







RADIO TEST REPORT

Test Report No.: 14420105H-B-R1

Customer	Sony Group Corporation
Description of EUT	Digital Wireless Transmitter
Model Number of EUT	DWT-P30
FCC ID	AK8DWTP30
Test Regulation	FCC Part 15 Subpart C
Test Result	Complied (Refer to SECTION 3)
Issue Date	November 18, 2022
Remarks	-

Representative Test Engineer	Approved By
	
Takumi Nishida Engineer	Tsubasa Takayama Leader
	 
	CERTIFICATE 5107.02
<input type="checkbox"/> The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan, Inc.	
<input checked="" type="checkbox"/> There is no testing item of "Non-accreditation".	

Report Cover Page - Form-ULID-003532 (DCS:13-EM-F0429) Issue# 21.0

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- The information provided from the customer for this report is identified in Section 1.
- For test report(s) referred in this report, the latest version (including any revisions) is always referred.

REVISION HISTORY

Original Test Report No.: 14420105H-B

This report is a revised version of 14420105H-B. 14420105H-B is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	14420105H-B	October 3, 2022	-
1	14420105H-B-R1	November 18, 2022	APPENDIX 3: Photographs of Test Setup Addition of below explanatory note. *The model printing of the EUT is different from the application model since this EUT is an engineering prototype. This difference has no effect on the Radio specification.

Reference: Abbreviations (Including words undescribed in this report)

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

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SECTION 1: Customer Information

Company Name	Sony Group Corporation
Address	8-4, Shiomi Kisarazu-shi, Chiba, 292-0834 Japan.
Telephone Number	+81-438-37-4704
Contact Person	Youhei Hisano

***Remarks**

Sony Global Manufacturing & Operations Corporation (Subsidiary Company Name) is on behalf of the applicant: Sony Group Corporation.

The information provided from the customer is as follows;

- Customer, Description 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 and Test 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

Description	Digital Wireless Transmitter
Model Number	DWT-P30
Serial Number	Refer to SECTION 4.2
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	July 24, 2022
Test Date	July 26 to August 4, 2022

2.2 Product Description

General Specification

Rating	DC 3.0 V (Battery (2 x AA Batteries)), DC 5.0 V (USB)
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Radio Specification

<Radio microphone part>*

Radio type	Transmitter
Modulation type	$\pi/4$ shift QPSK
Emission designator	192KG1D, 192KG1E
Necessary bandwidth	192 kHz, Manufacturer defined
Channel spacing	25 kHz
Frequency of operation	470.125 MHz to 607.875 MHz, 614.125 MHz to 615.875 MHz
RF power	470.125 MHz to 607.875 MHz: 25 mW, 10 mW, 2 mW 614.125 MHz to 615.875 MHz: 10 mW, 2 mW
Antenna gain	2.8 dBi max
AF Specification	20 Hz - 22000 Hz, Maximum input: -22 dBu (MIC level, ATT 0 dB)
Operating temperature	0 deg. C to 50 deg. C

<RF remote part>

Radio Type	Transceiver
Modulation type	DSSS
Frequency of Operation	2405 MHz to 2475 MHz
Channel spacing	5 MHz
Method of frequency generation	Synthesizer
Antenna Gain	-3.0 dBi max
Operating temperature	0 deg. C to 50 deg. C

*This test report applies for Radio microphone part.

SECTION 3: Test Specification, Procedures & Results

3.1 Test Specification

Test Specification	FCC Part 15 Subpart C The latest version on the first day of the testing period
Title	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.236 Operation of wireless microphones in the bands 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-698 MHz.

* The EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and Results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	ANSI C63.10-2013 6. Standard test methods	FCC: Section 15.207	13.91 dB 0.37850 MHz, QP, N	Complied a)	Conducted
RF Output Power	ANSI C63.10:2013 Clause 11.9.2.3	FCC: Section 15.236 (d) (1) (2)	See data.	Complied b)	Conducted
Emission Bandwidth (-20 dB Bandwidth)	ANSI C63.10:2013 Clause 6.9	FCC: Section 15.236 (f) (1) (2)	See data.	Complied c)	Conducted
Emission mask	EN 300 422-1 V1.4.2 Clause 8.3	FCC: Section 15.236 (g) KDB 206256 IV (d)	See data.	Complied d)	Conducted
Transmitter unwanted emissions	EN 300 422-1 V1.4.2 Clause 8.4	FCC: Section 15.236 (g) KDB 206256 IV (d)	3.0 dB 471.125 MHz, Horizontal	Complied e)	Radiated
Frequency Tolerance	ANSI C63.10:2013 Clause 6.8	FCC: Section 15.236 (f) (3)	See data.	Complied f)	Conducted

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.

a) Refer to APPENDIX 1 (data of Conducted Emission)
b) Refer to APPENDIX 1 (data of RF power output)
c) Refer to APPENDIX 1 (data of Emission Bandwidth (-20 dB Bandwidth))
d) Refer to APPENDIX 1 (data of Emission mask)
e) Refer to APPENDIX 1 (data of Transmitter unwanted emissions)
f) Refer to APPENDIX 1 (data of Frequency Tolerance)

FCC Part 15.31 (e)

This EUT provides the stable voltage constantly to RF Module regardless of input voltage. However, frequency tolerance test was performed according to section 15.236.

FCC Part 15.203 Antenna requirement

This section does not apply to device operated under section 15.236 (KDB 206256 D01).

3.3 Addition to Standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.

Note: When margins obtained from test results are less than the measurement uncertainty, the test results may exceed the limit.

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

Conducted emission

Using Item	Frequency range	Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	3.7 dB
	0.15 MHz to 30 MHz	3.3 dB

Spurious Emission (EUT height: 1.5 m) (Measurement Distance 3 m)	Uncertainty (+/-)
25 MHz to 200 MHz	5.6 dB
200 MHz to 1000 MHz	4.0 dB
1 GHz to 12.75 GHz	4.6 dB

Antenna terminal test	Uncertainty (+/-)
RF output power	1.3 dB
Emission Bandwidth (Span 1 MHz)	0.96 %
Emission mask	1.9 dB
Frequency Tolerance	0.01541 ppm

3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 884919

ISED Lab Company Number: 2973C / CAB identifier: JP0002

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

Telephone: +81-596-24-8999

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.10 shielded room	3.8 x 2.8 x 2.8	3.8 x 2.8	-	-
No.11 measurement room	4.0 x 3.4 x 2.5	N/A	-	-
No.12 measurement room	2.6 x 3.4 x 2.5	N/A	-	-
Large Chamber	16.9 x 22.1 x 10.17	16.9 x 22.1	-	10 m
Small Chamber	5.3 x 6.69 x 3.59	5.3 x 6.69	-	-

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

3.6 Test Data, Test Instruments, and Test Set Up

Refer to APPENDIX.

SECTION 4: Operation of EUT during testing

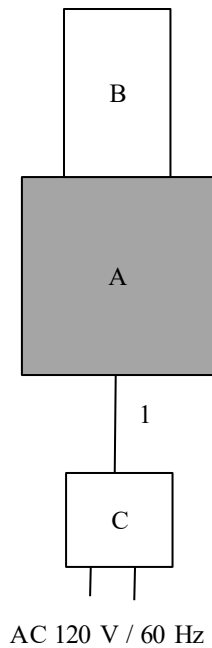
4.1 Operating Mode(s)

Mode	Remarks*
Transmitting (Tx), Power setting: 2 mW	Typ. 2 mW
Transmitting (Tx), Power setting: 10 mW	Typ. 10 mW
Transmitting (Tx), Power setting: 25 mW	Typ. 25 mW
*Transmitting duty was 100 % on all tests.	
*Power of the EUT was set by the software as follows; Power settings: 2 mW, 10 mW, 25 mW Software: Version: 0.01 (220621A) (Date: 2022.06.21 Storage location: EUT memory)	
*This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product except 2 mW and 10 mW settings.	

*The details of Operating mode(s)

Test Item	Tested frequency	Power setting	Modulation	Remarks
Conducted Emission	470.125 MHz (Low) 543.000MHz (Mid) 607.875 MHz (High)	25 mW	Digital modulation (PN9 data packet)	-
	614.125 MHz (Low) 615.000 MHz (Mid) 615.875 MHz (High)	10 mW		
RF power output	470.125 MHz (Low) 543.000MHz (Mid) 607.875 MHz (High)	2 mW, 10 mW, 25 mW	Digital modulation (PN9 data packet)	-
	614.125 MHz (Low) 615.000 MHz (Mid) 615.875 MHz (High)	2 mW, 10 mW		
Emission Bandwidth	470.125 MHz (Low) 543.000 MHz (Mid) 607.875 MHz (High)	2 mW, 10 mW, 25 mW	Digital modulation (PN9 data packet)	-
	614.125 MHz (Low) 615.000 MHz (Mid) 615.875 MHz (High)	2 mW, 10 mW		
Emission Mask	470.125 MHz (Low) 543.000 MHz (Mid) 607.875 MHz (High)	2 mW, 10 mW, 25 mW	Digital modulation (PN9 data packet)	-
	614.125 MHz (Low) 615.000 MHz (Mid) 615.875 MHz (High)	2 mW, 10 mW		
Transmitter unwanted emissions	470.125 MHz (Low) 543.000 MHz (Mid) 607.875 MHz (High)	25 mW	Digital modulation (PN9 data packet)	-
	614.125 MHz (Low) 615.000 MHz (Mid) 615.875 MHz (High)	10 mW		
Frequency Tolerance	543.000 MHz (Mid)	25 mW	No modulation	*1)
	615.000 MHz (Mid)	10 mW		
*1) There is no difference in frequency generating method on each frequency. Therefore the test was performed on Mid channel as a representative.				

4.2 Configuration and Peripherals



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

** This EUT has two types of power supply, USB power Supply and Battery power Supply.
The test was performed with USB power Supply that was the worst spurious emission level.

Description of EUT and Support Equipment

No.	Item	Model number	Serial Number	Manufacturer	Remarks
A	Digital Wireless Transmitter	DWT-P30	#910010 *1) #910009 *2)	Sony Group Corporation	EUT
B	Dynamic Microphone	F-112	14282	Sony Group Corporation	-
C	AC Adapter	0301PQA	MM-NGA	Mitsumi Electric Co.	-

*1) Used for Conducted Emission test and Radiated Emission test

*2) Used for Antenna Terminal conducted test

List of Cables Used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.1	Shielded	Shielded	-

SECTION 5: Conducted Emission

Test Procedure and Conditions

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

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

For the tests on EUT with other peripherals (as a whole system)

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

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

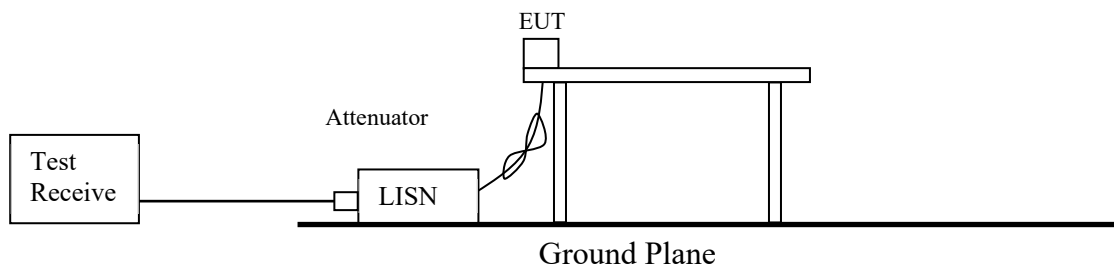
The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

Detector	: QP and CISPR AV
Measurement Range	: 0.15 MHz to 30 MHz
Test Data	: APPENDIX
Test Result	: Pass

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission

Test Procedure

- 1) EUT was placed on a platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength has been measured in semi anechoic chamber at a distance of 3 m.
The measuring antenna height was varied between 1 to 4 m and the turn table 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.

- 2) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 1.5 m as the EUT. The frequency below 1 GHz of the Substitution Antenna was used the Half wave dipole Antenna, which was tuned the measured frequency in 1).
The frequency above 1 GHz of the Substitution Antenna was used Horn Antenna.
The Substitution Antenna was connected to the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field strength is equal to the measured value in 1) by means of varying the measuring antenna height between 1 to 4 m to obtain maximum receiving level.
Its Output power of Signal Generator was recorded.

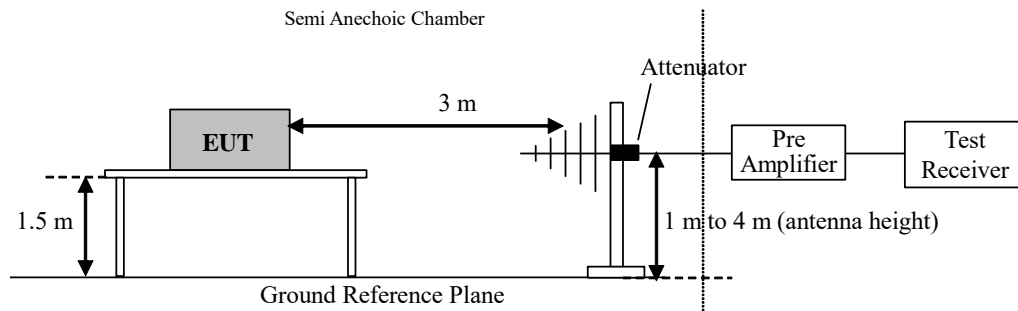
- 3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the Antenna (Horn Antenna) except for the Half wave dipole Antenna (2.15 dBi) for the Substitution Antenna, the Effective radiated power was calculated by compensating the finite difference in the Antenna gain of the Half wave dipole Antenna, and Substitution Antenna.

Frequency	25 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

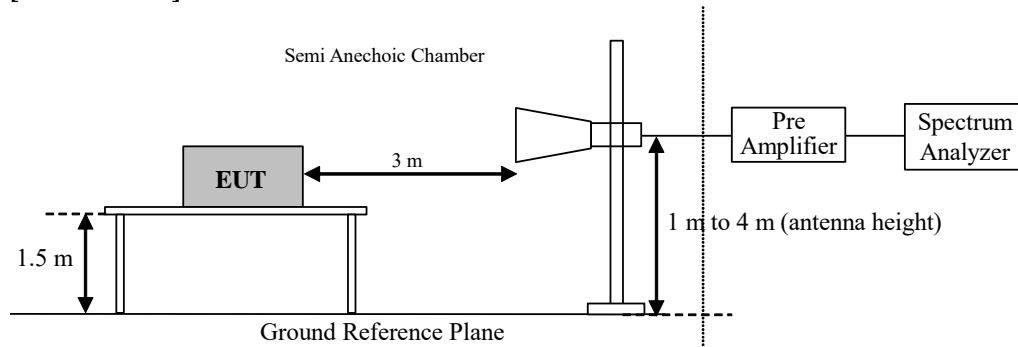
Frequency	25 MHz to 30 MHz	30 MHz to 1 GHz	Above 1 GHz
Instrument used	Test Receiver		Spectrum Analyzer
Detector	QP		RMS Average
IF Bandwidth	BW: 9 kHz	BW: 120 kHz	RBW: 1 MHz VBW: 3 MHz
Test Distance	3 m		

Figure 1: Test Setup

[25 MHz to 1 GHz]



[Above 1 GHz]



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

-This EUT has two types of power supply, USB power Supply/ Battery power Supply.
The test was performed with the worst case which was confirmed in pre-check.

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

Measurement range : 25 MHz to 7 GHz
Test data : APPENDIX
Test result : Pass

*Test was performed with 10th harmonics of fundamental.

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
RF Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 50 MHz BW)
Emission Bandwidth	2 times to 5 times of occupied bandwidth	1 to 5% of Occupied bandwidth	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer

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

[Emission mask]

The EUT was modulated with PN9 audio data packet.

The spectrum mask was measured in accordance with section 8.3.2 of EN 300 422-1.

The measurements were made under normal condition.

[Frequency Tolerance]

The EUT was tested with a new or fully charged battery.

The frequency of the EUT was recorded over a temperature variation of +50 deg. C to -20 deg. C by 10 deg. C step.

For Battery End Point, test was performed at the voltage just before the battery has run out.

EUT power supply was varied between 85 % and 115 % of nominal and the frequency of the EUT was recorded when temperature is 20 deg. C.

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

Test data : **APPENDIX**

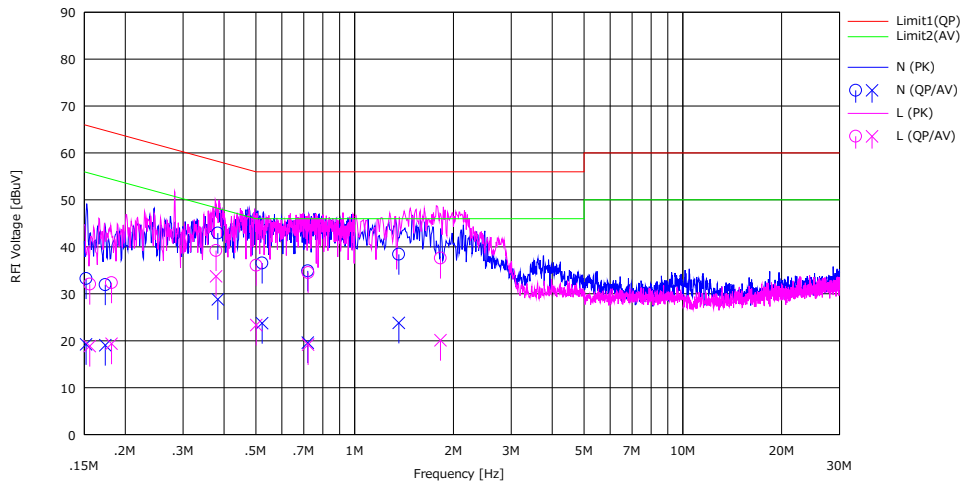
Test result : **Pass**

APPENDIX 1: Test Data

Conducted Emission

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber
 Date July 26, 2022
 Temperature / Humidity 23 deg. C / 71 % RH
 Engineer Nachi Konegawa
 Mode Tx 543.000 MHz

Limit : FCC_Part 15 Subpart C(15.207)

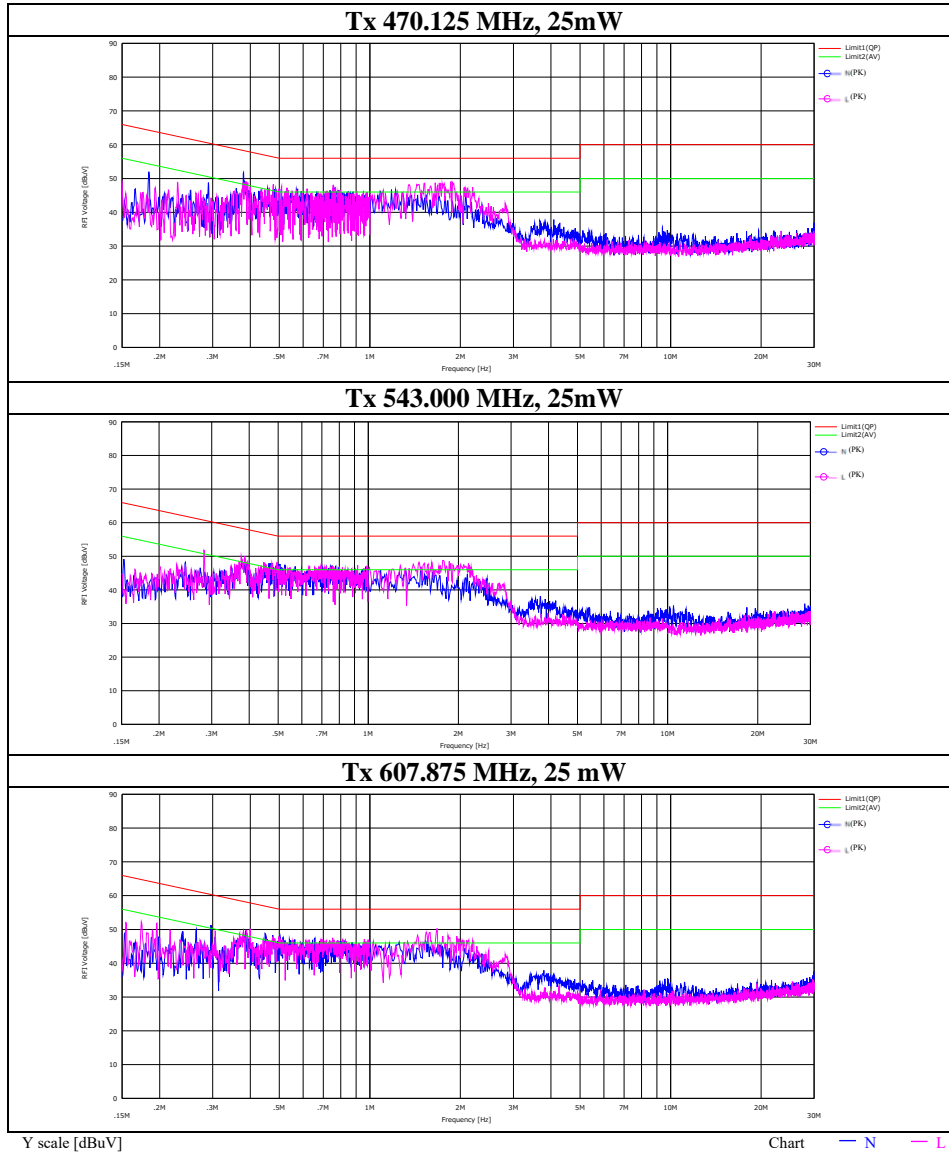


No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]				
1	0.15195	20.00	6.00	0.14	13.09	33.23	19.23	65.89	55.89	32.66	36.66	N	
2	0.17376	18.70	5.80	0.14	13.10	31.94	19.04	64.78	54.78	32.84	35.74	N	
3	0.38305	29.60	15.50	0.15	13.15	42.90	28.80	58.21	48.21	15.31	19.41	N	
4	0.52210	23.20	10.40	0.16	13.17	36.53	23.73	56.00	46.00	19.47	22.27	N	
5	0.72000	21.50	6.20	0.17	13.21	34.88	19.58	56.00	46.00	21.12	26.42	N	
6	1.36300	24.90	10.30	0.20	13.30	38.40	23.80	56.00	46.00	17.60	22.20	N	
7	0.15595	18.80	5.60	0.17	13.09	32.06	18.86	65.68	55.68	33.62	36.82	L	
8	0.18168	19.10	6.10	0.16	13.10	32.36	19.36	64.41	54.41	32.05	35.05	L	
9	0.37820	25.90	20.40	0.17	13.15	39.22	33.72	58.32	48.32	19.10	14.60	L	
10	0.50140	22.70	10.00	0.18	13.17	36.05	23.35	56.00	46.00	19.95	22.65	L	
11	0.72160	21.10	5.80	0.18	13.21	34.49	19.19	56.00	46.00	21.51	26.81	L	
12	1.82600	24.00	6.50	0.23	13.37	37.60	20.10	56.00	46.00	18.40	25.90	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

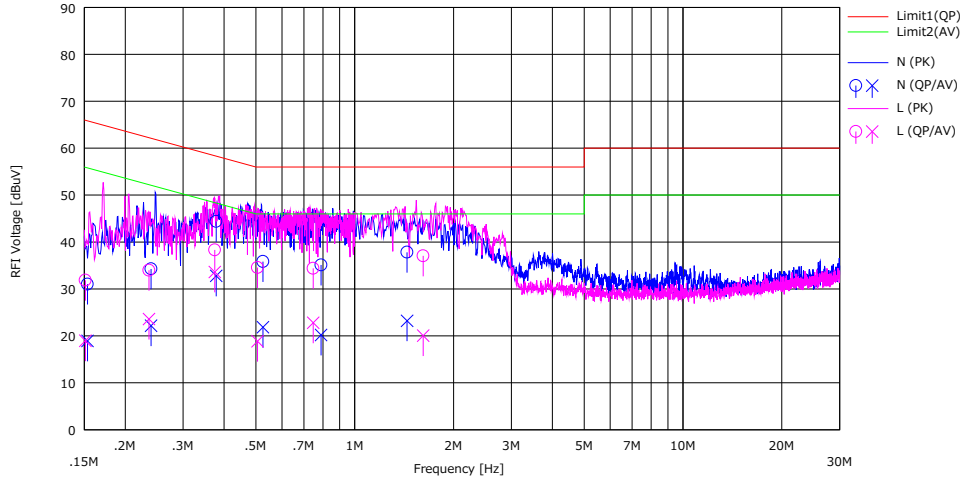
Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Date	July 26, 2022
Temperature / Humidity	23 deg. C / 71 % RH
Engineer	Nachi Konegawa
Mode	Tx



Conducted Emission

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber
Date July 26, 2022
Temperature / Humidity 23 deg. C / 71 % RH
Engineer Nachi Konegawa
Mode Tx 615.000 MHz

Limit : FCC_Part 15 Subpart C(15.207)

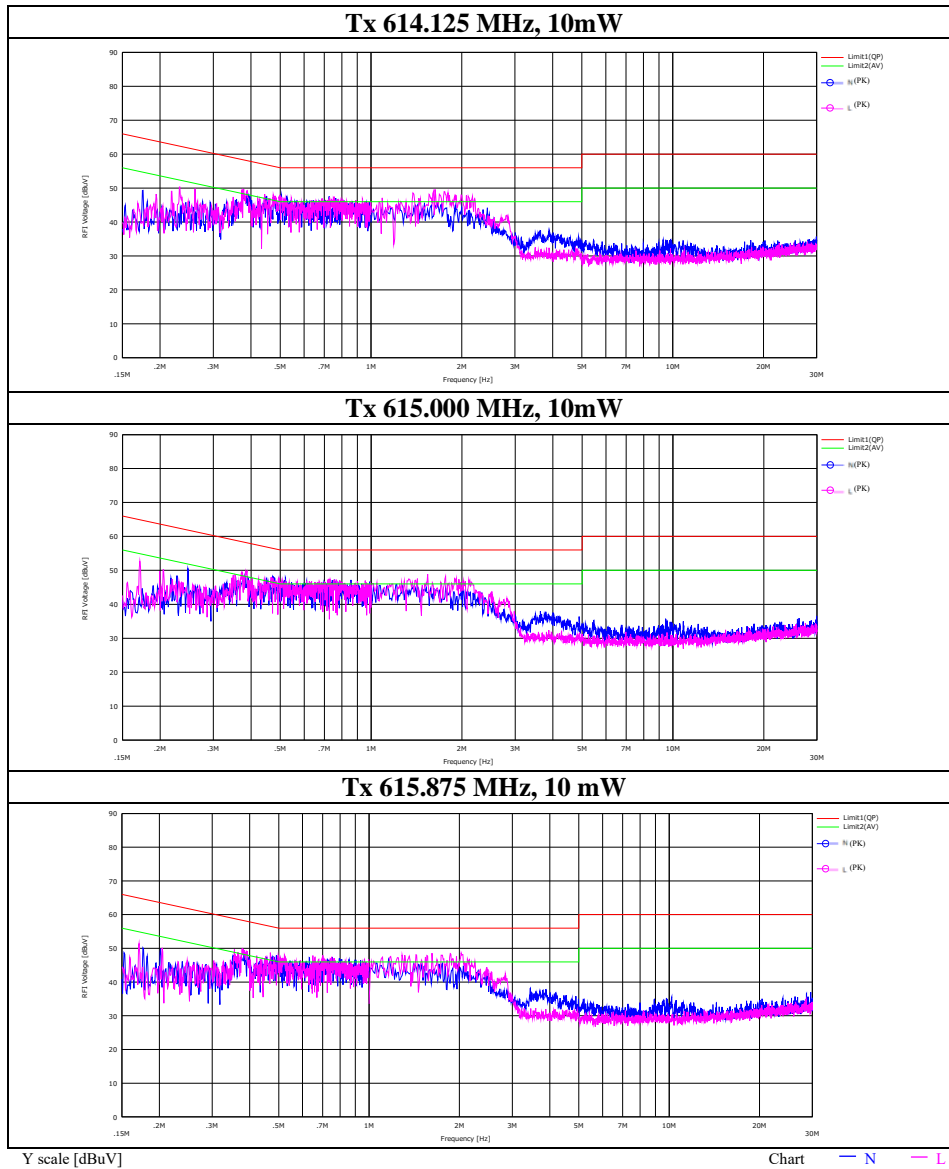


No.	Freq. [MHz]	Reading		LISN [dB]	LOSS [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]			<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15345	17.80	5.70	0.14	13.09	31.03	18.93	65.81	55.81	34.78	36.88	N	
2	0.23970	21.00	8.90	0.15	13.12	34.27	22.17	62.11	52.11	27.84	29.94	N	
3	0.37850	31.10	19.50	0.15	13.15	44.40	32.80	58.31	48.31	13.91	15.51	N	
4	0.52510	22.50	8.50	0.16	13.18	35.84	21.84	56.00	46.00	20.16	24.16	N	
5	0.78965	21.70	6.80	0.17	13.22	35.09	20.19	56.00	46.00	20.91	25.81	N	
6	1.44360	24.30	9.70	0.20	13.31	37.81	23.21	56.00	46.00	18.19	22.79	N	
7	0.15110	18.60	5.70	0.17	13.09	31.86	18.96	65.94	55.94	34.08	36.98	L	
8	0.23620	20.70	10.30	0.16	13.12	33.98	23.58	62.23	52.23	28.25	28.65	L	
9	0.37460	25.00	20.30	0.17	13.14	38.31	33.61	58.40	48.40	20.09	14.79	L	
10	0.50580	21.20	5.50	0.18	13.17	34.55	18.85	56.00	46.00	21.45	27.15	L	
11	0.74720	21.00	9.40	0.18	13.21	34.39	22.79	56.00	46.00	21.61	23.21	L	
12	1.61560	23.50	6.50	0.22	13.34	37.06	20.06	56.00	46.00	18.94	25.94	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

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Date	July 26, 2022
Temperature / Humidity	23 deg. C / 71 % RH
Engineer	Nachi Konegawa
Mode	Tx



RF Output Power

Test place Ise EMC Lab. No.8 Measurement Room
 Date July 26, 2022
 Temperature / Humidity 23 deg. C / 66 % RH
 Engineer Hiroki Numata
 Mode Tx 470.125 MHz to 607.875 MHz / 614.125 MHz to 615.875 MHz

Power Setting	Channel	Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Ant Gain [dBi]	Result Average [EIRP]		Limit [EIRP] [mW]	Margin [dB]	Remarks
							[dBm]	[mW]			
2mW	Low	470.125	-16.94	0.15	19.70	2.80	5.71	3.72	50	11.28	
	Mid	543.000	-16.93	0.15	19.70	2.80	5.72	3.73	50	11.27	
	High	607.875	-17.03	0.15	19.70	2.80	5.62	3.65	50	11.37	
10mW	Low	470.125	-10.75	0.15	19.70	2.80	11.90	15.49	50	5.09	
	Mid	543.000	-10.73	0.15	19.70	2.80	11.92	15.56	50	5.07	
	High	607.875	-11.02	0.15	19.70	2.80	11.63	14.55	50	5.36	
25mW	Low	470.125	-5.87	0.15	19.70	2.80	16.78	47.64	50	0.21	
	Mid	543.000	-5.76	0.15	19.70	2.80	16.89	48.87	50	0.10	
	High	607.875	-5.97	0.15	19.70	2.80	16.68	46.56	50	0.31	

Calculation formula:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Atten. Loss} + \text{Ant Gain}$$

Cable or Atten. was not used for factor 0.00 dB of the above table.

Power Setting	Channel	Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Ant Gain [dBi]	Result Average [EIRP]		Limit [EIRP] [mW]	Margin [dB]	Remarks
							[dBm]	[mW]			
2mW	Low	614.125	-17.05	0.15	19.70	2.80	5.60	3.63	20	7.41	
	Mid	615.000	-16.99	0.15	19.70	2.80	5.66	3.68	20	7.35	
	High	615.875	-17.03	0.15	19.70	2.80	5.62	3.65	20	7.39	
10mW	Low	614.125	-11.02	0.15	19.70	2.80	11.63	14.55	20	1.38	
	Mid	615.000	-11.01	0.15	19.70	2.80	11.64	14.59	20	1.37	
	High	615.875	-11.03	0.15	19.70	2.80	11.62	14.52	20	1.39	

Calculation formula:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Atten. Loss} + \text{Ant Gain}$$

Cable or Atten. was not used for factor 0.00 dB of the above table.

Emission Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 26, 2022
Temperature / Humidity	23 deg. C / 66 % RH
Engineer	Hiroki Numata
Mode	Tx 470.125 MHz to 607.875 MHz

Power Setting	Channel	Freq. [MHz]	99 % Occupied Bandwidth [kHz]	Limit [kHz]	Margin [kHz]
2 mW	Low	470.125	162.9667	200	37.0333
	Mid	543.000	162.6247	200	37.3753
	High	607.875	162.6071	200	37.3929
10 mW	Low	470.125	163.6488	200	36.3512
	Mid	543.000	164.2869	200	35.7131
	High	607.875	163.3945	200	36.6055
25 mW	Low	470.125	162.5516	200	37.4484
	Mid	543.000	163.4756	200	36.5244
	High	607.875	162.9651	200	37.0349

Power Setting	Channel	Freq. [MHz]	20 dB Bandwidth [kHz]	Limit [kHz]	Margin [kHz]
2 mW	Low	470.125	181.051	200	18.949
	Mid	543.000	180.992	200	19.008
	High	607.875	180.728	200	19.272
10 mW	Low	470.125	181.071	200	18.929
	Mid	543.000	181.228	200	18.772
	High	607.875	180.875	200	19.125
25 mW	Low	470.125	181.150	200	18.850
	Mid	543.000	181.219	200	18.781
	High	607.875	181.177	200	18.823

Emission Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 26, 2022
Temperature / Humidity	23 deg. C / 66 % RH
Engineer	Hiroki Numata
Mode	Tx 614.125 MHz to 615.875 MHz

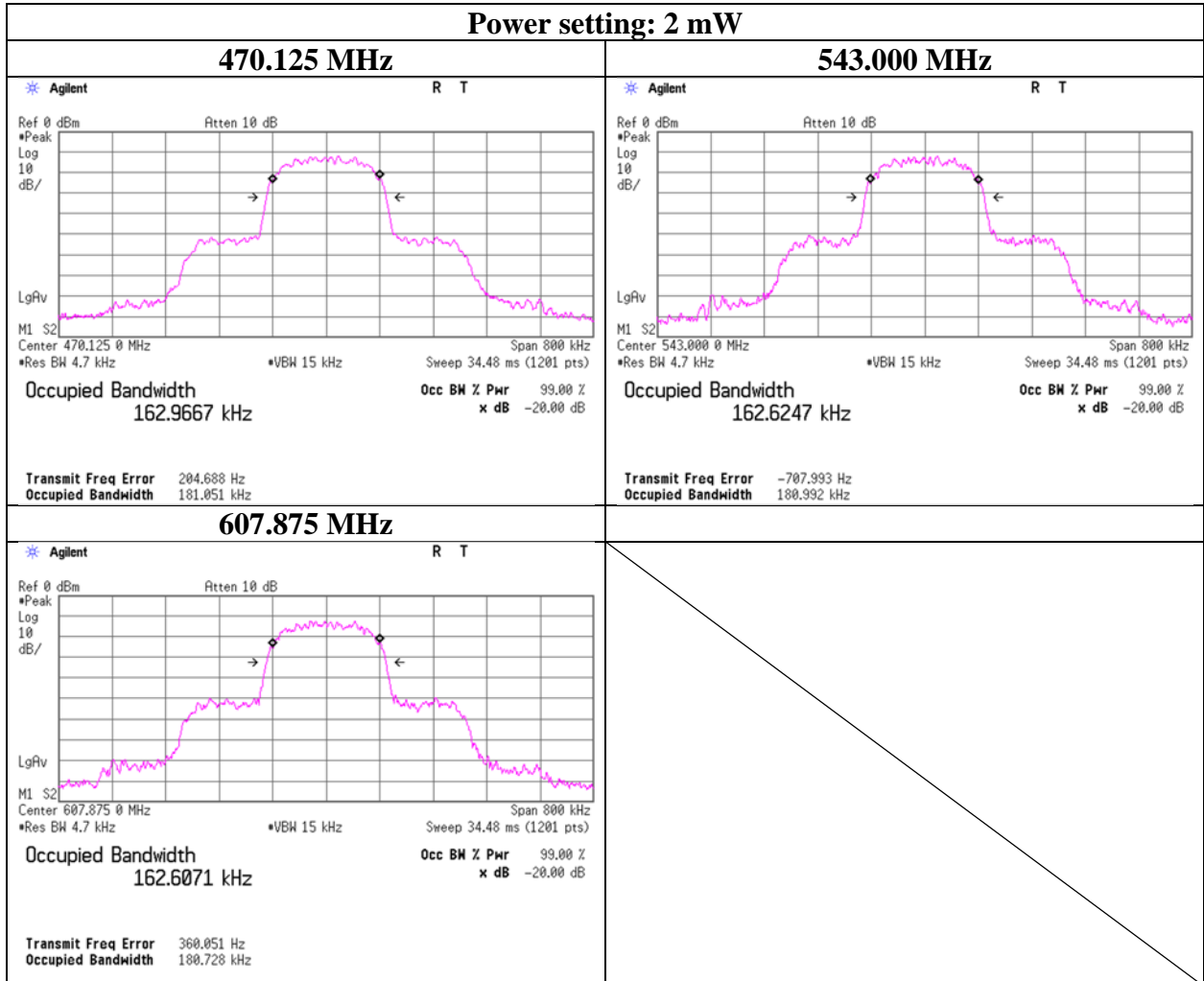
Power Setting	Channel	Freq. [MHz]	99 % Occupied Bandwidth [kHz]	Limit [kHz]	Margin [kHz]
2 mW	Low	614.125	163.6035	200	36.3965
	Mid	615.000	163.1970	200	36.8030
	High	615.875	163.3968	200	36.6032
10 mW	Low	614.125	163.0728	200	36.9272
	Mid	615.000	163.0487	200	36.9513
	High	615.875	163.0872	200	36.9128

Power Setting	Channel	Freq. [MHz]	20 dB Bandwidth [kHz]	Limit [kHz]	Margin [kHz]
2 mW	Low	614.125	181.139	200	18.861
	Mid	615.000	181.065	200	18.935
	High	615.875	181.261	200	18.739
10 mW	Low	614.125	181.173	200	18.827
	Mid	615.000	181.273	200	18.727
	High	615.875	181.109	200	18.891

Emission Bandwidth

Test place Ise EMC Lab. No.8 Measurement Room
Date July 26, 2022
Temperature / Humidity 23 deg. C / 66 % RH
Engineer Hiroki Numata
Mode Tx 470.125 MHz to 607.875 MHz

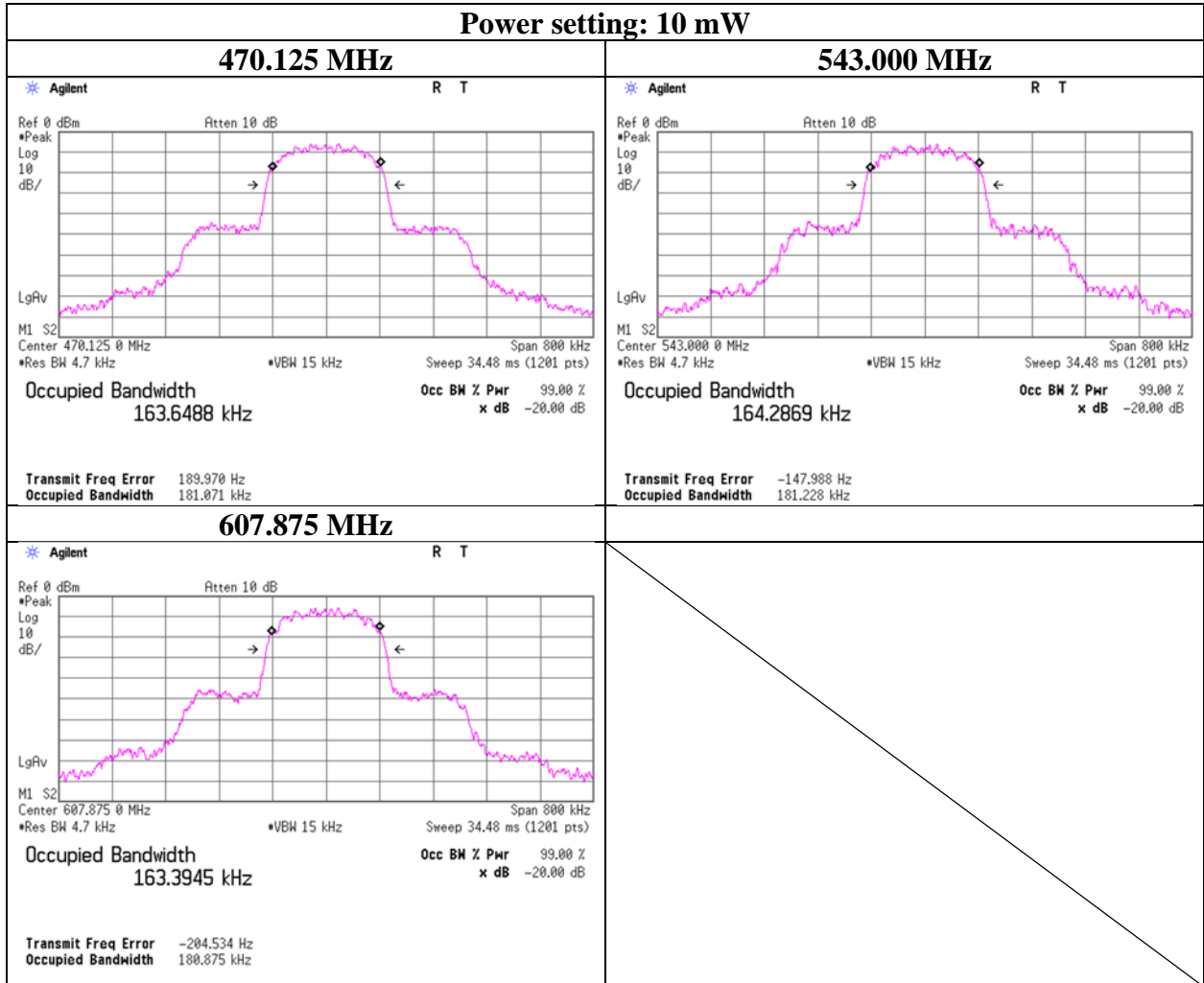
Power setting: 2 mW



Emission Bandwidth

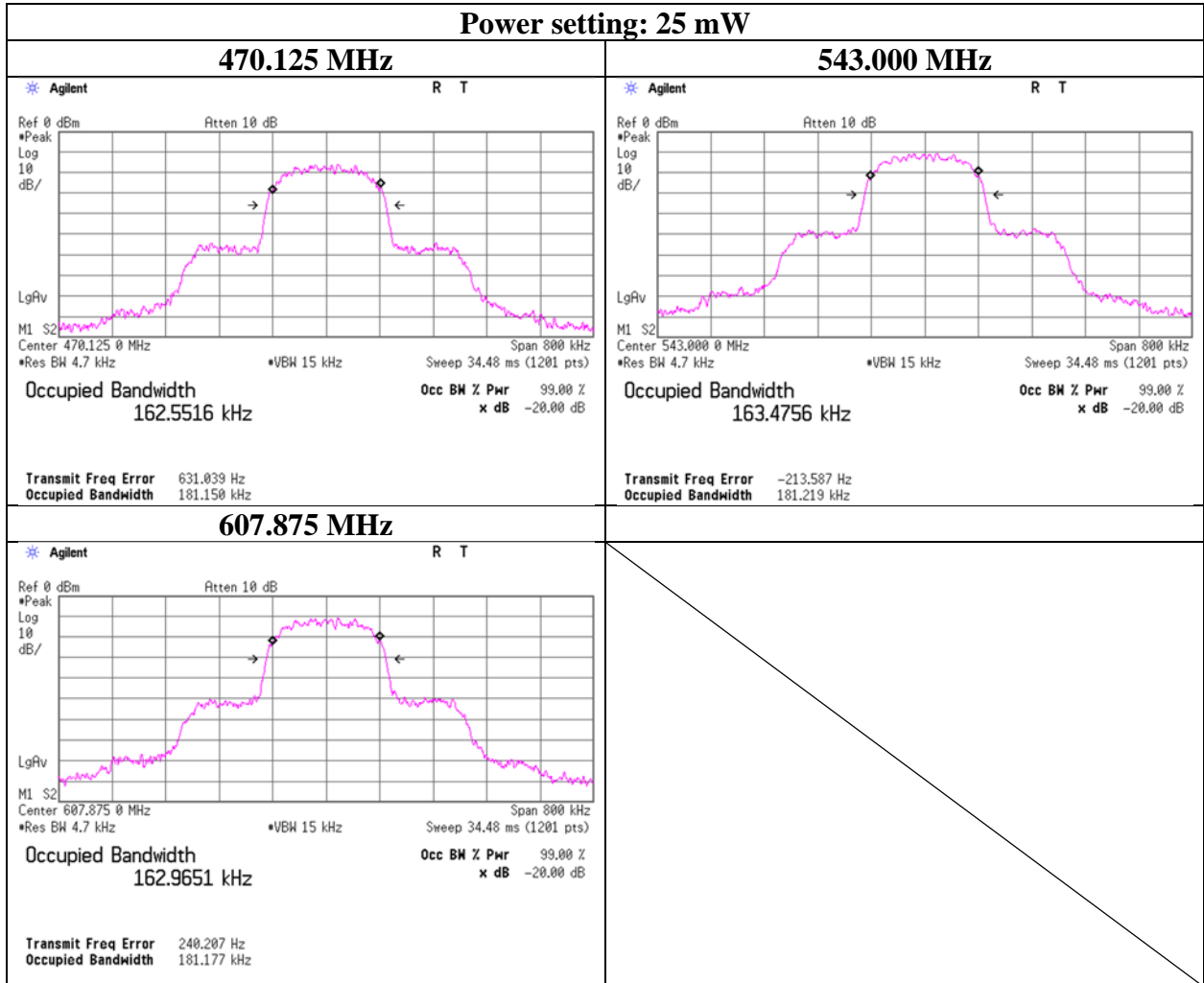
Test place Ise EMC Lab. No.8 Measurement Room
 Date July 26, 2022
 Temperature / Humidity 23 deg. C / 66 % RH
 Engineer Hiroki Numata
 Mode Tx 470.125 MHz to 607.875 MHz

Power setting: 10 mW



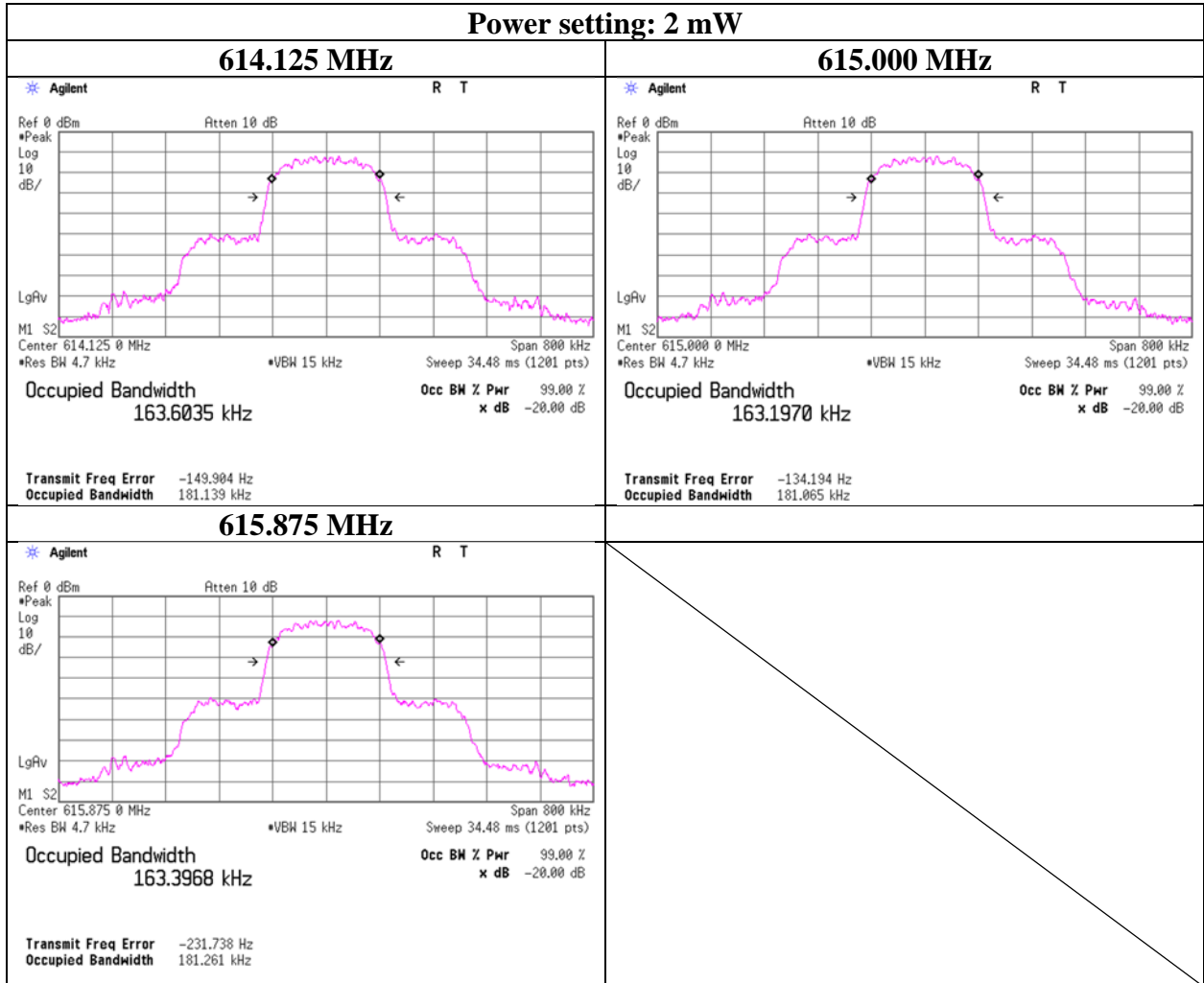
Emission Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 26, 2022
Temperature / Humidity	23 deg. C / 66 % RH
Engineer	Hiroki Numata
Mode	Tx 470.125 MHz to 607.875 MHz



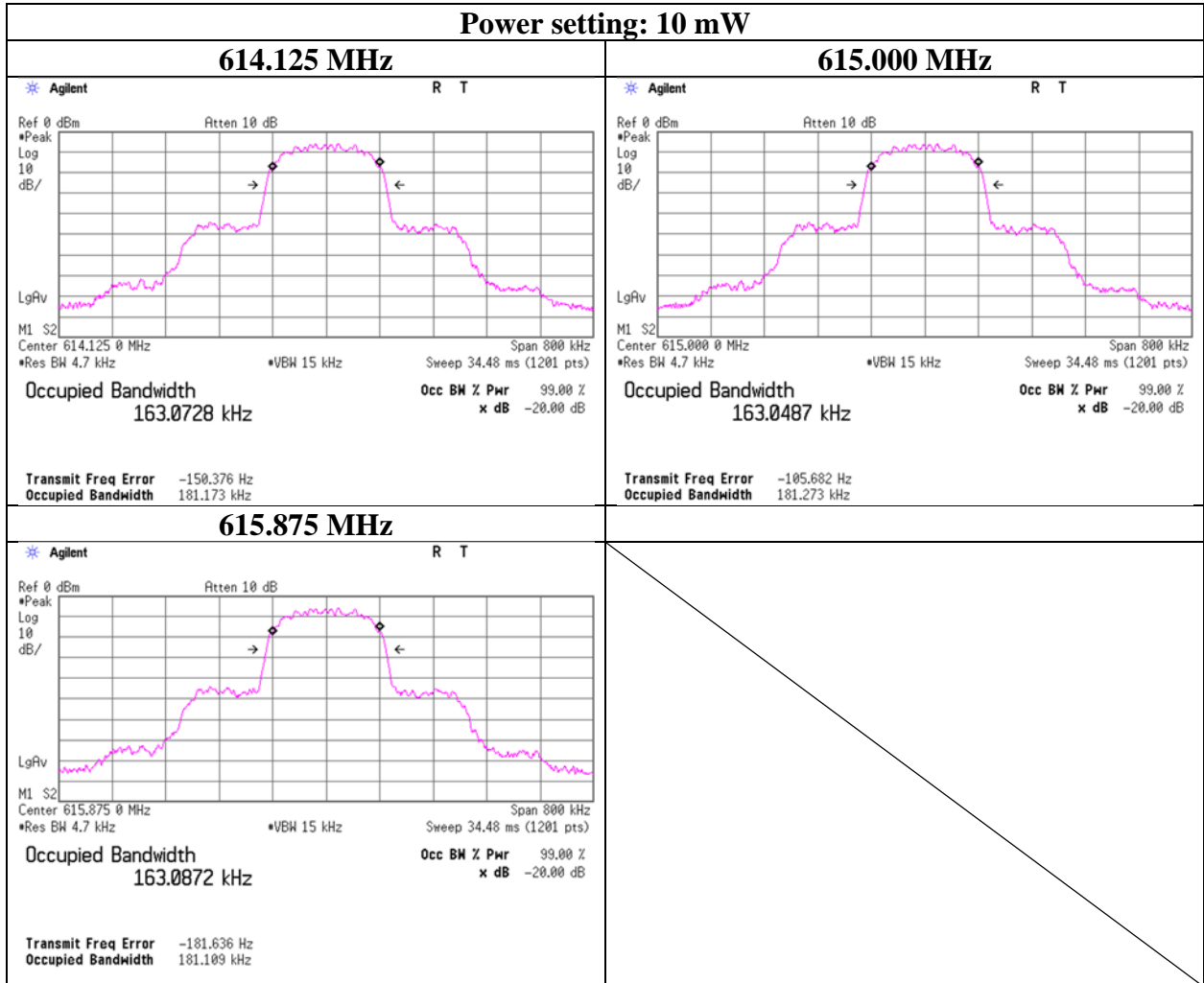
Emission Bandwidth

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 26, 2022
Temperature / Humidity	23 deg. C / 66 % RH
Engineer	Hiroki Numata
Mode	Tx 614.125 MHz to 615.875 MHz



Emission Bandwidth

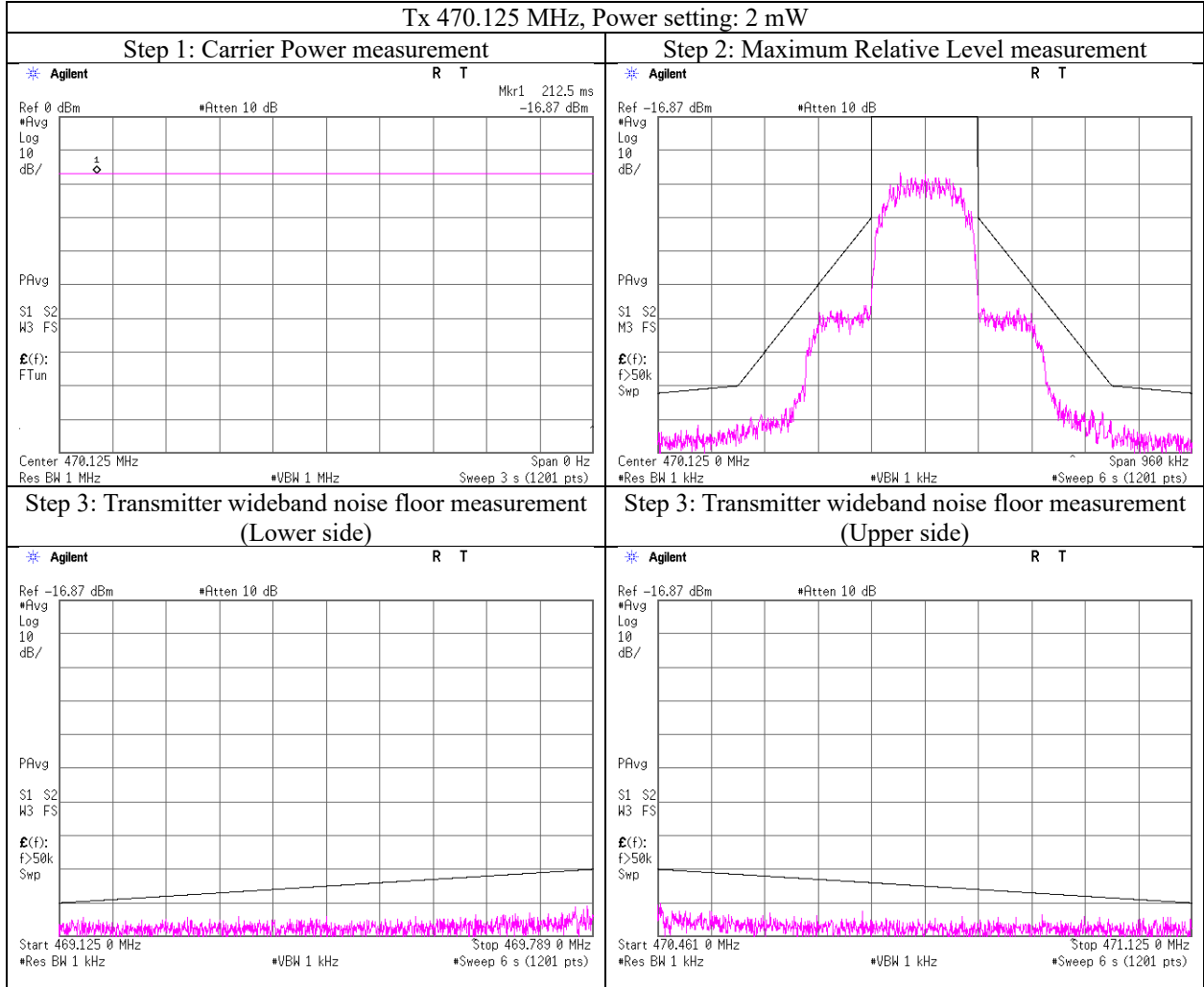
Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 26, 2022
Temperature / Humidity	23 deg. C / 66 % RH
Engineer	Hiroki Numata
Mode	Tx 614.125 MHz to 615.875 MHz



Emission Mask

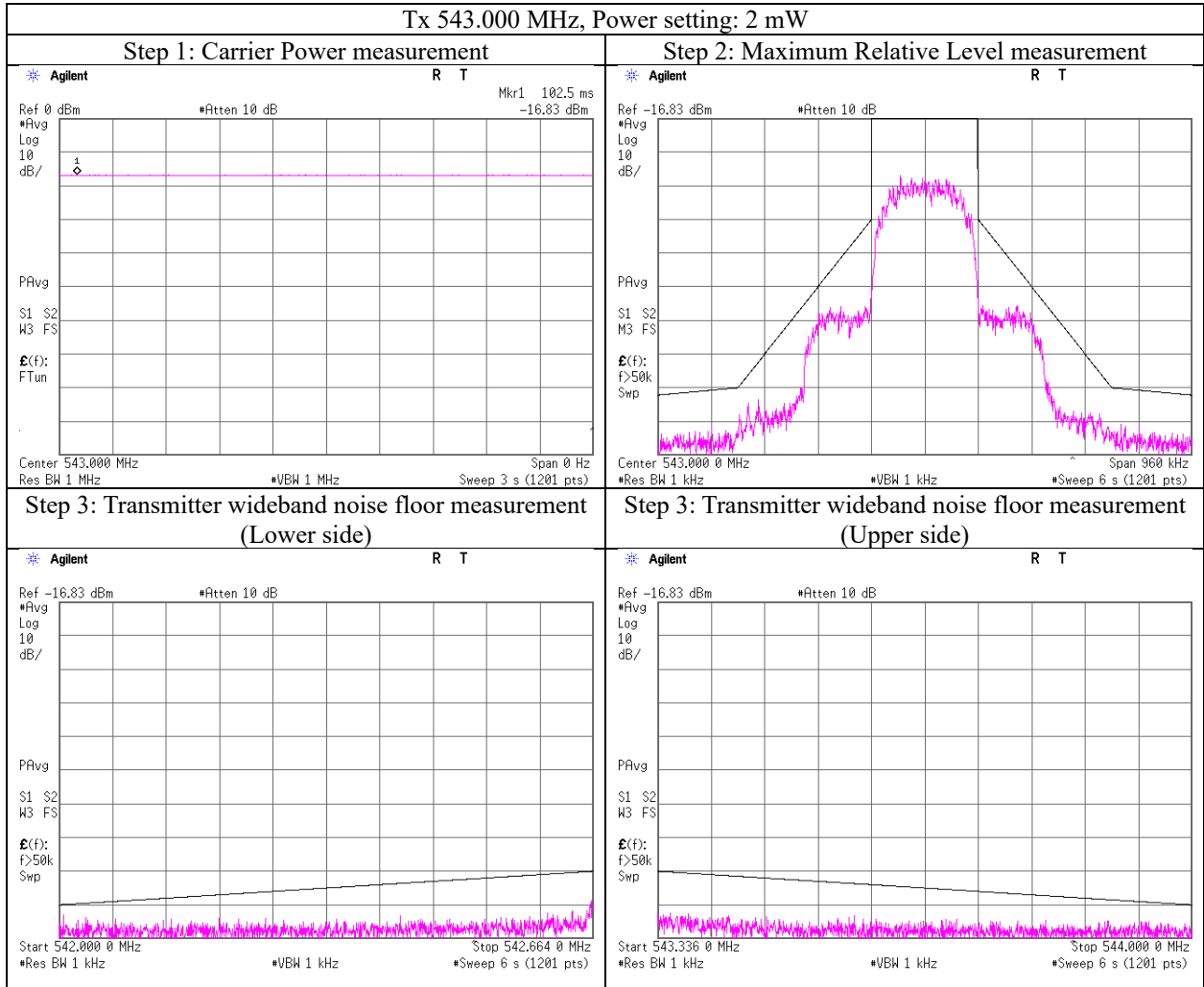
Test place Ise EMC Lab. No.8 Measurement Room
 Date July 28, 2022
 Temperature / Humidity 22 deg. C / 77 % RH
 Engineer Nachi Konegawa
 Mode Tx 470.125 MHz

Tx 470.125 MHz, Power setting: 2 mW



Emission Mask

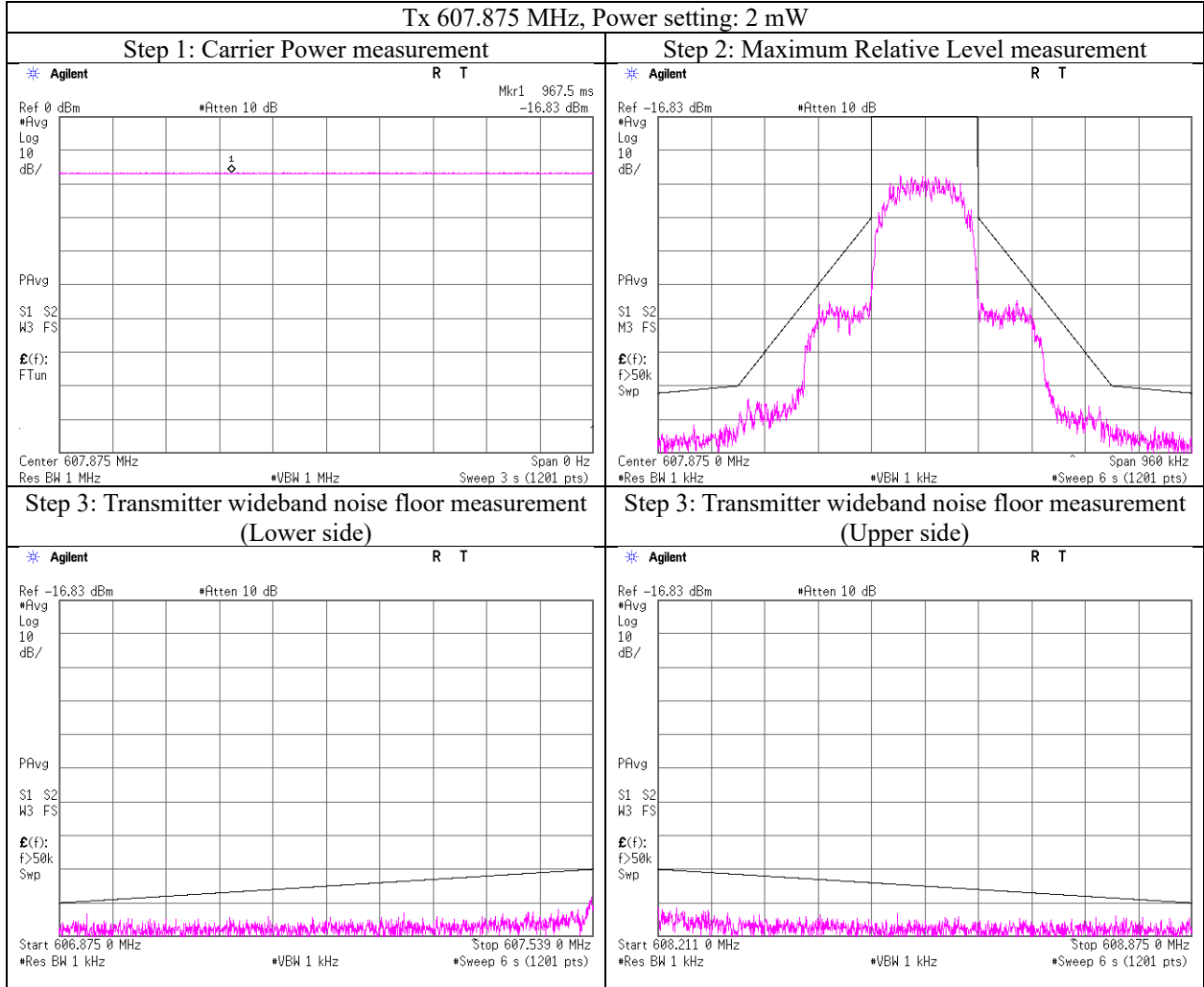
Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 543.000 MHz



Emission Mask

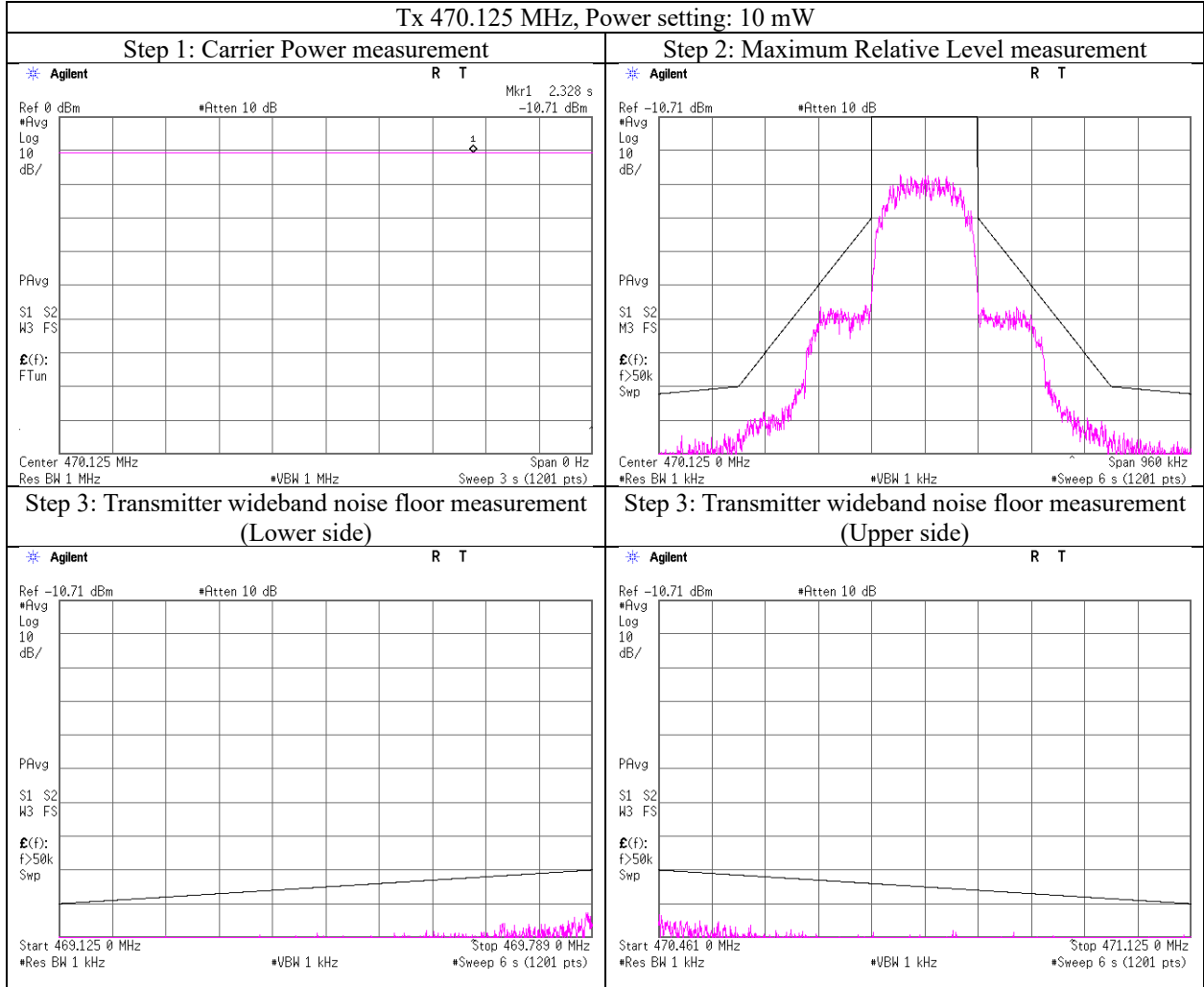
Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 607.875 MHz

Tx 607.875 MHz, Power setting: 2 mW



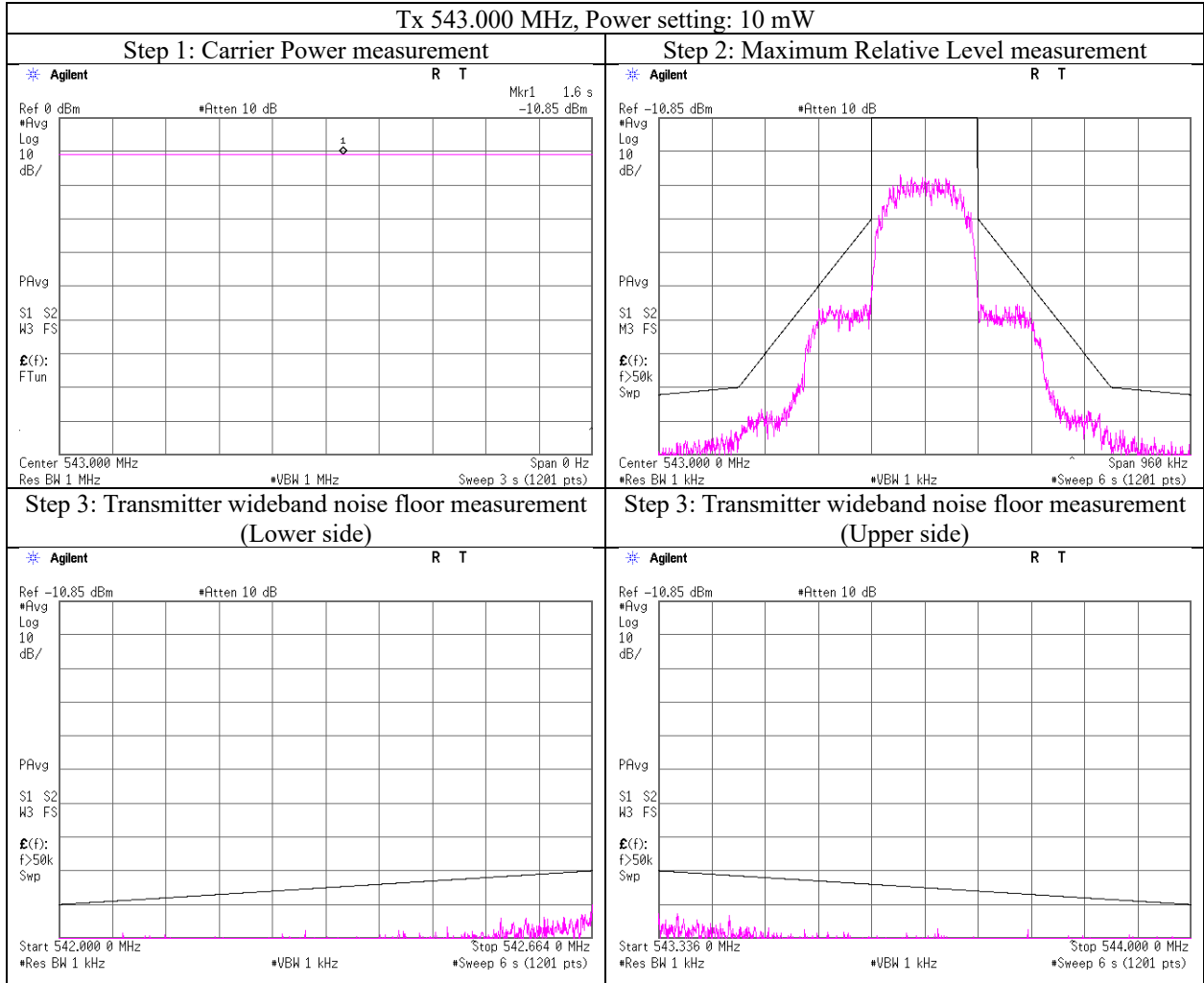
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 470.125 MHz



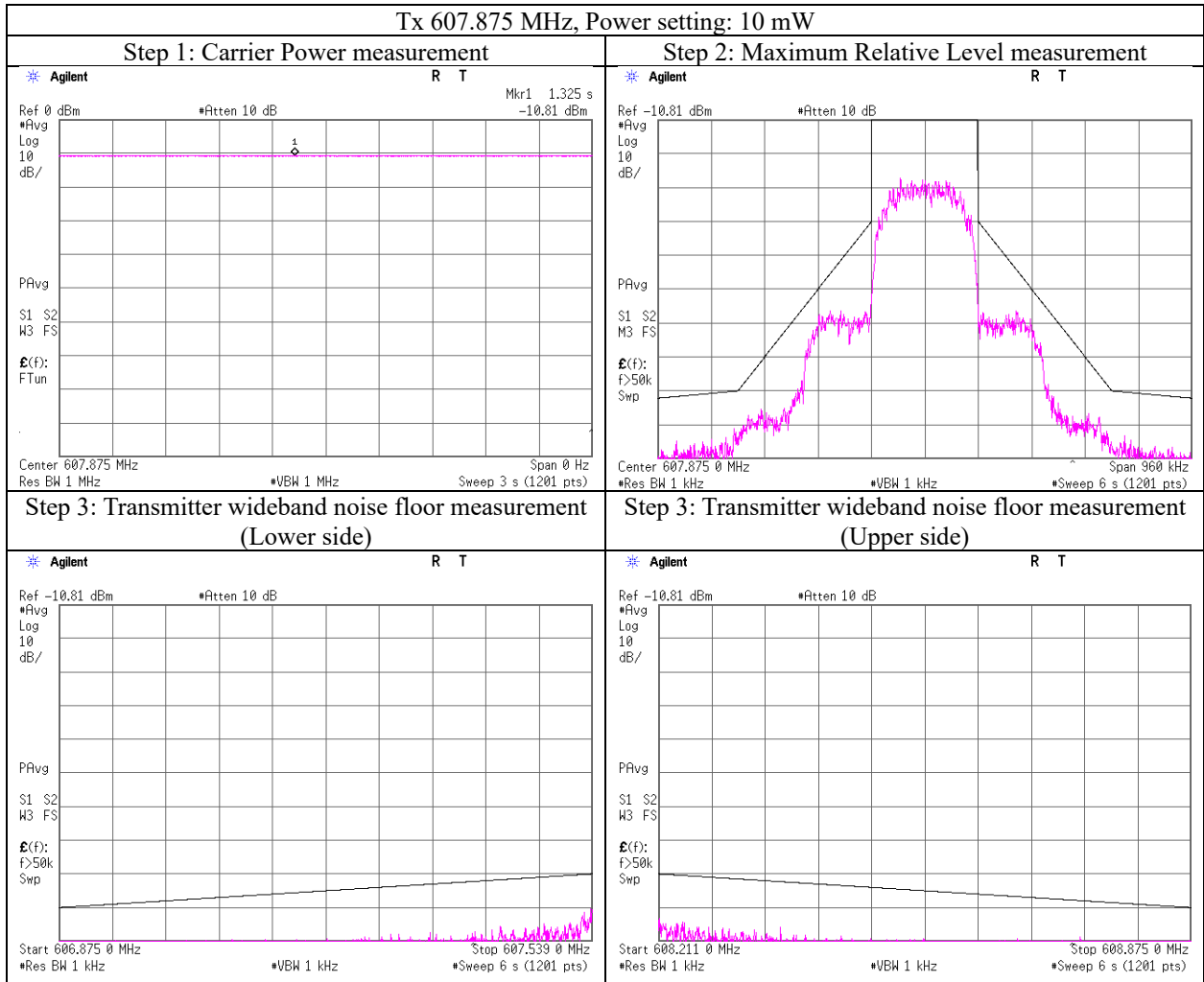
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 543.000 MHz



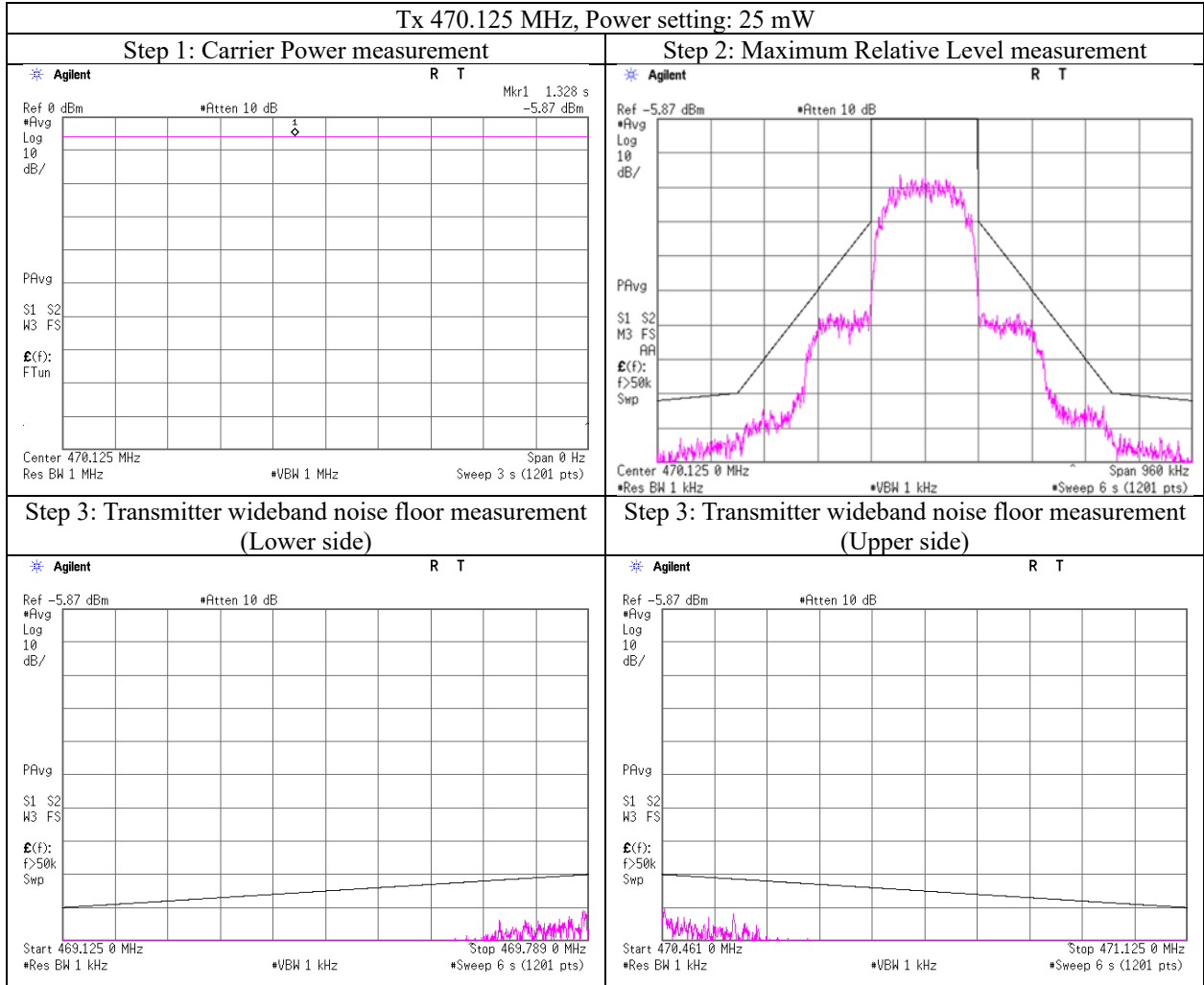
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 607.875 MHz



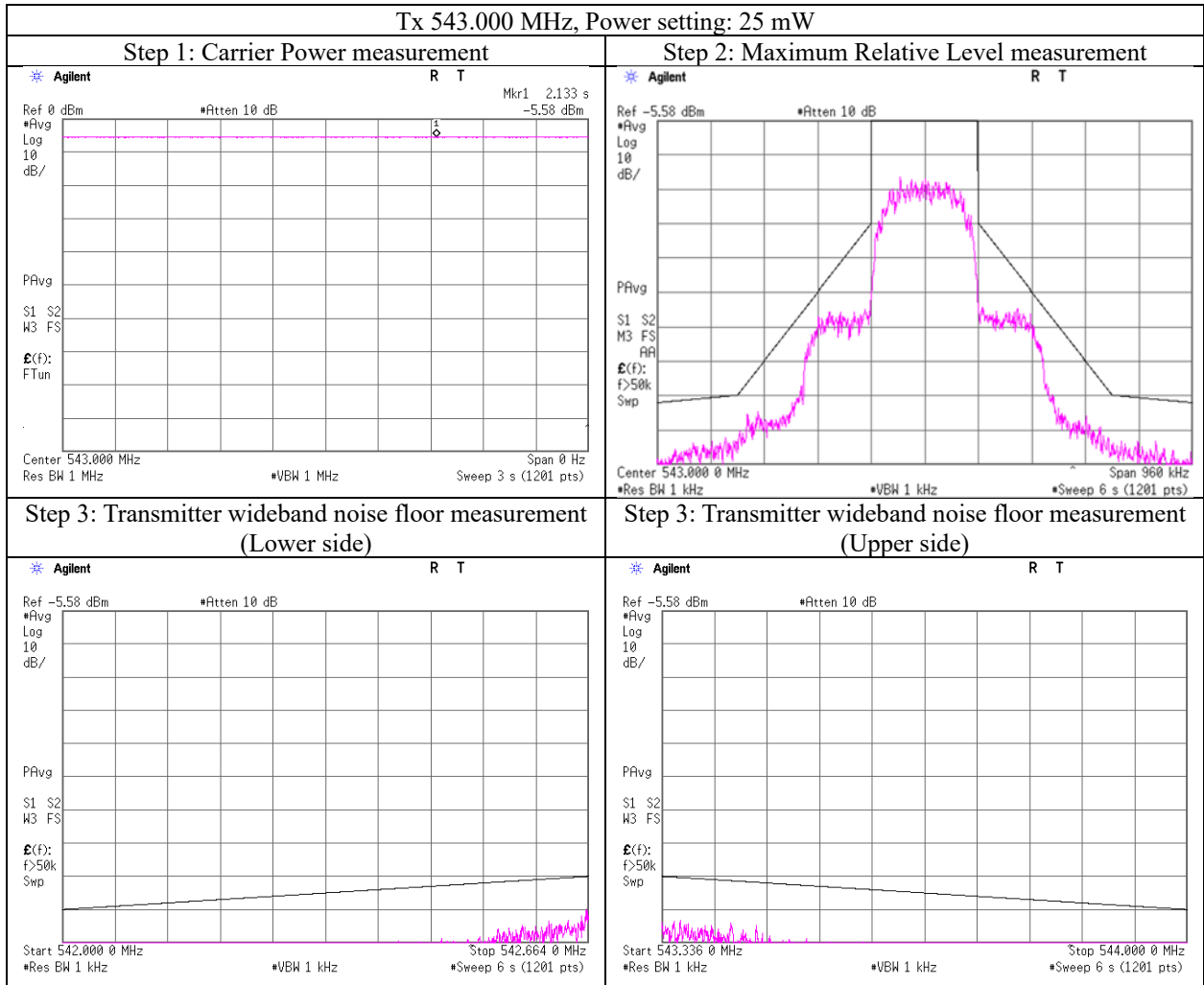
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 470.125 MHz



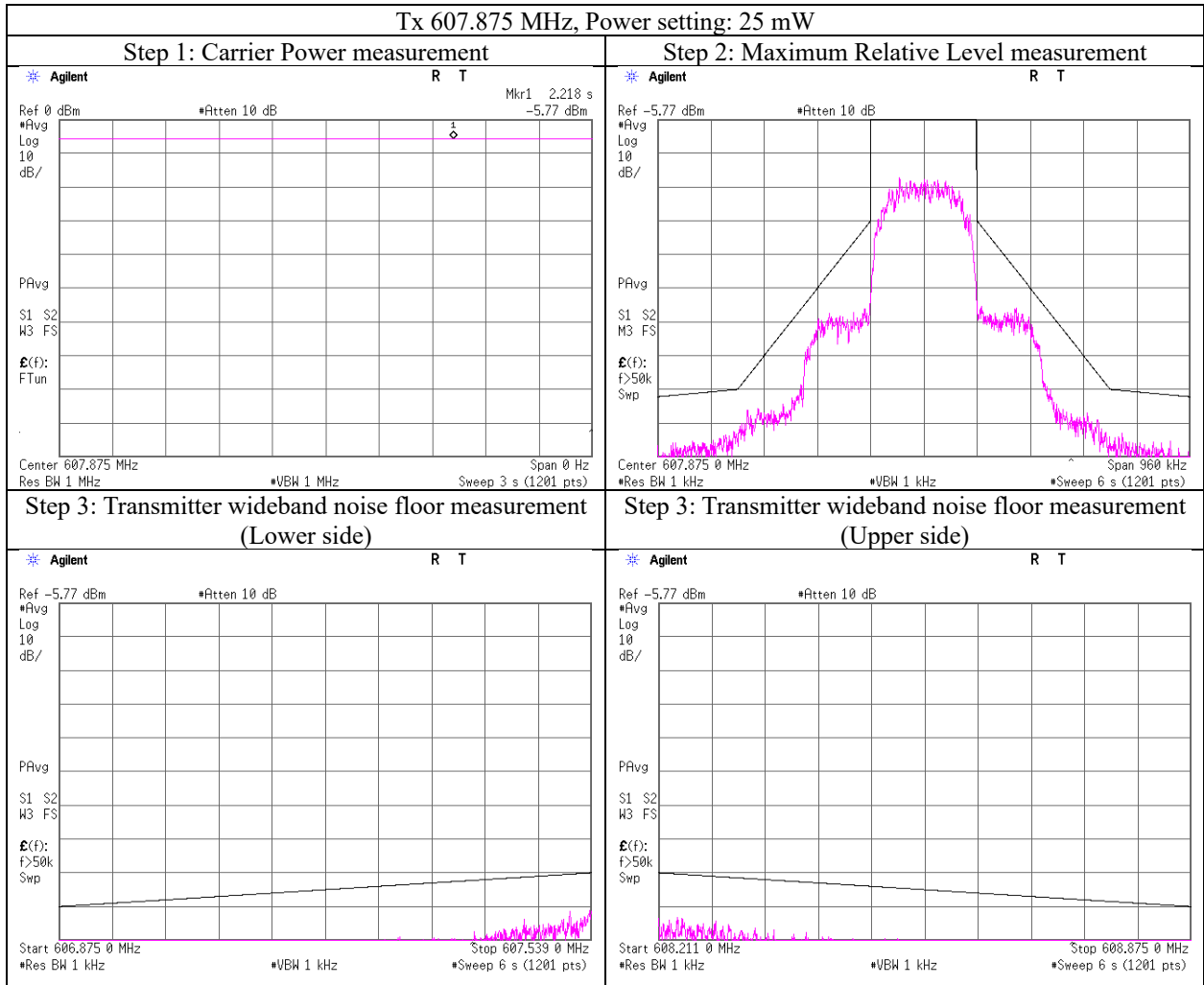
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 543.000 MHz



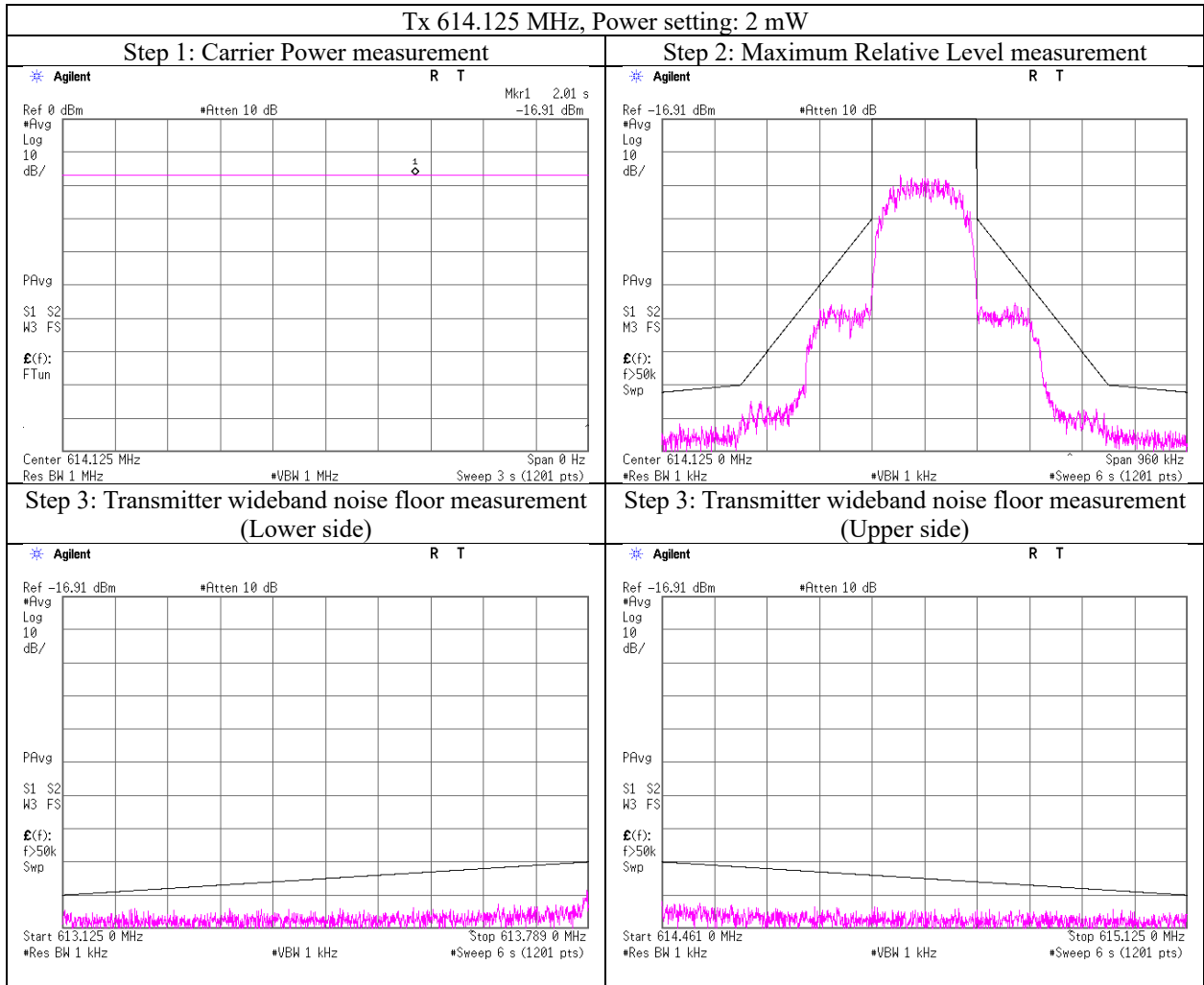
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 607.875 MHz



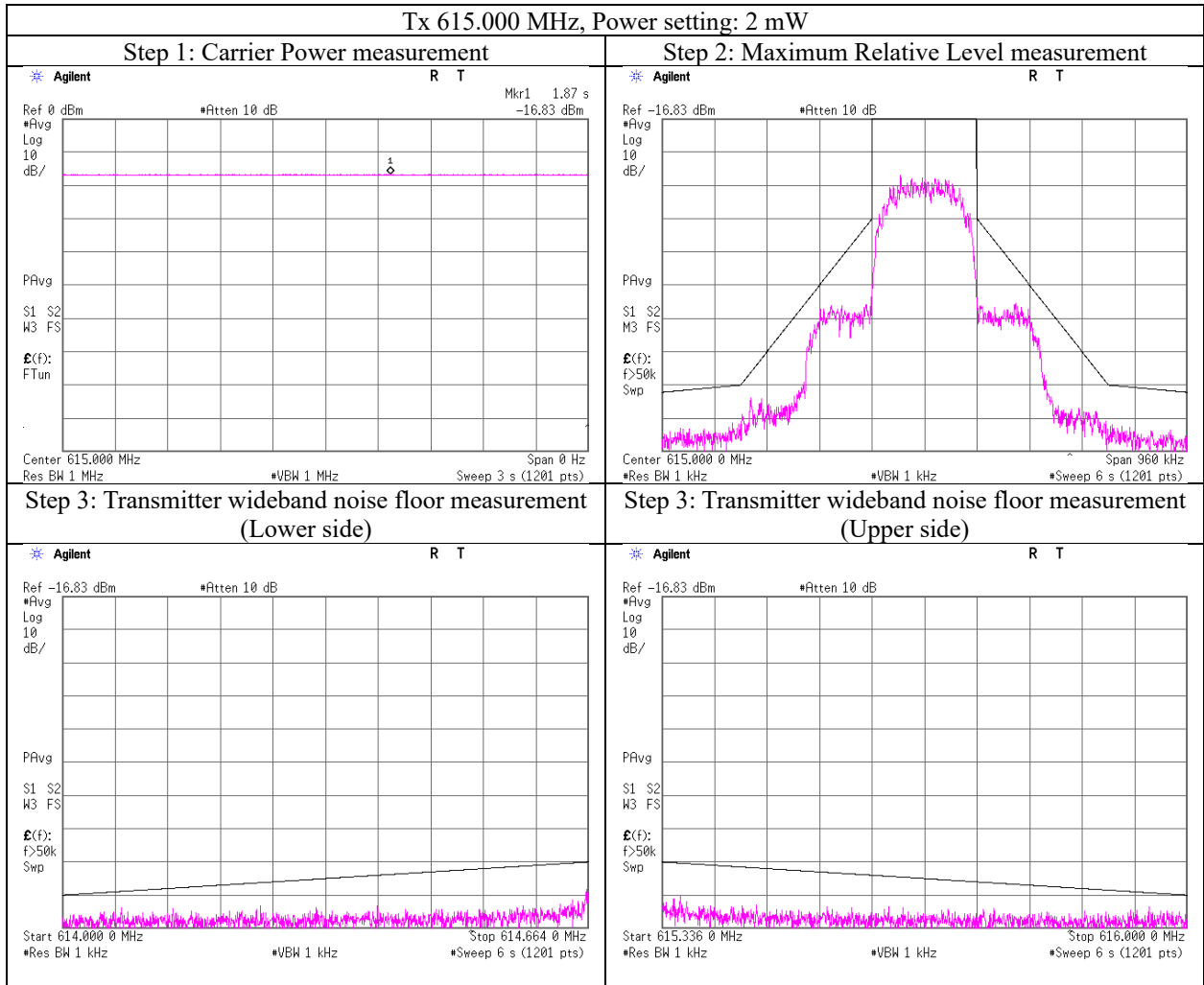
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 614.125 MHz



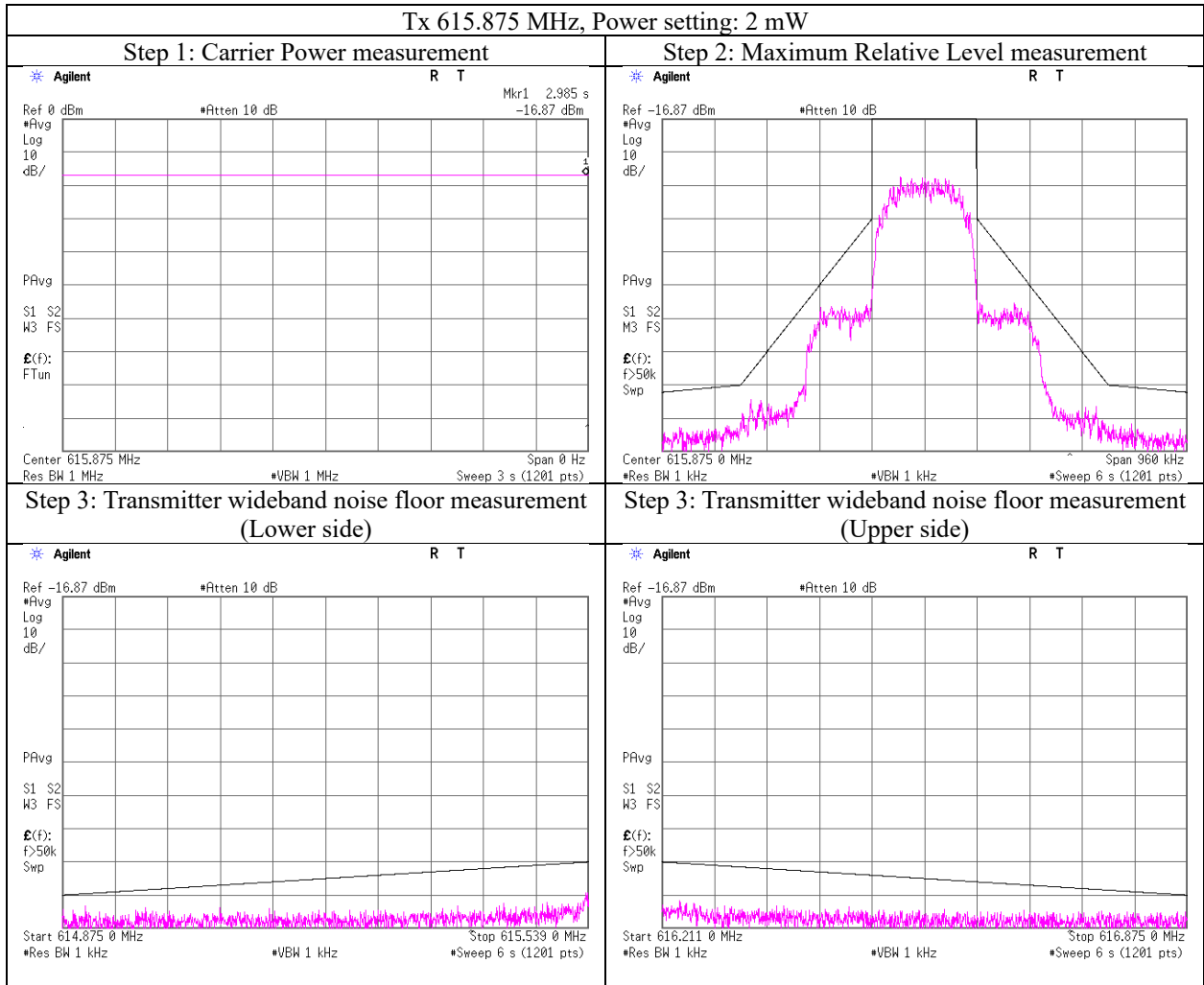
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 615.000 MHz



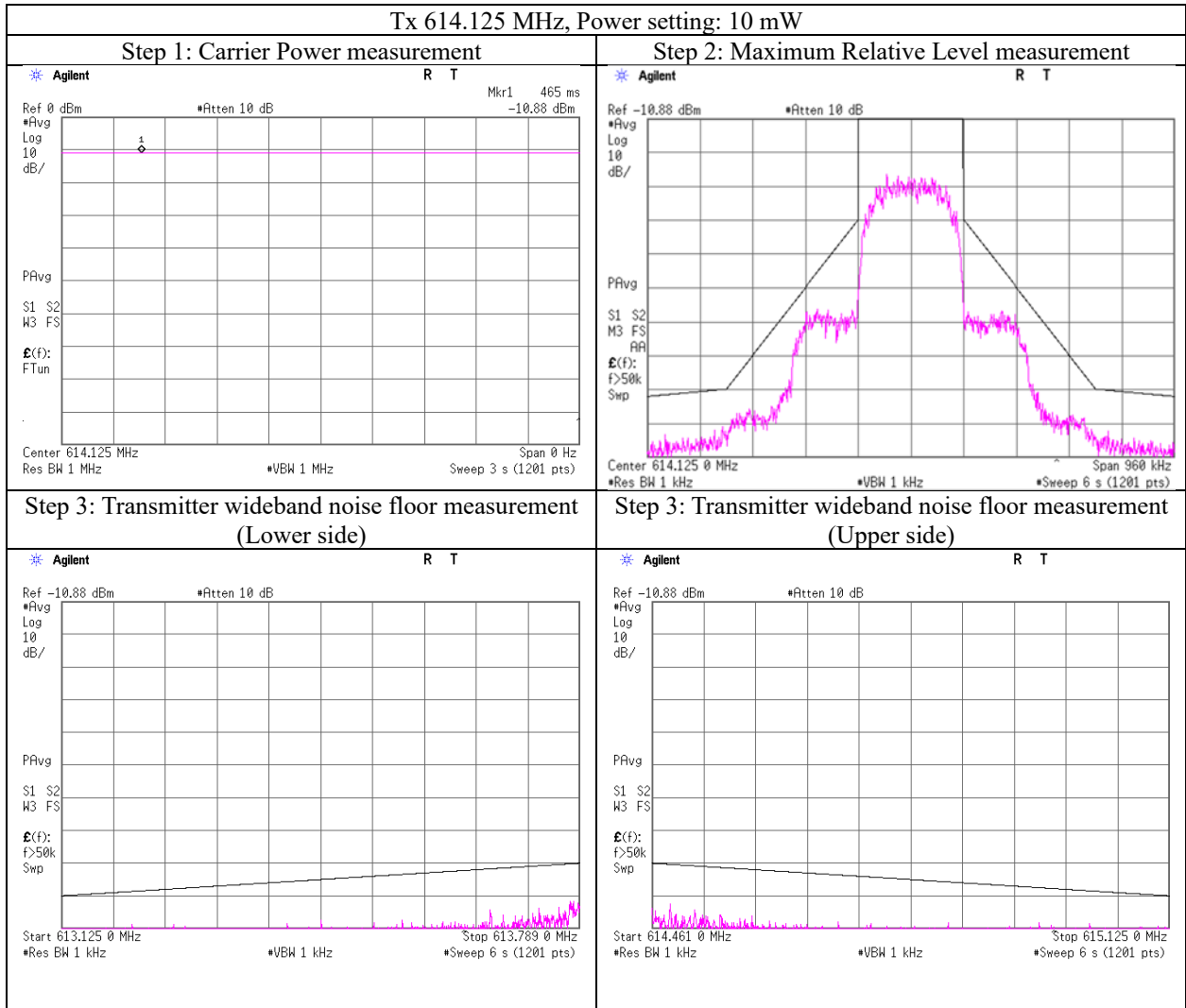
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 615.875 MHz



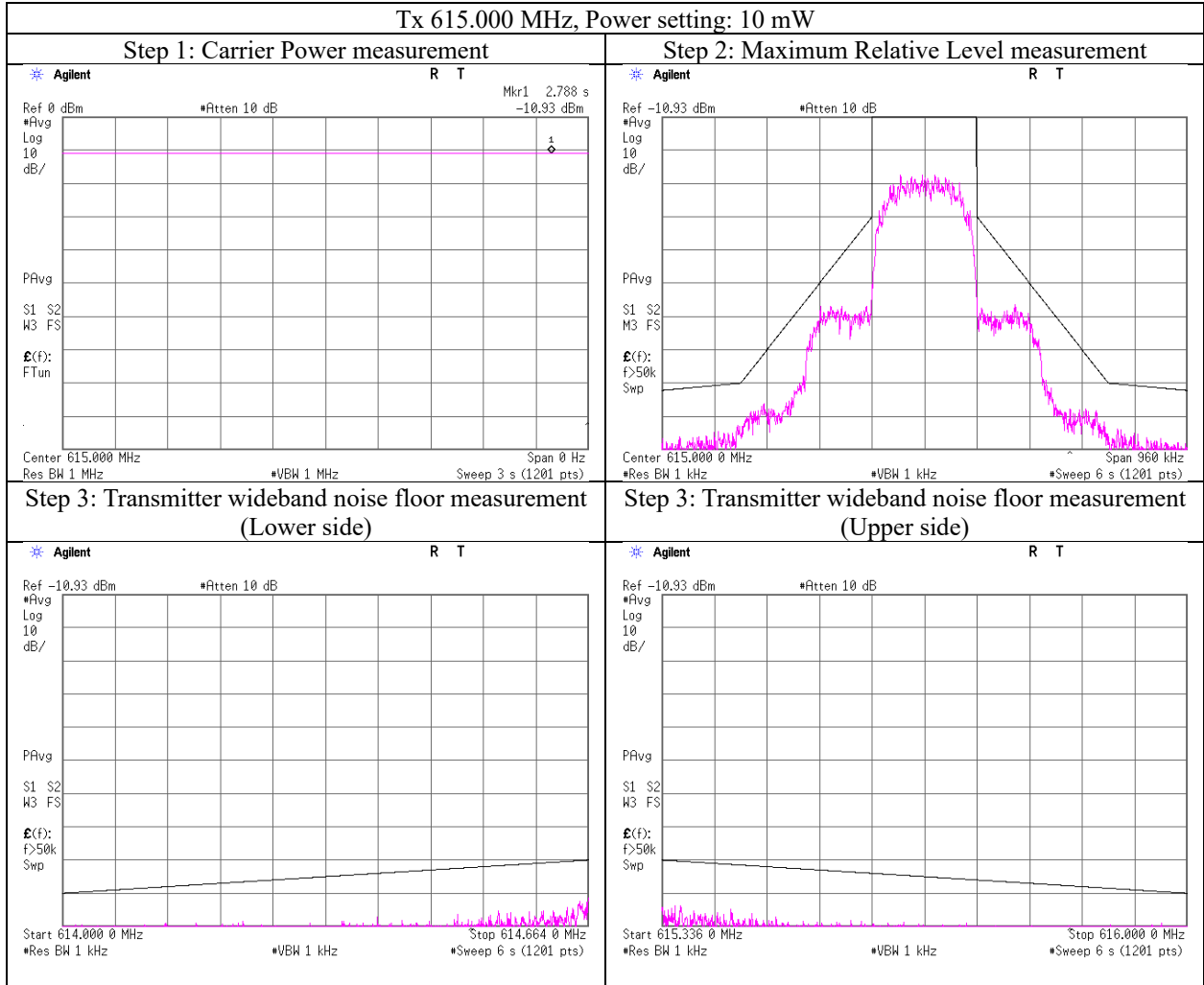
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 614.125 MHz



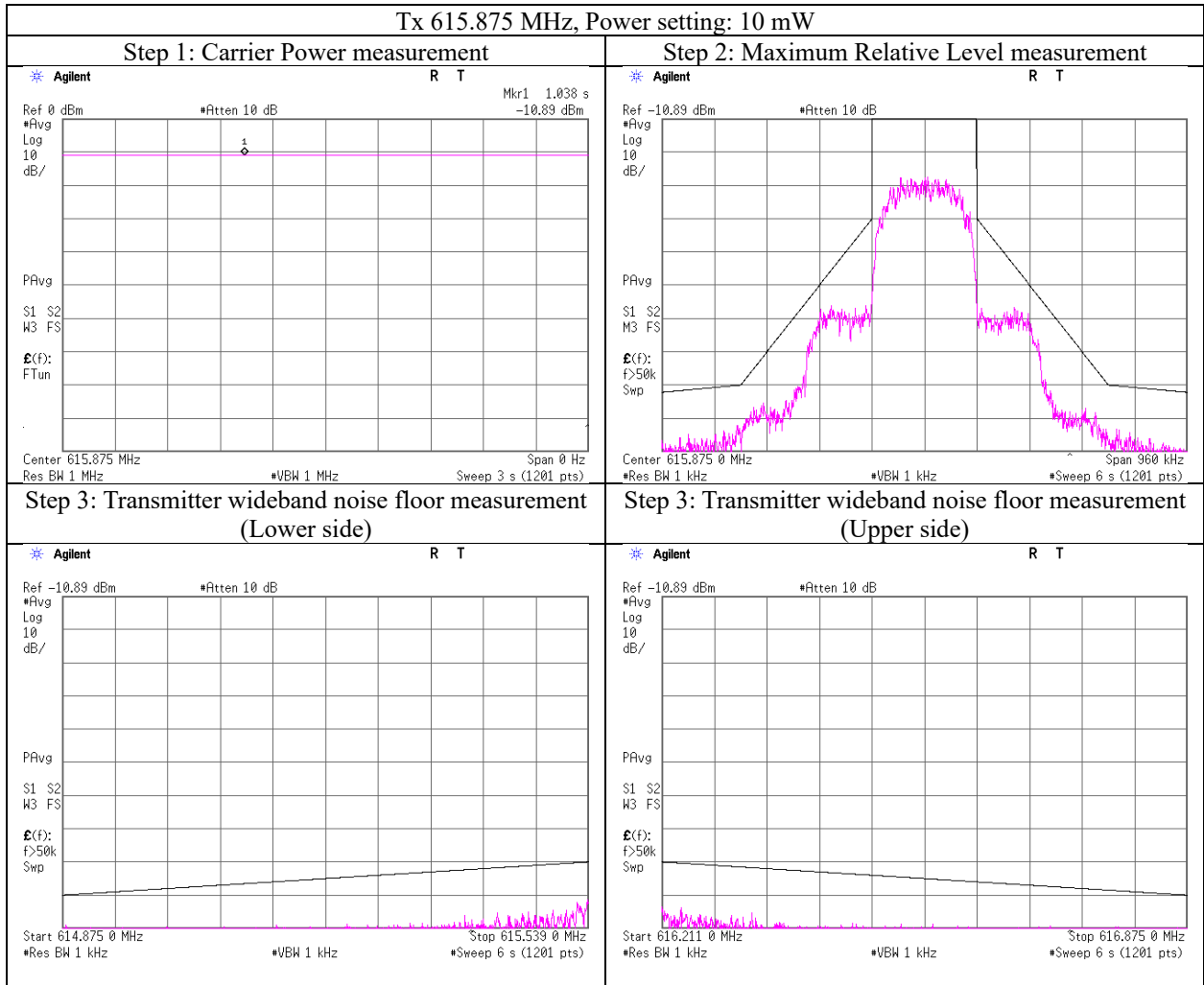
Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 615.000 MHz



Emission Mask

Test place	Ise EMC Lab. No.8 Measurement Room
Date	July 28, 2022
Temperature / Humidity	22 deg. C / 77 % RH
Engineer	Nachi Konegawa
Mode	Tx 615.875 MHz



Transmitter unwanted emissions

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 27, 2022	July 29, 2022
Temperature / Humidity	22 deg. C / 77 % RH	23 deg. C / 56 % RH
Engineer	Nachi Konegawa (Below 1 GHz)	Takumi Nishida (Above 1 GHz)
Mode	Tx 470.125 MHz	

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.	Hori.	Vert.	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
47.501	NS	37.9	-	-40.6	1.3	-32.8	-	-76.9	-54.0	-	22.9	-	-	150	233			
469.125	47.0	44.9	-42.5	-43.4	4.4	-8.0	-57.1	-58.0	-36.0	21.1	22.0	100	94	123	301			
471.125	47.1	45.0	-42.4	-43.3	4.5	-8.0	-57.0	-57.9	-54.0	3.0	3.9	100	94	123	301			
940.250	34.8	33.1	-45.1	-45.5	6.5	-8.7	-62.4	-62.8	-36.0	26.4	26.8	100	219	100	332			
1410.375	57.8	57.6	-51.5	-51.7	2.9	7.3	-49.1	-49.4	-30.0	19.1	19.4	139	313	107	19			
1880.500	52.6	49.2	-59.3	-64.4	3.3	10.2	-54.6	-59.6	-30.0	24.6	29.6	121	27	180	337			
2350.625	48.7	47.4	-64.7	-65.7	3.7	9.9	-60.6	-61.6	-30.0	30.6	31.6	125	28	244	351			
2820.750	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
3290.875	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
3761.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4231.125	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4701.250	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - 2.15,

Rx-ANTENNA : Biconical Antenna(25 MHz - 200 MHz), Logperiodic Antenna(200 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

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

NS : No signal detect.

Detector : Below 1 GHz: Test Receiver QP (RBW: 120 kHz)

Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)

Transmitter unwanted emissions

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 27, 2022	July 29, 2022
Temperature / Humidity	22 deg. C / 77 % RH	23 deg. C / 56 % RH
Engineer	Nachi Konegawa (Below 1 GHz)	Takumi Nishida (Above 1 GHz)
Mode	Tx 543.000 MHz	

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.	Hori.	Vert.	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
47.198	NS	37.5	-	-41.0	1.3	-33.0	-	-77.4	-54.0	-	23.4	-	-	150	246			
542.000	45.1	42.4	-43.0	-43.7	4.8	-8.1	-58.0	-58.7	-54.0	4.0	4.7	161	280	107	235			
544.000	45.2	42.6	-42.9	-43.5	4.8	-8.1	-57.9	-58.5	-54.0	3.9	4.5	161	280	107	235			
1086.000	51.8	51.5	-58.5	-59.2	2.5	6.1	-57.0	-57.7	-30.0	27.0	27.7	151	124	106	331			
1629.000	57.4	55.4	-53.5	-55.8	3.1	9.5	-49.2	-51.5	-30.0	19.2	21.5	165	310	110	300			
2172.000	50.0	47.7	-59.1	-59.5	3.5	9.1	-55.6	-56.0	-30.0	25.6	26.0	104	28	115	19			
2715.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
3258.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
3801.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4344.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4887.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
5430.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - 2.15,

Rx-ANTENNA : Biconical Antenna(25 MHz - 200 MHz), Logperiodic Antenna(200 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

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

NS : No signal detect.

Detector : Below 1 GHz: Test Receiver QP (RBW: 120 kHz)

Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)

Transmitter unwanted emissions

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 27, 2022	July 29, 2022
Temperature / Humidity	22 deg. C / 77 % RH	23 deg. C / 56 % RH
Engineer	Nachi Konegawa (Below 1 GHz)	Takumi Nishida (Above 1 GHz)
Mode	Tx 607.875 MHz	

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.	Hori.	Vert.	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
48.057	NS	38.0	-	-40.5	1.3	-32.6	-	-76.6	-54.0	-	22.6	-	-	150	93			
606.875	43.8	40.5	-42.6	-42.4	5.1	-8.0	-57.8	-57.6	-54.0	3.8	3.6	137	283	211	278			
608.875	43.1	39.9	-43.3	-43.0	5.1	-8.0	-58.5	-58.2	-54.0	4.5	4.2	137	283	211	278			
1215.750	51.3	50.0	-59.1	-60.4	2.7	6.4	-57.5	-58.8	-30.0	27.5	28.8	106	242	107	172			
1823.625	60.3	58.2	-48.7	-51.5	3.2	10.1	-44.0	-46.8	-30.0	14.0	16.8	105	22	219	22			
2431.500	50.0	48.3	-60.1	-60.5	3.7	10.4	-55.6	-55.9	-30.0	25.6	25.9	108	22	232	356			
3039.375	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
3647.250	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4255.125	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4863.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
5470.875	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
6078.750	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - 2.15,

Rx-ANTENNA : Biconical Antenna(25 MHz - 200 MHz), Logperiodic Antenna(200 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

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

NS : No signal detect.

Detector : Below 1 GHz: Test Receiver QP (RBW: 120 kHz)

Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)

Transmitter unwanted emissions

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 27, 2022	July 29, 2022
Temperature / Humidity	22 deg. C / 77 % RH	23 deg. C / 56 % RH
Engineer	Nachi Konegawa (Below 1 GHz)	Takumi Nishida (Above 1 GHz)
Mode	Tx 614.125 MHz	

Frequency [MHz]	Rx SA/TR [dBuV]		Tx SG [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.	Hori.	Vert.	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
48.364	NS	38.7	-	-39.8	1.3	-32.4	-	-75.7	-54.0	-	21.7	-	-	150	191			
613.125	38.0	35.0	-48.4	-48.6	5.1	-8.0	-63.6	-63.8	-54.0	9.6	9.8	134	61	209	182			
615.125	38.1	35.2	-48.3	-48.4	5.1	-8.0	-63.5	-63.6	-54.0	9.5	9.6	134	61	209	182			
1228.250	50.9	49.5	-59.4	-60.3	2.7	6.4	-57.8	-58.7	-30.0	27.8	28.7	102	228	108	178			
1842.375	65.8	64.3	-42.9	-45.0	3.3	10.1	-38.2	-40.2	-30.0	8.2	10.2	150	30	216	18			
2456.500	59.3	55.8	-48.7	-51.0	3.8	10.6	-44.1	-46.3	-30.0	14.1	16.3	105	29	168	350			
3070.625	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
3684.750	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4298.875	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4913.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
5527.125	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
6141.250	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - 2.15,

Rx-ANTENNA : Biconical Antenna(25 MHz - 200 MHz), Logperiodic Antenna(200 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

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

NS : No signal detect.

Detector : Below 1 GHz: Test Receiver QP (RBW: 120 kHz)

Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)

Transmitter unwanted emissions

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 26, 2022	July 29, 2022
Temperature / Humidity	23 deg. C / 55 % RH	23 deg. C / 56 % RH
Engineer	Kiyoshiro Okazaki (Below 1 GHz)	Takumi Nishida (Above 1 GHz)
Mode	Tx 615.000 MHz	

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.	Hori.	Vert.	Rx Ant.	Turn		Rx Ant.	Turn
														Height [cm]	Table [deg.]		Height [cm]	Table [deg.]
48.091	NS	38.1	-	-40.7	1.3	-32.6	-	-76.8	-54.0	-	22.8	-	-	150	100			
614.000	27.4	25.4	-62.5	-63.1	5.1	-8.0	-77.7	-78.3	-54.0	23.7	24.3	141	82	216	246			
616.000	33.5	25.2	-56.4	-63.3	5.1	-8.0	-71.6	-78.5	-54.0	17.6	24.5	141	82	216	246			
1230.000	51.4	49.8	-58.9	-60.0	2.7	6.4	-57.3	-58.3	-30.0	27.3	28.3	196	30	116	52			
1845.000	66.1	63.9	-42.6	-45.4	3.3	10.1	-37.9	-40.7	-30.0	7.9	10.7	124	39	116	357			
2460.000	58.7	55.1	-49.4	-51.6	3.8	10.6	-44.7	-47.0	-30.0	14.7	17.0	139	25	223	28			
3075.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
3690.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			
4305.000	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - 2.15,

Rx-ANTENNA : Biconical Antenna(25 MHz - 200 MHz), Logperiodic Antenna(200 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

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

NS : No signal detect.

Detector : Below 1 GHz: Test Receiver QP (RBW: 120 kHz)

Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)

Transmitter unwanted emissions

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 26, 2022	July 29, 2022
Temperature / Humidity	23 deg. C / 55 % RH	23 deg. C / 56 % RH
Engineer	Kiyoshiro Okazaki (Below 1 GHz)	Takumi Nishida (Above 1 GHz)
Mode	Tx 615.875 MHz	

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.	Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	47.747	NS	39.2	-			-39.3	1.3		-32.7	-	-75.5	-54.0	-	21.5	
614.875	27.3	25.5	-62.6	-63.0	5.1	-8.0	-77.8	-78.2	-54.0	23.8	24.2	141	310	191	172	
616.875	27.3	25.4	-62.6	-63.1	5.1	-8.0	-77.8	-78.3	-54.0	23.8	24.3	141	310	191	172	
1231.750	50.8	49.5	-59.6	-60.3	2.7	6.4	-58.0	-58.7	-30.0	28.0	28.7	124	43	100	224	
1847.625	66.6	63.2	-42.2	-46.1	3.3	10.1	-37.4	-41.3	-30.0	7.4	11.3	126	33	100	50	
2463.500	58.8	55.2	-49.3	-51.5	3.8	10.6	-44.6	-46.9	-30.0	14.6	16.9	124	34	165	39	
3079.375	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
3695.250	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4311.125	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - 2.15,

Rx-ANTENNA : Biconical Antenna(25 MHz - 200 MHz), Logperiodic Antenna(200 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 12.75 GHz)

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

NS : No signal detect.

Detector : Below 1 GHz: Test Receiver QP (RBW: 120 kHz)

Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)

Frequency Tolerance

Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 4, 2022
Temperature / Humidity	22 deg. C / 52 % RH
Engineer	Ken Fujita
Mode	Tx 543.000 MHz 25mW

Varying Temperature

Temp. [deg. C]	Test condition Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
50	5.00	Power on	542.999838	-0.000162	-0.00003	-0.3	0.005
		+ 2 min.	542.999837	-0.000163	-0.00003	-0.3	0.005
		+ 5 min.	542.999837	-0.000163	-0.00003	-0.3	0.005
		+ 10 min.	542.999837	-0.000163	-0.00003	-0.3	0.005
40	5.00	Power on	542.999824	-0.000176	-0.00003	-0.3	0.005
		+ 2 min.	542.999822	-0.000178	-0.00003	-0.3	0.005
		+ 5 min.	542.999822	-0.000178	-0.00003	-0.3	0.005
		+ 10 min.	542.999822	-0.000178	-0.00003	-0.3	0.005
30	5.00	Power on	542.999832	-0.000168	-0.00003	-0.3	0.005
		+ 2 min.	542.999846	-0.000154	-0.00003	-0.3	0.005
		+ 5 min.	542.999856	-0.000144	-0.00003	-0.3	0.005
		+ 10 min.	542.999860	-0.000140	-0.00003	-0.3	0.005
20	5.00	Power on	542.999960	-0.000040	-0.00001	-0.1	0.005
		+ 2 min.	542.999982	-0.000018	0.00000	0.0	0.005
		+ 5 min.	543.000006	0.000006	0.00000	0.0	0.005
		+ 10 min.	543.000026	0.000026	0.00000	0.0	0.005
10	5.00	Power on	543.000186	0.000186	0.00003	0.3	0.005
		+ 2 min.	543.000194	0.000194	0.00004	0.4	0.005
		+ 5 min.	543.000209	0.000209	0.00004	0.4	0.005
		+ 10 min.	543.000216	0.000216	0.00004	0.4	0.005
0	5.00	Power on	543.000149	0.000149	0.00003	0.3	0.005
		+ 2 min.	543.000130	0.000130	0.00002	0.2	0.005
		+ 5 min.	543.000102	0.000102	0.00002	0.2	0.005
		+ 10 min.	543.000094	0.000094	0.00002	0.2	0.005
-10	5.00	Power on	542.999964	-0.000036	-0.00001	-0.1	0.005
		+ 2 min.	542.999965	-0.000035	-0.00001	-0.1	0.005
		+ 5 min.	542.999966	-0.000034	-0.00001	-0.1	0.005
		+ 10 min.	542.999967	-0.000033	-0.00001	-0.1	0.005
-20	5.00	Power on	543.000009	0.000009	0.00000	0.0	0.005
		+ 2 min.	543.000031	0.000031	0.00001	0.1	0.005
		+ 5 min.	543.000046	0.000046	0.00001	0.1	0.005
		+ 10 min.	543.000062	0.000062	0.00001	0.1	0.005

Calculation formula:

Frequency error = Measured frequency - Tested frequency

Result [%] = Frequency error / Tested frequency * 100

Frequency Tolerance

Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 4, 2022
Temperature / Humidity	22 deg. C / 52 % RH
Engineer	Ken Fujita
Mode	Tx 543.000 MHz 25mW

Varying Supply Voltage

Temp. [deg. C]	Test condition Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
20	3.00	Power on	542.999960	-0.000040	-0.00001	-0.1	0.005
		+ 2 min.	542.999982	-0.000018	0.00000	0.0	0.005
		+ 5 min.	543.000006	0.000006	0.00000	0.0	0.005
		+ 10 min.	543.000026	0.000026	0.00000	0.0	0.005
20	2.55 (3.0 V -15 %)	Power on	543.000053	0.000053	0.00001	0.1	0.005
		+ 2 min.	543.000030	0.000030	0.00001	0.1	0.005
		+ 5 min.	543.000018	0.000018	0.00000	0.0	0.005
		+ 10 min.	543.000015	0.000015	0.00000	0.0	0.005
20	3.45 (3.0 V +15 %)	Power on	543.000004	0.000004	0.00000	0.0	0.005
		+ 2 min.	542.999997	-0.000003	0.00000	0.0	0.005
		+ 5 min.	542.999996	-0.000004	0.00000	0.0	0.005
		+ 10 min.	542.999995	-0.000005	0.00000	0.0	0.005
20	2.39 (Battery end point)	Power on	543.001763	0.001763	0.00032	3.2	0.005
		+ 2 min.	543.001791	0.001791	0.00033	3.3	0.005
		+ 5 min.	543.001799	0.001799	0.00033	3.3	0.005
		+ 10 min.	543.001842	0.001842	0.00034	3.4	0.005

Calculation formula:

Frequency error = Measured frequency - Tested frequency
Result [%] = Frequency error / Tested frequency * 100

Varying Supply Voltage (USB)

Temp. [deg. C]	Test condition Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
20	5.00	Power on	542.999960	-0.000040	-0.00001	-0.1	0.005
		+ 2 min.	542.999982	-0.000018	0.00000	0.0	0.005
		+ 5 min.	543.000006	0.000006	0.00000	0.0	0.005
		+ 10 min.	543.000026	0.000026	0.00000	0.0	0.005
20	4.25 (5.0 V -15 %)	Power on	543.000012	0.000012	0.00000	0.0	0.005
		+ 2 min.	543.000007	0.000007	0.00000	0.0	0.005
		+ 5 min.	543.000001	0.000001	0.00000	0.0	0.005
		+ 10 min.	542.999998	-0.000002	0.00000	0.0	0.005
20	5.75 (5.0 V +15 %)	Power on	543.000053	0.000053	0.00001	0.1	0.005
		+ 2 min.	543.000028	0.000028	0.00001	0.1	0.005
		+ 5 min.	543.000018	0.000018	0.00000	0.0	0.005
		+ 10 min.	543.000009	0.000009	0.00000	0.0	0.005
20	4.14 end point	Power on	543.000038	0.000038	0.00001	0.1	0.005
		+ 2 min.	543.000034	0.000034	0.00001	0.1	0.005
		+ 5 min.	543.000032	0.000032	0.00001	0.1	0.005
		+ 10 min.	543.000031	0.000031	0.00001	0.1	0.005

Calculation formula:

Frequency error = Measured frequency - Tested frequency
Result [%] = Frequency error / Tested frequency * 100

Frequency Tolerance

Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 4, 2022
Temperature / Humidity	22 deg. C / 52 % RH
Engineer	Ken Fujita
Mode	Tx 615.000 MHz 10mW

Varying Temperature

Temp. [deg. C]	Test condition Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
50	5.00	Power on	614.999794	-0.000206	-0.00003	-0.3	0.005
		+ 2 min.	614.999793	-0.000207	-0.00003	-0.3	0.005
		+ 5 min.	614.999794	-0.000206	-0.00003	-0.3	0.005
		+ 10 min.	614.999794	-0.000206	-0.00003	-0.3	0.005
40	5.00	Power on	614.999777	-0.000223	-0.00004	-0.4	0.005
		+ 2 min.	614.999775	-0.000225	-0.00004	-0.4	0.005
		+ 5 min.	614.999774	-0.000226	-0.00004	-0.4	0.005
		+ 10 min.	614.999772	-0.000228	-0.00004	-0.4	0.005
30	5.00	Power on	614.999782	-0.000218	-0.00004	-0.4	0.005
		+ 2 min.	614.999788	-0.000212	-0.00003	-0.3	0.005
		+ 5 min.	614.999794	-0.000206	-0.00003	-0.3	0.005
		+ 10 min.	614.999798	-0.000202	-0.00003	-0.3	0.005
20	5.00	Power on	614.999862	-0.000138	-0.00002	-0.2	0.005
		+ 2 min.	614.999876	-0.000124	-0.00002	-0.2	0.005
		+ 5 min.	614.999896	-0.000104	-0.00002	-0.2	0.005
		+ 10 min.	614.999916	-0.000084	-0.00001	-0.1	0.005
10	5.00	Power on	615.000089	0.000089	0.00001	0.1	0.005
		+ 2 min.	615.000113	0.000113	0.00002	0.2	0.005
		+ 5 min.	615.000132	0.000132	0.00002	0.2	0.005
		+ 10 min.	615.000150	0.000150	0.00002	0.2	0.005
0	5.00	Power on	615.000151	0.000151	0.00002	0.2	0.005
		+ 2 min.	615.000130	0.000130	0.00002	0.2	0.005
		+ 5 min.	615.000113	0.000113	0.00002	0.2	0.005
		+ 10 min.	615.000102	0.000102	0.00002	0.2	0.005
-10	5.00	Power on	614.999940	-0.000060	-0.00001	-0.1	0.005
		+ 2 min.	614.999939	-0.000061	-0.00001	-0.1	0.005
		+ 5 min.	614.999937	-0.000063	-0.00001	-0.1	0.005
		+ 10 min.	614.999937	-0.000063	-0.00001	-0.1	0.005
-20	5.00	Power on	615.000028	0.000028	0.00000	0.0	0.005
		+ 2 min.	615.000043	0.000043	0.00001	0.1	0.005
		+ 5 min.	615.000050	0.000050	0.00001	0.1	0.005
		+ 10 min.	615.000055	0.000055	0.00001	0.1	0.005

Calculation formula:

Frequency error = Measured frequency - Tested frequency

Result [%] = Frequency error / Tested frequency * 100

Frequency Tolerance

Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 4, 2022
Temperature / Humidity	22 deg. C / 52 % RH
Engineer	Ken Fujita
Mode	Tx 615.000 MHz 10mW

Varying Supply Voltage

Temp. [deg. C]	Test condition Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
20	3.00	Power on	614.999862	-0.000138	-0.00002	-0.2	0.005
		+ 2 min.	614.999876	-0.000124	-0.00002	-0.2	0.005
		+ 5 min.	614.999896	-0.000104	-0.00002	-0.2	0.005
		+ 10 min.	614.999916	-0.000084	-0.00001	-0.1	0.005
20	2.55 (3.0 V -15 %)	Power on	615.000051	0.000051	0.00001	0.1	0.005
		+ 2 min.	615.000044	0.000044	0.00001	0.1	0.005
		+ 5 min.	615.000042	0.000042	0.00001	0.1	0.005
		+ 10 min.	615.000039	0.000039	0.00001	0.1	0.005
20	3.45 (3.0 V +15 %)	Power on	614.999986	-0.000014	0.00000	0.0	0.005
		+ 2 min.	614.999989	-0.000011	0.00000	0.0	0.005
		+ 5 min.	614.999982	-0.000018	0.00000	0.0	0.005
		+ 10 min.	614.999995	-0.000005	0.00000	0.0	0.005
20	2.39 (Battery end point)	Power on	615.000038	0.000038	0.00001	0.1	0.005
		+ 2 min.	615.000037	0.000037	0.00001	0.1	0.005
		+ 5 min.	615.000036	0.000036	0.00001	0.1	0.005
		+ 10 min.	615.000035	0.000035	0.00001	0.1	0.005

Calculation formula:

Frequency error = Measured frequency - Tested frequency
Result [%] = Frequency error / Tested frequency * 100

Varying Supply Voltage (USB)

Temp. [deg. C]	Test condition Voltage [V]	Tested timing	Measured frequency [MHz]	Frequency error [MHz]	Result		Limit [+/- %]
					[%]	[ppm]	
20	5.00	Power on	614.999862	-0.000138	-0.00002	-0.2	0.005
		+ 2 min.	614.999876	-0.000124	-0.00002	-0.2	0.005
		+ 5 min.	614.999896	-0.000104	-0.00002	-0.2	0.005
		+ 10 min.	614.999916	-0.000084	-0.00001	-0.1	0.005
20	4.25 (5.0 V -15 %)	Power on	615.000005	0.000005	0.00000	0.0	0.005
		+ 2 min.	615.000003	0.000003	0.00000	0.0	0.005
		+ 5 min.	615.000003	0.000003	0.00000	0.0	0.005
		+ 10 min.	615.000002	0.000002	0.00000	0.0	0.005
20	5.75 (5.0 V +15 %)	Power on	614.999977	-0.000023	0.00000	0.0	0.005
		+ 2 min.	614.999976	-0.000024	0.00000	0.0	0.005
		+ 5 min.	614.999977	-0.000023	0.00000	0.0	0.005
		+ 10 min.	614.999977	-0.000023	0.00000	0.0	0.005
20	4.14 end point	Power on	615.000057	0.000057	0.00001	0.1	0.005
		+ 2 min.	615.000053	0.000053	0.00001	0.1	0.005
		+ 5 min.	615.000049	0.000049	0.00001	0.1	0.005
		+ 10 min.	615.000042	0.000042	0.00001	0.1	0.005

Calculation formula:

Frequency error = Measured frequency - Tested frequency
Result [%] = Frequency error / Tested frequency * 100

APPENDIX 2: Test Instruments**Test Equipment (1/2)**

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	MAEC-01	141998	AC1_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	06/28/2022	24
CE	MOS-27	141566	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	A08Q26	01/10/2022	12
CE	MMM-03	141530	Digital Tester	Fluke Corporation	FLUKE 26-3	78030621	08/10/2021	12
CE	MJM-25	142226	Measure	KOMELON	KMC-36	-	-	-
CE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	MCC-03	141215	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W/3D-2W/RG400u/RFM-E421(SW)	-/01068(Switcher)	06/11/2022	12
CE	MAT-67	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	12/17/2021	12
CE	MLS-23	141357	LISN(AMN)	Schwarzbeck Mess-Elektronik OHG	NLSLK8127	8127-729	07/28/2022	12
RE	MAEC-02	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	05/30/2022	24
RE	MOS-41	192300	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0013	12/19/2021	12
RE	MMM-01	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/12/2022	12
RE	MJM-27	142228	Measure	KOMELON	KMC-36	-	-	-
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103+ BBA9106	VHA 91031302	08/28/2021	12
RE	LA-17	160924	Logperiodic Antenna	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	225	11/13/2021	12
RE	MAT-112	220646	Attenuator	Huber+Suhner	6806_N-50-1	-	06/07/2022	12
RE	MCC-12	141317	Coaxial Cable	UL Japan	-	-	09/06/2021	12
RE	MTR-09	141950	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	10/14/2021	12
RE	MBF-06	141369	Band Pass Filter	M-City	BPF0950-01	UL0002	02/14/2022	12
RE	MCC-38	141395	Coaxial Cable	UL Japan	-	-	11/19/2021	12
RE	MPA-24	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/25/2022	12
RE	YTSSG03	141967	Signal Generator	Rohde & Schwarz	SMT02	51400043	08/05/2022	12
RE	MCC-125	141219	Coaxial Cable	UL Japan	-	-	07/09/2022	12
RE	MDA-01	141464	Dipole Antenna	Schwarzbeck Mess-Elektronik OHG	VHAP	1018	12/02/2021	12
RE	MDA-03	141454	Dipole Antenna	Schwarzbeck Mess-Elektronik OHG	UHAP	991	12/02/2021	12
RE	MHA-06	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	254	10/21/2021	12
RE	MCC-218	141394	Microwave Cable	Junkosha	MWX221	1607S141(1 m) / 1608S264(5 m)	09/30/2021	12
RE	MPA-10	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	02/22/2022	12
RE	MSA-16	141903	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186390	01/07/2022	12
RE	MHF-27	141297	High Pass Filter (1.1-10GHz)	TOKYO KEIKI	TF219CD1	1001	01/23/2022	12
RE	MTR-08	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	08/05/2021	12
RE	MAT-17	141171	Attenuator(20dB)_DC-1GHz_N	Weinschel Corp	MODEL 1	BG0143	12/23/2021	12
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MHA-30	141514	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	01611	06/22/2022	12
RE	MCC-258	214065	Microwave cable	Huber+Suhner	SF-126E/11PC35/11P C35/10000	550489/126E	01/18/2022	12
RE	MSG-23	213581	Signal Generator	Rohde & Schwarz	SMW200A	107688	02/03/2022	12

Test Equipment (2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	MSA-14	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	01/10/2022	12
AT	MCC-64	141327	Coaxial Cable	UL Japan	-	-	02/28/2022	12
AT	MPM-16	141812	Power Meter	Keysight Technologies Inc	8990B	MY51000271	08/05/2022	12
AT	MPSE-23	141835	Power sensor	Keysight Technologies Inc	N1923A	MY54070004	08/05/2022	12
AT	MAT-82	141249	Attenuator	Weinschel Associates	WA1-20-33	100132	04/06/2022	12
AT	MOS-28	141567	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0008	01/10/2022	12
AT	MMM-17	141557	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	70900530	01/16/2022	12
AT	MCC-128	141221	Coaxial Cable	Suhner	NRG180	-	08/11/2021	12
AT	MCC-38	141395	Coaxial Cable	UL Japan	-	-	11/19/2021	12
AT	MAT-26	141244	Attenuator(10dB)	Weinschel - API Technologies Corp	WA8-10-34	A198	02/25/2022	12
AT	MFC-01	141498	Microwave Counter	ADVANTEST	R5373	120100309	07/15/2022	12
AT	MCH-07	141441	Temperature Chamber	Espec	SU-241	92013843	07/09/2022	12

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

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

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

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

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