



RADIO TEST REPORT

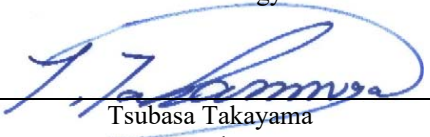
Test Report No. : 13407533H-A-R1

Applicant : DENSO WAVE INCORPORATED
Type of EUT : Fixed Type RFID Scanner
Model Number of EUT : UR40-H-ERU
FCC ID : PZWUR40HERU
Test regulation : FCC Part 15 Subpart C: 2020
Test Result : Complied (Refer to SECTION 3.2)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13407533H-A. 13407533H-A is replaced with this report.

Date of test: July 1 to September 4, 2020

Representative test engineer: 
Junya Okuno
Engineer
Consumer Technology Division

Approved by: 
Tsubasa Takayama
Leader
Consumer Technology Division



CERTIFICATE 5107.02

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

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REVISION HISTORY

Original Test Report No.: 13407533H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13407533H-A	July 28, 2020	-	-
1	13407533H-A-R1	September 10, 2020	P.1	Correction of Date of test
1	13407533H-A-R1	September 10, 2020	P.7	Correction of Worst Margin of Spurious Emission & Band Edge Compliance
1	13407533H-A-R1	September 10, 2020	P.7	Correction of FCC Part 15.203 Antenna requirement for External Antenna.
1	13407533H-A-R1	September 10, 2020	P.10	Addition of Power setting value
1	13407533H-A-R1	September 10, 2020	P.12	Correction of cable Name No.9: from LAN Cable to ETHERNET MEDIA M12 PACH CORD
1	13407533H-A-R1	September 10, 2020	P.12	Addition of Remarks of cable No.9, Cable information and note *1)
1	13407533H-A-R1	September 10, 2020	P.15	Recalculation of Test distance for 1 GHz - 10 GHz : (Internal Antenna) part from 4.0 m to 3.85 m (External Antenna) part from 4.0 m to 3.65 m
1	13407533H-A-R1	September 10, 2020	P.15	Deletion of Test Setup for 10 GHz - 26.5 GHz
1	13407533H-A-R1	September 10, 2020	P.15	Correction of measurement range: from 30 MHz - 26.5 GHz to 30 MHz - 10 GHz
1	13407533H-A-R1	September 10, 2020	P.29, 32	Addition of setting value “(30 dBm Setting)”
1	13407533H-A-R1	September 10, 2020	P.30, 33	Addition of Test data on setting value 10 dBm
1	13407533H-A-R1	September 10, 2020	P.54	Addition of Test Instrument: Bottom three lines of the table

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	:	DENSO WAVE INCORPORATED
Address	:	1 Yshiike, Kusagi, Agui-cho, Chita-gun, Aichi 470-2297, Japan
Telephone Number	:	+81-569-49-5276
Facsimile Number	:	+81-569-49-5488
Contact Person	:	Akira Ito

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (EUT) other than the Receipt Date
- SECTION 4: Operation of EUT during testing

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type	:	Fixed Type RFID Scanner
Model Number	:	UR40-H-ERU
Serial Number	:	Refer to SECTION 4.2
Rating	:	DC 20.4 V - 26.4 V
Receipt Date	:	June 27, 2020
Country of Mass-production	:	Japan
Condition	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: UR40-H-ERU (referred to as the EUT in this report) is a Fixed Type RFID Scanner.

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	915.25 MHz to 927.5 MHz
Modulation	:	PR-ASK
Antenna type	:	Polarization switching antenna (Circularly / Linearly) (Internal (Int.)), Circularly polarized antenna (External (Ext.))
Antenna Gain	:	6.0 dBi
Clock frequency (Maximum)	:	RF board: 24 MHz

*Simultaneously transmission does not do among combination of three external antennas and internal antenna.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

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

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

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

3.2 Procedures and results

Item	Test Procedure	Specification	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	11.11 dB 12.07713 MHz, QP, N, Internal Antenna / 12.07755 MHz, AV, N, External Antenna	Complied a)	-
Carrier Frequency Separation	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1) ISED: RSS-247 5.1 (b)	See data.	Complied b)	Conducted
20dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1) ISED: RSS-247 5.1 (a)		Complied b)	Conducted
Number of Hopping Frequency	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied c)	Conducted
Dwell time	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied d)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(a)(b)(1) ISED: RSS-247 5.4 (b)		Complied e)	Conducted
Spurious Emission & Band Edge Compliance	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	0.3 dB 2782.500 MHz, AV, Hori., Internal Antenna	Complied f) / g)	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). a) Refer to APPENDIX 1 (data of Conducted Emission) b) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation) c) Refer to APPENDIX 1 (data of Number of Hopping Frequency) d) Refer to APPENDIX 1 (data of Dwell time) e) Refer to APPENDIX 1 (data of Maximum Peak Output Power) f) Refer to APPENDIX 1 (data of Conducted Spurious Emission) g) 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)

This EUT provides stable voltage constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

For Internal Antenna

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

For External Antenna

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	ISED: RSS-Gen 6.7	ISED: -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation)					

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
0.5 m	26.5 GHz to 40 GHz	5.5 dB
10 m	1 GHz to 18 GHz	5.2 dB

3.5 Test Location

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*A2LA Certificate Number: 5107.02 / 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 3.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

RFID: Transmitting (Tx)

* Test was performed using each antenna (Internal / External).

Worst rate:

Internal Antenna	Polarization: Hori.	Profile: 4
External Antenna	Antenna: 2	Profile: 4

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off)	915.25 MHz 921.25 MHz 927.50 MHz
Carrier Frequency Separation	Tx (Hopping On)	915.25 MHz 921.25 MHz 927.50 MHz
20dB Bandwidth	Tx (Hopping Off)	915.25 MHz 921.25 MHz 927.50 MHz
Number of Hopping Frequency	Tx (Hopping On)	-
Dwell time	Tx (Hopping On),	915.25 MHz 921.25 MHz 927.50 MHz
Maximum Peak Output Power	Tx (Hopping Off)	915.25 MHz 921.25 MHz 927.50 MHz
Band Edge Compliance (Conducted)	Tx -Hopping On -Hopping Off	915.25 MHz 927.50 MHz
99% Occupied Bandwidth	Tx (Hopping On / Off)	915.25 MHz 921.25 MHz 927.50 MHz
*EUT has the power settings by the software as follows; Power settings: 10 dBm (Maximum Peak Output Power and Average Output Power tests), 30 dBm (all tests) Software: ScannerSettingF (Ver.2.1.1.0) UR40_TestTool (Ver.0.7.0) IndyTool (Ver.2.6.0) (Date: June 29, 2020 Storage location: Driven by connected PC) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.		

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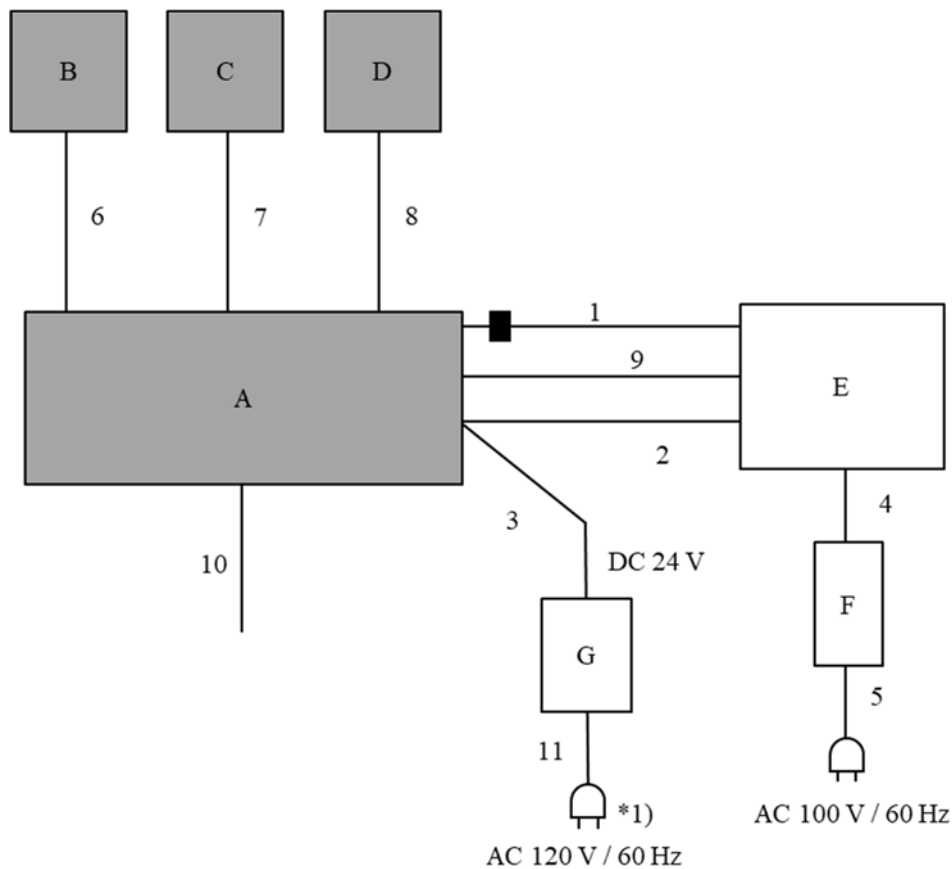
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4.2 Configuration and peripherals



■ : Standard Ferrite Core

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

*1) Conducted Emission test was performed on this port.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Fixed Type RFID Scanner	UR40-H-ERU	000007	DENSO WAVE INCORPORATED	EUT
B	Antenna	URAN-40H1	900009	DENSO WAVE INCORPORATED	EUT
C	Antenna	URAN-40H1	900025	DENSO WAVE INCORPORATED	EUT
D	Antenna	URAN-40H1	900029	DENSO WAVE INCORPORATED	EUT
E	Laptop PC	PR63PBAA337AD7X	6F053983H	TOSHIBA	-
F	AC Adapter	PA51770-1ACA	FX1200E91PCC	TOSHIBA	-
G	Regulated DC Power Supply	PW16-2ATP	GJR810407	TEXIO	for CE*

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	1.8	Shielded	Shielded	-
2	RS-232C + USB cable	4.7 for CE 2.7 for other	Shielded	Shielded	-
3	DC Cable	3.0	Unshielded	Unshielded	-
4	DC Cable	1.7	Unshielded	Unshielded	-
5	AC Cable	0.8	Unshielded	Unshielded	-
6	Signal Cable	5.0	Shielded	Shielded	-
7	Signal Cable	5.0	Shielded	Shielded	-
8	Signal Cable	5.0	Shielded	Shielded	-
9	ETHERNET MEDIA M12 PACH CORD	2.0	Shielded	Shielded	Model: 1585D-M4UBJM-2 Manufacturer: Allen-Bradley *1)
10	Signal Cable	2.0	Shielded	Shielded	-
11	AC Cable	1.0	Unshielded	Unshielded	for CE*

*1) As for the port which is connected to this cable, this cable only could be connected. Other cables should not be connected to this port.

*CE: Conducted Emission

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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 2.0 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). The test was performed on using representative DC power supply.

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.

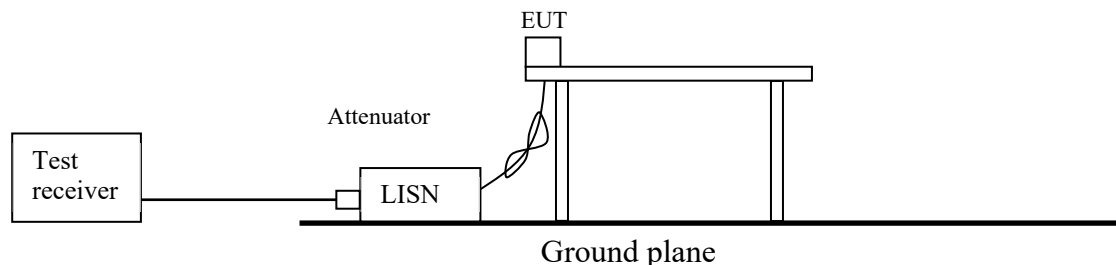
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

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

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 1.0 m by 2.0 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 1.0 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 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.

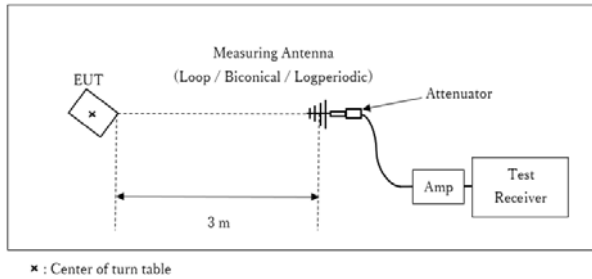
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 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	RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

*1) Average Power Measurement was performed based on KDB 558074 D01 15.247 Meas Guidance v05r02.

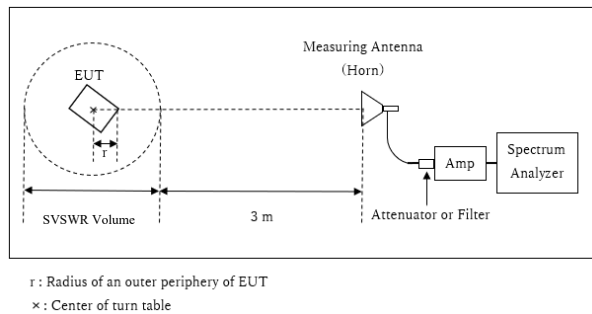
Figure 2: Test Setup

Below 1 GHz



Test Distance: 3 m

1 GHz - 10 GHz (Internal Antenna)



Distance Factor: $20 \times \log (3.85 \text{ m} / 3.0 \text{ m}) = 2.17 \text{ dB}$

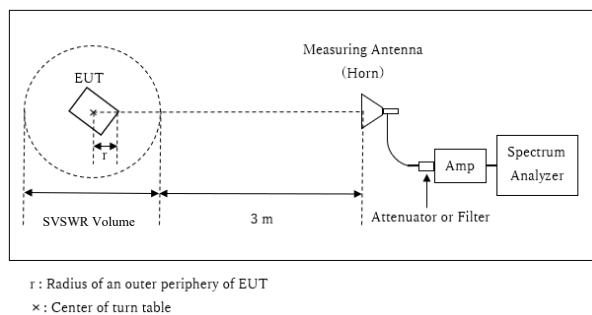
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.85 \text{ m}$

SVSWR Volume : 2.0 m

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

r = 0.15 m

1 GHz - 10 GHz (External Antenna)



Distance Factor: $20 \times \log (3.65 \text{ m} / 3.0 \text{ m}) = 1.71 \text{ dB}$

* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.65 \text{ m}$

SVSWR Volume : 2.0 m

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

r = 0.35 m

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

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

Measurement range	: 30 MHz - 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	500 kHz	5.1 kHz	16 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	750 kHz	10 kHz	30 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	68 kHz	200 kHz	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) *4)	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 10 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	16.5 MHz, 2.5 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 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

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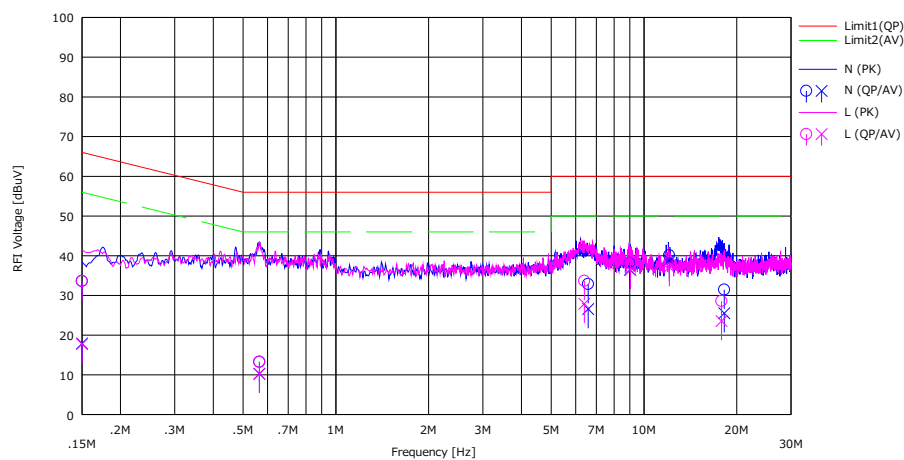
Facsimile : +81 596 24 8124

APPENDIX 1: Test data

Conducted Emission (Internal Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date July 9, 2020
Temperature / Humidity 22 deg. C / 60 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off, 915.25 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	0.15000	20.40	4.70	0.07	13.14	33.61	17.91	66.00	56.00	32.39	38.09	N	
2	0.56500	0.00	-3.00	0.08	13.19	13.27	10.27	56.00	46.00	42.73	35.73	N	
3	6.59100	19.20	12.90	0.17	13.48	32.85	26.55	60.00	50.00	27.15	23.45	N	
4	9.00042	24.40	22.70	0.20	13.56	38.16	36.46	60.00	50.00	21.84	13.54	N	
5	12.07713	26.20	25.00	0.25	13.64	40.09	38.89	60.00	50.00	19.91	11.11	N	
6	18.22000	17.30	11.40	0.34	13.79	31.43	25.53	60.00	50.00	28.57	24.47	N	
7	0.15000	20.40	4.50	0.07	13.14	33.61	17.71	66.00	56.00	32.39	38.29	L	
8	0.56500	0.00	-3.00	0.05	13.19	13.24	10.24	56.00	46.00	42.76	35.76	L	
9	6.40600	20.00	14.20	0.18	13.48	33.66	27.86	60.00	50.00	26.34	22.14	L	
10	9.03850	24.40	22.60	0.22	13.56	38.18	36.38	60.00	50.00	21.82	13.62	L	
11	12.07735	24.40	23.20	0.28	13.64	38.32	37.12	60.00	50.00	21.68	12.88	L	
12	17.84800	14.40	9.34	0.40	13.78	28.58	23.52	60.00	50.00	31.42	26.48	L	

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

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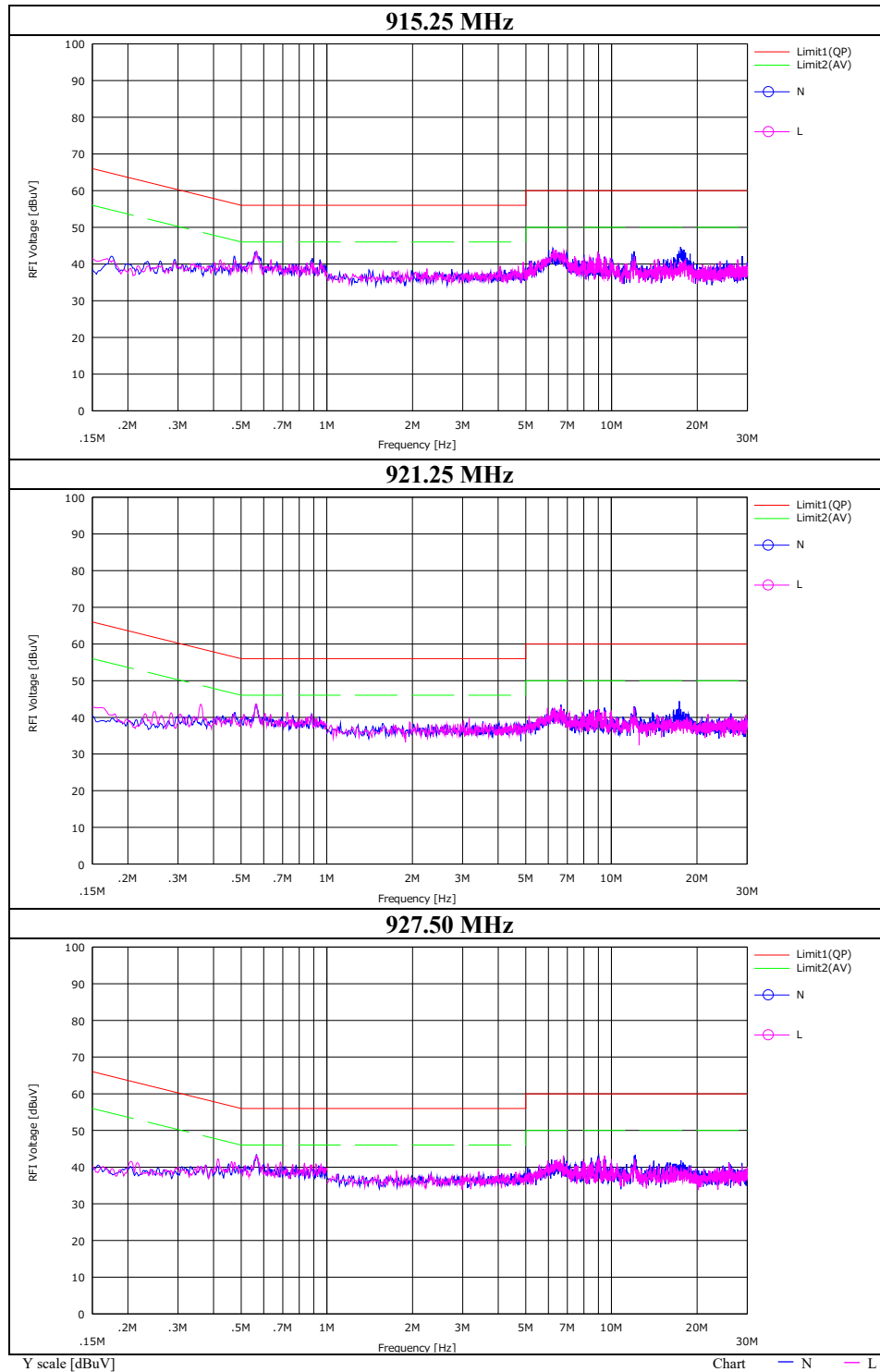
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Conducted Emission (Internal Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date July 9, 2020
Temperature / Humidity 22 deg. C / 60 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off



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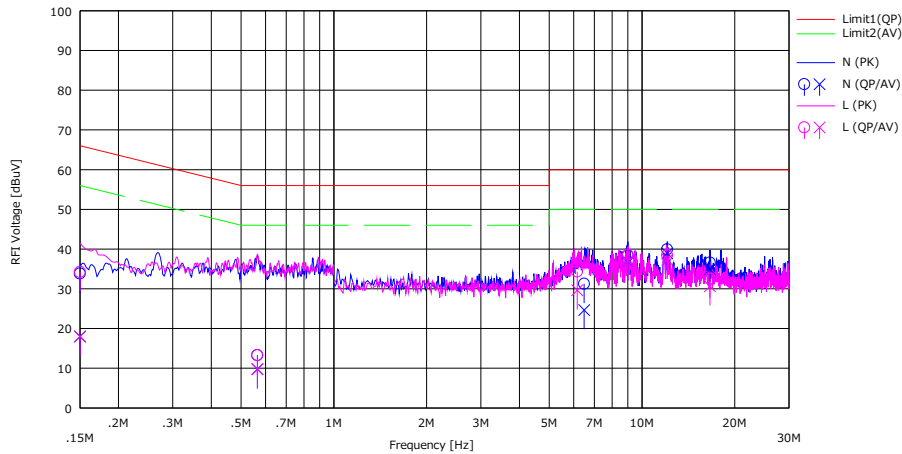
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Facsimile : +81 596 24 8124

Conducted Emission (External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date July 9, 2020
Temperature / Humidity 22 deg. C / 60 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off, 921.25 MHz

Limit : FCC_Part 15 Subpart C(15.207)

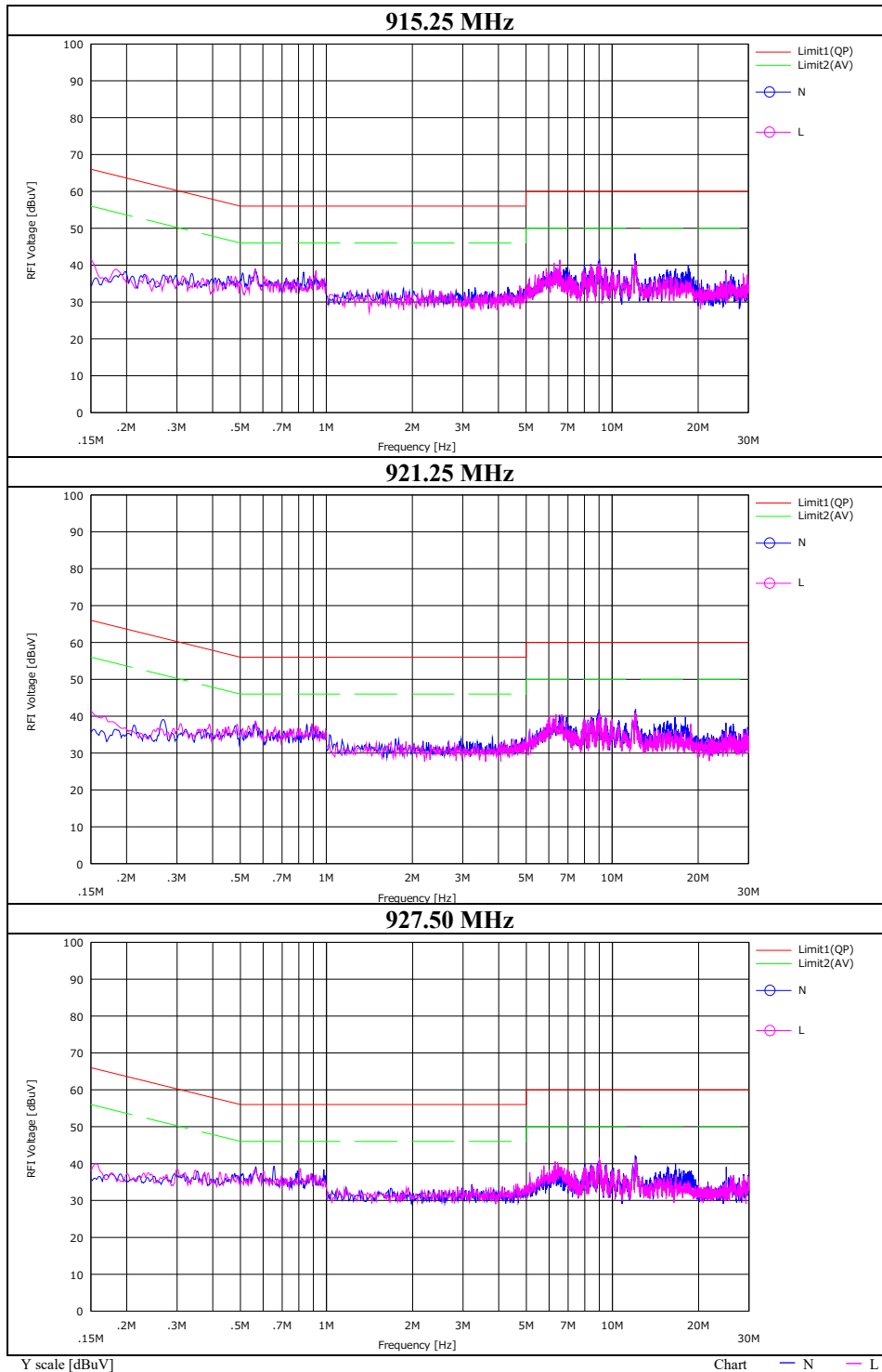


No.	Freq. [MHz]	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	20.60	4.80	0.07	13.14	33.81	18.01	66.00	56.00	32.19	37.99	N	
2	0.56500	0.00	-3.50	0.08	13.19	13.27	9.77	56.00	46.00	42.73	36.23	N	
3	6.49200	17.60	11.00	0.16	13.48	31.24	24.64	60.00	50.00	28.76	25.36	N	
4	8.99906	24.60	23.20	0.20	13.56	38.36	36.96	60.00	50.00	21.64	13.04	N	
5	12.07755	26.00	25.00	0.25	13.64	39.89	38.89	60.00	50.00	20.11	11.11	N	
6	16.61414	22.50	20.80	0.32	13.76	36.58	34.88	60.00	50.00	23.42	15.12	N	
7	0.15000	21.00	4.80	0.07	13.14	34.21	18.01	66.00	56.00	31.79	37.99	L	
8	0.56500	0.00	-3.50	0.05	13.19	13.24	9.74	56.00	46.00	42.76	36.26	L	
9	6.16150	20.70	16.00	0.17	13.47	34.34	29.64	60.00	50.00	25.66	20.36	L	
10	8.99978	24.70	23.20	0.22	13.56	38.48	36.98	60.00	50.00	21.52	13.02	L	
11	12.07730	24.50	23.40	0.28	13.64	38.42	37.32	60.00	50.00	21.58	12.68	L	
12	16.61478	18.40	16.50	0.38	13.76	32.54	30.64	60.00	50.00	27.46	19.36	L	

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

Conducted Emission (External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date July 9, 2020
Temperature / Humidity 22 deg. C / 60 % RH
Engineer Junya Okuno
Mode Tx, Hopping Off



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20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation
(Internal / External Antenna)

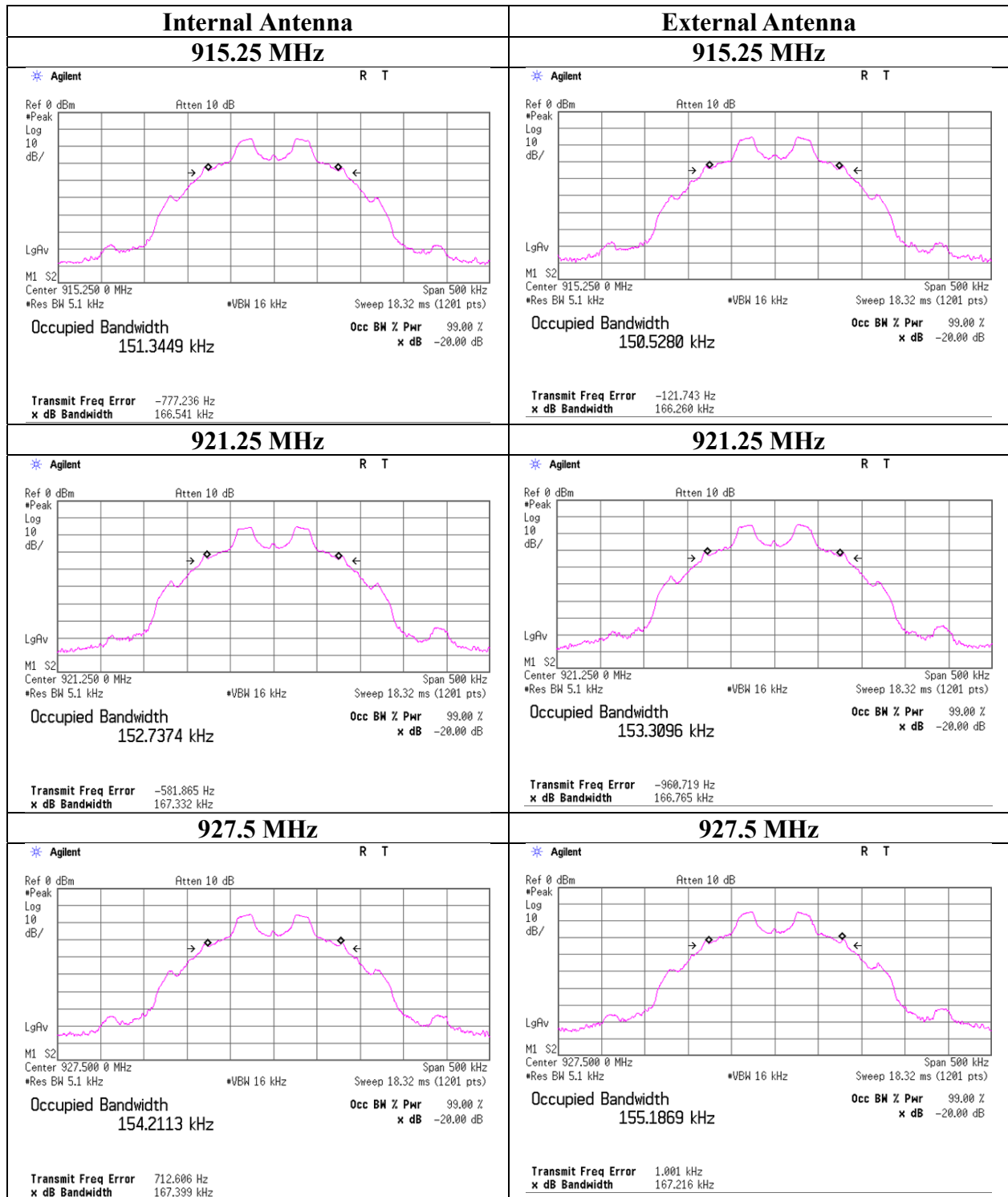
Report No. 13407533H
Test place Ise EMC Lab. No.4 Measurement Room
Date July 1, 2020 July 9, 2020
Temperature / Humidity 23 deg. C / 54 % RH 22 deg. C / 74 % RH
Engineer Junki Nagatomi Akihiko Maeda
Mode Tx, Hopping On / Off

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Limit for 20dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]
Internal	915.25	0.167	0.500	151.345	0.250
Internal	921.25	0.167	0.500	152.737	0.250
Internal	927.50	0.167	0.500	154.211	0.250
Internal	Hopping On	-	-	12392.700	-
External	915.25	0.166	0.500	150.528	0.250
External	921.25	0.167	0.500	153.310	0.250
External	927.50	0.167	0.500	155.187	0.250
External	Hopping On	-	-	12392.600	-

Limit for Carrier Frequency separation: 20dB Bandwidth or 25kHz (whichever is greater).

20dB Bandwidth and 99% Occupied Bandwidth

(Internal / External Antenna)



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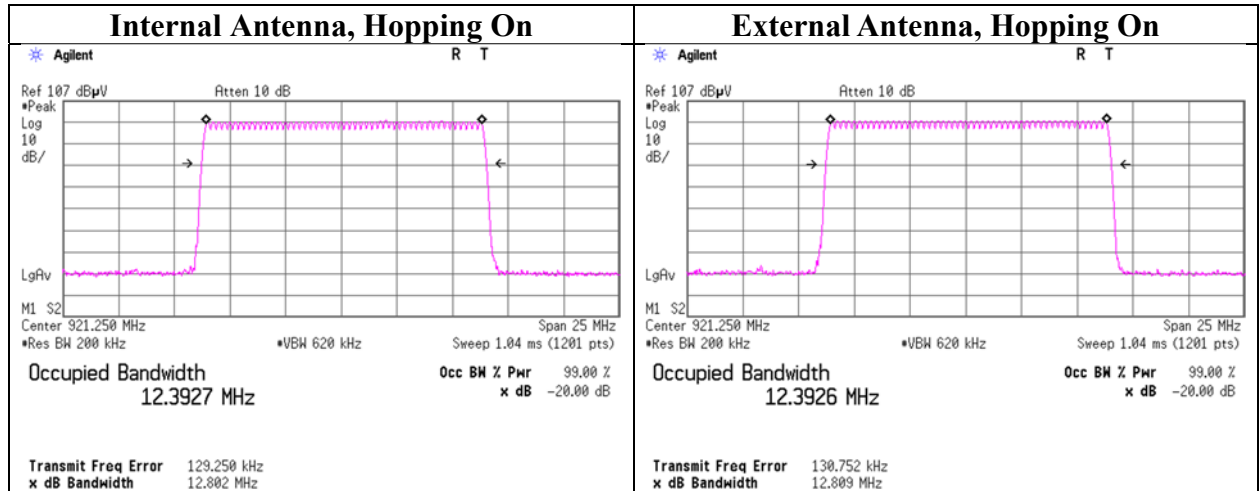
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20dB Bandwidth and 99% Occupied Bandwidth (Internal / External Antenna)



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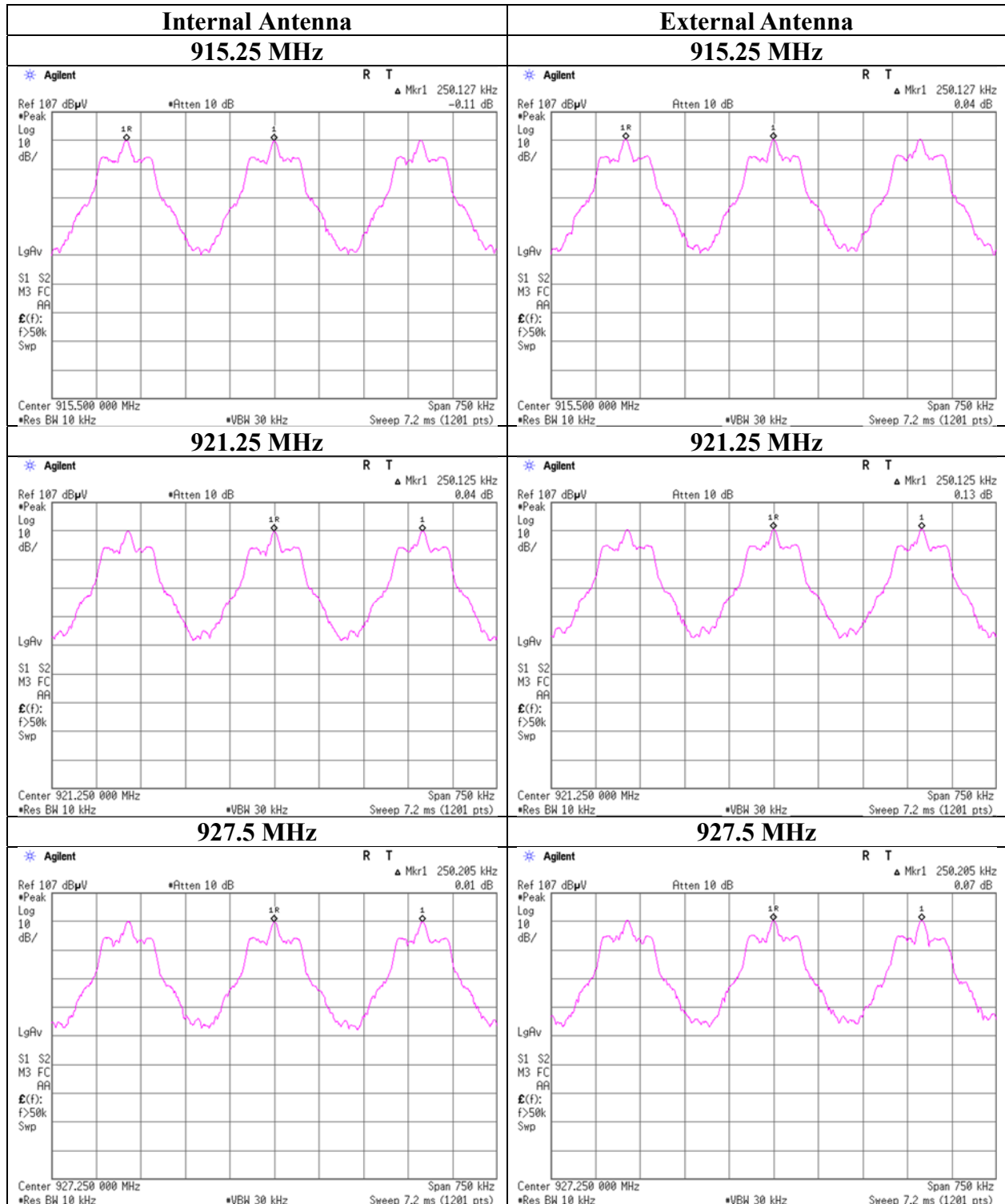
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Carrier Frequency Separation

(Internal / External Antenna)



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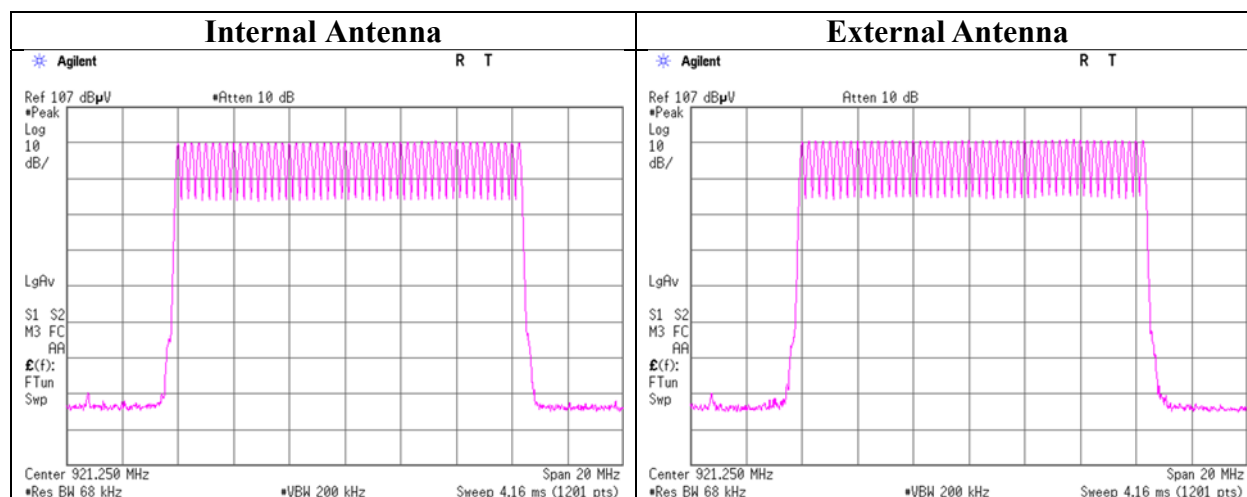
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Number of Hopping Frequency (Internal / External Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 9, 2020
Temperature / Humidity	22 deg. C / 74 % RH
Engineer	Akihiko Maeda
Mode	Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
Internal	50	≥ 50
External	50	≥ 50



Dwell time
(Internal / External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.4 Measurement Room
Date July 1, 2020 July 9, 2020
Temperature / Humidity 23 deg. C / 54 % RH 22 deg. C / 74 % RH
Engineer Junki Nagatomi Akihiko Maeda
Mode Tx, Hopping On

Internal Antenna

Mode	Number of transmission in 20 sec period	Length of transmission [msec]	Result [msec]	Limit [msec]
915.25	1	399.200	399.2	400
921.25	1	399.200	399.2	400
927.50	1	399.200	399.2	400

Sample Calculation

Result = Number of transmission x Length of transmission

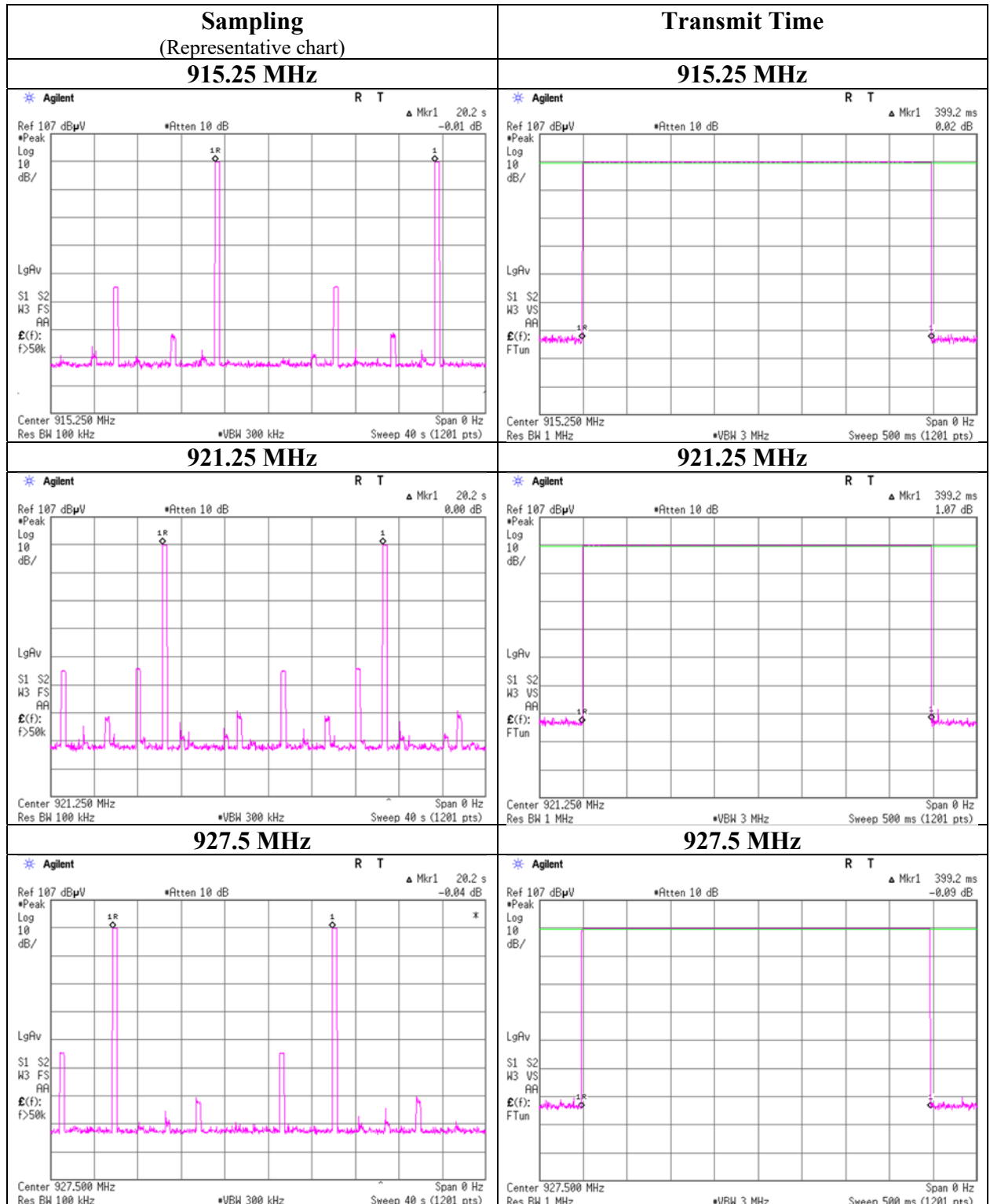
External Antenna

Mode	Number of transmission in 20 sec period	Length of transmission [msec]	Result [msec]	Limit [msec]
915.25	1	399.200	399.2	400
921.25	1	399.600	399.6	400
927.50	1	399.600	399.6	400

Sample Calculation

Result = Number of transmission x Length of transmission

Dwell time
(Internal Antenna)



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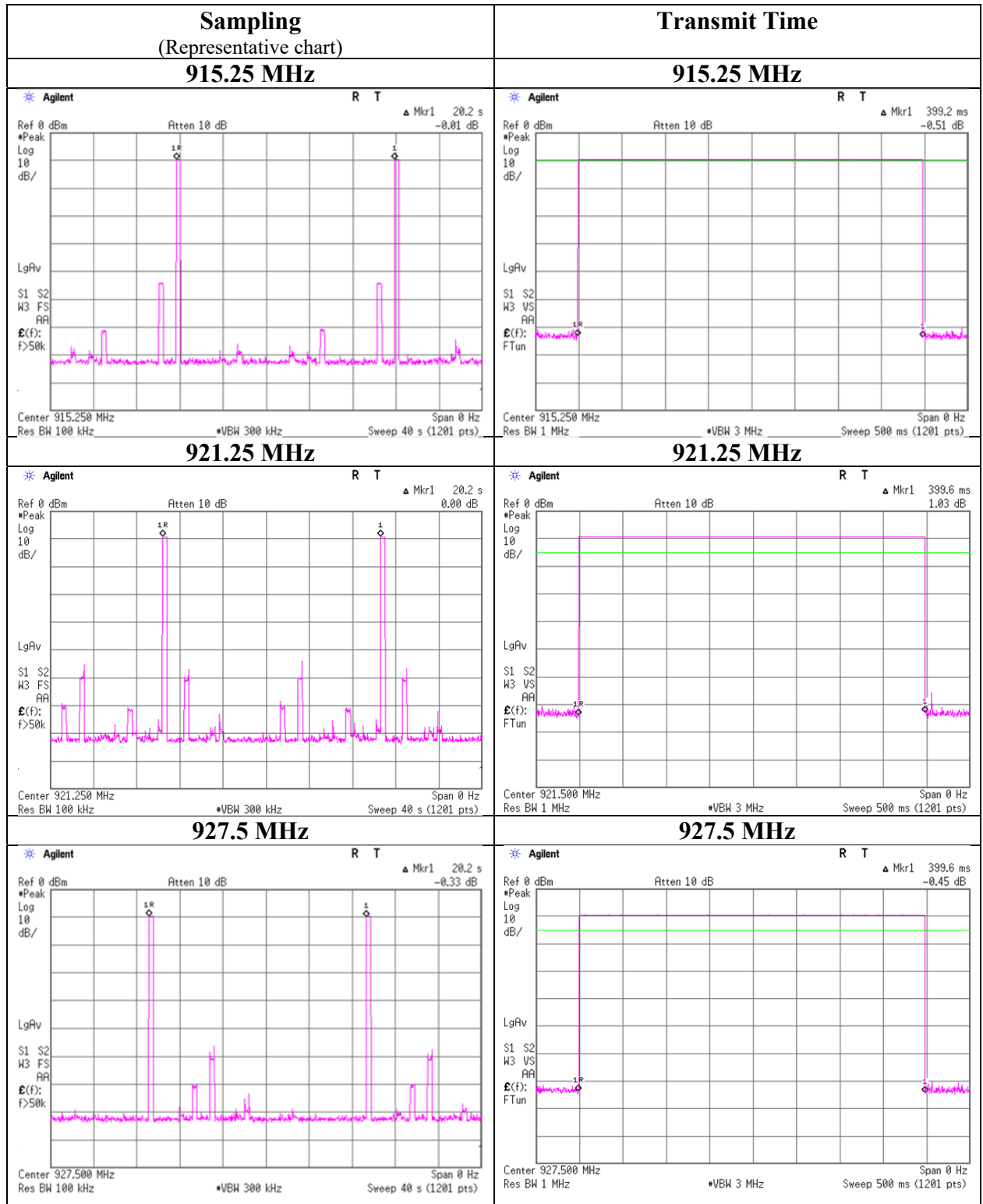
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Dwell time
(External Antenna)



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Maximum Peak Output Power (Internal / External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.4 Measurement Room
Date July 1, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Junki Nagatomi
Mode Tx, Hopping Off (30 dBm setting)

Internal Antenna

				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]	
915.25	-10.63	0.54	39.65	29.56	903.65	30.00	1000	0.44	6.00	35.56	3597.49	36.02	4000	0.46	
921.25	-10.84	0.54	39.65	29.35	860.99	30.00	1000	0.65	6.00	35.35	3427.68	36.02	4000	0.67	
927.50	-10.79	0.55	39.65	29.41	872.97	30.00	1000	0.59	6.00	35.41	3475.36	36.02	4000	0.61	

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

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

External Antenna

				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]
915.25	-10.19	0.36	39.65	29.82	959.40	30.00	1000	0.18	6.00	35.82	3819.44	36.02	4000	0.20
921.25	-10.12	0.36	39.65	29.89	974.99	30.00	1000	0.11	6.00	35.89	3881.50	36.02	4000	0.13
927.50	-10.29	0.37	39.65	29.73	939.72	30.00	1000	0.27	6.00	35.73	3741.11	36.02	4000	0.29

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

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

Maximum Peak Output Power (Internal / External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.2 Measurement Room
Date September 4, 2020
Temperature / Humidity 25 deg. C / 63 % RH
Engineer Ken Fujita
Mode Tx, Hopping Off (10dBm setting)

Internal Antenna

				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]	
915.25	-10.65	0.36	19.92	9.63	9.18	30.00	1000	20.37	6.00	15.63	36.56	36.02	4000	20.39	
921.25	-10.42	0.36	19.92	9.86	9.68	30.00	1000	20.14	6.00	15.86	38.55	36.02	4000	20.16	
927.50	-10.35	0.37	19.92	9.94	9.86	30.00	1000	20.06	6.00	15.94	39.26	36.02	4000	20.08	

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

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

External Antenna

				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]	
915.25	-10.87	0.36	19.92	9.41	8.73	30.00	1000	20.59	6.00	15.41	34.75	36.02	4000	20.61	
921.25	-10.57	0.36	19.92	9.71	9.35	30.00	1000	20.29	6.00	15.71	37.24	36.02	4000	20.31	
927.50	-10.52	0.37	19.92	9.77	9.48	30.00	1000	20.23	6.00	15.77	37.76	36.02	4000	20.25	

Sample Calculation:

Result = Reading + Cable Loss + Attenuator Loss

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

Maximum Peak Output Power
(Worst Case Check)
(Internal / External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.4 Measurement Room
Date July 1, 2020
Temperature / Humidity 23 deg. C / 54 % RH
Engineer Junki Nagatomi
Mode Tx, Hopping Off

Worst Internal Antenna Polarization and Profile Check

Internal Antenna Polarization	Profile	Freq. [MHz]	Reading [dBm]	Remarks
Circle	1	915.25	-10.81	
	2	915.25	-10.73	
	4	915.25	-10.69	
	5	915.25	-10.77	
Hori.	1	915.25	-10.83	
	2	915.25	-10.83	
	4	915.25	-10.67	*worst
	5	915.25	-10.79	
Vert.	1	915.25	-10.82	
	2	915.25	-10.77	
	4	915.25	-10.79	
	5	915.25	-10.77	

Worst External Antenna and Profile Check

External Antenna	Profile	Freq. [MHz]	Reading [dBm]	Remarks
1	1	915.25	-10.55	
	2	915.25	-10.30	
	4	915.25	-10.31	
	5	915.25	-10.28	
2	1	915.25	-10.29	
	2	915.25	-10.30	
	4	915.25	-10.19	*worst
	5	915.25	-10.22	
3	1	915.25	-10.37	
	2	915.25	-10.35	
	4	915.25	-10.33	
	5	915.25	-10.31	

Average Output Power
(Reference data for RF Exposure)
 (Internal / External Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 9, 2020
Temperature / Humidity	22 deg. C / 74 % RH
Engineer	Akihiko Maeda
Mode	Tx, Hopping Off (30 dBm setting)

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
Internal	915.25	-12.78	0.54	39.65	27.41	550.81	0.00	27.41	550.81
Internal	921.25	-12.67	0.54	39.65	27.52	564.94	0.00	27.52	564.94
Internal	927.50	-12.68	0.55	39.65	27.52	564.94	0.00	27.52	564.94
External	915.25	-12.64	0.54	39.65	27.55	568.85	0.00	27.55	568.85
External	921.25	-12.28	0.54	39.65	27.91	618.02	0.00	27.91	618.02
External	927.50	-12.30	0.55	39.65	27.90	616.60	0.00	27.90	616.60

Sample Calculation:

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

Result (Burst power average) = Time average + Duty factor

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

Average Output Power
(Reference data for RF Exposure)
(Internal / External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.2 Measurement Room
Date September 4, 2020
Temperature / Humidity 25 deg. C / 63 % RH
Engineer Ken Fujita
Mode Tx, Hopping Off (10 dBm setting)

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
Internal	915.25	-13.33	0.36	19.92	6.95	4.95	0.00	6.95	4.95
Internal	921.25	-13.06	0.36	19.92	7.22	5.27	0.00	7.22	5.27
Internal	927.50	-13.02	0.37	19.92	7.27	5.33	0.00	7.27	5.33
External	915.25	-13.54	0.36	19.92	6.74	4.72	0.00	6.74	4.72
External	921.25	-13.22	0.36	19.92	7.06	5.08	0.00	7.06	5.08
External	927.50	-13.21	0.37	19.92	7.08	5.11	0.00	7.08	5.11

Sample Calculation:

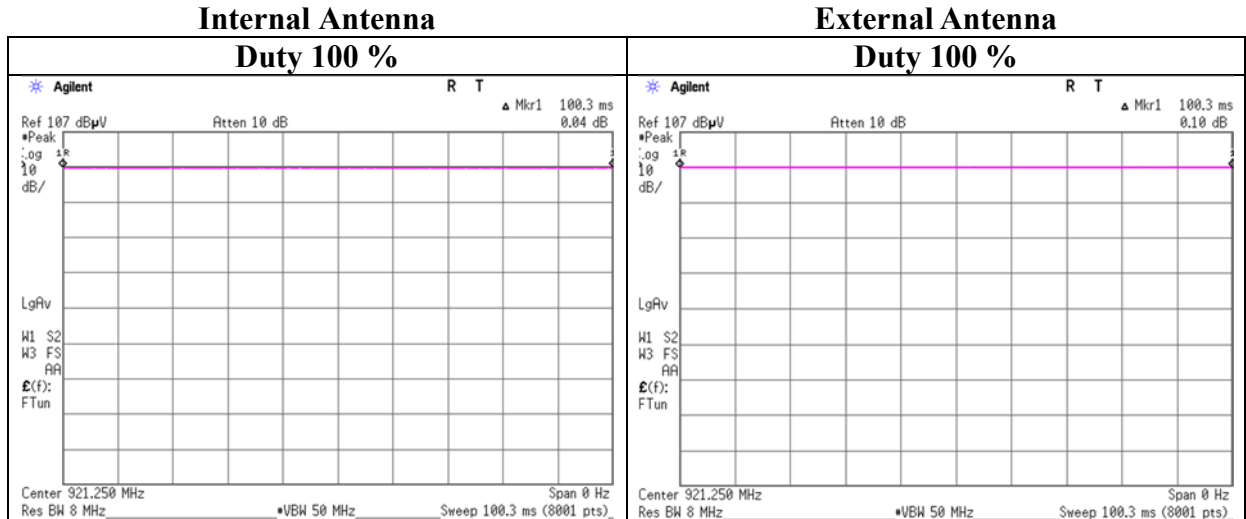
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Result (Burst power average) = Time average + Duty factor

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

Burst Rate Confirmation
(Internal / External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.4 Measurement Room
Date July 9, 2020
Temperature / Humidity 22 deg. C / 74 % RH
Engineer Akihiko Maeda
Mode Tx, Hopping Off



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

Radiated Spurious Emission (Internal Antenna)

Report No. 13407533H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4 No.3
Date July 2, 2020 July 4, 2020
Temperature / Humidity 23 deg. C / 53 % RH 22 deg. C / 51 % RH
Engineer Junki Nagatomi Ken Fujita
(Below 1 GHz) (Above 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.	57.052	QP	30.3	8.7	7.8	32.0	-	14.8	40.0	25.2	
Hori.	79.950	QP	31.9	6.9	8.1	32.0	-	14.9	40.0	25.1	
Hori.	117.000	QP	26.5	12.5	8.5	31.9	-	15.7	43.5	27.8	
Hori.	161.000	QP	25.8	15.5	9.0	31.9	-	18.4	43.5	25.1	
Hori.	412.256	QP	24.9	16.0	11.0	31.8	-	20.1	46.0	25.9	
Hori.	649.012	QP	22.4	19.2	12.5	32.0	-	22.1	46.0	24.0	
Hori.	1830.500	PK	54.2	25.3	3.0	32.5	-	50.0	73.9	23.9	
Hori.	2745.750	PK	50.2	28.5	3.2	31.7	-	50.3	73.9	23.6	
Hori.	3661.000	PK	47.4	29.1	3.6	31.5	-	48.7	73.9	25.2	
Hori.	4576.250	PK	40.2	30.9	4.0	31.3	-	43.9	73.9	30.0	Floor noise
Hori.	5491.500	PK	40.2	32.2	4.5	31.3	-	45.6	73.9	28.3	Floor noise
Hori.	6406.750	PK	41.0	34.2	4.8	31.8	-	48.2	73.9	25.7	Floor noise
Hori.	7322.000	PK	40.3	36.6	4.9	32.5	-	49.4	73.9	24.5	Floor noise
Hori.	8237.250	PK	40.1	36.6	5.3	32.8	-	49.2	73.9	24.7	Floor noise
Hori.	9152.500	PK	41.1	37.5	5.7	32.6	-	51.8	73.9	22.1	Floor noise
Hori.	1830.500	AV	50.0	25.3	3.0	32.5	-	45.8	53.9	8.1	
Hori.	2745.750	AV	44.0	28.5	3.2	31.7	-	44.0	53.9	9.9	
Hori.	3661.000	AV	41.2	29.1	3.6	31.5	-	42.5	53.9	11.4	
Hori.	4576.250	AV	32.3	30.9	4.0	31.3	-	35.9	53.9	18.0	Floor noise
Hori.	5491.500	AV	32.2	32.2	4.5	31.3	-	37.5	53.9	16.4	Floor noise
Hori.	6406.750	AV	32.2	34.2	4.8	31.8	-	39.4	53.9	14.5	Floor noise
Hori.	7322.000	AV	32.2	36.6	4.9	32.5	-	41.3	53.9	12.6	Floor noise
Hori.	8237.250	AV	32.0	36.6	5.3	32.8	-	41.1	53.9	12.8	Floor noise
Hori.	9152.500	AV	32.1	37.5	5.7	32.6	-	42.8	53.9	11.1	Floor noise
Vert.	55.730	QP	38.4	9.1	7.7	32.0	-	23.3	40.0	16.7	
Vert.	79.340	QP	35.8	6.8	8.1	32.0	-	18.7	40.0	21.3	
Vert.	116.000	QP	36.7	12.5	8.5	31.9	-	25.8	43.5	17.7	
Vert.	159.646	QP	33.1	15.4	9.0	31.9	-	25.6	43.5	17.9	
Vert.	412.256	QP	23.8	16.0	11.0	31.8	-	19.0	46.0	27.0	
Vert.	649.835	QP	22.2	19.2	12.5	32.0	-	21.8	46.0	24.2	
Vert.	1830.500	PK	55.9	25.3	3.0	32.5	-	51.8	73.9	22.1	
Vert.	2745.750	PK	50.2	28.5	3.2	31.7	-	50.2	73.9	23.7	
Vert.	3661.000	PK	44.1	29.1	3.6	31.5	-	45.4	73.9	28.5	
Vert.	4576.250	PK	40.5	30.9	4.0	31.3	-	44.2	73.9	29.7	Floor noise
Vert.	5491.500	PK	41.6	32.2	4.5	31.3	-	47.0	73.9	26.9	
Vert.	6406.750	PK	40.1	34.2	4.8	31.8	-	47.3	73.9	26.6	Floor noise
Vert.	7322.000	PK	40.2	36.6	4.9	32.5	-	49.3	73.9	24.6	Floor noise
Vert.	8237.250	PK	40.2	36.6	5.3	32.8	-	49.3	73.9	24.6	Floor noise
Vert.	9152.500	PK	41.1	37.5	5.7	32.6	-	51.8	73.9	22.1	Floor noise
Vert.	1830.500	AV	51.8	25.3	3.0	32.5	-	47.7	53.9	6.2	
Vert.	2745.750	AV	43.8	28.5	3.2	31.7	-	43.9	53.9	10.1	
Vert.	3661.000	AV	36.1	29.1	3.6	31.5	-	37.4	53.9	16.5	
Vert.	4576.250	AV	33.3	30.9	4.0	31.3	-	36.9	53.9	17.0	Floor noise
Vert.	5491.500	AV	35.2	32.2	4.5	31.3	-	40.6	53.9	13.3	
Vert.	6406.750	AV	33.3	34.2	4.8	31.8	-	40.5	53.9	13.4	Floor noise
Vert.	7322.000	AV	34.1	36.6	4.9	32.5	-	43.2	53.9	10.7	Floor noise
Vert.	8237.250	AV	32.3	36.6	5.3	32.8	-	41.4	53.9	12.5	Floor noise
Vert.	9152.500	AV	33.0	37.5	5.7	32.6	-	43.7	53.9	10.2	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 20log (3.85 m / 3.0 m) = 2.17 dB

***These results have sufficient margin without taking account Duty cycle correction factor.**

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	94.7	22.0	12.9	0.0	129.7	-	-	Carrier
Hori.	902.000	PK	36.4	22.0	12.9	0.0	71.3	109.7	38.4	
Vert.	915.250	PK	96.5	22.0	12.9	0.0	131.4	-	-	Carrier
Vert.	902.000	PK	33.7	22.0	12.9	0.0	68.7	111.4	42.8	

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

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Ise EMC Lab.

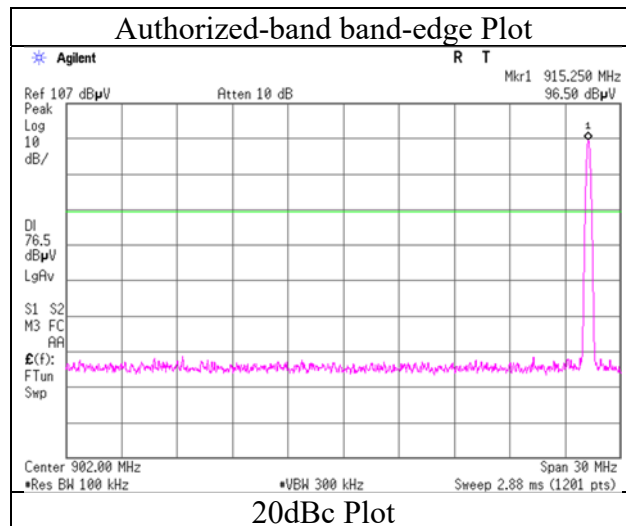
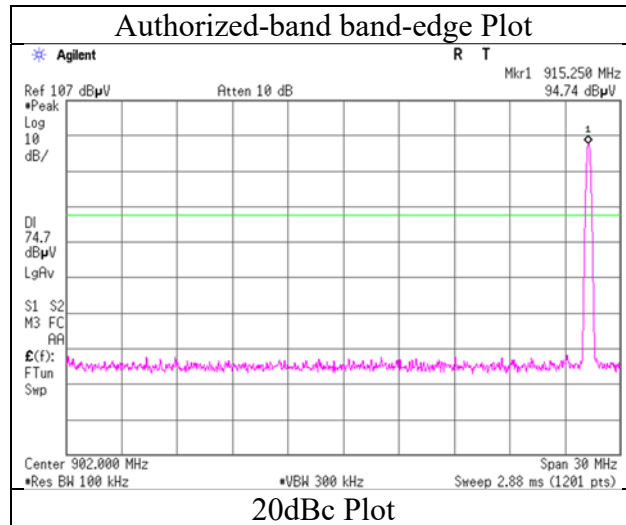
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge) (Internal Antenna)

Report No.	13407533H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Date	July 2, 2020	July 4, 2020
Temperature / Humidity	23 deg. C / 53 % RH	22 deg. C / 51 % RH
Engineer	Junki Nagatomi (Below 1 GHz)	Ken Fujita (Above 1 GHz)
Mode	Tx, Hopping Off, 915.25 MHz	



* 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 (Internal Antenna)

Report No. 13407533H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4 No.3
Date July 2, 2020 July 4, 2020
Temperature / Humidity 23 deg. C / 53 % RH 22 deg. C / 51 % RH
Engineer Junki Nagatomi Ken Fujita
(Below 1 GHz) (Above 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.	55.369	QP	28.5	9.2	7.7	32.0	-	13.5	40.0	26.5	
Hori.	79.206	QP	30.2	6.8	8.1	32.0	-	13.1	40.0	26.9	
Hori.	152.781	QP	28.1	15.2	8.9	31.9	-	20.3	43.5	23.2	
Hori.	353.542	QP	27.3	15.1	10.6	31.8	-	21.2	46.0	24.8	
Hori.	414.456	QP	25.3	16.0	11.1	31.8	-	20.6	46.0	25.4	
Hori.	649.460	QP	22.4	19.2	12.5	32.0	-	22.1	46.0	24.0	
Hori.	1842.500	PK	58.9	25.3	3.0	32.5	-	54.8	73.9	19.1	
Hori.	2763.750	PK	52.7	28.6	3.3	31.7	-	52.8	73.9	21.1	
Hori.	3685.000	PK	50.9	29.2	3.6	31.5	-	52.2	73.9	21.7	
Hori.	4606.250	PK	40.2	31.0	4.0	31.3	-	44.0	73.9	29.9	Floor noise
Hori.	5527.500	PK	47.4	32.2	4.5	31.4	-	52.8	73.9	21.1	
Hori.	6448.750	PK	40.2	34.3	4.8	31.8	-	47.6	73.9	26.3	Floor noise
Hori.	7370.000	PK	40.3	36.7	5.0	32.5	-	49.5	73.9	24.5	Floor noise
Hori.	8291.250	PK	40.1	36.5	5.3	32.8	-	49.1	73.9	24.8	Floor noise
Hori.	9212.500	PK	41.2	37.8	5.7	32.6	-	52.2	73.9	21.7	Floor noise
Hori.	1842.500	AV	55.6	25.3	3.0	32.5	-	51.5	53.9	2.4	
Hori.	2763.750	AV	47.1	28.6	3.3	31.7	-	47.2	53.9	6.7	
Hori.	3685.000	AV	44.7	29.2	3.6	31.5	-	46.0	53.9	7.9	
Hori.	4606.250	AV	33.1	31.0	4.0	31.3	-	36.9	53.9	17.0	Floor noise
Hori.	5527.500	AV	40.5	32.2	4.5	31.4	-	45.9	53.9	8.0	
Hori.	6448.750	AV	32.4	34.3	4.8	31.8	-	39.7	53.9	14.2	Floor noise
Hori.	7370.000	AV	33.2	36.7	5.0	32.5	-	42.4	53.9	11.5	Floor noise
Hori.	8291.250	AV	33.3	36.5	5.3	32.8	-	42.2	53.9	11.7	Floor noise
Hori.	9212.500	AV	32.3	37.8	5.7	32.6	-	43.2	53.9	10.7	Floor noise
Vert.	53.480	QP	35.4	9.9	7.7	32.0	-	21.0	40.0	19.0	
Vert.	79.750	QP	36.3	6.8	8.1	32.0	-	19.3	40.0	20.7	
Vert.	153.657	QP	29.5	15.2	8.9	31.9	-	21.7	43.5	21.8	
Vert.	353.224	QP	24.9	15.1	10.6	31.8	-	18.8	46.0	27.2	
Vert.	412.246	QP	24.0	16.0	11.0	31.8	-	19.2	46.0	26.8	
Vert.	649.030	QP	22.3	19.2	12.5	32.0	-	22.0	46.0	24.1	
Vert.	1842.500	PK	56.4	25.3	3.0	32.5	-	52.2	73.9	21.7	
Vert.	2763.750	PK	58.0	28.6	3.3	31.7	-	58.1	73.9	15.8	
Vert.	3685.000	PK	49.3	29.2	3.6	31.5	-	50.7	73.9	23.3	
Vert.	4606.250	PK	42.2	31.0	4.0	31.3	-	46.0	73.9	27.9	Floor noise
Vert.	5527.500	PK	46.5	32.2	4.5	31.4	-	51.9	73.9	22.0	
Vert.	6448.750	PK	41.1	34.3	4.8	31.8	-	48.5	73.9	25.5	Floor noise
Vert.	7417.778	PK	42.1	36.7	5.0	32.5	-	51.3	73.9	22.6	Floor noise
Vert.	8291.250	PK	41.3	36.5	5.3	32.8	-	50.2	73.9	23.7	Floor noise
Vert.	9212.500	PK	41.3	37.8	5.7	32.6	-	52.3	73.9	21.6	Floor noise
Vert.	1842.500	AV	52.4	25.3	3.0	32.5	-	48.3	53.9	5.6	
Vert.	2763.750	AV	52.7	28.6	3.3	31.7	-	52.7	53.9	1.2	
Vert.	3685.000	AV	42.6	29.2	3.6	31.5	-	43.9	53.9	10.0	
Vert.	4606.250	AV	32.3	31.0	4.0	31.3	-	36.1	53.9	17.8	Floor noise
Vert.	5527.500	AV	41.1	32.2	4.5	31.4	-	46.5	53.9	7.4	
Vert.	6448.750	AV	32.1	34.3	4.8	31.8	-	39.4	53.9	14.5	Floor noise
Vert.	7417.778	AV	31.9	36.7	5.0	32.5	-	41.1	53.9	12.9	Floor noise
Vert.	8291.250	AV	32.2	36.5	5.3	32.8	-	41.2	53.9	12.7	Floor noise
Vert.	9212.500	AV	32.0	37.8	5.7	32.6	-	42.9	53.9	11.0	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 $20 \log (3.85 \text{ m} / 3.0 \text{ m}) = 2.17 \text{ dB}$

***These results have sufficient margin without taking account Duty cycle correction factor.**

UL Japan, Inc.

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Radiated Spurious Emission (Internal Antenna)

Report No. 13407533H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4 No.3
Date July 2, 2020 July 4, 2020
Temperature / Humidity 23 deg. C / 53 % RH 22 deg. C / 51 % RH
Engineer Junki Nagatomi Ken Fujita
(Below 1 GHz) (Above 1 GHz)
Mode Tx, Hopping Off, 927.5 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.	53.654	QP	28.1	9.9	7.7	32.0	-	13.7	40.0	26.3	
Hori.	108.243	QP	29.5	11.4	8.4	31.9	-	17.4	43.5	26.1	
Hori.	169.313	QP	26.8	15.7	9.1	31.9	-	19.7	43.5	23.8	
Hori.	353.350	QP	25.0	15.1	10.6	31.8	-	18.9	46.0	27.1	
Hori.	412.766	QP	24.3	16.0	11.1	31.8	-	19.6	46.0	26.5	
Hori.	649.465	QP	22.6	19.2	12.5	32.0	-	22.3	46.0	23.8	
Hori.	1855.000	PK	54.7	25.4	3.0	32.4	-	50.7	73.9	23.2	
Hori.	2782.500	PK	58.6	28.5	3.3	31.7	-	58.6	73.9	15.3	
Hori.	3710.000	PK	54.6	29.3	3.6	31.5	-	56.0	73.9	17.9	
Hori.	4637.500	PK	46.5	31.1	4.1	31.3	-	50.4	73.9	23.5	
Hori.	5565.000	PK	50.5	32.2	4.5	31.4	-	55.8	73.9	18.1	
Hori.	6463.130	PK	45.1	34.4	4.8	31.8	-	52.5	73.9	21.4	
Hori.	7420.000	PK	40.2	36.7	5.0	32.5	-	49.4	73.9	24.5	Floor noise
Hori.	8347.500	PK	40.1	36.4	5.3	32.7	-	49.1	73.9	24.8	Floor noise
Hori.	9275.000	PK	41.1	38.0	5.7	32.6	-	52.2	73.9	21.7	Floor noise
Hori.	1855.000	AV	52.2	25.4	3.0	32.4	-	48.1	53.9	5.8	
Hori.	2782.500	AV	53.6	28.5	3.3	31.7	-	53.6	53.9	0.3	
Hori.	3710.000	AV	48.9	29.3	3.6	31.5	-	50.3	53.9	3.6	
Hori.	4637.500	AV	39.3	31.1	4.1	31.3	-	43.2	53.9	10.7	
Hori.	5565.000	AV	44.2	32.2	4.5	31.4	-	49.6	53.9	4.3	
Hori.	6463.130	AV	37.2	34.4	4.8	31.8	-	44.6	53.9	9.3	
Hori.	7420.000	AV	34.1	36.7	5.0	32.5	-	43.3	53.9	10.6	Floor noise
Hori.	8347.500	AV	33.3	36.4	5.3	32.7	-	42.3	53.9	11.6	Floor noise
Hori.	9275.000	AV	32.3	38.0	5.7	32.6	-	43.5	53.9	10.5	Floor noise
Vert.	79.297	QP	37.0	6.8	8.1	32.0	-	19.9	40.0	20.1	
Vert.	116.748	QP	34.8	12.5	8.5	31.9	-	23.9	43.5	19.6	
Vert.	154.357	QP	29.5	15.2	8.9	31.9	-	21.8	43.5	21.7	
Vert.	350.353	QP	26.2	15.0	10.6	31.8	-	20.1	46.0	26.0	
Vert.	412.542	QP	25.5	16.0	11.1	31.8	-	20.8	46.0	25.3	
Vert.	649.433	QP	23.4	19.2	12.5	32.0	-	23.1	46.0	23.0	
Vert.	1855.000	PK	55.5	25.4	3.0	32.4	-	51.4	73.9	22.5	
Vert.	2782.500	PK	57.8	28.5	3.3	31.7	-	57.8	73.9	16.1	
Vert.	3710.000	PK	53.0	29.3	3.6	31.5	-	54.5	73.9	19.4	
Vert.	4637.500	PK	45.1	31.1	4.1	31.3	-	49.0	73.9	24.9	
Vert.	5565.000	PK	49.7	32.2	4.5	31.4	-	55.0	73.9	18.9	
Vert.	6463.130	PK	43.0	34.4	4.8	31.8	-	50.4	73.9	23.5	
Vert.	7420.000	PK	40.2	36.7	5.0	32.5	-	49.4	73.9	24.5	Floor noise
Vert.	8347.500	PK	41.1	36.4	5.3	32.7	-	50.1	73.9	23.8	Floor noise
Vert.	9275.000	PK	41.3	38.0	5.7	32.6	-	52.5	73.9	21.4	Floor noise
Vert.	1855.000	AV	52.3	25.4	3.0	32.4	-	48.2	53.9	5.7	
Vert.	2782.500	AV	52.7	28.5	3.3	31.7	-	52.8	53.9	1.1	
Vert.	3710.000	AV	45.5	29.3	3.6	31.5	-	47.0	53.9	6.9	
Vert.	4637.500	AV	35.4	31.1	4.1	31.3	-	39.3	53.9	14.6	
Vert.	5565.000	AV	43.7	32.2	4.5	31.4	-	49.1	53.9	4.9	
Vert.	6463.130	AV	36.3	34.4	4.8	31.8	-	43.7	53.9	10.2	
Vert.	7420.000	AV	32.3	36.7	5.0	32.5	-	41.5	53.9	12.4	Floor noise
Vert.	8347.500	AV	33.3	36.4	5.3	32.7	-	42.3	53.9	11.6	Floor noise
Vert.	9275.000	AV	32.3	38.0	5.7	32.6	-	43.4	53.9	10.5	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 20log (3.85 m / 3.0 m) = 2.17 dB

***These results have sufficient margin without taking account Duty cycle correction factor.**

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	99.3	21.8	13.0	0.0	134.1	-	-	Carrier
Hori.	928.000	PK	32.4	21.8	13.0	0.0	67.2	114.1	46.9	
Vert.	927.500	PK	97.4	21.8	13.0	0.0	132.2	-	-	Carrier
Vert.	928.000	PK	33.9	21.8	13.0	0.0	68.7	112.2	43.5	

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

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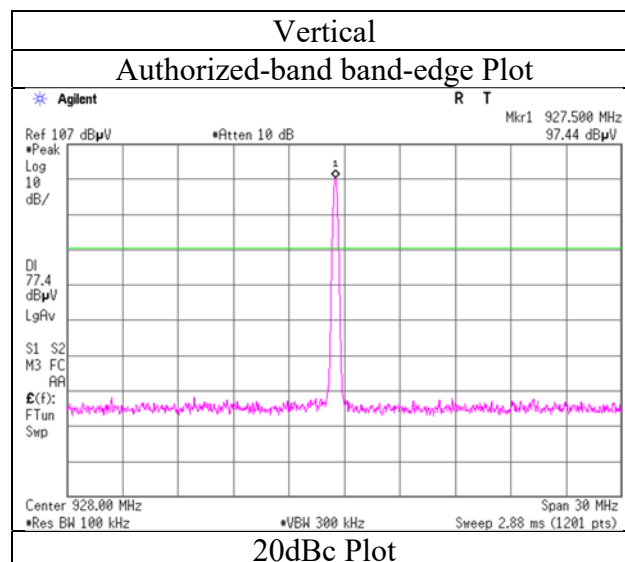
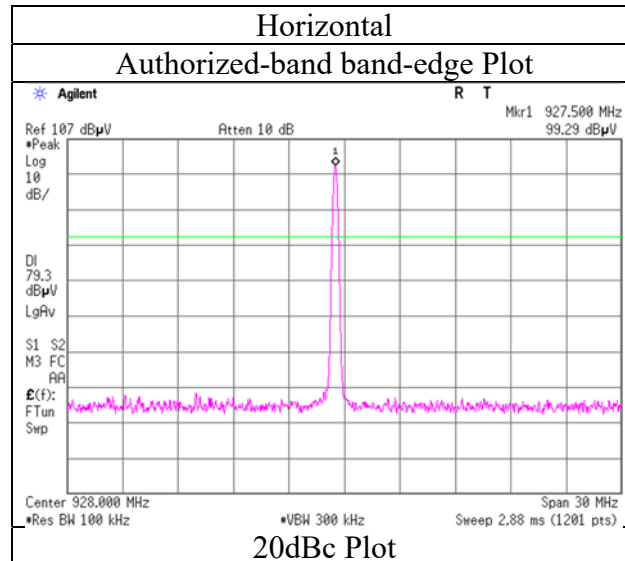
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge) (Internal Antenna)

Report No.	13407533H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	July 2, 2020
Temperature / Humidity	23 deg. C / 53 % RH
Engineer	Junki Nagatomi (Below 1 GHz)
Mode	Tx, Hopping Off , 927.5 MHz



* 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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Radiated Spurious Emission (External Antenna)

Report No. 13407533H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4 No.3
Date July 3, 2020 July 4, 2020
Temperature / Humidity 23 deg. C / 53 % RH 22 deg. C / 51 % RH
Engineer Ken Fujita Ken Fujita
(Below 1 GHz) (Above 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.	55.417	QP	26.6	9.2	7.7	32.0	-	11.6	40.0	28.4	
Hori.	79.369	QP	32.4	6.8	8.1	32.0	-	15.3	40.0	24.7	
Hori.	116.100	QP	26.8	12.5	8.5	31.9	-	15.9	43.5	27.6	
Hori.	154.066	QP	25.7	15.2	8.9	31.9	-	18.0	43.5	25.5	
Hori.	412.348	QP	25.8	16.0	11.0	31.8	-	21.0	46.0	25.0	
Hori.	649.932	QP	22.2	19.2	12.5	32.0	-	21.8	46.0	24.2	
Hori.	1830.500	PK	54.6	25.3	3.0	32.5	-	50.4	73.9	23.5	
Hori.	2745.750	PK	46.1	28.5	3.2	31.7	-	46.1	73.9	27.8	
Hori.	3661.000	PK	45.8	29.1	3.6	31.5	-	47.0	73.9	26.9	
Hori.	4576.250	PK	41.0	30.9	4.0	31.3	-	44.7	73.9	29.2	Floor noise
Hori.	5491.500	PK	41.0	32.2	4.5	31.3	-	46.4	73.9	27.5	Floor noise
Hori.	6406.750	PK	41.0	34.2	4.8	31.8	-	48.2	73.9	25.7	Floor noise
Hori.	7322.000	PK	41.0	36.6	4.9	32.5	-	50.1	73.9	23.8	Floor noise
Hori.	8237.250	PK	40.8	36.6	5.3	32.8	-	49.9	73.9	24.0	Floor noise
Hori.	9152.500	PK	41.3	37.5	5.7	32.6	-	52.0	73.9	21.9	Floor noise
Hori.	1830.500	AV	50.5	25.3	3.0	32.5	-	46.3	53.9	7.6	
Hori.	2745.750	AV	39.0	28.5	3.2	31.7	-	39.1	53.9	14.8	
Hori.	3661.000	AV	39.3	29.1	3.6	31.5	-	40.6	53.9	13.3	
Hori.	4576.250	AV	33.1	30.9	4.0	31.3	-	36.8	53.9	17.1	Floor noise
Hori.	5491.500	AV	33.0	32.2	4.5	31.3	-	38.4	53.9	15.5	Floor noise
Hori.	6406.750	AV	33.0	34.2	4.8	31.8	-	40.2	53.9	13.7	Floor noise
Hori.	7322.000	AV	32.0	36.6	4.9	32.5	-	41.1	53.9	12.8	Floor noise
Hori.	8237.250	AV	32.2	36.6	5.3	32.8	-	41.3	53.9	12.6	Floor noise
Hori.	9152.500	AV	32.8	37.5	5.7	32.6	-	43.4	53.9	10.5	Floor noise
Vert.	53.785	QP	38.0	9.8	7.7	32.0	-	23.5	40.0	16.5	
Vert.	78.734	QP	40.4	6.7	8.1	32.0	-	23.2	40.0	16.8	
Vert.	115.499	QP	37.5	12.4	8.5	31.9	-	26.5	43.5	17.0	
Vert.	158.983	QP	33.9	15.3	9.0	31.9	-	26.3	43.5	17.2	
Vert.	413.344	QP	25.4	16.0	11.1	31.8	-	20.7	46.0	25.3	
Vert.	649.543	QP	25.3	19.2	12.5	32.0	-	25.0	46.0	21.1	
Vert.	1830.500	PK	58.9	25.3	3.0	32.5	-	54.7	73.9	19.2	
Vert.	2745.750	PK	47.9	28.5	3.2	31.7	-	48.0	73.9	26.0	
Vert.	3661.000	PK	49.0	29.1	3.6	31.5	-	50.3	73.9	23.6	
Vert.	4576.250	PK	41.0	30.9	4.0	31.3	-	44.7	73.9	29.2	Floor noise
Vert.	5491.500	PK	43.2	32.2	4.5	31.3	-	48.6	73.9	25.3	
Vert.	6406.750	PK	40.2	34.2	4.8	31.8	-	47.4	73.9	26.5	Floor noise
Vert.	7322.000	PK	40.2	36.6	4.9	32.5	-	49.3	73.9	24.6	Floor noise
Vert.	8237.250	PK	40.4	36.6	5.3	32.8	-	49.5	73.9	24.4	Floor noise
Vert.	9152.500	PK	41.0	37.5	5.7	32.6	-	51.7	73.9	22.2	Floor noise
Vert.	1830.500	AV	55.7	25.3	3.0	32.5	-	51.6	53.9	2.3	
Vert.	2745.750	AV	41.5	28.5	3.2	31.7	-	41.5	53.9	12.4	
Vert.	3661.000	AV	42.5	29.1	3.6	31.5	-	43.8	53.9	10.1	
Vert.	4576.250	AV	34.2	30.9	4.0	31.3	-	37.9	53.9	16.0	Floor noise
Vert.	5491.500	AV	35.3	32.2	4.5	31.3	-	40.7	53.9	13.2	
Vert.	6406.750	AV	32.2	34.2	4.8	31.8	-	39.4	53.9	14.5	Floor noise
Vert.	7322.000	AV	32.1	36.6	4.9	32.5	-	41.2	53.9	12.7	Floor noise
Vert.	8237.250	AV	32.0	36.6	5.3	32.8	-	41.1	53.9	12.8	Floor noise
Vert.	9152.500	AV	32.3	37.5	5.7	32.6	-	43.0	53.9	10.9	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 (3.65 m / 3.0 m) = 1.71 dB

***These results have sufficient margin without taking account Duty cycle correction factor.**

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	92.2	22.0	12.9	0.0	127.1	-	-	Carrier
Hori	902.000	PK	31.1	22.0	12.9	0.0	66.0	107.1	41.1	
Vert	915.250	PK	90.7	22.0	12.9	0.0	125.6	-	-	Carrier
Vert	902.000	PK	31.4	22.0	12.9	0.0	66.4	105.6	39.3	

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

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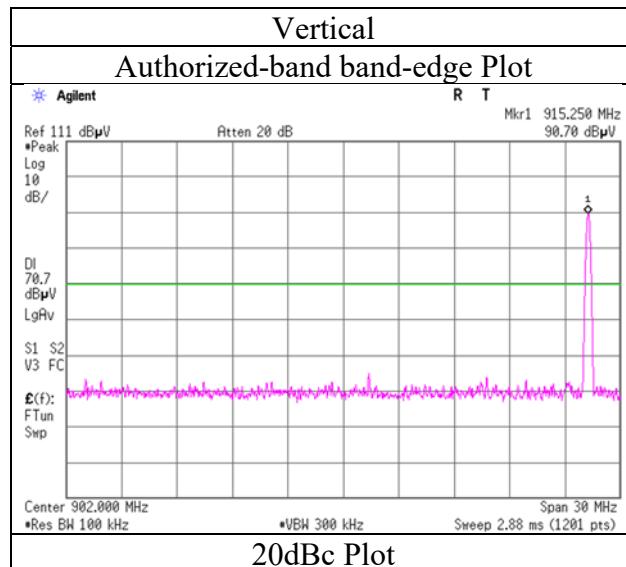
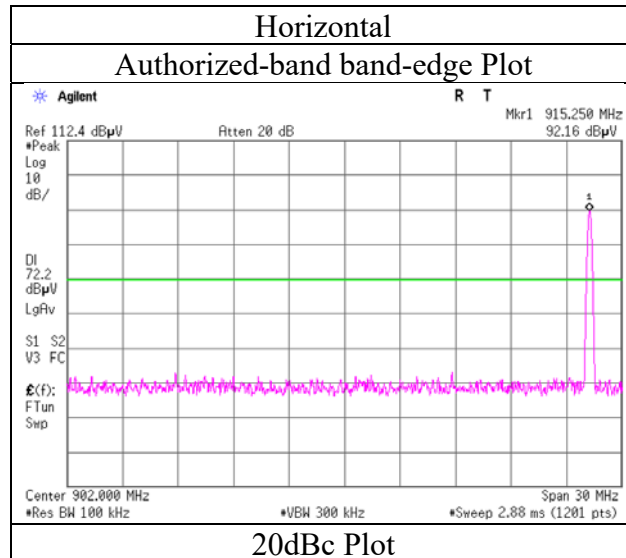
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge) (External Antenna)

Report No.	13407533H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	July 3, 2020
Temperature / Humidity	23 deg. C / 53 % RH
Engineer	Ken Fujita (Below 1 GHz)
Mode	Tx, Hopping Off, 915.25 MHz



* 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 (External Antenna)

Report No. 13407533H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4 No.3
Date July 3, 2020 July 4, 2020
Temperature / Humidity 23 deg. C / 53 % RH 22 deg. C / 51 % RH
Engineer Ken Fujita Ken Fujita
(Below 1 GHz) (Above 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.	54.281	QP	27.1	9.6	7.7	32.0	-	12.5	40.0	27.6	
Hori.	78.873	QP	31.4	6.7	8.1	32.0	-	14.2	40.0	25.8	
Hori.	116.299	QP	25.0	12.5	8.5	31.9	-	14.1	43.5	29.4	
Hori.	154.238	QP	26.6	15.2	8.9	31.9	-	18.9	43.5	24.6	
Hori.	412.118	QP	25.5	16.0	11.0	31.8	-	20.7	46.0	25.3	
Hori.	659.077	QP	25.6	19.3	12.6	32.0	-	25.4	46.0	20.6	
Hori.	1842.500	PK	60.3	25.3	3.0	32.5	-	56.2	73.9	17.7	
Hori.	2763.750	PK	50.7	28.6	3.3	31.7	-	50.7	73.9	23.2	
Hori.	3685.000	PK	47.2	29.2	3.6	31.5	-	48.6	73.9	25.3	
Hori.	4606.250	PK	44.6	31.0	4.0	31.3	-	48.4	73.9	25.5	
Hori.	5527.500	PK	40.0	32.2	4.5	31.4	-	45.4	73.9	28.5	Floor noise
Hori.	6448.750	PK	40.8	34.3	4.8	31.8	-	48.1	73.9	25.8	Floor noise
Hori.	7370.000	PK	40.2	36.7	5.0	32.5	-	49.4	73.9	24.5	Floor noise
Hori.	8291.250	PK	40.1	36.5	5.3	32.8	-	49.1	73.9	24.8	Floor noise
Hori.	9212.500	PK	40.2	37.8	5.7	32.6	-	51.1	73.9	22.8	Floor noise
Hori.	1842.500	AV	56.4	25.3	3.0	32.5	-	52.3	53.9	1.6	
Hori.	2763.750	AV	44.0	28.6	3.3	31.7	-	44.1	53.9	9.8	
Hori.	3685.000	AV	40.2	29.2	3.6	31.5	-	41.6	53.9	12.3	
Hori.	4606.250	AV	36.6	31.0	4.0	31.3	-	40.4	53.9	13.5	
Hori.	5527.500	AV	33.0	32.2	4.5	31.4	-	38.4	53.9	15.5	Floor noise
Hori.	6448.750	AV	33.0	34.3	4.8	31.8	-	40.3	53.9	13.6	Floor noise
Hori.	7370.000	AV	32.9	36.7	5.0	32.5	-	42.1	53.9	11.9	Floor noise
Hori.	8291.250	AV	32.0	36.5	5.3	32.8	-	40.9	53.9	13.0	Floor noise
Hori.	9212.500	AV	32.9	37.8	5.7	32.6	-	43.8	53.9	10.1	Floor noise
Vert.	54.406	QP	36.5	9.6	7.7	32.0	-	21.8	40.0	18.2	
Vert.	78.667	QP	41.2	6.7	8.1	32.0	-	24.0	40.0	16.0	
Vert.	116.690	QP	35.8	12.5	8.5	31.9	-	24.9	43.5	18.6	
Vert.	154.614	QP	29.9	15.2	8.9	31.9	-	22.2	43.5	21.4	
Vert.	412.546	QP	24.5	16.0	11.1	31.8	-	19.8	46.0	26.3	
Vert.	649.283	QP	23.3	19.2	12.5	32.0	-	23.0	46.0	23.1	
Vert.	1842.500	PK	61.1	25.3	3.0	32.5	-	57.0	73.9	16.9	
Vert.	2763.750	PK	47.7	28.6	3.3	31.7	-	47.8	73.9	26.1	
Vert.	3685.000	PK	52.4	29.2	3.6	31.5	-	53.8	73.9	20.2	
Vert.	4606.250	PK	46.2	31.0	4.0	31.3	-	50.0	73.9	23.9	
Vert.	5527.500	PK	40.1	32.2	4.5	31.4	-	45.5	73.9	28.4	Floor noise
Vert.	6448.750	PK	40.8	34.3	4.8	31.8	-	48.1	73.9	25.8	Floor noise
Vert.	7370.000	PK	40.9	36.7	5.0	32.5	-	50.1	73.9	23.8	Floor noise
Vert.	8291.250	PK	40.9	36.5	5.3	32.8	-	49.9	73.9	24.1	Floor noise
Vert.	9212.500	PK	41.1	37.8	5.7	32.6	-	52.0	73.9	21.9	Floor noise
Vert.	1842.500	AV	57.6	25.3	3.0	32.5	-	53.5	53.9	0.4	
Vert.	2763.750	AV	40.5	28.6	3.3	31.7	-	40.5	53.9	13.4	
Vert.	3685.000	AV	45.2	29.2	3.6	31.5	-	46.6	53.9	7.3	
Vert.	4606.250	AV	38.8	31.0	4.0	31.3	-	42.6	53.9	11.3	
Vert.	5527.500	AV	32.0	32.2	4.5	31.4	-	37.4	53.9	16.5	Floor noise
Vert.	6448.750	AV	31.9	34.3	4.8	31.8	-	39.2	53.9	14.7	Floor noise
Vert.	7370.000	AV	31.7	36.7	5.0	32.5	-	40.8	53.9	13.1	Floor noise
Vert.	8291.250	AV	32.1	36.5	5.3	32.8	-	41.1	53.9	12.8	Floor noise
Vert.	9212.500	AV	32.2	37.8	5.7	32.6	-	43.2	53.9	10.8	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 $20\log(3.65\text{ m} / 3.0\text{ m}) = 1.71\text{ dB}$

***These results have sufficient margin without taking account Duty cycle correction factor.**

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission (External Antenna)

Report No. 13407533H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4 No.3
Date July 3, 2020 July 4, 2020
Temperature / Humidity 23 deg. C / 53 % RH 22 deg. C / 51 % RH
Engineer Ken Fujita Ken Fujita
(Below 1 GHz) (Above 1 GHz)
Mode Tx, Hopping Off , 927.5 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.	54.458	QP	27.5	9.6	7.7	32.0	-	12.8	40.0	27.2	
Hori.	78.209	QP	33.7	6.7	8.1	32.0	-	16.5	40.0	23.5	
Hori.	113.974	QP	25.9	12.2	8.5	31.9	-	14.6	43.5	28.9	
Hori.	155.411	QP	28.6	15.2	8.9	31.9	-	20.8	43.5	22.7	
Hori.	412.258	QP	25.8	16.0	11.0	31.8	-	21.0	46.0	25.0	
Hori.	649.761	QP	25.8	19.2	12.5	32.0	-	25.4	46.0	20.6	
Hori.	1855.000	PK	52.5	25.4	3.0	32.4	-	48.4	73.9	25.5	
Hori.	2782.500	PK	49.5	28.5	3.3	31.7	-	49.6	73.9	24.3	
Hori.	3710.000	PK	43.5	29.3	3.6	31.5	-	45.0	73.9	28.9	
Hori.	4637.500	PK	42.3	31.1	4.1	31.3	-	46.2	73.9	27.7	
Hori.	5565.000	PK	40.7	32.2	4.5	31.4	-	46.1	73.9	27.8	
Hori.	6492.500	PK	40.3	34.6	4.8	31.9	-	47.8	73.9	26.1	
Hori.	7420.000	PK	40.6	36.7	5.0	32.5	-	49.8	73.9	24.1	
Hori.	8347.500	PK	40.3	36.4	5.3	32.7	-	49.2	73.9	24.7	
Hori.	9275.000	PK	41.2	38.0	5.7	32.6	-	52.3	73.9	21.6	
Hori.	1855.000	AV	48.0	25.4	3.0	32.4	-	43.9	53.9	10.0	
Hori.	2782.500	AV	43.0	28.5	3.3	31.7	-	43.1	53.9	10.8	
Hori.	3710.000	AV	35.8	29.3	3.6	31.5	-	37.2	53.9	16.7	
Hori.	4637.500	AV	33.4	31.1	4.1	31.3	-	37.3	53.9	16.6	
Hori.	5565.000	AV	33.1	32.2	4.5	31.4	-	38.5	53.9	15.4	
Hori.	6492.500	AV	33.2	34.6	4.8	31.9	-	40.7	53.9	13.2	
Hori.	7420.000	AV	32.3	36.7	5.0	32.5	-	41.5	53.9	12.5	
Hori.	8347.500	AV	32.2	36.4	5.3	32.7	-	41.2	53.9	12.7	
Hori.	9275.000	AV	32.9	38.0	5.7	32.6	-	44.0	53.9	9.9	
Vert.	54.539	QP	39.9	9.5	7.7	32.0	-	25.2	40.0	14.9	
Vert.	79.338	QP	36.2	6.8	8.1	32.0	-	19.1	40.0	20.9	
Vert.	116.759	QP	35.9	12.5	8.5	31.9	-	25.1	43.5	18.5	
Vert.	153.805	QP	27.3	15.2	8.9	31.9	-	19.6	43.5	24.0	
Vert.	412.431	QP	24.5	16.0	11.0	31.8	-	19.7	46.0	26.3	
Vert.	649.865	QP	23.1	19.2	12.5	32.0	-	22.7	46.0	23.3	
Vert.	1855.000	PK	55.4	25.4	3.0	32.4	-	51.3	73.9	22.6	
Vert.	2782.500	PK	50.5	28.5	3.3	31.7	-	50.6	73.9	23.3	
Vert.	3710.000	PK	45.8	29.3	3.6	31.5	-	47.2	73.9	26.7	
Vert.	4637.500	PK	45.3	31.1	4.1	31.3	-	49.2	73.9	24.7	
Vert.	5565.000	PK	44.3	32.2	4.5	31.4	-	49.7	73.9	24.2	
Vert.	6492.500	PK	40.1	34.6	4.8	31.9	-	47.6	73.9	26.3	
Vert.	7420.000	PK	40.3	36.7	5.0	32.5	-	49.5	73.9	24.4	
Vert.	8347.500	PK	40.2	36.4	5.3	32.7	-	49.2	73.9	24.7	
Vert.	9275.000	PK	40.2	38.0	5.7	32.6	-	51.4	73.9	22.6	
Vert.	1855.000	AV	50.5	25.4	3.0	32.4	-	46.4	53.9	7.5	
Vert.	2782.500	AV	44.4	28.5	3.3	31.7	-	44.5	53.9	9.5	
Vert.	3710.000	AV	39.9	29.3	3.6	31.5	-	41.3	53.9	12.6	
Vert.	4637.500	AV	37.4	31.1	4.1	31.3	-	41.3	53.9	12.6	
Vert.	5565.000	AV	36.1	32.2	4.5	31.4	-	41.5	53.9	12.4	
Vert.	6492.500	AV	32.2	34.6	4.8	31.9	-	39.7	53.9	14.2	
Vert.	7420.000	AV	32.0	36.7	5.0	32.5	-	41.1	53.9	12.8	
Vert.	8347.500	AV	32.1	36.4	5.3	32.7	-	41.1	53.9	12.8	
Vert.	9275.000	AV	32.2	38.0	5.7	32.6	-	43.3	53.9	10.6	

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 (3.65 m / 3.0 m) = 1.71 dB

***These results have sufficient margin without taking account Duty cycle correction factor.**

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	91.9	21.8	13.0	0.0	126.7	-	-	Carrier
Hori	928.000	PK	31.6	21.8	13.0	0.0	66.4	106.7	40.2	
Vert	927.500	PK	91.3	21.8	13.0	0.0	126.1	-	-	Carrier
Vert	928.000	PK	28.2	21.8	13.0	0.0	63.1	106.1	43.1	

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

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Ise EMC Lab.

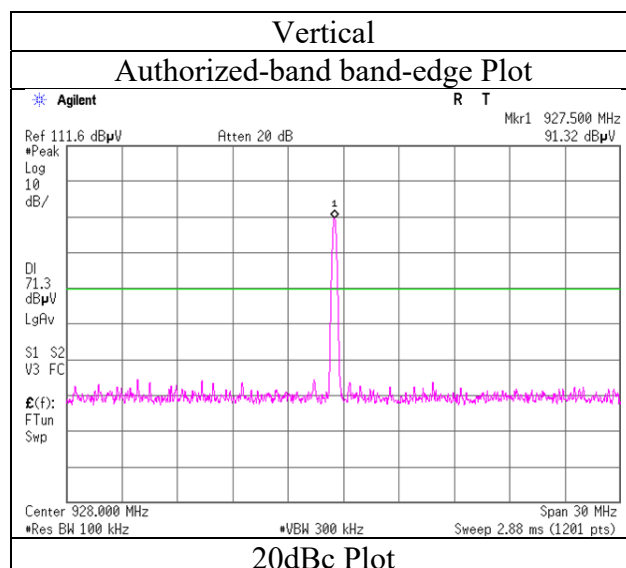
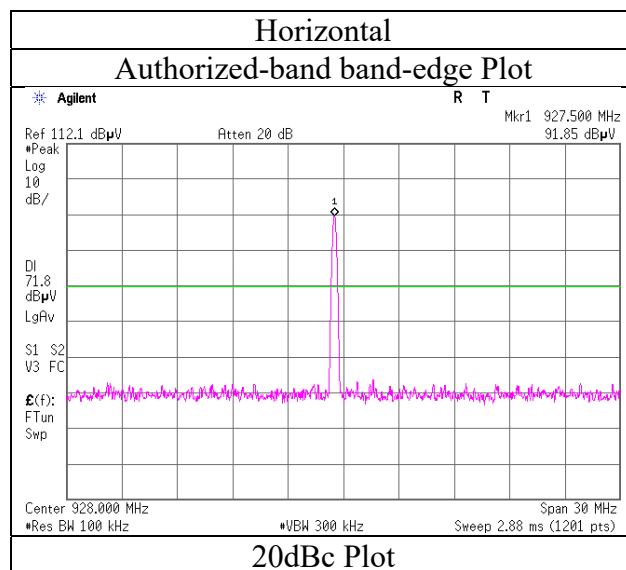
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge) (External Antenna)

Report No.	13407533H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	July 3, 2020
Temperature / Humidity	23 deg. C / 53 % RH
Engineer	Ken Fujita (Below 1 GHz)
Mode	Tx, Hopping Off, 927.5 MHz



* 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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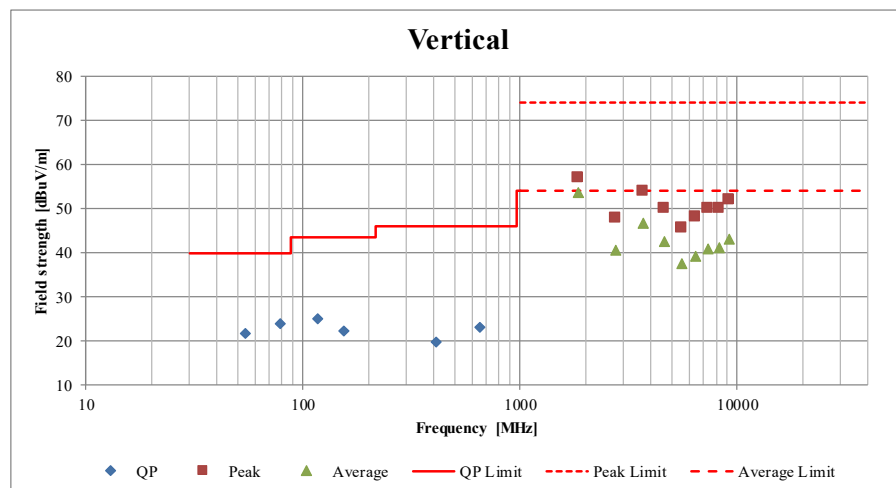
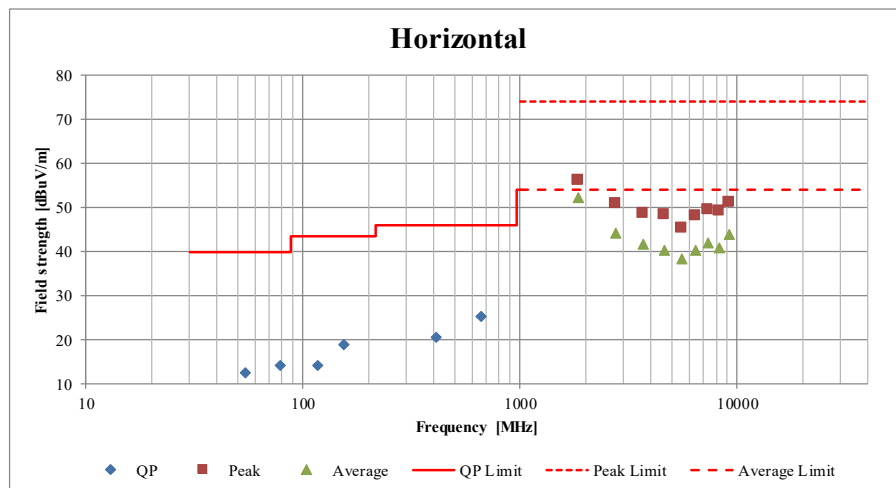
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Radiated Spurious Emission
(Plot data, Worst case)
(External Antenna)

Report No.	13407533H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Date	July 3, 2020	July 4, 2020
Temperature / Humidity	23 deg. C / 53 % RH	22 deg. C / 51 % RH
Engineer	Ken Fujita (Below 1 GHz)	Ken Fujita (Above 1 GHz)
Mode	Tx, Hopping Off, 915.25 MHz	

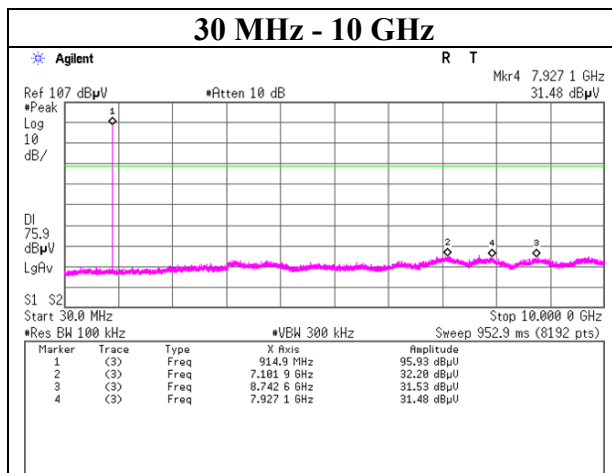
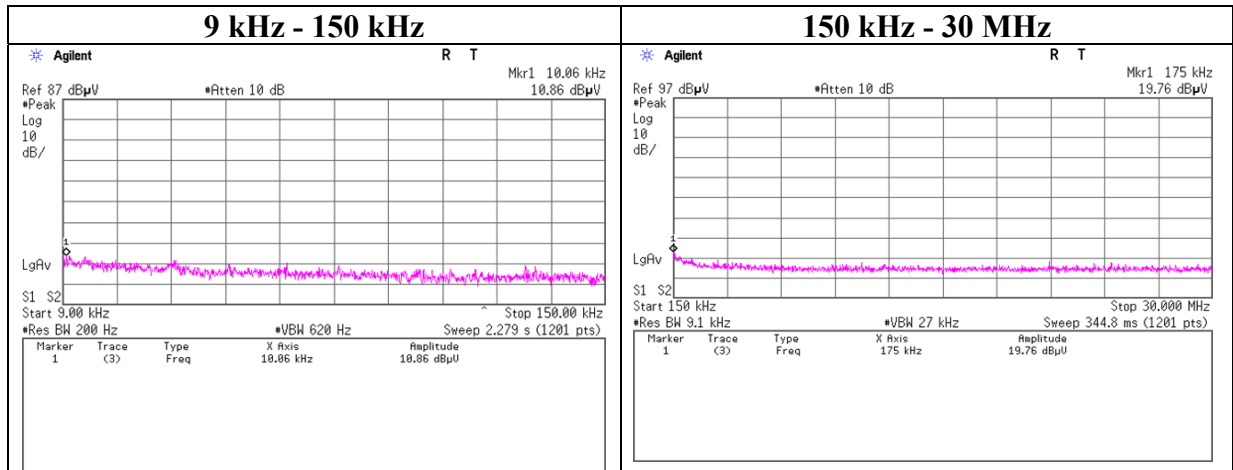


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission (Internal Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 1, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Junki Nagatomi
Mode	Tx, Hopping Off

915.25 MHz



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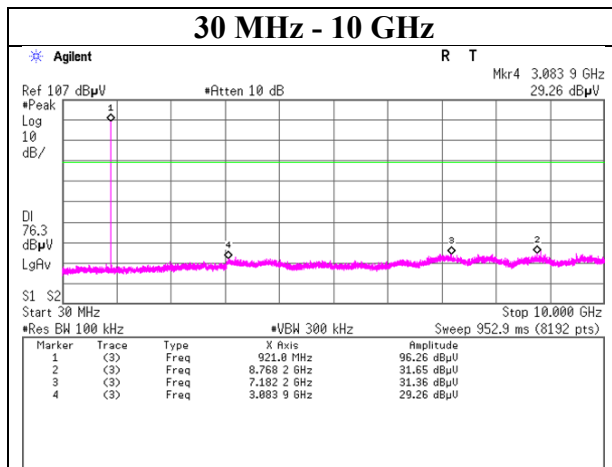
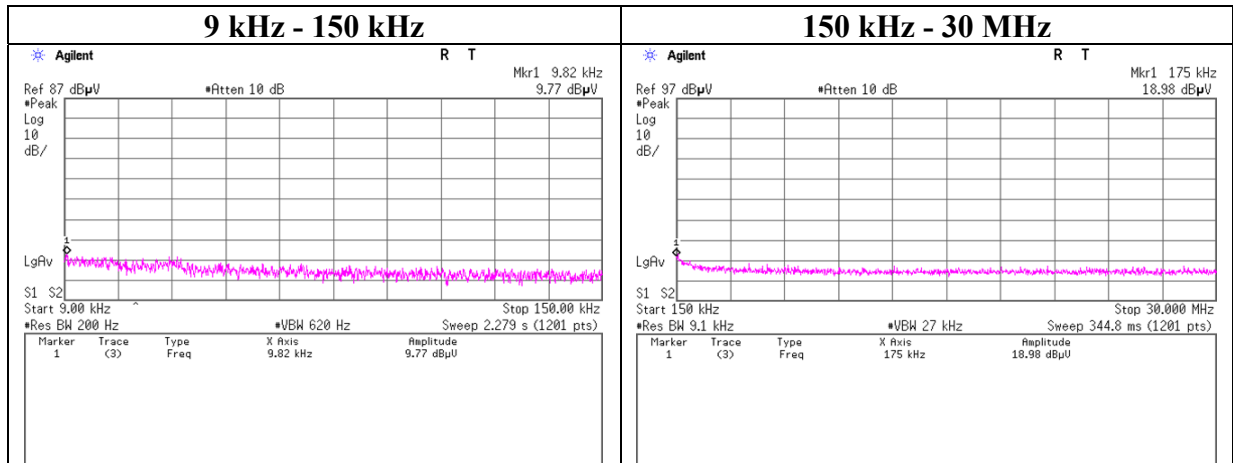
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Facsimile : +81 596 24 8124

Conducted Spurious Emission (Internal Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 1, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Junki Nagatomi
Mode	Tx, Hopping Off

921.25 MHz



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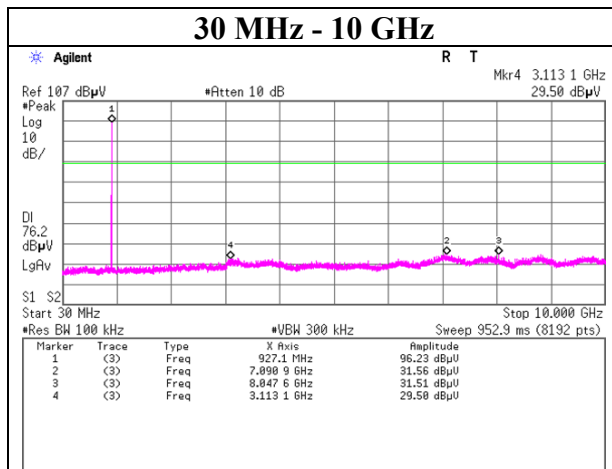
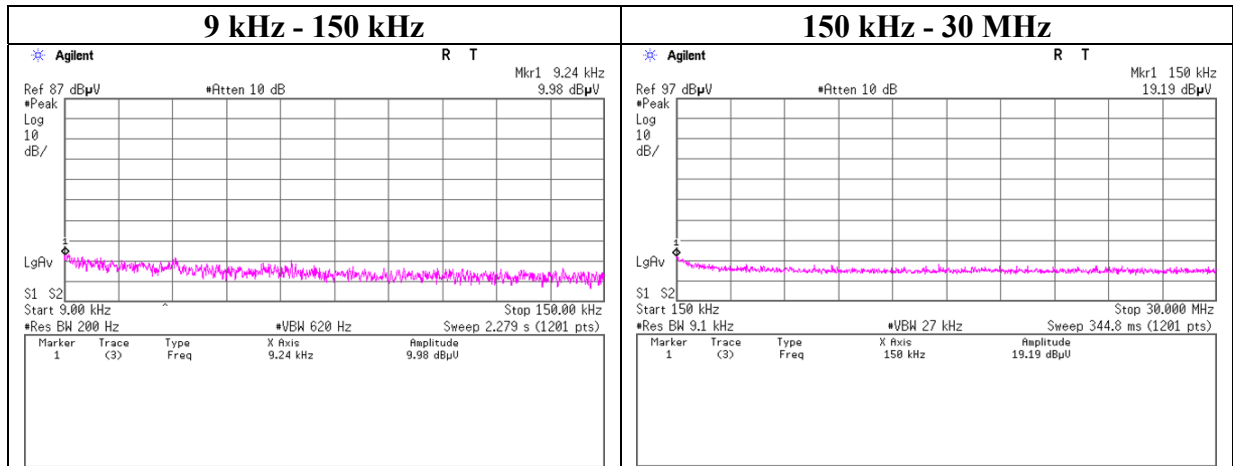
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission (Internal Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 1, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Junki Nagatomi
Mode	Tx, Hopping Off

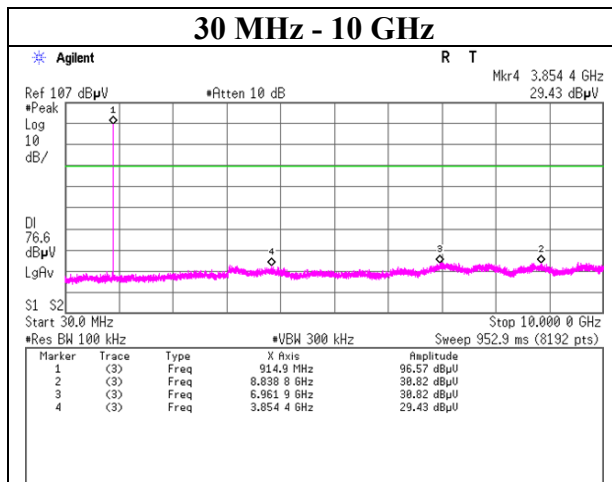
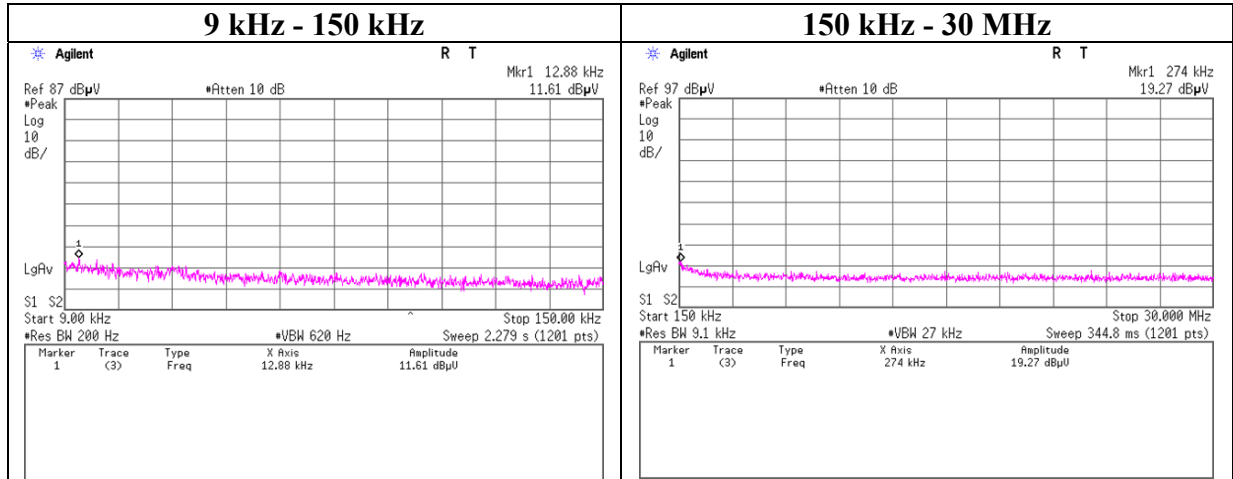
927.5 MHz



Conducted Spurious Emission (External Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 1, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Junki Nagatomi
Mode	Tx, Hopping Off

915.25 MHz



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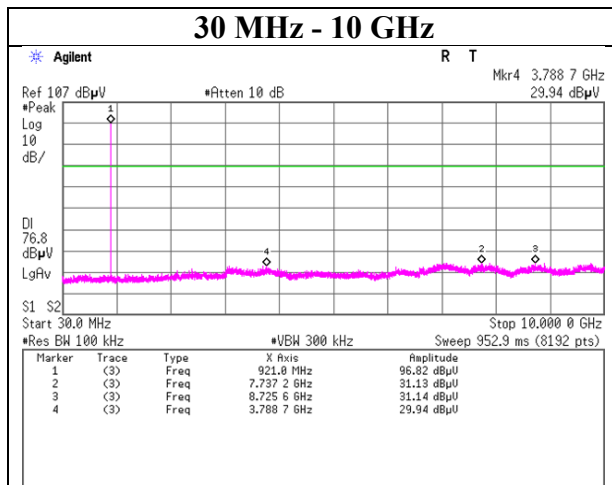
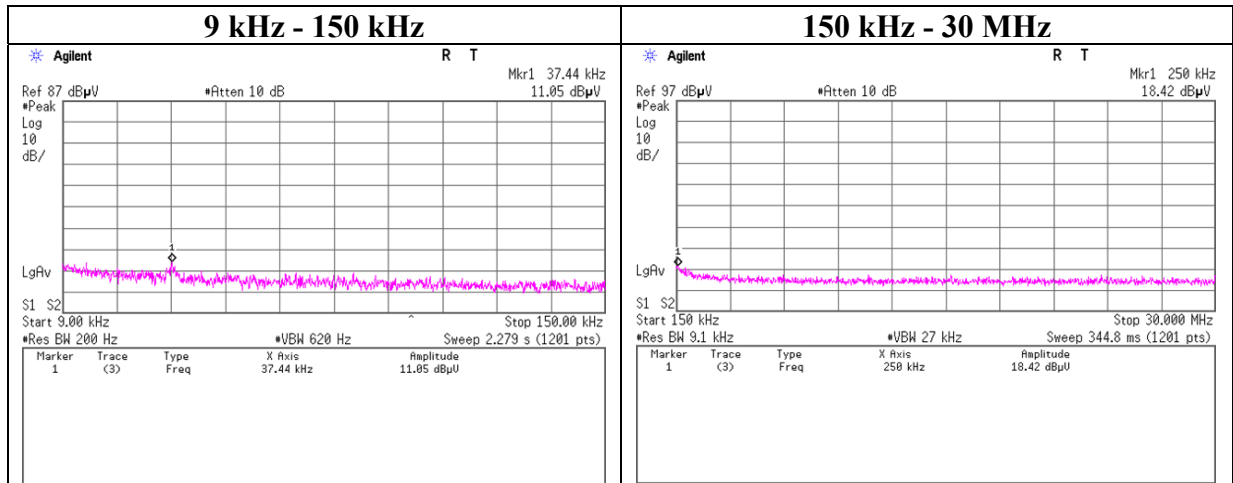
Facsimile : +81 596 24 8124

Conducted Spurious Emission

(External Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 1, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Junki Nagatomi
Mode	Tx, Hopping Off

921.25 MHz



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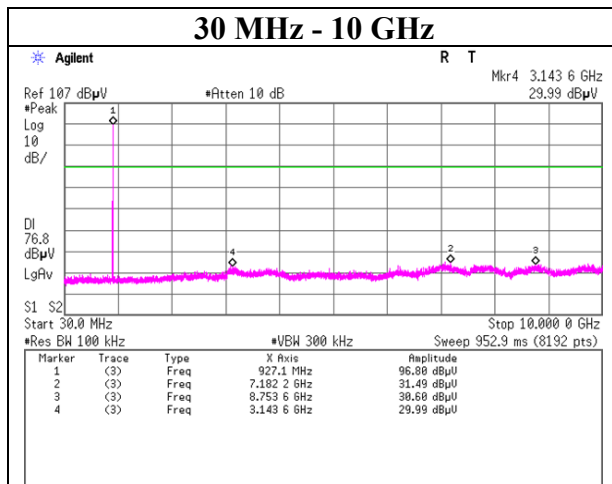
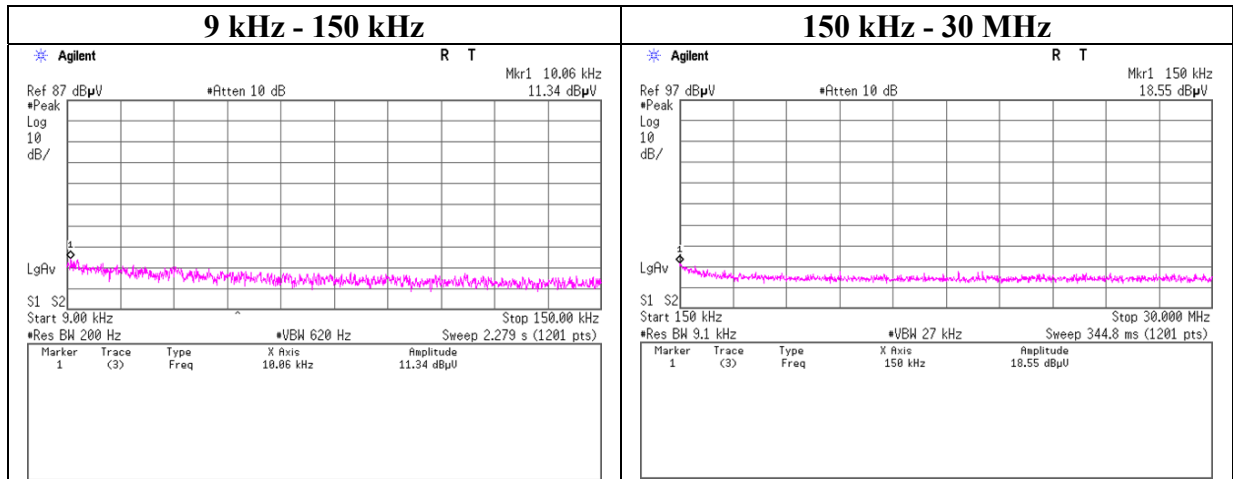
Facsimile : +81 596 24 8124

Conducted Spurious Emission

(External Antenna)

Report No.	13407533H
Test place	Ise EMC Lab. No.4 Measurement Room
Date	July 1, 2020
Temperature / Humidity	23 deg. C / 54 % RH
Engineer	Junki Nagatomi
Mode	Tx, Hopping Off

927.5 MHz



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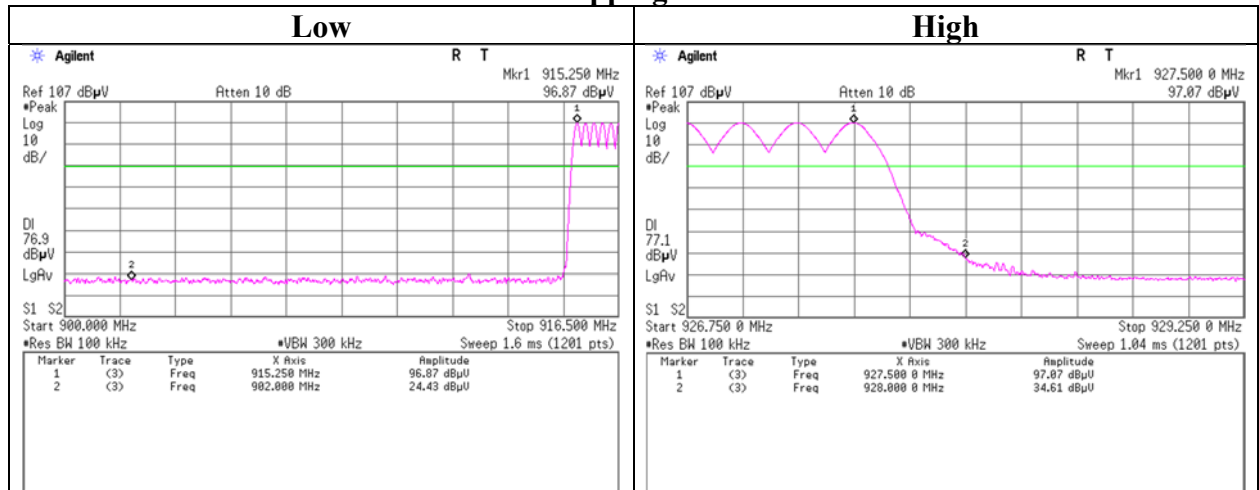
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

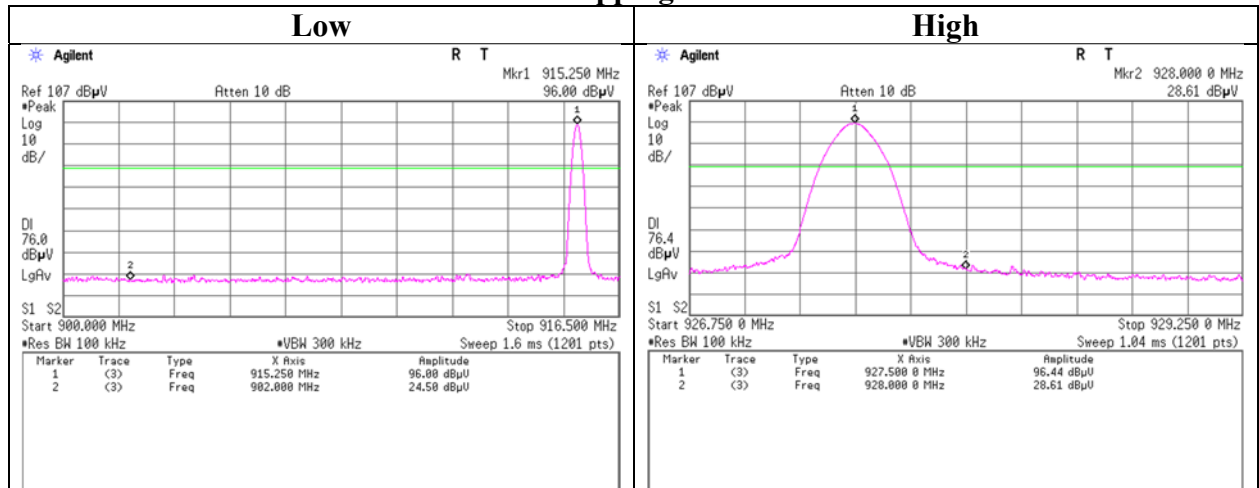
Conducted Emission Band Edge compliance (Internal Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.4 Measurement Room
Date July 9, 2020
Temperature / Humidity 22 deg. C / 74 % RH
Engineer Akihiko Maeda
Mode Tx Hopping On / Off

Hopping On



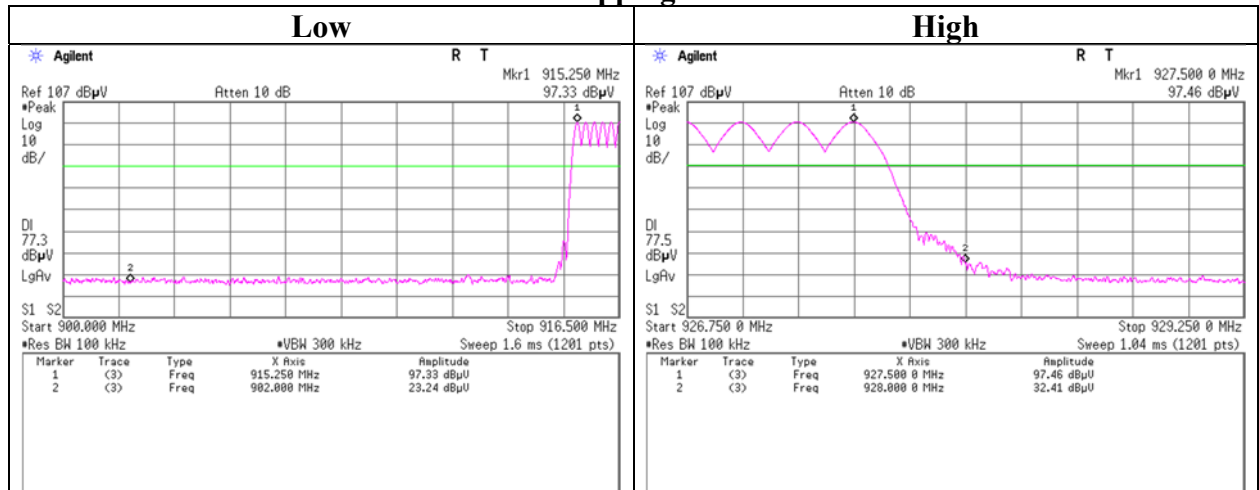
Hopping Off



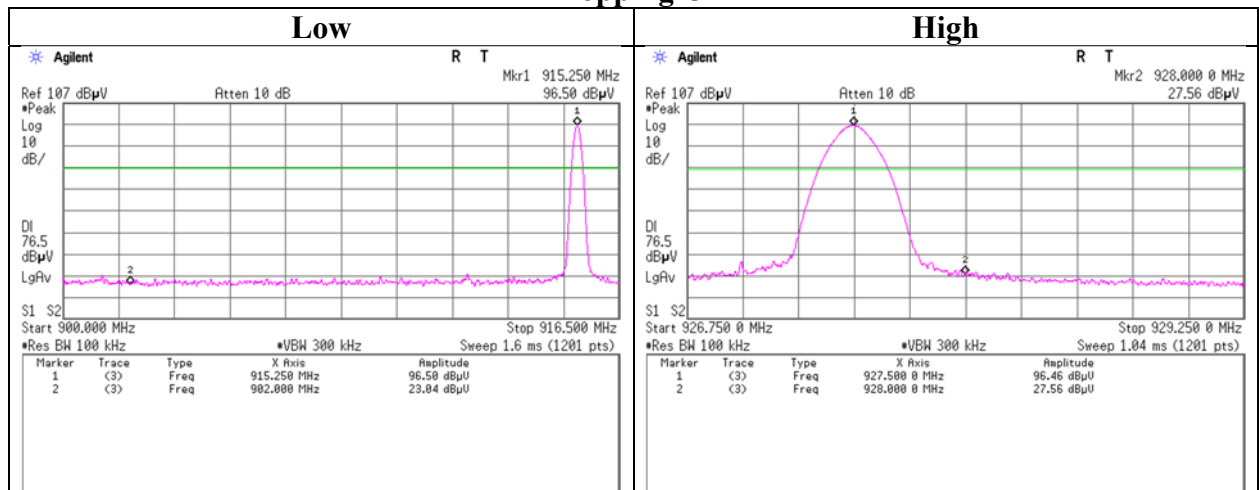
Conducted Emission Band Edge compliance (External Antenna)

Report No. 13407533H
Test place Ise EMC Lab. No.4 Measurement Room
Date July 9, 2020
Temperature / Humidity 22 deg. C / 74 % RH
Engineer Akihiko Maeda
Mode Tx Hopping On / Off

Hopping On



Hopping Off



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APPENDIX 2: Test instruments

Test equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
CE	MOS-13	141554	Thermo-Hygrometer	CUSTOM	CTH-201	1301	01/07/2020	12
CE	MMM-08	141532	DIGITAL HiTESTER	Hioki	3805	51201197	01/06/2020	12
CE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
CE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	MLS-23	141357	LISN(AMN)	Schwarzbeck Mess - Elektronik	NSLK8127	8127-729	07/05/2019	12
CE	MLS-24	141358	LISN(AMN)	Schwarzbeck Mess - Elektronik	NSLK8127	8127-730	07/05/2019	12
CE	MTA-52	141934	Terminator	TME	CT-01BP	-	12/02/2019	12
CE	MAT-67	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	12/02/2019	12
CE	MCC-112	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14/sucoform141-PE/421-010/RFM-E321(SW)	-/00640	07/06/2020	12
CE	MTR-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	08/02/2019	12
RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/25/2020	24
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/05/2020	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess - Elektronik	VHA9103+BBA9106	1302	08/24/2019	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	03/24/2020	12
RE	MLA-23	141267	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess - Elektronik	VUSLP9111B	9111B-192	08/24/2019	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	02/18/2020	12
RE	MRF-12	192072	Band Rejection Filter (902-928MHz)	Wakoh Communication Industrial Co., Ltd.	WFR-481	19122541	03/16/2020	12
RE	MHA-21	141508	Horn Antenna 1-18GHz	Schwarzbeck Mess - Elektronik	BBHA9120D	557	05/22/2020	12
RE	MPA-12	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	650	10/16/2019	12
RE	MHF-27	141297	High Pass Filter (1.1-10GHz)	TOKYO KEIKI	TF219CD1	1001	01/09/2020	12
RE	MSA-16	141903	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186390	02/06/2020	12
AT	MSA-04	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	11/21/2019	12
AT	MPM-16	141812	Power Meter	Keysight Technologies Inc	8990B	MY51000271	08/02/2019	12
AT	MPSE-23	141835	Power sensor	Keysight Technologies Inc	N1923A	MY54070004	08/02/2019	12
AT	MAT-16	141170	Attenuator(40dB)_DC-1GHz N	Weinschel Corp	MODEL 1	BF1940	12/09/2019	12
AT	MCC-64	141327	Coaxial Cable	UL Japan	-	-	02/04/2020	12
AT	MCC-212	141391	Microwave Cable	RS Pro	R-132G7210200CD	-	04/13/2020	12
AT	MOS-15	141562	Thermo-Hygrometer	CUSTOM	CTH-201	0010	01/07/2020	12
AT	MMM-10	141545	DIGITAL HiTESTER	Hioki	3805	51201148	01/06/2020	12
AT	MCC-210	141289	Microwave Cable	RS Pro	R-132G7210200CD	-	04/13/2020	12
AT	MCC-178	141227	Microwave Cable	Junkosha	MMX221-00500DMSDMS	1502S305	03/18/2020	12
AT	MTA-51	141933	Terminator	TME	CT-01BP	-	12/02/2019	12
AT	MTA-54	141936	Terminator	TME	CT-01BP	-	12/02/2019	12
AT	MAT-17	141171	Attenuator(20dB)_DC-1GHz N	Weinschel Corp	MODEL 1	BG0143	12/09/2019	12
AT	MOS-41	192300	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0013	12/19/2019	12
AT	MCC-206	141286	Microwave Cable	RS Pro	R-132G7210200CD	-	02/04/2020	12

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

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

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

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

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