RADIO TEST REPORT

Test Report No. : 11774427H-A-R1

Applicant	:	**DENSO WAVE INCORPORATED**
Type of Equipment	:	**RFID Table Scanner**
Model No.	:	**URCT-M21**
FCC ID	:	**PZWUR21MX**
Test regulation	:	**FCC Part 15 Subpart C: 2017**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11774427H-A. 11774427H-A is replaced with this report.

Date of test: August 10 to October 6, 2017

Representative test engineer:
T. Nakagawa
Tomohisa Nakagawa
Engineer
Consumer Technology Division

Approved by:
Takayuki Shimada
Engineer
Consumer Technology Division

NVLAP TESTING
NVLAP LAB CODE: 200572-0

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/

REVISION HISTORY

Original Test Report No.: 11774427H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11774427H-A	October 10, 2017	-	-
1	11774427H-A-R1	October 18, 2017	P.4, 5	Correction of Power Supply (radio part input)
1	11774427H-A-R1	October 18, 2017	P.9	Deletion of note sentence.
1	11774427H-A-R1	October 18, 2017	P.22	Deletion of calculation.
1	11774427H-A-R1	October 18, 2017	P.30, 36	Correction of Plot data.

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SECTION 1: Customer information

Company Name	:	DENSO WAVE INCORPORATED
Address	:	1, Yoshiike, Kusagi, Agui-cho, Chita-gun, Aichi 470-2297, Japan
Telephone Number	:	+81-569-49-5276
Facsimile Number	:	+81-569-49-5488
Contact Person	:	Satoshi Mizuno

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	RFID Table Scanner
Model No.	:	URCT-M21
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 5 V, 1.3 A
Receipt Date of Sample	:	July 31, 2017
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: URCT-M21 (referred to as the EUT in this report) is a RFID Table Scanner.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	915.25 MHz to 927.5 MHz
Modulation	:	FHSS
Power Supply (radio part input)	:	DC 1.8 V, DC 3.3 V, DC 4.0 V, DC 5.0 V
Antenna type	:	Patch Antenna
Antenna Gain	:	-2 dBi (URAN-S1) / -2 dBi (URAN-R2)
Clock frequency (Maximum)	:	RF board: 24 MHz, Control board: 24 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on June 14, 2017 and effective July 14, 2017
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods **IC:** RSS-Gen 8.8	**FCC:** Section 15.207 **IC:** RSS-Gen 8.8	**QP** 21.8 dB, 0.26095 MHz, N (Ant: URAN-S1) **AV** 17.7 dB, 0.25983 MHz, L (Ant: URAN-R2)	Complied	-
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (a)		Complied	Conducted
Number of Hopping Frequency	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (d)		Complied	Conducted
Dwell time	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (d)		Complied	Conducted
Maximum Peak Output Power	**FCC:** FCC Public Notice DA 00-705 **IC:** RSS-Gen 6.12	**FCC:** Section15.247(a)(b)(1) **IC:** RSS-247 5.4 (b)		Complied	Conducted
Spurious Emission & Band Edge Compliance	**FCC:** FCC Public Notice DA 00-705 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	0.1 dB 72.000 MHz, QP, Vertical 468.559 MHz, QP, Horizontal (URAN-S1) 288.000 MHz, QP, Horizontal (URAN-R2)	Complied	Conducted/ 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).					

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

FCC Part 15.31 (e)

This EUT provides stable voltage (DC 1.8 V, DC 3.3 V, DC 4.0 V, DC 5.0 V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The EUT has a unique coupling/antenna connector (GT-27). Therefore the equipment complies with the requirement of 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 6.6	**IC:** -	N/A	-	Conducted

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

3.4 Uncertainty

EMI

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

Ise EMC Lab.

Antenna terminal test	Uncertainty (+/-)
RF output power	1.2 dB
Antenna terminal conducted emission / Power density / Burst power	3.1 dB
Adjacent channel power / Channel power	
Below 3 GHz	1.8 dB
3 GHz to 6 GHz	2.7 dB

Frequency range	Conducted emission using AMN(LISN) (+/-)
0.009 MHz - 0.15 MHz	3.1 dB
0.15 MHz - 30 MHz	2.5 dB

Test distance	Radiated emission (+/-) 9 kHz - 30 MHz
3 m	3.8 dB
10 m	3.6 dB

Polarity	Radiated emission (Below 1 GHz)			
	(3 m*) (+/-)		(10 m*) (+/-)	
	30 MHz - 200 MHz	200 MHz - 1000 MHz	30 MHz - 200 MHz	200 MHz - 1000 MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	5.2 dB	6.3 dB	5.0 dB	5.0 dB

Radiated emission (Above 1 GHz)				
(3 m*) (+/-)		(1 m*) (+/-)		(10 m*) (+/-)
1 GHz - 6 GHz	6 GHz - 18 GHz	10 GHz - 26.5 GHz	26.5 GHz - 40 GHz	1 GHz - 18 GHz
5.2 dB	5.5 dB	5.5 dB	5.4 dB	5.5 dB

*Measurement distance

Conducted Emission test
The data listed in this test report has enough margin, more than the site margin.

Radiated emission test
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

Test site	IC Registration Number	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	2973C-1	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	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	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	2973C-4	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.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	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Mode(s)

RFID: Transmitting (Tx)
*Radiated emission and Antenna Terminal Conducted tests were performed with Port2 which the power value was higher.

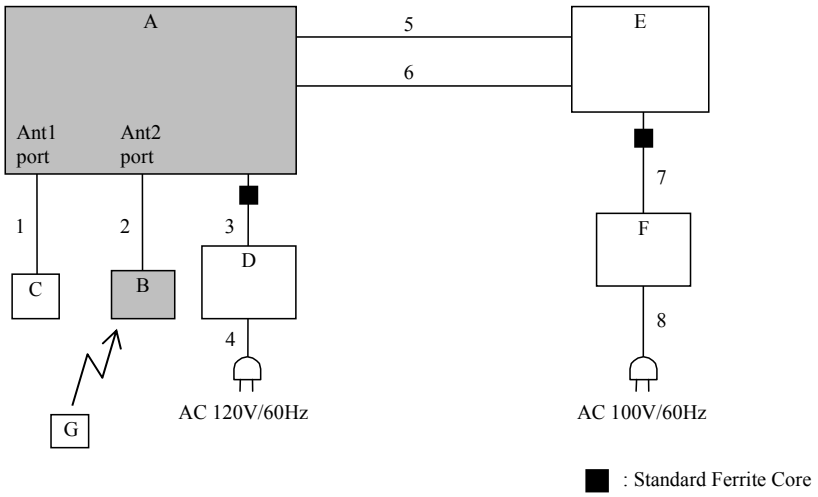
Details of Operating Mode(s)

Test Item	Mode	Tested Antenna *1)	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off)	2	915.25 MHz 921.25 MHz 927.50 MHz
Carrier Frequency Separation	Tx (Hopping On)	2	915.25 MHz 921.25 MHz 927.50 MHz
20dB Bandwidth	Tx (Hopping Off)	2	915.25 MHz 921.25 MHz 927.50 MHz
Number of Hopping Frequency	Tx (Hopping On)	2	-
Dwell time	Tx (Hopping On)	2	915.25 MHz 921.25 MHz 927.50 MHz
Maximum Peak Output Power	Tx (Hopping Off)	1, 2 (Individually)	915.25 MHz 921.25 MHz 927.50 MHz
Band Edge Compliance (Conducted)	Tx -Hopping On -Hopping Off	2	915.25 MHz 927.50 MHz
99% Occupied Bandwidth	Tx -Hopping On -Hopping Off	2	915.25 MHz 921.25 MHz 927.50 MHz

*EUT has the power settings by the software as follows;
Power settings: 23 dBm (all tests), 5 dBm (Maximum Peak Output Power test only) *2)
Software: Indy Tool ver: 2.6.0
*1)EUT does not have the function which Ant 1 and Ant 2 transmit simultaneously.
*2) All tests were performed with 23 dBm power setting as a representative which was the worst condition after having compared with other power settings.

*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.

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	RFID Table Scanner	URCT-M21	4662005060400271	DENSO WAVE INCORPORATED	EUT
B	Antenna	URAN-S1	4661005070600446	DENSO WAVE INCORPORATED	EUT
		URAN-R2	4661005050400554		
C	50Ω Terminator	-	-	-	-
D	AC Adapter	AWW0515NE	496460-0739	DENSO WAVE INCORPORATED	-
E	Laptop PC	L520	LR-7LF1V	Lenovo	-
F	AC Adapter	92P1156	11S92P1156Z1ZDXN 12ED9Z	Lenovo	-
G	Tag	AD229R6	-	Avery Dennison	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.5	Shielded	Shielded	-
2	Antenna Cable	2.0 for URAN-R2 1.8 for URAN-S1	Shielded	Shielded	-
3	DC Cable	1.2	Unshielded	Unshielded	-
4	AC Cable	1.8	Unshielded	Unshielded	-
5	USB Cable	1.5	Shielded	Shielded	-
6	RS232C-USB Cable	2.5	Shielded	Shielded	-
7	DC Cable	1.8	Unshielded	Unshielded	-
8	AC Cable	0.9	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0 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 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

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

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

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

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

SECTION 6: Radiated Spurious Emission

Test Procedure

[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 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
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 20 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.

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	3.5 m*2) (1 GHz - 10 GHz)		3 m (Below 1GHz)

*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.
*2) Distance Factor: 20 x log (3.5 m/3.0 m) = 1.34 dB

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of controller 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

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
20dB Bandwidth	300 kHz	3 kHz	9.1 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 Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	2 MHz	150 kHz	430 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*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 low enough as shown in the chart.
(9 kHz - 150 kHz: RBW = 200Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz).

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission
Ant: URAN-S1

DATA OF CONDUCTED EMISSION TEST

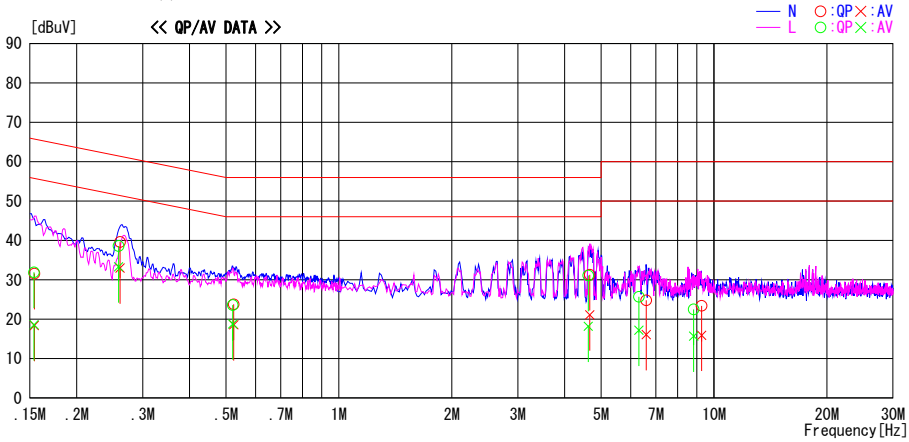
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2017/08/17

Report No. : 11774427H

Temp./Humi. : 23 deg. C / 65 % RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : Ant URAN-S1 Tx 915.25MHz

LIMIT : FCC15.107(a) QP ClassB
FCC15.107(a) AV ClassB



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15430	18.4	5.2	13.2	31.6	18.4	65.8	55.8	34.2	37.4	N	
0.26095	26.4	19.8	13.2	39.6	33.0	61.4	51.4	21.8	18.4	N	
0.52440	10.5	5.3	13.3	23.8	18.6	56.0	46.0	32.2	27.4	N	
4.66411	17.5	7.3	13.8	31.3	21.1	56.0	46.0	24.7	24.9	N	
6.59669	10.8	2.1	14.0	24.8	16.1	60.0	50.0	35.2	33.9	N	
9.26906	9.3	1.8	14.1	23.4	15.9	60.0	50.0	36.6	34.1	N	
0.15390	18.7	5.4	13.2	31.9	18.6	65.8	55.8	33.9	37.2	L	
0.25864	25.4	20.1	13.2	38.6	33.3	61.5	51.5	22.9	18.2	L	
0.52120	10.3	5.5	13.3	23.6	18.8	56.0	46.0	32.4	27.2	L	
4.62124	17.3	4.4	13.8	31.1	18.2	56.0	46.0	24.9	27.8	L	
6.30923	11.7	3.2	14.0	25.7	17.2	60.0	50.0	34.3	32.8	L	
8.82877	8.4	1.6	14.1	22.5	15.7	60.0	50.0	37.5	34.3	L	

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

Conducted Emission
Ant: URAN-R2

DATA OF CONDUCTED EMISSION TEST

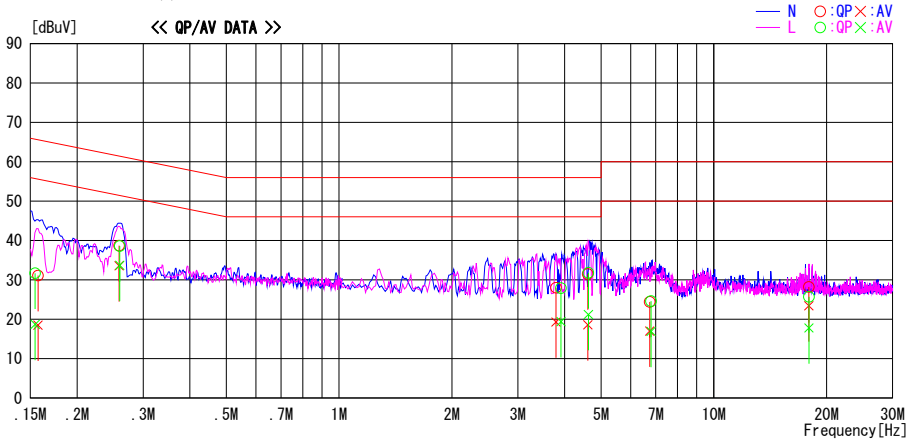
UL Japan, Inc. Ise EMC Lab. No.2 Semi Anechoic Chamber
Date : 2017/08/17

Report No. : 11774427H

Temp./Humi. : 23 deg. C / 65 % RH
Engineer : Tomohisa Nakagawa

Mode / Remarks : Ant URAN-R2 Tx 915.25MHz

LIMIT : FCC15.107(a) QP ClassB
FCC15.107(a) AV ClassB



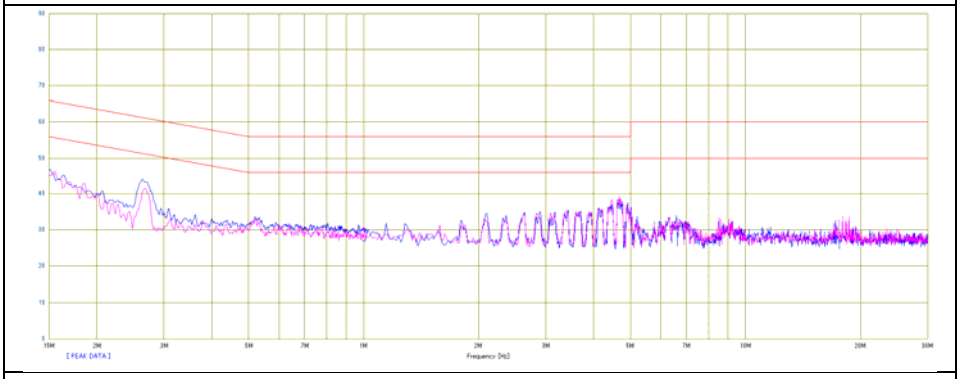
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15723	17.9	5.3	13.2	31.1	18.5	65.6	55.6	34.5	37.1	N	
0.25875	25.5	20.4	13.2	38.7	33.6	61.5	51.5	22.8	17.9	N	
3.79171	14.3	5.6	13.7	28.0	19.3	56.0	46.0	28.0	26.7	N	
4.61027	17.7	4.8	13.8	31.5	18.6	56.0	46.0	24.5	27.4	N	
6.74376	10.4	3.0	14.0	24.4	17.0	60.0	50.0	35.6	33.0	N	
17.93260	13.5	8.7	14.7	28.2	23.4	60.0	50.0	31.8	26.6	N	
0.15453	18.5	5.5	13.2	31.7	18.7	65.8	55.8	34.1	37.1	L	
0.25983	25.4	20.5	13.2	38.6	33.7	61.4	51.4	22.8	17.7	L	
3.90911	14.2	5.7	13.7	27.9	19.4	56.0	46.0	28.1	26.6	L	
4.62887	18.0	7.4	13.8	31.8	21.2	56.0	46.0	24.2	24.8	L	
6.79993	10.6	2.9	14.0	24.6	16.9	60.0	50.0	35.4	33.1	L	
17.93660	11.0	3.1	14.7	25.7	17.8	60.0	50.0	34.3	32.2	L	

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

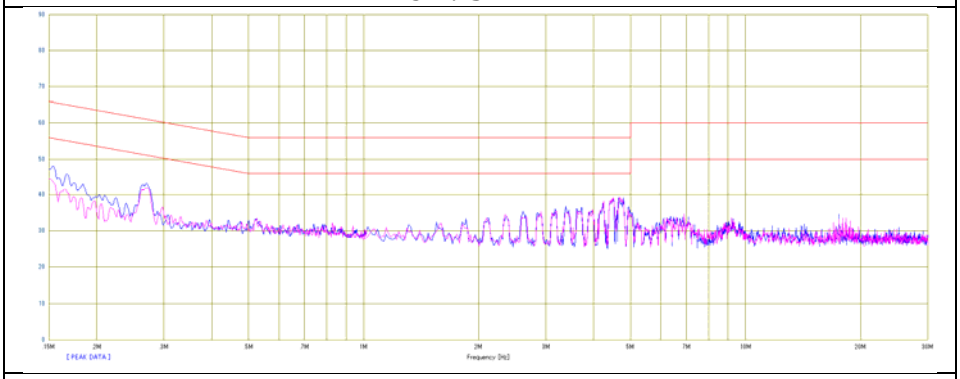
Conducted Emission
Ant: URAN-S1

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11774427H
Date	August 17, 2017
Temperature / Humidity	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa
Mode	Tx, Hopping Off

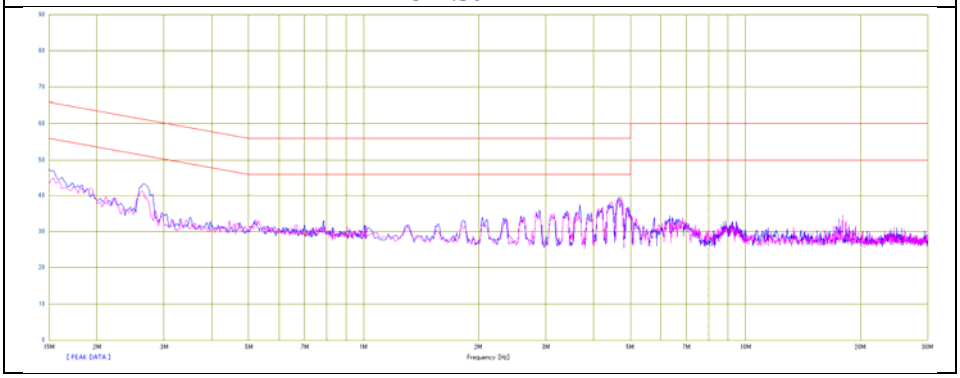
915.25 MHz



921.25 MHz



927.50 MHz

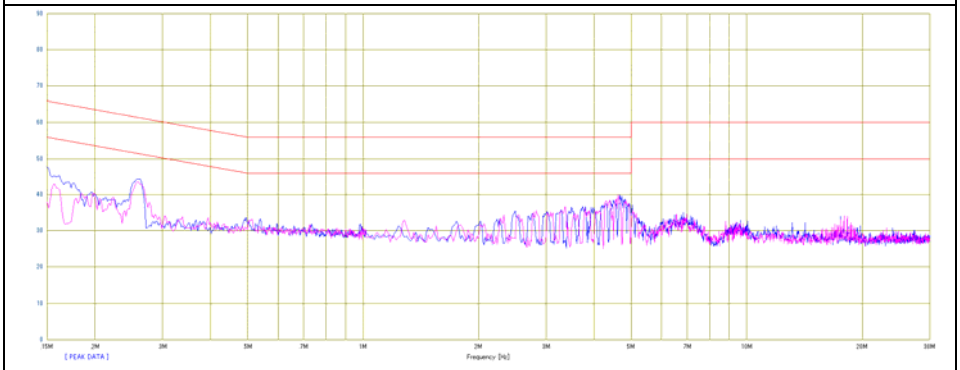


UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999
Facsimile : +81 596 24 8124

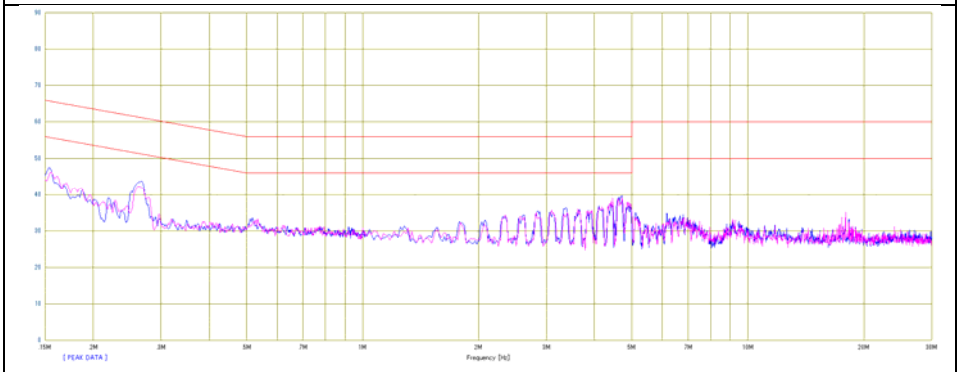
Conducted Emission
Ant: URAN-R2

Test place	Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No.	11774427H
Date	August 17, 2017
Temperature / Humidity	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa
Mode	Tx, Hopping Off

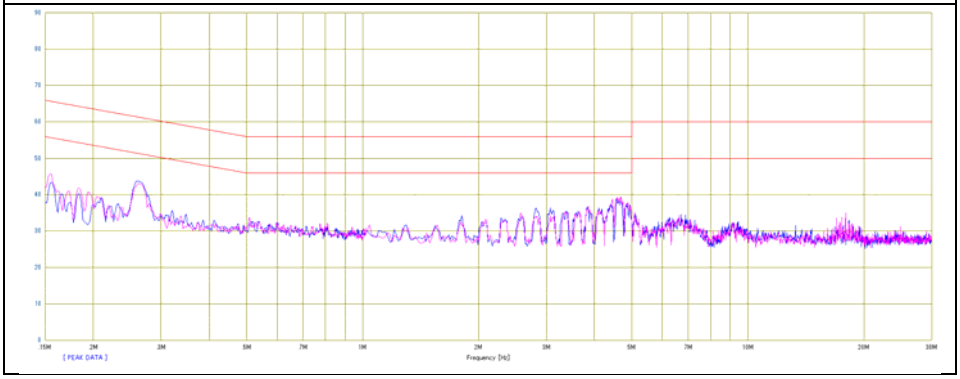
915.25 MHz



921.25 MHz



927.50 MHz



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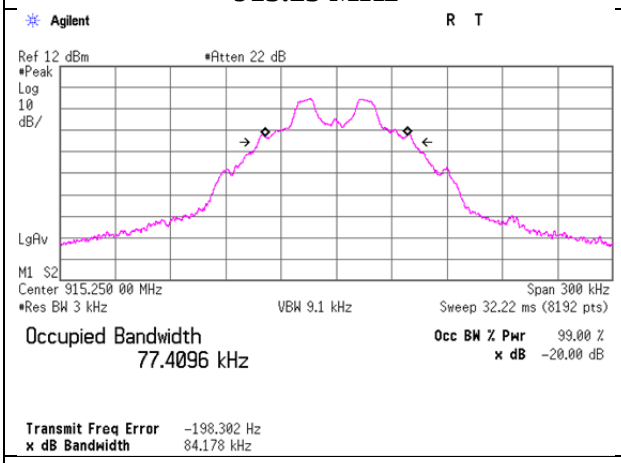
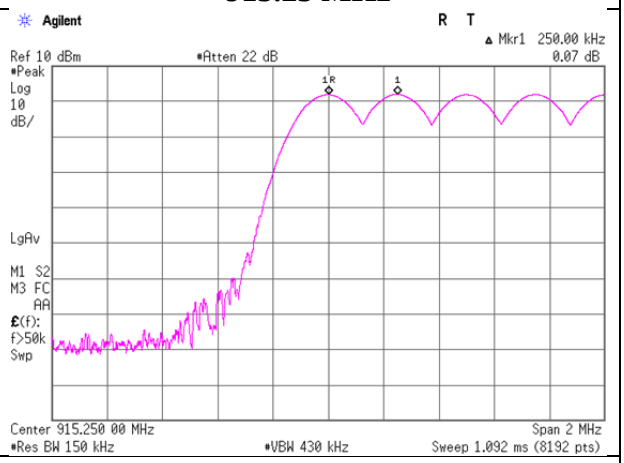
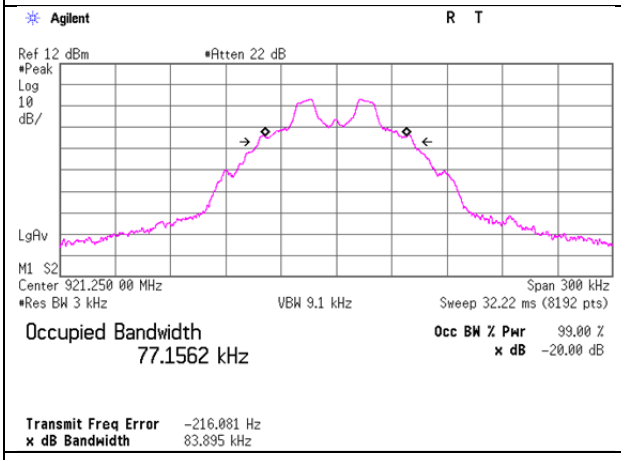
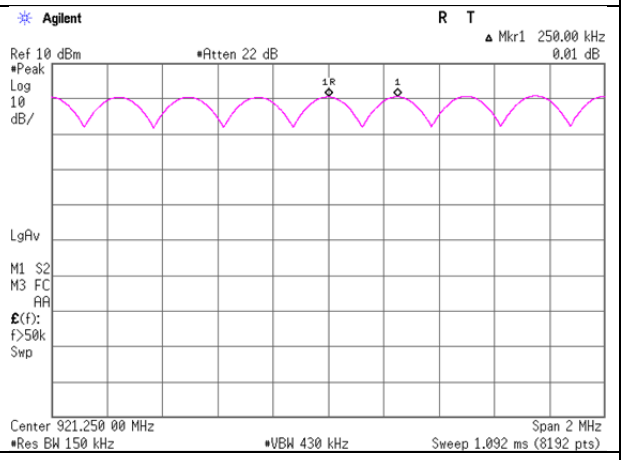
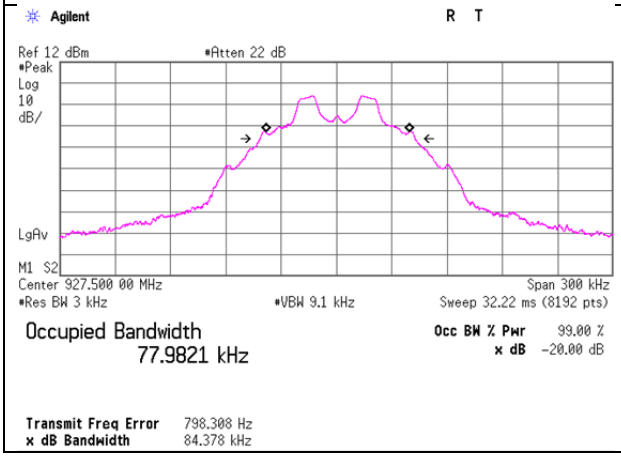
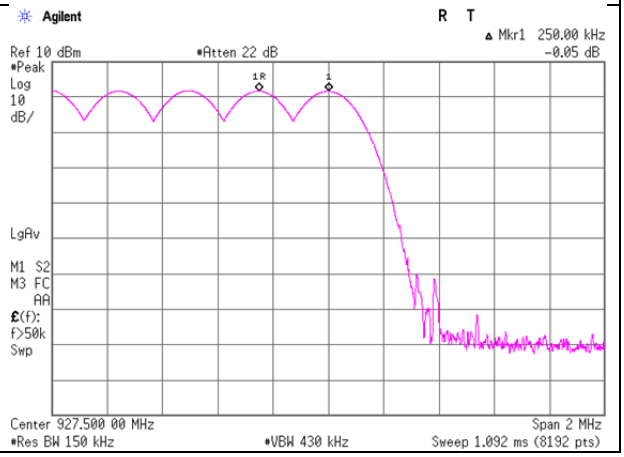
20dB Bandwidth and Carrier Frequency Separation

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping On / OFF

Freq. [MHz]	20dB Bandwidth [kHz]	Carrier Frequency Separation [kHz]	Limit for Carrier Frequency separation [kHz]
915.25	84.178	250.00	>= 84.178
921.25	83.895	250.00	>= 83.895
927.50	84.378	250.00	>= 84.378

Limit: 20dB Bandwidth or 25kHz (whichever is greater).

20dB Bandwidth and Carrier Frequency Separation

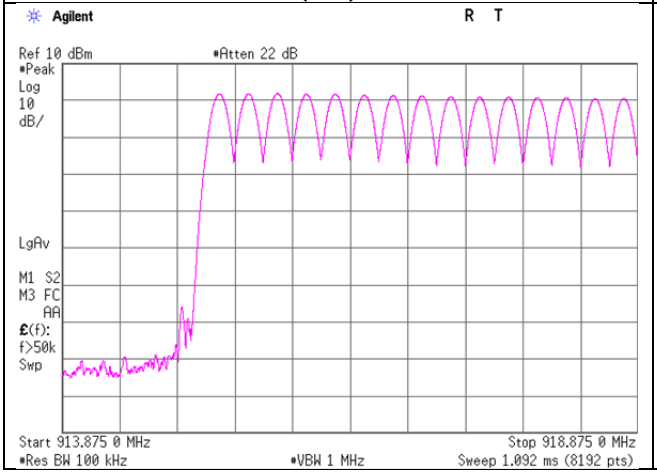
20 dB Bandwidth	Carrier Frequency Separation
915.25 MHz	**915.25 MHz**
	
921.25 MHz	**921.25 MHz**
	
927.50 MHz	**927.50 MHz**
	

Number of Hopping Frequency

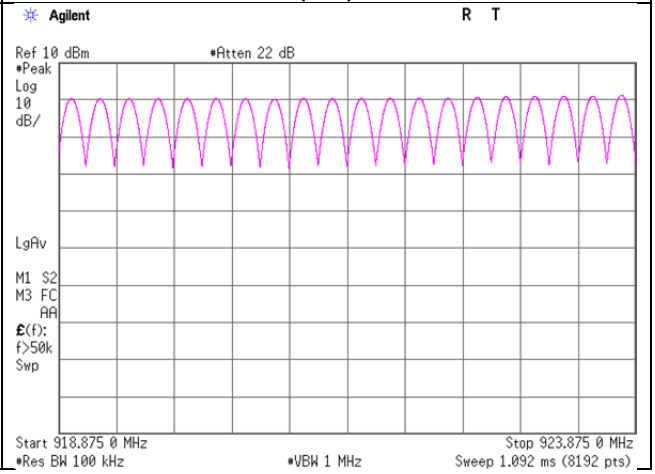
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping On

Number of channel [channels]	Limit [channels]
50	>= 50

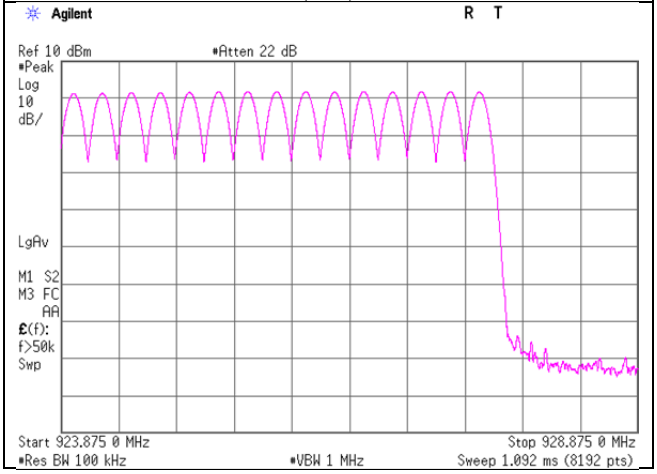
(1/3)



(2/3)



(3/3)



Dwell time

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping On

Freq. [MHz]	Average times in 60second	Analyzer sweep time	Period specified n the requirement	Number of transmission in 20 second	Length of one transmission [sec]	Average occupancy time in 20 second Result [sec]	Limit [sec]
915.25	6.0 times /	60 sec. x	20 sec. =	2.00 times	0.1013	0.203	0.4
921.25	6.0 times /	60 sec. x	20 sec. =	2.00 times	0.1012	0.202	0.4
927.50	6.0 times /	60 sec. x	20 sec. =	2.00 times	0.1017	0.203	0.4

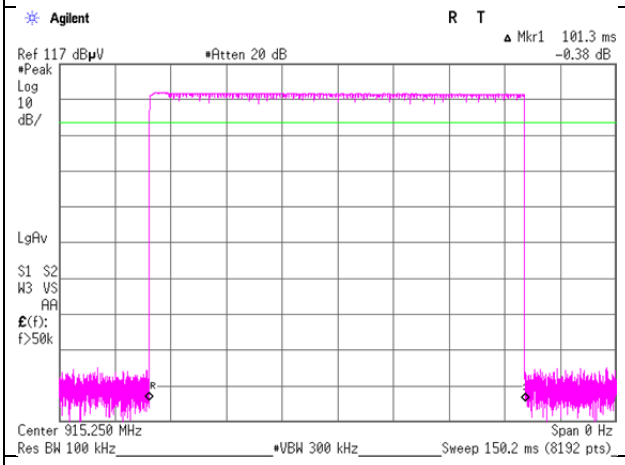
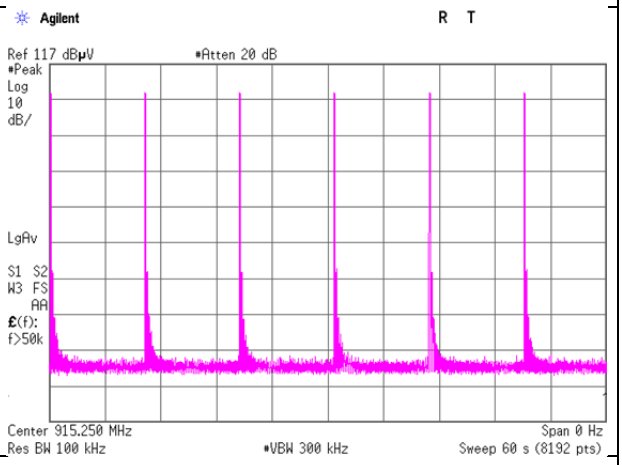
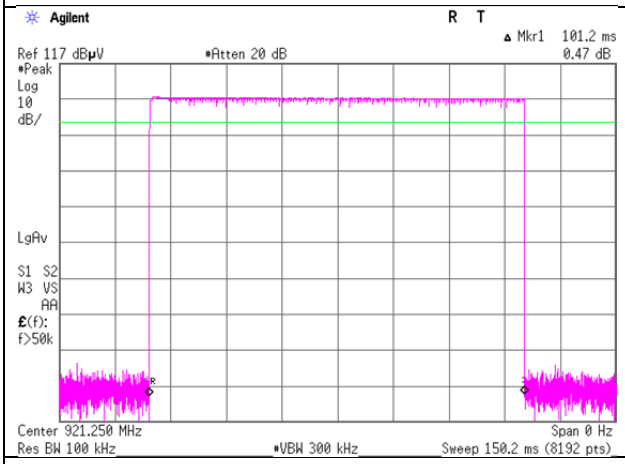
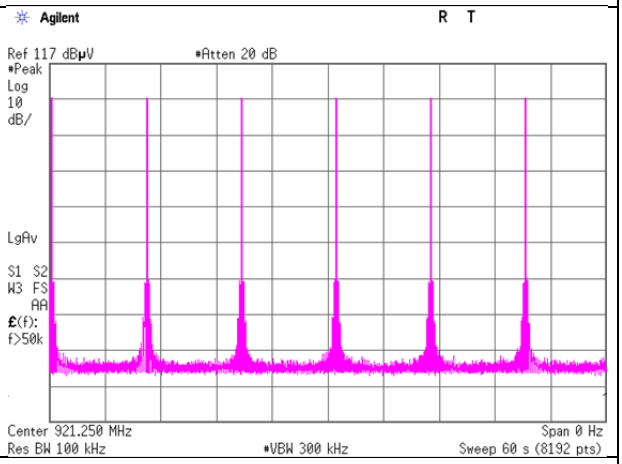
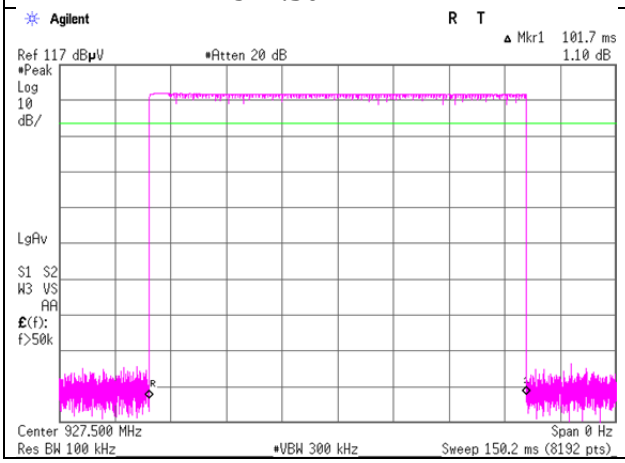
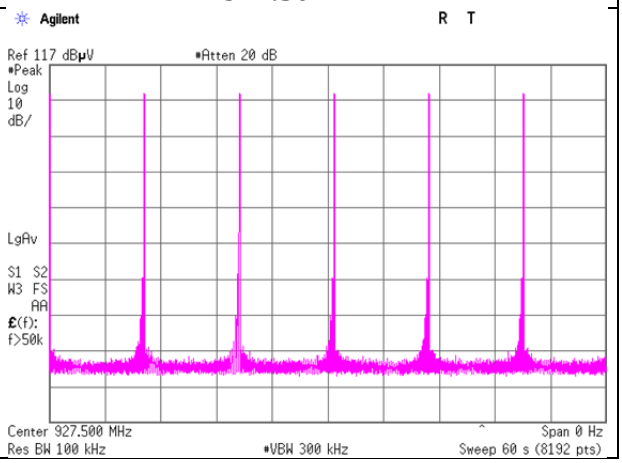
Sample Calculation
Result = Number of transmission x Length of one transmission

Number of hops on spectrum analyzer in observation period

Sampling [times]					Average times in 60 second
1	2	3	4	5	
6	6	6	6	6	6.0
6	6	6	6	6	6.0
6	6	6	6	6	6.0

Sample Calculation

Dwell time

Transmit time per hop	Sampling
915.25 MHz	**915.25 MHz**
	
921.25 MHz	**921.25 MHz**
	
927.50 MHz	**927.50 MHz**
	

Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room	
Report No.	11774427H	
Date	August 10, 2017	October 6, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 53 % RH
Engineer	Ryota Yamanaka	Takafumi Noguchi
Mode	Tx, Hopping Off	

Ant Port1 Power setting: 23 dBm

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	EIRP	EIRP Limit for RSS-247	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[dBm]	[mW]
915.25	0.71	0.50	19.89	21.10	128.82	30.00	1000.00	8.90	-2.00	19.10	36.02	4000
921.25	-0.37	0.50	19.89	20.02	100.46	30.00	1000.00	9.98	-2.00	18.02	36.02	4000
927.50	1.27	0.50	19.89	21.66	146.55	30.00	1000.00	8.34	-2.00	19.66	36.02	4000

Sample Calculation:
Result = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Ant Port1 Power setting: 5 dBm

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	EIRP	EIRP Limit for RSS-247	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[dBm]	[mW]
915.25	-6.71	0.50	9.95	3.74	2.37	30.00	1000.00	26.26	-2.00	1.74	36.02	4000
921.25	-6.89	0.50	9.95	3.56	2.27	30.00	1000.00	26.44	-2.00	1.56	36.02	4000
927.50	-6.69	0.50	9.95	3.76	2.38	30.00	1000.00	26.24	-2.00	1.76	36.02	4000

Sample Calculation:
Result = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Ant Port2 Power setting: 23 dBm

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	EIRP	EIRP Limit for RSS-247	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[dBm]	[mW]
915.25	1.35	0.50	19.89	21.74	149.28	30.00	1000.00	8.26	-2.00	19.74	36.02	4000
921.25	-0.03	0.50	19.89	20.36	108.64	30.00	1000.00	9.64	-2.00	18.36	36.02	4000
927.50	1.33	0.50	19.89	21.72	148.59	30.00	1000.00	8.28	-2.00	19.72	36.02	4000

Sample Calculation:
Result = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Ant Port2 Power setting: 5 dBm

Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	EIRP	EIRP Limit for RSS-247	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[dBm]	[mW]
915.25	-6.41	0.50	9.95	4.04	2.54	30.00	1000.00	25.96	-2.00	2.04	36.02	4000
921.25	-6.66	0.50	9.95	3.79	2.39	30.00	1000.00	26.21	-2.00	1.79	36.02	4000
927.50	-6.52	0.50	9.95	3.93	2.47	30.00	1000.00	26.07	-2.00	1.93	36.02	4000

Sample Calculation:
Result = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Average Output Power
(Reference data for RF Exposure)

Test place	Ise EMC Lab. No.6 Measurement Room	
Report No.	11774427H	
Date	August 10, 2017	October 6, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 53 % RH
Engineer	Ryota Yamanaka	Takafumi Noguchi
Mode	Tx, Hopping Off	

Ant Port1 Power setting: 23 dBm

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average) [dBm]	[mW]
915.25	-1.64	0.50	19.89	18.75	74.99
921.25	-2.57	0.50	19.89	17.82	60.53
927.50	-0.88	0.50	19.89	19.51	89.33

Sample Calculation:
Result (Time average) = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Ant Port1 Power setting: 5 dBm

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average) [dBm]	[mW]
915.25	-9.11	0.50	9.95	1.34	1.36
921.25	-9.30	0.50	9.95	1.15	1.30
927.50	-9.07	0.50	9.95	1.38	1.37

Sample Calculation:
Result (Time average) = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Ant Port2 Power setting: 23 dBm

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average) [dBm]	[mW]
915.25	-0.87	0.50	19.89	19.52	89.54
921.25	-2.18	0.50	19.89	18.21	66.22
927.50	-0.71	0.50	19.89	19.68	92.90

Sample Calculation:
Result (Time average) = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Ant Port2 Power setting: 5 dBm

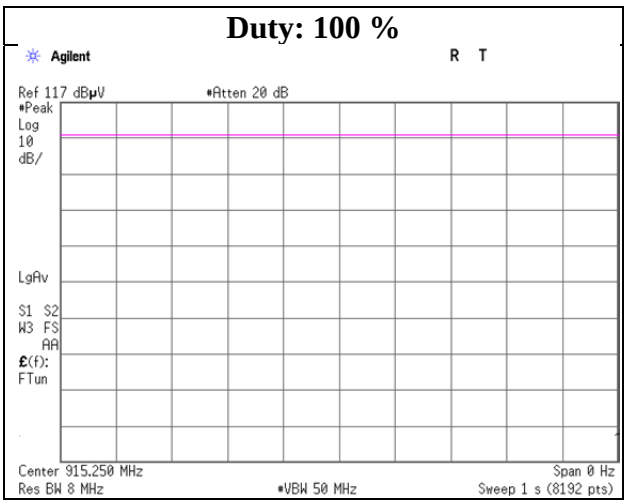
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst power average) [dBm]	[mW]
915.25	-8.66	0.50	9.95	1.79	1.51
921.25	-8.95	0.50	9.95	1.50	1.41
927.50	-8.83	0.50	9.95	1.62	1.45

Sample Calculation:
Result (Time average) = Reading + Cable Loss (the cable customer supplied) + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Burst Rate Confirmation

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping Off



Radiated Spurious Emission
Ant: URAN-S1

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	No.2
Date	August 15, 2017	August 17, 2017
Temperature / Humidity	25 deg. C / 68 % RH	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa (Above 1 GHz)	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 915.25 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	72.000	QP	50.9	6.2	7.2	28.1	-	36.2	40.0	3.8	
Hori	204.233	QP	49.5	11.4	8.2	27.4	-	41.7	43.5	1.8	
Hori	228.258	QP	49.2	11.6	8.3	27.2	-	41.9	46.0	4.1	
Hori	336.000	QP	47.4	14.3	9.1	27.4	-	43.4	46.0	2.6	
Hori	444.468	QP	47.2	16.6	9.4	28.0	-	45.2	46.0	0.8	
Hori	468.559	QP	47.3	17.1	9.5	28.0	-	45.9	46.0	0.1	
Hori	2745.750	PK	55.6	27.5	4.4	34.6	-	52.9	73.9	21.0	
Hori	3661.000	PK	51.7	28.8	5.0	34.0	-	51.5	73.9	22.4	
Hori	4576.250	PK	44.1	30.8	6.7	33.8	-	47.8	73.9	26.1	Floor noise
Hori	5491.500	PK	43.5	31.7	8.0	33.6	-	49.6	73.9	24.3	Floor noise
Hori	2745.750	AV	48.3	27.5	4.4	34.6	-	45.6	53.9	8.3	
Hori	3661.000	AV	47.4	28.8	5.0	34.0	-	47.2	53.9	6.7	
Hori	4576.250	AV	35.9	30.8	6.7	33.8	-	39.6	53.9	14.3	Floor noise
Hori	5491.500	AV	35.1	31.7	8.0	33.6	-	41.2	53.9	12.7	Floor noise
Vert	33.293	QP	42.8	16.4	6.8	28.2	-	37.8	40.0	2.2	
Vert	72.000	QP	54.6	6.2	7.2	28.1	-	39.9	40.0	0.1	
Vert	85.245	QP	48.2	7.5	7.3	28.0	-	35.0	40.0	5.0	
Vert	105.083	QP	48.8	10.8	7.5	27.9	-	39.2	43.5	4.3	
Vert	204.233	QP	46.7	11.4	8.2	27.4	-	38.9	43.5	4.6	
Vert	384.001	QP	37.0	15.4	9.3	27.7	-	34.0	46.0	12.0	
Vert	417.935	QP	42.5	16.1	9.4	27.9	-	40.1	46.0	5.9	
Vert	2745.750	PK	59.1	27.5	4.4	34.6	-	56.4	73.9	17.5	
Vert	3661.000	PK	51.6	28.8	5.0	34.0	-	51.4	73.9	22.5	
Vert	4576.250	PK	44.5	30.8	6.7	33.8	-	48.2	73.9	25.7	Floor noise
Vert	5491.500	PK	43.8	31.7	8.0	33.6	-	49.9	73.9	24.0	Floor noise
Vert	2745.750	AV	51.5	27.5	4.4	34.6	-	48.8	53.9	5.1	
Vert	3661.000	AV	48.8	28.8	5.0	34.0	-	48.6	53.9	5.3	
Vert	4576.250	AV	31.2	30.8	6.7	33.8	-	34.9	53.9	19.0	Floor noise
Vert	5491.500	AV	31.2	31.7	8.0	33.6	-	37.3	53.9	16.6	Floor noise

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

20dBc 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	915.250	PK	97.2	22.2	11.3	26.7	104.0	-	-	Carrier
Hori	1830.500	PK	69.1	26.8	4.3	34.9	65.3	84.0	18.7	
Vert	915.250	PK	106.4	22.2	11.3	26.7	113.2	-	-	Carrier
Vert	1830.500	PK	74.4	26.8	4.3	34.9	70.6	93.2	22.6	

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

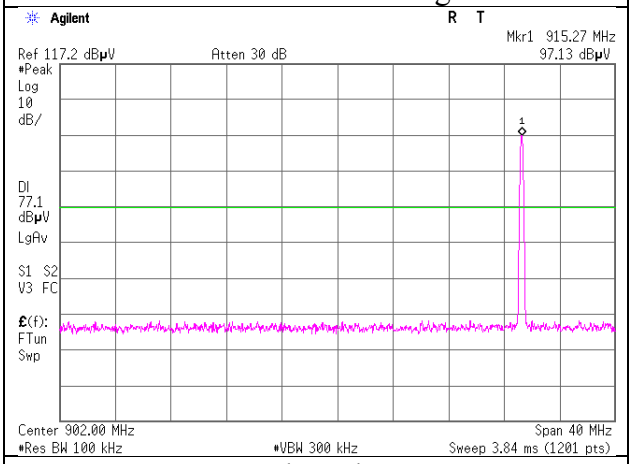
***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
(Reference Plot for band-edge)
Ant: URAN-S1

Test place	Ise EMC Lab.
Report No.	11774427H
Semi Anechoic Chamber	No.2
Date	August 17, 2017
Temperature / Humidity	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa
	(Below 1 GHz)
Mode	Tx, Hopping Off 915.25 MHz

Horizontal

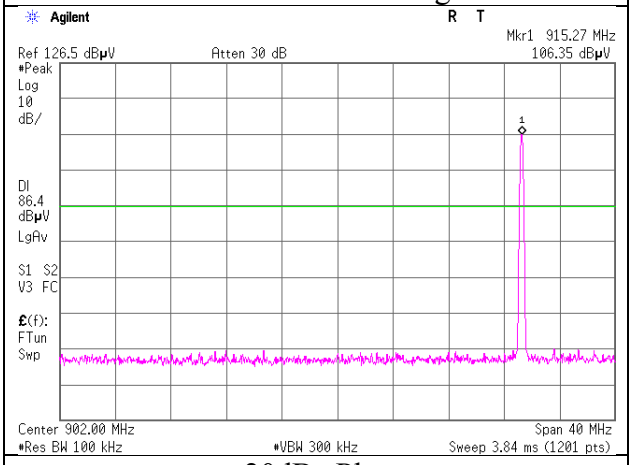
Authorized-band band-edge Plot



20dBc Plot

Vertical

Authorized-band band-edge Plot



20dBc Plot

Radiated Spurious Emission
Ant: URAN-S1

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	No.2
Date	August 15, 2017	August 17, 2017
Temperature / Humidity	25 deg. C / 68 % RH	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa (Above 1 GHz)	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 921.25 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	72.000	QP	50.8	6.2	7.2	28.1	-	36.1	40.0	3.9	
Hori	204.233	QP	49.5	11.4	8.2	27.4	-	41.7	43.5	1.8	
Hori	228.261	QP	48.8	11.6	8.3	27.2	-	41.5	46.0	4.5	
Hori	336.000	QP	46.1	14.3	9.1	27.4	-	42.1	46.0	3.9	
Hori	444.468	QP	46.8	16.6	9.4	28.0	-	44.8	46.0	1.2	
Hori	468.533	QP	47.0	17.1	9.5	28.0	-	45.6	46.0	0.4	
Hori	2763.750	PK	50.1	27.5	4.4	34.6	-	47.4	73.9	26.5	
Hori	3685.000	PK	51.6	28.9	5.1	34.0	-	51.6	73.9	22.3	
Hori	4606.250	PK	43.3	30.8	6.7	33.8	-	47.0	73.9	26.9	Floor noise
Hori	5527.500	PK	43.2	31.7	8.2	33.6	-	49.5	73.9	24.4	Floor noise
Hori	2763.750	AV	42.0	27.5	4.4	34.6	-	39.3	53.9	14.6	
Hori	3685.000	AV	47.8	28.9	5.1	34.0	-	47.8	53.9	6.1	
Hori	4606.250	AV	31.1	30.8	6.7	33.8	-	34.8	53.9	19.1	Floor noise
Hori	5527.500	AV	30.9	31.7	8.2	33.6	-	37.2	53.9	16.7	Floor noise
Vert	33.293	QP	43.7	16.4	6.8	28.2	-	38.7	40.0	1.3	
Vert	72.000	QP	54.4	6.2	7.2	28.1	-	39.7	40.0	0.3	
Vert	85.245	QP	48.4	7.5	7.3	28.0	-	35.2	40.0	4.8	
Vert	104.930	QP	47.2	10.8	7.5	27.9	-	37.6	43.5	5.9	
Vert	204.233	QP	47.2	11.4	8.2	27.4	-	39.4	43.5	4.1	
Vert	386.001	QP	40.5	15.5	9.3	27.7	-	37.6	46.0	8.4	
Vert	417.935	QP	43.1	16.1	9.4	27.9	-	40.7	46.0	5.3	
Vert	2763.750	PK	52.8	27.5	4.4	34.6	-	50.1	73.9	23.8	
Vert	3685.000	PK	51.7	28.9	5.1	34.0	-	51.7	73.9	22.2	
Vert	4606.250	PK	42.9	30.8	6.7	33.8	-	46.6	73.9	27.3	Floor noise
Vert	5527.500	PK	43.2	31.7	8.2	33.6	-	49.5	73.9	24.4	Floor noise
Vert	2763.750	AV	44.9	27.5	4.4	34.6	-	42.2	53.9	11.7	
Vert	3685.000	AV	48.5	28.9	5.1	34.0	-	48.5	53.9	5.4	
Vert	4606.250	AV	31.1	30.8	6.7	33.8	-	34.8	53.9	19.1	Floor noise
Vert	5527.500	AV	30.9	31.7	8.2	33.6	-	37.2	53.9	16.7	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 (3.5 m / 3.0 m) = 1.34 dB

20dBc 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	921.250	PK	95.7	22.2	11.3	26.6	102.6	-	-	Carrier
Hori	1842.500	PK	64.2	26.9	4.3	34.9	60.5	82.6	22.1	
Vert	921.250	PK	104.4	22.2	11.3	26.6	111.3	-	-	Carrier
Vert	1842.500	PK	69.5	26.9	4.3	34.9	65.8	91.3	25.5	

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
Ant: URAN-S1

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	No.2
Date	August 15, 2017	August 17, 2017
Temperature / Humidity	25 deg. C / 68 % RH	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa (Above 1 GHz)	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 927.50 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	72.000	QP	50.4	6.2	7.2	28.1	-	35.7	40.0	4.3	
Hori	204.233	QP	49.1	11.4	8.2	27.4	-	41.3	43.5	2.2	
Hori	228.261	QP	49.1	11.6	8.3	27.2	-	41.8	46.0	4.2	
Hori	336.000	QP	46.5	14.3	9.1	27.4	-	42.5	46.0	3.5	
Hori	444.468	QP	46.8	16.6	9.4	28.0	-	44.8	46.0	1.2	
Hori	468.533	QP	46.8	17.1	9.5	28.0	-	45.4	46.0	0.6	
Hori	2782.500	PK	54.0	27.5	4.4	34.6	-	51.3	73.9	22.6	
Hori	3710.000	PK	51.1	28.9	5.1	34.0	-	51.1	73.9	22.8	
Hori	4637.500	PK	43.6	30.9	6.7	33.8	-	47.4	73.9	26.5	Floor noise
Hori	5565.000	PK	43.0	31.8	8.2	33.6	-	49.4	73.9	24.5	Floor noise
Hori	2782.500	AV	46.3	27.5	4.4	34.6	-	43.6	53.9	10.3	
Hori	3710.000	AV	47.5	28.9	5.1	34.0	-	47.5	53.9	6.4	
Hori	4637.500	AV	31.5	30.9	6.7	33.8	-	35.3	53.9	18.6	Floor noise
Hori	5565.000	AV	30.8	31.8	8.2	33.6	-	37.2	53.9	16.7	Floor noise
Vert	33.293	QP	43.7	16.4	6.8	28.2	-	38.7	40.0	1.3	
Vert	72.000	QP	54.1	6.2	7.2	28.1	-	39.4	40.0	0.6	
Vert	85.245	QP	48.9	7.5	7.3	28.0	-	35.7	40.0	4.3	
Vert	104.269	QP	47.8	10.7	7.5	27.9	-	38.1	43.5	5.4	
Vert	204.235	QP	47.5	11.4	8.2	27.4	-	39.7	43.5	3.8	
Vert	386.001	QP	40.4	15.5	9.3	27.7	-	37.5	46.0	8.5	
Vert	418.295	QP	43.4	16.1	9.4	27.9	-	41.0	46.0	5.0	
Vert	2782.500	PK	55.9	27.5	4.4	34.6	-	53.2	73.9	20.7	
Vert	3710.000	PK	52.0	28.9	5.1	34.0	-	52.0	73.9	21.9	
Vert	4637.500	PK	43.7	30.9	6.7	33.8	-	47.5	73.9	26.4	Floor noise
Vert	5565.000	PK	43.5	31.8	8.2	33.6	-	49.9	73.9	24.0	Floor noise
Vert	2782.500	AV	49.4	27.5	4.4	34.6	-	46.7	53.9	7.2	
Vert	3710.000	AV	48.5	28.9	5.1	34.0	-	48.5	53.9	5.4	
Vert	4637.500	AV	31.7	30.9	6.7	33.8	-	35.5	53.9	18.4	Floor noise
Vert	5565.000	AV	30.7	31.8	8.2	33.6	-	37.1	53.9	16.8	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 (3.5 m / 3.0 m) = 1.34 dB

20dBc 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	927.500	PK	96.1	22.3	11.3	26.6	103.1	-	-	Carrier
Hori	1855.000	PK	68.3	26.9	4.2	34.9	64.5	83.1	18.6	
Vert	927.500	PK	104.8	22.3	11.3	26.6	111.8	-	-	Carrier
Vert	1855.000	PK	72.3	26.9	4.2	34.9	68.5	91.8	23.3	

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

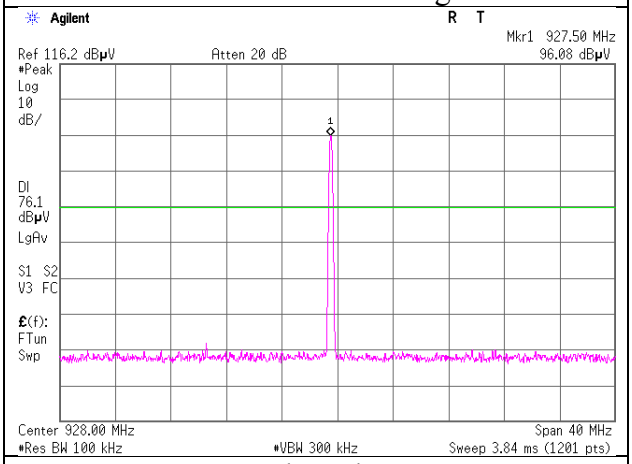
***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
(Reference Plot for band-edge)
Ant: URAN-S1

Test place	Ise EMC Lab.
Report No.	11774427H
Semi Anechoic Chamber	No.2
Date	August 17, 2017
Temperature / Humidity	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa
	(Below 1 GHz)
Mode	Tx, Hopping Off 927.50 MHz

Horizontal

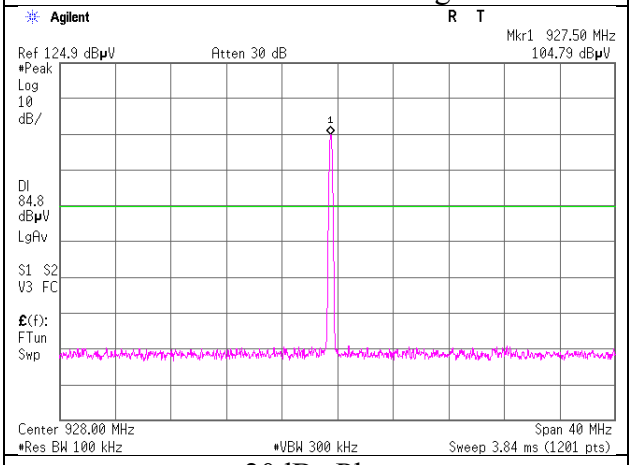
Authorized-band band-edge Plot



20dBc Plot

Vertical

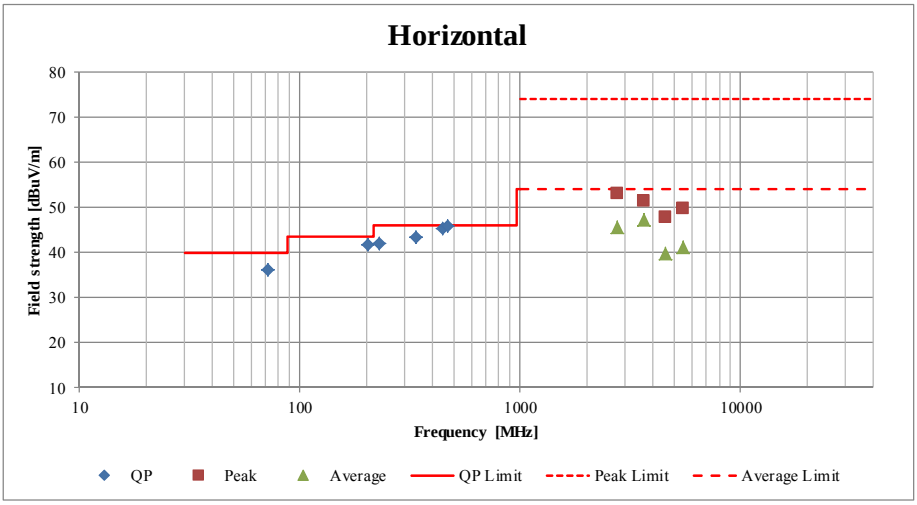
Authorized-band band-edge Plot

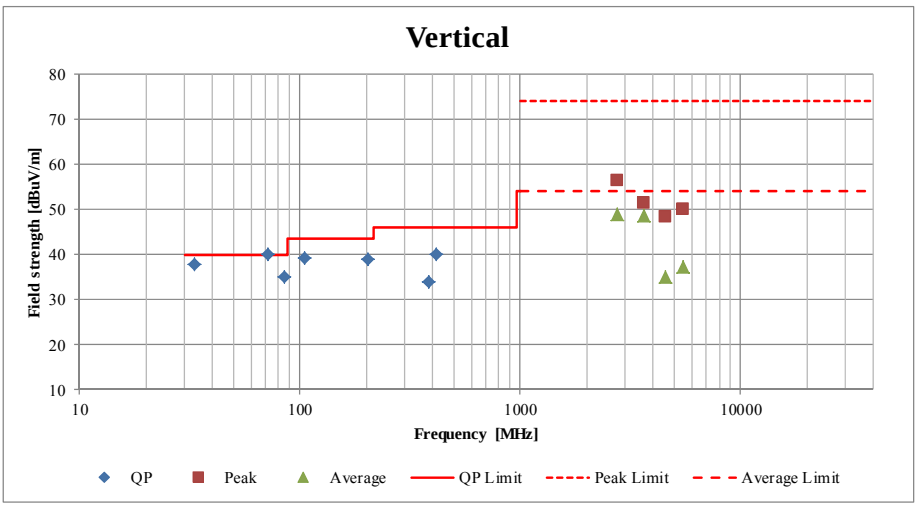


20dBc Plot

Radiated Spurious Emission
(Plot data, Worst case)
Ant: URAN-S1

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	No.2
Date	August 15, 2017	August 17, 2017
Temperature / Humidity	25 deg. C / 68 % RH	23 deg. C / 65 % RH
Engineer	Tomohisa Nakagawa	Tomohisa Nakagawa
	(Above 1 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off 915.25 MHz	





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

Radiated Spurious Emission
Ant: URAN-R2

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	No.2
Date	August 15, 2017	August 16, 2017
Temperature / Humidity	25 deg. C / 68 % RH	24 deg. C / 66 % RH
Engineer	Tomohisa Nakagawa (Above1 GHz)	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 915.25 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	204.233	QP	50.3	11.4	8.2	27.4	-	42.5	43.5	1.0	
Hori	252.289	QP	49.5	11.8	8.5	27.1	-	42.7	46.0	3.3	
Hori	276.318	QP	51.0	12.6	8.7	27.1	-	45.2	46.0	0.8	
Hori	288.000	QP	51.0	13.0	8.7	27.1	-	45.6	46.0	0.4	
Hori	300.344	QP	49.1	13.4	8.8	27.2	-	44.1	46.0	1.9	
Hori	444.509	QP	46.1	16.6	9.4	28.0	-	44.1	46.0	1.9	
Hori	468.535	QP	44.7	17.1	9.5	28.0	-	43.3	46.0	2.7	
Hori	2745.750	PK	55.5	27.5	4.4	34.6	-	52.8	73.9	21.1	
Hori	3661.000	PK	52.6	28.8	5.0	34.0	-	52.4	73.9	21.5	
Hori	4576.250	PK	43.1	30.8	6.7	33.8	-	46.8	73.9	27.1	Floor noise
Hori	5491.500	PK	44.2	31.7	8.0	33.6	-	50.3	73.9	23.6	Floor noise
Hori	2745.750	AV	48.7	27.5	4.4	34.6	-	46.0	53.9	7.9	
Hori	3661.000	AV	48.5	28.8	5.0	34.0	-	48.3	53.9	5.6	
Hori	4576.250	AV	31.4	30.8	6.7	33.8	-	35.1	53.9	18.8	Floor noise
Hori	5491.500	AV	31.3	31.7	8.0	33.6	-	37.4	53.9	16.5	Floor noise
Vert	33.650	QP	44.0	16.3	6.8	28.2	-	38.9	40.0	1.1	
Vert	44.999	QP	45.7	12.5	6.9	28.1	-	37.0	40.0	3.0	
Vert	95.752	QP	48.0	9.3	7.4	28.0	-	36.7	43.5	6.8	
Vert	204.223	QP	48.7	11.4	8.2	27.4	-	40.9	43.5	2.6	
Vert	276.316	QP	50.5	12.6	8.7	27.1	-	44.7	46.0	1.3	
Vert	287.998	QP	50.0	13.0	8.7	27.1	-	44.6	46.0	1.4	
Vert	417.918	QP	43.8	16.1	9.4	27.9	-	41.4	46.0	4.6	
Vert	2745.750	PK	56.1	27.5	4.4	34.6	-	53.4	73.9	20.5	
Vert	3661.000	PK	51.0	28.8	5.0	34.0	-	50.8	73.9	23.1	
Vert	4576.250	PK	43.0	30.8	6.7	33.8	-	46.7	73.9	27.2	Floor noise
Vert	5491.500	PK	43.7	31.7	8.0	33.6	-	49.8	73.9	24.1	Floor noise
Vert	2745.750	AV	48.0	27.5	4.4	34.6	-	45.3	53.9	8.6	
Vert	3661.000	AV	46.8	28.8	5.0	34.0	-	46.6	53.9	7.3	
Vert	4576.250	AV	31.1	30.8	6.7	33.8	-	34.8	53.9	19.1	Floor noise
Vert	5491.500	AV	31.2	31.7	8.0	33.6	-	37.3	53.9	16.6	Floor noise

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

20dBc 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	915.250	PK	98.1	22.2	11.3	26.7	104.9	-	-	Carrier
Hori	1830.500	PK	71.8	26.8	4.3	34.9	68.0	84.9	16.9	
Vert	915.250	PK	106.7	22.2	11.3	26.7	113.5	-	-	Carrier
Vert	1830.500	PK	77.5	26.8	4.3	34.9	73.7	93.5	19.8	

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

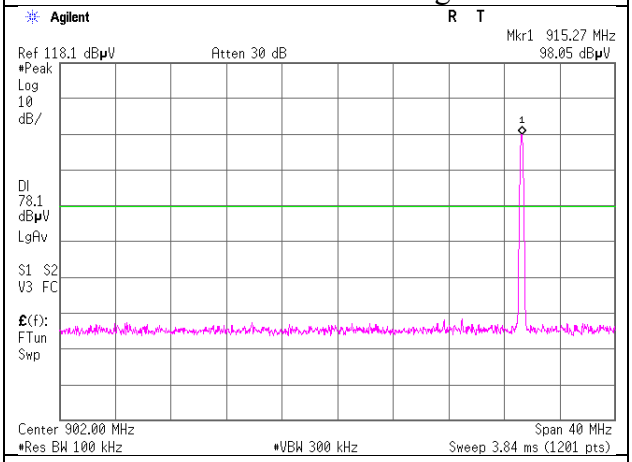
***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
(Reference Plot for band-edge)
Ant: URAN-R2

Test place	Ise EMC Lab.
Report No.	11774427H
Semi Anechoic Chamber	No.2
Date	August 16, 2017
Temperature / Humidity	24 deg. C / 66 % RH
Engineer	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 915.25 MHz

Horizontal

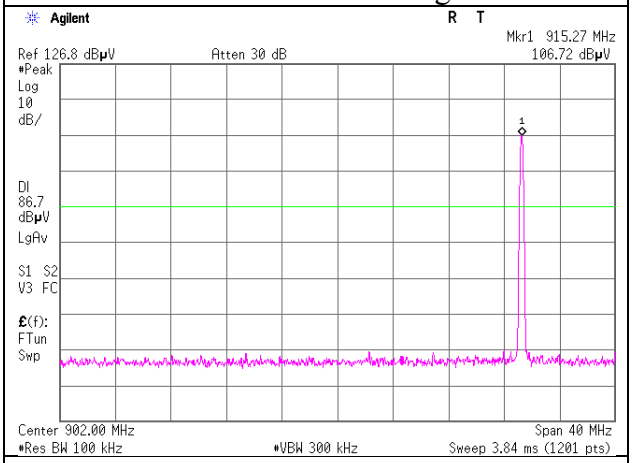
Authorized-band band-edge Plot



20dBc Plot

Vertical

Authorized-band band-edge Plot



20dBc Plot

Radiated Spurious Emission
Ant: URAN-R2

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	No.2
Date	August 15, 2017	August 16, 2017
Temperature / Humidity	25 deg. C / 68 % RH	24 deg. C / 66 % RH
Engineer	Tomohisa Nakagawa (Above 1 GHz)	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 921.25 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	204.233	QP	48.4	11.4	8.2	27.4	-	40.6	43.5	2.9	
Hori	252.289	QP	49.1	11.8	8.5	27.1	-	42.3	46.0	3.7	
Hori	276.316	QP	50.4	12.6	8.7	27.1	-	44.6	46.0	1.4	
Hori	288.000	QP	51.2	13.0	8.7	27.1	-	45.8	46.0	0.2	
Hori	300.342	QP	48.8	13.4	8.8	27.2	-	43.8	46.0	2.2	
Hori	444.509	QP	45.8	16.6	9.4	28.0	-	43.8	46.0	2.2	
Hori	468.535	QP	43.6	17.1	9.5	28.0	-	42.2	46.0	3.8	
Hori	2763.750	PK	50.8	27.5	4.4	34.6	-	48.1	73.9	25.8	
Hori	3685.000	PK	50.7	28.9	5.1	34.0	-	50.7	73.9	23.2	
Hori	4606.250	PK	43.0	30.8	6.7	33.8	-	46.7	73.9	27.2	Floor noise
Hori	5527.500	PK	43.2	31.7	8.2	33.6	-	49.5	73.9	24.4	Floor noise
Hori	2763.750	AV	43.5	27.5	4.4	34.6	-	40.8	53.9	13.1	
Hori	3685.000	AV	47.2	28.9	5.1	34.0	-	47.2	53.9	6.7	
Hori	4606.250	AV	31.1	30.8	6.7	33.8	-	34.8	53.9	19.1	Floor noise
Hori	5527.500	AV	30.9	31.7	8.2	33.6	-	37.2	53.9	16.7	Floor noise
Vert	33.287	QP	44.7	16.4	6.8	28.2	-	39.7	40.0	0.3	
Vert	45.017	QP	46.0	12.4	6.9	28.1	-	37.2	40.0	2.8	
Vert	95.492	QP	48.3	9.3	7.4	28.0	-	37.0	43.5	6.5	
Vert	204.233	QP	48.0	11.4	8.2	27.4	-	40.2	43.5	3.3	
Vert	276.316	QP	49.9	12.6	8.7	27.1	-	44.1	46.0	1.9	
Vert	287.996	QP	49.6	13.0	8.7	27.1	-	44.2	46.0	1.8	
Vert	418.668	QP	43.6	16.1	9.4	27.9	-	41.2	46.0	4.8	
Vert	2763.750	PK	50.4	27.5	4.4	34.6	-	47.7	73.9	26.2	
Vert	3685.000	PK	51.2	28.9	5.1	34.0	-	51.2	73.9	22.7	
Vert	4606.250	PK	43.4	30.8	6.7	33.8	-	47.1	73.9	26.8	Floor noise
Vert	5527.500	PK	42.9	31.7	8.2	33.6	-	49.2	73.9	24.7	Floor noise
Vert	2763.750	AV	43.2	27.5	4.4	34.6	-	40.5	53.9	13.4	
Vert	3685.000	AV	47.5	28.9	5.1	34.0	-	47.5	53.9	6.4	
Vert	4606.250	AV	31.0	30.8	6.7	33.8	-	34.7	53.9	19.2	Floor noise
Vert	5527.500	AV	30.9	31.7	8.2	33.6	-	37.2	53.9	16.7	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 (3.5 m / 3.0 m) = 1.34 dB

20dBc 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	921.250	PK	94.7	22.2	11.3	26.6	101.6	-	-	Carrier
Hori	1842.500	PK	66.3	26.9	4.3	34.9	62.6	81.6	19.0	
Vert	921.250	PK	105.4	22.2	11.3	26.6	112.3	-	-	Carrier
Vert	1842.500	PK	73.4	26.9	4.3	34.9	69.7	92.3	22.6	

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
Ant: URAN-R2

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	No.2
Date	August 15, 2017	August 16, 2017
Temperature / Humidity	25 deg. C / 68 % RH	24 deg. C / 66 % RH
Engineer	Tomohisa Nakagawa (Above 1 GHz)	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 927.50 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	204.225	QP	50.9	11.4	8.2	27.4	-	43.1	43.5	0.4	
Hori	252.292	QP	50.3	11.8	8.5	27.1	-	43.5	46.0	2.5	
Hori	276.317	QP	50.9	12.6	8.7	27.1	-	45.1	46.0	0.9	
Hori	288.000	QP	51.3	13.0	8.7	27.1	-	45.9	46.0	0.1	
Hori	300.342	QP	48.4	13.4	8.8	27.2	-	43.4	46.0	2.6	
Hori	444.509	QP	46.1	16.6	9.4	28.0	-	44.1	46.0	1.9	
Hori	468.534	QP	43.5	17.1	9.5	28.0	-	42.1	46.0	3.9	
Hori	2782.500	PK	54.6	27.5	4.4	34.6	-	51.9	73.9	22.0	
Hori	3710.000	PK	51.1	28.9	5.1	34.0	-	51.1	73.9	22.8	
Hori	4637.500	PK	43.5	30.9	6.7	33.8	-	47.3	73.9	26.6	Floor noise
Hori	5565.000	PK	43.1	31.8	8.2	33.6	-	49.5	73.9	24.4	Floor noise
Hori	2782.500	AV	47.5	27.5	4.4	34.6	-	44.8	53.9	9.1	
Hori	3710.000	AV	46.8	28.9	5.1	34.0	-	46.8	53.9	7.1	
Hori	4637.500	AV	31.7	30.9	6.7	33.8	-	35.5	53.9	18.4	Floor noise
Hori	5565.000	AV	31.1	31.8	8.2	33.6	-	37.5	53.9	16.4	Floor noise
Vert	33.320	QP	43.4	16.4	6.8	28.2	-	38.4	40.0	1.6	
Vert	45.017	QP	42.1	12.4	6.9	28.1	-	33.3	40.0	6.7	
Vert	95.167	QP	47.5	9.2	7.4	28.0	-	36.1	43.5	7.4	
Vert	204.233	QP	48.9	11.4	8.2	27.4	-	41.1	43.5	2.4	
Vert	276.317	QP	51.0	12.6	8.7	27.1	-	45.2	46.0	0.8	
Vert	288.000	QP	50.8	13.0	8.7	27.1	-	45.4	46.0	0.6	
Vert	418.668	QP	44.8	16.1	9.4	27.9	-	42.4	46.0	3.6	
Vert	2782.500	PK	55.7	27.5	4.4	34.6	-	53.0	73.9	20.9	
Vert	3710.000	PK	51.3	28.9	5.1	34.0	-	51.3	73.9	22.6	
Vert	4637.500	PK	43.3	30.9	6.7	33.8	-	47.1	73.9	26.8	Floor noise
Vert	5565.000	PK	42.8	31.8	8.2	33.6	-	49.2	73.9	24.7	Floor noise
Vert	2782.500	AV	48.2	27.5	4.4	34.6	-	45.5	53.9	8.4	
Vert	3710.000	AV	48.0	28.9	5.1	34.0	-	48.0	53.9	5.9	
Vert	4637.500	AV	32.0	30.9	6.7	33.8	-	35.8	53.9	18.1	Floor noise
Vert	5565.000	AV	30.8	31.8	8.2	33.6	-	37.2	53.9	16.7	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 (3.5 m / 3.0 m) = 1.34 dB

20dBc 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	927.500	PK	96.6	22.3	11.3	26.6	103.6	-	-	Carrier
Hori	1855.000	PK	68.7	26.9	4.2	34.9	64.9	83.6	18.7	
Vert	927.500	PK	105.5	22.3	11.3	26.6	112.5	-	-	Carrier
Vert	1855.000	PK	75.4	26.9	4.2	34.9	71.6	92.5	20.9	

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

Distance factor: 1 GHz - 10 GHz 20log (3.5 m / 3.0 m) = 1.34 dB

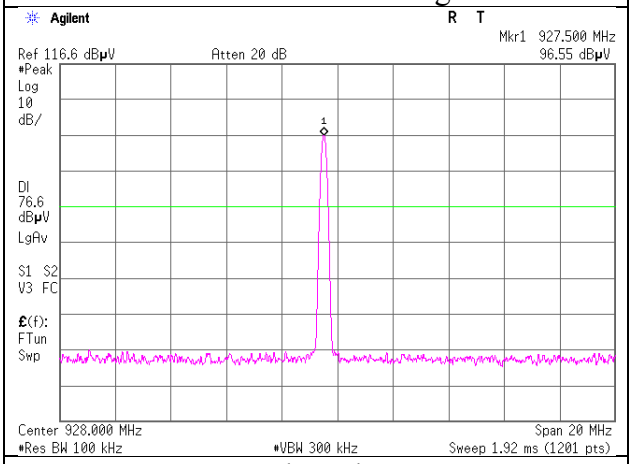
***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission
(Reference Plot for band-edge)
Ant: URAN-R2

Test place	Ise EMC Lab.
Report No.	11774427H
Semi Anechoic Chamber	No.2
Date	August 16, 2017
Temperature / Humidity	24 deg. C / 66 % RH
Engineer	Tomohisa Nakagawa
	(Below 1 GHz)
Mode	Tx, Hopping Off 927.50 MHz

Horizontal

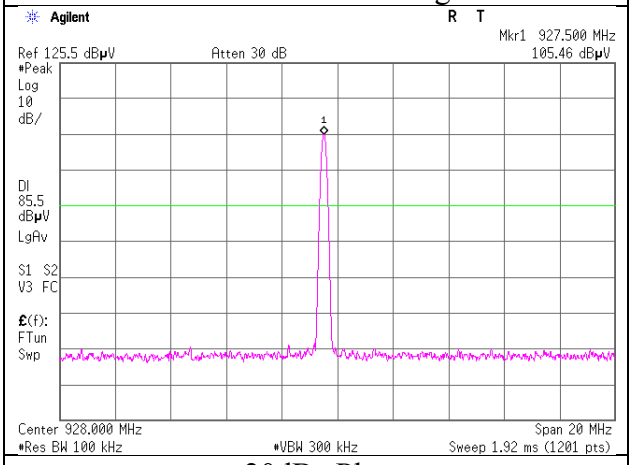
Authorized-band band-edge Plot



20dBc Plot

Vertical

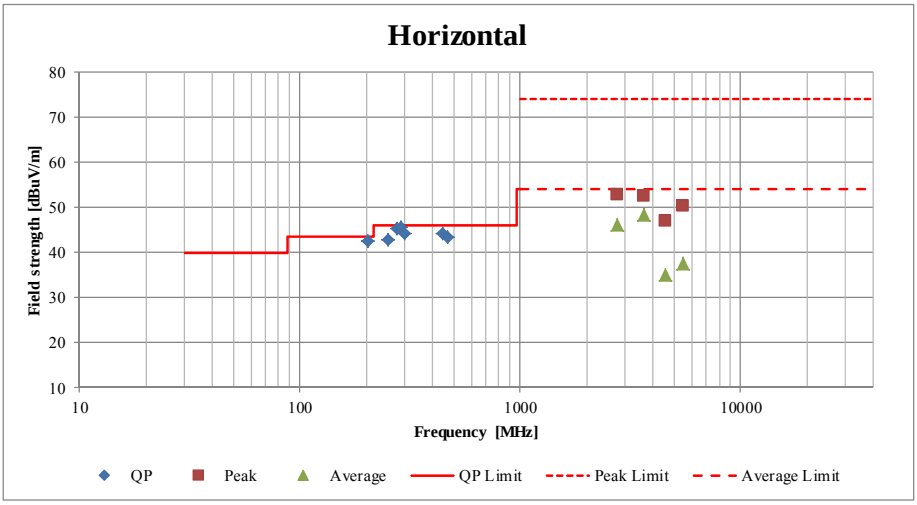
Authorized-band band-edge Plot

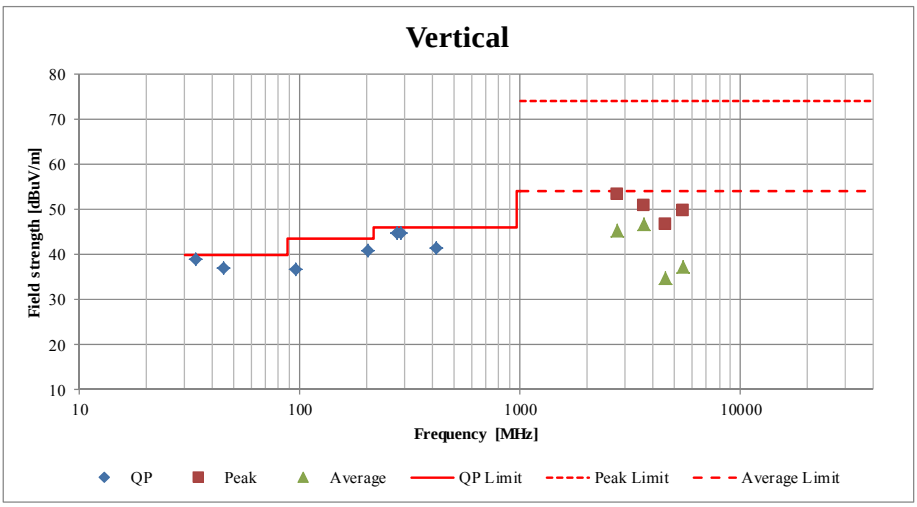


20dBc Plot

Radiated Spurious Emission
(Plot data, Worst case)
Ant: URAN-R2

Test place	Ise EMC Lab.	
Report No.	11774427H	
Semi Anechoic Chamber	No.2	
Date	August 15, 2017	August 16, 2017
Temperature / Humidity	25 deg. C / 68 % RH	24 deg. C / 66 % RH
Engineer	Tomohisa Nakagawa (Above1 GHz)	Tomohisa Nakagawa (Below 1 GHz)
Mode	Tx, Hopping Off 915.25 MHz	





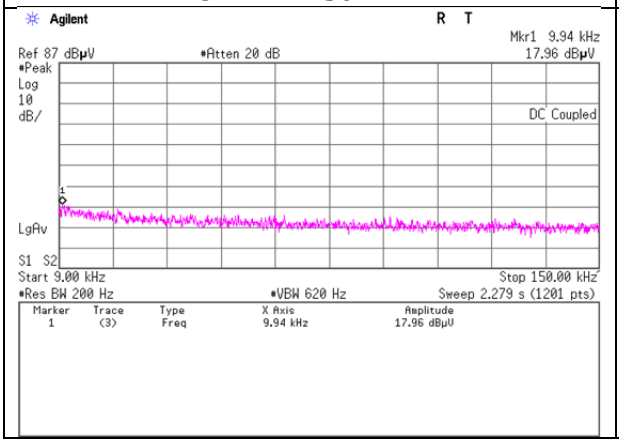
*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

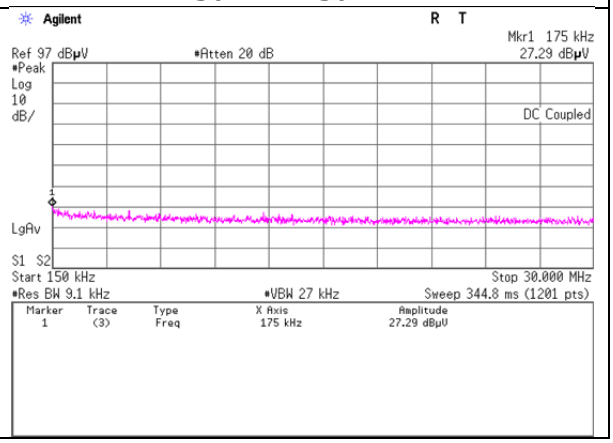
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping Off

915.25 MHz

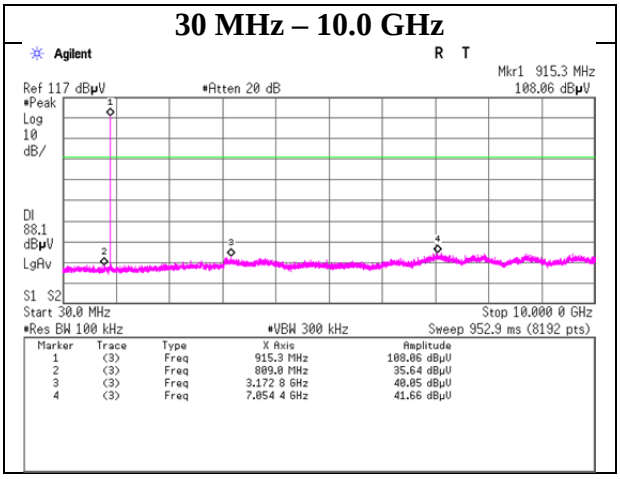
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz – 10.0 GHz

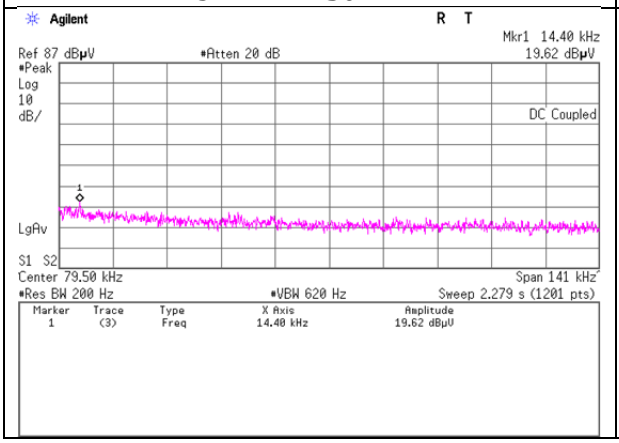


Conducted Spurious Emission

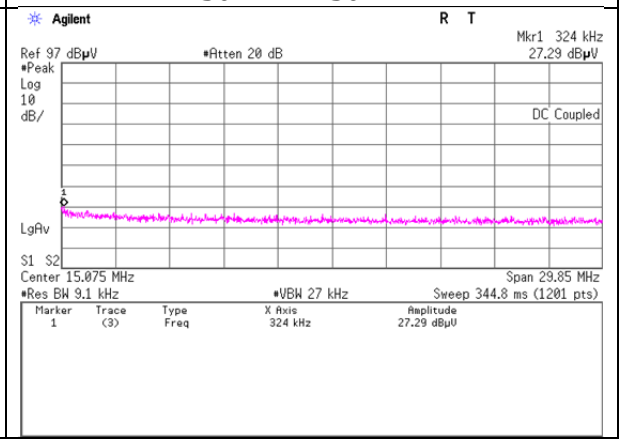
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping Off

921.25 MHz

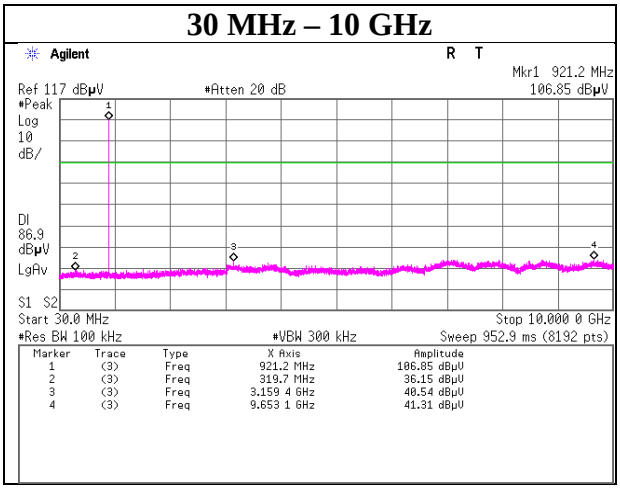
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 10 GHz

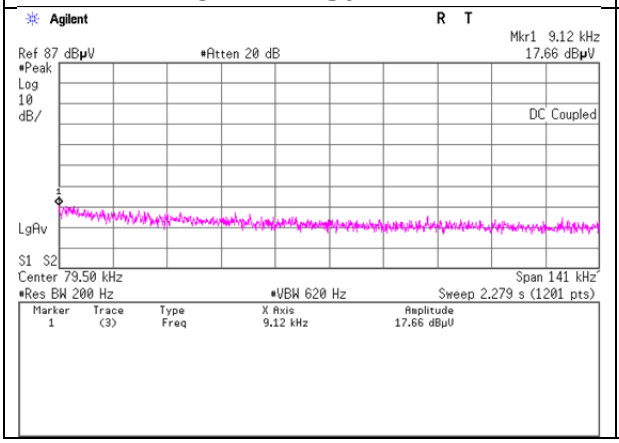


Conducted Spurious Emission

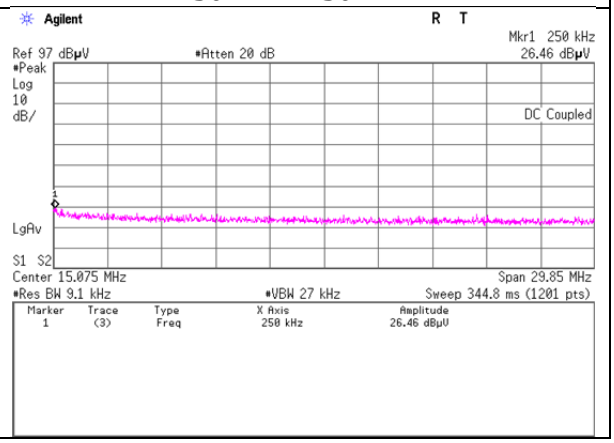
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping Off

927.50 MHz

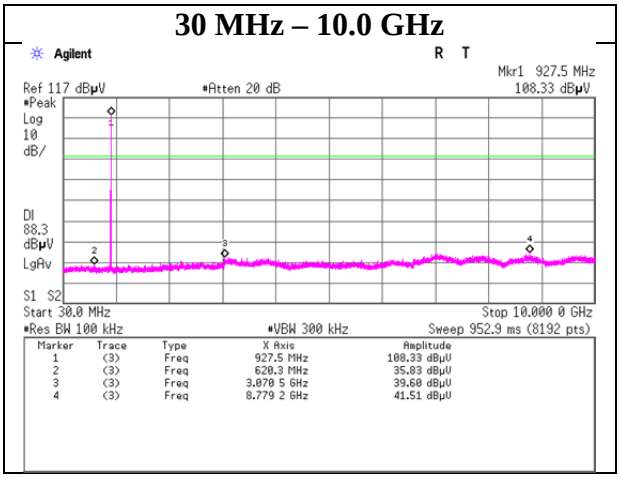
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 10.0 GHz

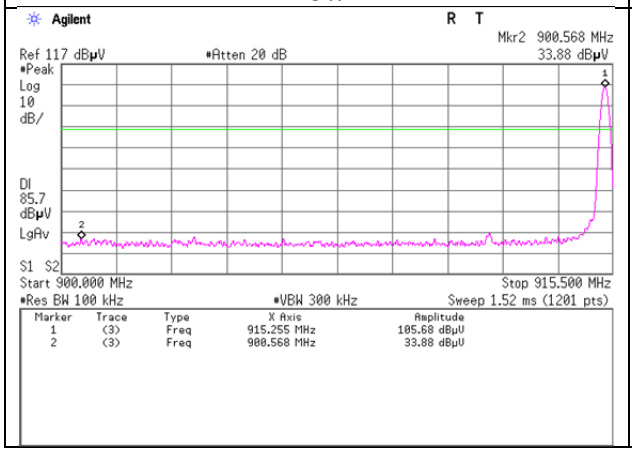


Conducted Emission Band Edge compliance

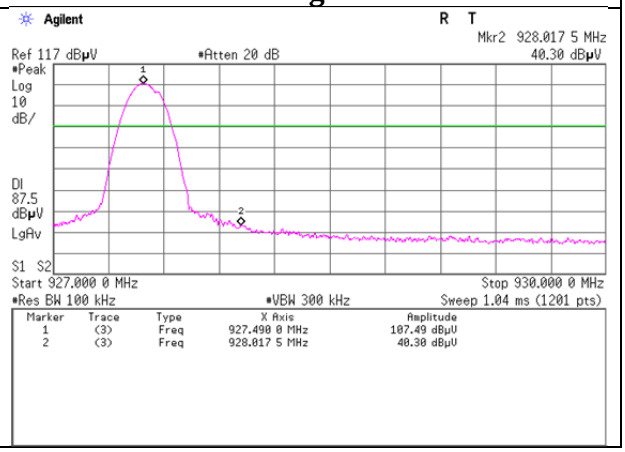
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping On / Off

Hopping Off

Low

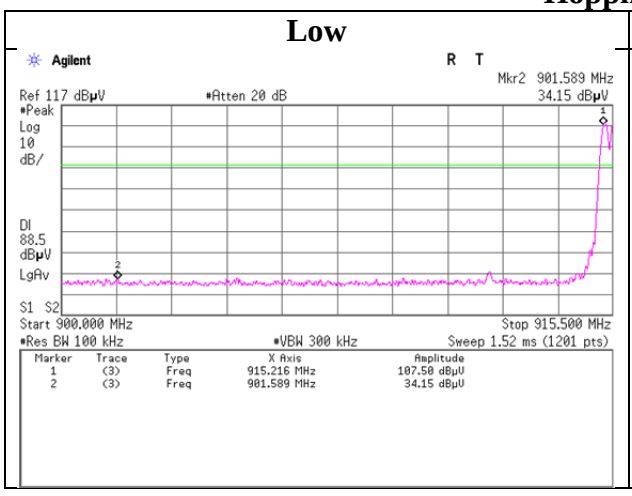


High

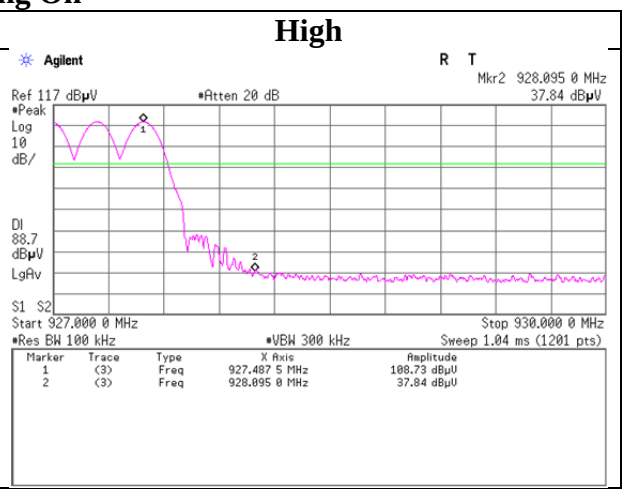


Hopping On

Low



High

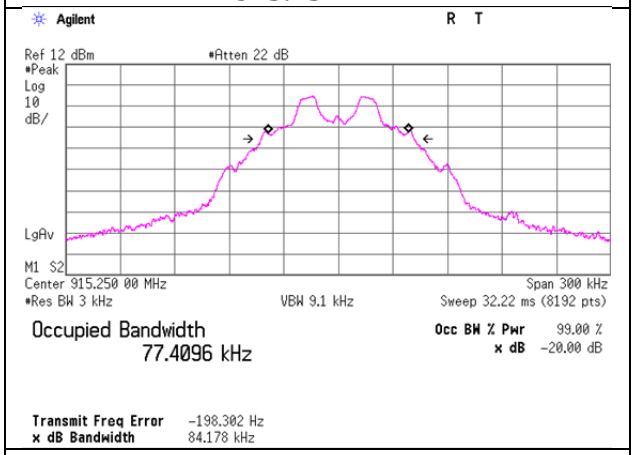


99%Occupied Bandwidth

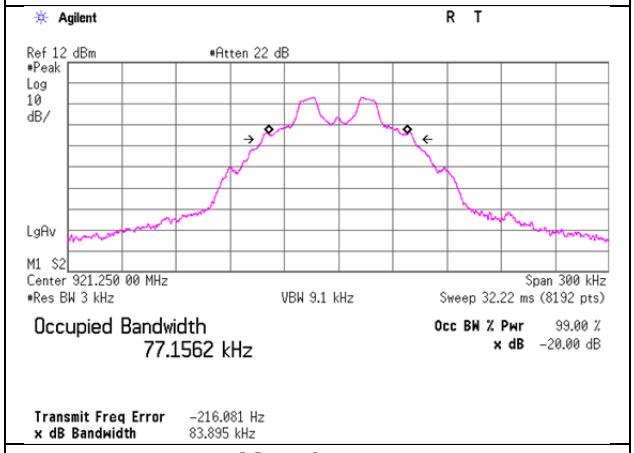
Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping Off

Hopping Off

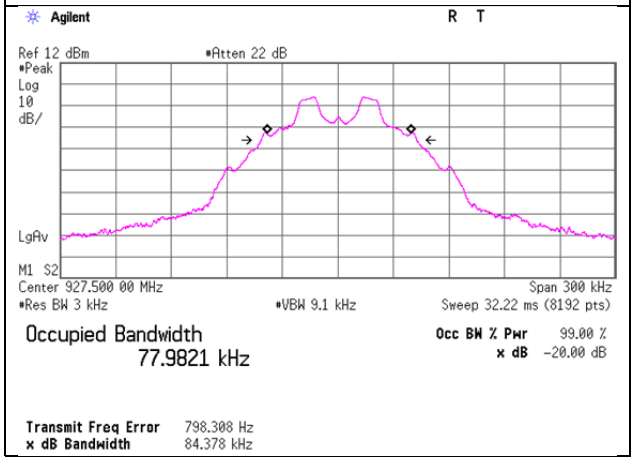
915.25 MHz



921.25 MHz



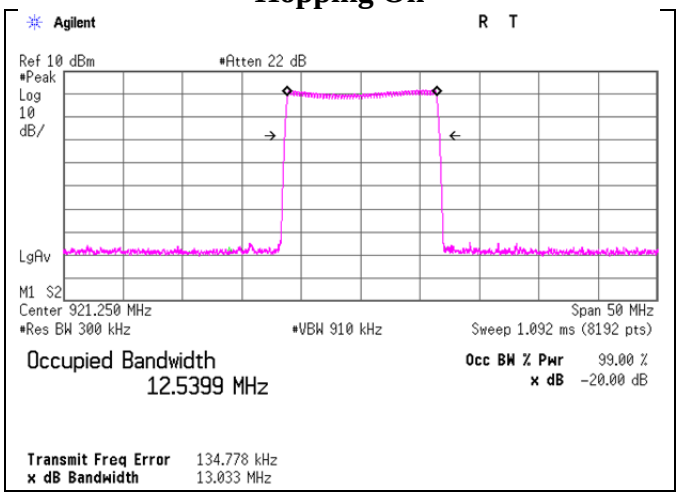
927.50 MHz



99% Occupied Bandwidth

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	11774427H
Date	August 10, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping On

Hopping On



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2016/08/02 * 12 *1)
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2016/12/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/CE	2016/11/10 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2017/08/21 * 12
MBA-08	Biconical Antenna	Schwarzbeck	VHA9103B	08031	RE	2016/09/29 * 12 *1)
MLA-21	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-190	RE	2017/01/05 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2017/02/24 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2016/11/28 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2016/09/13 * 12 *1)
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	RE	2017/08/07 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(EUT)	2017/07/24 * 12
MLS-24	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	CE(AE)	2017/07/20 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2016/12/24 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/ 5D-2W(5m)/ 5D-2W(0.8m)/ 5D-2W(1m)	-	CE	2017/02/24 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/12/21 * 12
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	AT	2017/02/21 * 12
MAT-17	Attenuator(20dB)_DC-1 GHz_N	Weinschel Corp	MODEL 1	BG0143	AT	2016/12/24 * 12
MCC-173	Microwave Cable	Junkosha	MWX221	1409S496	AT	2017/03/13 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2017/03/24 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2016/10/07 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2016/10/07 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2016/12/13 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2016/11/28 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2017/06/20 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2017/06/20 * 12

***1) This test equipment was used for the tests before the expiration date of the calibration.**

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