.	8145.000	PK	40.7	36.5	7.8	32.8	-	52.2	73.9	21.7	Floor noise
Vert.	9050.000	PK	40.8	37.6	8.2	33.1	-	53.4	73.9	20.5	Floor noise
Vert.	9955.000	PK	41.7	38.9	8.4	33.5	-	55.5	73.9	18.4	Floor noise
Vert.	2715.000	AV	43.9	28.1	5.7	32.6	-	45.0	53.9	8.9	
Vert.	3620.000	AV	39.5	29.2	6.0	32.2	-	42.5	53.9	11.4	
Vert.	4525.000	AV	33.7	30.8	6.5	31.9	-	39.0	53.9	14.9	Floor noise
Vert.	5430.000	AV	32.2	31.6	6.9	31.9	-	38.8	53.9	15.1	Floor noise
Vert.	8145.000	AV	33.4	36.5	7.8	32.8	-	44.8	53.9	9.1	Floor noise
Vert.	9050.000	AV	33.4	37.6	8.2	33.1	-	46.0	53.9	7.9	Floor noise
Vert.	9955.000	AV	34.1	38.9	8.4	33.5	-	47.9	53.9	6.0	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 31 % RH	23 deg. C / 35 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takumi Shimada (Above 1 GHz)
Mode	Tx 905 MHz (2 MHz)	

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	905.000	PK	81.8	22.2	13.5	0.0	117.5	-	-	Carrier
Hori.	704.000	PK	32.0	19.8	13.4	32.0	33.2	87.5	54.3	
Hori.	713.000	PK	31.2	20.0	13.4	31.9	32.7	87.5	54.8	
Hori.	736.000	PK	33.2	20.1	13.5	31.8	35.0	87.5	52.5	
Hori.	768.000	PK	41.9	20.5	13.7	31.6	44.4	87.5	43.1	
Hori.	800.000	PK	41.6	20.8	13.9	31.4	44.8	87.5	42.7	
Hori.	832.000	PK	43.9	21.1	14.0	31.3	47.7	87.5	39.9	
Hori.	864.000	PK	48.6	21.8	14.3	31.1	53.6	87.5	33.9	
Hori.	902.000	PK	43.7	22.2	13.5	0.0	79.4	87.5	8.1	
Hori.	937.000	PK	46.7	22.0	15.1	30.7	53.1	87.5	34.4	
Hori.	1810.000	PK	68.0	25.2	5.4	33.4	65.2	87.5	22.3	
Hori.	6335.000	PK	33.2	33.1	7.2	32.2	41.4	87.5	46.1	
Hori.	7240.000	PK	35.3	36.0	7.4	32.7	46.0	87.5	41.5	
Vert.	905.000	PK	82.0	22.2	13.5	0.0	117.7	-	-	Carrier
Vert.	704.000	PK	32.0	19.8	13.4	32.0	33.2	87.7	54.5	
Vert.	713.000	PK	32.3	20.0	13.4	31.9	33.8	87.7	53.9	
Vert.	736.000	PK	33.7	20.1	13.5	31.8	35.6	87.7	52.1	
Vert.	768.000	PK	42.9	20.5	13.7	31.6	45.5	87.7	42.2	
Vert.	800.000	PK	42.0	20.8	13.9	31.4	45.2	87.7	42.5	
Vert.	832.000	PK	47.8	21.1	14.0	31.3	51.6	87.7	36.2	
Vert.	864.000	PK	50.1	21.8	14.3	31.1	55.1	87.7	32.6	
Vert.	902.000	PK	45.5	22.2	13.5	0.0	81.2	87.7	6.5	
Vert.	937.000	PK	45.1	22.0	15.1	30.7	51.5	87.7	36.2	
Vert.	1810.000	PK	69.2	25.2	5.4	33.4	66.4	87.7	21.3	
Vert.	6335.000	PK	33.2	33.1	7.2	32.2	41.4	87.7	46.3	
Vert.	7240.000	PK	36.2	36.0	7.4	32.7	47.0	87.7	40.7	

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

UL Japan, Inc.

Ise EMC Lab.

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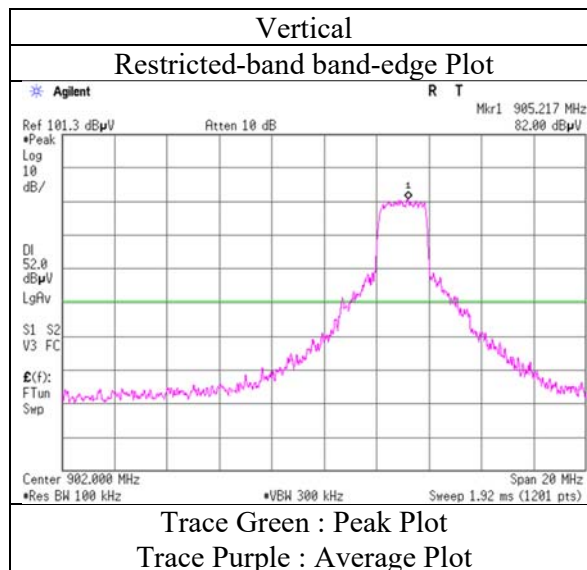
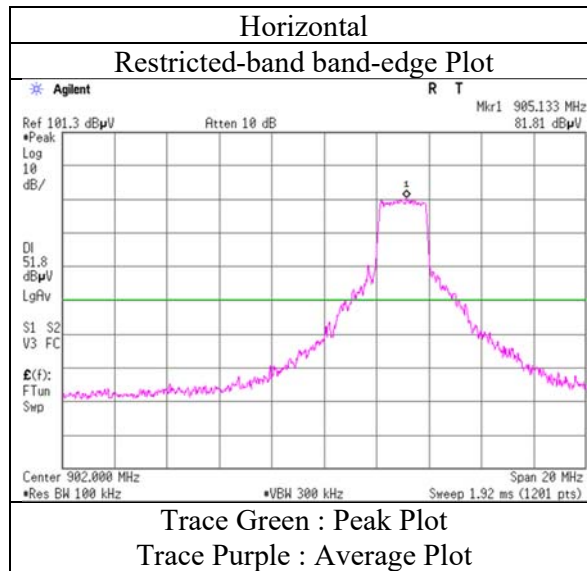
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 16, 2020
Temperature / Humidity	21 deg. C / 31 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)
Mode	Tx 905 MHz (2 MHz)

(PCB Antenna)



* 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.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 31 % RH	23 deg. C / 35 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takumi Shimada (Above 1 GHz)
Mode	Tx 917 MHz (2 MHz)	

(PCB Antenna)

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.	960.000	QP	37.5	22.2	14.8	30.6	-	43.9	46.0	2.1	
Hori.	2751.000	PK	46.4	28.3	5.7	32.6	-	47.8	73.9	26.1	
Hori.	3668.000	PK	46.6	29.3	6.1	32.2	-	49.8	73.9	24.2	
Hori.	4585.000	PK	41.1	31.0	6.5	31.9	-	46.7	73.9	27.3	Floor noise
Hori.	5502.000	PK	40.0	31.7	7.0	31.9	-	46.8	73.9	27.1	Floor noise
Hori.	7336.000	PK	41.2	36.2	7.4	32.7	-	52.1	73.9	21.8	Floor noise
Hori.	8253.000	PK	41.9	36.4	7.8	32.9	-	53.3	73.9	20.7	Floor noise
Hori.	9170.000	PK	41.3	38.3	8.2	33.1	-	54.6	73.9	19.3	Floor noise
Hori.	2751.000	AV	38.2	28.3	5.7	32.6	-	39.5	53.9	14.4	
Hori.	3668.000	AV	37.5	29.3	6.1	32.2	-	40.6	53.9	13.3	
Hori.	4585.000	AV	32.4	31.0	6.5	31.9	-	38.0	53.9	15.9	Floor noise
Hori.	5502.000	AV	31.8	31.7	7.0	31.9	-	38.6	53.9	15.3	Floor noise
Hori.	7336.000	AV	33.6	36.2	7.4	32.7	-	44.5	53.9	9.4	Floor noise
Hori.	8253.000	AV	33.6	36.4	7.8	32.9	-	45.0	53.9	8.9	Floor noise
Hori.	9170.000	AV	33.8	38.3	8.2	33.1	-	47.2	53.9	6.7	Floor noise
Vert.	960.000	QP	36.6	22.2	14.8	30.6	-	43.0	46.0	3.0	
Vert.	2751.000	PK	53.1	28.3	5.7	32.6	-	54.4	73.9	19.5	
Vert.	3668.000	PK	50.5	29.3	6.1	32.2	-	53.6	73.9	20.3	
Vert.	4585.000	PK	40.1	31.0	6.5	31.9	-	45.7	73.9	28.2	Floor noise
Vert.	5502.000	PK	40.0	31.7	7.0	31.9	-	46.8	73.9	27.1	Floor noise
Vert.	7336.000	PK	42.0	36.2	7.4	32.7	-	52.9	73.9	21.0	Floor noise
Vert.	8253.000	PK	40.9	36.4	7.8	32.9	-	52.3	73.9	21.6	Floor noise
Vert.	9170.000	PK	41.2	38.3	8.2	33.1	-	54.6	73.9	19.3	Floor noise
Vert.	2751.000	AV	45.2	28.3	5.7	32.6	-	46.6	53.9	7.3	
Vert.	3668.000	AV	42.2	29.3	6.1	32.2	-	45.4	53.9	8.5	
Vert.	4585.000	AV	32.7	31.0	6.5	31.9	-	38.3	53.9	15.6	Floor noise
Vert.	5502.000	AV	32.4	31.7	7.0	31.9	-	39.1	53.9	14.8	Floor noise
Vert.	7336.000	AV	33.3	36.2	7.4	32.7	-	44.2	53.9	9.7	Floor noise
Vert.	8253.000	AV	33.4	36.4	7.8	32.9	-	44.8	53.9	9.1	Floor noise
Vert.	9170.000	AV	34.0	38.3	8.2	33.1	-	47.4	53.9	6.5	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 31 % RH	23 deg. C / 35 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takumi Shimada (Above 1 GHz)
Mode	Tx 917 MHz (2 MHz)	

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	917.000	PK	83.5	22.2	13.6	0.0	119.3	-	-	Carrier
Hori.	704.000	PK	32.3	19.8	13.4	32.0	33.5	89.3	55.8	
Hori.	725.000	PK	32.1	20.1	13.5	31.9	33.8	89.3	55.4	
Hori.	736.000	PK	33.3	20.1	13.5	31.8	35.2	89.3	54.1	
Hori.	768.000	PK	42.2	20.5	13.7	31.6	44.7	89.3	44.5	
Hori.	800.000	PK	40.1	20.8	13.9	31.4	43.3	89.3	46.0	
Hori.	832.000	PK	45.6	21.1	14.0	31.3	49.4	89.3	39.8	
Hori.	864.000	PK	50.4	21.8	14.3	31.1	55.4	89.3	33.9	
Hori.	885.000	PK	48.2	22.1	14.7	31.0	53.9	89.3	35.3	
Hori.	896.000	PK	48.5	22.1	14.9	30.9	54.6	89.3	34.7	
Hori.	949.000	PK	47.2	22.0	14.8	30.6	53.3	89.3	35.9	
Hori.	1834.000	PK	66.2	25.3	5.4	33.3	63.6	89.3	25.7	
Hori.	6419.000	PK	33.7	33.5	7.2	32.2	42.2	89.3	47.1	
Vert.	917.000	PK	82.9	22.2	13.6	0.0	118.7	-	-	Carrier
Vert.	704.000	PK	31.9	19.8	13.4	32.0	33.1	88.7	55.6	
Vert.	725.000	PK	32.1	20.1	13.5	31.9	33.9	88.7	54.8	
Vert.	736.000	PK	32.7	20.1	13.5	31.8	34.6	88.7	54.1	
Vert.	768.000	PK	42.9	20.5	13.7	31.6	45.4	88.7	43.3	
Vert.	800.000	PK	42.4	20.8	13.9	31.4	45.6	88.7	43.1	
Vert.	832.000	PK	49.1	21.1	14.0	31.3	52.9	88.7	35.8	
Vert.	864.000	PK	51.5	21.8	14.3	31.1	56.5	88.7	32.2	
Vert.	885.000	PK	48.4	22.1	14.7	31.0	54.1	88.7	34.6	
Vert.	896.000	PK	48.9	22.1	14.9	30.9	55.0	88.7	33.7	
Vert.	949.000	PK	45.3	22.0	14.8	30.6	51.5	88.7	37.2	
Vert.	1834.000	PK	66.3	25.3	5.4	33.3	63.7	88.7	25.0	
Vert.	6419.000	PK	33.4	33.5	7.2	32.2	41.9	88.7	46.7	

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

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 31 % RH	23 deg. C / 35 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takumi Shimada (Above 1 GHz)
Mode	Tx 925 MHz (2 MHz)	

(PCB Antenna)

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.	960.000	QP	37.2	22.2	14.8	30.6	-	43.6	46.0	2.4	
Hori.	2775.000	PK	47.5	28.4	5.7	32.6	-	49.0	73.9	24.9	
Hori.	3700.000	PK	47.4	29.4	6.1	32.2	-	50.6	73.9	23.3	
Hori.	4625.000	PK	40.4	31.1	6.5	31.9	-	46.2	73.9	27.8	Floor noise
Hori.	5550.000	PK	39.8	31.7	7.0	31.9	-	46.5	73.9	27.4	Floor noise
Hori.	7400.000	PK	41.9	36.3	7.5	32.7	-	52.9	73.9	21.0	Floor noise
Hori.	8325.000	PK	41.9	36.2	7.9	32.9	-	53.1	73.9	20.8	Floor noise
Hori.	9250.000	PK	41.7	38.7	8.2	33.2	-	55.5	73.9	18.4	Floor noise
Hori.	2775.000	AV	38.1	28.4	5.7	32.6	-	39.6	53.9	14.3	
Hori.	3700.000	AV	38.8	29.4	6.1	32.2	-	42.1	53.9	11.8	
Hori.	4625.000	AV	32.5	31.1	6.5	31.9	-	38.2	53.9	15.7	Floor noise
Hori.	5550.000	AV	31.7	31.7	7.0	31.9	-	38.5	53.9	15.4	Floor noise
Hori.	7400.000	AV	34.1	36.3	7.5	32.7	-	45.2	53.9	8.7	Floor noise
Hori.	8325.000	AV	34.2	36.2	7.9	32.9	-	45.4	53.9	8.5	Floor noise
Hori.	9250.000	AV	33.9	38.7	8.2	33.2	-	47.7	53.9	6.2	Floor noise
Vert.	960.000	QP	36.3	22.2	14.8	30.6	-	42.7	46.0	3.3	
Vert.	2775.000	PK	52.5	28.4	5.7	32.6	-	54.0	73.9	19.9	
Vert.	3700.000	PK	50.0	29.4	6.1	32.2	-	53.3	73.9	20.6	
Vert.	4625.000	PK	39.7	31.1	6.5	31.9	-	45.5	73.9	28.5	Floor noise
Vert.	5550.000	PK	40.3	31.7	7.0	31.9	-	47.1	73.9	26.8	Floor noise
Vert.	7400.000	PK	40.9	36.3	7.5	32.7	-	51.9	73.9	22.0	Floor noise
Vert.	8325.000	PK	41.3	36.2	7.9	32.9	-	52.5	73.9	21.4	Floor noise
Vert.	9250.000	PK	41.6	38.7	8.2	33.2	-	55.4	73.9	18.6	Floor noise
Vert.	2775.000	AV	44.7	28.4	5.7	32.6	-	46.2	53.9	7.7	
Vert.	3700.000	AV	41.4	29.4	6.1	32.2	-	44.6	53.9	9.3	
Vert.	4625.000	AV	33.1	31.1	6.5	31.9	-	38.8	53.9	15.1	Floor noise
Vert.	5550.000	AV	32.2	31.7	7.0	31.9	-	38.9	53.9	15.0	Floor noise
Vert.	7400.000	AV	34.1	36.3	7.5	32.7	-	45.2	53.9	8.7	Floor noise
Vert.	8325.000	AV	34.1	36.2	7.9	32.9	-	45.3	53.9	8.6	Floor noise
Vert.	9250.000	AV	34.0	38.7	8.2	33.2	-	47.8	53.9	6.1	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 31 % RH	23 deg. C / 35 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takumi Shimada (Above 1 GHz)
Mode	Tx 925 MHz (2 MHz)	

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	925.000	PK	83.0	22.1	13.6	0.0	118.7	-	-	Carrier
Hori.	704.000	PK	33.9	19.8	13.4	32.0	35.0	88.7	53.7	
Hori.	733.000	PK	31.4	20.1	13.5	31.8	33.2	88.7	55.5	
Hori.	736.000	PK	31.4	20.1	13.5	31.8	33.2	88.7	55.5	
Hori.	768.000	PK	40.0	20.5	13.7	31.6	42.5	88.7	46.2	
Hori.	800.000	PK	41.2	20.8	13.9	31.4	44.4	88.7	44.3	
Hori.	832.000	PK	44.6	21.1	14.0	31.3	48.4	88.7	40.3	
Hori.	864.000	PK	49.0	21.8	14.3	31.1	54.0	88.7	34.7	
Hori.	893.000	PK	46.8	22.1	14.8	30.9	52.8	88.7	36.0	
Hori.	896.000	PK	47.4	22.1	14.9	30.9	53.4	88.7	35.3	
Hori.	928.000	PK	40.8	22.0	13.7	0.0	76.5	88.7	12.2	
Hori.	957.000	PK	46.4	22.1	14.8	30.6	52.8	88.7	36.0	
Hori.	1850.000	PK	63.4	25.4	5.4	33.3	60.9	88.7	27.8	
Hori.	6475.000	PK	33.1	33.8	7.3	32.3	41.9	88.7	46.9	
Vert.	925.000	PK	82.2	22.1	13.6	0.0	118.0	-	-	Carrier
Vert.	704.000	PK	32.0	19.8	13.4	32.0	33.2	88.0	54.8	
Vert.	733.000	PK	32.1	20.1	13.5	31.8	33.9	88.0	54.0	
Vert.	736.000	PK	32.4	20.1	13.5	31.8	34.2	88.0	53.8	
Vert.	768.000	PK	40.7	20.5	13.7	31.6	43.2	88.0	44.8	
Vert.	800.000	PK	40.8	20.8	13.9	31.4	44.0	88.0	44.0	
Vert.	832.000	PK	48.3	21.1	14.0	31.3	52.1	88.0	35.9	
Vert.	864.000	PK	52.4	21.8	14.3	31.1	57.4	88.0	30.6	
Vert.	893.000	PK	47.3	22.1	14.8	30.9	53.3	88.0	34.6	
Vert.	896.000	PK	48.1	22.1	14.9	30.9	54.2	88.0	33.8	
Vert.	928.000	PK	38.9	22.0	13.7	0.0	74.5	88.0	13.4	
Vert.	957.000	PK	44.2	22.1	14.8	30.6	50.5	88.0	37.4	
Vert.	1850.000	PK	63.4	25.4	5.4	33.3	60.8	88.0	27.1	
Vert.	6475.000	PK	33.2	33.8	7.3	32.3	42.0	88.0	46.0	

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

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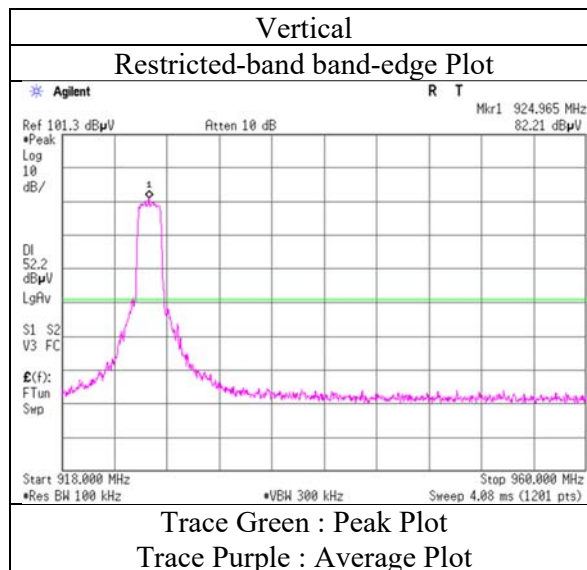
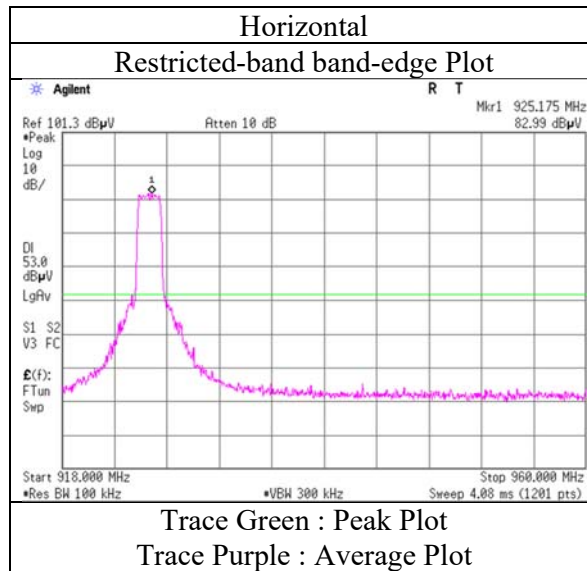
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 16, 2020
Temperature / Humidity	21 deg. C / 31 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)
Mode	Tx 925 MHz (2 MHz)

(PCB Antenna)



* 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.

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Date	March 22, 2020	March 18, 2020
Temperature / Humidity	24 deg. C / 38 % RH	23 deg. C / 35 % RH
Engineer	Junya Okuno	Takumi Shimada
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 910.0 MHz (4 MHz)	

(PCB Antenna)

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.	960.000	QP	34.2	22.1	14.7	30.8	-	40.2	46.0	5.8	
Hori.	2730.000	PK	44.9	28.2	5.7	32.6	-	46.1	73.9	27.8	
Hori.	3640.000	PK	45.0	29.2	6.1	32.2	-	48.1	73.9	25.8	
Hori.	4550.000	PK	40.4	30.8	6.5	31.9	-	45.8	73.9	28.1	Floor noise
Hori.	5460.000	PK	39.9	31.7	6.9	31.9	-	46.6	73.9	27.3	Floor noise
Hori.	6370.000	PK	41.2	33.3	7.2	32.2	-	49.5	73.9	24.4	Floor noise
Hori.	7280.000	PK	41.8	36.1	7.4	32.7	-	52.6	73.9	21.3	Floor noise
Hori.	8190.000	PK	40.9	36.4	7.8	32.8	-	52.2	73.9	21.7	Floor noise
Hori.	9100.000	PK	41.1	38.0	8.2	33.1	-	54.1	73.9	19.8	Floor noise
Hori.	2730.000	AV	35.8	28.2	5.7	32.6	-	37.1	53.9	16.9	
Hori.	3640.000	AV	37.5	29.2	6.1	32.2	-	40.6	53.9	13.3	
Hori.	4550.000	AV	32.6	30.8	6.5	31.9	-	38.0	53.9	15.9	Floor noise
Hori.	5460.000	AV	32.4	31.7	6.9	31.9	-	39.2	53.9	14.7	Floor noise
Hori.	6370.000	AV	32.4	33.3	7.2	32.2	-	40.7	53.9	13.2	Floor noise
Hori.	7280.000	AV	34.2	36.1	7.4	32.7	-	45.0	53.9	8.9	Floor noise
Hori.	8190.000	AV	33.5	36.4	7.8	32.8	-	44.8	53.9	9.1	Floor noise
Hori.	9100.000	AV	33.7	38.0	8.2	33.1	-	46.8	53.9	7.2	Floor noise
Vert.	960.000	QP	34.4	22.1	14.7	30.8	-	40.4	46.0	5.6	
Vert.	2730.000	PK	49.2	28.2	5.7	32.6	-	50.4	73.9	23.5	
Vert.	3640.000	PK	45.7	29.2	6.1	32.2	-	48.8	73.9	25.1	
Vert.	4550.000	PK	40.0	30.8	6.5	31.9	-	45.4	73.9	28.5	Floor noise
Vert.	5460.000	PK	39.4	31.7	6.9	31.9	-	46.1	73.9	27.8	Floor noise
Vert.	6370.000	PK	40.6	33.3	7.2	32.2	-	48.9	73.9	25.0	Floor noise
Vert.	7280.000	PK	41.8	36.1	7.4	32.7	-	52.7	73.9	21.3	Floor noise
Vert.	8190.001	PK	41.7	36.4	7.8	32.8	-	53.0	73.9	20.9	Floor noise
Vert.	9100.000	PK	40.9	38.0	8.2	33.1	-	53.9	73.9	20.0	Floor noise
Vert.	2730.000	AV	41.2	28.2	5.7	32.6	-	42.4	53.9	11.5	
Vert.	3640.000	AV	37.7	29.2	6.1	32.2	-	40.8	53.9	13.1	
Vert.	4550.000	AV	32.7	30.8	6.5	31.9	-	38.1	53.9	15.8	Floor noise
Vert.	5460.000	AV	32.3	31.7	6.9	31.9	-	39.0	53.9	14.9	Floor noise
Vert.	6370.000	AV	32.9	33.3	7.2	32.2	-	41.2	53.9	12.7	Floor noise
Vert.	7280.000	AV	34.2	36.1	7.4	32.7	-	45.0	53.9	8.9	Floor noise
Vert.	8190.001	AV	34.0	36.4	7.8	32.8	-	45.3	53.9	8.6	Floor noise
Vert.	9100.000	AV	33.6	38.0	8.2	33.1	-	46.7	53.9	7.3	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Date	March 22, 2020	March 18, 2020
Temperature / Humidity	24 deg. C / 38 % RH	23 deg. C / 35 % RH
Engineer	Junya Okuno	Takumi Shimada
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 910.0 MHz (4 MHz)	

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	Factor [dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	910.000	PK	75.6	21.9	13.5	0.0	111.0	-	-	Carrier
Hori.	768.000	PK	36.7	20.4	13.6	31.7	39.0	81.0	42.1	
Hori.	800.000	PK	36.9	20.8	13.8	31.6	39.9	81.0	41.1	
Hori.	832.000	PK	42.6	21.1	13.9	31.4	46.2	81.0	34.8	
Hori.	864.000	PK	44.5	21.6	14.2	31.3	49.0	81.0	32.0	
Hori.	902.000	PK	25.6	22.0	13.4	0.0	61.0	81.0	20.0	
Hori.	942.000	PK	40.0	21.9	14.8	30.9	45.8	81.0	35.2	
Vert.	910.000	PK	78.2	21.9	13.5	0.0	113.6	-	-	Carrier
Vert.	768.000	PK	40.1	20.4	13.6	31.7	42.4	83.6	41.2	
Vert.	800.000	PK	39.2	20.8	13.8	31.6	42.2	83.6	41.4	
Vert.	832.000	PK	45.9	21.1	13.9	31.4	49.5	83.6	34.1	
Vert.	864.000	PK	50.2	21.6	14.2	31.3	54.7	83.6	28.9	
Vert.	902.000	PK	27.8	22.0	13.4	0.0	63.2	83.6	20.4	
Vert.	942.000	PK	41.0	21.9	14.8	30.9	46.8	83.6	36.8	

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

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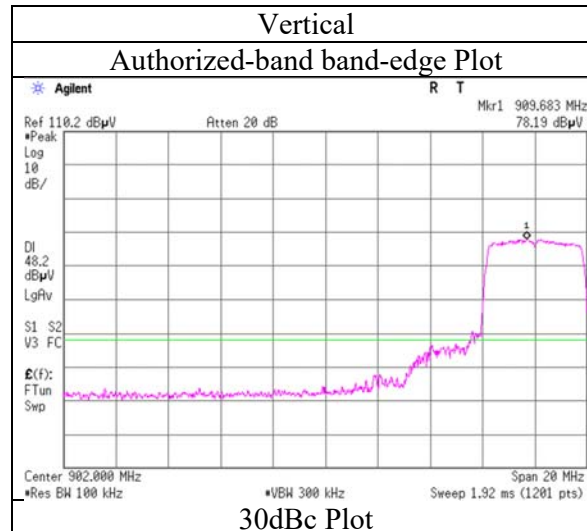
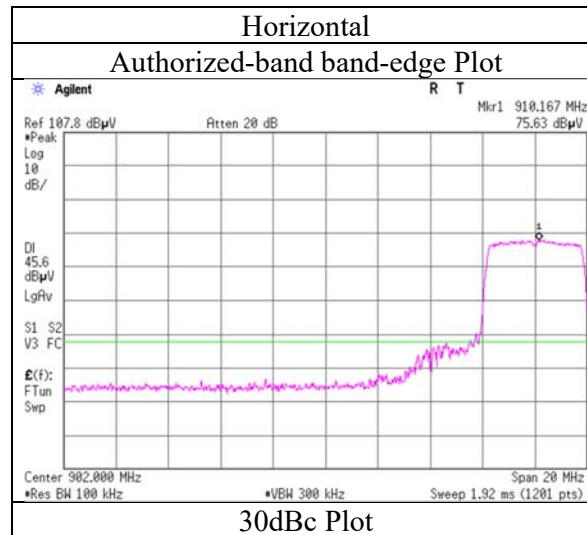
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Radiated Spurious Emission **(Reference Plot for band-edge)**

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	March 22, 2020
Temperature / Humidity	24 deg. C / 38 % RH
Engineer	Junya Okuno
	(Below 1 GHz)
Mode	Tx 910.0 MHz (4 MHz)

(PCB Antenna)



* 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.

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Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date March 17, 2020 March 18, 2020
Temperature / Humidity 23 deg. C / 68 % RH 24 deg. C / 32 % RH
Engineer Yuta Moriya Takafumi Noguchi
(Below 1 GHz) (Above 1 GHz)
Mode Tx 918.0 MHz (4 MHz)

(PCB Antenna)

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.	960.000	QP	37.3	22.2	14.8	30.6	-	43.7	46.0	2.3	
Hori.	2754.000	PK	52.3	28.3	5.7	32.6	-	53.7	73.9	20.2	
Hori.	3672.000	PK	48.7	29.3	6.1	32.2	-	51.9	73.9	22.0	
Hori.	4590.000	PK	40.8	31.0	6.5	31.9	-	46.4	73.9	27.5	Floor noise
Hori.	5508.000	PK	41.1	31.7	7.0	31.9	-	47.8	73.9	26.1	Floor noise
Hori.	6426.000	PK	42.1	33.6	7.3	32.3	-	50.6	73.9	23.3	Floor noise
Hori.	7344.000	PK	42.2	36.2	7.4	32.7	-	53.2	73.9	20.8	Floor noise
Hori.	8262.000	PK	41.4	36.4	7.8	32.9	-	52.8	73.9	21.1	Floor noise
Hori.	9180.000	PK	42.0	38.4	8.2	33.1	-	55.4	73.9	18.5	Floor noise
Hori.	2754.000	AV	41.8	28.3	5.7	32.6	-	43.2	53.9	10.7	
Hori.	3672.000	AV	37.6	29.3	6.1	32.2	-	40.8	53.9	13.1	
Hori.	4590.000	AV	32.4	31.0	6.5	31.9	-	38.0	53.9	15.9	Floor noise
Hori.	5508.000	AV	32.0	31.7	7.0	31.9	-	38.8	53.9	15.1	Floor noise
Hori.	6426.000	AV	32.5	33.6	7.3	32.3	-	41.1	53.9	12.9	Floor noise
Hori.	7344.000	AV	33.8	36.2	7.4	32.7	-	44.8	53.9	9.2	Floor noise
Hori.	8262.000	AV	33.5	36.4	7.8	32.9	-	44.8	53.9	9.1	Floor noise
Hori.	9180.000	AV	34.2	38.4	8.2	33.1	-	47.7	53.9	6.3	Floor noise
Vert.	960.000	QP	34.5	22.2	14.8	30.6	-	40.9	46.0	5.1	
Vert.	2754.000	PK	50.8	28.3	5.7	32.6	-	52.2	73.9	21.7	
Vert.	3672.000	PK	48.0	29.3	6.1	32.2	-	51.1	73.9	22.8	
Vert.	4590.000	PK	40.8	31.0	6.5	31.9	-	46.4	73.9	27.5	Floor noise
Vert.	5508.000	PK	41.0	31.7	7.0	31.9	-	47.8	73.9	26.1	Floor noise
Vert.	6426.000	PK	42.0	33.6	7.3	32.3	-	50.6	73.9	23.3	Floor noise
Vert.	7344.000	PK	42.2	36.2	7.4	32.7	-	53.1	73.9	20.8	Floor noise
Vert.	8262.000	PK	41.3	36.4	7.8	32.9	-	52.6	73.9	21.3	Floor noise
Vert.	9180.000	PK	42.0	38.4	8.2	33.1	-	55.4	73.9	18.5	Floor noise
Vert.	2754.000	AV	40.5	28.3	5.7	32.6	-	41.9	53.9	12.0	
Vert.	3672.000	AV	37.9	29.3	6.1	32.2	-	41.1	53.9	12.8	
Vert.	4590.000	AV	32.8	31.0	6.5	31.9	-	38.4	53.9	15.5	Floor noise
Vert.	5508.000	AV	32.2	31.7	7.0	31.9	-	39.0	53.9	14.9	Floor noise
Vert.	6426.000	AV	32.3	33.6	7.3	32.3	-	40.8	53.9	13.1	Floor noise
Vert.	7344.000	AV	33.8	36.2	7.4	32.7	-	44.7	53.9	9.2	Floor noise
Vert.	8262.000	AV	33.2	36.4	7.8	32.9	-	44.6	53.9	9.3	Floor noise
Vert.	9180.000	AV	34.3	38.4	8.2	33.1	-	47.7	53.9	6.2	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 17, 2020	March 18, 2020
Temperature / Humidity	23 deg. C / 68 % RH	24 deg. C / 32 % RH
Engineer	Yuta Moriya	Takafumi Noguchi
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 918.0 MHz (4 MHz)	

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	918.000	PK	77.3	22.2	13.6	0.0	113.0	-	-	Carrier
Hori.	768.000	PK	40.6	20.5	13.7	31.6	43.2	83.0	39.9	
Hori.	800.000	PK	37.3	20.8	13.9	31.4	40.5	83.0	42.5	
Hori.	832.000	PK	43.7	21.1	14.0	31.3	47.5	83.0	35.5	
Hori.	864.000	PK	48.2	21.8	14.3	31.1	53.2	83.0	29.9	
Hori.	886.000	PK	44.2	22.1	14.7	31.0	50.0	83.0	33.0	
Hori.	896.000	PK	46.2	22.1	14.9	30.9	52.3	83.0	30.7	
Hori.	1836.000	PK	58.8	25.3	5.4	33.3	56.2	83.0	26.8	
Vert.	918.000	PK	77.4	22.2	13.6	0.0	113.2	-	-	Carrier
Vert.	768.000	PK	40.6	20.5	13.7	31.6	43.1	83.2	40.0	
Vert.	800.000	PK	40.3	20.8	13.9	31.4	43.5	83.2	39.6	
Vert.	832.000	PK	45.9	21.1	14.0	31.3	49.7	83.2	33.5	
Vert.	864.000	PK	49.7	21.8	14.3	31.1	54.7	83.2	28.4	
Vert.	886.000	PK	44.2	22.1	14.7	31.0	50.0	83.2	33.2	
Vert.	896.000	PK	46.9	22.1	14.9	30.9	52.9	83.2	30.2	
Vert.	1836.000	PK	60.8	25.3	5.4	33.3	58.2	83.2	25.0	

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

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 17, 2020	March 18, 2020
Temperature / Humidity	23 deg. C / 68 % RH	24 deg. C / 32 % RH
Engineer	Yuta Moriya (Below 1 GHz)	Takafumi Noguchi (Above 1 GHz)
Mode	Tx 922.0 MHz (4 MHz)	

(PCB Antenna)

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.	960.000	QP	37.5	22.2	14.8	30.6	-	43.9	46.0	2.1	
Hori.	2766.000	PK	52.5	28.4	5.7	32.6	-	54.0	73.9	19.9	
Hori.	3688.000	PK	49.2	29.3	6.1	32.2	-	52.4	73.9	21.5	
Hori.	4610.000	PK	40.8	31.0	6.5	31.9	-	46.5	73.9	27.5	Floor noise
Hori.	5532.000	PK	40.6	31.7	7.0	31.9	-	47.3	73.9	26.6	Floor noise
Hori.	6454.000	PK	41.2	33.7	7.3	32.3	-	49.8	73.9	24.1	Floor noise
Hori.	7376.000	PK	41.9	36.3	7.4	32.7	-	52.9	73.9	21.0	Floor noise
Hori.	8298.000	PK	41.6	36.2	7.9	32.9	-	52.8	73.9	21.1	Floor noise
Hori.	9220.000	PK	41.9	38.6	8.2	33.1	-	55.5	73.9	18.4	Floor noise
Hori.	2766.000	AV	42.2	28.4	5.7	32.6	-	43.7	53.9	10.2	
Hori.	3688.000	AV	37.8	29.3	6.1	32.2	-	41.1	53.9	12.8	
Hori.	4610.000	AV	32.7	31.0	6.5	31.9	-	38.4	53.9	15.5	Floor noise
Hori.	5532.000	AV	32.5	31.7	7.0	31.9	-	39.3	53.9	14.6	Floor noise
Hori.	6454.000	AV	32.7	33.7	7.3	32.3	-	41.3	53.9	12.6	Floor noise
Hori.	7376.000	AV	34.0	36.3	7.4	32.7	-	45.0	53.9	8.9	Floor noise
Hori.	8298.000	AV	33.5	36.2	7.9	32.9	-	44.7	53.9	9.2	Floor noise
Hori.	9220.000	AV	34.2	38.6	8.2	33.1	-	47.9	53.9	6.0	Floor noise
Vert.	960.000	QP	36.3	22.2	14.8	30.6	-	42.7	46.0	3.3	
Vert.	2766.000	PK	51.0	28.4	5.7	32.6	-	52.5	73.9	21.4	
Vert.	3688.000	PK	49.0	29.3	6.1	32.2	-	52.2	73.9	21.7	
Vert.	4610.000	PK	40.6	31.0	6.5	31.9	-	46.2	73.9	27.7	Floor noise
Vert.	5532.000	PK	40.9	31.7	7.0	31.9	-	47.7	73.9	26.3	Floor noise
Vert.	6454.000	PK	41.2	33.7	7.3	32.3	-	49.9	73.9	24.0	Floor noise
Vert.	7376.000	PK	41.9	36.3	7.4	32.7	-	52.9	73.9	21.1	Floor noise
Vert.	8298.000	PK	41.8	36.2	7.9	32.9	-	52.9	73.9	21.0	Floor noise
Vert.	9220.000	PK	41.7	38.6	8.2	33.1	-	55.4	73.9	18.5	Floor noise
Vert.	2766.000	AV	41.0	28.4	5.7	32.6	-	42.4	53.9	11.5	
Vert.	3688.000	AV	38.3	29.3	6.1	32.2	-	41.5	53.9	12.4	
Vert.	4610.000	AV	32.4	31.0	6.5	31.9	-	38.0	53.9	15.9	Floor noise
Vert.	5532.000	AV	32.3	31.7	7.0	31.9	-	39.1	53.9	14.8	Floor noise
Vert.	6454.000	AV	32.5	33.7	7.3	32.3	-	41.2	53.9	12.7	Floor noise
Vert.	7376.000	AV	33.8	36.3	7.4	32.7	-	44.8	53.9	9.1	Floor noise
Vert.	8298.000	AV	33.4	36.2	7.9	32.9	-	44.6	53.9	9.3	Floor noise
Vert.	9220.000	AV	34.2	38.6	8.2	33.1	-	47.9	53.9	6.0	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

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 17, 2020	March 18, 2020
Temperature / Humidity	23 deg. C / 68 % RH	24 deg. C / 32 % RH
Engineer	Yuta Moriya	Takafumi Noguchi
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 922.0 MHz (4 MHz)	

(PCB Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	922.000	PK	76.9	22.1	13.6	0.0	112.7	-	-	Carrier
Hori.	768.000	PK	40.8	20.5	13.7	31.6	43.4	82.7	39.3	
Hori.	800.000	PK	38.8	20.8	13.9	31.4	42.0	82.7	40.7	
Hori.	832.000	PK	45.5	21.1	14.0	31.3	49.3	82.7	33.4	
Hori.	864.000	PK	49.8	21.8	14.3	31.1	54.8	82.7	27.9	
Hori.	890.000	PK	45.1	22.1	14.8	31.0	51.0	82.7	31.7	
Hori.	896.000	PK	45.4	22.1	14.9	30.9	51.5	82.7	31.2	
Hori.	928.000	PK	36.2	22.0	13.7	0.0	71.9	82.7	10.8	
Hori.	954.000	PK	44.2	22.1	14.8	30.6	50.4	82.7	32.3	
Hori.	1844.000	PK	59.7	25.4	5.4	33.3	57.1	82.7	25.6	
Vert.	922.000	PK	78.1	22.1	13.6	0.0	113.9	-	-	Carrier
Vert.	768.000	PK	39.3	20.5	13.7	31.6	41.9	83.9	42.0	
Vert.	800.000	PK	38.9	20.8	13.9	31.4	42.1	83.9	41.7	
Vert.	832.000	PK	47.1	21.1	14.0	31.3	50.9	83.9	33.0	
Vert.	864.000	PK	50.2	21.8	14.3	31.1	55.2	83.9	28.7	
Vert.	890.000	PK	46.3	22.1	14.8	31.0	52.2	83.9	31.7	
Vert.	896.000	PK	47.8	22.1	14.9	30.9	53.9	83.9	30.0	
Vert.	928.000	PK	36.3	22.0	13.7	0.0	71.9	83.9	11.9	
Vert.	954.000	PK	41.4	22.1	14.8	30.6	47.7	83.9	36.2	
Vert.	1844.000	PK	60.5	25.4	5.4	33.3	57.9	83.9	26.0	

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

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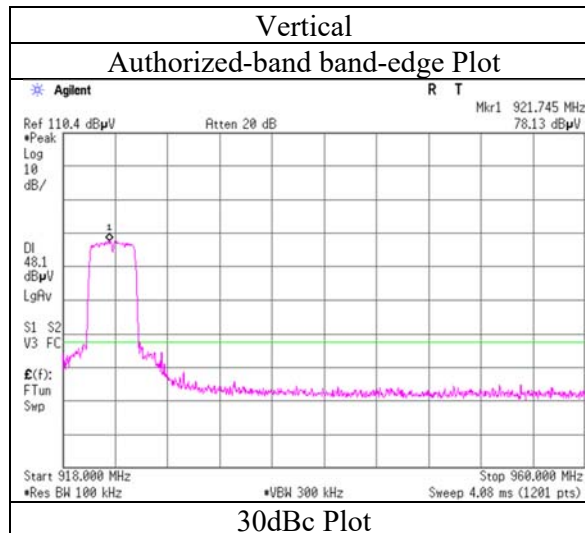
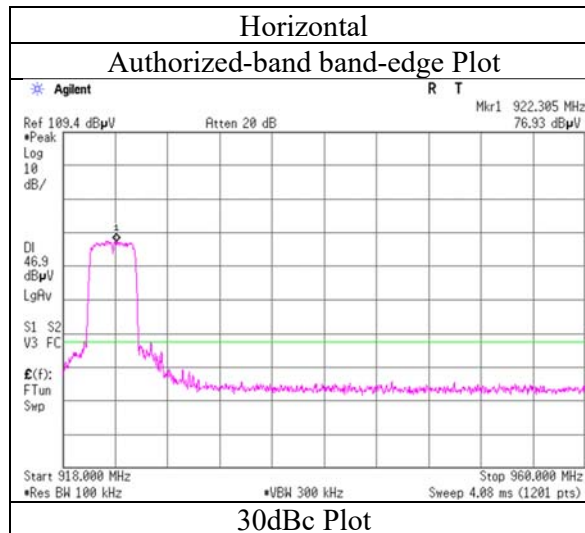
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Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 17, 2020
Temperature / Humidity 23 deg. C / 68 % RH
Engineer Yuta Moriya
(Below 1 GHz)
Mode Tx 922.0 MHz (4 MHz)

(PCB Antenna)

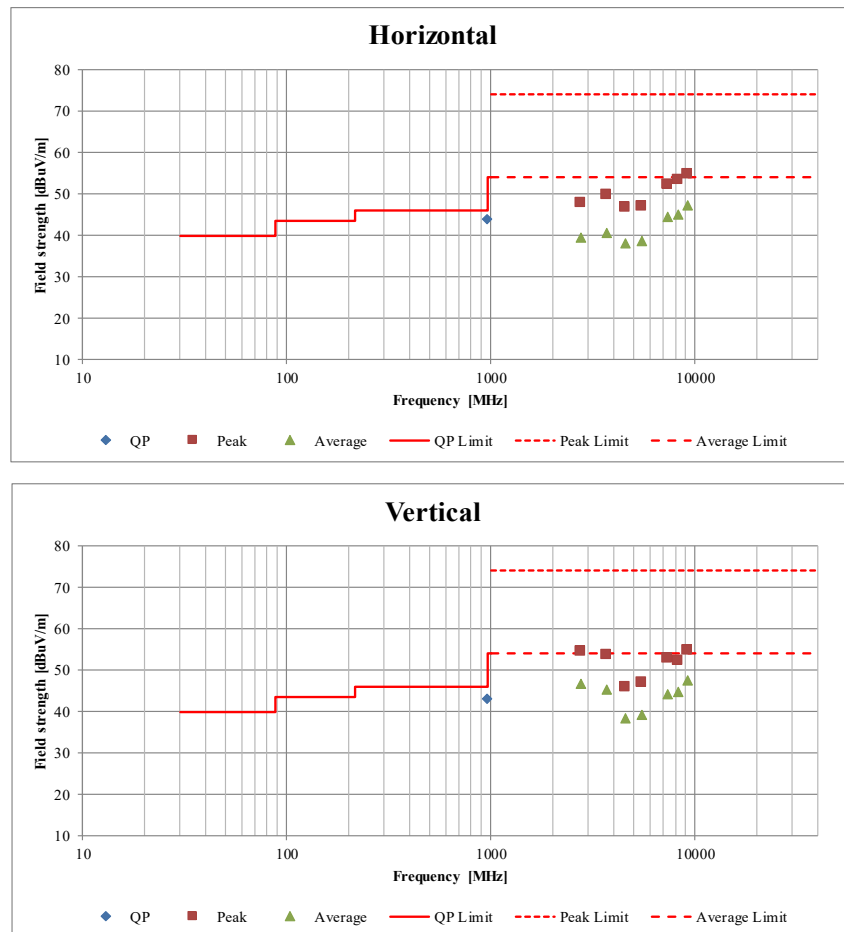


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (Plot data, Worst case)

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 16, 2020	March 18, 2020
Temperature / Humidity	21 deg. C / 31 % RH	23 deg. C / 35 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)	Takumi Shimada (Above 1 GHz)
Mode	Tx 917 MHz (2 MHz)	

(PCB Antenna)



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

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 14, 2020	March 18, 2020
Temperature / Humidity	22 deg. C / 35 % RH	24 deg. C / 32 % RH
Engineer	Junya Okuno	Takafumi Noguchi
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 903.5 MHz (1 MHz)	

(ROD Antenna)

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.	960.000	QP	37.3	22.2	14.8	30.6	-	43.7	46.0	2.3	
Hori.	2710.500	PK	56.1	28.1	5.7	32.6	-	57.2	73.9	16.7	
Hori.	3614.000	PK	54.4	29.2	6.0	32.2	-	57.4	73.9	16.5	
Hori.	4517.500	PK	47.7	30.7	6.5	31.9	-	53.0	73.9	21.0	
Hori.	5421.000	PK	47.3	31.6	6.9	31.9	-	54.0	73.9	19.9	
Hori.	7228.000	PK	42.2	36.0	7.4	32.7	-	52.9	73.9	21.0	Floor noise
Hori.	8131.500	PK	41.2	36.6	7.8	32.8	-	52.7	73.9	21.2	Floor noise
Hori.	9035.000	PK	42.0	37.5	8.2	33.1	-	54.6	73.9	19.3	Floor noise
Hori.	2710.500	AV	49.0	28.1	5.7	32.6	-	50.1	53.9	3.8	
Hori.	3614.000	AV	45.0	29.2	6.0	32.2	-	48.0	53.9	5.9	
Hori.	4517.500	AV	35.2	30.7	6.5	31.9	-	40.5	53.9	13.5	
Hori.	5421.000	AV	34.8	31.6	6.9	31.9	-	41.5	53.9	12.5	
Hori.	7228.000	AV	34.2	36.0	7.4	32.7	-	44.9	53.9	9.0	Floor noise
Hori.	8131.500	AV	33.8	36.6	7.8	32.8	-	45.3	53.9	8.6	Floor noise
Hori.	9035.000	AV	33.6	37.5	8.2	33.1	-	46.2	53.9	7.7	Floor noise
Vert.	960.000	QP	36.0	22.2	14.8	30.6	-	42.4	46.0	3.6	
Vert.	2710.500	PK	56.2	28.1	5.7	32.6	-	57.3	73.9	16.6	
Vert.	3614.000	PK	54.5	29.2	6.0	32.2	-	57.5	73.9	16.4	
Vert.	4517.500	PK	46.3	30.7	6.5	31.9	-	51.5	73.9	22.4	
Vert.	5421.000	PK	45.8	31.6	6.9	31.9	-	52.4	73.9	21.5	
Vert.	7228.000	PK	42.3	36.0	7.4	32.7	-	53.0	73.9	20.9	Floor noise
Vert.	8131.500	PK	41.2	36.6	7.8	32.8	-	52.7	73.9	21.2	Floor noise
Vert.	9035.000	PK	42.1	37.5	8.2	33.1	-	54.7	73.9	19.2	Floor noise
Vert.	2710.500	AV	49.1	28.1	5.7	32.6	-	50.2	53.9	3.7	
Vert.	3614.000	AV	45.1	29.2	6.0	32.2	-	48.1	53.9	5.8	
Vert.	4517.500	AV	34.5	30.7	6.5	31.9	-	39.8	53.9	14.1	
Vert.	5421.000	AV	33.6	31.6	6.9	31.9	-	40.2	53.9	13.7	
Vert.	7228.000	AV	34.5	36.0	7.4	32.7	-	45.2	53.9	8.7	Floor noise
Vert.	8131.500	AV	33.8	36.6	7.8	32.8	-	45.3	53.9	8.6	Floor noise
Vert.	9035.000	AV	33.7	37.5	8.2	33.1	-	46.4	53.9	7.6	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	
Date	March 14, 2020	March 18, 2020	
Temperature / Humidity	22 deg. C / 35 % RH	24 deg. C / 32 % RH	
Engineer	Junya Okuno	Takafumi Noguchi	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 903.5 MHz (1 MHz)		

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	903.500	PK	89.0	22.2	13.5	0.0	124.7	-	-	Carrier
Hori.	704.000	PK	39.3	19.8	13.4	32.0	40.5	94.7	54.2	
Hori.	711.530	PK	39.8	20.0	13.4	31.9	41.3	94.7	53.4	
Hori.	736.000	PK	36.0	20.1	13.5	31.8	37.8	94.7	56.9	
Hori.	768.000	PK	48.8	20.5	13.7	31.6	51.3	94.7	43.4	
Hori.	800.000	PK	49.2	20.8	13.9	31.4	52.5	94.7	42.3	
Hori.	832.000	PK	54.1	21.1	14.0	31.3	57.9	94.7	36.8	
Hori.	864.000	PK	54.5	21.8	14.3	31.1	59.5	94.7	35.2	
Hori.	902.000	PK	47.3	22.2	13.5	0.0	83.0	94.7	11.8	
Hori.	935.525	PK	46.9	22.0	15.1	30.7	53.3	94.7	41.4	
Hori.	1807.000	PK	76.5	25.2	5.4	33.4	73.7	94.7	21.0	
Hori.	6324.500	PK	41.8	33.0	7.2	32.2	49.9	94.7	44.8	
Vert.	903.500	PK	88.1	22.2	13.5	0.0	123.8	-	-	Carrier
Vert.	704.000	PK	38.5	19.8	13.4	32.0	39.7	93.8	54.0	
Vert.	711.530	PK	39.0	20.0	13.4	31.9	40.4	93.8	53.3	
Vert.	736.000	PK	37.0	20.1	13.5	31.8	38.8	93.8	55.0	
Vert.	768.000	PK	43.2	20.5	13.7	31.6	45.7	93.8	48.1	
Vert.	800.000	PK	44.5	20.8	13.9	31.4	47.7	93.8	46.1	
Vert.	832.000	PK	50.6	21.1	14.0	31.3	54.4	93.8	39.3	
Vert.	864.000	PK	52.5	21.8	14.3	31.1	57.5	93.8	36.3	
Vert.	902.000	PK	44.5	22.2	13.5	0.0	80.2	93.8	13.6	
Vert.	935.525	PK	47.4	22.0	15.1	30.7	53.8	93.8	40.0	
Vert.	1807.000	PK	74.4	25.2	5.4	33.4	71.6	93.8	22.1	
Vert.	6324.500	PK	38.1	33.0	7.2	32.2	46.2	93.8	47.6	

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

UL Japan, Inc.

Ise EMC Lab.

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

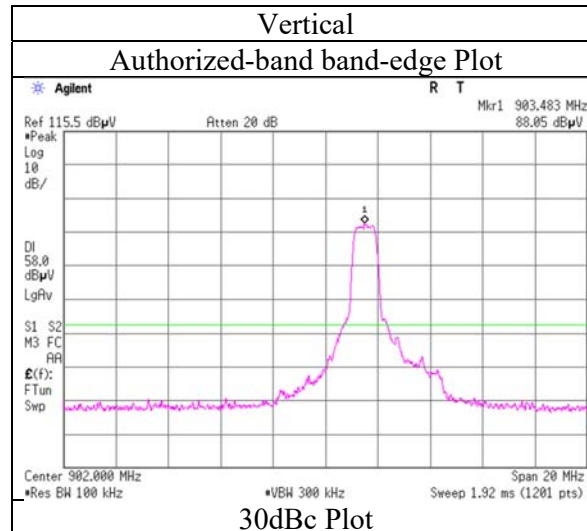
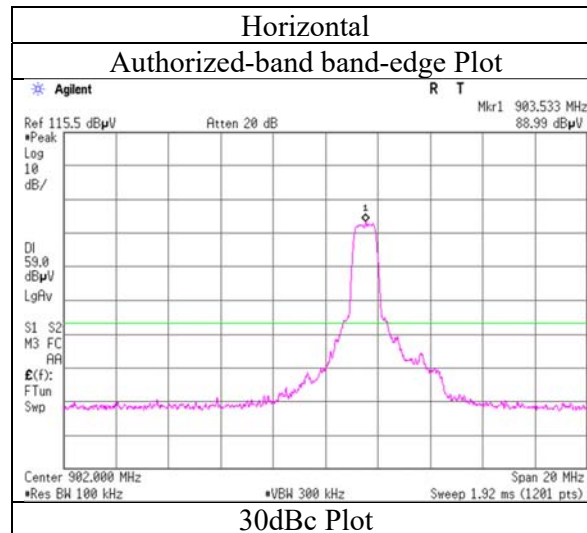
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 14, 2020
Temperature / Humidity	22 deg. C / 35 % RH
Engineer	Junya Okuno
	(Below 1 GHz)
Mode	Tx 903.5 MHz (1 MHz)

(ROD Antenna)



* 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.

UL Japan, Inc.

Ise EMC Lab.

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

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Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	
Date	March 14, 2020	March 18, 2020	
Temperature / Humidity	22 deg. C / 35 % RH	24 deg. C / 32 % RH	
Engineer	Junya Okuno	Takafumi Noguchi	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 915.5 MHz (1 MHz)		

(ROD Antenna)

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.	960.000	QP	37.2	22.2	14.8	30.6	-	43.6	46.0	2.4	
Hori.	2746.500	PK	58.6	28.3	5.7	32.6	-	59.9	73.9	14.0	
Hori.	3662.000	PK	55.0	29.2	6.1	32.2	-	58.2	73.9	15.7	
Hori.	4577.500	PK	46.6	30.9	6.5	31.9	-	52.1	73.9	21.8	
Hori.	5493.000	PK	41.2	31.7	7.0	31.9	-	48.0	73.9	25.9	Floor noise
Hori.	7324.000	PK	42.4	36.2	7.4	32.7	-	53.3	73.9	20.6	Floor noise
Hori.	8239.500	PK	41.3	36.4	7.8	32.9	-	52.6	73.9	21.3	Floor noise
Hori.	9155.000	PK	41.8	38.2	8.2	33.1	-	55.0	73.9	18.9	Floor noise
Hori.	2746.500	AV	49.4	28.3	5.7	32.6	-	50.8	53.9	3.1	
Hori.	3662.000	AV	44.1	29.2	6.1	32.2	-	47.3	53.9	6.7	
Hori.	4577.500	AV	34.9	30.9	6.5	31.9	-	40.4	53.9	13.5	
Hori.	5493.000	AV	32.2	31.7	7.0	31.9	-	39.0	53.9	14.9	Floor noise
Hori.	7324.000	AV	34.2	36.2	7.4	32.7	-	45.1	53.9	8.8	Floor noise
Hori.	8239.500	AV	33.4	36.4	7.8	32.9	-	44.8	53.9	9.1	Floor noise
Hori.	9155.000	AV	34.0	38.2	8.2	33.1	-	47.2	53.9	6.7	Floor noise
Vert.	960.000	QP	35.8	22.2	14.8	30.6	-	42.2	46.0	3.8	
Vert.	2746.500	PK	58.2	28.3	5.7	32.6	-	59.5	73.9	14.4	
Vert.	3662.000	PK	54.6	29.2	6.1	32.2	-	57.8	73.9	16.1	
Vert.	4577.500	PK	45.7	30.9	6.5	31.9	-	51.2	73.9	22.7	
Vert.	5493.000	PK	41.4	31.7	7.0	31.9	-	48.2	73.9	25.8	Floor noise
Vert.	7324.000	PK	42.3	36.2	7.4	32.7	-	53.2	73.9	20.7	Floor noise
Vert.	8239.500	PK	41.6	36.4	7.8	32.9	-	52.9	73.9	21.0	Floor noise
Vert.	9155.000	PK	41.7	38.2	8.2	33.1	-	54.9	73.9	19.0	Floor noise
Vert.	2746.500	AV	48.2	28.3	5.7	32.6	-	49.5	53.9	4.4	
Vert.	3662.000	AV	43.9	29.2	6.1	32.2	-	47.0	53.9	6.9	
Vert.	4577.500	AV	33.9	30.9	6.5	31.9	-	39.4	53.9	14.5	
Vert.	5493.000	AV	32.2	31.7	7.0	31.9	-	39.0	53.9	14.9	Floor noise
Vert.	7324.000	AV	34.3	36.2	7.4	32.7	-	45.2	53.9	8.7	Floor noise
Vert.	8239.500	AV	33.5	36.4	7.8	32.9	-	44.9	53.9	9.0	Floor noise
Vert.	9155.000	AV	34.0	38.2	8.2	33.1	-	47.2	53.9	6.7	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	
Date	March 14, 2020	March 18, 2020	
Temperature / Humidity	22 deg. C / 35 % RH	24 deg. C / 32 % RH	
Engineer	Junya Okuno	Takafumi Noguchi	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 915.5 MHz (1 MHz)		

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	915.500	PK	87.1	22.2	13.6	0.0	122.9	-	-	Carrier
Hori.	704.000	PK	38.7	19.8	13.4	32.0	39.8	92.9	53.1	
Hori.	723.500	PK	40.6	20.1	13.5	31.9	42.3	92.9	50.6	
Hori.	736.000	PK	35.2	20.1	13.5	31.8	37.0	92.9	55.9	
Hori.	768.000	PK	47.9	20.5	13.7	31.6	50.5	92.9	42.4	
Hori.	800.000	PK	48.0	20.8	13.9	31.4	51.2	92.9	41.7	
Hori.	832.000	PK	53.1	21.1	14.0	31.3	56.9	92.9	35.9	
Hori.	864.000	PK	53.8	21.8	14.3	31.1	58.8	92.9	34.1	
Hori.	883.520	PK	50.0	22.0	14.7	31.0	55.7	92.9	37.2	
Hori.	896.000	PK	50.5	22.1	14.9	30.9	56.6	92.9	36.3	
Hori.	947.520	PK	47.6	22.0	14.8	30.6	53.8	92.9	39.1	
Hori.	1831.000	PK	73.5	25.3	5.4	33.3	70.9	92.9	22.0	
Hori.	6408.500	PK	41.5	33.5	7.2	32.2	50.0	92.9	42.9	
Vert.	915.500	PK	84.6	22.2	13.6	0.0	120.4	-	-	Carrier
Vert.	704.000	PK	38.0	19.8	13.4	32.0	39.1	90.4	51.2	
Vert.	723.500	PK	39.4	20.1	13.5	31.9	41.1	90.4	49.2	
Vert.	736.000	PK	35.2	20.1	13.5	31.8	37.0	90.4	53.4	
Vert.	768.000	PK	41.4	20.5	13.7	31.6	44.0	90.4	46.4	
Vert.	800.000	PK	43.4	20.8	13.9	31.4	46.6	90.4	43.7	
Vert.	832.000	PK	50.3	21.1	14.0	31.3	54.1	90.4	36.2	
Vert.	864.000	PK	52.3	21.8	14.3	31.1	57.3	90.4	33.0	
Vert.	883.520	PK	50.2	22.0	14.7	31.0	55.9	90.4	34.5	
Vert.	896.000	PK	48.1	22.1	14.9	30.9	54.2	90.4	36.1	
Vert.	947.520	PK	44.9	22.0	14.8	30.6	51.1	90.4	39.3	
Vert.	1831.000	PK	72.5	25.3	5.4	33.3	69.9	90.4	20.5	
Vert.	6408.500	PK	37.8	33.5	7.2	32.2	46.3	90.4	44.1	

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

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

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Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	
Date	March 14, 2020	March 18, 2020	
Temperature / Humidity	22 deg. C / 35 % RH	24 deg. C / 32 % RH	
Engineer	Junya Okuno	Takafumi Noguchi	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 926.5 MHz (1 MHz)		

(ROD Antenna)

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.	960.000	QP	37.1	22.2	14.8	30.6	-	43.5	46.0	2.5	
Hori.	2779.500	PK	59.5	28.5	5.7	32.6	-	61.1	73.9	12.8	
Hori.	3706.000	PK	54.5	29.4	6.1	32.2	-	57.8	73.9	16.1	
Hori.	4632.500	PK	45.9	31.1	6.5	31.9	-	51.6	73.9	22.3	
Hori.	5559.000	PK	41.0	31.7	7.0	31.9	-	47.8	73.9	26.2	Floor noise
Hori.	7412.000	PK	42.3	36.3	7.5	32.7	-	53.4	73.9	20.5	Floor noise
Hori.	8338.500	PK	42.1	36.2	7.9	32.9	-	53.4	73.9	20.6	Floor noise
Hori.	9265.000	PK	42.2	38.8	8.2	33.2	-	56.1	73.9	17.8	Floor noise
Hori.	2779.500	AV	48.5	28.5	5.7	32.6	-	50.1	53.9	3.8	
Hori.	3706.000	AV	42.5	29.4	6.1	32.2	-	45.8	53.9	8.1	
Hori.	4632.500	AV	34.0	31.1	6.5	31.9	-	39.7	53.9	14.2	
Hori.	5559.000	AV	32.2	31.7	7.0	31.9	-	39.0	53.9	14.9	Floor noise
Hori.	7412.000	AV	33.8	36.3	7.5	32.7	-	44.9	53.9	9.0	Floor noise
Hori.	8338.500	AV	34.1	36.2	7.9	32.9	-	45.3	53.9	8.6	Floor noise
Hori.	9265.000	AV	34.0	38.8	8.2	33.2	-	47.9	53.9	6.1	Floor noise
Vert.	960.000	QP	35.5	22.2	14.8	30.6	-	41.9	46.0	4.1	
Vert.	2779.500	PK	57.9	28.5	5.7	32.6	-	59.4	73.9	14.5	
Vert.	3706.000	PK	53.7	29.4	6.1	32.2	-	57.0	73.9	16.9	
Vert.	4632.500	PK	45.4	31.1	6.5	31.9	-	51.1	73.9	22.8	
Vert.	5559.000	PK	40.7	31.7	7.0	31.9	-	47.4	73.9	26.5	Floor noise
Vert.	7412.000	PK	42.4	36.3	7.5	32.7	-	53.5	73.9	20.5	Floor noise
Vert.	8338.500	PK	41.7	36.2	7.9	32.9	-	52.9	73.9	21.0	Floor noise
Vert.	9265.000	PK	42.0	38.8	8.2	33.2	-	55.9	73.9	18.0	Floor noise
Vert.	2779.500	AV	47.0	28.5	5.7	32.6	-	48.6	53.9	5.4	
Vert.	3706.000	AV	42.0	29.4	6.1	32.2	-	45.3	53.9	8.6	
Vert.	4632.500	AV	33.2	31.1	6.5	31.9	-	38.9	53.9	15.0	
Vert.	5559.000	AV	32.1	31.7	7.0	31.9	-	38.9	53.9	15.0	Floor noise
Vert.	7412.000	AV	34.2	36.3	7.5	32.7	-	45.2	53.9	8.7	Floor noise
Vert.	8338.500	AV	33.9	36.2	7.9	32.9	-	45.1	53.9	8.8	Floor noise
Vert.	9265.000	AV	34.0	38.8	8.2	33.2	-	47.9	53.9	6.1	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	March 14, 2020	March 18, 2020
Temperature / Humidity	22 deg. C / 35 % RH	24 deg. C / 32 % RH
Engineer	Junya Okuno	Takafumi Noguchi
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 926.5 MHz (1 MHz)	

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	926.500	PK	86.7	22.1	13.6	0.0	122.4	-	-	Carrier
Hori.	704.000	PK	38.2	19.8	13.4	32.0	39.3	92.4	53.0	
Hori.	736.000	PK	33.9	20.1	13.5	31.8	35.7	92.4	56.6	
Hori.	768.000	PK	43.8	20.5	13.7	31.6	46.3	92.4	46.0	
Hori.	800.000	PK	42.3	20.8	13.9	31.4	45.5	92.4	46.8	
Hori.	832.000	PK	50.7	21.1	14.0	31.3	54.5	92.4	37.9	
Hori.	864.000	PK	53.3	21.8	14.3	31.1	58.3	92.4	34.1	
Hori.	896.000	PK	50.2	22.1	14.9	30.9	56.3	92.4	36.1	
Hori.	928.000	PK	46.6	22.0	13.7	0.0	82.3	92.4	10.1	
Hori.	958.513	PK	46.6	22.1	14.8	30.6	53.0	92.4	39.4	
Hori.	1853.000	PK	69.2	25.4	5.4	33.3	66.7	92.4	25.6	
Hori.	6485.500	PK	40.7	33.9	7.3	32.3	49.5	92.4	42.9	
Vert.	926.500	PK	84.7	22.1	13.6	0.0	120.4	-	-	Carrier
Vert.	704.000	PK	35.6	19.8	13.4	32.0	36.8	90.4	53.6	
Vert.	736.000	PK	35.0	20.1	13.5	31.8	36.9	90.4	53.5	
Vert.	768.000	PK	40.5	20.5	13.7	31.6	43.0	90.4	47.4	
Vert.	800.000	PK	41.4	20.8	13.9	31.4	44.6	90.4	45.8	
Vert.	832.000	PK	49.6	21.1	14.0	31.3	53.4	90.4	37.0	
Vert.	864.000	PK	51.1	21.8	14.3	31.1	56.1	90.4	34.3	
Vert.	896.000	PK	46.6	22.1	14.9	30.9	52.7	90.4	37.7	
Vert.	928.000	PK	40.8	22.0	13.7	0.0	76.4	90.4	13.9	
Vert.	958.513	PK	44.5	22.1	14.8	30.6	50.8	90.4	39.5	
Vert.	1853.000	PK	68.1	25.4	5.4	33.3	65.6	90.4	24.7	
Vert.	6485.500	PK	36.6	33.9	7.3	32.3	45.4	90.4	45.0	

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

UL Japan, Inc.

Ise EMC Lab.

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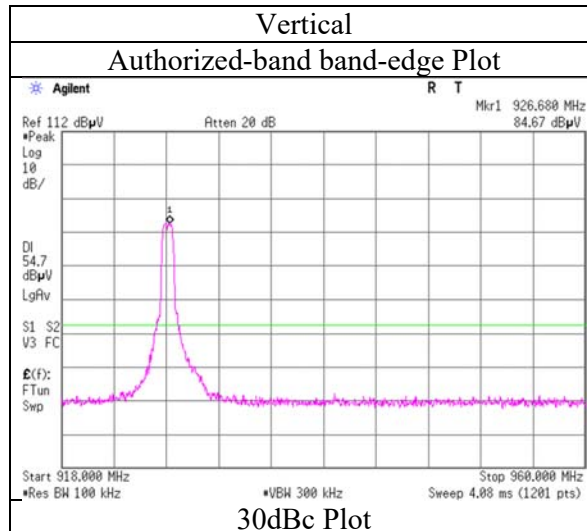
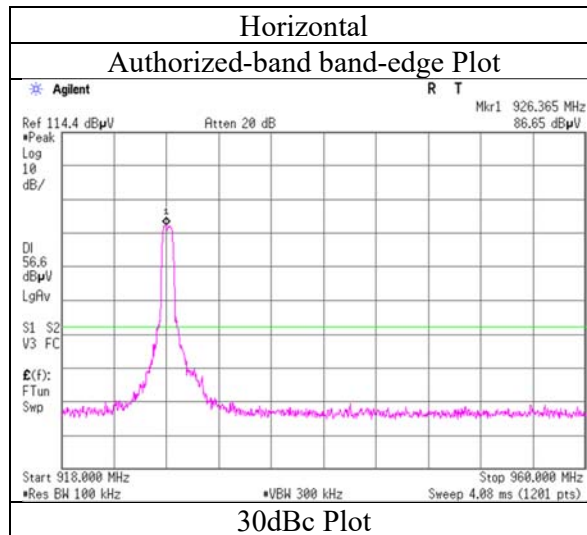
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission **(Reference Plot for band-edge)**

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 14, 2020
Temperature / Humidity	22 deg. C / 35 % RH
Engineer	Junya Okuno
	(Below 1 GHz)
Mode	Tx 926.5 MHz (1 MHz)

(ROD Antenna)



* 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.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date March 15, 2020 March 18, 2020
Temperature / Humidity 22 deg. C / 30 % RH 24 deg. C / 32 % RH
Engineer Yuta Moriya Takafumi Noguchi
(Below 1 GHz) (Above 1 GHz)
Mode Tx 905.0 MHz (2 MHz)

(ROD Antenna)

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.	960.000	QP	36.5	22.2	14.8	30.6	-	42.9	46.0	3.1	
Hori.	2715.000	PK	55.7	28.1	5.7	32.6	-	56.9	73.9	17.0	
Hori.	3620.000	PK	53.7	29.2	6.0	32.2	-	56.7	73.9	17.2	
Hori.	4525.000	PK	41.0	30.8	6.5	31.9	-	46.3	73.9	27.6	Floor noise
Hori.	5430.000	PK	40.9	31.6	6.9	31.9	-	47.6	73.9	26.3	Floor noise
Hori.	7240.000	PK	42.2	36.0	7.4	32.7	-	53.0	73.9	21.0	Floor noise
Hori.	8145.000	PK	41.2	36.5	7.8	32.8	-	52.7	73.9	21.2	Floor noise
Hori.	9050.000	PK	41.9	37.6	8.2	33.1	-	54.5	73.9	19.4	Floor noise
Hori.	2715.000	AV	46.7	28.1	5.7	32.6	-	47.8	53.9	6.1	
Hori.	3620.000	AV	42.3	29.2	6.0	32.2	-	45.4	53.9	8.5	
Hori.	4525.000	AV	32.9	30.8	6.5	31.9	-	38.2	53.9	15.7	Floor noise
Hori.	5430.000	AV	32.8	31.6	6.9	31.9	-	39.5	53.9	14.4	Floor noise
Hori.	7240.000	AV	34.1	36.0	7.4	32.7	-	44.9	53.9	9.1	Floor noise
Hori.	8145.000	AV	33.5	36.5	7.8	32.8	-	44.9	53.9	9.0	Floor noise
Hori.	9050.000	AV	33.8	37.6	8.2	33.1	-	46.5	53.9	7.4	Floor noise
Vert.	960.000	QP	36.6	22.2	14.8	30.6	-	43.0	46.0	3.0	
Vert.	2715.000	PK	55.5	28.1	5.7	32.6	-	56.7	73.9	17.2	
Vert.	3620.000	PK	52.8	29.2	6.0	32.2	-	55.8	73.9	18.1	
Vert.	4525.000	PK	41.0	30.8	6.5	31.9	-	46.3	73.9	27.6	Floor noise
Vert.	5430.000	PK	41.4	31.6	6.9	31.9	-	48.0	73.9	25.9	Floor noise
Vert.	7240.000	PK	42.3	36.0	7.4	32.7	-	53.0	73.9	20.9	Floor noise
Vert.	8145.000	PK	41.6	36.5	7.8	32.8	-	53.0	73.9	20.9	Floor noise
Vert.	9050.000	PK	41.4	37.6	8.2	33.1	-	54.1	73.9	19.8	Floor noise
Vert.	2715.000	AV	46.0	28.1	5.7	32.6	-	47.1	53.9	6.8	
Vert.	3620.000	AV	41.2	29.2	6.0	32.2	-	44.2	53.9	9.7	
Vert.	4525.000	AV	32.9	30.8	6.5	31.9	-	38.2	53.9	15.7	Floor noise
Vert.	5430.000	AV	32.7	31.6	6.9	31.9	-	39.3	53.9	14.6	Floor noise
Vert.	7240.000	AV	34.1	36.0	7.4	32.7	-	44.8	53.9	9.1	Floor noise
Vert.	8145.000	AV	33.5	36.5	7.8	32.8	-	44.9	53.9	9.0	Floor noise
Vert.	9050.000	AV	33.9	37.6	8.2	33.1	-	46.6	53.9	7.3	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date March 15, 2020
Temperature / Humidity 22 deg. C / 30 % RH
Engineer Yuta Moriya
(Below 1 GHz)
Mode Tx 905.0 MHz (2 MHz)

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	905.000	PK	85.1	22.2	13.5	0.0	120.8	-	-	Carrier
Hori.	704.000	PK	38.5	19.8	13.4	32.0	39.7	90.8	51.0	
Hori.	712.694	PK	35.2	20.0	13.4	31.9	36.7	90.8	54.1	
Hori.	736.000	PK	38.4	20.1	13.5	31.8	40.3	90.8	50.5	
Hori.	768.000	PK	49.0	20.5	13.7	31.6	51.6	90.8	39.2	
Hori.	800.000	PK	46.9	20.8	13.9	31.4	50.1	90.8	40.7	
Hori.	832.000	PK	52.9	21.1	14.0	31.3	56.7	90.8	34.1	
Hori.	864.000	PK	53.5	21.8	14.3	31.1	58.5	90.8	32.2	
Hori.	902.000	PK	41.8	22.2	13.5	0.0	77.5	90.8	13.3	
Hori.	937.013	PK	43.9	22.0	15.1	30.7	50.3	90.8	40.5	
Hori.	1810.000	PK	72.1	25.2	5.4	33.4	69.3	90.8	21.5	
Hori.	6335.000	PK	37.7	33.1	7.2	32.2	45.9	90.8	44.9	
Vert.	905.000	PK	83.8	22.2	13.5	0.0	119.5	-	-	Carrier
Vert.	704.000	PK	37.2	19.8	13.4	32.0	38.3	89.5	51.2	
Vert.	712.694	PK	37.4	20.0	13.4	31.9	38.8	89.5	50.7	
Vert.	736.000	PK	36.1	20.1	13.5	31.8	38.0	89.5	51.6	
Vert.	768.000	PK	40.7	20.5	13.7	31.6	43.2	89.5	46.3	
Vert.	800.000	PK	44.1	20.8	13.9	31.4	47.3	89.5	42.3	
Vert.	832.000	PK	49.6	21.1	14.0	31.3	53.4	89.5	36.1	
Vert.	864.000	PK	51.5	21.8	14.3	31.1	56.5	89.5	33.1	
Vert.	902.000	PK	41.1	22.2	13.5	0.0	76.8	89.5	12.8	
Vert.	937.013	PK	36.1	22.0	15.1	30.7	42.5	89.5	47.0	
Vert.	1810.000	PK	71.3	25.2	5.4	33.4	68.6	89.5	21.0	
Vert.	6335.000	PK	34.9	33.1	7.2	32.2	43.1	89.5	46.4	

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

UL Japan, Inc.

Ise EMC Lab.

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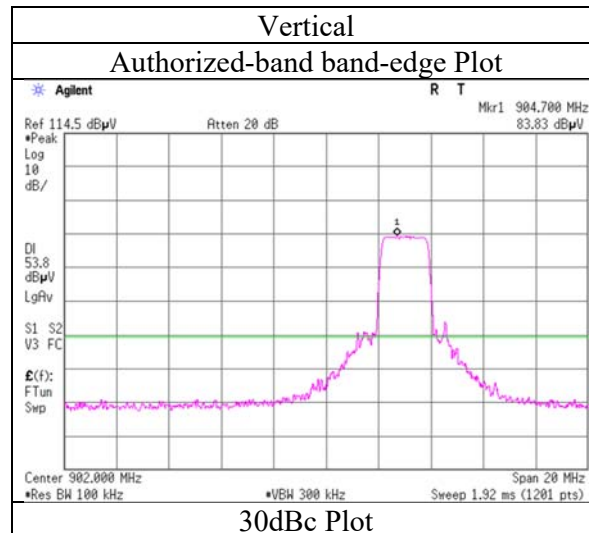
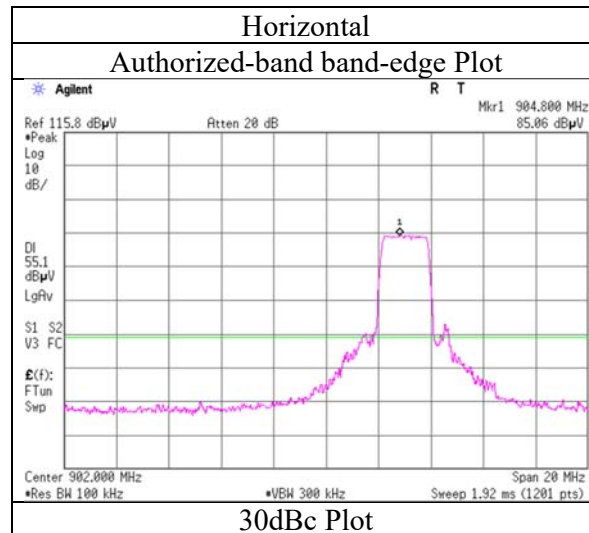
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 15, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Yuta Moriya (Below 1 GHz)
Mode	Tx 905.0 MHz (2 MHz)

(ROD Antenna)



* 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.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.4
Date March 15, 2020 March 22, 2020
Temperature / Humidity 22 deg. C / 30 % RH 23 deg. C / 39 % RH
Engineer Yuta Moriya Yuta Moriya
(Below 1 GHz) (Above 1 GHz)
Mode Tx 917.0 MHz (2 MHz)

(ROD Antenna)

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.	960.000	QP	37.0	22.2	14.8	30.6	-	43.4	46.0	2.6	
Hori.	2751.000	PK	55.2	28.4	5.9	31.7	-	57.7	73.9	16.2	
Hori.	3668.000	PK	52.3	29.2	6.3	31.5	-	56.4	73.9	17.6	
Hori.	4585.000	PK	42.2	31.0	6.7	31.3	-	48.7	73.9	25.3	
Hori.	5502.000	PK	40.3	32.1	7.2	31.3	-	48.3	73.9	25.6	Floor noise
Hori.	7336.000	PK	40.8	36.5	7.8	32.5	-	52.6	73.9	21.3	Floor noise
Hori.	8253.000	PK	41.4	36.6	8.1	32.8	-	53.3	73.9	20.6	Floor noise
Hori.	9170.000	PK	39.8	37.6	8.7	32.6	-	53.5	73.9	20.4	Floor noise
Hori.	2751.000	AV	45.4	28.4	5.9	31.7	-	48.0	53.9	5.9	
Hori.	3668.000	AV	41.7	29.2	6.3	31.5	-	45.7	53.9	8.2	
Hori.	4585.000	AV	33.8	31.0	6.7	31.3	-	40.2	53.9	13.7	
Hori.	5502.000	AV	32.2	32.1	7.2	31.3	-	40.1	53.9	13.8	Floor noise
Hori.	7336.000	AV	32.3	36.5	7.8	32.5	-	44.1	53.9	9.8	Floor noise
Hori.	8253.000	AV	33.2	36.6	8.1	32.8	-	45.1	53.9	8.8	Floor noise
Hori.	9170.000	AV	32.8	37.6	8.7	32.6	-	46.5	53.9	7.4	Floor noise
Vert.	960.000	QP	37.2	22.2	14.8	30.6	-	43.6	46.0	2.4	
Vert.	2751.000	PK	56.9	28.4	5.9	31.7	-	59.4	73.9	14.5	
Vert.	3668.000	PK	52.3	29.2	6.3	31.5	-	56.3	73.9	17.6	
Vert.	4585.000	PK	42.8	31.0	6.7	31.3	-	49.2	73.9	24.7	
Vert.	5502.000	PK	39.7	32.1	7.2	31.3	-	47.7	73.9	26.2	Floor noise
Vert.	7336.000	PK	41.8	36.5	7.8	32.5	-	53.6	73.9	20.3	Floor noise
Vert.	8253.000	PK	40.0	36.6	8.1	32.8	-	51.9	73.9	22.0	Floor noise
Vert.	9170.000	PK	39.8	37.6	8.7	32.6	-	53.5	73.9	20.4	Floor noise
Vert.	2751.000	AV	47.8	28.4	5.9	31.7	-	50.4	53.9	3.5	
Vert.	3668.000	AV	44.2	29.2	6.3	31.5	-	48.3	53.9	5.6	
Vert.	4585.000	AV	34.4	31.0	6.7	31.3	-	40.8	53.9	13.1	
Vert.	5502.000	AV	31.9	32.1	7.2	31.3	-	39.9	53.9	14.0	Floor noise
Vert.	7336.000	AV	34.5	36.5	7.8	32.5	-	46.3	53.9	7.6	Floor noise
Vert.	8253.000	AV	33.6	36.6	8.1	32.8	-	45.5	53.9	8.4	Floor noise
Vert.	9170.000	AV	32.7	37.6	8.7	32.6	-	46.4	53.9	7.5	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.4	
Date	March 15, 2020	March 22, 2020	
Temperature / Humidity	22 deg. C / 30 % RH	23 deg. C / 39 % RH	
Engineer	Yuta Moriya	Yuta Moriya	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 917.0 MHz (2 MHz)		

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	917.000	PK	81.2	22.2	13.6	0.0	116.9	-	-	Carrier
Hori.	704.000	PK	39.4	19.8	13.4	32.0	40.6	86.9	46.4	
Hori.	724.893	PK	38.8	20.1	13.5	31.9	40.5	86.9	46.4	
Hori.	736.000	PK	37.6	20.1	13.5	31.8	39.4	86.9	47.6	
Hori.	768.000	PK	47.8	20.5	13.7	31.6	50.3	86.9	36.6	
Hori.	800.000	PK	53.1	20.8	13.9	31.4	56.3	86.9	30.6	
Hori.	832.000	PK	52.7	21.1	14.0	31.3	56.5	86.9	30.5	
Hori.	864.000	PK	54.3	21.8	14.3	31.1	59.3	86.9	27.6	
Hori.	885.675	PK	49.5	22.1	14.7	31.0	55.2	86.9	31.7	
Hori.	949.265	PK	45.3	22.0	14.8	30.6	51.4	86.9	35.5	
Hori.	1834.000	PK	69.3	25.4	3.3	32.5	65.5	86.9	21.4	
Hori.	6419.000	PK	37.5	34.1	5.3	31.8	45.1	86.9	41.9	
Vert.	917.000	PK	82.4	22.2	13.6	0.0	118.2	-	-	Carrier
Vert.	704.000	PK	37.0	19.8	13.4	32.0	38.1	88.2	50.0	
Vert.	724.893	PK	36.5	20.1	13.5	31.9	38.2	88.2	50.0	
Vert.	736.000	PK	35.8	20.1	13.5	31.8	37.6	88.2	50.6	
Vert.	768.000	PK	40.3	20.5	13.7	31.6	42.9	88.2	45.3	
Vert.	800.000	PK	43.7	20.8	13.9	31.4	46.9	88.2	41.2	
Vert.	832.000	PK	50.1	21.1	14.0	31.3	53.9	88.2	34.3	
Vert.	864.000	PK	51.1	21.8	14.3	31.1	56.1	88.2	32.0	
Vert.	885.675	PK	48.6	22.1	14.7	31.0	54.4	88.2	33.8	
Vert.	949.265	PK	45.2	22.0	14.8	30.6	51.3	88.2	36.8	
Vert.	1834.000	PK	68.7	25.4	3.3	32.5	65.0	88.2	23.2	
Vert.	6419.000	PK	34.8	34.1	5.3	31.8	42.4	88.2	45.8	

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

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.4
Date March 15, 2020 March 22, 2020
Temperature / Humidity 22 deg. C / 30 % RH 23 deg. C / 39 % RH
Engineer Yuta Moriya Yuta Moriya
(Below 1 GHz) (Above 1 GHz)
Mode Tx 925.0 MHz (2 MHz)

(ROD Antenna)

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.	960.000	QP	36.3	22.2	14.8	30.6	-	42.7	46.0	3.3	
Hori.	2775.000	PK	57.1	28.5	5.9	31.7	-	59.8	73.9	14.1	
Hori.	3700.000	PK	50.2	29.3	6.3	31.5	-	54.4	73.9	19.5	
Hori.	4625.000	PK	40.4	31.2	6.7	31.3	-	47.0	73.9	26.9	Floor noise
Hori.	5550.000	PK	41.2	32.1	7.3	31.4	-	49.3	73.9	24.7	Floor noise
Hori.	7400.000	PK	42.1	36.5	7.8	32.5	-	53.9	73.9	20.0	Floor noise
Hori.	8325.000	PK	41.9	36.4	8.1	32.8	-	53.7	73.9	20.2	Floor noise
Hori.	9250.000	PK	40.2	38.0	8.7	32.6	-	54.2	73.9	19.7	Floor noise
Hori.	2775.000	AV	46.8	28.5	5.9	31.7	-	49.4	53.9	4.5	
Hori.	3700.000	AV	39.8	29.3	6.3	31.5	-	44.0	53.9	9.9	
Hori.	4625.000	AV	32.2	31.2	6.7	31.3	-	38.8	53.9	15.1	Floor noise
Hori.	5550.000	AV	31.8	32.1	7.3	31.4	-	39.8	53.9	14.1	Floor noise
Hori.	7400.000	AV	34.3	36.5	7.8	32.5	-	46.1	53.9	7.8	Floor noise
Hori.	8325.000	AV	33.0	36.4	8.1	32.8	-	44.8	53.9	9.1	Floor noise
Hori.	9250.000	AV	32.5	38.0	8.7	32.6	-	46.5	53.9	7.4	Floor noise
Vert.	960.000	QP	36.1	22.2	14.8	30.6	-	42.5	46.0	3.5	
Vert.	2775.000	PK	53.4	28.5	5.9	31.7	-	56.1	73.9	17.9	
Vert.	3700.000	PK	49.6	29.3	6.3	31.5	-	53.7	73.9	20.2	
Vert.	4625.000	PK	41.8	31.2	6.7	31.3	-	48.3	73.9	25.6	Floor noise
Vert.	5550.000	PK	39.9	32.1	7.3	31.4	-	48.0	73.9	26.0	Floor noise
Vert.	7400.000	PK	42.6	36.5	7.8	32.5	-	54.4	73.9	19.6	Floor noise
Vert.	8325.000	PK	40.3	36.4	8.1	32.8	-	52.1	73.9	21.8	Floor noise
Vert.	9250.000	PK	39.9	38.0	8.7	32.6	-	53.9	73.9	20.0	Floor noise
Vert.	2775.000	AV	44.0	28.5	5.9	31.7	-	46.6	53.9	7.3	
Vert.	3700.000	AV	40.0	29.3	6.3	31.5	-	44.2	53.9	9.7	
Vert.	4625.000	AV	31.9	31.2	6.7	31.3	-	38.5	53.9	15.4	Floor noise
Vert.	5550.000	AV	32.1	32.1	7.3	31.4	-	40.1	53.9	13.8	Floor noise
Vert.	7400.000	AV	34.2	36.5	7.8	32.5	-	46.0	53.9	7.9	Floor noise
Vert.	8325.000	AV	33.5	36.4	8.1	32.8	-	45.2	53.9	8.7	Floor noise
Vert.	9250.000	AV	33.0	38.0	8.7	32.6	-	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

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Date	March 15, 2020	March 22, 2020
Temperature / Humidity	22 deg. C / 30 % RH	23 deg. C / 39 % RH
Engineer	Yuta Moriya	Yuta Moriya
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 925.0 MHz (2 MHz)	

(ROD Antenna)

30dBc Data Sheet

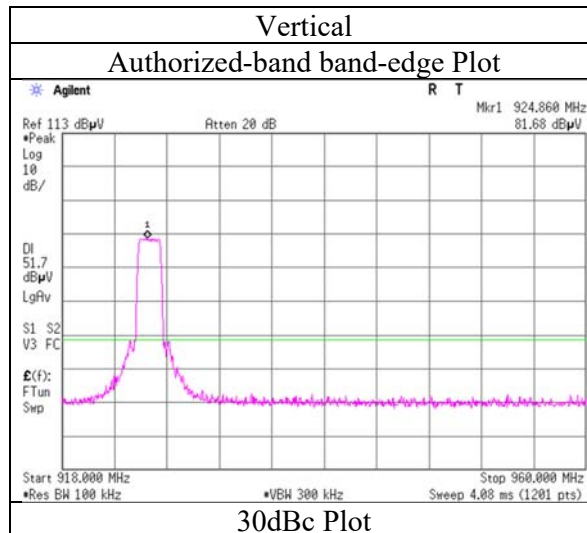
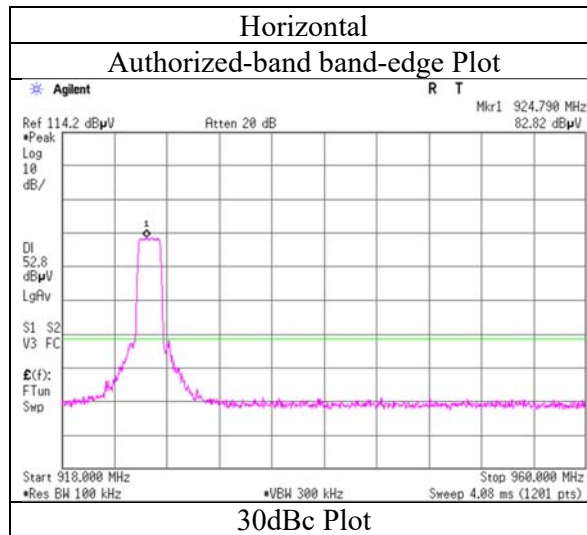
Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	925.000	PK	82.8	22.1	13.6	0.0	118.6	-	-	Carrier
Hori.	704.000	PK	38.2	19.8	13.4	32.0	39.4	88.6	49.2	
Hori.	732.875	PK	37.2	20.1	13.5	31.8	39.0	88.6	49.6	
Hori.	736.000	PK	36.1	20.1	13.5	31.8	37.9	88.6	50.7	
Hori.	768.000	PK	39.5	20.5	13.7	31.6	42.0	88.6	46.6	
Hori.	800.000	PK	45.9	20.8	13.9	31.4	49.1	88.6	39.4	
Hori.	832.000	PK	51.2	21.1	14.0	31.3	55.0	88.6	33.5	
Hori.	864.000	PK	53.8	21.8	14.3	31.1	58.8	88.6	29.8	
Hori.	893.050	PK	48.6	22.1	14.8	30.9	54.6	88.6	34.0	
Hori.	896.000	PK	48.8	22.1	14.9	30.9	54.8	88.6	33.7	
Hori.	928.000	PK	40.0	22.0	13.7	0.0	75.7	88.6	12.9	
Hori.	956.734	PK	43.6	22.1	14.8	30.6	50.0	88.6	38.6	
Hori.	1850.000	PK	67.4	25.5	3.3	32.4	63.8	88.6	24.8	
Hori.	6475.000	PK	33.7	34.3	5.3	31.8	41.5	88.6	47.1	
Vert.	925.000	PK	81.7	22.1	13.6	0.0	117.4	-	-	Carrier
Vert.	704.000	PK	37.0	19.8	13.4	32.0	38.2	87.4	49.3	
Vert.	732.875	PK	36.4	20.1	13.5	31.8	38.2	87.4	49.2	
Vert.	736.000	PK	34.0	20.1	13.5	31.8	35.8	87.4	51.6	
Vert.	768.000	PK	38.6	20.5	13.7	31.6	41.1	87.4	46.3	
Vert.	800.000	PK	42.3	20.8	13.9	31.4	45.5	87.4	42.0	
Vert.	832.000	PK	49.6	21.1	14.0	31.3	53.4	87.4	34.0	
Vert.	864.000	PK	52.1	21.8	14.3	31.1	57.1	87.4	30.4	
Vert.	893.050	PK	47.2	22.1	14.8	30.9	53.2	87.4	34.3	
Vert.	896.000	PK	48.0	22.1	14.9	30.9	54.1	87.4	33.3	
Vert.	928.000	PK	39.2	22.0	13.7	0.0	74.8	87.4	12.6	
Vert.	956.734	PK	44.0	22.1	14.8	30.6	50.3	87.4	37.1	
Vert.	1850.000	PK	67.4	25.5	3.3	32.4	63.8	87.4	23.6	
Vert.	6475.000	PK	33.7	34.3	5.3	31.8	41.5	87.4	45.9	

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

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 15, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Yuta Moriya
	(Below 1 GHz)
Mode	Tx 905.0 MHz (2 MHz)

(ROD Antenna)



* 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.

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.4	
Date	March 22, 2020	March 22, 2020	
Temperature / Humidity	24 deg. C / 38 % RH	23 deg. C / 39 % RH	
Engineer	Junya Okuno	Yuta Moriya	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 910.0 MHz (4 MHz)		

(ROD Antenna)

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.	960.000	QP	35.5	22.1	14.7	30.8	-	41.5	46.0	4.5	
Hori.	2730.000	PK	52.1	28.3	5.9	31.7	-	54.5	73.9	19.4	
Hori.	3640.000	PK	47.6	29.2	6.2	31.5	-	51.5	73.9	22.4	
Hori.	4550.000	PK	40.1	30.9	6.7	31.3	-	46.3	73.9	27.6	Floor noise
Hori.	5460.000	PK	40.0	32.0	7.2	31.3	-	47.9	73.9	26.0	Floor noise
Hori.	7280.000	PK	41.5	36.4	7.7	32.4	-	53.1	73.9	20.8	Floor noise
Hori.	8190.000	PK	42.3	36.6	8.0	32.8	-	54.2	73.9	19.7	Floor noise
Hori.	9100.000	PK	39.6	37.2	8.7	32.5	-	53.0	73.9	21.0	Floor noise
Hori.	2730.000	AV	42.9	28.3	5.9	31.7	-	45.3	53.9	8.6	
Hori.	3640.000	AV	38.2	29.2	6.2	31.5	-	42.1	53.9	11.8	
Hori.	4550.000	AV	32.4	30.9	6.7	31.3	-	38.7	53.9	15.3	Floor noise
Hori.	5460.000	AV	31.9	32.0	7.2	31.3	-	39.8	53.9	14.1	Floor noise
Hori.	7280.000	AV	33.7	36.4	7.7	32.4	-	45.4	53.9	8.5	Floor noise
Hori.	8190.000	AV	33.3	36.6	8.0	32.8	-	45.1	53.9	8.8	Floor noise
Hori.	9100.000	AV	32.8	37.2	8.7	32.5	-	46.1	53.9	7.8	Floor noise
Vert.	960.000	QP	36.8	22.1	14.7	30.8	-	42.8	46.0	3.2	
Vert.	2730.000	PK	50.7	28.3	5.9	31.7	-	53.1	73.9	20.8	
Vert.	3640.000	PK	47.6	29.2	6.2	31.5	-	51.5	73.9	22.4	
Vert.	4550.000	PK	39.8	30.9	6.7	31.3	-	46.0	73.9	27.9	Floor noise
Vert.	5460.000	PK	39.5	32.0	7.2	31.3	-	47.4	73.9	26.5	Floor noise
Vert.	7280.000	PK	41.7	36.4	7.7	32.4	-	53.3	73.9	20.6	Floor noise
Vert.	8190.000	PK	41.3	36.6	8.0	32.8	-	53.1	73.9	20.8	Floor noise
Vert.	9100.000	PK	41.4	37.2	8.7	32.5	-	54.7	73.9	19.2	Floor noise
Vert.	2730.000	AV	41.2	28.3	5.9	31.7	-	43.6	53.9	10.3	
Vert.	3640.000	AV	37.9	29.2	6.2	31.5	-	41.8	53.9	12.1	
Vert.	4550.000	AV	32.1	30.9	6.7	31.3	-	38.3	53.9	15.6	Floor noise
Vert.	5460.000	AV	32.0	32.0	7.2	31.3	-	39.9	53.9	14.0	Floor noise
Vert.	7280.000	AV	33.8	36.4	7.7	32.4	-	45.5	53.9	8.4	Floor noise
Vert.	8190.000	AV	33.2	36.6	8.0	32.8	-	45.0	53.9	8.9	Floor noise
Vert.	9100.000	AV	33.0	37.2	8.7	32.5	-	46.3	53.9	7.6	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.4
Date	March 22, 2020	March 22, 2020
Temperature / Humidity	24 deg. C / 38 % RH	23 deg. C / 39 % RH
Engineer	Junya Okuno	Yuta Moriya
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 910.0 MHz (4 MHz)	

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	910.000	PK	78.6	21.9	13.5	0.0	114.0	-	-	Carrier
Hori.	704.000	PK	37.6	19.8	13.3	32.1	38.7	84.0	45.3	
Hori.	768.000	PK	43.6	20.4	13.6	31.7	45.9	84.0	38.1	
Hori.	800.000	PK	43.4	20.8	13.8	31.6	46.4	84.0	37.6	
Hori.	832.000	PK	49.6	21.1	13.9	31.4	53.2	84.0	30.8	
Hori.	864.000	PK	51.5	21.6	14.2	31.3	56.0	84.0	27.9	
Hori.	902.000	PK	28.5	22.0	13.4	0.0	64.0	84.0	20.0	
Hori.	942.000	PK	42.5	21.9	14.8	30.9	48.3	84.0	35.7	
Hori.	1820.000	PK	65.9	25.4	5.6	32.5	64.3	84.0	19.7	
Hori.	6370.000	PK	33.5	33.8	7.6	31.8	43.2	84.0	40.8	
Vert.	910.000	PK	79.8	21.9	13.5	0.0	115.2	-	-	Carrier
Vert.	704.000	PK	34.6	19.8	13.3	32.1	35.7	85.2	49.5	
Vert.	768.000	PK	40.1	20.4	13.6	31.7	42.3	85.2	42.8	
Vert.	800.000	PK	40.8	20.8	13.8	31.6	43.8	85.2	41.4	
Vert.	832.000	PK	49.0	21.1	13.9	31.4	52.6	85.2	32.6	
Vert.	864.000	PK	49.8	21.6	14.2	31.3	54.3	85.2	30.8	
Vert.	902.000	PK	29.6	22.0	13.4	0.0	65.0	85.2	20.1	
Vert.	942.000	PK	42.1	21.9	14.8	30.9	47.9	85.2	37.3	
Vert.	1820.000	PK	64.3	25.4	3.3	32.5	60.4	85.2	24.8	
Vert.	6370.000	PK	33.1	33.8	5.3	31.8	40.4	85.2	44.7	

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

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

UL Japan, Inc.

Ise EMC Lab.

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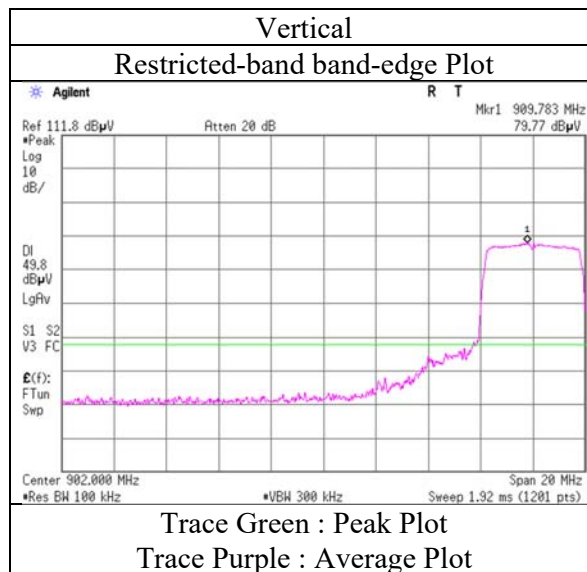
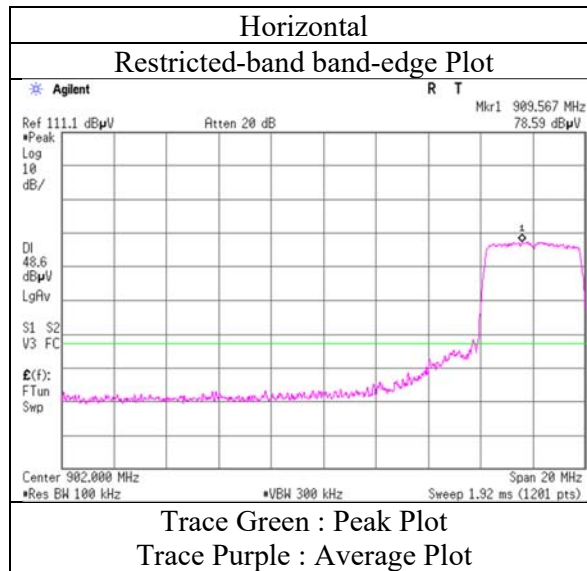
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	March 22, 2020
Temperature / Humidity	24 deg. C / 38 % RH
Engineer	Junya Okuno (Below 1 GHz)
Mode	Tx 910.0 MHz (4 MHz)

(ROD Antenna)



* 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.

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.4
Date March 15, 2020 March 22, 2020
Temperature / Humidity 22 deg. C / 30 % RH 23 deg. C / 39 % RH
Engineer Takafumi Noguchi Yuta Moriya
(Below 1 GHz) (Above 1 GHz)
Mode Tx 918.0 MHz (4 MHz)

(ROD Antenna)

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.	960.000	QP	36.2	22.2	14.8	30.6	-	42.6	46.0	3.4	
Hori.	2754.000	PK	53.7	28.4	5.9	31.7	-	56.2	73.9	17.7	
Hori.	3672.000	PK	48.4	29.2	6.3	31.5	-	52.5	73.9	21.5	
Hori.	4590.000	PK	40.9	31.0	6.7	31.3	-	47.3	73.9	26.6	Floor noise
Hori.	5508.000	PK	41.2	32.1	7.2	31.3	-	49.2	73.9	24.7	Floor noise
Hori.	7344.000	PK	41.4	36.5	7.8	32.5	-	53.3	73.9	20.6	Floor noise
Hori.	8262.000	PK	40.2	36.5	8.1	32.8	-	52.1	73.9	21.9	Floor noise
Hori.	9180.000	PK	41.2	37.6	8.7	32.6	-	55.0	73.9	18.9	Floor noise
Hori.	2754.000	AV	43.9	28.4	5.9	31.7	-	46.4	53.9	7.5	
Hori.	3672.000	AV	38.7	29.2	6.3	31.5	-	42.8	53.9	11.1	
Hori.	4590.000	AV	32.8	31.0	6.7	31.3	-	39.3	53.9	14.6	Floor noise
Hori.	5508.000	AV	31.4	32.1	7.2	31.3	-	39.4	53.9	14.5	Floor noise
Hori.	7344.000	AV	33.7	36.5	7.8	32.5	-	45.5	53.9	8.4	Floor noise
Hori.	8262.000	AV	32.4	36.5	8.1	32.8	-	44.3	53.9	9.6	Floor noise
Hori.	9180.000	AV	32.2	37.6	8.7	32.6	-	46.0	53.9	8.0	Floor noise
Vert.	960.000	QP	36.3	22.2	14.8	30.6	-	42.7	46.0	3.3	
Vert.	2754.000	PK	50.6	28.4	5.9	31.7	-	53.2	73.9	20.7	
Vert.	3672.000	PK	47.4	29.2	6.3	31.5	-	51.5	73.9	22.4	
Vert.	4590.000	PK	40.2	31.0	6.7	31.3	-	46.7	73.9	27.2	Floor noise
Vert.	5508.000	PK	39.2	32.1	7.2	31.3	-	47.2	73.9	26.7	Floor noise
Vert.	7344.000	PK	40.8	36.5	7.8	32.5	-	52.6	73.9	21.3	Floor noise
Vert.	8262.000	PK	41.3	36.5	8.1	32.8	-	53.2	73.9	20.7	Floor noise
Vert.	9180.000	PK	41.0	37.6	8.7	32.6	-	54.8	73.9	19.1	Floor noise
Vert.	2754.000	AV	40.9	28.4	5.9	31.7	-	43.4	53.9	10.5	
Vert.	3672.000	AV	37.0	29.2	6.3	31.5	-	41.1	53.9	12.8	
Vert.	4590.000	AV	32.1	31.0	6.7	31.3	-	38.6	53.9	15.3	Floor noise
Vert.	5508.000	AV	31.3	32.1	7.2	31.3	-	39.3	53.9	14.6	Floor noise
Vert.	7344.000	AV	33.6	36.5	7.8	32.5	-	45.4	53.9	8.5	Floor noise
Vert.	8262.000	AV	33.4	36.5	8.1	32.8	-	45.2	53.9	8.7	Floor noise
Vert.	9180.000	AV	32.7	37.6	8.7	32.6	-	46.5	53.9	7.4	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 $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

Radiated Spurious Emission

Report No.	13128136H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.4	
Date	March 15, 2020	March 22, 2020	
Temperature / Humidity	22 deg. C / 30 % RH	23 deg. C / 39 % RH	
Engineer	Takafumi Noguchi	Yuta Moriya	
	(Below 1 GHz)	(Above 1 GHz)	
Mode	Tx 918.0 MHz (4 MHz)		

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	918.000	PK	79.5	22.2	13.6	0.0	115.3	-	-	Carrier
Hori.	704.000	PK	38.7	19.8	13.4	32.0	39.9	85.3	45.4	
Hori.	726.000	PK	36.0	20.1	13.5	31.9	37.7	85.3	47.6	
Hori.	736.000	PK	36.4	20.1	13.5	31.8	38.3	85.3	47.0	
Hori.	768.000	PK	46.9	20.5	13.7	31.6	49.4	85.3	35.9	
Hori.	800.000	PK	46.6	20.8	13.9	31.4	49.8	85.3	35.5	
Hori.	832.000	PK	51.8	21.1	14.0	31.3	55.6	85.3	29.7	
Hori.	864.000	PK	53.2	21.8	14.3	31.1	58.2	85.3	27.1	
Hori.	886.000	PK	49.4	22.1	14.7	31.0	55.2	85.3	30.1	
Hori.	896.000	PK	48.9	22.1	14.9	30.9	55.0	85.3	30.3	
Hori.	950.000	PK	42.7	22.0	14.8	30.6	48.9	85.3	36.4	
Hori.	1836.000	PK	62.9	25.4	5.6	32.5	61.5	85.3	23.8	
Hori.	6426.000	PK	33.2	34.1	7.6	31.8	43.1	85.3	42.2	
Vert.	918.000	PK	78.3	22.2	13.6	0.0	114.0	-	-	Carrier
Vert.	704.000	PK	36.2	19.8	13.4	32.0	37.4	84.0	46.7	
Vert.	726.000	PK	34.8	20.1	13.5	31.9	36.5	84.0	47.5	
Vert.	736.000	PK	34.5	20.1	13.5	31.8	36.4	84.0	47.7	
Vert.	768.000	PK	40.8	20.5	13.7	31.6	43.3	84.0	40.7	
Vert.	800.000	PK	43.7	20.8	13.9	31.4	46.9	84.0	37.2	
Vert.	832.000	PK	49.4	21.1	14.0	31.3	53.2	84.0	30.9	
Vert.	864.000	PK	51.7	21.8	14.3	31.1	56.7	84.0	27.4	
Vert.	886.000	PK	47.0	22.1	14.7	31.0	52.8	84.0	31.2	
Vert.	896.000	PK	47.3	22.1	14.9	30.9	53.4	84.0	30.6	
Vert.	950.000	PK	42.7	22.0	14.8	30.6	48.9	84.0	35.1	
Vert.	1836.000	PK	62.3	25.4	5.6	32.5	60.9	84.0	23.2	
Vert.	6426.000	PK	33.2	34.1	7.6	31.8	43.1	84.0	40.9	

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

Radiated Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3 No.4
Date March 15, 2020 March 22, 2020
Temperature / Humidity 22 deg. C / 30 % RH 24 deg. C / 38 % RH
Engineer Takafumi Noguchi Junya Okuno
(Below 1 GHz) (Above 1 GHz)
Mode Tx 922.0 MHz (4 MHz)

(ROD Antenna)

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.	960.000	QP	37.1	22.2	14.8	30.6	-	43.5	46.0	2.5	
Hori.	2766.000	PK	52.0	28.4	5.9	31.7	-	54.6	73.9	19.3	
Hori.	3688.000	PK	47.8	29.3	6.3	31.5	-	51.9	73.9	22.0	
Hori.	4610.000	PK	40.7	31.1	6.7	31.3	-	47.2	73.9	26.7	Floor noise
Hori.	5532.000	PK	39.7	32.1	7.3	31.4	-	47.7	73.9	26.2	Floor noise
Hori.	6454.000	PK	40.3	34.2	7.6	31.8	-	50.3	73.9	23.6	Floor noise
Hori.	7376.000	PK	41.1	36.5	7.8	32.5	-	52.9	73.9	21.0	Floor noise
Hori.	8298.000	PK	41.2	36.4	8.1	32.8	-	53.0	73.9	21.0	Floor noise
Hori.	9220.000	PK	40.9	37.8	8.7	32.6	-	54.8	73.9	19.1	Floor noise
Hori.	2766.000	AV	43.6	28.4	5.9	31.7	-	46.2	53.9	7.7	
Hori.	3688.000	AV	38.6	29.3	6.3	31.5	-	42.7	53.9	11.2	
Hori.	4610.000	AV	31.9	31.1	6.7	31.3	-	38.4	53.9	15.5	Floor noise
Hori.	5532.000	AV	31.8	32.1	7.3	31.4	-	39.8	53.9	14.1	Floor noise
Hori.	6454.000	AV	33.0	34.2	7.6	31.8	-	43.0	53.9	10.9	Floor noise
Hori.	7376.000	AV	33.6	36.5	7.8	32.5	-	45.4	53.9	8.5	Floor noise
Hori.	8298.000	AV	33.6	36.4	8.1	32.8	-	45.3	53.9	8.6	Floor noise
Hori.	9220.000	AV	32.8	37.8	8.7	32.6	-	46.7	53.9	7.2	Floor noise
Vert.	960.000	QP	37.1	22.2	14.8	30.6	-	43.5	46.0	2.5	
Vert.	2766.000	PK	49.1	28.4	5.9	31.7	-	51.7	73.9	22.2	
Vert.	3688.000	PK	47.5	29.3	6.3	31.5	-	51.6	73.9	22.3	
Vert.	4610.000	PK	40.0	31.1	6.7	31.3	-	46.6	73.9	27.3	Floor noise
Vert.	5532.000	PK	39.6	32.1	7.3	31.4	-	47.6	73.9	26.3	Floor noise
Vert.	6454.000	PK	40.4	34.2	7.6	31.8	-	50.4	73.9	23.5	Floor noise
Vert.	7376.000	PK	41.0	36.5	7.8	32.5	-	52.8	73.9	21.1	Floor noise
Vert.	8298.000	PK	41.5	36.4	8.1	32.8	-	53.3	73.9	20.7	Floor noise
Vert.	9220.000	PK	40.3	37.8	8.7	32.6	-	54.3	73.9	19.7	Floor noise
Vert.	2766.000	AV	40.5	28.4	5.9	31.7	-	43.1	53.9	10.8	
Vert.	3688.000	AV	37.6	29.3	6.3	31.5	-	41.7	53.9	12.2	
Vert.	4610.000	AV	31.9	31.1	6.7	31.3	-	38.4	53.9	15.5	Floor noise
Vert.	5532.000	AV	31.8	32.1	7.3	31.4	-	39.8	53.9	14.1	Floor noise
Vert.	6454.000	AV	33.1	34.2	7.6	31.8	-	43.1	53.9	10.8	Floor noise
Vert.	7376.000	AV	33.5	36.5	7.8	32.5	-	45.4	53.9	8.6	Floor noise
Vert.	8298.000	AV	33.5	36.4	8.1	32.8	-	45.2	53.9	8.7	Floor noise
Vert.	9220.000	AV	32.6	37.8	8.7	32.6	-	46.6	53.9	7.3	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

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Date	March 15, 2020	March 22, 2020
Temperature / Humidity	22 deg. C / 30 % RH	24 deg. C / 38 % RH
Engineer	Takafumi Noguchi	Junya Okuno
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 922.0 MHz (4 MHz)	

(ROD Antenna)

30dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori.	922.000	PK	79.8	22.1	13.6	0.0	115.6	-	-	Carrier
Hori.	704.000	PK	38.6	19.8	13.4	32.0	39.8	85.6	45.8	
Hori.	730.000	PK	36.2	20.1	13.5	31.8	38.0	85.6	47.6	
Hori.	736.000	PK	35.3	20.1	13.5	31.8	37.1	85.6	48.5	
Hori.	768.000	PK	46.8	20.5	13.7	31.6	49.3	85.6	36.2	
Hori.	800.000	PK	46.5	20.8	13.9	31.4	49.7	85.6	35.8	
Hori.	832.000	PK	52.7	21.1	14.0	31.3	56.5	85.6	29.1	
Hori.	864.000	PK	54.5	21.8	14.3	31.1	59.5	85.6	26.1	
Hori.	890.000	PK	48.8	22.1	14.8	31.0	54.7	85.6	30.8	
Hori.	896.000	PK	49.9	22.1	14.9	30.9	56.0	85.6	29.6	
Hori.	928.000	PK	35.1	22.0	13.7	0.0	70.8	85.6	14.8	
Hori.	954.000	PK	43.8	22.1	14.8	30.6	50.0	85.6	35.5	
Hori.	1844.000	PK	62.9	25.5	5.6	32.4	61.5	85.6	24.1	
Vert.	922.000	PK	79.0	22.1	13.6	0.0	114.7	-	-	Carrier
Vert.	704.000	PK	36.4	19.8	13.4	32.0	37.6	84.7	47.2	
Vert.	730.000	PK	34.4	20.1	13.5	31.8	36.2	84.7	48.6	
Vert.	736.000	PK	34.3	20.1	13.5	31.8	36.1	84.7	48.6	
Vert.	768.000	PK	40.5	20.5	13.7	31.6	43.0	84.7	41.7	
Vert.	800.000	PK	43.6	20.8	13.9	31.4	46.8	84.7	37.9	
Vert.	832.000	PK	50.4	21.1	14.0	31.3	54.2	84.7	30.6	
Vert.	864.000	PK	52.4	21.8	14.3	31.1	57.4	84.7	27.3	
Vert.	890.000	PK	47.5	22.1	14.8	31.0	53.5	84.7	31.3	
Vert.	896.000	PK	48.4	22.1	14.9	30.9	54.5	84.7	30.2	
Vert.	928.000	PK	36.5	22.0	13.7	0.0	72.2	84.7	12.6	
Vert.	954.000	PK	43.1	22.1	14.8	30.6	49.4	84.7	35.3	
Vert.	1844.000	PK	61.4	25.5	5.6	32.4	60.0	84.7	24.7	

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

Distance factor: 1 GHz - 10 GHz $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

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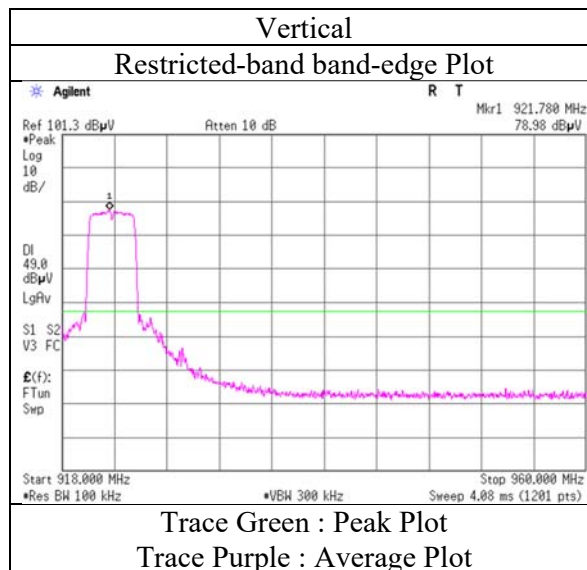
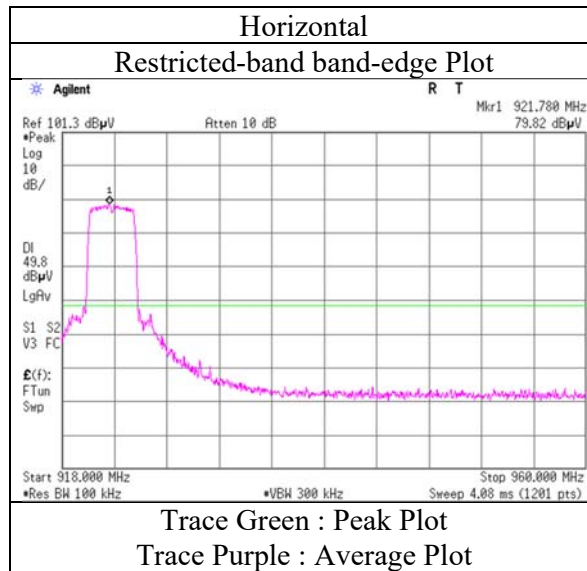
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13128136H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	March 15, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Takafumi Noguchi (Below 1 GHz)
Mode	Tx 922.0 MHz (4 MHz)

(ROD Antenna)



* 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.

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Ise EMC Lab.

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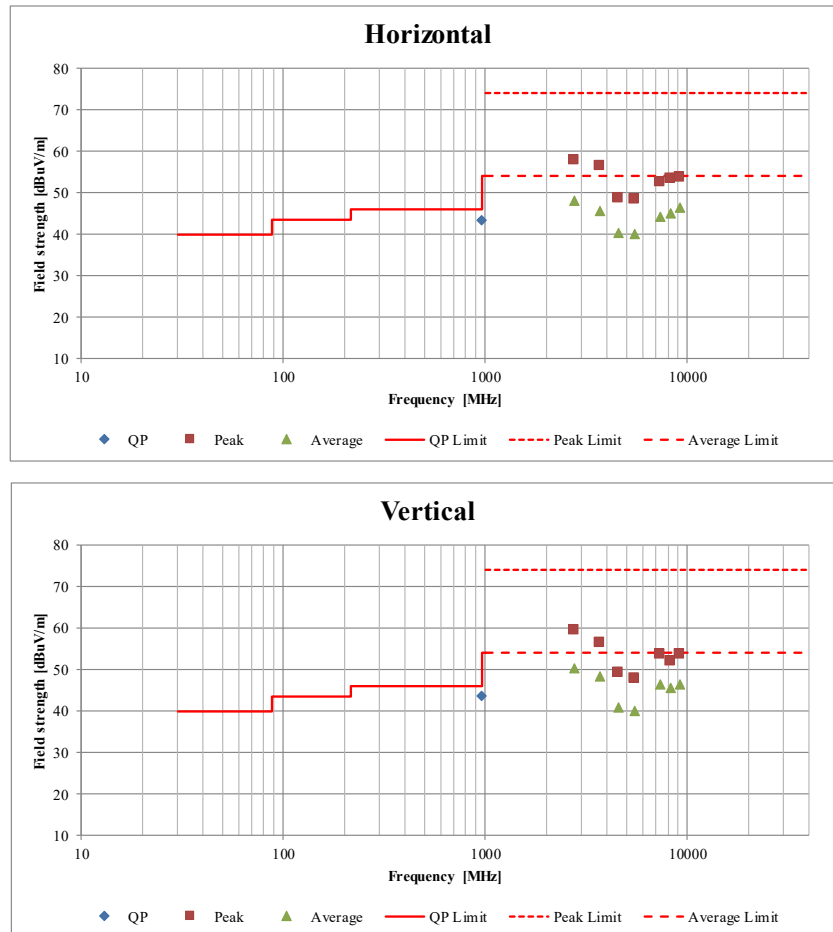
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Radiated Spurious Emission (Plot data, Worst case)

Report No.	13128136H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.4
Date	March 15, 2020	March 22, 2020
Temperature / Humidity	22 deg. C / 30 % RH	23 deg. C / 39 % RH
Engineer	Yuta Moriya	Yuta Moriya
	(Below 1 GHz)	(Above 1 GHz)
Mode	Tx 917.0 MHz (2 MHz)	

(ROD Antenna)



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

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Ise EMC Lab.

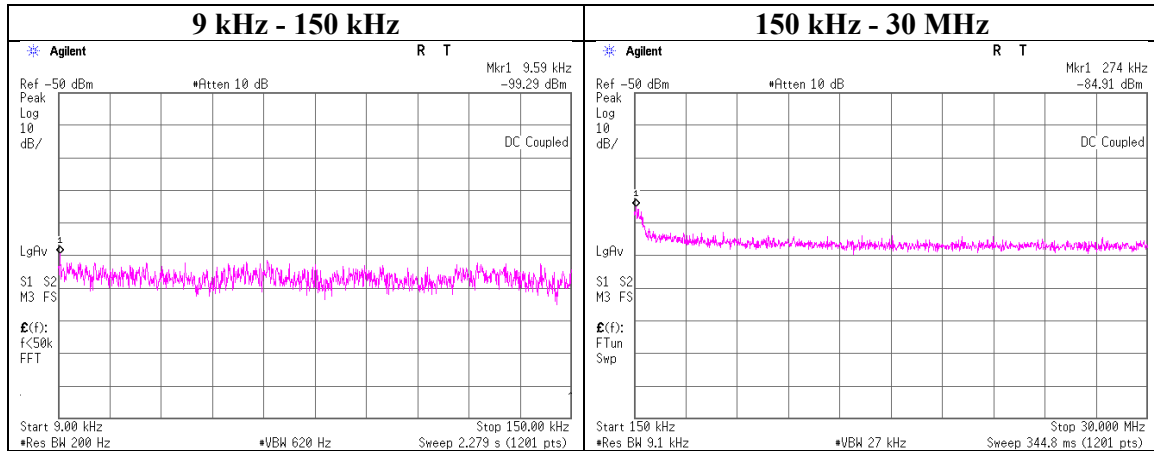
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 16, 2020
Temperature / Humidity 23 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx 1 MHz Bandwidth 903.5 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
9.59	-99.29	0.00	19.87	3.4	1	-76.0	300	6.0	-14.8	47.9	62.7	
274.00	-84.91	0.00	19.86	3.4	1	-61.7	300	6.0	-0.4	18.8	19.2	

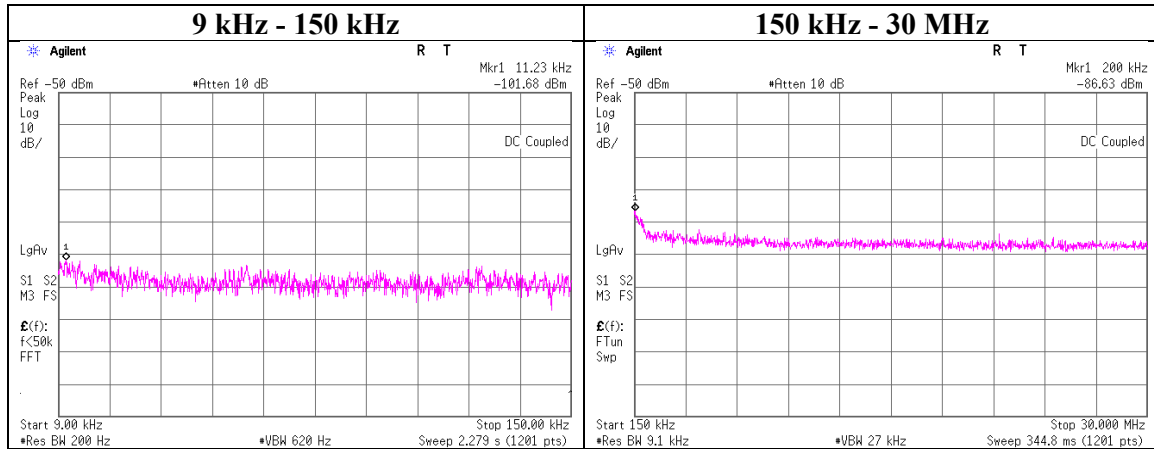
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

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

N: Number of output

Conducted Spurious Emission

Report No.	13128136H
Test place	Ise EMC Lab. No.1 Measurement Room
Date	March 16, 2020
Temperature / Humidity	23 deg. C / 32 % RH
Engineer	Yuta Moriya
Mode	Tx 1 MHz Bandwidth 915.5 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
11.23	-101.68	0.00	19.87	3.4	1	-78.4	300	6.0	-17.2	46.5	63.7	
200.00	-86.63	0.00	19.86	3.4	1	-63.4	300	6.0	-2.1	21.5	23.6	

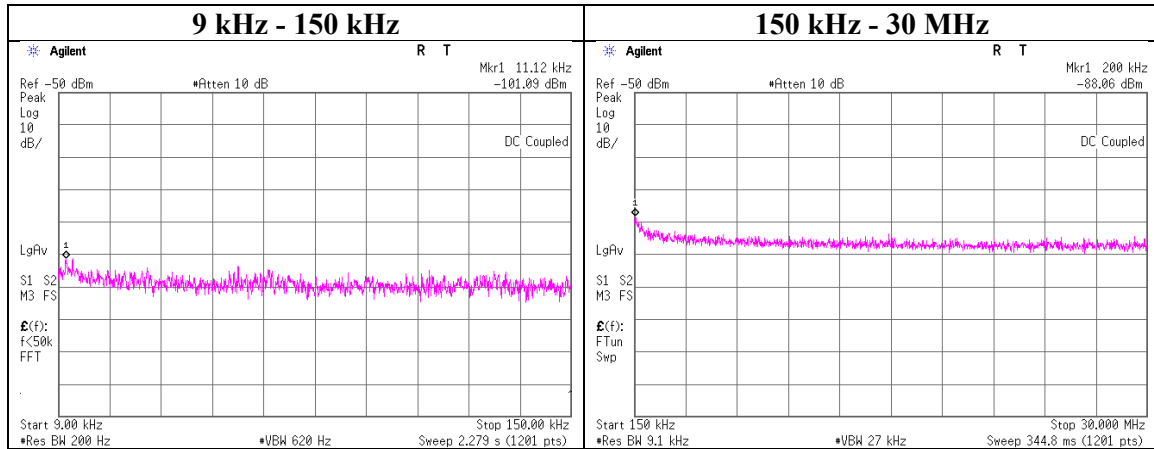
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

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

N: Number of output

Conducted Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 16, 2020
Temperature / Humidity 23 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx 1 MHz Bandwidth 926.5Hz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
11.12	-101.09	0.00	19.87	3.4	1	-77.8	300	6.0	-16.6	46.6	63.2	
200.00	-88.06	0.00	19.86	3.4	1	-64.8	300	6.0	-3.5	21.5	25.0	

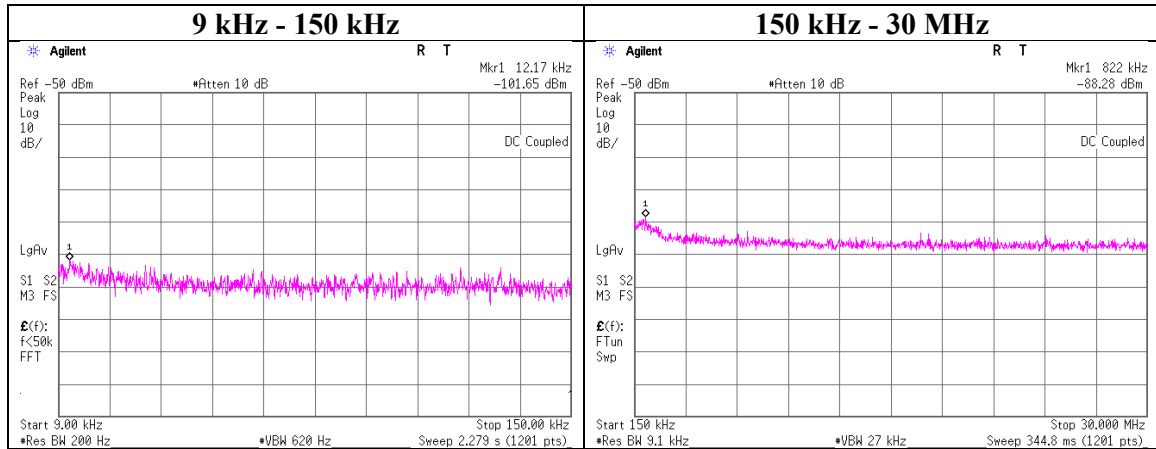
$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log(\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$

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

N: Number of output

Conducted Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 16, 2020
Temperature / Humidity 23 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx 2 MHz Bandwidth 905.0 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
12.17	-101.65	0.00	19.87	3.4	1	-78.4	300	6.0	-17.1	45.8	62.9	
822.00	-88.28	0.00	19.86	3.4	1	-65.0	30	6.0	16.2	29.3	13.1	

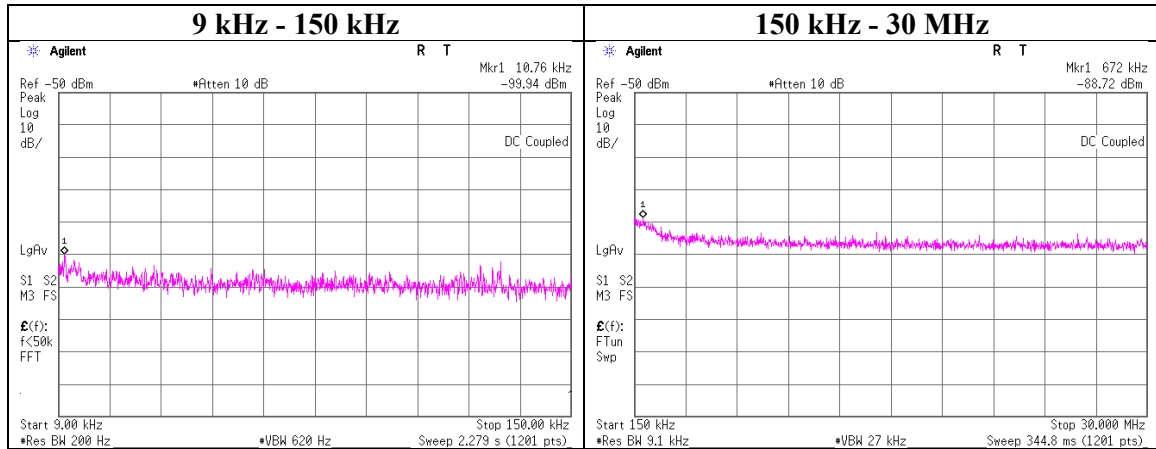
$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

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

N: Number of output

Conducted Spurious Emission

Report No.	13128136H
Test place	Ise EMC Lab. No.1 Measurement Room
Date	March 16, 2020
Temperature / Humidity	23 deg. C / 32 % RH
Engineer	Yuta Moriya
Mode	Tx 2 MHz Bandwidth 917.0 MHz



Frequency	Reading	Cable	Attenuator	Antenna	N	EIRP	Distance	Ground	E	Limit	Margin	Remark
[kHz]	[dBm]	Loss	Loss	Gain	(Number of Output)	[dBm]	[m]	bounce	(field strength)	[dBuV/m]	[dB]	
10.76	-99.94	0.00	19.87	3.4	1	-76.7	300	6.0	-15.4	46.9	62.3	
672.00	-88.72	0.00	19.86	3.4	1	-65.5	30	6.0	15.8	31.0	15.2	

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

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

N: Number of output

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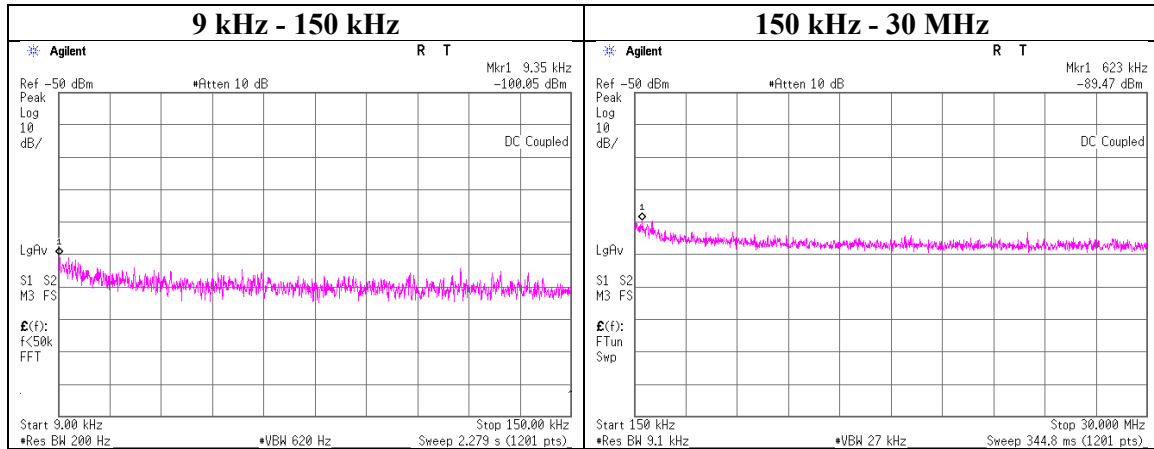
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Conducted Spurious Emission

Report No. 13128136H
Test place Ise EMC Lab. No.1 Measurement Room
Date March 16, 2020
Temperature / Humidity 23 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx 2 MHz Bandwidth 925.0 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
9.35	-100.05	0.00	19.87	3.4	1	-76.8	300	6.0	-15.5	48.1	63.6	
623.00	-89.47	0.00	19.86	3.4	1	-66.2	30	6.0	15.0	31.7	16.7	

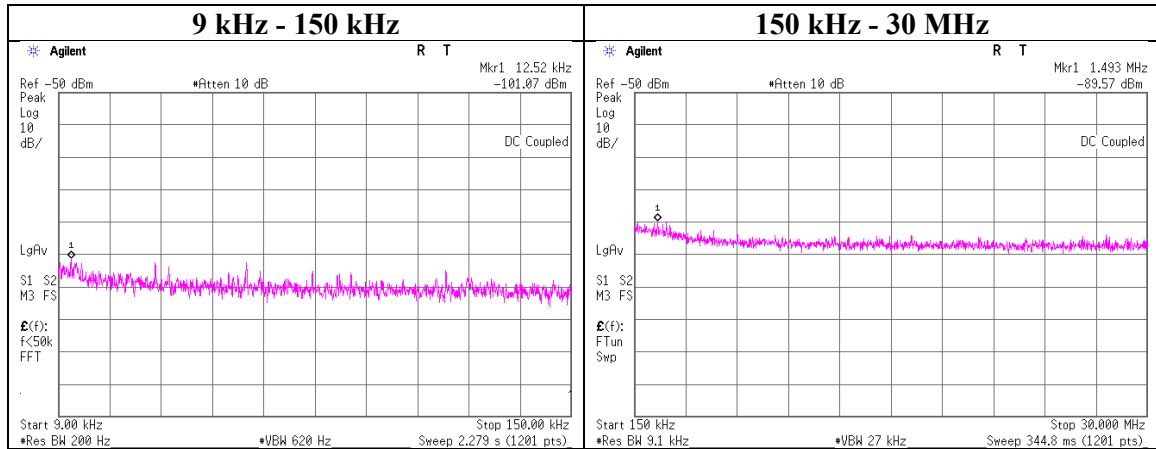
$$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$$

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

N: Number of output

Conducted Spurious Emission

Report No.	13128136H
Test place	Ise EMC Lab. No.1 Measurement Room
Date	March 16, 2020
Temperature / Humidity	23 deg. C / 32 % RH
Engineer	Yuta Moriya
Mode	Tx 4 MHz Bandwidth 910.0 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
12.52	-101.07	0.00	19.87	3.4	1	-77.8	300	6.0	-16.5	45.6	62.1	
1493.00	-89.57	0.00	19.87	3.4	1	-66.3	30	6.0	15.0	24.1	9.1	

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

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

N: Number of output

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Ise EMC Lab.

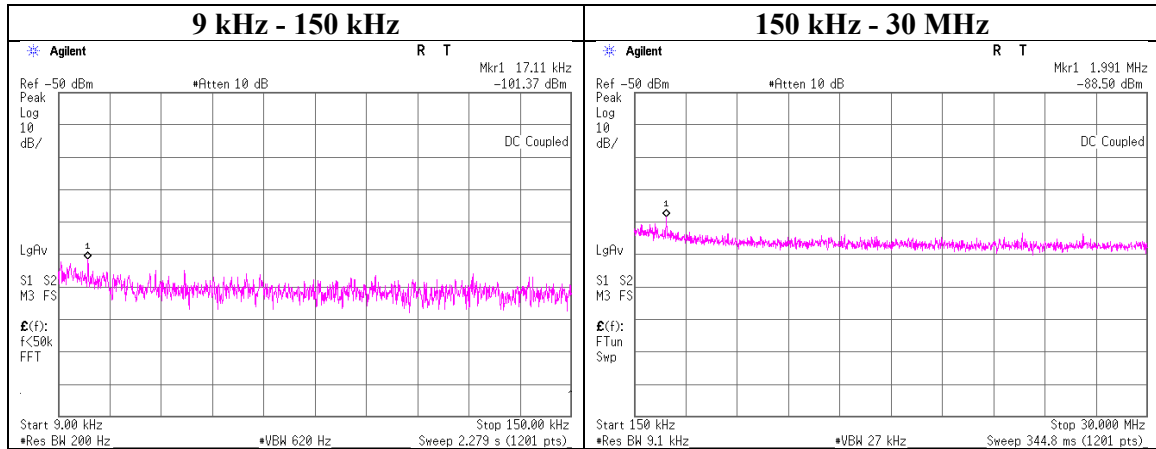
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Conducted Spurious Emission

Report No.	13128136H
Test place	Ise EMC Lab. No.1 Measurement Room
Date	March 16, 2020
Temperature / Humidity	23 deg. C / 32 % RH
Engineer	Yuta Moriya
Mode	Tx 4 MHz Bandwidth 918.0 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
17.11	-101.37	0.00	19.87	3.4	1	-78.1	300	6.0	-16.8	42.9	59.7	
1991.00	-88.50	0.00	19.87	3.4	1	-65.2	30	6.0	16.0	29.5	13.5	

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

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

N: Number of output

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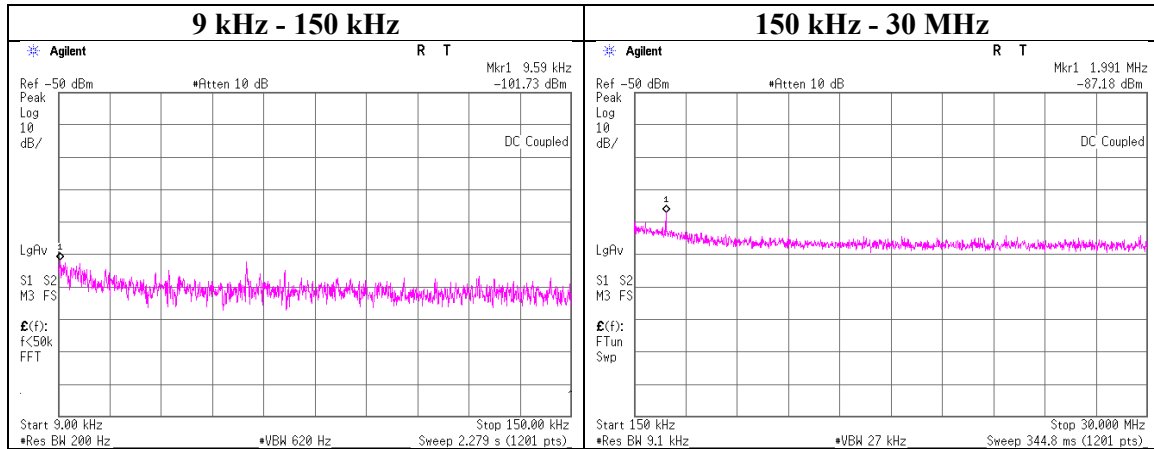
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Conducted Spurious Emission

Report No.	13128136H
Test place	Ise EMC Lab. No.1 Measurement Room
Date	March 16, 2020
Temperature / Humidity	23 deg. C / 32 % RH
Engineer	Yuta Moriya
Mode	Tx 4 MHz Bandwidth 922.0 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [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
9.59	-101.73	0.00	19.87	3.4	1	-78.5	300	6.0	-17.2	47.9	65.1	
1991.00	-87.18	0.00	19.87	3.4	1	-63.9	30	6.0	17.3	29.5	12.2	

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

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

N: Number of output

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Power Density

Report No. 13128136H
Test place Ise EMC Lab.
No.1 Measurement Room No.4 Measurement Room
Date March 16, 2020 March 22, 2020
Temperature / Humidity 23 deg. C / 32 % RH 24 deg. C / 35 % RH
Engineer Yuta Moriya Junya Okuno
Mode Tx

1 MHz

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
903.5	-15.14	0.37	19.92	5.16	8.00	2.85
915.5	-16.57	0.37	19.92	3.72	8.00	4.28
926.5	-19.83	0.37	19.92	0.46	8.00	7.54

2 MHz

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
905.0	-15.49	0.37	19.92	4.81	8.00	3.20
917.0	-16.78	0.37	19.92	3.51	8.00	4.49
925.0	-22.44	0.37	19.92	-2.15	8.00	10.15

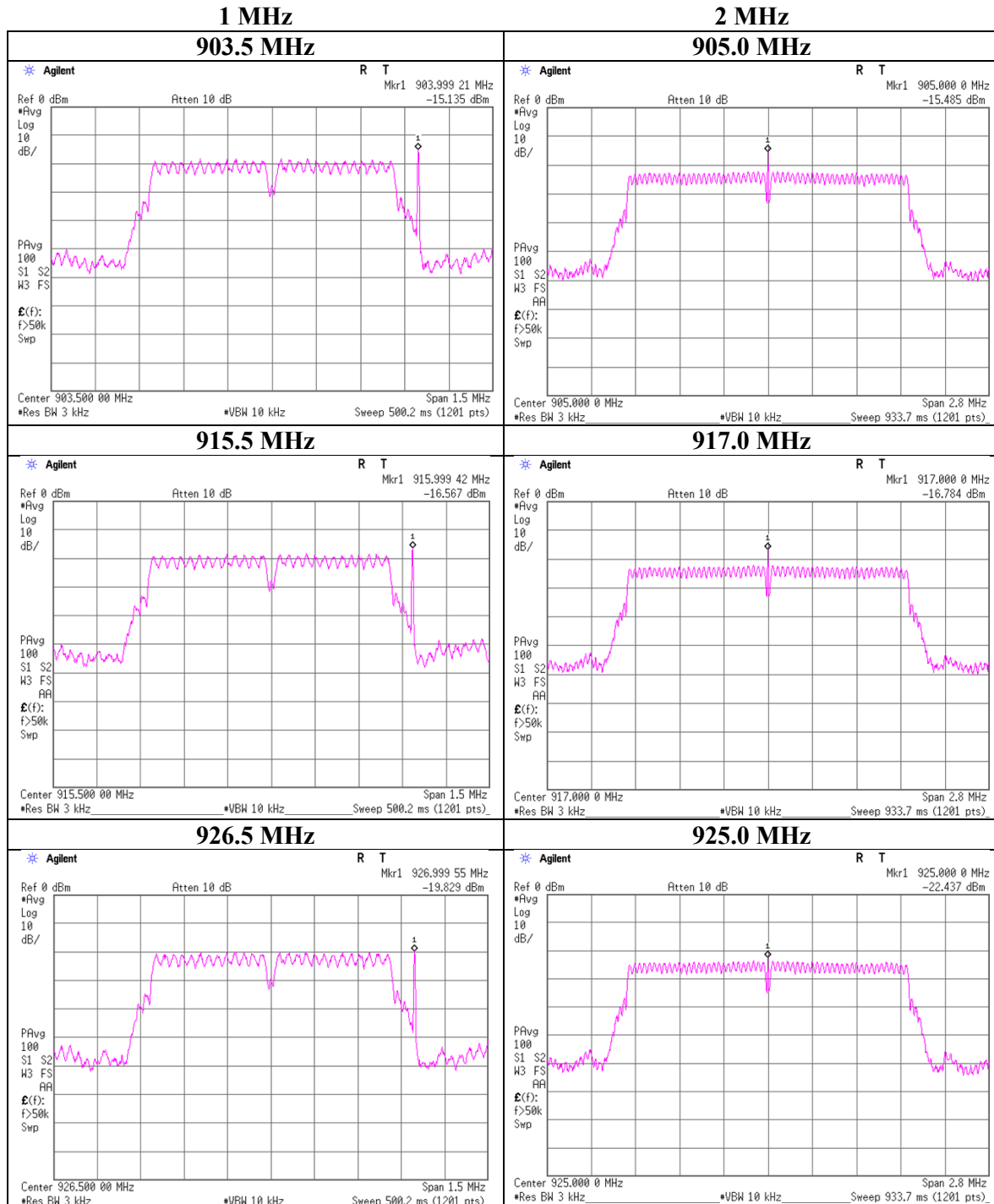
4 MHz

Freq.	Reading	Cable Loss	Atten. Loss	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
910.0	-16.79	0.37	19.92	3.50	8.00	4.50
918.0	-20.57	0.37	19.92	-0.28	8.00	8.28
922.0	-20.82	0.37	19.92	-0.53	8.00	8.53

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Power Density



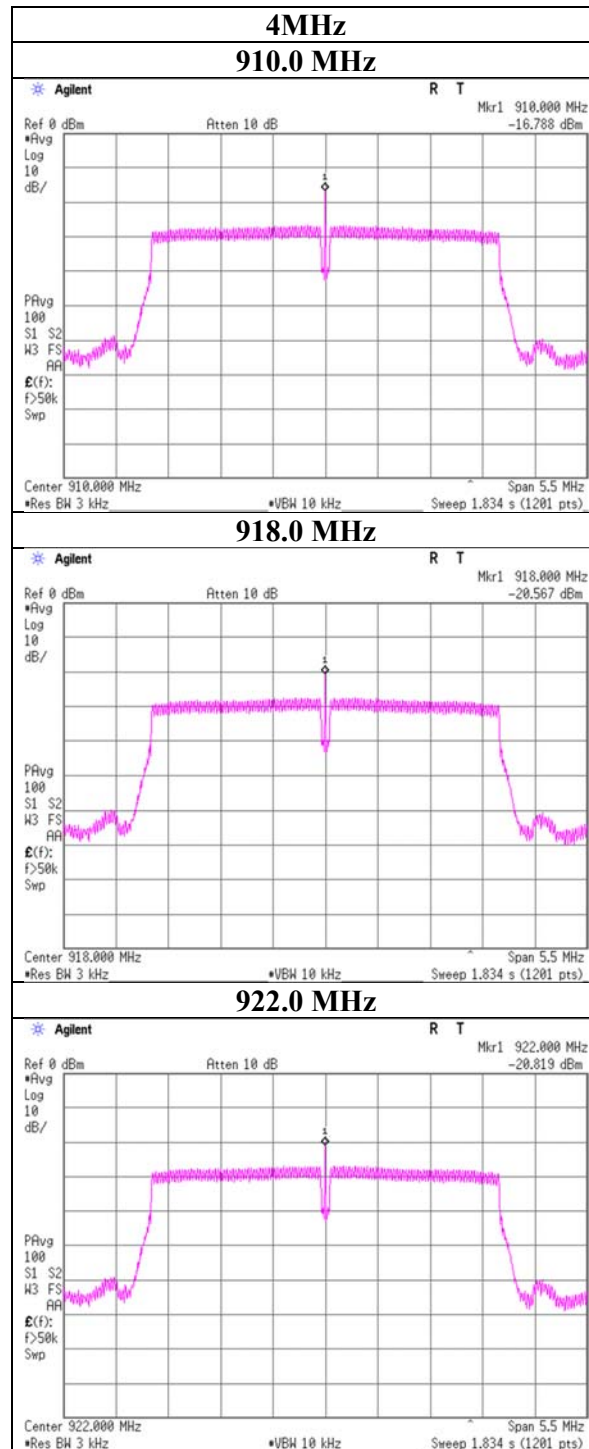
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APPENDIX 2: Test instruments

Test equipment (1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	MHA-06	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess - Elektronik	BBHA9120D	254	2019/09/03	12
RE	MCC-141	141412	Microwave Cable	Junkosha	MWX221	1305S002R(1m) 1405S146(5m)	2019/06/17	12
RE	MPA-10	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	2020/01/07	12
RE	MAEC-02	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	2018/06/29	24
RE	MOS-41	192300	Thermo-Hygrometer	CUSTOM	CTH-201	0013	2019/12/19	12
RE	MMM-01	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	2019/08/20	12
RE	MJM-27	142228	Measure	KOMELON	KMC-36	-	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ	TEPTO-DV	-	-	-
RE	MHF-27	141297	High Pass Filter (1.1-10GHz)	TOKYO KEIKI	TF219CD1	1001	2020/01/09	12
RE	MSA-03	141884	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY44020357	2020/03/04	12
RE	MAT-07	141203	Attenuator(6dB)	Weinschel Corp	2	BK7970	2019/11/07	12
RE	MBA-08	141427	Biconical Antenna	Schwarzbeck Mess - Elektronik	VHA9103B+ BBA9106	8031	2019/08/23	12
RE	MCC-12	141317	Coaxial Cable	Fujikura/Agilent	-	-	2019/09/03	12
RE	MLA-21	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess - Elektronik	VUSLP9111B	9111B-190	2019/08/23	12
RE	MPA-09	141578	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10845	2019/09/06	12
RE	MTR-03	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	2019/08/08	12
RE	MCC-64	141327	Coaxial Cable	UL Japan	-	-	2020/02/04	12
RE	MRF-12	192072	Band Rejection Filter(902-928MHz)	Wakoh Communication Industrial Co., Ltd.	WFR-481	19122541	2020/03/16	12
AT	MAT-17	141171	Attenuator(20dB)_DC-1GHz N	Weinschel Corp	MODEL 1	BG0143	2019/12/09	12
AT	MCC-211	141322	Microwave Cable	RS Pro	R-132G7210200CD	-	2019/04/17	12
AT	MPM-12	141809	Power Meter	ANRITSU	ML2495A	825002	2019/05/16	12
AT	MPSE-17	141830	Power sensor	ANRITSU	MA2411B	738285	2019/05/16	12
RE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2018/06/26	24
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	TEPTO-DV	-	-	-
RE	MAT-95	142314	Attenuator	Pasternack	PE7390-6	D/C 1504	2019/06/11	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	-	-	2019/07/02	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-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	2019/08/02	12
RE	MCC-64	141327	Coaxial Cable	UL Japan	-	-	2020/02/04	12
RE	MRF-12	192072	Band Rejection Filter(902-928MHz)	Wakoh Communication Industrial Co., Ltd.	WFR-481	19122541	2020/03/16	12
AT	MSA-04	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	2019/11/21	12
AT	MOS-14	141561	Thermo-Hygrometer	CUSTOM	CTH-201	1401	2020/01/07	12
RE	MAEC-03-SVSWR	142013	AC3_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	2019/04/08	24

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Test equipment (2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
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	MHF-27	141297	High Pass Filter (1.1-10GHz)	TOKYO KEIKI	TF219CD1	1001	2020/01/09	12
RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM	CTH-201	0010	2020/01/07	12
RE	MMM-10	141545	DIGITAL HiTESTER	Hioki	3805	51201148	2020/01/06	12
RE	MPA-12	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	650	2019/10/16	12
RE	MSA-14	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	2019/10/06	12
RE	MCC-141	141412	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	2019/06/17	12
RE	MHA-21	141508	Horn Antenna 1-18GHz	Schwarzbeck Mess – Elektronik	BBHA9120D	9120D-557	2019/09/26	12
RE	MAEC-04-SVSWR	142017	AC4_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	2019/04/04	24
AT	MSA-14	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	2019/10/06	12
AT	MPM-08	141805	Power Meter	ANRITSU	ML2495A	6K00003338	2019/10/03	12
AT	MPSE-11	141840	Power sensor	ANRITSU	MA2411B	11737	2019/10/03	12
AT	MAT-17	141171	Attenuator(20dB)_DC-1GHz_N	Weinschel Corp	MODEL 1	BG0143	2019/12/09	12
AT	MCC-212	141391	Microwave Cable	RS Pro	R-132G7210200CD	-	2019/04/17	12
AT	MCC-211	141322	Microwave Cable	RS Pro	R-132G7210200CD	-	2019/04/17	12
AT	MOS-42	192303	Thermo-Hygrometer	CUSTOM	CTH-201	0014	2019/12/19	12
RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2018/06/28	24
RE	MJM-26	142227	Measure	KOMELON	KMC-36	-	-	-
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	2020/02/05	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess – Elektronik	VHA9103 +BBA9106	1302	2019/08/24	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	2020/03/24	12
RE	MLA-23	141267	Logperiodic Antenna(200-1000MHz)	Schwarzbeck Mess – Elektronik	VUSLP9111B	9111B-192	2019/08/24	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	2020/02/18	12
CE	MSA-13	141900	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185823	2019/11/20	12
CE	MTR-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	2019/08/02	12
CE	MAT-66	141247	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	2019/12/02	12
CE	MCC-112	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14/ suciform141- PE/421-010/ RFM-E321(SW)	-/00640	2019/07/02	12
CE	MLS-23	141357	LISN(AMN)	Schwarzbeck Mess – Elektronik	NSLK8127	8127-729	2019/07/05	12
CE	MOS-13	141554	Thermo-Hygrometer	CUSTOM	CTH-201	1301	2020/01/07	12
CE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2018/06/26	24
CE	COTS-MEMI-02	178648	EMI measurement program	TSJ	TEPTO-DV	-	-	-

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*Hyphens for Last Calibration Date, Calibration Due 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.

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

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

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